



## User Manual



# ULTRA-DI DI100

Professional Battery/Phantom Powered DI-Box

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**Thank you**


Thank you very much for expressing your confidence in Behringer products by purchasing the ULTRA-DI.


## EN Important Safety Instructions





 Terminals marked with this symbol carry electrical current of sufficient magnitude to constitute risk of electric shock. Use only high-quality professional speaker cables with ¼" TS or twist-locking plugs pre-installed. All other installation or modification should be performed only by qualified personnel.

 This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure - voltage that may be sufficient to constitute a risk of shock.

 This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

 **Caution**  
To reduce the risk of electric shock, do not remove the top cover (or the rear section). No user serviceable parts inside. Refer servicing to qualified personnel.

 **Caution**  
To reduce the risk of fire or electric shock, do not expose this appliance to rain and moisture. The apparatus shall not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, shall be placed on the apparatus.

 **Caution**  
These service instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operation instructions. Repairs have to be performed by qualified service personnel.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

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**9.** Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

**10.** Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

**11.** Use only attachments/accessories specified by the manufacturer.



**12.** Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart

is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

**13.** Unplug this apparatus during lightning storms or when unused for long periods of time.

**14.** Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

**15.** The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection.

**16.** Where the MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.



## Legal Disclaimer

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## Limited Warranty

### § 1 Warranty

① This limited warranty is valid only if you purchased the product from a MUSIC Group Authorized Reseller in the country of purchase. A list of authorized resellers can be found on BEHRINGER's website [behringer.com](http://behringer.com) under "Where to Buy", or you can contact the MUSIC Group office closest to you.

② MUSIC Group\* warrants the mechanical and electronic components of this product to be free of defects in material and workmanship if used under normal operating conditions for a period of one (1) year from the original date of purchase (see the Limited Warranty terms in § 4 below), unless a longer minimum warranty period is mandated by applicable local laws. If the product shows any defects within the specified warranty

period and that defect is not excluded under § 4, MUSIC Group shall, at its discretion, either replace or repair the product using suitable new or reconditioned product or parts. In case MUSIC Group decides to replace the entire product, this limited warranty shall apply to the replacement product for the remaining initial warranty period, i.e., one (1) year (or otherwise applicable minimum warranty period) from the date of purchase of the original product.

③ Upon validation of the warranty claim, the repaired or replacement product will be returned to the user freight prepaid by MUSIC Group.

④ Warranty claims other than those indicated above are expressly excluded.

PLEASE RETAIN YOUR SALES RECEIPT. IT IS YOUR PROOF OF PURCHASE COVERING YOUR LIMITED WARRANTY. THIS LIMITED WARRANTY IS VOID WITHOUT SUCH PROOF OF PURCHASE.

### § 2 Online registration

Please do remember to register your new BEHRINGER equipment right after your purchase at [behringer.com](http://behringer.com) under "Support" and kindly read the terms and conditions of our limited warranty carefully. Registering your purchase and equipment with us helps us process your repair claims quicker and more efficiently. Thank you for your cooperation!

### § 3 Return materials authorization

- ① To obtain warranty service, please contact the retailer from whom the equipment was purchased. Should your MUSIC Group Authorized Reseller not be located in your vicinity, you may contact the MUSIC Group Authorized Fulfiller for your country listed under “Support” at behringer.com. If your country is not listed, please check if your problem can be dealt with by our “Online Support” which may also be found under “Support” at behringer.com. Alternatively, please submit an online warranty claim at behringer.com BEFORE returning the product. All inquiries must be accompanied by a description of the problem and the serial number of the product. After verifying the product’s warranty eligibility with the original sales receipt, MUSIC Group will then issue a Return Materials Authorization (“RMA”) number.
- ② Subsequently, the product must be returned in its original shipping carton, together with the return authorization number to the address indicated by MUSIC Group.
- ③ Shipments without freight prepaid will not be accepted.

### § 4 Warranty Exclusions

- ① This limited warranty does not cover consumable parts including, but not limited to, fuses and batteries. Where applicable, MUSIC Group warrants the valves or meters contained in the product to be free from defects in material and workmanship for a period of ninety (90) days from date of purchase.

