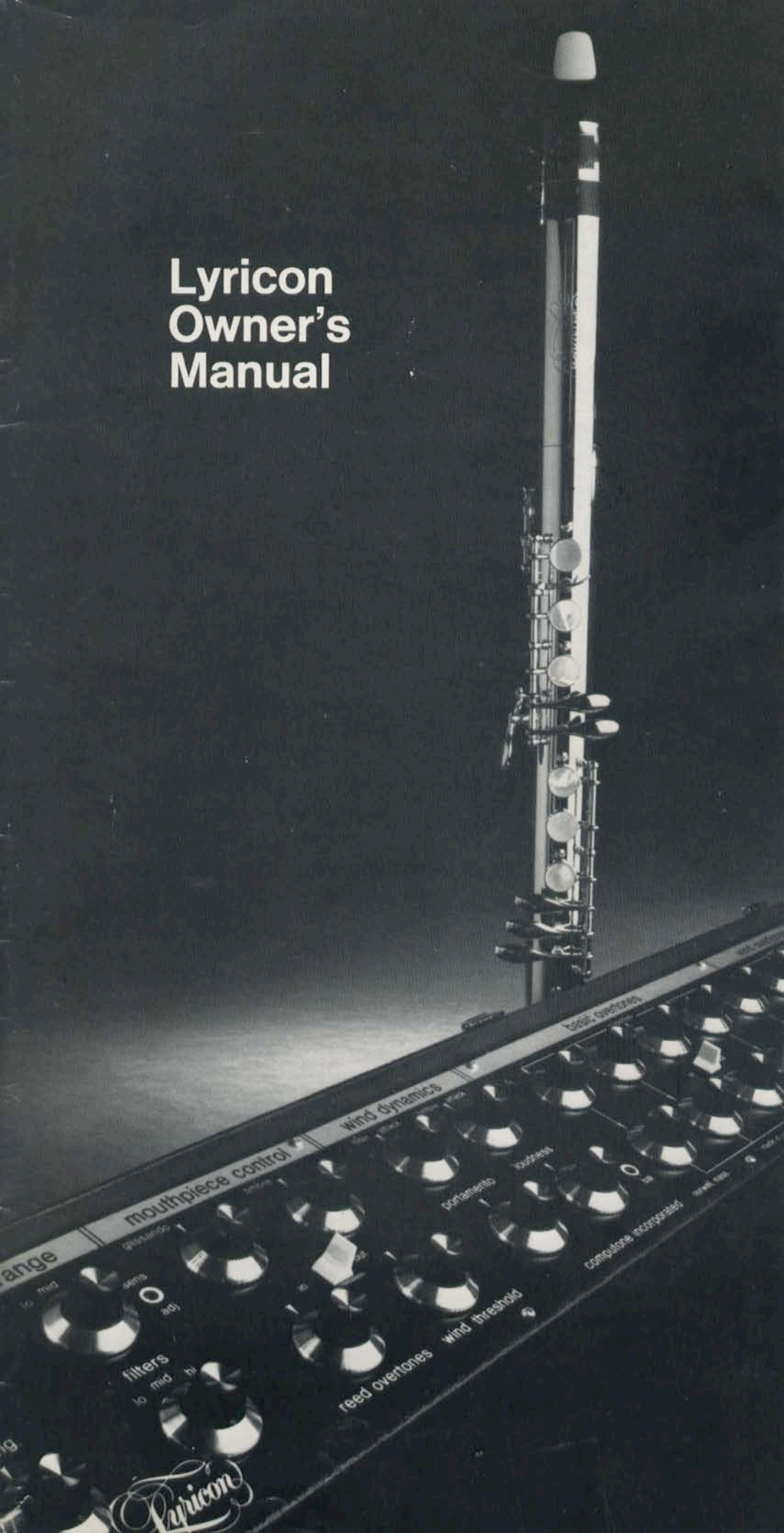
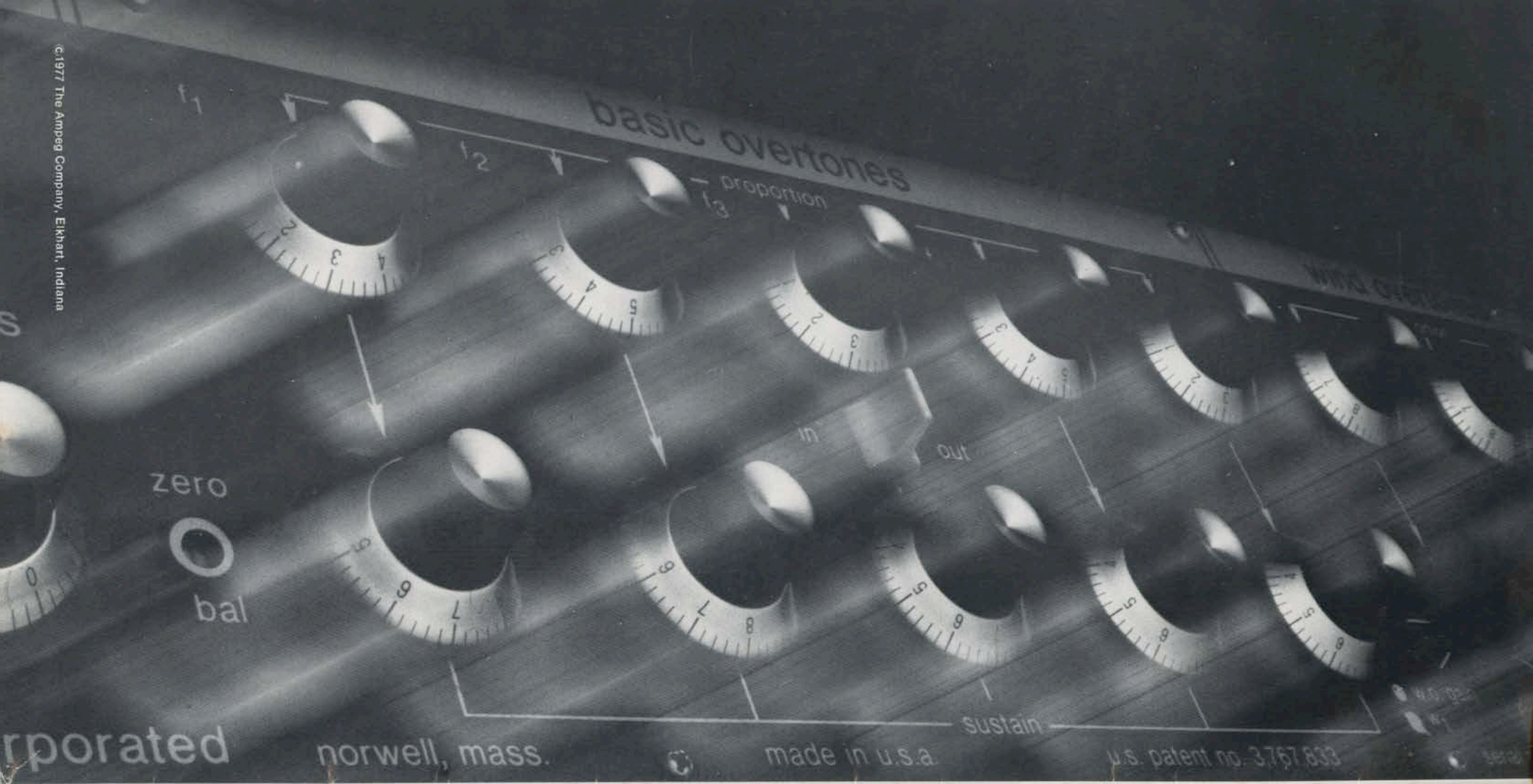
Lyricon Owner's Manual

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u.s. patent no. 3,767,833
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PART I
Lyricon Instruction Manual

INTRODUCTION: Why the Lyricon is Unique among Electronic Instruments

In order to realize the full potential of the Lyricon it is necessary first to understand the nature of its design. Although the Lyricon produces sound electronically, the player's *control* of its sound is based on the same principles by which any of the classic woodwinds, strings, brass or percussion instruments operate. The five essential components of any sound are *attack, pitch, timbre, loudness* and *decay*. Here, briefly, is how each contributes to musical expression.

LOUDNESS

Loudness, in its simplest terms, is the quantity of energy radiated through the air received by the ear. The ability to exercise instantaneous but varying degrees of control over the loudness of an instrument forms an essential part of phrasing and articulation.

PITCH

Pitch is the relative frequency or number of vibrations heard in a given time period. This is expressed as vibrations (cycles) per second or Hz. The higher the number, the higher the pitch; the lower the number, the lower the pitch. For example, the deepest pedal tones of the largest church organs vibrate at 16 cycles per second or 16 Hz. An octave above that, at 32 cycles per second, we reach the lowest C of a seven octave piano.

