

Sonic Farm 2di4 Pentode Direct Box



By Tom Bowlus

A great name piques your interest and sometimes hints at things to come. The name “Sonic Farm” certainly does both. Thought of in their best light, farms are wholesome; they are natural; they grow the things we need to survive. Translated into the amplified/recorded (“sonic”) world, preamps and direct boxes are certainly things we need, and we definitely want them to be wholesome and natural. So far, so good. While something has to be *extremely* good “to die for,” even in the non-literal sense, Sonic Farm has turned this slang phrase into a formal noun. This play on words (well, play on letters and numbers, really) has multiple levels. At the heart of its name, the 2di4 is a DI, so that works. It’s also two DI’s in one (a pentode tube DI, and a triode tube DI). And, without spoiling the ending, it *is* extremely good. I’m still working on the “4” part, though...

Farmers Unite

Sonic Farm Pro Audio is the brainchild of two men whose friendship spans not only decades, but continents, as well. Zoran Todorovic and Boris Drazic met back in 1966, in the former Yugoslavia, when the two musicians formed a band and started gigging the Adriatic coast. Both studied electrical engineering, graduated, and got steady jobs. The two started their own recording studio in the early ‘80s, and experienced a good bit of success. However, the conflicts in their homeland led them to seek their fates elsewhere in the early ‘90s. Boris went to Germany, then on to Canada. Zoran ended up in a recording studio in Los Angeles, and stayed there for 15 years. In 2009, however, the two joined forces in Vancouver, British Columbia, and formed Sonic Farm Pro Audio.

Any field of manufacturing has its celebrated icons, and the audio recording world is no exception. Neve and API are hallowed names,

and with good reason. They set the standard for studio preamps, and have lead to many boutique builders offering clones, or slightly tweaked versions of their circuits. This is a world which Sonic Farm seeks to steer clear from. They believe that focusing on yesterday’s designs limits tomorrow’s possibilities. One of their founding premises is to come up with pro audio equipment that the world market is not already saturated with. Furthermore, they attach no mythical benefits to any one type of technology or design. To that end, they don’t care if their products use tubes, transistors, op amps, or IC’s, so long as it gets the tone they are after.

With that background in mind, let’s see what happened when they decided to make a DI...

What’s a DI, Anyway?

We use them all the time, but do you really know exactly what a DI does? Or what those letters stand for? Well, it’s the box the sound guy makes you plug into when you ask him to mic your rig, and he

says, “No, use this,” right? Sort of, but there’s more to it. Whether you call it “direct input,” “direct interface,” or “direct injection,” a DI connects a high-impedance, line-level, unbalanced output signal to a low-impedance, mic-level, balanced input. The most typical scenario where we bass players see a DI used is to send the signal coming out of our bass into a mixing console, either live, or in the recording studio. Our rigs are designed to accept the signal right out of our instrument, but those pesky mixing boards are not. Still, it seems like a simple task, right?

Your DI is actually doing more than you might think. It is matching levels, balancing the signal, eliminating ground loops and minimizing noise and distortion (either through active buffering or passive impedance matching). Especially in a live setting, you are typically playing your bass a goodly distance from the mixing board, so the DI needs to send your signal a long way, without losing anything along the way. And it’s doing all of this while sitting between YOUR bass, and YOUR rig, so it darned well better not get in the way or screw up the mojo you’ve been dialing in for years.

In its most basic form, the typical DI box has a 1/4” input (from your bass), a 1/4” output (to be sent on to your rig), and an XLR mic-level output (to be sent to the mixing console). Hopefully, there’s a ground lift option, as well. These devices may be found in either passive or active form (hint: if it has a power cord or takes a battery, it’s an active DI).

Features To Die For

The 2di4 covers all the DI basic function, but offers some very nice “value added” features. Let’s familiarize ourselves with the front

and back panels a bit. Up front, we of course have the requisite 1/4” input (labeled “In”) and 1/4” output (labeled “Amp”). But check out all this other stuff! The big white knob controls the final output level, and it’s a straightforward affair, but the rest deserve a little explaining. The two white push buttons are labeled “Gain” and “T/P.” The Gain button provides a signal boost of either 5dB or 9dB, depending on the setting of the next button. The T/P button allows you to run the EF86 tube (which is the heart and soul of the 2di4) in either triode mode or pentode mode (the technical aspects of this are discussed in detail in Tom Lees’ Amp Lab portion of the review). The bottom row of controls also features a bi-color LED which glows green when a signal is present, and red when the input signal begins to clip (though this is more of a “rough estimate” indicator of clipping; more on this, below). The LED set between the Gain and T/P buttons glows blue when the unit is powered up. The two small holes above the Trim label are actually level (gain) controls for the Lo and Hi Boost functions.

Moving up to the top row of controls on the front panel, we find three mini-toggle switches. The first

one has settings for 0 (no gain reduction), -12dB and M (which mutes the signal after the tube stage and before the output buffer). Since the 2di4 does make a very audible “pop!” when switching between triode and pentode mode, I would strongly suggest that you engage the mute before hitting that T/P switch. Note: the -12dB attenuation setting occurs post tube and preamp output stages, so instead of being there to knock down the level of a hot input, its intended use is for adjusting the output to avoid overloading a low-headroom device, such as a computer interface/AD converter. Next up, we have the two 3-way switches for Lo Boost and Hi Boost. In the middle position, no boost is applied. Options 1 and 2 provide fixed boosts to the lower frequencies or higher frequencies. These are gentle shelving controls, and so they impact a fairly wide range of frequencies. For the specifics on what frequencies are affected by each switch, I once again refer you to the Amp Lab portion of the review.

