

# DENON

## SERVICE MANUAL

ELECTRONIC PIANO

MODEL  
**EP-700**

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**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-913R

**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.

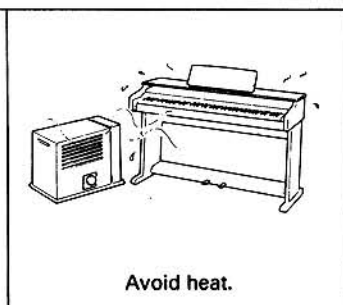
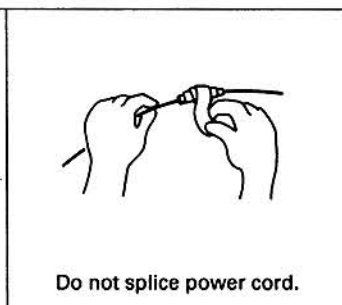
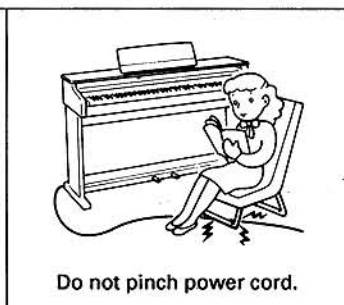
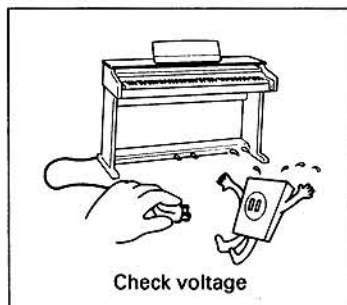
● Select a flat and level surface allowing enough space for setting up and operation.

● 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.

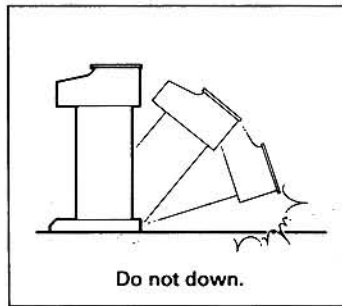
3. Take care so that the INSTRUMENTS is not dropped to avoid damaging the cabinet which defeats safeguards or injuring yourself. If the INSTRUMENTS has been dropped or the cabinet has been damaged, unplug the INSTRUMENTS and have it checked by a WURLITZER service technician to restore the safeguards.



### ■ 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.



# DISASSEMBLY

Fig. 1

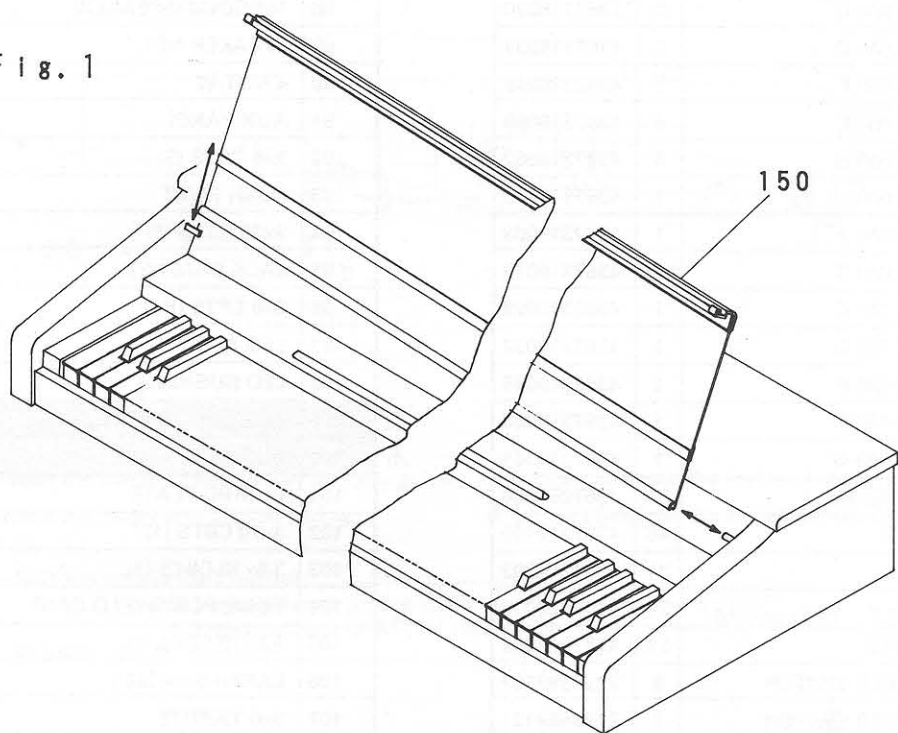


Fig. 2

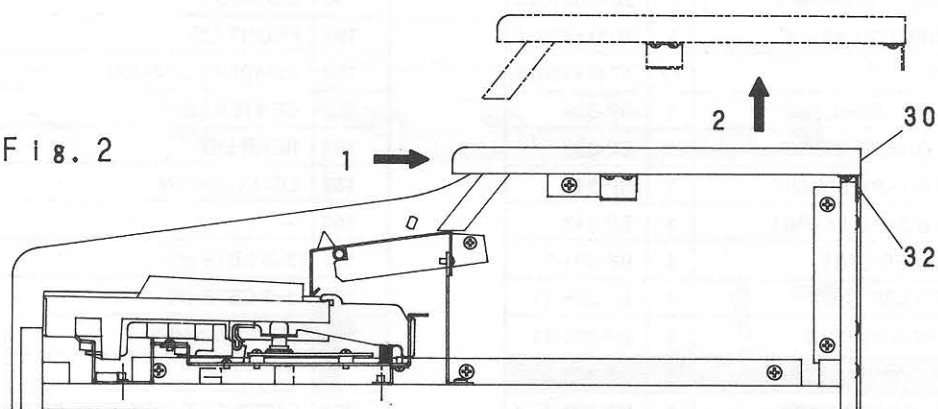


Fig. 3

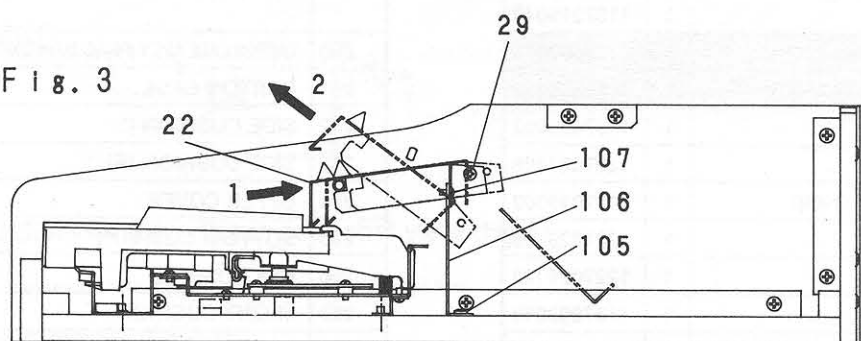


Fig. 4

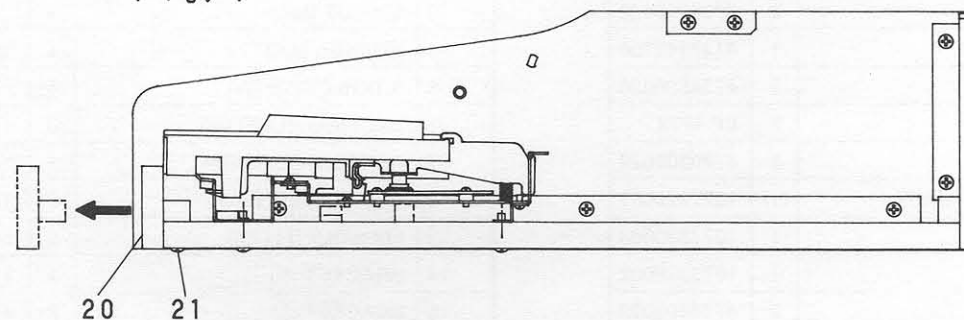
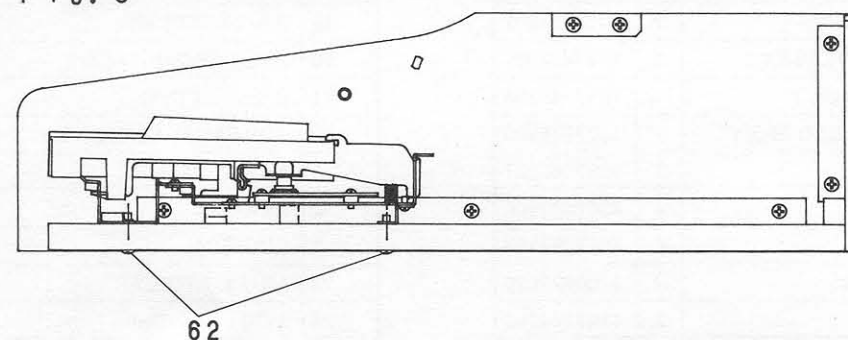


