

DENON

SERVICE MANUAL

ELECTRONIC PIANO

MODEL
EP-5500

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NIPPON COLUMBIA CO., LTD.

CAUTIONS

CAUTION:

- Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 Kohms, the unit is defective.

WARNING:

- Parts marked with  this symbol have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.
- DO NOT return the unit to the customer until the problem is located and corrected.

LIST OF P.C. Board UNIT

Name of P.C. Board	UNIT No.	Remarks
SWITCH BOARD I	BP-343	
SWITCH BOARD II	BP-339	
SWITCH BOARD III	BP-344	
SWITCH BOARD IV	BP-341	
MAIN PCB	BP-421-2	
EFFECT BOARD	BP-422-1	
POWER BOARD	BP-419-1	
PANEL BOARD	BP-420-3	
L/FILTER BOARD	BP-393-2	U.S.A., Canada Models
	BP-393-3	Europe, U.K., Asia Models

Fig. 1

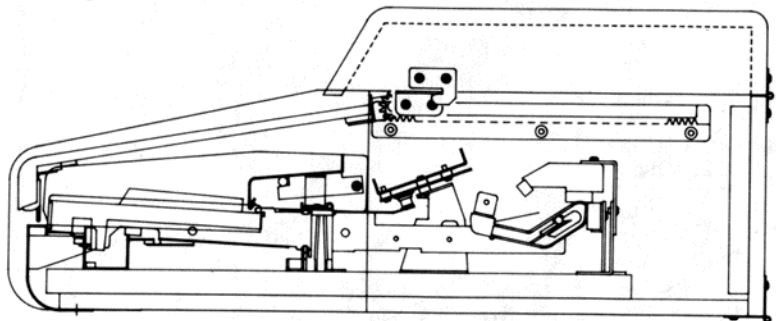
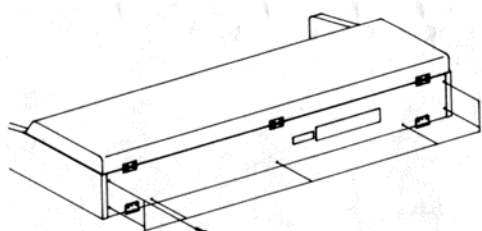
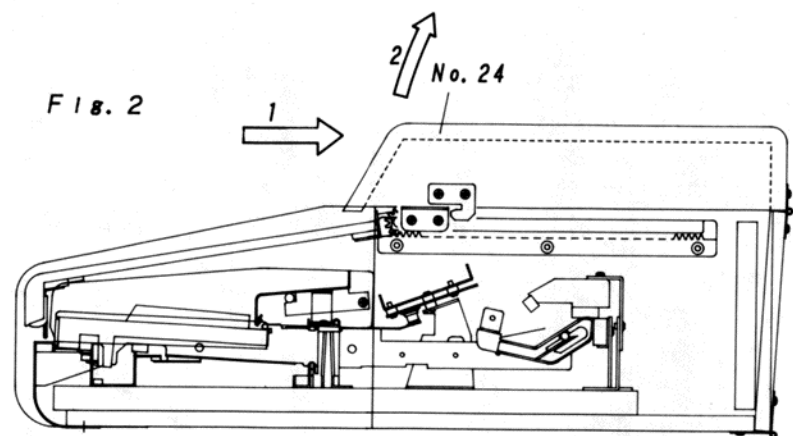


Fig. 2



No. 23
3.5 x 25 CTTS (1) ZnB-7

Fig. 3

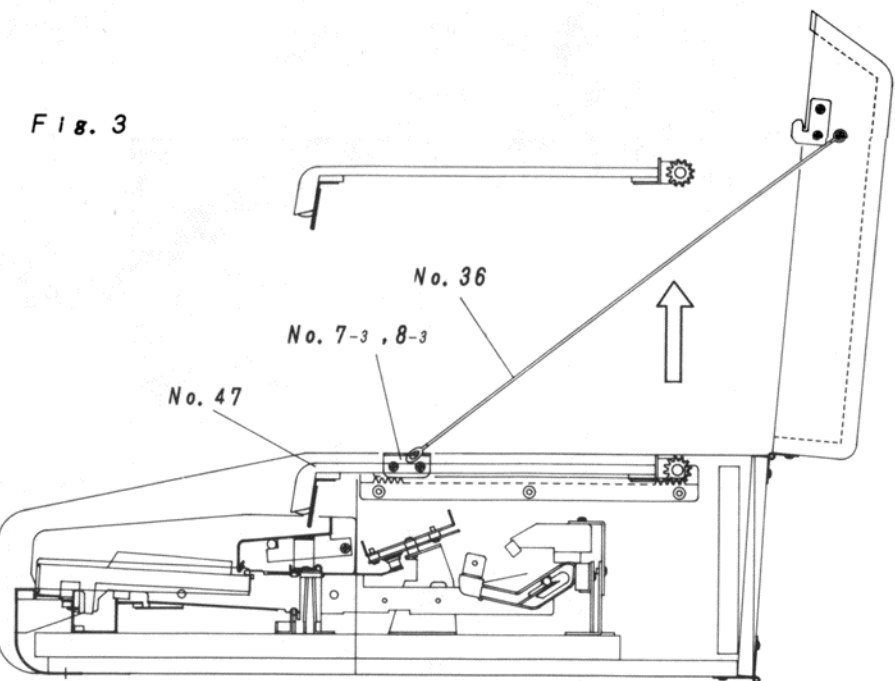
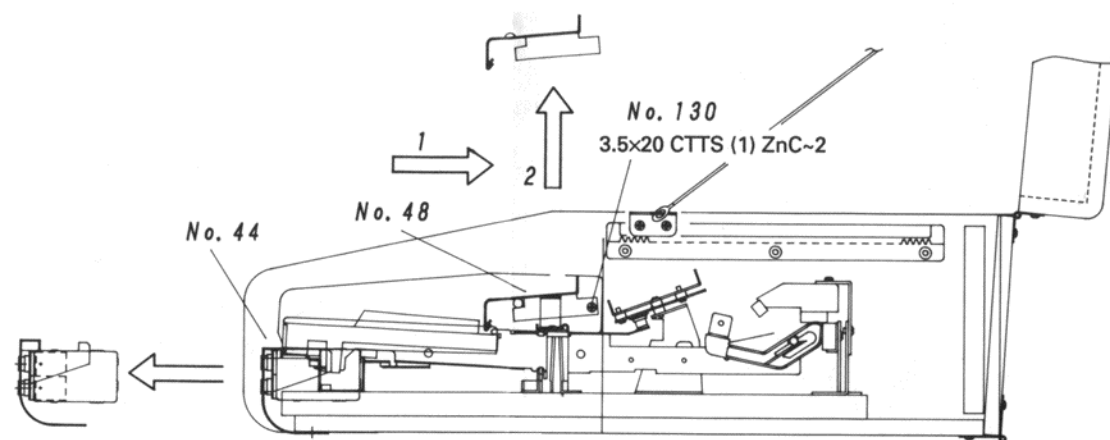


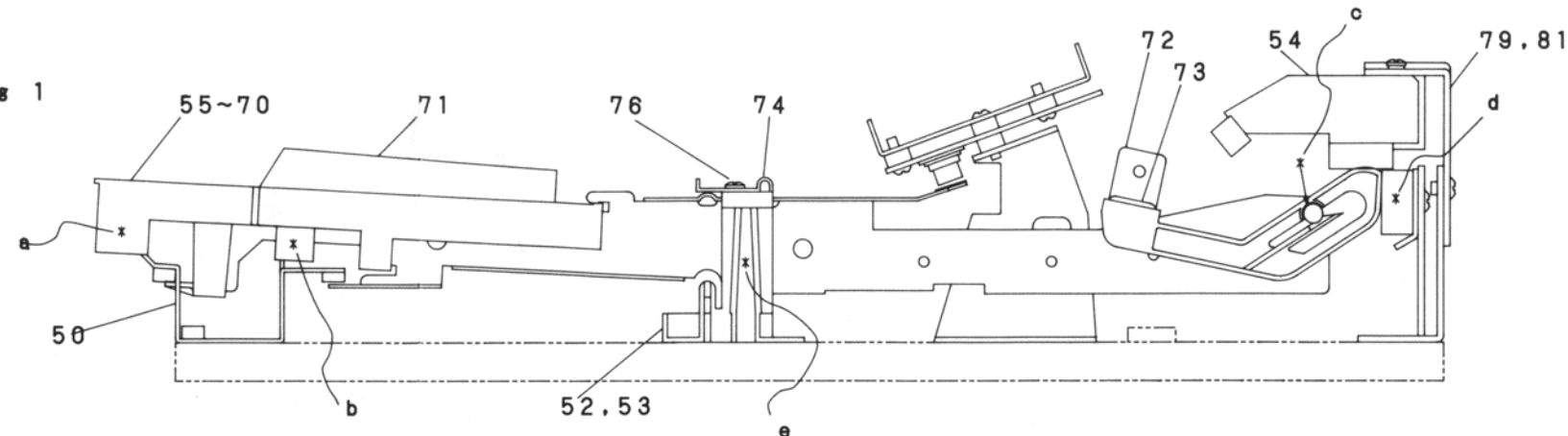
Fig. 4



No. 45, 46
3.5 x 25 CTTS (1) ZnB-4
4.1W ZnB-4

1. Remove roof board assembly 24. (Fig. 1)
 - 1) Remove seven (7) screws 23 (3.5 x 25 CTTS(1)).
 - 2) Move roof board assembly 24 in the direction of arrow 1 and lift it in the direction of arrow 2.
 - 3) Hook stay 36 to joint bracket (A) 7-3. (Fig. 2)
2. Remove key cover assembly 47. (Fig. 3)
 - 1) Lift key cover assembly 47 to remove it.
3. Remove top panel semi-assembly 48 and front panel 44. (Fig. 4)
 - 1) Remove two (2) screws 130 (3.5 x 20 CTTS(1)) and move top panel semi-assembly 48 in the direction of arrow 1 and then in the direction of arrow 2 to remove it.
 - 2) Remove four (4) screws 45 (3.5 x 25 CTTS(1)) and four (4) washers 46 (4.1 W), then remove front panel 44 in the direction of the arrow.

Fig 1



Coat sections marked * with grease.
 a. Rubbed sections between the insides of the normal keys and the key guides
 b. Rubbed sections between the insides of the chromatic keys and the key guides
 c. Linked sections between the hammers and hammer shafts
 d. Rubbed sections between the hammers and cushion rail felt pad
 e. Rubbed sections between the key assembly and center rail
 Grease: MOLY COAT EM-50L (milky white) a ~ d
 PLASTILUBE EP (brown) e

