ONYX·80 Series

ONYX·80 Series

MACKIE.

☎ **800.898.3211 (Toll free within U.S.)** ☎ **425.487.4333 (Outside U.S.)** ✉ **info@mackie.com**

ONYX·80 Series

Mackie offers four models of Onyx 80. From the small-footprint 2480 to the massive 48-input 4880, each 80 Series console has the same great feature set—sized to your need.

ONYX·2480

ONYX·3280

ONYX·4080

ONYX·4880

Premium big-console performance and quality brought to you by **Mackie.**

When it comes to live sound, the margin for error is tight. Nobody knows this better than regional sound professionals, medium-sized venues, and houses of worship. Unlike the major touring and live sound companies, these hardy folks must make a difficult choice when buying a live sound console; it's the age-old tradeoff between channel count and sound quality. Pay for quality, and you have to find some way to cram all your mics and instruments into 16 or fewer inputs. Go cheapo, and you know it's only a matter of when—not if—the console fails at some crucial moment. As of today, that age-old tradeoff has gone the way of grunge and dial-up modems. Introducing the new Onyx 80 Series 2480, 3280, 4080 and 4880 Premium Live Sound Consoles—the best value in the history of live sound—from Mackie, of course.
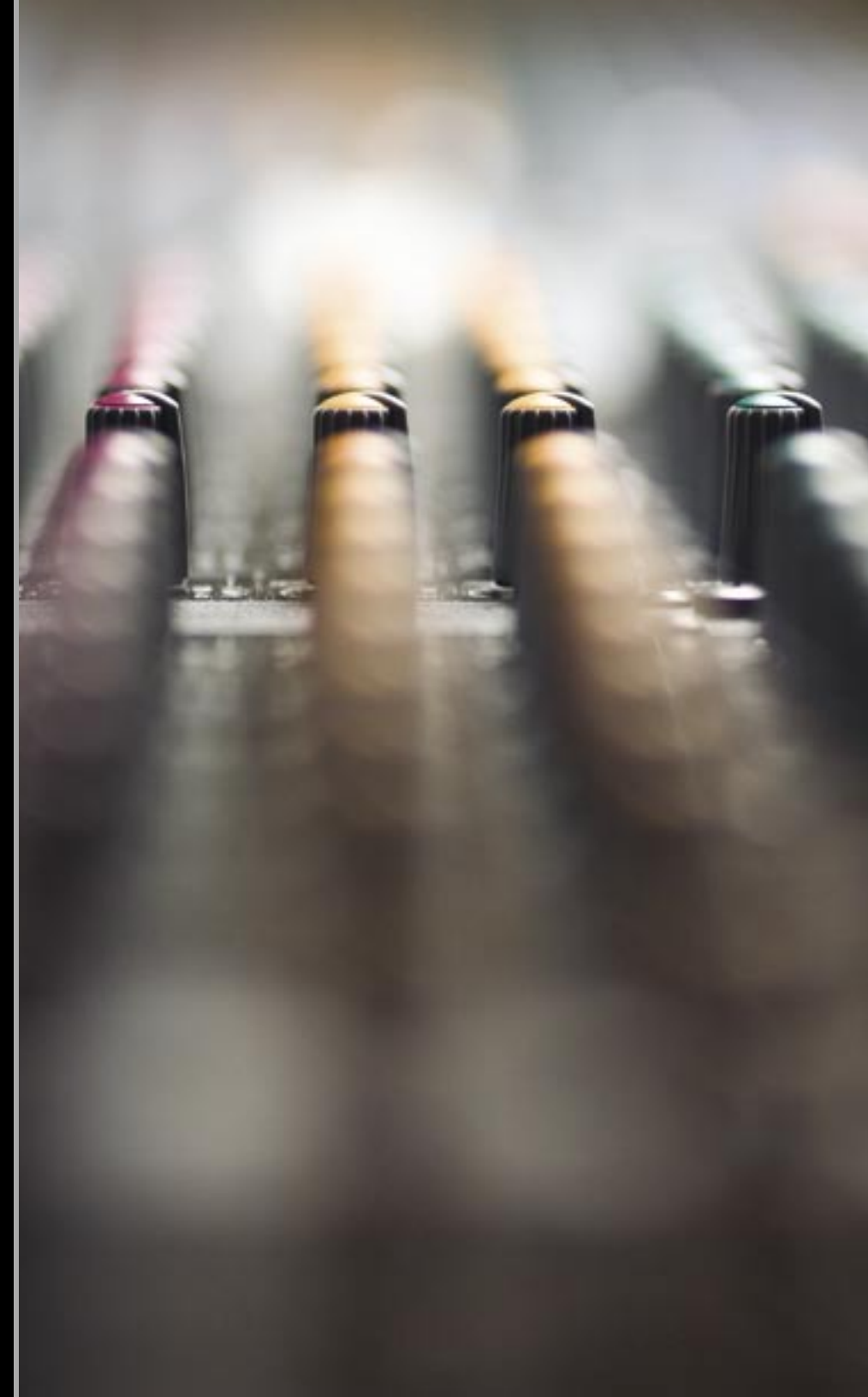
Superior sound.

