



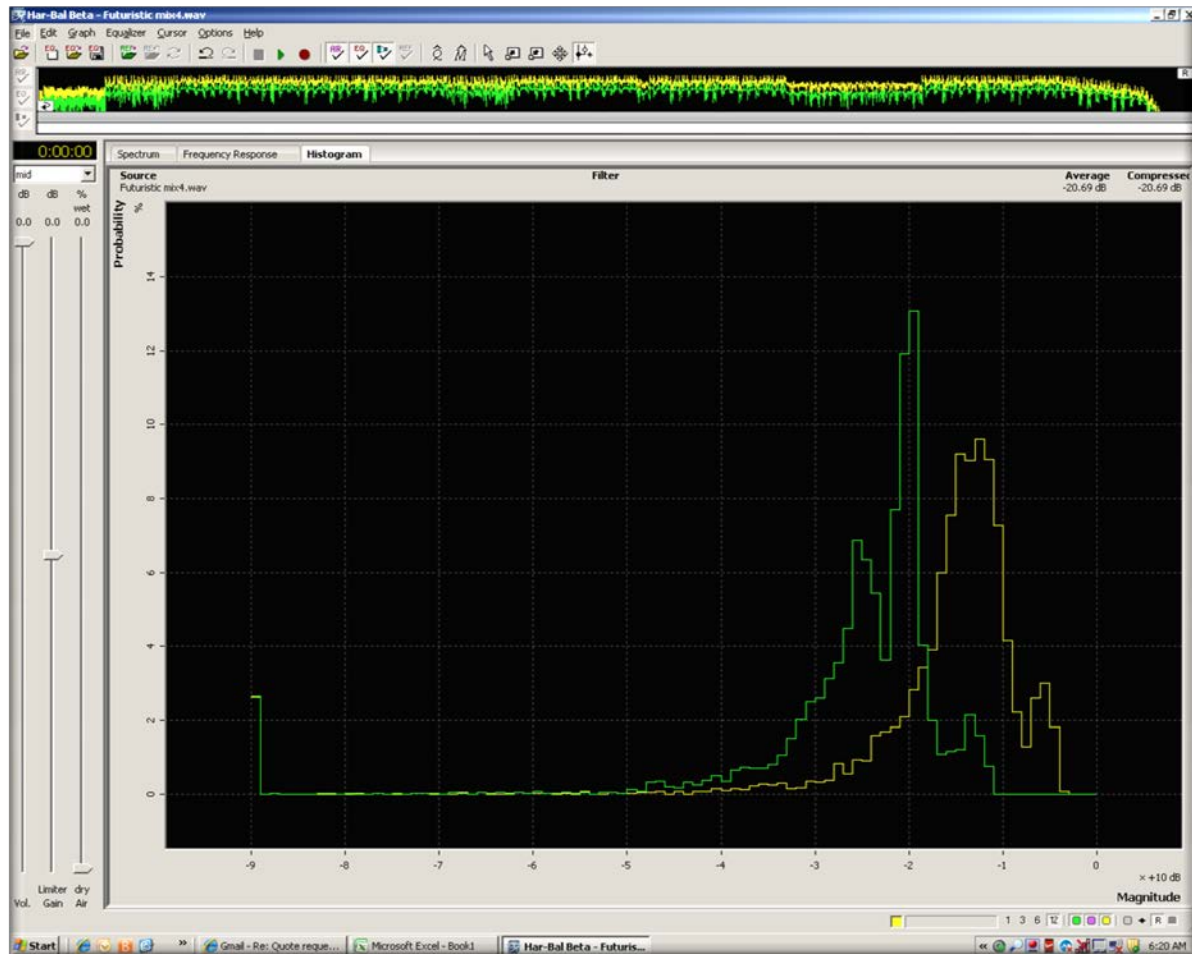
# Har-Bal 3.0

[www.har-bal.com](http://www.har-bal.com)

Dynamic Node Tool

The following are our suggestions to correctly use the new Dynamic Node Tool included in Har-Bal 3.0 (Using a multiband compressor is no longer a necessity)

Har-Bal 3.0 automatically computes the correct attack and release compression settings during the initial analysis when the file is loaded. You only need to increase the Gain.



