



The MBL Noble Line preamplifier (N11) and integrated amplifier (N51) incorporate a new technology developed by MBL called "UNITY GAIN" which provides a clearly audible and measurable sound enhancement. This paper describes the details of this technology and how it works.

In a typical music system, the preamplifier has the task of receiving the music signal originating from the source device, preparing it, and forwarding it to the power amplifiers.

The power amplifiers expect the preamplifier to relay the signal to them with a maximum of 2 volts RMS. They are designed to deliver their full rated output at 2 volts input level (this value varies within limits, depending on line voltage and rated load, and applies to all output stages of MBL's and most manufacturers' amplifiers).

Analogue source devices, such as turntables, with the associated equalizer pre-amplifier, or tape decks, provide a voltage of 0.5 volt maximum (tuners and turntables) to 0.75 volts (tape decks). Nevertheless, in order to achieve a maximum voltage of 2 volts at the amplifier input, the signal must be "pre-amplified" before being passed on to the output stage. This is the responsibility of the preamplifier, hence its namesake.

Today's preamplifiers typically amplify the input signal by 12 dB before delivering it to the amplifier's input. This corresponds to gain by a factor of 4, making it possible to achieve the required 2 volts at the output even at input levels of only 0.5 volts.

In a source device with a voltage of 0.75 volts, for example, a voltage of 3 volts would already be reached at the power amp input and the volume potentiometer would have to be reduced to about 67% in order to not exceed the maximum level.

In the majority of cases, today's source devices are digital sources and the music signal supplied to the preamplifier comes from a D/A converter. These are standardized to the extent that they deliver a maximum output voltage of 2 volts RMS (+/- 5%) and all D/A converters from MBL strictly adhere to this requirement (although other manufacturers sometimes exceed this value to sound "louder").

Pre-amplification of this signal is not necessary, since the output voltage of the D/A converter corresponds exactly to what the output stage expects from input voltage. Nevertheless, manufacturers of preamplifiers have adhered to the system of amplifying a signal originating from a D/A converter.

In this situation, with the volume turned up fully, a voltage of up to 8 volts (!) would appear at the output stage's input, and in order not to exceed the 2 volts, the potentiometer would need to be turned down to a maximum of 25%.





At first, the music listener does not notice this strange situation, since he regulates the desired volume level with the volume control of the preamplifier and compensates for this excessive gain with a low volume setting. He may even be inclined to believe that he still has a lot of reserves, since he will reach a high volume at a relatively low gain setting and still "headroom" exists. At first glance, there is no problem with his point of view.

But, is this really the truth? Is it really side-effect free when the signal is down-regulated by the potentiometer and then amplified by the preamp again by the same factor?

The answer to this question is a clear "no." By unnecessarily reducing the level and then amplifying it, dynamics and resolution are lost, while noise and distortion increase--factors that one desperately wants to avoid with high performance, high resolution systems.

For this reason, MBL has developed a technique in its preamplifier and preamp section of the integrated amplifier of the new Noble Line in which the input signal is controlled so that *exactly* the maximum 2 volts are provided at the power amplifier's inputs. As a result, the entire dynamic range of the D/A converter is completely retained and no dB in the signal-to-noise ratio is wasted. This is clearly audible and measurable (see measurements below).

Developed by MBL, this technology is called "MBL UNITY GAIN" and it is the default setting for the N11 preamp and N51 integrated amplifier.

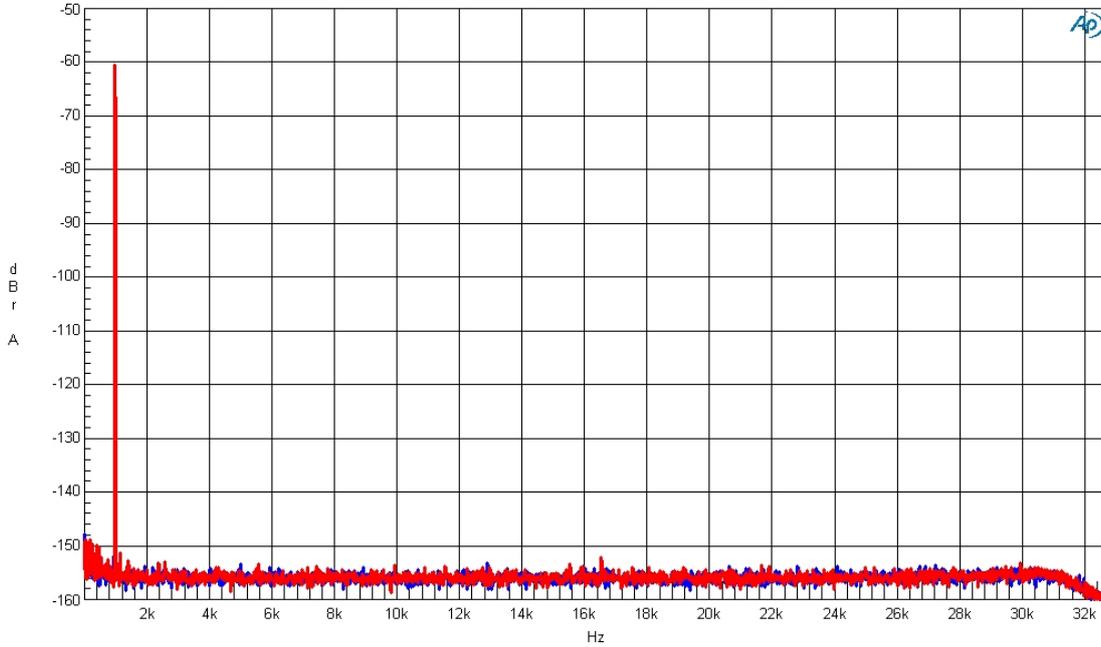
Let's take a look at a few measurements that show differences in dynamic range and distortion...in the first few measurements with UNITY GAIN turned on; in the second, each case without UNITY GAIN (there is 8 dB of gain in the regular gain mode of Noble Line devices).

