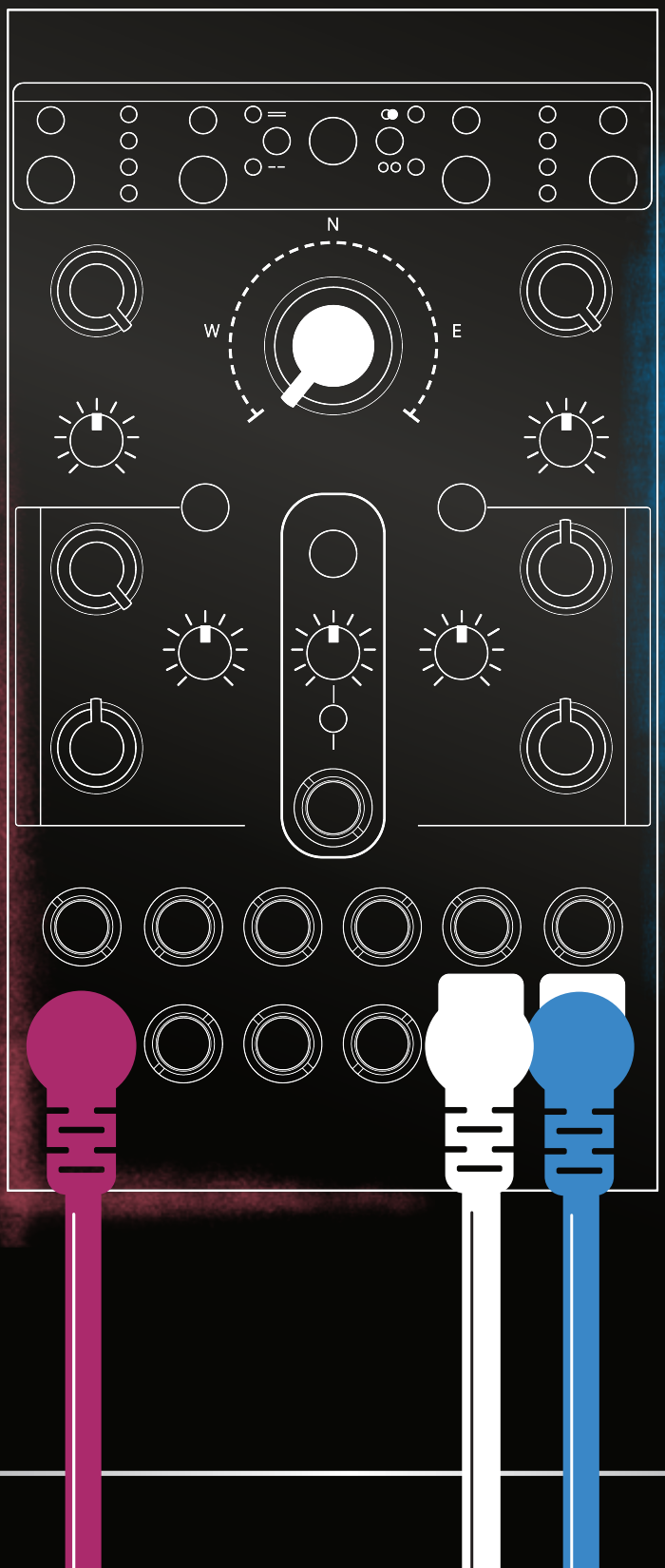
MERIDIAN

DUAL MULTIMODE FILTER ARRAY



mod bap.
MODULAR
BY BEATPPL

Contents

About Us

MODBAP MODULAR BY BEATPPL

Modbap Modular is a line of eurorack modular synthesizers and electronic music instruments by Beatppl. Founded by Corry Banks (Bboytech), Modbap Modular was born of the Modbap Movement with a simple mission to dev tools for beat driven hiphop leaning modular artists. It is our goal to develop eurorack modules from the beatmaker's perspective while adding value for music makers of all genres.
It's almost impossible to explain Modbap Modular without answering the questions; "So, what is ModBap?" MODBAP is the fusion of modular synthesis and boom-bap (or any form of hiphop) music production. The term was created by BBoyTech as a denotation of his experiments with modular synthesis and boombap music production. From that point forward, a movement was born where like minded creatives built a community around idea of Modbap. Modbap Modular is in effect, the result of that movement in a space where we'd previously not existed.

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Overview

MERIDIAN

Meridian is a digital Eurorack modular dual multimode filter array. It is what we call a "complex filter array." This isn't because it's hard to use. We take great pride in distilling complexity into a fun and performable user interface. It is a “complex filter array” because it has a harmonious set of features that let you create complex tones and uniquely interesting sounds. It's made to change the sound and tone of audio signals through a cleverly assembled set of features, such as an array of interrelated filter types, filter modes, phase shifting modulation, drive, and bit depth, which all work together to make complex soundscapes and textures. Meridian is designed to offer users a choice between various selectable and routable filter types and filter modes including Ladder, OTA, Comb, Formant. This gives the flexibility to easily create a range of sound textures and sonic landscapes using a single device. Meridian is composed of two filters, each of which has independently adjustable cut off and resonance parameters. Additionally, the prime frequency control adjusts both filters’ cut off frequencies in tandem. All of Meridian's key features can be adjusted via CV inputs and the phase shifter can be synchronized to tempo using the clock input. Meridian's Low Pass Gate boasts a dynamic control and input feature aptly titled 'Ping'. Meridian permits selection of serial or parallel routing configurations and offers an authentic sound with its two distinctive and characterful effects: PhaseShifter and Drive. Finally, as is typical of Modbap modules, Meridian was designed with tweak-ability and performance in mind and capacity to store and recall presets is perhaps its most remarkable feature, making it highly advantageous whether playing live or in studio.

WHAT'S IN THE BOX?

The Meridian package comes with the following items included:-

- Meridian module.
- Eurorack IDC power ribbon cable
- 4 x 3m mounting screws.
- Quick reference guide.
- Sticker.

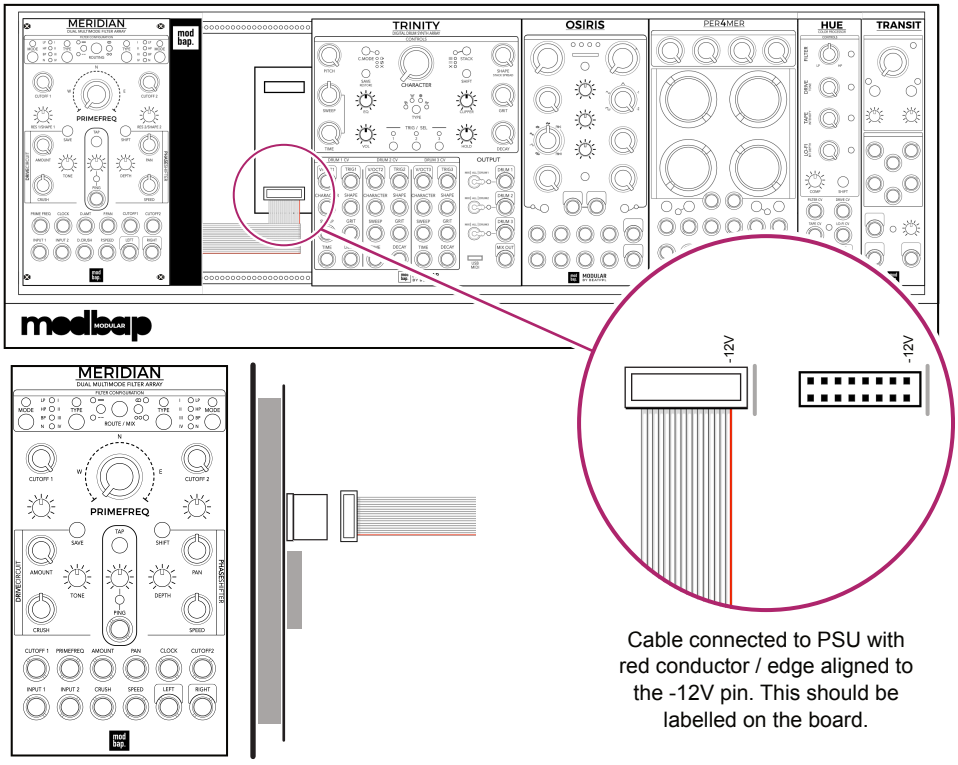
SPECIFICATION AND CORE FEATURES

- Module size. 3U, 14 HP, Depth 34mm
- +12V Current demand: Average 107mA, Peak 115mA.
- -12V Current demand: Average 7mA, Peak 11mA.
- +5V current demand 0mA (Not Used)
- Dual Mono / Stereo filter
- Save and recall presets
- 4 filter types:
    - Filter Types - Ladder,OTA, Comb, Vocal Formant
- Effects
    - Phase Shifter with speed, panning and depth controls.
    - Drive Circuit with level, tone and crush controls.

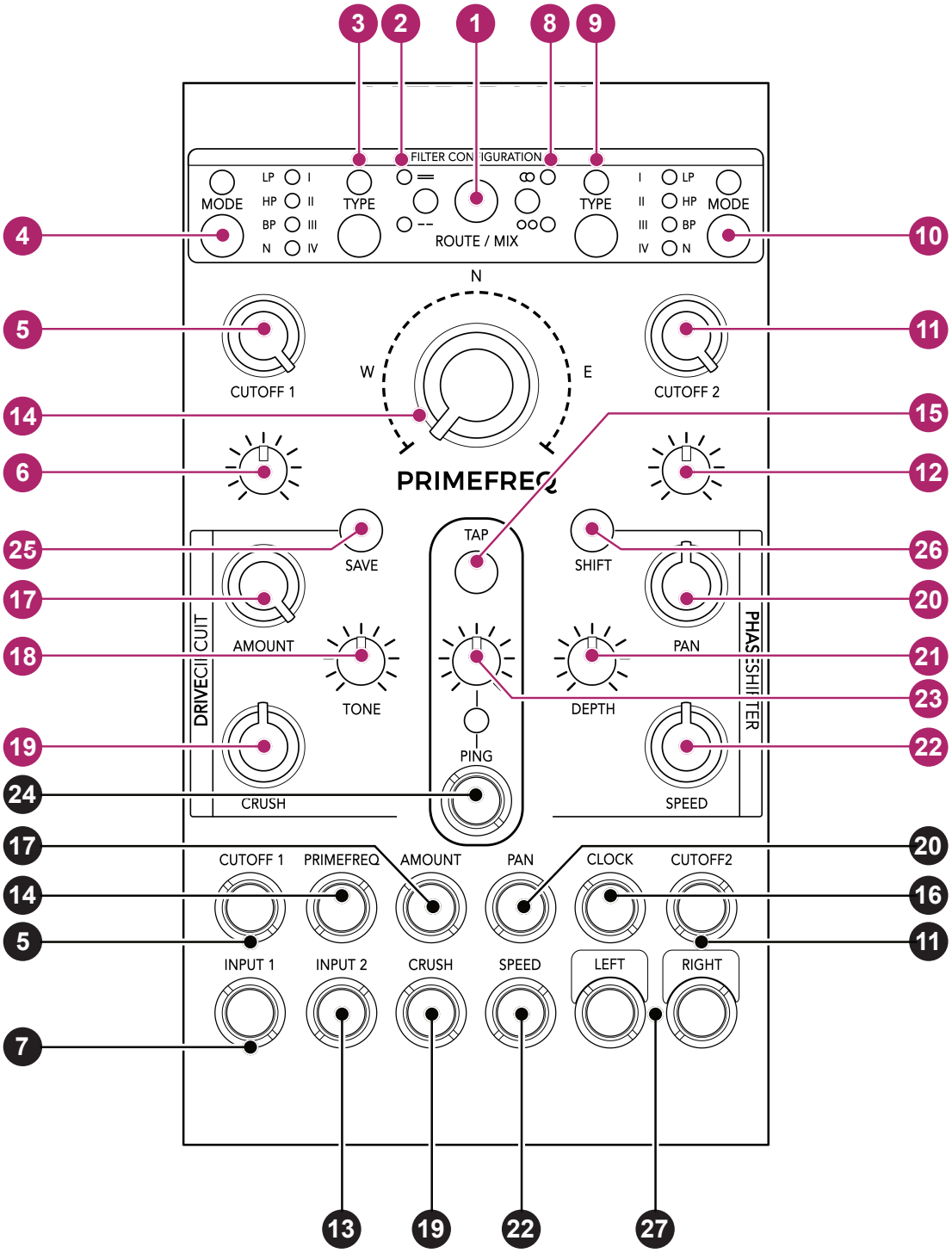
INSTALLATION

Follow the installation instructions carefully to avoid module or rack damage.

