ORPHIC DYNAMICS

CHIRP - Eurorack 18HP/3U

Analog crossfading multimode VCF with mixed input mode channels

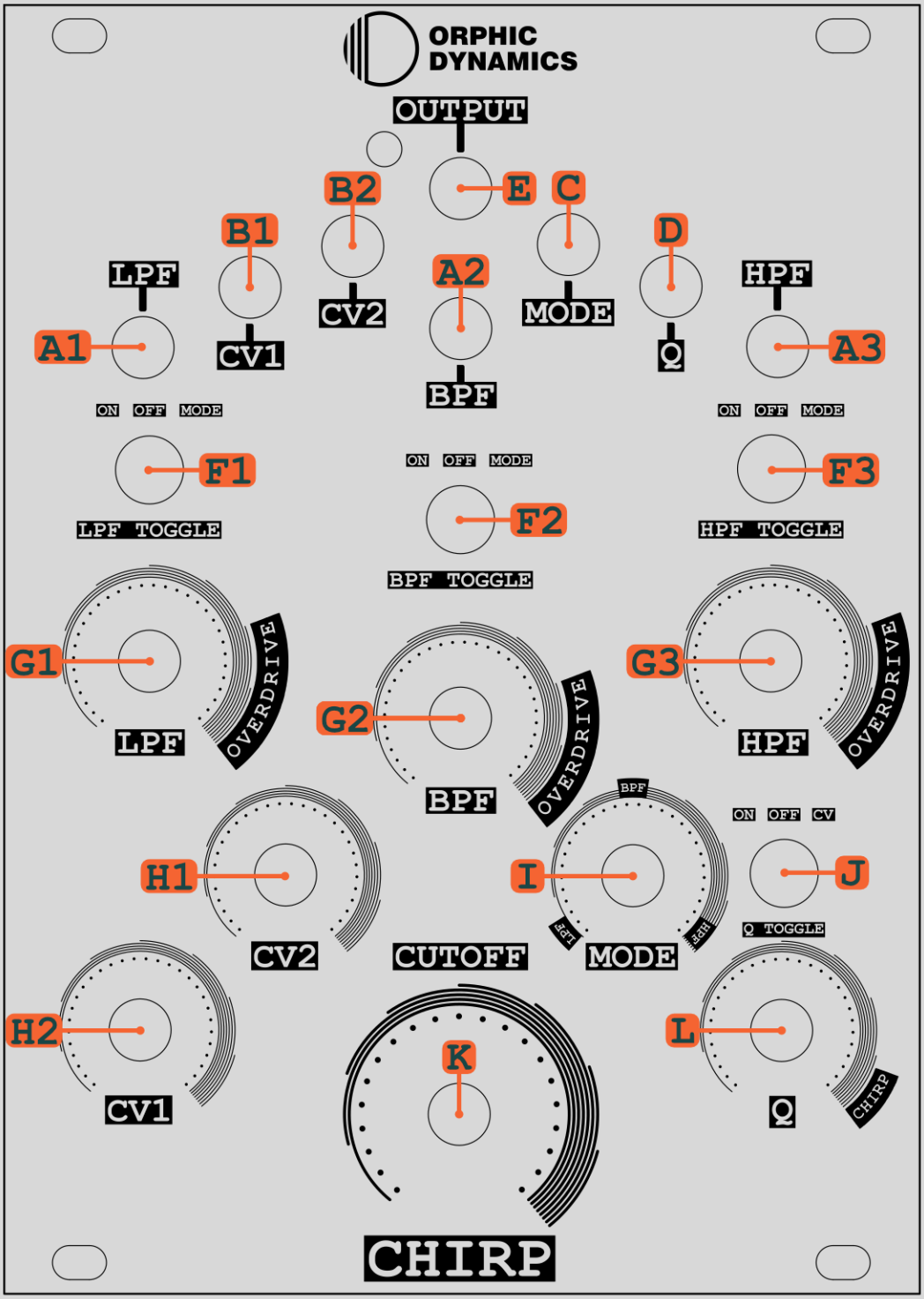
CHIRP is a fully analog VCF featuring multi-input mode mixing and crossfading capabilities with three filter modes, low-pass (LPF), band-pass (BPF), and high-pass (HPF).
All three inputs can be activated simultaneously by using toggle switches, enabling creative combinations from a single input patch. When the resonance (Q) control is turned fully up, CHIRP enters self-oscillation, making the module a sound source capable of producing melodies using an external CV.
CHIRP's filter design is inspired by vintage synthesizers and employs a modified Sallen-Key topology combined with a resonance feedback circuit reminiscent of the classic Korg MS-20. The crossfading function allows smooth transitions between filter modes, making CHIRP an interesting tool for sound design and experimental music production.