Turning our gaze to the back panel, we find two XLR outputs; one labeled “D.I. Out,” the other “Line Out.” The D.I. Out is your more traditional output, and it delivers a balanced, mic-level output via a





very nice Cinemag transformer (which also protects the device from accidentally engaged phantom power). The Line Out is also balanced, but this time via op-amps, and it delivers a significantly hotter, line-level signal. Sonic Farm lists the max gain on the Line Out as +54dB, versus +32dB via the transformer-balanced D.I. Out. Other back-panel details include a ground lift switch, on/off switch, 300mA fuse, IEC power cord socket, and Mains Voltage switch for 110v or 220v operation. Clearly, Sonic Farm has covered all the bases, and then some.

Harvesting Sonic Crops

As previously indicated, there are several ways that you will likely use a DI, and you want your unit to excel at all of them. What most people will hear (whether it's at a live performance or via a recording) is what's coming out of the balanced outputs. Most sound engineers will likely use the D.I. Out, but in some situations, the hotter signal from the Line Out may be the ticket. Fortunately, they are simultaneously available. Both outputs deliver a faithful reproduction of the input signal, but with a most pleasing blend of organic warmth and detail.

Listening to the two of them (after gain matching), the signal from the D.I. Out sounds ever so slightly more full and "girthy." Credit likely lies with the sweet Cinemag transformer. However, the Line Out is no slouch in the fullness department. It's just that D.I. Out nudges ever so slightly ahead in back-to-back comparison.

The EQ options available from the Lo and Hi Boost switches are not likely to replace a full tone stack (if you need one), but are good at making very musical nudges in one direction or another. Powerful EQ can offer a wide range of tone sculpting, but EQ can do very bad things, as well, and I have always found too much EQ to be much harder to deal with (either in a live mix or in the studio) than little or no EQ. The gentle slopes chosen by Sonic Farm and the use of capacitors and inductors mean that the 2di4's boosts won't muck up your tone. I found them to be very useful, and a very welcome feature. It is worth noting that the Lo and Hi Boost are only available when the Gain switch is not engaged. This is a result of the design of the tube gain stages, where you have the option of either a global frequency boost (hitting the Gain button) or

more tailored Lo and/or Hi boosts, but not both at the same time. Zoran Todorovic explains, "The unit provides more than enough gain for any bass guitar on the market. The idea behind the Gain switch was to drive the tube harder, when desired."

The variety of gain control options are very nice, and this will allow a wide range of instruments to effectively interface with the 2di4. Since this is a tube-based device, it also means that you have the ability to dial in varying levels of tube saturation. Not all tube-based DI's allow you to intentionally push the input signal into clipping, but the 2di4 happily does so. Personally, I am not likely to seek a saturated tube overdrive from a DI box, but if you want to put just a bit of "hair" on your signal, Sonic Farm has you covered. The tube saturation in triode mode is probably a bit more familiar-sounding for bass or guitar, but check out what pentode mode has to offer, as it does have a somewhat different character. Of course, if you like to keep things clear and pure, have no fear. The 2di4 has a very wide range of tones/gain available before you are anywhere near clipping. On that topic, though, I must point out that the front panel indicator LED is not your best tool for determining when you might be hitting tube saturation. As always, use your ears.

"Ah, but Tom, what about this brick getting in the way of your stage rig; your pride and joy?" Well, the Amp output is a direct copy of the input, albeit a buffered copy. At first blush, it seems completely identical to the input signal, but after a little A/Bing, you can notice the effects of the buffering – which is not necessarily a bad thing. Using a passive Carvin PB5, the buffered signal was just a touch more full and meaty. Switching to an active

Skjold Exotic Custom 4, the low end was identical between the direct signal from the Skjold and the Amp output, but the high end coming out of the Amp output had an extra layer of detail that was quite nice. In short, I've got no problem running the 2di4 in between my bass and rig. In fact, I dig it a lot!

