



# Polymoog

Owners Manual

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We at Moog would like to extend a special greeting to you as a new Polymoog Owner. You are no doubt eager to begin playing your instrument. There are a few matters, however, which you should attend to before you start getting musical:

Store the crate and packing material in a safe place after you have removed the

Polymoog. They will come in handy if you have to transport the synthesizer.

Fill out your warranty card right now, please. The few minutes that this will take are worth it to protect your Polymoog.

Make sure that you have everything. That includes legs, power cord, signal cord, and knobs on all the sliders.

## **Set Up**

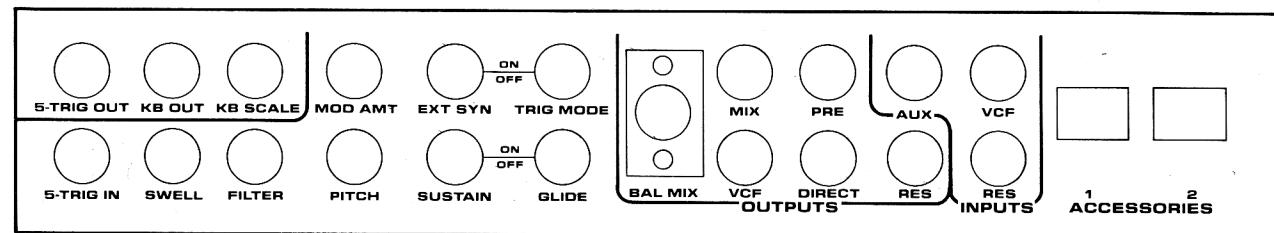
This is how the Polymoog should look after you have attached the legs and braces. You can also leave the legs off and set it on a table or the top of your organ.

Be certain that the 115/230 voltage switch in back is set properly. Although this is set at the factory for you, it doesn't hurt to double-check. 115v for the U.S., 230v for Europe and elsewhere.



## Hook Up

A glance at the back of the Polymoog tells you that you have several outputs to choose from: Balanced Mix, Mix, Mode, VCF, Direct and RES.



Balanced Mix allows you to mix the four sections of the Polymoog into one output. It is different from MIX in that it has a transformer plus a third, shielded conductor which protects the hot and cold conductors from the interference commonly caused by fluorescent lights and radio stations. Use this output for recording and mixing into low impedance inputs. Mix is the output you would normally use when playing the various sections of the Polymoog through a stage amp. Please

use this output as you work your way through the manual.

Mode, VCF, Direct, and RES refer to the four separate outputs of the Polymoog. Gain controls for these outputs are found on the front panel under the section labelled "Master Gain Controls."

The separation of these outputs will enable you to discreetly amplify or record them simultaneously in quint with zero over-lap.

## Amplification Suggestions

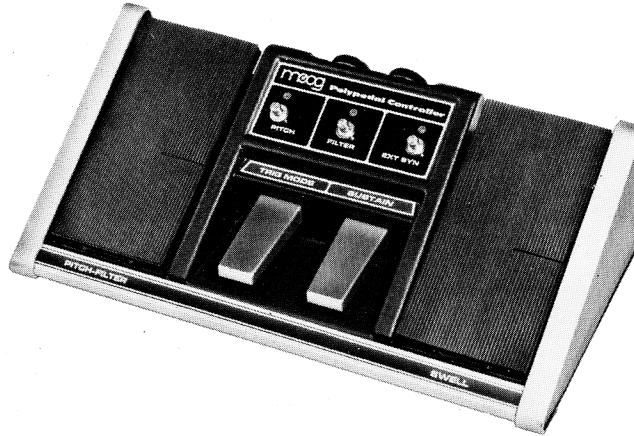
Rather than get too specific, we recommend a high quality, medium-to-high powered, wide band audio system. Public address systems generally produce a

wider range of frequencies and are more suitable than guitar amps. Try to get a system with efficient loudspeakers and an amp to match.

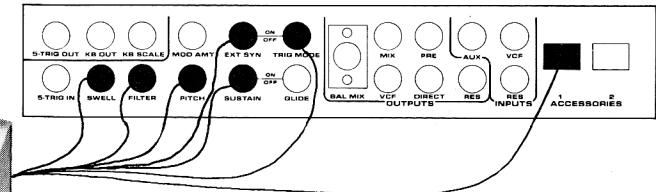
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## Pedals

If you have purchased the Moog Polypedal Controller, please plug the labelled plugs into the proper jacks in back. As you progress through the next few sections of the Owner's Manual, you will find that the Swell pedal will regulate the volume of all voices on the BAL MIX and the MIX output and the



Sustain pedal acts exactly like the sustain pedal on a piano (except on Voice 3). If you don't have a Polypedal but do have a Moog #1120 Foot Pedal Controller and #1121 Foot Switch, plug them respectively into the SWELL and SUSTAIN jacks in back to get the same effects.



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## GETTING DOWN TO SOUNDS

Your Polymoog contains a digital logic system which has been programmed at the factory to synthesize eight basic voice modes. The modes are processed through four treatment sections: Mode, Direct, Voltage-controlled Filter (VCF) and the Resonators (RES). Thus, any of

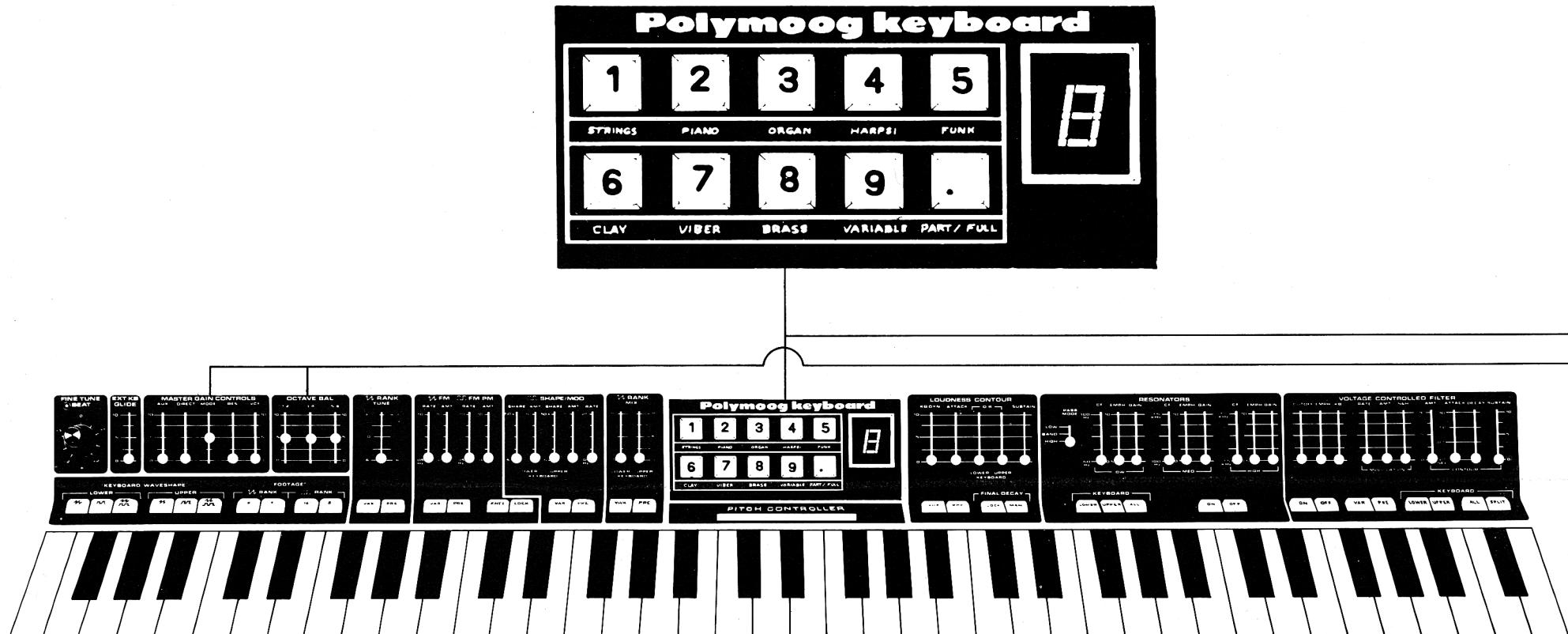
thirty-two different voices are available at the touch of a button and the raising of a slider. Although any one of the eight basic voices can be heard simultaneously through all four sections, we will introduce you to the voices and sections one at a time.

## Mode

Set OCTAVE BALANCE sliders at 5, all others at 0. In the Master Gain Control section, raise the slider marked MODE. If you are without a swell pedal, use this slider as a volume control. The eight preset Mode voices can now be heard by pressing the buttons numbered 1-8. Buttons 9 and “.” are covered further ahead.

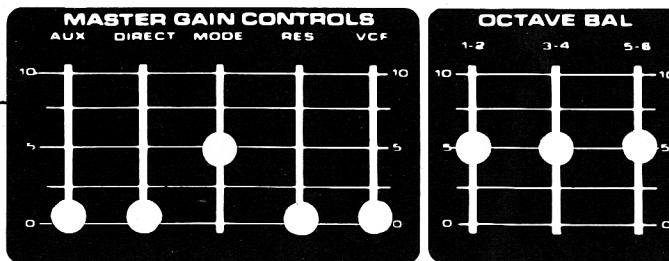
An internal filter with no external controls is used in processing the Mode

voices. The word “mode” is used to describe these voices, (as in Piano mode, String mode, etc.) because they represent the basic characteristics of familiar instruments. These characteristics are programmed and synthesized by the Polymoog when the various sections are in the Preset mode, but any of them can be altered to suit your taste. Varying the sounds is covered later in the manual.



