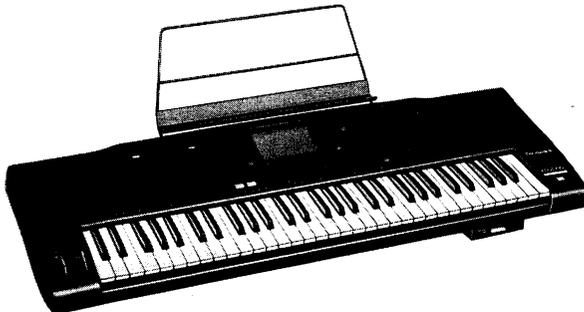


# Service Manual

PCM Keyboard

## SX-KN2000



(M), (MC), (XM), (EN), (EH), (EF), (EZ), (EW),  
(EA), (EP), (EK), (XL), (XR), (XS), (XD), (X)

### AREAS

(M): U.S.A.	(EK): the United Kingdom
(MC): Canada	(XL): New Zealand
(XM): Mexico	(XR): Australia
(EN): Norway, Sweden, Denmark, Finland	(XS): Malaysia, Singapore, South Africa
(EH): Holland, Belgium	(XD): Saudi Arabia, Kuwait
(EF): France, Italy	(X): the Middle East,
(EZ): Germany	Indonesia, Hong
(EW): Switzerland	Kong, the Philippines,
(EA): Austria	Thailand, Taiwan
(EP): Spain, Portugal, Greece	

### Specifications

KEYBOARD	61 KEYS (WITH INITIAL TOUCH)	
SOUND GENERATOR	PCM	
MAXIMUM NUMBER OF NOTES PRODUCED SIMULTANEOUSLY	64 NOTES	
SOUNDS	250 SOUNDS GROUP: PIANO & E PIANO, HARPSI & Mallet, GUITAR, SPECIAL PERC, STRINGS & VOCAL, ORGAN & ACCORDION, BRASS, REED, FLUTE & ETHNIC, SYNTH LEAD, BASS, SYNTH PAD, KEYBOARD PERC, PERC & EFFECT	
EFFECTS	DIGITAL EFFECT, DSP EFFECT, SUSTAIN, DIGITAL REVERB	
PART SELECT	RIGHT 1, RIGHT 2, LEFT	
TRANPOSE	G-C-F#	
RHYTHM	200 RHYTHMS GROUP: 8 BEAT 1, 8 BEAT 2, 16 BEAT, JAZZ ROCK & SOUL, FUNK & LATIN ROCK, DANCE POP, BIG BAND & SWING, ROCK (OTHERS), JAZZ COMBO, U.S. TRAD, MARCH & WALTZ, TRAD DANCE, LATIN 1, LATIN 2	
CONTROLS	MAIN VOLUME, BALANCE, CONDUCTOR, START/STOP, INTRO & ENDING, FILL IN 1, FILL IN 2, VARIATION, COUNT INTRO, SYNCHRO & BREAK, TEMPO/PROGRAM, SPLIT POINT	
MANUAL PERCUSSION	1, 2, 3	
BACKGROUND SOUND	BIRD, WAVE, RAIN, CHURCH BELL, APPLAUSE, FADE OUT	
AUTO PLAY CHORD	ONE FINGER, FINGERED, PIANIST, MEMORY, DYNAMIC ACCOMP, MUSIC STYLE ARRANGER	
ONE TOUCH PLAY	○ (ONE TOUCH PLAY/MUSIC STYLE SELECT)	
TECHNI-CHORD	○	
PANEL MEMORY	3 BANKS × 8, SET	
SEQUENCER	16 TRACKS STORAGE CAPACITY: APPROX. 19000 NOTES INPUT MODES: EASY RECORD, REALTIME RECORD, STEP RECORD FUNCTIONS: TRACK ASSIGN, EDIT (SONG CLEAR, TRACK CLEAR, VELOCITY CHANGE, QUANTIZE, TRACK MERGE, MEASURE ERASE, MEASURE COPY), PUNCH RECORD, PLAY, MEDLEY	
COMPOSER	5 TRACKS: STORAGE CAPACITY: APPROX. 8600 NOTES INPUT MODES: REALTIME RECORD, STEP RECORD FUNCTIONS: MODE SELECT, COPY, LOAD SINGLE COMPOSER PATTERN, BEND RANGE MEMORY: 2 BANKS × 6	
MEMORY & CONTROL	INITIAL, DISK LOAD, DISK SAVE, MIDI FILE LOAD, MIDI FILE SAVE, FOOT SWITCH & PAD SETTING, DISK FORMAT, LOAD SINGLE COMPOSER PATTERN, LOAD SINGLE SOUND MEMORY	
SOUND SETTING	SOUND SETTING (VOLUME, SUSTAIN, DIGITAL EFFECT, PAN, KEY SHIFT, TUNING, PITCH BEND RANGE, PEDAL SETTING), OVERALL TOUCH SENSITIVITY, MASTER TUNING, TECHNI-CHORD TYPE, LEFT HOLD, REVERB, DSP EFFECT, REVERB & DSP EFF PART SETTING, PAD SOUNDS	
SOUND EDIT	EASY EDIT, GENERAL EDIT (OCTAVE SHIFT, VIBRATO, AUTOBEND & TRILL, MODULATION, DISTORTION, CONTROLLERS, SOUND REVERB), TONE EDIT (TONE, LEVEL, ENVELOPE, ENVELOPE KEY FOLLOW, FILTER), EFFECT EDIT MEMORY: 2 BANKS × 18	
MIDI	BASIC CHANNEL, CONTROL MESSAGE, PART SETTING, REALTIME MESSAGES, COMMON SETTING & P .MEM OUTPUT, MIDI PRESETS, INPUT/OUTPUT SETTING, SYSEX BULK DUMP, GENERAL MIDI	

# Technics

EXTERNAL MEMORY	DISK DRIVE
DISPLAY	LCD (320 × 240 DOTS) DISPLAY ANGLE, CONTRAST, EXIT, DISPLAY HOLD
HELP	○
DEMO	○
TERMINALS	PHONES, LINE OUT (R/R+L, L), AUX IN (R/R+L, L), FOOT SW 1, 2, EXP PEDAL, MIDI (IN, OUT, THRU)
OUTPUT	18 W × 2
SPEAKERS	14 cm × 2, 6.5 cm × 2
POWER REQUIREMENT	110 W, 100 W (CANADA), 80 W (NORTH AMERICA AND MEXICO)
	AC120/220/240V 50/60 Hz
	AC120V 60Hz (NORTH AMERICA AND MEXICO) AC230V 50/60Hz (NEW ZEALAND AND EUROPE EXCEPT FOR UNITED KINGDOM)
DIMENSIONS (W×H×D)	104.4 cm × 14.6 cm × 37.6 cm (41-3/32" × 5-3/4" × 14-13/16")
NET WEIGHT	13.2 kg (29.1lbs.)
ACCESSORIES	MUSIC STAND, AC CORD

Specifications are subject to change without notice for further improvement.

## CONTENTS

### ■ PART I (INTRODUCTION)

SAFETY PRECAUTION	I-1
ARRANGEMENT OF CONTROL PANEL	I-2
BASIC FUNCTIONS	I-2
INITIAL SETTING	I-4
OPTIONS AND CONNECTIONS	I-4
CONDUCTOR SETTINGS	I-5
PARTS LOCATIONS	I-6
KEYBOARD RANGES	I-6
DISASSEMBLY INSTRUCTIONS	I-7
SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE	I-10
ERROR DISPLAY	I-12
ABOUT THE SELF-DIAGNOSTIC FUNCTION	I-13
MIDI IMPLEMENTATION CHART	I-15
PRECAUTIONS BEFORE SERVICING	I-17

MAIN	TG	CIRCUIT BOARD	II-6		
MAIN	TG	CIRCUIT DIAGRAM	II-9		
FAJ	ACP	HB	CIRCUIT BOARD	II-13	
FAJ	ACP	HB	CIRCUIT DIAGRAM	II-17	
CPL	CPR	INV	ESW	CIRCUIT BOARD	II-20
CPL	CPR	INV	ESW	CIRCUIT DIAGRAM	II-23
MKB1	MKB2	MANUAL KEYBOARD 1, 2 CIRCUIT DIAGRAM AND CIRCUIT BOARD		II-27	

### ■ PART III (REPLACEMENT PARTS LIST)

REPLACEMENT PARTS LIST (P.C.B. and Wiring Parts)	III-1
EXPLODED VIEWS OF CABINET	III-7
REPLACEMENT VIEWS OF CABINET (Cabinet and Chassis Parts)	III-9
PACKING	III-10

### ■ PART II (SCHEMATIC DIAGRAM)

WIRING CONNECTION DIAGRAM	II-1
BLOCK DIAGRAM	II-3

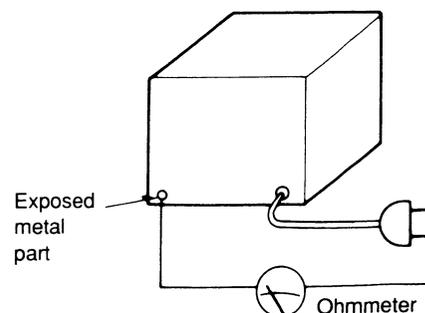
## SAFETY PRECAUTION (This "safety precaution" is for the U.S.A. only)

### • Safety Precaution

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

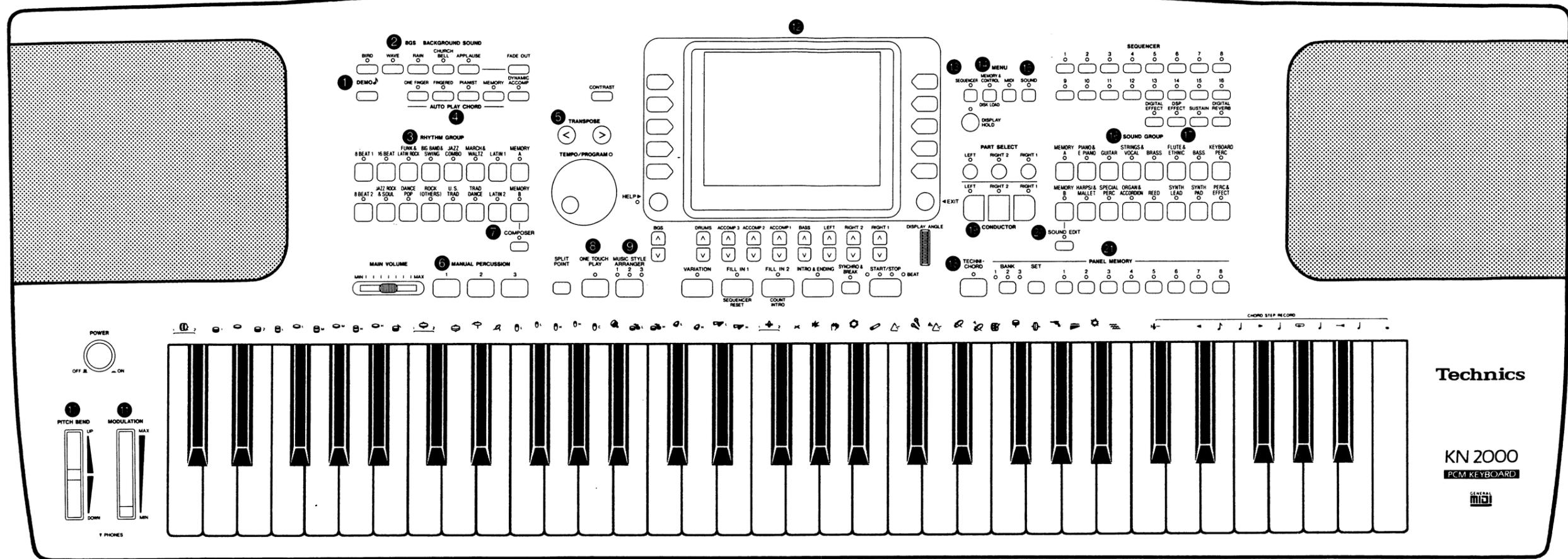
### • Insulation Resistance Test

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw heads, connectors, control shafts, handle brackets, etc. Measurements should range from 4 MΩ to infinity for all exposed parts.



Resistance=4 MΩ to ∞

# ARRANGEMENT OF CONTROL PANEL



## BASIC FUNCTIONS

- 1 DEMO**  
Pre-recorded performances are used to demonstrate the individual appeal of the rhythms, sounds and other features.
- 2 BACKGROUND SOUND (BGS)**  
Five unique background sounds add special life and interest to your performance. The **FADE OUT** button is pressed once for slowly diminishing background sound, twice for immediate cut-off. The volume is adjusted with the **BGS** buttons.
- 3 RHYTHM GROUP**  
Various rhythm patterns are available for each rhythm group. Other rhythm controls are **START/STOP**, **SYNCHRO & BREAK**, **INTRO & ENDING**, **COUNT INTRO** and **FILL IN 1** and **2**. The volume is adjusted with the **DRUMS** balance buttons below the display.
- 4 AUTO PLAY CHORD**  
This feature is activated when the **ONE FINGER**, **FINGERED** or **PIANIST** button is turned on. An automatic accompaniment appropriate for the selected rhythm is produced when you play a chord. **MEMORY** allows you to continue the accompaniment even after the chord keys are released. The volume for each part of the **AUTO PLAY CHORD (DRUMS, BASS, ACCOMP 1, 2, 3)** is adjusted with the respective balance buttons below the display.
- 5 TRANSPOSE**  
C is the standard setting, but you can raise or lower the key of the entire instrument with these two buttons. The transposed key is shown on the normal performance display.

- 6 MANUAL PERCUSSION**  
The three buttons are used to add percussion sounds during your performance. The desired **KEYBOARD PERCUSSION** sounds are easily stored in the buttons. The buttons can also be programmed for other functions, such as rhythm start/stop.
- 7 COMPOSER**  
Create original rhythm patterns, either in realtime or with the step record method, or modify preset rhythms. Store up to 12 new rhythms in the reserved memory locations and recall them as you play, just like the preset rhythms.
- 8 ONE TOUCH PLAY**  
Select a rhythm and press the **ONE TOUCH PLAY** button until the panel settings change. The sounds and effects perfect for the selected rhythm are automatically set in seconds. Or press the **ONE TOUCH PLAY** button briefly to access the **MUSIC STYLE SELECT** display. Choose one of the many music styles and the appropriate sounds, effects and even rhythm are set instantly.
- 9 MUSIC STYLE ARRANGER**  
A tap of a button during your performance changes the rhythm and sounds to a simpler or flashier arrangement to match the feeling of the music.
- 10 PITCH BEND**  
This wheel is moved up or down with your hand to create a continuous change in pitch. The wheel returns to the center position automatically when it is released.

- 11 MODULATION**  
Add vibrato to the sound by turning the wheel upwards.
- 12 DISPLAY (LCD screen)**  
Displays performance information, function settings and other messages.
 
  - Use the **DISPLAY ANGLE** wheel to set it to the angle at which it is easiest to read.
  - Use the **CONTRAST** button to adjust the display so that it is easy to read.
- 13 SEQUENCER**  
With this feature you can separately play and record the parts for an entire song. Then have the whole ensemble performance played back automatically. This is a true 16-track sequencer, with full realtime recording, step recording and editing features.
- 14 MEMORY & CONTROL**  
The settable functions in this mode include initialization, foot switch and PAD button function-assignment, and settings related to Disk Drive operation.
- 15 SOUND**  
This button is used for making the various sound, volume and effect settings for each part, as well as tuning and **TECHNI-CHORD** type, by reading the display.
- 16 SOUND GROUP**  
Various sounds are available for each sound group.

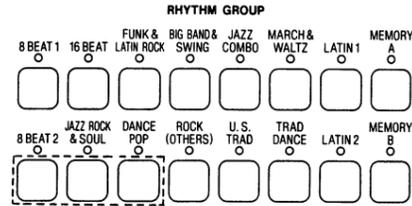
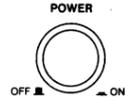
- Effects**  
Turn the **DIGITAL REVERB** button on to add reverberation to the sound. **DIGITAL EFFECT** gives the sound a thickness and diffusion. The **DSP EFFECT** changes the quality of the sound. When **SUSTAIN** is on, the musical tones fade gradually after the keys are released.
- 17 TECHNI-CHORD**  
Chord notes played on the left section of the keyboard are added to melody notes played on the right section. Choose from four harmonic styles.
- 18 CONDUCTOR**  
These buttons allow you to assign a different sound to each part, and then assign the desired part to the entire keyboard, assign a different part to each section of the keyboard, or mix parts. When the keyboard is divided into sections, change the dividing point with the **SPLIT POINT** button.
- 19 SOUND EDIT**  
Modify preset sounds to create new and unique sounds.
- 20 PANEL MEMORY**  
Set up the sounds and effects, and then store them in these 24 memories (3 BANKS x 8 memory locations) buttons for instant recall as you play. You can expand the range of storable settings to include the rhythm selection, tempo setting and more.

**Disk Drive**  
This Disk Drive allows you to store up to 20 **SEQUENCER** performances and other data on a 3.5-in. 2DD memory disk.

# INITIAL SETTING

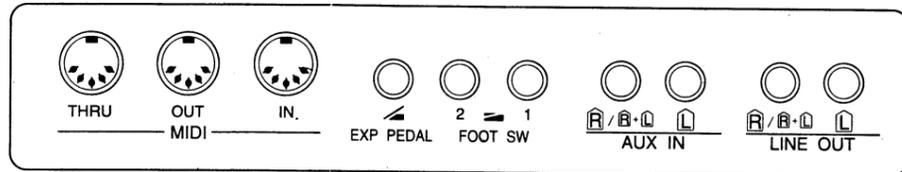
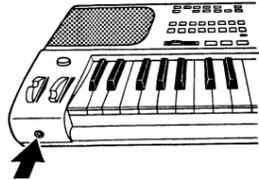
The initial setting function is used to return to the original factory settings, and to reset the customer settings and misoperations.

1. Press the **POWER** button to turn off the instrument.
2. While pressing the three leftmost buttons in the **RHYTHM GROUP** section (**8 BEAT 2**, **JAZZ ROCK & SOUL** and **DANCE POP**) at the same time, turn the **POWER** button on again.



**NOTE:**  
All stored data in the **SEQUENCER** and **COMPOSER** and other settings are initialized with this operation.

# OPTIONS AND CONNECTIONS



(on the rear panel)

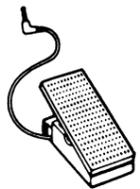
**PHONES** (Ω) (Use headphones with over 16Ω impedance.)  
For silent practice headphones may be used. When plugged in, the speaker system is automatically switched off, and sound is heard only through the headphones.

**MIDI (Musical Instrument Digital Interface)**  
MIDI is the standard specification that enables connection to equipment such as synthesizers and personal computers. Data transmission and reception are possible between the Technics Keyboard and other instruments provided with MIDI terminals.

**IN:** The terminal that receives data from external equipment.  
**OUT:** The terminal that transmits data from this instrument to external equipment.  
**THRU:** The terminal that transfers data from the **IN** terminal directly to other equipment.

• Use a 5-pin DIN cord (less than 15m long) for these connections.

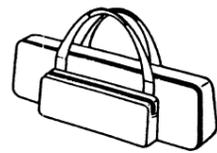
• **Options**



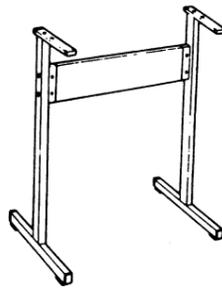
**SZ-E2**  
Expression Pedal



**SZ-P1**  
Foot Switch



**SZ-B7**  
Carrying Bag



**SZ-S61**  
Keyboard Stand

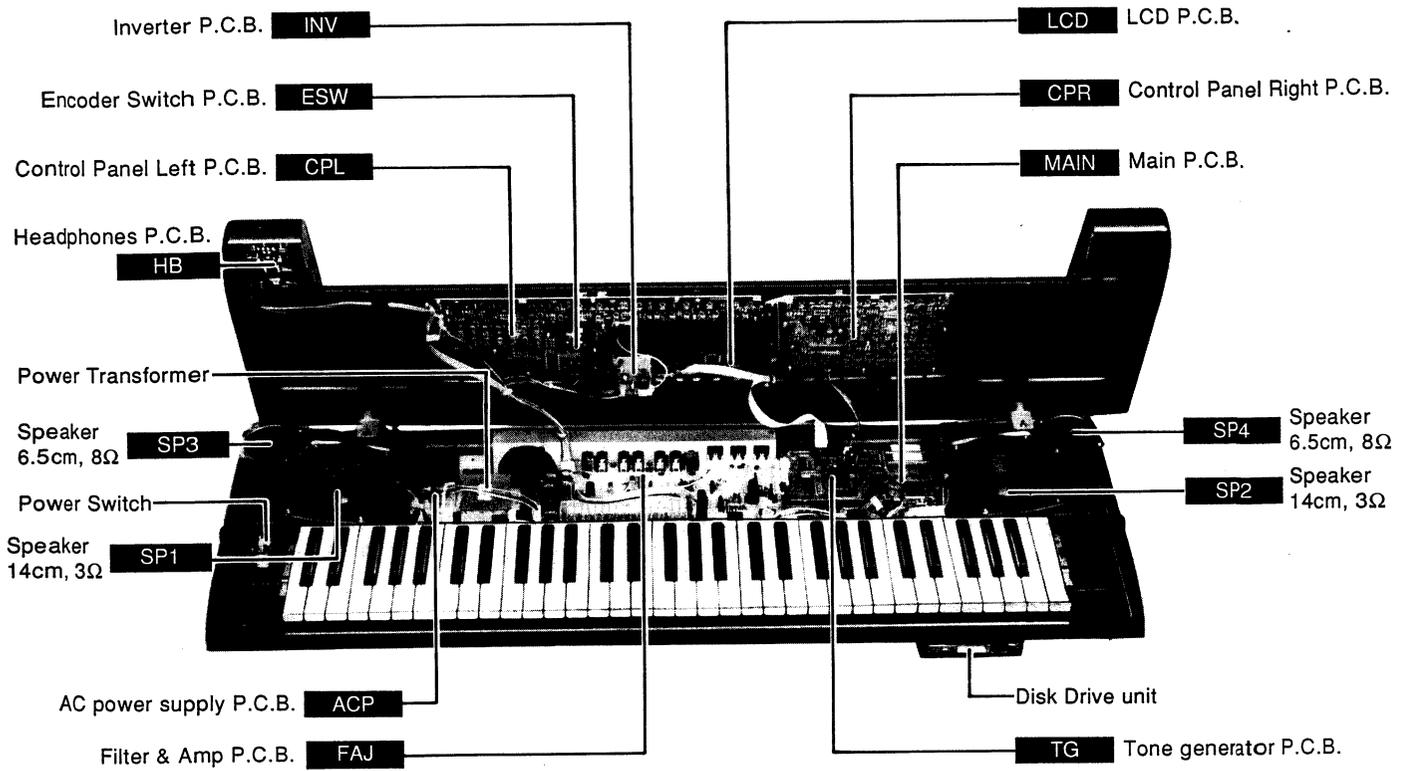
# CONDUCTOR SETTINGS

The **CONDUCTOR** buttons are used to assign sounds to the keyboard in many different ways. For example, you can assign two sounds to the entire keyboard so that playing one key will produce two sounds. You can even split the keyboard into right and left sections (**SPLIT**), and assign a different sound to each section.