Direct Comparisons

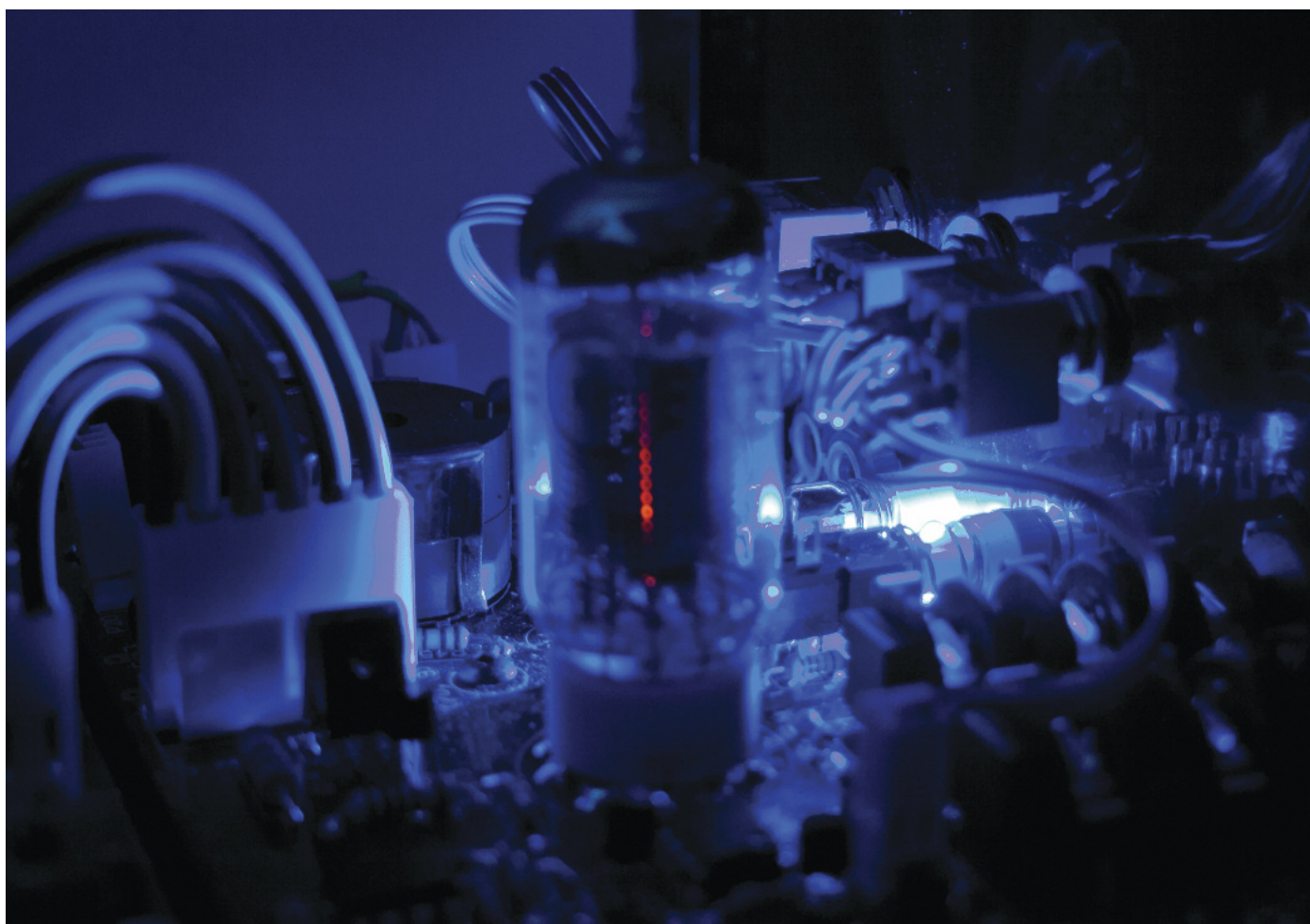
Although their "job" seems very simple and direct (excuse the pun), your DI will, to a greater or lesser extent, impart its sonic signature on your bass tone as it gets sent on up to the FOH or recording studio board. With the 2di4, at the very first listen, it strikes you as an exact copy of the signal from instrument. However, more careful listening shows the 2di4 to be organically warm, clear and detailed, and somewhat more harmonically rich than the input signal. That it can do all this without changing the natural

character of the individual instrument is impressive. In this regard, it reminds me of another favorite tube DI, the Demeter VTDB-2b Tube Direct. Comparing the two of them back to back, the 2di4 is a tad more warm/round, and the Demeter is a tad more articulate/detailed, but the two were very close – which, again, is an impressive feat, considering the VTDB-2b's pedigree.

Just for kicks, I also compared the 2di4 to a very plain-Jane, pedestrian DI, the passive Groove Tubes Direct Box (model PDI). While the PDI is an entirely competent device, there is an immediately audible difference which is best summarized by the responses to each: "Eh," versus, "Wow!" Feature sets aside (the GT's features start, and end, with the ground lift switch), the 2di4 has more life and dynamics.

The Bottom Line

If you are a gigging bassist or a studio musician, you need a DI. The DI's job seems simple, but it's very important that it doesn't screw it up. Yes, you can get the job done with a fairly inexpensive piece of kit, and to be honest, if you're just getting your feet wet as a bassist, or if you routinely play to less than discerning crowds, perhaps you're just as well off with a more modest box. However, if you really care about that recording; if you need to nail that live tone; if you want to be sure that your Fodera sounds like a Fodera, both at your rig and at the board, then a high quality DI is your best friend. There are some very nice options out there, but few – if any – can match the build quality, feature set, and sonic excellence embodied in Sonic Farm's 2di4. **BGM**





Sonic Farm

2di4

ENCLOSURE

Material:	Steel
Dimensions:	11 3/8" L x 6" W x 5" H (with handle)
Weight:	5.4 lbs
Rackable:	No

PREAMP

Inputs:	1 x 1/4"
Mode:	Tube/Solid State
Tubes:	1 x EF86
Input Impedance:	> 1 Megohm 200 Hz, 200mV Sin
EQ Type/Features:	Lo and Hi shelving boost
Compressor/Limiter:	N/A
DI Output:	Transformer Balanced
Effects Loop:	N/A
Dedicated Tuner Out:	N/A
Construction:	PCB
Additional Features:	Instrument out, DI out and Line out; Ground Lift

POWER AMP

Mode:	N/A
Tubes:	N/A
Outputs:	N/A
Impedance Options:	N/A
Power Supply/Transformer:	N/A
Cooling System:	N/A
Line Voltage Options:	N/A

MEASUREMENTS

Full Bandwidth All Controls At Noon:	20Hz - 20kHz +/- 0.2 dB; 250 mV swept sin input
Limited Bandwidth All Controls At Noon:	20Hz - 20kHz +/- 0.2 dB; 250 mV swept sin input
Limited Bandwidth (Optimally Flat):	20Hz - 20kHz +/- 0.2 dB; 250 mV swept sin input

