



VU-DIY 2

Output Level VU Meter

Do It Yourself Kit

Thank You

Congratulations on your purchase of the D'Amore Engineering VU-DIY 2. This unit is designed and manufactured in the USA with pride.

A Word of Caution: This product has exposed circuitry and components on it. Damage can result from static discharge into the circuit board. Please handle with care.

Description

The VU-DIY 2 can be used as a real time indicator of how close to clipping your amplifier is being driven (when calibrated with our DD-1 Distortion Detector) and / or as a light show to add a visual sense to your music. Adding a visual sense to your music is great, as long as it is perfectly in sync. With the use of high speed circuitry in the VU-DIY 2, the response is real-time (zero delay).

*******READ THIS! IMPORTANT*******

We recommend using LEDs that already have the appropriate resistors installed for 12V use. If you use standard LEDs that do not have integrated resistors, you WILL HAVE TO use your own resistors. We recommend 600 - 1200 Ohms per LED depending on how bright you would like it. Less Ohms = More Brightness

About the Design

Some might consider the VU-DIY 2 to be over-built; we think it is just right. Some features of the design are:

- Mil spec FR4 circuit board
- Adjustable sensitivity
- Wide operating voltage range for vehicles with modified electrical systems
- Ability to drive 1 Amp per output in meter mode, 0.5 Amp per output in bar graph modes.

Specifications

Operating voltage range for power supply	8 – 18 VDC
Operating voltage range for remote turn on	3 – 18 VDC
Voltage required on speaker input for full scale @ maximum sensitivity	4 VAC RMS
Voltage required on speaker input for full scale @ minimum sensitivity.....	150 VAC RMS
Maximum input.....	200 VAC RMS
Maximum current requirement	5.5 Amps DC
LED outputs in VU mode.....	11 Channels, 3db spacing per output
LED outputs in 12V Voltmeter mode.	11 channels, 10.5V - 15.5V range, 0.5V per step [see chart on page]
LED outputs in 16V Voltmeter mode.	11 channels, 13.0V - 18.4V range 0.6V per step [see chart on page]
Max output current (Modes 1 and 4).....	1 Amp / Channel
Max output current (Modes 2 and 3).....	0.5 Amp /Channel
Dimensions.....	3.85 X 2.125 X 0.5 Inches

Modes of operation

Mode LED	Bar - VU - A	Bar - VU - B	Bar - VM - A	Bar - VM - B	Dot - VU - A	Dot VU B	Dot - VM - A	Dot - VM - B
1	-27dB	-27dB	<11.0 V	<13.0 V	-27dB	x	<11.0 V	<13.0 V
2	-24dB	-24dB	11.0 V	13.0 V	-24dB	x	11.0V	13.0V
3	-21dB	-21dB	11.5 V	13.6 V	-21dB	x	11.5V	13.6V
4	-18dB	-18dB	12.0 V	14.2 V	-18dB	x	12.0V	14.2V
5	-15dB	-15dB	12.5 V	14.8 V	-15dB	x	12.5V	14.8V
6	-12dB	-12dB	13.0 V	15.4 V	-12dB	x	13.0V	15.4V
7	-9dB	-9dB	13.5 V	16.0 V	-9dB	x	13.5V	16.0V
8	-6dB	-6dB	14.0 V	16.6 V	-6dB	x	14.0V	16.6V
9	-3dB	-3dB	14.5 V	17.2 V	-3dB	x	14.5V	17.2V
10	0dB	0dB	15.0 V	17.8 V	0dB	x	15.0V	17.8V
11	+3dB	+3dB	15.5 V	18.4 V	+3dB	x	15.5V	18.4V

Mode 1 - Bar Graph VU Meter. This mode is selected by switching the DIP SWITCHES to **BAR - VU - A**. In this mode all 11 LED outputs will be activated. This is a common type used with bar graphs in professional audio. Each LED step is approximately 3dB. See Chart.

Mode 2 - Bar Graph VU Meter with Peak Hold. This mode is selected by switching the DIP SWITCHES to **BAR - VU - B**. In this mode all 11 LED outputs will be activated sequentially, with the last (highest) LED remaining on longer, holding the peak, and then slowly tapering down. This is a common type used with bar graphs in professional audio. Each LED step is approximately 3dB. See Chart.

Mode 3 - Bar Graph 12V Voltmeter. This mode is selected by switching the DIP SWITCHES to **BAR - VM - A**. In this mode all 11 LED outputs will be activated sequentially. The Voltmeter range is 11.0V to 15.5V in 0.5V steps. See Chart.

Mode 4 - Bar Graph 16V Voltmeter. This mode is selected by switching the DIP SWITCHES to **BAR - VM - B**. In this mode all 11 LED outputs will be activated sequentially. The Voltmeter range is 13.0V to 18.4V in 0.6V steps. See Chart.

Mode 5 - "Dot" mode VU Meter. This mode is selected by switching the DIP SWITCHES to **DOT - VU - A**. In this mode the only one LED output will be activated at any given time. Useful for making the analog style meter like the D'Amore Engineering company logo, or for a moving dot bar graph. Each LED step is approximately 3dB. See Chart.