- ② This limited warranty does not cover the product if it has been electronically or mechanically modified in any way. If the product needs to be modified or adapted in order to comply with applicable technical or safety standards on a national or local level, in any country which is not the country for which the product was originally developed and manufactured, this modification/adaptation shall not be considered a defect in materials or workmanship. This limited warranty does not cover any such modification/adaptation, regardless of whether it was carried out properly or not. Under the terms of this limited warranty, MUSIC Group shall not be held responsible for any cost resulting from such a modification/adaptation.
- ③ This limited warranty covers only the product hardware. It does not cover technical assistance for hardware or software usage and it does not cover any software products whether or not contained in the product. Any such software is provided “AS IS” unless expressly provided for in any enclosed software limited warranty.
- ④ This limited warranty is invalid if the factory-applied serial number has been altered or removed from the product.
- ⑤ Free inspections and maintenance/repair work are expressly excluded from this limited warranty, in particular, if caused by improper handling of the product by the user. This also applies to defects caused by normal wear and tear, in particular, of faders, crossfaders, potentiometers, keys/buttons, guitar strings, illuminants and similar parts.

⑥ Damage/defects caused by the following conditions are not covered by this limited warranty:

- improper handling, neglect or failure to operate the unit in compliance with the instructions given in BEHRINGER user or service manuals;
- connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used;
- damage/defects caused by acts of God/ Nature (accident, fire, flood, etc) or any other condition that is beyond the control of MUSIC Group.

⑦ Any repair or opening of the unit carried out by unauthorized personnel (user included) will void the limited warranty.

⑧ If an inspection of the product by MUSIC Group shows that the defect in question is not covered by the limited warranty, the inspection costs are payable by the customer.

⑨ Products which do not meet the terms of this limited warranty will be repaired exclusively at the buyer's expense. MUSIC Group or its authorized service center will inform the buyer of any such circumstance. If the buyer fails to submit a written repair order within 6 weeks after notification, MUSIC Group will return the unit C.O.D. with a separate invoice for freight and packing. Such costs will also be invoiced separately when the buyer has sent in a written repair order.

⑩ MUSIC Group Authorized Resellers do not sell new products directly in online auctions. Purchases made through an online auction are on a "buyer beware" basis. Online auction confirmations or sales receipts are not accepted for warranty verification and MUSIC Group will not repair or replace any product purchased through an online auction.

### § 5 Warranty transferability

This limited warranty is extended exclusively to the original buyer (customer of authorized reseller) and is not transferable to anyone who may subsequently purchase this product. No other person (reseller, etc.) shall be entitled to give any warranty promise on behalf of MUSIC Group.

### § 6 Claim for damage

Subject only to the operation of mandatory applicable local laws, MUSIC Group shall have no liability to the buyer under this warranty for any consequential or indirect loss or damage of any kind. In no event shall the liability of MUSIC Group under this limited warranty exceed the invoiced value of the product.

### § 7 Limitation of liability

This limited warranty is the complete and exclusive warranty between you and MUSIC Group. It supersedes all other written or oral communications related to this product. MUSIC Group provides no other warranties for this product.

**EN § 8 Other warranty rights and national law**

- 1 This limited warranty does not exclude or limit the buyer's statutory rights as a consumer in any way.
- 2 The limited warranty regulations mentioned herein are applicable unless they constitute an infringement of applicable mandatory local laws.
- 3 This warranty does not detract from the seller's obligations in regard to any lack of conformity of the product and any hidden defect.

**§ 9 Amendment**

Warranty service conditions are subject to change without notice. For the latest warranty terms and conditions and additional information regarding MUSIC Group's limited warranty, please see complete details online at [behringer.com](http://behringer.com).

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## Welcome to BEHRINGER!

DI stands for Direct Injection. On stage or in the studio there are sources you want to connect to your mixer that are not equipped with a suitable connection. Keyboards seldom have properly balanced outputs. Guitars cannot be directly plugged into a mixer and placing a microphone in front of a backline is not always ideal. A microphone picks up ambient noise such as other instruments. Low frequencies (such as from a bass guitar) are especially difficult for a microphone to handle.

A DI-box makes it possible to tap a signal from a high impedance unbalanced line, for instance the signal from a guitar to a guitar amplifier, and inject it directly into the mixer's input without having to use a microphone. But that's not all, there are lots of situations where you want to inject the signal coming from an unbalanced source directly into your mixer and preferably balanced, too. That is the application of a Direct Injection box.

Impedance is the electrical frequency dependent resistance of a device combined with its phase response. It is a literally complex matter. That is why a good DI-box is distinguishable from a bad one. As with a power amplifier and speakers the impedance to a device determines the performance. With a good power amplifier the load impedance only affects the maximum power output. Whereas on some other devices the impedance governs other properties as well. With a transformer as used in a DI-box, the connected impedances (in and out) influence the bandwidth, frequency response, distortion, etc.

