AutoVelocity™ Dynamics and the dbx 160SL

White Paper

dbx® PROFESSIONAL PRODUCTS

Many audio compressors employ an "Auto" mode to set the attack and release of the VCA so that the compressor will be well behaved when used in a variety of situations such as compressing vocals, piano, or program material. "Well behaved" means that pumping and breathing are minimized and that dynamic distortion, caused by low frequencies modulating the control line feeding the VCA, is not audible. The "Auto" mode works beautifully for most compression needs, however, we often need to compress signals that require a quicker attack time to catch leading edge transients such as a snare drum hit.

Many compressors on the market have manually adjustable attack and release controls to give the engineer greater creative control over how the compressor reacts to a signal. dbx compressors having manual controls include the 266/266XL, 1066, 165/165A, the MC6, and new dbx 160S/160SL. If we look at the markings around the dbx 1066 attack and release controls, we find the attack range is 3 to .04 dB/msec and the release range is 250 to 5 dB/sec. These markings may seem cryptic at first but, upon further investigation, we find that an attack setting of 3 dB/msec means that the VCA will reduce its gain at a rate of 3 dB for every millisecond (0.001 second) of time, or 3000 dB for every second of time. Whereas a release rate of 250 dB/sec means that the VCA will release its gain reduction at a rate of 250 dB for every second of time. These attack and release times may seem incredibly fast, but believe it or not, they are not fast enough for all compression needs. So, why not just speed up the range of the attack and release controls?

Well, let's examine the dbx 165/165A. Her attack and release times ranges are 400 to 1 dB/msec and 4000 to 10 dB/sec respectively. Anyone who has used the 165/165A in the manual attack/release mode knows that it has an extremely wide range of control and how effective it is for compressing fast transients by dialing in a fast attack time. However, they also know how easy it is to get a "bad" sound out of the 165A if the attack and release controls are

adjusted too fast for a particular application. In fact, most users find that they use only the upper half (12:00 and clockwise) of both the attack and release controls for 99% of their compression needs. Inappropriately fast attack and release times can "chew up" a signal yielding unpleasant results. This is why we have chosen to limit the range of the attack and release controls on other compressors we manufacture such as the 1066.

The ultra-fast response of the 165/165A is one reason for its longevity and "classic" status in the pro audio arena, enabling it to dynamically alter fast signals as well as provide a creative tool for intentionally shredding the sound, adding "bite" to vocals, for example. To preserve the heritage of the 165/165A, we chose to include its manual attack and release characteristics in the new Blue Series 160S. But in striving to constantly improve our products, we sought a way to combine the benefits of having ultra-fast response to fast signals with the forgiving program-dependent characteristics of the Auto mode. Enter AutoVelocity™ Dynamics processing (AVD). AutoVelocity™ Dynamics circuitry allows the engineer to set the attack and release controls for relativity fast settings and not have the dynamic distortion problems associated with these faster settings.

The AutoVelocity™ Dynamics circuitry allows the compressor to operate in a manually adjustable program-dependent mode, meaning signals that change slowly experience slower attack and release times than what are indicated by the attack and release controls; see Figures 1 and 2. For signals that change quickly (i.e. snare drum hit), the attack and release response speeds up to reflect the actual settings of the attack and release controls; see Figures 3 and 4. The faster attack time allows us to catch the transients without allowing overshoot and to release quickly from the larger change of compression without "punching holes" in our sound. So, we get to use the full range of the attack and release controls without being overly cautious of setting the controls

too fast and still have the quick response of the VCA needed to tame transient signals. This essentially means that AutoVelocity™ Dynamic circuitry creates a fast "peak limiting" function which rides on top of a slower "compression" function.

AutoVelocity™ Dynamics is now available on all dbx 160SL units manufactured after January 1, 1998. A retrofit kit is available so that any dbx 160S can be updated to include this new technology. One might ask how this retrofit kit affects the manual attack and release settings that were modeled after the 165/165A. Die-hard fans of this sound, of course, would not want to give up the sound they know and love for a different one. No problem, just remove the lid of the 160S and depress a push-push type switch to disengage the AVD circuitry in each channel, and instantly the original attack and release characteristics of the 165/165A are restored giving the user ultimate flexibility in compression needs. Instructions to do this are included in the manual for new units and in the retrofit kit instructions for the existing units.

