

# DENON

## SERVICE MANUAL

ELECTRONIC PIANO

MODEL  
**EP-923**

### TABLE OF CONTENTS

CAUTIONS .....	2
DISASSEMBLY .....	3
PARTS LIST OF EXPOLDED VIEW .....	4
EXPLODED VIEW .....	5
DISASSEMBLY OF KEY-148 .....	6
ADJUSTMENT OF KEY-148 .....	7
EXPLODED VIEW OF KEY-148 .....	8
PARTS LIST OF KEY-148 KEY UNIT .....	9
VOLUMU ADJUSTMENT .....	10 - 11
CIRCUIT DIAGRAM .....	12 - 18
BLOCK DIAGRAM .....	19
P. W. BOARD .....	20 - 26
SPECIFICATIONS .....	27
LIST OF P.W.BOARD No. ....	27

**NIPPON COLUMBIA CO., LTD.**

## IMPORTANT TO SAFETY

### WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

### CAUTION:

#### 1. Handle the power supply cord carefully

Do not damage or deform the power supply cord. If it is damaged or deformed, it may cause electric shock or malfunction when used. When removing from wall outlet, be sure to remove by holding the plug attachment and not by pulling the cord.

#### 2. Do not open the top cover

In order to prevent electric shock, do not open the cover. If problems occur, contact your WURLITZER dealer.

#### 3. Do not place anything inside

Do not place metal objects or spill liquid inside INSTRUMENTS. Electric shock or malfunction may result.

Please, record and retain the Model name and serial number of your INSTRUMENTS shown on the rating label.  
Model No. EP-923

**NOTE:** To allow you to enjoy music at a stable operation, it is recommended to use this in a room 10°C~35°C.

## SAFETY INSTRUCTIONS FOR ELECTRONIC PIANO

### ■ INSTALLATION

1. Operate the INSTRUMENTS only from a power source which is indicated on the rating label (indication) at the back of the INSTRUMENTS.

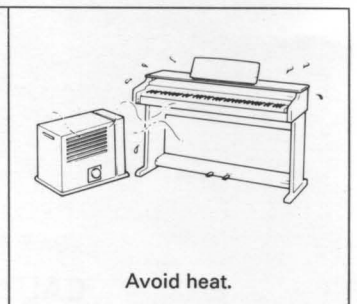
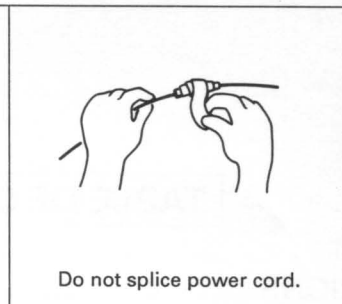
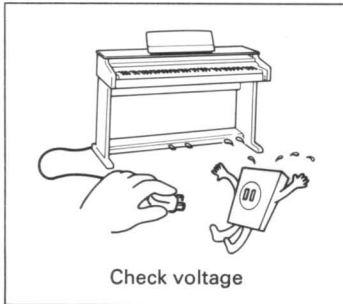
2. Prayed cords and broken plugs may cause a fire or shock hazard.

Do not damage the power cord.

- Do not cut and splice the power cord.
- When removing the power cord from wall outlet, be sure to unplug by holding the plug attachment and not by pulling the cord. Do not hold the plug with wet hands.
- Call your service technician for replacement of damaged cords and plugs.

3. Select a place so that the location or position does not interfere with the proper ventilation of the INSTRUMENTS for releasing heat generated during operation.

- Select a flat and level surface allowing enough space for setting up and operation.
- Never block the bottom ventilation holes placing the INSTRUMENTS on a bed, sofa, rug etc.
- Never place the INSTRUMENTS in a "built-in" enclosure unless proper ventilation is provided.
- Never place the INSTRUMENTS near a radiator, heat register or stove.
- Avoid locations where the INSTRUMENTS is exposed directly to the sun light.



### ■ USE

1. Do not expose the INSTRUMENTS to rain or water (liquid). Do not spill liquid or insert metal objects inside the set. Rain, water or liquid such as cosmetics as well as metal may cause electric shorts which can result in fire or shock hazard. If anything gets inside, unplug the power cord and have a WURLITZER service technician check your set before further use.

2. Never leave your INSTRUMENTS switched on when leaving the house. For added protection of your audio system during lightning storm or when the INSTRUMENTS is to be left unused for a long period of time, be sure to unplug the power cord from the wall outlet.

3. Take care so that the INSTRUMENTS is not dropped to avoid damaging the cabinet which defeats safeguards or injuring yourself. If the INSTRUMENTS has been dropped or the cabinet has been damaged, unplug the INSTRUMENTS and have it checked by a WURLITZER service technician to restore the safeguards.



### ■ SERVICING

1. The servicing of the INSTRUMENTS must not be attempted by yourself beyond that described in the operating instructions. In case of problems that cannot be settled by referring to your operating instructions, unplug the power cord and contact your WURLITZER dealer. No user serviceable parts are inside the INSTRUMENTS. Only qualified service technician can service inside your INSTRUMENTS.

2. Refer to the operating instructions for maintenance and cleaning.

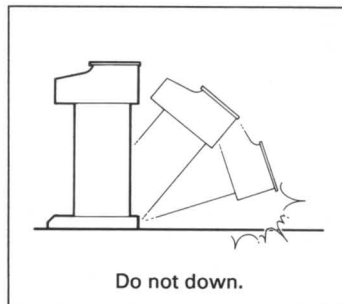


Fig 1

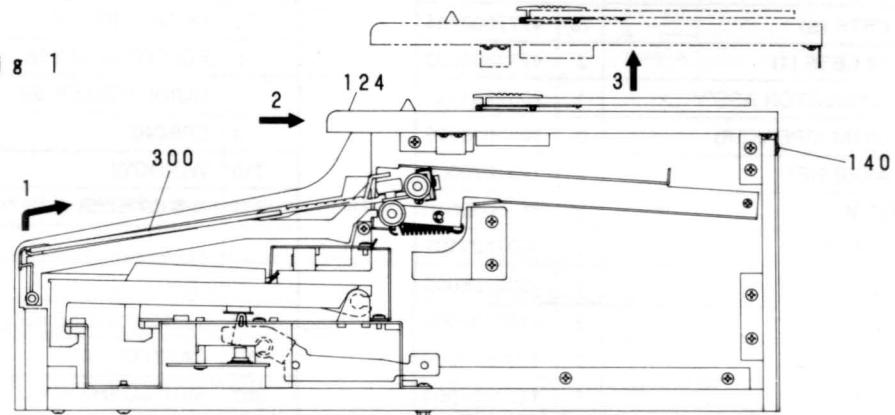


Fig 2

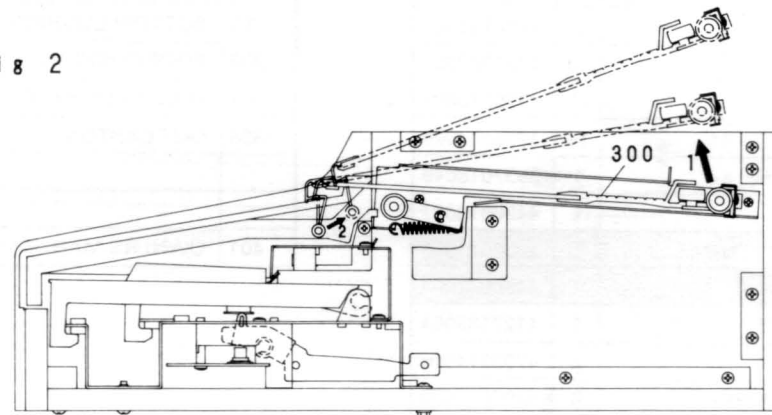


Fig 3

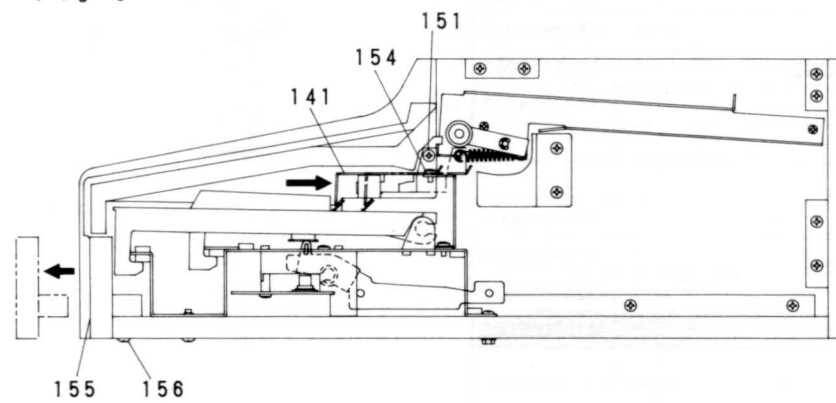
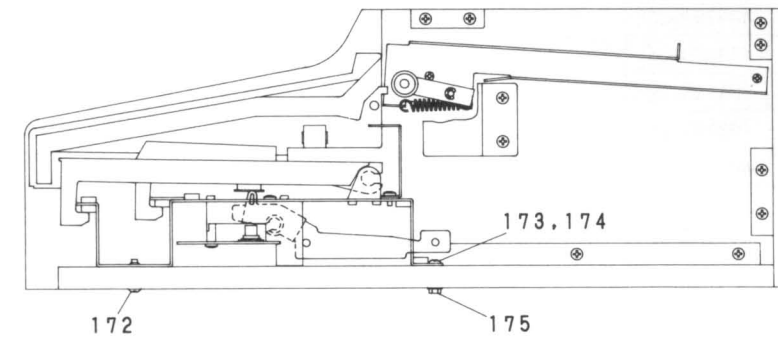


Fig 4



**How to disassemble the cabinet.**

1. Remove the roof board. (Fig.1)
  - 1) Move the lid ass'y 300 backward. (Arrow 1)
  - 2) Remove eight screws 140 (3 x 10 CBTS (1)).
  - 3) Remove roof board 124 in the arrow 3 direction by moving it in the arrow 2 direction.
2. Remove the lid ass'y. (Fig.2)
  - 1) Move the lid ass'y 300 backward, and lift its rear part toward arrow 1.
  - 2) Remove the lid ass'y by moving its front part toward arrow 2.
3. Remove the top panel semi-ass'y and front board ass'y.
  - 1) Remove right and left screws 151 (3.5 x 30 CTTS (1)), one each, and screw 154 (3x 6 CBTS (s), 5pc.), and remove the top panel semi-ass'y 141 removing it toward the arrow.
  - 2) Remove five screws 156 (3.5 x 25 CTTS (1)), and remove the front board ass'y 155 toward the arrow.
4. Remove the keyboard unit. (Fig.4)
  - 1) Remove five screws 172 (4 x 20 CTS), two screws 174 (4 x 20 CTS), two nuts 175 (4NUT-W), and thirteen screws 173 (4 x 12CTTS (1).)

# EP-923 PARTS LIST

No.	Part Name	EP-923	
		Q'ty	Part No.
1~34	KEY UNIT	(1)	KEY-148
101	SIDE BOARD (L) SEMI ASS'Y	(1)	1017928103
102	GUIDE RAIL (L) ASS'Y	(1)	4097016605
a	GUIDE RAIL (L) SEMI ASS'Y	1	4097015305
b	ROLLER ARM ASS'Y	1	4307104304
c	GUIDE ROLLER (A)	1	4217001102
d	ROLLER ARM SPRING	1	4367293103
e	3 E RING	1	4761003009
103	3x12 CFTS (1)	2	4732306010
104	COVER GUIDE (L)	1	4097011503
105	3.5x20 CTTS (1)	3	4734806039
106	PROTECTION BRACKET	1	4097019000
107	3.5x12 CBTS (1)	2	4733804045
108	SIDE BOARD (R) SEMI ASS'Y	(1)	1017931103
109	GUIDE RAIL (R) ASS'Y	(1)	4097018603
a	GUIDE RAIL (R) SEMI ASS'Y	1	4097017303
b	ROLLER ARM ASS'Y	1	4307104304
c	GUIDE ROLLER (A)	1	4217001102
d	ROLLER ARM SPRING	1	4367293103
e	3 E RING	1	4761003009
110	3x12 CFTS (1)	2	4732306010
111	COVER GUIDE (R)	1	4097012405
112	3.5x20 CTTS (1)	3	4734806039
113	PROTECTION BRACKET	1	4097019000
114	3.5x12 CBTS (1)	2	4733804045
115	BOTTOM BOARD	1	1077243006
a	SP NUT (M4)	2	SC-1123-1
b	SP NUT (M6)	4	
116	LOCKING SUPPORT	12	4498079005
117	BOTTOM CUSHION	1	1247090034
118	RUBBER FOOT	4	1047037006
119	3.1x16 CRWS (With W)	4	4700035009
120	FIX BOLT	8	SC-1136J-1
121	BRACKET (C)	2	4127166001
122	3.5x10 CBTS (1)	8	4733804003
123	BRACKET (B)	2	4127159005
124	ROOF BOARD	1	1017937000
125	ANGLE BRACKET	4	4037010001
126	3x12 CBRTS (1)	8	4730306012
127	TOP BRACKET	2	2010023J
128	3x12 CBRTS (1)	4	4730306012
129	MUSIC STOPPER	1	4397007110
130	3x18 CBTS (P)	4	4737500060
131	3.5W	4	4751134001
132	SCORE HOLDER	1	4397022111
133	SCORE HINGE	2	4017027108
134	3x6 CBTS (P)	4	4737508004
135	SCORE SUPPORT	1	1037055001
136	PROTECTION SHEET	2	1247123008