Fig. 5

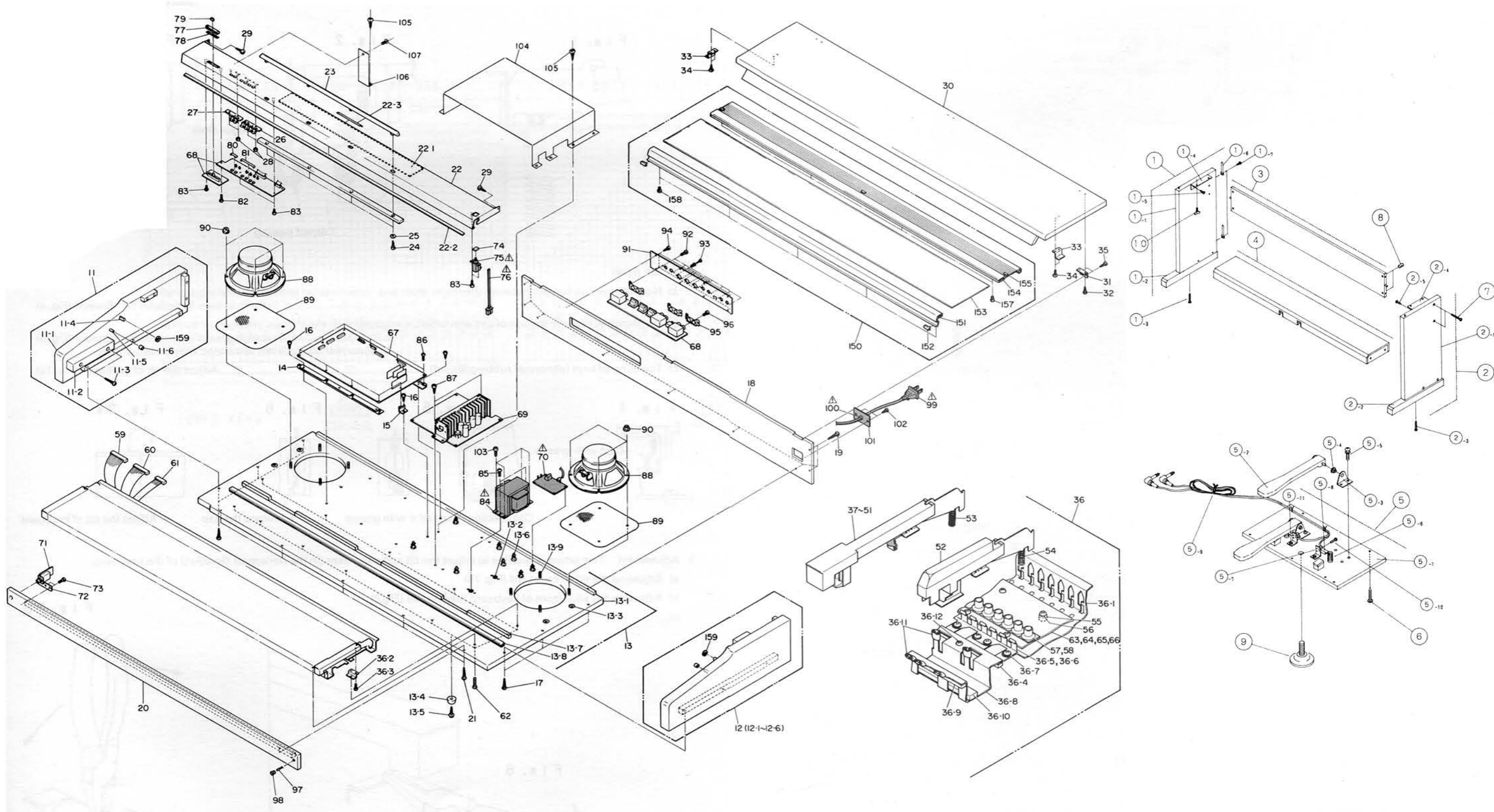


## Cabinet Disassembly

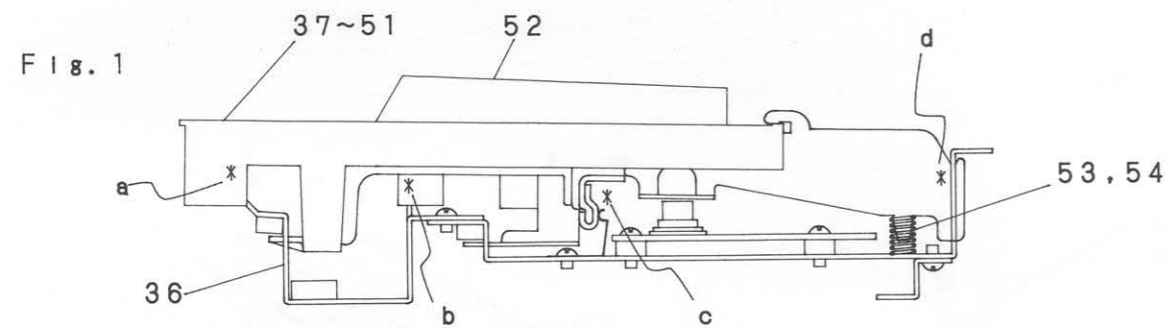
1. Remove lid assembly 150. (Fig.1)
  - 1) Open lid assembly 150 as shown in the figure and lift its left end and slide the entire assembly to remove it.
2. Remove roof board 30. (Fig.2)
  - 1) Remove six (6) screws 32 (3 × 10, CBTS(1)).
  - 2) Move roof board 30 in the direction of arrow 1 and remove it in the direction of arrow 2.
3. Remove top panel assembly 22. (Fig.3)
  - 1) Remove screw 107 (3 × 6, TAPTITE) and two (2) screws 105 (3.5 × 10, CBTS(1)), then remove earth bracket 106.
  - 2) Remove screw 29 (3.5 × 10, CBTS (1)) and push top panel assembly 22 in the direction of arrow 1.
  - 3) Lift the front of top panel assembly 22 and move the entire assembly in the direction of arrow 2 to remove it.
4. Remove front board assembly 20. (Fig.4)
  - 1) Remove five (5) screws (3.5 × 25, CTTS(1)) and move front board assembly 20 in the direction of the arrow to remove it.
5. Remove the key unit. (Fig.5)
  - 1) Remove twelve (12) screws 62 and lift the key unit to remove it.