Fig 2

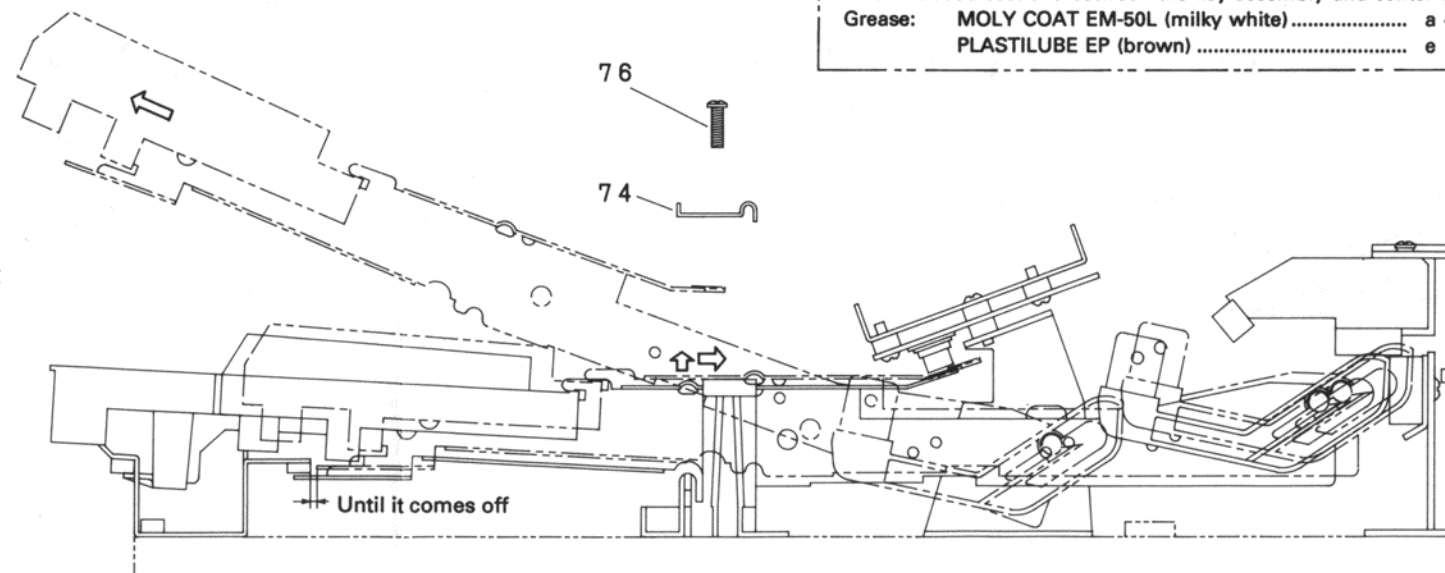


Fig 3

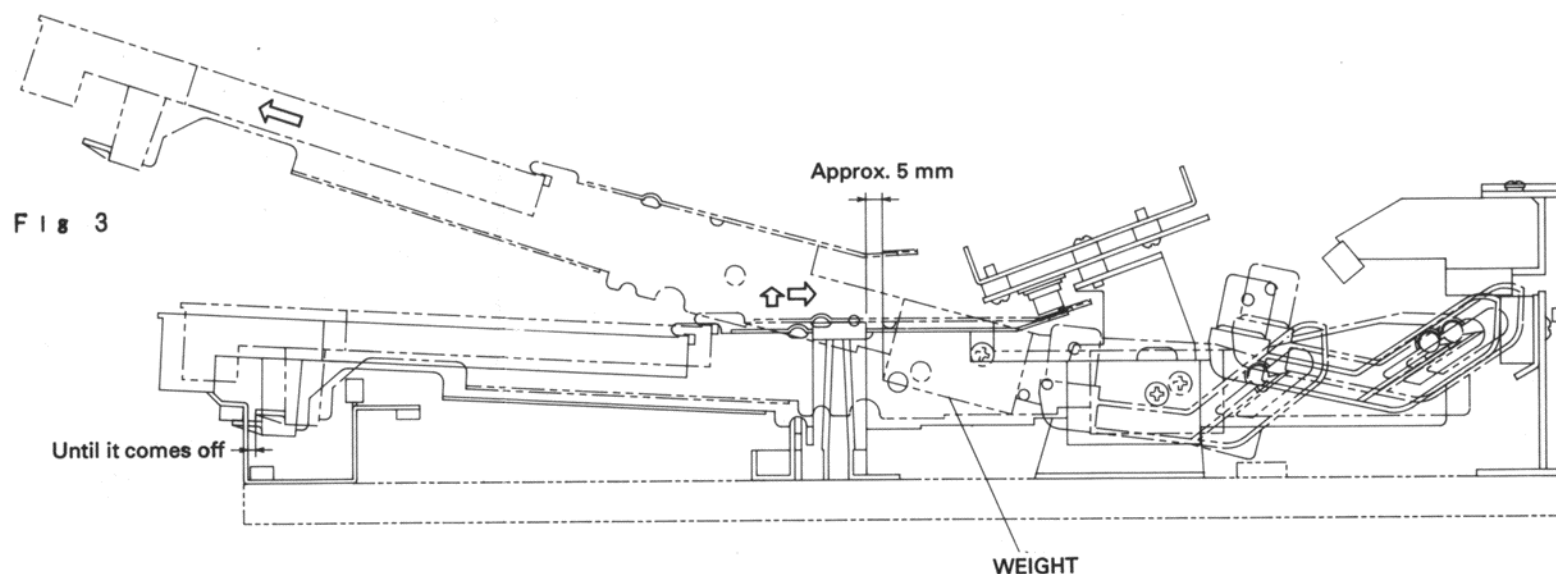
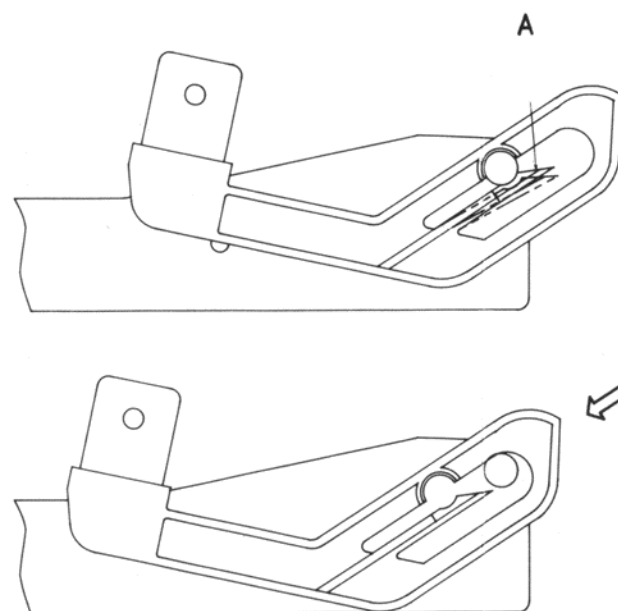


Fig. 4




Keyboard Removal (grand hammer action) - Section View (Fig. 1)

* Remove chromatic keys first, and install normal keys first.

1. Chromatic key removal (Fig. 2)
 - 1) Remove two (2) screws 76 (3.5 x 12 CBTS (2)) (1 block) and then key stopper 74.
 - 2) Lift key assembly (B) 71 and move it backwards, then release the upper limit stopper at the front bottom from front guide rail assembly 50.
 - 3) Lift the front of the chromatic key and pull it out to the front. Since hammers 72 and 73 rotate freely at this time, hold them with your fingers so the key can be pulled out easily.
2. Normal key removal (Fig. 3)
 - 1) Lift key assemblies (W) 55-70 and move them backwards, then release the upper limit stopper at the front bottom from front guide rail assembly 50.
 - 2) Lift the front of the normal key and pull it to the front obliquely until approx. 5 mm before the weight hits center rails 52 and 53, then twist it to the left or right by approx. 45° to pull it out. Since hammers 72 and 73 rotate freely at this time, hold them with your fingers so the key can be pulled out easily.
3. Hammer removal (Fig. 4)
 - 1) Push section A of hammers 72 and 73 to widen it and push the hammer in the direction of the arrow.

EXPLODED VIEW

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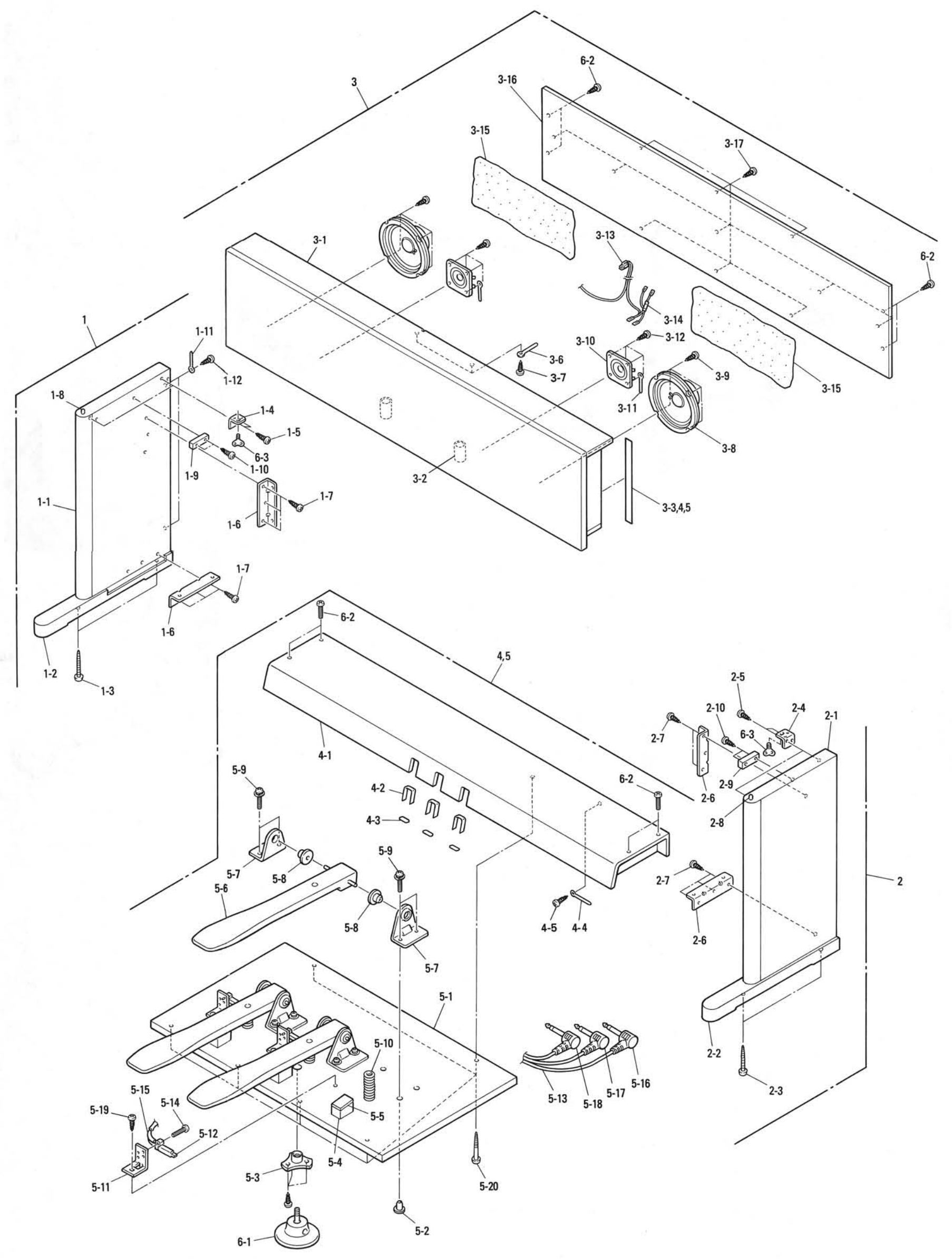
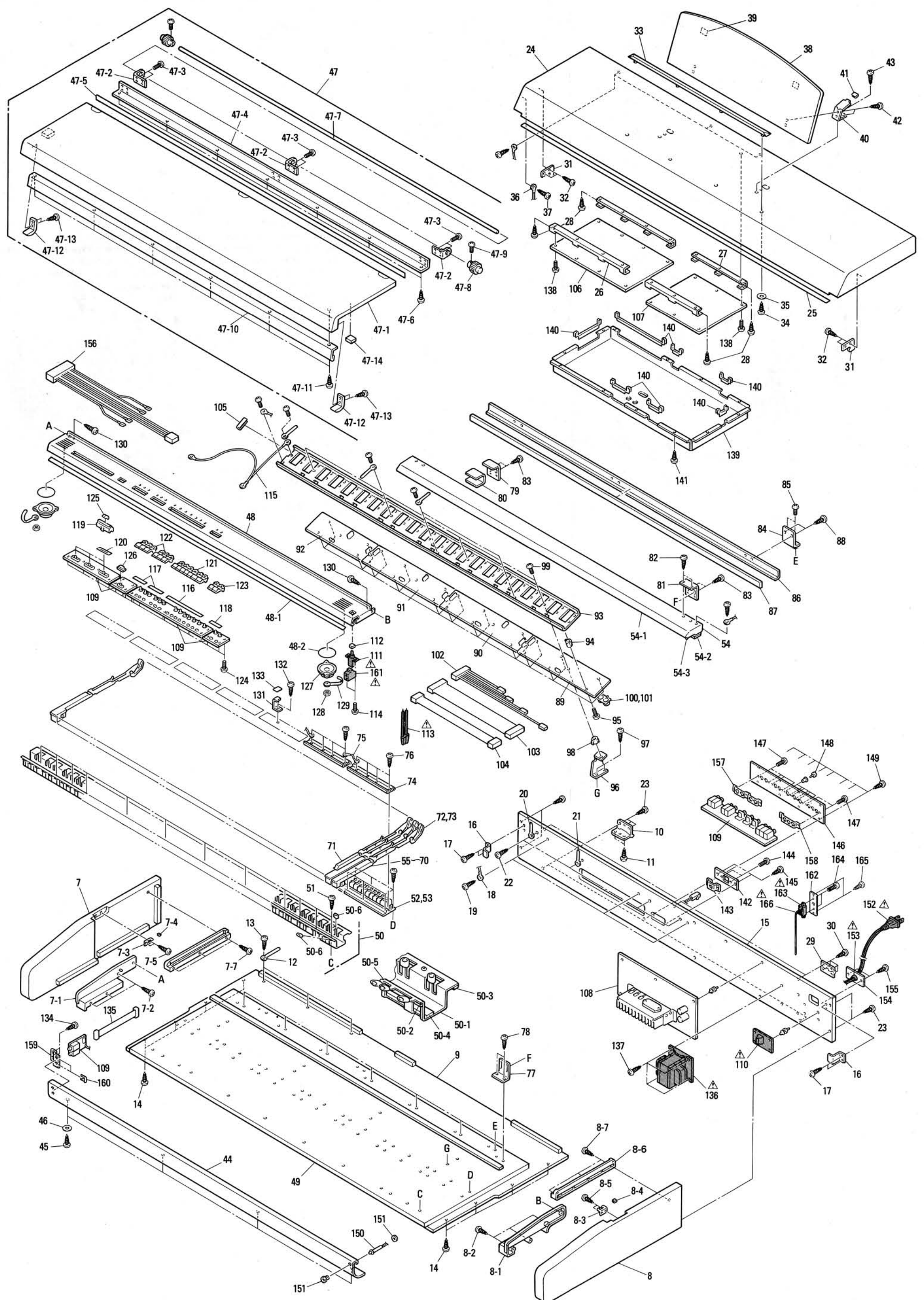


Fig. 1 * Loosen screw A holding back rail brackets 79 and 81 (so it moves when hit with the shaft of a screwdriver) and lower the back rail to adjust so the key sinks 10.5 ± 0.5 mm, then tighten the screw. (The key sinks less when back rail 54 is lowered, and more when it is raised.)

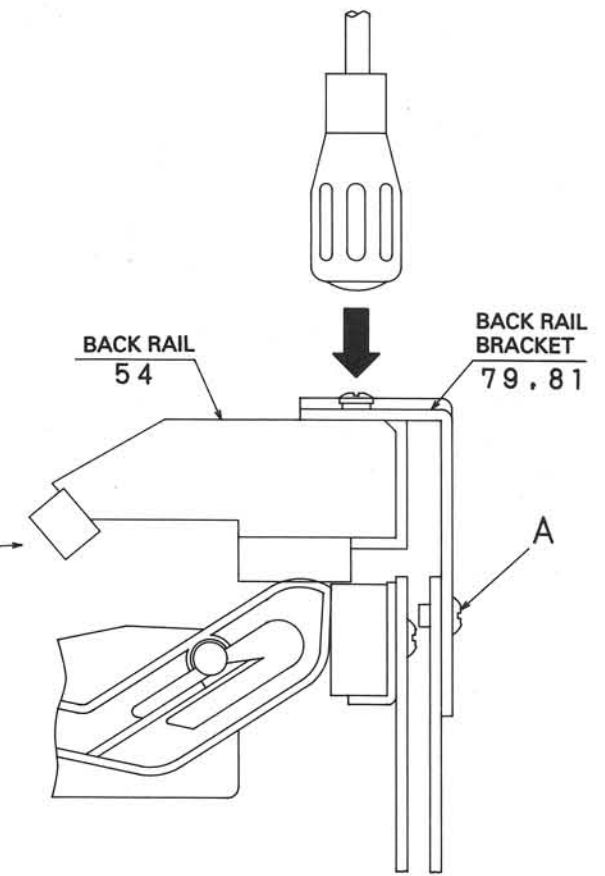
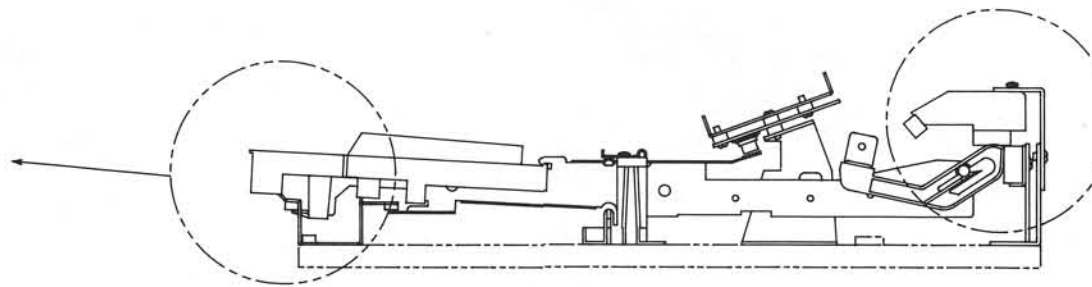
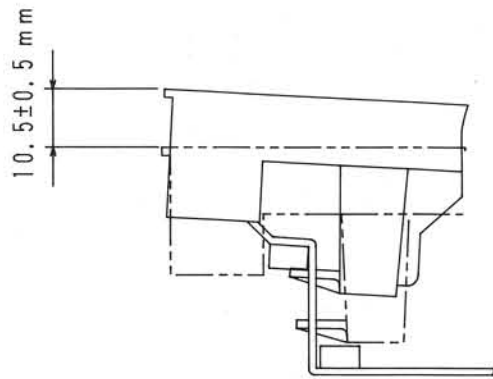


