



Fredenstein
Professional Audio

HD
MIC-PRE

Operating Manual

Fredenstein HD Microphone Preamplifier

The Fredenstein HD microphone preamplifier utilizes a completely new approach to microphone level amplification. Everybody in the recording industry is now using 96 kHz or 192 kHz sampling rates while tracking, but still using equipment, which cannot provide the frequency response or bandwidth provided by modern A/D converters. The HD Pre overcomes these limitations and yields a new sound quality. Especially for wider bandwidth sources, like acoustic instruments, voices, and drums, the HD pre plays in its own league. It is the preferred choice for classical recordings as well.

Besides incorporating a fully discrete signal path and a Class-A balanced output stage, the HD Pre uses a revolutionary current amplification circuit, which neutralizes limiting internal transistor capacitors. As a result, the HD Pre features an unprecedented bandwidth of over 900 kHz. The screen shot below shows the -3dB point at 917 kHz.

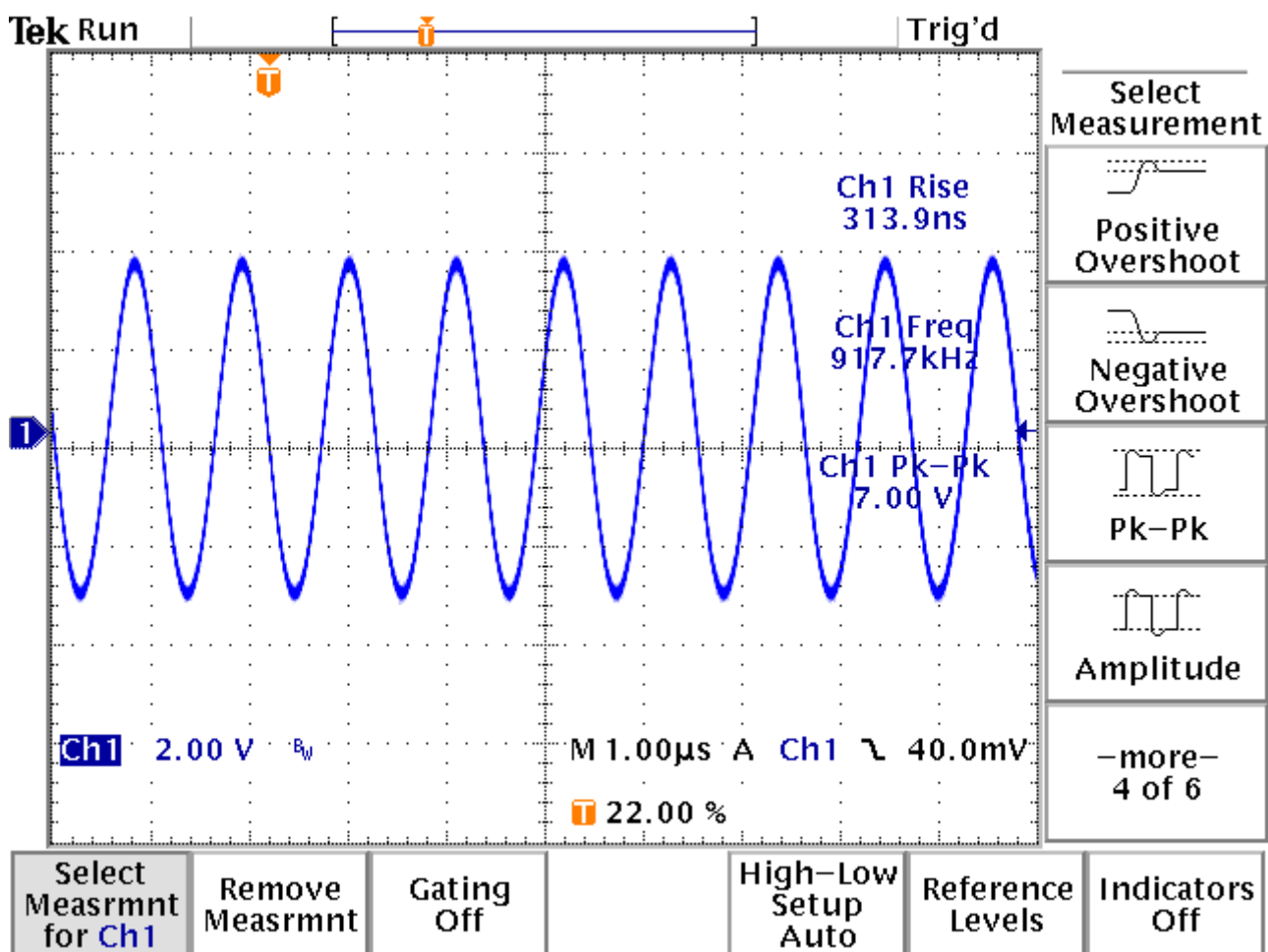


Figure 1: -3 dB point

The new current amplification circuit does not need any negative feedback which improves the impulse response dramatically. The next screen shot shows the square wave response at 106 kHz. The slew rate of the output stage is less than 400ns for a 12 Vpp output signal, which equals to 30

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Volts per microsecond.