Premium preamps.

Smoother EQ.

More inputs.

Priority one for the Onyx 80 Series design team was to create a live sound console that made absolutely no sacrifice in sonic integrity at any stage of the design. To pull this off, the Onyx 80 Series engineers started with the highest quality analog components available — from premium op-amps to IC chips costing exponentially more than previous designs. By utilizing semi-discrete eight channel modular circuit boards, the Onyx series combine the flexibility of single PCBs for each channel, with the cost advantages and minimal cabling of large-scale integrated circuit boards.

No corners were cut. Every Subgroup, Left, Right and Center main bus is electronically balanced for an uncompromised signal from input to output. All-new summing bus circuitry was designed from the ground up to maximize master section headroom, while minimizing noise and crosstalk. And most notably, we developed premium Onyx mic preamps and Perkins EQ circuitry specifically for optimum performance within the total Onyx system.

Sure its electronics are impressive, but what good would it be if the console chassis had the resilience of an eggshell? That's why we went overboard on the toughness factor, even by Mackie standards, building the Onyx 80 chassis for over-the-top physical protection of the technology inside.

Onyx mic preamps.

Creating our flagship Onyx mic preamps presented a unique challenge. On one hand, we wanted to deliver traits more commonly associated with boutique studio mic preamps: a tight, focused high end, superior ambience retrieval, detailed lower bass octaves, and highly textural midrange—no matter what you plug in. On the other hand, we knew Onyx mic preamps would have to function in the real world of live performance, which often includes high levels of radio frequency and microwave energy, long cable runs and the occasional "hot-patched" cable.

The analog engineering staff here at Mackie is always ready to sink its teeth into a juicy design problem, so the Onyx mic preamp builds upon our already-impressive XDR mic preamp design, and adds custom high-performance IC chips developed specifically for low-noise, high-headroom audio. Onyx preamps provide a level of accuracy and transparency unsurpassed even by some expensive esoteric designs.

Onyx mic preamps deliver oustanding, verifiable specs like 130dB total dynamic range, –129 dBm Equivalent Input Noise, and 0.0007% Total Harmonic Distortion—for real. Their superior design also addresses problematic issues like input impedance and linearity, maximum input level handling at low gain settings, shielding and grounding effectiveness, overload recovery, and radio frequency interference. And because Onyx mic preamps are designed for use at "real world" gain settings, they'll easily handle anything from +22 dB line level down to microvolt-level signals from a ribbon mic, without adding noise.

Onyx 80 Series consoles offer individually switchable, true 48v phantom power on every preamp. That's because, despite the widely-held notion that dynamic microphones don't "see" phantom power, the presence of phantom power where it's not needed can adversely affect overall sound or even damage sensitive ribbon mics. We provide individual phantom power on every channel. Problem solved.

But published specifications and technical talk tell only part of the Onyx preamp story. The real test comes when you plug in a multitude of the various mics that pop up in live performance situations—everything from a high-end condenser to the cheesiest harmonica mic. Listen to the depth, headroom and immense detail. Then plug those same mics into any of the competetion. We think you'll agree the Onyx preamp gives you transparency and fidelity on par with any console preamp on the market. But hey, don't take our word for it... just listen to what Monty Lee Wilkes, FOH Engineer for Britney Spears, had to say: *"Holy crap! ... I have to admit that the Onyx preamps sounded phenomenal."*
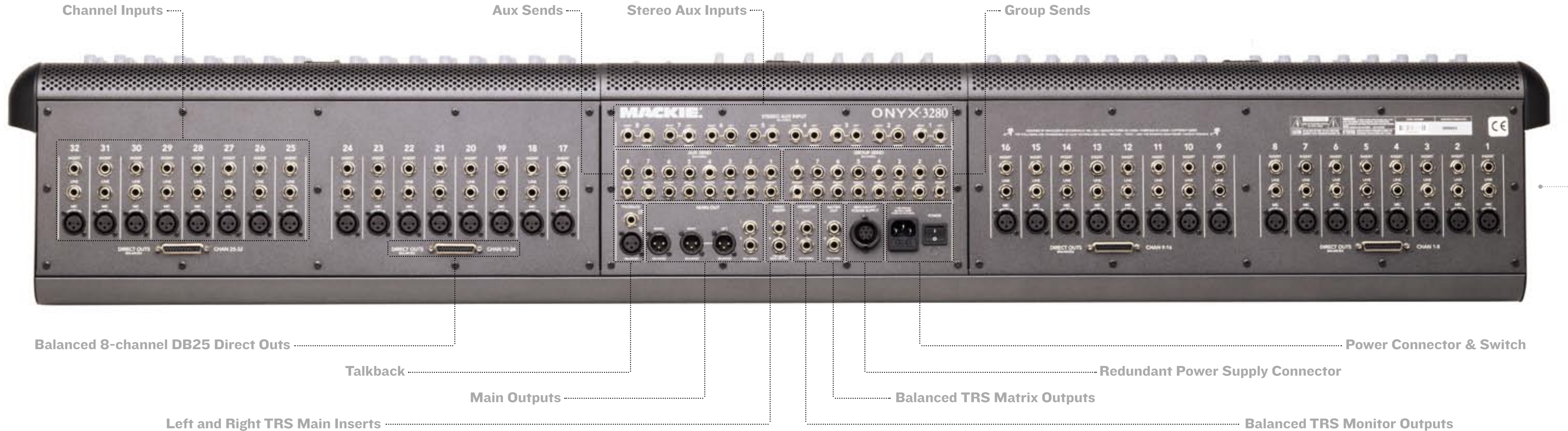
Powerful
Aux/Group
Functionality.