1. Ensure the power connection is disconnected before installing the device.
2. Identify a location in the rack to install the module. This needs 14HP of free space.
3. Connect the 10 pin connector from the IDC ribbon power cable to the header on the rear side of the module. Ensure that the pins are aligned correctly with the red stripe on the ribbon conductor closest to the -12V pin on the header.
4. Insert the cable through the rack and connect the 16 pin side of the IDC ribbon cable to the rack power supply header. Ensure that the pins are aligned correctly with the red stripe on the ribbon conductor closest to the -12V pin on the header.
5. Mount and position the module into the dedicated rack position.
6. Attach the 4 x M3 screws by screwing into the 4 locator holes and the rack mount. Do not over tighten.
7. Power up the rack and observe the module start up.



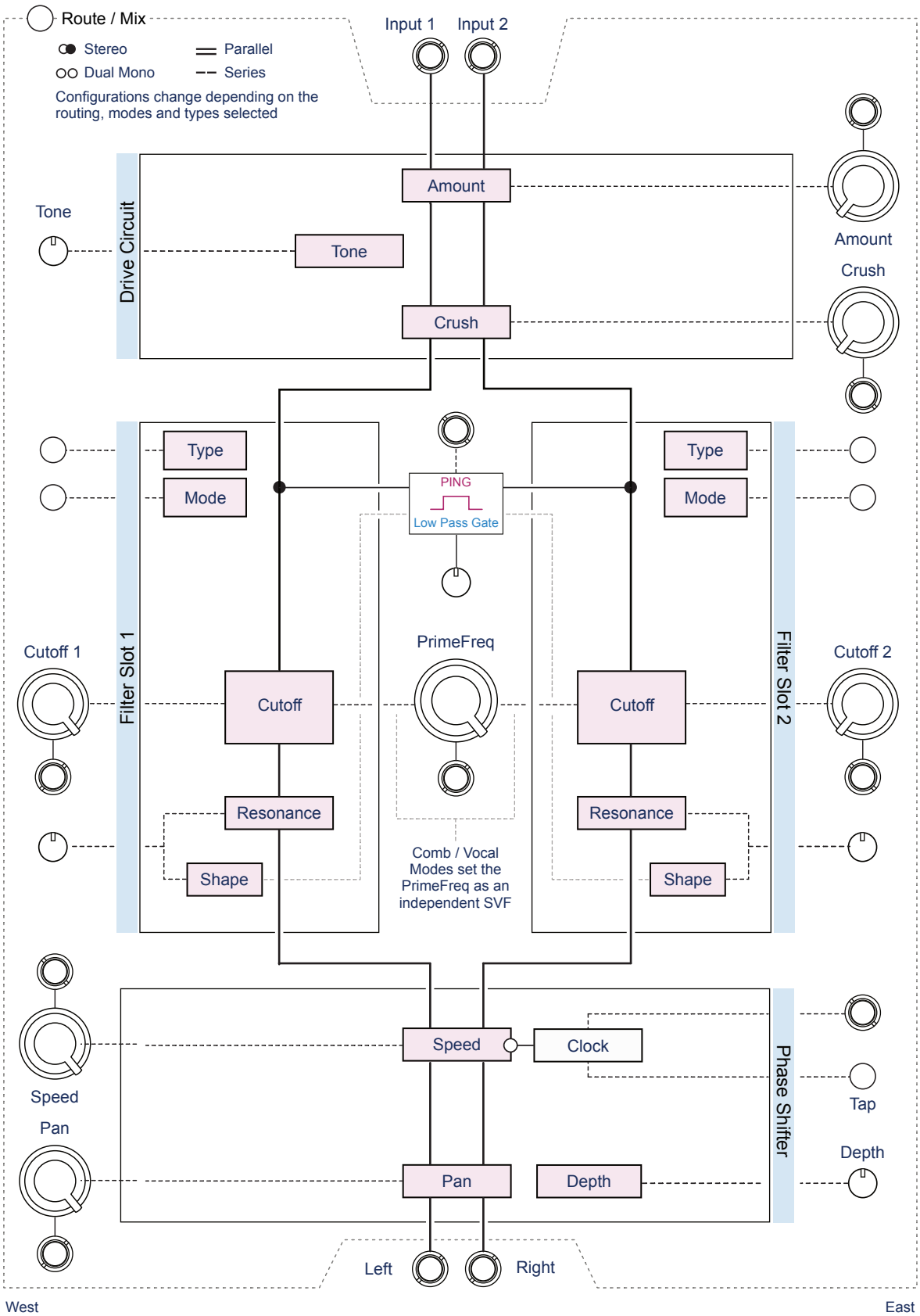
Cable connected to PSU with red conductor / edge aligned to the -12V pin. This should be labelled on the board.



Press or Turn

Plug and Patch

1. Route / Mix Options. Tap for Parallel / Series and Shift + Tap for Stereo / Dual Mono
2. Filter Routing Indicator LED - Parallel (Pink) or Series (Blue).
3. Filter Slot 1 Type Selection Button & LED Indicator.
   Filter Types: I. Ladder (Pink), II OTA (Blue) , III Comb (Yellow), IV Vocal Formant (White)
4. Filter Slot 1 Mode Selection Button & LED Indicator.
   Modes: Low Pass (Pink), High Pass (Blue), Band Pass (Yellow), Notch (White)
5. Filter Slot 1 Cutoff Frequency. CV Control input also available.
6. Filter Slot 1 Resonance / Shape. Hold Shift + Turn for Contour Shaping.
7. Filter Slot 1 Audio Input Connection. Left side if using stereo input.
8. Filter Slot 2 Routing Indicator LED - Parallel (Pink) or Series (Blue).
9. Filter Slot 2 Type Selection Button & LED Indicator.
   Filter Types: I. Ladder (Pink), II OTA (Blue) , III Comb (Yellow), IV Vocal Formant (White)
10. Filter Slot 2 Mode Selection Button & LED Indicator.
    Modes: Low Pass (Pink), High Pass (Blue), Band Pass (Yellow), Notch (White)
11. Filter Slot 2 Cutoff Frequency. CV Control input also available.
12. Filter Slot 2 Resonance / Shape. Use Shift + Turn for Ping Shape.
13. Filter Slot 2 Audio Input Connection. Right side if using stereo input.
14. Primefreq. For filter types I Ladder or II OTA, common control over both cutoff frequencies.
    For filter types III Comb or IV Formant, acts as independent SVF. CV Controllable via input.
15. Tap Button. Pings the filter when tapped or sets tempo with shift + tap.
16. External Clock input. Phase Shifter clock.
17. Drive Circuit Amount. Common to both filters. CV Control input also available.
18. Drive Circuit Tone. Common to both filters.
19. Drive Circuit Crush Effect. Common to both filters. CV Control input also available.
20. Phase Shifter Panning. Common to both filters. CV Control input also available.
21. Phase Shifter Depth. Common to both filters.
22. Phase Shifter Speed. Common to both filters. CV Control input also available.
23. Low Pass Gate Control. Adjust the filter ping depth.
24. Ping CV Input. Direct filter pinging.
25. Save Button. Saves the current control settings to memory.
26. Shift Button. Used in conjunction with other controls to access secondary functions.
27. Audio Outputs Left / Right.


Route / Mix
Stereo
Dual Mono
Parallel
Series
Configurations change depending on the routing, modes and types selected
Input 1
Input 2
Drive Circuit
Tone
Amount
Crush
Filter Slot 1
Filter Slot 2
Type
Mode
PING
Low Pass Gate
Cutoff 1
Cutoff 2
PrimeFreq
Cutoff
Resonance
Shape
Comb / Vocal Modes set the PrimeFreq as an independent SVF
Phase Shifter
Speed
Pan
Clock
Tap
Depth
Left
Right
West
East

INPUT / OUTPUT ASSIGNMENT

CV and Gate can be applied to control various parameters around Meridian. These are patched into Meridian from other modules. There are 2 audio inputs and 2 audio outputs are provided. The filter has two, east and west audio channels and routing can be specifically configured.

CV Inputs

There are 6 Control Voltage inputs located on the lower front panel of Meridian. Primefreq, Cutoff 1, Cutoff 2, Drive Circuit Amount & Crush and Phase Shifter Speed & Pan. Clock inputs control the Phase Shifter Clock. All CV Inputs typically operate use a 0-5V input range.

Clock Input

A Clock input controls the Phase Shifter Clock. The input would typically be patched into Meridian from an external clock or trigger signal at a voltage >1V.

Audio Inputs

Two, dual mono audio inputs are provided. These would typically be connected from another Eurorack level audio output. For example, patch in from audio sources, Trinity Digital Drum Synth or Osiris Bi-Fidelity Wavetable Oscillator. Audio can be routed through Meridian as mono channels or stereo.

Audio Outputs

Two, mono audio outputs are provided. The convention is for output connectors to be framed with a white label tag. These would typically be connected to another Eurorack level audio input. For example, patch into destinations for further processing such as Hue Color Processor or to combine with other signals using Transit 2 Channel Stereo Mixer.

Filters

Meridian

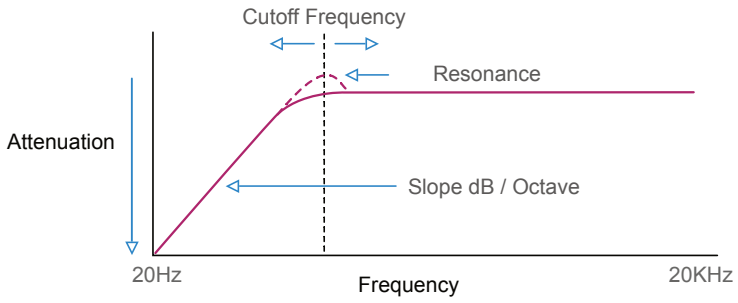
In the most basic terms a filter is a device that attenuates frequencies within an audio range to shape a sound. Filters typically operate across a frequency range between 20Hz and 20KHz, the frequency range for human hearing. A filter is therefore a useful device for sound shaping and design, to fit into the mix with other audio sounds and to add more movement to audio when modulated. What comes with an audio filter module is a host of abbreviations and terms that refer to it's general and specific functions and operational controls. Meridian is a Eurorack modular dual multimode filter array with some advanced and unique features. In order to get the best from the module it therefore makes sense to de-mystify the general principles of a filter and clarify some of the terminology used with filters and especially where relevant to the Meridian digital filter. Meridian is very much a designers delight with intended sweet spots and surprisingly gnarly tones as well. The key is to understand the differences in the filters and modes and how they are set in relation to how either side of the device's cutoff and resonance will interact with the primefreq. Primefreq will be dramatically sweeping and other times it may be subtle and smooth.