Mode 6 - "Dot" mode 12V Voltmeter. This mode is selected by switching the DIP SWITCHES to **DOT - VM - A**. In this mode the only one LED output will be activated at any given time. Useful for making the analog style meter like the D'Amore Engineering company logo, or for a moving dot bar graph. Each LED step is approximately 0.5V, See Chart

Mode 7 - "Dot" mode 16V Voltmeter. This mode is selected by switching the DIP SWITCHES to **DOT - VM - A**. In this mode the only one LED output will be activated at any given time. Useful for making the analog style meter like the D'Amore Engineering company logo, or for a moving dot bar graph. Each LED step is approximately 0.6V, See Chart.

Installation

Connectors will accept 16AWG - 24AWG wiring.

Connect a constant battery positive source to B+ connector. (Acceptable range is 8V – 18V)

Connect a switched battery positive source to the REM connector. (Acceptable range is 3V – 18V)

Connect a battery or chassis ground to the GROUND connector.

The AUDIO / INPUT connector should be connected to a DC voltage you wish to measure (in VM modes) or the (+) speaker signal wire of your amplifier, or to the speaker itself (in VU modes). Note: If you are trying to connect to the right channel of a 2 or more channel amplifier you may have to connect it to the (-) speaker output instead.

Connect LEDs intended for use with 12V or LEDs with resistors using 1k Ohm resistors in series with each LED - connector. *Not all channels need to be used if desired.*
Example: *Use just last output to make a clipping indicator. Or last 2 outputs for a 2 stage clipping indicator. ALL LED + or anodes should be connected together with no resistor to a constant or switched battery positive voltage.*

To apply vinyl logo and create the D'Amore Engineering Logo (one possible use for the VU-DIY 2)

1. Apply vinyl logo to outside of window. If you need instructions for this part there are many videos on YouTube showing how to apply vinyl logos.
2. Either attach the LED strips to a small sheet of plastic or wood using the double sided tape that is on the LED strips, OR cut small pieces of VHB tape and stick them to the LED side of the strips and then stick the strips directly to the glass.
3. There are 11 segments to the logo meter, aim one end of the LED strip toward the dB calibration number and the other end toward the small square dot at the bottom of the logo. The small vinyl dot should be removed once all 11 LED strips are lined up properly to simulate an analog VU meter.

Calibration with Distortion Detector DD-1

1. Disconnect speakers from amplifier
2. Connect VU-DIY 2 as described in installation section.
3. Connect DD-1 to amplifier output
4. Play track 3 or 4 from Distortion Detector CD (Track 3 for subwoofer amplifier, Track 4 for full range amplifier), set track to repeat.
5. Turn volume on source unit up until the **DD-1's** RED distortion detected LED illuminates.
6. Turn source volume down one click until distortion is no longer detected.
7. Turn the adjustment pot on the VU-DIY 2 fully counter clockwise. Then turn clockwise until the display switches from amber to red. Do this for each of the meters.
8. It is now calibrated, reconnect speakers and enjoy.

Calibration without Distortion Detector DD-1

1. Connect VU-DIY 2 as described in installation section.
2. Play music as loud as possible **without damaging your system or distorting the sound.**
3. Turn the adjustment pot on the VU-DIY 2 fully counter clockwise. Then turn clockwise until the display activates the red LED only slightly on the loudest peaks of the music.
4. Enjoy
5. Buy a DD-1 ;)

Troubleshooting

Problem: The VU-DIY 2 doesn't seem to do anything in VU mode.

Solution: Make sure the Grey signal wire is connected to audio signal. On most 2 and 4 channel amplifiers the Grey wire should be connected to the amplifier's Left Speaker (+) terminal. For monitoring a (Right) channel it should be connected to the Right Speaker (-) terminal. If the right channel doesn't work try connecting it to the Right Speaker (+) terminal of amplifier.

Problem: The meters do not return to the -27dB position even when no audio signal is present in VU mode.

Solution: There may be noise in the system or the amplifier has some DC offset on the output. If DC offset is the problem, it may be necessary to place a capacitor in series with White or Grey wire to filter this noise from the signal. If this is the case, a 10uF 200V non-polarized capacitor will do the trick. One side of capacitor connected to amplifier, the other side of capacitor connected to VU-DIY 2 White or Grey wires. Each wire (white and grey) should have its own capacitor connected as above. If system noise is the problem, it will need to be tracked down. Usual causes are grounding issues and gain structure not set correctly.

Limited Warranty

D'Amore Engineering warrants this product to be free of defects in materials and workmanship for a period of one year. This warranty is not transferrable and applies only to the original purchaser from an authorized D'Amore Engineering dealer. Should service be necessary under this warranty for any reason due to manufacturing defect or malfunction, D'Amore Engineering will (at its discretion), repair or replace the defective product with new or remanufactured product at no charge. Damage caused by the following is not covered under warranty: accident, misuse, abuse, product modification or neglect, unauthorized repair attempts, misrepresentations by the seller. This warranty does not cover incidental or consequential damages. Cosmetic damage due to accident or normal wear and tear is not covered under warranty. **Warranty is void if the product's serial number has been removed or defaced.**

Any applicable implied warranties are limited in duration to the period of one year beginning with the date of the original purchase. No warranties shall apply to this product thereafter. Some states do not allow limitations on implied warranties; therefore these exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If you need service on your D'Amore Engineering product:

All warranty returns should be sent to D'Amore Engineering accompanied by proof of purchase (a copy of the original sales receipt). Warranty expiration on products returned without proof of purchase will be determined from the manufacturing date code. Non-defective items received will be returned COD. Customer is responsible for shipping charges and insurance in sending the product to D'Amore Engineering. Shipping damage on returns is not covered under warranty.

To obtain service worldwide please e-mail D'Amore Engineering at:

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