There are two basic types of DI-boxes, passive and active. Both active and passive DI boxes are designed to be connected to the console's microphone input. A passive DI box has the advantage of being slightly lower in cost (less electronics, no battery facility) but their performance is highly dependent on the connected impedances. When the impedance on the mixer side of a passive DI-box changes, the impedance on the input changes also. Not only that, the frequency response changes, too. A passive DI-box only works well at specified connected impedances, high in and low out, which means that they only work in a standard application.

Active DI-boxes don't have such restrictions. The signal coming from the input is buffered with an amplifier. The input impedance of the ULTRA-DI is ultra-high so it doesn't affect the signal throughput at all. The output impedance of the Ultra-DI is balanced and very low so that it is much less susceptible to picking up hum and noise. This way, the impedance for the signal source is independent from the impedance of the used mixer and vice versa. There is no sound alteration. The transformer used is BEHRINGER's renowned OT-1 which guarantees distortion free, clean sound and a flat frequency response. Furthermore the BEHRINGER ULTRA-DI can be powered by your console's phantom power or by battery and switches automatically between these two.

- ◆ To avoid switching noise, you should mute the desk channel before activating the DI100. Same applies when switching between battery and phantom power and vice versa.

The design of the DI100 includes four sturdy rubber feet which protect the unit (even during a unplanned drop) and allow cables to run underneath. It also provides literally a “ground lift” so that the unit can be stacked on top of another unit and other equipment without creating ground loops.

## 1. Control Elements

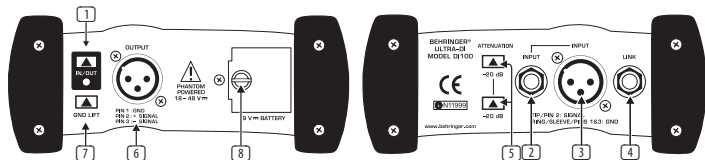


Fig 1.1: Front & Rear DI100

- 1 With the **ON/OFF** switch you can switch the battery power on and off to preserve battery life. Switched off the ultra-di will still work on phantom power. Switched on, the ULTRA-DI will automatically switch between battery and phantom power. When the DI100 is operating on battery power the on/off LED will flash once every few seconds, when operating on phantom power the LED will light up continuously.
  - 2 **INPUT.** Connect the source to this 1/4" jack to receive the signal.
  - 3 To provide maximum flexibility the ULTRA-DI is also fitted with an unbalanced XLR input to connect the source.
  - 4 **LINK OUT.** This is the unbalanced parallel output of the ULTRA-DI. Connect this to the input of the backline or monitor amplifier.
- ◆ The 1/4" jacks (input and link out) and the Input XLR are wired parallel, so any connection as input will give the same performance.
- 5 The **-20 dB** attenuation switches greatly increase the operating range of the ULTRA-DI. From the low-level signals of a high impedance microphone or guitar to the hot speaker terminals of a P. A. amplifier. Depressing both will give 40 dB attenuation.

- ◆ Only use the -20 dB switches if you are sure the ULTRA-DI is clipping (overloading) and not your mic pre-amp. Always use as little attenuation as possible to get the best possible signal-to-noise ratio.
- 6 **OUTPUT.** This is the balanced microphone level output of the ULTRA-DI. Connection to the microphone input should be made with a standard high quality balanced cable.
- ◆ Never connect pin 2 or 3 to pin 1 and never disconnect the shield from pin 1, or the unit will not work on phantom power.
- 7 Use the **GROUND LIFT** switch to either connect the ground of input and output or keep them completely separate. Depending on the grounding of the connected devices linking or disconnecting will reduce hum or prevent ground loops. **GROUND LIFT ON** means no interconnection.
- 8 **BATTERY COMPARTMENT.** Loosen the screw to open the compartment and to replace the 9 V battery. When the ULTRA-DI is switched on battery power the LED blinks, when it stops blinking it is time to change the battery.

## 2. DI100 Configurations

The next section will show several different ways the ULTRA-DI can be hooked up.