WHAT IS A FILTER?

Audio signals are made up of a series of sound waves that travel through air to the listener. These sound waves sit in the frequency range of human hearing and the emphasis on specific frequencies are what contributes to the distinct sound character. Filters are a often used device in modular setups. Filters ‘carve out’ the frequencies in the sound spectrum which in turn shapes the tone and timbre. As such filters are applied in the audio signal chain to shape the sound and are often modulated to create more interest and movement. The type of filter selected has a major influence on the sound character while the mode is selected for specific applications.

Anatomy of a Filter.

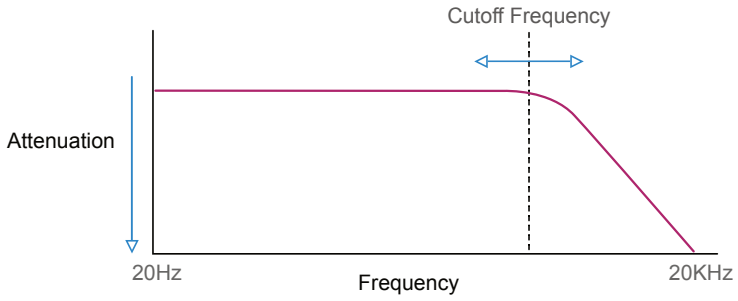
High Pass Filter



High pass filter allows higher frequencies to pass through and be audible while cutting off lower frequencies

Also called Low Cut Filter

Low Pass Filter



Low pass filter allows lower frequencies to pass through and be audible while cutting off higher frequencies

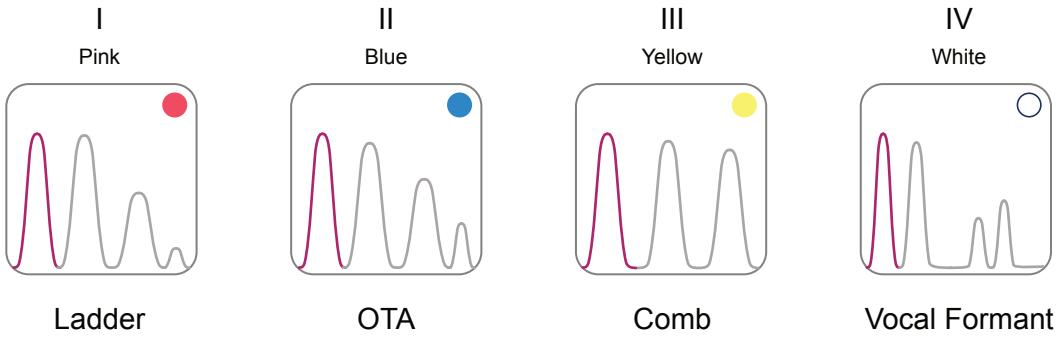
Also called High Cut Filter

Meridian provides control over the Cutoff Frequency and Resonance of each of the two filter slots. The Slope is fixed. The filter mode can be selected between Low Pass (LP), High Pass (HP), Band Pass (BP) and Notch (N). Also four filter types are available, one selectable per filter slot.

MERIDIAN FILTER TYPES

Meridian has two filter slots and 4 filter types. The behaviour of the Meridian controls, especially Primefreq will be based on the filter type currently active. The Types available are; Ladder, OTA, Comb and Vocal Formant. Primefreq controls an independent SVF when in Comb or Formant Mode. The type is selected per slot by cycling through the four options using the ‘Type’ Button. The LED color associated with the Type function will represent the currently selected filter type.

Filter Types



Ladder. This is a classic type used in many hardware synths, technically formed from a series of chained filter electronics, hence the name ladder filter. This digital version offers a retro style filter control with an aggressive 24dB / Oct (4-Pole) slope to carve the sound.

OTA. An OTA or Operational Transconductance Amplifier Filter is named after the technology integrated into its design. This type of filter offers accurate, clean and smooth control over the audio signal and operates as a 24dB / Oct (4-Pole) filter.

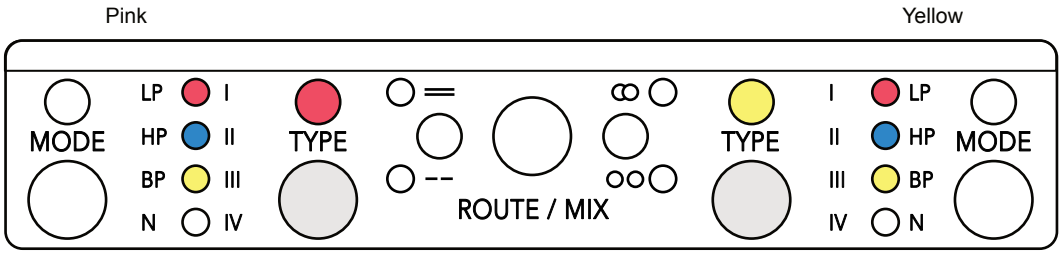
Comb. A comb filter operated on the principle of audio reaching the listener at different points in times. This would be illustrated in a frequency representation with a pulsed frequency profile similar to the shape of a comb. Comb filter introduces a style similar to a chorus or a phasing character to an audio sound. Characteristically, Comb is most familiar when resonance is up and cut-off sweeps.

Vocal Formant. The resonant frequencies in the human vocal tract are known as formants. The original formant filter design is based on a chained set of band pass filters which introduces similar vocal effects to an audio signal. The filter therefore operates around the characteristics of the human voice and speech.

SVF. An SVF or State Variable Filter is a term referred to a general 12dB / Octave filter with the standard filter controls and selectable output modes HP, LP BP. Meridian’s Primefreq control will switch from controlling both filter slot cutoff parameters for the Ladder and OTA Types to acting as an independent SVF (including LP, HP, BP & N Modes) when set to Comb or Formant type.

Selecting a Filter Type

1. Press the ‘Type’ button for the desired Filter Slot to select. The top left side buttons of Meridian sets the filter type for slot 1 and the top right side buttons set the filter type for slot 2.
2. Each press of the mode button will cycle through the filter type options.
3. The Filter Type LED color will indicate which filter is selected. A key label reference for I, II, III, IV is provided next to the Type button.



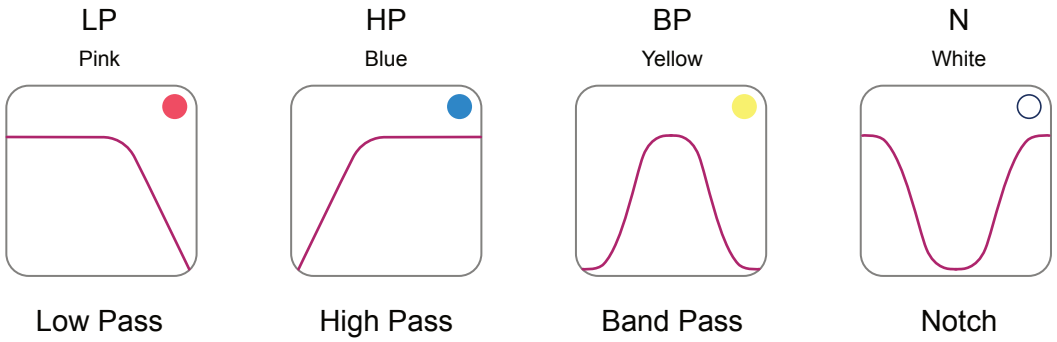
Example shows Filter Slot 1 set to I - Ladder Filter while Filter Slot 2 is set to III - Comb

Label	Color	Filter Type	PrimeFreq Function
I	Pink	Ladder	Controls both filter slot 1 & slot 2 cutoff frequency together.
II	Blue	OTA	Controls both filter slot 1 & slot 2 cutoff frequency together.
III	Yellow	Comb	Independent SVF - Controls cutoff frequency.
IV	White	Vocal Formant	Independent SVF - Controls cutoff frequency.

MERIDIAN FILTER MODES

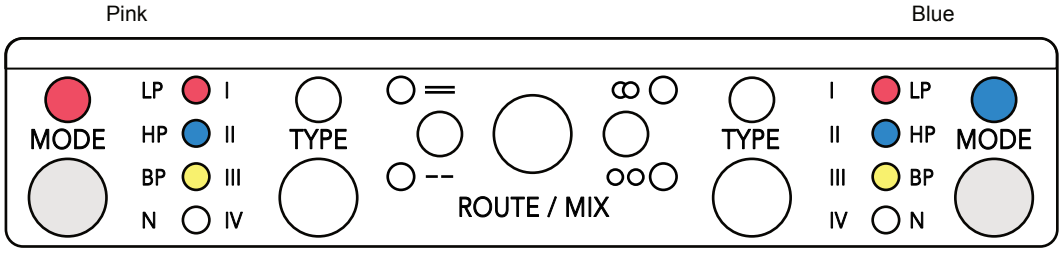
Meridian has 4 filter modes, LP, HP, BP and Notch. These do not apply to Comb or Formant filter types. These are selected per slot by cycling through the four options using the ‘Mode’ Button. The LED color associated with the Mode function will represent the currently selected filter mode.