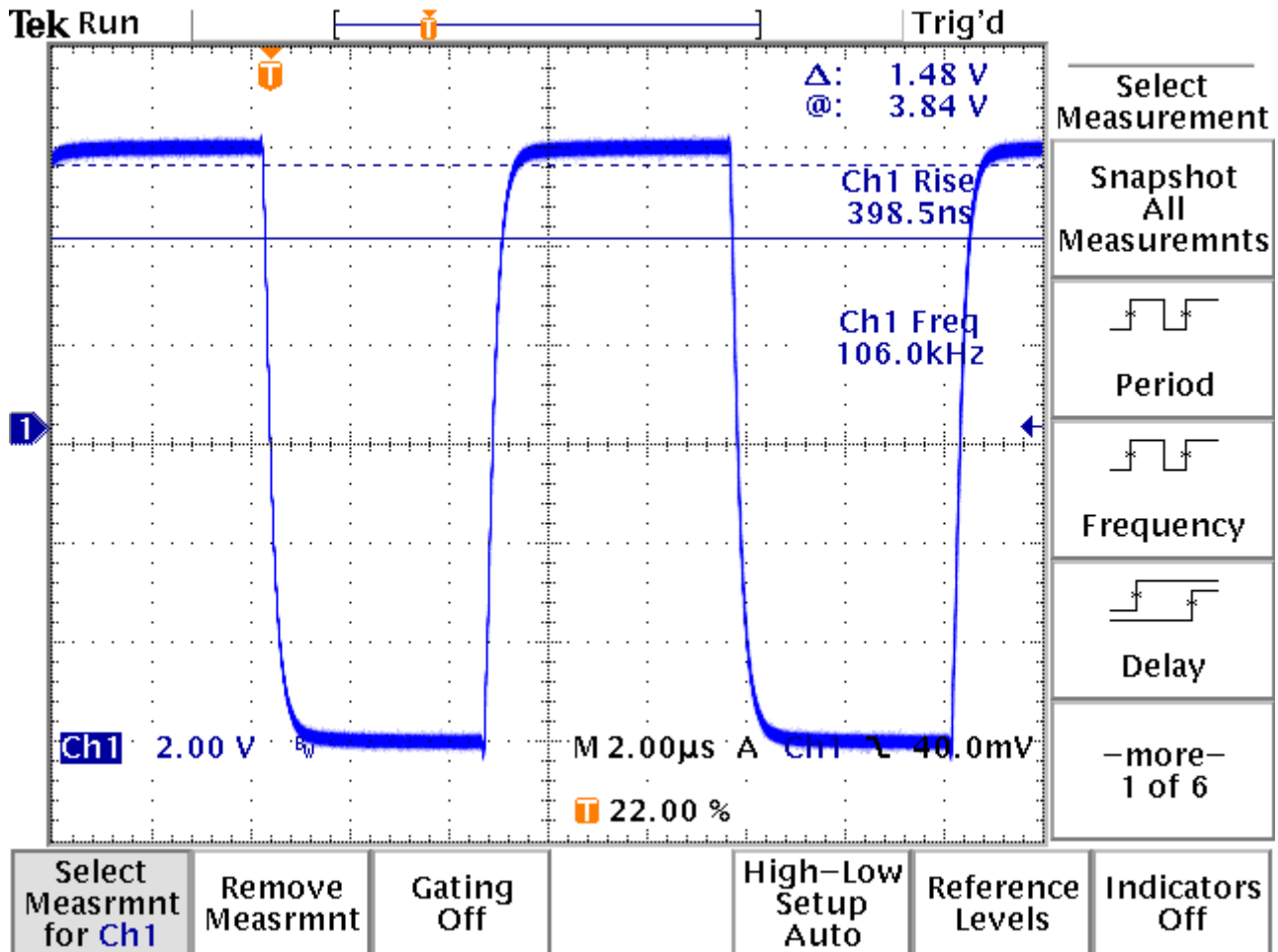


Figure 2: 106 kHz square wave response

The input impedance of the HD Pre is standard 200 kOhms and can be reduced to 1 KOhm by activating the LOW-Z function. This high input impedance avoids loading the microphone output transformers and yields in most cases sonically superior result. In any case, the engineer can switch between the two settings to find the desired result without any fear of damaging the microphone.

