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Sonic Farm Berliner

Pentode Microphone/Instrument/Line Preamplifier

USER MANUAL



Dear Audio Professional,

Thank you for purchasing the Berliner. We hope it will deliver exceptional recordings for many years into the future. Please take the time to read this manual. It describes Berliner's design philosophy as well as its most important functions.

DESIGN PHILOSOPHY

After our very successful Creamer pentode preamps, an idea was born to create something different. A local client brought in his vintage Telefunken V76 for service and a minor upgrade. I had known of them for a long time but have never had a chance to actually test one. And this unit, claimed the owner, was a really good sounding one selected from out of a dozen of available V76 modules.

After the easy to do service job and checking the result on a scope, I couldn't resist plugging in a few good microphones and hearing what this thing actually sounded like through my trusted studio monitors.

Wow! The sound was huge and yet so open and detailed! It was a bit more "polite" and less colored than our Creamer but had a subtlety you would definitely kill for in many studio situations. And yet...it used these out of production tubes? So one needed to scour the eBay to replace them?

We immediately decided to build a preamp with this kind of a sonic character, and, staying true to our company's concept, let ourselves be guided by any ideas to take this masterpiece of last century's German audio engineering to the next level. Thus, Berliner was born.

Back in time when the V76 was conceived, the designers were trying to achieve the lowest distortion possible. No one was even questioning the inherent tonal quality or "warmth" because it was always there with tubes and transformers.

(The following section deals with electronic circuit explanation and can be interesting for those inclined.)

We kept the original German gain stage almost unchanged. It consisted of 2 cascaded EF804 pentodes with a huge inductor in the second tube's plate and a rotary switch controlling the gain through the feedback loop. The gain could be set to very high but could not be turned very low for high output condenser mics on loud sources. Also we thought it would be better to make the gain regulation more uniform. The bias of the input tube was achieved by using a resistive network that lifted the input grid potential and thus required coupling capacitors to separate the signal. That's not very handy for ¼" instrument jack hookup (note that the original V76 was intended for broadcast use so they had no bass guitars in mind).

So we got rid of the clumsy bias circuit by using an additional voltage regulator. This enabled us to return the input grid to 0V and have a broader gain regulation range.

The original EF804 tubes were replaced by current production EF86/EF806 ones. We liked the sound of JJ-Electronics EF-806S as well as the Russian 6J32P (which we use with Creamers).

The original V76 had a second tube pair to drive the output. It had a step-down transformer to drive loads as low as 600 Ohms.

We thought this approach was archaic and replaced it with Creamer's output circuit that uses a modern discrete solid-state buffer to drive the output transformer, for coloration only. No step-down. And we left the option to bypass the output transformer if a cleaner sound is desired.

So here's Berliner's signal path: Mic into a Cinemag transformer (or balanced line into a dedicated Cinemag 1:1 transformer, or instrument plugged into the ¼" jack socket) into the tube gain stage, followed by the output level control, followed by a switchable output: discrete buffer into the output transformer (another Cinemag type), or a solid state balanced line driver IC.

A word on Berliner's tone:

Having a feedback loop makes it sound less colored than the Creamer. It also has smoother transients. But we chose an input transformer with a 1:20 ratio rather than the V76's original 1:30 one. This makes Berliner's tubes work a bit harder as the feedback doesn't have to be as extreme as with the original unit, which translates into a bit sparklier transients.

That being said, the original Telefunken sound is still unmistakably there. The amount of detail Berliner reveals is staggering! And all with that sweet tubey character! It will meet or exceed the expectations of an engineer hunting for the best V76 unit on the used market (and they are very inconsistent with both sound and condition) but not having the wallet thick enough to pay double the Berliner's price for a single racked V76 channel.

The gain pot enables easy gain adjustment, even overdriving the gain stage. Also the added preset EQ opens a whole another sound palette. It is very unique in the fact that it interacts with the gain control similar to a "bright" switch with tube guitar amps.

The standard output transformer has a Ni-Fe alloy core, but Berliner can be also ordered with 100% Fe transformers. Those can even be combined on the 2 channels. This, along with a switchable solid-state balanced output, yields the final tone coloring. (Tip: If you prefer a vintage tone, try a 100% Fe output transformer.)