## Mode Voice Descriptions and Playing Techniques

1. **String Mode:** Because most orchestral works are written with fewer than six parts, an authentic string orchestra can best be created by using no more than four or five fingers at a time, spread widely over the keyboard.
2. **Piano Mode:** Not only is this voice programmed to sound like a piano, it enables you to play the Polymoog as you might play a piano. If you play legato, the notes are soft, whereas swift passages will be louder. We call this feature Keyboard Dynamics and it is directly related to the speed with which the keys are struck.
3. **Organ Mode:** Keyboard Dynamics will give you a more definitive percussive attack if you strike swiftly, or a mellower initiation if you play legato. This voice is especially effective when run
4. **Harpsichord Mode:** Featuring the typically thin sound of this delicate instrument. Don't forget to use the sustain pedal, if you have one.
5. **Funk Mode:** An original Moog voice with a sharp attack and chorus-like modulation.
6. **Clavinet Mode:** Keyboard Dynamics applies to this popular, stringed keyboard sound. Often used as a substitute for rhythm guitar.
7. **Vibes Mode:** The bell-like quality of this voice is enhanced with the use of Sustain.
8. **Brass Mode:** A full fanfare-like tone color with vibrato and characteristic sharp attack.

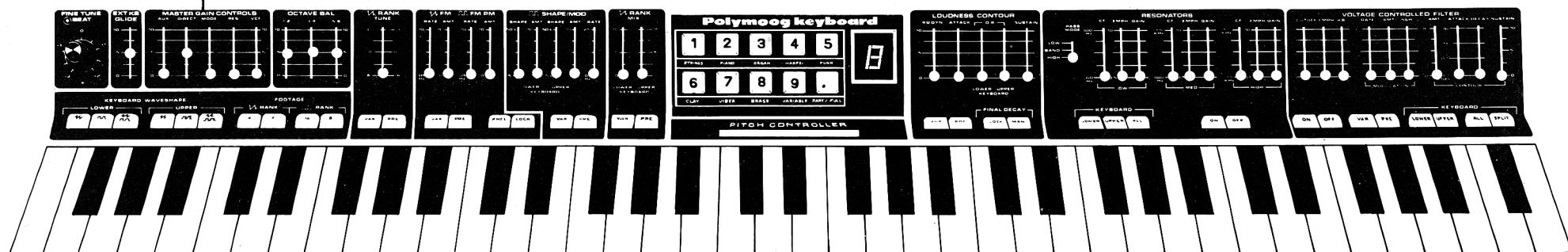
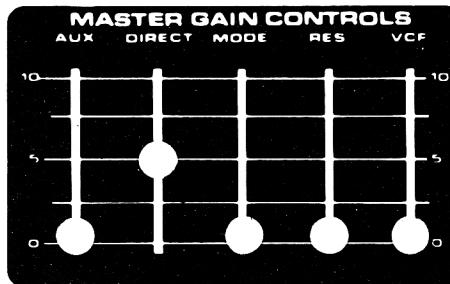


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### Direct Voices (See graphic 6 playing set-up)

Voces produced by the Direct output differ from Mode voices in that there is no internal filtering: the sound comes directly from the programming chip, proceeding to the Direct output jack. As a result, overtones which usually are not heard from conventional instruments are

allowed to play through, creating some unfamiliar, yet musical textures. Differences between Mode and Direct voices are most apparent in Voices 1, 2, 4, 5, and 8. To hear them, lower the Mode gain control and raise Direct.



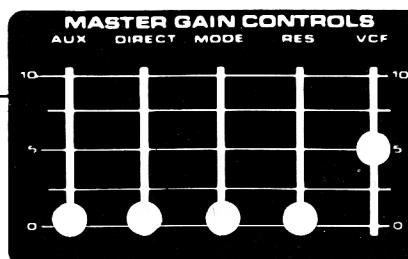
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### VCF Voices (See graphic 7)

The voices in the Voltage-controlled Filter section truly demonstrate the versatility of the Moog low-pass filter. Each of the eight basic voices is processed through the VCF, which is controlled by a number of other voltage-controlled functions: contour generator, low-frequency oscillator, sample/hold and keyboard control with glide. These functions are brought into play by the memories attached to each voice preset. But it's easier to understand while listening to the Polymoog, so please check-out the description of each voice as you play it. Note: Pedal owners should refer to "Controlling the Polymoog with Pedals" at the back of the manual.

**1. Mellow strings:** A very slow rise in the VCF level creates a "mwah" attack, which develops into the normal string sound. Staccato playing produces horn like sounds.

2. **Muted "wah" piano:** Keyboard Dynamics will give you expressive piano lines.
3. **"Ow" organ:** A sharp attack and decay applied to the VCF provide a percussive sound. At its best when used as rhythm back-up.
4. **"Wah" harpsichord:** Slower attack eliminates the plectrum sound enabling you to simulate muted brass.
5. **Sample/Hold:** The rapidly sampled VCF produces totally random tone colors.
6. **"Bwah" Clavinet:** What more can we say?
7. **Smooth vibes:** Sound especially good with sustained arpeggios.
8. **"Wow" brass:** Brass chorus fed through the VCF with familiar Moog filter effect.



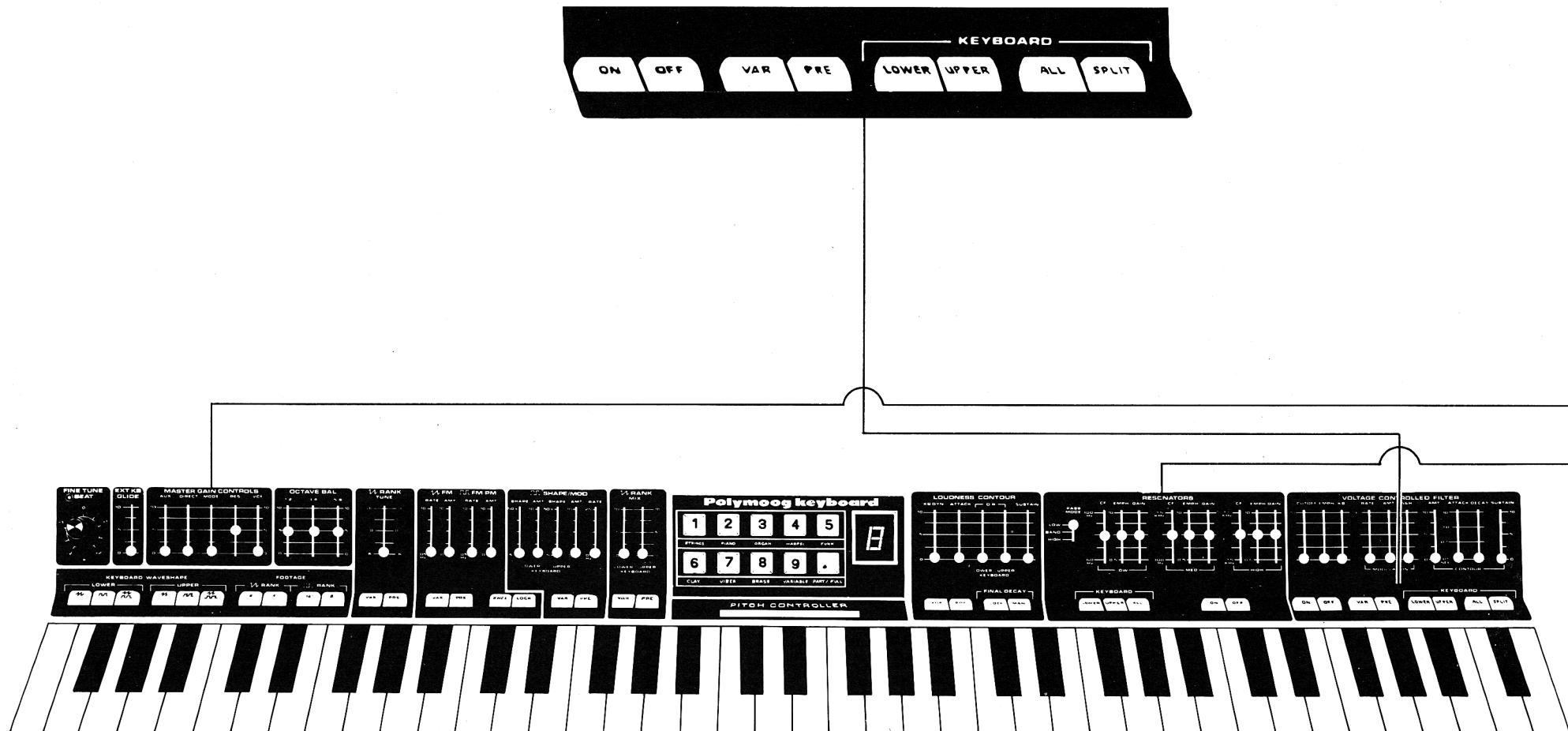
Although we may be getting ahead of ourselves, it might be to your advantage to know what the buttons beneath the Voltage Controlled Filter section do:

**On/Off:** When playing any of the VCF voices, these two buttons enable you to eliminate or bring in the voice without affecting Direct, Mode or RES voices.

**VAR/PRE:** VARIABLE brings all control

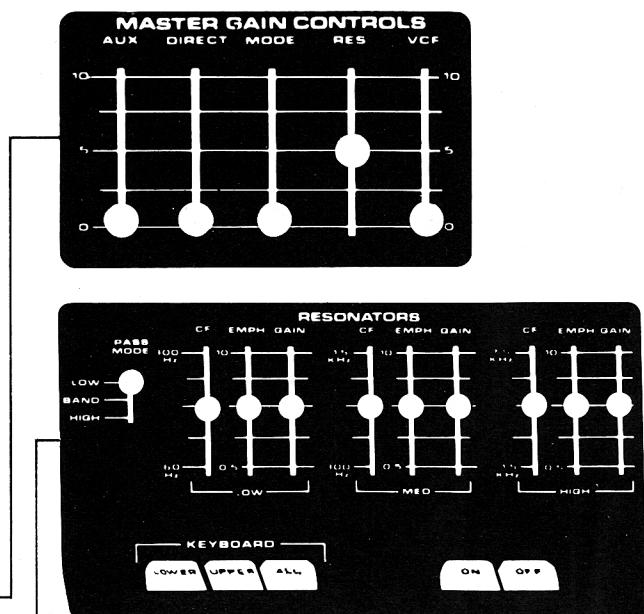
over the VCF to the sliders above. PRE-SET puts control of the VCF in the hands of the Polymoog memory circuits.

**Keyboard Lower/Upper All/Split:** Pressing SPLIT enables you to assign the VCF voices to either the UPPER or LOWER part of the keyboard, whichever you select. ALL brings them back to the full keyboard.



