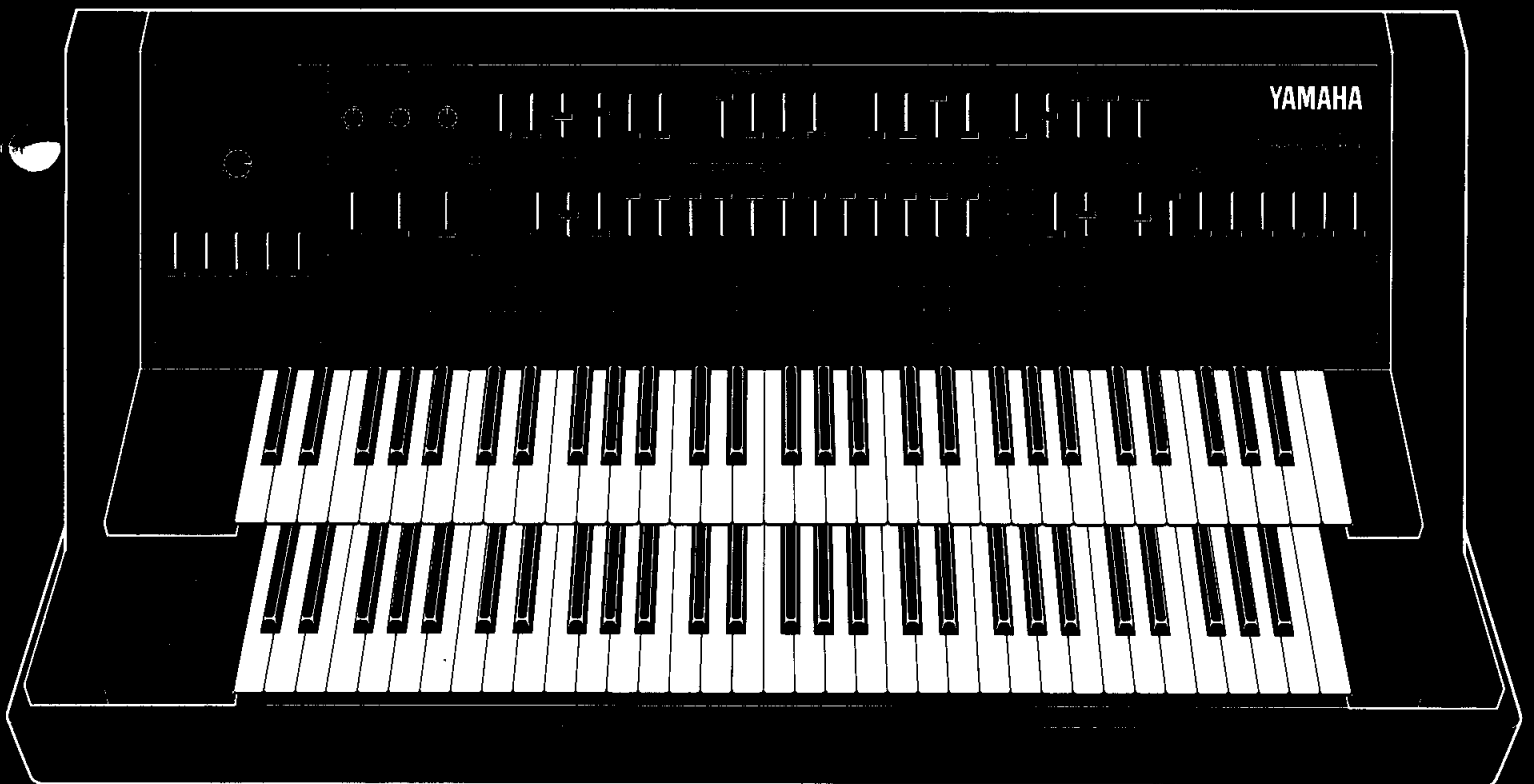


# YAMAHA

# SK50D

SYMPHONIC ENSEMBLE

OWNER'S MANUAL



# INTRODUCTION · CONTENTS

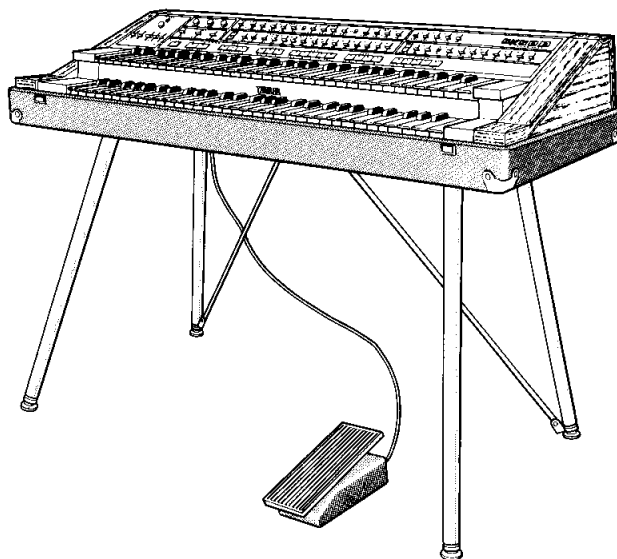
Thank you very much for your purchase of the Yamaha SK50D Symphonic Ensemble. Incorporating a new Yamaha-developed LSI and the latest digital electronic technology, the SK50D offers a tremendous variety of functions and sound creation possibilities making it ideal for live performance or studio applications. The SK50D features dual 61-key keyboards and a versatile combination of polyphonic organ, synthesizer and strings plus a solo synthesizer section that offers a number of unique keyboard touch response effects. The SK50D also accepts an optional bass pedal unit as well as several foot controllers and foot switches that afford extensive sound control capability during performance.

The wide-ranging versatility and flexibility provided by this remarkable multi-function instrument will undoubtedly be of great value to both the professional and amateur keyboardist.

We urge you to read the contents of this Owner's Manual carefully in order to make full use of all the capabilities of the SK50D.

## CONTENTS

	Page
PRE-USE CAUTIONS . . . . .	2
FEATURES AND FUNCTIONS . . . . .	3
CONNECTIONS: BASIC SETUP . . . . .	5
OPTIONS . . . . .	6
OPERATION: OUTPUT . . . . .	7
PITCH . . . . .	8
ORGAN . . . . .	9
POLY-SYNTH/STRING . . . . .	11
VIBRATO . . . . .	13
BASS . . . . .	14
SOLO SYNTHESIZER . . . . .	15
TREMOLO/ENSEMBLE . . . . .	20
BLOCK DIAGRAM . . . . .	21
SOUND MEMO . . . . .	22
SPECIFICATIONS . . . . .	25
SERVICE . . . . .	26



# PRE-USE CAUTIONS

Be sure to read the following points carefully before operating your Symphonic Ensemble.

## LOCATION

When setting up your Symphonic Ensemble, avoid placing it in direct sunlight or close to a source of heat. Also avoid locations subject to vibration, excessive dust, cold or moisture.

## POWER CORD

In order to prevent damage to or shorting of the power cord, never remove the power plug from the wall socket by pulling on the power cord. Always grip the power plug directly.

If you will not be using your Symphonic Ensemble for an extended period of time, be sure to unplug the power cord.

## CLEANING

Do not use solvents such as benzine or thinner to clean

your Symphonic Ensemble as this may cause discoloration or staining of the panel. Use a soft, dry cloth.

## CONNECTION

Follow the "Connections" instructions given in this manual carefully when setting up your Symphonic Ensemble. Connection errors could lead to serious damage to the Symphonic Ensemble, amplifier and speakers.

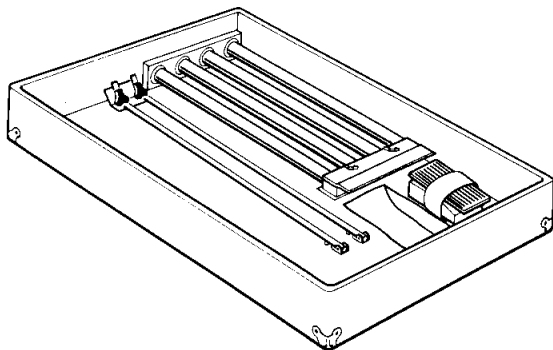
## OTHER APPLIANCES

Since your Symphonic Ensemble incorporates a considerable amount of digital circuitry, it is advisable to use it where it will not be influenced by electromagnetic radiation from appliances such as televisions, radios, etc.

## STAND ASSEMBLY

Four legs and two braces are stored in the upper section of the SK50D case. These are attached to the instrument in the following manner.

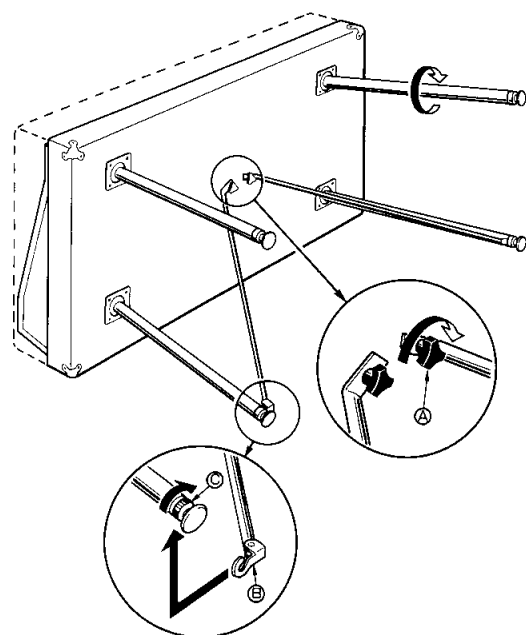
1. Remove the legs and braces from the upper section of the SK50D case, then securely close the case while assembling the stand.
2. Stand the instrument on the rear panel of the case and screw the legs into their sockets as shown in the illustration below.



### LIST

- Leg (4)
- Foot controller (FC-3A)
- Brace (2)
- Power cord

3. Attach the braces to the rear legs as shown below.
  - Loosely attach the braces to the underside of the SK50D with the screws (A).
  - Loosen the lock rings (B) on the rear legs and insert the brace hooks (C) between the legs and lock rings. Tighten the lock rings securely.
  - Finally, securely tighten the screws (A).



# SK50D FEATURES AND FUNCTIONS

The SK50D is basically composed of six sections: upper and lower organ, poly-synth, strings, bass and solo synthesizer. Each of these sections can function as a completely independent instrument or they can be combined and mixed to any desired degree of balance to create ensemble effects.

## Keyboard Range and Functions

Both the upper and lower SK50D keyboards have 61 keys covering a full five octave range ( $C_1$  ---  $C_6$ ). Sounds available on the upper keyboard are upper organ, covering the full five octave range, and solo synthesizer (normal mode) spanning a three octave range from  $C_3$  ---  $C_6$ .

In the normal mode of operation the lower keyboard offers lower organ, poly-synth and strings across its full five octave range. In the Manual Bass mode, however, the lowest 19 keys ( $C_1$  ---  $F\#_2$ ) are used for the bass or solo synthesizer (bass mode) sounds. In this case the poly-synth and strings sound are limited to the  $G_2$  ---  $C_6$  range. Bass and solo synthesizer output is single-note, high-note priority format. All other sections offer full 7-note polyphonic capability for the upper and lower keyboards, respectively.

## Rear Panel

In addition to a MIXED (all sections) output, the SK50D rear panel offers independent outputs for each section for connection to an external mixer or multi-amp system. Optional foot controllers and foot switches can also be connected providing convenient foot control of certain sound parameters during performance. In particular, the inclusion of a PEDALS jack for connection to an optional bass foot pedal unit affords greatly improved performance versatility.

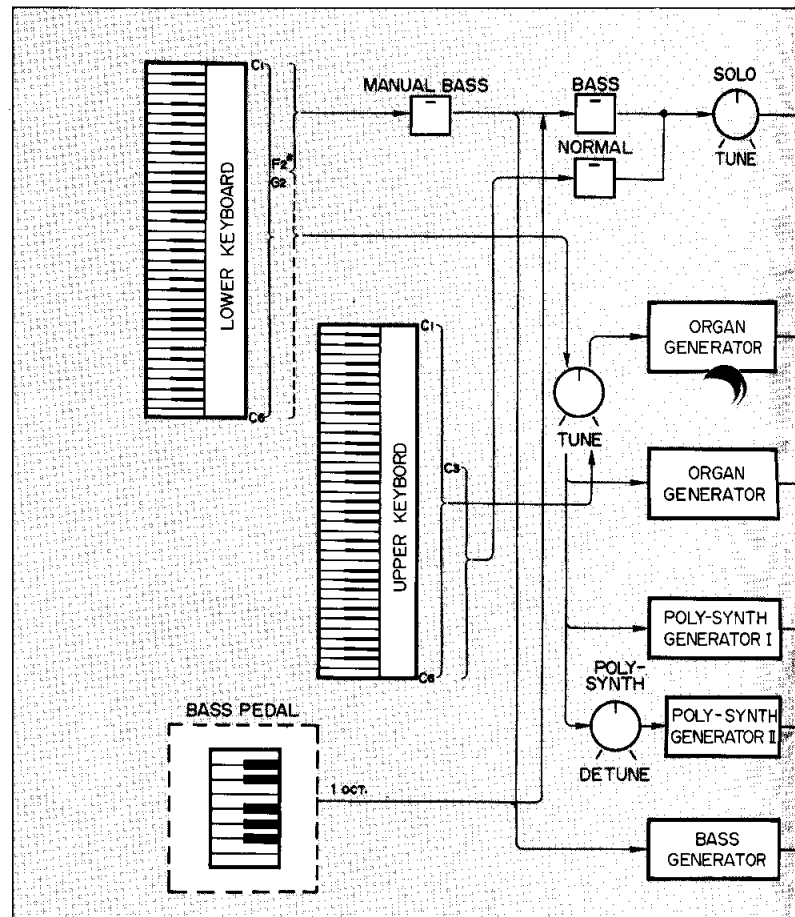
## Organ (Upper and Lower)

The upper and lower organ sections are played on the upper and lower keyboards, respectively. The lower organ section offers two preset sounds, while the upper organ offers three. In addition to the preset sounds the tone color of the upper organ section can be set manually using drawbar-type tone levers. In addition to manually set sounds the three upper organ preset sounds are affected by settings of the DECAY, SUSTAIN and PERCUSSIVE controls so it is possible to introduce volume and tone color variation to the preset sounds during the period of a note or chord. The lower organ preset sounds maintain constant volume and tone color.