Features:

- **Cutoff (CV/manual)**
- **Resonance Q (CV/manual)**
- **Input drive (manual)**
- **Self-Resonance**
- **Three Filter Modes (manual)**
- **Combined Filter Modes (CV/manual)**
- **Crossfading Filter Modes (CV/manual)**

Specifications:

Power consumption	**68mA @ +12V, 65mA @ -12V**
Audio input signal	**Up to 20Vpp (+-10V)**
Audio output signal	**Depends on the input audio level**
CV input signal	**Up to 24Vpp (+-12V)**
Roll-Off (Approximate)	**-24dB/octave (4-pole response)**
Operation frequency	**8Hz - 26kHz**
Panel width	**18HP**
Panel length	**3U**
Module depth	**35mm**


ORPHIC DYNAMICS
OUTPUT
B2
E
C
B1
D
LPF
A2
HPF
A1
CV2
MODE
CV1
Q
BPF
A3
ON OFF MODE
ON OFF MODE
ON OFF MODE
F1
F2
F3
LPF TOGGLE
BPF TOGGLE
HPF TOGGLE
G1
G2
G3
OVERDRIVE
LPF
BPF
HPF
H1
BPF
ON OFF CV
I
J
CV2
LPF
HPF
CUTOFF
MODE
Q TOGGLE
H2
K
L
CV1
Q
CHIRP
CHIRP

A1 ➔ Input channel for low-pass signal processing. This channel is by default connected directly to the band-pass input channel (BPF).

A2 ➔ Input channel for band-pass signal processing. This channel can be used to share the input of the low-pass input channel (LPF) when left unplugged. The shared connection between LPF and BPF will be broken if a patch is inserted in this (BPF) channel. This channel is by default connected directly to the high-pass input channel (HPF).

A3 ➔ Input channel for high-pass signal processing. This channel can be used to share the input of the band-pass input channel (BPF) when left unplugged. The shared connection between BPF and HPF will be broken if a patch is inserted in the (HPF) channel. This channel can be used even if there is one patch entering the low-pass input (LPF) or the band-pass input (BPF) channels.

B1 ➔ Input control voltage for cutoff frequency modulation, this takes effect and adjusts the cutoff for all filter modes that are active by the user. The CV input level can be negative and the permitted levels range from **-12V to +12V**.

B2 ➔ Input control voltage for cutoff frequency modulation. There are two CV inputs for extra user flexibility. One input may be used to feed in a modulation signal and the other one can be used to input a constant DC signal to vary the offset of the modulation signal. Since both inputs may range from **-12V to +12V**, the choice is up to the user on how the CV inputs are used.

C ➔ Input control voltage for setting a dominant filter mode to process the input signal(s) on the enabled input channels. This input cannot be negative and the permitted levels range from **0V to +12V**.

D → Input control voltage for the amount of desired resonance feedback (quality factor Q). This input cannot be negative and the permitted levels range from **0V to +12V**.

E → Output audio signal with an audio intensity indicator LED.

F1 → This toggle switch allows the user to pick the state of the low-pass input channel. The channel is by default in the middle position where it disables the LPF channel input, the signal patched to this channel will not proceed to the filter, however, the band-pass channel is still able to receive the input signal patched to LPF if the BPF channel is left unpatched, since they are by default connected. The band-pass channel may be enabled and the patched signal to the low-pass channel may be used by the other modes as desired. The LPF channel may be turned constantly on or depend on the 'MODE'.

F2 → This toggle switch has the same function and allows for picking the state of the band-pass input channel.

F3 → This toggle switch has the same function and allows for picking the state of the high-pass input channel.