Fig. 2

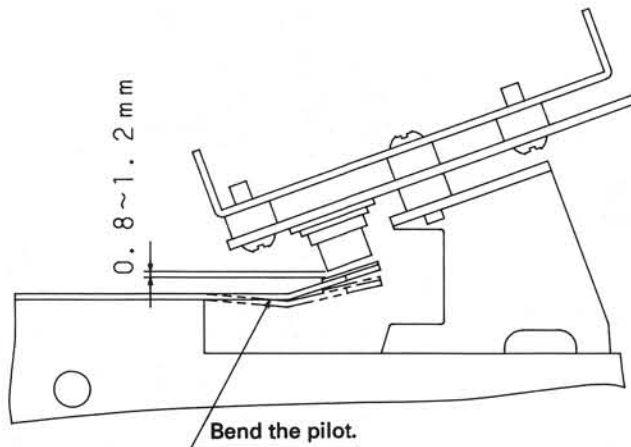


Fig. 3

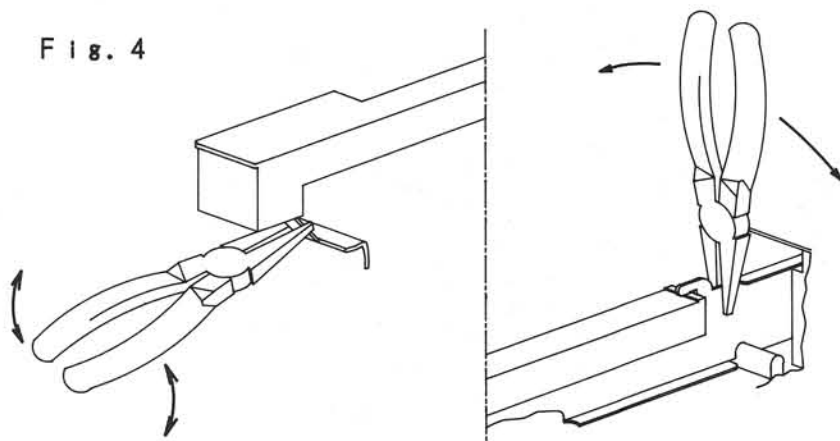


Fig. 4

◎ Causes of defects and how to repair and adjust

1. Key does not return or it returns incorrectly.

a) The key arm is in contact with the switch base bracket. _____	Bend the key arm so they do not touch each other.
b) No grease on key guide. _____	Coat with grease (Moly coat EM-50L *Milky white)
c) No grease at center rail. _____	Coat with grease (Plastilube EP *Brown)
d) Hammer does not turn smoothly _____	Coat with grease (Moly coat EM-50L *Milky white)

* Replace the hammer if it is engaged incorrectly.
2. Key noise

a) No grease between center rail and key arm. _____	Coat with grease (Plastilube EP *Brown)
b) The key arm is in contact with the switch base bracket. _____	Bend the key arm so they do not touch each other.
c) The center rail and key arm pivot lift _____	The key sink adjustment is faulty.

(when the key pressed hits against the key cushion first). (Refer to key sink adjustment)

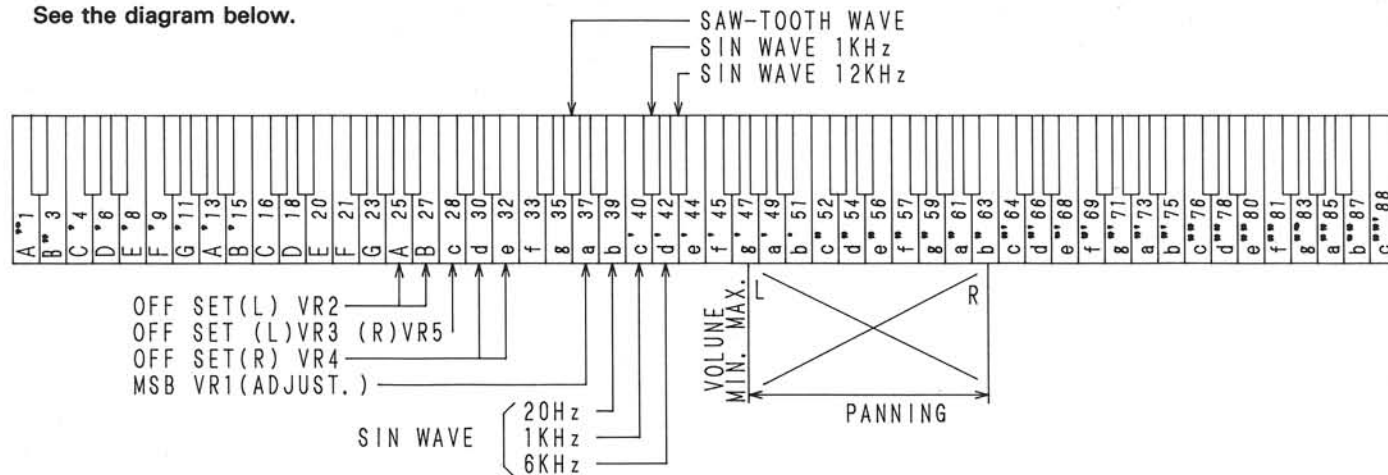
d) Keys are in contact with each other. _____ Adjust the tilt of keys. (Refer to key tilt adjustment.)
3. Adjustments

The following adjustments can be done with this model.

 - a) Key tilt adjustment (Fig. 3)
 - b) Key row adjustment (left/right) (Fig. 4)
 - c) Key sink adjustment (amount of sink) (Fig. 1)
 - d) Adjustment of gap between rubber switch and actuator (Fig. 2)

Test Mode

- (1) How to set to the test mode:
Press the BASS button and hold it, then set the POWER switch to ON. Only the PIANO 1 indicator lights.
- (2) How to clear the test mode:
Press the timbre select button once or set the POWER switch to OFF and then ON again.
- (3) Details of test mode
OFFSET adjustment
MSB adjustment
Sine-wave outputs (20Hz, 1kHz, 6kHz, 12kHz)
Sine-wave outputs (higher than the above at 1kHz)
Panning
- (4) Relationship between test mode and keyboard
See the diagram below.



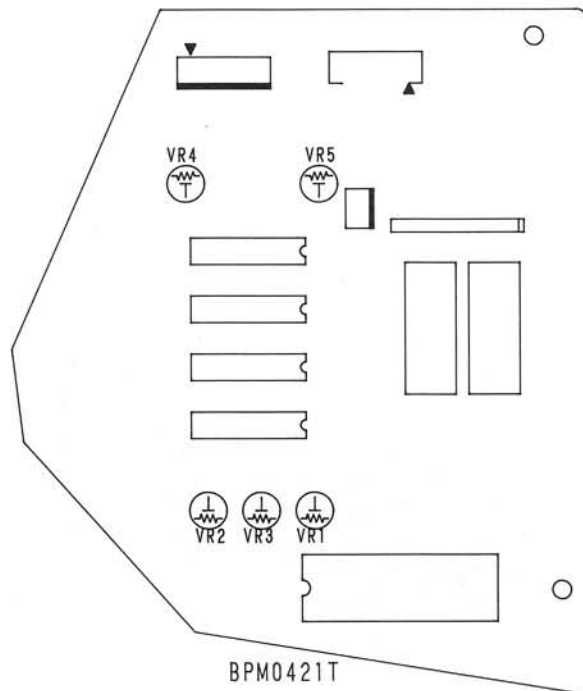
Adjustment

- (1) Test equipment necessary for adjustment
Millivoltmeter
- (2) Before starting
Warm up for 5 minutes and set to the test mode before starting adjustment.
- (3) Adjustment point locations
See the diagram on the right.
- (4) Order of adjustments

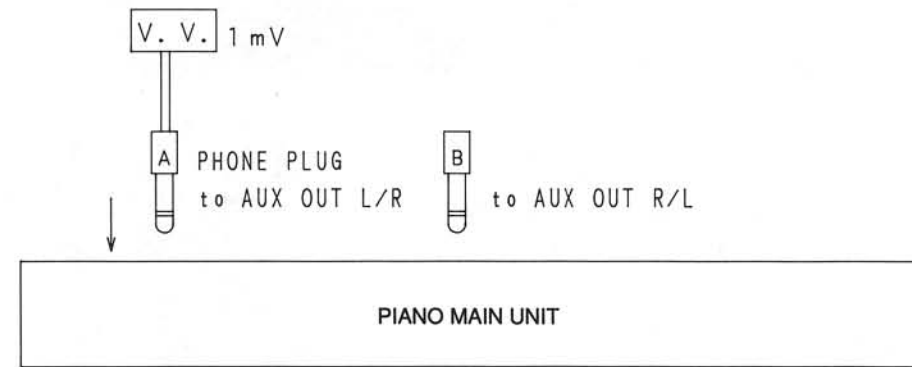
1	Warm up	More than 5 minutes
2	Test mode	
3	MSB adjustment	VR1
4	OFFSET adjustment	1 VR5 (R Side)
		2 VR4 (R Side)
		3 VR3 (L Side)
		4 VR2 (L Side)

(5) Settings of VRs on panel

Name of VR	VOLUME	BRILLIANCE
Setting	MAX.	BRIGHT



(6) How to connect



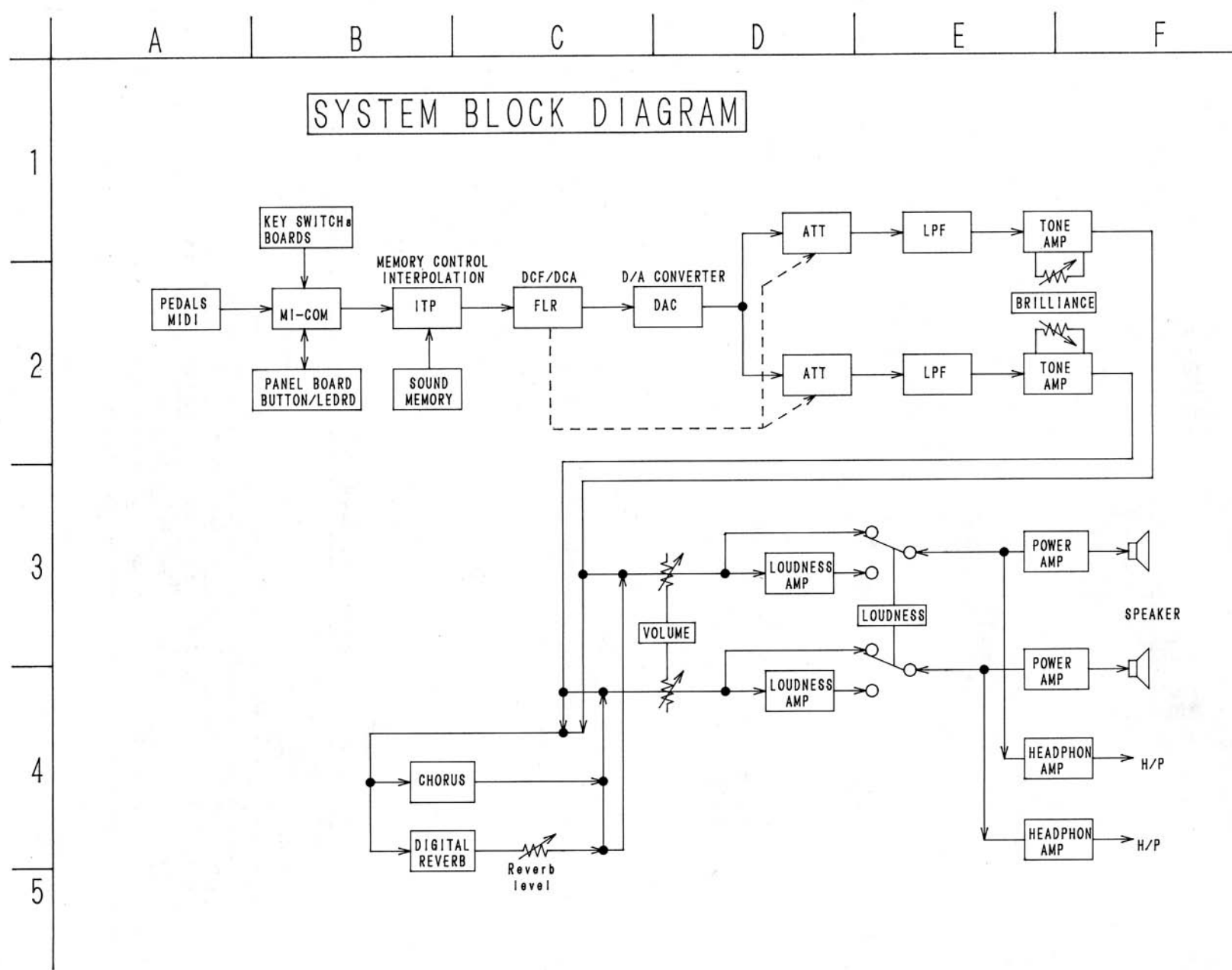
(7) Adjustment procedure

Adjust the VRs so the millivoltmeter reading is minimum.

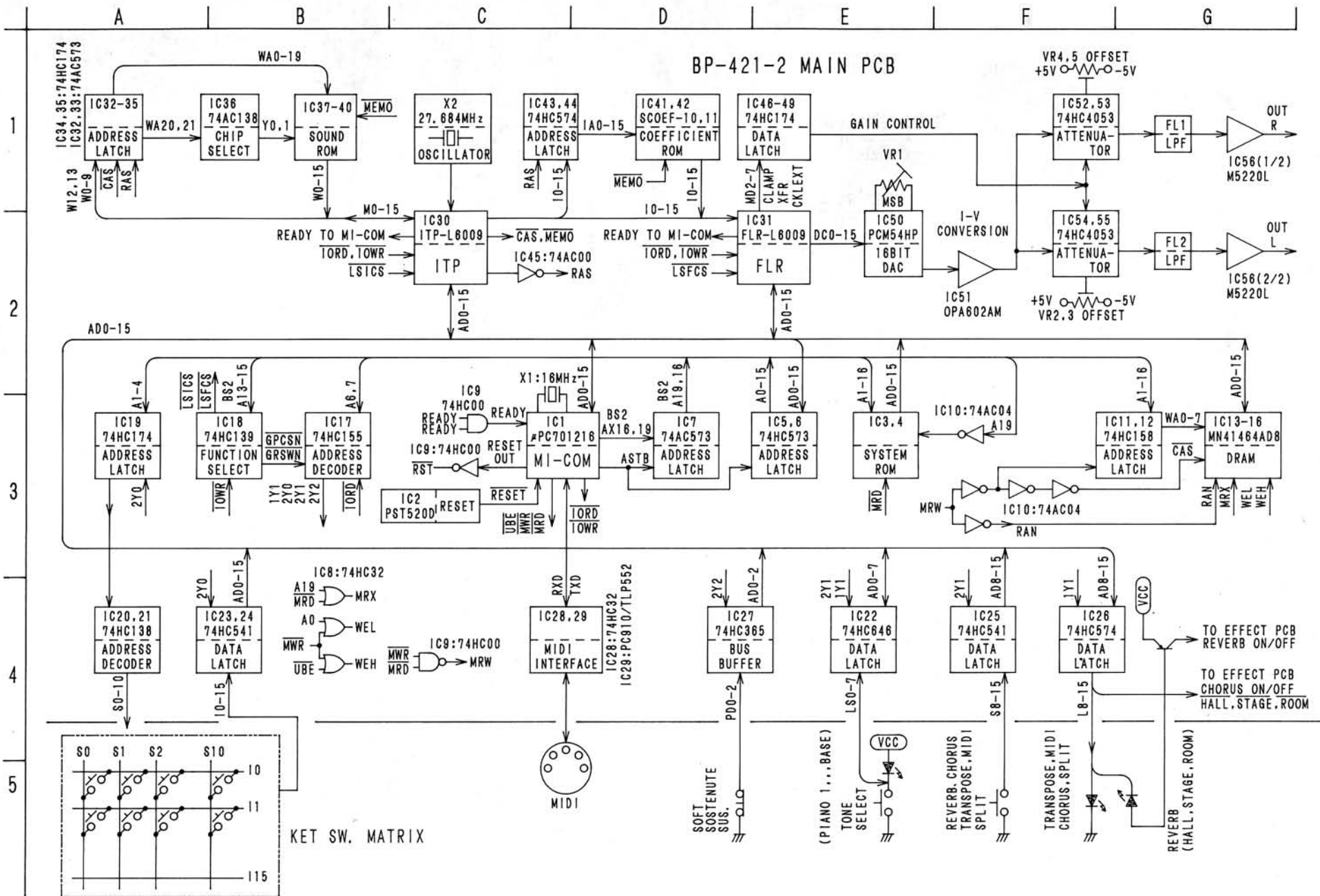
VR No.	Plug positions (AUX OUT)		No. of keys	Operation
	A	B		
1	VR1	R L	37 (A)	Set A to ON.
2	VR5	R L	28 (C)	Set C to ON repeatedly.
3	VR4	R L	30, 32 (D, E)	Set D and E to ON alternately and repeatedly.
4	VR3	L R	28 (C)	Set C to ON repeatedly.
5	VR2	L R	25, 27 (A, B)	Set A and B to ON alternately and repeatedly.