But the HD also performs excellent in more traditional amplifier tests:

Unfortunately, standard audio test equipment is unable to cover the complete range of the HD Pre. Above is the frequency response of the HD: 20Hz to 20kHz within 0.1 dB, -3dB at 7Hz and 900 kHz.

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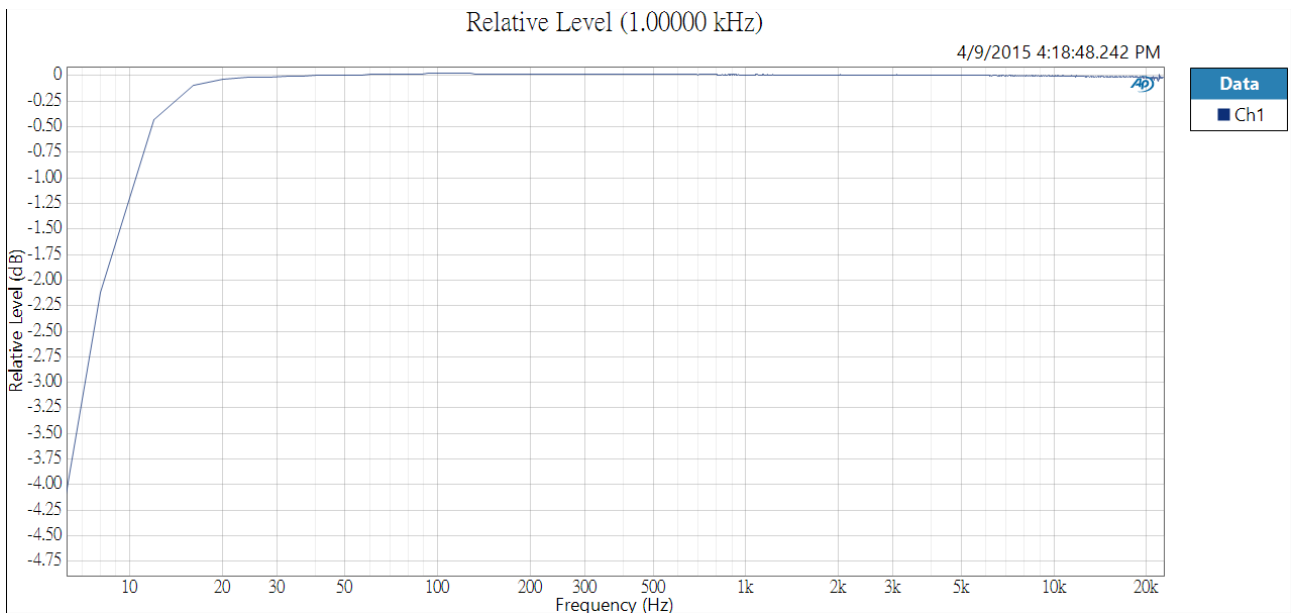


