



m303 Active DI

User Manual – Revision A / 10/03/2024

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1 Welcome

Thanks for purchasing the m303 Active DI. While it is designed to be simple and easy to use, we do recommend that you familiarize yourself with the setup and operational details contained in this manual. As always, with this or any other Grace Design product, please don't hesitate to reach out if you have any questions. We are always available by telephone Monday – Friday, 9AM to 5PM MST, or by email at info@gracedesign.com. Also, other information including technical documents and firmware can always be found on our website – www.gracedesign.com. Thanks for reading and enjoy your m303!

2 Important Safety Information

2.1 General

- Ordinary Protection: This equipment should not be exposed to dripping or splashing.
- Avoid placing objects filled with liquids, such as vases or glasses, on this equipment.
- Pollution Degree 2
- Maximum Relative Humidity: <80%
- Operation temperature range: -10 °C to 60C °C
- Storage and transportation temperature range –40 °C to 70 °C
- Maximum altitude: 3000m (9843 ft)
- Equipment suitable for continuous operation

2.2 Safety Marking Symbols



This symbol, located in this manual, refers to important instructions. Read this manual thoroughly before operating this equipment.

2.3 Service Information

The Grace Design m303 contains no user serviceable components. Contact Grace Design for repair and upgrade information. In the event that your Grace Design m303 needs to be returned to the factory, contact us for a return authorization number.

2.4 California Proposition 65 Warning

This product may contain metallic nickel, a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

3 Overview And Features

3.1 Features

- Phantom powered active DI with full galvanic isolation
- Custom wound Lundahl transformer with magnetic shield
- Ultra low noise output -118dBu (A weighting)
- Wide bandwidth 20-80kHz (-3dB)
- Excellent low frequency headroom 0.1% THD+N @50Hz <-80dB (0.007%)
- 1M ohm input impedance works with any pickup or line signal source
- Peak indicator LED 3dB before clipping
- Power indicator LED
- Efficient design only draws 4ma of phantom power current
- Through signal connector
- Fully ESD and RFI protected
- Input pad for high level signals
- High quality gold contact toggle switches
- Rugged 1/4" wall extruded aluminum chassis

4 m303 Overview

The m303 is a fully-isolated active DI, which converts a high impedance unbalanced signal to a low impedance balanced signal. It is perfectly suited for connecting instrument pickups (passive or active) and line level signals such as from a keyboard, synthesizer or laptop computer.

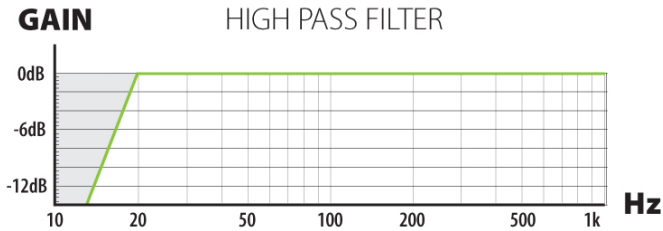
Passive pickups require a very high input impedance to ensure that there is no alteration of the tone quality of the instrument, which the high impedance FET input amplifier of the m303 provides. The unique power supply design of the m303 provides power for the active FET input amplifier while also supplying complete galvanic isolation from the XLR output connection. This provides the best possible provisions for minimizing ground loop noises.

In the event that the m303 is connected to high level signals, the input pad can be used to protect the m303 from overload. The PAD allows the m303 to receive a maximum level of +27dBu (27V peak to peak), which is sufficient for any line level source. However, even with the pad enabled the m303 is *not* designed to be connected to power amplifier outputs.

The audio signal is isolated through the use of a custom audio transformer from Lundahl in Sweden. Lundahl transformers are legendary for their sonic fidelity and transparency. The m303 transformer features a high nickel core which ensures high headroom and low distortion. The mu-metal magnetic shield protects the m303 from hum and buzz interference from nearby equipment.

