

BY RICHARD ALAN SALZ

# Mackie Onyx 1640 Analog Mixer

**M**ackie's 1604 mixer is something of an industry yardstick when it comes to compact analog mixers. I can only imagine how many tens, or perhaps hundreds of thousands of them are in use every day in applications ranging from live sound reinforcement to studio recording. That said, the industry has changed since its introduction (and later revisions) and Mackie has seen the need to update this venerable design. Enter the new Mackie Onyx series, with a new microphone preamplifier and equalizer design and a FireWire recording interface option. Does Mackie's new mixer live up to its esteemed predecessor?

## FEATURES

The Mackie Onyx 1640 mixer (\$1,649) has 16 mono channels with new Onyx microphone preamps, four busses, six aux sends, four-band equalization, as well as stereo and mono master outputs. An optional FireWire card can be installed into the mixer, which allows the direct streaming of 16 inputs and two outputs of 24-bit/96 kHz audio. Like many competitive products (but departing from Mackie's traditional USA-made products) the Onyx mixer is made in China.

Each of the input channels features switchable 48V phantom power, a low-cut filter (75Hz/18 dB per octave), input sensitivity (0 - 60 dB range), EQ in/out selector, with shelving low-frequency EQ (80 Hz), sweepable low-mid EQ (100 Hz - 2 kHz), sweepable high-mid EQ (400 Hz - 8 kHz), and shelving high-frequency EQ (12 kHz). The auxiliary section features six aux sends which are all switchable between pre and post in the master section. Muting, panning controls, channel



assignment, solo button, 60mm fader, and a three-led meter round out the channel strips. Additionally the first two input channels include a switchable DI input for instrument level instruments.

The master section features six aux masters, four buss master faders, main stereo fader, control room source monitoring, headphone jack, metering, talkback functionality and microphone, and metering. An associated switch and LED are included for the optional FireWire card.

The back panel includes microphone inputs and main outputs on XLRs, line, insert, and aux inputs, sub outputs, on 1/4-inch TRS connectors. Additionally, two DB-25 connectors offer balanced direct output of each input channel. The optional FireWire card (\$519) slides into a back panel slot, and provides 1394 connectors. Incidentally, the FireWire card outputs the 16 output channels both prefader and pre-EQ, which is good for direct recording, but could be a serious limitation for other users. The FireWire card ships with a CD that includes Macintosh and Windows drivers, as well as Mackie's Tracktion recording software.

## IN USE

I gave the 1640 a workout in my studio in both analog and digital modalities, using it to track projects as a front end in Nuendo 3.0 and the included Tracktion software, as well as

mixing 16 tracks of previously recorded 2-inch analog material.

Mackie traditionally has introduced each of their new preamplifier designs with great fanfare, heralding them as the sonic equivalents of multi-thousand dollar standalone preamps. While the new Onyx preamps sound good for a mid-priced analog console, they are quite honestly not the sonic equals of boutique standalone preamps as they still retain an electronic edge like many other "built to a price" devices. On the other hand, they do sound a bit better than the previous generation Mackie XDR preamps.

The equalization section does offer a significant upgrade compared to previous Mackie designs, as it is much cleaner and less "hard" sounding (perhaps less phase shift) than the previous 1604 equalizers: in addition, they are more flexible with the addition of another sweepable band of EQ compared to the 1604. The overall sound of the console seems closer to sonic neutrality than its predecessor.

The construction and parts quality of the Onyx 1640 were a different issue, however. Upon removing the mixer from the box a rattling sound (which ended up being a pair of small nuts floating around inside the mixer) was immediately apparent. The overall quality of finish of the metalwork also seemed sub-par for a Mackie product, instead much more rem-

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## Fast Facts

### Applications:

Studio, live sound, sound reinforcement

### Key Features:

16-channel; 4-buss mixer; 4-band EQ; two DI inputs; optional FireWire interface card; balanced direct outputs for each channel

### Price:

\$1,649

### Contact:

Mackie at 425-487-4333,  
[www.mackie.com](http://www.mackie.com).