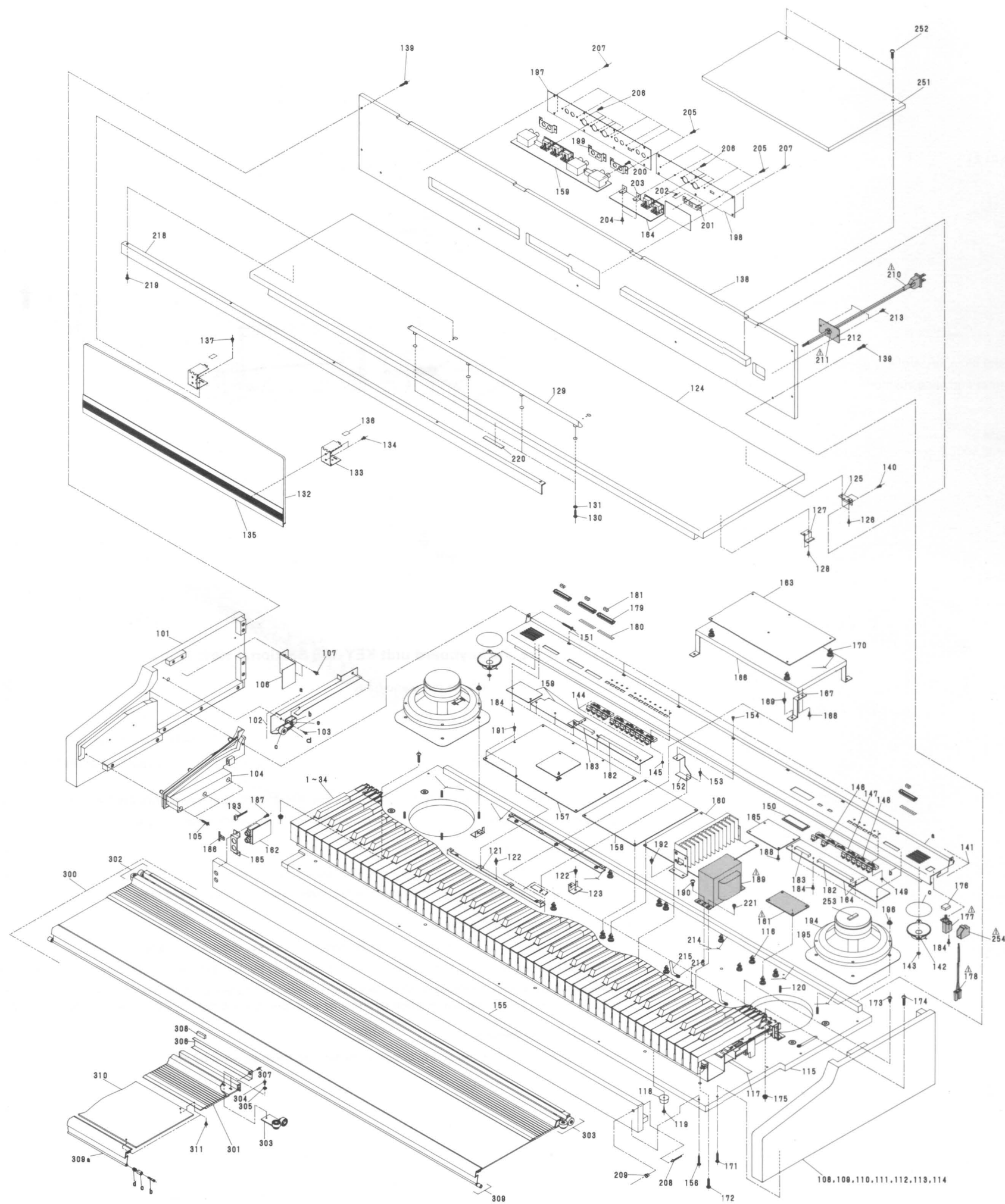
No.	Part Name	EP-923	
		Q'ty	Part No.
137	3x10 CBTS (1)	4	4733814006
138	REAR BOARD	1	1077323007
139	3.5x20 CTTS (1)	9	4734806000
140	3x10 CBTS (1)	8	4733814006
141	TOP PANEL SEMI ASS'Y	(1)	1027124421
a	TOP PANEL	1	1027125307
b	KEY FELT	1	1247095068
c	SPEAKER HIMELON	2	1227032009
142	PT-01M (CONE TWEETER)	2	3017023006
143	3 NUT-W	4	SC-1082-2
144	SWITCH BUTTON	3	1137020004
145	3LN (NUT)	6	4756007007
146	SWITCH BUTTON (A)	1	1137021003
147	SWITCH BUTTON (B)	1	1137022002
148	SWITCH BUTTON (C)	1	1137023001
149	3 LN (NUT)	6	4756007007
150	LED PLATE	1	1037085000
151	3.5x30 CTTS (1)	2	4734806042
152	T.P SUPPORTER	5	4337004005
153	3x6 CBTS (S)	5	4737002034
154	3x6 CBTS (S)	5	4737002034
155	FRONT BOARD ASS'Y	1	1017940000
156	3.5x25 CTTS (1)	5	4734804002
157	TONE 1 ASSEMBLY UNIT	1	BP-385-8
158	TONE BOARD 2 UNIT	1	BP-392-1
159	PANEL BOARD UNIT	1	BP-336-7
160	POWER BOARD UNIT	1	BP-391-2
△	161 L/FILTER BOARD UNIT	1	BP-393-2
162	H/PHONE BOARD UNIT	1	BP-394
163	RECORDER BOARD	1	BP-352-2
164	PANEL DIN BOARD UNIT	1	BP-353-2
165	LED BOARD	1	BP-396
166	P.C.B.BOARD	1	
167	BOARD BRACKET	4	4127167000
168	3x10 CBTS (1)	8	4733814006
169	3.5x10 CBTS (1)	4	4733804003
170	LOCKING SUPPORT	5	4498079005
171	3.5x25 CTTS (1)	8	4734804002
172	4x20 CTS	5	4714410021
173	4x12 CTTS (1)	13	4734406015
174	4x20 CTS	2	4714410021
175	4 NUT-W	2	4756131009
176	PUSH BUTTON	1	1137015048
△	177 POWER SWITCH	1	2128590018
△	178 SW.CONNECTOR ASS'Y	1	2033505114
179	VOLUME PANEL	4	1027025002
180	BLIND SHEET	4	1227027108
181	SLIDE VOLUME KNOB	4	1137019002
182	BLIND SHEET	2	1227029106

No.	Part Name	EP-923	
		Q'ty	Part No.
183	BLIND SHEET	2	1227029119
184	3x8 TAPTITE	13	4737002018
185	H/J BRACKET	1	4127165002
186	SNAP PLATE	1	
187	3.5x12 CBTS (1)	2	4733804045
188	3x6 TAPTITE	4	4770152006
△	189 POWER TRANS	1	2338530004
190	4x10 CTS	2	4714405010
191	3x6 CBTS (S)	10	4777002034
192	3.5x10 CBTS (1)	2	4733804003
193	4P CONNECTOR ASS'Y	1	203746112
194	16RG04M (SPEAKER)	2	3017018008
195	SPEAKER NET	2	1097020005
196	4 NUT-W	8	SC-1050H
197	AUX PANEL	1	1027121107
198	SEQUENCER PANEL	1	1027126005
199	JACK BRACKET	3	4127138000
200	3x8 CBTS (Bo)	3	4733814006
201	MIDI BRACKET	1	4127154000
202	2.6x4 CPS	2	
203	ANGLE	2	4127153001
204	3x6 TAPTITE	2	4770152006
205	3x8 CBTS (S)	10	4737002021
206	PUSH RIVET	10	4770210003
207	3x10 CBTS (1)	14	4733814006
208	LED ASS'Y	1	3937018049
209	LED BUSHING	1	4430310007
△	210 AC CORD WITH PLUG	1	2062021009
△	211 BUSHING	1	4450047004
212	BUSHING PLATE	1	4127133004
213	3x10 CBTS (1)	2	4733814006
214	COLOR STEEL WIRE	8	4497027003
215	CORD HOLDER	3	EP-6214
216	3.5x10 CBTS (1)	3	4733804003
217	3x8 CBTS (S)	3	4737002018
218	REFORM RAIL	1	4097020002
219	3.5x12 CBTS (1)	5	4733804045
220	PROTECTION SHEET	1	1247118000
221	3.5x10 CBTS (1)	4	4733804003
251	SHIELD PLATE	1	1077319008
252	3.5x20 CTTS (1)	3	4734806000
253	T.F FELT	1	1247037026
△	254 SWITCH COVER	1	4157006005
300	LID ASS'Y	(1)	1037058901
301	REAR LID	1	1037054303

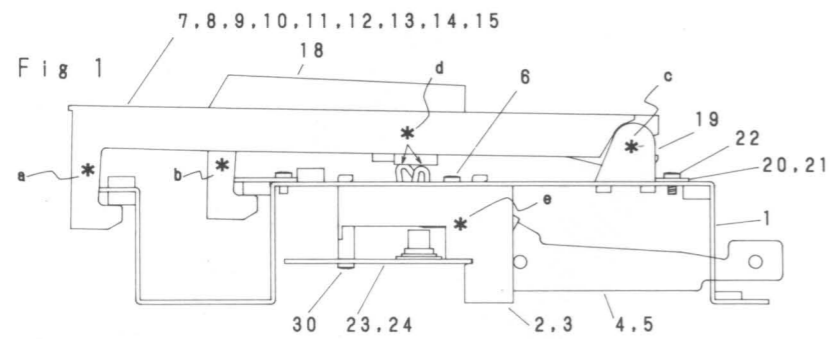
No.	Part Name	EP-923	
		Q'ty	Part No.
302	R/BRACKET (L) ASS'Y	(1)	4397025406
303	R/BRACKET (R) ASS'Y	(1)	4397026104
304	3x6 CBTS (S)	4	2737002005
305	3 W	4	4751003006
306	COVER SUPPORT	1	4337005004
307	3x6 CBTS (P)	5	4737500002
308	PANEL FELT	2	1247096025
309	FRONT LID ASS'Y	(1)	1037056301
a	FRONT LID	1	1037052208
b	ROLLER SHAFT (B)	2	4227002201
c	GUIDE ROLLER (B)	2	4217002004
d	SPRING	2	4367294102
310	WINDOW	1	1037053100
311	3x5 CBTS (B)	14	4733814048
350	CARTON CASE ASS'Y	(1)	5017406100
351	CARTON CASE	1	5017266081
352	SIDE CUSHION (L)	1	5027333108
353	SIDE CUSHION (R)	1	5027333111
354	COVER	1	5027365008
355	BOTTOM CUSHION	1	5027307008
356	ROOF CUSHION	1	5027351009
357	FRONT CUSHION	1	5027352008
358	OUT CARTON	1	5017412013
401	OWNERS MANUAL	1	5117229009



EXPLODED VIEW OF EP-923



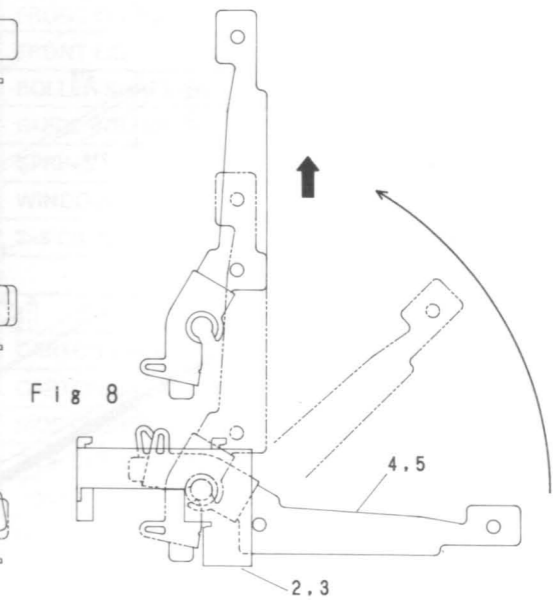
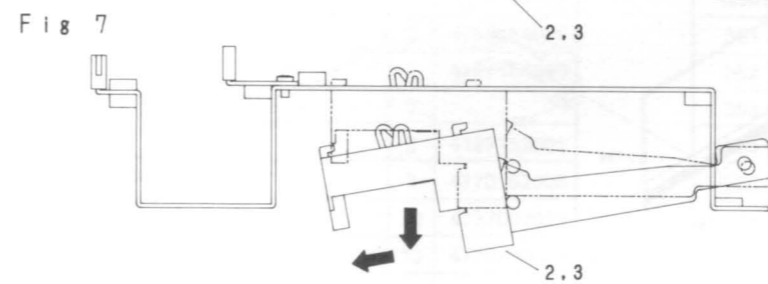
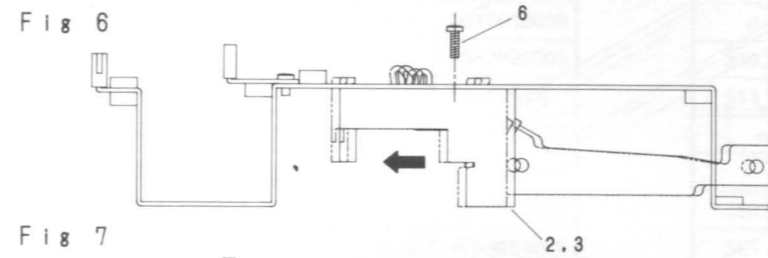
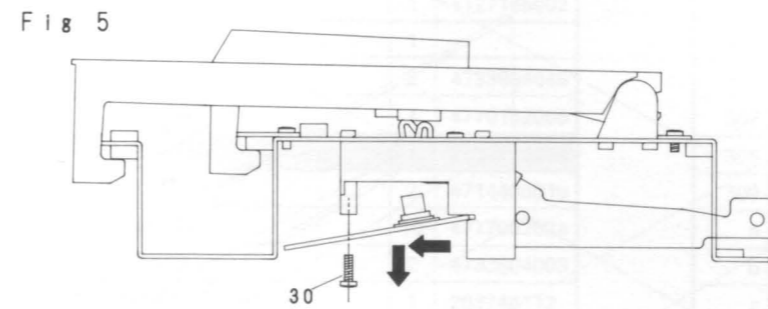
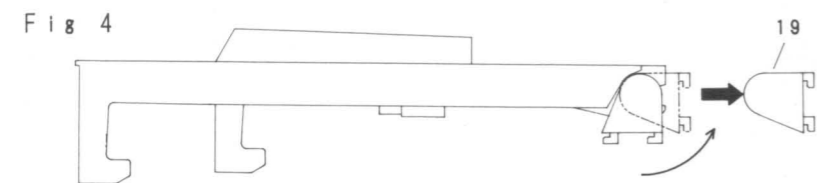
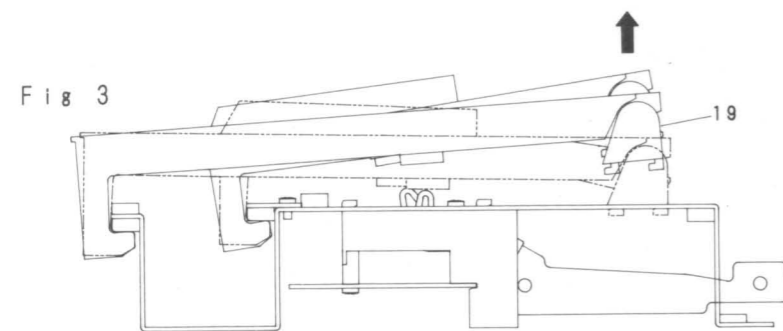
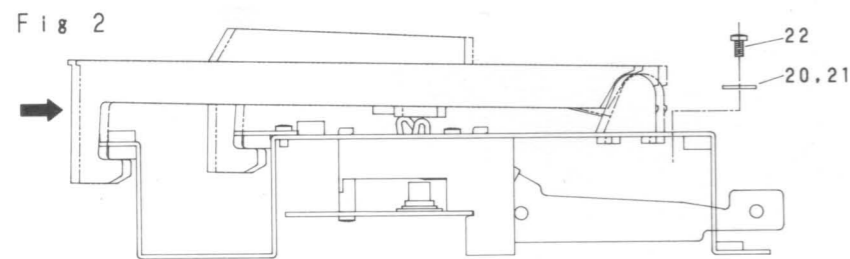
# DISASSEMBLY OF KEY-148



Apply a coat of grease to the portions marked with (\*).