Filter Modes



Selecting a Filter Mode

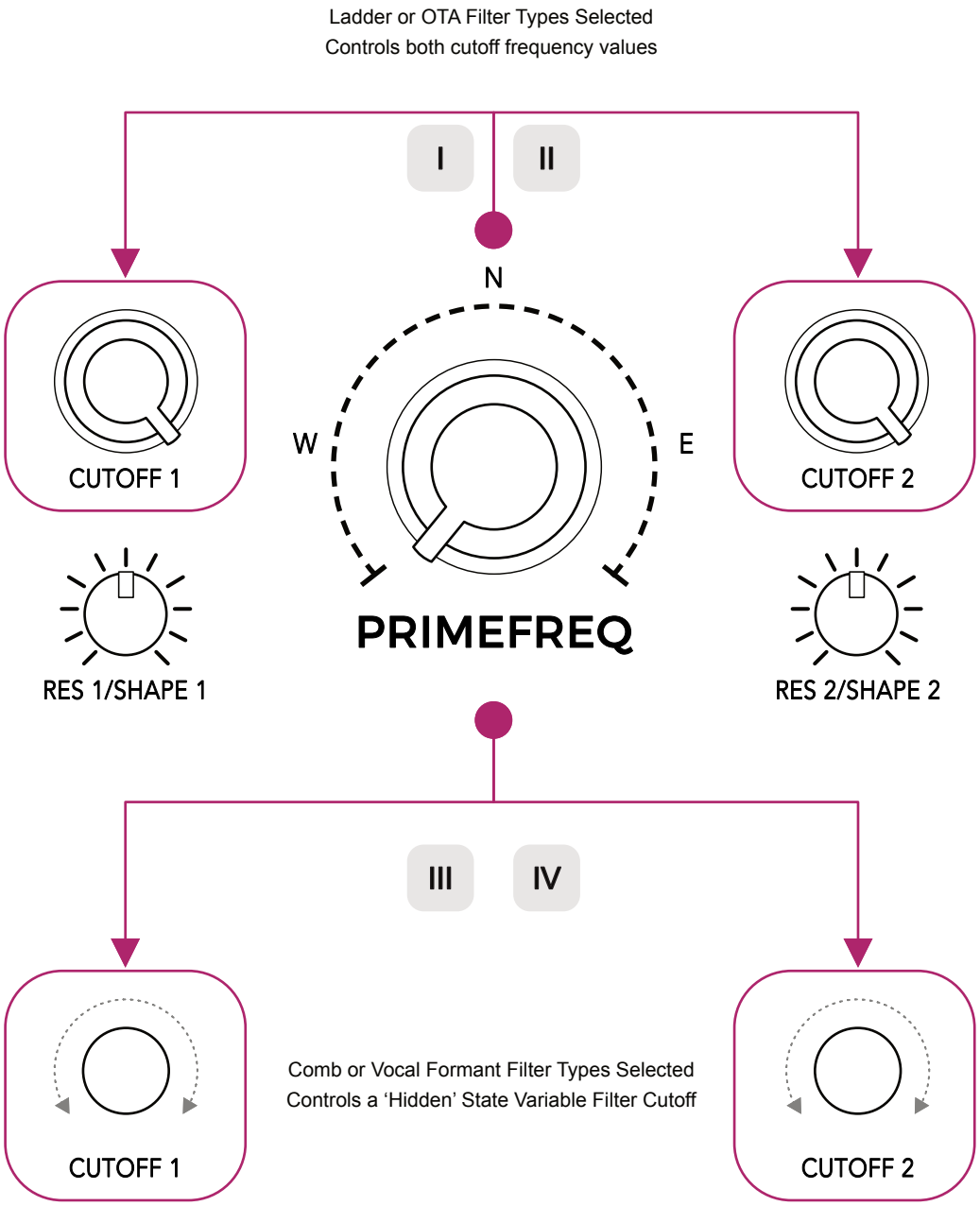
1. Press the ‘Mode’ button for the desired Filter Slot to select. The top left side buttons of Meridian sets the filter mode for slot 1 and the top right side buttons set the filter mode for slot 2.
2. Each press of the mode button will cycle through the filter mode options.
3. The Filter Mode LED color will indicate which filter is selected. A key label reference for LP, HP, BP and N is provided next to the Mode button.



Example shows Filter Slot 1 set to the Low Pass Filter while Filter Slot 2 is set to High Pass

PRIMEFREQ

Meridian has a central filter cutoff control called Primefreq. This is both manually and CV controllable. Primefreq's behaviour will change depending on the filters selected. When Comb or Formant filter type is selected, Primefreq operates as an additional, independent SVF. When Ladder or OTA is selected for Type, Primefreq will control the cutoff frequency of the filter 1 and filter 2 slots both together.



FILTER PING

Filter pinging is a technique in audio production that allows the ‘striking’ of a filter directly as opposed to applying filtering to incoming audio. The ping technique triggers a filter’s resonance directly generating an audio signal from the filter itself. This is useful for creating organic plucks and percussive sounds. Meridian is equipped with a low pass gate to enable a simple and easy approach to pinging of the filter and to take advantage of the filters resonance.

Pinging the Filter

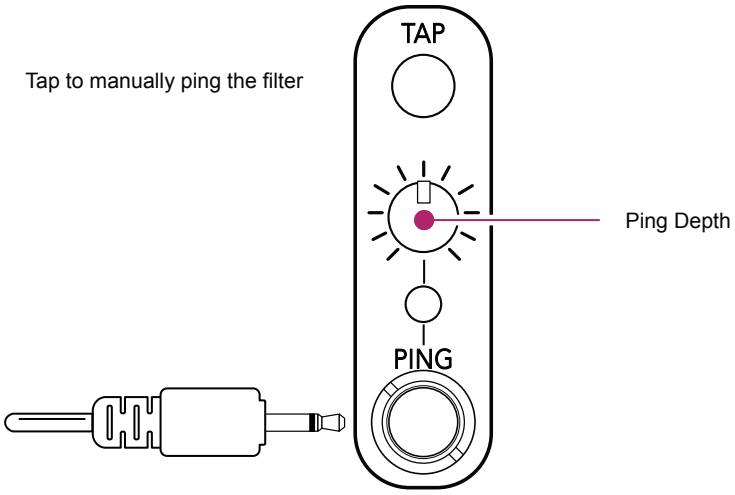
1. Connect an external trigger signal into the ‘Ping’ jack input. Typically this could from a sequencer or function generator, LFO or a manually generated trigger. This input will trigger the low pass gate to ping the filter.

2. The Audio inputs can be disconnected to allow the clear signal from pinging Meridian to be audible while setting up.

3. A trigger input will activate the low pass gate which is signalled by the ‘Ping’ LED which will flash on receipt of each trigger at the input.

4. The amount of pinging can be set with the dedicated rotary knob located above the ping LED.

5. Try adjusting the filter cutoff and resonance while generating ping triggers to create percussive or pulse like sounds.



Effects

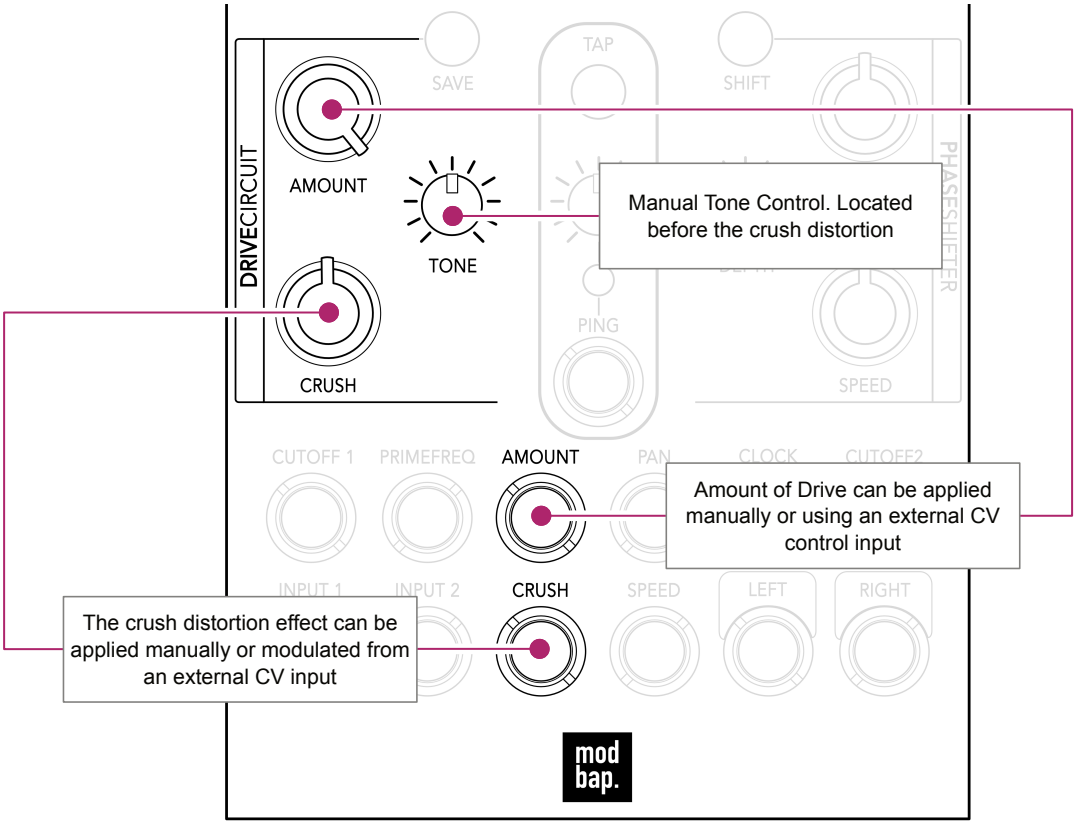
Meridian

Meridian has two distinctive and characterful effect sections that add to the sonic creativity. The Drive Circuit introduces a pre-filter boost as well as crush distortion. A manual tone control is also available. The phase shifter is located post-filter giving control to the depth applied as well as Pan control. The phase shifter also has manual and external clock control. Phase shifter depth can be manually controlled. As well as Meridians dual filter configurations and selectable filter types and modes, these effects add audio processing functionality and make Meridian a unique and extremely flexible module.

DRIVE CIRCUIT

The drive circuit is located before the filter section and introduces a boost to the signal, generating distortion and dirt into the audio path. The character can be controlled using the manual tone control or the crush which, along with the drive amount can also be controlled from an external CV input.

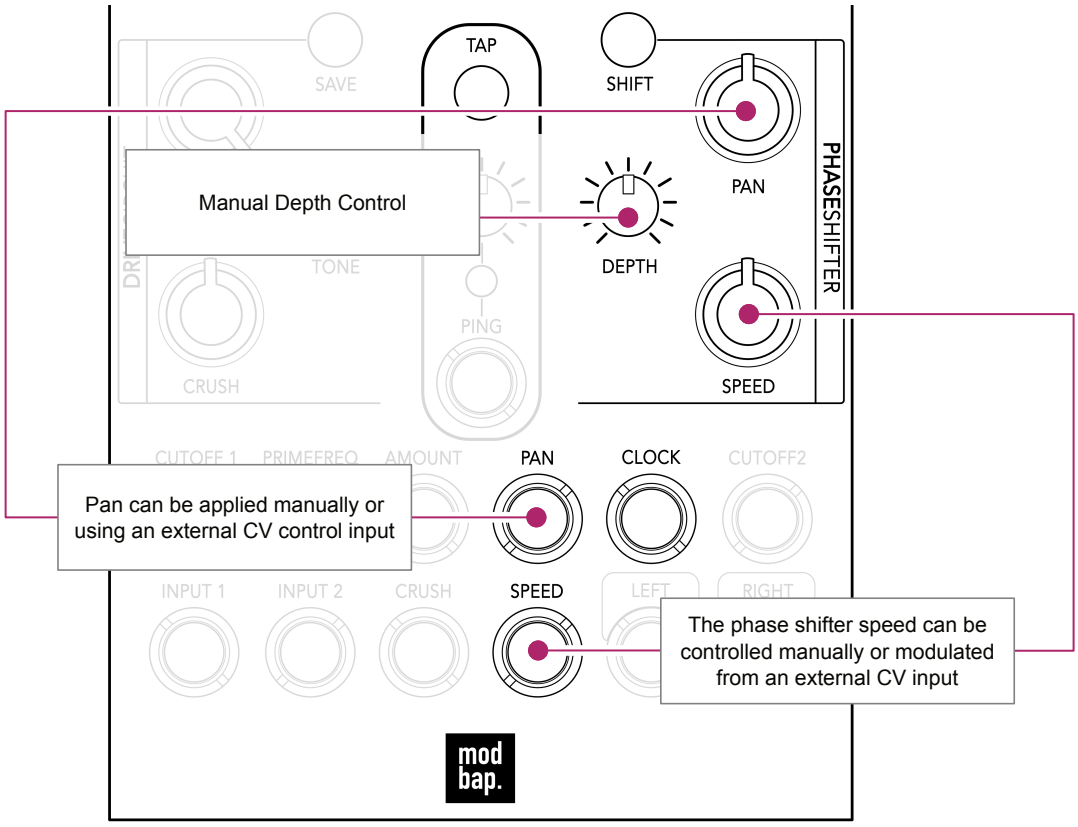
Drive Circuit controls located left of the front panel and operates pre-filter



PHASE SHIFTER

Meridian includes a phase shifter modulation effect, which is an audio modulation effect that modifies the phase relationship of the input signal. This produces an undulating, sweeping effect that can add depth and movement to the sound.