Who wants run-of-the-mill Aux and Group sends? Not our customers—they've come to expect more value when it comes from Mackie. That's why each of the eight Aux Sends become stereo pairs when the stereo switch is engaged, reducing the amount of head-scratching when asked to provide four stereo mixes for IEM (in-ear monitor) systems.

AUX/GROUP FLIP switches "flip" the controls for the Aux Sends and the Group Sends, so that the Group Faders control the Aux Send levels, and the Aux Send GAIN controls adjust the Group levels. The Group signals still appear at the GROUP SEND outputs and the Aux Send signals still appear at the AUX SEND outputs. This allows you to use the long-throw (100 mm) Group Fader to make more precise settings for the Aux Sends.

More connections than a crooked promoter

Channel Inputs

Aux Sends

Stereo Aux Inputs

Group Sends

Balanced 8-channel DB25 Direct Outs

Talkback

Main Outputs

Left and Right TRS Main Inserts

Power Connector & Switch

Redundant Power Supply Connector

Balanced TRS Matrix Outputs

Balanced TRS Monitor Outputs

The Most Flexible Feature Set For Your Money. Period.

The Onyx 80 Series mixers break the "you get what you pay for" adage by offering more channels and features than any other mixer even remotely close in price. These features include eight pre/post-switchable, stereo-linkable Aux sends for in-ear monitoring and effects routing—plus eight Stereo Aux Inputs (yes, that's 16 line inputs), each with 4-band Perkins EQ. This means you'll no longer sacrifice mic inputs to accommodate effects returns and playback devices. We've also added new features that any hardcore live engineer can appreciate, like a Monitor Flip function; a 10x2 Matrix Mixer; four Mute Groups; and an optional redundant power supply.

CHANNEL STRIP.
Mackie has combined the premium sound quality of the Onyx mic preamp and Perkins EQ with an extensive professional feature set. This intuitive, ergonomic layout creates the most flexible channel strip in this class of mixer.

Onyx Mic Preamplifiers

Mackie's flagship mic preamplifiers feature individual 48V phantom power (with indicator), mic/line switch, 100Hz High Pass filter, and polarity inversion providing exceptional fidelity and professional functionality.

Perkins EQ

When it was time for the Onyx EQ section, we turned to veteran audio engineer Cal Perkins to develop our new Perkins EQ circuitry—a "neo classic" 4-band design based on classic "British EQ" circuitry from mixing desks of the '60s and '70s. Cal devised a way to give Perkins EQ that sweet "British console" sound, but with greater filter control and minimum phase shift.

Stereo Linkable Auxiliary Sends

Mackie's latest groundbreaking design incorporates 8 auxiliary sends logically divided into pairs. Each pair of sends can be designated as pre- or post-fader. Plus every pair has a Stereo button that reconfigures two potentiometers to perform level and pan functions for simple and intuitive control of up to four stereo In Ear Monitoring (IEM) mixes.

Mute Groups

Four mute group switches on every channel allow for fast and simple assignment of channels to any and all of the mute groups. Mute Group master controls are accessed in the Master Section for lightning fast activation/deactivation of the groups.

Channel Master Section

Each channel comes equipped with a 100mm Panasonic® fader for smooth, high-resolution control of your mix. A four-segment input meter right next to the fader instantly provides an expanded view of signal level—far superior to the typical signal/peak LEDs found on most consoles. Mute and Solo buttons with indicators are positioned above and below the fader to ensure functional separation.

MASTER SECTION.
Mackie's Onyx 80 Series Master section provides everything you'd expect from a professional full-size mixing console, and more. Designed with a practical and easy-to-understand layout, everyone from the Sunday School teacher, to the highly experienced mix engineer can quickly learn the console and fully exploit its outstanding flexibility.

Stereo Auxiliary Input Channels

These eight "hybrid" channels provide ample stereo inputs for all your outboard effects returns and stereo playback devices, and ensure that you will never be forced to chew up valuable microphone input channels. And every Stereo Aux input includes a 4-band fixed Perkins EQ, 4-segment input meter, 60mm fader, Mute, PFL Solo, and exceptionally flexible routing to the Aux sends, Groups 7-8 and Main Outputs.

Aux Masters

Eight Aux Masters provide level control, Mute and AFL Solo for each output. Master control knobs are color coded to match the channel Aux send controls and make locating them fast and simple.

Aux/Group Flip

Functions associated with each set of Aux Master and Group controls can individually be flipped via these convenient buttons with LED indicators. Perfect for simultaneous FOH/Monitor applications, these switches allow the Aux masters to be controlled via the 100mm faders and associated 4 segment meters.

Group Control

Eight 100mm Panasonic® faders provide smooth and accurate control of Group levels. A 4-segment input meter located next to each fader instantly provides detailed signal level information. Mute and AFL Solo buttons with LEDs, plus Main Mix assignment and Group Pan controls round out the section to give you quick access to all the control you need.

Main/Solo Meters

Two large, 12-segment LED meters for Left and Right Main Outputs plus two additional 12-segment meters dedicated to PFL/AFL solo levels provide clear indication of primary signal levels. Two Green and Amber "Rude Solo" LEDs flash to indicate currently AFL and/or PFL soloed channels.

10x2 Matrix

Two extra independent mixes built from the Subgroups and Main Outputs for recording, zone outputs, hearing assistance systems, additional aux sends, etc.

Masters and Utilities

Master switches for the four Mute Groups, Talkback system with extensive routing, Mono Main Output control with Solo, Headphone and Monitor Output control, and separate 100mm Panasonic® faders for the Left and Right Main Outputs provide convenient access to all necessary functions.
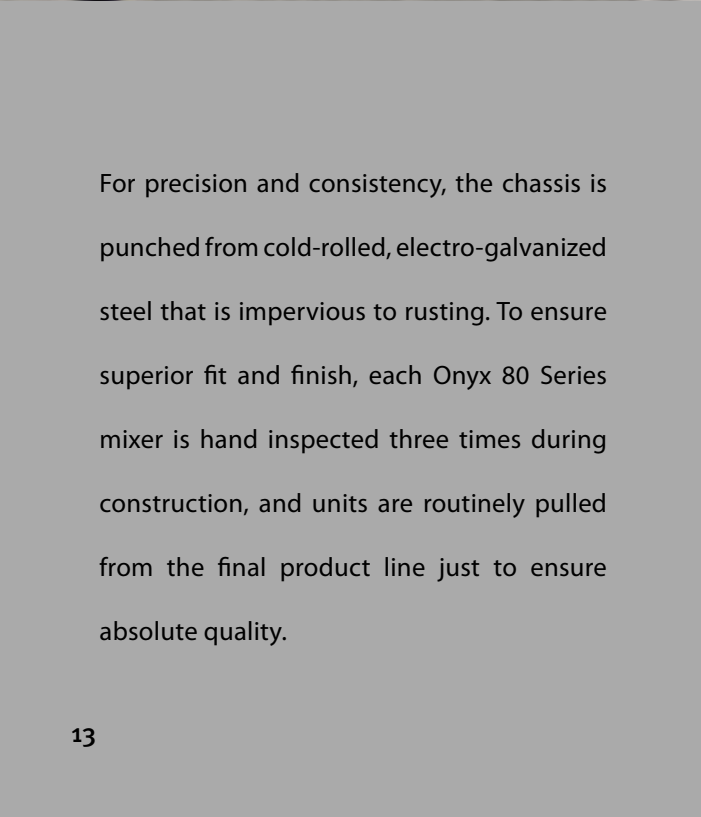
The Onyx 80 Series chassis design uses natural convection to shed heat, taking advantage of its sloped design to channel heat away from internal components, and evacuate it from the thermal relief cowl on the top edge of the chassis. In fact, the whole process works so well, the top panel is cool to the touch even after hours of operation.

Superior construction.

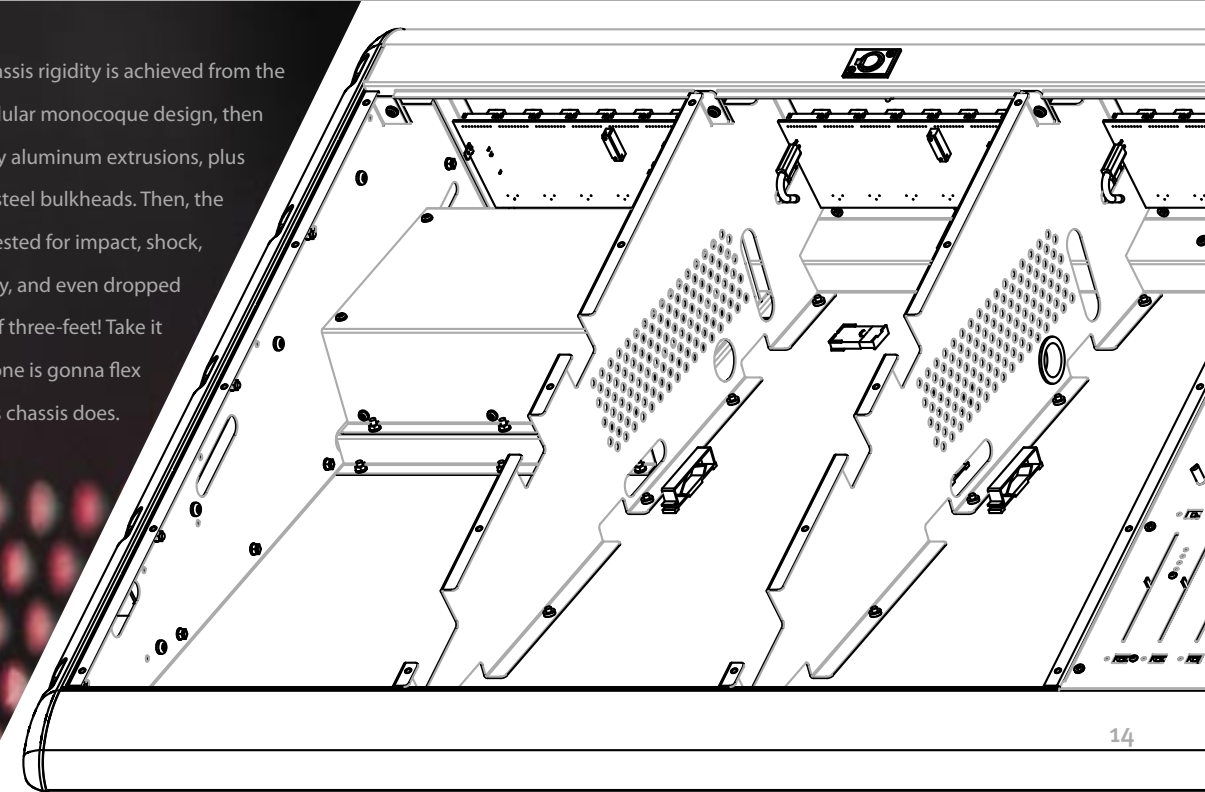## When you're live, there are no second takes.

For precision and consistency, the chassis is punched from cold-rolled, electro-galvanized steel that is impervious to rusting. To ensure superior fit and finish, each Onyx 80 Series mixer is hand inspected three times during construction, and units are routinely pulled from the final product line just to ensure absolute quality.

Mechanically and electronically, the Onyx 80 Series is the most robust console Mackie has ever manufactured. Even the rivets and fasteners are aircraft quality—ensuring what started out tight, stays that way.

Extreme chassis rigidity is achieved from the tough-as-nails modular monocoque design, then reinforced with beefy aluminum extrusions, plus strategically placed steel bulkheads. Then, the console was torture-tested for impact, shock, heat, vibration, humidity, and even dropped repeatedly from a height of three-feet! Take it from us, a block of onyx stone is gonna flex before an Onyx 80 Series chassis does.

Extraordinary EQ, from extraordinary engineers.

Before we tell you about the Perkins EQ section, we should probably introduce you to its designer—the legendary **Cal Perkins**. Along with **Greg Mackie**, Cal was the driving force behind Mackie innovations like XDR mic preamps, HR Series monitors and more... not to mention his 30-plus years of experience designing classic audio gear for other big names in the business.

To create his all-new Perkins EQ, Cal started with the Wien Bridge circuit topology —a very musical design inspired by the

Cal and Greg cancelled their hip-hop album to design Onyx.

hallowed "British" desks of the 60s and 70s. This design essentially trades boost/cut capability for a wider, highly musical Q filter. But Cal, being the cool dude he is, decided that you deserve a better bargain.

To get past the tradeoffs of the Wien Bridge, he wrote a mind-numbing 20 pages of equations describing this seemingly simple circuit in complete detail. After solving the equations with overclocked brain power, Cal was able to specify capacitor and resistor values that would give Onyx mixers an extra 6dB of control (±15 dB) without excessively narrowing the "Q" or bandwidth of the filters.

