BLACK BOX
ANALOG DESIGN

HG-2

rev. 3.0

MIX BUS, MEET YOUR NEW BEST FRIEND

Looking for the piece of gear that gives you that elusive "magic" on your mix bus? We were too! We went through everything from high end summing mixers to racks of insanely expensive gear and most of it barely did anything (you had to sit on the edge of your seat and strain to see if you could tell the difference)! Even when we did find combinations that got us close to what we were after, it meant tens of thousands of dollars in gear and using each piece for very little (sometimes using a piece of gear only for it's transformers). Most frustrating of all, it meant lots of controls with none of them directly focused on doing what we were after. This was 2009 and it became obvious that no one made what we were looking for so we created *Black Box Analog Design* and spent the next five years designing the HG-2.

The HG-2 is specifically and uniquely designed to be an all in one unit capable of giving you all the vibe, harmonics, saturation, tonal enhancement and RMS you could want on the mix bus. With simple, intuitive controls, no compromise components and unique features not seen on any other piece of gear, the HG-2 replaces many pieces of gear and simplifies mixing.

From extremely subtle harmonic enhancement of the tubes and Cinemag transformers to RMS pushing saturation, full on distortion and natural tube compression, the HG-2 is designed to give you full control over the "mojo" on your mix bus. It also happens to sound awesome on instruments and as a front end for synths and other stereo sources!

Robert & Eric

IMPORTANT SAFETY INFORMATION

READ ALL INSTRUCTIONS BEFORE USE

⚠ WARNING!

For your safety, the information in this manual must be followed to minimize the risk of electric shock. Failure to do so may result in property damage, injury or loss of life.

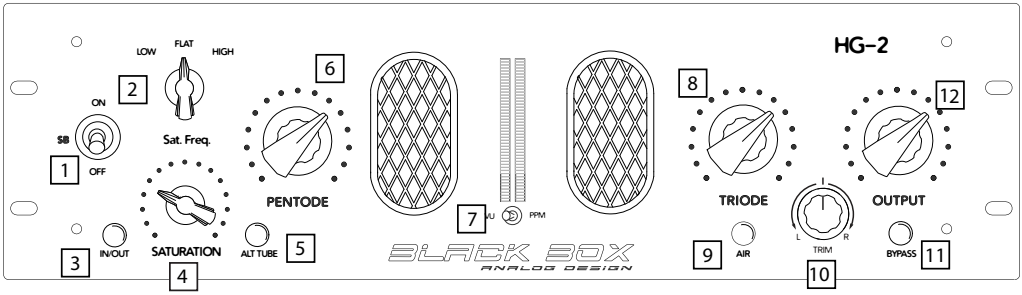
IMPORTANT SAFETY INSTRUCTIONS

⚠ **WARNING:** This device contains high voltage electricity capable of delivering lethal shocks if used improperly.

- **Never, under any circumstances operate this unit without being connected to a properly grounded circuit! If you are unsure, consult an electrician to make sure your outlet is properly grounded before plugging the unit in.**
- **Never defeat ground using a ground lift or other device.**
- **Never expose unit to moisture or water**
- **Do not attempt to service unit or open the case for any reason. Internal capacitors are capable of delivering dangerous shocks even after the unit has been unplugged.**
- **Do not plug in or operate unit if it is visibly damaged.**
- **Never replace fuse with a fuse of a different rating.**

CONTROLS

WHAT DOES THIS BUTTON DO?



1 3 way power switch with Off/Standby/On positions: Standby mode sends power to the tube heaters and LEDs

2 Sat. Freq. chooses which frequencies are present in the parallel sat. circuit

3 Brings the parallel saturation circuit in or out

4 Saturation pot adjusts how much of the parallel saturation signal is fed into the main signal path

5 Switches between two sets of 12AX7 tubes in the parallel saturation circuit

6 Pentode gain control

7 Selects between VU and PPM meter modes

8 Triode gain control

9 Engages or disengages high frequency "air" lift

10 Left / Right fine trim adjust

11 True bypass switch shorts input XLRs directly to output XLRs

12 Passive output attenuation

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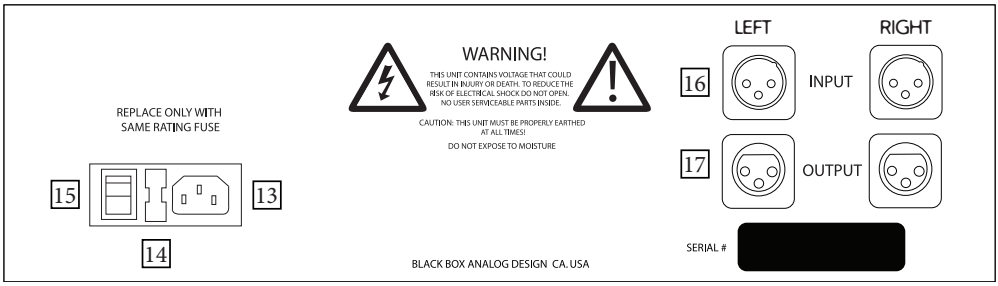


13 IEC power socket

14 2AG power fuse: Replace only with the same rating fuse (5 amp slow blow)

15 Master on/off switch: In the "off" position, no power will reach the face plate and the front panel power switch will be inoperable. Be aware that in the "on" position, power is present inside the box even when the power switch on the front panel is in the "off" position.

