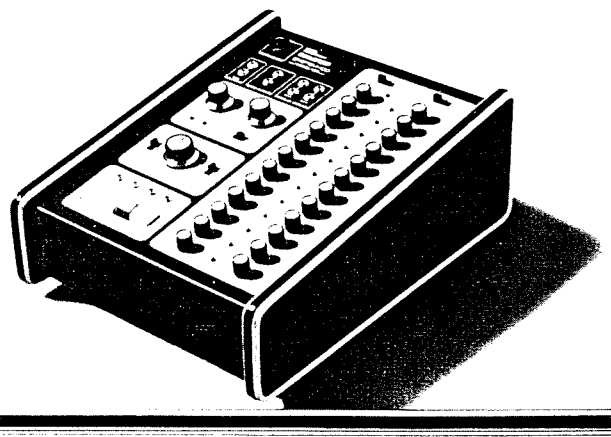
Roland Synthesizer

SYSTEM 100

MODEL 104

INSTRUCTION MANUAL



Roland

CONTENTS

INTRODUCTION

Although it is designed as a part of the ROLAND System 100, the Model 104 Sequencer can be used with almost any synthesizer.

This manual is divided into two main sections. The first section is a breif survey of the controls and their functions.

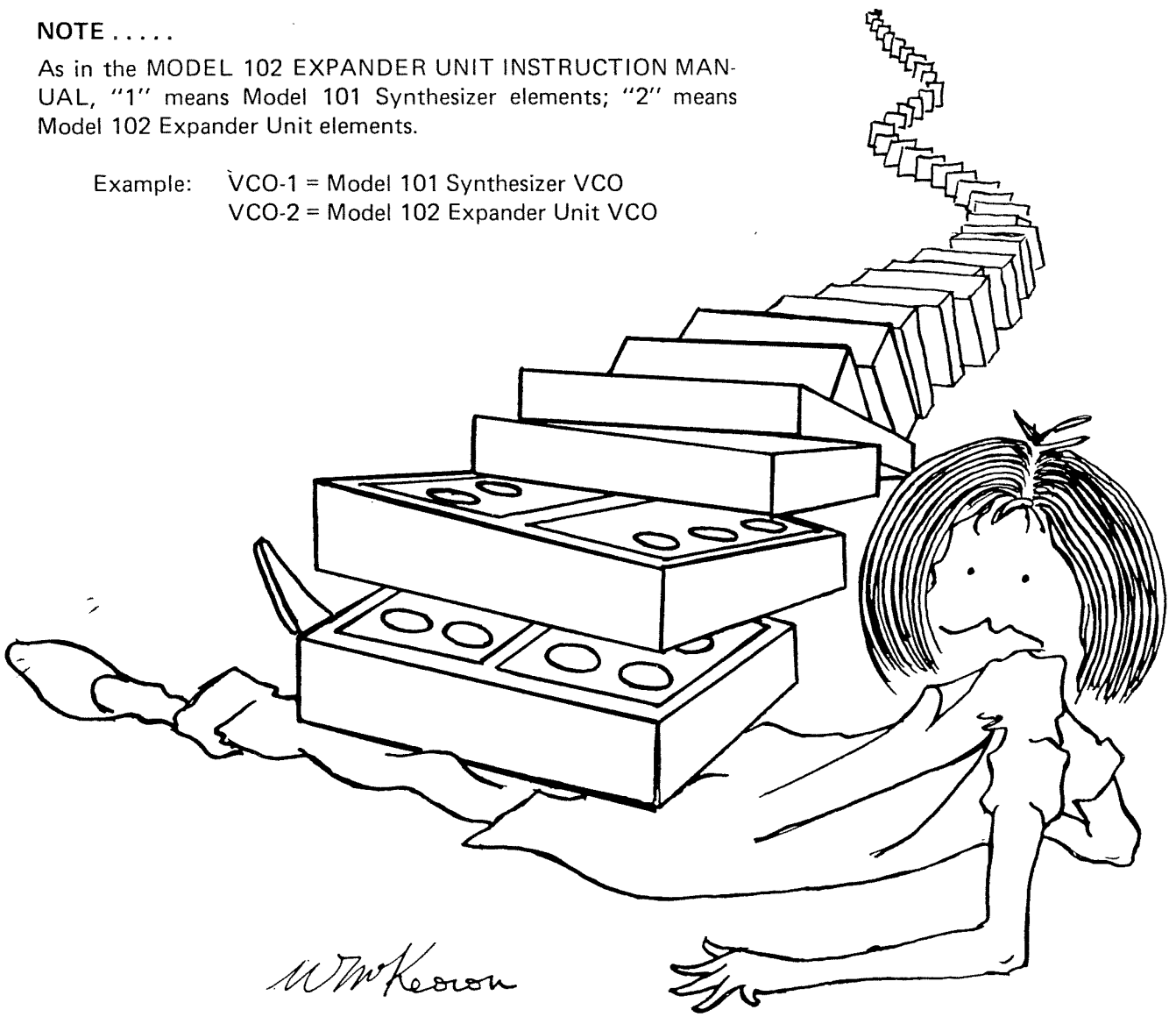
The second section is a series of experiments designed to help give you a better understanding of the sequencer and how it can be used.

If you are not too familiar with sequencers, read quickly through Section 1 first, then try the experiments in Section 2. These experiments should help to clear up any trouble palces.

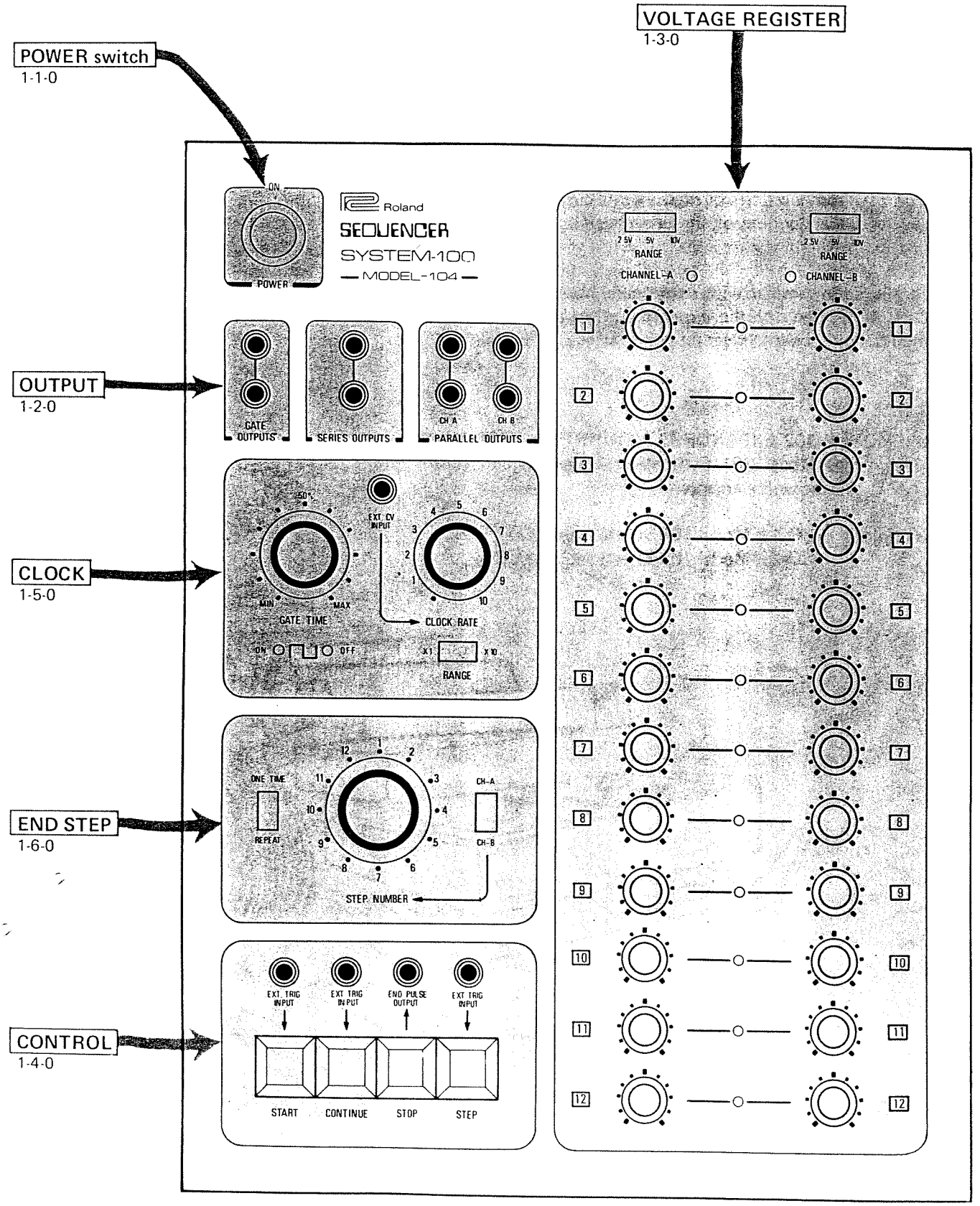
NOTE . . . . .

As in the MODEL 102 EXPANDER UNIT INSTRUCTION MANUAL, "1" means Model 101 Synthesizer elements; "2" means Model 102 Expander Unit elements.

Example: VCO-1 = Model 101 Synthesizer VCO
VCO-2 = Model 102 Expander Unit VCO



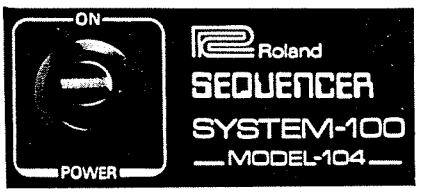
SECTION NAME



1. THE CONTROLS

1-1-0 The POWER switch

Fig. 1-1

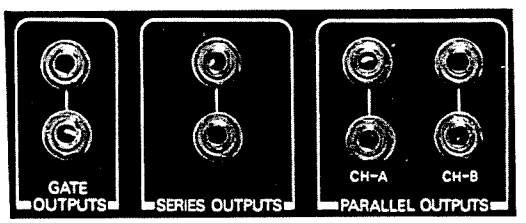


When the POWER switch is turned ON, one or more of the lights on the front panel will light showing that the sequencer is receiving power.

1-2-0 The OUTPUT section

The outputs of the sequencer are taken from this section.

Fig. 1-2



1-2-1 The GATE OUTPUT jacks . . . . .

The GATE OUTPUT jacks provide two outputs for the gate pulse generated by the internal clock circuits and used for triggering up to two ADSR's. Each step in the sequence produces one gate pulse.

1-2-2 The SERIES OUTPUT jacks . . . . .

The control voltage output of the VOLTAGE REGISTERS (1-3-1) for both channels appears at these jacks in series:

Output: A1, A2, A3, → A10, A11, A12, B1, B2, B3, → B11, B12, A1, etc.

A = Channel A control voltages
B = Channel B control voltages

(See 2-1-0)

1-2-3 The PARALLEL OUTPUT jacks . . . . .

The PARALLEL OUTPUT jacks are used for obtaining two separate control voltages for each step in the sequence.

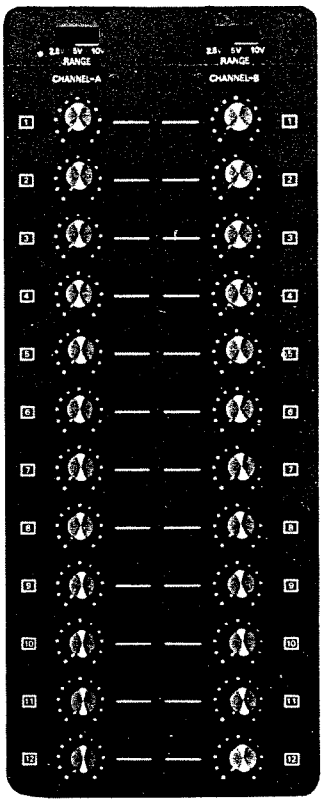
Output:

$$\begin{bmatrix} \text{CH A: A1, A2, A3, } \rightarrow \text{ A11, A12, A1, A2, } \rightarrow \text{ A11, A12, A1 } \rightarrow \\ \text{CH B: B1, B2, B3, } \rightarrow \text{ B11, B12, B1, B2, } \rightarrow \text{ B11, B12, B1 } \rightarrow \end{bmatrix} \text{ etc.}$$

(See 2-3-0)

1-3-0 The VOLTAGE REGISTER section

Fig. 1-3



1-3-1 The VOLTAGE REGISTERS . . . . .

The VOLTAGE REGISTERS are the two vertical rows of knobs in the VOLTAGE REGISTER section. They are used for setting the control voltage output for each step in the sequence. (See 2-2-0).

1-3-2 The step lights . . . . .

The red lights between the VOLTAGE REGISTERS show which step is in effect at the output jacks.

1-3-3 The CHANNEL lights . . . . .

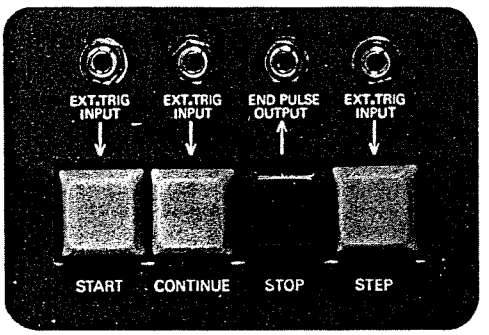
The two red lights (labled CHANNEL A and CHANNEL B) located above the VOLTAGE REGISTERS show which of the two channels are in effect at the SERIES OUTPUT jacks. (See 2-2-7).

1-3-4 The RANGE switches . . . . .

The RANGE switches determine the voltage range covered by the VOLTAGE REGISTERS. When controlling the VCO frequency of a 1 volt per octave synthesizer (such as the System 100), "2.5V" means that the VOLTAGE REGISTERS under that switch will have a range of two and one half octaves; "5V" means five octaves, and "10V", ten octaves.
(See 2-2-1, 2-2-3)

1-4-0 The CONTROL section

Fig. 1-4



The CONTROL section controls the start and stop functions of the sequencer.

1-4-1 The START button . . . . .

Pushing the START button starts the sequencer; the sequence will always start with Step 1 (Channel A when using SERIES OUTPUT).

1-4-2 The STOP button . . . . .

Pushing the STOP button will cause the sequencer to stop running as soon as the button is pushed.

1-4-3 The CONTINUE button . . . . .

Pushing the CONTINUE button will cause the sequencer to start running the sequence from where it left off when the STOP button was pushed.

1-4-4 The STEP button . . . . .

When the sequencer is not running, the STEP button will advance the sequencer one step each time it is tapped. This allows for setting of the VOLTAGE REGISTERS or for manual control of the sequence run.

1-4-5 The CONTROL section jacks . . . . .

The CONTROL section jacks allow for external control of the sequencer CONTROL functions and are dicussed in more detail in Section 2 of this manual (2-5-0).

