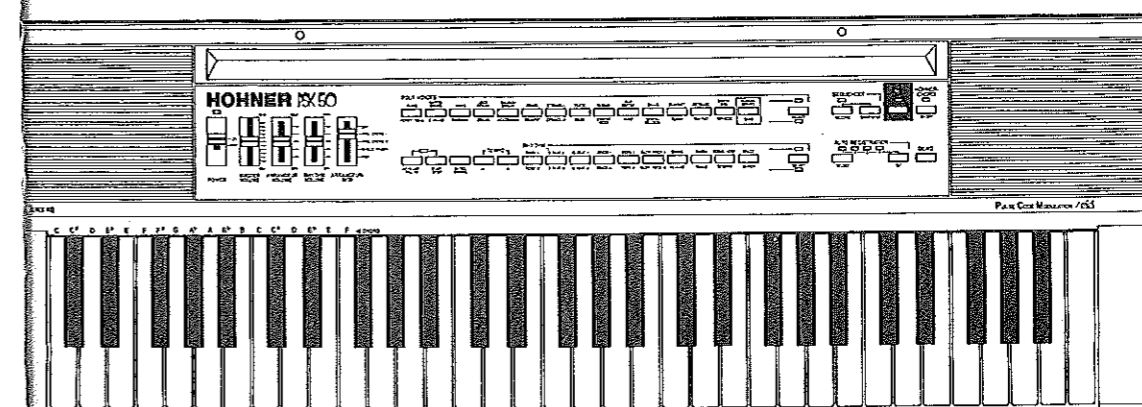


HOHNER

SERVICE MANUAL & PARTS LIST

ELECTRONIC KEYBOARD

PSK-50



MATTH. HOHNER AG.

Hohnerstraße 8 D-7218 Trossingen

PRINTED IN JAPAN
®

MAY 1988

CONTENTS

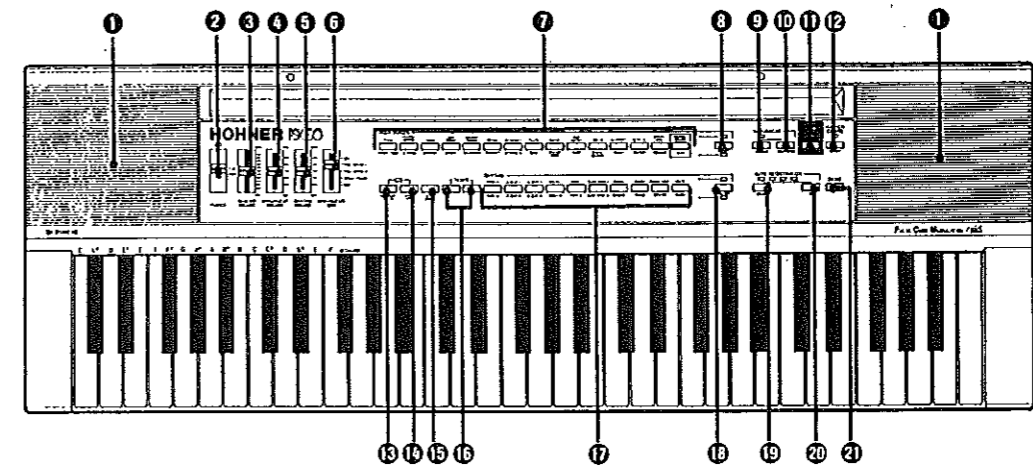
OPERATION MANUAL	Page 1
CIRCUIT DESCRIPTION	12
PARTS LIST	28
EXPLODED VIEW	33
PCB VIEW	34
SCHEMATIC DIAGRAM	35

OPERATION MANUAL

CONTENTS

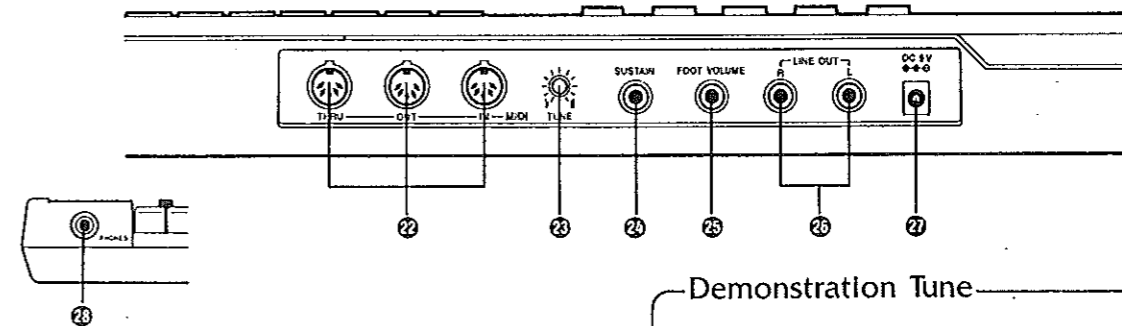
1. General Guide	1
2. Power Supply	2
3. General Operation	2
4. Poly Voices	3
5. Poly Mix Sounds	3
6. Auto-rhythms	4
7. Arrangeur	5
8. Auto Registration Function	7
9. Sequencer	7
10. MIDI	8
11. Troubleshooting	9
12. Care of Your Keyboard	10
13. Specifications	10

1. General Guide



- | | | |
|---------------------------|-------------------------------|------------------------------|
| ① Built-in speakers | ⑧ Poly voice select button | ⑮ Intro/ending button |
| ② Power switch | ⑨ Record button | ⑯ Tempo control buttons |
| ③ Master volume slider | ⑩ Sequencer start/stop button | ⑰ Rhythm selectors |
| ④ Arrangeur volume slider | ⑪ Poly Mix button | ⑱ Rhythm select button |
| ⑤ Rhythm volume slider | ⑫ Hohnerchord button | ⑲ Registration select button |
| ⑥ Arrangeur/MIDI selector | ⑬ Keystart/fill-in button | ⑳ Registration set button |
| ⑦ Poly voice selectors | ⑭ Rhythm start/stop button | ㉑ Demo button |

[Rear panel]



- ⑳ MIDI terminals (IN/OUT/THRU)
- ㉑ Tuning control
Adjusts the pitch of the entire keyboard within ± 30 cents and allows easy tuning with other instruments.
- ㉒ Sustain jack
- ㉓ Foot volume jack
- ㉔ Output jacks (L/R)
* As many poly voices are in stereo, be sure to use both output jacks when connecting to an external amplifier.
- ㉕ AC adaptor jack
- ㉖ Headphone jack

Demonstration Tune

This unit features a preset demonstration tune which has been carefully programmed to showcase all the features and benefits of this unit. Simply press the Demo button ㉑, and listen to the PSK50 plays itself!



* The demonstration tune is played in an endless loop. Press the Demo button again to stop the tune.
* The keyboard is inoperable while playing the demonstration tune.

2. Power Supply

DC Power

• Dry batteries

This unit can be powered by six D size (SUM-1/R20P) manganese dry cell batteries. Weakened batteries will result in lower volume or poor tonal quality. The power indicator lamp will gradually lose its brightness when battery power weakens. At this time, change batteries or shift to one of the alternate power sources mentioned below.

Battery replacement:

- ① Open the battery compartment cover on the bottom of the unit and take out used batteries.
- ② Load new batteries taking care that polarity is correct.
 - * It is advisable to replace all six batteries at the same time for longer battery life.
 - * Standard battery life is approximately 6 hours.

★ Auto power off function

Power is automatically cut off approximately 6 minutes after the last operation of the unit. Power supply can be restored by switching power OFF and then ON again.

CAUTION

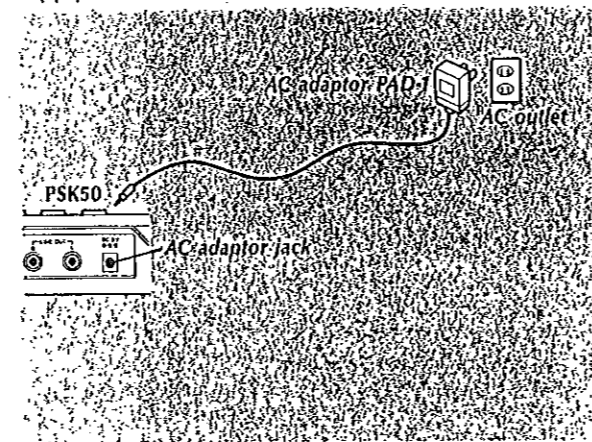
- * Use only genuine HOHNER adaptors to avoid risk of damage.

3. General Operation

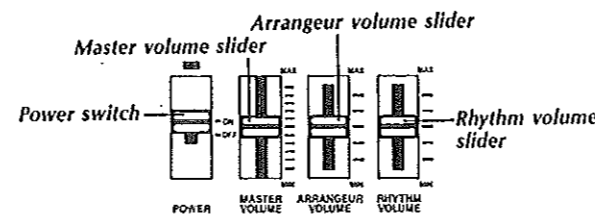
- ① Turn the power switch ON.
- ② Adjust the volume level.
- ③ Select one of 30 poly voices (see "Poly Voices", page 3) or one of 465 Poly Mix sounds (see "Poly Mix Sound", page 3).
- ④ Now, start playing.

AC Power

An AC adaptor (PAD-1, optional) is required when using household current. Use only a genuine HOHNER adaptor with the same voltage rating (100, 117, 220, or 240) as the power supply in your area to prevent component damage. Plug the AC adaptor into the AC outlet and the cord into the unit. This will automatically cut off the battery power supply.



- * Remove batteries from the battery compartment when the unit is not used for extended periods. (Battery leakage can damage electrical parts.)
- * The adaptor may become warm when left connected to an outlet. This is normal, but the adaptor should be disconnected when not in use.
- * THE FOLLOWING CONDITION CAN CAUSE BATTERIES TO BURST:
 1. Use of adaptors other than genuine HOHNER adaptors.
 2. Loading batteries with polarities reversed.



4. Poly Voices

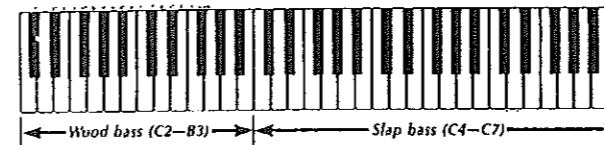
• To select a poly voice

- ① Specify either the upper or lower row of poly voices by pressing the poly voice select button. The upper or lower select indicator lights to show the active row.
- ② Press one of the poly voice selectors to choose a poly voice.
 - * "PIANO" tone is automatically selected when power is turned ON.

• Dual bass sounds

When BASS sound is selected by pressing the "BASS" button (one of the poly voice selector), two different bass voices can be played on the keyboard at the same time.

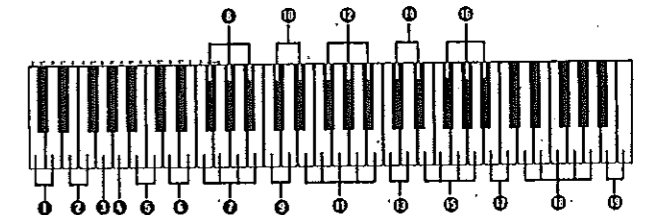
The WOOD BASS voice sounds on the lower half of the keyboard (C2-B3), while the SLAP BASS voice sounds on the upper half (C4-C7).



• To select manual drums

When MANUAL DRUMS sound is selected by the poly voice selector, the keyboard keys can be used to play a total of 49 different built-in percussion sounds. These sounds are assigned to respective keys as shown below;

- * Manual drums can be output through MIDI, allowing this keyboard to be used as a MIDI percussion sound source (see page 9).



- | | |
|----------------------------|--|
| ① bass drum 1/2 | ⑪ synth. tom 1/2/3 |
| ② snare drum 1/2 | ⑫ cow bell 1/2 |
| ③ gated snare drum | ⑬ triangle open/mute |
| ④ limb shot | ⑭ timbales; high mute/high/low/mixed |
| ⑤ closed hihat 1/2 | ⑮ computer game sound 1/2/3 |
| ⑥ open hihat 1/2 | ⑯ agogo high/low |
| ⑦ crush cymbal 1/2/3/mixed | ⑰ conga; high mute/high/middle/low/mixed |
| ⑧ synth. cymbal 1/2/3 | ⑱ clave high/low |
| ⑨ ride cymbal 1/2 | |
| ⑩ gong 1/2 | |
| ⑪ tom 1/2/3/4/mixed | |

5. Poly Mix Sounds

This keyboard features Hohner's innovative "Poly Mix" feature, which lets you choose from an amazing total of 465 different sound combinations. To create these layered sounds, the Poly Mix function actually integrates the characteristics of the 30 preset sounds which are produced by the new PCM sound source to create entirely new and distinct sounds which can be selected through the following procedure.

• To select Poly Mix sounds

- ① Select any of the 30 poly voices. When selecting Poly Mix sounds, the voice initially selected is used as a base, or "Primary" sound.
 - * When the Primary sound is selected, the keyboard features 10-note polyphony.
- ② Press the Poly Mix button. This activates the Poly Mix function, allowing you to choose a Secondary sound to integrate with the Primary sound you just selected.
 - * After the Poly Mix button is pressed, the keyboard changes to 5-note polyphony.

- ③ Select any other of the 30 poly voices. The characteristics of this "Secondary" sound is automatically integrated with those of the "Primary" sound already selected.

• To select a different secondary sound

The secondary sound can be changed at any time, as long as the Poly Mix function is selected. Simply select a different poly voice—the primary sound remains the same.