## Poly-Synth and Strings

The organ and poly-synth (strings) sections each offer full 7-note polyphonic capability.

The basic difference between the organ and poly-synth sections is the tonal color of the sound source. Organ sounds are created by adding or subtracting harmonics using the drawbar-type levers. The poly-synth sounds are created by passing a harmonic-rich signal through a controllable filter which selectively removes certain harmonics. Since this filter can be controlled directly by the poly-synth envelope generator (ADSR), it is possible to produce sounds which change in tonality as they are played. This permits the production of a variety of voices including brass-like sounds.



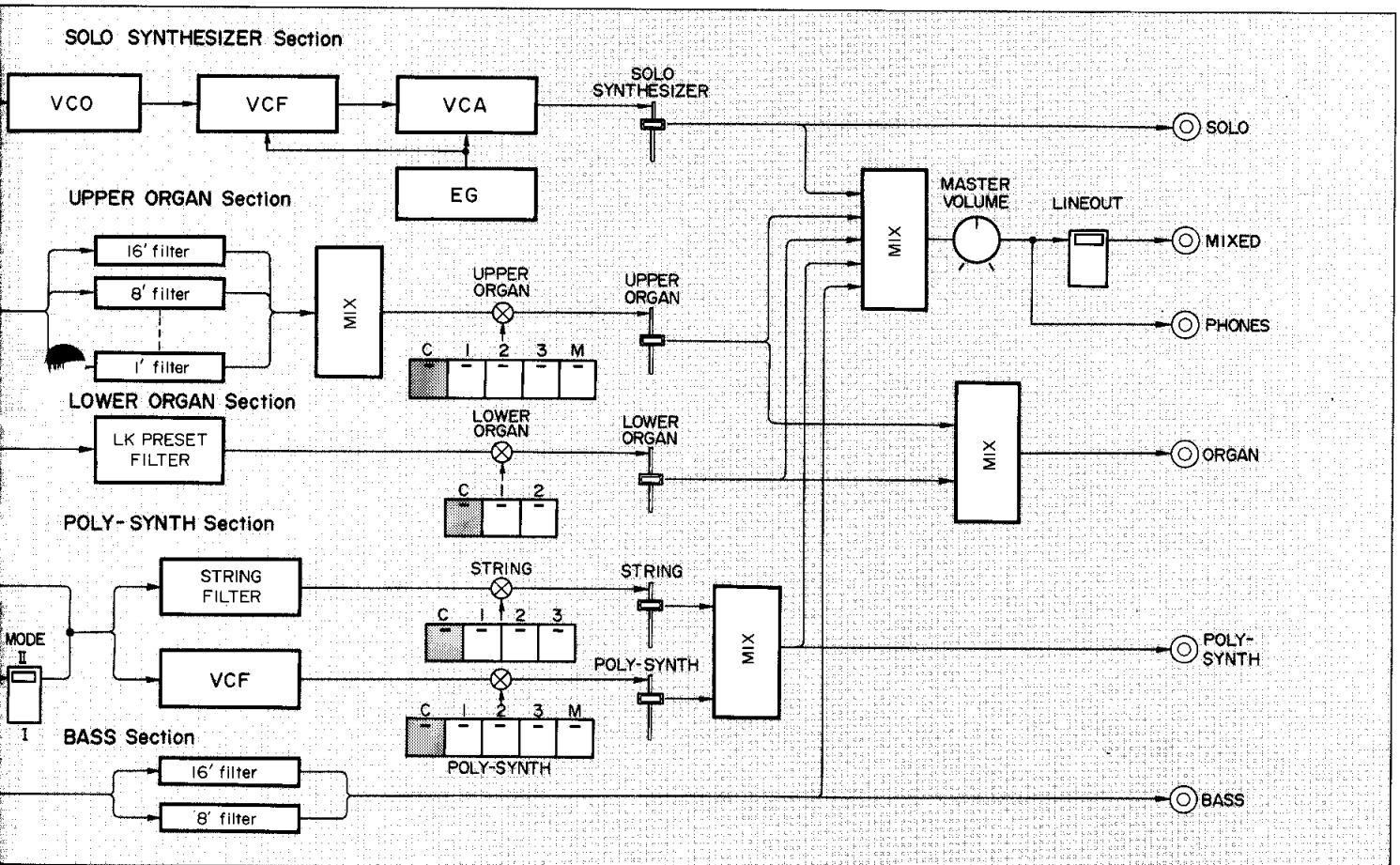
## Bass

This section provides an independent set of tone generators and controls for a deep, rich organ bass sound. Included are 16', 8', and 8' "attack" stop levers, as well as sustain and brilliance controls. The organ bass sound is controlled from either the lower "manual bass" section of the lower keyboard or the optional bass pedals.

## Solo Synthesizer

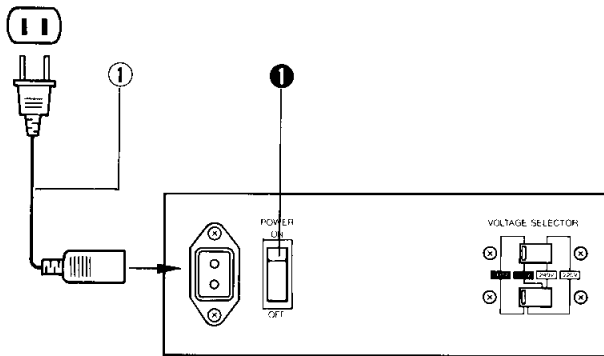
The solo synthesizer has a single voltage controlled oscillator (VCO), and allows full control of pitch, waveform shape, filter (VCF), volume (VCA), and envelope generator (EG) functions. Also, the keyboard after-touch response gives the player the ability to add vibrato, modulation and brilliance variations by depressing the keys slightly harder. These features give virtually unlimited variations in sound for a single-note (high-note priority when playing more than one note) performance. This makes the solo synthesizer section ideal for lead lines, and is especially effective when played simultaneously with the organ or strings sections.

As we have seen, the SK50D upper/lower organ, poly-synth, solo synthesizer, bass and strings sections each have their own particular features and capabilities. This design makes the SK50D a truly versatile multi-keyboard that, with thorough understanding and a little practice, permits the musician to greatly expand the scope of his musical expression. In order to fully understand these capabilities, it is advisable to experiment with the controls of the SK50D as you go through each section of this manual. Be sure to connect your SK50D to a sound system with ample power and wide-range speakers (such as Yamaha EM-150BII and S0410H or S4115H speakers) so that the tonal characteristics of the sounds you create may be fully appreciated.



The SK50D does not incorporate a built-in power amplifier. For this reason, when sound output other than via headphones is required, an external keyboard amplifier or power amplifier and speaker must be used.

## Power Supply Connection



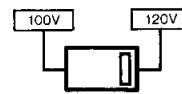
### ① POWER CORD

The power cord plug is inserted into an AC power socket providing the standard line voltage for your area.

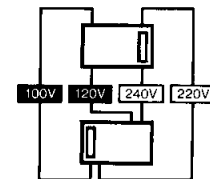
### \*VOLTAGE SELECTOR

Before turning the unit on, make sure that the rear-panel voltage selector is properly set according to the line voltage in your area.

### US & CANADIAN MODELS



### GENERAL MODEL



## Amplifier / Speaker Connection

### OUTPUT BLOCK

Output level from all output block jacks is  $-10\text{dBm}/600$  ohms. This level is ideal for direct input to any standard keyboard amplifier.

### ② MIXED OUTPUT

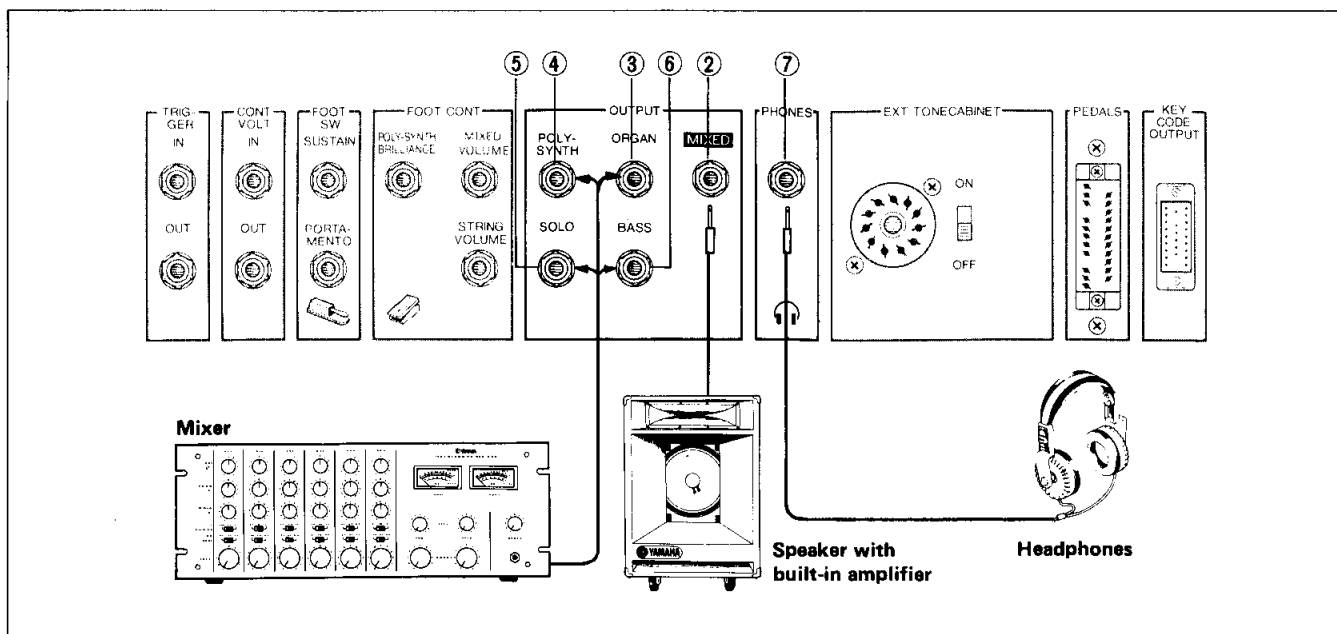
This output is primarily intended for use with a single-channel (monaural) amplifier and speaker. This jack provides output from the organ, poly-synth, strings, solo synthesizer and bass sections. Overall output level can be controlled by the MASTER VOLUME control in the OUTPUT block on the front panel.

### ③, ④, ⑤, ⑥ INDIVIDUAL OUTPUTS

Independent organ, poly-synth (strings) solo synthesizer and bass output jacks are provided for use with an external mixer or multi-channel amplifier and speaker(s). The output levels of these jacks are separately controlled by the independent front-panel OUTPUT block volume levers, but are not affected by the MASTER VOLUME control.

### ⑦ HEADPHONE JACK

For connection to standard stereo headphones. Headphone jack output is the same combination of organ, poly-synth, strings, solo synthesizer and bass signals as the mixer output jack.



# CONNECTIONS      OPTION CONNECTORS AND ACCESSORIES

The versatility of the SK50D can be enhanced greatly through the use of various accessory connectors on the rear panel. Bass pedals (BP2), foot controllers (FC-3A, FC-4), an external tone cabinet, and even another Yamaha synthesizer may be interfaced with the SK50D for an even more creative performance.

## Option Connections

### ⑧ KEY CODE OUTPUT

This multi-pin connector carries a digital code representing the notes played on the SK50D keyboard. Connection to a Yamaha polyphonic keyboard equipped with a KEY CODE input will allow that keyboard to be "played" from the SK50D.

### ⑨ BASS PEDAL CONNECTOR

The optional BP2 1-octave bass pedal unit attaches to this connector.

### ⑩ EXTERNAL TONECABINET CONNECTOR

An 11-pin connector and output switch for connection to a Leslie rotating speaker unit (model #715, #815, etc.). When connected to a Leslie speaker, the SK50D front panel tremolo ON/OFF and speed switches directly activate the appropriate Leslie functions. For details refer to the Tremolo/Ensemble section in this manual.

\* Be sure to turn the EXT TONECABINET output switch off when no Leslie speaker unit is attached.

## FOOT CONTROLLER CONNECTIONS

### ⑪ MIXED VOLUME

An FC-3A foot controller unit plugged into this jack controls the overall volume of the organ, poly-synth, strings and solo synthesizer sections.

### ⑫ STRING VOLUME

Permits independent foot volume control of the strings section.

### ⑬ POLY-SYNTH BRILLIANCE

Permits foot control of poly-synth brilliance (tonal color).

## FOOT SWITCH CONNECTIONS

### ⑭ SUSTAIN

Connecting a foot switch to this jack permits foot operated sustain ON/OFF switching.

\* The function of the sustain foot switch is exactly the same as the front-panel sustain switch ⑩, ⑳. When using a foot switch for sustain control the front-panel sustain switch should be set to ON. The length of sustain is controlled by the front-panel sustain lever, ⑪, ㉓.

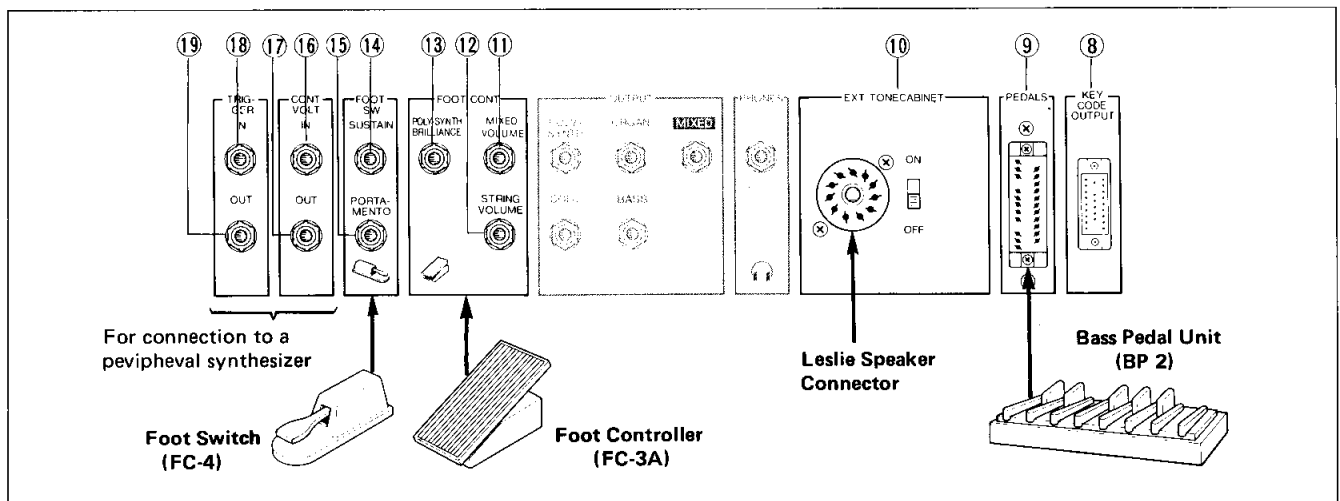
### ⑮ PORTAMENTO

Permits ON/OFF foot control of solo synthesizer portamento. Portamento length is controlled by the front-panel portamento lever ㉔. If the portamento lever is set all the way to the "S" end of the scale, activating the foot switch will produce no portamento effect.