- (a) Slide way inside the white key and key guide (w)
- (b) Slide way inside the black key and key guide (B)
- (c) Fit portion of key shaft and key
- (d) Slide way of hammer and slide cushion
- (e) Fit portion of hammer and hammer flange

Lubricate them with silicon grease SB-1. — Shinetsu silicone grease G30M —  
 Shinetsu silicone oil KF96H 100,000CS — Mixing ratio: 1:1



## How to disassemble the keyboard unit KEY-148 Sectional view (Fig.1)

1. Remove the keyboard unit from the piano body.
2. How to remove the keyboard (Fig.2,3, and 4)
  - 1) After removing screws 22, remove K/S stoppers 20,21. Push the keyboard toward the arrow. (Fig.2)
  - 2) Remove the key together with key shaft 19 from the chassis ass'y by lifting the rear part of the key in the arrow direction. (Fig.3)
  - 3) Remove the white key first, and then, the black key. For mounting them, mount the black key first.
  - 4) Remove the key shaft 19 backward by turning it 90° in the arrow direction. (Fig.4)
3. How to remove the switch board. (Fig.5)
  - 1) Remove screw 30, and then, remove the switch board by moving it toward the arrow.
  - 2) Removal of the keyboard is not necessary when removing the switch board only.
4. How to remove the hammer (Fig.6, 7)
  - 1) Remove screws 6, and move the hammer flanges in the arrow direction. (Fig.6)
  - 2) Remove hammer flanges 2,3 (together with each hammer) by moving them in the arrow directions. (Fig.7)
  - 3) For removing the hammer flanges, all screws 6 can be removed by removing five white/black keys of octave G-B, four white/black keys (key 76) on the low-pitched sound side and four white/black keys (keys 88) on the high-pitched sound side.
5. How to remove the hammers
  - 1) Remove hammer 4,5 in the arrow direction by turning them upward by 90°.

# ADJUSTMENT OF KEY-148

## Troubleshooting of Key-148

### 1. A keyboard does not return normally.

- a) The keyboard itself does not move normally.
- b) Its hammer does not function normally.
- c) Both keyboard and hammers function normally when they are not combined with each other, but they don't function normally together when they are combined with each other.

#### △ How to locate its cause

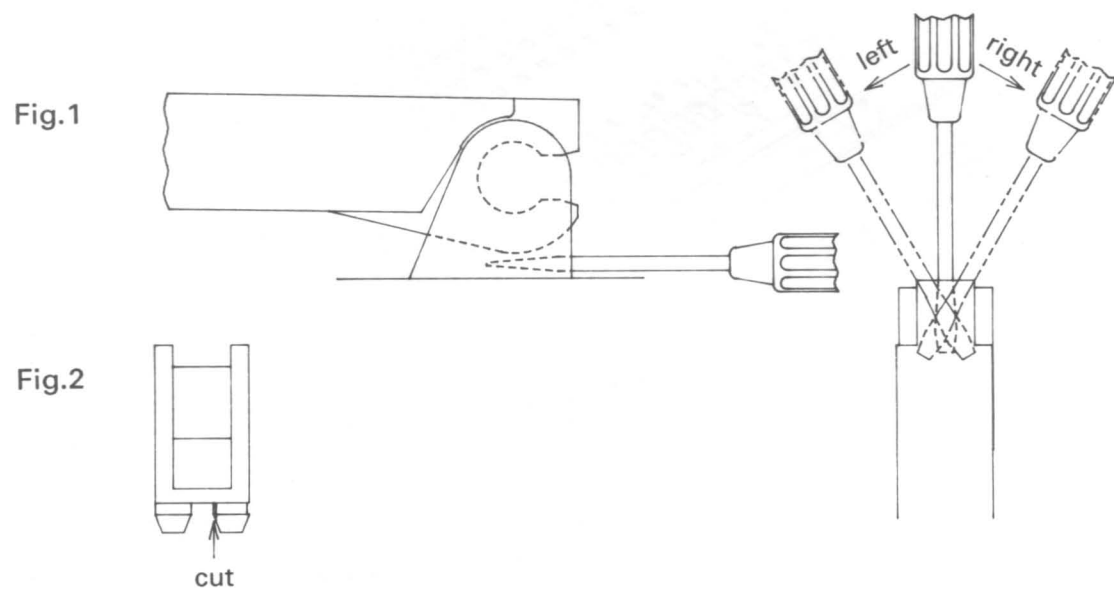
Lift the hammer tip. If the keyboard lowers due to its own weight, the trouble is not caused by (a).  
 If the keyboard does not lower, the trouble is caused by (a).  
 After fixing the keyboard under its lifted condition, lift the hammer up and down to check if a feeling of resistance of the hammer exists. If yes, the trouble is caused by (b).  
 If the keyboard lowers due to its own weight without any feeling of resistance of the hammer, the trouble is caused by (c)

#### Causes of (a)

- 1) Malfunction due to the friction force between the key guide and the keyboard.

##### Repair method

Insert a small minus screwdriver into the key shaft rear part as shown in Fig.1, and position the key for normal movement while tilting it left ward or right ward.  
 If the key shaft can fully adjusted right ward, but it cannot fully be adjusted left ward, cut the inside of the rear lead of the key shaft by using a cutter knife as shown in Fig.2.  
 Fig.1 Left Right Fig.2 Cut



- 2) The fit portion of the key and the key shaft is not lubricated with grease. .... Apply a coat of grease SB-1.
- 3) The portion between the key and the key guide is not lubricated with grease. .... Apply a coat of a grease SB-1.
- 4) Tilting of key guide (in case of a black key, in particular). .... Repair the tilted condition.

#### Causes of (b)

- 1) Malfunction with the hammer flange due to the bending of hammer. .... Replace the hammer.
- 2) A contact to the chassis due to the bending of hammer. .... Replace the hammer.
- 3) A contact to the chassis due to the exfoliation of the hammer cushion. .... Replace the hammer cushion.
- 4) The fit portion of the hammer and hammer flange is not lubricated with grease. .... Apply a coat of grease. (SB-1)

#### Causes of (c)

- 1) Deformation of hammer (key contact part). .... Replace the hammer.
- 2) Wrinkle of slide cushion. .... Replace the slide cushion.

## 2. Action noises

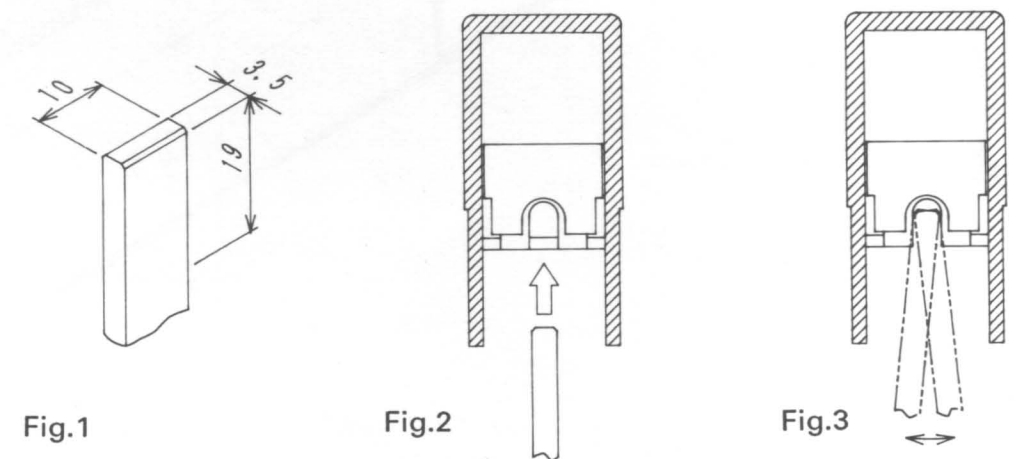
- 1) The fit portion of the key shaft and key is out lubricated with grease.
- 2) The fit portion SB-1 of the hammer and hammer flange is not lubricated with grease. SB-1
- 3) No slide cushion exists. (Either hammer or key lowers.)
- 4) A tightening failure of key guide rail screw (key touches the screw head when pressing it, or noises are produced when key returns).

## 3. Others

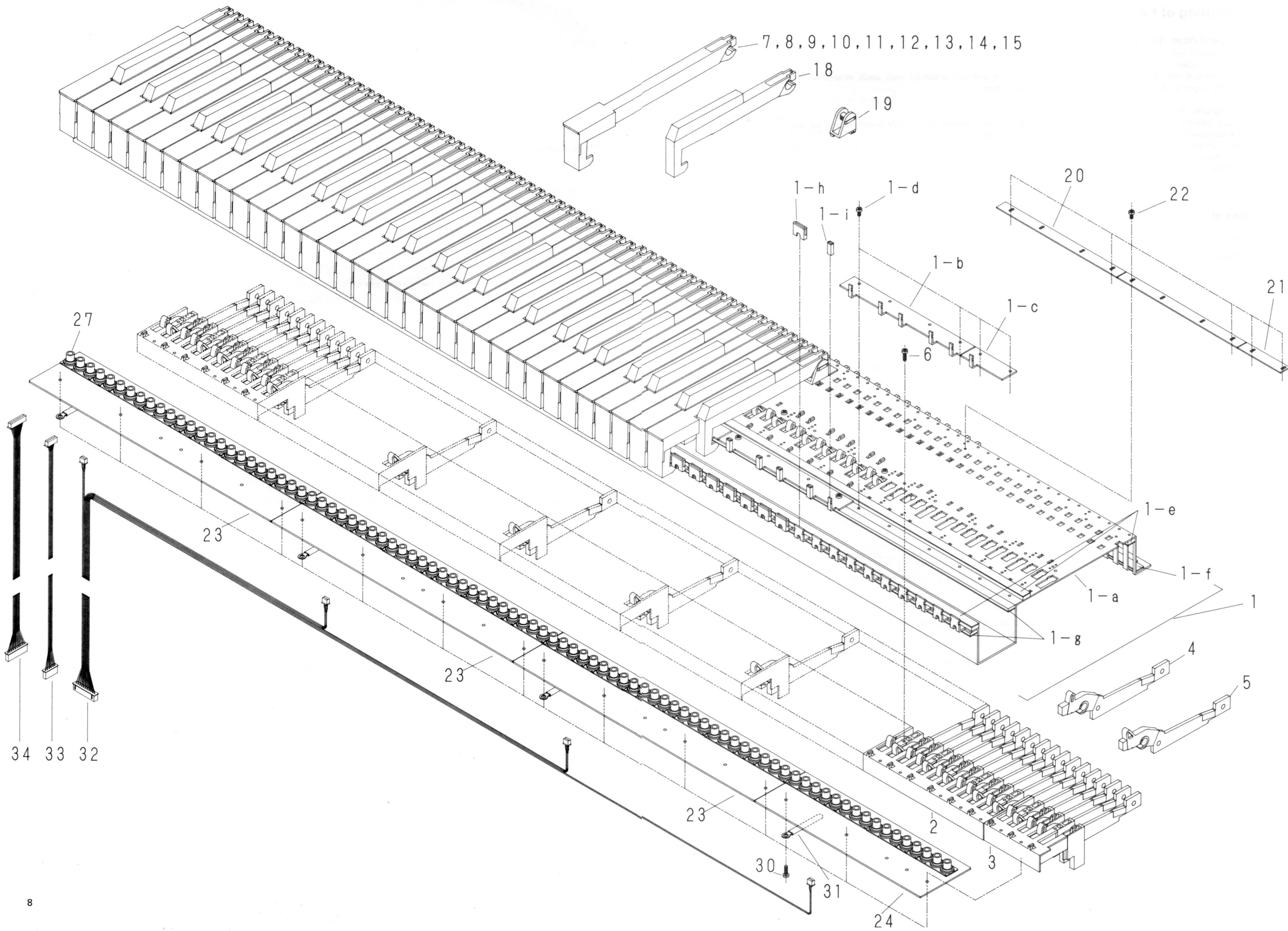
- 1) Key arrangement adjustment failure
- 2) Key fluctuates Key shaft is broken ..... Replace the key shaft.
- 3) Key shaft is unstable longitudinally.
- 4) Slide cushion is worn. Neither slide cushion nor hammer slide portion is lubricated with grease, or they are lubricated insufficiently. .... Apply a coat of grease (SB-1)

## Adjusting method

- 1) This action is not adjustable basically, except for the horizontal key arrangement.
- 2) For adjusting the key arrangement, insert the tool shown in Fig.1 into the groove key guide as shown in Fig.2 and 3, and wrench the groove toward the desired moving direction.  
 (After this adjustment lift each, and check if key moves normally.)



**EXPLODED VIEW OF KEY-148**



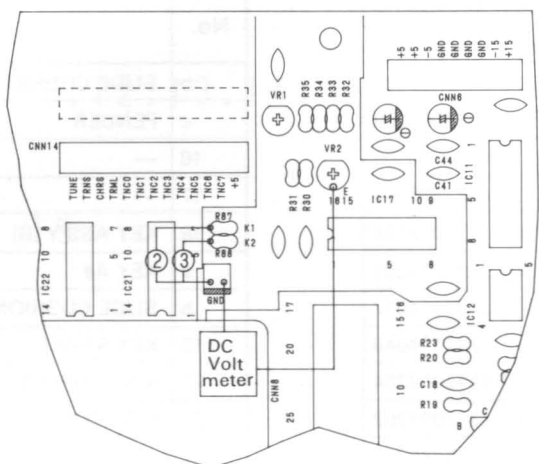


# KEY-148 PARTS LIST

No.	Part Name	KEY-148 (88KEYS)	
		Q'ty	Part No.
1	KEY CHASSIS ASS'Y	(1)	4117100417
a	KEY CHASSIS	1	4117098202
b	KEY GUIDE RAIL	7	4367278005
c	KEY GUIDE RAIL (S)	1	4367286000
d	3x6 CBTS (S)	16	4737002034
e	KEY CUSHION	3	1247114004
f	KEY CUSHION	1	1247114017
g	KEY CUSHION	2	1247114046
h	KEY GUIDE (W)	52	4317003204
i	KEY GUIDE (B)	36	4317004203
2	HAMMER FLANGE	7	4367284109
3	HAMMER FLANGE (S)	1	4367285108
4	HAMMER (W) ASS'Y	(52)	4367299107
a	HAMMER (W)	52	4367297109
b	HAMMER WEIGHT (W)	52	4367295004
c	HAMMER CUSHION	52	1247116002
5	HAMMER (B) ASS'Y	(36)	4367300106
a	HAMMER (B)	36	4367298108
b	HAMMER WEIGHT (B)	36	4367296003
c	HAMMER CUSHION	36	1247116002
6	3x10 CBTS (Bo)	16	4733814019
7	KEY ASS'Y (W)	(7)	4367290106
a	KEY A	7	4367265209
b	SLIDE CUSHION	7	1247115003
8	KEY ASS'Y (W)	(8)	4367290119
a	KEY B	8	4367266208
b	SLIDE CUSHION	8	1247115003
9	KEY ASS'Y (W)	(7)	4367301105
a	KEY C	7	4367267207
b	SLIDE CUSHION	7	1247115003
c	FENDER	7	1247122009
10	KEY ASS'Y (W)	(7)	4367290135
a	KEY D	7	4367268206
b	SLIDE CUSHION	7	1247115003
11	KEY ASS'Y (W)	(7)	4367290148
a	KEY E	7	4367269205
b	SLIDE CUSHION	7	1247115003
12	KEY ASS'Y (W)	(7)	4367301118
a	KEY F	7	4367270207
b	SLIDE CUSHION	7	1247115003
c	FENDER	7	1247122009
13	KEY ASS'Y (W)	(7)	4367290164
a	KEY G	7	4367271206
b	SLIDE CUSHION	7	1247115003
14	KEY ASS'Y (W)	(1)	4367291105
a	KEY A'	1	4367272205
b	SLIDE CUSHION	1	1247115003
15	KEY ASS'Y (W)	(1)	4367301121
a	KEY C'	1	4367273204

