

RSS
Roland Studio System

SYSTEM-100 M
190·191J
OWNER'S MANUAL

 Roland

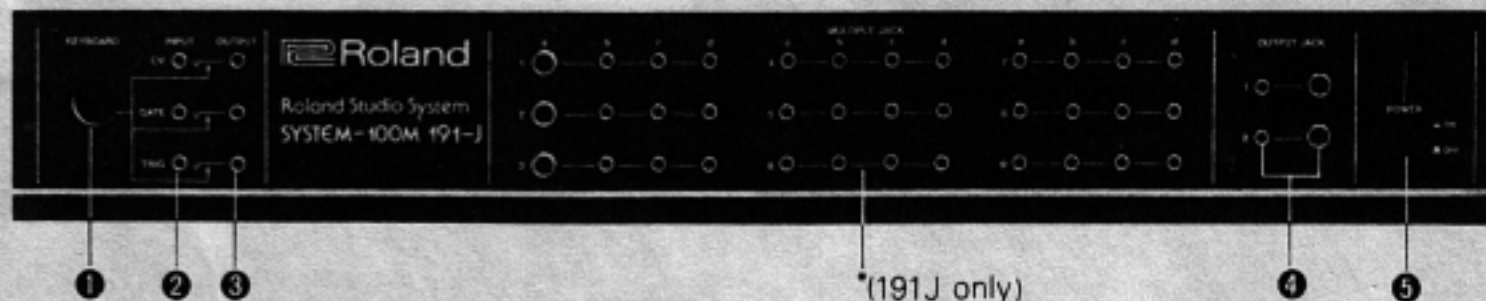
● RACK190-191J

■ 191J is a rack equipped with the multiple jacks and the power for five modules.

■ 190 is a rack equipped with the power for three modules.

● NAMES AND FUNCTIONS OF THE COMPONENTS.

■ FRONT PANEL



① KEYBOARD — Keyboard HOOKUP Din Jack

This jack is used for hookup with the DIN jack of the keyboard.

② INPUT — Input Jacks

These are the input jacks for the CV, GATE, and TRIG. Using any of these jacks will automatically eliminate the input of the corresponding DIN jack.

③ OUTPUT — Output Jacks

These jacks generate the CV, GATE and TRIG from the input jacks (or when not using the input jacks; from the DIN jacks).

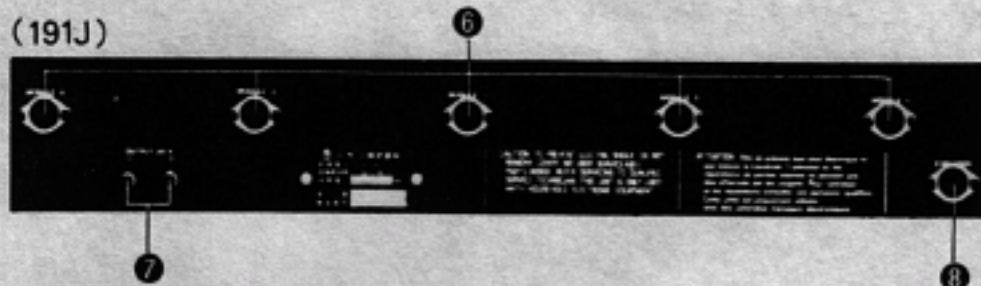
*MULTIPLE JACKS (191J only) Nine rows of four jacks connected together for external combination of different signals or control voltages.

④ JACK A, B — Jacks of Different Sizes

These jacks are for hookup with other mechanisms which have different jack sizes. They are the miniature jack (A), the standard jack (B), and the RCA pin jack (C) (on the rear panel.)