• To select a different primary sound

The primary sound can be changed by first turning the Poly Mix function OFF (press Poly Mix button so that indicator goes out), selecting any other poly voice, and finally turning the Poly Mix function back ON. The secondary voice remains the same in this case.

<Example of Poly Mix Operation>

- ① Select the preset ORGAN voice by pressing the corresponding poly voice selector. (This is the "Primary" sound.) Initially, the ORGAN voice can be played with 10-note polyphony.
- ② Press the Poly Mix button. The ORGAN voice can now be played with 5-note polyphony.

* Indicator lights



Poly Mix button

NOTE:

When power is turned ON, the PIANO voice is automatically selected in Poly Mix memory. Because of this, procedure ② above causes the ORGAN voice to be integrated with the PIANO voice.

- ③ Select the preset HUMAN voice by pressing the corresponding poly voice selector. (This is the "Secondary" sound.) Now, the "ORGAN + HUMAN" integrated Poly Mix sound can be played with 5-note polyphony.



- ④ Next, try changing the Secondary sound by selecting the preset FLUTE voice. The "ORGAN + FLUTE" integrated Poly Mix sound can be played with 5-note polyphony.



- ⑤ Next, try changing the Primary sound by first pressing the Poly Mix button once again to turn the Poly Mix function OFF temporarily. The preset ORGAN voice can once again be played with 10-note polyphony.



- ⑥ Select a new Primary sound—the STRINGS voice for example, and turn the Poly Mix function back ON. As the secondary sound (FLUTE) does not change in this case, you can now play the "STRINGS + FLUTE" integrated Poly Mix sound with 5-note polyphony.



6. Auto-rhythms

• Playing an auto-rhythm

- ① Press the rhythm select button to choose the upper row or the lower row of auto-rhythms. The upper or lower select indicator lights to show the active row.
- ② Press one of the rhythm selectors.
- ③ Press start/stop button to start the rhythm.
- ④ Adjust the tempo of the rhythm by using the tempo control buttons. Pressing the <▲> button will increase tempo, while pressing the <▼> button will decrease tempo.

* Tempo of the auto-rhythm can be adjusted between 40 and 256 beats per minute. Pressing both tempo keys at the same time resets the tempo to 132 beats per minute.

- ⑤ You can adjust the relative volume of the rhythm by using the rhythm volume slider.
- ⑥ Press start/stop button once again to stop auto-rhythm play.

• Using keystart/fill-in button

Press to enter keystart standby. Rhythm starts when an arrangeur keyboard key (lower 1.5 octave, C through F) is pressed. (See page 5—6 to use keystart in the arrangeur performance.) When pressed during auto-rhythm and arrangeur performance, an appropriate fill-

in is inserted in the rhythm pattern. If the button is held down, the fill-in pattern is repeated until the end of the measure during which the button is released.

• Using Intro/ending button

If you press the intro/ending button instead of pressing the start/stop button to start an auto-rhythm, the selected auto-rhythm begins after a one-measure intro pattern. This can be an effective way to lead into auto-rhythm performance. If pressed during auto-rhythm and arrangeur performance, the rhythm stops after an appropriate ending pattern.

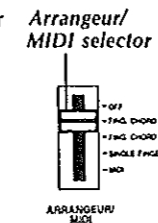
★ Using keystart with an intro pattern

Press the keystart/fill-in button to enter keystart standby, and subsequently press the Intro/ending button. Rhythm starts when an arrangeur keyboard key is pressed, after a one-measure intro pattern.

7. Arrangeur

• Arrangeur/MIDI selector

Slide to select one of the Arrangeur functions (or MIDI function).



- OFFFor normal play without arrangeur.
- FING. CHORD I & II ..For arrangeur pressing chords as usual.
- SINGLE FINGER.....For arrangeur using the Single Finger system.
- MIDISet to use the MIDI functions (refer to "10. MIDI").

• Arrangeur volume control

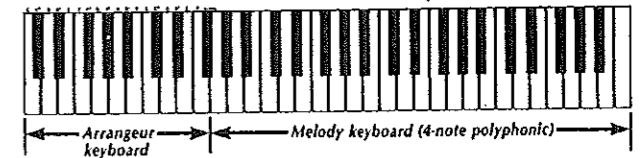
Adjust the volume of the arrangeur.

Arrangeur volume slider



NOTES:

- If the Arrangeur/MIDI selector is set to "FING. CHORD (I or II)" or "SINGLE FINGER", the lower 1.5 octave of the keyboard become arrangeur keyboard keys, and the upper part of the keyboard becomes 4-note polyphonic.



- During arrangeur performance, chord played on the arrangeur keyboard will continue to sound after releasing the keys.
- Arrangeur performance starts with rhythm, the moment the arrangeur keyboard key is pressed if keystart is in standby status.

Single Finger system

The Single Finger system has been developed so you can play the four main types of chords more easily. Playing of the chords is simplified as shown below:

- Pressing one of the arrangeur keyboard keys produces a major chord corresponding to that note.
- Simultaneously pressing any key to the right (two keys at the same time) results in a minor chord.
- Similarly, pressing one more key to the right (three keys in all) produces a seventh chord, and pressing the fourth key to the right (four keys in all) creates a minor seventh chord.

< Examples >

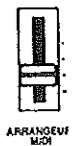
- C (C major chord)—Press ①.
- Cm (C minor chord)—Press ①, ② together.
- C7 (C seventh chord)—Press ①, ②, ③ together.
- Cm7 (C minor seventh chord)—Press ①, ②, ③, ④ together.

* Not only ②, ③, and ④, but any black or white keys can be used as long as they are to the right of ①.



[1] Arrangeur using the Single Finger system

- ① Set the Arrangeur/MIDI selector to "SINGLE FINGER".



- ② Select one of the auto-rhythms and press the keystart/fill-in button.

* Tempo indicator lights, meaning that the arrangeur keyboard keys are ready for play.

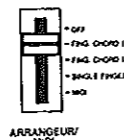


- ③ Play on the arrangeur keyboard keys according to the Single Finger system.

* Adjust the tempo and arrangeur volume using the respective controls.

[2] Arrangeur play using standard chord fingering

- Set the Arrangeur/MIDI selector to "FING. CHORD I" or "FING. CHORD II".



- Select one of the auto-rhythms and press the keystart/fill-in button.

* Tempo indicator lights, meaning that the arrangeur keyboard keys are ready for play.



- Play a chord on the arrangeur keyboard keys.

* Adjust the tempo and arrangeur volume using the respective controls.
* This unit is capable of recognizing the following chords; <M, m, -5, +5, dim, sus4, 7, M7, m7, mM7, m75, 7sus4, 9, m9>

<About the voices used in the arrangeur>

Each arrangeur pattern consists of one bass line and two types of chord lines (chord 1 and chord 2). The voices of these elements are preset corresponding to each auto-rhythms as shown below;

RHYTHMS	CHORD 1 TONES	CHORD 2 TONES	BASS TONES
ROCK I	BRASS	METALLIC	SLAP BASS
ROCK II	BRASS	FUNKY	SLAP BASS
8 BEAT I	JAZZ ORGAN	PIANO	SLAP BASS
8 BEAT II	METALLIC	BRASS	SLAP BASS
16 BEAT I	MARIMBA	E-PIANO	SLAP BASS
16 BEAT II	FUNKY	BRASS	SLAP BASS
DISCO I	SYNTH. CELESTA	BRASS	SLAP BASS
DISCO II	HARP	STRINGS	BRASS
POPS I	JAZZ ORGAN	PIANO	WOOD BASS
POPS II	FLUTE	BRASS	SLAP BASS
SLOW ROCK I	PIANO	VIBRAPHONE	WOOD BASS
SLOW ROCK II	PIANO	HARP	WOOD BASS
SWING	PIANO	BRASS	WOOD BASS
SAMBA	FUNKY	JAZZ ORGAN	SLAP BASS
BOSSA NOVA	E-PIANO	STRINGS	WOOD BASS
WALTZ	STRINGS	ORGAN	WOOD BASS
REGAE	JAZZ ORGAN	CLAVINET	SLAP BASS
TANGO	ACCORDION	PIANO	WOOD BASS
BEGUINE	PIANO	JAZZ GUITAR	WOOD BASS
MARCH	BRASS ENS.	FLUTE	BRASS

<About "FING. CHORD I" and "FING. CHORD II">

This keyboard features two different types of fingered arrangeur patterns. You can select which type you want by selecting either the FING. CHORD I mode, or the FING. CHORD II mode. Respective arrangeur patterns and characteristics are as listed below.

(FING. CHORD I Arrangeur)

Arrangeur consists of a single bass line and two different backing chord patterns. The pattern does not change until you play a chord consisting of at least 3 notes.

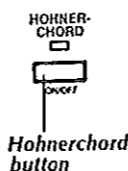
(FING. CHORD II Arrangeur)

Arrangeur consists of a single bass line and a single backing chord pattern. In addition, you can add notes manually in two-note polyphony on the "arrangeur keyboard" without affecting the arrangeur pattern. The pattern does not change until you play a chord consisting of at least 3 notes.

* Arrangeur voices are preset in correspondence to each auto-rhythm type. A list of auto-rhythms and corresponding arrangeur voices is provided.

• Using the Hohnerchord function

When you're using the arrangeur function, you can add automatic harmony to your melodies by pressing the Hohnerchord button. If you use this function when Poly Mix button is ON, automatic harmony is added using the "Secondary" sound (see "Poly Mix Sounds", page 3), and "Primary" sound performance becomes monophonic.



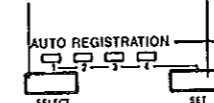
* The Hohnerchord function is inoperative when Arrangeur/MIDI selector is set to OFF.
* When you select this function, melody keyboard performance becomes monophonic even if no arrangeur keyboard keys are pressed.

8. Auto Registration Function

This keyboard features 4 memory banks which can be used to "register" or store often-used poly voices, rhythms, Poly Mix sounds, etc. These registered settings can be called back instantly with just the touch of a button. The following types of settings can be held in each registration memory bank.

- Poly voice or a Poly Mix sound selections
- Auto-rhythm settings
- Hohnerchord button ON/OFF setting

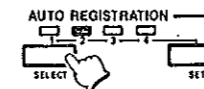
Registration select button Registration set button



• To register keyboard settings

- Select the bank (1-4) via the registration select button.

* corresponding LED lights



Now, set up the keyboard with the poly voice (or the poly mix sound), rhythm and effect desired.

- Press the registration set button to register the settings into the registration bank.

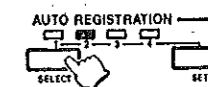


- Press the registration select button as necessary to get out of the registration mode.



* This unit keep the last registration bank (bank 4) settings when getting out of the registration mode.

- To recall the registered bank
- Press the registration select button as necessary to select the bank you desire.



9. Sequencer

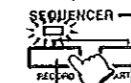
The sequencer function lets you "record" notes as you play them on the keyboard. Up to 1250 notes can be stored in memory for subsequent playback.

Recording

- Start an auto-rhythm and adjust the tempo of the recording.

- Press the record button to enter the recording standby mode.

* LED flashes



Record button
Sequencer start/stop button

- Set the Arrangeur/MIDI selector to "FING. CHORD I", "FING. CHORD II" or "SINGLE FINGER" if you want to use arrangeur in your recording. If not, set this switch "OFF".

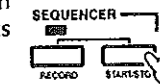
- Select one of the auto-rhythms you like.

* If you don't want an auto-rhythm in your recording (or if you want to start an auto-rhythm during recording), press rhythm start/stop button here.

* If you want to start an auto-rhythm with intro pattern, press Intro/ending button here.

* If you want to start an auto-rhythm using keystart, press keystart/fill-in button here.

- Press the sequencer start/stop button to start recording. Recording starts after one measure of beat count.



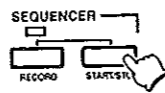
- Play the keyboard as you like.

NOTE:

You can record changes in the following operations as well as keyboard play during recording.

- Changing poly voices
- Changing Poly Mix sounds
- Changing auto-rhythms
- Starting or stopping a rhythm
- Starting a rhythm using intro start
- Inserting the fill-in patterns of rhythms
- Setting Hohnerchord on/off
- Setting auto registration select (bank 1-4)
- Ending the rhythm with the ending pattern

- ⑦ Press the sequencer start/stop button again to stop recording.

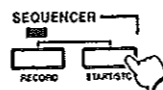


NOTES:

- Memory capacity is approximately 1250 notes. Operations such as changes in rhythms, voices or Poly Mix sound selections are counted as a half-note.
- Recording automatically ends when you exceed the memory capacity

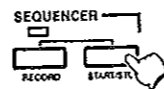
Playing back memory contents

- ① Press the sequencer start/stop button to play back your performance. LED lights and the playback starts.



- You can play whole keyboard with the playback if the recording has been done in Arrangeur "OFF" mode. If you recorded in Arrangeur "ON" mode, only the melody keyboard can be used.
- In this playback status, all switches and buttons except volume sliders are inoperative.
- Tempo of playback cannot be adjusted.

- ② Press the sequencer start/stop button again to stop the playback.



10. MIDI

"MIDI" stands for "Musical Instrument Digital Interface". Practically speaking, it lets you connect this keyboard to other MIDI-equipped musical instruments and devices, such as synthesizers, drum machines, sequencers, and even personal computers.