Note: For item 1 adjust to the volume is minimum when listening.

BLOCK DIAGRAM



CONTROL SYSTEM & D/A CONVERTER BLOCK DIAGRAM

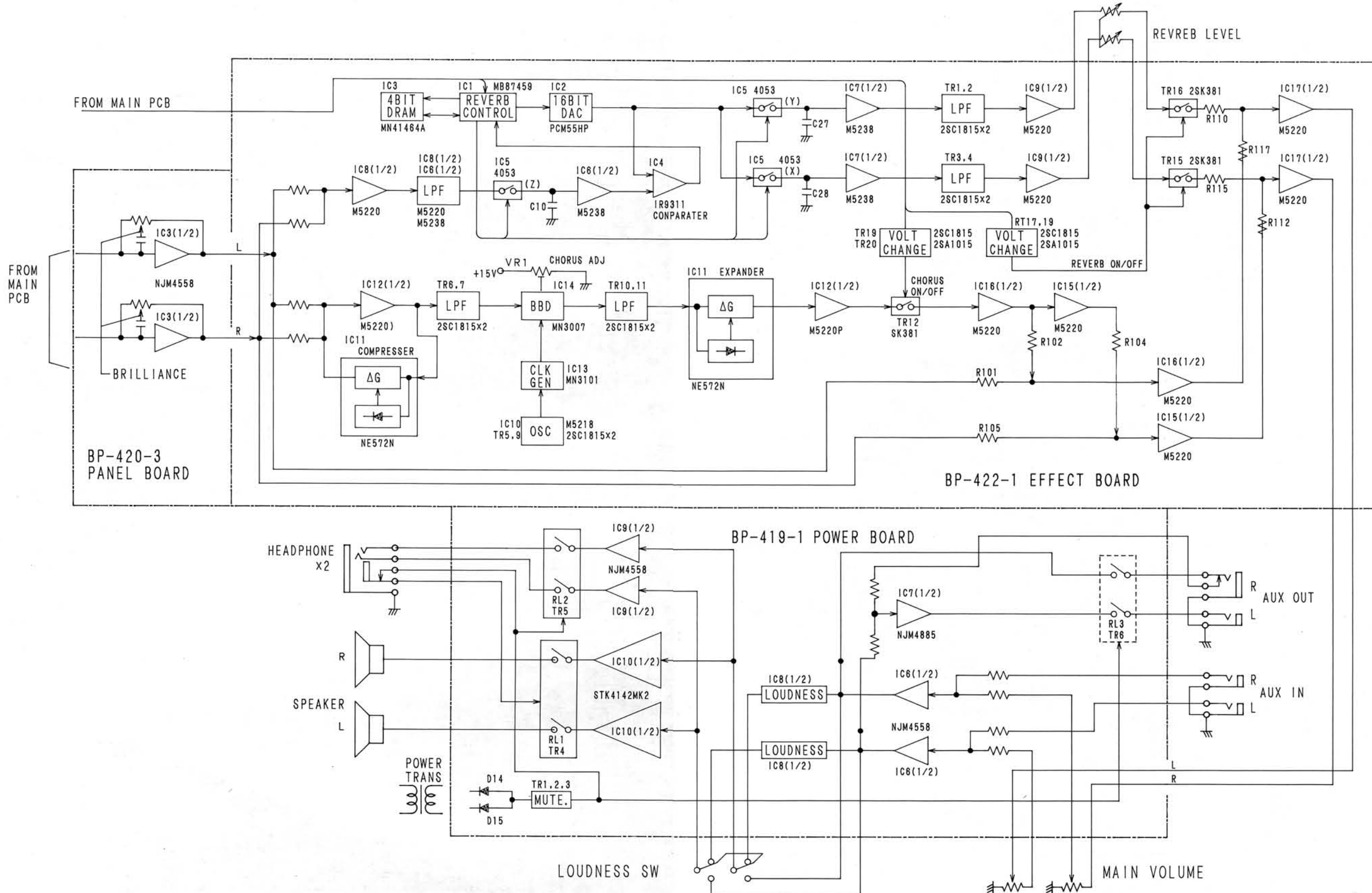


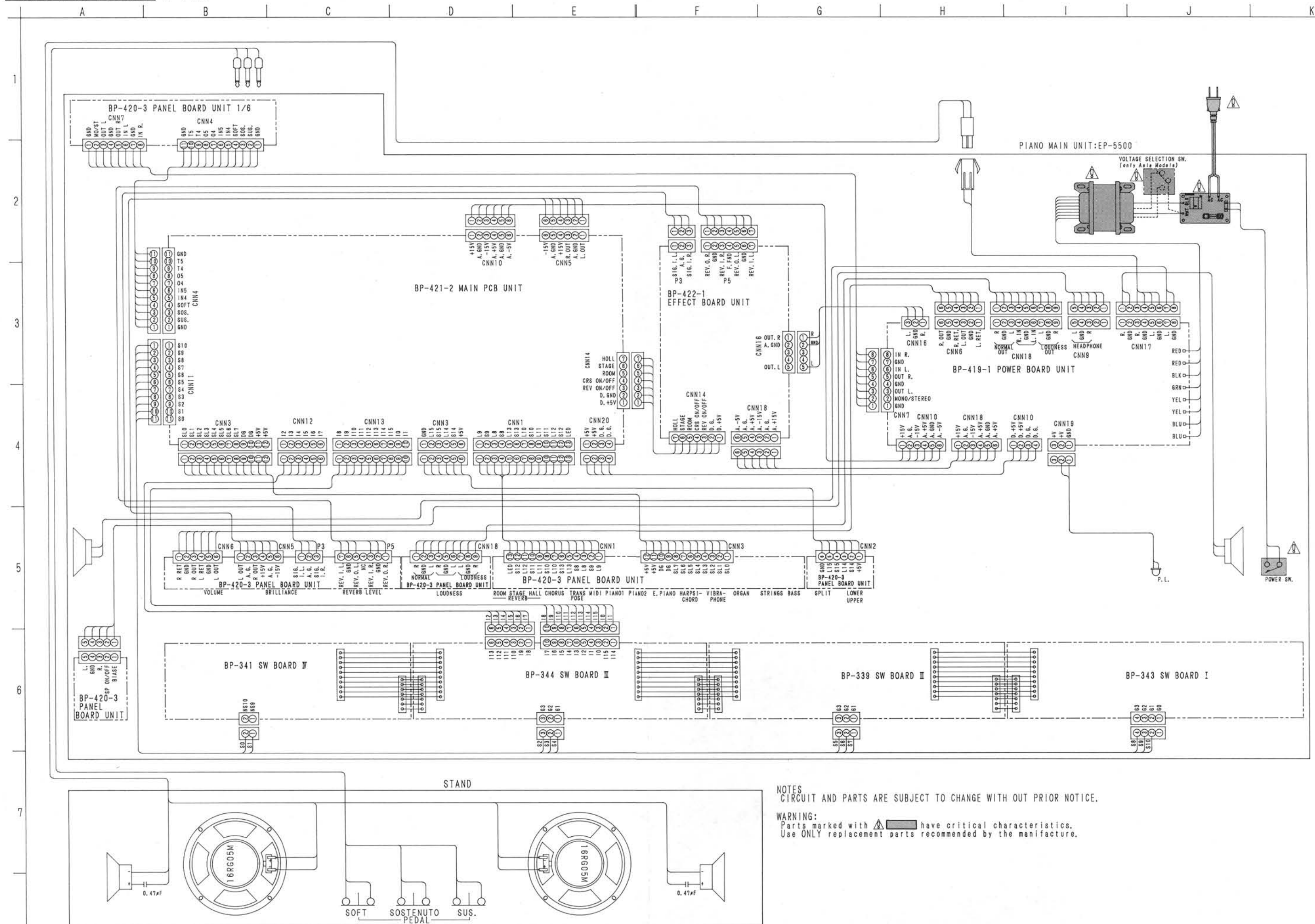
SOUND SYSTEM

BLOCK DIAGRAM

A B C D E F G

1
2
3
4
5





NOTES
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITH OUT PRIOR NOTICE.

WARNING:
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Use ONLY replacement parts recommended by the manufacture.

PARTS LIST Printed Circuit Board:EP-5500

BP-421-2 MAIN PCB

Ref. No.	Part No.	Part Name	Remarks
IC1	2621535004	PD702166F-8-3B8	
IC2	2630803002	PST520D-2	
IC3	2621726075	27C512-5500-3.0-L	
IC4	2621727074	27C512-5500-3.0-M	
IC5,6	2621313006	TC74HC573AP	
IC7,32,33	2621538001	CD74AC573E	
IC8,28	2621321001	TC74HC32AP	
IC9	2621318001	TC74HC00AP	
IC10	2621542000	HD74AC04P	
IC11,12	2621552003	HD74AC158P	
IC13-16	2621551004	MN4164A-08	
IC17	2621544008	TC74HC155AP	
IC18	2621159008	TC74HC139AP	
IC19,34,35,46-49	2621543002	TC74HC174AP	
IC20,21	2621160000	TC74HC138AP	
IC22	2621077009	TC74HC646AP	
IC23-25	2621315004	TC74HC541AP	
IC26,43,44	2621314005	TC74HC574AP	
IC27	2621553002	TC74HC365AP	
IC29	3939330000	TLP552/PC910	
IC30	2621536003	ITP-L6009	
IC31	2621537002	FLR-L6009	
IC36	2621592005	TC74AC138P	
IC37	2621730003	LH538K13 AWV-100-3	
IC38	2621731002	LH538K14 AWV-100-4	
IC39	2621728002	LH538K11 AWV-100-1	
IC40	2621729001	LH538K12 AWV-100-2	
IC41	2621545007	SC0EF10-512 9743-081	
IC42	2621546006	SC0EF11-512 9743-081	
IC45	2621541001	HD74AC00P	
IC50	2620672007	PCM54HP	
IC51	2630804001	OPA602AM	
IC52-55	2621550005	CD74HC4053E	
IC56	2630226003	M5220L	
FL1,2	2610123003	LP YC258BLR-5589N	
△ R20,21	2412315035	RD14B2E3306FRF	330
△ R38-41	2412371011	RD14B2E1506FRF	150
X1		HC-49/U-S 16.000MHz	
X2	3997002008	COX-042C 27.684MHz	
RA1-3	2462045038	RK99=1H103JP8	10KΩ×8
RA4	2462085001	RK99=1H103JP3	10KΩ×3
VR1	2116089010	K07PB105	B-1MKΩ
VR2-5	2116089007	K07PB502	B-5KΩ

BP-422-1 EFFECT BOARD

Ref. No.	Part No.	Part Name	Remarks
D1,2,5,6	2760432000	1SS270A	
9,10			
D3,4	2760460001	HZS5C-1	
TR1-6,8-11	2730198028	2SC1815(GR)	
17,19			
TR12,15,16	2750048006	2CK381(D/E)	
TR7	2730415002	2SC3330T	
TR18,20	2710102021	2SA1015(GR)	
IC1	2631486001	MB87459PF-001	
IC2	2621561007	PCM55HP	
IC3	2621551004	MN4164A-08	
IC4	2630806009	IR9311	
IC5	2621562008	TC74HC4053AP	
IC6,7	2630679000	M5238P	
IC8,9,12	2630317006	M5220P	
15-17			
IC10	2630711000	M5218AP	
IC11	2630807008	NE572N	
IC13	2620212001	MN3101	
IC14	2630152009	MN3007	
X1	3997002024	HC-49/U-S 20.000MHz	
△ R201,202	2412371011	RD14B2E1506FRF	150
RA1	2462077006	RK99=1H104JP4	100KΩ×4
VR1	2116056072	V06PB203	B-20KΩ
L10-16,19	2350023007	BL02RN2-R62	
21-25,27			
L1-5	2350090001	SBT-0240	

BP-420-3 PANEL BOARD

Ref. No.	Part No.	Part Name	Remarks
IC3	2630081002	NJM4558D	
SW1-16	2124388004	TACT SWITCH	
SSW1	2128600005	SLIDE SWITCH	
LD1-16	3939490005	LN221RP	
VR1,3	2117050006	J3020VBB103	B-10KΩ
VR2	2117050019	J3020VBB503	B-50KΩ
L1-12	2350050009	BEAD INDUCTOR	
△ R29-32	2412314007	RD14B2E101JNBF	1000
MIDI	2049431007	DIN SOCKET	
AUX IN	2049437001	PHONE JACK	
AUX OUT	2049436002	PHONE JACK	
PEDAL	2049444007	PHONE JACK	
HEADPHONE	2049443008	PHONE JACK	

