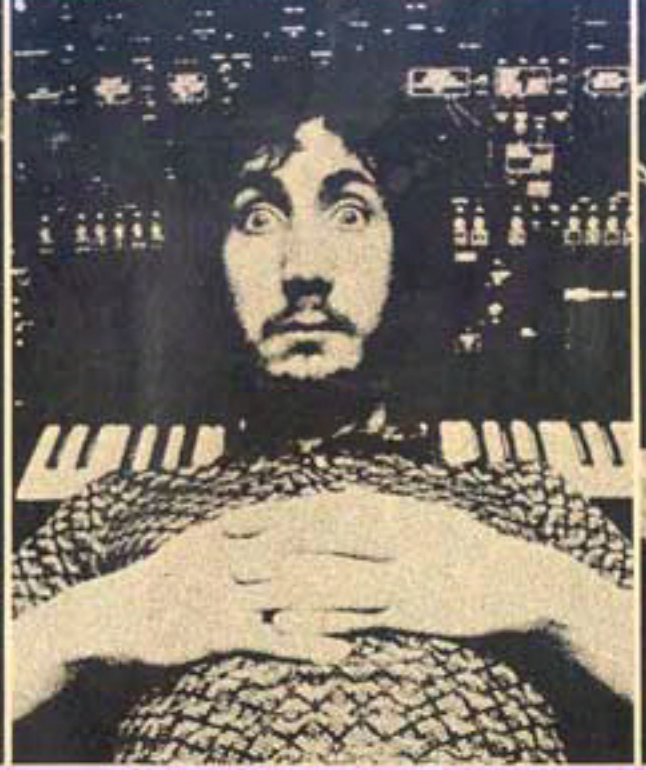


ARP

AXXE OWNER'S MANUAL

Specifications

VOLTAGE CONTROLLED OSCILLATOR

Frequency Range: 16Hz to 16KHz
Waveforms: Sawtooth, Square, Pulse, dynamic pulse
Warm-up Drift: 1/30 Semitone from turn on
"Tune" Control Range: ± 1.5 semitones
Max. Vibrato Depth: ± 1 octave
Max. Trill Depth: + 1.2 octaves
Max. ADSR Frequency Shift: +9 octaves
Pulse Width: 5% to 50%
Pulse Width Modulation: LFO, ± 25%
ADSR, +45%

NOISE GENERATOR

Noise Spectrum Type: Pink, ± 3dB 20Hz to 20KHz

VOLTAGE CONTROLLED FILTER

Frequency Range: 16 Hz to 16 KHz
Maximum Usable Q: approx. 30
Resonance: 1/2 to self-oscillate
VC Response: approx. 1 v/oct., same as VCO
Max. LFO Modulation: 1.5 octaves
Max. ADSR Sweep: 10 octaves

VOLTAGE CONTROLLED AMPLIFIER

Dynamic Range: 80dB

ADSR ENVELOPE GENERATOR

Attack Time: 5 ms to 5 seconds
Decay Time: 12 ms to 10 seconds
Sustain Level: 0 to 100% of peak
Release Time: 15 ms to 10 seconds

KEYBOARD

37 note standard AGO action

LFO

Waveforms: sine, square
Frequency Range: 0.2Hz to 20Hz
Note: The LFO is clamped to the keyboard trigger

SAMPLE AND HOLD

Sample Command Source: LFO square wave, leading edge
Max. pitch deviation in VCO: 2.5 octaves
Max. frequency deviation in VCF: 2.5 octaves

PITCH BEND CONTROL

Max. Deviation: Exactly ± one octave, calibrated
Dead Zone: Approx. ± 10^{o} from dead center

TRANSPOSE SWITCH

Positions: Down 2 octaves, normal, up 2 octaves

PORTAMENTO

Minimum speed: 1.5 seconds per octave
Maximum speed: .01 ms per octave

INTERFACE JACKS

Keyboard Control Voltage In/Out: 1 volt/oct.
Gate Out: Approx. +10 v.
Gate In; min.: 8 volts
Trig Out: 10 volt pulse, 20 microseconds duration
Trig In: 8 volt pulse, 10 microseconds min. duration
External Audio Input Sensitivity: 500 mv for full output

AUDIO OUTPUTS

Maximum signal voltage: 2.5 volts P-P High level
0.25 volts P-P Low level

OPERATING POWER REQUIREMENTS

Line Voltage Range: 100 volts to 130 volts, or 200 volts to 250 volts, 50Hz-60Hz AC
Normal Operating Power: 20 watts

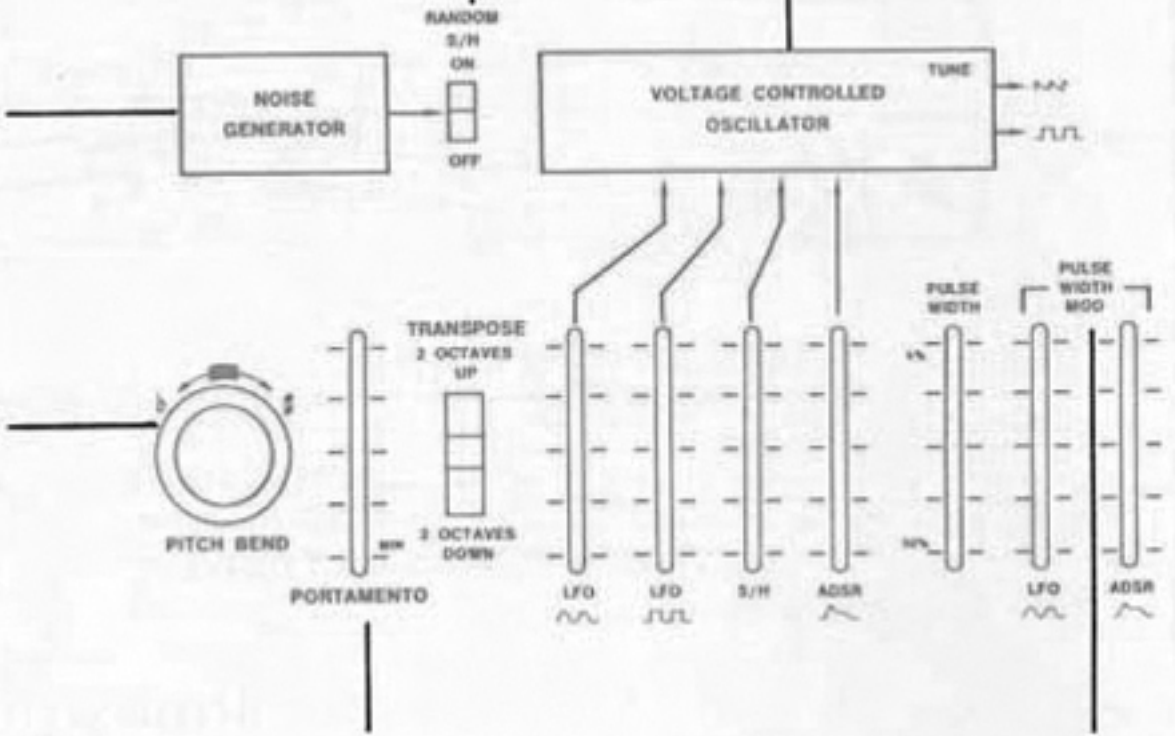
PHYSICAL CHARACTERISTICS:

Weight: 15 lbs.
Size: L. 23½", W. 14½", H. 6¼"
Materials: Aluminum chassis, walnut end blocks, G-10 glass/epoxy printed circuit board

The Sample and Hold circuit is a controller; it is used to create a series of random tones or accents.

The Voltage Controlled Oscillator produces pitched tones. The pitch of the oscillator is controlled by the keyboard, the Pitch Bend knob, and other controllers.

Noise Generator: The noise generator produces pink noise which is used in creating unpitched effects like thunder, surf and wind.



Pitch Bend: This control bends notes up to one octave sharp or flat. The center "dead zone" facilitates tuning. In addition to extending the tuning range of the synthesizer up and down an extra octave, the Pitch Bend control permits you to bend individual notes, simulating the "pitch bend" techniques used by many guitarists.

Portamento: The Portamento allows you to glide from one note to the next. This control determines the speed of the glide.