## Resonator Voices

Set the controls as shown. Raise the Master Gain Control labelled RES and move Resonator sliders to mid-point. Any of the eight voice modes can now be heard as they are filtered through the three Resonators.

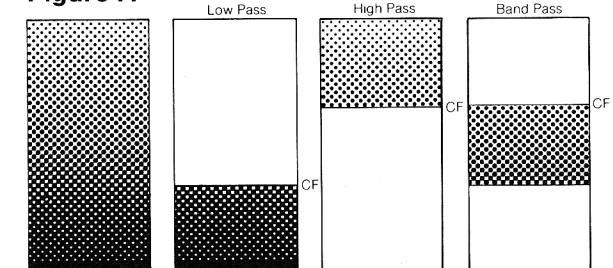


The function of these (and any) resonant filters is to selectively eliminate some overtones and emphasize others. Figure A is a representation of a sound which is rich in overtones. The fundamental pitch appears as a dark band across the bottom and the overtones accompanying the fundamental are represented by the gradually fading area above that band. As is the case with most musical sounds,

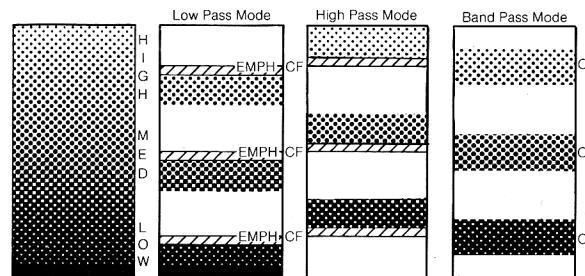
the higher pitched overtones are less intense than those below them.

When our sound is passed through a "low-pass" filter only overtones below the Cutoff Frequency (CF) will be allowed through. A "high-pass" filter passes the overtones above the CF and the "band-pass" filter passes overtones in an area on either side of a Center Frequency.

**Figure A**

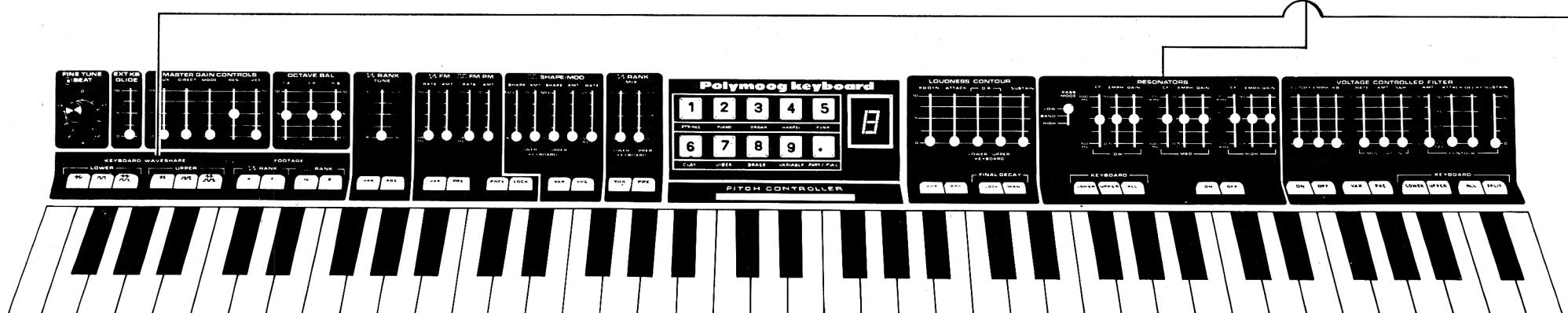
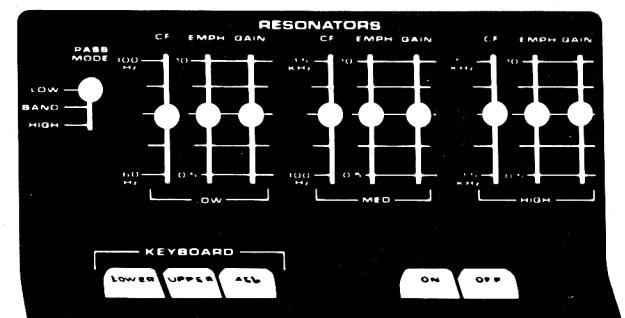


Each of the three Resonators covers a specific frequency range: 60-300 Hz (Bass vocal range), 300-1500 Hz (Oboe range), and 1500-7500 Hz (Piccolo plus). Relating them to our model of sound, each filter affects overtones. As seen below:



As you play Voice #1, experiment with different settings of CF, Emph, Gain and Pass Mode. Emphasis refers to the relative loudness level of overtones closest to the movable Cutoff Frequency. Gain regulates the loudness of each filter. Avoid running the Gain sliders at maximum except when needed (usually only in high-pass) for they may overdrive the output and distort the sound.

The ON/OFF buttons operate exactly like the VCF buttons. So do the LOWER/UPPER/ALL buttons. See page 8 for details.



## Mix and Match

You can create complex voices simply by combining levels of Mode, Direct, RES and VCF outputs. Take care not to run

the gains too high: you might overdrive the outputs and distort the sound.

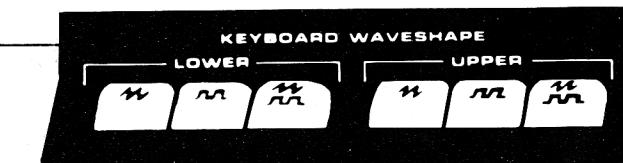
## A CHANGE OF PACE

Some of the nicest alterations to a sound are the subtle ones. With the controls on the far left of the control panel, you can alter the waveshape, footage, octave balance, and tuning.

### Keyboard Waveshape

You may already have noticed that there are timbral (tone color) differences between the eight voices. This is largely due to the preprogrammed selection of oscillator waveshapes (either sawtooth or square). You can override the pre-

program by selecting a different waveshape for either or both of the keyboards (UPPER and LOWER). The Light-emitting Diode (LED) will light up under the waveshape you've selected: Sawtooth () or Combination ().



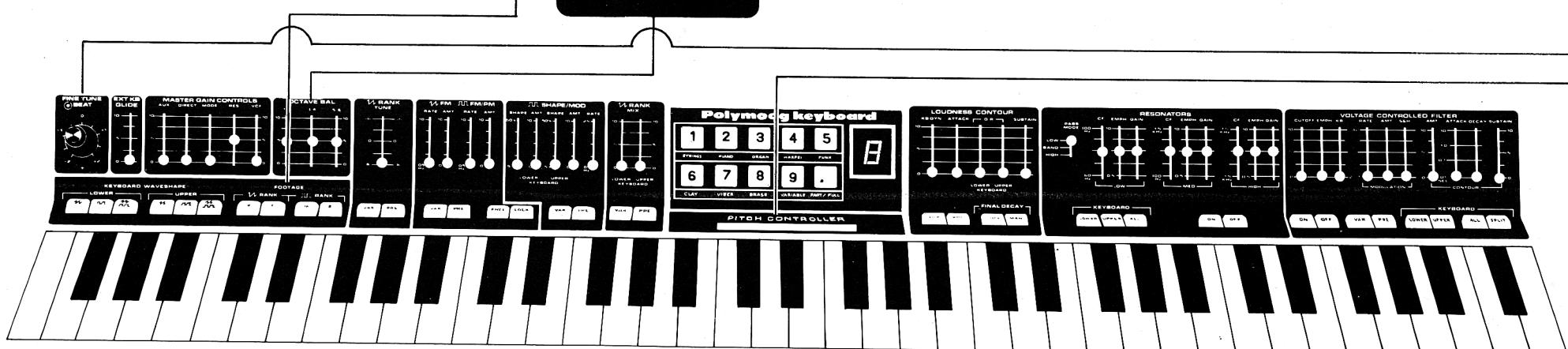
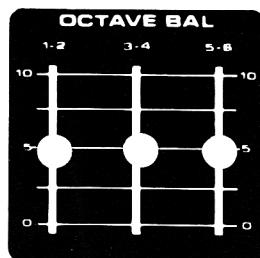
## Footage and Rank

Footage (octave) switching on both oscillator ranks is accomplished by pushing the 8' or 4' button for the sawtooth rank, the 16' or 8' for the square rank. "Rank" and "8'" are pipe organ terminology: a rank is a group of pipes which produce



## Octave Balance

The three Octave Balance sliders control the loudness level of the three two-octave



similar sounds and which are tuned at half-steps over several octaves to match the keys of the organ. An eight-foot (8') long pipe is the largest pipe in its particular rank and produces a pitch an octave higher than that of a 16' pipe (or an octave lower than a 4' pipe). Just as various footages can be selected on a pipe organ, so can you combine either sawtooth rank footage with either square rank footage. Remember that switching voices will often reset the footages.

sections of the keyboard: 1-2, 3-4, 5-6. At ten, maximum boost will be given to a two-octave section. The best way to use this slider group is to set all three sliders at five and boost or attenuate as is necessary. Again, setting all three at maximum may overdrive the outputs under certain conditions.

### Fine Tune and Beat

In the Fine Tune/Beat section, the outer knob will adjust the overall tuning of the instrument. The inner knob will detune



the square rank relative to the sawtooth rank (when the ranks are in the FREE mode), thus creating "chorus" or "beating" effects. The light below the knob indicates the beat rate.

Beating works especially well for ensemble string effects and honky-tonk piano.