No.	Part Name	KEY-148 (88KEYS)	
		Q'ty	Part No.
b	SLIDE CUSHION	1	1247115003
c	FENDER	1	1247122009
16	—	—	—
17	—	—	—
18	KEY ASS'Y (B)	(36)	4367292104
a	KEY A#	36	4367276201
b	SLIDE CUSHION	36	1247115003
19	KEY SHAFT	88	4367277103
20	K/S STOPPER	7	4367279004
21	K/S STOPPER (S)	1	4367287009
22	3x6 CBTS (S)	16	4737002034
23	24 KEYS SWITCH BOARD	3	BP-380-2
24	16 KEYS SWITCH BOARD	1	BP-383-2
25	—	—	—
26	—	—	—
27	RUBBER SWITCH 8-II	11	2128598007
28	—	—	—
29	—	—	—
30	3x10 CBTS (Bo)	15	4733814019
31	CORD HOLDER	4	EP-4772
32	11P WIRE ASS'Y	1	2047420117
33	6P WIRE ASS'Y	1	2041435014
34	10P WIRE ASS'Y	1	2045037010

# VOLUME ADJUSTMENTS VR1, VR2 (TONE BOARD)



DC Volt meter

1. Turn the MAIN volume to the minimum setting.  
This is necessary because if your finger touches a key during adjustments, a big sound is generated unless the MAIN volume is set at this minimum position.
2. Connect the DC voltmeter as illustrated above.
3. Short the opposite side of the K1 of R87 to GND, and adjust VR1 to obtain  $0 \pm 10\text{mV}$ .
4. Short the opposite side of K2 of R88 to GND, and turn VR2 to obtain  $-2.325 \pm 0.025\text{V}$ .

**Notes:**

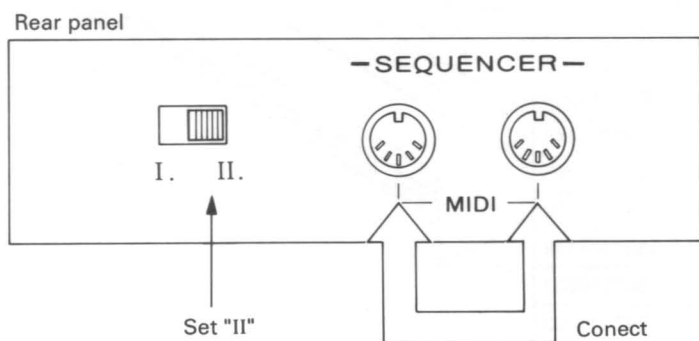
1. Always adjust VR1 first and then VR2.
2. Re-adjustment is required only when IC 17 (PCM56P), or a component part in the  $\pm 5\text{ V}$  and/or  $\pm 15\text{ V}$  line has been replaced.

# SEQUENCER TEST MODE

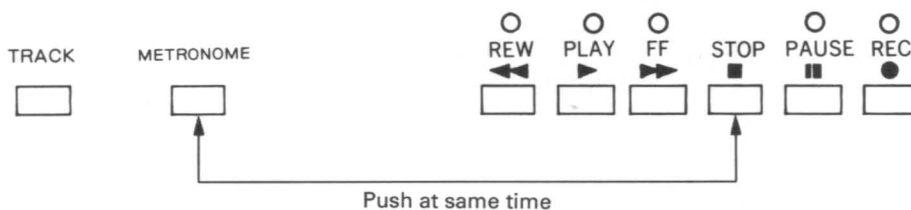
**Check**

BOARD Operating	PANEL S.W	LED
Segment display	MIDI IN OUT	

① Set below



② In order to enter TEST MODE.  
Push "METRONOME" and "STOP" at the same time.



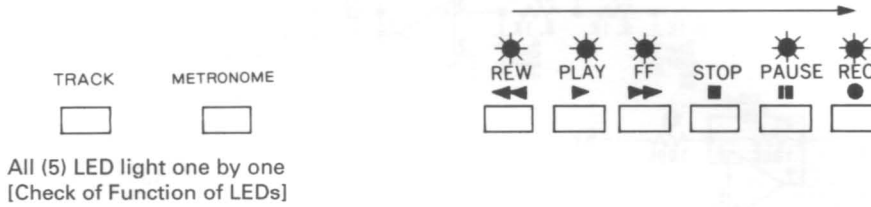
And Power sw on while pushing the above buttons.

## TEST MODE

- ③ Display LED changes.

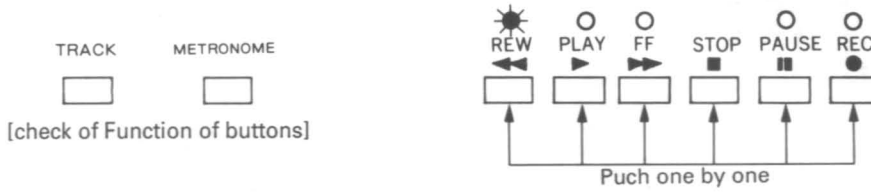


- ④ Push "TRACK" 1 time only.



All (5) LED light one by one  
[Check of Function of LEDs]

- ⑤ Push TRACK 1 time only then .  
Push buttons one by one, "REW", "PLAY", "FF", "STOP", "PAUSE", "REC". (each time LED Lights but "STOP" not.)



Segment display changes as below after. ("REC") button is pressed.



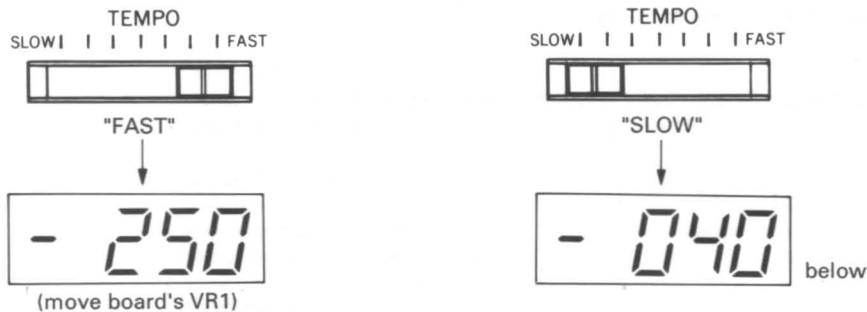
- ⑥ Push "TRACK" 1 time only (MIDI in out Test). Segment display changes as below.



Then Metronome beep  
Finish to repower on

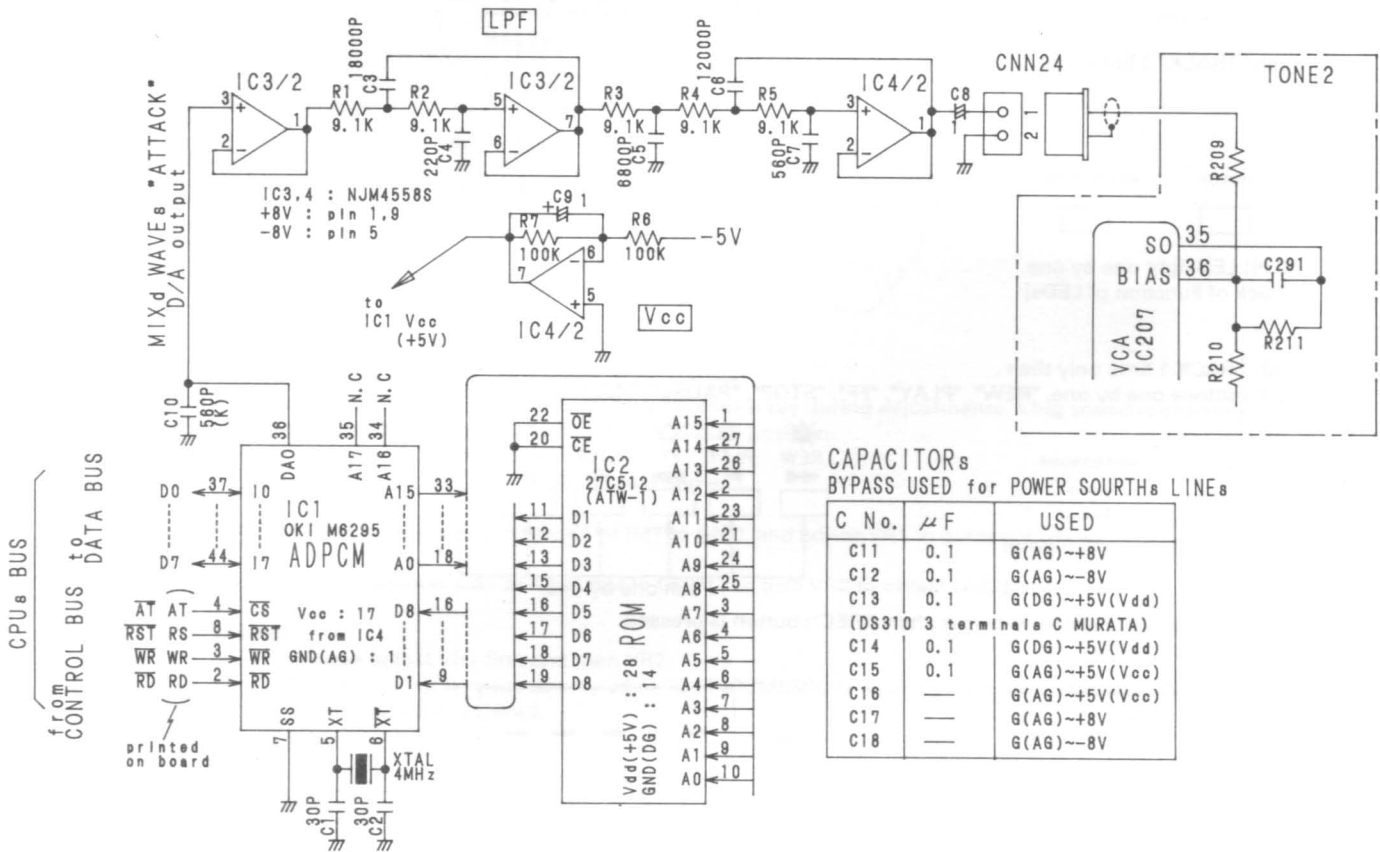
## ADJUSTMENT OF TEMPO

Tempo can be set by adjusting VR1 on the RECORDER P.C.B.  
Push "METRONOME" 1 time then display changes and beep.  
Adjust VR1 so as to display reads 250. While setting "TEMPO" at fast position.



2227155105 RECORDER BOARD'S VR1  
"FAST" → Adjust board's VR1, setting TEMPO "250".

# BP-357 ATTACK BOARD CIRCUIT DIAGRAM



**NOTES**

ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**

Parts marked with this symbol  $\triangle$   have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

**CAUTION:**

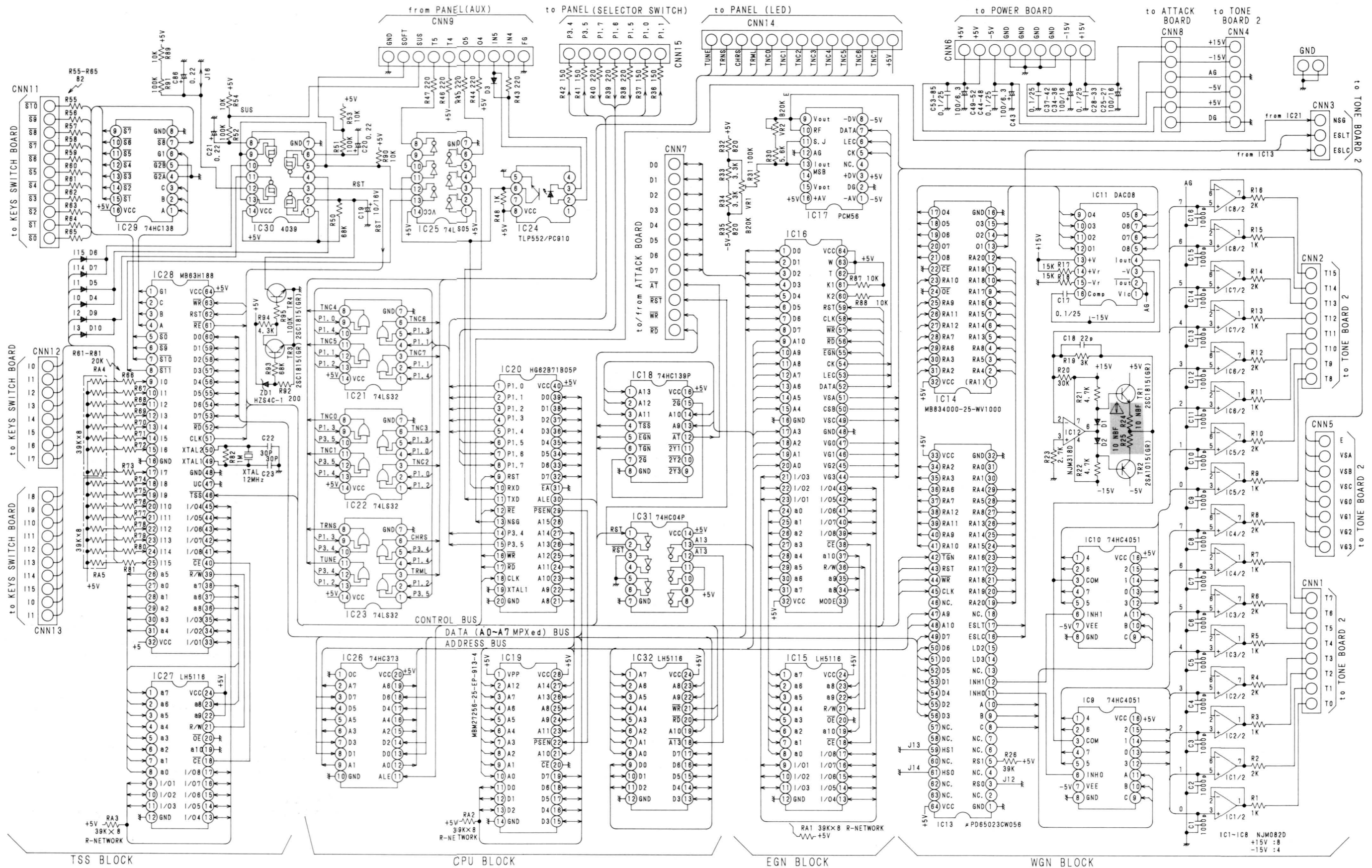
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 k ohm, the unit is defective.