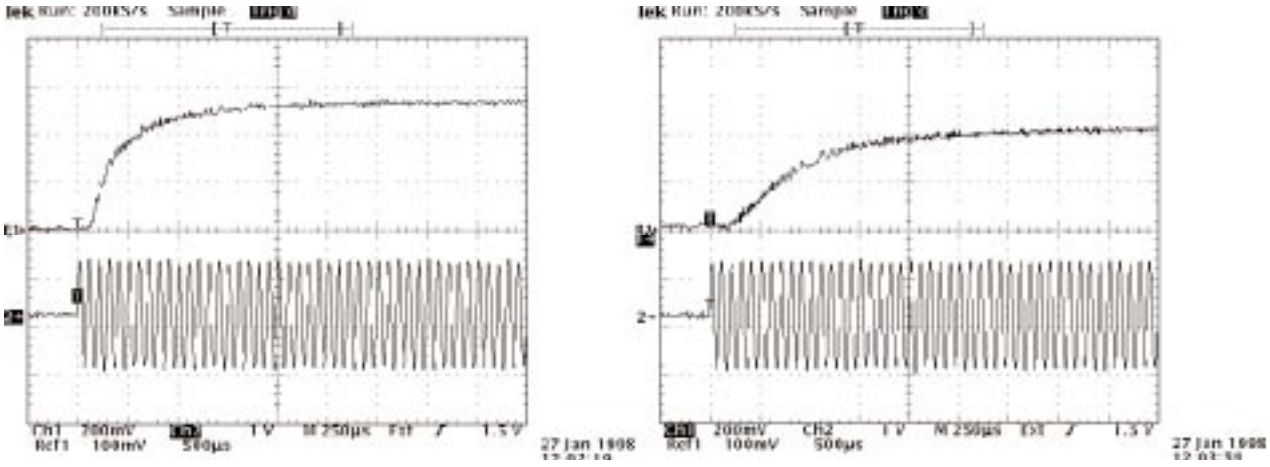

Figure 1. The graph on left shows the small step attack curve of the 160SL in response to a sine wave burst input with AVD circuitry disengaged. The graph on the right shows the attack curve of the 160SL to the same burst input with AVD circuitry engaged. Note the slower attack time in the graph on the right.

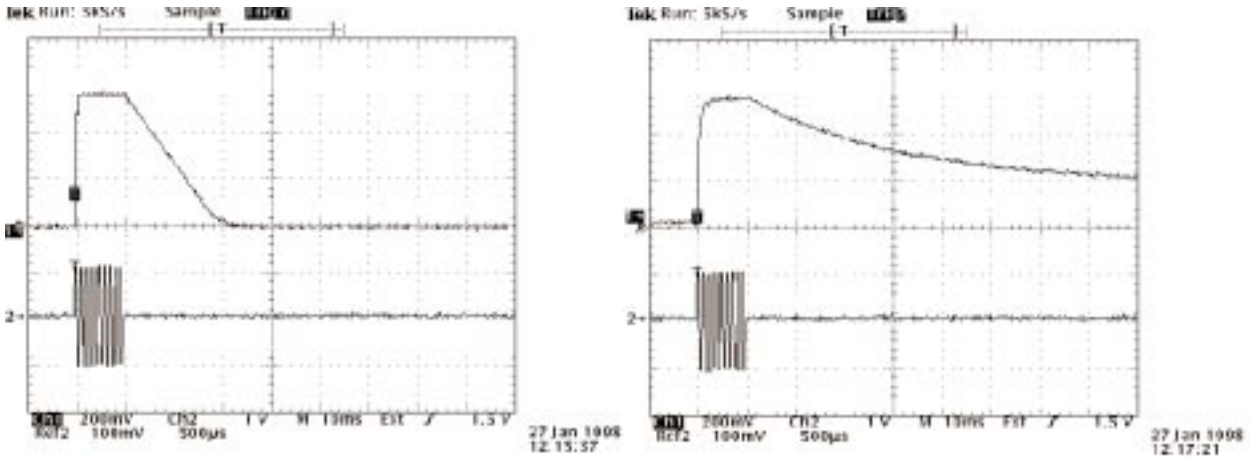

Figure 2. The graph on the left shows the small step release curve of the 160SL in response to a sine wave burst input with AVD circuitry disengaged. The graph on the right shows the release curve of the 160SL to the same burst input with AVD circuitry engaged. Note the slower release time in the graph on the right.

