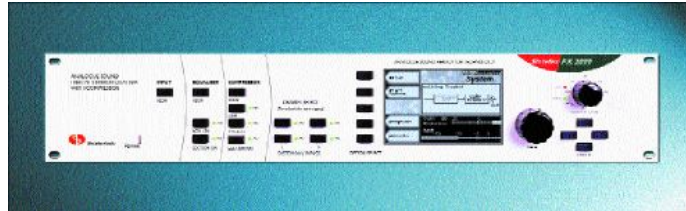


# Sintefex FX2000

## CLASSIC SAMPLED EQ AND COMPRESSOR

**KK PROFFITT** examines the Sintefex FX2000 and finds a digital stereo equalizer/compressor worth buying.



Although many plug-ins and hardware effects boxes purport to deliver the "classic sound" and "analog warmth" of old favorites, few of them can begin to match the delight I felt when I first heard a bass guitar track brought to life by a Pultec EQP 1A-3. The Sintefex FX2000 analog sample digital stereo equalizer/compressor uses "dynamic convolution" to provide retro warmth with modern digital precision and maximum control. While lacking the big knobs (chicken heads on the Pultec) and heavy chassis, it's the closest thing to a Pultec 1A-3, Fairchild 660 or Urei 1176 that I've used in recording and mixing.

The FX2000 is a stereo "spin-off" of the more full-featured FX8000. The FX8000 uses dynamic convolution to sample an analog process and digitally reproduce it with a highly accurate simulation of the original's frequency response and distortion characteristics. While the concept of convolution is not simple (mathematically or empirically), one may think of the process as using audio samples to scale filter impulse responses. For those who have worked with Sonic Foundry's Acoustic Mirror, the characteristics of an impulse response in audio will be quite familiar. (For a simple graphical approach to convolution check out the java applet at <http://plaza.harmonix.ne.jp/~tosiwata/cnv.html>.)

Michael J. Kemp, co-founder of Sintefex with Mike Eden, designed the FX8000 (as well as its stereo "children" the FX2000 and CX2000). Kemp gives an operational definition and overview of the dynamic convolution process in his AES Pre-print, "Analysis and Simulation of Analog Dynamic Compressors and Limiters in the Digital Domain." He describes it as using non-linear synthesis to analyze and simulate classic hardware compressors and equalizers. This involves using level-dependent impulse responses, measurements of attenuation characteristics against various signal amplitudes and applying these in simulation via bilateral dynamic convolution on a sample by sample basis. It's immediately apparent that these Sintefex boxes require a lot of horsepower under the hood.

### On The Inside

Inside the box, 10 SHARC floating-point digital signal processors provide up to 800 Mflops per channel. There's a 3GB disk for storing samples and programs used with the dynamic convolution process. Also included is a power linear mode capable of reproducing analog equalization with linear phase response.

Both channels support sampling rates up to 96kHz(24-bit) and are fully balanced on both analog and digital connections (pin 2 hot). Four main sample rates are selectable for internal clock: 44.1, 48, 88.2 and 96kHz; external reference locks from 30kHz to 96kHz. The unit comes with digital I/O as standard (single-cable AES for all sampling rates). The analog interface with 24-bit conversion is an option that is not field upgradeable.

A digital high-pass DC removal filter on the analog input provides 3dB attenuation at 1Hz and 0.1dB at 6.5Hz at 48kHz sampling rate. At 96kHz the attenuation is 3dB at 2Hz and 0.1dB at 13Hz. The filter may be switched off in software.

Word clock reference in is via 75(omega) BNC TTL level word clock input. MIDI I/O is included for serial remote control of major parameters from sequencer or keyboard as well as for uploading or downloading effect data. A USB port permits a PC-compatible computer to communicate with the FX2000 using remote control software downloadable from [www.sintefex.com](http://www.sintefex.com). At this time Windows XP is not supported, but we were able to use Windows 98 on an old laptop to run the software. Additional presets are also available for download if you register at the site.

### On The Front

The FX2000 sports a straightforward layout on the front panel, although much of the real operation lies beneath the surface of the LCD display that claims about a quarter of the surface real estate. The first three sections comprise input, equalizer and compressor switches.

The Input section includes the power On/Off switch and a View switch that calls the input screen to the LCD display to monitor and adjust metering, sample rates and input path options.

To the right is the Equalizer section. Again, there is a View switch that brings up a screen with adjustable parameters. If there is no EQ preset loaded, you can push one of the option select buttons to the left of the LCD screen to load a screen with a second set of button options leading to a set of preset selections. The second button, Non Lin, permits the non-linearity of an analog simulation to be switched off. On the Classic EQ screen is a drive control to vary the non-linear distortion common in analog units. When Non Lin is switched off, the simulation retains the original EQ characteristics of the original device without the non-linear distortion. When Classic EQ is not in use, this switch also affects the Classic compressor.

The Section On button switches the EQ section in or out of the selected channel or channels.

The Compressor section also has View and Section On buttons. In addition there's a Link button that switches the gain link on to maintain proper imaging in stereo operation. The Pre EQ button toggles the dynamics section before the compressor section (On) or after the compressor section (Off).

In the center of the faceplate are two Channel Select buttons. Their respective LEDs indicate that a channel (or channels) is selected for adjustment. If one channel is selected then selecting the other channel switches the controls and displays over to the other channel. Holding down both Channel Select buttons toggles the channels from ganged stereo to un-ganged mono.

Below the Channel Select buttons are the System On/Bypass buttons. They toggle between bypassing or enabling channels, and if the channels have been ganged to stereo, touching one button will bypass both.

Option Select buttons to the left of the LCD display bring up hidden selections (for a few seconds only) on some screens. They also select and carry out certain labeled operations.

To the right of the LCD screen the Data knob provides quick data entry in selected fields. Four cursor buttons in the lower left corner navigate the fields on the LCD display. The Output Gain knob is continuously variable from -40dB to +20dB and has an associated LED clip indicator. There's also a Track LED indicator. When the Output Gain knob has been disabled via software for the channel you are working on, the Track light will go out.

## **The LCD Display**

Navigating the FX2000 can be a bit daunting at first, but the View buttons simplify the routes to related operations. In most screens, there is a Status indication in the upper right corner showing channel or channels affected and current sample rate. The main portion of the screen generally shows program status and availability or controls for the selected program. The left edge of the screen may flash temporarily available selections (known as "Vanishing Labels") that appear when an Option Select button is pressed.

There are four main control areas: input, classic EQ, compressor/expander/gate and output. There's also a "system" area where parameters including viewing angle, grey-scale display and power up options may be edited. Data dump and load are located also in the system area under "setup."

In the Input/Output screens, you can set input and output gain to be at unity or to be at fixed levels. You can also select whether or not you want the output gain control to be active.

The FX2000 converters ship with +18dBu=0dBFS. In the I/O section you can vary this from +10dBu to +24dBu. You can also trim the analog input gains on each channel in tenths of a dB. Other variables include values for the zero on bar meters (in dBFS) and peak hold times in mS.

## **The Classic EQ/Compressor Screens**

The FX2000 uses programs, effects and samples to create its extraordinary replication of analog processes.

In Sintefex terminology, samples are process samples. They are samples of the way an audio processor affects the signal passing through it, and they are used by the dynamic convolution process to recreate the audio effect of the original unit digitally, including any level dependent effects. Samples may be stored separately on an FX2000 so that the samples from an FX8000 may be played back on the FX2000.

Effects contain information about how to sound like an EQ or compressor. It's also used as a general term for Classic EQ and Classic Compressor effects stored on an FX2000.

Programs (called "presets") are snapshots of the settings of an FX2000. They may be saved to hard disk and loaded onto a PC to be used by the Replimat software for archiving or transfer to other machines. Programs contain lists of effects and samples required for effects.

There are many samples of Classic EQs including the Pultec EQP-1A3, Tubetech rebuild of the Pultec design, API DESK EQ module, Massive Passive, Decca two-band EQ, Neve 1073 and GML 8200. Most screens have four bands of EQ with adjustable frequency, bandwidth (Q) and boost, cut, or both. Wherever possible, original labeling is followed. For example, with a Pultec-type equalizer, frequencies are labeled as CPS and KCS rather than Hz and kHz.

The FX2000 provides compression by using its built-in compressor as a digital compressor or by loading a sampled analog compressor. Sampled units include Urei 1176, Teletronix LA-2A, dbx 160, Tubetech CL1B, Summit Audio TLA100A, Neve VR channel strip compressor, Alesis 3630, SSL 9000 deskmaster VCA compressor, Manley Variable MU and several others.

Because the FX2000 recreates both the sound of the sampled compressor and the way it changes with gain reduction and the "curve" of the compressor, soft knee effects can be accurately recreated.

The Fairchild 670 program was a real favorite during our tests at JamSync. We tested it with a young girl's vocals. In comparisons with plug-ins on a couple of our DAWs, we found that we could compress the vocals heavily through the Sintefex without the grit and grain that its plug-in counterparts delivered.

With the Pultec EQU-1A3 program I was able to warm up some lifeless bass tracks with that familiar, meaty effect I remember from the Pultecs of years ago. Furthermore, unlike the Pultecs of old, I could be certain that the Sintefex would be working when the client arrived! Again, it won out over the plug-in counterparts on the DAWs.

### Power Linear

Select Phase Mode: Power Linear allows the equalizers in the FX2000 to be heard with linear phase. All frequencies are delayed by the same amount to preserve transient response and provide a better stereo image. It's not usable for real-time processing because all delays are compensated by a matching pre-delay and this increases total system delay. Still, for post production (and especially mastering), it's an invaluable addition.

### Replimat

Although the FX2000 is easily navigated via the front panel, I must confess the very slight fan noise coming from the box breaks the near silence of our ultra-quiet control room. Fortunately, the folks at Sintefex provide Replimat software you can download at the Sintefex Website. With Replimat you can upload and download samples, programs and effects to the unit. You can also archive these to PC in case you run out of room on the FX2000. For us, Replimat's remote control of the FX2000 via USB was a lifesaver. We could move the unit into the machine room and use a notebook computer to control it. The only drawback was that Replimat does not yet work under Windows XP, so we had to run it under Windows 98, which we use in the studio.

### You'll Have To Pry It From My Cold, Dead Fingers

We liked the FX2000. We really, really liked it. In fact, we liked it so much that we couldn't bear to send it back, so we bought it.

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### INFORMATION

[www.sintefex.com](http://www.sintefex.com)