# EXPLODED VIEW



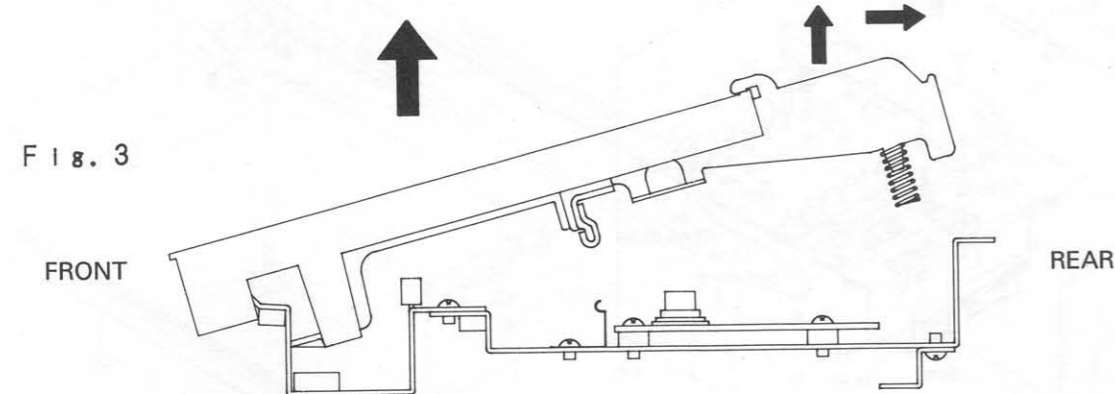
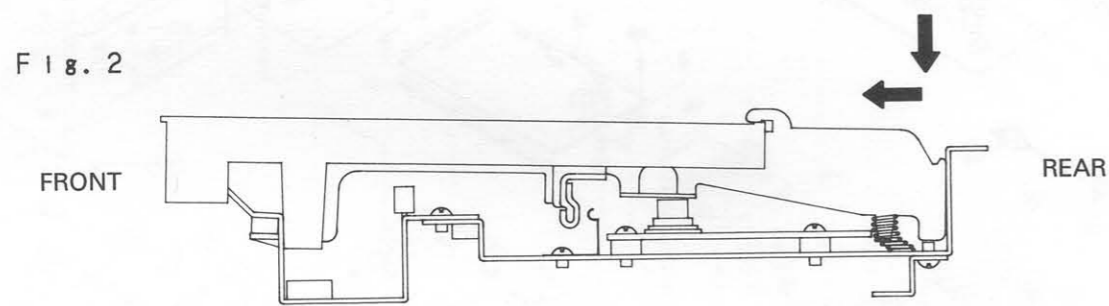
# DISASSEMBLY AND ADJUSTMENT OF KEYS



### Coat sections marked \* with grease

- a. Contact between the inside of natural key and key guide
- b. Contact between the inside of chromatic key and key guide
- c. Contact between the finger and friction spring
- d. Contact between the key assembly and chassis

Grease — Silicone grease SB-1 (white) ..... a, b  
 (Shinetsu silicone grease G30M  
 Shinetsu silicone oil KF96H 100,000CS) → Mixing ratio : 1:1  
 — PLASTILUBE EP (brown) ..... c, d



### Keyboard Disassembly - Cross-sectional view (Fig.1)

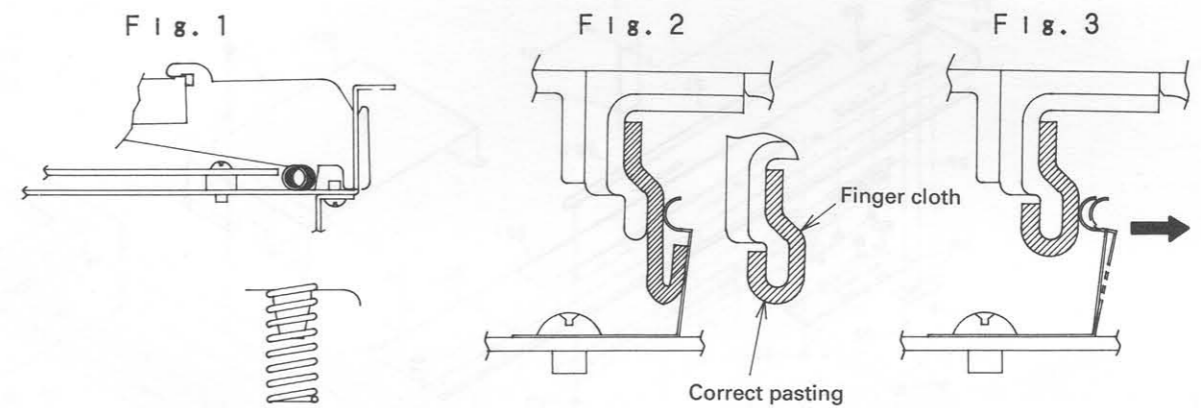
\* Remove natural keys first, and install chromatic keys first.

1. Keyboard removal (Fig. 2, 3)
  - 1) Depress the rear of key assemblies (W) 37-51 in the direction of the arrow and then move the assemblies forward. (Fig.2)
  - 2) Lift the rear of the assembly in the direction of the arrow and move it backward, then lift the whole assembly to remove it. (Fig.3)
  - 3) Remove key assembly (B) 52 in the same way.

### Causes of Defect, Remedies and Adjustments

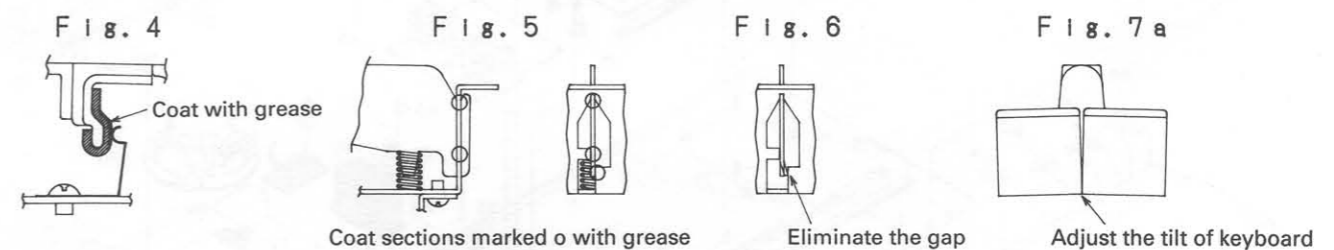
#### 1. Key does not return

- a) Key spring comes off ..... Install the key spring correctly. (Fig. 1)
- b) Finger cloth peels off ..... Re-paste the finger cloth. (Fig. 2)
- c) No grease at the key guide ..... Coat with grease (silicon grease SB-1 \* white)
- d) Pressure of contact between the finger and friction spring is too high ..... Bend the friction spring in the direction of the arrow to decrease the pressure. (Fig. 3)



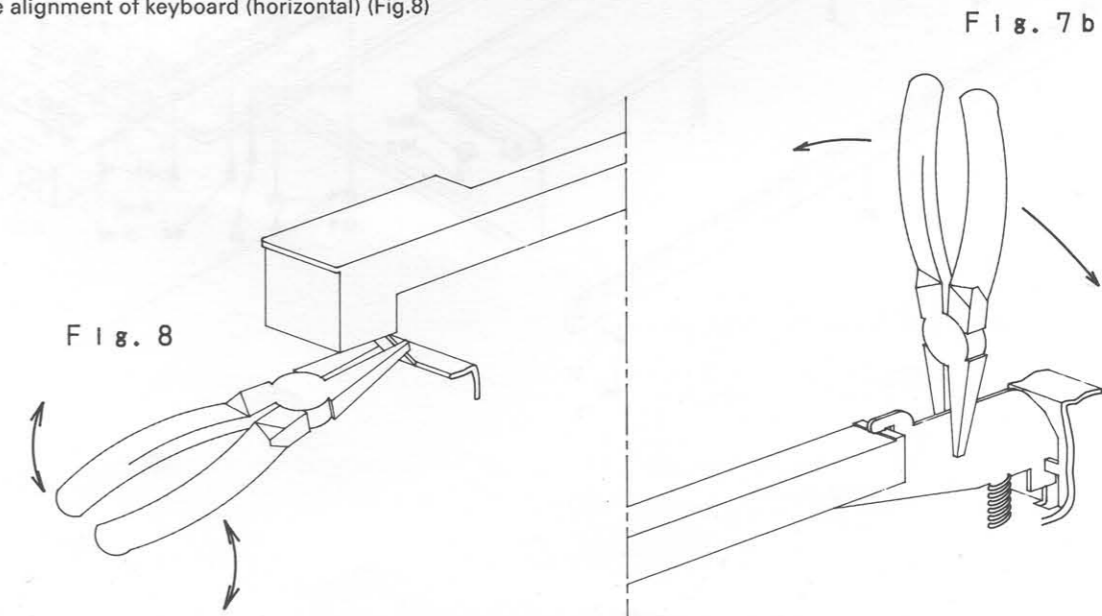
#### 2. Action noise

- a) No grease at the contact between the finger cloth and friction spring (abnormal rubbing sound) ..... Coat with grease (Plastilube EP \*Brown) (Fig. 4)
- b) No grease at the rear section of key arm which is engaged with the chassis (mechanical sound) ..... Coat with grease (Plastilube EP \*Brown) (Fig. 5)  
 \*If abnormal sound is not eliminated with grease (Fig. 6)
- c) Touching of keys (abnormal rubbing sound) ..... Adjust the tilt of keyboard (Fig. 7a)

