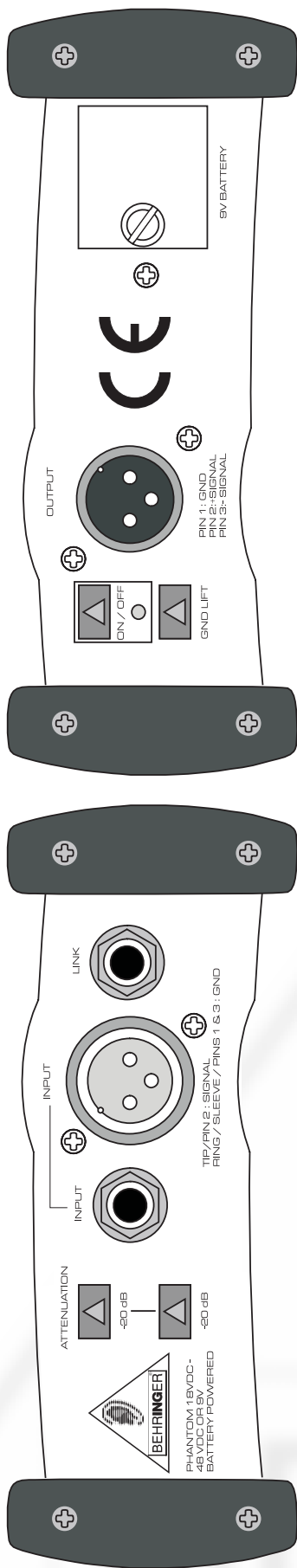


# ULTRA-DI

# DI100



## User's Manual



Version 1.0 August 1998



[www.behringer.de](http://www.behringer.de)

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Tel. +49 (0) 21 54 / 92 06-0, Fax +49 (0) 21 54 / 92 06-30

# Welcome to BEHRINGER!

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


DI stands for Direct Injection. On stage or in the studio there are sources you want to connect to your mixer that aren't 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 witch 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.

 **You should mute the desk channel before activating the DI100.**

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

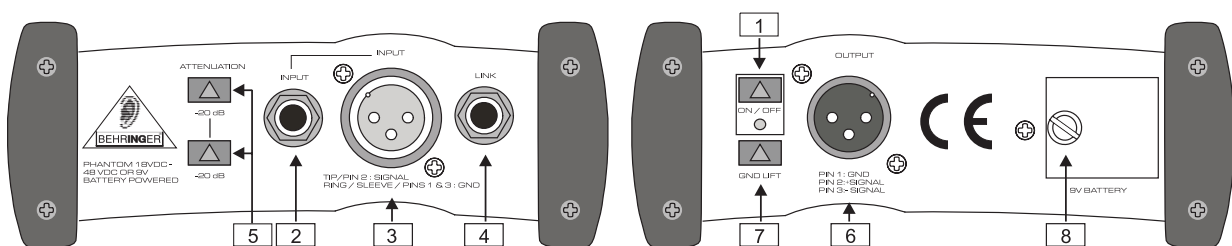



Fig 1.1: Front & Rear DI100

- 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

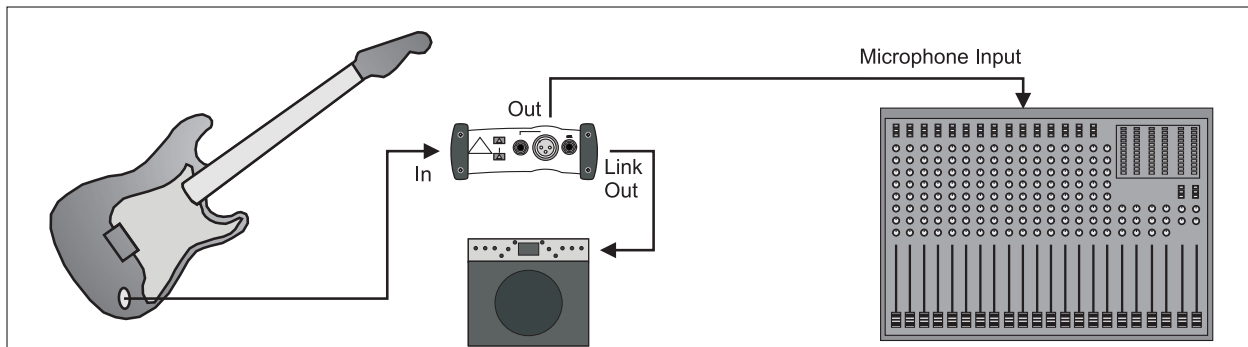


Fig 2.1: Guitar → DI → Guitar Amp/Mixer

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

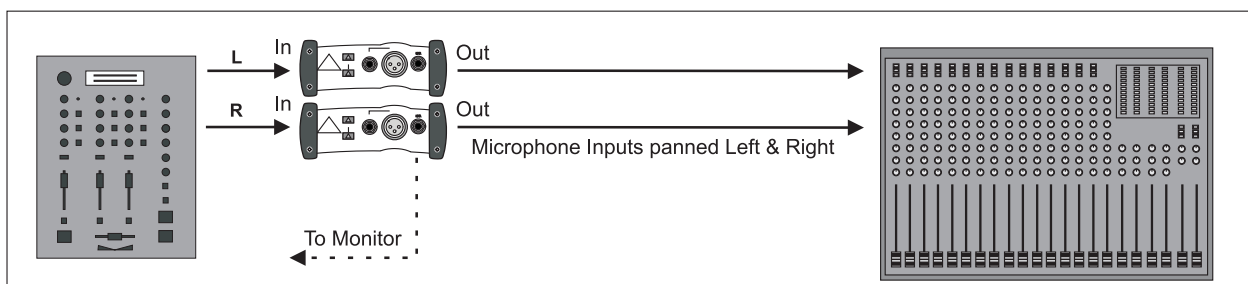


Fig 2.2: DJ-mixer → 2xDI → Mixer

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 a 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.