**CONDUCTOR**

CONDUCTOR settings	How sounds are assigned to the keyboard
	All keys produce the <b>RIGHT 1</b> sound. <div style="border: 1px solid black; width: 100%; height: 40px; text-align: center; margin-top: 10px;"> <b>RIGHT 1</b> </div>
	All keys produce the <b>RIGHT 2</b> sound. <div style="border: 1px solid black; width: 100%; height: 40px; text-align: center; margin-top: 10px;"> <b>RIGHT 2</b> </div>
	All keys produce both the <b>RIGHT 1</b> sound and the <b>RIGHT 2</b> sound. <div style="border: 1px solid black; width: 100%; height: 40px; text-align: center; margin-top: 10px;"> <b>RIGHT 1 + RIGHT 2</b> </div>
	The left keys produce the <b>LEFT</b> sound and the right keys produce the <b>RIGHT 1</b> sound and the <b>RIGHT 2</b> sound. <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>LEFT</b> </div> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>RIGHT 1 + RIGHT 2</b> </div> </div>
	The left keys produce the <b>LEFT</b> sound and the right keys produce the <b>RIGHT 1</b> sound. <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>LEFT</b> </div> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>RIGHT 1</b> </div> </div>
	The left keys produce the <b>LEFT</b> sound and the right keys produce the <b>RIGHT 2</b> sound. <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>LEFT</b> </div> <div style="border: 1px solid black; width: 45%; height: 40px; text-align: center;"> <b>RIGHT 2</b> </div> </div>

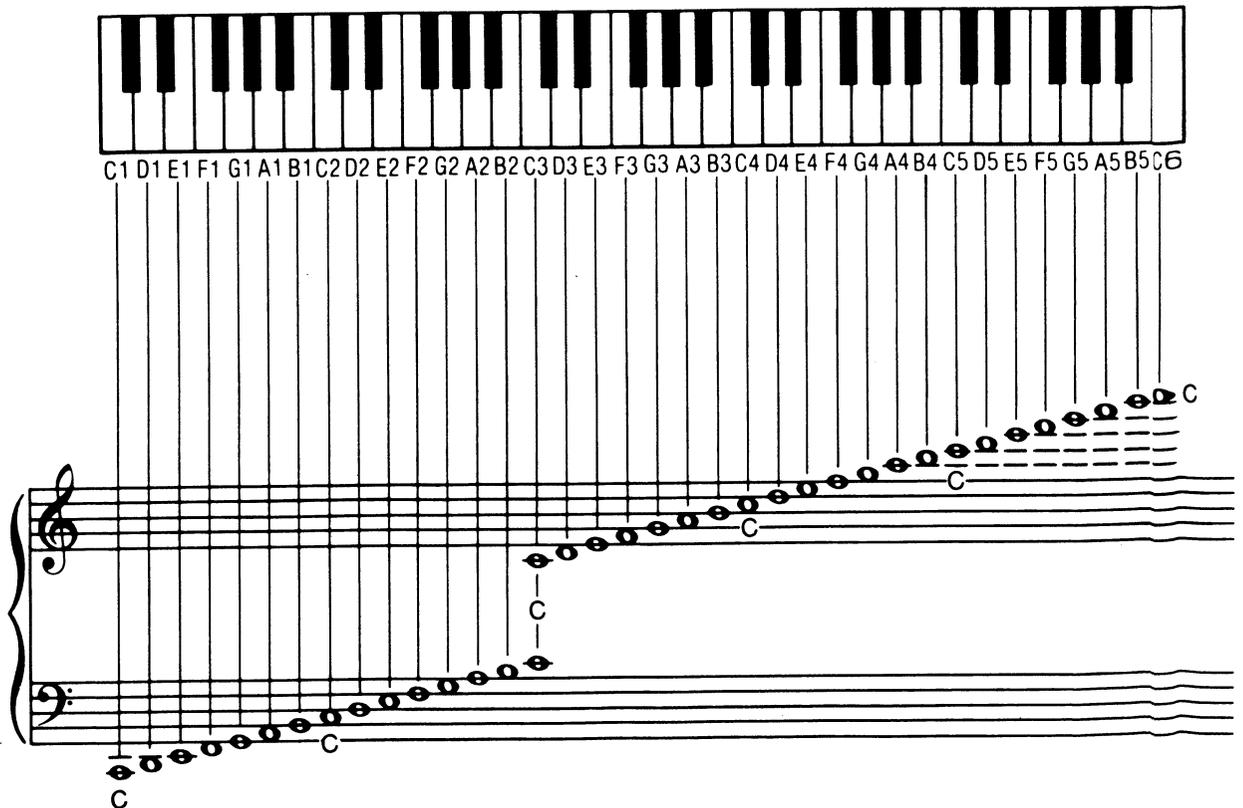
# PARTS LOCATION



[Photo-1]

# KEYBOARD RANGES

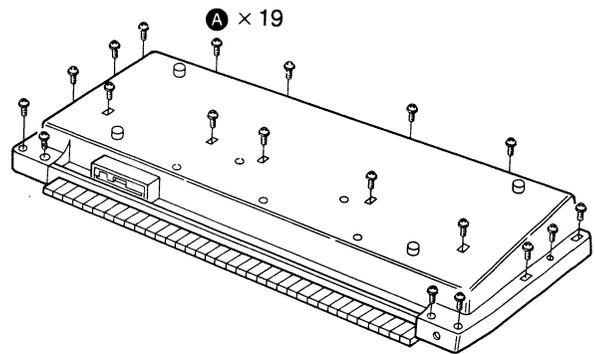
- This keyboard features Touch Response, by which you control the volume by playing the keys harder or softer.



# DISASSEMBLY INSTRUCTIONS

## 1 Opening the cabinet

1. Turn the keyboard cabinet upside down as shown in Fig. 1, and remove the bottom screws (A 19 pcs.).
2. Place the keyboard bottomside down, and open the top cabinet.



[Fig. 1]

## 2 Removing the printed circuit boards

- Open the cabinet (see step 1). Use the brackets affixed to the right and left speaker boxes to attach the top cabinet as shown in Fig. 2.

### MAIN TG P.C.B.

1. Remove the MAIN P.C.B. mounting screws (B 4 pcs.).
2. Pull out the TG P.C.B. on the MAIN P.C.B..

### FAJ P.C.B.

1. Remove the FAJ P.C.B. mounting screws (C 5 pcs.).

### ACP P.C.B.

1. Remove the AC inlet jack fixing screws on the rear panel (D 1 pc.).
2. Remove the ACP P.C.B. mounting screws (E 2 pcs.).

### CPL P.C.B.

1. Pull off the MAIN VOLUME knob.
2. Remove the CPL P.C.B. mounting screws (F 14 pcs.).

### CPR P.C.B.

1. Remove the CPR P.C.B. mounting screws (G 10 pcs.).

### HB P.C.B.

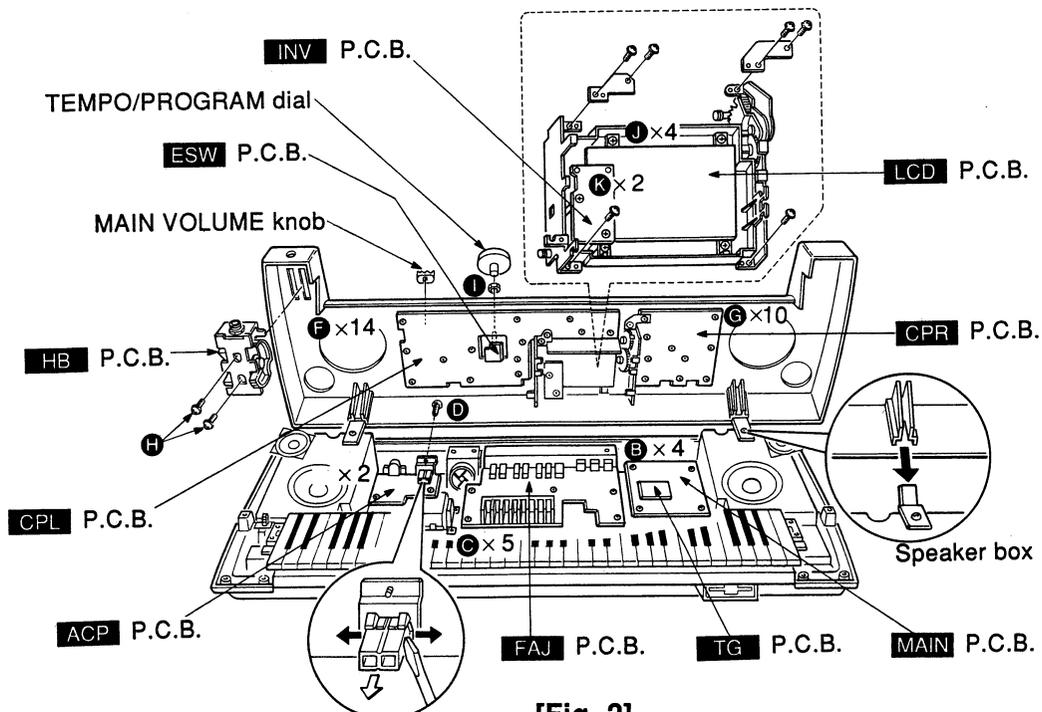
1. Remove the HB P.C.B. mounting screws (H 2 pcs.).

### ESW P.C.B.

1. Pull off the TEMPO/PROGRAM dial from the control panel.
2. Remove the encoder switch holding nut on the ESW P.C.B. (I 1 pc.).
3. Open the cabinet, and remove the ESW P.C.B.

### LCD INV P.C.B.

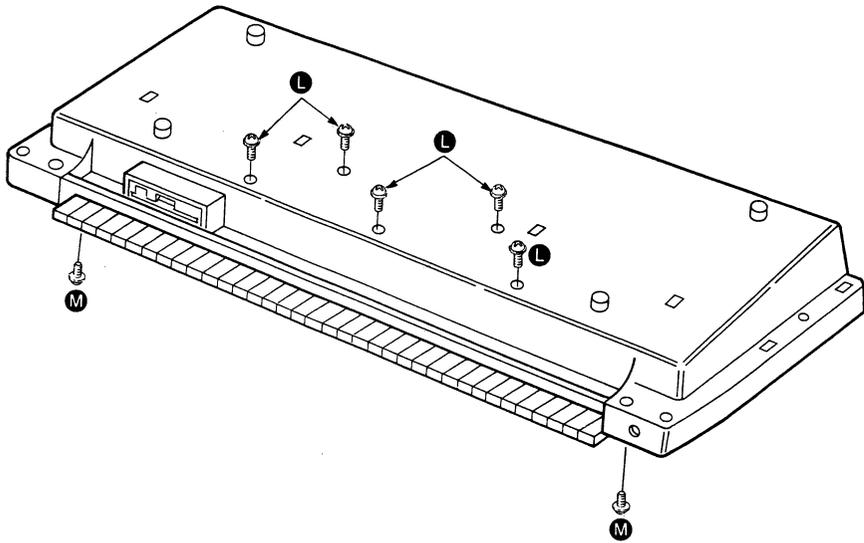
1. Remove the LCD P.C.B. mounting screws (J 4 pcs.).
2. Remove the INV P.C.B. mounting screws (K 2 pcs.).



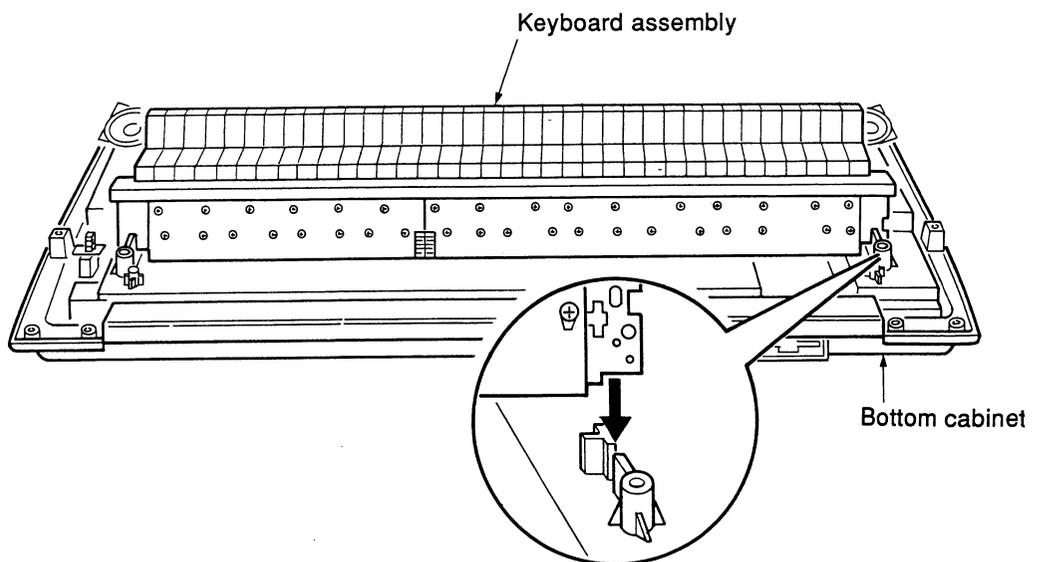
[Fig. 2]

### 3 Removing the keyboard

1. Remove the bottom screws (see step 1).
2. Remove the keyboard assembly holding screws (L 5 pcs.).
3. Place the keyboard bottomsides down, and open the top cabinet.
4. Remove the keyboard assembly holding screws (M 2 pcs.). The keyboard assembly can be affixed to the holder on the bottom cabinet as shown in Fig. 4.



[Fig. 3]



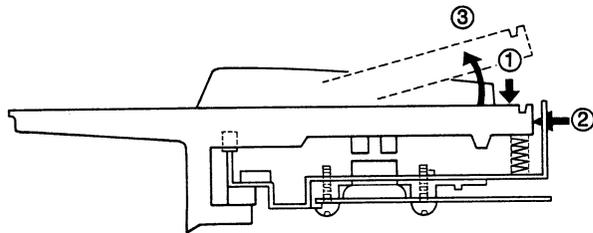
[Fig. 4]

#### 4 Removing the keys

1. Remove the keyboard by following the procedure in step 3.
2. Press downward on the rear of the key (Fig. 5-①).
3. While pressing downward on the rear of the key, push the key forward and release it from the chassis (Fig. 5-②).
4. Lift the key and remove it from the chassis (Fig. 5-③).

#### NOTE:

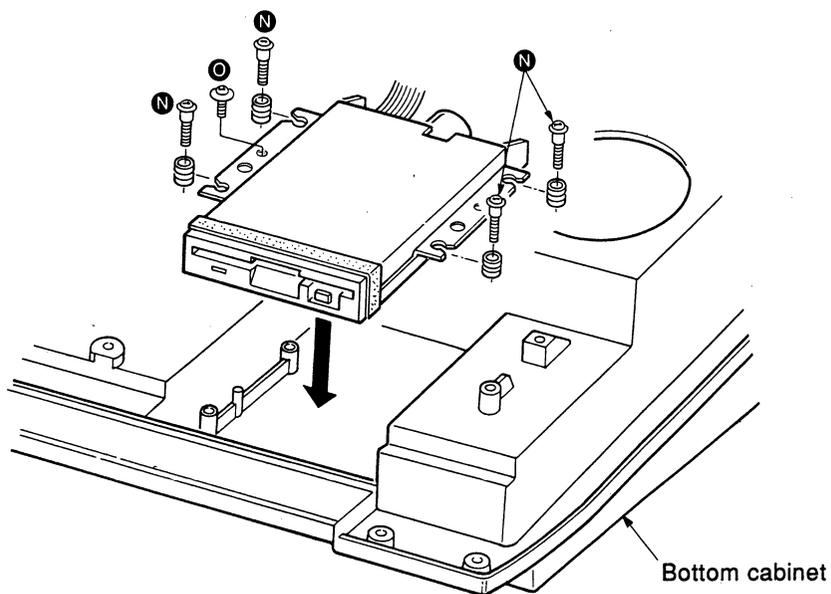
To remove a black key, the white key to either side of it should be removed first.



[Fig. 5]

#### 5 Removing the digital disk recorder (DDR)

1. Removing the keyboard by following the procedure in step 3.
2. Remove the DDR mounting screws (N 4 pcs. and O 1 pc.).



[Fig. 6]

# SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE

The following changes in performance may occur in the Technics Keyboard but do not indicate trouble.

	Phenomenon	Remedy
Sounds and effects	The buttons, keys, etc. malfunction.	<ul style="list-style-type: none"> <li>• Turn off the <b>POWER</b> button once, then turn it on again. If this procedure is not successful, turn off the <b>POWER</b> button once. Then, while pressing the three lower left buttons in the <b>RHYTHM GROUP</b> section (<b>8 BEAT 2</b>, <b>JAZZ ROCK &amp; SOUL</b> and <b>DANCE POP</b>) at the same time, turn the <b>POWER</b> button on again. (Note that, in this case, all programmable settings, functions and memories return to their factory-preset status.)</li> </ul>
	No sound is produced when the keys are pressed.	<ul style="list-style-type: none"> <li>• The <b>MAIN VOLUME</b> is at the minimum setting. Adjust the volume with the <b>MAIN VOLUME</b> control.</li> <li>• The volumes for the selected parts are set to the minimum levels. Use the balance buttons to set the volumes of the relevant parts to appropriate levels.</li> <li>• The local control for a part performed on the keyboard is set to OFF. Set the local control to ON.</li> </ul>
	Only percussive instrument sounds are produced when the keyboard is played.	<ul style="list-style-type: none"> <li>• In the <b>SOUND GROUP</b> section, the <b>KEYBOARD PERC</b> button is on.</li> </ul>
Rhythm	The rhythm does not start.	<ul style="list-style-type: none"> <li>• The <b>DRUMS</b> volume is set to the minimum level. Use the balance buttons to set the <b>DRUMS</b> volume to an appropriate level.</li> <li>• In the <b>RHYTHM GROUP</b> section, a rhythm in <b>MEMORY A</b> or <b>MEMORY B</b> with no stored pattern was selected. Select a different rhythm.</li> <li>• A <b>SEQUENCER</b> track button is on. When you are not playing back the <b>SEQUENCER</b> performance, turn off the track buttons.</li> <li>• <b>CLOCK</b> is set to MIDI. Set <b>CLOCK</b> to INTERNAL.</li> </ul>
SEQUENCER	Storage is not possible.	<ul style="list-style-type: none"> <li>• The remaining memory capacity of the <b>SEQUENCER</b> is 0. Follow the <b>SONG CLEAR</b> or <b>TRACK CLEAR</b> procedure to erase the memory.</li> </ul>
	Multi-track storage is not possible.	<ul style="list-style-type: none"> <li>• The playback track has been selected, but the <b>START/STOP</b> button has not been pressed. A flashing track indicator shows the track which is ready for recording, and a lit track indicator shows a track which is ready for playback. To record one track while listening to another (playback) track, press the <b>START/STOP</b> button to begin playback.</li> </ul>
	The playback measure indication is different from when the performance was recorded.	<ul style="list-style-type: none"> <li>• The number of measures corresponds to the time signature of the rhythm selected at the start of recording. To change the rhythm in the middle of the song, record the rhythm change in the <b>RHYTHM</b> part.</li> </ul>

Phenomenon		Remedy
AUTO PLAY CHORD	No sound is produced for the automatic accompaniment.	<ul style="list-style-type: none"> <li>In the <b>RHYTHM GROUP</b> section, a rhythm in <b>MEMORY A</b> or <b>MEMORY B</b> with no stored pattern was selected. Select a different rhythm.</li> </ul>
	No sound is produced for the automatic accompaniment, or only the sounds of some parts are produced.	<ul style="list-style-type: none"> <li>An <b>ACCOMP</b> part does not sound if its corresponding volume is set to the minimum level. Use the respective balance buttons to set the <b>ACCOMP 1, 2 and 3</b> volumes to appropriate levels.</li> </ul>
COMPOSER	Storage is not possible.	<ul style="list-style-type: none"> <li>The remaining memory capacity of the <b>COMPOSER</b> is 0.</li> </ul>
	Setting the time signature and number of measures is not possible.	<ul style="list-style-type: none"> <li>The time signature and number of measures cannot be changed for a pattern which is currently recorded in the <b>COMPOSER</b>. If you wish to change the time signature and/or measure data, first follow the procedure to clear the memory.</li> </ul>
	The playback timing of the rhythm pattern is different from the timing with which it was recorded.	<ul style="list-style-type: none"> <li>The <b>QUANTIZE</b> function was on when the pattern was recorded and the timing was automatically corrected. Set the quantize level to a smaller note unit or to OFF when recording.</li> </ul>
Disk Drive	The Disk Drive produces a noise during recording or playback.	<ul style="list-style-type: none"> <li>This occurs when the Disk Drive is reading a disk. It does not indicate a problem.</li> </ul>
	When the procedure to load from a disk is performed, the contents of the keyboard memory are erased.	<ul style="list-style-type: none"> <li>When performing the load operation from a disk, the keyboard memory changes to that of the data loaded from the disk. If you wish to preserve a song which is stored in the keyboard memory, save it on a disk before performing the load procedure.</li> </ul>
Other	Noise from a radio or TV can be heard.	<ul style="list-style-type: none"> <li>This sometimes occurs when electrical equipment such as a radio or TV is used near the instrument. Try moving such electrical equipment further away from the instrument.</li> <li>The sound may be coming from a nearby broadcast station or amateur radio station. If the sound is bothersome, consult your dealer or service center.</li> </ul>
	The cabinet becomes warm during use.	<ul style="list-style-type: none"> <li>This instrument has a built-in power source that heats the cabinet to some degree. This is not an indication of trouble.</li> </ul>

# ERROR DISPLAY

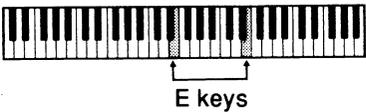
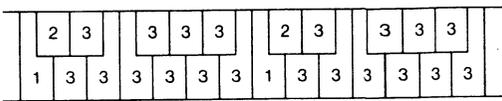
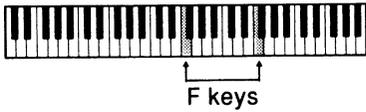
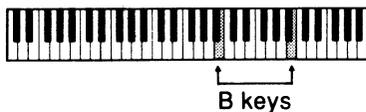
No.	Contents
00	The data on the disk that you are using is for a different product.
01	An error has occurred while the disk was loading. Please try again!
02	There is no disk in the Disk Drive.
03	The file that you tried to load is empty.
05	An error has occurred while the disk was saving. Please try again!
06	The disk that you are using is write protected. Please remove the write protection and try again.
07	The disk that you are using is full. Please use another disk.
08	An error has occurred while the disk was formatting. The disk that you are using may be faulty. Please try formatting another disk.
10	The data is already copy protected.
11	The password that you entered is incorrect.
20	A problem has occurred with your <b>SEQUENCER</b> Data. This might be due to a damaged or faulty disk.
21	Memory full
22	It is necessary to press PUNCH OUT to complete this procedure.
23	It is impossible to change the time signature because it has already been set in the existing tracks.
24	A rhythm track already exists. It is impossible to assign two tracks to rhythm.
25	It is only possible to change the velocity on a melody track.
26	It is only possible to merge melody tracks. Tracks such as rhythm, chord and control cannot be merged.

No.	Contents
27	It is only possible to copy melody tracks. Tracks such as rhythm, chord and control cannot be copied.
28	This song is too long to be saved as a MIDI file.
29	The MIDI file that you have tried to load exceeds the memory capacity of the KN2000 and cannot be played. The <b>SEQUENCER</b> memory has been cleared.
30	It is not possible to change the time signature or measure length of a <b>COMPOSER</b> pattern after it has been recorded. If you want to proceed, you must first clear the entire <b>COMPOSER</b> pattern.
31	The time signature of the pattern from which you are copying is different from the <b>COMPOSER</b> memory that you are using. Either: Change the time signature of the <b>COMPOSER</b> memory or: Copy from a pattern that has the same time signature
32	Memory full
40	The Identification (ID) code of the system exclusive data received by the KN2000 is for a different product.
41	An error has occurred during system exclusive data reception. The data from the transmitting device may be incomplete. Please try again.
42	An error has occurred during system exclusive transmission. The data has not been received correctly. Please try again.
43	The file that you are trying to load was saved on a previous KN keyboard. It is only possible to load using the "ALL" option.
44	It is impossible to edit a Drum Kit. Please select a different sound from any group except Keyboard Percussion.

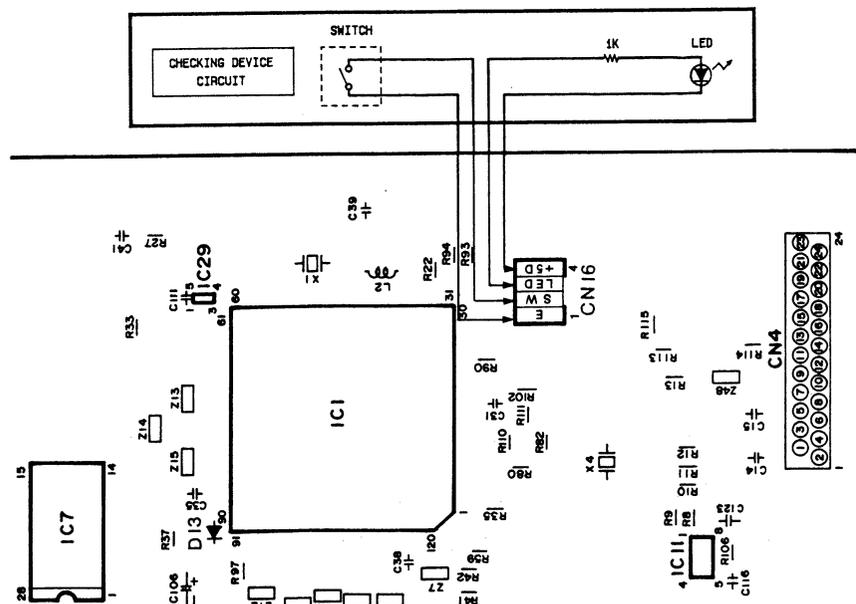
# ABOUT THE SELF-DIAGNOSTIC FUNCTION

This model has some self-diagnostic capabilities. When set to the self-diagnostic mode, operation of various components can be verified by following the procedures in the chart below.