CHANGING OUTPUT TRANSFORMERS

Remove Berliner's cover by loosening screws encircled **red** and marked with an **asterisk** (see front and rear panel legends: 3 on the rear panel and one on the front one – middle upper one) as well as all side screws (4 on either side). You will need an allen wrench (some models will have Phillips screws).

Each of the 2 output transformers is fastened to the chassis by 2 M3 screws (encircled green on Berliner's gut photo). You need to remove those and also unplug each of the 8-pin connectors that connect transformers to the main board (also marked green).

Pull out the old transformers and put in new ones. Screw and tighten back in place, and plug connectors into the same headers on the main boards. Put the cover back in place, place and tighten all 8 screws (4 on either side, 3 in the back, and only the upper middle one in front) and you're done.

SOME REMINDERS REGARDING TUBES

Tubes work with very high supply voltages. There are points inside Berliner that measure in excess of 350V DC. If touched, those voltages could be lethal!

Make sure that no pointed objects (especially metal) or liquids penetrate the inside of the unit through its cooling grilles or otherwise. If that accidentally occurs, immediately pull the plug out of the power socket and wait for the unit to discharge. Berliner must not be operated if moisture penetrates inside.

Before opening the unit one must disconnect the mains cord and then wait several minutes for the internal capacitors to discharge.

When mounting in a rack enclosure, always leave an empty space above the unit to ensure proper cooling.

Please do not replace the mains fuse with one of a higher value: use only slow-blow types rated 630mA@110-120V or 350mA@220-240V.

Legal Disclaimer: Neither Sonic Farm nor anybody associated with it can take any liability for damage to persons or property caused by either use, modification or servicing this unit.

HOW TO CHANGE TUBES

This only applies to a functional unit. Please entrust any repairs to qualified service personnel.

Only an EF-86 or EF-806/EF-806S (or equivalent, like 6267, 6CF8 or Russian 6J32P) pentode can be used.

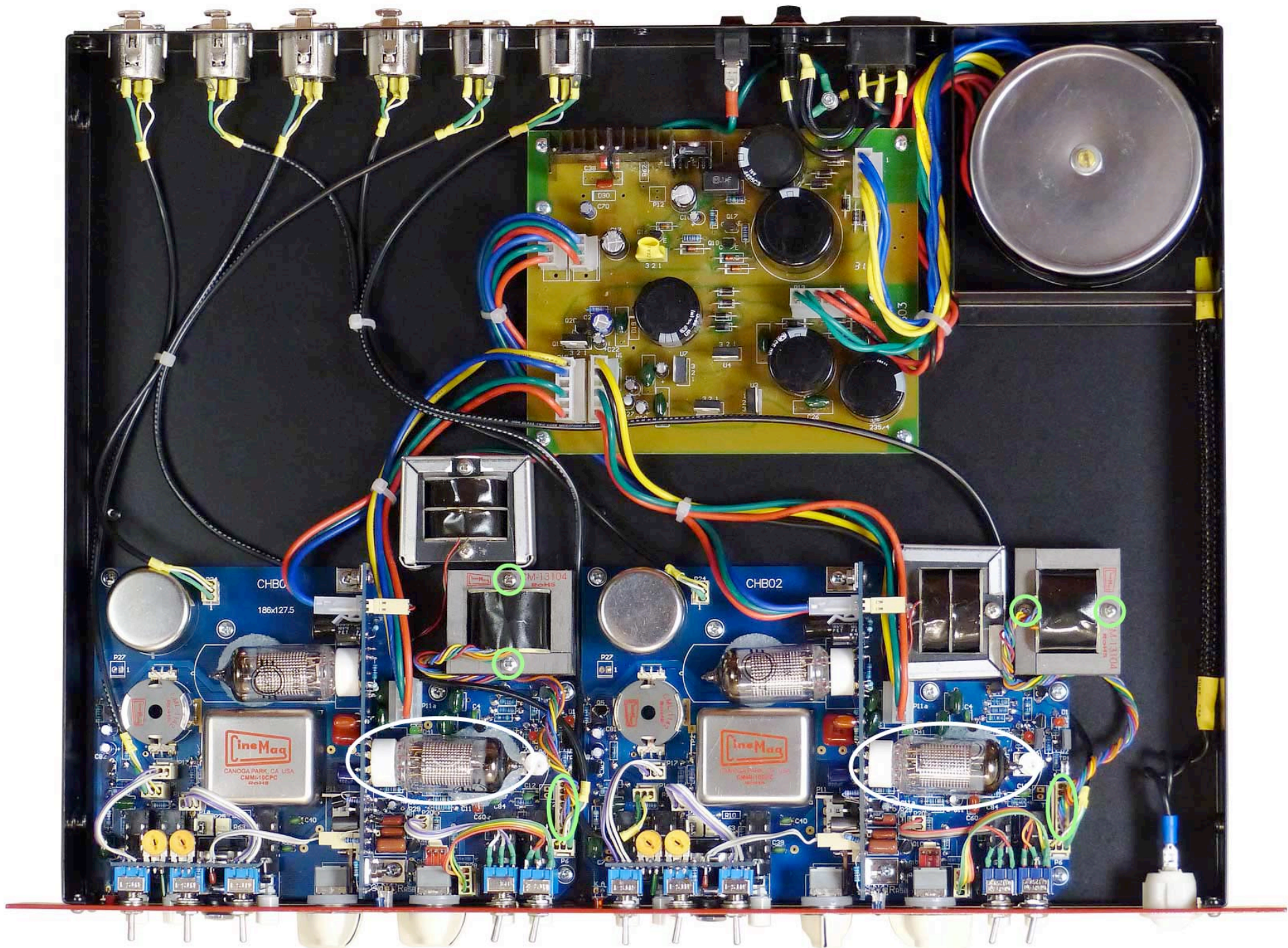
Pull out the power cord. Wait for at least 10 minutes for all the capacitors to discharge.

