REDSECTA

3VU

Owner's Manual

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Functional Eye Candy

The VU meter, developed in the 1930's, was the first mechanical instrument designed to represent average loudness. As technology improved, more accurate digital metering standards were adopted. Peak/RMS became the standard for some time followed by the current standard, LUFS.

You would think that the VU meter would have completely disappeared by now, but the fact is that many of us simply enjoy watching the mechanical feedback of needles moving along to audio signal over a warmly-lit background, despite their inaccuracies. The 3VU offers three independent positions to calibrate 0VU to various loudness targets using 1kHz tones. Inaccuracies aside, watching the movement of the needles between 0VU and how far they fall down the (now irrelevant) scale gives us a sense of how dense the material is. Audio with greater dynamic range will have more "swing" in the needles than material that has less, and I think this visual representation is what makes mechanical VUs in this configuration still useful. It also features a nice reference quality headphone amplifier, the DIYRE HC1 with an upgraded Alps volume potentiometer.

Thank you for your purchase, each 3VU is a unique build that I'm sure you'll enjoy for many years to come. It's built to last a lifetime, and backed by a full one year warranty. Scan the code below for details.

Luis "L-ROX" Franco
Redsecta, LLC

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Features & Controls

Featuring a VU buffer amplifier by JLM Audio that properly rectifies the DC style meters, and keeps noise from bleeding back into the signal.

1 On/Bypass Switch
2 Nissei TN-73 VU Meters
3 Dust-proof ABS Case
4 Headphone Section
5 Calibration Positions 1-3
6 Mechanical Zeroing Screws
7 Position Selector Switches
8 12 volt Power Supply Connector
9 XLR Input & Through Connections
10 Vibration absorbing rubber feet

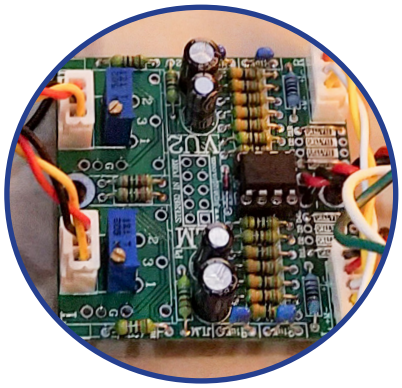
Features & Controls *continued*

1 On/Bypass Switch

The intact signal passes through the unit to your monitoring system/speakers whether or not the 3VU is on.

2 Nissei TN-73 VU Meters

A low-cost, high quality DC type VU meter alternative to the Sifam AL29. These meters require a rectifying circuit to work correctly with audio signals, which is provided by the JLM Audio VU2 buffer amplifier inside the unit. This buffer amp also isolates any noise that could be generated from the meters, keeping the signal intact. Nissei is a brand from Taiwan that has been making various types of VU meters and other professional measurement instruments since the 1960's.



JLM Audio's VU2 Buffer Amplifier provides a rectification circuit to the VU meters and prevents any noise that could be generated at the meters from coming back into the audio signal. The trims on both channels have been matched and are already set to allow the broadest range of calibration options.

3 Dust-proof ABS Case

The case is made from a high-quality instrument-grade ABS plastic that has been painted with a few coats of premium matte, UV-resistant acrylic-based spray paint that won't fade or discolor.

4 Headphone Section

The DIYRE HC1 is capable of effortlessly driving many of the headphones used in music production. To my ears, it performs best with headphones ranging between 30-300 ohms. To give you an example, it will drive my Sennheiser HD650s (300 ohms) with ease, it reaches approximately 80 dB SPL (c) with ~40% volume, and I don't need to dial in more than about 25% volume to reach a comfortable level on my 80 ohm Beyerdynamic DT770 Pro. I have added an Alps RK271 for volume control. It's known as the "Blue Velvet" in the DIY audio community for its smooth operation and balanced sound down to the lowest levels.

5 Calibration Positions (1-3)

You can set each position's 0VU to a loudness target of your choice by playing a 1kHz tone from your DAW and using a RMS or LUFS meter. Each position can be calibrated to levels as low as about -20 dB LUFS. To calibrate to a reference track, set each (L/R) calibration point to where the needle hovers near 0VU. Make adjustments as you listen,

focusing on the loudest sections. Next, bring up a 1kHz tone until the needles are hovering at or close to 0VU. If one channel is lower than the other, increase the 1kHz tone level and stop at the closest middle point between both channels. Adjust each position's knob down or up to reach 0VU. Note down the level of the 1kHz tone track in your DAW to recall this calibration in the future. The idea is to make 0VU match the loudest portions of the audio, and then study the movement of the needles as they move down the scale. Louder material will register in the red, and lower material would need to be turned up to reach 0VU.