TIMBRE

Timbre is generally defined as the number and proportion of overtones contained in the sound. Since individual overtones are *identical* in sound quality, the character or personality of a tone — e.g. violin vs. trumpet — is determined by the amount of energy an instrument is capable of supplying to each overtone. Normally, the "brighter" the sound the more the higher pitched overtones are present. Conversely, the more mellow the tone, the greater the concentration of energy in the lower overtones. For example, most of a flute's energy is limited to the first and second overtones. The mellow tonal quality characteristic of the flute is the result. The clarinet, on the other hand, is strongest in the first, third and fifth overtones (fundamental, octave, and fifth above the octave). The distribution of sound energy in this manner accounts for the tonal personality of the clarinet.

The player may substantially alter the tonal personality of an instrument by forcing energy into less efficient overtones through use of his embouchure. From this basic but vital element of control evolves the great flexibility and degree of expression characteristic of solo instruments and the consequent difficulty in mastering them.

ATTACK

Attack is an instantaneous change in timbre, loudness and pitch. The more expressive instruments have high degrees of control over changes in these three components and, conversely, the less expressive instruments have less control. Attack comes into play the moment the instrument is excited into

sound. The method by which it is excited has a substantial effect on the character of the sound. For example, a string may be struck, plucked, or bowed, and in each case the sound being generated is distinctive. Once the exciting mechanism is removed, however, the string will revert quickly to its long tone characteristics.

DECAY

Decay is the opposite of attack. As the sound producing energy is decreased or withdrawn, subtle changes in pitch, timbre, and loudness occur continuously until the sound disappears. The control the musician has over the sound as he withdraws the exciting energy again characterizes the more expressive musical instruments.

In order to express the ideas and feelings of a musician, a musical instrument must give him control, to some degree, over each of these components. The Lyricon is unique in giving him, as he plays, the sensitive and instantaneous control over these components that makes traditional wind instruments so much more expressive than most synthesizers.

PRELIMINARY SETUP INSTRUCTIONS

1) Plug instrument body connector into the receptacle marked *Instrument* on the console. The connector is keyed and will plug in only in one direction. Gently twist the ferrule on the body connector clockwise until the threads engage the receptacle on the console. Tighten finger-tight only.
2) Remove AC line cord from underneath the instrument body tray. Plug it into the appropriate outlet on the right side of the console (it will plug in only in one direction). Then connect it to a properly grounded 110-120 VAC 60 cycle outlet. (Overseas models are designed for 220V, 50 cycle.)
3) Using an appropriate guitar-type patch cord, connect the *Output* jack on the Lyricon console to the *Input* jack (low-gain, if available) of a high quality musical instrument amplifier. The quality of sound you obtain is directly related to the external amplifier and speaker system that you use. A good quality guitar amplifier with reverb and low gain inputs is recommended. A good P.A. system also works well for live performance. For recording purposes, the console *Output* jack may be patched directly into a studio recording system. To achieve "acoustic" sounds, however, it may be necessary to mix the sound from an amplifier as well.
4) Turn both the *Loudness* control on the Lyricon console and the *Volume* control on the external amplifier to zero.
5) Set the *Power* switch on the Lyricon console to *on*. Turn on the external amplifier and allow a five minute warm-up period.
6) Turn the *Loudness* control on the Lyricon console to (5) and the *Volume* control on the external amplifier approximately a quarter-turn. If you hear a tone, the *Wind Threshold* control is adjusted incorrectly. Be sure that all five *Sustain* controls in the *Basic Overtone* section are turned counter-clockwise to zero, and follow the procedure described below.

ZERO BALANCE ADJUSTMENT

This adjustment is critical to the proper operation of the Lyricon. Please follow the steps described below exactly in the order presented. Otherwise, an incorrect balance adjustment may occur.

1) Set the *Mouthpiece Control* switch to *off*.
2) Turn the *Mixer* control fully counter-clockwise (this produces full signal from the *Basic Overtone* section).
3) Turn the *Basic Overtone* switch to *on*. Turn *f1* and *f2 Proportion* controls to full output (fully clockwise).
4) Turn the *Sensitivity* control fully clockwise.
5) Turn the *Wind Threshold* counter-clockwise (to the left) as far as it will go.
6) Turn the *Loudness* control on the Lyricon console fully clockwise and turn up the *Volume* control on the external amplifier about half way.
7) With a screwdriver, rotate *Zero Balance* control to left and right until minimum tone is heard from the Lyricon console, (see sketch below). Somewhere near the middle of the *Zero Balance* control range, little or no tone should be audible.
8) Return *Loudness* control on console to (4) and external amplifier *Volume* to normal (approximately ¼ turn). Turn the *Wind Threshold* control clockwise until the tone is just audible, and then turn it back slightly until the tone disappears. Adjust the *Wind Threshold* control in this way before each performance without repeating steps 1-7. However, do not attempt to adjust the *Zero Balance* without following all of the eight steps indicated.
9) If turning the *Wind Threshold* control fully counter-clockwise does not eliminate the tone, carefully repeat steps 1-8.
10) Return *Loudness* control to (4). *Loudness* control settings above (5) may cause distortion by overdriving the external amplifier. If you need more volume, turn up the *Volume* control on the external amplifier.

EMBOUCHURE

WIND TECHNIQUE

The Lyricon body is not an acoustic device; consequently it does not have to be pre-blown or filled with air to operate efficiently. Indeed, blowing too vigorously into the Lyricon body will cause the wind sensitive electronic systems to overload, effectively cancelling any means for subtle variation in sound. Therefore, you must not use a conventional reed instrument technique. Think subtone for a proper Lyricon blowing technique. The *Wind Overtones* section requires special attention in this respect.

The combination adjustment of *Sensitivity, Loudness, Wind Threshold* and amplifier *Volume* directly relates to the "feel" of the Lyricon. The proper comfortable feel should be obtained by first setting the *Loudness* control at (4) or (5) and reducing the *Sensitivity* control to somewhere between twelve and five o'clock, with the external amplifier set at desired volume. Proper adjustment of these three controls should provide the proper balance of volume and blowing comfort.

Remember, however, that the *Sensitivity* control provides the control signals for wind activated circuits in the console. Too *high* an adjustment of the *Sensitivity* control with too strong a wind pressure may cause distortion or overloading. Too *low* an adjustment of the *Sensitivity* control may result in insufficient drive to the sound determining circuits and hence a loss of "color" in the sound.

Fig

REED TECHNIQUE

The external reed does not vibrate but serves as a self-springing lever enabling the lip to engage the reed lever inside the mouthpiece. As more or less lip pressure is applied to the reed, the change in lip position creates a control voltage that is used to drive reed-sensitive circuits within the computer console. The magnitude of effect within the console is determined by the settings of *Glissando* and *Reed Overtones* controls.

Note: the *Mouthpiece Control* section switch activates or deactivates the reed signal. An increase in *Glissando* setting results in a greater or lesser change in pitch (bend) as the lip is relaxed or tightened. When you use high *Glissando* settings, the instrument will be in pitch only with a tight embouchure. (To become familiar with the contribution of each *Reed* control, increase each slowly while blowing into the Lyricon and alternately tightening and relaxing the lip.)

MOUTHPIECE AND REED

The mouthpiece of the Lyricon is a modified tenor saxophone mouthpiece. The reed has been trimmed at its base to fit the Lyricon, and should be located with its tip about ⅛" below the tip of the mouthpiece. If you have to replace the reed, be careful not to bend the reed lever out of position. Check the adjustment of the reed lever as follows:

1) Turn the *Mouthpiece Control* switch on and turn the *Glissando* control up (clockwise) to maximum.
2) Turn the *Wind Threshold* control clockwise until you hear a tone.
3) Place your thumb on the external reed and slowly press it against the mouthpiece. As you close the reed the pitch should rise. With the external reed nearly bottomed on the mouthpiece facing, turn the *Glissando* control full up and then full off. *No* change in pitch should occur. If the pitch changes with the reed fully shut adjust the reed lever.

REED LEVER ADJUSTMENT

CAUTION Do not attempt to adjust the reed lever without following these instructions carefully. Always be careful not to bend or force the reed lever in any way when cleaning the mouthpiece or changing reeds. Forcing the reed lever out of its normal position may damage the internal reed mechanism, necessitating factory repair.

1) Turn on Lyricon and turn up *Wind Threshold* control until a tone is heard. Turn on *Mouthpiece Control* section switch.
2) Remove the ligature and reed. Turn *Glissando* up fully clockwise. With your thumb, move the reed lever flat against the inside of the mouthpiece and listen for a change

. 1

in pitch. Release the reed lever and repeat until you are able to determine where the reed lever tonal activity occurs.

3) With the reed lever in the closed position (fig. 3) turn the *Glissando* control up full and back to zero. *No* change in pitch should be noticed.

   If the pitch does change, the reed lever has been bent inwards slightly towards the mouthpiece. If so, proceed as follows:

   a) Grasp the mouthpiece, taking care not to disturb the reed lever, twist slightly back and forth, and remove.

   b) Holding the instrument body with its underside (Thumb keys) facing you, grip the base of the reed lever with a pair of small pliers and with your thumb and forefinger, bend the reed lever very slightly away from you. Replace the mouthpiece, taking care not to disturb the reed lever, and repeat #3. (see fig. 5).