POWER

	4	8
Continuous Power:	N/A	N/A
Measured Voltage:	N/A	N/A
Burst Power:	N/A	N/A
Measured Voltage:	N/A	N/A
Input Signal:	N/A	N/A
Wall Voltage DUT:	N/A	N/A
THD+N:	N/A	N/A

GENERAL

Company:	Sonic Farm Pro Audio Vancouver, BC, Canada (310) 402-2390 (US) (778) 863-1613 (Canada) www.sonicfarm.com
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Country of origin:	Canada
Year of origin:	2013
Warranty:	1 year
List price:	\$850 (Canadian)
Street price:	\$850 (Canadian)
Options:	None
Accessories:	None
Available colors:	Red

Acquired from:	Sonic Farm
Dates:	November 2013-February 2014
Locales:	Ohio
Test gear:	Carvin PBS, Skjold Exotic Custom 4, Stewart World 21, Bergantino HT10, Bergantino IP112, GK MB200, Demeter VTDB-2b, Groove Tubes Direct Box

TEST RESULTS

1-5 (unacceptable to impeccable)

In-Hand

Features:	4
Tonal Flexibility:	4
Ease of Use:	4.5
Aesthetics:	4
Tone:	5
Value:	3.5

On-Bench

Internal Parts	4.5
External Parts	4
Overall Assembly	4
Ease of Repair	4
Instructions/Manual	3.5
Quality Per Price	3.5
Layout/Cooling	4

In-Hand Score

4.17 average

On-Bench Score

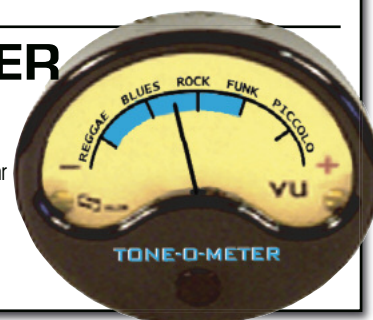
3.93 average

SONIC PROFILE:

Lows: Full, tight, controlled
Mids: Clean, pure, slightly warm
Highs: Smooth, detailed, inviting

TONE-O-METER

The 2di4 is faithful to your instrument's voice and character, but adds a touch of warmth and harmonic excitement, while keeping things clear and controlled. In addition, it offers multiple ways to subtly, yet meaningfully, tweak your signal (gain and tone).



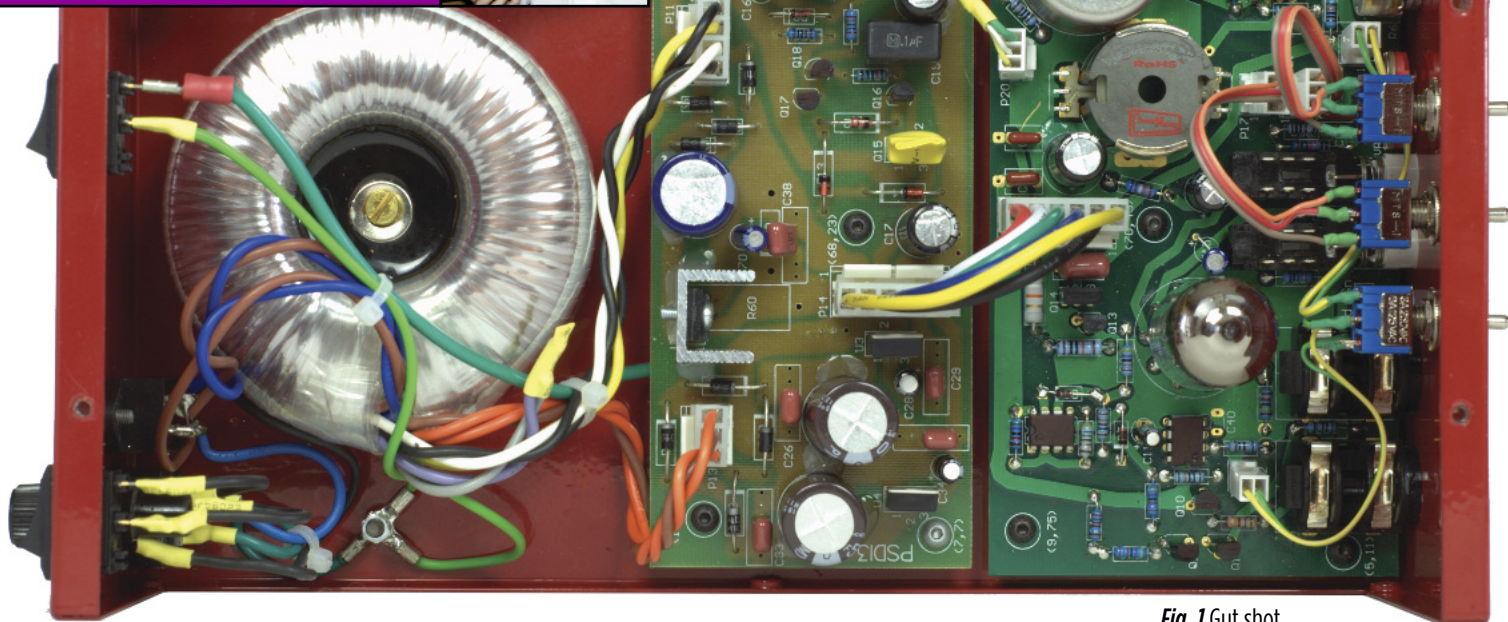


Fig. 1 Gut shot

Sonic Farm 2di4

The 2di4 is a bold name to bequeath to a piece of gear so pedestrian as a direct injection box. Come on, shouldn't this name have been saved for something much more muscular and glamorous? If this name is to stay, it better deliver the goods. In my neck of the woods, I can purchase a budget DI for under \$50. My Radial boxes cost a bit more than these budget DIs, but they typically do such an admirable job that I rarely see a reason to look further. Now, the 2di4 list price is \$850 Canadian. I have no hesitation paying that price for something that truly is to die for, but I am setting the bar for this product pretty high before I can say that I am impressed, given that this is ... well ... a DI box.