# Increasing Gain

First things first

Increase the Gain Slider until the yellow line to the right moves toward the 0db wall then stop. If you happen to move the Gain Slider you'll note that the histogram marches up and down the horizontal axis by the amount of gain you apply.

You only have to increase the Gain Slider until it is kissing the 0db scale. Notice the new Gain Slider position. Look at the final resting place for the yellow spectrum.



Dynamic Node Tool  
This tool only appears in the Histogram view



Place the Dynamic Node Tool at the lowest flat side of the green spectrum on the right and left click to create a node. The node displays as two circles connected by lines, one filled and one not. Think of the unfilled one as an 'O' for output. It represents the level you are mapping the input to. The filled circle represents the input level.



Now place another node on the flattest side to the left of the green spectrum at the flattest point and left click. Use the crosshairs on the node tool as your guide. Pay attention to the **Compressed** level.

*A couple of observations you can make. When compressing the width of the histogram is compressed but that squeezing makes the peak higher. That is because the area under the curve is constant and sums to 100% (i.e. everything). You can think of it as a lump of plasticine you use to model a hill. If you squeeze the sides together all pushes out the top because the volume has to go somewhere. Similarly, if you stretch it, it falls down, which is dynamic range expansion.*

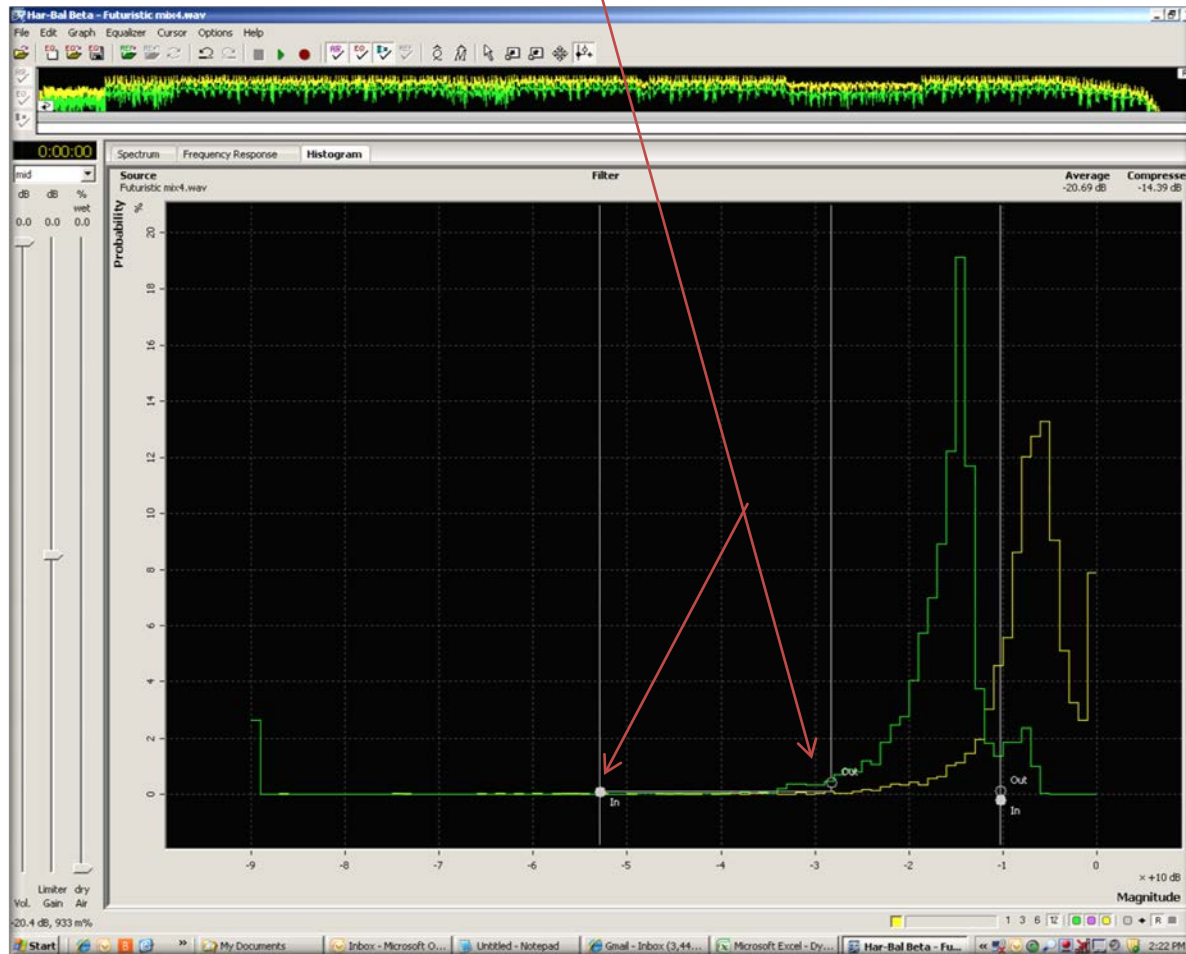


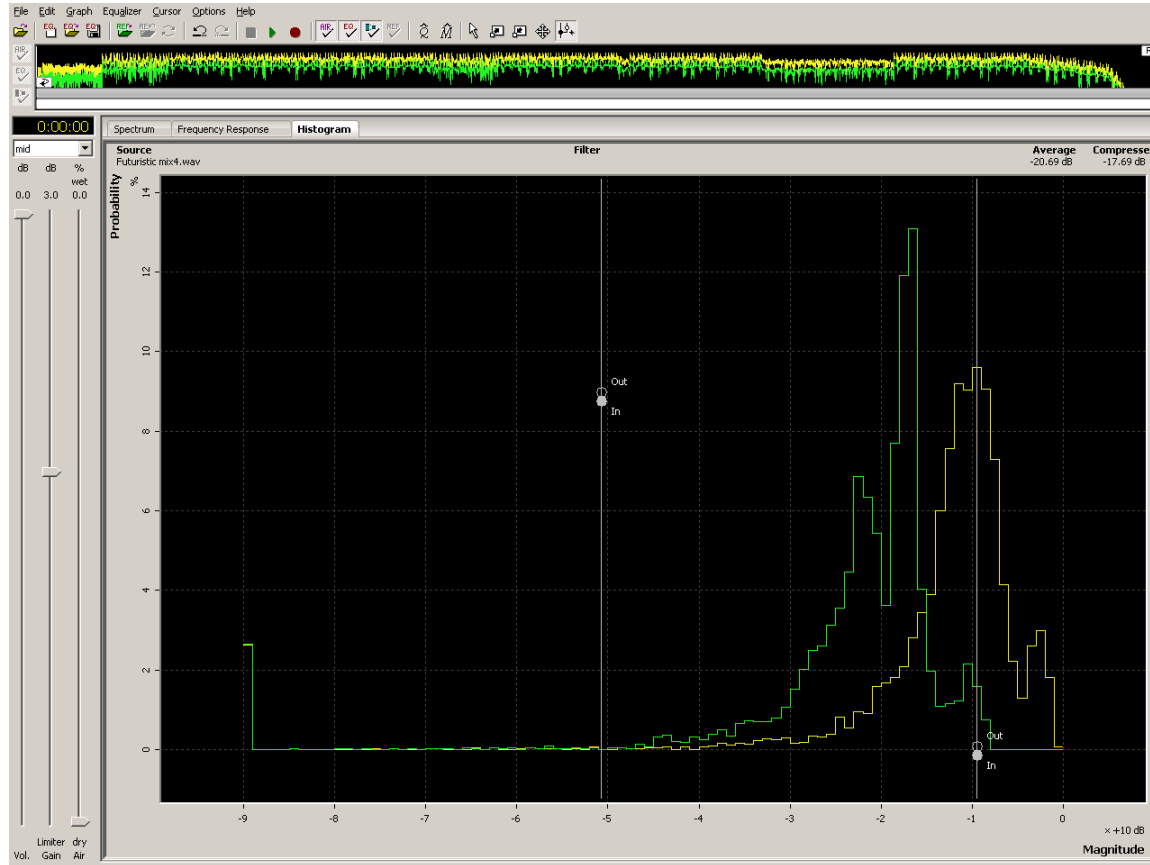
Now we will place our cursor over the Output button and it will change to a shape with an arrow pointing left and right  
We then simply hold down the left mouse button and **drag** it to the right (See below)