No.	PCB	TEST MODE	Procedure												
1	MAIN	RAM (IC7, 8, 9), ROM (IC5, 6) check	<ol style="list-style-type: none"> <li>1. Connect the CHECKING DEVICE (refer to page I-14) to CN16 on the MAIN P.C.B., and turn on the CHECKING DEVICE switch.</li> <li>2. Turn on the power switch.</li> </ol>												
		<p>When the power switch is turned on, the LED of the CHECKING DEVICE flashes 8 times. The first 4 flashes are for the RAM check, and the latter 4 flashes are for the ROM check. The order of the LED flashes corresponds to the respective IC numbers as shown below. If an IC is defective, the corresponding flash time is longer.</p> <p>Examples</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="text-align: center;">RAM</td> <td style="text-align: center;">ROM</td> </tr> <tr> <td>1. RAM OK, ROM OK</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td>2. RAM OK, ROM (IC5) defective</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td>3. RAM (IC7) defective, ROM OK</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </table> <p>Note: ● indicates short flash time = OK          ─ indicates long flash time = Defective</p>		RAM	ROM	1. RAM OK, ROM OK			2. RAM OK, ROM (IC5) defective			3. RAM (IC7) defective, ROM OK			
	RAM	ROM													
1. RAM OK, ROM OK															
2. RAM OK, ROM (IC5) defective															
3. RAM (IC7) defective, ROM OK															
2	MAIN	V53 gate array (IC2) check	<p>While pressing two C keys simultaneously, turn on the power switch.</p> <p style="text-align: center;">C keys</p>												
		<p>Monitor pins 89~96 (P00~P07) of IC2 on an oscilloscope, and check whether incremental data (see figure) is output.</p>													
3	CP	Control panel CPU check.	<ol style="list-style-type: none"> <li>1. Connect the CHECKING DEVICE to CN16 on the MAIN P.C.B. (The Checking Device switch should be off.)</li> <li>2. While pressing two D keys simultaneously, turn on the power switch.</li> </ol> <p style="text-align: center;">D keys</p>												
		<p>When the power switch is turned on, the LED of the CHECKING DEVICE flashes 4 times. The order of the LED flashes corresponds to the CPU (IC) on the respective P.C.B.s as shown below. If an IC is defective, the corresponding flash time is longer.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td>1. OK</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> </tr> <tr> <td>2. CPL CPU defective</td> <td style="text-align: center;">─</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> </tr> </table> <p style="text-align: center;">             ↑ CPR P.C.B. CPU (IC1)              ↑ CPL P.C.B. CPU (IC1)         </p> <p>Note: ● indicates short flash time = OK          ─ indicates long flash time = Defective</p>		1	2	3	4	1. OK	●	●	●	●	2. CPL CPU defective	─	●
	1	2	3	4											
1. OK	●	●	●	●											
2. CPL CPU defective	─	●	●	●											

No.	PCB	TEST MODE	Procedure
4	MAIN	Wave ROM (IC15, 19, 20) check	While pressing two E keys simultaneously, turn on the power switch.  
		When set to the self-diagnostic mode, the Wave ROM outputs a sine wave. The Wave ROMs correspond to the keyboard keys as shown in the diagram to the right. When a key is pressed, the corresponding sine wave sound is produced. If no sound is produced, or if the sound is distorted, the Wave ROM corresponding to that key is defective.	<ul style="list-style-type: none"> <li>The key number indicates the Wave ROM number (1: IC15, 2: IC19, 3: IC20).</li> </ul> 
5	CPL, CPR	LED & SW check	While pressing two F keys simultaneously, turn on the power switch.  
		All the LEDs turn off after lighting once. Confirm that all the LEDs light.	
6	LCD	LCD Display check	While pressing two G keys simultaneously, turn on the power switch.  
		The test pattern for the LCD character display is shown. There are more than 10 different test patterns, which are selected with the TRANPOSE buttons. Only the first display of the test pattern display differs. Confirm that the characters appear correctly.	
7	MKB	Keyboard ROM (IC2) check	While pressing two B keys simultaneously, turn on the power switch.  
		If the keyboard ROM (IC2) is OK, one confirming beep will sound. If it is defective, several consecutive error beeps will sound.	

■ Connection between serving CHECKING DEVICE and MAIN PCB



# MIDI IMPLEMENTATION CHART

Keyboard [ SX - KN2000 ]

(Transmitted)

Function	RIGHT1,2,LEFT, PART4~15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks	
Basic Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized	
Channel Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16		
Mode Default	3	3	3	3	3	3	3	3	OMNI OFF, POLY MODE	
Mode Messages	×	×	×	×	×	×	×	×		
Mode Altered	-	-	-	-	-	-	-	-		
Note Number True voice	0-127	0-127	0-127	0-127	0-127	0-127	0-127	-	Changes depending on the position of the transpose control, octave shift, and drums type.	
Velocity Note ON	○	○	○	○	○	○	○	-		
Velocity Note OFF	×	×	×	×	×	×	×	-		
After Key's	×	×	×	×	×	×	×	-		
Touch Ch's	×	×	×	×	×	×	×	-		
Pitch Bender	○×*	×	○×*	○×*	○×*	×	○×*	×		
Control Change	0,32 1 6,38 7 10 11 64 80 82 91 93 94 100,101 121	○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×*	○×* ×	○×* ○×* ×	○×* ○×* ×	○×* ○×* ×	○×* ○×* ×	○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×*	○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×* ○×*	bank select MSB, LSB modulation data entry MSB, LSB volume panpot expression sustain auto play chord intro, fill in, ending reverb digital effect DSP effect RPN LSB, MSB all sound off reset all cotrollers
Prog Change True #	○×*	○×*	○×*	○×*	○×*	○×*	○×*	○×*	Changes depending on program change mode and prog.cng to p.mem.	
System exclusive	○									
System common	○×* ○×* (0-19) ×									
System Real Time	○ ○×*								start/stop, continue	
Aux Messages	Local ON/OFF	×	×	×	×	×	×	×	-	
Aux Messages	All notes OFF	×	×	×	×	×	×	×	-	
Aux Messages	Active Sense	○								
Aux Messages	Repeat	×								
Notes	○×*.....Whether or not the data for each of these items is transmitted can be set.									

Mode 1: OMNI ON, POLY

Mode 2: OMNI ON, MONO

○:Yes

Mode 3: OMNI OFF, POLY

Mode 4: OMNI OFF, MONO

×:No

Function	RIGHT1,2,LEFT, PART4~15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks
Basic Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized
Channel Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	
Mode Default	3	3	3	3	3	3	3	3	OMNI OFF, POLY MODE
Mode Messages	×	×	×	×	×	×	×	×	
Mode Altered	—	—	—	—	—	—	—	—	
Note Number True voice	0-127	0-127	0-127	0-127	0-127	0-127	0-127	0-127	Changes depending on the position of the transpose control, octave shift, and drums type.
Velocity Note ON	○	○	○	○	○	○	○	○	
Velocity Note OFF	×	×	×	×	×	×	×	×	
After Key's	×	×	×	×	×	×	×	×	
Touch Ch's	×	×	×	×	×	×	×	×	
Pitch Bender	○x*	×	○x*	○x*	○x*	×	○x*	×	
Control Change	0,32 1 6,38 7 10 11 64 80 82 91 93 94 100,101 121	○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* x x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* ○x* x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* ○x* x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* x x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* ○x* x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	○x* x x ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x* ○x*	bank select MSB, LSB modulation data entry MSB, LSB volume panpot expression sustain auto play chord intro, fill in, ending reverb digital effect DSP effect RPN LSB, MSB all sound off reset all controllers
Prog Change True #	0-127	0-127	0-127	0-127	0-127	0-127	0-127	0-21	Changes depending on program change mode and prog.cng to p.mem.
System exclusive	○								
System common	○x* (0-19)								
System Real Time Commands	○								
Aux Messages	○x*								
Local ON/ OFF	×	×	×	×	×	×	×	—	
All notes OFF	○	○	○	○	○	○	○	○	
Active Sense	○								
Repeat	x								
Notes	○x*.....Whether or not the data for each of these items is received can be set.								

Mode 1: OMNI ON, POLY      Mode 2: OMNI ON, MONO      ○: Yes  
 Mode 3: OMNI OFF, POLY      Mode 4: OMNI OFF, MONO      ×: No

## PRECAUTIONS BEFORE SERVICING

### ■ Precautions for measuring of the output waveforms.

- The waveform was measured with a "National Digital Storage Oscilloscope VP-5730A". Therefore the waveforms of musical tone signals shown may differ somewhat due to the difference in the timing of triggering.
- Since the 1/10 test probe is used, the indicated voltage value on the bottom part of each waveform photo is 1/10 of the actual value (e.g. 0.2V/cm should be 2.0V/cm).

### ■ Important safety notice:

Components identified by a ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

### ■ Symbolic Marks

The symbolic marks for resistors and capacitors which used in this circuits are classified as following TABLE-1 and TABLE-2.

#### 1. RESISTORS

- Resistors without symbolic mark are FIXED CARBON FILM RESISTORS (ERD-type).
- All resistors are 1/4WATT, ±5% TOLERANCE unless otherwise designated in the schematic diagrams.

(TABLE-1)

SYMBOL	SPECIFICATION	SYMBOL	SPECIFICATION
Ⓣ	Fixed Carbon Film Resistors "FLAME-PROOF" (ERD—F—type)	Ⓣ	Fixed Metal Film Resistors "FLAME-PROOF" (ERX—type)
Ⓣ	Fixed Wire Wound Resistors "FLAME-PROOF" (ERF—type)	Ⓣ	Fuse Type Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERQ—type)
Ⓣ	Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERG—type)	Ⓣ	Fuse Type fixed Carbon Film Resistors "FLAME-PROOF" (ERD2FC—type)
Ⓣ	Fixed Metal Film Resistors (Precision and High Stability) (ERO—type)		

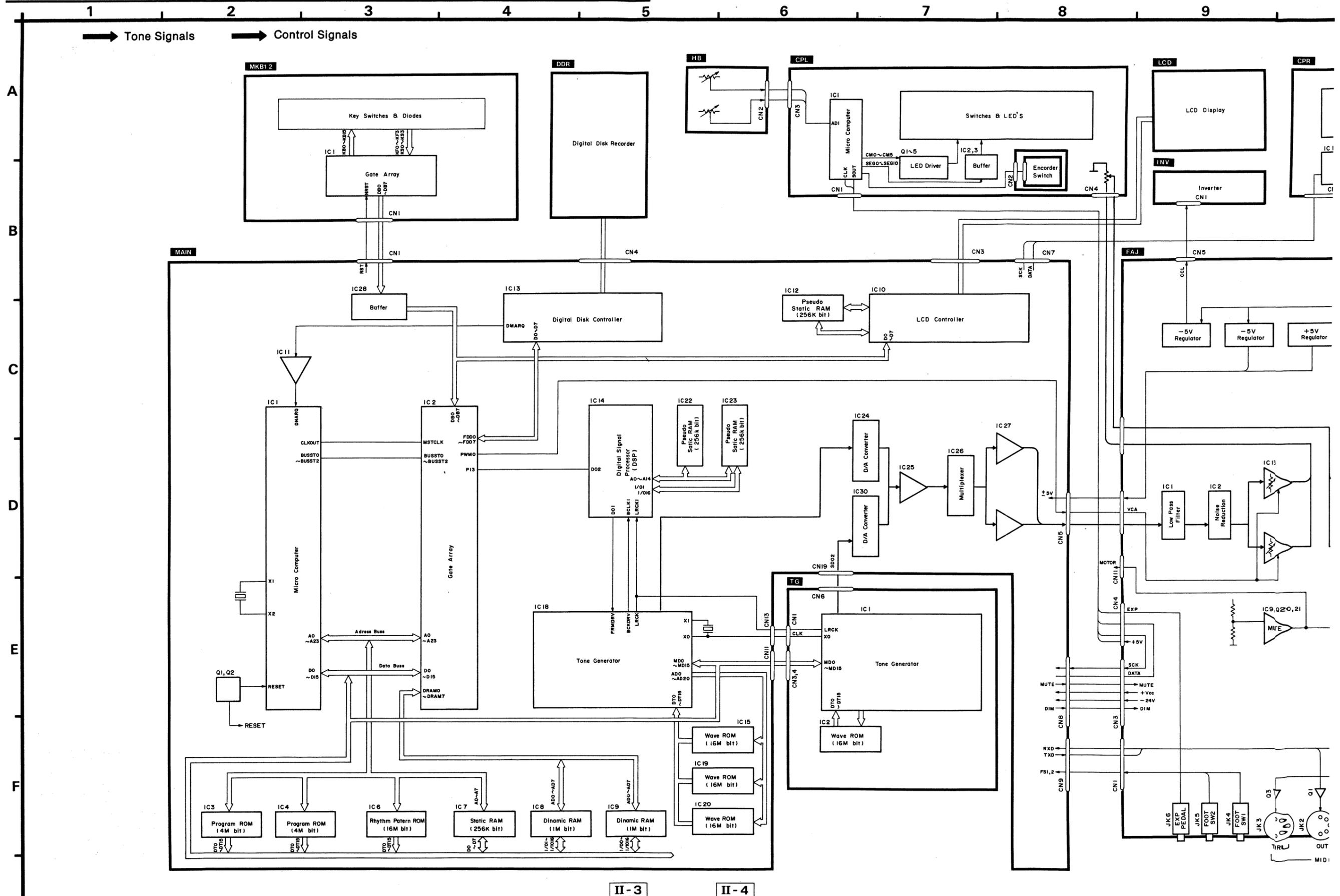
#### 2. CAPACITORS

- Capacitors without symbolic mark are POLYESTER CAPACITORS. (ECQM-type, ECQG-type, ±10% Tolerance)
- Polarized capacitors without symbolic mark are Aluminum Electrolytic Capacitors. (ECEA—type, ±20% Tolerance)

(TABLE-2)

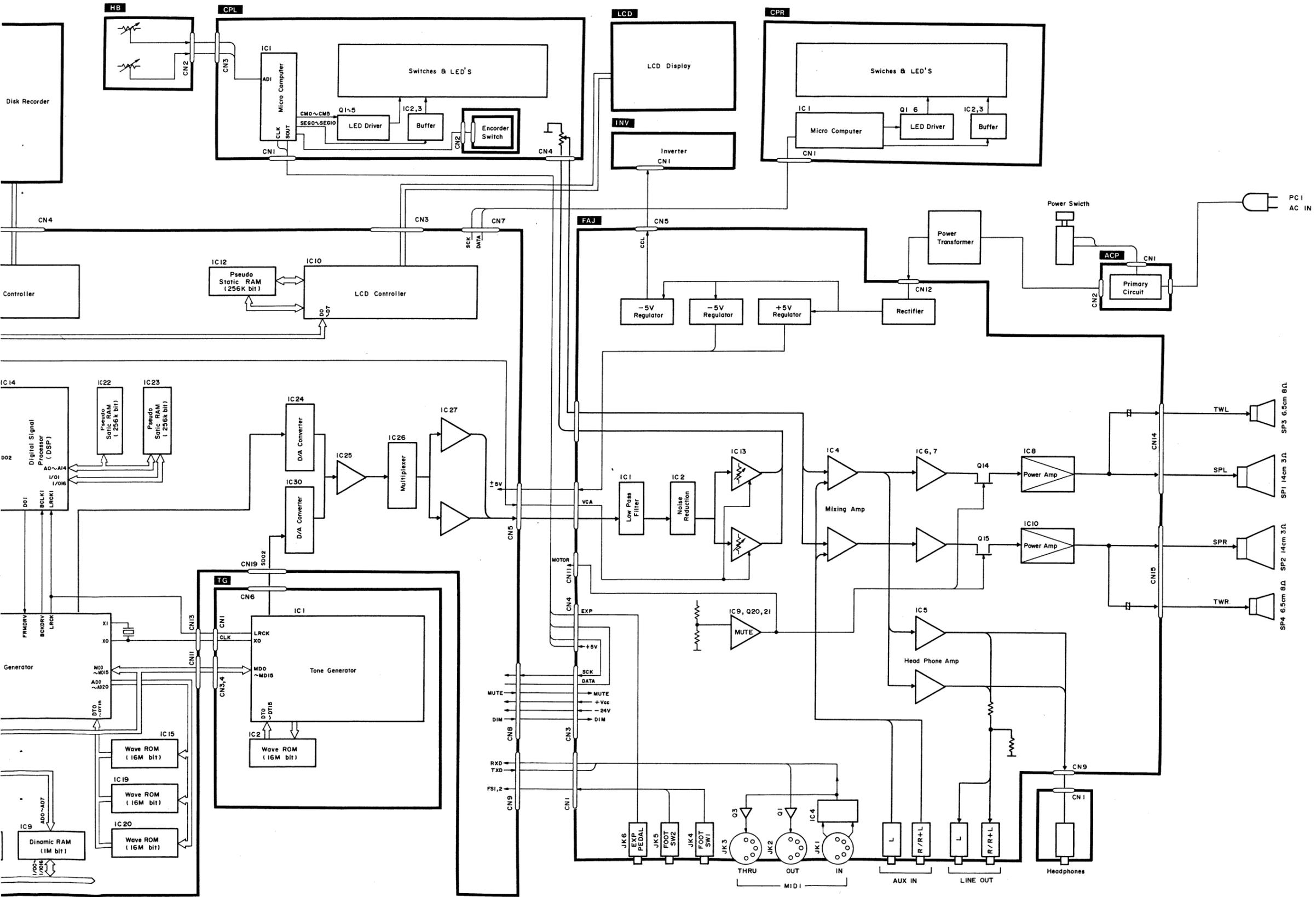
SYMBOL	SPECIFICATION	TYPE
Ⓝ	Non-Polarized Electrolytic Capacitors	ECEA_KN_type
Ⓝ	Non-Polarized Electrolytic (for Network System)	ECEA_Y_type
Ⓝ	Tantalum Solid Electrolytic Capacitors	ECS_type
Ⓝ	Metalized Plastic Film Capacitors (TF Series)	ECQV_type
○	Temperature Compensating Ceramic Capacitors	ECC_type
	High-Dielectric Constant Ceramic Capacitors	ECK_type ECR_type
	Axial Lead Ceramic Capacitors	ECB_type
	Metalized Polyester Film Capacitors for Across the Line	ECQ_EW_type
	Aluminum Electrolytic Capacitors for Smoothing Circuit	ECES_type
	Multilayer Ceramic Chip Capacitors	ECUV_type

# BLOCK DIAGRAM



II-3

II-4

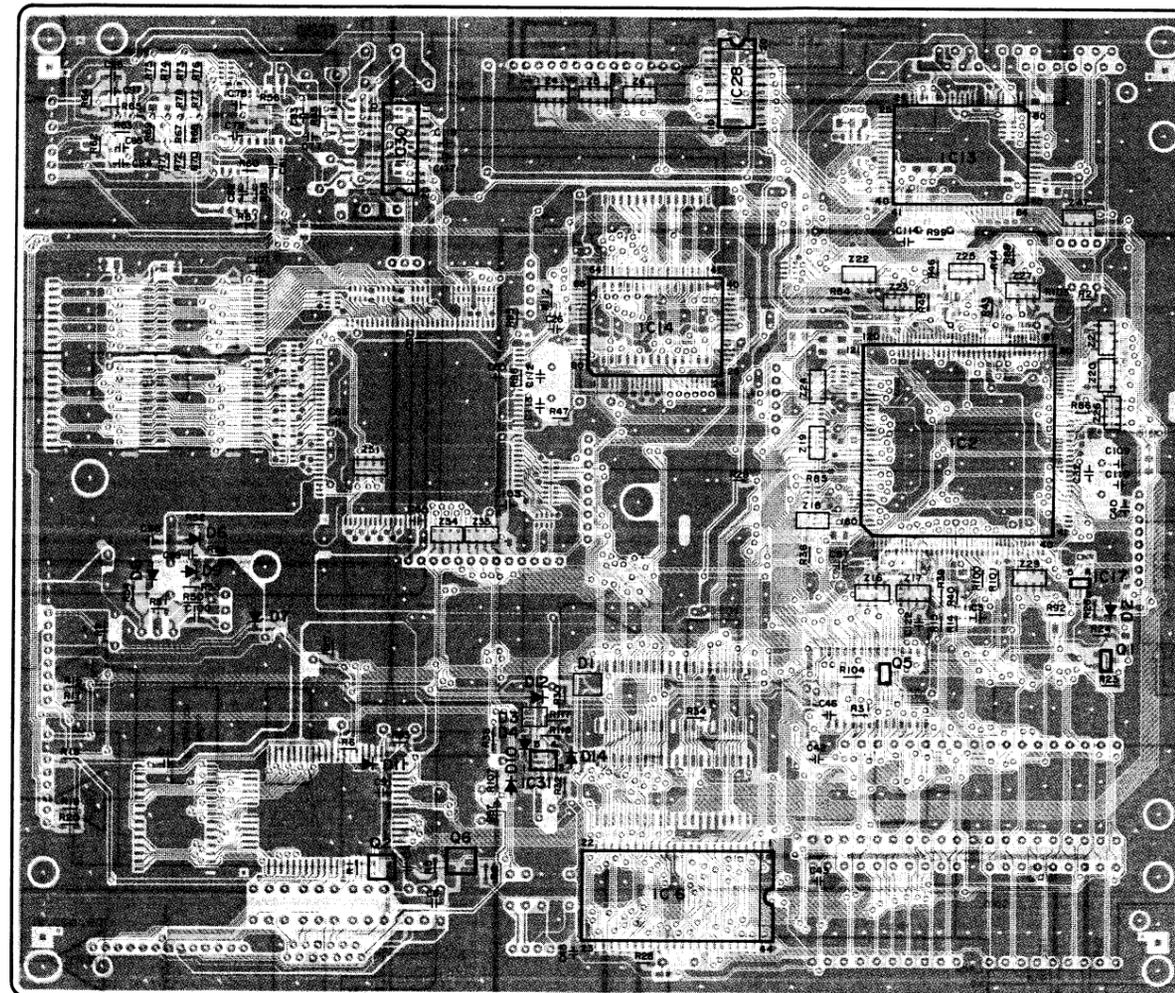
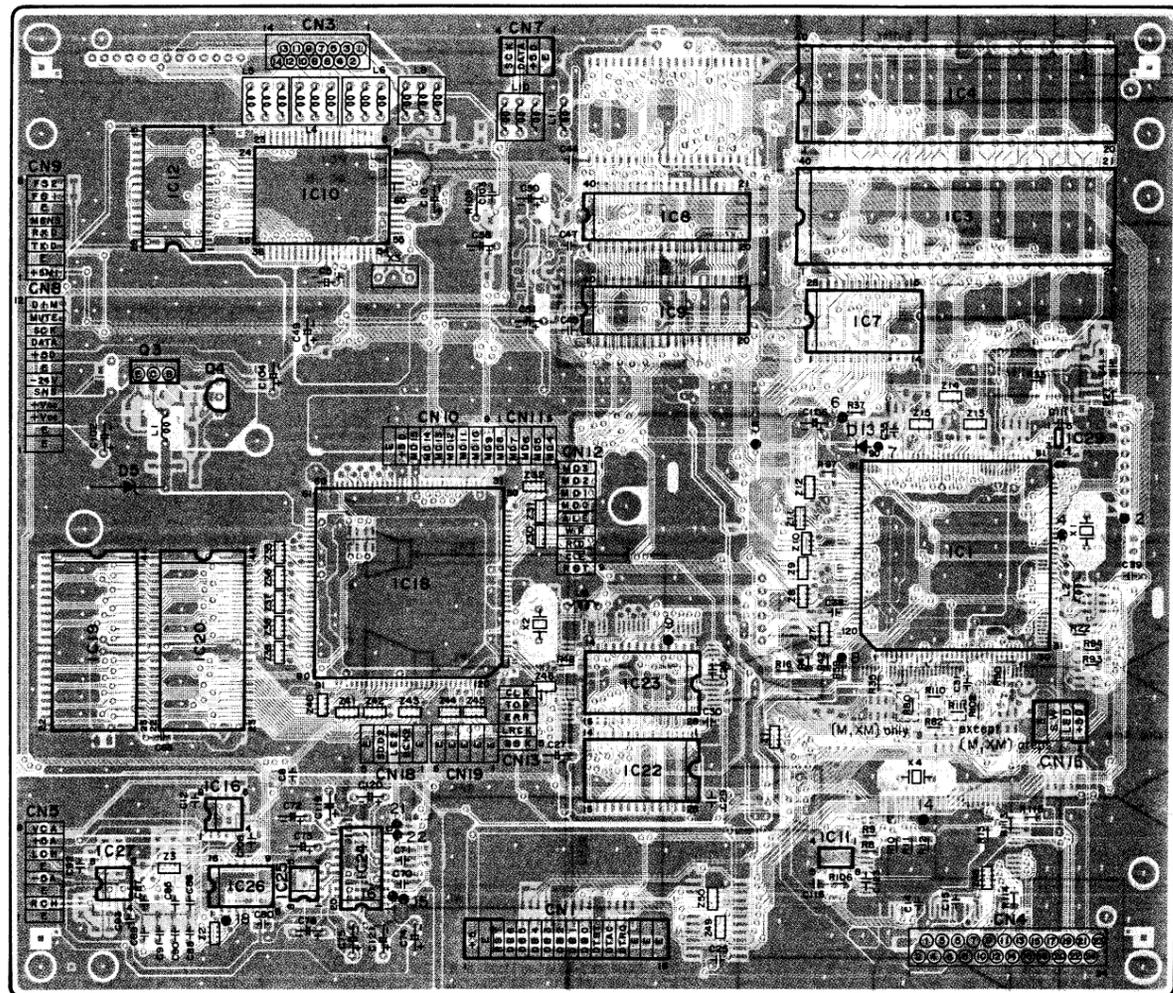