6 Mechanical Zeroing Screws

These screws align the needles on the meters so that they rest at "0" at the bottom of the scale. Prior to shipping your 3VU, I set and aligned these screws but it is possible that they could have shifted a little during shipping. Originally, VU meters operated with fixed resistance, not variable resistance like the 3VU, so it was important to have them aligned for accuracy to the scale. Since you can easily calibrate 0VU using the position knobs (and accuracy of the scale is no longer of importance), any minor offsets can be accounted for.

If you do decide to manually adjust these screws, please be careful. Use a small flat head screwdriver and turn carefully, the spring mechanism can easily snap if you turn these too hard.

7 Position Selector Switches

Both of these switches need to be set to the same position for the 3VU to operate properly. The "duckbill" style knobs make it easy to tell what position each knob is in from the front of the unit, without the need to look behind it. From the front of the unit, position 1 is the leftmost, 2 is in the middle and 3 is all the way to the right, matching the placement of the calibration points at the front of the unit, allowing for quick and intuitive operation of the 3VU.

8 12v Power Supply Connector

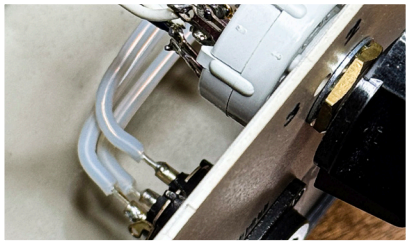
Connect the included Triad Magnetics 12v Power Supply. If it ever needs to be replaced, make sure you use the same barrel type connector.

9 XLR Inputs & Thru Connections

You can connect balanced or unbalanced signals via the XLR inputs. The Thru connections mirror the inputs.