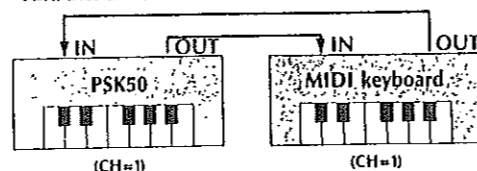


- MIDI IN.....Receives MIDI signal from external device.
- MIDI OUT.....Sends MIDI signal to external device.
- MIDI THRU.....Passes unchanged signal received from one device through MIDI IN to another device.

★ Set Arrangeur/MIDI selector to "MIDI" to use MIDI function of this keyboard.

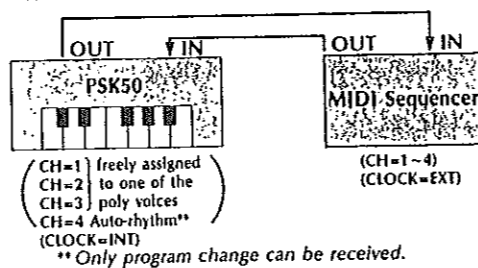
- [1] Transmits/Receives MIDI messages as a single keyboard (6-note poly).

<EXAMPLE CONNECTION 1>



- [2] Splits keyboard into 3 sections, a 6-note poly section, a 4-note poly section and a 2-note poly section for use as a multiple sound source. The voice of each channel can be freely changed by program change message (refer to "MIDI Data Transmit/Receive" for details).

<EXAMPLE CONNECTION 2>



- Use as a MIDI percussion sound source (MANUAL DRUMS, see page 3)
It is possible to use this keyboard as a MIDI percussion sound source, as all percussion instrument sounds are assigned independent MIDI note number, as listed below;

Note Number	Percussion sound
① 36/38	bass drum 1/2
② 40/41	snare drum 1/2
③ 43	gated snare drum
④ 45	limb shot
⑤ 47/48	closed hihat 1/2
⑥ 50/52	open hihat 1/2
⑦ 53/55/57/59	crush cymbal 1/2/3/mixed
⑧ 54/56/58	synth. cymbal 1/2/3
⑨ 60/62	ride cymbal 1/2
⑩ 61/63	gong 1/2
⑪ 64/65/67/69/71	tom 1/2/3/4/mixed
⑫ 66/68/70	synth. tom 1/2/3
⑬ 72/74	cow bell 1/2
⑭ 73/75	triangle open/mute
⑮ 76/77/79/81	timbales; high mute/high/low/mixed
⑯ 78/80/82	computer game sound 1/2/3
⑰ 83/84	agogo high/low
⑱ 86/88/89/91/93	conga; high mute/high/middle/low/mixed
⑲ 95/96	clave high/low

• MIDI Data Transmit/Receive

This unit is capable of transmitting/receiving the following MIDI data.

<Receiving>

MESSAGES	CH 1	CH 2	CH 3	CH 4
1 Note on/off	○	○	○	×
2 Program change		0-29 (*1)		0-19 (*2)
3 Sustain on/off		○		×
4 Clock			×	

<Transmitting>

MESSAGES	CH 1	CH 4
1 Note on/off	○	×
2 Program change	0-29 (*1)	0-19 (*2)
3 Sustain on/off	○	×
4 Clock	○	

(*1) changing poly voices.
(*2) changing auto-rhythms.

11. Troubleshooting

*For any malfunction, always check battery condition first. (see page 2)

Trouble	Possible Cause	Remedy
No sound, even if keys are pressed.	1. Master volume turned down. 2. Headphones connected. 3. Auto power off has activated.	1. Turn up master volume. 2. Disconnect headphones. 3. Turn the power switch off and then on again.
Poly Mix inoperative Hohnerchord inoperative Registration select button inoperative Record button inoperative	Arrangeur/MIDI selector is set to MIDI position.	Change setting of Arrangeur/MIDI selector.
No rhythm.	Rhythm volume turned down.	Turn up rhythm volume.
No arrangeur.	Master and arrangeur volume turned down.	Turn up master and arrangeur volume.
Occasional interference.	Refrigerators, washing machines and similar electric appliances.	Use outlet as far away as possible from appliance thought to be the cause.
No sound when connected to external amplifier.	1. Master volume turned down. 2. Defective connection cord.	1. Turn up master volume. 2. Replace connection cord.

12. Care of Your Keyboard

- Avoid heat, humidity, and direct sunlight.**
Do not overexpose the unit to direct sunlight, place it near a heater, or in any area subject to high temperature.
- Avoid severe impacts and do not drop.**
Severe impacts can result in malfunction. When carrying or transportation the unit, protect the keyboard and keys by packing with soft cloth.
- Keep the unit free of liquids, dust, particles, etc.**
Do not allow foreign matter to enter between the keys. Be especially careful of metallic objects such as hairpins, sewing needles or coins. Also, do not allow the unit to get wet.
- Never attempt to modify any part of the unit.**
Your keyboard is a precision musical instrument made up of sophisticated electronic parts. Any modification of, or tampering with internal components can cause trouble or malfunction.
- Do not use lacquer thinner or similar chemicals for cleaning.**
Clean the keyboard with a soft cloth dampened with a mild detergent solution and squeeze it until almost dry.
- Remove batteries before extended storage.**
Batteries left in the unit for long periods can leak and cause damage to electronic circuitry.
- In case of malfunction...**
Check whether buttons and connections are set correctly as indicated in the troubleshooting chart. If the unit still does not work properly, contact the original retailer or a nearby dealer. Never attempt to repair the unit yourself. This can result in serious damage of the components.

13. Specifications

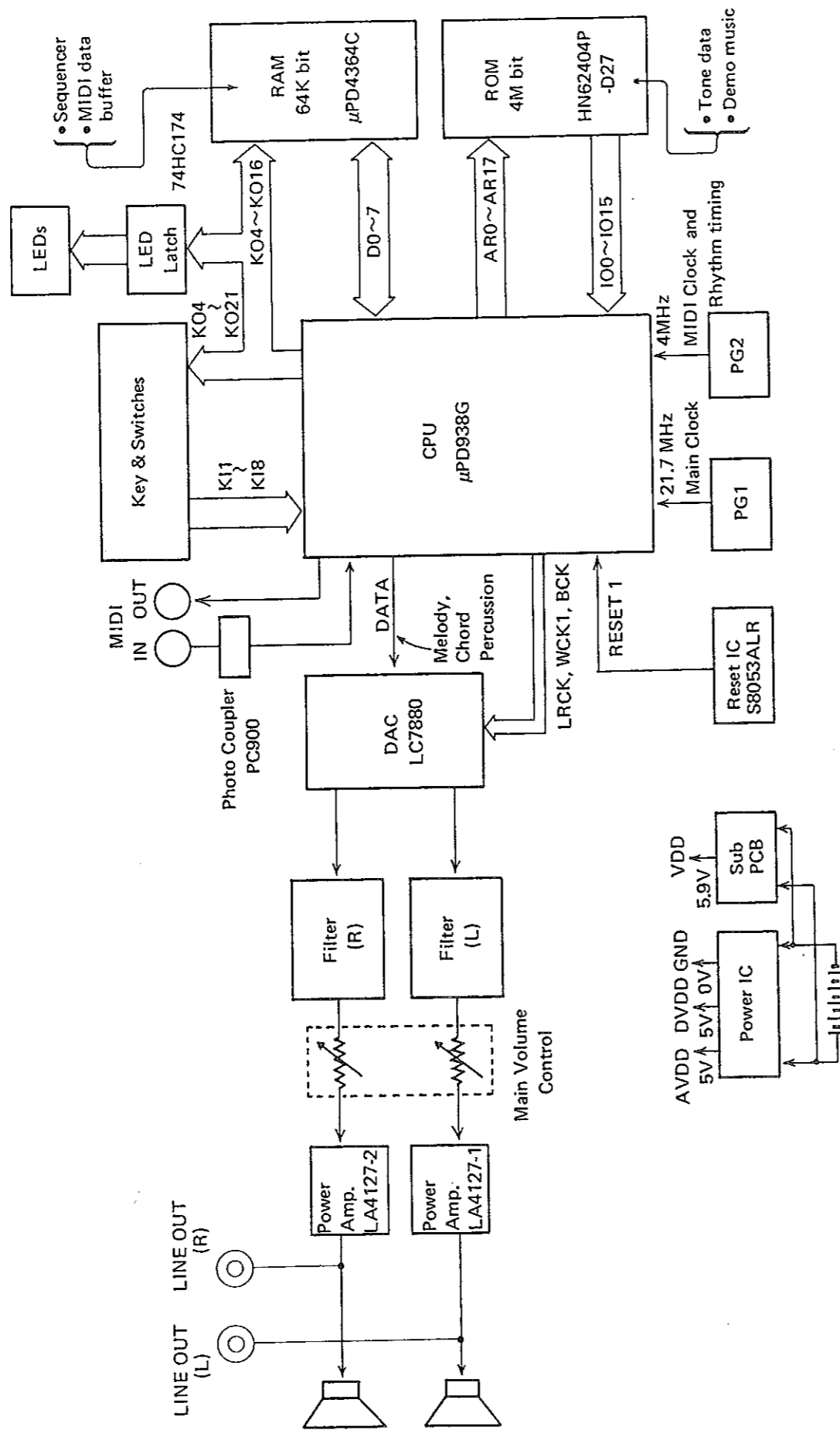
Model:	HOHNER PSK50
Number of keys:	61 keys
Polyphonic:	10-note polyphonic
Preset tones:	30; Piano, Harpsichord, Vibes, Jazz organ, Church organ, Brass, Strings I, Flute, Human, Jazz guitar, Bells, Clavinet, Metallic, Synth-ens, Manual drums, Honky-tonk, E-piano, Marimba, Organ, Accordion, Trumpet, Strings II, Oboe, Synth-reed, Harp, Synth-celesta, Funky, Fantasy, Miracle, Bass (Wood bass/Slap bass)
Poly mix sounds:	465
Auto-rhythms:	20; Rock I-II, 8 beat I-II, 16 beat I-II, Disco I-II, Pops I-II, Slow rock I-II, Swing, Samba, Bossa nova, Waltz, Reggae, Tango, Beguine, March
Rhythm source:	49 PCM rhythm sources
Arrangeur function:	SINGLE FINGER/FING. CHORD I/FING. CHORD II
Effect:	Hohnerchord
Built-in effects:	Stereo delay, Stereo panning
Auto Registration memory:	4 banks
Sequencer:	Up to 1250 notes
Terminals:	Line out L/R [output impedance: 3 K Ω , output voltage: 1 V (RMS) MAX], headphone jack, sustain jack, foot volume jack, AC adaptor jack (DC 9 V), MIDI (IN/OUT/THRU)
Tuning control:	A4=442 Hz \pm 30 cents
Built-in speakers:	12 cm dia \times 2
Auto power off function:	Approximately 6 minutes after the last operation
Power source:	2-way AC/DC power source; • AC: 100, 117, 220, 240 V (\pm 10 V), 50/60 Hz, with optional PAD-1 AC adaptor • DC: 6 D size (SUM-1/R20P) manganese dry batteries Battery life: Approximately 6 hours
Power consumption:	7.7 W
Dimensions:	938(W) \times 320(D) \times 89(H) mm 36 15/16" (W) \times 12 5/8" (D) \times 3 1/2" (H)
Weight:	6.3 kg (13.9 lbs) including batteries
Standard accessories:	6 "D" size batteries, score stand, dust cover

* Designs and specifications are subject to change without notice.


CIRCUIT DESCRIPTION

BLOCK DIAGRAM	Page 12
CPU (μ PD938G) PIN FUNCTIONS	13
DAC (Digital to Analog Converter: LC7880)	15
LINERA CIRCUITS	19
POWER ON CIRCUIT	20
POWER OFF CIRCUIT	20
LED DRIVING	21
INITIAL RESET CIRCUIT	21
POWER CIRCUIT	22
KEY & SWITCH MATRIX	23
TROUBLESHOOTING TABLE	24
MAJOR WAVEFORMS	25