MAIN COMPONENT SIDE

Component Side  
Foil Side

MAIN FOIL SIDE

- [M] [XM] areas **SXPG215131**
- [MC] area **SXPG215141**
- [EZ] [EW] [EA] areas **SXPG215151**
- Others **SXPG215111**

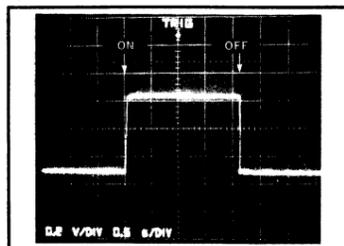


MAIN

NOTES:

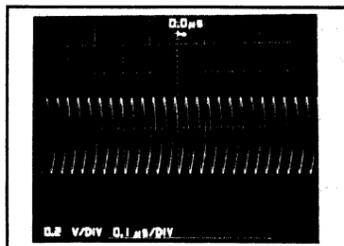
- IC'S
  - IC1: D70236C
  - IC2: D65046C
  - IC3: QSIGCK
  - IC4: QSIGCK
  - IC4: QSIGCK
  - IC6: QSIG03C
  - IC7: ATT7C2I
  - IC8, 9: M5M411
  - IC10: SED133C
  - IC11: TC7W14
  - IC12: HM6525
  - IC13: D72068C
  - IC14: D6382GI
  - IC16: M5218A
  - IC17: TC7586I
  - IC18: TC2554C
  - IC19: QSIGM3
  - IC20: QSIGM3
  - IC22, 23: HM6525
  - IC24: PCM170
  - IC25: M5238FI

② RESET

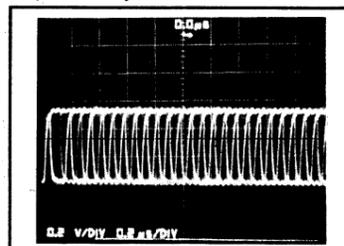


Power ..... ON → OFF

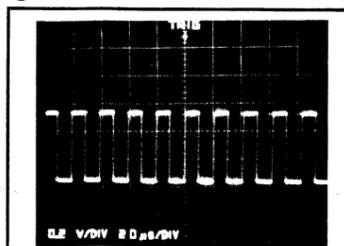
④



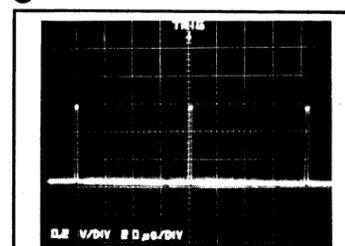
⑤, ⑥ RD, WR



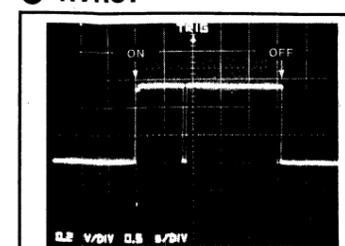
⑦



⑧

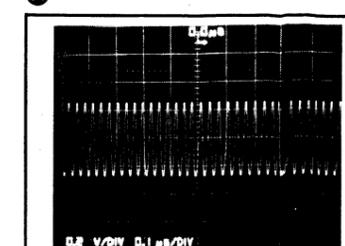


⑨ RVRST



Power ..... ON → OFF

⑭



MAIN FOIL SIDE

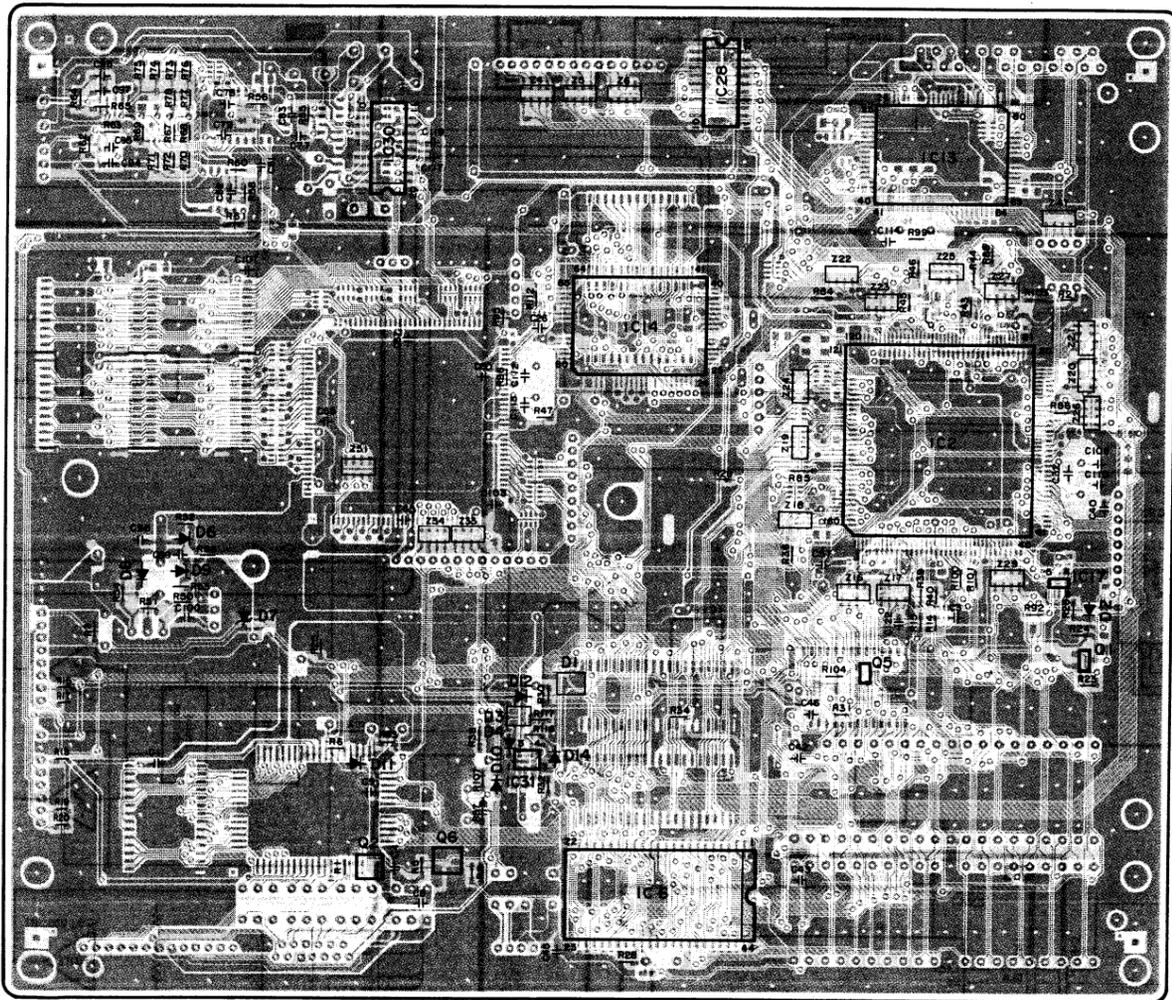
- [M] [XM] areas
- [MC] area
- [EZ] [EW] [EA] areas
- Others

SXPG215131

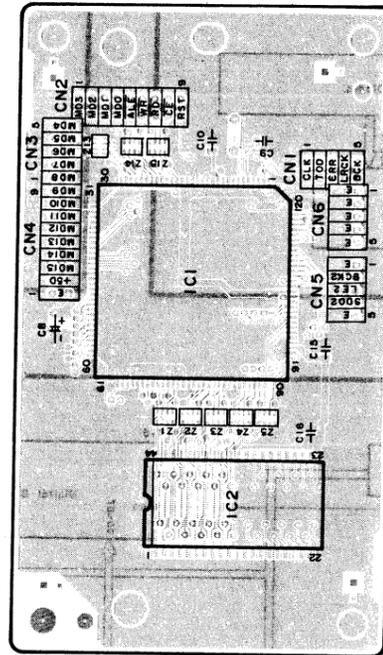
SXPG215141

SXPG215151

SXPG215111

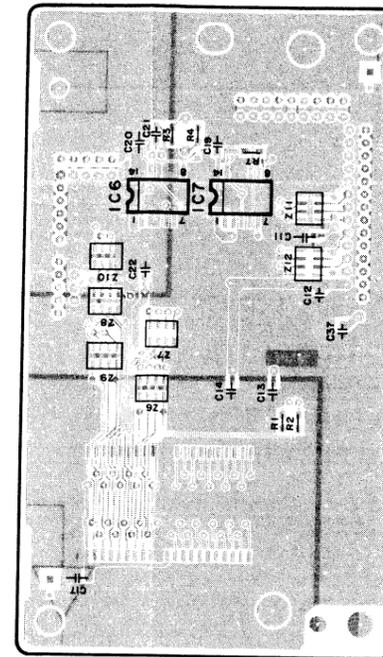


TG COMPONENT SIDE



TG FOIL SIDE

SXPG216311



MAIN NOTES:

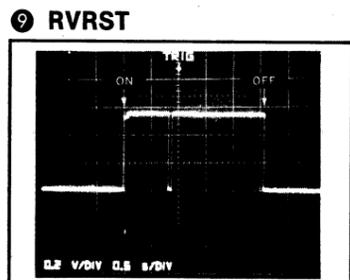
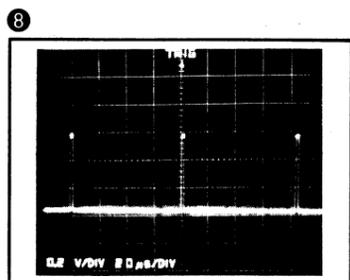
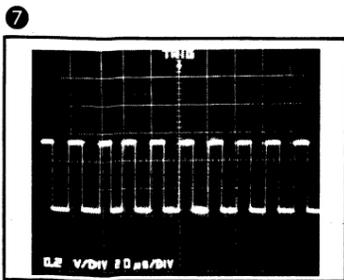
- IC'S
  - IC1: D70236GD125B
  - IC2: D65046GD188
  - IC3: QSIGCKN20AX
  - IC4: QSIGCKN20BX, others
  - IC4: QSIGCKN20C, EZ EW EA only
  - IC6: QSIG03C16015
  - IC7: ATT7C256BF85
  - IC8, 9: M5M411664J8S
  - IC10: SED1330FBA
  - IC11: TC7W14F
  - IC12: HM65256BLF10
  - IC13: D72068GF-3B9
  - IC14: D6382GF-3B9
  - IC16: M5218AFP
  - IC17: TC7S86F
  - IC18: TC25540AF006
  - IC19: QSIGM3C16194
  - IC20: QSIGM3C16193
  - IC22, 23: HM65256BLF10
  - IC24: PCM1702U
  - IC25: M5238FP
  - IC26: T74H4051AF
  - IC27: M5218AFP
  - IC28: M74HC244FP
  - IC29: TC7S32F
  - IC30: PCM1702U
  - IC31: TC7S66F
- TRANSISTORS
  - Q1, 6: 2SB709ARTW
  - Q2, 5: 2SD601AQTW
  - Q3: 2SA1643
  - Q4: 2SC1815GR
- DIODES
  - D1: MA704WK
  - D2, 4, 6, 11~14: MA110
  - D3: MA151WK
  - D5: MA2062LF
  - D7: MA8056
  - D8: MA738
  - D9: MA8051
  - D10: MA8180

TG NOTES:

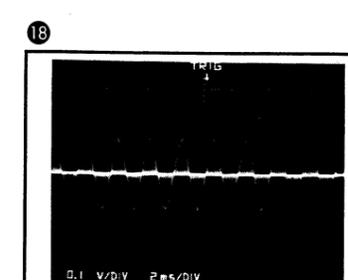
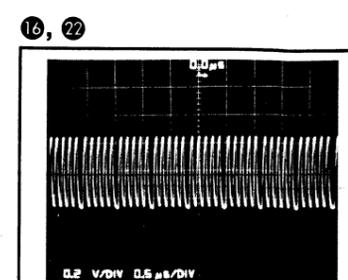
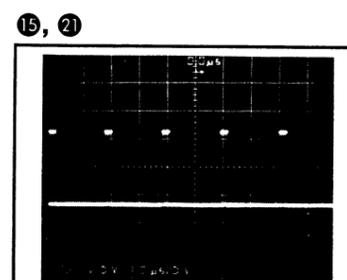
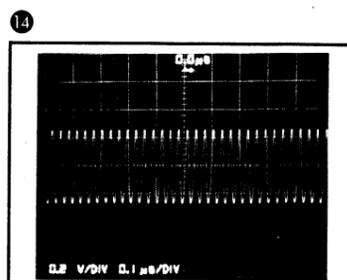
- IC'S
  - IC1: TC25540AF006
  - IC2: QSIGH3C16D81
  - IC6: M74HC00FP
  - IC7: M74HC74FP

Measuring Conditions

Check Point ⑮~⑳  
 Set to the self-diagnostic mode followings.  
 • While pressing E3 key and E4 key simultaneously, turn on the power switch.



Power ..... ON - OFF



A

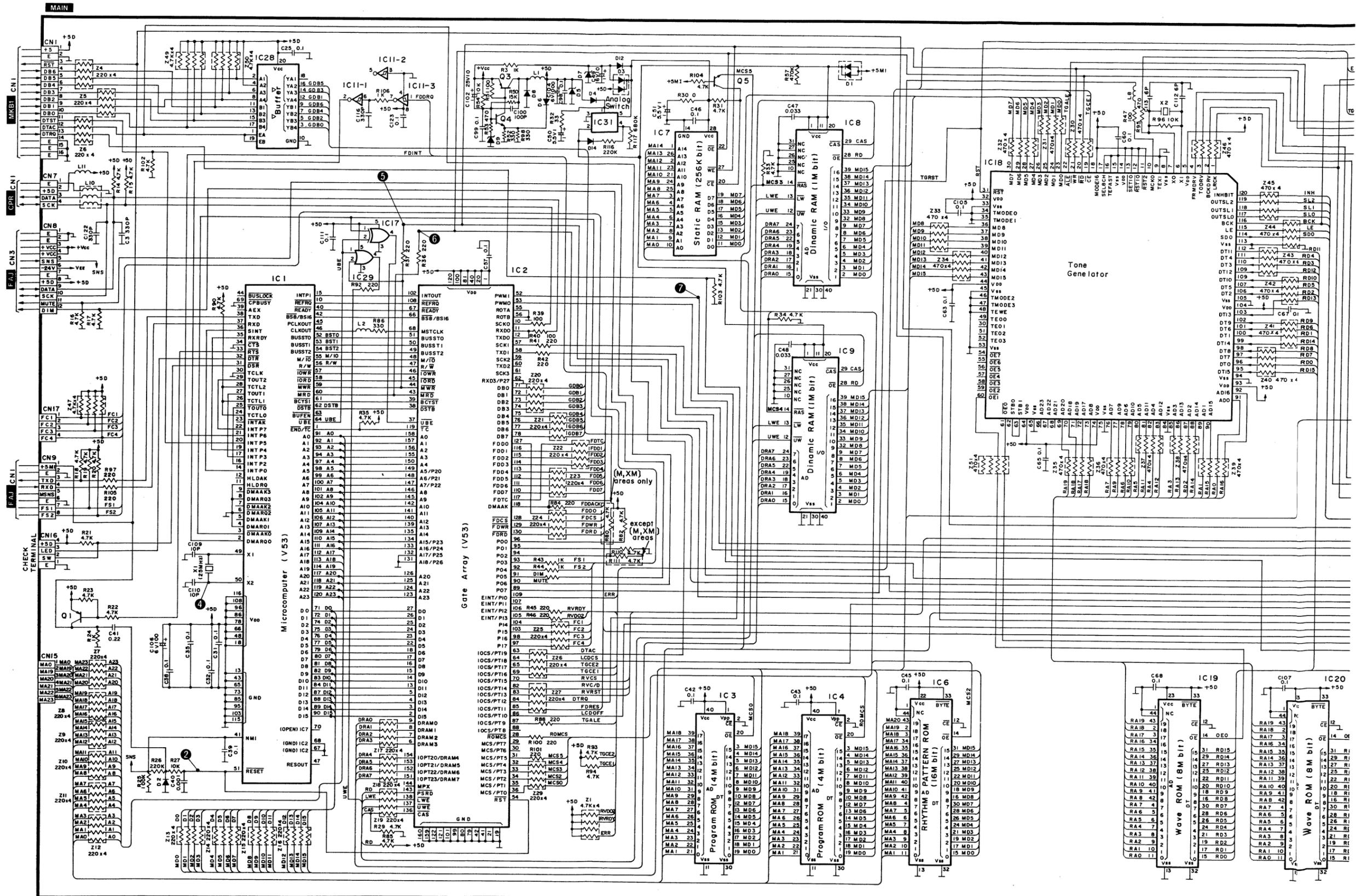
B

C

D

E

F

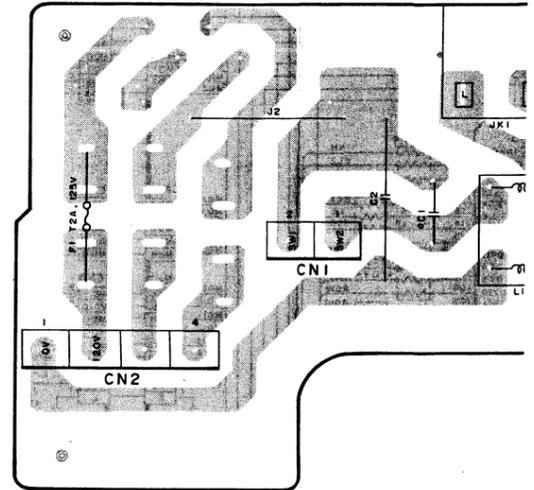
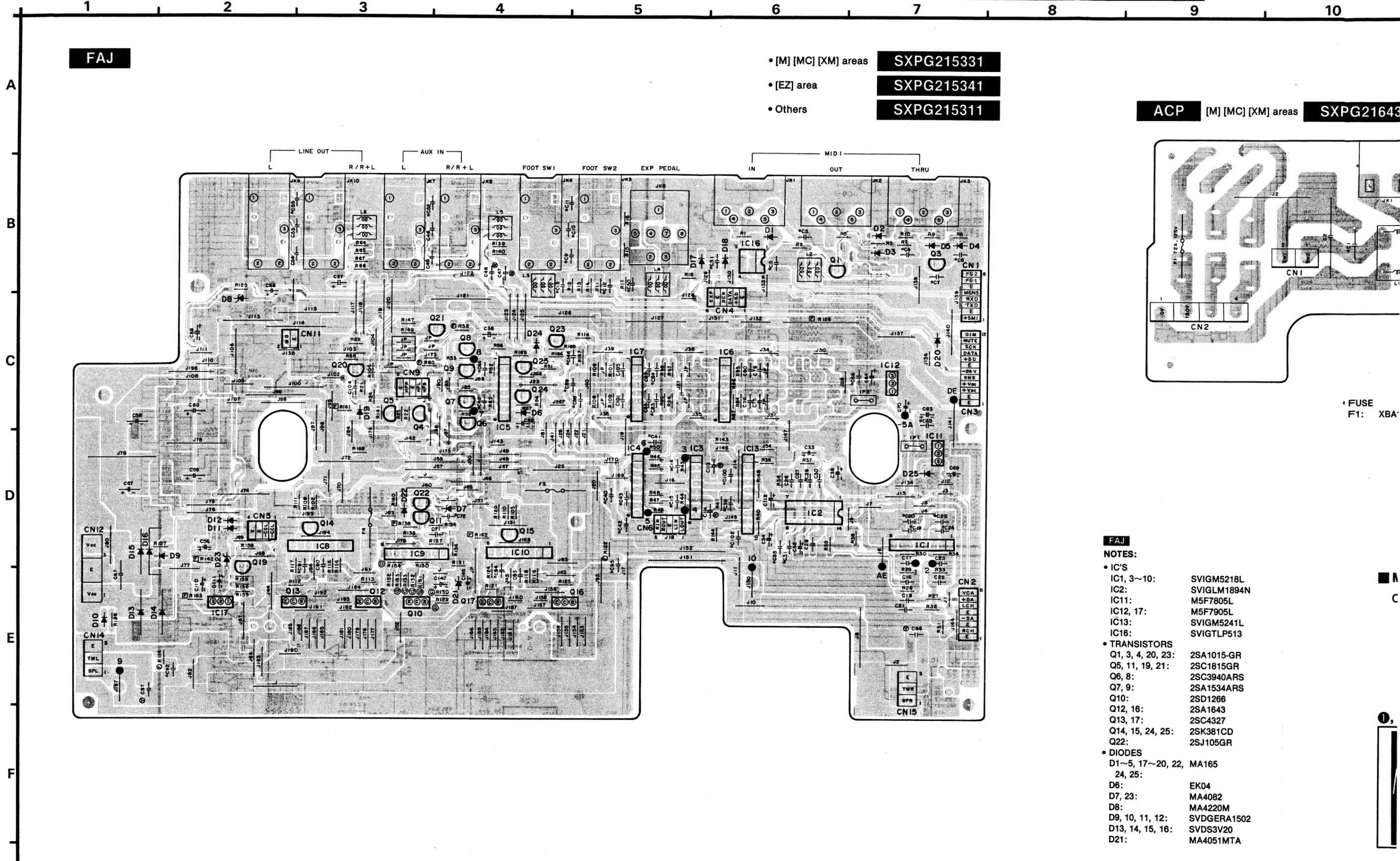




FAJ

- [M] [MC] [XM] areas **SXPG215331**
- [EZ] area **SXPG215341**
- Others **SXPG215311**

ACP [M] [MC] [XM] areas **SXPG21643**



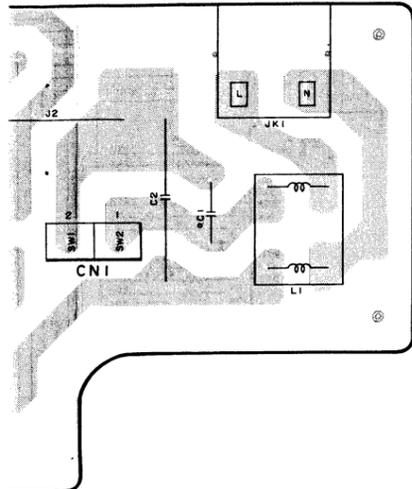
FUSE F1: XBA

FAJ

NOTES:

