

MM-1

Microphone preamplifier & D.I.

Rev. 1.0

REDEFINING WHAT A PREAMP CAN DO

(AGAIN)

The Black Box Analog Design MM-1 vacuum tube preamp is an entirely new approach to capturing audio. It's not based on any existing circuit but designed from the ground up, using the best parts and ignoring all of the standard ideas of how a preamp "should work". We took the concept behind our original microphone preamp, incorporated everything we discovered while building the HG-2, made it even more flexible, added features and even made it more affordable! The result is an incredibly versatile piece of gear that not only sounds amazing but shatters the idea of what a preamp can do!

Until now, a preamp simply amplified the signal; you essentially got one sound and the ability turn it up or down. The MM-1 on the other hand allows you to drastically shape the response curve of the unit without using an EQ, control the harmonic content from pristine to full on saturation and even control the dynamics without a compressor!

All of the shaping is done at the tubes and from the constantly variable interaction between stages allowing you to dial in virtually unlimited tonal possibilities. You can find the sweet spot of any microphone and instrument easily and naturally.

Congratulations on your new preamp!

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**
- **Never connect a microphone to the unit if hands are wet/damp**
- **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.**

INTRODUCTION

READ ME!

While no one likes to read manuals, the *Black Box Analog Design*™ **MM-1 mic pre is different than any other microphone preamplifier both in how it's designed and how it functions so taking a few minutes to understand the approach and controls will have you getting great tones MUCH faster!**

WHAT IS SO DIFFERENT ABOUT IT?

(AND DOES IT REALLY CHANGE HOW I USE IT?)

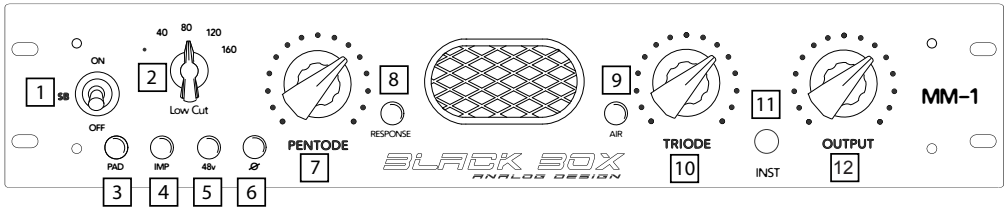
Most microphone preamplifiers do one thing: increase the gain of a signal. While that is great, we think a pre should do more. We think it should be able to help you dial in tones and character, right there at the first stage.

The MM-1 allows you to control how you capture a sound and get it right before you ever hit tape or your converters! And yes, it does change how you use it. In fact, once you get used to the controls, dialing in a tone and finding the sweet spot feels more like playing an instrument than using a preamp.

With the MM-1, you have the ability to dramatically shape the frequency response, harmonic content, saturation and even dynamic range. This control means that you can do things never before possible with a preamp and that you will hear your microphones and D.I. signals like you've never heard them before. It also means that it's possible to dial in tones that are not what you're after so understanding the controls and approach behind the unit is important. It might seem different at first but we promise that it's actually really simple and a ton of fun!

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. 5 position, low end roll-off selector
3. 10db input pad
4. Input impedance selector: Impedance is switched by tapping into the transformer at different points in the winding.
5. 48 volt Phantom power fed by an isolated, regulated, linear supply
6. Phase switch
7. Pentode gain control
8. "Response" selection
9. "Air" engages the air circuit from the HG-2 (10k harmonic shelf)
10. Triode gain control
11. Instrument input
12. Passive output attenuation
14. Microphone input
15. Balanced, line level output
16. Voltage selection switch
17. 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.
18. 2AG power fuse: Replace only with the same rating fuse (2amp)

A CLOSER LOOK

While finding the sweet spot and getting the right tone with the *MM-1* pre is more about feel than anything, it is still helpful to know how each part of the circuit behaves and reacts. This section goes into more detail about what each control/stage does.