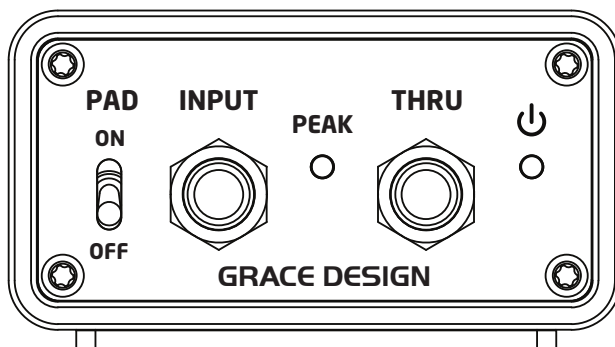
The m303 power supply converts the incoming 48V phantom power to a bi-polar DC supply for the input amplifier and HPF. This power supply is isolated, so that when you switch the GND lift switch, the instrument input ground is completely isolated from the output XLR ground. This ensures the highest possible rejection of ground induced noises.

The m303 features a built-in 2nd order (12db/octave) high pass filter (HPF), which removes any subsonic noise from the signal before being sent to the audio transformer. Subsonic information in the signal can easily cause high flux density in the output transformer which can significantly increase the distortion in the audio band. The HPF protects the downstream signal path from the adverse affects of unwanted low frequency information and provides maximum signal level handling of the DI. This is especially useful with piezo type pickups which can be very sensitive to instrument handling noise.



m303 features a power indicator which is on whenever connected to a 48V phantom power source. As well, there is a peak indicator which flashes red when the signal level reaches 3dB before clipping. These super efficient LEDs can be seen from a significant distance even in bright daylight.

4.1 m303 Front Panel Connections, Controls, and Indicators



1. PAD Switch

UP position will add 13dB of attenuation. Normally the pad will not be needed. In the case where a very high level input signal is being used, the PAD can be switched on to avoid overloading the m303.

2. INPUT jack

The input of the m303 is unbalanced, for use with a cable that is wired with a TS (Tip-Sleeve) plug. The tip is hot and the sleeve is ground. If using a TRS (Tip-Ring-Sleeve) connector, the Ring will be grounded.

The input impedance of the m303 is 1M Ω with the PAD off and 115k Ω with the PAD on. For passive pickups it is best to leave the PAD off as the lower impedance can have significant effects on the tone quality. If using a very high output source like an active pickup system or keyboard, the PAD may be necessary.



Do not connect the m303 INPUT to the output of a power amplifier. It is not designed to accommodate power amplifier levels. Also, some power amplifiers have balanced bridged outputs. Connecting to a balanced output amplifier would put amplified signals on the ground of the m303 which could damage downstream equipment.

3. PEAK indicator LED

The red peak indicator LED will illuminate when the input level exceeds +11dBu (PAD Off) and +21dBu (PAD On).

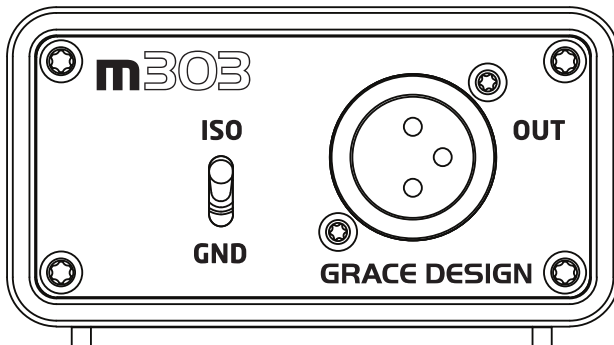
4. THRU jack

The THRU jack is wired in parallel with the INPUT jack. It is intended to be used as a parallel output for feeding a stage amplifier.

5. Power indicator LED

The green Power Indicator LED will illuminate when +48V phantom power is applied.

4.2 m303 Rear Panel Controls and Connections



1. Ground Lift Switch

The GND-ISO switch disconnects the Input ground from the Output ground for true (galvanic) isolation. When in ISO, the m303 can withstand large ground potential differences without causing hum or buzz.

2. OUT XLR connector

The OUT XLR connector receives the +48V phantom power and sends the low impedance balanced line outputs to the PA system.