### Pitch Controller (Ribbon)

The gray mesh strip in the center of the Polymoog is the Pitch Controller and it bends the pitch of whatever you're playing over a range of six semi-tones either side of normal. Press a finger on the center of the ribbon (standard pitch), play

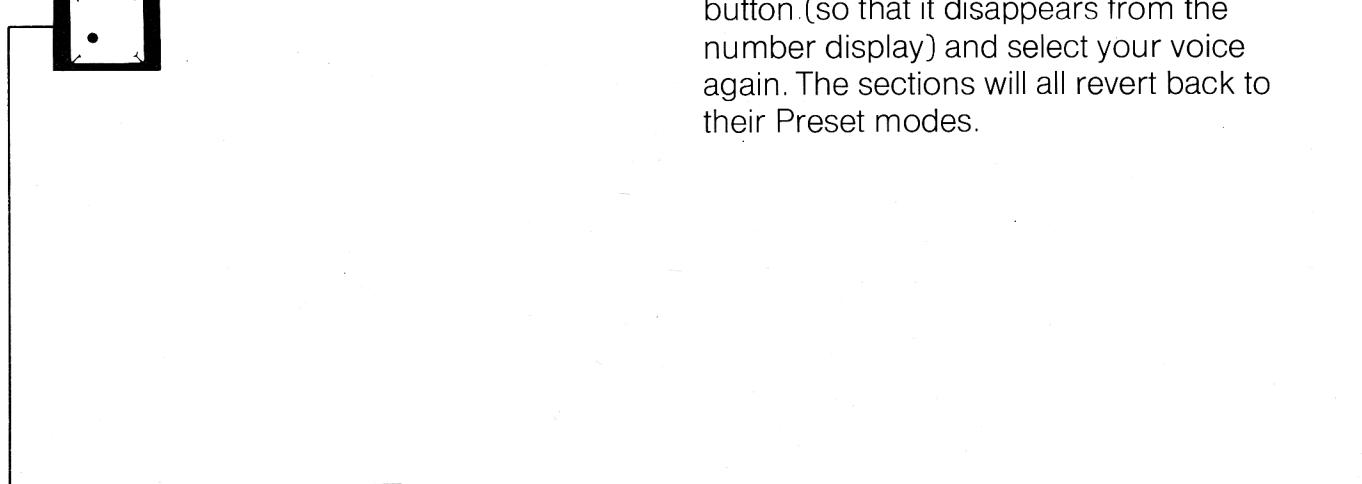
a chord, and move your finger to either side. The pitch will jump back to standard once you raise your finger. With practice, you can create vibrato or work bluesy slides into your solos. Pitch bending is especially effective on Voice 6.

PITCH CONTROLLER

## Period Button

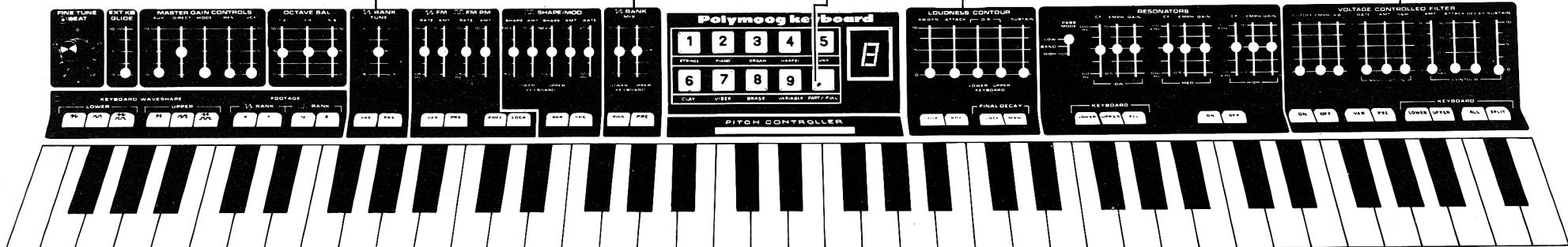
As you move into the Variable sections of the Polymoog, you will want to apply your variations of pitch, contour, tone color, etc., to the eight voice modes. The function of the Period button is to remember which sections are in the Variable mode.

Here's how it works: select any voice (1-8) and notice that all the sections are



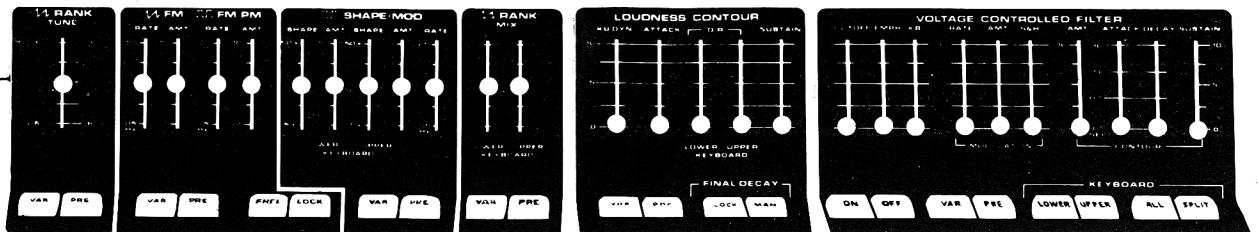
in the Preset modes. Punch a couple of Variable mode buttons, keep your eye on their LEDs and select another voice. You'll find that they jump back to Preset. Try this again, but this time push the Period before switching voices. Those sections you had selected as Variables should still be Variables.

To erase the Variables, push the Period button (so that it disappears from the number display) and select your voice again. The sections will all revert back to their Preset modes.



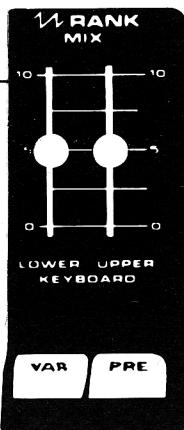
## VARIABLES

The buttons and sliders depicted below control a number of important synthesizer functions.



### **V1** Rank Level

Listening to Direct Voice 3, push the Variable button beneath **V1** Rank Level.



Raising and lowering the sliders will affect the loudness level of the sawtooth rank from zero to maximum. Press the Period button and try this control on other voice modes. Voice 7 will be unaffected by the **V1** Rank Level sliders because only square waves are being used. (Check the waveform LEDs).

## Shape/Modulation

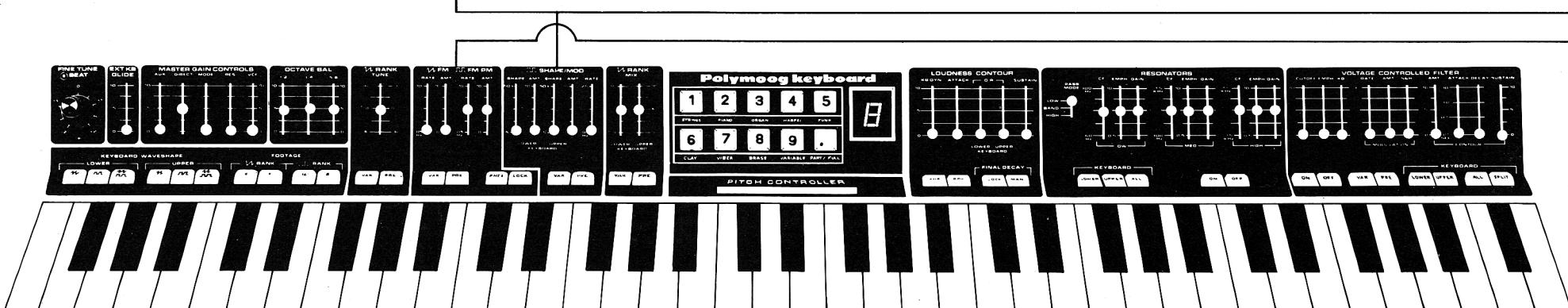
Again listening to Direct Voice 3, press the square waveshape buttons for both Upper and Lower keyboards. You only want to hear the square rank for this experiment. Press the **Shape/Modulation Variable** button and lower the sliders in this section to zero.

Hold a chord on the Upper keyboard while raising the Shape slider for the Upper keyboard from 5% to 50%. Note the change in sound from a thin oboe color to the fullness of a clarinet. The same thing happens with the Lower keyboard Shape slider.

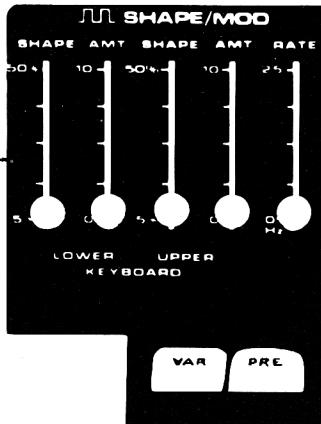
Moving the Shape slider up and down smoothly creates a chorus-like effect. But a built-in, low-frequency oscillator will do this automatically, saving your spare hand

for more important functions. To bring the modulating oscillator into play, raise the Upper keyboard Amount slider to 10, then slowly raise the Rate slider. The chorus effect will get faster and faster.

Technically speaking: The square wave is simply a voltage which is on or off. The speed of the change between these two states determines the pitch of the note being played. The relationship of the amount of time the voltage is “on” to “off” time is known as the *duty cycle*, which is expressed in terms of percent (i.e., a 50% duty cycle). As you have discovered, different duty cycles produce different tone colors: the smallest duty cycle (5%) being rather reedy; the largest (50%) sounding similar to a clarinet. The transi-

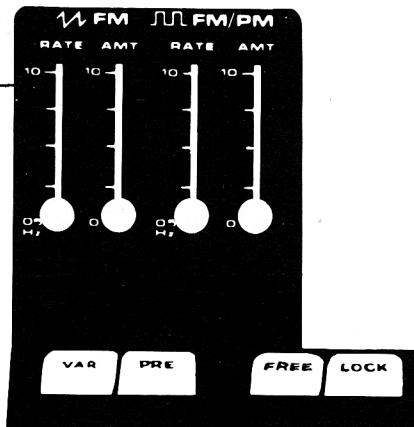


tion between duty cycles (modulation) emphasizes various harmonic overtones



### **FM (Frequency Modulation)**

Listening to Direct Voice 3, select the waveshape buttons for Upper and Lower keyboards. Press the FM Variable button and set the sliders in this section at zero.



as it passes, thus giving the impression of there being numerous oscillators.

Square wave modulation is effective on all voice modes. At 5%, the wave is very thin and may not sound at all on Voice 7, which uses only the square, so raise the Shape slider a little if you don't hear anything. And don't forget to press the Period button before switching voices. Note: Pedal owners refer to back of manual for shape-mod control.

