

DS-90/90A

BI-AMP MONITOR

SERVICE NOTES

First Edition
Issued by RJA

TABLE OF CONTENTS

	Page
SPECIFICATIONS	1
LOCATION OF CONTROLS.....	2
EXPLODED VIEW	3
BLOCK DIAGRAM	4
PARTS LIST	5
CIRCUIT BOARD (DA BOARD)	7
CIRCUIT DIAGRAM (DA BOARD)	8
CIRCUIT BOARD (ANALOG SHEET)	10
CIRCUIT DIAGRAM (ANALOG SHEET)	11
CIRCUIT DIAGRAM (ANALOG SHEET) 1/4	12
CIRCUIT DIAGRAM (ANALOG SHEET) 2/4	13
CIRCUIT DIAGRAM (ANALOG SHEET) 3/4	14
CIRCUIT DIAGRAM (ANALOG SHEET) 4/4	15
INFOMATION	16



Copyright © 2000 ROLAND CORPORATION

All rights reserved. No part of this publication may be reproduced in any form without the written permission of ROLAND CORPORATION.

SPECIFICATIONS

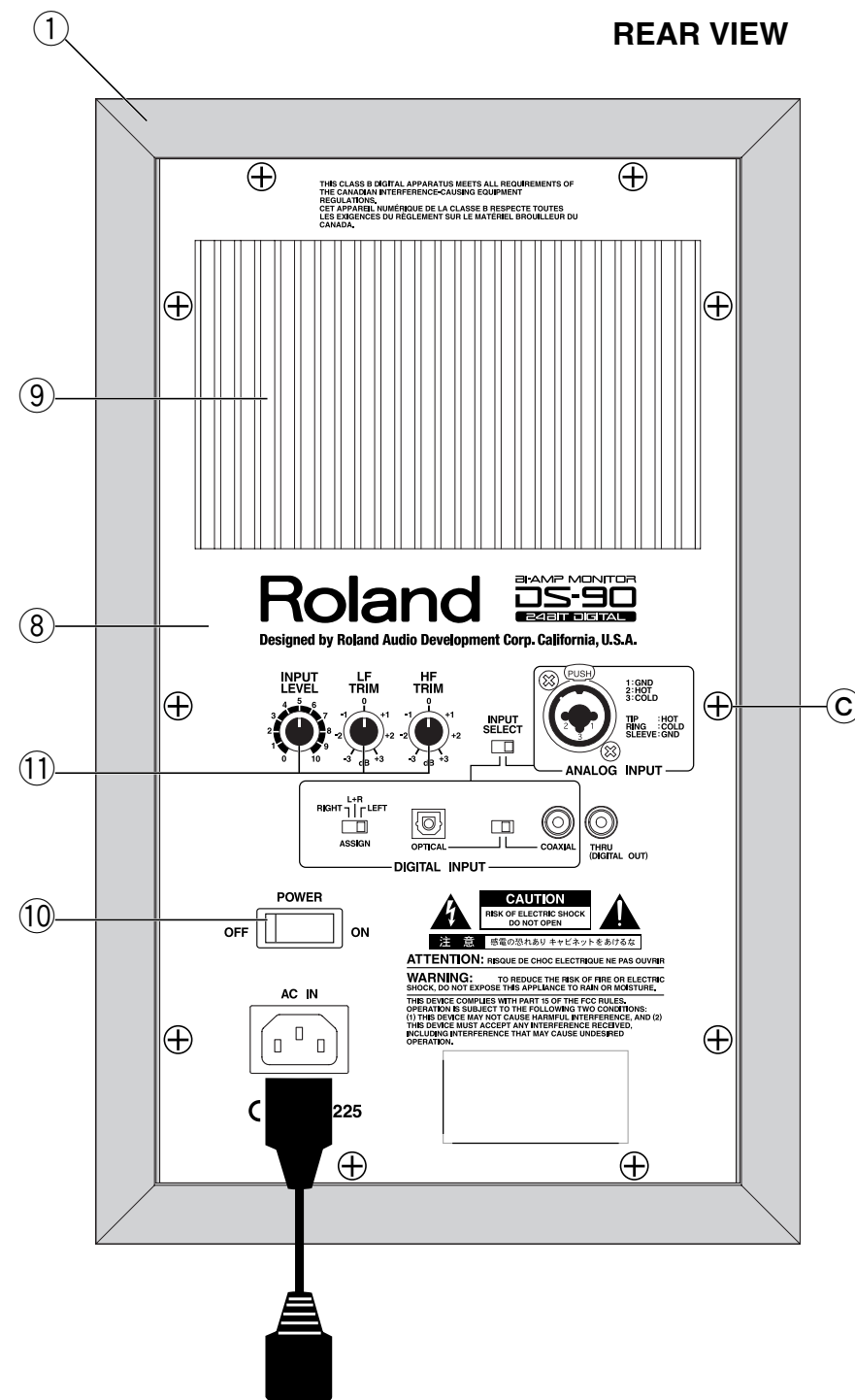
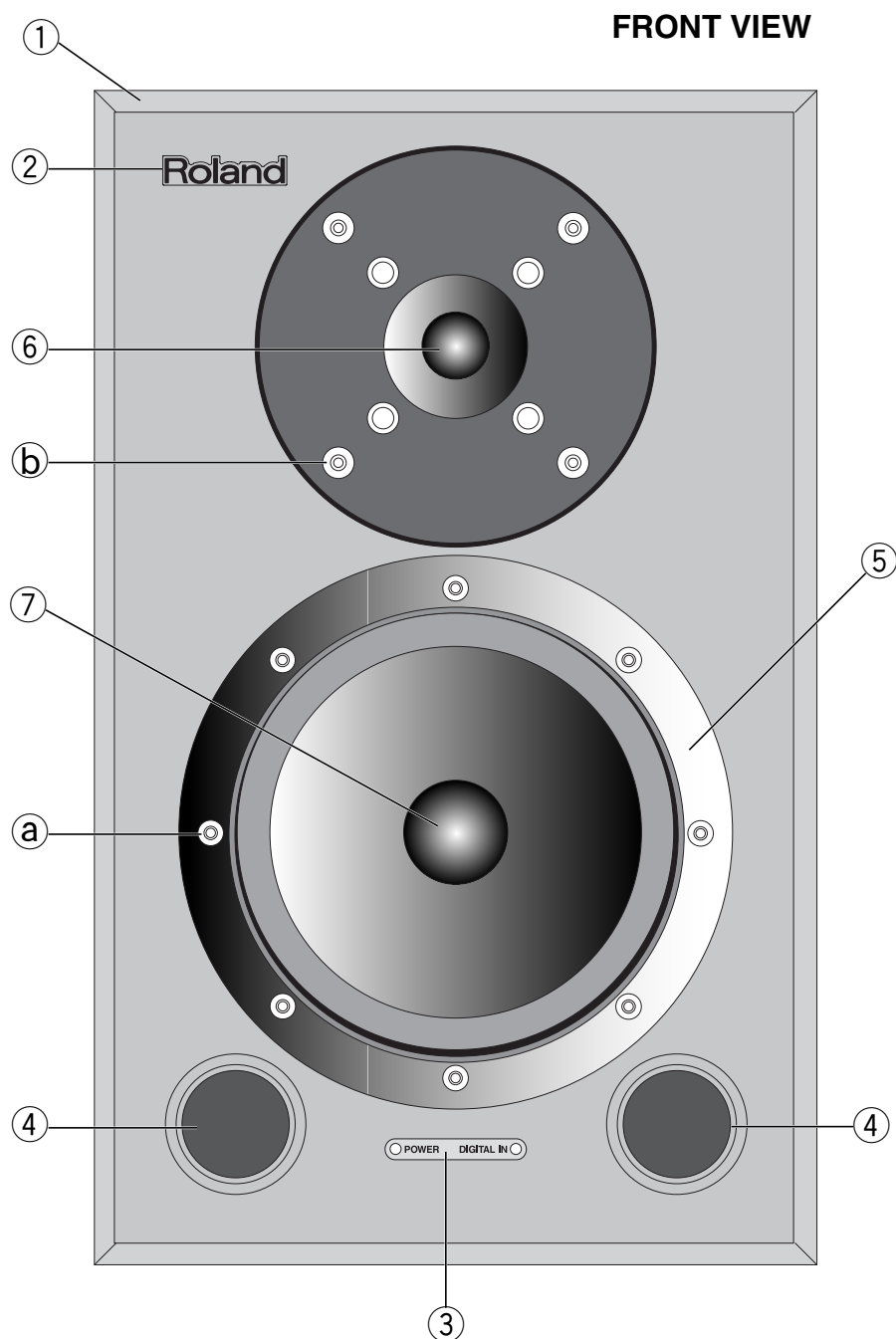
- **System**
2 Way Bi-Amplified Monitor
- **Enclosure**
Bass-reflex type
- **Cabinet**
3/4" MDF, Baffle: 1" MDF
- **LF Driver**
160 mm (6-1/2") Foamed polypropylene cone type, magnetically shielded
- **HF Driver**
25 mm (1") soft dome type, magnetically shielded
- **Frequency Response**
48 Hz to 20 kHz (+/-3 dB)
- **Crossover Frequency**
2.6 kHz (active fourth order)
- **LF Amplifier Power**
60 W
- **HF Amplifier Power**
30 W
- Analog in -----
- **Input Sensitivity**
0 dBu (0.775 Vrms)
- **Input Impedance**
20k ohm (Balanced/Unbalanced)
- Digital in -----
- **Format**
Conformity with S/P DIF
- **Sample Rate**
25 k Hz to 55 k Hz (de-emphasis: automatic detection of ON/OFF)
- **D/A Converter**
24 bit
-
- **Controls**
INPUT LEVEL Knob
LF TRIM Knob (60 Hz, +/-3 dB)
HF TRIM Knob (10 kHz, +/-3 dB)
INPUT SELECT SW (Analog In/Digital In)
ASSIGN SW (Right/L+R/Left)
DIGITAL INPUT SELECT SW (Coaxial/Optical)
POWER SW
- **Indicators**
POWER
DIGITAL IN
- **Connectors**
ANALOG INPUT(XLR/TRS PHONE, Balanced/Unbalanced)
DIGITAL INPUT (Optical)
DIGITAL INPUT (Coaxial)
DIGITAL THRU OUT (Coaxial)
- **Power Supply**
AC117 V, AC230 V or AC240 V
- **Power Consumption**
80 W
- **Dimensions**
*DS-90
228.6 (W) x 330.2 (D) x 371.5 (H) mm
9 (W) x 13 (D) x 14-5/8 (H) inches
*DS-90A
228.6 (W) x 381.0 (D) x 371.5 (H) mm
9 (W) x 15 (D) x 14-5/8 (H) inches
- **Weight**
*DS-90
13.5 kg / 29 lbs. 13 oz.
*DS-90A
15 kg / 33 lbs. 2 oz.
- **Accessories**
*DS-90
Owner's Manual English (17055161)
*DS-90A
Owner's Manual English (17055213)

AC Cord 117 V (G3497134)
AC Cord 230 VD (G3497135)
AC Cord 230 VE (G3497136)
AC Cord 240 VA (G3497137)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A LOCATION OF CONTROLS

B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V



[PARTS]