### ⑯, ⑰ CONTROL VOLTAGE INPUT/OUTPUT

### ⑱, ⑲ TRIGGER INPUT/OUTPUT

These connectors allow the SK50D solo synthesizer section to be interfaced with any other Yamaha synthesizer so that the peripheral synthesizer may be "played" from the SK50D keyboard. In this way the performer can add any number of extra oscillators and filters to the solo synthesizer signal to create an even "fatter" solo sound in conjunction with the organ, poly-synth and strings. For details on use of the Control Voltage and Trigger interface jacks, refer to the owner's manual of the optional synthesizer.



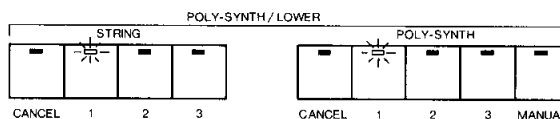
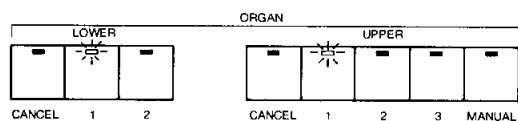
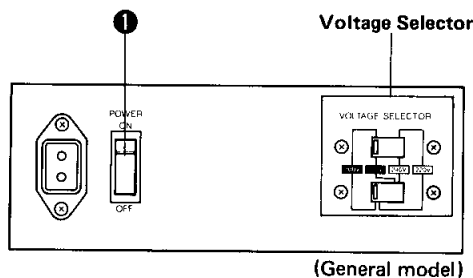
Once all necessary connections have been made, double-check to be sure that no errors have been made. If a connection error goes unnoticed and power to the SK50D is switched on, there is a possibility of damaging both the SK50D and its related power amplifier, speakers, etc.

The following is a block-by-block description of the SK50D control functions. As you read through the manual, try the controls as they are described with the SK50D MIXED output connected to an amplifier and speaker.

## 1 POWER SWITCH

The SK50D power switch is located next to the power cord on the rear panel. When the power switch is turned on, the UPPER ORGAN 1, LOWER ORGAN 1, STRING 1 and POLY-SYNTH 1 preset buttons will automatically engage and their respective indicator lamps will light.

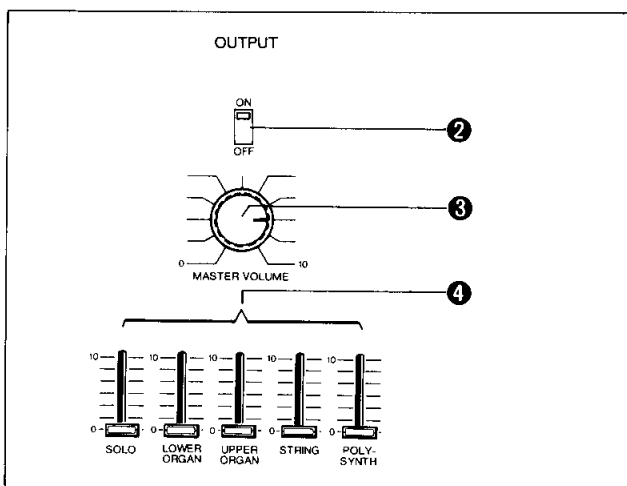
**\*Be sure the rear-panel voltage selector switch is properly set for the line voltage in your area. Avoid accidental alteration of the voltage selector switch setting.**



Settings shown automatically initiated when power switched ON.

## OUTPUT BLOCK

In this condition (power switched on) the SK50D is ready to play using the preset organ, poly-synth and string sounds. The level and balance of the preset sounds can be adjusted by the OUTPUT block controls. In order to use the solo synthesizer section, however, an appropriate sound must be set using the solo synthesizer controls.



**\* Output to an external tone cabinet (Leslie speaker) is also adjusted by the master volume control.**

## 4 SOLO, ORGAN (UPPER & LOWER), STRING AND POLY-SYNTH VOLUME CONTROLS

The volume of the solo synthesizer, organ, strings and poly-synth sections are independently adjusted by these controls. They are particularly useful for creating the desired balance between sections.

Raising the volume levers increases the volume of the respective sections. With the appropriate, volume levers raised, you can play the keyboard using any of the upper organ, lower organ, strings and/or poly-synth preset sounds. If any of the preset group CANCEL buttons are pressed, the sound from the respective section(s) will be cut off regardless of the volume lever setting.

**\* By setting the solo synthesizer section controls to the Basic Setting given on the following page, you will be able to use solo synthesizer sound as well as the organ, strings and poly-synth preset sounds.**

## 2 LINE OUT SWITCH

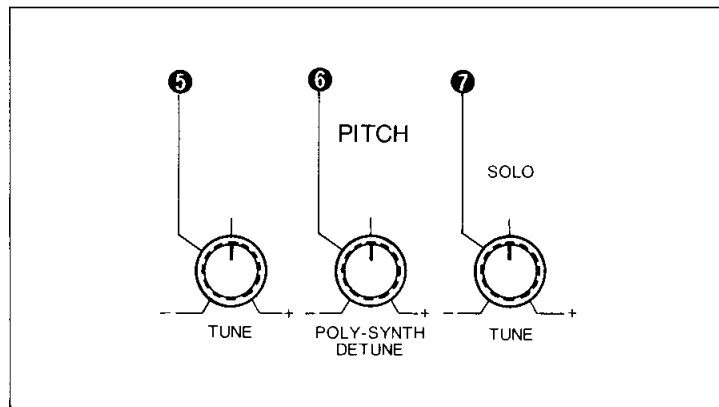
This switch turns output from the MIXED jack on or off. It has no effect on the individual or headphone outputs.

## 3 MASTER VOLUME CONTROL

Adjusts the volume of the mixed and headphone outputs.



This block permits tuning of the individual SK50D sections.



### 5 TUNE

Adjusts the overall pitch of the organ and poly-synth (strings) sections.

### 6 POLY-SYNTH DETUNE

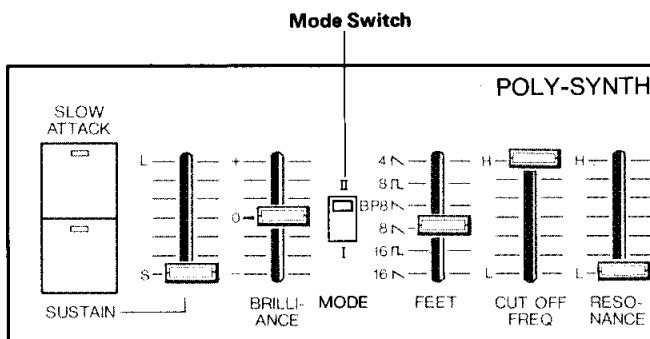
For creating special harmonic effects, this knob is used to offset the tuning of the poly-synth (strings) section.

**\*Poly-synth detune only functions when the poly-synth MODE switch is in the II position.**

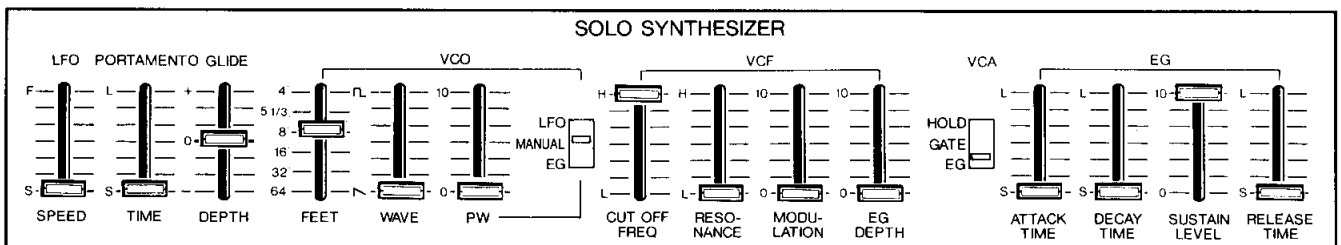
### 7 SOLO TUNE

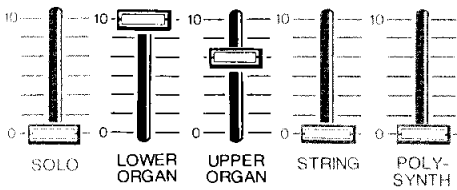
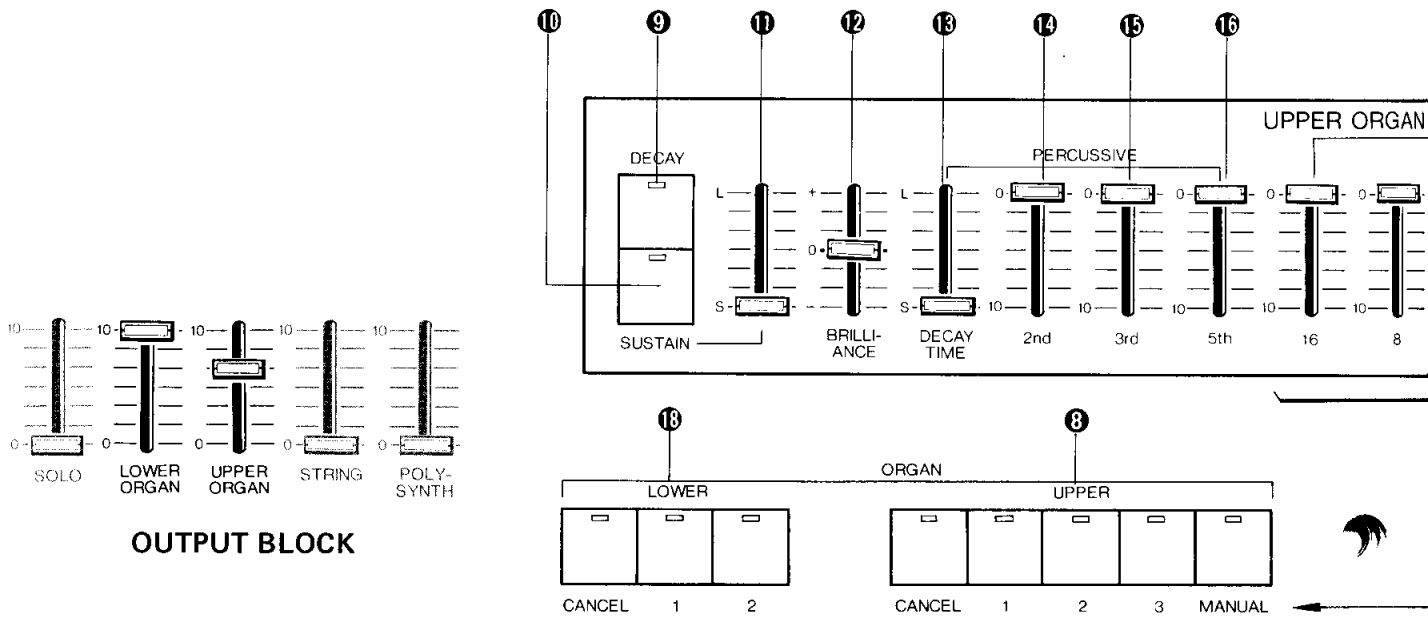
Adjusts the overall pitch of the solo synthesizer section. The TUNE control 5 has no effect on solo synthesizer pitch.

**\*Sound output from the solo synthesizer section can be obtained by pressing the solo synthesizer NORMAL MODE button and setting the section controls as shown below.**



## SOLO SYNTHESIZER BASIC SETTING





**OUTPUT BLOCK**

The organ section is divided into upper organ, to be played on the upper keyboard, and lower organ, to be played on the lower keyboard. Lower organ preset sounds are determined by the LOWER ORGAN selector switches, while upper organ preset sounds and the upper organ manual mode are determined by the UPPER ORGAN selector switches. The tonal color of the upper organ section can be freely adjusted using the tone levers when the MANUAL mode is selected. Unlike the lower organ preset sounds, the upper organ preset sounds are affected by the settings of the DECAY, SUSTAIN and BRILLIANCE controls.

## Upper Organ

Upper organ sounds are created by all controls in the front-panel UPPER ORGAN block when the upper organ manual mode is selected. All controls from the DECAY switch to the PERCUSSIVE 5th lever also function for upper organ preset sounds.

button permits tone variation using the manual tone levers. Pressing the CANCEL button completely cuts off output from the organ section.