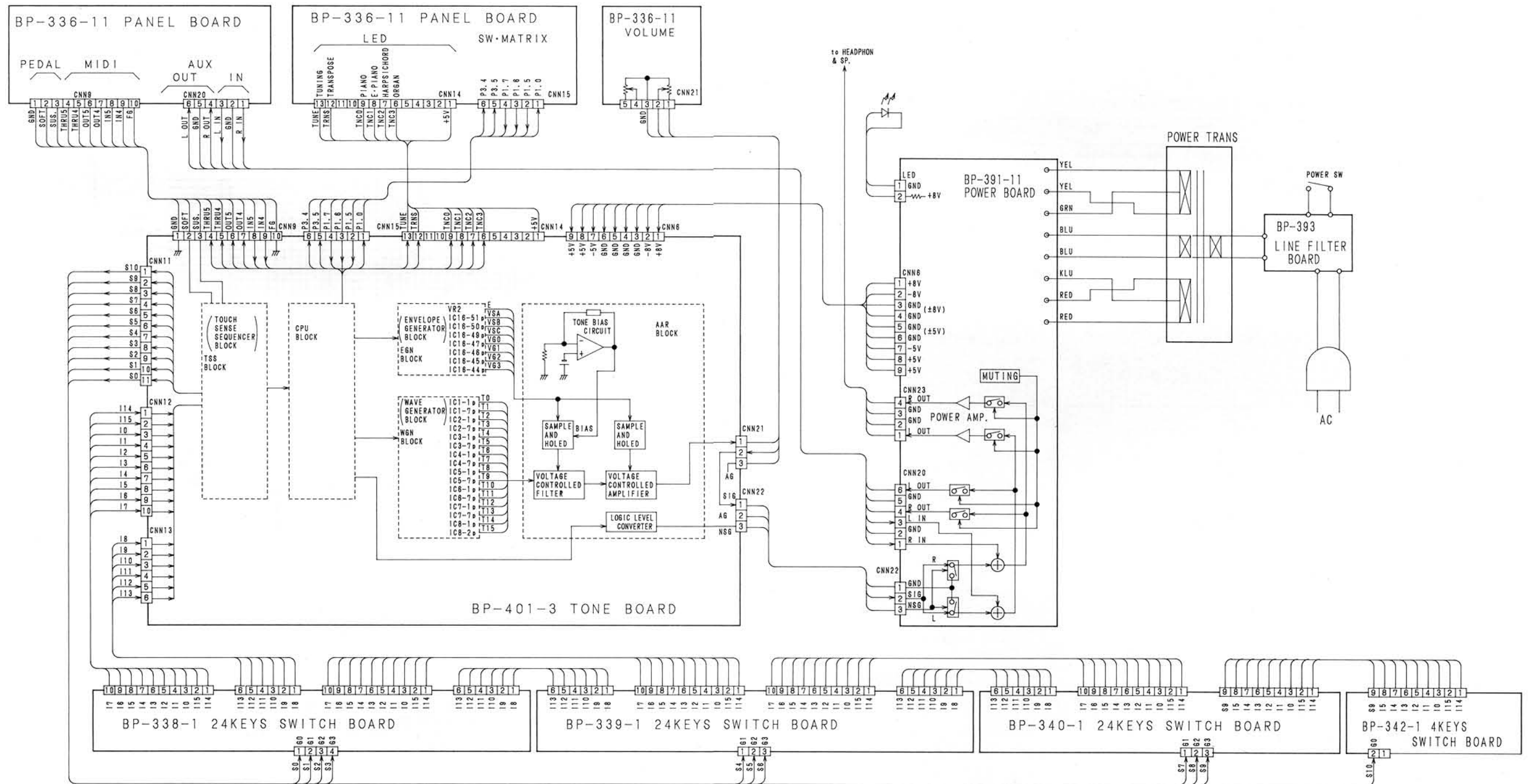


#### 3. Adjustment This action is feasible to adjust the tilt and alignment (in the horizontal direction) of the keyboard.

- a) Adjusting the tilt of keyboard (Fig. 7b)
- b) Adjusting the alignment of keyboard (horizontal) (Fig.8)



# BLOCK 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.

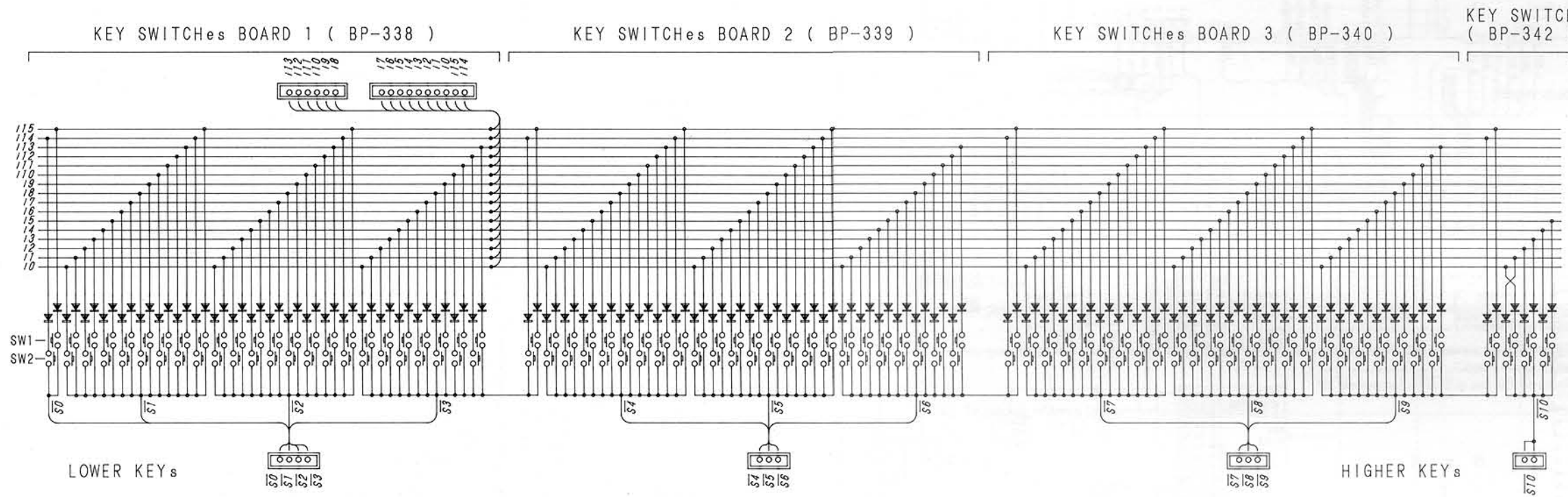
**CAUTION:**

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-338, 339, 340, 342 SWITCH BOARD CIRCUIT DIAGRAM**



KEY SWITCHES BOARDs ( 76 KEYS MATRIX )

KEY SWITCH :