Pentode Stage ('response' disengaged)

The Pentode stage is the first amplification stage and gives you extreme control over the frequency response of the mic pre as well as gain and beautiful harmonics. In the graph below you can see that when "response" is disengaged, the Pentode has a frequency response that "tilts" around a fixed top end depending on the gain setting. As you increase the gain, you also increase the low end.

The Pentode can also be pushed into the Triode much the way you can drive one stage of a guitar amplifier into the next. The result here is of course much more subtle but it can have a very pleasing effect.

Pentode Stage ('response' engaged)

When the alternate response mode is engaged (by pushing the 'Response' button), the top end of the Pentode stage is no longer fixed. The Pentode stage will still tilt but the top end has a gentle roll off to allow for an entirely new set of frequency responses.

Triode Stage

The Triode stage of the circuit is located after the Pentode stage and can be thought of as "drive". Rather than the frequency control of the Pentode stage, the Triode stage is linear so it can be used to amplify the response curve of the Pentode stage as much as desired.

The triode stage is set up to allow for clean amplification of the signal as well as the ability to drive the signal into saturation. The Triode stage is set up to output a voltage swing of no more than 30 volts no matter the input so as you drive into the tube (both with the Pentode and Triode knobs), you begin to get harmonics, followed by saturation and eventually hard limiting without the artifacts associated with the attack and release of a compressor.

CONTROLS

Output

The output knob is a passive attenuation after the Triode stage and can be used to set the overall output of the MM-1.

Air

The "Air" circuit is the same beloved circuit from the HG-2. Engaging the circuit adds a 10k shelf boost, made up mostly of harmonics for a lift that opens up your material.

Input impedance

Unlike most impedance switches on preamps today, we use real impedance switching by tapping into the custom made transformer at different points in the windings.

While the low impedance setting (button in) would usually be used for ribbon microphones, it sounds amazing on condensers and dynamics alike. In this mode you get a very mid-forward sound and an increase in gain and punch. The best way to describe the difference on a vocal track for example is the difference between an uncompressed vocal and a gently compressed one. It can do wonders for lead vocals and they often sit in the mix with authority right where you want them. This setting also allows you to back a singer off the microphone while still capturing all the detail without any of the excess sibilance, mouth noise and proximity issues.

The default setting (button out) is a more standard setting and sounds more "relaxed". It works well for lead vocals as well as backing vocals or stacks that sit perfectly in the mix and gives a very natural response on any source.

Low Roll-off

This simple roll-off circuit has been designed to give you a gentle roll off that allows you to filter out unwanted low end without adding large resonance peaks at the cutoff frequency.

Instrument D.I.

The instrument D.I. of the MM-1 follows the same signal path as the microphone input with the exception of the input transformer. The controls and gain stages allows for the same unique control over the signal. The D.I. is automatically activated when an instrument cable is inserted into it.

IN USE

LET'S SHAPE TONE!

With an understanding of how each stage operates, lets look at how they can be used together to control what you capture.

- Set the Triode and Output to 12 o'clock

- Start with the Pentode

Start with the Pentode at zero (no sound will pass) and begin to turn the knob clockwise. As you do, you will hear the response tilt, adding more and more low end as you increase the gain while the top end stays fixed.

- Switch the response and Impedance

While adjusting the Pentode knob, switch the 'response' setting and you will hear the top end change as it switches from being fixed (regardless of Pentode position) to rolled off, allowing for new frequency response curves.

Switching the input impedance will give you yet another set of response curves and possible combinations.

- Low frequency roll off

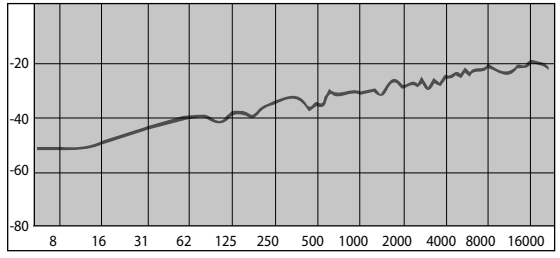
Along with the Pentode knob, input impedance and 'response' options, the low end roll off selector will help you shape the frequency response. Rather than a steep HPF, the roll off is an extremely gentle slope that extends all the way to the midrange with a 1db drop at 1k in the fully clockwise position. This gentle approach not only sounds more musical and natural but allows you to achieve a wide range of frequency response curves in conjunction with the other controls.