⑤ POWER — Power Switch and Indicator

■ REAR PANEL



⑥ MODULE 1-5

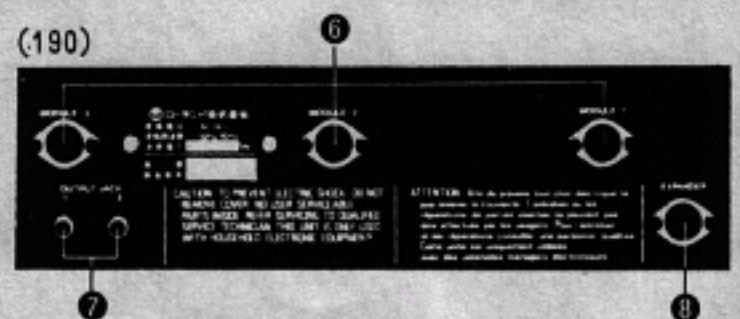
These are the DIN jacks for hookup with the DIN jacks of each module. With hook-up, power, CV, GATE and TRIG will be supplied to the modules.

⑦ JACK C

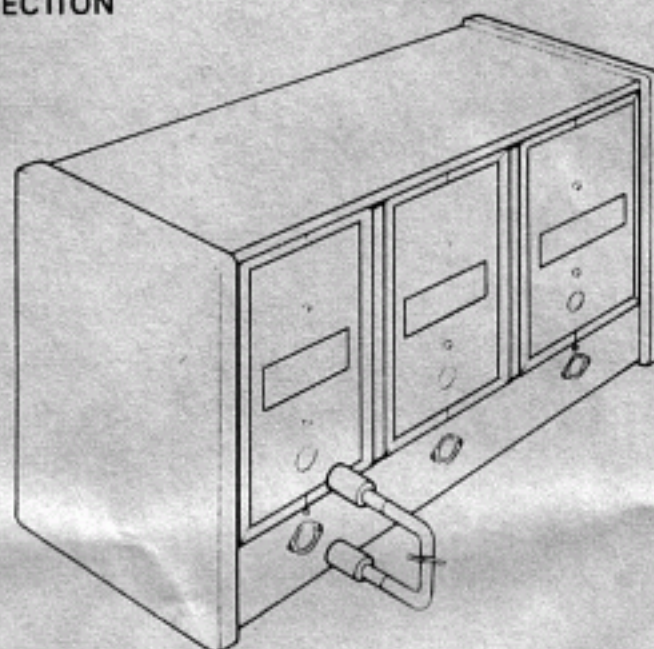
It is connected to JACK A, B of the front panel.

⑧ EXPANDER

It is used only for the input, output of the CV, GATE and TRIG.



■ CONNECTION



«BEFORE USE»

This mechanism make use of AC power and might emit some heat. However this is not a sign of damage.

*Always plug the cord before turning on the power switch.

«PRECAUTIONS»

Keep away from interferences that induce high levels of noise such as neon lights and flourescent lamps.

Avoid places that are dusty, of high temperature or humidity.

