ANTARES

# Filter

## QUAD RHYTHMIC MULTIMODE FILTERS

OWNER'S MANUAL

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## Quad Rhythmic Multimode Filters

Owner's Manual

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Printed in USA Rev 1.0 10/03 PN 40205-M01

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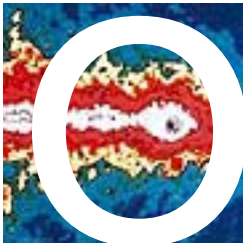
Whew!  Now that that's over, let's get on to the good stuff.

# Contents

# Welcome!



On behalf of everyone at Antares Audio Technologies, we'd like to offer both our thanks and congratulations on your decision to purchase Antares Filter, a powerful, great-sounding, easy-to-use tool for sonic sculpting and creating unique rhythmic harmonic effects for your tracks and mixes.

Before you proceed any farther, we'd like to strongly encourage you to register and authorize your copy of Filter. (You can skip ahead to the Authorization and Installation instructions on page 2. We'll wait.) Also, if you're planning on discarding that lovely Filter box, it's probably a good idea to write down the serial number that appears on the bottom of the box for future reference. (The inside cover of this manual would be a good place.)

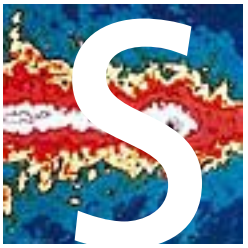
As a Filter owner, you are entitled to receive notification of any software upgrades, technical support, advance announcements of upcoming products and even the occasional special promotion. But we can't send you stuff unless we know who and where you are. So please, register.

At Antares, we are committed to excellence in quality, customer service, and technological innovation. With your purchase of Filter, you have created a relationship with Antares which we hope will be long and gratifying. Let us know what you think. You can count on us to listen.

Again, thanks.

Dr. Sturgeon and The Whole Antares Crew

# Chapter 1: Getting Started



## HOW TO USE THIS MANUAL

Since we already made the "read the words and turn the pages" joke back in the kantos 1.0 manual, we'll forego it this time around (although we certainly encourage you to buy a copy of kantos 1.0 and check it out there).

Instead, while we'd always like everyone to read every word in our manuals, it was our intent in the design of Filter that if you already had some experience programming an analog (or analog modeling) synth with traditional synth filters and modulation, about 90% of Filter would be totally self-evident.

If you count yourself among that group, you can probably get by with reading the installation and authorization instructions in this chapter and then scanning Chapter 3 for the various notes and tips along with the details of the MIDI implementation and the tempo syncing functions.

If, on the other hand, this is your first exposure to filters and modulation, we strongly encourage you to read the entire manual. In particular, Chapter 3 includes not only a guide to Filter's interface, but also introductions to some key filter and modulation basics.

In either case, if you just can't wait to get some sound going, feel free to check out Filter's collection of factory presets (although you might want to read Chapter 4 first). They'll give you a good idea of what Filter is capable of as well as providing inspiration for your own creations. Then come back and dig into the details.

## THE CONTENTS OF THIS MANUAL

### Chapter 1: Getting Started

The chapter you are reading. Includes instructions on installing, registering and authorizing your copy of Filter.

### Chapter 2: Introducing Filter

This chapter provides a brief overview of what Filter is about, as well as descriptions of the functional modules that make up Filter.

## Chapter 3: Filter Controls

This chapter describes in detail the functions of all of the controls used in the Filter interface as well as providing a variety of tips for getting the most out of Filter.

## Chapter 4: About the Factory Presets

Some basic information about making best use of the factory presets that ship with Filter.

## Chapter 5: Fun Facts About Sturgeons

Fun facts to know and share about one of America's most misunderstood fish.

### INSTALLING FILTER

Any special instructions for installing Filter for your specific plug-in format will be located in the Filter Read Me file that accompanies the plug-in. That file may also contain any last-minute Filter information that didn't make it into this manual.

Filter is designed to work as an insert effect with a wide variety of digital audio applications. Please refer to your host application's user manual for more information on installing and using plug-ins.

### AUTHORIZING FILTER

Authorization (the process by which this software is allowed to run on your computer) is accomplished by a technique called "Challenge/Response." Basically, the first time you launch this software you will be presented with a string of words (the Challenge) and will be asked to enter another string of words (the Response).

> *NOTE: When initially installed, this software will run for ten days without authorization.*

So even if you can't authorize it right away you can still use your software in the meantime. (During this period, click the "Try It" button whenever you are presented with the Trial Period screen at launch.) But don't procrastinate too long. After those ten days are up, you will no longer be able to launch Filter until the correct Response is entered.

### CHALLENGE/RESPONSE AUTHORIZATION

You can obtain a Response via the Antares web site, email, or fax. Web authorization, an automated process, is available 24 hours a day. Email and fax authorization involve the participation of actual live people and, depending on when you send your challenge, may take from one to three days to provide a response.

For web authorization, follow these directions:

- Launch Filter. To access Challenge/Response authorization, press "Next" at the Trial Period screen to access the Challenge screen.

  The Challenge screen displays the Challenge string. To receive the appropriate Response you will need to provide us with both the Challenge string and the registration code that was included on the yellow card in your software package (if you bought a retail package) or supplied with your download.

- To obtain your Response, have your registration code and Challenge string at hand. (If you will be accessing the web from the same computer that will be running your software, you can press "Copy Challenge" at the Challenge screen and then simply paste the Challenge into the appropriate field on the web page below.)

- Point your web browser to:

  https://transactions.antarestech.com/

  and simply follow the directions. (Be extremely careful to enter the registration code and Challenge string accurately.)

If, for some reason, you do not have access to the web but do have email, copy and paste your Challenge string and registration code into an email along with your name and the product name (e.g., Filter for MAS), and send it to:

register@antarestech.com

You will receive your Response string by return email.

If you do not have access to the web or email, fax your Challenge string along with your registration code to us at (831) 461-7801. Be sure to include your fax number. We will fax the Response string back to you at that number.

*NOTE: You may optimize (defragment) the hard disk containing the Challenge/Response authorization, or even reinstall your system, without losing the authorization. However, if you reformat the hard drive or if it fails, contact Antares for the re-authorization procedure (you are a registered user, right?).*

## TECHNICAL SUPPORT

In the unlikely event that you experience a problem using Filter, try the following:

1. Make another quick scan through this manual. Who knows? You may have stumbled onto some feature that you didn't notice the first time through.
2. Check our web page for tips, techniques, or any late-breaking information:

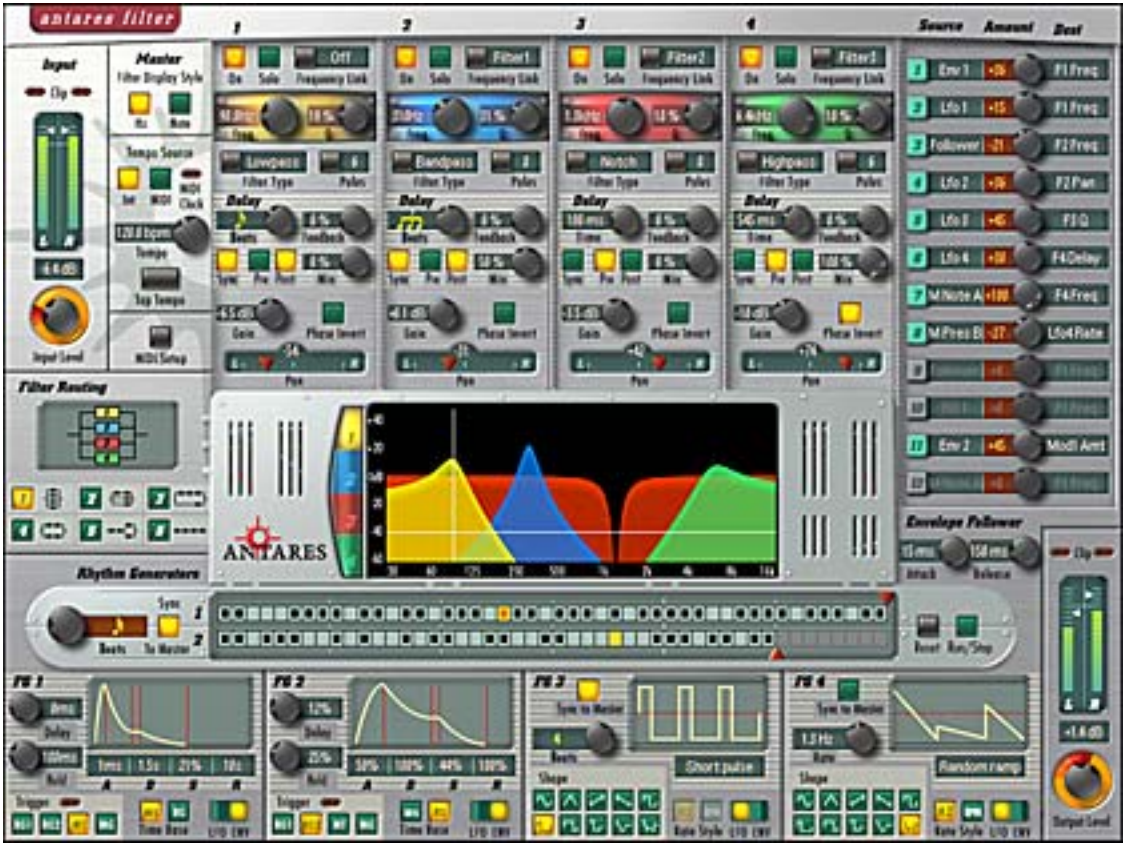
   http://www.antarestech.com
3. Call your local Antares dealer.
4. Email our tech support department by pointing your web browser to:

   http://www.antarestech.com/support/etech.shtml

   and filling in the form there.
5. Call us at (831) 461-7800 (and select option number 3) Monday through Friday between 9am and 5pm USA Pacific Standard Time.

For options 3, 4, or 5, please be prepared to provide the Registration Code of your copy of Filter.

# Chapter 2: Introducing Filter




## SO WHAT EXACTLY IS FILTER?

Filter is a multiformat plug-in designed for anyone who wants to give their digital audio tracks (or complete mixes) new and distinctive sonic character — from subtle harmonic enhancements to dramatic rhythmic effects.