Figure 3: Frequency response

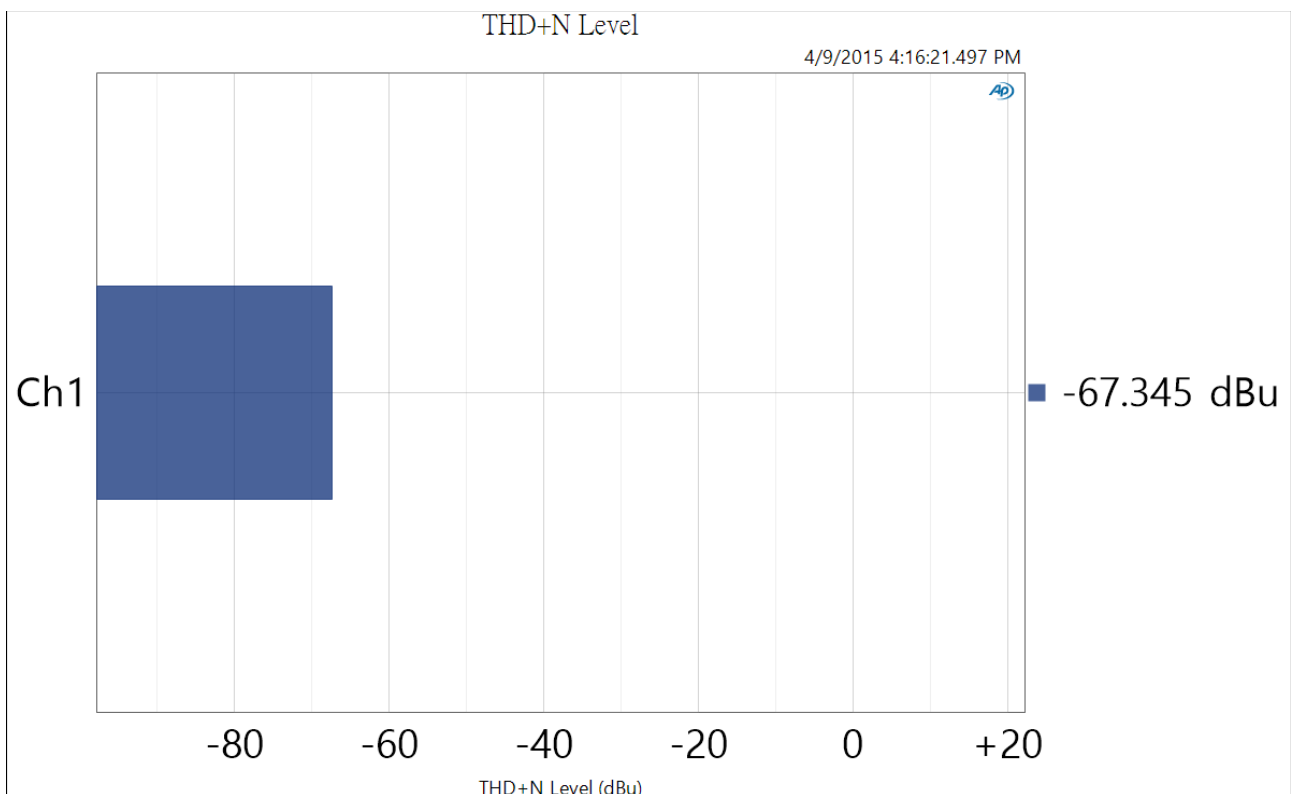


Figure 4: Total Harmonic Distortion plus Noise at 64 dB Gain

The output reference level is +4dBu, the standard American studio reference level. So THD plus Noise is at -71 dB at 64 dB gain which equals to an input noise of -135 dB at 50 Ohms generator output impedance. The total distortion and noise ratio is excellent at 0.0082 %.