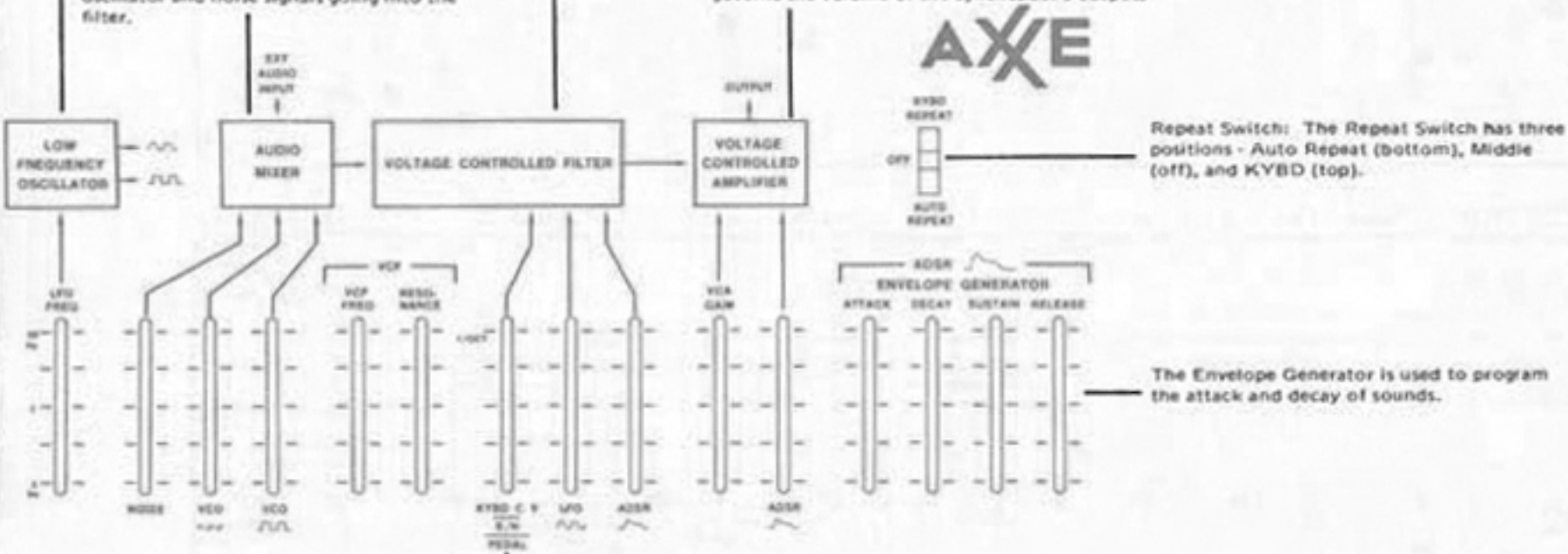
Pulse Width Modulation gives the pulse wave a "phase-shifting" quality.

The Low Frequency Oscillator (LFO) is a controller; its output signal is used to create vibrato, tremolo, repeat and other effects.

The Voltage Controlled Filter is the heart of the synthesizer. It is used to create individual characteristics for each sound you make. The VCF can also function as an oscillator.

The Audio Mixer governs the volume of the oscillator and noise signals going into the filter.

The Voltage Controlled Amplifier (VCA) governs the volume of the synthesizer's output.



Repeat Switch: The Repeat Switch has three positions - Auto Repeat (bottom), Middle (off), and KYBD (top).

The Envelope Generator is used to program the attack and decay of sounds.

The VCF can be controlled by the KYBD or S/H. The footpedal overrides these functions when it is plugged in.

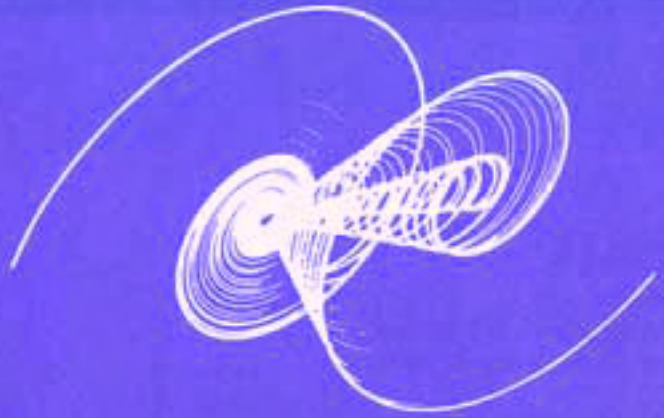
THE ARP AXXE

Introduction

Welcome to the ARP AXXE Electronic Music Synthesizer. Your AXXE will take you on the most important experience of your musical career. The AXXE synthesizer will broaden your creativity and expressivity and it will open to you the new world of synthesized sound. With the AXXE you can create musical textures that are new to this world, distinctly yours.

The controls on your AXXE have been "human engineered" to feel right in your hands. Controls are grouped logically and are electrically scaled to respond easily to musical demands. As you learn to play your AXXE, the value of this human engineering will become increasingly apparent. The musicians and engineers who are responsible for the AXXE labored over the placement of each control, the color-coding, panel graphics, and countless other details. The result is an instrument of elegant simplicity, superior performance, and unparalleled quality in design and workmanship. And as you will read later in this booklet, the AXXE is an open-ended system. The jacks on the back of your AXXE can be used to expand the AXXE as your musical needs grow.

Contents



GETTING STARTED

The AXXE belongs to the class of Variable synthesizers. A variable synthesizer, as opposed to a Preset synthesizer, allows you to shape every aspect of a sound, from the attack and decay to the harmonic structure. Your AXXE is equipped with controls that will let you precisely shape each and every parameter of the sound you are creating.

Synthesizers create sounds electronically in much the same fashion that any natural sound is created acoustically. There are definite elements of sound which, when put together in different combinations, will precisely reproduce anything from a clarinet to a jackhammer. The AXXE is a musical instrument comprised of a number of different electronic circuits; each one is designed to control an element of sound.

This manual is an operational guide for the AXXE, but it should also give you a working knowledge of electronic music functions.

Checklist:

1. Fill out your warranty card and send it in.
2. Save the carton (It can be used to protect your AXXE until you get a carrying case).
3. Place the AXXE on a suitable playing surface (Don't worry about ventilation; it won't get hot).

EXTERNAL AMPLIFIER AND SPEAKER

The AXXE, like all electronic musical instruments, is designed to be connected to an amplifier and loudspeaker system. This external equipment (amplifier and loudspeaker) may be a guitar amplifier, P.A. system, an electronic organ, recording console, or even a high fidelity or stereo system. Two outputs are provided on the rear panel of the synthesizer - a phone jack labeled "Low" and a smaller phono jack labeled "High." Use the outputs in the following manner:

1. If you are planning to plug your synthesizer into a guitar amplifier, use the synthesizer's "Low" output. A standard guitar cord can be used for this connection.
2. If you're using the synthesizer with an organ or a hi-fi amplifier, use the output marked "High." An input jack is already available on most organ models. In the event your organ is lacking this input, it will only take a serviceman a few moments to install one. Ask him to wire the jacks so the volume of the synthesizer can be controlled by the expression pedal of the organ.

WHAT KIND OF AMP WORKS BEST?

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 amplification 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.

Also, don't be afraid to use accessory devices, such as phasers, fuzz-wow pedals, equalizers and so forth with your AXXE. You can get interesting results.

LET'S BEGIN

By now your curiosity is probably beginning to exert itself, and you may wish to start playing immediately. In this case, simply turn to page 26, read the brief description of the control functions, and then set up any of the patches starting on page 28. While these patches provide some basic ideas of the vast potential that lies within the AXXE, you'll ultimately discover an ever greater number of new and exciting sounds and effects on your own.

If you prefer to systematically examine each control of your AXXE before playing, continue on to the information which follows.

HOW YOUR AXXE WORKS

Generally speaking, all the electronic circuits in your AXXE perform one of three basic functions:

1. Signal sources: the "raw" tones or noise which will ultimately be shaped into musical sounds,
2. Signal Modifiers: the "raw" sounds are passed through signal modifiers where the timbre (or tone quality) is changed to produce the desired sound, and
3. Controllers: devices which determine the operating characteristics of the signal sources and the signal modifiers. For instance, the keyboard is a controller which produces a voltage to tell the oscillator what pitch to create. Similarly, the ADSR envelope generator creates an attack and decay signal that controls the Voltage Controlled Filter (VCF) so that the final musical sound has an attack and decay.

