ARP OMNI-2

POLYPHONIC SYNTHESIZER OWNER'S MANUAL

INTRODUCTION

The ARP OMNI offers the musician unlimited orchestral and symphonic sounds in a single keyboard which features realistic strings, brass, piano, harpsichord, vibes and many synthesizer effects. Stereo polyphonic circuitry can produce strings on one side of the stage, a synthesizer effect on the other, and bass in the middle.

The OMNI has been designed with special attention to the voicing of string sounds, achieved through a new process invented by ARP called "asynchronous phase modulation."

The key to the OMNI's big sound is its ability to produce several different sounds simultaneously. For instance, you can play violins and horns together with a separate synthesizer bass on the lower end of the split keyboard. Or, you can have a slow, delayed attack on the strings so that they only come in when you play sustained notes.

The OMNI's switches have a minimum life of 3 million operations and are the fastest switches made. Each switch has a LED (light emitting diode) status light that tells you what's happening, even if you are playing in total darkness.

Inside the OMNI you will find an intriguingly compact collection of printed circuit boards, packed with the latest electronic devices, including MSI microcircuits, monolithic resistor arrays, and other components which replace hundreds of conventional electronic parts. The circuit boards are interconnected with gold-plated, plug-in ribbon cables, taking a cue from the computer industry. The circuit boards themselves are made of G-10 glass-epoxy, the same indestructible material used in all military and aerospace equipment. If you are a touring musician with professional grade sound gear, you will appreciate the line-level cannon XLR output connectors, proven to be ultra-reliable and hum-free for balanced line hookup. Be sure to send in your Warranty Card in order to have full protection under the Warranty.

INITIAL HOOKUP

AMPLIFICATION

The whole idea of a synthesizer is to give you the capability to shape and control every aspect of a musical sound using the synthesizer's controls. Therefore, the ideal amplication system for synthesizers should introduce as little distortion or coloration as possible. For this reason, P.A. systems usually produce the cleanest sound with synthesizers. Likewise, a bass guitar amplifier is probably the worst kind of amplification for synthesizers because bass guitar amps usually have poor high frequency response. Some lead guitar amps also have a lot of distortion and coloration. If you play your synthesizer through such an amp, your sounds will tend to be characteristic of the amplifier rather than the synthesizer. Sometimes, however, the combination of the synthesizer and an amplifier with a great deal of its own coloration will produce just the sound you might be looking for.

Generally, the type of sound system that is right for you depends on the following factors:

1. Exactly what instruments will be connected into the sound system.
2. The type of music you play.
3. How loud you play.
4. The size of the room you play in.

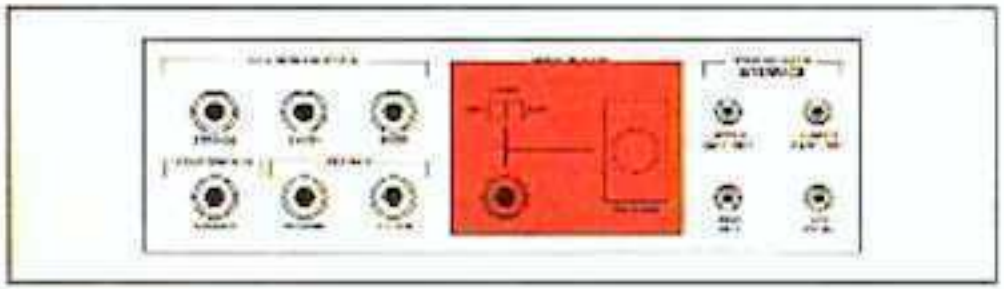
Since there are numerous amp/speaker combinations available on the market, ARP suggests that you consult your local ARP dealer who should be able to tailor a sound system to your style of music.

FOOT CONTROL HOOKUP

ARP offers two types of foot controllers which may be used with your OMNI: a Sustain Foot Switch (packed with your instrument), and a Foot Pedal (available as optional equipment) which may be used as either a filter pedal or volume pedal. The pedal is available through your ARP dealer or from the ARP factory through the ARP Software & Accessory Catalog. For information on the use of these controllers, see page 14.

MAIN OUTPUT

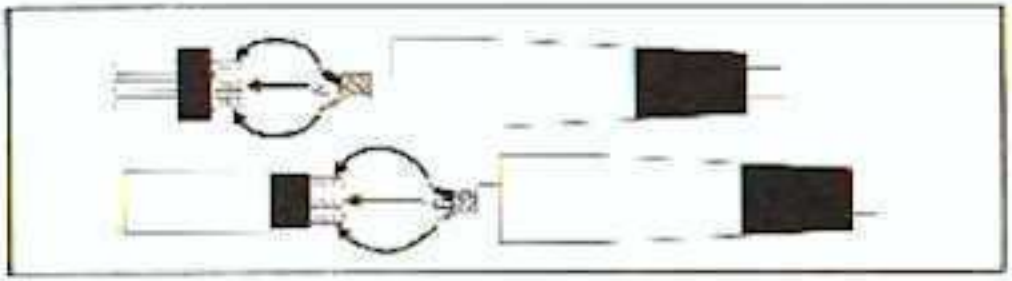
Two different MAIN OUTPUT jacks are provided. The three-pin cannon XLR professional connector is used in all professional recording equipment and is the most reliable connector in widespread use. A 1/4" phone jack is also provided and can be used to connect the OMNI to standard guitar-type amplifiers or commercial P.A. systems by means of a standard guitar cord. The two-position slide switch affects both of these jacks. The HIGH position is a line-level audio signal capable of driving the most insensitive amplifiers. The LOW position is a somewhat lower level signal since much of the commercial equipment used in a P.A. application might overload or distort from the high-level signals in the HIGH position.



Using this output will provide a "hum-free" signal when used in conjunction with a mixer that features "balanced line" outputs.

Here's how to wire up your own cables:

1. Obtain one "female" XLR connector and one "male" XLR connector.
2. Obtain the desired length of "2-conductor shielded cable." (15' is usually standard)
3. Wire the connector as follows:

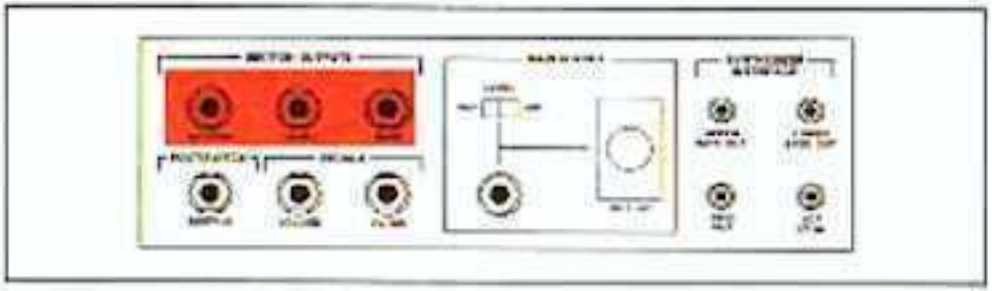


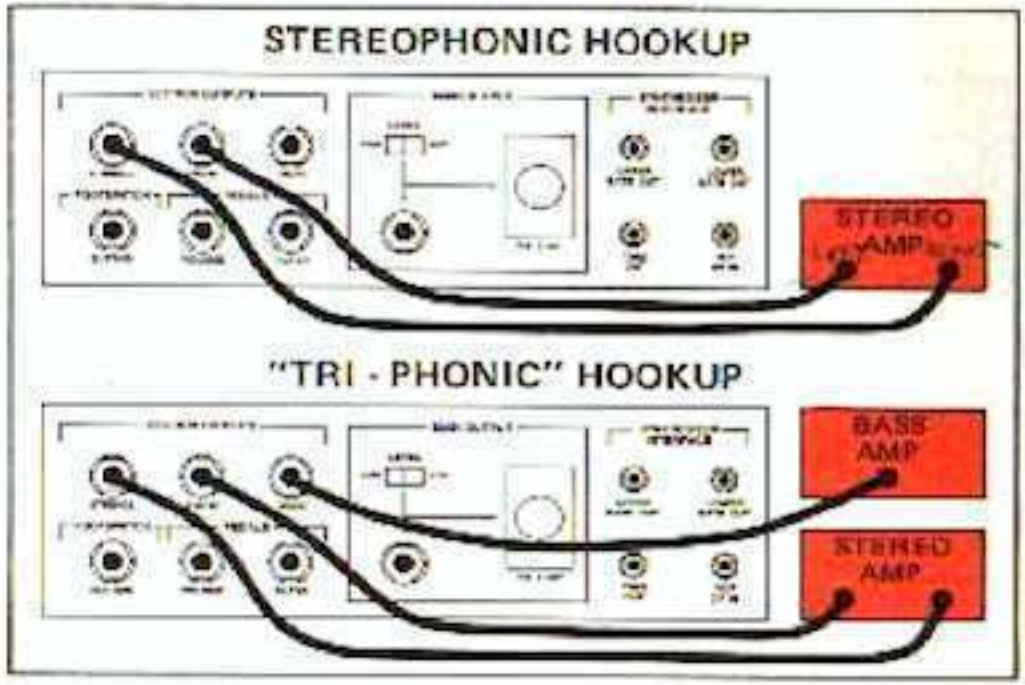
4. Pin 3 is "hot," and is connected to Pin 3 on the other connector.
5. Pin 2 is connected to Pin 2.
6. Pin 1 should be connected to the cable shield on both the "male" side and on the "female" side.

CAUTION: All OMNI-2 outputs are DC coupled for extended frequency response, and they should not be directly connected to a power amplifier which is also DC coupled. When using a DC coupled power amplifier, an AC coupled preamp or mixer is recommended.

SECTION OUTPUTS

Included in this section is a STRINGS output jack, a SYNTH output jack and a BASS output jack. This feature allows you to separate the three sections of the OMNI into a discrete "tri-phonic" mode simultaneously. This effect is very dramatic in live performance. Simply connect the jack marked SYNTH to the left channel of your stereo amplification system. Connect the jack marked STRINGS to the right channel. Then connect the jack labeled BASS to a standard bass guitar amplifier. Experiment with different timbre settings on your mixer/amp for best sound. Both the STRINGS and SYNTH outputs are affected by the MASTER VOLUME and the VOLUME pedal. The BASS output is affected by the BASS VOLUME control only.