      IMPORTANT! Do not attempt to twist or remove sections of the body except as described.

4) If step 3 appears satisfactory but no tonal change occurs, the reed lever is bent too far towards the inside of the mouthpiece. Repeat step 3b but bend the reed lever slightly towards you.

The final test for correct reed lever position is to replace the mouthpiece, ligature and reed and move the reed with your lip while varying the amounts of *glissando* and observe if the response is as described in #3. It should not be necessary to repeat the reed adjustment unless the reed lever has been accidentally bent out of position. Once done correctly it is simple and quick to repeat any time it is required.

The proper position for the external reed (unlike conventional single reeds) is approximately 1/8 inch below the tip of the mouthpiece. (With the reed adjusted too close to the tip of the mouthpiece, the air flow may be restricted with a tight embouchure.)

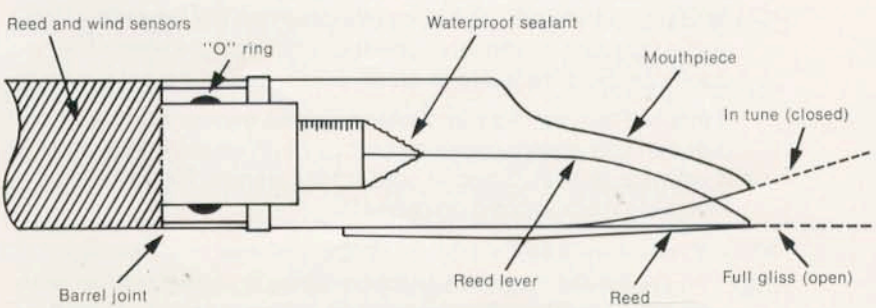


Fig. 2 Cutaway View of Mouthpiece

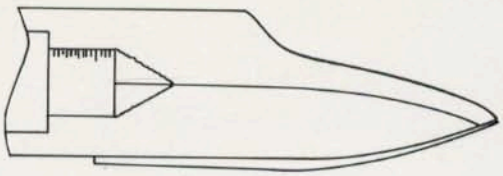


Fig. 3 In tune position
(tight embouchure)

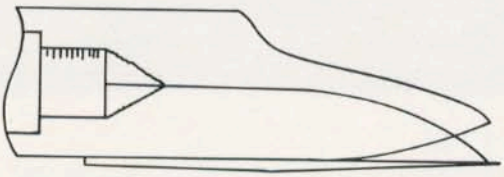


Fig. 4 Full glissando position
(approximately one octave lower in pitch with maximum setting of glissando control)

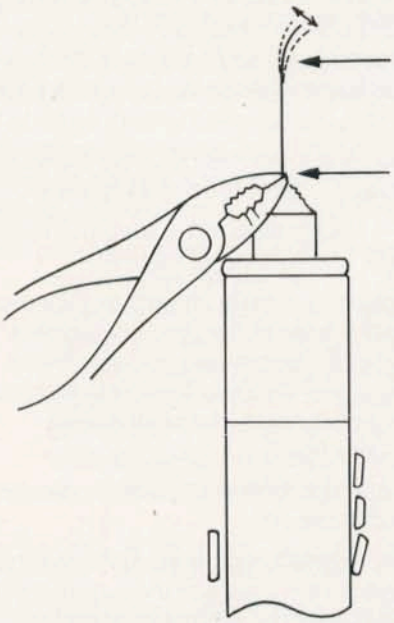


Fig. 5 Adjusting Reed Lever

LYRICON BODY

The barrel joint or upper section of the body contains the wind and lip electronic sensing systems. The main body contains the pitch determining circuits and interpose logic circuits.

Each key is actually a switch that consists of a silver pad mounted under each key and a silver contact mounted on an insulated pad on the body.

CLEANING THE CONTACTS

Although the contacts are excellent conductors, surface contamination (because of pollutants in the air) may cause erratic contact or noisy key action. Cleaning may be quickly accomplished as follows:

Fold a reasonably clean dollar bill (or business card) in half and slide under each key between the pad and the contact on the body. Press gently down on the key and at the same time gently slide the dollar bill out from between the two contacts. Be sure to clean all contacts, including octave keys.

If this will not correct the problem, clean the contacts with a piece of fine emery paper or crocus cloth (available at most hardware stores). Special contact burnishing files are available from Ampeg on request.

Note: The pivot rod lubricant and pad adhesive used are conductive. Therefore, no repairs of the mechanical part of the body should be attempted except by the factory or by an authorized service center.

INITIAL SETUP OF THE CONSOLE CONTROLS

Use the following setup to gain familiarity with the contributions of the various sound determining circuits within the computer console. Then turn to Part II, an introduction to the virtually limitless tonal resources these circuits can put at your command.

Set up computer console as follows:

Key	—	C
Tuning	—	(4) (or tune to C pitch, L.H. middle finger)
Range	—	mid
Filters	—	mid
Glissando	—	0 (full counter-clockwise approx. seven o'clock)
Sensitivity	—	See pg. 5 "Embouchure"
Reed Overtones	—	0 (full counter-clockwise) off
Mouthpiece Control switch	—	off
Timbre	—	(4)
Threshold	—	as described on page 5, #9
Filter Attack	—	0 (full counter-clockwise)
Timbre Attack	—	0 (full counter-clockwise)
Portamento	—	fast (full counter-clockwise)
Loudness	—	(4)

BASIC OVERTONES SECTION:

Proportion Controls (upper row)

f1 (2) f2 (8) f3 (0) f4 (0) f5 (0)

Sustain Controls (lower row)

f1 (2) f2 (3) f3 (2) f4 (2) f5 (2)

Basic Overtones Section switch to *on.*

WIND OVERTONES SECTION:

W1/Content

W1 (lower knob) one o'clock approx.

Content (upper knob) one o'clock approx.

W2 (4) W3 (4) W4 (4)

Wind Overtone switch to *on.*

MIXER — full counter-clockwise (approx. eight o'clock)

*TONE COLOR — Threshold** — max. (full clockwise)

Content — 0 (full counter-clockwise)

Note: Do not confuse the *Threshold* control in the tone color section with the *Wind threshold* control located in the mouthpiece control section.

Blow gently into the horn — gradually increasing your wind level while turning up the amplifier volume to the desired loudness. Turn the *Sensitivity* and *Wind Threshold* controls down a little and increase the external amplifier volume to compensate, if necessary, until you achieve a comfortable loudness and "feel".

EXPERIMENTING WITH DIFFERENT SETTINGS

Experiment with the following controls first, since interesting changes in sound character may be obtained very quickly: Range, Filters, Timbre, Mixer, Filter Attack, Timbre Attack.

First play the instrument briefly to become familiar with its compass. (A fingering chart appears on page 27.) Note that the low octave is obtained with the thumb on the thumb rest; the middle octave with the thumb on the middle thumb key; and the upper octave with both middle and upper keys. Note also that the G♯ and D♯ keys will sharp any note from any position. The L.H. Gb/Db R.H. auxiliary keys will flat any note from any position and will *double flat* when used together from any position.

GLISSANDO

1) Switch *Mouthpiece Control* section on, and slowly turn the *Glissando* control clockwise while blowing into the Lyricon. Using a *very loose embouchure,* move your lip until you feel the area where the reed is active. The *Glissando* control presets the amount of pitch change produced by variations in lip pressure. A quarter or half tone change is satisfactory for conventional vibrato and pitch bending.

2) Try different settings of *Range* and *Filters.* For example:

	1	*2*	*3*	*4*	*5*
Range	lo	lo	lo	mid	hi
Filters	lo	mid	hi	hi	hi

3) For each of these settings try *Timbre* settings of 0, 2, 4, 6, 8.

WIND OVERTONES

Turn the *Mixer* knob full clockwise to engage the *Wind Overtones* section. Experiment with different contributions from each overtone (W1, W2, W3, W4). If *f1 Sustain* is too high the *Wind Overtones* will "bobble." If *f1 Sustain* is too low, the *Wind Overtones* section will have little color. The best position for *f1 Sustain* is approximately (2) unless a special effect is desired.

Do not reset the *Range* switch without setting the *Filters* switch in a corresponding position. If the *Filters* switch is set lower than the *Range* switch, the *Wind Overtones* section will not operate.

Note: The *Wind Overtones* section is not designed to be played legato. It shares with brass instruments the characteristic that each note should be articulated.

TONE COLOR

Turn the *Tone Color Threshold* knob full clockwise. Slowly increase the *Tone Color Content* control while varying your wind pressure. The tone color circuits contribute a bright "edge" to the sound, the presence of which is determined by how hard you are blowing. While varying your wind pressure, slowly turn the *Threshold* knob counter-clockwise until the edge is comfortable to control.