## Mackie Onyx 1640 Analog Mixing Console



The Mackie Onyx 1640 is a versatile 16 channel/4-bus analog small-format mixer at the top of the Onyx line. An accessory FireWire card allows for connecting the mixer up to various Mac and Windows programs for computer control and mixing in software.

In setting the channel gains with the gain trim pots, it was difficult to get repeatable consistent gain at the maximum setting. Further, the gains were a bit difficult to set to some desired value for the knob positions of half rotation to maximum rotation.

Frequency response of a typical channel feeding the mic input at minimum and maximum gain is shown plotted in **Fig. 1**. The measurement was taken at the main outputs.

Distortion of the Onyx 1640 was generally very low with circuitry just shy of clipping. **Fig. 2** is a plot of THD+N vs. frequency for the conditions of 6.72V or 6.72 mV input into mic input of channel 1 with channel gains set for min and max. This just caused the channel red LEDs to come on. Master fader set to unity with channel faders set for +4 dBu main output. Measurement bandwidth was 80 kHz here and the distortion is mostly out of band noise. Another distortion condition is shown in **Fig. 3**. In this case, channel and main faders are full up, input voltage is set to produce main output voltage of +20 dBu, and channel gain is set for min and max. Measurement bandwidth is 22 kHz. This test is more indicative of the performance of the mic preamps.

The equalizer section of the 1640 is quite flexible. **Fig. 4** shows the range of equalization for the low and high shelving along with the two parametric controls with frequencies set for mid rotation.

Channel separation varied somewhat for different channels and conditions. A typical result is plotted in **Fig. 5** for the two testing directions for Channels 1 and 2.

The unit under test was equipped with the accessory FireWire card. After testing the 1640 itself, I installed the included software on my lab computer that I use to control my Audio Precision System Two Cascade measurement system. The software consists of an Onyx control panel where sample rate and latency are selected and a full version of Traction, Mackie's multitrack recording and sequencing software for the PC and Mac. I got this all going and briefly experimented with recording and playing back some signal test files. I must say that it is pretty impressive how the FireWire card and the Onyx 1640 work together as a mixer/recording system.

— Bascom H. King

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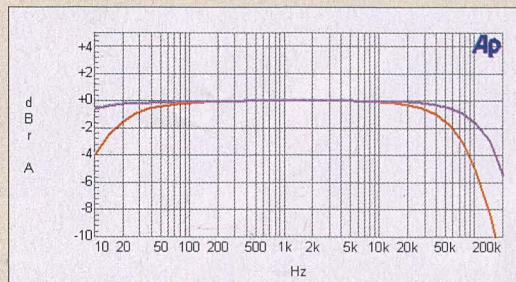


Figure 1: Frequency response of mic preamps through main outputs. Red = Max Gain, Magenta = Min Gain.

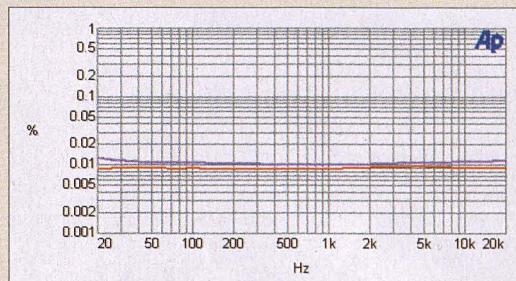


Figure 2: THD+N vs. frequency and gain setting. Red = Min, Magenta = Max. 80 kHz measurement BW.

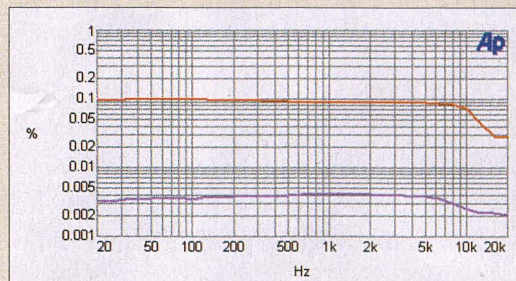


Figure 3: THD+N vs. frequency and gain setting. Red = Max, Magenta = Min. 20 kHz measurement BW.

