_FILTER MS-20

ARTURIA
_The sound explorers

Special Thanks

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Special Messages

This manual covers how to use Filter MS-2O, provides a comprehensive look at its features, and details how to download and activate it. First, some important messages:

Specifications Subject to Change:

The information contained in this manual is correct at the time of printing. However, Arturia reserves the right to change or modify any of the specifications or features without notice or obligation.

IMPORTANT:

The software, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high volume or at a level that is uncomfortable.

If you encounter any hearing loss or ringing in your ears, please consult an audiologist.

NOTICE:

Service charges incurred due to lack of knowledge relating to how a function or a feature works (when the software is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owner's responsibility. Please study this manual carefully and consult your dealer before requesting additional support.

Epilepsy Warning — Please read before using Filter MS-2O :

Some people are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures. If you or anyone in your family has ever had symptoms related to epilepsy (seizures or loss of consciousness) when exposed to flashing lights, consult your doctor prior to using the software.

If you experience any of the following symptoms: dizziness, blurred vision, eye or muscle twitches, loss of consciousness, disorientation, any involuntary movement or convulsion, while using this software, discontinue use IMMEDIATELY and consult your doctor.

Precautions to Take During Use

- Do not stand too close to the screen. Sit a good distance away from the screen.

- Avoid using if you are tired or have not had much sleep.

- Make sure that the room is well lit.

- Rest for at least 1O to 15 minutes per hour

Congratulations on your purchase of Filter MS-20.

Excellence is placed at the heart of every Arturia product, and Filter MS-2O is no exception. Explore the presets, tweak a few controls, get lost in the features - dive as deeply as you like.

Be sure to visit the www.arturia.com website for information on all our other inspiring hardware and software instruments, effects, MIDI controllers, and more. They have become indispensable tools for many visionary artists around the globe.

Musically yours,

The Arturia team

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1. WELCOME TO FILTER MS-20!

Thank you for purchasing Filter MS-2O. This audio effect plug-in for VST2, VST3, Audio Unit, and AAX formats uses our exclusive TAE® (True Analog Emulation) modeling to bring you a software version of the famed Voltage Controlled Filters from the Korg MS-2O monophonic semi-modular synthesizer – with some seriously cool extras, including elements from the MS-2O's External Signal Processor (ESP).

This versatile plug-in not only includes the High Pass and Low Pass filters with individual Cutoff and Peak (resonance) controls, but also includes a Stereo control that pans the two filters and offsets their cutoff values for dramatic wide stereo effects.

There's also a built-in Distortion with its own Low Cut and High Cut filters, which can be switched with the Filter in the signal path – letting you explore how filtered distortion can sound dramatically different than distorted filtering!

If that's not enough, the Advanced Panel adds a set of three Modulators: an Envelope Follower, Step Sequencer, and Function Generator, each of which can control multiple effect parameters with different amounts. This gives you the power to animate your filter's behavior in a wide variety of ways – with the option to sync to your DAW's tempo as well.

With everything from vintage-quality filtering to outrageously distorted special effects, Filter MS-2O is a simple yet powerful representation of one of the most famous synth filters in history... just without the synth.

1.1. The Korg MS-20: a little history

In 1977, Korg was looking for ways to compete with other manufacturers in the potentially lucrative market for affordable, accessible monophonic analog synthesizers. Electronic music was exploding in popularity in Japan, largely due to the efforts of Isao Tomita and Yellow Magic Orchestra (YMO), and while Korg's PS-Series polyphonic synths stunned listeners with their 48-voice polyphony and huge feature set, their bulk, size, and price were also stunning.

In late 1977, a team at Korg began to develop a new synthesizer, codenamed "MS-20". The design team was headed by Mr. Fumio Mieda, who had designed nearly every Korg product up to that point. Mr. Mieda had a new vision for a new synthesizer: an affordable yet powerful synth aimed more at sound design than careful emulation of acoustic instruments, for a young and curious audience of exploration-minded students and other musicians.

The project was considered an urgent one, as Yamaha had just released its own affordable synth, the CS-10. From the first idea to the finished and shipping synth, the MS-20 was developed in barely six months, with engineers often sleeping in the lab after very long days. The MS-20, its smaller sibling the MS-10, and the SQ-10 sequencer and VC-10 vocoder, were all released in April 1978, and were quickly adopted by players worldwide.

> ℹ Fun fact: the MS-20 was considered such an excellent tool for teaching that Korg made a few units built into oversized flat panels that could be mounted on a classroom wall like a chalkboard!

1.1.1. Those amazing filters

An analog synthesizer's filter is the heart of its sound, defining the instrument's character and making it stand out from other synths. Faced with the need to create a musical, useful filter at a rock-bottom price, Mr. Mieda came up with the Korg 35 filter circuit. It was a work of genius, using only five transistors and six resistors plus a few other components, and could be configured as a high pass or low pass filter. By putting two of these filters in series, bandpass filtering was possible, allowing for interesting vocal-like timbres.

Later in the production run of the MS-20, the filter design was changed to one based on *operational transconductance amplifiers* (OTAs). OTA filters are often characterized as having a "smoother" sound with more controllable distortion and lower noise. Filter MS-20 is modeled after the OTA filter found in later MS-20 units.

The MS-20 filter was so popular that in the 1990s, many artists were using the MS-20 strictly to process external sounds, and several third-party manufacturers were selling the filter circuit in standalone boxes for use as an effect pedal.

1.1.2. External Signal Processor elements

Much of the MS-20's utility as an effects box came from the fact that it was designed to do this from the start. The External Signal Processor was a signal chain of four elements that could process guitar or other signals: an amplifier that was frequently overdriven for a warm and sweet distortion, a band pass filter made from dedicated low cut and high cut filters in series, a frequency-to-voltage converter, and an envelope follower that tracked the dynamics of incoming audio and output a control voltage based on that.

Filter MS-20 contains (in slightly altered form) three of these elements: the amplifier and low/high filters, which are represented in the Distortion section, and the Envelope Follower, which is one of the three Modulators.

1.2. Filter MS-20 Features Summary

- Filter section with Master Cutoff as well as High Pass and Low Pass Cutoff and Peak (resonance) controls
- Distortion section with Drive, Dry/Wet mix, and Low Cut/High Cut frequency settings
- Switchable Filter/Distortion order
- Three Modulators:
    - Envelope Follower
    - Step Sequencer
    - Multi-Segment Function Generator
- Output section with Mix, Movement, and FX Level controls
- Switchable Clean/Dirty Gain modes
- Switchable Resonance Limiting
- Advanced searchable Preset Browser
- Windows or macOS compatible in AAX, Audio Units, and VST2/VST3 formats.

We hope that this powerful, easy-to-use filter becomes an essential part of your creative toolbox, and that it leads you to many great creative discoveries!

2. ACTIVATION AND GETTING STARTED

2.1. Compatibility

Filter MS-20 works on computers and laptops equipped with Windows 8.1 or later or macOS 10.13 or later. It is compatible with the current generation of Apple M1, M1 Pro/Max/Ultra, and other Apple Silicon processors, as well as Macs based on Intel processors. You can use it as an Audio Unit, AAX, VST2, or VST3 plug-in within your favorite recording software.

2.2. Download and Install

You can download Filter MS-20 directly from the Arturia Products Page by clicking either the Buy Now or Get Free Demo options. The free demo is limited to 20 minutes of operation.

If you have not already done so, now is a good time to create an Arturia account by following the instructions on the My Arturia webpage.

Once you install Filter MS-20, the next step is to register the software. This is a simple process that involves a different software program, the **Arturia Software Center**.

2.2.1. Arturia Software Center (ASC)

If you haven't installed ASC yet, please go to this web page: Arturia Downloads & Manuals.

Look for the Arturia Software Center near the top of the page, and then download the installer version for the system you're using (Windows or macOS). ASC is a remote client for your Arturia account, letting you conveniently manage all your licenses, downloads, and updates from one place.

After you complete the installation, proceed to do the following:

- Launch the Arturia Software Center (ASC).
- Log into your Arturia account from ASC's interface.
- Scroll down to the **My Products** section of ASC.
- Click on the **Activate** button next to the software you want to start using (in this case, Filter MS-20).

It's as simple as that!

2.3. Working with Filter MS-20 as a plug-in

Filter MS-2O can be used as a *plug-in* within all major Digital Audio Workstation (DAW) programs including Cubase, Digital Performer, Live, Logic, Pro Tools, REAPER, Studio One, and more.

Plug-ins have numerous advantages over hardware, including:

- You can use as many instances on different tracks as your computer can handle.
- You can automate the plug-in's settings via your DAW's automation feature.
- All settings and changes are saved with your DAW project, letting you pick up right where you left off.