Phase Shifter controls located left of the front panel and operate post-filter



By default Tap pings the filter. The clock controls are applied to the Phase Shifter clock. This includes the external clock trigger input or by setting Meridians internal clock from its default 90 BPM using the Shift+ Tap tempo buttons. Speed then can be modulated with the CV input control. The phaser speed operates with a note interval based on tempo. These are set at; 8 Beats, 4 beats, 2 beats, dotted quarter note, 1 beat, dotted eighth, eighth note triplet, sixteenth and 32nd.

In addition to the phase shifter effect, this configuration also incorporates a panning effect. The amount of modulation is determined by the pan control, and the modulation frequency is identical to that of the phase shifter. The pan control allows the user to move the audio signal between the left and right channels to modify its stereo placement. The auto pan effect modulates the pan control automatically, producing a rhythmic back-and-forth motion in the stereo field. The pan effect is linked to the speed control of the phase shifter, which is set to 90BPM by default and can be adjusted via the clock input or by holding Shift and tapping the tap button.

When configured as a stereo filter the phase shifter's pan control modulates each channel in opposing directions beginning in the center of the stereo field. When configured as a Dual Mono filter, the pan amount of the phase shifter determines the degree to which the other side's audio is crossfaded into the current channel (essentially a stereo "balance" modulation).

Together, the phase shifter and pan control can produce a sound that is complex, evolving, and dynamically travels across the stereo field. The phase shifter effect gives the sound an undulating motion, whereas panning moves it back and forth in the stereo field. This can give the sound a sense of space and motion, making it more immersive and engaging.

Controls

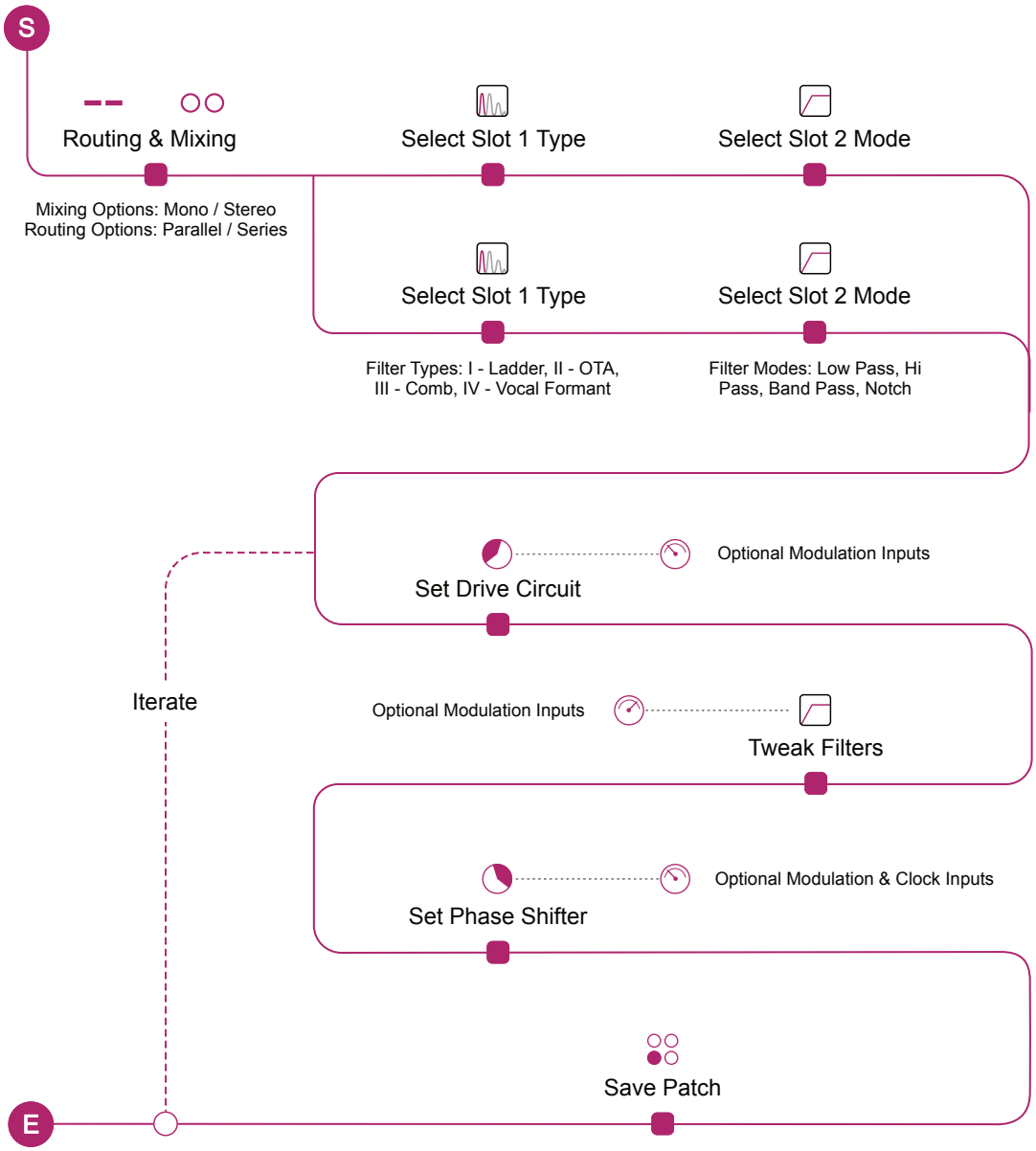
Meridian

Meridian has a wealth of features and options. Some functions support the setting up and configuration of Meridian. These include changing of the routing of the filters and setting the filter types and modes. Also a number of functions directly change and affect the sound character real time and are available as manual controls as well as external CV control for some parameters. There are 7 parameters that can be controlled by the larger rotary knobs as well as dedicated CV inputs. The 5 smaller knobs provide manual only control over their parameters. In addition two trigger inputs for clock and ping also exist. The input and output section is rounded off by two mono audio inputs as well as two outputs allowing two mono filter channels or stereo processing. It is important to keep the volume levels at a low setting when making adjustments to the device parameters to protect hearing from any level jumps especially with resonance and cutoff. The Volume level can always be increased once setup is completed.

TYPICAL WORKFLOW

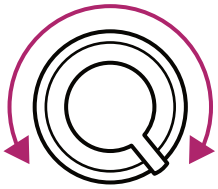
The basic principle of Meridian is to feed in audio inputs allow the filter processing (in various setting and configurations) as well as the effects to be applied. The creativity and added movement is possible by patching modulation.

Example Workflow



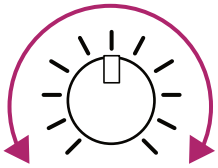
Basic Operation.

Parameter Controls.



TURN - Adjust a selected parameter.

Control can be applied using an external CV input.



TURN - Adjust a selected parameter.
Hold Shift + Turn to adjust the secondary parameter, labelled blue.

No external CV option available.

General buttons

Tap button to cycle through options. Respective LEDs will indicate the currently selected state.

Shift Button. Hold along with another button for secondary options.

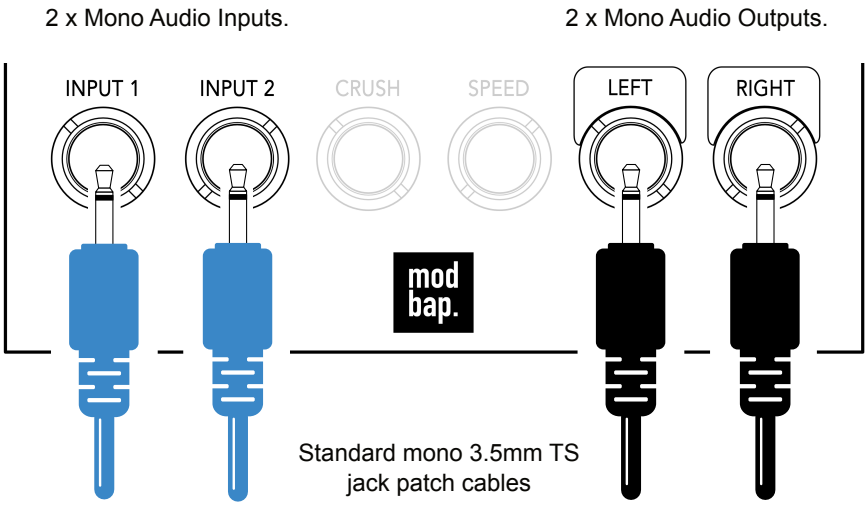
Button Combo's.

Function	Button Combo	Description
Bypass	Hold Type 1 or Type 2	Long press on either Type button will bypass its the audio filters
Restore Defaults	Hold Mode 1 + Mode 2	Resets defaults. i.e. LP Ladder filters, Serial Routing, Mixing Dual Mono.
Tap Tempo	Shift Tap	Tap Tempo for Phase Shifter
Ping	Tap	Manually ping the low pass gate.
Save Slot	Tap Save	Cycle through 4 available slots. Current slot indicated by the PING LED.
Save Settings	Hold Save	Save the active settings to the current slot indicated by the PING LED
Recall Settings	Shift + Save	Restore saved settings from the current slot indicated by the PING LED
Shape 1	Shift + Res 1	Adjust the low pass gate shape
Shape 2	Shift + Res 2	Adjust the low pass gate shape
Mix Type	Shift + Routing	Change the routing option

AUDIO INPUTS AND OUTPUTS

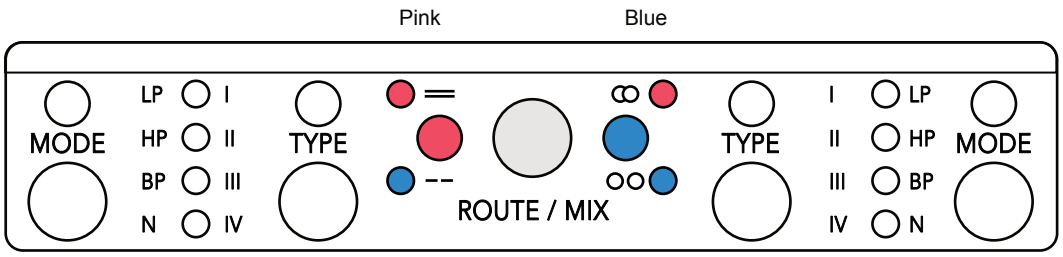
Meridian has stereo functionality provided by 2 mono audio inputs which are the source for the left and right audio signals to be processed. Both input and output connections take 3.5mm / 1/8th Inch TS (Tip & Sleeve) audio jack plugs.

Input 1 is normalled to input 2 if there is an active input to 1 and nothing connected to input 2. In this instance Input 1 is then duplicated to input 2 signal path.