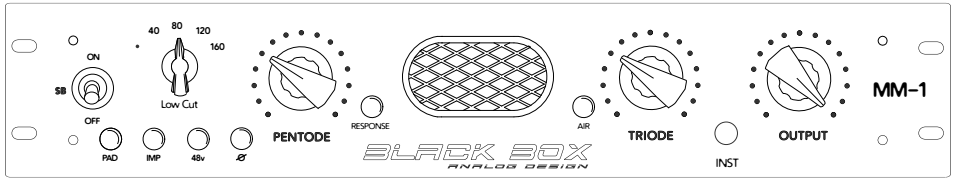
- Triode

Once you've achieved the frequency response you are after, adjust the Triode stage to drive that signal. Start by lowering the Triode and compensating by turning the output all the way up. This will result in extremely clean, high headroom amplification. As you increase the Triode gain, compensate as needed at the output and you will hear the Triode tube begin to add beautiful harmonics, saturation and eventually compression and limiting. By "squeezing" the signal between these two stages, you can actually control the dynamics of your material in an incredibly natural way and still get exactly the output you need for the next stage.

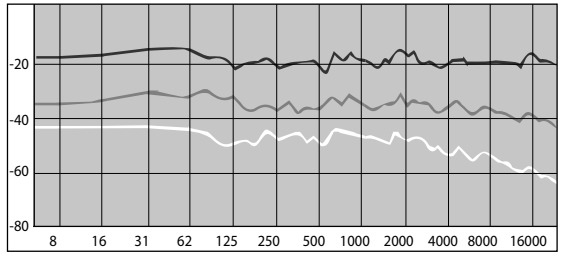
EXAMPLES IN USE

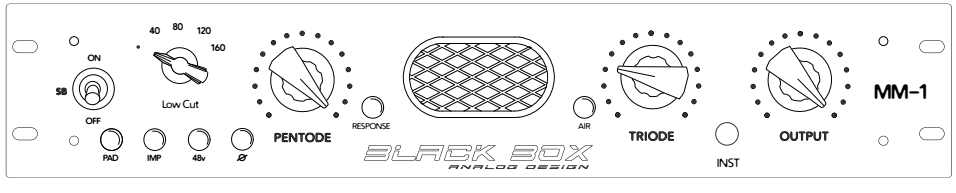
High tilt





Flat & Low bump



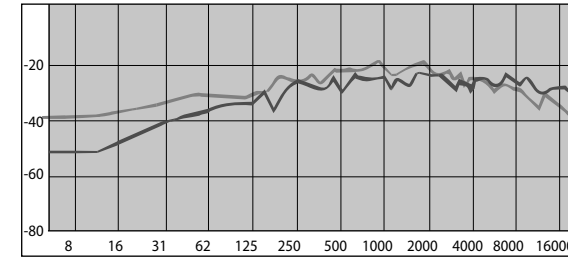


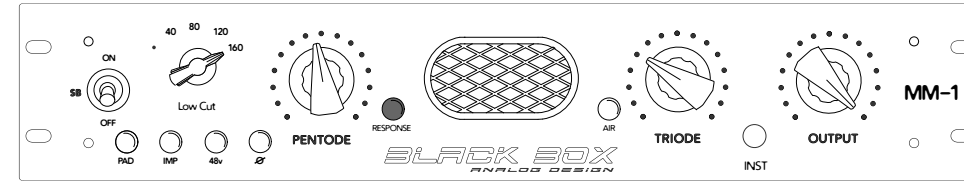
'Response' out
'Response' in (volume offset for graph)
'Response' & Impedance in (volume offset for graph)