Audio and MIDI settings for Filter MS-2O as a plug-in

When Filter MS-2O is used as a plug-in, settings for audio and MIDI routing are handled in your recording software or DAW. They are generally located in some type of Preferences menu, though each product does things a bit differently. So, consult your recording software's documentation for information on how to select your audio interface, active outputs, sample rate, MIDI ports, project tempo, buffer size, etc.

Now that you've set up your software, it's time to explore all of the possibilities to be found in Filter MS-2O!

Let's not waste any more time – it's time to dive into Filter MS-20 and make some cool sounds!

The Main Panel is where you'll be doing most of your tweaking. We'll talk about the Advanced Panel [p.16] in the next chapter.

3.1. Common Control Gestures

Virtually all controls on the Main Panel (and elsewhere in Filter MS-20) follow a few rules designed to make things more convenient for you, the musician.

3.1.1. Knobs and Arcs

The Main Panel, aside from the Swap [p.14] button, has only two kinds of controls: *Knobs* and *Arcs*.

In the image above, you can see the Master Cutoff knob with its three arcs beside it.

Note that the knob has illuminated numbers for a quick visual reference to what it's doing at the moment. This is important because if the value is modulated, the knob's setting (the white line) will remain stationary, but the illuminated numbers will follow the modulation, providing a sort of live metering for what the modulations are doing.

The Arcs are both controls and displays for the three Modulators in the Advanced Panel [p.16]. As you can see, they can be set to positive or negative modulation amounts, indicated visually in green (Envelope Follower), purple (Step Sequencer), and blue (Function Generator).

To set an arc's value, just click anywhere inside the arc and drag as you would a knob.

3.1.2. Value Pop-Ups
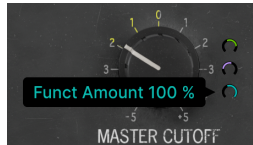
Operate or hover the mouse on any knob or arc, and a "tooltip" pop-up appears, displaying its current value. Note that the plug-in may have to be actively passing signal for these to be visible.

3.1.3. Fine Adjustments

To adjust a control more slowly and precisely, drag while holding Control (Windows) or Command (macOS), or use the right mouse button, while operating it.

3.1.4. Parameter Name Display

As mentioned in the User Interface chapter [p.28], operating or hovering on any control will cause its full name to appear in the left side of the Lower Toolbar.

3.1.5. Hover and Scroll

If you have a mouse or trackball with a scroll wheel, hover it over any control and then use the scroll wheel to adjust it.

3.1.6. Double Click for Default

Last but not least, you can double-click on any control to return it to its default value. To reset an arc, double-click inside the arc.

3.2. Filter

The heart of Filter MS-20 is its Filter. (Please don't tell us that comes as a surprise.)

This is a model of the OTA filter circuit used in later MS-20 units. Check out the MS-20 history [p.4] to learn more about it, and about its predecessor the Korg 35 circuit.

The Filter controls are:

- **High Pass/Low Pass**: independently control the cutoff frequencies of the high pass and low pass filters. Their range is from 20 Hz to 20 kHz, roughly the full range of human hearing. When the High Pass is set to 0 and/or the Low Pass is set to 10, all frequencies are being passed through the circuit and you'll hear no effect. If you only want to work with one of the filters, leave the other one set to 0 (High Pass) or 10 (Low Pass).

- **Peak**: controls the resonance of each filter. If the Limit Resonance [p.12] button in the Lower Toolbar is engaged, the filters won't self-oscillate. If Limit Resonance is not engaged, the filters can be driven into very loud self-oscillation. Have fun, but go easy on the output volume so you don't break anything!

- **Stereo**: This control offsets the cutoff frequency for the signals coming from the left vs. right stereo channels, with 0 being no offset. This control is bipolar, and can create very interesting panning and phasing effects when modulated.

3.2.1. Master Cutoff

Despite its importance, we've left **Master Cutoff** until last because its effect is more complex than it seems. Unlike the hardware MS-20, whose individual filters must be set individually (as with the High Pass, Low Pass, and Peak controls above), Filter MS-20 lets you control both filters' cutoff frequencies at the same time, over a range of –100% to +100%. In a way, this allows the filters to be tweaked as if they are a single Band Pass filter.

The amount of movement from 0 corresponds directly to the amount of movement in both filters, even if that means one filter reaching its limit of control before the other one does.

The following image shows how this works:

*Master Cutoff's effect on High Pass and
Low Pass*

The yellow rings around the Low Pass and High Pass knobs appear whenever you tweak the Master Cutoff knob, and show the range of movement on each knob that corresponds to the Master Cutoff's distance from 0. When you let go of the Master Cutoff knob, the rings vanish.

In this case, we've moved the Master Cutoff to +2. That's 40% (2 out of 5) away from 0.

Notice that on a scale of 0 to 10, the High Pass filter has moved from 3 to 7, or 4 out of 10... which is 40%. If we were to turn the Master Cutoff higher, the High Pass value would continue to rise until it reached 10.

However, the Low Pass filter has already reached 10. It won't go any higher no matter how much we turn the Master Cutoff knob, because it's already maxed out.

As you can see, this allows for some very interesting filter shapes, which can be tweaked in real time with a single knob.

3.2.2. Filter controls on the Lower Toolbar

There are two more Filter controls that can affect the overall tonality of the Filter; because these aren't used very often, they are accessed from buttons found on the Lower Toolbar [p.34].
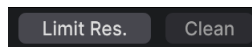
3.2.2.1. Limit Resonance
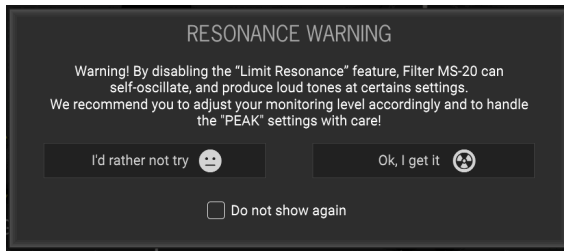
Limit Resonance warning pop-up

Filter MS-20 is designed to emulate the behavior of the original MS-20 filters, and those filters weren't always very civilized. When the Peak is cranked up, these filters will self-oscillate and produce very loud audio that can hurt your speakers and your ears.

If you want to avoid that happening, click the **Limit Res.** button. This will limit the maximum Peak value to roughly a 6 on the non-limited scale, free of self-oscillation.

The first time you click the button, Filter MS-20 will open the pop-up shown above. Click "I'd rather not try" to limit Peak values to prevent self-oscillation, or click "OK, I get it" to venture forth without a safety net. You can choose to not see the warning every time you click the button. Just be sure to follow the warning in the pop-up, so you don't let Filter MS-20 go on a rampage!

3.2.2.2. Clean or Dirty Filter Mode
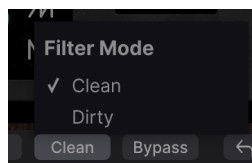
Choose a Filter Mode

The character of the filter changes dramatically depending on the level of the input signal. You can get some really cool dirty overdrive effects this way!

Clicking on the **Filter Mode** button lets you choose between two modes:

- **Clean** *lowers* the input signal before entering the filter, and *raises* the filter's output by the same amount, giving the signal a lot of headroom. This is the default setting.
- **Dirty** *raises* the input signal before entering the filter, and *lowers* the filter's output by the same amount. This pushes the circuit hard and can clip the output when the Peak is turned up high enough. This produces some pretty monstrous sounds even without using the Distortion.

3.3. Distortion

The Distortion section of Filter MS-20 is inspired by elements of the original MS-20's External Signal Processor (ESP), which was designed to process the sounds of guitars or other instruments. Nearly all of the original ESP's elements are made available here.

> ℹ The Distortion section faithfully models the original ESP's dark and heavy tone thanks to a gentle built-in high frequency rolloff, which will remove some highs as you add distortion.

- **Drive**: controls the amount of input amplification the signal receives. The gain ranges from 0 to 50 dB, which is more than enough gain for truly gnarly overdrive. If the signal level reaches a peak that will overload the signal chain's dynamic range, a red LED will light. Depending on the amount of distortion you want, you can look at this light as an indicator of either "Turn it down, quick!" or "Yeah, now that's what I want!".

> ℹ The gain of the Distortion circuit is loudness-compensated, so you can crank it up and get plenty of drive without blowing your speakers.

- **Low Cut/High Cut**: The original ESP had two filters that worked together to form a bandpass filter, which improved the ESP's ability to track input frequencies for frequency-to-voltage conversion. Here, the two filters work together to isolate or notch particular frequencies to give a vocal-like or other organic quality to sounds. Note that neither of these knobs is modulatable.