16 Balanced line input

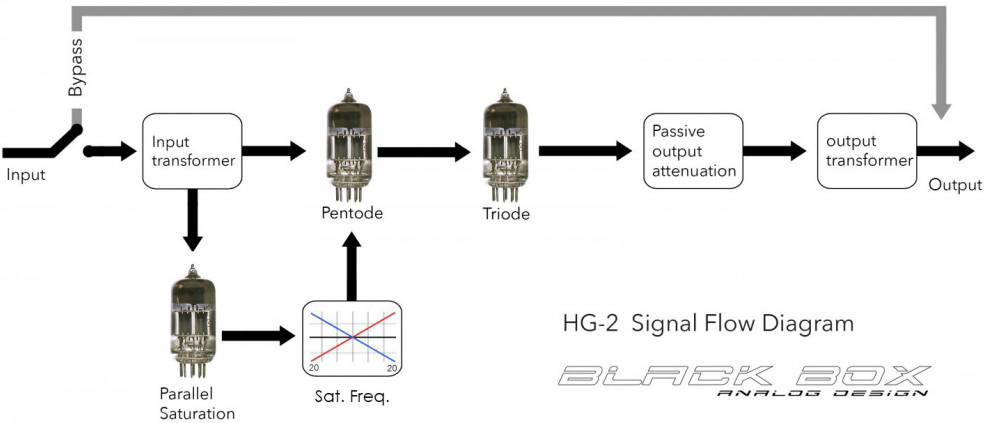
17 Balanced line output

WHAT CAN THE *HG-2* DO?

Add Harmonics and Saturation (in multiple ways)

The main signal path of the HG-2 travels from the input transformers to the Pentode amplification stage, on to the Triode amplification stage and finally to a passive output attenuation before hitting a pair of *Cinemag* output transformers. The tubes naturally produce pleasing harmonics but each stage (Pentode and Triode) are voiced to produce more and more harmonics and eventually saturation as you drive them harder. **Driving the Pentode quickly produces harmonics while pushing the Triode saturates the signal in a very pleasing way.**

Along with the main signal path, the HG-2 also has a parallel path that splits off directly from the input transformers. This parallel path is fed into a pair of 12AX7 tubes, voiced for their own pleasing harmonics. The "saturation" knob allows you to mix in as much of this parallel signal as you want with the "dry" signal before being recombined at the Pentode stage. These three knobs (Saturation,Pentode and Triode) give you full control over how much and what type of saturation and harmonics you add.



INTRODUCTION

Increase RMS of your signal

The same controls that allow you to enhance your signal with harmonics, also allow you to increase the RMS of your signal by pushing the tubes into saturation and natural compression. Each tube stage is specifically setup to have a range that goes from clean reproduction of the signal to full saturation where the peaks are compressed and the average level is increased. Since each stage feeds the next (parallel saturation feeds Pentode which in turn feeds the Triode), **the stages interact in a very useful way**. In other words, if you set the Pentode and Triode to just before where they begin to saturate, adding signal from the parallel saturation circuit or driving the Pentode harder will push the Triode into saturation. You can then push the Triode itself harder which will in turn produce more compression, increasing your perceived level while maintaining your peaks. Similarly, pushing the parallel saturation circuit hard will allow you to achieve compression at the Pentode stage which can then be used to push the Triode as hard as you like from clean to further compression.

Shape Tone

In addition to being another source of harmonics and saturation, the parallel saturation circuit also opens up tonal possibilities. The 3 way "Freq. Select" switch gives the user the option to choose what frequencies are present in the parallel saturation circuit. The "low" position feeds the circuit only lows and low mids, the "high" position feeds the circuit only the highs and high mids and the "flat" position feeds full bandwidth. This allows the user to add body and weight to the low end of tracks by mixing in the saturated signal and harmonics only in the low end or add sizzle, bite and harmonics only to the top end of dull tracks. The "air" switch is a gentle lift starting at 10kHz.

Instantly Switch between Tubes

The "alt tube" button instantly switches between two sets of parallel saturation tubes. The "alt" tube is voiced slightly more aggressively allowing for even more flexibility when using matched tubes but the tubes can be swapped with any 12AX7 tubes, allowing the user to try different tubes and switch between them in real time, at the push of a button.

WHAT SETTING SHOULD I START WITH?

When setting up the HG-2, start with a neutral setting that closely matches the original signal. To match, use the bypass to switch back and forth as you make adjustments.

Pentode: 12 o'clock **NEUTRAL SETTING***
Triode: 10-11 o'clock
Output: Adjust until levels match when bypassed
Parallel sat circuit: Off
Air: Off

**** It's important to remember that the HG-2 is designed to saturate, so how hard you drive into it affects the settings. The above settings will be neutral for the vast majority of unmastered mixes. If your track is extremely hot or low in volume, adjust the signal feeding the input of the HG-2.***

Adjusting the Pentode and Triode

From the neutral setting, begin by increasing the Pentode gain. This will increase the Pentode harmonics and eventually begin gentle saturation. As you turn the Pentode up, turn the Triode down to compensate. Now go back to the neutral setting and turn the Pentode up again but this time, use the output attenuation to compensate. Notice the difference in response.

Starting again from the neutral position, increase the triode gain, using the output volume to compensate for the volume difference. Continue to experiment with driving both the Pentode and Triode in different amounts until you find a setting you like.

Adding the parallel saturation circuit

Once you have a Pentode and Triode setting you like and your output level peak matched, make sure the **"Saturation" knob is all the way down** and the **"Sat. Freq." switch is in the "flat" position**, then engage the parallel saturation circuit via the "in/out" switch. Slowly turn the knob clockwise to mix in more of the saturated signal and keep watching your peak meters. You will notice that how much increase in peak or RMS levels you achieve is dependant on the settings of the Pentode and Triode. **If the Pentode and Triode are in a very "clean" setting, the parallel saturation circuit will add both peak and RMS. If the main path is already in saturation, the parallel saturation circuit will further saturate the signal, resulting in higher RMS without much peak gain.**

Shaping tone

In addition to the harmonic and saturation control, the HG-2 also allows the user to shape tone via the "tilt" selector and the "air" switch.

The "Sat. Freq." selector

The 3 position "Sat. Freq." selector is a simple yet powerful feature that allows the user to choose what are present in the parallel saturation circuit.

In the "Flat" position, full bandwidth is fed into the circuit, allowing for saturation of all frequencies.

In the "Low" position, only the low mid and bass frequencies are fed into the circuit. This allows the user to add body and weight to recordings.

In the "High" position, only high mid and high frequencies are fed into the circuit, allowing the user to add sizzle, presence and top end.

"Air" boost

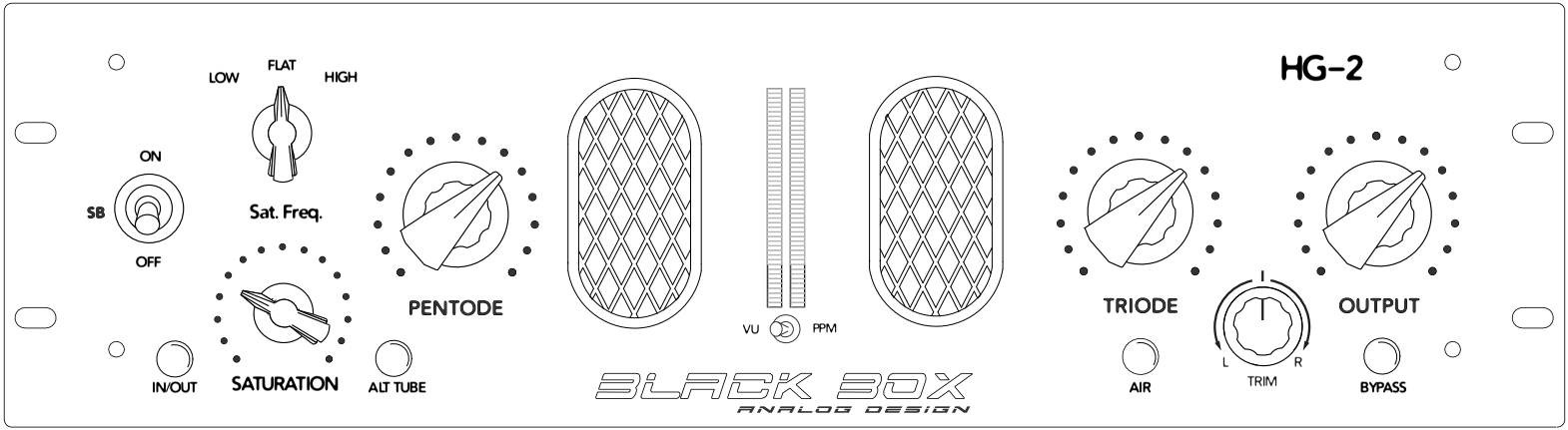
The "air" boost is a gentle high frequency lift that begins around 10khz and gently increases as it approaches 20kHz. The boost is inserted in the main signal path, at the Triode gain stage.

"Alt tube "

The "Alt tube" selector switches between two sets of 12AX7 tubes in the parallel saturation circuit. The "alt" tube is voiced slightly more aggressively, giving the user a wider range of tones and saturation types. Both 12AX7 tubes can be swapped for any 12AX7s for even more flexibility. The user can then switch between them instantly.

SESSION: _____ DATE: _____

TRACK: _____



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