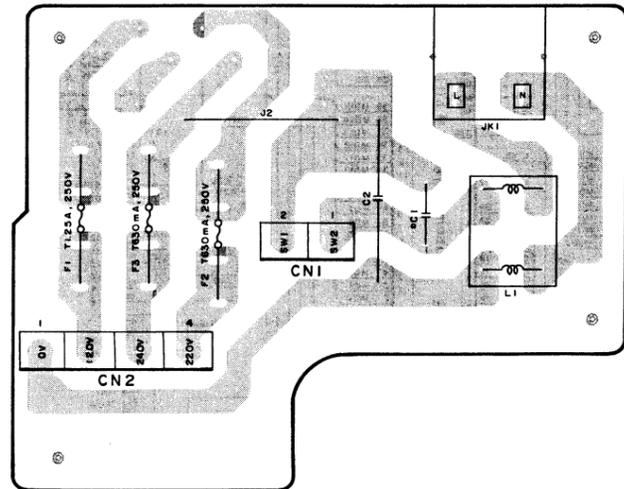
- IC'S
  - IC1, 3~10: SVIGM5218L
  - IC2: SVIGLM1894N
  - IC11: M5F7805L
  - IC12, 17: M5F7905L
  - IC13: SVIGM5241L
  - IC16: SVIGLTP513
- TRANSISTORS
  - Q1, 3, 4, 20, 23: 2SA1015-GR
  - Q5, 11, 19, 21: 2SC1815GR
  - Q6, 8: 2SC3940ARS
  - Q7, 9: 2SA1534ARS
  - Q10: 2SD1266
  - Q12, 16: 2SA1643
  - Q13, 17: 2SC4327
  - Q14, 15, 24, 25: 2SK381CD
  - Q22: 2SJ105GR
- DIODES
  - D1~5, 17~20, 22, 24, 25: MA165
  - D6: EK04
  - D7, 23: MA4082
  - D8: MA4220M
  - D9, 10, 11, 12: SVDGERA1502
  - D13, 14, 15, 16: SVDS3V20
  - D21: MA4051MTA

(M) areas **SXPG216431**



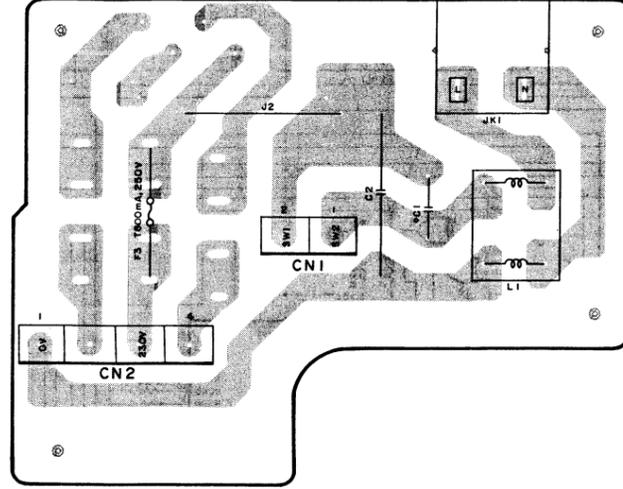
• FUSE  
F1: XBA1C20NU100

ACP [EK] [X] [XR] [XS] [XD] [XT] areas **SXPG216441**



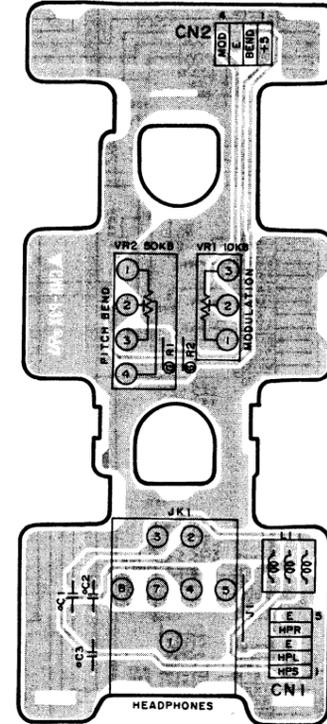
• FUSE  
F1: XBA2C12TB0  
F2, 3: XBA2C06TB0

ACP Other areas **SXPG216431**



• FUSE  
F3: XBA2C08TB0

HB **SXPG216411B**



■ **Measuring Conditions**

Check Point ①~⑧

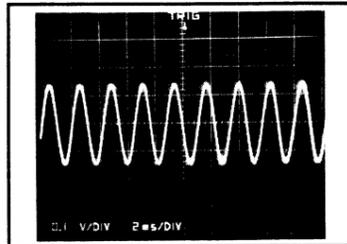
Set to the self-diagnostic mode followings.

- While pressing E3 key and E4 key simultaneously, turn on the power switch.
- Main Volume..... Max
- Keyboard ..... A3
- Sound Button..... SYNTH LEAD

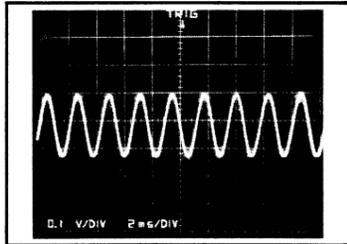
Check Point ⑨, ⑩

- Main Volume..... Center

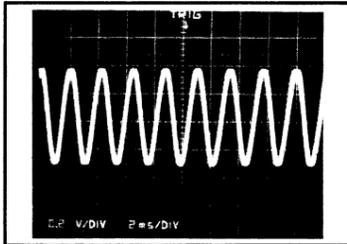
①, ②



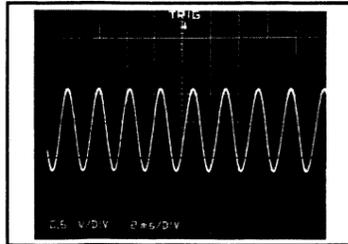
③, ④



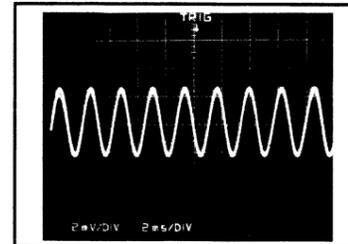
⑤, ⑥



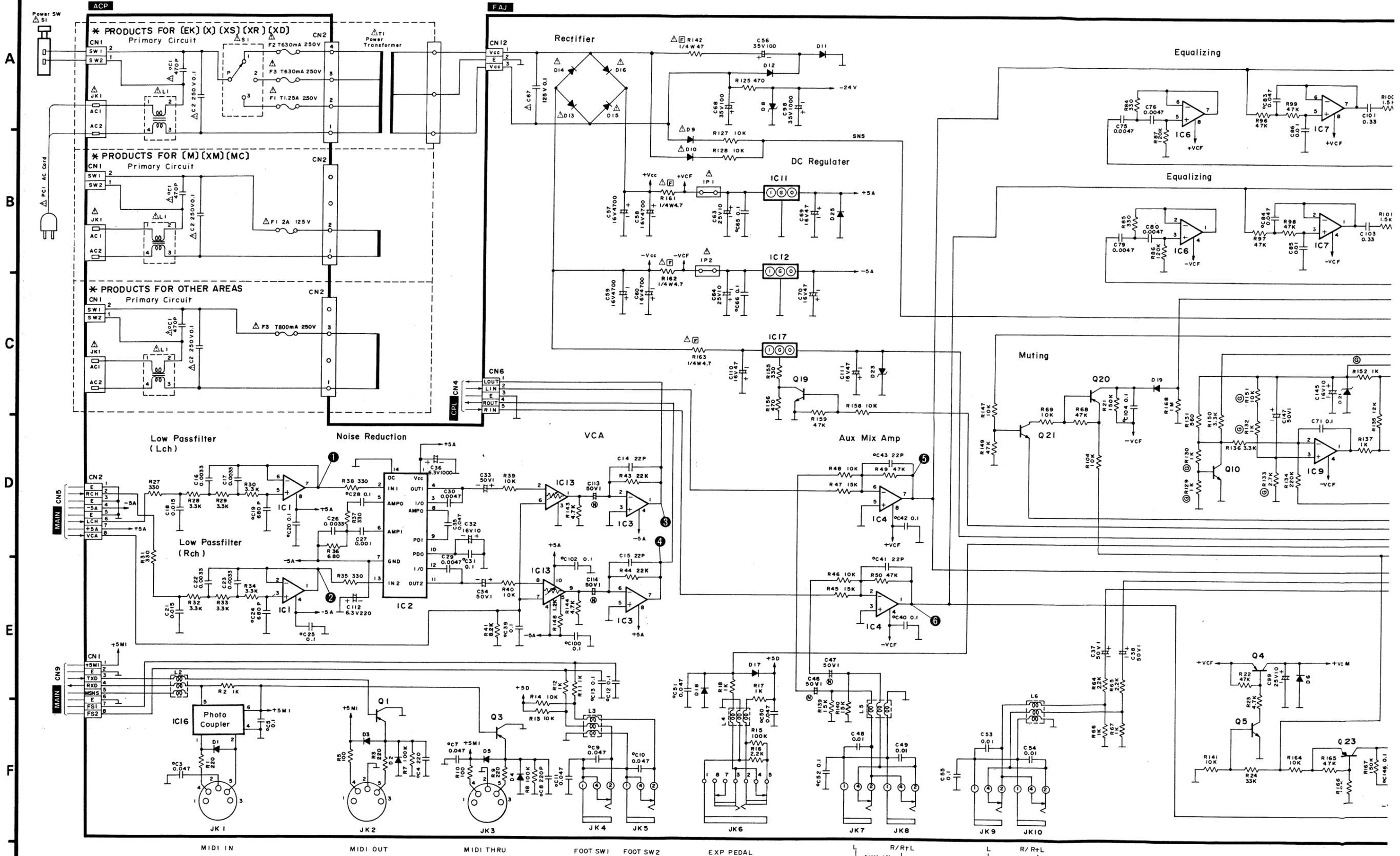
⑦, ⑧



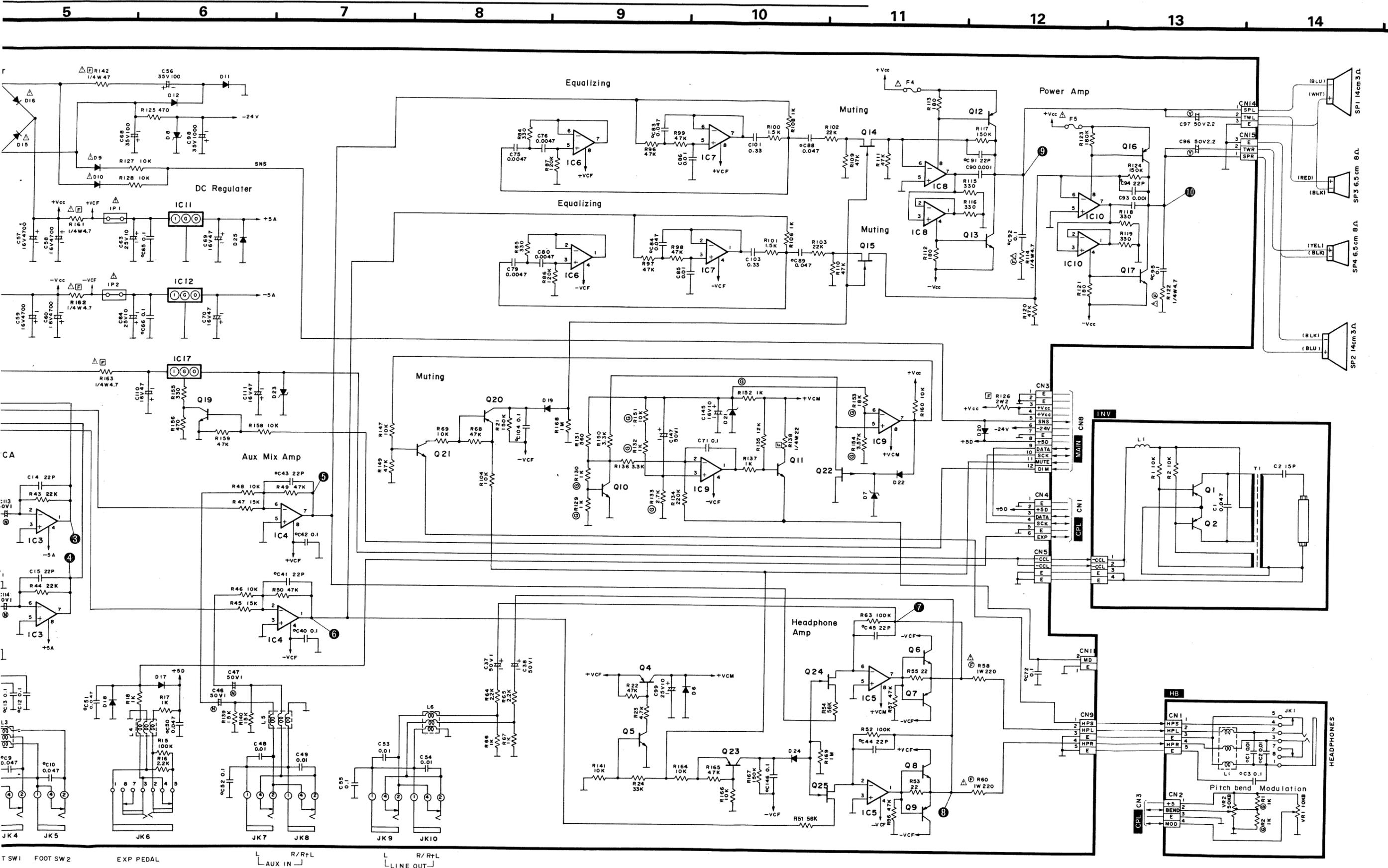
⑨, ⑩



1 2 3 4 5 6 7 8 9 10



# HEADPHONES BEND, INVERTER AND AC POWER SUPPLY CIRCUIT DIAGRAM



T SW1 FOOT SW2

EXP PEDAL

AUX IN R/R+L

L R/R+L LINE OUT

1 2 3 4 5 6 7 8 9 10

A

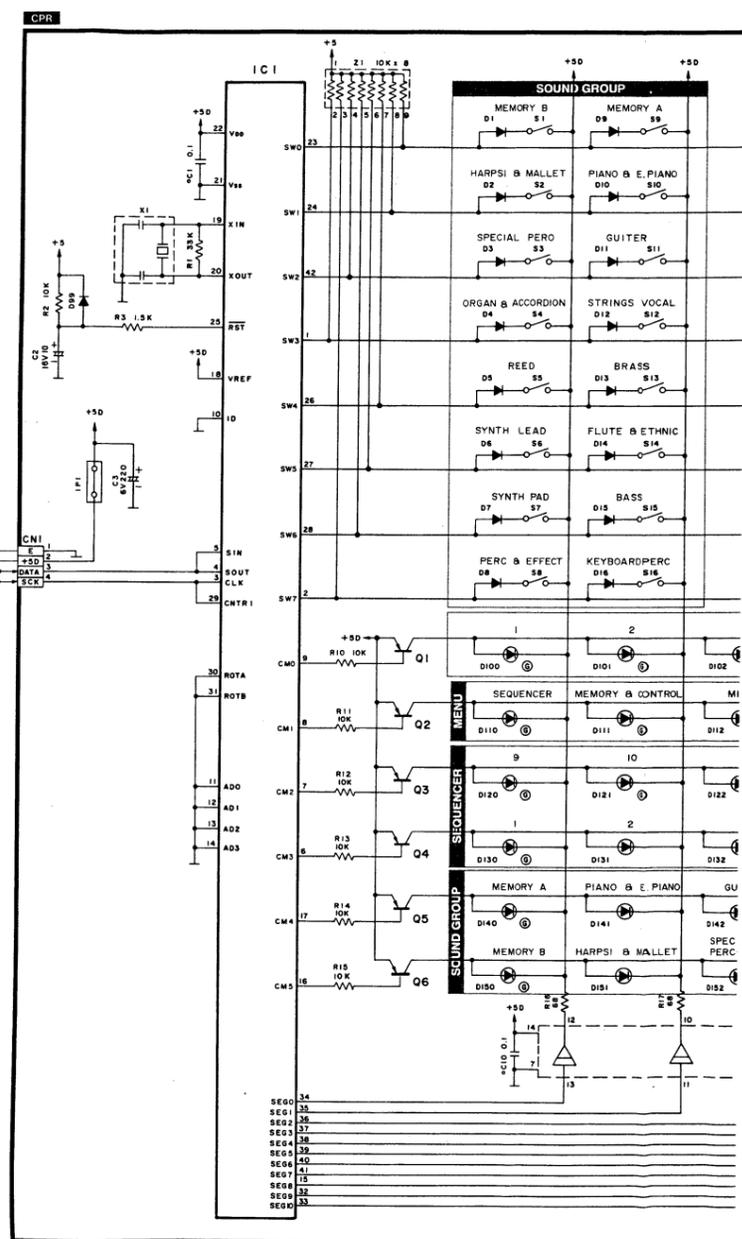
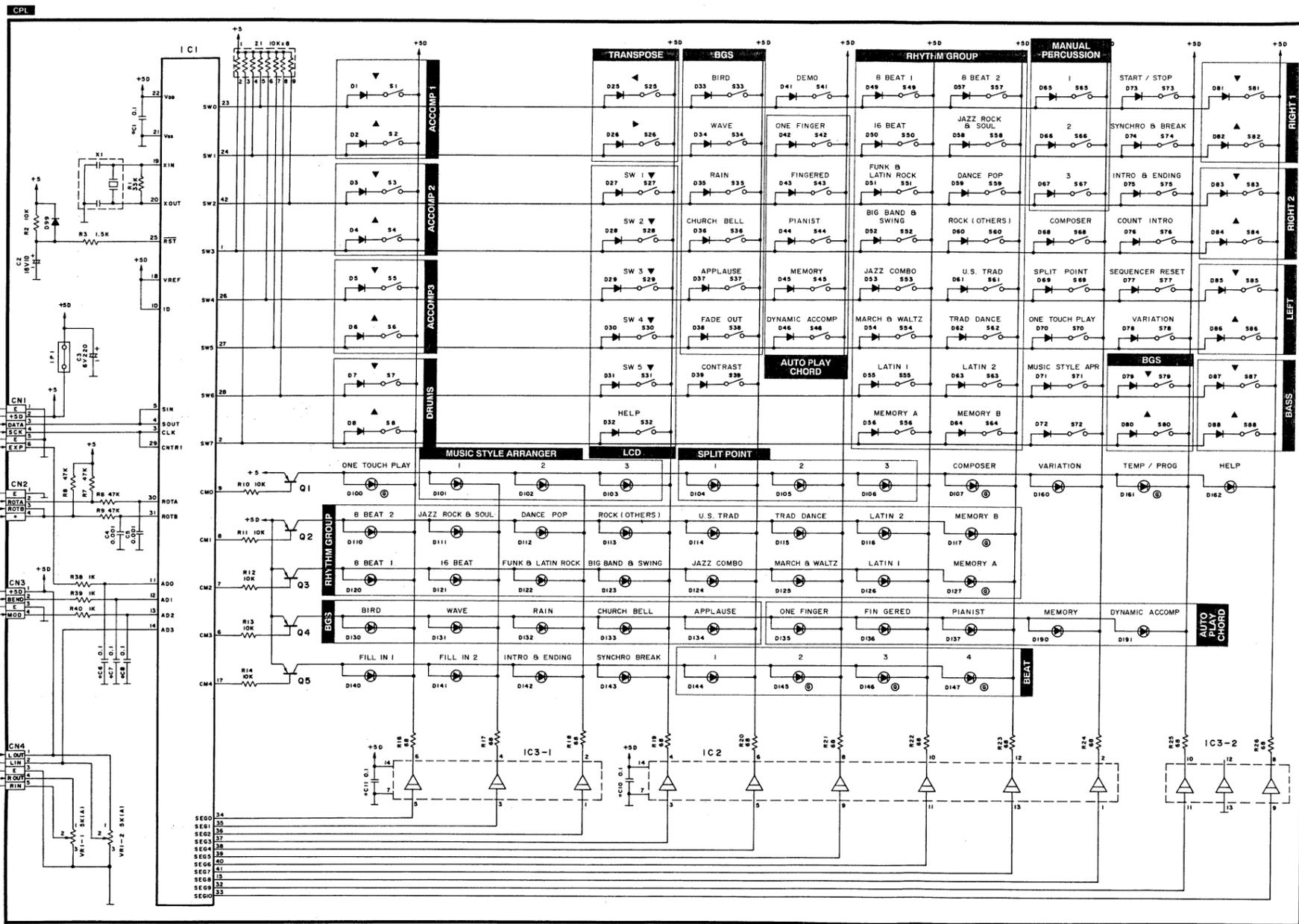
B

C

D

E

F



# RIGHT AND ENCODER SWITCH CIRCUIT DIAGRAM

5

6

7

8

9

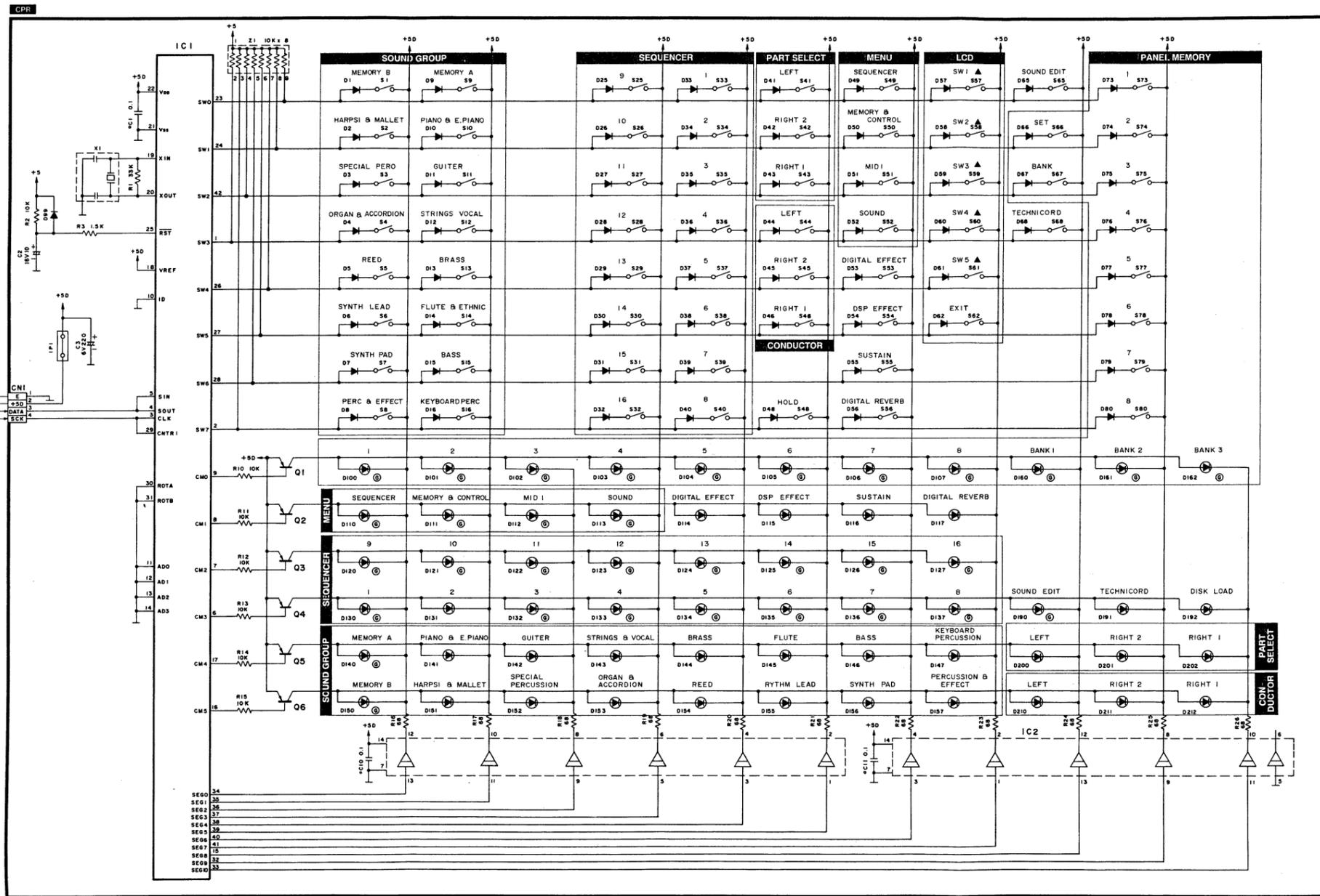
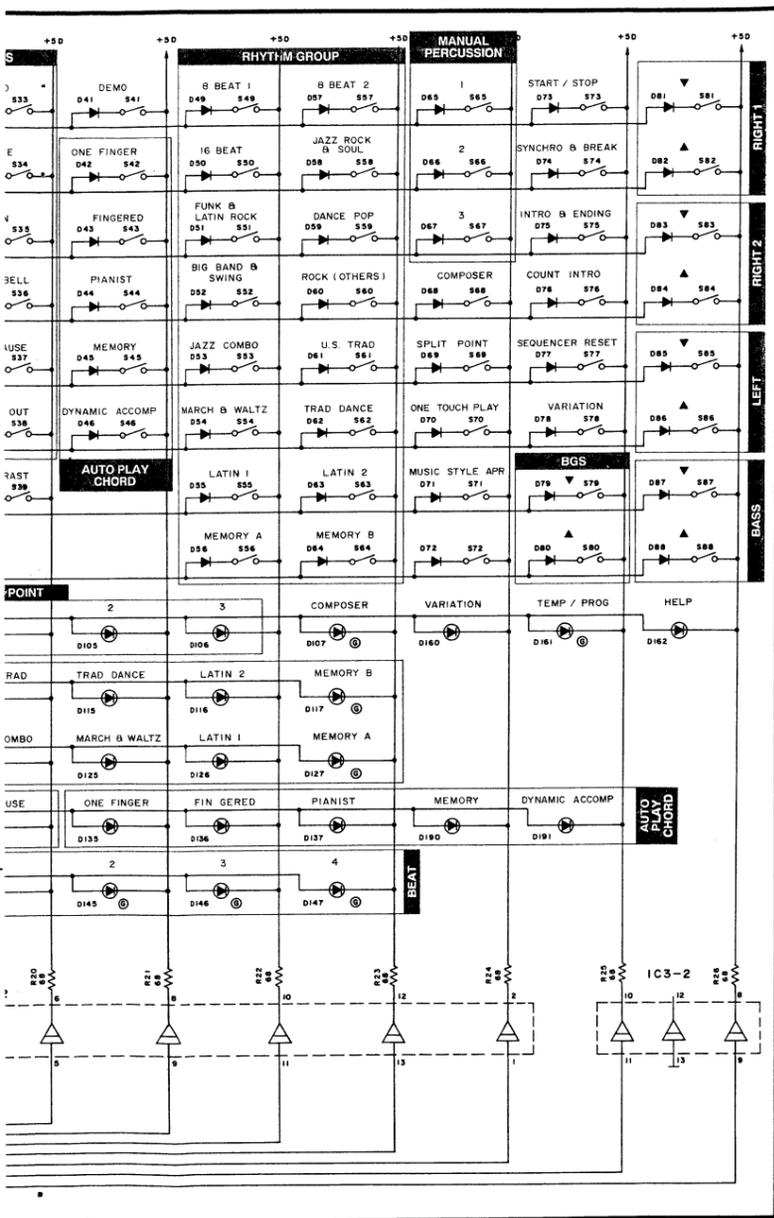
10

