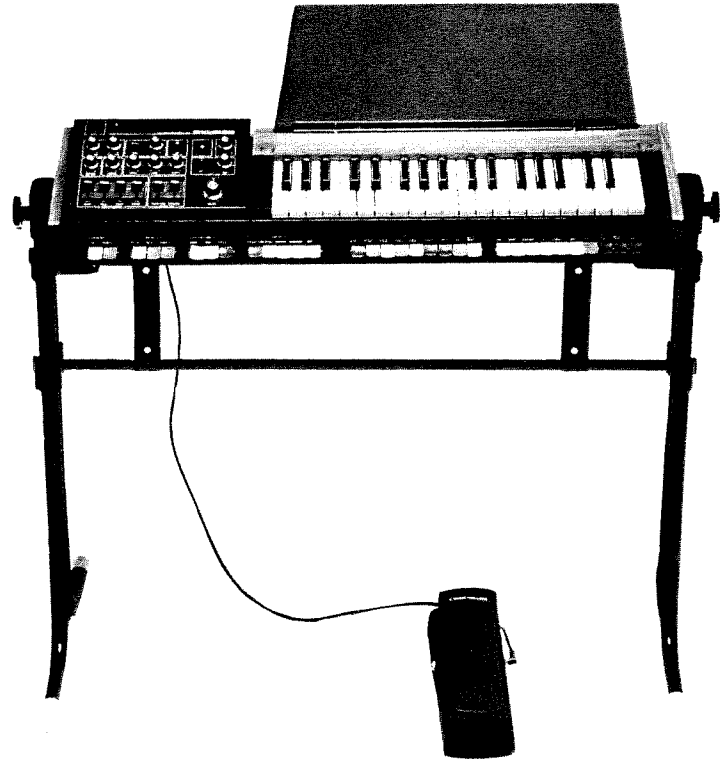
Roland
SYNTHESIZER

SH-1000
INSTRUCTION MANUAL



ROLAND SYNTHESIZER

SH-1000

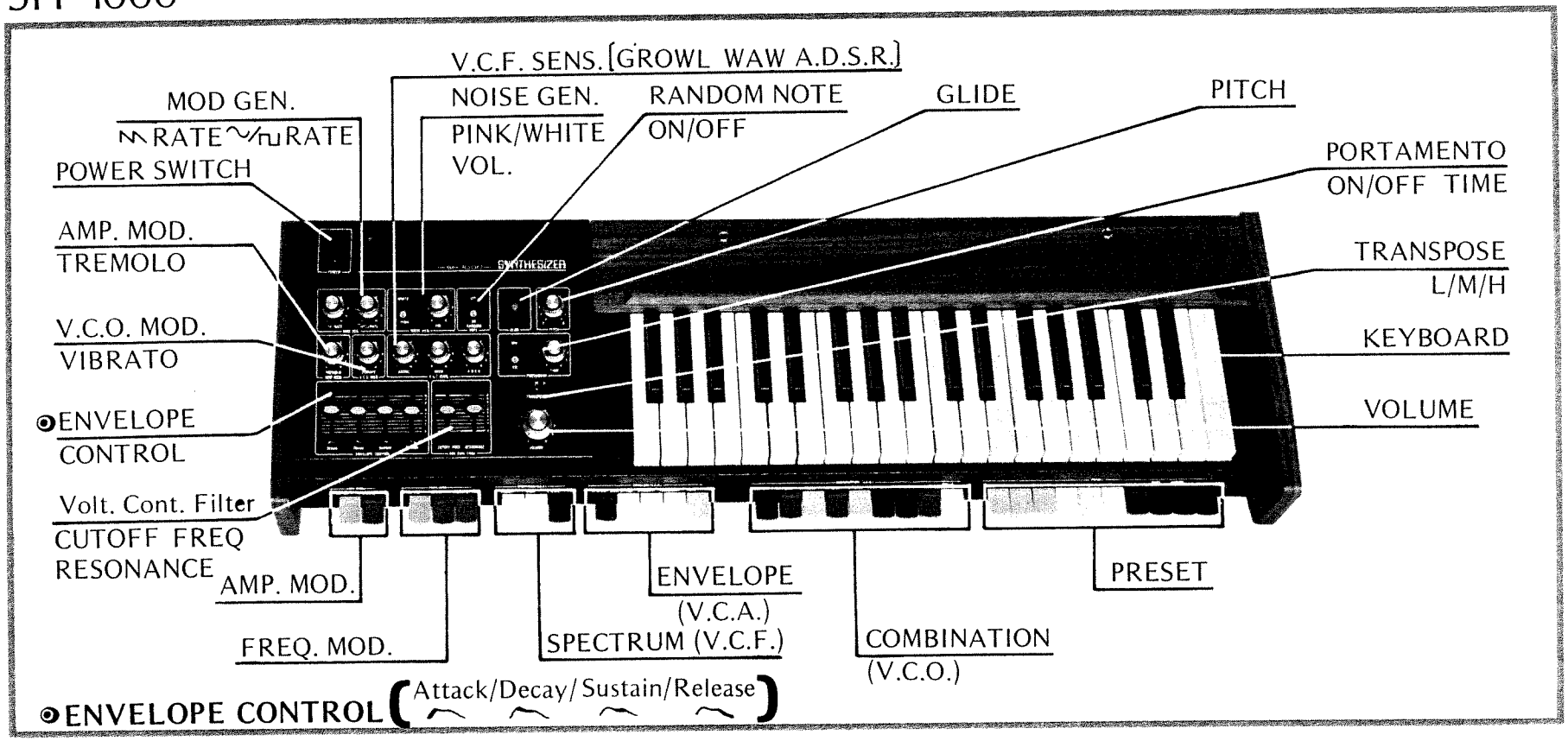


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1. Comparison to the Organ

A synthesizer is not an organ. The usual electronic organ is not able to freely modify sound envelopes characterized by "Attack", "Decay" and "Sustain" etc. all of which play an important role in the quality of musical sounds. Here, "Attack" means the rising of the sound, "Decay", the diminishing of the sound and "Sustain", the maintaining of the sound, while "Envelope" is defined by the curve of these characteristic elements.
The Synthesizer, however, can modify these elements to change envelope characteristics and thus modify volume and tone to synthesize many sounds which are unlike any which can be produced by conventional instruments, in addition to sounds which are exactly like those of conventional instruments.
Thus, the Synthesizer has the inherent capability of extending the range of musical conception through production of unique new sounds.

2. Theory of the Synthesizer

The Voice Generator, which generates electronic signals that play an important role in all electronic musical instruments, is composed of the VCO "Voltage Controlled Oscillator", and its musical interval is controlled by the voltage coming from the keyboard switch. As the wave form of the music sound produced by the VCO has many harmonics, the desired tone is produced through a VCF or "Voltage Controlled Filter".