> ℹ Either or both filters can be turned completely off by setting the Low Cut to 20.0 Hz (0) and/or the High Cut to 20 kHz (10), as shown in the image above.

- **Dry/Wet**: controls the amount of distorted signal mixed with the input signal, from 0 to 100%.

- **Output**: controls the output level of the distortion section. This control can be set from -70 dB to +12 dB, allowing you to adjust the signal level for best results from the Filter or Output section.

3.4. Swap

The **Swap** button simply swaps the order in which signal goes through the plug-in. You can place the Distortion before the Filter, or the Filter before the Distortion; clicking Swap reverses the signal processing order.

> ℹ️ To help you keep things straight, the two sections also swap places in the Main Panel, as shown in the images above.

This is well worth experimenting with! Filtered distortion and distorted filtering sound quite different, and when you add modulation, the range of possibilities gets even wider.

3.5. Output

- **Mix**: controls the global amount of processed signal that's blended with the dry input signal, from 0 to 100%.

- **Movement**: this is a global control that smoothly alters the total amount of modulation applied by all of the Modulators at once, keeping them in proportion to one another for each control being modulated. Think of it as a simple control to give you more or less modulation with one tweak!

- **FX Level**: controls the output level of the distortion section. This control can be set from -12 dB to +12 dB, allowing you to adjust the signal level for best results from the Filter or Output section.

3.6. One more thing...

Yes, the big red **On/Off** switch on the back does something! It's a second Bypass control. No detail too small...

4. ADVANCED PANEL

Click the **Advanced** Button [p.33] at the top right of the upper toolbar to open Filter MS-2O's **Advanced Panel**, which contains three Modulators to add movement and life to your filter explorations:

- an **Envelope Follower**, which creates a modulation signal based on audio input level
- a **Step Sequencer** with 16 independent modulation values playable in various ways
- a **Function Generator**, which produces simple or complex modulation waveforms

4.1. Setting Modulation Amounts

The Modulators can be routed to most of the controls on the Main Panel, with each Modulator having its own positive or negative amount set with the associated Arc [p.8].

> ℹ️ Each Modulator's display will appear static and unmoving until at least one parameter is modulated with it. Then the Modulator will "start".

From top to bottom, the three arcs show:

- Envelope Follower modulation amount in green
- Step Sequencer modulation amount in purple
- Function Generator modulation amount in blue

In the image above, the Master Cutoff is being modulated by +1OO% via the Envelope Follower, by –5O% via the Step Sequencer, and by +5O% via the Function Generator.

To reset any arc's modulation amount to O, double-click inside the arc.

4.2. Envelope Follower

An *envelope follower* does just that: it follows the envelope – the rises and drops in an audio signal's level – and creates a control signal based on that. A very common use of an envelope follower is the *envelope filter* guitar/bass pedal, also called a touch wah or auto-wah. It opens and closes a filter based on the dynamics of the playing, creating a famously funky sound. Filter MS-20's Envelope Follower lets it do this and much more.

The Envelope Follower can follow either the audio input of the effect itself, or a separate audio input called a *sidechain*. It then turn this into a modulation source. In the image above, the Envelope Follower is creating a modulation signal (the green line) in response to the dynamics of a kick drum track (the white waveform display).

4.2.1. Sensitivity and Envelope Follower Source

Use the **Sensitivity** knob to adjust the input gain of the envelope follower from -24 dB to + 24 dB. Adjust it so that the output signal has a wide range but doesn't clip – unless of course you want it to!

Click just beneath the Sensitivity knob to choose the source of the control audio, either **Audio In** or **Sidechain**:
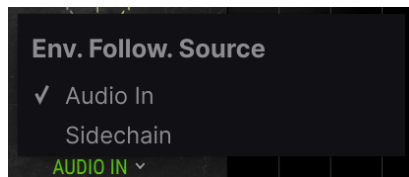
A sidechain input can be useful for *keying* the envelope follower, and whatever parameter(s) it is modulating, to a different musical source. For example, Filter MS-20 can listen to a kick drum track as a sidechain input, and use that to create a rhythmic pulsing filter control on a guitar track.

> ℹ Note: The exact method for setting up sidechain routing will vary based on your DAW, so consult its documentation.

4.2.2. Delay
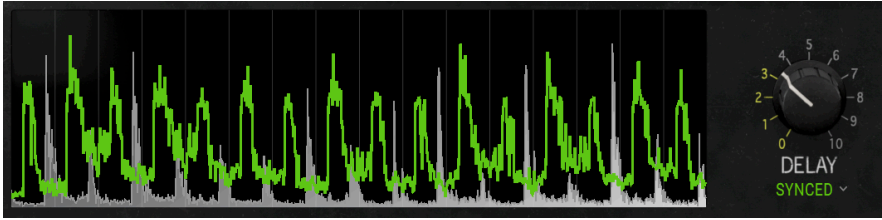
The Envelope follower also has a built-in **Delay**, which can run without sync or sync to the host tempo (usually that of the DAW).

In the image above, Delay is set to 1/16, so the control signal follows each kick by 1/16 of a bar. In this case, kicks are happening 8 to the bar, so the control signal for each kick falls halfway between it and the next kick.

Click below the Delay knob to set the **Time Mode**:

- Unsynced: sets the delay in milliseconds, from 0.00 to 2000 (2 seconds)
- Synced: sets the delay in divisions of a beat, from 1/128 to 4/1 (4 beats)
- Synced Triplets: as above, but the divisions are for triplet note values
- Synced Dotted: as above, but the divisions are for dotted note values
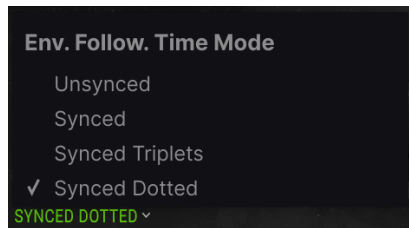
4.2.3. Rise and Fall
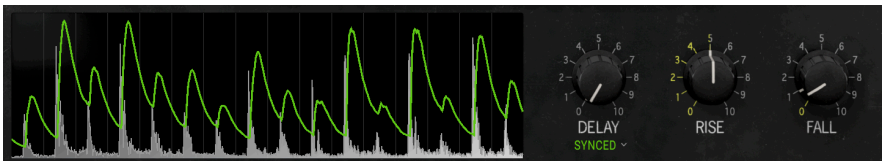
Rise is like the Attack knob on a compressor: It sets how long the Follower takes to "grab on" to the incoming audio and create a control signal. Its range can be set from 0.0 to 1000 milliseconds (1 second).

Fall is like the Release knob: It determines how long the follower takes to "let go" of its control signal once the audio input drops. Its range can be set from 50.0 to 5000 milliseconds (5 seconds).

In the image above, both the Rise and the Fall have been set at 500 ms. You can see how the control signal is now delayed beyond the actual hit, and takes a while to drop back to zero. This gives a smoother control signal that's easier to adjust to provide musical results.

On the other hand, if these times are set very low or at 0, you will see that the green line in the waveform display follows the waveform exactly. You can see this in the first image in this chapter.

4.3. Step Sequencer

Filter MS-20 includes a 16-step sequencer intended to be used as a modulation source.

The central display is where you'll create patterns and set play modes. The sequencer is always running, although it need not affect any modulation destination if left unassigned.

> ℹ If the Step Sequencer isn't assigned anywhere on the Main Panel, you won't see any stepping on the central display. Turn up at least one Step Sequencer arc on the Main Panel to start the display moving. Even when it's not modulating anything, the Step Sequencer is always running and can't be started or stopped.

4.3.1. Rate, Rate Type, and Bipolar

Rate sets the rate at which the Step Sequencer plays the sequence.
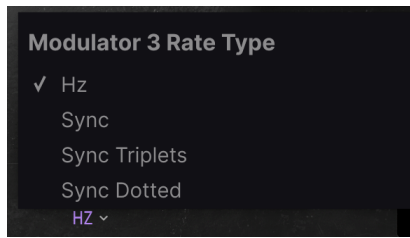
Click below the Rate knob to set the **Rate Type**:

- Hz: sets the rate in Hertz, from 0.010 (one full cycle every 100 seconds) to 20.0 Hz (20 cycles per second)
- Sync: sets the rate in divisions of a beat, from 8/1 (8 bars) to 1/32 (1/32 bar)
- Sync Triplets: as above, but the divisions are for triplet note values
- Sync Dotted: as above, but the divisions are for dotted note values

Bipolar: When this button is lit, the sequence pattern is *bipolar*. Instead of each step having a value between 0 and maximum, steps can have either positive or negative values. When Bipolar is engaged, the display shows a set of faint grey lines where 0 is for each step.