Offering four great-sounding stereo multimode filters, a prodigious complement of control sources, powerful modulation capabilities, and features optimized for the rhythmic loop-based applications so prevalent in today's popular music, Filter is a flexible, fun, easy-to-use power tool for the experienced synth programmer and dedicated tweaker.

But even if you're new to filters, you can still get great results right out of the box since Filter comes ready-to-use with a boatload of professionally developed factory presets designed for a wide variety of applications.

## SO WHAT'S THE BIG DEAL WITH FILTERS, ANYWAY?

This is the section where we were originally planning to present a sort of "Filters for Dummies" introduction to what audio filters are all about. We were thinking that an analogy to some familiar everyday filter process might be effective.

Initially, we were going to base our analogy on the common drip coffee filter. It seemed to make sense. With the coffee filter, you put your raw materials (ground coffee beans and hot water) into the filter, which passed through what you wanted (rich, great tasting coffee), while filtering out what you didn't (a mess of soggy coffee grounds). In a way, this was just like Antares Filter, where you put your raw materials (your original track) into the filter, which passed through what you wanted (stunning sound), while filtering out what you didn't (any undesired harmonic content).

Unfortunately, while it appeared promising at first, the more we looked at it, the more the analogy started to break down. For instance, if you accidentally leave Filter running all night, you won't come down in the morning to find a disgusting pool of burnt, acrid audio. And no matter how much you use Filter, you're never faced with the unappetizing prospect of having to empty a wet disintegrating mess of unwanted overtones. And thankfully, you'll never have to pour a quart of dilute vinegar through your DAW's channel inserts.

In the end, we decided that this probably wasn't such a great approach after all.

So instead, let's just take a closer look at what Filter includes:

- **Four warm, analog-sounding stereo multimode filters**
  Modeled on the legendary analog filters of yore, Filter's filters give you great sound and smooth control response (and did we mention that there's four of them?).
- **Lowpass, highpass, bandpass and notch modes with variable resonance**
  Create all the classic synth filter effects, plus a huge variety of new effects only possible by combining multiple filters
- **Variable cutoff slope**
  To allow filtering from gentle to radical, each filter can be set for 2 pole (12 dB/oct), 4 pole (24 dB/oct), 6 pole (36 dB/oct), or 8 pole (48 dB/oct) response characteristics

- **Four independent delay sections**

  Four full-featured Delay sections with feedback and mix for stunning rhythmic delay effects. Each filter's Delay section can be patched pre- or post- filter and can be used alone with no filtering if desired.

- **Multiple filter routing options**

  Use Filter as four independent parallel filters, one four-section series filter or in a variety of parallel/series combinations. Six choices in all.

- **Four flexible Envelope Generators**

  As a modulation source, each Envelope Generator offers Delay, Attack, Decay, Sustain Level, Hold Time, and Release parameters and can be triggered by one of the Rhythm Generators or by MIDI. All of an Envelope's time-based parameters can be set in absolute time or synced to your song's master tempo

- **Four multi-shape LFOs**

  Each Low Frequency Oscillator offers a choice of 10 different waveforms, including three different types of random waves. Each LFO's rate can be set in Hertz or BPM and, like all of the time-based parameters in Filter, can be synced to the master tempo.

- **Envelope Follower**

  For classic effects like auto-wah (and lots more), the Envelope Follower lets you control filter parameters with the dynamic characteristics of your input audio.

- **Two Rhythm Generators**

  The two drum machine-style Rhythm Generators let you easily program loop-based grooves or complex polyrhythms. And of course, their tempo can be set in BPM or synced to the master tempo.

- **Powerful Modulation Matrix**

  Filter's Modulation Matrix lets you bring your patches to life by routing the various internal control sources and external MIDI controllers to virtually any of Filter's key parameters.

- **Extensive MIDI control**

  Filter lets you lock all of its parameters to MIDI clock as well as providing extensive MIDI control capabilities, either from prerecorded MIDI tracks or live in real time from a variety of MIDI controllers.

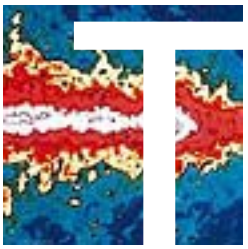
- **Every time-based parameter syncable to internal master tempo or MIDI Clock**

  Each of Filter's modules with time-based parameters can be set in absolute time or can be synced to Filter's master clock, in which case all parameters will automatically scale properly and remain in sync as the tempo is changed.

- **A straight-forward, informative, easy-to-use interface**
  Filter has been designed to be fun and easy-to-use. Virtually every parameter is immediately accessible, with graphic representations of filter, envelope, LFO and Rhythm Generator settings.
- **A comprehensive collection of great-sounding, ready-to-use presets**
  Even if you've never played with a filter before, Filter gives you a great out-of-the-box selection of useful, professionally developed presets designed to provide solutions for a wide range of sonic needs.

Check out the next chapter for all the aromatic details.

# Chapter 3: Filter Controls



This chapter is a reference for all of the controls used in the Filter interface.

## General Control Behavior

### KNOBS

- When the cursor passes over an active knob control, it changes to a double-ended horizontal arrow. Click, hold, and move the mouse to the right to increase the value of the associated parameter or move it to the left to decrease the parameter.
- To allow more precise setting of tempos, rates and filter frequencies, pressing Shift while adjusting those knobs will increase the control's resolution.
- Option-click (Mac) or Alt-click (PC) a knob to return it to its factory default value.

  *NOTE: If the cursor does not change to the horizontal arrow when over a knob, it indicates that that control is not currently active. (In that case, the knob's associated data display will also be grayed out.)*

### DATA DISPLAYS

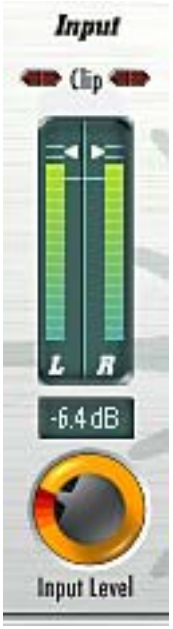
The various alphanumeric data displays act as parameter value indicators for their associated controls as well as allowing direct data input.

- For fields with continuous numeric values, single-click the field to highlight the entire value. You may then:
  - > Type a new value (replacing the previous value)
  - > Use your keyboard's up and down arrow keys to increment or decrement the highlighted value
  - > Click in the highlighted value to place the cursor at the point you click and edit the current value

  When you have changed a field's value by any of these techniques, type Enter or Return to accept the new value.

  If you edit a field's value but then change your mind before typing Enter or Return, click anywhere outside the data display to return to the original value.

- For fields with a set of discrete choices (e.g., Filter Type, Poles, LFO Shape, etc.), click on the field to display a popup menu of the available choices.




## Input Section

### INPUT LEVEL

Use the Input Level knob to set your audio track's input level. In most cases, start by setting the highest level that does not result in clipping. The numeric display will indicate in dBs the exact amount of gain applied.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 0dB.

### LEVEL METER(S)

On a mono track, Filter may be instantiated in either a mono->mono or mono->stereo version. In either case, the Input Section will display a single level meter.

Filter can be instantiated in a stereo->stereo version on a stereo track, and in that case the Input Section will display dual level meters.

In either case, the small white triangles indicate instantaneous peak levels and the red Clip "LED" will light to indicate signal clipping.


## Master Section

This is where you make settings that effect the overall plug-in.

### FILTER DISPLAY STYLE

Click the appropriate button to display the filters' frequencies in either Hertz or MIDI note names. The horizontal scale of the graphical filter display will also change to reflect this selection.

### TEMPO SOURCE

The Tempo Source buttons select between Filter's internal clock and your host's MIDI clock. Whichever is chosen becomes the Master Clock to which each of Filter's time-based parameters will be synchronized whenever their individual Sync To Master buttons are pressed (see below for details about syncing Filter's various parameters to the Master Tempo).

### MIDI CLOCK INDICATOR

If the Tempo Source is set to MIDI, this indicator will light whenever Filter is receiving MIDI clock from your host.

*VERY IMPORTANT NOTE: In order to use MIDI Clock as the source of Filter's Master Tempo, you must be sure that your host is properly routing MIDI Clock to Filter. If the MIDI Clock Indicator is not lit, Filter is not getting MIDI Clock. Host programs typically each have their own method of routing MIDI Clock. Consult your host's manual to ensure that you have correctly configured the MIDI Clock routing.*

## TEMPO

If Int (Internal) is selected as the tempo source, use the Tempo knob to set the desired tempo over a range of 10.0 BPM to 400.0 BPM.

For ease in setting precise tempos, press Shift while turning the knob to adjust the tempo by 0.1 BPM.

The numeric display will indicate selected tempo in BPM.

You may also click in the numeric display and type in the desired tempo.

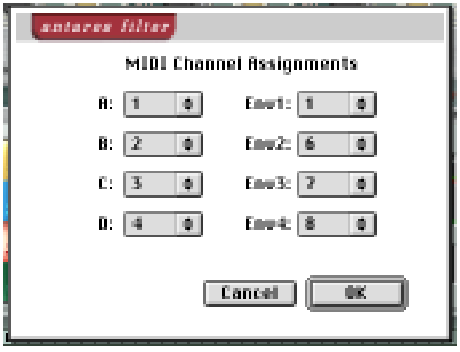
Option (Mac)/Alt (PC) clicking the knob will reset the value to 120.0 BPM

If Tempo Source is set to MIDI, the Tempo control will be inactive. However, if your host program provides the MIDI tempo value to plug-ins, the data display will display the tempo of the received MIDI Clock.

## TAP TEMPO

If Int is selected as the tempo source and you want to match Filter's tempo to an existing track whose BPM you don't know, just click on the Tap Tempo button in time with the track's tempo. Repeatedly clicking the button causes Filter to calculate the time between clicks, from which it will derive the tempo.

If Tempo Source is set to MIDI, this control is inactive.




## MIDI SETUP

Pressing MIDI Setup opens a dialog box for selecting which MIDI channels will supply the control signals for use in the Modulation Matrix and to let you assign MIDI channels for triggering the Envelope Generators. (Using MIDI for these purposes is covered in detail in their respective sections below.)

In either case, simply select the desired MIDI channel from each assignment popup menu.

*ANOTHER VERY IMPORTANT NOTE: In order to use MIDI in the Modulation Matrix or to trigger Envelope Generators, your host application must be capable of routing MIDI to a plug-in. Luckily, most modern plug-in formats and hosts provide this capability. However, there are a lot of freeware and shareware host applications out there (particularly for the DirectX format) and it is inevitable that some will not support routing MIDI to plug-ins. If you are using one of these, you will not be able to access any of Filter's MIDI functions and, frankly, your Filter experience is going to be severely compromised.*


## Filter Settings

The heart of Filter is its four multimode filters. Although the four filters are color-coded for ease of understanding the various routing options and to identify each filter's response plot on the Graphic Filter Display, they are in all other ways identical. The following control explanations refer to Filter #1, but the other three filters provide exactly the same controls.

### ON

The On button turns the filter section on or off. When a filter is turned off, all of its controls become inactive and its response plot does not appear on the Graphic Filter Display.

If a filter in parallel mode is turned off, its output is removed from the patch.

If a filter in series mode is turned off, it is as if that filter simply doesn't exist (i.e., it does not prevent signal from getting to the next filter in the chain). For example, if you select a series configuration that routes Filter #1 to Filter #2 to Filter #3, and then turn Filter #2 Off, the output of Filter #1 will pass directly to Filter #3.

*NOTE: Clicking Solo on a filter that is Off will temporarily turn it on and Solo it. However, unclicking Solo will return the filter to an Off state.*

### SOLO

Clicking Solo will solo the output of the filter (i.e., will mute all but the soloed filter). When a filter is soloed, only its plot will appear on the Graphic Filter Display and the controls of all other filters will be inactive.

Solo is an exclusive function. Only one filter can be soloed at a time.

## FREQUENCY LINK

The Frequency Link menu lets you slave a filter's frequency to any of the other filters, so that changing the frequency of the master filter causes the linked filter's frequency to move in parallel. The linked filter's frequency control also remains active (e.g., to adjust its relationship to the master filter).

> *NOTE: Just to be very clear, when you select a filter in a filter's Frequency Link menu, the filter selected in the menu becomes the master. For example, if you are setting the parameters for Filter #3 and select Filter #1 in Filter #3's Frequency Link menu, changing the frequency of Filter #1 will cause Filter #3's frequency to move in parallel. On the other hand, changing Filter #3's frequency will have no effect on Filter #1, but will redefine the interval between Filter #1 and Filter #3.*

When a filter is linked to another filter, it will respond to any frequency change of the master filter, whether by manual control, modulation in the Modulation Matrix or automation applied to the master filter's frequency.

> *NOTE: When adjusting the frequency of the master filter causes linked filters to "pin" against the upper or lower frequency limits, the filters' relationships will be compressed. However, if the master is moved such that the original relationships can be restored, they will be. (The Graphic Filter Display (see below) will make this behavior quite clear)*

FREQUENCY LINK OPTIONS The basic intent of the Frequency Link function is to allow you to set up a patch with the filters' frequencies in a specific relationship and then easily move all of the filters while maintaining that relationship. However, depending on your exact goal, there are a number of ways to set up your links:

- SINGLE MASTER Define one Filter as the sole master and link all of the other filters to that one (e.g., link Filters #2, #3 and #4 to Filter #1). This configuration lets you control all of the filters by controlling the master while also letting you individually control any of the slaves without affecting any of the other slaves.
- SERIES LINKS Link multiple filters in series (e.g., link Filter #2 to #1, #3 to #2 and #4 to #3). This configuration also lets you control all of the filters by controlling the first in the series, but controlling intermediate filters also affects filters later in the link series. In the above example, for instance, adjusting Filter #3 also affects Filter #4 but has no effect on #1 or #2.
- COMBO LINKS As you'd imagine, any combination of the above two approaches. For example, link Filter #2 to Filter #1 and then link both Filters #3 and #4 to Filter #2. It will be left as an exercise for the reader to figure out how this configuration would behave.

### FREQUENCY

Use the Freq knob to set the filter's cutoff frequency. Hold the Shift key on your keyboard while moving the knob for higher resolution. Depending on the setting of the Filter Display Style in the Master section, the numeric display will indicate the frequency in Hertz or by MIDI note name. The actual effect of the cutoff frequency depends on the filter type selected (see Filter Type below).

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 1kHz.

A filter's cutoff frequency can also be set graphically in the Graphic Filter Display (see below), in which case the filter's Freq knob and data display will change to reflect that setting.

### Q (RESONANCE)

The effect of increasing resonance differs from filter type to filter type, but in general it increases the volume of signal at the cutoff frequency while further attenuating signal on either side of the cutoff frequency. (In the case of a notch filter, increasing resonance makes the notch both narrower and less deep.) Playing with a filter's resonance while listening to audio and watching the filter's plot on the Graphic Filter Display will make its behavior abundantly clear.

Use the Q knob to set the filter's resonance from 0% (none) to 100% (maximum).

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 0%.

A filter's resonance can also be set graphically in the Graphic Filter Display (see below), in which case the filter's Q knob and data display will change to reflect that setting.

### FILTER TYPE

Click on the Filter Type button to display a popup menu of available filter types. The choices include:

- LOWPASS  Passes all frequencies below the cutoff frequency and attenuates all frequencies above the cutoff frequency with a slope defined by the filter's Poles setting (and potentially modified by the Q setting).
- HIGHPASS  Passes all frequencies above the cutoff frequency and attenuates all frequencies below the cutoff frequency with a slope defined by the filter's Poles setting (and potentially modified by the Q setting).

- BANDPASS  Attenuates all frequencies above and below the cutoff frequency with slopes defined by the filter's Poles setting (and potentially modified by the Q setting).
- NOTCH  Passes all frequencies except for a band around the cutoff frequency. The width and depth of the notch are defined by the filter's Poles and Q settings.
- FLAT  Passes all frequencies with no modification (i.e., no filtering of any kind). This setting is provided to give you the option to use a filter section solely for its Delay function.

### POLES

The Poles setting defines the slope at which the filter attenuates frequencies at increasing distance from the cutoff frequency. This parameter is usually expressed in dBs of attenuation per octave. For example, a lowpass filter with a slope of 24dB per octave (the slope of many classic synth filters) means that a signal one octave above the cutoff frequency will be attenuated by 24dBs, a signal two octaves above the cutoff frequency will be attenuated by 48dBs, at 3 octaves 72dBs, etc.

Expressed as filter poles, 2 poles provide 12dB/oct of attenuation. The available slopes for each filter are:

2 poles = 12dB/oct
4 poles = 24dB/oct
6 poles = 36dB/oct
8 poles = 48dB/oct

As with Q above, changing the poles setting while listening to audio and watching the filter's plot on the Graphic Filter Display will make its behavior clear.


## Delay Section

Each filter includes its own independent tempo-syncable delay section with feedback and mix controls. (And by setting a filter's type to Flat you have the option of using its delay section without any filter effects.)

### DELAY TIME/BEATS — TIME MODE

When the delay section is not synced to the master tempo (the Sync button is not lit), this parameter is labeled Time and is set in milliseconds.

Use the Time knob to set the desired delay time over a range of 1ms to 2000ms (two seconds).

For ease in setting precise times, press the Shift key on your keyboard while turning the knob to adjust the time by 1ms.

The numeric display will indicate the selected delay time in ms.

You may also click in the numeric display and type in the desired time.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 100ms.

### DELAY TIME/BEATS — BEATS MODE

When the delay section is synced to the master tempo (the Sync button is lit), this parameter is labeled Beats and is set in beats or fractional beats relative to the Master Tempo.

Use the Beats knob to select the desired beat division.

The data display will indicate the selected beat as follows:

- For two or more beats, the number of beats (i.e., 2, 3, 4)
- For beat divisions, a graphic representation of the selected beat division

You may also click in the data display to display a popup menu of the available values. The choices are:

32nd note triplet (1/12 beat)
32nd note (1/8 beat)
dotted 32nd note (3/16 beat)
16th note triplet (1/6 beat)
16th note (1/4 beat)
dotted 16th note (3/8 beat)
8th note triplet (1/3 beat)
8th note (1/2 beat)
dotted 8th note (3/4 beat)
quarter note triplet (2/3 beat)
quarter note (1 beat)
dotted quarter note (1 1/2 beats)
2 beats
3 beats
4 beats

Option (Mac)/Alt (PC) clicking the knob will reset the value to 1 beat.

### FEEDBACK

Adjust this control to select how much of the delayed signal is fed back into the input of the delay.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset its value to 0%.

When Feedback is set to 0%, no signal is fed back to the input and you will hear only a single delay. As the feedback amount is increased, you will hear additional repetitions of the delay, each successive repetition at a lower volume (the higher the setting, the more repetitions). As the feedback amount approaches 100%, the delay becomes self-sustaining.

### SYNC

Click on this button to set the delay time in beats or fractional beats relative to the Master Tempo. The button will light to indicate this state, the Time knob label will change to Beats, and its data display will read in beats. Clicking the button again will return the delay time setting to milliseconds.

> *NOTE: Keep in mind that in addition to simply defining the delay time's unit of measure, a further difference is that when you set delay time in milliseconds you are setting an absolute time, while when you set it in beats you are setting a relative time.*
>
> *For example, if you set a delay time of 500ms, the delay will always be 500ms, regardless of any changes to the tempo of your track. On the other hand, if you have a track at a tempo of 120 BPM and you set a delay time of 1 beat, the delay time will also be 500ms (the length of 1 beat at 120 BPM). However, if later in the track the tempo changes to 150 BPM, the delay time will change to 400ms (the length of one beat at 150 BPM).*
>
> *In short, if the absolute length of the delay is of primary importance, set the delay time in milliseconds. If, however, the delay is a component of a tempo-dependent rhythmic pattern, Sync it to the Master Tempo so that it will remain in proper sync with any tempo changes.*

### PRE/POST

Click one of these two buttons to place the Delay either before or after the filter.

If Pre is selected, the signal is first processed through the Delay section and then passed to the filter for harmonic processing.

If Post is selected, the signal is first filtered and then passed to the Delay section.

Depending on the source material and the delay settings, the resulting effects can be remarkably different. Experimentation is the order of the day.

### MIX

Adjust this control to set the balance between the original input signal and the output of the Delay section.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset its value to Off.

When set to Off, only the input is heard and all of the Delay section controls become inactive. As you increase the Mix amount, more of the delayed signal will appear in the mix. With a setting of 50% you will have an equal mix of the input and the delay. At 100% only the delayed signal is heard.