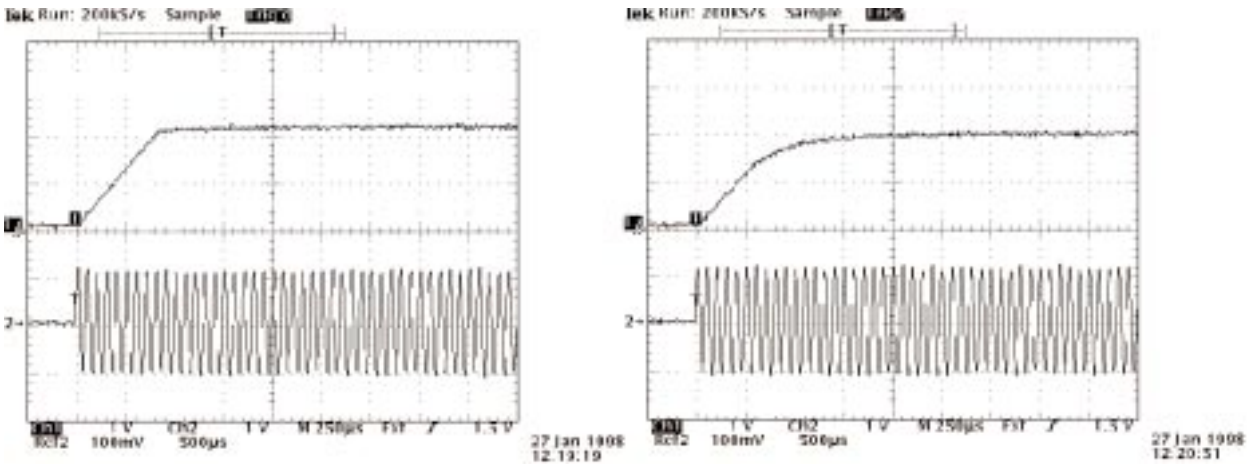

Figure 3. The graph on the left shows the large step attack curve of the 160SL in response to a sine wave burst input with AVD circuitry disengaged. The graph on the right shows the attack curve of the 160SL to the same burst input with AVD circuitry engaged. Note the slope of the curves are essentially the same.

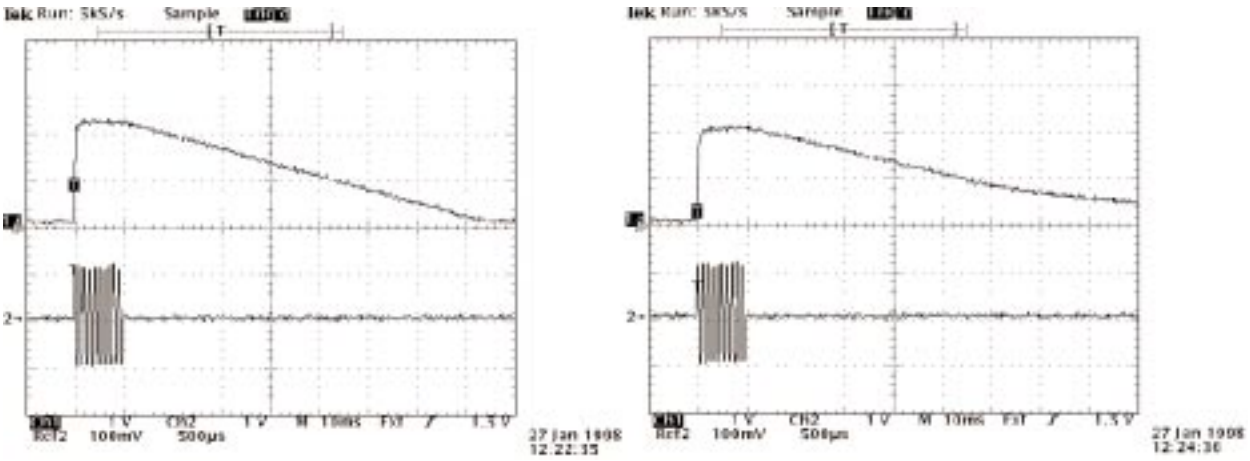

Figure 4. The graph on the left shows the large step release curve of the 160SL in response to a sine wave burst input with AVD circuitry disengaged. The graph on the right shows the release curve of the 160SL to the same burst input with AVD circuitry engaged. Note the slope of the curves are essentially the same.

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