4.3.2. Sequence Length
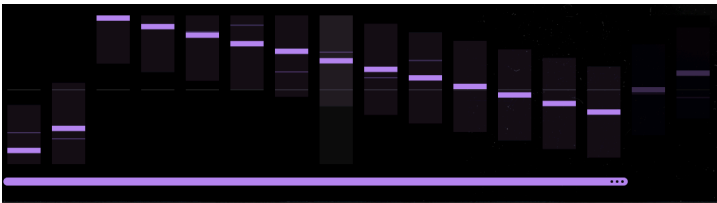
At the bottom of the step display is the **Step Sequencer Length Bar**. Drag on it to set the sequence length from 1 to 16 steps. Unused steps are greyed out at the end of the pattern.

In the image above, the sequence length has been set to 14 steps; the last two steps are greyed out.

4.3.3. Play Mode

To the left of the display are four **Play Mode** buttons with different arrow icons. From top to bottom, the modes are:
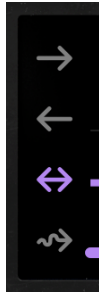
- **Forward:** Steps play in linear fashion from beginning to end.

- **Reverse:** Steps play in linear fashion from end to beginning.

- **Back and Forth:** Steps play forward from beginning to end, then in reverse back to the beginning.

> ℹ The first and last steps will play twice in this mode.

- **Random:** Steps play in random order.

4.3.4. Drawing Tools
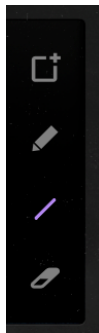
To the right of the display are the **Drawing Tools**. Each tool lets you create or modify sequences in various ways, just by clicking and dragging steps in the Central Display.

From top to bottom, the tools are:

- **Clear**: replaces the current sequence with a new, empty one. If you accidentally clear a sequence, you can recover it with the Undo [p.34] function in the Lower Toolbar.

- **Pencil**: lets you adjust individual steps in the sequence by dragging up and down on them. You can also drag sideways; multiple steps will snap to the vertical position of your mouse cursor.

- **Line**: With this tool, when you drag across multiple steps, they are locked in to ascending or descending order with linear changes in value. You can then click on individual steps to adjust their values if desired. This mode is great for creating steady, repeating rises or falls.

- **Eraser:** Clicking on an individual step will reset it to its default value. You can sweep across multiple steps to reset them all.

4.3.5. Swing, Random, and Smooth
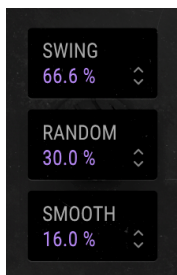
Three more parameters are found at the far right of the panel. Click and drag up or down to change their values.

- **Swing**: adds a swing feel by delaying the second step in each pair of steps. In other words, it's classic sampled drum machine swing. Its value ranges from 50% (no swing) to 75% (heavy swing).

- **Random:** Drag to add random variation in the value of each step. Higher settings increase both the probability that any step will be randomized and the amount by which the value can change.

When you set Random to any value above 0, faint grey bars will appear over each step to show the range of possible randomization. A thin grey line will show the step value for each cycle, and will be reset to new values when a new cycle begins. Random will also shuffle the values for the entire sequence at the start of each cycle.

- **Smooth:** Drag on this parameter to add a degree of smooth value transition from one step to the next. At 0, values jump instantly; at 100%, all possible values between any two steps are covered. Think of this as something like a synthesizer's glide/portamento setting.

4.4. Function Generator
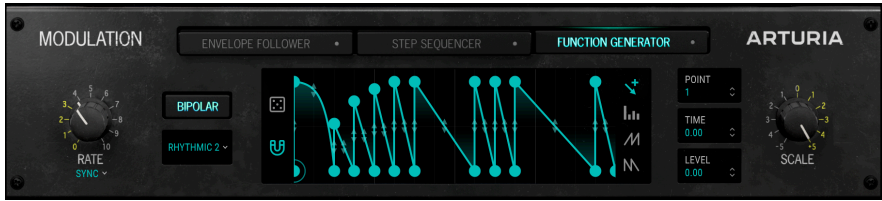
The Function Generator lets you draw and shape curves called *functions*, which can be applied as modulation sources. A variety of drawing and editing tools let you create and save functions in almost any shape you can think of. You can think of functions as very fancy LFO waveforms.
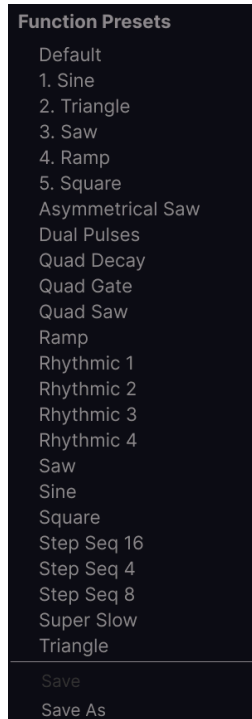
Functions can be unipolar (all values above O) or bipolar (positive and negative values). Click on the **Bipolar** button to choose one or the other.

4.4.1. Rate and Rate Type

Rate sets the rate at which the Function Generator cycles through the function. Click below the Rate knob to set the Rate Type for the Function Generator. These controls are identical in operation and range to the Step Sequencer Rate controls [p.19].

4.4.2. Function Presets

When you click on the Presets button, you get the following pop-up menu:

Function Presets

Default
1. Sine
2. Triangle
3. Saw
4. Ramp
5. Square
Asymmetrical Saw
Dual Pulses
Quad Decay
Quad Gate
Quad Saw
Ramp
Rhythmic 1
Rhythmic 2
Rhythmic 3
Rhythmic 4
Saw
Sine
Square
Step Seq 16
Step Seq 4
Step Seq 8
Super Slow
Triangle

Save
Save As

Feel free to experiment with the factory presets, and note that there are Save and Save As entries for you to create and store your own functions.

4.4.3. Breakpoints and Curves

The tools for creating and editing functions are easy to learn and use. The two primary concepts here are *breakpoints* and *curves*.

A function is made up of a series of breakpoints connected by curves. The breakpoints are indicated on the display by circles, and the curves between them by straight or curved lines. Horizontal position indicates where you are in the function, and vertical position represents the amplitude of the modulation signal at that point.
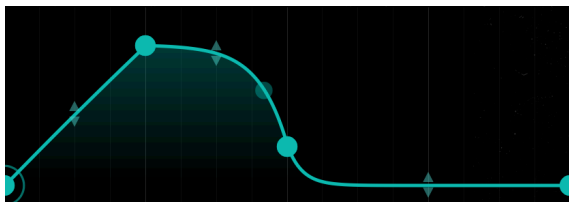
Click anywhere on the display to add a breakpoint; a function can contain up to 34 breakpoints, including the start and end points.

The currently selected breakpoint will have a ring around it. The breakpoint where you hover your mouse will grow slightly larger and will show a ring around it, but won't be selected for editing until you actually click on it.

To delete a point, right-click or double-click on it.

> ! The start and end points can be moved vertically, but they cannot be deleted or moved horizontally. After all, a function has to start and end somewhere, right?

4.4.3.1. Moving a Breakpoint

To change the location of a breakpoint within a function, click its circle and drag it. You can move it up or down to adjust its level. Drag it to the left or right to change its time within the Function.

Alternately, you can drag on the following fields to select and move breakpoints along one axis without affecting the other:
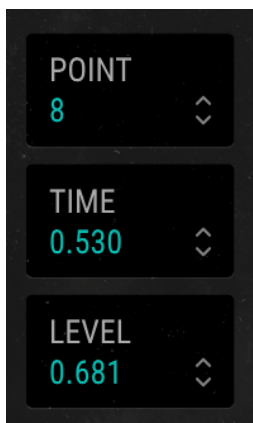
- **Point**: selects individual breakpoints on the visualizer.

- **Time**: moves the selected point in time (horizontally).

- **Level**: moves the selected point in amplitude (vertically).

> You can see these parameters displayed for any breakpoint by hovering your mouse over the point in question.

4.4.3.2. Changing a Curve

Notice that between any two points, in the middle of the curves that connect them, are up/ down arrows. Grab one of these "handles" and gradually move it all the way up or down. The line will warp until it reaches its extreme, at which time it will become completely squared off. The steeper the slope, the faster the change!

4.4.3.3. Drawing Tools

The drawing tools shown below can speed up your function creation by letting you draw repeating shapes via click-dragging inside the display.

Function drawing tools

- **Draw:**: creates a single point.