No.	PART CODE	PART NAME	Q'ty
①	17055177	CABINET ASSY (CABIN00016)	1
	● 17055155	CABINET ASSY(CABIN00017)	1
②	17055182	BADGE SILVER LOGO "ROLAND" SML (HARDW00028)	1
③	17055183	LED SHEET "DIGITAL IN" LABEL (HARDW00030)	1
④	17055184	1"PORT TUBE (HARDW00032)	2
⑤	17055185	EDGE GRILL SPKR RING PAINTED PLASTIC (HARDW00034)	1
⑥	17055191	SPEAKER TWEETER 25 MM/8 OHM S0108C18 (SPEAK00019)	1
⑦	17055190	SPEAKER WOOFER 160 MM/4 OHM S0604F19 (SPEAK00018)	1
⑧	○ G281713500	CHASSIS	1
	● G281713501	CHASSIS	1
⑨	G2467412	HEATSINK	1
⑩	01905145	SEESAW SWITCH (POWER) SDDJF10100	1
⑪	22485109	KNOB 248-109	3

[SCREWS]

No.	PART CODE	PART NAME	Q'ty
a	17055188	WOOD SCREW-BRT 10-20x1" ZINC (SCREW00043)	8
b	17055187	SCREW 6-20x5/8" TORX PAN HEAD TYPE A-B BLK OX (SCREW00042)	4
c	17055186	SCREW #8x3/4" SHT MTL PAN HEAD PHILLIPS BLK OX (SCREW00006)	10

○ = DS-90, ● = DS-90A

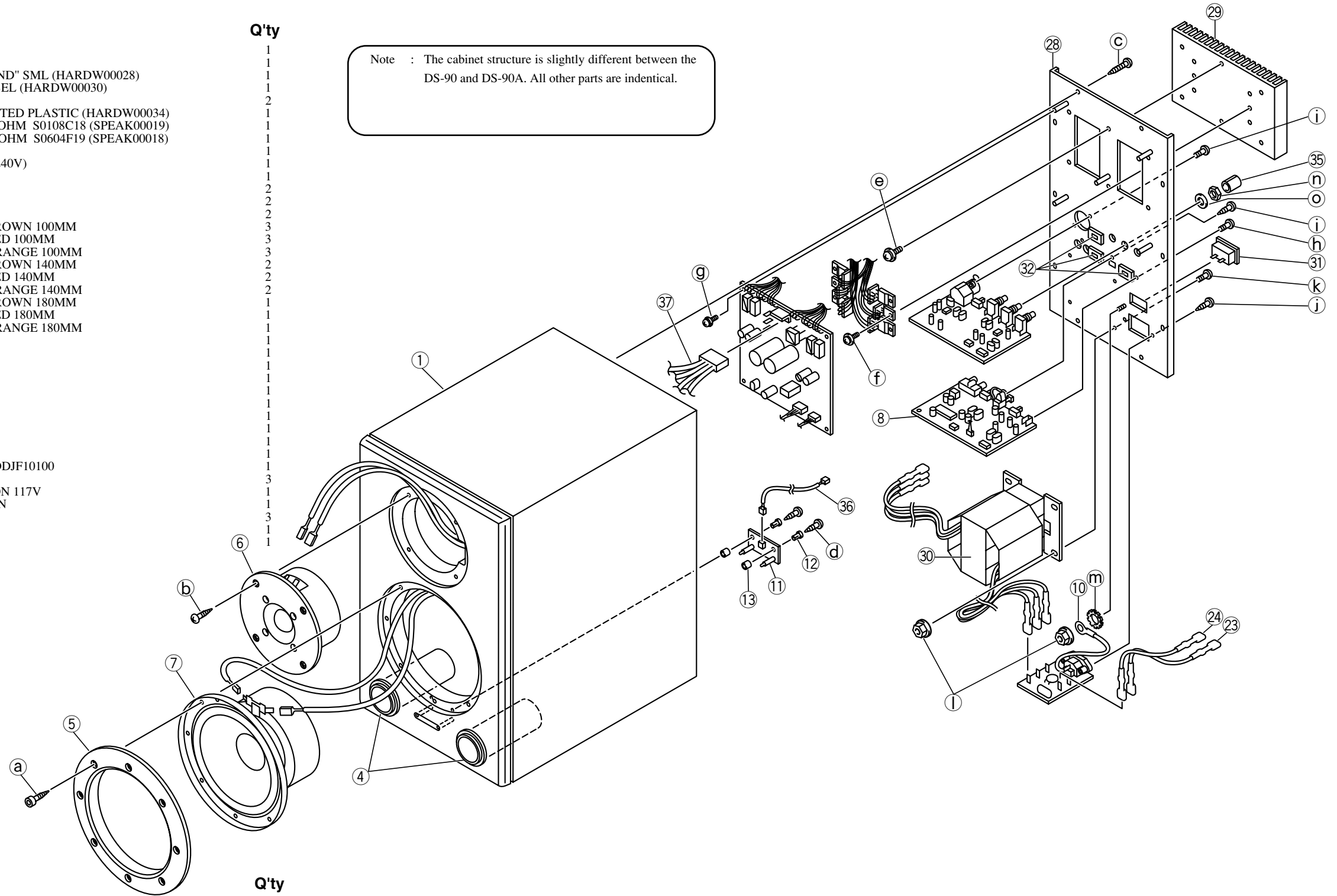
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A EXPLODED VIEW

[PARTS]

No.	PART CODE	PART NAME	Q'ty
①	○ 17055177	CABINET ASSY (CABIN00016)	1
	● 17055155	CABINET ASSY(CABIN00017)	1
②	17055182	BADGE SILVER LOGO "ROLAND" SML (HARDW00028)	1
③	17055183	LED SHEET "DIGITAL IN" LABEL (HARDW00030)	1
④	17055184	1"PORT TUBE (HARDW00032)	2
⑤	17055185	EDGE GRILL SPKR RING PAINTED PLASTIC (HARDW00034)	1
⑥	17055191	SPEAKER TWEETER 25 MM/8 OHM S0108C18 (SPEAK00019)	1
⑦	17055190	SPEAKER WOOFER 160 MM/4 OHM S0604F19 (SPEAK00018)	1
⑧	01897512	DA BOARD ASSY	1
⑨	01897534	ANALOG SHEET ASSY (230V/240V)	1
⑩	H4019130	WIRING AWG-18 GND 70MM	1
⑪	H2369418	LED SPACER LED-14T	2
⑫	F2199507	LED BOARD SPACER RS-1	2
⑬	F2199508	LED BOARD SPACER RS-57	2
⑭	H4039102	WIRING AWG-20 UL1430 W BROWN 100MM	3
⑮	H4039103	WIRING AWG-20 UL1430 W RED 100MM	3
⑯	H4039104	WIRING AWG-20 UL1430 W ORANGE 100MM	3
⑰	H4039105	WIRING AWG-20 UL1430 W BROWN 140MM	2
⑱	H4039106	WIRING AWG-20 UL1430 W RED 140MM	2
⑲	H4039107	WIRING AWG-20 UL1430 W ORANGE 140MM	2
⑳	H4039108	WIRING AWG-20 UL1430 W BROWN 180MM	1
㉑	H4039109	WIRING AWG-20 UL1430 W RED 180MM	1
㉒	H4039101	WIRING AWG-20 UL1430 W ORANGE 180MM	1
㉓	G3489210	WIRING W BLACK 90MM	1
㉔	G3489211	WIRING W BROWN 90MM	1
㉕	G3489206	WIRING 4P 60MM	1
㉖	G3489207	WIRING 5P 120MM	1
㉗	G3489208	WIRING 6P 150MM	1
㉘	○ G281713500	CHASSIS	1
	● G281713501	CHASSIS	1
㉙	G2467412	HEATSINK	1
㉚	G2457147	TRANSFORMER 100V/117V	1
㉛	G2457148	TRANSFORMER 230V/240V	1
㉜	01905145	SEESAW SWITCH (POWER) SDDJF10100	1
㉝	G2247106	CUSHION	3
㉞	G2537710	CAUTION SEAL FUSE CAUTION 117V	1
㉟	G2537608	CAUTION SEAL GND CAUTION	1
㊱	22485109	KNOB 248-109	3
㊲	G348920501	WIRING 4P 490MM	1
㊳	G348920901	WIRING VHR4N L600 + L530	1

Note : The cabinet structure is slightly different between the DS-90 and DS-90A. All other parts are identical.



[SCREWS]

No.	PART CODE	PART NAME	Q'ty
①	17055188	WOOD SCREW-BRT 10-20x1" ZINC (SCREW00043)	8
②	17055187	SCREW 6-20x5/8" TORX PAN HEAD TYPE A-B BLK OX (SCREW00042)	4
③	17055186	SCREW #8x3/4" SHT MTL PAN HEAD PHILLIPS BLK OX (SCREW00006)	10
④	17055189	WOOD SCREW-ZINC #4x3/4" PAN HEAD PHILLIPS (SCREW00047)	2
⑤	40013001	SCREW M4x8 PAN W SEMS BZC	6
⑥	40012967	SCREW 3x10 PAN MACHINE SCREW W/SW+PW BZC	6
⑦	40013056	SCREW 3x6 PAN MACHINE W/SW+SMALL PW ZC	5
⑧	○ 40010245	SCREW 3x6 BINDING BZC	1
	● 40010245	SCREW 3x6 BINDING BZC	2
⑨	40011312	SCREW 3x8 BINDING TAPTITE P FE BZC	4
⑩	40012501	SCREW 4x12 BINDING TAPTITE P FE BZC	2
⑪	40013012	SCREW M4x10 PAN SEMS FE BZC	4
⑫	40011767	FRANGE HEX NUT M4 FEFCM	5
⑬	40011889	EXTERNAL TOOTH WASHER M4 FEFCM	1
⑭	17048630	VR ACCESSORY NUT M9	3
⑮	17048631	VR ACCESSORY WASHER M9	3

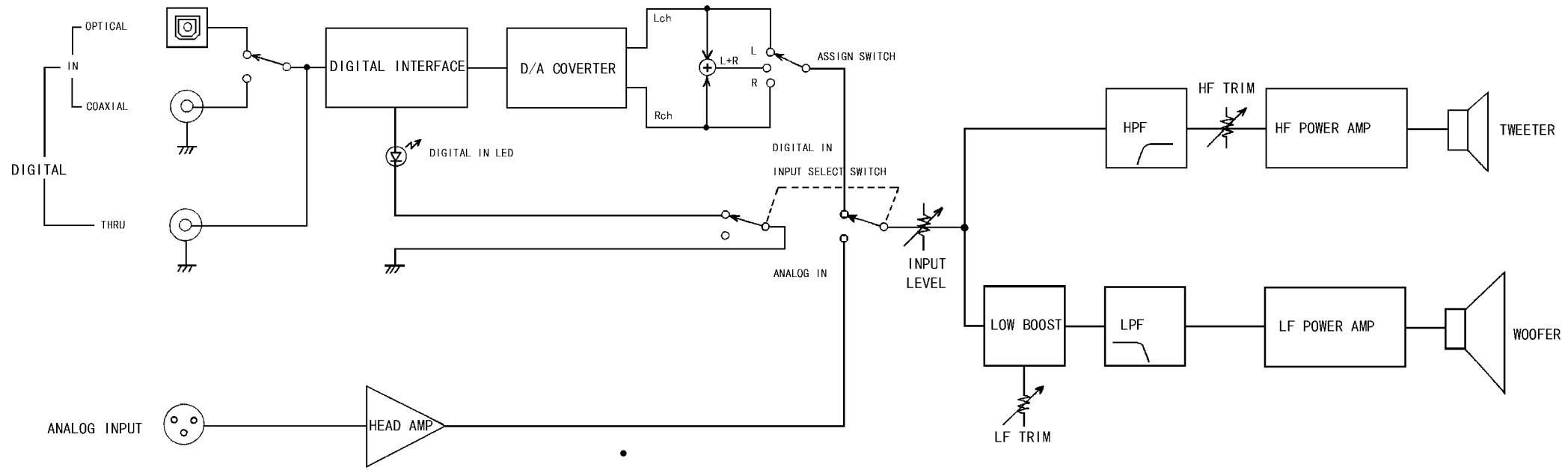
○ = DS-90, ● = DS-90A

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A BLOCK DIAGRAM

B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V



PARTS LIST

<p>SAFETY PRECAUTION: *1 The parts marked Δ have safety-related characteristics. Use only listed parts for replacement.</p>	<p>The parts marked # are new (initial parts). *2</p>	<p>CONSIDERATIONS ON PARTS ORDERING When ordering any parts listed in the parts list, please specify the following items in the order sheet.</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Ex.</th> <th style="text-align: left;">QTY</th> <th style="text-align: left;">PART NUMBER</th> <th style="text-align: left;">DESCRIPTION</th> <th style="text-align: left;">MODEL NUMBER</th> </tr> </thead> <tbody> <tr> <td>10</td> <td></td> <td>22575241</td> <td>Sharp key</td> <td>C-20/50</td> </tr> <tr> <td>15</td> <td></td> <td>2247017300</td> <td>Knob (orange)</td> <td>DAC-15D</td> </tr> </tbody> </table> <p>Failure to completely fill the above items with correct number and description will result in delays or even undelivered replacement.</p>	Ex.	QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER	10		22575241	Sharp key	C-20/50	15		2247017300	Knob (orange)	DAC-15D	<p>DA BOARD --> DA, ANALOG SHEET --> AS</p>
Ex.	QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER														
10		22575241	Sharp key	C-20/50														
15		2247017300	Knob (orange)	DAC-15D														