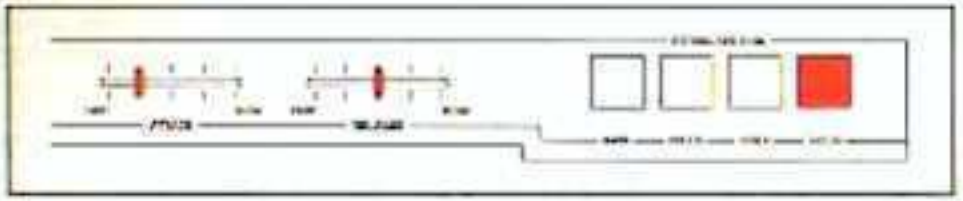
In the event the OMNI should be out of tune with another instrument that is difficult to tune (e.g., acoustic piano, organ, etc.), locate the recessed tuning screw on the top panel and, using a small, flat blade screwdriver, turn this screw for sharp or flat.

IMPORTANT: The OMNI has been pretuned (A 440) at the factory and should only be adjusted when absolutely necessary.

THE STRING SECTION

VIOLIN

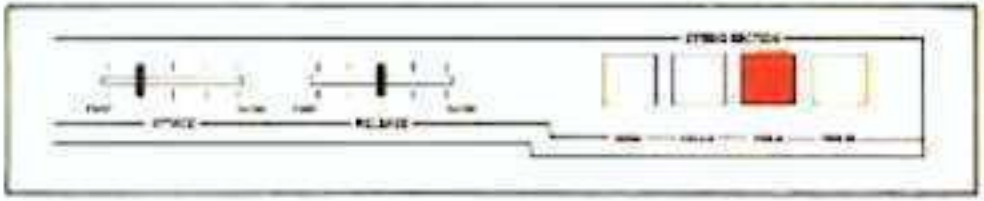
First be sure that the CHORUS PHASER and HOLLOW WAVEFORM switches near the left end of the panel are both off. Set the MIX control over the keyboard all the way to the right, towards the end marked STRING. Set the ATTACK and RELEASE controls like this:



Select the VIOLIN voice at the extreme right end of the instrument. The green light over the switch will go on. Be sure that the other string voices are off. (You will notice that these push-button switches require very little force, are very fast, and are almost silent.) Now play some very slow chords on the keyboard, lifting your hands completely off the keyboard and pausing in between each chord. This "detached" playing lets you hear the ATTACK and RELEASE clearly. Adjust the MASTER VOLUME slider and the volume control on your amplifier for a comfortable listening level. Play chords high on the keyboard and hear the OMNI Violin's ethereal shimmering quality. Try "spread" chords playing with both hands at the high and low ends of the keyboard for dramatic contrasts.

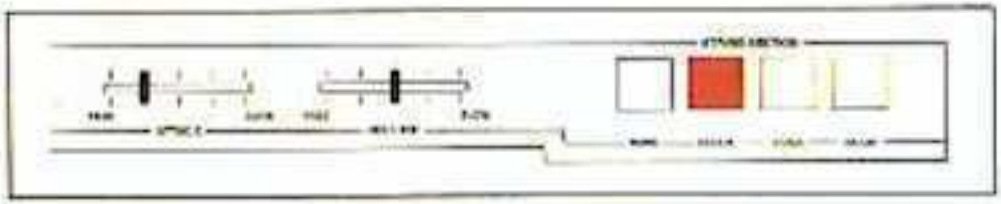
VIOLA

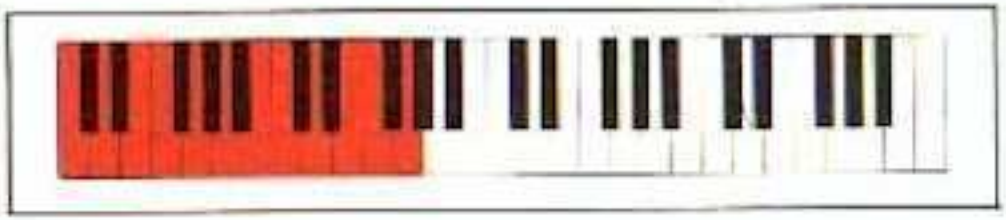
Turn off the VIOLIN and turn on the VIOLA. You will note immediately that the VIOLA is one octave lower in pitch than the VIOLIN and has a slightly mellower tone quality. The mellower tone quality provides contrast between the violin sound and the viola sound and adds to the ensemble richness when both are used simultaneously. Try playing a musical passage with the VIOLA sound, and then add the VIOLIN sound to get the differences established in your ear. You will note that the ATTACK and RELEASE controls work identically for both the VIOLA and VIOLIN sounds. The VIOLIN sound is both higher pitched and brighter than the VIOLA. If you play long, sustained passages with the VIOLA sound alone, adding the VIOLINS creates a dramatic and expansive musical effect. Violas and violins in a symphony orchestra are often used exactly this way by composers.



CELLO

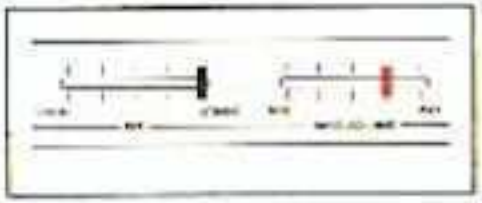
Now, turning off both the VIOLIN and VIOLA, press the CELLO button. Set the BASS VOLUME control at about half-way. You will notice that the CELLO plays only one note at a time and plays only in the bottom octave-and-a-half of the keyboard. The reason that the CELLO voice has been designed to play only one note at a time is based on classical orchestral principles. Simply put, chords played with cellos come out sounding muddy. They should provide a solid bass line for chords played with the higher strings.

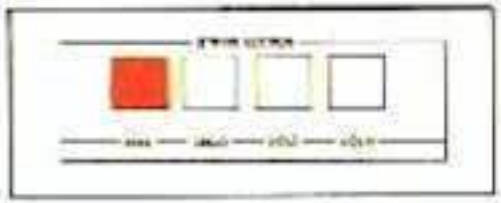




BASS & BASS VOLUME

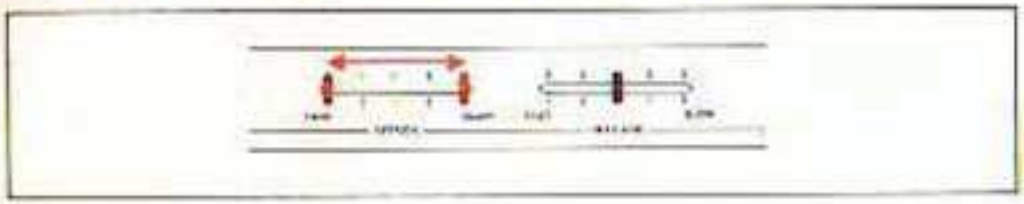
Press the BASS button and you will note that the BASS is one octave lower than the CELLO. The volume of both the BASS and the CELLO can be controlled by the BASS VOLUME control. This BASS VOLUME control lets you get the perfect balance between the high strings and the low strings. The CELLO and BASS voices have their own fixed release. (The RELEASE control affects only the VIOLIN and VIOLA.) Try playing all four string voices together and try different settings of the BASS VOLUME. See how big an orchestral effect you can produce.





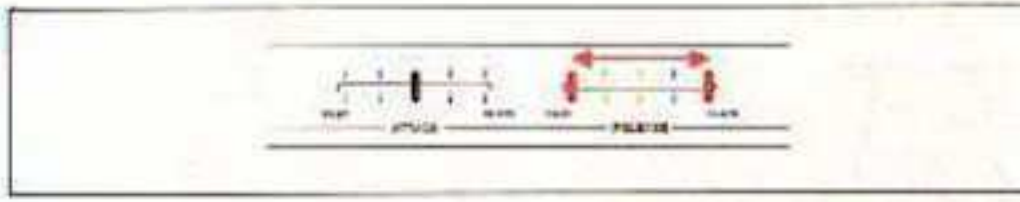
STRING SECTION ATTACK

Adjust the ATTACK control all the way to the left, over the word FAST. Notice that the sound starts instantly when you play a chord. Now move the ATTACK control to SLOW. Hold a chord down and notice how long it takes for the sound to reach full volume and brightness. You will find that for slow, legato playing, a slow attack works best. For fast passages, a fast attack works best. If you adjust the ATTACK control to about half-way, you'll find that your playing style can make the keyboard very responsive. Try playing a scale with one hand very staccato, so that the notes just barely sound. Now, without changing the speed of your playing, slur your notes together and observe how the sound builds!



STRING SECTION RELEASE

Next, let's experimant with the RELEASE control. Moving the RELEASE control all the way to the left produces a fast release. When you take your hands off the keyboard, the sound dies away instantly. If you move the RELEASE slider to the right, the sound dies away slowly when you take your hand off the keyboard, and notes will run together when you play a fast scale on the keyboard. Try different combinations of the ATTACK and RELEASE slider settings. You will note that in general a fast ATTACK should be accompanied by a fast RELEASE and a slow ATTACK by a slow RELEASE. Try them the other way around, however, and play with the effects.

