OPERATION MANUAL

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MODEL 1010

PROPHET-10 SYNTHESIZER AND POLYPHONIC SEQUENCER OPERATION MANUAL

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SECTION 1
GETTING STARTED

1-0 INTRODUCTION

The Prophet-10 contains two completely programmable polyphonic synthesizer banks, each having five complete and individual synthesizer "voices." Although each voice is keyed independently, all five voices in each polyphonic bank function from the same patch setting, and are therefore homophonous. However, each of the two 5-voice synthesizer banks can operate on a completely different program, and can be articulated independently via the two keyboard manuals. In other words, two different programs can be used at any one time. One is the UPPER program, with one 5-voice synthesizer usually tied to the upper keyboard, and the other is the LOWER program, with the other 5-voice synthesizer usually tied to the lower keyboard.

Each synthesizer voice consists of two voltage-controlled oscillators (VCOs), a white noise source, a resonant low-pass voltage-controlled filter (VCF), a voltage-controlled amplifier (VCA), two envelope generators (one wired to the VCF and one wired to the VCA) and a 3-band equalizer (EQ). In addition, there are routings (via the POLY-MOD section) that allow for oscillator B and the filter envelope generator to function as modulation sources which can be applied to the frequency or pulse-width of oscillator A, or the filter frequency. Finally, each 5-voice synthesizer bank has a single LFO which can be applied to all of its voices for various effects. The two LFOs (UPPER and LOWER) can also be combined (summed) and applied to both polyphonic synthesizers for other effects.

The Prophet also contains a microcomputer, which serves several purposes: it determines which voice is assigned to which key, it keeps the voices in tune, and (most importantly) it remembers preset voice patches which may be instantly recalled to program the voices. These preset programs are retained by the microcomputer's memory even when the Prophet is turned off, thanks to a small battery with a 10-year life.

1-1 SET-UP

To set up the Prophet-10, simply plug the power cord into an AC outlet and connect the instrument to an amplifier via the AUDIO OUT jacks on the back panel. Both balanced (XLR connector) and unbalanced (¼" phone jack) outputs are provided. The MONO jack provides the output of all ten synthesizer voices. The UPPER and LOWER jacks can be used to separate the outputs of the two polyphonic synthesizer banks for stereo effects.

The fixture for the removable power cord also contains the main AC fuse, facilities for selecting between 100, 120, 220, and 240 volts AC line levels, and an AC line filter. Prophet-10s shipped in the USA will be set at 120, those shipped to Europe will be set at 220, and those shipped to Japan will be set at 100. The fuse used should match the AC setting: A 2-amp slo-blo fuse should be used for 110 and 120-volt operation, and a 1-amp slo-blo fuse should be used for 220- and 240-volt operation. (These specifications are indicated on the power cord fixture.)

As with most electronic equipment, the Prophet comes with a three-prong power plug to insure safe grounding with other pieces of equipment in use. The ground prong is connected to the chassis of the instrument. It is up to you to check the ground connections of the Prophet and all other instruments and equipment you use, to prevent potentially lethal shocks. As you probably know, many older buildings and clubs are not known for their quality AC wiring, so we urge you to use one of the several "ground-checking" devices available on the market to verify AC connections.

Because of the AC ground, a "ground loop" will often exist when a cable is plugged between the Prophet and an amplifier; as a result, low-level hum will often occur. Defeating the AC ground with a two-prong adapter will usually eliminate the noise, but it can also set up a shock hazard between the pieces of equipment. The amount of hum is dependent on where the two units are connected to AC.

For minimal hum, use the same outlet for both the Prophet and its amplifier; with this set-up, the hum will be low enough below the signal level to be acceptable. The further away from each other the plugs are connected to AC, the more hum will occur. The quality of wiring in the wall and wall socket will also affect the amount of hum.

Here is a summary of recommended procedures to follow when setting up the Prophet-10:

1) Plug the Prophet into a three-prong outlet. Don't defeat the AC-ground.
2) Plug all other connected equipment (amplifiers, volume pedals, effects devices, and other accessories) into the same outlet. (Warning: do not overload. When in doubt, consult an electrician.)
3) Verify all equipment grounding with a ground tester.

Sequential Circuits is not responsible for any equipment failure due to incorrect AC connections, and is not liable for any personal injury due to electrical shocks as a result of poor grounding.

1-2 TURN-ON AND INITIAL TUNING

The Prophet is turned on via the POWER switch on the rear panel. After the instrument is turned on, the front panel will be dark — except for the TUNE switch — for approximately 15 seconds while the computer tunes the oscillators. When tuning is complete the front panel will light up and the BANK-PROGRAM indicator (the digital display) in the PROGRAMMER section of the front panel will display "1-1" for both the UPPER and LOWER programming sections. This indicates that the Prophet-10 is ready to play and that its voices are programmed according to the settings stored in those locations in the computer's memory. In addition, the UPPER panel switch in the programming section will be lit, indicating that the UPPER program is displayed on (and connected to) the front panel patch controls. (Although separate UPPER and LOWER programs can be used at any time, there is only one set of front panel controls. Hence, only one of the two programs can be connected to the front panel controls at a time.)

1-3 MASTER OUTPUT CONTROLS

The MASTER VOLUME knob is used to adjust the overall volume of the Prophet-10's output.

The BALANCE knob is used to adjust the relative volume of the upper and lower synthesizer banks.

The *A*-440 switch activates a built-in, crystal-referenced *A*-440 oscillator which is accurate to .1 Hz in any environment. This reference oscillator is enabled by hitting the switch — the LED indicator in the switch will light. To turn the tone off, hit the switch again. (The *A*-440 signal is routed independently to both the upper and lower synthesizer banks. In order to be heard, the programmable VOLUME, MASTER VOLUME, and BALANCE knobs must all be set correctly — as well as any AMP footpedals.)

The MASTER TUNE knob is used to adjust the overall tuning of the Prophet-10's output. Tune by holding down a key (e.g. middle *A*) and matching either the *A*-440 reference or an outside pitch source.

1-4 PRESET SELECTION

When turned on, the Prophet automatically enters PRESET mode, meaning that it is ready to set up the synthesizer's voices according to preset patches stored in the memory of the Prophet's computer. Both the UPPER and LOWER presets are arranged in four banks of eight programs each (UPPER = 32 programs, and LOWER = 32 programs, for a total of 64 programs). These programs may be selected via the switches in the programmer section on the front panel. The switches marked BANK SELECT will step through the banks in order, and the two sets of eight switches marked PROGRAM SELECT (numbered 1 through 8) allow immediate selection of a particular program within a bank. To choose a program for either the UPPER or LOWER polyphonic synthesizer bank, step through the banks until you reach the bank you want, then hit the PROGRAM SELECT switch for the exact program you wish. The selected bank will be indicated by the digital display in the programmer section, and the selected program will be indicated both by the digital display and by the LEDs embedded in the PROGRAM SELECT switches. You will be able to see which program is selected for both the UPPER and the LOWER synthesizer bank. The PANEL select switches will allow you to choose which of these two programs you wish to have displayed on (and connected to) the front panel patch controls.

Since the Prophet is shipped with a full complement of 64 factory programs it will be ready to play as soon as it has been turned on and the initial tuning procedure has ended. For information on these factory-loaded patches, see SECTION 7, THE FACTORY PRESET PROGRAMS. For information on MANUAL operation, see SECTION 3, THE PATCH CONTROLS.

1-5 PITCH AND MOD WHEELS

The pitch wheel (PITCH) and modulation wheel (MOD) are located to the left of the upper keyboard. Normally, both wheels affect all voices simultaneously. The PITCH wheel has a center detent position, from which the pitch may be varied up or down by about a 5th. Both wheels can be "disconnected" from the LOWER program by holding the LOWER TRANSPOSE DOWN switch and hitting the LOWER TRANSPOSE UP switch. Repeating this procedure will re-connect the wheels. This is useful when using the poly-sequencer.

The MOD wheel determines, for the most part, the amount of modulation to be routed via the MONO-MOD settings of a particular program. The total amount of modulation to be routed is determined by the sum of the settings of: 1) the programmable LFO AMOUNT knob in the MONO-MOD section on the front panel; 2) the MOD wheel; and 3) the voltage supplied from PEDAL 1 (if it is programmed to affect the MONO-MOD section). Note that the MOD wheel may have different results on the upper and lower programs, since the MONO-MOD sections may be programmed differently. For information on the effects that may be engaged via the MOD wheel relative to the various factory-programmed patches, see the notes accompanying each patch diagram in SECTION 7.

1-6 TRANSPOSE SWITCHES

These switches allow instant octave transposition of either UPPER or LOWER programs, within an overall four-octave range. Each touch of the switch will raise or lower the program by an octave. The relationship between this overall range and the TRANSPOSE switches is determined by the settings of the FREQUENCY knobs in the oscillator sections of the front panel. These knobs also have a four-octave range; and if, for instance, both oscillators were set at the top of their frequency range in a particular program, the TRANSPOSE UP switch would have no effect (the TRANSPOSE DOWN switch would in this case have a four-octave range). In addition, the TRANSPOSE switches always operate to the limit of their range. If you begin with a program that has the oscillators tuned an octave apart, and continue to hit the TRANSPOSE UP switch, both oscillators will end up in unison at the top of their range.

The computer remembers the number of times you strike a particular TRANSPOSE switch, even if it has ceased to have an effect on the oscillators. Here is an example of what this means in actual use: You begin with both oscillators set two octaves up (with their respective FREQUENCY knobs); then you hit the TRANSPOSE UP switch five times. The last three strokes will no longer transpose the oscillators, but the computer is still counting, so in order to transpose down again, you will have to hit the TRANSPOSE DOWN switch three times before anything happens. On the fourth stroke the oscillators will transpose down an octave.

If the KEYBOARD switch on OSCILLATOR B is off, the TRANSPOSE will have no effect on that oscillator. OSCILLATOR A will always be affected.

If the KEYBOARD switch in the FILTER section of the patch panel is lit, the TRANSPOSE switches will also connect to the CUTOFF FREQUENCY of the filter. Since this parameter has a much greater range than that of the oscillators (10 octaves), successive strokes of the TRANSPOSE switches may continue to alter the CUTOFF setting after the oscillators have reached the limit of their range.

None of the transpose operations performed with the TRANPOSE switches can be recorded as part of a program. In order to change octaves permanently, you must adjust the FREQUENCY controls on the oscillators (and perhaps the CUTOFF control on the filter).

To return quickly to the original programmed octave after transpositions via the TRANPOSE switches, simply hit the PROGRAM switch for the program you are playing or change to a new program. (Adjusting either FREQUENCY knobs will also cancel the effects of the TRANSPOSE switches.)

1-7 VOICE ASSIGNMENT

The assignment of voices to keys played on the keyboard is done by the Prophet's computer. If the same key is struck repeatedly, the computer will continue to assign the same voice. If more than five keys are held down at the same time on either keyboard in NORMAL keyboard mode, the computer will reassign the earliest used voices first; for example, playing *C, D, E, F, G,* and *A* in succession and holding all six keys down will cause *D, E, F, G,* and *A* to be sustained — the *C* will disappear when the *A* is played. In other words, the Prophet normally operates on a "last-note priority" system: each new note played is assigned to the earliest-used voice. In DOUBLE keyboard mode, reassignment will begin if more than five keys are held down (total) on both keyboards. In SINGLE and ALTERNATE keyboard modes reassignment will occur if more than ten keys are held down on both keyboards.

There are two exceptions to this system. First, if the UNISON switch is on, all five voices are assigned to a single key. UNISON assigns priority to the highest key held. This is particularly useful in DOUBLE keyboard mode. (In UNISON mode, the keyboard operates in single trigger fashion: there will not be a new trigger unless there is a space between key depressions.)

The second exception to normal voice assignment is provided for the occasion when a voice may become "unplayable" due to component failure. In such cases, a VOICE DEFEAT allows you to eliminate the bad voice from the assignment system. The Prophet can then be played normally, with the remaining voices. The VOICE ASSIGNMENT lights allow you to see which voice is failing.

To defeat a voice, hold the key currently assigned to it with one hand while holding UPPER PROGRAM SELECT 1 and pressing UPPER PROGRAM SELECT 8 with the other hand. The voice will be defeated, the corresponding light will go out, and the voice will remain defeated until the Prophet's power is switched off.

Defeating a voice in one synthesizer bank will also defeat the corresponding voice in the other bank. For instance, defeating voice 4 in the UPPER synthesizer will also defeat voice 9 in the LOWER synthesizer.

If power is turned off, then on again — the voice will have to be defeated again (if it is still bad).

1-8 RETUNING

Although the computer tunes the oscillators when the Prophet is first turned on, it may become necessary to retune, particularly during the first few minutes of operation since the oscillators need time to stabilize. After 20 minutes or so the instrument should not have to be retuned very often, unless there is a radical temperature change in the room.

Hitting the TUNE switch will tell the computer to retune the oscillators. When this is done the front panel will go dark — except for the TUNE switch — for approximately 15 seconds, and then will return to the previous front panel status.

SECTION 2
BASIC PROCEDURES

2-0 INTRODUCTION: THE FRONT PANEL

The Prophet-10's front panel controls are color-coded to clarify the modes of operation and the function of the computer's memory. All black knobs and switches are programmable; that is, their settings can be recorded into memory and recalled in PRESET mode.

The silver knobs (MASTER VOLUME, BALANCE, and MASTER TUNE) and grey switches (PRESET, A-440, TUNE, and TRANSPOSE switches, and the entire PROGRAMMER section) are not programmable. The PITCH and MOD wheels are also not programmable. The RECORD switch is orange, so that it can easily be distinguished.

All of the switches except BANK SELECT and TRANSPOSE have LED indicators embedded in them. And, except for the two sets of 8 PROGRAM SELECTS, PANEL, KEYBOARD MODE, and TUNE, all LED switches are alternate action: one push turns them on, the next push turns them off. For example, the PRESET switch LED when lit indicates PRESET mode. The LED goes off when the Prophet is switched to MANUAL mode, by pushing the (lit) PRESET switch.

2-1 MODES OF OPERATION

In PRESET (PRESET switch LED lit) the Prophet-10's synthesizers will be patched according to the programs stored in the locations indicated on the digital display. In this mode, entire patches can be changed instantaneously using the BANK SELECT and PROGRAM SELECT switches in the programmer section.

In addition to PRESET, the Prophet has MANUAL and RECORD modes of operation. In MANUAL mode a patch can be formed entirely "from scratch." RECORD is a momentary mode for storing or relocating programs. A "patch" becomes a "program" when recorded. Custom programs can therefore by created in two ways: 1) by recording manually-formed patches or 2) recording edited programs. (Edited programs can be recorded into the original location if the original program is not desired, or into a new location.)

In MANUAL mode the control panel always indicates the status of the patch under construction. You can see exactly what signal paths are closed by (lit) switches. The knob settings reflect their actual values. As you select different programs in PRESET the switch LEDs still indicate how the switches are programmed. Note that the knobs cannot move with program changes, but stay where they were last set. So, in PRESET the knobs do not normally indicate their "current" setting. However as soon as you move a knob to EDIT a program, that knob converts to MANUAL operation. So only the knobs you move will actually indicate their current setting: the parameters controlled by unmoved knobs do not change.

This EDIT feature of PRESET mode is a powerful tool that allows you to experiment with changes in programs, using the patch controls. The original program remains unchanged and can be restored at any time by simply hitting its PROGRAM SELECT again.

For example, suppose you like program 3-3 but want to change OSC A pitch and prefer a brighter tone. In PRESET mode, select BANK 3 - PROGRAM 3, adjust OSC A FREQUENCY to the desired pitch and increase the FILTER CUTOFF to the desired brightness. You can cancel any changes and return to the original program by hitting PROGRAM SELECT 3. If you want to permanently change program 3-3 to your edited version, record it in 3-3. Or, if both the original and edited versions are wanted, record the edited program in a new location. Remember that even though two programs (UPPER and LOWER) can be selected at a time, only the program indicated by the PANEL select switches can be altered via the front panel patch controls. However, edited changes are remembered when the UPPER and LOWER PANEL switches are hit. Hence, one can select UPPER and edit the UPPER program, and select LOWER and edit the LOWER program independently as desired. Both programs will play in their edited form, even if you switch back and forth a number of times.

NOTE — If a particular patch is programmed with the RELEASE switch off but with a programmed amplifier envelope RELEASE setting that will have an audible effect, this release can be engaged (while in PRESET mode) by switching the RELEASE switch on, or using the footswitch. Further modifications (non-permanent changes) to the preset programs can be brought about through the use of other accessories which connect to the Prophet via jacks in the back panel. For information on these possibilities, see SECTION 4 ACCESSORIES. Remember that the RELEASE switch and knob settings may be different on the upper and lower programs. Hence, the footswitch may have an effect on one program and not the other depending on the different settings.

2-2 RECORDING PROGRAMS

In general, to record a manually-formed patch or edited program, the RECORD switch is pressed on, then the desired destination BANK and PROGRAM are selected. NOTE — To protect existing programs, RECORD mode can only be entered if the back panel RECORD ENABLE/DISABLE switch is up (ENABLE). It is suggested that the switch be left in the DISABLE position until the modes of operation and control functions are understood. This will prevent the accidental erasure of the factory preset programs (Remember also that an accidental erasure is not a disaster, since by referring to the diagrams in SECTION 7 you can always patch a factory program manually, and re-record it).

The exact RECORD procedure is as follows:

1) Set the back panel RECORD ENABLE/DISABLE switch to the ENABLE (up) position.

2) Switch on the orange RECORD switch in the PROGRAMMER SECTION.

3) Select the desired general location (UPPER or LOWER) by using the PANEL select switches.

4) Select the desired bank using the BANK SELECT. (Ignore this step if current BANK is desired).

5) At this point you can abort RECORD mode by switching the RECORD switch off. The memory will not be affected.

6) Otherwise, pressing any PROGRAM SELECT will cause the patch or edited program to be recorded at the corresponding location in the selected bank. NOTE — Make sure to hit the correct PROGRAM SELECT switch or you may erase a program you wanted to keep.

7) When a PROGRAM SELECT switch has been hit, the RECORD switch LED will automatically go off and the Prophet will return to the mode it was in before recording.

8) After recording a patch it is always a good idea to return to PRESET mode and check that the program is correctly recorded in the desired location.

To move a program from one location to another (edited or not), the procedure is as follows:

1) Select the program to be moved (set PANEL, BANK, PROGRAM).

2) Edit the program (if desired).

3) Hit RECORD switch (latches up current program).

4) Change PANEL if necessary (for moving from UPPER to LOWER or vice-versa).

5) Select destination BANK (if necessary).

6) Hit desired PROGRAM SELECT.

7) This new location now has the old program stored in it. In order to play the program, it is necessary to hit the PROGRAM SELECT a second time to "load" the program.

2-3 KEYBOARD MODES AND THE UPPER/LOWER PANEL SWITCHES

The four programmable KEYBOARD MODE switches are an important part of the basic operation of the Prophet-10, since they determine the relationship between the two 5-voice polyphonic synthesizers and the two keyboard manuals. They offer a great range of possibilities for playing the programs stored in the Prophet's UPPER and LOWER program sections.

NORMAL Mode: The UPPER five voices (connected to the UPPER program) play on the upper keyboard, while the LOWER five voices (connected to the LOWER program) play on the lower keyboard.

SINGLE Mode: All ten voices will be assigned and will play their own UPPER or LOWER program. Usually the UPPER and LOWER programs are set up to be the same. The notes can be played on either keyboard in any combination.

DOUBLE Mode: Hitting a key (on either keyboard) will engage one voice with the UPPER program and one voice with the LOWER program. Only five keys can be played at one time (since each key is connected to *both* of the 5-voice synthesizer banks).

ALTERNATE Mode: Every new key hit will alternate between the UPPER and LOWER programs.

As can be seen, NORMAL is the only mode in which it makes a difference which keyboard is physically played. In the other three modes the keyboards can be used interchangably — together or separated.

So, these switches determine how the Prophet-10 will be played. There is also another factor in setting up the playing mode of the instrument: the choice of program being displayed on the front panel patch controls. Since the KEYBOARD mode switches are programmable, their status is recorded along with each patch. At any given time, there will be two selected programs (UPPER and LOWER), but the KEYBOARD mode operation will be determined *only* by the program that is displayed on the front panel patch controls. Therefore, the UPPER/LOWER PANEL switches also play a role in determining the playing configuration on the Prophet. For example, look at programs U-1-1 and L-1-1 — both are patches with a brass sound. If U-1-1 is displayed, the Prophet will operate in NORMAL keyboard mode, but if L-1-1 is displayed, the Prophet will operate in DOUBLE keyboard mode.

These interrelations can be used to enhance the flexibility of the Prophet-10 as a live performance instrument.

SECTION 3
THE PATCH CONTROLS

3-0 INTRODUCTION: THE FRONT PANEL

This section explains the functions of the patch controls comprising the "modules" (e.g. VCO, LFO, VCF, and VCA) outlined on the front panel. The alternatives of each switch and ranges of each knob are described relative to the overall signal flow of the voices and to the modulation circuitry.

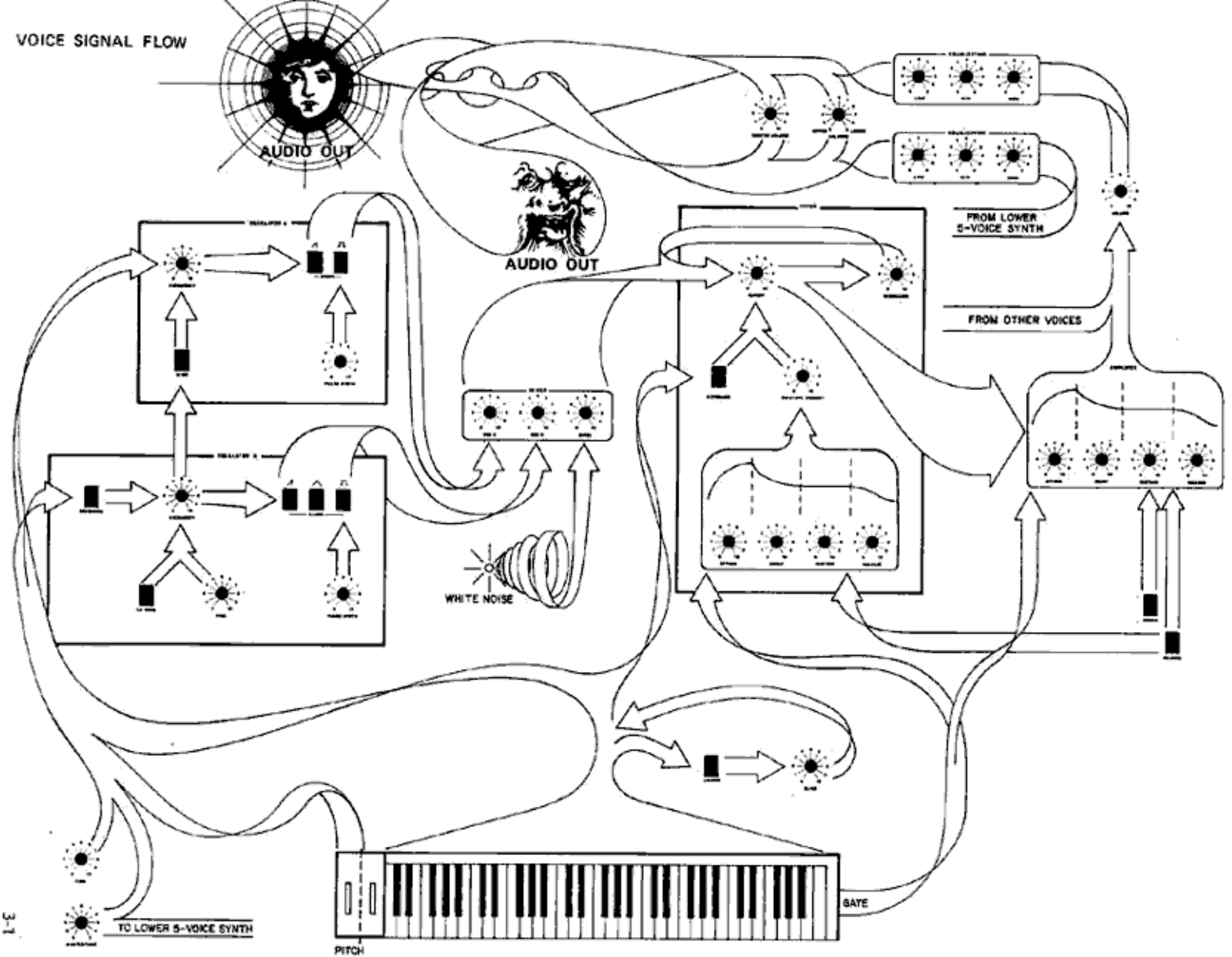
In SECTION 1 and SECTION 2, we described the basic operation of the Prophet using the factory programs accessible through the UPPER and LOWER PROGRAMMER. It is true that the Prophet can be used exclusively in PRESET mode, in which case the voice and modulation patch controls would not be used very often. However it is also true that using the instrument in this way would defeat a large part of its overall purpose, which is to allow synthesists to create and record their own programs for immediate use. The creation of satisfying custom programs depends entirely on your familiarity with the patch controls.

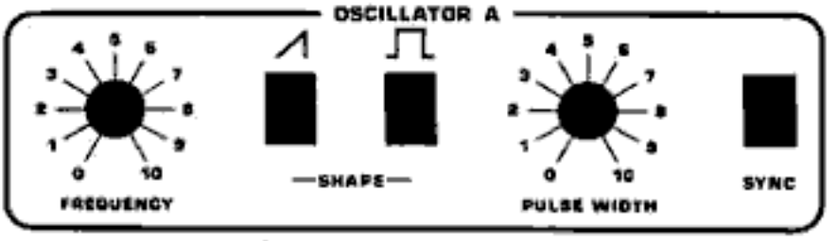
By the way, in describing the controls this section will not attempt to be a manual of synthesis technique. However by referring to the patch diagrams in SECTION 7 while playing through the factory programs, you will soon grasp some of the sonic possibilities the Prophet makes available. As explained in SECTION 7, we particularly encourage you to EDIT the factory programs (see paragraph 2-1, MODES OF OPERATION). This is the best way to gain familiarity with the patch controls.

For more information on synthesis technique, refer to the books and magazines listed in SECTION 6.

3-1 VOICE SIGNAL FLOW

The Prophet's audio output results from several stages of signal generation, combination, and modification. The front panel is divided into VOICE and MODULATION sections. (MODULATION controls are covered in paragraph 3-8). It should be kept in mind that although only one voice is depicted on the panel, the voice controls simultaneously patch five voices in parallel. The figure diagrams signal flow in a single voice. Basically, the MIXER sets OSCILLATOR (VCO) A, B and NOISE levels sent to the FILTER (VCF) and AMPLIFIER (VCA) where, roughly speaking, the timbre and dynamics are shaped. The EQUALIZER section further modifies the frequency spectrum. Then the voices of each 5-voice synthesizer bank are combined and their overall level and tuning are set by the VOLUME and TUNE controls. Finally the two synthesizer banks are combined, and the instrument's overall level and tuning are set by the MASTER VOLUME, BALANCE, and MASTER TUNE controls.





FREQUENCY knob: Controls pitch (oscillator tuning). Stepped (quantized) in semitones over a four-octave range. (Exact pitch is set with the MASTER TUNE knob.)

NOTE:

— OSC A pitch is always under keyboard control.

SAWTOOTH WAVESHAPE switch: When on, a sawtooth wave (containing all the harmonics) is supplied as OSC A's output.

PULSE WAVESHAPE switch: When on, a pulse wave is supplied as OSC A's output. Harmonic content is dependent on the setting of the PULSE WIDTH knob.

NOTES:

— When both the sawtooth and pulse switches are on, sawtooth and pulse waves are mixed at full level and supplied as OSC A's output.

— When neither waveshape switch is on, no signal is supplied as OSC A's output.

PULSE WIDTH knob: Sets OSC A pulse width from approximately 1% to 99%. (Varies harmonic content of pulse output.)

NOTES:

— The extreme settings of this knob (0 and 10) may cause the OSC A signal to degenerate to DC, resulting in no output signal (of course, this knob will only have this effect if the pulse waveshape is selected).

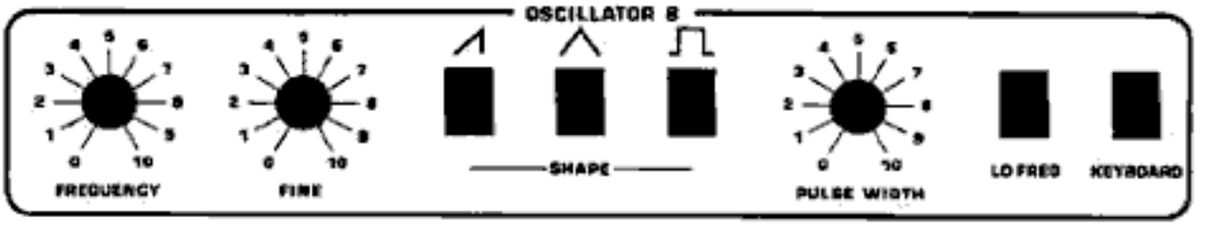
— An exact square wave (having only odd harmonics) may be obtained by setting this knob to approximately 5 and adjusting by ear for the drop out of the 2nd harmonic (the octave).

SYNC switch: when on, OSC A becomes "hard" synchronized to OSC B, and will therefore tune only to harmonic frequencies of OSC B. Intermediate frequency settings will produce unusual waveforms (and therefore unusual timbres) at the next lower harmonic of OSC B. To gain an understanding of the effect of SYNCing, check the following factory preset programs: 1-4, 1-7, 3-2, and U-4-3.

NOTES:

— When a pulse shape with a wide pulse width is selected for OSC A in sync with OSC B, and if OSC B's frequency is set much higher than that of OSC A, the signal from OSC A may degenerate into DC since the pulse is not given a chance to discharge before being re-synced.

3-3 OSCILLATOR B



FREQUENCY knob: Controls pitch (oscillator tuning). Stepped (quantized) in semitones over a four octave range. (Exact pitch is set with the MASTER TUNE knob.)

NOTE:

— If the KEYBOARD switch is off, the FREQUENCY knob will have a range of nine octaves.

FINE knob: Continuously varies pitch over a semitone range (up from the basic pitch setting of the FREQUENCY knob). This knob is useful for detuning of OSC B relative to OSC A. When no detuning is desired, the FINE knob should be set at 0.

SAWTOOTH WAVESHAPE switch: When on, a sawtooth wave (containing all harmonics) is supplied as OSC B's output.

TRIANGLE WAVESHAPE switch: When on, a triangle wave (containing only odd harmonics) is supplied as OSC B's output.

PULSE WAVESHAPE switch: When on, a pulse wave is supplied as OSC B's output (harmonic content is dependent on the setting of the PULSE WIDTH knob).

NOTES:

— When two or three of the waveshape switches are on, the selected waveshapes are mixed at full level and supplied as OSC B's output.

— When no waveshape switch is on, no signal is supplied as OSC B's output. However, the overall pitch range of a particular patch may still be determined by the FREQUENCY knob setting of OSC B, if OSC A is in SYNC with it.

PULSE WIDTH knob: Sets OSC B pulse width from approximately 1% to 99%. (Varies harmonic content of pulse output.)

NOTES:

— The extreme settings of this knob (0 and 10) may cause the OSC B signal to degenerate to DC, resulting in no output signal (of course, this knob will only have this effect if the pulse waveshape is selected).

— An exact square wave (having only odd harmonics) may be obtained by setting this knob to approximately 5 and adjusting by ear for the drop out of the 2nd harmonic (the octave).

LO FREQUENCY switch: When on (with the KEYBOARD switch off), OSC B will function as a low frequency oscillator (LFO), ranging from approximately .4 Hz (or 2.5 seconds-per-cycle) into low audio frequencies. This function is usually used in conjunction with the POLY-MOD section (see paragraph 3-8).

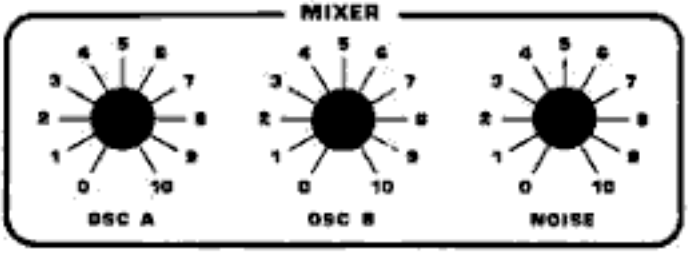
KEYBOARD switch: When on, the frequency of OSC B is controlled by the keyboard. When off, the frequency of OSC B will not be controlled by the keyboard.

NOTES:

— If the KEYBOARD switch is off and the LO FREQ switch is off, OSC B will act as a drone in the audio range. Set the pitch of this drone with the FREQUENCY knob *after* the KEYBOARD switch is turned off (otherwise you may have to retune).

— The use of OSC B as a modulation source for the POLY-MOD will be discussed in paragraph 2-8. Normally, when OSC B is being used as an audio signal source, the LO FREQ switch will be off and the KEYBOARD switch will be on. (For exceptions to this general rule, check some of the patch diagrams for the factory presets loaded in bank 5.)

3-4 MIXER



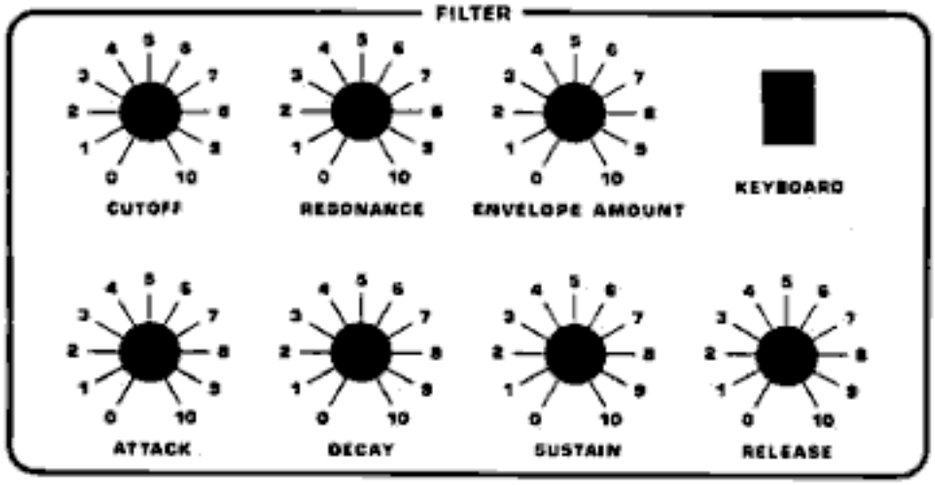
OSC A knob: Determines the amount of OSC A's output sent to the filter.

OSC B knob: Determines the amount of OSC B's output sent to the filter.

NOISE knob: Determines the amount of white noise (combination of all frequencies) sent to the filter.

NOTES:

— These mixer amount knobs are also used to program overall volume of the patch so that when switching from one program to another in PRESET mode one program won't be wildly different in volume than the others.



CUTOFF knob: The Prophet's filters are 4-pole, 24 dB-per-octave low-pass filters and therefore the cutoff knob sets the frequency below which all elements of the signal are let through. The higher frequency components of the signal (i.e. the frequencies above the cutoff frequency) are suppressed. The higher the knob is set, the more frequencies are allowed through the filter. In general terms, the CUTOFF knob may be thought of as a tone control.

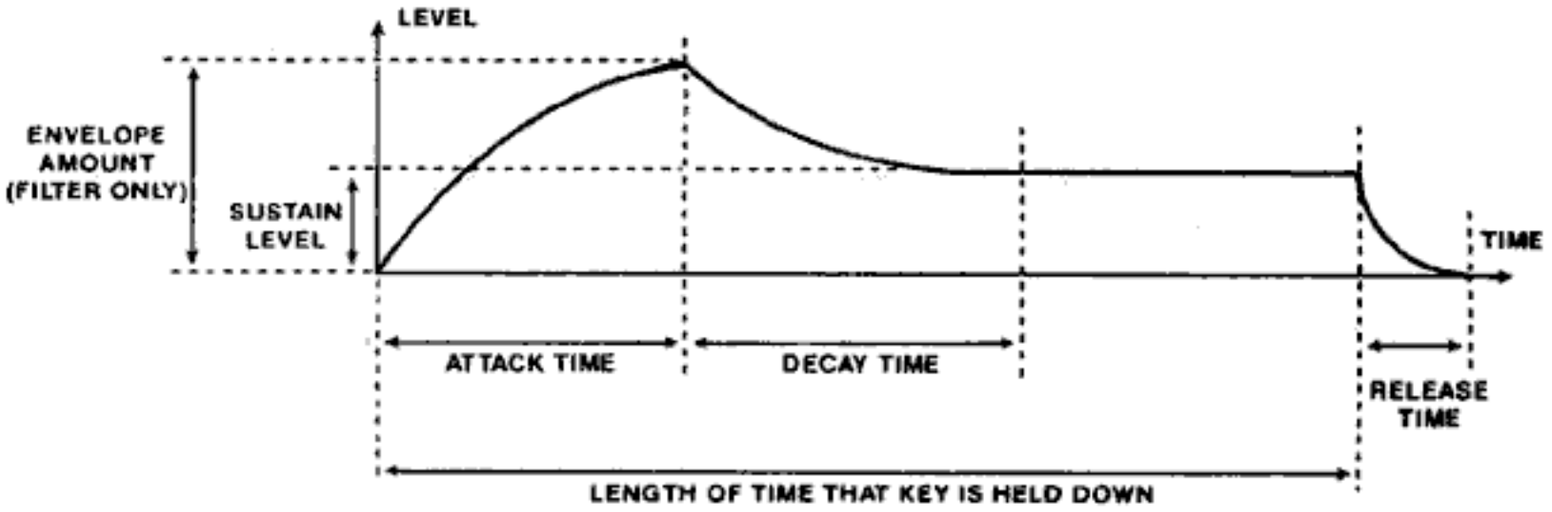
RESONANCE knob: As the setting of this knob is increased from 0 to approximately 7, the amount of resonance ("emphasis", "regeneration", or "Q") applied to those signal frequencies at the cutoff frequency will increase (as the resonance increases, the frequencies far below the cutoff frequency will be less audible relative to the frequencies being resonated). If the setting is increased beyond 7, the filter will break into oscillation and will act as a sine wave audio source whose pitch is determined by the cutoff frequency.

ENVELOPE AMOUNT knob: The filter cutoff frequency may be contoured (shaped) electronically in a pattern determined by the settings of the ATTACK, DECAY, SUSTAIN, and RELEASE knobs (these are the controls for the ADSR envelope generator that is connected to the filter). The envelope amount knob determines the amount (but not the shape) of this contouring that is applied to the filter's cutoff frequency.

NOTES on the ENVELOPE GENERATORS:

— The ADSR envelope generators whose controls appear as the ATTACK, DECAY, SUSTAIN, and RELEASE knobs in the filter and amplifier sections generate voltage patterns that can be used to contour timbre (via the filter's cutoff frequency) and loudness (via the VCA, see paragraph 3-6) respectively. The voltage patterns generated have four stages (one for each knob) as illustrated. The entire contour pattern is initiated when a key is depressed and proceeds through the attack and decay stages at rates determined by the settings of those knobs. The sustain level is determined by the setting of the SUSTAIN knob, and is maintained as long as the key is held down. When the key is released the release stage is activated and proceeds at a rate determined by that knob.

— In the FILTER section, the ENVELOPE AMOUNT knob functions as an attenuator on the voltage patterns from the filter's envelope generator. There is no comparable attenuator connected to the VCA's envelope generator.



ATTACK knob: Determines the length of time it takes the envelope generator's contour to go from 0 level (at initial key depression) to maximum level.

DECAY knob: Determines the length of time it takes the envelope generator's contour to go from maximum level to sustain level. If SUSTAIN is set at maximum then the DECAY knob setting is irrelevant.

SUSTAIN knob: Determines the sustain level of the envelope generator's contour. Remember, this is a level setting, not a time setting; the sustain time is determined by the key being held down.

RELEASE knob: Determines the length of time it takes the envelope generator's contour to drop from the sustain level to 0 level after the key is released. If the key is released before the attack and decay stages of the envelope are complete, the RELEASE knob setting will determine the length of time for the contour to drop from its level at the time of key release to 0 level. If the sustain is set at 0 and the attack and decay stages are complete (while the key is still depressed) then the release setting is irrelevant.

NOTES:

— The time range on the ATTACK, DECAY, and RELEASE knobs is approximately 1 millisecond to 30 seconds. Since the response to the knob is exponential, the durations as set on these knobs will not be linear; for example, setting 5 on these knobs gives a period of approximately ½ second.

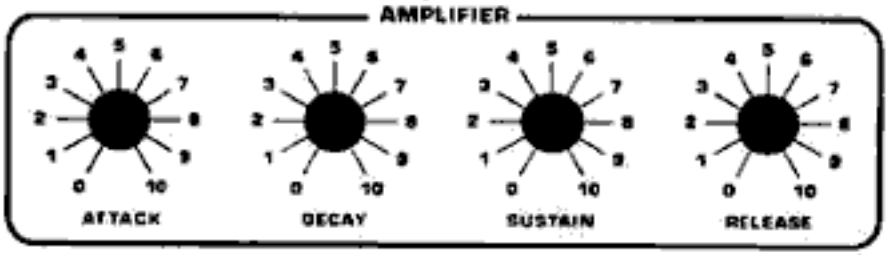
— Remember that, for the FILTER only (not the VCA), the overall level of the envelope generator's contour is determined by the ENVELOPE AMOUNT knob. If the envelope amount is set at 9 then the envelope will have no effect on the filter's cutoff frequency.

KEYBOARD switch: When on, the control voltage from the keyboard will be applied to the filter's cutoff frequency (just as it is normally applied to the frequency of the oscillators). This patch maintains the cutoff frequency at a constant level relative to the notes played on the keyboard, and therefore creates a consistency of tone color over the entire range of the keyboard. When this switch is off, notes played higher on the keyboard will have more of their overtones suppressed than notes played lower on the keyboard; as a result, notes played in the higher register of the keyboard will be less bright in tone color than those notes played in the lower register of the keyboard.

NOTES:

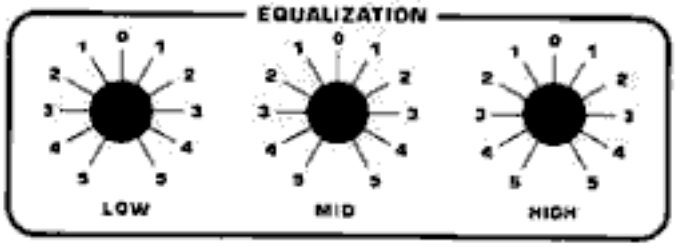
— If the filter RESONANCE is set so that the filter is in oscillation (i.e. generating a sine wave), then switching the KEYBOARD switch on will allow the frequency of this sine wave to be controlled from the keyboard. Unless a complex effect is desired when playing the filter's sine wave in this way, the envelope generator setting will normally be set at 0; the ENVELOPE AMOUNT knob should also be set at zero in this case (in order to maintain a steady response from voice to voice).

3-6 AMPLIFIER



The **ATTACK**, **DECAY**, **SUSTAIN**, and **RELEASE** controls in the amplifier section determine the settings for the amplifier's ADSR envelope generator. For details on the function of these knobs, see the "NOTES on the ENVELOPE GENERATOR" and the notes on the ATTACK, DECAY, SUSTAIN, and RELEASE knobs in paragraph 3-5.

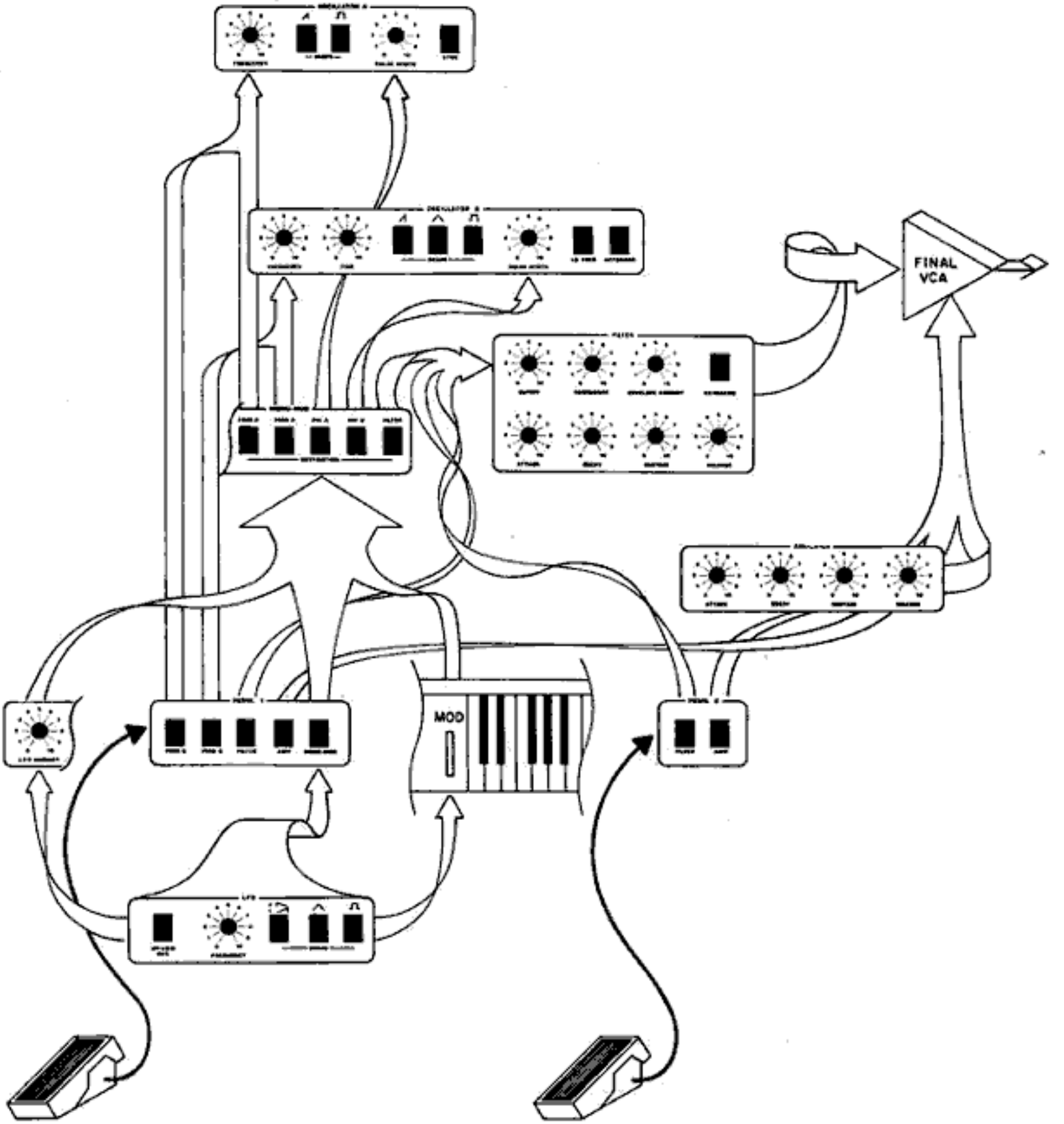
3-7 EQUALIZATION



LOW knob: provides cut/boost facilities for lower frequency signals.

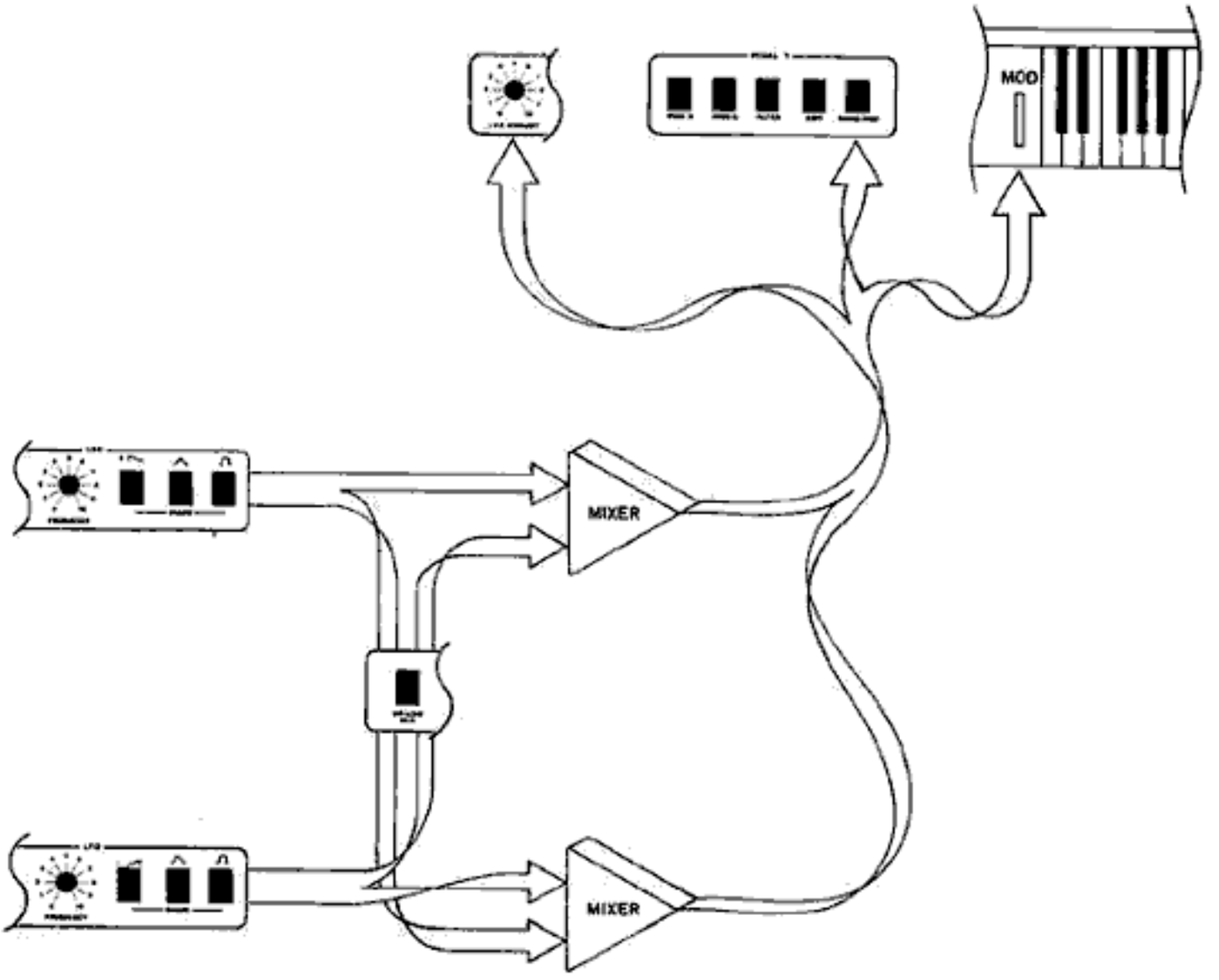
MID knob: provides cut/boost facilities for mid-range frequency signals.

HIGH knob: provides cut/boost facilities for high frequency signals.

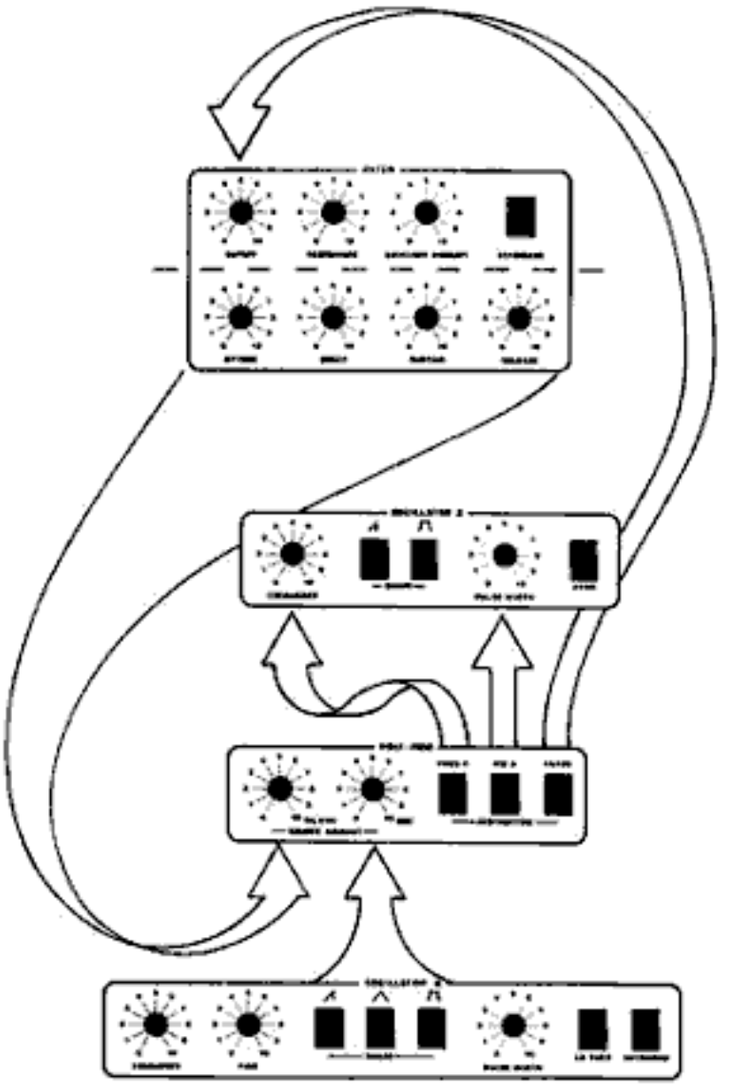


The Prophet provides two distinct modulation systems, MONOphonic-MOD and POLYphonic MOD. Modulation involves a source and a destination; the destination is modulated (changed) in a pattern determined by the source. The MONO-MOD system, diagrammed above, uses a low-frequency oscillator (LFO) with sawtooth, triangle, and square waves as source material. Note that the UPPER synthesizer bank provides a descending sawtooth wave as a modulation source, while the LOWER synthesizer bank has an ascending sawtooth wave. These modulation sources can be routed to the frequency and pulse-width of OSC A (FREQ A, PW A), the frequency and pulse-width of OSC B (FREQ B, PW B), the filter's cutoff frequency (FILTER), or any combination thereof.

The amount of modulation directed to these destinations is determined by the programmable LFO AMOUNT knob, the non-programmable MOD wheel, and PEDAL 1 (if it is programmed to control MONO-MOD). The amounts from these three sources are summed, determining the total amount of modulation. The FREQUENCY knob in the LFO section determines the LFO frequency (or rate), the overall range being approximately .04 Hz (or 25 seconds-per-cycle) to 20 Hz. The SHAPE switches determine the waveforms used as the LFO portion of the modulation source. (When more than one waveshape switch is on, the selected waveshapes are mixed at full level.)



The UP-LOW MIX switches allows the UPPER LFO and the LOWER LFO to be mixed (at full level) and applied to both the UPPER and LOWER program selected. This is useful for performing "double modulation" effects. If you wish to apply one LFO to both UPPER and LOWER, simply program one LFO as desired, program nothing on the other LFO (all shape switches off) and program UP-LOW MIX on. This is useful when synchronized modulation is desired on both UPPER and LOWER programs.



In the Prophet's unique POLY-MOD section, five LFOs (OSC B in LO FREQ mode) or five filter envelope generators—one from each of the five voices in either polyphonic synthesizer bank—can be used as modulation sources (see above). Although the modulation routing will be the same for each voice, the minute differences between the voices (the phase relationships of the oscillators, for instance) will create modulation effects that will be slightly different from voice to voice and from note to note. This is in direct contrast to the WHEEL-MOD section where, since a single modulation source is applied equally to all five voices, the modulation effect is exactly the same from note to note.

As said above, OSC B and the filter envelope generator are the possible sources for modulation in the POLY-MOD section. The amounts of each source are determined by the SOURCE AMOUNT knobs. The possible destinations are frequency of OSC A (FREQ A), pulse-width of OSC A (PW A), and the filter's cutoff frequency (FILTER). There will be no modulation via the POLY-MOD section if the SOURCE AMOUNT knobs are set at 0 or if all destination switches are off.

POLY-MOD with OSC B as source is useful for creating clangorous sounds such as bells, chimes, percussive sounds, and "ring modulation" type sounds. Various pitch and timbre sweeps may be obtained using the filter's envelope generator as source. The LO FREQ switch *on* and/or KEYBOARD switch *off* settings in the OSC B module are primarily for use when OSC B is used as a POLY-MOD source rather than a signal source.

In order to get an idea of some of the modulation possibilities offered by the POLY-MOD section of the Prophet, study its use in some of the factory preset programs.

3-9 MISCELLANEOUS

RELEASE switch: When off, the amplifier and filter release times are approximately 0 (instant release). (Actually, the release time is set at about 2 when the RELEASE switch is off, so there won't be an audible "whack" when the key is released — which would be caused by the instantaneous closing down of the VCA).

NOTES:

— This switch must be off to allow for the operation of the RELEASE footswitch (see SECTION 4 ACCESSORIES).

— Remember that this switch is separately programmable for UPPER and LOWER programs, even though only one setting is visible. This is important relative to the use of the RELEASE footswitch.

DRONE switch: When on, the amplifiers on all voices (within the programmed synthesizer bank) will stay on for continuous sound once they are engaged via the keyboard. If the SUSTAIN in the AMPLIFIER section is set to zero, you will not get a drone effect.

UNISON switch: When on, the Prophet will assign all five voices (within the programmed synthesizer bank) to the highest played note. In other words, in UNISON mode the Prophet becomes a very "fat" monophonic synthesizer.

GLIDE knob: Effective only in UNISON mode, this knob determines the rate of glide (portamento) between notes played on the keyboard.

NOTES:

— Remember that these controls are programmed separately for the UPPER and LOWER synthesizer banks. Only one program status will be visible, but both will be operative.

— In UNISON mode the synthesizer bank will function on a high-note priority system. This is useful for DOUBLE mode lead-line-plus-chord effects. (UPPER program in UNISON, LOWER program not in UNISON).

TUNE knob: For detuning one synthesizer bank relative to the other; will vary pitch continuously over a semitone range (up from the basic pitch setting of the oscillators). If no detuning is desired, the TUNE knob should always be set at 0.

VOLUME knob: For setting the overall level of programs relative to one another within one synthesizer bank. This will allow for equal volume levels from program to program within a given series of programs.

NOTES:

— If the MIXER, EQUALIZATION, and VOLUME knobs are all set at full level, the synthesizer may distort. There are many levels of volume control on the Prophet-10, and they should be used judiciously.

PEDAL 1 & PEDAL 2: These programmable switches allow for the routing of two external control voltages to various destinations. (The Prophet-10 is shipped with two pedals for this purpose, but other voltage sources may be used as well; see SECTION 4, ACCESSORIES.) PEDAL 1 may be routed to the FREQUENCY of OSC A (FREQ A), the FREQUENCY of OSC B (FREQ B), the CUTOFF frequency of the filter (FILTER), the VCAs (AMP), the MONO-MOD section, or any combination of the above. PEDAL 2 may be routed to the CUTOFF frequency of the filter (FILTER, the VCAs (AMP), or both. The amount of voltage applied to these sources will be determined by the position of the pedal (or by the output of any other control-voltage device used).

NOTES:

— Remember once again that the routings for these pedals can be different for the UPPER program and the LOWER program: the same pedal could have an entirely different function, depending on which keyboard manual you play (and on which keyboard mode you are on). Only one routing will be displayed, but both the UPPER and LOWER routing will be functional.

— If you do not plan to connect the pedals to the Prophet-10, it is best to program all of these switches off. *If the AMP switch is engaged for either pedal and no pedal is plugged in, the VCAs for that synthesizer bank will remain closed and no sound will come from the instrument.*

SECTION 4
ACCESSORIES AND THE BACK PANEL

4-0 INTRODUCTION

The Prophet-10 is shipped from the factory with two foot pedals and two foot switches, all of which can be connected to the instrument via the back panel to provide many different kinds of nuance control over the output of the synthesizer banks. Other interface capabilities are also provided, which may be used if desired to create even more external control.

4-1 CONTROL VOLTAGE IN — PEDALS 1 AND 2

The two voltage pedals shipped with the Prophet are connected to it via the two ¼" jacks labeled CV IN. The routings of these two pedals are determined by the programmable switches on the front panel labeled PEDAL 1 and PEDAL 2 (see SECTION 3, paragraph 3-9). These voltage pedals are the most common devices for use in this context, but various other devices (such as a ribbon controller, and x/y joystick controller, or a sample-and-hold module) will also provide for control of various interesting effects. All voices within a given synthesizer bank will be affected equally by the input voltages. Note that these inputs are *not* calibrated at 1 v/octave.

4-2 FOOTSWITCHES

The ¼" jack labeled RELEASE allows for footswitch control of the release portion of the filter and amplifier envelope generators. It functions in much the same manner as the RELEASE switch on the front panel, and is only operative when the RELEASE switch is off. It then takes the place of the RELEASE switch: when pushed, the programmed amplifier release time is engaged; when not pushed, the programmed amplifier release time is not engaged. In that respect, it is similar to a piano sustain pedal. The footswitch for use in this context comes standard with every Prophet-10.

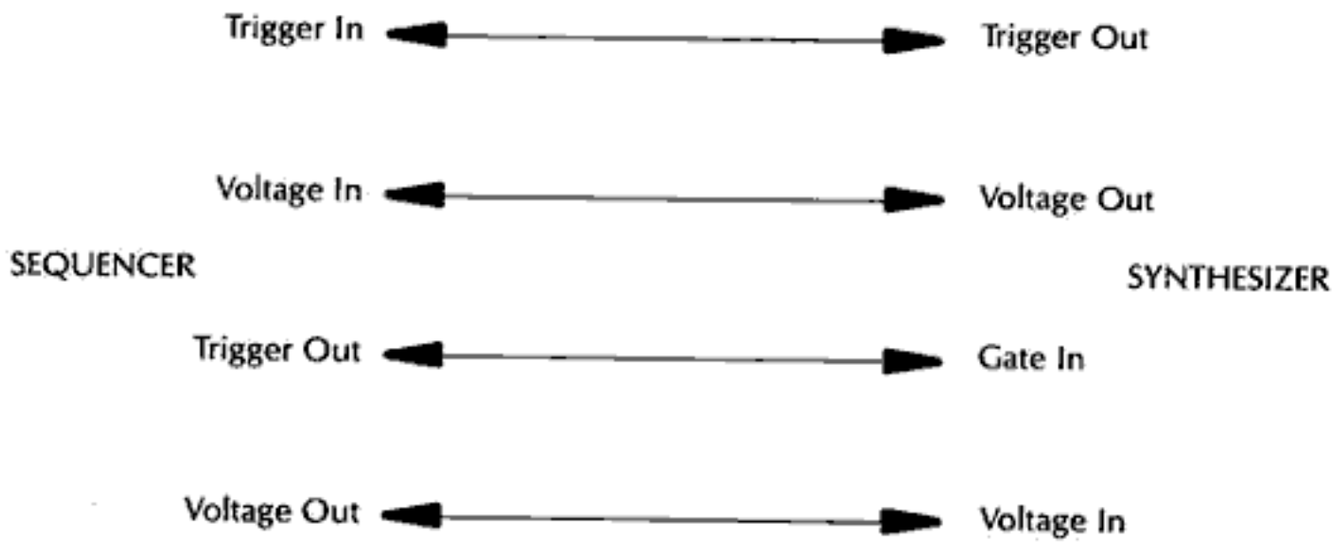
The ¼" jack labeled PROGRAM INCREMENT can be used to step through the programs in a particular program bank (both UPPER and LOWER) while both hands are engaged in other performance activities. Each time the footswitch is depressed, both the UPPER and LOWER programs will increment one position. This will most often be used to increment from one set of conceptually-linked programs to another (e.g., U-1-1 and L-1-1 would increment to U-1-2 and L-1-2), but the increment switch will work on both program banks regardless of their relative position (e.g., U-1-3 and L-2-4 would increment to U-1-4 and L-2-5). If the currently selected program is an 8, the increment footswitch will cycle back to 1 (U-1-8 would increment to U-1-1). The increment footswitch will never change banks; it will only cycle through the eight programs of the selected bank (for both UPPER and LOWER programs). The footswitch for use in this context comes standard with every Prophet-10.

The ¼" jack labeled SEQUENCER is for use in connection with the optional POLYPHONIC SEQUENCER. It serves the same function as the STOP/CONTINUE switch on the sequencer's front panel. Its function will be described in SECTION 5 POLYPHONIC SEQUENCER.

4-3 MONOPHONIC SEQUENCER INTERFACE

The four ¼" jacks in the SEQUENCER section of the back panel (VOLTAGE IN, GATE IN, VOLTAGE OUT, GATE OUT) are provided to allow for the interfacing of a Sequential Circuits Model 800 digital sequencer to the Prophet-10. The Prophet, when connected to a Model 800, devotes voice 5 of the UPPER synthesizer bank to the sequencer; the other four voices of the UPPER synthesizer can be played "live" while the sequencer is controlling voice 5. *NOTE: When a Model 800 is connected to a Prophet-10 and is therefore controlling voice 5, the corresponding voice on the LOWER synthesizer, voice 10, will be disabled.* Even if the keyboard is in DOUBLE mode, the sequencer will only play voice 5 — voice 10 will be disabled whenever the Model 800 is connected to the Prophet-10.

The diagram below shows how the Model 800 should be connected to the Prophet-10. The Model 800 TRIGGER IN and VOLTAGE IN switches should be in the up (1) position; the TRIGGER OUT switch should be in the center (2) position. When recording a sequence, the Prophet-10 will send *each note played* to the sequencer, together with a trigger; when playing back a sequence, the Prophet will route all input control voltages and gates to the same voice (voice 5).



These four jacks can also be used for other functions: the OUT jacks can be used to control other synthesizers (most common 1-volt-per-octave synthesizers), while the IN jacks can be used to apply other controllers (such as analog sequencers, sample-and-hold units, guitar synthesizer pitch followers, etc.) to voice 5 of the Prophet. However, since VOLTAGE IN is "digitized" by the microcomputer to maintain tuning with the other voices, the external controller will not be able to "glide." Also, the voltage will only be converted on a new gate edge. Both VOLTAGE jacks are exactly 1-volt-per-octave. The GATE OUT is a +15 volt gate, and GATE IN can be any signal which switches through at least 3.5 volts.

NOTE: Any time a plug is inserted into the GATE IN jack on the Prophet-10, the computer disconnects voice 5 and voice 10 from the keyboards; the instrument becomes essentially two 4-voice synthesizers, with voice 5 reserved for the external input (if any) and voice 10 disabled. The monophonic sequencer interface cannot operate if voice 5 or voice 10 has been disabled (see paragraph 1-7).

SECTION 5
THE POLYPHONIC SEQUENCER

5-0 INTRODUCTION

The optional poly-sequencer makes it possible to record complex polyphonic note sequences directly from the Prophet-10's lower keyboard, and to play these sequences back (with variable speed and/or pitch) simply by pressing a button. Groups of up to six sequences can be stored in the sequencer's active memory at any one time, up to a limit of about 2500 notes for each group of sequences. In addition, these groups of sequences can be stored permanently on micro-cassettes, and can be loaded quickly into the sequencer's memory bank for playback.

The above is merely a sketchy outline of what the poly-sequencer does. Before we proceed with a complete description of the sequencer's capabilities, however, it is important to understand *how* the sequencer does the things it does (in a general sense at least), because a good grasp of the sequencer's basic functioning will make it easier to understand and use.

We use the words "record" and "playback" to describe the basic operation of the sequencer, but these words are being used here to describe something very different from the kind of recording and playback done with tape recorders and record players. When you play a note on the Prophet's keyboard, the sequencer does not record the sound you hear; rather, it records the (digital) electronic information coming from the keyboard — the information that is used to drive the synthesizer banks. This information is stored (digitally) in the sequencer's memory bank. When the sequencer is playing back the notes you played, it is actually sending the electronic information it has stored to the synthesizer, which reacts as if the keyboard were being played. In other words, in playback the sequencer is "playing" the synthesizer (or at least the part of it that is connected to the lower keyboard) — the synthesizer itself is the audio playback device.

This is still not all of the story, because the sequencer also has to record the timing of the notes you record into it (in order to "playback" exactly what you "recorded"). It does this by comparing the timing of the notes you play to a steady clock pulse (the rate of which is controlled by the SPEED knob). Timing is stored in reference to this clock pulse: the sequencer will store the information that a certain note you played had a duration of four clock pulses, for example.

When a recorded sequence is being played back, the sequencer operates just as if it were the lower keyboard. In other words, it will connect to the synthesizer banks of the Prophet just as the lower keyboard would, according to the KEYBOARD MODE that is active on the front panel. If the keyboard mode is NORMAL, the sequencer will be controlling the LOWER synthesizer bank, and will therefore play the LOWER bank program; and, like the lower keyboard, the sequencer will be able to play up to five notes at a time. If the keyboard mode is SINGLE (and if the UPPER and LOWER programs are the same), the sequencer will then be able to play up to ten notes at once (the limit of the synthesizer's capability). If the keyboard mode is DOUBLE, the sequencer will drive (simultaneously) the UPPER and LOWER programs, and will then be limited to five notes at a time (each note playing on both synthesizer banks). And finally, if the keyboard mode is ALTERNATE, the sequencer (like the lower keyboard) will have access to both UPPER and LOWER programs (alternately), and will have a full range of ten notes at a time to control.

Since the timing of the material in the sequencer is stored relative to the sequencer's steady clock pulse, the playback speed of any sequence of notes can be changed by changing the SPEED of the clock pulse. Sequences can be played back at superhuman speeds (if you so desire); and, of course, the pitch of the sequence will not change, because only the timing of the stored information is being altered by changing the clock pulse reference — the information that controls the pitch of the notes is not being changed. However, the sequencer can also transpose an entire sequence up (from a half-step to as far as three octaves) or down (as far as 2 octaves) without changing the speed of playback.

In addition, the sequencer can change programs for you during the playback of a sequence, and can record specific program-select information at the beginning of a particular sequence (meaning that whenever you selected that sequence for playback the sequence would automatically set the upper and/or lower synthesizer banks for the desired patch program).

The micro-cassette slot in the front side of the sequencer allows you to store sequence information from the sequencer's memory bank for permanent storage. The sequences are stored in the form of (digital) electronic data. In other words, the cassette is being used as a digital storage device, and is not a sound recording of the sequence. Whenever the sequence material is stored onto a cassette, the complete patch program information currently in the synthesizer's memory bank is stored also. This will allow you to build up a repertoire of patches much greater than the 64 that can be stored in the synthesizer's permanent (non-volatile) memory at any given time.

Now that you have a basic idea of how the sequencer functions, let's go ahead with our explanation of its operation and use.

5-1 BASIC OPERATION

5-1-1 THE FRONT PANEL LAYOUT

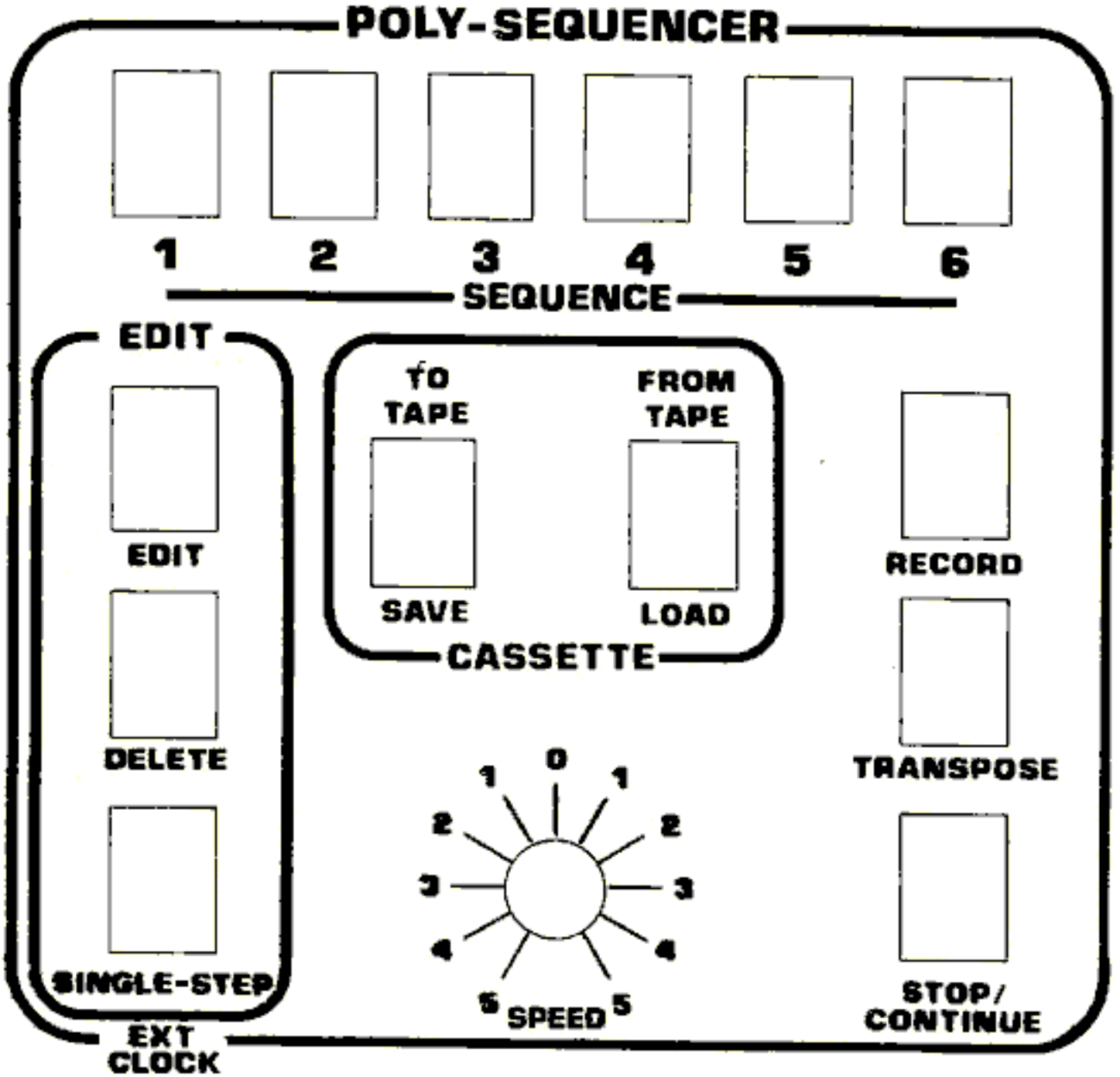
There are two ways to approach the use of the poly-sequencer, The simplest and most straightforward mode of operation involves treating the sequencer almost like a tape recorder: you put it in RECORD mode and play, then put it in PLAYBACK mode and listen to what you have recorded. Of course, the sequencer doesn't work like a tape recorder (see the INTRODUCTION to this section of the manual), but the overall effect is similar: a real-time performance is recorded, and then is played back with precisely the same notes and rhythmic values.

There are many things that can be done with sequences recorded in this way, and all of these operations can be initiated easily via the sequencer's front panel controls. The front panel is laid out so that it will be easy to focus in on these basic functions and begin using the sequencer right away. (The more complex uses of the sequencer will be discussed in the next section — SINGLE-STEP MODE OPERATION).

For basic operation we will concern ourselves with the six SEQUENCE switches at the top of the panel, the RECORD, TRANSPOSE, and STOP/CONTINUE switches on the right side of the panel, the SPEED knob in the lower center of the panel, and (to some extent) the EDIT switch to the left. The other controls will be discussed later.

5-1-2 RECORD MODE

If you look at the sequencer panel after the Prophet-10 has been turned on (and after the intial tuning procedure), you will notice that the STOP/CONTINUE light is on. This indicates that the sequencer is in IDLE mode — nothing is happening, but the sequencer is ready for use. The sequencer must be in IDLE mode before a RECORD cycle can be initiated.



In basic RECORD operation, the SPEED knob should be pushed in, meaning that it is in NORMAL speed position. The LOW speed position (SPEED knob pulled out) is usually used only for single-step record mode operation (see section 5-2-2). For most purposes in NORMAL record mode, the SPEED knob should be set to the left of zero (1 or 2).

Once you have set the SPEED knob, press the RECORD switch. It will begin to blink, indicating that you are in RECORD INTERLOCK MODE and are ready to initiate the recording of a sequence. Now select the sequence position in which you want to record by pressing the appropriate sequence switch (1 through 6). Both the selected sequence switch and the RECORD switch will go on, indicating that you are in RECORD mode. Begin playing.

The sequencer will not record any timing information before the first note played; therefore none of your stored sequences will begin with a long silence. However, program select information can be stored at the beginning of a sequence (meaning that the synthesizer will always jump to the selected programs at the beginning of a sequence playback). In order to record program select information, you must press a program select switch after the desired bank has been set up and RECORD mode has been entered. For example, let's say that you have a sequence that should be played back with brass sounds (U-1-1 and L-1-1). Do the following: 1) set the sequencer up in RECORD mode; 2) set up both banks to 1 and press program select switch 1 on UPPER and LOWER; 3) begin playing when ready. The sequencer has now stored U-1-1 and L-1-1 at the beginning of the sequence, and will set the synthesizer to those patches automatically when the sequence is selected. By the way, program select information does not initiate the recording of timing information — you can wait before starting to play; and on playback the sequence will begin immediately.

After you have finished recording, close down RECORD mode by pressing the STOP/CONTINUE switch (which acts only as a STOP switch in RECORD mode); the RECORD light will go off, and the sequencer will immediately begin playback of the sequence just stored. If you do not wish the playback to begin right away, press the RECORD switch instead of the STOP/CONTINUE switch: Record mode will end, but the playback cycle will not begin (instead, the sequencer will return to idle mode).

For proper timing of the sequence playback, the STOP/CONTINUE switch (or the RECORD switch) must be struck in exact time at the conclusion of the RECORD cycle. If you stop playing and pause before turning off the RECORD mode, that pause will become part of your sequence.

Here is a step-by-step summary of basic RECORD mode operation:

1) Make sure the sequencer is in IDLE mode, and the SPEED knob is pushed in and set slightly to the left of zero.

2) Press the RECORD switch — it will blink (RECORD INTERLOCK mode).

3) Select the desired sequence position by pressing one of the sequence switches. The selected sequence light will come on, and the RECORD light will come on steady (RECORD mode).

4) Record any program select information you desire.

5) Play the sequence of notes on the lower keyboard.

6) End the RECORD cycle by pressing STOP/CONTINUE (which will immediately initiate PLAYBACK) or RECORD (which will end the RECORD cycle and return the sequencer to IDLE mode). Remember to press the STOP/CONTINUE switch or the RECORD switch in exact time with the end of the sequence.

If you want to record a lengthy sequence with program patch changes, just include the program changes as part of your performance while in RECORD mode. Remember to let the last notes of the previous program patch decay completely before making any program change, or there may be an audible pop when the change is punched up. (If you plan to speed up the sequence on playback, allow extra time for the decay fo these final notes — the synthesizer envelope generators will not change their timing when the sequencer SPEED does.)

5-1-3 PLAYBACK MODE

In order to play back a given sequence, simply press the desired sequence switch. The selected sequence light will go on, the STOP/CONTINUE light will go off, and the sequence will begin to play (synchronized from the beginning). The speed of playback can be adjusted with the SPEED knob.

As long as the sequencer is left in this state, the selected sequence will repeat itself continuously. To stop the sequence at the end of a cycle, press the sequence switch again. You can press it at any time — the sequence will then play to its end and stop (the sequence light will go out, and the STOP/CONTINUE light will come on).

If you wish to jump from one sequence to another in the middle of playback, simply press the new sequence switch: the current sequence will stop immediately and the new one will begin playing from the beginning.

The STOP/CONTINUE switch is quite useful in PLAYBACK mode, and functions as its name suggests. If it is pressed while a sequence is playing, it will STOP the playback of that sequence (the STOP/CONTINUE light will come on, and the sequence light will remain lit); pressing the STOP/CONTINUE switch again will cause the sequence to CONTINUE from where it left off (the STOP/CONTINUE light will go out, and the sequence light will, of course, remain lit).

If you want to stop a sequence in the middle of its playback and then start it again from the beginning, simply press STOP/CONTINUE and then press the sequence switch again. And, if you want to stop a sequence playback and return to IDLE mode, simply press the sequence switch a second time and then press the STOP/CONTINUE switch. You can also return to IDLE from playback by pressing a null sequence switch (a sequencer position that has nothing recorded in it).

To change the pitch of a sequence while in PLAYBACK mode, press the TRANSPOSE switch. Then, by playing a single note on the lower keyboard, you can cause the entire sequence to be transposed up or down by an amount equal to the interval middle C and the note played. To deactivate TRANSPOSE mode, simply press the TRANSPOSE switch again. If not in transpose mode, notes played on the lower keyboard will be played by the synthesizer and shared with the sequencer notes according to the synthesizer's regular voice assignment priorities.

Here is a summary of the various start and stop functions available in PLAYBACK mode:

1) To initiate playback — press the desired sequence switch.
2) To stop a sequence playback at the end of a cycle — press the sequence switch again.
3) To jump from one sequence to another — press the desired new sequence switch.
4) To stop a sequence playback immediately and then continue from where it was stopped — press STOP/CONTINUE switch once to stop, again to continue.
5) To stop a sequence playback immediately and then start up again from the beginning — press STOP/CONTINUE once to stop, then press the sequence switch to begin again.
6) To stop a sequence playback immediately and return to IDLE mode — press the sequence switch a second time and then press the STOP/CONTINUE switch. Or, instead, press a null sequence switch.

5-1-4 EDIT MODE

The sequencer's EDIT mode allows you to add new notes (chords, melodies, counterpoint) to a sequence already recorded. In basic operation mode this editing is done in real time, while the sequence is playing back. Numerous layers can be added as the sequence cycles through its pattern, up to the limit of the synthesizer's voices.

EDIT mode can only be entered when the sequencer is in PLAYBACK mode and a sequence is playing. To enter EDIT mode, press the RECORD switch: it will blink, indicating RECORD INTERLOCK mode. Then press the EDIT switch; the EDIT light will go on, the RECORD light will go off, and you will be in EDIT mode. Any notes played on the lower keyboard while in EDIT mode will be added to the sequence that is currently playing. Program changes can be added in EDIT mode as well. To exit EDIT mode and return to straight PLAYBACK, simply press the EDIT button again (the EDIT light will go off).

Both the sequence switches and the STOP/CONTINUE switch function as in playback when the sequencer EDIT mode. In addition, the STOP/CONTINUE switch can be used to enter SINGLE-STEP edit mode and EVENT STEP-THROUGH edit mode (see section 5-2-4). The SPEED knob may be used in EDIT mode to slow down the sequence for more precise coordination of the added notes; you might even want to pull the knob up and change over to LOW speed for even more precise coordination.

If you interrupt the playback of a sequence in EDIT mode by pressing a new sequence switch, the sequence will exit EDIT mode and return to straight playback of the new sequence.

You may have noticed that none of these EDIT features allow you to shorten or lengthen a particular sequence; in other words, you cannot shorten the sequence by removing notes from the end, or lengthen it by adding notes at the end. However, both of these things can be accomplished through the use of the sequencer's TRUNCATE feature.

TRUNCATE operates in real time while the sequencer is in PLAYBACK mode.

To add something to the end of a sequence (TRUNCATE/ADD), or to record a new ending, do the following: 1) While the sequence is playing, press the RECORD button; the RECORD light will flash (RECORD INTERLOCK mode). 2) When the last desired event is heard, press the SEQUENCE switch currently active. You are now in RECORD mode, with the clock uninterrupted from playback. No new timing information will be stored until a note is played.

To delete material from the end of a sequence (TRUNCATE/DELETE), do the following: 1) While the sequence is playing, press the RECORD button; the RECORD light will flash (RECORD INTERLOCK mode). 2) When the last desired event is heard, press the STOP/CONTINUE switch. You have now deleted the remainder of the sequence from the sequencer's memory, and the overall length will be shortened accordingly (there will be no pause between playback cycles).

5-2 SINGLE-STEP MODE OPERATION

5-2-1 THE FRONT PANEL LAYOUT

Although the BASIC operation modes of the Prophet's poly-sequencer are quite powerful, there are additional capabilities of the system that provide subtler levels of control over the recording, editing, and playback of sequence material. SINGLE-STEP mode allows you to make *exact* determinations of the length of each note recorded into a sequence, and also allows precise coordination of additional material in EDIT mode. Other features allow you to DELETE wrong notes and replace them with the correct notes, and adjust the durations of specific notes as well.

In SINGLE-STEP mode all of the front panel controls are used, and the SINGLE-STEP and DELETE switches (in the EDIT section of the sequencer's front panel) become very important. In SINGLE-STEP mode there are also secondary functions that are called up by pressing combinations of front-panel switches in particular ways. All of these functions, while not immediately obvious in their operation are relatively easy to grasp, and an understanding of them will increase the control provided by the poly-sequencer.

5-2-2 RECORD MODE

In order to enter SINGLE-STEP RECORD mode, the SPEED knob must be pulled out (in LOW speed position). Other than that, the procedure for entering SINGLE-STEP RECORD is much the same as that for entering NORMAL RECORD, with one additional step. Here is an outline of the procedure:

1) Make sure the SPEED knob is pulled out (in LOW speed).

2) Make sure the sequencer is in IDLE mode.

3) Press the RECORD switch — it will blink (RECORD INTERLOCK mode).

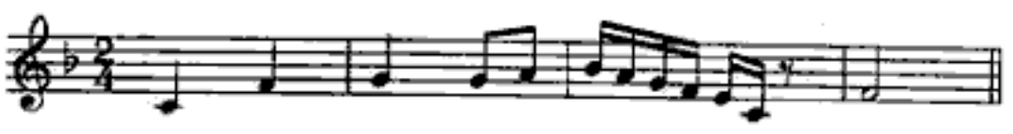
4) Select the desired sequence position by pressing one of the sequence switches. The selected sequence light will come on, and the RECORD light will come on steady. You are now in NORMAL RECORD mode, with one addition: if the SPEED knob is set low enough (at zero or to the left of zero), you will see the STOP/CONTINUE light flashing. This blinking will indicate the speed of the sequencer's internal clock pulse. (If the SPEED knob is set to far to the right of zero, the LED will not be able to blink rapidly enough, and the STOP/CONTINUE light will appear to be off; you will still be in LOW speed mode, however.)

5) Press the SINGLE-STEP switch. The STOP/CONTINUE light will come on steady. You are now in SINGLE-STEP RECORD mode.

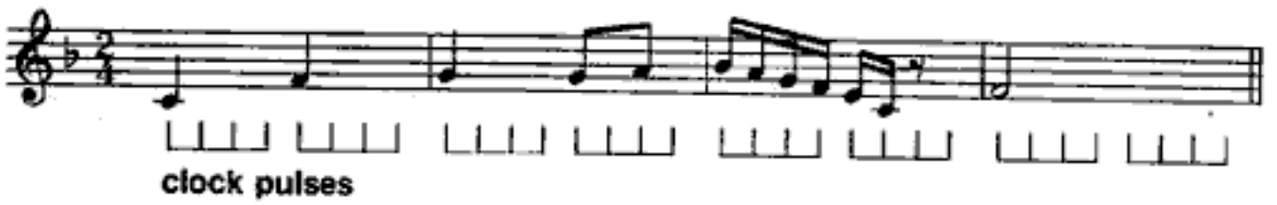
Now that you are in SINGLE-STEP RECORD mode, you will notice that each time you press the SINGLE-STEP switch the STOP/CONTINUE light will blink. Each time you press SINGLE-STEP, you are advancing the sequencer's internal clock one clock step. Any notes that are held down on the lower keyboard when you press the SINGLE-STEP switch will be recorded as being on during that clock step. In other words, you are no longer recording in "real time." The clock is, essentially, coming from the SINGLE-STEP switch. All of the other function switches work exactly as they do in NORMAL RECORD mode.

So, there is only one basic difference between the two RECORD modes. What does it mean? Well, first of all, it means that you can record sequences with *exact* timing (should you so desire). You can also control the beginning (gate on) and ending (gate off) of all notes precisely, which can create striking effects in a polyphonic sequence.

Let's look at a simple example of SINGLE-STEP RECORD mode in action. Here is a simple melody:

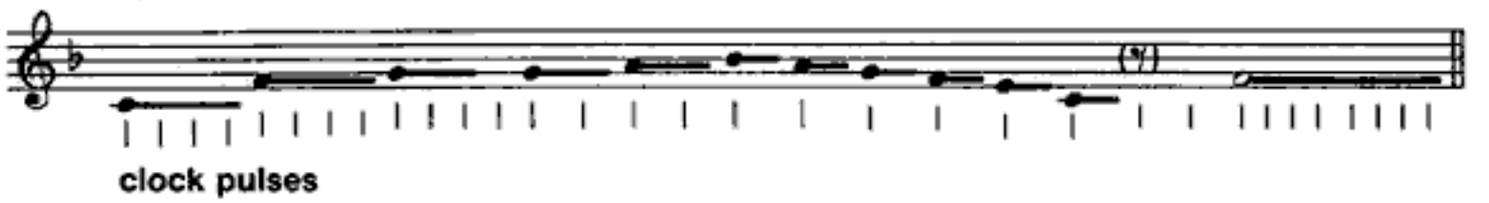


In order to determine how to record this with single-step RECORD, you must first decide how to relate the clock to the rhythmic values of the piece. Since the shortest rhythmic value is a sixteenth-note, let's assign it one clock pulse; so eighth-notes will get two clock pulses, quarter-notes will get four, and so on:



Since we are not recording in real time, you will not have to play the melody in correct rhythm — you just have to make sure that each note is recorded for the proper number of SINGLE-STEP switch strokes. Remember, the sequencer will record all notes that are being held down when the clock is advanced by the SINGLE-STEP switch; and, if a note that was held down for at least one switch stroke is subsequently released, the sequencer will record a gate off (end of note) for that note with the next switch stroke.

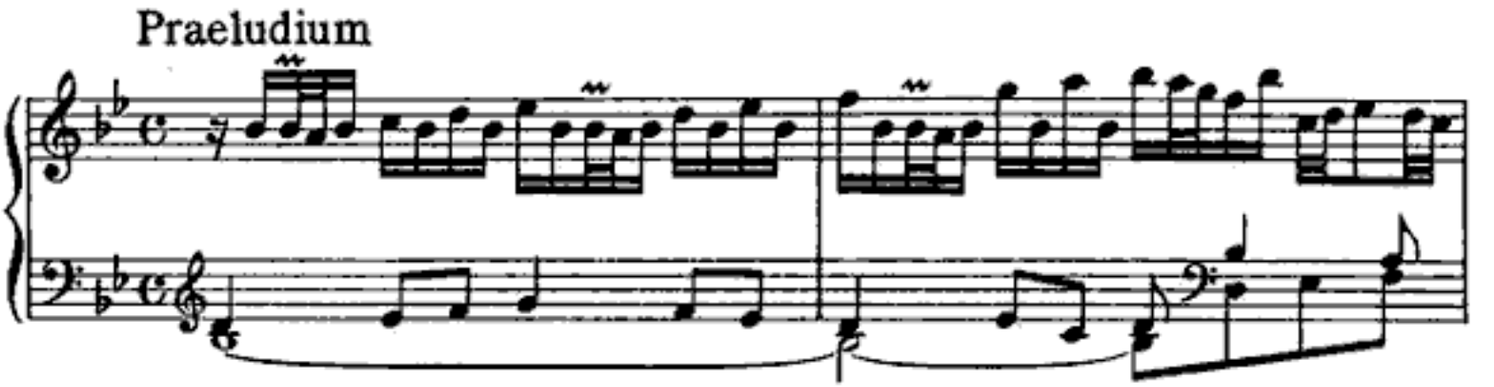
Since a note must be held down *before* the SINGLE-STEP switch is pressed in order to be recorded, you have to develop a technique to ensure proper recording of a melody. Here is the way to record the melody shown above; in this example the duration of the notes is shown graphically (in relation to the keystrokes of the SINGLE-STEP switch), since real-time rhythmic precision is not required:



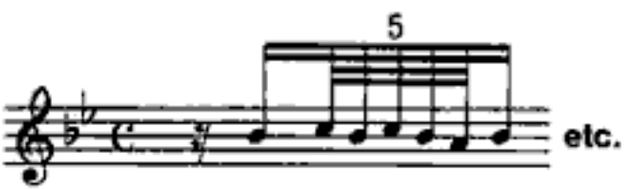
In the example above, you will notice that the quarter-note *G* in bar three was given only 3 clock steps (followed by a clock step with no notes depressed). This is because the next note in the melody is also a *G*. If the quarter-note *G* were recorded for 4 clock steps, and then followed by the 2 clock steps of the *G* eighth-note, there would be no gate off recorded for the first *G*, and therefore no new attack for the second. The sequencer *only* records the events that are happening when the SINGLE-STEP button is pressed.

In order to achieve proper articulation when in SINGLE-STEP RECORD mode, you must allow for a gate off when there are repeated notes.

In order to determine how to relate the clock pulse to the rhythm of a particular piece, you must examine the rhythmic values of the entire piece. Here is the beginning of the Bach *Partita No. 1*:

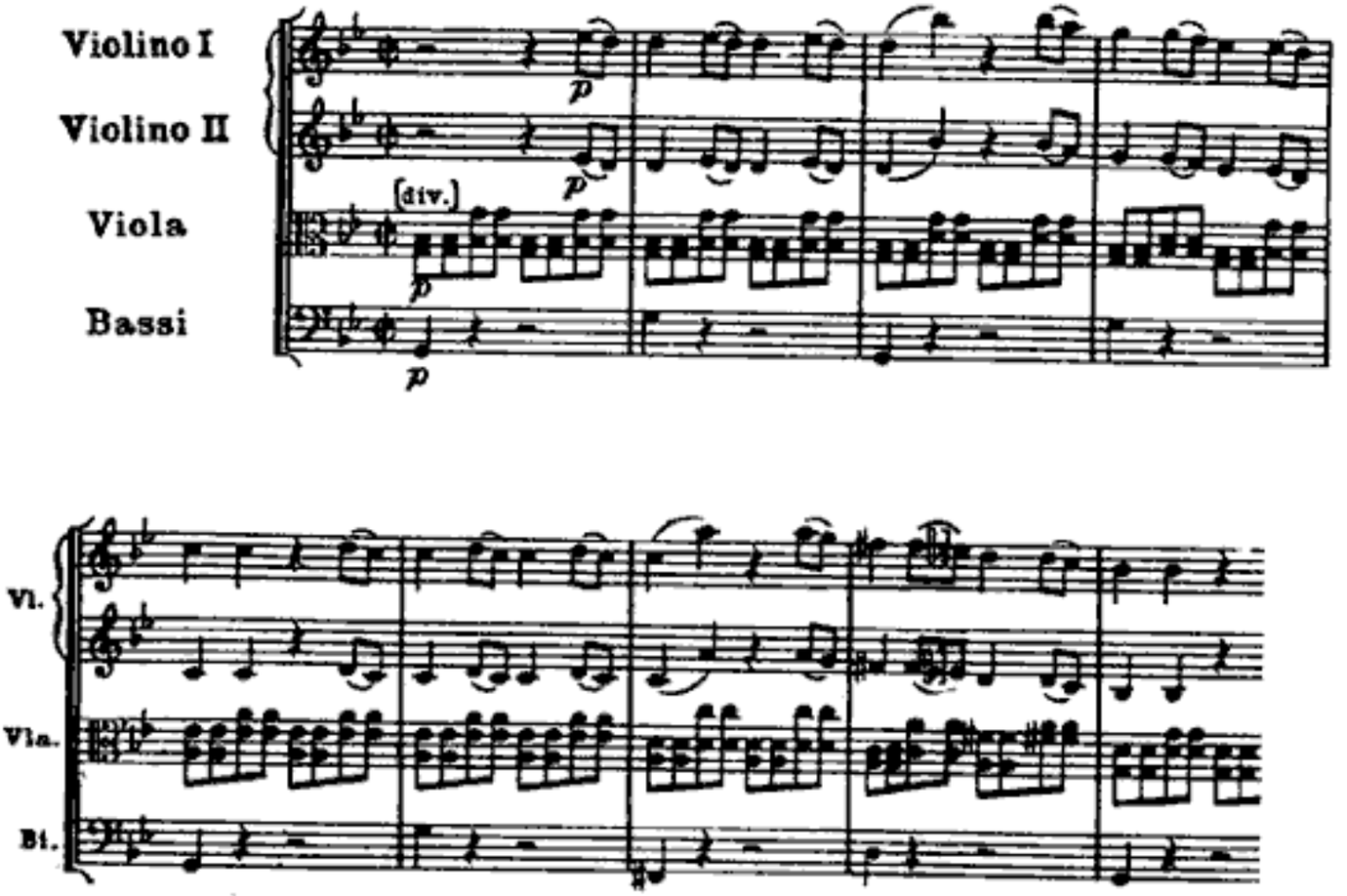


Now, the ornamental figure in bar 1 is usually played like this:



Therefore, you will need at least 5 clock pulses for each sixteenth-note. But then how will you play the thirty-second-notes in bar 2? They must have half the value of the sixteenths, but they can't last 2½ clock pulses. The answer is to give each sixteenth-note *10* (count 'em, ten) clock pulses. Then everything works out: thirty-second-notes get 5 clock pulses each, and the quintuplet sixty-fourths get 2 clock pulses each. You should plan out the rhythmic procedure you will use before you begin, in order to achieve exact rhythmic timing.

The precise control of gate off impulses will allow you to create many ensemble effects that would be impossible in real-time RECORD mode. Here, for example, is the beginning of Mozart's *40th Symphony*:



This passage is for strings alone. In order to create the different articulations called for by the orchestration, we must record one section at a time, and pick a clock-pulse-to-rhythm ratio that will allow many possibilities (in actual practice, you would have to use EDIT mode to add on all of the lines but the first one recorded — see section 5-2-4 — but for purposes of discussing articulation let's assume that we're dealing with RECORD mode: the two operations are very similar in SINGLE-STEP mode).

I recommend that we use at least 3 clock pulses per eighth-note; that will give us a lot of control over the gate impulses. If we record the violas with a gate lasting 1 clock pulse (1 on followed by 2 off to fill the eighth-note timing), we will get the detached sound needed for the accompaniment (the decay time programmed into a string-like patch will keep the sound from being dry). For the slurs in the violins, we will use a full 3 clock pulse gate on to create legato, and for the repeated notes, we will use a gate lasting 2 clock pulses (2 on followed by 1 off) to allow for the new articulation. For the basses (whose decay is slower than the higher strings) let's hold the gate on for 7 clock pulses (one quarter-note plus a little), so that the notes will seem to decay more slowly.

This piece is very fast, and playback should be adjusted accordingly. The changes in gate length will create the effect of different envelopes: an ensemble. (NOTE: Both this piece and the Bach example above are recorded as part of the poly-sequencer demo cassette included with your instrument; they are part of sequence 1.)

Unlike NORMAL RECORD mode, where no timing information is recorded until a note is played, the SINGLE-STEP switch will advance the internal timing clock one step each time it is pressed. This makes it possible to record blank space before a sequence.

When recording program information, each program change must be 'clocked in' using the SINGLE-STEP switch. In this case, however, the internal timing clock is not advanced. For example, to set up UPPER and LOWER programs at the beginning of a sequence, use the following procedure.

1) Enter RECORD MODE normally.

2) Press SINGLE-STEP (to enter SINGLE-STEP mode).

3) Set up desired upper bank.

4) Press desired UPPER PROGRAM SELECT.

5) Press SINGLE-STEP.

6) Set up desired lower bank.

7) Press desired LOWER PROGRAM SELECT.

8) Press SINGLE-STEP.

9) Hold down first note or chord.

10) Press SINGLE-STEP and continue recording.

This procedure records both programs and the beginning notes all on the first clock step — when played back they will happen simultaneously.

5-2-3 PLAYBACK MODE

All playback functions work exactly as they do in NORMAL playback mode; they are, in fact, the same. The only important thing to remember is that you may want to adjust the SPEED knob based on the desired playback speed (your RECORD procedure had no relationship to the speed you will eventually want to use). Try both LOW and NORMAL speed positions until you find the one that gives you the most flexibility relative to the sequence you are playing back.

5-2-4 EDIT MODE

SINGLE-STEP EDIT mode can be entered from PLAYBACK mode with the SPEED knob in either position (LOW or NORMAL). To enter SINGLE-STEP EDIT, begin by entering regular EDIT mode. Then hit the STOP/CONTINUE switch.

At this point, each depression of the SINGLE-STEP switch advances the clock one cycle. As with SINGLE-STEP RECORD, the sequencer will record (add on, in this case) any notes or program changes that are in effect when the SINGLE-STEP switch is pressed to advance the clock. Remember you will be hearing the notes you have already recorded as you step through your sequence in EDIT mode, but you must play any new notes *before* the clock cycle advances to the desired position. This creates an unusual aural effect that may take some getting used to.

Another aspect of SINGLE-STEP EDIT mode involves deleting notes from the sequence, and involves the use of EVENT STEP-THROUGH mode. This is also entered through regular EDIT mode: After you are in EDIT, press the STOP/CONTINUE switch and keep it *held down*. Now as you press the SINGLE-STEP switch you will advance from event to event (an "event" is defined as a key depressed (gate on), a key released (gate off), a program change, or a stop bit). Chords will be spread out and played one note at a time.

As you step through the events, pressing the DELETE switch will delete the most recently played event. Although, technically speaking, the DELETE switch will operate in other modes, it should not be attempted in any mode other than EVENT STEP-THROUGH (in other modes you will not be sure which event you are deleting. Take care not to delete any gate off events by accident: the note will go on forever in the next play-through. (To cancel one of these "infinite sustain" notes, key in a gate off by playing the note (on top of itself, in EDIT mode) for at least one clock cycle after you have released it.)

It should be noted that it is impossible to delete (or, for that matter, to add) clock pulses, except by completely re-recording the sequence from the given point onward, using the TRUNCATE/ADD feature.

To exit either of these SINGLE-STEP modes, simply CONTINUE by pressing the STOP/CONTINUE switch. You will remain in EDIT mode, and can move ahead to the next position in your sequence where SINGLE-STEP EDIT is required.

5-3 MISCELLANEOUS FUNCTIONS

5-3-1 OVERFLOW INDICATOR

If more than 2500 notes are recorded (total) in any given sequence group, all of the sequencer lights will blink, indicating that you have exceeded the sequencer's memory capacity. Take the sequencer out of RECORD mode by hitting the STOP/CONTINUE switch or the RECORD switch; if in EDIT mode, hit the EDIT switch to exit EDIT mode. All of the information stored in the memory will be saved to the point of overflow. You can create more space for your final sequence by using the DELETE feature, or by using the TRUNCATE mode to delete the final portion of any sequence in that group, or by completely erasing a sequence (re-record with no notes played.) Care should be taken not to attempt to record any additional information without using one of these procedures to create more space.

In rare instances it is possible that an overflow indication will result from attempting to insert too many events at once during EDIT mode, even though the memory is not filled to capacity. If you are in EDIT mode, have been inserting rapid passages, and are sure you have not recorded more than 2500 notes, and have an overflow indication, you may return to normal condition by simply going out of EDIT, then back into EDIT.

5-3-2 PITCH & MOD WHEEL DISCONNECT

When using the sequencer in PLAYBACK mode with the Prophet in live performance, you may want to disconnect the pitch and mod wheels from the lower manual (so that pitch bends or modulation directed to the upper manual will not disturb the playback of a sequence on the lower manual). To disconnect the wheels, use the TRANSPOSE switches for the LOWER keyboard (located to the left of the upper keyboard): Press the DOWN switch and hold it, then strike the UP switch. The pitch and mod wheels will now be disconnected from the lower keyboard (and therefore will not interfere with the sequencer's playback operations). To reconnect the wheels to the lower keyboard, press the two TRANSPOSE switches again in the same way. (Remember that the upper keyboard is permanently connected to the wheels). It is good practice to set this up before beginning playback: In general, the functioning of Prophet-10 switches may be somewhat sluggish during playback of extremely complex sequences.

5-3-3 FOOTSWITCH

The sequencer footswitch can be connected to the sequencer via the ¼" phone jack receptacle on the Prophet's back panel. The footswitch will function exactly the same as the front panel STOP/CONTINUE switch, leaving both hands for other musical activities.

5-3-4 EXTERNAL CLOCK

The poly-sequencer can be connected to an external clock source via the ¼" phone jack receptacle on the side of the sequencer. When using an external clock source, you will obviously have to control the clock speed at the external source — the SPEED knob on the sequencer panel will not function. Do not use an external clock speed greater then 400-500 pulses per second, since the sequencer's computer cannot always cycle that fast. It is possible to "kill" the sequencer by running it too fast.

5-4 CASSETTE OPERATION

The sequencer's micro-cassette allows you to store sequence groups and Prophet patch programs on tape. Each micro-cassette will store one sequence group (up to a limit of 2500 notes) and one complete sets of Prophet patch programs (32 UPPER and 32 LOWER programs, for a total of 64). Since the sequencer's memory is erased when the instrument is turned off, the cassette is the only method of permanent storage available. And, even though the Prophet retains program information in memory even when turned off, the cassette feature will allow you to build up a library of patches much larger than the 64 that can be stored in the synthesizer's memory bank at any one time.

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To **SAVE** a set of sequences and a set of patch programs on a micro-cassette, do the following:

1) Make sure the sequencer is in IDLE mode.

2) Insert a micro-cassette (face up, bare tape side pointing in) into the cassette slot on the side of the sequencer. NOTE: in order to save to tape, the aluminum dot must be in position on the top of the cassette. If the dot has been peeled off, the SAVE TO TAPE routine will not engage — this allows you to protect completed sequence tapes from accidental erasure.

3) Enter RECORD INTERLOCK mode by pressing the RECORD switch; it will blink.

4) Press the SAVE TO TAPE switch. The SAVE TO TAPE light will go on, indicating that the SAVE TO TAPE operation has begun.

The save to tape routine takes approximately 30-50 seconds. The sequencer will then automatically verify the recording by comparing the information on the tape with it's own memory. During this portion of the process, which takes about 30-50 seconds, the LOAD FROM TAPE light will come on. If the recording is OK, the LOAD FROM TAPE light will go out and the sequencer will re-enter IDLE mode (STOP/CONTINUE light on). The sequences and program information have been recorded, and the cassette may be removed. If the recording is not correct, the SAVE TO TAPE light will begin to blink (indicating an error in the tape's stored information). To re-save the material, press SAVE TO TAPE and the process will repeat itself. If the SAVE TO TAPE light is blinking, but you want to check the verification procedure before going through the SAVE TO TAPE routine again, press the LOAD FROM TAPE switch. (If the cassette SAVE routine doesn't work after a number of tries, try another cassette.) If you want to re-enter normal sequencer operation instead of re-saving the material (if the SAVE TO TAPE light is blinking), simply press the STOP/CONTINUE switch and the sequencer will return to IDLE mode.

Here is a summary of SAVE TO TAPE operations:

— To save sequence and program information on tape:

1) sequencer in IDLE mde.

2) insert micro-cassette.

3) press RECORD switch.

4) press SAVE to TAPE switch.

5) wait for SAVE routine and VERIFY routine to be completed (1-2 minutes).

6) if information has been stored (SAVED) correctly, sequencer will re-enter IDLE mode; cassette may be removed.

7) if information has been stored incorrectly, SAVE TO TAPE light will blink.

— To re-SAVE information on tape (if SAVE TO TAPE light is blinking):

1) press SAVE TO TAPE switch.

2) wait for SAVE and VERIFY routines to be completed.

— To re-check the VERIFY routine (if SAVE TO TAPE light is blinking):

1) press LOAD FROM TAPE switch.

2) wait for VERIFY routine to be completed (30-50 seconds).

— To return to normal sequencer operation if SAVE TO TAPE light is blinking:

1) press the STOP/CONTINUE switch.

After you have loaded a set of sequences to your satisfaction, you may want to remove the aluminum dot from the top (to prevent accidental erasure) and make a second copy for extra safety.

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To **LOAD** a group of sequences and a set of patch programs from a micro-cassette, do the following;

1) Make sure the sequencer is in IDLE mode.

2) Insert the micro-cassette with the desired information into the cassette slot on the side of the sequencer.

3) Enter RECORD INTERLOCK mode by pressing the RECORD switch; it will blink.

4) Press the LOAD FROM TAPE switch. The LOAD FROM TAPE light will go on, indicating that the LOAD FROM TAPE operation has begun.

The LOAD FROM TAPE routine takes approximately 30-50 seconds. After the information has been loaded into the sequencer's memory, the sequencer will verify the information (by comparing its memory to the information on tape). If the information has been loaded correctly, the LOAD FROM TAPE light will go out and the sequencer will re-enter IDLE mode (STOP/CONTINUE light on). The sequence and program information has been loaded into the sequencer's memory, and the cassette may be removed.

If the information has not been loaded correctly, the LOAD FROM TAPE light will blink (indicating an error in the information in the sequencer's memory). To re-LOAD the information, press LOAD FROM TAPE and the process will repeat itself. If you want to re-enter normal sequencer operation instead of re-loading the cassette (if the LOAD FROM TAPE light is blinking), simply press the STOP/CONTINUE switch and the sequencer will return to IDLE mode.

If you accidentally press LOAD FROM TAPE without having inserted a cassette, you can interrupt the LOAD routine immediately by pressing the STOP/CONTINUE switch. (This interruption will not take place if there is a tape in the cassette slot.)

Here is a summary of LOAD FROM TAPE operations:

1) sequencer in IDLE mode.

2) insert micro-cassette with the desired information.

3) press RECORD switch.

4) press LOAD FROM TAPE switch.

5) wait for LOAD routine to be completed (30-50 seconds).

6) if information has been loaded correctly, the sequencer will re-enter IDLE mode; cassette may be removed.

7) if information has been loaded incorrectly, LOAD FROM TAPE light will blink.

— to re-LOAD information from tape (if LOAD FROM TAPE light is blinking):

1) press LOAD FROM TAPE switch.

2) wait for LOAD routine to be completed.

— To return to normal sequencer operation if LOAD FROM TAPE light is blinking:

1) press the STOP/CONTINUE switch.

NOTE: The Prophet-10 may be played as normal (both manuals) while a SAVE TO TAPE or LOAD FROM TAPE routine is in progress, but the TUNE switch is automatically disabled during any sequencer cassette operations.

5-5 NOTES, HINTS, & SUGGESTIONS

1) Always hit the sequencer switches according to a specific defined function. Hitting switches randomly could cause problems (for instance, you might accidently enter TRUNCATE mode and erase the last half of a sequence).

2) Try not to hit switches too quickly when not necessary, and make sure you are hitting the correct switch to accomplish the operation you are planning.

3) Though unlikely to cause problems, you may want to disable the synthesizer's RECORD mode via the switch on the back panel when not actually recording new program patches. This will ensure that you will have the program information you want in the synthesizer's memory bank when you go to load it on a cassette.

4) Transfer all completed sequences and/or completed sets of patch programs to tape as soon as they are finished. After the sequencer has verified that the information on the cassette is correct, protect the material from accidental erasure by peeling off the aluminum stick-on dot.

5) Back-up important tapes by making a second copy and storing it in a safe place. Backups can be generated by LOADING the original, then SAVING to the backup. After the backup has been verified, peel off the aluminum stick-on dot.

6) If you are working on a complex sequence (or set of sequences), make tapes of work in progress. This is an insurance policy against accidental TRUNCATION; it will also save the sequences if you have to turn the Prophet's power off. Remember, the sequencer's memory is volatile — it is not stored in memory when the power is off. Whenever the sequencer "hangs up" completely (does not operate in any normal mode), the only way to restart it is to turn the power off and back on.

7) If you have completed sequence one of a particular group and have stored it on a cassette, remember to reload that cassette before beginning work on sequence two. If you just turn the instrument on and begin by recording sequence 2, you will not be able to load it into the partially-filled cassette without erasing the sequence one material. The sequencer always loads everything that is currently in memory onto the cassette (including null sequences).

8) The micro-cassette tapes are somewhat delicate: handle them with care. Do not touch the tape itself with your oily fingers.

9) If one of your micro-cassettes has a small loop of tape sticking out of its open end, *do not* try to load it into the cassette machine: the tape may break when the slack is taken up, and the machinery will then chew up the tape and clog itself. Always push loops back into the cassette casing, so that the machine is presented with a flush surface at the cassette's open end.

10) If the sequencer has seemingly "stopped" momentarily in playback or EDIT mode, strike the currently active sequence switch, which will start the sequence again from the beginning (if in EDIT, will return to normal PLAYBACK mode).

11) If for any reason the sequencer "hangs up" completely and refuses to restart, you must "power down" by turning the synthesizer's power off and then back on. The sequencer will then work normally. Remember to make tapes of sequences-in-progress, so that powering down won't cause you to lose valuable time, labor, and nearly completed sequences.

12) Like any other type drive, the head should be cleaned periodically. This will help insure against bad tape loads and dumps. Any standard head cleaning kits can be used.

SUPPLEMENTAL NOTES ON POLYPHONIC SEQUENCER OPERATION

Tape Operation

1. Be careful with tapes: make sure there is no tape sticking out of the cassette when inserting into machine.

2. Don't remove cassette while the transport is running. If the tape will not stop by itself, the front panel STOP switch will stop the tape in the fast-wind portion of the cycle. If all else fails, turn off the Prophet's main power switch.

3. A dirty end-of-tape sensor can cause the tape to not stop. This sensor is a black cube about 1/4-in. on each side, which sits above the tape when it is in place. The sensor can be cleaned with a cotton swab and alcohol, using caution not to bend the adjacent sensing wires.

4. The tape head should also be cleaned periodically.

Sequencer Operation

1. During playback and/or edit of extremely complex sequences, switches on the Prophet-10 or the POLY-SEQUENCER may not work instantaneously. This is normal---simply hold the switch until it takes effect, or turn down the CLOCK speed.

2. When playing-back extremely rapid, complex sequences, the sequencer may stop by itself. Again, this is normal. Just slow down the clock and start again.

3. The present version of the sequencer operating program is quite robust, and has all the known 'bugs' rem oved. However, it is still possible that the sequencer will cease operating. Sometimes when this happens all function lamps will light. In this case, pressing the STOP switch should restore normal operat ion. Otherwise, it will be necessary to turn off the Prophet main power switch, then turn it back on. Unfortunately, in either case, all sequences will be lost. (A good reason to SAVE TO TAPE often.)

   If this happens repeatedly, under some particular set of conditions, please contact the Service Dept with a full description of the conditions, as you may have discovered a software 'bug'.

4. In recording SINGLE STEP sequences, it is necessary to provide at least one rest at the end of the sequence.

MORE HINTS ON USING THE MICRO-WAFER CASSETTES

1. Look at the opening in the wafer before inserting it into the cassette deck. Make sure the tape is running straight across the path.

2. Don t leave the wafer in the deck for an extended period of time.

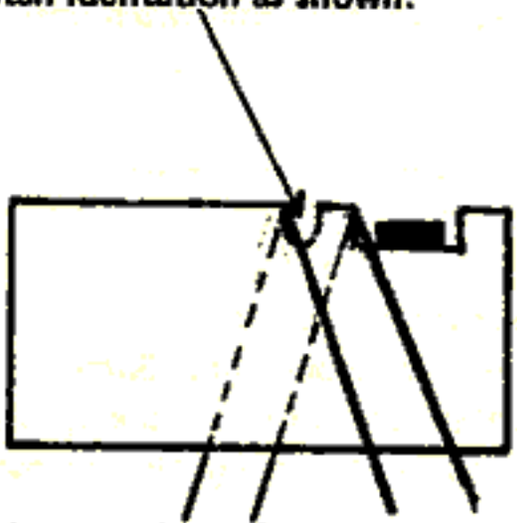
CLEANING THE MICRO-CASSETTE DECK

1. The head can be cleaned with head cleaner or alcohol-soaked cotton swab. Avoid touching the sensing contact springs in the top of the tape slot.

2. Clean the capstan periodically, using the following procedure :

A. Assuming a micro-wafer with broken tape is available, remove the tape as much as possible from the shell.

B. Wrap a strip of paper about 1/2-inch wide by several inches long around the shell, covering the capstan identation as shown:



C. Insert wafer with paper into machine. Press RECORD, then FROM TAPE. Let the deck run for a few seconds , then turn off power.

D. Switch power back on and repeat step C until the paper is clean when removed.

SECTION 6
SELECTED BIBLIOGRAPHY

This abbreviated list is not intended to be complte; it is merely a short compilation of currently available materials that may prove useful to you in your exploration of synthesis through the Prophet-10. Should you wish to explore further, many of the books listed here have extensive bibliographies.

BOOKS ON SYNTHESIS

Appleton, John; and **Perera, Ronald**. *The Development and Practice of Electronic Music*; Prentice-Hall, Englewood Cliffs, NJ.

The ARP 2600 Owner's Manual; ARP Instruments, Lexington, MA.

Backus, John. *The Acoustical Foundations of Music*; W.W. Norton and Company, New York, NY.

Deutsch, Herbert. *Synthesis*; Alfred Publishing, Sherman Oaks, CA.

Ernst, David. *The Evolution of Electronic Music*; Schirmer, New York, NY.

Friend, David; **Pearlman, Alan**; and **Piggott, Thomas**. *Learning Music With Synthesizers*; Hal Leonard Publishing, Milwaukee, WI.

Rhea, Tom. *The Minimoog Owner's Manual*; Moog Music, Buffalo, NY.

Strange, Allen. *Electronic Music*; William C. Brown Company, Dubuque, IO.

Wells, Thomas, and **Vogel, Eric**. *The Technique of Electronic Music*; Sterling Swift Publishing, Manchaca, TX.

MAGAZINES ON SYSNTHESIS

Contemporary Keyboard, 20605 Lazaneo, Cupertino, CA 95014.

Polyphony, Box 20305, Oklahoma City, OK 73156.

SECTION 7
THE FACTORY PRESET PROGRAMS

The Prophet-10 is shipped from the factory in "ready-to-play" condition with 64 factory preset programs. These programs are arranged in two sets (UPPER and LOWER) of banks, each bank containing 8 programs. The programs are selected by means of buttons in the UPPER and LOWER programmer section, and the selected bank and program numbers are indicated by the digital displays in the programmer section.

In this section of the manual you will find front-panel patch diagrams for all of the factory presets as programmed into the Prophet's memory. This will of course allow you to recreate a program in the event that you accidentally erase a particular patch from the memory. However, the main purpose for the inclusion of these diagrams is to provide you with a frame of reference as you familiarize yourself with the Prophet's capabilities. Knowing how each patch is set up may help you to understand the process of programming in general, and it will definitely make it easier for you to begin adjusting, fine tuning, and altering the various preset programs to suit your particular musical needs and tastes.

Along with each patch diagram you will find a set of comments and notes concerning various aspects of each patch. These notes will contain the following information:

1) The potential uses of the MONO-MOD section, including:
   a) an explanation of any constant MONO-MOD effect, programmed via the LFO AMOUNT knob;
   b) a discussion of any potential MONO-MOD effects that can be engaged via the MOD wheel (including optimum settings for the wheel to create the effects that are programmed in);
   c) a mention of any programmed connections between PEDAL 1 and the MONO-MOD section (allowing for control of the modulation amount via the pedal).

2) Special considerations concerning performance on the keyboards (what range to use, whether to use a sustained, chordal approach or a staccato, detached approach, etc.) to obtain the maximum effect from the program.

3) An explanation of potentially-active settings, such as the 5th doubling in the Baroque Horn patch (U-1-1), which can be engaged by switching on a waveform in OSCILLATOR B.

4) A discussion of the programmed choices for the KEYBOARD MODE switches (which determine the connections between each set of programs and the two keyboards).

5) An indication of certain settings that can be adjusted to alter some aspect of the patch. This information is provided to help you fine tune the patch to suit your tastes.

6) A mention of the programmed (or potential) routings for PEDAL 1 and PEDAL 2. *NOTE:* PEDAL 2 is not programmed on any of the factory preset programs. In general, PEDAL 2 would function well routed to Prophet's VCAs (AMP), providing volume control; however, if either pedal is programmed in this way and no pedal is plugged in the back panel, the VCAs will remain closed and no sound will get through. Therefore, to avoid possible confusion, all factory presets are set up without this routing. (See paragraphs 3-9 and 4-1 in sections 3 and 4 of this manual.)

Occasionally there is also some explanation of how some aspect of the patch works (representative examples: the discussions included with the U-1-4 and L-1-6 patch diagrams). These short discussions should help you understand why a particular patch is configured the way it is, and should also help you develop an approach to the creation of your own sounds.

In general, the comments and notes are most extensive for the patches in bank 1 (UPPER and LOWER), since they are (for the most part) representative instrumental timbres, and are therefore subject to adjustments and fine tuning to taste. The notes are more sketchy for the later banks in general (particularly for the sound-effects patches in bank 4) since many of those patches are dedicated to a specific effect that is either not subject to alteration (without changing the basic character of the sound) or is easy to assimilate from a study of the front-panel settings themselves.

As you play through the programmed presets, study the patch diagrams and read the accompanying notes. They will help you to get a quick grasp of some of the capabilities of the Prophet-10. (Remember to check out the different KEYBOARD MODE possibilities for each set of programs by selecting first the UPPER and then the LOWER panel select switches. And remember also that only the program connected to and displayed on the front panel can be altered via the knobs and switches on the front panel.)

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At this point, we would like to offer a special word of acknowledgement and thanks to John Bowen, who created most of the factory preset programs for the Prophet-10.

BANK 1

This bank is arranged with related sounds in each set of UPPER and LOWER programs. Whenever the PANEL display is UPPER, the programs will be in NORMAL keyboard mode; whenever the PANEL display is LOWER, the programs will be in DOUBLE keyboard mode. Play through all the programs with the PANEL displaying the UPPER program, so that you can check out the sound of each program; then go back and play through BANK 1 with the PANEL displaying the LOWER program, so that you can hear each set of paired programs operating together in DOUBLE keyboard mode. (Then try various unmatched pairs of programs in BANK 1 in DOUBLE keyboard mode, in order to find other pairings that will suit your musical needs.)

BANK 2

This bank is arranged so that all programs are in DOUBLE keyboard mode. Although all sets of UPPER and LOWER program pairs are designed to be played together (in DOUBLE keyboard mode), most of them can also be of some interest when played separately (in NORMAL keyboard mode).

BANK 3

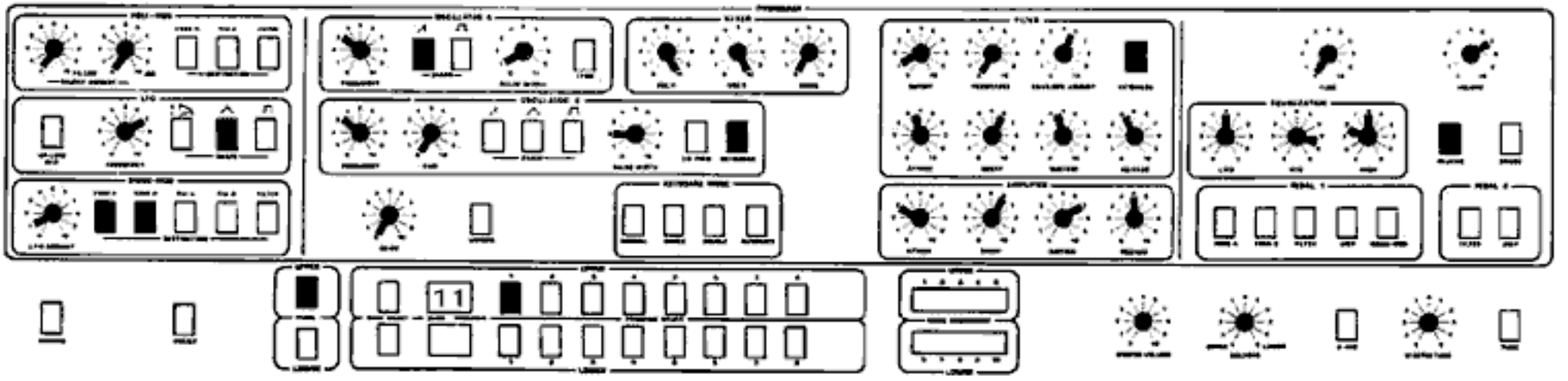
This bank contains a number of different kinds of programs, involving NORMAL, SINGLE, and ALTERNATE keyboard modes. The ALTERNATE keyboard mode programs are designed to be used as sets of matched UPPER and LOWER program pairs. Both UPPER and LOWER programs must be patched the same way in SINGLE mode in order to create a full complement of 10 voices; therefore both 3-1 UPPER and 3-1 LOWER have the same patch. 3-8 UPPER and LOWER have been programmed to provide a demonstration of the UP-LOW MIX switch in the MONO-MOD section.

BANK 4

The programs in this bank are, for the most part, more in the nature of sound effects or sonic events (rather than being instrumental voices); therefore there will be few notes. The best way to gain an understanding of how the effect is created is by studying the patch diagrams while playing the patch, and by listening for changes in the sound that occur as you change some aspect of the patch (switching waveforms, changing modulation amounts and speeds, and so on).

PRESET PROGRAMS

		1	2	3	4	5	6	7	8
BANK 1	UPPER	U-1-1 BAROQUE HORN	U-1-2 (HIGH) STRINGS I	U-1-3 MUTED CLAV.	U-1-4 (PERCUSSIVE) ELECTRONIC PIANO I	U-1-5 FLUTES	U-1-6 HARPSICHORD II	U-1-7 SYNC I	U-1-8 PERCUSSIVE ORGAN
	LOWER	L-1-1 TRUMPET/ FLUTE	L-1-2 (LOW) STRINGS II	L-1-3 ACCORDION	L-1-4 ELECTRONIC PIANO II	L-1-5 PIPE ORGAN FLUTES	L-1-6 HARPSICHORD I	L-1-7 SLOW SYNC SWEEP	L-1-8 ORGAN WITH RESONANCE
BANK 2	UPPER	U-2-1 UNISON GLIDE	U-2-2 STRINGS DOUBLED	U-2-3 DOUBLE DELAY	U-2-4 DELAYED HARMONIC	U-2-5 SYNC III	U-2-6 PUNCHY PULSES	U-2-7 ELECTRONIC ORGAN	U-2-8 PIPE ORGAN
	LOWER	L-2-1 UNISON GLIDE	L-2-2 STRINGS DOUBLED	L-2-3 DOUBLE DELAY	L-2-4 RELEASE REPEAT	L-2-5 UNISON TRIANGLE-SQUARE WAVE	L-2-6 CLAV-TYPE	L-2-7 ELECTRONIC ORGAN	L-2-8 PIPE ORGAN
BANK 3	UPPER	U-3-1 PHASE SHIFT EFFECT	U-3-2 ALTERNATE I	U-3-3 ALTERNATE 5THS	U-3-4 ALTERNATE II	U-3-5 MUTED TOY PIANO	U-3-6 PERCUSSIVE SYNC	U-3-7 BELLS	U-3-8 UP-LOW MODULATION MIX EXAMPLE
	LOWER	L-3-1 PHASE SHIFT EFFECT	L-3-2 ALTERNATE I	L-3-3 ALTERNATE 5THS	L-3-4 ALTERNATE II	L-3-5 MUTED TOY PIANO	L-3-6 BASS	L-3-7 STEEL DRUMS	L-3-8 UP-LOW MODULATION MIX EXAMPLE
BANK 4	UPPER	U-4-1 ALIEN	U-4-2 REPEAT DRONE I	U-4-3 HELICOPTER	U-4-4 SAWTOOTH ARPEGGIATOR	U-4-5 POLY-FILTER SWEEP IN UNISON	U-4-6 SPACE ALARMS (PART I)	U-4-7 SPACESHIP LANDING	U-4-8 DUPE OF U-1-1 (BAROQUE HORN)
	LOWER	L-4-1 ALIEN	L-4-2 REPEAT DRONE II	L-4-3 SWEEPING NOISE REPEAT	L-4-4 SWEEPING RESONANCE	L-4-5 DRIPPY BIRDS	L-4-6 SPACE ALARMS (PART II)	L-4-7 SPACESHIP LANDING	L-4-8 DUPE OF L-1-6 (HARPSI-CHORD)



U-1-1: Baroque Horn

OSC A: up 1 octave (basic pitch)
OSC B: up 1 octave + a perfect 5th

MONO-MOD section is set for a vibrato effect (approximately 5 cycles per second). Move MOD wheel up to intensify the effect.

OSC B is programmed off (no waveform selected); however, the mixer section is set to allow for its addition to the sound. If added, OSC B will provide a 5th doubling, for a richer overall effect. Use sawtooth wave to match tone color with OSC A; the triangle wave will give a softer doubling effect.

PULSE-WIDTH on both oscillators is set at a value above 0; this allows switching of waveforms (if pulse-width were programmed at 0, there would be no sound when OSC A or B were switched to pulse wave).

NOTES:

— Try routing mod to the FILTER instead of the oscillators; it gives a quasi-tremolo effect rather than a straight vibrato. Adjust vibrato or tremolo rate to suit your preference by adjusting the LFO FREQUENCY.

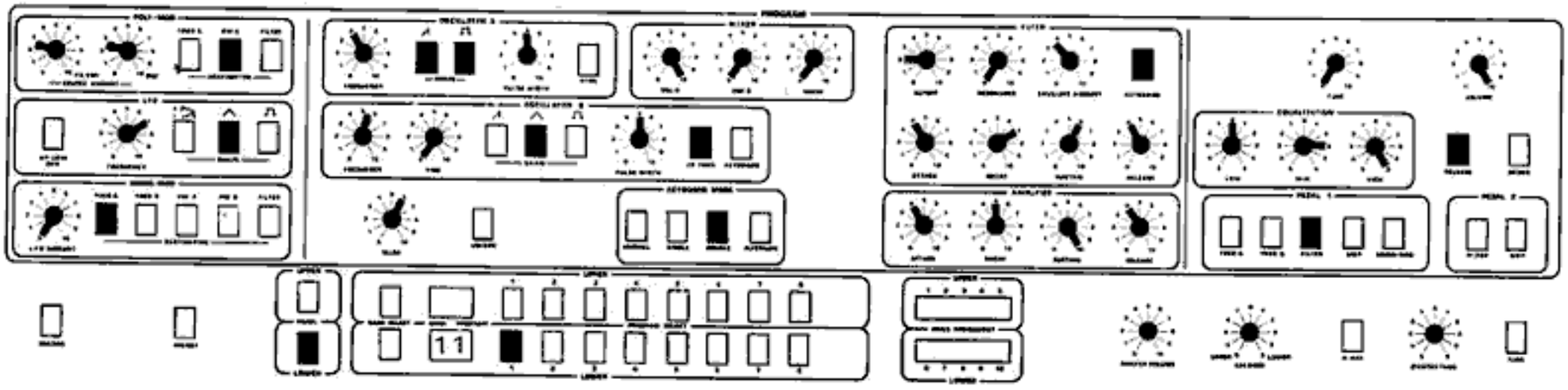
— Adjust filter settings (CUTOFF and ENVELOPE AMOUNT) to alter brightness of tone. Adjust settings on both envelope generators (particularly the ATTACK and DECAY settings) to change the characteristic shape of the sound (in order to simulate different brass instruments).

— For different ensemble balance (if both oscillators are used), change MIXER settings for OSC A and B.

— Select different waveforms on OSC A and OSC B to experiment with different tone colors — sounds that are less "brass"-like.

— OSC B can be used in LO FREQ mode with the POLY-MOD section for either vibrato (route to OSC A) or tremolo (route to FILTER). Set the OSC B SOURCE AMOUNT at approximately 1½. There will be a bit more animation with the POLY-MOD, since 5 LFOs are involved (one for each voice).

— Adjust the EQUALIZATION settings to alter the tonal balance.



L-1-1: Trumpet/Flute

OSC A: up 2 octaves
OSC B: LF mode

MONO-MOD section is set for a vibrato effect. Move MOD wheel up to intensify the effect.

GLIDE is programmed in for use with UNISON mode — when the patch is used as a lead line. Glide will engage if UNISON is switched on.

PULSE-WIDTH on OSC B is set at 5; this allows switching of waveforms.

OSC A is set as a square wave (set at approximately 5 and listen for the dropout of the octave — the 2nd harmonic).

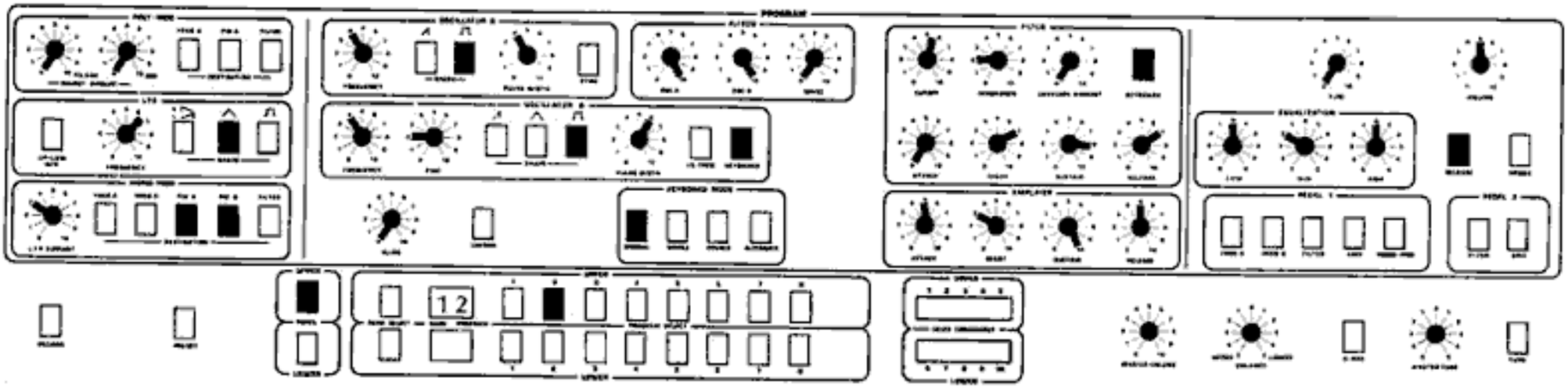
NOTES:

— Select different waveforms and combinations of waveforms on OSC A and OSC B to experiment with different tone colors.

— Adjust filter settings (CUTOFF and ENVELOPE AMOUNT) to alter brightness of tone.

— Adjust the EQUALIZATION settings to alter the tonal balance.

— PEDAL 1 is routed to the FILTER cutoff frequency; use to alter brightness of tone (or for a psuedo-wah effect).



U-1-2: (High) Strings I

OSC A: up 2 octaves
OSC B: up 2 octaves

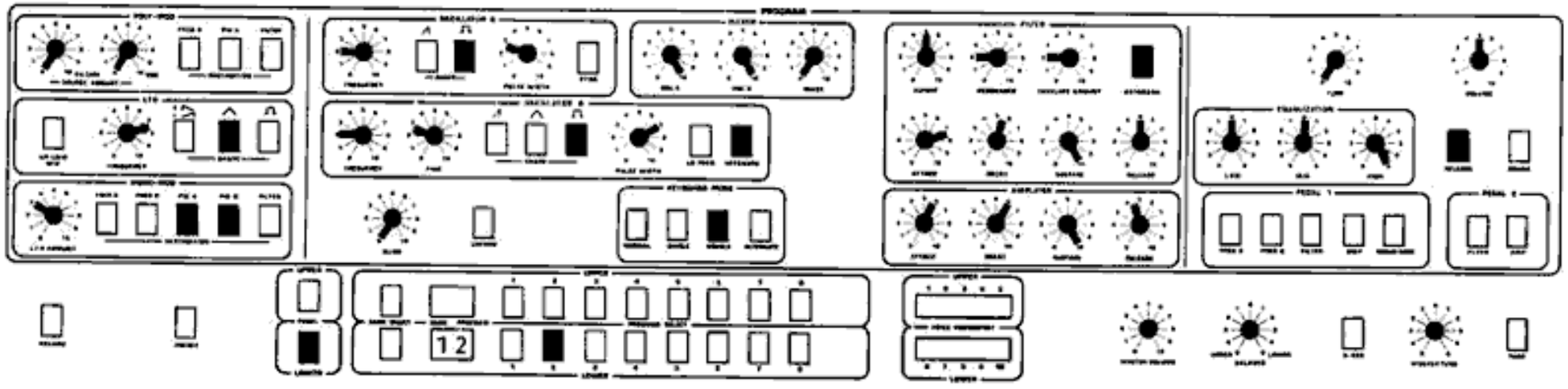
MONO-MOD is programmed for pulse-width modulation. Pulse-width modulation is used on both oscillators to create the animation of the sound; in combination with the detuning of OSC B, the pulse-width mod helps create the effect of a string section. The MOD WHEEL should be adjusted for different registers on the keyboard; more for playing in the higher register, less for the lower register.

In general, the best string sound results when the keyboard is played in the bottom 3 octaves; adjust the filter CUTOFF to play consistently in the top 2 octaves.

NOTES:

— Adjust filter CUTOFF to change brightness of tone.

— Remember that in order to create the effect of a low string section you must do your part: you must play notes that are idiomatic for strings. If you play this patch with piano phrasing, it will not sound like a string section.



L-1-2: (Low) Strings II

OSC A: up 1 octave
OSC B: up 1 octave

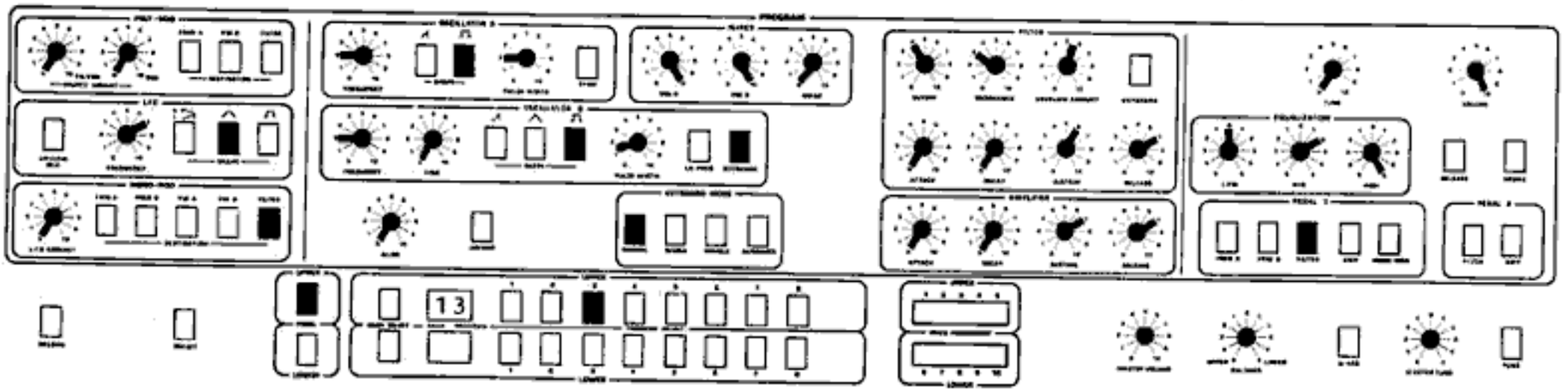
MONO-MOD is programmed for pulse-width modulation. Pulse-width modulation is used on both oscillators to create the animation of the sound; in combination with the detuning of OSC B, the pulse-width mod helps create the effect of a string section. The MOD WHEEL should be adjusted for different registers on the keyboard; more for playing in the higher register, less for the lower register.

In general, the best string sound results when the keyboard is played in the bottom 3 octaves; adjust the filter CUTOFF to play consistently in the top 2 octaves.

NOTES:

— Adjust filter CUTOFF to change brightness of tone.

— Remember that in order to create the effect of a low string section you must do your part: you must play notes that are idiomatic for strings. If you play this patch with piano phrasing, it will not sound like a string section.



U-1-3: Muted Clav.

OSC A: up 1 octave
OSC B: up 1 octave

RELEASE is programmed off; switch on to engage the programmed release times — sound will fade slowly after keys are released.

UNISON can be switched on to get a thick bass patch.

MOD WHEEL section can be engaged (if desired) to add a tremolo effect to the sound. Move wheel up slightly (⅛ to ¼) to engage tremolo.

NOTES:

— Pulse-width on both oscillators is programmed at 1½. Adjust to a narrower pulse-width for a more nasal sound, or to a wider pulse-width for a thicker sound.

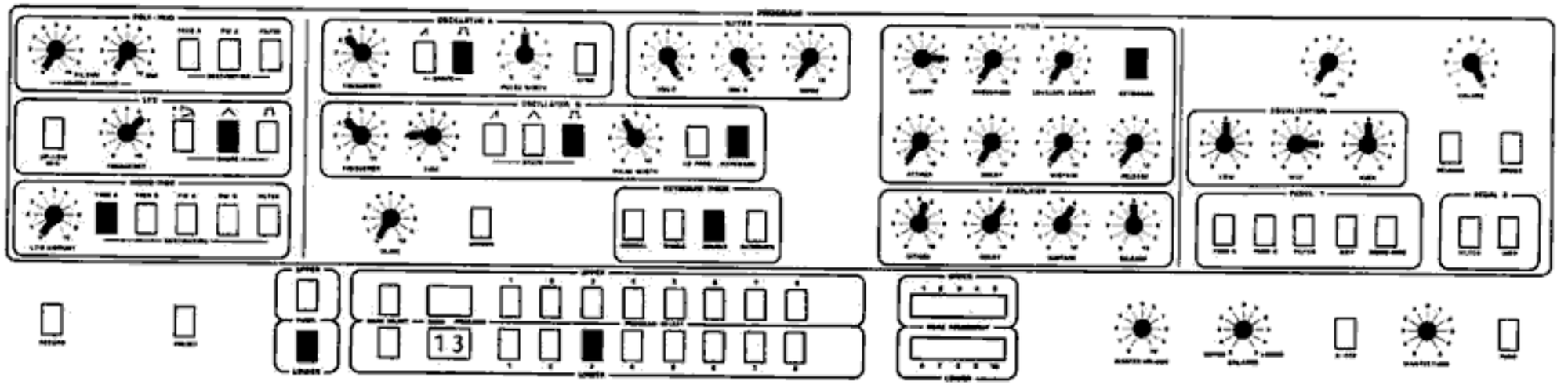
— Add filter KEYBOARD switch for increased brightness (particularly in the higher register of the keyboard).

— Try increasing the filter ENVELOPE AMOUNT to brighten the sound.

— For increased thickness in the sound, try detuning OSC B by setting the FINE TUNE knob to 1 or 1½.

— In conjunction with these various changes (as suggested above), adjust the filter CUTOFF setting to alter the overall brightness of the sound.

— PEDAL 1 is routed to the FILTER cutoff frequency; use to alter the brightness and punch of the sound.



L-1-3: Accordion

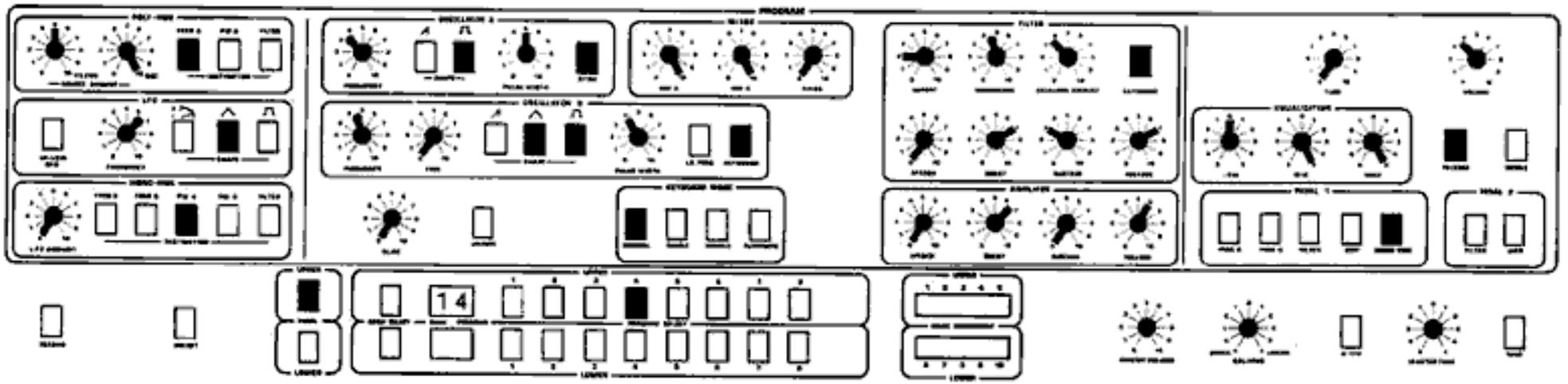
OSC A: up 2 octaves (basic pitch)
OSC B: up 2 octaves (basic pitch)

MONO-MOD section is programmed to create a chorusing animation-of-sound effect. Move MOD wheel up to intensify effect.

The two oscillators are detuned slightly (via the FINE tune knob in the OSCILLATOR B section) to create a "fuller" sound.

NOTES:

— Turn on RELEASE switch to create a "harmonium" sound.



U-1-4: (Percussive) Electronic Piano I

OSC A: up 1 octave + a perfect 5th
OSC B: up 2 octaves (basic pitch)

One important aspect of the sound of this patch is the appearance of an octave overtone at the beginning of each note, which fades as the note decays (this is a characteristic sound of reed or tine electric pianos, when the keys are struck forcefully). This effect is created by the POLY-MOD section in conjunction with the SYNC on OSC A: the FILTER ENVELOPE is used as the modulation source (as the voltage lowers during the DECAY portion, the octave overtone disappears). To study this effect directly, switch off the OSC B waveshapes and listen to OSC A by itself. Since the two oscillators are in SYNC, the effect of OSC 2 as a modulation source in the POLY-MOD section is minimal; if SYNC is switched off, OSC B will have a strong effect via the POLY-MOD section: you will hear a clangorous tone that descends at the rate of the filter envelope decay.

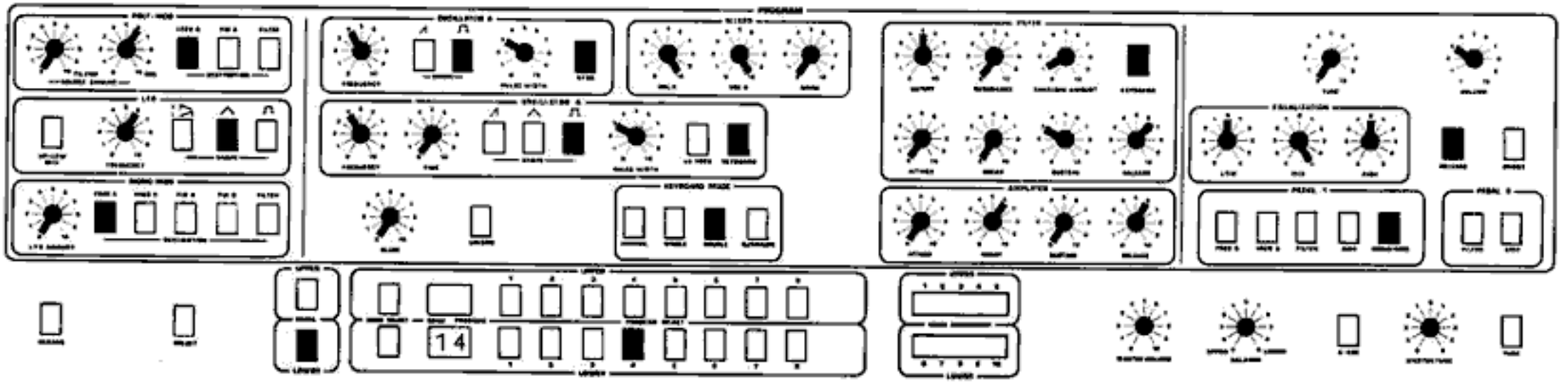
To simulate a piano sustain pedal, switch RELEASE off and use the footswitch to engage and disengage the release settings.

MOD wheel can be engaged (if desired) to create a quasi-rotating-speaker animation of sound via the MONO-MOD section. Move wheel up approximately ½ (or more) to engage the effect. Also, try routing the modulation to FREQ A or PW B (or in various combinations with PW A to get different animation effects. PEDAL 1 is also routed to MONO-MOD, and can be used to engage these effects.

NOTES:

— Select different waveforms on OSC A and OSC B to experiment with different tone colors.

— If the MOD WHEEL section is engaged, try adding to the RELEASE time on the two envelope generators; the animation effect will seem to increase somewhat (since it will have more time to establish itself in the sound).



L-1-4: Electronic Piano II

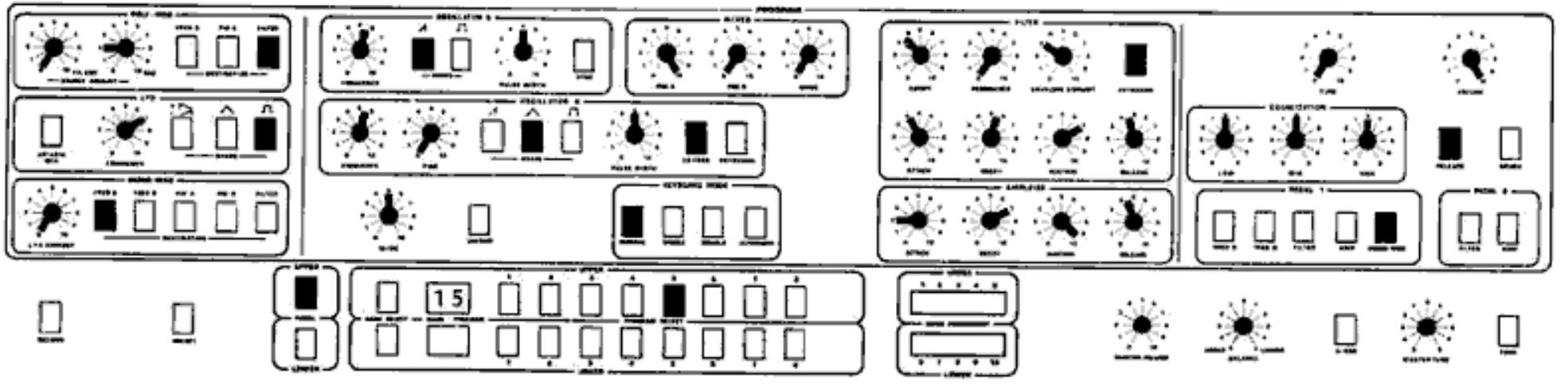
OSC A: up 2 octaves
OSC B: up 2 octaves

MOD wheel can be engaged (if desired) to create a vibraphone-like vibrato/tremolo effect via the MONO-MOD section. Move wheel on full to engage effect. PEDAL 1 is also routed to MONO-MOD.

To simulate a piano sustain pedal, switch RELEASE off and use the footswitch to engage and disengage the release settings.

NOTES:

— Since the two oscillators are in SYNC, the effect of OSC B as a modulation source in the POLY-MOD section is minimal; if SYNC is switched off, OSC B will have a strong clangorous effect via the POLY-MOD section.



U-1-5: Flutes

OSC A: up 3 octaves
OSC B: LF mode

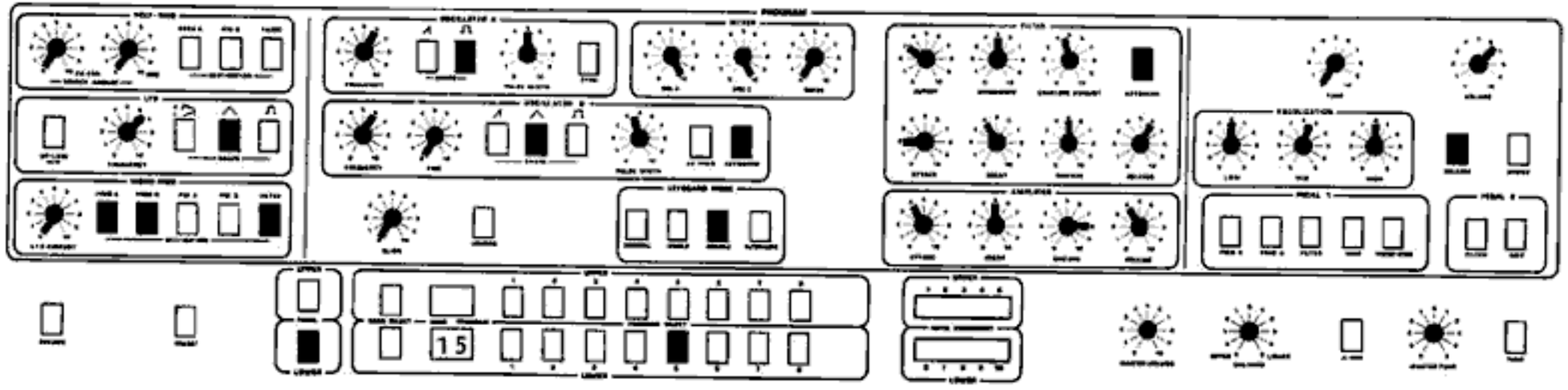
MOD wheel can be engaged (if desired) to create a trill effect via the MONO-MOD section. The range of the trill is determined by the position of the wheel: the more the wheel is moved up, the greater the range of the trill. PEDAL 1 is also routed to MONO-MOD.

POLY-MOD is being used to create a quasi-tremolo effect (similar to the breath-controlled vibrato/tremolo used by flute players).

PULSE-WIDTH on both oscillators is set at 5; this allows switching of waveforms on OSC A, and on OSC B it leaves open the option to use the pulse wave as a modulation source. The use of the pulse wave on OSC A will create a hollower sound (more like a wooden flute).

NOTES:

— Adjust filter settings (CUTOFF and ENVELOPE AMOUNT) to alter brightness of tone.



L-1-5: Pipe Organ Flutes

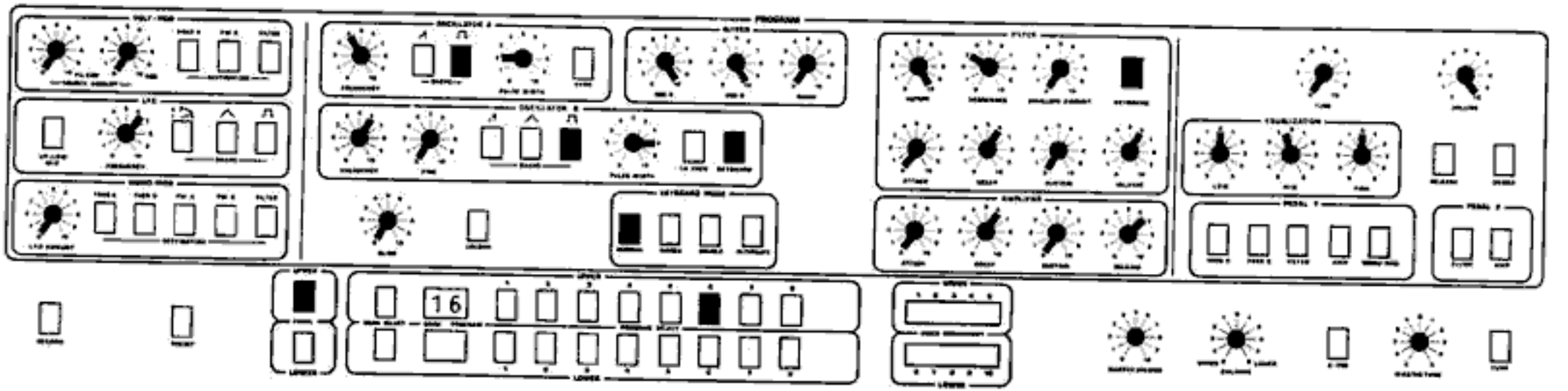
OSC A: up 3 octaves
OSC B: up 3 octaves

MONO-MOD is set for a vibrato effect, and can be engaged (if desired) by moving the MOD wheel up slightly (⅛ to ¼).

PULSE-WIDTH on both oscillators is set at 5; this allows switching of waveforms on OSC B.

NOTES:

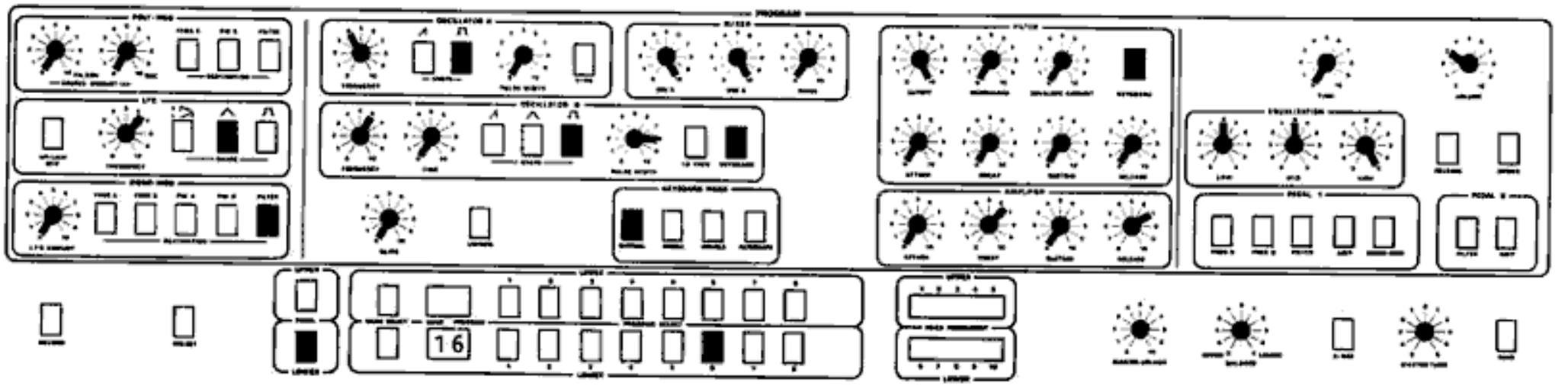
— The wooden "chiff" effect in the initial portion of the tone (a characteristic of pipe organ attack transients) is created mainly by the settings in the FILTER section. The filter envelope generator settings (particularly the ATTACK, DECAY, and SUSTAIN), working in conjunction with the filter CUTOFF, ENVELOPE AMOUNT, and RESONANCE settings, are critical. (The use of the mellow triangle waveshape in OSC B is also important to the overall tone color.) To understand how these settings work together to create the effect, try altering them all slightly, one at a time and in combination.



U-1-6: Harpsichord II

OSC A: up 2 octaves
OSC B: up 3 octaves

See the notes with **L-1-6: Harpsichord 1,** particularly the section entitled GENESIS OF THIS PATCH:



L-1-6: Harpsichord I

OSC A: up 2 octaves
OSC B: up 3 octaves

GENESIS OF THIS PATCH: To create the bright, nasal sound of the thin strings of a harpsichord, narrow pulse waves were selected. The FILTER settings are also important: brightness is insured by setting the filter CUTOFF fully open. The amplifier envelope generator is set to simulate a plucked string (since, in a harpsichord, the strings are plucked rather than struck). Even though there is no audible release time on a harpsichord, the RELEASE is set at 6 on the VCA envelope generator so there won't be an audible "whack" when the key is released (caused by the instantaneous closing down of the VCA). The oscillators are set at two different octaves to emphasize the brightness of the harpsichord (and to simulate the sound of the harpsichord with more than one of its stops selected).

MOD wheel can be engaged (if desired) to create a repeating effect via the MONO-MOD section. Move wheel up approximately ½ (or more) to engage the effect.

NOTES:

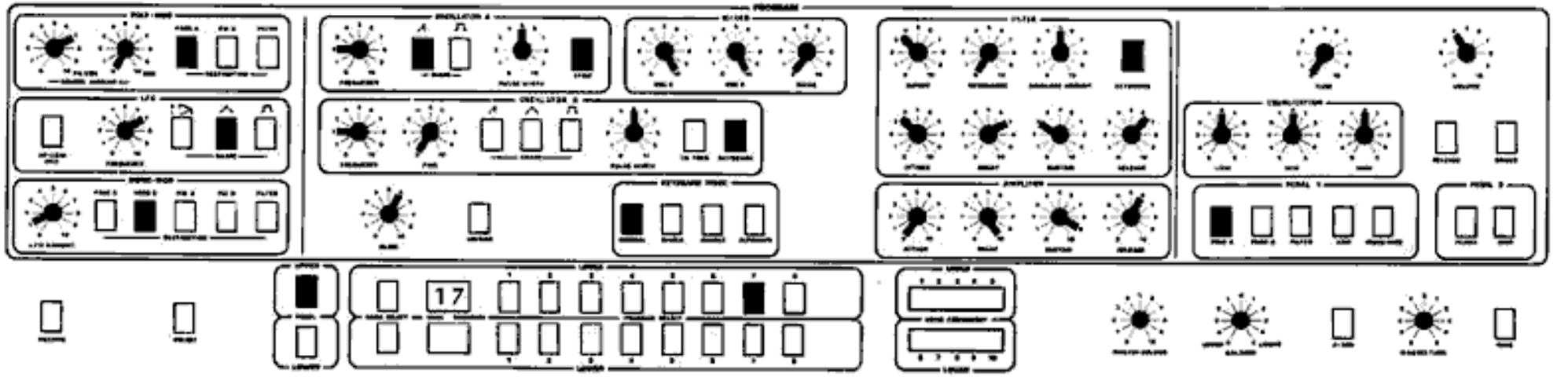
— Adjust oscillators to a wider pulse-width for a fuller sound.

— For a more nasal sound, increase the amount of filter RESONANCE.

— To change overall tone color mix, change MIXER settings for OSC A and B.

— Try adding an envelope shape to the FILTER. Envelope generator settings should be similar to those on the amplifier section; adjust filter CUTOFF and ENVELOPE AMOUNT to engage the envelope generator at the proper level.

— When in DOUBLE keyboard mode, try transposing the LOWER program (Harpsichord I) down or up 1 octave.



U-1-7: Sync I

OSC A: up 1 octave
OSC B: up 1 octave

MONO-MOD section is set for a vibrato effect. Move MOD wheel up to intensify the effect.

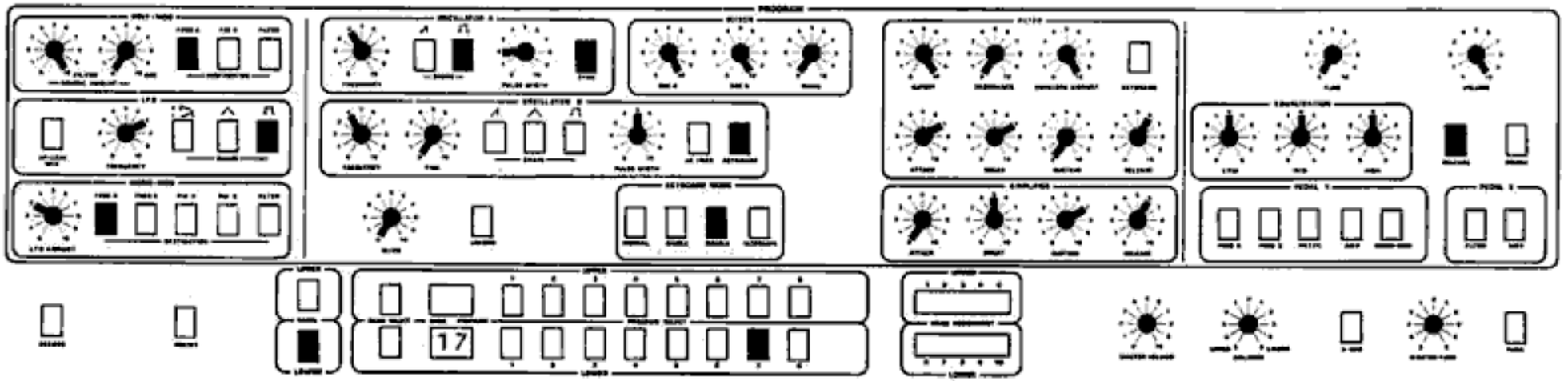
OSC B is programmed off (no waveform selected); however, the mixer section is set to allow for its addition to the sound.

PULSE-WIDTH on both oscillators is set at 5; this allows switching of waveforms on OSC A, and leaves open the possibility of adding OSC B pulse wave to the sound.

GLIDE is programmed in for use with UNISON mode — when the patch is used as a lead line. Glide will engage if UNISON is switched on.

NOTES:

— PEDAL 1 is routed to OSCILLATOR A, and can be used to create a sync-sweep effect.



L-1-7: Slow Sync Sweep

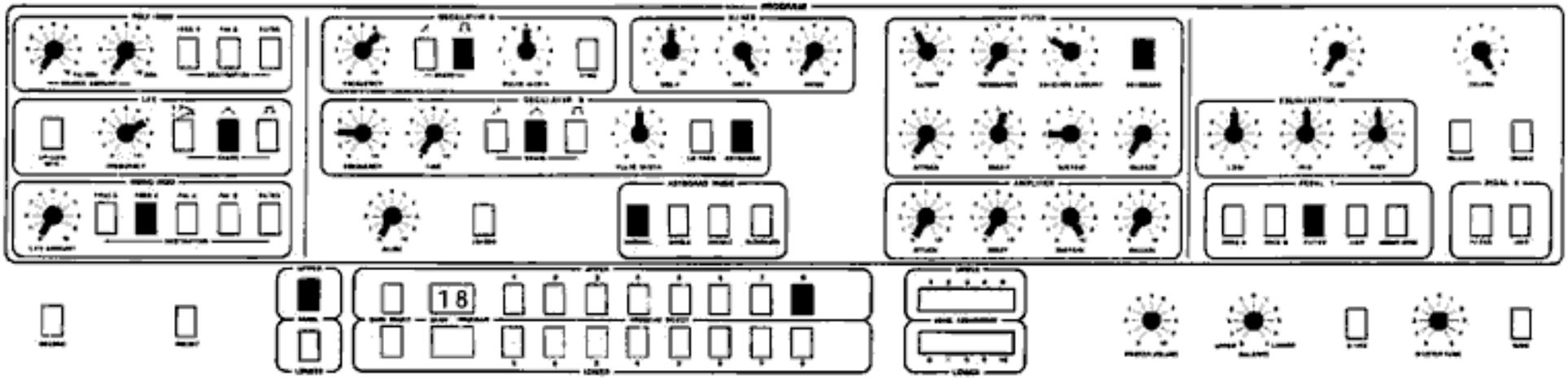
OSC A: up 2 octaves
OSC B: up 2 octaves

For the full sweeping effect, hold keys down (i.e. play long, sustained tones).

MONO-MOD section is set for a sync-trill effect. Move MOD wheel up to intensify the effect.

OSC B is programmed off (no waveform selected); however, the mixer section is set to allow for its addition to the sound.

PULSE-WIDTH on OSC B is set at 5; this leaves open the possibility of adding OSC B pulse wave to the sound.



U-1-8: Percussive Organ

OSC A: up 3 octaves + a perfect 5th
OSC B: up 1 octave (basic pitch)

MONO-MOD section is set for a vibrato effect, and can be engaged by moving the MOD wheel up slightly (⅛ to ¼).

PULSE-WIDTH on OSC B is set at 5; this allows for switching of waveforms.

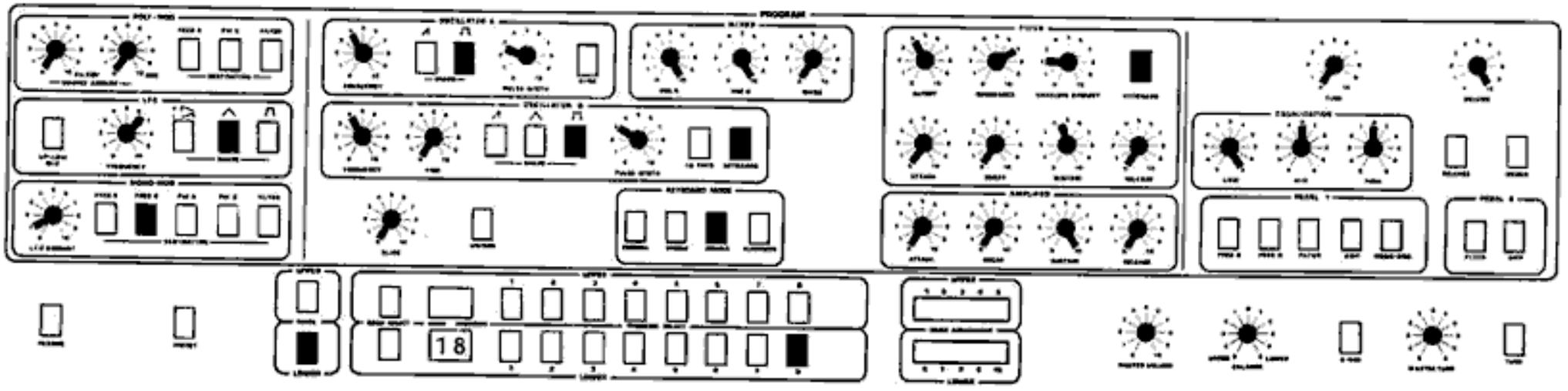
For proper effect, OSC A must be a square wave (set at approximately 5 and listen for the dropout of the octave — the 2nd harmonic).

NOTES:

— Adjust the filter ENVELOPE AMOUNT to change amount of percussion effect and brightness of tone color.

— Adjust filter CUTOFF to change overall brightness of tone.

— PEDAL 1 is routed to the FILTER cutoff frequency, and can be used to alter the brightness of tone (or for psuedo-wah effects).



L-1-8: Organ with Resonance

OSC A: up 2 octaves
OSC B: up 2 octaves

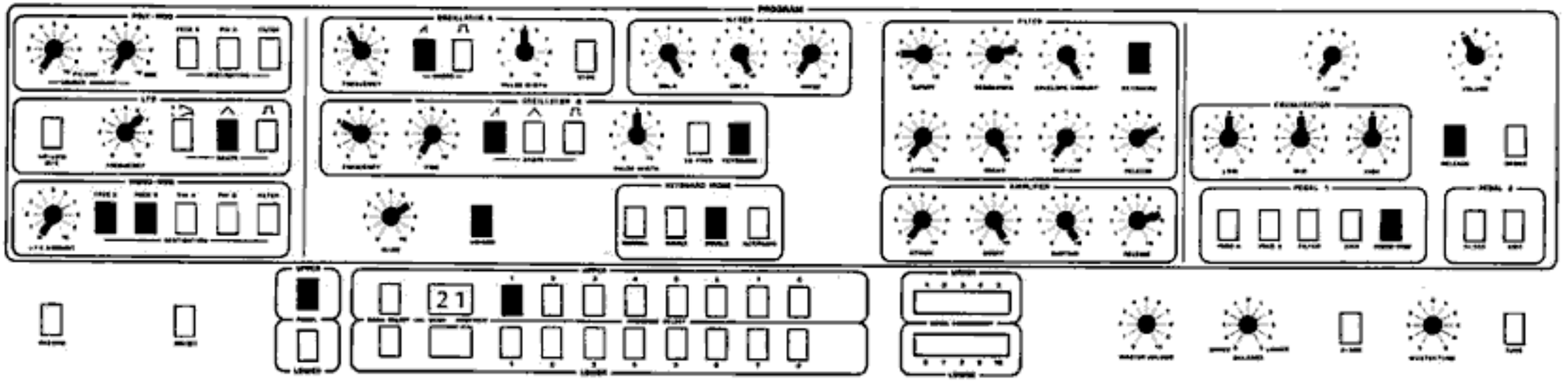
MONO-MOD section is set for a rotating-speaker effect. Move MOD wheel up to intensify the effect.

NOTES:

— For a thicker sound, detune OSC B by setting FINE tune to approximately 1½.

— For a different animation-of-sound effect, try routing mod to PW A (or PW A and PW B) instead of FREQ B.

— Adjust DECAY and SUSTAIN settings on filter envelope generator to alter the organ percussion effect.

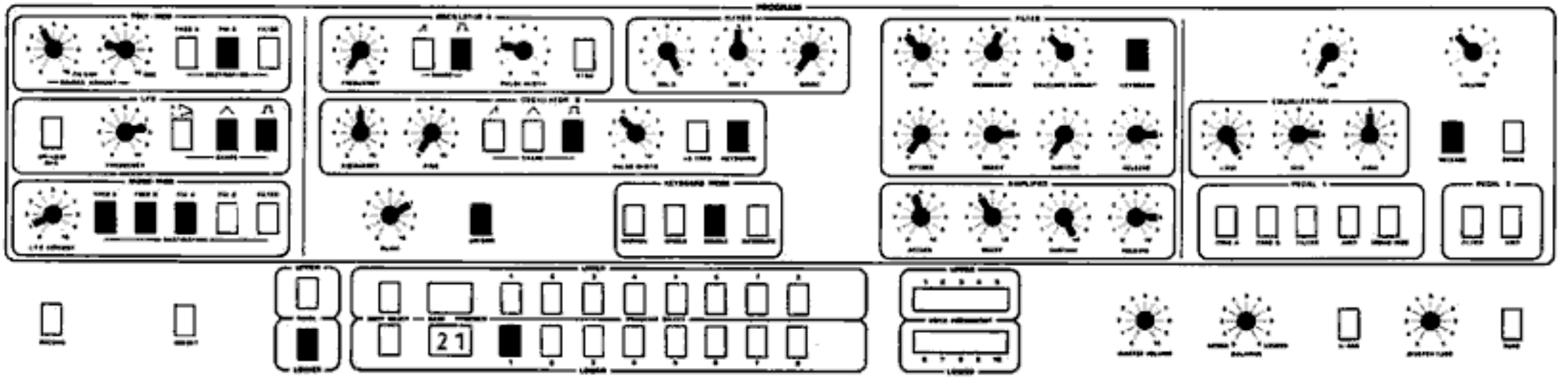


U-2-1: Unison Glide

OSC A: up 2 octaves
OSC B: up 1 octave

MONO-MOD section is set for a vibrato effect, and can be engaged by moving the MOD wheel up slightly. PEDAL 1 is also routed to MONO-MOD.

PULSE-WIDTH on both oscillators is set at 5; this allows switching of waveforms.



L-2-1: Unison Glide

OSC A: up 0 octaves
OSC B: up 2 octaves + a perfect 5th

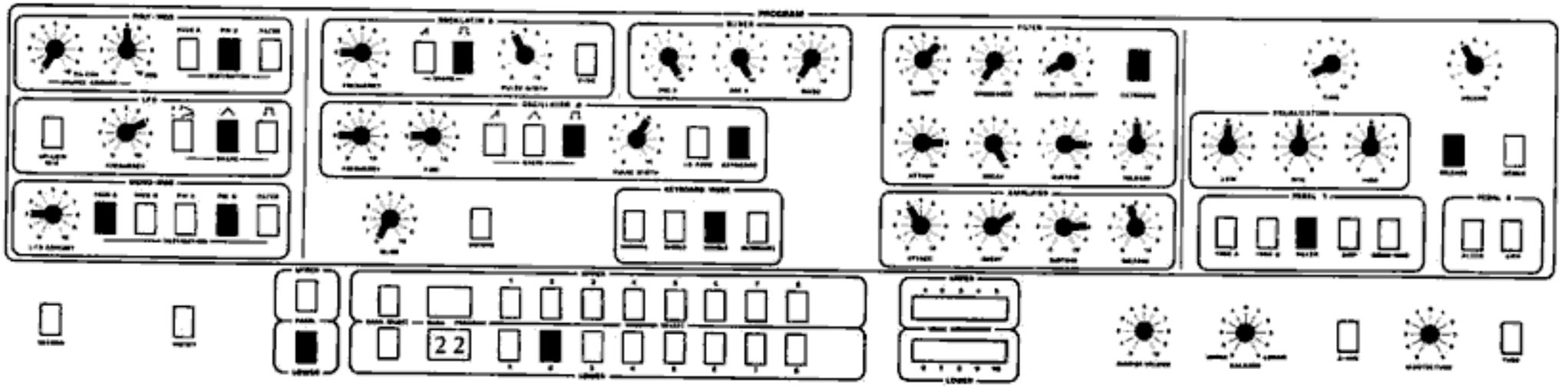
MONO-MOD section is set for a vibrato chorusing effect. Move the MOD wheel up to intensify the effect.

NOTES:

— The combined effect of these two programs (in DOUBLE keyboard mode) is a pseudo-stereo cross-fade. This is created (mainly) by the relative envelope generator settings in the two programs, and by the routing of the POLY-MOD in the 2-1 LOWER program.

U-2-2: Strings Doubled

OSC A: up 1 octave
OSC B: up 1 octave



L-2-2: Strings Doubled

OSC A: up 1 octave
OSC B: up 1 octave

See the notes with U-1-2 and L-1-2.

NOTES:

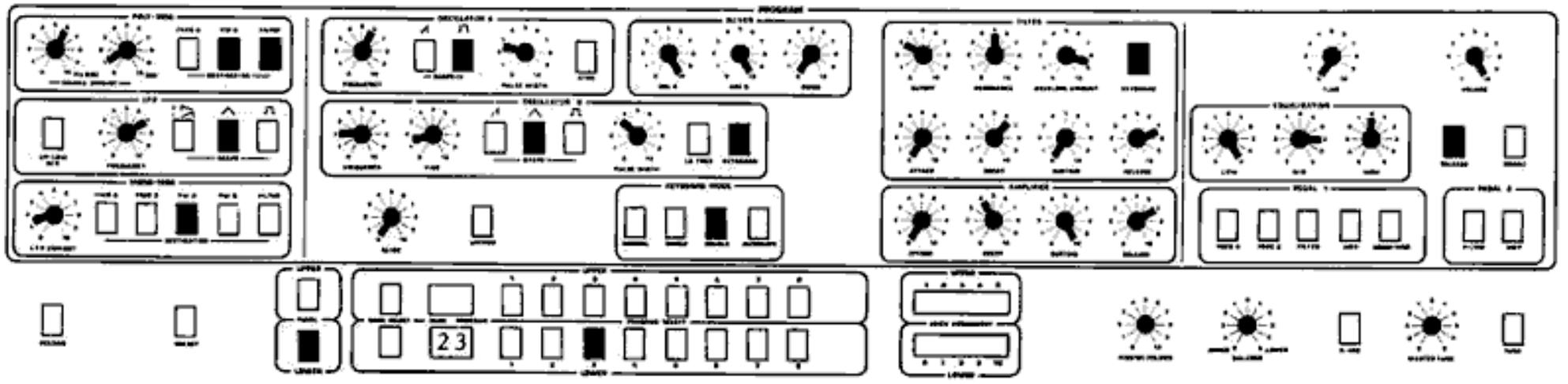
— L-2-2 is slightly detuned relative to U-2-2 (via the programmable TUNE knob) for added depth and animation of sound.

— Transpose either UPPER or LOWER program up one octave for different "full" sound.

— Filter pedal on Pedal 1 can be used to add brightness.

U-2-3: Double Delay

OSC A: up 2 octaves
OSC B: up 2 octaves + a perfect 5th



L-2-3: Double Delay

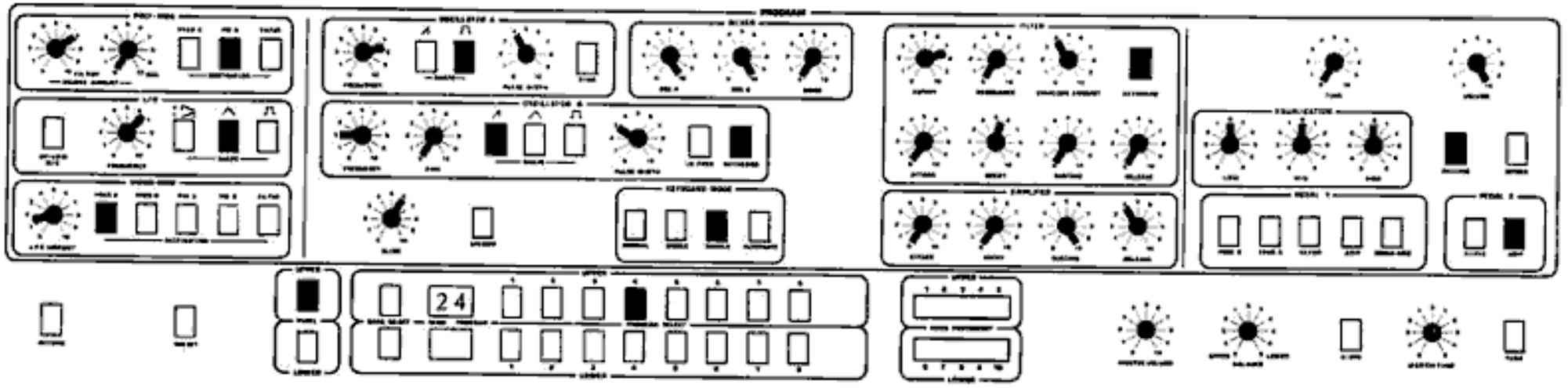
OSC A: up 3 octaves
OSC B: up 1 octave

The delay effects in these programs are crated by the POLY-MOD section. In both the UPPER and LOWER programs, the filter envelope generator is being used as the modulation source, routed to PW A; at the beginning of each sound, the PULSE-WIDTH of OSC A is driven to 10 and degenerates to DC — in other words, no sound is generated (by OSC A) at the beginning of each sound. As the envelope generators progress through their cycles, the PULSE-WIDTH drops below 10, and OSC A is allowed to sound. The relative setting of the UPPER and LOWER programs is such that the LOWER OSC A enters as the first delay, and then UPPER OSC A enters as the second delay. (Both UPPER and LOWER OSC B enter immediately when a key is struck, with no delay.)

MONO-MOD is set for a chorusing effect in both UPPER and LOWER programs. Move the MOD wheel up to intensify the effect.

NOTES:

— Try UNISON mode. Also try changing the settings of the oscillators to create 4-note chords with delayed entrances.



U-2-4: Delayed Harmonic

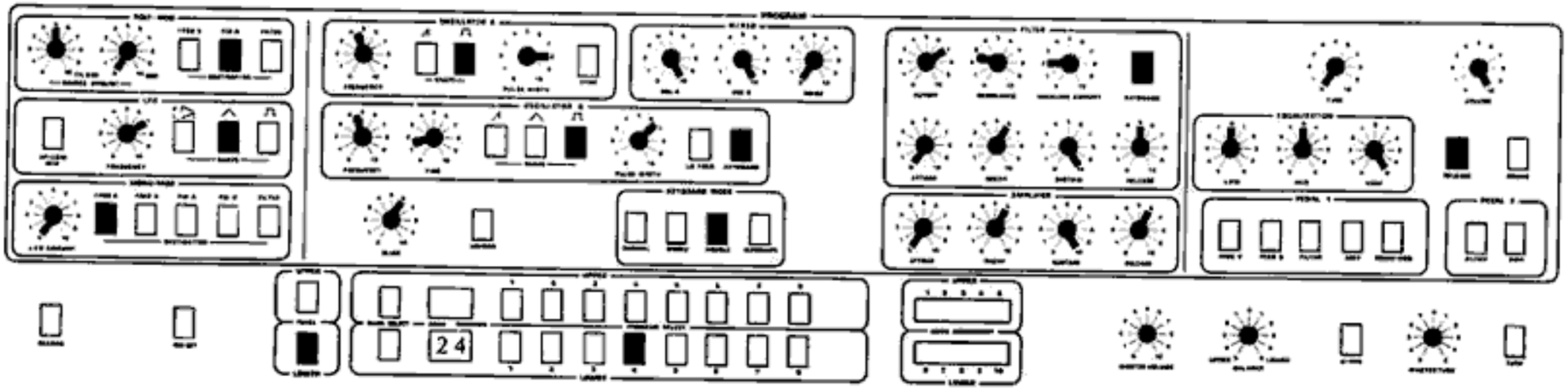
OSC A: up 4 octaves
OSC B: up 1 octave (basic pitch)

The delayed harmonic effect in this patch is created by the POLY-MOD section. The filter envelope generator is being used as the modulation source, routed to PW A; at first, the voltage from the envelope generator is so high that the PULSE-WIDTH is driven to 10 and generates to DC — in other words, no sound is generated. As the DECAY of the envelope generator continues, the voltage lowers, and OSC A is allowed to sound. Since it is pitched 3 octaves above OSC B (the primary sound source), it gives the effect of an overtone.

The type of effect generated by this patch depends on the technique used on the keyboard: if the keys are held down, you will get the basic "delayed harmonic" effect; if you play with a staccato touch, the harmonic note (OSC A) will come in as a plucked timbre at the release of each key.

MOD WHEEL section is set for a vibrato effect on the harmonic note only (OSC A). Move wheel up slightly (⅛ to ¼) to engage vibrato.

GLIDE is programmed in for use with UNISON Mode — when the patch is used as a lead line. Glide will engage if UNISON is switched on.



L-2-4: Release Repeat

OSC A: up 2 octaves
OSC B: up 2 octaves

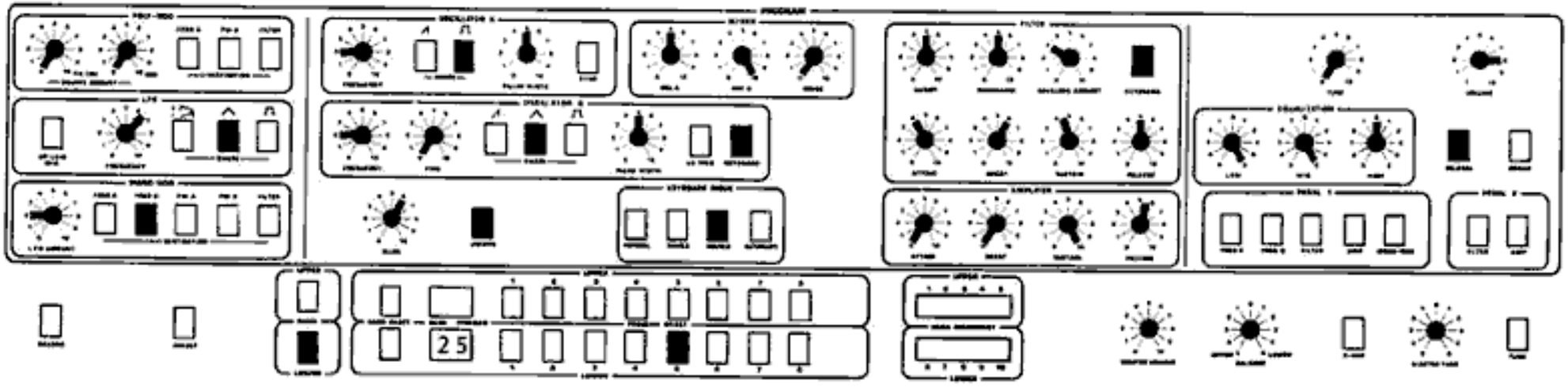
The release effect in this patch is created by the POLY-MOD section. The filter envelope generator is being used as the modulation source, routed to PW 1; since the SUSTAIN is set at 9, the PULSE-WIDTH of OSC 1 is driven to 10 and degenerates to DC — in other words, no sound is generated. When the key is released, the filter RELEASE is faster than the amplifier RELEASE, so that OSC 1 is allowed to sound. In other words, OSC 2 provides the sound while a key is depressed, and OSC 1 provides the repeat effect. OSC B is detuned from OSC A — this gives the "off-tune" sound to the release portion of the sound.

MOD WHEEL section can be engaged (if desired) to create a chorusing effect on the release portion of the sound. Move wheel up to engage effect (from ⅛ to ½, depending on effect desired).

GLIDE is programmed in for use with UNISON mode — when the patch is used as a lead line. Glide will engage if unison is switched on.

U-2-5: Sync III

OSC A: up 3 octaves
OSC B: up 2 octaves



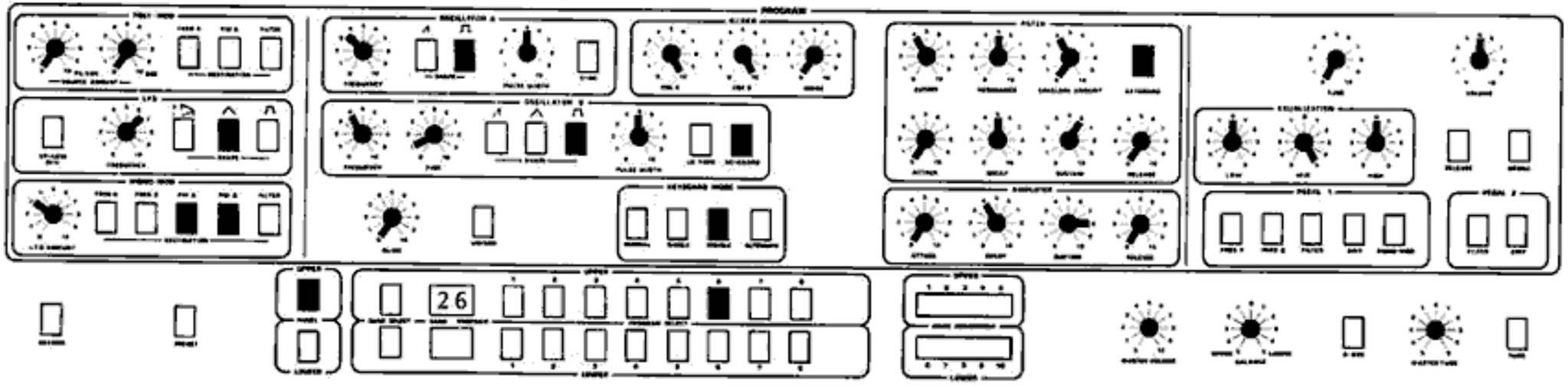
L-2-5: Unison Triangle-Square Wave

OSC A: up 1 octave
OSC B: up 1 octave

MONO-MOD for both UPPER and LOWER programs is set for a vibrato-like effect. Move MOD wheel up to intensify the effect. In addition, PEDAL 1 is routed to the MONO-MOD of the UPPER program.

NOTES:

— If chords are played, the unison patch (L-2-5) will sound with the top note of the chord. If you are planning to play a specific melody with chordal accompaniment, you must remember to release the top note of each chord last (just slightly) — if the top note is released before some other note in the chord, the unison patch (L-2-5) will jump down to that note momentarily. Working with these two patches will help you understand how to deal with the high-note priority of UNISON mode.



U-2-6: Punchy Pulses

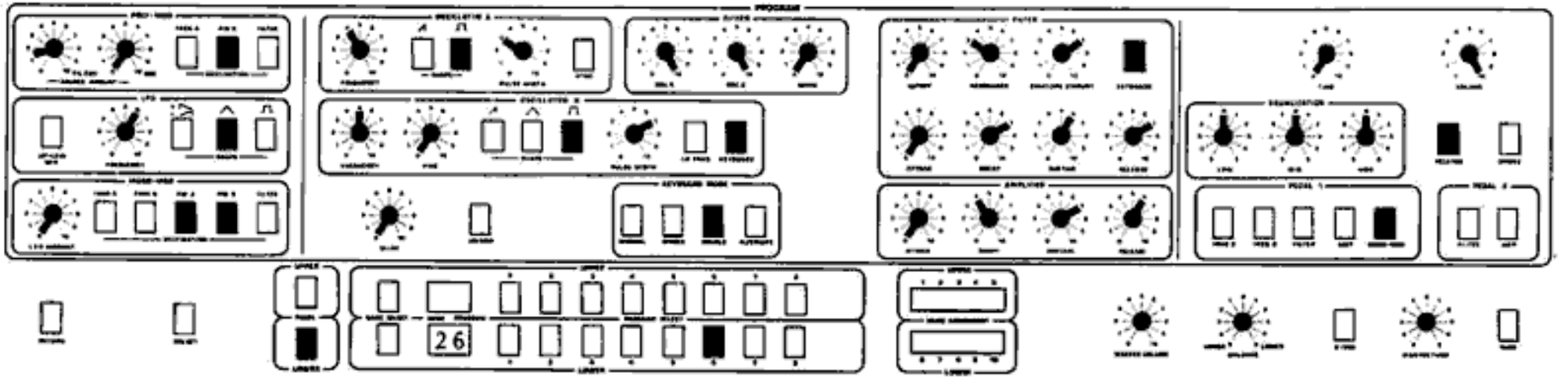
OSC A: up 2 octaves
OSC B: up 2 octaves

MONO-MOD is programmed for a chorus-like animation of sound. Move MOD wheel up to intensify the effect.

NOTES:

— Adjust CUTOFF and ENVELOPE AMOUNT for different tone colors.

— Add other waveshapes to OSC A and OSC B to thicken sound.



L-2-6: Clav-Type

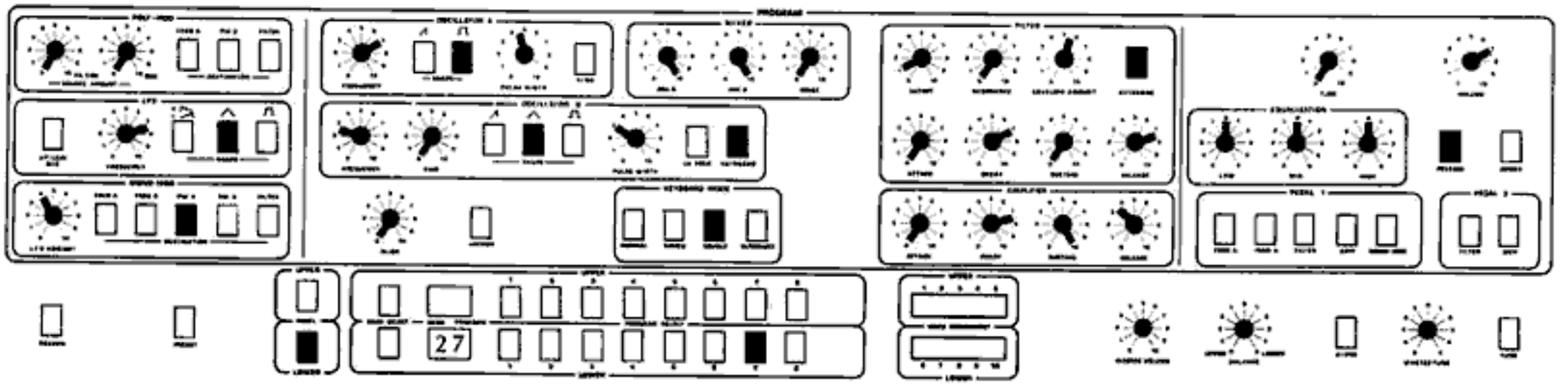
OSC A: up 2 octaves
OSC 3: up 3 octaves

MONO-MOD is set for a chorus-like animation of sound, and can be engaged by moving the MOD wheel up slightly. PEDAL 1 is also routed to the MONO-MOD section.

POLY-MOD is set for pulse-width modulation of OSC A (the lower octave) by the filter's envelope generator (ENV). As a result, the lower octave begins as a nasal sound that thickens as the tone decays, in imitation of a plucked strings timbre. The setting of the ENV knob is critical; if set too high, the PW of OSC A will be driven past 10 and will degenerate into DC (and the result will be no sound from OSC A).

U-2-7: Electronic Organ

OSC A: up 3 octaves + a perfect 5th
OSC B: up 2 octaves



L-2-7: Electronic Organ

OSC A: up 4 octaves
OSC B: up 1 octave

The selected waveshapes and octave positions selected for these two programs are combined to approximate the full ensemble sound of a "drawbar" electronic organ.

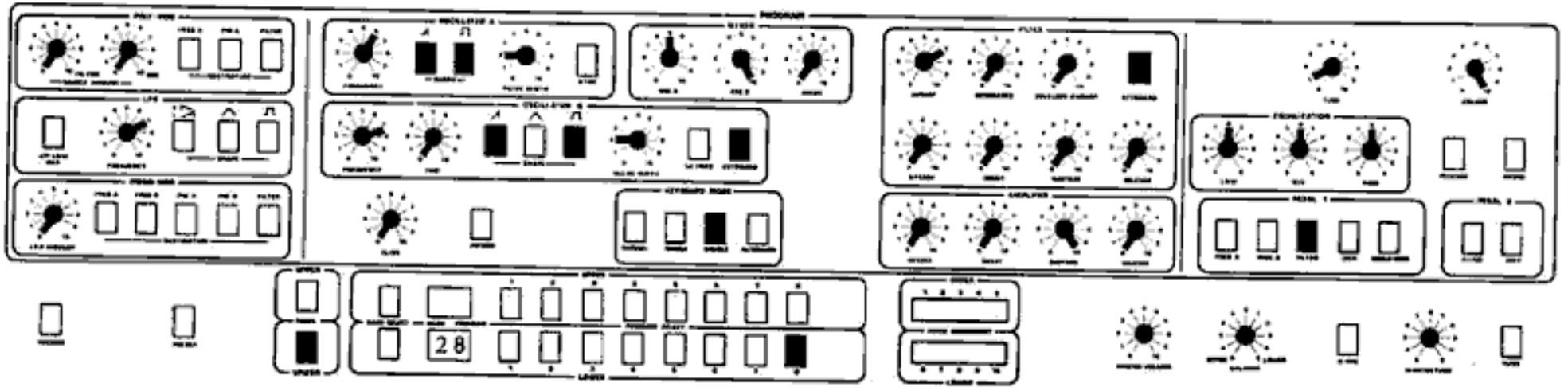
MONO-MOD is programmed for vibrato on the UPPER program, and can be engaged by moving the MOD wheel up slightly.

MONO-MOD is programmed to provide a chorus-like animation of sound on the highest oscillator (OSC A) on the LOWER program. Moving the MOD wheel up will intensify this effect.

To create a "percussion" sound, adjust the FILTER envelope generator on both programs: shorten the DECAY time, and lower the SUSTAIN level.

U-2-8: Pipe Organ

OSC A: up 1 octave
OSC B: up 2 octaves



L-2-8: Pipe Organ

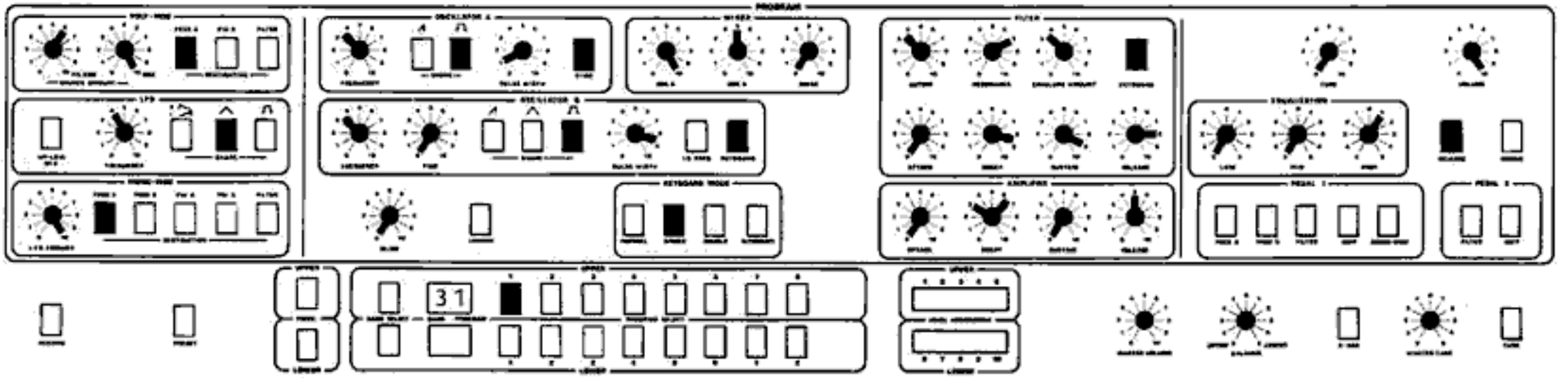
OSC A: up 3 octaves
OSC B: up 4 octaves

The LOWER program is detuned relative to the UPPER program via the programmable TUNE knob.

Although no waveshapes or routings are selected in the MONO-MOD section, a vibrato-like LFO rate has been programmed in the UPPER and LOWER sections, so that a vibrato or tremolo can be added to the sound with a waveform switch and the MOD wheel.

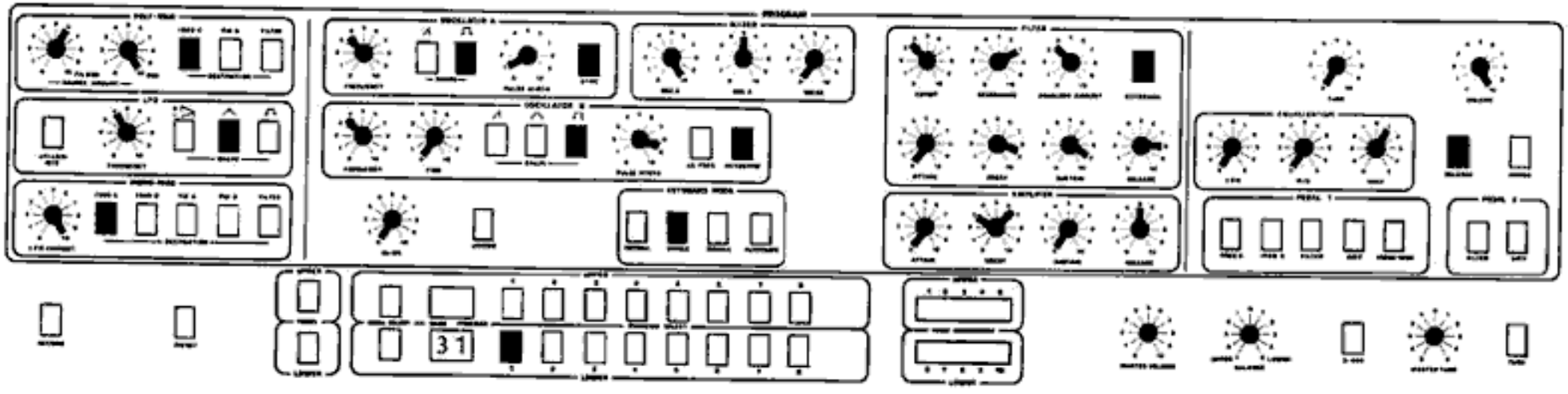
NOTES:

— PEDAL 1 is routed to the FILTER cutoff frequency in both the UPPER and LOWER programs. This can be used to alter the brightness of tone, or for pseudo-wah effects.



U-3-1: Phase Shift Effect

OSC A: up 2 octaves
OSC B: up 2 octaves



L-3-1: Phase Shift Effect

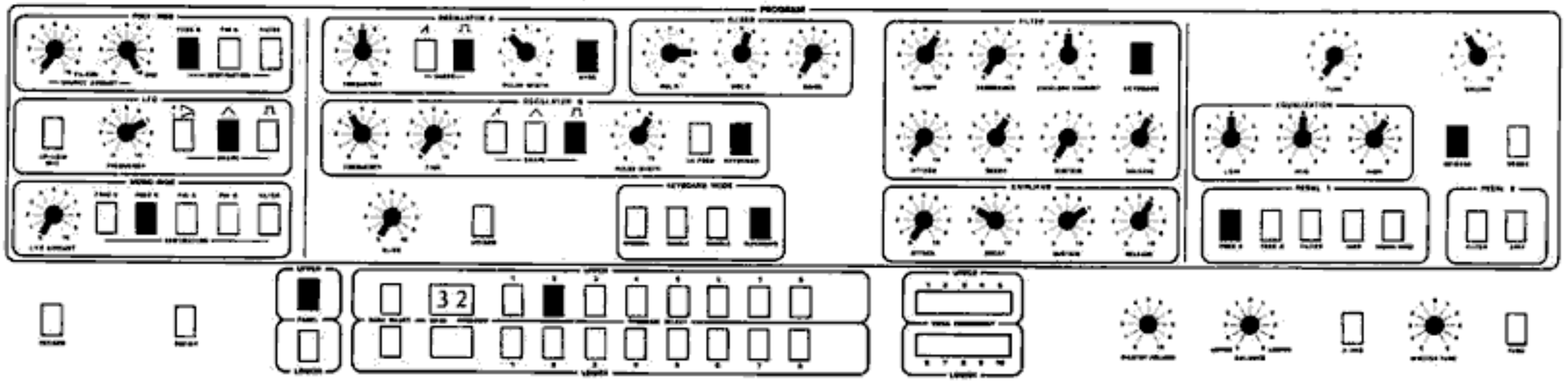
OSC A: up 2 octaves
OSC B: up 2 octaves

The phase-shift effect is created by the combination of MONO-MOD and POLY-MOD routings to modulate OSC A; since OSC A is synced to OSC B, its overall pitch can't change, but marked changes in tone color are brought about through the modulation.

NOTES:

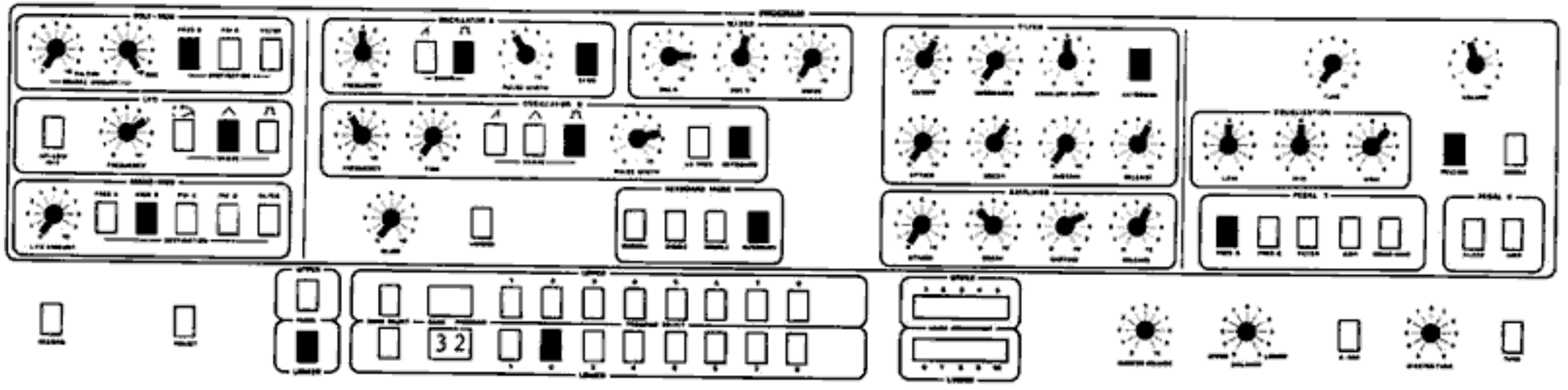
— Try switching on additional waveforms of OSC B for tonal variations.

— Remember that in order to edit this sound completely (in SINGLE keyboard mode) the editing changes must be carried out (and re-programmed) with both the UPPER panel and then the LOWER panel displayed. One simple way to do this would be to make the changes on one synthesizer bank (UPPER), record those changes, and then record the entire patch onto the LOWER position.



U-3-2: Alternate I

OSC A: up 2 octaves + a perfect 4th
OSC B: up 2 octaves



L-3-2: Alternate I

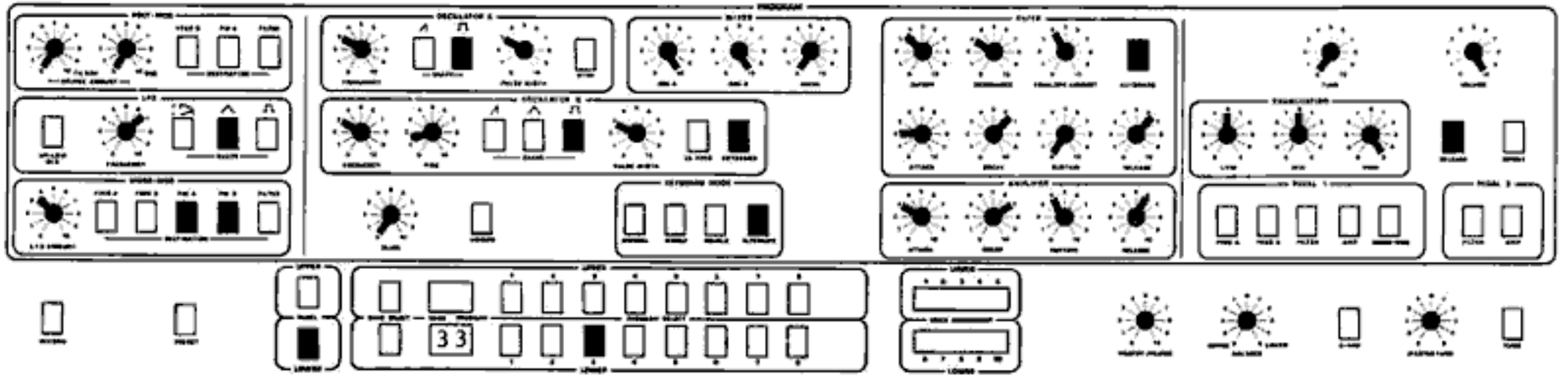
OSC A: up 2 octaves + a tritone
OSC B: up 2 octaves

This patch is set up to show the basic function of ALTERNATE keyboard mode. The two patches are almost exactly the same, with only these two differences: 1) the tuning of the SYNCed oscillator (OSC A); and 2) the pulse-width of OSC B. Since the SYNCed oscillator in the UPPER program is set for an interval that has a strong harmonic relationship to OSC B, the sound is thick, while the SYNCed oscillator in the LOWER program is set for a weaker harmonic interval, and therefore has a thinner sound. Also, since OSC B in the LOWER program is set for a higher pulse width than is its counterpart in the UPPER program, it has a more nasal sound. This patch should give you some idea of the importance of fine adjustments to the overall sound of a patch.

MONO-MOD (for both programs) is set for vibrato, and can be engaged by moving the MOD wheel up slightly.

U-3-3: Alternate 5ths

OSC A: up 1 octave
OSC B: up 1 octave



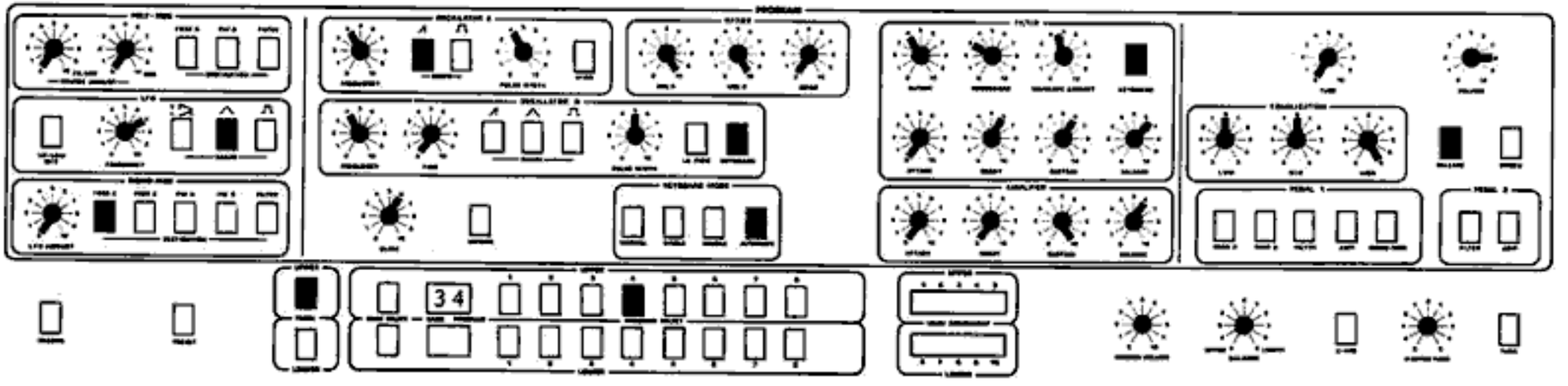
L-3-3: Alternate 5ths

OSC A: up 1 octave + a perfect 5th
OSC B: up 1 octave + a perfect 5th

MONO-MOD is programmed to provide a chorus-like animation of sound (for both UPPER and LOWER programs). Move MOD wheel up to intensify effect.

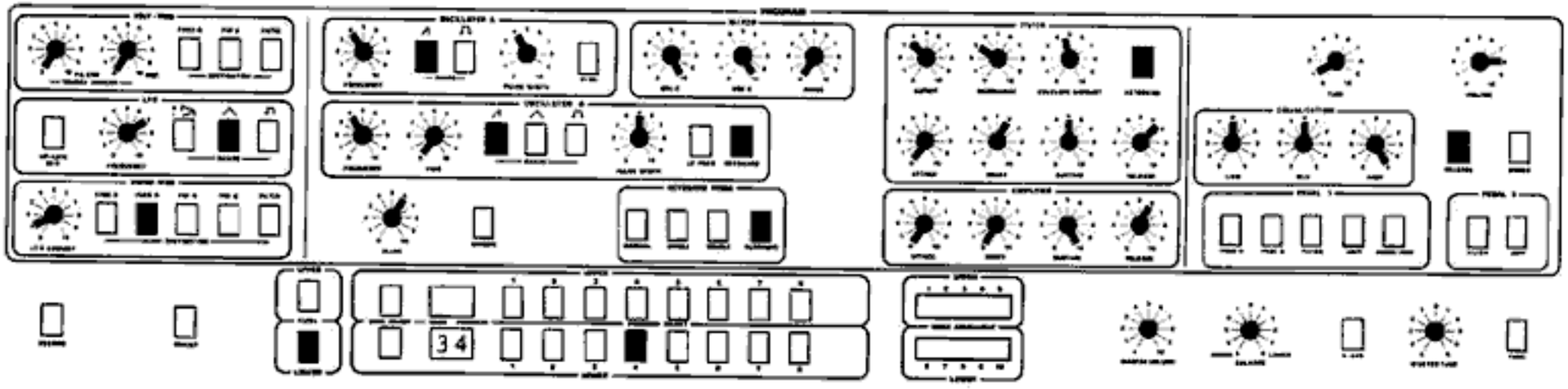
NOTES:

— The ALTERNATE keyboard mode effect in this case is a change in pitch — the two programs are tuned a 5th apart. This will create some unusual melodic effects with straightforward keyboard playing.



U-3-4: Alternate II

OSC A: up 2 octaves
OSC B: up 2 octaves



L-3-4: Alternate II

OSC A: up 2 octaves
OSC B: up 2 octaves

In the UPPER program, OSC B is programmed off; this accounts for much of the timbral difference between the UPPER and LOWER programs. OSC B can be switched on to change the tone color of the UPPER program.

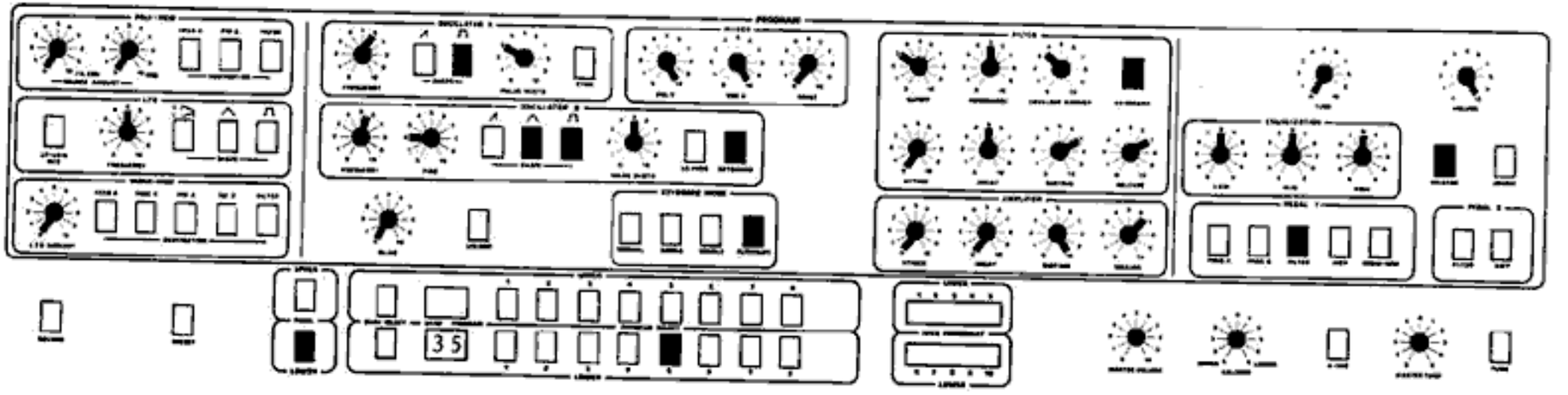
Although no pulse waves have been selected for the oscillators in either program, the pulse-widths of OSC A (UPPER and LOWER) have been programmed at 4, and the pulse-widths of OSC B (UPPER and LOWER) have been programmed at 5. This allows switching of waveforms.

The LOWER program has been detuned relative to the UPPER program via the programmable TUNE knob.

MONO-MOD for the UPPER program has been programmed to provide a vibrato effect, which can be engaged by moving the MOD wheel up slightly (⅛ to ¼).

U-3-5: Muted Toy Piano

OSC A: up 3 octaves
OSC B: up 3 octaves



L-3-5: Muted Toy Piano

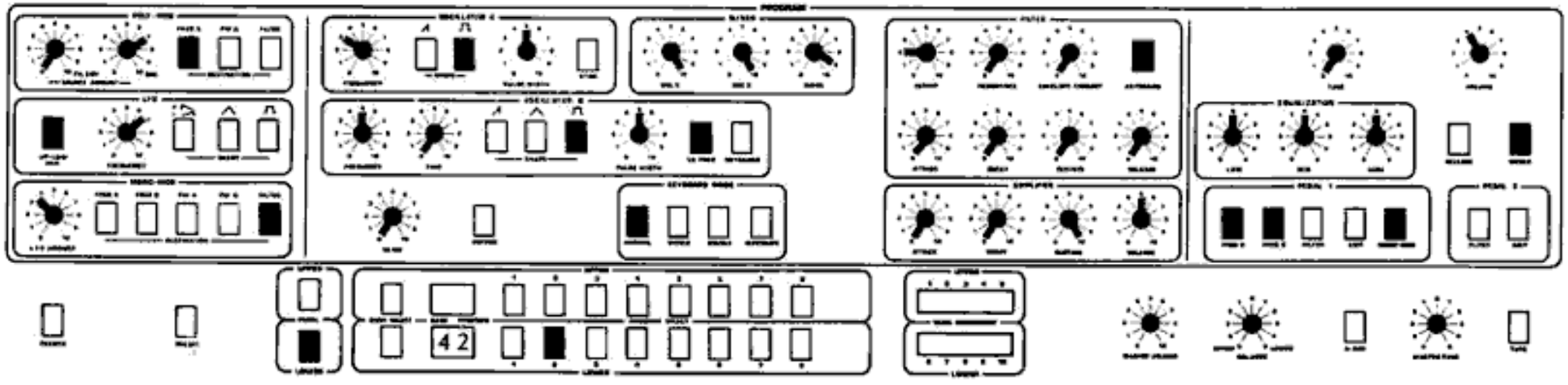
OSC A: up 3 octaves
OSC B: up 3 octaves

Both UPPER and LOWER patches are the same, except that OSC B is switched off in the UPPER program. This will create volume and timbral difference when the programs are played together in either SINGLE keyboard mode or ALTERNATE keyboard mode.

MONO-MOD is set to provide a chorus-like animation of sound for the UPPER program. Move the MOD wheel up to intensify the effect. PEDAL 1 is also routed to MONO-MOD for the UPPER program.

NOTES:

— PEDAL 1 is routed to the FILTER cutoff frequency for the LOWER program (and to MONO-MOD for the UPPER program). The FILTER routing can be used to alter the brightness of tone, and to provide a pseudo-wah effect.



L-4-2: Repeat Drone II

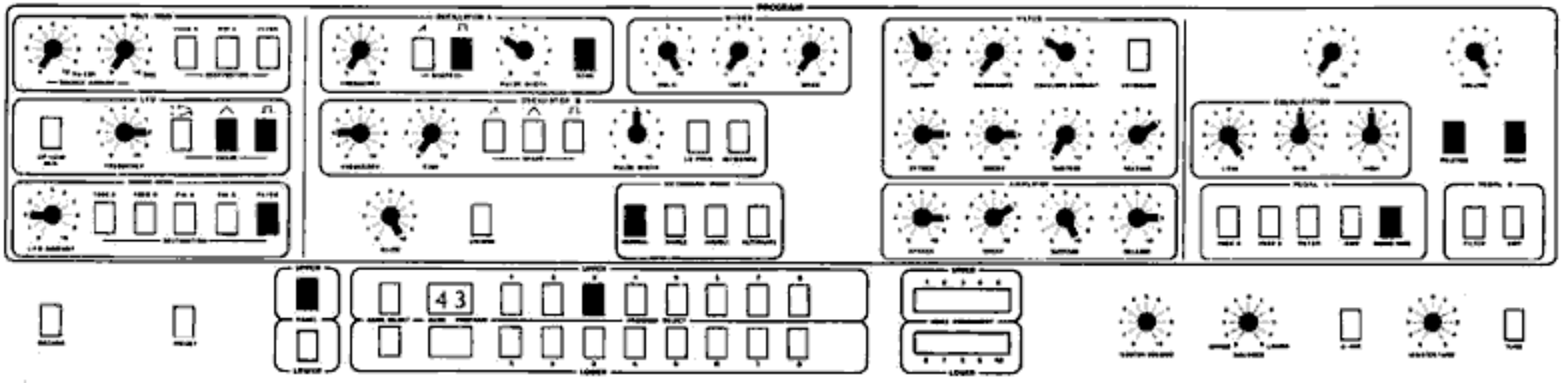
OSC A: up 1 octave + a perfect 5th
OSC B: LF mode

In this patch, the LFO square waves of OSC B are modulating OSC A; since this is accomplished via the POLY-MOD section, the modulations occur at slightly different rates of speed, setting up the thick texture you hear. NOISE is also part of the sound source of this patch.

MONO-MOD is routed to the FILTER cutoff frequency, but no waveshapes are selected in the LFO section. Try selecting different waveforms, and notice the effect they have on the overall sound (particularly the NOISE source).

NOTES:

— Try PEDAL 1 and notice the difference in the overall effect. Select fewer routings and notice how the effect changes.



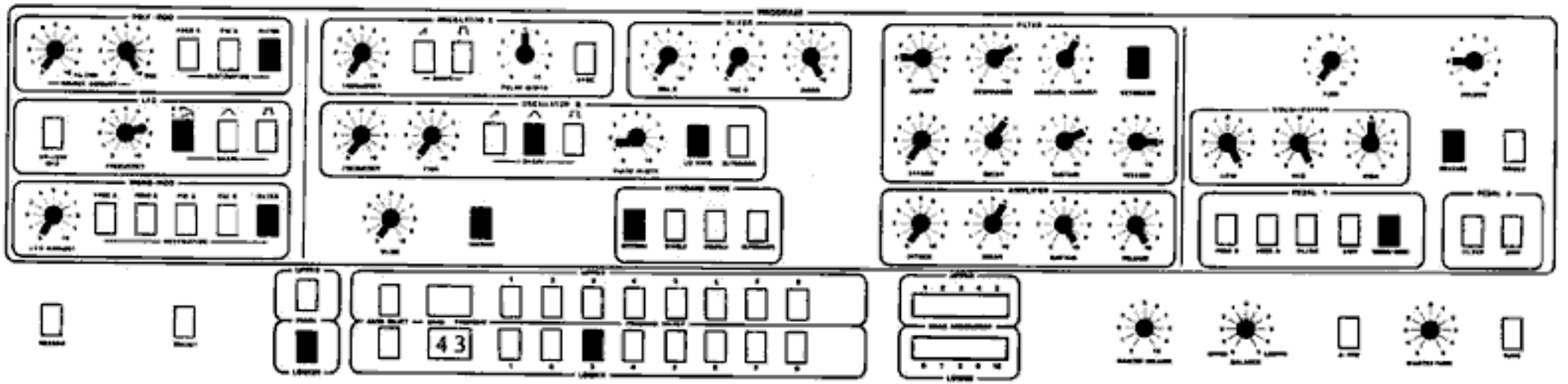
U-4-3: Helicopter

OSC A: up 0
OSC B: tuned to low E (1 octave + major 3rd above lowest note).

MONO-MOD section is set to create "chopper" effect. Move MOD wheel up for increased effect. If LFO AMOUNT knob is turned to 0, sound will resemble a distant airplane squadron rather than a helicopter. PEDAL 1 is also routed to MONO-MOD.

For best helicopter effect, play keyboard in the bottom 3 octaves. Try "flying" the sound by playing low C and middle C alternately on the keyboard while moving the PITCH and MOD wheels slightly to simulate approach and departure of aircraft.

Turn OSC B after turning KEYBOARD switch off; pitch may change when KEYBOARD switch is disengaged.

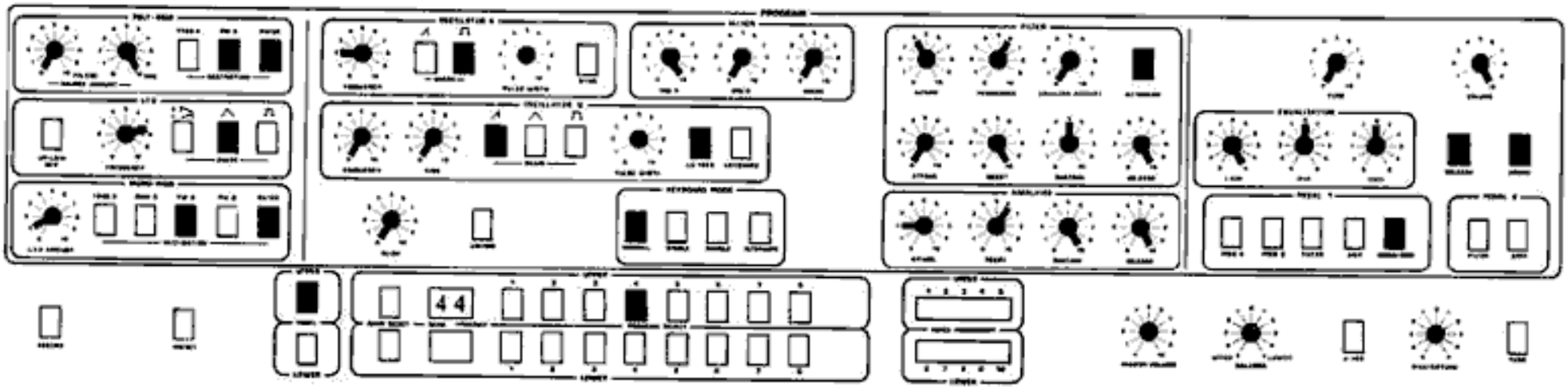


L-4-3: Sweeping Noise Effect

The oscillators are not part of the sound source for this patch.

This patch creates a texture of noise sweeps via the POLY-MOD section (modulation of the FILTER cutoff frequency by OSC B in LF mode). Noitce how the POLY-MOD sets up five independent sweeps (one for each voice in the synthesizer bank).

MONO-MOD is programmed for another kind of FILTER cutoff frequency modulation, and can be engaged by moving the MOD wheel up. PEDAL 1 is also routed to MONO-MOD.



U-4-4: Sawtooth Arpeggiator

OSC 1: up 1 octave
OSC 2: LF mode

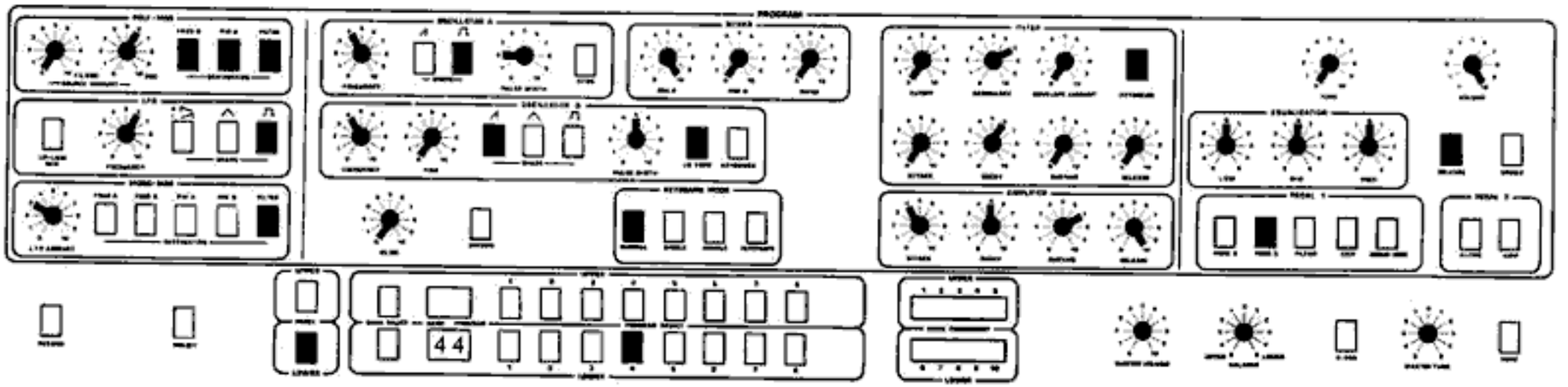
MOD WHEEL can be engaged (if desired) to increase the overall effect. Move wheel full up to engage effect.

NOTES:

— For a completely different effect, switch OSC B LO FREQ off and switch OSC B KEYBOARD on.

— The filter envelope generator settings are programmed to allow enveloping on the filter. Try adding the programmed envelope by setting the filter ENVELOPE AMOUNT above 0 (adjust the filter CUTOFF accordingly). This aspect of the patch can also be engaged in performance by switching the filter section out of PRESET mode.

— Speed up OSC B FREQUENCY for an "Invasion of the Body Snatchers" sound.



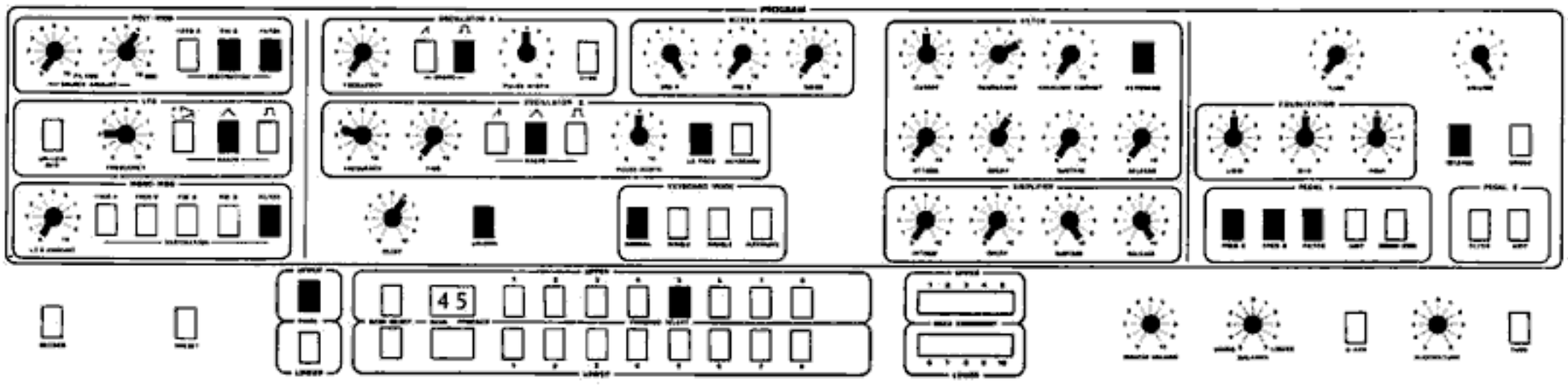
L-4-4: Sweeping Resonance

OSC A: up 2 octaves
OSC B: LF mode

The effect of this patch is created by the POLY-MOD and MONO-MOD sections. The POLY-MOD routing of OSC B sets up the pitch sweep and the changes in tone color. The MONO-MOD provides the on/off effect: since the FILTER cutoff frequency is programmed at 0, sound is only let through during the up portion of the LFO square wave cycle.

NOTES:

— PEDAL 1 is routed to OSC B, and can be used to alter the rate of the pitch sweep.



U-4-5: Poly-Filter Sweep in Unison

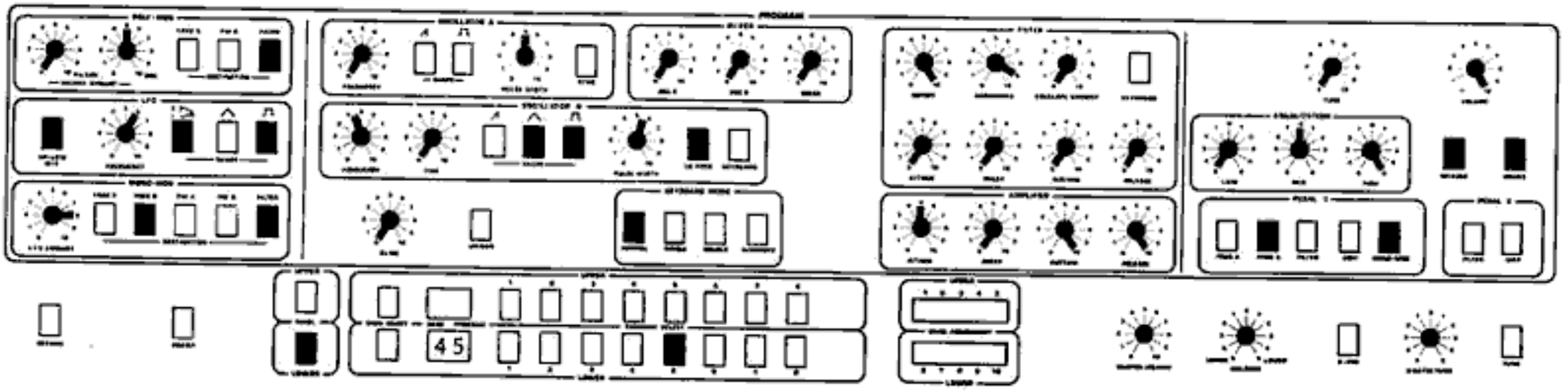
OSC A: up 0 octaves
OSC B: LF mode

Although operating in UNISON mode, this patch has 5 distinct filter sweeps for each note, because the modulation is routed via the POLY-MOD section. The sweeps sound almost like overtone sweeps because the filter RESONANCE is set high. The pulse-width (PW) routing in POLY-MOD adds to the overall animation of sound.

MONO-MOD is programmed for a slow overall change in filter brightness, and can be engaged by moving the MOD wheel up.

NOTES:

— PEDAL 1 is routed to OSC A, OSC B, and the FILTER, and can be used for (among other things) pitch bending.



L-4-5: Drippy Birds

OSC A: off
OSC B: LF mode

Oscillators are not part of the sound source of this patch.

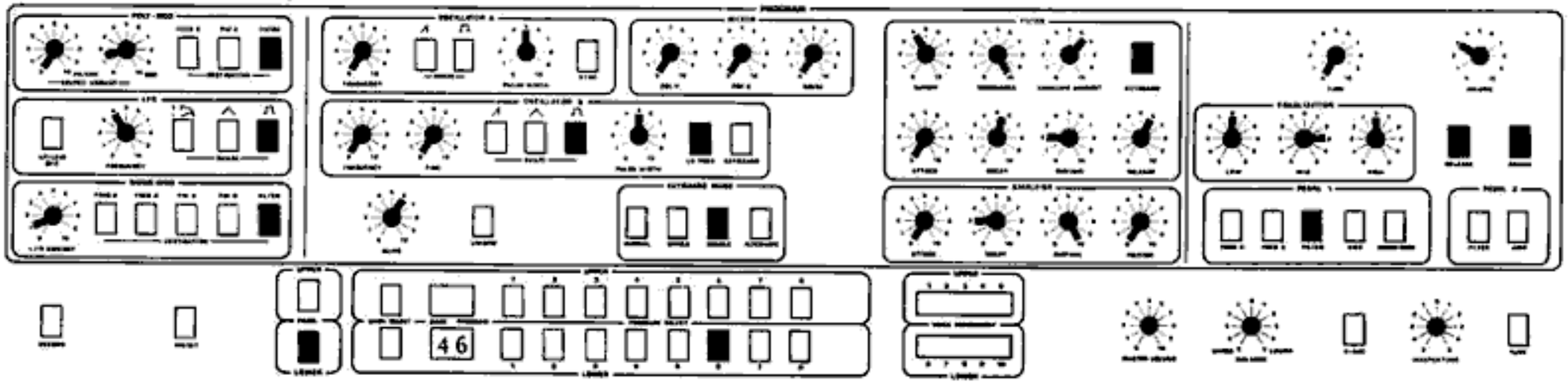
The overall effect of this patch is caused by multiple modulations of the filter, which is set to resonate: the filter is the sound source.

NOTES:

— Turn UP-LOW MIX switch on and off for a change of rate. PEDAL 1 (routed to OSC B and MONO-MOD) can be used for the same type of change (but smoother).

U-4-6: Space Alarms I

OSC A: up 4 octaves
OSC B: LF mode



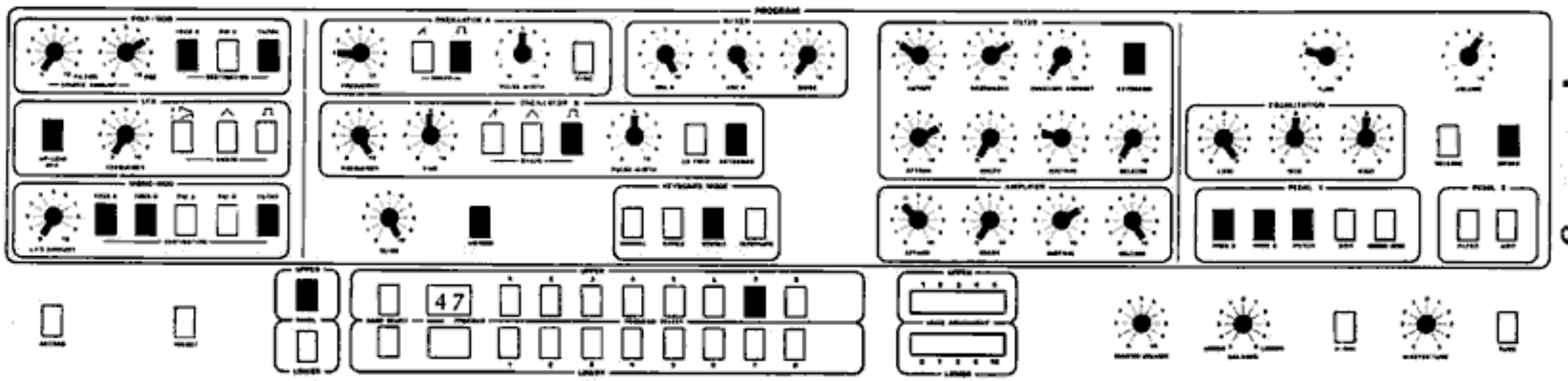
L-4-6: Space Alarms II

OSC A: off
OSC B: LF mode

Work out the effects created by this patch by studying the UPPER and LOWER programs separately. Isolate the contributions of the oscillators, the modulation sections, the filter, and other elements.

NOTES:

— RESONANCE on LOWER program is adjusted so that only 3 of the 5 filters are in oscillation.



U-4-7 & L-4-7: Spaceship Landing

OSC A: up 1 octave
OSC B: up 4 octaves (plus FINE tune knob)

Work out the effects created by this patch by isolating the various elements and studying their interactions.

NOTES:

— Both pulse waves are set at exactly 50%, and are therefore square waves.

U-4-8: Dupe of U-1-1 (Baroque Horn)
L-4-8: Dupe of L-1-6 (Harpsichord I)

These duplicate presets have been included for several reasons: 1) to leave open pivot points to allow you to move the factory presets to different locations for your particular needs; 2) to give you space to store your first programs and live with them for a while before storing them in another location (in place of one of the factory presets); 3) to allow you to practice working with the factory presets in order to fine tune them to suit your tastes; and 4) to let you trace the development of certain of the factory preset sounds (Baroque Horn and Harpsichord I) so that you can begin to work out your own methods for creating programmed sounds. Let us look at these various things one at a time.

It is easy to change the positions of the factory presets using either U-4-8 or L-4-8 as a pivot point. For instance, let us say that we want to move Sync I from U-1-7 to L-2-5 (so it will be paired with Sync II), Unison Tri./Sq. Wave from L-2-5 to L-1-3 (so it will be paired with Muted Clav.), and Accordion from L-1-3 to U-1-7 (so it will be paired with Slow Sync Sweep). Use the following procedure:

1) Put the back panel RECORD ENABLE/DISABLE switch in the ENABLE position.
2) Switch PRESET mode on.
3) Select L-2-5 and press the RECORD switch.
4) Select U-4-8. You have now recorded Unison Tri./Sq. Wave in location U-4-8.
5) Select U-1-7 and press the RECORD switch.
6) Select L-2-5. You have now recorded Sync I in location L-2-5.
7) Select L-1-3 and press the RECORD switch.
8) Select U-1-7. You have now recorded Accordion in location U-1-7.
9) Select U-4-8 and press the RECORD switch.
10) Select L-1-3. You have now recorded Unison Tri./Sq. Wave in location L-1-3, and have completed this round of location juggling.

If the above procedure is followed carefully, you will never erase a program accidentally, because each program that is about to be erased from one location also exists in another location. Of course, you should be careful to hit the correct BANK and PROGRAM buttons when you are in RECORD mode — if you hit the wrong button you may erase a program that is not duplicated.

It is true that if you erase a factory program you can duplicate it using the patch diagrams provided in this manual; however, if you erase one of your own programs, you will have to start again from scratch unless you have kept a record of your front panel settings for that program. For this reason, we have provided you with a number of blank front panel diagrams at the end of this manual, and we recommend that you keep a record of your favorite programs.

Before replacing U-4-8 or L-4-8, it might be good to use the duplicate programs to familiarize yourself with techniques of fine-tuning a program. Edit U-4-8 and RECORD those adjustments, then switch back and forth between U-1-1 (the original patch) and U-4-8 (the patch as you have edited it). This will allow you to make some very direct comparisons between various settings, and will help you to understand how to go about adjusting various aspects of a patch in order to get the sound you want.

Use a similar approach in working with the L-4-8 dupe of the Harpsichord program. Read the notes accompanying the Harpsichord patch diagram (L-1-6) particularly those under the heading "GENESIS OF THIS PATCH." Experiment with some of the critical adjustments on the FILTER; change the PULSE-WIDTH settings of the two oscillators. RECORD some of your alterations on the patch in location L-4-8 and compare them with the original patch at location L-1-6 and use L-4-8 for a new purpose.

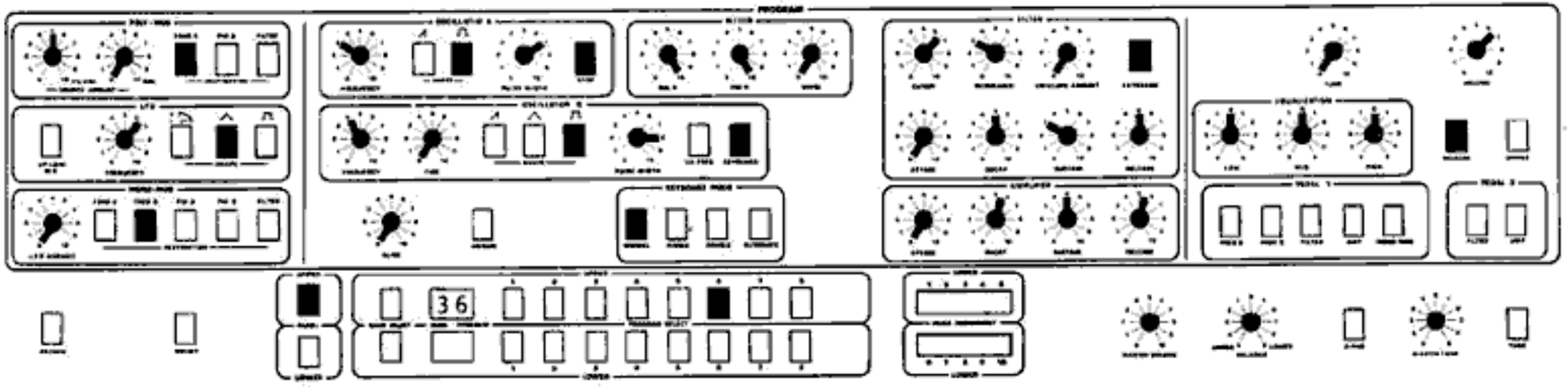
By the way, you need not limit yourself to Baroque Horn and Harpsichord sounds when experimenting in this way: any of the factory presets can be duplicated in location U-4-8 or L-4-8 to allow for this kind of experimental comparison.

After you have worked up a patch you like, store it (at first in U-4-8 or L-4-8) and experiment with it for a while. After you are satisfied that it is what you want, copy the panel settings into a patch diagram, and then locate your program in place of one of the factory programs that doesn't suit your needs. After your patch has been programmed in its final location, U-4-8 or L-4-8 will again be open for further experimentation.

You are encouraged to adjust all of the factory programs to suit your taste (or at least those that you want to keep). You are also encouraged to erase the factory programs that you don't find useful and replace them with patches of your own design (remember, you can always recreate any of the factory patches using the diagrams in this manual). If you never use the EDIT mode, or if you never record any of your own programs, much of the circuitry of the Prophet will be standing idle. The full scope of the instrument can only be realized if you use the technology it contains as an extension of your own musical personality.

PRESET PROGRAMS

		1	2	3	4	5	6	7	8
BANK 1	UPPER	U-1-1	U-1-2	U-1-3	U-1-4	U-1-5	U-1-6	U-1-7	U-1-8
	LOWER	L-1-1	L-1-2	L-1-3	L-1-4	L-1-5	L-1-6	L-1-7	L-1-8
BANK 2	UPPER	U-2-1	U-2-2	U-2-3	U-2-4	U-2-5	U-2-6	U-2-7	U-2-8
	LOWER	L-2-1	L-2-2	L-2-3	L-2-4	L-2-5	L-2-6	L-2-7	L-2-8
BANK 3	UPPER	U-3-1	U-3-2	U-3-3	U-3-4	U-3-5	U-3-6	U-3-7	U-3-8
	LOWER	L-3-1	L-3-2	L-3-3	L-3-4	L-3-5	L-3-6	L-3-7	L-3-8
BANK 4	UPPER	U-4-1	U-4-2	U-4-3	U-4-4	U-4-5	U-4-6	U-4-7	U-4-8
	LOWER	L-4-1	L-4-2	L-4-3	L-4-4	L-4-5	L-4-6	L-4-7	L-4-8



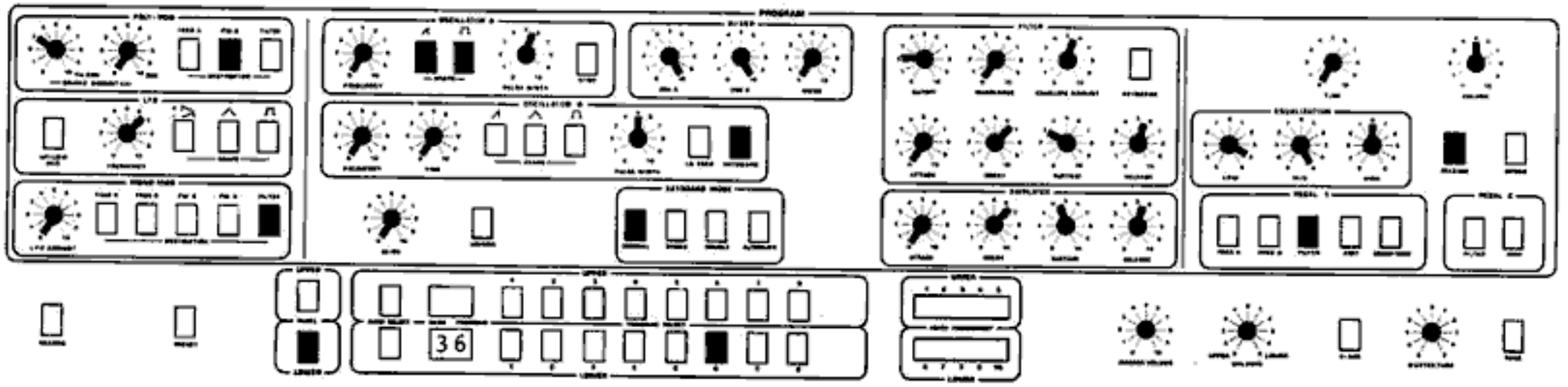
U-3-6: Percussive Sync

OSC A: up 1 octave + a major 3rd
OSC B: up 2 octaves

POLY-MOD is programmed to modulate the frequency of oscillator A (OSC A) with the FILTER envelope.

The POLY-MOD section is programmed to modulate the frequency of OSC A with the filter's envelope generator; since OSC A is SYNCed to OSC B, this modulation results in a tone color change rather than a pitch change. Notice that the pitch of OSC A is lower than that of OSC B; therefore, if the voltage from the filter's envelope is removed (POLY-MOD switched off), the waveshape will not be able to complete its cycle before it is retriggered by OSC B (via the SYNC switch) and will therefore degenerate into DC (no sound).

MONO-MOD is programmed for vibrato, and can be engaged by moving the MOD wheel up slightly.



L-3-6: Bass

OSC A: up 0 octaves
OSC B: up 0 octaves

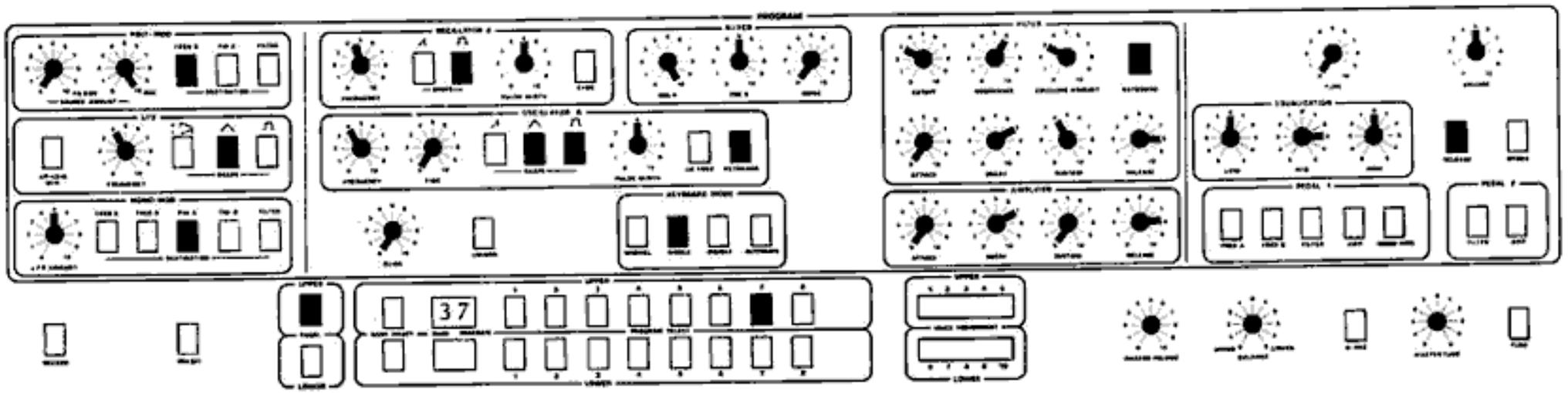
MONO-MOD is routed to the FILTER cutoff frequency, but no waveshapes are selected in the LFO section. Try experimenting with the various waveshapes and the effects they create.

NOTES:

— OSC B is programmed off (no waveforms selected); however, pulse-width is set at 5 to allow adding OSC B pulse wave. Add OSC B (with various waveshapes selected) to create a thicker bass sound.

— Try UNISON mode.

— PEDAL 1 is routed to the FILTER, and can be used to alter the brightness of tone (or for pseudo-wah effects).

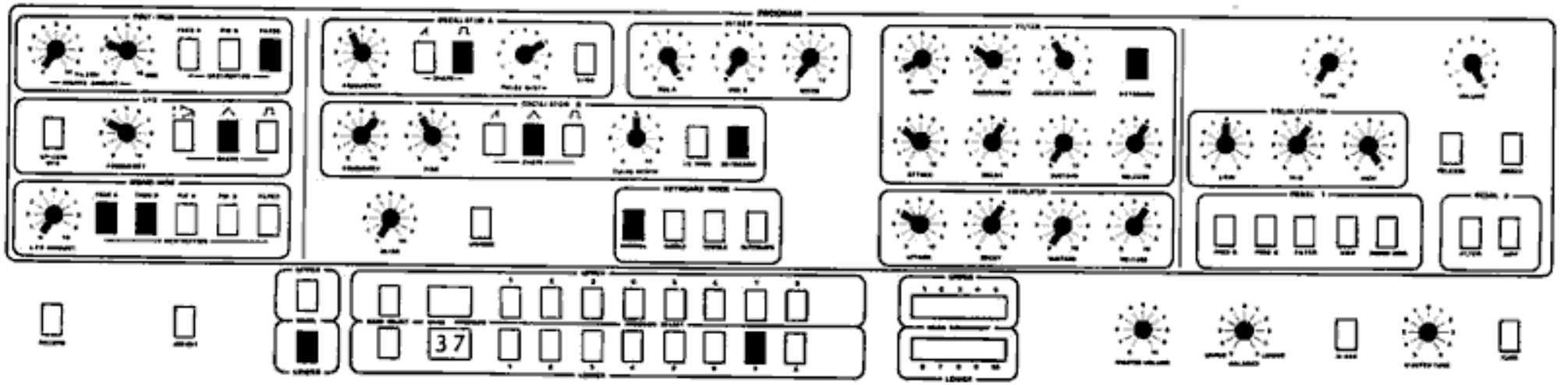


U-3-7: Bells

OSC A: up 2 octaves + a tritone
OSC B: up 2 octaves

The bell effect of this patch is created via the POLY-MOD section: Both oscillators are in the audible range, and OSC B is modulating OSC A; the clangorous effect is intensified because the two oscillators are not in a strong harmonic (i.e. overtone-related) relationship to each other. OSC A is the sound source for the patch (see MIXER section).

MONO-MOD is set to add to the overall animation of sound. Move MOD wheel up to intensify the effect.



L-3-7: Steel Drums

OSC A: up 2 octaves
OSC B: up 3 octaves + a perfect 4th

The sound of this patch is created by audio oscillator modulation of the filter's cutoff frequency (via the POLY-MOD section). Although OSC B is not part of the sound source for the patch, the precise pitch setting is important for the steel drum timbre that results. (Try adjusting the FREQUENCY knob for OSC B over its whole range and listen to the resultant sounds.)

MONO-MOD is programmed to provide minute swoops in the pitch, in imitation of the minute pitch changes heard when steel drums are played. Move MOD wheel up to engage this effect.

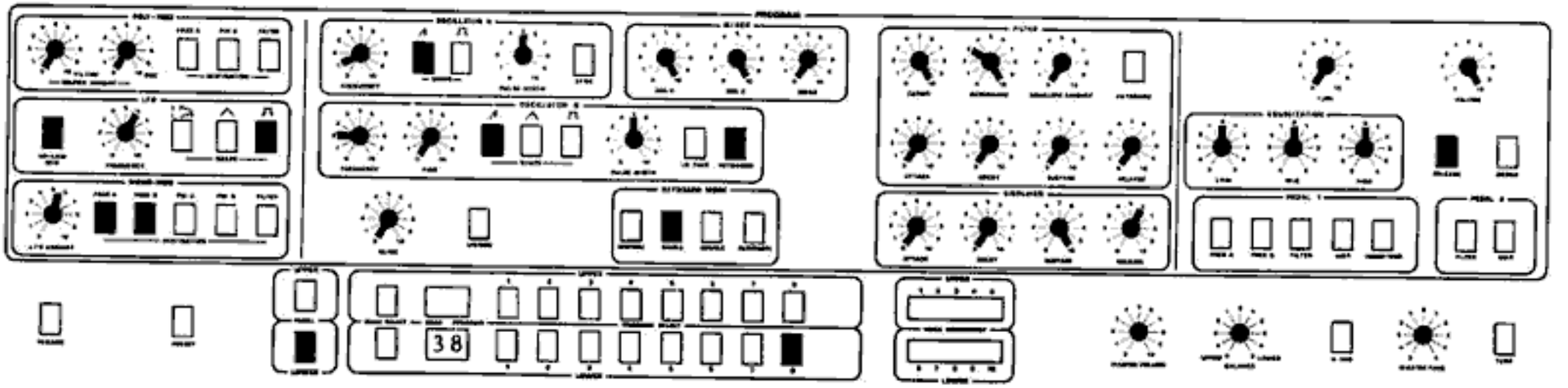
NOTES:

— To alter the "metallic overtones," adjust the FINE tune knob of OSC B and/or the OSC B amount knob in the POLY-MOD section.

U-3-8
Up-Low Modulation Mix Example

U-3-8: Up-Low Modulation Mix Example

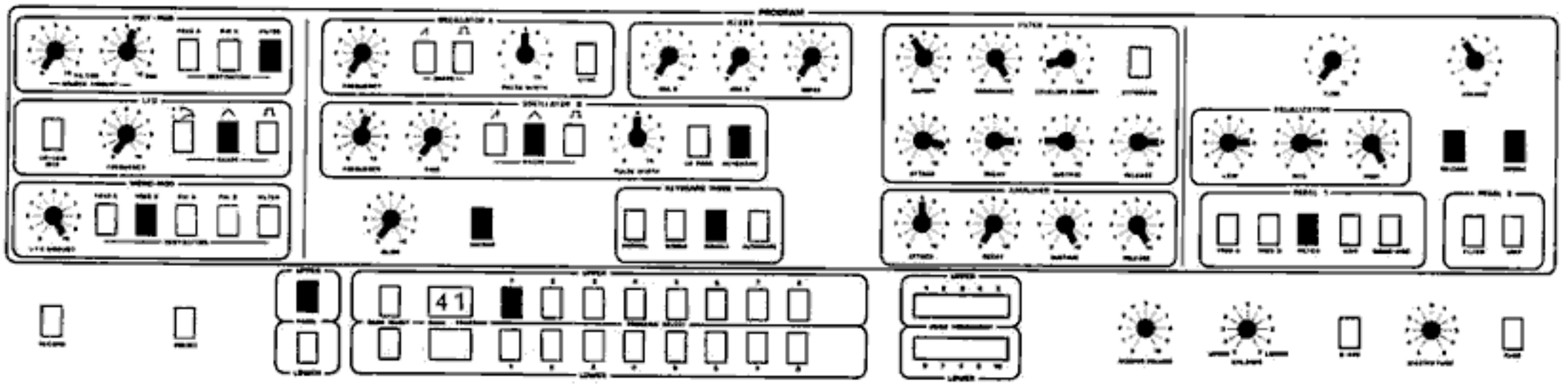
OSC A: up 1 octave
OSC B: up 3 octaves



L-3-8: Up-Low Modulation Mix Example

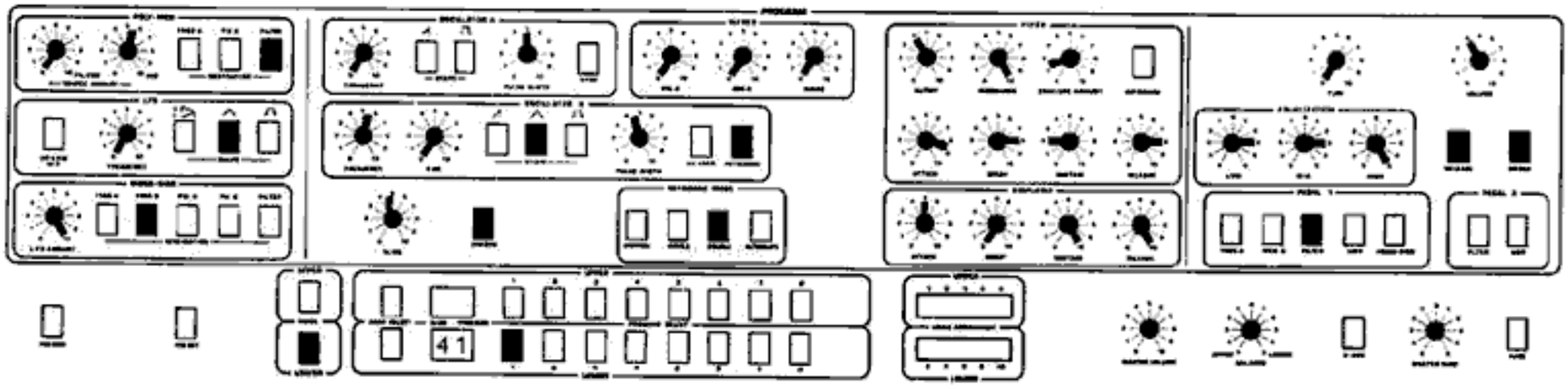
OSC A: up 1 octave
OSC B: up 3 octaves

To understand how the UP-LOW MIX switch mixes the UPPER and LOWER LFO waveforms, switch off then on, listening to the difference in sound. Also try altering the settings on one or both LFOs.



U-4-1: Alien

OSC A: up 0 octaves
OSC B: up 4 octaves (plus FINE tune on 10)



L-4-1: Alien

OSC A: up 0 octaves
OSC B: up 4 octaves (plus FINE tune on 10)

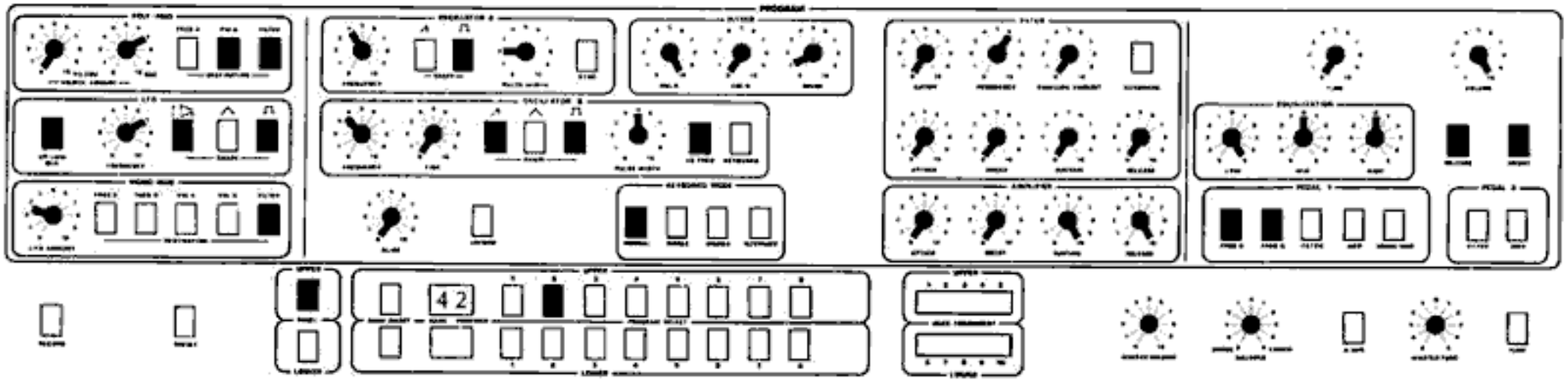
To allow time for full effect to develop, hold key down for a long time (approximately 30 seconds).

NOTES:

— For extra effect, route MONO-MOD to FILTER in addition to FREQ 2.

— Increase filter ENVELOPE AMOUNT to exaggerate effect.

— You may want to try switching on the UP-LOW MIX switch in the LFO section for a more uniform sweep.



U-4-2: Repeat Drone I

OSC A: up 2 octaves
OSC B: LF mode

This effect is created by a combination of MONO-MOD and POLY-MOD. The MONO-MOD provides the overall "sample-and-hold" rhythm: the LFO sawtooth is routed to the FILTER cutoff frequency, and since it is programmed at 0, only opens up enough to let sound through at the beginning of each sawtooth cycle. The POLY-MOD provides the overall shape on the notes; and since it operates polyphonically (5 modulating oscillators), each note played goes through the POLY-MOD cycling independently.

NOTES:

— PEDAL 1 is routed to OSC A and OSC B. Although only OSC A is part of the sound source of this patch, the pedal's effect will be noticable relative to both.