ROUTING AND MIXING

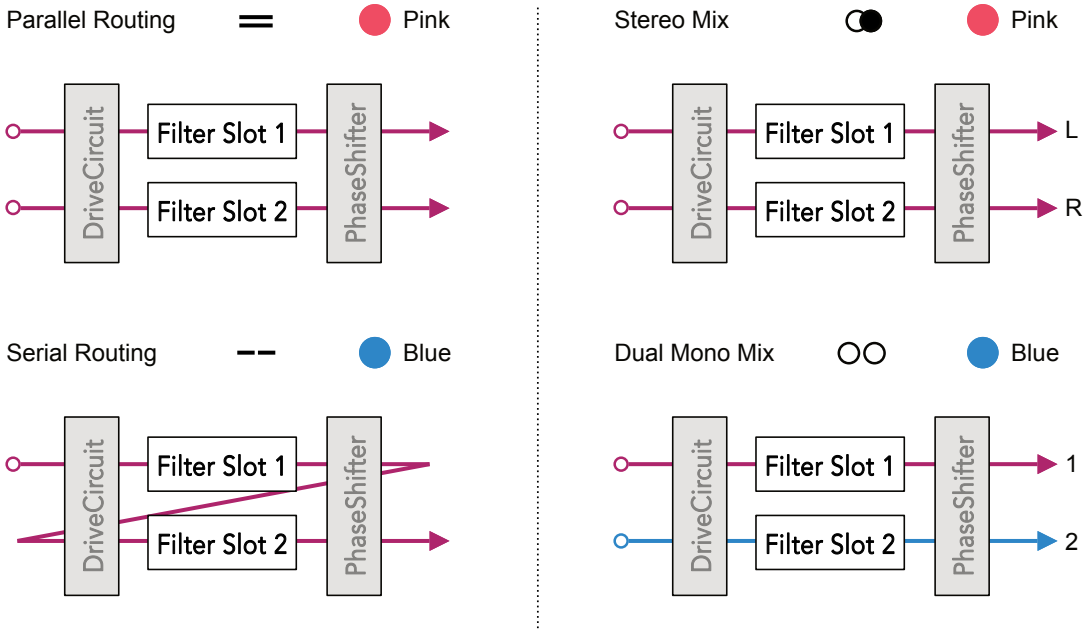
There are two global audio options which can be selected and will determine the configurations. Routing controls parallel or series options. Mixing controls the dual mono or stereo configurations. These are applied within the ‘Route / Mix’ section for the audio channels.



Example shows Routing as Parallel - Pink and Mix as Dual Mono - Blue.

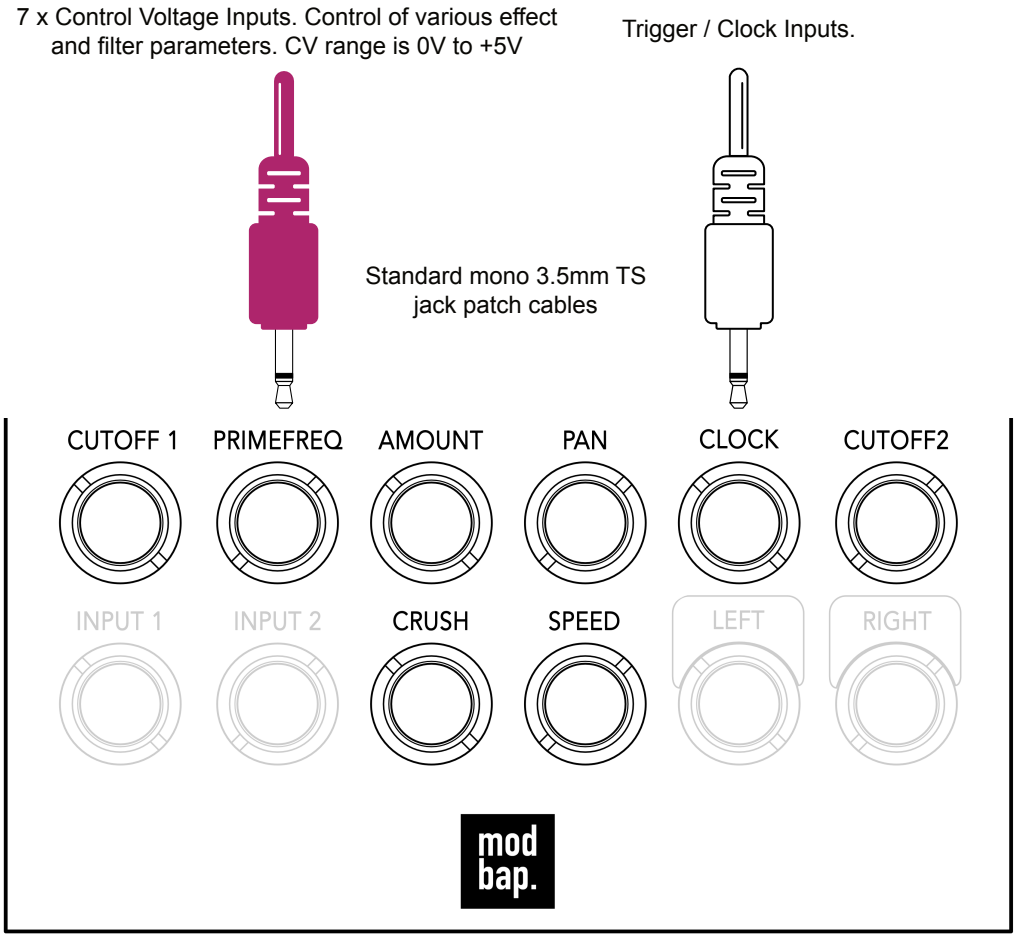
Selecting Routing / Mixing Options

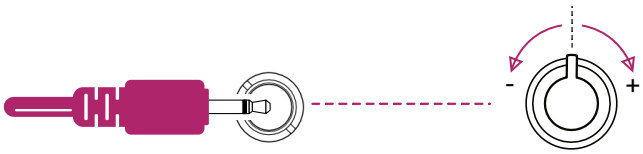
1. Press the ‘Route / Mix’ button to select the desired Parallel or Series Routing.
2. Hold Shift + Tap Route Mix to select between Dual Mono or Stereo Mix.
3. The respective Route / Mix LED color will indicate which option is selected for each side. A color reference for the parallel / series left side and stereo / dual mono right side is indicated on the panel.



CONTROL VOLTAGE INPUTS

Meridian can accept external CV control for 7 of its parameters. In addition an external clock can be connected for the Pitch Shifter and a trigger can be used for the low pass gate to ping the filter. Input connections are normal patch cables which use 3.5mm / 1/8th Inch TS (Tip & Sleeve) jack plugs.





Control Voltage is applied to the current FX control position

SAVING / LOADING SETTINGS

There are 4 save / recall slots available to which a series of Meridian parameter settings can be stored. The saved parameters include; Type 1, Mode 1, Type 2, Mode 2, Routing Mode, Mix Mode, Shape 1, Shape 2. The current slot will be automatically recalled and parameters restored on power up.

Saving Settings

1. Tap Save button once to check the currently active slot. The slots are indicated by the PING LED Color. The slots assigned are; Slot 1 - Pink, Slot 2 - Blue, Slot 3 - Yellow and Slot 4 - White.

2. Each subsequent tap of the Save button will cycle through each slot selection. Preset slots are just selected at this stage, no preset is loaded.

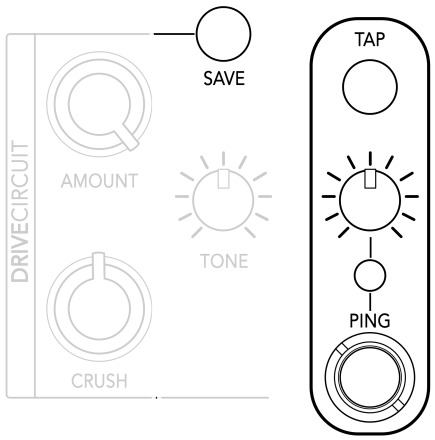
3. Once the desired slot is selected, Hold the Save button. The current settings are saved to the selected slot.

Recalling Settings

1. Tap Save button once to check the currently active slot. The slots are indicated by the PING LED Color. The slots assigned are; Slot 1 - Pink, Slot 2 - Blue, Slot 3 - Yellow and Slot 4 - White.

2. Each subsequent tap of the Save button will cycle through each slot selection. Preset slots are just selected at this stage, no preset is loaded.

3. Once the desired slot is selected, Hold Shift and Tap Save button. The current settings are loaded from the selected slot as active in the device..



PING LED will indicate the active and selected save slot when tapping ‘Save’ button.

Slot	Ping LED
1	Pink
2	Blue
3	Yellow
4	White

Concepts

Meridian

Meridian is for sure a deep and powerful device taking on board a number of audio filter concepts but also adding some unique features. The patching and configuration combinations seems almost endless whether based on its routing or mixing or the various filter options or the multiple combinations of all. This section aims to give more details and clarity on the filter applications and also provides an overview of the combinations available

MERIDIAN COMB FILTER

When two or more sound waves with similar frequencies are played together, they can create a phenomenon called comb filtering. This happens because the waves interact and form an interference pattern that amplifies certain frequencies while canceling out others. As a result, the sound's frequency response shows a pattern of peaks and dips.

Comb/Notch Filtering

When configuring the Modbap Meridian, using two comb/notch filters in series can create a distinctive and captivating sound effect. The first filter will amplify or weaken specific frequencies before they pass through the second filter. This creates a complex interference pattern that produces peaks and dips in the frequency response, resulting in a unique and intriguing tearing and smearing sound effect. It's worth noting that the outcome may vary depending on the source material.

The "tearing and smearing" effect described is caused by the ups and downs in the frequency response. These fluctuations can add movement and instability to the sound, which is useful in music production. By adjusting the comb/notch filter parameters, like the center frequency and Q factor (res), the comb filtering effect can be customized to produce a variety of distinct and intriguing sounds.

The use of two comb/notch filters in series results in a unique sound that can enhance the depth and complexity of any music composition. The Modbap Meridian dual multimode digital complex filter array system is an effective and flexible tool for experimentally exploring the creative applications of comb filtering and other sound manipulation techniques.

Comb in notch mode filtering involves creating a dip in the frequency response of sound. To achieve this effect, the comb/notch filter configuration needs to be set to a high Q factor (res), which determines the sharpness of the dip. However, it's important to note that setting the Q point too high can create unpleasant frequency resonances, so be careful. However, to get the full effect of the notch mode filtering, resonance needs to be added all the way down. This is because the resonance creates a peak at the edges of the dip, emphasizing the frequencies just outside the dip and creating a more pronounced effect.

Comb/LP Filtering

On the other hand, LP comb filtering involves using a low pass filter in combination with the comb filter. This creates a series of peaks and dips in the frequency response, similar to the notch mode filtering. However, in this case, the resonance needs to be all the way up to get the signature comb, pinched straw-blowing, effect. This effect is created by the peaks and dips in the frequency response, which resemble the sound of blowing through a pinched straw.

Whether using a comb/notch or comb/lp method, the resonance parameter is essential for achieving the desired sound effect. It adds depth and character to the sound, emphasizing certain frequencies and creating a distinct timbre. Musicians and producers can create an array of intricate sounds with the Modbap Meridian dual multimode digital complex filter array system by experimenting with various combinations of resonance, cut-off, and filter types.

MERIDIAN VOWEL FILTER

The vocal formant filter, also known as the vowel filter, is a unique type of filter found in the Modbap Meridian dual multi-mode digital complex filtering system. It consists of a number of resonator filters that are specifically tuned to the formants of different vowel sounds. This allows the filter to emphasize and mimic the natural resonance of the human voice, creating a range of expressive and organic sounds.

The vowel filter's cut-off frequency and resonance parameters have intriguing interactions, notably at the extremes. Lower cut-off frequencies enhance lower frequencies, producing a deeper and more guttural sound, while higher cut-off frequencies emphasize higher frequencies, yielding a brighter and more nasal sound. The resonance parameter determines the formant peaks' intensity, with lower values resulting in less pronounced peaks and higher values producing more expressive and exaggerated peaks.