The tubes encircled white are input tubes for their respective channels. They will influence the tone more than the other 2. However, all 4 tubes are of the same type and can be replaced when worn out or if a slightly different tonal texture is desired.

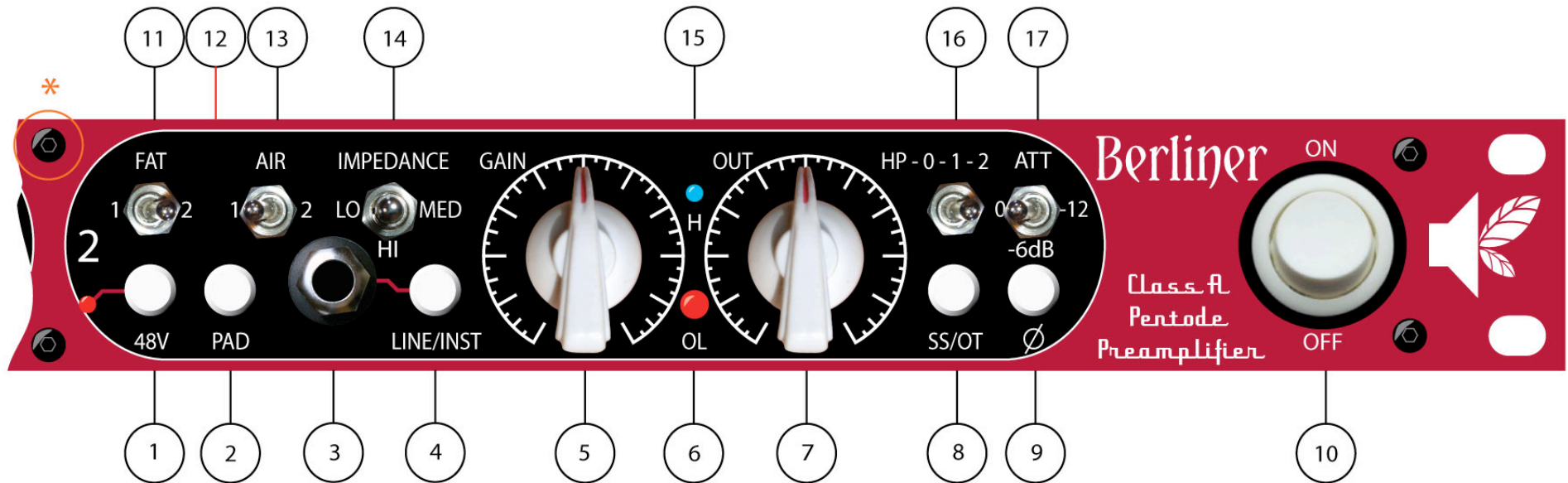
Remove Berliner's cover by loosening screws encircled **red** and marked with an **asterisk** (3 on the rear panel and one on the front one) as well as all side screws (4 on either side). You will need an allen wrench (some models will have Phillips screws).

