

KEYBOARD REPORT

The Oberheim System (OB-8, DSX, & DMX)

Instruments Reviewed by Jim Aikin

WHEN A SYSTEM of organization works on a lower level, evolution may elect to repeat it on a higher level. That's why an anthill behaves a lot like a single amoeba. We can see something similar happening in synthesizer design. Fifteen years ago, if you wanted to make electronic music, you'd probably buy a bunch of synthesizer modules and hook them all together with patch cords. The Minimoog, a synthesizer-in-a-box, was designed to simplify matters and became the paradigm for what followed. Today, however, we find ourselves back where we started, only on a higher level. A number of manufacturers are getting into the business of building whole lines of "modules" that are designed to be electrically compatible, and that are hooked together with patch cords. The difference is that the "modules" are no longer simple things like oscillators or filters; they're complete musical instruments and accessories, each with its own complex internal structure. And the kinds of music they'll make are correspondingly complex.

One such line of equipment is the Oberheim System, an integrated music laboratory consisting of three free-standing elements — the OB-8 polyphonic synthesizer (\$4,395.00 list), the DSX polyphonic sequencer (\$1,995.00), and the DMX drum machine (\$2,895.00). You can buy any of these items separately if you want to, but they're designed to interface with one another quickly and easily. You might be able to cobble together similar units by three different manufacturers and get them to talk to one another, but there might be a lot of headaches involved in getting them all operating smoothly and predictably. The people at Oberheim have gone to a lot of trouble to eliminate the headaches. That's not to say you won't have to do a little head-scratching learning to use the equipment, because these are fairly complicated pieces of machinery. Still, the advantages of having an integrated setup should be obvious.

Oberheim has been able to build a lot of functions into these devices while keeping the front panels simple, by making extensive use of computer technology. Many of the switches have two or three completely different functions; what they do will depend on what other switches you hit in conjunction with them. Again, this is a bit boggling at first, but you quickly get used to it. Indicator lights, LED readouts, and so on give you immediate information about what status each of the switches is in, and with only a few minutes of practice you should find yourself hitting buttons like a champ, because Oberheim has succeeded in getting everything laid out very clearly and logically.

The OB-8. The OB-8 is the successor to the OB-X and the OB-Xa. It looks very similar to its forebears, but inside it's a whole new instrument. We're told that a lot of effort went into simplifying the basic engineering design to make it more trouble-free, while at the same time an expanded software package allows for a lot more musical possibilities. The good news is



The OB-8.

that the OB-8 sells for about \$1,800 less than the OB-Xa. (Good news unless you just bought an OB-Xa, that is.) So what's in the box, you ask? Well, let's see. . . .

The Keyboard. This is a standard five-octave C-to-C keyboard (not touch-sensitive). The OB-8 will play two tone colors at once if desired, each with four of its eight voices, and the two patches are available in either split or double mode. The location of the split point, where the lower patch leaves off and the upper begins, is programmable. Once all of the available voices are in use in a chord (eight keys normally, four keys in double mode) no new keys that are depressed will sound. When the unison mode (all eight voices on one key) is activated, the keyboard has low-note priority.

The Left-Hand Controller Section. This panel, at the left end of the keyboard, has an amazing number of functions. In fact, it's really two completely separate "panels" that use most of the same controls. The two basic elements are an LFO and an arpeggiator. There are also, of course, a pitch-bend lever and a pair of transpose switches. The transpose switches shift the range of the entire keyboard (both halves, when you're in split mode) either up or down one octave from the normal range. The pitch-bend lever can be programmed to bend any exact interval up to an octave — and you can switch back and forth instantly between the range you select and a built-in range of a whole step, simply by hitting a button labelled "amount." This is obviously very handy for getting good pitch-bending on a lead and still being able to do a large bend as a special effect. As on all of Oberheim's recent polyphonics, the lever bends up when you pull it toward you and down when you push it away, which is backwards as far as the rest of the universe is concerned, though easy enough to play once you get used to it. We aren't going to quibble about this. As with many of the other decisions that were made in designing this instrument, Oberheim is trying to maintain a product identity by preserving features that their own users are familiar with — probably a good philosophy in general, although it

does occasionally leave them stuck with some odd design decisions that were made years ago. The pitch-bend lever is an obvious example. Nonetheless, it has a good feel, and it's spring-loaded to return to center.

The modulation lever is also spring-loaded. Again, as on earlier instruments, Oberheim is giving us a mod lever that *only* works when you pull it toward you. It moves in the opposite direction, but nothing happens. We've never understood why this "blank spot" couldn't be filled with some other function, but this is just another very minor point, not a big deal. The modulation added by the lever has a maximum depth of a whole step, but you can easily add to this with the modulation depth knob. The knob is especially useful musically because it is turned on and off by pulling it up and pushing it back down, which means you can preset a modulation depth of a precise interval and cue it in as needed by pulling up the knob. The maximum range here is a little over a fifth.

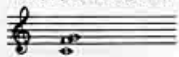
The modulation in this panel comes, as already mentioned, from an LFO. This is separate from the LFO on the main panel, so if you like double-vibrato effects you can get them. The LFO on the modulation panel isn't just a vibrato generator, though. Far from it. It has six different waveforms that can be accessed by various procedures — triangle, square, up sawtooth, down sawtooth, noise, and sample-and-hold. Both modulation and pitch-bend can be set to affect only the upper or lower program in splits and doubles, or only one oscillator instead of both.

To get at the arpeggiator controls, you have to hit a button called "mode." This changes the functions of most of the switches on the panel. Since all the switches have LEDs in them, if the mode light is lit, you can easily tell that the controls now have their arpeggiator functions. (The levers, the modulation depth knob, and the arpeggiator 'on' switch, however, retain their original functions at all times, as do the transpose switches — a sensible system.) The arpeggiator clock is entirely independent of the LFO, although they share a rate knob. This is

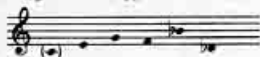
obviously preferable to having the two tied together.

The arpeggiator offers a number of options. In split and double mode it can arpeggiate either the lower or the upper program separately, or both together. It will arpeggiate up, down, up and down, or randomly. "Up" and "down," however, refer not to pitch but to the order in which you play the notes on the keyboard, "down" meaning "in reverse order." This is definitely superior to a straight one-way arpeggio, since it allows you to construct much more varied musical patterns. In addition, you can program five "arpeggio transpositions," and command the arpeggiator to play any number of them. You can choose the intervals for the transpositions by holding down the "mode" and "arpeggiate" switches simultaneously and hitting five notes on the keyboard, one at a time. (This is a prime example of switches having multiple functions.) Then, when you set up an arpeggio, it will be played first with the notes you actually played and then in each succeeding transposition. The result might sound something like this:

You play on the keyboard:



Programmed arpeggiator transpositions:



Arpeggiator plays:



If you select "down" instead of "up" arpeggios, the transposition will cycle through in reverse order. And last but not least, the arpeggiator has a pair of buttons labelled "hold" and "keyboard," either or both of which can be active at a given time. When only "hold" is selected, a group of notes latched by the front panel "hold" control will arpeggiate instead of sustaining, while added notes that you play on the keyboard will not be part of the arpeggio. When "keyboard" is selected, the opposite effect occurs: Groups of notes you hold on the keyboard will arpeggiate, while a latched chord will merely sustain without arpeggiating. When both buttons are selected, playing the keyboard will add notes to a latched arpeggio. The arpeggiator controls interact to give you some really beautiful swirling patterns of notes at fast speeds.

The Programmer. The OB-8 holds 120 user-writable patch programs, organized into 15 banks of 8 programs each. The button system used to access the programs is a model of simplicity. There are four "group" buttons, lettered A through D, and eight "program" buttons, numbered 1 through 8. Doesn't look like 120, does it? It looks like 32. But the group buttons can be activated in any combination. That is, in addition to groups A, B, C, and D, there is a group AB, a group AC, and so on — ACD, BC, ABCD, etc.

To the left of the programmer buttons are four buttons in a group labelled "keyboard," though they really relate more to the programmer. These are the split, double, lower, and upper buttons. In addition to its 120 patch programs, the OB-8 will hold 12 "split" and 12 "double" programs. You access these by hitting and

holding "split" or "double" and then hitting one of the programmer buttons. What is contained in a split or double program is not tone color information but rather such items as where the split point is on the keyboard, what the relative volumes of the lower and upper programs are, which numbered programs (AC2 and BD7, for example) are in the split or double, whether either of them is transposed and by what interval, and whether the lower program is detuned relative to the upper. In addition to the 24 stored programs, you can set up your own live panel split or double at any time, and the machine will remember all of its settings and return to it any time you hit the split or double button again, even if the synthesizer has been turned off in the interim.

The "lower" and "upper" buttons in this section are used to access the front-panel settings of the two patches in split and double mode. The panel will display the settings of either patch, so you can edit them one at a time till you get the combination you want.

Live Editing. The entire front panel of the OB-8 is live at all times. Turning a knob adds to or subtracts from the value stored in memory, and if you want the knob to show the true value of a parameter, all you have to do is rotate it full left and then full right, to clear it. Any time you want to return to the program in memory, just hit the program selector button that's already lit, and you're back where you started. There is no provision for switching back and forth between an edited version of a patch and the version stored in memory, which is sometimes necessary to be sure whether you want to erase the old version of a patch and replace it with a new version. But if you want to do this, it's very easy to keep one patch slot, such as ABCD-8, empty, and when you've got an edited version of a patch that you think you might want to keep, just write it temporarily into the spare slot.

If you want to make up a sound from scratch, there is also a "manual" button that disconnects the programmer and sets all the parameters to the values found on the front panel.

Master And Control Sections. The Master section, at the left end of the front panel, has master volume and master tuning knobs (not programmable), as well as a volume balance control that is programmable, allowing you to match the volume levels of various separate programs and also get the balance you want between upper and lower voices in splits and doubles. An auto tune switch initiates a program that tunes all the instrument's oscillators, which takes about ten seconds, during which time the instrument won't play. Also in the Master section are the hold and chord switches. The hold switch latches a chord so it sustains indefinitely. When you hit the chord switch, the held chord will stop sounding, but the entire chord can then be played with one finger on a lowest-key priority basis. The voices not latched into the chord are still available as single notes above the chord.

Obviously, there's a potential problem in this system, which Oberheim has solved very neatly. If you're playing a latched chord with one finger of your left hand, and a sustained melody above it with your right hand, what happens if you left the left-hand key up? Normally, the latched chord will jump up to the lowest note you're sustaining in the right hand, which might be very undesirable musically. To eliminate this, you can program a "transpose limit," which is the top key on the keyboard that

the latched chord can be played from. Any key above this will only sound normally, with one voice. Rather ingenious.

The Control section is fairly simple. There's a portamento rate knob, which does about what you'd expect it to — although it does a couple of other things you wouldn't necessarily expect. The portamento on the OB-8 can be quantized in half-steps if desired rather than gliding smoothly between pitches. It can also be set to bend up from below into the pitch of every note. By combining the two, you can get a little chromatic scale at the beginning of every note. And you can program the amount below the note at which this upward bend will start, as well as the speed of the bend. It isn't an effect you'd use every day, but it does sound nice.

Below this knob is a unison mode switch, which dumps all eight voices onto one key. In unison mode, the keyboard is low-note priority. We wouldn't have minded seeing some other types of priority offered as programmable options, but it's easy enough to work with a low-note system. At the bottom of the section is an "osc 2 detune" knob, which is useful for fattening up certain sounds. An LED above the knob lights when oscillator two is detuned, and goes out when it's in tune with oscillator one. Another thoughtful feature.

The Modulation Section. Everything considered, this is probably the most complicated part of the instrument, but we'll do our best to slash our way through the jungle. The LFO has a range of from one cycle every eight seconds up to about 50Hz. Like all the pots on the OB-8, the LFO rate knob is read by the computer in a quantized fashion, which means that not all of the frequencies above 10Hz or so are available; only a few selected ones are. But since audio rate modulation isn't that vital on an instrument of this type, the quantization doesn't hurt anything. There are six LFO waveforms, plus a seventh function we'll get to in a minute. The waveforms are triangle, up sawtooth, down sawtooth, square, sampled noise (random stepped), and — for the first time on any non-modular instrument, as far as we know — a stepped output that is sampled not from noise but from the vibrato LFO in the left-hand control section. This lets you set up some complex but quasi-regular stepped patterns that change depending on the rates of the two LFOs.