11

12

13

14

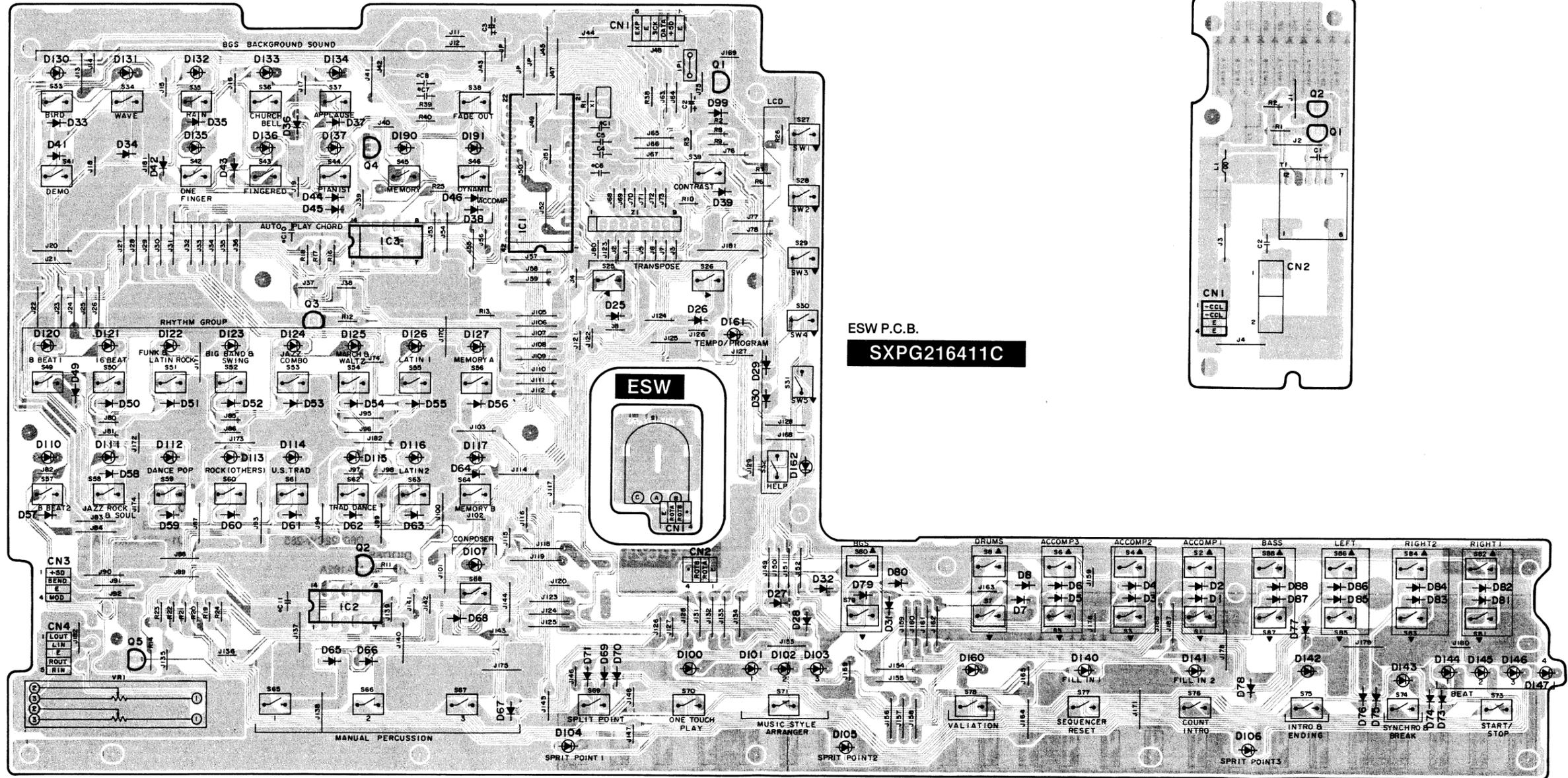


CPL

SXPG215211A

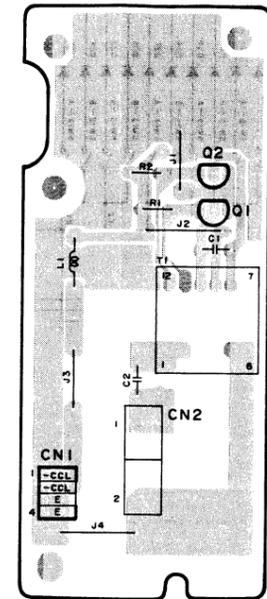
INV

SXPG215211C



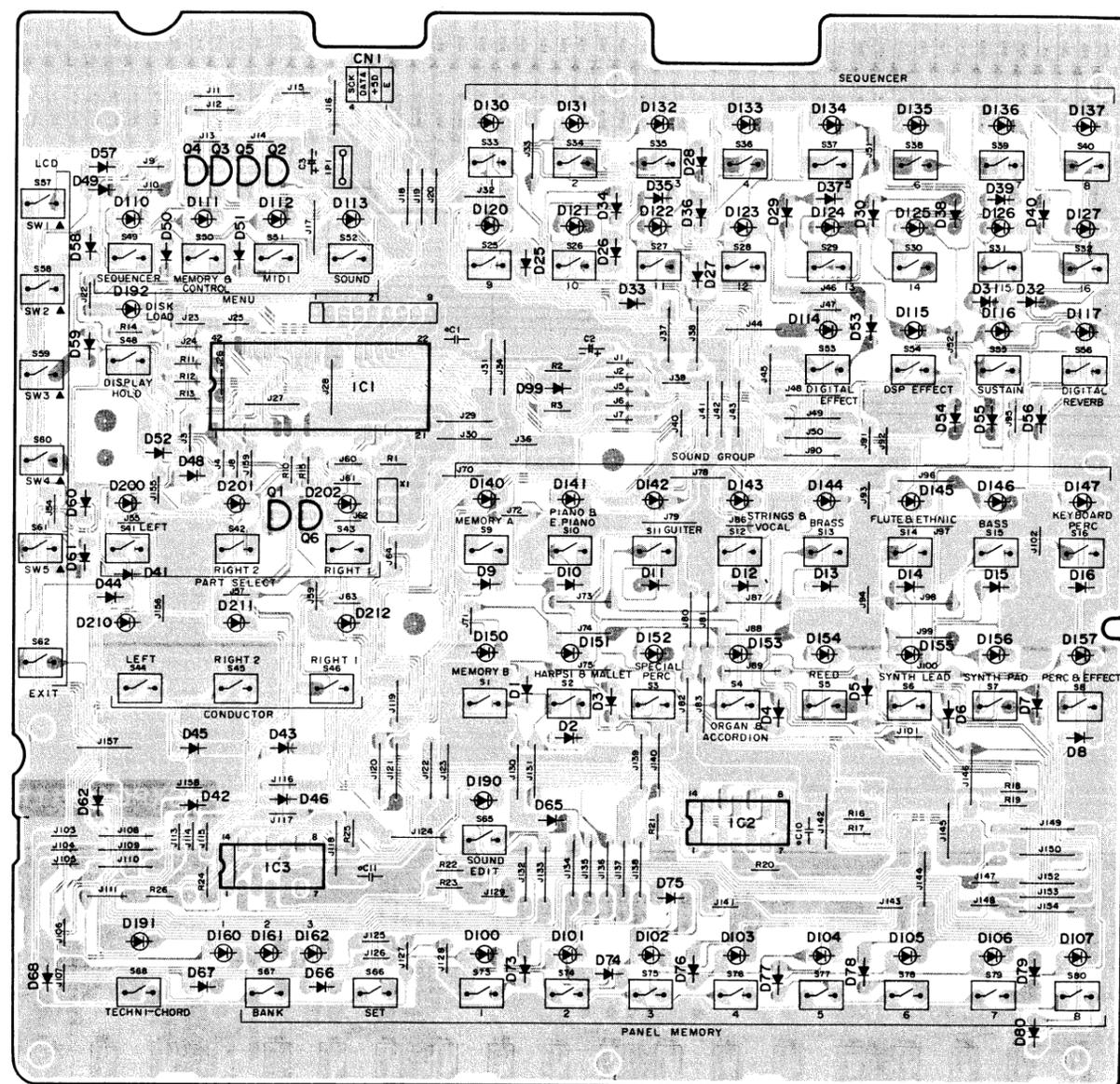
ESW P.C.B.

SXPG216411C



CPR

SXPG215211B



CPL

NOTES:

- IC'S
- IC1: M37471M2142S
- IC2, 3: HD74LS07P
- TRANSISTORS
- Q1~3, 5: 2SA1015-GR
- Q4: 2SA830SB
- DIODES
- D1~8, 25~39, 41~46, 49~71, 73~88, 99: MA165
- D100, 107, 117, 127, 145~147, 161: SEL4417GM
- D101~106, 110~116, 120~126, 130~137, 140~144, 160, 162, 190, 191: SEL4117RM

CPR

NOTES:

- IC'S
- IC1: M37471M2142S
- IC2, 3: HD74LS07P
- TRANSISTORS
- Q1, 6, 3, 4: 2SA830SB
- Q2, 5: 2SA1015-GR
- DIODES
- D1~16, 25~46, 48~68, 73~80, 99: MA165
- D100~107, 110~113, 120~127, 130~137, 140, 150, 160~162, 190: SEL4417GM
- D114~117, 141~147, 151~157, 191, 192, 200~202, 210~212: SEL4117RM

INV

NOTES:

- TRANSISTORS
- Q1, 2: 2SA1534ARS

1 2 3 4 5 6 7 8 9 10

A

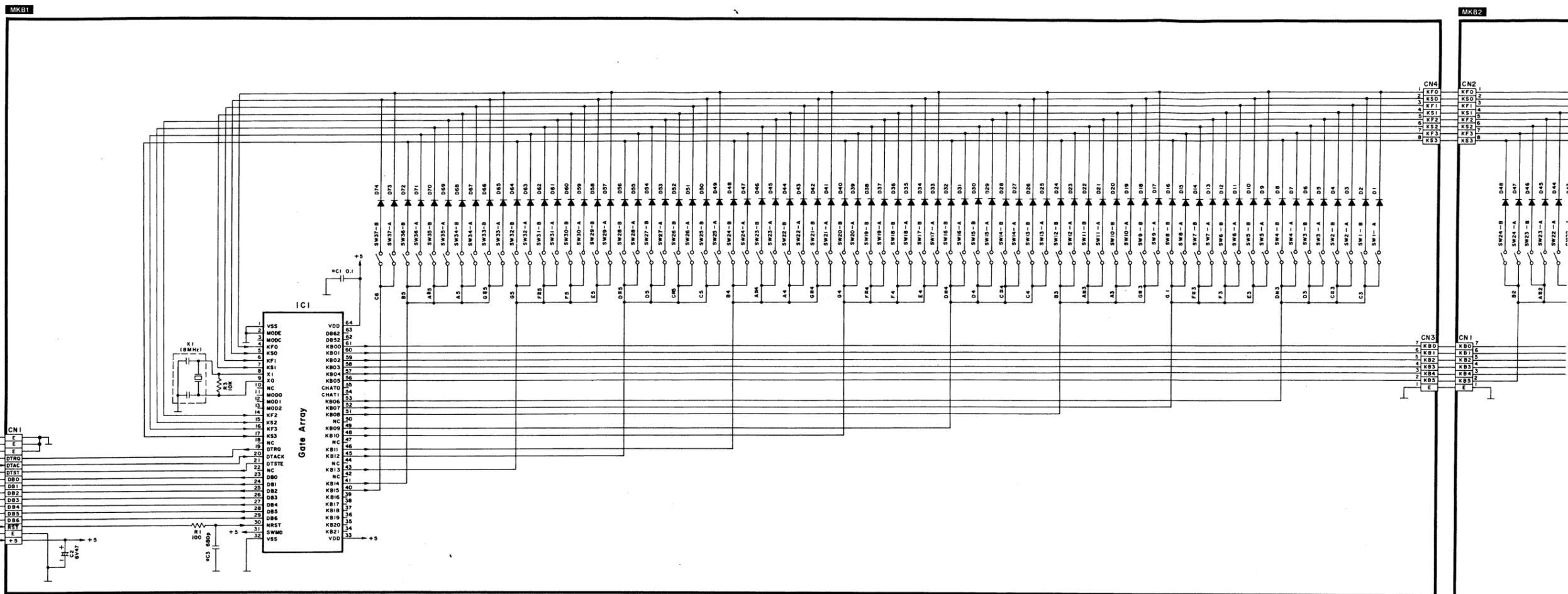
B

C

D

E

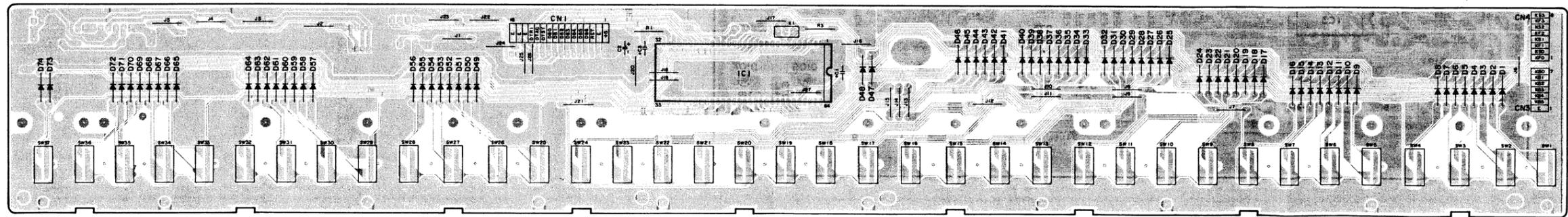
F

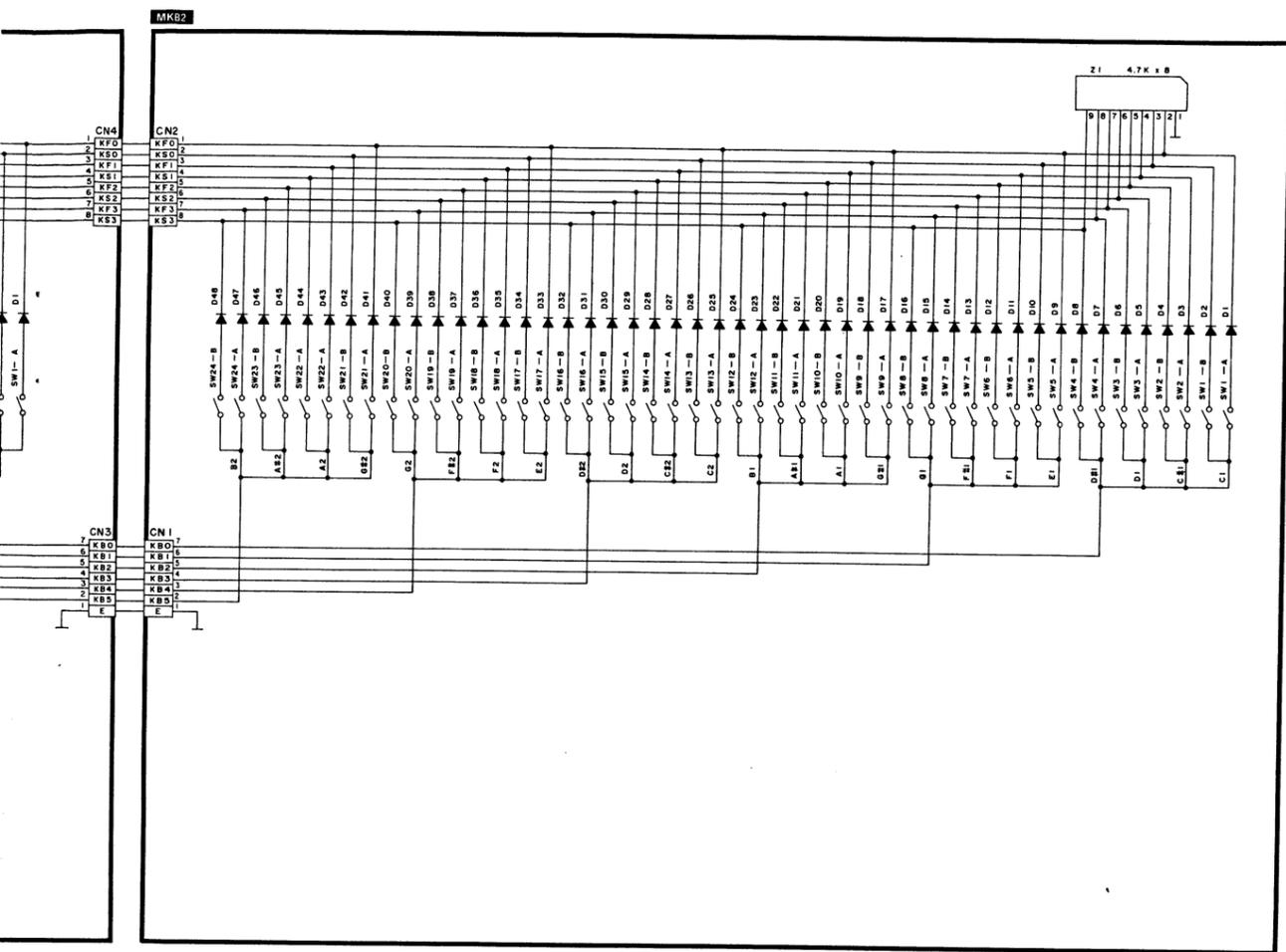


MKB1

SXPG216111

M

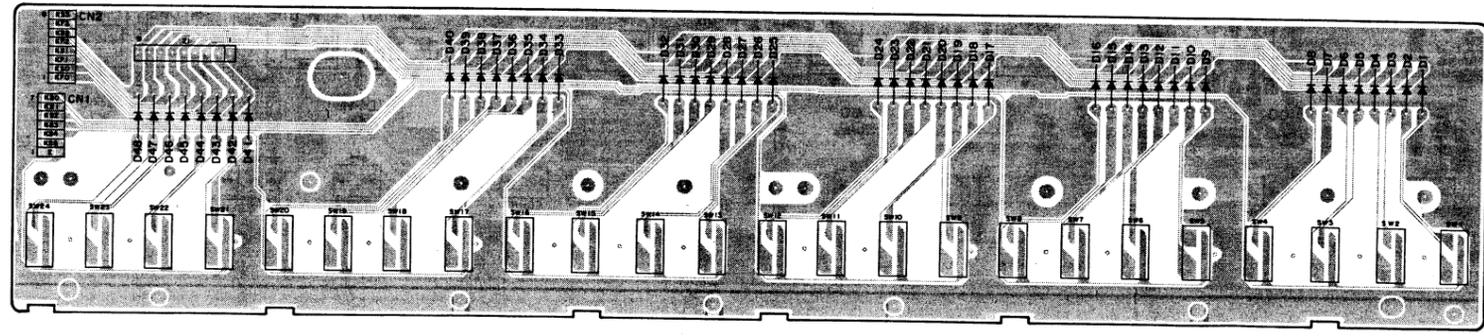
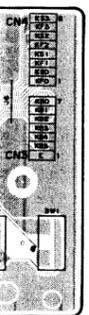




1

MKB2

SXPG216211



**MKB1**

**NOTES:**

- IC'S  
IC1: D65022CW-285
- DIODES  
D1~74: MA162A

**MKB2**

**NOTES:**

- DIODES  
D1~48: MA162A

# REPLACEMENT PARTS LIST.....P.C.B. and Wiring Parts

## Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.  
After the end of this period, the assembly will no longer be available.

2. Important safety notice  
Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "S" mark is service standard parts and may differ from production parts.
4.  $\bigcirc$  mark are new parts.
5. For part No. with area mark, check the area when placing an order.

## PRINTED CIRCUIT BOARD

	RTL	Area	Part No.	Description	P/S
$\bigcirc$	RTL	Others	SXPG215111	MAIN	1
$\bigcirc$	RTL	M XM	SXPG215131	MAIN	1
$\bigcirc$	RTL	EZ EW EA	SXPG215141	MAIN	1
$\bigcirc$	RTL	MC	SXPG215151	MAIN	1
$\bigcirc$	RTL	Others	SXPG216411A	ACP	1
$\bigcirc$	RTL	M MC XM	SXPG216431A	ACP	1
$\bigcirc$	RTL	EK X XR	SXPG216441A	ACP	1
$\bigcirc$	RTL	XS XD XT			
$\bigcirc$	RTL	Others	SXPG215311	FAJ	1
$\bigcirc$	RTL	M MC XM	SXPG215331	FAJ	1
$\bigcirc$	RTL	EZ	SXPG215341	FAJ	1
$\bigcirc$	RTL		SXPG216411B	HB	1
$\bigcirc$	RTL		SXPG215211A	CPL	1
$\bigcirc$	RTL		SXPG215211B	CPR	1
$\bigcirc$	RTL		SXPG216411C	ESW	1
$\bigcirc$	RTL		SXPG215211C	INV	1
$\bigcirc$	RTL		SXPG216311	TG	1
$\bigcirc$	RTL		SXPG216111	MKB1	1
$\bigcirc$	RTL		SXPG216211	MKB2	1

	Ref. No.	Part No.	Description	P/S
$\bigcirc$	IC28	M74HC244FP	3-State Buffers	1
$\bigcirc$	IC29	TC7S32F	2 INPUT OR Gate	1
$\bigcirc$	IC30	PCM1702U	D-A Converter	1
$\bigcirc$	IC31	TC7S66F	Analog Switch	1

### TRANSISTORS

	Q1, 6	2SB709ARTW	Transistor	2
	Q2, 5	2SD601AQTW	Transistor	2
	Q3	2SA1643	Transistor	1
S	Q4	2SC1815GR	Transistor	1

### DIODES

	D1	MA704WK	Diode	1
	D2, 4, 6, 11~14	MA110	Diode	7
$\bigcirc$	D3	MA151WK	Diode	1
	D5	MA2062LF	Zener, 6.2V	1
	D7	MA8056	Zener, 5.6V	1
$\bigcirc$	D8	MA738	Diode	1
$\bigcirc$	D9	MA8051	Zener, 5.1V	1
$\bigcirc$	D10	MA8180	Zener, 18V	1

### OSCILLATORS

$\bigcirc$	X1	QSXG1A2500A	25 MHz, Quartz Oscillator	1
	X2	QSXG1I4915A	49 MHz, Quartz Oscillator	1
	X3	EF0EC8004A5	8 MHz, Ceramic Oscillator	1
$\bigcirc$	X4	QSXG1I3200A	32 MHz, Quartz Oscillator	1

### COMPONENT COMBINATIONS

$\bigcirc$	Z1	EXBV8V472J	4.7k $\Omega$ $\times$ 4	1
$\bigcirc$	Z2, 3	EXBV8V101J	100 $\Omega$ $\times$ 4	2
	Z4~6	EXBS8V221J	220 $\Omega$ $\times$ 4	3
$\bigcirc$	Z7~15	EXBV8V221J	220 $\Omega$ $\times$ 4	9
	Z16~27, 29	EXBS8V221J	220 $\Omega$ $\times$ 4	13
	Z30~32	EXBV8V471J	470 $\Omega$ $\times$ 4	3
	Z33, 34, 51	EXBS8V471J	470 $\Omega$ $\times$ 4	3
	Z35~46	EXBV8V471J	470 $\Omega$ $\times$ 4	12
	Z47	EXBS8V472J	4.7k $\Omega$ $\times$ 4	1
$\bigcirc$	Z48~50	EXBV8V472J	4.7k $\Omega$ $\times$ 4	3

### COILS

$\bigcirc$	L1	QLQGT1T230KA	Coil	1
$\bigcirc$	L2	QLBG003A	Coil	1
	L4~6, 9, 10	QLQGT3T150SA	Coil	5
	L8, 11	QLQGT1B800MA	Coil	2

### RESISTORS

	R1, 2	ERJ6GEYJ472V	4.7k $\Omega$	2
	R3	ERJ6GEYJ102V	1k $\Omega$	1
	R5	ERJ6GEYJ102V	1k $\Omega$	1
	R6	ERJ6GEYJ333V	33k $\Omega$	1

## MAIN MAIN CIRCUIT

	Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUITS</b>				
$\bigcirc$	IC1	D70236GD125B	16 bit Microcomputer	1
$\bigcirc$	IC2	D65046GD188	Gate Array	1
$\bigcirc$	IC3	QSIGCK2000AX	4M bit EP ROM	1
$\bigcirc$	IC4	QSIGCK2000BX	4M bit EP ROM, Others	1
$\bigcirc$	IC4	QSIGCK2000BZ	4M bit EP ROM, EZ EW EA only	1
$\bigcirc$	IC6	QSIG03C16015	16M bit Rhythm Pattern ROM	1
$\bigcirc$	IC7	ATT7C256BF85	256K bit Static RAM	1
$\bigcirc$	IC8, 9	M5M411664J8S	1M bit D-RAM	1
$\bigcirc$	IC10	SED1330FBA	LCD Driver	1
$\bigcirc$	IC11	TC7W14F	Inverter	1
$\bigcirc$	IC12	HM65256BLF10	256K bit Pseudo Static RAM	1
$\bigcirc$	IC13	D72068GF-3B9	Floppy Disk Controller	1
$\bigcirc$	IC14	D6382GF-3B9	Digital Signal Processor	1
$\bigcirc$	IC16	M5218AFP	Operational Amplifier	1
$\bigcirc$	IC17	TC7S86F	2 INPUT OR Gate	1
$\bigcirc$	IC18	TC25540AF006	Tone Generator LSI	1
$\bigcirc$	IC19	QSIGM3C16194	16M bit Wave ROM	1
$\bigcirc$	IC20	QSIGM3C16193	16M bit Wave ROM	1
$\bigcirc$	IC22, 23	HM65256BLF10	256K bit Pseudo Static RAM	2
$\bigcirc$	IC24	PCM1702U	D-A Converter	1
$\bigcirc$	IC25	M5238FP	Operational Amplifier	1
$\bigcirc$	IC26	T74H4051AF	8-channel Multiplexer	1
$\bigcirc$	IC27	M5218AFP	Operational Amplifier	1

Ref. No.	Part No.	Description	P/S	Ref. No.	Part No.	Description	P/S
R8~23	ERJ6GEYJ472V	4.7kΩ	16	<b>CAPACITORS</b>			
R24	ERJ6GEYJ102V	1kΩ	1	○ C3	ECUV1H331JG	330pF	1
R25	ERJ6GEYJ104V	100kΩ	1	C4	ECUV1H104ZFX	0.1μF	1
R26	ERJ6GEYJ224V	220kΩ	1	C5	ECEA1HKA010	1μF, 50V	1
R27	ERJ6GEYJ103V	10kΩ	1	C6	ECUV1H104ZFX	0.1μF	1
R28, 29	ERJ6GEYJ472V	4.7kΩ	2	C8, 9	ECUV1H104ZFX	0.1μF	2
R30	ERJ6GEY0R00V	0Ω	1	C10	ECEA0JKA470	47μF, 6.3V	1
R31	ERJ6GEYJ472V	4.7kΩ	1	C11, 12	ECUV1H104ZFX	0.1μF	2
R32	ERJ6GEYJ330V	33Ω	1	C14	ECUV1H101JG	100pF	1
R33~35	ERJ6GEYJ472V	4.7kΩ	3	C15	ECUV1H104ZFX	0.1μF	1
R36, 37	ERJ6GEYJ221V	220Ω	2	C25, 26	ECUV1H104ZFX	0.1μF	2
R38	ERJ6GEYJ471V	470Ω	1	C27	ECEA0JKA101	100μF, 6.3V	1
R39, 40	ERJ6GEYJ101V	100Ω	2	C28~32	ECUV1H104ZFX	0.1μF	5
R41, 42	ERJ6GEYJ221V	220Ω	2	C35	ECUV1H104ZFX	0.1μF	1
R43, 44	ERJ6GEYJ102V	1kΩ	2	C38, 39	ECUV1H104ZFX	0.1μF	2
R45, 46	ERJ6GEYJ221V	220Ω	2	C40	ECUV1H102JX	0.001μF	1
R47	ERJ6GEYJ101V	100Ω	1	○ C41	ECUV1E224ZFX	0.22μF	1
R48	ERJ6GEYJ472V	4.7kΩ	1	C42~46	ECUV1H104ZFX	0.1μF	5
R50	ERJ6GEYJ153V	15kΩ	1	○ C47, 48	ECUV1H333KBX	0.033μF	2
R51	ERJ6GEYJ101V	100Ω	1	C49	ECEA1CKA100	10μF, 16V	1
R52	ERJ6GEYJ331V	330Ω	1	C50, 51	EES5R5V105	1F, 5.5V, Memory Back-up	2
R53	ERJ6GEYJ471V	470Ω	1	C57	ECUV1H104ZFX	0.1μF	1
R54	ERJ6GEYJ103V	10kΩ	1	C58	ECEA0JKA470	47μF, 6.3V	1
R55	ERJ6GEYJ332V	3.3kΩ	1	C60	ECUV1H104ZFX	0.1μF	1
R56	ERJ6GEYJ101V	100Ω	1	C63	ECUV1H104ZFX	0.1μF	1
R57	ERJ6GEYJ474V	470kΩ	1	C65	ECUV1H104ZFX	0.1μF	1
R58, 59	ERJ6GEYJ334V	330kΩ	2	C67, 68	ECUV1H104ZFX	0.1μF	2
R60~65	ERJ6GEYJ154V	150kΩ	6	C70, 71	ECUV1H104ZFX	0.1μF	2
R67	ERJ6GEYJ683V	68kΩ	1	C72	ECEA1CKA100	10μF, 16V	1
R68	ERJ6GEYJ823V	82kΩ	1	C73	ECEA0JKA470	47μF, 6.3V	1
R69, 70	ERJ6GEYJ104V	100kΩ	2	C74	ECEA1CKA100	10μF, 16V	1
R71	ERJ6GEYJ154V	150kΩ	1	C75	ECEA0JKA470	47μF, 6.3V	1
R72	ERJ6GEYJ334V	330kΩ	1	C76	ECEA0JKA101	100μF, 6.3V	1
R73	ERJ6GEYJ104V	100kΩ	1	C77	ECUV1H104ZFX	0.1μF	1
R74	ERJ6GEYJ683V	68kΩ	1	○ C78	ECUV1H682KBG	0.0068μF	1
R75	ERJ6GEYJ823V	82kΩ	1	C79~81	ECUV1H104ZFX	0.1μF	3
R76	ERJ6GEYJ104V	100kΩ	1	C82	ECUV1H103KBG	0.01μF	1
R77	ERJ6GEYJ154V	150kΩ	1	C83	ECUV1H104ZFX	0.1μF	1
R78	ERJ6GEYJ334V	330kΩ	1	○ C85~91	ECUV1H222KX	0.0022μF	7
R80	ERJ6GEYJ472V	4.7kΩ, <b>M XM</b> only	1	C92, 93	ECUV1H104ZFX	0.1μF	2
R82	ERJ6GEY472V	4.7kΩ	1	C94	ECUV1H102JX	0.001μF	1
R83	ERJ6GEYJ473V	47kΩ	1	C95	ECUV1H470JG	47pF	1
R84	ERJ6GEYJ221V	220Ω	1	C96	ECUV1H102JX	0.001μF	1
R85	ERJ6GEYJ472V	4.7kΩ	1	C97	ECUV1H470JG	47pF	1
R86	ERJ6GEYJ331V	330Ω	1	C98, 99	ECUV1H104ZFX	0.1μF	2
R87	ERJ6GEYJ332V	3.3kΩ	1	C100	ECUV1H101JG	100pF	1
R88	ERJ6GEYJ221V	220Ω	1	C102	ECSS1EF106	10μF, 25V	1
R90	ERJ6GEYJ472V	4.7kΩ	1	C103	ECUV1H104ZFX	0.1μF	1
R92	ERJ6GEYJ221V	220Ω	1	C104	ECEA0JU102	1000μF, 6.3V	1
R93, 94	ERJ6GEYJ472V	4.7kΩ	2	C105	ECUV1H104ZFX	0.1μF	1
R95	ERJ6GEYJ471V	470Ω	1	C106	ECEA0JKA101	100μF, 6.3V	1
R96	ERJ6GEYJ103V	10kΩ	1	C107, 108	ECUV1H104ZFX	0.1μF	2
R97	ERJ6GEYJ221V	220Ω	1	○ C109, 110	ECUV1H100DCN	10pF	2
R98	ERJ6GEYJ331V	330Ω	1	C111	ECUV1H104ZFX	0.1μF	1
R99	ERJ6GEYJ473V	47kΩ	1	○ C112, 113	ECUV1H060DCN	6pF	2
R100, 101	ERJ6GEYJ221V	220Ω	2	○ C114	ECUV1H100DCN	10pF	1
R102~104	ERJ6GEYJ472V	4.7kΩ	3	○ C116	ECUV1H331JG	330pF	1
R105	ERJ6GEYJ221V	220Ω	1	○ C117, 118	ECUV1H104ZFX	0.1μF	2
R106	ERJ6GEYJ102V	1kΩ	1	C119	ECEA0JKA470	47μF, 6.3V	1
R107	ERJ6GEYJ221V	220Ω	1	C120	ECEA0JKA101	100μF, 6.3V	1
R108	ERTD2ZHK153	15kΩ	1	C121	ECEA0JKA470	47μF, 6.3V	1
R110	ERJ6GEYJ472V	4.7kΩ	1	○ C122	ECUV1H331JG	330pF	1
R111	ERJ6GEYJ472V	4.7kΩ, except <b>M XM</b>	1	C123	ECUV1H104ZFX	0.1μF	1
R112, 113	ERJ6GEYJ472V	4.7kΩ	2				
R114, 115	ERJ6GEYJ101V	100Ω	2				
R116	ERJ6GEYJ224V	220kΩ	1				
R117	ERJ6GEYJ684V	680kΩ	1				

## ACP AC POWER SUPPLY CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>LINE FILTER</b>			
L1	△ SLTGLF3	Line Filter	1
<b>JACK</b>			
JK1	△ SJVD0203B	AC Inlet	
<b>FUSES</b>			
F1	△ XBA1C20NU100	T2A, 125V, M MC XM	1
F1	△ XBA2C12TB0	T1.25A, 250V, EK X XR XS XD XT	1
F2, 3	△ XBA2C06TB0	T630mA, 250V, EK X XR XS XD XT	2
F3	△ XBA2C08TB0	T800mA, 250V EN EZ EW EF EA EH EP XL	1
<b>CAPACITORS</b>			
C1	△ ECKCVA1472MF	4700pF, Line Capacitor	1
C2	△ ECQU2A104MN	0.1μF, 250V, Across-the Line Capacitor	1

## FAJ FILTER & AMP CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUITS</b>			
S IC1, 3~10	SVIGM5218L	Operational Amplifier	9
IC2	SVIGLM1894N	Dynamic Noise Reduction	1
IC11	M5F7805L	Voltage Regulator	1
○ IC12, 17	M5F7905L	-5V Voltage Regulator	2
IC13	SVIGM5241L	Dual VCA	1
IC16	SVIGTLP513	Photo Coupler	1
<b>TRANSISTORS</b>			
S Q1, 3, 4, 20, 23	2SA1015-GR	2SA933STRS (SUB. Part)	5
S Q5, 11, 19, 21	2SC1815GR	Transistor	4
Q6, 8	2SC3940ARS	Transistor	2
Q7, 9	2SA1534ARS	Transistor	2
Q10	2SD1266	Transistor	1
Q12, 16	2SA1643	Transistor	2
○ Q13, 17	2SC4327	Transistor	2
Q14, 15, 24, 25	2SK381CD	FET	4
Q22	2SJ105GR	FET	1
<b>DIODES</b>			
D1~5, 17~20, 22, 24, 25	MA165	Diode	11
D6	EK04	Diode	1
D7, 23	MA4082	Zener, 8.2V	2
○ D8	MA4220M	Zener, 22V	1
D9, 10, 11, 12	△ SVDGERA1502	Rectifier	4
D13, 14, 15, 16	△ SVDS3V20	Rectifier	4
D21	MA4051MTA	Zener, 5.1V	1
<b>COILS</b>			
L2~6	QLQGT3T150SA	Coil	5
<b>JACKS</b>			
JK1~3	SJSG1370A	MIDI THRU, OUT, IN	3
JK4, 5	QJJG003AA	FOOT SW1, 2	2

Ref. No.	Part No.	Description	P/S
JK6	SJJG100A	EXP PEDAL	1
JK7~10	QJJG003AA	LINE OUT, AUX IN	4
<b>IC PROTECTORS</b>			
○ IP1, 2	ICP-N15T104	IC Protector	2
<b>FUSES</b>			
F4, 5	△ XBA2C20TB0	T2A, 250V, except M MC XM	2
○ F4, 5	△ XBA1C25NU100	T2.5A, 125V, M MC XM only	2
<b>RESISTORS</b>			
R1	ERDS2TJ221	220Ω	1
R2	ERDS2TJ102	1kΩ	1
R3	ERDS2TJ221	220Ω	1
R5	ERDS2TJ101	100Ω	1
R7, 8	ERDS2TJ104	100kΩ	2
R9	ERDS2TJ221	220Ω	1
R10	ERDS2TJ101	100Ω	1
R11, 12	ERDS2TJ102	1kΩ	2
R13, 14	ERDS2TJ103	10kΩ	2
R15	ERDS2TJ104	100kΩ	1
R16	ERDS2TJ222	2.2kΩ	1
R17, 18	ERDS2TJ102	1kΩ	2
R21	ERDS2TJ154	150kΩ	1
R22	ERDS2TJ473	47kΩ	1
R23	ERDS2TJ472	4.7kΩ	1
R24	ERDS2TJ333	33kΩ	1
R27	ERDS2TJ331	330Ω	1
R28~30	ERDS2TJ332	3.3kΩ	3
R31	ERDS2TJ331	330Ω	1
R32~34	ERDS2TJ332	3.3kΩ	3
R35	ERDS2TJ331	330Ω	1
R36	ERDS2TJ681	680Ω	1
R37, 38	ERDS2TJ331	330Ω	2
R39, 40	ERDS2TJ103	10kΩ	2
R41	ERDS2TJ822	8.2kΩ	1
R43, 44	ERDS2TJ223	22kΩ	2
R45	ERDS2TJ153	15kΩ	1
R46	ERDS2TJ103	10kΩ	1
R47	ERDS2TJ153	15kΩ	1
R48	ERDS2TJ103	10kΩ	1
R49, 50	ERDS2TJ473	47kΩ	2
R51	ERDS2TJ563	56kΩ	1
R52	ERDS2TJ104	100kΩ	1
R53	ERDS2TJ220	22Ω	1
R54	ERDS2TJ563	56kΩ	1
R55	ERDS2TJ220	22Ω	1
R56, 57	ERDS2TJ473	47kΩ	2
○ R58	△ ERG1SJ221	220Ω, 1W	1
○ R60	△ ERG1SJ221	220Ω, 1W	1
R63	ERDS2TJ104	100kΩ	1
R64, 65	ERDS2TJ222	2.2kΩ	2
R66, 67	ERDS2TJ102	1kΩ	2
R68	ERDS2TJ473	47kΩ	2
R69	ERDS2TJ103	10kΩ	2
R84, 85	ERDS2TJ331	330Ω	2
R86, 87	ERDS2TJ124	120kΩ	2
R96~99	ERDS2TJ473	47kΩ	4
R100, 101	ERDS2TJ152	1.5kΩ	2
R102, 103	ERDS2TJ223	22kΩ	2
R104	ERDS2TJ103	10kΩ	1
R106, 108	ERDS2TJ102	1kΩ	2
R109~111	ERDS2TJ473	47kΩ	3
R112, 113	ERDS2TJ181	180Ω	2
R114	△ ERD25FVJ4R7	4.7Ω, 1/4W, Flame-Proof	1

Ref. No.	Part No.	Description	P/S
R115, 116	ERDS2TJ331	330Ω	2
R117	ERDS2TJ154	150kΩ	1
R118, 119	ERDS2TJ331	330Ω	2
R120	ERDS2TJ473	47kΩ	1
R121	ERDS2TJ181	180Ω	1
R122	△ ERD25FVJ4R7	4.7Ω, 1/4W, Flame-Proof	1
R123	ERDS2TJ184	180kΩ	1
R124	ERDS2TJ154	150kΩ	1
R125	ERDS2TJ471	470Ω	1
R126	△ ERQ2CJP2R0S	2Ω, 2W, Fuse Type	1
R127, 128	ERDS2TJ103	10kΩ	2
R129, 130	ER0S2CKF1001	1kΩ, ±1%	2
R131	ERDS2TJ561	560Ω	1
R132	ER0S2CKF1001	1kΩ, ±1%	1
R133	ER0S2CKF2701	2.7kΩ, ±1%	1
R134	ERDS2TJ224	220kΩ	1
R135	ERDS2TJ123	12kΩ	1
R136	ERDS2TJ332	3.3kΩ	1
R137	ERDS2TJ102	1kΩ	1
R138	ERD2FCVG220	22Ω, 1/4W, Fuse Type	1
R139, 140	ERDS2TJ153	15kΩ	2
R141	ERDS2TJ103	10kΩ	1
R142	△ ERD2FCVJ4R7	4.7Ω, 1/4W, Fuse Type	1
R143, 144	ERDS2TJ472	4.7kΩ	2
R147	ERDS2TJ103	10kΩ	1
R148	ERDS2TJ122	1.2kΩ	1
R149	ERDS2TJ473	47kΩ	1
R150	ERDS2TJ332	3.3kΩ	1
R151	ER0S2CKF1002	10kΩ, ±1%	1
R152	ERDS2TJ102	1kΩ	1
R153	ER0S2CKF1802	18kΩ, ±1%	1
R154	ER0S2CKF3571	3.57kΩ, ±1%	1
R155	ERDS2TJ331	330Ω	1
R156	ERDS2TJ471	470Ω	1
R158	ERDS2TJ103	10kΩ	1
R159	ERDS2TJ473	47kΩ	1
R160	ERDS2TJ103	10kΩ	1
R161~163	△ ERD2FCVJ4R7	4.7Ω, 1/4W, Fuse Type	3
R164	ERDS2TJ103	10kΩ	1
R165	ERDS2TJ473	47kΩ	1
R166	ERDS2TJ103	10kΩ	1
R167	ERDS2TJ154	150kΩ	1
R168, 169	ERDS2TJ105	1MΩ	1

**CAPACITORS**

C3	ECKF1E473ZV	0.047μF	1
C4	ECCF1H221J	220pF	1
C5	ECRF1H104ZF	0.1μF	1
C7	ECKF1E473ZV	0.047μF	1
C8	ECCF1H221J	220pF	1
C9~11	ECKF1E473ZV	0.047μF	3
C12, 13	ECRF1H104ZF	0.1μF	2
C14, 15	ECCF1H220J	22pF	1
C16, 17	ECQG1H332KZ	0.0033μF	2
C18	ECQB1H153JF	0.015μF	1
C19	ECCF1H681J	680pF	1
C20	ECRF1H104ZF	0.1μF	1
C21	ECQB1H153JF	0.015μF	1
C22, 23	ECQG1H332KZ	0.0033μF	2
C24	ECCF1H681J	680pF	1
C25	ECRF1H104ZF	0.1μF	1
C26	ECQG1H332KZ	0.0033μF	1
C27	ECQG1H102KZ	0.001μF	1
C28	ECRF1H104ZF	0.1μF	1
C29, 30	ECQG1H472KZ	0.0047μF	2
C31	ECRF1H104ZF	0.1μF	1
C32	ECEA1CKA100	10μF, 16V	1

Ref. No.	Part No.	Description	P/S
C33, 34	ECEA1HKA010	1μF, 50V	2
C35	ECKF1E473ZV	0.047μF	1
C36	ECEA0JU102	1000μF, 6.3V	1
C37, 38	ECEA1HKA010	1μF, 50V	2
C39, 40	ECRF1H104ZF	0.1μF	2
C41	ECCF1H220J	22pF	1
C42	ECRF1H104ZF	0.1μF	1
C43~45	ECCF1H220J	22pF	3
C46, 47	ECEA1HKN010	1μF, 50V	2
C48, 49	ECQB1H103JF	0.01μF	2
C50, 51	ECKF1E473ZV	0.047μF	2
C52	ECRF1H104ZF	0.1μF	1
C53, 54	ECQB1H103JF	0.01μF	2
C55	ECRF1H104ZF	0.1μF	1
C56	ECEA1VU101	100μF, 35V	1
C57~60	ECEA1CU472	4700μF, 16V	4
C63, 64	ECEA1EKA100	10μF, 25V	2
C65, 66	ECRF1H104ZF	0.1μF	2
C67	△ ECQE1A104M6	0.1μF, 125V	1
C68	ECEA1VU101	100μF, 35V	1
C69, 70	ECEA1CKA470	47μF, 16V	2
C71	ECQV1H104JM	0.1μF	1
C72	ECRF1H104ZF	0.1μF	1
C75, 76	ECQG1H472KZ	0.0047μF	2
C79, 80	ECQG1H472KZ	0.0047μF	2
C83, 84	ECKF1E473ZV	0.047μF	2
C85, 86	ECQB1H103JF	0.01μF	2
C88, 89	ECKF1E473ZV	0.047μF	2
C90	ECQG1H102KZ	0.001μF	1
C91	ECCF1H220J	22pF	1
C92	ECRF1H104ZF	0.1μF	1
C93	ECQG1H102KZ	0.001μF	1
C94	ECCF1H220J	22pF	1
C95	ECRF1H104ZF	0.1μF	1
C96, 97	ECEA50Y2R2	2.2μF, 50V	1
C98	ECEA1VU102	1000μF, 35V	1
C99	ECEA1EKA100	10μF, 25V	1
C100	ECRF1H104ZF	0.1μF	1
C101	ECQV1H334JM	0.33μF	1
C102	ECRF1H104ZF	0.1μF	1
C103	ECQV1H334JM	0.33μF	1
C104	ECRF1H104ZF	0.1μF	1
C110, 111	ECEA1CKA470	47μF, 16V	2
C112	ECEA0JKA221	220μF, 6.3V	1
C113, 114	ECEA1HKN010	1μF, 50V	1
C145	ECEA1CKA100	10μF, 16V	1
C146	ECRF1H104ZF	0.1μF	1
C147	ECEA1HKA010	1μF, 50V	1

**HB HEADPHONES CIRCUIT**

Ref. No.	Part No.	Description	P/S
<b>COIL</b>			
L1	QLQGT3T150SA	Coil	1
<b>JACK</b>			
JK1	SJYG100A	Jack	1
<b>VARIABLE RESISTORS</b>			
VR1	EVA07115B14G	10kΩ, B MODULATION	1
VR2	EVA07015B54G	50kΩ, B PITCH BEND	1

Ref. No.	Part No.	Description	P/S
<b>RESISTORS</b>			
R1, 2	EROS2CKF1001	1k $\Omega$ , $\pm$ 1%	2
<b>CAPACITORS</b>			
C1, 2	ECCF1H331J	330pF	2
C3	ECRF1H104ZF	0.1 $\mu$ F	1

### CPL UPPER CONTROL PANEL LEFT CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUITS</b>			
○ IC1	M37471M2142S	8 bit Microcomputer	1
IC2, 3	HD74LS07P	Hex Buffers	2
<b>TRANSISTORS</b>			
S Q1~3, 5	2SA1015-GR	2SA933STRS (SUB. Part)	4
Q4	2SA830SB	Transistor	1
<b>DIODES</b>			
D1~8, 25~39, 41~46, 49~71, 73~88, 99	MA165	Diode	69
D100, 107, 117, 127, 145~147, 161	SEL4417GM	LED (GREEN)	8
D101~106, 110~116, 120~126, 130~137, 140~144, 160, 162, 190, 191	SEL4117RM	LED (RED)	37
<b>OSCILLATOR</b>			
X1	EF0EC4004A3	4MHz, Ceramic Oscillator	1
<b>COMPONENT COMBINATION</b>			
Z1	EXBPI8103JM	10k $\Omega$ $\times$ 8	1
<b>SWITCHES</b>			
S1~8, 25~39, 41~46, 49~71, 73~88	EVQ21507K	Push Switch	68
<b>IC PROTECTOR</b>			
IP1	△ ICP-N10T104	IC Protector	1
<b>VARIABLE RESISTOR</b>			
VR1	QRVG30P02A53	5k $\Omega$ , A	1
<b>RESISTORS</b>			
R1	ERDS2TJ333	33k $\Omega$	1
R2	ERDS2TJ103	10k $\Omega$	1
R3	ERDS2TJ152	1.5k $\Omega$	6
R6~9	ERDS2TJ473	47k $\Omega$	4
R10~14	ERDS2TJ103	10k $\Omega$	5
R16~26	ERDS2TJ680	68 $\Omega$	11
R38~40	ERDS2TJ102	1k $\Omega$	3

Ref. No.	Part No.	Description	P/S
<b>CAPACITORS</b>			
C1	ECRF1H104ZF	0.1 $\mu$ F	1
C2	ECEA1CKA100	10 $\mu$ F, 16V	1
C3	ECEA0JKA221	220 $\mu$ F, 6.3V	1
C4, 5	ECQG1H102KZ	0.001 $\mu$ F	2
C6~8	ECRF1H104ZF	0.1 $\mu$ F	3
C10, 11	ECRF1H104ZF	0.1 $\mu$ F	2

### CPR UPPER CONTROL PANEL RIGHT CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUITS</b>			
○ IC1	M37471M2142S	8 bit Microcomputer	1
IC2, 3	HD74LS07P	Hex Buffers	2
<b>TRANSISTORS</b>			
S Q1, 6, 3, 4	2SA830SB	Transistor	4
Q2, 5	2SA1015-GR	2SA933STRS (SUB. Part)	2
<b>DIODES</b>			
D1~16, 25~46, 48~68, 73~80, 99	MA165	Diode	66
D100~107, 110~113, 120~127, 130~137, 140, 150, 160~162, 190	SEL4417GM	LED (GREEN)	34
D114~117, 141~147, 151~157, 191, 192, 200~202, 210~212	SEL4117RM	LED (RED)	26
<b>OSCILLATOR</b>			
X1	EF0EC4004A3	4MHz, Ceramic Oscillator	1
<b>COMPONENT COMBINATION</b>			
Z1	EXBPI8103JM	10k $\Omega$ $\times$ 8	1
<b>SWITCHES</b>			
S1~16, 25~46, 48~62, 65~68, 73~80	SSHG1049A	Push Switch	65
<b>IC PROTECTOR</b>			
IP1	△ ICP-N10T104	IC Protector	1
<b>RESISTORS</b>			
R1	ERDS2TJ333	33k $\Omega$	1
R2	ERDS2TJ103	10k $\Omega$	1
R3	ERDS2TJ152	1.5k $\Omega$	6
R10~15	ERDS2TJ103	10k $\Omega$	6
R16~26	ERDS2TJ680	68 $\Omega$	11
<b>CAPACITORS</b>			
C1	ECRF1H104ZF	0.1 $\mu$ F	1
C2	ECEA1CKA100	10 $\mu$ F, 16V	1
C3	ECEA0JKA221	220 $\mu$ F, 6.3V	1
C10, 11	ECRF1H104ZF	0.1 $\mu$ F	2

III-5

### ESW ENCODER SWITCH

Ref. No.	Part No.	Description	P/S
<b>SWITCH</b>			
S1	SSRG110A	Encoder Switch	1

### INV INVERTER CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>TRANSISTORS</b>			
Q1, 2	2SA1534ARS	Transistor	2
<b>TRANSFORMER</b>			
○ T1	QTDG002A	Transformer	1
<b>COIL</b>			
L1	QLCGTJR10KA	Coil	1
<b>RESISTORS</b>			
R1, 2	ERDS2TJ103	10k $\Omega$	2
<b>CAPACITORS</b>			
○ C1	ECHS1473JZW	0.047 $\mu$ F	1
○ C2	ECCD3F180KGE	18pF	1

### TG TONE GENERATOR CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUITS</b>			
○ IC1	TC25540AF006	Tone Generator LSI	1
IC2	QSIGH3C16D81	16M bit Wave ROM	1
IC6	M74HC00FP	Quad 2-input NAND Gates	1
IC7	M74HC74FP	Dual D-type Flip-Flop	1
<b>COMPONENT COMBINATIONS</b>			
Z1~5, 13~15	EXBV8V471J	470 $\Omega$ $\times$ 4	8
Z6~12	EXBS8V471J	470 $\Omega$ $\times$ 4	7
<b>RESISTORS</b>			
R1~3	ERJ6GEYJ221V	220 $\Omega$	3
R4	ERJ6GEYJ103V	10k $\Omega$	1
R7	ERJ6GEYJ221V	220 $\Omega$	1
<b>CAPACITORS</b>			
C8	ECEA0JKA101	100 $\mu$ F, 6.3V	1
C9~16	ECUV1H104ZFX	0.1 $\mu$ F	8
C19, 20	ECUV1H104ZFX	0.1 $\mu$ F	2
C21	ECUV1H101JG	100pF	1
C22, 37	ECUV1H104ZFX	0.1 $\mu$ F	2

III-6

### MKB1 MANUAL KEYBOARD 1 CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>INTEGRATED CIRCUIT</b>			
IC1	D65022CW-285	Gate Array	1
<b>DIODES</b>			
S D1~74	MA162A	MA150IR (SUB. Part)	74
<b>OSCILLATOR</b>			
X1	EF0EC8004A5	8MHz, Ceramic Oscillator	1
<b>RESISTORS</b>			
R1	ERDS2TJ101	100 $\Omega$	1
R3	ERDS2TJ103	10k $\Omega$	1
<b>CAPACITORS</b>			
C1	ECRF1H104ZF	0.1 $\mu$ F	1
C2	ECEA0JU470	47 $\mu$ F, 6.3V	1
C3	ECCF1H681J	680pF	1

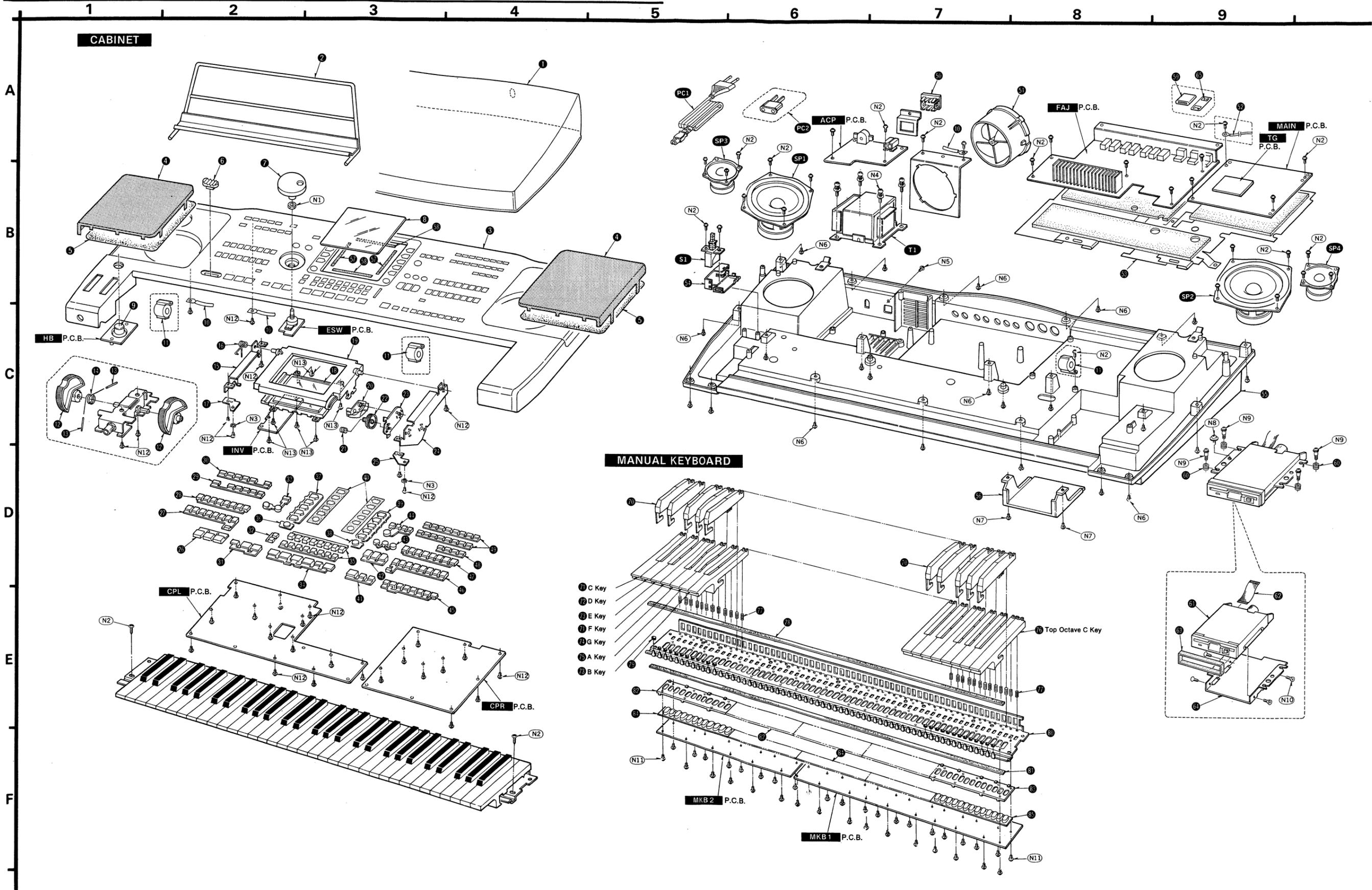
### MKB2 MANUAL KEYBOARD 2 CIRCUIT

Ref. No.	Part No.	Description	P/S
<b>DIODES</b>			
S D1~48	MA162A	MA150IR (SUB. Part)	48
<b>COMPONENT COMBINATION</b>			
Z1	EXBPI8472JM	4.7k $\Omega$ $\times$ 8	1

### WIRING PARTS

Ref. No.	Part No.	Description	P/S
○ W1	QEXGSS05055B	Connector with Wire	1
○ W2	QEXGSS04040A	Connector with Wire	1
○ W3	QEXGSS06055A	Connector with Wire	1
○ W4	QEXGSS05100A	Connector with Wire	1
○ W5	QEXGVH03050B	Connector with Wire	1
○ W6	QEXGVH03055C	Connector with Wire	1
○ W7	QEXGVH03035B	Connector with Wire	1
○ W8	QEXGSS16015A	Connector with Wire	1
○ W9	QEXGSS04020A	Connector with Wire	1
○ W10	QEXGSS04006A	Connector with Wire	1
○ W11	QEXGSS04045A	Connector with Wire	1

# CABINET PARTS LOCATION



# REPLACEMENT PARTS LIST .....Cabinet and Chassis Parts

**Notes:**

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.  
After the end of this period, the assembly will no longer be available.
2. ○ mark are new parts.

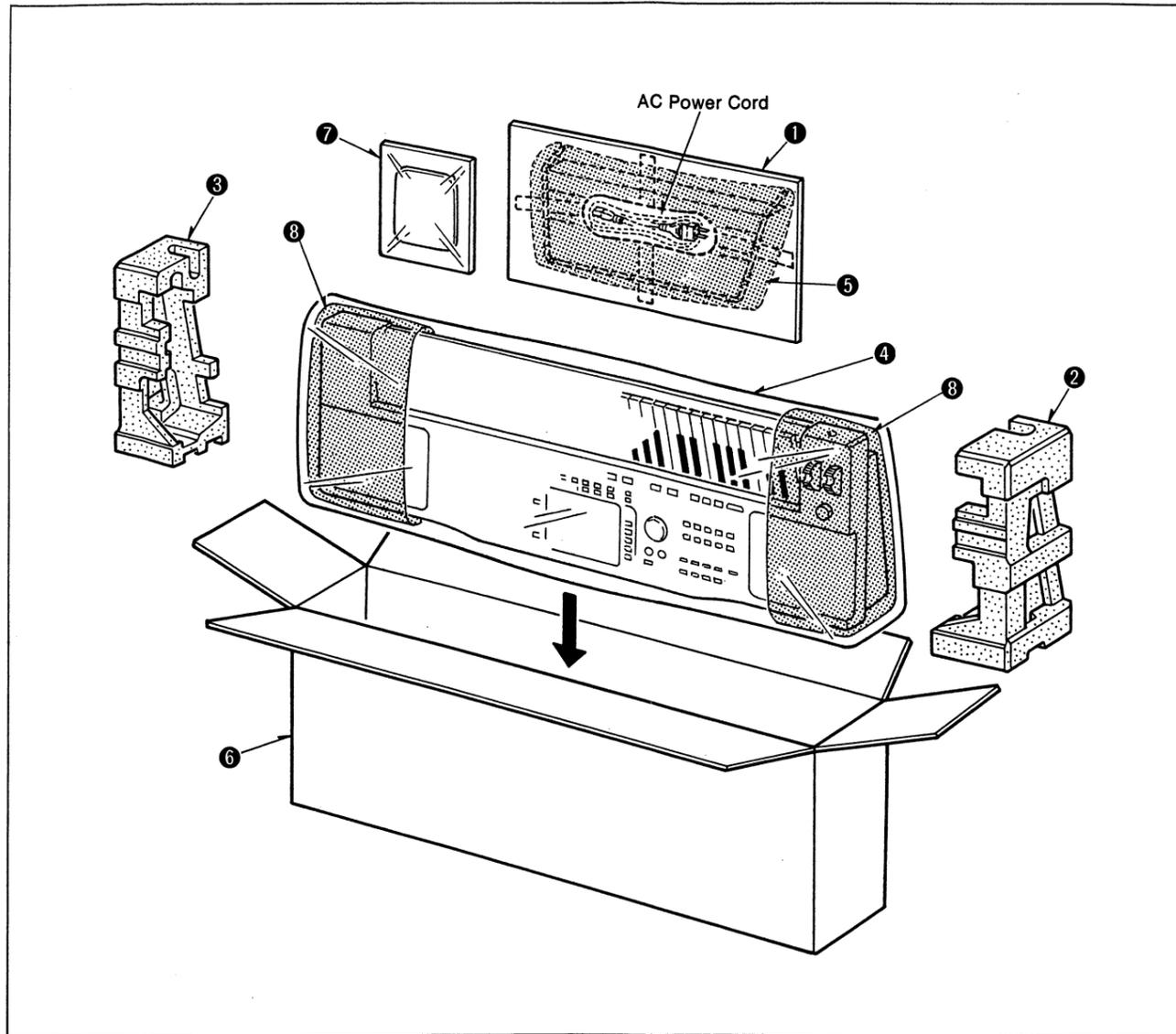
3. Important safety notice  
Components identified by △ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
4. For part No. with area mark, check the area when placing an order.
5. The raw material indication for synthetic resin  
In order to facilitate classification of parts of synthetic resin manufacture and to promote the recycling of natural resources, a raw material symbol for such parts is indicated in the Ref. No./Material column.

**■ CABINET & CHASSIS PARTS**

Ref. No.	Part No.	Description	P/S	Ref. No.	Part No.	Description	P/S
<b>SWITCH</b>							
S1	△ ESB823V	Power Switch	1	23	QMRG7043AA	LCD Base	1
<b>SPEAKERS</b>							
○ SP1, 2	EAS14PL96A	14cm, 3Ω	2	24	QMAG0102AA	Bracket	1
○ SP3, 4	EAS65PH31A3	6.5cm, 8Ω	2	25	QSCG057A	Shield	1
<b>TRANSFORMER</b>							
○ T1	QTPG1M020A	Power Transformer, Others	1	26	QGUG1212AA	Button	1
○ T1	QTPG1M026A	Power Transformer, <b>M MC XM</b>	1	27	QGUG1206AA	Button	1
○ T1	QTPG1M021A	Power Transformer, <b>EK X XR XS XD XT</b>	1	28	QGUG1205AA	Button	1
<b>POWER CORD &amp; PLUG</b>							
PC1	△ SJAG65	Power Cord, Others	1	29	QGUG1202AA	Button	1
PC1	△ QJAG013AA	Power Cord, <b>M MC XM</b> only	1	30	QGUG1201AA	Button	1
○ PC1	QJAG014AA	Power Cord, <b>XR XL</b>	1	31	QGUG1213AA	Button	1
PC1	△ VJA0733	Power Cord, <b>EK XD</b> only	1	32	QGUG1218AA01	Button	1
PC2	△ SJP5213-1	Attachment Plug, <b>X XT</b> only	1	33	QGUG1211AA01	Button	1
<b>CABINET PARTS</b>							
1	SQCG402A	Dust Cover	1	34	QGUG1208AA	Button	1
2	QYAG3001AA	Music Rack	1	35	QGUG1217AA01	Button	2
3	QGP0056AB	Control Panel	1	36	QGUG1200AA	Button	1
4	QGMG0010AA	Punching Net	2	37	QGUG1199AA	Button	1
5	QKNG1016A02	Speaker Net	2	38	QGUG1197AA	Button	1
6	SBNG7070B	Knob, Main Volume	1	39	QGUG1198AA	Button	1
7	QGUG3002AB	Dial Wheel	1	40	QMFG4100BA	Felt	2
8	QKWG011AA	LCD Cover	1	41	QGUG1209AA	Button	1
9	QGUG1219AA	Button	1	42	QGUG1216AA	Button	1
10	SUWG219	Binder	3	43	QGUG1215AA	Button	1
11	QLZG005A	Core, <b>EZ M MC XM</b> only	3	44	QGUG1214AA	Button	1
12	SBNG4050A	Wheel Knob	2	45	QGUG1210AA	Button	1
13	SHGG5010A	Tube	2	46	QGUG1207AA	Button	1
14	SUSG570A	Spring	1	47	QGUG1206AA	Button	1
15	QMAG0094AA	Bracket	1	48	QGUG1204AA	Button	1
16	QMBG006AA	Spring	1	49	QGUG1203AA	Button	2
17	QSCG056A	Shield	1	50	△ PS SJS9231A	AC Inlet Cover, Others	1
18	QSLG011AA	LCD	1	50	△ PS SJS9334A	AC Inlet Cover, <b>M MC XM XL XR</b>	1
19	QMNG0027AA	LCD Holder	1	51	SYE1128-4	Fan	1
20	QMRG7042AA	LCD Lever	1	52	QEXGRA01028B	Earth Line, <b>M XM MC EZ</b>	1
21	QMBG008AA	LCD Spring	1	53	QSCG054A	Shield	1
22	QGUG3003AA	LCD Knob	1	54	PP SHRG8390A	Cover, Power SW.	1
				55	PS QYKG127AA	Bottom Plate, <b>EK X XR XS XD XT</b>	1
				55	PS QYKG127BB	Bottom Plate, Others	1
				56	PS QMQG0019AA	FD Cover	1
				57	QMRG5044AA	Sponge	2
				58	QMRG5045AA	Sponge	2
				59	QLZG009A	Core, <b>M MC XM</b> only	1
				60	QMG029AA	Floating Rubber	4
				61	EME213DVA	DDR Drive Unit	1
				62	QEUGMQW10D	Flat Cable	1
				63	QMFG1095AA	Felt	1
				64	QMAG0093AA	FDD Bracket	1
				65	QMRG1011AA	Stopper, <b>M MC XM</b> only	1

Ref. No.	Part No.	Description	P/S
<b>MANUAL KEYBOARD</b>			
○ 70	AS STBG2071A	Black Key	25
○ 71	AS STBG1101A	White Key (C and F Key)	10
○ 72	AS STBG1111A	White Key (D Key)	5
○ 73	AS STBG1121A	White Key (E and B Key)	10
○ 74	AS STBG1131A	White Key (G Key)	5
○ 75	AS STBG1141A	White Key (A Key)	5
○ 76	AS STBG1151A	White Key (Top Octave C Key)	1
77	SUSG270A	Spring	61
○ 78	QMFG1119BA	Felt	1
79	SHGG9052A	Key Guide Rubber	61
○ 80	QMWG3006BA	Chassis	1
○ 81	QMFG1120BA	Felt	1
○ 82	ABS QMWG8031AA	Spacer (13pcs. on one)	4
○ 83	ABS QMWG8030AA	Spacer (12pcs. on one)	1
○ 84	QMWG6010BA	Rubber Switch (12pcs. on one)	4
○ 85	QMWG6009BA	Rubber Switch (13pcs. on one)	1
<b>SCREWS &amp; WASHERS</b>			
N1	XNS9	Nut	1
N2	XTW3+10Q	Screw	31
○ N3	XWC3C	Washer	2
N4	QHDG002AA	Screw with Washer	4
N4	XYN4+F16S	Screw with Washer	4
○ N5	XTB3+16JFZ	Screw	1
N6	XTW3+16JFZ	Screw	22
N7	XTW3+10QFZ	Screw	2
○ N8	QHDG025AA	Screw with Washer	1
N9	QHDG023AA	Screw with Washer	4
N10	XSS3+6FZ	Screw	4
○ N11	XTW3+10FVC	Screw	37
N12	XTV3+10G	Screw	32
N13	XTWSG2	Screw with Washer	6

# PACKING



## PACKING PARTS

Ref. No.	Part No.	Description	P/S
1	QPGG0195AA	Card Board	1
2	PS QPNG0378AB	Pad	1
3	PS QPNG0379AB	Pad	2
4	PE QPFG002AA	Polyethylene Bag	2
5	PE SPHG1770A	Polyethylene Bag	1
6	QPGG0236A	Carton	1
8	PE QPHG007AA	Polyethylene Bag	2
<b>OPERATING INSTRUCTION MANUAL</b>			
7	QQFGKN2000AA	Operating Instruction Manual, EN	1
7-1	QQTG0182A	NORSK	1
7-2	QQTG0183A	SVENSKA	1
7-3	QQTG0184A	DANSK	1
7-4	QQTG0185A	SUOMI	1
7	QQFGKN2000BA	Operating Instruction Manual, M	1
7-1	QQTG0186A	ENGLISH	1
7	QQFGKN2000CA	Operating Instruction Manual, MC	1
7-1	QQTG0187A	ENGLISH	1
7-2	QQTG0188A	FRANCAIS	1
7	QQFGKN2000DA	Operating Instruction Manual, EK XL XE XS XD	1
7-1	QQTG0187A	ENGLISH	1
7	QQFGKN2000EA	Operating Instruction Manual, EA ES	1
7-1	QQTG0189A	DEUTSCH	1
7	QQFGKN2000FA	Operating Instruction Manual, EW	1
7-1	QQTG0188A	FRANCAIS	1
7-2	QQTG0189A	DEUTSCH	1
7-3	QQTG0190A	ITALIANO	1
7	QQFGKN2000GA	Operating Instruction Manual, EE	1
7-1	QQTG0188A	FRANCAIS	1
7-2	QQTG0190A	ITALIANO	1
7	QQFGKN2000JA	Operating Instruction Manual, EH	1
7-1	QQTG0188A	FRANCAIS	1
7-2	QQTG0189A	DEUTSCH	1
7-3	QQTG0191A	NERDERLANDS	1
7	QQFGKN2000KA	Operating Instruction Manual, EP XE	1
7-1	QQTG0187A	ENGLISH	1
7-2	QQTG0192A	ESPAÑOL	1
7	QQFGKN2000LA	Operating Instruction Manual, X	1
7-1	QQTG0187A	ENGLISH	1
7-2	QQTG0192A	ESPAÑOL	1
7-3	QQTG0193A	中文	1
7	QQFGKN2000MA	Operating Instruction Manual, XT	1
7-1	QQTG0193A	中文	1