Clearly recognizable is the higher dynamic range and the lower distortion in the UNITY GAIN setting. When compared to typical 12 dB gain pre-amplifications, the differences would be even greater.

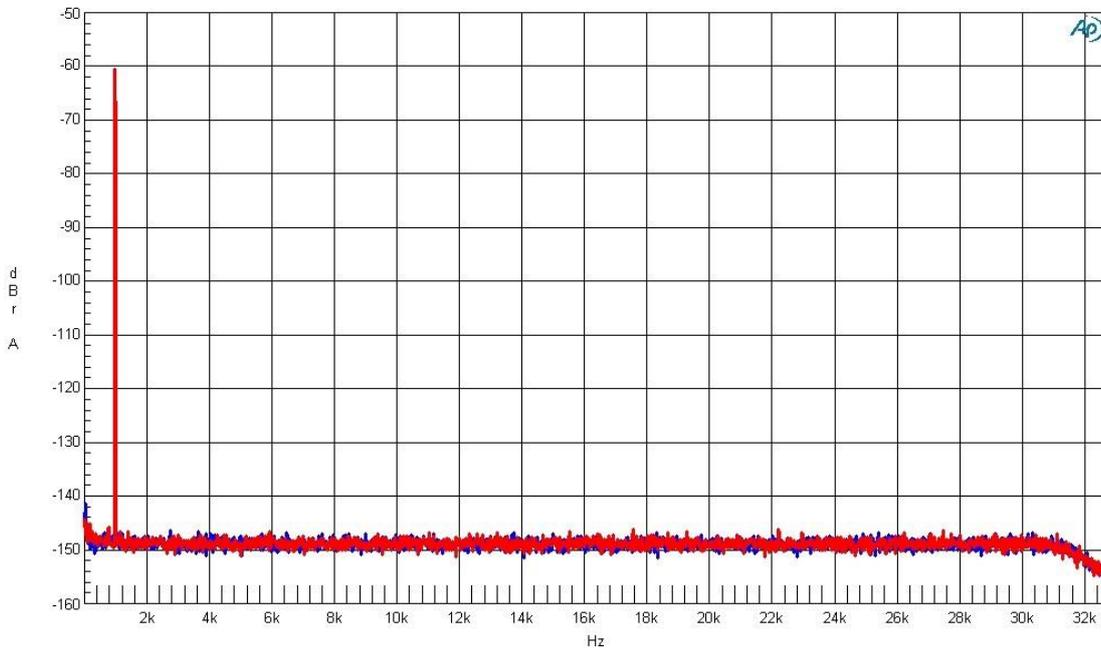




## Dynamic range:



**with UNITY GAIN**

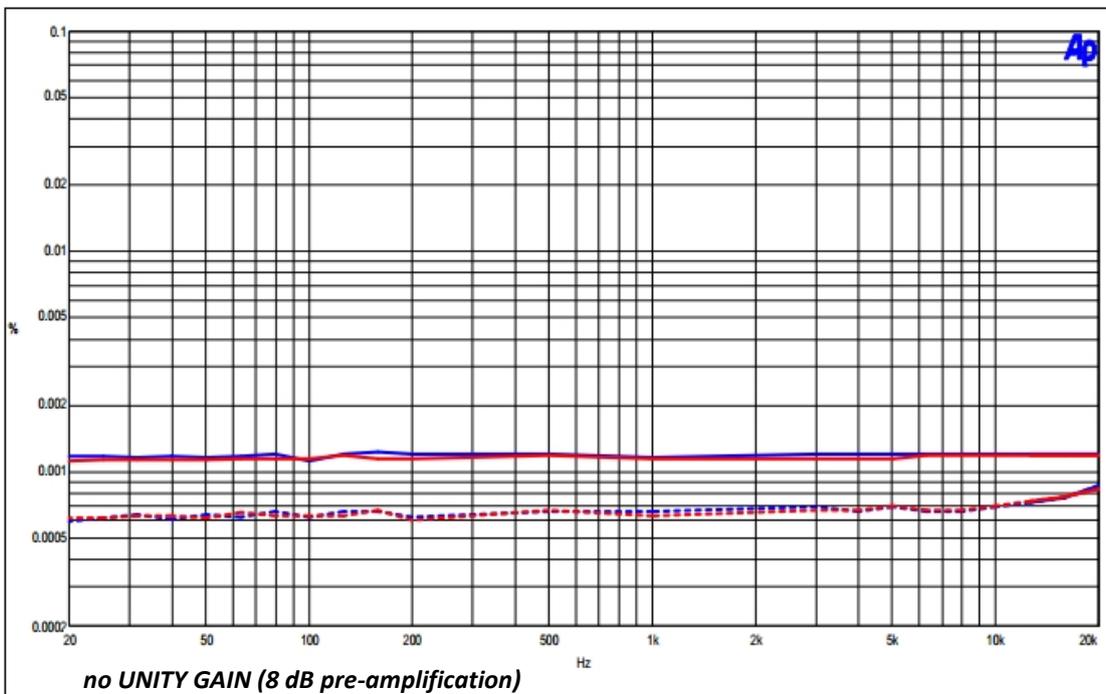
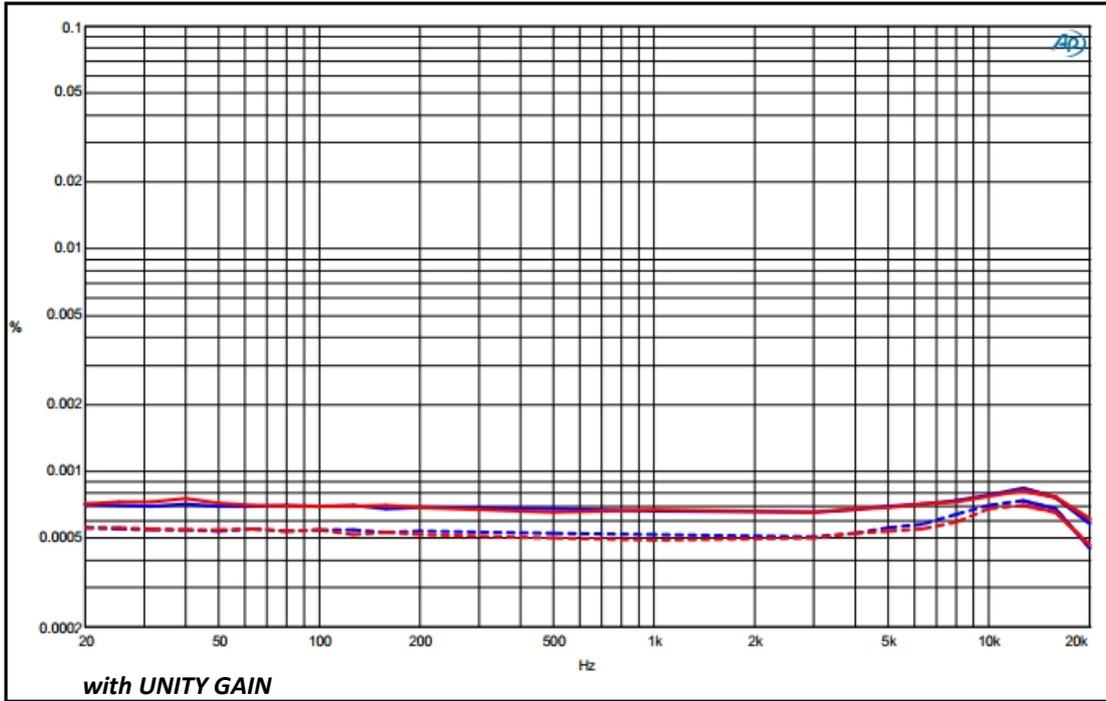


**no UNITY GAIN (8 dB pre-amplification)**





## Distortion:





However, the UNITY GAIN setting on all preamplifiers can also be turned off and switched to a REGULAR GAIN setting, which pre-amplifies the signal by 8 dB. This can be useful on occasions where you desire much higher volumes, for example at parties. The music listener has generous reserves and does not have to worry about not getting enough volume at any time.

Incidentally, an adjustment of the volume by the music listener when switching between UNITY GAIN and REGULAR GAIN is not necessary, since this is done independently by the device via precision stepper motors on the volume potentiometer. There is no audible change in the volume when switching.

Regarding tonal balance, there are no differences detectable between UNITY GAIN on and off. This is achieved by two separate signal paths, each with different components and individual tuning.

The MBL UNITY GAIN feature allows for higher dynamics, higher resolution, exceptionally low noise and vanishing distortion--factors that provide significant sound advantages over conventional preamplifiers.