All mechanical instruments work in a similar way. A violin, for instance, has a vibrating string which would be a signal source. The vibrating string corresponds to the oscillator in your AXXE. The vibrations from the string are transmitted to the body of the violin which modifies the sound of these vibrations. The body of the violin is actually a mechanical filter and corresponds to the Voltage Controlled Filter (VCF) on the AXXE. It is the characteristic resonances of

the body that give the violin its distinctive tone quality. The fingerboard, like the keyboard on your AXXE, determines the pitch of the sound. The movement of the bow, like the ADSR Envelope Generator, determines the attack and decay characteristics of the sound.

Interconnecting the various functions shown in Figure A is known as creating a "patch." The block diagram illustrated in Figure A is, of course, a violin patch. Similarly, it is possible to diagram any patch that you may play on the AXXE. Actually, this visual representation of a patch permits you to better understand what functions of the synthesizer are being employed and how each function contributes to the finished sound.

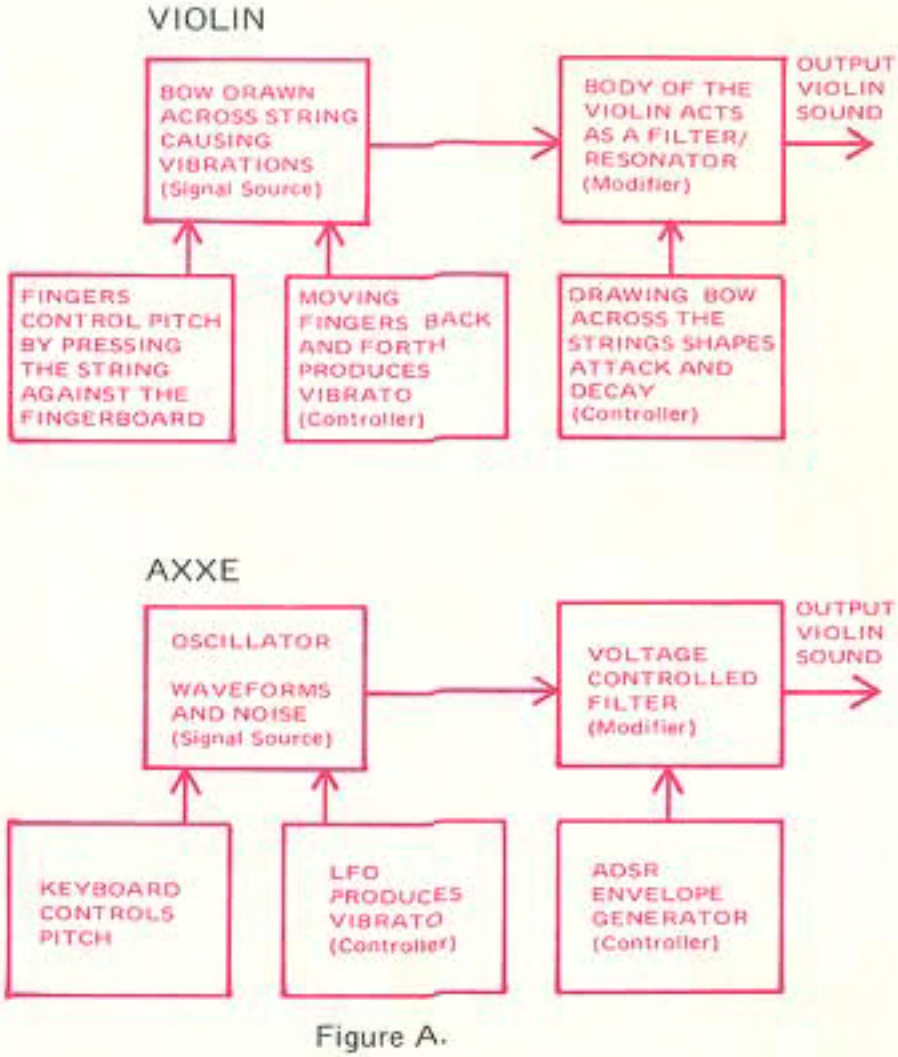
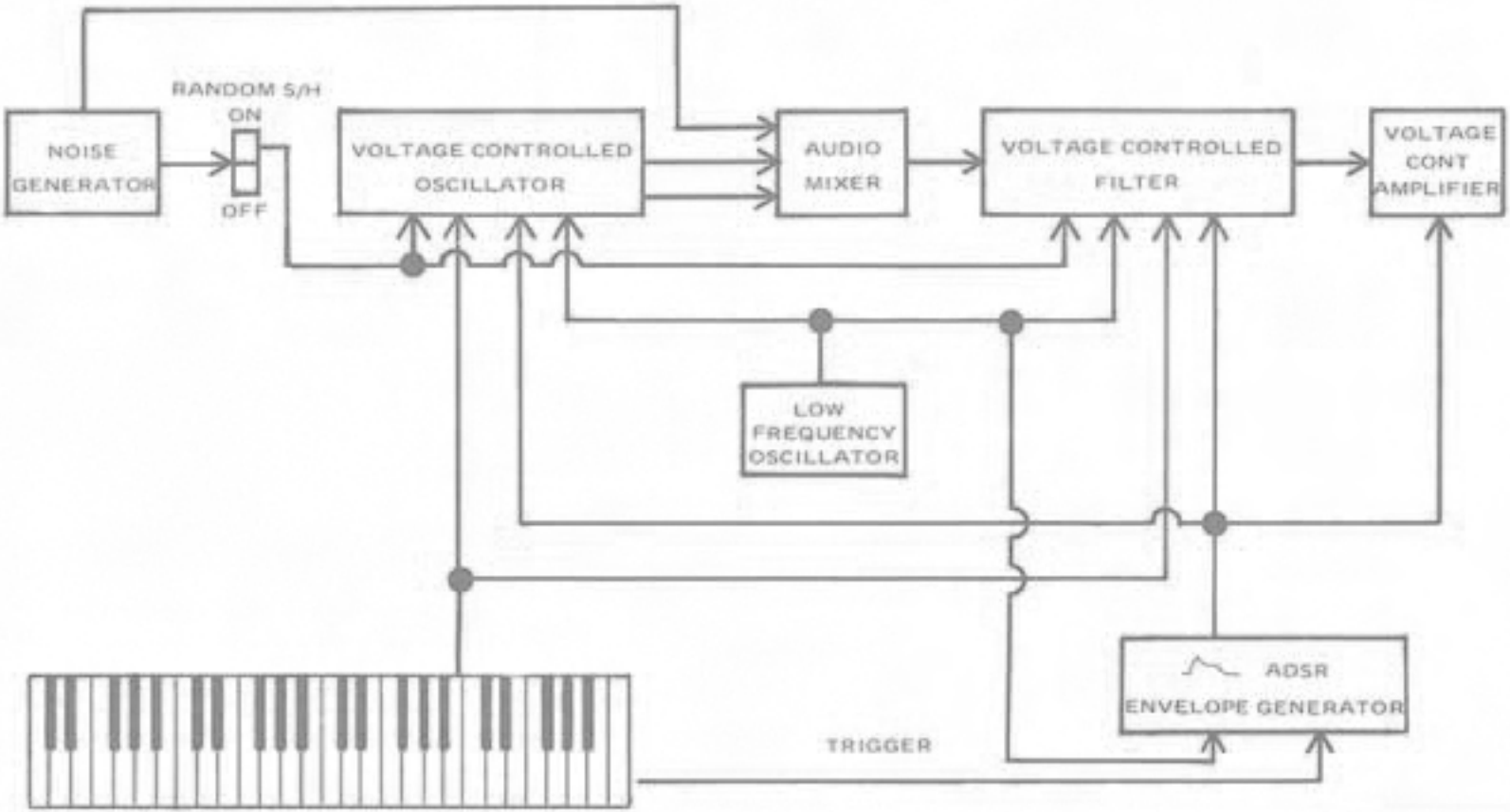


Figure A.

The figure below is a block diagram of all the functions and internal connections in your AXXE.

As we proceed with our discussion on the AXXE's functions, you will be able to see exactly how the different functions interact.

Figure B.



Sound Sources

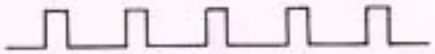
The Voltage Controlled Oscillator on your AXXE produces electrical waveforms (saw-tooth, pulse, and square waves) which are used to create a wide range of sound timbres. If a signal generated by an oscillator has the same waveform as a sound created by a traditional instrument, both will sound the same.