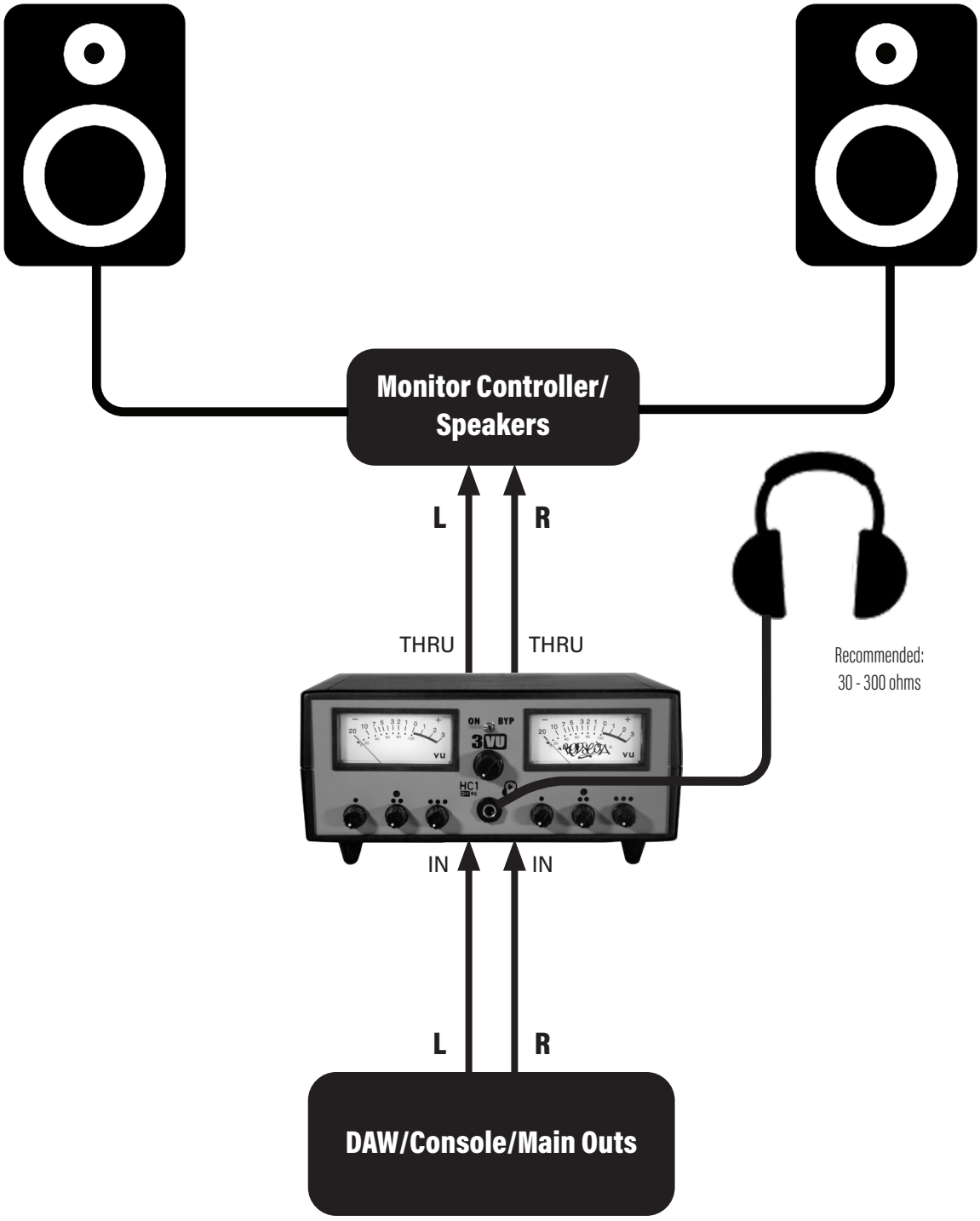
10 Vibration Absorbing Rubber Feet

These will help absorb vibrations from nearby monitor speakers and will also help keep the unit from sliding around your console or work area.



Bypass connections are made with 14-gauge teflon-coated solid core silver plated copper. I use Cardas Quad Eutectic solder on all my builds. The stuff melts so easily, reducing the amount of time & heat that needs to be applied when soldering components.

Connections



About these VUs

Original VU metering specs be damned.

I came up with the idea to design this metering package about 15 years ago, after buying a couple of vintage true AC VU meters, placing the proper (fixed) resistor values on them, and then being totally disappointed when discovering that the loudness targets that I was working towards, in RMS at the time, caused the needles to completely peg against the top of the scale. I was getting ready to throw them in a box and forget about them, when the thought hit me: *"Nobody is using VUs anymore to seriously measure loudness, so why can't I just use a potentiometer instead of fixed resistor values, set 0VU to whatever I want, and see what happens?"*

I had learned that not using the proper resistor values would result in the meters to no longer operate under their intended metering specs, and that the movement of the needles would no longer be what they were intended to be. I decided to try and experiment anyway. I also thought it would be cool to be able to have three separate calibration points that I could quickly switch into for different loudness targets.

You're not working into the meters' outdated spec, you're making them make better sense for today's loudness targets.

What I discovered, when setting 0VU using a 1kHz tone at a desired loudness target (using RMS metering, and later LUFS) was that the main characteristics of VU metering were essentially still there. If sections of the audio went above my RMS/LUFS target for 0 on the VUs, they went into the red. Sections with more dynamic range have a wider swing on the needles than sections that are louder and that are more dense. Using them alongside more accurate loudness metering such as RMS and LUFS, allows you to forget that they are technically incorrect - and that's alright because we ultimately make decisions with our ears anyway.

When working on vinyl premastering, where my loudness target is much lower than it is for digital distribution, I noticed a little more swing in the needles and made an adjustment on the VUs to better match what I was reading on my RMS/LUFS meters. The goal here is to make 0VU match *your* loudness targets, and then study the movement of the needles in relation to 0VU; you're not working into the meters' outdated spec, you're making them make better sense for today's loudness targets. By now, I have several 1kHz tone targets saved in a Pro Tools session that I can quickly recall and dial into the meters using one of its positions.

The addition of a headphone amplifier came years later. I had already built a couple of CMOY and Objective2 amplifiers, two fantastic opensource headphone amps and I was getting ready to add an O2 when I learned that DIYRE released a kit that is based on Douglas Self's 5532 opamp amplifier design, and decided to add it after some extensive listening, completing this design. You could say that I gave the old, outdated mechanical VU meter a new life, but that wouldn't be right - I actually gave it three.