*NOTE: When the Mix amount is set to Off, the Delay section is completely removed from the signal path. Since the Delay section requires a certain amount of CPU power, setting the Mix to Off for unused Delay sections will slightly (but noticeably) reduce Filter's CPU requirements.*

*A TIP: To create interesting raw material for further filtering, try feeding the delay with a signal rich in harmonics (an entire mix works well). Turn Sync off, set Feedback and Mix to 100% and try experimenting with delay times between 1 ms and 100 ms (or even more). Depending on the actual input signal, you can end up with rich and unusual textures that make great fodder for rhythmic filtering.*


## Filter Output

### GAIN

Use this knob to adjust the gain of the filter to achieve a correct balance with any other filters in the patch.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset its value to 0dB.

*NOTE: In addition to simply balancing the mix of the filters, when setting the initial Gain value you should also keep in mind the potential effect of any modulation sources that will be routed to the filter's Gain. Set the initial Gain such that the sum of the initial setting and the maximum possible modulation amount won't cause the filter's output to clip. This is particularly important if the filter is applying high Q or is acting on an already hot portion of the input's frequency range.*

*ANOTHER NOTE: If you want to mix some of the original unprocessed audio into your preset and your preset does not use all four filters, set one of the unused filters to "Flat" and use its Gain control to set the amount of the original audio in your preset.*

### PHASE INVERT

You guessed it. Clicking this button will invert the phase of the filter's output. "Why might I want to do that?" you might be asking. Well, try sending your signal through two filters in parallel and make exactly the same settings on both filters. Invert the phase of one of the filters. If everything is set up identically, you should get no output (as the out-of-phase version exactly cancels the in-phase version). Now apply some random frequency modulation. Depending on the type of signal and the filter settings, interesting sounds can ensue. If they don't, start tweaking things until they do. More often than not, your efforts will be amply rewarded.

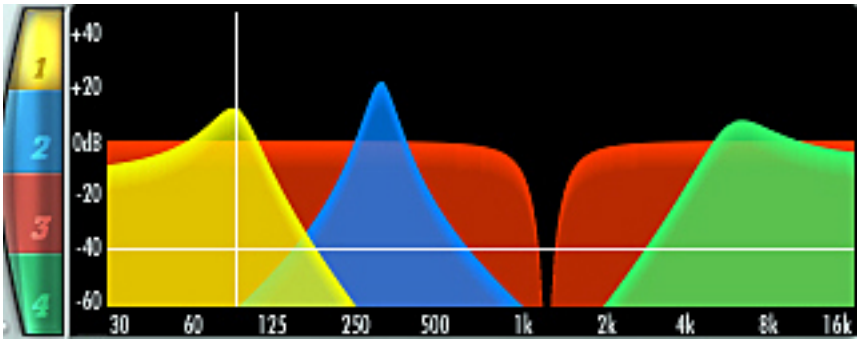
### PAN

The function of the Pan control depends on the version of Filter you have instantiated:

- MONO->MONO  In the Mono->Mono version of Filter this control is grayed out and inactive.
- MONO->STEREO  In the Mono->Stereo version of Filter this control will position its filter's output in the stereo field.
- STEREO->STEREO  In the Stereo->Stereo version of Filter this control acts as a balance control between the filter's two stereo channels.

To adjust the Pan value, click on the red indicator and move it to the desired position or click anywhere on the pan display scale to instantly move the indicator to that position.

Option (Mac)/Alt (PC) clicking anywhere in the Pan display scale will set Pan to 0 (exact center).




## Graphic Filter Display

This display (as its name so ably implies) graphically displays the initial response curves of the currently active filters. This is extremely useful for visualizing the effects of your filter settings and associating their response curves with their audio effects.

Additionally, the Graphic Filter Display allows the adjustment of a filter's frequency and/or Q through the direct graphic manipulation of the filter's response curve.

Here's how it works:

- Each active filter is represented on the display by a color-coded representation of its response curve. The horizontal axis of the display is frequency (in Hertz or Notes, depending on the Display Style setting in the Master section) and the vertical axis displays the amount of gain or attenuation at each frequency in dB.

In other words, where a filter's curve is at 0dB on the display, the filter is having no effect on those frequencies and any signal at those frequencies pass though the filter unaffected. Where the curve dips below 0dB, signals at those frequencies are attenuated by the number of dBs indicated by the curve's position below 0dB. Conversely, where the curve rises above 0dB, the signals at those frequencies are being boosted by the filter's Q.

- For ease of keeping track of which filter is doing what, matching colors appear on the filter sections and their associated display curves, filter selection buttons (to the left of the main display - see below), and filter blocks in the filter routing diagrams.
- In order to graphically adjust a filter's frequency or resonance, that filter's response curve must be at the "front" of the display. There are a number of ways to bring a curve to the front:
  - > Whenever you adjust a filter's Freq, Q, Filter Type or Poles using its controls up in the filter section, that filter's curve will automatically come to the front of the display.
  - > Clicking on any exposed portion of a filter's curve will bring it to the front of the display.
  - > Clicking one of the four Filter Selection buttons to the left of the display will bring the associated curve to the front. (Note that if a filter is currently inactive, its selection button will be dimmed and also inactive.)
  - > Soloing a filter causes it to appear alone on the display (where it will be at the front by default).
- Once a filter's curve is at the front of the display, you can adjust its frequency and Q by manipulating the vertical frequency adjustment and/or horizontal Q adjustment lines.

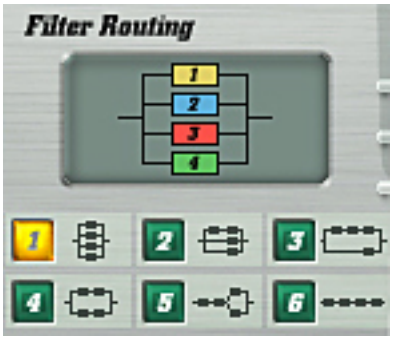
  When the cursor passes over the vertical frequency adjustment line, it changes to a horizontal double-ended arrow. Click on the line and move it right or left to adjust the frequency. Both the graphic curve and the filter's Freq knob and data display will change to reflect any adjustment.

  When the cursor passes over the horizontal Q adjustment line, it changes to a vertical double-ended arrow. Click on the line and move it up or down to adjust the Q. Both the graphic curve and the filter's Q knob and data display will change to reflect any adjustment.

  *NOTE: When a filter's Q is set to its minimum value, the Q adjustment line will be at the very bottom of the display area and can be difficult to see. In that case, just move the cursor to the bottom of the display until it turns into the vertical arrows.*

When the cursor passes over the intersection of the two adjustment lines, it will change to a four-pointed arrow. Clicking on the intersection will allow you to adjust both the frequency and Q simultaneously.

- Turning a filter Off eliminates its curve from the display

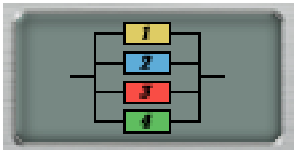



## Filter Routing

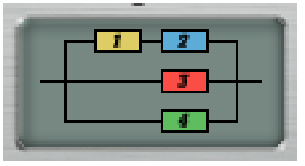
Here's where you select the way your audio is patched through the four filters.

To select one of the six routings, click the button next to the tiny little routing diagram. The button will light and the selected color-coded routing diagram will appear in the routing display.

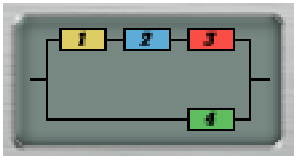
The available routings are:



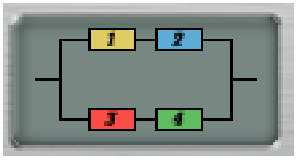
1 ALL FOUR FILTERS IN PARALLEL With this routing you are essentially working with four independent filters. Your audio is routed to the input of each filter where it is processed and then mixed with the output of the other three filters.



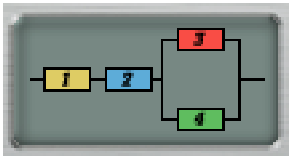
2 FILTERS #1 AND #2 IN SERIES AND #3 AND #4 IN PARALLEL Your audio is routed to the input of Filter #1 and after being processed is sent to the input of Filter #2. The output of Filter #2 is mixed with the outputs of Filters #3 and #4.



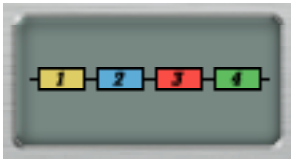
3 FILTERS #1, #2 AND #3 IN SERIES AND #4 IN PARALLEL Your audio is routed to the input of Filter #1 and after being processed is sent to the input of Filter #2 where it is processed and sent to the input of Filter #3 whose output is then mixed with the output of Filter #4.



4 FILTERS #1 AND #2 IN SERIES AND #3 AND #4 IN A SEPARATE SERIES CONFIGURATION Here the filters are arranged as two independent series (we were going to say two parallel series, but we figured that was just asking for trouble). The audio is routed to the first in each series, with the outputs of the second in each series mixed together.




5 FILTERS #1 AND #2 IN SERIES WITH THEIR OUTPUT ROUTED TO #3 AND #4 IN PARALLEL In this configuration, audio is routed to the input of Filter #1 and after being processed is sent to the input of Filter #2. The output of Filter #2 is then sent to the inputs of both Filter #3 and Filter #4 where it is processed in parallel with the outputs of #3 and #4 mixed together for the final output.

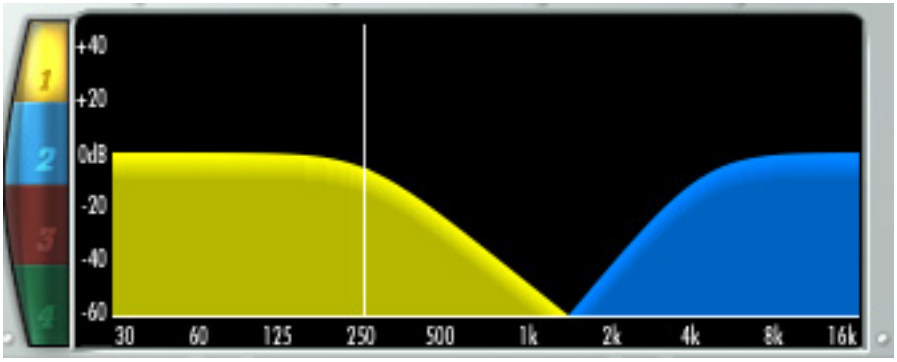



6 ALL FOUR FILTERS IN SERIES In this configuration, the audio is first routed to Filter #1 and its output then passed through each filter in turn for further processing. It should be noted that in this configuration it is extremely easy to end up with no audio at the output. See the following notes for details.