G1 → This knob regulates the amplitude of the low-pass input channel. Turning this drive past a certain point will make the input signal clip and distort ('OVERDRIVE').

G2 → This knob regulates the amplitude of the band-pass input channel. It has the same drive functionality.

G3 → This knob regulates the amplitude of the high-pass input channel. It has the same drive functionality.

H1 → Amplitude control for the second cutoff frequency control voltage input signal.

H2 → Amplitude control for the first cutoff frequency control voltage input signal.

I → Smoothly crossfade the filter modes or mix them with or without a dominant choice. To be able to use this feature, the input channels must be toggled to 'MODE'.

J → This toggle switch allows the user to pick a state of the resonance feedback. The switch is by default in the middle position where it disables any resonance added to the signal and can be toggled to constantly on or depend on the resonance feedback amount (Q) CV input signal.

K → Manually adjust the cutoff frequency for all input channels. This adjustment has a very wide range of frequency settings (8Hz to 26kHz).

L → Adjust the amount of resonance feedback manually and make the module self-oscillate up to a chirping high frequency. This feature can only be used when the resonance toggle is enabled (either constantly or CV-dependent).

Input Channels

The CHIRP VCF module features three input channels: low-pass (LPF), band-pass (BPF) and high-pass (HPF) filters. These inputs are normalized, allowing for efficient patching without the need for external mults.

Low-Pass Input (LPF)

By default, this input is normalized to the band-pass input (BPF). If no patch cable is inserted into the BPF input, the LPF input signal is shared with the BPF channel. Inserting a patch into the BPF input breaks this normalization, isolating the LPF input.

Band-Pass Input (BPF)

This input is normalized to the high-pass input (HPF). If no patch cable is inserted into the HPF input, the BPF input signal is shared with the HPF channel. Inserting a patch into the HPF input breaks the normalization, isolating the BPF input. If only the LPF input is patched, the signal is still routed to the BPF and HPF unless overridden by direct patching.

High-Pass Input (HPF)

This input is normalized to the BPF input when left unplugged. Inserting a patch into the HPF input breaks the normalization, allowing independent signal processing. Even if the LPF or BPF input is patched, the HPF input can still be used separately.

Channel Toggles

Low-Pass Channel Toggle (LPF)

The LPF toggle switch controls the state of the low-pass input channel. By default, the toggle is in the **middle position**, which disables the LPF channel input. In this state, the signal patched to the LPF input will **not proceed** to the filter. If the band-pass input (BPF) remains unpatched, the LPF input signal is still **shared** with the band-pass channel, as they are normalized.

The toggle can be set to:

- **ON**: The LPF channel is constantly active.
- **MODE**: The LPF channel will only activate based on the selected mode.

Band-Pass Channel Toggle (BPF)

The BPF toggle switch functions similarly to the LPF toggle, controlling the state of the band-pass input channel. By default, the toggle in the **middle position** disables the BPF channel input. If the high-pass input (HPF) remains unpatched, the BPF input signal is still **shared** with the high-pass channel.

The toggle can be set to:

- **ON**: The BPF channel is constantly active.
- **MODE**: The BPF channel will only activate based on the selected mode.

High-Pass Channel Toggle (HPF)

The HPF toggle switch controls the state of the high-pass input channel. By default, the toggle in the **middle position** disables the HPF channel input. The HPF input operates independently when patched, but it can still share signals with the BPF input if unpatched, maintaining the normalized connections.

The toggle can be set to:

- **ON**: The HPF channel is constantly active.
- **MODE**: The HPF channel will only activate based on the selected mode.

Input CVs

Cutoff Frequency CV Inputs

CHIRP includes two CV inputs for cutoff frequency modulation. Both inputs accept signals ranging from **-12V to +12V**. One input can be used for modulation signals (e.g. LFOs or envelopes), while the second input can introduce a **constant DC signal** to offset the modulation. These inputs apply modulation to the cutoff frequency across all active filter modes.

Mode CV Input

This CV input sets the dominant filter mode to process the signal on the enabled input channels. The **voltage range is 0V to +12V** (negative voltages are prohibited). Smooth transitions and crossfading between modes can be achieved depending on the modulation signal.

- **0V**: Low-pass filter becomes dominant.
- **12V**: High-pass filter becomes dominant.
- **Intermediate voltages**: Band-pass filter becomes dominant.