Construction

Red is my favorite color, and the large, shoebox housing really appeals to my stylistic sensibilities. In this regard, the 2di4 scores high on external appearance. The jacks, switches and buttons feel of quality. I like the look of the chicken head knob on the trim control setting off the black and white labeling on the front panel. Regardless of opinion of

the front panel, it is really hard to find fault with what is under the hood. The internal construction drips of quality. There are two main circuit boards, including an amplifier board and a power supply board. The circuit boards are thick, with gold-plated pads and a double copper layer. The power supply board provides regulated power to the tube and analog circuitry of the amplifier board. The amplifier board boasts boutique signatures, including a gold-plated tube socket, a Cinemag transformer and high quality passive components.

The Circuit

The signal path of the 2di4 is simple and clean. The 2di4 boasts a single 1/4" input, which is buffered and folded back to an unbalanced 1/4" jack labeled "AMP" on the front panel. This lets the musician connect to an amplifier with a buffered, instrument-level signal. This is a really nice touch, and a welcome part of this DI.

The 2di4 offers four independent means to shape the gain structure through the DI circuitry. The four means include a trim switch, a GAIN button, a Triode/Pentode

(T/P) button, and an Output knob. The 2di4 offers a first means controlled by a pad switch that allows the user to select one of three options: 0dB, -12dB or Mute. Flip the pad switch to the mute position for quick instrument changes, use the -12dB position to accommodate low-headroom devices downstream of the 2di4, or leave the pad switch in the 0dB setting to effectively bypass attenuation at the pad switch circuitry. Switching between Triode and Pentode mode (discussed below) can sometimes cause a pop because of the way that the circuitry is reconfigured. As such, switch the pad switch to the mute position when toggling the T/P switch.

A second means is controlled by a GAIN button on the front panel. Depressing the GAIN button affects the signal level, adding a fixed gain. The 2di4 features a single active gain stage, which is implemented by an EF86 vacuum tube. The gain added by the GAIN button is created by bypassing the current setting circuitry designed around the cathode of the EF86.

A third means is also built around an EF86 vacuum tube. The EF86 is normally a pentode vacuum tube that can be operated in either triode mode or pentode mode, selected based upon a Triode/Pentode (T/P) switch. In short, the T/P switch “rewires” the tube to operate in pentode mode or triode mode. The T/P switch also reconfigures the bias for proper operation. The triode and pentode modes are discussed in greater detail below.

A fourth means is the Output control, which is adjusted by the output potentiometer. The EF86 has

a high output impedance. As such, the tube output is buffered before the signal is coupled to the XLR output jacks on the back panel. The Output control is after the gain is applied, so tube gain and tube overload are unaffected by the Output control. However, the Output control does affect the level at which the output buffer, transformer and connected output device are driven.

The 2di4 also offers a few equalization options, including two low-frequency options, selectable with a LO switch, and two high-frequency options, selectable with a HI switch. A neat trick here is that the tonal shaping is performed by providing frequency dependent elements (capacitors for the HI boost, and inductors for the LO boost) in the cathode circuitry of the EF86 tube. The benefit here is that the circuitry is clean and the signal path is as short as possible. The tone-shaping elements are not in the direct signal path. The disadvantage here is that because the GAIN, LO and HI all operate on the cathode circuitry around the EF86 tube, the GAIN switch, when engaged, defeats the LO and HI tone-shaping options. As such, you have the option of no gain/no EQ; gain with no EQ; or EQ.

Referring to *Fig. 2*, a frequency response plot shows that the LO and HI options each provide subtle shelving boost relative to the flat setting (LO and HI switches in the center position). Although subtle, the EQ is effective in its role as a DI tone control. If you need major

equalization, you need to make adjustments at the source (or replace the source). Note that the response illustrated in *Fig. 2* is merely illustrative of the shape of the EQ curves. The ultimate level of boost is determined by a number of factors, including other DI settings. In this regard, the controls are interactive and work together. Moreover, there are two small trim controls (labeled TRIM – located between the T/P switch and Output knob) that you can tweak with a small screwdriver to adjust the overall level, to obtain slightly more, or less, gain.