BLOCK DIAGRAM

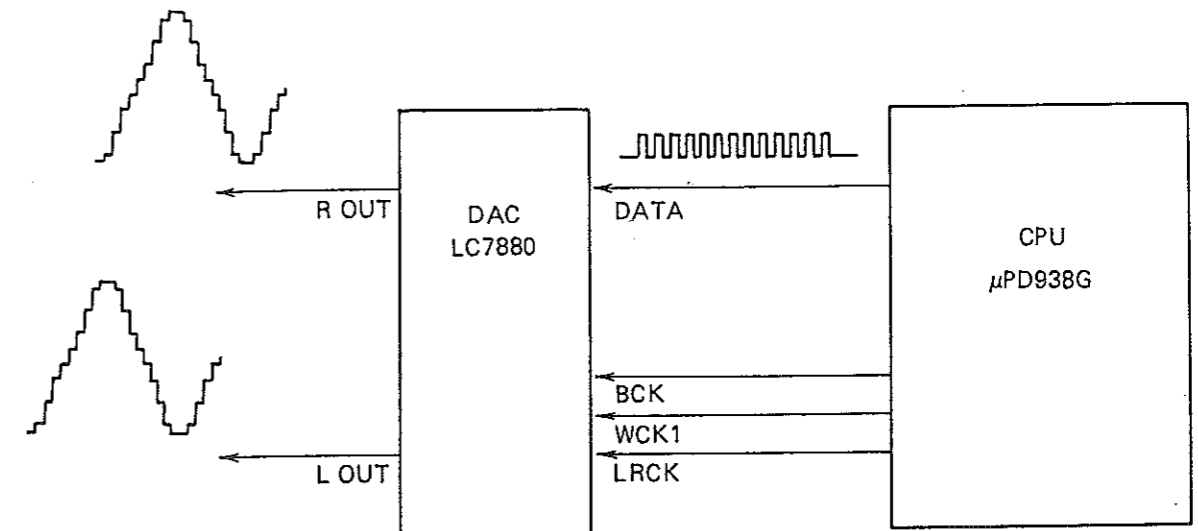


CPU (μPD938G) PIN FUNCTIONS

Pin No.	Terminal	In/Out	Function
1	VDD2	-	+5.9V power source for the LSI. While power switch is turned on, the terminal receives +5.9V.
2	POFF	Out	Power OFF signal output. When power switch is OFF, the terminal drops to Low level turning externally connected transistors off to shut VDD2 (pin 1) off.
5	RESET 1	In	CPU reset signal input. When batteries are set or an AC adaptor is inserted, the terminal receives a signal. CPU then initializes its internal circuits.
6	MI	In	Power ON trigger pulse input. When the power switch is turned on, the terminal receives a differential pulse (). Receiving this signal, the CPU starts functioning.
8, 9	COSI, COSO	In/Out	21.7248 MHz clock pulse input/output. Varying this frequency changes the tune (pitch).
10	VDD1	-	+5.9V power source. No matter the power switch position, the terminal always receives +5.9V.
11	MPG	Out	4 MHz clock pulse check terminal. As direct touch of an oscilloscope probe may stop the oscillation, use this terminal for checking 4 MHz clock pulse (pins 13 and 14).
12	GND	-	Ground (0V) source.
13, 14	MOSI, MOSO	In/Out	4 MHz clock pulse for MIDI and rhythm tempo.
17	MOUT	Out	MIDI data output
18	MIN	In	MIDI data input
19, 20	KO0, KO1	Out	Clock pulses for LED latches. At the rising edge of this pulse, LED data is kept in the LED latches.
22	KO3	Out	"465 SOUND TONE BANK" LED drive signal
23~30	KI8~KI1	In	Keys and switches input terminals
31	APO	Out	APO (Auto Power Off) signal output. When the keyboard is left unoperated for six minutes, the signal drops to Low level shutting the voltages AVDD and DVDD off in the Power IC CA5668.
32~49	KO21~KO4	Out	By the time sharing, these signals function as RAM address bus, key and switch scanning, and LED driving.
50	WE1	Out	Write enable for the RAM. CPU drops this terminal voltage Low when it writes data in the RAM.
51	OE1	Out	RAM's out enable signal. When this signal is Low, the RAM is able to output data.
52	CE1	Out	RAM's chip enable signal. When this signal is Low, the CPU is able to read or write data in the RAM.
53~60	D0 ~ D7	In/Out	Data bus to the RAM.

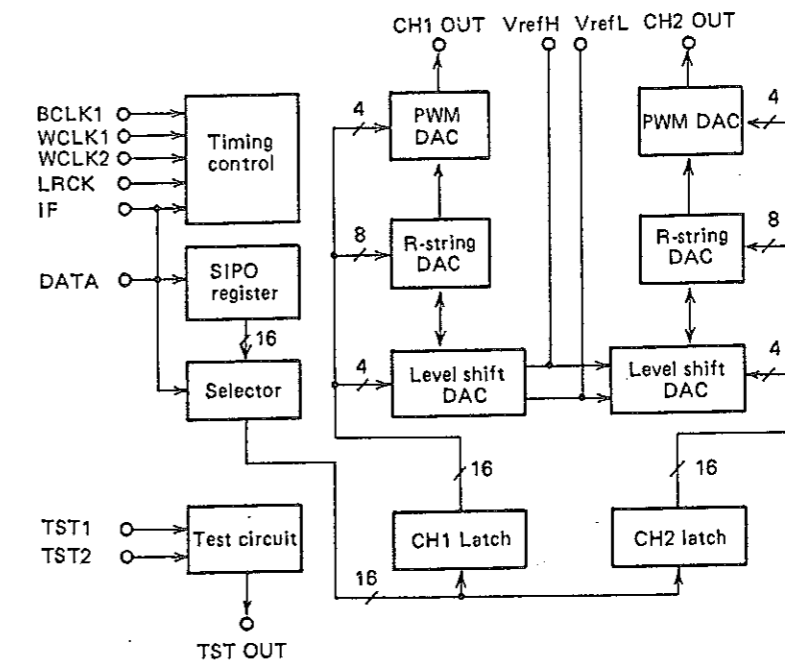
61~76	IO0~IO15	In	Data inputs from the ROM.
78~95	AR0~AR17	Out	ROM's address bus.
96	AR18	Out	ROM's chip enable signal. Low effective.
100	\overline{CE}	Out	ROM's out enable signal. When Low, the ROM is able to output data.
105	MCLK	Out	Check terminal for main clock. Outputting 2.7156 MHz (1/8 of 21.7248 MHz) pulse, this terminal is used for checking the main clock pulse generator.
107	BCLK (BCK)	Out	DAC's bit clock. Timing pulse for writing serial digital audio data in DAC. Provides one pulse per one bit of digital audio data.
109	SWD1 (DATA)	Out	Serial digital audio data. By the time sharing, this terminal provides 16-bit serial data for the right and the left channels' tone, percussion, chord, and bass sounds.
111	WCK1 (WCLK1)	Out	Word clock pulse for the DAC. At the falling edge of this signal, 16-bit serial sound data is latched in the DAC.
112	LRCK	Out	Left/Right channel separation signal. As the serial sound data contains right and left channels sounds, the voltage level of this signal determines the output channel of DAC. High: Left channel Low: Right channel
114	VRT	In	High level reference voltage for the built-in ADCs (Analog to Digital Converters). Connected to DVDD (+5V).
115	ADVDD	In	+5V power source for the built-in ADCs.
116~118	Vin0~Vin2	In	Analog inputs for the built-in ADCs. Not used.
119	ADGND	In	Ground for the built-in ADCs.
120	VRB	In	Low level reference voltage for the built-in ADCs.

DAC (Digital to Analog Converter: LC7880)



Data output from CPU is 16-bit serial signals containing digital sound data of melody, chord, bass, and percussion for the right and the left channels.

LC7880 converts the 16-bit serial sound data into analog waveforms and outputs the right and the left channels waveforms separately.



LC7880 Block Diagram

(1) Data reading

Digital audio data is 16-bit serial signals of 2's complement.

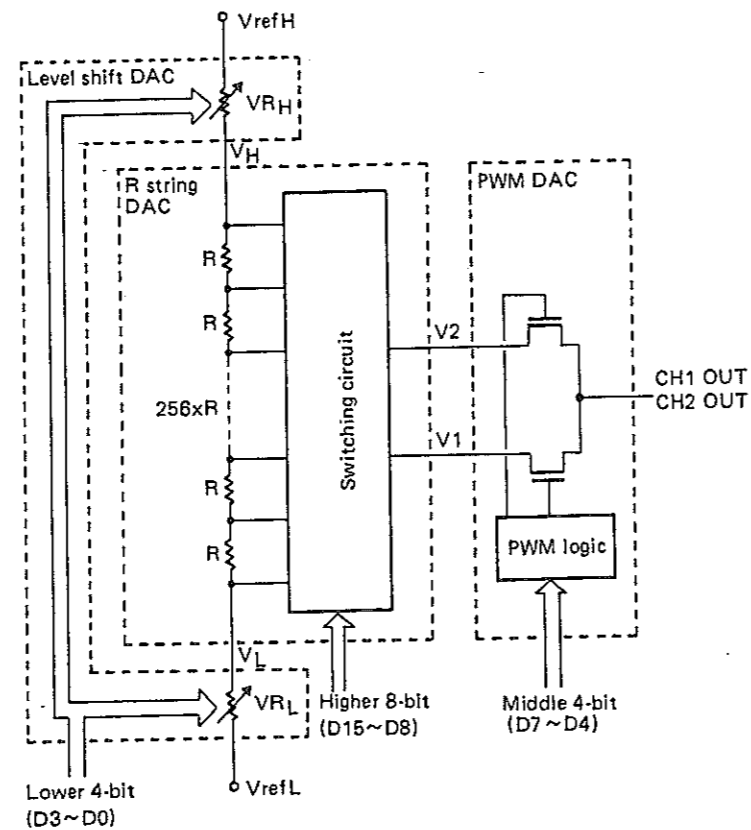
In accordance with the voltage level of terminal IF, LC7880 is able to read either MSB first data or LSB first data.

Since the CPU's DATA output is MSB first data, the terminal IF is connected to High level.

Synchronized with the rising edge of BCLK, digital audio signal from DATA terminal is stored in SPO register.

At the falling edge of word clock WCLK1, the data is latched in either CH1 Latch or CH2 Latch. The channel selection is done by signal LRCK (High: CH1, Low: CH2).

(2) D/A conversion



LC7880 D/A Conversion Block for one channel

LC7880 contains two each of R-string DAC, PWM (Pulse Width Modulation DAC, and Level Shift DAC for the right and the left channels.)

After being latched, 16-bit digital audio signal is separated in three blocks and each block data is sent to a certain DAC.

- Upper 8 bits (D15 ~ D8) ... To R-string DAC
- Middle 4 bits (D7 ~ D4) ... To PWM DAC
- Lower 4 bits (D3 ~ D0) ... To Level Shift DAC

① R-string DAC

By means of connecting 256 (2^8) pieces of unit resistors in serial, voltages V_H and V_L applied to both ends of the resistors are divided in 256 steps. Potential difference at both ends of one unit resistor R is $(V_H - V_L) / 256$. The upper 8 bits of signal DATA turn the switches in switching circuit and extracts a voltage level.

② PWM (Pulse Width Modulation) DAC

The potential difference $V_2 - V_1$ of R-string DAC is further divided in 16 steps in PWM DAC. The division is controlled by the middle 4 bits ($D_7 \sim D_4$).

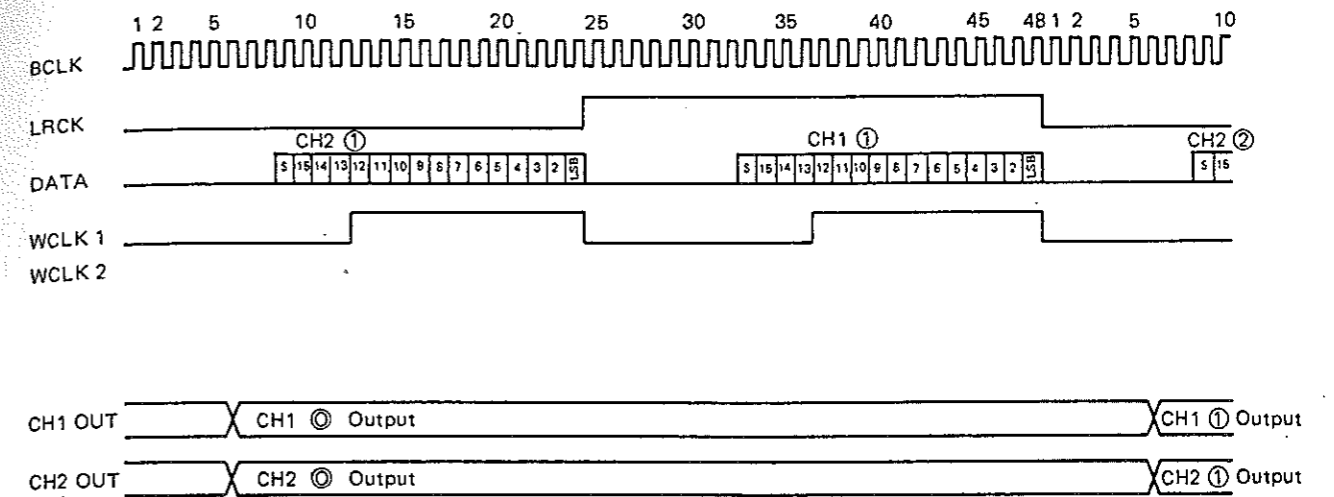
③ Level Shift DAC

The resistances of variable resistors VR_H and VR_L are varied by the lower 4 bits of signal DATA ($D_3 \sim D_0$).

By means of varying the potential difference between V_{refH} and V_{refL} , R-string DAC's output voltage for the minimum step is further controlled.