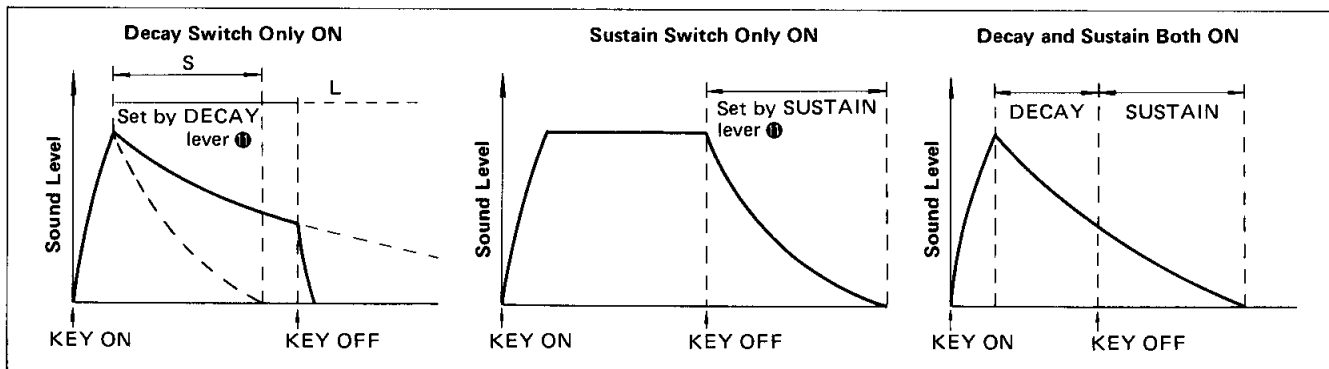
## 8 ORGAN SELECTOR SWITCHES

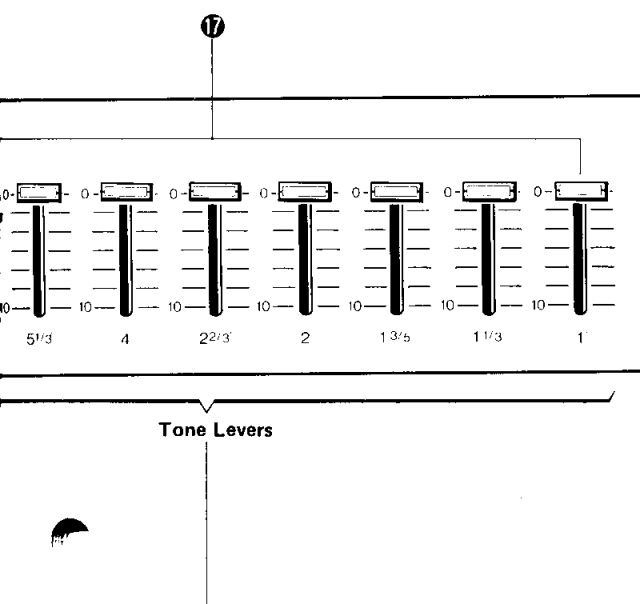
These switches permit selection of the organ section tonal color. ORGAN 1--3 are preset sounds, and the MANUAL

## 9 DECAY SWITCH

When the DECAY switch is turned on, the organ section behaves like a percussion instrument. If a note on the keyboard is pressed and held, the sound quickly reaches maximum volume and then fades out (decays). If the keyboard is released during the decay period, the sound is instantly cut off.

## DECAY AND SUSTAIN





The rate of decay is controlled by the lever ① adjacent to the decay switch. Pressing the decay switch a second time turns this function off.

## ⑩ SUSTAIN SWITCH

Turning the SUSTAIN switch on causes a note played on the keyboard to fade out gradually after the key is released. Length of sustain is controlled by the lever adjacent to the sustain switch.

Pressing the sustain switch a second time turns this function off.

**\* If both the decay switch ⑨ and sustain switch ⑩ are turned on, a note played will gradually decay regardless of keyboard attack or release.**

## ⑪ DECAY, SUSTAIN LEVER

This lever adjusts the length of decay and sustain when the respective functions are used. If this lever is set toward the "L" end of the scale, long, flowing decay or sustain will result.

**\* If both decay and sustain functions are switched off, the decay/sustain lever will have no effect on the sound.**

## ⑫ BRILLIANCE LEVER

Adjusts tone color. If the brilliance lever is set toward the "+" end of the scale, a bright, crisp sound results. Setting to the "-" end of the scale produces a softer sound.

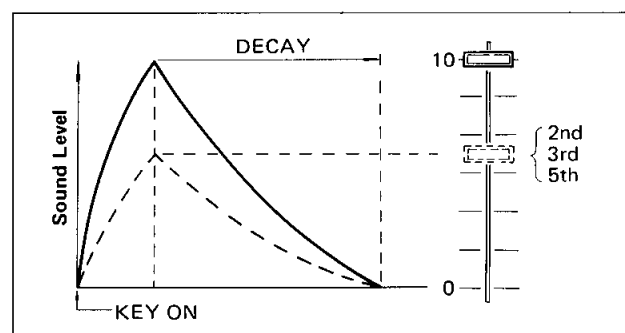
**\* Normally, the brilliance control should be set to its center (0, click stop) position. According to changes in the mood of the music it can then be operated to create an appropriately bright or soft atmosphere.**

## PERCUSSIVE LEVERS

### ⑬ DECAY TIME CONTROL, ⑭, ⑮, ⑯ 2ND, 3RD and 5TH HARMONIC CONTROLS

These controls adjust the tone color of the initial attack of a note thereby permitting production of a variety of percussive effects. The 2nd (second harmonic), 3rd (third harmonic) and 5th (fifth harmonic) levers, when set towards the "10" end of their scales, add the respective harmonics in proportions determined by the setting of the controls to the initial attack of notes played on the keyboard. The DECAY TIME control adjusts the length of decay of the percussive attack.

**\* No percussive effect is produced if a key is pressed while previously pressed keys are held.**



### ⑰ TONE LEVERS (16' --- 1')

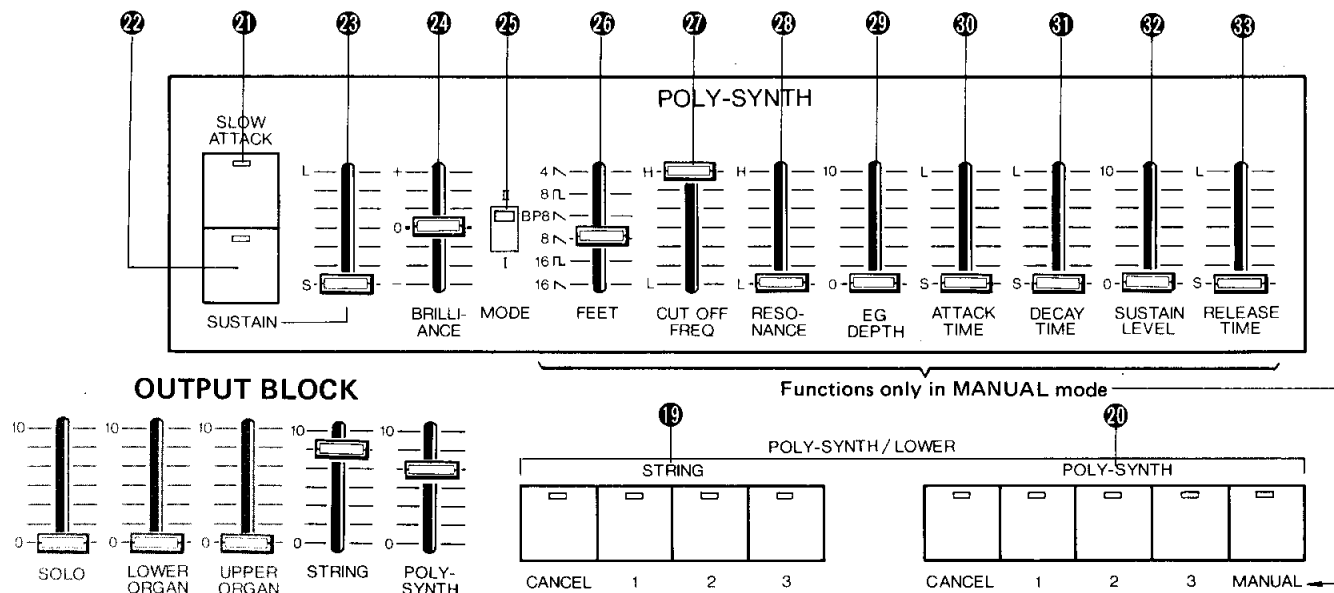
These levers become effective when the organ section is set to the manual mode. Ordinarily, the sound of an instrument is determined by the number and type of harmonics that are produced with its fundamental tone. The organ section, however, permits free selection and proportioning of harmonic tones to build up the desired tonal quality. The tone levers provide versatile control of tones from as low as 16' all the way up to 1'.

## ■ Lower Organ

Lower organ sounds are determined by the two LOWER ORGAN preset selector switches. When the SK50D power switch is initially turned on, the LOWER ORGAN 1 preset mode is automatically activated.

### ⑱ LOWER ORGAN SELECTOR SWITCHES

These switches permit selection of the lower organ section tonal color. LOWER ORGAN 1 and 2 are preset sounds, while pressing the CANCEL button completely cuts off output from the lower organ section.



## POLY-SYNTH / STRINGS

Poly-synth operating modes include three preset sounds and manual sound control in which front-panel controls permit adjustment of the sound envelope as well as the tonal color.

The strings section offers three preset sounds.

Since the poly-synth and strings sounds are generated by the same source, some of the poly-synth controls apply to strings as well.

### 19 STRINGS SELECTOR SWITCHES

Provide a choice of three preset strings sounds. When the power switch is initially turned on, the STRINGS 1 preset sound is automatically activated. If the CANCEL switch is pressed, output from the strings section is completely cut off.

**\* If a foot controller is plugged into the STRINGS jack of the rear panel FOOT CONT section, foot control of strings volume is possible. This facilitates smooth fade-in or fade-out of the string sound while playing.**

### 20 POLY-SYNTH SELECTOR SWITCHES

These switches provide selection of three preset poly-synth sounds as well as a manual mode in which tone color and envelope are determined by settings of the poly-synth section controls. When the power switch is initially turned on, the POLY-SYNTH 1 preset sound is automatically activated. If the CANCEL switch is pressed, output from the poly-synth section is completely cut off.

**\* If the strings and/or poly-synth cancel switches are turned on (19, 20) no sound output will be produced even if their respective independent volume controls are raised. This makes it convenient to cut off sound from the strings or poly-synth sections without affecting the settings of the volume controls.**

### 21 SLOW ATTACK SWITCH

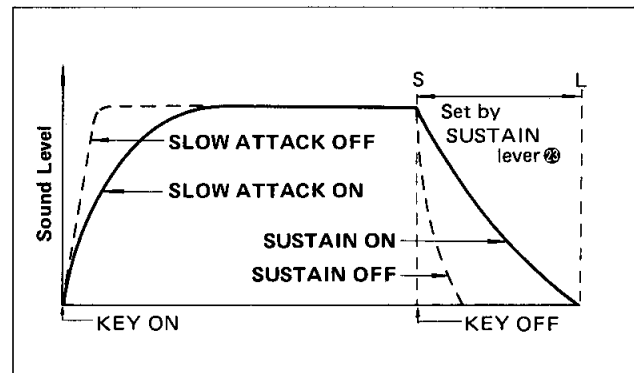
When this switch is turned on, the attack of notes played on the keyboard is delayed.

**\* The SUSTAIN lever 22 has no effect on the slow attack function.**

### 22, 23 SUSTAIN SWITCH AND LEVER

Turning this switch on causes notes played to decay (fade out) slowly once the keyboard is released.

Length of sustain is adjusted by the SUSTAIN lever.



**24 BRILLIANCE LEVER**

Adjusts tone color. This control functions for both poly-synth and strings sounds. Set towards the “+” end of the scale a bright, crisp sound results. Set towards the “-” end of the scale a softer sound is produced.

**25 MODE SWITCH**

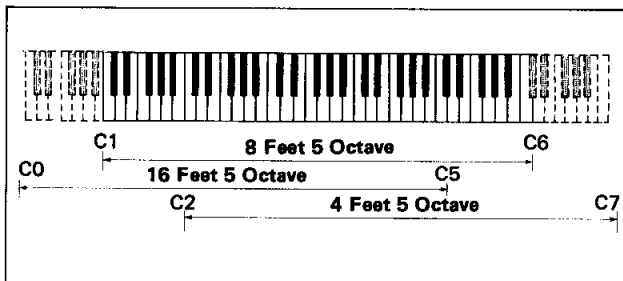
Selects the poly-synth tone generator. The poly-synth section incorporates two tone generators, the pitch of one of which can be offset in relation to the other. In mode II both tone generators function. In this mode the pitch of one of the tone generators can be varied with the pitch block TUNE and DETUNE controls to create varied harmonic effects. In mode I only the TUNE control affects tone generator pitch, and no detune effects can be created.

\* The slow attack switch 21, sustain switch 22, sustain lever 23, brilliance lever 24 and mode switch 25 all function for both poly-synth and strings sounds, including poly-synth preset sounds.

All levers to the right of the poly-synth FEET lever 26 are operative in the poly-synth manual mode only. Even when the poly-synth section is in the manual mode, no sound will be produced if the controls are improperly set. To begin with, set the controls to the positions shown in the illustration to the left and turn the MANUAL switch on.

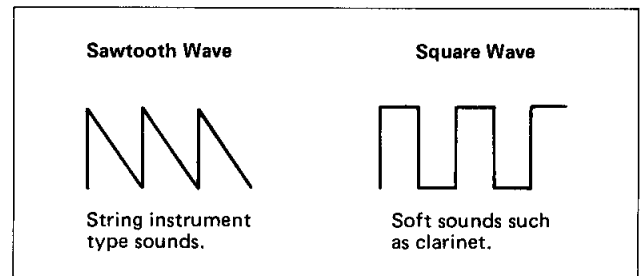
**26 FEET SWITCH**

Selects tone generator pitch, waveform and filter characteristics. In the 8' position, the keyboard covers a five octave range from C<sub>1</sub> to C<sub>6</sub>. In the 16' position the sound is one octave lower, and in the 4' position the sound is one octave higher.



**\* About Waveform**

The tone generator produces either a sawtooth wave ( / \ ) or a square wave ( □ ). The sawtooth waveform is most useful for producing string or brass instrument type sounds, while the square wave is ideally suited for producing the softer tones of clarinets, etc.



**27 CUTOFF FREQUENCY CONTROL**

Controls the overall tonal color in the manual mode. As the lever is moved from the “H” end of the scale to the “L” end, more and more of the sound’s upper harmonics are cut off producing a rounder, mellower sound. Set all the way to the “L” end of the scale even the fundamental tone is cut off and no sound is produced.

**28 RESONANCE**

Setting this lever to the “H” end of the scale produces a peak in the frequency response in the area of the cutoff frequency. This permits creation of a variety of sharp, “contrasty” sounds.

All levers from the EG DEPTH control 29 to the RELEASE TIME control 30 are used to adjust the tonal “shape” of the sound from the time it is initiated to the time it fades out or cuts off. In order to experiment with the envelope generator controls, set the cutoff frequency lever 27 to approximately the center of its scale.

**29 ENVELOPE GENERATOR DEPTH**

Controls the amount of tonal change produced by the four levers to its right. Setting to the “10” end of the scale produces a greater variation in tonality. If all the envelope generator levers are set to their minimum positions, no tonal variation will be produced. Set all the levers to their maximum positions and try out their effect one by one.