Notice the two circles.

The hollow circle is your Output

The filled in circle is your Input





## Removing the Dynamic Node Tool from the screen

To delete a node click on (one of the circles) and drag it off screen or use the undo command



## Additional Info

Below you will find additional documentation to assist in your understanding of this new innovative tool.

Cheers

The Har-Bal Team

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## Har-Bal 3.0 Dynamic Node Tool

The normal way of using the node editing tool is to click on the level mapping "from" point to the "to" point and then letting go of the mouse button, or alternatively single click on the "from" point to create the node and then drag the open circle to your desired "to" point.

The normal way to use it in a compression context is to put a blocking node at the right hand end of the average level distribution (i.e. where the green hill comes down to zero on the right hand side) with input mapped to output (simply click a node here, no drag) and then click and drag right a node on the left hand end of the distribution to the desired level of compression. If you gaze down at the status line at the bottom of the Har-Bal window you will see a summary of the dynamics processing slope to the left and to the right of that node. Pay attention to the right hand value as this is the compression ratio you are creating.

If you do this you will note that the distribution gets squeezed and the average level goes up accordingly. Toggling the dynamics on/off button you should now here a difference in level.

Har-Bal dynamics processing is based on the envelope information HB3 obtains during analysis: the time series constructed from peak and average power levels for each 50ms frame it analyses when a track is first opened. Those time series are what you see in the timeline control above the graph in the Har-Bal UI. The green is the average and the yellow is the peak. That same time series is also used to obtain the peak and average histograms in histogram view.

Now if you don't know what a histogram is it is a graph, representing the likelihood (probability) of the x- value (horizontal axis) occurring. In our case the horizontal axis is level in dB and it is binned in 1dB wide bins (hence the city line appearance of the graph). If you take

any one of those tall rectangles, look at the dB value below it and the percent value corresponding to its height you interpret it as follows. Let's say the column I'm looking at is centred on -5 dB and its height is 7%. That is telling you that for 7% of the time the level is between -5.5dB and -4.5dB (the bin is 1dB wide and centred on -5dB). Now, that could be either the peak level or the average level depending on whether you are looking at the green or the yellow trace.

If you happen to move the gain slider you'll note that the histogram marches up and down the horizontal axis by the amount of gain you apply. Now that you know what the histogram is you should see why that should be, because a level that was in the range from -5.5dB to -4.5dB after a 2 dB gain will now be in the range of  $-5.5 + 2$  dB to  $-4.5 + 2$  dB. However, you might be wondering why when you increase the gain the 0dB bin gets taller and taller. Well, if you think about it, the maximum level we can produce is 0dB. If something was in a -3dB bin and we apply a 6dB gain it can't go into the +3dB bin because there isn't one. What actually happens is the limiter cuts in and forces it into the 0dB bin. Thus, the more you push the gain higher the more the topmost bin in the histogram fills up as the values from other bins are forced into it.

This is a very useful thing in mastering because you can immediately see how over-zealous your limiting is. As an example, take any current generation master of popular music and look at the histogram of the peak level and you will almost certainly see a massive 0dB bin and little left in the other bins. That is what over-limiting does to the dynamics of your track. it squashes them into oblivion.