The vowel filter is an effective way to enhance the quality and emotion of your music. It can replicate the natural tones of the human voice, making it a valuable tool for producers and musicians who want to create intricate and diverse sounds. With the ability to adjust the cut-off frequency, resonance, and the various filter modes, the options for using the vowel filter are limitless.

The Modbap Meridian dual multi-mode digital complex filtering system has a vocal formant filter that's flexible enough to work with various filter modes such as low pass, high pass, band pass, and notch filter modes. This filter can add warmth and depth to bass lines and pads, emphasizing lower frequencies and creating a smooth and full-bodied sound when used with a low pass filter. On the other hand, the vowel filter can add sparkle and clarity to leads and arps, emphasizing higher frequencies and producing a bright and lively sound when used with a high pass filter.

When in band pass mode, the vowel filter can be utilized to isolate particular frequency ranges, resulting in a sharper and clearer sound in the original source material. This feature proves to be especially helpful when dealing with drums and beats, as it emphasizes the force and impact of each individual drum hit. Additionally, the notch filter mode can be paired with the vowel filter to produce intricate and complex sounds. The notch filter mode is designed to eliminate or dampen certain frequencies, while the formant peaks of the vowel filter are emphasized.

Depending on the specific use, the vowel filter can treat various types of source material differently. When used on bass lines and pads, it can enhance the depth and warmth of the lower and mid frequencies, resulting in a fuller and richer sound. On the other hand, when applied to leads and arps, it can bring out the formant peaks, creating movement and variation in the sound while adding expressiveness and character.

When it comes to drums and beats, you can use the vowel filter to isolate particular frequency ranges. This emphasizes the impact and punch of each drum hit, resulting in clearer and more focused beats from a frequency perspective. It's a great way to drive the overall groove of your track and can also add expressive and organic sounds to your music. The vowel filter is versatile and can be used in a variety of contexts to create distinct and intricate sounds.

MERIDIAN FILTER CONFIGURATION POSSIBILITIES

In the world of eurorack modular synthesis, the filters utilized have a significant impact on the final sound. The digital dual multi-mode filter array found in the Modbap Meridian offers for a large variety of filter settings, allowing your sounds to be sculpted and shaped to meet any artistic vision. The possibilities for creative sound design are nearly boundless with four distinct filter types and four distinct filter modes accessible on each side. To illustrate the flexibility and power of this advanced Eurorack modular synthesizer, this section will list the 256 configurations (x2 when you consider the routing possibilities of serial or parallel for a combined total of 512 combinations) available in the Meridian. THE FILTER COMBINATIONS OF THE MERIDIAN WILL INSPIRE AND BOOST YOUR CREATIVE PROCESS whether you're an experienced modular synthesist or fresh to the realm of eurorack.

Meridian's digital twin multi-mode filter array is a potent tool for sound designers working in the eurorack format. The filter array provides a broad variety of customization possibilities, including low-pass filters that block out high-frequency content, high-pass filters that block out low-frequency content, band-pass filters that only allow a certain frequency range to pass through, and notch filters that create unique tonal effects and remove unwanted frequencies from the sound sources.

Here, we'll look at all possible filter configurations per side. Meridian may be used to craft a wide variety of sounds, from evolving pads to cutting leads to rumbling bass and overall beat processing. The Modbap Meridian eurorack modular synthesizer has a wide variety of filter configurations waiting to be explored.

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
1	Ladder	LP	Ladder	LP
2	Ladder	LP	Ladder	HP
3	Ladder	LP	Ladder	BP
4	Ladder	LP	Ladder	N
5	Ladder	LP	OTA	LP
6	Ladder	LP	OTA	HP
7	Ladder	LP	OTA	BP
8	Ladder	LP	OTA	N
9	Ladder	LP	Comb	LP
10	Ladder	LP	Comb	HP
11	Ladder	LP	Comb	BP
12	Ladder	LP	Comb	N
13	Ladder	LP	Vocal Formant	LP
14	Ladder	LP	Vocal Formant	HP
15	Ladder	LP	Vocal Formant	BP
16	Ladder	LP	Vocal Formant	N
17	Ladder	HP	Ladder	LP
18	Ladder	HP	Ladder	HP
19	Ladder	HP	Ladder	BP
20	Ladder	HP	Ladder	N
21	Ladder	HP	OTA	LP
22	Ladder	HP	OTA	HP
23	Ladder	HP	OTA	BP
24	Ladder	HP	OTA	N
25	Ladder	HP	Comb	LP
26	Ladder	HP	Comb	HP
27	Ladder	HP	Comb	BP
28	Ladder	HP	Comb	N
29	Ladder	HP	Vocal Formant	LP
30	Ladder	HP	Vocal Formant	HP
31	Ladder	HP	Vocal Formant	BP
32	Ladder	HP	Vocal Formant	N

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
33	Ladder	BP	Ladder	LP
34	Ladder	BP	Ladder	HP
35	Ladder	BP	Ladder	BP
36	Ladder	BP	Ladder	N
37	Ladder	BP	OTA	LP
38	Ladder	BP	OTA	HP
39	Ladder	BP	OTA	BP
40	Ladder	BP	OTA	N
41	Ladder	BP	Comb	LP
42	Ladder	BP	Comb	HP
43	Ladder	BP	Comb	BP
44	Ladder	BP	Comb	N
45	Ladder	BP	Vocal Formant	LP
46	Ladder	BP	Vocal Formant	HP
47	Ladder	BP	Vocal Formant	BP
48	Ladder	BP	Vocal Formant	N
49	Ladder	N	Ladder	LP
50	Ladder	N	Ladder	HP
51	Ladder	N	Ladder	BP
52	Ladder	N	Ladder	N
53	Ladder	N	OTA	LP
54	Ladder	N	OTA	HP
55	Ladder	N	OTA	BP
56	Ladder	N	OTA	N
57	Ladder	N	Comb	LP
58	Ladder	N	Comb	HP
59	Ladder	N	Comb	BP
60	Ladder	N	Comb	N
61	Ladder	N	Vocal Formant	LP
62	Ladder	N	Vocal Formant	HP
63	Ladder	N	Vocal Formant	BP
64	Ladder	N	Vocal Formant	N

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
65	OTA	LP	Ladder	LP
66	OTA	LP	Ladder	HP
67	OTA	LP	Ladder	BP
68	OTA	LP	Ladder	N
69	OTA	LP	OTA	LP
70	OTA	LP	OTA	HP
71	OTA	LP	OTA	BP
72	OTA	LP	OTA	N
73	OTA	LP	Comb	LP
74	OTA	LP	Comb	HP
75	OTA	LP	Comb	BP
76	OTA	LP	Comb	N
77	OTA	LP	Vocal Formant	LP
78	OTA	LP	Vocal Formant	HP
79	OTA	LP	Vocal Formant	BP
80	OTA	LP	Vocal Formant	N
81	OTA	HP	Ladder	LP
82	OTA	HP	Ladder	HP
83	OTA	HP	Ladder	BP
84	OTA	HP	Ladder	N
85	OTA	HP	OTA	LP
86	OTA	HP	OTA	HP
87	OTA	HP	OTA	BP
88	OTA	HP	OTA	N
89	OTA	HP	Comb	LP
90	OTA	HP	Comb	HP
91	OTA	HP	Comb	BP
92	OTA	HP	Comb	N
93	OTA	HP	Vocal Formant	LP
94	OTA	HP	Vocal Formant	HP
95	OTA	HP	Vocal Formant	BP
96	OTA	HP	Vocal Formant	N
97	OTA	BP	Ladder	LP

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
98	OTA	BP	Ladder	HP
99	OTA	BP	Ladder	BP
100	OTA	BP	Ladder	N
101	OTA	BP	OTA	LP
102	OTA	BP	OTA	HP
103	OTA	BP	OTA	BP
104	OTA	BP	OTA	N
105	OTA	BP	Comb	LP
106	OTA	BP	Comb	HP
107	OTA	BP	Comb	BP
108	OTA	BP	Comb	N
109	OTA	BP	Vocal Formant	LP
110	OTA	BP	Vocal Formant	HP
111	OTA	BP	Vocal Formant	BP
112	OTA	BP	Vocal Formant	N
113	OTA	N	Ladder	LP
114	OTA	N	Ladder	HP
115	OTA	N	Ladder	BP
116	OTA	N	Ladder	N
117	OTA	N	OTA	LP
118	OTA	N	OTA	HP
119	OTA	N	OTA	BP
120	OTA	N	OTA	N
121	OTA	N	Comb	LP
122	OTA	N	Comb	HP
123	OTA	N	Comb	BP
124	OTA	N	Comb	N
125	OTA	N	Vocal Formant	LP
126	OTA	N	Vocal Formant	HP
127	OTA	N	Vocal Formant	BP
128	OTA	N	Vocal Formant	N

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
129	Comb	LP	Ladder	LP
130	Comb	LP	Ladder	HP
131	Comb	LP	Ladder	BP
132	Comb	LP	Ladder	N
133	Comb	LP	OTA	LP
134	Comb	LP	OTA	HP
135	Comb	LP	OTA	BP
136	Comb	LP	OTA	N
137	Comb	LP	Comb	LP
138	Comb	LP	Comb	HP
139	Comb	LP	Comb	BP
140	Comb	LP	Comb	N
141	Comb	LP	Vocal Formant	LP
142	Comb	LP	Vocal Formant	HP
143	Comb	LP	Vocal Formant	BP
144	Comb	LP	Vocal Formant	N
145	Comb	HP	Ladder	LP
146	Comb	HP	Ladder	HP
147	Comb	HP	Ladder	BP
148	Comb	HP	Ladder	N
149	Comb	HP	OTA	LP
150	Comb	HP	OTA	HP
151	Comb	HP	OTA	BP
152	Comb	HP	OTA	N
153	Comb	HP	Comb	LP
154	Comb	HP	Comb	HP
155	Comb	HP	Comb	BP
156	Comb	HP	Comb	N
157	Comb	HP	Vocal Formant	LP
158	Comb	HP	Vocal Formant	HP
159	Comb	HP	Vocal Formant	BP
160	Comb	HP	Vocal Formant	N
161	Comb	BP	Ladder	LP

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
162	Comb	BP	Ladder	HP
163	Comb	BP	Ladder	BP
164	Comb	BP	Ladder	N
165	Comb	BP	OTA	LP
166	Comb	BP	OTA	HP
167	Comb	BP	OTA	BP
168	Comb	BP	OTA	N
169	Comb	BP	Comb	LP
170	Comb	BP	Comb	HP
171	Comb	BP	Comb	BP
172	Comb	BP	Comb	N
173	Comb	BP	Vocal Formant	LP
174	Comb	BP	Vocal Formant	HP
175	Comb	BP	Vocal Formant	BP
176	Comb	BP	Vocal Formant	N
177	Comb	N	Ladder	LP
178	Comb	N	Ladder	HP
179	Comb	N	Ladder	BP
180	Comb	N	Ladder	N
181	Comb	N	OTA	LP
182	Comb	N	OTA	HP
183	Comb	N	OTA	BP
184	Comb	N	OTA	N
185	Comb	N	Comb	LP
186	Comb	N	Comb	HP
187	Comb	N	Comb	BP
188	Comb	N	Comb	N
189	Comb	N	Vocal Formant	LP
190	Comb	N	Vocal Formant	HP
191	Comb	N	Vocal Formant	BP
192	Comb	N	Vocal Formant	N
193	Vocal Formant	LP	Ladder	LP
194	Vocal Formant	LP	Ladder	HP

