

Drawmer Dynamics

Plug-In Guide

Version 2.1 for Macintosh and Windows

Digidesign

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chapter 1

Getting Started with Drawmer Dynamics

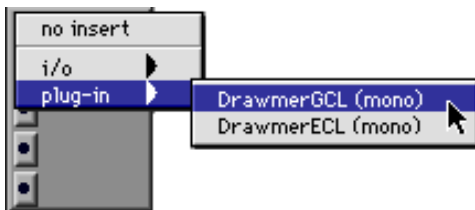
Thank you for purchasing the Drawmer Dynamics Plug-in for Pro Tools TDM systems.

Based in England, Drawmer has a longstanding reputation for creating high-quality, industry-standard, analog and digital signal processing devices, including microphone preamplifiers, esoteric tube equipment, equalizers, and most significantly, dynamics processors.

The Drawmer Dynamics Plug-In is a real-time TDM plug-in that retains the look and sound of Drawmer's renowned hardware units, specifically, the highly-acclaimed Drawmer DS201 and DL241.

There are two configuration of the Drawmer Dynamics Plug-In:

- DrawmerECL, providing an Expander, Compressor, and Limiter
- DrawmerGCL, providing a Gate, Compressor, and Limiter



Drawmer Dynamics Plug-In

System Requirements

To use Drawmer Dynamics 2.1 you need:

◆ A Digidesign-approved, Pro Tools|HD system with version 5.3 software or higher.

– or –

◆ Third-party software that supports the Digidesign TDM plug-in standard.

For the latest compatibility information, contact your local Digidesign dealer or visit Digidesign's web site.

▲ *The Drawmer Dynamics plug-in does not support sample rates above 96 kHz.*

Removing an Older Version of Drawmer Dynamics

If you have an older version of the Drawmer Dynamics Plug-In on your system, remove it before performing a new installation.

Macintosh

To remove a plug-in:

- 1 Locate and open the Plug-Ins folder (System Folder/DAE Folder/Plug-Ins).
- 2 Drag the plug-in to the Trash.
- 3 Empty the Trash.

Windows

To remove a plug-in:

- 1 From the Start menu, choose Settings > Control Panels and double-click Add/Remove Programs.
- 2 Select the plug-in from the list of installed software and click the Add/Remove button.
- 3 When removal is complete, click OK and close the Add/Remove Control Panel.

Installing Drawmer Dynamics

Use the Installer CD-ROM to install the Drawmer Dynamics Plug-In.

Macintosh

To install Drawmer Dynamics:

- 1 Insert the Installer CD-ROM in your CD-ROM drive and double-click the Installer.
- 2 Click Install.
- 3 When installation is complete, click Quit. When you open Pro Tools, you will be prompted to authorize the plug-in.

Windows

To install Drawmer Dynamics:

- 1 Insert the Installer CD-ROM in your CD-ROM drive.
- 2 Locate and double-click the Setup.exe file on the Installer CD-ROM.
- 3 Click Install.
- 4 When installation is complete, click Finish.
- 5 When you open Pro Tools, you will be prompted to authorize the plug-in.

Digidesign Registration

Please make sure to register! Registered users are entitled to up to one year of free technical support based on product purchased. For more information please refer to your registration card, or visit the Digidesign Web site at www.digidesign.com/support for more information.

Authorizing Plug-Ins


iLok

The Drawmer Dynamics Plug-in is authorized using the iLok USB hardware key from PACE Anti Piracy. One iLok hardware key is included with your HD Core system. This key can hold over 100 authorizations for all your iLok-enabled software. Once iLok is authorized for a given piece of software, use iLok to authorize that software on any computer.

The iLok is authorized using License Cards. License Cards are specific to each plug-in. You will receive the appropriate License Cards for the plug-ins that you purchase.

To authorize iLok:

- 1 Insert the iLok into an available USB port on your computer.
- 2 Launch Pro Tools. You will be prompted to authorize any installed unauthorized plug-ins.

 *If you are trying to authorize one or more plug-ins that are already running in Demo mode, do not insert the iLok into any available USB port (or remove it if it is already connected) before launching Pro Tools. Then insert the iLok into any available USB port when prompted by Pro Tools.*

- 3 Follow the on-screen instructions until you are prompted to insert the License Card into the iLok.
- 4 Separate the License Card—the smaller GSM cutout—from the larger protective card by pulling the cutout up and out with your thumb. Do not force your finger downward.
- 5 Insert the License Card into the iLok, making sure that the arrows on the License Card are pointing towards the iLok. You will be able to visually verify that the License Card makes contact with the iLok's metal card reader.



iLok with License Card

- 6 After authorizing, remove the License Card.
- 7 Follow the on-screen instructions to complete the authorization process.

DSP Requirements

The number of Drawmer Dynamics Plug-Ins you can use at one time depends on how much DSP power is available in your system. Since the TDM hardware on Pro Tools cards provide dedicated DSP for plug-ins, plug-in performance isn't limited by CPU processing power.

The Drawmer Dynamics Plug-In has the following DSP requirements:

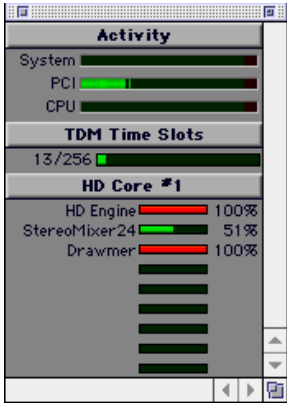
HD Core/Process (Pro Tools HD systems)		
Plug-In	Instances per DSP chip (mono/stereo)	Available DSP chips per card
Drawmer ECL	4/2 at 48 kHz 2/1 at 96 kHz	9
Drawmer GCL	4/2 at 48 kHz 2/1 at 96 kHz	9

MIX Core/Farm (Pro Tools 24 MIX systems)		
Plug-In	Instances per DSP chip (mono/stereo)	Available DSP chips per card
Drawmer ECL	4/2	6
Drawmer GCL	4/2	6


DSP Farm (Pro Tools 24 MIX systems)		
Plug-In	Instances per DSP chip (mono/stereo)	Available DSP chips per card
Drawmer ECL	2/1	4
Drawmer GCL	2/1	4

Monitoring DSP Usage

The DSP Usage window (Windows > Show DSP Usage) shows how much DSP is available in your system and how it is being used in the current Pro Tools session.



DSP Usage window showing Gas Meter format

 For more information about DSP usage and allocation, see the Pro Tools Reference Guide.

Allocating Additional Memory to Pro Tools

(Macintosh Only)

If you plan to use a large number of TDM plug-ins in addition to the DigiRack TDM plug-ins included with Pro Tools, allocating additional memory to Pro Tools will help ensure reliable system performance.

If enough RAM is available in your computer, allocate 1–2 megabytes of additional RAM to Pro Tools for each non-DigiRack plug-in installed on your system.

To allocate additional memory to Pro Tools:

- 1 Start Pro Tools so that it can calculate its basic memory allocation.
- 2 Go to the Finder and choose About This Computer from the Apple menu.
- 3 If you have 3 megabytes or more of memory available (as indicated in the Largest Unused Block portion of this window), go to step 4. If you have less than 3 megabytes of free memory (3,000k), stop here: Do not allocate additional memory to Pro Tools unless you install additional RAM in your computer.
- 4 Quit Pro Tools.
- 5 Open the Pro Tools folder, select the Pro Tools application, and choose Get Info from the Finder's File menu.
- 6 Choose Memory from the Show menu.
- 7 Enter the desired amount of memory *above the minimum requirement* in the Preferred Size field. For example, if the Preferred Size field currently says "30410k" and you wish to allocate an additional 3 megabytes of memory (1 megabyte equals 1024 kilobytes), enter "33410" into the Preferred Size field.
- 8 Close the Get Info dialog.

The next time you start Pro Tools, it will use this new memory allocation.


Delay in Digital Signal Processing

Virtually all TDM plug-ins incur some amount of signal delay. Drawmer Dynamics adds 7 samples of delay per occurrence.

This is significant only if you use a Drawmer Dynamics Plug-In on one channel of a stereo or multichannel signal but not the others, since this can cause the channels to be slightly out of phase.

If you are working with mono tracks, or are processing all channels with the same plug-in, the signal delays are not long enough to be significant and should not be a concern.

If it becomes necessary to compensate for plug-in delay, use the TimeAdjuster Plug-In included with Pro Tools. See the *DigiRack Plug-Ins Guide* for more information on TimeAdjuster.


 For a comprehensive guide to calculating DSP-induced delays, see the *Pro Tools Reference Guide*.


Conventions Used in This Guide


All Digidesign guides use the following conventions to indicate menu choices and key commands:


Convention	Action
File > Save Session	Choose Save Session from the File menu
Control+N	Hold down the Control key and press the <i>N</i> key
Option-click	Hold down the Option key and click the mouse button

The following symbols are used to highlight important information:

 *User Tips* are helpful hints for getting the most from your Pro Tools system.

 *Important Notices* include information that could affect your Pro Tools session data or the performance of your Pro Tools system.

 *Shortcuts* show you useful keyboard or mouse shortcuts.

 *Cross References* point to related sections in the Pro Tools Guides.

Choose and Select

The words “choose” and “select” are often interchangeable in conversational English. In this guide, however, there is a distinction between the two terms.

Select When the guide instructs you to *select* something, it stays selected. This is the case with dialog box options and menu items that enable or disable an option.

Choose When the guide instructs you to *choose* something, a one-time action is performed. This is the case with most menu commands; they perform their chosen action only once.

chapter 2

Drawmer Dynamics Parameters

This chapter explains the parameters of the Drawmer Dynamics Expander, Gate, and Compressor modules.



Drawmer DynamicsECL Plug-In



Drawmer DynamicsGCL Plug-In

Adjusting Parameters

The Drawmer Dynamics Plug-In allows several methods of parameter adjustment.

Rotary Control Adjustment

Click and Drag

Rotary controls can be adjusted by dragging vertically or horizontally on the control.

Pop-Up Slider

Clicking a parameter name makes a pop-up slider appear. Drag the slider to adjust the parameter.



Using the pop-up slider

Increment & Decrement

For incremental parameter adjustment, click the up or down increment buttons at the right of each parameter text box.



Using the increment and decrement buttons

Expander Module

The Expander is part of the DrawmerECL Plug-In and is modelled on the Drawmer DL241 and DS201 hardware processors.

Features

- ◆ Auto-adaptive attack and release for a more musical response
- ◆ Upward expansion capability with a wide Threshold
- ◆ Adjustable Ratio with soft-knee options
- ◆ Gain reduction LED metering



Expander

A common problem with compression is that maximum gain compensation occurs during extremely quiet passages or during pauses. This results in an increase of background noise, the degree of which depends on the amount of compression applied.

The accepted way of dealing with this problem is to use an Expander for low-level gating that keeps quiet passages or pauses in the material clean. A problem with simple expanders is that they may undesirably process low-level audio signals, since the expander has no way of differentiating low-level audio signals from noise.

On a vocal track, for example, this can lead to the start or ending of words being accidentally removed, especially if the singer has a wide dynamic range.

Auto-Adaptive Expansion

The Expander has the ability to automatically adapt its settings to audio material. This mode of operation is enabled by turning the Ratio control fully clockwise to the Soft or Softer setting. It automatically varies ratio and release time depending on the dynamics of the signal being processed.

The Expander's transition from unity gain to maximum gain reduction is then dependant on how far the input level exceeds the threshold setting.

Because the onset of expansion is progressive, low-level signals will be processed with a lower ratio of expansion while the residual noise during pauses will be processed with a higher ratio of expansion (resulting in greater attenuation). This makes the Expander easier to use effectively and more likely to preserve desired audio signals that are only slightly above the residual noise floor.

Expander Parameters

Threshold

The Threshold control sets the level below which expansion starts to take place. Threshold range is from -70 dB to $+12$ dB.

Setting this control above 0 dB permits upwards expansion, where over-compressed material can be re-expanded.

Ratio

The Ratio control sets the amount of attenuation applied to the signal as it decreases below the Threshold level.

Ratio range is from 1.1:1 to 50:1. At 1.1:1 the Expander closes only slightly (an input signal that is 10dB below the Threshold setting will be output at -11 dB). At 50:1 the Expander functions like a Gate (an input signal that is 2 dB below the Threshold setting will be reduced by 100 dB).

To enable the Expander's ability to automatically adapt its settings to audio material, turn the Ratio control fully clockwise until either the Soft or Softer setting appears.

Attack

The Attack control sets the rate at which the Expander opens from a closed state. Attack speed ranges from $100 \mu\text{s}$ (0.0001 seconds) to 1.5 seconds. A very fast attack time can sometimes produce audible clicks on low frequency signals.

Release

The Release control determines the speed at which the Expander closes to the Range setting once the input signal has fallen below the Threshold level. Release ranges from 50 ms to 2.5 seconds.

With slow, legato audio material, very fast release times can result in audible and possibly undesirable side-effects, due to the gain changing too quickly.

Range

The Range control sets the level to which the Expander will close, once the input signal has fallen below the Threshold setting. Range is from 0 dB (no expansion) to infinity (∞ dB). In general, use a much smaller range setting than you would with a Gate.

Bypass

The Bypass toggle switch bypasses the Expander.

Expander Gain Reduction (GR) Meter

This ten-element LED meter indicates from 0 dB to 90 dB of gain reduction. The number of illuminated LEDs will change as the Range control is adjusted, indicating the maximum gain reduction achievable.

Suggestions for Using the Expander

The fastest way to begin using the Expander is to choose one of the presets in the Librarian menu. (See "Using the Librarian" on page 24 for details.) Alternatively, create your own settings using the procedure that follows.

To use the Expander:

- 1 Bypass the Compressor by clicking the Compressor Bypass toggle.
- 2 Select the desired amount of reduction using the Range control.
- 3 Set the Attack and Release controls based on the character of the audio material you want to expand. For material with long, legato release, set a long Release. For material with a lots of low frequency content, set a slow Attack. For sharp, percussive sounds, set a short Attack.
- 4 Set the Ratio control based on the character of the audio material. Try a maximum setting of 2.5:1 for vocals, and higher ratios for dynamic, full mix material.
- 5 Adjust the Threshold control until the the vertical VU meter and the Expander Gain Reduction (GR) meter begin to light.

As a rule, the Threshold should be between 6 dB to 10 dB below the average input level. Use a section of audio material with pauses and adjust the threshold to be as low a dB level as possible while still attenuating the noise during pauses. Listen carefully to how the sounds come in after the pauses and how cleanly they fade away again. If the Expander changes the sound in an unacceptable way, the Threshold is probably set too high.

The Gate Module

The Gate is part of the DrawmerGCL Plug-In. It is based on the highly acclaimed Drawmer DS201 hardware dynamics processor, which was instrumental in creating many recording effects that have become industry standard practice such as the Gated reverb, and enhanced percussive kick-drums.

Features

- ◆ Variable high-pass and low-pass filters for frequency-conscious gating
- ◆ Comprehensive envelope control with attack, hold, release and range
- ◆ Ultra-fast response time
- ◆ Comprehensive side-chain filtering
- ◆ Key listen capability for monitoring the effect of the Key Filter
- ◆ LEDs for clear indication of Gate status
- ◆ Duck mode for voice-overs



Gate

Gate Parameters

HF & LF Key Filters

These controls adjust the roll-off frequencies of the Key filters. The LF or low frequency filter ranges from 32 Hz to 4 kHz and attenuates signals below the cut-off frequency at 12 dBs per octave. The HF or high frequency filter ranges from 250 Hz to 16 kHz and attenuates signals above the cut-off frequency. When both filters are used, only the frequency band between the two settings remains.

These controls do not overlap each other, since this would produce very little audio output.

Side-Chain/Internal

Setting this control to Side-Chain enables side-chain processing. Side-Chain processing permits triggering of the Gate by a mono source or *key input* other than the gated material itself. Setting this control to internal disables side-chain processing. (See “Using a Key Input for Side-Chain Processing” on page 23 for more information.)

Key Listen/Normal

Set this toggle to Key Listen to monitor the audio specified as the key input. (See “Using a Key Input for Side-Chain Processing” on page 23 for more information.)

Threshold

The Threshold control sets the level below which gating takes place (the level at which the output of the Key Filter triggers the Gate). Threshold ranges from -70 dB to 0 dB. Setting this control fully counter-clockwise closes the Gate.

For most noise removal applications, set the Threshold as low as is possible, so that none of the desired signal is lost.

Attack

The Attack control sets the rate at which the Gate opens from a closed state. Attack ranges from 20 μ S (about 1 sample) to 1.7 seconds.

A very fast attack time can sometimes produce audible clicks on low frequency signals.

Hold

The Hold control determines the amount of time the Gate is held open after the signal falls below the Threshold setting. Hold range is from 2 ms to 2.2 seconds. Hold helps prevent spurious re-triggering of the Gate when using fast release times. It is also useful for creating the classic gated reverb sound often applied to drums.

The Hold cycle starts when the Threshold is crossed. Audio material with slow attacks requires the Hold setting to be at least as long as the Attack setting for it to complete its attack cycle.

Release

The Release control determines the speed at which the Gate closes to the Range setting after the input signal has fallen below the Threshold level. Release range is from 1 ms to 9 seconds. Longer releases help retain the original envelopes of the gated audio.

Range

The Range control sets the level to which the Gate closes after the input signal has fallen below the Threshold setting.

The range is from 0 dB (no gating) to infinity (fully gated, or no signal).

When Ducking is enabled, the Range control sets the level to which the signal will be reduced when open (triggered). For Ducking set this between -3 dB and -12 dB.

Gate/Duck

This toggle switch selects the Gate's mode of operation. In Gate mode, a signal above the Threshold will cause the Gate to open. In Duck mode, the audio passes unattenuated until the signal exceeds the Threshold. Ducking is mainly for applications such as voice-overs or removal of pops and clicks.

Bypass

The Bypass control bypasses the Gate.

Gate Envelope LED meter

This traffic light-style LED shows the active state of the Gate envelope:

- ◆ When the Gate is closed, the red LED is lit.
- ◆ When the Gate is open, only the green and yellow LEDs are lit.
- ◆ When the input signal falls below the threshold, the yellow LED will light then fade over the duration of the release time.

In Duck mode, the green LED indicates an untriggered (resting) state.

Suggestions for Using the Gate

The fastest way to begin using the Expander is to choose one of the presets available in the Librarian menu. (See "Using the Librarian" on page 24 for details.) Alternatively, create your own settings using the procedure that follows.

To use the Gate:

- 1 Bypass the Compressor by clicking the Compressor Bypass toggle.
- 2 Choose the key input mode (Side-Chain or Internal). If you select Side-Chain, from the Side Chain Input pop-up, choose the input/bus that carries the audio you want to use to trigger gating.
- 3 To hear the key input audio source you have selected to control gating, click Key Listen.
- 4 To filter the key input so that only certain frequencies trigger the plug-in, set the LF Key Filter and HF Key Filter controls to the desired frequency range.
- 5 Begin playback. Gating is now controlled by the input/bus you chose as a key input.
- 6 Select the desired amount of reduction using the Range control. Typically, set this fully counter clockwise.
- 7 Set the Attack, Hold and Release controls. For material with long legato release, use a long Release time. For material with a lot of low frequency content, use a slow Attack.
- 8 Adjust the Threshold control until the the vertical VU meter and the LED meters, show gating activity. As a rule, the Threshold should be about 3 dB below the average input level to see and hear the dynamic processing.

Additional Tips for Effective Gating

Initially, set the LF Key Filter fully counter-clockwise and the HF Key Filter fully clockwise. This allows you to hear the full audio spectrum of the key input. Set the Range control fully counter-clockwise and Key Listen to Normal.

With the Release control set at its midway position, and with suitable program material fed into the Gate module, increase the Threshold level from its counter-clockwise position until the Gate starts to operate. This will be indicated by the LEDs. Pauses in the program should now be silent. If the Threshold setting is too high, the Gate will start to cut out desired audio. If so, adjust it as low as possible.

If the ends of sounds are obviously being truncated, a longer Release time may help. On the other hand, if unwanted noise is audible after the desired audio has ended, a shorter Release time is more appropriate.

Filtering Out Noise

There may be circumstances when the program material contains unwanted random noise or other sounds. For example, in a multi-miked drum kit set up, hi-hat will inevitably leak into the snare microphone, snare drum will leak into the kick drum microphone, and so on.

Similarly, when processing audio recorded on location, you may experience problems due to wind or traffic noise or close-by conversation. If the unwanted noise is different in pitch to the desired audio, it is often possible, using Key Listen, to use the filters to tune in to the wanted sound while excluding as much of the unwanted sound as possible. Used carefully, these filters can significantly decrease false triggering of the Gate.

Adjusting Attack Time Effectively

The Attack control has a very wide range. At its fastest, it can open instantaneously. Conversely, setting the Gate attack time too fast on material with a slow or moderate attack can cause clicks, particularly if the Threshold has to be set high because of excessive background noise.

This is a common problem with noise gates, especially when processing low-frequency audio such as bass guitar or bass drum. With a high threshold, a low frequency sine wave will be ignored as the signal starts from its zero level point.

As this wave climbs towards its peak, the level will suddenly exceed the threshold setting. At this point a very fast attack rate will switch the signal through the noise Gate with such a steep (almost vertical) leading edge that the low frequency sound will have a single high frequency square wave added to its first cycle, causing a click.

In cases like these, start with a fast attack time and moderate threshold, then gradually lengthen the attack time until the click disappears when the Gate opens.

Performing Ducking

Probably the most common form of Ducking is that used by radio announcers, whereby the volume of the background music being played is dropped, enabling them to speak over it. In Duck mode the Gate module can perform this effect. The music signal is routed to the input and the announcer's microphone signal is fed into the key input. (Be sure to set the key input to Side-Chain.)

The Range control is used to set the level to which the music will drop when the Ducker is triggered from the key input. The envelope controls determine the rate at which the level will drop and then recover. It is usual to select a medium to fast Attack time, so that the music level drops rapidly as soon as the announcer begins to speak—with a slow Release time of a second or so.

This will bring the music level back up slowly and smoothly. Some Hold time will help prevent chattering, when the voice on the key input pauses to breathe. This technique can also be used to reduce the level of other instruments during a solo.

Besides voice over applications, the Duck function of the Gate module can also be used to treat a signal where the peaks are too loud and require attenuating. In this application, Duck and Side-Chain key input modes should be selected, and the Range control adjusted to give the desired attenuation to signals above the Threshold setting. In extreme cases, the ducking action may be used to attenuate signal peaks, and by careful use of the filters, it may be possible to remove a snare drum from a drum mix or clicks and pops from a recording.

For most ducking applications, the lowest practical Threshold setting must be used.

Using a Stereo Gate

When using the Gate on a stereo signal, be aware that the control signal is derived by averaging the left audio channel with the right audio channel. Where one channel differs significantly from another in a stereo track, better results may be obtained if the channels are treated as two mono channels. (For a side-chain key signal, the control is always a mono signal.)

By setting up a stereo plug-in with one channel in Gate mode and the other in Duck, the envelope controls can be used to create interesting triggered panning effects, simply by feeding a mono signal into left and right channels and setting the Range control to maximum attenuation.

Difficult Material To Gate

As with any Gate, noise can only be removed during pauses in the desired material. If noise contamination is serious enough to be evident even during moderately loud program material, simple gating will do little to help. In fact, the very fact that the Gate produces silence during pauses can make the noise content of the program material even more apparent. In extreme cases, restricting the Range of the Gate to about -15 dB will adequately reduce noise during pauses but not sufficiently to cause an unacceptably dramatic change in noise level as the Gate opens and closes.

Creative Use of the Key Input Filters

The key input filters in the Gate may also be used to good effect in situations where the desired audio does not occupy the full audio spectrum. Conventional equalizers seldom have a sharp enough response to remove unwanted noise without also removing desired audio.

Used with electric guitar, this produces little below 100 Hz or above 3 kHz, so setting the Gate to Key Listen mode will enable you to use the filters to exclude much of the amplifier hum at the low end and hiss at the top end while having little effect on the sound of the guitar. The same is true for acoustic guitar. The filters can be used to reduce fret noise or a player's breathing.

Other applications of the filters include removing unpleasant overtones from direct-injected instruments and warming up digital synthesizer sounds.

Tips For Using Key Inputs and Key Input Filtering

Complicated Keying

For a more intricate and musical key input, combine several tracks together by bussing them to auxiliary inputs.

Leaving Key Listen Enabled

You can use the Gate as a simple filter by enabling Key Listen.

Key Filter Propagation Delay

Key input filtering with high frequency attenuation can cause a slight delay in the time the Gate takes to trigger. Under most circumstances this will be imperceptible. However, when transient sounds are being processed with the HF Key Filter control set to a very low value, some degradation of the attack transient may become apparent.

Consequently, always set the HF Key Filter control to the highest possible value when processing percussive sounds and set the Threshold as low as possible.

Cleaner Keying

It is often useful to use a Drawmer Dynamic Plug-In to process the key input before it is used. Good results can be achieved by using an Expander (with the Compressor bypassed) on the key input source. This will give the key input source a more accentuated difference between program and silence. With a cleaner key input, any associated gating will be more defined, and the Gate's Threshold settings will be easier to optimize.

The Compressor Module

The Compressor appears in both the DynamicsECL and DynamicsGCL Plug-Ins.

Features

- ◆ Wide Threshold range for accurate compression
- ◆ Auto-adaptive Attack and Release for a more musical response
- ◆ Adjustable Ratio, ranging from very gentle compression to absolute Limiting
- ◆ Soft knee for progressive and unobtrusive compression
- ◆ Automatic Gain Make-up calculates the most suitable output Gain position for maximum data dynamic range
- ◆ Gain reduction meter



Compressor

The Compressor combines aspects of both traditional ratio-style compressors and soft-knee compressors, making it equally adept at creative work and subtle level control. Traditionally, soft-knee compressors have been preferable for subtle level control where the original sound is changed as little as possible. Ratio-type compressors are generally considered better suited to creative applications where large amounts of gain reduction are required.

Compressor Parameters

Threshold

The Threshold control determines the input level above which gain reduction will be applied. Threshold range is from -64 dB to $+0$ dB. Soft knee compression takes place for signals exceeding the threshold level by up to 10 dB. Above this level, conventional ratio compression is applied.

Ratio

The Ratio control sets the compression ratio applied after the 10 dB soft-knee region of the Threshold is exceeded.

Ratio ranges from 1.1:1 to infinity. This allows hard limiting with adjustable attack and release.

Attack

The Attack control sets the rate at which the Compressor will respond to input signals that exceed the Threshold level setting. Attack ranges from $100\mu\text{s}$ to 100 ms.

When Auto Attack and Release is enabled, the control knobs have no effect.

Auto (Attack & Release)

This toggle switch disables the Attack and Release rotary controls and instead optimizes the Attack and Release times to suit the dynamics of the material being processed.

Enabling this setting will often produce the subtlest level control on signals with widely varying dynamics or complete mixes.

Release

The Release control sets the rate at which gain returns to normal after the input signal level has fallen below the Threshold. Release range is from 50 ms to 5 seconds.

With very long release settings the Compressor may not have enough time to recover between the signal peaks.

With very short release settings low frequency signals will have a tendency to distort as the Compressor tries to release on the signal sine wave.

Gain

The Gain control has two functions, depending on the current state of the Auto Gain Make-up toggle switch. When Auto Gain Make-up is on, the control has a center-zero and is used as a fine trim for optimum output level. This should be centered at 0 dBfs, but can be reduced up to 9 dB, or driven harder, in which case the signal will hit the Limiter.

When Auto Gain Make Up is turned on, the gain control becomes a ± 9 dB trim. In manual mode, up to 36 dB of gain compensation can be added for level changes caused by Compression.

In the signal path, this control comes before the Peak Limiter detector. This fact should be taken into account when setting the Peak limiter threshold. Driving the gain too hard will often produce excessive limiting.

Auto Gain Make-Up

With Auto Gain Make-Up on, Gain Make Up is adjusted automatically when the Compressor's Threshold, Attack and Ratio or Limiter Threshold are adjusted, so that the output level is as close as possible to the Limit Threshold.

⚠ *When set to extremes, the Auto Gain Make-up feature cannot restore enough gain to make back all the level that would be required to repair excessive Compression.*

Compressor Gain Reduction Meter

This nine-element LED-style meter indicates from 0 dB to 30 dB of gain reduction.

Limit Threshold

The Limit Threshold control sets an absolute limit in decibels that the output signal is not allowed to exceed. This control is normally left in its fully clockwise position, where preventative limiting will sometimes occur with audio material containing high level peaks.

The Compressor Gain control should be used to ensure that the Peak Limiter operates rarely, if at all. Alternatively, you can deliberately drive it into limiting for creative effects.

Limit Gain Reduction Meter

This five-element LED-style meter indicates from 1 dB to 16 dB of gain reduction. The meter scale has been designed so that more sensitive amounts of limiting are displayed, rather than the maximum available.

Bypass (Compressor and Limiter)

This toggle switch bypasses the Compressor and Peak Limiter. Normally it is used to compare the unprocessed signal with the processed signal.

Suggestions for Using the Compressor

The fastest way to begin using the Expander is to choose one of the presets available in the Librarian menu. (See "Using the Librarian" on page 24 for details.)

Alternatively, create your own settings using the procedure that follows.

To use the Compressor:

- 1 Bypass the Gate or Expander by clicking their Bypass toggle.
- 2 Turn on Auto Attack & release.
- 3 Turn on Auto Gain Make-up.
- 4 Set the Limiter control fully clockwise.
- 5 Set the Ratio control. For vocals, try 2.5:1 or less. For full mixes use even less. For dynamic single tracks, use more.
- 6 Adjust the Threshold control until the the vertical VU meter and the Compressor Gain Reduction (GR) meter show activity. As a rule, the Threshold should be 6 dB to 10 dB below the average input level to hear much change.

Additional Suggestions for Using the Compressor

Setting up the Compressor is simpler if the Expander or Gate is initially set to Bypass and the Peak Limiter threshold set to maximum. This allows you to adjust the Compressor in isolation.

Ratio Amount

The Ratio setting depends on how much the signal dynamics need controlling. As a rule, higher ratios provide a higher degree of control but also tend to be more audible in operation when high levels of gain reduction are required. The soft-

knee feature of the Compressor makes this far less pronounced. Overall, a higher ratio can be used than on conventional compressors without compromising the sound quality.

Effective Gain Reduction

If the Attack & Release switch is set to Auto, setting up is simply a matter of adjusting the Threshold control until the desired amount of gain reduction occurs. You can judge this partly by ear and partly by observing the gain reduction meter.

A maximum gain reduction of between 8 dB and 12 dB is usually adequate. If more gain reduction is necessary, consider applying compression during recording and then further compression while mixing.

With Auto Gain Make-up disabled, rotate the Gain control until as near to 0 dB (full scale) signal output is seen at the VU meter. For greater simplicity, select Auto Gain Make-Up.

Background Noise

Compression during a mix increases the subjective level of background noises during pauses and quiet passages. Unless the noise problem is serious, the Expander can attenuate this noise to a very high degree, without compromising the desired audio signal.

Attack Times

The longer the attack time, the longer the Compressor takes to respond to increases in signal level and a slow attack time is often used to accentuate the beginning of percussive or plucked sounds such as drums, basses and guitars. A long attack time can also permit peaks to pass unattenuated. The limiter will pick these up, so it is

quite common with slow attack times to see increased limiter activity. A fast attack time will bring the input signal under control very quickly.

Pumping

Pumping refers to heavy compression with incorrectly set envelope parameters. This results in very audible gain changes when the compressor attacks and releases. It is often an indication that the release time is too long. Release time should be set short enough so that the gain has returned to normal before the next signal peak occurs, and, in general, it should be set as short as possible before audible gain pumping occurs.

In most cases, an output of 0 dBfs is the optimum output level. Lower output levels can be set using the Limiter Threshold. You might want to do this so that later inserts can better receive an optimized signal level at their input. If so, set the Peak Limiter Level to the desired output value then adjust the Compressor Auto or manual Gain control to ensure minimum Limiter activity.

Peak Limiter Bypass

The Peak Limiter has no bypass control. However, turning the Level control fully clockwise will prevent virtually all limiting. To use the Limiter while effectively bypassing the Compressor, turn the Compressor Threshold fully counter clockwise to its maximum of +0 dB. Then set the Ratio to its lowest setting of 1.1:1 if Gain Make-Up is set to manual. Set the Gain to 0 dB if Auto Gain is enabled.

Compensating for Apparent Dullness in Compressed Material

Compression can sometimes seem to have the effect of dulling audio material. Most of the energy in typical broadband music is contained within the bass range. This high energy causes the Compressor to operate, causing any quieter, high frequency sounds occurring at the same time to be reduced in level. That is why the cymbals and hi-hats in a heavily compressed drum track seem to dip in level whenever a loud bass drum or snare drum beat occurs.

The solution is to use less compression or increase the attack time to allow the leading edge of the brighter sounds to pass through the Compressor before gain reduction occurs. Though the semi-soft-knee compression systems used in Drawmer Dynamics modules tend to minimize this effect, in extreme cases, it may be necessary to add a little artificial brightness to the processed sound using equalization or some form of exciter.

The Limiter

If the Compressor module is used with higher ratios, it will function as a Limiter. In addition to this feature, there is a separate auto-adaptive Peak Limiter. This not only catches any peaks that a slow Compressor attack might pass through unprocessed, but also allows the user to set an absolute output signal level that will not be exceeded.

Limiting is extremely valuable in digital recording where an absolute maximum recording level exists. When overdriven with Gain, it can also be used creatively to produce deliberate level-pumping effects.

Meters and Indicators

Drawmer Dynamics provides several types of LED-type signal meters and indicators.

Peak Input LED

The Peak Input LED indicates peaks in input signals. At 1.0 dB below digital full scale the LED is amber. At -0.01 dB, (just below full scale input) it is red. If the Peak Input LED frequently flashes red, the input signal is clipping and should be reduced.



Peak Input LED

VU Meter

The sixteen-element LED VU Meter shows output levels after processing. Metering ranges from 60 dB below full scale to 0 dBfs. Green LEDs indicate levels below -4 dB. Yellow LEDs indicate levels from -3 dB to -1 dB. An amber LED indicates -0.5 dB and turns red for peaks held at 0 dBfs.



VU meter (stereo)

Stereo Input Balance

This control, which appears only when Drawmer Dynamics is used in stereo, allows you to correct an imbalance between stereo input images without introducing any gain. (Stereo dynamic control is best achieved with a mix that is equally centered.)

The LEDs show relative input balance and how far off center the incoming stereo mix is. A perfectly matching stereo input should produce virtually no LED activity, regardless of audio level.

When centered, the Stereo Input Balance control has no effect. Moving the control to the left attenuates the right input signal by up to 6 dB and pans the image to the left. Moving the fader to the right attenuates the left input signal by up to 6 dB and pans the image to the right.

Peak input LEDs appear at both ends of the meter.



Stereo Input Balance control

chapter 3

Using Drawmer Dynamics

Drawmer Dynamics is a real-time TDM plug-in. It processes audio non-destructively in real time. It does not alter the original source audio, but only applies its effects during playback.

Using Plug-Ins as Inserts

To use the Drawmer Dynamics Plug-In, you must insert it in-line on an audio track, auxiliary return, or a master fader.

When more than one insert is used on a track, they process the audio in series, each effect being added to the previous one, from top to bottom in the Mix window.

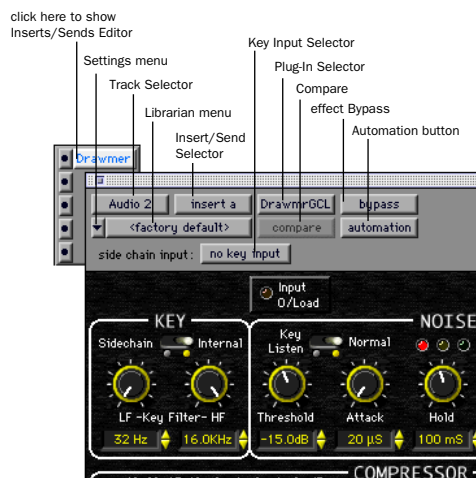
Pre-Fader Operation

Drawmer Dynamics functions as a *pre-fader* insert, meaning that its level is not affected by a track's volume fader (except when used on a master fader).

For this reason, clipping can occur if you boost its gain to extremes. This is particularly true on tracks recorded at high amplitude. Watch on-screen metering to identify and rectify clipping if it occurs.

Using the Inserts/Sends Editor

The Inserts/Sends Editor, which appears whenever you click an insert on a track, allows you to access and edit the parameters for any real-time plug-in in use.



Inserts/Sends Editor

Settings Menu Allows you to copy, paste, save, and import plug-in settings.

Track Selector Allows you to access any non-MIDI track in your session.

Librarian Menu Allows you to recall settings files saved and stored in a plug-in's root settings folder or in the current session's Plug-In Settings folder. See "Using the Librarian" on page 24.

Insert/Send Selector Allows you to access any insert or send on the current track.

Key Input Selector Allows you to select a mono audio signal on a particular input or bus and route it to trigger the Gate.

Plug-In Selector Allows you to select any real-time plug-in installed in the DAE Plug-Ins folder.

Compare Button If you have changed the settings of a plug-in since you last saved them, clicking this button toggles between the original settings and the edited settings in order to compare them.

Bypass Button Clicking this button disables the currently displayed plug-in. This allows you to compare the track with and without the effect. To re-enable a plug-in, click this button again.

Automation Button Clicking this button allows you to enable individual plug-in parameters for automation recording. See "Automating Drawmer Dynamics" on page 23.

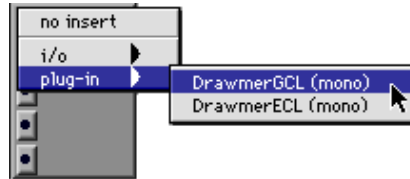
Inserting Drawmer Dynamics on a Track

To use Drawmer Dynamics in a Pro Tools session, add it to a track as an insert.

To insert Drawmer Dynamics on a track:

- 1 Click the Inserts Selector on a track and select the plug-in that you want to use.
- 2 Click Play on the Transport to begin audio playback.

3 Adjust the parameters of the plug-in for the effect you want.



Adding Drawmer Dynamics as an insert

Keyboard Shortcuts

- For finer adjustments, Command-drag (Macintosh) or Control-drag (Windows), the desired parameter.
- To return a control to its default value, Option-click (Macintosh) or Alt-click (Windows) the control.

To remove Drawmer Dynamics from a track:

- Click the Insert Selector and choose No Insert.



Removing Drawmer Dynamics

Using a Key Input for Side-Chain Processing

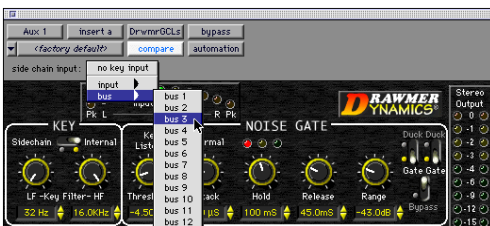
The Drawmer Dynamics GCL Plug-In features side-chain processing. With side-chain processing you can control gating of a mono or stereo audio signal using the dynamics of a different mono signal (the *key input*).

A typical use for this feature is to use a kick drum track to gate and tighten up a bass track, or a rhythm guitar track to gate another instrument track such as a keyboard pad.

Key Input Filters

You can use key input filters to define a specific frequency range in the key input signal to trigger gating.

A common production technique is to use these controls to filter a drum track so that only specific high frequencies (a hi-hat, for example) or low frequencies (a tom or a kick, for example) trigger the gate.



Selecting a Key Input

To use a key input for side-chain processing:

- 1 Click the Side-Chain Input pop-up and select the input or bus that carries the audio you want to use to trigger gating.
- 2 Set the Key to Side-Chain.
- 3 To hear the audio source you have selected to control side-chain input, click Key Listen.

- 4 To filter the Key Input so that only certain frequencies trigger the plug-in, set the LF Key Filter and HF Key Filter controls to the desired frequency range.

- 5 Begin playback. Gating is now controlled by the input or bus you chose as a key input.

- 6 Adjust the Noise Gate's Threshold to fine tune side-chain triggering.

- 7 Adjust other parameters to achieve the exact effect you want.

Automating Drawmer Dynamics

You can automate changes to Drawmer Dynamics settings in real time. Pro Tools creates a separate playlist for each plug-in parameter that you automate. This allows you to later edit and modify each automated parameter individually and build up complex automation in stages.

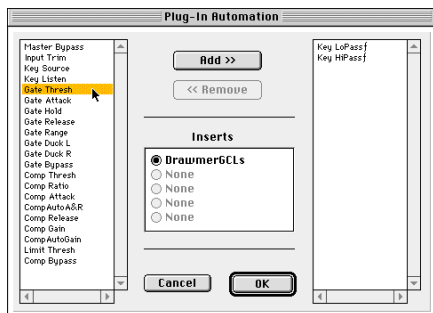
To enable automation:

- 1 Click the Automation button in the Inserts/Sends Editor.



Opening the Plug-In Automation dialog

2 Choose the parameters to automate and click Add. If there are multiple plug-ins on the same track, you can select from among these by clicking their buttons in the Inserts section of this dialog.



Selecting the parameters to automate

3 Click OK to close the Plug-In Automation dialog.

To automate Drawmer Dynamics:

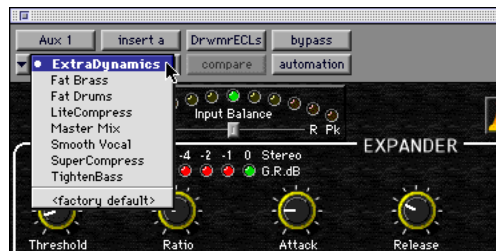
- 1 In the Automation Enable window, make sure that automation is enabled.
- 2 Choose an automation mode for each track you want to automate. For an initial pass, choose Auto Write.
- 3 Click Play to begin writing automation. Adjust the plug-in parameters.
- 4 When you have finished, click Stop.

To add additional automation:

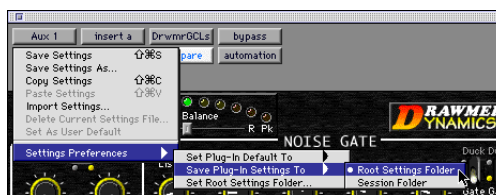
- To augment your previous pass, repeat the procedure using Touch mode. This will add new automation only when you actually touch or move a control.

Using the Librarian

The Settings Librarian makes it easy to create your own library of commonly used Dynamics settings. Using the Librarian and Settings menus, you can copy, paste, save, and import these settings from plug-in to plug-in, or from session to session.



Librarian menu



Settings menu

Once you create and save settings files to disk (and tell Pro Tools where to find them by assigning their *root* folder) they will appear in the Librarian menu. You can save settings in the current session or to a different location.

Pro Tools always saves the current session's plug-in settings with the session itself. The Librarian allows you to access additional settings you have saved during other sessions.

⚠ *Dynamics settings created in version 2.0 and later of Drawmer Dynamics are not compatible with earlier versions of the plug-in.*

The Settings Menu

The Settings menu contains the following commands:

Save Settings Saves the parameter settings of the currently active plug-in. This command overwrites any previous version of the settings that you have saved. The setting then appears in the Librarian pop-up menu.

Save Settings As Saves the settings of the currently active plug-in under a different name. It is particularly useful if you are experimenting and want to save different versions.

Copy Settings Copies the current settings of a plug-in. You can then apply these settings to the same type of Plug-in on a different track by calling up the track in the Inserts/Sends Editor and pasting the settings with the Paste Settings command. Plug-in settings can be copied and pasted during playback. To apply a plug-in's settings in another session, use the Save Settings and Import Settings commands.

Paste Settings Pastes Settings copied with the Copy Settings command. Plug-in settings can be copied and pasted during playback. To apply a plug-in's settings in another session, use the Save Settings and Import Settings commands.

Import Settings Imports a Settings file from a location other than your current Root Plug-In Settings folder or Session's Settings folder. When the setting is loaded, it is applied to the currently active plug-in. Pro Tools adds the imported setting to the current library. The Import Settings command is particularly useful for loading settings files that have been created on or transferred from another Pro Tools system.

Delete Current Settings File Permanently deletes the currently selected settings from disk.

Set As User Default Defines the current settings as the User Setting for that type of plug-in. Once you have done this, you can use the Set Plug-In Default To command to have the plug-in default to your custom settings whenever you first place it on a track. Normally, Pro Tools defaults to the Factory Default setting.


Settings Preferences

Selects several preferences for saving and importing plug-in settings. The commands available here are:

Set Plug-In Default To Sets the current plug-in default settings to either Factory Default (the Pro Tools standard default settings for that plug-in) or User Setting (your own custom settings). Use the Set As User Default command to define a custom User Setting first. Whichever you choose becomes the default setting for the plug-in.

Save Plug-In Settings To Selects the folder where plug-in settings are saved. If you choose Session Folder, the settings are saved in a folder named "Plug-In Settings" within the current Session folder. If you choose Root Settings Folder, the settings are saved in the folder you specified with the Set Root Settings Folder command.

Set Root Settings Folder Selects a source or *root* folder for saving and importing settings. The root settings folder must be named "Plug-In Settings." Use this command only if you want to choose a location other than DAE's Plug-In Settings folder.

 *To save plug-in settings to any location other than the Plug-In Settings folder in the DAE Folder, you must first create a folder named "Plug-In Settings" in the new location and then save to that folder.*

Choosing a Destination for Settings

Before you save any plug-in settings, select their destination folder.

To select the destination folder for settings:

- From the Settings pop-up menu, choose Settings Preferences > Save Plug-In Settings To, and choose either Session's Plug-In Settings folder or Root Settings folder.

If you choose Root Settings folder, Pro Tools saves to the Plug-In Settings folder within the DAE Folder.

To set a different folder, you must show Pro Tools where to look for this folder.

To set your Root Settings folder:

- 1 From the Settings pop-up menu, choose Settings Preferences > Set Root Settings Folder.
- 2 Select the folder you want to use as your Root folder and click Select "(your folder's name)."

Saving Plug-In Settings

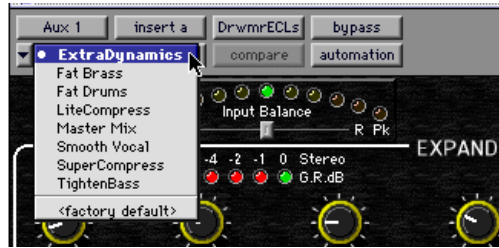
To save the current settings of a plug-in, use the Save Settings command. This will save the settings to the destination folder you specified with the Save Plug-In Settings To command.

To save plug-in settings:

- 1 With the plug-in open, click the Settings pop-up menu and choose Save Settings.
- 2 Enter a name for the settings file and click OK. The setting now appears in the Librarian menu.

To load a previously saved setting:

- With the plug-in open, click the Librarian pop-up menu and select the setting.



Librarian menu

Importing Plug-In Settings

If you keep banks of settings files on other hard disks, floppy disks, or removable media, you can use the Import Settings command to access these settings.

To import a plug-in settings file:

- 1 With the plug-in open, click the Settings menu and choose Import Settings.
- 2 Locate the settings file you want to import and click Open. Pro Tools loads the settings and copies them to your current root destination folder for future use.

Copying Plug-In Settings

The Copy Settings command allows you to copy the settings from one plug-in so that you can then paste them into another.

To copy plug-in settings:

- With the plug-in open, choose Copy Settings from the Settings pop-up menu.

Pasting Plug-In Settings

Once you have copied a plug-in's settings, you can paste them into a destination plug-in of the same type.

To paste plug-in settings:

- 1 Open the destination plug-in.
- 2 From the Settings pop-up menu, choose Paste Settings. Pro Tools pastes the previously copied settings into the destination plug-in.

Creating a Custom User Default Setting

The Set As User Default command allows you to create a custom setting for any category of plug-in and use that setting as the default User Setting.

You can make a plug-in default to this custom setting whenever you first insert it on a track by using the Set Plug-In Default To command. This feature saves you the trouble of loading a setting each time you want to use it.

To create a custom User Default setting:

- 1 Set the plug-in parameters as desired.
- 2 Click the Settings pop-up menu and choose Save Settings As.
- 3 Name the settings file and click Save.
- 4 From the Settings pop-up menu, choose Set As User Default. Pro Tools defines the current settings as the User Default for that type of plug-in.

To make a plug-in default to your custom setting:

- From the Settings pop-up menu, choose Set Plug-In Default To > User Setting. Pro Tools now uses the custom settings as the default for the plug-in.

The Factory Default Setting

The *Factory Default* setting is always available in the Librarian menu and is used as the default settings for a plug-in (unless you use the Set As User Default command to change it to something else).

Because the Factory Default setting is always available, choosing it allows you to access the original default settings for your plug-in as a starting point at any time.

Creating Library Subfolders

Pro Tools automatically creates subfolders in the root destination folder for each type of plug-in. You may want to subdivide your settings files still further by creating subfolders for them.

For example, if you are using an EQ, you may want to organize settings files and folders by the type of instrument or effect that the EQ settings is suited to. This allows you to keep your library well organized with hierarchical menus for accessing plug-in settings.

To create a settings subfolder:

- 1 Set the plug-in parameters as desired.
- 2 From the Settings pop-up menu, choose Save Settings.
- 3 Click the New Folder button and enter a name for the subfolder.
- 4 Name the plug-in setting and click Save. The new setting is saved within the subfolder.



Librarian menu with subfolders for settings

appendix a

Drawmer Dynamics Demo Sessions

Several demo sessions are included with Drawmer Dynamics. These illustrate how to use the plug-in in typical recording scenarios.

Using the Demo Sessions

Before opening a demo session, you must have already installed and authorized the Drawmer Dynamics plug-in.

To open a demo session:

- 1 Locate and open the demo sessions folder (Digidesign/Drawmer Dynamics/Drawmer Dynamics Demo/Demo Sessions).
- 2 Double-click the desired demo session.
- 3 When the session opens, press the Spacebar to begin playback.
- 4 Click Bypass to compare the track with and without dynamics processing.

About the Demo Sessions

Following are brief descriptions of each demo session and the features they illustrate.

“Gated Tones” Demo

This session illustrates keying of two different tone bursts from an existing short drum loop using the Gate. The three-channel session uses two Gates. The key input is from the original drum track.

⚠ *The unprocessed audio in this session is very loud. Turn down your monitoring system if you plan to bypass the Gate.*

“Snare” Demo

This session illustrates a gated reverb effect using the Gate and a modified variation of “Gate&Comp Staccato” setting with a reduced Gate Threshold to compensate for low signal level. Notice how the reverberated sound is shortened. Imagine that the reverb could also be high level noise. Gate Release greatly affects the output.

“Noise Removal” Demo

This session illustrates how to use the Expander to effectively remove excessive background hiss from a short drum loop. Use the Bypass button to compare the processed and unprocessed audio.

“Wrong & Right” Demo

This session illustrates the right and wrong way to use a Gate. The same bass guitar audio appears on two tracks. Both tracks have the same Gate assigned, but each has differing parameter settings. Notice that using the wrong Threshold, Attack, Hold and Release settings can give very poor results from low frequency signals. Use Solo and Mute to compare the effect of the right and wrong settings.

“VoxOver” Demo

This session illustrates how to use the Gate to perform ducking. Note how the levels of the music tracks are attenuated whenever the vocal track comes in. This technique is frequently used in radio, film, and commercial voice-overs, or anywhere that automatic control over background pad level is required.

Note that one audio source (the vocal track) is used to trigger two separate mono backing tracks by positioning the key selector switch centrally. In reality, the amount of ducking in this demo is excessive, and often as little as 3 dB of attenuation may be sufficient.

The main vocal track utilizes the Expander to remove headphone spill/background noise.

Try inverting the Gate/Duck switch of one of the Gates. This will result in distinct panning of the outputs during the duration of the vocal track.

“Extra-Clean-Key & Drum” Demo

This session illustrates keying of a short drum loop from a composite track of mixed sine wave tones. The tone mix is first cleaned using the Expander assigned to the first mixer insert button. This audio is then used as a key input. The result is a cleaner key signal for the Gate.

This demo includes automation that shows how you can vary the Threshold parameter to ignore a key input.

“Clean & Dirty Drums” Demo

This session illustrates three different styles of processing using both the Gate and the Expander. There are three audio tracks, each of which demonstrates a different effect:

- ◆ The left audio channel (“Rhythm <L”) carries the original “scratchy” audio. The DrawmerGCL Plug-In is loaded in a bypassed state. Adjusting the Gate Threshold to about -20 dB will allow the rest of the drum track to pass through the plug-in.
- ◆ The right audio channel (“Rhythm >R”) carries the audio after being bounced and processed. This channel has a DrawmerECL Plug-In that once enabled, demonstrates Upward Expansion. This shows how to add more life to a track that suffers from an over-squashed dynamic range.
- ◆ The center channel carries audio that has been over processed. This shows the kind of effect that can be achieved with this type of double-pass processing.

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- VU meter 19