- **Steps**: creates a repeating square wave-like pattern.

- **Ramp Up**: Creates a repeating pattern of rising sawtooth waves.

- **Ramp Down**: - Creates a repeating pattern of falling sawtooth waves.

4.4.4. Randomize, Magnetize, and Scale

You may have noticed that we skipped over two icons at the left of the display. These are handy extra tricks to help you create functions with more variety or precision.

The dice icon activates **Randomize**. Click and hold the dice icon and move your mouse up and down; this will randomize each breakpoint's amplitude to a greater or lesser extent. Note that as with other parameters, right-clicking will produce finer changes than left-clicking.

The magnet icon activates or deactivates **Magnetize**. This makes each breakpoint a tiny bit "magnetic" – you can set a breakpoint to any horizontal position, but if you want to be sure to hit a precise point on the rhythmic grid, getting the breakpoint close to it and releasing the mouse will "click" it into place.

Finally, **Scale** determines the overall strength of the function's effect. It has a range of -1.0 to +1.0. Negative values will invert the shape of the function; this effect is shown graphically on the display when you change the Scale.

5. USER INTERFACE

This chapter covers the user interface elements of Filter MS-2O. Aside from two specific exceptions that we discussed in the section on the Filter [p.11], they all relate to working with the plug-in's general features and are common to many other Arturia plug-ins. They include:

- The Upper Toolbar, including
  - the Main Menu and
    - the Preset Browser [p.39]
- The Lower Toolbar

5.1. Upper Toolbar

Let's start with the Upper Toolbar, covering its functions from left to right.
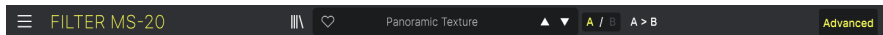
5.1.1. Main Menu
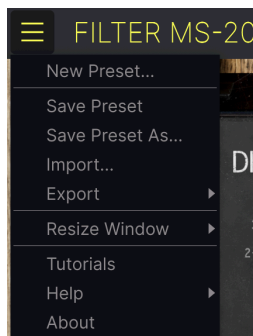
Clicking the "hamburger" icon (three horizontal lines) in the top left corner of the upper toolbar opens the Main Menu, a drop-down menu that lets you access a number of useful functions related to Preset management and more.

5.1.1.1. New Preset
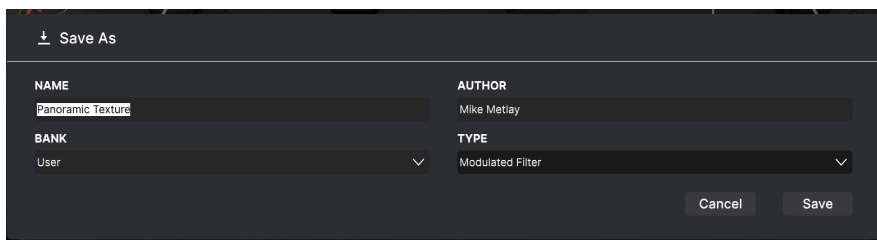
Creates a new Default Preset with initialized settings for all parameters.

5.1.1.2. Save Preset

Overwrites the current Preset with any changes you have made. This applies only to user presets, so this option is greyed out for factory presets.

5.1.1.3. Save Preset As...

Saves the current settings of Filter MS-20 under a new Preset name. Clicking this option reveals a window where you can name your Preset and enter more detailed information about it:

> ♪ The Bank, Author, and Type fields are all useful when searching for Presets in the Preset Browser [p.39].

5.1.1.4. Import...

This command lets you import a Preset file or entire Bank stored on your computer. It opens a navigation window in your computer's OS to find the proper files.

5.1.1.5. Export...

You can export Presets to your computer in two ways – as a single Preset, or as a Bank. In either case, an OS-level navigation window lets you specify where to save the file(s).

- **Export Preset...:** Exporting a single Preset is handy for sharing a preset with someone else. The saved preset can be reloaded using the **Import** menu option.

- **Export Bank:** This option exports an entire Bank of Presets, which is useful for backing up or sharing many Presets at once. Saved Banks can be reloaded using the **Import** menu option.

5.1.1.6. Resize Window

Filter MS-20 can be resized from 50% to 200% of its default size (100%) without any visual artifacts. On a smaller screen, such as a laptop, you may want to reduce the interface size so it doesn't dominate the display. On a larger screen or a second monitor, you can increase the size to get a better view of the controls and graphics.

This operation can also be performed using keyboard shortcuts: every time you press CTRL- (Windows) or CMD- (macOS), the window will shrink by one size increment, and every time you press CTRL+ (Windows) or CMD+ (macOS), the window will grow by one size increment.

5.1.1.7. Tutorials

This Filter MS-20 tutorial introduces you to the Advanced Panel.

Filter MS-20 comes with interactive tutorials that walk you through different features of the plug-in. Clicking this option opens a pane on the right side of the window where the tutorials appear. Select one to access step-by-step descriptions that highlight the relevant controls and walk you through the process.

5.1.1.8. Help

Get more help by visiting links to this user manual and Frequently Asked Questions pages on Arturia's website. You will need an internet connection to access these pages.

5.1.1.9. About

Here you can view the software version and developer credits. Click again anywhere on the screen (outside the About window but inside the plug-in) to make this pop-up window disappear.

5.1.2. Preset Browser Access and Name Pane
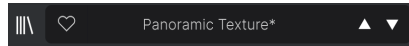
The Preset Pane

Clicking the "books on a shelf" button opens the Preset Browser [p.39], which offers a myriad of ways to browse, sort, and organize Presets in Filter MS-20.
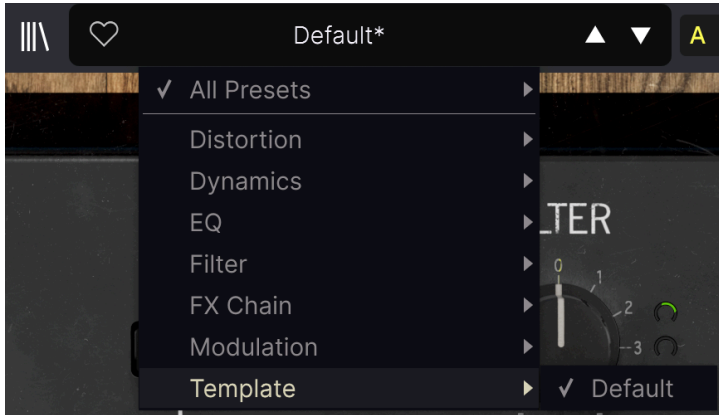
Selecting Template from the drop-down menu shows the one Template Preset: Default.

Clicking on the Preset name also opens up quick drop-down menus for selecting Presets outside of the Browser. You can select to look at lists of Presets organized by Type, as shown above, or look at All Presets at once, as shown below:
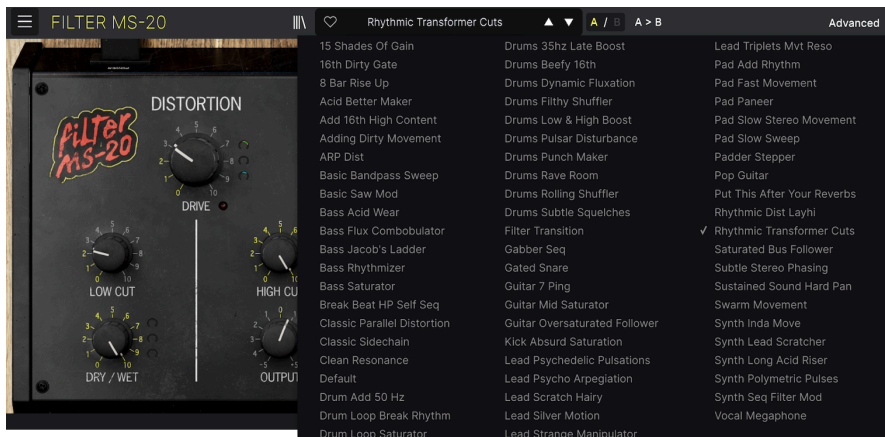
Everything all at once!

Everything you'll need to know about managing Presets will be covered in detail in the chapter on the Preset Browser [p.39]. This includes working with Favorites, which are tagged by clicking the heart icon.

5.1.3. A/B Settings and Copy

Each Preset is actually two Presets in one! Using the A and B buttons, you can switch between two completely different sets of knob settings in both the Main Panel [p.8] and the Advanced Panel [p.16]. These are saved within each Preset.

When A is active, clicking **A > B** will copy the A settings to B. When B is active, clicking **A < B** will copy the B settings to A.