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
195	Vocal Formant	LP	Ladder	BP
196	Vocal Formant	LP	Ladder	N
197	Vocal Formant	LP	OTA	LP
198	Vocal Formant	LP	OTA	HP
199	Vocal Formant	LP	OTA	BP
200	Vocal Formant	LP	OTA	N
201	Vocal Formant	LP	Comb	LP
202	Vocal Formant	LP	Comb	HP
203	Vocal Formant	LP	Comb	BP
204	Vocal Formant	LP	Comb	N
205	Vocal Formant	LP	Vocal Formant	LP
206	Vocal Formant	LP	Vocal Formant	HP
207	Vocal Formant	LP	Vocal Formant	BP
208	Vocal Formant	LP	Vocal Formant	N
209	Vocal Formant	HP	Ladder	LP
210	Vocal Formant	HP	Ladder	HP
211	Vocal Formant	HP	Ladder	BP
212	Vocal Formant	HP	Ladder	N
213	Vocal Formant	HP	OTA	LP
214	Vocal Formant	HP	OTA	HP
215	Vocal Formant	HP	OTA	BP
216	Vocal Formant	HP	OTA	N
217	Vocal Formant	HP	Comb	LP
218	Vocal Formant	HP	Comb	HP
219	Vocal Formant	HP	Comb	BP
220	Vocal Formant	HP	Comb	N
221	Vocal Formant	HP	Vocal Formant	LP
222	Vocal Formant	HP	Vocal Formant	HP
223	Vocal Formant	HP	Vocal Formant	BP
224	Vocal Formant	HP	Vocal Formant	N
225	Vocal Formant	BP	Ladder	LP
226	Vocal Formant	BP	Ladder	HP
227	Vocal Formant	BP	Ladder	BP

Combination	Slot 1 Filter Type	Slot 1 Filter Mode	Slot 2 Filter Type	Slot 2 Filter Mode
228	Vocal Formant	BP	Ladder	N
229	Vocal Formant	BP	OTA	LP
230	Vocal Formant	BP	OTA	HP
231	Vocal Formant	BP	OTA	BP
232	Vocal Formant	BP	OTA	N
233	Vocal Formant	BP	Comb	LP
234	Vocal Formant	BP	Comb	HP
235	Vocal Formant	BP	Comb	BP
236	Vocal Formant	BP	Comb	N
237	Vocal Formant	BP	Vocal Formant	LP
238	Vocal Formant	BP	Vocal Formant	HP
239	Vocal Formant	BP	Vocal Formant	BP
240	Vocal Formant	BP	Vocal Formant	N
241	Vocal Formant	N	Ladder	LP
242	Vocal Formant	N	Ladder	HP
243	Vocal Formant	N	Ladder	BP
244	Vocal Formant	N	Ladder	N
245	Vocal Formant	N	OTA	LP
246	Vocal Formant	N	OTA	HP
247	Vocal Formant	N	OTA	BP
248	Vocal Formant	N	OTA	N
249	Vocal Formant	N	Comb	LP
250	Vocal Formant	N	Comb	HP
251	Vocal Formant	N	Comb	BP
252	Vocal Formant	N	Comb	N
253	Vocal Formant	N	Vocal Formant	LP
254	Vocal Formant	N	Vocal Formant	HP
255	Vocal Formant	N	Vocal Formant	BP
256	Vocal Formant	N	Vocal Formant	N

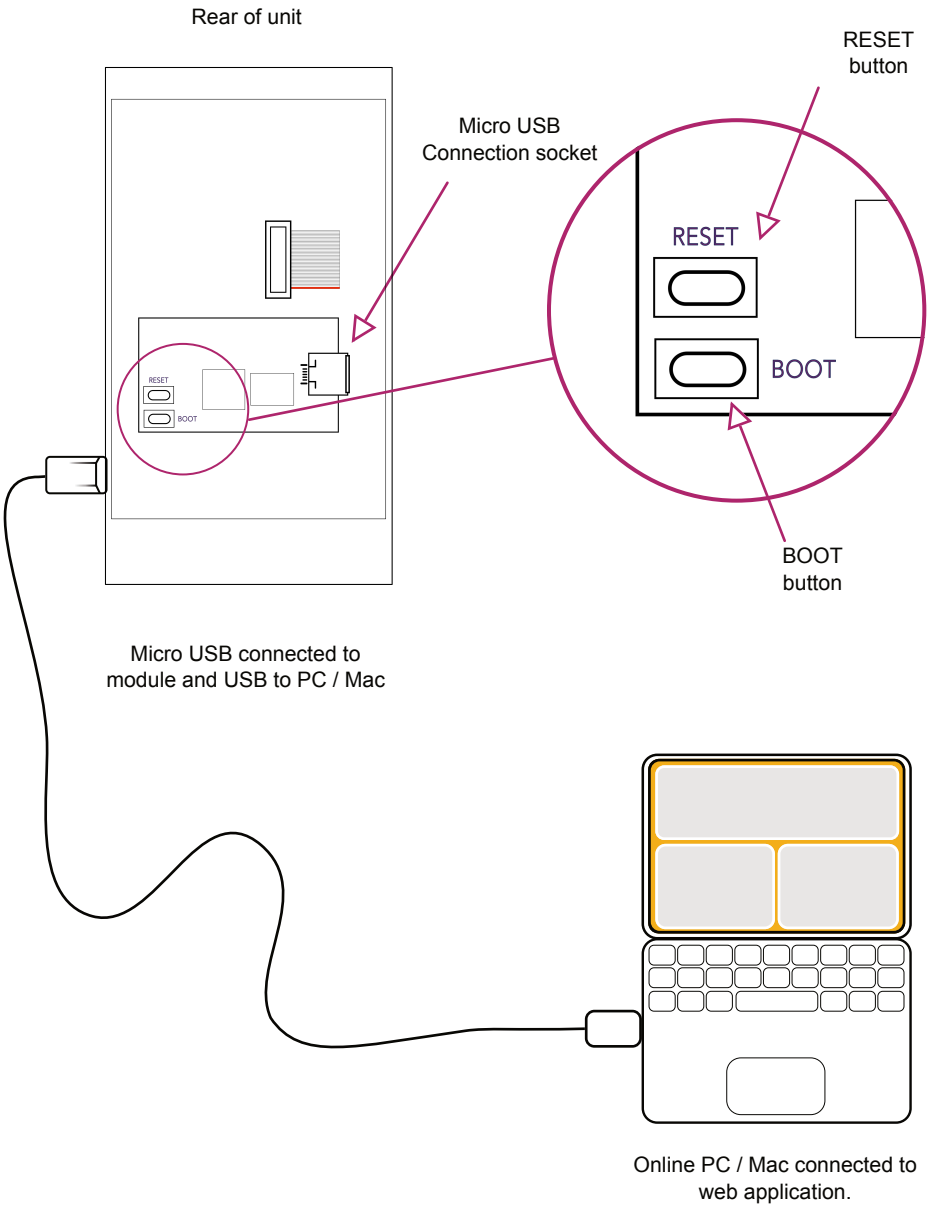
System

Meridian

Firmware updates occasionally are made available as the module feature set develops and also to introduce system improvements. The general update process is described here but it is important to read and follow the instructions issued with each firmware update. The process described here is for general information and may be subject to change. Check out modbap modular online for latest versions and updates.

FIRMWARE UPDATES

Occasionally firmware updates are available. This maybe to provide improvements to the functionality, fix bugs or add new features. Updates are applied using the micro USB connector on the rear of the unit and connecting to a PC or Mac.



UPDATING THE FIRMWARE

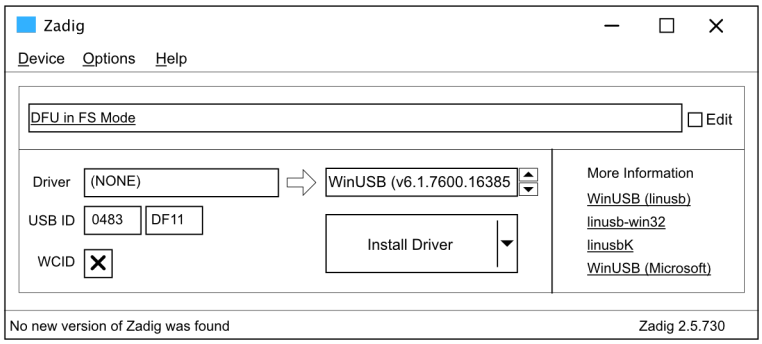
The instructions below are a guide. Always follow the instructions that are provided with each update.

1. Download the firmware update.
2. Remove the device from the rack and ensure power is disconnected.
3. Connect device using a micro usb connection to the module and USB to a mac or PC. The module LED will illuminate. Power for the programming function is provided by the USB connection to the PC / Mac.
4. Open the programming utility at electro-smith github within the PC / Mac browser. It is recommended to use Chrome browser to ensure scripting compatibility.
5. On the module, firstly hold the boot button and then press the reset button. The module will enter boot mode and the single LED may appear slightly brighter.
6. On the programming page, press ‘Connect’.
7. The option pop up box will open and select ‘DFU in FS Mode’.
8. Click the bottom left option to select a file using the browser. Select the .bin firmware update file from the PC / Mac.
9. Click ‘program’ in the bottom programming section window. The status bar indicators will show erase status followed by upload status.
10. When complete disconnect the usb connection and reinstall into the rack.
11. Power on the rack and module.

UPDATING THE FIRMWARE - PC WINDOWS

The instructions below are a guide, follow the instructions provided with each update.

1. Windows PC's may need the original WinUSB drivers installed. It is recommended to install Zadig, a utility which reinstalls windows drivers, before updating. This can be downloaded from www.zadig.akeo.ie.



1. Download the firmware update.
2. Remove the device from the rack and ensure power is disconnected.
3. Connect device using a micro usb connection to the module and USB to a PC. The module LED will illuminate. Power for the programming function is provided by the USB connection to the PC.
4. Open the programming utility at electro-smith github within the PC browser. It is recommended to use Chrome browser.
5. On the module, firstly hold the boot button and then press the reset button. The module will enter boot mode and the LED may appear slightly brighter.
6. On the programming page, press 'Connect'.
7. The option pop up box will open and select 'DFU in FS Mode'.
8. Click the bottom left option to select a file using the browser. Select the .bin firmware update file from the PC.
9. Click 'program' in the bottom programming section window. The status bar indicators will show erase status followed by upload status.
10. When complete disconnect the usb connection and reinstall into the rack.
11. Power on the rack and module.

Limited Warranty

Modbap Modular warrants all products to be free of manufacturing defects related to materials and/or construction for a period of one (1) year following the product's purchase date by the original owner as certified by proof of purchase (i.e. receipt or invoice).
This non-transferrable warranty does not cover any damage caused by misuse of the product, or any unauthorized modification of the product's hardware or firmware.
Modbap Modular reserves the right to determine what qualifies as misuse at their discretion and may include but is not limited to damage to the product caused by 3rd party related issues, negligence, modifications, improper handling, exposure to extreme temperatures, moisture, and excessive force.

Manual Version 1v0 - May 2023

(Firmware Version 1.0)

Manual designed by Synthdawg

www.synthdawg.com

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BUILT FOR EURORACK
DOPE ENOUGH FOR BOOMBAP!

Firmware
V1.0

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