Different waveforms have different sounds. Your AXXE is capable of creating five basic waveforms, plus noise:

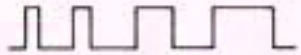
Sawtooth wave; full, brassy

Square wave; clarinet-like

Pulse wave; bright, nasal



Modulated pulse wave; chorus-like, rich



Sine wave; pure, whistle-like

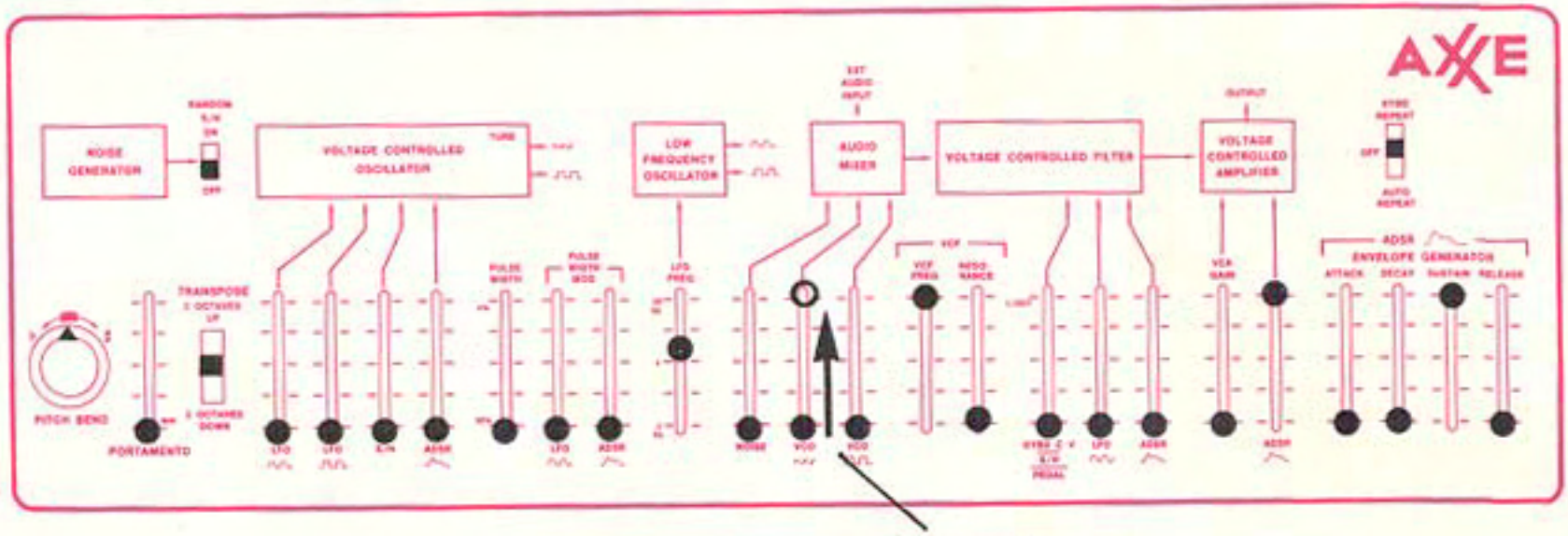


Figure C.

Experiment 1. Listening to Waveforms

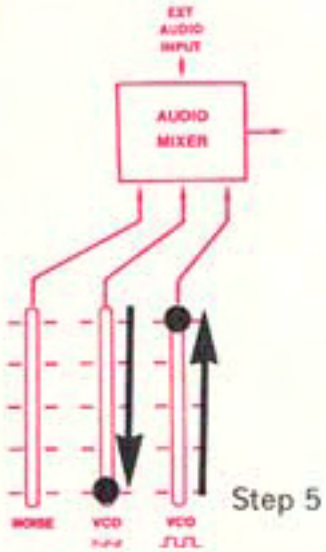
1. Hook up your AXXE to a speaker and amplifier as described on page 3. For the time being, set all tone controls on your amplifier for "flat" response.

2. Set all the controls on your AXXE to match the positions shown in Figure C. Double check the settings before proceeding.

3. The controls on your AXXE are now set so that you will be able to hear the different "raw" waveforms from the AXXE's Voltage Controlled Oscillator (VCO) whenever you play the keyboard. Locate the three slide controls under the Audio Mixer (white, green and blue).

4. Raise the green slider labeled "VCO ~" and play a few notes on the keyboard. The sound you are hearing is the raw, unprocessed sawtooth wave. Move the transpose switch up and down so that you can become familiar with the sawtooth wave at various pitch ranges. You will find out later how to process the sawtooth wave to create a wide range of sounds, especially brassy types of sounds.

5. Bring the green sawtooth wave slider back down, and raise the blue slider labeled "VCO ⎍." Again play the keyboard and you will now be hearing the sound of a raw unprocessed square wave. Notice how the square wave, especially at low pitches, has a hollow, clarinet-like sound.



Step 5

6. The square wave on your AXXE can be turned into another waveform called a "PULSE WAVE" by raising the blue slider labeled "PULSE WIDTH" located under the Voltage Controlled Oscillator box. Raise this slider to the halfway mark and again play on the keyboard. Notice how the pulse wave sounds brighter, more nasal, than the square wave.

7. An even narrower pulse wave can be created by raising the PULSE WIDTH slider all the way up to the 5% marking. This waveform is very buzzy and thin. The 5% marking means that the top part of the pulse waveform is only 5% of the total waveform. A square wave, as its symbol implies, has a top part of its waveform that is exactly 50% of the total waveform.

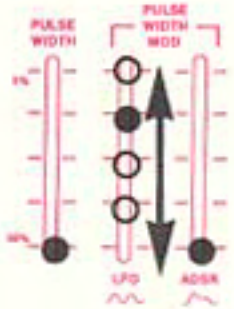
Steps 6 + 7

Experiment 2. Pulse Width Modulation

1. Lower the PULSE WIDTH control slowly thereby gradually increasing the width of the pulse wave until it becomes a square wave again with the PULSE WIDTH slider all the way down.

2. If you move the PULSE WIDTH control up and down while holding down a low note, you will hear that the changing pulse width creates a kind of chorus-like effect. The faster you move the PULSE WIDTH control, the more pronounced the effect. By changing or "modulating" the pulse width while you play, you are creating another waveform called the "Modulated Pulse Wave."

3. The AXXE has special PULSE WIDTH MODULATION controls that facilitate the generation of the modulated pulse waveform. Bring the blue PULSE WIDTH control all the way down, and raise the pink LFO ∿ PULSE WIDTH MOD. control all the way up. Play the keyboard and you will hear a sound which is similar to the effect you created when you moved the pulse width control by hand in step 2. If you lower the pink LFO PULSE WIDTH MOD slider, the effect will diminish and finally disappear. Notice that the pink LFO FREQ control under the Low Frequency Oscillator box changes the speed of the chorus-like sound.

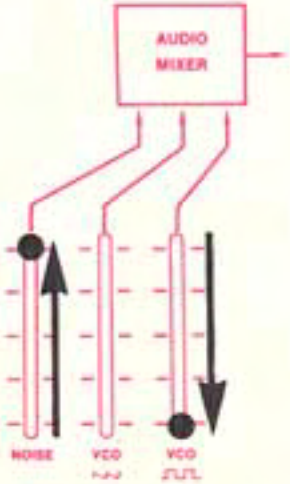


Step 3

4. Experiment with different combinations of settings of the blue PULSE WIDTH control, the pink LFO∿ PULSE WIDTH MOD control, and the pink LFO FREQ control.

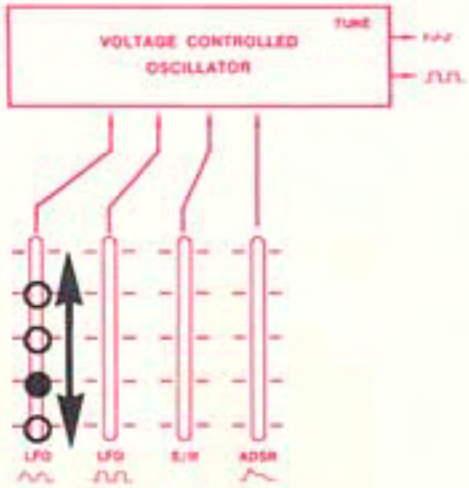
Experiment 3. Noise

Lower the blue VCO control under the AUDIO MIXER. Now raise the white NOISE slider. Play a few notes on the keyboard and familiarize yourself with the sound of "Pink Noise." "Pink Noise" is the most musically useful kind of noise because it sounds balanced to the ear, neither too high and hissy, nor too low and rumbling. You will see later how to use the other functions on your AXXE to turn noise into a wide range of exciting sounds.