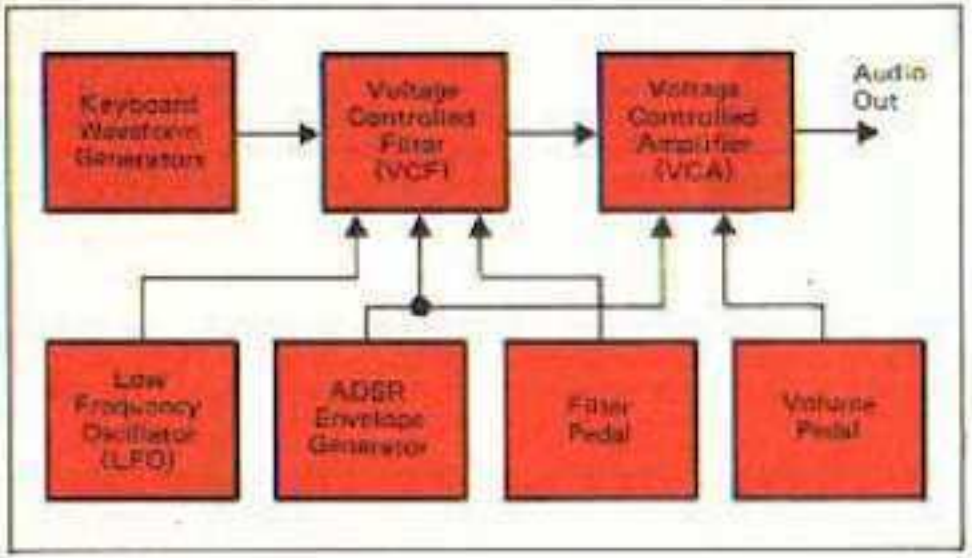


NOTE: The string release also controls the release function on the ADSR of the synthesizer section. For more information on this, refer to the ADSR description in the VCF section

THE SYNTHESIZER SECTION

THEORY

The Synthesizer Section of the OMNI (generally, all the controls on the left side of the instrument) can best be understood by studying the following diagram:

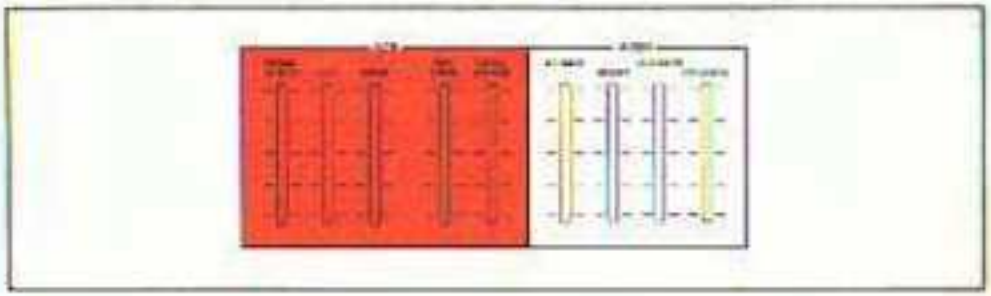


In the Block Diagram shown above, the Keyboard Waveform Generators are modified by the VCF & VCA. The blocks in the lower row are "controllers" of the VCF & VCA.

VCF

The keyboard circuitry of the OMNI produces a separate tone for every key on the keyboard. If you press more than one key down, the tones from these keys are, of course, mixed. All these tones, mixed together, are fed into the Voltage Controlled Filter (VCF).

A VCF is the most important element in any synthesizer. It is a device that alters the amount of higher harmonics in a sound, thereby altering the sound's brilliance. It is similar to the treble control on your amplifier, though much more powerful. The VCF is also different from a treble control in that it can be adjusted not only with a knob but also by applying a voltage as a modifier. This is known as "Voltage Control." The next section will describe how the ADSR may be used to modify the output of the VCF.



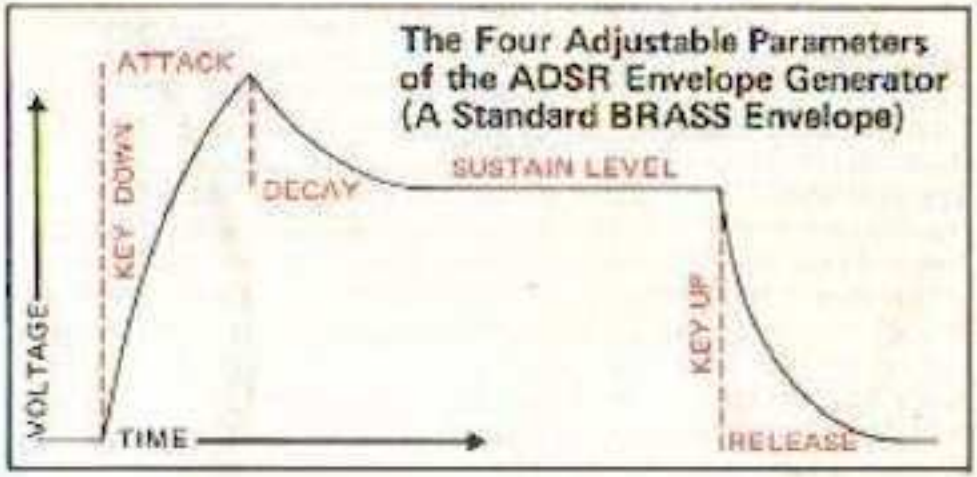
ADSR

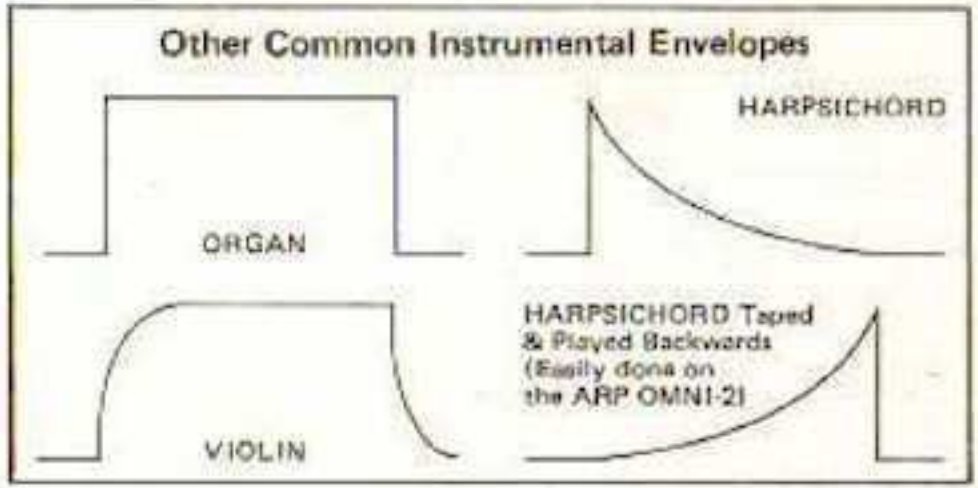
The ADSR Envelope Generator is a device that is used to create the Attack, Decay, Sustain and Release (ADSR) of a sound. The ADSR itself produces no sound. It simply produces a rising and falling voltage that can be used to control the volume and brightness of the sound, giving the sound an adjustable Attack and Decay.

As you can see on the block diagram, the output of the ADSR Envelope Generator is connected to the control input of the VCF. Every time you press a key on the keyboard, the following sequence occurs:

1. The tone from the keyboard enters the VCF.
2. The ADSR produces a rising and falling voltage.
3. The rising and falling voltage causes the VCF to "open" (producing an increase in the brightness of the sound) then "close" (producing a decrease in the brightness).
4. The rising and falling voltage simultaneously enters the VCA (Voltage Controlled Amplifier) and causes the sound to grow louder and then softer according to the settings of the controls in the ADSR section of the OMNI.

As we proceed to experiment with the controls on the synthesizer section, try to relate them to the block diagram. If you can understand how your OMNI functions, you will be better equipped to make full use of its creative musical potential.





VCF FREQ

Leaving the ATTACK and RELEASE controls on the string section set about half-way, turn off all the string voices. Move the MIX control all the way to the left, towards the word SYNTH. Leave the MASTER VOLUME control where you had it during the experiments with the string section. Press the switch marked 8' in the SYNTHESIZER SECTION. The red light will come on. Set all the controls in the VCF box all the way down. Set all the controls in the ADSR box all the way down, except for the SUSTAIN control which should be all the way up. (See Figure A) Play a chord on the keyboard with your right hand while you slowly raise the slider marked VCF FREQ. As you raise this slider the sound gets progressively brighter and louder. Raise and lower the VCF FREQ control a few times to get the sound of the VCF opening and closing. This is an example of manually opening and closing the filter.

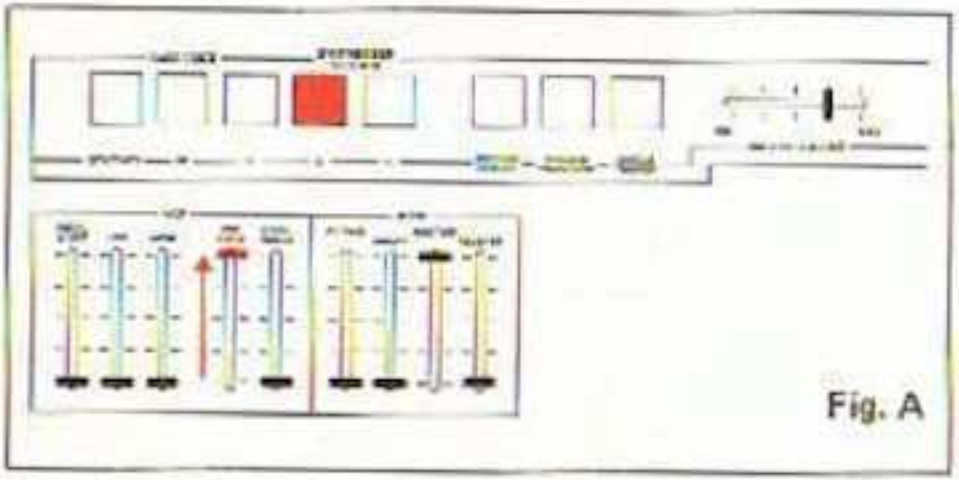
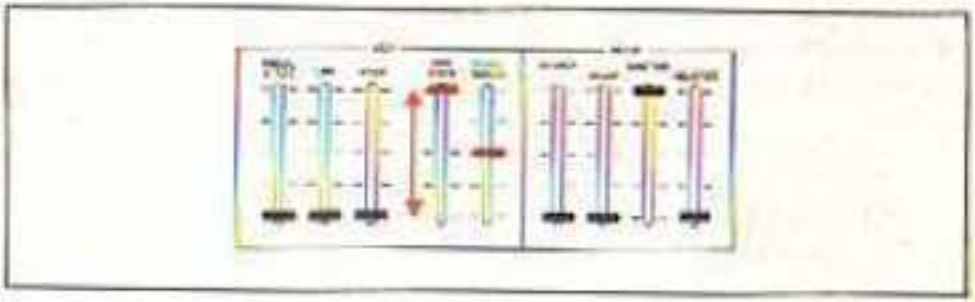


Fig. A

RESONANCE

Resonance accents the highest harmonic determined by the VCF FREQ slider. Raise the RESONANCE slider to half way and repeat the same movement of the VCF FREQ slider. Now you will notice a "wow" type sound. Try different amounts of resonance.



ADSR Control of VCF

As mentioned earlier, the output from the ADSR can be used to open and close the VCF. The amount of opening and closing is controlled by the ADSR slider in the VCF box.