The mode CV input operates independently of the **MODE knob**, allowing users to manually adjust the mode even when the input is patched.

Note: This input cannot be attenuated on the module; users must regulate the CV signal externally to stay within the permitted voltage range.

Resonance (Q) CV Input

This CV input controls the amount of resonance feedback (quality factor Q). The **voltage range is 0V to +12V** (negative voltages are prohibited).

- **0V**: No resonance or very low resonance.
- **12V**: Maximum resonance, driving CHIRP into self-oscillation (screaming like a bird).
- The **Q knob** acts as an attenuator for this input, allowing users to fine-tune the resonance amount even when CV control is enabled and patched.

OUTPUT

Signal Level

The output signal level is directly dependent on the input signal level(s) and the filter configuration. Input signals ranging from **-10V to +10V** will produce corresponding output signals within the same range, depending on the filter response and resonance settings.

Audio Intensity LED

The integrated LED provides a clear visual indication of the signal's audio intensity at the output. The LED brightness dynamically responds to the amplitude of the processed signal.

Protection

The output is designed with short-circuit protection, preventing damage to the module if the output is accidentally shorted to ground or another signal.

Input Drives

CHIRP features three independent drive knobs that regulate the amplitude of the input signal for each filter channel. Each knob provides smooth gain control and can introduce **OVERDRIVE** when turned beyond a certain point, adding harmonic distortion to the input signals.

Overdriving one or more input channels can introduce intermodulation effects when multiple inputs are active, leading to complex and harmonically rich outputs. Input signals should be managed carefully when applying significant drive to avoid overwhelming the filter and producing unwanted distortion. Users may experiment with different drive levels to explore a wide range of tones, from clean and subtle filtering to heavily distorted and saturated sounds.

Low-Pass Drive

Controls the amplitude of the low-pass input channel. Turning the knob past its mid-point will progressively clip the signal, introducing harmonic distortion and overdrive. Useful for fattening up signals or adding texture to clean audio sources.

Band-Pass Drive

Controls the amplitude of the band-pass input channel. Features the same overdrive characteristics as the LPF drive, allowing for aggressive tones when pushed. This is ideal for shaping midrange content or highlighting specific frequencies in the signal.

High-Pass Drive

Controls the amplitude of the high-pass input channel. Similar overdrive behavior as the LPF and BPF drives, delivering edgy tones when overdriven. Useful for creating sharp signals or emphasizing high-frequency detail.

CUTOFF

The Cutoff knob provides manual control over the cutoff frequency for all input channels, determining the point at which the filter attenuates frequencies.

Frequency Range

The cutoff frequency can be adjusted anywhere between 8Hz to 26kHz. This broad range allows precise control over the filter's effect, from subsonic rumbles to attenuating high-ends.

Interaction with CV Inputs

When CV signals are patched into the Cutoff CV inputs, the Cutoff knob acts as an offset control, shifting the base frequency around which modulation occurs. Combining manual adjustments with modulation inputs allows dynamic cutoff frequency sweeps.

Self-Oscillation Behavior

At maximum resonance (Q), CHIRP can enter self-oscillation. In this state, the cutoff frequency determines the oscillation pitch, effectively turning the module into a sine wave oscillator. The wide cutoff range enables self-oscillation to cover subsonic, audio, and ultrasonic frequencies.

Patch tips

Use slow modulation signals (e.g. LFOs) for smooth, evolving cutoff sweeps. Fast modulation signals (e.g. envelopes or audio-rate CV) can create dynamic and percussive effects. Combine manual cutoff adjustments with resonance for more unique tonal responses.

MODE

The **MODE** knob allows you to blend or crossfade between the three filter modes. The feature is central to CHIRP's sound design potential.

Low-Pass (LPF)

When turned fully counterclockwise, the knob activates the Low-Pass Filter.

Band-Pass (BPF)

At the center position of the knob, the Band-Pass Filter becomes dominant.

High-Pass (HPF):

Turning the knob fully clockwise activates the High-Pass Filter.

The **MODE** feature also allows the mixing of filter modes in creative ways. By activating multiple filter modes with the input toggle switches, you can mix or crossfade between LPF, BPF, and HPF, creating complex filter shapes. The crossfading allows smooth transitions between modes.