Experiment 3

Experiment 4



Experiment 4. Frequency Modulation

The pitch of the Voltage Controlled Oscillator (VCO) on your AXXE is controlled by the keyboard. You know this from the previous experiments and you can also see that the keyboard is connected to the VCO on the block diagram, page 6. As you will now experience, you can also change the pitch or frequency of the VCO by bringing in "control voltages" from other devices on the AXXE.

1. To begin experimenting with Frequency Modulation, again set the controls exactly as shown in Figure C.

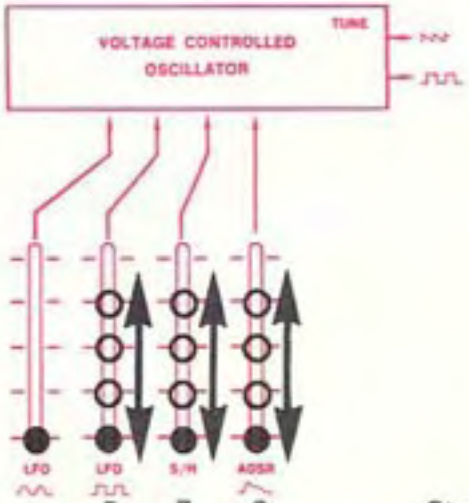
2. Raise the green VCO slider under the AUDIO MIXER. You will now hear the sawtooth wave again when you play the keyboard.

3. Hold down a note on the keyboard and slowly raise the pink LFO control next to the TRANSPOSE switch. Notice that a slow vibrato is introduced that becomes deeper as you raise this control.

4. With this LFO control up about ¼, adjust the LFO FREQ control and observe how the vibrato rate can be changed from very slow to very fast. About ¾ should provide a pleasing vibrato rate.

5. Lower the pink LFO ∿ and raise the LFO ⎍ while holding down a note. Instead of a smooth vibrato, the LFO ⎍ produces a trill. Notice that as you raise this slider, the bottom note of the trill stays the same and the top note moves depending on the setting of the slider. Try tuning the trill for different intervals, like a fifth, octaves, etc. If you increase the LFO SPEED control, the trill can become a useful musical timbre, expecially when the trill is tuned to simple intervals, like octaves.

6. When you have finished experimenting with trills, bring the LFO ⎍ slider back down.



Steps 5 - 9

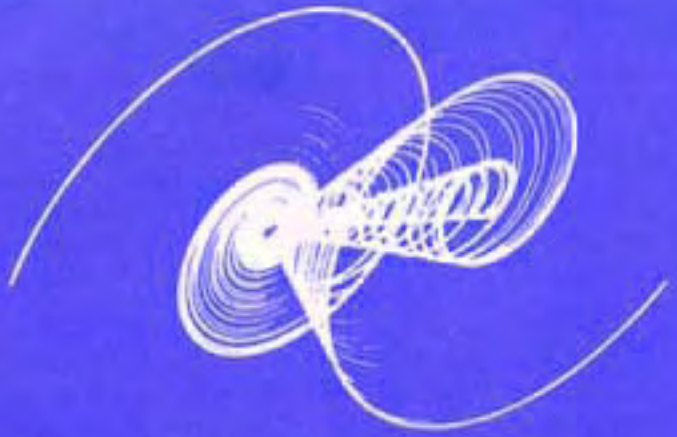
7. Now turn on the switch labeled "RANDOM S/H" which is located in the upper left hand corner of the panel. While holding down a note on the keyboard, slowly raise the yellow S/H control under the VCO. Notice that this control causes the pitch of the VCO to jump around in a completely random manner. The higher you raise the yellow S/H slider, the wider the pitch variations. The RANDOM S/H switch must be ON in order for the yellow S/H control to be activated.

8. Bring the yellow S/H slider back down, and turn off the RANDOM S/H switch.

9. Now hold down a note and slowly raise the red ADSR control under the VCO. Notice how the pitch rises. Leave this control set so that you have raised the pitch about an octave.

10. Now bring up all the way the four red ADSR ENVELOPE GENERATOR controls (located in the lower right hand corner of the panel).

11. Again play on the keyboard. You will hear the pitch of the sound rise and fall each time you hit a key. The settings of the ADSR controls will determine the speed of the pitch change. You will learn more about these controls when you get to the section on "Controllers."



Modifiers

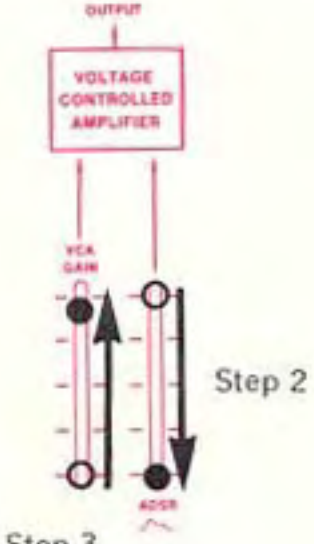
Modifiers are electronic devices that can process a signal and change its sound. Consequently a modifier must have an input and an output. A tone control on a hi-fi set is a simple modifier since it changes the nature of the sound signal that passes through its circuitry.

The ARP AXXE contains two modifiers, the Voltage Controlled Filter (VCF) and the Voltage Controlled Amplifier (VCA). Any signal that is introduced into the AUDIO MIXER, i.e., Noise, VCO ∿, or VCO ⎍, must pass through the VCF and the VCA before reaching the output of the AXXE.

Experiment 1. The VCA

1. Set the controls on your AXXE to match the settings in Figure C. This time, raise the white NOISE slider under the AUDIO MIXER. As before, when you hit a note on the keyboard, you will hear the noise sound.

2. While holding down a note on the keyboard, gradually lower the red ADSR slider under the VCA. Notice that this slider acts like a volume control. Bring this control all the way down and the sound will completely disappear.



Step 2

Step 3

3. With this ADSR control all the way down, slowly raise the black VCA GAIN control. Notice how this control also acts like a volume control. The difference between the operation of the ADSR slider and the VCA GAIN control is obvious: The ADSR control depends on playing the keyboard. The VCA GAIN control has nothing to do with the keyboard. The VCA GAIN control allows a certain amount of signal to pass through the VCA at all times. Bringing up the red ADSR control will let the signal pass through only when the keyboard is used.

Actually, to be more specific, the ADSR slider lets the voltage produced by the ADSR ENVELOPE GENERATOR to "open" the VCA and let signal pass through. The settings of the ADSR ENVELOPE GENERATOR controls will determine the speed with which the VCA opens and closes. Experiment with the four ADSR ENVELOPE GENERATOR controls to observe this effect.

Experiment 2. The VCF

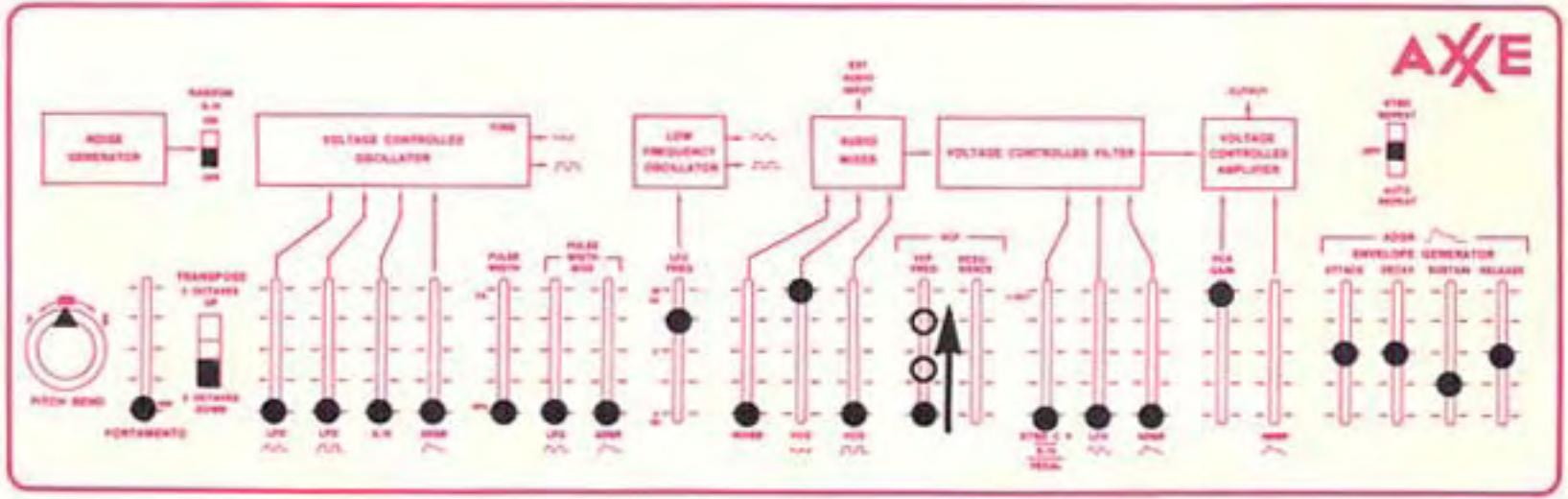
The Voltage Controlled Filter (VCF) is the most important modifier on any synthesizer. The VCF is responsible for taking the raw signals from the VCO and the Noise Generator and shaping them into useful musical sounds.