Referring to Figure B, set the ADSR control in the VCF box all the way up. Now, while continuing to play, slowly lower the ADSR control and the sound will get less bright and more mellow and flute-like. This loss of brilliance occurs because the filter is not opening up as far in response to the signal from the ADSR. Basically, you can think of this control as a brilliance control. If a sound is too mellow, raise the control. If a sound is too bright, lower it.

Note that the sound starts and stops immediately on depressing and releasing a key. This is due to the ADSR opening and closing the Voltage Controlled Amplifier (VCA) in response to the signal you have set up on the ADSR.

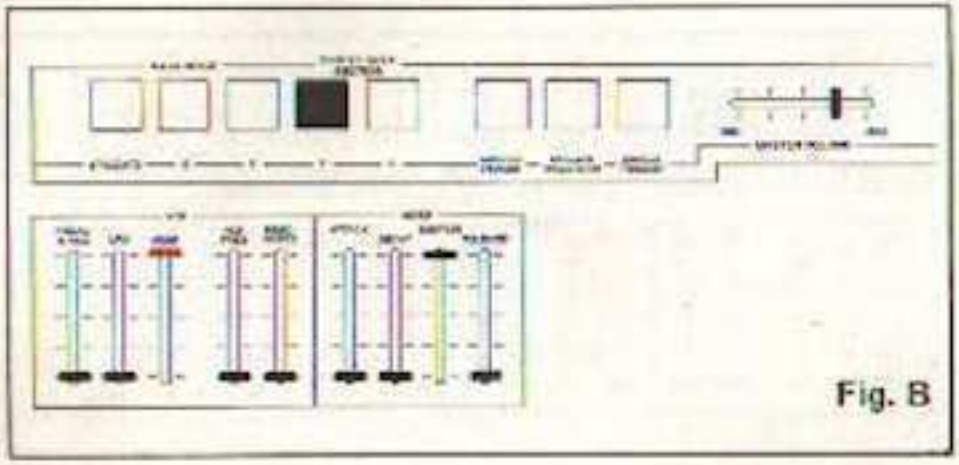


Fig. B

Referring to Figure C, raise the ATTACK slider in the ADSR box about half-way up. Now when you play a note, the sound fades in with a "soft" attack. Note that the sound still dies away instantly when you release the key. Raise the ATTACK slider all the way and listen how long it takes for the sound to build up to full brightness. You will find that setting the ATTACK slider about 1/4 of the way up produces a good brass-like attack.

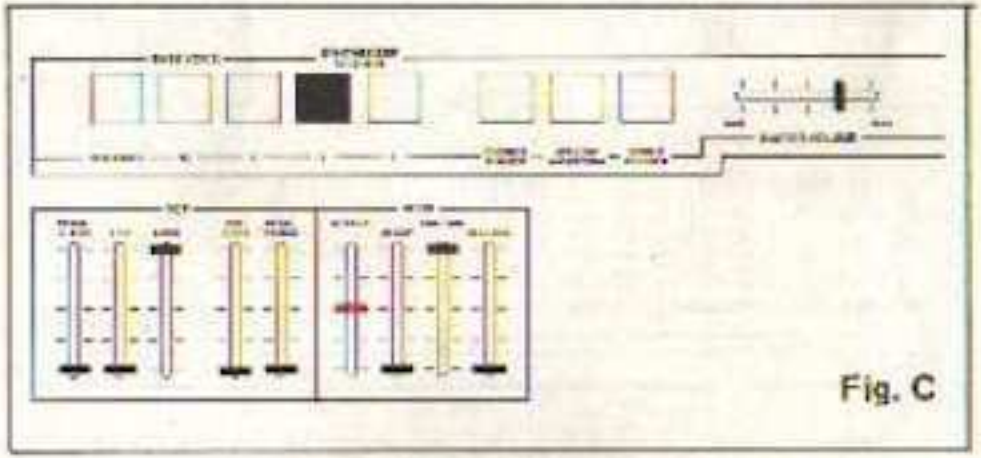


Fig. C

Now, leaving the ATTACK slider at about 1/4, raise the RELEASE slider to half-way (Figure D). Observe that the sound no longer dies away instantly when the key is released, but dies away rather slowly. The higher you set the RELEASE slider, the slower the sound will die away.

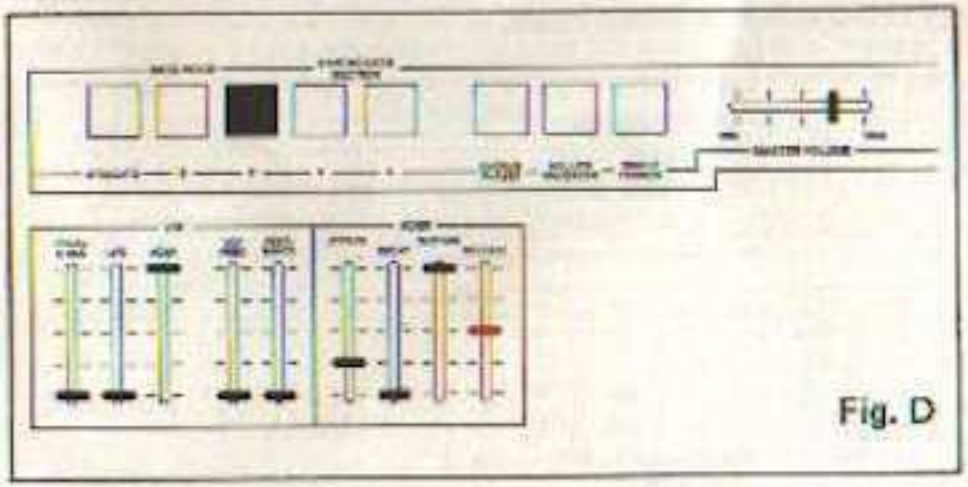


Fig. D

There is one important thing to remember about the RELEASE function on the ADSR. The release time on the ADSR cannot be any longer than the release time set in the string section. For instance, if the RELEASE control in the string section is set for the fastest possible release time, then it will be impossible to get a long release time from the synthesizer section. These are the only two interdependent controls on your OMNI and it is important to understand how they work.

Bring all four ADSR sliders down, as shown in Figure E. When you play now, you will get a series of short pops. If you slowly raise the DECAY slider while playing, these "pops" will spread into percussive sounds that die away as the note is being held down. Like the RELEASE control, the higher you set the DECAY control, the longer it takes for the sound to die away. The difference between the two is that the DECAY control operates while you are holding down a note, and the RELEASE control operates when you let go of all the notes.

The SUSTAIN control determines to what level the sound will decay while you are holding down a note. Leave the DECAY slider set at about halfway. With the SUSTAIN slider still all the way down, the sound of a note eventually dies away completely. If you move the SUSTAIN control to the 1/4 mark, the sound will not die away completely until you release the key.

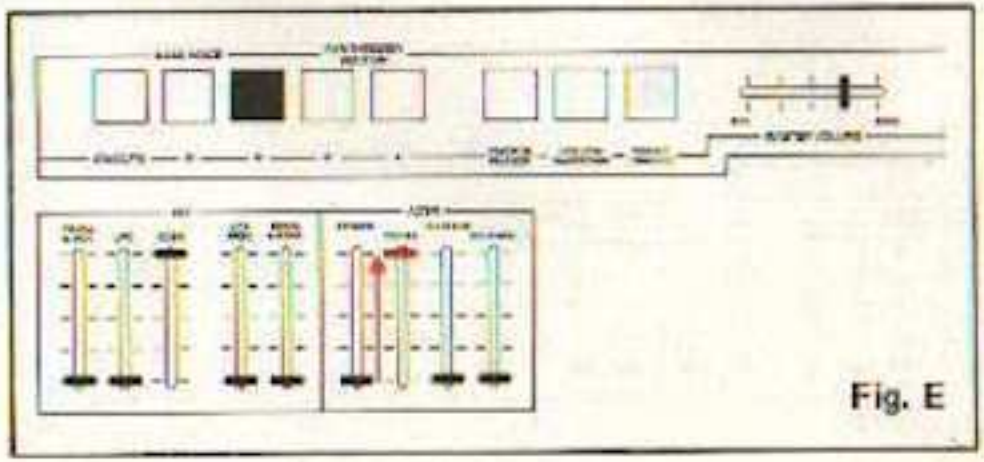


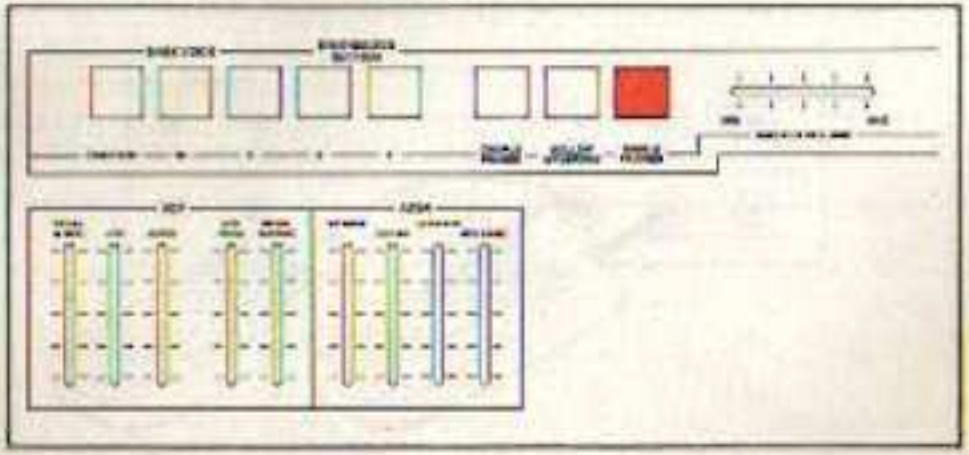
Fig. E

SINGLE TRIGGER SWITCH

When the SINGLE TRIGGER switch is off, and any key is depressed, the keyboard circuitry produces a voltage impulse (trigger) which in turn fires the ADSR. This event happens regardless of the number of new keys depressed or the number held down.

In the SINGLE TRIGGER mode, however, the only time a trigger is produced is on the first depression of a key. This feature is useful in creating authentic piano or harpsichord voices and is essential to good phrasing techniques.