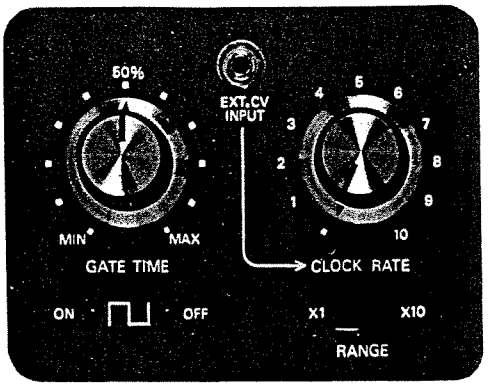
Using the ROLAND FS-1 foot switch with a convertion jack allows foot triggering of the sequencer CONTROL functions.

The output at the END PULSE OUT jack is a short pulse which occurs at the end of the END STEP (1-6-0).

The END PULSE OUT jack, used in conjunction with a pulse shaper and a tape deck, allows the recording of different 24 step (or less) sequences one after another without any break in rhythm.

1-5-0 The CLOCK section

Fig. 1-5



The CLOCK determines the speed of the sequence.

1-5-1 The CLOCK RATE control and RANGE switch . . . . .

The CLOCK RATE controls the speed (tempo) of the sequence. With the RANGE switch at "X1", the CLOCK rate is normal; at "X10", the CLOCK rate is ten times normal. (See 2-2-2)

1-5-2 The GATE TIME . . . . .

The CLOCK generates gates pulses which are most often used to trigger an ADSR. The GATE TIME determines the length of these gate pulses. At MIN, the gate pulses are short and staccato-like; at MAX, long and legato-like. (See 2-2-2)

1-5-3 The EXT CV INPUT jack . . . . .

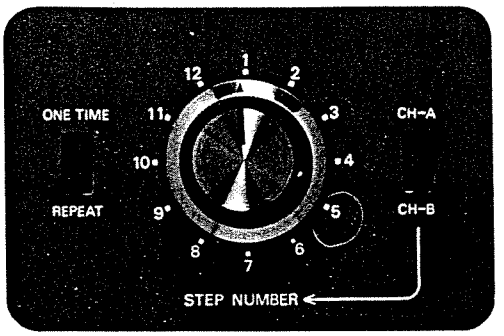
The EXT CV INPUT jack allows the use of control voltages from external sources to affect the CLOCK RATE. (See 2-4-0, 2-4-2)

1-5-4 The GATE TIME ON/OFF lights . . . . .

The ON/OFF lights under the GATE TIME control serve to show when there is a gate pulse present at the GATE OUTPUT jacks.

1-6-0 The END STEP section

Fig. 1-6



In the following, END STEP means the last step in a sequence, but does not necessarily mean that the sequencer stops running.

1-6-1 The STEP NUMBER selector . . . . .

The STEP NUMBER selects which step will be the END STEP in a sequence. (See 2-2-6)

1-6-2 The ONE TIME/REPEAT switch . . . . .

In the ONE TIME position, the sequence will run one time only (after pushing START) and stop at the END STEP (selected by the STEP NUMBER control).

In REPEAT, the sequence will repeat itself over and over. The last step in this repeating sequence will be the END STEP.

For example: STEP NUMBER at "4" (and CH A/CH B switch at CH A); sequence will be:

1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, → etc.

In REPEAT, if the switch is changed to ONE TIME while the sequencer is running, the sequencer will automatically stop at the END STEP the next time it shows up in the sequence. (See fig. 2-8)

1-6-3 The CH A/CH B switch . . . . .

This switch determines which channel will contain the END STEP.

In the CH A position, the sequence will END with the step selected by the STEP NUMBER control.

EXAMPLE: Controls set at: STEP 4; REPEAT; CH A

SERIES OUTPUT will be:

A1, A2, A3, A4*, A1, A2, A3, A4, A1, A2, → etc.

PARALLEL OUTPUT will be:

$$\begin{bmatrix} \text{A: } 1, 2, 3, 4,^{*}\ 1, 2, 3, 4, 1, 2, \rightarrow \\ \text{B: } 1, 2, 3, 4,\ \ 1, 2, 3, 4, 1, 2, \rightarrow \end{bmatrix} \text{etc.}$$

In the CH B position, the sequencer will run all the way to Step 12 once, then to the END STEP, then repeat.

EXAMPLE: Controls set at: STEP 4; REPEAT; CH B

SERIES OUTPUT will be:

A1, A2, A3, → A10, A11, A12, B1, B2, B3, B4*, A1, A2, A3, → A12, B1, → B4, A1 etc.

PARALLEL OUTPUT will be:

$$\begin{bmatrix} \text{A: } 1, 2, 3, \rightarrow 10, 11, 12, 1, 2, 3, 4,^{*}\ 1, 2, 3, 4, 5, \rightarrow 11, 12, 1, 2, 3, 4, 1, 2, \rightarrow \\ \text{B: } 1, 2, 3, \rightarrow 10, 11, 12, 1, 2, 3, 4,\ \ 1, 2, 3, 4, 5, \rightarrow 11, 12, 1, 2, 3, 4, 1, 2, \rightarrow \end{bmatrix} \text{etc.}$$

NOTE: * indicates where the sequence would stop if the ONE TIME/REPEAT switch were in the ONE TIME position.

2. EXPERIMENTING WITH THE SEQUENCER

The following is a series of experiments to help clarify the use of the sequencer.

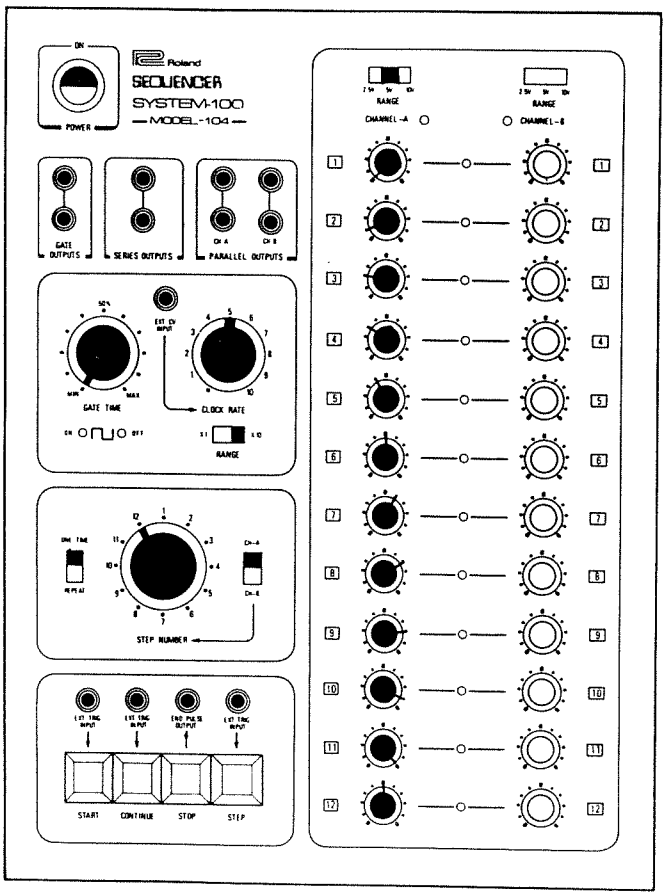
2-0-1 Before we begin . . . . .

The function of the sequencer is to run off a set of preprogrammed control voltages. One of the most common uses of the sequencer is to control the VCO so as to produce repeating musical sequences of any desired pattern.

Actually, the sequencer is a rather simple device. It may seem complicated because of the number of controls on the front panel, but inside it is basically not much more than an electronic counting circuit, much the same as used in electronic digital clocks and watches.

Before beginning, set all the sequencer controls as shown in fig. 2-1.

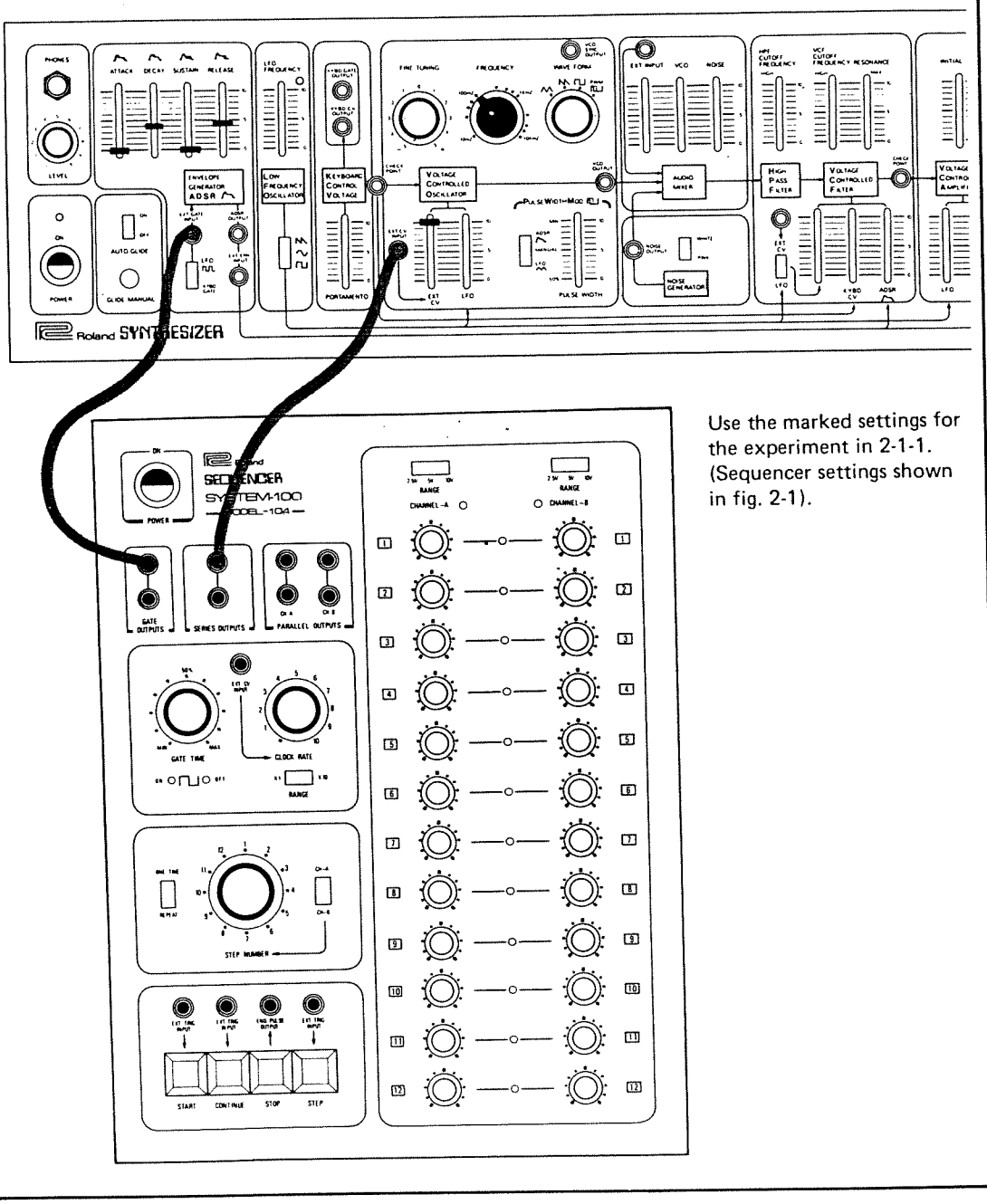
Fig. 2-1 Settings for experiment in 2-1-1



2-1-0 Series outputs

Fig. 2-2 shows a typical method of using the SERIES OUTPUT of the sequencer. Set the synthesizer controls as shown in fig. 2-2 and try tapping the START button.

Fig. 2-2 Series output



Use the marked settings for the experiment in 2-1-1. (Sequencer settings shown in fig. 2-1).

2-1-1 The keyboard control voltage . . . . .

In addition to receiving the sequence of control voltages from the sequencer, the VCO is still receiving the control voltage from the keyboard.

Tap a key on the lower part of the keyboard and then tap START. After the sequence ends, tap a key on the upper part of the keyboard and again tap START.

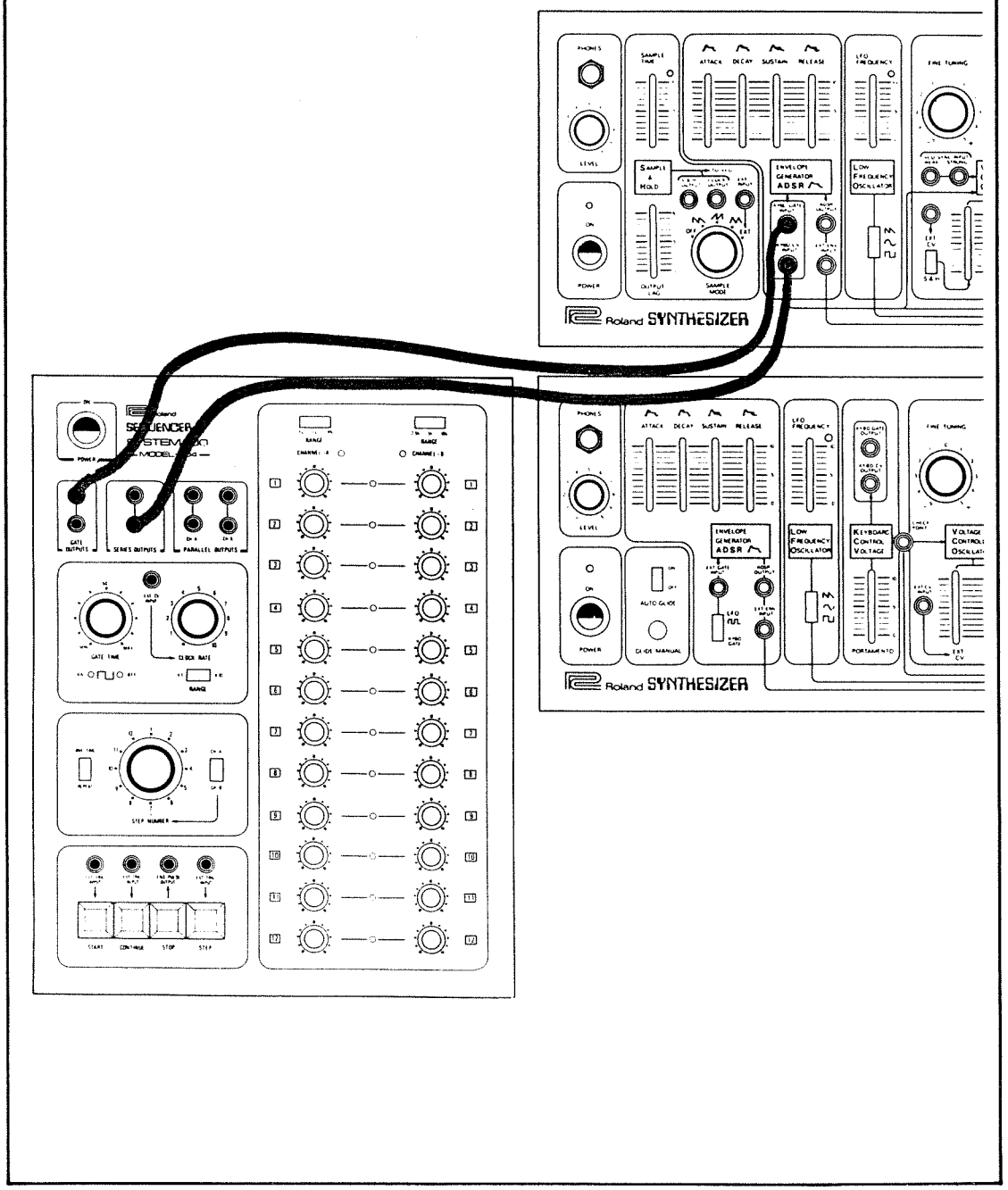
Also, try changing the RANGE switch and tapping START.