**30 ATTACK TIME**

Adjusts the time between keyboard attack and maximum tonal change in the sound. The more this lever is set to “L” end of the scale the longer it takes for maximum tonal change to occur.

\* Check this out by setting the attack time lever towards the “L” end of the scale and pressing a key.

## ④1 DECAY TIME

Adjusts the time required for the sound to return to its original tonality after maximum tonal change has been reached as determined by the attack time control.

The more this lever is set towards the "L" end of the scale the longer it takes for the sound to return to its initial tonality.

**\* If both attack time and decay time controls are set to their maximum positions the decay sound is exactly the reverse of the attack sound.**

## ④2 SUSTAIN LEVEL

Determines the constant tonal color that continues after the attack and decay functions have ended and the depressed key(s) is held.

The tone color determined by the sustain lever is the same as if it were set to "0" and the adjustment made using the cutoff frequency lever.

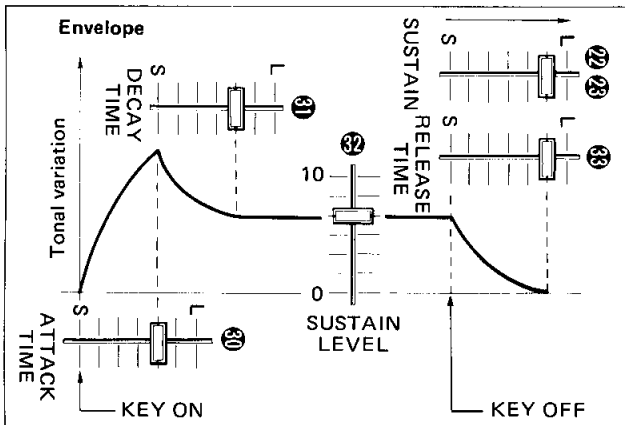
## ④3 RELEASE TIME

Adjusts the change in tone color that occurs after the keyboard has been released.

**\* If after setting this lever to the "L" end of the scale no tone variation is heard when the keyboard is released, turn the sustain switch ④2 on and set the sustain lever ④2 to the same position as the release time lever.**

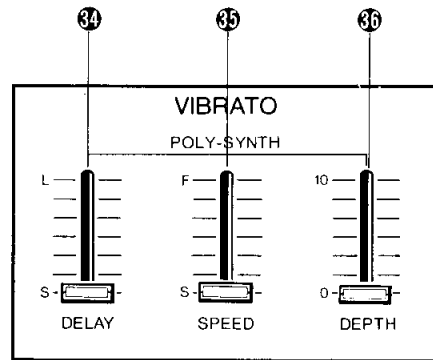
Setting the controls described above produces an envelope curve like the one shown below.

## ENVELOPE GENERATOR



**\* Once a key is pressed and the envelope initiated, pressing other keys produces no envelope effect. Further, if a number of pressed keys are released one by one, the last key released initiates the release time function.**

## VIBRATO BLOCK



The vibrato function permits addition of delay vibrato (the vibrato effect gradually appears after a key is pressed) to the poly-synth and strings sounds.

## ④4 DELAY

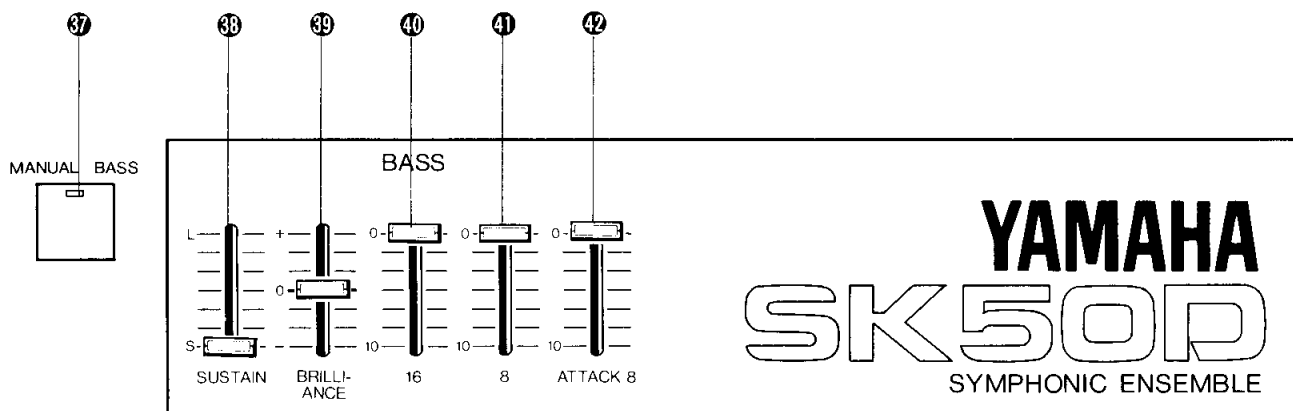
Adjusts the time between keyboard attack and the beginning of the vibrato effect. The more this lever is set toward the "L" end of the scale, the longer it takes for the vibrato effect to begin.

## ④5 SPEED

Determines the speed of the vibrato. Setting toward the "F" end of the scale produces a faster vibrato effect.

## ④6 DEPTH

Determines the strength of the vibrato effect.



The bass section can be played using either the lower-keyboard **MANUAL BASS** keys or an optional bass pedal unit (BP2). Bass section output is single-note, high-note priority format. If the **MANUAL BASS** switch is pressed, the bass section can be played using the lowest 19 keys (C<sub>1</sub> --- F<sub>2</sub>, 1-1/2 octaves) of the lower keyboard. The remaining lower keyboard (G<sub>2</sub> --- C<sub>6</sub>) can be used for lower organ, and/or poly-synth (strings).

### 37 MANUAL BASS SWITCH

This switch should be turned on when the **MANUAL BASS** section of the lower keyboard is to be used.

**\* If the optional bass pedal unit is connected to the rear-panel PEDALS connector, the pedals can be played whether the MANUAL BASS switch is turned on or off. If the MANUAL BASS switch is turned on, both the pedals and the lower-keyboard manual bass section are operative. If, however, a pedal note and a manual bass note are played simultaneously, the highest bass note played will be output.**

**\* If the solo synthesizer BASS mode is selected, both the solo synthesizer bass and bass section sounds will be output when either the bass pedals or manual bass keys are played.**

### 38 SUSTAIN LEVER

Although the bass section sound usually cuts off immediately a key is released, gradually diminishing bass volume (sustain) can be added by setting the **SUSTAIN** lever above its minimum ("S") position. The more this lever is set toward the "L" end of the scale, the longer the sustain.

### 39 BRILLIANCE LEVER

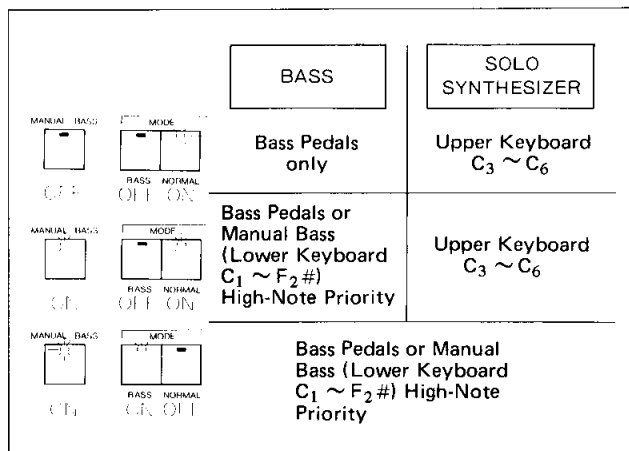
Adjusts tone color. Normally this lever should be set to its center (0, click stop) position. Setting toward the "+" end of the scale produces a bright, crisp sound. Setting toward the "-" end of the scale produces a softer sound.

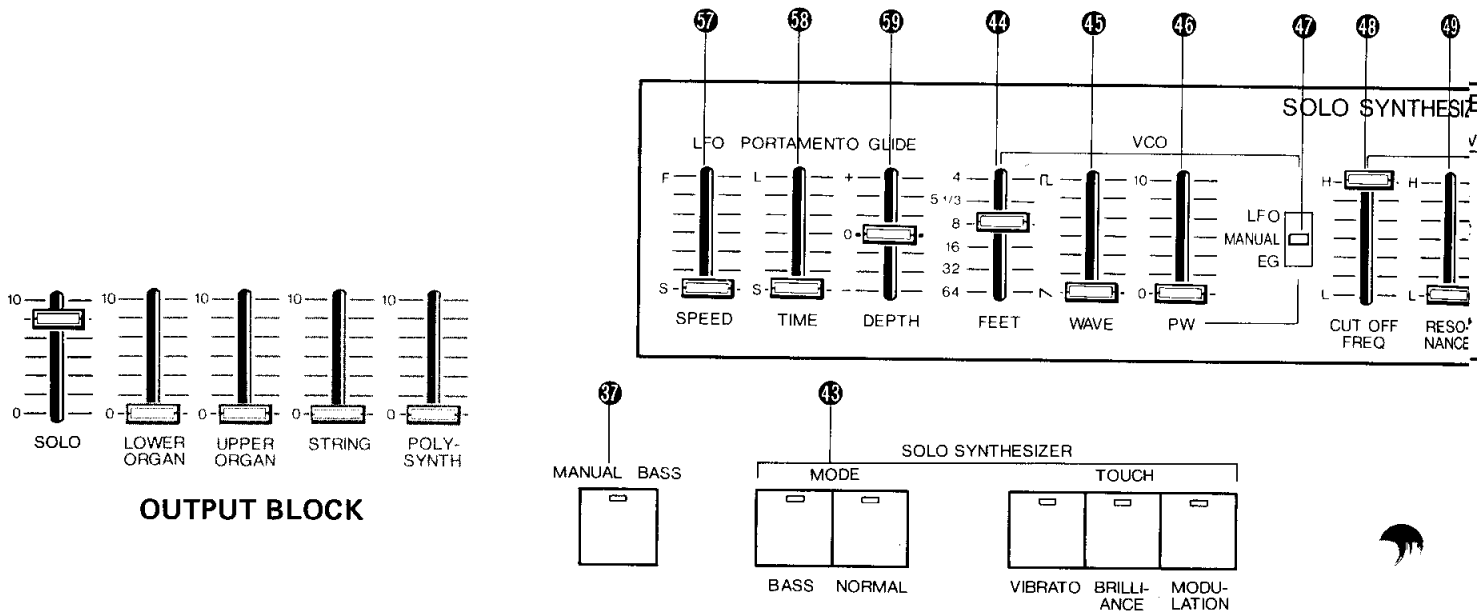
### 40, 41, 42 16', 8', ATTACK 8' TONE LEVERS

These levers adjust bass tonality and volume. Since no independent bass volume control is provided in the **OUTPUT** block, these levers are used to control bass tonality as well as volume permitting setting up of optimum balance between the bass and other sections. The **ATTACK 8'** lever affects tonal quality only at the very beginning of each note creating a percussive accent.

**\* The sustain lever has no effect on the ATTACK 8' effect. To create a bass guitar effect, add sustain to the 16' and 8' sounds, then add the percussive string effect using the ATTACK 8' lever.**

**\* When not using the bass section, set all bass section tone levers to their minimum positions ("0"). Particularly when a bass pedal unit is used, the tone levers are the only means of completely cutting off the bass sound.**





The solo synthesizer section uses variable control voltages in VCO, VCF and VCA circuitry to produce changes in pitch, tone color and volume. In order to use the solo synthesizer section it is necessary to make appropriate settings of the controls in each of its blocks. As a starting point, set the solo synthesizer controls to the positions shown above..

## 43 MODE SELECTOR SWITCHES

If the NORMAL mode is selected, the solo synthesizer can be played on the upper  $C_3$  ---  $C_6$  keys (single note, high note priority). In order to use the optional bass pedal unit (connected to the rear-panel PEDALS connector) select the BASS mode. Selecting the MANUAL BASS mode permits the solo synthesizer to be played on the lowest 19 keys of the keyboard (1-1/2-octaves).

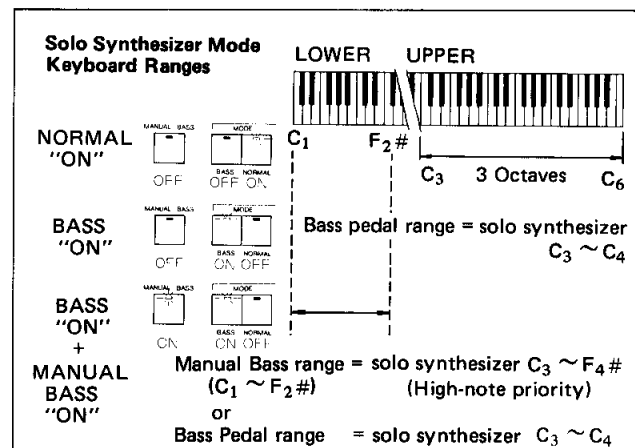
### \* About High Note Priority

The solo synthesizer provides single note, high note priority output. This means that if a number of keys are pressed simultaneously, only the highest key pressed will be effective. Further if a key is held and a higher key is subsequently pressed, the sound will shift to that of the higher key. If, however, 7 keys are being held, pressing a higher key will produce no shift in sound.

## 37 MANUAL BASS

If the MANUAL BASS switch is pressed while the solo synthesizer is operating in the bass mode, output will be transferred to the lowest 19 keys of the manual keyboard (equivalent to the  $C_3$  ---  $F_{\#4}$  range in the normal mode).