EP-419-1 POWER BOARD

Ref. No.	Part No.	Part Name	Remarks
IC1	2360053006	NJM7805FA	
IC2	2630561001	NJM7915FA	
IC3	2630560002	NJM7815FA	
IC4	2630567005	NJM78M05FA	
IC5	2630501003	NJM79M05FA	
IC6-8	2630405002	NJM4558S	
IC9	2630485006	NJM4556S	
IC10	2650074002	STK4142MK2	
△ D1	2760505005	DBA20B	
D2,3,5-12	2760432000	1SS270A	
14-19			
△ D4	2760504006	DBA10C	
△ D13	2780804003	DBA60C	
ZD1	2760468003	HZS9B-(1)	
TR1,4-6	2730198028	2SC1815(GR)	
TR2,3	2710102021	2SA1015(GR)	
RL1	2140146000	G6B2214P-US DC12V	
RL2,3	2140148008	G5A-234P DA12	
△ F1,2	2061039092	FUSE 4A 125V	U.S.A.,Canada
△ F1,2	2081015087	FUSE 4A 125V	Europe,U.K.
△ F1,2	2061035070	FUSE 4A 125V	Asia
△ F3,4	2061039021	FUSE 500mA 125V	U.S.A.,Canada
△ F3,4	2061015003	FUSE 500mA 250V	Europe,U.K.
△ F3,4	2061035083	FUSE 630mA 125V	Asia
△ F5	2061039034	FUSE 1A 125V	U.S.A.,Canada
△ F5	2061015029	FUSE 1A 250V	Europe,U.K.
△ F5	2061053007	FUSE 1A 125V	Asia
△ R69,78	2412314007	RD14B2E101JNBF	1000
△ R76,77	2452381003	RN14B3D4R7JNBF	4.70
△ R80	2412321028	RD14B2E152JNBF	1.5K0
△ R92	2412314081	RD14B2E561JNBF	5600
△ R95,98	2412321087	RD14B2E121JNBF	1200
△ R105,106	2412314049	RD14B2E100JNBF	100
L1-5	2350050009	BEAD INDUCTOR	

BP-344,339,343 KEY SWITCH BOARD

Ref. No.	Part No.	Part Name	Remarks
D1-48	2760049008	1S2706	
	2128582107	8KEY RUBBER SWITCH	

BP-341 KEY SWITCH BOARD

Ref. No.	Part No.	Part Name	Remarks
D1-34	2760049008	1S2706	
	2128582107	8 KEY RUBBER SWITCH	
	2128584105	1 KEY RUBBER SWITCH	

BP-393-2 L/FILTER BOARD(U.S.A./Canada)

Ref. No.	Part No.	Part Name	Remarks
△ F	2061056004	FUSE 2A 125V	
△	2397001008	LINE FILTER	
△ C1,2	2538012005	CK45F2GAC222M	
△ C3	2538015002	CK45F2GAC103P	
△ SW	2033518004	2P CONNECTOR BASE	

BP-393-3 L/FILTER BOARD(Europe,U.K.,Asia)

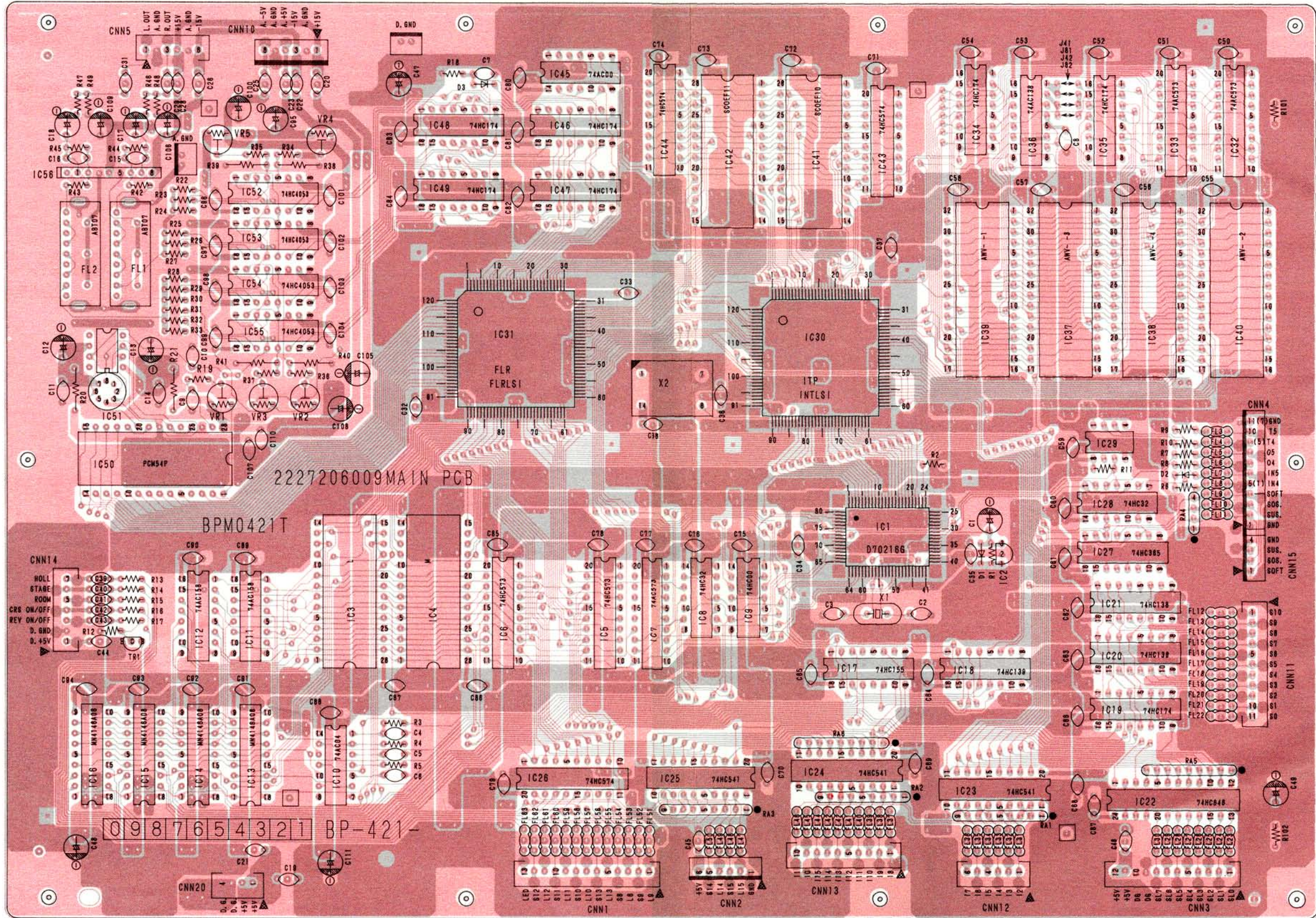
Ref. No.	Part No.	Part Name	Remarks
△ F	2061015081	FUSE 2A 250V	
△	2020014003	FUSE CLIP	
△	2397001008	LINE FILTER	
△ C1,2	2538012005	CK45F2GAC222M	
△ C3	2538015002	CK45F2GAC103P	
△ SW	2033518004	2P CONNECTOR BASE	

WARNING:

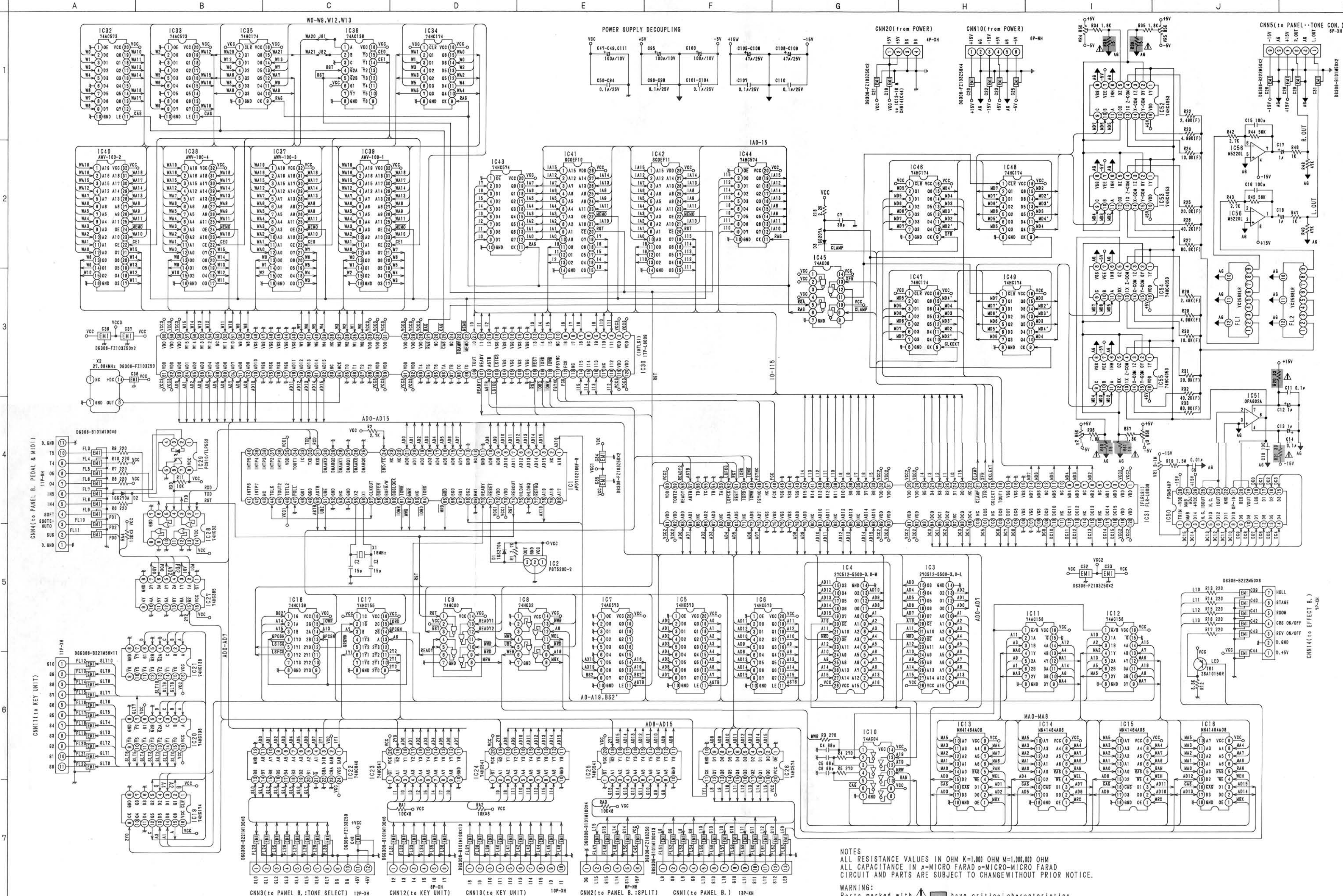
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BP-421 MAIN PCB UNIT Soldering side

Mounting Side



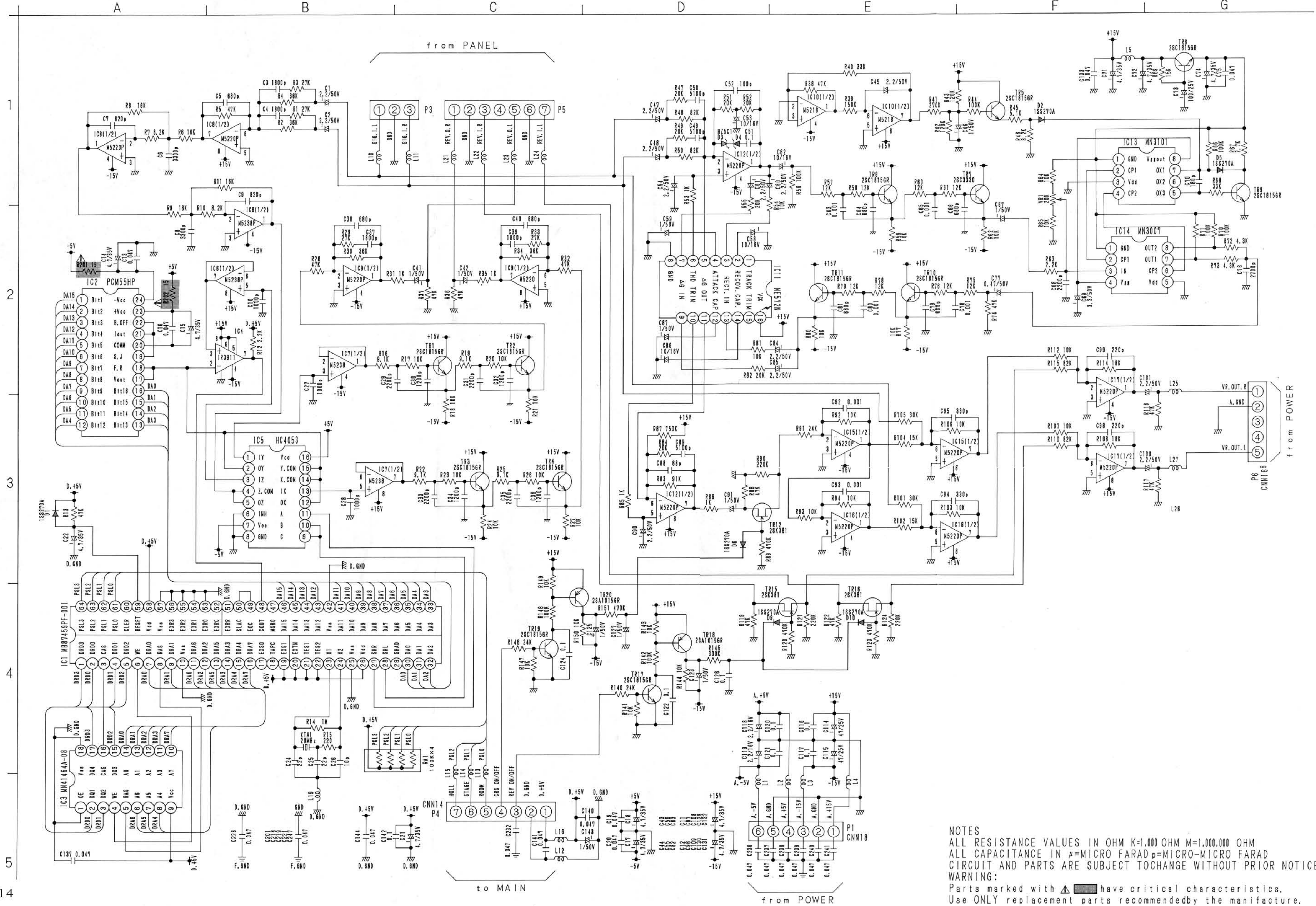
SCHEMATIC DIAGRAM BP-421-2 MAIN PCB



NOTES
 ALL RESISTANCE VALUES IN OHM K=1,000 OHM M=1,000,000 OHM
 ALL CAPACITANCE IN μ=MICRO FARAD p=MICRO-MICRO FARAD
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