The VCF in your AXXE is technically called a "low pass filter." Low-pass means that the filter will pass all audio frequencies below a certain point (called the "cut-off point") and will filter out all frequencies above this point.

1. Set the controls on your AXXE according to Figure D. In this setting, the sawtooth wave from the VCO is entering the VCF through the AUDIO MIXER. Also, the VCA GAIN control is raised so that any signal passing through the VCF will be heard.

2. Play a note in the middle of the keyboard. You don't have to hold it down. Slowly raise the VCF FREQ control and listen to the effect. Notice how the sound gets brighter and louder

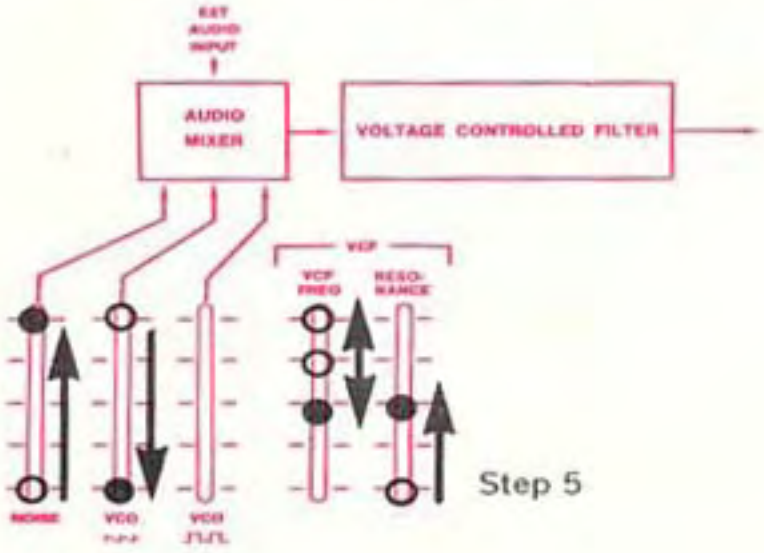
Figure D.



as you raise this control. It does so because you are raising the "cut-off frequency" of the filter, thereby letting more and more high frequencies pass through.

3. Slowly lower the VCF FREQ control. The highs will fade and finally the whole signal will be filtered out.

4. Lower the green VCO ~~ slider under the AUDIO MIXER and raise the white NOISE slider. Again open and close the VCF by raising and lowering the VCF FREQ control.



Step 5

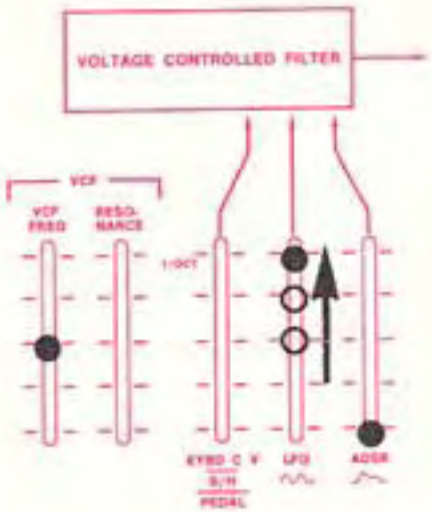
Step 4

5. Notice how the noise can be made to sound like surf by opening and closing the filter slowly. Raise the RESONANCE slider about half way up and try the same experiment. Notice how the noise now takes on a whistling quality. This pitch-like whistling is caused by the resonance of the filter. Resonance emphasizes a narrow band of frequencies just at the filter cutoff frequency. The more resonance you add, the more emphasis, and consequently the more pitched the sound becomes.

6. Lower the noise slider and listen again to the VCO sawtooth wave. Again move the VCF FREQ control up and down slowly with different settings of the RESONANCE control. Notice that when the resonance is between the ½ and ¾ marks you can actually hear the individual harmonics of the sound as you slowly sweep the VCF FREQ up and down.

7. If you leave the RESONANCE control about half way up, and sweep the VCF FREQ up and down, you can create a "wow" type of sound. Leave the VCF FREQ control all the way down and raise the red ADSR slider under the VCF all the way up. When you hit a key on the keyboard, the ADSR ENVELOPE GENERATOR produces a signal which will open and close the VCF automatically, producing a "wow" sound. Experimentation with the setting of the ADSR slider will show the similiarities between the response of this control and the response of the ADSR slider under the VCA.

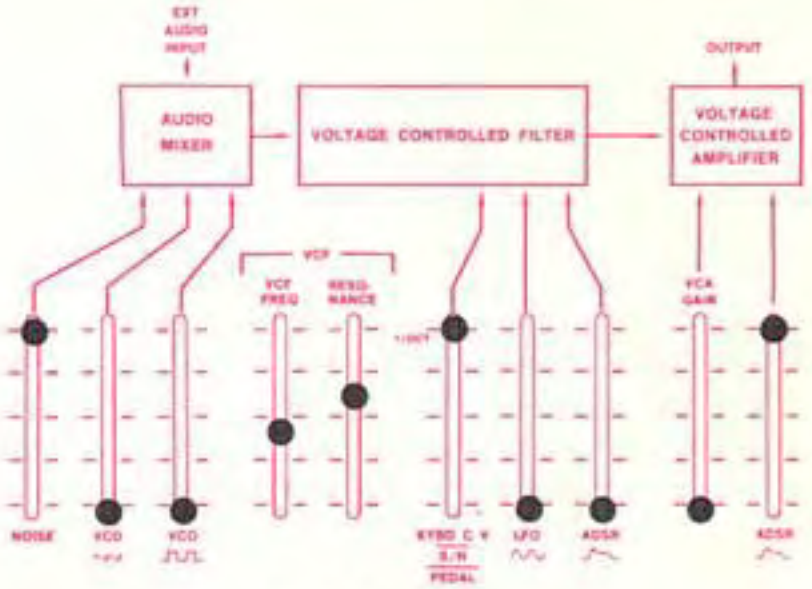
8. Lower the RESONANCE slider and experiment with the different settings of the ADSR slider under the VCF. Try changing the settings of the four ADSR ENVELOPE GENERATOR controls.



Step 9

9. Lower the ADSR control again, and set the VCF FREQ control about half way up. Now, raise the pink LFO ∿ slider under the VCF. Notice the tremolo effect that is created. Lower the LFO slider and increase the LFO SPEED until you achieve a good tremolo sound.

10. Lower the LFO slider, and raise the yellow slider labeled KYBD CV S/H under the VCF. Normally this slider will allow you to control the VCF from the keyboard.



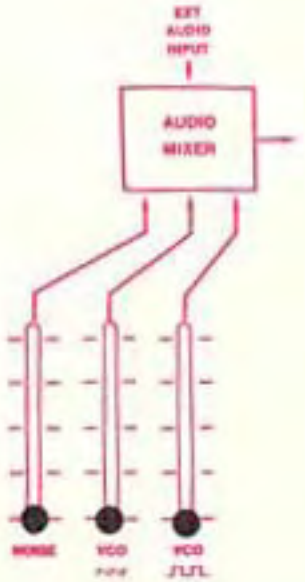
Step 11

11. Let's try controlling the VCF with the keyboard. Set the controls on the panel as above. Now when you play on the keyboard, the pitch of the filtered noise will follow the note played on the keyboard. If you lower the yellow KYBD slider under the VCF, the keyboard will have no effect on the pitch.

12. Raise the yellow slider all the way up again. Turn on the RANDOM S/H switch and play the keyboard. Notice the random changes in the filter frequency.