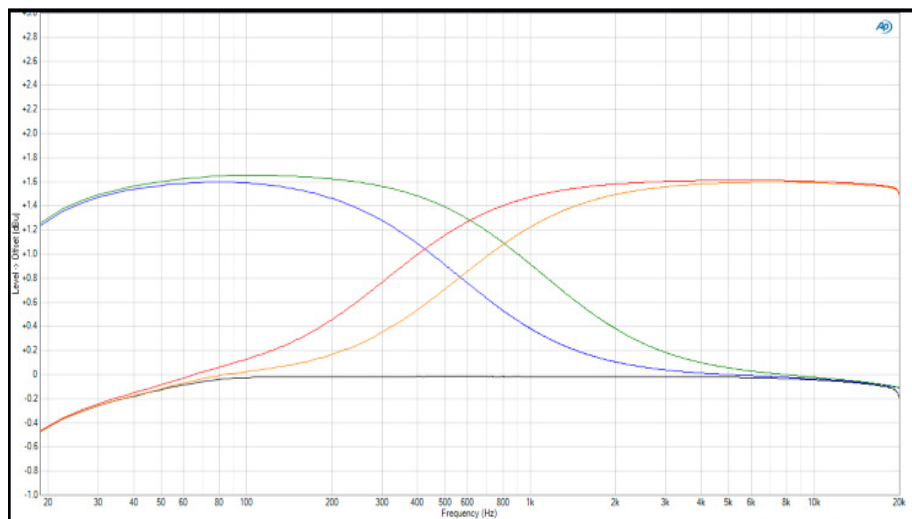


FIG. 2 EQ options

The output of the EF86 tube gain stage is buffered, and the buffered output is coupled to a Cinemag transformer-balanced DI output that connects to a first XLR jack on the back panel. The buffered output of the EF86 also feeds an op-amp balanced line output that is connected to a second XLR jack on the back panel. As such, the 2di4 provides an instrument level output, a transformer-balanced microphone output and a line output, which are simultaneously available.

A signal indicator designated OL is located between the input jack and the GAIN button. The LED glows green if a signal is detected as being present. If the signal exceeds a predetermined threshold, then the LED glows red.

To get a sense of the gain of this device at both the line and mic levels, we set the trim switch to its 0dB position, and set the GAIN and T/P switches out. We calibrated the line level out to provide 0dB as our baseline and ran a frequency sweep. Regardless of switch settings, the frequency response was similar. We measured approximately 28dB difference between the mic and line levels throughout the tests. Under our test conditions, engaging GAIN switch resulted in about 4dB gain. Engaging the T/P switch resulted in about 7dB gain. However, engaging both the GAIN and the T/P switches resulted in just under 18dB gain.

Switching our tests, we measured about 35dB gain in pentode mode and approximately 28dB in triode mode, with a THD+N under 1%. The nature of the particular design in this product allows for measureable distortion levels well over 1% without any sign of nasty distortion. I would not hesitate to call the signal “clean” at levels over 2% THD+N. In this regard, gain in pentode mode can reach into the 50+dB range.

Triode/Pentode Switch

Before getting into the function of this switch, let’s take a minute and

address this whole pentode/triode thing. Let’s start with a triode, because that will make the pentode easier to understand. A triode has basically three controllable electrodes (hence tri-ode), including an anode, cathode and grid. Each electrode is accessed by the designer as a pin on the tube. A triode also has heaters that heat the cathode, but let’s not concern ourselves with them, for this discussion. Basically, the heated cathode releases electrons that are attracted across the vacuum of the tube to the anode (an electron migration). An input voltage applied across the grid is injected into this electron migration, such that a small change in input voltage is converted into a large change in current. Circuitry attached to the anode converts the change in current to a voltage.

Now, a pentode is basically a triode with two additional electrodes (which we see as two