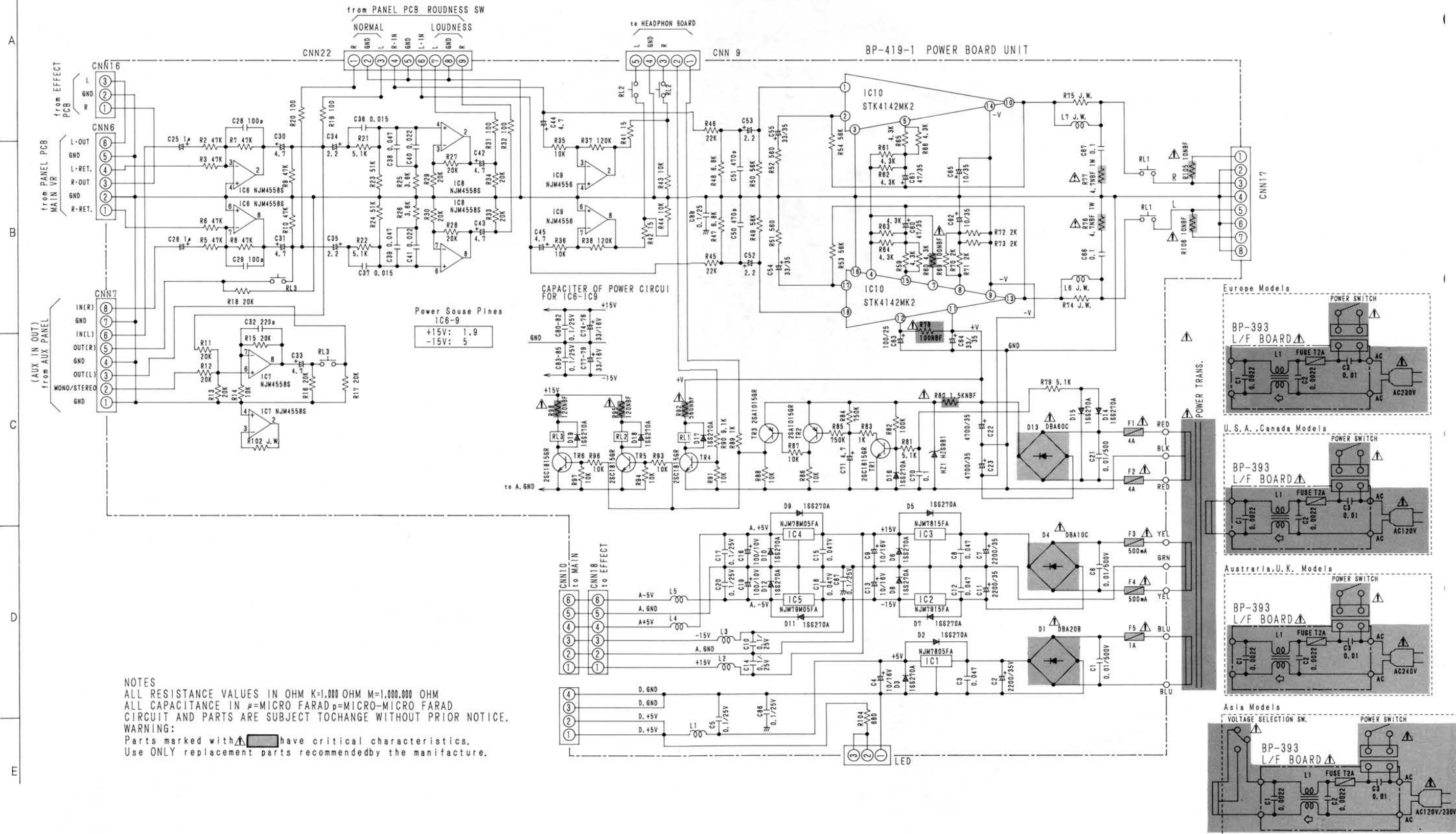
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SCHEMATIC DIAGRAM BP-422-1 EFFECT BOARD

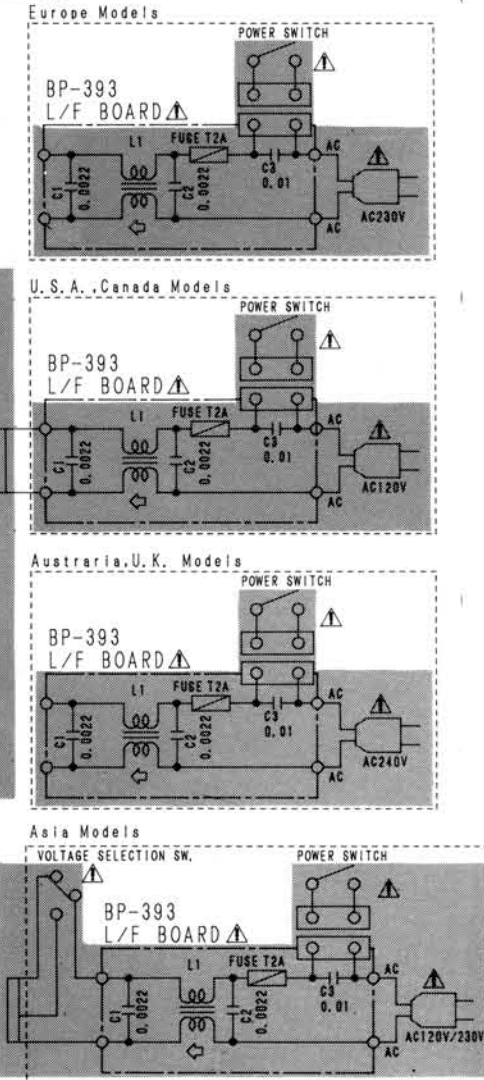


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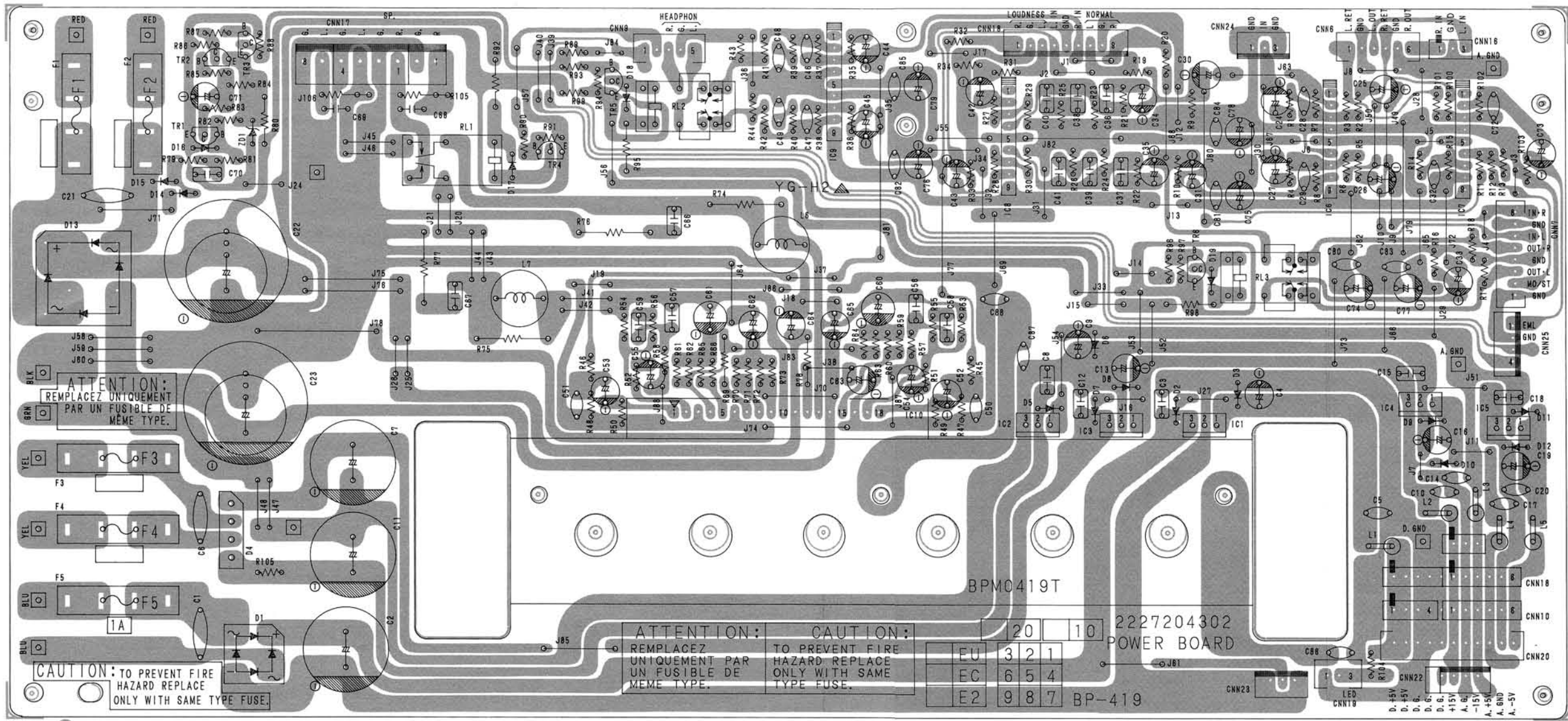
SCHEMATIC DIAGRAM



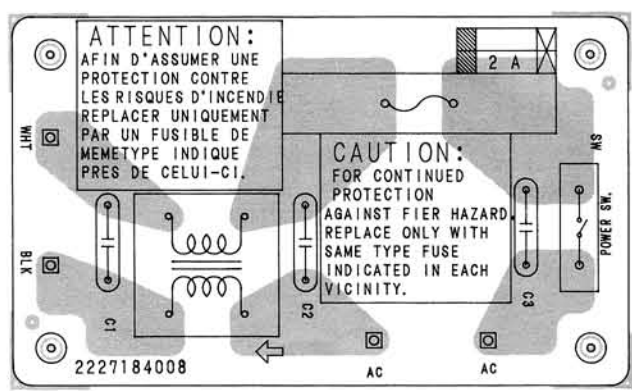
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BP-419 POWER BOARD UNIT Pattern side



BP-393 L/FILTER BOARD Pattern side



A B C D E F

1

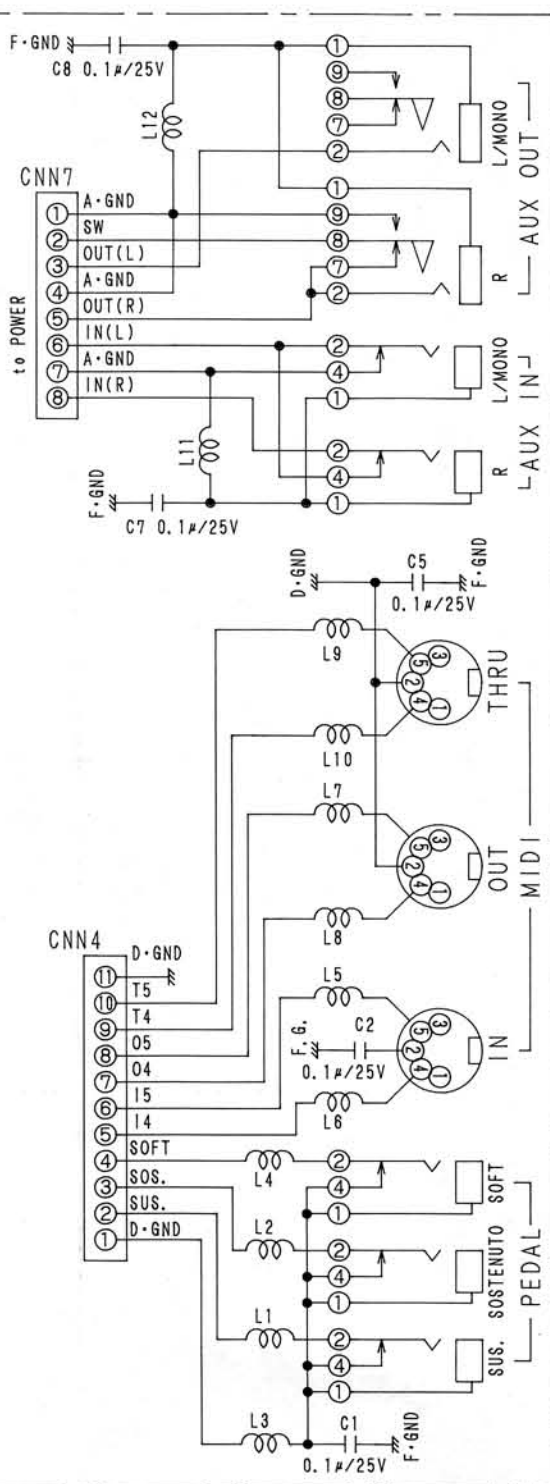
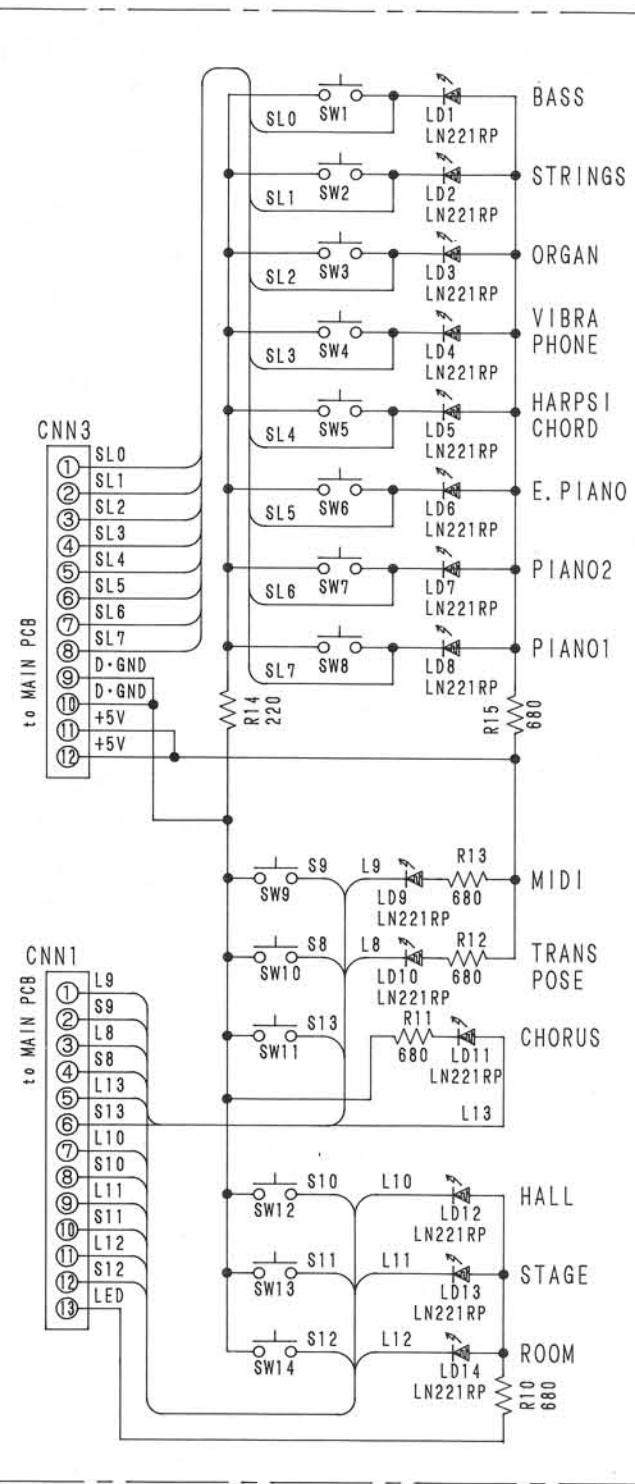
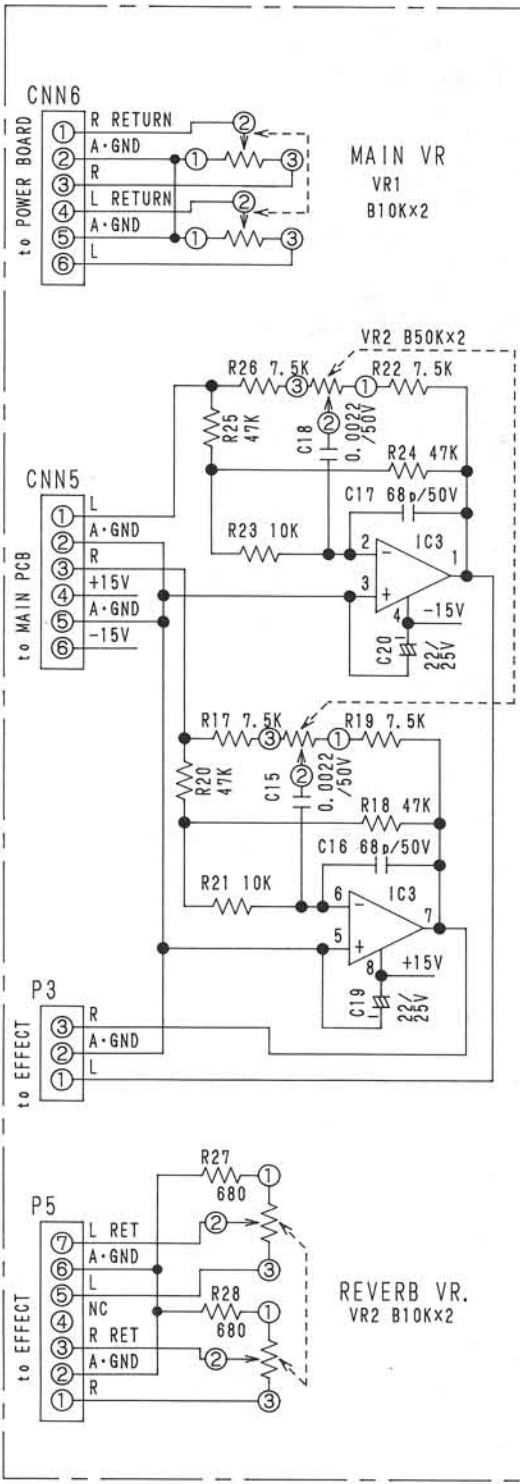
2

3

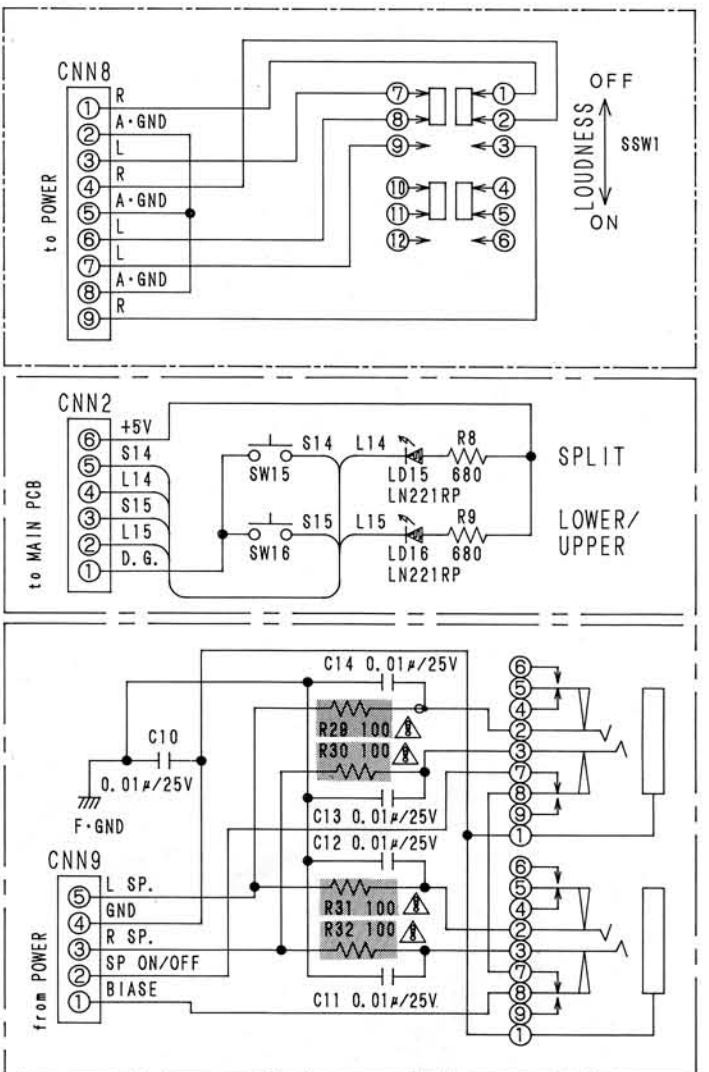
4

5

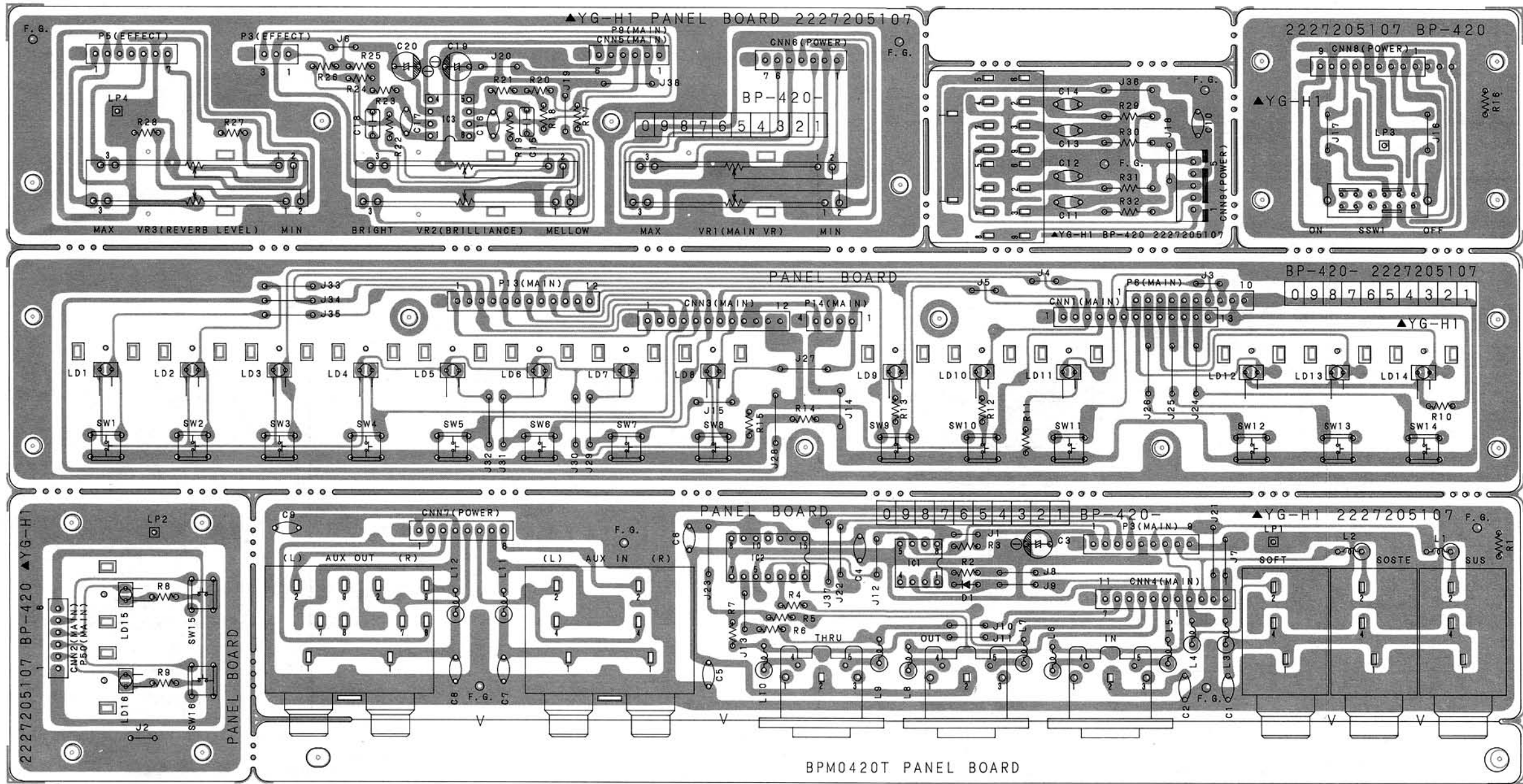
6



NOTES
ALL RESISTANCE VALUES IN OHM K=1,000 OHM M=1,000,000 OHM
ALL CAPACITANCE IN μ=MICRO FARAD p=MICRO-MICRO FARAD
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
WARNING:
Parts marked with Δ have critical characteristics.
Use ONLY replacement parts recommended by the manufacture.



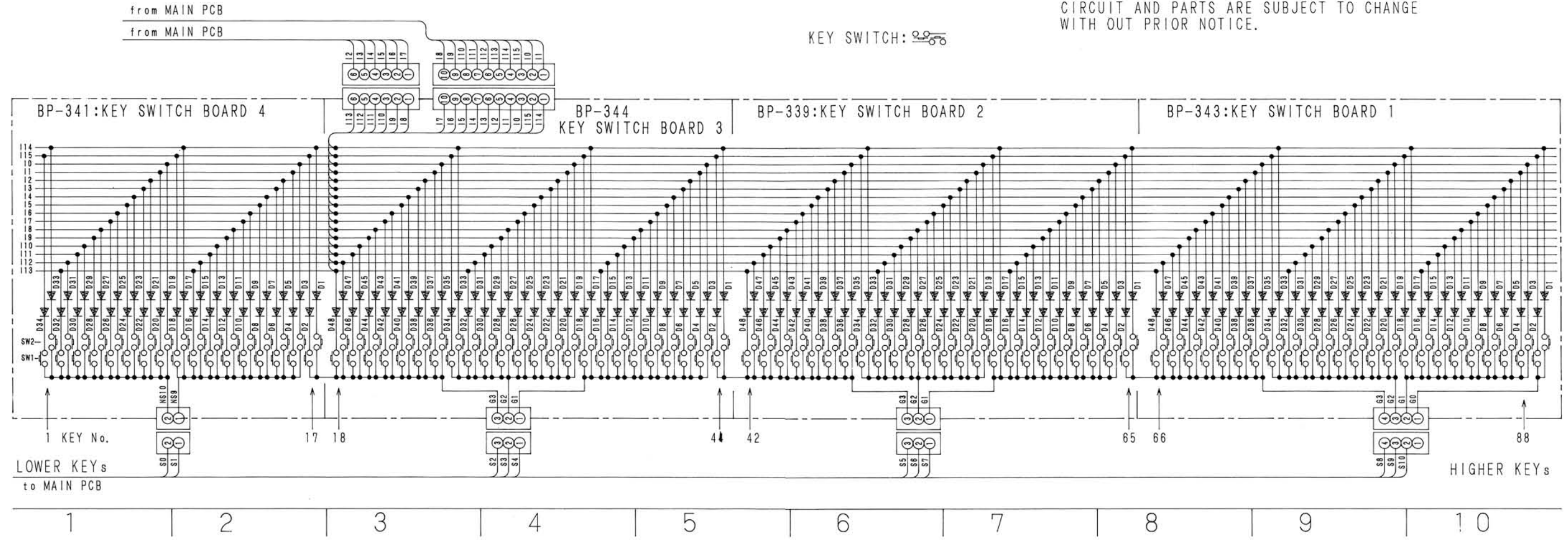
BP-420 PANEL BOARD UNIT Pattern side



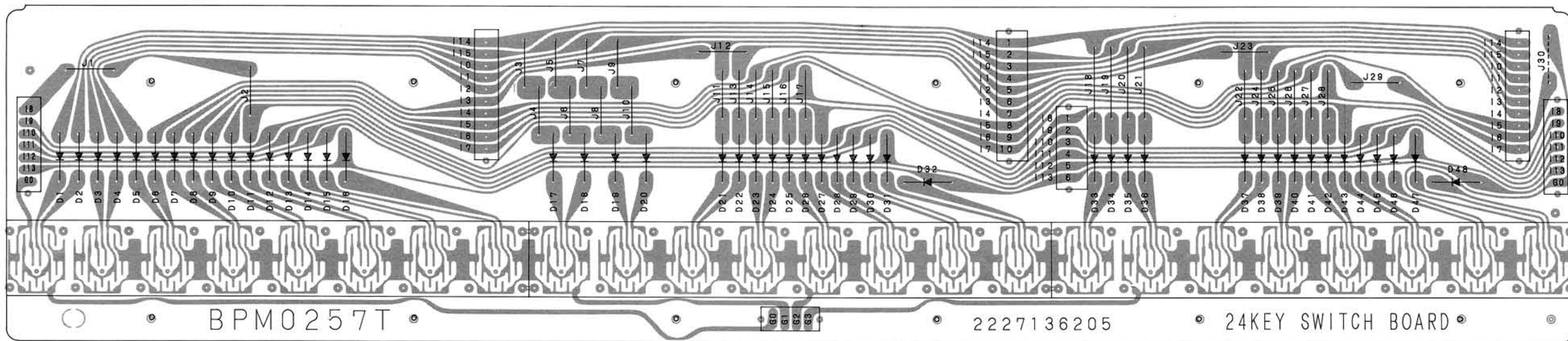
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

SCHEMATIC DIAGRAM GRAND HAMMER ACTION TYPE

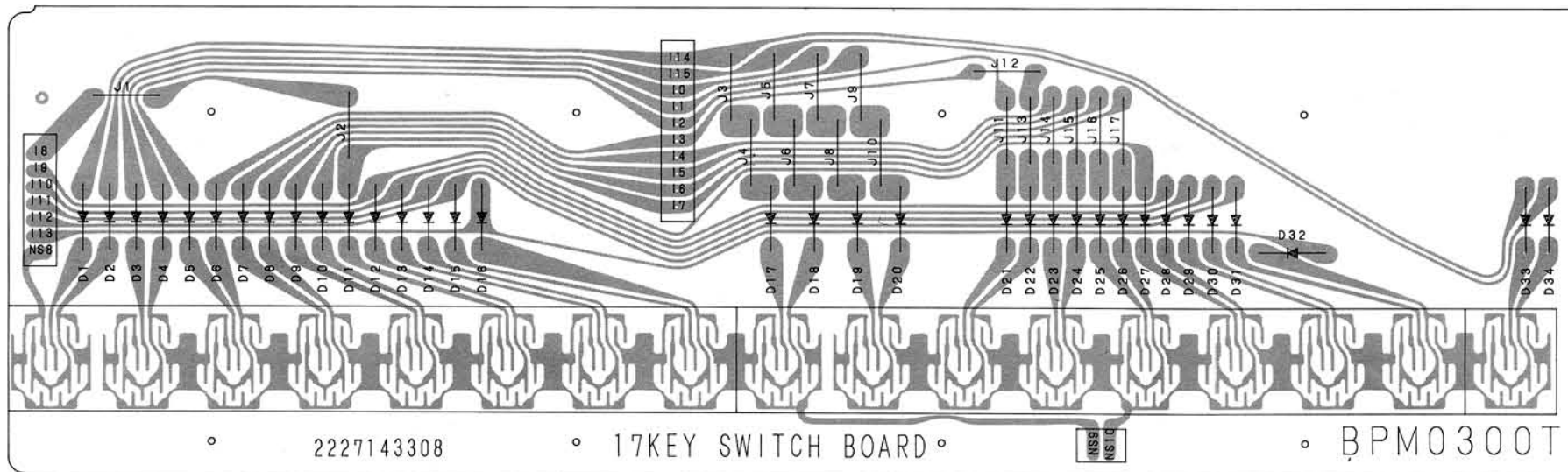
NOTES
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE
WITH OUT PRIOR NOTICE.