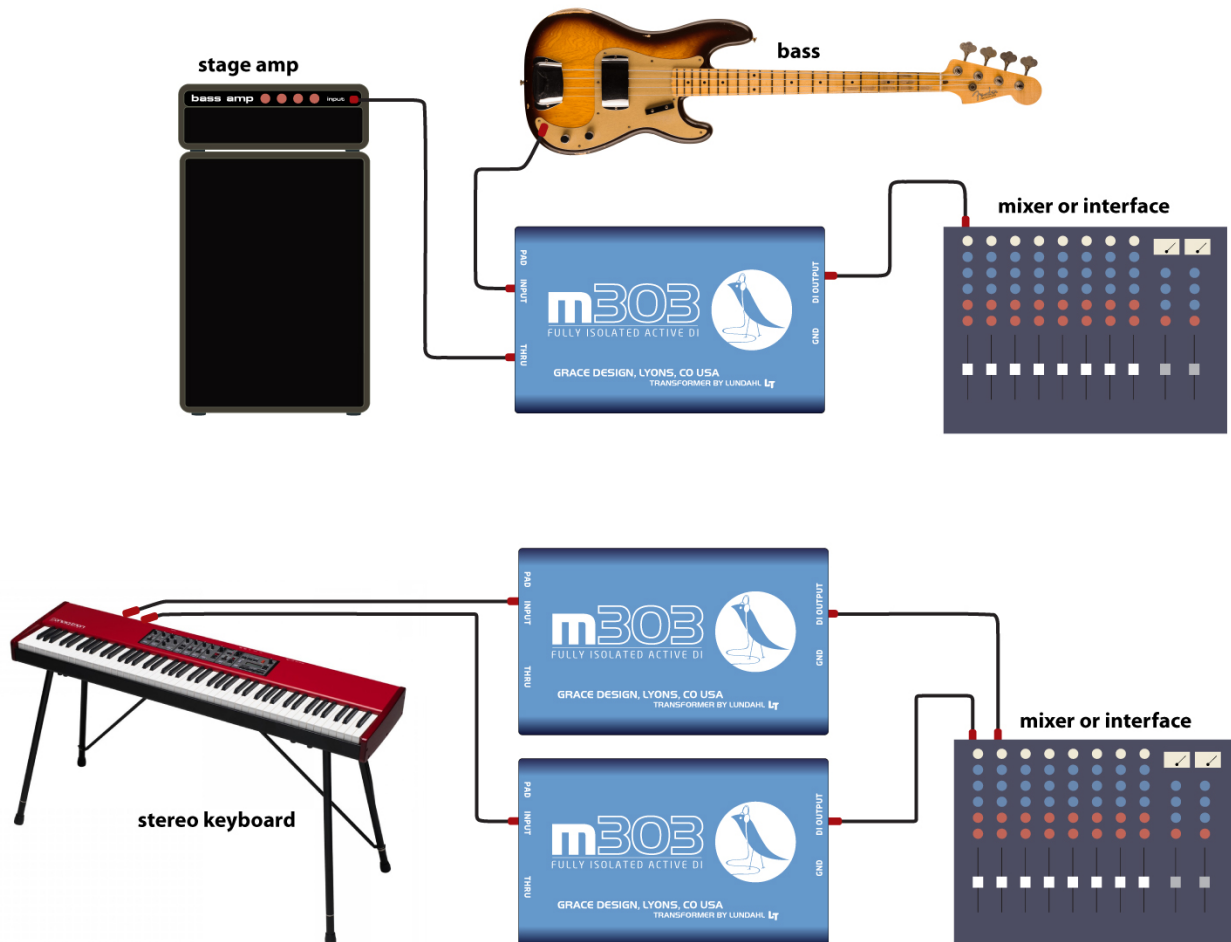
5 Installation

5.1 Open and inspect your box

Please take care when removing the m303 from its OEM packaging. Our packaging is designed with 'Korrvu©' suspension inserts, which provide the best protection from the dubious underworld of freight handling. The protective packing is 100% recyclable so please, if you don't save the packing materials, recycle them.