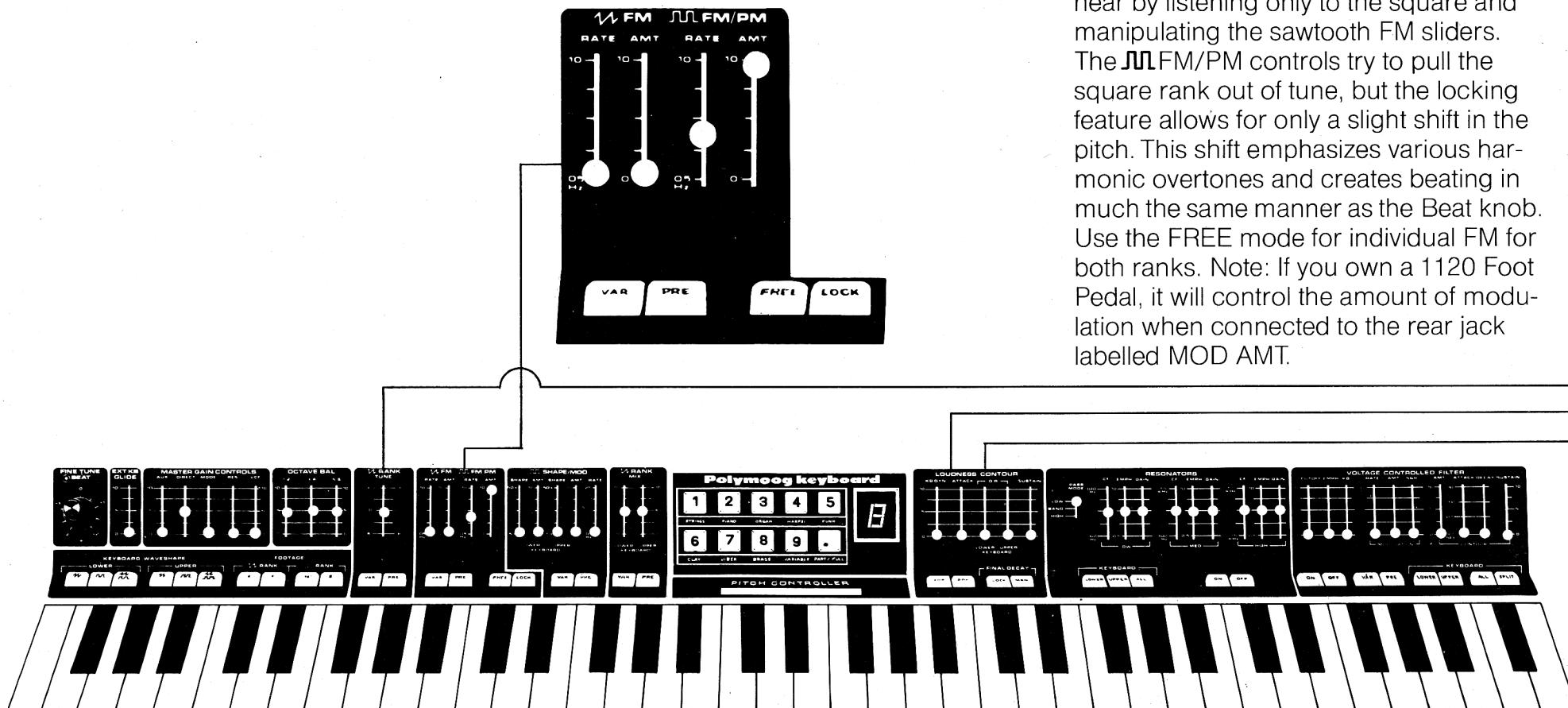
Raise the Amount slider to ten and slowly raise the Rate slider. At first, there will be no effect, but as the Rate increases, a slow, wide vibrato begins and becomes faster. The depth of this vibrato is controlled by the Amount slider. The sawtooth wave is being frequency-modulated (altered in pitch) by a low-frequency oscillator, identical to the one used for shape modulation in the previous section. A normal setting for vibrato would be: Rate 7, Amount 7.

## **FM/PM (Phase Modulation)**

Select Direct Voice 3, press the FM Variable and the LOCK buttons, and set the FM/PM Rate at 4, the Amount at 10. Instead of a wide vibrato, you should hear the square rank being modulated in and out of phase with the sawtooth rank, which could be described as being a shifting, waxing and waning effect. The Rate slider controls the speed of the

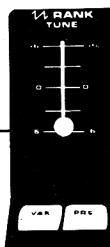
phase-shift; the Amount slider controls depth. Press the Period button, select Voice 1 and experiment with various settings of both FM and FM/PM.

The function of the LOCK button is to tie the pitch of the square rank to that of the sawtooth rank. Any control over the sawtooth rank in the LOCK position will directly affect the square rank, as you can hear by listening only to the square and manipulating the sawtooth FM sliders. The FM/PM controls try to pull the square rank out of tune, but the locking feature allows for only a slight shift in the pitch. This shift emphasizes various harmonic overtones and creates beating in much the same manner as the Beat knob. Use the FREE mode for individual FM for both ranks. Note: If you own a 1120 Foot Pedal, it will control the amount of modulation when connected to the rear jack labelled MOD AMT.

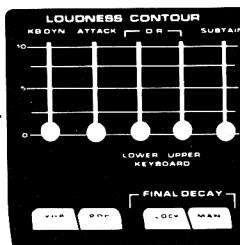


### **Rank Tune**

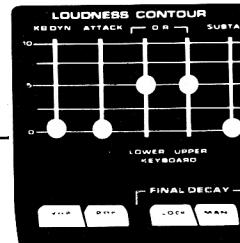
While playing Direct Voice 2, press the **Rank Tune** Variable button and move the slider. Both square and sawtooth ranks can now be tuned over a range of nine semi-tones. This is convenient for pre-programming transpositions.



### **Loudness Contour**



### **Decay/Release**



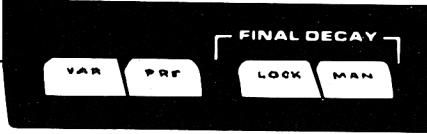
Even more interesting: Press the **FREE** button and experiment with different tunings of the sawtooth rank. Since the square rank is no longer locked to the sawtooth, its pitch will remain the same. Complex chords and polytonal clusters will result from various sawtooth tunings.

If you wish to retain a single-voiced bass line, just select either the square or sawtooth waveshape for the LOWER keyboard. Or you can lower the Variable Rank Level.

Until now, you have been relying on the controls over loudness and duration that are pre-programmed with each voice mode. This section enables you to synthesize a wide variety of loudness contours. Select Direct Voice 2 and press the Loudness Contour Variable button.

Raise the Decay/Release sliders (both UPPER and LOWER keyboard) to 5 and play, holding the keys down until the sound dies away. If you raise the Decay sliders higher, the sound dies away more slowly. Separate Decay rates for the UPPER and LOWER keyboard sections allow you to vary the definition of bass or harmony lines.

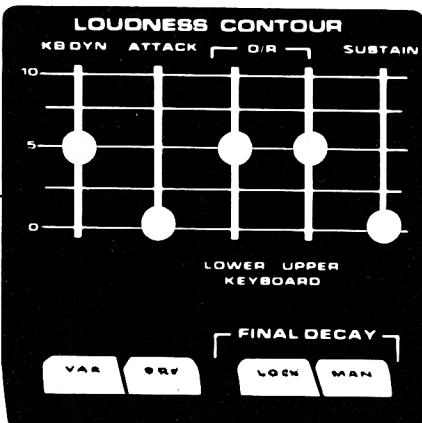
## Final Decay



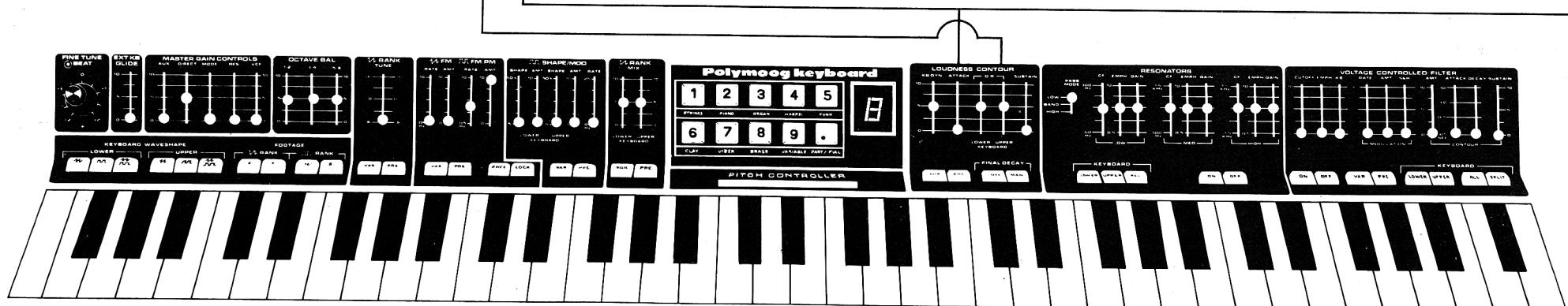
Pressing the Lock button overrides the piano-like sustain pedal function. The notes will hang on, depending on the final decay rate, whether or not you are holding the keys down.

## Keyboard Dynamics

Set the Decay sliders at a moderate level and set the other sliders in this section



at zero. Playing the keys slowly will produce a much softer sound than playing them swiftly. The Keyboard Dynamics control is at its widest range when the slider is set at a minimum. Raising this slider increases the loudness level of legato playing without affecting that of swift playing; in effect narrowing the control range. At 10, there is no discernable difference in level.



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### Sustain

With Sustain at zero, notes played will die away completely according to the Decay rate. Set Sustain at 4 and notice that the sound doesn't disappear as long as you are holding keys down. Higher Sustain levels do two things: defeat the Keyboard

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### Attack

Raising this slider allows the loudness level to gradually increase to the Sustain level you have selected. On the Poly-moog, the Attack time will not exceed the

Dynamics function and increase the loudness level. Be careful not to raise the Sustain slider too high if your Master Gain controls are already high: the sound may distort.