Set up the ADSR as shown in Figure E. Be sure that the SINGLE TRIGGER light is off. Now play a legato passage and notice how the attack is initiated every time a key is depressed. Depress the SINGLE TRIGGER switch (light on) and play the same passage. Notice how the notes die away even though you are still playing. You must take your hand completely off the keyboard before another ADSR envelope can be generated.



LFO

The LFO (Low Frequency Oscillator) is used to create tremolo effects. Set up a brass-like ADSR as shown in Figure F. Leave the ADSR control in the VCF box set about halfway. Hold some notes down on the keyboard and raise the LFO slider until you can hear the sound getting alternately brighter and duller. With the LFO control about halfway up, adjust the LFO SPEED slider (next to the MIX slider) to get a feel for the range of tremolo speeds available. A speed of 5 to 7 beats per second is the normal speed for tremolo, but you will find the great range of the LFO useful in creating a wide variety of interesting musical effects.

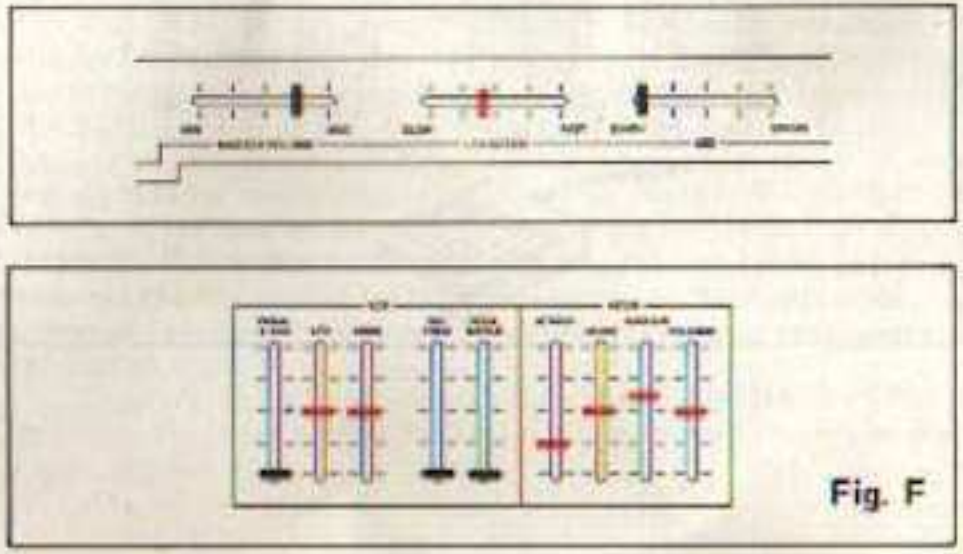
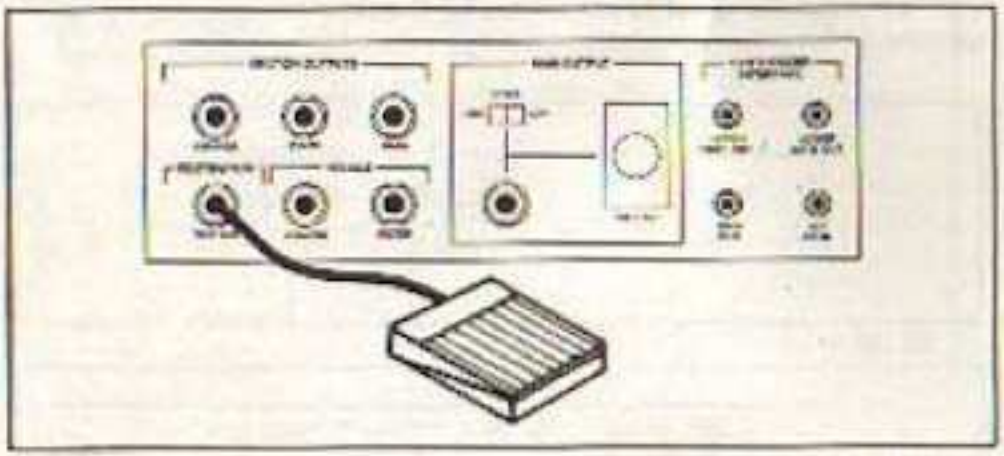


Fig. F

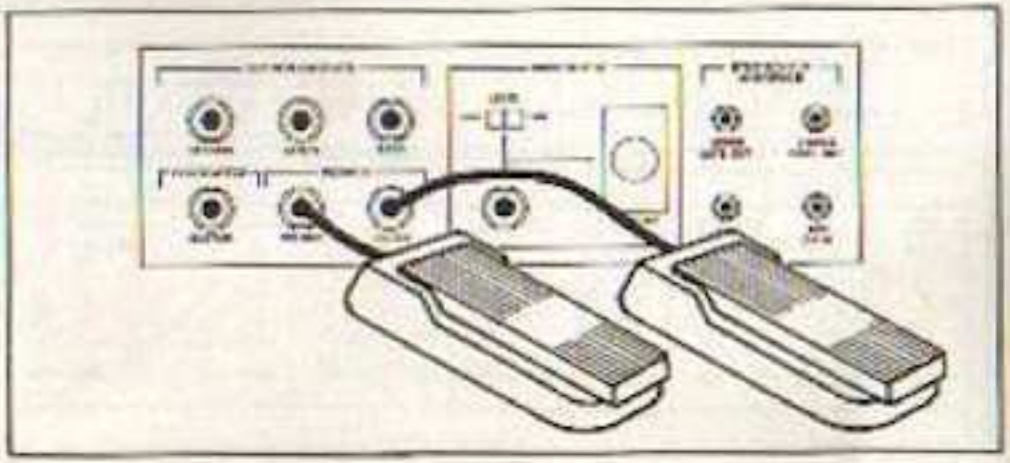
FOOT SWITCH & PEDALS

The SUSTAIN foot switch works like the sustain pedal on a piano. It affects the operation of both the STRING SECTION and the SYNTHESIZER SECTION. When you press the SUSTAIN foot switch, the RELEASE time of the strings and the ADSR automatically go to the maximum setting, thereby giving you the longest possible release. When the foot switch is released, then the release times return to the panel control settings.



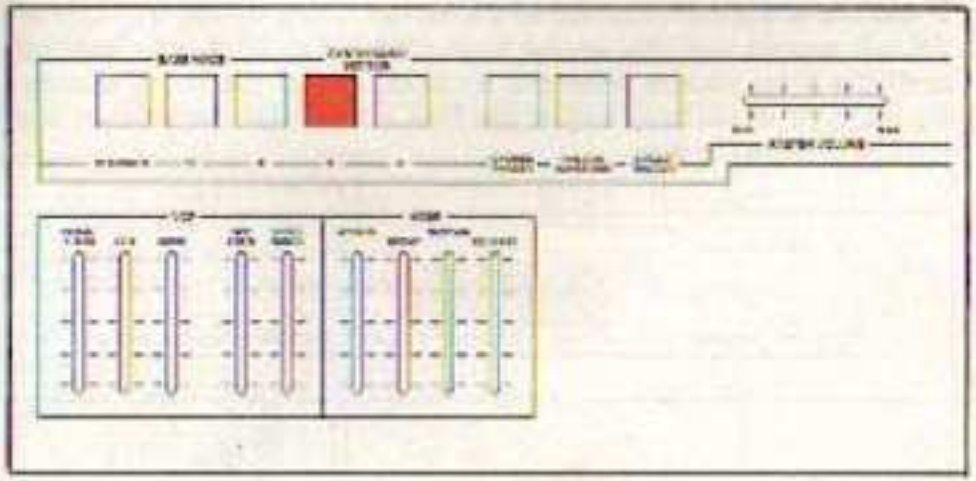
Foot Pedals should be plugged into the appropriate jacks on the rear panel. Make sure that they are not confused with the Foot Switch jack. To use the Foot Pedal as a Filter Foot Pedal, set the controls as in Figure F, with the LFO slider all the way down. Until you raise the slider marked PEDAL & ACC, the pedal will have no effect. When you raise this slider, however, the pedal can be used to make the sound brighter. Where you set this control will determine the range of the pedal. The pedal is extremely useful for expressive effects in playing brass sounds and other voices where a swell in brightness is important.

To use the pedal as a Volume Pedal, simply plug it into the jack marked VOLUME. The range of the pedal will be determined by the setting of the MASTER VOLUME slider on the front panel. This effect is very useful for string voices and other sounds in which a crescendo effect is desirable.



SYNTHESIZER VOICES

Like the STRING SECTION, there are four pushbuttons to select the basic synthesizer pitch range. Turn off the 4' pitch and press the 8' button in the SYNTHESIZER SECTION. You will note that the 8' sound is basically the same as the 4' except that it is an octave lower and just a shade mellower. The 8' sound has been made more mellow because the lower-pitched sounds require a more full-bodied and richer texture.



BASS VOICES

The BASS VOICE sounds work the same way as the CELLO and BASS sounds - that is, they play only in the lower portion of the split keyboard.

The BASS VOICE derives its sound from the keyboard tone generators and has its own preset filter with a choice of two preset envelopes. The BASS VOICE is always in a single trigger mode (much like a real bass), and is, therefore, unaffected by the SINGLE TRIGGER switch.

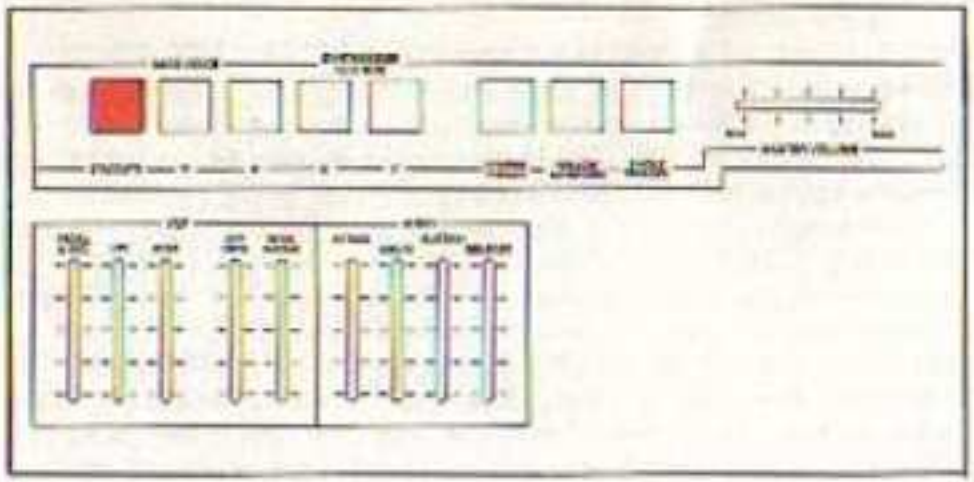
You will note that depressing either of the BASS VOICE switches will prohibit any other sound (except for strings) from operating in the lower octave-and-a-half on the keyboard.