2-2-1 Using the Model 102 Expander Unit . . . . .

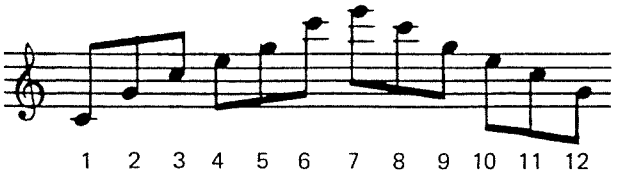
Set any patch on both the Model 101 Synthesizer and the Model 102 Expander Unit and tune VCO-1 so it produces pitches tuned as desired.

Connect the sequencer as shown in fig. 2-3 (another method of using the SERIES OUTPUT).

Fig. 2-3 Series output
(Also used for setting VOLTAGE REGISTERS)



Decide the pitches of the sequence. For this experiment, try this arpeggio:



Give each note a number; the number, then, will represent the step number in the sequence for each note.

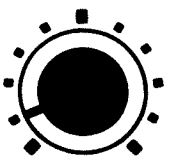
Decide the range of the sequence. In our example, the range is less than two and one half octaves, so try setting the VOLTAGE REGISTER RANGE switch for Channel A at "2.5V".

Start with the lowest note in the sequence and set the sequencer for that step. In our example, Step 1 is the lowest note. With the sequencer in STOP mode, tap the STEP button until the Channel A and the Step 1 lights come on. (If the CLOCK RATE is low, you can often set Step 1 by tapping the START button, then very quickly tapping the STOP button much in the same way as you would play a grace note on the keyboard:).

Set the Step 1 VOLTAGE REGISTER as shown in fig. 2-4.

START button STOP button

Fig. 2-4 First VOLTAGE REGISTER setting



(This setting allows for slight corrections in tuning later, if needed).

Move both VCA INITIAL GAIN controls up so you can hear sound. Strike the key on the keyboard which represents the lowest pitch in the sequence and tune VCO-2 to unison with the keyboard pitch (using the VCO-2 FREQUENCY control).

To check that the RANGE switch is set correctly, strike the key on the keyboard which produces the highest pitch in the sequence, then adjust the Step 1 VOLTAGE REGISTER so that VCO-2 produces unison with the new pitch. If this is impossible, the RANGE switch will have to be changed to the "5V" position.

If VCO-2 tunes correctly, the RANGE switch setting is okay. Strike the lowest pitch in the sequence on the keyboard again and reset the Step 1 VOLTAGE REGISTER so that VCO-2 again produces unison with VCO-1.

Next, advance the sequencer to Step 2 by tapping on the STEP button once. Tap the key on the keyboard which produces the next note in the sequence, then use the Step 2 VOLTAGE REGISTER to tune VCO-2 to unison with the keyboard pitch.

Advance the sequencer again, and tap the key for the next pitch. Use the Step 3 VOLTAGE REGISTER to tune VCO-2 to unison with this pitch.

Continue in this manner until all VOLTAGE REGISTERS have been set.

Move the VCA INITIAL GAINS down to "0", move the VCA-2 control up and tap the START button to check the sound of the sequence.

2-2-2 **The ADSR . . . . .**

Generally, the higher the CLOCK RATE, the shorter the ADSR attack and release times should be for clear separation of notes.

Note that if you put the ADSR ATTACK at "10" and tap the START button, there will be no sound unless the CLOCK RATE is set very low and the GATE TIME at or near MAX.

2-2-3 **No Exapnder Unit . . . . .**

To set the VOLTAGE REGISTERS without the use of a second VCO requires constantly shifting between two different patch cord arrangements. For ease in explaining, the first arrangement we will call Condition 1 (fig. 2-5) and the second Condition 2 (fig. 2-6).

Fig. 2-5 Condition 1 patch

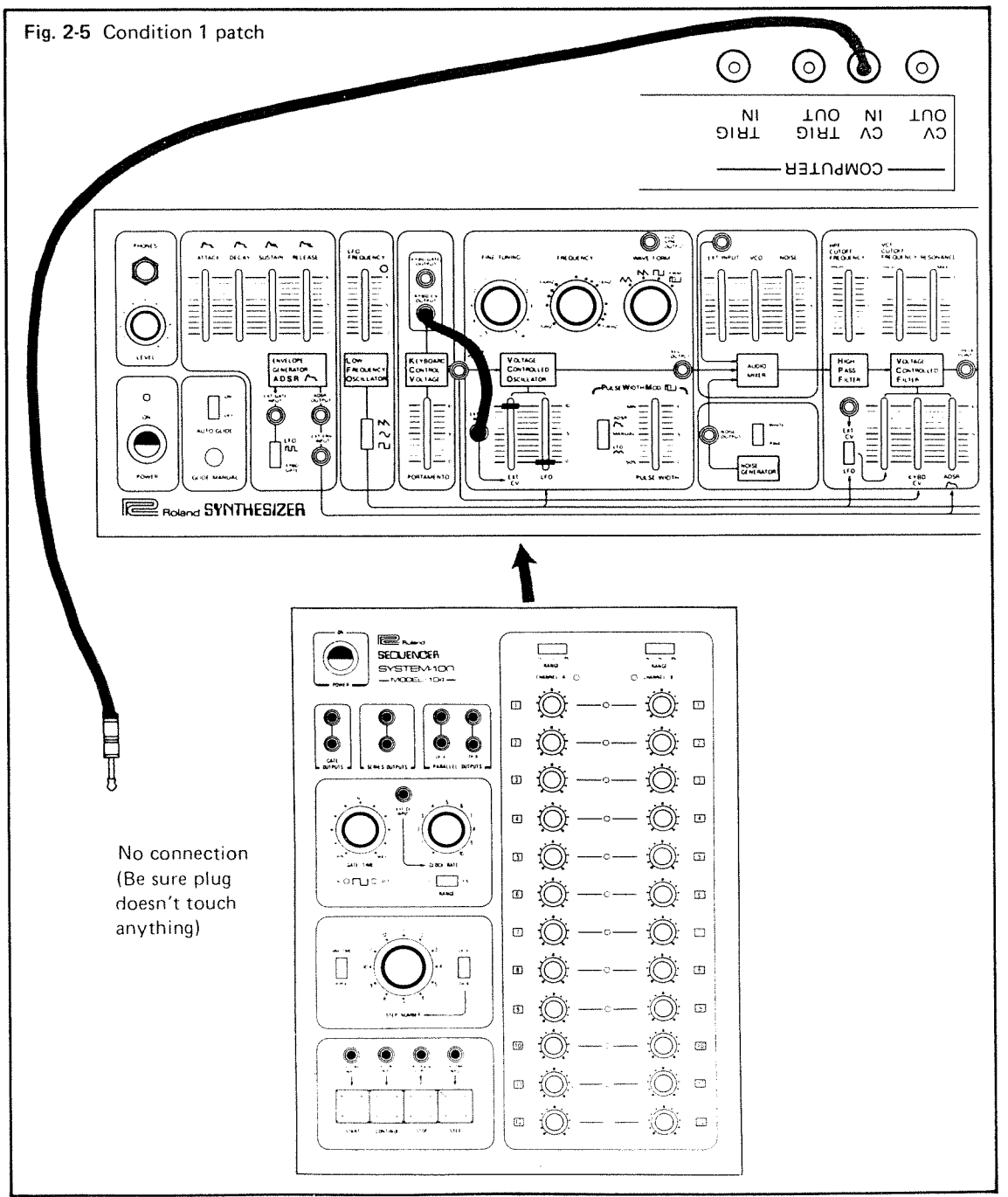
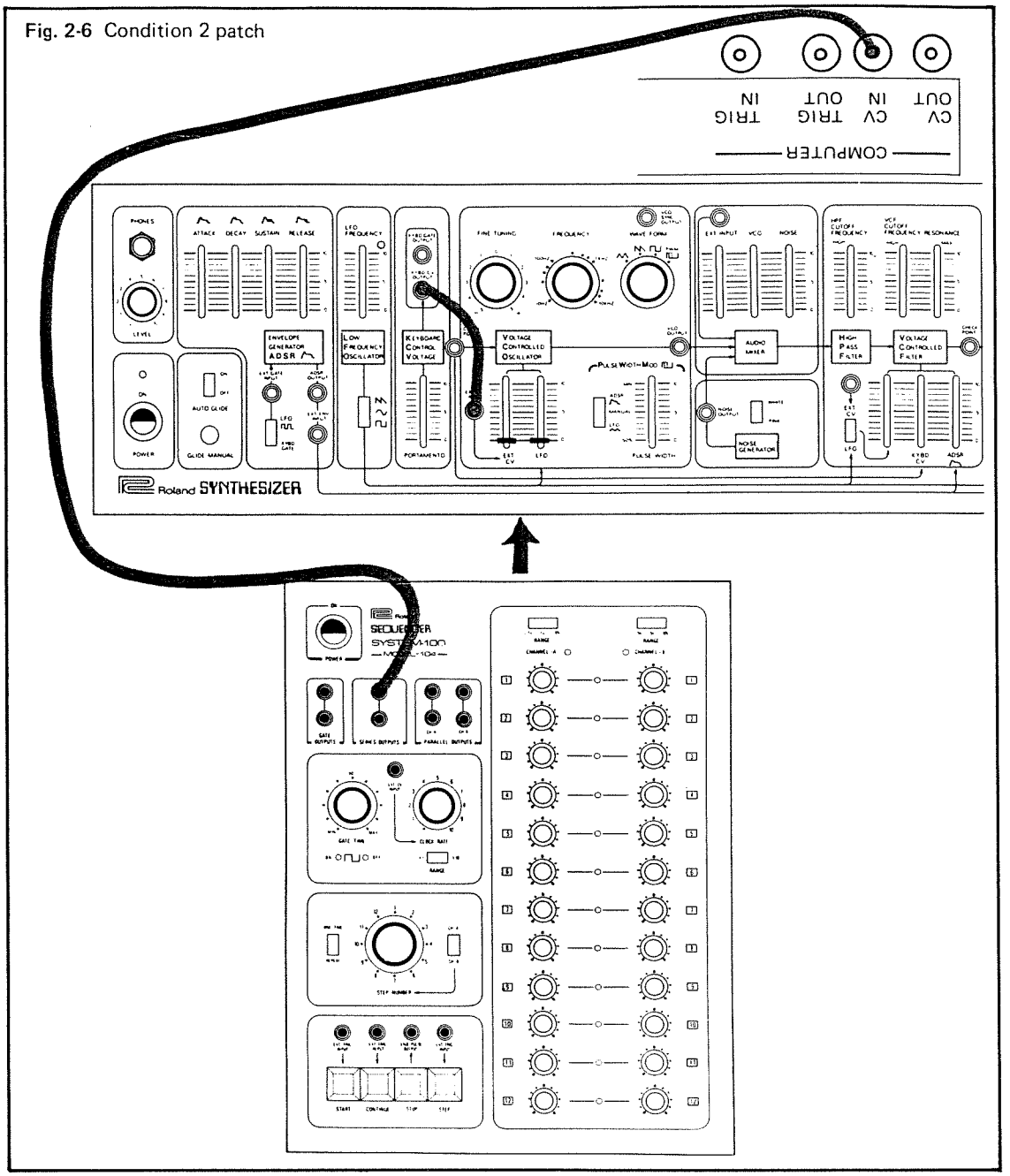


Fig. 2-6 Condition 2 patch



Start by setting Condition 1. Set a patch and tune the VCO as desired.

Next, tap the key on the keyboard for the lowest pitch in the sequence and keep this pitch in mind.

Set Condition 1 and set Step 1 on the sequencer. Set the Step 1 VOLTAGE REGISTER so that the VCO produces the remembered pitch.

Go back to Condition 1 and tap the key for the highest pitch in the sequence. Keep this pitch in mind.

Go back to Condition 1 and adjust the Step 1 VOLTAGE REGISTER for this pitch. If this can't be done, increase the range of the VOLTAGE REGISTERS by changing the RANGE switch to the "5V" position.

Now that the RANGE switch is set, go back to the beginning and set Step 1 for the lowest pitch again.

After that, set Condition 1 again, tap the next key in the sequence, and note the pitch. Set Condition 2, set Step 2 on the sequencer and tune the Step 2 VOLTAGE REGISTER for the second pitch.

Continue in this way for the remainder of the sequence.

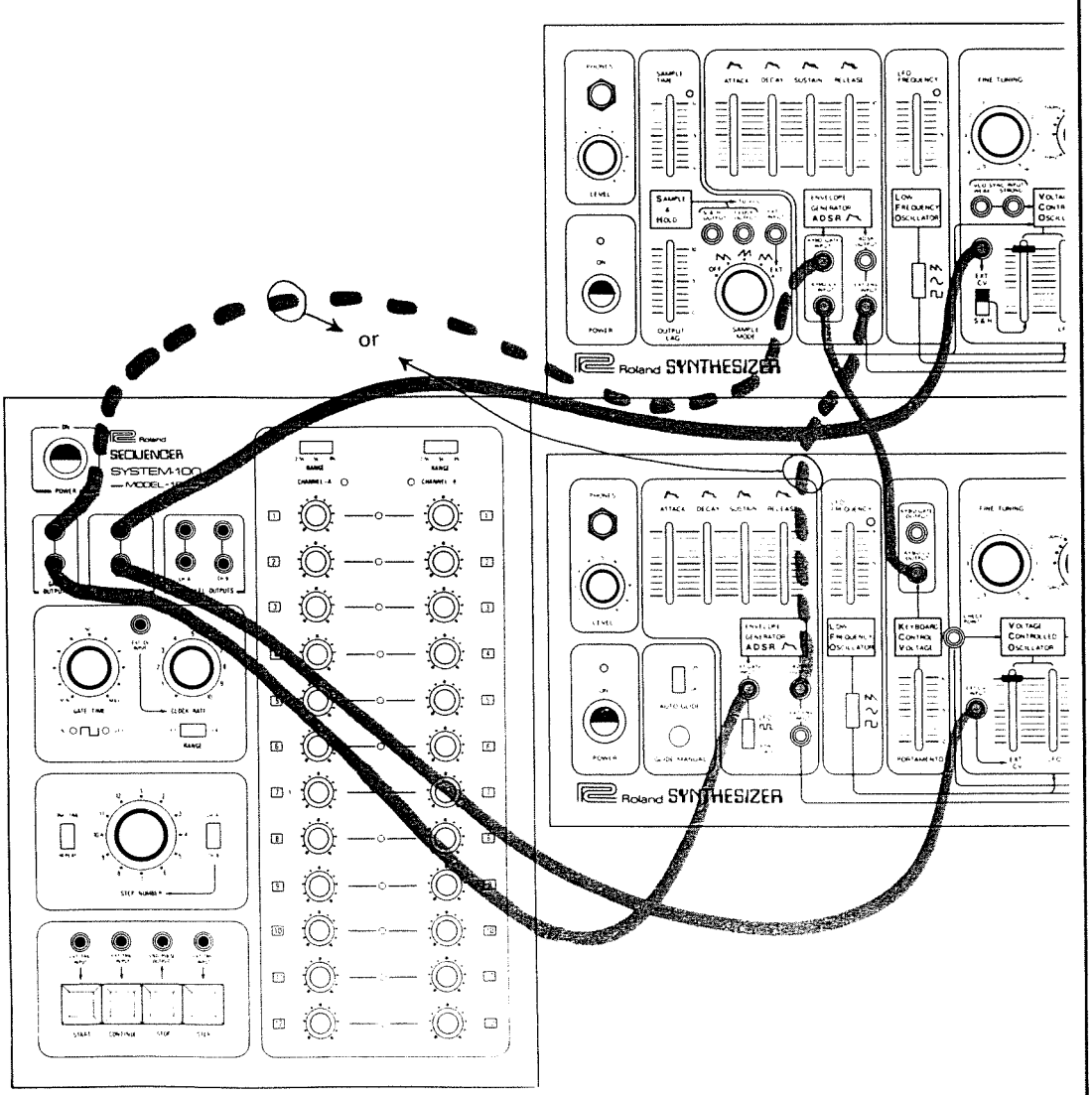
When you've finished setting up the sequence, you can either retain Condition 2 (without the short patch cord to the VCO EXT CV INPUT) or you can set the SERIES OUTPUT patch shown in fig. 2-2

Using the Condition 2 arrangement, the keyboard will have no effect on the VCO frequency.

2-2-4 Two VCO's . . . . .

Fig. 2-7 shows how to use two VCO's with the series output.

Fig. 2-7 Series output with two VCO's



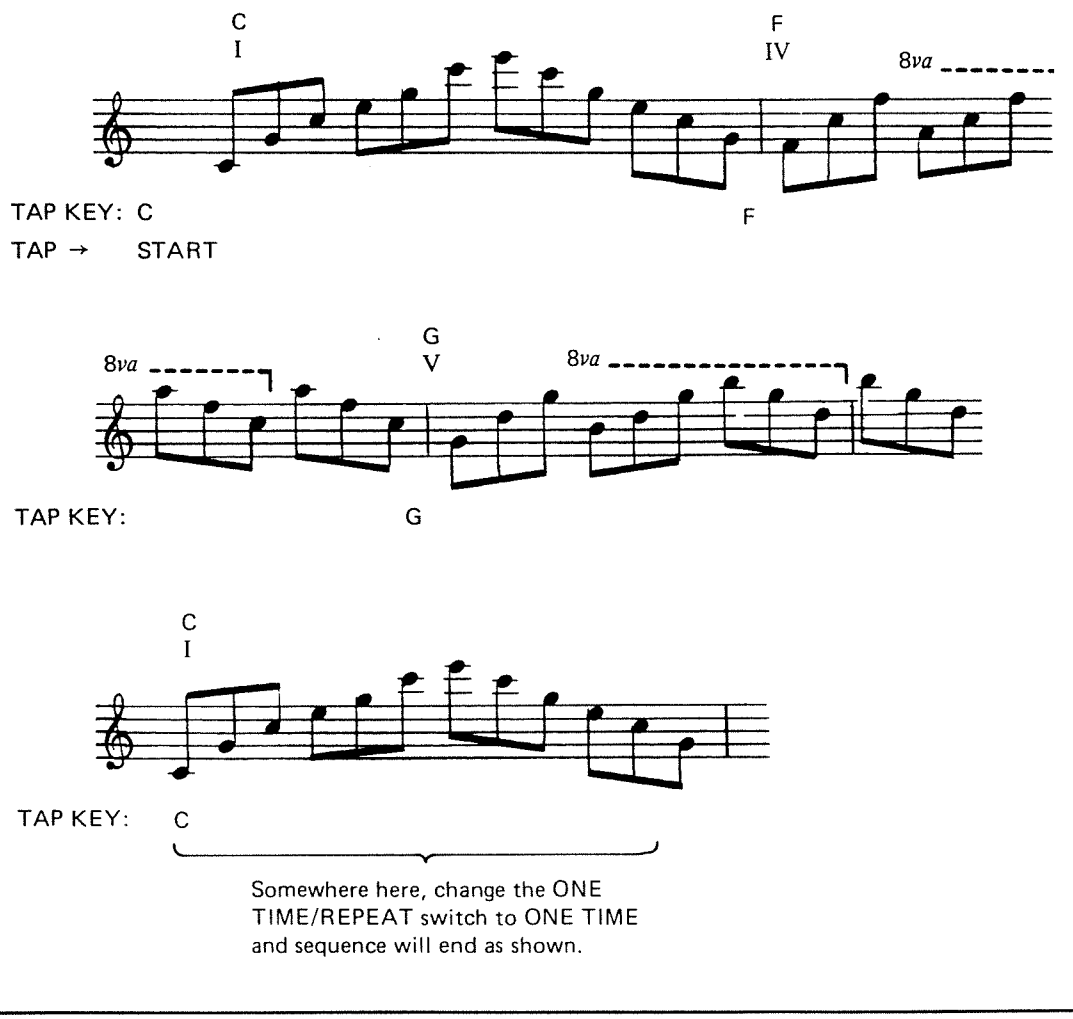
Since both VCO's are receiving control voltages from the exact same sources (keyboard and sequencer), tuning of VCO-2 is simple: Just raise the VCA INITIAL GAIN controls and use the VCO-2 FREQUENCY control to tune VCO-2 to unison (or any other interval) with VCO-1.

2-2-5 **Modulation . . . . .**

With one of the series output patches set (fig. 2-2 or 2-7), the control voltage from the keyboard still affects VCO-1 (and VCO-2 when using fig. 2-7) and can be used for modulations.

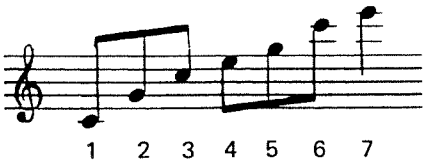
Set the ONE TIME/REPEAT switch at REPEAT, tap the low C on the keyboard, and tap the START button. Try tapping keys on the keyboard just before the first note in the sequence sounds. See fig. 2-8.

Fig. 2-8 Modulation (chord changes)



2-2-6 **Shorter sequences . . . . .**

Try running a sequence with the STEP NUMBER control in other positions. For example, set at "7", the sequence would be:



When the sequencer reaches the step indicated by the STEP NUMBER control (END STEP), the sequencer automatically starts the sequence over again from Step 1 (with the ONE TIME/ REPEAT switch in REPEAT).

2-2-7 **Longer sequences . . . . .**

The CH A/CH B switch determines which channel will contain the END STEP.

Return the STEP NUMBER control to "12" and change the CH A/CH B switch to CH B. Now you have as many as 24 steps available at the SERIES OUTPUT jacks; 12 steps in Channel A, and 12 steps in Channel B.

The Channel B VOLTAGE REGISTERS are set in the same way as the Channel A REGISTERS. Remember that the two CHANNEL lights above the VOLTAGE REGISTERS show which of the two rows of REGISTERS is in effect at the SERIES OUTPUT jacks at any given point in the sequence.

Fig. 2-9 Typical patch
French Horn (Patch 19, MODEL 101 SYNTHESIZER PATCH BOOK)

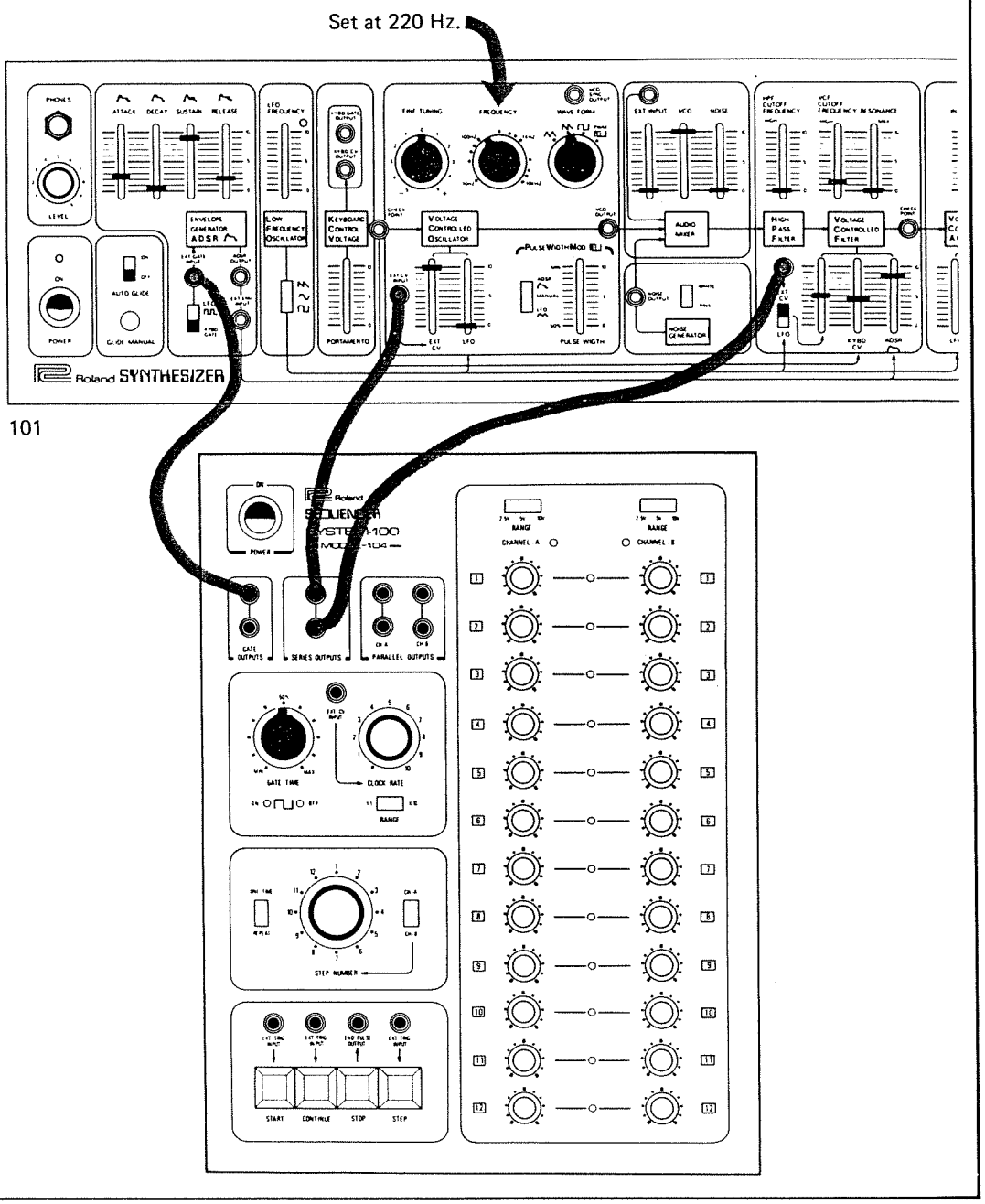


Fig. 2-9 shows a typical application of the series output of the sequencer to a patch from the MODEL 101 SYNTHESIZER PATCH BOOK. Notice that one of the SERIES OUTPUT patch cords goes to the VCF EXT CV jack of the synthesizer so that the tone color of the patch will change with the pitches of the VCO.

2-2-9 Another typical patch . . . . .

Fig. 2-10 Typical patch
Vibraphone (Patch 21, MODEL 102 EXPANDER UNIT PATCH BOOK)

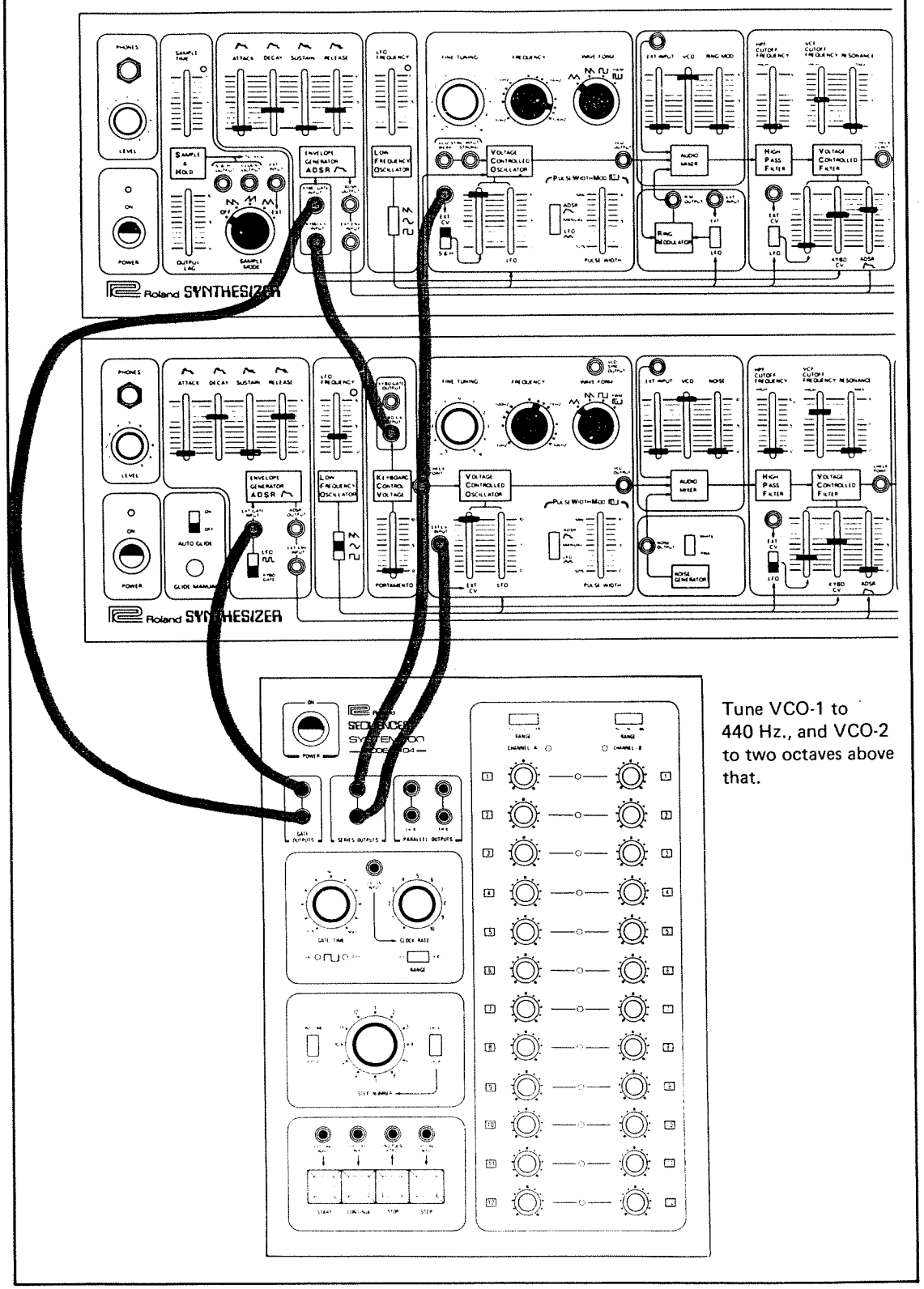


Fig. 2-10 shows a typical application with a patch from the MODEL 102 EXAPNDER UNIT PATCH BOOK.