### 2.1 Tapping signal from the (Bass) guitar

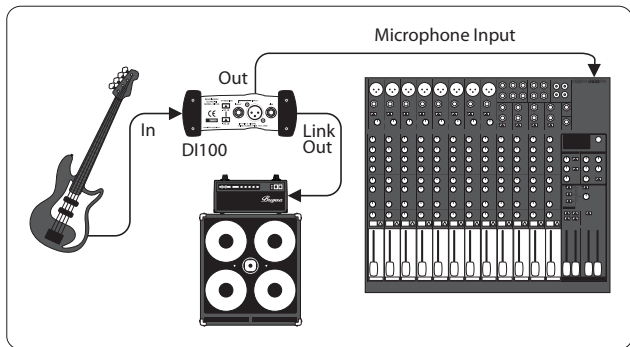


Fig 2.1: Guitar → DI → Guitar Amp/Mixer

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This figure shows the standard application of any direct injection box. The signal to the amplifier is unaffected, it is just tapped off to be routed to the microphone input of the mixer. Especially bass guitars benefit from this application. It is difficult to find a microphone which handles high level low frequencies well and with a linear frequency response. Using the ULTRA-DI will give you clean and crisp sound. Connect the ULTRA-DI after any effects devices so that their effect will be heard over the P.A.-system or on the recording. If the mixer provides phantom power between 20 V and 52 V, the internal battery of the DI100 will automatically be detached. You should chose this possibility whenever possible to save battery power.

## 2.2 Converting the output of a Keyboard / DJ-mixer / Headphone plug

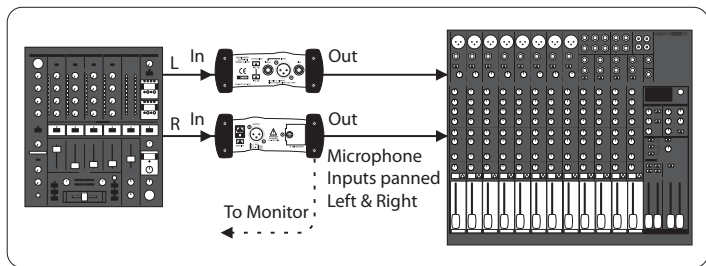


Fig 2.2: DJ-mixer  $\rightarrow$  2 x DI  $\rightarrow$  mixer

This configuration can be used with a keyboard, DJ-mixer, headphone output, drum kit or any (stereo or mono) line source. In all cases where you want to run long lines, for instance to the FOH (Front Of House) desk. In most cases the best setting is achieved by depressing one of the -20 dB pad buttons to avoid overloading the FOH desk input. The signal can be linked through to another amplifier, if the keyboard player / DJ / etc. wants to have a monitor connected independent of the foldback mix. The ULTRA-DI acts as both a ground isolator and an unbalanced to balanced converter.

## 2.3 Converting a microphone from high impedance unbalanced to low impedance balanced

Sometimes all that's available (especially when all other mics are in use) is an unbalanced high impedance microphone with an unbalanced jack. With the ULTRA-DI long cable runs to the console can be established without fear of picking up noise and hum. Just plug the jack into the input and connect the output to the console's mic in.

## 2.4 Tapping a signal from a power amplifier output

When no line out is available it is possible to connect an amplifier output directly to the DI100 (for example, recording direct from a guitar amplifier, TV-speaker, etc). It is possible to connect the output, i.e an extra speaker output, of up to 3000 Watts to the ULTRA-DI without fear of overloading. Pay attention to the two -20 dB buttons on the ULTRA-DI! Both must be depressed if an amplifier output is connected to the DI100 input.

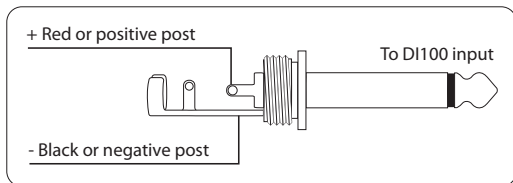


Fig 2.3: Connection to an amplifier output

- ◆ Always make sure the ground lift is on (no ground link) when connecting to speaker terminals. This prevents accidental short-circuiting of the amplifier output. Also make sure the Tip of the input jack is connected to the red terminal and that the metal housing of the DI100 has no contact with other equipment.

**EN 3. Specifications**

Frequency Response	10 Hz to 93 kHz
Noise Level	-110 dBu
THD + N @ 1 kHz / 0 dBu	< 0,005 %
Input Impedance	> 250 kOhm
Load Impedance	> 600 Ohm
Inputs	¼" jack unbal. In/Link Out XLR unbalanced In
Output	XLR balanced Out
Maximum Input level	+10/ +30/ +50 dBu

**Power supply**

Phantom power	18 V DC to 48 V DC
Battery	9 V blockcell 6LR91
Dimensions	150 x 130 x 60 mm
Weight	ca. 650 g

BEHRINGER is constantly striving to maintain the highest professional standards. As a result of these efforts, modifications may be made from time to time to existing products without prior notice. Specifications and appearance may differ from those listed or shown.



We Hear You