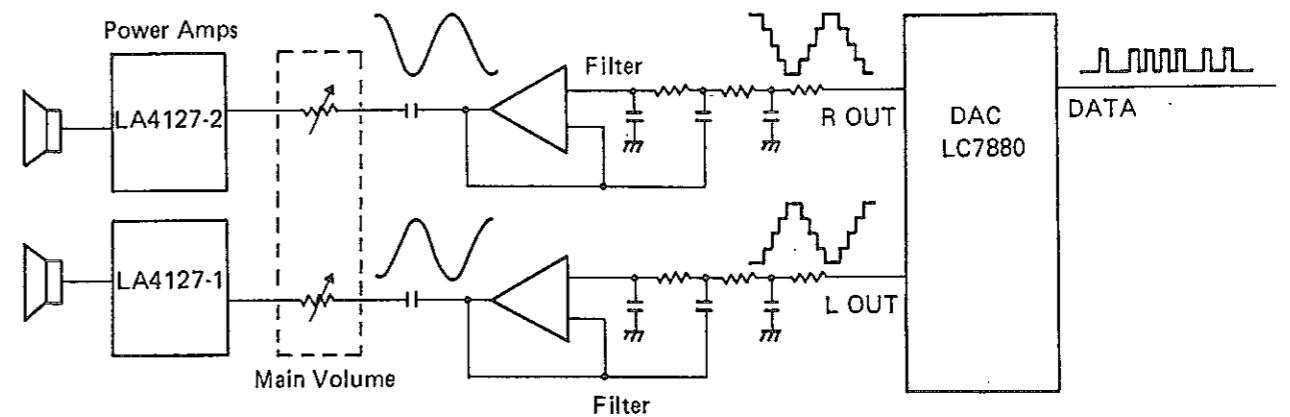
LC7880 Pin Function

Pin No.	Thermal	Function
1	L OUT	Channel 1 output. Provides left channel sounds.
2	V ref H	High level reference voltage. Connected to AVDD (+5V)
4	VCC	+5V source
5	WCLK2	Not used. Connected to AG (0V).
6	LRCK	Left/right channels separation signal. As signal DATA contains both channels' sounds, the voltage level of this terminal separates the channels. High ... Left channel Low ... Right channel
7	WCLK1	Word clock terminal. At the falling edge of this signal, signal DATA is latched in either CH1 Latch or CH2 Latch.
8	DATA	16-bit serial digital audio signal input.
9	BCLK	Bit clock pulse terminal. Timing pulse for reading DATA signal. Also clock pulse for PWM DAC.
10	VCC	+5V source
14	IF	LSB/MSB first signal selection terminal. Voltage level of this terminal determines the format of signal DATA. High ... MSB first data Low ... LSB first data The format of DATA is MSB first on this model, this terminal is connected to AVDD (+5V).
15	GND	Ground (0V) source
16	VrefL	Low level reference voltage. Connected to AG (0V).
17	GND	Ground (0V) source
20	R OUT	Channel 2 output. Provides right channel sounds.



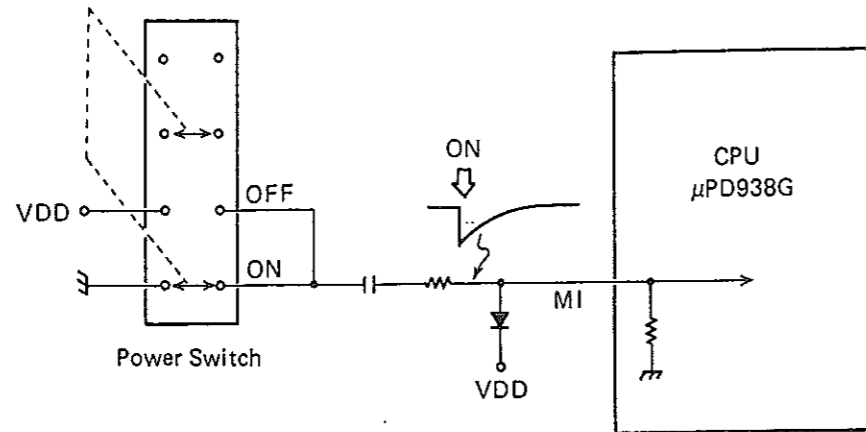
Timing Chart

LINEAR CIRCUITS



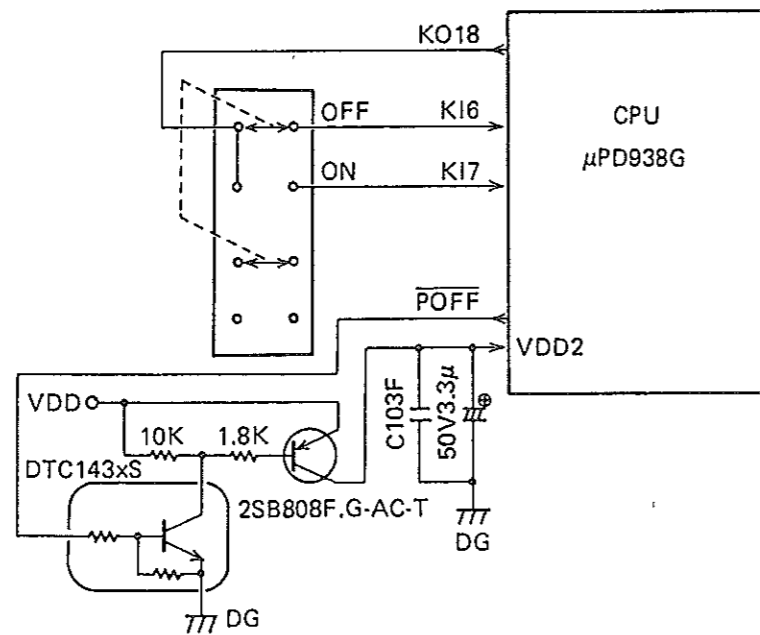
After filtered and amplified, the right and the left channels sounds are emanated from the speakers.

POWER ON CIRCUIT



When the power switch is turned on, a Low level differential pulse is provided to terminal MI of the CPU. Upon receipt of the pulse, the CPU starts the Power ON sequence.

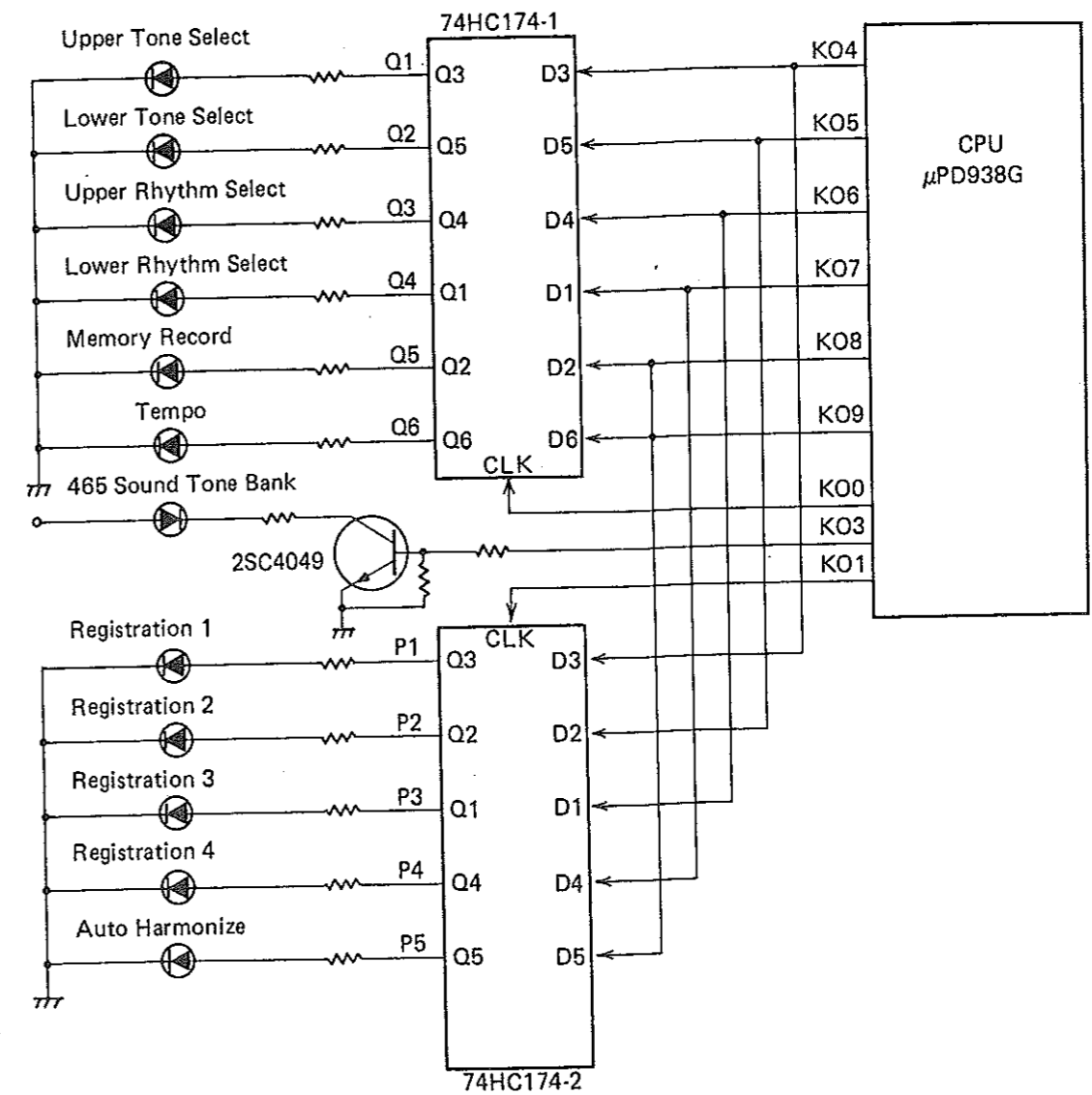
POWER OFF CIRCUIT



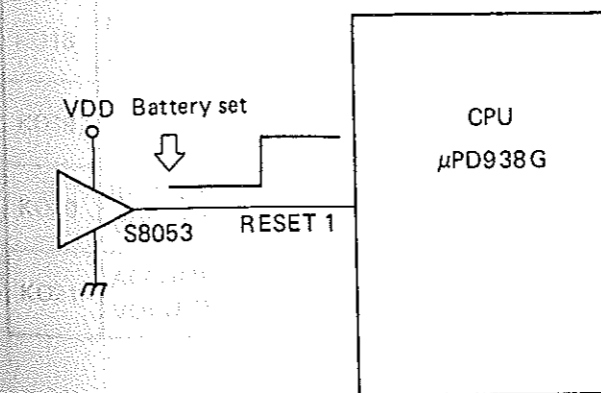
While power switch is turned on, CPU provides High level from terminal \overline{POFF} . Being High of signal \overline{POFF} turns the transistors on and VDD (+5.9V) is provided to a power source terminal VDD2.

Receiving scan signal KO18 from terminal KI6, the CPU detects the OFF position of power-switch. CPU then drops the voltage level of terminal \overline{POFF} Low causing the transistors to be turned off. Since +5.9V is not provided from terminal VDD2, CPU stops functions.

LED DRIVING

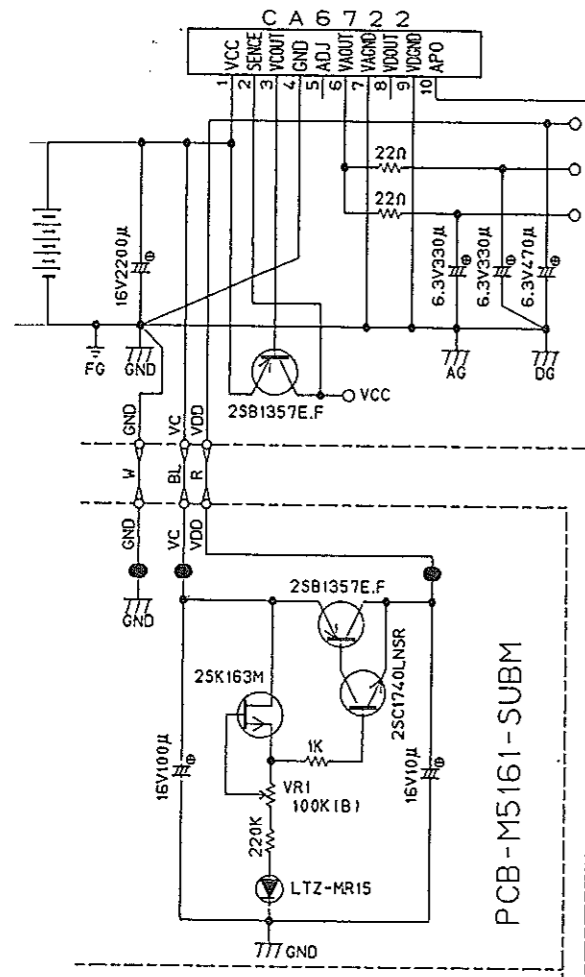


INITIAL RESET CIRCUIT



When batteries are newly set or an AC adaptor jack is inserted, the reset IC S8053, provides a Low level pulse to CPU's RESET 1 terminal. CPU then initializes its internal circuits.

POWER CIRCUIT



The PSK-50 employs a power IC CA6722 which provides VDD (+5V), AVDD (+5V for analog circuits), DVDD (+5V for digital circuits), and VCC (+9V for Power Amp). Since the CPU functions with 5.9 volts, the VDD output from CA6722 is not used but 5.9V is provided from the external regulator circuit. If some parts in the Power Circuit are replaced, adjust the variable resistor VR1 so that the VDD is +5.9V.