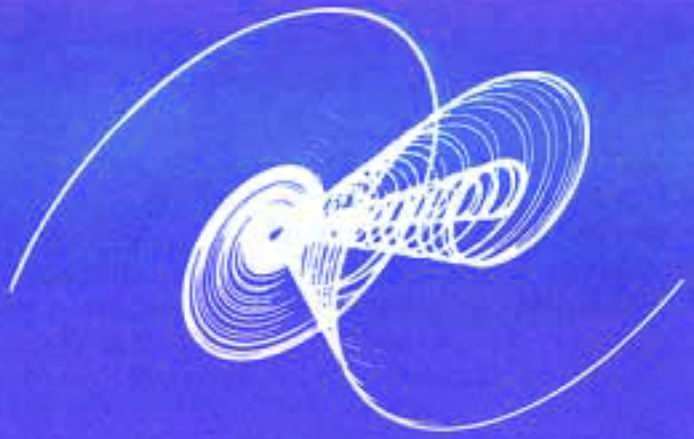
13. If you have the optional FOOTPEDAL controller, plug the pedal into the appropriate jack on the back of your AXXE. When the pedal is plugged in, both the S/H and the KEYBOARD are disconnected from the VCF. The PEDAL can now be used to open and close the VCF. The range of the pedal will be determined by the setting of the yellow slider under the VCF. See the back page of this manual for information on the footpedal.

14. The VCF can also function as an oscillator. Turn off the RANDOM S/H switch. Unplug the pedal. Raise the yellow slider under the VCF all the way.



Step 15

15. All three sliders under the AUDIO MIXER should be down. Turn the RESONANCE all the way up and tune the resulting tone with the VCF FREQ control. You can now hear a pure sine wave generated by the filter.



Controllers

Controllers are devices on the synthesizer which are used to create electrical signals which in turn control modifiers and sources on the synthesizer. For instance, the most obvious controller on the AXXE is the keyboard. The keyboard produces a voltage which controls the VCO and can control the VCF. Other controllers on the AXXE are the RANDOM S/H, ADSR ENVELOPE GENERATOR, LFO, PITCH BEND CONTROL, and FOOTPEDAL.

By this time you have had an opportunity to experiment with each of these controllers, so let's just review the functions of each of the controllers.

KEYBOARD: The keyboard produces a voltage which is always connected to the VCO. The pitch of the VCO changes according to the voltage that the keyboard produces.

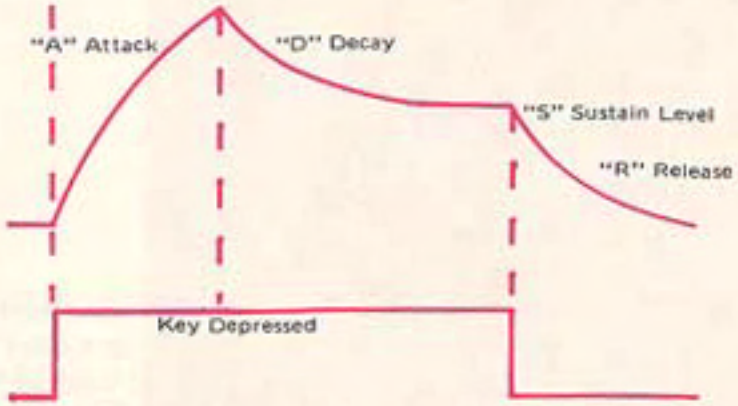
The keyboard can also be connected to the VCF by raising the yellow slider under the VCF. Also, the keyboard triggers the ADSR ENVELOPE GENERATOR, as we shall see. The keyboard on your AXXE has a built-in memory so that it holds the last note that was played on the keyboard.

It is important to note that it shares this memory capability with the RANDOM S/H circuit, so when the RANDOM S/H switch is ON, the keyboard memory is disabled.

The keyboard on your AXXE has two controls - the TRANSPOSE SWITCH and the PORTAMENTO slider. The TRANSPOSE SWITCH will shift the pitch of the keyboard up or down exactly two octaves.

Portamento is a "sliding" effect. Set up your AXXE as in Figure D. Raise the ADSR control under the VCF. As you play on the keyboard, raise the PORTAMENTO slider and listen to the resulting effect.

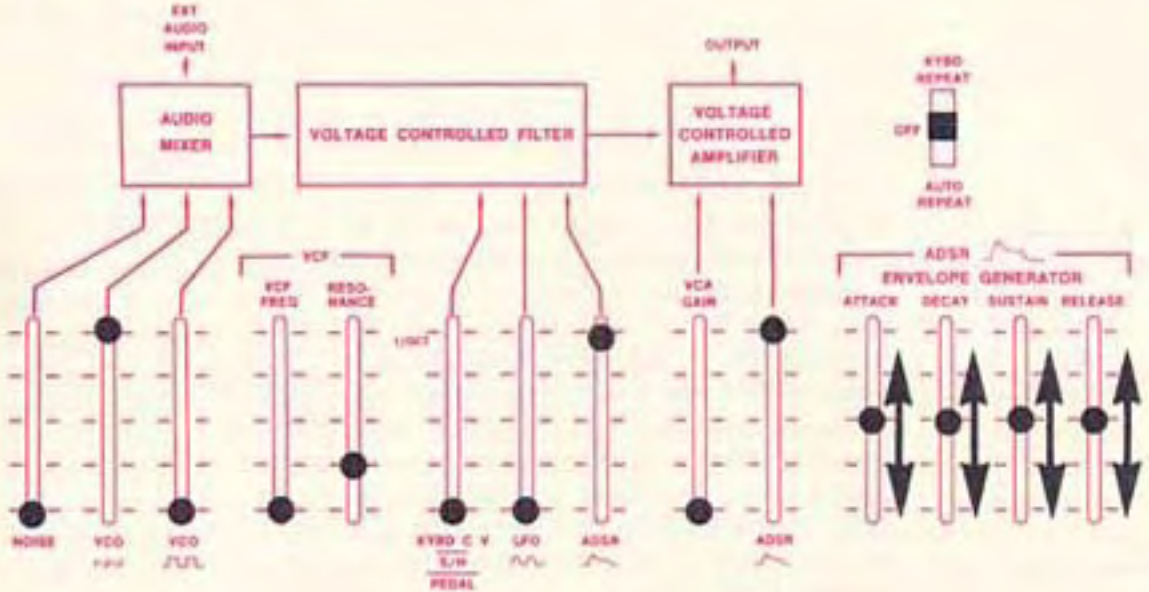
ADSR ENVELOPE GENERATOR: Each time a note is pressed on the keyboard, the keyboard generates a "trigger" signal that initiates an attack from the ADSR. A complete cycle of the ENVELOPE GENERATOR looks like this:



When a key is depressed, the output of the ADSR rises at a speed determined by the setting of the "ATTACK" control. This attack is represented above by the letter "A." When the attack has reached its peak, it automatically turns around and begins heading down again at a rate controlled by the "DECAY" control. This part of the cycle is represented as the letter "D." The Output of the ADSR ENVELOPE GENERATOR

will eventually reach the Sustain Level "S" and stay there until the keyboard is released. Upon release of the key, the output of the ADSR will drop back down to zero at a rate determined by the setting of the Release Control. This release portion of the cycle is represented by the letter "R."

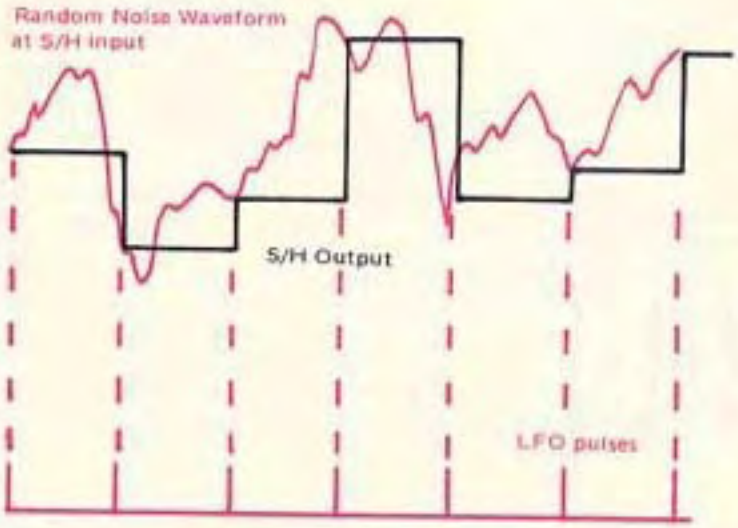
Let's experiment with the four ADSR controls. To begin, set the controls as shown below.