**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.

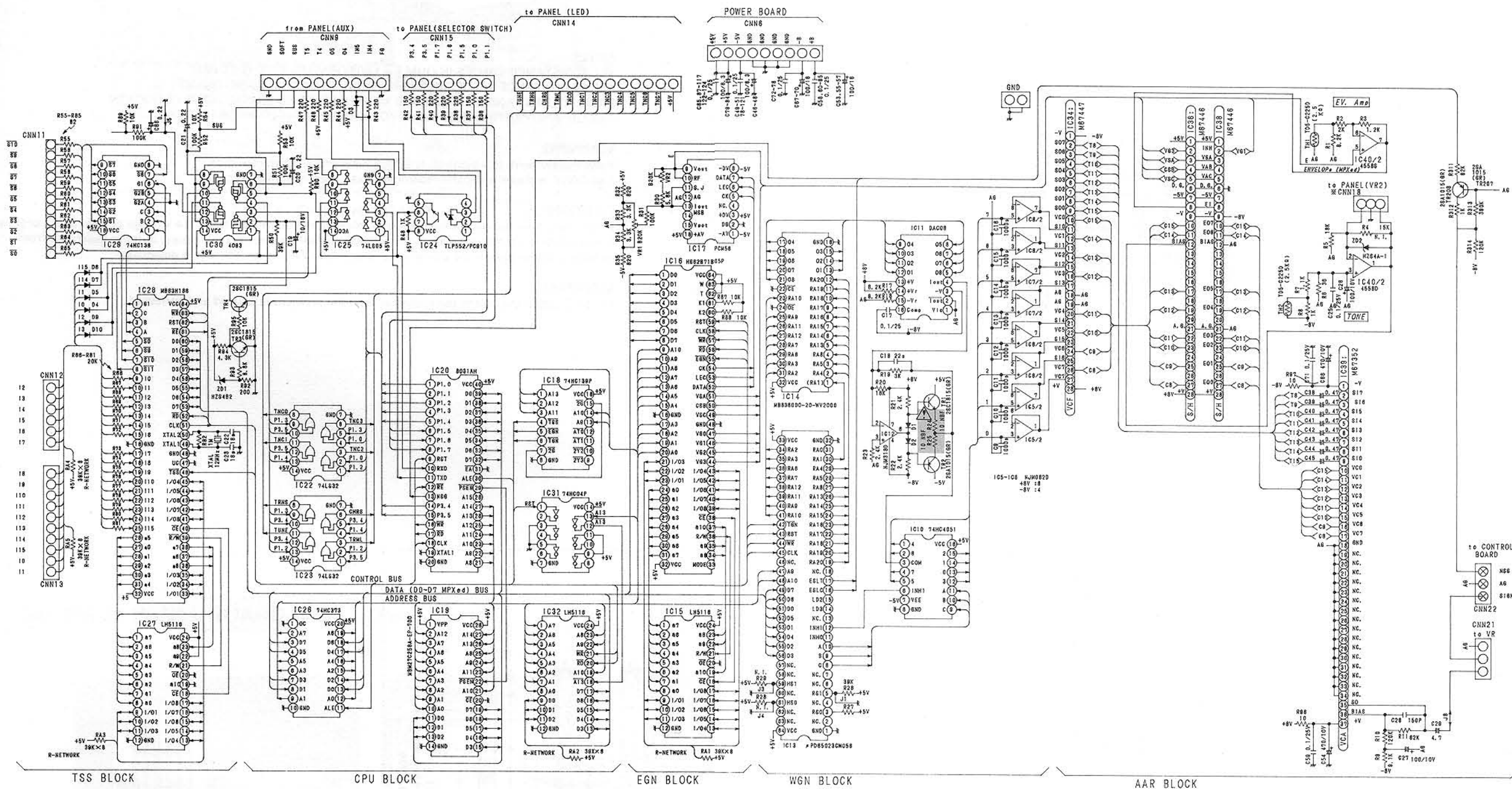
**WARNING:**  
 Parts marked with this symbol have critical characteristics.  
 Use ONLY replacement parts recommended by the manufacturer.

**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-401-3 TONE BOARD CIRCUIT DIAGRAM



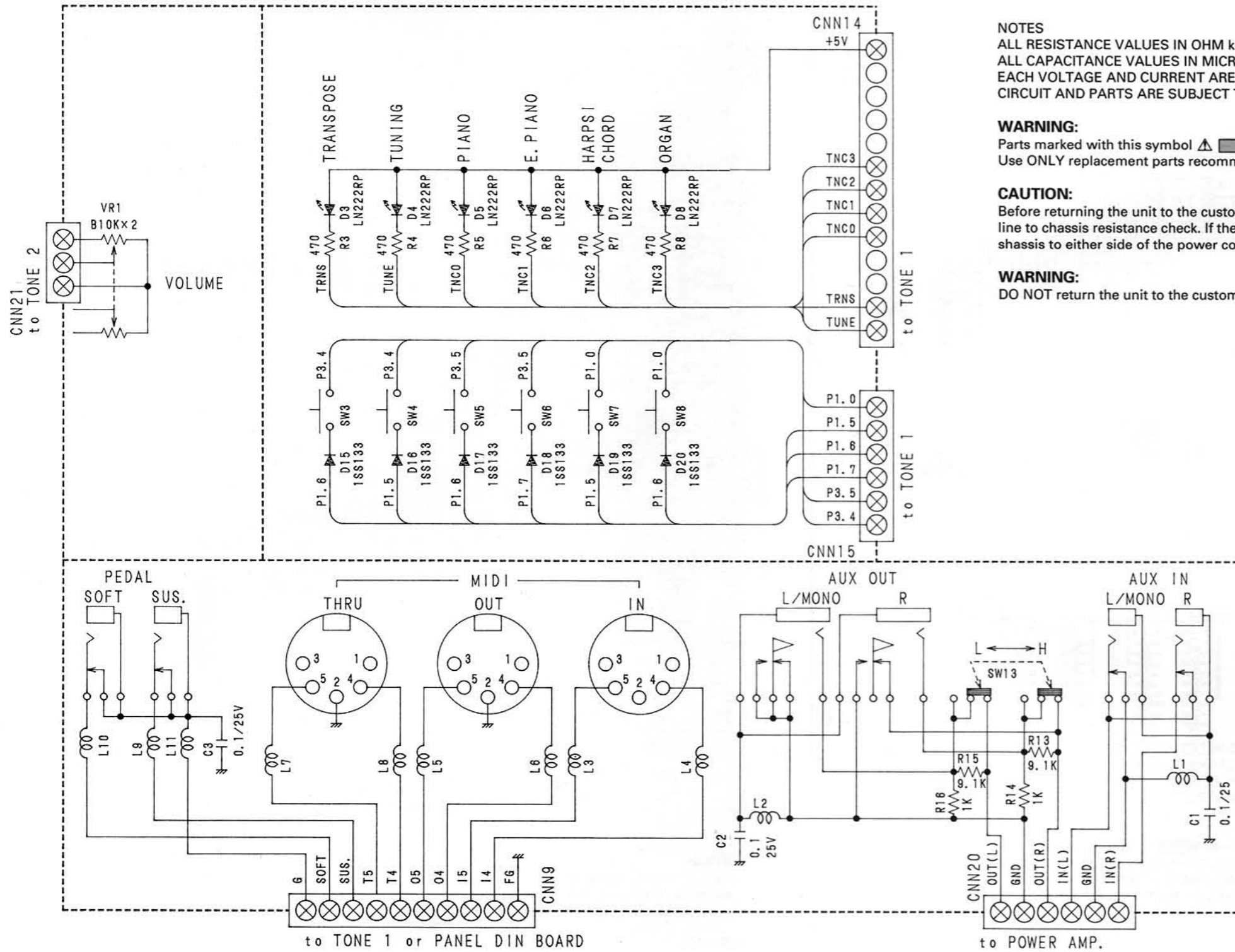
**NOTES**  
 ALL RESISTANCE VALUES IN OHM k = 1,000 OHM M = 1,000,000 OHM  
 ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD  
 EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**WARNING:**  
 Parts marked with this symbol 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-336-11 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  have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

