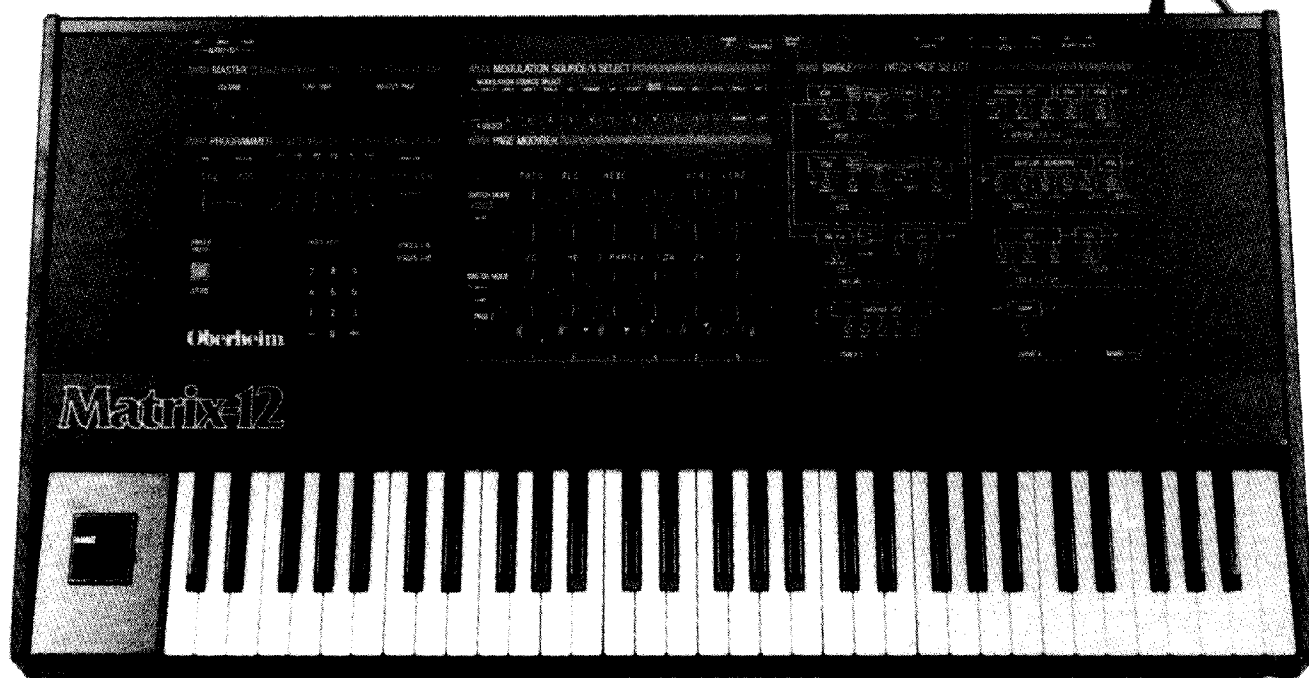


# HARDWARE

## Oberheim Matrix 12

Programmable 12-Voice Multi-timbral Polysynth



Oberheim's pricey but successful Xpander gets a velocity-sensing keyboard and a doubling of voices. Suddenly, words are not enough.

*Simon Trask*

When most manufacturers were producing expanders as keyboardless versions of already-existing synths, Oberheim surprised everybody by bringing out an expander with an entirely new spec. When the six-voice Xpander was unveiled at the 1984 Frankfurt show, a 12-voice version with keyboard was already taking shape at Oberheim's R&D labs. It took a while coming, but now that it's here, it looks set to affirm the Californian company's position as the premier makers of upmarket analogue polysynths.

The instrument in question is the Matrix 12, a 12-voice, touch-sensitive polyphonic synthesiser that employs the same hardware and software sound-generating elements as the Xpander module, and also shares most important design principles. So much so, in fact, that current Matrix documentation comprises an Xpander user manual and a brief Matrix 12 introductory guide.

A quick comparison between the Xpander and Matrix 12 front panels reveals that Oberheim have retained the

former's highly successful design layout, with just a few modifications necessitated by the difference in number of voices. The block diagrams at the right of the panel tend to be a bit off-putting at first glance, but they do in fact provide a wealth of information about the structure of each voice, how that structure is accessed via the LED displays, and which elements of each voice can be subjected to modulation.

### Sound Generation

Basically, each voice comprises two VCOs, a multimode VCF, two VCAs, five Envelope Generators, one FM VCA, five LFOs, three Tracking Generators and four Ramp Generators. Of these, only the two VCOs, VCF and two output VCAs are hardware, with the remaining features being implemented in software to control the hardware. Now, while the hardware elements are arranged in a fixed configuration, the software bits and pieces can be arranged in any order you might wish to

contrive. If you like, you can set them to control each other or even themselves. The source of this flexibility is Oberheim's Matrix Modulation system (of which more anon), which is probably best explained as a modern-day software equivalent of the vast, sprawling synth patchbays of yesteryear.

Anyway, for those of you who missed Paul White's review of the Xpander (E&MM September 84), I'll quickly run through Oberheim's version of what a top-end analogue synth system should contain.

Each VCO is capable of generating triangle, sawtooth and pulse waves individually or in combination. Pulse width is adjustable, and VCO2 has an additional Noise input which may be mixed in. It's possible to sync VCO2 to VCO1 (ie. give it the same pitch), in which case changing the frequency of VCO2 produces a change of timbre. In fact, the frequency of both VCOs is adjustable in semitone steps over a five-octave range, a Detune function is also available, and each VCO has its own VCA.

Moving on to the filter section (isn't it wonderful, getting back to familiar analogue systems?), the Oberheim's multi-mode filter allows selection of any one of 15 filter modes, covering one-, two-, three- and four-pole versions of all filter types, plus selected combinations of these. In other words, a uniquely comprehensive filter section that only adds to the Matrix 12's programming desirability. Frequency and resonance of the filter are, of course, programmable, while the final stage of the hardware link is provided by two master VCAs.

Additionally, it's possible to configure the two VCOs in a carrier/modulator relationship for simple FM effects (though don't fool yourself into thinking you're going to get DX7 sound potential as a bonus feature - you aren't), with destination routable to either VCO2 or the VCF.

Other software-implemented elements of each voice include five Envelope Generators, each with their own initial output level. These are five-stage envelopes, adding an initial Delay (max 2.5 seconds) to the familiar ADSR configuration. Longest attack time is around 16 seconds, while the longest release runs to about 90, which should be enough for almost everybody, eccentric remix engineers included. And as if that wasn't enough, Oberheim claim that setting all the Envelope times to 63 (their maximum value), modulating each of them with a Tracking Generator set to 63, and switching on Freerun and DADR triggering modes results in an envelope cycle that runs about half-an-hour in length. Sad to say, though, I didn't actually check this to be accurate; pressure of deadlines, and all that.

But we still haven't finished. The remaining items are five LFOs (with programmable speed, waveform, and amplitude), three Tracking Generators (which enable various parameters such as filter frequency or amplitude to be tracked according to keyboard position), four Ramp Generators (for setting an overall 'rate of increase' for VCO1 or VCF frequency, say) and a Lag Generator (for portamento effects). Lastly, a number of triggering options (eg. single, multiple and external) are assignable to both the Envelope Generators and Ramp Generators.

## Modulation Routing

This is it. Computer technology's answer to the spaghetti-heap wiring nightmare beloved of Tangerine Dream in days of yore. Its name? The Oberheim Matrix Modulation system.

For every parameter that can be modulated on the Matrix 12, there exists a Modulation Page. Each Page allows up to six modulation sources, each with their own modulation amount, to be assigned to any one destination parameter. And you can select any one of 27 different destinations simply by pressing the appropriate button in the Modulation Source/X Select section on the front panel. A maximum of 20 modulation

sources is permissible for each voice.

Possible modulation sources include two levers, two pedals, attack and release velocities, and any of the Envelope Generators, LFOs, Tracking Generators and Ramp Generators.

A particularly handy feature - and one new to the Matrix - is the inclusion of a Modulation List for each single patch. This enables all currently-assigned modulations to be viewed as one sequence, and quick alterations and deletions to be made in real time. But there are two problems here. First, the modulation source can't be changed from this Page, and second, if you exit and then return, you don't re-enter at the point you left. Damn silly, if you ask me.

Any modulation can be quantised into semitone steps, and modulation sources can either add or subtract from the initial value (for a rise or fall in amplitude, pitch or filter cutoff frequency, for example). For something a little more dramatic, modulation sources can be directed to a destination more than once; an envelope Delay stage could be given greater duration in this way. And as if 20 modulations per voice wasn't enough, Page 2 of the VCO and VCF sections allows further modulations of pitch and cutoff frequency. That should keep you quiet for a month or two...

But no matter how many words you use to describe the Oberheim's range of modulation options, they simply aren't sufficient to do justice to what is in essence an open-ended system. As a result, it's unlikely to meet its match in terms of a programmer that can exhaust its potential, even if some of its more obscure possibilities aren't necessarily going to be of much musical value.

I mentioned levers earlier on, and these black plastic contraptions are what Oberheim consider preferable to the now almost universal pitch and mod wheels. And the choice is a happy one. The levers are a lot easier to operate in tandem, and as a player more than used to wheel configurations (a situation an awful lot of players now find themselves in, I'd guess), I found getting acclimatised to Oberheim's system a surprisingly painless process. The only thing they could

do with is some sort of serrated top to make them easier to grab hold of, but that's a small point, really.

## Voice Orchestration

One of the strongest features of the Matrix 12 (potentially, at least) is its ability to 'map out' voices on the keyboard by means of what Oberheim call 'zones'; because Oberheim's approach goes well beyond the split-keyboard and dual-voicing implementations of so many other instruments, and the Matrix 12 has no fewer than six zones to be exploited by the lucky user.

Each zone can be defined as encompassing any area of the keyboard, from as little as one note up to the entire MIDI allowable range (which effectively allows the physical range of the keyboard to be much larger than it is). Each of the Matrix 12's voices may be assigned to any single zone, and as each voice can be assigned its own patch and the zones may be overlapped in any fashion, it's possible to build up a bewildering array of multi-timbral 'palettes', the sheer scope of which defies description.

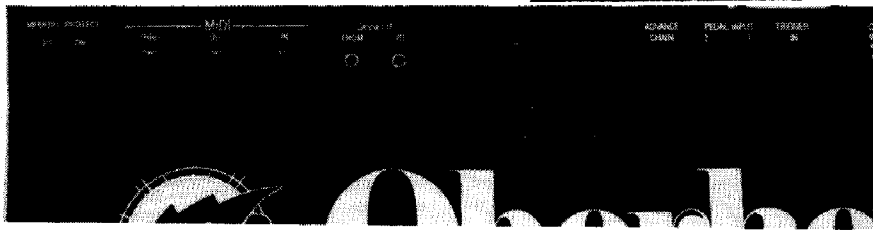
Once you've assembled a specific configuration to your satisfaction, the Matrix 12 has capacity for storing 100 of them; it's these palettes that become Multi Patches in OberheimSpeak. Further refinements, all multi-patch specific, include volume, stereo panning and transposition settings for each voice, while each zone can be assigned its own voice mode, allowing monophonic or polyphonic playing with various sorts of note priority.

The icing on the cake is that both single and multi patches can be combined in a 100-link chain, which has got to be good news for anyone contemplating live use of a Matrix.

## Sounds

And so we come to the stock factory patches. The 100 Single patches are organised into 10 groups of 10 allied sounds, and these are titled Brass, Strings, Pianos, Rhythm Comps, Symphonic Ensemble, Pitched Percussion,





Basses & Leads, Percussion, Effects and First Impression. Presumably, the last group is intended for shop demo purposes.

Most impressive are the Strings and Symphonic Ensemble sections. The string sounds don't have the attack or the clarity of Yamaha FM strings, but then that's not what Oberheim's programmers have set out to achieve.

Generally weakest are the Percussion sounds (a bit of careful tweaking on the user's part would no doubt make them a mite more presentable), but by contrast, the Pitched Percussion sounds are a delight. Ringing FM sonorities put in an appearance on such sounds as 'Bello' and 'Carrilon', while one of the E&MM staff favourites, 'St Happi' (where *do* they get these names from?), sounds like a room full of striking clocks out of sync with one another, and plays itself endlessly as soon as you press a key. I always wanted an easy life...

What's really daft is the way the preset multi patches don't quite cut it the way the single patches do. Daft because as we've seen, multi patches give you a lot more in the way of programming scope than their single brethren. But it seems Oberheim's programming staff haven't really come to grips with the system's inherent potential, and as a result, many of the combinations are decidedly unimpressive.

There are a few gems, though, like 'Jazztrio', 'Ode 2joy', and 'Lead Wah', which applies multiple modulations to Lever 2 to give a pretty realistic Hendrix guitar sound, complete with wah-wah and feedback. I kid you not.

## Keyboard Sensitivity

You might have a whole load of truly wonderful multi-timbral textures at your disposal, but will the Matrix keyboard allow you to use them to their best effect? Well, thankfully, this particular Oberheim keyboard is touch-sensitive on all three counts, ie. attack velocity, pressure (also known as after-touch), and release velocity, though pressure sensing is currently readable only *via* MIDI, which is a pity. Keyboard-based pressure sensing will, according to the Operation Guide, be available as a retrofit *at no charge* in the near future, so that's some consolation, I guess.

Five keyboard velocity scales are assignable for both attack and release velocities, so you can adjust things finely to suit your own touch. And as if that wasn't enough, individual scales can even be set to act upon MIDI input data.

Thanks to the Matrix Modulation sys-

tem, velocity and pressure values can be used to modulate almost any parameter of a Matrix 12 voice. So for instance, as well as the more usual amplitude and filter frequency assignments, you can choose to modulate FM amplitude, lag rate, LFO speed, and VCF resonance. Hearing is believing.

## Page Editing

Given the complexity of all these modulation options and possible zonal configurations, you'd be forgiven for thinking that the Matrix 12 is a beast of an instrument to do *anything* with. Fortunately, this isn't the case.

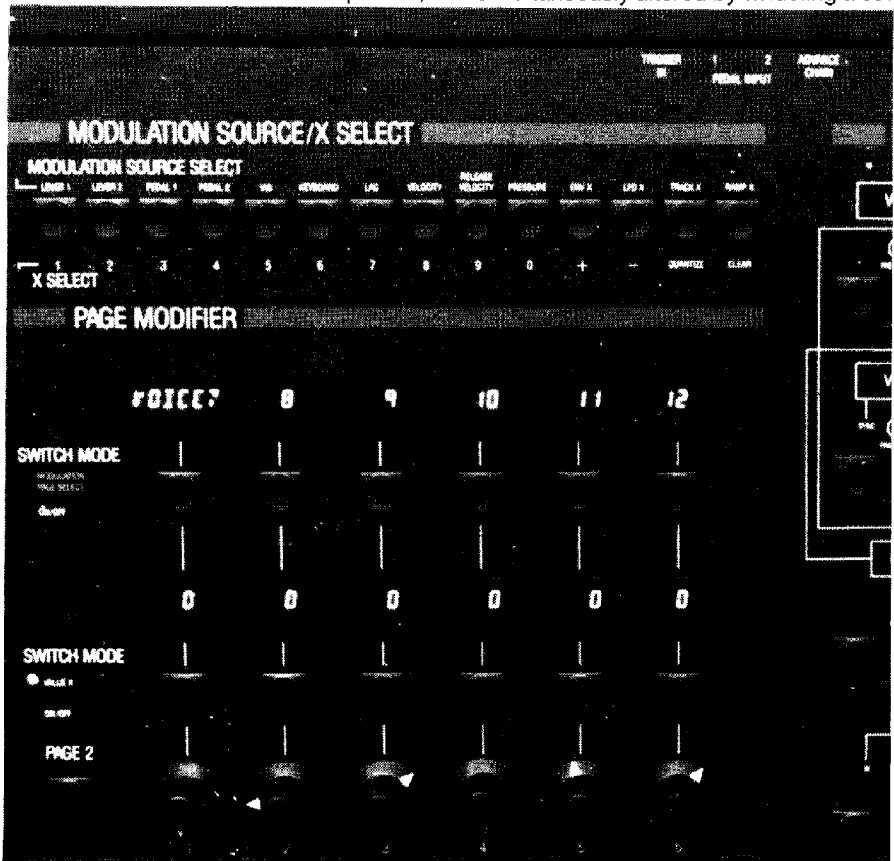
The aforementioned block diagram of voice organisation, which takes up about a third of the front panel display, gives a breakdown of each voice component,

blues that currently grace the instrument's front panel – they aren't exactly an aid to visibility.

As they did with the Xpander, Oberheim have provided three 40-character, 14-segment fluorescent green LED displays on which (at last) a sensible amount of information can be displayed. Two of these windows are located on the centre panel in the Page Modifier section, one being used to display the selected parameters or functions, and the other to display their associated values. An array of buttons under each window is used to select a function or a parameter, and a set of infinite rotary knobs selects a new value.

Sad to say, things get more complex when you come to Multi Patch mode, because it's here that a second set of Pages comes into play. These Pages are assigned appropriate names like 'Volume', 'Pan' and 'Zone X', and can be summoned forth into the central display at the touch of a button.

But what's so nice about this way of doing things is that whole sections (consisting of up to six allied parameters) can be called into the central display at any one time. From there, they can be simultaneously altered by twiddling a set



and tells you at a glance exactly what you can and can't modulate. These components are conceived as Pages, and are given stunning names like 'VCO1', 'FM/LAG' and 'LFO X'. Each Page has a Page Select button adjacent to it, which is used to call the associated parameters into the LED windows.

The diagrams are a great help, make no mistake, but having said that, I reckon Oberheim could have chosen better colours than the dull greys, greens and

of six infinite rotary knobs. As PW pointed out last September, this is a much more helpful arrangement than the digital parameter access system now almost universally employed by the rest of the synth industry. The reason for that is simple. Whereas most modern synths don't allow you to discover how altering more than one parameter value simultaneously affects the sound, the Oberheims do. And that's going to save a lot of people a lot of programming time.

All editing can be accomplished as you're playing, with any changes being registered immediately (ie. in real time). New settings are remembered no matter which Page you subsequently go to, and even through power-down, until a new patch is selected prior to storing.

So, Oberheim have come up with an access system that strikes a neat balance between the economy of centralised displays and the immediacy of dedicated controllers. I found I was able to access and alter any parameter very quickly, and the new Modulation Page proved a tremendous help in dealing with that side of things.

## Interconnections

Sad to say, it's in this department that the Matrix 12 is somewhat lacking by comparison with the Xpander. For the moment, at least.

But first the good news. Carried over from the Xpander are a memory protect switch (recessed, thankfully) and the merry trio of MIDI In, Out and Thru sockets, plus cassette in and out connectors, two pedal sockets (capable of handling footswitches and footpedals), an 'advance chain' socket, a trigger in socket (with switchable polarity) and stereo and mono outputs.

However, gone are the individual CV/Gate inputs and audio outs that graced the Xpander. Their omission wouldn't be so serious if the Matrix were a budget poly of limited studio applications. But it aspires to be a good deal more than that, and seeing as Oberheim managed to give the Xpander both CV/Gate connectors and individual audio outs, I can't for the life of me think why they've left them off

the Matrix. The nice people at Turnkey assure me they're doing all they can to get the Californians to change their minds on this one, and I hope they succeed.

And so to MIDI. Historically, Oberheim were initially fairly sceptical about the virtues of the new interface (and perhaps they still are), but there's no denying they've subsequently implemented it with a welcome thoroughness. Specifically, the Matrix 12's MIDI implementation can be split into three areas: multi patches, global control and data transfer.

Each zone within a multi patch can be assigned its own MIDI channel, or be set to Omni mode. Choice of MIDI transmission and/or reception is also zone-specific. If MIDI In is selected, the zone responds to note and controller information, while if MIDI Out is selected, the zone transmits notes received from the keyboard and from MIDI In; controller information is only transmitted if you select the appropriate option. A final provision, very necessary if zones are overlapped and one of them is only meant to be playing incoming MIDI data, can be brought into play to shut off keyboard input for any given zone.

In case you hadn't already guessed, what all these options add up to is a tremendously versatile system for configuring a MIDI setup, though I guess the system will make even more people happy when the CV/Gate inputs eventually materialise.

As for the MIDI global control and data transfer options, these are accessed via the Master Page. Global control consists of Basic Channel selection, controller code allocation, scaled response to incoming velocity information, patch

change transmission on/off, echo on/off (when this is on, Matrix data and MIDI In data are both sent to MIDI Out), Reset (turns off all notes and returns the instrument to a default MIDI condition) and Mute (turns off all notes).

Incidentally, controller code allocation can be seen as a software 'patchbay' used to connect MIDI controllers to the local controllers of the Matrix 12. Levers, pedals and pressure may all be assigned any MIDI controller number between zero and 121, or the dedicated Bender and after-touch pressure codes. This is the sort of flexibility you'd expect to find on a dedicated controller keyboard, though Yamaha's KX88 is the only example that springs to mind at the moment. Maybe Oberheim's own forthcoming XK controller will offer something similar. Whatever, combining the flexibility of the Matrix 12's internal modulation routings with its own comprehensive keyboard arrangement makes for a highly versatile MIDI system.

The third area of MIDI control concerns data exchange. 'SystemX' must be enabled before anything can happen on this front. You can send either a single or multi patch individually, or all internal patches in one go, which takes about 20 seconds. Any Xpander owners out there might like to know that Matrix 12 and Xpander data are fully compatible with each other, and may be transferred in either direction – but you'll need something in the way of modification. Downloading from Matrix 12 to Xpander, for instance, will require Xpander Software Revision 1.3, available from your nearest chemist.

Compatibility is also present on the tape storage front, which can't be bad.

## Conclusions

Powerful enough to kick the rest of the band into the ionosphere in a live situation, yet sufficiently flexible to take pride of place in an above-average studio setup, the Matrix 12 is everything a top-notch analogue poly should be and a fair bit more besides. Because apart from the odd case of Retrofit Blues, Oberheim seem to have got everything right.

UK distributors Turnkey already have takers for the entire first batch of Matrix 12s, and the review model only gained a temporary reprieve so that E&MM's readership could learn of the instrument's many and varied synthetic delights.

By combining the best that analogue synthesis has to offer with one of the smartest examples of microprocessor-based control of a musical instrument I've yet seen, Oberheim have come up with a keyboard that deserves to set not just one standard, but a whole slew of them. If you can afford the Matrix 12, go for it. If you can't, you're in for a long wait before any secondhand bargains come along... ■

RRP of the Matrix 12 is £5200 plus VAT. Further details from: Turnkey, Brent View Road, London NW9 7EL. ☎ 01-202 4366.