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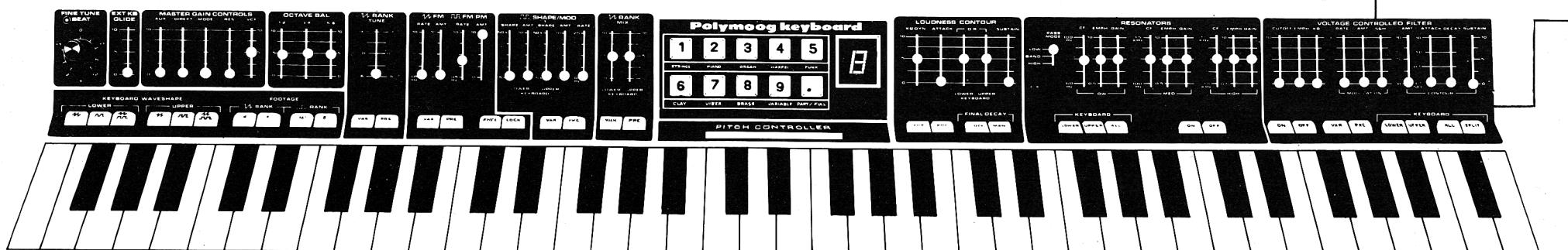
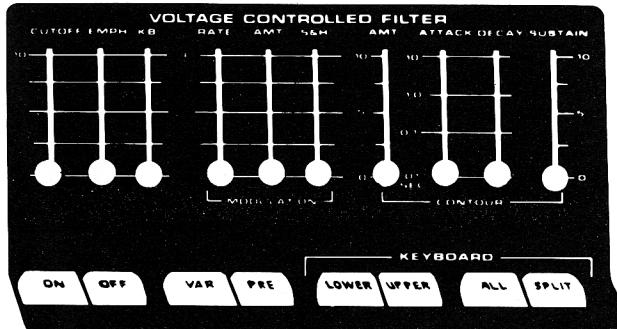
Decay time, so bear in mind that the Attack slider should never be set higher than the Decay sliders.

## Voltage-Controlled Filter (VCF)

You have already heard a few of the things the VCF can do if you tried out the pre-programmed VCF Voices. And you also must know why the descriptions are brief: low-pass filtering is a delicate art for which there is no standard terminology. The subtle changes in tone color possible with the Moog VCF are numerous and

they all defy attempts to capture them on paper. This section of the manual will explain the functions of the VCF sliders. It's up to you to synthesize the "wahs," "ows," "bwahs," and "whaps" to fit your music.

The VCF is similar to the Resonator section in the low-pass mode. It will cut out pitches above the Cutoff frequency and emphasize pitches close to same. But there are four controls which change the level of the Cutoff so you won't have to tie-up your free hand: the Keyboard and Ext KB Glide slider, Modulation, Sample & Hold, and the Contour. Select VCF Voice 8, press the VCF Variable button, and read on.



### Cutoff

With all VCF sliders at 0, hold a chord and work the Cutoff slider slowly. You will

hear the tone color become sharper and blunter with high and low Cutoff settings.

### Emphasis (Emph)

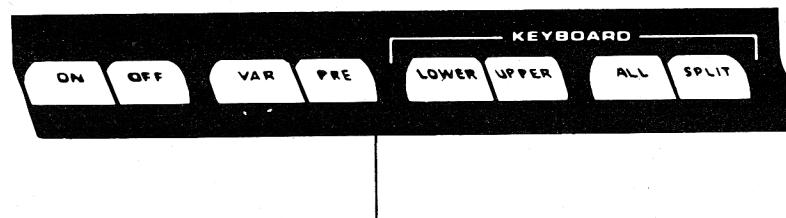
Raise the Emphasis slider to 10 and fool

with the Cutoff. Presto: A "wow."

### Keyboard

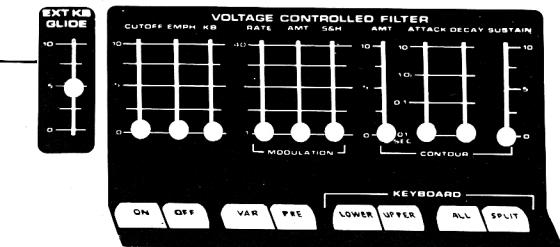
The keyboard can control the VCF to produce tone colors that; are consistent for the length of the keyboard, are muted gradually as one approaches the top end, or become increasingly sharper at the top. Lower the Cutoff to 3, raise the Emph and KB sliders to 10. The UPPER keyboard now controls the VCF and notes played on the right end of the key-

board will be bright, while notes played at the bottom of the UPPER keyboard will be muted. Lowering the VCF KB slider will cause the higher notes to be muted: too low a setting will eliminate them entirely. The LOWER keyboard is not included as a VCF control when the VCF keyboard buttons are in the ALL mode.



## External Keyboard Glide

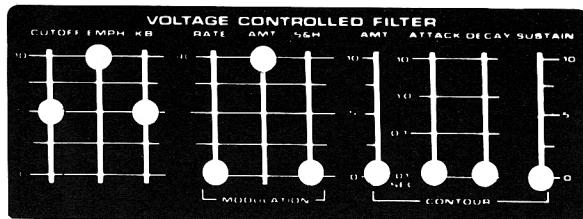
At this point, locate the Ext KB Glide slider on the far left of the Polymoog.



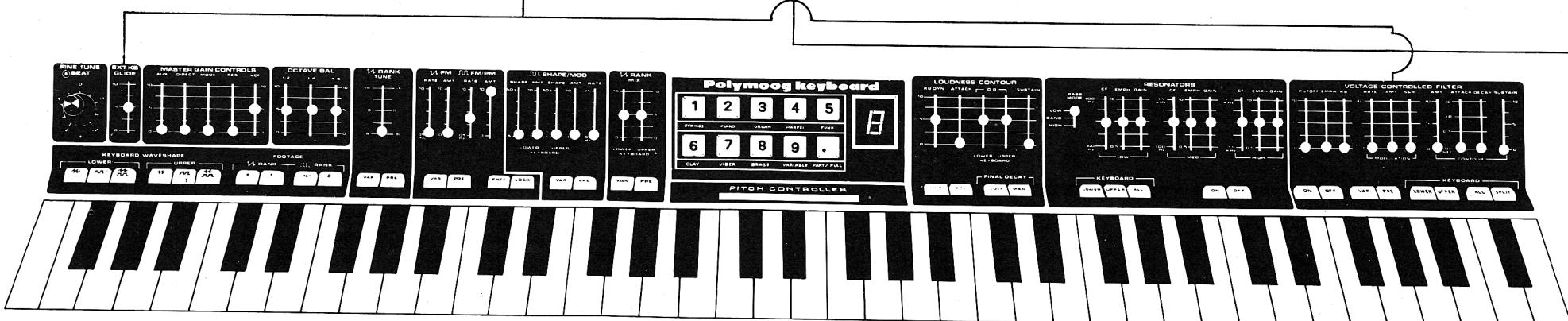
Raise this control to 5 and set the VCF controls as follows: cutoff at 3, Emph and KB at 10. "Wahs" and "ows" will result from alternating high notes with low notes on the UPPER keyboard only. The UPPER keyboard is still controlling the VCF, but the Cutoff is gliding from level to level at a rate controlled by the Ext KB Glide slider. At a setting of 10, the glide lasts for 10 seconds between the top and bottom notes of the UPPER keyboard.

## Modulation: Rate and Amount

Still listening to VCF Voice 8, set Cutoff and KB at 5, Emph at 10. Raise the

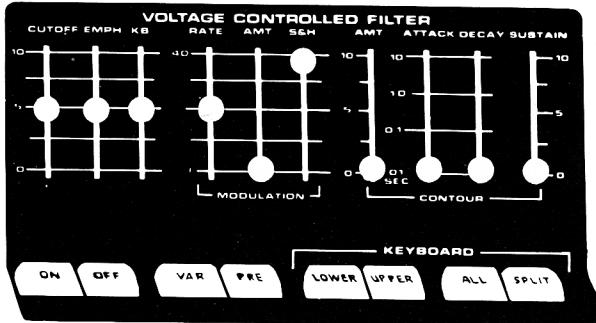


Modulation Amount slider to maximum. The VCF is now being swept by the modulating oscillator at a rate of one cycle every 10 seconds. To get it going faster, raise the Rate slider. Lower the Amount slider for a less severe "wow". Tremolo can be synthesized by totally eliminating the Emphasis.



## Modulation: Sample & Hold

Set Cutoff, Emph, KBD and Rate at 5, all others at zero. As you raise the S & H slider to 10, you can hear different filter

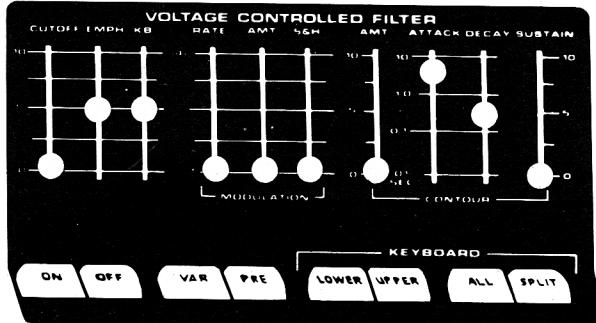


## Contour

The VCF Contour section is the secret behind the majority of familiar Moog sounds. It's the control that gives you a "wah," "wow," "ow" or "bwah" every time you hit a key. The three sliders labelled

## Contour: Amount and Attack

Set the KB and Emph at 5, all others at zero. Raise the Contour Amount slider to



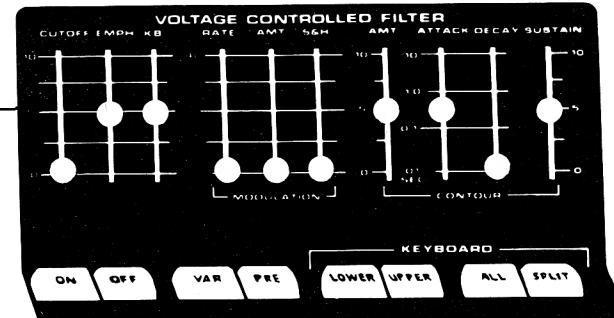
levels being selected at a moderate rate. This bubbly sound is caused by random control voltages being "sampled" by the modulating oscillator and "held" for brief time periods. These voltages are then applied to the Cutoff frequency, which is shot up and down arbitrarily without any transitional gliding. For super-bubbly sounds, increase the Emphasis and Rate and lower the Cutoff level.

Attack, Sustain, and Decay are respectively responsible for "wa," "ah," and "ow." If you are using an external pedal controller, make sure you are in the multiple triggering mode.

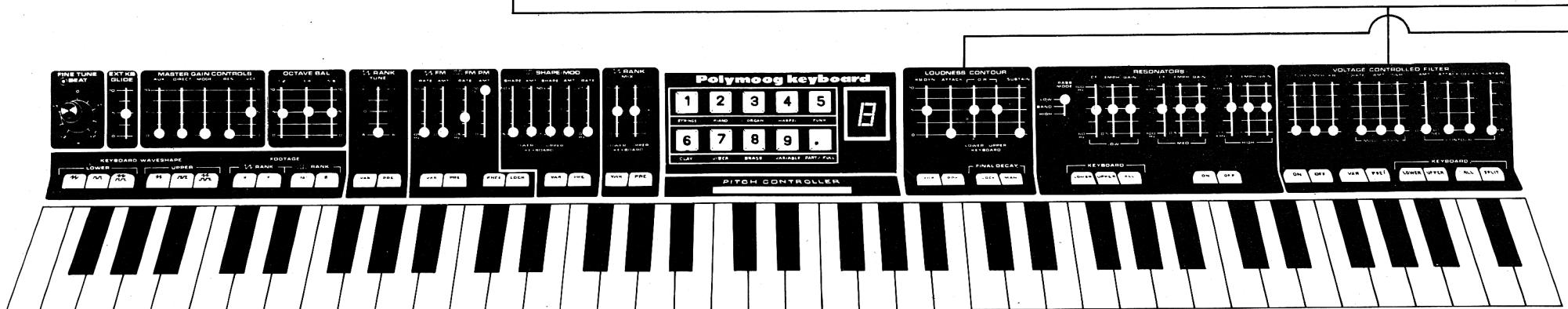
7 and the Attack slider to mid-point. Play. The "whap" sound is caused by a swift upward sweep of the filter. A higher Attack setting gives you a longer "whap." Lowering the Amount brings the filter level down, leaving you with a mellower "wump."

## Contour: Sustain

With KB, Emph, Contour Amount and Attack at mid-point, raise Sustain to 5 and hold a chord. The level of the filter (after

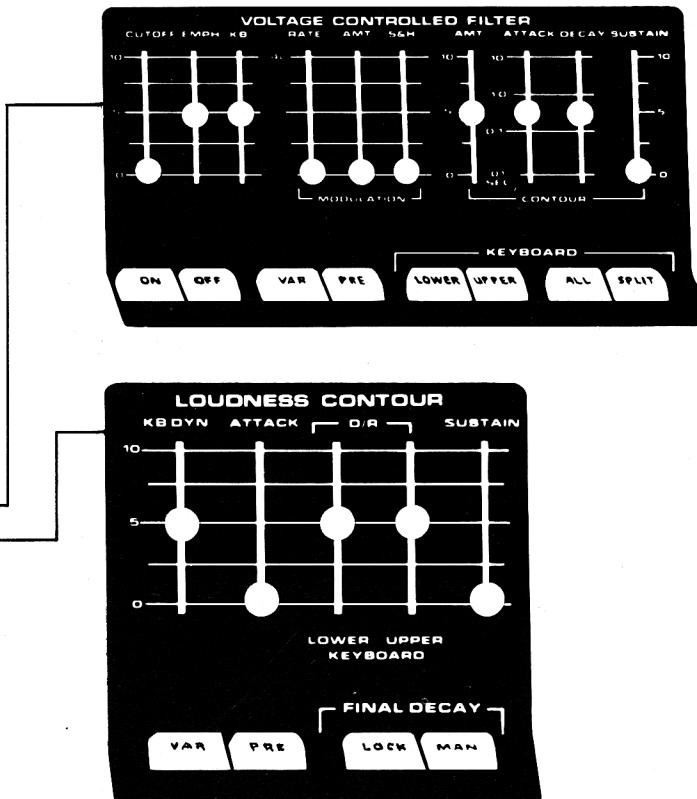


the Attack stage is over) is dependent on the Sustain setting. Hold a chord and move Sustain up and down: notice that it acts exactly like the Cutoff slider, only it waits until the Attack is through to kick in. At 10, Sustain holds the filter level at a point designated by the Contour Amount slider. Remember: Sustain has nothing to do with the duration of the Contour. It is just the Cutoff frequency point of the VCF while you are holding a key down.



## Contour: Decay

Decay is decay, whether you apply it to a Loudness Contour or the VCF. It allows the VCF to come down easily after it peaks. Set Sustain at zero and raise Decay to half-way. If you are using any Attack, the effect will be a "wow." Without Attack, you ought to hear an "ow." Again, the length of the "ow" increases as you raise Decay.



Now raise Sustain, Attack and Decay to half-way, press the Loudness Contour Final Decay Lock button and experiment with legato and staccato playing. Instead of immediately jumping down to the moderate Sustain level (as you heard the VCF do in the Sustain experiment), the filter level slides down to it. Upon release, the VCF level "ows" down the rest of the way. The Sustain level is acting as an intermediary resting point for the filter as it decays from maximum to minimum.

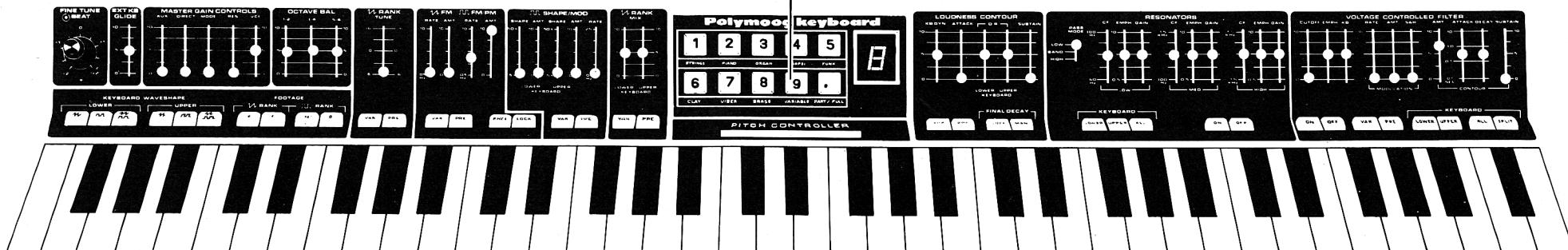
Try combining various variable Loudness Contours with VCF Contours. You'll find that the Attack, Sustain, and Decay functions are quite interdependent. Short Loudness Decay times will make long VCF Decays inaudible; the same is true of long Loudness Attacks and short VCF Attacks. The only reason we had you experiment with the VCF on Voice 8 was to give you a preset Loudness Contour that didn't interfere with the VCF Controls. Once you have mastered the relationships between the Contours, press the Period button and check out these effects on the other seven voices.

## Voice #9

Which brings us to one of the nicest features of the Polymoog. Until now, you probably have been working with only one or two Variables at a time. But you've also probably hit Voice 9 a couple of times just to see what would happen and ended up with nothing or else something very strange.

Pressing Voice 9 automatically kicks every function covered in the last chapter into the Variable mode. But it does not alter any of the Pre-set voicing features. This list will help you sort them out.

9



## Variable Functions

- ✓ Rank level
- ✓ Shape/Modulation
- ✓ FM & LF FM/PM
- ✓ Rank Tune
- Loudness Contour
- VCF Controls

## Pre-set Functions

- Keyboard Waveshapes
- Footages
- Lock/Free
- Final Decay Lock/Manual
- RES and VCF Keyboard Assignments  
(UPPER and LOWER)
- RES and VCF ON/OFF Modes

You can totally synthesize your own Polymoog voice with #9, press the Period, and apply all the Variables to any of the other eight voices. You can also cut out any unwanted Variables by pushing their PRE buttons.

---

### **Interfacing the Minimoog and Micromoog with the Polymoog**

If you are fortunate enough to own either a Minimoog or Micromoog, connecting it for operation from the Polymoog keyboard is a piece of cake. Three cables are necessary: two with 1/4-inch phone plugs and one with Cinch-Jones female and male ends (looking exactly like the S-TRIG ins and outs on all three Moog instruments).

One of the 1/4-inch cords will go from the Polymoog KB OUT jack in the back to KB IN or Oscillator Control Input on the external synthesizer. (On the Micromoog, the connection may be made to the KB OUT which will eliminate any transposing effect of the Micromoog keyboard when the rear panel EXT SYN jack is activated—or all the time if the EXT SYN jack is not used.) Another cord

runs from the ext. synthesizer's HIGH output to either the AUX, RES, or VCF inputs on the Polymoog. The third connects S-TRIG OUT on the Polymoog to S-TRIG IN on the external Moog for control of the latter's Contour generators.

The external synthesizer must be tuned to the Polymoog using its tuning control and the Polymoog rear panel SCALE adjust. Repeatedly depress E3 and match pitches using the external synthesizers' tuning control. Then, play E6, three octaves higher, and tune using the rear panel SCALE pot.

After patching and tuning, the external Moog can be played from either or both of the Polymoog's UPPER and LOWER keyboards by selecting the KEYBOARD

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ALL/SPLIT-UPPER/LOWER buttons on the right (under the VCF section). If you have a Polypedal, the audio signal can be cut in and out by tapping the EXT SYN button. When the ALL button is depressed, control over the pitch will come from the highest of any keys played simultaneously on the UPPER keyboard: the lowest of keys played on the LOWER keyboard. Glide may be imparted to pitches coming from the Minimoog or Micromoog by raising the Ext. KB GLIDE slider on the left side of the Polymoog.

When patching an external audio signal

for processing through the Polymoog's Resonators or VCF, the square and sawtooth ranks can be eliminated with the touch of the OFF button in these sections. The external signal will now appear as a solo voice. Remember that the external synthesizer's contours will be interacting with the Loudness Contour of the Polymoog: Attack, Sustain and Decay must be set carefully.

When patching an audio signal into AUX, the only control over loudness is located in the Master Gain Control area and is understandably labelled "AUX."

---

## Controlling the Polymoog with Pedals

The control inputs on the back of the Polymoog are designed to be used with either the Polypedal Controller or Moog's 1120 Foot Pedal and 1121 Foot Switch.

If you own a Polypedal, the seven functions are:

**Swell:** When rocked forward, this pedal increases the loudness of all voices on the BAL MIX and MIX outputs.

**Sustain:** When depressed, this pedal allows the sound to die away gradually, operating exactly like the sustain pedal on a piano. The amount of sustain time is pre-programmed on the preset voices and can be altered with the Decay sliders on the Variable Loudness Contour.