Play a few notes or a short tune on the keyboard; then move the ADSR attack slider to various positions. The change in sound is due to the "automatic" voltage control of the VCF by the ADSR Envelope Generator.

As you raise the attack slider, the ADSR opens the filter more slowly, thus "slowing" the attack by opening the filter more gradually. Continue by returning the attack slider control to its lowest position and experiment with the decay, sustain, and release sliders in the same way.

RANDOM S/H: The "S/H" portion of this function's name is short for SAMPLE AND HOLD. A sample and hold circuit is designed to temporarily store a voltage which is fed into it. The SAMPLE AND HOLD circuit in your AXXE is hooked up to the output of the noise generator which is producing random voltages. Consequently, the sample and hold circuit produces random voltages. The RANDOM S/H produces a new random voltage each time the LFO goes through one complete cycle.



LOW FREQUENCY OSCILLATOR: The LFO on your AXXE, as you have already seen, is used to create voltages which produce vibrato, trill, tremolo, and other effects when these voltages are applied to the VCO or VCF. As the panel graphics imply, the LFO produces both a sinewave output and a square wave output. The sinewave output is used to create vibrato and tremolo effects and the square wave is used to create trills. The LFO is also hooked up internally to the RANDOM S/H circuit and the ADSR ENVELOPE GENERATOR, via the REPEAT SWITCH.

PITCH BEND CONTROL: The Pitch Bend knob is a live performance control for bending notes. It also extends the tuning range up to an extra octave beyond normal. This control permits you to realistically "bend" pitches in order to recreate the kinds of effects produced by guitars and other stringed instruments. Naturally, you can go beyond these effects and create sounds that are not imitative of traditional instruments.

When recreating the effect of the pitch bend of traditional instruments, however, limit the pitch deviation to approximately one half-step. This is the most useful and common effect employed by guitarists, including those who work with rock groups. Notice that the normal position for the pitch bend knob is in the center of a "dead zone" where turning the knob slightly either way results in little or no pitch change. This feature lets you "feel" the normal position while playing, without having to look at the panel.

OTHER FUNCTIONS ON THE AXXE

KEYBOARD-AUTO REPEAT SWITCH: The Keyboard-Auto Repeat switch is normally set at the "Off" line when you are playing most sounds, but it can be used very effectively if you desire repeating effects. In the Keyboard Repeat position, the switch enables the LFO to trigger the ADSR every time you press a key. In the Auto Repeat position, the LFO will trigger automatically.

TUNE: If you look at the Voltage Controlled Oscillator block on the first panel, you will see a small white plastic knob labeled "Tune." Turning this knob gently by hand or with a screwdriver will allow you to tune the VCO within a small range. This feature is useful when you are playing along with other instruments that can't be tuned easily, such as pianos and organs. You can also read music along with brass or woodwind instruments by transposing the AXXE to the same key.

EXTERNAL AUDIO INPUT: On the back of your AXXE you will see a jack labeled "EXTERNAL AUDIO INPUT." This jack is used to bring an external signal, such as the output of an organ, electric piano, other synthesizers, etc., into the Audio Mixer and VCF in your AXXE. The EXTERNAL AUDIO INPUT is fixed in sensitivity. The sensitivity is adequate for use with most electronic instruments. However, some very low level signals, like dynamic microphones and low-level guitar pickups, may have to be preamplified before entering the AXXE. Many guitar amplifiers have a separate preamp output that can be used for this purpose.

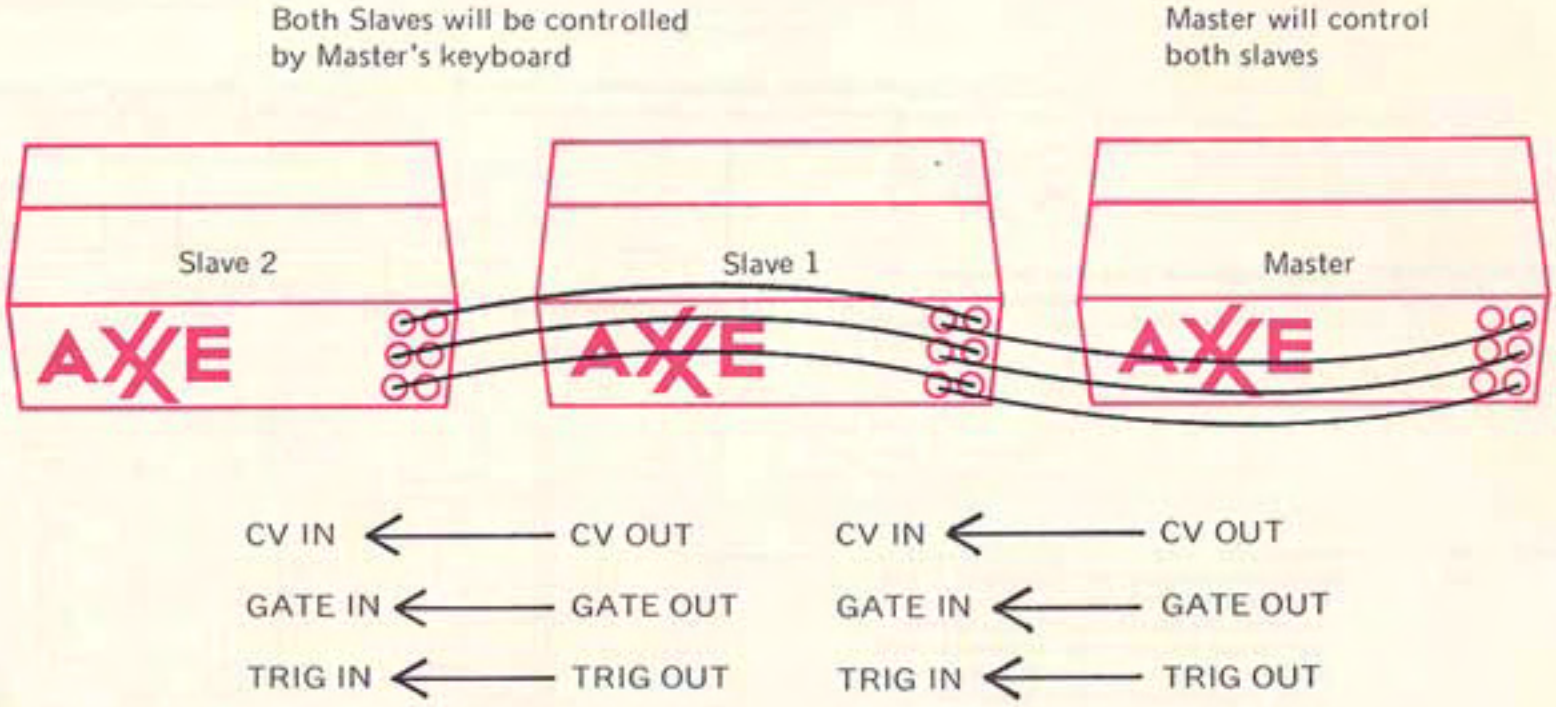
Once an external signal has been brought into the AXXE, it can be processed through the VCF. The optional footpedal is especially useful in processing external signals since the VCF can be made to perform like a wow-wow pedal, with adjustable range and resonance.

At the same time you are processing an external signal, you can also add in signals from the VCO and noise generator, so it is possible to create a rich and complex texture by combining both the external signal and a signal generated by the AXXE's VCO or NOISE GENERATOR, and then filtering the combined signal with the VCF.

INTERFACE JACKS: Your AXXE is one member of a whole family of ARP synthesizers and synthesizer accessories. As such, it is equipped with input and output jacks that allow your AXXE to control other ARP synthesizers or to be controlled by other ARP's. For instance, you can use two AXXE's together and play both of them from one keyboard. Or you can hook up your AXXE to control an Odyssey or 2600 model. Similarly, if you already own a 2600, you can remotely slave your AXXE to the 2600's keyboard. The possibilities created by the ARP INTERFACE JACKS are endless.

If you wish to hook up two AXXE's in a master-slave relationship where one AXXE is controlled by the other's keyboard, simply connect the jacks labeled "CV OUT," "CV IN," and "TRIG OUT" on the master to the "CV IN," "GATE IN," and "TRIG IN" jacks on the Slave.

If you wish to slave more than one AXXE from another, the second slave AXXE is hooked up to the first slave in the same way that the first is hooked up to the master, i.e., CV, GATE, and TRIG OUT to CV, GATE, and TRIG IN. See Figure E.



INTERFACE JACKS

Figure E.