**\* In the manual bass mode, only the solo synthesizer sound can be produced on the lower 19 keys of the keyboard. In this condition organ and/or poly-synth (strings) will not function in the manual bass range.**



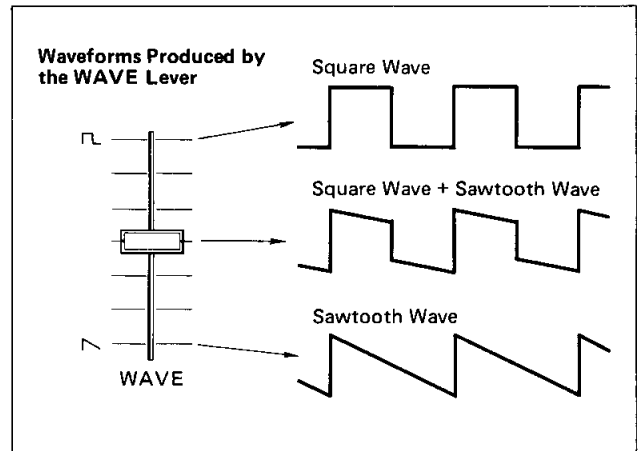
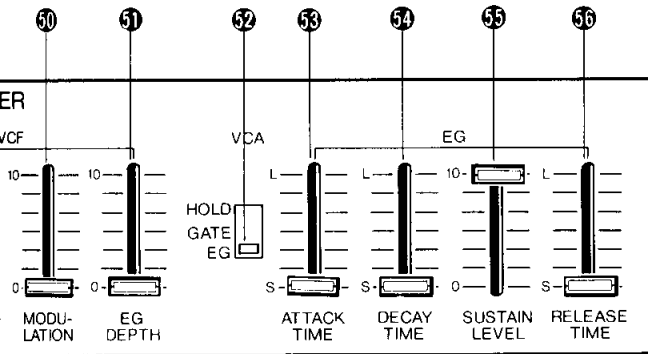
## VCO (Voltage Controlled Oscillator)

In contrast to the organ section in which tonal color is created by adding harmonic tones with the tone levers, the synthesizer begins with a harmonic-rich waveform and uses filters to remove certain harmonics to create tone color variations.

The VCO is the synthesizer's source of harmonic-rich sound, utilizing control voltages from the keyboard to determine its pitch (this control voltage is available at the rear-panel CONT VOLT OUT jack).

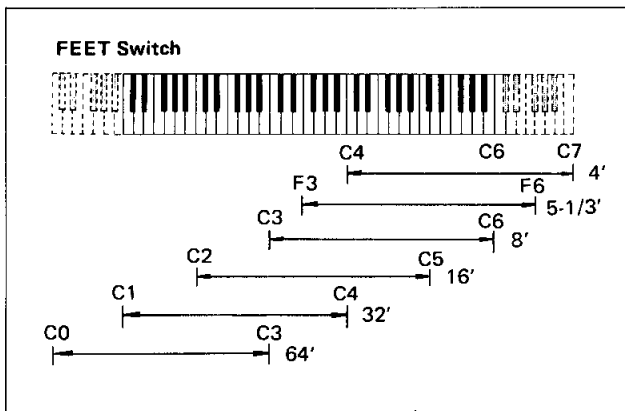
Begin by setting the mode switch to normal.





## 44 FEET SWITCH

Determines the pitch range of the solo synthesizer. The 8' position provides the standard C<sub>3</sub> to C<sub>6</sub> (C<sub>3</sub> to F#<sub>4</sub> in the bass mode) range, 5-1/3', a fifth higher, and 4', one octave higher. Similarly 16', 32' and 64' lower the range by one octave each.



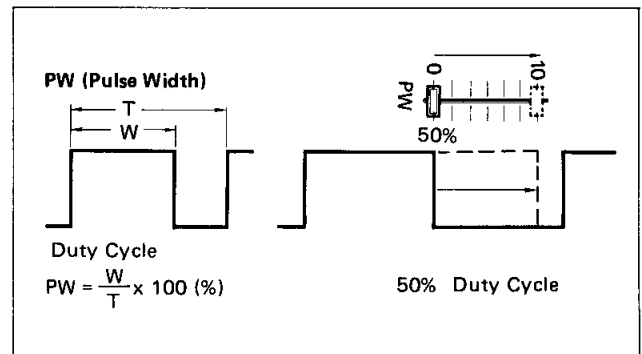
## 45 WAVEFORM SELECTOR

Determines the waveform produced by the VCO. If the WAVE lever is set in the ( / ) position, a sawtooth waveform is produced, and if set in the ( □ ) position a square wave is produced. Set to the center position a mixture of both waveforms is output.

\*At present, the waveform lever should be set in the ( / ) position. Press a key and move the WAVE lever back and forth in order to become familiar with the tonal variations it produces. Since the VCF and VCA are not being used at the moment, the sound you hear is that of the VCO only.

## 46 PULSE WIDTH LEVER

Produces tonal variation by altering the pulse width of the VCO square wave output. With this lever in the "0" (50%) position the upper and lower halves of the square wave are the same width. The more the setting is moved toward the "10" (85%) end of the scale the greater the difference between the widths of the upper and lower halves of the waveform.

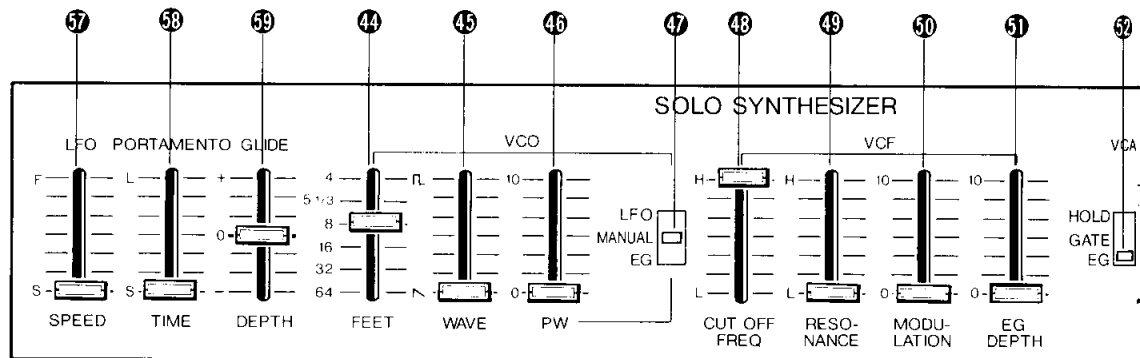


## 47 PULSE WIDTH MODULATION SWITCH

Permits modulation of square wave pulse width via the LFO (Low Frequency Oscillator) or EG (Envelope Generator). With this switch in the MANUAL position, pulse width is affected only by the PW lever 46 and is otherwise constant. In the LFO position pulse width is varied at a speed determined by the setting of the LFO lever 57. In the EG mode pulse width is determined by the envelope generated by the envelope generator.

Modulation depth in the LFO or EG modes is controlled by the PW lever.

# SOLO SYNTHESIZER

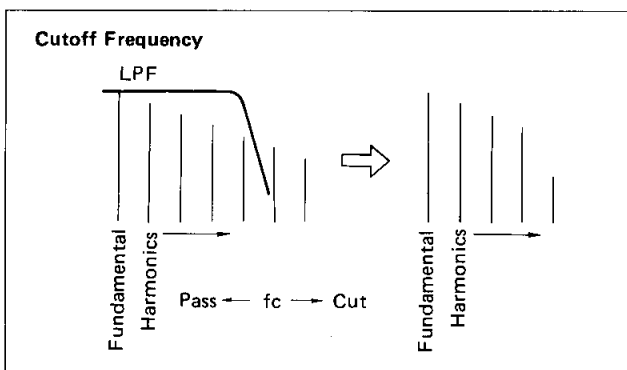


## ■ VCF (Voltage Controlled Filter)

The waveform produced by the VCO is sent to the VCF. Appropriate adjustment of the VCF controls permits removal of certain harmonics of the VCO waveform, strengthening or "peaking" of certain harmonics, and general control of tonal color.

### 48 CUTOFF FREQUENCY CONTROL

Determines the harmonics to be passed and those to be cut off by the VCF. All harmonics below the cutoff frequency are passed while those above the cutoff frequency are cut off. Moving the CUT OFF FREQ lever toward the "H" end of the scale allows more high harmonics to pass, providing a brighter sound. Setting toward the "L" end of the scale cuts off more high harmonics producing a softer sound.



\*The cutoff frequency control is one of the most important controls in determining the tone quality of the produced sound. Try moving it back and forth to get used to the sound variations it produces. Then before going on to the next section, set it to its center position.

### 49 RESONANCE CONTROL

Produces a response peak in the area of the cutoff frequency.

\*Try out this control a few times then set it to its center position.

### 50 MODULATION CONTROL

Permits variation of cutoff frequency via the LFO. The more the MODULATION lever is set towards the "10" end of the scale, the greater the degree of cutoff frequency variation.

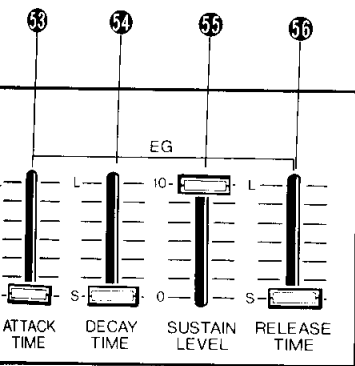
\*The speed of modulation is determined by the setting of the LFO lever 57. Raise the MODULATION lever and try out the operation of this function by varying the setting of the LFO control, then set the modulation control to "0" and go on to the next section.

### 51 EG DEPTH

Adjusts the amount of tonal variation between the initiation and end of a note played, with the "shape" of variation determined by the EG controls.

\*At present, only the EG sustain lever should be raised. In this condition, as the EG DEPTH lever is set towards the "10" end of the scale the VCF cutoff frequency increases accordingly.

Following is a description of the VCA and EG functions. For now, set the EG DEPTH control to "0".



## VCA(Voltage Controlled Amplifier)

Generally, the volume, speed of attack and speed of decay of a music instrument are constant. In a synthesizer, however, these parameters can be freely controlled with the EG (Envelope Generator).

The output from the VCF is sent to the VCA where the volume (level) of the sound is varied by a control voltage from the envelope generator. Appropriate setting of the EG controls permits a wide range of time-based level variation possibilities.

### 52 VCA SWITCH

Selects the VCA control voltage. If set to the HOLD position, the solo synthesizer sound is continuously output whether a key is pressed or not. In the GATE position, sound is produced at a constant level only when a key is pressed. In the EG position, pressing a key causes the level envelope to vary according to the settings of the EG ADSR controls.

**\*At present the VCA switch should be set to EG and the sustain lever should be set to "10"—sound is produced when a key is pressed. This condition is the same as if the VCA switch were set to GATE. The following is a description of the envelope generator.**

## EG(Envelope Generator)

The envelope generator functions on the basis of keyboard ON/OFF trigger signals. The envelope generated by this section can be used to control various sound parameters in accordance with the settings of the VCA and VCO EG depth levers and the VCO block pulse width modulation switch.

### 53 ATTACK TIME

Determines the time between keyboard attack and maximum envelope variation. The more the ATTACK TIME control is set towards the "L" end of the scale, the longer it takes to reach maximum envelope variation after a key is pressed.

### 54 DECAY TIME

Determines the time required for the envelope to fall to sustain level, as set by the SUSTAIN LEVEL lever, after maximum envelope variation has been reached. Setting towards the "L" end of the scale produces a longer delay.

**\* If the sustain level lever is set to maximum, decay time variations are not effective.**

### 55 SUSTAIN LEVEL

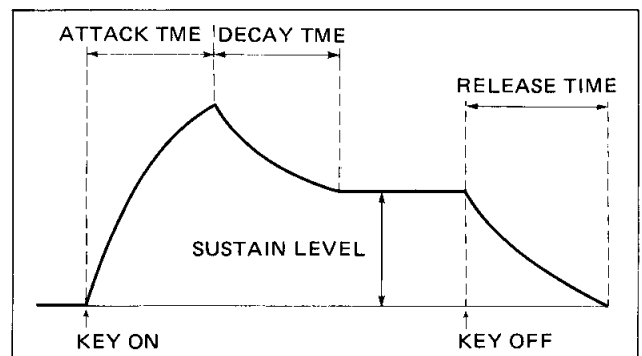
Determines the constant envelope level that continues after the attack and decay functions have ended while a key is held. Setting the SUSTAIN LEVEL lever toward the "10" end of the scale produces a higher sustain level.

### 56 RELEASE TIME

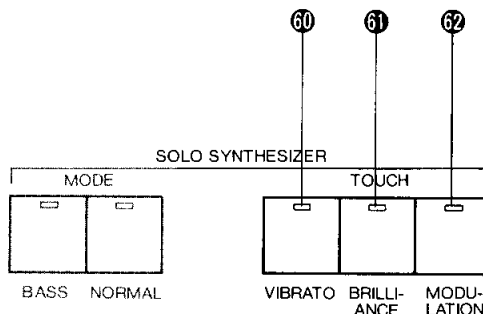
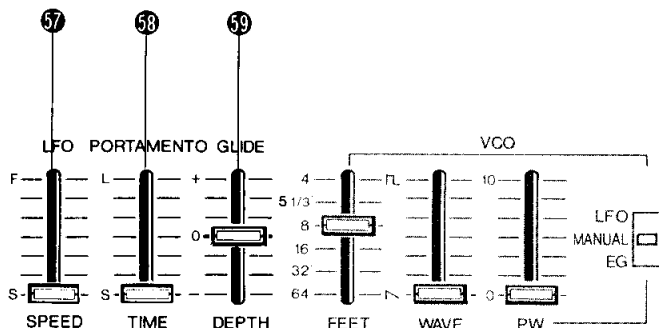
Determines the time required for the envelope to fade out after a key is released. The more the RELEASE TIME lever is set towards the "L" end of the scale the longer it takes for the envelope to fade out.

**\* The four EG controls are often called ADSR controls. Spend some time becoming familiar with the operation of these controls.**

**According to the setting of the ADSR controls, an envelope like the one shown below is produced.**



## OTHER CONTROLS



### 57 LFO (Low Frequency Oscillator)

This control permits variable-speed modulation of several synthesizer sound parameters. Setting towards the "F" end of the scale produces higher speed oscillation.

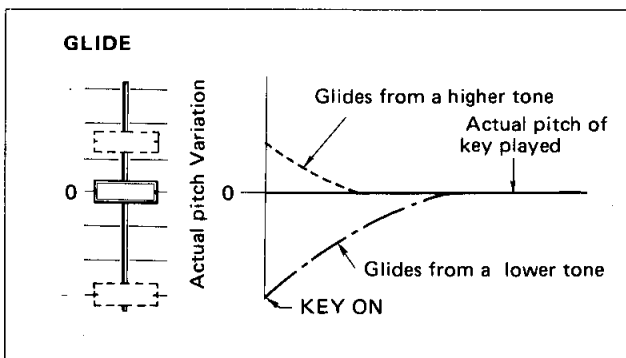
### 58 PORTAMENTO

Portamento is an effect that causes the sound to "slide" from one note to the next. The PORTAMENTO lever adjusts the speed of this slide. Set towards the "L" end of the scale a longer portamento is produced.