Filter Mode Blending

When multiple input channels are toggled on, the **MODE** knob allows you to blend the different filter modes, enabling creative interactions between them. This makes CHIRP particularly useful for sound design, experimental music, and dynamic live performances.

Resonance and Self-Oscillation

When the self-oscillation effect is activated, turning CHIRP into an active sound source, the **MODE** control can be used to dynamically shift the tonal character of the self-oscillating tone, offering lots of possibilities for exploration.

Q

The **Q** (Resonance) control on CHIRP determines the amount of resonance or feedback applied to the filter circuit. Resonance accentuates frequencies near the cutoff point, and when pushed to its limits, it drives the filter into self-oscillation.

No Resonance (0V to low CV signal)

At the lowest settings, the **Q** knob attenuates resonance, leaving a clean, uncolored signal. This is ideal when you want a subtle or transparent filter effect without the pronounced emphasis on the cutoff frequency.

Moderate Resonance

As you increase the **Q** control, the resonance feedback strengthens, creating a more pronounced peak at the filter's cutoff frequency. This mode is useful for adding presence, or a sense of movement to the sound.

Maximum Resonance (High CV signal or fully clockwise)

When turned fully clockwise or driven by a high CV signal, the resonance feedback is pushed to its limit, causing CHIRP to enter self-oscillation. In this state, the filter produces a pure tone that can be used as a melodic sound source, capable of generating pitched tones when controlled by an external CV signal.

Resonance Feedback Toggle

The **Q** toggle switch allows users to adjust the way resonance interacts with the signal:

OFF (Default)

In the middle position, the resonance is disabled and is not influenced by the **Q** control or any external CV input.

ON

In the left position, the resonance is applied normally, influenced by the **Q** control but not by the external CV input. The resonance feedback will dynamically respond to the **Q** knob only.

CV Controlled

In the CV-controlled position, the amount of resonance feedback is dynamically influenced by the **Q (CV) Input**. This allows external modulation sources as well as the knob to adjust the resonance amount.

Safety instructions

Use a +-12V power supply unit from a reputable manufacturer. Doing otherwise may cause permanent damage to the device.
Water is hazardous to most electronic devices unless they have been specifically designed to be waterproof. The CHIRP VCF module is **NOT** intended for use in a humid or wet environment. No liquids or other conductive substances should come into contact with the module. If any liquids or conductive materials are spilled onto the module, immediately disconnect it from mains power, dry it thoroughly, and contact us, or have it inspected and cleaned by a qualified technician.
Do not expose the module to temperatures above +50°C or below -20°C. If the module has been transported in extremely low temperatures, allow it to acclimate to room temperature for at least an hour before powering it on.
When transporting the module, handle it with care. Never drop or allow it to fall, as this could cause damage. The warranty does not cover instruments with visible damage.
The CHIRP VCF module must be shipped only in its original packaging. Any instrument returned for repair, exchange, or warranty service must be sent in its original packaging. Any items shipped in other packaging will be rejected and returned to you. Be sure to keep the original packaging and all associated technical documentation for future reference.

Compliance

This device meets the requirements of the following EU directives and harmonized standards:

EMC: 2014/30/EU

EN 55032:2015

EN 55103-2:2009

EN 55024:2010

EN 61000-3-2:2014

EN 61000-3-3:2013

LVD: 2014/35/EU

EN 60065:2002+A1:2006+A11:2008+A2:2010+A12:2011

RoHS: 2011/65/EU

EN 50581:2012

WEEE: 2012/19/EU

Disposal

This device complies with EU regulations and is manufactured in accordance with RoHS standards, without the use of mercury, cadmium, or chromium. However, this device is considered special waste and should not be disposed of with household waste.

Legal

Intellectual Property

Warranty

This product is covered by a limited warranty for a specified period from the date of purchase. The warranty covers defects in materials or workmanship but does not cover damage caused by misuse, unauthorized repairs, or modifications. For more details, refer to the warranty terms on the Orphic Dynamics website (WWW.ORPHICDYNAMICS.COM) or contact our customer support team (CONTACT@ORPHICDYNAMICS.COM).