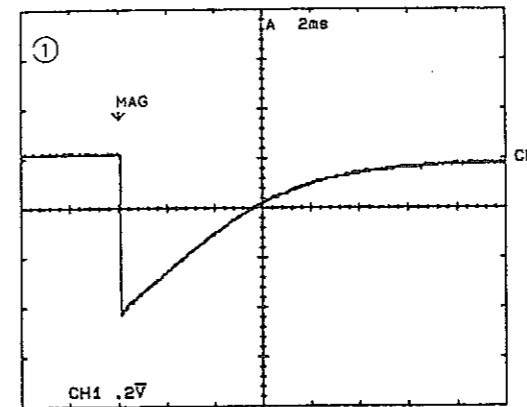
KEY & SWITCH MATRIX

	K11	K12	K13	K14	K15	K16	K17	K18
KO4	TEMPO -	TEMPO +	C1	C#1	D1	D#1	E1	F1
KO5	SEQUENCER RECORD	SEQUENCER START/STOP	F#1	G1	G#1	A1	A#1	B1
KO6	DEMO		C2	C#2	D2	D#2	E2	F2
KO7	REGIST. SET	REGIST. SELECT	F#2	G2	G#2	A2	A#2	B2
KO8	POLY MIX	AUTO HARMONIZE	C3	C#3	D3	D#3	E3	F3
KO9			F#3	G3	G#3	A3	A#3	B3
KO10			C4	C#4	D4	D#4	E4	F4
KO11			F#4	G4	G#4	A4	A#4	B4
KO12			C5	C#5	D5	D#5	E5	F5
KO13			F#5	G5	G#5	A5	A#5	B5
KO14	TONE SELECT	RHYTHM SELECT	C6	KEYSTART FILL IN	START/STOP	INTRO/ENDING	ROCK	8 BEAT
KO15	16 BEAT	DISCO	POPS	SLOW ROCK	SWING	SAMBA	BOSSA-NOVA	WALTZ
KO16	PIANO	HARPSICHORD	VIBES	JAZZ ORGAN	CHURCH ORGAN	BRASS	STRINGS	FLUTE
KO17	CHORUS	JUZZ GUITAR	BELLS	FUNKY CLAVI	METALLIC SOUND	SYNTH. ENS.	PERCUSION	
KO18	CHORD OFF	CHORD FING'D 1	CHORD FING'D 2	CHORD ON	MIDI SELECTOR	POWER OFF	POWER ON	
KO19							SUSTAIN	
KO20	RHYTHM VOLUME 0	RHYTHM VOLUME 1	RHYTHM VOLUME 2	RHYTHM VOLUME 3	RHYTHM VOLUME 4			
KO21	ACCOMP. VOLUME 0	ACCOMP. VOLUME 1	ACCOMP. VOLUME 2	ACCOMP. VOLUME 3	ACCOMP. VOLUME 4			

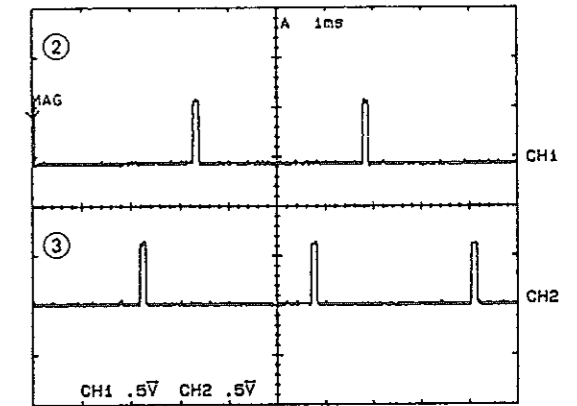
TROUBLESHOOTING TABLE

Nature of trouble	Faulty block	Checkpoint
No power (Pilot lamp does not light)	Power IC (CA5668)	Pin 2 should be +9V
	Power jack	
No sound at all	VDD Regulator	2SB1357 collector should be +5.9V
	Power IC (CA5668)	Pin 6 voltage should be +5V
	Master Clock Pulse Generator	CPU (μ PD938G) pin 105
	Power OFF Circuit	2SB808F, G collector must be +5.9V during Power ON
	CPU (μ PD938G)	<ul style="list-style-type: none"> ○ Signal MI ○ Signals DATA, BCK, WCK1, LRCK ○ ROM/RAM address bus
	Reset IC (S8053)	○ Pin 1 should output Low level pulse when AC adaptor is inserted.
	DAC (LC7880)	Pins 1 and 20 output waveforms
	Power Amp (LA4127)	
	ROM (HN62404PD27)	Address/Data bus
	RAM (μ PD4364C-12L, 15)	Address/Data bus
Certain keys or switches do not function	Key/Switch matrix	Open circuit on KI or KO line
A certain key does not function	Key matrix	Dust on the contact
Distortion sound	Power IC (CA6722)	Voltages of pin 2 (+9V) and pin 6 (+5V)
	DAC (LC7880)	Pins 1 and 20 output waveforms
	Power Amp (LA4127)	<ul style="list-style-type: none"> ○ Pin 11 voltage (+9V) ○ Pins 9 and 12 waveforms
	CPU (μ PD938GD-001)	
	ROM (HN62404PD)	

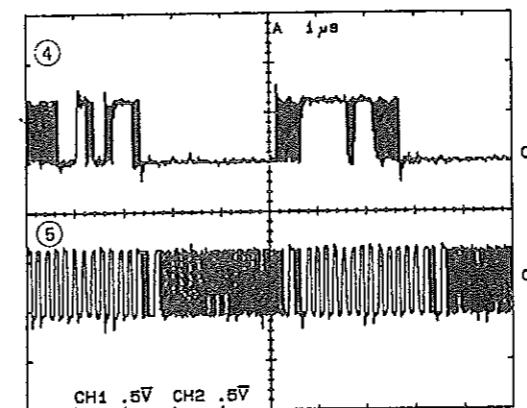
MAJOR WAVEFORMS



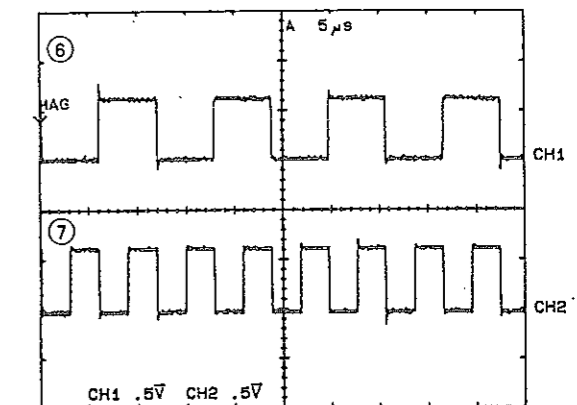
① Signal MI
 μ PD938G pin 6
Power ON



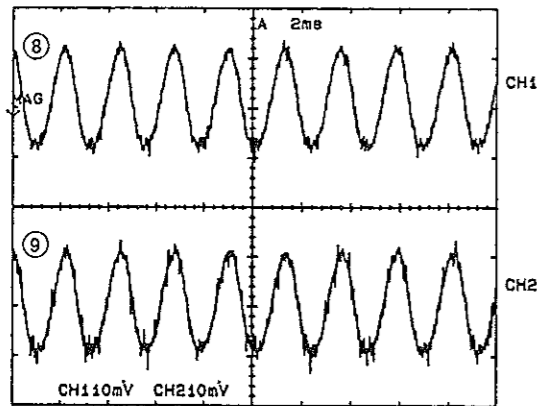
② Key scan signal KO9
 μ PD938G pin 44
③ Key scan signal KO19
 μ PD938G pin 34



④ DATA
LC7880 pin 8
⑤ BCK
LC7880 pin 9

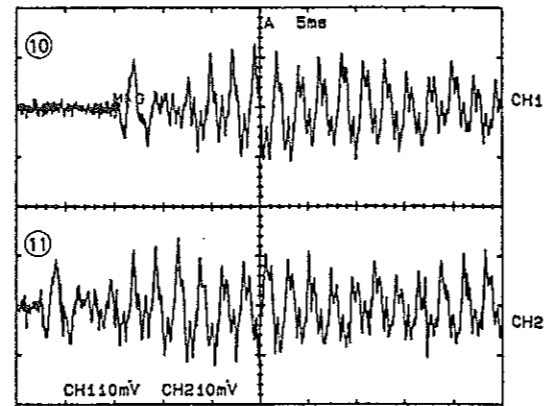


⑥ LRCK
LC7880 pin 6
⑦ WCK1
LC7880 pin 7



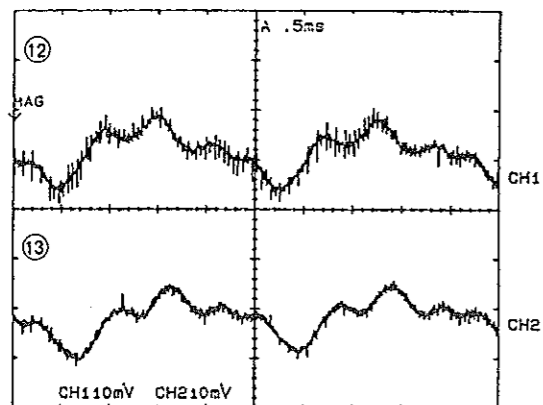
⑧ DAC output: LC7880 pin 1

⑨ DAC output: LC7880 pin 20
Tone: PIANO
Key: A3



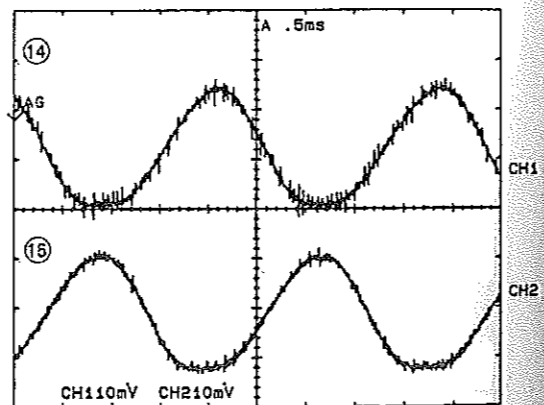
⑩ DAC output: LC7880 pin 1

⑪ DAC output: LC7880 pin 20
Tone: PIANO
Key: A3



⑫ Filter output: M5218PR-1 pin 1

⑬ Filter output: M5218PR-1 pin 7
Tone: PIANO
Key: A3



⑭ Filter output: M5218PR-1 pin 1

⑮ Filter output: M5218PR-1 pin 7
Tone: PIANO
Key: A3

PARTS LIST

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price
1) M5161-MA1M PCB ASS'Y						
	2010 5474	LSI	HN62404PD27	1		
	2010 5509	LSI	MSM5165P-10L, 12L (μ PD4364C-12L, 15L)	1		
	2010 5635	LSI	μ PD938GD-001	1		
	2105 0035	C-MOS IC	TC74HC174P	2		
	2105 0798	C-MOS IC	LC7880	1		
	2120 1146	Monolithic IC	M5218PR	1	10	
	2220 1387	Transistor	2SC1740SQ-TP-T	1	10	
	2251 0287	Transistor	2SB808F, G-AC-T	1	20	
	2252 0140	Digital transistor	2SC4049-AC-T	1	20	
	2259 0147	Digital transistor	2SC143XS-TP-T	1	5	
	2390 0112	Variable capacitor	SVC201SPR	1	20	
	2301 0241	Diode	1SS254T-77-T	5	10	
	2590 0497	Ceramic oscillator	EFO-FC4004A4C	1	20	
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	8	20	
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	8	20	
	2617 0141	Carbon film resistor	R-20-100K-J-T24-T	1	20	
	2617 0192	Carbon film resistor	R-20-1.8K-J-T24-T	1	20	
	2617 0335	Carbon film resistor	R-20-56-J-T24-T	3	20	
	2617 0386	Carbon film resistor	R-20-330-J-T24-T	12	20	
	2617 0491	Carbon film resistor	R-20-330K-J-T24-T	1	20	
	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	2	10	
	2807 1023	Electrolytic capacitor	50RE2-1-T2-T	2	10	
	2807 1091	Electrolytic capacitor	6.3RE2-100-T2-T	4	20	
	2813 0161	Ceramic capacitor	RT-HE60TKCH430J-T	1	20	
	2813 0560	Semi-conductive capacitor	DD408SR104K16-T	6	20	
	2813 0609	Ceramic capacitor	RT-HE90TKCH131J-T	1	20	
	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	2	10	
	2818 0494	Ceramic capacitor	RT-HE80TKSL331J-T	2	10	
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	8	10	
	2818 3305	Ceramic capacitor	RT-HE50TKCH270J-T	1	10	
	2819 5141	Semi-conductive capacitor	DD404SR222K25-T	2	20	
	2819 5150	Semi-conductive capacitor	DD404SR562K25-T	2	20	
	2845 0196	Three polarity capacitor	DS310-76D223S	2		
	3020 2147	Ferrite beads	BL02RN2-R62	5	10	
	3841 0476	Coil	L2P-7L	1		

Note: Q'ty -- Quantity used per unit
* -- Minimum order and supply quantity

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price
	3850 1216	MOS IC	S8053ALR	1		
	4307 8920	Blank PCB M5161-MA1M	M110214-1	1		
2) M5161-SUB PCB ASS'Y						
	2220 1425	Transistor	2SC1740LNSR-TP-T	1	10	
	2240 1068	FET	2SK163M-T	1		
	2251 0301	Transistor	2SB1357SSY2E, F	1	10	
	2370 0119	LED	LTZ-MR15T-77-T	1	20	
	2617 0036	Carbon film resistor	R-20-220K-J-T24-T	1	20	
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	1	20	
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	1	20	
	2760 2231	Semi-fixed resistor	V8K4-11B100K	1	10	
	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	1	20	
	2807 1082	Electrolytic capacitor	16RE2-100-T2-T	1	20	
	4307 9700	Blank PCB M5161-SUB	M310514-1	1		
3) M5257-AS PCB ASS'Y						
	2110 3756	Bipolar IC	SN74LS04N	1		
	2114 0070	Monolithic IC	LA4127	2		
	2114 1176	Monolithic IC	CA6722	1		
	2251 0273	Transistor	2SB1357E, F	1		
	2400 5062	Photo coupler	PC900	1		
	2770 6860	VR	K121K0Z1B-100KB	1		
	2301 0241	Diode	1SS254T-77-T	1	20	
	2310 7848	Zener diode	RD4.3ESB2-T1-T	1	20	
	2360 0903	Zener diode	RD4.7JSB3-T1-T	1	20	
	2390 0378	Diode	1SR139-100T-32-T	3	20	
	2606 0315	Carbon film resistor	R-20-3.3-J-T24-T	6	20	
	2606 0413	Carbon film resistor	R-20-510-J-T24-T	2	20	
	2617 0036	Carbon film resistor	R-20-220-J-T24-T	6	20	
	2617 0061	Carbon film resistor	R-20-2.2K-J-T24-T	2	20	
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	8	20	
	2617 0117	Carbon film resistor	R-20-47K-J-T24-T	2	20	
	2617 0141	Carbon film resistor	R-20-100K-J-T24-T	2	20	
	2617 0231	Carbon film resistor	R-20-270-J-T24-T	1	20	
	2617 0246	Carbon film resistor	R-20-12K-J-T24-T	2	20	
	2617 0271	Carbon film resistor	R-20-5.6K-J-T24-T	1	20	