**\* The portamento effect can be turned on and off using an optional foot switch connected to the rear-panel PORTAMENTO jack. In this case the front-panel PORTAMENTO lever should be set to "L".**

### 59 GLIDE DEPTH CONTROL

The glide function produces a pitch variation at the very beginning of a note. In the center (click stop) position no glide effect is produced. Setting to the "+" end of the scale produces a glide from a higher tone, while setting to the "-" end of the scale produces a glide from a lower tone.



## TOUCH RESPONSE SELECTORS

This function permits the player to create variations in tone color, etc., according to the pressure places on the keys. Turning these switches on makes the respective functions controllable by keyboard pressure.

### 60 VIBRATO

Pressing firmly on a key introduces a vibrato effect. Vibrato speed is determined by the LFO control.

### 61 BRILLIANCE

Pressing firmly on a key raises the VCF cutoff frequency slightly producing a brighter sound.

### 62 MODULATION

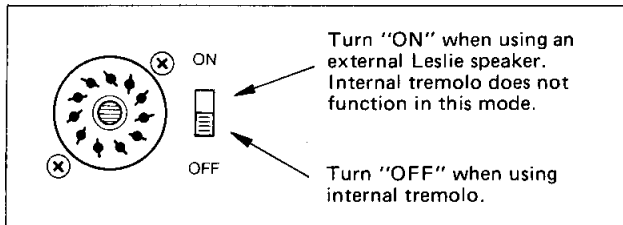
Produces a "wah-wah" effect. The effect is the same as raising the MODULATION lever slightly.

**\* Since the brilliance and modulation touch response functions are coupled to the VCF block, the sound obtained varies with the setting of the CUT OFF FREQ 48 and RESONANCE 49 controls. If the cutoff frequency control is raised too high, the effectiveness of the touch response functions is reduced.**

The tremolo and ensemble functions can be used to vary the sound of the upper organ, lower organ and poly-synth (strings) sections. The tremolo switches can be used to control either the internal electronic tremolo circuitry, or an external Leslie rotating speaker unit. When an external tone cabinet is not used, however, the ensemble and tremolo functions cannot be used simultaneously (ensemble priority). The ensemble and tremolo effects are present at the rear panel MIXED output only.

## ■ Tremolo

This block can be used to control the SK50D internal tremolo circuitry or an external Leslie speaker. If an external Leslie speaker is not being used, be sure to turn the rear-panel EXT TONE CABINET switch off otherwise the internal tremolo function will not be effective. If the external tone cabinet switch is turned on, the SK50D tremolo control signals are sent directly and only to the external speaker unit.



## Ⓢ SPEED SWITCH

Electronically varies the speed of the internal tremolo function. If this switch is pressed, the indicator lamp lights and the tremolo speed gradually increases, if this switch is pressed while the indicator lamp is on the tremolo speed gradually decreases.

**\*When the SK50D is connected to an external tone cabinet the SPEED switch acts as a remote speed control.**

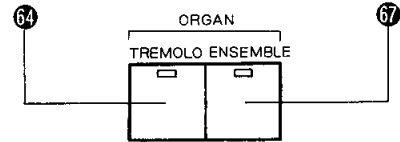
## Ⓡ UPPER ORGAN, Ⓟ LOWER ORGAN, Ⓠ POLY-SYNTH TREMOLO SWITCHES

If these switches are pressed, the indicator lamps light and the tremolo effect is introduced to the respective sections. Pressing these switches a second time turns the effect off.

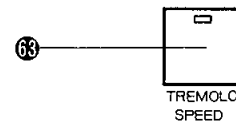
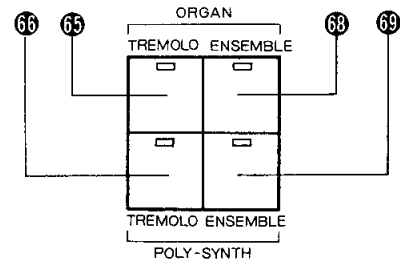
**\*Turning on the ensemble switches Ⓡ, Ⓟ and Ⓠ while the tremolo effect is on causes the tremolo function to be cancelled (ensemble priority).**

**\*When the rear-panel EXT TONE CABINET switch is on, the tremolo switches act as remote ON/OFF controls for an external Leslie speaker unit.**

### Upper Keyboard Section



### Lower Keyboard Section



## ■ Ensemble

The ensemble function uses an electronic delay system to produce a "doubled sound" effect.

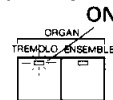
## Ⓡ UPPER ORGAN, Ⓟ LOWER ORGAN, Ⓠ POLY-SYNTH ENSEMBLE SWITCHES

If these switches are pressed, the indicator lamps light and the ensemble effect is introduced to the respective sections. Pressing these switches a second time turns the ensemble function off.

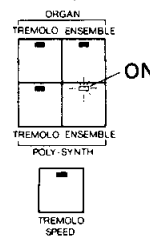
**\* If the ENSEMBLE switches Ⓡ, Ⓟ and Ⓠ are turned on while the tremolo function is on, the tremolo function is automatically cancelled.**

### Ensemble Priority

#### ■ Upper Keyboard Section

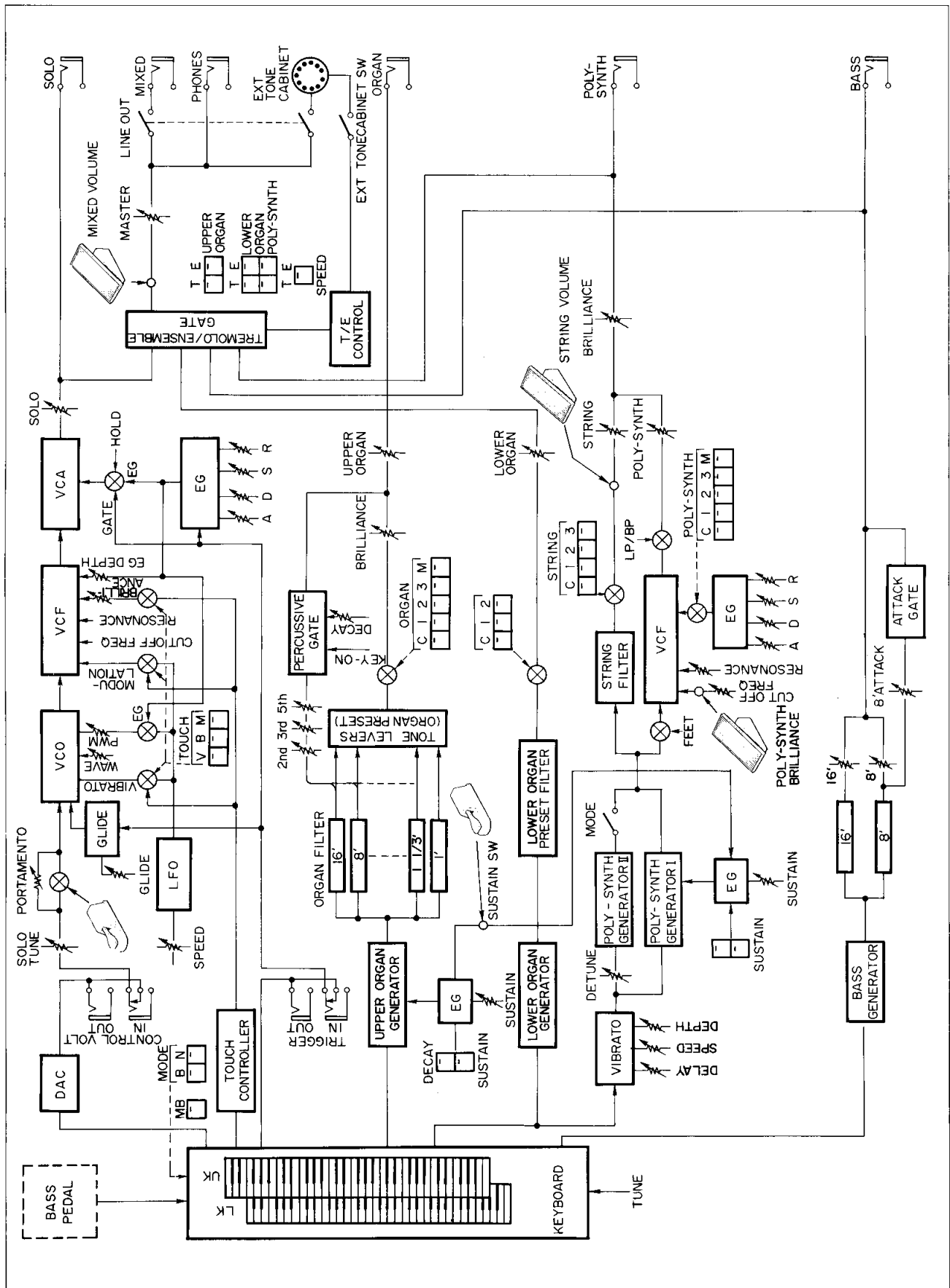


#### ■ Lower Keyboard Section

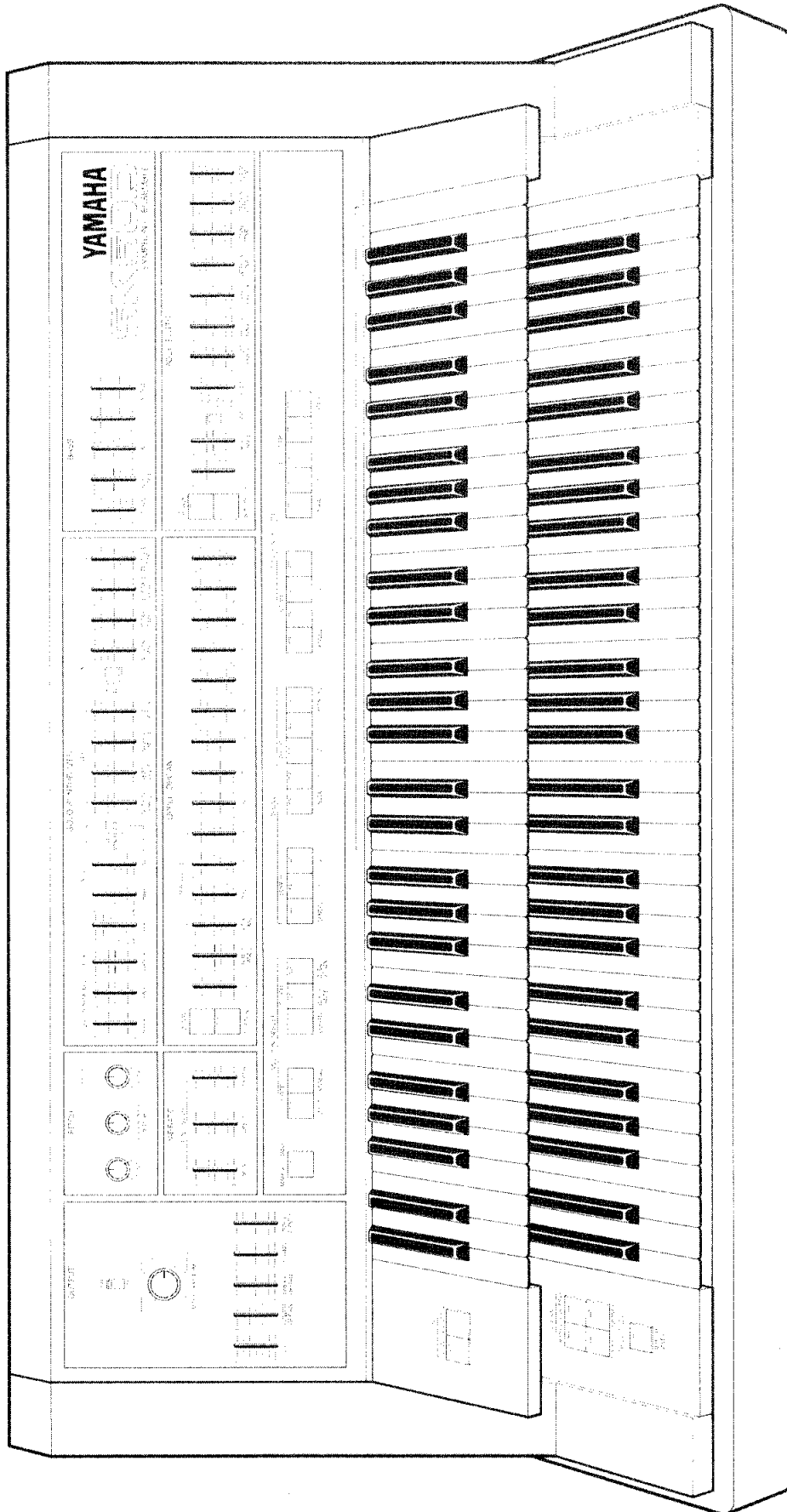


In this case, the poly-synth ENSEMBLE switch is ON so ensemble, not tremolo, is applied to the upper organ. If upper organ tremolo is desired, the poly-synth ENSEMBLE switch must be turned OFF.