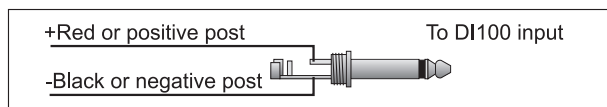


Fig 2.3: Connection to an amplifier output

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.

## 3. Specifications

Frequency Response	10 Hz to 93 kHz	Power supply	
Noise Level	-110 dBu	Phantom power	18 V DC to 48 V DC
THD+N @ 1 kHz / 0 dBu	< 0,005 %	Battery	9 V blockcell 6LR91
Input Impedance	>250 kOhm	Dimensions	150 mm x 130 mm x 60 mm
Load Impedance	>600 Ohm	Weight	ca. 650 g
Inputs	1/4" jack unbal. In/ Link Out XLR unbalanced In		
Output	XLR balanced Out		
Maximum Input level	+10/+30/+50 dBu		

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.

## 4. Warranty

### § 1 WARRANTY CARD

To be protected by this warranty, the buyer must complete and return the enclosed warranty card (signed/stamped by retail dealer) within 14 days of the date of purchase to BEHRINGER INTERNATIONAL (address see § 3). Failure to return the card in due time (date as per postmark) will void any extended warranty claims.

### § 2 WARRANTY

BEHRINGER INTERNATIONAL warrants the mechanical and electronic components of this product to be free of defects in material and workmanship for a period of one (1) year from the original date of purchase, in accordance with the warranty regulations described below. If any defects are found in the materials or workmanship, or if the product fails to function properly within the specified warranty period, BEHRINGER INTERNATIONAL shall, at its sole discretion, either repair or replace the product. If the warranty claim proves to be justified, the product will be returned freight prepaid by BEHRINGER INTERNATIONAL within Germany. Outside of Germany, the product will be returned at the buyer's expense.

Warranty claims other than those indicated above are expressly excluded.

### § 3 RETURN AUTHORIZATION NUMBER

To obtain warranty service, the buyer must call Behringer GmbH during normal business hours BEFORE returning the product (Tel.: +49 (0) 21 54 / 92 06 66). All inquiries must be accompanied by a description of the problem. BEHRINGER INTERNATIONAL will then issue a return authorization number. The product must be returned in its original shipping carton, together with the return authorization number, to the following address:

BEHRINGER INTERNATIONAL GmbH  
Service Department  
Hanns-Martin-Schleyer-Str. 36-38  
D - 47877 Willich-Münchheide

Shipments without freight prepaid will not be accepted.

### § 4 WARRANTY REGULATIONS

Warranty services will be furnished only if the product is accompanied by an original retail dealer's invoice. Any product deemed eligible for repair or replacement by BEHRINGER INTERNATIONAL under the terms of this warranty will be repaired or replaced within 30 days of receipt of the product at BEHRINGER INTERNATIONAL. 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. The warranty does not cover any such modification/adaptation, irrespective of whether it was carried out properly or not. Under the terms of this warranty, BEHRINGER INTERNATIONAL shall not be held responsible for any cost resulting from such a modification/adaptation. Free inspections, maintenance/repair work and replacement of parts are expressly excluded from this warranty, if caused by normal wear of the product. Damages/defects caused by the following conditions are not covered by this warranty:

- ▲ misuse, neglect or failure to operate the unit in compliance with the instructions given in the 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.
- ▲ damages/defects that are caused by force majeure or by any other condition beyond the control of BEHRINGER INTERNATIONAL.

Any repair carried out by unauthorized personnel will void the warranty. Products which do not meet the terms of this warranty will be repaired exclusively at the buyer's expense. BEHRINGER INTERNATIONAL will inform the buyer of any such circumstance. If the buyer fails to submit a written repair order within 4 weeks after notification, BEHRINGER INTERNATIONAL will return the unit C.O.D. with a separate invoice for freight and packing. Such cost will also be invoiced separately when the buyer has sent in a written repair order.

### § 5 WARRANTY TRANSFERABILITY

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

### § 6 CLAIM FOR DAMAGES

Failure of BEHRINGER INTERNATIONAL to provide proper warranty service shall not entitle the buyer to claim (consequential) damages. In no event shall the liability of BEHRINGER INTERNATIONAL exceed the invoiced value of the product.

### § 7 OTHER WARRANTY RIGHTS

This warranty does not exclude or limit the buyer's statutory rights provided by national law, in particular, any such rights against the seller that arise from a legally effective purchase contract.