

OBERHEIM  
THE OB-1 SYNTHESIZER

After you have unpacked your OB-1 and placed it on something that will hold it in a playable position, connect the AC cord to a 117 volt AC line. Locate the On-Off switch beside the AC cord. When you turn the unit on, one of the red LED's will light-up indicating which of the program memory sections is active.

Either low or high output jacks may be used for amplification of your signal. Start with low output since high-out is 20db stronger.

Your OB-1 comes pre-set with eight factory patches:

- |              |                    |
|--------------|--------------------|
| 1) BASS      | 5) TALK BOX GUITAR |
| 2) HARMONICA | 6) STRING          |
| 3) FLUTE     | 7) HORN            |
| 4) ZIPPER    | 8) STEEL DRUM      |

" You can move from one preset to another by merely touching the capacitive switch under the appropriate LED light. All rotary controls that do not program have grey tops. All switches that appear in the three performance sections below the Oberheim TradeMark do not program and the VCA On-Off switch is also not programmable. All controls in the master section are programmable with the exception of four grey tops; VCO-1 fine tune, VCO-2 fine tune, VCF fine tune, Volume. A short tuning and set-up procedure is necessary:

- |                     |                         |
|---------------------|-------------------------|
| 1) VCO-1 FINE TUNE  | 12 O'CLOCK              |
| 2) VCO-2 FINE TUNE  | " " (unison with VCO-1) |
| 3) VCF FINE TUNE    | " "                     |
| 4) VCF PERFORMANCE  | " "                     |
| 5) TRANSPOSE SWITCH | MID POSITION            |
| 6) MANUAL VOLUME    | 9-12 O'CLOCK            |
| 7) VCA SWITCH       | OFF                     |

The factory programs should now be available. If you experience difficulty in changing from preset to preset, you might have a low capacitance. Simply use your thumb to make contact with any part of the metal face plate while you change programs. Your thumb acts as a ground to the switch.

Now we are going to examine every control available with the OB-1. To simplify this procedure we will take it one section at a time.

- 1) VOLTAGE CONTROLLED OSCILLATOR VCO-1
- 2) VOLTAGE CONTROLLED OSCILLATOR VCO-2
- 3) VOLTAGE CONTROLLED FILTER VCF
- 4) ENVELOPE GENERATORS
- 5) PROGRAMMER
- 6) PERFORMANCE SECTION
- 7) BACK PANEL
- 8) KEYBOARD

At this time, activate the manual capacitance switch in the program section; the red LED beside the switch should light. Now you have access to all controls on your master panel.

## 1. VOLTAGE CONTROLLED OSCILLATOR - 1

- a) FREQUENCY (TUNING): This control changes the initial pitch of VCO-1 up to five octaves in 1/2 step increments, by raising the control from full left to full right. There is some "slack" in rotation at the left-most setting.
- b) WAVEFORM: Varies VCO-1 selected waveform from square to pulse or triangle to sawtooth. Use in conjunction with waveform select switch to determine the initial number of harmonics available ("raw sound").
- c) WAVEFORM SELECT: Selects either pulse-type or saw-type wave. Set left for saw, right for pulse.
- d) FUNDAMENTAL OUTPUT: Passes the output of the oscillator to the VCF section. Three position switch, ON, half power (-3 db), or OFF.
- e) OCTAVE OUTPUT: Passes the subharmonic of VCO-1 (one octave below) to the VCF section, square wave only with three position switch. ON, half power (-3 db) or OFF.
- f) MODULATION: Using the LFO section as a sole source of signal, rightwards rotation will cause increasing change in either the waveshape or the frequency of VCO-1.
- g) MODULATION SELECT: Used in conjunction with modulation amount control, this two-position switch determines what characteristic of VCO-1 will be affected. Left-modulation will drive frequency sharp and flat. Right-modulation will alter waveshapes, thus, changing the overtone series.
- h) CROSSMOD: Allows VCO-2 frequency to modulate VCO-1, thus, changes in the pitch of VCO-2 and will affect the output of VCO-1. Useful for bells, gong, steel drums, etc. Left-off, right-on.
- i) FINE TUNE: A non-programmable pitch adjustment.

## 2. VOLTAGE CONTROLLED OSCILLATOR - 2

- a) FREQUENCY: Same as VCO-1
- b) WAVEFORM: Same as VCO-1
- c) WAVEFORM SELECT: Same as VCO-1
- d) FUNDAMENTAL OUTPUT: Same as VCO-1
- e) OCTAVE OUTPUT: Same as VCO-1
- f) MODULATION: Similar to VCO-1 control with the addition of another signal that can be used (VCF envelope) to produce effect.
- g) MODULATION SELECT: same as VCO-1.
- h) LFO/ENV SELECT: Selects signals from either LFO section of VCF envelope to modulate VCO-2 left-LFO, right-VCF envelope.

i) SYNC: When set to the right, it slaves VCO-2 to VCO-1. VCO-1 will control the tuning of VCO-2, forcing VCO-2 to produce only notes or partials related to the pitch of VCO-1.

j) FINE TUNE: Same as VCO-1.

### 3. VOLTAGE CONTROLLED FILTER

a) FREQUENCY: This control changes the cutoff frequency of the filter. Rotated full-left maximum filtering or minimum number of harmonics let out. Full-right minimum filtering or maximum number of harmonics available.

b) RESONANCE: This control "boosts" harmonics of signals present at VCF cutoff point with increasing intensity as pot is turned clockwise. Past middle position, causes VCF to oscillate with pitch variable to five octaves in 1/2 step increments by VCF frequency. There is a very large adjustment available on this control, enough to make the filter circuit "feed back" and howl just like a PA system. This self-oscillation can be used for a tone or note without damaging the OB-1. It is exactly the same principal that is used to make the oscillators produce notes, so don't worry about burning up the circuit. It will survive.

c) MODE: Two-position switch controls the filter cutoff slope. In four pole mode, causes VCF cutoff to have a sharper slope than in two pole, thus cutting off more harmonics causing a more rounded sound. "Poles" refer to the number of electronic parts used to achieve the desired results.

d) KEYBOARD TRACK: This allows the keyboard to control the VCF cutoff frequency. Since the keyboard increases control voltage 1/12 volt for every key further rightwards, it will force the initial frequency of the filter to rise (open further) and follow the rise in pitch of the oscillators.

e) MODULATION: This control determines how much signal from either LFO section or VCF envelope will affect the filter frequency; full left, no effect, full right, minimum effect.

f) MODULATION SELECT: Two position switch selects either LFO section or VCF envelope to modulate filter frequency (try slow LFO sine wave mod for phasing effect, fast LFO S/H mod for sample and hold of the filter, ENV mod for "breath" of acoustic instruments, horn, flute, etc.).

g) FINE TUNE: a non-programmable frequency adjustment.

h) NOISE: This aperiodic waveform contains all possible frequencies, all playing at the same time. It is useful in synthesizing sound effects (waterfall, wind, locomotives) percussion and other non-pitched things.

### 4. ENVELOPE GENERATORS

a) ATTACK: Controls time or speed of the envelope rise. Set fully leftwards, fast response, right, slow.

b) DECAY: Controls time of envelope from high point to sustain level. Left, fast, right, slow.

c) SUSTAIN: Controls sustain level after the attack/decay cycle. Set fully leftward, no sustain level, right, full sustain.

d) RELEASE: Controls time or speed of envelope fall after keyboard is released. Set left, fast, right, slow.

e) VCF ENVELOPE: This four parameter section will control either or both the VCF and VCO-2 (pitch or waveform mod).

f) VCA ENVELOPE: This four parameter section will control only the voltage controlled amplifier/volume.

g) PROGRAMMED VOLUME: Programmable volume control for uniformity of patches without readjusting manual volume, (example), upon storing a trumpet and flute sound, one would find the flute significantly "softer" because of increased filtering. To resolve this situation, simply increase programmed volume when writing your patch so that the output volumes of both patches are similar.

h) MANUAL VOLUME: Controls overall output of your OB-1; non-programmable.

i) VCA ON: This two-position switch bypasses the VCA envelope and opens the VCA when set to the right. A continuous sound will be heard if any of VCO output switches or noise is open. This setting is useful in tuning up or in creating "infinite sustain".

## 5. PROGRAMMER

The OB-1 programmer will store in memory the settings of 33 knobs and switches. After you have "written" a setup into memory, touching the appropriate capacitive switch until the LED above it lights (1/10 second contact required), will recall the entire setup or "patch" with a single action. Eight complete "patches" can be stored and recalled so nine full settings are useable in live performance, eight from the memory section and one unmemorized manual layout.

Selecting a memory position (1-8) will have the same effect as removing all of the 33 programmable knobs and switches from the top panel. All rotary controls that do not program have grey tops.

Fifteen controls and the keyboard remain active but all other knobs and switches are being "overridden" by the memory. Moving them will have no effect on the sound until you return to the "manual" mode.

To store a patch in memory or "write" a program, follow these basic steps:

1. Get the sound you want in manual program mode.
2. Check the "standard setting" controls to make sure you will be able to switch between memory positions quickly.
3. Touch the "write" capacitive switch and hold contact. When the LED next to "manual" begins to blink...
4. Touch the program you wish to load without losing contact with the "write" position. Maintain contact with both switches (write and program) until the manual LED stops blinking and remains lit. Your program is now stored in memory and setup in "manual".
5. Select any program other than the one just entered and see if it is louder or softer. If they are volume compatible, you can stop, return to manual and work up another sound.

6. If they are not similar in volume, adjust "programmed volume" up or down as needed.

7. Check volume of new program against the old.

The OB-1 does not program one knob at a time so any change you wish to make in a stored program will require complete re-entry. Programs can only be entered from "manual" to a memory position.

One other note, the LFO will not affect the oscillators or the filter unless you program the pathway into these sections by setting the switches and modulation pots to receive LFO signal. If you don't have a "way in" stored in memory, the LFO will only change pitch in the bend mode.

## 6. PERFORMANCE SECTION

a) LFO RATE: This control varies the speed of the low frequency oscillator. This frequency is never heard as an audible sound. It is used as a "rate of change" command, and can be applied to VCO-1, VCO-2, VCF, and pitch bend. It can be applied to all circuits that have provision for receiving its signal simultaneously, but since there is only one LFO running at one adjustable speed, all effects will have the same rate of change.

b) LFO WAVEFORM: This three-position switch will alter the waveshape the LFO produces. In "sine" position, the effect on pitch is a smooth warble (vibrato), on filter, a smooth opening and closing (phase shifter). In "square" position, the effect on both pitch and filter is an abrupt change (trill). In "S/H" position, the noise generator is connected to the sample and hold circuit, which takes a measurement at random, sets an unpredictable level of voltage and holds the setting until the next cycle of the LFO. When this random control is applied to oscillators, the result is random change in pitch. When this voltage is applied to the filter we have random change in the filter cut-off point.

c) LFO DELAY: This control adds a time delay to the LFO signal allowing a note to start without vibrato or other LFO controlled change. Left, no effect, right, full effect. The onset of LFO action is gradual and in proportion to the delay time setting.

d) PORTAMENTO: Slows down changes in voltage on the keyboard, causing a "sliding" from note to note. Set left, no effect, right, slowest speed.

e) ENV RESET: In up position, this switch cancels the release function of both envelopes and resets them to zero. This switch must be in the off position to achieve any response from envelope release functions in "manual" mode.

f) TRANSPOSE: Transpose keyboard up or down an octave.

g) VCF: Master filter control varies the VCF frequency up or down. Manual controller for performance filter expression.

h) BEND BOTH OSC/VCO-2 ONLY: Selects either VCO-2 or both oscillators to be affected by pitch bend.

i) BEND MODE: This three-position switch selects bend of a whole-step up or down (narrow) or up and down an octave (broad), or modulation from the LFO section (pitch bend up) or noise modulation (pitch bend down).

j) PITCH BEND LEVER: This spring loaded lever returns to "neutral" when released. With practice it is easy to form a "natural" vibrato technique utilizing the narrow pitch bend mode.

## 7. BACK PANEL

- a) AC CORD: Connect to 117 volt AC line. The circuits in the OB-1 will remain stable as long as the line voltage does not drop below 96 volts. At lower voltages the unit may not perform properly.
- b) POWER SWITCH: Synthesizer ON-OFF switch. When you turn the unit on, one of the red LED's will light up indicating which one of the program memory sections is active. Although the OB-1 will produce sound almost immediately, we recommend a five minute warm-up. After five minutes, all circuits will stabilize.
- c) FUSE LOCATION: The fuse is voltage protection for your synthesizer.
- d) AUDIO OUTPUT JACK, LOW: Connect this jack to an instrument amplifier with a two-conductor cord. Standard 1/4 phone jack. Maximum output is 1 volt P.-P.
- e) AUDIO OUTPUT JACK, HIGH: Use this output to feed a mixer or a studio console. Standard 1/4 phone jack, maximum output is 10 volt P.-P.
- f) LOUDNESS: Input for external VCA control. Use standard 1/4 phone jack.
- g) AUDIO IN: Input for an external audio source. Standard 1/4 phone jack.
- h) VCF PEDAL: Input for external VCF frequency control (pedal). Use a three-conductor (tip-ring-sleeve) cord from this jack. A guitar cord (two-conductor) will not work. Look for the three sections on the jack.
- i) CV-IN: Input for external control voltage. Used when you want to operate the OB-1 from another 1 volt per octave CV source (sequencer, keyboard, etc.). Standard phone jack.
- j) CV-OUT: Control voltage output from keyboard. Standard 1/4 phone jack.
- k) GATE IN: Input for external gate sources. Standard 1/4 phone jack. Gate signal required is 5 volts positive D.C.
- l) GATE OUT: Gate voltage output from keyboard. Standard 1/4 phone jack.
- m) CASSETTE: Cassette interface input/output. A Cassette Interface is available as an option. This allows you to store the patches you have achieved on a standard cassette tape using a standard cassette tape player/recorder. You can create eight more, store them and continue until you have a library of patches. The patches can be loaded back into the OB-1 using the same Cassette Interface.
- n) PROGRAM SELECT: Input for external program selection.

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