The seventh function is called "trig," a mode in which any of the LFO waveforms can be made to reset every time a key is pressed. This is extremely useful for such things as getting trills to always start on the upper note, or rising sawtooths to always start at the bottom of their slope. There are actually two front-panel LFOs in the OB-8, one for voices 1 through 4 and the other for voices 5 through 8. Since four voices share one LFO, if it resets while some of the voices are already holding a chord, the notes in the chord will obviously be affected.

The signal from the panel LFO can be routed to several destinations, via two knobs and six switches. Each knob controls the depth of modulation on one of two independent routing channels, and each channel has three possible destinations, which can be turned on and off with the switches. Channel one routes to the frequency of both oscillators, and to the filter cutoff frequency, while channel two routes to the pulse width of the two oscillators, and to the VCA. This is a fairly flexible system that provides for a lot of different effects, especially when you consider that the response can be quantized in

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half-steps, allowing for chromatic glissandos and (when sample-and-hold is selected) random patterns of notes that are in tune with the rest of the band.

The Synthesizer. Well, we might as well call it that. It's the basic tone-generating part of the instrument. Here we're on more familiar ground. There are two oscillators, each of which will produce triangle, pulse, saw, or saw-plus-pulse waveshapes. The filter is lowpass, with the usual cutoff, resonance, and envelope amount controls. Both filter envelope and VCA envelope are standard ADSRs.

Oberheim has streamlined a number of the controls traditionally associated with this part of the instrument. This makes them easier to deal with, but does undeniably limit the amount of fine-tuning the musician has available. The mixer section, as on older Oberheim instruments, is a simple set of buttons. Oscillator one can be turned on or off. Noise can be turned on or off. Oscillator two can be turned full on, half on, or off. Keyboard tracking is either on or off. On the other hand, Oberheim's traditional two pole/four pole rolloff slope selector gives some nice tone color options.

Pulse widths on the two oscillators are independently adjustable. Oscillator two can be synced to oscillator one, and can also be modulated by the filter envelope. This combination provides some wonderful attack transients. We do continue to be mystified why Oberheim chooses to control the osc 2 modulation and the filter modulation from the same pot. The two sorts of attack transients are rather different, and it would be nice if they were available separately.

Page Two. The really remarkable features of this instrument are found in what's called Page Two. This, a fold-out diagram when you reach it in the owner's manual, is a second set of functions for the front panel. This seems a really sensible way of accessing additional functions, although it would have been nice if the Page Two functions were lettered on the front panel instead of being invisible. You get to Page Two by hitting the "chord" button in the Master section twice within 1.5 seconds. You're still looking at the same front panel, but the LEDs on the switches jump to new positions to show you you're on Page Two. In particular, all eight LEDs in the Programmer section light. On Page Two these switches are used for disabling any of the voices that happen to malfunction. Simple, readily accessible, and reassuring. The other Page Two controls are many and various, and we don't have space to describe them in detail. Suffice it to say that you can:

- detune the eight voices relative to one another — useful for fattening up the tone in unison mode, but also a great special effect for making normal keyboard playing sound "wrong."
- quantize either of the two modulation routings into half-steps.
- set the two LFOs (voices 1-4 and voices 5-8) to be in phase with one another, or out of phase by 90 or 180 degrees.
- select which LFO waveshape will be used when the re-triggering function is activated.
- set the point in this waveshape that the re-triggering will set it to.
- instruct the LFO rate to track the keyboard at a special 1/4-volt-per-octave rate, which is probably more useful musically than a standard 1-volt-per-octave rate would have been.

• modulate the depth of LFO modulation on either channel from a pair of delay/attack envelope generators.

• invert a function of either of these envelope generators so it puts out a sustain time/decay envelope.

• use one of these envelope generators to control LFO rate, with or without inversion.

• instruct the portamento on the eight voices to move at either a perfectly synchronized rate or a slightly variable rate.

• apply the "portamento bend" (up from below each note) either to arpeggiated notes or to latched chords.

• control the amount of additional time that will be given to the filter and volume envelopes when a sustain footswitch is depressed.

Cassette Interface. All the programs in the OB-8 can be stored as digital information on cassette tape. There is also a simple procedure for checking the accuracy of the tape after it is recorded.

Back Panel. The back panel of the OB-8 is fairly simple, but it contains all the basic functions you'd expect on a good synthesizer. There is a mono signal output, and also a pair of left/right stereo outputs; these are all phone jacks. Interestingly, on the side panel of the instrument is a set of eight recessed pan pots that allow you to place the eight voices anywhere in the stereo mix you want — a great feature for fattening up your sounds.

There are memory protect and cassette enable switches, and a set of three mini-phone jacks for interfacing with a cassette recorder. These are mini-phones rather than RCAs because Oberheim assumes you'll want to use a portable cassette recorder and go in and out through its mike and headphone jacks, rather than use a stereo deck and go in and out through line level RCA jacks.

A set of six phone jacks is used for connecting footswitches and pedals (not shipped with the unit). The first switch governs sustain (actually it's release, not sustain), and works like a piano's damper pedal, with the length of the release segment programmable from Page Two, as explained above. The second switch input is for stepping from one program to another. The third is a chord hold input, which functions just like the hold button on the Master section. The footpedals control filter cutoff frequency, volume, and LFO modulation depth from the LFO in the left-hand controller section.

Finally, there is an arpeggiator clock input, which can easily be driven from the "click" output of the DMX for synchronized arpeggios, and a 37-pin connector for hooking the OB-8 up to the DSX. Whither we now direct our footsteps.



The DSX.

The DSX. Polyphonic digital sequencers are helpful tools for both recording and live work, though some are designed more for one task than the other. (See the story on sequencers

beginning on page 25.) You might wonder why bother with a sequencer if you're recording on a 24-track tape deck. Why not just record the parts directly onto the tape? For two reasons. First, sequencers like the DSX will sync to the tape, allowing you to record a part on the sequencer and have it played onto tape with perfect time. And second, you can try out many different versions of a part on the sequencer before recording it, thus reducing wear and tear on the tape itself and thereby improving the sound quality of the finished recording. The DSX is specifically designed to sync to tape, as well as to external devices like the DMX drum machine. And it has some other important features as well.

It's not a snap to learn to use, because of its complexity, but we're confident that within a few days you should be having no troubles at all. In the upper right corner of the unit is an LED readout that gives all sorts of information about the status of the system — everything from "connect synth" if the OB-8 isn't turned on yet, to messages like "select record track" and "copy voice to CV." In addition, the row of ten buttons across the top of the unit, which have several different functions depending on the status of the system, will sometimes blink to let you know what's going on. There is never any ambiguity about the messages, once you understand what they mean. If you do get confused, just hit a button labelled "display," and the LED readout will give you more data as a "crawl" (moving text).

The internal structure of the DSX's memory is as flexible as you're likely to need it to be, given one basic limitation: There is no single-step editing mode. What this means is that once a given string of notes is stored in one of the 90 slots, called "tracks," you can't operate on it by adding, subtracting, or changing notes. But this is not nearly the limitation you might think at first glance. In fact, Oberheim has gone to a lot of trouble to give you the kind of musical options you would most likely use single-step editing for, without getting tangled up in the complex software that such a function would entail.

The DSX will store ten separate sequences, and each sequence is made up of ten tracks, which run parallel like the tracks on a tape. Track 0 is reserved for information about the sequence: this is where the sequencer stores tempo, endpoint, and changes in patch designations, splits, and doubles that occur while the sequence is running. Tracks 1 through 9 store keystrokes, and they're all polyphonic. At a higher level of organization, the various sequences can be strung together into "merges." Thus you can build up an entire tune out of small sections, and at any point you have the option of re-recording one of the sections by playing a new track into one of the sequences. This is the editing flexibility we were talking about.

Another dimension of flexibility is available in the fact that you can select which tracks of a sequence you want to be playing back at any point. So the merge might contain, say, sequence 3 four or five different times, and on each repetition you might select a track with a different part on it. By interacting with the machine this way as it's playing, you can spin out compositions with many more than ten different sections if you like.

In addition, before recording you can select which of the OB-8's voices you want each track to play. By using one or two voices at a time on different tracks within a sequence, you can