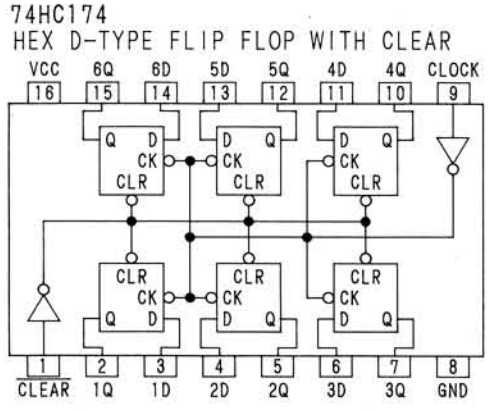
BP-344, BP-339, BP-343 SWITCH BOARD Soldering side



BP-341 SW BOARD IV Soldering side



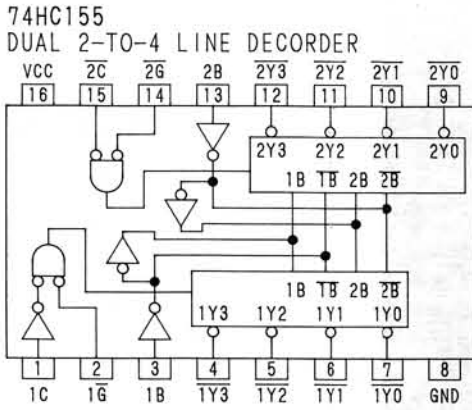
SEMICONDUCTORS



FUNCTION TABLE

INPUT			OUTPUT	FUNCTION
CLEAR	D	CLOCK	Q	
L	X	X	L	CLEAR
H	L	\uparrow	L	—
H	H	\uparrow	H	—
H	X	\downarrow	Q _o	NO CHANGE

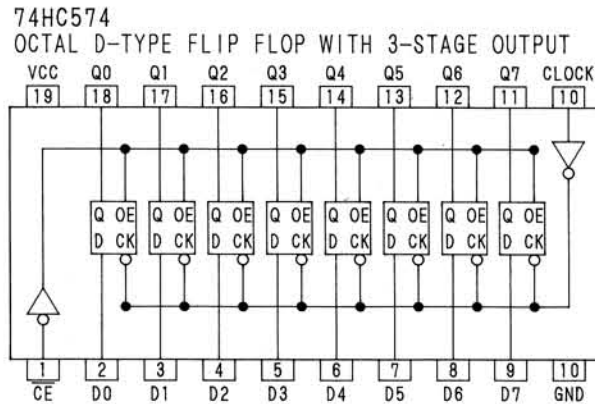
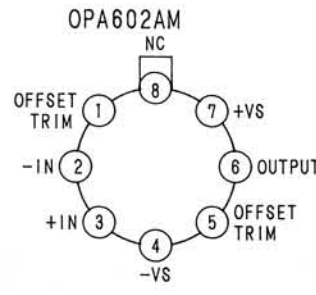
X: Don't care



FUNCTION TABLE

INPUT				OUTPUT			
1B	2B	1A	1C	1Y0	1Y1	1Y2	1Y3
X	X	H	X	H	H	H	H
L	L	L	H	L	H	H	H
L	L	L	L	L	L	H	H
L	L	L	L	L	L	L	H
L	L	L	L	L	L	L	L
H	H	L	H	H	H	H	L
H	H	L	H	H	H	H	L
X	X	X	L	H	H	H	H

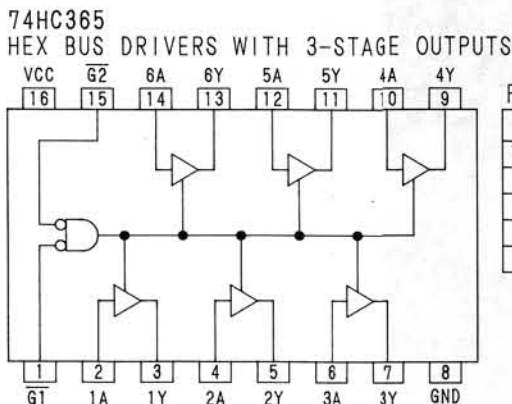
X: Don't care



FUNCTION TABLE

INPUT			OUTPUT
OE	CK	D	Q
H	X	X	Z
L	\downarrow	X	Q _o
L	\uparrow	L	L
L	\uparrow	H	H

X: Don't care
Z: HIGH-IMPEDANCE
Q_o: NO CHANGE

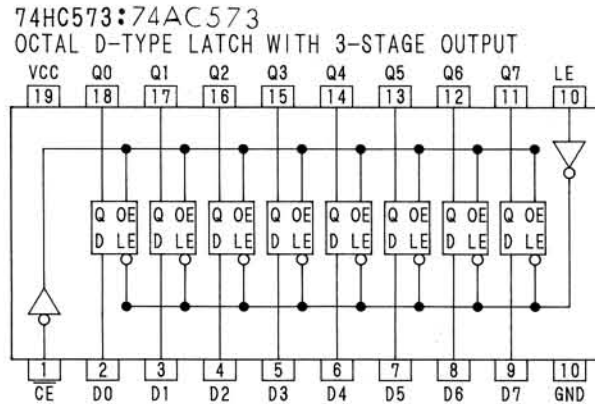
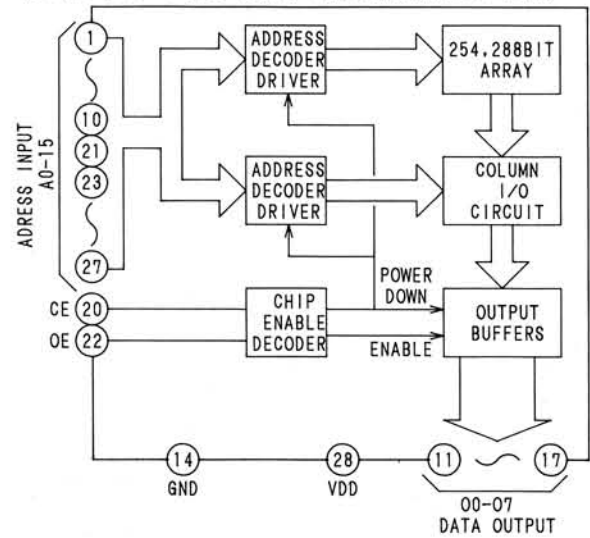


FUNCTION TABLE

INPUT			OUTPUT
G1	G2	A _n	Y
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

X: Don't care
Z: HIGH-IMPEDANCE

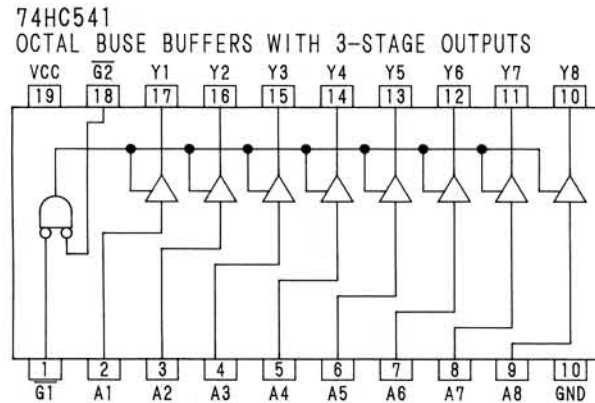
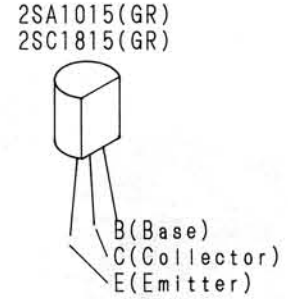
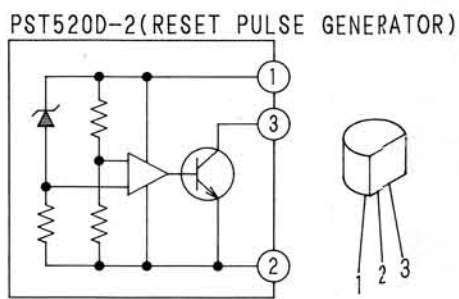
SCOEF10-512/SCOEF11-512
(512K BIT C-MOS MASK PROGRAMMABLE ROM)



FUNCTION TABLE

INPUT			OUTPUT
OE	CK	D	Q
H	X	X	Z
L	L	X	Q _o
L	H	L	L
L	H	H	H

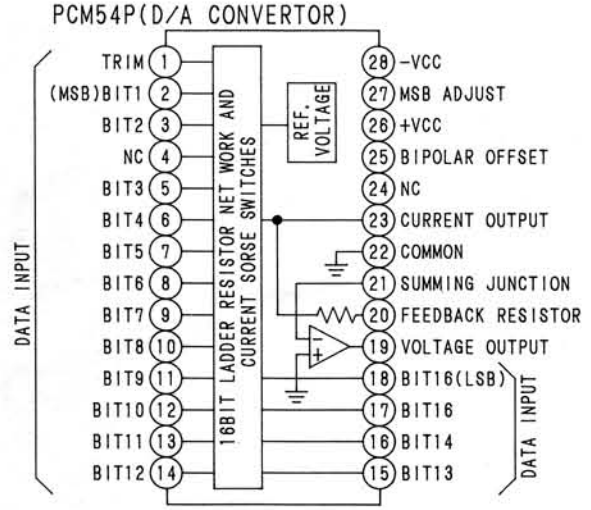
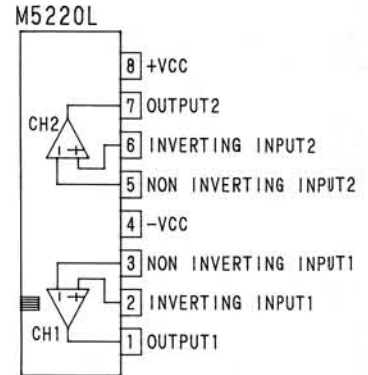
X: Don't care



FUNCTION TABLE

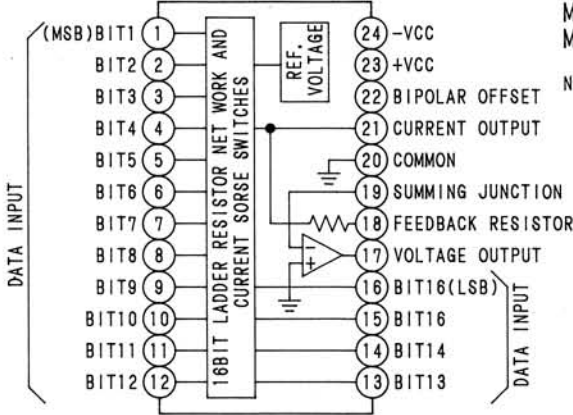
INPUT			OUTPUT
G1	G2	A _n	Y
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

X: Don't care
Z: HIGH-IMPEDANCE

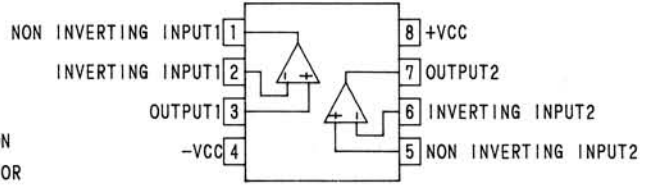


SEMICONDUCTORS

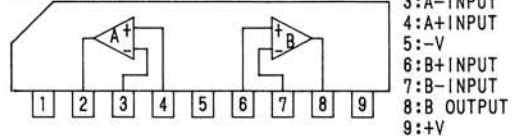
PCM55P(D/A CONVERTER)



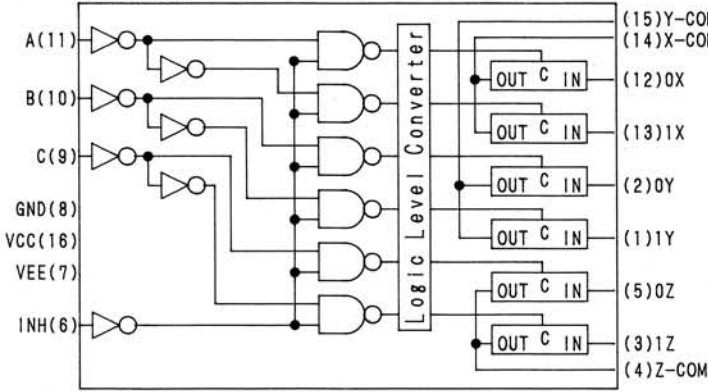
M5220P(LOW NOISE DUAL OPERATIONAL AMP.
M5238P(J-FET INPUT DUAL OPE. AMP.)
M5218P(DUAL OPE. AMP.)



NJM4556S
NJM4558S



74HC5043



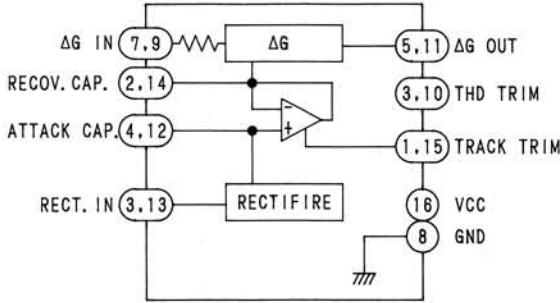
FUNCTION TABLE

INHIBIT	C	B	A	*ON*CHANNEL
L	L	L	L	0X, 0Y, 0Z
L	L	L	H	1X, 0Y, 0Z
L	L	H	L	0X, 1Y, 0Z
L	L	H	H	1X, 1Y, 0Z
L	H	L	L	0X, 0Y, 1Z
L	H	L	H	1X, 0Y, 1Z
L	H	H	L	0X, 1Y, 1Z
L	H	H	H	1X, 1Y, 1Z
H	X	X	X	NONE

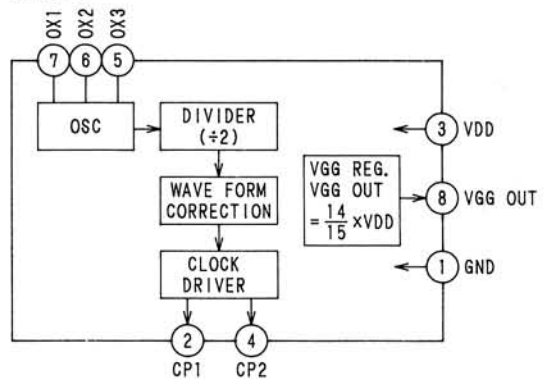
X: DON'T CARE

NE572

PROGRAMMABLE ANALOG COMPANDOR



MN3101



MN3007