Let's get back to dynamics processing. Well, the dynamics processing in Har-Bal is based entirely on the average level envelope that you see in the time-line. You create a transfer function to map the input average level to a new output average level and Har-Bal uses it to figure out what gain to apply dynamically prior to the limiter at any point in time. Unlike conventional dynamics processing, it doesn't use attack - decay envelope extraction. The envelope it already has from the analysis. As such the gain change that tracks the music is in sync and symmetrical about the content. By that I mean with normal, a normal compressor you would typically have a fast attack time and slow release which means that the gain quickly drops at the start of a transient and slow falls at the tail. In Har-Bal the dynamics processing is effectively equal attack and release.

Now you'll probably think that makes no sense and will sound awful. In the reality it's not and here is the reason why. In traditional compression we principally have fast attack and slow release because a compressor cannot predict the future so it doesn't know when to pull down the level and if it does it slowly a very big transient will push through before it has a chance to bring it down. We have a slow release time because fast gain change will lead to a lot of distortion. Because Har-Bal knows the entire history of the track we don't need fast attack because we know when to pull the level down. The net result is that the dynamics processing in Har-Bal works more like the volume riding technique of recording engineers gone past where they adjust down the level while the music is being recorded because they know when the loud parts are about to arrive. This type of dynamics processing introduces very little distortion and as such, sounds quite different to what you might be used to expecting. I've heard it described as sounding more like modest limiting than compression.

That's enough of the theory behind it. How do you actually use it? Well, as hinted at before you design an input-output transfer function using the dynamics node editing tool in the histogram view. Why the histogram view? Because the histogram view shows you a summary of the dynamics content and to stick with a theme in Har-Bal, it will show you the effect your dynamics processing has on that histogram.

The process works like this. A transfer characteristic is made up of nodes. You create a node by clicking the dynamics node tool anywhere on the histogram graph. The node displays as two circles connected by lines, one filled and one not. Think of the unfilled one as an 'O' for output. It represents the level you are mapping the input to. The filled circle represents the input level. So a typical compression scheme would work like this. You look at the average level histogram (green trace) and look at the highest level it has (i.e. where the hill comes down to the flat on the right hand side). At that point you put a node with input and output equal. Why, because we want the top of the histogram to stay put and just squash up the bottom (quieter) parts. Its saying map the input level to the output level of,-for arguments sake let's say it is -8dB.

Now look at the other side of the hill. Where the left hand slope comes down to the flat we want to map that level to a higher level (compressing it) so we press down the left mouse button (that sets the input level) then drag it up to the level we want to map it to and release the mouse button (that is the output level). For example it might be an input of -40dB and an output of -27dB. You'll note that after releasing the mouse Har-Bal gives you an updated histogram showing the effect of the scheme on it and also the updated average track level figure of merit. You'll also note that if you happen to render those changes and re-analyze the result the prediction is pretty accurate.

That is basically all there is to using it. I'm sure it will seem strange at first until you understand the concepts but once you've gotten the hang of it I think you will find it a natural and informative way of dealing with dynamics.

A couple of observations you can make. When compressing the width of the histogram is compressed but that squeezing makes the peak higher. That is because the area under the curve is constant and sums to 100% (i.e. everything). You can think of it as a lump of plasticine you use to model a hill. If you squeeze the sides together all pushes out the top because the volume has to go somewhere. Similarly, if you stretch it, it falls down, which is dynamic range expansion.

Another thing to note is that this processing can be used for more than just compression. Another useful thing to use it for is noise gating. What I would typically do for that application is to provide a split at the end of the track where it fades away and apply dynamics processing to that split to gate the noise. The setting of the nodes is essentially exactly the same as with compression except you now map the input to a lower level on the left hand side to make the noise quieter. If you have additional dynamics processing applied to the overall track the two mappings are combined.

It all makes for a powerful and flexible architecture for managing the dynamic range of your track.