5.2 Connecting your m303

typical DI connections



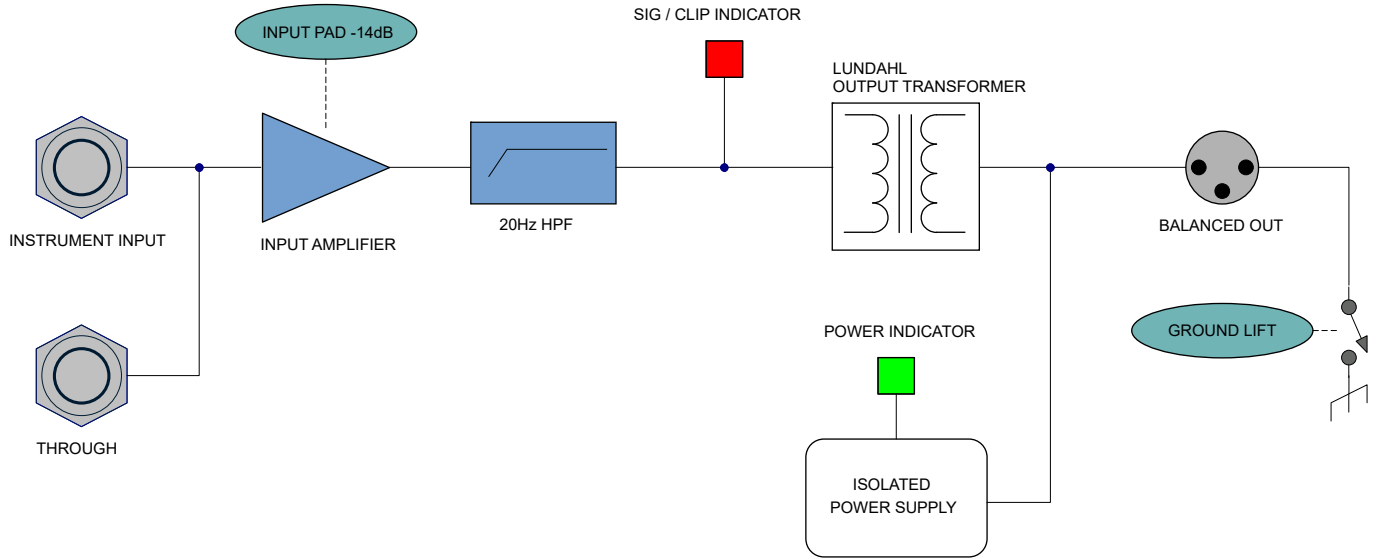
6 Operation

1. First make sure you have properly connected your instrument to the m303, your m303 through to your amp (if using), and the DI XLR output to your mixer or interface.
2. Next activate 48V phantom power on your mixer or interface. **Note:** it is always best to activate 48V power *after* all the connections are made, and deactivate 48V power *before* disconnecting.
3. The green LED power light will be on, indicating the m303 is ready to go.
4. If you are using a passive pickup, you probably won't need the PAD, if you are using a higher level active source, you may need to engage the PAD circuit.
5. If there is hum or buzz on your signal, try setting the GND-ISO switch to the 'ISO' setting, which will isolate the input ground from the output ground.
6. Enjoy!