WIND DYNAMICS

Using a fairly sharp wind attack, gradually increase the *Filter Attack* control until its effect becomes noticeable. A wah-wah effect may be created by setting all *Basic Overtones* up and increasing the *Sustain* controls to the point of ringing. If you set the *Sustain* controls higher than (3.5), play the upper range first. The basic overtones become more efficient in the upper register and may self-excite or oscillate. Gradually increase the *Timbre Attack* control and determine its effects with changes in wind attack. Shift the *Range* to lo and the *Filters* to hi to accentuate the effect. Since the wind *Dynamics* section reacts to instantaneous *changes* in wind pressure, staccato tonguing produces the most conspicuous effect.

As you experiment with various console settings, build a mental catalog of sounds available to you through changes in wind and lip position. Think of each sound as a "building block" for a more complex sound structure. The character and originality of this structure depend wholly on your commands. You are, in essence, the "variable program" for the computer console.

VARIATIONS IN LYRICON CONSOLES

Although all Lyricon consoles are identical electronically, some controls that were located on the front panel of early models are now internal and set at the factory for the convenience of the player.

Those controls are:

Brilliance

The internal *Brilliance* control is set for maximum. The musician may easily alter the sound brightness with his external amplifier controls.

Wind Attack/Key Attack

The *Wind Attack* control was originally the upper knob of the *Filter Depth* control. The *Key Attack* control was originally the upper knob of the *Portamento* control. Both are now fixed internally at the optimum setting.

Wind Overtones In/Out Switch

The *Wind Overtones* switch, essentially a duplication of the *Mixer* control, has been fixed internally at on.

Reed Timbre

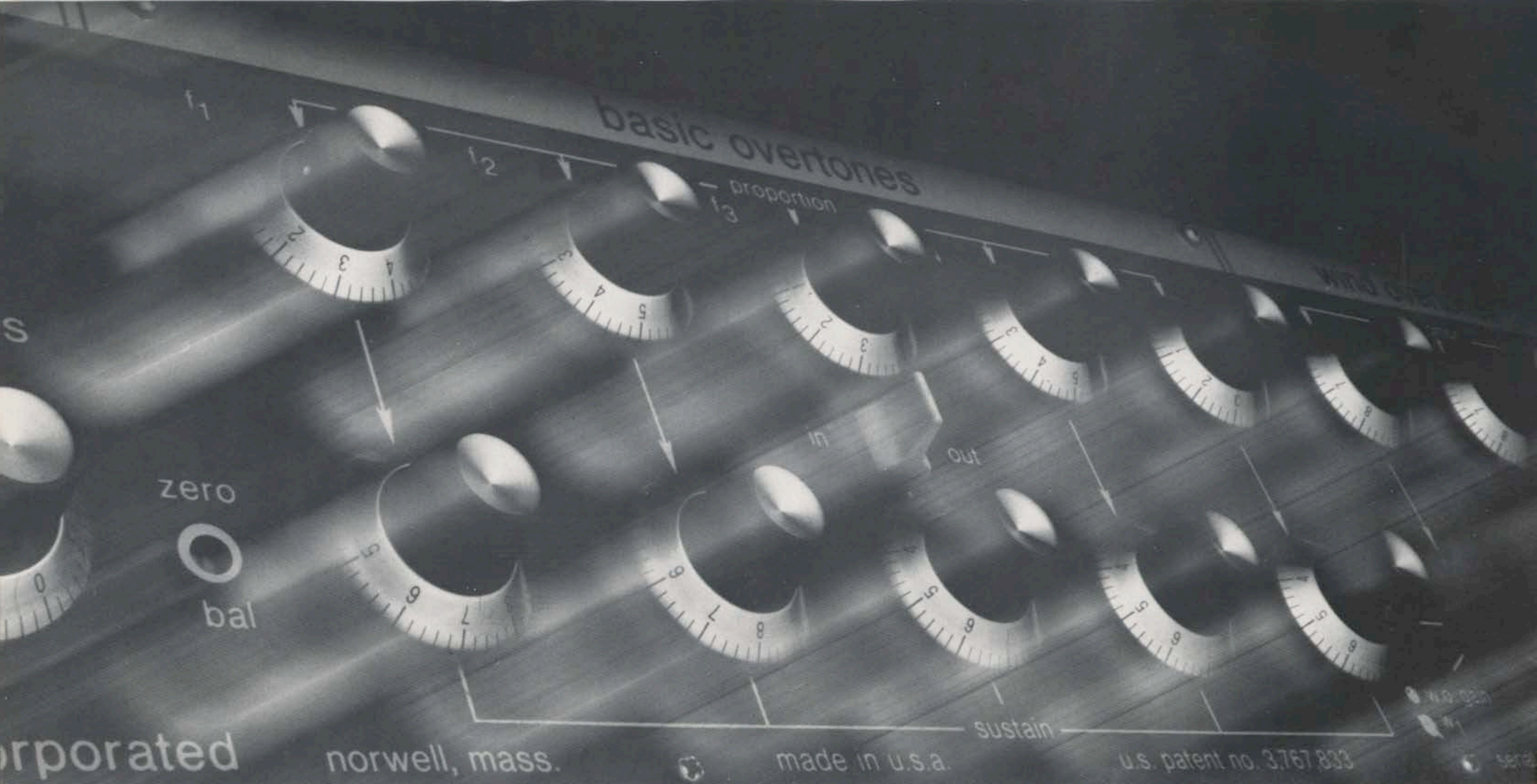
The *Reed Timbre*, originally the lower knob of the *Reed Overtones* control, was eliminated from later consoles.

Sensitivity

The *Sensitivity* control, formerly the lower knob of the *Glissando* control, has been relocated as a screwdriver adjustment to the left of the *Glissando* control. Once set by the musician in conjunction with his external amplifier, it rarely requires further adjustment.

Wind Threshold

On earlier models, the *Wind Threshold* control was a screwdriver adjustment. It has now been relocated as a knob control on the front panel for the convenience of the player.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PART II
Lyricon Sounds Manual

The last section of this manual will introduce you to a few of the many sounds that the Lyricon is capable of producing. It is intended only to be a starting point, so as not to restrict or confine your creative search for your own distinctive sounds.

General Approach

The Lyricon has no tonal personality of its own. It is wholly up to you to determine what its sound characteristics will be. Since any given computer console setup may be altered substantially with your embouchure and air pressure, pay special attention to the notes on technique.

There is no direct relationship between a knob and a sound. The console controls act as building blocks — each making a particular contribution to the personality of the overall sound.

Using the Console

To find a starting point in your experimentation, familiarize yourself with the basic setting (page 16). Return to this setting whenever you can't get a desired result from the console. Each additional setting in the series is arranged so that you *must* begin with the basic setting.

The experimental settings are related to the characteristic sounds of more conventional musical instruments. Although imitative sounds represent only a small fraction of the effects possible with the Lyricon, they are naturally among the first goals of the novice. It is a useful exercise to see just how close you *can* come to imitating other instruments with the Lyricon. If you are attempting to imitate a trumpet, for example, you must think like a trumpet player. Pick a tune that is normally associated with that instrument, then articulate and phrase as the musician would on that particular instrument. You will soon discover that the sound quality produced by the Lyricon is sometimes not nearly as important as your phrasing and attack.

Wind Technique

A proper blowing technique is essential to mastery of the Lyricon because the Lyricon wind section has definite physical limits. Blowing too hard into the mouthpiece will cause the wind system to "bottom", thereby eliminating any additional effects through changes in wind pressure. The wind levels required to achieve a particular result become obvious after a little practice. Meanwhile, blow gently as you experiment with the variations in sound available from the console. Notice as you program the console circuits with your wind and lip action that it is just as important to have the ability to reject a sound characteristic as it is to produce it.

Lip Technique

Traditional lip technique is not necessary, since the Lyricon body is not acoustic. Variations in lip configuration and facial muscles have no effect on intonation or timbre unless the *Glissando* and *Reed Overtones* controls are engaged. To obtain the various reed effects from the console, be sure that the reed lever is operating properly as described on page 6.

To experiment with the amount of glissando (pitch bend) available, use a relaxed embouchure, with your jaw loose and comfortable. A quarter- or half-tone pitch shift with full lip motion is ideal for conventional playing. This enables the player either to maintain a tonal center or to glide in and out of pitch at will.

The Lyricon is equipped with a Fibercane reed, which lasts a good deal longer than natural cane and is not easily damaged. It serves two important purposes. First, it acts as a self-springing lever to modulate or control the air stream reaching the wind transducer. Secondly, it engages the reed lever, the position of which determines the magnitude of the electrical signal reaching the *Reed Overtones* and *Glissando* circuits.

CAUTIONS

Reed Overtones/Filter Attack

Various desirable changes in tonal personality may be obtained by increasing the strength of particular overtones with the *Sustain* controls. Remember that as you increase a *Sustain* above (2), the upper register may ring or oscillate independently of your control. If *Reed Overtones* or *Filter Attack* are set above (3), the system becomes much more sensitive to this condition. Always check the upper register as you experiment so that you know where to expect this condition. Self-resonance or oscillation will not occur with low or middle *Range* and *Filters* settings.

Memorize the *Sustain* settings described in the basic setting on page 16: 2,3,2,2,2. They will always keep you out of trouble.

Wind Overtones

Turning up the *f1 Sustain* control will also increase the signal to the *Wind Overtones* section. For convenience, the following experiments are based on an *f1 Sustain* setting of (2).

Always set the *Filters* switch either the same as the *Range* switch or higher. If the *Filters* switch is set lower than the *Range* switch, there will be no output from the *Wind Overtones* section.

The *Wind Overtones Gain* control (WO gain) controls the signal to the *Wind Overtones* section from *f1*. If the sound is distorted, exert maximum blowing effort and lower the *WO Gain* control until the distortion disappears.

Loudness Setting

The *Loudness* control sets the maximum amount of signal available to drive the external amplifier. With some external amplifiers, a *Loudness* setting higher than (4) may cause the external amplifier preamp to overload and distort the resulting sound.

The setting combinations of:

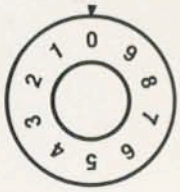
Sensitivity
Loudness
Threshold
Volume (external amplifier)

have a substantial effect on wind comfort: Once you find the combination that feels most satisfactory to you, it need not be changed.

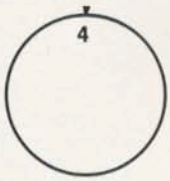
HOW TO USE THE LYRICON SOUNDS DIAGRAMS

When using the numbered knobs please observe the following:

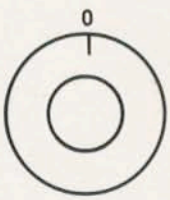
a) When the knob is fully counter-clockwise, the number at the arrow (top) should be zero (0). (*Exception:* on some consoles the *Tonecolor* section has arrows at three o'clock for *Threshold* and nine o'clock for *Content.*)



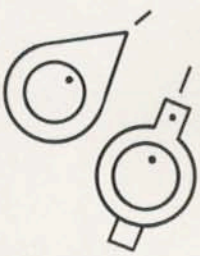
b) The number the knob should be set at will appear at the *top* of the circle representing the knob in the diagrams.



The lined knobs (except for the *Mixer* control) are *switches.* Rotate the switch so that the line points to the desired function.



Double control knob settings are located by the imaginary clock system. If the setting described in the Lyricon Sound section refers to "one o'clock", for example, set the pointer of the knob in question to the equivalent of one o'clock on a clock face.



The *Sensitivity* control in some consoles is a screwdriver adjustment. The imaginary clock system is used to indicate its position. The range of the screwdriver adjustment is from eight (full counter-clockwise) to five o'clock (full clockwise).

Basic Setting

Console

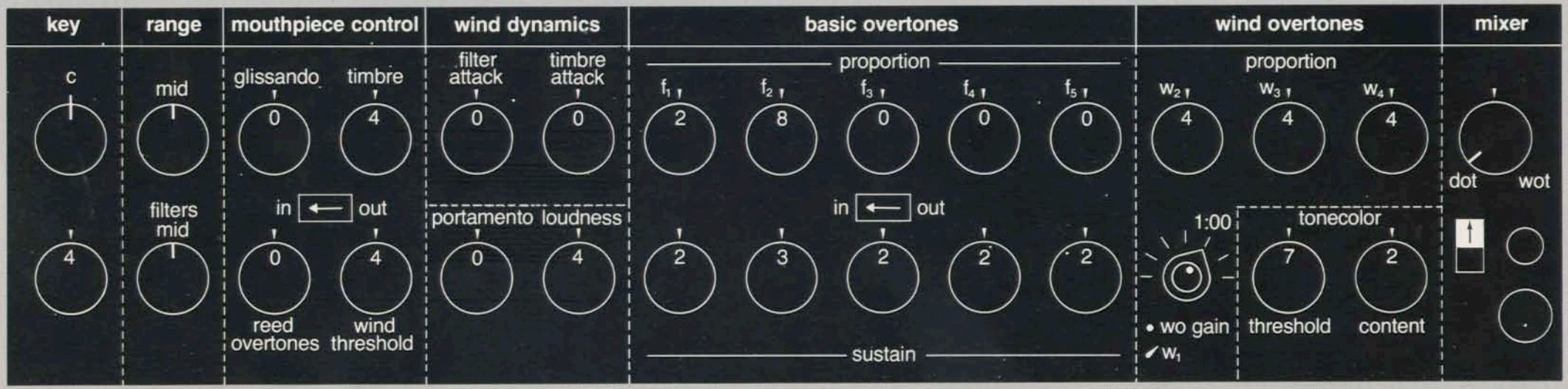
1. Set all controls as shown on the panel diagram.
2. Adjust *sensitivity* and *wind threshold* for proper blowing feel as described in the *embouchure instructions*, page 5.
3. *Loudness* should be set between 3 and 4. Use the external amplifier for additional volume.

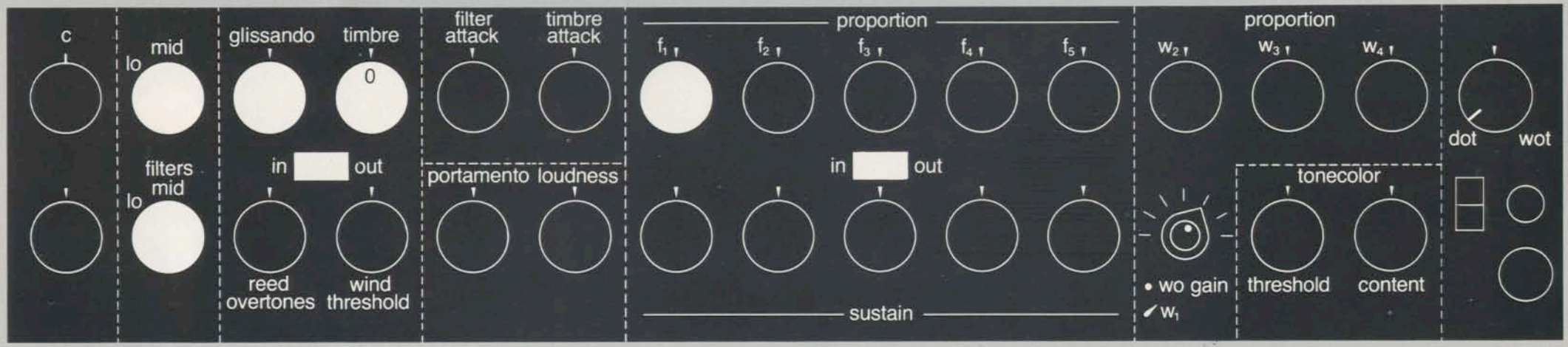
Technique

1. Blow gently until you feel you can control the sound quality.
2. Use staccato and legato wind attack to obtain variations in effect.
3. Use a relaxed embouchure.

Experiment

1. Adjust *tonecolor content* and *tonecolor threshold* slightly while changing wind pressure. The tonecolor section adds edge or brightness to the sound by strengthening the higher overtones at a wind level determined by the *tonecolor threshold* setting.





Reed Sound I

Console

1. Turn the *timbre* control to zero.
2. All other controls should be at the basic setting, page 16.

Technique

1. A tonal quality similar to a clarinet should be obtainable in the middle and low registers.
2. Reduce *tonecolor content* if sound is too edgy.

Experiments

1. Switch both *range* and *filters* controls to the lo position. Play instrument in lowest register and try to duplicate a bass reed sound. Try different *timbre* settings.
2. Move switch in *mouthpiece control* section to in or on position. Add ¼ to ½ tone pitch change with *glissando* control. Use a loose embouchure until you feel where the reed is active. Experiment with a vibrato and pitch glide.
3. To add more body to the sound, increase the amount of f_1 *proportion.*

Reed Sound II

Console

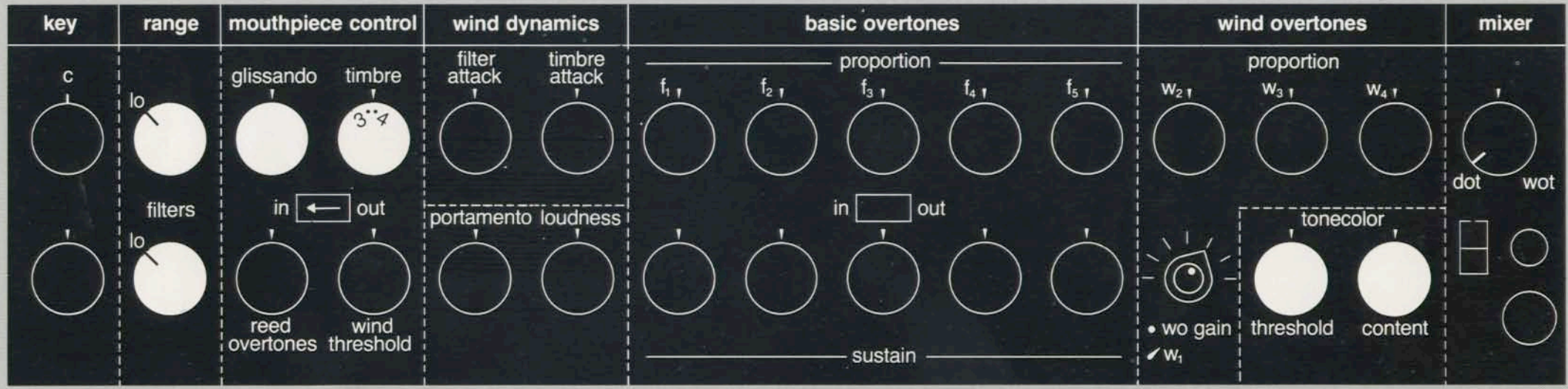
1. Return all controls to the basic setting, page 16.
2. Turn *range* to lo and *filters* to lo.

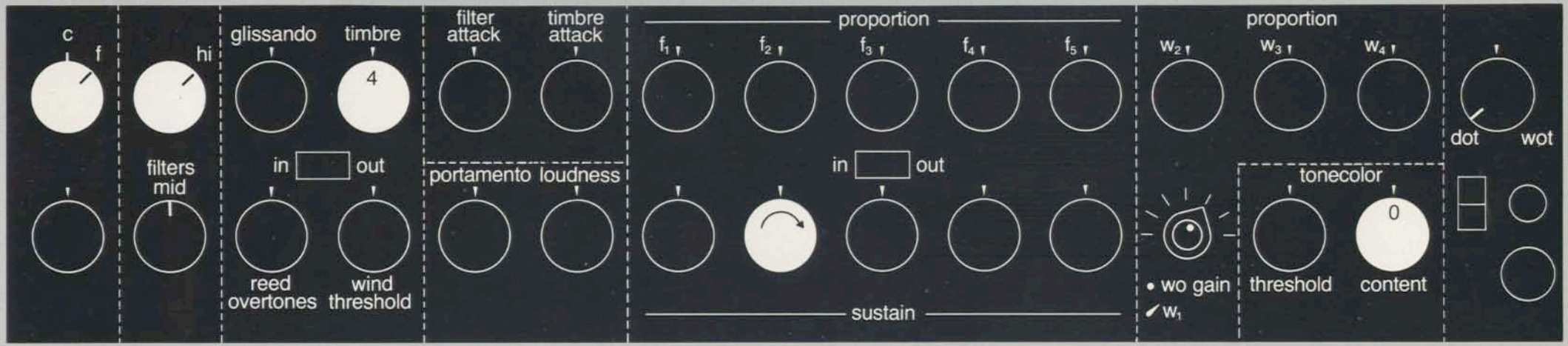
Technique

1. Vary the *timbre* control between 3 and 4 while playing the instrument in the low and middle registers and try to create a tonal quality like a saxophone.
2. Use approximately a ½ tone *glissando* setting for a comfortable tonal center and vibrato. (Use a relaxed embouchure!)

Experiment

1. The settings of *tonecolor* will greatly affect the quality and energy of the sound available. Adjust the *tonecolor threshold* until you can control it comfortably with your wind level. Once the *tonecolor threshold* is adjusted to your satisfaction, it need not be readjusted. The quantity or content of tonecolor is easily increased or reduced by adjusting the *tonecolor content* knob.





Piccolo/Flute Sound

Console

1. Return all controls to the basic setting, page 16.
2. Turn *range* switch to hi. (Check that *timbre* is set at 4.)
3. Turn *tonecolor content* to zero.
4. Switch *key* to F.

Technique

1. For best effect play instrument in upper and middle registers.
2. Use a gentle wind attack.

Experiment

1. Increase f_2 *sustain* very gradually as you play. Note the increase in brightness and tonal energy. DO NOT ADJUST f_2 *sustain* OR ANY OTHER SUSTAIN CONTROL HIGHER THAN 4 OR THE INSTRUMENT WILL OSCILLATE OR SELF-RESONATE! The efficiency or resonance of each filter (f_1 thru f_5) in the basic overtones section increases as the pitch becomes higher. Check the highest note on the instrument to be sure that the system is stable if you use sustain settings higher than 2.

Lead Horn Sound

Console

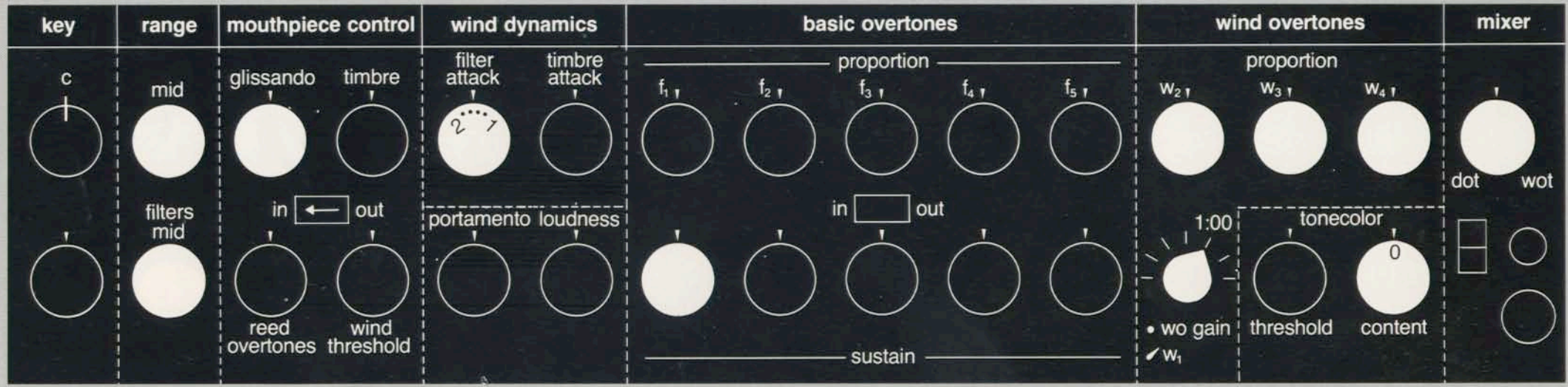
1. Return all controls to the basic setting, page 16.
2. Turn *mixer* control full - clockwise.
3. Turn *tonecolor content* control to zero (full counter-clockwise).
4. Use ¼ or ½ tone *glissando* setting.

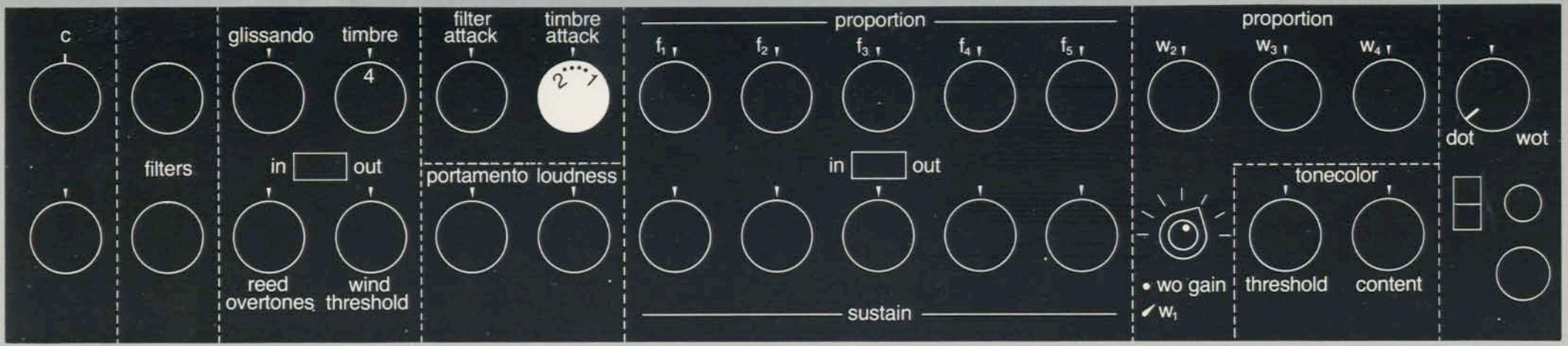
Technique

1. A lead horn sound will be obtained in the middle and upper instrument registers. Wind control *is vital* when using the *wind overtones* section. Blow gently at first and increase your wind level *gradually* while listening for the increase in higher overtones as you blow harder.
2. Reduce *WO gain* control (upper knob) if the sound distorts too easily or requires an uncomfortable wind pressure.
3. Articulate each note with diaphragm pressure. Avoid fast legato playing.

Experiments

1. Try the same setup with *range* and *filters* in lo position. Try for bass or baritone horn sound.
2. Add a slight amount of *filter attack* and play the low instrument register slightly staccato. The filter attack effect occurs abruptly between 1 and 2 on the control. Blow staccato notes while slowly turning up the *filter depth* control until you locate the point of activity.
3. Adjust the *glissando* so that the reed drops the pitch a full 4th. Try trombone smear effects using your lip.





Timbre Attack

CHORAL EFFECT

Console

1. Return all controls to the basic setting, page 16.
2. Be sure *mixer* control is full - counter-clockwise.
3. Turn *tonecolor content* to 5.
4. Gradually increase *timbre attack* control clockwise while blowing staccato notes. Listen for the timbre shift.

Technique

1. Timbre shift is most pronounced in the lower register with a large amount of *tonecolor content.* A definite choral effect or multi-instrument sound should be obtainable.

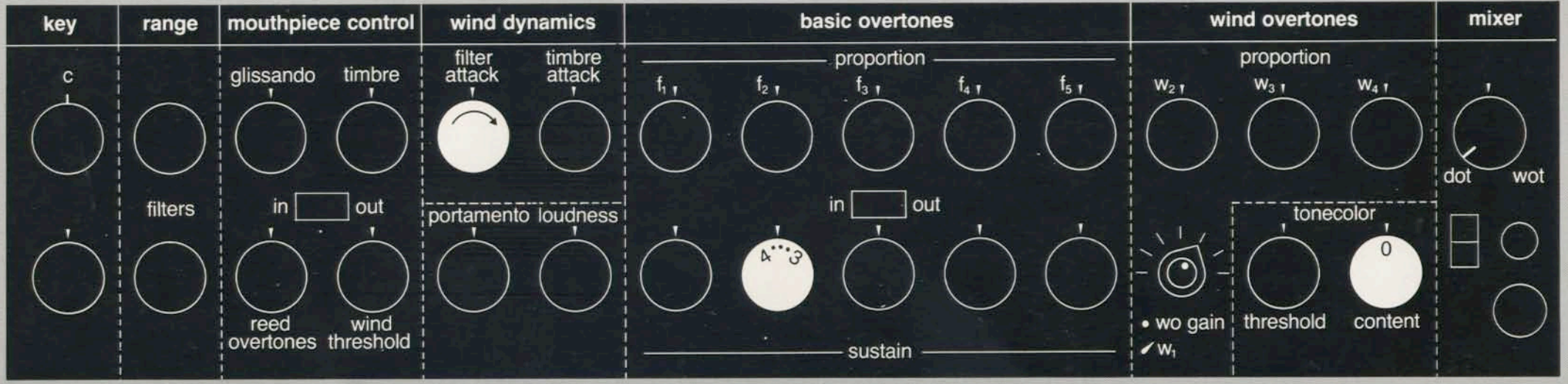
Note: The timbre attack effect and filter attack effect are only present with an abrupt change in wind pressure, either by staccato tonguing or pumping air quickly through the mouthpiece with the diaphragm.
These controls may be used as embellishments to any basic sound. They may be instantly eliminated by blowing steadily and playing legato.

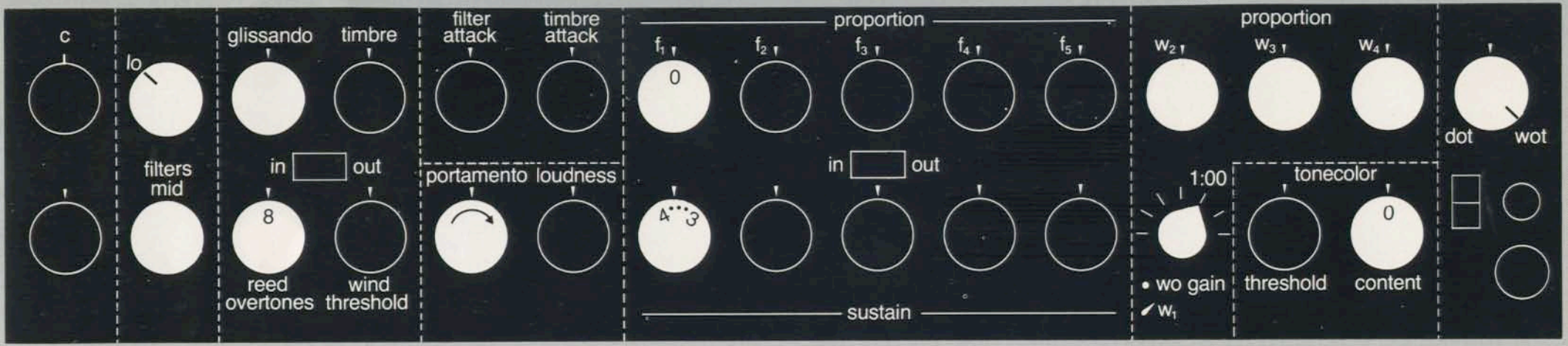
Filter Attack
OVERTONE SWEEP

Console
1. Return all controls to the basic setting, page 16.
2. Check that *tonecolor content* is zero.

Technique
1. To determine effects available, blow staccato notes while slowly increasing *filter attack* control until knob is full clockwise.
2. With *filter attack* control up full a wah-wah effect may be obtained with quick changes in diaphragm pressure. Blowing steadily and playing legato reduces the effect.

Experiment
1. The effect may be increased noticeably by turning f_2 *sustain* to just below 4. When *sustain* setting is higher than 2 and *filters* and *range* settings are hi, be careful that the instrument doesn't self-resonate in the upper register!





Synthesizer Sound

ADVANCED

Console

1. Return all controls to the basic setting, page 16.
2. Turn *mixer* control to WOT (wind overtones) full clockwise.
3. Turn *reed overtones* control full clockwise.
4. Turn f_1 *proportion* to zero.
5. Turn f_1 *sustain* up as close to 4 as possible without causing ringing or self-resonance in the top register.

Technique

1. While blowing into instrument, move lip in and out gradually (use very loose embouchure) and listen for a "filter sweep" effect. The overtones should be easily controllable with your lip. The greatest effect will be obtained in the low register.

Experiments

1. Add some *filter attack* to obtain a similar effect with wind changes. Use both together.
2. Use full reverb setting on your amplifier to enhance the effect.
3. Turn *glissando* control up full clockwise and try various pitch and overtone effects.
4. Increase *portamento* to glide from note to note.

Growl Effect

ADVANCED

Console

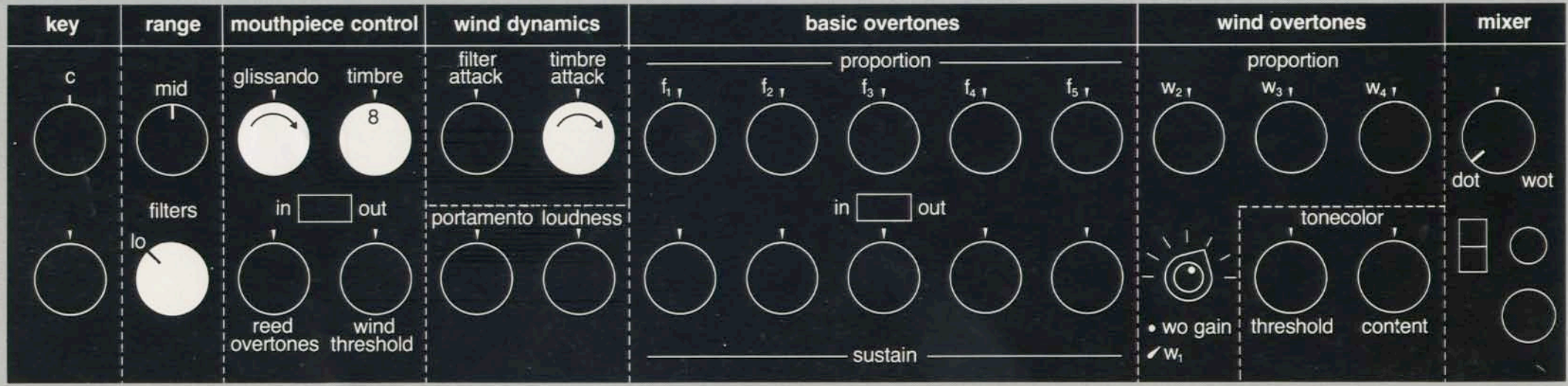
1. Return all controls to the basic setting, page 16.
2. Turn *filters* switch to lo.
3. Turn *timbre attack* full - clockwise.
4. Turn *timbre* control to 7 or 8.

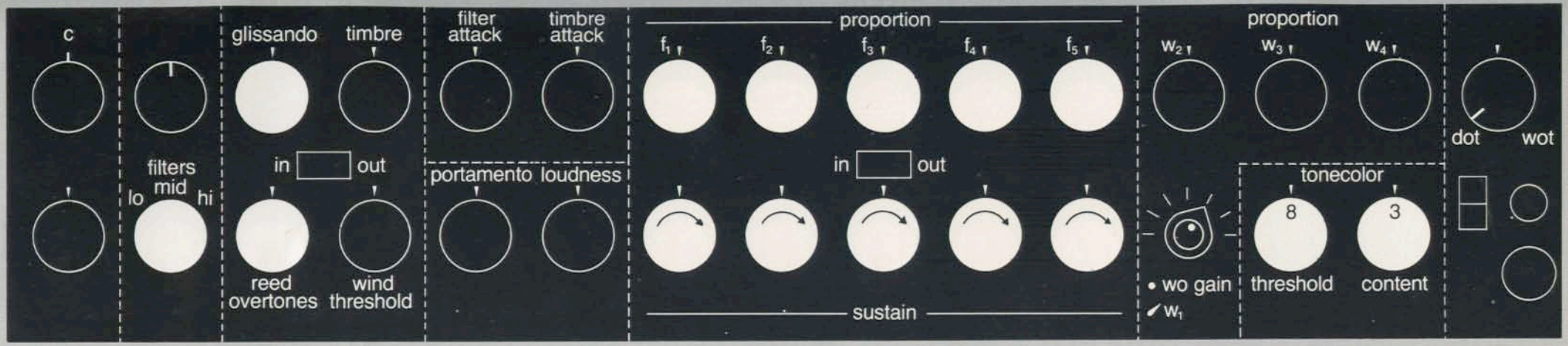
Technique

1. While blowing into instrument, growl with your throat at the same pitch as the note you are playing or at some harmonic interval above or below it. A distinct multi-tonal effect will be produced by the wind transducer's reaction to your throat tones.