Note: Q'ty -- Quantity used per unit
* -- Minimum order and supply quantity

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price
	2617 0273	Carbon film resistor	R-20-22-J-T24-T	2	20	
	2617-0297	Carbon film resistor	R-20-22K-J-T24-T	6	20	
	2617 0335	Carbon film resistor	R-20-56-J-T24-T	1	20	
	2617 0416	Carbon film resistor	R-20-18K-J-T24-T	2	20	
	2617 0459	Carbon film resistor	R-20-27K-J-T24-T	2	20	
	2617 0931	Carbon film resistor	R-20-6.2K-J-T24-T	2	20	
	2801 7469	Electrolytic capacitor	ECE-A1CU471ZB-T	2	10	
	2805 2391	Electrolytic capacitor	16RC2200S-S1	1	5	
	2805 3169	Electrolytic capacitor	6.3RE2-47-T2-T	4	20	
	2807 0942	Electrolytic capacitor	6.3RE2-330-T2-T	2	20	
	2807 0985	Electrolytic capacitor	16RE2-220-T2-T	4	20	
	2807 0993	Electrolytic capacitor	16RE2-22-T2-T	4	20	
	2807 1023	Electrolytic capacitor	50RE2-1-T2-T	8	10	
	2807 1040	Electrolytic capacitor	6.3RE2-470-T2-T	1	10	
	2807 1082	Electrolytic capacitor	16RE2-100-T2-T	2	10	
	2807 1091	Electrolytic capacitor	6.3RE2-100-T2-T	1	20	
	2807 1112	Electrolytic capacitor	10RE2-100-T2-T	4	20	
	2818 0365	Ceramic capacitor	RT-HE50TKYB102K-T	4	10	
	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	5	20	
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	5	10	
	2830 6606	Mylar capacitor	AMZV-224K50-T	4	10	
	3020 2147	Ferrite beads	BL02RN2-R62	13	10	
	3025 0042	EMI filter	DST306-51B222M	2	10	
	3501 0070	DC jack	HEC2305-01-030	1		
	3612 0541	DIN jack	TCS4650-01-1211	3		
	3612 0665	Phone jack	YKB21-5006	2		
	3612 0789	Jack	YKB21-5010	3		
	3725 1309	PC joiner M257D	JSF00-11-60	1	10	
	4307 9120	Blank PCB M5257-AS1M	M210211-1	1		
	4307 9130	Blank PCB M5257-AS2M	M210211-2	1		
	4) M5161-CN1M PCB ASS'Y					
	2301 0241	Diode	1SS254T-77-T	23	20	
	2320 9799	LED	LN266RPT-(TA)	12	10	
	3410 1728	Tact switch	EVQ-QS205K	39	10	
	3725 1316	PC joiner M161B	JSF00-16-140M	1		
	3725 1323	PC joiner M161C	JSF00-20-150M	1		

Note: Q'ty -- Quantity used per unit
* -- Minimum order and supply quantity

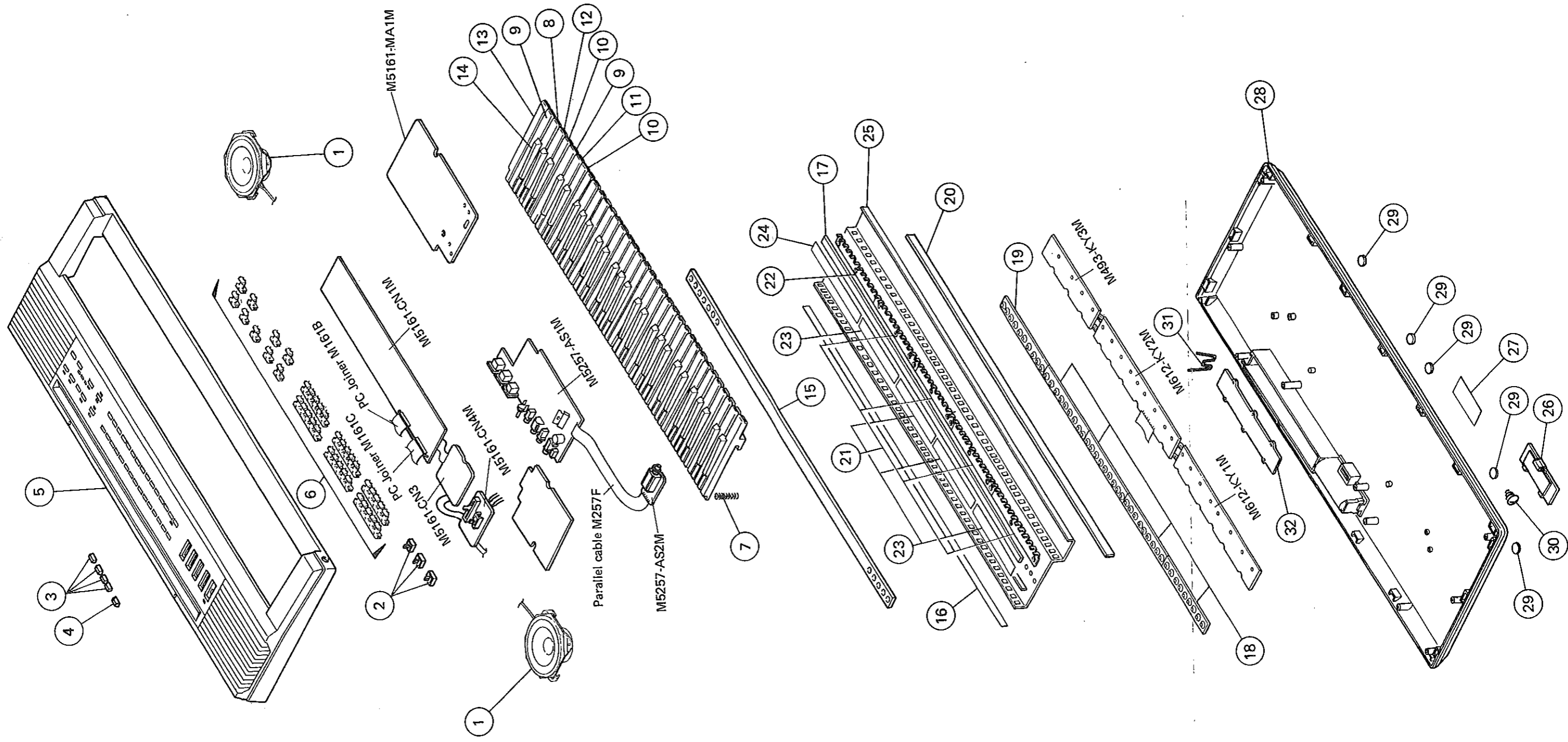
Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price
	4307 8910	Blank PCB M5161-CN1M	M110219-1	1		
	6230 2356	Joiner holder	E41585A-1	1		
	5) M5161-CN3 PCB ASS'Y					
	3725 1330	PC joiner M161J	JSF00-6-90	1		
	3725 1337	PC joiner M257H	JSF00-15-40	1		
	4307 8870	Blank PCB M5161-CN3M	M310348-1	1		
	6) M5161-CN4M PCB ASS'Y					
	2320 9799	LED	LN266RPT-(TA)	1	10	
	2614 0145	Carbon film resistor	R-25-100-J-T24-T	1	10	
	2765 0280	Slide VR	EWA-NAXCH1B14	1		
	3420 0050	Slide switch	SSE-22FP	1		
	4307 8880	Blank PCB M5161-CN4M	M110219-2	1		
	7) KEYBOARD PCB ASS'Y					
	2301 0101	Diode	1S2473-T-77-T	61	20	
	3720 9317	PC joiner M35J	PCJ-JPSS-6-22	2		
	3721 0350	PC joiner M88H	PCJ-JPSS-3-29	1		
	3721 0431	PC joiner M153Q	PCJ-JPSS-4-29	1		
	4307 5131	Blank PCB M493K-KY3M	M32083A-1	1		
	4307 9080	Blank PCB M612K-KY1M	M210213-1	1		
	4307 9090	Blank PCB M613K-KY2M	M210214-1	1		
	8) UPPER CASE ASS'Y					
1	3831 0266	Speaker	C120101	2		
2	6909 5880	SL contact 12S	CSB-12S	3	10	
3	6915 0420	Slide knob 90	M31032-26	6		
4	6915 1650	Upper case sub ass'y	M210195*2	1		
5	6915 1720	Console panel	M310209-2	1		
6	6915 1730	Key top set 254BA	M310376-2	1		
	9) KEYBOARD SET 61A					
7	6904 5160	KB spring A	M42123-1	61	50	
8	6904 5183	White key A	M31565C-1	5		
9	6904 5193	White key BE	M31566C-1	10		

Note: Q'ty -- Quantity used per unit
* -- Minimum order and supply quantity

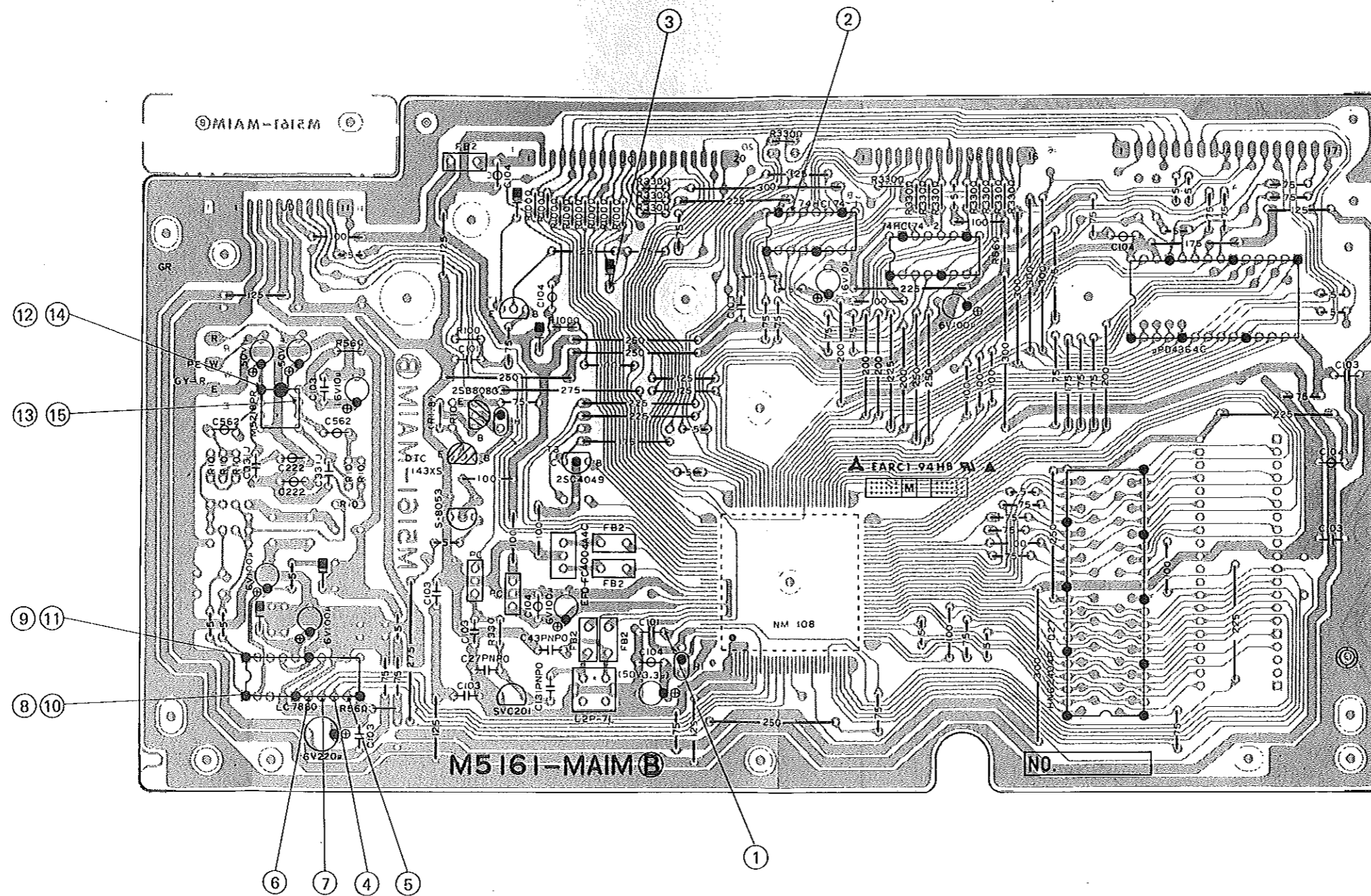
Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price
10	6904 5203	White key CF	M31567C-1	10		
11	6904 5213	White key D	M31568C-1	5		
12	6904 5223	White key G	M31569C-1	5		
13	6904 5233	White key S	M31570C-1	1		
14	6904 5244	Black key	M31571D-1	25		
15	6904 7530	KB damper 61	M21084-1	1		
16	6905 7920	Key stopper 61A	M42126-2	1		
17	6901 6162	S felt 61C	M4925B-1	1		
18	6904 5281	Rubber switch G	M31553A-1	4		
19	6904 5291	Rubber switch H	M31554A-1	1		
20	6904 7542	Felt (upper)	M42105B-1	1		
21	6905 7930	Key guide A	M31937-1	4		
22	6905 7940	Key guide B	M31938-1	1		
23	6911 9812	Key seal A	M31730B-1	4	20	
24	6911 9822	Key seal B	M31731B-1	1	20	
25	6914 1540	KB chassis 257	M210119-1	1		
10) LOWER CASE ASS'Y						
26	6912 6427	Battery cover sub ass'y	M31520G*10	1		
27	6913 8330	Rating plate	M41157-41	1		
28	6915 1550	Lower case sub ass'y	M210200*2	1		
29	6902 3900	Rubber foot	M41109-1	5	10	
30	6902 6140	Battery spring 90	M41226-1	1	10	
31	6903 2150	Battery spring B	M41330-1	1	10	
32	6905 3280	Battery blind	M31490-2	1		
11) OTHERS						
	6909 9890	Note stand	M3373-2	1		
	6915 2050	Dust cover	M310376-2	1		

