

Di box - lab report example



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Di box

The DI Box: The first application of the DI box was done to record Paul McCartney's bass guitar in "Sgt Pepper's Lonely Hearts Club Band" on 1st February 1967. However in America, Motown Engineers were using them about five years before this. The DI or Direct Injection box is used for several purposes. The chief application is to convert a low impedance line level signal to a high impedance mic level signal. The first widespread use came into existence during the 1970s, when live touring equipment became more powerful and complex and venues started to become larger. The basic function was to enable the sound engineers to lay long lines of three core balanced cable between musicians and the engineer, who might be seated at the far end of the venue. In order to send him proper and noiseless signals, one would require balanced lines with high impedance. But the electric guitar, bass guitar, electric keyboard or the drum machine outputs are all unbalanced and low impedance outputs of around 50 kilo ohms. In order to convert it into impedances of around 3 kilo ohms, DI boxes are employed. They basically consist of an impedance matching transformer. A transformer consists of two coils - the primary and the secondary. The number of turns in each actually determines whether it is a step-up, a step-down or just an isolating transformer. Having a transformer also serves another very important purpose - isolation between the input and output signals. This helps to keep the expensive musical instruments out of the way of damage by the intrusion of unwanted electrical impulses such as an accidentally switched on phantom power in the mixing console. In DI boxes, however, a step-down transformer is used. The number of turns in the

primary coil is more than in the secondary coil. Therefore lesser amount of current is induced in the secondary coil, resulting in a mic level output (around -30dBV), from a line level input (around -10dBV). The change in the signal level is directly proportional to the turn's ratio in the primary and secondary coils. Output transformers in DI boxes typically employ a 10: 1 winding ratio. Another important feature is the ground lift switch, which helps to eliminate unwanted hum or any other type of noise that might be induced into the system by the interference of more than one ground loop, resulting from more than one grounding loop employed in a single system. The ground lift breaks the ground loops and prevents the reproduction of low frequency hum and interference (usually about 60 Hz or 50 Hz, depending on the AC power cycle of a particular country). The top side of using such passive DI box is usually a little loss of signal (about 3 to 6 dB) strength and signal quality (a high frequency roll-off and phasing problems) that sometimes may result from a cheap output transformer. However, these little difficulties are easily got over by employing an active DI box that uses either the phantom power from the mixing console it is connected to or uses batteries or main power adaptors to drive the unit. They basically consist of a pre-amplifier with an adjustable input sensitivity to match the source signal. These units sometimes don't employ a step-down transformer in the output and thus they do not provide the physical isolation between the incoming and the outgoing signal. They do their job by employing complicated and active electronic components such as ICs and chips. The active DI boxes can also provide other features such as basic filtering circuits that can be switched in or out, and input attenuators by different selectable pads, and sometimes polarity reverse to compensate for a faulty cable or connector

and sometimes an output gain control to match the input sensitivity of any mixing console. The DI box, though playing a small part in the audio chain is not to be overlooked. They are to be selected very carefully and only after considering their full specification and the application should the choice be made. List of references: 1. "Going Direct", Scott Wilkinson, Electronic Musician Article, November 1st, 2001, 12: 00 pm; www. emusician. com, Web: 15th April, 2001, 10pm, http://emusician.com/mag/emusic_going_direct/index.html

2. "Direct Injection (DI) boxes can be real problem solvers in the studio, but you have to choose the right one for the job", Paul White, www. soundonsound. com, articles, June 2002 issue, Web: 15th April 2011, 10pm, [http://www. soundonsound. com/sos/jun02/articles/diboxes. asp](http://www.soundonsound.com/sos/jun02/articles/diboxes.asp) _____