**WARNING:**

DO NOT return the unit to the customer until the problem is located and corrected.



# BP-385-8 TONE BOARD1 CHRCUIT DIAGRAM



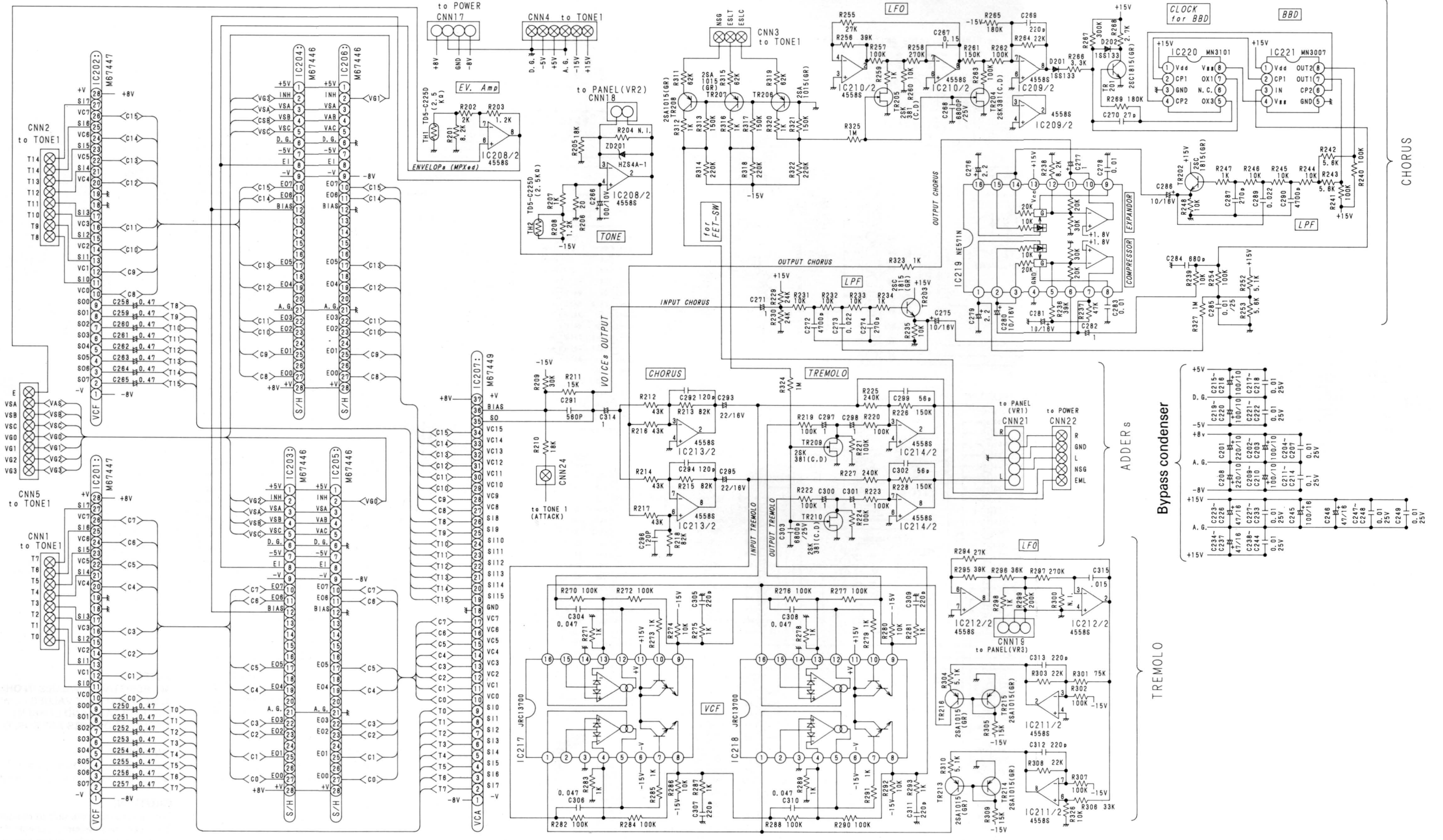
**NOTES**  
 ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**  
 Parts marked with this symbol have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

**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 k ohm, the unit is defective.

**WARNING:**  
 DO NOT return the unit to the customer until the problem is located and corrected.

# BP-392-1 TONE BOARD2 CIRCUIT DIAGRAM



**NOTES**  
 ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

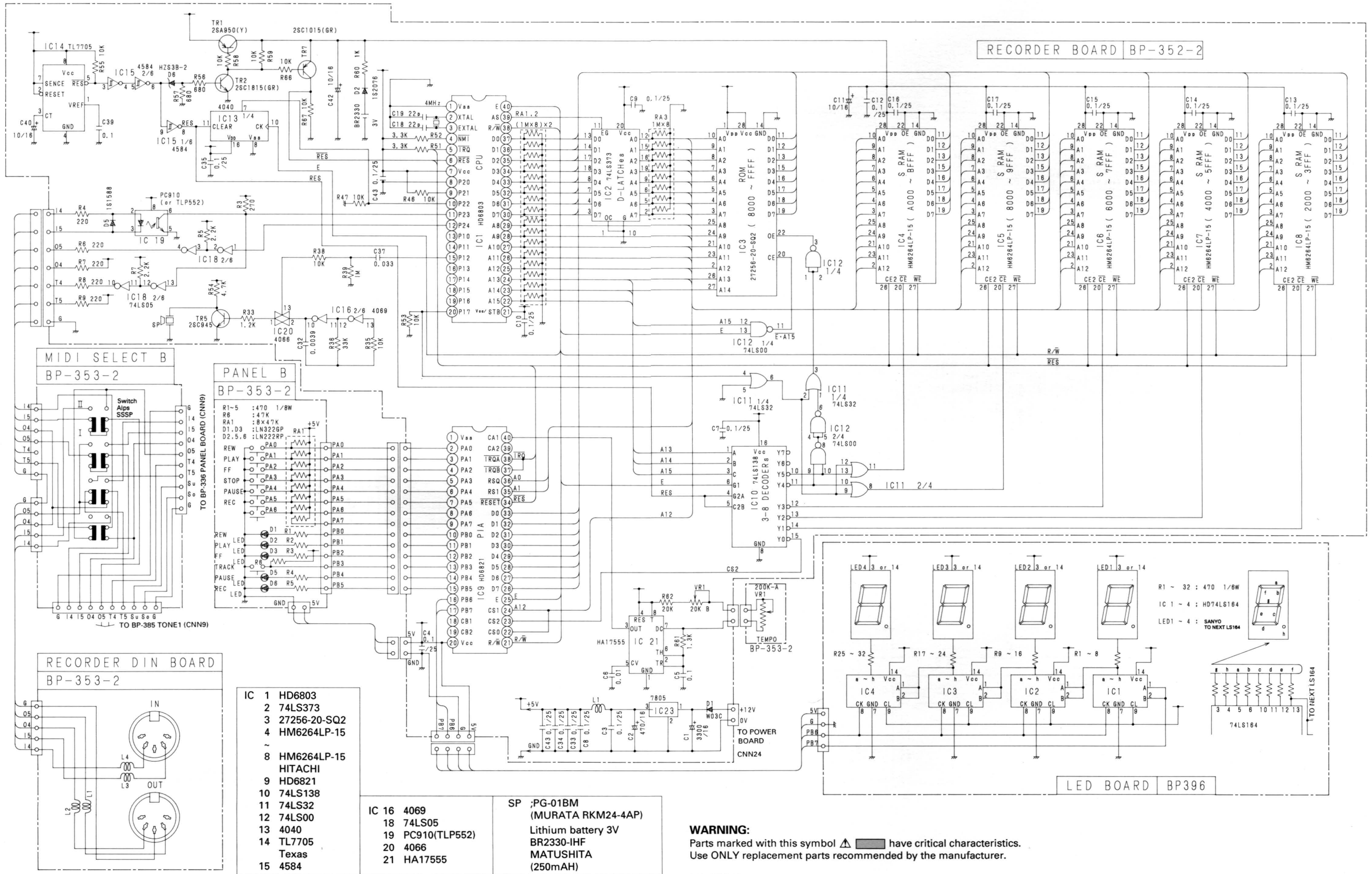
**WARNING:**  
 Parts marked with this symbol have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

**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 shassis to either side of the power cord is less than 240 k ohm, the unit is defective.

**WARNING:**  
 DO NOT return the unit to the customer until the problem is located and corrected.



# BP-352-2 RECORDER BOARD CIRCUIT DIAGRAM



- |       |               |    |                               |
|-------|---------------|----|-------------------------------|
| IC 1  | HD6803        | SP | PG-01BM<br>(MURATA RKM24-4AP) |
| 2     | 74LS373       |    | Lithium battery 3V            |
| 3     | 27256-20-SQ2  |    | BR2330-IHF                    |
| 4     | HM6264LP-15   |    | MATUSHITA                     |
| 8     | HM6264LP-15   |    | (250mAH)                      |
| 9     | HITACHI       |    |                               |
| 10    | 74LS138       |    |                               |
| 11    | 74LS32        |    |                               |
| 12    | 74LS00        |    |                               |
| 13    | 4040          |    |                               |
| 14    | TL7705        |    |                               |
| 15    | 4584          |    |                               |
| IC 16 | 4069          |    |                               |
| 18    | 74LS05        |    |                               |
| 19    | PC910(TLP552) |    |                               |
| 20    | 4066          |    |                               |
| 21    | HA17555       |    |                               |

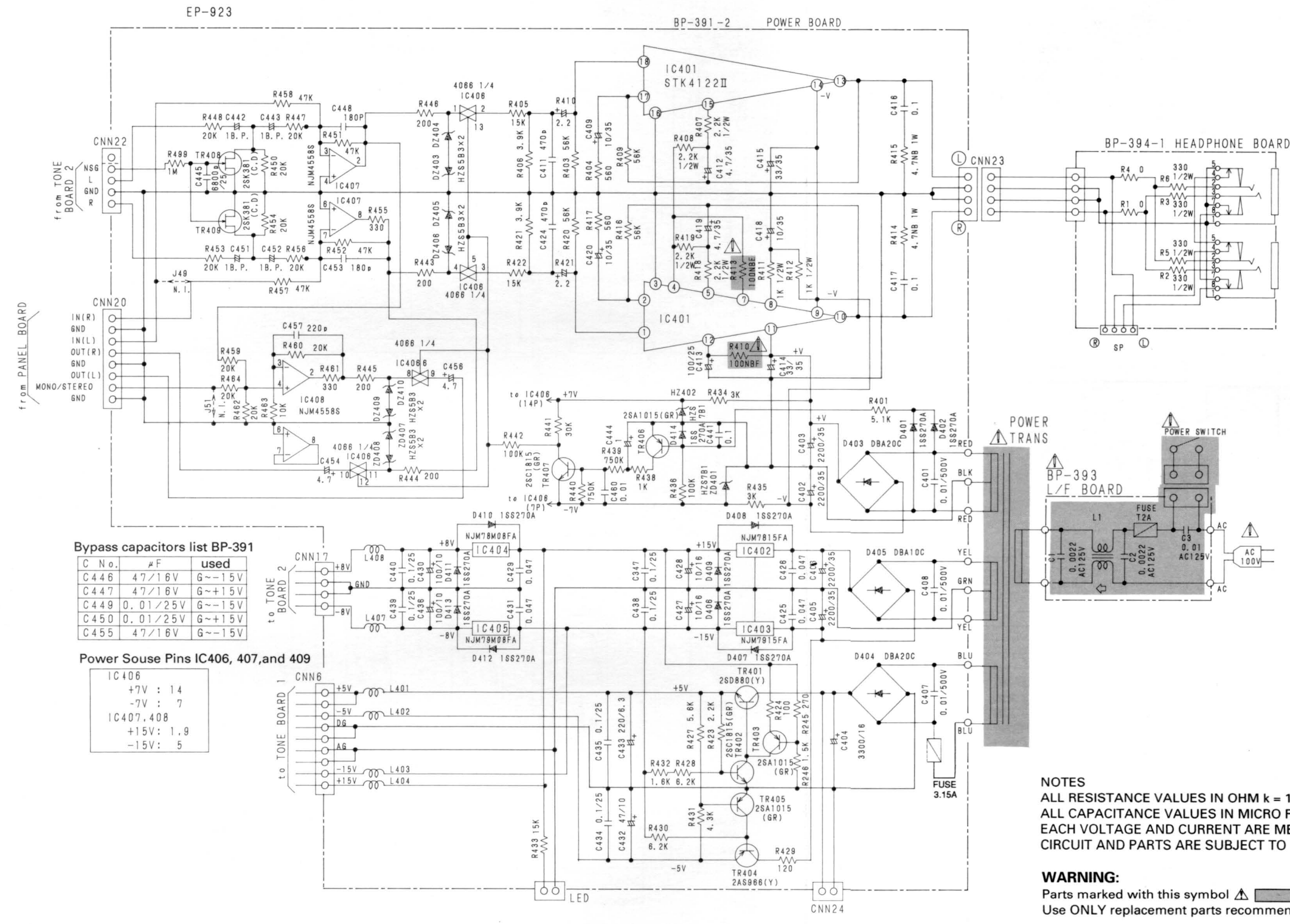
**NOTES**  
 ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**  
 Parts marked with this symbol have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

**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 shassis to either side of the power cord is less than 240 k ohm, the unit is defective.