The BASS VOICE circuit contains a unique device which enables you to play bass solo and a synthesizer sound exclusively or simultaneously. Set up the patch as shown in Figure B. Depress the 16' BASS VOICE switch. Play a scale from the bottom of the keyboard to the top and notice how the bass sound stops at G2 and the synthesizer sound begins. Now, move the BASS VOLUME control all the way to the left (off). Leave the 16' BASS VOICE switch on. Play a chord on the upper part of the keyboard and one note on the lower. Notice that you can hear the lower note ("middle" voice) as long as one or more notes are depressed above the "split" (G2).

This exclusive split keyboard allows you to play BASS VOICE sounds in the lower part of the keyboard, synthesizer sounds in the upper, but still retain these "middle" voices.

STACCATO SWITCH

This switch changes the length of the decay on the BASS VOICE envelope, which is preset. In general, you should use the faster decay (STACCATO switch on) for fast phrasings, and the slow decay (STACCATO switch off) for slow phrasings. In addition, you can produce an extremely fast decay by playing the keys in a staccato manner.



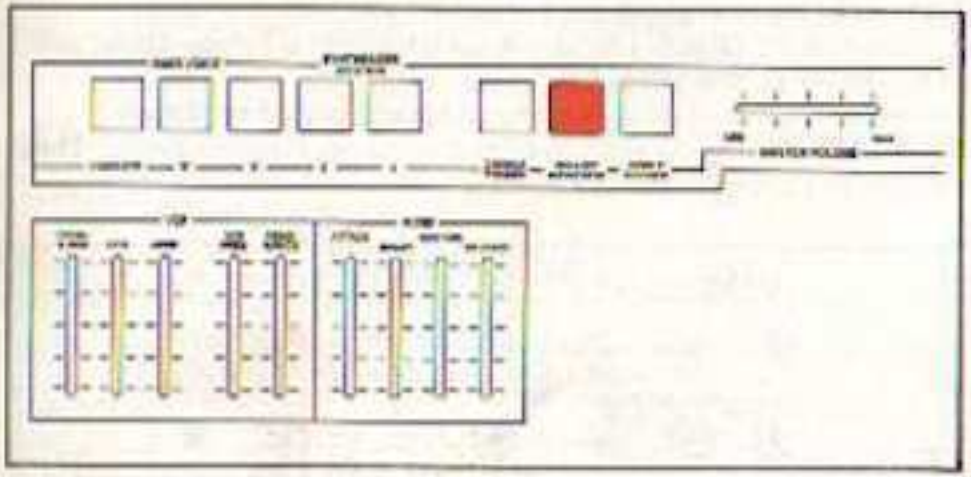
MIX

As its name implies, the MIX control determines the balance between the string voices and the synthesizer voices. If the MIX control is all the way to the left, you will hear only the synthesizer voices. If the MIX control is all the way to the right, you will hear only the string sounds. If you place the MIX control near the center, you will hear a mixture of both the string voices and the synthesizer voices. (This control only affects the MAIN OUTPUT jacks.)

Leave the brass-like voice set up on the synthesizer as in Figure G and move the MIX control to the center. Turn on the VIOLIN or VIOLA sounds and play on the keyboard. You will now be hearing both the brass sounds from the synthesizer and the string sounds from the string section. Adjust the MIX control for the balance that is most pleasing to you.

HOLLOW WAVEFORM SWITCH

This switch, located next to the synthesizer section, has a curious name but is really very simple in operation. If you listen to a combination brass-string sound as set up in the previous example and press the HOLLOW WAVEFORM switch, you will notice that the sound character changes for both the strings and brass and becomes more hollow-sounding and spacious. For those who know synthesizer terminology, this switch changes the basic waveform of the OMNI from a sawtooth wave to a dynamic pulse wave. The musical effect is that it changes, in a subtle way, the sound of the entire instrument.



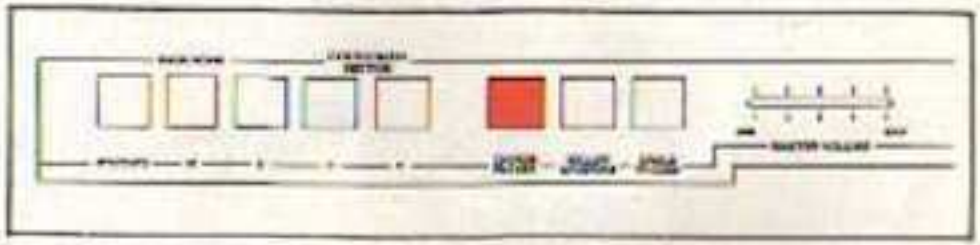
CHORUS PHASER

The string section of the OMNI actually uses a number of phase shifters to produce the lush string effect. The CHORUS PHASER button does two important things:

1. It slows down the speed of the phasers and thereby alters the string sounds.
2. It feeds the output of the synthesizer section into the phasers, along with the strings.

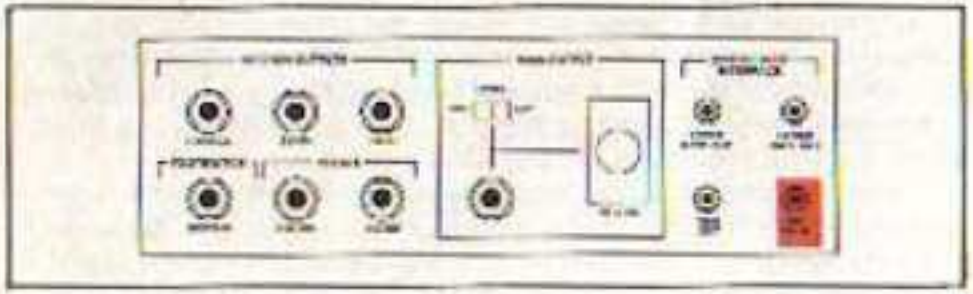
The result is that the synthesizer's musical capabilities are greatly enhanced by being able to use the phase shifters. But, remember, the output of the phase shifters always appears at the STRING side of the MIX control. Therefore, if you want to process the output of the synthesizer through the phase shifters, you must move the MIX control to the STRING side.

For example, leave the brass sound set up on the synthesizer section. Turn off all the string sounds. While playing the keyboard, press the CHORUS PHASER switch. Notice how the sound seems to come alive. Move the MIX control back and forth. You'll see that the sound at the SYNTH end of the control is unchanged, but that the sound from the CHORUS PHASER is all at the STRING end. Leaving the MIX control in the center usually provides a good blend of chorus-phased brass and straight brass.



VCF CV IN

The VCF CV IN jack on the rear panel is part of the SYSTEM INTERFACING provided on many different ARP synthesizers. This jack provides a way for the user to control the VCF in the OMNI from an external signal, such as a control voltage from another synthesizer or the output of the ARP SEQUENCER. The front panel control labeled PEDAL & ACC. determines the sensitivity of the VCF CV IN input.



UPPER GATE OUT, LOWER GATE OUT & TRIG OUT

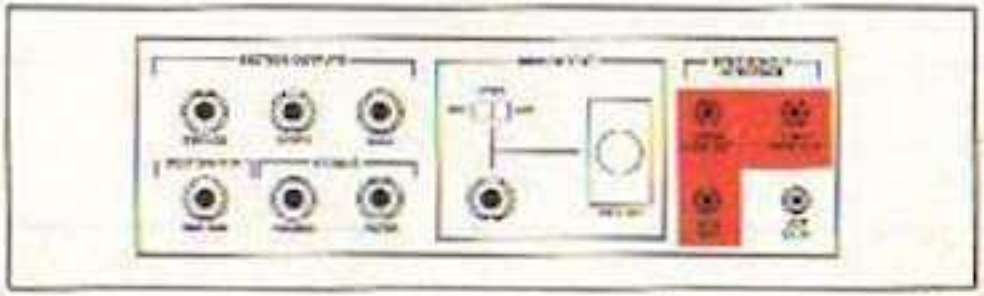
The UPPER GATE OUT jack produces a standard ARP Gate signal whenever any note on the keyboard is depressed, except when a BASS VOICE has been selected. When a BASS VOICE has been selected, the UPPER GATE OUT jack produces the Gate signal only when a note is depressed that is above the keyboard "split."

The LOWER GATE OUT jack produces a standard ARP Gate signal whenever any note below the keyboard split is depressed.

When the SINGLE TRIGGER switch is on, the TRIG OUT jack produces a standard ARP Trigger signal only on the first note depressed, and will not produce a new signal for any notes depressed as long as that first note is held down. If a BASS VOICE is selected, this only holds true above the keyboard split.

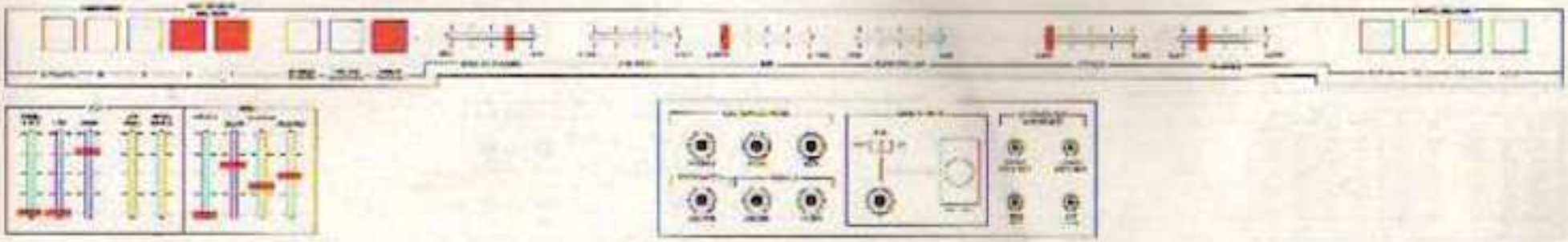
When the SINGLE TRIGGER switch is off, a Trigger signal will be produced at the TRIG OUT jack every time a new note is depressed, regardless of how many notes are being held down.