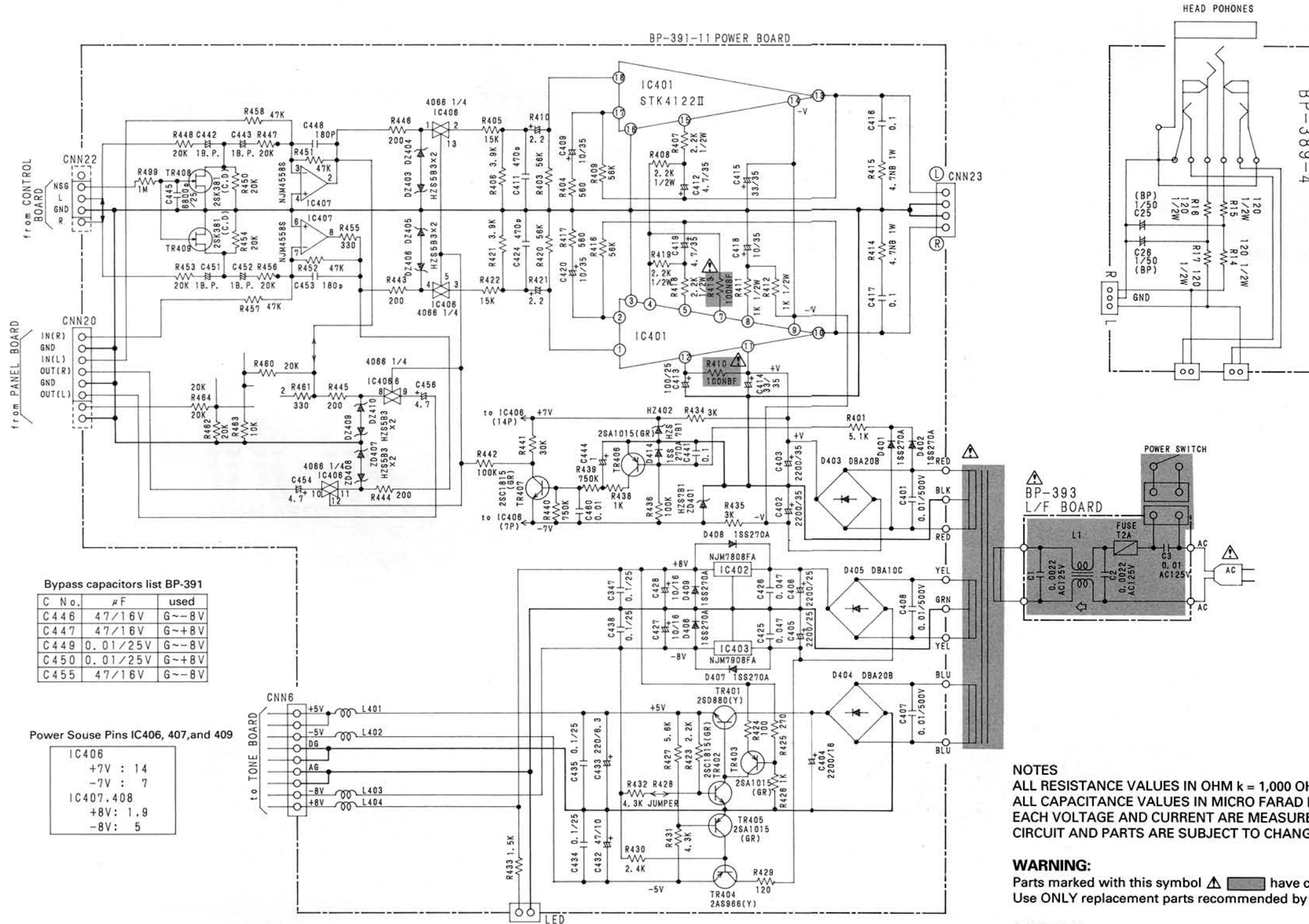
### CAUTION:

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-391-11 POWER & POWER SUPPLY, BP393-2 L/FILTER BOARD, BP-389-4 H/PHONE BOARD CIRCUIT DIAGRAM



Bypass capacitors list BP-391

C No.	μF	used
C446	47/16V	G~-8V
C447	47/16V	G~+8V
C449	0.01/25V	G~-8V
C450	0.01/25V	G~+8V
C455	47/16V	G~-8V

Power Souse Pins IC406, 407, and 409

IC406	
+7V :	14
-7V :	7
IC407, 408	
+8V :	1, 9
-8V :	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.

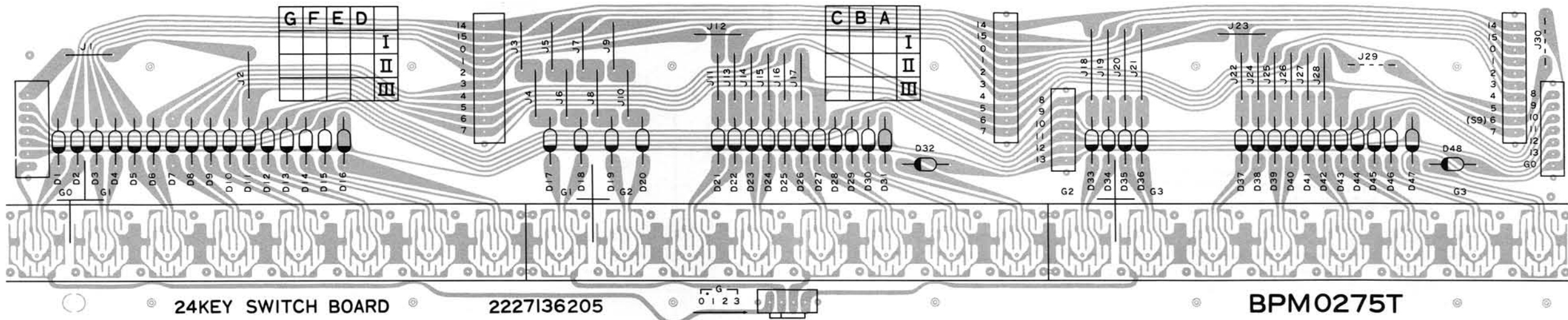
**CAUTION:**

Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to 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.

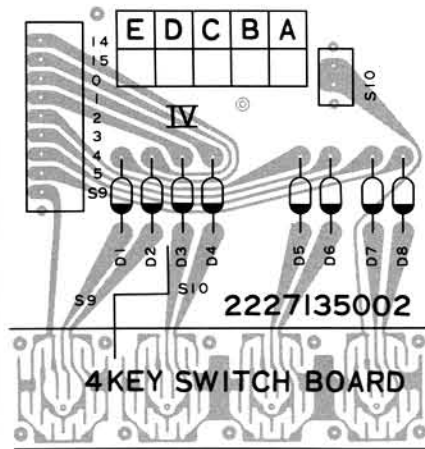
**WARNING:**

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

**BP-338, 339, 340 KEY SWITCH BOARD UNIT**

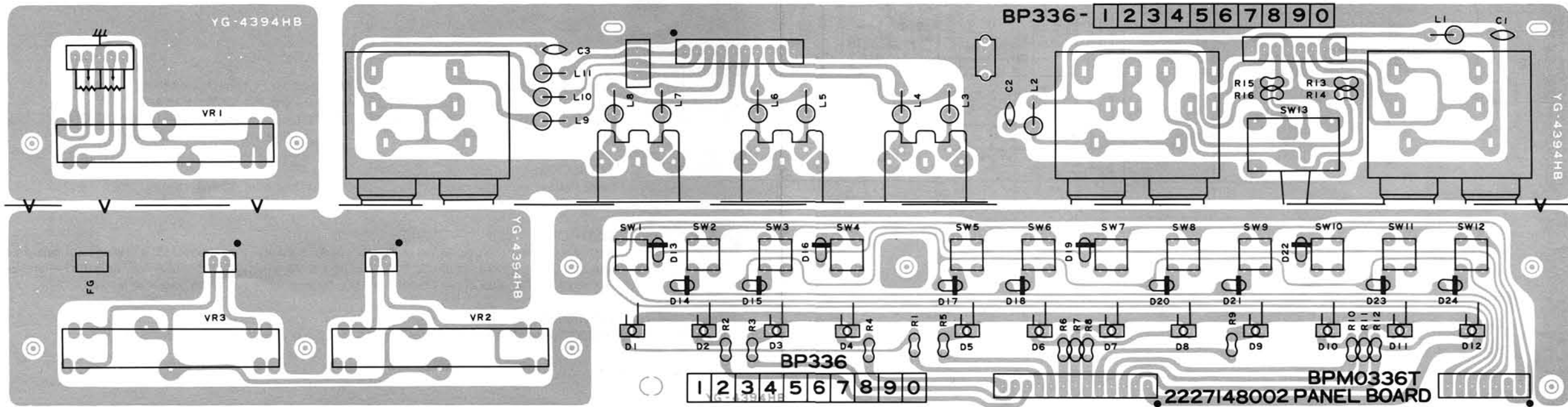


**BP-342 KEY SWITCH BOARD UNIT**



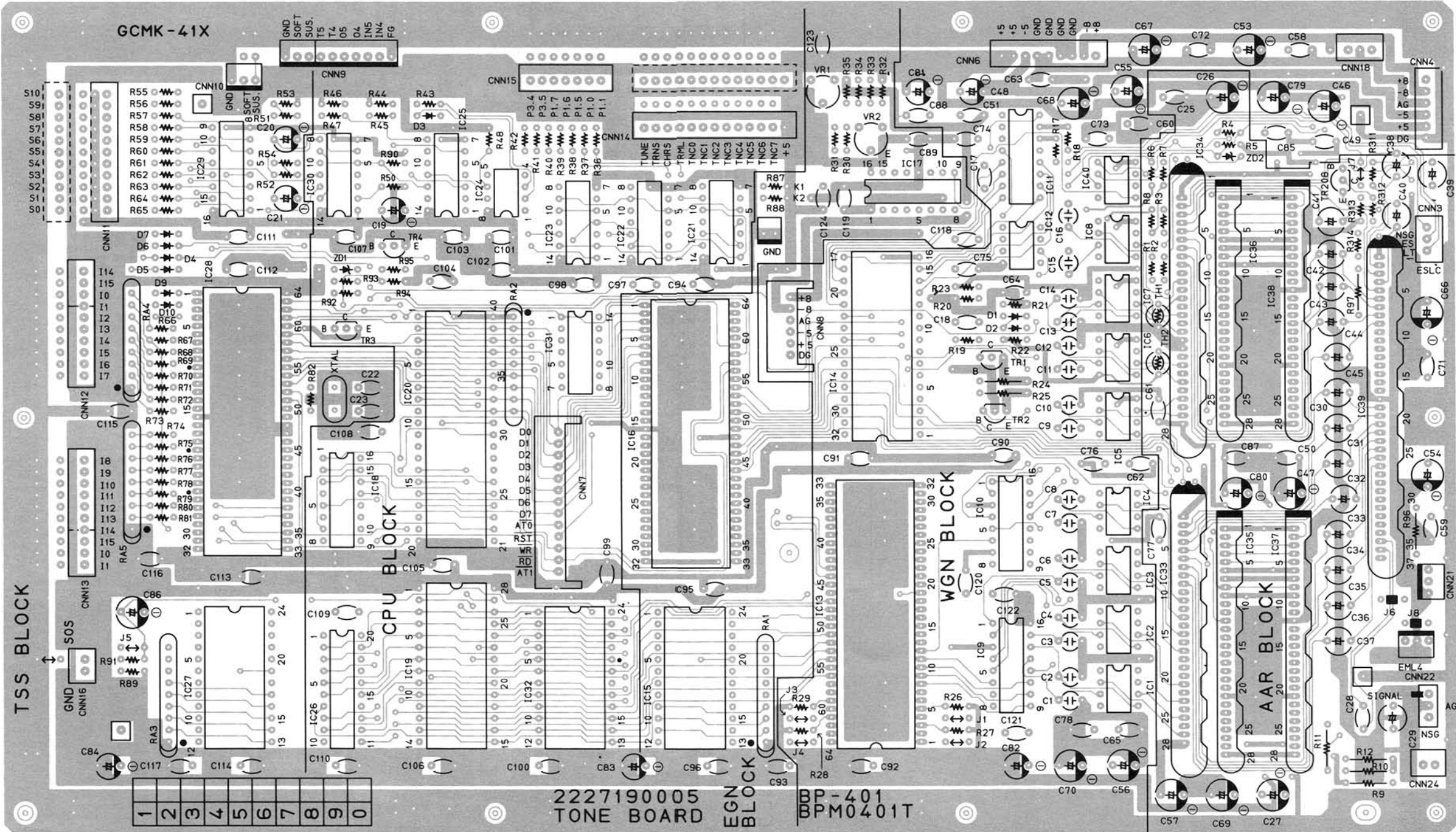
**BP-336-11 PANEL BOARD UNIT**

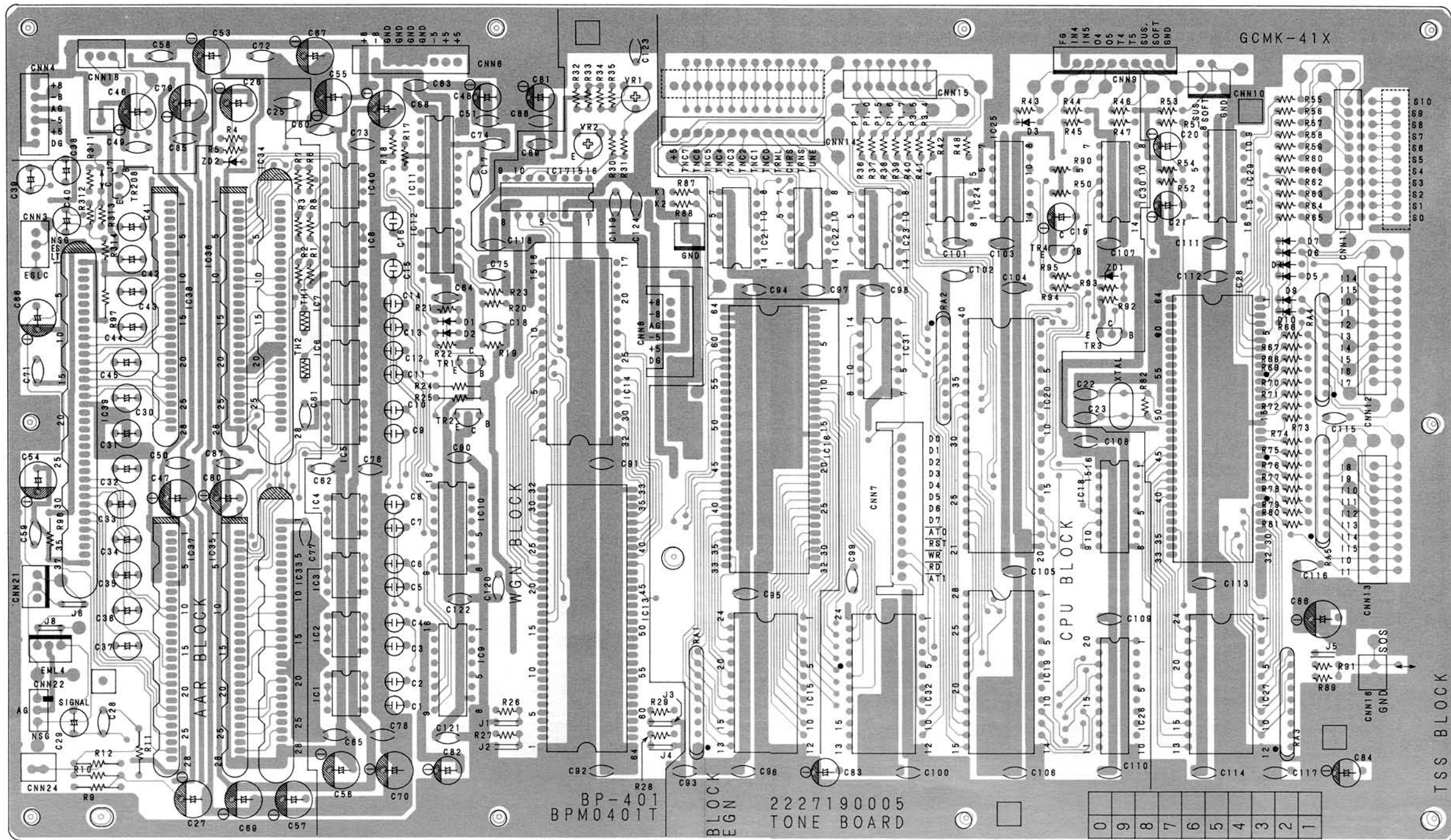
Pattern Side



# BP-401-3 TONE BOARD UNIT

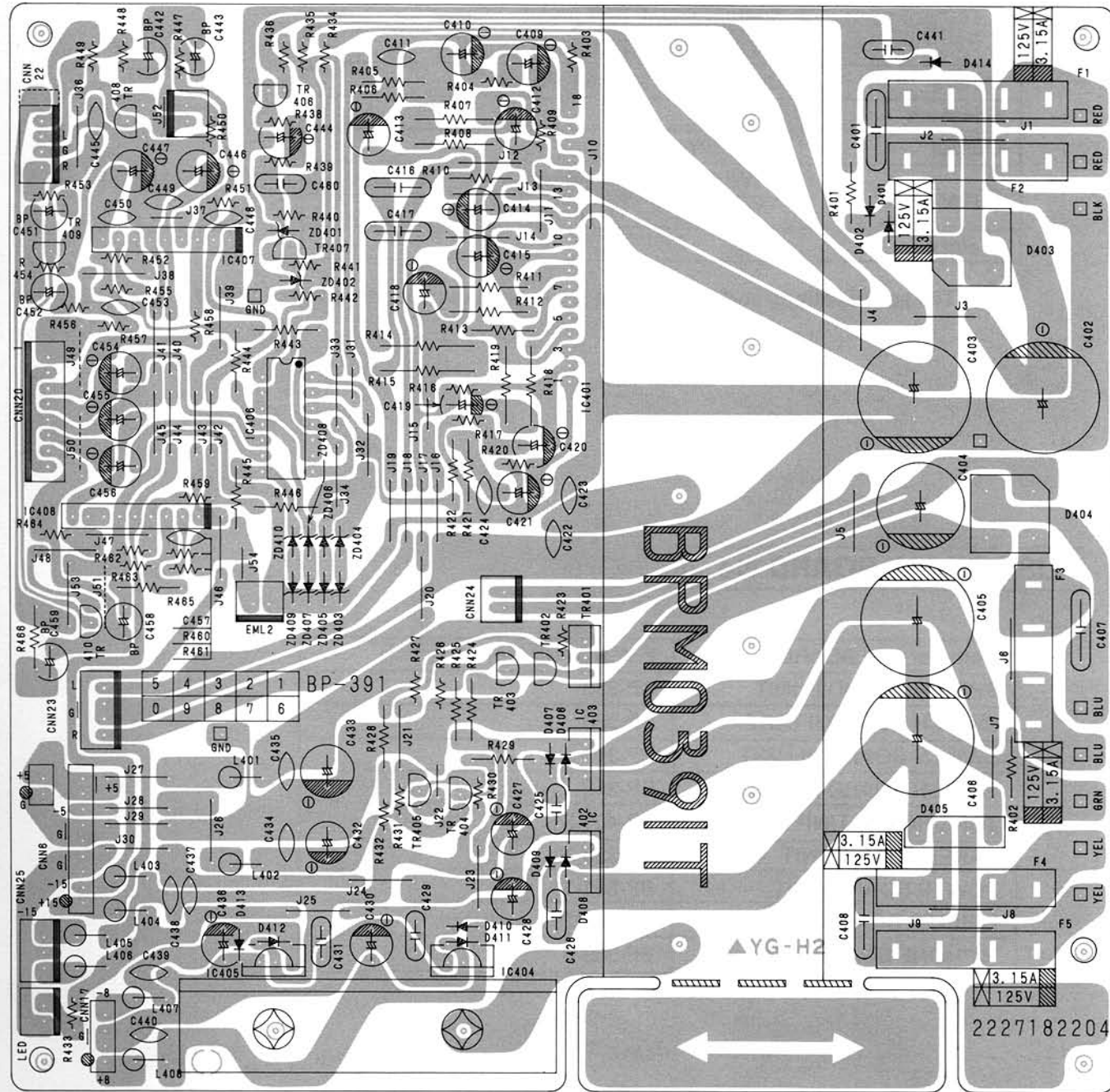
Mounting Side





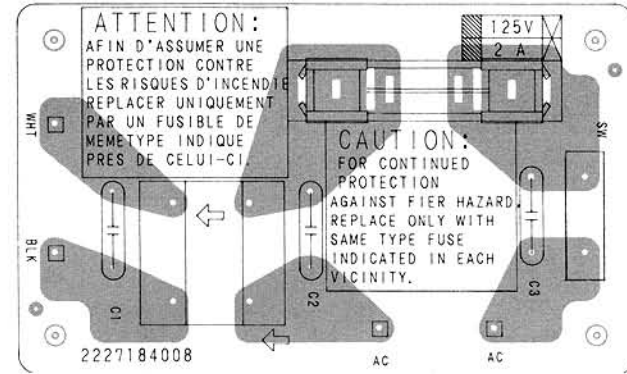
# BP-391-11 POWER BOARD UNIT

Pattern Side



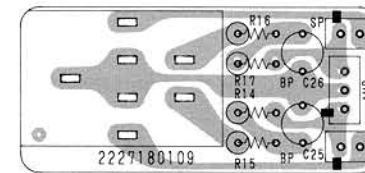
# BP-393-2 L/FILTER BOARD UNIT

Pattern Side

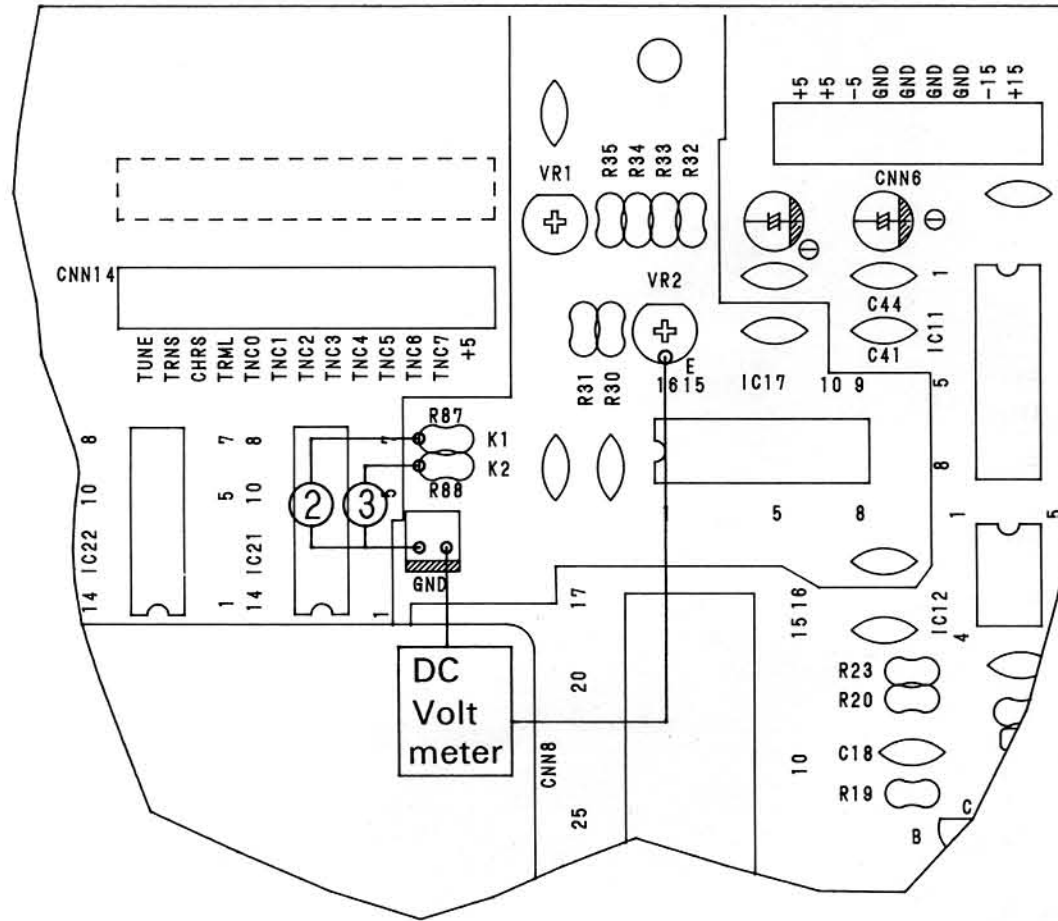


# BP-389-4 HEADPHONE BOARD UNIT

Pattern Side



## VOLUME ADJUSTMENTS VR1, VR2 (TONE BOARD)



### DC Volt meter

0. 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.
1. Connect the DC voltmeter as illustrated above.
2. Short the opposite side of the K1 of R87 to GND, and adjust VR1 to obtain  $0 \pm 10\text{mV}$ .