The function of the Filter is also dependent on the voltage. The signal through the VCF is modified with regard to the rising, falling or the maintaining of sound by the function of the VCA "Voltage Controlled Amplifier".
Consequently, the VCO, VCF and VCA are the crux of Synthesizer operation.
There are included various kinds of voltage generators to modify these three circuits.
Firstly, when a key is depressed, voltage is supplied to the ADSR until release of key. This voltage is the basis of the various envelopes.

The Envelope, composing Attack(A), Decay(D), Sustain(S) and Release(R), is shown in Figure 1 in general form, and can be varied according to control operation.
Two basic kinds of envelopes can be produced, namely AR and ADSR. The ADSR and AR are also called Envelope Generators. Figure 2 shows the mutual relation among VCO, VCF, VCA and ADSR. This is the general theory of Synthesizer operation. Of course, besides the abovementioned, there are several other functions — namely modulator, white-noise generator, etc. Synthesizing these functions in many ways creates even more complicated and more unique sounds.

Fig.1

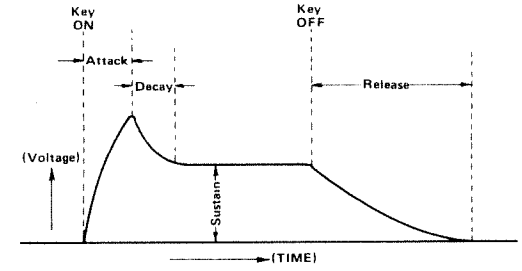
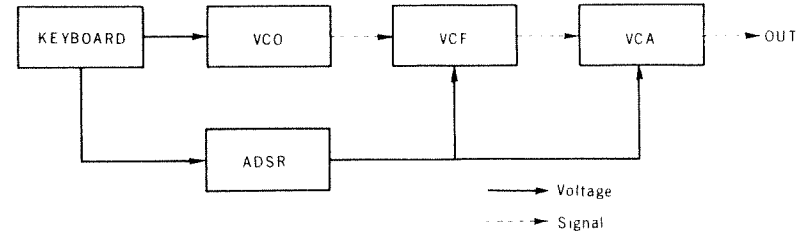