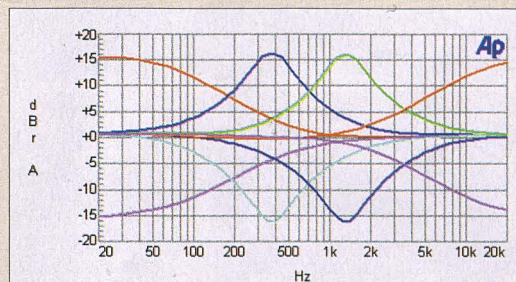


Figure 4: Various equalizer tone control settings with boost and cuts at maximum and minimum.

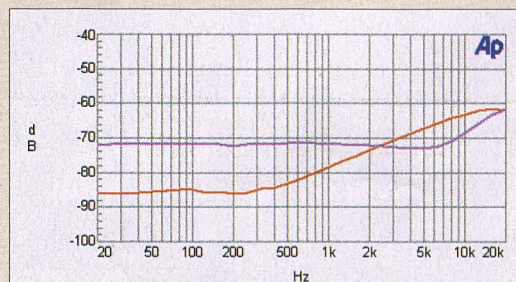


Figure 5: Channel separation vs. frequency. Red = Channel 1 > 2, Magenta = 2 > 1.



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## Mackie Onyx 1640 Analog Mixing Console

### INPUT SENSITIVITIES

For output level of +4 dBu at main outputs, Input & output faders set to maximum

Mic inputs  
Gain trims at maximum 118.3 uV, -76.3 dBu  
Gain trims at minimum 122.4 mV, -16.0 dBu

Line inputs  
Gain trims at maximum 1.23 mV, -56.0 dBu  
Gain trims at minimum 1.23 V, +4.0 dBu

Insert inputs 151.0 mV, -14.2 dBu

Aux Return inputs 123.4 mV, -16.0 dBu

Main Insert inputs 199.0 mV, -11.8 dBu

### GAINS

Mic inputs  
Gain trims at maximum 80.3 dB  
Gain trims at minimum 20.0 dB

Line inputs  
Gain trims at maximum 60.0 dB  
Gain trims at minimum 0 dB

Insert inputs 18.2 dB  
Aux Return inputs 20 dB  
Main Insert inputs 15.8 dB

### INPUT OVERLOAD

Mic inputs  
Gain trims at maximum 9.14 mV, -38.6 dBu  
Gain trims at minimum 4.94 V, 16.1 dBu

Line inputs, Ch 3 - 16  
Gain trims at maximum 93.9 mV, -18.3 dBu  
Gain trims at minimum > 25 V, 30.2 dBu

Instrument inputs, ch 1 & 2  
Gain trims at maximum 91.6 mV, -18.3 dBu  
Gain trims at minimum 8.4 V, 20.7 dBu

### OUTPUT LEVEL

At main out, onset of clipping @ 1% THD+N 9.7 V, 22.0 dBu

### INPUT/OUTPUT POLARITY

Input to main outputs  
Mic input non-inverting  
Line input non-inverting  
Channel insert inverting  
Aux returns non-inverting  
Main insert inverting

### INPUT IMPEDANCE

Mic inputs 2.5 K  
Line inputs 28.0 K  
Instrument inputs Ch 1 & 2 > 300 K  
Insert inputs 1.3 K  
Aux returns 19.8 K

### OUTPUT IMPEDANCE

Main stereo outputs 152 ohm  
Tape outputs 2.15 K  
Aux send outputs 300 ohm  
Headphone outputs 27 ohm

### HEADPHONE OUTPUT

Power at onset of Clipping, 1% THD+N  
600 ohm 145 mW  
50 ohm 144 mW

### FREQUENCY RESPONSE

Mic input to main output  
  
Min gain  
+0, -1 dB < 10 Hz - 78 kHz  
+0, -3 dB < 10 Hz - 144 kHz

Max gain  
+0, -1 dB 25 Hz - 40 kHz  
+0, -3 dB 12 Hz - 74 kHz

### TOTAL HARMONIC DISTORTION

Input level at 6.7V, gain trim at minimum, main mix fader

at "unity setting, Channel red LED lights just on, channel gains set for output of +4 dBu at main outputs < 0.015% 20Hz - 20 kHz

Input level at 6.7mV, gain trim at maximum, main mix fader at "unity setting, Channel red LED lights just on, channel gains set for output of +4 dBu at main outputs < 0.015% 20Hz - 20 kHz

### SIGNAL TO NOISE RATIO

Mic inputs  
Signal to noise ratio with +4 dBu input to mic channels, channel fader and main mix faders at unity setting, gains set for +4 dBu output 22 - 22 kHz bandwidth 86 dBu

Equivalent input noise, channel gain, channel fader and main mix fader at maximum, 150 ohm source impedance, 22 Hz - 22 kHz bandwidth -129 dBu

### CHANNEL SEPARATION

Adjacent channel  
Mic inputs

Gain trims at minimum  
> 70 dB 20 Hz - 700 Hz  
> 42 dB @ 20 kHz  
Gain trims at maximum  
> 70 dB 20 Hz - 3 kHz  
60 dB @ 20 kHz

Line inputs  
Gain trims at minimum  
> 70 dB 20 Hz - 2 kHz  
> 58 dB @ 20 kHz  
Gain trims at maximum  
> 70 dB 20 Hz - 300 Hz  
> 40 dB @ 20 kHz

**Notes:** All measurements with balanced I/O unless otherwise noted.

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incent of other (budget) made-in-China designs. The input sensitivity rotary pots were also wildly nonlinear, (most of the gain occurred between the 12 o'clock and 3 o'clock markings) and the nonlinearity of the pots varied from channel to channel. Lastly, many of the pushbuttons inserted audible clicks and thumps into the audio when used.

The optional FireWire card is able to provide simultaneous output of all 16 channels (as well as the stereo mix) at a maximum of 96 kHz sampling rate at 24 bits. The sound of the converters was quite true to the overall sound of the mixer itself. I didn't notice any sonic artifacts that were attributable to the conversion process. I experienced a very smooth driver installation process and had absolutely no problems with crashes, glitches, or other audio gremlins. The included Traktion software is a great choice for users that don't need the functionality of more fully-featured (and fully-submenued!) products. It's quite possible to use Traktion without ever needing to refer

to the documentation and I can't think of any higher praise for software than that!

### SUMMARY

The Onyx 1640 features an attractive design, logical layout, versatile I/O configuration, and the optional FireWire card is a convenient and good sounding option for computer recording. But, the indifferent fit and finish, nonlinearities and variability of the input gain controls, clicks and thumps, and high price (compared to other Chinese-made mixers) left me a little disappointed. On the positive side, both the microphone preamps and equalizers do represent an improvement over previous Mackie designs, and the inclusion of two DI inputs, and direct outputs for all 16 input channels are useful additions. For those that need an analog mixer with an integrated digital I/O solution, the Onyx 1640 represents an interesting choice.

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### REVIEW SETUP

UREI 809 and Fostex NF-1 monitors; Yamaha and Bryston amplification; Neotek IIIc console; Dell Pentium 4 3MHz workstation; Steinberg Nuendo 3; Audio-Technica 4060, Audix D6, Shure SM57 microphones.

## Product Points

### Mackie Onyx 1640

#### Plus

- + Mic preamps on every input channel
- + Versatile EQ
- + Optional FireWire option
- + Logical layout

#### Minus

- Build quality

#### The Score

A good sounding console with user-friendly features, but build-quality leaves us a bit disappointed.