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
CASING				
#	17055177	CABINET ASSY	(CABIN00016) (for DS-90)	1
#	17055155	CABINET ASSY	(CABIN00017) (for DS-90A)	1
#	17055184	1'PORT TUBE	(HARDW00032)	2
#	17055182	BADGE SILVER LOGO	ROLAND SML (HARDW00028)	1
#	17055185	EDGE GRILL SPKR RING	PAINTED PLASTIC (HARDW00034)	1
#	17055183	LED SHEET	DIGITAL IN LABEL (HARDW00030)	1
CHASSIS				
#	G281713500	CHASSIS	(for DS-90)	1
#	G281713501	CHASSIS	(for DS-90A)	1
KNOB, BUTTON				
	22485109	KNOB	248-109	3
SWITCH				
Δ	01905145	SDDJF10100	SEESAW SWITCH (POWER)	1
#	01900989	SSSF120500	SLIDE SWITCH SW2 on DA. SW1 on AS	2
#	01900990	SSSF123800	SLIDE SWITCH SW3 on DA	1
JACK, EXT TERMINAL				
#	01901001	NCJ9FI-H	PHONE AND XLR EXT CONNECTOR JK2 on AS	1
	00458801	YKC21-3044 PIN 0/0	RCA PIN JACK JK2 on DA	1
	01343001	TORX178A	OPTICAL DIGITAL IN JK3 on DA (for DS-90)	1
	01343001	TORX178A	OPTICAL DIGITAL IN JK1 on DA (for DS-90A or New DA)	1
SPEAKER, BUZZER				
#	17055191	SPEAKER TWEETER (25 MM/8 OHM)	S0108C18 (SPEAK00019)	1
#	17055190	SPEAKER WOOFER (160 MM/4 OHM)	S0604F19 (SPEAK00018)	1
PWB ASSY				
#	01897512	DA BOARD ASSY		1
#	01897534	ANALOG SHEET ASSY	230V/240V	1

- ***** POWER AMP BOARD
- ***** HEAD AMP BOARD
- ***** INLET BOARD
- ***** LED BOARD

NOTE: Replacement 'ANALOG SHEET Assy' is for 230 V/240 V version only. And 230 V/240 V version only in fusesystem.
When using 'ANALOG SHEET Assy' for 100 V/117 V version, replace fuse of specific voltage version. (refer to TABLE A)

TABLE A	F1
100 V/117 V	Δ F2559424 5TT 3 A/125 V
230 V/240 V	Δ F2559102 5ST 1.25 A/250 V

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
	01451578	AK4324-VF-E2	IC (DAC)	IC7 on DA (for DS-90)
	01451578	AK4324-VF-E2	IC (DAC)	IC2 on DA (for DS-90A or New DA)
	00675290	CS8412-CP	IC (DIGITAL INTERFACE)	IC2 on DA (for DS-90)
	00675290	CS8412-CP	IC (DIGITAL INTERFACE)	IC5 on DA (for DS-90A or New DA)
Δ	15199190	NJM7805FA	IC (V.RGL)	IC5 on AS
Δ	15199209	NJM7815FA	IC (V.RGL)	IC4 on AS
Δ	15199208	NJM7915FA	IC (V.RGL)	IC3 on AS
	15169625	TC74HC595AP	IC (HC MOS)	IC4 on DA
	15169512	TC74HCU04P	IC (HC MOS)	IC1, IC8 on DA (for DS-90)
	15169512	TC74HCU04P	IC (HC MOS)	IC3 on DA (for DS-90A or New DA)
	15189129	TL072CP	IC (OP AMP)	IC6 on DA. IC1, IC2, IC6, IC7 on AS
	15189129	TL072CP	IC (OP AMP)	IC1 on DA. IC1, IC2, IC6, IC7 on AS (for DS-90A or New DA)

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
TRANSISTOR				
	15119111	2SA970-GR	TRANSISTOR	Q14, Q17, Q18, Q24 on AS
	15119113	2SA1015-GR	TRANSISTOR	Q3, Q5 on DA. Q25 on AS (for DS-90)
	15119113	2SA1015-GR	TRANSISTOR	Q2, Q4 on DA. Q25 on AS (for DS-90A or New DA)
	01455889	2SA1145-Y	TRANSISTOR	Q11, Q15 on AS
Δ	15119156	2SA1358-Y	TRANSISTOR	Q7, Q9 on AS
Δ	00122245	2SA1671	TRANSISTOR	Q2, Q4 on AS
	15129114	2SC1815-GR	TRANSISTOR	Q4, Q6 on DA. Q21, Q26 on AS (for DS-90)
	15129114	2SC1815-GR	TRANSISTOR	Q3, Q5, Q7, Q8 on DA. Q21, Q26 on AS (for DS-90A or New DA)
	15129120	2SC2240-GR	TRANSISTOR	Q16, Q19, Q20, Q23, Q28-Q32 on AS
	15129437	2SC2705-Y	TRANSISTOR	Q12, Q13 on AS
	15129136	2SC2878-A	TRANSISTOR	Q1, Q2 on DA. Q22, Q27 on AS (for DS-90)
	15129136	2SC2878-A	TRANSISTOR	Q1, Q6 on DA. Q22, Q27 on AS (for DS-90A or New DA)
	15129421	2SC3421-Y	TRANSISTOR	Q5, Q6, Q8, Q10 on AS
Δ	00122256	2SC4386	TRANSISTOR	Q1, Q3 on AS

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
DIODE				
Δ	F5019209RT	1N4004	DIODE	D1, D3, D8, D9 on AS
	15019126	1SS133 T-77	SWITCHING DIODE	D1 on DA. D4-D7 on AS
	F5019407	MTZ J2.0B	ZENER DIODE	D1 on DA
Δ	F5019205	CP1002 10A/200V	BRIDGE DIODE	D2 on AS
#	F5029119	L-1154GD	LED (GREEN)	LED2 on AS
#	F5029120	L-1154ND	LED (ORANGE)	LED1 on AS

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
RESISTOR				
#	F3749114	10 OHM 1/2W	CARBON RESISTER	R29 on DA (for DS-90)
#	F3749114	10 OHM 1/2W	CARBON RESISTER	R35 on DA (for DS-90A or New DA)
#	13829904	27 OHM 1/2W	CARBON RESISTOR	R14, R15 on AS
	13749189	100 OHM 1/2W	CARBON RESISTOR	R9, R10, R12, R16 on AS
Δ	F3839181	0.33 OHM 5W	CEMENT RESISTOR	R1, R2, R4, R5 on AS
Δ #	F3839188	82 OHM 5W	CEMENT RESISTOR	R46 on AS (for DS-90)
Δ #	F3839654	82 OHM 7W	CEMENT RESISTOR	R46 on AS (for DS-90A or New AS)
Δ #	F3829904	4.7 OHM 1/2W	NON-FLAME RESISTOR	R3, R6, R7, R8 on AS
Δ #	F3829905	33 OHM 1/2W	NON-FLAME RESISTOR	R11, R13, R17, R19 on AS

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
POTENTIOMETER				
#	01789045	RK11K1120A0A 10KA	11MM ROTARY POTENTIOMETER	VR1 on AS
#	01789067	RK11K112002F 50KB (W/C.C.)	11MM ROTARY POTENTIOMETER	VR2 on AS
#	01789056	RK11K112002K 10KB (W/C.C.)	11MM ROTARY POTENTIOMETER	VR3 on AS

#	QTY	DESCRIPTION	MODEL NUMBER	Q'TY
CAPACITOR				
	F3519502	EC8472MH	CERAMIC CAPACITOR	C1 on AS
Δ	F3519501	PY17FY472MLO 472/250V	CERAMIC CAPACITOR	C50 on AS
	13639194RT	SKR102MIVJ35 1000UF/35V	ELECTROLYTIC CAPACITOR	C3, C4, C12, C13 on AS
	13639175	2200UF/25V	ELECTROLYTIC CAPACITOR	C26 on AS
Δ #	F3659231	10000UF/35V	ELECTROLYTIC CAPACITOR	C8, C9 on AS
#	F3549258	0.15UF	FILM CAPACITOR	C38, C42 on AS
#	13549282	0.18UF	FILM CAPACITOR	C54, C55 on AS
#	F3549263	0.47UF	FILM CAPACITOR	C32, C35, C38, C40 on DA. C28, C53 on AS (for DS-90)
#	F3549263	0.47UF	FILM CAPACITOR	C3, C4, C17, C18 on DA. C28, C53 on AS (for DS-90A or New DA)

INDUCTOR, COIL, FILTER

12449268	BL02RN2-R62T2	FERRITE-BEAD	L1 on DA	1
12449426	BLM31B601SPT	FERRITE-BEAD	L2-L6 on DA (for DS-90A or New DA)	5
12449615	PT-10244-615	PULSE TRANSFORMER	FL1 on DA	1

FUSE, FUSE HOLDER

△	F2559102	5ST 1.25A/250V (230V/240V)	FUSE 5x20	F1 on AS	1
△ #	F2559424	5TT 3A/125V (100V/117V)	FUSE 5x20	F1 on AS	1
△	F2029601	FH-1	FUSE COVER	F1 on AS	1
△	12199550RT	HTF-015	FUSE HOLDER	F1 on AS	2

CONNECTOR

13369913	B4P-VH 4P 7A/250V	CONNECTOR	CN1 on AS	1
13369664	S4B-PH-K-S(4P)	CONNECTOR	CN2 on DA. CN2, CN6 on AS	3
13369665	S5B-PH-K-S(5P)	CONNECTOR	CN5 on AS	1
13369666	S6B PH-K-S(6P)	CONNECTOR	CN1 on DA	1