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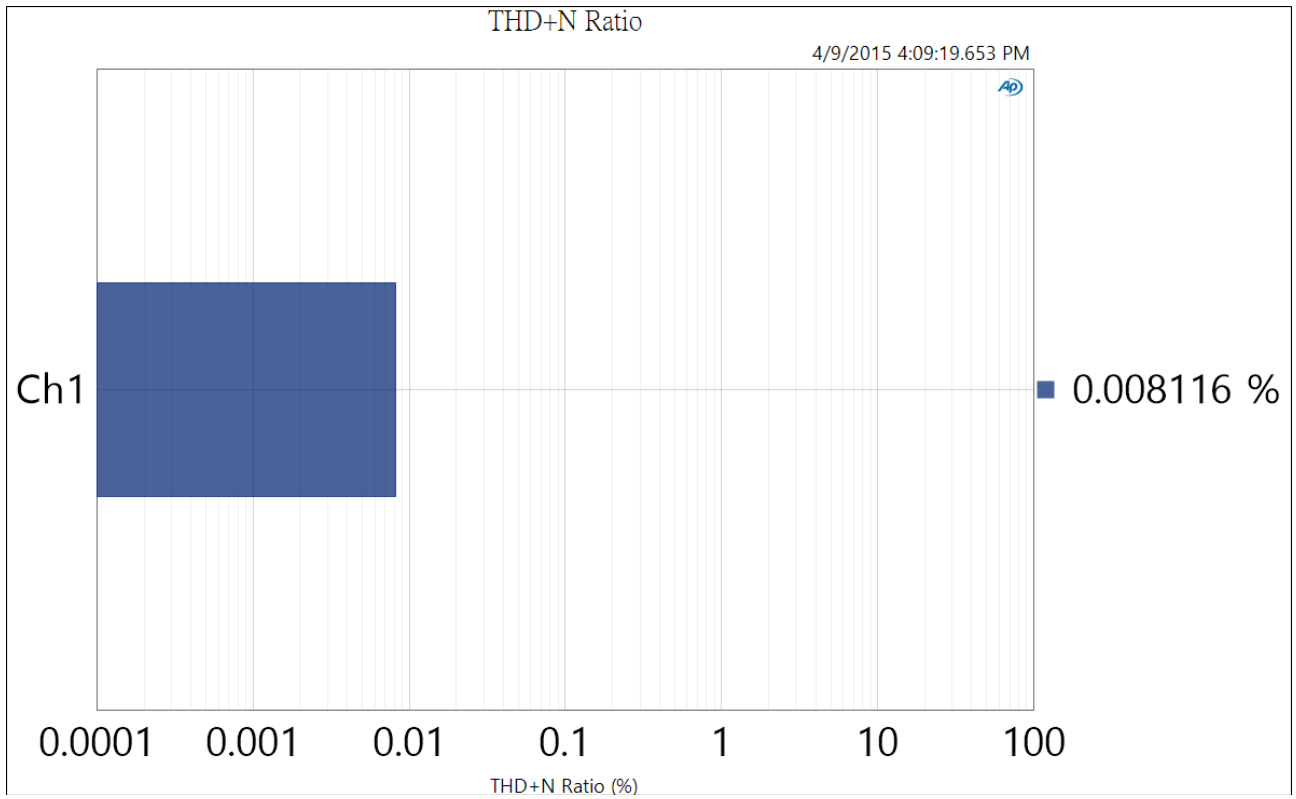
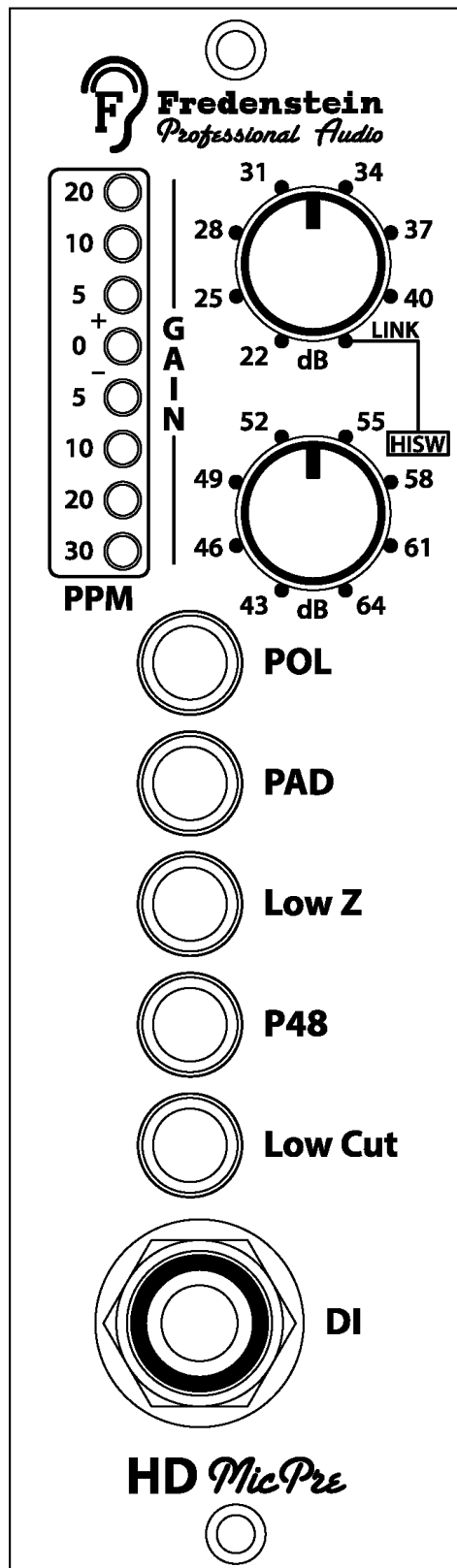