5.1.4. Advanced Button
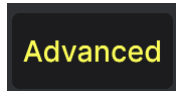
Near the upper right corner of the top toolbar is the **Advanced** button. This opens up a panel which we cover in detail in the Advanced Panel [p.16] chapter.

5.2. The Lower Toolbar

Lower toolbar, left side

The Lower Toolbar of the Filter MS-20 interface has two parts. On the left is the Control Description display, and on the right are buttons for several useful utility functions.

5.2.1. Control Description

Modulator 1 Bipolar: Sets whether the modulator output is bipolar or unipolar

This Control Description pops up when you mouse over the Bipolar button in the Advanced Panel

The Control Descriptions appear and tell you what any knob, button, icon, or other control does, simply by hovering your mouse over it.

5.2.2. Lower Toolbar Functions

Lower Toolbar functions

The right half of the lower toolbar is home to a number of other very useful functions.

From left to right, these are:

5.2.2.1. Limit Res.

This button activates or deactivates Resonance Limiting, as discussed in more detail in the section on Filter controls [p.12].

5.2.2.2. Filter Mode (Clean or Dirty)

This button pops up a menu where you can select Clean or Dirty filter behavior, as described in the section on Filter Controls [p.12].

5.2.2.3. Bypass

The **Bypass** button bypasses the plug-in. (What a surprise, right?)

5.2.3. Undo, Redo, and History

When editing a plug-in, it's all too easy to overshoot a sweet spot and then wonder how to get back to where you were. Like all Arturia plug-ins, Filter MS-20 offers comprehensive Undo, Redo, and History so that you always have a trail of "bread crumbs."

Use the arrows to go back and forward one control movement or other action at a time.
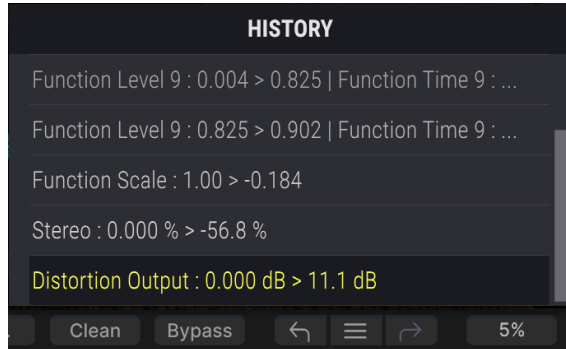
5.2.3.1. Undo

Click the left arrow to revert to the state before the most recent edit you made. You may click repeatedly to undo several edits in reverse time order.

5.2.3.2. Redo

Click the right arrow to redo the most recent edit you undid. If you have undone several, you may click repeatedly to redo them in forward time order.

5.2.3.3. History

Click the "hamburger" (three lines) center button to open the History window, as shown above. This provides a step-by-step account of every move you have made in Filter MS-20. Clicking on an item in the list not only re-executes that move — it returns the plug-in to the overall state it was in when you first made that move.

> ℹ Note that the A and B controls settings within a Preset have separate Undo Histories.

5.2.3.4. CPU Meter

At far right is the **CPU Meter**, which displays the overall load Filter MS-20 is placing in your computer CPU. Since it deals only with this plug-in, it is not a substitute for the overall CPU metering tools in your DAW.

5.2.3.5. Panic

Mousing over the CPU Meter accesses the PANIC function

Mouse over the CPU Meter, and it will display the word PANIC. Click to send an all-sounds-off command and kill any filter self-oscillation if present. This is a momentary command, so sound will resume if your DAW is still playing.

In the event of serious runaway audio (say, from an unrelated delay effect going nuts in a feedback loop), use the FeedBack Mute button; if that doesn't work, stop your DAW playback and disable the plug-in causing the problem.

5.2.3.6. Maximize View Button

If you resize the Filter MS-20 window larger and some of its parameters are pushed outside the viewable range of your computer display, you may see this icon in the far lower right corner of the window, just to the right of the CPU Meter:
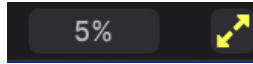

Click it, and the window will resize and re-center to optimize your available screen space.

6. SELECTING PRESETS

Filter MS-2O lets you browse, search, and select Presets from a browser-like interface inside the plug-in. You can also create and save your own Presets in the User Bank. Of course, the state of any instance of the plug-in – including the current Preset – is automatically saved when you save your DAW project, so you can always pick up where you left off.

6.1. Preset Name Pane
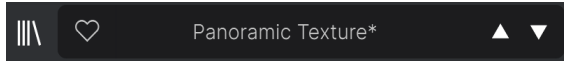
The name pane at top center is always displayed whether you're in the main controls view or the Preset Browser. It displays the name of the current Preset, obviously, but also offers further ways to browse and load Presets. Again, a filled-in heart icon indicates a liked Preset.

6.1.1. The Arrows

The up and down arrows to the right of the Preset name step serially through Presets. This is limited by the results of any currently active search, i.e. the arrows will only step through those Presets. So, make sure any searches are cleared if you simply want to step through all available Presets until you find something you like.

6.1.2. Quick Browser

As mentioned briefly in the previous chapter, you can click on the Preset name in the center of the upper tool bar to bring up a drop-down Quick Browser for Presets. The first option in this menu is called All Types, and it brings up a submenu of literally every Preset in the current Bank:
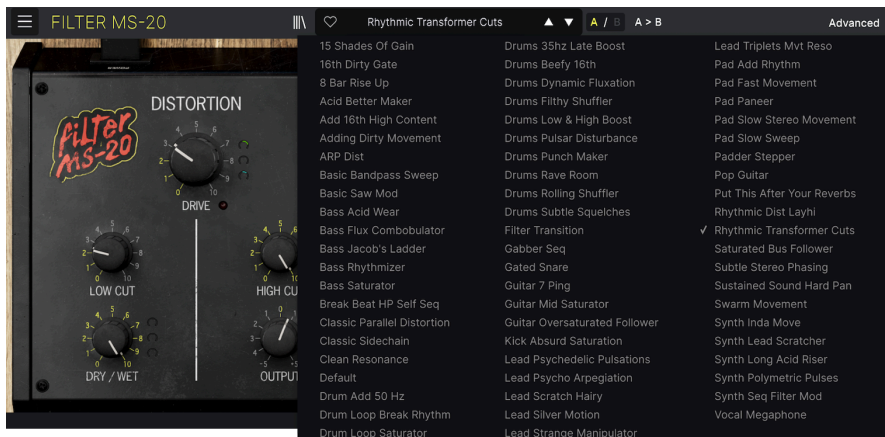
Below this are options that correspond to the Types. Each of these brings up a submenu of all Presets of its Type:
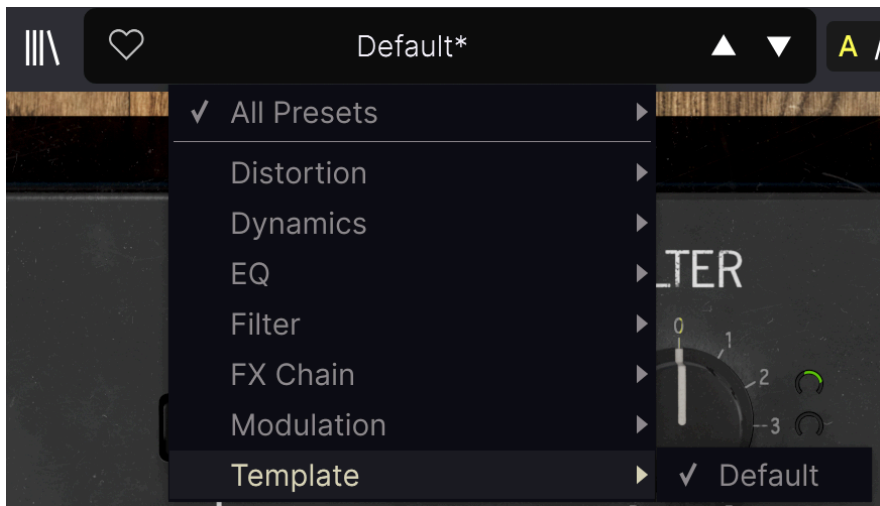

Selecting Template from the drop-down menu shows the one Template Preset: Default.

Unlike the up and down arrows, the "All Presets" submenu is independent of search criteria – it simply shows you every Preset available. Likewise for the Type choices below the line, which always include all Presets within that Type.

6.2. The Preset Browser

Click the "books on a shelf" icon (four vertical and tilted lines) in the Upper Toolbar to access the Preset Browser. When the Preset Browser is open, the icon becomes a large X, and is used to close the Browser when you're done.