These jacks can be used to trigger other ARP synthesizers. They can also be used with the ARP Sequencer.

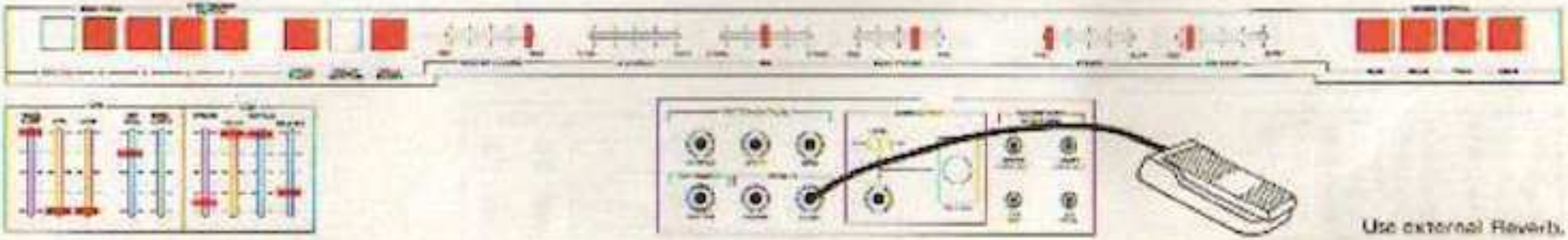


PATCHES

HONKY-TONK PIANO

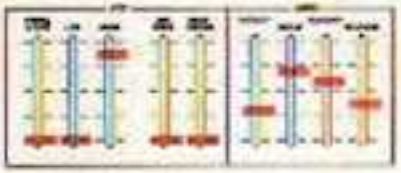


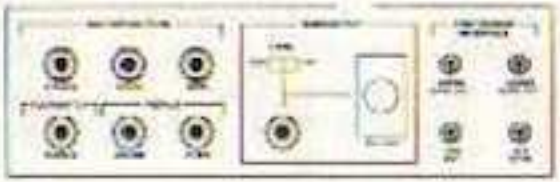
CATHEDRAL PIPE ORGAN



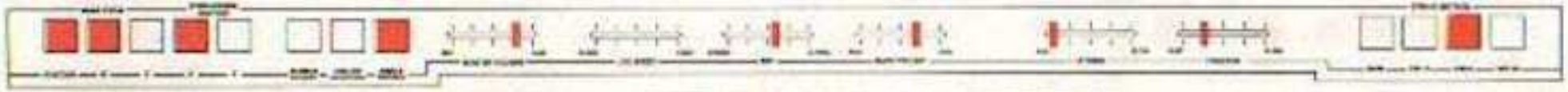
Use external Reverb.

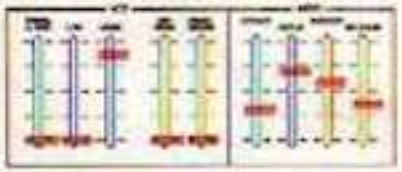
BRASS

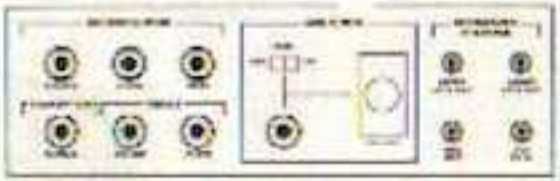




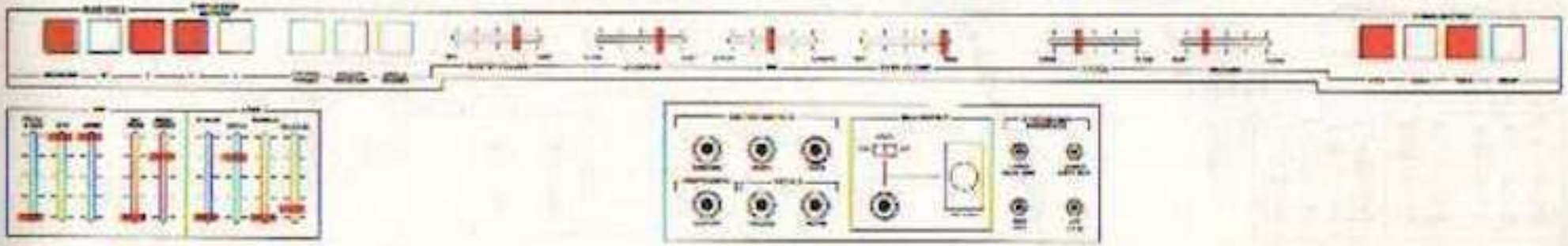
BRASS, STRINGS & BASS



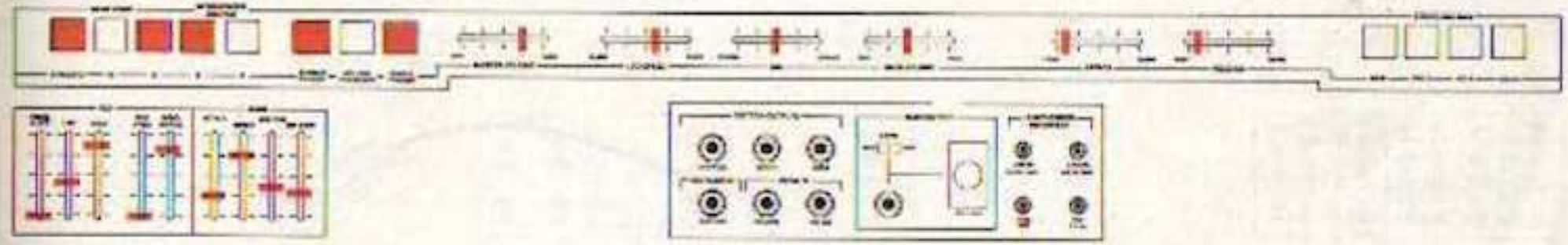




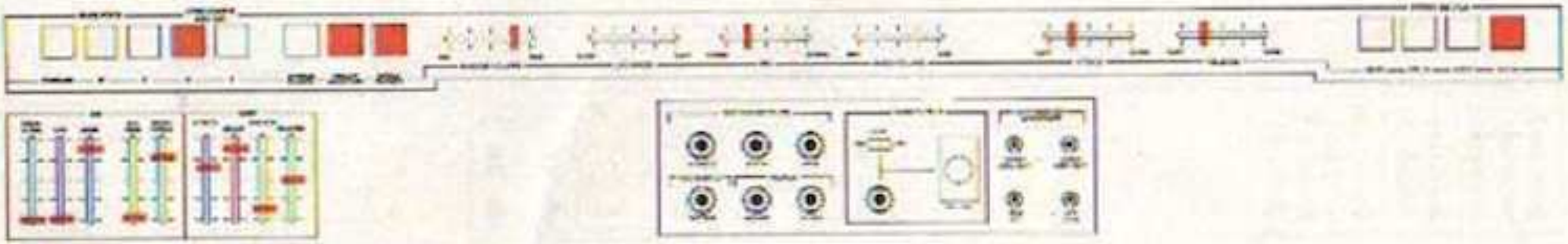
SHIMMERING FILTER SWEEP with STRINGS & BASS