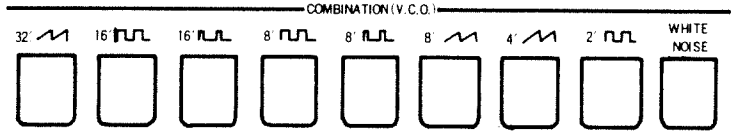
Fig. 2



3. Function of the SH-1000

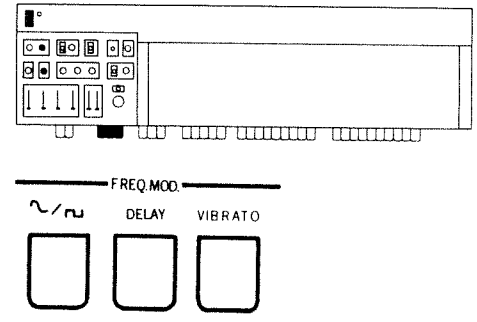
a) VCO (Voltage Controlled Oscillator)
The VCO of the SH-1000 is composed of 9 combination tablets, as shown in Figure 3, and is able to produce eight kinds of pitch wave forms (32' – 2'). Of course it is possible to combine these wave forms to produce a great many basic tones. Moreover, it is possible to raise or lower the note by 1 octave via Transpose Switch. In addition, white-noise contributes non-tonal sounds. The pitch of the VCO can be adjusted via the Pitch Knob. In addition, Vibrato, Glide and Portamento effects can also be obtained by including each in the VCO circuit as desired.

Fig. 3



(1) VIBRATO
This effect is produced by supplying the oscillated voltage of the Modulation Generator to the VCO.
As in Figure 4, lower the VIBRATO tablet, turn the Modulation knob of the VCO, and the VIBRATO effect is obtained.
The depth of the VIBRATO is controlled by the Modulation knob, and the rate of the VIBRATO is adjusted by the RATE knob of the Modulation generator.

Fig. 4



VCO

The VIBRATO effect emerges with a slight delay after depressing the key. In the case of Legato playing, only the first note is given this delay effect, and the VIBRATO effect continues in the following notes.
If this effect is desired for each note, play each note only after releasing previous note.
The VIBRATO effect is usualy obtained by the modulation employing the sine wave. Using the square wave, however, brings the characteristic jump of the musical interval. The degree of jump is controlled by the Modulation knob.

(2) GLIDE

When pushing the GLIDE button while playing, the musical interval drops, and as soon as the button is released, the musical interval is gradually restored.
This produces a Hawaiian guitar effect.

(3) PORTAMENTO

The PORTAMENTO effect is obtained by switching the PORTAMENTO lever to "ON". When using PORTAMENTO effect, one note drifts to the subsequent note. This changing speed is adjusted by the TIME knob.

VCF

b) VCF (Voltage Controlled Filter)

The VCF of the SH-1000 controls Cut-off Frequency and Resonance.
As shown in Figure 5, the Cut-off Frequency control has the function of cutting off the high frequency part of the harmonics and plays an important role in tone production.
Note that over-cutting of the harmonics will cause elimination of the basic frequency, and the sound will not be produced.
The Resonance control emphasizes the harmonics, producing a peak slightly under the Cut-off Frequency.
Since over-emphasizing the peak causes oscillation of the other frequency for the key depressed, it becomes an interruption in the performance of melody except where special effect is desired.
There are also three Spectrum tablets to control VCF automatically.

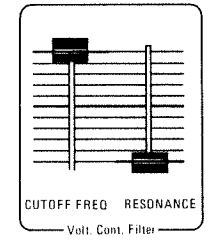
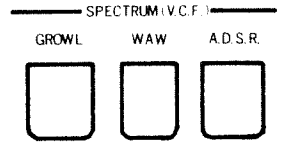


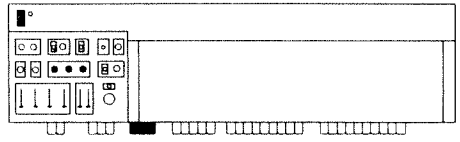
Fig. 5

VCF

VCA

Fig. 6





(1) GROWL

Pressing the GROWL tablet to "ON" creates a kind of phase modulation, and the VIBRATO effect is obtained. This VIBRATO effect differs from the VIBRATO effect added to the VCO on nuance.