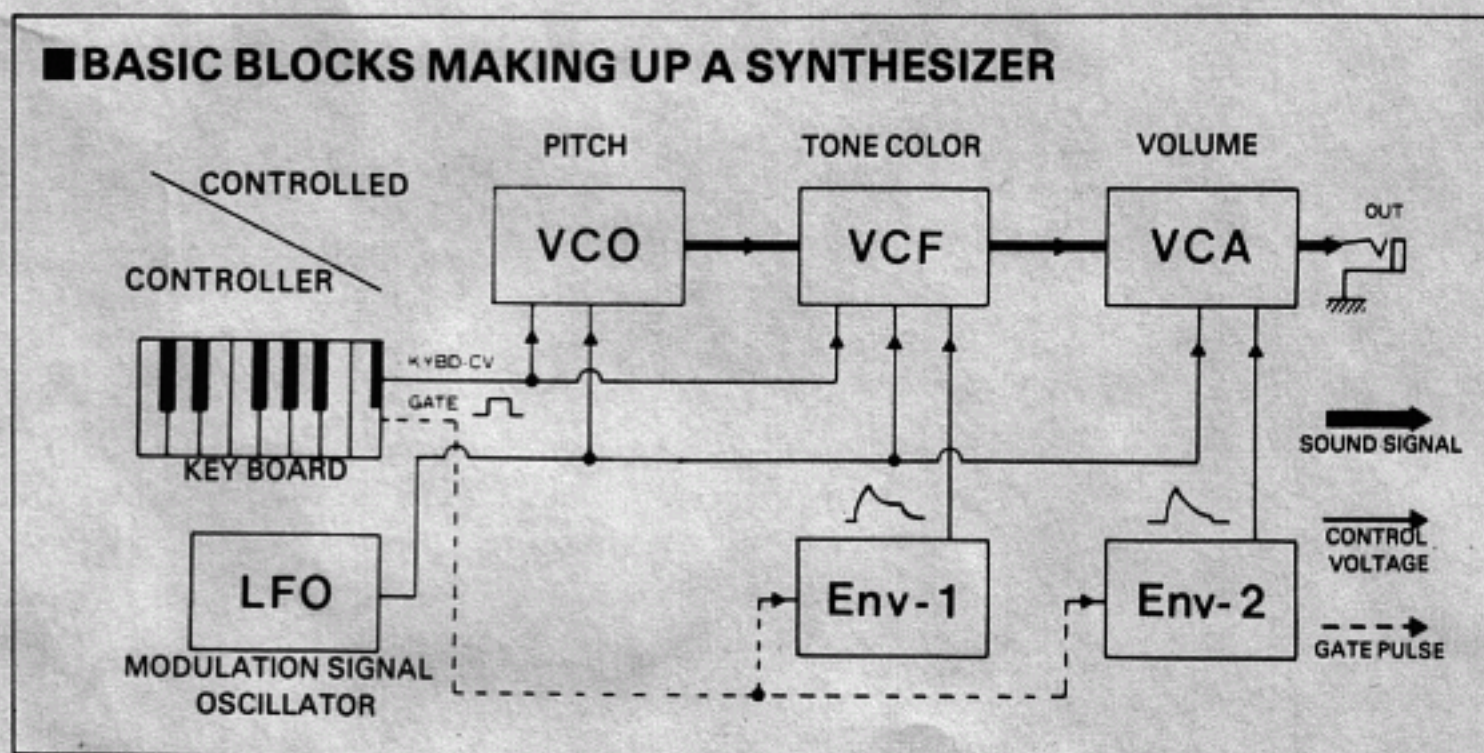
Clean the control panel with neutral detergent. Use a soft dry cloth for the wooden body. Do not use solvents such as paint thinner.

● SYSTEM 100M

SYSTEM 100M is equipped with "modulized" synthesizer blocks and the combination of these modules allows various formations of systems according to its use. Each module is provided with a high standard capacity, reliance and durability for stable sound production.

The miniature jack is used for the patch jack and the modules are extremely compact. The control voltage is 1V/1oct and this makes hookup with other synthesizers and controllers possible.

● SYNTHESIZER BASICS



■ THE THREE QUALITIES OF SOUND

A note consists of three factors which are pitch, tone color and volume. Sound is the physical vibration of an object. Therefore "pitch" is determined by the frequency of vibration per second. As seen in FIG. 1, the greater the frequency the higher the pitch and the lesser the frequency the lower the pitch. Frequency is the number of vibrations per second and the unit used is "hertz".

The range of frequencies that our ears interpret as sound is called the range of frequency audibility and it covers from approximately 20Hz -- 16,000Hz.

With a synthesizer, this pitch is determined by the VCO. "VCO" stands for the Voltage Controlled Oscillator. The VCO generates a pitch signal according to the added voltage and determines the pitch of the three elements.

Tone color is determined by the waveform. No matter how complicated the waveform is, the majority is made up of a combination of sine waves (a waveform not consisting of any overtones). As seen in FIG. 2, the square wave is made up of an odd-number combination of sine waves (a sine wave of 3 times the frequency; 5 times, 7 times, 9 times...) The sine waves of the frequencies of these integer multiples are called overtones. The greater the overtone content, the more brilliant the tone color is. And the lesser the overtone content, the more dull the tone color becomes. The sine wave does not contain any overtones and is the purest sound. With a synthesizer the VCF is used to determine the tone color. "VCF" stands for the Voltage Controlled Filter. The VCF shaves off or emphasizes the overtones from the

waveforms (square waves, saw tooth waves) sent from the VCO and creates various tone colors. Tone color can be controlled to be either vivid or melancholic by the degree of voltage on the VCF.

Volume is, as shown in FIG. 3, determined by the amplitude of a waveform. With a synthesizer, this volume is determined by the VCA. "VCA" stands for the Voltage Controlled Amplifier.