Figure 5: Total Harmonic Distortion (THD) plus Noise at 31dB Gain

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Overview:



Rotary Control:

GAIN : Upper Gain Switch from 22 to 40 dB in 3dB steps and enable for Lower Gain Switch

Lower Gain Switch from 43 to 64 dB in 3 dB steps

Output Peak Level Indicator: -30 dB to +20 dB (0dB = +4dBu)

Switches:

POL : Reverse Output Polarity when lit

PAD : -20 dB Input Attenuator when lit

LOW Z : 1000 Ohms Input Impedance when lit

P48 : +48 Volt Phantom Power when lit

Low Cut : reduces the lower frequency response to 60 Hz

DI : High Impedance (2M Ohms) balanced or unbalanced Input

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Installation:

Please power down your rack or box first before inserting the HD Pre. The power requirements are quite demanding at a maximum of +/-150mA and the HD Pre will not work in weaker racks.

Gain Control:

Two Stage Gain Control, ranging from 22 to 64 dB in 15 steps, 3 dB each. The upper rotary switch covers the range from 22 to 40 dB, the lower switch from 43 to 64 dB. The clockwise last position of the upper switch, labeled Link, enables the lower switch.

POL – Polarity Control:

Pushing the POL switch selects the polarity, when lit (blue), the output polarity is reversed. Otherwise the true, non-reversed, polarity is selected (normal operation).

PAD – Input Attenuator:

Setting the PAD switch (orange light) activates a 20dB attenuator at the input allowing line level signals to pass through the preamplifier (note: Pad also affects affects the DI input)

Low Z – Low Inout Impedance:

When lit (green), the input impedance changes from 200 kOhms to 1000 Ohms. Some dynamic- and ribbon-microphones only work linear on a low input impedance.

P48 Phantom Power:

Most FET condenser microphones as well as some other microphones with built-in amplifiers require +48V Phantom Power. Setting the P48 switch (red light) enables +48V through the balanced microphone line. Please check your microphone documentation if you are not 100% sure. Enabling P48 on microphones not designed for P48 might cause severe damage to the microphone. The DI input is not supplied with Phantom Power.

Low Cut:

A 60Hz low cut filter is activated when lit, avoiding unwanted low frequencies while tracking.

DI – Direct Input:

The most common use for the DI input is to connect instruments like guitars directly to the HD Pre. The input impedance is greater than 2 MOhms to insure compatibility with most instrument pickups. After inserting a balanced (Tip-Ring-Sleeve) or an unbalanced (Tip-Sleeve) plug, the balanced microphone input through the box or rack is automatically disabled.

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Technical Data:

Frequency Response :	12 Hz – 700,000 Hz, +/- 1 dB
Distortion :	< 0.0082 at +4 dBu Output Level (31 dB Gain)
Input Noise :	< -131 dB at 150 Ohms Source Impedance (64dB Gain)
Input Impedance :	> 200 kOhms or 1000 Ohms selectable
DI Impedance :	> 2 MOhms
Max. Input Level :	+ 20 dBu,
PAD attenuation :	- 20 dB
Output Impedance :	600 Ohms
Max. Output Level :	+ 26 dBu
Max Input Signal :	+20 dBu (PAD activated)
(DI or Microphone Input)	+ 0dBu (without PAD)

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