The Modulation Speed is controlled via the knob (∼/⊓⊔) of the Modulation Generator in the same way as the VIBRATO of the VCO, and the Modulation Depth is controlled via the GROWL knob.

(2) WAW

Pressing the WAW tablet to "ON" produces the WAW effect which emerges automatically upon touching the key.

These GROWL and WAW effects depend strongly on the position of the slide control knob for the Cut-Off Frequency.

(3) ADSR

When this tablet is at "ON" position, the voltage of the ADSR envelope is supplied to the VCF.

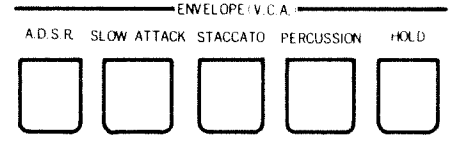
So, the Filter works with the VCA simultaneously, and very interesting effects can be obtained.

The effects of GROWL, WAW and ADSR for the VCF are controlled by the knobs of the VCF SENS panel section.

c) VCA (Voltage Controlled Amplifier)

As in Figure 7, the VCA of the SH-1000 is operated by the five tablets.

Fig. 7



(1) HOLD

The HOLD is a note memory device, and the note for the key depressed is continued until next key is depressed even though the key is released.

VCA

For example, Staccato playing becomes the same as Legato playing. So, it is convenient to synthesize the tone by continuing the sounds.

(2) ADSR (Attack, Decay, Sustain, Release)

When this tablet is at "ON" position, the VCA is operated by the ENVELOPE MODE produced by the ADSR.

As in Figure 8, sliding the Attack knob upwards increases the rising time.

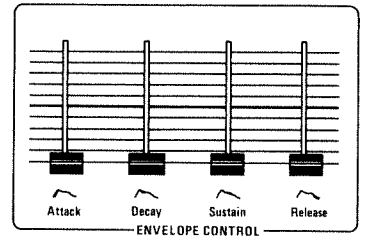
Sliding the Decay knob upwards increases the diminishing-time.

The Sustain knob controls the sound volume after decay.

The Release perfectly controls the time of sound disappearance after releasing the key.

The Attack, Decay and Sustain form the envelope during key depression, and the Release forms the envelope after key release.

Fig. 8



(3) SLOW ATTACK

Pressing this tablet to "ON" brings a slow rising sound such as produced by a violin or an accordion.

(4) STACCATO

Pressing this tablet to "ON" causes a Staccato-like sound (like the sound of PIZZICATO playing of a violin) regardless of key depression time.

(5) PERCUSSION

Pressing this tablet produces accents to the sound, operating the VCA to supply percussive envelope. As these envelope modifying tablets operate on the "right-side-tablet-take-precedence" system, the right end tablet alone works regardless of other tablets depression.

(6) AMP. MODULATION

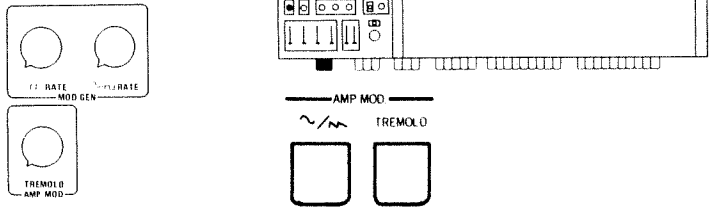
The tablet shown in Figure 9, works to supply Tremolo effect to the sound. When employing sine wave (∿) it is of the usual Tremolo, and for saw-tooth wave (◺) it produces an effect like the Tremolo playing of a Mandolin.

These waves all operate the VCA.

The speed and the depth of this Tremolo effect are adjusted by the knobs shown in Figure 9.

Pre-Setting

Fig. 9



(7) NOISE GENERATOR

The SH-1000 comprises a Noise Generator.
Noises are classified into two kinds of noises which are alternated via the Noise Changer. They are the white noise audible as "Shyaa" and the pink noise audible as "Zaa".
As these noises emerge when depressing the key, they may be used together with the sound coming from the VCO.
The sound of a steam locomotive "SL" and the sound of the wind or waves can also be produced by using these noises alone.