The VCA regulates the volume of the signal sent from the VCF. It is rare for this volume to always flow at a fixed level. There are always changes in "attack", "decay", "sustain" and reverberation in each sound.

These changes with each sound are synthesized by the Envelope Generator controlling the VCA.

FIG. 1 SOUND PITCH = FREQUENCY

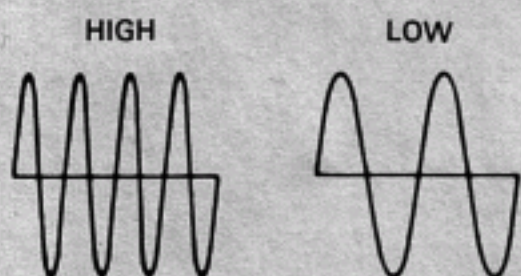


FIG. 2 TONE COLOR = HARMONIC CONTENT

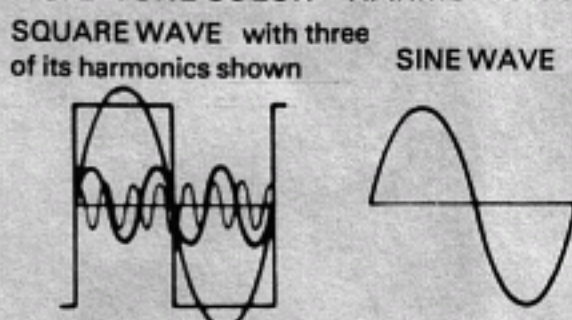
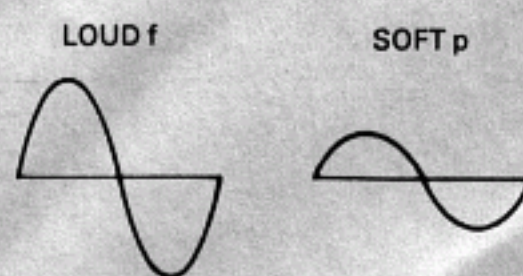
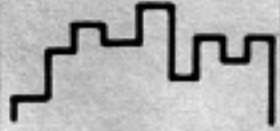
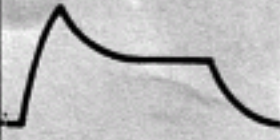
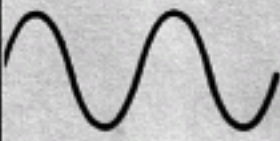


FIG. 3 VOLUME = AMPLITUDE



■ BASIC SYNTHESIZER THEORY

CONTROLLER CONTROLLED	VCO PITCH = FREQUENCY	VCF TONE COLOR = HARMONIC CONTENT	VCA LOUDNESS = AMPLITUDE
KYBD-CV 	The most common use of the keyboard control voltage is for the control of the pitch of a VCO; the pitch produced will correspond to the key pressed.	The tone color of most instruments will vary with pitch; higher pitches often produce brighter tone colors, lower pitches darker tone colors. For this purpose, the VCF can be controlled by the keyboard.	The control of loudness by means of the keyboard is of little practical use; the SYSTEM100M has no provision for this type of control.
ENVELOPE 	With some sounds, it is desirable to incorporate pitch changes during the production of each note.	The tone color of many instruments, particularly the wind instruments, changes during the production of each note. This effect can be produced with envelope generator control of the VCF. Raising the VCF resonance control will produce sounds possible only on the synthesizer.	The loudness pattern (or articulation) of a sound is produced by using the output of the envelope generator to control the VCA.
LFO 	The LFO (Low Frequency Oscillator) produces low frequency wave forms. Using the LFO sine wave output to control the pitch of the VCO will produce vibrato effects. The LFO square wave output will produce trills, and the sawtooth wave output will produce pitches which sweep downwards.	With some sounds, the tone color will vary at the same rate as vibrato. This can be done with LFO control of the VCF. Raising the VCF RESONANCE control will produce "growl" effects.	The LFO output can be used to vary the loudness of the sound output. The most common form is to use the sine wave output to produce tremolo effects.