**WARNING:**  
 DO NOT return the unit to the customer until the problem is located and corrected.

# BP-391-2 POWER & POWER SUPPLY CIRCUIT DIAGRAM



Bypass capacitors list BP-391

C No.	μF	used
C446	47/16V	G~-15V
C447	47/16V	G~+15V
C449	0.01/25V	G~-15V
C450	0.01/25V	G~+15V
C455	47/16V	G~-15V

Power Souse Pins IC406, 407, and 409

IC406	+7V : 14
	-7V : 7
IC407, 408	+15V : 1,9
	-15V : 5

**NOTES**

ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**

Parts marked with this symbol have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

**CAUTION:**

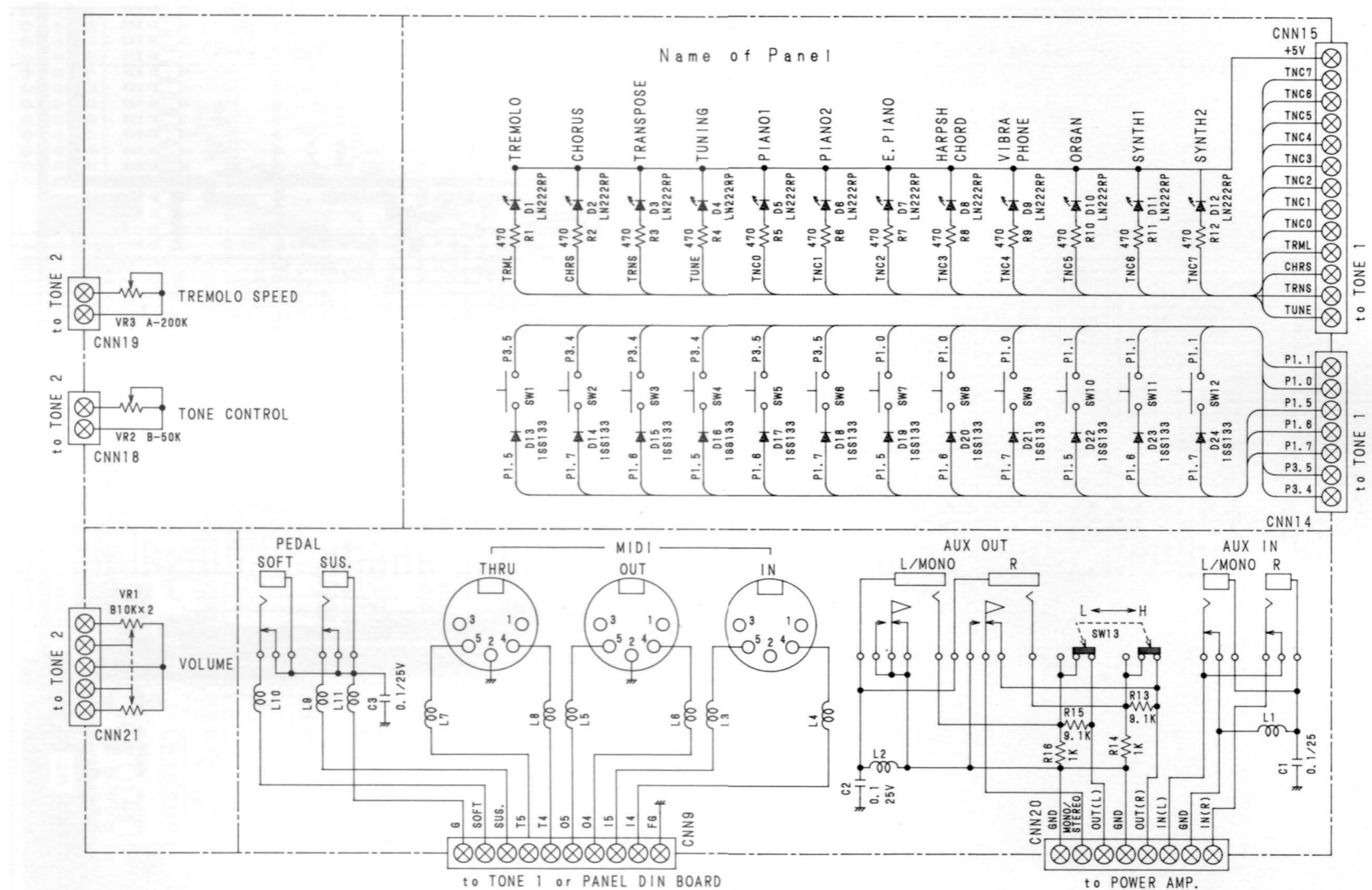
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to shassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from shassis to either side of the power cord is less than 240 k ohm, the unit is defective.

**WARNING:**

DO NOT return the unit to the customer until the problem is located and corrected.



# BP-336-10 PANEL BOARD CIRCUIT DIAGRAM



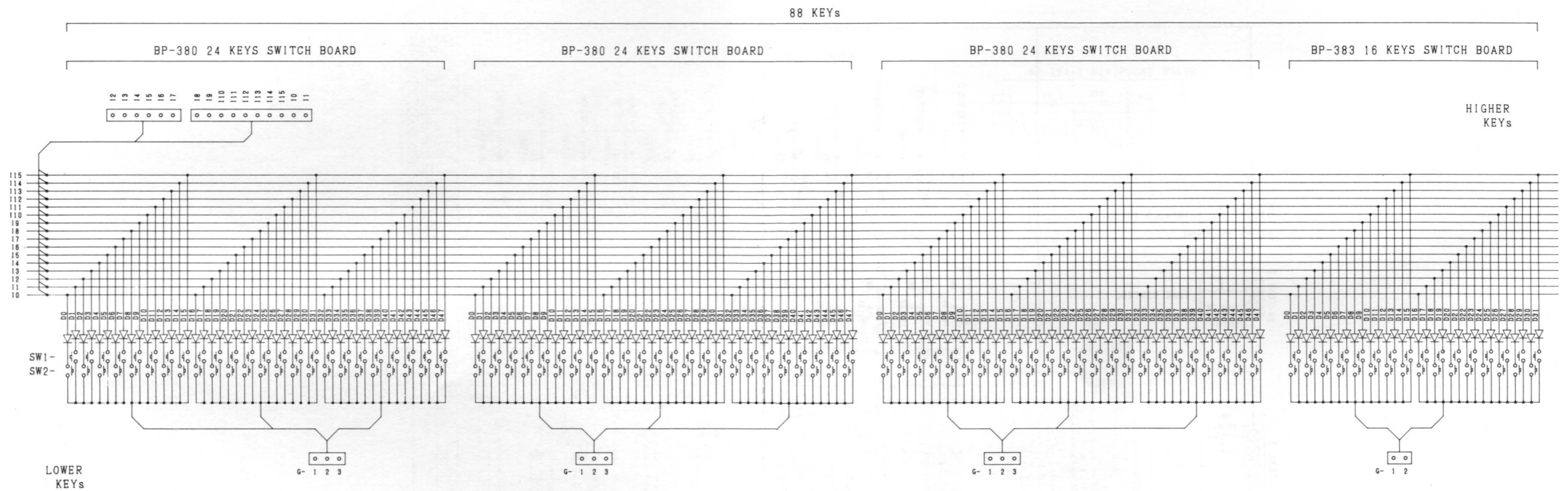
**NOTES**  
 ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**  
 Parts marked with this symbol  $\triangle$   have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

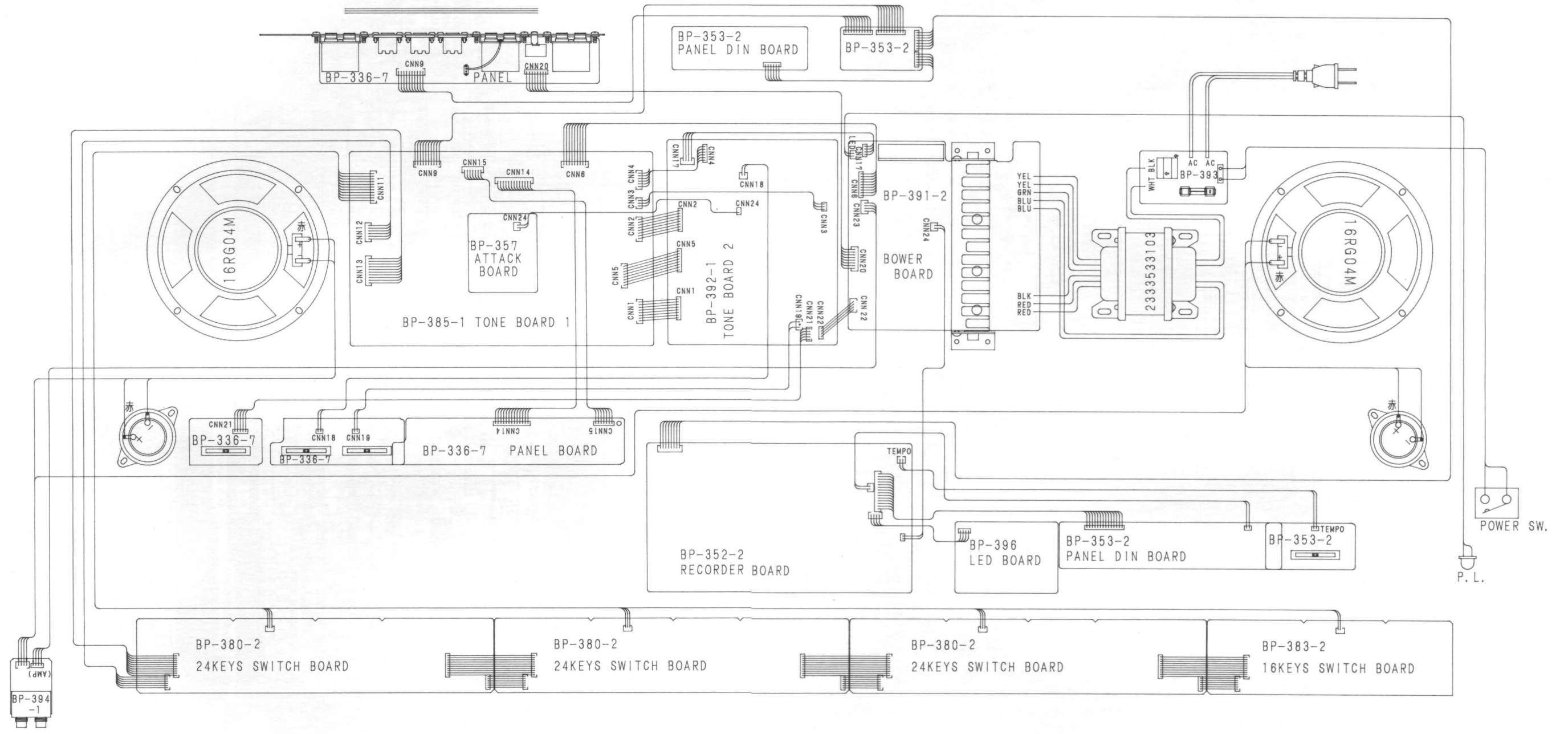
**CAUTION:**  
 Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 k ohm, the unit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

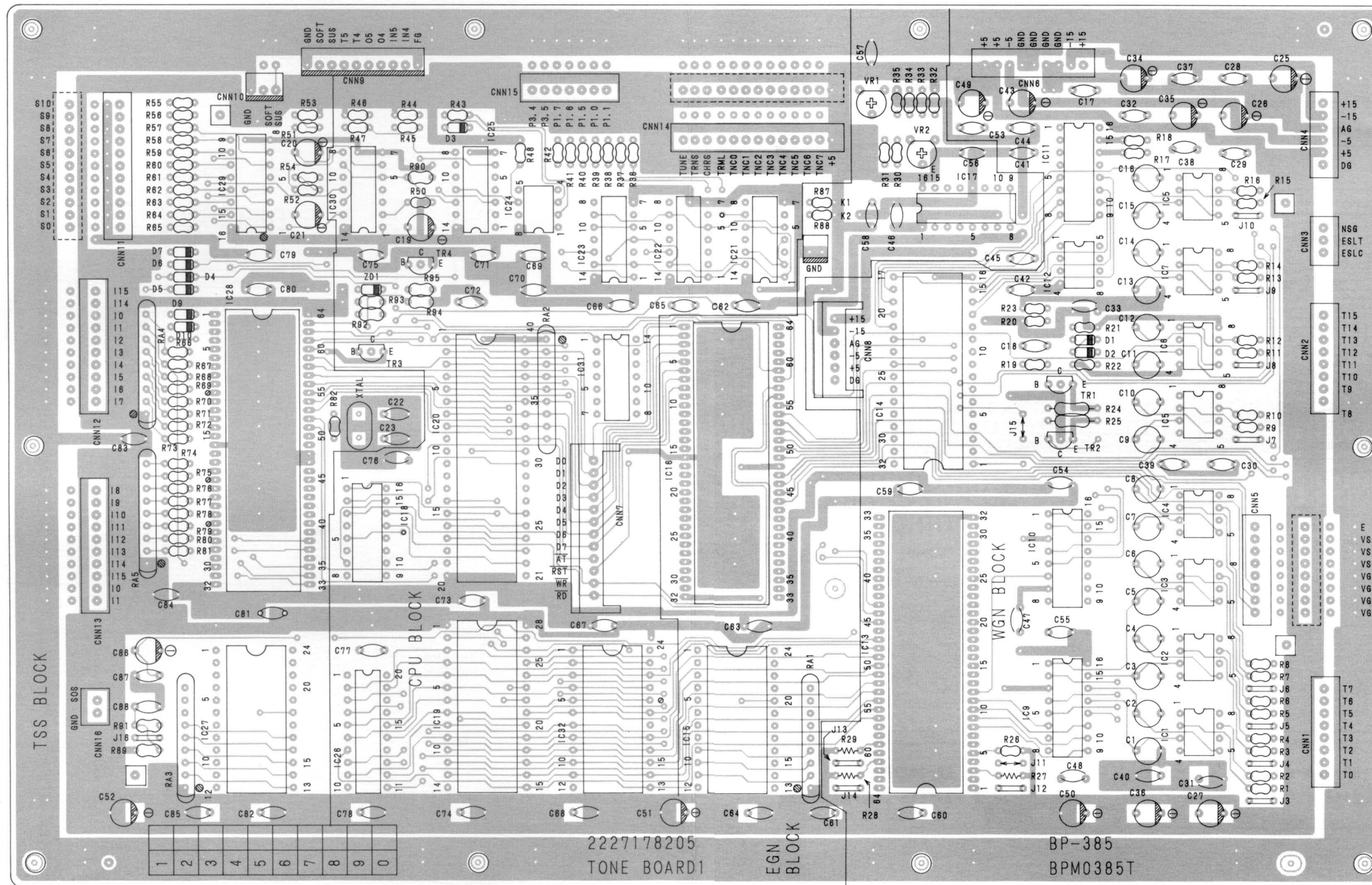
**WARNING:**  
 DO NOT return the unit to the customer until the problem is located and corrected.