While pressing on the edge of the vertical PC board (the one containing tubes) with one hand, pull out the tube with your other one. Small, but fast forward-reverse motion may be needed to loosen the tube from a tight socket. Do not bend the tube much out of the axis because you can break the pins or cause air to enter the tube and destroy it. Paying attention to the pin alignment, push the replacement tube into the socket using same motions but in the opposite direction. Make sure it goes in all the way.

Due to electric shock danger, testing the preamp with the lid removed is not recommended. Screw the cover back in place and you're done.



BERLINER'S FRONT PANEL CONTROLS:



- 1 Phantom power switch with the corresponding light. Berliner's soft phantom circuit eliminates the annoying audible "crack" with MOST microphones. However, some rare microphones, due to their circuit design, will still cause a loud pop a few seconds AFTER the phantom voltage is switched off. With those, you will still need to mute or lower your monitoring level.
- 2 Mic input attenuation 10dB pad, pre-transformer. Use if unit clips even at minimum gain. All pad circuits lower mic input impedance.
- 3 1/4 inch unbalanced instrument input. Good for guitar, bass or keyboards. The input impedance is 3.9M Ω .
- 4 Instrument input selector: leave it out for microphone, depress it to activate the line input or the instrument input. Berliner has dedicated XLR Line inputs with separate 1:1 transformers. Great to insert into a master buss (or any individual track) for tonal coloration. To use the instrument input, simply push the switch in and insert a 1/4-inch plug into the front panel jack. Unplug it to use the rear line inputs.
- 5 Gain control pot. It allows a gain variation of about 36.7dB. If you increase the gain while simultaneously reducing the output level, the tone will change. You can also overdrive the input stage into clipping if you so desire.
- 6 Bi-color LED (green/red) signal presence/overload indicator. Red indicates clipping distortion. To eliminate it, reduce gain or engage the pad (for mic only).

7 Output level. Does not affect tube gain or overload level, just determines how hard the output buffer, transformer, and ultimately the load are driven. The Berliner may drive your next unit (Compressor, EQ, Converter, Mixer) into clipping even though the red light doesn't indicate any distortion. In that case, reduce Berliner's output level. It's always better to start with lower output level and then increase it as much as your audio chain allows, as distortion can occur at more than one point.

8 Output select: low-distortion balanced line driver IC or transformer (driven by a discrete buffer). Solid-state mode will sound somewhat cleaner and the transformer rounder and fatter. Berliner "A" has Ni/Fe (50/50), and Berliner "B" 100% Fe transformers. B sounds more colored. You can also have "AB", a combination of Ni/Fe on ch.1 and 100% Fe on ch.2.

9 Phase reverse (at the very output of the preamp) affects both mic and instrument inputs.

10 Power switch.

11, 12 and **13** Low and high frequency shelving boost, 6dB/octave. Mid position is flat. This is a subtle tone control meant for a gentle boost, adding depth or air to the signal. It does not use a separate stage; rather, it utilizes the tube gain stage. The boost level can be adjusted by 2 trim-pots, accessed from the top lid, between the boost switches and about an inch in from the front panel (**12**, marked by a red pointer). Use a mini slot (.098"/2.5mm Ø, .031"/0.8mm wide) or hex (.104"/2.64mm hex x .055"/1.4mm deep) screw driver to adjust pots.

The corner frequencies will interact with the gain setting. With the "Air" switch in either "1" or "2" position, the boost will start from a lower frequency as the gain is lowered and there will consequently be more treble boost. With "Fat" switch in either "1" or "2" position, the opposite will be true: the lower the gain, the higher the corner frequency will be, and the amount of bass boost will increase. The default settings are somewhere in the middle. Here, experimentation will quickly give you an idea of these functions and where they can be most useful. Low boost uses a real inductor for a fat tone.