Fig. 2-11 Parallel output

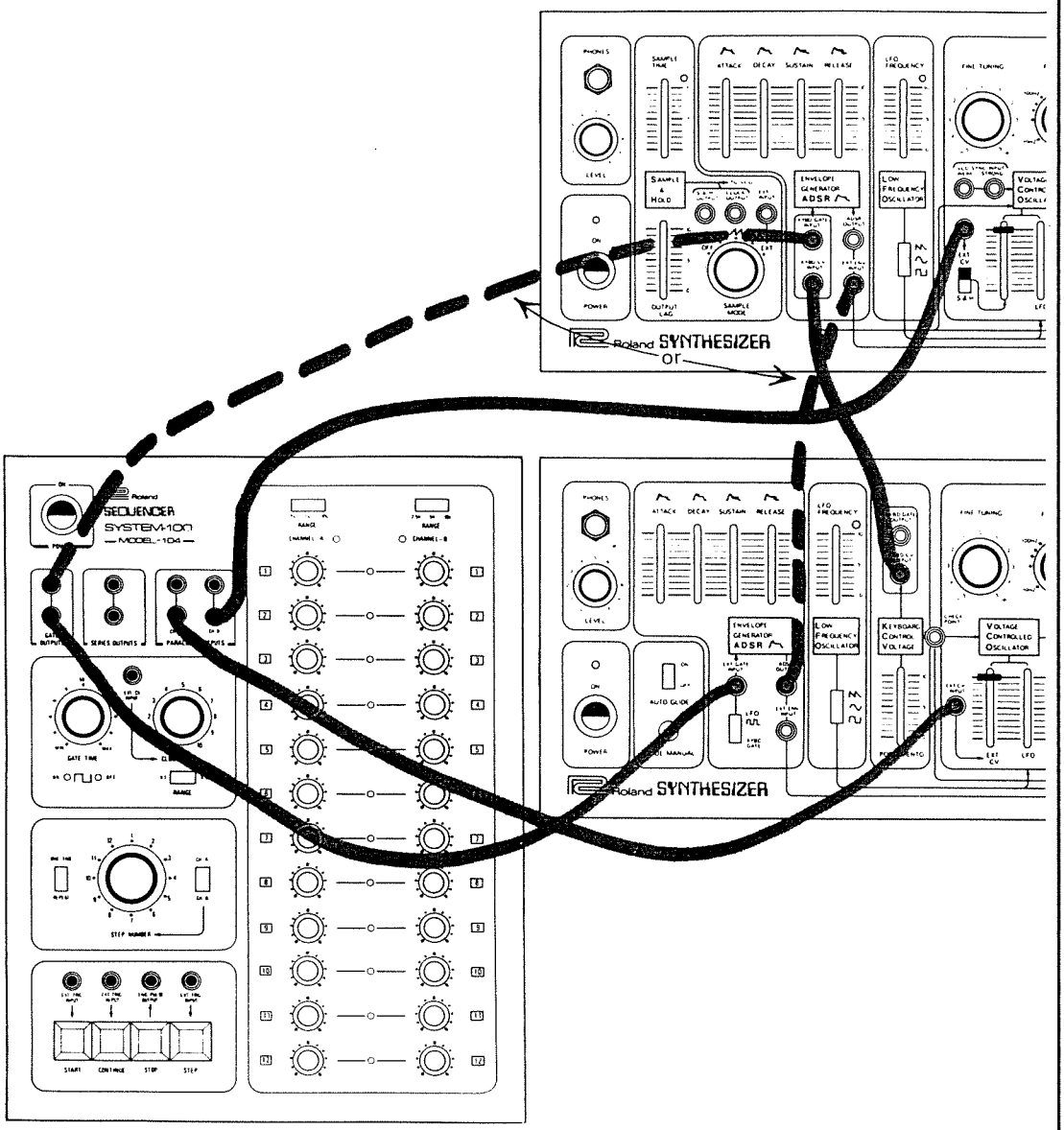


Fig. 2-11 shows a typical parallel output patch. VCA-2 can be controlled either by ADSR-2 (triggered from the second GATE OUTPUT jack on the sequencer) or by ADSR-1 (by means of a patch cord from the ADSR-1 ADSR OUTPUT jack). Don't forget the keyboard control voltage patch cord if you want both VCO's to modulate according to the keyboard.

In this patch, VCO-1 will follow the control voltages set with the Channel A VOLTAGE REGISTERS and VCO-2 will follow the Channel B REGISTERS.

Fig. 2-12 Parallel output; different tone color for each pitch

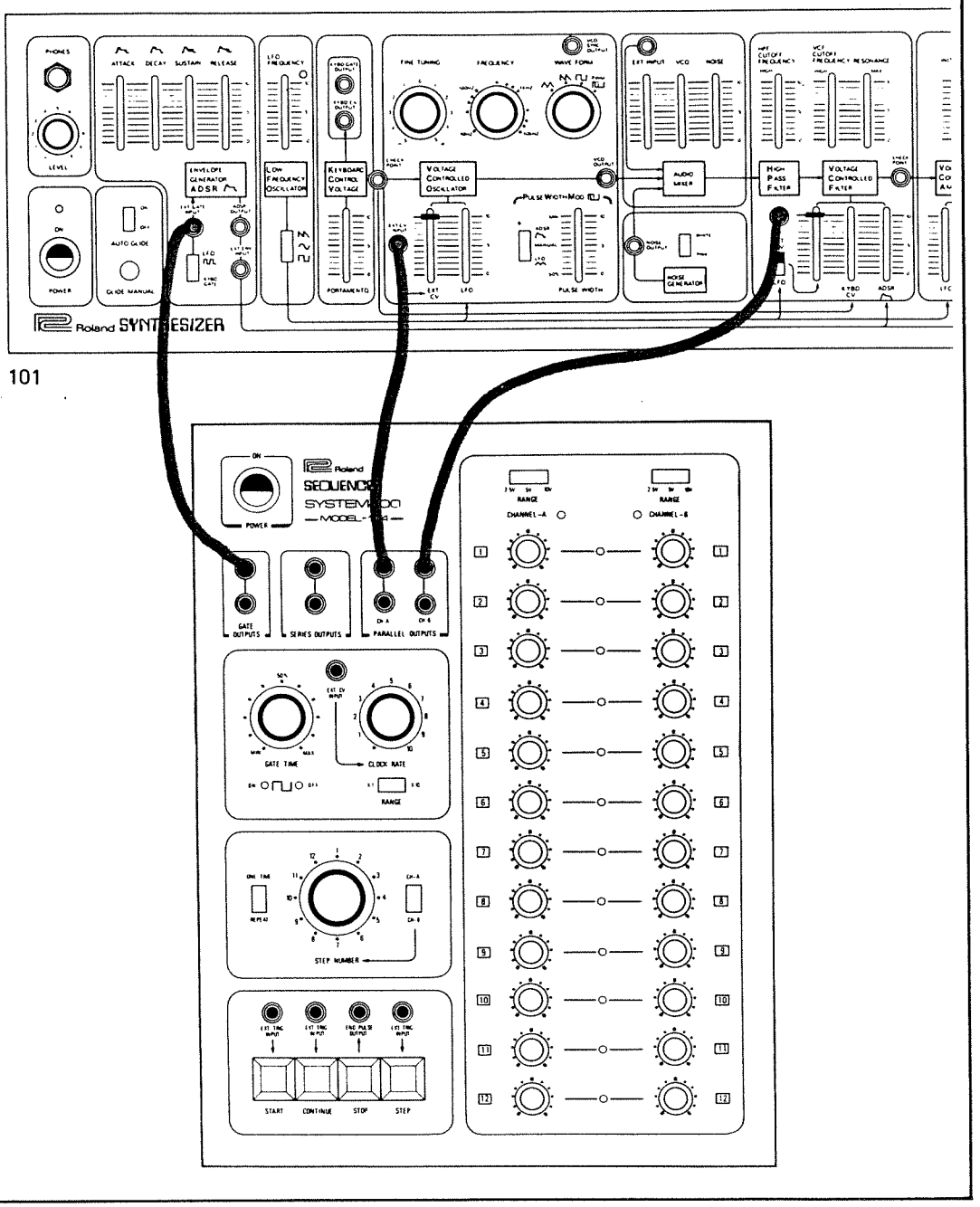


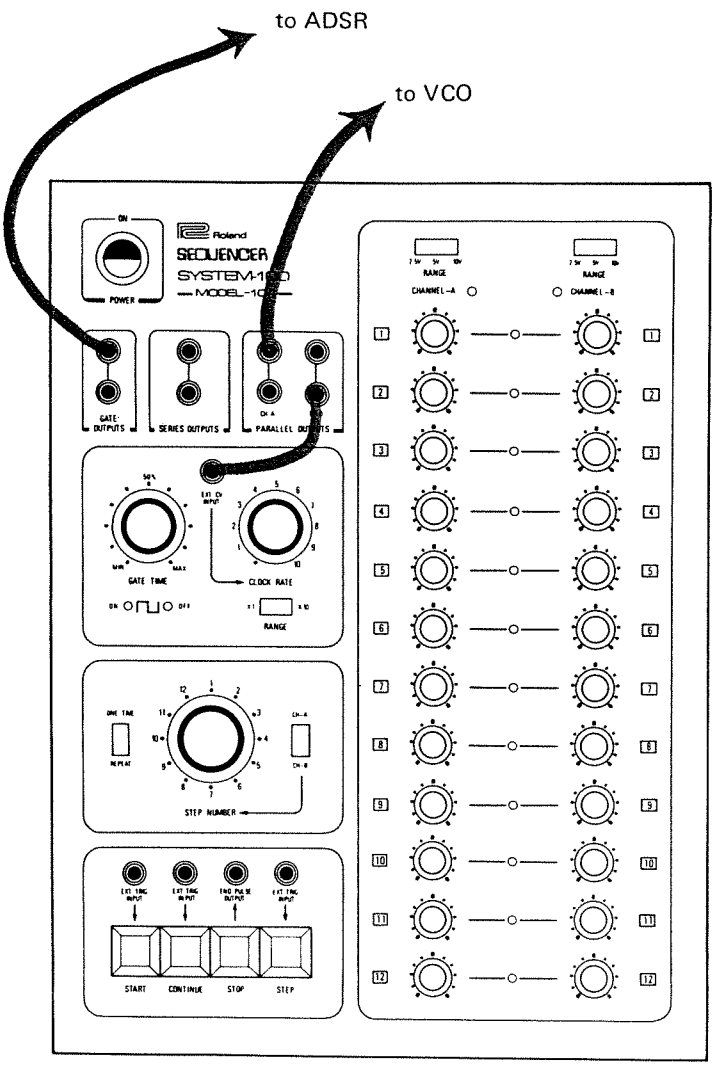
Fig. 2-12 shows another typical parallel output. In this case, Channel A controls the pitches of the VCO and Channel B controls the tone color of the output sound by means of the patch cord to the VCF. In this way, tone coloring can have little or no relation to the pitches.

2-4-0 Rhythm

With all the patches we've talked about so far, all steps have the same time duration with the CLOCK RATE controlling the overall speed (tempo) of the sequence.

It is possible to use the output of one of the sequencer channels as a control to vary the timing of each step. Fig. 2-13 shows this patch.

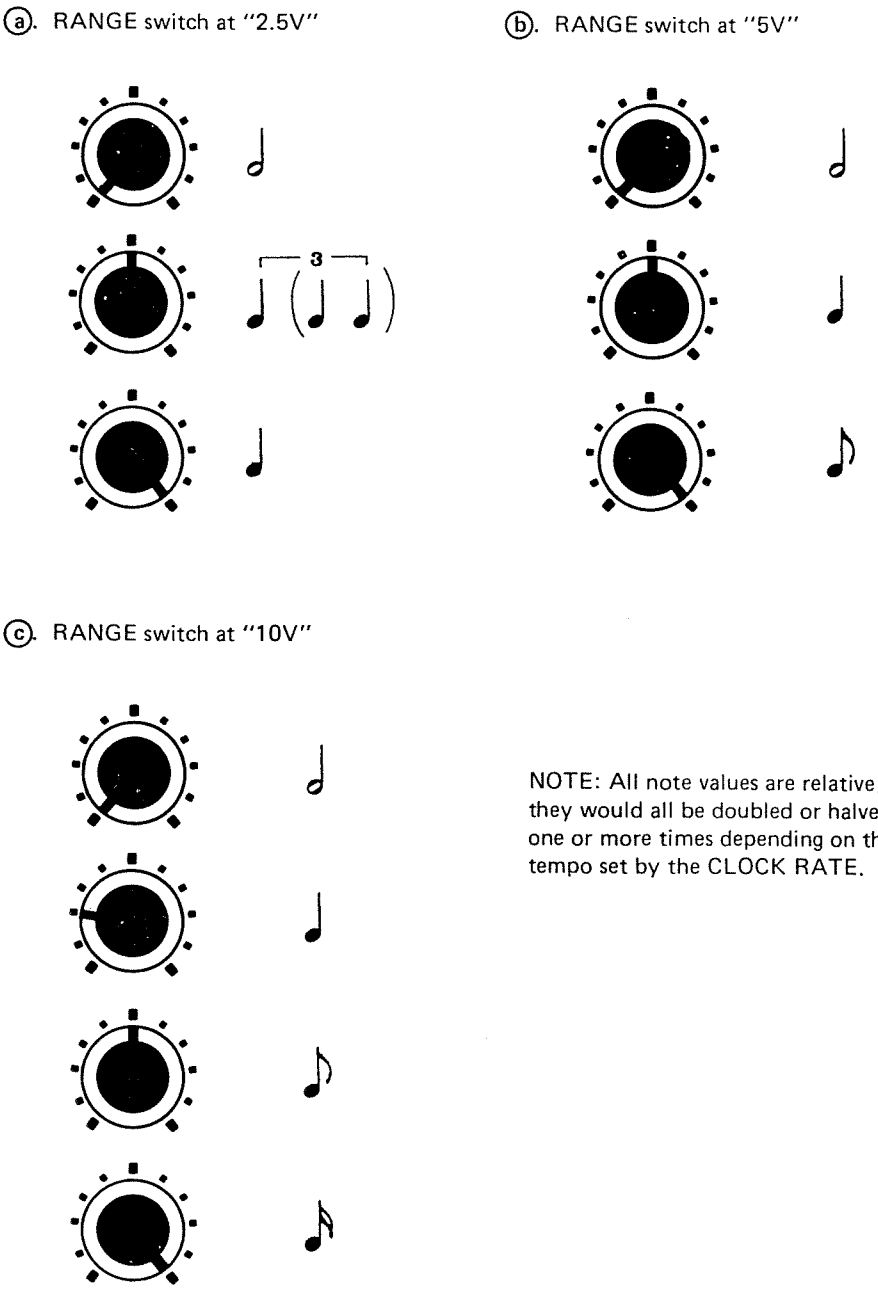
Fig. 2-13 Controlling the CLOCK with the Channel B output



In fig. 2-13, the Channel A REGISTERS are set for the pitch to be produced by each step, while the Channel B REGISTERS are set for the time duration of each step.

The approximate time values of the notes would be as shown in fig. 2-14.

Fig. 2-14 Approximate time values of VOLTAGE REGISTERS



NOTE: All note values are relative; they would all be doubled or halved one or more times depending on the tempo set by the CLOCK RATE.

2-4-1 **The snare drum . . . . .**

With patches such as the snare drum (Patch 14, MODEL 102 EXPANDER UNIT PATCH BOOK) where pitch is not needed, both channels of the sequencer can be used to produce longer rhythmic figures. Fig. 2-15 shows this arrangement.

Fig. 2-15 Sequencer control of snare drum rhythm (Patch 14, MODEL 102 PATCH BOOK)

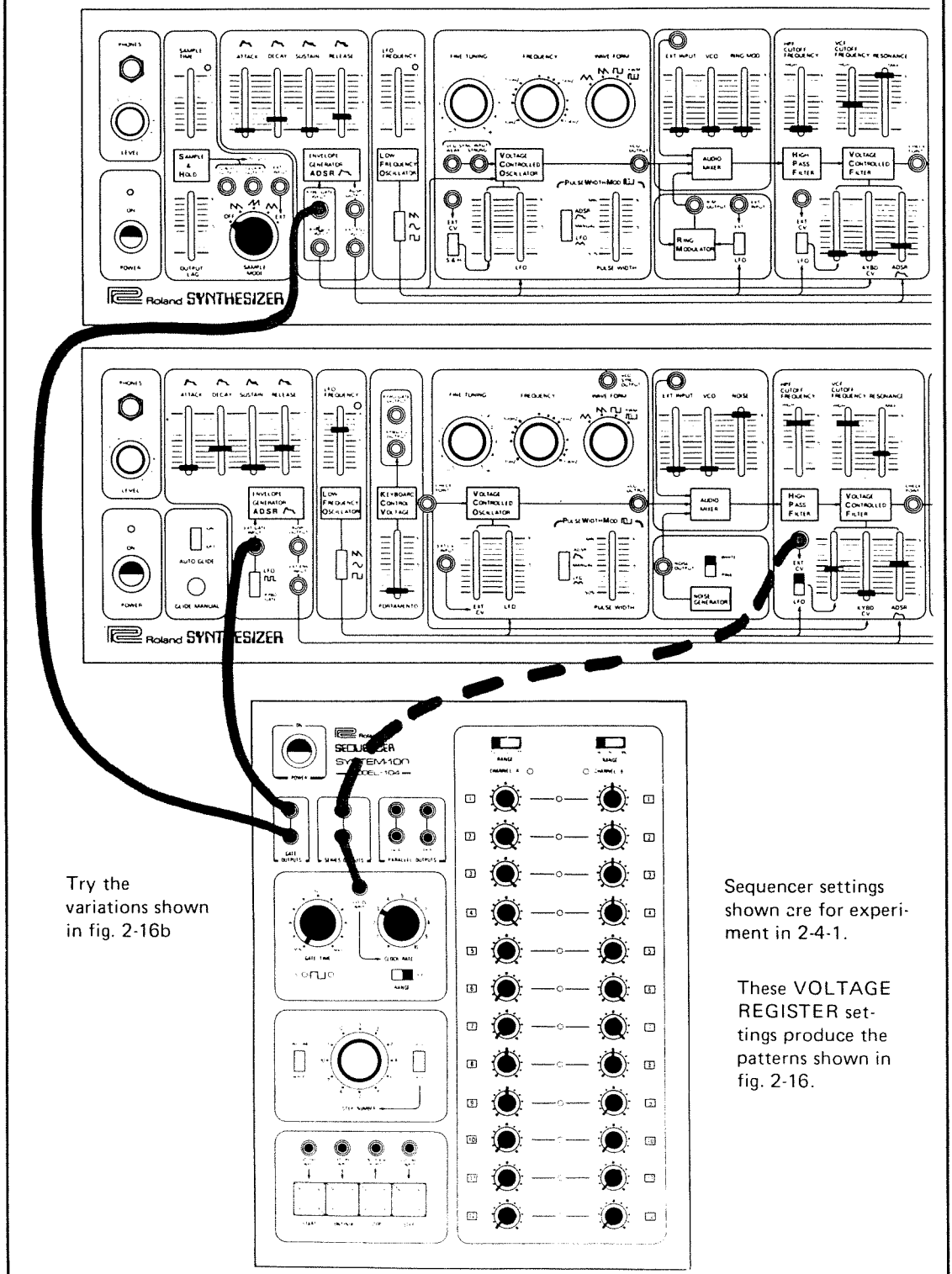


Fig. 2-16 shows some rhythmic variations you can try.

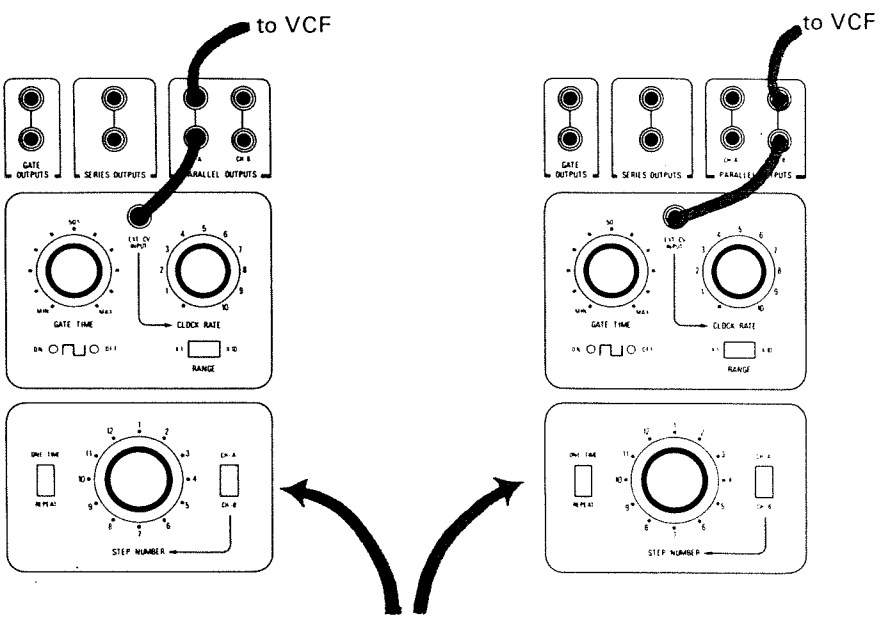
Fig. 2-16 Rhythmic patterns produced by the settings in fig. 2-15

ⓐ.

Channel A:

Channel B:

ⓑ. Variations on fig. 2-15

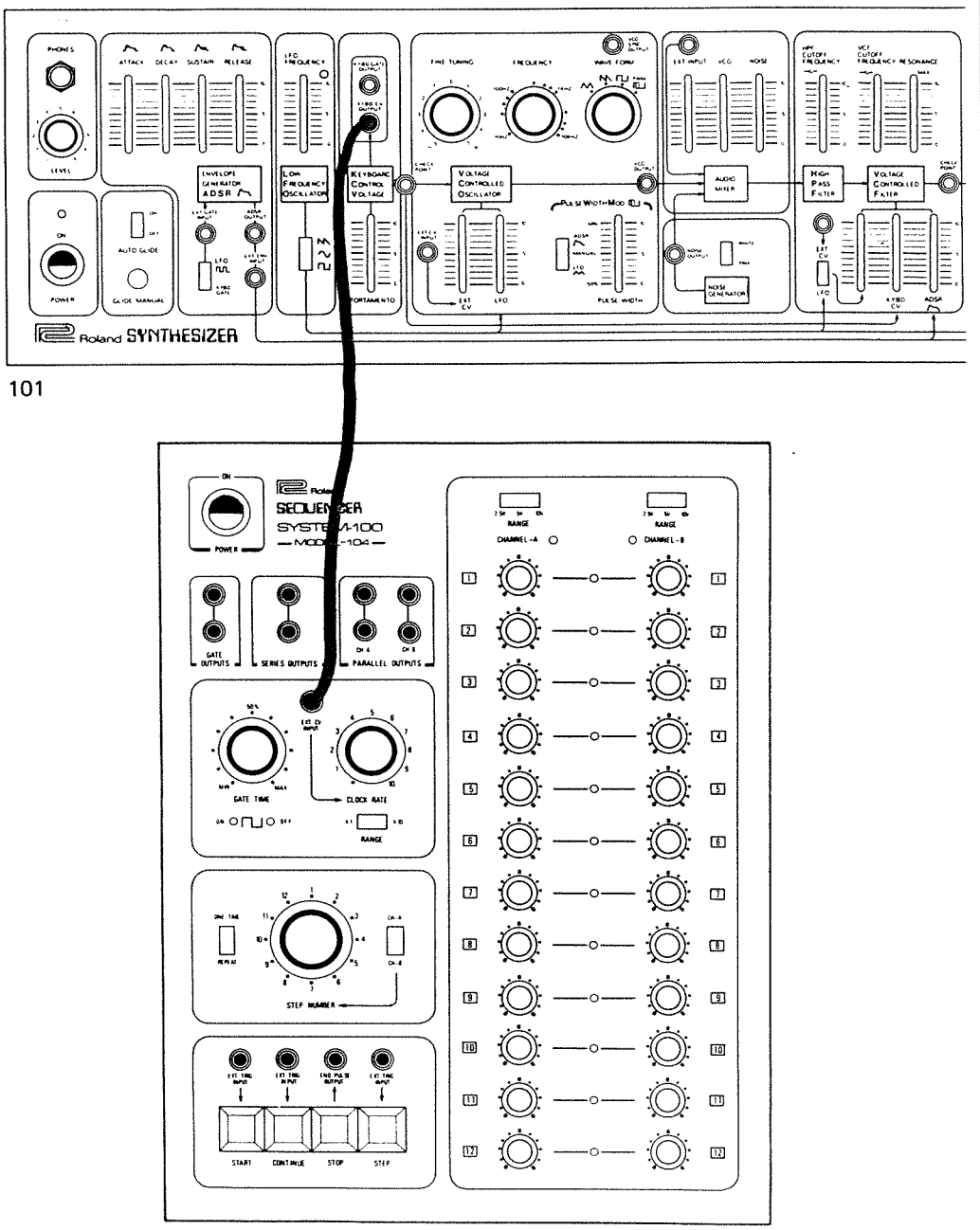


Try both of these with different settings of all the controls in the END STEP section.

2-4-2 Keyboard control of CLOCK RATE . . . . .

Fig. 2-17 shows how to use the control voltage from the keyboard for controlling the CLOCK RATE. Tapping a lower key produces a slower clock rate and a higher key produces a higher clock rate.

Fig. 2-17 Keyboard control of CLOCK RATE



(Also note that the CLOCK RATE control still affects the speed of the sequence).

2-5-0 External triggering of the sequencer

The sequencer can be triggered from external sources for various effects.

2-5-1 Playing duets . . . . .

Fig. 2-18 shows a patch which allows certain types of duet playing. One voice of the duet (VCO-2) would be a fixed pattern (set by the sequencer) and the other voice (VCO-1) can be improvised in harmony with it.

In fig. 2-18, with the sequencer in the STOP mode, gate pulses from the keyboard are used to trigger the STEP function of the sequencer. Each time you depress a key on the keyboard, the sequencer advances to the next step. The VOLTAGE REGISTERS can be set up for some bass accompaniment figure (for example) and a melody improvised on the keyboard.

2-5-2 Independant melody lines . . . . .

Playing legatissimo on the keyboard produces only one gate pulse (fig. 1-48a, p. 32; MODEL 101 SYNTHESIZER INSTRUCTION MANUAL). This can be used to advantage when using the sequencer for duets.

If you want to hold the VCO-2 pitch while moving around with the VCO-1 pitch, press the next key on the keyboard before lifting the previous one.

To hold the VCO-1 pitch while advancing the sequencer is more difficult, but not impossible.

Try setting the CLOCK RATE at its lowest point (with the RANGE switch at "X1") and the GATE TIME at MIN. Now, while holding down a key on the keyboard, the sequencer can be advanced to the next step by tapping once on the CONTINUE button, then immediately on the STOP button. The application of this method is rather limited; a little experimenting will show you what you can and cannot do.

Another way to advance the sequencer is simply to remove the patch cord from the STEP EXT TRIG INPUT jack and then replace it (all the while holding down a key on the keyboard). The sequencer will advance when the cord is replaced.

Fig. 2-19a shows how you can make a special patch cord for this purpose.

Fig. 2-19b shows how you can use the ROLAND DP-1 Electronic Piano Damper Pedal for this function.

Remember that in both cases, the sequencer will advance when you release the button or foot pedal.