3. 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) has been replaced.

## SPECIFICATIONS

### Model EP-700

Keyboards	76keys (E <sub>1</sub> ~g <sup>4</sup> )		
Sound range	6 octaves 1/4		
Voices	Piano, E.Piano, Harpsichord, Organ		
Controls	Volume, Tuning, Transpose		
Connecting Jacks	AUX IN (monaural, stereo)		
	AUX OUT × 2		
	Headphone terminal × 1		
	Sustain pedal, Soft pedal		
Others	MIDI IN, MIDI OUT, MIDI THRU		
	Output level selector switch		
Speakers	16cm×2		
Output	20W+20W		
Dimensions	Width	Height	Depth
	1185mm	795mm	475mm
Weight	36Kg		

**Note:** The specifications and appearance are subject to changes with out notice.

## LIST OF P.W.BOARD No.

Name of P.W.BOARD	P.W.BOARD No.
SWITCH BOARD I UNIT	BP-338
SWITCH BOARD II UNIT	BP-339
SWITCH BOARD III UNIT	BP-340
SWITCH BOARD IV UNIT	BP-342
TONE BOARD UNIT	BP-401-3
PANEL BOARD UNIT	BP-336-11
POWER BOARD UNIT	BP-391-11
L/FILTER BOARD UNIT	BP-393-2
H/PHONE BOARD UNIT	BP-389-4