*IMPORTANT NOTE: Unlike routing configuration #1, which is pretty much foolproof, when you route filters in series, you need to pay close attention to each filter's configuration and cutoff frequency to avoid ending up with a patch that makes no sound. Since each filter subtracts some portion of a signal's harmonic content and then passes it on to the next filter for more to be subtracted, it's all too easy in series routings to end up with nothing left at the final output.*

*When this happens, solo each filter in the series in order from the first to last to find out where the audio disappears and then modify the offending filters' settings as necessary.*

*As an example, suppose you're processing a wideband signal through Filters #1 and #2. You've set Filter #1 for lowpass at 250Hz and Filter #2 for highpass at 5kHz, so the filter display will look like this:*




*It's obvious that when the two filters are routed in parallel, the output will be your original audio with the range between 250Hz and 5kHz seriously filtered. However, switch to routing #2 and you will hear no output at all. The reason is that Filter #1 starts out by removing the portion of your audio above 250Hz and then passes the remaining*

*portion on to Filter #2 which removes audio under 5kHz. Since the entire signal from Filter #1 is under 5kHz, there's nothing left to send to the output.*

*ANOTHER NOTE: The one place where series routing is not only useful, but pretty much required is when you're dealing with multiple notch filters. As an example, choose routing #6 and set all four filters to notch at different frequencies. Link #2, #3 and #4 to #1 and sweep #1's frequency to hear the effect. Now switch to routing #1 and try the same thing. There will be very little effect because each of the parallel filters is "filling in" the other 3 filters' notches.*

*YET ANOTHER NOTE: When using parallel routings, and particularly routing #1, keep in mind that the final output is the sum of all of the active filters' outputs. If you have three or four filters emphasizing the same frequency ranges or with high Qs, you can generate levels that can cause clipping and distortion. To prevent this, adjust the individual filters' Gain controls to eliminate the clipping.*

## Function Generators

Filter's four Function Generators provide a huge variety of dynamic control signals that can be used in combination with the Modulation Matrix to affect pretty much any key Filter parameter.

Each of the four Function Generators provides both an Envelope Generator and a Low Frequency Oscillator (LFO), thereby offering a simultaneous total of 4 Envelope Generators and 4 LFOs. Even though each Function Generator can only display the interface of one or the other at a time, both functions are available simultaneously in the Modulation Matrix, i.e., Function Generator 1 provides both LFO 1 and Env 1, Function Generator 2 provides both LFO 2 and Env 2, etc.

Use the LFO/ENV rocker switch in the lower right hand corner of each Function Generator to select which function to display.


### LFOs

Each of Filter's four identical LFOs (Low Frequency Oscillators), provides 10 different shapes — including three different random shapes — and can be set to an independent rate or synced to Filter's Master Tempo.

*NOTE: When using an LFO to produce a desired effect on a particular parameter, it is important to recognize that the LFO provides a bipolar control signal, i.e., the signal is centered around the value of 0 (the value at which it has no effect on the controlled parameter) and (except for the random shapes) moves symmetrically both above and below 0.*

*What this means in practice is that an LFO will cause the parameter it is controlling to alternately increase and decrease relative to its initial value. If you are going to control something with an LFO, the parameter's initial value should be set with this behavior in mind.*

### SYNC TO MASTER

Click on the Sync To Master button to toggle its state.

When the button is lit, the LFO is locked to Filter's Master Tempo and its rate is set in beats or fractional beats relative to that tempo. When it is not lit, the LFO's rate can be set directly in Hz or BPM.

*NOTE: When an LFO is Synced To Master, it is truly locked to the master tempo, its rate can not be affected by modulation.*

### RATE STYLE

When an LFO is not Synced To Master, click one of the two Rate Style buttons to display the LFO's rate in either BPM or Hz. (This function also serves as a handy Hz to BPM calculator.)

When an LFO is Synced To Master, this control is inactive and the buttons are grayed out.

### RATE/BEATS

This control is used to set the LFO's frequency. Its label and function depend on the state of the Sync To Master button.

*NOTE: Whether you are setting the frequency as an absolute rate or in relative beats, this control defines the time it takes the LFO to complete one cycle of the selected shape (keep in mind that each LFO's Graphic Shape Display shows three complete cycles). So for shapes 1-7, the frequency is the time it takes for the LFO to start at zero, move through its selected shape and then return to zero ready to start the cycle again. In the case of the three random shapes, the frequency defines the amount of time that each random value is held. The actual shape of the LFO in these cases depends on which type of random shape is selected and the actual sequence of values (see the LFO shape descriptions below).*

## BEATS

When the LFO is synced to the master tempo (the Sync To Master button is lit), this parameter is labeled Beats and is set in beats or fractional beats relative to the Master Tempo.

Use the Beats knob to select the desired beat division.

The data display will indicate the selected beat as follows:

- For two or more beats, the number of beats (i.e., 2, 3, 4, ...16)
- For beat divisions, a graphic representation of selected beat division

You may also click in the data display to display a popup menu of the available values. The choices are:

32nd note triplet (1/12 beat)
32nd note (1/8 beat)
dotted 32nd note (3/16 beat)
16th note triplet (1/6 beat)
16th note (1/4 beat)
dotted 16th note (3/8 beat)
8th note triplet (1/3 beat)
8th note (1/2 beat)
dotted 8th note (3/4 beat)
quarter note triplet (2/3 beat)
quarter note (1 beat)
dotted quarter note (1 1/2 beats)
2 beats
3 beats
4 beats
…
16 beats

Option (Mac)/Alt (PC) clicking the knob will reset the value to 1 beat .

## RATE

When the LFO is not synced to the master tempo (the Sync To Master button is not lit), this parameter is labeled Rate and is set in Hz or BPM (depending on the Rate Style setting).

Use the Rate knob to set the LFO's frequency over a range of 0.10 Hz to 20 Hz or 6 BPM to 1200 BPM.

For ease in setting precise rates, press the Shift key on your keyboard while turning the knob to increase the resolution.

The numeric display will indicate the selected rate in Hz or BPM.

You may also click in the numeric display and type in the desired rate.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 1 Hz or 60 BPM.

*NOTE: Keep in mind that in addition to simply defining the LFO frequency's unit of measure, a further difference is that when you set LFO rate in Hz or BPM you are setting an absolute frequency, while when you set it in beats you are setting a relative frequency.*

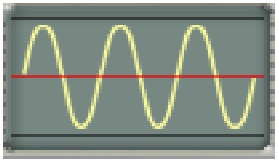
*For example, if you set an LFO rate of 12 BPM or .20 Hz (they are equivalent), the LFO will complete a single cycle in exactly 5 seconds, regardless of any changes to the tempo of your track. On the other hand, if you are Synced To Master and have a track at a tempo of 120 BPM and you set the rate to 10 beats, the LFO will also complete a single cycle in exactly 5 seconds (the length of 10 beats at 120 BPM). However, if later in the track the tempo changes to 150 BPM, the LFO's rate will change to one cycle every 4 seconds (the length of 10 beats at 150 BPM).*

*In short, if the absolute length of the LFO pattern is of primary importance, set the rate in Hz or BPM. If, however, the LFO is a component of a tempo-dependent rhythmic pattern, Sync it to the Master Tempo so that it will remain in proper sync with any tempo changes.*

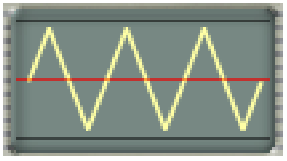
## SHAPE

To select one of the LFO's 10 shapes, click on the appropriate Shape button or click on the shape name to display a popup menu of the available choices. In either case, a graphic representation of 3 cycles of the chosen shape will appear on the Shape display.

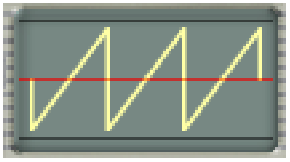
The available shapes are:



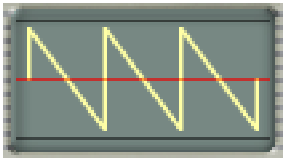
SINE: Starting at zero, the control signal moves smoothly to the maximum, to the minimum, and then back to zero. Great for smoothly sweeping filter frequencies.



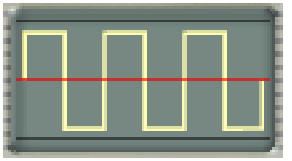
TRIANGLE: Similar to the Sine shape, but with a sharp (and potentially audible) change of direction at the maximum and minimum points.



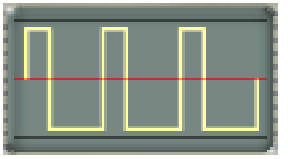
RAMP UP: Starts by instantaneously jumping to the minimum value and then spending the entire cycle moving up to the maximum value.



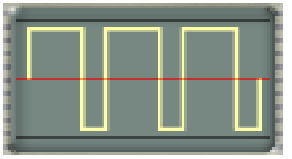
RAMP DOWN: The inverse of the Ramp up. Starts by instantaneously jumping to the maximum value and then spending the entire cycle moving down to the minimum value.



SQUARE: Jumps to maximum where it spends 50% of the cycle and then jumps to minimum for the remaining 50% of the cycle. Used to rhythmically switch a parameter between two specific values.

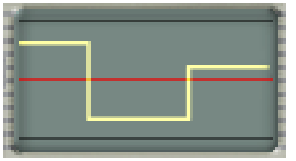


SHORT PULSE: Like the Square shape, but spends only 25% of the cycle at maximum and 75% at minimum.

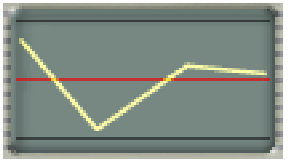


LONG PULSE: The inverse of the Short Pulse. Spends 75% of the cycle at maximum and 25% at minimum.