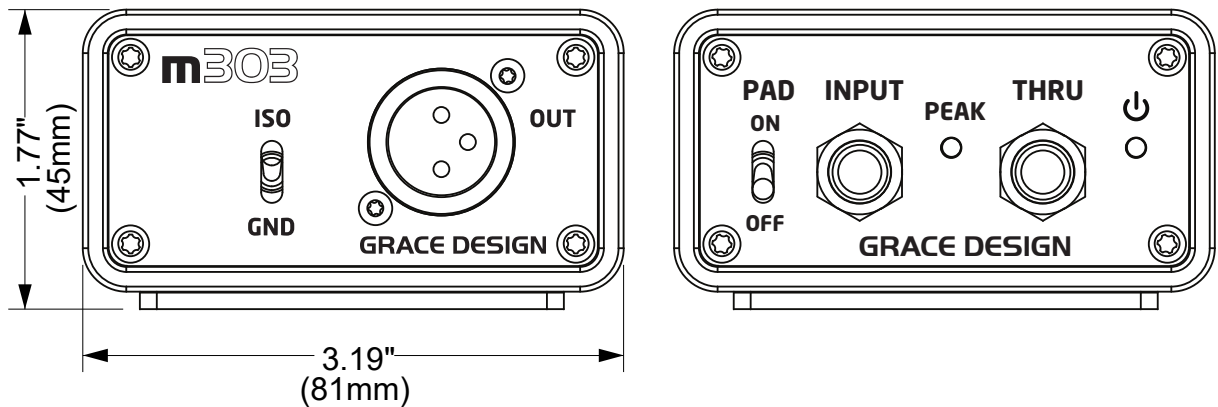
7 Electrical Specifications

m303 Specifications (preliminary)	
Gain	
Pad Off, 13.6k Ohm load	-6dB
Pad On, 13.6k Ohm load	-19dB
Frequency Response	
± 0.2dB (50Ω source, 13.6k load))	82Hz-27kHz
± 3dB (50Ω source, 13.6k load)	20Hz-80kHz
THD+N 20Hz-20kHz BW	
-10dBu out, 1kHz	-102.8dB (0.00072%)
-10dBu out, 50Hz	-83dB (0.0073%)
-10dBu out, 25Hz (10Hz-20kHz BW)	-72dB (0.023%)
High Pass Filter	
2 nd Order, Bessel	-3dB 20Hz
Intermodulation Distortion -10dBu Out	
SMPTE/DIN 1:1 (50Hz, 7kHz)	-106dB (0.0005%)
SMPTE/DIN 4:1 (50Hz, 7kHz)	-99dB (0.0010%)
Noise – Output Level 20Hz-20kHz	
Pad Off, 50Ω source	-116.2dBu
Pad Off, Input disconnected (equivalent to 330pF source)	-112.3dBu
Pad On, 50Ω source	-113.1dBu
Pad On, Input disconnected (equivalent to 330pF source)	-113d.0Bu
Noise – Output Level A-weighted	
Pad Off, 50Ω source	-118.6dBu
Pad Off, Input disconnected (equivalent to 330pF source)	-114.9dBu
Pad On, 50Ω source	-115.5dBu
Pad On, Input disconnected (equivalent to 330pF source)	-115.2dBu
Maximum Input Level (0.1% THD+N)	
1kHz, Pad Off	14dBu
1kHz, Pad On	27dBu
Maximum Output Level (0.1% THD+N)	
Balanced, 1kHz, 13.6kΩ Load	8dBu
Balanced, 1kHz, 3.65kΩ Load	7.3dBu
Impedance	
Input Pad Off	1MΩ
Input Pad On	115kΩ
Output	330Ω
Power Supply	
48V Phantom Power, IEC 61938	4mA max
Weight	
1.05lb, 0.48kg	
Dimensions	
5.30”L x 3.19”W x 1.73”H, 134mmL x 81mmW x 44mmH	
Grace Design reserves the right to update or change the electrical specifications at any time.	

8 Block Diagrams



9 Dimensions



10 Warranty Information

- Grace Design warrants this product to be free of defective parts and workmanship for a period of five years. This warranty period begins at the original date of purchase and is transferable to any person who may subsequently purchase the product during this time.
- This warranty excludes the following conditions: normal wear and tear, misuse, customer negligence, accidental damage, unauthorized repair or modification, cosmetic damage and damage incurred during shipment.
- During the time of this warranty, Grace Design will repair or replace, at its option, any defective parts or repair defective workmanship without charge, provided the customer has appropriate proof of purchase and that the product has its original factory serial number.
- In order for Grace Design to provide efficient and timely warranty service, it is important that you register your product online at www.gracedesign.com within 10 days of the original date of purchase. You may also register your product directly with Grace Design by telephone (303-823-8100 Monday-Friday 9:00am to 5:00pm MST).
- This warranty is in lieu of all other warranties whether written, expressed, or implied, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
- In no event will Grace Design be liable for lost profits or any other incidental, consequential or Exemplary damages, even if Grace Design is aware of the possibility of such damages. In no event will Grace Design's liability exceed the purchase price of the product.
- This warranty gives the customer specific legal rights. The customer may also have other rights, which vary from state to state. Some states do not allow limitations on implied warranties or consequential damages, so some of the limitations of the above may not apply to a particular customer.

11 Manual Revision History

Manual Revision History			
Rev.	Description	Date	Initials
01	Initial Engineering Draft	9/10/2024	MBG