The three main areas of the Preset Browser are as follows:
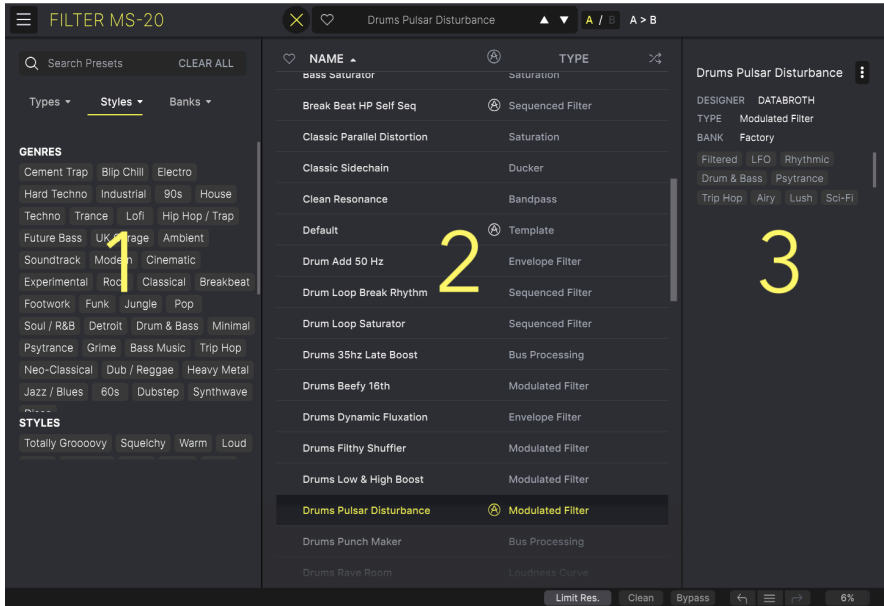
Number	Area	Description
1.	Search [p.39]	Searches for Presets by text entry with filters for Type, Style, and Bank.
2.	Results Pane [p.43]	Displays search results, or all Presets if no search criteria are active.
3.	Preset Info [p.46]	Displays Preset Details; can edit details for Presets in User Bank.

6.3. Searching Presets

Click on the Search field at the top left and enter any search term. The browser will filter your search in two ways: First, simply by matching letters in the Preset name. Second, If your search term is close to that of a Type or Style [p.40] it will include results fitting those tags as well.

The Results Pane will show all Presets that fit your search. Click the **CLEAR ALL** text to clear your search terms.
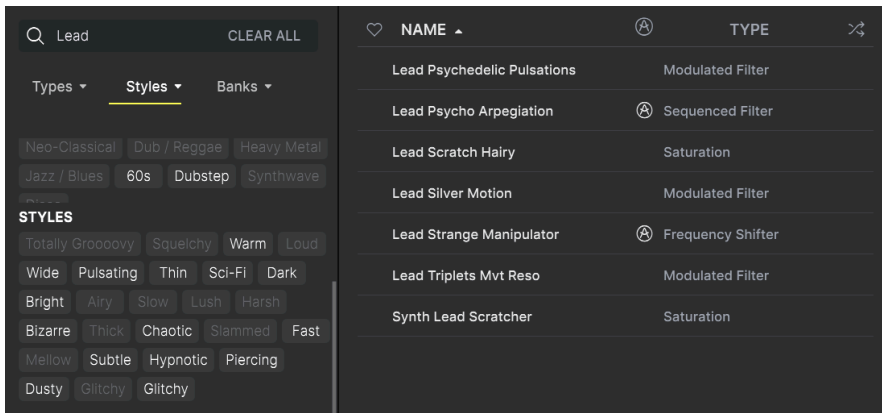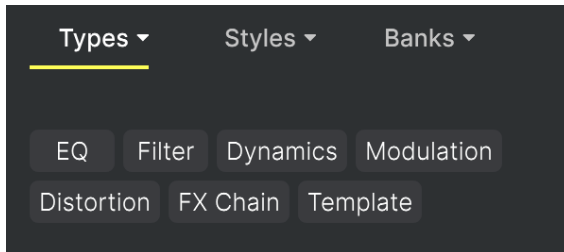
Filtering by typing text ("Lead") in the Search field

6.3.1. Using Tags as a Filter

You can narrow (and sometimes expand) your search using different *tags*. There are two kinds of tags: **Types** and **Styles**. You can filter by one, the other, or both.

6.3.1.1. Types

Types are categories of audio effects: filter, distortion, modulation, and so on. With a clear search bar, click the **Types** drop-down to bring up the list of types. Types sometimes include sub-types (especially in more complex Arturia effect plug-ins) but Filter MS-20 is relatively simple, so Filter is the type you will see most often.

You can also select multiple Types using CMD-click (macOS) or CTRL-click (Windows). For example, if you aren't sure whether the preset you're looking for was tagged with Dynamics or FX Chain, select both to broaden the search:
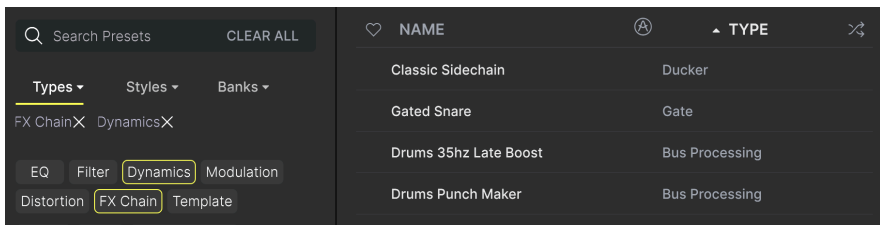
The display order of the Name and Type columns can be inverted by clicking the arrow buttons to the right of their titles.

> ♪ You can specify the type when . That Preset will then show up in searches where you've selected that Type.

6.3.1.2. Styles

Styles are, well … exactly that. Accessed by the **Styles** button, this area has three further subdivisions:
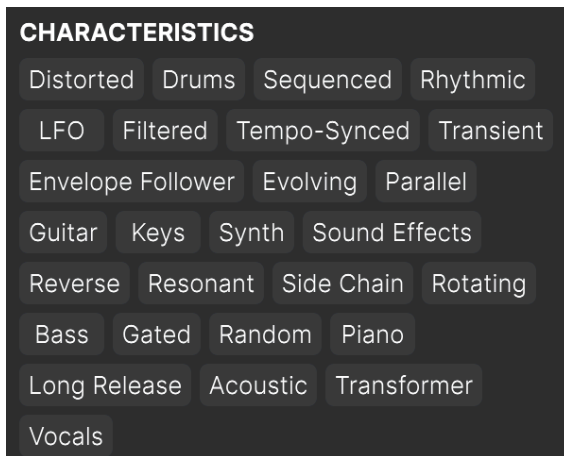
- *Genres*: Identifiable musical genres such as Ambient, Bass Music, Industrial, etc.:
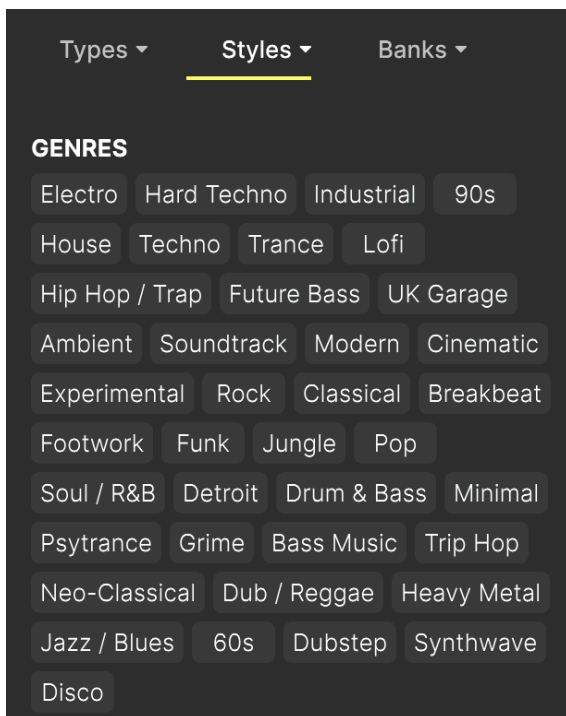
- *Styles*: General "vibe" such as Bizarre, Metallic, Slammed, etc.:

STYLES

Warm　Loud　Wide　Pulsating　Thin
Sci-Fi　Dark　Bright　Airy　Slow
Lush　Harsh　Bizarre　Thick　Chaotic
Slammed　Fast　Mellow　Subtle
Hypnotic　Piercing　Dusty　Glitchy

- *Characteristics*: Even more detailed audio qualities such as Filtered, Resonant, Mechanical, Noise, and more:

CHARACTERISTICS

Distorted　Drums　Sequenced　Rhythmic
LFO　Filtered　Tempo-Synced　Transient
Envelope Follower　Evolving　Parallel
Guitar　Keys　Synth　Sound Effects
Reverse　Resonant　Side Chain　Rotating
Bass　Gated　Random　Piano
Long Release　Acoustic　Transformer
Vocals

Click any one, and the results will show only Presets that match that tag. Notice that when you select any tag, several other tags usually grey out and become unavailable. This is because the browser is *narrowing* your search by a process of elimination.