Fig. 2-18 Playing duets

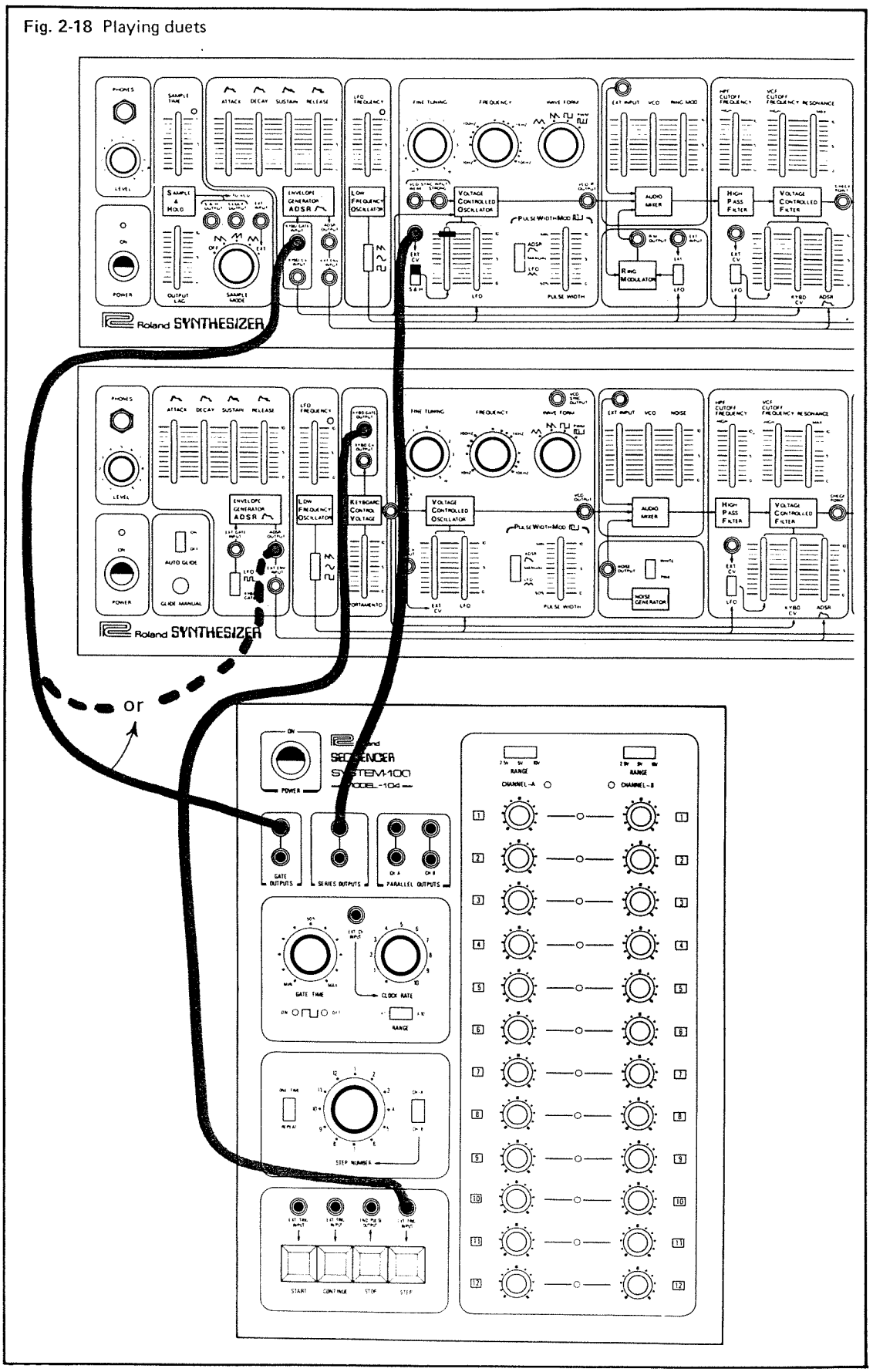
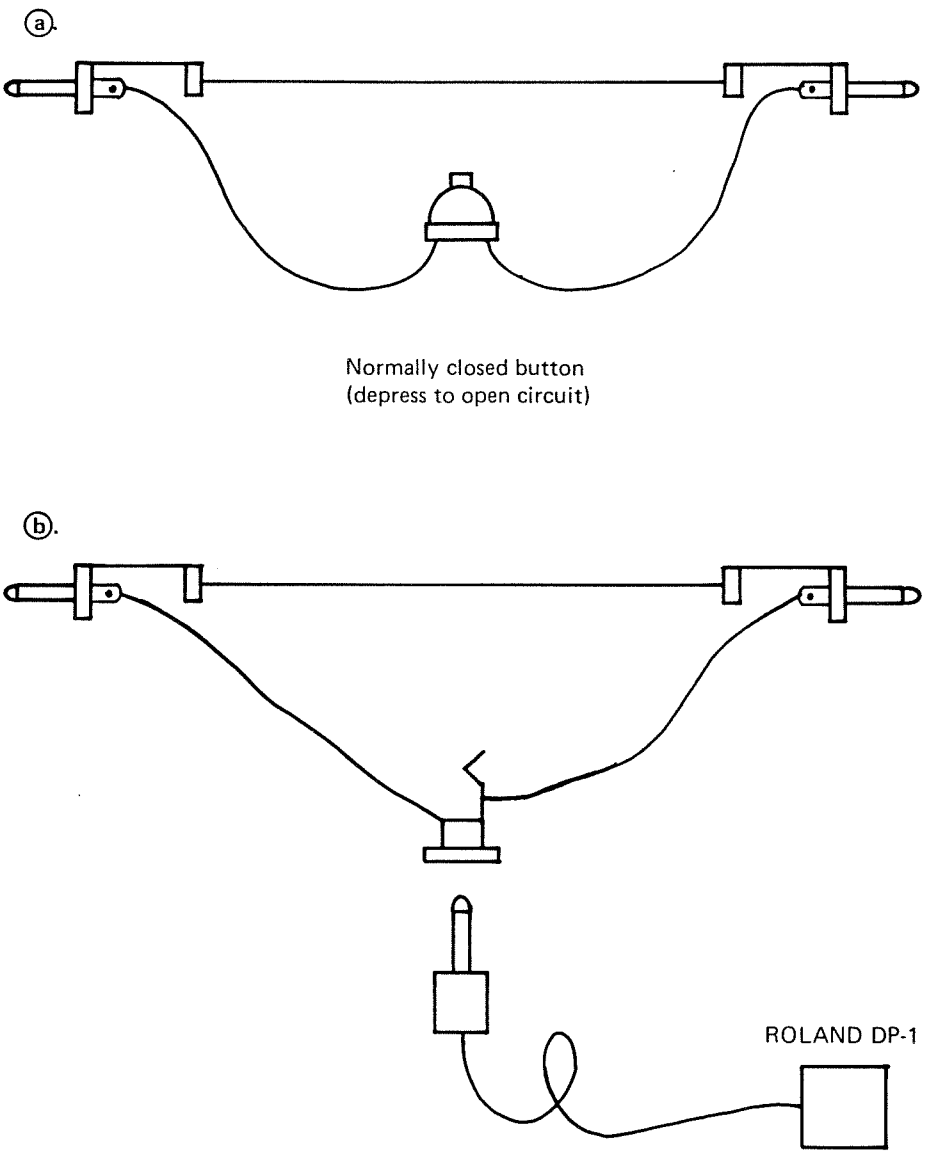


Fig. 2-19 Special patch cords



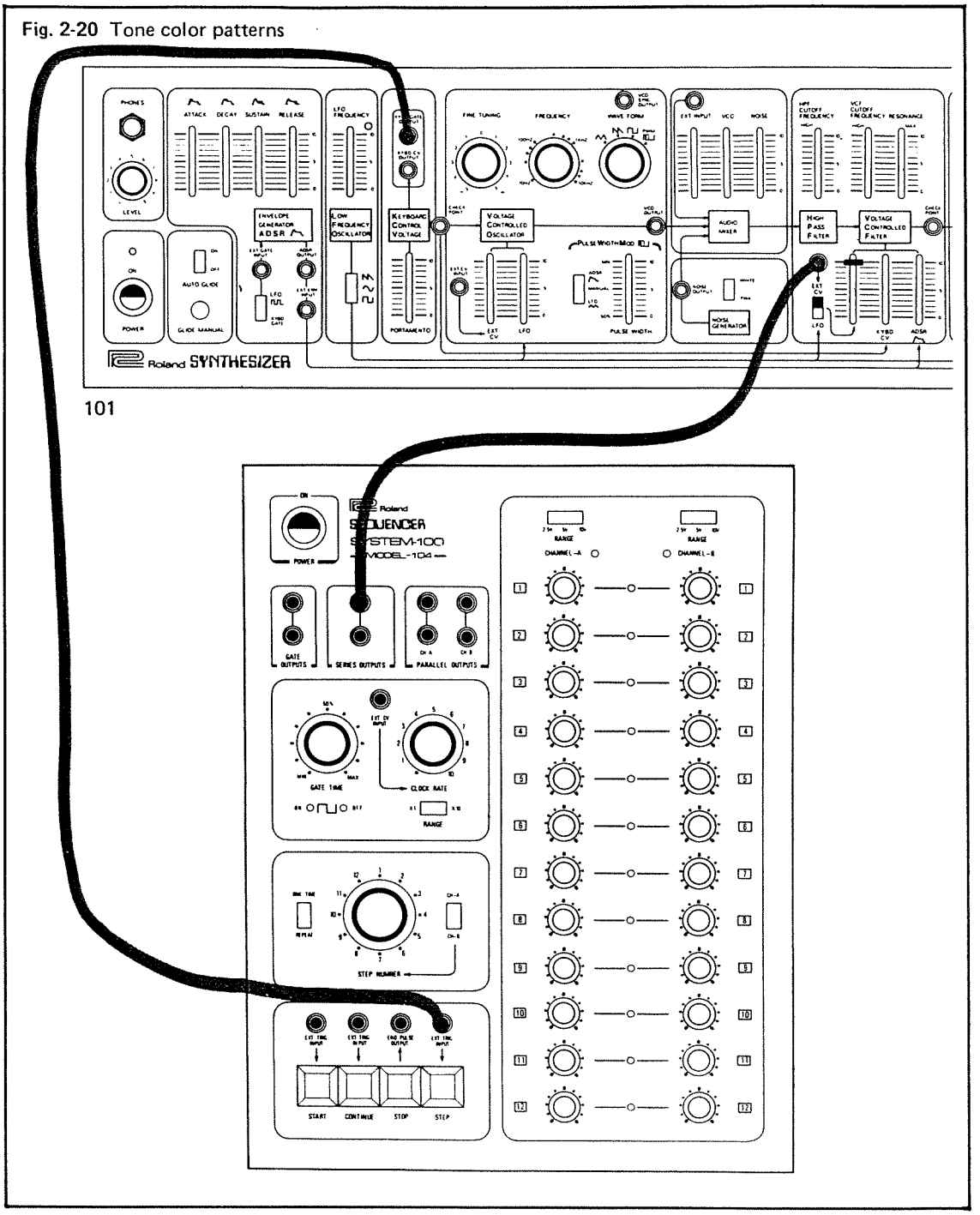
2-5-3 **Setting the VOLTAGE REGISTERS . . . . .**

The duet patch can also be used for setting the VOLTAGE REGISTERS. Tap the key on the keyboard for the first pitch in the sequence, then set Step 1 on the sequencer and tune to unison. Then tap each successive note in the sequence setting the VOLTAGE REGISTERS as you go.

2-5-4 **Tone color patterns . . . . .**

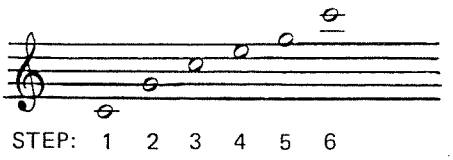
Instead of controlling the VCO, the output of the sequencer can be used to control a tone color pattern which would advance and change with each note played on the keyboard. This arrangement is shown in fig. 1-20.

Fig. 2-20 Tone color patterns



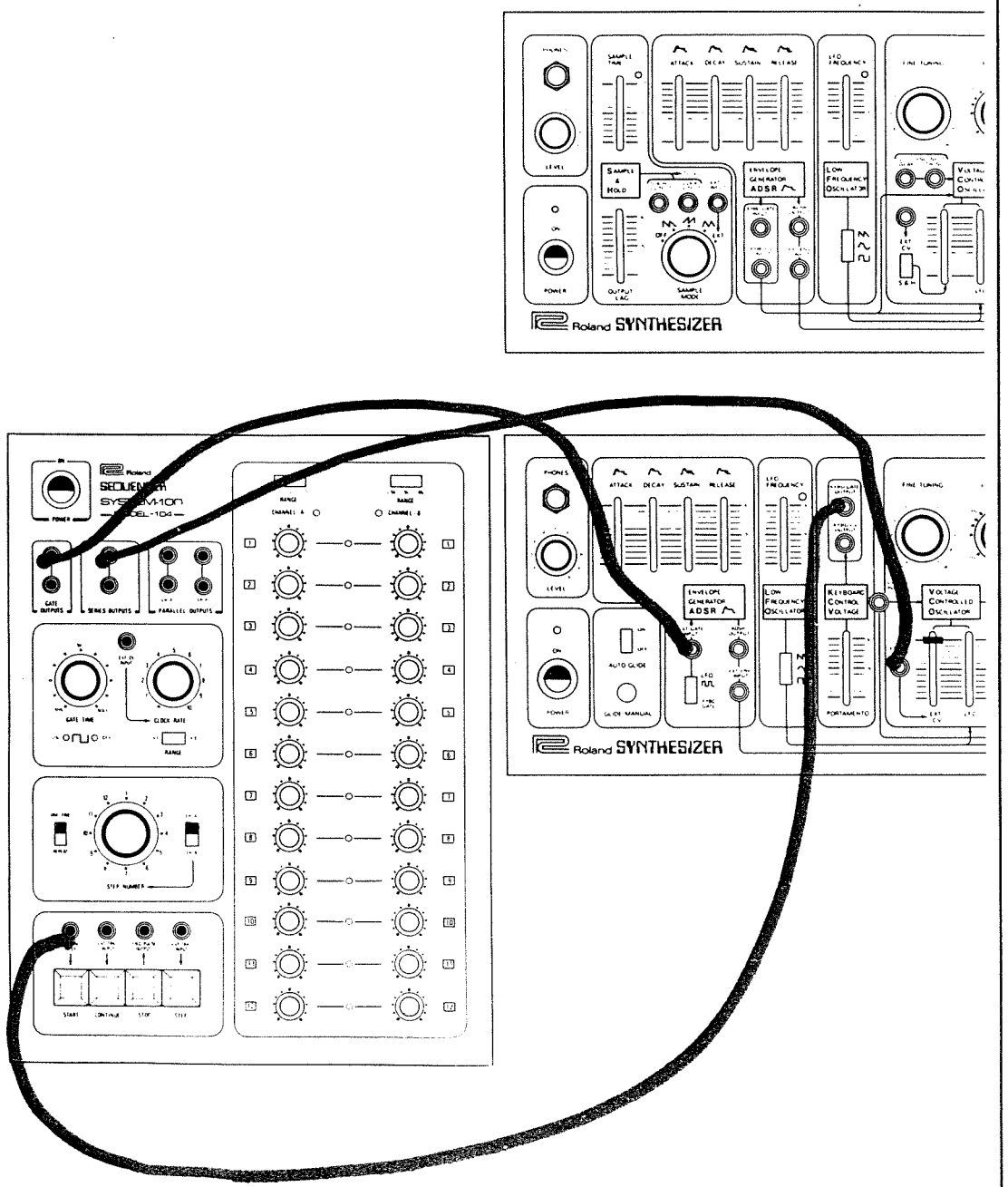
2-5-5 **Arpeggios triggered from the keyboard . . . . .**

Set the VOLTAGE REGISTERS in Channel A so as to produce the following;

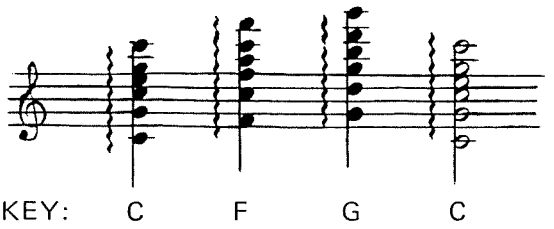


Set up the patch shown in fig. 2-21.