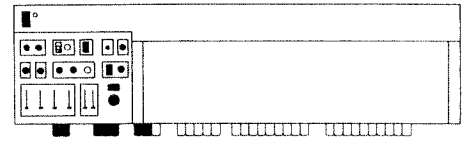
(8) RANDOM NOTE

When Random Note is switched to "ON", accidental sounds having no relation to the performer's mind are produced by operating the VCO with random voltages of the uncertain factor emerging from the white noise.

d) Pre-Setting

The SH-1000 is equipped with Pre-Setting tablets.
Since these tablets are arranged for sounds to be used comparatively often, like the existing ten kinds of musical instruments, it is very easy to choose the tone by the touch of a tablet. For these tablets, the right side tablet takes precedence, and therefore, when tablets are at "ON" position the right end tablet alone works. In this case, the working parts on the control panel are shown in Figure 10.
Set Pre-Setting tablet according to designed instrumental sound in conjunction with other controls.

Fig. 10



NOTE

When using Pre-Setting tablets, if separate sound variation is required, set combination and other tablets/controls desirably and set the Pre-Setting tablets to Off.

4. Operation

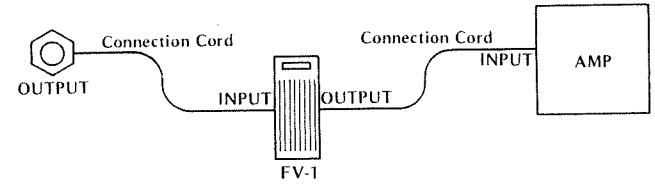
1) Connect the output jack to the input jack of the amplifier with the connection cord accessory.
2) Turn the power switches of SH-1000 and the amplifier to "ON".
3) Raise the volume of amplifier properly.
Setting is thus complete.
Now play freely with desired Pre-Setting tablet "ON".
Adjustment of the sound volume is to be done via the volume knob.

5. Tuning

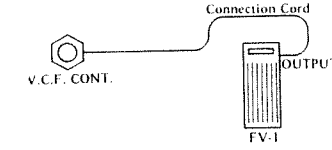
Allow 5 minutes after setting the power switch to ON, then set the Pitch Knob to "O" position. Tune the Synthesizer to a standard musical instrument by adjusting the TUNING screw located on the left end of the rear panel.
In this case, ascertain that the TRANSPOSE is positioned at "M".
(NOTE) In case a sudden temperature variation occurs or the Synthesizer is played over an excessively long time, readjustment of tuning may be required.

6. Accessories (optional)

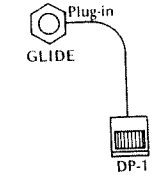
1) Volume Control Pedal FV-1



a) Provides same effect as obtained by turning the volume knob on the control panel (volume adjustment).



b) Provides same effect as obtained by controlling V.C.F. Cut-Off Frequency via slide volume.



2) Foot Switch DP-1

Plugging the DP-1 cord into the Glide jack, foot pedal control equivalent to that as obtained by Glide Button on the control panel is obtained.

7. Synthesis of Unique Sounds

Possible unique sounds produced without use of the Pre-Setting tablets are innumerable. Experiment with unique sounds at will. Some examples are shown in attached sheets.

ROLAND SYNTHESIZER SH-1000
SPECIFICATIONS

37 Keys (F Scale)	
Preset Tablet	10
VCO Assembly	
Combination Tablet	9
Modulation Tablet	3
Vibrato Depth Control	1
Pitch Control	1
Glide Switch	1
Portamento Time	1
Portamento Switch	1
Transpose Changeover Switch (L/M/H)	1
VCF Assembly	
Spectrum Tablet	3
Sensitivity Control	3
Filter Resonance Control	2
VCA Assembly	
Envelope Tablet	5
Modulation Tablet	2
Tremolo Depth Control	1
Others	
Envelope Control	4
Modulation Generator	2
Noise Generator Volume	1
White/Pink Noise Changer	1
Random Note Switch	1
Volume	1
Tuning	1
Output Jack	1
Output Voltage Changeover Switch (L/M/H)	1
Jack for Glide	1
Jack for V.C.F. Control	1
Voltage Changer (for changing AC Voltage)	1
Power Source	AC 100/117V or 220/250V, 50/60Hz
Power Consumption	8VA
Dimensions	H: 150 mm (5.9″) W: 865 mm (34″) D: 260 mm (10.22″)
Weight (Net)	12 kg (26.5 Lbs.)
Accessories	Music Rack Connection Cord (2.5 m with Pin-Plug Adaptor)

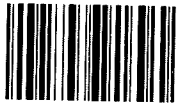
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