Note: Q'ty — Quantity used per unit
* — Minimum order and supply quantity

EXPLODED VIEW

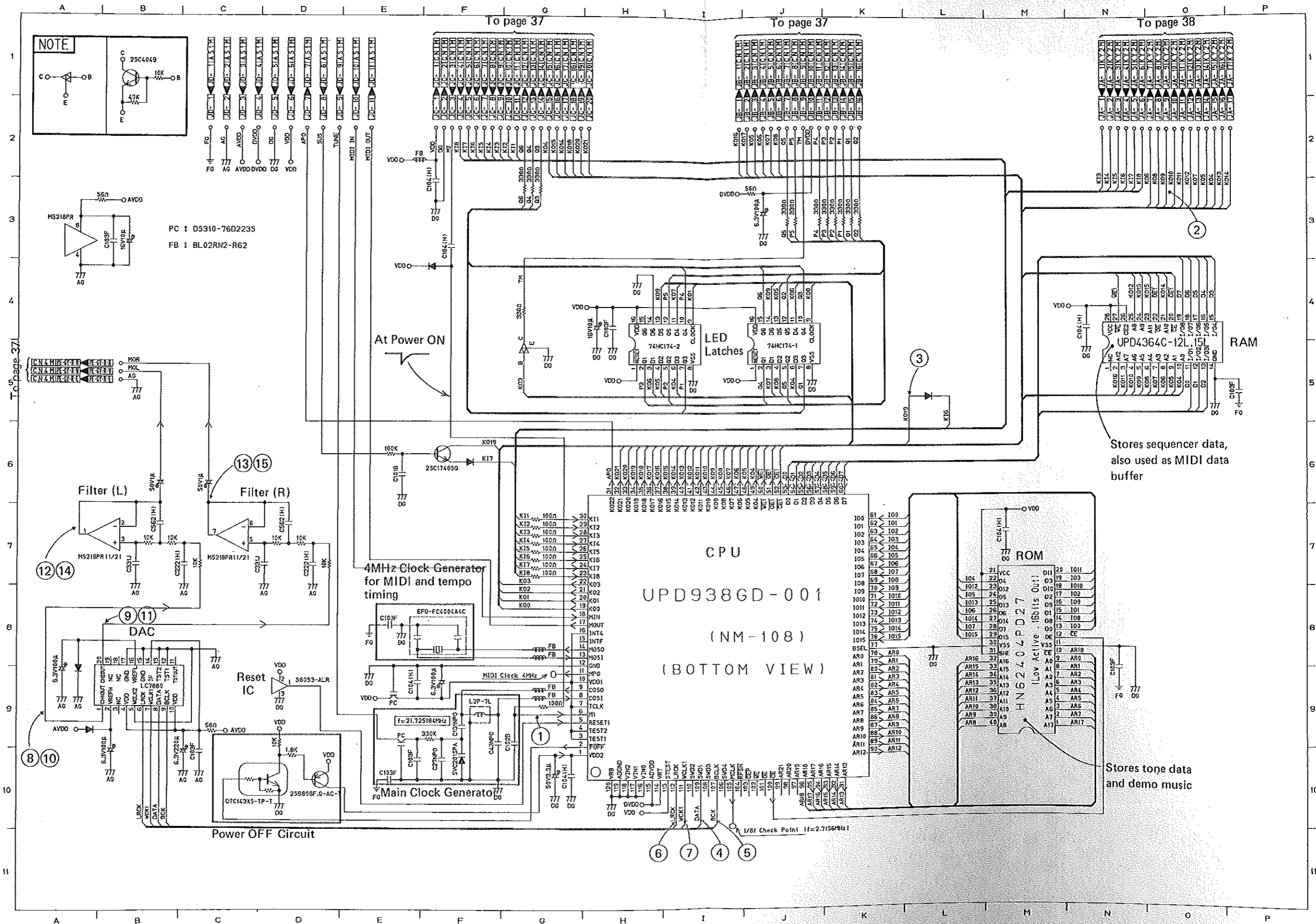


PCB VIEW



SCHEMATIC DIAGRAM

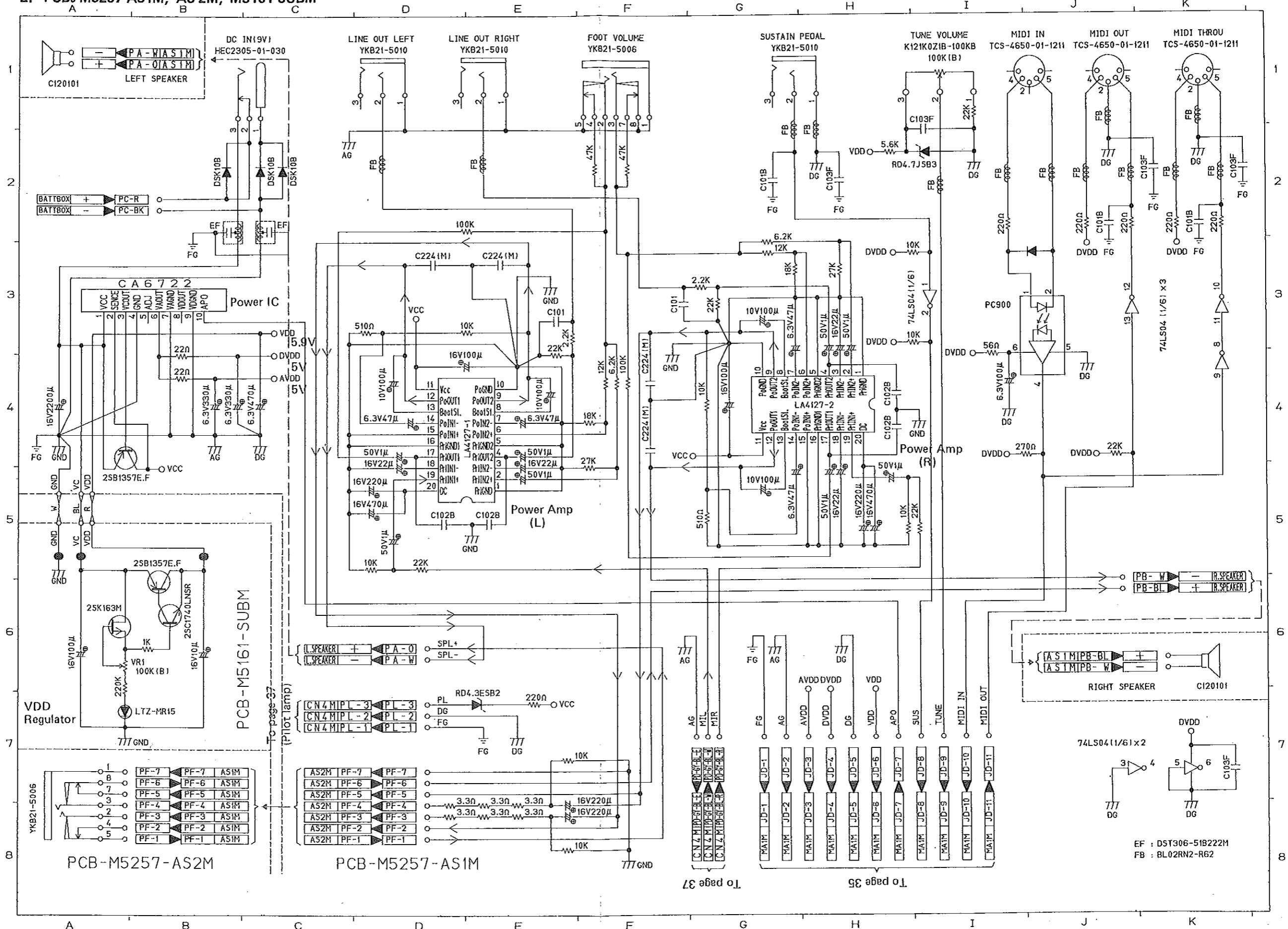
1. PCB M5161-MA1M



To page 37

To page 38

2. PCBs M5257-AS1M, AS-2M, M5161-SUBM



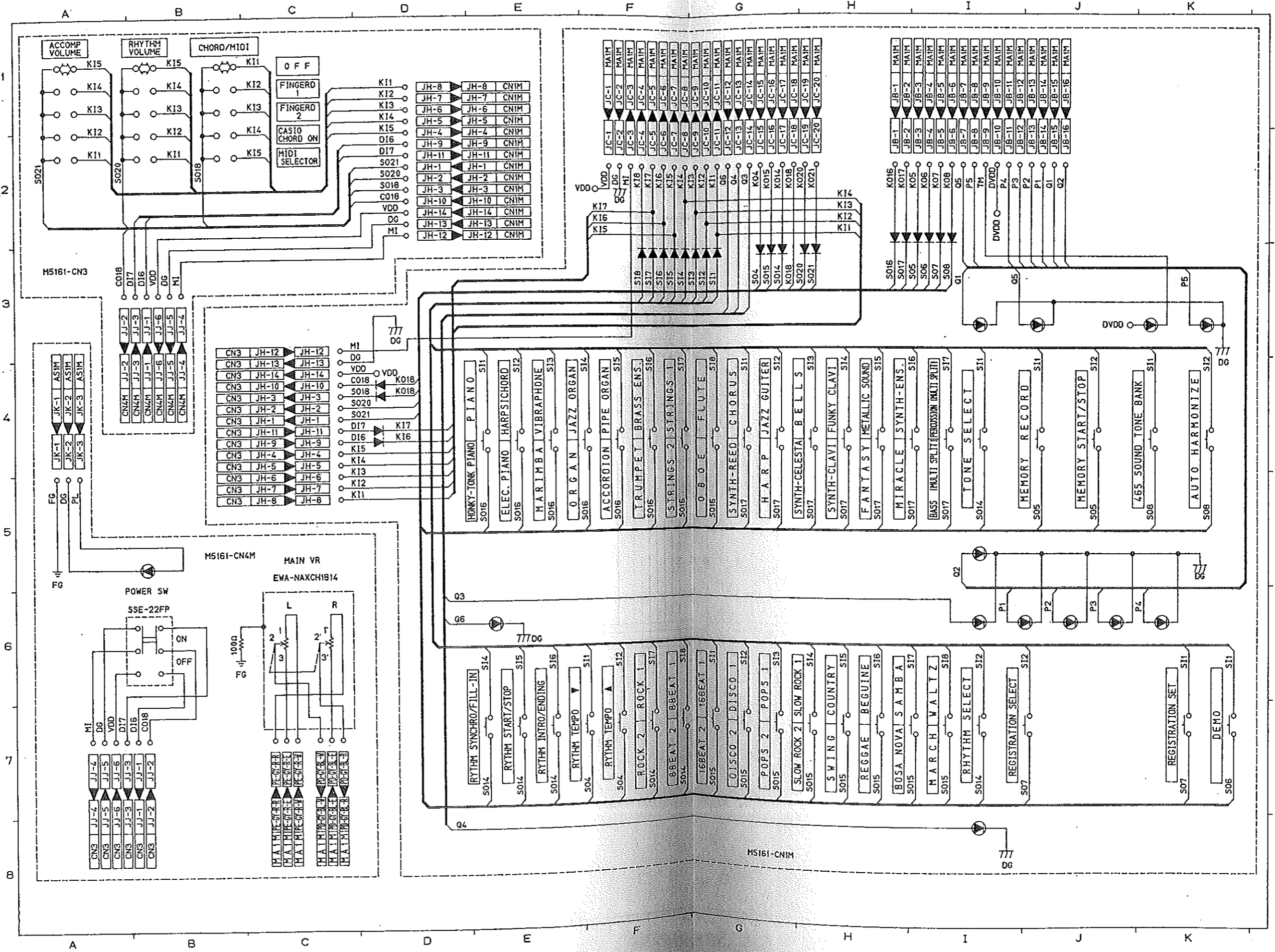
EF : DST306-51B222M
FB : BL02RN2-R62

To page 37

To page 35

3. PCBs M5161-CN1M, CN3, CN4M

MIDI THRU
5-4650-01-1211



4. PCBs M612K-KY1M, M613K-KY2M, M439K-KY3M