# KEY SWITCH BOARDS CIRCUIT DIAGRAM

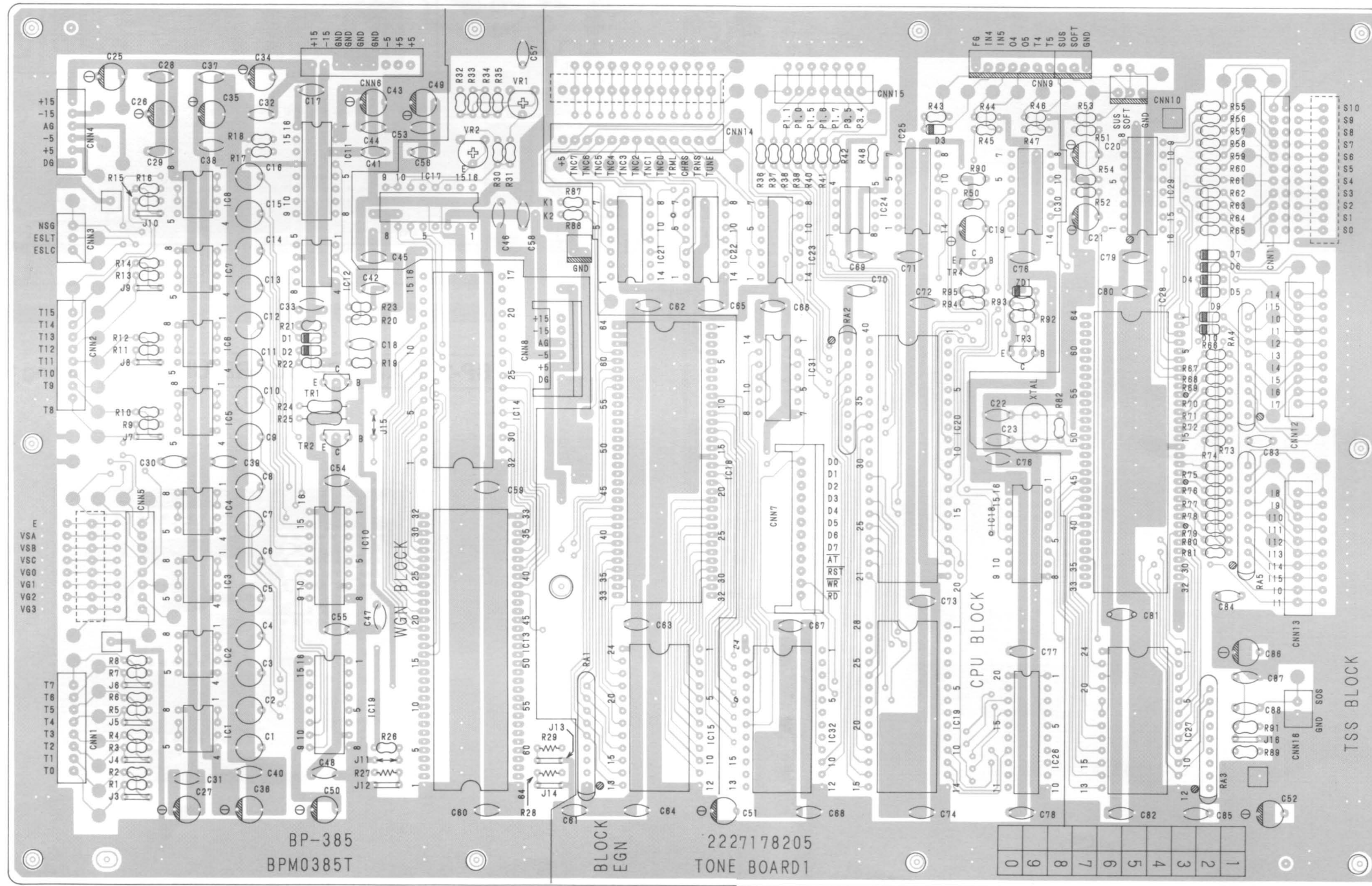


**BLOCK DIAGRAM**



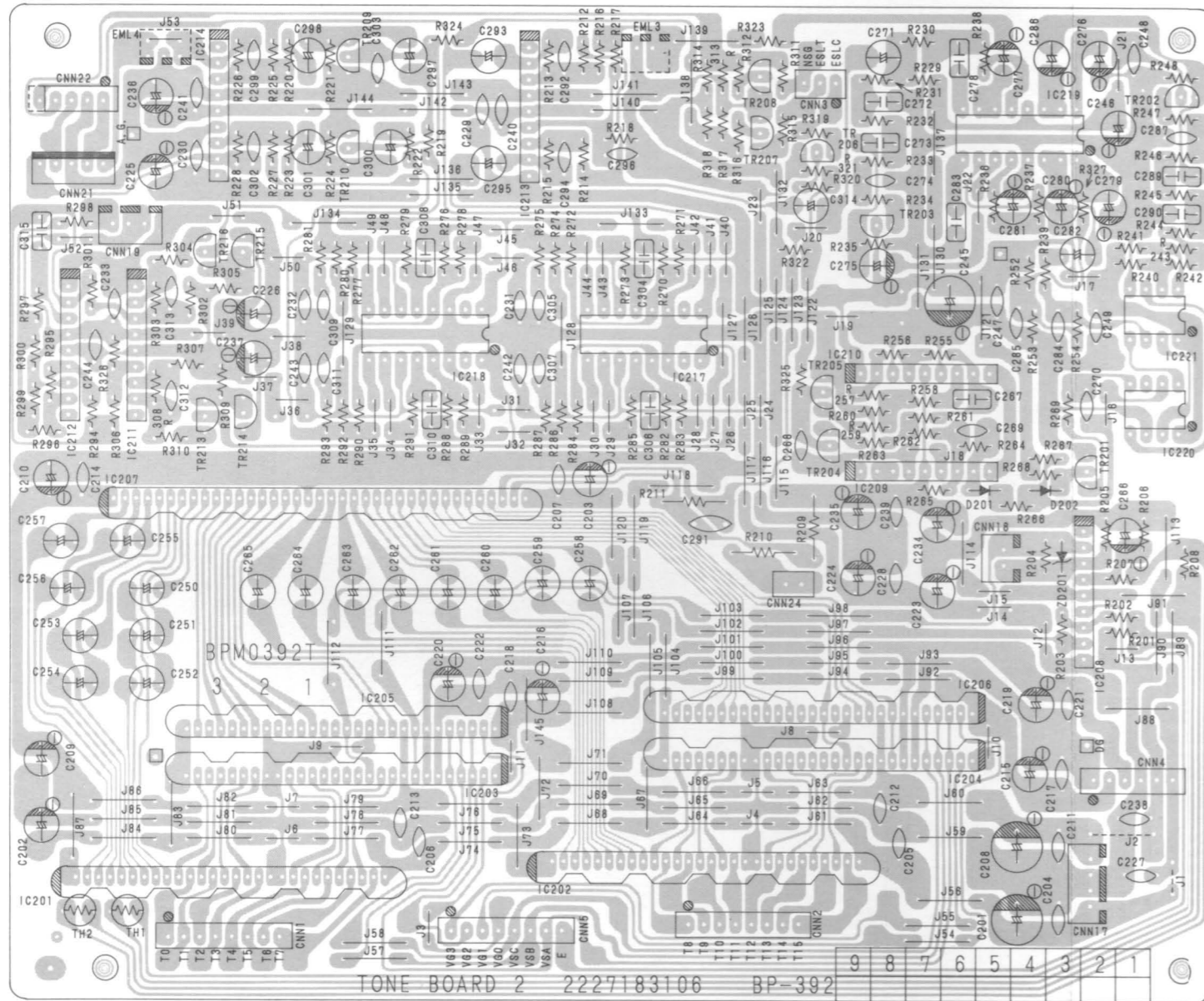






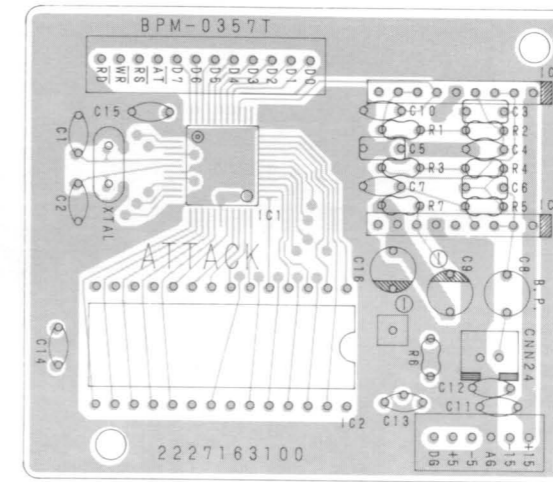
**BP-392-1 TONE BOARD2 UNIT**

Pattern Side



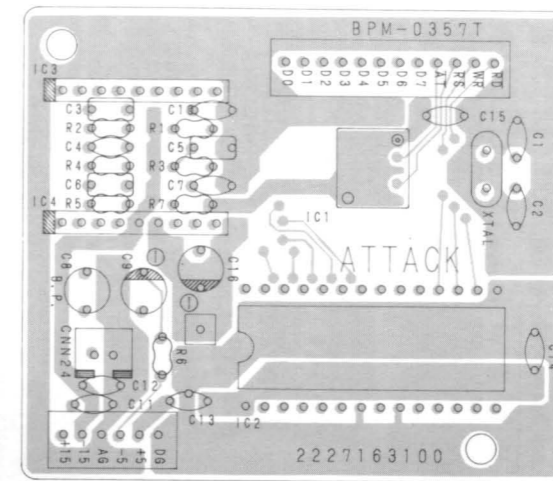
**BP-357 ATTACK BOARD UNIT**

Mounting Side



**BP-357 ATTACK BOARD UNIT**

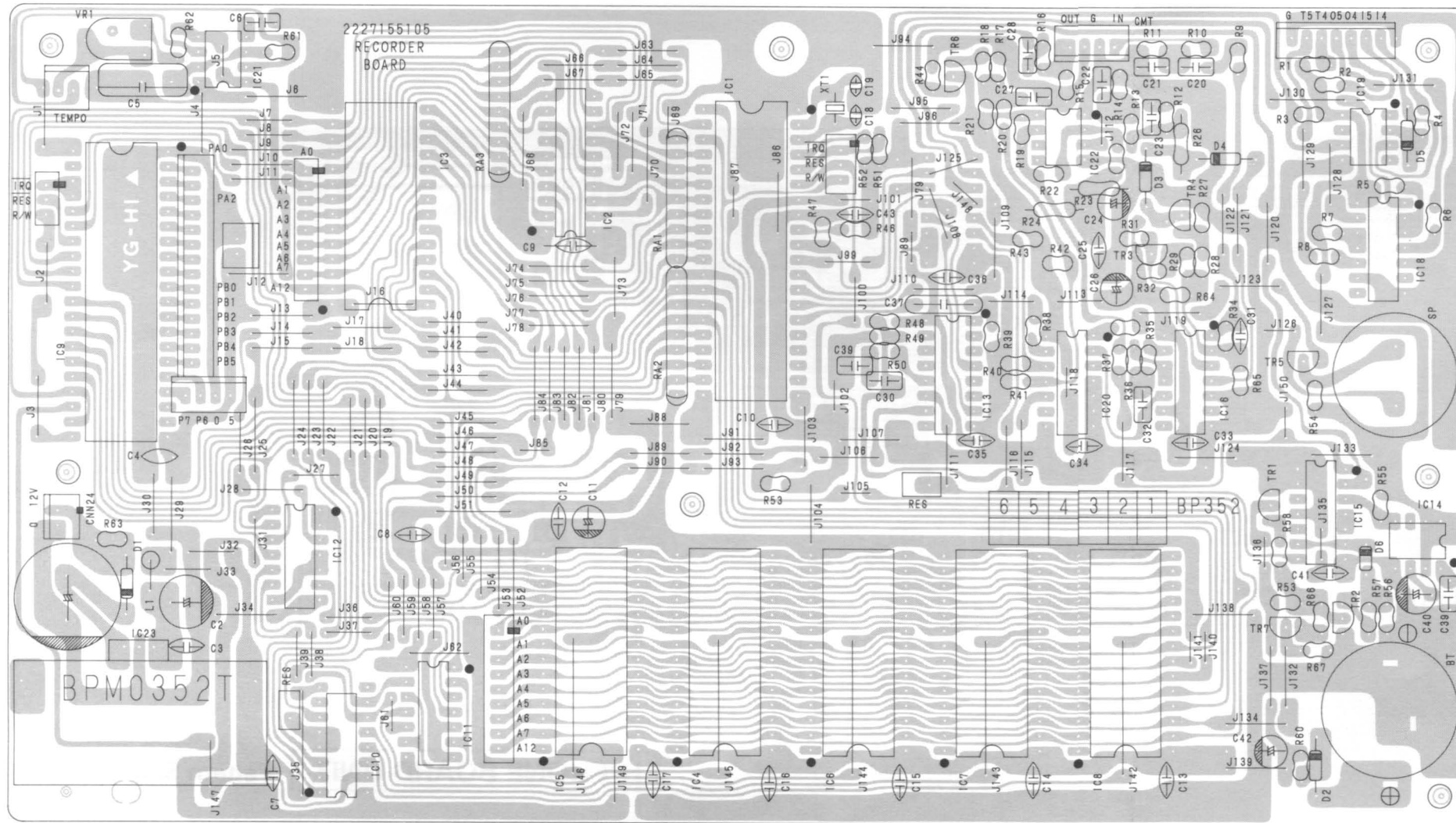
Soldering Side





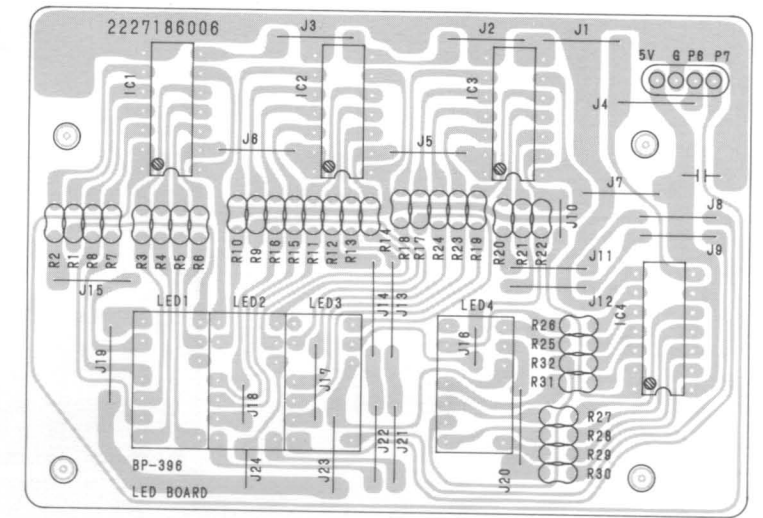
**BP-352-2 RECORDER BOARD UNIT**

Pattern Side



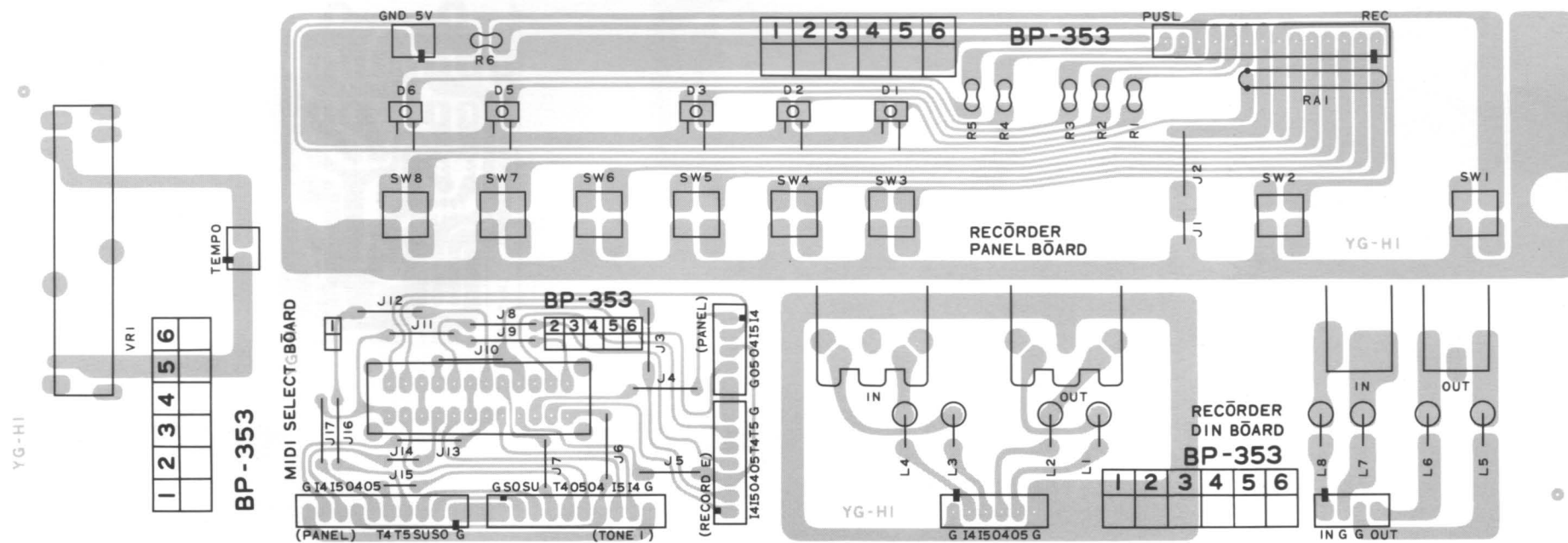
**BP-396 LED BOARD UNIT**

Pattern Side



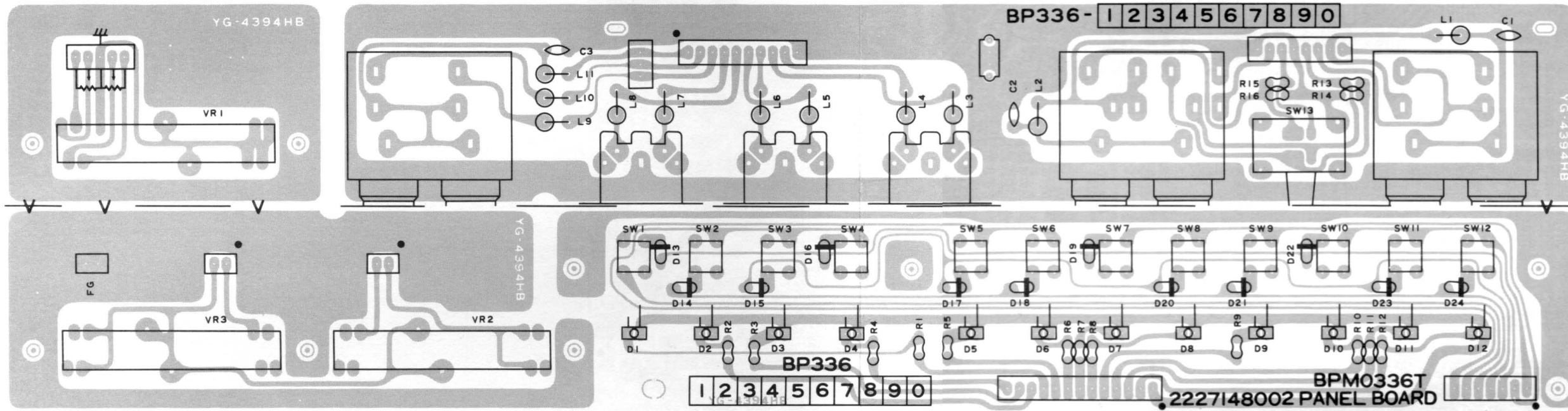
**BP-353-2 PANEL DIN BOARD UNIT**

Pattern Side



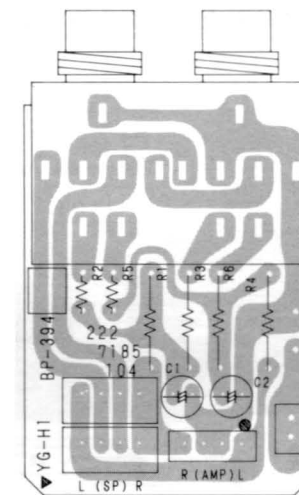
**BP-336-7 PANEL BOARD UNIT**

Pattern Side



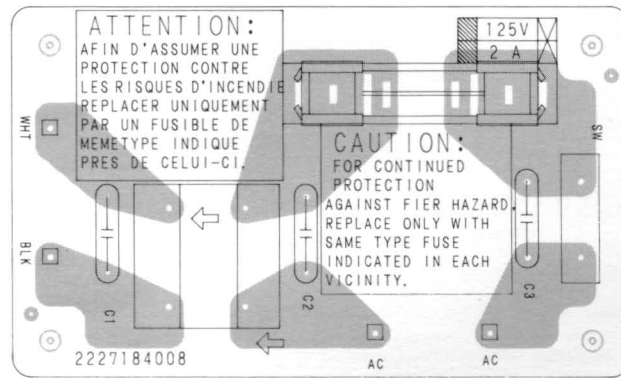
**H/PHONE BOARD UNIT**

Pattern Side



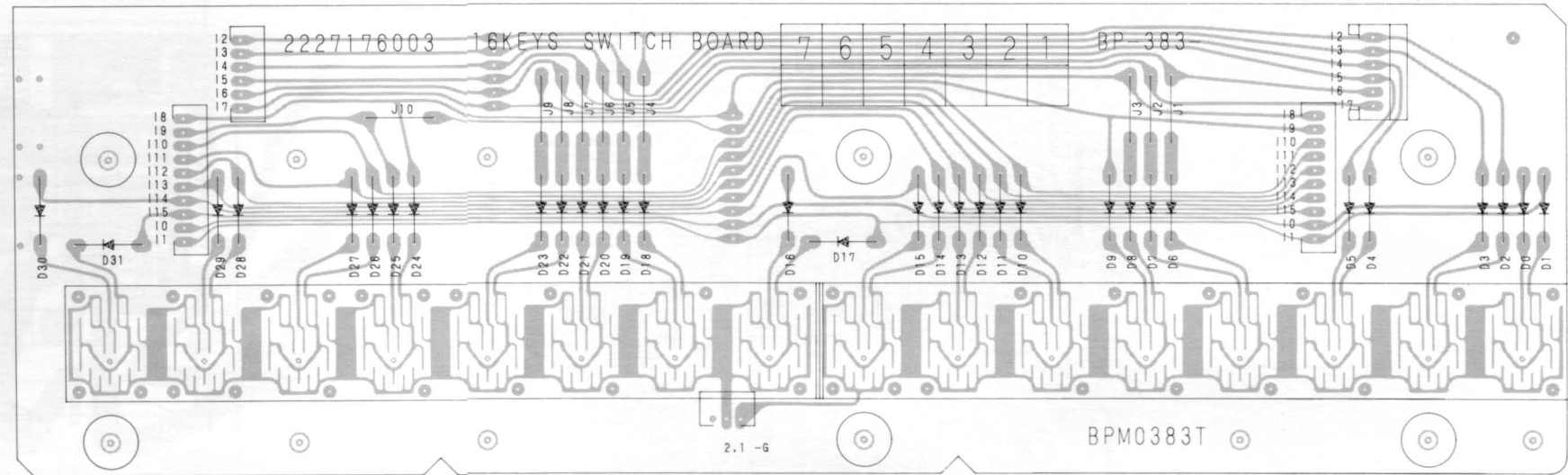
**BP-393 L/FILTER BOARD UNIT**

Pattern Side



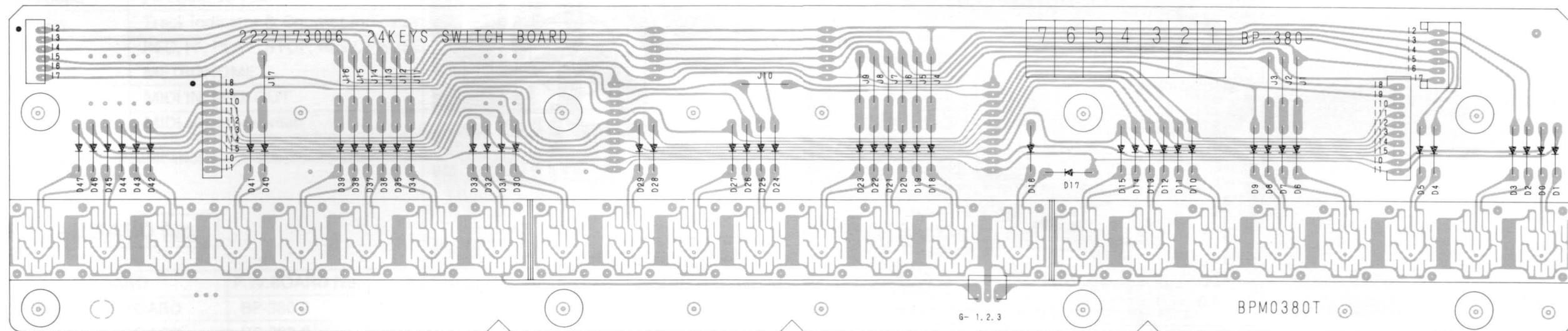
**BP-383-2 16 KEYS SWITCH BOARD**

Pattern Side



**BP-380-2 24KEYS SWITCH BOARD**

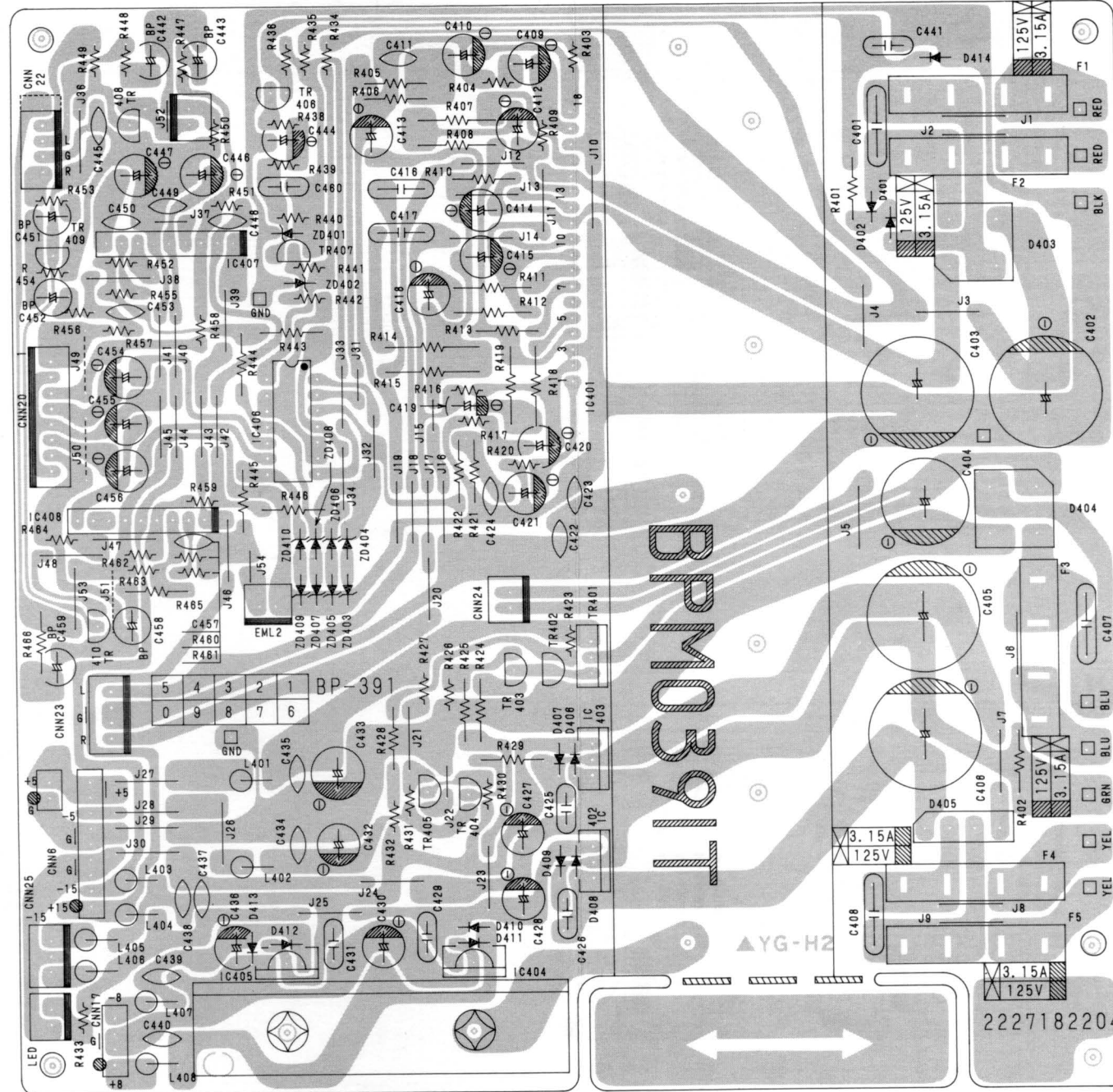
Pattern Side





**BP-391-2 POWER BOARD UNIT**

Pattern Side





## SPECIFICATIONS

### Model EP-923

Keyboard	88keys (A2-c5)