Fig. 2-21 Triggering patterns from the keyboard



Tapping a key on the keyboard produces a major triad whose root is the key you tap. The gate pulse from the keyboard triggers the sequence.



2-5-6 **Pronunciation . . . . .**

Fig. 2-22 shows how to use the sequencer to control two VCF's for experiments in getting you synthesizer to pronounce vowel sounds.

2-5-7 **Delayed gate . . . . .**

Fig. 2-23 shows how to use the sequencer for generating a delayed gate which can be used for certain plucked string sounds and the "double" sound of a twelve string guitar. The patch in fig. 2-23 gives the sound of a cracking whip. (Why don't you try to synthesize some screams to go with it?)

The sequence is set to run one time and stop on Step 3. The output at Step 1 is 0 volts; at Step 2, 10 volts (RANGE switch at "10V"); and at Step 3, 0 volts. The result is a 10 volt pulse at Step 2 which triggers ADSR-2. The amount of delay is determined by the CLOCK RATE.

Since the GATE TIME control affects the output at the GATE OUTPUT jacks only, the resulting pulse at the CH A PARALLEL OUTPUT is too long. To avoid this, the output at CH B is used to control the CLOCK RATE to create a short pulse. Step 1 is set at minimum and Step 2 at maximum so that the duration of Step 2 is as short as possible in relation to Step 1 (see 2-4-0).

The setting of the Step 3 timing is unimportant because Step 3 acts only as a buffer. If the sequencer dwells on Step 2, the output of the synthesizer will be a continuous sound even though the ADSR SUSTAIN control is at "0". Going to Step 3 allows the sequencer to move away from Step 2.

Since both channels of the VOLTAGE REGITERS are set the same in fig. 2-23, the other end of the CLOCK RATE EXT CV INPUT patch cord could be connected to a CH A PARALLEL OUTPUT jack instead of CH B.

Also try a CLOCK RATE of about "1" with the RANGE at "X1". The delay will be about eight seconds. Also try setting the STEP NUMBER at "12" and all the VOLTAGE REGISTERS at minimum except Step 11 for a delay of over one minute.

Fig. 2-22 Pronunciation experiments

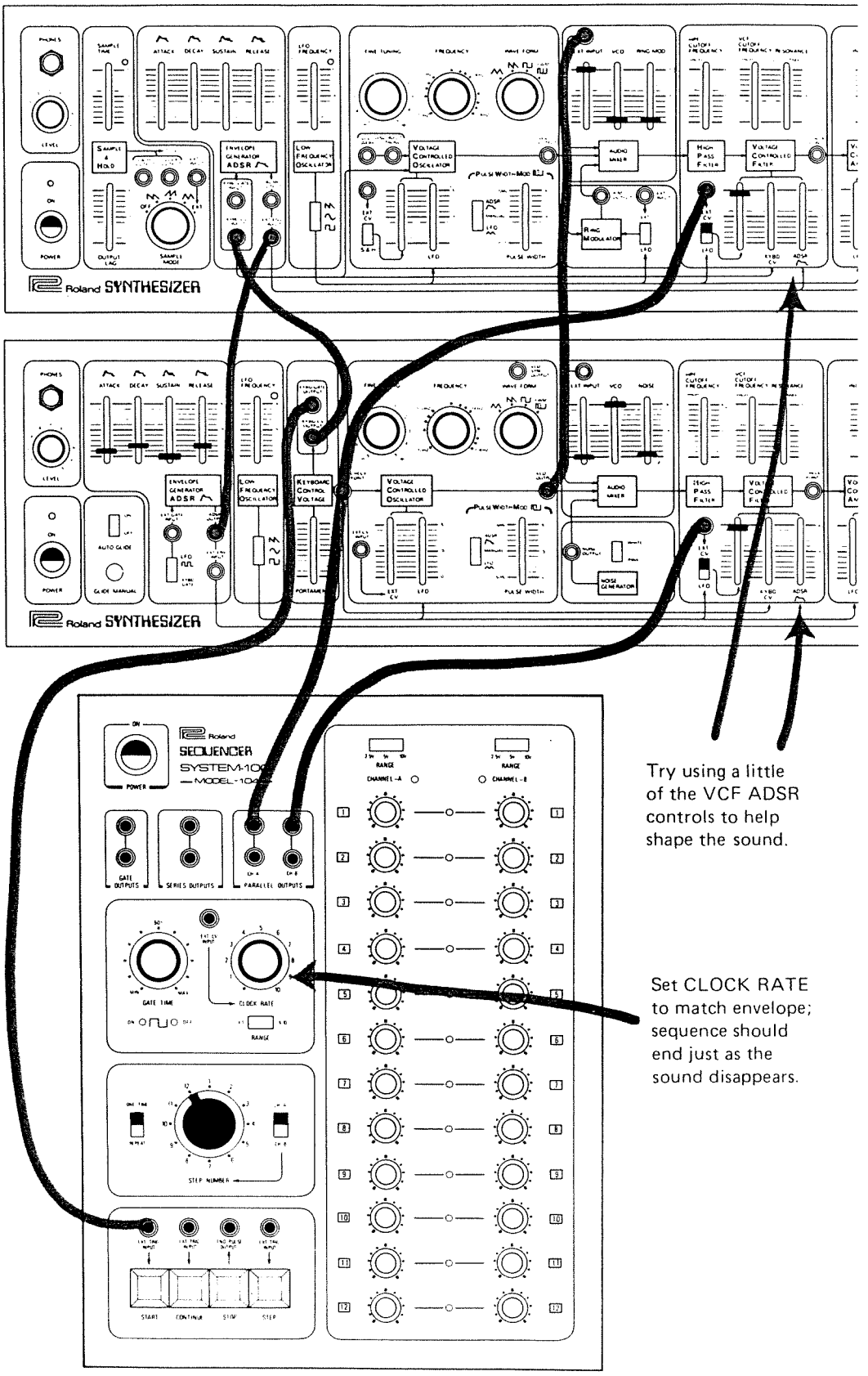
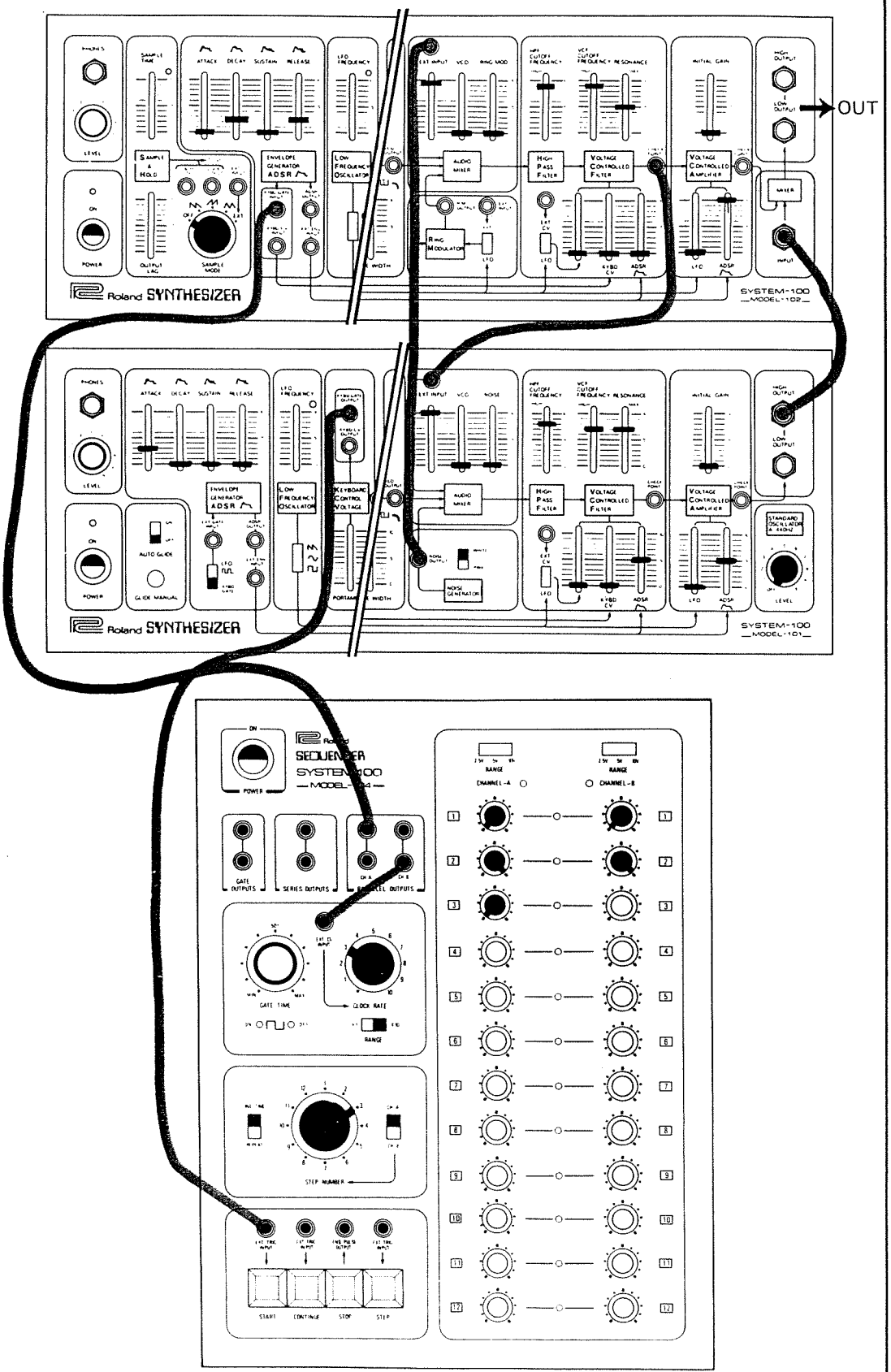


Fig. 2-23 Delayed gate The "Whip" patch



3. IN CASE OF DIFFICULTY

Most troubles with the sequencer can be traced to mistakes in control settings and patch cord arrangements. The following are a few points to check.

3-1-0 Priliminary

Make sure that both control voltage and gate pulse connections have been correctly made. For example, on the Model 102 Expander Unit, the VCO EXT CV/S & H switch should be in the EXT CV position and the slider raised.

3-2-0 Sequencer does not run

With the CLOCK RATE at "0" and the CLOCK RATE RANGE switch at "X1", the sequencer runs very slowly and at first glance may not seem to be running at all when the START or CONTINUE buttons are first pressed.

3-3-0 No sound

With long ADSR attack times, there will be no or little sound output with high CLOCK RATES and short GATE TIMES.

Repeating notes do not sound clearly with long ADSR delay or release times.

There will be no Channel B output at the SERIES OUTPUT jack if the CH A/CH B switch is in the CH A position.

With the STEP NUMBER switch in the "1" position and the CH A/CH B switch in the CH A position, Step 1 (Channel A) will repeat itself over and over and the other steps will not sound.

3-4-0 VOLTAGE REGISTER settings

The output impeadance of the VOLTAGE REGISTERS changes slightly with the number of patch cords connected to the outputs. This means that if you place one patch cord in the SERIES or PARALLEL OUTPUT, set the VOLTAGE REGISTERS, then place another patch cord in one of the outputs, the tuning of the VOLTAGE REGISTERS will change slightly. Usually a slight change in the VCO FREQUENCY control will correct this, or simply be sure to set the VOLTAGE REGISTERS after all patch cords have been placed.

THE LAST WORD....

A lot of time and effort has gone into the design and preparation of the SYSTEM 100 SYNTHESIZER, its accompanying instruction manuals and patch books. If you have any suggestions, ideas, questions, problems, complaints, praise, etc., please feel free to write to:

Synthesizer Project Manager
Roland Corporation
3-2-26, Shinkitajima
Suminoe-ku
Osaka, JAPAN

It may not be possible to reply to all letters, but all letters will be read and given due consideration by all staff members of the synthesizer division.

SPECIFICATIONS

MODEL-104

2 channel, 12 step SEQUENCER (Parallel out: 24 steps)

1. CLOCK OSCILLATOR

Clock Rate	:	0.1Hz — 10Hz (X1) 1Hz — 100Hz (X10)
Range	:	X1 or X10
Control:	:	By CLOCK RATE control or external CV
Gate Time	:	10%-90%
Gate Time Indicator	:	on/off LED

2. END STEP SECTION

Step Number	:	1-12 steps
Channel Selecter	:	CH-A or CH-B
Sequence Selecter	:	One Time or Repeat

3. CONTROL SECTION

START	:	Reset-Start	Ext. Trig . . . . . +5V threshold level
CONTINUE	:	Continue-Start	Ext. Trig . . . . . +5V threshold level
STOP	:	stop	End Pulse Out . . . . +14V Pulse
STEP	:	step	Ext. Trig . . . . . +5V threshold level

4. VOLTAGE REGISTER SECTION

VOLTAGE REGISTERS: CH-A, CHB: 12-steps each

Range	:	2.5V-5V-10V

5. OUTPUT SECTION

Gate Outputs	:	X2 +14V
Series Outputs	:	X2
Parallel Outputs	:	CH-A X2 CH-B X2

6. DIMENSIONS AND WEIGHT

Overall Size	:	280mm (11") wide, 355mm (14") deep, 145mm (5-3/4") high,
Net Weight	:	5kg (11 lbs.)

7. POWER REQUIREMENTS

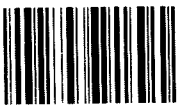
100-120V 50-60Hz 220-250V 50-60Hz	:	5W max.

Specifications are subject to change without notice.

Roland®

10267

UPC 10267



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