■ THE BASIC STRUCTURE OF A SYNTHESIZER

The three factors of a synthesizer sound is produced from the three sections of the VCO, the VCF and the VCA, but as shown in the diagram above, the numerous voltages (signals) that control these sections play a strong part in sound production.

The VCO, controlled by the KYBD-CV (Keyboard Control Voltage) produces the scale. Also the VCF and the VCA, controlled by the Envelope Generator is able to determine the attack and decay of each sound.

Each time a key is pressed the Envelope Generator generates a time-changing voltage with a fixed pattern.

This pattern will change greatly with the four sliders of ADSR. Therefore by controlling the VCF or the VCA with the envelope voltage, you can create the attack time or decay time of various instruments. For example, the diagrams of the

way the sounds of the violin and the piano are produced and fades out are shown below.

You can produce such a volume change of each note by establishing the voltage change of the envelope generator to the pattern of the attack and decay of sound. Controlling the VCA with this voltage will transform the voltage change to a volume change and this will make it possible to produce the envelopes of the violin or the piano.

Changes in an envelope of this sort may just a shift in volume but it can also be accompanied by changes in tone color (harmonic content). For changes in tone color, the VCF is also controlled by the output of the Envelope Generator. Other controls of a synthesizer are the LFO, S/H, etc. Each one, with some variations in voltage, controls one of the three factors

of a synthesizer. There will be an explanation of each section. Try playing the synthesizer to see what the explanations are all about.

The use of effectors such as the echo chamber, chorus, phaser, shifter or flanger produce a variety of sounds. We recommend you try out some of these effectors.

FIG. 4 VIOLIN ENVELOPE

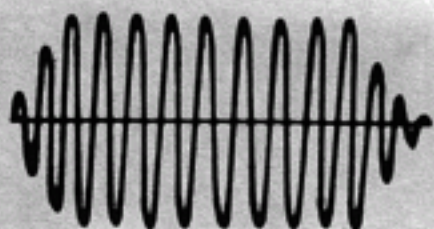


FIG. 5 PIANO ENVELOPE

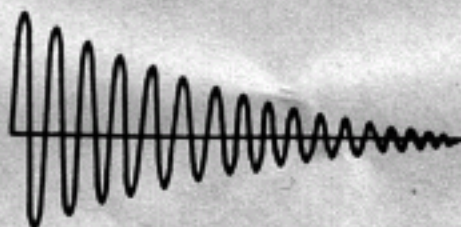
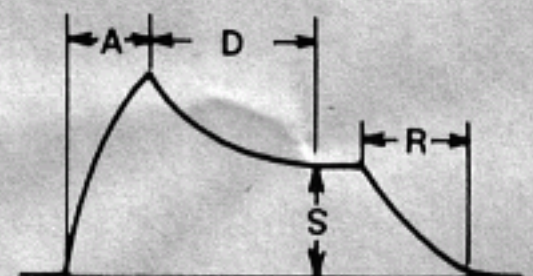
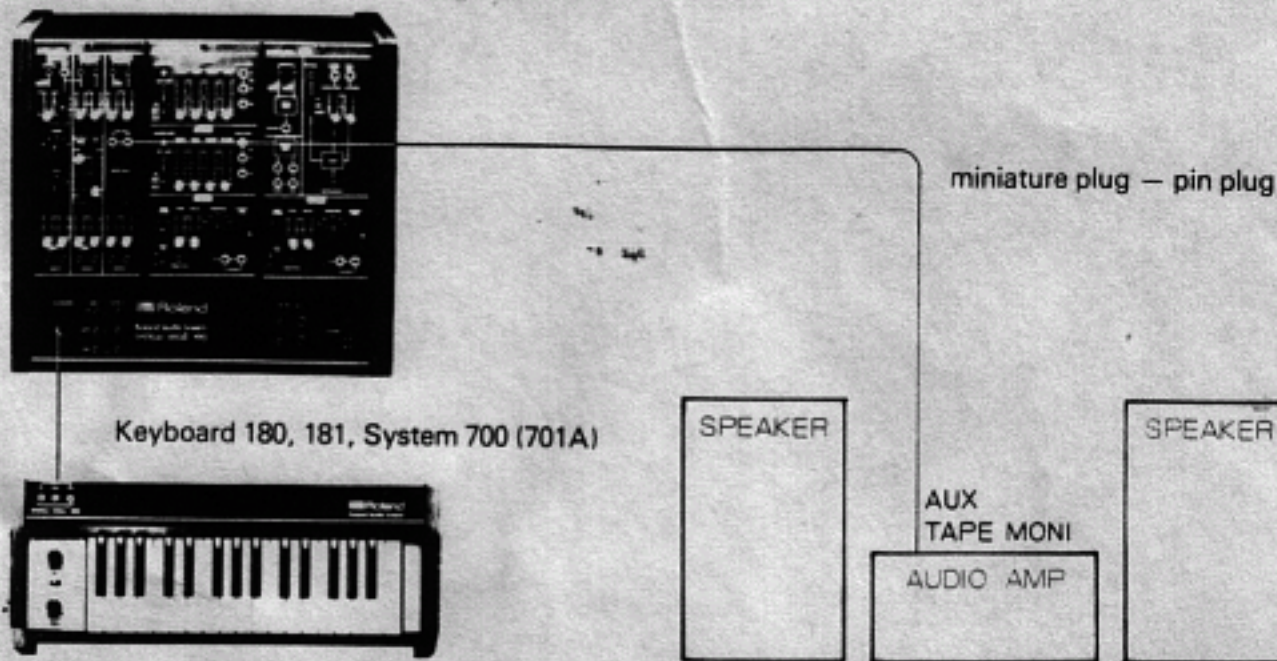


FIG. 6 ENVELOPE ANALYSIS

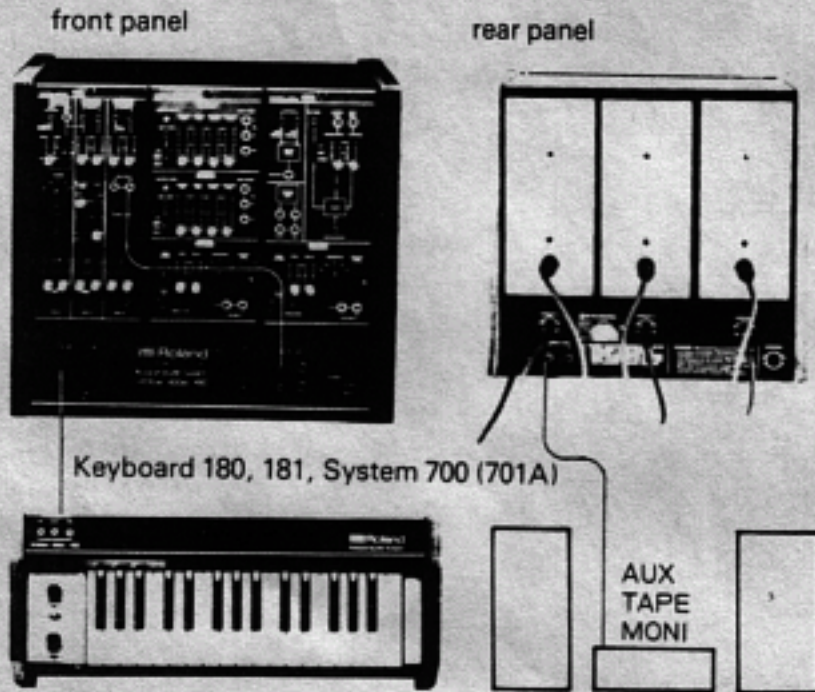


● HOOKUP

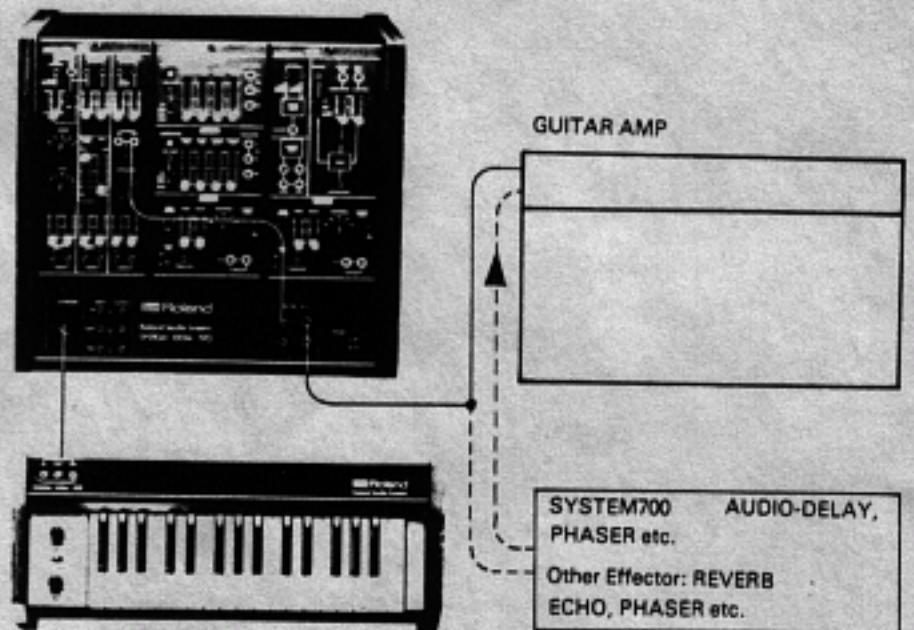
■ HOOKUP With An Audio System (1)



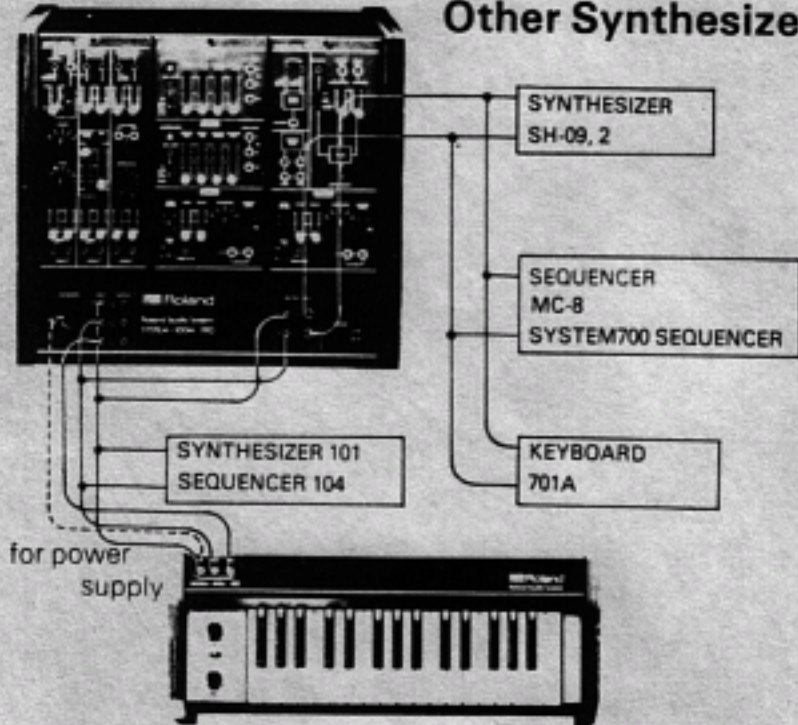
■ Hookup With An Audio System (2)