WIRING, CABLE

#	G348920501	490MM	WIRING 4P	CN2 on AS to CN2 on DA	1
#	G3489206	60MM	WIRING 4P	CN6 on AS to CN3 on DA	1
#	G3489207	120MM	WIRING 5P	CN4 to CN5 on AS	1
#	G3489208	150MM	WIRING 6P	CN3 on AS to CN1 on DA	1
△ #	G348920901	VHR4N L600 + L530	WIRING	CN1 on AS to WOOFER & TWEETER.	1
△ #	G3489210	W BLACK 90MM	WIRING	TER4 on AS to POWER SWITCH	1
△ #	G3489211	W BROWN 90MM	WIRING	TER7 on AS to POWER SWITCH	1
#	H4019130	AWG-18 GND WIRING 70MM	WIRING	JK1 on AS to CHASSIS	1
#	H4039101	AWG-20 UL1430 W ORANGE 180MM	WIRING	POWER AMP BOARD to POWER TR	1
#	H4039102	AWG-20 UL1430 W BROWN 100MM	WIRING		3
#	H4039103	AWG-20 UL1430 W RED 100MM	WIRING		3
#	H4039104	AWG-20 UL1430 W ORANGE 100MM	WIRING		3
#	H4039105	AWG-20 UL1430 W BROWN 140MM	WIRING		2
#	H4039106	AWG-20 UL1430 W RED 140MM	WIRING		2
#	H4039107	AWG-20 UL1430 W ORANGE 140MM	WIRING		2
#	H4039108	AWG-20 UL1430 W BROWN 180MM	WIRING		1
#	H4039109	AWG-20 UL1430 W RED 180MM	WIRING		1

TRANSFORMER

△ #	G2457147	100V/117V	TRANSFORMER		1
△ #	G2457148	230V/240V	TRANSFORMER		1

AC INLET, OUTLET

△	00125023	PW11818INL7 10A/250V	AC INLET (3P)	JK1 on AS	1
---	----------	----------------------	---------------	-----------	---

SCREWS

	40010245	SCREW 3x6	BINDING BZC	for TER1 on DA (for DS-90)	1
	40010245	SCREW 3x6	BINDING BZC	for TER1 on DA (for DS-90A)	2
	40013056	SCREW M3x6	PAN MACHINE W/SW+SMALL	PW ZC for POWERAMP BOARD on AS	5
	40011312	SCREW 3x8	BINDING TAPTITE P FE BZC	for JK2-3 on DA. JK2 on AS	4
	40012967	SCREW M3x10	PAN MACHINE SCREW W/SW+PW BZC	for Q1-6. IC5 & HS1 on AS	6
#	40013001	SCREW M4x8	PAN W SEMS BZC	for HEATSINK	6
	40013012	SCREW M4x10	PAN SEMS FE BZC	for TRANSFORMER	4
	40012501	SCREW 4x12	BINDING TAPTITE P FE BZC	for JK1 on AS	2
	40011889	EXTERNAL TOOTH WASHER M4	FECM	for CHASSIS GND	1
	40011767	FRANGE HEX NUT M4	FECM	for TRANSFORMER & CHASSIS GND	5
#	17055186	SCREW #8x3/4' SHT MTL PAN HEAD	PHILLIPS BLK OX (SCREW00006)	for CHASSIS	10
#	17055187	SCREW 6-20x5/8' TORX PAN HEAD	TYPE A-B BLK OX (SCREW00042)	for TWEETER	4
#	17055188	WOOD SCREW-BRT 10-20x1'	ZINC (SCREW00043)	for WOOFER	8
#	17055189	WOOD SCREW-ZINC #4x3/4'	PAN HEAD PHILLIPS (SCREW00047)	for LED BOARD	2
	17048630	VR ACCESSORY NUT M9			3
	17048631	VR ACCESSORY WASHER M9			3

PACKING

#	17055178	SHIPPING CARTON	(CARTO00065)	(for DS-90)	1
#	17055199	SHIPPING CARTON	(CARTO00047)	(for DS-90A)	1
#	17055179	SHIPPING INSERT TRAY	(CARTO00048)	for SHIPPING CARTON (for DS-90)	1
#	17055200	SHIPPING INSERT TRAY	(CARTO00052)	for SHIPPING CARTON (for DS-90A)	1
#	17055180	TUBE INSERT	(CARTO00049)	for SHIPPING CARTON (for DS-90)	1

#	17055201	TUBE INSERT	(CARTO00053)	for SHIPPING CARTON (for DS-90A)	1
#	17055181	DIVIDER INSERT	(CARTO00050)	for SHIPPING CARTON (for DS-90)	1
#	17055202	DIVIDER INSERT	(CARTO00051)	for SHIPPING CARTON (for DS-90A)	1
#	17055210	OUTER SHIPPING BOX(BRN)	(CARTO00051)	(for DS-90A)	1
#	17055211	CORNER PAD(GREEN)	Z-PARTS	for OUTER SHIPPING BOX (for DS-90A)	8

MISCELLANEOUS

△	G2537710	CAUTION SEAL	FUSE CAUTION 117 V		1
△	G2537608	CAUTION SEAL	GND CAUTION		1
#	G2247106	CUSHION		for SLIDE SWITCH	3
#	G2467412	HEATSINK		on CHASSIS	1
#	G2467111	HEATSINK K217 H=25		on HS1 on AS	1
#	F2199507	RS-1	LED BOARD SPACER	on LED BOARD on AS	2
#	F2199508	RS-57	LED BOARD SPACER	on LED BOARD on AS	2
#	H2369418	LED-14T	LED SPACER	on LED1, LED2 on AS	2
△	H5039705	1741BS-2 187	TERMINAL	on TER1-TER8 on AS	8

ACCESSORIES (Standard)

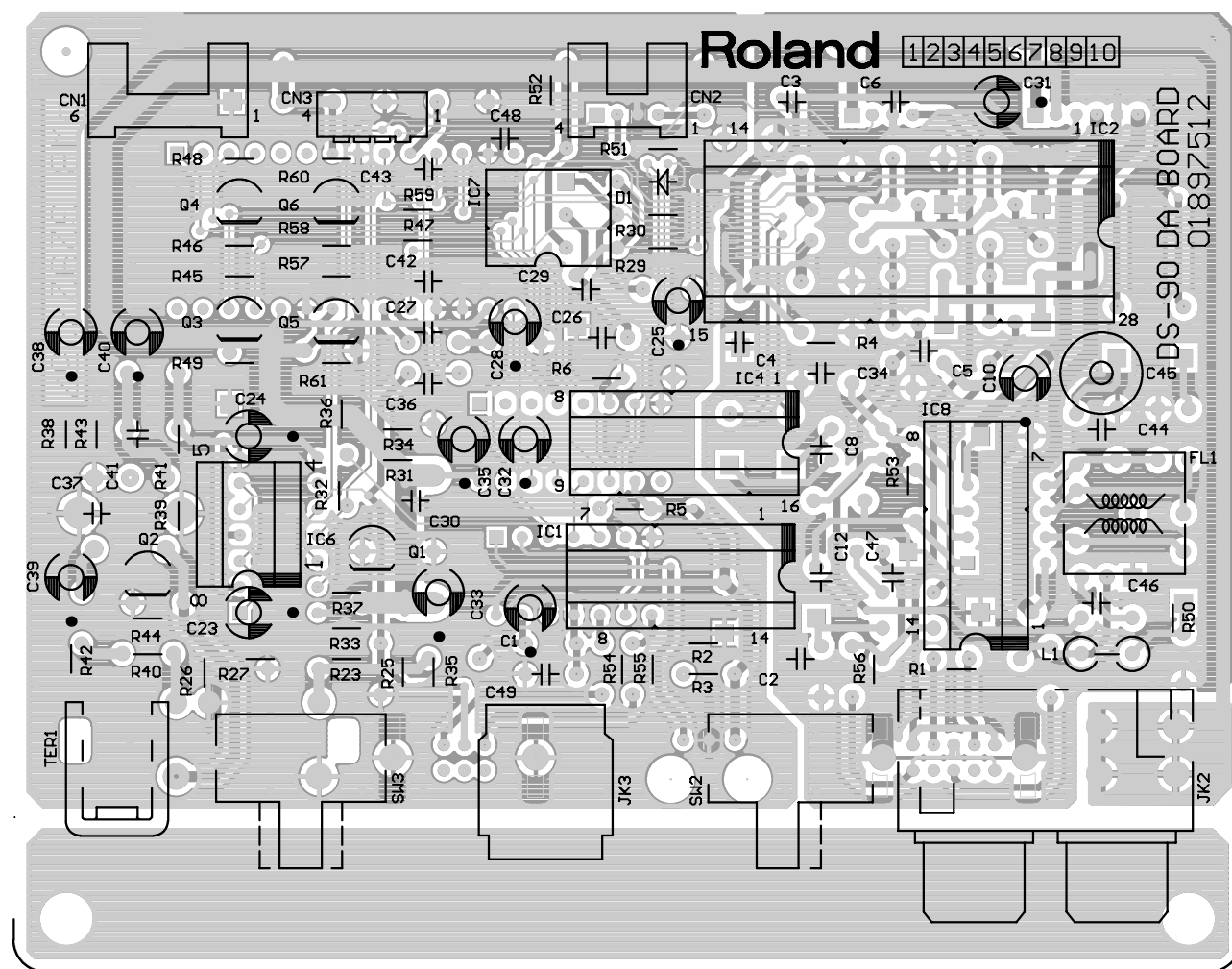
#	17055162	OWNER'S MANUAL	JAPANESE (for DS-90)		
△ #	17055212	OWNER'S MANUAL	JAPANESE (for DS-90A)		1
#	17055161	OWNER'S MANUAL	ENGLISH (for DS-90)		
△ #	17055213	OWNER'S MANUAL	ENGLISH (for DS-90A)		1
△ #	G3497133	AC CORD SET 100 V			1
△ #	G3497134	AC CORD SET 117 V			1
△ #	G3497135	AC CORD SET 230 VD			1
△ #	G3497136	AC CORD SET 230 VE			1
△ #	G3497137	AC CORD SET 240 VA			1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (DA BOARD)