Sound range	7 octaves 1/4
Voices	Piano1, 2, E, Piano, Harpsichord
	Vibraphone, Organ, Tynth1, 2
Effects	Chorus, Tremolo
Controls	Volume, Transpose, Tuning, Tone, Tremolo speed
Connecting Jacks	AUX IN (monaural, stereo)
	AUX OUT (monaural, stereo)
	Headphone terminalx2
	Sustain pedal, Soft/Sostenuto pedal
	MIDI IN, MIDI OUT, MIDI THRU
Others	Output level selector switch
Speakers	16cmx2      Tweeterx2
Output	20W+20W
Dimensions	1360(W) × 206(H) × 520(D)mm
Weight	43Kg
Accessories	

## SPECIFICATIONS OF SEQUENCER

Memory stores	40K-byte 10,000notes (with velocity)
Tempo speed	♩ = about 40-250
LED display	Track indicator & Counter indicator
Operting buttons	REC, FF, PLAY, STOP, REW, PAUSE, TRACK, METRONOME
Connectors	MIDI IN, MIDI OUT
Others	MIDI selector switch

**Note:** Design and specifications are subject to change without notice in the course of product improvement.

## LIST OF P.W.BOARD No.

Name of P.W.BOARD	P.W.BOARD No.	Remarks
24 KEYS SWITCH BOARD	BP-380-2	Used 3 units
16 KEYS SWITCH BOARD	BP-383-2	
TONE BOARD 1	BP-385-8	
ATTACK BOARD	BP-357	On TONE BOARD
TONE BOARD 2	BP-392-1	
PANEL BOARD	BP-336-7	
POWER BOARD	BP-391-2	
HEADPHON BOARD	BP-394	
RECORDER BOARD	BP-352-2	
PANEL DIN BOARD	BP-353-2	
LED BOARD	BP-396	