BLACK BOX ANALOG DESIGN

EXAMPLES IN USE

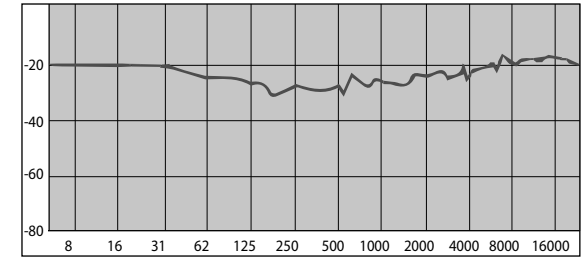
Mid push

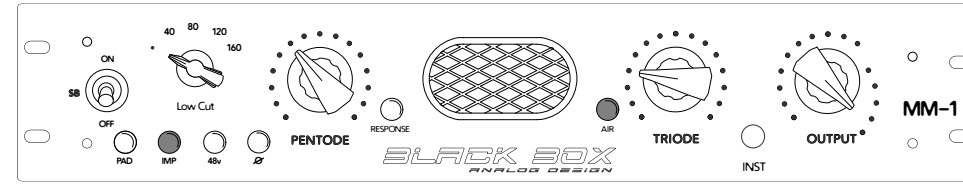




Impedance out
Impedance in

Mid scoop





BLACK BOX ANALOG DESIGN

MAINTENANCE / CALIBRATION

Replacing the tubes

Under normal conditions, the tubes in the MM-1 should have a long, hassle free life but eventually all tubes need to be replaced. With this in mind, the MM-1 has been designed to use readily available and easily replaceable tubes that need no biasing or calibration when replaced.

There are two tubes in the MM-1 and it is important to replace each with the correct tube.

Pentode Tube (located on the main PCB)

The MM-1 ships with an Electro Harmonix EF86 tube in this position. These tubes also have several variations available as well.

Triode Tube (visible through the front panel cutout)

The MM-1 ships with an Electro Harmonix 6922 tube in this position. These tubes sound fantastic in this circuit but there are a number of high end variations available as well.

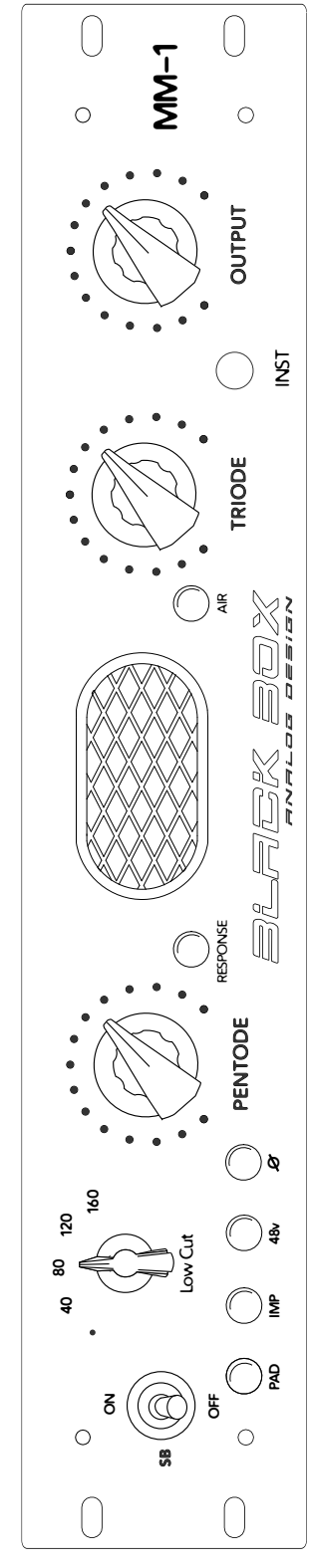
Air Calibration

The only internal adjustment/calibration in the MM-1 is the air adjustment. Like the original air circuit in the HG-2, the gain of the air circuit can be adjusted based on the user's preference. The adjustment is a single turn trim resistor located at the front right corner of the main PCB (looking from the front) and is labeled "air". As with the HG-2, as you increase the gain, the frequency also shifts up slightly.

DATE:_____

SESSION:_____

TRACK:_____



NOTES: