ENSONIQ

DP/PRO

Professional 24-Bit Effects Processor

Reference Manual

Version 1.10

D P / P r o R e f e r e n c e M a n u a l :

Written, designed, and illustrated by: Robby Berman and Jonathan Coulton
Special Thanks: Ray Legnini and Bryan Pape

Please record the following information:

Your Authorized ENSONIQ Dealer:_____ Phone:_____

Your Dealer Sales Representative:_____

Serial Number of Unit:_____ Date of Purchase:_____

Your Authorized ENSONIQ Dealer is your primary source for service and support. The above information will be helpful in communicating with your Authorized ENSONIQ Dealer, and provide necessary information should you need to contact ENSONIQ Customer Service. If you have any questions concerning the use of this unit, please contact your Authorized ENSONIQ Dealer first. For additional technical support, or to find the name of the nearest Authorized ENSONIQ Repair Station, call ENSONIQ Customer Service at (610) 647-3930 Monday through Friday 9:30 AM to 12:15 PM and 1:15 PM to 6:30 PM Eastern Time. Between 1:15 PM and 5:00 PM we experience our heaviest call load. During these times, there may be delays in answering your call.

Although every effort has been made to ensure the accuracy of the text and illustrations in this manual, no guarantee is made or implied in this regard.

IMPORTANT:

Note: This equipment has been designed and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
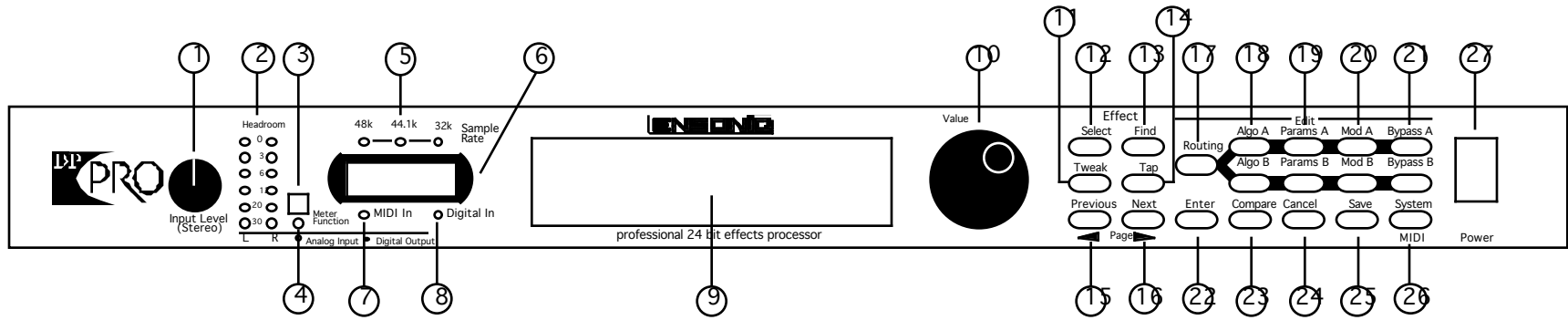
* Reorient or relocate the receiving antenna.
* Increase the separation between the equipment and receiver.
* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
* Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to the product not expressly approved by ENSONIQ could void the user's FCC authority to operate the equipment.
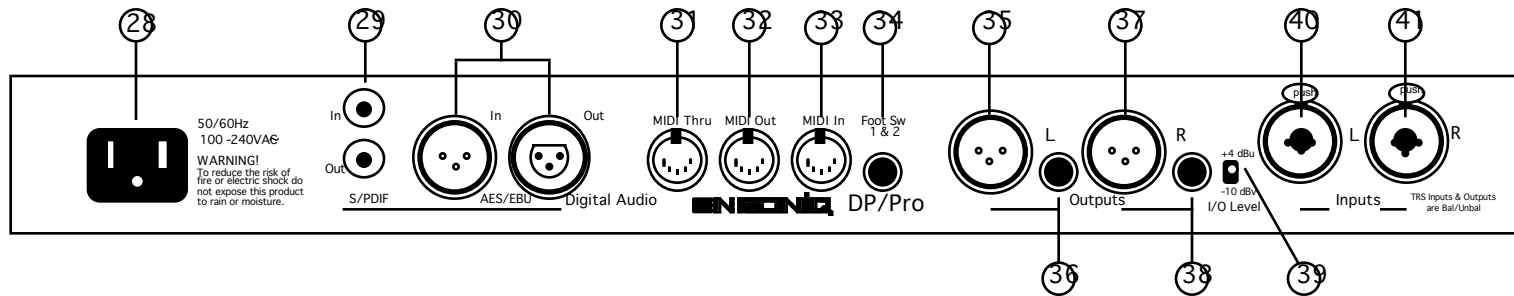
In order to fulfill warranty requirements, your **DP/Pro** should be serviced only by an Authorized ENSONIQ Repair Station. The ENSONIQ serial number label must appear on the outside of the unit, or the ENSONIQ warranty is void.

• ENSONIQ and **DP/Pro** are trademarks of ENSONIQ Corp.

DP/Pro Front Panel View

DP Pro

Headroom
0
3
6
10
20
30

L   R

Meter Function

Analog Input   Digital Output

48k 44.1k 32k   Sample Rate

MIDI In   Digital In

Input Level (Stereo)

professional 24 bit effects processor

ENSONIQ

Value

Select   Find
Tweak   Tap

Effect
Routing

Edit
Algo A   Params A   Mod A   Bypass A
Algo B   Params B   Mod B   Bypass B

Previous   Next   Enter   Compare   Cancel   Save   System

Page

MIDI   Power

DP/Pro Rear Panel View

50/60Hz
100 -240VAC

WARNING!
To reduce the risk of
fire or electric shock do
not expose this product
to rain or moisture.

In
Out

S/PDIF

In   Out

AES/EBU   Digital Audio

ENSONIQ   DP/Pro

MIDI Thru   MIDI Out   MIDI In   Foot Sw 1 & 2

L   R

push   push

L   R

Outputs   I/O Level   Inputs   TRS Inputs & Outputs are Bal/Unbal

+4 dBu
-10 dBv

Front and Rear Panel Key

1. Input Level Knob—set analog input level to the DP/Pro.
2. Headroom LEDs—show analog input level to, or digital output level from, the DP/Pro
3. Meter Function switch—sets behavior of Headroom LEDs.
4. Meter Function LED—shows current meter function.
5. Sample Rate LEDs—show the DP/Pro current sample rate.
6. Auxiliary display—shows effect, algo and parameter numbers.
7. MIDI In LED—lights to show incoming MIDI data.
8. Digital In LED—lights to show presence of digital sync.
9. Main DP/Pro display
10. Value knob—is used to select effects, algos and adjust parameters.
11. Tweak button—provides access to Tweak parameters and virtual Tweak knobs.
12. Select Effect button—accesses the list of effects currently in the DP/Pro's internal memory; repeated presses moves between effect banks.
13. Find Effect button—accesses Effect Finder.
14. Tap button—can be tapped to set the DP/Pro's system tempo for synchronized effects.
15. Previous Page button—scrolls the DP/Pro's display back through parameters and moves cursor during some operations.
16. Next Page button—scrolls the DP/Pro's display forward through successive parameters and moves cursor during some operations.
17. Routing button—provides access to signal-flow settings, and to copy/swap functions.
18. Algo A and Algo B buttons—intitiates selection of algorithms and/or algorithm variations for ESP-A and ESP-B.
19. Params A and Params B buttons—provides access to mixing, algorithm and Tweak parameter settings for ESP-A and ESP-B.
20. Mod A and Mod B buttons—provides access to real-time modulation parameters for ESP-A and ESP-B.
21. Bypass A and Bypass B buttons—bypasses ESP-A and/or ESP-B.
22. Enter button—executes various DP/Pro operations.
23. Compare button—toggles between edited and last-saved version of currently selected effect.
24. Cancel button—undoes last operation.
25. Save button—intitiates process of saving effects to memory.
26. System/MIDI button—provides access to global parameters.
27. Power switch—turns the DP/Pro on and off.
28. AC Line jack—connects power cord to DP/Pro.
29. S/PDIF Input and Output jacks—connects DP/Pro to an S/PDIF digital device when a DI-Pro Digital I/O board is installed.
30. AES/EBU Input and Output jacks—connects DP/Pro to an AES/EBU digital device when a DI-Pro Digital I/O board is installed.
31. MIDI In jack—receives MIDI data.
32. MIDI Out jack—transmits MIDI data from the DP/Pro.
33. MIDI Thru jack—passes received MIDI data out from the DP/Pro.
34. Foot SW 1 & 2 jack—connects a dual foot switch to the DP/Pro.
35. Left XLR Analog Output jack—sends analog audio from the DP/Pro's left stereo bus.
36. Left 1/4" Analog Output jack—sends analog audio from the DP/Pro's left stereo bus.
37. Right XLR Analog Output jack—sends analog audio from the DP/Pro's right stereo bus.
38. Right 1/4" Analog Output jack—sends analog audio from the DP/Pro's right stereo bus.
40. Combination 1/4" and XLR Left Input jack—receives analog audio to be sent into the DP/Pro's left stereo bus.
41. Combination 1/4" and XLR Right Input jack—receives analog audio to be sent into the DP/Pro's right stereo bus.

Reference Manual Table of Contents

1—Introduction

Welcome

Congratulations on your purchase of the ENSONIQ DP/Pro Professional 24-bit Effects Processor. The DP/Pro Reference Manual provides descriptions of all of the DP/Pro's many features, and provides tips for unlocking the product's tremendous sonic potential.

Tip: Be sure to check out ENSONIQ's World Wide Web home page at <http://www.ensoniq.com> from time to time for the latest info on the DP/Pro and other ENSONIQ products.

Parameters, Values and Pages

There are three basic terms that underlie every DP/Pro activity, and which must be understood. They are:

- Parameter—A parameter is any one of the DP/Pro's programmable attributes.
- Value—A value is a parameter's setting.
- Page—The DP/Pro's front-panel buttons provide access to a great many parameters, often presented one after another on sequentially arranged displays. Each display is called a "page."

Tip: A parameter is described by the button with which it's associated. For example, if a parameter is referred as a "System/MIDI parameter," you'll know that it's one of the group of parameters accessed by pressing the System/MIDI button.

Navigating the DP/Pro

It's simple to navigate the DP/Pro's pages and perform its operations once you understand the front-panel tools central to so many of its activities:

- The Next and Previous Page buttons allow you to move forward or back, and across, the DP/Pro's pages.
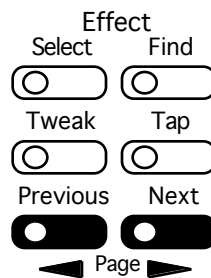
Tip: The Next and Previous Page buttons, when held down, will scroll through multiple pages.

• The Value knob, when it's turned clockwise or counter-clockwise, changes the setting of the currently selected parameter. It's also used, in conjunction with the virtual tweak knobs, as a real-time controller (described later in this chapter).

Value
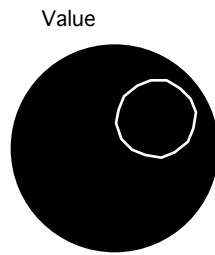
• The Enter button, when pressed, executes an operation, or functions as a "Yes" answer to a displayed question. When an Enter button-press is required to complete an operation, its LED flashes.
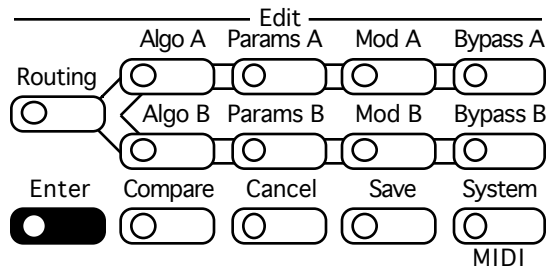
• The Cancel button provides a mechanism for undoing edits and procedures. Its precise behavior varies somewhat depending on what it is you're doing and what's showing on the DP/Pro's display. The procedures described throughout the Reference Manual detail the specific role that the Cancel button plays in each context.
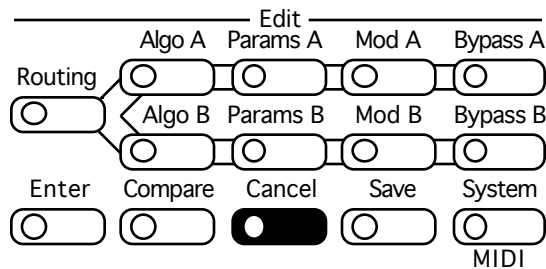
Tip: Many parameters in the DP/Pro can be reset to their nominal values by double-clicking the Cancel button.

LEDs

The small lightbulbs—*LED*s (for "Light Emitting Diode")—in many of the DP/Pro's buttons light to help you keep track of where you are in the DP/Pro.

A Note About Read-Only Displays

Each of the areas within the DP/Pro has its own set of displays, which are described in detail in the chapters of the DP/Pro Reference Manual. The DP/Pro provides a number of read-only displays for informational purposes, in addition to its many adjustable parameters. When a displayed value is

read-only, its name will be followed by a colon (":"). The names of all editable parameters are followed by an "equals" symbol ("=").

Tip: See the Glossary in Chapter 13 for definitions of terms used in the DP/Pro Reference Manual and software.

The DP/Pro Architecture

Effects

In the DP/Pro, an *effect* is a preset that contains all of the settings for the DP/Pro's two processor chips, as well as the settings that determine the flow of audio into, through and out of the DP/Pro.
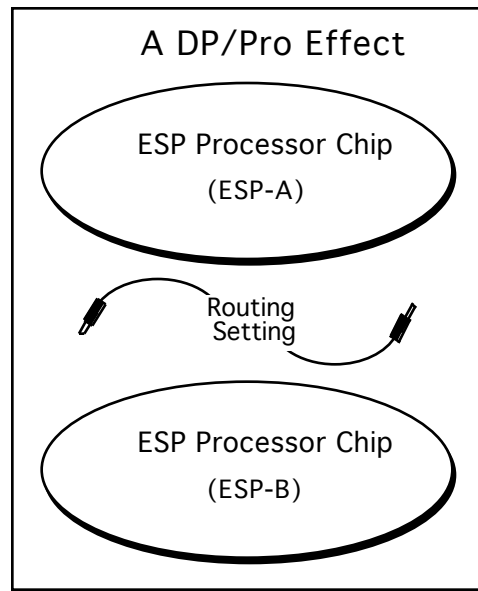
The DP/Pro can contain up to 387 effects. Effects are stored in the DP/Pro's memory in four banks:

- Banks 0 and 1 are RAM banks that can be used for the storage of effects you edit and create.
- Banks 2 and 3 are ROM banks that contain effects programmed by ENSONIQ; these effects are always available and uneraseable.

Effects can be selected using the DP/Pro's Select Effect button and the Value knob, with a foot switch (such as the ENSONIQ SW-10) or with Program Changes and Bank Select messages received via MIDI.
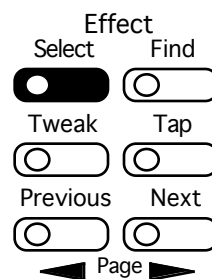
Effect Finder

The DP/Pro offers a powerful mechanism for locating the desired effect from the many available in memory. This mechanism—*Effect Finder*—searches for effects according to criteria that you provide. Effect Finder is accessed via the Find button.
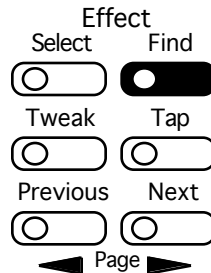
To learn more about selecting effects and Effect Finder, see Chapter 3.

The DP/Pro's Two ESP2 Processor Chips

The basic building blocks of DP/Pro effects are two of ENSONIQ's second-generation 24-bit ESP2 custom VLSI chips. "ESP" is an acronym for "ENSONIQ Signal Processing." The two chips are called *ESP-A* and *ESP-B*.

Each ESP uses an *algorithm*—a highly specialized digital signal processing program—to perform an audio processing task. The DP/Pro contains 42 different algorithms, any of which can be used by either ESP. Each algorithm offers its own set of useful presets, called *variations*.
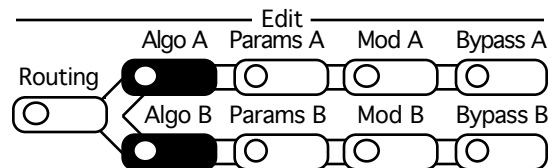
Algorithm and variation selection occurs after pressing the Algo A (for ESP-A) and Algo B (for ESP-B) buttons. Chapter 5 explains in detail the manner in which algorithms and variations are selected.

Each algorithm contains a comprehensive suite of parameters, accessed via the Params A and Params B button. Algorithms parameters are described in Chapter 6.
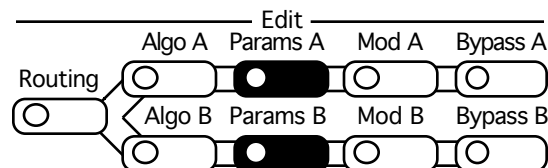
In addition, each ESP contains its own set of mix-related parameters that govern the ESP's input/output levels, stereo balances and, where applicable, its feedback settings. The mixer parameters are also found under the Params A and Params B buttons. The ESP-A and ESP-B Mixer Params are described in Chapter 8.

The Contents of ESP-A and ESP-B
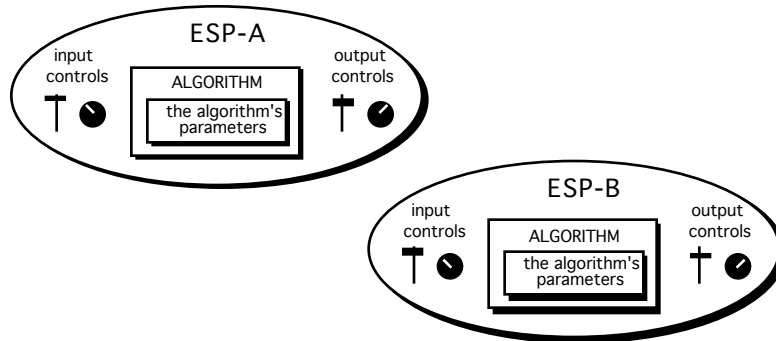
Fast Editing of Parameters

The DP/Pro's Tweak parameters system offers the ability to bring your most-commonly used ESP mix and algorithm parameters up to the DP/Pro's front panel. This provides quick access to these parameters for editing without requiring you to navigate through all of the parameters available for each ESP and algorithm. Chapter 9 describes the setup—via the Params A and Params B buttons, shown above—and use—via the Tweak button—of Tweak parameters.
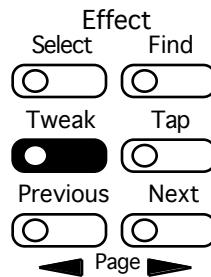
Bypassing ESP-A and ESP-B

Either ESP can be disabled at any time by pressing the Bypass A and/or Bypass B buttons directly, via a foot switch or from MIDI.
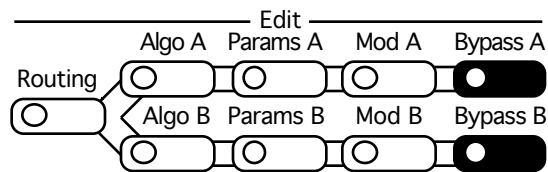
The DP/Pro offers a range of bypass options that allow you to control what it means to "turn off" an ESP. These options are described in Chapter 2.

Copying and Swapping Algorithms

The DP/Pro provides a selection of tools for moving algorithms and their settings from one ESP to another, or between effects. These tools, available under the Routing button (shown below), are described in Chapter 7.

Routing

The DP/Pro provides a variety of ways in which you can pass audio into the DP/Pro, through the ESPs, and back out again. This is referred to as signal *routing*.

- You can process audio sent into the DP/Pro's left and right inputs as a single stereo feed, or as two separate mono signals.
- When you process stereo audio, you can arrange the two ESPs so that signal passes through them separately, from ESP-A into ESP-B, or in a feedback loop, where audio goes into ESP-A, then ESP-B ,and then back to ESP-A again.
- You can also determine whether the stereo outputs of the ESPs will be mixed together, presenting a single stereo feed at the DP/Pro's outputs, or whether the ESPs will each use their own single output.

Routing options are access by pressing the Routing button. Chapter 4 describes the DP/Pro's routing options in detail.
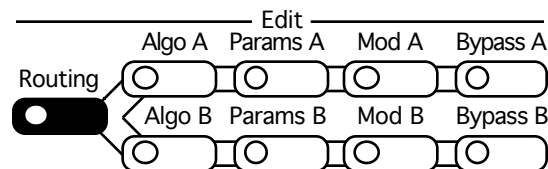
Real-Time Effect Modulation

The DP/Pro provides an extensive set of tools that allow for the real-time manipulation, or *modulation*, of effects. The Mod A and Mod B buttons are provided for this purpose.
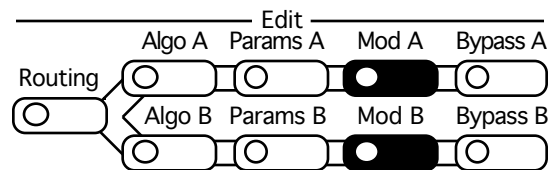
The setting of any ESP mix or algorithm parameter can be controlled in real-time. Real-time modulation can be performed using any MIDI controller, a stereo foot switch, a CV pedal or the DP/Pro's unique virtual controllers, its Tweak knobs, or mod LFOs.

The Virtual Tweak Knobs

Each effect in the DP/Pro contains two virtual controllers called *Tweak Knob 1* and *Tweak Knob 2*. These two devices are software objects that, when enabled, are controlled by the front-panel Value knob. The tweak knobs can be used for the modulation of any ESP mix or algorithm parameters in either ESP, and can be assigned names in order to help you keep track of what it is you've programmed them to do.

The Mod LFOs

In addition to the LFOs available within the DP/Pro's algorithms, two free-standing LFOs are available at all times for use as real-time modulators of ESP mix and algorithm parameter settings in either ESP: the *mod LFOs*. These LFOs can provide cyclical changes to parameters' settings, as they cycle back and forth through their low-frequency waves.

Real-time effect modulation, the tweak knobs and mod LFOs are described in detail in Chapter 9.

Synchronizing Effects to a Tempo

Many of the DP/Pro's algorithms contain elements that can be synchronized to a timing reference. The DP/Pro contains a system clock to provide such a pulse. The system clock can be set to be internally controlled or to respond to received MIDI clocks. When the system clock is not linked to an external MIDI timing source, its rate may be set manually, or by tapping the desired tempo on the front-panel *Tap button*. The Tap button—whose LED flashes the current system tempo—is itself highly configurable. Chapter 2 provides information on the system clock and setting up the Tap button.
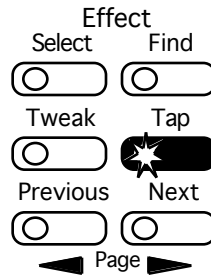
The DP/Pro and MIDI

The DP/Pro is a MIDI-conversant device, allowing the selection of effects, bypassing and real-time modulation via MIDI. The DP/Pro's basic MIDI characteristics are provided in its System/MIDI parameters, described in Chapter 2.
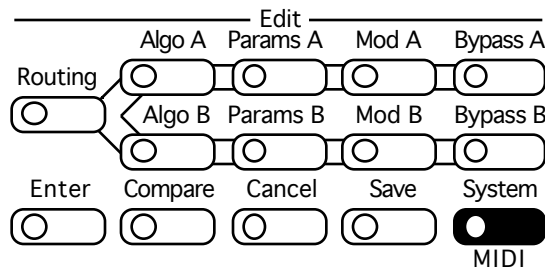
Defining your DP/Pro Workspace

The DP/Pro's overall operation is quite customizable. The System/MIDI button —shown above—provides access to the many parameters that allow you to make your DP/Pro working environment comfortable. The System/MIDI parameters are described in Chapter 2.

Important: Two Final Concepts

Downloading and Installing

In the DP/Pro, the selection of an effect, algorithm or algorithm variation does not necessarily mean that it's ready for use:

- When an effect is selected, the DP/Pro must be instructed to download all of the effect's algorithm settings into its ESPs, and to configure the effect's signal routing.
- When an algorithm or algorithm variation is selected, the DP/Pro must be instructed to download all of the algorithm's settings into the selected ESP.

The DP/Pro allows you to choose whether you'd like it to download, or install, these objects as they're selected, or whether you'd like the option of installing effects and/or algorithms (and variations) manually by pressing the Enter button after you've selected them. If you choose the latter, the Enter button will flash after you've selected an effect, algorithm or algorithm variation to remind you that it needs to be pressed.
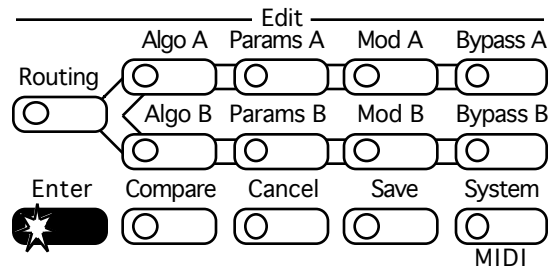
The System/MIDI AutoLoad parameter allows you to determine the DP/Pro's behavior in this regard. When the DP/Pro is shipped from the factory, algorithms and algorithm variations are set to automatically download, while effects are set for manual installation.

Saving
When you're editing effects in the DP/Pro—including every non-System/MIDI parameter—the changes you make are not permanent until you save the effect you're working on. See Chapter 11 to learn how to save effects to the DP/Pro's memory.
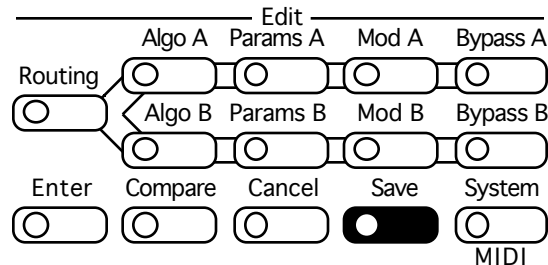
Available Options for the DP/Pro

•   ENSONIQ SW-10 Dual Foot Switch—provides left and right foot pedals in a single unit. These foot pedals can be configured to perform many tasks in the DP/Pro.
•   ENSONIQ DI-Pro Digital I/O Board—provides AES-EBU and S/PDIF digital inputs and outputs for the DP/Pro. The DI-Pro is user-installable.
•   ADC-24—upgrades the DP/Pro's analog-to-digital and digital-to-analog converters from 20-bit to 24-bit performance. The ADC-24 is user-installable.

Installing the DP/Pro

Powering Up the First Time
The correct procedure for powering up the DP/Pro for the first time is as follows:
1.   Make sure the DP/Pro's power button is turned off—the bottom of the button should be pressed in.
2.   Plug the provided line cord into the AC line receptacle on the rear panel of the DP/Pro.
3.   Plug the other end of the line cord into a grounded AC outlet.
4.   Press the top of the Power button on the right side of the DP/Pro's front panel.

Powering up the DP/Pro in a MIDI Configuration
In a series of MIDI devices, you should always turn on the device that's transmitting MIDI data (keyboards, sequencers, etc.) before you power up the device that's receiving MIDI data. For instance, if you're using the DP/Pro to receive MIDI information from a keyboard or sequencer, you should turn the keyboard or sequencer on before the DP/Pro. This prevents any unwanted MIDI information

from being "spit" out of the transmitting device during power up, which could confuse or disable your DP/Pro. If this should happen, turn off the DP/Pro, and then turn it back on.

Polarization and Grounding

Like many modern electrical devices, the DP/Pro has a three-prong power cord with earth ground to ensure safe operation. Some products have power cords with only two prongs and no earth ground. For safety, some of these products have polarized plugs which can only be inserted into an outlet the proper way.
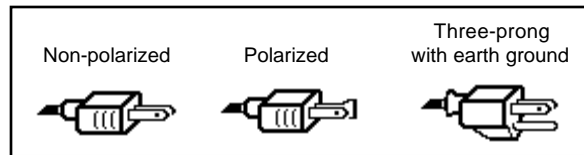
Some products, such as older guitar amplifiers, do not have polarized plugs and can be connected to an outlet incorrectly. This may result in dangerous high voltages on the audio connections, which could cause you physical harm, or damage any properly grounded equipment to which they are connected, such as your DP/Pro.

To avoid shock hazards or equipment damage, we recommend the following precautions:

*   If you own equipment with two-pronged power cords, check to see if they're polarized or non-polarized. You might consider having an authorized repair station change any non-polarized plugs on your equipment to polarized plugs to avoid future problems.
*   Exercise caution when using extension cords or plug adapters. Proper polarization should always be maintained from the outlet to the plug. The use of polarized extension cords and adapters is the easiest way to maintain proper polarity.
*   Whenever possible, connect all products with grounded power cords to the same outlet ground. This will ensure a common ground level to prevent equipment damage and minimize hum in the audio output.

AC outlet testers are available from many electronic supply and hardware stores. These can be used to check for proper polarity of outlets and cords.

For more information on grounding the DP/Pro, see Chapter 12.

AC Line Conditioning

As with any computer device, the DP/Pro is sensitive to sharp peaks and drops in the AC line voltage. Lightning strikes, power drops, or sudden and erratic surges in the AC line voltage can scramble the internal memory, and in some cases, damage the unit's hardware. Here are a few suggestions to help guard against such occurrences:

*   A surge/spike suppressor—this absorbs surges and protects your gear from all but the most severe over-voltage conditions. You can get multi-outlet power strips with built-in surge/spike suppressors for little more than the cost of unprotected power strips, so purchasing one is a good investment for all your electronic equipment.
*   A line conditioner—this is the best, but by far the more expensive way to protect your gear. In addition to protecting against surges and spikes, a line conditioner guards equipment against excessively high or low line voltages. If you use the DP/Pro in lots of different locations with varying or unknown AC line conditions, you might consider investing in a line conditioner.

Rack Mounting Guidelines

Because the DP/Pro uses an internal transformer, it generates a certain amount of heat. For better reliability, we don't recommend the installation of the DP/Pro near devices that are particularly sensitive to heat, or near power amps, tube equipment, or other products that emit a lot of heat.

Temperature Guidelines

The DP/Pro contains computerized and electronic circuitry that can be susceptible to damage when exposed to extreme temperature changes. When the DP/Pro is brought inside after sitting in a cold climate (i.e., the back seat of your car), condensation builds up on the internal circuitry in much the same way a pair of glasses fogs up when you come inside on a cold day. If the unit is powered up as this condensation occurs, components can short out or be damaged. Excessively high temperatures also pose a threat to the unit, stressing both the internal circuits as well as the case. With this in mind, we advise you to follow these precautions when storing, mounting and setting up your DP/Pro:

• Avoid leaving the DP/Pro in temperatures of less than 50 degrees Fahrenheit or more than 100 degrees Fahrenheit.

• When bringing the DP/Pro indoors after travel, allow at least 20 minutes for the unit to reach room temperature before powering up. In the case of extreme outdoor temperatures (below 50 degrees Fahrenheit or above 100 degrees Fahrenheit), allow an hour or more before powering up.

• Avoid leaving the DP/Pro inside a vehicle exposed to direct sunlight.

Setting Analog Input Levels

The DP/Pro can accept +4dB or -10dB input levels. The rear panel I/O level switch should be set to match the output of your sending device.

+4 dBu

-10 dBv

I/O Level

The DP/Pro's Headroom LEDs show the level of incoming analog audio whenever the Meter Function switch is in the out, or up, position. The LEDs under the Meter Function switch show the current state of the Headroom LEDs.

Headroom

○ 0 ○
○ 3 ○
○ 6 ○
○ 12 ○
○ 20 ○   Meter
○ 30 ○   ○   Function
L   R   ○ Analog Input ○ Digital Output
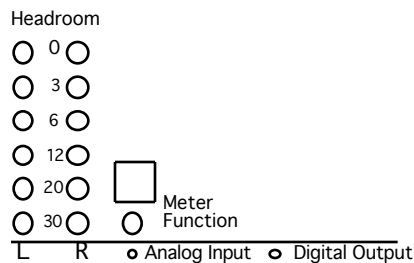
The optimal input level for the DP/Pro is just below the point at which the red Headroom LEDs light.

Since the DP/Pro provides its best signal-to-noise performance when its Input Level knob is set straight up, it's a good idea to set the knob to this position and then adjust the output levels of your sending device to obtain a healthy Headroom LED reading.

Input Level
(Stereo)
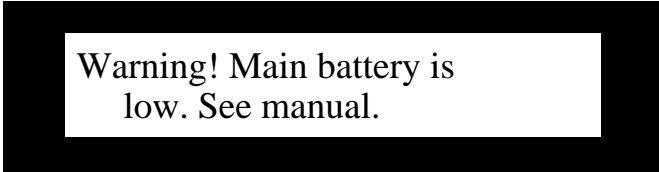
Troubleshooting

Battery Replacement

The DP/Pro "remembers" its effects and various settings even when its power is turned off, since it contains a battery which keeps its memory intact. All batteries eventually become discharged, and

though your DP/Pro battery should last for years, you may eventually need to have it replaced by an authorized ENSONIQ Repair Station.

The DP/Pro will tell you when its battery needs replacing. It will flash the following when you power up:

> Warning! Main battery is
>   low. See manual.

This display will appear only briefly, and then allow you to proceed normally. Make sure that everything in RAM that you'd like to keep—or any special system settings—have been safely stored on an external MIDI storage device—as described in Chapter 2—and take the DP/Pro to an authorized ENSONIQ Repair Station as soon as possible to have the battery replaced.

Reinitializing the DP/Pro

All computer-based devices—including the DP/Pro—occasionally experience signs of data corruption. If your DP/Pro begins acting oddly, you can reinitialize its software to clear out any problems lurking there.

Warning: Make sure you've saved any effects or system settings that you want to preserve to an external MIDI device before reinitializing. Reinitializing erases the contents of the DP/Pro's user memory banks, and resets all System/MIDI parameters to their default values.

To Reinitialize the DP/Pro
1. Hold down the System/MIDI button.
2. While continuing to hold the System/MIDI button, press the Cancel button.
3. Let go of both buttons. The displays shows:

> Press ENTER to Reinit. All data
> will be lost!

4. Press the Enter button to reinitialize the DP/Pro.

2—System/MIDI Parameters

What Are the Global System and MIDI Parameters?

The global System and MIDI parameters provide options for determining the overall behavior of your DP/Pro. These parameters create the framework within which all other DP/Pro operations occur. Certain special procedures are also available via the System/MIDI parameter pages.

All of the System and MIDI parameters are accessed by:

* pressing the System/MIDI button.
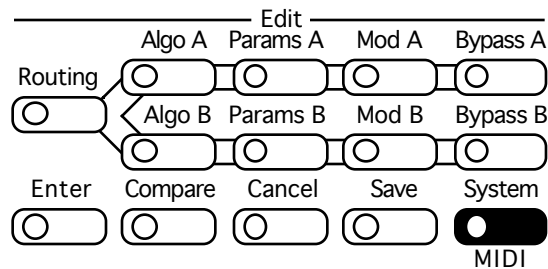
* pressing the Next and Previous Page buttons to navigate among the parameters.
* turning the Value knob to set the selected parameter's value.

Tip: When you've altered a parameter's value, you can press the Cancel button to undo your edit. You can also double-click the Cancel button to quickly set any parameter to its default value.

Tip: Important System/MIDI parameters are bookmarked for easy access. Press the System/MIDI button repeatedly to jump from one bookmarked parameter to the next. You can also use this technique to quickly access any System/MIDI parameter by jumping to the nearest bookmark and then using the Next or Previous Page buttons to locate the parameter you want.

The Numbering of the System/MIDI Parameters

The System/MIDI parameters are numbered—as each parameter is selected, its number appears in the auxiliary display to the left of the DP/Pro's main display.

"P" stands for "parameter"
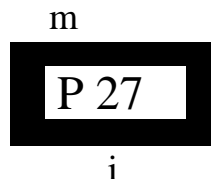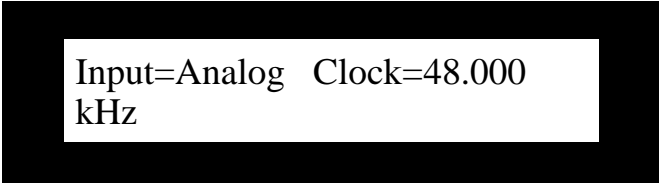
This shows the number of the currently displayed and selected parameter

Selecting the Type of Audio to be Processed

The first step in using the DP/Pro is determining the type of audio you'll be sending into its input jacks. All DP/Pros can process analog audio. Any DP/Pro with an ENSONIQ DI-Pro digital I/O board installed can also process incoming digital audio in AES and S/PDIF formats.

System/MIDI Parameter 1: Input

k   Input=Analog   Clock=48.000
     kHz

Values: Analog; Digital, AES; Digital, S/PDIF; Ana+Dig, AES; Ana+Dig, S/PDIF
Default: Analog

Note: The listed values are available when the optional DI-Pro digital I/O board is installed in the DP/Pro. When the DI-Pro board is not present, only the Analog setting is visible.

What this Parameter Does:

The Input parameter selects the type of audio source you'll be sending into the DP/Pro. Rear-panel combination 1/4"/XLR jacks are provided for analog signals, and the optional DI-Pro digital I/O board provides digital inputs for AES- and S/PDIF-format data.

Establishing the DP/Pro's Sample Rate
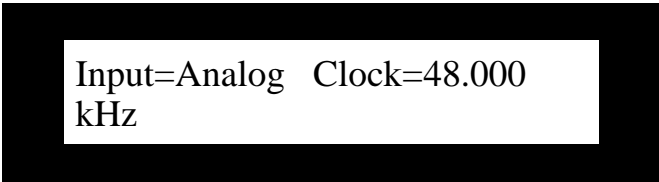
The DP/Pro's A/D and D/A converters can operate at several different sample rates.

When an analog signal is being processed, the DP/Pro can operate at either 44.100 kHz or 48.000 kHz. Both rates have their advantages and disadvantages. The 48.000 kHz provides the highest-quality signal processing. However, should you be using the DP/Pro's digital outputs to master an analog signal to CD or some other digital medium that operates at 44.100 kHz, you'll need to use the same sample rate in the DP/Pro.

Note: The DP/Pro's Sample Rate LEDs—located above the auxiliary display—show the DP/Pro's current sample rate.

System/MIDI Parameter 2: Clock

     Input=Analog   Clock=48.000
k   kHz

Values: 44.100 kHz (when Input=Analog); 48.000 kHz (when Input=Analog)
Default: 48.000 kHz

What this Parameter Does:

The Clock parameter sets or displays the sample rate used by the DP⁄Pro's A⁄D and D⁄A converters. The behavior of this parameter is dependent on the setting of the Input parameter.

•   When Input=Analog, the setting of the Clock parameter determines the operating sample rate of the DP⁄Pro.

> System/MIDI parameters 3 through 5 are available only when a DI-Pro digital I/O board has been installed in the DP/Pro. See the DI-Pro User's Guide for information on these parameters.

Global MIDI Settings

The DP⁄Pro is a highly MIDI-aware device:

•   DP⁄Pro effects can be selected via MIDI Program Change and Bank Select messages.
•   Effects can be modulated in real time using any MIDI controller.
•   Many aspects of DP⁄Pro algorithms can be synchronized to MIDI clocks.
•   The DP⁄Pro generates and responds to System Exclusive data dumps.
•   The DP⁄Pro can transmit control change messages generated by its virtual Tweak knobs, its Bypass buttons and its dual foot switch.
•   The DP⁄Pro can transmit Program Change messages when effects are selected from the front panel, or by using a foot switch.
•   Various elements of MIDI transmission and reception can be individually enabled or disabled; the DP⁄Pro also provides an overall MIDI reception on⁄off parameter.
•   The DP⁄Pro's response to Program Change messages can be re-mapped to allow any Program Change value to select any effect.

The DP⁄Pro uses three MIDI channels. Program Changes received on the System MIDI channel select effects, while ESP-A and ESP-B each have their own MIDI channels upon which they receive MIDI controller messages used for the real-time manipulation of their algorithms.

System/MIDI Parameter 6: MIDI Device ID

k

MIDI Device ID=0   System
MIDI Channel=1

Values: 0 through 127
Default: 0

What this Parameter Does:

System Exclusive data is always stamped with a MIDI Device ID number. This is used to identify an individual device in MIDI setups that contain more than one of a particular product. If you are using multiple DP⁄Pros, make sure that each has been assigned its own Device ID number if you intend to be working with System Exclusive data. This includes external MIDI storage devices, as well as remote editing software on a computer.

System/MIDI Parameter 7: System MIDI Channel

MIDI Device ID=0   System
MIDI Channel=1

k

Values: 1 through 16
Default: 1

What this Parameter Does:

MIDI Program Change and Bank Select messages received on the System MIDI channel select effects (see Chapter 3 to learn more about selecting effects via MIDI). This parameter allows you to set the System MIDI channel to any of the 16 MIDI channels.

System/MIDI Parameter 8: ESP-A MIDI Channel
System/MIDI Parameter 9: ESP-B MIDI Channel

ESP-A MIDI Channel=2   ESP-B
MIDI Channel=3

Values: 1 through 16
Defaults: ESP-A MIDI Channel: 2; ESP-B MIDI Channel: 3

What this Parameter Does:

Any parameter in any DP/Pro algorithm can be manipulated in real time via MIDI controller messages. ESP-A and ESP-B each have their own MIDI channel upon which they receive such MIDI data. Either may be set to respond to any MIDI channel.

System/MIDI Parameter 10: Accept MIDI Msgs

k

Accept MIDI Msgs=Yes   Accept
SysEx Msgs=Yes

Values: No; Yes
Default: Yes

What this Parameter Does:

The Accept MIDI Msgs parameter enables or disables the DP/Pro's response to MIDI messages of any kind.

Note: When this parameter is set to "No," the settings of System/MIDI parameters 11 through 13 will have no effect.

System/MIDI Parameter 11: Accept SysEx Msgs

k

> Accept MIDI Msgs=Yes   Accept
> SysEx Msgs=Yes

Values: No; Yes
Default: Yes

What this Parameter Does:
The Accept SysEx Msgs parameter enables or disables the DP/Pro's ability to accept or load received
System Exclusive messages.

Note: If the Accept MIDI Msgs parameter is set to "Off," this parameter will have no effect,
since the Accept MIDI Msgs parameter will have completely disabled overall MIDI reception.

System/MIDI Parameter 12: Accept Cntlr Msgs

k

> Accept Cntlr Msgs=Yes   Accept
> PrgCh Msgs=Yes

Values: No; Yes
Default: Yes

What this Parameter Does:
The Accept Cntlr Msgs parameter enables or disables the DP/Pro's response to received MIDI
controller messages.

Note: If the Accept MIDI Msgs parameter is set to "Off," this parameter will have no effect,
since the Accept MIDI Msgs parameter will have completely disabled overall MIDI reception.

System/MIDI Parameter 13: Accept PgmCh Msgs

> Accept Cntlr Msgs=Yes   Accept
> PrgCh Msgs=Yes

k

Values: No; Yes
Default: Yes

What this Parameter Does:
The Accept PrgCh Msgs parameter enables or disables the DP/Pro's response to received MIDI
Program Change and Bank Select messages.

Note: If the Accept MIDI Msgs parameter is set to "Off," this parameter will have no effect,
since the Accept MIDI Msgs parameter will have completely disabled overall MIDI reception.

System/MIDI Parameter 14: Transmit Cntlr Msgs

k

Transmit Cntlr Msgs=No
Transmit PrgCh Msgs=No

Values: No; Yes
Default: No

What this Parameter Does:

The Transmit Cntlr Msgs parameter enables or disables the DP/Pro's transmission of MIDI controller data from either of its virtual Tweak knobs, bypass button or dual foot switch.

System/MIDI Parameter 15: Transmit PrgCh Msgs

k

Transmit Cntlr Msgs=No
Transmit PrgCh Msgs=No

Values: No; Yes
Default: No

What this Parameter Does:

The DP/Pro can transmit a corresponding Program Change and Bank Select message each time you select an effect from the DP/Pro's front panel. The Transmit PrgCh Msgs parameter enables or disables this feature.

System/MIDI Parameter 16:MIDI Pgm Chngs

k

MIDI Pgm Changes=Direct
Map=000 > Effect=None
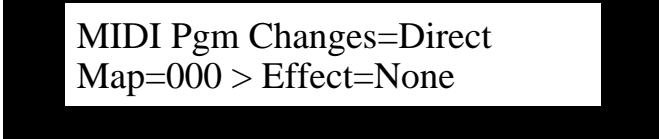
Values: Direct; Use Map
Default: Direct

What this Parameter Does:

The MIDI Pgm Chngs parameter determines the manner in which the DP/Pro will respond to received Bank Select and Program Change messages. When the parameter is set to:

• "Direct," each received Bank Select and Program Change message will select the like-numbered bank and effect.

• "Use Map," you can designate the effects to be selected by particular Program Change values.

This parameter functions in conjunction with System/MIDI parameters 17 and 18, described below.

System/MIDI Parameter 17: Map
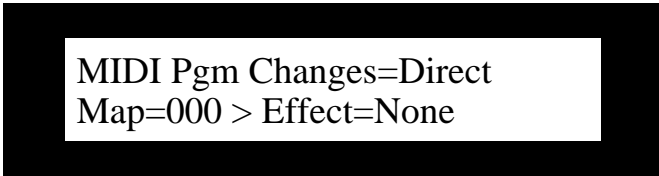
```
MIDI Pgm Changes=Direct
Map=000 > Effect=None
```

       i

Values: 000 to 127
Default: 000

What this Parameter Does:

The Map parameter operates in conjunction with System/MIDI parameters 16 and 18. It selects a Program Change value to be linked to the effect selected with parameter 18 whenever parameter 16 is set to "Use Map."

System/MIDI Parameter 18: (Map) Effect

```
MIDI Pgm Changes=Direct
Map=000 > Effect=None
```

       i

Values: None; 0000* through 3005
Default: None

What this Parameter Does:

The Effect parameter operates in conjunction with System/MIDI parameters 16 and 17, described above. Set the Effect parameter to the number of the effect you'd like selected when the DP/Pro receives the Program Change value displayed in the Map field to its left. This feature is active only when parameter 16 is set to "Use Map."

Each effect is shown as a four-digit number. The first digit represents the bank in which the effect is stored. The three remaining digits show the program number of each effect within the selected bank.

If System/MIDI parameter 76 is set to "Yes," an asterisk following the effect's bank and program numbers shows that the memory location is currently empty. " If parameter 76 is set to "No," unused locations will not be available for selection by this parameter.

System/MIDI Parameter 19: ENTER to Send SysEx Dump Type

ENTER to Send SysEx Dump
Type=Bank 0 RAM Effects

Values: Selected Effect; Bank 0 RAM Effects; Bank 1 RAM Effects; All RAM Effects; All System Params (this includes all System/MIDI parameter settings)
Default: Bank 0 RAM Effects

What this Parameter Does:

When this page is displayed, pressing the Enter button causes the DP/Pro to transmit a System Exclusive (SysEx) data dump of the object selected on the lower line of the display. This provides an opportunity to store the contents of the DP/Pro's memory in an external MIDI storage device.

Note: Since SysEx data records the MIDI Device ID number of the sending device, make sure to note the setting of the MIDI Device ID parameter (System/MIDI parameter 6) when performing the dump. In order to successfully reload the data back into the DP/Pro at a later date, this Device ID number must match the one embedded in the SysEx data. In addition, the Accept SysEx Msgs System/MIDI parameter (12) must be set to "Yes" in order for the DP/Pro to reload SysEx data transmitted from an external source.

Setting Up a Reference for Time-Based Effects

Many of the DP/Pro's algorithms contain time-based elements—LFOs and delays, for example—that can be synchronized to a timing reference. This provides a high degree of timing control of those elements. The DP/Pro provides its own internal clock for such purposes, or it can synchronize its algorithms to MIDI clocks received from and external MIDI device.

Tip: The algorithm parameter charts in Chapter 6 of the DP/Pro Reference Guide show which algorithm elements are capable of synchronization. Any parameter with the letter "T" (for "Time") in its Attributes column can be synchronized.

The DP/Pro's internal clock can be set by manually adjusting the System/MIDI System Tempo parameter, or by tapping out the desired tempo on the Tap button. The DP/Pro can be set to respond to Tap button strikes in a variety of ways.

System/MIDI Parameter 20: Tempo Source

k   Tempo Source=Internal System
Tempo=120 BPM

Values: Internal; MIDI Clock
Default: Internal

What this Parameter Does:

The Tempo Source parameter determines the master timing reference source for the DP/Pro. The DP/Pro uses its own internal clock when Tempo Source is set to "Internal." The DP/Pro can also use MIDI clocks received from an external source when this parameter is set to "MIDI Clock."

System/MIDI Parameter 21: System Tempo

k

Tempo Source=Internal System
Tempo=120 BPM

Values: 40 BPM through 400 BPM
Default: 120 BPM
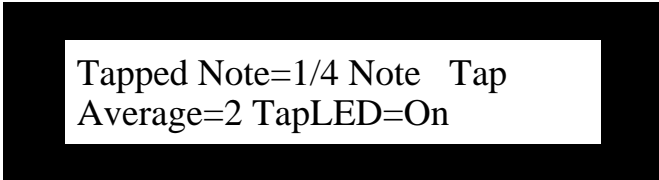
What this Parameter Does:

The System Tempo parameter sets the speed of the DP/Pro's internal clock, shown in Beats Per Minute (BPM). When the System/MIDI Tempo Source parameter (16) is set to "Internal," the System Tempo parameter provides control over the timing of any synchronized algorithm elements.

Tip: You can also set the tempo of the DP/Pro's internal clock by tapping the desired tempo on the DP/Pro's Tap button.

System/MIDI Parameter 22: Tapped Note

k
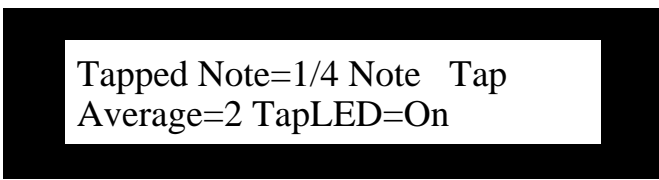
Tapped Note=1/4 Note   Tap
Average=2 TapLED=On

Values:	4 Beats	Dotted 1/4	1/8 Note	1/16 Triplet
	3 Beats	1/4 Note	1/8 Triplet	Dotted 1/32
	1/2 Note	1/4 Triplet	Dotted 1/16	1/32 Note
	1/2 Triplet	Dotted 1/8	1/16 Note	1/32 Triplet
Default:	1/4 Note			

What this Parameter Does:

The Tapped Note parameter determines the note value ascribed to each Tap button strike when the DP/Pro calculates its system tempo from the Tap button.

System/MIDI Parameter 23: Tap Average

Tapped Note=1/4 Note   Tap
Average=2 TapLED=On

i

Values: 2 through 8
Default: 2

What this Parameter Does:

The Tap Average parameter determines the number of Tap button strikes the DP/Pro will average in order to calculate the timing of the system tempo. You can also set the note value of each tap—see System/MIDI parameter 20, Tapped Note.

System/MIDI Parameter 24: TapLED

Tapped Note=1/4 Note   Tap
Average=2 TapLED=On
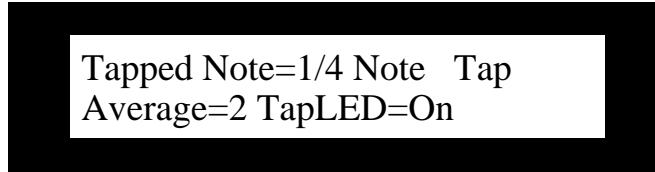
i

Values: Off; On
Default: On

What this Parameter Does:

The TapLED parameter turns on or off the LED in the DP/Pro's Tap button. The Tap LED flashes at the current system tempo when this parameter is set to "On."

Creating Your Own App Category for Effect Finder

The DP/Pro's Effect Finder can search for effects according to the manner in which they're used. These possible uses are presented as the various App—for "Application"—categories in Effect Finder (for more on using Effect Finder, see Chapter 3). You can also create up to 10 of your own usage categories for situations not covered by those already written into the DP/Pro's software. Each can contain up to 10 effects This will allow you to use Effect Finder to locate effects according to your unique needs.

Each of the 10 user-defined categories can be selected from among the App values in Effect Finder—they're listed as Groups 1 to 10.

System/MIDI Parameter 25: Finder App Group

k   Finder App Group =1   Item=1 >
        Effect=None
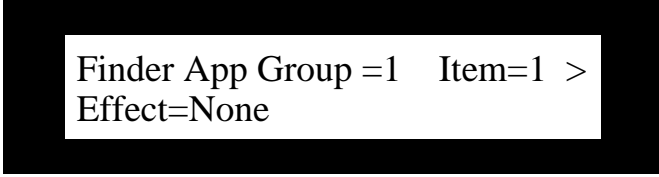
Values: 1 through 10
Default: 1

What this Parameter Does:

The Finder App Group parameter selects one of the 10 App groups. Once you've selected a group, you can choose the effects you want to assign to the group by assigning an effect to each item number.

System/MIDI Parameter 26: Item

```
Finder App Group =1    Item=1  >
Effect=None
```
                    i
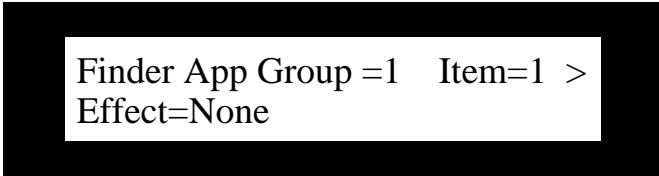
Values: 1 through 10
Default: 1

What this Parameter Does:

The Item parameter selects one of the 10 items—you can think of this as a slot—available in the selected App group.

System/MIDI Parameter 27: (App Group) Effect

```
Finder App Group =1     Item=1  >
Effect=None
```
                     i

Values: None; 0000* through 3005
Default: None

What this Parameter Does:

The Effect parameter allows you to assign one of the DP/Pro's effects to the currently selected item.

Each effect is shown as a four-digit number. The first digit represents the bank in which the effect is stored. The three remaining digits show the program number of each effect within the selected bank.

If System/MIDI parameter 76 is set to "Yes," an asterisk following the effect's bank and program numbers shows that the memory location is currently empty. " If parameter 76 is set to "No," unused locations will not be available for selection by this parameter.

Grouping Effects for Easy Selection

The DP/Pro allows you to group effects together as songs—a DP/Pro song is a list of effects meant to be selected one after the other. A song can use any of the effects in the DP/Pro, arranged in any order. There can be up to 10 steps in each song—each step being associated with a single effect—and up to 10 songs in the DP/Pro's memory at any given time. You can move forward or back through the list by pressing the pedals on a dual foot switch—such as an ENSONIQ SW-10 (see the System/MIDI L Ftsw Cntlr and R Ftsw Cntlr parameters below).

System/MIDI Parameter 28: Song

m

```
Song=1  Name=Undefined Step=1
> Effect=None
```
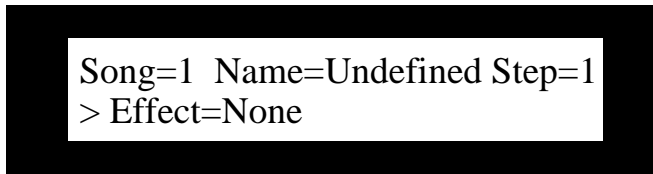
Values: 1 through 10
Default: 1

What this Parameter Does:

The Song parameter selects one of the 10 DP/Pro songs. Once you've selected a song, you can name the song, and then assign an effect to each of its steps.

System/MIDI Parameters 29-39: Name

m

```
Song=1  Name=Undefined Step=1
> Effect=None
```
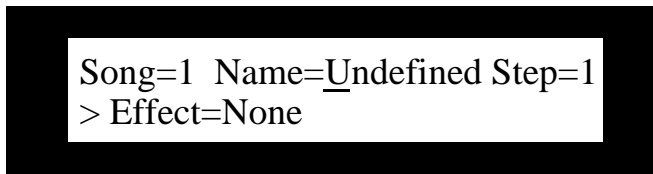
Values: Symbols, numbers, upper- and lower-case characters
Default: "Undefined"

What these Parameters Do:

The System/MIDI song page's Name fields allow you to name the song you're constructing. Use the Next and Previous Page buttons to underline each character in turn—when a character is underlined, it can be edited. Turn the Value knob to select the desired character.

System/MIDI Parameter 40: Step

```
Song=1  Name=Undefined Step=1
> Effect=None
```

i
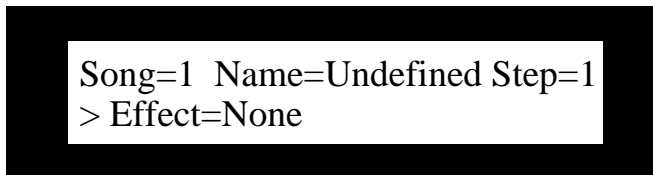
Values: 1 through 10
Default: 1

What this Parameter Does:

The Step parameter selects one of the 10 steps available in the selected song.

System/MIDI Parameter 41: (Song) Effect

```
Song=1  Name=Undefined Step=1
> Effect=None
```

i

Values: None; 0000* through 3005
Default: None

What this Parameter Does:

The Effect parameter allows you to assign any of the DP/Pro's effects to the step currently selected with the Step parameter.

Each effect is shown as a four-digit number. The first digit represents the bank in which the effect is stored. The three remaining digits show the program number of each effect within the selected bank.

If System/MIDI parameter 76 is set to "Yes," an asterisk following the effect's bank and program numbers shows that the memory location is currently empty. " If parameter 76 is set to "No," unused locations will not be available for selection by this parameter.

Designating Real-Time Controllers

Every parameter in each of the DP/Pro's algorithms can be manipulated in real time, allowing for the creation of highly animated effect processing. The DP/Pro supports the use of a wide variety of control mechanisms, ranging from the two virtual Tweak knobs, to foot switches, to all 121 MIDI controllers.

The first step in setting up real-time control of the DP/Pro's effects is to establish of suite of up to 16 control mechanisms that you'd like to have available for this purpose—these are referred to as DP Cntlrs 1 through 16. You can use any of the 16 for real-time control of any algorithm parameter.

To learn more about real-time control of the DP/Pro's effects, see Chapter 10.

System/MIDI Parameters 42 through 57:   DP Cntlr 1 through DP Cntlr 16

```
DP Cntlr 1 =TwkKnob 1   DP
Cntlr 2 =TwkKnob 2
```

Values: Off   This setting disables the selected DP Cntlr.

TwkKnob1   The selected DP Cntlr will use the first of the DP/Pro's two virtual tweak knobs. To utilize Tweak Knob 1 from the DP/Pro's front panel, the Tweak LED must be lit and the Knob 1 Name parameter must be showing when these conditions are met, the Value knob operates as the displayed tweak knob. Tweak Knob 1 may be used as a real time controller via MIDI at any time, regardless of the state of the Tweak LED or the DP/Pro's display (see "Using the Tweak Knobs with MIDI Controllers" later in this chapter).

TwkKnob2   This serves a similar function as the "Twk Knob 1" setting, except that it enables the use of the second of the DP/Pro's two virtual tweak knobs; see above.

LFO 1   The selected DP Cntlr will use the first of two mod LFOs available in each DP/Pro effect.

LFO 2   The selected DP Cntlr will use the second of two mod LFOs available in each DP/Pro effect.

L FootSw	The selected DP Cntlr will use the left pedal of a dual foot switch as an on/off modulator that's in its "on" state whenever the pedal is depressed.	
L FtSwToggle	The selected DP Cntlr will use the left pedal of a dual foot switch as an on/off toggle; alternating presses of the pedal will apply either a full modulation value or no modulation to the target algorithm parameter.	
R FootSw	The selected DP Cntlr will use the right pedal of a dual foot switch as an on/off modulator that's in its "on" state whenever the pedal is depressed.	
R FtSwToggle	The selected DP Cntlr will use the right pedal of a dual foot switch as an on/off toggle; alternating presses of the pedal will apply either a full modulation value or no modulation to the target algorithm parameter.	
NoteNumber	The selected DP Cntlr will use received MIDI note numbers to generatemodulation values. Lower note numbers (such as those played by the low notes on a MIDI keyboard) will generate lower modulation values; higher note numbers (notes played higher on a MIDI keyboard) generate higher modulation values.	
Velocity	The selected DP Cntlr will use received MIDI velocity values as modulation values.	
Aftertouch	The selected DP Cntlr will use received MIDI aftertouch values as modulation values.	
PitchBend	The selected DP Cntlr will use received MIDI pitch bend values as modulation values.	
MIDI controllers	The selected DP Cntlr will use received values for any of the 121 possible MIDI controllers as modulation values.	

Defaults:

DP Cntlr 1=TwkKnob 1	DP Cntlr 9=Note Number
DP Cntlr 2=TwkKnob 2	DP Cntlr 10=ModWheel#1
DP Cntlr 3=LFO 1DP Cntlr 11=PitchBend	
DP Cntlr 4=LFO 2DP Cntlr 12=Velocity	
DP Cntlr 5=L FootSw	DP Cntlr 13=Off
DP Cntlr 6=L FtSwToggle	DP Cntlr 14=Off
DP Cntlr 7=R FootSw	DP Cntlr 15=Off
DP Cntlr 8=R FtSwToggle	DP Cntlr 16=Off

Note: The DP Cntlrs may be re-set to use any control mechanism. The default values for the first 12 DP Cntlrs are intended to serve as handy starting points—they are also used extensively in the DP/Pro's ENSONIQ-programmed ROM effects.

What these Parameters Do:

The DP Cntlr 1 through 16 parameters allow you to designate up to 16 control mechanisms for use as real-time controllers of the DP/Pros effects.

Setting Up Foot Switch Controls

The DP/Pro provides a rear-panel Foot Sw 1&2 jack for the connection of a stereo—two-pedal—foot switch such as an ENSONIQ SW-10. Either of the pedals can be programmed to accomplish various tasks.

Note: The DP/Pro is designed for use with a dual foot switch, though modified mono footswitches can be used as well. See Chapter 12 for information on converting mono foot switches for use with the DP/Pro.

System/MIDI Parameter 58: L Ftsw Cntlr

System/MIDI Parameter 59: R Ftsw Cntlr

> L Ftsw Cntlr=DP Cntlr   R Ftsw
> Cntlr=DP Cntlr

Values:	Off	The foot switch will be inactive.
	DP Cntlr	The foot switch may be selected as a DP Cntlr and designated to perform real-time modulation on the DP/Pro's effects. DP Cntlrs 5-8 default to using the left and right foot switches.
	Tap Tempo	The foot switch operates in the same manner as the front-panel Tap tempo button. (See the Tap Average, Tap LED and Tapped notes System/MIDI parameters earlier in this chapter.)
	Inc Effect	Each press of the foot switch selects the next effect in the DP/Pro's memory.
	Dec Effect	Each press of the foot switch selects the next lowest effect in the DP/Pro's memory.
	Inc Song	Each press of the foot switch selects the next song in the DP/Pro's memory.
	Dec Song	Each press of the foot switch selects the next lowest song in the DP/Pro's memory.
	Inc Step	Each press of the foot switch selects the next step in the currently selected song
	Dec Step	Each press of the foot switch selects the next lowest step in the currently selected song.
	Bypass A	Each press of the foot switch toggles the bypass state of ESP-A. The nature of the bypass is determined by the ESP-A Bypass Btn parameter described later in this chapter.
	Bypass B	Each press of the foot switch toggles the bypass state of ESP-B. The nature of the bypass is determined by the ESP-B Bypass Btn parameter described later in this chapter.
Defaults:	DP Cntlr	

What these Parameters Do:

The L Ftsw Cntlr and R Ftsw Cntlr parameters assign tasks to the two foot switches on a dual foot switch.

MIDI Transmission from the Foot Switches

Whenever the System/MIDI Transmit Cntlr Msgs parameter (14) is on, pressing a foot switch pedal transmits MIDI data. The kind of data transmitted depends on the current job to which the pedal is assigned:

- When the foot switch is being used for the selection of effects, a Program Change value equivalent to each selected effect is transmitted. This occurs when foot switch is set to Inc Effect, Dec Effect, Inc Step or Dec Step.
- When the foot switch is set to Bypass A or Bypass B , it mimics the pressing of the appropriate Bypass button. As a result, the DP/Pro will transmit an On (127) or Off (0) value for the controller currently selected for turning the ESP's bypass on and off via MIDI (see "Bypassing ESPs with MIDI" later in this chapter).
- When a foot switch is set to DP Cntlr, Tap Tempo, Inc Song or Dec Song and pressed, the DP/Pro transmits a value of 127 for MIDI controllers 70 (the left pedal) or 71 (the right pedal). When the pedal is released, a 0 value for the same controller is transmitted. These controllers are understood as left and right Patch Select button-presses by ENSONIQ products that have Patch Select buttons.
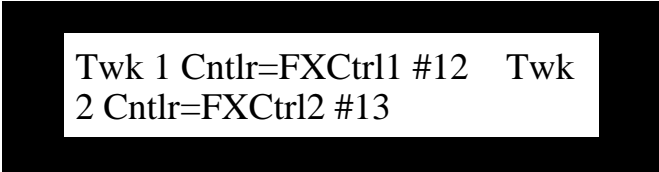
Using the Tweak Knobs with MIDI Controllers

Setting up:Tweak knobs:MIDI transmissionThe DP/Pro Tweak Knob 1 and 2 transmit and respond to MIDI controllers. This allows you to record real-time tweaks into a MIDI sequencer, which can reproduce the tweaks on playback by transmitting the data back to the DP/Pro. Both Tweak Knob 1 and 2 can be set to transmit and respond to any MIDI controller.

Tip: To learn more about the DP/Pro Tweak knobs, see Chapter 10.

System/MIDI Parameter 60: Twk 1 Cntlr

System/MIDI Parameter 61: Twk 2 Cntlr

Twk 1 Cntlr=FXCtrl1 #12   Twk
2 Cntlr=FXCtrl2 #13

Values: Off; All MIDI controllers
Defaults: Twk 1 Cntlr: FXCtrl1 #12; Twk 2 Cntlr: FXCtrl2 #13

What these Parameters Do:

The Twk 1 Cntlr and Twk 2 Cntlr parameters allow you to assign any MIDI controller to be transmitted from the DP/Pro when the Tweak LED is lit and the Tweak Knob1 or Tweak Knob2 pages are displayed. The Tweak knobs will also respond to this controller at all times—even when the Tweak LED is off—as long as the System/MIDI Accept MIDI Msgs parameter is set to "Yes."

Note: The Tweak knobs send and receive MIDI data on the System MIDI channel (see the description of the System MIDI Channel parameter earlier in this chapter).

MIDI Bypassing of the ESPs

The DP/Pro allows you to bypass its ESPs by sending MIDI controllers of your choice on the DP/Pro's system MIDI channel. This feature acts in the same manner as pressing the Bypass A and/or Bypass B buttons on the DP/Pro's front panel. When the DP/Pro receives a value of 64 or above for a selected controller, it switches on the target ESP's bypass function. Values of 64 or below turn the bypass off.
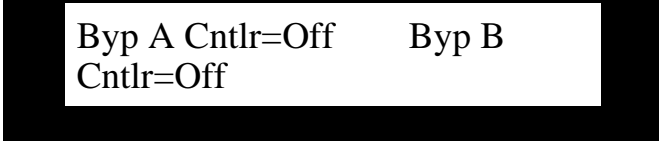
When the System/MIDI Transmit Cntlr Msgs parameter is set to "On," pressing the front panel Bypass buttons transmits either a 127 (when bypass is switched on) or 0 (when bypass is switched off) value for the selected controller from the DP/Pro's MIDI Out jack.

Note: The nature of the bypass is determined by the setting of the System/MIDI ESP-A Bypass Btn and ESP-B Bypass Btn parameters, described later in this chapter.

System/MIDI Parameter 62: Byp A Cntlr

System/MIDI Parameter 63: Byp B Cntlr

```
Byp A Cntlr=Off       Byp B
Cntlr=Off
```

Values: Off; All MIDI controllers
Defaults: Off

What these Parameters Do:

The Byp A Cntlr and Byp B Cntlr parameters allow you to designate a MIDI controller for each ESP that can be used to toggle the ESP's bypass function on or off. An On (127) or Off (0) value for the MIDI controller will also be transmitted from the DP/Pro each time one of the Bypass buttons is pressed.
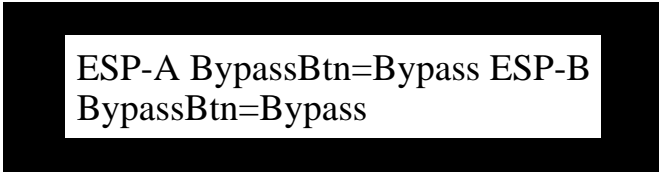
Determining What Happens When You Bypass an ESP

The DP/Pro provides a Bypass button for each ESP as a way to quickly disable it. You can also use a dual foot switch or a MIDI controller to switch the Bypass buttons on and off (see "Setting Up Foot Switch Controls" earlier in this chapter, and "MIDI Bypassing of the ESPs" above).

The DP/Pro allows you to determine exactly what will occur when an ESP is bypassed. There are several possibilities, useful for different situations.

System/MIDI Parameter 64: AlgoA Bypass Btn

System/MIDI Parameter 65: AlgoB Bypass Btn

```
ESP-A BypassBtn=Bypass ESP-B
BypassBtn=Bypass
```

Values: Bypass—shuts off the audio processing being applied by the ESP, allowing dry audio to continue to pass through.
Inp Mute—stops the inputting of audio into the ESP, allowing any signal already being processed to finish sounding in a natural manner
Out Mute—stops the output of the ESP, instantly cutting off all audio. This setting allows you to continue sending audio into the ESP, so that when you deactivate the bypass, any audio currently being processed will be heard.
All Mute—stops both the input to and the output from the ESP.
Default: Bypass

What this Parameter Does:

The ESP-A Bypass Btn and ESP-B Bypass Btn parameters let you control precisely the behavior of the ESPs when they're bypassed.

Tip: Double-clicking either Bypass button sets the selected ESP to All Mute, regardless of the setting of ESP-A Bypass Btn or ESP-B Bypass Btn parameters.

Enabling/Disabling Status Messages

You can set the DP/Pro so that it will display messages informing you:

• of the current bypass state of the ESP whose Bypass button you've just pressed.

- that the DP/Pro is installing either the last-saved version of the currently selected effect or the contents of the edit buffer when you press the Compare button.

System/MIDI Parameter 66: Display Bypass State

k

Display Bypass State=Off Show
Compare Message=Off
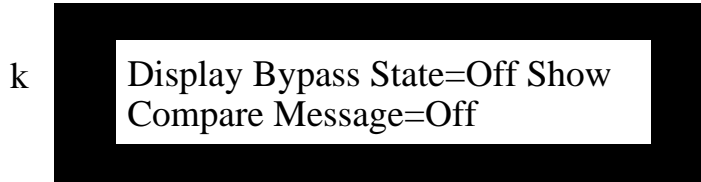
Values: Off; On
Default: Off

What this Parameter Does:

The Display Bypass State parameter determines whether the DP/Pro will display a status message each time a Bypass button is pressed (On) or not (Off).

System/MIDI Parameter 67: Show Compare Message

k

Display Bypass State=Off Show
Compare Message=Off
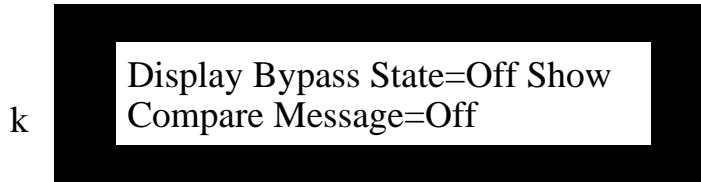
Values: Off; On
Default: Off

What this Parameter Does:

The Show Compare Message parameter determines whether the DP/Pro will display a message telling you when it's installing the last-saved version of the currently selected effect or the contents of the edit buffer, to help you keep track of which version of an effect is in place.

Protecting Effects from Accidental Erasure

The DP/Pro provides a memory-protection feature to help prevent the accidental erasure of effects in banks 0 and 1 as you create, edit, save, and perhaps inadvertently overwrite, effects.

System/MIDI Parameter 68: Memory Protect

k   Memory Protect=Off System
     Wake Up=Restart

Values: Off; On
Default: Off

What this Parameter Does:

The Memory Protect parameter enables (On) or disables (Off) the safeguarding of effects in the DP/Pro's user banks from accidental erasure.

Setting What Happens When You Turn On the DP/Pro

The System/MIDI Wake Up parameter can be set so that the DP/Pro powers up in either of two states:

- Restart—The DP/Pro will power up with the default factory effect, DepTh oF SpaCe, selected.
- Restore—The DP/Pro will restart with the last-selected effect still selected.

System/MIDI Parameter 69: System Wake Up

k   Memory Protect=Off System
     Wake Up=Restart

Values: Restart; Restore
Default: Restart

What this Parameter Does:

The System/MIDI Wake Up parameter allows you to determine whether or not the DP/Pro will retain its effect selection at power-down when you turn it back on.

Automatic Installation of Effects and Algorithms

Automatic installation of effects, algorithms and variations:enabling and disablingWhenever an effect or algorithm is selected, it must be installed before it can be used. The DP/Pro can:

- automatically perform this task a moment after each effect, algorithm or algorithm variation is selected.
- wait until you press the Enter button to execute the installation—when this is the case, the Enter button's LED will flash to remind you that the selected effect, algorithm or algorithm variation has not yet been installed.

System/MIDI Parameter 70: AutoLoad

k   AutoLoad=Algos   Meter
    Range=18 dB

Values: Off—Effects and algorithms must be installed after selection by pressing the Enter button.
Algos—Algorithms and algorithm variations will be automatically installed upon selection.
Effects—Effects will be automatically installed upon selection.
Algos & Effects—Effect, algorithms and algorithm variations will be automatically installed upon selection.
Default: Algos

What this Parameter Does:

The AutoLoad parameter determines whether or not effects and/or algorithms and their variations will be automatically installed by the DP/Pro upon selection.

Tip: You may find it easier to shop for effect, algorithms and variations with this parameter turned off, so that the DP/Pro will not perform an installation each time you pause during the selection process.

Setting Gain-Reduction Metering

The DP/Pro's algorithms that pertain to dynamics, such as its compressors and limiters, incorporate gain-reduction. The displays that show the current amount of gain reduction can be scaled to depict various dB ranges, providing a coarser or finer view of gain reduction.

System/MIDI Parameter 71: Meter Range

k   AutoLoad=Algos   Meter
    Range=18 dB

Values: 3 dB through 48 dB, in 3dB steps
Default: 18 dB

What this Parameter Does:

The Meter Range parameter determines the scale of gain-reduction displays presented in the DP/Pro's dynamics-related algorithms.

Processing a Single Mono Audio Signal

The DP/Pro's routing structures anticipate that you'll be sending audio into both of the DP/Pro's left and right inputs, whether that audio is a single stereo image or two separate mono feeds. However, if you'd prefer to use only a single input, the DP/Pro allows you to select the one you'd like to use, switching the unused input off.

System/MIDI Parameter 72: Mono Input Src

k   Mono Input Src=Off   Global Wet
    Mix=100% Wet

Values: Off; L-Input; R-Input
Default: Off

What this Parameter Does:

The Mono Input Src parameter allows you to route only the audio present at either the left or right input into the DP/Pro's ESPs.

Setting the Global Wet/Dry Mix

Many of the DP/Pro's algorithms contain a wet/dry mix parameter to provide control of the interaction between dry signal and the audio processing provided by the algorithm. In addition, each ESP offers an additional wet/dry mix—located among its Mixer Params—to help achieve a balance between the result of the ESP's processing and the original uneffected signal. Finally, the DP/Pro allows you set an overall global balance between the original dry signal received at the DP/Pro's inputs and the mix produced by the outputs of its ESPs.

System/MIDI Parameter 73: Global Wet Mix

k   Mono Input Src=Off   Global Wet
    Mix=100% Wet

Values: Full Dry through 100% Wet
Default: 100% Wet

What this Parameter Does:

The Global Wet Mix parameter allows you to set a balance between the dry signal present at the DP/Pro's inputs and the audio produced at the outputs of its two ESPs.

Personalizing EQ Low Frequency and High Gain Limits

The DP/Pro allows you to establish low-frequency and maximum boost limits when editing algorithms that contain EQ (equalization). Given the DP/Pro's wide dynamic range, judicious settings for this parameter can help prevent damage to your ears and/or equipment.

The algorithm parameter charts in Chapter 6 show which parameters are affected by these limits. If a parameter has an "L" in its Attributes column, it's affected by the Set Min Freq parameter. If it has a "G," it's affected by the Set Max Gain parameter.

System/MIDI Parameter 74: Set Min Freq

k | Set Min Freq=1Hz   Set Max
Gain=+48.0dB

Values: 1Hz through 20Hz
Default: 1Hz

What this Parameter Does:

The Set Min Freq parameter allows you to pre-set the bottom frequency to which an EQ low-frequency parameter can be set.

System/MIDI Parameter 75: Set Max Gain

k | Set Min Freq=1Hz   Set Max
Gain=+48.0dB

Values: +0.0dB through +48.0dB
Default: +48.0dB

What this Parameter Does:

The Set Max Gain parameter allows you to pre-set the maximum amount of boost you'll be able to apply to an EQ boost parameter.

Showing or Hiding Unused Effect Memory Locations

The DP∕Pro allows you to hide unused memory locations in Banks 0 and 1 so that you needn't waste time dialing past them as you browse through effects. The empty locations are hidden only when selecting effects—they're always available when saving effects.

System/MIDI Parameter 76: Show Undef Effects

k | Show Undef Effects=Yes   O.S.
Version: 1.11

Values: No; Yes
Default: Yes

What this Parameter Does:

The Show Undef Effects allows you to display (Yes) or hide (No) unused, or undefined, locations in the DP∕Pro's two user memory banks.

Viewing the DP/Pro's Operating System Version

The DP/Pro's operating system (O. S.) contains the programming code that allows it to function. The DP/Pro provides a read-only display that shows the version of the O.S. currently installed in your DP/Pro.

System/MIDI Parameter 77: O.S. Version

k

```
Show Undef Effects=Yes   O.S.
Version: 1.10
```

Values: Read-only display

What this Parameter Does:

The O.S. Version parameter shows the version number of the currently installed DP/Pro operating system, the software that controls the DP/Pro.

3—Selecting and Finding Effects

Selecting Effects

The DP/Pro effects are stored in four banks, numbered as Banks 0, 1, 2 and 3. Banks 0 and 1 each contain 128 RAM memory locations—numbered from 0 through 127—in which you can store the effects you've created or edited. The upper two banks contain ROM effects pre-programmed by ENSONIQ.

Note: The effect bank and memory locations are numbered as they are to correspond to the MIDI Bank Select and Program Change values with which they can be selected. See "Selecting Effects Via MIDI" below.

The effects in the DP/Pro are arranged sequentially in a single list that you can browse at any time.

Tip: You can repeatedly press the Select button to jump from the first effect in each bank to the first effect in the next bank.

The Effect-Selection Displays

When the Select Effect button has been pressed, the DP/Pro's main display shows the routing used by the currently selected effect, and its name.

The signal routing used by the effect is shown on the top line

m

```
Type=Stereo: Serial
Name=DepTh oF SpaCe
```

i

The name of the effect appears on the bottom line

The DP/Pro's auxiliary display shows the bank in which the currently selected effect resides, and the three-digit number of its memory location it occupies within the bank.

The currently selected bank's number

m

```
2000
```

i

The number of the effect's memory location within the bank

Selecting Effects from the DP/Pro's Front Panel

Effects are selected from the DP/Pro's front panel by:

• pressing the Select Effect button.
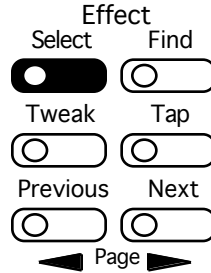
• turning the Value knob to browse through the effects in memory to locate the desired effect.
• pressing the Enter button to install the effect.
  The Enter LED will flash when you've selected an effect to remind you that you haven't yet installed it. This provides an easy way to tell whether the effect that's displayed is the effect you're hearing.

Tip: If you've selected an effect, but not yet installed it, you can press the Cancel button to return the DP/Pro's display to the currently installed effect.

Automatic Installation of Effects

The DP/Pro can be set so that it automatically installs effects as they're selected. See "Automatic Installation of Effects and Algorithms" in Chapter 2.

Selecting Effects Via MIDI

When the DP/Pro's System/MIDI Accept MIDI Messages parameter is set to "Yes," its effects can be selected via MIDI by:

• sending Bank Select and Program Change messages to the DP/Pro on its system MIDI channel (see Chapter 2) corresponding to the bank and memory location in which the desired effect resides.
• pressing the Enter button to install the effect.
  The Enter button's LED will flash to remind you to install the effect.

Note: The DP/Pro will ignore MIDI Bank selects and Program Changes that select empty memory locations.

Finding Effects

Effect Finder

Effect Finder™ can locate effects that meet specified criteria. There are three types of criteria:

- Routing—Effect Finder can search for effects that use the specified type of signal routing.
- FX—Effect Finder can search for effects that employ a specified type of algorithm.
- App—Effect Finder can search for effects that are designated as being used for a specified type of application.

You can perform an Effect Finder Find procedure utilizing one, two or three of these criteria simultaneously. Obviously, you can search with a high degree of specificity by using all three criteria in a single search.

The DP/Pro "knows" the routing of each of its effects, and automatically assigns the appropriate Routing value to each effect. An effect's FX and App values are manually assigned when the effect is saved to memory (see Chapter 11). You can assign as many FX or App values to each effect as you wish. As you assign these values, you can conform to the below-listed meanings for the different values to the degree you see fit.

The Effect Finder Criteria

The "All" Setting for an Effect Finder Criterion

Each of the three Effect Finder criteria offers an "All" setting that instructs Effect Finder to accept any effect that matches any of the criterion's possible values—the net result of this setting is to turn off the criterion as a factor in a search. Therefore, whenever a criterion is not a factor in a search, set it to "All."

The Routing Criterion

The possible Effect finder choices for the Routing criterion are:

- All—Use this value if the relationship between the DP/Pro's ESPs is irrelevant.
- S: Serial—will limit the search to effects that employ the Stereo: Serial routing.
- S: Feedback—will limit the search to effects that employ the Stereo: Feedback routing.
- S: Parallel-S—will limit the search to effects that employ the Stereo: Parallel-S routing.
- S: Parallel-M—will limit the search to effects that employ the Stereo: Parallel-M routing.
- M: Dual Mono—will limit the search to effects that employ the 2-Mono: Dual Mono routing.
- M: Stereo Mix—will limit the search to effects that employ the 2-Mono: Stereo Mix routing.

Note: To learn more about the DP/Pro routings, see Chapter 4.

The FX Criterion

The possible Effect finder choices for the FX criterion are:

- All—Use this value if the algorithm used by the effect you seek are irrelevant to your search.
- Reverb—will limit the search to effects using any type of reverb algorithm.
- Room—will limit the search to effects using room simulation algorithms.
- Hall—will limit the search to effects using concert hall simulation algorithms.
- Plate—will limit the search to effects using plate reverb simulation algorithms.
- Non-Lin—will limit the search to effects using non-linear reverb algorithms.
- Delay—will limit the search to digital delay algorithms.
- PitchMod—will limit the search to pitch-modulation algorithms, such as pitch shifters, choruses, flanger and phasers.

- Spatial—will limit the search to algorithms that create or alter stereo imaging.
- Dynamics—will limit the search to algorithms that perform amplitude shaping, such as compressors, limiters, expanders and gates.
- EQ/Filtr—will limit the search to equalization and frequency filtering algorithms.
- Amp/Spkr—will limit the search to algorithms that simulate amplifiers, speaker enclosures and rotary speakers.
- Utility—will limit the search to algorithms used for special purposes, such as tone generation.

The App Criterion

The possible Effect finder choices for the App criterion are:

- All—Use this value if the way the effect you seek is usually used is irrelevant to the search.
- *Demo—will limit the search to effects designed to show off the capabilities of the DP/Pro.

• Live PA	• Guitar-E
• Master	• Keyboard
• Rec/Mix	• Percussn
• Bass	• Piano
• Brass	• Strings
• Drums	• WindReed
• Guitar-A	• Vocal

- *Custom—provides a general catch-all category for effects that don't quite belong anywhere else.
- Group 1-10—The DP/Pro also provides 10 user-definable App types. See Chapter 2 to learn how to assign effects to one of these groups.

The Effect Finder Display

Each criterion is allotted a portion of the Effect Finder display.

```
Routing=All          FX=All
App=All
```
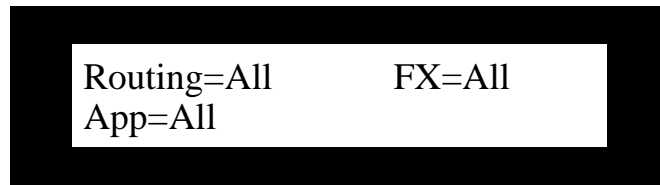
When a criterion is selected for editing, it flashes.

Performing a Find

Effects are found using Effect Finder when you:

- press the Find Effect button.
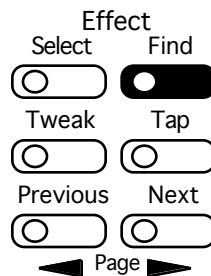
- use the Next and Previous Page buttons to select each criterion in turn.
- turn the Value knob to set each criterion as you wish.

• press the Find Effect button again to execute the search.
The Find Effect button's LED will flash to remind you to execute the search.

The Results of a Find

One of two things can occur when you attempt to find effects using Effect Finder: either you'll find an effect—or effects—that match your criteria, or you won't.

If Effect Finder locates any effects, the lowest-numbered effect will be displayed. You can turn the Value knob to browse through the found effects. Once you've found the effect you seek, you can install it by press the Enter button.

The list of found effects will be available until you:

• press the Select Effect button, at which point the entire list of the DP/Pro's effects will be presented.
• press the Find Effect button, which will initiate a new Find process.

If Effect Finder finds no effects matching your criteria, the display will show:

No Match Found

You can perform as many Find procedures as you wish. Consider adjusting your criteria, or broadening the search by setting one or more of the criteria to "All."

4—Signal Routing

Choosing a Signal Path

The audio signals sent into the DP/Pro's left and right inputs can be directed through the DP/Pro and out of its left and right outputs in a variety of ways. Each of these signal paths—which is called a *routing*—provides a different type of effect processing.

Tip: When you select effects n the DP/Pro, each effect's routing is shown on the top line of the effect-selection display.

Stereo: Serial
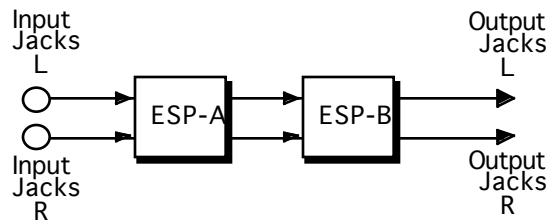
```
Input                                    Output
Jacks                                    Jacks
  L                                        L
  O  ──────►  ┌───────┐    ┌───────┐  ──────►
              │ ESP-A │──► │ ESP-B │
  O  ──────►  └───────┘    └───────┘  ──────►
Input                                    Output
Jacks                                    Jacks
  R                                        R
```

In this routing:

- The audio sent into the DP/Pro's left and right inputs is treated as a single stereo image.
- The stereo image is sent into ESP-A.
- The left and right outputs of ESP-A are fed into the left and right inputs, respectively, of ESP-B.
- The left and right outputs of ESP-B are sent to the DP/Pro's left and right outputs.

Stereo: Feedback

```
Input                                    Output
Jacks                                    Jacks
  L                                        L
  O  ──►⊕──►  ┌───────┐    ┌───────┐  ──────►
              │ ESP-A │──► │ ESP-B │
  O  ──►⊕──►  └───────┘    └───────┘  ──────►
Input                                    Output
Jacks                                    Jacks
  R                                        R
```

In this routing:

- The audio sent into the DP/Pro's left and right inputs is treated as a single stereo image.
- The stereo image is sent into ESP-A.
- The left and right outputs of ESP-A are fed into the left and right inputs, respectively, of ESP-B.
- The left and right outputs of ESP-B are sent back to the left and right inputs, respectively, of ESP-A, as well as to the DP/Pro's left and right outputs.

Tip: The amount of signal fed back into ESP-A from ESP-B is controlled by the B>A Input Level Mixer parameter (see Chapter **8**).

Stereo: Parallel-S
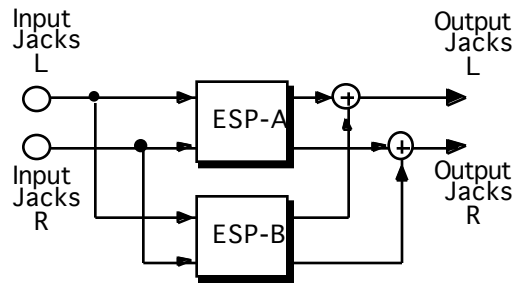
In this routing:

- The audio sent into the DP/Pro's left and right inputs is treated as a single stereo image.
- One copy of the stereo image is sent into ESP-A.
- Another copy of the stereo image is sent into ESP-B.
- The left output of ESP-A is summed with the left output of ESP-B and sent to the DP/Pro's left output.
- The right output of ESP-A is summed with the right output of ESP-B and sent to the DP/Pro's right output.
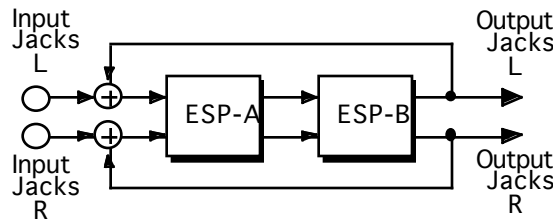
Stereo: Parallel-M
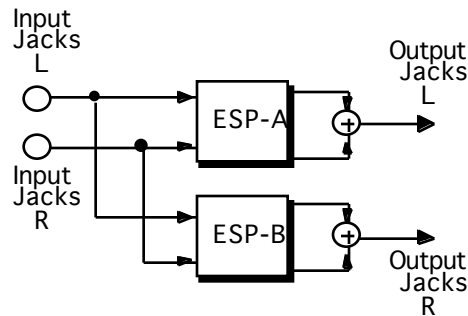
In this routing:

- The audio sent into the DP/Pro's left and right inputs is treated as a single stereo image.
- One copy of the stereo image is sent into ESP-A.
- Another copy of the stereo image is sent into ESP-B.
- The left and right outputs of ESP-A are summed to mono and sent to the DP/Pro's left output.
- The left and right outputs of ESP-B are summed to mono and sent to the DP/Pro's right output.

2-Mono: Dual Mono
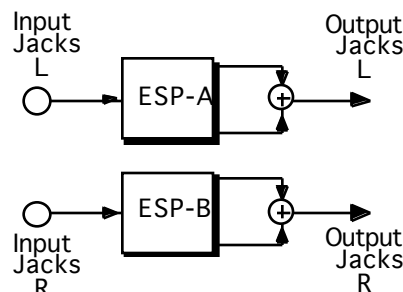
In the 2-Mono: Dual Mono routing (shown on the previous page):

• The audio sent into the DP/Pro's left input is copied and sent into both the left and right inputs of ESP-A.
• The audio sent into the DP/Pro's right input is copied and sent into both the left and right inputs of ESP-B.
• The left and right outputs of ESP-A are summed to mono and sent to the DP/Pro's left output.
• The left and right outputs of ESP-B are summed to mono and sent to the DP/Pro's right output.

2-Mono: Stereo Mix
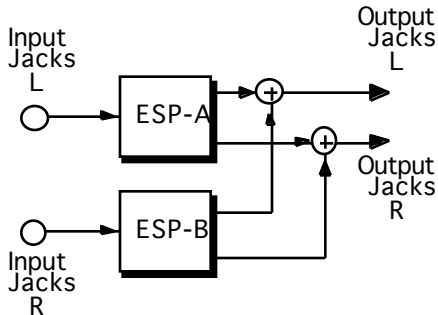
In this routing:

• The audio sent into the DP/Pro's left input is copied and sent into both the left and right inputs of ESP-A.
• The audio sent into the DP/Pro's right input is copied and sent into both the left and right inputs of ESP-B.
• The left output of ESP-A is summed with the left output of ESP-B and sent to the DP/Pro's left output.
• The right output of ESP-A is summed with the right output of ESP-B and sent to the DP/Pro's right output.

Processing a Single Mono Audio Source

If you'd like to send audio to only one of the DP/Pro's inputs, you can select the input you'd like to use by setting the System/MIDI Mono Input Source as desired (see Chapter 2). The signal will be copied to both sides of the DP/Pro's internal stereo bussing, appearing in the center of the stereo field.

The Routing Display

When you press the Routing button, the routing display appears, showing the currently selected routing:

The shows the relationship of the DP/Pro's inputs   This shows the relationship between ESP-A and ESP-B

Type=Stereo: Serial
    (Input) (StereoOut)
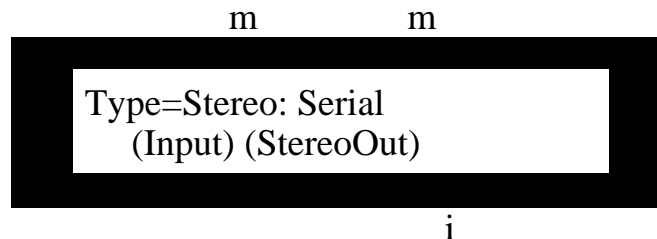
This shows the relationship of the DP/Pro's outputs

Selecting a Routing

Routings are selected by:

• pressing the Routing button.
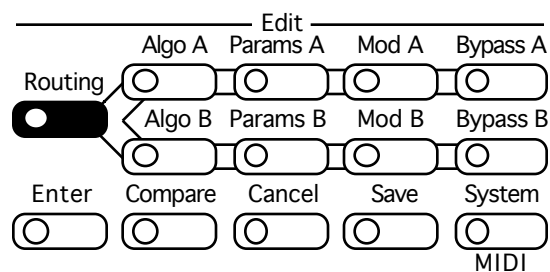
• turning the Value knob to browse through the effects in memory to select the desired routing.

Note: Not all algorithms work with all of the routings. For this reason, as you change an effect's routing, the algorithms available for use may change.

Tip: You can press the Compare button to listen to the last-saved version of the effect you're editing. Press it again to return to your edits.

5—Selecting Algorithms and Variations

Choosing New Algorithms and Variations

The DP/Pro Algorithms

The DP/Pro's audio processing is accomplished using software programs called *algorithms*—or *algos*. The two ESP2 chips each employ a single algorithm at a time, as shown in this illustration:
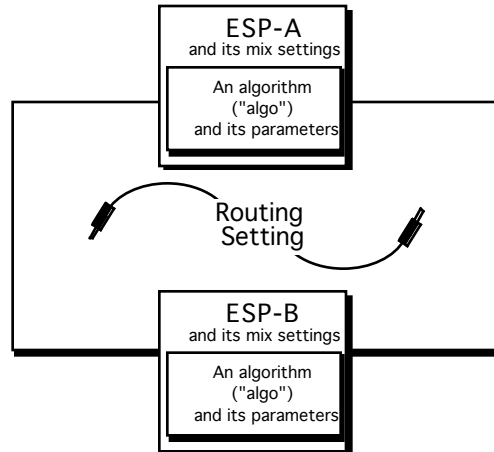
Either ESP can use any algorithm from the following list:

1. No Effect	16. Stereo Delay	31. Chatter Box
2. Mastering Limiter	17. Loop Recorder	32. Rotary Speaker
3. Compressor/Limiter	18. Expert Reverb	33. Tunable Speaker
4. Compressor	19. Expert Reverb 2	34. Parametric EQ
5. Servo Limiter	20. Reflection Modeler	35. Octave EQ
6. 3-Band Comp/Lim	21. Small Ambience 1	36. Delay+Chorus
7. Expander	22. Small Ambience 2	37. Delay+Flanger
8. Stereo Gate	23. Non-Lin Reverb 1	38. Delay+Phaser
9. Dual-Mono Gate	24. Non-Lin Reverb 2	39. Distortion+Chorus
10. De-Esser	25. Multi-Pitch Shift	40. Distortion+Flanger
11. Stereo Synthesizer	26. Multi-Chorus	41. Distortion+Phaser
12. Stereo Re-Imager	27. Flanger	42. Signal Generator
13. Variable-Tap Delay	28. Phaser	
14. Spatial Delays	29. Tremolo	
15. Ping-Pong Delay	30. Panner	

Note: The DP/Pro offers for selection only those algorithms that are compatible with the currently selected routing.

Variations

Each algorithm is pre-programmed with a collection of *variations*—presets based on the algorithm. The variations show off the possibilities inherent in each algorithm; they can also serve as starting points for your own programming. The number of variations supplied with each algorithm varies; they're numbered in the DP/Pro's auxiliary display for your convenience.

The Special *User Variation*'

When you first begin editing an effect's algorithms or variations, the DP/Pro shows the current parameters settings for each of its algorithms as a special variation called the *User Variation*. The *User Variation* is a temporary variation for holding the last-saved settings for an algorithm's parameters, and any algorithm parameter edits you make.

Note: If you select another variation, the *User Variation* will become unavailable except by re-installing the effect with which you've been working. Re-installing the effect—and the *User Variation*— will restore the last-saved algorithm parameter settings. Your recent edits, however, will have been discarded.

The Algorithm-and Variation Selection Displays

When the AlgoA or AlgoB button has been pressed, the DP/Pro's main display shows the algorithm-selection page. The top line of the display shows the currently selected algorithm, while the bottom line shows the selected variation:

The currently selected algorithm

m

> ESP-A=Spatial Delays
> Var=*User Variation*

i

The currently selected variation
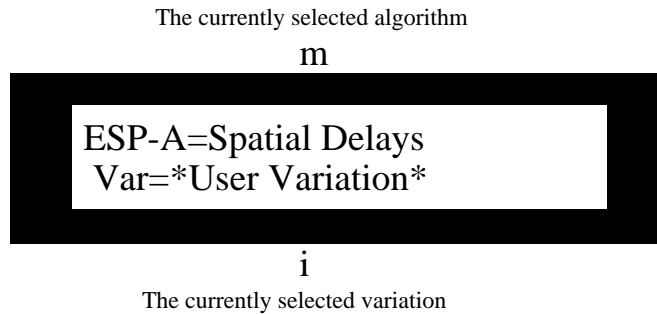
When the top line of the algorithm-selection display is selected—when the algorithm name is flashing—the DP/Pro's auxiliary display shows the number of the currently selected algorithm.

The "A" stands for "algorithm"

m

> A 11

i

The current algorithm's number
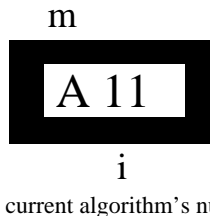
When the lower line of the selected—when the variation name is flashing—the DP/Pro's auxiliary display shows the number of the currently selected variation, except when the *User Variation* is selected—in that case the auxiliary display is blank.

The Selection of Algorithms and Variations

Algorithms and variations are selected by:

• pressing the AlgoA or AlgoB button.
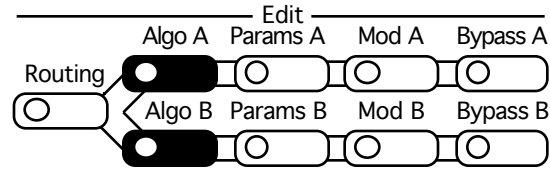
• pressing the Previous Page button to select the top line of the algorithm-selection display if it's not already selected.
• turning the Value knob to select the desired algorithm.
• waiting a moment for the DP/Pro to install the algorithm you've selected.
• pressing the Next Page button to select the lower line of the algorithm-selection display.
• turning the Value knob to select the desired variation.
• waiting a moment for the DP/Pro to install the variation you've selected.

Tip: The DP/Pro is shipped from the factory with automatic installation of algorithms and variations enabled. If you'd prefer to install algorithms and variations (and all their associated parameters) manually—by pressing the Enter button after you've selected the desired algorithm or variation—you can reset the System/MIDI AutoLoad parameter (see Chapter 2).

Tip: You can press the Compare button to listen to the last-saved version of the effect you're editing. Press it again to return to your edits.

Tip: When the AutoLoad feature is disabled and you've selected a new algorithm or variation but haven't pressed Enter to install it, you can press the Cancel button to return the DP/Pro's display to the currently installed algorithm and variation.

6—Editing Algorithms

The Algo Params Display

The ESP-A and ESP-B algorithm parameters —displayed as "Algo Params"—are accessed via the Params A and B buttons. Since other types of parameters are also accessed by pressing these buttons, the top line of the Algo Params display establishes the kind of parameters being edited, while the parameters themselves appear on the bottom line:

The ESP being edited   The type of parameter being edited

m   m

ESP-A: Algo Params   HiShelf
Gain=-9.0dB

i

The selected algorithm parameter
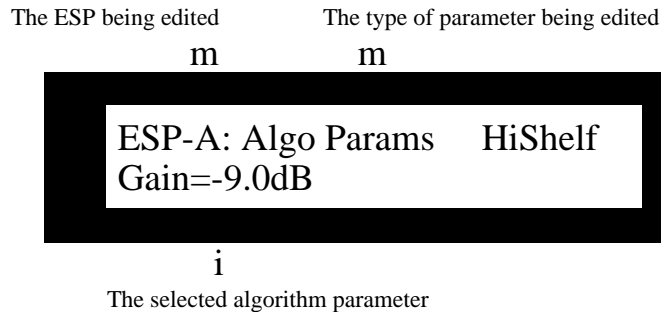
The DP/Pro's auxiliary display shows the number of the currently selected parameter.

The "P" stands for "parameter"

m

P 1

i
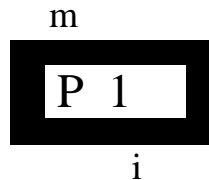
The number of the selected algorithm parameter

Editing Algorithm Parameter Settings

The algorithm parameters are edited by:

• pressing the Params A or B button repeatedly until "Algo Params" appears on the top line of the DP/Pro's main display.
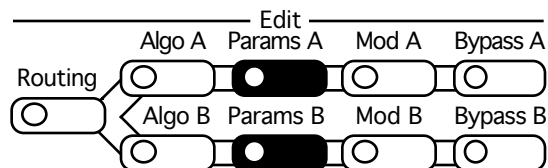
• pressing the Next or Previous Page buttons to select the parameter you'd like to edit.
• turning the Value knob to set the selected parameter to the desired value.

Tips: When you've altered a parameter's value, you can press the Cancel button to undo your edit—you can also double-click the button to quickly set any algorithm parameter to its default value. Use the Compare button to toggle between your edits and the last-saved version of the effect you're editing.

A Note About Algorithm Mix Parameters

The DP/Pro provides a three-pronged approach to setting the wet/dry balance between an audio signal as it is before and then after processing:

1. The System/MIDI Global Wet Mix parameter allows you to set an overall wet/dry balance for all of the effects in the DP/Pro (see Chapter 2).
2. Both of the ESPs in each effect also offer their own wet/dry mix parameters to provide control over the balance between signal before in enters and after it leaves each of the ESPs. See Chapter 8 for more information on the ESP Mixer params.
3. Finally, many of the DP/Pro algorithms themselves contain a Mix parameter that allows you to control the wet/dry mix within the algorithm. This is especially helpful in algorithms that offer level-sensitive audio processing.

Shared LFO Waveshapes

The LFO waveshapes shown below are available in the Stereo Delay, Flanger, Phaser, Tremolo and Panner algorithms.
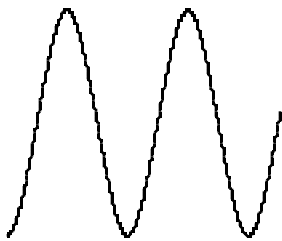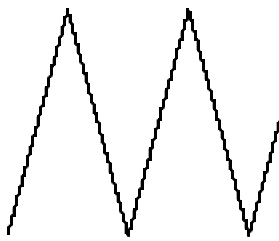
Sine   Triangle   Asym-1   Asym-2
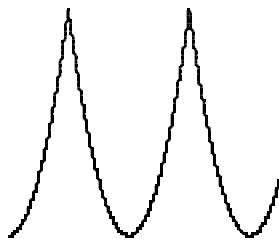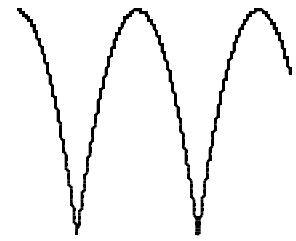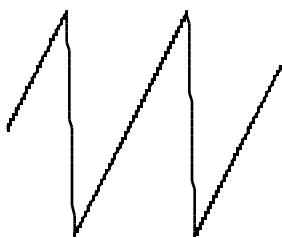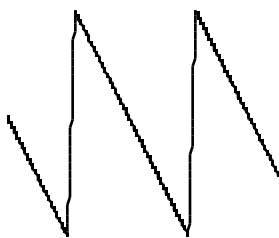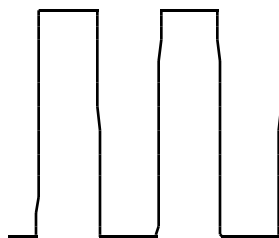
Saw-1   Saw-2   Square   Pulse
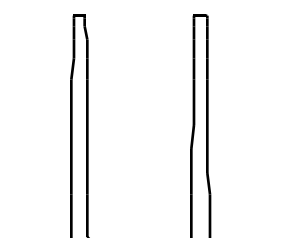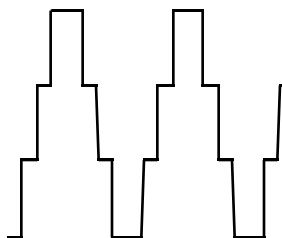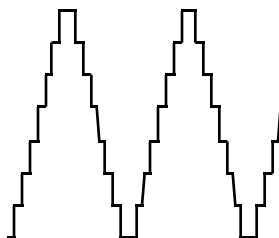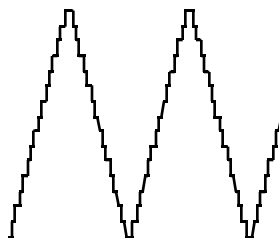
4-Step   8-Step   16-Step   Samp/Hold
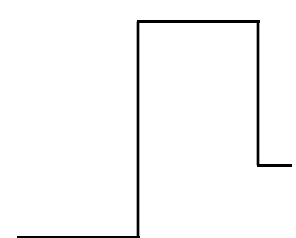
The DP/Pro Algorithm Parameters

1   No Effect

Description: Audio passes through the ESP unaffected.

I/O Characteristics: Stereo-in, stereo-out.

2   Mastering Limiter
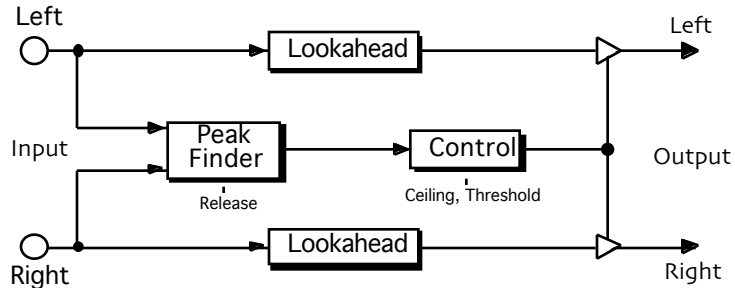
Description: A brick wall peak limiter designed to maximize headroom with no objectionable distortion. As the threshold is decreased, signal level increases (by up to 96 dB). Peaks that exceed the threshold are re-shaped—not clipped—producing a master-quality result.

Notes: Set the release time just long enough for smooth level changes to occur. The peak-shaping circuit requires a minimum lookahead delay (at least 25 ms). This amount can be increased to correspond to standard frame rates for film applications.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Thresh	-20.0dB	-96.0dB	+0.0dB	M
OutCeiling	+0.0dB	-99.0dB	+0.0dB	
Release	100.0ms	50.0us	10.0sec	
Lookahead	25m [Default]	25m [Default]	41.67m [24fps]	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

3   Compressor/Limiter
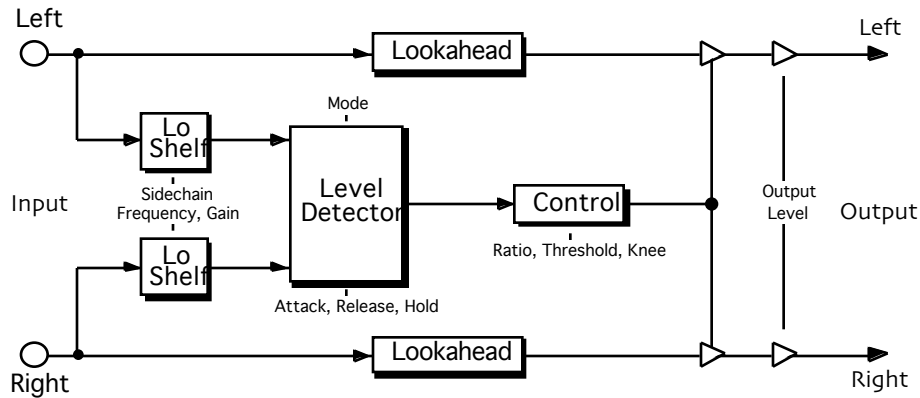
Description: Similar to the Compressor algorithm (see next page), but operates as a limiter at high ratios (no makeup gain is applied).

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Output	+0.0dB	-99.0dB	+96.0dB	
Thresh	-20.0dB	-99.0dB	+0.0dB	M
Ratio	1.0:1	1.0:1	100:1	
Knee-Width	Hardest	Hardest	Softest	
SC LoCut Fc	100Hz	1Hz	20.000kHz	H, L
SC LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Detector	Peak	Peak	RMS	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	
Hold	100.0ms	0.0us	10.0sec	
Lookahead	0.0ms	0.0ms	50.0ms	

B=parameter has bi-polar range

H=high-frequency limit determined by system sample rate

L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter

M=parameter has supplemental metered display

T=parameter can be synchronized to system clock or MIDI clocks

4   Compressor
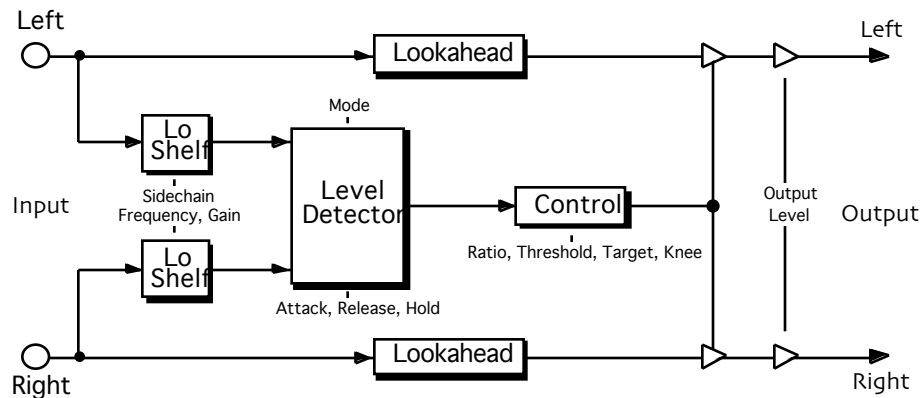
Description: A compressor with an adjustable knee and automatic gain makeup. By varying the knee width, the response can be set anywhere from hard and precise to soft and tube-like. The sidechain filter reduces pumping effects, while the adjustable lookahead delay allows precise overshoot correction. The addition of selectable peak or RMS detection makes this a versatile dynamics processor for use with a wide range of sources.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Output	+0.0dB	-99.0dB	+0.0dB	
Thresh	-20.0dB	-99.0dB	+0.0dB	M
Ratio	1.0:1	1.0:1	100:1	
Target Level	+0.0dB	-99.0dB	+0.0dB	
Knee-Width	Hardest	Hardest	Softest	
SC LoCut Fc	100Hz	1Hz	20.000kHz	H, L
SC LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Detector	Peak	Peak	RMS	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	
Hold	100.0ms	0.0us	10.0sec	
Lookahead	0.0ms	0.0ms	50.0ms	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

5   Servo Limiter
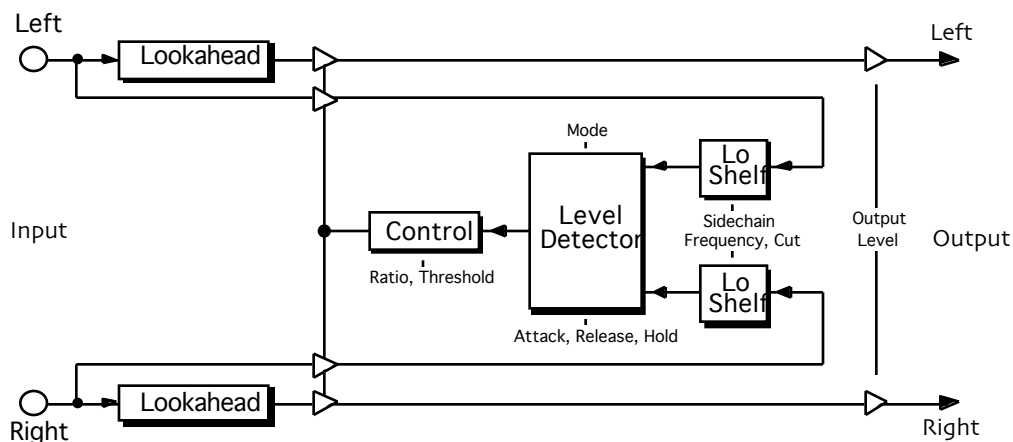
Description: A feedback-type compressor/limiter based on a vintage design.

Notes: Compressor gain is continuously adjusted as a function of the level of the compressed signal itself, resulting in a response quite unlike that of more recent feedforward-type compressors that monitor directly the level of the source. Has adjustable lookahead delay (a feature uncommon in feedback-type compressors) and sidechain EQ.

I/O Characteristics: Stereo-in, stereo-out.

Name	Ref	Min	Max	Attributes
Output	+0.0dB	-99.0dB	+96.0dB	
Thresh	-20.0dB	-99.0dB	+0.0dB	M
Ratio	1.0:1	1.0:1	30:1	
SC LoCut Fc	100Hz	1Hz	20.000kHz	H, L
SC LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Detector	Peak	Peak	RMS	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	
Hold	100.0ms	0.0us	10.0sec	
Lookahead	0.0ms	0.0ms	50.0ms	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

6   3-Band Comp/Lim
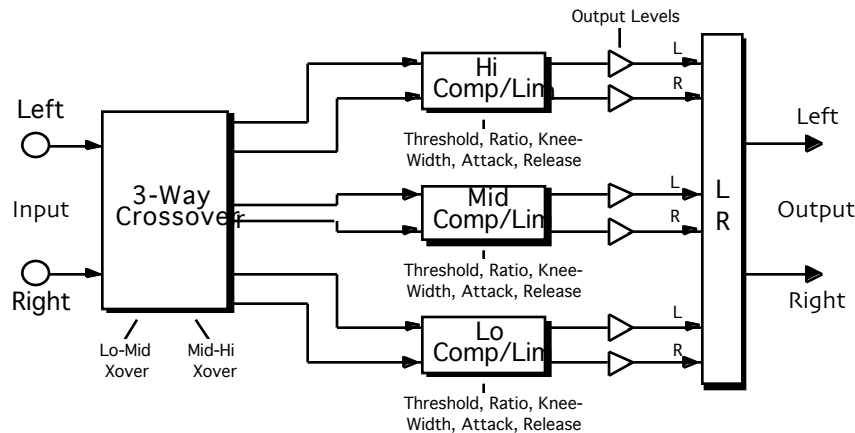
Description: Multiband, adjustable-knee compression. A three-way crossover splits a stereo source into low, mid, and high frequency bands. Each band gets compressed separately, with its own threshold, ratio, knee-width, attack, release, and output-level controls. Crossover points are fully adjustable.

Notes: The crossover is designed such that the sum of the three bands exactly equals the source when there is no compression and output levels are at 0 dB.

I/O Characteristics: Stereo-in, stereo-out.

Name	Ref	Min	Max	Attributes
Lo-Mid Xover	500Hz	1Hz	20.000kHz	H, L
Mid-Hi Xover	5.000kHz	1Hz	20.000kHz	H, L
Lo Thresh	-20.0dB	-99.0dB	+0.0dB	M
Lo Ratio	1.0:1	1.0:1	100:1	
Lo Knee-Width	Hardest	Hardest	Softest	
Lo Attack	10.0ms	50.0us	10.0sec	
Lo Release	100.0ms	50.0us	10.0sec	
Lo Output	+0.0dB	-99.0dB	+48.0dB	

Mid Thresh	-20.0dB	-99.0dB	+0.0dB	M
Mid Ratio	1.0:1	1.0:1	100:1	
Mid Knee-Width	Hardest	Hardest	Softest	
Mid Attack	10.0ms	50.0us	10.0sec	
Mid Release	100.0ms	50.0us	10.0sec	
Mid Output	+0.0dB	-99.0dB	+48.0dB	
Hi Thresh	-20.0dB	-99.0dB	+0.0dB	M
Hi Ratio	1.0:1	1.0:1	100:1	
Hi Knee-Width	Hardest	Hardest	Softest	
Hi Attack	10.0ms	50.0us	10.0sec	
Hi Release	100.0ms	50.0us	10.0sec	
Hi Output	+0.0dB	-99.0dB	+48.0dB	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

7   Expander
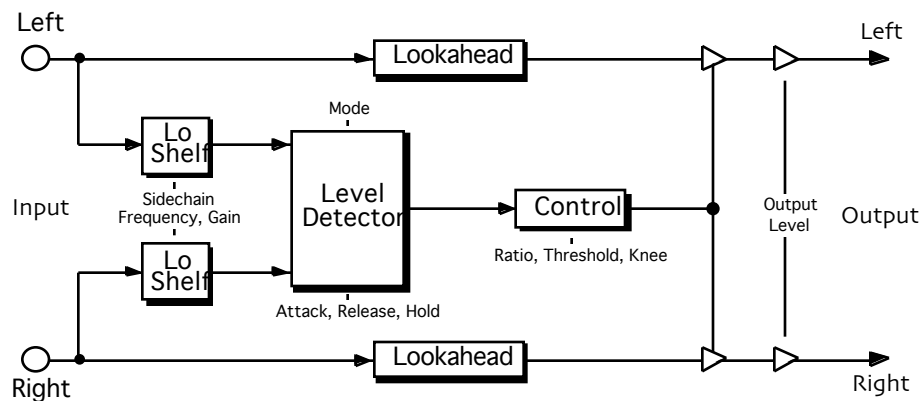
Description: A downward expander with an adjustable knee, lookahead delay, and selectable peak or RMS detection.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Output	+0.0dB	-99.0dB	+48.0dB	
Thresh	-20.0dB	-99.0dB	+0.0dB	M
Ratio	1:1.0	1:1.0	1:30	
Knee-Width	Hardest	Hardest	Softest	
Detector	Peak	Peak	RMS	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	
Hold	100.0ms	0.0us	10.0sec	
Lookahead	0.0ms	0.0ms	50.0ms	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

8   Stereo Gate
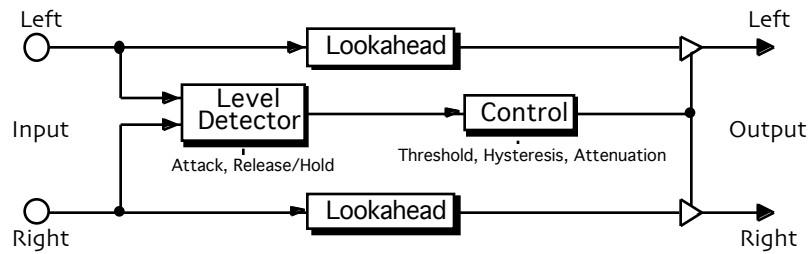
Description: A fast gate with a lookahead delay that prevents chopping-off of attack transients.

Notes: Set the attenuation for the desired gating level. Minimize chatter by setting the hysteresis and the hold time. The amount of hysteresis sets the dB difference between the (attack) threshold and the release threshold. The hold time is the duration for which the source level must remain below the threshold before the gate closes.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Thresh	-20.0dB	-99.0dB	+0.0dB	M
Hysteresis	+10.0dB	+0.0dB	+99.0dB	
Attenuation	+40.0dB	+0.0dB	+99.0dB	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	
Hold	100.0ms	0.0us	10.0sec	
Lookahead	0.0ms	0.0ms	20.0ms	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

9   Dual-Mono Gate
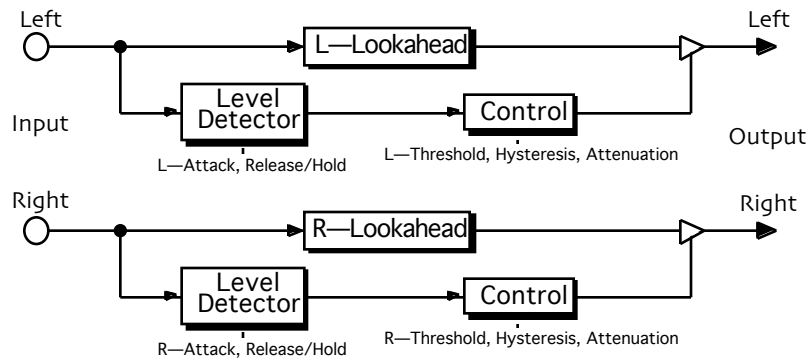
Description: Similar to the Stereo Gate, but allows independent processing of left and right channels.

Notes: Set the attenuation for the desired gating level. Minimize chatter by setting the hysteresis and the hold time. The amount of hysteresis sets the dB difference between the (attack) threshold and the release threshold. The hold time is the duration for which the source level must remain below the threshold before the gate closes.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
L-Thresh	-20.0dB	-99.0dB	+0.0dB	M
L-Hysteresis	+10.0dB	+0.0dB	+99.0dB	
L-Atten	+40.0dB	+0.0dB	+99.0dB	
L-Attack	10.0ms	50.0us	10.0sec	
L-Release	100.0ms	50.0us	10.0sec	
L-Hold	100.0ms	0.0us	10.0sec	
L-Lookahead	0.0ms	0.0ms	20.0ms	
R-Thresh	-20.0dB	-99.0dB	+0.0dB	M
R-Hysteresis	+10.0dB	+0.0dB	+99.0dB	
R-Atten	+40.0dB	+0.0dB	+99.0dB	
R-Attack	10.0ms	50.0us	10.0sec	
R-Release	100.0ms	50.0us	10.0sec	
R-Hold	100.0ms	0.0us	10.0sec	
R-Lookahead	0.0ms	0.0ms	20.0ms	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

10   De-Esser
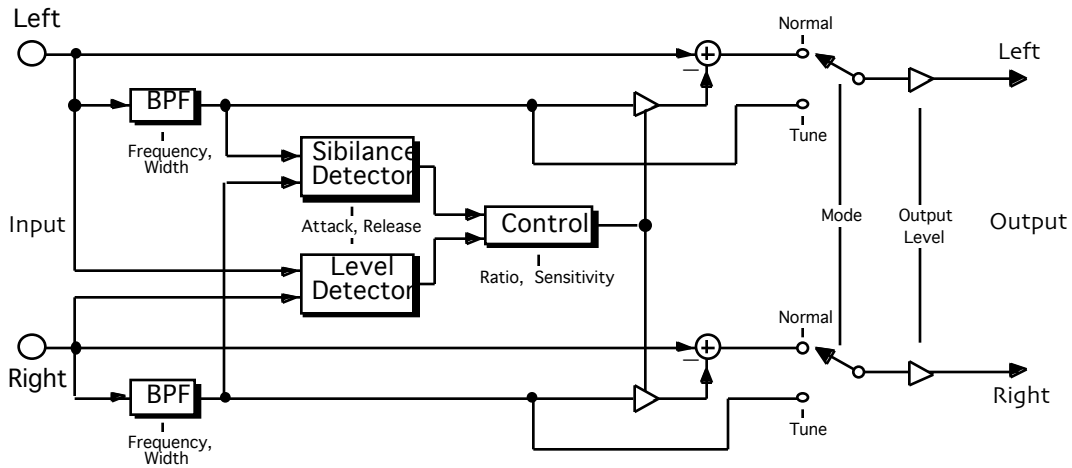
Description: A level-independent, frequency-selective de-esser. Frequency selectivity means no full-bandwidth drop-outs—just transparent de-essing in the frequency band where the problem occurs.

Notes: Starting with tune mode, sweep the filter frequency and bandwidth until the filter is centered over the offending frequency band. Then switch to normal mode and adjust the sensitivity until any esses are attenuated to the desired degree.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Output	+0.0dB	-99.0dB	+48.0dB	
Mode	Normal	Normal	Tune	
Sensitivity	+10.0dB	+0.0dB	+99.0dB	
Notch Freq	2.000kHz	1Hz	20.000kHz	H, L
Notch Width	1.00oct	0.00oct	4.00oct	
Ratio	1.0:1	1.0:1	100:1	
Attack	10.0ms	50.0us	10.0sec	
Release	100.0ms	50.0us	10.0sec	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

11   Stereo Synthesizer
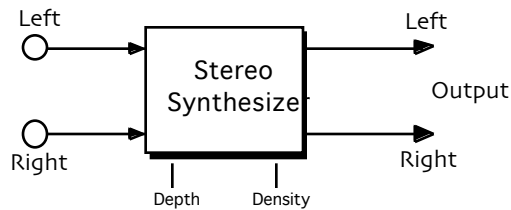
Description: Takes a mono source and spreads it out across the stereo field. Retains any stereo information that is already present in the source.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Depth	0%	0%	100%	
Density	100%	1%	100%	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

12   Stereo Re-Imager
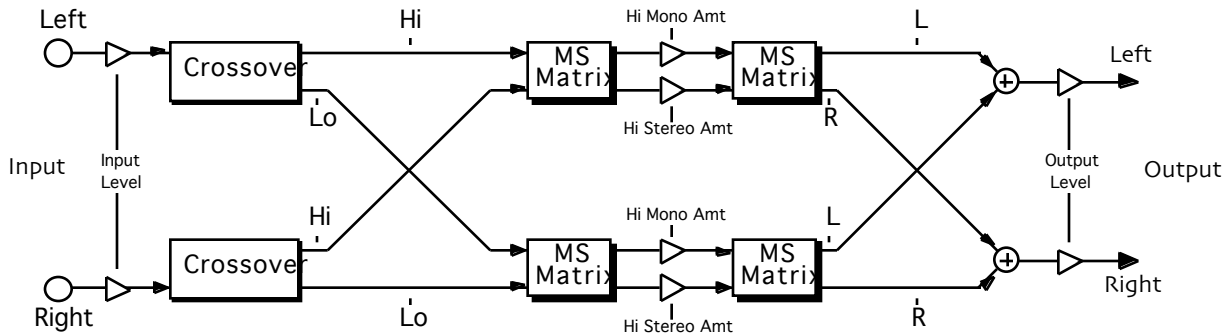
Description: Allows precise manipulation of mono and stereo (middle and side) information in high and low frequency bands. Can be used to widen a stereo image, steer the bass to mono, invert channels, swap channels, and to apply creative repositioning to any stereo source.

Notes: The crossover is designed such that the sum of high and low bands exactly equals the original source.

I/O Characteristics: Stereo-in, stereo-out

Parameter Name	Ref Value	Min	Max	Attributes
Input	+0.0dB	-99.0dB	+48.0dB	
Output	+0.0dB	-99.0dB	+48.0dB	
Xover Fc	500Hz	1Hz	20.000kHz	H, L
Lo Mono Amt	+0%	-400%	+400%	B
Lo Stereo Amt	+0%	-400%	+400%	B
Hi Mono Amt	+0%	-400%	+400%	B
Hi Stereo Amt	+0%	-400%	+400%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

13   Variable-Tap Delay
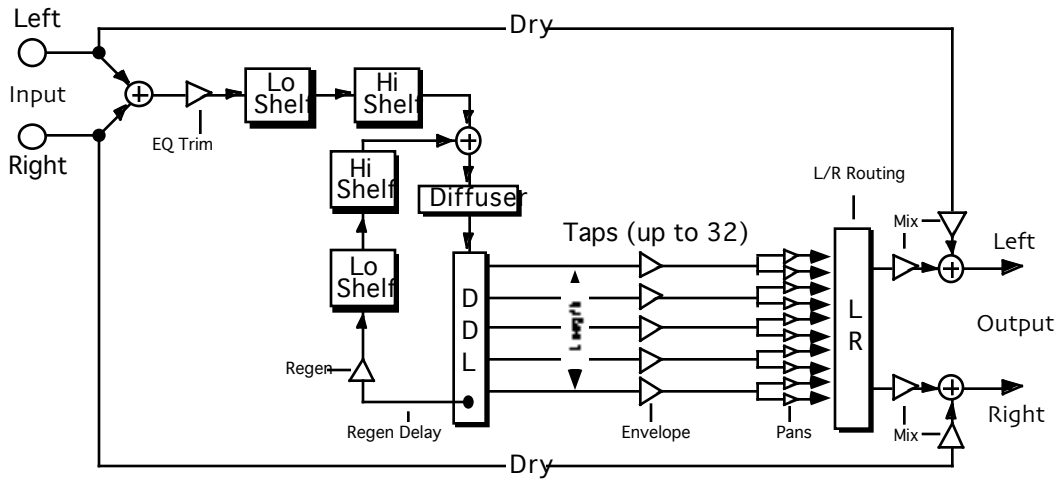
Description: Provides up to 32 taps. Preset curves allow quick selection from among a variety of delay spacings, amplitude envelopes, and pan shapes. Features low and high shelving EQ, four diffusion stages, and filtered regeneration.

Notes: Delay Warp and Env Warp params control the shape of the exponential delay spacings and amplitude envelopes, and appear in the list only when an appropriate shape is selected. Random offsets can be applied to the delay curves to break up resonances.

I/O Characteristics: Mono-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Number of Taps	32	0	32	
Max Length	2480ms	0ms	2480ms	T
Delay Spacing	Const	Const	Expon Dec	
Delay Warp	0%	0%	100%	
Randomization	0%	0%	100%	
Random Seed	0	0	255	
Env Shape	Const	Const	Expon Dec	
Env Warp	+0%	-100%	+100%	B
Pan Shape	Center	Left	Alt	
Pan Width	+0%	-100%	+100%	B
Diffusion	+0%	-100%	+100%	B
Diffus1 Time	0.0ms	0.0ms	50.0ms	
Diffus2 Time	0.0ms	0.0ms	50.0ms	
Diffus3 Time	0.0ms	0.0ms	50.0ms	
Diffus4 Time	0.0ms	0.0ms	50.0ms	
Regen	+0%	-200%	+200%	B
Regen Delay	0ms	0ms	1000ms	T
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
(Variable-Tap Delay parameters con't.)				
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	

B=parameter has bi-polar range   G=maximum gain limited by Set Max Gain System/MIDI parameter

H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

14   Spatial Delays
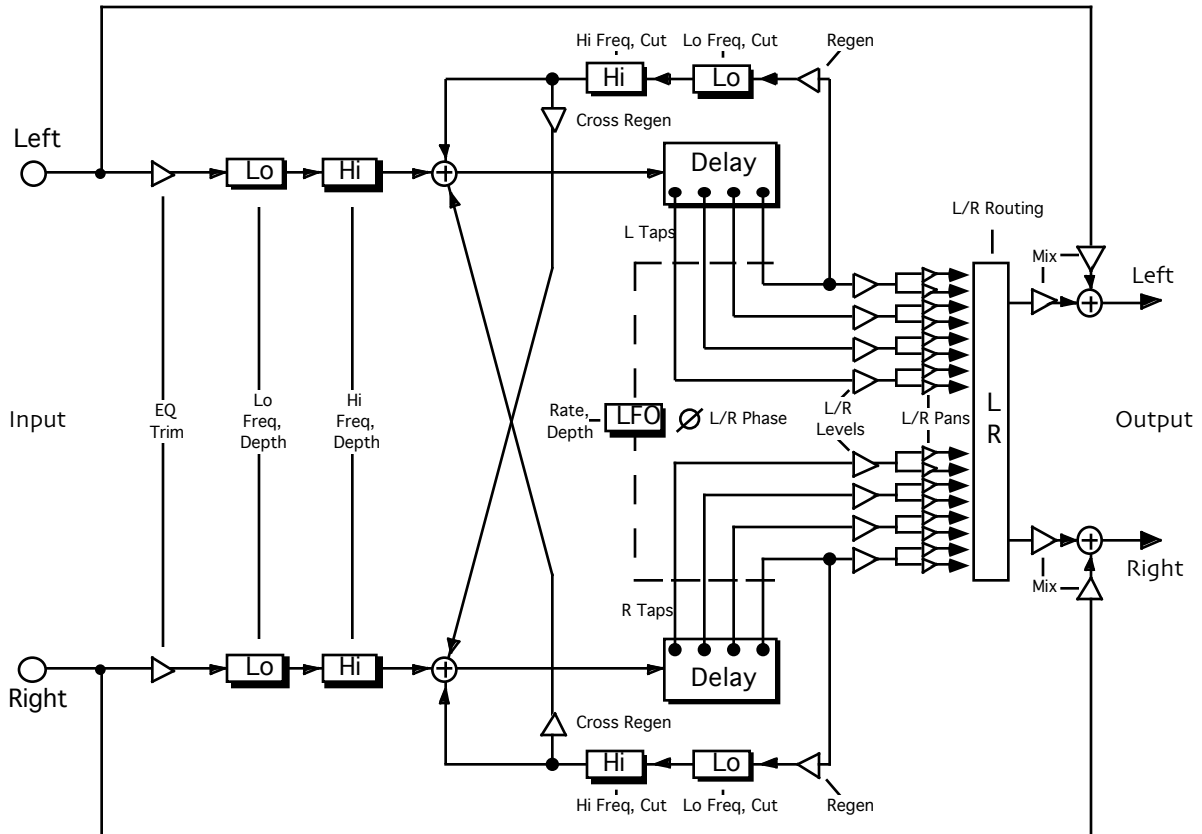
Description: Eight modulatable delays (four left and four right), each with level and pan controls. Features low and high shelving EQ and a master size param that allows simultaneous control of all delay times.

Notes: Sweep the delays manually, for Doppler and flange effects, or use the built-in LFO. Then create dense, spatial echo fields using filtered regeneration and cross-regeneration.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
(Spatial Delay parameters con't.)				
Parameter Name	**Ref Value**	**Min**	**Max**	**Attributes**
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Size	0.000%	0.000%	100%	
Mod Depth	0.000%	0.000%	100%	
Mod Rate	0.00Hz	0.00Hz	3.520kHz	T
Mod Phase	+0deg	-180deg	+180deg	B

Delay Smoothing	0ms	0ms	100.0sec	
Regen TapL	4L	Off	4R	
Regen TapR	4R	Off	4R	
Regen	+0%	-200%	+200%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	
L-Tap1 Time	0.0ms	0.0ms	1365ms	T
L-Tap1 Level	+0%	-100%	+100%	B
L-Tap1 Pan	+0%	-100%	+100%	B
L-Tap2 Time	0.0ms	0.0ms	1365ms	T
L-Tap2 Level	+0%	-100%	+100%	B
L-Tap2 Pan	+0%	-100%	+100%	B
L-Tap3 Time	0.0ms	0.0ms	1365ms	T
L-Tap3 Level	+0%	-100%	+100%	B
L-Tap3 Pan	+0%	-100%	+100%	B
L-Tap4 Time	0.0ms	0.0ms	1365ms	T
L-Tap4 Level	+0%	-100%	+100%	B
L-Tap4 Pan	+0%	-100%	+100%	B
R-Tap1 Time	0.0ms	0.0ms	1365ms	T
R-Tap1 Level	+0%	-100%	+100%	B
R-Tap1 Pan	+0%	-100%	+100%	B
R-Tap2 Time	0.0ms	0.0ms	1365ms	T
R-Tap2 Level	+0%	-100%	+100%	B
R-Tap2 Pan	+0%	-100%	+100%	B
R-Tap3 Time	0.0ms	0.0ms	1365ms	T
R-Tap3 Level	+0%	-100%	+100%	B
R-Tap3 Pan	+0%	-100%	+100%	B
R-Tap4 Time	0.0ms	0.0ms	1365ms	T
R-Tap4 Level	+0%	-100%	+100%	B
R-Tap4 Pan	+0%	-100%	+100%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

15   Ping-Pong Delay
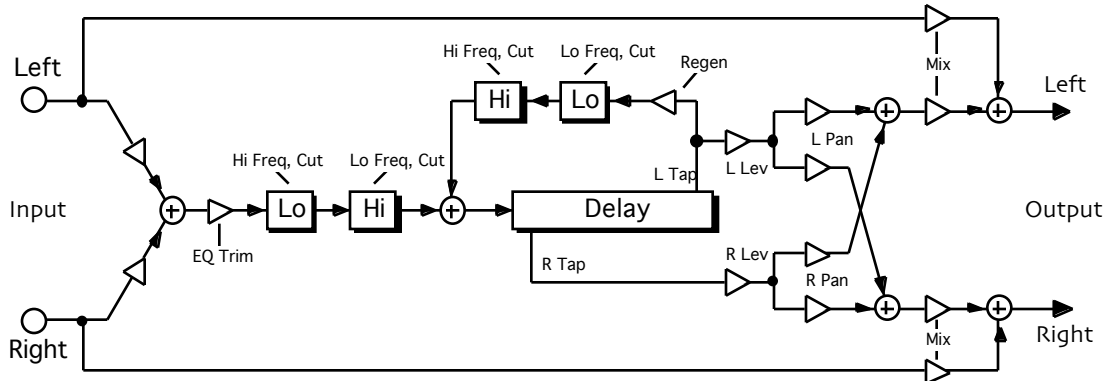
Description: A modulatable long mono delay with two taps, one of which can be regenerated. Each tap has level and pan controls.

Notes: Features low and high shelving EQ, modulatable delays, and filtered regeneration. To get the ping-pong effect, set the left delay time to twice that of the right, and apply some regeneration.
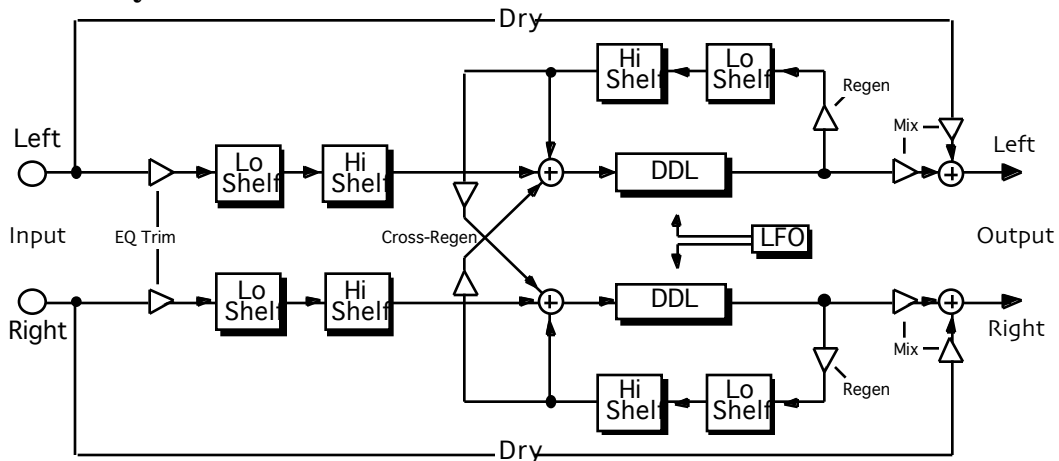
I/O Characteristics: Mono-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Size	0.000%	0.000%	100%	
Delay Smoothing	0ms	0ms	100.0sec	
Dly1 Time	0ms	0ms	2730ms	T
Dly1 Level	+0%	-100%	+100%	B
Dly1 Pan	+0%	-100%	+100%	B
Dly2 Time	0ms	0ms	2730ms	T
Dly2 Level	+0%	-100%	+100%	B
Dly2 Pan	+0%	-100%	+100%	B
Dly1 Regen	+0%	-200%	+200%	B
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

16   Stereo Delay

Description: A stereo delay optimized for modulation-based effects, with stereo-strapped left and right parameter sets (for independent control of delay times, use the Spatial Delays algorithm).

Notes: Features low and high shelving EQ, modulatable delays, built-in flexible stereo LFO (see Flanger algorithm for LFO description), and filtered regeneration and cross-regeneration.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Mod Depth	0.0ms	0.0ms	1365ms	
Delay Time	0.0ms	0.0ms	1365ms	T
Delay Smoothing	0ms	0ms	100.0sec	
LFO Rate	0.00Hz	0.00Hz	1.760kHz	T
LFO Shape	Sine	Sine	Full-Neg	
LFO Pulse Width	50%	0%	100%	
LFO S/H Ratio	[500]:1	[1]:1	[1000]:1	
LFO S/H Ratio	1 [500]	1 [1]	1 [1000]	
LFO L/R Phase	+0deg	-180deg	+180deg	B
LFO Rand Amount	0%	0%	100%	
LFO Rand Rate	0.00Hz	0.00Hz	20.000kHz	H, T
Regen	+0%	-200%	+200%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Infinite Hold	Off	Off	On	
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

17   Loop Recorder
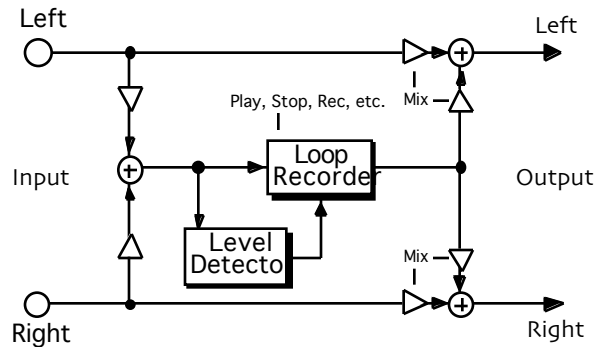
Description: Records and plays samples. Playback speed can be decreased to near zero or can be increased to up to 1600 times the original rate. Samples can be played both forwards and backwards (hence positive and negative speeds), and the end of a sample can be spliced to the beginning with an adjustable fade-in/out time. Audio-triggering modes allow sample playback to be keyed by an audio source and allow recording to begin automatically when the source level exceeds a threshold.

I/O Characteristics: Mono-in, mono-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
Function	Pla [Stop]Rec	[Play]Stop Rec	Play Sto [Rec]	
Play Mode	Once	Once	Loop	
Sample Start	0ms	0ms	2730ms	
Sample End	2730ms	0ms	2730ms	
Playback Speed	+0%	-1600%	+1600%	B
Fade Time	0ms	0ms	2730ms	
Play Trigger	Manual	Manual	Audio	
Play Threshold	-20.0dB	-99.0dB	+0.0dB	
Play Hysteresis	+89.0dB	+0.0dB	+99.0dB	
Record Trigger	Manual	Manual	Audio	
Record Threshold	-20.0dB	-99.0dB	+0.0dB	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

18　Expert Reverb
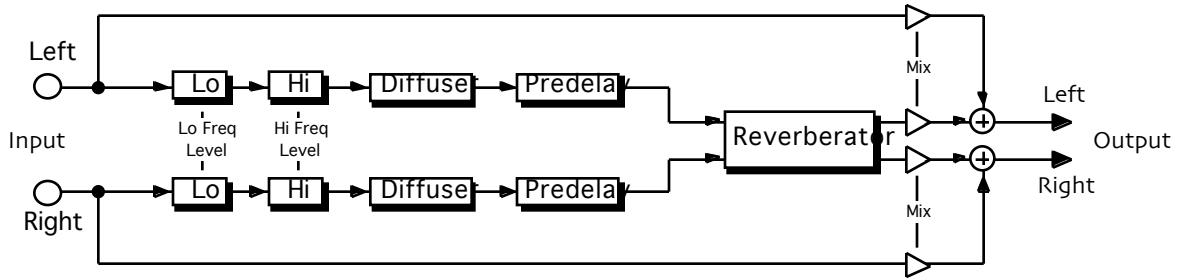
Description: A fully customizable stereo reverberation module. The delays that make up the reverberator can be adjusted to create a variety of plates and spaces. Features low and high shelving EQ, a six-stage diffuser, predelay, low and mid decay times, density control, and high-frequency damping.
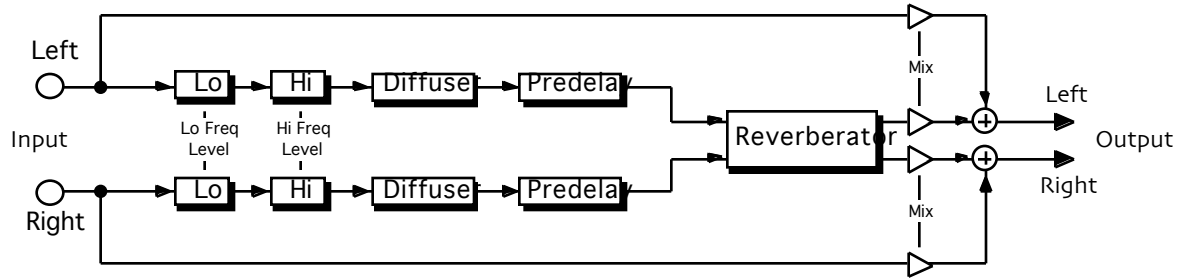
I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	50% Wet	Full Dry	Full Wet	
Lo Cut Fc	100Hz	1Hz	20.000kHz	H, L
Lo Cut Gain	+0.0dB	-99.0dB	+0.0dB	
Hi Cut Fc	10.000kHz	1Hz	20.000kHz	H, L
Hi Cut Gain	+0.0dB	-99.0dB	+0.0dB	
PreDelay	0ms	0ms	100ms	
Diffuser Size	100%	0%	100%	
Diffusion	+0%	-100%	+100%	B
Diffus1 L	0.0ms	0.0ms	25.0ms	
Diffus2 L	0.0ms	0.0ms	25.0ms	
Diffus3 L	0.0ms	0.0ms	25.0ms	
Diffus4 L	0.0ms	0.0ms	25.0ms	
Diffus5 L	0.0ms	0.0ms	25.0ms	
Diffus6 L	0.0ms	0.0ms	25.0ms	
Diffus1 R	0.0ms	0.0ms	25.0ms	
Diffus2 R	0.0ms	0.0ms	25.0ms	
Diffus3 R	0.0ms	0.0ms	25.0ms	
Diffus4 R	0.0ms	0.0ms	25.0ms	
Diffus5 R	0.0ms	0.0ms	25.0ms	
Diffus6 R	0.0ms	0.0ms	25.0ms	
Reverb Size	100%	0%	100%	
Mid Decay	5.0s	0.0s	1000s	
Lo Decay	100%	0%	400%	
Lo-Mid Xover	500Hz	1Hz	20.000kHz	H, L
HF Damping	20.000kHz	1Hz	20.000kHz	H, L
Density	100%	0%	100%	
Delay1 Time	0.0ms	0.0ms	200.0ms	
Delay2 Time	0.0ms	0.0ms	200.0ms	
Delay3 Time	0.0ms	0.0ms	200.0ms	
Delay4 Time	0.0ms	0.0ms	200.0ms	
Delay5 Time	0.0ms	0.0ms	200.0ms	
Delay6 Time	0.0ms	0.0ms	200.0ms	
(Expert Reverb parameters con't.)				
Parameter Name	Ref Value	Min	Max	Attributes
Delay7 Time	0.0ms	0.0ms	200.0ms	
Delay8 Time	0.0ms	0.0ms	200.0ms	
Mod 1 Depth	0.0ms	0.0ms	200.0ms	
Mod 1 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 2 Depth	0.0ms	0.0ms	200.0ms	

Mod 2 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 3 Depth	0.0ms	0.0ms	200.0ms	
Mod 3 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 4 Depth	0.0ms	0.0ms	200.0ms	
Mod 4 Rate	0.00Hz	0.00Hz	1.760kHz	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

19   Expert Reverb 2

Description: Similar to expert reverb but has a slightly different distribution of resonances.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	50% Wet	Full Dry	Full Wet	
Lo Cut Fc	100Hz	1Hz	20.000kHz	H, L
Lo Cut Gain	+0.0dB	-99.0dB	+0.0dB	
Hi Cut Fc	10.000kHz	1Hz	20.000kHz	H, L
Hi Cut Gain	+0.0dB	-99.0dB	+0.0dB	
PreDelay	0ms	0ms	100ms	
Diffuser Size	100%	0%	100%	
Diffusion	+0%	-100%	+100%	B
Diffus1 L	0.0ms	0.0ms	25.0ms	
Diffus2 L	0.0ms	0.0ms	25.0ms	
Diffus3 L	0.0ms	0.0ms	25.0ms	
Diffus4 L	0.0ms	0.0ms	25.0ms	
Diffus5 L	0.0ms	0.0ms	25.0ms	
Diffus6 L	0.0ms	0.0ms	25.0ms	
Diffus1 R	0.0ms	0.0ms	25.0ms	
Diffus2 R	0.0ms	0.0ms	25.0ms	
Diffus3 R	0.0ms	0.0ms	25.0ms	
Diffus4 R	0.0ms	0.0ms	25.0ms	
Diffus5 R	0.0ms	0.0ms	25.0ms	
(Expert Reverb 2 parameters con't.)				
Parameter Name	Ref Value	Min	Max	Attributes
Diffus6 R	0.0ms	0.0ms	25.0ms	
Reverb Size	100%	0%	100%	
Mid Decay	5.0s	0.0s	1000s	
Lo Decay	100%	0%	400%	
Lo-Mid Xover	500Hz	1Hz	20.000kHz	H, L
HF Damping	20.000kHz	1Hz	20.000kHz	H, L
Density	100%	0%	100%	
Delay1 Time	0.0ms	0.0ms	200.0ms	
Delay2 Time	0.0ms	0.0ms	200.0ms	
Delay3 Time	0.0ms	0.0ms	200.0ms	
Delay4 Time	0.0ms	0.0ms	200.0ms	
Delay5 Time	0.0ms	0.0ms	200.0ms	

Delay6 Time	0.0ms	0.0ms	200.0ms	
Delay7 Time	0.0ms	0.0ms	200.0ms	
Delay8 Time	0.0ms	0.0ms	200.0ms	
Mod 1 Depth	0.0ms	0.0ms	200.0ms	
Mod 1 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 2 Depth	0.0ms	0.0ms	200.0ms	
Mod 2 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 3 Depth	0.0ms	0.0ms	200.0ms	
Mod 3 Rate	0.00Hz	0.00Hz	1.760kHz	
Mod 4 Depth	0.0ms	0.0ms	200.0ms	
Mod 4 Rate	0.00Hz	0.00Hz	1.760kHz	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

20   Reflection Modeler
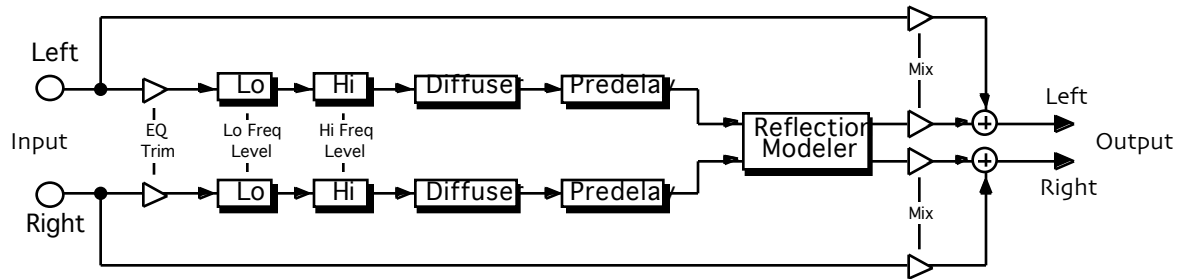
Description: Models the early reflection patterns between a stereo source and listener in an enclosed space, such as a room, hall, or cavern. There are controls for dimensions, wall reflectivity, diffusion, and frequency-dependent damping. The source and receiver can be placed anywhere within the simulated space. This algo maintains stereo images and can add a stereo ambience to mono sources.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	50% Wet	Direct	Reflect	
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
PreDelay	0ms	0ms	100ms	
HF Damping	20.000kHz	1Hz	20.000kHz	H, L
Diffuser Size	100%	0%	100%	
Diffusion	+0%	-100%	+100%	B
Diffus1 L	0.0ms	0.0ms	30.0ms	
Diffus2 L	0.0ms	0.0ms	30.0ms	
Diffus3 L	0.0ms	0.0ms	30.0ms	
Diffus4 L	0.0ms	0.0ms	30.0ms	
Diffus1 R	0.0ms	0.0ms	30.0ms	
Diffus2 R	0.0ms	0.0ms	30.0ms	
Diffus3 R	0.0ms	0.0ms	30.0ms	
Diffus4 R	0.0ms	0.0ms	30.0ms	
Room Size	100%	0%	100%	
Room Depth	100m	0m	200m	
Room Width	100m	0m	200m	
Reflectivity	+0%	-100%	+100%	B
Source Spread	100%	0%	100%	
Receiver Spread	100%	0%	100%	
Source X	Center	Left	Right	
Source Y	Center	Back	Front	
Receiver X	Center	Left	Right	
Receiver Y	Center	Back	Front	
Randomization	0%	0%	100%	
Random Seed	0	0	255	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

21   Small Ambience 1
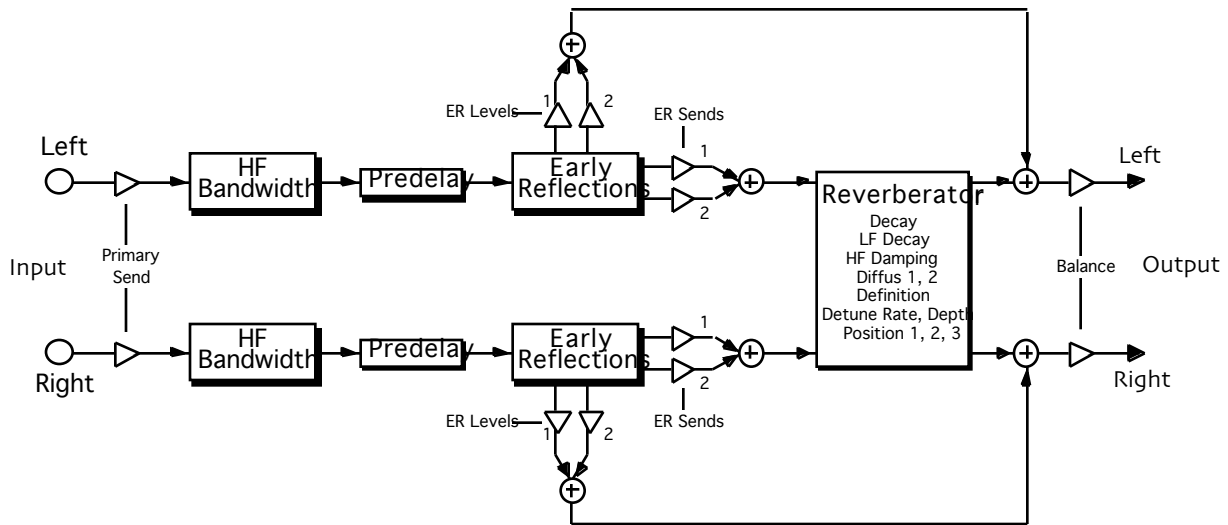
Description: Creates the ambience of a small space. Low settings of diffusion result in more discrete echoes being heard in the decay; higher settings produce a smoother sound. Definition determines the rate of echo buildup in the reverb tail.

Notes: The Position params simulate an array of microphones placed at various distances from the source, and are ordered from nearest to farthest.
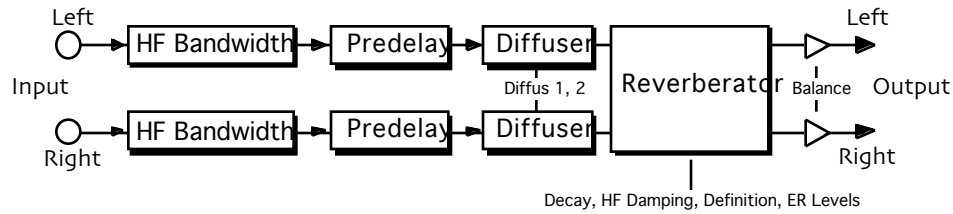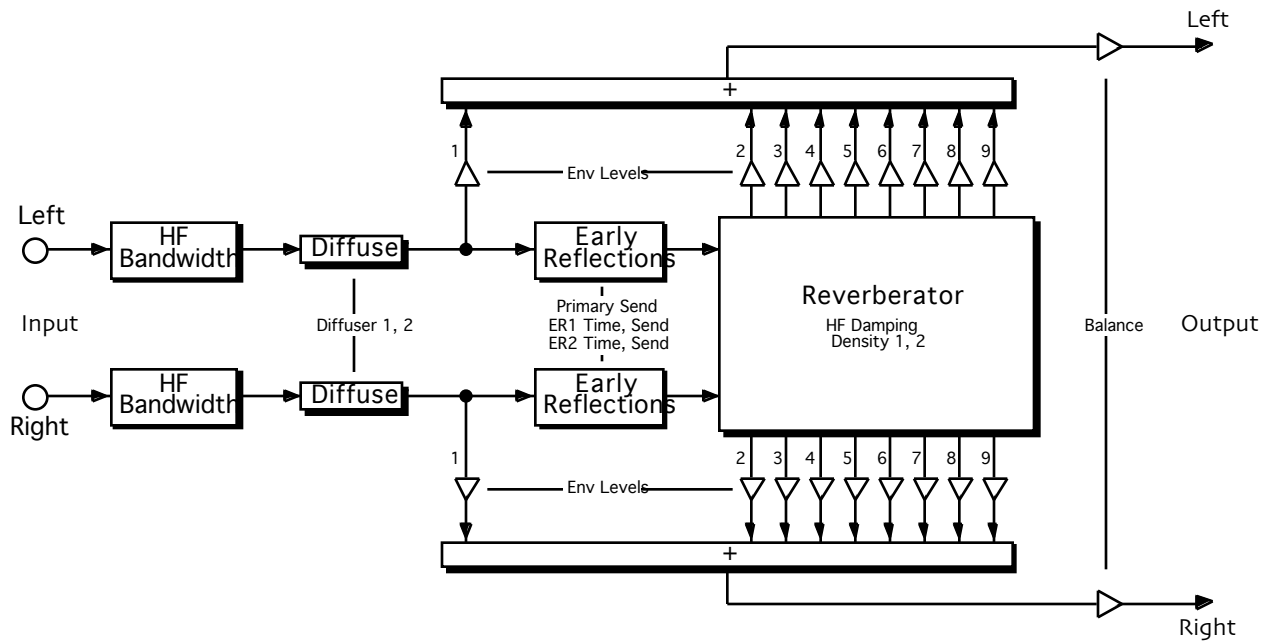
I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Decay	0.0sec	0.0sec	10.0sec	
LF Decay	0%	-99%	+99%	B
HF Damping	20.0kHz	100Hz	21.2kHz	H
HF Bandwidth	20.0kHz	100Hz	21.2kHz	H
Primary Send	0%	-99%	+99%	B
Diffus1	0	0	100	
Diffus2	0	0	100	
Definition	0	0	100	
Detune Rate	0.00Hz	0.00Hz	1.54Hz	
Detune Depth	0%	0%	100%	
PreDelay	0ms	0ms	200ms	
ER 1 Time	0ms	0ms	200ms	
ER 1 Send	0%	-99%	+99%	B
ER 1 Level	0%	-99%	+99%	B
ER 2 Time	0ms	0ms	200ms	
ER 2 Send	0%	-99%	+99%	B
ER 2 Level	0%	-99%	+99%	B
Position 1	0%	-99%	+99%	B
Position 2	0%	-99%	+99%	B
Position 3	0%	-99%	+99%	B
Balance	Center	Full <L	Full >R	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

22   Small Ambience 2

Description: Simulates a small plate reverb. Diffusion and definition work as in Small Ambience 1.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Decay	0.0sec	0.0sec	10.0sec	
HF Damping	20.0kHz	100Hz	21.2kHz	H
HF Bandwidth	20.0kHz	100Hz	21.2kHz	H
Diffus1	0	0	100	
Diffus2	0	0	100	
Definition	0	0	100	
PreDelay	0ms	0ms	200ms	
ER 1 Level	0%	-99%	+99%	B
ER 2 Level	0%	-99%	+99%	B
ER 3 Level	0%	-99%	+99%	B
ER 4 Level	0%	-99%	+99%	B
Balance	Center	Full <L	Full >R	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

23   Non-Lin Reverb 1

Description: Non-Lin can be used to obtain gated reverb, reverse reverb, blooming reverb, and early reflections. Non- linear reverbs have a decay characteristic that is generally unlike that of real rooms.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Env 1 Level	0%	-99%	+99%	B
Env 2 Level	0%	-99%	+99%	B
Env 3 Level	0%	-99%	+99%	B
Env 4 Level	0%	-99%	+99%	B
Env 5 Level	0%	-99%	+99%	B
Env 6 Level	0%	-99%	+99%	B
Env 7 Level	0%	-99%	+99%	B
Env 8 Level	0%	-99%	+99%	B
Env 9 Level	0%	-99%	+99%	B
HF Damping	20.0kHz	100Hz	21.2kHz	H
HF Bandwidth	20.0kHz	100Hz	21.2kHz	H
Primary Send	0%	-99%	+99%	B
Diffus1	0	0	100	
Diffus2	0	0	100	
Density 1	0	0	100	
Density 2	0	0	100	
ER 1 Time	0ms	0ms	200ms	
ER 1 Send	0%	-99%	+99%	B
ER 2 Time	0ms	0ms	200ms	
ER 2 Send	0%	-99%	+99%	B
Balance	Center	Full <L	Full >R	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

24   Non-Lin Reverb 2
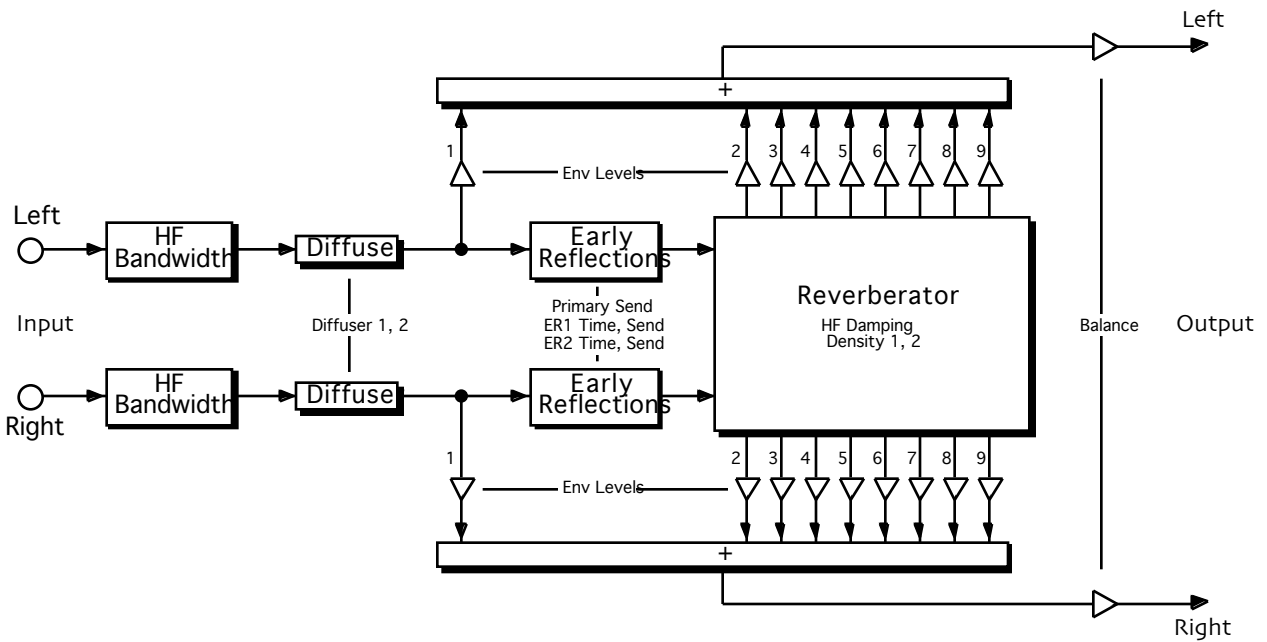
Description: Similar to Non-Lin Reverb 1, but is smaller and has less stereo movement, making this algo well-suited for drum tracks.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Env 1 Level	0%	-99%	+99%	B
Env 2 Level	0%	-99%	+99%	B
Env 3 Level	0%	-99%	+99%	B
Env 4 Level	0%	-99%	+99%	B
Env 5 Level	0%	-99%	+99%	B
Env 6 Level	0%	-99%	+99%	B
Env 7 Level	0%	-99%	+99%	B
Env 8 Level	0%	-99%	+99%	B
Env 9 Level	0%	-99%	+99%	B
HF Damping	20.0kHz	100Hz	21.2kHz	H
HF Bandwidth	20.0kHz	100Hz	21.2kHz	H
Primary Send	0%	-99%	+99%	B
Diffus1	0	0	100	
Diffus2	0	0	100	
Density 1	0	0	100	
Density 2	0	0	100	
ER 1 Time	0ms	0ms	200ms	
ER 1 Send	0%	-99%	+99%	B
ER 2 Time	0ms	0ms	200ms	
ER 2 Send	0%	-99%	+99%	B
Balance	Center	Full <L	Full >R	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

25   Multi-Pitch Shift
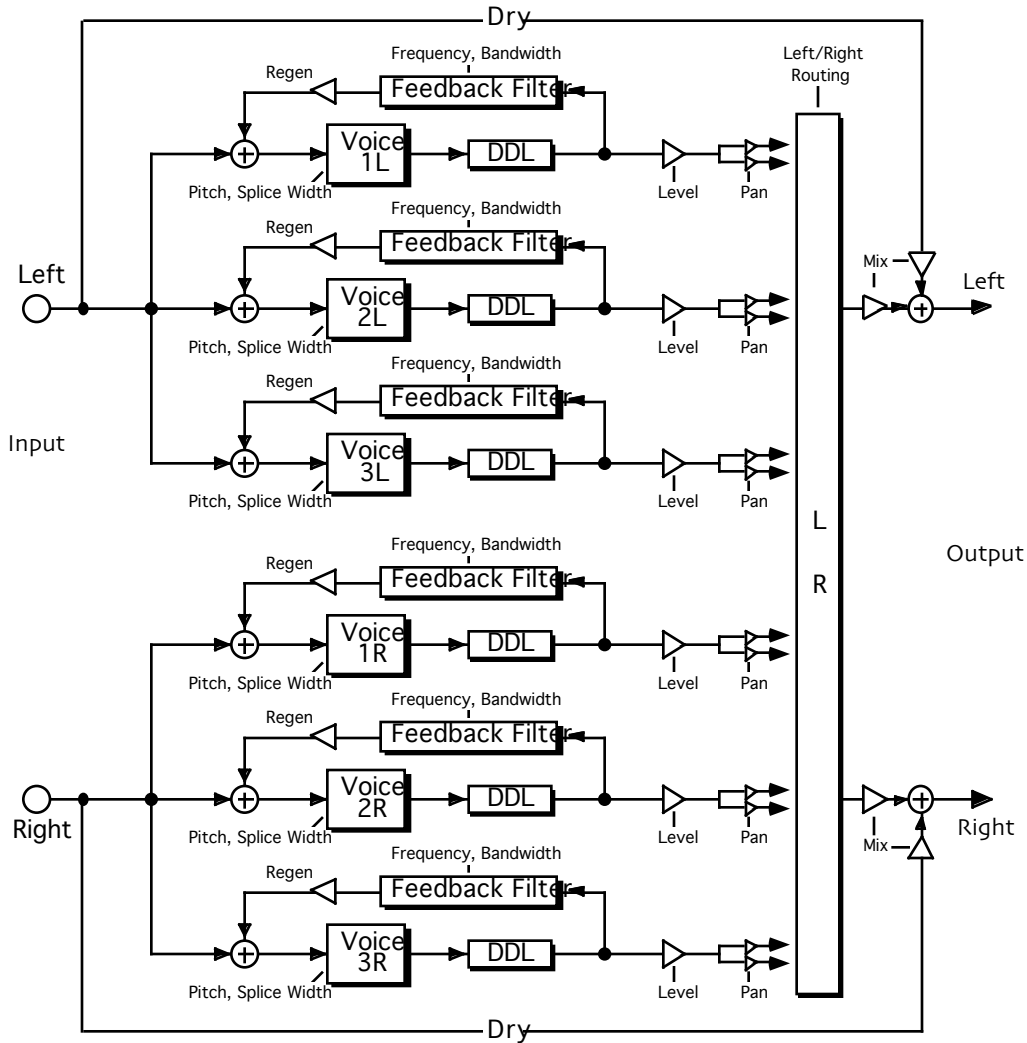
Description: Six independent pitch shifters (three left and three right), each with a shift range of plus and minus eight octaves. Each pitch shifter features level and pan controls, adjustable splice width, delay, and filtered regeneration.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
L-V1 Pitch	+0cents	-9600cents	+9600cents	B
L-V1 Splice Time	10ms	0ms	200ms	
L-V1 Delay	0ms	0ms	200ms	
L-V1 Regen	+0%	-200%	+200%	B
L-V1 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
L-V1 Regen BW	Full	0.01oct	Full	
L-V1 Level	+0.0dB	-99.0dB	+0.0dB	
L-V1 Pan	Center	Full <L	Full >R	
L-V2 Pitch	+0cents	-9600cents	+9600cents	B
L-V2 Splice Time	10ms	0ms	200ms	
L-V2 Delay	0ms	0ms	200ms	
(Multi-Pitch Shift parameters con't.)				

Parameter Name	Ref Value	Min	Max	Attributes
L-V2 Regen	+0%	-200%	+200%	B
L-V2 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
L-V2 Regen BW	Full	0.01oct	Full	
L-V2 Level	+0.0dB	-99.0dB	+0.0dB	
L-V2 Pan	Center	Full <L	Full >R	
L-V3 Pitch	+0cents	-9600cents	+9600cents	B
L-V3 Splice Time	10ms	0ms	200ms	
L-V3 Delay	0ms	0ms	200ms	
L-V3 Regen	+0%	-200%	+200%	B
L-V3 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
L-V3 Regen BW	Full	0.01oct	Full	
L-V3 Level	+0.0dB	-99.0dB	+0.0dB	
L-V3 Pan	Center	Full <L	Full >R	
R-V1 Pitch	+0cents	-9600cents	+9600cents	B
R-V1 Splice Time	10ms	0ms	200ms	
R-V1 Delay	0ms	0ms	200ms	
R-V1 Regen	+0%	-200%	+200%	B
R-V1 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
R-V1 Regen BW	Full	0.01oct	Full	
R-V1 Level	+0.0dB	-99.0dB	+0.0dB	
R-V1 Pan	Center	Full <L	Full >R	
R-V2 Pitch	+0cents	-9600cents	+9600cents	B
R-V2 Splice Time	10ms	0ms	200ms	
R-V2 Delay	0ms	0ms	200ms	
R-V2 Regen	+0%	-200%	+200%	B
R-V2 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
R-V2 Regen BW	Full	0.01oct	Full	
R-V2 Level	+0.0dB	-99.0dB	+0.0dB	
R-V2 Pan	Center	Full <L	Full >R	
R-V3 Pitch	+0cents	-9600cents	+9600cents	B
R-V3 Splice Time	10ms	0ms	200ms	
R-V3 Delay	0ms	0ms	200ms	
R-V3 Regen	+0%	-200%	+200%	B
R-V3 Regen Fc	1.000kHz	1Hz	20.000kHz	H, L
R-V3 Regen BW	Full	0.01oct	Full	
R-V3 Level	+0.0dB	-99.0dB	+0.0dB	
R-V3 Pan	Center	Full <L	Full >R	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

26 Multi-Chorus
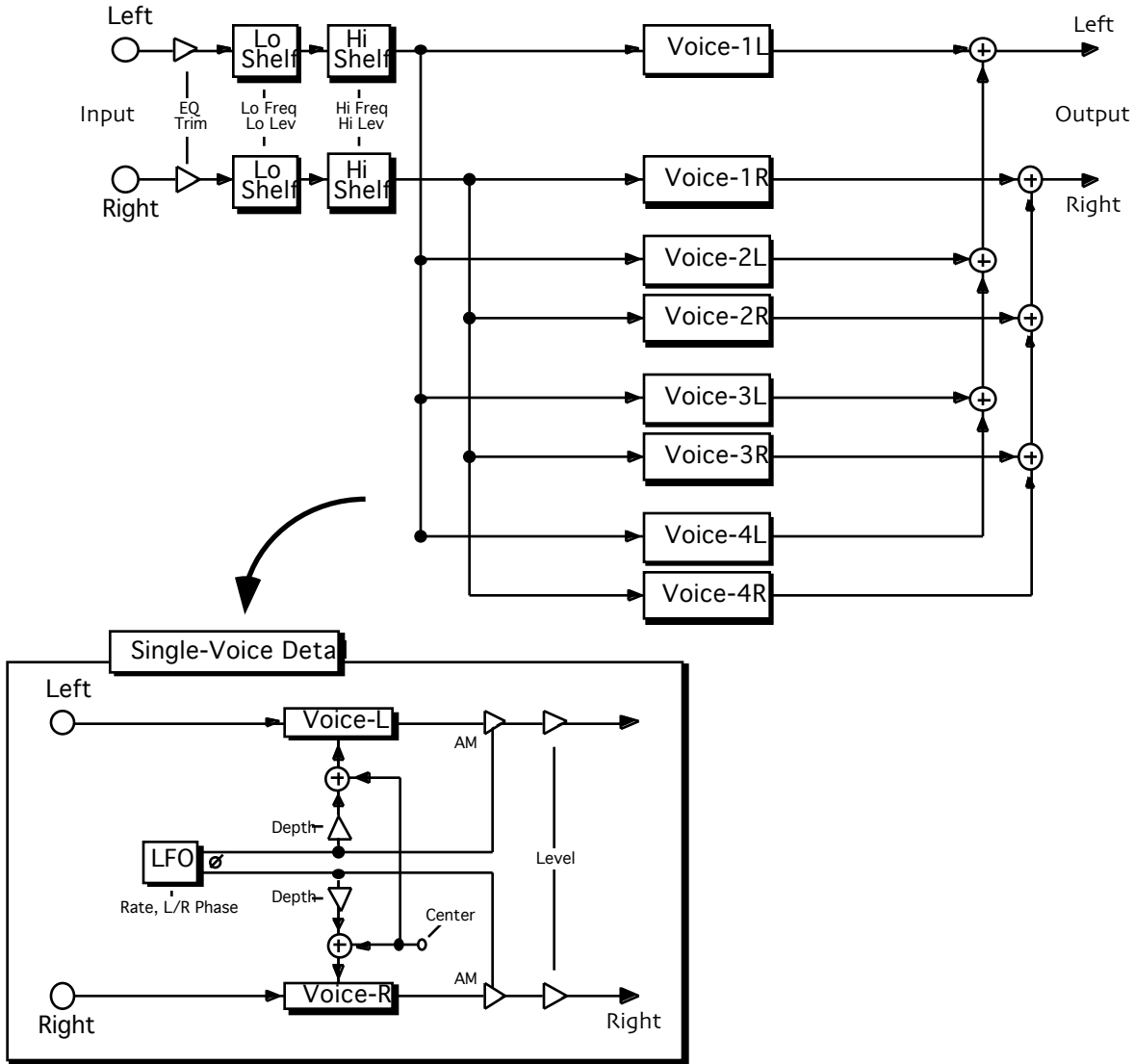
Description: An eight-voice stereo chorus. The voices are arranged as four stereo pairs, and each pair is modulated by its own LFO. The left-to-right LFO phase offsets can be adjusted to obtain wide stereo effects.

Notes: In addition to the chorus effect, amplitude modulation (tremolo) can be applied to each voice.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Master Rate	100%	0%	100%	
Master Depth	100%	0%	100%	
(Multi-Chorus parameters con't.)				
Parameter Name	**Ref Value**	**Min**	**Max**	**Attributes**

Master Center	100%	0%	100%	
Master L/R Phase	100%	0%	100%	
Master AM	100%	0%	100%	
Master Level	100%	0%	100%	
Voice1 Rate	0.00Hz	0.00Hz	1.760kHz	
Voice2 Rate	0.00Hz	0.00Hz	1.760kHz	
Voice3 Rate	0.00Hz	0.00Hz	1.760kHz	
Voice4 Rate	0.00Hz	0.00Hz	1.760kHz	
Voice1 Depth	0.0ms	0.0ms	500.0ms	
Voice2 Depth	0.0ms	0.0ms	500.0ms	
Voice3 Depth	0.0ms	0.0ms	500.0ms	
Voice4 Depth	0.0ms	0.0ms	500.0ms	
Voice1 Center	0.0ms	0.0ms	500.0ms	
Voice2 Center	0.0ms	0.0ms	500.0ms	
Voice3 Center	0.0ms	0.0ms	500.0ms	
Voice4 Center	0.0ms	0.0ms	500.0ms	
Voice1 L/R Phase	+0deg	-180deg	+180deg	B
Voice2 L/R Phase	+0deg	-180deg	+180deg	B
Voice3 L/R Phase	+0deg	-180deg	+180deg	B
Voice4 L/R Phase	+0deg	-180deg	+180deg	B
Voice1 AM	0%	0%	100%	
Voice2 AM	0%	0%	100%	
Voice3 AM	0%	0%	100%	
Voice4 AM	0%	0%	100%	
Voice1 Level	+0.0dB	-99.0dB	+0.0dB	
Voice2 Level	+0.0dB	-99.0dB	+0.0dB	
Voice3 Level	+0.0dB	-99.0dB	+0.0dB	
Voice4 Level	+0.0dB	-99.0dB	+0.0dB	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

27 Flanger
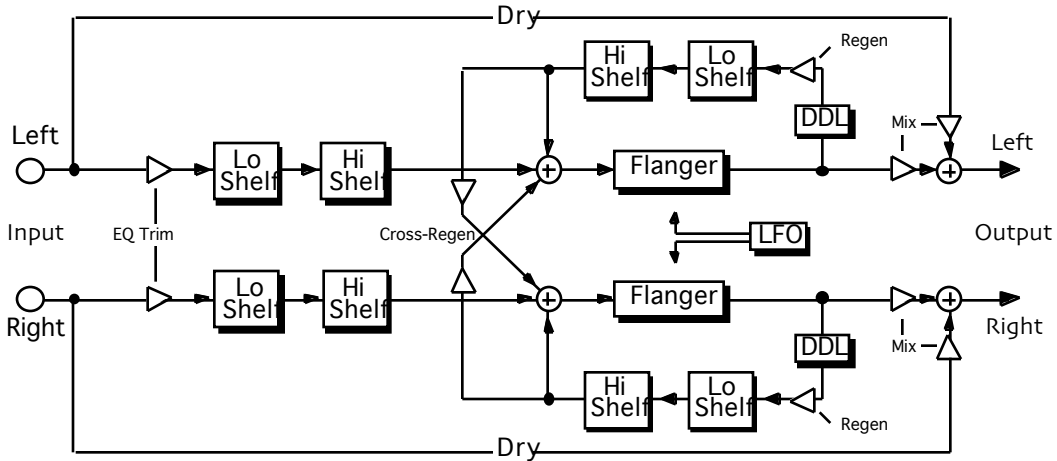
Description: A stereo flanger driven by a flexible stereo LFO. The LFO features a variety of selectable waveshapes (described at the beginning of this chapter), modulation rate from the sub-audio through the audio range, left-to-right phase offset, and a randomization function.

Notes: When LFO Shape is Samp/Hold, the LFO S/H Ratio param appears in the list. The two fields of this param control the long-term variation and repetition period, respectively, of the sample-and-hold waveform. When LFO Shape is Pulse, the LFO Pulse Width param appears in the list. This param controls the duty cycle of the pulse waveform. The LFO L/R Phase sets the phase offset between the left LFO and the right LFO (increasing this param can produce a stereo signal from a mono source). LFO Rand Amount controls the amount of waveform randomization. When the param is set to 100%, the waveshape is purely random, regardless of the setting of LFO Shape. LFO Rand Rate controls the rate of the randomizer (the effect of this param can be heard only when LFO Rand Amount is nonzero). The Flanger also features low and high shelving EQ, modulatable delays, and filtered regeneration and cross-regeneration. The algo can be tapped after the flanger or after the regen delay (the latter setting allows the wet signal to be delayed with respect to the dry).

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Notch Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Depth	0.0ms	0.0ms	100ms	
Center	0.0ms	0.0ms	100ms	
Delay Smoothing	0ms	0ms	100.0sec	
LFO Rate	0.00Hz	0.00Hz	20.000kHz	H, T
LFO Shape	Sine	Sine	Full-Neg	
LFO Pulse Width	50%	0%	100%	
LFO S/H Ratio	[500]:1	[1]:1	[1000]:1	
LFO S/H Ratio	1 [500]	1 [1]	1 [1000]	
LFO L/R Phase	+0deg	-180deg	+180deg	B
LFO Rand Amount	0%	0%	100%	
LFO Rand Rate	0.00Hz	0.00Hz	20.000kHz	H, T
Regen	+0%	-200%	+200%	B
(Flanger parameters con't.)				
Parameter Name	Ref Value	Min	Max	Attributes
Cross-Regen	+0deg	-180deg	+180deg	B

Regen Delay	0.0ms	0.0ms	1265ms	T
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	
Output Tap	Flanger	Flanger	DDL	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

28   Phaser
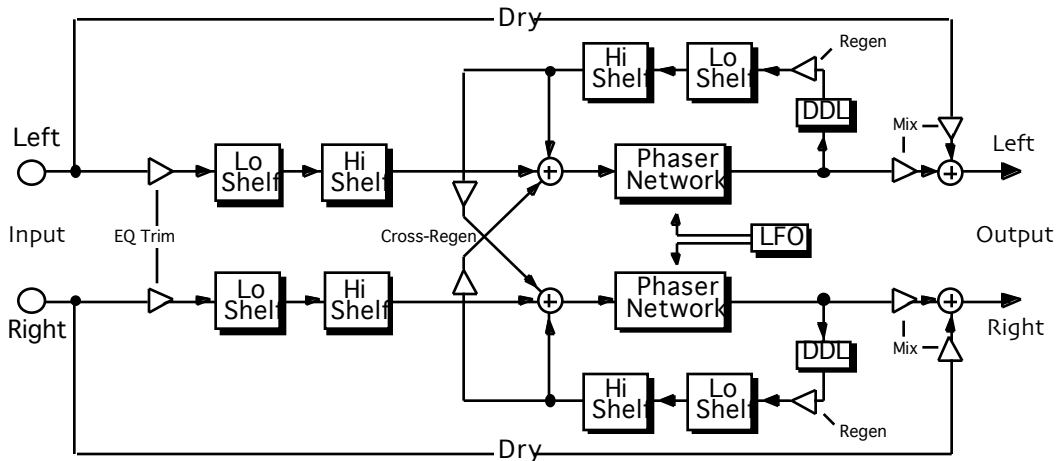
Description: A stereo phaser driven by a flexible stereo LFO (see Flanger for LFO description). Features low and high shelving EQ, modulatable delays, and filtered regeneration and cross-regeneration.

Notes: Add some regen, set a very short delay, then cut high and low regen shelves to get plucked-string and drum-like effects (try the LFO Pulse shape with a touch of randomization). The algo can be tapped after the phaser or after the regen delay (the latter setting allows the wet signal to be delayed with respect to the dry).

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Notch Mix	Full Dry	Full Wet	Full Wet	B
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Depth	0.00%	0.00%	100%	
Center	0.00Hz	0.00Hz	20.000kHz	H, T
Stages	1	1	12	
Delay Smoothing	0ms	0ms	100.0sec	
(Phaser parameters con't.)				
Parameter Name	Ref Value	Min	Max	Attributes
LFO Rate	0.00Hz	0.00Hz	1.760kHz	T
LFO Shape	Sine	Sine	Full-Neg	
LFO Pulse Width	50%	0%	100%	
LFO S/H Ratio	[500]:1	[1]:1	[1000]:1	
LFO S/H Ratio	1 [500]	1 [1]	1 [1000]	
LFO L/R Phase	+0deg	-180deg	+180deg	B

LFO Rand Amount	0%	0%	100%	
LFO Rand Rate	0.00Hz	0.00Hz	20.000kHz	H, T
Regen	+0%	-200%	+200%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Regen Delay	0.0ms	0.0ms	1365ms	T
Regen LoCut Fc	100Hz	1Hz	20.000kHz	H, L
Regen LoCut Gain	+0.0dB	-99.0dB	+0.0dB	
Regen HiCut Fc	10.000kHz	1Hz	20.000kHz	H, L
Regen HiCut Gain	+0.0dB	-99.0dB	+0.0dB	
Output Tap	Phaser	Phaser	DDL	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

ENSONIQ DP/Pro Reference Manual
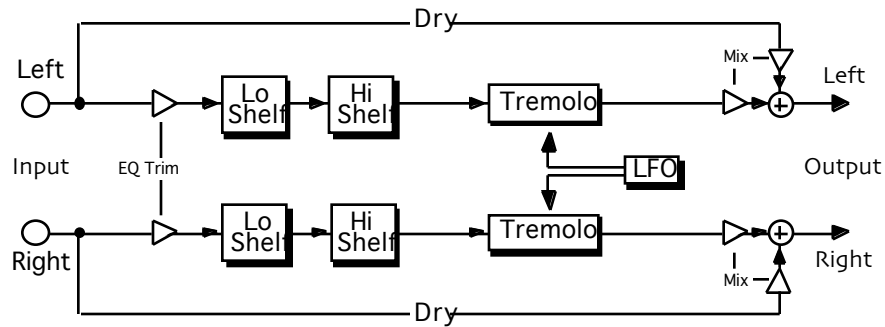
29   Tremolo

Description: A stereo tremolo. Increasing the rate turns the tremolo into a ring modulator. Features low and high shelving EQ.

Notes: (See Flanger for LFO notes.)

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Depth	0%	0%	100%	
LFO Rate	0.00Hz	0.00Hz	20.000kHz	H, T
LFO Shape	Sine	Sine	Full-Neg	
LFO Pulse Width	50%	0%	100%	
LFO S/H Ratio	[500]:1	[1]:1	[1000]:1	
LFO S/H Ratio	1 [500]	1 [1]	1 [1000]	
LFO L/R Phase	+0deg	-180deg	+180deg	B
LFO Rand Amount	0%	0%	100%	
LFO Rand Rate	0.00Hz	0.00Hz	20.000kHz	H, T

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

30   Panner
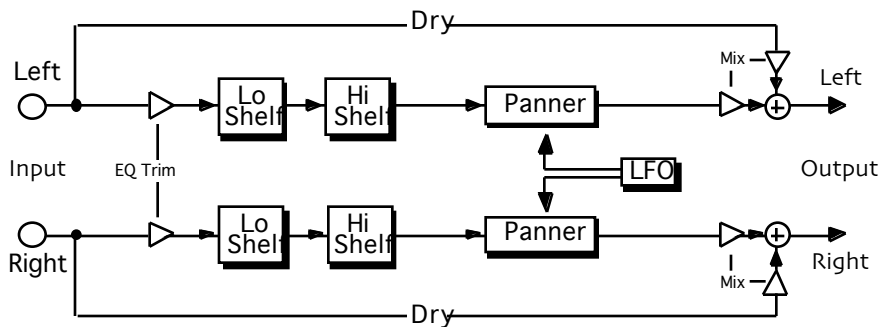
Description: A stereo panner driven by a flexible stereo LFO. Features low and high shelving EQ.

Notes: (See Flanger for LFO notes.) For mono sources, set LFO L/R Phase to a non-zero value (the greater the value, the wider the pan). For stereo sources, a zero value for this param results in left and right channels being panned to opposite sides, while a value of 180 degrees results in left and right channels being panned to the same side.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
EQ Trim	+0.0dB	-99.0dB	+0.0dB	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Auto-pan Depth	0%	0%	100%	
LFO Rate	0.00Hz	0.00Hz	20.000kHz	H, T
LFO Shape	Sine	Sine	Full-Neg	
LFO Pulse Width	50%	0%	100%	
LFO S/H Ratio	[500]:1	[1]:1	[1000]:1	
LFO S/H Ratio	1 [500]	1 [1]	1 [1000]	
LFO L/R Phase	+0deg	-180deg	+180deg	B
LFO Rand Amount	0%	0%	100%	
LFO Rand Rate	0.00Hz	0.00Hz	20.000kHz	H, T

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

31   Chatter Box
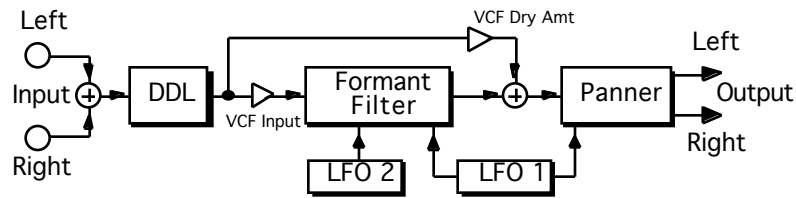
Description: A time-varying filter that imposes vocal formants onto the source. The filter morphs among four selected vowel shapes, driven by a polyrhythmic combination of two LFOs, the first of which is also tied to an auto-panner that operates on the vocalized signal.

Notes: Feeding the filter is a regenerated delay that can be used to create talking-echo effects.

I/O Characteristics: Mono-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
VCF Input	0.0dB	Off	0.0dB	
VCF Dry Amt	Off	Off	0.0dB	
Shape 1	'A'	'A'	'Z'	
Shape 2	'E'	'A'	'Z'	
Shape 3	'I'	'A'	'Z'	
Shape 4	'O'	'A'	'Z'	
Formant Warp	0 semi	-12 semi	+12 semi	B
Auto-pan Depth	0%	0%	100%	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
LFO 2 Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO 2 Shape	Sine	Triangle	4-Step	
Dly1 Time	0ms	0ms	630ms	T
Dly1 Level	0.0dB	Off	+12.0dB	
Dly1 Regen	0%	-99%	+99%	B
Dly1 Damping	20.0kHz	100Hz	21.2kHz	H
Dly2 Time	0ms	0ms	630ms	T
Dly2 Level	0.0dB	Off	+12.0dB	
Dly2 Regen	0%	-99%	+99%	B
Dly2 Damping	20.0kHz	100Hz	21.2kHz	H

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

32   Rotary Speaker
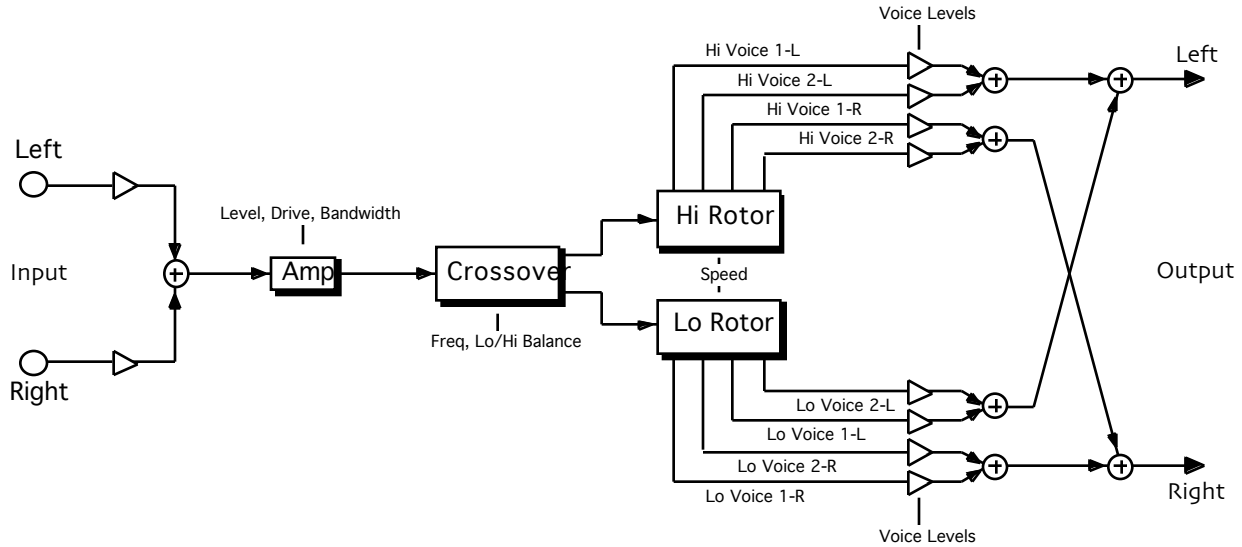
Description: A 12-dB/octave crossover drives low and high rotors. A toggle switch lets you change speeds on the fly, at a selected acceleration determined by the inertia setting.

Notes: Crank up the drive control for a distorted sound (set the level and bandwidth to tame those harmonics). The FM and AM controls set the amount of Doppler and tremolo to your liking, while two stereo voices per rotor simulate microphone placement. This algo doubles as a two-speed, four-voice ring modulator (set FM amounts to zero, AM amounts to 100%, and set slow and fast speeds to somewhere in the audio range).

I/O Characteristics: Mono-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Drive	+0.0dB	-99.0dB	+48.0dB	
Level	+0.0dB	-99.0dB	+0.0dB	
Bandwidth	20.000kHz	15Hz	20.000kHz	H, L
Speed	Slow	Slow	Fast	
Lo/Hi Bal	50% Hi	100% Lo	100% Hi	
Lo Effect	100% Rotor	100% LPF	100% Rotor	
Hi Effect	100% Rotor	100% HPF	100% Rotor	
Lo Width	+0deg	-180deg	+180deg	B
Hi Width	+0deg	-180deg	+180deg	B
Crossover Fc	800Hz	15Hz	Out	H, L
Delay Smoothing	250ms	0ms	100.0sec	
Lo Inertia	2.0sec	0ms	100.0sec	
Lo Slow	1.00Hz	0.00Hz	3.520kHz	
Lo Fast	10.0Hz	0.00Hz	3.520kHz	
Lo FM Min	10%	0.000%	100%	
Lo FM Max	10%	0.000%	100%	
Lo AM Min	50%	0%	100%	
Lo AM Max	50%	0%	100%	
Lo V1 Time	0ms	0ms	100ms	
Lo V1 Level	+0%	-100%	+100%	B
Lo V2 Time	0ms	0ms	100ms	
Lo V2 Level	+0%	-100%	+100%	B
(Rotary Speaker parameters con't.)				
Parameter Name	Ref Value	Min	Max	Attributes
Hi Inertia	2.0sec	0ms	100.0sec	
Hi Slow	1.00Hz	0.00Hz	3.520kHz	

Hi Fast	10.0Hz	0.00Hz	3.520kHz	
Hi FM Min	10%	0.000%	100%	
Hi FM Max	10%	0.000%	100%	
Hi AM Min	50%	0%	100%	
Hi AM Max	50%	0%	100%	
Hi V1 Time	0ms	0ms	100ms	
Hi V1 Level	+0%	-100%	+100%	B
Hi V2 Time	0ms	0ms	100ms	
Hi V2 Level	+0%	-100%	+100%	B

B=parameter has bi-polar range   G=maximum gain limited by Set Max Gain System/MIDI parameter
H=high-frequency limit determined by system sample rate   M=parameter has supplemental metered display
L=lowest frequency limited by Set Min Freq System/MIDI parameter   T=parameter can be synchronized to system clock or MIDI clocks

33   Tunable Speaker
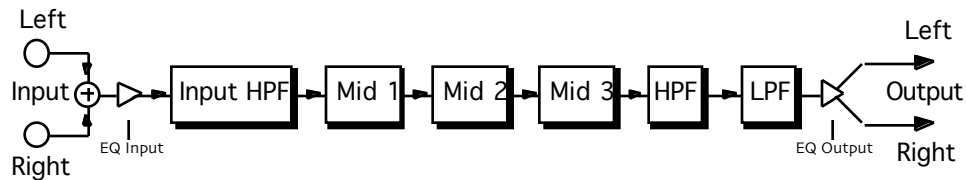
Description: A speaker simulation with tunable resonances. Sliding lowpass and highpass filters control the bandwidth.

Notes: Process music and speech to sound like it's coming from a radio, television, or telephone, or emulate the sounds of different speaker cabinets.

I/O Characteristics: Mono-in, mono-out.

Parameter Name	Ref Value	Min	Max	Attributes
Pre HP Fc	10Hz	10Hz	1.50kHz	L
EQ Input	0.0dB	Off	+24dB	G
HPF Cutoff	100Hz	10Hz	20.0kHz	H, L
Mid 1 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 1 BW	1.0	1.0	40.0	
Mid 1 Gain	0.0dB	Off	+24dB	G
Mid 2 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 2 BW	1.0	1.0	40.0	
Mid 2 Gain	0.0dB	Off	+24dB	G
Mid 3 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 3 BW	1.0	1.0	40.0	
Mid 3 Gain	0.0dB	Off	+24dB	G
LPF Cutoff	10.0kHz	10Hz	20.0kHz	H, L
EQ Output	0.0dB	Off	+24dB	G

B=parameter has bi-polar range   G=maximum gain limited by Set Max Gain System/MIDI parameter
H=high-frequency limit determined by system sample rate   M=parameter has supplemental metered display
L=lowest frequency limited by Set Min Freq System/MIDI parameter   T=parameter can be synchronized to system clock or MIDI clocks

34   Parametric EQ
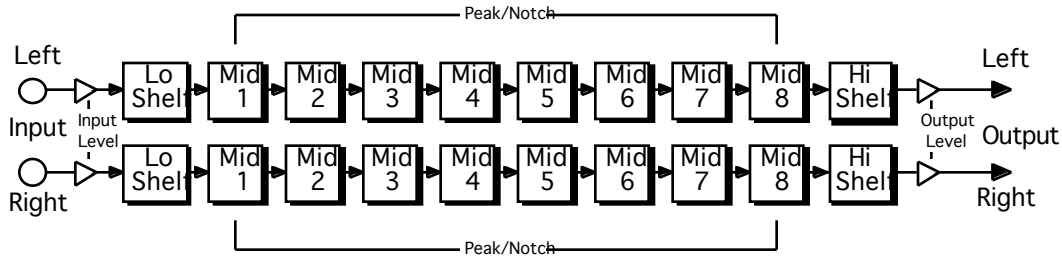
Description: Simultaneous low shelving, high shelving, and eight peak/notch filters.

Notes: Peak/notch bandwidth is selectable as the frequency span between the -3 dB points or as that between the half-gain (in dB) points. The former setting has a gentler feel; the latter setting yields symmetric boost/cut curves.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
EQ Input	+0.0dB	-99.0dB	+48.0dB	G
EQ Output	+0.0dB	-99.0dB	+48.0dB	G
BW Def	3-dB Width	3-dB Width	Half-Gain Width	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 1 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 1 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 1 BW	0.10oct	0.00oct	4.00oct	
Mid 2 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 2 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 2 BW	0.10oct	0.00oct	4.00oct	
Mid 3 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 3 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 3 BW	0.10oct	0.00oct	4.00oct	
Mid 4 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 4 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 4 BW	0.10oct	0.00oct	4.00oct	
Mid 5 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 5 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 5 BW	0.10oct	0.00oct	4.00oct	
Mid 6 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 6 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 6 BW	0.10oct	0.00oct	4.00oct	
Mid 7 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 7 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 7 BW	0.10oct	0.00oct	4.00oct	
Mid 8 Fc	1.000kHz	1Hz	20.000kHz	H, L
Mid 8 Gain	+0.0dB	-99.0dB	+48.0dB	G
Mid 8 BW	0.10oct	0.00oct	4.00oct	
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

35   Octave EQ
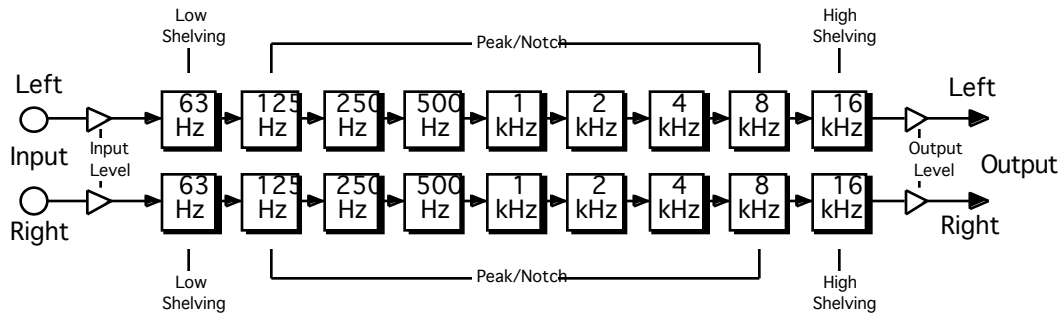
Description: A classic octave-band equalizer, but with the lowest and highest bands implemented as adjustable shelves. Low-noise design.

Notes: Peak/notch bandwidth is selectable as in the Parametric EQ.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
EQ Input	+0.0dB	-99.0dB	+48.0dB	G
EQ Output	+0.0dB	-99.0dB	+48.0dB	G
BW Def	3-dB Width	3-dB Width	Half-Gain Width	
LoShelf Fc	100Hz	1Hz	20.000kHz	H, L
LoShelf Gain	+0.0dB	-99.0dB	+48.0dB	G
125Hz Gain	+0.0dB	-99.0dB	+48.0dB	G
250Hz Gain	+0.0dB	-99.0dB	+48.0dB	G
500Hz Gain	+0.0dB	-99.0dB	+48.0dB	G
1.0kHz Gain	+0.0dB	-99.0dB	+48.0dB	G
2.0kHz Gain	+0.0dB	-99.0dB	+48.0dB	G
4.0kHz Gain	+0.0dB	-99.0dB	+48.0dB	G
8.0kHz Gain	+0.0dB	-99.0dB	+48.0dB	G
HiShelf Fc	10.000kHz	1Hz	20.000kHz	H, L
HiShelf Gain	+0.0dB	-99.0dB	+48.0dB	G

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

36   Delay+Chorus

Description: A four-tap modulatable stereo delay combined with a stereo chorus.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Delay Mix	100% Delay	100% Dry	100% Delay	
L-Tap1 Time	0.0ms	0.0ms	1365ms	T
L-Tap1 Level	+0%	-100%	+100%	B
L-Tap1 Pan	+0%	-100%	+100%	B
L-Tap1 Regen	+0%	-200%	+200%	B
L-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
R-Tap1 Time	0.0ms	0.0ms	1365ms	T
R-Tap1 Level	+0%	-100%	+100%	B
R-Tap1 Pan	+0%	-100%	+100%	B
R-Tap1 Regen	+0%	-200%	+200%	B
R-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
L-Tap2 Time	0.0ms	0.0ms	1365ms	T
L-Tap2 Level	+0%	-100%	+100%	B
L-Tap2 Pan	+0%	-100%	+100%	B
R-Tap2 Time	0.0ms	0.0ms	1365ms	T
R-Tap2 Level	+0%	-100%	+100%	B
R-Tap2 Pan	+0%	-100%	+100%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Delay Smoothing	0ms	0ms	100.0sec	
Effect Mix	100% Chorus	100% Delay	100% Chorus	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
LFO L/R Phase	0deg	-180deg	+180deg	B
Depth	0.0ms	0.0ms	25.0ms	
Center	0.0ms	0.0ms	50.0ms	
Spread	---M---	L--|--R	R--|--L	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

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37   Delay+Flanger

Description: A four-tap modulatable stereo delay combined with a stereo flanger.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Delay Mix	100% Delay	100% Dry	100% Delay	
L-Tap1 Time	0.0ms	0.0ms	1365ms	T
L-Tap1 Level	+0%	-100%	+100%	B
L-Tap1 Pan	+0%	-100%	+100%	B
L-Tap1 Regen	+0%	-200%	+200%	B
L-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
R-Tap1 Time	0.0ms	0.0ms	1365ms	T
R-Tap1 Level	+0%	-100%	+100%	B
R-Tap1 Pan	+0%	-100%	+100%	B
R-Tap1 Regen	+0%	-200%	+200%	B
R-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
L-Tap2 Time	0.0ms	0.0ms	1365ms	T
L-Tap2 Level	+0%	-100%	+100%	B
L-Tap2 Pan	+0%	-100%	+100%	B
R-Tap2 Time	0.0ms	0.0ms	1365ms	T
R-Tap2 Level	+0%	-100%	+100%	B
R-Tap2 Pan	+0%	-100%	+100%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Delay Smoothing	0ms	0ms	100.0sec	
Effect Mix	100% Flanger	100% Delay	100% Flanger	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
LFO L/R Phase	0deg	-180deg	+180deg	B
Depth	0.0ms	0.0ms	25.0ms	
Center	0.0ms	0.0ms	50.0ms	
Notch Depth	0%	0%	100%	
Regen	0%	-99%	+99%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

38   Delay+Phaser

Description: A four-tap modulatable stereo delay combined with a stereo phaser.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Delay Mix	100% Delay	100% Dry	100% Delay	
L-Tap1 Time	0.0ms	0.0ms	1365ms	T
L-Tap1 Level	+0%	-100%	+100%	B
L-Tap1 Pan	+0%	-100%	+100%	B
L-Tap1 Regen	+0%	-200%	+200%	B
L-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
R-Tap1 Time	0.0ms	0.0ms	1365ms	T
R-Tap1 Level	+0%	-100%	+100%	B
R-Tap1 Pan	+0%	-100%	+100%	B
R-Tap1 Regen	+0%	-200%	+200%	B
R-Tap1 Damping	20.000kHz	1Hz	20.000kHz	H, L
L-Tap2 Time	0.0ms	0.0ms	1365ms	T
L-Tap2 Level	+0%	-100%	+100%	B
L-Tap2 Pan	+0%	-100%	+100%	B
R-Tap2 Time	0.0ms	0.0ms	1365ms	T
R-Tap2 Level	+0%	-100%	+100%	B
R-Tap2 Pan	+0%	-100%	+100%	B
Cross-Regen	+0deg	-180deg	+180deg	B
Delay Smoothing	0ms	0ms	100.0sec	
Effect Mix	100% Phaser	100% Delay	100% Phaser	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
Depth	0	0	100	
Center	0	0	100	
Notch Depth	0%	0%	100%	
Regen	0%	-99%	+99%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

39 **Distortion**+**Chorus**

Description: Stereo distortion combined with a stereo chorus.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Dist LPF Fc	2.00kHz	10Hz	20.0kHz	H, L
Dist Offset	0%	-99%	+99%	B
Dist Gain	0.0dB	Off	+48dB	
Dist Curve	Soft	Soft	Buzz	
Dist Volume	0dB	Off	0dB	
Post VCF Fc	2.00kHz	10Hz	7.10kHz	L
Post VCF Q	1.0	1.0	40.0	
Dist Dry Lev	Off	Off	0.0dB	
EQ Input	0.0dB	Off	+24dB	G
LoShelf Fc	100Hz	10Hz	20.0kHz	H, L
LoShelf Gain	0.0dB	Off	+24dB	G
Mid 1 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 1 BW	1.0	1.0	40.0	
Mid 1 Gain	0.0dB	Off	+24dB	G
Mid 2 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 2 BW	1.0	1.0	40.0	
Mid 2 Gain	0.0dB	Off	+24dB	G
HiShelf Fc	10.0kHz	10Hz	20.0kHz	H, L
HiShelf Gain	0.0dB	Off	+24dB	G
EQ Output	0.0dB	Off	+24dB	G
Effect Mix	100% Chorus	100% Dist	100% Chorus	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
LFO L/R Phase	0deg	-180deg	+180deg	B
Depth	0.0ms	0.0ms	25.0ms	
Center	0.0ms	0.0ms	50.0ms	
Spread	---M---	L--|--R	R--|--L	

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

40 Distortion+Flanger

Description: Stereo distortion combined with a stereo flanger.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Dist LPF Fc	2.00kHz	10Hz	20.0kHz	H, L
Dist Offset	0%	-99%	+99%	B
Dist Gain	0.0dB	Off	+48dB	
Dist Curve	Soft	Soft	Buzz	
Dist Volume	0dB	Off	0dB	
Post VCF Fc	2.00kHz	10Hz	7.10kHz	L
Post VCF Q	1.0	1.0	40.0	
Dist Dry Lev	Off	Off	0.0dB	
EQ Input	0.0dB	Off	+24dB	G
LoShelf Fc	100Hz	10Hz	20.0kHz	H, L
LoShelf Gain	0.0dB	Off	+24dB	G
Mid 1 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 1 BW	1.0	1.0	40.0	
Mid 1 Gain	0.0dB	Off	+24dB	G
Mid 2 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 2 BW	1.0	1.0	40.0	
Mid 2 Gain	0.0dB	Off	+24dB	G
HiShelf Fc	10.0kHz	10Hz	20.0kHz	H, L
HiShelf Gain	0.0dB	Off	+24dB	G
EQ Output	0.0dB	Off	+24dB	G
Effect Mix	100% Flanger	100% Dist	100% Flanger	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
LFO L/R Phase	0deg	-180deg	+180deg	B
Depth	0.0ms	0.0ms	25.0ms	
Center	0.0ms	0.0ms	50.0ms	
Notch Depth	0%	0%	100%	
Regen	0%	-99%	+99%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

41   Distortion+Phaser

Description: Stereo distortion combined with a stereo phaser.

I/O Characteristics: Stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes
Dist LPF Fc	2.00kHz	10Hz	20.0kHz	H, L
Dist Offset	0%	-99%	+99%	B
Dist Gain	0.0dB	Off	+48dB	
Dist Curve	Soft	Soft	Buzz	
Dist Volume	0dB	Off	0dB	
Post VCF Fc	2.00kHz	10Hz	7.10kHz	L
Post VCF Q	1.0	1.0	40.0	
Dist Dry Lev	Off	Off	0.0dB	
EQ Input	0.0dB	Off	+24dB	G
LoShelf Fc	100Hz	10Hz	20.0kHz	H, L
LoShelf Gain	0.0dB	Off	+24dB	G
Mid 1 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 1 BW	1.0	1.0	40.0	
Mid 1 Gain	0.0dB	Off	+24dB	G
Mid 2 Fc	1.00kHz	10Hz	20.0kHz	H, L
Mid 2 BW	1.0	1.0	40.0	
Mid 2 Gain	0.0dB	Off	+24dB	G
HiShelf Fc	10.0kHz	10Hz	20.0kHz	H, L
HiShelf Gain	0.0dB	Off	+24dB	G
EQ Output	0.0dB	Off	+24dB	G
Effect Mix	100% Phaser	100% Dist	100% Phaser	
LFO Rate	0.0Hz	0.0Hz	20.0Hz	T
LFO Shape	Sine	Triangle	4-Step	
Depth	0	0	100	
Center	0	0	100	
Notch Depth	0%	0%	100%	
Regen	0%	-99%	+99%	B

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

42 Signal Generator
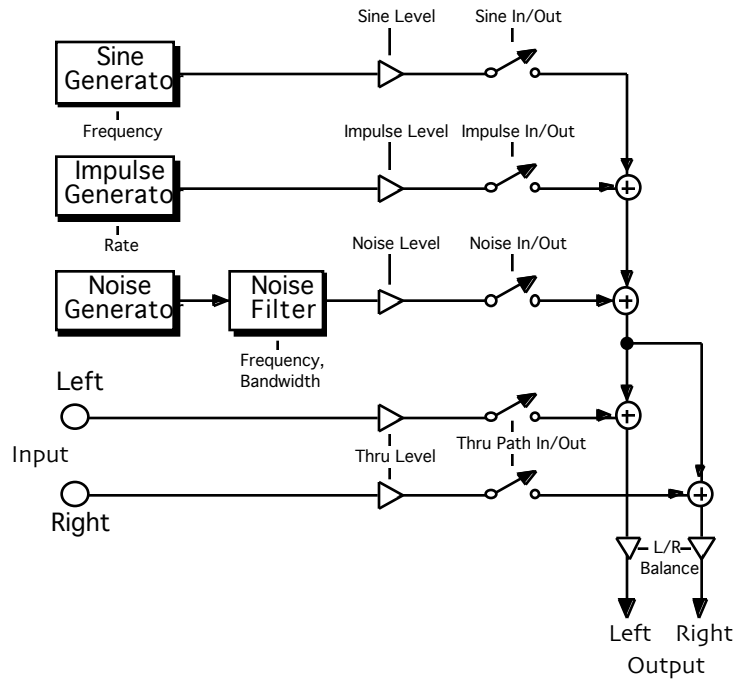
Description: Sine, impulse, and noise generators. The noise can be full-bandwidth or colored (a bandpass filter sets the center frequency and bandwidth).

Notes: Each generator can be switched clicklessly in or out.

I/O Characteristics: Generators are mono-out; thru path is stereo-in, stereo-out.

Parameter Name	Ref Value	Min	Max	Attributes	Comments
Sine Gen	Out	Out	In		
Impulse Gen	Out	Out	In		
Noise Gen	Out	Out	In		
Thru Path	Out	Out	In		
Sine Freq	1.000kHz	1Hz	20.000kHz	H	
Sine Level	+0.0dB	-99.0dB	+0.0dB		
Impulse Rate	0.00Hz	0.00Hz	20.000kHz	H	
Impulse Level	+0.0dB	-99.0dB	+0.0dB		
Noise Filter	1.000kHz	1Hz	20.000kHz	H,	
Noise BW	Full	0.00oct	Full		
Noise Level	+0.0dB	-99.0dB	+0.0dB		
Thru Level	+0.0dB	-99.0dB	+0.0dB		
L/R Balance	Center	Full <L	Full >R		

B=parameter has bi-polar range
H=high-frequency limit determined by system sample rate
L=lowest frequency limited by Set Min Freq System/MIDI parameter

G=maximum gain limited by Set Max Gain System/MIDI parameter
M=parameter has supplemental metered display
T=parameter can be synchronized to system clock or MIDI clocks

7—Copying and Swapping Algorithms

Using the Copy/Swap Tools

The DP/Pro provides a set of utilities that allow you to use your favorite algorithm edits again and again, in different contexts. You can:

- swap algorithms and their settings between ESP-A and ESP-B.
- copy algorithms and their settings from ESP-A to ESP-B.
- copy algorithms and their settings from ESP-B to ESP-A.
- copy algorithms and their settings from either ESP in one effect to either ESP in another.

Each of these procedures is accomplished by performing a special procedure; in the case of moving an algorithm and its setting between effects, two procedures are required.

The Copy/Swap Display

All of the DP/Pro's copying and swapping procedures are accomplished from the same display, which is accessed by pressing the Routing button:

Press ENTER to:
Swap Algo A and Algo B
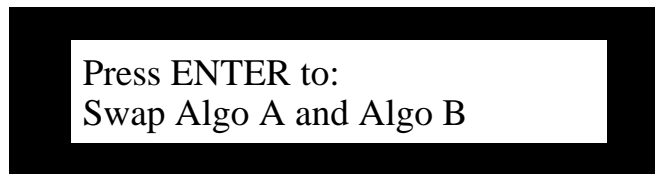
i

This shows the procedure to be performed

Performing a Copy/Swap Procedure

The copying and swapping commands are accessed by:

- pressing the Routing button repeatedly until the phrase "Press ENTER to:" appears on the top line of the DP/Pro's main display.
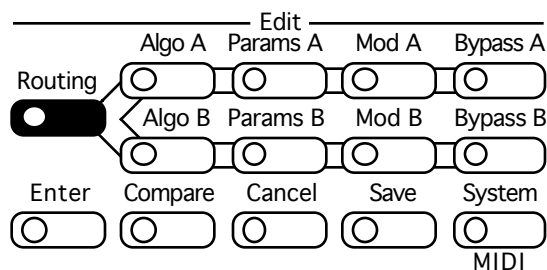
- turning the Value knob to select the procedure you'd like to perform.
- pressing the Enter button to execute the procedure.

Tip: You can undo a copy/swap procedure by pressing the Cancel button.

Moving Algorithms Between Effects Using AlgoMover

The process of moving algorithms between effects involves a few steps. To accomplish this, you:

- copy the algorithm into the AlgoMover memory buffer using the "Copy Algo A to AlgoMover" or "Copy Algo B to AlgoMover" procedure, as explained in "Performing a Copy/Swap Procedure" above.

- select the effect into which you'd like to copy the algorithm and its settings, and install the effect (see Chapter 3).

- Second, copy the algorithm from the AlgoMover buffer into the desired ESP using the "Copy AlgoMover to Algo A" or "Copy AlgoMover to Algo B" procedure, as explained in "Performing a Copy/Swap Procedure" above.

8—Mixing

The ESP-A and ESP-B Mixer Parameters

ESP-A and ESP-B each contain their own submixing facility, provided through a set of mixer parameters. These parameters provide control over each ESP's:

- input level.
- stereo balance for its input signal.
- overall output level
- balance between the ESP's output and the original input signal

When the Stereo: Feedback routing is selected, ESP-A also offers an additional mixer parameter that controls the amount of signal sent back into ESP-A from ESP-B.

Each ESP's mixer parameters apply to the ESP itself—therefore, as you change the ESP's algorithm or variation, its mixer parameter settings remain in place.
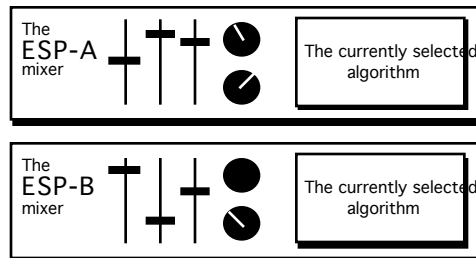
The Mixer Params Display

The ESP-A and ESP-B mixer parameters are accessed via the Params A and B buttons. Since other types of parameters are also accessed with these buttons, the top line of the Mixer Params display shows the kind of parameter being edited—the parameters themselves appear on the bottom line:

The ESP being edited   The type of parameter being edited

ESP-A: Mixer Params   ANA Inp
Level=+0.0dB

The selected mixer parameter
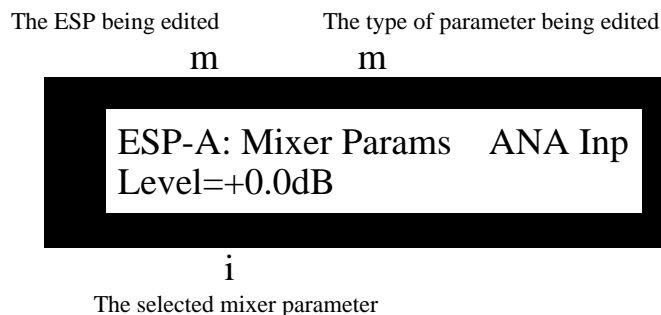
The DP/Pro's auxiliary display shows the number of the currently selected mixer parameter.

The "P" stands for "parameter"

P 1
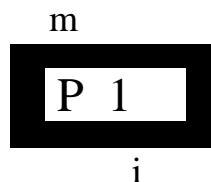
The number of the selected mixer parameter

Editing Mixer Parameter Settings

The mixer parameters are edited by:

• pressing the Params A or B button repeatedly until "Mixer Params" appears on the top line of the DP/Pro's main display.
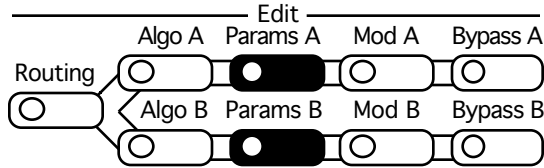
• pressing the Next or Previous Page buttons to select the parameter you'd like to edit.
• turning the Value knob to set the selected parameter to the desired value.

Tip: If you'd like to undo your most recent parameter edit, press the Cancel button. You can also double-click the Cancel button to quickly reset any algorithm parameter to its default setting.

Setting an ESP's Input Level

The DP/Pro allows you to individually control the volume of the audio being sent into each ESP. The adjustment is measured in decibels relative to the original signal level. Positive values increase the input level; negative values decrease it.

Mixer Parameter 1: ANA Inp Level

k
```
ESP-A: Mixer Params    ANA Inp
Level=+0.0dB
```

Values: -99.0dB through +6.0dB
Default: +0.0db

What this Parameter Does:

The ANA Inp Level parameter allows you to set the volume of analog audio being fed into each ESP.

Setting an ESP's Stereo Input Balance

The DP/Pro allows you to alter the stereo imaging of the audio being sent into each ESP by adjusting its left/right balance as it enters the ESP. The amount of panning shift is shown as a percentage of change to the original balance, with arrows showing the direction of the shift.

Mixer Parameter 2: ANA Inp Balance

k

ESP-A: Mixer Params   ANA Inp
Balance=Center

Values: Full <L through Full >R as percentages; Center
Default: Center

What this Parameter Does:

The ANA Inp Level parameter allows you to alter the stereo balance of analog audio being fed into each ESP.

Mixer parameters 3 and 4 are available only when a DI-Pro digital I/O board has been installed in the DP/Pro. See the DI-Pro User's Guide for information on these parameters.

Setting the Amount of Signal Fed Back to ESP-A from ESP-B

When the Stereo: Feedback routing is selected, ESP-A offers a mixer parameter for controlling how much of ESP-B's output will be fed back into ESP-A's input. The parameter values are deciBels of change to a unity-gain feed from the output of ESP-B into ESP-A.

Mixer Parameter 5: B>A Inp Level
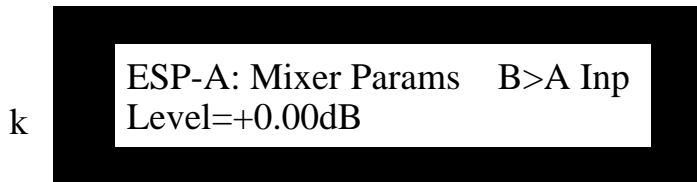
k

ESP-A: Mixer Params   B>A Inp
Level=+0.00dB

Values: -99.0dB through +6.0dB
Default: +0.0dB

What this Parameter Does:

The B>A Inp Level parameter adjusts the amount of signal being fed back from ESP-B to ESP-A when the Stereo: Feedback routing is selected.

Setting the Stereo Balance of Signal Fed Back to ESP-A from ESP-B

When the Stereo: Feedback routing is selected, ESP-A offers a mixer parameter for controlling the stereo imaging of the audio being sent from ESP-B's output back into ESP-A's input. The amount of panning shift is shown as a percentage of change to the original balance, with arrows showing the direction of the shift.

Mixer Parameter 6: B>A Inp Balance
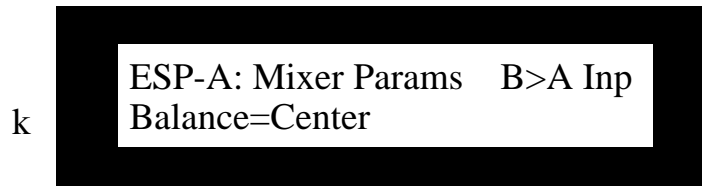
k
ESP-A: Mixer Params   B>A Inp
Balance=Center

Values: Full <L through Full >R as percentages; Center
Default: Center

What this Parameter Does:

The B>A Inp Level parameter allows you to alter the stereo balance of audio being fed back into ESP-A from ESP-B when the Stereo: Feedback routing is selected.

Setting an ESP's Output Level

The DP/Pro allows you to adjust the output of each ESP. This provides a means of creating an appropriate volume balance between ESP-A and ESP-B—it also allows you to set one component in the overall level of the effect being created or edited. The adjustment is measured in deciBels relative to the ESP's unaltered output level. Positive values increase the output level; negative values decrease it.

Mixer Parameter 7: AlgoA Out Level; AlgoB Out Level

k
ESP-A: Mixer Params   AlgoA
Out Level=+0.0dB
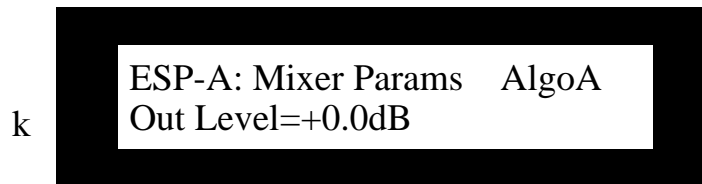
Values: -99.0dB through +6.0dB
Default: +0.0db

What this Parameter Does:

The AlgoA Out Level and AlgoB Out Level parameters allow you to alter the output volume of each ESP.

Setting an ESP's Wet/Dry Output Balance

The DP/Pro allows you to alter the balance between each ESP's output and the original signal being fed into the ESP—when the mix contains purely the ESP's output, the display shows "Full Wet"; when the mix contains only the original, pre-ESP audio; the display shows "Full Dry." All other wet/dry balances are shown as a percentage of "wetness."

Note: Some of the DP/Pro's algorithms contain a wet/dry mix of their own, provided as a means of fine-tuning the interaction between the signal and the algorithm's audio processing; this is particularly critical when the algorithm is level-sensitive. The Wet/Dry Output Balance mixer params take the result of that algorithm wet/dry mix and balance it against the original dry signal. The DP/Pro also provides a system-wide wet/dry mix setting (see Chapter 2).

Mixer Parameter 8:   AlgoA Out Mix; AlgoB Out Mix

k

ESP-A: Mixer Params   AlgoA
Out Mix=Full Wet

Values: Full Dry through Full Wet as percentages
Default: Full Wet

What this Parameter Does:

The AlgoA Out Mix and AlgoB Out Mix parameters allow you to adjust the balance between the output of each ESP and the audio being fed into the ESP.

9—Tweak Parameters

The Tweak Parameter Solution

While the number of parameters offered by the DP/Pro's algorithms makes the DP/Pro a powerful audio processing tool, there are some parameters that you'll find yourself reaching for time and time again. The DP/Pro allows you to designate these parameters as Tweak parameters that are never more than a few button presses away from your fingertips. In each DP/Pro effect, eight algorithm parameters in ESP-A and eight in ESP-B can be designated as Tweak parameters.

The process for using Tweak parameters has two parts: setting them up, and then accessing and adjusting them.

Designating Tweak Parameters

The first step in using Tweak parameters is to designate as Tweak parameters the algorithm parameters to which you want quick access. ESP-A and ESP-B each offer eight Tweak parameter slots. As each Tweak parameter slot is displayed, you can select the algorithm parameter you'd like to designate as the displayed Tweak parameter.

The Set Tweak Params Display

The ESP-A and ESP-B Set Tweak Params display is accessed via the Params A and B buttons. Since other types of parameters are also accessed by pressing these buttons, the top line of the Set Tweak Params display establishes the kind of parameters being edited, while the eight Tweak parameter slots appear on the bottom line:

The ESP being edited   The type of parameter being edited

ESP-A: Set Tweak Params
Param A1=Size

The Tweak parameter slot being set   The algorithm parameter selected for this Tweak parameter slot

ESP-A's Tweak parameters are "Param A1," "Param A2," and so on through "Param A8"; ESP-B's are "Param B1" through "Param B8."

The number of each Tweak parameter is reflected in the DP/Pro's auxiliary display:

The "P" stands for "parameter"

P 1

The number of the selected Tweak parameter

Setting Up a Tweak Parameter

An algorithm parameter is designated as a Tweak parameter by:

- pressing the Params A or B button repeatedly until "Set Tweak Params" appears on the top line of the DP/Pro's main display.
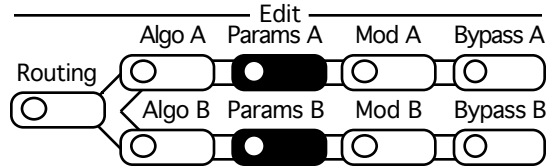
- pressing the Next or Previous Page buttons to select an unused Tweak parameter slot.
- turning the Value knob to select the algorithm parameter you'd like to assign to the displayed Tweak parameter slot.

Tip: You can double-click the Cancel button to quickly reset any Tweak parameter to its starting-point setting.

Accessing and Adjusting Tweak Parameters

The Tweak Display

The Tweak display displays the Tweak parameters for both of the currently installed effect's ESPs, as well as the DP/Pro's virtual Tweak knobs (see Chapter 10). When a Tweak parameter is selected, the top line of the Tweak display shows the selected Tweak parameter 's name, while the bottom line shows the algorithm parameter designated as the Tweak param, and its current value:
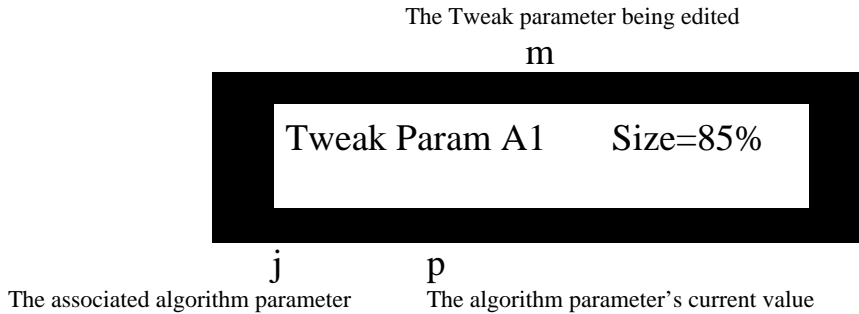
The Tweak parameter being edited

m

Tweak Param A1   Size=85%

j   p

The associated algorithm parameter   The algorithm parameter's current value

ESP-A's Tweak parameters are "Param A1," "Param A2," and so on through "Param A8"; ESP-B's are "Param B1" through "Param B8."

The number of each Tweak parameter is also shown in the DP/Pro's auxiliary display:

The "P" stands for "parameter"

m

P 1

i

The number of the selected Tweak parameter
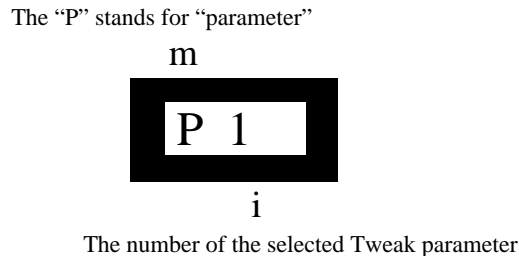
Tweaking a Tweak Parameter

An Tweak parameter's value is edited by:

- pressing the Tweak button.

```
           Effect
     Select      Find
     ⊂ ○ ⊃    ⊂ ○ ⊃
     Tweak       Tap
     ⊂ ● ⊃    ⊂ ○ ⊃
    Previous     Next
     ⊂ ○ ⊃    ⊂ ○ ⊃
        ◄ Page ►
```
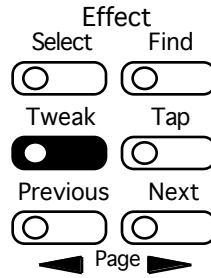
- • pressing the Next or Previous Page buttons until the desired Tweak parameter appears on the display.
- • turning the Value knob to adjust the parameter.

Tip: By pressing the Tweak button repeatedly, you can jump quickly to the Tweak parameters associated with ESP-A or ESP-B, and then use the Previous or Next Page buttons to select the specific Tweak parameter you want to edit.

Tip: When you've altered a parameter's value, you can press the Cancel button to undo your edit. You can also double-click the Cancel button to quickly set any parameter to its Tweak parametersdefault value.

10—Effect Modulation

Real-Time Effect Modulation

Every parameter of every algorithm (see Chapter 6) and every ESP mixer parameter (see Chapter 8) can be manipulated in real time, providing for exceptionally dynamic effects. There are numerous way to modulate parameters in real time:

- The DP/Pro contains two virtual Tweak knob controllers that allow real-time front-panel control of effects; the Tweak knobs can also transmit MIDI data from the DP/Pro for recording in—and eventual playback from—an external MIDI sequencer.
- The DP/Pro offers two special Mod LFOs that can automate a cyclical modulation of parameter values.
- The DP/Pro supports the use of a stereo foot switch—such as the ENSONIQ SW-10—that can be used as a parameter modulator.
- MIDI control data transmitted to the DP/Pro can alter parameter settings.

In any effect, ESP-A can support four separate real-time modulation tasks at a time, and ESP-B can support four of its own.

Each type of modulator has its own characteristics and offers its own modulation opportunities—these differences are discussed in "Getting to Know the DP/Pro Modulators" later in this chapter.

Overview of Setting Up Real-Time Modulation

There are two aspects to any effect modulation: the modulator, or *modulation source*, and the target parameter whose setting is to be modulated. The DP/Pro also provides the ability to modulate a parameter's setting in different ways. The process of setting up modulation, then, includes three basic tasks:

- First, choose and configure a modulation source.
- Second, choose the destination for the modulation—the parameter to be manipulated.
- Third, choose the method the manipulation will employ, and the limits you'd like to impose on the manipulation.

Each ESP offers four complete sets of modulation parameters, numbered 1 through 4. All of these parameters are accessed by pressing the appropriate Mod button for the ESP containing the parameter you want to modulate—either the Mod A button or the Mod B button.
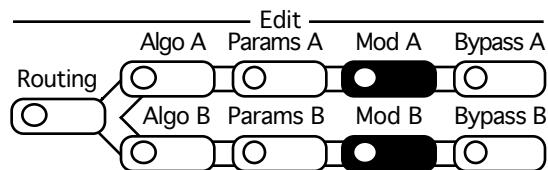
All of the modulation parameters are set by:

- pressing the Mod A or Mod B button.
- pressing the Next or Previous Page buttons until the parameter is displayed.
- using the Value knob to set the parameter as desired.

Tip: When you've altered a parameter's value, you can press the Cancel button to undo your edit. You can also double-click the Cancel button to quickly set a parameter to its default value.

The Modulation Displays

Each modulation task provides its own distinctive display. These displays share a critical element that helps you keep track of which of the selected ESP's four modulation setups you're programming: the number of the modulation setup, which always appears somewhere in the upper left portion of the display:

- When you're assigning and configuring the modulation source the Src number tells you which setup you're programming.
- When you're designating the destination parameter and choosing the modulation method, the Dest number tells you which setup you're programming.
- When you're setting up the modulation range, the Dest Range or Dest Mix numbers tell you which setup you're programming.

Tip: Repeated presses of the appropriate Mod button will cause the display to jump from the currently displayed modulation parameter to its counterpart in the next modulation setup. The displays will eventually return to where they started (after showing the Tweak-knob naming and Mod LFO displays).

The modulation parameters are numbered for easy reference. This number is shown in the DP/Pro's auxiliary display:

The "P" stands for "parameter"

m

P 1

i
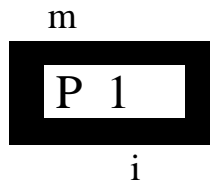
The number of the selected modulation parameter

Selecting a Modulator

Any of the 16 DP Controllers can be used as a modulation source.

Note: The DP Controllers are designated by setting the DP Cntlr1 through DP Cntlr16 System/MIDI parameters (see "Designating Real-Time Controllers" in Chapter 2 for details).

Mod A/B Parameters 1, 10, 19, 28: Src1, 2, 3, 4

m

Src1=DP Cntr1 (TwkKnob1)
Min=0   Max=127 Map=Sin
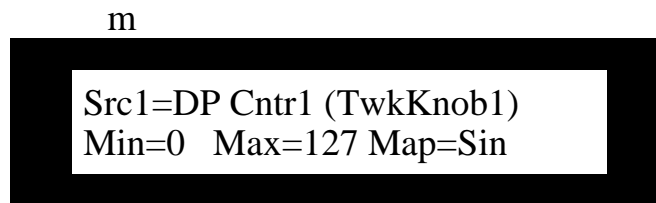
Values: DP Cntr1 through DP Cntr16 (the name of each controller is shown in parentheses)

What these Parameters Do:

The Src1, Src2, Src3 and Src4 parameters each allow you to designate a control mechanism for one of each ESP's four possible modulation setups.

Creating a Modulation Reception Window

The DP∕Pro allows you to limit each modulation setup's response to values received from its modulator. This is accomplished by creating a reception window. Received modulator values which fall outside of the window will be ignored.

Mod A/B Parameters 2, 11, 20, 29: Min (1), Min (2), Min (3), Min (4)

Mod A/B Parameters 3, 12, 21, 30: Max (1), Max (2), Max (3), Max (4)

```
Src1=DP Cntr1 (TwkKnob1)
Min=0   Max=127 Map=Sin
```
       i   i
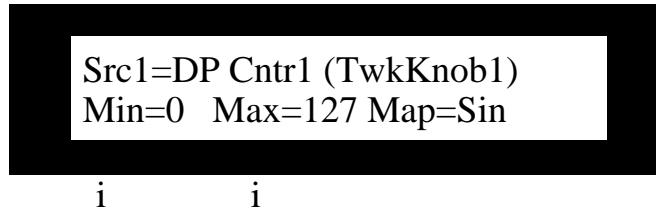
Values: Min (1-4): 0 through 127; Max (1-4): 0 through 127

What these Parameters Do:
The Min (1-4) parameters allow you to set the lowest value produced by the modulator to which each destination parameter will respond. The Max (1-4) parameters allow you to set the highest modulator value to be recognized.

Setting Up the Interpretation of Modulator Values
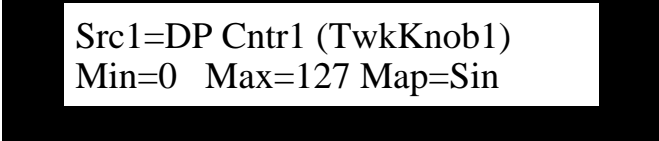
Each modulation setup can be programmed to respond to its received controller values according to one of the following response curves.

Log   Sin   Lin

Cos   Exp
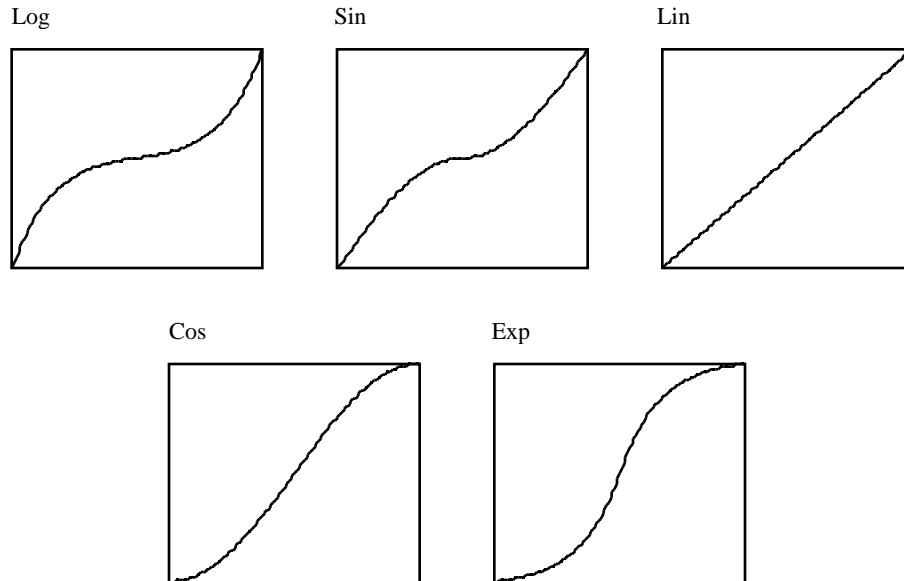
There are two versions provided for each curve: a version that uses the name shown above, and a version that's followed by a "+." The difference between the two versions is that the version that ends with a "+" applies the curve only above the point at which the destination parameter reaches its center value.

Mod A/B Parameters 4, 13, 22 31: Map (1), Map (2), Map (3), Map (4)

```
Src1=DP Cntr1 (TwkKnob1)
Min=0   Max=127 Map=Sin
```

i

Values: Log, Log+, Sine, Sine+, Lin, Lin+, Cos, Cos+, Exp, Exp+

What these Parameters Do:

The Map (1-4) parameters allow you to determine the manner in which received modulator values will be interpreted.

Choosing a Parameter to be Modulated

Mod A/B Parameters 5, 14, 23, 32: Dest1, Dest2, Dest3, Dest4

m

```
Dest1=AlgoA Out Mix
Method=Absolute
```

Values: All mixer parameters associated with the selected ESP; all parameters belonging to the ESP's installed algorithm

What these Parameters Do:

The Dest1, Dest2, Dest3 and Dest4 parameters allow you to select a mixer or algorithm parameter to be modulated for each of the four possible modulation setups associated with each ESP.

Choosing a Modulation Method

Modulation can be applied to a parameter in one of two ways:

•   Additive—The received modulation will offset the parameter's programmed value above or below its original setting.

•   Absolute—The parameter will be set to a value that corresponds directly to the value received from the modulator.

Note: When Method=Additive, a center modulation value of 64 will neither increase nor decrease the parameter's original setting.

Methods and Shared Destination Parameters

The DP/Pro allows you to modulate the same parameter with up to four modulation sources at once according to the following rules:

•   If more than one modulation setup targets the same destination parameter, only the additive method can be used.

•   If a modulation setup is using the absolute method for the modulation of a parameter, the parameter will not be available as a destination parameter for other modulation setups.

Mod A/B Parameters 6, 15, 24, 33: Method (1), Method (2), Method (3), Method (4)

Dest1=AlgoA Out Mix
Method=Absolute

i

Values: Additive; Absolute

What these Parameters Do:

The Method (1), Method (2), Method (3) and Method (4) parameters allow you to determine whether receive modulator values will offset or override the destination parameter's original setting.

Setting a Modulation Range

The amount of allowable modulation is set according to the modulation method determined by the Method parameter (described above):

- When the selected method is Additive, the maximum amount of offset to the destination parameter's setting is described as a percentage of change to the setting.
- When the selected method is Absolute, the actual minimum and maximum allowable values for the destination parameter are set individually.

Setting an Additive Modulation Range

Note: When Method=Absolute, the following parameters are not available.
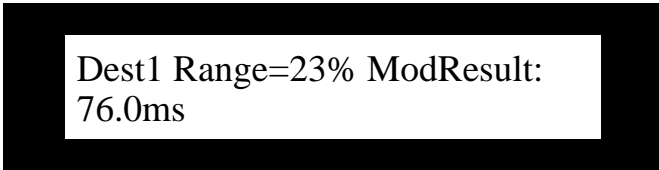
Mod A/B Parameters 9, 18, 27, 36: (Additive) Range (1), (Additive) Range (2), (Additive) Range (3), (Additive) Range (4)

The modulation setup being edited   The maximum amount of modulation

m   m

Dest1 Range=23% ModResult:
76.0ms

i

The ModResult is a read-only display of the destination parameter's current value

Values: -100% to 100%

What these Parameters Do:

The (Additive) Range (1), (Additive) Range (2), (Additive) Range (3) and (Additive) Range (4) parameters allow you to determine the maximum amount off offset that modulation will apply to the destination parameter's setting. When a positive percentage is selected, the destination parameter's value is increased with positive modulator values; with a negative percentage selected, positive modulator values decrease the destination parameter's setting.

Setting an Absolute Modulation Range

Note: When Method=Absolute, the following parameters are not available.

Mod A/B Parameters 7, 16, 25, 34: (Absolute) Min (1), (Absolute) Min (2), (Absolute) Min (3), (Absolute) Min (4)

Mod A/B Parameters 8, 17, 26, 33: (Absolute) Max (1), (Absolute) Max (2), (Absolute) Max (3), (Absolute) Max (4)

The modulation setup being edited   The minimum value that modulation can produce

Dest1 Min=0.00oct
    Max=0.65oct
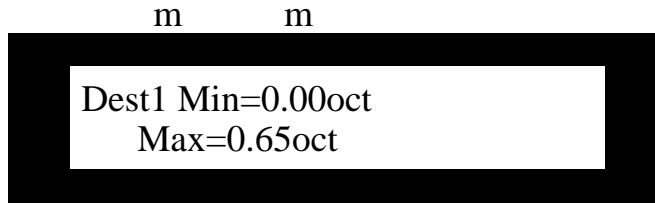
The maximum value that modulation can produce

Values: destination parameter's values

What these Parameters Do:

The (Absolute) Min (1), (Absolute) Min (2), (Absolute) Min (3), (Absolute) Min (4), (Absolute) Max (1), (Absolute) Max (2), (Absolute) Max (3), (Absolute) Max (4) parameters allow you to set the highest and lowest values to which the destination parameter can be set as a result of modulation.

Getting to Know the DP/Pro Modulators

Overview of the DP/Pro's Virtual Tweak Knobs

Each DP/Pro effect provides for the use of two virtual controllers that allow you to manipulate effects in real time from its front panel: Tweak Knob 1 and Tweak Knob 2. When either of these is active, turning the Value knob turns the active virtual tweak knob. Once activated, each tweak knob functions in the same way as any other modulator, and may be used for the modulation of any ESP mixer or algorithm parameter. The tweak knobs are programmed to be real-time controllers using the method described in "Selecting a Modulator" earlier in this chapter.

Tip: The ROM effects in the DP/Pro make extensive use of the tweak knobs.

Naming an Effect's Tweak Knobs

Since each effect contains two of these virtual controllers, you can assign them names to help keep track of the tasks you've programmed them to perform. The tweak knob names are programmed in the same manner as any other Mod A or Mod B parameter and saved as part of the effect. You can access the currently selected effect's tweak knob name parameters from ESP-A or ESP-B.

Mod A/B Parameters 37-49: Knob 1 Name

Mod A/B Parameters 50-62: Knob 2 Name

Knob1 Name=Bloom Fractal
Knob2 Name=Swirl Factor
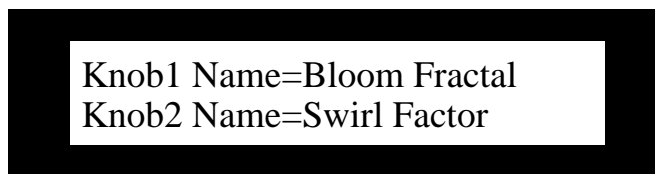
Values: characters, numbers, letter

What these Parameters Do:

The Knob 1 Name and Knob 2 Name parameters allow you to name the two virtual tweak knobs for the currently selected effect. Each name can use up to 13 characters, each of which must be selected and edited individually.

Activating a Tweak Knob

In order for a tweak knob to be used from the DP/Pro's front panel, it must be activated (see "MIDI and the Tweak Knobs" below to learn about using them via MIDI).

A tweak knob is activated by:

•   pressing the Tweak button.
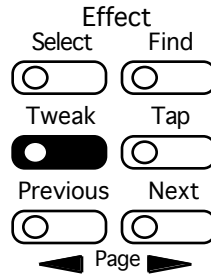
•   pressing the Next or Previous Page buttons until the desired tweak knob's page is displayed:

The active tweak knob   The active tweak knob's name

Knob1 Name: Bloom Fractal
Knob1 Mod Value=86

The amount of modulation the active knob is currently producing
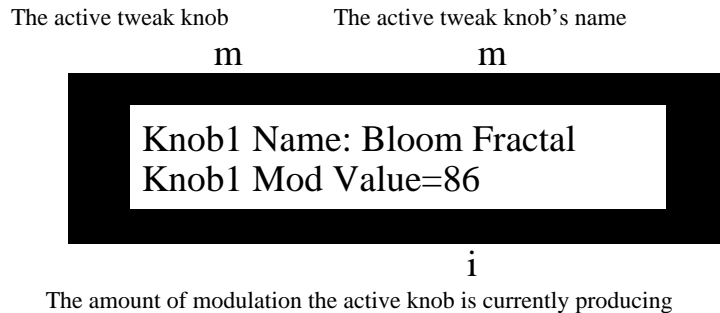
When the tweak knob's display is visible, it is activated, and the Value knob functions as the displayed tweak knob.

MIDI and the Tweak Knobs

When the System/MIDI Transmit Cntlr Msgs and Accept Cntlr Msgs parameters are set to "Yes," the Tweak knobs transmit and respond to MIDI. Whenever a tweak knob is activated, it will transmit values for the controller it's been assigned with the System/MIDI Twk 1 Cntlr or Twk 2 Cntlr parameter. This allows the recording of tweak knob moves into an external MIDI recording device. When the DP/Pro receives MIDI data for the selected controller, the tweak knob will respond, even when it's not activated for front-panel use. (See Chapter 2 for information on the above-mentioned System/MIDI parameters.)

Overview of the Mod LFOs

Many of the DP/Pro's algorithms contain LFOs. In addition, the DP/Pro provides two LFOs that are always available: the mod LFOs. Either of these LFOs can be assigned at any time as a real-time modulator for any ESP mixer or algorithm parameter using the method described in "Selecting a Modulator" earlier in this chapter. The parameters pertaining to LFO 1 and LFO 2 are selected and edited in the same manner as any other modulation parameter.

Setting the Mod LFO's Wave Shape

The mod LFOs can be set to any of the following eight wave shapes:

Sine   Triangle   Sawtooth   Asymm

Square   4-Step   8-Step   16-Step
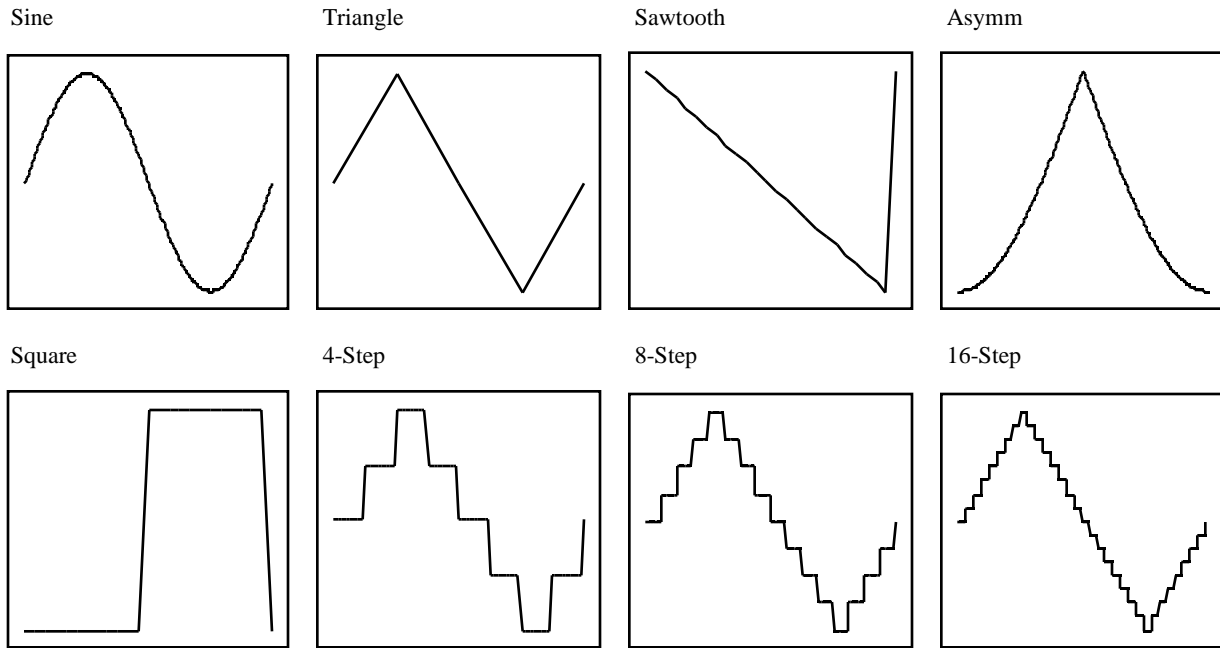
Mod A/B Parameter 63: LFO 1 Shape

Mod A/B Parameter 66: LFO 2 Shape

The mod LFO being edited   The currently selected low-frequency wave shape

m   m

```
LFO 1 Shape=Sine  Rate=1/2
Note Phase=45
```
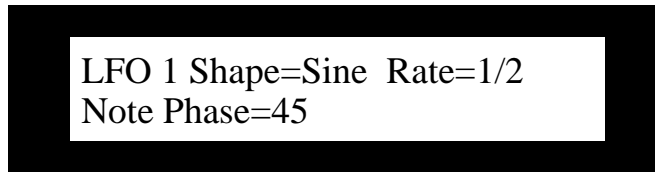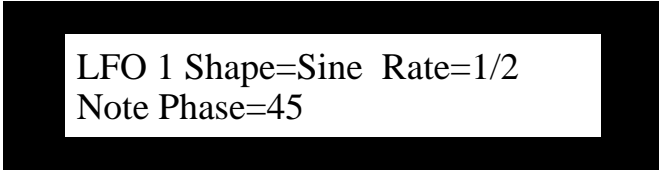
Values: Sine, Triangle, Sawtooth, Asymm, Square, 4-Step, 8-Step, 16-Step

What these Parameters Do:

The LFO 1 Shape and LFO 2 Shape parameters determine the type of low-frequency wave to be used as a modulator.

Setting a Mod LFO's Speed

The mod LFOs can be synchronized to the current system clock or MIDI clocks (see Chapter 2) by note value, or to a specific frequency, in hertz.

Mod A/B Parameter 64: (LFO 1) Rate

Mod A/B Parameter 67: (LFO 2) Rate

```
LFO 1 Shape=Sine  Rate=1/2
Note Phase=45
```

i

Values:	8 Beats	1/2 Note	1/8 Note	1/32Note
	7 Beats	1/2 Trip	1/8 Trip	1/32Trip
	6 Beats	Dot 1/4	Dot 1/16	0.1 through 0.9 Hz
	5 Beats	1/4 Note	1/16Note	1.0 through 4.5 Hz in .5 Hz increments
	4 Beats	1/4 Trip	1/16Trip	5.0 through 20 Hz in 1.0 Hz increments
	3 Beats	Dot 1/8	Dot 1/32	

What these Parameters Do:

The (LFO 1) Rate and (LFO 2) Rate parameters set the speed of low-frequency oscillation. Values that describe beats or fractions of beats synchronize the LFO to the system clock or MIDI clocks. Values expressed in Hz drive the LFO without synchronization.

Determining the Phase of Synchronized LFOs

When a mod LFO is synchronized to the current system clock or MIDI clocks (see "Setting a Mod LFO's Speed" above), you can set where in its cycle the LFO wave will be at each occurrence of the rhythmic value selected with (LFO 1) Rate and (LFO 2) Rate.

(See the illustration on the next page.)

When Note Phase=0, the LFO will start at its center point at each occurrence of the selected value, and move up first, then do

When Note Phase=180, the LFO will start at its center point at each occurrence of the selected value, and move down, then up
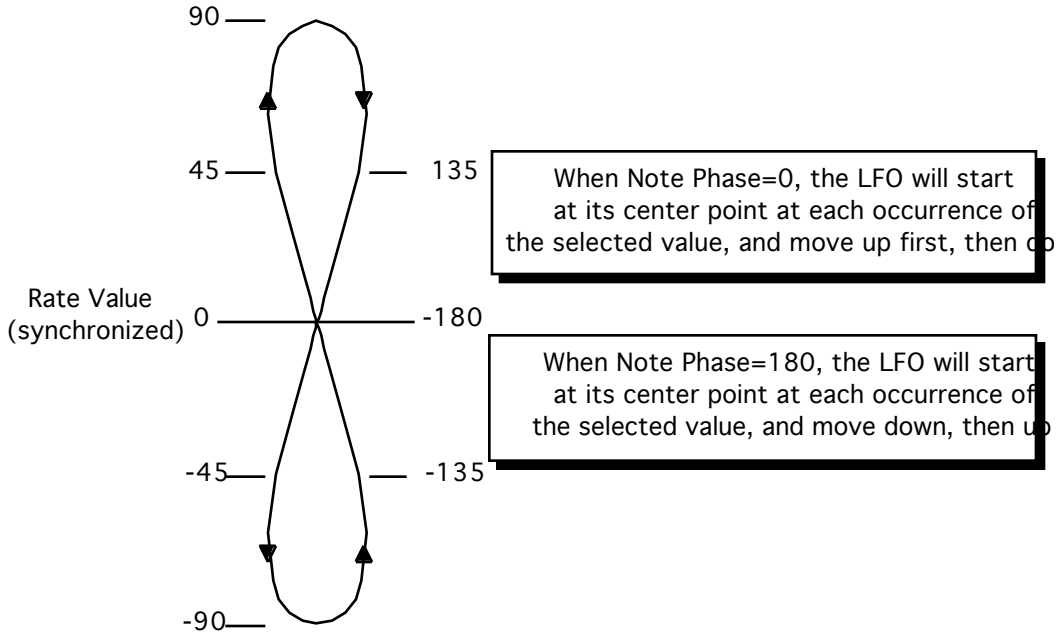
Note: When a mod LFO's Rate is set to an unsynchronized value, this parameter is unavailable.

Mod A/B Parameter 65: (LFO 1) Note Phase

Mod A/B Parameter 68: (LFO 2) Note Phase

LFO 1 Shape=Sine Rate=1/2
Note Phase=45

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Values: **-180; -135; -90; -45; 0; 45; 90; 135; 180**

What these Parameters Do:

The (LFO 1) Note Phase and (LFO 2) Phase determine the location of the LFO wave at each occurrence of the selected synchronized Rate value. Positive values cause the wave to start in an upward direction; negative values start the wave in a downward direction.

11—Saving Effects

Where Effects are Saved

The DP/Pro provides two user banks for the storage of effects you've edited or created—banks 0 and 1. The procedure for saving an effect includes steps that allow you to assign Effect Finder attributes to the effect.

Note: Effects you've edited or created are only temporary until you save them to the DP/Pro's memory.

Should you choose to save an effect to an already occupied location, the DP/Pro lets you audition the effect currently stored there. This helps ensure that you don't inadvertently replace effects that you want to keep.

Saving an Effect to the DP/Pro's Memory

Saving an effect is a multi-step process. The DP/Pro's displays lead you through the procedure, step-by-step (the displays are detailed below). An effect is saved by:

- pressing the Save button.
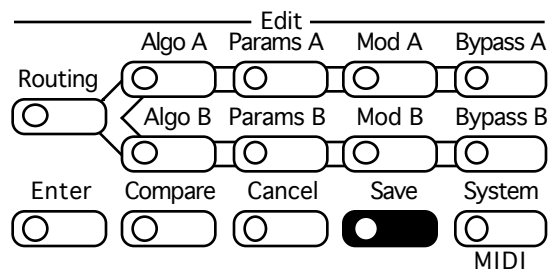
- turning the Value knob to select a location in Bank 0 or 1 in which to store the effect, and then pressing Enter.
- using the Next and Previous Page buttons and the Value knob to name the effect being saved, and then pressing Enter.
- using the Next and Previous Page buttons and the Value knob to assign one or more Effect Finder FX types to the effect (see Chapter 3 to learn about Effect Finder), and then pressing Enter.
- using the Next and Previous Page buttons and the Value knob to assign one or more Effect Finder App types to the effect (see Chapter 3), and then pressing Enter.
- optionally pressing Enter to audition any effect currently stored in the location you've chosen, and then pressing Enter again to proceed, or the Previous Page button to select a new location.
- pressing Enter to complete the saving process.

Tip: You can cancel a saving operation at any time by pressing the Cancel button.

The Saving Displays

The Location Selection Display

When you press the Save button, the first of the DP/Pro's Save pages appears:

The selected location's bank number   The memory location within the selected bank

l   n

Save into location 0:001
Name:Undefined 0:0

i

If there's an effect already stored in the selected location, its name will appear here

The Effect-Naming Display

When you've selected a location and pressed the Enter button, the effect naming page appears:

Save new effect as:
Name=_DepTh oF SpaCe

i

The underlined character is selected for editing

When this page is visible, you can press the Next or Previous Page buttons to select each position in the effect's name, and then turn the Value knob to select the desired character.

The Effect Finder FX Type Selector Display

When you've named your effect and pressed the Enter button, the DP/Pro allows you to designate Effect Finder FX types for your effect:

The Yes (Y)/ No (n) toggle for each FX type; the selected type is underlined

m

Finder Type: YnYnnnnnnnn
FX:Reverb   ENTER=Done

i

As you select each type's Y/n toggle, the FX type it represents will appear here

This display offers a Yes/no toggle switch for each of the Effect Finder FX types. Pressing the Next or Previous Page buttons selects each toggle in turn—as each toggle is selected, its FX type is shown on the bottom line of the display. Turning the Value knob sets each toggle to its yes or no position.

The word ENTER is shown on the bottom line of the display to remind you to press the Enter button when you're finished designating FX types for your effect.

To learn more about Effect Finder, and for a complete list of FX types, see Chapter 3.

The Effect Finder App Type Selector Display

When you've designated FX types for your effect and pressed the Enter button, the DP/Pro allows you to assign Effect Finder App types to your effect:

The Yes (Y)/ No (n) toggle for each App type; the selected type is underlined

m

Finder: YYnYnYnYnYnYYYYn
App:*Demo   ENTER=Done

i
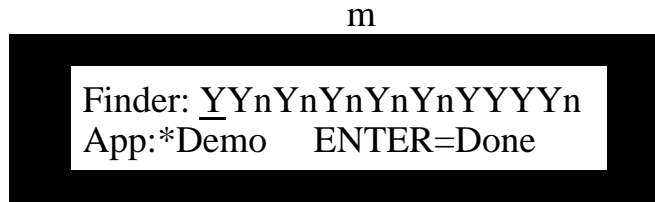
As you select each type's Y/n toggle, the App type it represents will appear here

This display offers a Yes/no toggle switch for each of the Effect Finder App types. Pressing the Next or Previous Page buttons selects each toggle in turn—as each toggle is selected, its App type is shown on the bottom line of the display. Turning the Value knob sets each toggle to its yes or no position.

The word ENTER is shown on the bottom line of the display to remind you to press the Enter button when you're finished designating App types for your effect.

Tip: An effect can be assigned to App Groups 1 through 10 using the System/MIDI Finder App Group parameters.

To learn more about Effect Finder, and for a complete list of App types, see Chapter 3.

The "Check Old Effect?" Display

If you've selected an already occupied location for your effect, the "Check Old Effect?" display appears when you press Enter after selecting your Effect Finder App types:

The bank and program number of the location you've selected
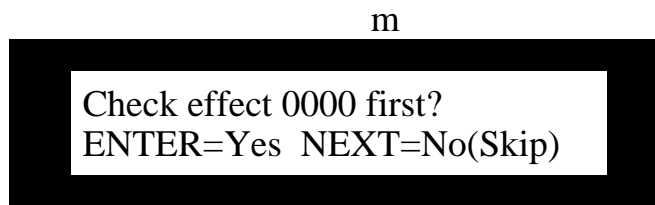
m

Check effect 0000 first?
ENTER=Yes NEXT=No(Skip)

i

The lower line of the display presents your options

This display offers two choices:

• If you'd like to audition the effect you're about to replace, you can press the Enter button and send some audio into your DP/Pro to hear the old effect stored in the selected memory location.

• If you don't need to audition the effect your replacing, you can press the Next Page button to proceed to the final saving page.

The "Replace Old Effect?" Display

Whether you press Enter or the Previous Page button while on the "Check Old Effect?" page, the "Replace Old Effect" display will appear:

The bank and program number of the location you've selected
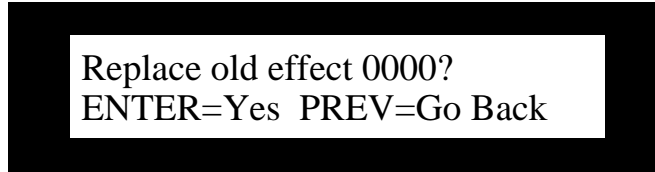
m

```
Replace old effect 0000?
ENTER=Yes  PREV=Go Back
```

i

The lower line of the display presents your options

This display offers two choices:

• If you'd like to replace the old effect, you can press the Enter button to finish saving your effect.

• If you'd like to select a new location—after deciding not to erase the old effect—you can press the Previous Page button to return to the location selection display.

12—Supplemental Information

DP/Pro Bank 2 ROM Effects List

No.	Effect Name	FX Type(s)	Application Type(s)	Tweak Knob 1	Tweak Knob 2
2000	DepTh oF SpaCe	Reverb, Hall	Rec/Mix, Vocals, Ac. Key, El. Key, A. Guitar, E. Guitar, Demo, Warped, Percs, Winds, Brass, Strings, Live/PA, Guitar-A, Keys, WindReed, Piano, *Demo	Bloom Fractal	Swirl Factor
2001	MaJestiC HaLL	Reverb, Hall	Rec/Mix, Vocals, Ac. Key, A. Guitar, Strings, Brass, Winds, Percs, WindReed, Piano, Guitar-A, Percussn, Guitar-E	Character	Coloration
2002	VerSa-VeNue	Reverb, Hall	Rec/Mix, Brass, Winds, Percs, A. Guitar, Ac. Key, Percussn, Keys, Guitar-A, Drums, Guitar-E, *Demo, Strings	Position	Coloration
2003	VaRiAblE HaLL	Reverb, Hall	Rec/Mix, Drums, Guitar-E, Vocals, Strings, Piano, Percussn, Keys, Brass, Guitar-A, WindReed	Depth : Width	Size
2004	IntiMate Hall	Reverb, Hall	Rec/Mix, Vocals, Ac. Key, A. Guitar, Percs, Drums, Winds, Brass, Strings, Percussn, Guitar-E, Guitar-A, WindReed, *Demo	Dimension	Size and Shape
2005	OpeninG NitE	Reverb, Hall	Rec/Mix, Ac. Key, A. Guitar, Winds, Strings, Percs, WindReed, Vocals, Keys, *Demo, Percussn	Stage Field	Dimension
2006	RoYal HaLL	Reverb, Hall	Rec/Mix, Vocals, Ac. Key, A. Guitar, Percs, Winds, Strings, WindReed, Guitar-A, Percussn, *Demo, Keys	Sugar 'n Spice	Length /Girth
2007	CaPacitY Hall	Reverb, Hall	Rec/Mix, Ac. Key, A. Guitar, Strings, Brass, Winds, Vocals, *Demo, Guitar-A, Piano	Row & Section	Presence
2008	VocaL HaLL 1	Reverb, Hall	Rec/Mix, Mastering, Vocals	Stage Field	Presence
2009	ENSemble HaLL	Reverb, Hall	Rec/Mix, Strings, Brass, Winds, A. Guitar, Guitar-A, Keys, Drums, WindReed, Vocals	Size & Shape	Stage Field
2010	ThE SoLoiSt HaLL	Reverb, Hall	Rec/Mix, Ac. Key, A. Guitar, Percs, Winds, Brass, Strings, WindReed, Piano, Guitar-A, *Demo	Coloration	Length /Girth
2011	ConTourEd HaLL	Reverb, Hall	Rec/Mix, Ac. Key, El. Key, A. Guitar, E. Guitar, Drums, Guitar-E, Percussn, Piano, WindReed, Vocals	Curvature	Size
2012	LEaD VoCaL PlaTe	Reverb, Plate	Rec/Mix, Vocals	Size Factor	Pull 800
2013	Group VoCal PlaTe	Reverb, Plate	Vocals, Rec/Mix	Depth	Blend
2014	UniQue PlaTe	Reverb, Plate	Rec/Mix, Percs, Winds, Brass, Vocals, Ac. Key, A. Guitar, Drums, Percussn, *Demo	Bigger	Color
2015	DruM KiT PlaTe	Reverb, Plate	Drums, Rec/Mix, *Demo, Percussn	Grits	Shape
2016	ATTacK PlaTe	Reverb, Plate	Rec/Mix, A. Guitar, E. Guitar, Drums, Percs, Percussn, Guitar-E	Teeth	Spread
2017	StruMMing PlaTe	Reverb, Plate	A. Guitar, E. Guitar, Rec/Mix, Guitar-A, Guitar-E	Stage Field	Smoother
2018	PUMPED Up PlaTe	Reverb, Plate	Rec/Mix, Percs, Drums, El. Key, E. Guitar, A. Guitar, Guitar-E, Percussn	Pump Factor	Size

(ROM Effects con't.)					
No.	Effect Name	FX Type(s)	Application Type(s)	Tweak Knob 1	Tweak Knob 2
2019	SmaLL PlaTe 1	Reverb, Plate	Percussn, Drums, Vocals, Brass, Guitar-E, *Demo, Rec/Mix	Size	Density
2020	LusciouS PlaTe	Reverb, Plate	El. Key, Winds, Vocals, Rec/Mix, Keys, Guitar-A, Guitar-E, *Demo, WindReed	Lushness	Scope
2021	Smooth TiZ PlaTe	Reverb, Plate	Vocals, Ac. Key, A. Guitar, Drums, Strings, Guitar-A, Keys, *Demo	Color	Reflex
2022	Large PlaTe	Reverb, Plate	Live/PA, Rec/Mix, Brass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed	Size	Density
2023	NoN-LiN DruMs	Reverb, NonLin	Drums, Rec/Mix, Percussn, Live/PA, Brass, Guitar-E, Vocals	Length	Blur
2024	NoN-LiN VoCaLs	Reverb, NonLin	Vocals, Rec/Mix	Size	Pitch Spread
2025	BiG RooM	Reverb, Room	Rec/Mix, Winds, Brass, Drums, Percs, A. Guitar, Percussn, Piano, Keys, *Demo, Strings, Vocals, WindReed, Guitar-A, Bass	Furniture?	Stretch
2026	MediuM RooM	Reverb, Room	Vocals, Ac. Key, El. Key, A. Guitar, E. Guitar, Percs, Drums, Winds, Brass, Strings, Rec/Mix, Bass, Percussn, Piano, WindReed, Keys, Guitar-E, *Demo, Guitar-A	Position	Vibe
2027	SmaLL RooM	Reverb, Room	Rec/Mix, Vocals, Ac. Key, El. Key, A. Guitar, E. Guitar, Percs, Drums, Bass, Brass, Guitar-A, Strings, Percussn, Keys, Guitar-E, Piano, WindReed	Size	Response
2028	VerY SmaLL RooM	Reverb, Room	Rec/Mix, Percs, Drums, Winds, Brass, Vocals, Keys, Guitar-E, Percussn, Piano, Strings, WindReed, Bass, *Demo, Guitar-A	Color	Size Shifter
2029	HaRd WooD RooM	Reverb, Room	Vocals, Ac. Key, El. Key, Percs, Drums, Winds, *Demo, Guitar-E, Keys, Percussn, Piano, Brass, Guitar-A, Rec/Mix, Strings, WindReed	Oak Factor	Size
2030	StoNe WaLL RooM	Reverb, Room	Vocals, El. Key, A. Guitar, Percs, Drums, Brass, Rec/Mix, Percussn, Guitar-E, Guitar-A, *Demo	Stone Count	Size
2031	SofT WaLL RooM	Reverb, Room	Rec/Mix, Brass, Drums, Percussn, WindReed, Keys, Guitar-A	Vibe	Size
2032	PUMPED Up RooM	Reverb, Room	Keys, Guitar-E, Percussn, Brass	Space	Compression
2033	BroWn 224 ReVerB!	Reverb, Room, Hall, Plate	*Demo, Rec/Mix, Brass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed, Live/PA	Size	Predelay
2034	SpaTial AmBiencE	Reverb, NonLin	Percussn, Keys, Guitar-E, Guitar-A, Drums, Rec/Mix, *Demo	Spatiality	Size
2035	FamouS CathEdral	Reverb, Hall	*Demo, Vocals, WindReed, Guitar-A, Rec/Mix, Strings, Keys, Brass	Continuity	Color
2036	RanD-o-TaP	Delay	*Demo, Bass, Guitar-E, Rec/Mix, Brass, Drums, Guitar-A, WindReed, Vocals, Strings, Piano, Percussn, Keys	Multiply	Interval
2037	TraiN StAtioN	Reverb, Hall	*Custom, *Demo, Vocals	Mid Boost	Station Size
2038	ApoLLo 13	Reverb, Plate, Delay, PitchMod	Guitar-A, Guitar-E, Vocals, WindReed, Piano, Strings, Rec/Mix, *Demo	Diffusion	Size

No.	Effect Name	FX Type(s)	Application Type(s)	Tweak Knob 1	Tweak Knob 2
			(ROM Effects con't.)		
2039	BlooM STaR	Reverb, Hall, Delay	WindReed, Vocals, Strings, *Demo, Guitar-A, Rec/Mix, Piano, Guitar-E, Keys	Bloom Time	Diffusion
2040	ThE BooMer	Reverb, Plate, EQ/Filtr	Drums, Rec/Mix, *Demo, Percussn	Length	Crossover
2041	Tap-TiMe ReVerb	Reverb, Hall, Delay	*Demo, Drums, Guitar-E, Percussn, Rec/Mix, Vocals, Keys	Tonality	Fluff
2042	SuRReaL VocaLs 2	Reverb, Plate, Delay	Vocals, *Demo, Rec/Mix, WindReed, Strings	Swirl Factor	Bloom Fractal
2043	LivE DruM SpaCe	Reverb, Room	Percussn, Drums, Live/PA, Rec/Mix	WallTreatment	Listener Pos
2044	RaY-o-VerB	Reverb, Room	Drums, Percussn, Piano, Brass	Size	Walls
2045	StuDio DruMs	Reverb, Plate, NonLin	*Demo, Percussn, Drums	Inverse Amt	Size
2046	BroWn 224 & SwirL	Reverb, Hall	Keys, Vocals, Strings, Piano, Percussn, WindReed, Rec/Mix, *Demo	Size	Speed /Depth
2047	PerCuSSion PlaTe	Reverb, Plate	Percussn, Drums, *Demo, Rec/Mix	Immensity	Reflections
2048	SnAre VerB	Reverb, Plate	Drums, Percussn, Rec/Mix, Live/PA	Size	Reflections
2049	VintagE RooM	Reverb, Hall	Rec/Mix, Brass, Drums, Percussn, Vocals, Keys, Guitar-E	Size	Blend
2050	CluB MoDeleR	Reverb, Hall	*Custom, Live/PA, Rec/Mix	Club Size	Distance
2051	SpAtiaL DelaYs	Delay, Spatial	*Demo, Rec/Mix, Brass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed	Regen Mania	Spacial
2052	TaP-TemPo BouNce	Delay	Live/PA, *Demo, Rec/Mix, Drums, Guitar-E, Keys, Percussn, Vocals	Width	Regen &Filter
2053	AnTiMatteR DelaYs	Delay	*Custom, Rec/Mix, *Demo	Injector	Antimatter
2054	ResoNanT DelaYs	Delay	*Custom, Drums, Percussn, *Demo, Rec/Mix	Rez-o-Pitch	Dimension
2055	RandomiZed DelaYs	Delay	*Demo, Guitar-E, Guitar-A, Strings, Vocals	Size	Fun Factor
2056	LusCiouS DelaYs	Delay	Keys, Guitar-E, Strings, Vocals, WindReed, Guitar-A, *Demo	Extension	Lushness
2057	TwEakY TaPs	Delay	*Demo, Strings, Keys, Guitar-E, Guitar-A, Vocals	Width	Intensity
2058	TimE ModuLatoR	Delay	*Demo, *Custom	Warp	Dispersion
2059	W i D e N inG TaPs	Delay, Spatial	*Demo, *Custom, Percussn, Vocals, WindReed	Width	Depth
2060	LusH Multi-ChoRus	PitchMod	Rec/Mix, Guitar-E, Keys	Twinkle	Blend
2061	Wild Multi-Chorus	PitchMod	Keys, Guitar-E, Rec/Mix, Live/PA	Doppler	Spatial Q
2062	Shifted Chorus	PitchMod	Rec/Mix, Bass, Guitar-E, Keys	Shift Width	Swirl
2063	DiamonD ChoRus	PitchMod	Guitar-E, Live/PA, Rec/Mix, Bass, Guitar-A	Shimmer	Texture
2064	ParaMetriC ChoRuS	PitchMod	Live/PA, Rec/Mix, Bass, Guitar-A, Guitar-E, Keys	Contour	Swirl
2065	Pretty Harmonizer	PitchMod	Keys, Vocals, Guitar-E, Rec/Mix	Thickness	Blend
2066	Chordal Harmony	PitchMod	Guitar-E, Keys, Vocals, *Custom, Rec/Mix	Spiral 5th	2nds Volume
2067	EviL ScaRy HarMo	PitchMod	Rec/Mix, *Custom, Vocals	Monsterness	Munch on It
2068	HarMo-SynThesiS	PitchMod	Rec/Mix, Guitar-E, *Custom, Keys	Correlation	Trajectory

(ROM Effects con't.)					
No.	Effect Name	FX Type(s)	Application Type(s)	Tweak Knob 1	Tweak Knob 2
2069	LosT SouLs HarMo	PitchMod	Rec/Mix, Guitar-E, Keys, Vocals	Lost Souls	Regen
2070	PsychaDeliC FlanGe	PitchMod	Rec/Mix, Guitar-E, Keys, Vocals	Speed / Depth	Psychadelia
2071	LiQuiD FlanGe	PitchMod	Rec/Mix, Bass, Guitar-E, Keys	Liquidity	Rotation
2072	RhYthM FlanGe	PitchMod	Rec/Mix, Drums, Guitar-E, Keys, Percussn, Vocals	Edge	Dampness
2073	MulTi-PhaSor	PitchMod	Rec/Mix, Guitar-E, Keys	Notch Factor	Rotation
2074	LiQuiD PhaSor	Delay, PitchMod	Rec/Mix, Guitar-E, Keys	Swirl Factor	Liquidity
2075	RhYthmiC PhaSor	PitchMod	Drums, Keys, Percussn, Rec/Mix	Stages	Step Mix
2076	SloW TreMoLo	Dynamics	Rec/Mix, Guitar-E, Keys	Rotation	Phaser Depth
2077	GuiTaR TreMoLo	Dynamics	Rec/Mix, Guitar-E, Keys	Add Stereo	Intensity
2078	Pad Chopper	Reverb, NonLin, Spatial, Dynamics	Keys, Drums, Rec/Mix, Vocals, Guitar-E	Chop Factor	Inverse
2079	TemPo-PaNNeR	Dynamics	Rec/Mix, Guitar-A, Guitar-E, Keys, Percussn, Vocals	Less Center	More Edge
2080	Animated Random	Spatial	Rec/Mix, Guitar-E, Keys, Vocals, Percussn	Animation	Intensity
2081	Flange-o-Pan	PitchMod, Spatial	Rec/Mix, Guitar-E, Keys	Wider	Random
2082	ChaT-ShiFt	Delay, PitchMod, EQ/Filtr	Keys, Vocals, Rec/Mix, Guitar-E	DDL Level	Pitch Balance
2083	Phasic-Chatter	Delay, PitchMod	Guitar-E, Keys, Rec/Mix, Vocals	Add Delays	Faze Phactor
2084	PsyKotic Chat	Delay, EQ/Filtr	Rec/Mix, Vocals, Keys, Guitar-E	Mess It Up	DDL Level
2085	RoTarY In SpacE	Amp/Spkr	Guitar-E, Keys	Fast / Slow	Room Size
2086	DeeP Sea EcHo	Delay	Rec/Mix, Guitar-E, Keys, Vocals	Delay Length	Feedback
2087	DDL and Reverb	Reverb, Hall, Delay	Live/PA, Rec/Mix, Brass, Guitar-A, Guitar-E, Keys, Piano, Strings, Vocals, WindReed	DDL Regen	Texture
2088	InStanT AntiQue	Spatial, EQ/Filtr, Amp/Spkr	Master, Rec/Mix, Drums, Percussn, *Custom	Age	Hiss Level
2089	TabLe RaDio	Spatial, EQ/Filtr, Amp/Spkr	Master, Rec/Mix, Drums, Percussn, Vocals, *Custom	Hum / Buzz	Noise
2090	AurAtOnEs	Spatial, EQ/Filtr, Amp/Spkr	Rec/Mix, Master, Drums, Vocals, Percussn, *Custom	Distance	Brightness
2091	tiny SpEaKerS	EQ/Filtr, Amp/Spkr	Rec/Mix, Drums, Percussn, Vocals	Ugliness	Image
2092	Subwoofer	EQ/Filtr, Amp/Spkr	Live/PA, Rec/Mix, Bass, Drums, Guitar-E, Keys, Vocals	Crossover Pt	Subharmonics
2093	AM TrAnsisToR	EQ/Filtr, Amp/Spkr	Live/PA, Rec/Mix, Vocals, *Custom	Distance	Cheapness
2094	Amp In A RooM	Reverb, Room, Spatial, EQ/Filtr, Amp/Spkr	Rec/Mix, Guitar-E, Keys	Mic Position	Uni-Vibe
2095	LooP Mangler	EQ/Filtr, Amp/Spkr	*Custom, Vocals, Drums, Percussn, Rec/Mix	Jet Flange	Soft Limit

			(ROM Effects con't.)		
No.	**Effect Name**	**FX Type(s)**	**Application Type(s)**	**Tweak Knob 1**	**Tweak Knob 2**
2096	LooP CrUncHeR	EQ/Filtr, Amp/Spkr	Rec/Mix, Drums, Percussn, *Custom	Soft Limit	Crunch
2097	LooP GooP	Spatial, EQ/Filtr, Amp/Spkr	Rec/Mix, Drums, Percussn	Crunchies	Imaging
2098	MoGriFieR 1	PitchMod	Rec/Mix, Guitar-E, Keys, Drums, Percussn, Vocals, *Custom	Mogrify	Tempo
2099	MoGriFieR 2	Delay, PitchMod	*Custom, Vocals, Drums, Percussn, Rec/Mix	Mogrify	Pitch
2100	AuToHarP Maj/Minor	Delay, PitchMod	Rec/Mix, Vocals, *Custom, Guitar-E, Keys	Major -> Minor	Harmonics
2101	FlanG-oruS	PitchMod	*Demo, Rec/Mix, Guitar-E, Keys	Edge	Swirl
2102	FlaSoR	PitchMod	Rec/Mix, Bass, Guitar-E, Keys	Twist	Swirl
2103	PhaSoSauRus	PitchMod	Rec/Mix, Bass, Guitar-E, Keys	Swirl	Blend
2104	PEQ & ComPresS	Dynamics, EQ/Filtr	Live/PA, Rec/Mix, Bass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Vocals	Shaping	Punch
2105	PEQ & XpanD	Dynamics, EQ/Filtr	Rec/Mix, Guitar-A, Guitar-E, Percussn, Vocals	Shaping	Softness
2106	PEQ & DeEss	Dynamics, EQ/Filtr	Vocals, Guitar-E, Rec/Mix, Master	Normal/Tune	Notch Freq
2107	Master EQ & LiMiT1	Dynamics, EQ/Filtr		Sweep-o-matic	Gain-o-matic
2108	Master EQ & LiMiT2	Dynamics, EQ/Filtr	Master, Rec/Mix	Presence	Squeezability
2109	Master EQ & Widen	Spatial, EQ/Filtr	Master, Rec/Mix, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals	Sweep-o-matic	Imaging
2110	Mstr. De-Ess & LiM	Dynamics, EQ/Filtr	Master, Rec/Mix, Vocals	Target Fc	Gain-o-matic
2111	MaKe My MiX LOUD!	Dynamics, EQ/Filtr	Master, Rec/Mix	Gain- Me!	Curvature
2112	SloW ComPressoR	Dynamics	Rec/Mix	Spectral Tilt	Compression
2113	GuitaR ComPressoR	Dynamics	Guitar-E, Guitar-A, Rec/Mix, Live/PA	Spectral tilt	Compression
2114	SeRvo LiMiTer & EQ	Dynamics, EQ/Filtr	Rec/Mix, Guitar-A, Guitar-E, Bass, Keys	Smiley Curve	Thresh/OutLev
2115	FasT ComPressoR	Dynamics	Rec/Mix, Guitar-E, Percussn, Drums, Vocals	Spectral Tilt	Compression
2116	DruM SQuasheR	Dynamics	Rec/Mix, Drums, Percussn	Spectral tilt	Squash Factor
2117	SSL TyPe LiMiTeR	Dynamics	Master, Rec/Mix	Spectral Tilt	Limiting
2118	OpTo LiMiTeR	Dynamics	Rec/Mix	Spectral Tilt	Drive Amount
2119	DyNamiC InteGratoR	Dynamics	Rec/Mix	Spectral Tilt	Process Time
2120	WhaT DyNamics?	Dynamics	Rec/Mix, Master, *Custom	Soft Limit	Slaughter
2121	MuLtiBand CoMpresS	Dynamics, EQ/Filtr	Rec/Mix, Bass, Brass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed, Master	Smiley Curve	X-Over Points
2122	Loop-ReCord & EQ	EQ/Filtr, Utility	Bass, Brass, Rec/Mix, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed	Playback Speed	Brightness
2123	Midi Pitch Fix [e4]	PitchMod, Utility	Vocals, Rec/Mix	A-440	Delay

(ROM Effects con't.)					
No.	Effect Name	FX Type(s)	Application Type(s)	Tweak Knob 1	Tweak Knob 2
2124	OctaVe EQ & GaTe	Dynamics, EQ/Filtr, Utility	Live/PA, Rec/Mix, Bass, Brass, Drums, Guitar-A, WindReed, Vocals, Strings, Piano, Percussn, Guitar-E, Keys	High Shelf	Envelope
2125	Dual-Mono Gates	Dynamics	Live/PA, Rec/Mix, Bass, Brass, Drums, Guitar-A, Guitar-E, Keys, Percussn, Piano, Strings, Vocals, WindReed	Envelope A	Envelope B
2126	MuNcheD CasSetTe	PitchMod, Spatial, EQ/Filtr	*Demo, Master, Rec/Mix, *Custom	Speed	Erasure
2127	Tone Generator!	Utility	Live/PA, Master, Rec/Mix	Throuput A	Throuput B

DP/Pro Real-Time Modulators List

TwkKnob 1	MIDI #21	MIDI #54	MIDI #87
TwkKnob 2	MIDI #22	MIDI #55	MIDI #88
LFO 1	MIDI #23	MIDI #56	MIDI #89
LFO 2	MIDI #24	MIDI #57	MIDI #90
L FootSw	MIDI #25	MIDI #58	FxDepth1#91
L FtSwToggle	MIDI #26	MIDI #59	FxDepth2#92
R FootSw	MIDI #27	MIDI #60	FxDepth3#93
R FtSwToggle	MIDI #28	MIDI #61	FxDepth4#94
NoteNumber	MIDI #29	MIDI #62	FxDepth5#95
Velocity	MIDI #30	MIDI #63	DataInc #96
Aftertouch	MIDI #31	Sustain #64	DataDec #97
PitchBend	BankSel #32	PortTogl#65	NRPN LSB#98
BankSel #0	ModWheel#33	Sostnuto#66	NRPN MSB#99
ModWheel#1	Breath #34	SoftPed #67	RPN LSB #100
Breath #2	MIDI #35	Legato #68	RPN MSB #101
MIDI #3	FootCtrl#36	Hold 2 #69	MIDI #102
FootCtrl#4	GlidTime#37	PatchSel#70	MIDI #103
GlidTime#5	DataEnt #38	Timbre #71	MIDI #104
DataEnt #6	Volume #39	Release #72	MIDI #105
Volume #7	Balance #40	Attack #73	MIDI #106
Balance #8	MIDI #41	Bright #74	MIDI #107
MIDI #9	Pan #42	SndCtl6 #75	MIDI #108
Pan #10	Express #43	SndCtl7 #76	MIDI #109
Express #11	FxCtrl1 #44	SndCtl8 #77	MIDI #110
FxCtrl1 #12	FxCtrl2 #45	SndCtl9 #78	MIDI #111
FxCtrl2 #13	MIDI #46	SndCtl10#79	MIDI #112
MIDI #14	MIDI #47	GenCtrl5#80	MIDI #113
MIDI #15	GenCtrl1#48	GenCtrl6#81	MIDI #114
GenCtrl1#16	GenCtrl2#49	GenCtrl7#82	MIDI #115
GenCtrl2#17	GenCtrl3#50	GenCtrl8#83	MIDI #116
GenCtrl3#18	GenCtrl4#51	Portmnto#84	MIDI #117
GenCtrl4#19	MIDI #52	MIDI #85	MIDI #118
MIDI #20	MIDI #53	MIDI #86	MIDI #119

DP/Pro MIDI Implementation

For normal applications, you will find all the information you need regarding the DP/Pro's MIDI functions in this manual. Refer to the MIDI Implementation Chart on the next page for a summary of the DP/Pro MIDI implementation. If you require a copy of the full DP/Pro MIDI System Exclusive Specification, it is available free of charge by writing to:

ENSONIQ Corp
MIDI Specification Desk
Box 3035
155 Great Valley Parkway
Malvern, PA 19355-0735
USA

Include in your written request your name and address, and indicate that you would like a copy of the "DP∕Pro MIDI System Exclusive Specification." Please allow 6-8 weeks for delivery.

ENSONIQ [Effect Processor]   Date: February 28, 1997

MODEL: DP/Pro   MIDI Implementation Chart   Version: 1.10

Function…		Transmitted	Recognized	Remarks
Basic Channel	Default	1*	1*, 2, 3	
	Channels	1-16	1-16	
Mode	Default	MULTI	MULTI	
	Messages	X	X	
	Altered	X	X	
Note Number	True Voice	X	0-127	Modulation Source
Velocity	Note ON	X	O	Modulation Source
	Note OFF	X	X	
After Touch	Key	X	O	Modulation Source
	Channel	X	O	
Pitch Bender		X	O	Modulation Source
Control Change		0-119[1]	0-119[2, 3]	[1]Virtual Tweak Knobs, Bypass buttons can transmit any MIDI controller [2] Any MIDI controller can be used as modulation source [3] #32, Bank Select LSB selects effect banks
Program Change	True Number	0-127	0-127[4] (map off) 0-127[5] (map on)	[4]Will select sounds from current bank [5]Will select sounds from any bank
System Exclusive		O	O	
System Common	: Song Pos	X	X	
	: Song Sel	X	X	
	: Tune	X	X	
System Real Time	: Clocks	X	O[6]	[6]For synchronizing effects
	: Commands	X	X	
Aux. Messages	: Local On∕Off	X	X	
	: All Notes Off	X	X	
	: Active Sense	X	X	
	: Reset	X	X	
Notes:	*All Program Change, Bank Select and modulation messages are received on the system MIDI channel. Virtual Tweak Knobs 1 and 2, Bypass buttons A and B transmit on system channel.			

O= YES
X = NO

Converting Mono Foot Switches for Use with the DP/Pro

The use of a single foot switch (that has a mono plug) is not recommended, and can affect the operation and performance of the DP/Pro. Since the DP/Pro is designed with a stereo foot switch jack, when any mono foot switch is plugged in, it functions like the right side of a dual foot switch. It also acts as a permanent shut-off switch for the (non-existent) left side of the foot switch. This means that depending on how your DP/Pro is configured to respond to the left foot switch, using a mono foot switch could have unpredictable results on the DP/Pro's performance.

The SW-10 is a dual foot switch and has a stereo plug

SW-10

The SW-6 and SW-2 are mono foot switches and both use a mono plug

SW-6   SW-2
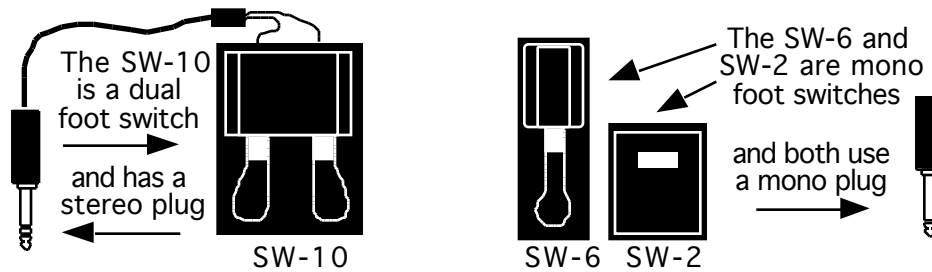
Although mono foot switches can be used as is, their usage can be optimized if you are willing to make either of the following modifications.

Replace the Mono Foot Switch Plug with a Stereo Plug

This modification will eliminate the permanently shut-off left foot switch problem.

Before

After

Ring

Sleeve   Tip
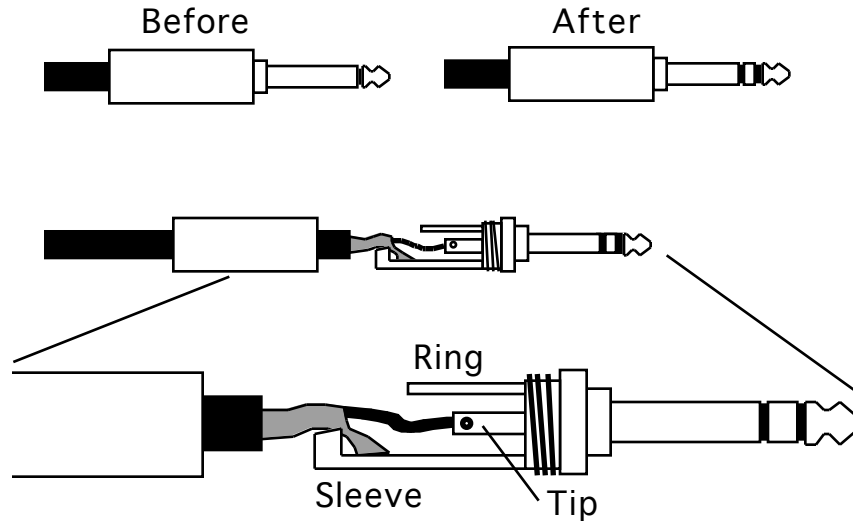
Required materials: soldering iron
solder
wire cutters
1/4" stereo plug

1.   Unscrew the mono plug cover, and slide it out of the way (down the cable).
2.   Either with wire cutters or a soldering iron, remove the wires from the mono plug.
3.   Replace the mono plug cover with the stereo plug cover on the mono foot switch cable.
4.   Solder the "hot" wire (the insulated wire in the center of the cable) to the tip connector, and the ground (shield) wire to the sleeve on the stereo plug as shown in the diagram.
5.   Screw the stereo plug cover onto the stereo plug to complete the modification.

Build a Box to Merge Two Mono Foot Switches into One Stereo Jack

The advantage of this modification is that it will allow you to make two mono foot switches function as one stereo foot switch.
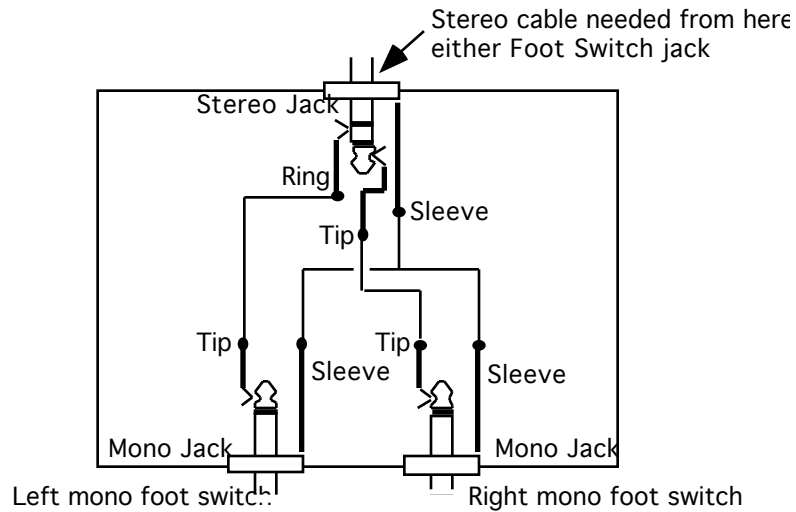
Required materials: soldering iron
solder
wire cutters
drill and drill bits
one plastic housing assembly (must be large enough to mount three jacks)
one stereo jack
two mono jacks
shielded wire
1/4" stereo-to-stereo cable

1. Drill three holes in the housing assembly and mount the stereo and mono jacks.
2. Solder a wire from the tip of the left mono jack to the ring of the stereo jack.
3. Solder a wire from the tip of the right mono jack to the tip of the stereo jack.
4. Solder a wire(s) connecting the sleeves of all three jacks.
5. Connect the mono foot switch(es) to the mono jacks.
6. Connect the stereo-to-stereo cable between the stereo jack and the Foot Switch jack.
7. You might want to mark the housing assembly to easily identify the jacks.

About Ground Loops

The DP/Pro has ground compensated outputs, which offer the advantages of balanced outputs (which provide minimized hum and interference), plus the advantage of a transformer isolated output—the ouput connector "grounds" are not hooked directly to the DP/Pro ground, thus eliminating the possibility of a ground loop. This means that you can use balanced or unbalanced equipment with the DP/Pro, and you won't have any ground loop problems on the outputs.

Ground loops are only possible on the inputs, depending on what equipment you're using with the DP/Pro. If you find that you do have a ground loop problem, you can eliminate it in one of two ways:

• by using an audio isolation transformer. Many of these devices have a switch that can either connect or disconnect the grounds (a ground lift switch). As long as the two grounds don't connect, you can avoid input ground loops.

• by modifying the cables you're using to connect to the DP/Pro's inputs.

Modifying Cables to Eliminate Input Ground Loops

If you're connecting to the DP/Pro's 1/4" inputs, you may be using either 1/4" unbalanced cables, 1/4" balanced cables, or XLR to 1/4" balanced cables. (If you're connecting to the DP/Pro's XLR inputs, you won't have any input ground loops.) Use the diagrams below to determine which kind of cable you're using and make the appropriate modifications.

• If you're using balanced 1/4" cables, disconnect the shield from the connector that's plugged into output of the source device.

OTHER 1/4" Balanced Output   ENSONIQ 1/4" Balanced Input

OTHER 1/4" Balanced Output   ENSONIQ 1/4" Balanced Input
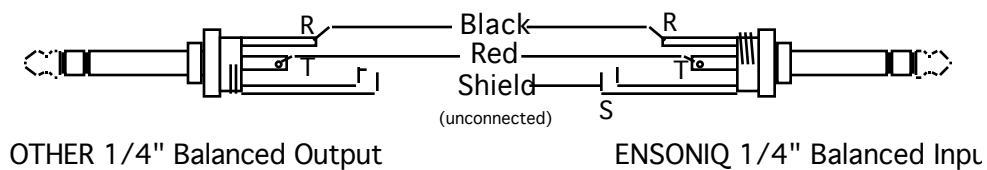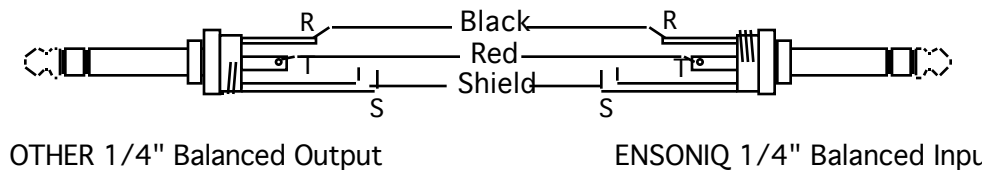
•   If you're using unbalanced 1/4" cables, create a custom cable with a 1/4" stereo plug on the end that's connected to the DP/Pro's inputs. Attach the source device's ground to the ring of the stereo connector. Leave the shield unconnected, and attach the two tips normally.

Red
Shield
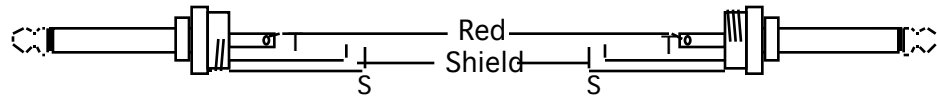
OTHER 1/4" Unbalanced Output   ENSONIQ 1/4" Unbalanced Input

Black
Red
Shield
(unconnected)
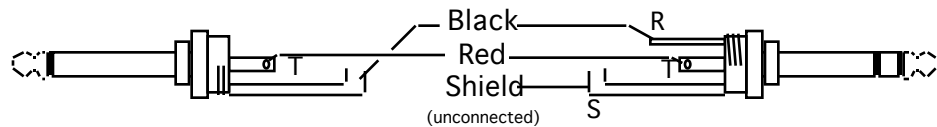
OTHER 1/4" Unbalanced Output   ENSONIQ 1/4" Balanced Input

•   If you're using XLR to balanced 1/4" cables, disconnect the shield from the case and pin 1 of the XLR cable.
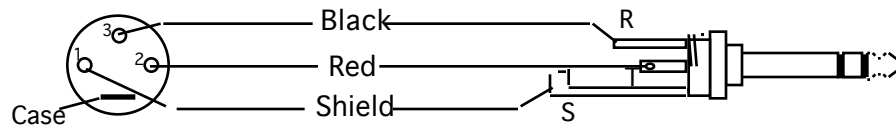
Black
Red
Shield
Case

OTHER 1/4" XLR Balanced Output   ENSONIQ 1/4" Balanced Input

Black
Red
Shield
(unconnected)
Case
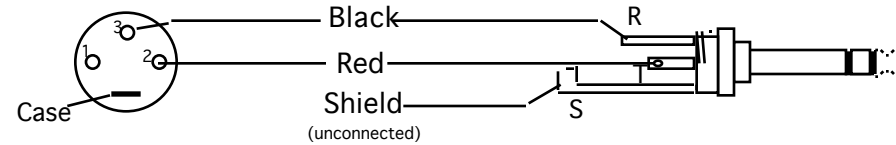
OTHER 1/4" XLR Balanced Output   ENSONIQ 1/4" Balanced Input

Need More Help?

The following publications can enhance your understanding of effect processing, MIDI and related topics. These, in addition to the numerous monthly magazines, provide a wealth of information. While we don't endorse any publications, we offer this partial list as a resource upon which to draw.

Books

The Mix Bookshelf (800-233-9604)

MIDI
HOW MIDI WORKS, **Dan Walker**
MIDI FOR MUSICIANS, **Craig Anderton**
THE MIDI BOOK, **Steve De Furia, Joe Scacciaferro**
THE NEXT MIDI BOOK, **Rychner & Walker**
THE MIDI RESOURCE BOOK, **Steve De Furia, Joe Scacciaferro**

THE MIDI MANUAL, **David Huber**
MIDI, THE INS, OUTS AND THRUS, **Jeff Rona**
THE MIDI HOME STUDIO, **Howard Massey**
USING MIDI, **Helen Casabona, David Frederick**
MAKING MUSIC WITH YOUR COMPUTER, **David (Ruby) Trubitt, Ed.**

RECORDING
IMPROVING YOUR SIGNAL PROCESSING SKILLS, **(cassette & manual) Bill Gibson**
MASTER HANDBOOK OF ACOUSTICS, **F. Alton Everest**
SOUND RECORDING HANDBOOK, **John Woram**
SOUND REINFORCEMENT HANDBOOK, **Davis & Jones**

SYNTHESIS
A SYNTHESIST'S GUIDE TO ACOUSTIC INSTRUMENTS, **Howard Massey**
MUSIC & TECHNOLOGY, **H.P. Newquist**
SECRETS OF ANALOG AND DIGITAL SYNTHESIS, **Steve De Furia**

VIDEOS
SHAPING YOUR SOUND, **(video series) Tom Lubin**

Alfred Publishing Company (818-891-5999)

ADVANCED MIDI APPLICATIONS, **GPI**
BASIC MIDI APPLICATIONS, **GPI**
WHAT IS MIDI?, **GPI**

Hal Leonard Publishing (414-774-3630)

MIND OVER MIDI, **GPI**

Monthly Magazines

The TRANSONIQ Hacker (503-227-6848)
The TRANSONIQ Hacker is an independent news magazine for ENSONIQ users.

KEYBOARD (800-289-9919)
ELECTRONIC MUSICIAN (800-888-5139)
HOME & STUDIO RECORDING (818-407-0744)
MIX (800-888-5139)
EQ (212-213-3444)

13—Glossary

Term	Definition
Algo	Abbreviation for "algorithm."
Algorithm	A software program that processes digitized audio data.
AM	Abbreviation for "amplitude modulation."
Ambience	The sound of the physical space—real or simulated—in which a sound occurs. Also used to describe a subtle form of reverberation.
Amplify	To increase the level, or loudness, of a signal.
Amplitude	The level, or loudness, of a signal.
Amplitude Modulation	An alteration of signal volume; at low frequencies, known as tremolo, at higher frequencies, known as ring modulation.
Attack	In a level detector (as used in a compressor, limiter, expander, or gate), attack time determines the speed at which increases in level are tracked.
Attenuate	To decrease the level, or loudness, of a signal.
Auto-Wah	An audio processing circuit similar to a wah-wah, but which is controlled by the amplitude of the input signal rather than by a pedal.
Balanced-Line Input	Three-conductor balanced lines are used to interconnect various pieces of equipment, and are often used in professional studios. These balanced-line inputs tend to reject hum and/or radio frequency interference. The DP/Pro has balanced-line outputs, for connecting with professional balanced-line input studio equipment.
Bandpass Filter	A filter that passes frequencies within a selected range and attenuates frequencies outside that range.
Bandwidth	A range of frequencies. For a frequency-selective filter or equalizer, this is the range of frequencies that is allowed to pass through the filter with little or no attenuation.
Bank	A collection of 127 effects. The DP/Pro contains two RAM banks for the storage of new or edited effects (Banks 0 and 1), as well as two ROM banks (Banks 2 and 3) containing pre-programmed effects. Banks may be selected via MIDI through the use of MIDI Bank Select messages.
Bank Select	A MIDI message pair which allows the remote selection of DP/Pro effect banks. A Bank Select message pair is comprised of an MSB value of 0 followed by an LSB value specifying the desired bank, in the case of the DP/Pro, either 0, 1, 2 or 3.
Boost	An increase in volume.
BPF	Abbreviation for "bandpass filter."
BW	Abbreviation for "bandwidth."
Bypass	The process by which an audio signal is shunted around an ESP, so that it is heard unaffected by the ESP. The DP/Pro also uses this term to describe various other means of turning an ESP off, such as silencing only the signal, silencing the ESP while continuing to feed signal into it, and silencing the ESP and the audio signal.
Center	In a flanger or chorus, controls the nominal time delay. In a phaser, controls the nominal turnover frequency (the lowest frequency at which the processed signal is completely out of phase with the original).
Center Frequency	In a bandpass filter, the frequency at which the peak occurs. In a parametric equalizer, the frequency at which a boost or a cut is applied.
Chorusing	An audio process that involves the mixing together of a source signal with slightly delayed copies of itself where the delay time of the copies is fluctuating in a regular, rhythmic fashion. The timing variations create phasing anomalies that cause the source signal to swirl, and sound wider and/or bigger.
Compression	A sound-conditioning process that reduces a source signal's dynamic range. Loud signals get softer and softer signals get louder.
Compression Ratio	The amount by which a signal is compressed, expressed as a ratio. For example, a 4 to 1 compression ratio will result in an increase of 1dB in output level for every 4dB increase in input level. At high ratios (such as 20:1 and above), the compressor acts as a limiter.
Crossover	A sort of audio prism that separates frequency components into several bands (typically two or three).
Cut	An decrease applied to the volume of an object.
Cutoff Frequency	In a lowpass or highpass filter, the frequency at which the transition between passband and stopband occurs. In a low shelf or a high shelf, the frequency below which or above which a boost or a cut is applied.

Cycle	A sound wave's single journey from exerting a greater amount of air pressure to a lesser one and back to its starting point. The number of cycles per second determines the pitch—or frequency—of the sound wave. The number of cycles per second is expressed in hertz (Hz) and kilohertz (kHz).
Damping	A reverb parameter that determines how quickly the high-frequency content of a reverb will be reduced as it decays to silence.
DDL	Abbreviation for "digital delay line," an audio process that creates a digital copy, or copies, of a source signal and plays it (or them) back later than the original signal.
Dec	Abbreviation for "decrement"; to decrease.
Decay	In a reverb, the time during which the envelope of the reverb tail decreases to a very small level. Commonly referenced as RT60, the time for the reverberation to decay by 60 dB.
Definition	In a reverb, a control that affects the rate at which the number of echoes increases with time.
Delay Smoothing	A parameter in some algorithms containing delays that even out any changes made to the delay times (the changes can be made manually or through a modulator). The higher the setting, the longer it will take for the delay time to ramp to its final value.
Density	In a reverb, a control that affects the degree to which echoes are regenerated, thus producing a buildup of echoes with time.
Depth	The degree to which a signal is processed.
Diffusion	In a reverb, a control that affects the density of the initial cluster of echoes. Low settings of diffusion result in a discrete echoes; higher settings produce a smoother sound.
Doppler Shift	A frequency change produced by relative motion between a sound source and a receiver; simulated electronically by processing a signal through a varying time delay.
Double-click	To rapidly press a button twice.
Download	The process by which the DP/Pro reads values saved in an effect or algorithm and instructs the DP/Pro to use those values.
Dry	The state of an audio signal prior to signal processing; also a relative term used in wet/dry mix parameters to describe the signal prior to additional processing.
DSP	Acronym for "Digital Signal Processor."
Early Reflections	Early reflections are delayed signals that aurally suggest the size of ambient spaces. In the real world, sound bounces off surfaces it encounters—walls, ceiling and floor. Quick early reflections suggest small spaces, with these surfaces close by. Longer early reflections imply to the ear that the surfaces are farther away, and that the ambient space is therefore larger.
Effect	An effect in the DP/Pro is a preset containing all of the settings for the DP/Pro's two signal processing chips (ESPs) and a signal-flow routing.
Envelope	A curve that roughly describes the level of a signal over time.
EQ Trim	A control that adjusts the gain of a signal before it is fed into an equalizer. Used to compensate for an EQ boost that would otherwise cause distortion, and in some cases to compensate for an EQ cut that would otherwise result in a very low signal level.
Equalization (EQ)	The process of altering the frequency content of sound by changing the volume balance of the frequencies it contains.
ER	Abbreviation for "early reflection."
ESP	Acronym for "ENSONIQ Signal Processor"; refers in the DP/Pro to one of the DP/Pro's two processors. Also, the sixth sense.
ESP2	For "ENSONIQ Signal Processor 2"; second-generation VLSI DSP chip that powers the DP/Pro. The DP/Pro contains two ESP2s.
Fc	Abbreviation for "center frequency" or for "cutoff frequency."
Feedback	The process of scaling a system's output and adding it back to the system's input. In the case of a DDL, the amount of feedback determines the number of decaying echoes that are heard (synonymous in this case with regeneration).
Filter	A device that attenuates selected frequencies within an audio signal. A highpass filter passes all signals higher than a selected frequency, attenuating all those frequencies below it. A lowpass filter passes all signals below a selected frequency, attenuating all those frequencies above it.
Flanger	A processor that simulates the effect of two synchronized tape machines playing back the same signal, with the speed of one machine being slowed slightly by the gentle pressing on the outer shell—or "flange"—of one of its tape reels. This small amount of delay causes a phasing cancellation that filters out elements of the signal being processed. Changing the delay time causes the "flange" effect.
FM	Abbreviation for "frequency modulation."

Formant	Any of the group of frequencies associated with a particular vowel sound.
Formant Warp	A parameter in certain algorithms that modifies the spectrum of a formant filter to correspond to the voice of a man, woman, or child.
Frequency	The number of repetitions of a waveform per unit of time, commonly expressed in hertz (Hz), or cycles per second.
Frequency Modulation	An alteration of signal frequency content; at low frequencies, used for vibrato and Doppler Shift.
Gain	The increase in level produced by an amplifier.
Gate	A device that attenuates a source signal falling below a predetermined volume threshold. A useful tool in eliminating noise and controlling signals that use an effect. Ambiences such as reverb may be gated to produce an extreme and artificial-sounding decay.
HF	Abbreviation for "high frequency."
HiCut	Abbreviation for "high cut." Used in a high shelving equalizer to control the amount of decrease applied.
HiShelf	Abbreviation for "high shelf," a type of equalizer in which the volume of frequencies above the selected value are increased or decreased.
Hold	In a level detector (as used in a compressor, limiter, expander, or gate), hold time determines the amount of time that must elapse during which no increases in signal level are detected, before the detector is allowed to go into release mode. A small setting of hold time can produce a smoother response and can reduce chatter in gates. Longer settings are used for special effects.
Hysteresis	In a noise gate, hysteresis is the difference between the gate-open threshold and the gate-close threshold. This control reduces the "chatter" phenomenon produced when the gate bounces rapidly between open and closed states.
Inc	Abbreviation for "increment"; to increase.
Knee Width	The dB range about the threshold over which the compression ratio bends from 1:1 to the dialed-in value. Tube compression (soft compression) can be emulated by increasing the knee width.
LED	LEDs (Light Emitting Diodes) are small solid-state lamps found embedded in a number of the DP/Pro's buttons. Under normal conditions, they have a virtually unlimited lifetime.
LF	Abbreviation for "low frequency."
LFO	An oscillator that generates sound waves at a frequency below the audio spectrum. These low-frequency waves can modulate audio signals to produce vibrato, tremolo, and other effects. The DP/Pro's mod LFOs can also modulate parameter values.
Limiter	A device that will prevent a source signal from exceeding a previously set amplitude threshold. A limiter can be thought of as a compressor with an infinite compression ratio.
LoCut	Abbreviation for "low cut." Used in a low shelving equalizer to control the amount of decrease applied.
Lookahead	In a compressor or limiter, this is a delay that reduces the problem of overshoot (a failure to compress the initial portion of a high-level signal). The function is similar in an expander or gate, where lookahead can regulate unwanted chopping off of the initial portion of a signal.
LoShelf	Abbreviation for "low shelf," a type of equalizer in which the volume of frequencies below the selected value are increased or decreased.
LSB	Many MIDI controllers use a pair of MIDI messages. The first—the MSB—for "Most Significant Byte"—chooses among 128 sets of MIDI values, each of which contains 128 values of its own. The LSB—for "Least Significant Byte"—selects one of the 128 values contained in each MSB set.
MIDI	Musical Instrument Digital Interface. A communication protocol for musical instruments.
MIDI Controller	The DP/Pro uses this word in two senses: 1. a MIDI-transmitting instrument—such as a MIDI keyboard, MIDI drum pads, or MIDI guitar, etc.; or 2. a type of MIDI message which allows the modification of effects in real time via MIDI, generated by devices such as pitch bend wheels, data entry sliders, mod wheels or levers, sustain pedals, and so on.
MIDI In	The jack on the DP/Pro's rear panel that receives MIDI data transmitted to the DP/Pro from an external MIDI device.
MIDI Out	The jack on the DP/Pro's rear panel that transmits MIDI data from the DP/Pro to an external MIDI device.
MIDI Thru	The jack on the DP/Pro's rear panel that passes along MIDI data received by the DP/Pro's MIDI In jack.

Mod LFO	One of the two LFOs available in each effect; used for the modulation of algorithm or mixer parameters.
Modulation	Any change made to an audio signal or to an algorithm or mixer parameter, either through pre-programmed automatic devices or real-time manual manipulation.
Modulator	Any device, real or software-based, that can be used to perform modulation.
MS Matrix	A processing element that converts a stereo signal into an MS (sum-difference) signal, or vice-versa. Operations can be performed on the MS signal (to increase stereo width, for example) before it is converted back to a stereo signal.
Noise Gate	See "Gate."
Notch	In an equalizer, a cut applied at a specific frequency.
Note Phase	The location in its cycle at which an LFO wave will begin its travel.
OutCeiling	A parameter that sets an algorithm's highest possible output level, thus providing some headroom for any further processing.
Pan	The apparent location of a sound relative to the left and right speakers used in a stereophonic sound system.
Parameter	Any setting of the DP/Pro that can be changed or modified.
Parametric EQ	An adjustable equalizer for targeting specific frequency regions in an audio signal with pinpoint accuracy.
Peak Detector	A level detector that operates on the absolute peaks of a signal. Peak detectors are used in limiters, where fast tracking is essential to avoiding transient overload.
Phaser	Originally conceived as an approximation of a flanging effect. All-pass filters are used in place of the delay lines. All-pass filters introduce delay by modifying signal phase, hence the name.
Predelay	A delay between direct and reverberant signals. Applying some predelay in a reverb can simulate the result of sound bouncing off a far-away surface.
Program Change	A MIDI message which instructs the DP/Pro to select the effect whose number corresponds to the Program Change's numerical value in the currently selected bank.
Pulse Width	A parameter that controls the shape of a pulse waveform. As pulse width is increased from 0% to 100%, the waveform changes from an infinitesimally narrow blip to a fat pulse with very narrow edges. A pulse width of 50% yields a square wave.
Q	A bandwidth control that determines the width of the resonant peak at the center of the frequency band. This is equal to the center frequency divided by the bandwidth. By raising the Q value, a narrower bandwidth is selected.
RAM	For "Random Access Memory"; RAM memory is used in the DP/Pro for the storage of new or edited effects. Effect banks 0 and 1 are RAM memory banks.
Random Seed	The starting point of a random sequence of numbers or of a random waveform.
Randomize	To make a waveform or sequence less predictable by modulating it with a random waveform or sequence.
Rate	Speed.
Reflectivity	The degree to which a surface reflects sound and thus produces echoes. A high reflectivity means relatively loud echoes are produced; a low reflectivity means sound is absorbed, and very quiet echoes are produced.
Regeneration	A signal flow in which some of a system's output is mixed back into its input.
Release	In a level detector (as used in a compressor, limiter, expander, or gate), release time determines the speed at which decreases in level are tracked.
Resonant Peak	A relatively narrow peak in the frequency response of a filter. The narrower the peak, the more resonant, or ringy, will be the sound of the filter (this phenomenon is heard in vintage synths and wah-wah pedals, where the resonant peak is swept in frequency).
Reverb	Multiple echoes and reflections which combine to create a single prolonged ambience.
Reverb Tail	The trailing edge of a reverb as it fades away.
Routing	A signal-flow setup in the DP/Pro.
S/H	Abbreviation for "sample-and-hold."
Sample and Hold	A modulation source consisting of steps of either random levels or of a repeating sequence of levels.
Send	A signal path that routes an audio signal to a processing element.
Shelf	An equalizer that boosts or cuts a wide range of frequencies above or below a reference frequency. A low shelf, or bass tone control, operates on frequencies below the reference; a high shelf, or treble tone control, operates on frequencies above the reference.

Signal	A quantity, such as a voltage, a current, or a sequence of numbers, that represents a physical phenomenon, such as a sound wave.
Signal Flow	The path that audio follows into, through and out of the DP/Pro.
Sound Wave	A periodic disturbance in air pressure that causes the eardrum to vibrate in response.
Splice Time	In a pitch shifter, the length of the tape splice (or digitally-sampled segment) that is looped at the speed determined by the desired amount of pitch shift. A long splice time gives a smoother sound but more delay, while a short splice time gives a coarser sound but less delay. Ideally, the splice time should be a multiple of the pitch period of the input signal.
Stage	Refers to one filter in a series connection of similar filters. In a phaser, the number of stages refers to the number of phase-shifting filters used; the more stages, the more intense the result.
SysEx	Abbreviation for "System Exclusive."
System Clock	A reference pulse generated used for the synchronization of various algorithm components. The system clock can be set to a fixed value or synchronized to received MIDI clocks.
System Exclusive Data	A form of MIDI data understood only by a particular product. Typically used for the storage of product settings to an external MIDI device, and the reloading of the settings back into the product. Also used as a mechanism for communication between MIDI devices.
System MIDI Channel	The MIDI channel on which the DP/Pro receives Bank Select, Program Change and controller messages
Tap	A point within a network, such as a DDL, from which the signal is routed to an output or to another part of the network.
Thresh	Abbreviation for "threshold."
Threshold	A reference point below which, or above which, a specified result will occur. In a noise gate, for example, a signal whose level falls below the threshold will be attenuated, and a signal whose level exceeds the threshold will be passed.
Transient	A quick, momentary burst of high-amplitude sound.
Value	A DP/Pro parameter's setting.
Variation	A factory-programmed edit of an algorithm; each algorithm offers a selection of variations.
VCF	Abbreviation for "voltage-controlled filter."
Velocity	The force—interpreted in MIDI terms as speed—with which you strike keys on a keyboard. Velocity can be used as a modulator of DP/Pro effects.
Voltage-Controlled Filter	A filter whose cutoff frequency is modulated by a control voltage. Useful for creating wah-wahs and auto-wahs.
Wah-Wah	An audio processing circuit, usually controlled by a pedal, that produces a fluctuating resonant sound.
Warp	To bend or twist. In the Variable-Tap Delay algorithm, to warp the delay spacing or envelope shape is to bend the curve while leaving its basic form intact (this control applies only to the exponential curves).
XLR Connector	A type of professional audio connector, with three pins: Pin 1 is the ground reference, Pin 2 carries the "hot" signal, and Pin 3 carries the anti-phase "cold" signal. Designed for use with balanced inputs and outputs.
Xover	Abbreviation for "crossover." Also used as shorthand for crossover point, or crossover frequency, the frequency that separates two bands of a crossover.

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