# BLOCK DIAGRAM



# SOUND MEMO



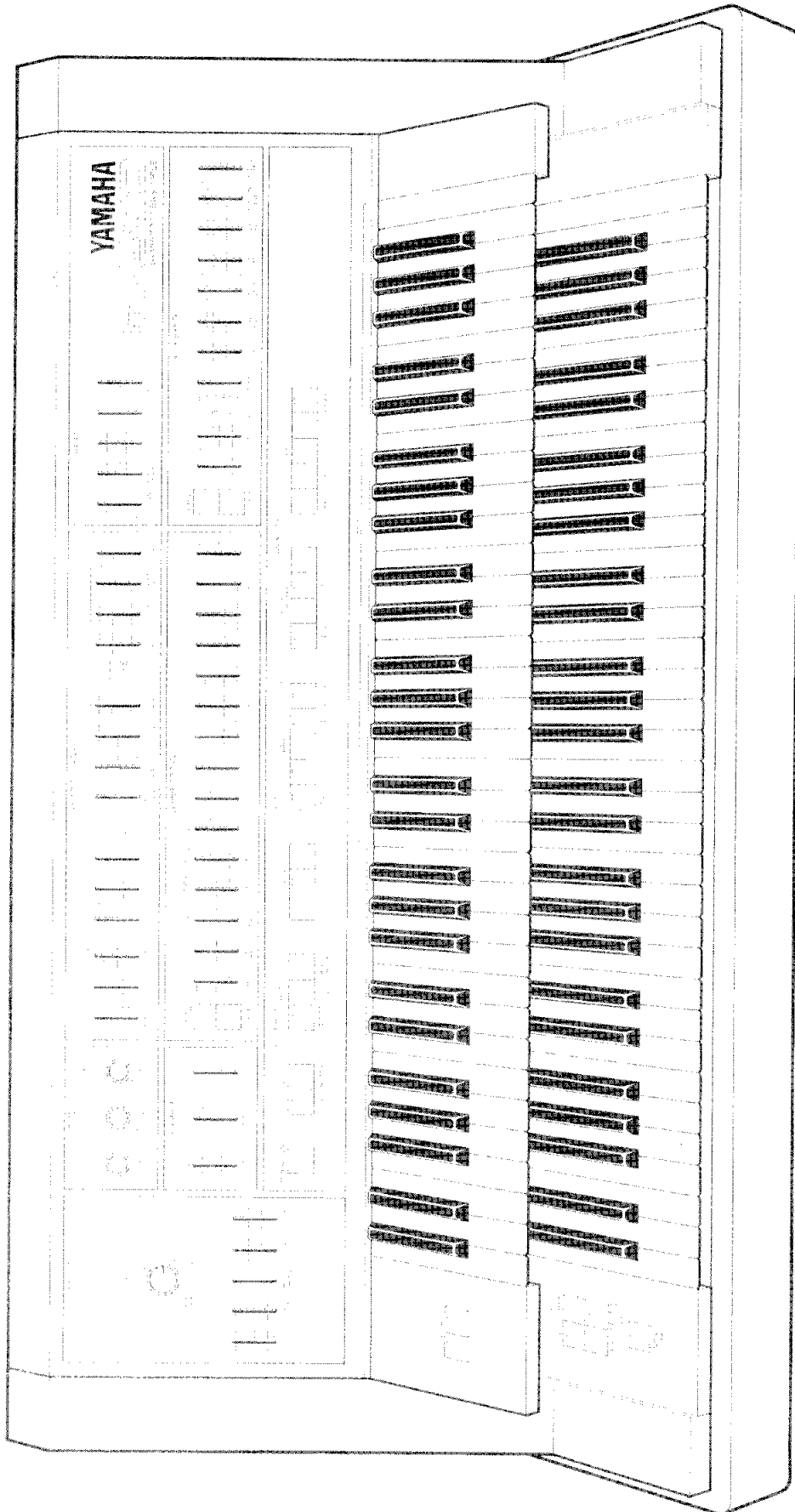
DATE: / /

-----

-----

-----

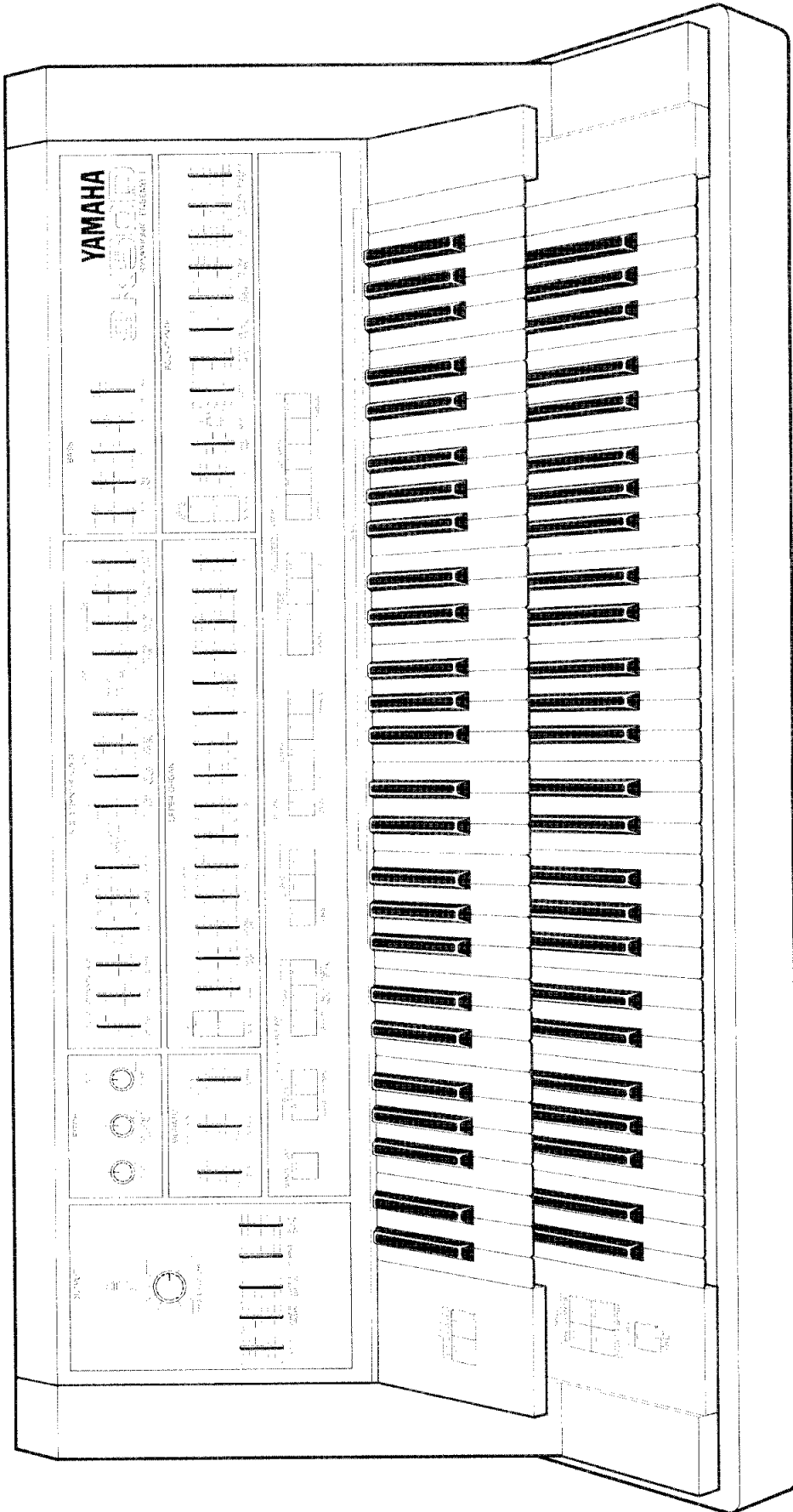
# SOUND MEMO



DATE: / /



# SOUND MEMO



DATE: / /

# SPECIFICATIONS

## KEYBOARD

UPPER KEYBOARD . . . 61 keys C<sub>1</sub> ~ C<sub>6</sub> 5 octaves  
 LOWER KEYBOARD . . . 61 keys C<sub>1</sub> ~ C<sub>6</sub> 5 octaves

## OUTPUT section

LINE OUT . . . . . ON, OFF; MIXED  
 EXT TONECABINET output OFF  
 Volume . . . . . MASTER VOLUME  
 SPLIT volume:  
 SOLO/UPPER ORGAN/LOWER  
 ORGAN/STRING/POLY-SYNTH

## PITCH section

TUNE: 438 ~ 450Hz  
 POLY-SYNTH DETUNE: -20  
 +27 cents  
 SOLO TUNE: -500 ~ +700 cents

## SOLO SYNTHESIZER section (Single-note, High-note priority)

MODE . . . . . NORMAL, BASS  
 (to lower keyboard C<sub>1</sub> ~ F<sub>2</sub>#  
 by MANUAL BASS)  
 LFO . . . . . SPEED: 0.1 ~ 100Hz  
 PORTAMENTO . . . . . 3 sec max. (C<sub>3</sub> ~ C<sub>6</sub>)  
 GLIDE . . . . . 70msec. max.  
 VCO block  
 FEET . . . . . 4', 5-1/3', 8', 16', 32', 64'  
 WAVE . . . . .  $\curvearrowright$  →  $\curvearrowleft$ , mixable  
 PW . . . . . 50 ~ 85%,  
 LFO, MANUAL, EG selectable

## VCF block

CUT OFF FREQ . . . . . Variable range: 10 octaves  
 RESONANCE . . . . . Q : 0.5 ~ 10  
 MODULATION . . . . . 3 octaves/max.  
 EG DEPTH . . . . . 0 ~ 10 octaves

## VCA block

HOLD, GATE, EG selectable  
 EG (ENVELOPE GENERATOR)  
 ATTACK TIME . . . . . 0.003 ~ 3 sec.  
 DECAY TIME . . . . . 0.03 ~ 30 sec.  
 SUSTAIN LEVEL . . . . . 0 ~ 10  
 RELEASE TIME . . . . . 0.03 ~ 30 sec.

## TOUCH

VIBRATO . . . . . ±120 cents/8', A<sub>3</sub>  
 BRILLIANCE . . . . . +5 octaves/max.  
 MODULATION . . . . . 6 octaves/max.

## BASS section

MANUAL BASS . . . . . OFF: Playable by BASS PEDAL  
 ON: Playable lower keyboard  
 C<sub>1</sub> ~ F<sub>2</sub># and by BASS  
 PEDAL  
 SUSTAIN . . . . . 2 sec. max.  
 BRILLIANCE . . . . . ±5dB/500Hz (Sine wave)  
 Tone Lever . . . . . 16', 8', ATTACK 8'

## VIBRATO section (POLY-SYNTH & STRING)

DELAY . . . . . 0 ~ 3.2 sec.  
 SPEED . . . . . 5 ~ 7Hz  
 DEPTH . . . . . ±30 cents

## UPPER ORGAN section

ORGAN selector . . . . . CANCEL, ORGAN 1, ORGAN 2  
 ORGAN 3, MANUAL  
 DECAY . . . . . OFF, ON → } SUSTAIN  
 0.03 ~ 1.6 sec. } lever  
 SUSTAIN . . . . . OFF, ON → } S ~ L  
 0.03 ~ 1.6 sec. }  
 BRILLIANCE . . . . . ±7dB/5kHz (Sine wave)  
 PERCUSSIVE . . . . . 2nd, 3rd, 5th lever  
 DECAY TIME . . . . . 0.8 sec./max.  
 Tone Lever . . . . . 16', 8', 5-1/3', 4', 2-2/3', 2', 1-3/5',  
 1-1/3', 1'

## LOWER ORGAN section

ORGAN selector . . . . . CANCEL, ORGAN 1, ORGAN 2

## POLY-SYNTH section

STRINGS selector . . . . . CANCEL, STRING 1, STRING 2  
 STRING 3  
 POLY-SYNTH selector . . . . . CANCEL, POLY-SYNTH 1, POLY-  
 SYNTH 2, POLY-SYNTH 3,  
 MANUAL  
 SLOW ATTACK . . . . . OFF: 3msec. ON: 80msec.  
 SUSTAIN . . . . . SUSTAIN switch: ON, OFF  
 SUSTAIN lever: 0.03 ~ 1.6 sec.  
 BRILLIANCE . . . . . ±12dB/5kHz (Sine wave)  
 MODE . . . . . I: one tone generator  
 II: both tone generators  
 FEET . . . . . 4' $\curvearrowleft$ , 8' $\curvearrowleft$ , BP8' $\curvearrowleft$ , 8' $\curvearrowright$ , 16' $\curvearrowleft$ , 16' $\curvearrowright$   
 CUT OFF FREQ . . . . . 10 octaves  
 RESONANCE . . . . . Q : 0.5 ~ 10  
 EG DEPTH . . . . . 10 octaves  
 ATTACK TIME . . . . . 0.003 ~ 3 sec.  
 DECAY TIME . . . . . 0.03 ~ 30 sec.  
 SUSTAIN LEVEL . . . . . 0 ~ 10  
 RELEASE TIME . . . . . 0.03 ~ 30 sec.

## TREMOLO/ENSEMBLE section (ENSEMBLE priority)

TREMOLO . . . . . UPPER ORGAN, LOWER ORGAN  
 POLY-SYNTH switch  
 SPEED . . . . . OFF: 0.64Hz, ON: 6.4Hz  
 ENSEMBLE . . . . . UPPER ORGAN, LOWER ORGAN  
 POLY-SYNTH switch

## REAR PANEL

OUTPUT . . . . . MIXED: 600Ω, -10dBm  
 ORGAN, POLY-SYNTH, SOLO,  
 BASS  
 FOOT CONT . . . . . Foot controller connection  
 MIXED VOLUME, STRING  
 VOLUME, POLY-SYNTH  
 BRILLIANCE  
 FOOT SW . . . . . Foot switch connection  
 SUSTAIN (ORGAN, POLY-  
 SYNTH) PORTAMENTO (SOLO  
 SYNTHESIZER)  
 CONTROL VOLT . . . . . IN: 0.25 ~ 2V  
 OUT: 0.19 ~ 3V  
 TRIGGER . . . . . IN: 15 ~ 5V OFF, 0 ~ -15V ON  
 OUT: OFF (14 ~ 10V), ON (1 ~ 0V)  
 KEY CODE . . . . . TTL level, key code data output  
 PEDALS . . . . . Bass Pedal connection  
 EXT TONECABINET . . . . . 11 pins connector, ON/OFF switch  
 connectable the Leslie models 415,  
 715, 815 or equivalent (2ch-11 pin  
 type)

## USABLE TONES (depending on MODE of SOLO SYNTHESIZER section)

UPPER KEYBOARD . . . . . NORMAL: OFF 7 notes  
 NORMAL: ON 7 notes +1 notes  
 LOWER KEYBOARD . . . . . BASS: OFF 7 notes  
 BASS: ON 7 notes +1 notes

## OTHERS

Power source . . . . . US and Canadian models  
 100V, 120V selectable 60Hz  
 General model  
 100, 120, 220 or 240V  
 selectable, 50/60Hz  
 Power consumption . . . . . US model 60W  
 Canadian Model 60W  
 General model 60W  
 Dimensions (WxHxD) . . . . . 1128x237x642mm (without legs)  
 (44-3/8' x 9-3/8' x 25-1/4')  
 Finish . . . . . Rosewoodgrain cabinet  
 Accessory . . . . . FC-3A Foot controller  
 Optional Accessories . . . . . FC-4 Foot switch pedal  
 BP2 Bass pedal

\* Specifications subject to change without notice.

## **SERVICE**

The SK50D SYMPHONIC ENSEMBLE is supported by Yamaha's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest Yamaha dealer.

SINCE 1887  **YAMAHA**  
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN