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WAVES API Collection Plug-Ins FIELD TEST
by Barry Rudolph

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Waves Audio Ltd. has co-engineered with Automated Processed Inc. the API Collection of plug-in processors based on API's seminal audio hardware processors first manufactured in the 1960's. The API Collection

API 560 Graphic EQ

API 550B Four-Band EQ

API 550A Three-Band EQ

bundles four plug-in processors: 550A 3-band EQ, 550B 4-band EQ, 560 10-band graphical EQ and the 2500 stereo compressor. The processors are carefully modeled in stereo and mono versions using 48-bit double-precision math, and they operate at up to 96 kHz, except the 560, which goes up to 192 kHz. They are available in native ($1,000) and TDM ($2,000) versions; iLok authorization is required.

Simple GUI

Each of the four plug-ins is encased in a virtual anodized-blue Series 500 Lunchbox with a large output level control. A pair of large VU meters dominates the GUI; even the mono versions of the EQs have two meters but instead of showing input and output level, they both show output level. Unlike the original hardware units, the plug-in offers an input/output clip indicator, polarity "flip" switch and an Analog on/off switch. The thoughtful Analog feature switches on/off modeling of the hardware's processor noise and harmonic distortion--i.e. the juicy bits of analog gear personality. With Analog on, these plug-ins sound so close to the originals it's scary, so I chose to do all my testing with Analog enabled. With Analog off, these plugs sound and work great too--just absent some of the *"je ne sais quoi"* of the analog originals. As with all Waves plug-ins, the included WaveSystem toolbar manages user and factory presets with 32 levels of undo/redo, preset A/B'ing and recall/save/load functions.

550A, 550B, And 560 Equalizers

The widespread and long-lived popularity of the compact API 550A, 550B and 560 hardware equalizers is due to the great sound of the proportionate Q circuit design coupled with API's famed discrete 2520 Class AB operational amplifier module. Applying more boost/cut sharpens the Q, offering a more aggressive sound. This makes them equally useful for subtle to extreme tone carving. Furthermore, the boost and cut curves are reciprocal--you can easily reverse an equalizer setting used in a recording by applying an equal but opposite amount of boost or cut in remix. This is as close as it's gets to an "undo" button in analog.

The 550A has five frequency choices for each of its three, overlapping band sections--or 15 frequencies total. The high and low bands are switchable from peaking to shelving filters. The plug-in also models the independent 50 to 15k Hz bandpass filter that's only available on the 550A. The 550B has seven frequency choices for each of its four, overlapping band sections--or 28 frequencies. Again, the high and low bands are peak/shelving-switchable.

The 560 graphic EQ has 10 frequency bands, spaced one octave apart with +/-12dB boost/cut. A graphical EQ with proportionate Q means that just touching a frequency band with a small boost or cut makes a very subtle change. However, moving the fader up by more than one-third begins carving more deeply.

The equalizers each have a Trim window, which, as your audio plays, displays the highest peak signal level for that track over time. When Trim shows the top level to be 1.5 dB, another 1.4 dB of headroom remains before clip. If you click on Trim, it will reset the highest peak to be at -0.1 dBFS. This is a tremendous feature to maximize channel strip signal chain gain structure.

A Look At The 2500

API 2500 Stereo Compressor

The WAVES API 2500 Stereo Compressor models the single rack space unit that uses four discrete VCAs in each channel to minimize noise and distortion. Like the hardware unit, the API 2500 stereo compressor plug-in has separate threshold, attack, release, ratio, and fixed- and variable-release controls. Unique to the 2500 are the compressor Tone section and the 3comprehensive stereo linking. The aptly named Tone section is comprised of hard, medium and soft compressor knee choices, the patented Thrust detector filter circuit and a choice between two compressor detector signal derivation topologies: old-style feedback or the more modern feed forward method.

Old-style feedback detector signal derivation is when the output of the compressor is fed back to the Thrust filter (and detector). Feed forward simply connects the Thrust filter to the input of the compressor. Having a choice means you can configure the 2500 to act more like an old smoothie, such as the Fairchild 660 (feedback) or harder sounding like an UREI/JBL 7110 limiter/compressor (feed forward).

Choosing between hard, medium or soft-knee compression configures the 2500 for the desired compression task-- anywhere between aggressively controlled and noticeable to gentle, smooth and subtle. Thrust inserts any of three different filters before the compressor's RMS detector. Normal position is flat; Med decreases the energy in the low frequencies and slightly boosts the high frequencies; and Loud decreases even more lows and adds more highs to the detector's input.

The L/R linking system sends a mix of the left and right channels' level contributions to the left and right channel detectors. Furthermore, you can set the "depth" of linkage from none--or 0-percent--for dual-mono setups to 50, 60, 70, 80, 90 or 100-percent linked. The Link control signal can be shaped using a three-position filter: high pass to remove lows, low pass to remove highs or both together for a bandpass filter.

Waves has accurately modeled the 2500's Auto-Make-Up gain; it maintains the same output level without regard to changes made to threshold or ratio--a great feature for "on-the-fly" adjustment.

API On The Mix

I tested the API Collection in a Pro Tools Accel HD3 rig running on a MAC Quadcore. I started using the 550As as if engineering on a real API desk--on everything! The 550A, with its low latency and DSP usage, is the perfect candidate for use all across your mixer as a main EQ for vocals, guitars, keyboards or program. On guitars, the Trim feature helped to maximize the channel strip for the wide dynamics of a wah-wah part, but a simple input trim control (similar to that on Waves' SSL channel strip plug-in) would have saved me the trouble of adding a DigiRack Trim plug-in to keep an over-recorded track (in the red) from overloading the EQ.

I liked that on the 550A and 550B, the amount of boost/cut (2, 4, 6, 9, 12dB) changes to yellow to verify you've selected it. I recorded vocals through the 550B with no trouble at all. A smooth boost at 5 kHz and 12.5 kHz was just what my singer needed when using a Neumann U47.

The 550A and -B provide subtle EQ until the boost/cut knob goes beyond 4 dB. The 550A worked with just about any track, but if I needed a fourth frequency the 550B came to the rescue. Most individual tracks benefit from a little EQ, and subtle +/-2 dB here and there can make a big difference in the overall sound. Like the hardware 550A, winding up to +9 dB at 10 kHz on a vocal track will open up the air and ambience to recover from the dulling effect of a compressor that's ahead in the chain, but beware of sibilance.

The 560 graphic EQ went to work on all my drum tracks. Whether you're adding point and boom to kicks, carving out something useful from a dumpy old snare drum or dialing in tom-toms, this is the one! Good thing the output level control lowered the level-off clip when I pushed excessive 8 kHz on a side-stick sample. On kick drums, I thinned out the 500Hz area and boosted the frequencies an octave down to get more kick drum presence and a better "marriage" with the bass guitar.

2500 On the Mix Bus

I did extensive A/B'ing between the 2500 and Waves' other stereo bus compressor, the SSL Compressor. On the SSL, I normally use only about 3 dB or less of max compression at 4:1. I use this technique for the slight level jump and the way it enhances the bottom end of my mixes. Set the same way, the 2500 excels over the SSL whenever I'm after a more crushed sound. With all the ways you can program this compressor, creating specific combinations of the knee, thrust and feedback/feed-forward settings, the 2500 provides more punch and clarity when it's pushed hard. It is worth taking the time to learn and experiment here.

For stereo mixes, I found myself using the Med Thrust and Knee positions most often--changing to Loud Thrust necessitates resetting threshold and/or output level. I don't use stereo linking because it always narrows the stereo width in my mixes--but then I never put superloud "events" on one side only, which might shift the center image if linking is used.

Available for both Mac and PC platforms, WAVES and API have come together to produce a plug-in collection that will become an essential DAW studio asset just like any analog outboard hardware processor rack full of desirous gear has become. Impressive sounding the first time I used them, the API Collection is a "must have" for any DAW mixer serious about the best sound possible.

Waves, 865/909-9200, www.waves.com.

Barry Rudolph is an L.A.-based recording engineer. Visit his Web site at: WWW.BARRYRUDOLPH.COM

Buy The Waves Native API Collection Plugin Bundle (Macintosh and Windows)

WAVES API Collection Specifications

550A Bands And Frequencies	550B Bands And Frequencies	560 Graphic Bands And Frequencies	2500 Stereo Compressor

550A Bands And Frequencies

Low Band Gain
Range -12dB to +12dB (2-3dB steps)

Low Band Frequencies
Filter Types: shelf, bell
50Hz, 100Hz, 200Hz, 300Hz, 400Hz

Mid Band Gain
Range -12dB to +12dB (2-3dB steps)

Mid Band Frequencies
Filter Type: bell
400Hz, 800Hz, 1.5kHz, 3kHz, 5kHz

High Band Gain
Range -12dB to +12dB (2-3dB steps)

High Band Frequency
Filter Types: shelf, bell
5kHz, 7kHz, 10kHz, 12.5kHz, 15kHz

Bandpass Filter 50Hz to 15kHz

550B Bands And Frequencies

Low Band Gain
Range -12dB to +12dB (2-3dB steps)

Low Band Frequencies
30Hz, 40Hz, 50Hz, 100Hz, 200Hz, 300Hz, 400Hz

Low Mid Band Gain
Range -12dB to +12dB (2-3dB steps)

Low Mid Band Frequencies
75Hz, 150Hz, 180Hz, 240Hz, 500Hz, 700Hz, 1kHz

High Mid Band Gain
Range -12dB to +12dB (2-3dB steps)

High Mid Band Frequencies
800Hz, 1.5kHz, 3kHz, 5kHz, 8kHz, 10kHz, 12.5kHz

High Band Gain
Range -12dB to +12dB (2-3dB steps)

High Band Frequencies
Filter Types: shelf, bell
2.5kHz, 5kHz, 7kHz, 10kHz, 12.5kHz, 15kHz, 20kHz

560 Graphic Bands And Frequencies

Gain Range -12dB to +12dB

Frequency Bands

31Hz

63Hz

125Hz

250Hz

500Hz

1kHz

2kHz

4kHz

8kHz

16kHz

2500 Stereo Compressor

Threshold Range
+10dBu to -20dBu

Attack Times
.03ms, .1ms, .3ms, 1ms, 3ms, 10ms, 30ms

Release Times
.05sec, .1sec, .2sec, .5sec, 1sec. 2sec, Variable

Ratios Available
1.5:1. 2:1, 3:1, 4:1, 6:1, 10:1, Infinity:1

L/R Link Modes
Dual Mono, 50%, 60%, 70%, 80%, 90%, 100%

TDM DSP Usage/Latency

Pro Tools ver 7.3.1cs3 Accel HD3 Running On A MAC Quadcore 4.5GB RAM. All Sessions Were 44.1/48kHz-24-Bit.

550A mono 21% of chip for each instance--5 to Chip--3 samples
550A stereo 38% of chip for each instance--2 to Chip--3 samples
550B mono 21% of chip for each instance--5 to Chip--3 samples

550B stereo 38% of chip for each instance--2 to Chip--3 samples
560 mono 53% of chip for each instance--68 samples
560 stereo 100% of chip for each instance--68 samples

2500 mono 21% of chip for each instance--4 to Chip--3 samples
2500 stereo 48% of chip for each instance--2 to Chip--3 samples

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