Experiments

1. Growl in one tonal direction and play in opposing tonal direction.
2. Unusual tonal effects may be obtained by turning the *glissando* control on full, and using your lip to bend pitch in one direction while growling opposing harmonic intervals.





Parallel Chords

MULTI-TONAL

Console

1. Return all controls to the basic setting, page 16.
2. Turn all *proportion* controls in the *basic overtones* section to zero.
3. Starting with f_1 *filter* section, turn f_1 *sustain* control to 4.5. Turn up f_1 *proportion* slowly until a tone is heard. Do the same thing for f_2 thru f_5 *filter* sections.

Technique

1. Tune the intervals between basic overtones by changing the *sustain* controls until a desirable chord is produced.
2. Set up a 3 or 4 note chord and use the *tonecolor* as a melody note.
3. Switch off the *basic overtones* section to eliminate the parallel chord.

Experiments

1. Try different positions of the *filters* switch. This shifts the tuning of the entire *basic overtones* section up or down one octave.
2. Try different settings of *reed overtones*, and use your lip to shift the pitch of the parallel chord.

String Sounds

Console

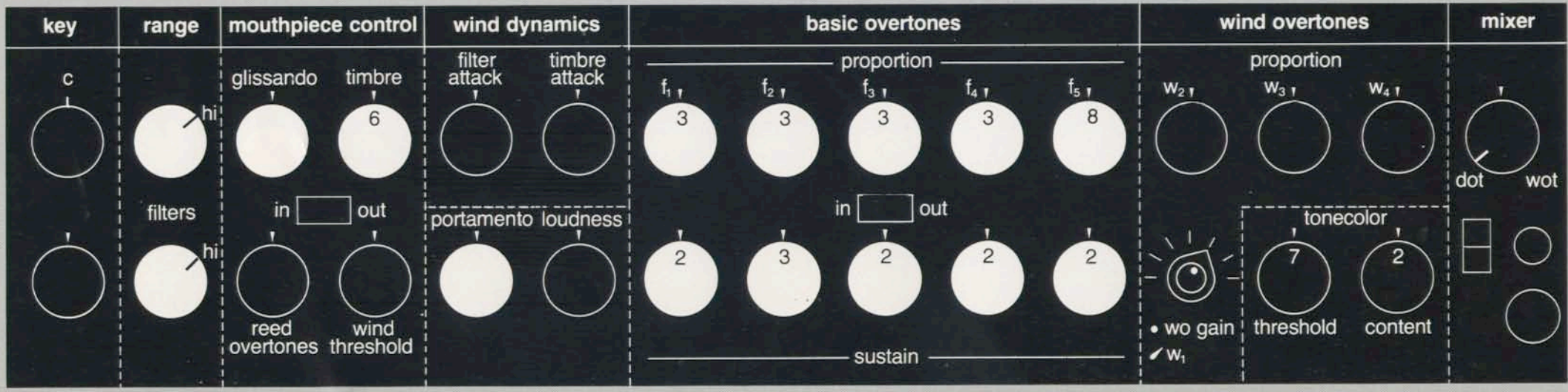
1. Return all controls to the basic setting, page 16.
2. Switch *range* and *filters* to hi position.
3. Set *basic overtones* section controls as indicated in panel diagram.
4. Set *timbre* at 6.
5. Adjust *glissando* control for ½ tone shift with lip.

Technique

1. With the proper wind and lip technique, violin-like sounds will be obtained in the upper and middle registers.
2. The lower register will allow viola or cello-like sounds.

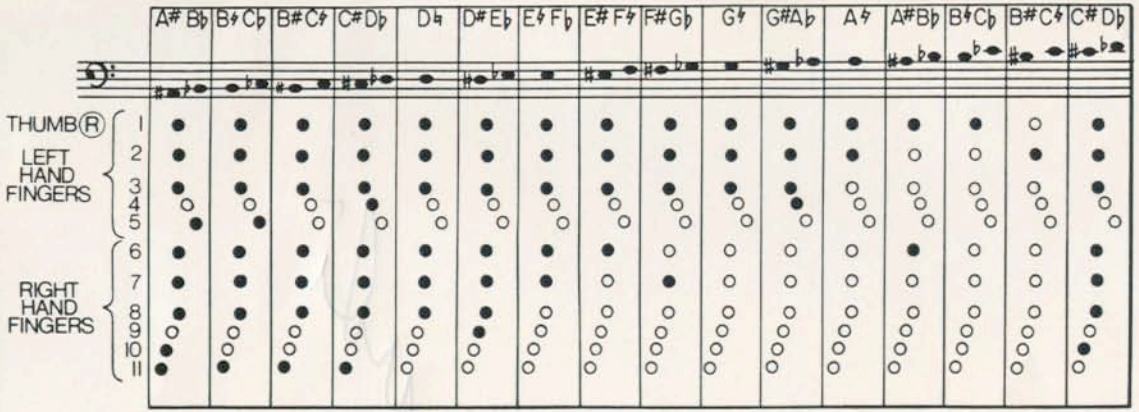
Experiments

1. Add a small degree of *portamento* for a more legato shift or glide from note to note.
2. Try different timbre settings. (Use medium amplifier reverb.)

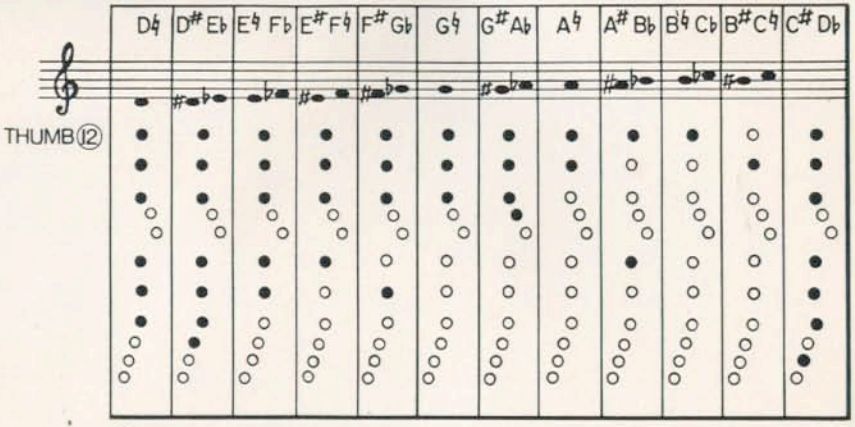


Fingering Charts

LOW REGISTER (MODIFIED BOEHM SYSTEM)



MIDDLE REGISTER (MODIFIED BOEHM SYSTEM)



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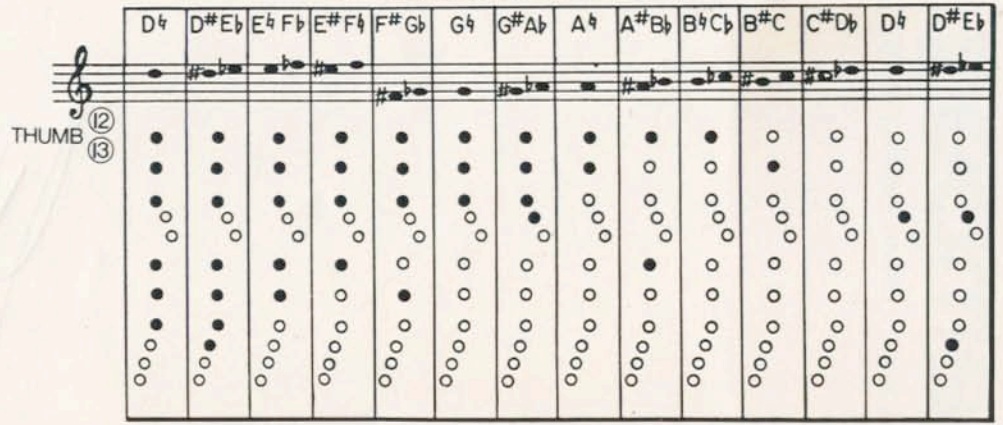
UPPER REGISTER (MODIFIED BOEHM SYSTEM)



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