

Inside the Avalon U5

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When I tried to find something about the Avalon U5, I realise that there was almost nothing about it.

The Avalon U5 is really different of other classical DI :

- it is a preamp : gain of maxi +30 dB is set by 3dB steps
- it's an equalizer : some useful Eq curves are already programmed in it.
- it has a very high clipping level : +24dBu.

A Classical DI box takes its power from Phantom power of the console, or from a 9V battery, giving a poor +4.5V / -4.5V power supply for the internal circuitry.

Here is the big difference of the U5 : you need a mains plug for it, and the power rails are much higher : + 32V / -32V.

When the box is opened, we could see that the DI contains 3 PCB :

- the main PCB, which includes pre amplifier, amplifiers , power supply
- the GAIN PCB which contains only resistors and gain switch. it is connected to main PCB by 2 wires
- the EQ PCB, which contains the passive EQ. it is connected to main PCB by 3 wires

Let's have a look inside :

On the main PCB, we could see that very few active components are used :

- BC546 : NPN Transistor 65V 100mA
- BC556 : PNP Transistor 65V 100mA
- BD139 : NPN 80V , 1.5A
- BD140 : PNP 80V , 1.5A
- LF412 : dual opamp

That's all for audio ! we also have two transistors for the power supply :

- TIP31
- TIP32

This is a discrete preamp / DI : that means audio amplification is made by transistors rather than integrated circuits. And that's why we could get a High headroom.

With classical Opamps design, the limitation for power supply voltage is around +/-17V.

Here, the Avalon is going to +/- 32V .

The DI must have a very high input impedance : the datasheet claims that it is 3Meg.

how do we get such high impedance with bipolar transistor ?

to answer to this question, I have to do a bit of "reverse", as no schematic is available on the net for the U5.

By the way, we could verify by ourself if the mention : "DC coupling" "Super Bass" is true (and of course...it is not !)

Here is the schematic of the input circuit (simplified and partial) :

as it could be seen, the input stage has no differential pair : a single PNP transistor is used to create an asymmetrical input with a very high input impedance.

Here is the real mystery of this circuit : the input impedance is approx 3Meg : that's roughly the 3 resistors of 10Meg in parallel.

It seems that the input impedance of the bipolar transistor (which is quite low) does not count.