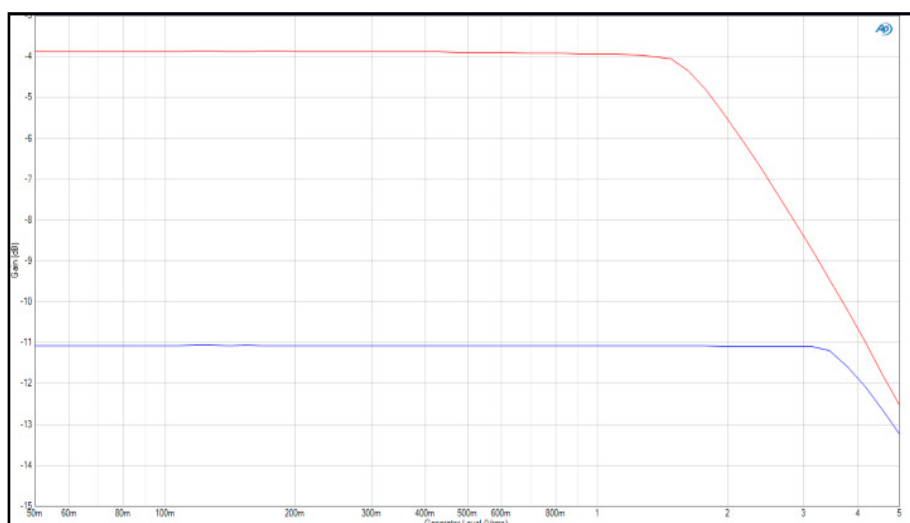


FIG. 3 Gain

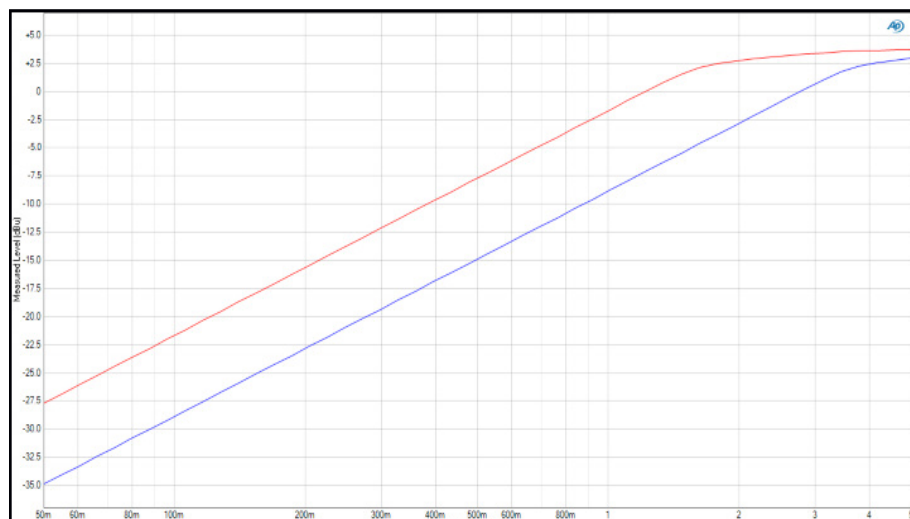


FIG. 4 Linearity

additional pins on the tube), including a screen grid and a suppressor grid. Without getting too techy, the screen grid provides two functions. It accelerates electrons towards the anode, thus providing increased gain over a conventional triode. Moreover, it reduces capacitance that forms between the grid and anode. However, the screen grid adds artifacts that are undesirable. These artifacts are corrected for by the suppressor grid. Now, the neat trick is that if the screen grid is connected to the anode, and the suppressor grid is tied to the cathode, the resulting configuration is a triode.

Life does not come without tradeoffs and compromises. Even though the Pentode position gives more gain, you have to give something in return, and that something is headroom. To see these tradeoffs, take a look at *Figs. 3-5*. Under our

test conditions, we set the trim switch to 0dB, we set the GAIN switch to its out position, we dialed the Output potentiometer to noon and swept our input signal level from off to 5 Vrms. Pentode mode is illustrated in the red trace and triode mode is illustrated in the blue trace.

As illustrated in *Fig. 3*, for low signal levels, the Pentode mode has about 7dB more gain compared to the Triode mode. However, the gain of the Pentode mode starts dropping off at about 1.5 Vrms (indicating the onset of clipping), whereas the gain in Triode mode stays clean up to an input signal of about 3.5 Vrms.

As illustrated in *Fig. 4*, for low signal levels, the Pentode mode and the Triode mode are extremely linear, tracking gain as a function of input signal with precision. *Fig. 4* is consistent with *Fig. 3* in that the difference in gain between Pentode mode and Triode mode is about 7dB, with Pentode mode providing more overall gain. However, the Triode mode demonstrates consistently more headroom. Note that when reading a linearity graph, distortion begins to onset when the slope of the line begins to flatten out.

As illustrated in *Fig. 5*, the tube characteristics of this device are clearly apparent. The design of the circuitry in the 2di4 allows the THD+N measurements to reach a few percent before you would even begin to notice. In our tests, THD+N as high as 2-3% yielded no signs of clear, nasty clipping. For low signal levels, both Pentode mode and Triode mode are clean at well under 1% THD+N. However, in Pentode mode, under our test conditions, the distortion quickly increased for inputs above about 1.5 Vrms, whereas the signal remains relatively clean in Triode mode to over 3 Vrms. To illustrate this, refer to *Fig. 6*. We input a 3.15 Vrms input signal in Triode mode and measured about 2% THD +N. As the scope trace