14 Microphone input impedance. The lower the impedance, the more of a load will the preamp input present to the microphone. Standard values will be 10kΩ for the middle position (HI), 900Ω for the left (LO) and 2400Ω for the right (MED). The "PAD" switch will also influence the resultant mic input impedance value. Changing input impedance is more likely to influence the tone of dynamic mics, to some degree ribbons, and to a lesser degree or not at all condensers. Lower impedance values will roll off some high end.

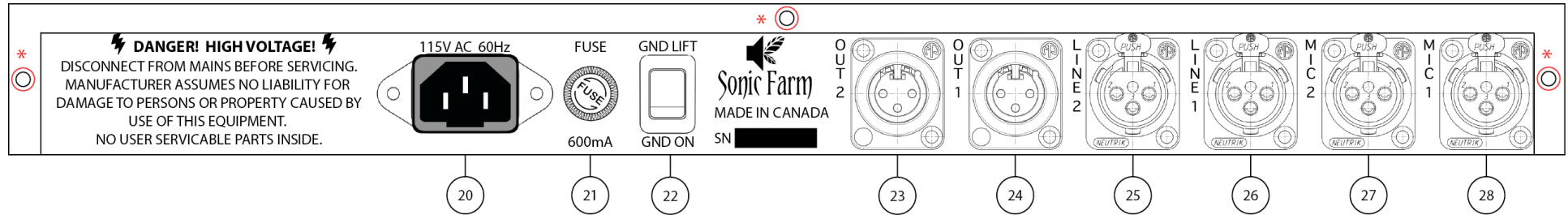
15 Tube heater voltage indicator: it should come on with the power switch.

16 High-pass filter cutoff frequency. 160Hz (pos. 1) or 80Hz (pos. 2), 6dB/octave

17 This switch attenuates the output of the tube before the output level control pot. It will be useful when working with hot signals to avoid operating the output level control at levels close to minimum, where precise adjustment is difficult. Attenuation can be 6 or 12dB's.

18-19 N/A

BERLINER'S REAR PANEL CONTROLS:



20 AC power receptacle. Always operate the unit on the mains voltage it was designed for (115VAC or 220-240VAC). We purposely omitted the mains voltage selector as a wrong voltage setting can cause a lot of damage to the unit. Berliner's power transformer can be rewired for a different operating voltage but that is something only a qualified service technician would do.

21 Mains fuse. Please replace it only with a slow blow type of the same rating: 630mA@110-120VAC, 350mA@220-240VAC

22 Ground lift switch. It should normally be kept in "Gnd On" position. However if you encounter hum when the unit is patched into your system, switch it over to "Gnd Lift". This will remove hum due to ground loops only; it will not help eliminate hum that comes in with the signal! Do not disconnect the ground wire on your 3-prong mains plug!

23 and 24 Outputs. Balanced connection only! (XLR pin connection: 1=GND, 2=HOT, 3=COLD). Berliner can put out up to +32dBu of level.

25 and 26 Line level inputs. Balanced connection only! (XLR pin connection: 1=GND, 2=HOT, 3=COLD)

27 and 28 Microphone inputs. Balanced connection only! (XLR pin connection: 1=GND, 2=HOT, 3=COLD)

TECHNICAL SPECIFICATIONS:

2 channels

Variable input impedance (for mic input only): 10k, 2k4, 0.9k

Instrument input impedance: 3.9M

Frequency response: 10Hz-50kHz +/- 3dB

Maximum gain: 76dB (mic) and 50dB (instrument and line)

Gain control range: 36.7dB

Harmonic distortion: <1% before clipping level; quickly decreases if driven less.

Maximum output level: 32dBu

Minimum output load: 600Ω

Connectors: XLR mic, line and output, balanced only

Instrument input: 1/4" unbalanced, mono

Power consumption: 50W

WARRANTY INFORMATION

Sonic Farm gives a one-year warranty on parts and labor from the date of purchase.

Should you need to send in your unit for warranty-covered service, please contact us for an RMA number first.

We will also tell you where to send the unit.

Any Modification of the unit voids the warranty.

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