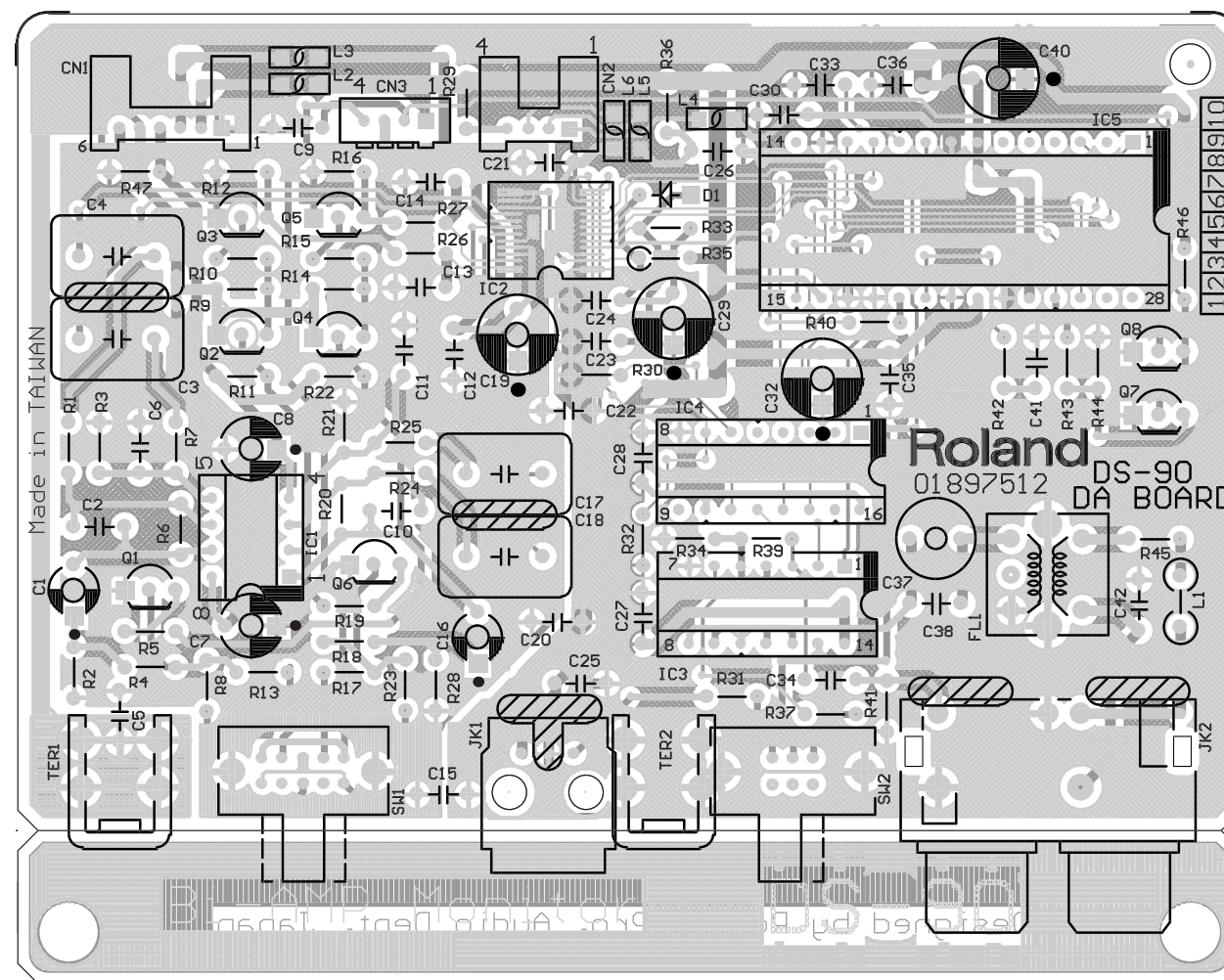
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

for DS-90



View from components side

for DS-90A or NEW DA

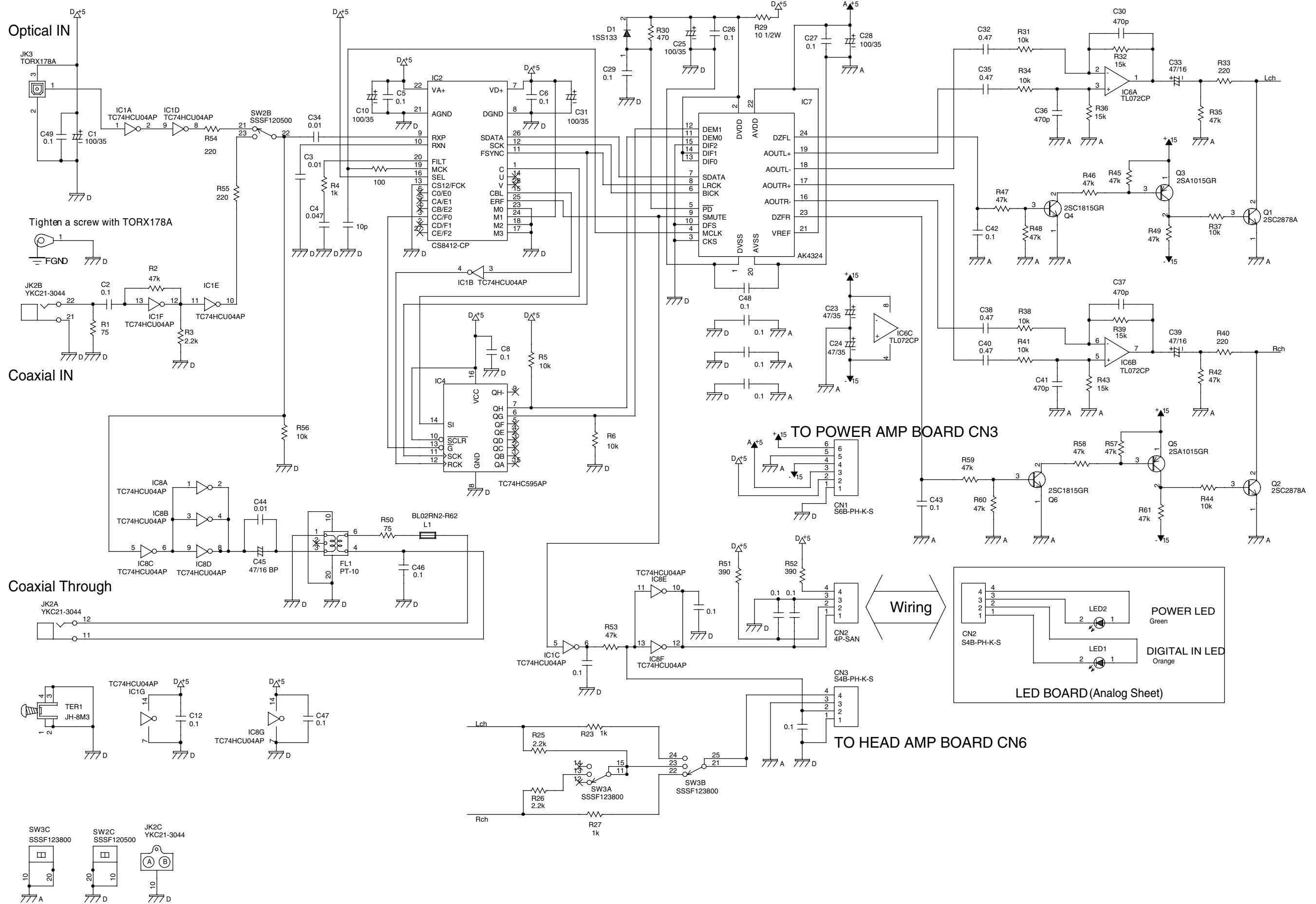


View from components side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (DA BOARD)

for DS-90

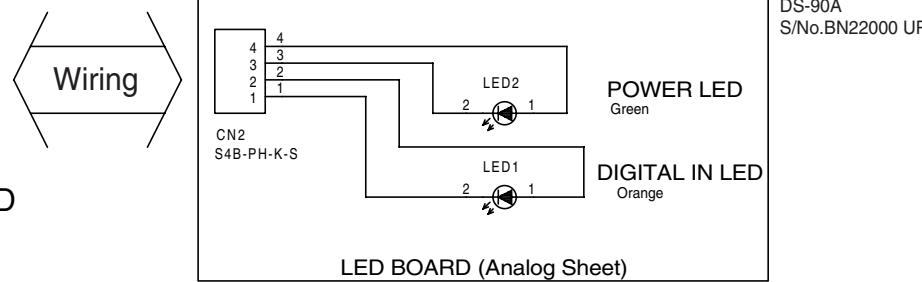
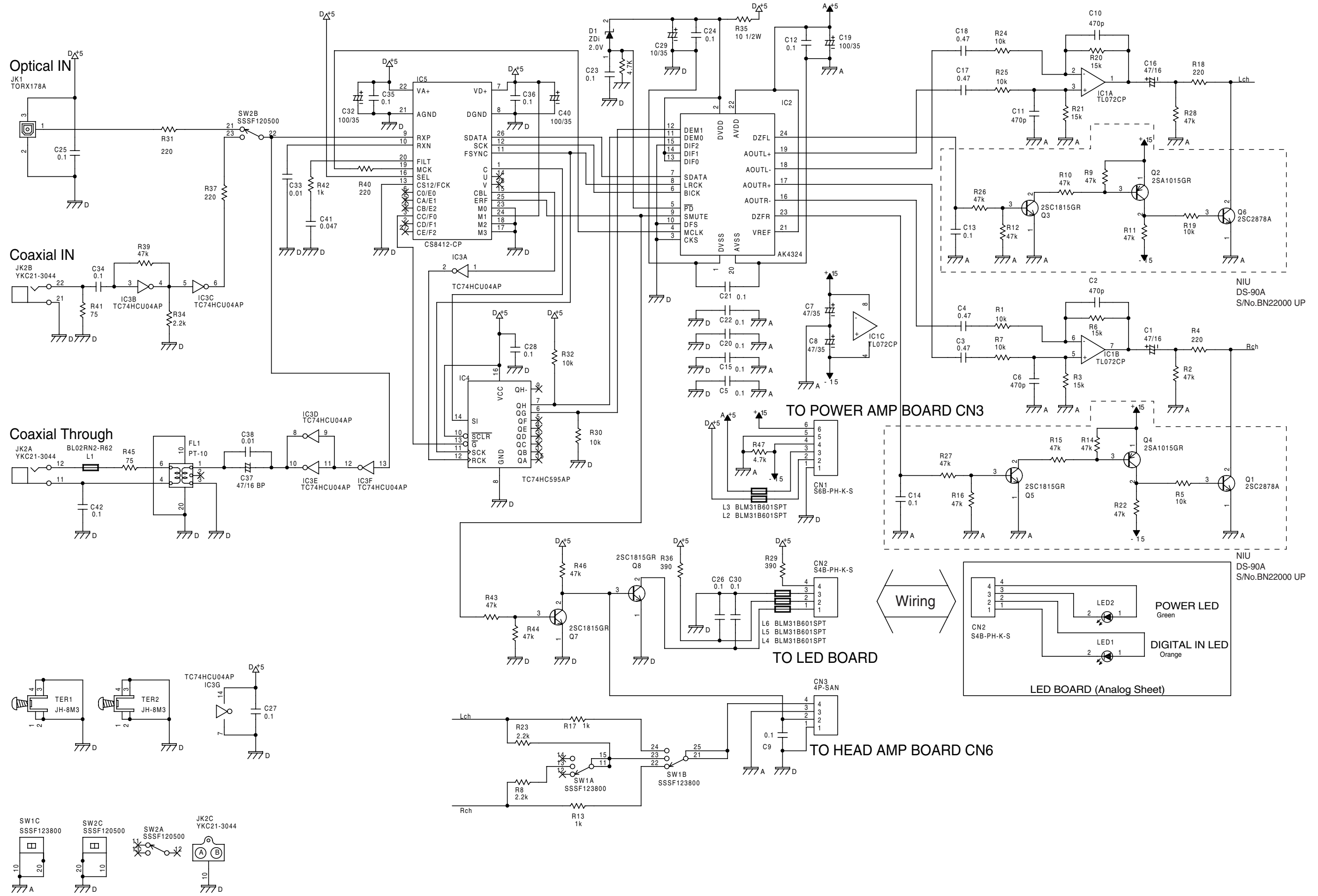


B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (DA BOARD)

for DS-90A or NEW DA

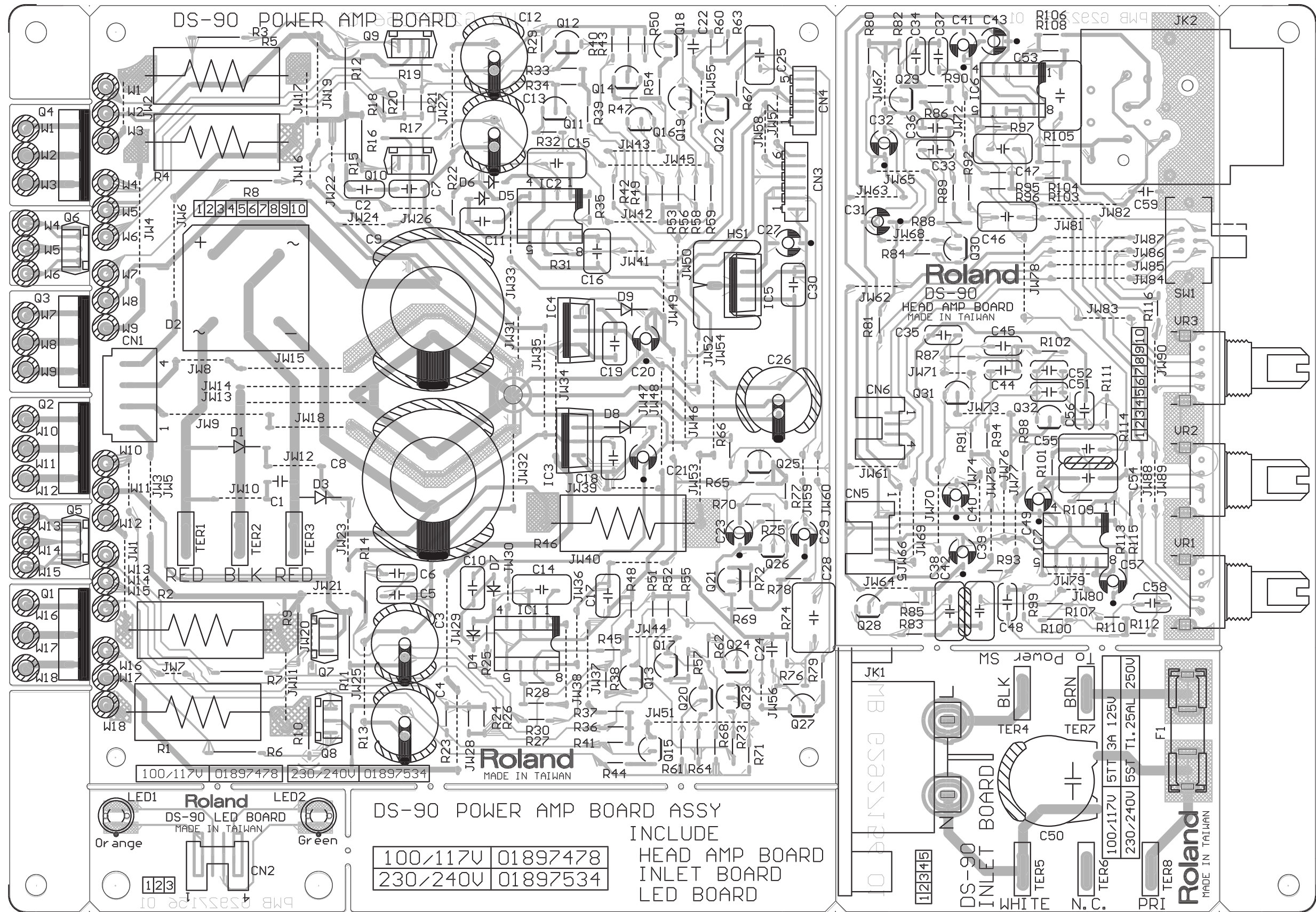


B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (ANALOG SHEET)

B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

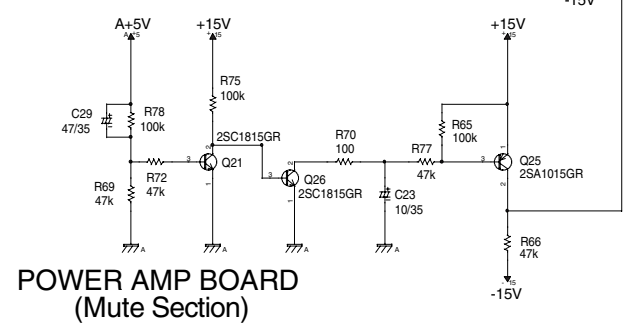
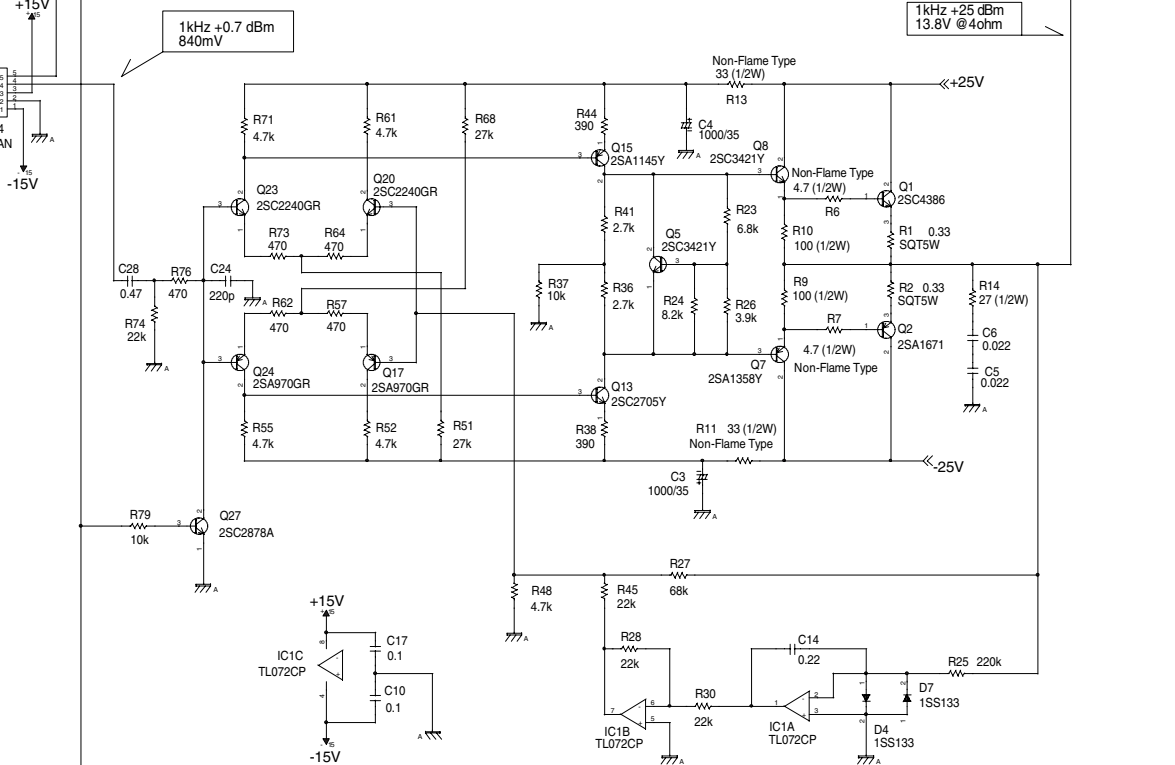
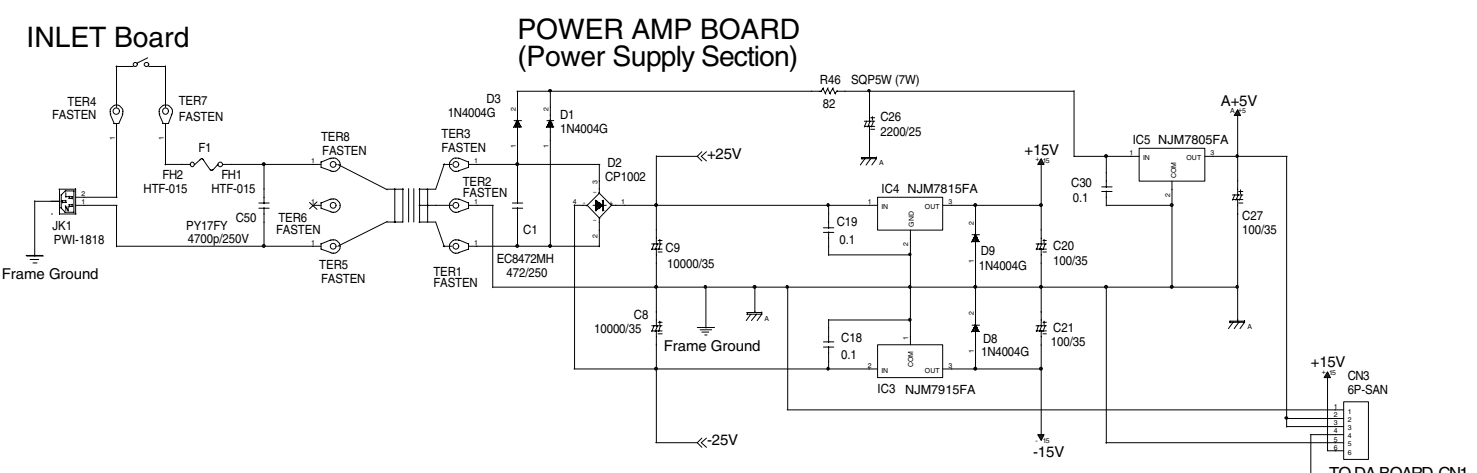
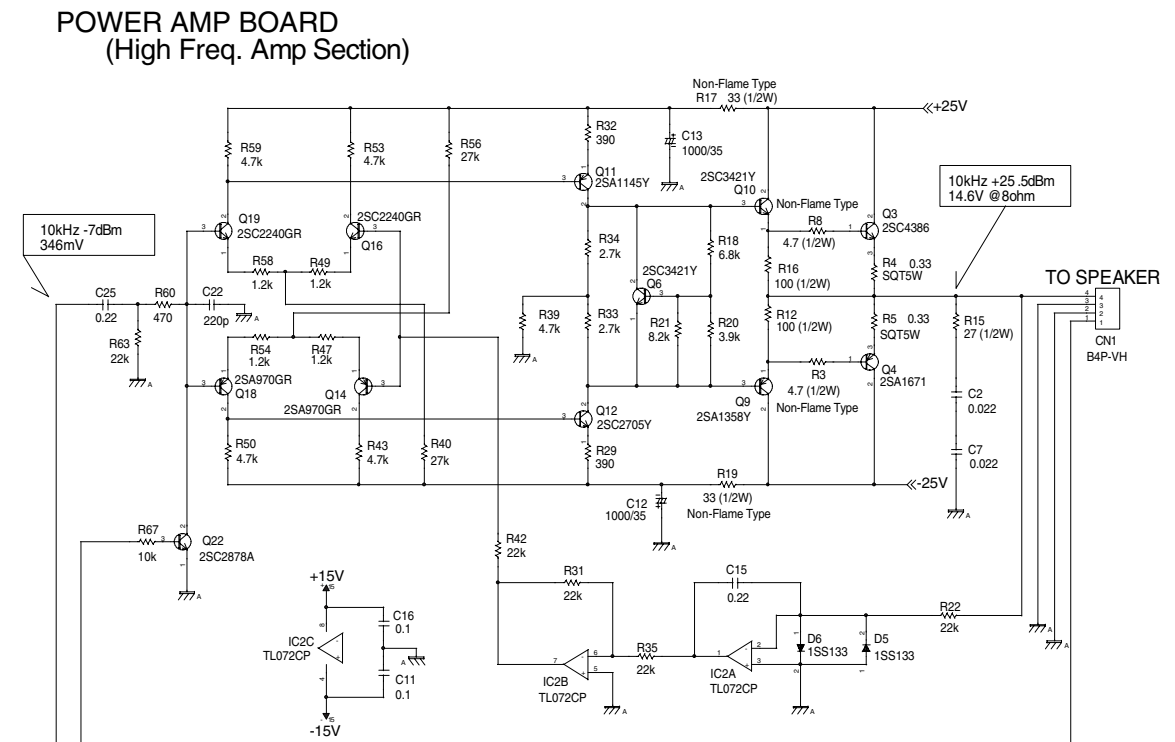
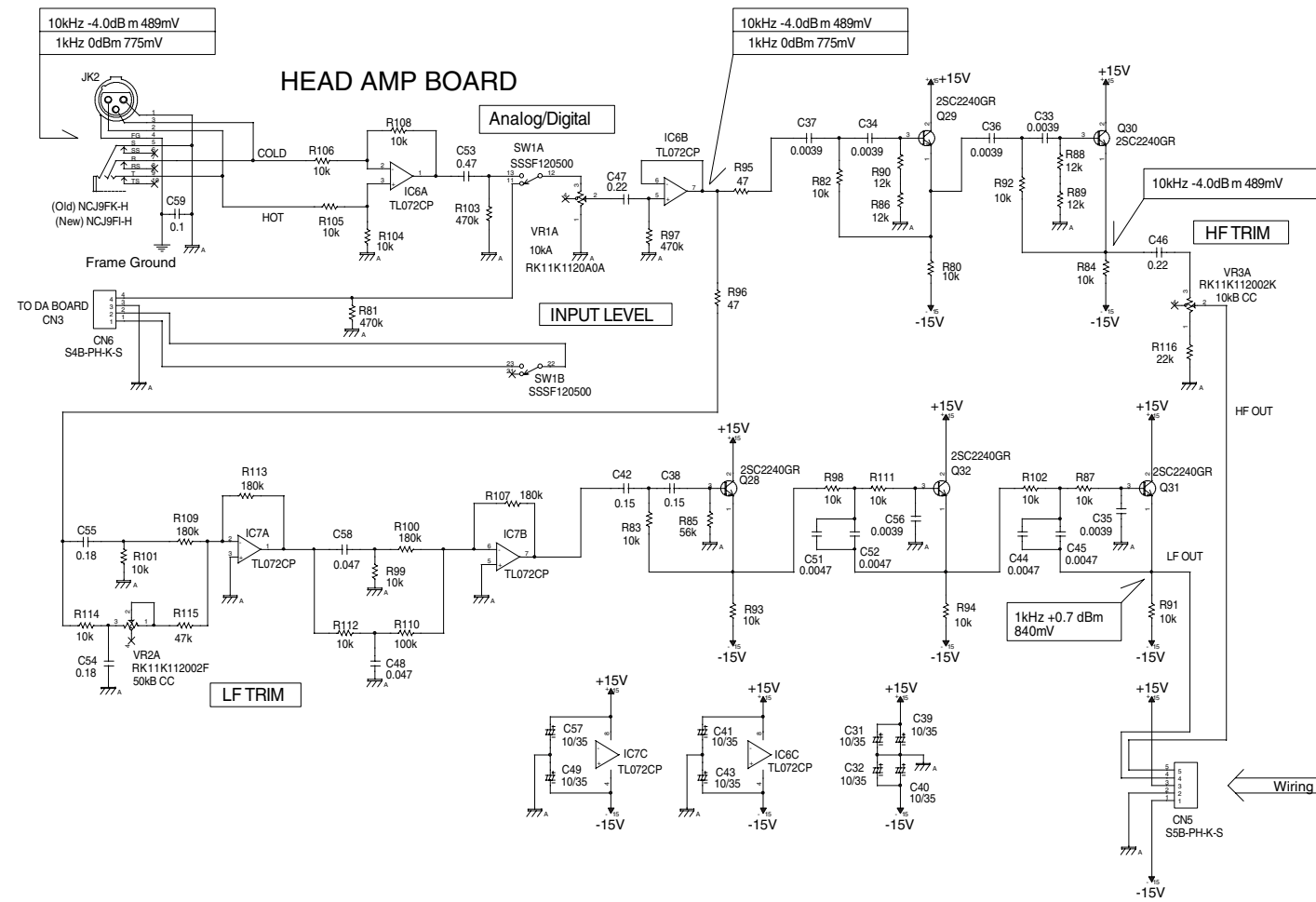


View from components side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (ANALOG SHEET)

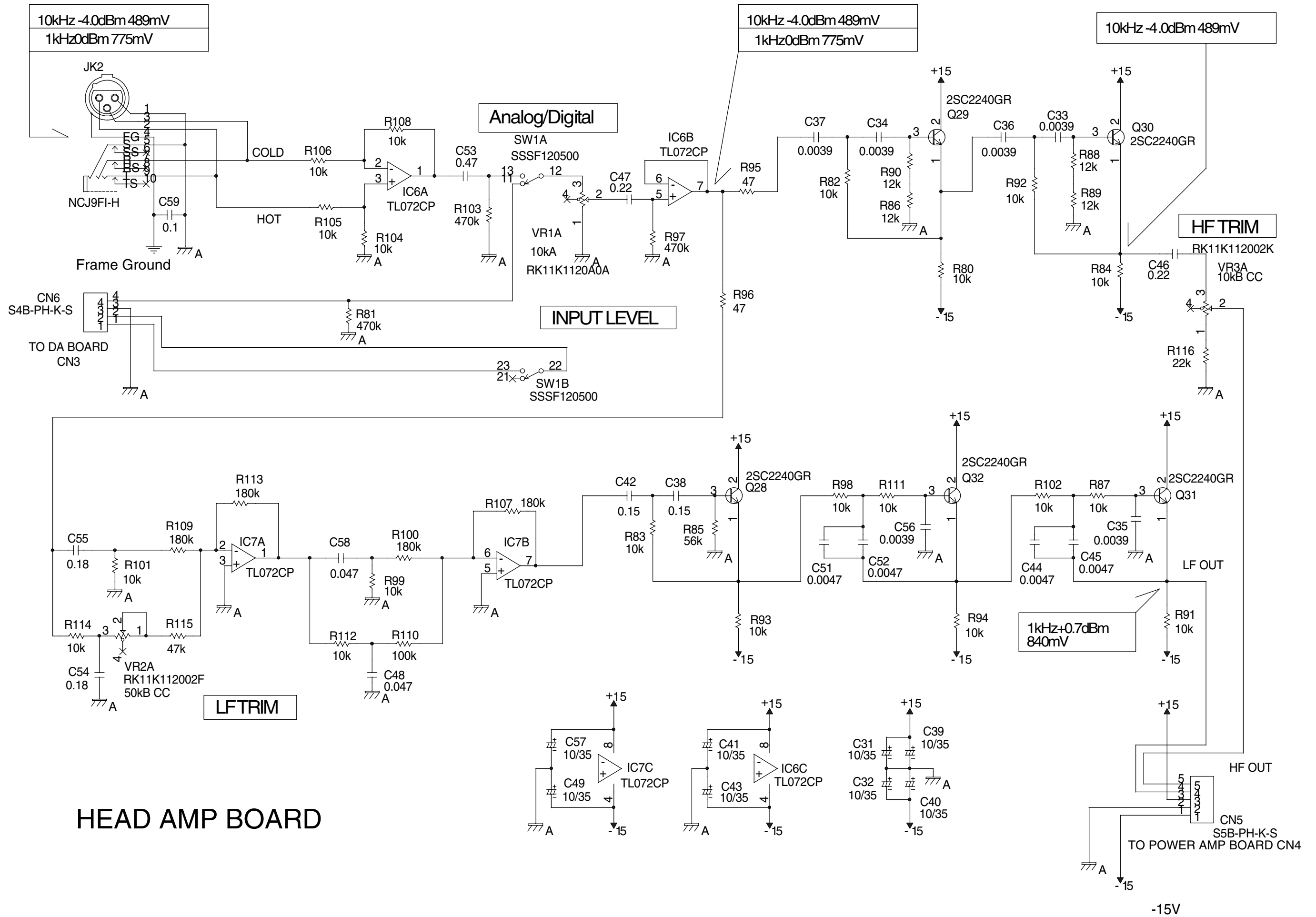
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (ANALOG SHEET) 1/4

B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

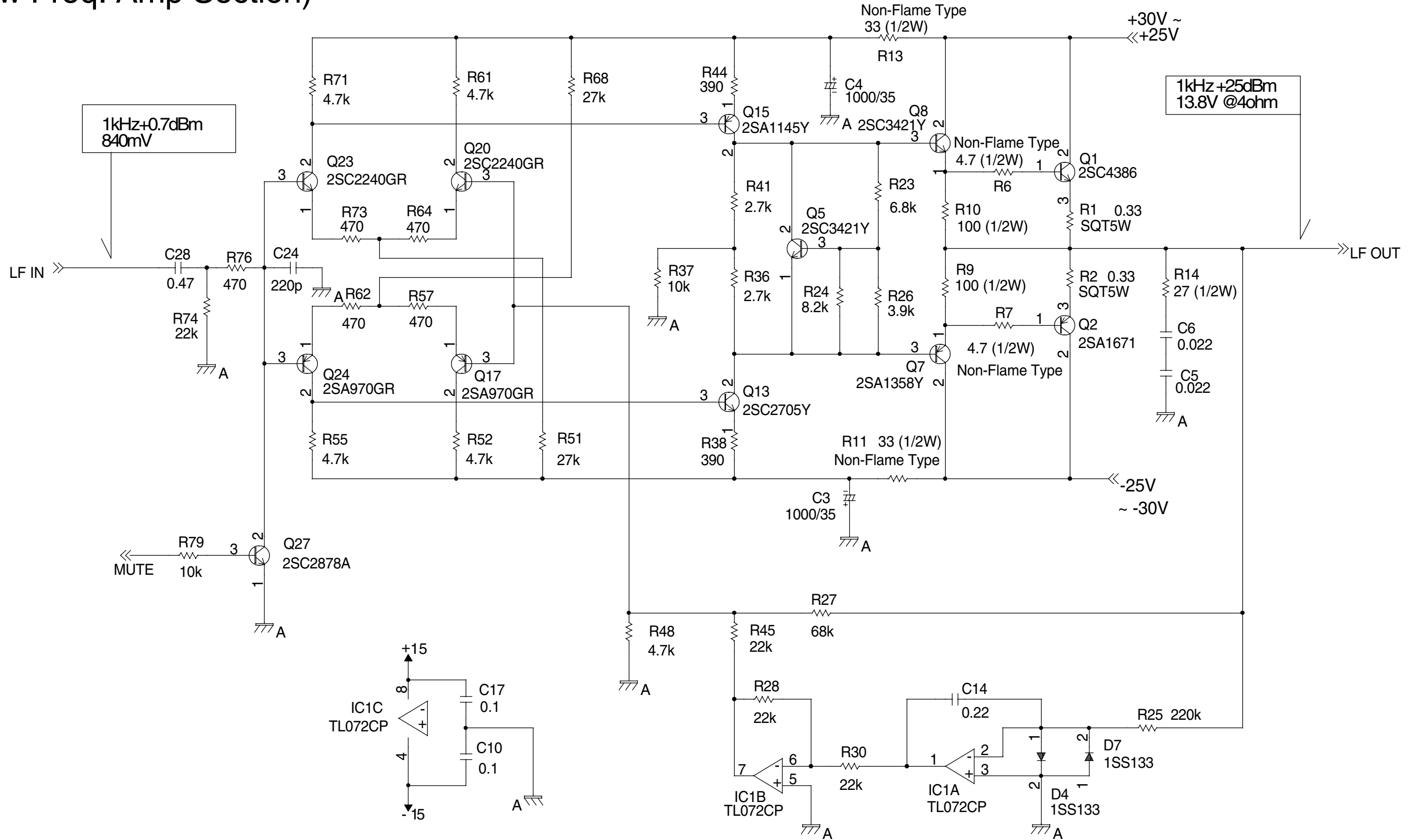


HEAD AMP BOARD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (ANALOG SHEET) 3/4

POWER AMP BOARD (Low Freq. Amp Section)