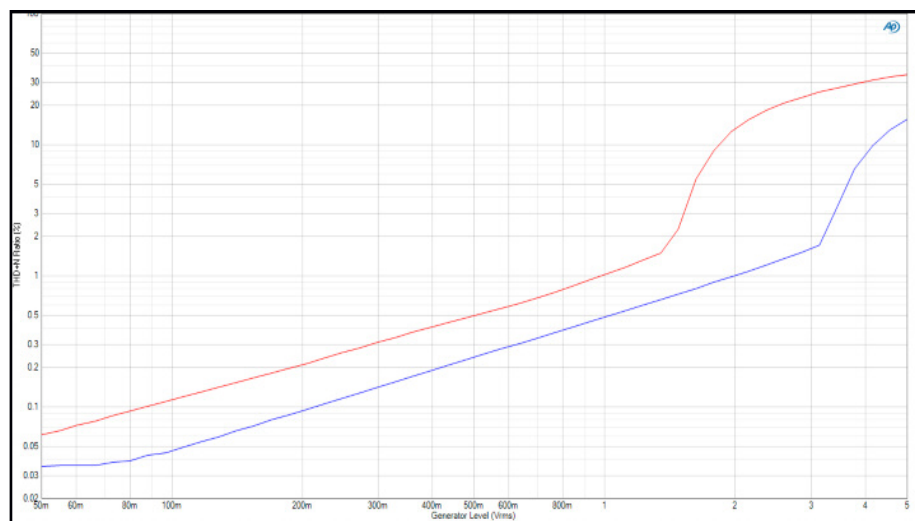


FIG. 5 THD+N ratio

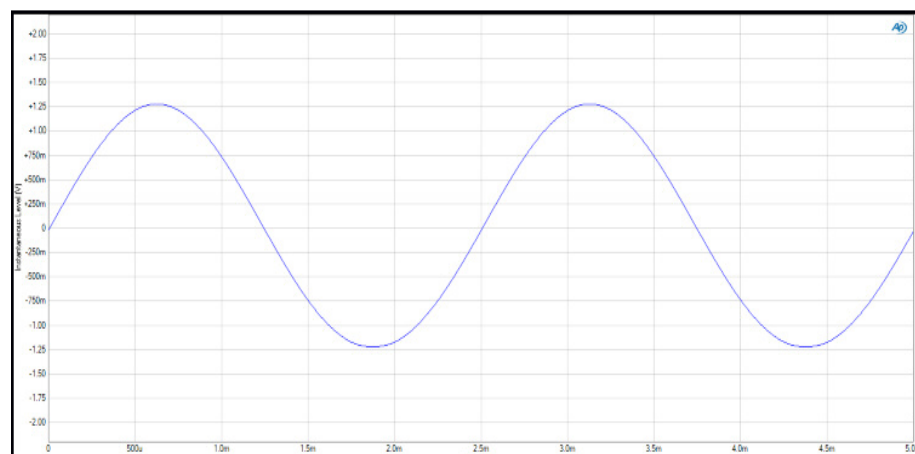


FIG. 6 Scope trace triode mode 3.15 Vrms input

illustrates, whereas a critical eye might suggest that there are signs of compression rounding out/fattening up the peaks, there are no signs of hard clipping.

Keep in mind that headroom is not the only difference between the Pentode mode and the Triode mode. Each offers its own harmonic signature. For instance, compare *Fig. 7* to *Fig. 8*. *Fig. 7* shows the 1% THD+N in Triode mode, whereas *Fig. 8* shows 1% THD+N in Pentode mode. Both modes show that the second harmonic is about 40dB down. However, the Triode mode harmonics show a gradual “stair step” response, with the third harmonic over 30dB down, compared to the second harmonic. Comparatively, in Pentode mode, the third harmonic is about 15dB down from the second harmonic. Moreover, the higher-order harmonics exhibit a relatively flatter response.

Due to gain differences, biasing differences and other effects of the tube configuration, the Triode/Pentode switch offers not only the opportunity to trade off input gain for headroom, but also to alter the harmonic signature of the device.

Conclusions

On the bench, the 2di4 appears to be a strong contender for supreme DI. Yes, I am impressed with this DI. Is it 2 di 4? Well, as far as DI boxes go, this box should deliver the goods. If you own a studio, this DI should be on the short list of additions (assuming that you do not already own it). If you play bass, the wide range of headroom, the tube character, the subtle EQ shaping, the instrument out, DI out and line level out make this product extremely versatile.

Do you truly need a DI will all of these bells and whistles? Maybe not. But if you are looking for the ultimate DI, I would start, and likely end, my search right here.

If I had one complaint, it would be that the overload indicator was not as precise as I had expected. It seemed to sometimes “latch” onto an overload indication, even when the input signal clearly fell below clipping. Also, under certain conditions, the overload indicator turns red when the observable scope trace looks clean. As such, I would use the

overload indicator as a “rough approximation,” but I would trust my ears over the LED color when determining whether an adjustment is necessary. Then again, I think that is good practice, no matter what the gear. **BGM**

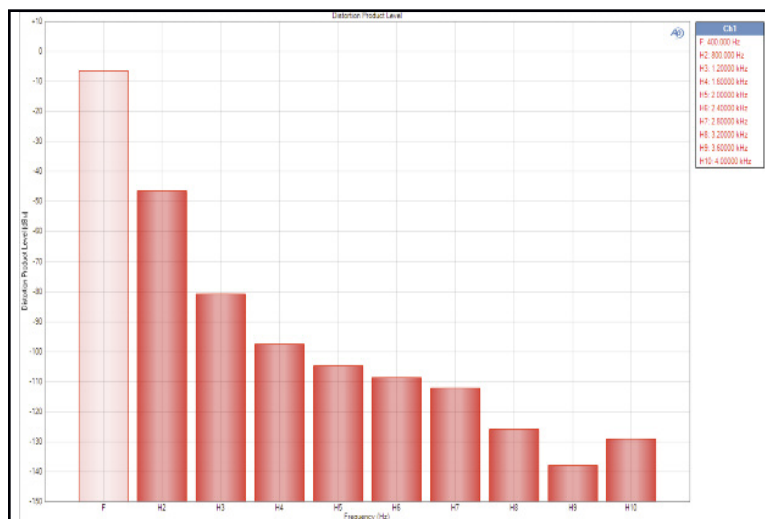


FIG. 7 1% THD+N triode mode

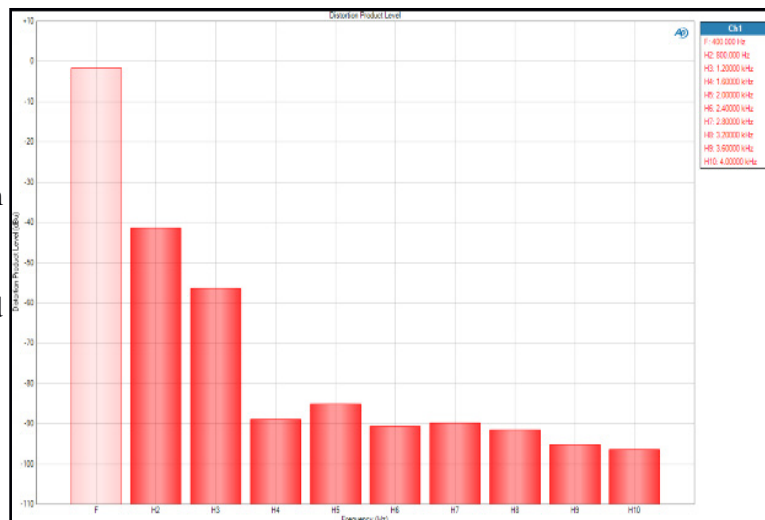


FIG. 8 1% THD+N pentode mode