> ℹ️ Note that this is the opposite of how selecting multiple Types *broadens* your search.

Deselect any tag to remove it and widen the search without having to start all over again. You can also clear the tag by clicking the X to the right of its text, which appears at the top.

Note that you can search by a string of text, Types and Styles, or both, with the search becoming narrower as you enter more criteria. Clicking **CLEAR ALL** in the search bar will remove all Type and Style filters as well as any text entry.

6.3.2. Banks
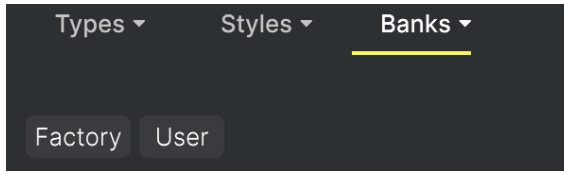
Next to the **Types** and **Styles** drop-down is the **Banks** drop-down, which lets you do your search (using all the methods above) within the Factory or User Banks.

6.4. The Results Pane

The central area of the browser shows search results, or simply a list of all Presets in the Bank if no search criteria are active. Simply click on a Preset name to load it.

6.4.1. Sorting Presets

Click the **NAME** header in first column of the Results list to sort the results list of Presets in ascending or descending alphabetical order.

Click the **TYPE** header in the second column to do the same thing by Type.

6.4.2. Liking Presets

As you explore and create Presets you can mark them as Liked by clicking the heart icon next to their names. (This icon also appears in the Upper Toolbar's .

Clicking on the heart icon makes all of your liked Presets show up at the top of the results list, as shown here:
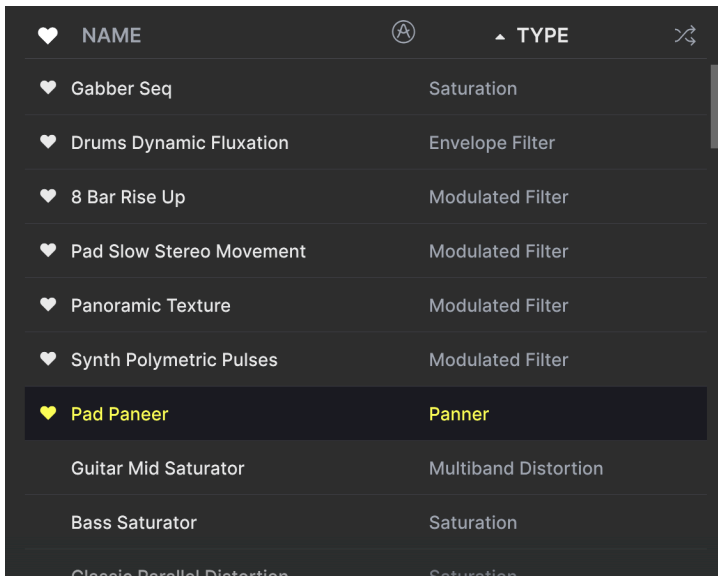
A filled-in heart icon indicates a Liked Preset. An outline indicates a Preset that has not been Liked (yet). Click the heart at the top of the list again to return the list to its previous state.

6.4.3. Featured Factory Presets

Presets accompanied by the Arturia logo are factory creations we think really showcase the capabilities of Filter MS-20.

Clicking the Arturia icon at the top of the Results pane sorts all featured Presets to appear at the top of the list.
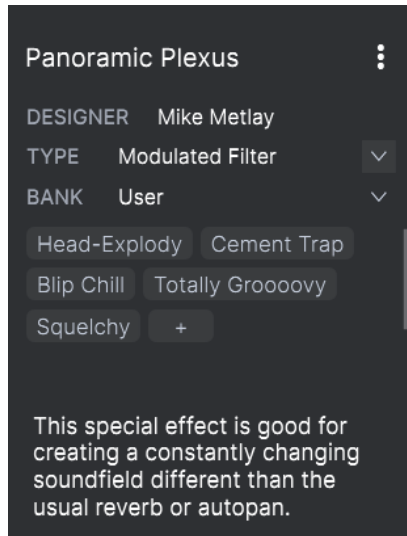
6.4.4. Shuffle Button

This button randomly reorders the Preset list. Sometimes it can help you find the sound you're looking for more quickly than scrolling through the entire list.

6.5. Preset Info Section

The right side of the browser window shows specific information about each Preset.

For Presets in the User bank (as the result of a *Save As* operation), you can enter and edit the information in the Preset Info Section and it will update in real time. This includes the designer (author), Type (menu is open in the above image), all Style tags, and even a custom text description at the bottom.

To make the desired changes, you can type directly in the text fields or use one of the pull-down menus to change the Bank or Type. As shown here, you can also use a hierarchical menu to select the Type or even create a new Type or Subtype.
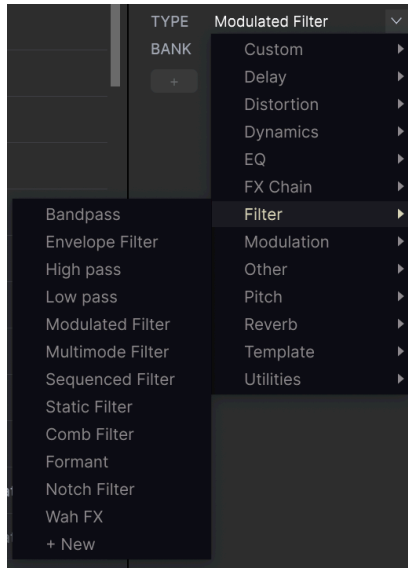
ℹ️ ♪ Types and Styles changes you make here are reflected in searches. For example, if you remove the "Ambient" Style tag from a Preset and then save that Preset, it will not show up in future searches for Ambient Presets.

6.5.1. Preset Info Quick Menu

Clicking the icon with three vertical dots brings up a quick menu for Save, Save As, and Delete Preset Operations:
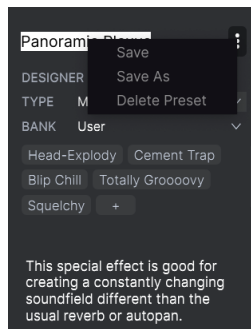
For sounds in the Factory Bank, only **Save As** is available.

6.5.2. Edit Style

You can also create your own Style tags to help refine searches according to criteria that matter most to you. Clicking on the + icon in the list in the Preset Info pane opens the Edit Style pane, where you can create as many new tags as you'll ever need:

6.5.3. Editing Info for Multiple Presets

It's easy to edit information such as Types, Styles, designer name, and text description for several presets at the same time. Simply hold CMD (macOS) or CTRL (Windows) and click the names of the Presets you want to change in the Results list. Then enter the comments, change the Bank or Type, etc., and save.
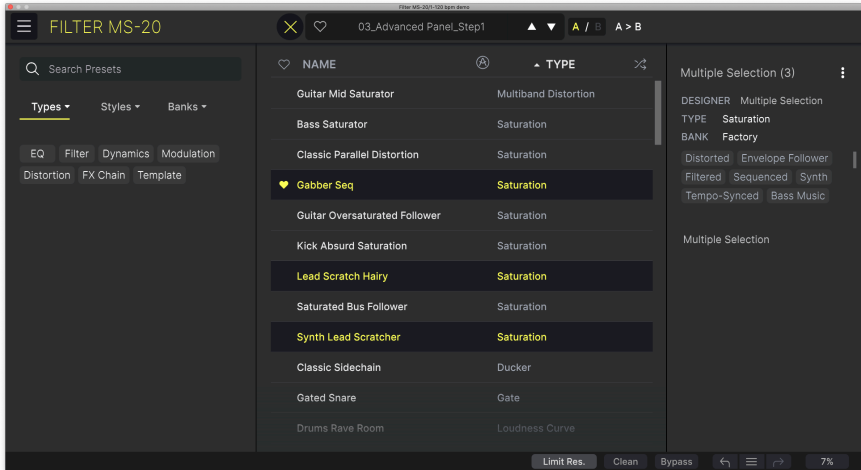
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