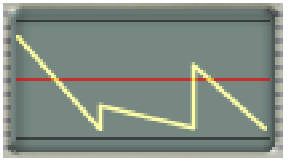
THE RANDOM SHAPES: For the three Random shapes, a random value is generated for each cycle period. The shapes differ in how they transition from value to value:



RANDOM HOLD: For this shape, the LFO remains at the random value for the entire cycle period and then instantaneously changes to the next value. This is the classic sample-and-hold effect so beloved on early analog synthesizers.



RANDOM SLEW: With Random Slew, the LFO glides smoothly from value to value, taking exactly one cycle to move from the last value to the next one. Useful in moderation for adding some random "human error" to an otherwise too perfect parameter.



RANDOM RAMP: This unique shape starts each cycle by instantaneously jumping up to the new random value and then spending the rest of the cycle ramping down to minimum.

*TIP: Try routing the Random Ramp shape to a filter's frequency and gain. Sync the rate to the master tempo and select a beat of an 8th or 16th note. By adjusting the filter's initial frequency and gain and the LFO's modulation depths, you can create a variety of percussive rhythms with intricate, randomly generated harmonic accents. Fun stuff.*

*ANOTHER TIP: A quick way to familiarize yourself with the effects of the various shapes is to filter a rich pad-type sound with a bandpass filter with Q set to 50%. Assign an LFO to control the filter's frequency (see the Modulation Matrix section for details). Set the LFO's rate to 27 BPM (or so) and listen to the effects of shapes 1–7. Then boost the rate to 299 BPM and try each of the three random shapes. All should become clear.*

## FUNCTION DISPLAY SELECTOR

Click on the LFO/ENV rocker switch to select which of the Function Generator's functions to display. Remember that both functions (LFO and Envelope) are active simultaneously, regardless of which one's controls are currently displayed.


## ENVELOPE GENERATORS

Each of Filter's four identical Envelope Generators provide a flexible way to create event-based control signals for controlling various Filter parameters. Each Envelope offers multiple triggering options and parameters that can be programmed in absolute time or synced to Filter's Rhythm Generators.

*NOTE: When using an Envelope to produce a desired effect on a particular parameter, it is important to recognize that the Envelope, unlike an LFO, provides only a positive-going control signal, i.e., the signal starts at the value of 0 (the value at which it has no effect on the controlled parameter) and thereafter produces only positive values.*

*What this means in practice is that an Envelope will always* cause the parameter it is controlling to increase relative to its initial value. If you are going to control something with an Envelope, the parameter's initial value should be set with this behavior in mind.*

** Well, not always always. If you set a negative modulation amount in the Modulation Matrix (see the Mod Matrix section below for details), the shape of the envelope will be inverted, causing the parameter it is controlling to decrease relative to its initial value. But we're getting ahead of ourselves.*

## ENVELOPE OVERVIEW

An Envelope Generator is essentially a control signal that follows a preset series of actions at rates and for times that you program. For Filter's Envelope Generators, those actions are:

1 TRIGGER A trigger is an external signal that tells the Envelope Generator to begin its actions. In Filter, that trigger can come from one of the two Rhythm Generators or from a MIDI Note On command.

2 DELAY (optional) You can set a delay time between when the Trigger is received and when the Attack phase begins.

3 ATTACK in the Attack phase, the Envelope's signal rises from zero to the maximum value at the programmed Attack rate.

4 DECAY During the Decay phase, the signal falls from the maximum level to the Sustain level at the programmed Decay rate.

5 SUSTAIN LEVEL This is the level that is maintained during the Hold time.

6 HOLD TIME This is the amount of time that the Envelope remains at the Sustain level. Depending on the Envelope's Trigger Source, the Hold Time is set by the Hold control or by the MIDI Gate time.

7 RELEASE During the Release phase, the signal falls from the Sustain level to zero at the programmed Release rate.

*IMPORTANT NOTE: If a new trigger is received by the Envelope Generator before it has finished all of the phases described above, it will immediately reset to step #2 and start the process over at that point.*

## TIME BASE

Click one of the two Time Base buttons to select the units for the Envelope's time and rate-based parameters. Choosing "ms" (milliseconds) will allow you to program the parameters in absolute time. Choosing "RG" (Rhythm Generators) will allow you to program the parameters as a percentage of the Rhythm Generator step time (see the Rhythm Generator section below for details on setting the RG step time).

*NOTE: When you choose RG, keep in mind that you are setting the rate parameters as a percentage of one RG step. If you have programmed an RG to supply a trigger on every step and you want to have the envelope complete its entire cycle with each trigger, make sure that the sum of all the rate parameters does not exceed 100%. Likewise, if you have programmed an RG to supply a trigger on every other step and you want to have the envelope complete its entire cycle with each trigger, make sure that the sum of all the rate parameters does not exceed 200%. Etc.*

*ANOTHER NOTE: Like the Delay time and LFO rate described above, when you set Envelope parameters in milliseconds, you are setting an absolute time or rate, while when you set them as a percentage of the RG step time, you are setting a relative time or rate.*

*This is of particular importance when you are triggering an Envelope with a Rhythm Generator. In that case, you will often want to set the parameters in terms of the RG tempo so that if you later need to change the tempo, the Envelope will rescale itself to remain in proper proportion to the rhythm pattern.*

*In short, if the absolute length of the Envelope is of primary importance, set the parameters in milliseconds. If, however, the Envelope is a component of a tempo-dependent rhythmic pattern, set it in terms of the RG step time so that it will remain in proper sync with any RG tempo changes.*

### DELAY

This control is used to set the delay time between the arrival of a trigger and the onset of the Attack phase. The numeric display will indicate the time in milliseconds or as a percentage of the Rhythm Generator step time.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 0 ms or 0%.

*NOTE: You must be careful when setting the Delay to ensure that the delay time is not longer than the time between triggers. If a new trigger arrives before the entire delay time has passed, the envelope will reset to the start of the delay time and the Attack phase will never be reached, giving the impression hat the Envelope is somehow "broken"or otherwise nonfunctional.*

### ATTACK

The Attack rate is set graphically on the Graphical Envelope Display by moving the cursor over the Attack area of the display until the cursor turns into a double ended horizontal arrow. Click and hold the mouse button and move left or right to set the desired rate. Then you will see a graphical representation of the Envelope's Attack contour and the numeric display will indicate the time in milliseconds or as a percentage of the Rhythm Generator step time.

Option (Mac)/Alt (PC) clicking while the cursor is the double ended arrow will reset the value to 0 ms or 0%.

You may also click in the numeric display and type in the desired value.

### DECAY RATE AND SUSTAIN LEVEL

The Decay Rate and Sustain Level can be set simultaneously on the Graphical Envelope Display by moving the cursor over the Decay or Sustain area of the display until the cursor turns into a four-pointed arrow. Click and hold the mouse button and move left or right to set the desired Decay Rate and up or down to set the desired Sustain Level. You will see a graphical representation of the Envelope's Decay and Sustain contour and the numeric displays will indicate the selected values.

Option (Mac)/Alt (PC) clicking while the cursor is the four-pointed arrow will reset the Decay Rate to 50 ms or 12% and the Sustain Level to 70%.

You may also click in the numeric displays and type in the desired values.

### HOLD TIME

This control is used to set the time that the Envelope will remain at the Sustain Level. The numeric display will indicate the time in milliseconds or as a percentage of the Rhythm Generator step time. For ease in setting precise times, press the Shift key on your keyboard while turning the knob to adjust the time by 1ms.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 160 ms or 19%.

> *NOTE: This control is inactive if the Envelope's Trigger Selector is set to MG (MIDI Gate).*

### RELEASE

The Release time is set on the Graphical Envelope Display by moving the cursor over the Release area of the display until the cursor turns into a double ended horizontal arrow. Click and hold the mouse button and move left or right to set the desired rate. Then you will see a graphical representation of the Envelope's Release contour and the numeric display will indicate the time in milliseconds or as a percentage of the Rhythm Generator step time.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking while the cursor is the double ended arrow will reset the value to 1.0 sec or 40%.

### TRIGGER SELECTOR

Click one of the four Trigger Selector buttons to choose the source of the Envelope's trigger. The choices are:

- **RG1** (Rhythm Generator 1) The envelope will be triggered whenever Rhythm Generator 1 is running and encounters an active cell. (See the Rhythm Generator section below for details.)

- **RG2** (Rhythm Generator 2) The envelope will be triggered whenever Rhythm Generator 2 is running and encounters an active cell.
- **MT** (MIDI Trigger) The envelope will be triggered whenever it receives a MIDI Note On message on the MIDI channel assigned to the Envelope in the MIDI Setup dialog.

  For example, if you assign MIDI Channel 6 to Envelope 2 in the MIDI Setup dialog and set Envelope 2's trigger source to MT or MG, Envelope 2 will be triggered whenever a Note On message is received on Channel 6.
- **MG** (MIDI Gate) As in the MT mode, the envelope will be triggered whenever it receives a MIDI Note On message on the MIDI channel assigned to the Envelope in the MIDI Setup dialog. However, in MG mode, the Hold Time control is ignored and instead, the Envelope's Sustain phase continues until a MIDI Note Off message is received on the assigned MIDI channel. (The Envelope's Hold Time control is inactive when MG is selected.)

### TRIGGER INDICATOR

The Trigger "LED" lights whenever a trigger is received from the selected source.

**A Few Tips on Using MIDI Triggering:**

- When triggering an envelope using MIDI, the MIDI commands can come not only from a track programmed in your host's MIDI sequencer but live from a MIDI controller.
- When using a MIDI track to trigger an envelope, it is easy to ensure that every Note On and Note Off is exactly where you want it. However, when using a MIDI keyboard live, it is probably useful to send in Mono Mode on the selected track to help prevent imprecise fingering from resulting in unwanted multiple triggers or unexpected Note Offs.
- To "play" a filter in much the same way you'd play a MIDI synth, use the Modulation Matrix to assign a MIDI Channel's Note messages to a filter's frequency and assign the same MIDI Channel to trigger an Envelope that is also assigned to that filter's frequency and gain. The effect is that when you play a key on your MIDI keyboard, the key's Note value sets the filter's initial frequency while the Note On message triggers the Envelope to provide timbral and amplitude articulation.
- While a keyboard might be the most typical live controller, MIDI percussion controllers can also prove useful (and fun), particularly if their velocity control is simultaneously used in the Modulation Matrix to affect a filter's frequency and/or gain.


## Envelope Follower

The Envelope Follower provides a control signal (for use in the Modulation Matrix) that is proportional to the input audio's amplitude (i.e., when the input audio gets louder, the envelope follower's value rises, and vice versa). It's particularly useful for classic auto-wah effects (when patched to a bandpass filter's frequency) as well as a wide range of other effects driven by your audio's dynamics.

As you would expect, the Envelope Follower is most useful on tracks with wide dynamics. Drum loops, for example, will provide Envelope Follower signals that are both rhythmic and dynamic - a powerful combination.

The Envelope Follower's Attack and Decay controls allow you to add a selectable amount of lag to the respective portions of the Envelope Follower's signal. (Easier to hear than explain — just try it).

### ATTACK

This control is used to set the amount of lag time added to the Envelope Follower's Attack. Its effect is to turn very percussive attacks into more legato ones. It can also smooth out unwanted reattacks caused by noise in the audio's attack.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 15 ms.

### RELEASE

This control is used to set the amount of lag time added to the Envelope Follower's Release. The numeric display will indicate the time in milliseconds.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 150 ms.


## Modulation Matrix

Filter's Modulation Matrix is where you assign the various control sources we've described above to the parameters that you want them to control. The Mod Matrix (as its friends call it) lets you choose from eleven internal modulation sources and another 28 possible MIDI sources which can be routed to 52 possible modulation destinations through up to 12 patches (more than enough to get yourself into serious trouble).

### WHAT IS MODULATION?

Modulation is actually one of those big words for a simple process designed to convince the uninitiated that they're dealing with a body of hidden knowledge known only to the "experts." In point of fact, modulation is simply the process of changing some characteristic or parameter of a system.

In audio, modulation usually refers to the process of using one control signal to alter some other sound producing or modifying parameter. For a classic example, turning up the volume on your stereo is an example of "modulating" its amplitude with a "control signal" (your hand turning the knob).

In Filter, the Modulation Matrix is a set of 12 virtual patch cords that let you connect control sources to their destinations. Here's how it works:

### PATCH ON/OFF

Click on the numbered button next to each modulation patch to turn it on or off. When you turn a patch off, its controls become inactive and it is grayed out. However, the patch remembers its most recent settings so that if you turn the patch back on again those settings are restored.

From an organizational point of view, turning off all unused patches makes it easier to see at a glance exactly what's being modulated in a particular preset. Additionally, alternately turning a patch on and off can help you determine if its modulation is having the effect you expect.

*NOTE: Since each patch's default Modulation Amount is 0 (i.e., no modulation), if you turn on a patch but hear no effect, check to make sure that the patch's Amount has been set to some non-zero value.*

## SOURCE SELECTION

Click on the Source field to display a popup menu of all the available sources.

*NOTE: The same source can be used in multiple patches and can therefore simultaneously control multiple destinations.*

Filter's internal sources are:

LFO 1
LFO 2
LFO 2
LFO 4
Envelope 1
Envelope 2
Envelope 3
Envelope 4
Envelope Follower
Rhythm Generator 1
Rhythm Generator 2

The MIDI Controller sources are:

MIDI Note A, B, C, D
MIDI Velocity A, B, C, D
MIDI Mod Wheel A, B, C, D
MIDI Pitch Bend A, B, C, D
MIDI Pressure A, B, C, D
MIDI Volume A, B, C, D
MIDI Pan A, B, C, D

## ASSIGNING MIDI CONTROLLERS TO THE MODULATION MATRIX

The letters A, B, C, and D in the names of the various MIDI Controller modulation sources reference the MIDI Channel assignments made in the MIDI Setup dialog (accessed in the Master Section). This lets you use up to seven different controller messages on four different MIDI channels to control various Filter parameters (for a total of 28 independent MIDI control sources).

As an example, assume that you make the following assignments in the MIDI Setup dialog:

A = MIDI Channel 4
B = MIDI Channel 9
C = MIDI Channel 13
D = MIDI Channel 16

If you then select MIDI Pressure B as the source in a Mod Matrix patch whose destination is Filter Frequency 2, Filter will monitor MIDI channel 9 and use any Pressure messages on that channel to control Filter #2's frequency. Likewise, if you select MIDI Pan D as a source, filter will monitor MIDI channel 16 looking for Pan messages.

*NOTE: You are definitely not limited to using a MIDI control source only for its named function. If you want to use MIDI Volume B to control a filter's delay time or MIDI Pan A to control an LFO's rate, go right ahead, it's no problem.*

## MODULATION AMOUNT

Use this control to set the amount of the modulation, i.e., how much a change in the source value will affect the value of the destination. The greater the absolute value of the number, the more dramatic the modulation effect.

The Amount control is bidirectional. If a negative amount is selected, the control source is essentially inverted (i.e., a higher source value will result in a lower destination value).

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 0.

## DESTINATION SELECTION

Click on the Destination field to display a popup menu of all the available destinations.

*NOTE: The same destination can be selected in multiple patches and can therefore be controlled by multiple sources simultaneously.*

Filter's modulation destinations are:

**Filter Parameters**

Filter Frequency (1-4)
Filter Q (1-4)
Filter Gain (1-4)
Filter Pan (1-4)
Delay Time (1-4)
Delay Feedback (1-4)

**Modulator Parameters**

LFO Rate (1-4)
Envelope Attack (1-4)
Envelope Decay (1-4)
Envelope Sustain (1-4)
Envelope Hold (1-4)
Envelope Release (1-4)

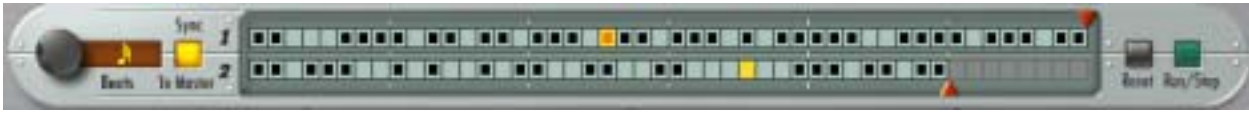
**Special Modulation Parameters**

Mod1 Amount
Mod2 Amount
Mod3 Amount
Mod4 Amount

These four Mod Amount destinations allow one Mod Matrix patch to control the modulation amount of another patch. To use this feature, program the patch whose amount you want to control in patch 1, 2, 3, or 4. Then set up another patch so that its destination is the amount of the patch you want to control.

We realize that this can be a bit mind-boggling, so here's an example:

- Set up patch #1 so that LFO 1 is controlling the frequency of Filter 1, but set the amount to 0 (so the patch will initially have no effect).
- Now program patch #6 with Env 3 as the source and Mod1 Amt as the destination.
- Set Env 3 to have a long Attack and set patch #6's amount to +20. When Env 3 is triggered it will cause the modulation amount of patch #1 to slowly increase and therefore allow you to hear more and more of LFO 1 affecting Filter 1's frequency.




## Rhythm Generators

Filter's two drum machine style Rhythm Generators are the modules that really put the "Rhythmic" in Quad Rhythmic Multimode Filters. They let you easily program loop-based grooves or complex polyrhythms and can be used directly as control sources in the Mod Matrix or can act as rhythmic trigger generators for Envelopes (or both). And of course their tempo can be set independently in BPM or synced to the master tempo. Here's how they work:

### SYNC TO MASTER

Click on this button to set the Rhythm Generators' tempo (which defines the rate at which the Rhythm Generators step from cell to cell) in beats or fractional beats relative to the Master Tempo. The button will light to indicate this state, the Tempo knob label will change to Beats, and its data display will read in beats. Clicking the button again will return the Tempo setting to BPM.

*NOTE (if you've read this entire chapter this far, you probably know what's coming here): Keep in mind that when you set the Rhythm Generators' Tempo in BPM you are setting an absolute tempo, while when you set it in beats you are setting a relative tempo.*

*As always, if the absolute tempo of the Rhythm Generators' patterns is of primary importance, set the tempo in BPM. If, however, the patterns must always remain in sync with the track's tempo (which will usually be the case), select Sync To Master to ensure that it will remain in proper sync with any tempo changes.*

### TEMPO/BEATS

The Tempo/Beats control allows you to set the rate at which the Rhythm Generators step from cell to cell.

### TEMPO/BEATS — TEMPO MODE

When the Rhythm Generators are not synced to the master tempo (the Sync To Master button is not lit), this parameter is labeled Tempo and is set in BPM.

Use the Tempo knob to set the desired tempo over a range of 10 BPM to 999.9 BPM

For ease in setting precise tempos, press the Shift key on your keyboard while turning the knob to adjust the tempo by 0.1 BPM.

The numeric display will indicate the selected tempo in BPM.

You may also click in the numeric display and type in the desired tempo.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 120.0 BPM.

### TEMPO/BEATS — BEATS MODE

When the Rhythm Generators are synced to the master tempo (the Sync To Master button is lit), this parameter is labeled Beats and is set in beats or fractional beats relative to the Master Tempo.

Use the Beats knob to select the desired beat division.

The data display will indicate the selected beat as follows:

- For two or more beats, the number of beats (i.e., 2, 3, 4, etc.)
- For beat divisions, a graphic representation of selected beat division

You may also click in the data display to display a popup menu of the available values. The choices are:

32nd note triplet (1/12 beat)
32nd note (1/8 beat)
dotted 32nd note (3/16 beat)
16th note triplet (1/6 beat)
16th note (1/4 beat)

dotted 16th note (3/8 beat)
8th note triplet (1/3 beat)
8th note (1/2 beat)
dotted 8th note (3/4 beat)
quarter note triplet (2/3 beat)
quarter note (1 beat)
dotted quarter note (1 1/2 beats)
2 beats
3 beats
4 beats
5 beats
6 beats
7 beats
8 beats

Option (Mac)/Alt (PC) clicking the knob will reset the value to 1 beat.

*NOTE: For ease of programming, whenever you select a fractional beat, the small index marks on the Rhythm Generator grid will change to indicate the number of cells that make up one full beat. E.g., if you select 1/8th note, the marks appear every two cells, while if you select 16th note triplet, the marks appear every 6 cells. When any number of whole beats is selected, the marks appear at 4 cell intervals.*

### THE CELL GRIDS

The heart of the Rhythm Generators are the cell grids, where you program each generator's rhythm pattern. These patterns can then be used to trigger Envelopes or to control any of the modulation destinations in the Modulation Matrix.

To create a rhythm pattern:

- Click on an empty cell to cause a black square to appear in that cell.
- Click on a cell that already contains a black square to clear it.
- To set multiple cells, click on an empty cell and hold the mouse button while moving the mouse over a range of cells. All currently blank cells in that range will be filled with squares.
- To clear multiple cells, click on a cell that already contains a black square and hold the mouse button while moving the mouse over a range of cells. All currently filled cells in that range will be cleared.

When the Rhythm Generators are running, the currently selected cell is highlighted in yellow

### THE REPEAT INDICATORS

To set each Rhythm Generator's repeat point, click its red triangular repeat indicator and move it to the point in the pattern where you want it to repeat.

All cells to the right of each indicator are grayed out, but any previously programmed cells are remembered, so that if you later move the repeat indicator back to the right, those cells are restored with their programming intact.

## RUN/STOP

The Run/Stop button is the Rhythm Generators' transport control. It is lit to indicate the Run state and unlit to indicate the Stop state. Clicking on the button toggles its state.

The Run/Stop button functions differently depending on the setting of the Sync To Master button and the selected Tempo Source in the Master section as follows:

### Not Synced to Master

If the Rhythm Generators are not synced to the master tempo (the Sync To Master button is not lit), clicking Run (i.e., clicking the button so it lights) will cause the Rhythm Generators to run at the rate selected by the Rhythm Generator Tempo control.

Clicking the Run/Stop button while the Rhythm Generators are running will cause them to stop with the selected cells remaining at their stop points. Clicking the button again will cause the Rhythm Generators to resume running from the stop points.

### Synced to Master and Master Tempo Set to Int

If the Rhythm Generators are synced to the master tempo (the Sync To Master button is lit) and Tempo Source (in the Master section) is set to Int, clicking Run (i.e., clicking the button so it lights) will cause the Rhythm Generators to run at the rate defined by Filter's Master Tempo and the Rhythm Generator Beat setting.

Clicking the Run/Stop button while the Rhythm Generators are running will cause them to stop with the active cells remaining at the stop point. However, while the Rhythm Generators are stopped, Filter will continuously keep track of where in the rhythm patterns the selected cells would be if the Rhythm Generators had remained running.

In this case, clicking the Run/Stop button again will cause the Rhythm Generators to instantaneously jump forward to the points where they would have been if they had remained running and then resume running from there.

### Synced to Master and Master Tempo Set to MIDI

When the Rhythm Generators are synced to the Master Tempo and the Tempo Source (in the Master section) is set to MIDI (and MIDI Clock is properly routed to Filter), the Rhythm Generators will be controlled by your host's transport controls.

In this situation, the Run/Stop button functions more as a Run Enable button.

When it is in its Stop state (unlit), the Rhythm Generators will not run regardless of the host's transport state.

When it is in its Run state (lit), the Rhythm Generators will run whenever the host's transport is in Play mode and will stop whenever the host's transport is in Stop or Pause mode.

Furthermore, in this mode Filter uses MIDI Clock to keep track of the Rhythm Generator positions for your entire song. Consequently, you can navigate to any point in your song and the the Rhythm Generators will automatically locate to the correct points in their patterns for that position.

We realize that the above can be a bit confusing to read about, but if you just spend a few minutes trying out the Run/Stop button with the various Sync and Master Tempo settings described above, it will all become clear.

### RESET

The Reset button is only active when the Rhythm Generators are not synced to the master tempo (the Sync To Master button is not lit). In that case, clicking the Reset button will force the Rhythm Generators to reset their positions to the beginning of their patterns.

When the Rhythm Generators are Synced to Master, the positions of the selected cells are locked to the master tempo or MIDI Beat Clock and the Reset button has no effect.

### USING THE RHYTHM GENERATORS AS MODULATION SOURCES

When you select a Rhythm Generator as a source in the Modulation Matrix, it works as follows:

- While the selected cell is a blank cell, the Rhythm Generator will send a value of zero and will therefore have no effect on the destination parameter.
- While the selected cell contains a black square, the Rhythm Generator will send a maximum positive value. In this case, it will affect the destination parameter in an amount defined by the patch's Modulation Amount setting. If Modulation Amount is set to a positive value, it will increase the destination parameter, while if it is set to a negative value it will decrease the destination parameter.
- When a Rhythm Generator transitions between a blank cell and a cell containing a black square, the value changes instantaneously from zero to maximum. When a Rhythm Generator transitions between a cell containing a black square and a blank cell, the value changes instantaneously from maximum to zero.

As modulation sources, Rhythm Generators are particularly useful for rhythmically changing parameters between two distinct values.

*A TIP: Another very useful RG function is to rhythmically turn on and off the output of an individual filter. To do this, set the filter's gain to -infinity and patch a Rhythm Generator to the filter's gain with a Modulation Amount of +100. The filter will be silent during empty cells and audible during filled cells. You can then fine tune the On volume by adjusting the Modulation Amount.*

## USING THE RHYTHM GENERATORS TO TRIGGER ENVELOPES

When a Rhythm Generator is assigned to trigger an Envelope, it sends the envelope a trigger signal each time the selected cell moves to a cell containing a black square.

Important Note: Whenever an envelope receives a new trigger, it resets to its beginning. Therefore it's important to be aware of the relationship between an envelope's time parameters - particularly its Attack time and Delay time (if used) - and the Rhythm Generator's trigger rate.

As an (extreme) example, if an envelope has been set to a 10 second Attack time, but the Rhythm Generator that's triggering it is running at 120 BPM and sending a trigger in every other cell, the envelope will be getting a trigger once every second. In that case, its value will only just begin to rise above zero before a new trigger forces it back to zero to start over again.

As mentioned in the Envelope section above, the Delay parameter is even more dangerous. If the Delay time is set longer than the interval between triggers, the envelope will never even get to begin its Attack phase. So be careful.


## Output Section

### OUTPUT LEVEL

Use the Output Level knob to set Filter's main output level. In most cases, start by setting the highest level that does not result in clipping. The numeric display will indicate in dBs the exact amount of gain applied.

You may also click in the numeric display and type in the desired value.

Option (Mac)/Alt (PC) clicking the knob will reset the value to 0dB.

### LEVEL METER(S)

When Filter is instantiated as a mono->mono plug-in, the Output Section will display a single level meter.

When Filter is instantiated in a mono->stereo or stereo->stereo version, the Output Section will display dual level meters.

In either case, the small white triangles indicate instantaneous peak levels and the red Clip "LED" will light to indicate signal clipping.

# Chapter 4: About the Factory Presets

When you install Filter you will also get a generous collection of factory presets designed to provide examples of many of the things that you can do with Filter, from subtle harmonic sweetening to all-out wackification.

While our sound designers have tried to design their presets around general audio categories (voice, guitar, drum loops, pads etc.), there's no way they can predict the specific audio you will be processing with Filter. With that in mind, we offer the following tips for getting the best from the factory presets:

- First and foremost, there are no rules. Try using any audio with any preset. You never know what might happen. That being said, the presets are likely to work most predictably with the type of audio they were designed for.
- When you first call up a factory preset, make a quick scan of the Filter interface to see exactly what's happening. How many filters are active? Which routing? What's going on in the Mod Matrix? Is Filter synced to the host's MIDI and how many of the modules are synced to the master tempo? Are the Rhythm Generators in use?
- If more than one filter is active, try soloing each filter to see what it's doing.
- The various levels in the presets (Input Level, individual filter Gains and Output Level) have been set to work with a wide range of audio. However, depending on the nature of your specific audio, it may be necessary to adjust the various Levels and/or Gains for best balance and effect. In particular, watch out for clipping or distortion. The filters are capable of quite a bit of gain, so if your audio has a lot of energy right at their resonant frequencies, problems could ensue.
- Once the levels are right, the first things to try tweaking are the filters' frequencies. Sometimes a little adjustment is necessary to get the preset dialed in to the sweet spot of your audio. (If there's frequency linking going on, start by adjusting the master filter.)
- In most cases, the preset designers have selected one or two parameters as the most likely candidates for tweaking. Give those a try. Then try anything else.

- If a preset's Master Tempo is set to MIDI, be sure that your host is correctly configured to send MIDI clock to Filter. If it's not getting MIDI clock (i.e., the MIDI Clock indicator is not lit), the preset will not function as it was designed to.
- If a preset is not synced to your host's MIDI clock but makes use of tempo-synced LFOs, Delays, Rhythm Generators or Envelopes, you may have to readjust the internal Master Tempo for the best effect with your particular audio.
- If various time-based parameters are not synced to the master, you may want to individually readjust LFO rates, Delay times, Envelope settings, etc. to work best with your audio.
- We will periodically be posting new presets on our web site for download. Check out the site often for new additions. (Instructions for installing the new presets will be included with the downloads.)

# Chapter 5: Fun Facts About Sturgeons

- Long considered a nuisance fish and hated by commercial fishermen for the damage they did to nets, the once lowly sturgeon has finally achieved status as a top game fish. Prized by the angler for its strength and speed, gourmets and backyard chefs alike have come to savor its firm flesh.
- Instead of scales, sturgeon have tough skin and rows of bony plates called scutes.
- Sturgeons are the most primitive of the bony fishes (family *Acipenseridae)* alive today, modern relics of an ancient group of fishes, changed very little since they appeared 200 million years ago.
- The last known sturgeon in Chesapeake Bay was reported in 1876 in the Potomac River, Washington, DC.

- You can visit a group of pet sturgeons living in a big pond at the Bonneville Dam on the Columbia River, west of Portland, Oregon. Follow that icon to find them.
- The biggest one is named Herman.
- Under their snouts are four hairlike projections called barbels.
- Historically, sturgeon have been reported to live up to 200 years. Today, they generally live 80 to 125 years.
- There have been reports of sturgeon growing to over 1800 pounds. Today's population generally grow to about 600 pounds.
- In the wild, females reach maturity between 15 and 20 years of age and males between 7 and 15 years.
- A female sturgeon can produce up to 3 million eggs (roe). Sturgeon roe (caviar) is sold as a luxury food and commands extremely high prices.
- Isinglass, which is used in the clarification of wines and beers as well as a stiffening agent for jellies, is made from the dried air bladders of sturgeons.

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A DANCING STURGEON?

ANTARES

WHERE THE FUTURE'S STILL WHAT IT USED TO BE