**Pitch:** The Pitch of all voices can be raised by tapping the Pitch button (so that the LED comes on) and rocking the pedal forward. The extent (0 to two octaves) of the pitch-shift is regulated by a knob on the back of the Polypedal.

**Filter:** The same pedal can act as a "wah" control on VCF voices. Just tap the Filter button and experiment on VCF voices 1-8: notice that the VCF doesn't seem to do anything if the pedal is left at maximum. It's best to switch the Filter pedal off when not in use.

**Modulation:**  FM and  Shape Modulation can be brought in and out from the Polypedal if you are plugged into that control on the back of the Polymoog. The FM and Shape Mod sections must be in the Variable mode for this to work.

**Trig Mode:** The Polymoog keyboard is normally a multiple-triggering device, meaning that VCF Voices which use Contour-control (2, 3, 6, 7 & 8) are re-articulated with each key that is depressed. The TRIG MODE pedal allows you to switch to single-triggering, in which case the playing of a chord will trigger the contour, but any other keys pressed will not re-trigger the contour while that chord is being held. A switch on the back reverses the operation of this pedal.

**Ext Synthesizer:** This button will couple the keyboard control voltage and trigger to an external synthesizer (Minimoog or Micromoog) to bring it in and out for solos.

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### List of Controls and Functions

- 1. Fine Tune**—Tunes entire instrument  $\pm 2$  semitones.
- 2. Beat**—Tunes oscillator to rank  $\pm \frac{1}{2}$  semitone.
- 3. Ext Kb Glide**—Sets amount of glide of monophonic keyboard circuit.
- 4. Master Gain Controls**—
  - (a) **AUX**—Sets output level of external signal applied to AUX input.
  - (b) **Direct**—Sets output level of Direct Poly channel.
  - (c) **Mode**—Sets output level of Poly Mode channel.
  - (d) **RES**—Sets output level of Poly Resonator channel.
  - (e) **VCF**—Sets output level of Poly voltage controlled filter channel.
- 5. Octave Bal**—
  - (a) **1-2**; Sets drive level of audio signal for lowest two octaves for output channels.
  - (b) **3-4**; Sets drive level for middle two octaves for all output channels.
  - (c) **5-6**; Sets drive level of upper two octaves for all output channels.
- 6. Sawtooth Rank Tune**—Tunes sawtooth rank  $\pm$  a musical sixth.

### 7. Sawtooth FM, Rectangular FM/PM—

- (a) **Rate**—Sets rate (Freq) of frequency modulation of sawtooth oscillator.
- (b) **Amt**—Determines amount of sawtooth frequency modulation.
- (c) **Rate**—Determines rate (Freq) of rectangular frequency modulation.
- (d) **Amt**—Determines amount of rectangular rank frequency modulation.

### 8. Rectangular Shape/Mod—

- (a) **Shape**—Varies rectangular pulse width for lowest two octaves from 5% to 50%.
- (b) **Amt**—Sets amount of pulse width modulation for the lowest two octaves.
- (c) **Shape**—Varies rectangular pulse width of upper four octaves from 5% to 50%.
- (d) **Amt**—Sets amount of pulse width modulation for the upper four octaves.
- (e) **Rate**—Determines rate (Freq) of pulse width modulation for all octaves.

### 9. Sawtooth Rank Mix—

- (a) **Lower**—Sets sawtooth level for lower two octaves.
- (b) **Upper**—Sets sawtooth level for upper four octaves.

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**10. Center Selector Panel—**

- (a) Buttons Labeled 1-8—Selects one of the eight basic preset operating modes.
- (b) Nine Button—Forces entire instrument into variable mode.
- (c) Period Button—Defeats cancelling action (return to PRE state) when mode 1 through 8 depressed.

**11. Ribbon Controller—**Varies pitch of entire instrument  $\pm$  a musical sixth.**12. Loudness Contour—**

- (a) KB DYN—Determines amount of dynamic keyboard effect.
- (b) Attack—Determines attack rate if sustain level is raised.
- (c) D/R—Determines initial decay and final decay to sustain level.
- (d) Sustain—Determines sustain level while key is depressed.

**13. Resonators—**

- (a) Pass Mode (low, band, high)—Selects low, band, or high pass mode for all three resonators simultaneously.
- (b) CF—Sets cutoff frequency of low resonator.
- (c) EMPH—Sets emphasis (Q) of low resonator.
- (d) Gain—Sets gain of low resonator.
- (e) CF—Determines cutoff frequency of medium resonator between 300 and 1500 Hz.

(f) EMPH—Determines emphasis (Q) of medium resonator.

(g) Gain—Sets level of medium resonator.

(h) CF—Determines cutoff frequency of high resonator between 1.5 and 7.5 KHz.

(i) EMPH—Sets emphasis (Q) of high resonator.

(j) Gain—Sets gain of high resonator.

**14. Part I—Rotary and Slide Pot Controls**

- (a) Cutoff—Varies cutoff frequency of VCF.
- (b) EMPH—Varies emphasis (Q) of VCF.
- (c) KB—Determines amount of monophonic keyboard buss voltage applied to VCF.
- (d) Rate—Sets rate (freq) of VCF modulation oscillator.
- (e) AMT—Determines amount of repetitive VCF modulation.
- (f) S AND H—Determines the amount of sample and hold modulation of the cutoff frequency.
- (g) Amount, Contour—Sets amount of filter contour.
- (h) Attack—Determines attack rate of filter contour.
- (i) Decay—Determines initial and final decay of filter contour.
- (j) Sustain—Determines sustain level while key is held off filter contour.

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## **Part II—Push Button Controls**

### **1. Keyboard Waveshape**

- (a) Lower, 3 Buttons—Select sawtooth, rectangular or both for lower two octave waveshape.
- (b) Upper, 3 Buttons—Select sawtooth, rectangular or both wave forms for upper four octave waveshape.

### **2. Footage**

- (a) Sawtooth Rank, 2 Buttons—8', 4' sawtooth oscillator frequency select.
- (b) Rectangular Rank, 2 Buttons—16', 8' rectangular rank oscillator frequency select.

### **3. Sawtooth Rank Tune, VAR/PRE—** Selects variable or preset mode for sawtooth rank tuning.

### **4. Sawtooth Rank FM, Rectangular FM/PM**

- (a) VAR/PRE—Sets frequency and/or phase modulation to variable or preset control.
- (b) PRE/LOCK—Puts two oscillator ranks in either free or lock mode.

### **5. Rectangular Shape/Mod, VAR/PRE—** Variable or preset mode for rectangular shape and modulation.

### **6. Sawtooth Rank Mix, VAR/PRE—** Variable or preset selection for sawtooth rank mix levels.

### **7. Loudness Contour—**

- (a) VAR/PRE—Variable or preset selector for loudness contour control.

- (b) Final Decay, Lock/Man—Lock turns final decay unconditionally on; Man allows use of foot pedal control of final decay.

### **8. Resonators**

- (a) Keyboard, Low High All—Determines whether resonators are fed from the lower two octaves, the upper four octaves, or all octaves.
- (b) On/Off—Turns resonator audio channel on and off.

### **9. Voltage Controlled Filter**

- (a) On/Off—Turns voltage controlled filter audio channel on and off.
- (b) VAR/PRE—Variable or preset control for voltage controlled filter parameters.
- (c) Keyboard, Low/High—Determines whether monophonic keyboard voltage is derived from lower two octaves or upper four octaves.
- (d) Keyboard, All/Split—Determines whether audio feed to voltage controlled filter is from the entire keyboard, or whether it is determined by the low/high switches immediately to the left.

---

### **Polymoog Rear Panel Connections**

1. **S-Trig Out**—S-trigger output, either single or multiple trigger, determined by trig mode input control.
2. **KB Out**—Monophonic keyboard control voltage output for controlling external synthesizer.
3. **KB Scale**—Adjusts Kb out voltage range.
4. **S-Trig In**—S-trigger input for filter contour.
5. **Swell**—Controls output level of BAL MIX or MIX output.
6. **Filter**—input to vary voltage control
7. **MOD AMT**—input to control amount of frequency and pulse width modulation when appropriate front panel controls are in the variable mode.
8. **Pitch**—input to vary frequency of Polymoog oscillators, jack tip controls both oscillators simultaneously, stereo ring controls frequency of rectangular rank separately.
9. **EXT SYN**—switch input to control on/off of s-trig out and kb out.
10. **Trig Mode**—switch input to determine single or multiple trigger mode s-trig out.
11. **Sustain**—switch input to control final decay when front panel final decay switch is in MAN position.
12. **Glide**—switch input to control KB OUT GLIDE on or off.
13. **Bal Mix**—XLR balanced line 600 ohm output.
14. **Mix**—single ended mix output derived from BAL MIX connector; insertion of jack automatically unbalances BAL MIX to provide single ended output.
15. **VCF**—voltage controlled filter channel output.
16. **PRE-mode** (internal fixed filter) channel output.
17. **Direct**—direct channel output.
18. **RES**—resonator output channel.
19. **AUX**—input for external audio signal with front panel gain control, output appears in mix.
20. **VCF**—input directly to voltage controlled filter, output appears in VCF output or MIX output.
21. **RES**—Direct input to resonators, output appears in RES or MIX outputs.
- 22, 23. **ACCESSORIES**—Provides +15, -15, and +5 VDC power for accessories.

## **Thank You**

Moog Music wishes to thank the artists listed below for their assistance, suggestions and involvement in developing the Polymoog.

Herbie Hancock, Stevie Wonder, Walter Carlos, Jan Hammer, Chick Corea—"Return to Forever," Keith Emerson—"Emerson, Lake and Palmer," Roger Powell—"Todd Rundgren Group," Pat Moraz—"Yes," Garth Hudson—"Band," Mike Boddicker—"Mac Davis Group" and Los Angeles studio musician, Larry Fast—"Synergy," Randy Goodman—Nashville studio musician, Alin Ingren—"Neil Diamond Group," Terry Fryer—"Shy Rhythm" and Chicago studio musician, John Bowen—"Neilson-Pearson" and San Francisco studio musician, Tim Tappan—"Bobby Goldsboro Group," Michael Tillson Thomas—Buffalo Symphony, Harold Schapero—Brandeis University, Shane Keister—Nashville studio musician.



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