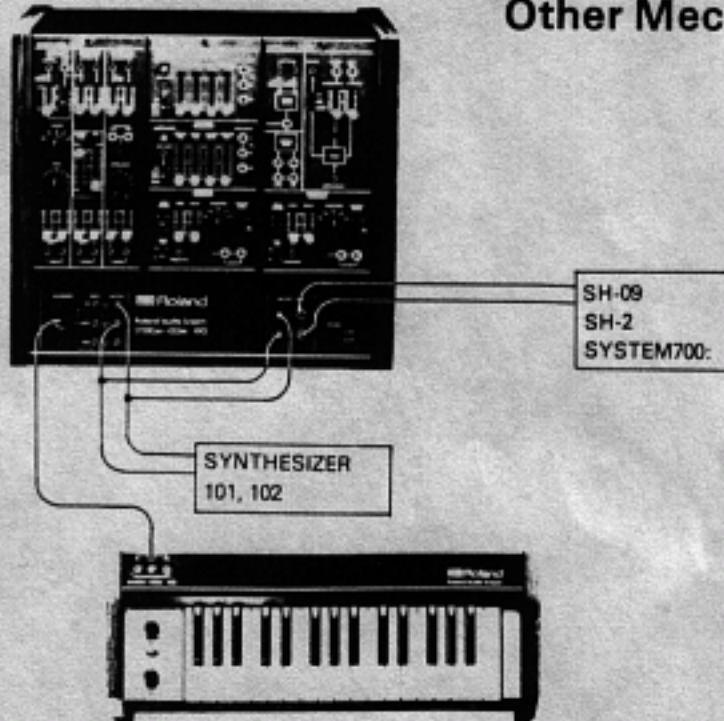
■ Hookup With Other Audio Equipments



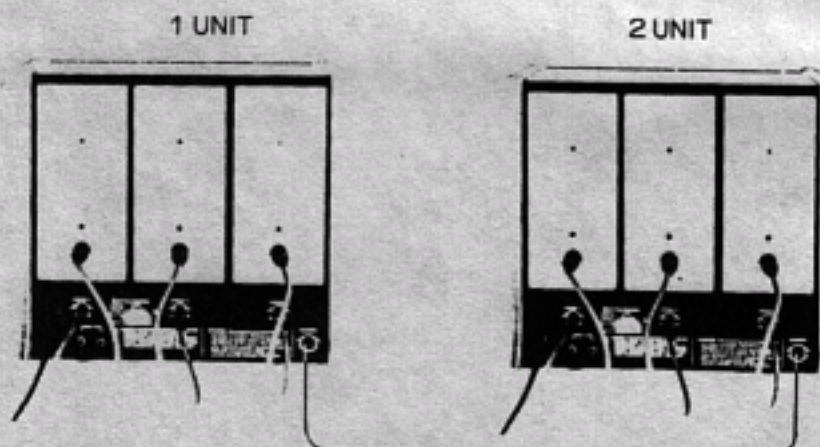
■ Hookup and Control of Other Synthesizer



■ Simultaneous Control of Other Mechanisms



■ Unit Addition



★ For hookup of more than 3 units, connect the order of:

EXPANDER → KEYBOARD EXPANDER → KEYBOARD EXPANDER →

★ For hookup of 2 units, interconnect their expanders.

● SPECIFICATIONS

★ 190 3-UNIT SYSTEM RACK

INPUT JACKS

CV 1 (miniature jack)
 GATE 1 (miniature jack)
 TRIG 1 (miniature jack)
 KEYBOARD 1 (6 pin DIN)

OUTPUT JACKS

CV 1 (miniature jack)
 GATE 1 (miniature jack)
 TRIG 1 (miniature jack)
 EXPANDER 1 (6 pin DIN)
 (CV, GATE, TRIG)
 Power Supply 3 (8 pin DIN)
 (CV, GATE, TRIG, $\pm 15V$, +14V)

JACKS OF DIFFERENT SIZES

Miniature Jack, Standard Jack, RCA
 Pin Jack 2
 POWER SWITCH 1
 PILOT LAMP 1
 DIMENSIONS 350(W) x 190(D) x 315(H) mm
 NET WEIGHT 5.6kg

★ 191J 5-UNIT SYSTEM RACK

INPUT JACKS

CV 1 (miniature jack)
 GATE 1 (miniature jack)
 TRIG 1 (miniature jack)
 KEYBOARD 1 (6 pin DIN)

OUTPUT JACKS

CV 1 (miniature jack)
 GATE 1 (miniature jack)
 TRIG 1 (miniature jack)
 EXPANDER 1 (6 pin DIN)
 (CV, GATE, TRIG)
 Power Supply 5 (8 pin DIN)
 (CV, GATE, TRIG, $\pm 15V$, +14V)

JACKS OF DIFFERENT SIZES

Miniature Jack, Standard Jack, RCA
 Pin Jack 2
 POWER SWITCH 1
 PILOT LAMP 1
 MULTIPLE JACKS 4x9
 DIMENSIONS 560(W) x 190(D) x 315(H) mm
 NET WEIGHT 7.0kg

● BLOCK DIAGRAM