Next, Cal employed combining filters for minimum phase shift, making the entire EQ section as musical as possible. Finally, he added
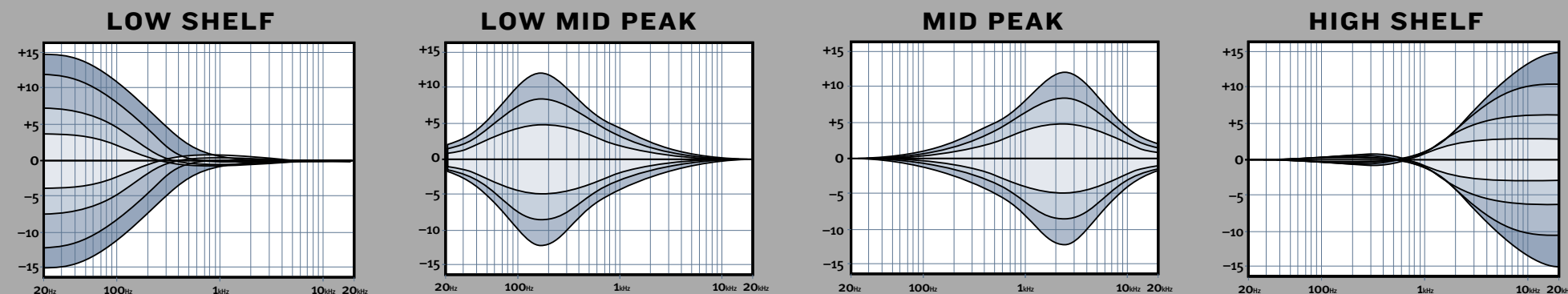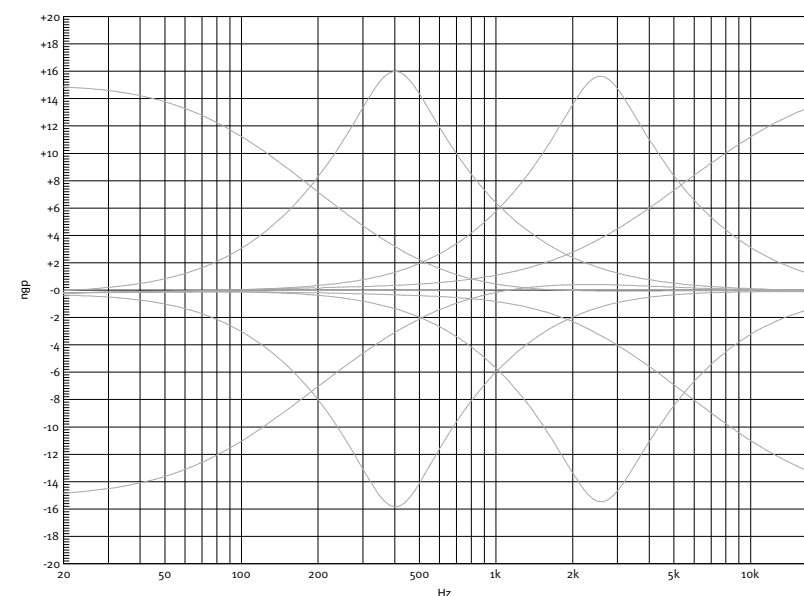
an individual hardware bypass on every channel that completely removes the EQ circuitry from the signal path. On the seventh day, he rested. The end result is a sweet, very musical analog EQ section that sounds great when it's "in" and is completely invisible when it's "out."

As important as great mic preamps and musical EQ sections are, they are only part of the reason we can confidently call the Onyx 80 Series a "premium analog mixer." Equally as important, though admittedly less sexy, are the Onyx mixers' proprietary negative-gain architecture and minimized signal path.
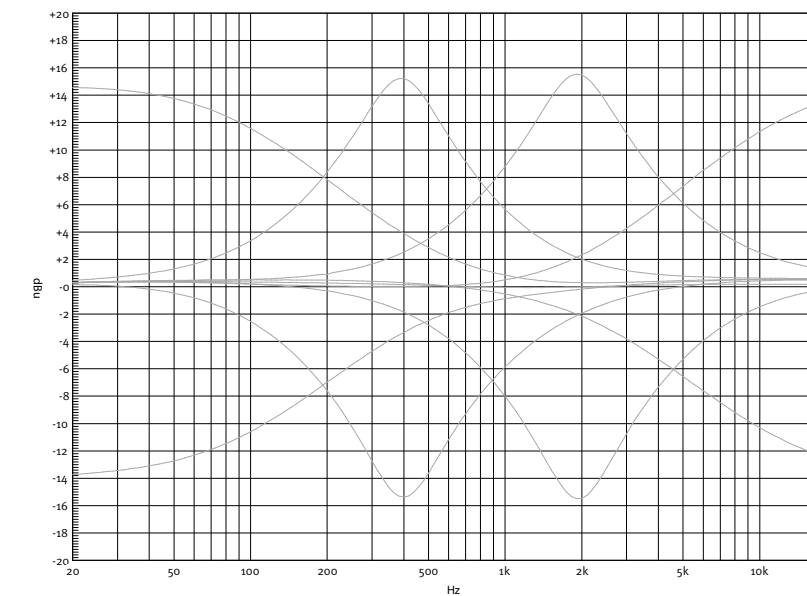
For those of us who don't speak electrical engineer, negative-gain architecture means that by running at internal levels of -6dB, Onyx mixers can handle up to four times the number of hot signals of regular mixers before clipping. Minimized signal path, on the other hand, is the reason the Onyx mixers' EQ section is above the Aux assignments—creating a linear signal path from the mic preamp to the EQ, through the Aux sends and on to the channel faders—resulting in a 50% shorter path (and less noise) than many of our competitors' mixers.
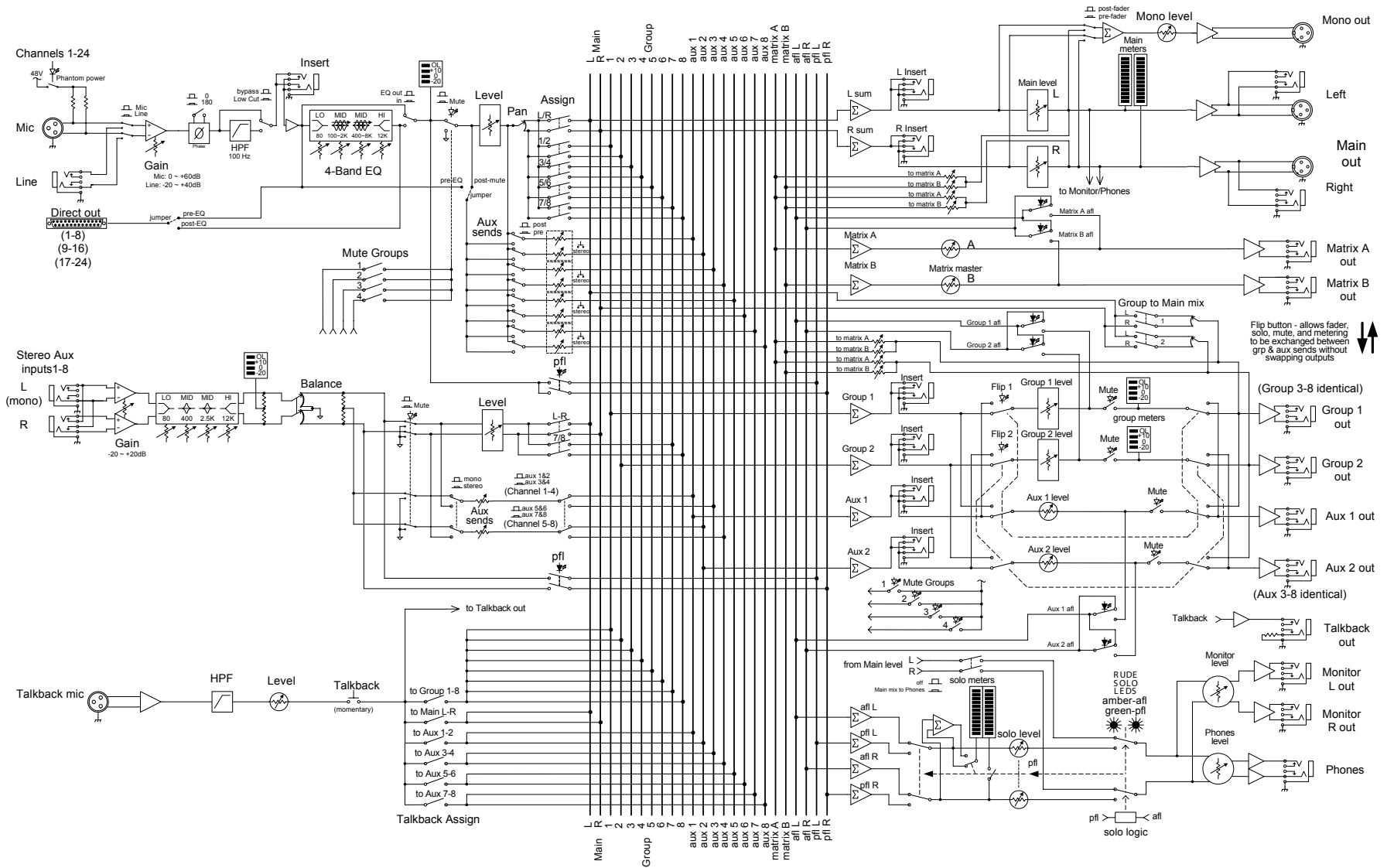

LOW SHELF — LOW MID PEAK — MID PEAK — HIGH SHELF

STEREO EQ

CHANNEL EQ

Onyx 80 Series: Premium sound and features, without the premium price.

Frequency Response
Mic Input to Main Output (Gain @ Unity):
+0, −1 dB, <10 Hz to 80 kHz
+0, −3 dB, <10 Hz to 130 kHz

Distortion (THD & IMD)
Mic Input to Main Output (@ +4 dBu):
THD: < 0.007% max, 0.005% typical,
20 Hz to 20 kHz
SMPTE IMD: < 0.005% (7 kHz/60 Hz, 4:1)

Dynamic Range
>105 dB, 24 channels assigned
>115 dB, one-channel assigned

Noise Floor
Signal-to-Noise Ratio:
−87 dBu (ref. +4 dBu, Mic In to Main Out, 48
channels and Main Mix levels at unity)
−90 dBu, (ref. +4 dBu, Mic In to Main Out, 24
channels and Main Mix levels at unity)
Equivalent Input Noise (E.I.N.), 20 Hz to 20 kHz
Bandwidth, 150Ω source impedance
−129.5 dBu @ +60 dB gain
Mic Output Noise:
Direct Output: −98 dBu (minimum gain)
Residual Output Noise:
Main Out: −100 dBu (Channel and
Main Mix levels off)
Main Out: −83 dBu (48 channels and
Main Mix levels at unity)
−86 dBu (24 channels and Main Mix
levels at unity)

Crosstalk
Adjacent Inputs: < −95 dB @ 1 kHz
Input to Output: < −85 dB @ 1 kHz

Input Gain Control Range
Mic In: 0 dB to +60 dB
Line In: −20 dB to + 40 dB, mono channels

Phantom Power
+48 VDC

Equalization
Mono Channel EQ:
High: ±15 dB @ 12 kHz
High Mid: ±15 dB, sweepable from
400 Hz to 8 kHz
Low Mid: ±15 dB, sweepable from
100 Hz to 2 kHz
Low: ±15 dB @ 80 Hz
Stereo Channel (Aux Input) EQ:
High: ±15 dB @ 12 kHz
High Mid: ±15 dB @ 2.5 kHz
Low Mid: ±15 dB @ 400 Hz
Low: ±15 dB @ 80 Hz

Mixer Rated Output
Main Outs: +4 dBu
Aux Send: +4 dBu
Group Send: +4 dBu
Monitor Out: +4 dBu
Matrix Out: +4 dBu
Maximum Rated Output:
+21 dBu @ Main XLR and TRS outputs

Maximum Input Levels
Mic Input: +21 dBu, Gain @ unity
Line Input: +30 dBu, Gain @ −20 dB
Aux Input: +21 dBu

Maximum Voltage Gain
Mic Input to:
Main Out: 90 dB
Group Send: 80 dB
Aux Sends: 86 dB
Monitor Out: 102 dB
Matrix Out: 105 dB
Phones Out: 102 dB
Line Input to:
Main Out: 70 dB
Group Send: 60 dB
Aux Sends: 66 dB
Monitor Out: 82 dB
Matrix Out: 85 dB
Phones Out: 82 dB
Stereo Aux Input to:
Main Out: 50 dB
Group Send: 40 dB
Aux Sends: 39 dB
Monitor Out: 62 dB
Matrix Out: 65 dB
Phones Out: 62 dB

Input Impedance
Mic Input: 2.4 kΩ, balanced
Mono Channel Line Input:
30 kΩ balanced; 15 kΩ unbalanced
Stereo Aux Inputs:
20 kΩ balanced; 20 kΩ unbalanced

Output Impedance
Main Out: 150 Ω balanced, XLR outputs;
150 Ω TRS outputs
Direct Out: 300 Ω
Group Sends: 100 Ω
Monitor Out: 100 Ω
Matrix Out: 100 Ω
Aux Sends: 100 Ω
Phones Out: 25 Ω

Common Mode Rejection Ratio (CMRR)
Mic In: >70 dB @ 1 kHz, Gain @ maximum

Physical Dimensions and Weight
Onyx 2480:
Height: 9.4 in/239 mm
Width: 48.8 in/1240 mm
Depth: 29.6 in/751 mm
Weight: 95-lb/43 kg
Onyx 3280:
Height: 9.4 in/239 mm
Width: 60.0 in/1523 mm
Depth: 29.6 in/751 mm
Weight: 113-lb/51 kg
Onyx 4080:
Height: 9.4 in/239 mm
Width: 70.4 in/1788 mm
Depth: 29.6 in/751 mm
Weight: 131-lb/59 kg
Onyx 4880:
Height: 9.4 in/239 mm
Width: 81.3 in/2065 mm
Depth: 29.6 in/751 mm
Weight: 149-lb/68 kg