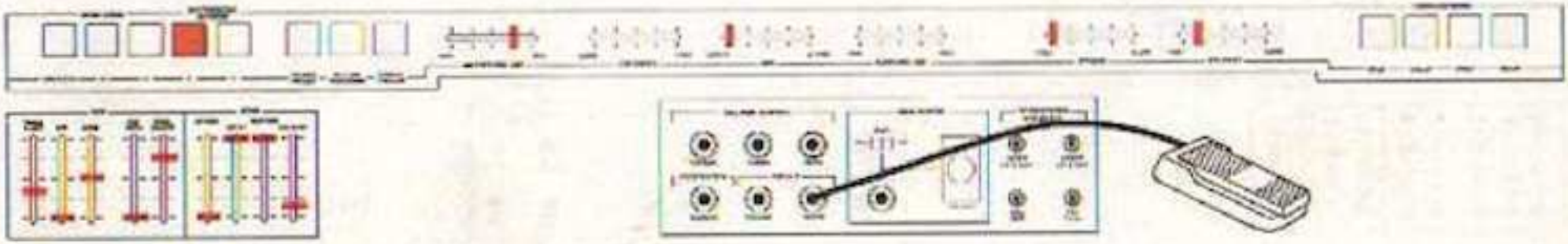
PHASED FILTER SWEEP with BASS



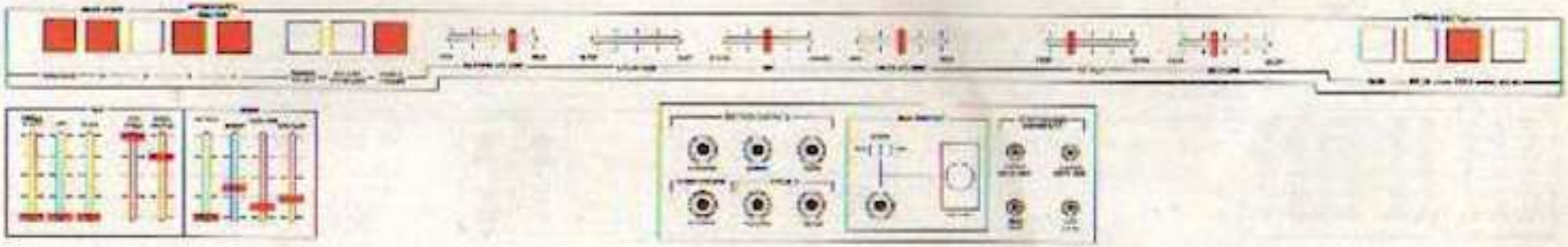
SWEEPING FILTER & ENHANCED STRINGS



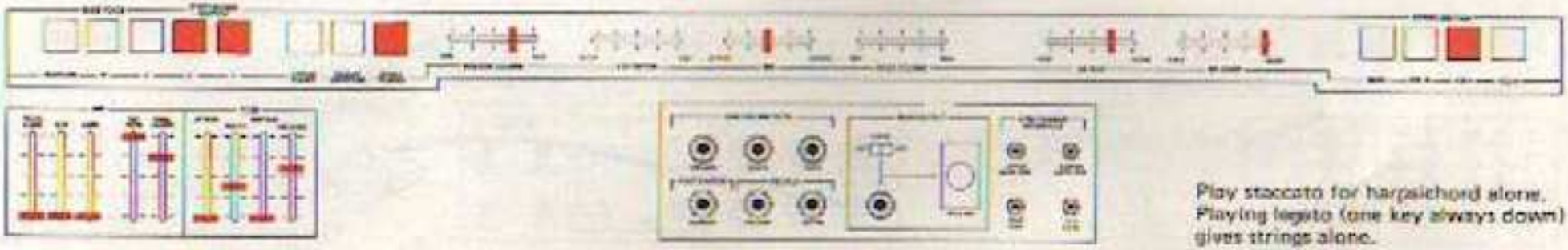
POLY WAH



HARPSICHORD, STRINGS & BASS

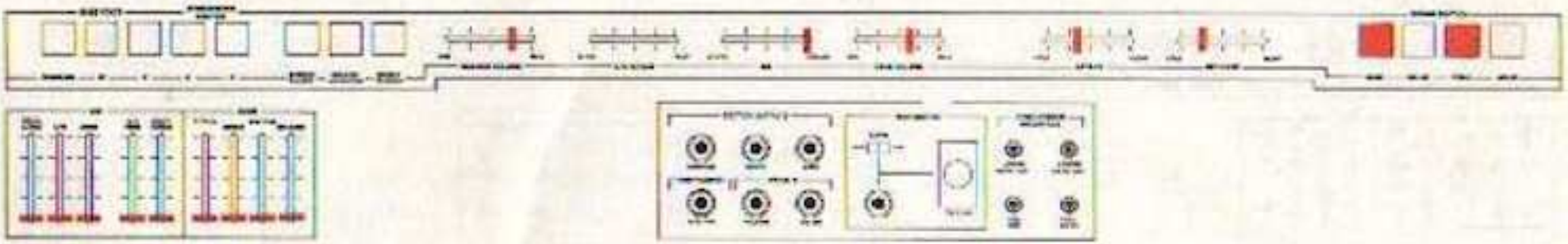


TOUCH-RESPONSIVE STRINGS with HARPSICHORD

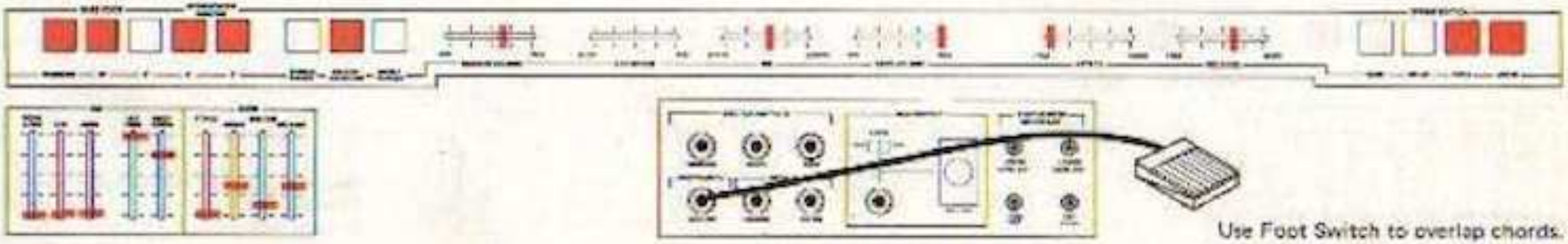


Play staccato for harpsichord alone. Playing legato (one key always down) gives strings alone.

LOWER STRINGS ENSEMBLE



LUCY in the SKY



Use Foot Switch to overlap chords.

SPECIFICATIONS

I. Controls

A. String Section
1. Instrument selection switches
   a. VIOLIN
   b. VIOLA
   c. CELLO
   d. BASS
2. String Envelope controls
   a. ATTACK (time)
   b. RELEASE (time)

B. Synthesizer Section
1. Synthesizer Pitch Range switches
   a. 4' and 8'
2. Voltage Controlled Filter (4-pole Low Pass)
   a. VCF FREQ
      1. Frequency Range: 16 Hz to 16 KHz
   b. RESONANCE
      1. Maximum usable Q: 30
   c. ADSR (depth)
   d. LFO (depth)
   e. PEDAL & ACC (depth)
3. LFO (speed)
4. ADSR
   a. ATTACK (time) 5 msec. to 5 sec.
   b. DECAY (time) 10 msec. to 8 sec.
   c. SUSTAIN (level) 0 to 100% of peak
   d. RELEASE (time) 15 msec. to 10 sec.
   e. SINGLE TRIGGER

C. Bass Voice Section
1. Bass Voice Pitch Range switches
   a. 8' and 16'
2. Bass Voice section filter (2-pole Low Pass)
   a. AD Generator (single trigger)
      1. STACCATO SWITCH
         A. .5 sec. decay (On)
         B. 1.0 sec. decay (Off)

D. General Controls
1. MASTER VOLUME
2. BASS VOLUME
3. MIX
4. HOLLOW WAVEFORM (Strings & Synth)
   a. Sawtooth (Off)
   b. Dynamic Pulse (On)
5. CHORUS PHASER
   a. Solid State Delay Line type

II. Rear Panel Jacks

A. UPPER GATE OUT
1. +10V (On)
2. 0V (Off)

B. LOWER GATE OUT
1. +10V (On)
2. 0V (Off)

C. TRIG OUT
1. +10V pulse, 10 msec. duration

D. VCF CV IN
1. Sensitivity, 1V/oct

E. Footswitch Input

F. Foot Pedal Inputs
1. 100K Audio Taper Potentiometer

III. General Information

A. Frequency Range: 32 Hz to 2093 Hz

B. Keyboard: 4 octaves, split at 1⅛ octaves

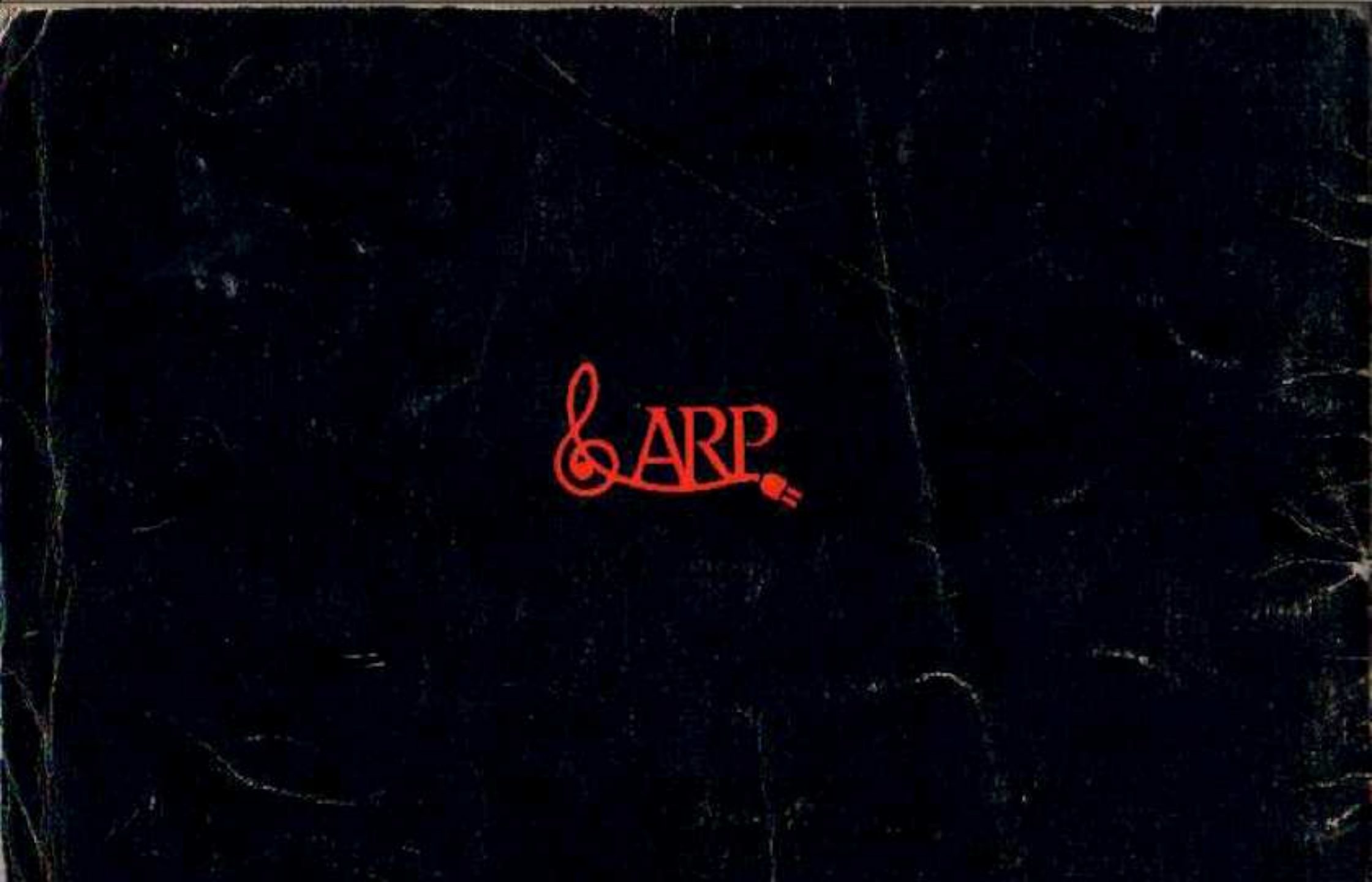
C. Circuit Boards: G10 glass epoxy

D. Chassis: Welded steel

E. Weight: 39½ lbs.

AUDIO OUTPUT SPECS

OUTPUT	JACK TYPE	LEVEL	VOLTAGE	IMPEDANCE
Main 1	XLR Cannon	High/Low Switched	High, 1V PP	100 ohms DC coupled
Main 2	1/4" phone		Low, 200mV pp	720 ohms DC coupled
Strings	1/4" phone	High	2V PP	600 ohms DC coupled
Synth	1/4" phone	High	2V PP	600 ohms DC coupled
Bass	1/4" phone	High	1.5V PP	600 ohms DC coupled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