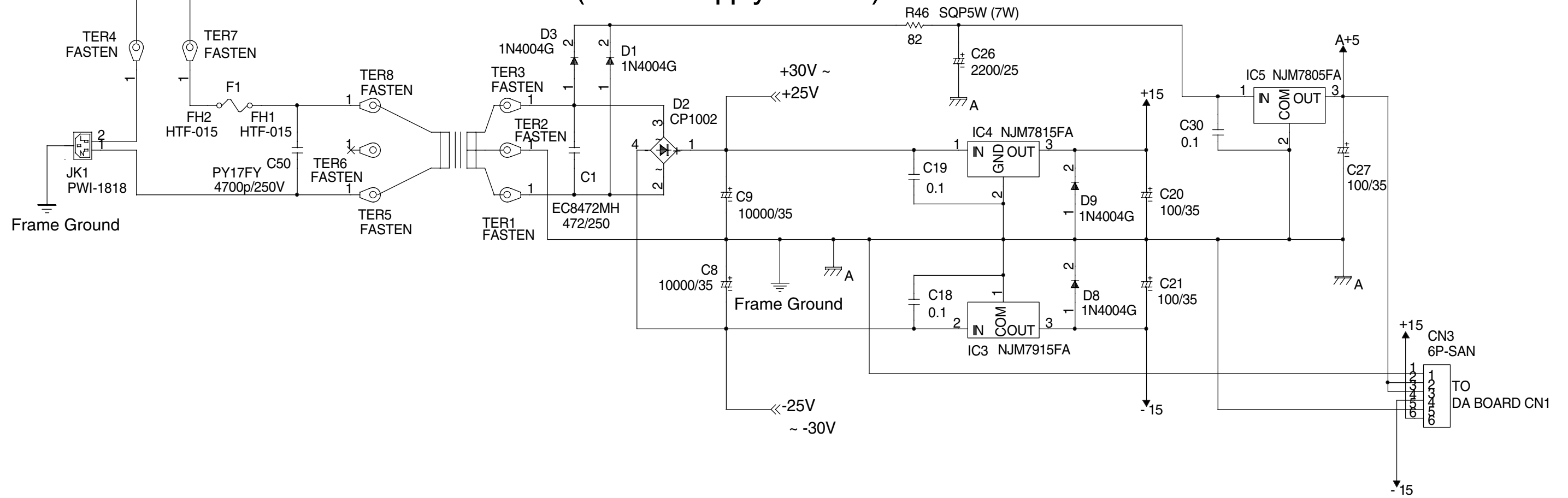
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (ANALOG SHEET) 4/4

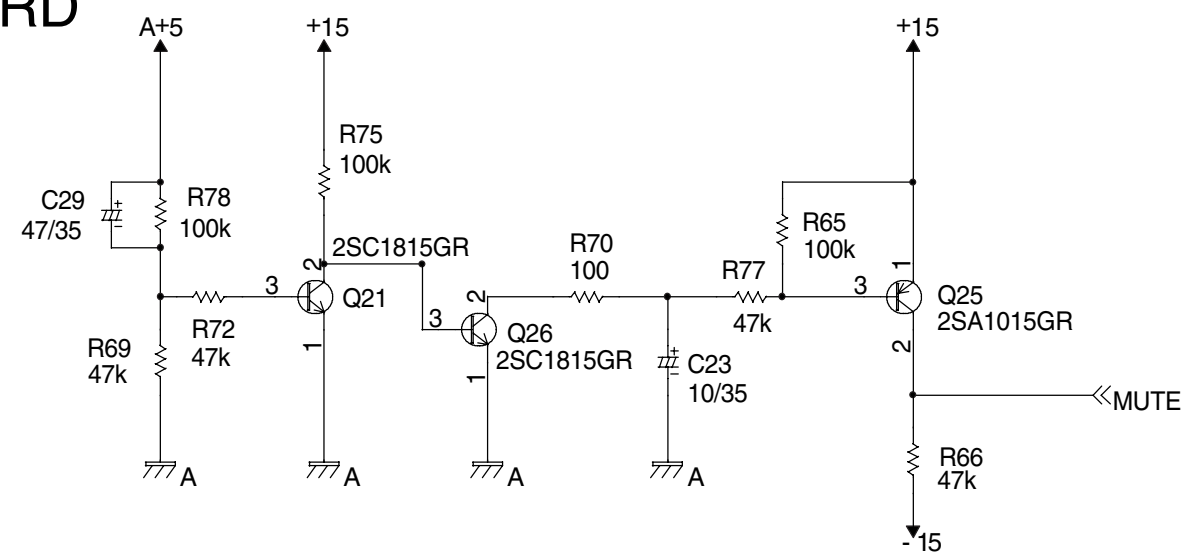
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

INLET BOARD

POWER AMP BOARD (Power Supply Section)



POWER AMP BOARD (Mute Section)

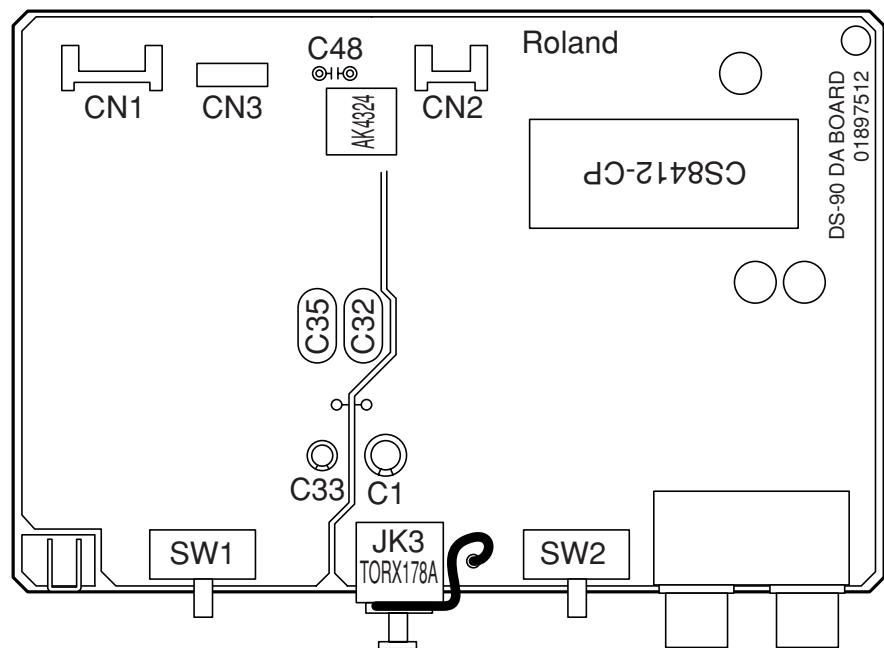


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

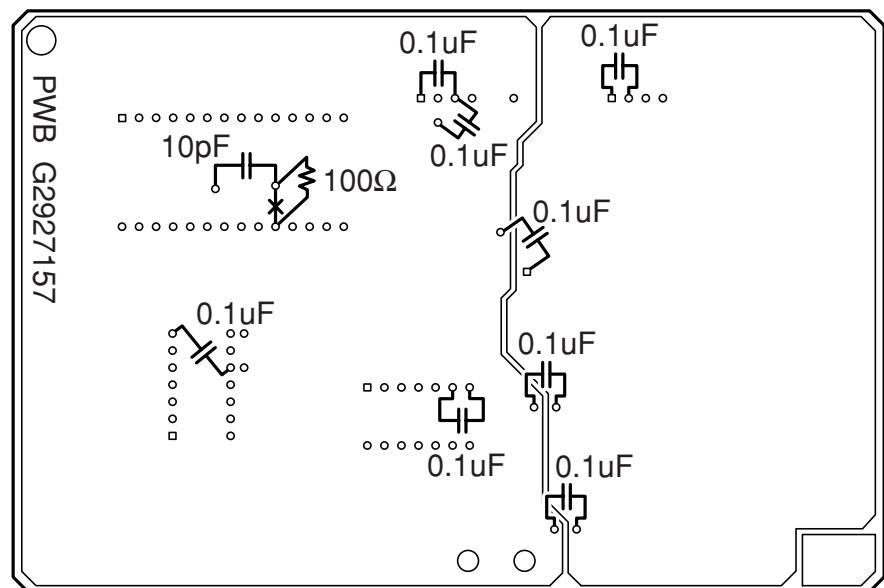
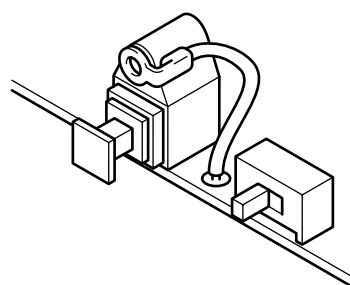
A INFORMATION

● The following changes were made to the early versions of the DS-90 BOARD.

B DA BOARD for DS-90



Ground line is connected to the main body chassis. View from components side

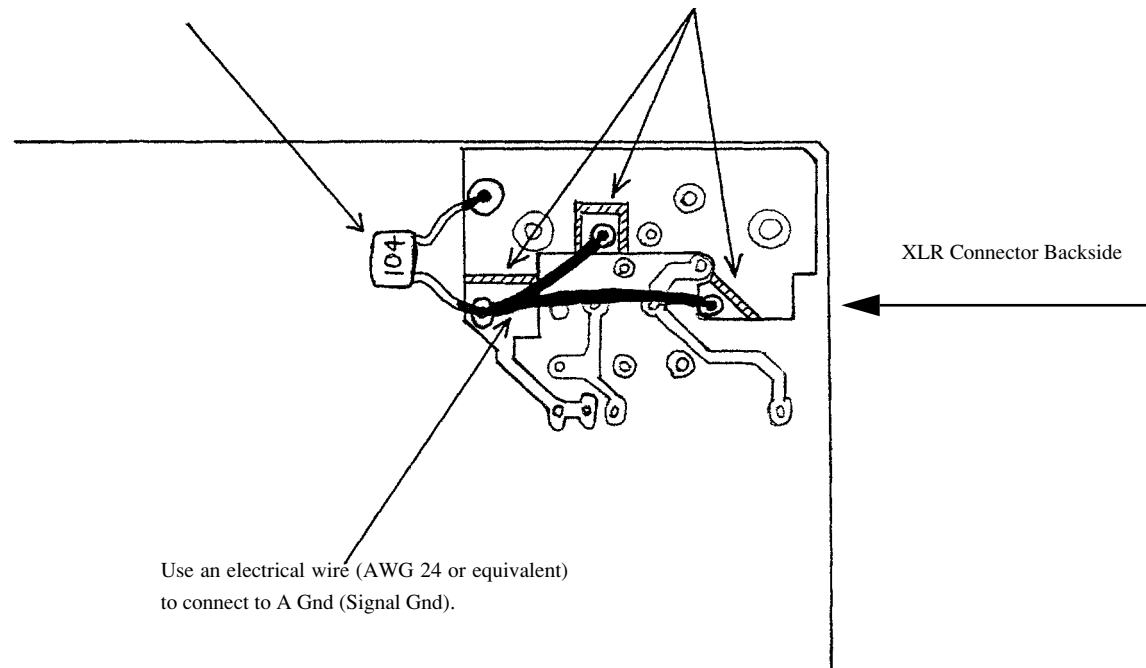


0.1uF capacitors are connected to the backside. View from foil side

C ANALOG SHEET for DS-90 (HEAD AMP BOARD BLOCK)

Use a 0.1uF monolithic ceramic capacitor to connect between Frame Gnd and A Gnd.

Cut the Gnd pattern (3 places).



Use an electrical wire (AWG 24 or equivalent) to connect to A Gnd (Signal Gnd).

View from foil side