Sintefex FX8000 Replicator

A sophisticated convolution analysis technique enables the Replicator to copy any piece of classic outboard. **Dave Foister** examines this year's model.

IF THERE'S SSAIRA gong for most outlandish new product of the year, I hereby nominate the Sintefex Replicator. Analogue replicas of classic processors are one thing; off-the-shelf digital simulations of them are another; but a device for cloning any other processor you care to hook up to it is a highly adventurous first, the work of a mind that thinks sideways. This, then, is what the Replicator is all about--digitally analysing the behaviour of a connected device and duplicating its effect on a signal passing through it.

It does this using convolution, sending a stream of impulses at steadily increasing levels through the connected processor and analysing what comes back.

This gives it all the information it needs about behaviour in both time and amplitude domains, and enables the DSP to model this behaviour. A very important aspect is that this allows the processor's response to increasing signal levels to be tracked and reproduced, in a bid to emulate the classic analogue warmth of connected processors that digital traditionally misses.

The Replicator is a big deep 2U-high box that lets you know on power-up that it's basically a computer; there's a hard drive whirring inside and a lengthy and satisfyingly flashy boot routine. Driving it centres round a large bright black-on-white screen, with a full set of five soft keys, a data wheel and four cursor keys to get around it. Nearby are five dedicated keys for switching elements of the processing in and out, and for calling their parameters to the screen.

The rear panel is important to consider at this stage as it gives some idea of the principle of operation and the potential flexibility of the Replicator. Its main inputs and outputs are on a big D connector, and a flail breaks this out into stereo analogue XLRs and AES-EBU in and

out. The card carrying the D sits in one of four slots, the rest of which are blanked on the review box, revealing that this is potentially an 8-channel processor. The cards also carry unbalanced analogue in and out on phonos. Elsewhere are optical connectors handling ADAT or SPDIF, coax SPDIF connectors, sync for AES clock, and most importantly the outputs delivering the analysis signal that the Replicator uses to model the connected device. This appears in analogue and digital formats for connection to a wide range of equipment.

The procedure is simple. This analysis signal is connected to the input(s) of the device to be modelled, and the device's output(s) are connected to any channel input. The screen helps with navigation to the Sample page, which first allows a tone to be sent for checking all the connections, then allows an automated sequence of impulses to be run through the device. Since these step up from very low levels to 0dB it's wise to have any connected monitors turned down first. The screen reports when the sampling is complete, and the result can be saved in one of over a thousand memories--as the unit has its own hard drive, the eight banks of 128 samples, along with more complex files we'll come to later, can be accommodated easily. Fortunately there is also room for long descriptive names to identify all the files.

What we now have is a snapshot of the connected device as currently set, which can now be replicated by the DSP in any of the audio channels. To use the setting, the Replicator channel must obviously be repatched into, say, a console insert point. There are many obvious candidates for this sort of snapshot, and as many reasons for wanting to use them. Suggestions include storing the characteristics of a borrowed or hired

device; making the characteristics of a single unit available on several channels, so that if you only have one of your favourite EQs, you can set it up for one channel, clone it, put the Replicator in its place and move the real EQ on to the next, repeating until you run out of Replicator channels; and allowing a favourite EQ setting to be duplicated across a stereo pair (or a full surround mix) with a degree of precision analogue processors cannot manage.

I checked this central sampling process out using my console EQ, once with a subtle setting and once with an extreme aggressive one. The procedure is very straightforward and logical, requiring a little time, but not much thought, and the obvious next step was direct comparison with the EQ I had just sampled. Both times the sound was indistinguishable from the original. I was tempted to sum the two and invert one to see what was left, but the inherent processing delay, small as it is, ruled that out. The point was that I could believe I was listening to my console EQ--which, for better or worse, I know quite intimately.

Sintefex provides a selection of samples already on the unit's drive, and they show how the type of signal path that can be sampled in this way can be anything you care to name: EQs, valve circuits, the characteristics of analogue tape, even a room sampled via a loudspeaker and microphone or a distorted guitar amp via close or distant mics. What all of these have in common is that the sampled effect will be simply a snapshot; the response and behaviour, apart from the nonlinearities introduced by varying levels through the device, will be set in concrete. What you get then is not a replica of your favourite EQ that you can use just like the original, but a replica of your favourite EQ stuck on one setting. This still has many powerful uses, but obviously the full

benefit of the concept comes only with real adjustable replicas.

Encouragingly, a specimen preset provided with the Replicator shows that this is already possible, albeit only at the factory at this time.

The preset is called Classic EQ, and with two each of Boost and Atten controls, plus frequency switches marked in cps and kcs and a Width

knob, it doesn't take much to work out what it is--in fact later software comes clean and says Pultec on the screen. The point is that all the controls are fully adjustable, a function made possible by taking a lot of samples of the original and assembling them together with the required front panel controls. Although this is currently a very time consuming procedure, Sintefex intends to have software tools available this year to allow users to do it themselves.

Note that, although the sampling process takes account of changes in the device's character as signal levels change, the replicated effect does not have to use these elements if a straight clean linear behaviour is required. The switch for deciding whether to allow the nonlinearities or not is on a dedicated section of the front panel; also here is a Drive control that determines how hard the nonlinear aspects will be driven, and a Limit indicator that shows when you've gone far enough.

One type of processor that is very much a special case where the Replicator is concerned is the compressor. The parameters required to simulate the variable behaviour of a compressor are very different from those associated with EQ, and are such that the Replicator can come much closer to modelling a complete adjustable compressor. Although nothing like the number of samples is required to do the job as would be the case with EQ, the process of analysing what the compressor is doing is still not quick; it is, however, very simple, and the results justify the work.

Analysing a compressor comprises two separate jobs. The first is to sample the characteristics of the compressor's basic signal path--exactly the same procedure as for an EQ. Its controls must be set so that it will not attempt to do any actual compression--ratio of 1:1, threshold as high as possible and so on--and so

the fundamental character of the compressor is established. Then a series of curves must be sampled, each with a known threshold and compression ratio and saved separately to the disk. The number of available compressor curve memories is relatively small, but once you have a set for your chosen compressor these can be associated with the signal path sample and stored as a complete program.

What you then get is a Compressor screen with the basic controls required for operation of the device--ratio, threshold and attack and release times--plus a graphic of the transfer function as currently set. The compressor section is always available on the Replicator even without the use of sampled characteristics, in which case it offers a choice of knee shapes and operates like a conventional digital compressor. It constitutes a separate block from the one used for EQ simulation, so the two can be used together. With the samples for a real compressor loaded, it behaves just like the original but with the same simple set of controls, so any special timing characteristics or signal-dependent release times are lost. All the same, the compression ratio is variable, and not restricted to just the sampled values, although it won't go any higher than the maximum originally sampled. Inter-channel linking is provided on a dedicated section of the front panel, along with a dedicated threshold control and gain-reduction meters.

An obvious test for this function was to hook up the Focusrite 430 that I still had from reviewing it the previous month and to attempt to replicate its compressor. The procedure for doing it was easy to master, although it meant hanging around the Replicator for quite some time initiating the sequence of analysis routines. At the end of it all, the Replicator seemed to be giving me a very accurate and very useable emulation of the original, with its characteristic smooth sound and soft knee, so it was undoubtedly time well spent. Factory programs include an 1176, a d160, a c11b and an al3630.

In the same way that there is always a compressor available regardless of whether any replicated processors are loaded, so there is also an onboard EQ. This is a straightforward 4-band digital parametric, with generous control ranges and a graphic display of the resulting curve. Usefully, the actual contribution of the currently

selected band is shown on the display in grey as well as the complete EQ curve. There are no shelving bands, and the number of bands actually available might vary depending on what else the channel is doing and the sampling rate in use--the Replicator goes all the way to 24-96--but the EQ is a useful adjunct nonetheless.

Potentially equally useful but still in the development stage at the moment is a section marked AFX for after effects. This is for adding delay-based effects like reverbs, and at the moment comprises various types of straight delay including multitap, with adjustable delay, pan, level and feedback on each tap.

Future plans include allowing the Replicator signal path to be placed in the feedback loop to allow emulation of analogue delay devices, and reverbs using samples of actual rooms to provide the required colour, although not a full replication of the original reverb behaviour.

Navigation of all this takes a little practice, but is logical enough considering how much there is to find. Dedicated keys select the various building blocks on to the screen and also switch them in and out; the catch here is that a quick touch does the switching while a longer hold brings up the display, which makes it a bit too easy to switch a process off accidentally — I would have preferred the functions the other way round. Like all good multi-effects processors, the Replicator allows these various elements to be arranged in any order in the input-output chain.

To complete the picture, there are digital controls for input and output level (mind the zippering) with clip lights and an elaborate meter screen for the input. What this shows depends on how many channel cards are fitted to the Replicator; in the case of this simple 2-channel version the meters show both instantaneous levels and short-term peak hold, creating a kind of arrow effect. With more cards more channels are shown, but with less detail.

Extensive facilities are provided for file backups and data interchange, using a simple piece of PC software called Replimat. At its most basic, this allows data to be exchanged between PC and Replicator via MIDI, but this is inevitably very slow. More impressive is a facility allowing data to be transferred digitally in

the form of WAV files; the unit can create WAVs from its internal data

and Replimat converts these appropriately. Sintefex' web-site has software updates and files for samples and programs available in this format, and given the necessary facilities on the PC, backups can be made on CD-R easily using this feature.

If I had to pick the Replicator up on one point, it would be the necessity for so much repatching when switching between the two modes of sampling an effect and then actually

using it. It adds significantly to the time it takes to carry out the analysis, and careful thought is required in order to keep track of what you're doing and avoid silly mistakes--the potential is there after all to have

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extremely loud test impulses appearing from the monitors, or to inadvertently set up a loop. Since the unit has a dedicated analysis output, it would seem sensible to have a corresponding analyser input, separate from the main channel ins and automatically selected by the software when a sample is to be taken. On the other hand, a reviewer is always lashing a piece of equipment into his system with adaptor cables, and the process may be much simpler if the Replicator appears on a patchbay.

The FX8000 Replicator is in one sense an extraordinarily simple and obvious concept; the fact that technology now makes it so straightforward in operation is almost equally extraordinary. If Sintefex can get the full-blown adjustable thing in action, there will be a few nervous manufacturers and hire companies

out there--your client with a Replicator may never give you any more repeat business. Until that time the limitations of the snapshots will prevent it replacing beloved EQs, although the next time that compressor decides to go noisy it may find its days numbered.

The FX8000 is in fact more than it needs to be. Sintefex could have marketed the Replicator and Compressor sections as they are with no more frills. The addition of the on-board EQ and the delay section are nothing more than bonuses on a device that keeps suggesting new uses for itself, and its open architecture, ongoing development, web support and easy data transfer make it more desirable still. With the right exposure and an imaginative reception this could make a big impression.