

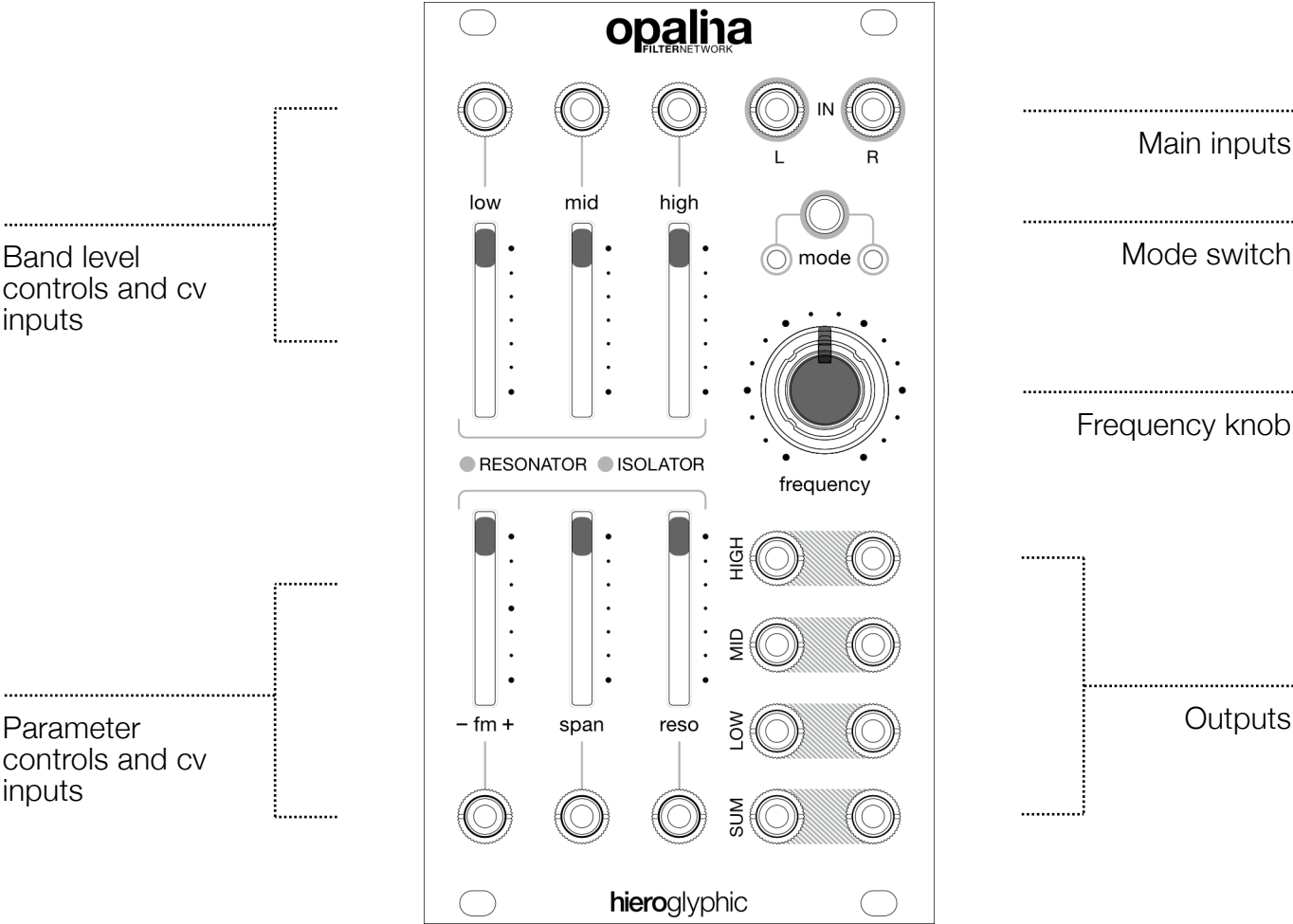
# opalina

FILTERNETWORK

User Guide

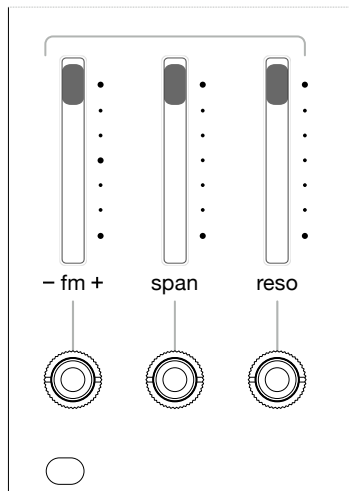
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# Overview & Front Panel



# Parameter Controls & CV Inputs, Frequency Knob

**Span** and **reso** slider control values are summed with their respective CV inputs to determine each parameter's total amount. Negative CV values are subtracted from the slider value. The **fm** slider is an attenuverter.



## FM

The **fm** input signal affects the frequency of all three filter bands. The associated attenuverter determines the strength and polarity of the input signal (positive towards the top, negative towards the bottom). Extending the slider fully allows v/oct keyboard tracking.

## Frequency Knob

The main frequency knob controls the **mid** output's centre frequency and spans from approximately 30Hz to 15kHz. This range can extend further via cv and the **span** control.

## Span

**Span** behaves differently in each operating mode (see 'Mode Switch' section). In **Resonator** mode, it controls the frequency spread of the **low** and **high** bands relative to the **mid** band (Fig. 1). In **Isolator** mode, it controls the bandwidth of the **mid** output (which consequently affects the cutoff frequencies of the **low** and **high** outputs) [Fig. 2].

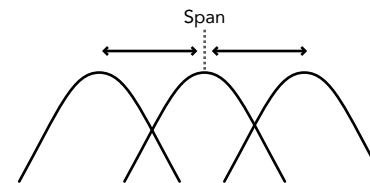


Fig. 1. In **Resonator** mode, **Span** controls the frequency spread of the **low** and **high** bands relative to the **mid** band.

## Reso

The frequency cutoff peaking of all three filter bands is controlled by **reso**. In **Isolator** mode, the **mid** output (bandpass) has two resonant peaks.

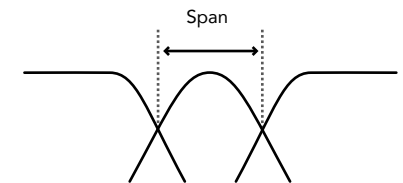
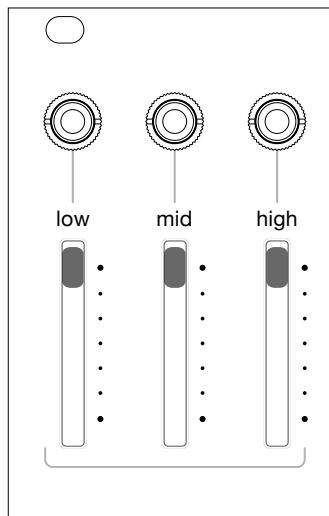


Fig. 2. In **Isolator** mode, **Span** controls the bandwidth of the **mid** output.

# Band Level Controls & CV Inputs, Mode Switch

Individual band level controls affect the input signal. Slider control values are summed with their respective cv inputs. Negative cv values are subtracted from the slider value.



## Low, Mid, High

Each slider and cv input controls an exponential vca pre-filter. A +5v control signal gives approximately unity gain when no resonance is applied (+5v cv is equivalent to having the slider fully extended). Higher cv input values will amplify the signal and saturate the filters. Each slider affects the associated band, as well as the **sum** output.

The **mode** switch toggles between Opalina's two operating modes:

**Resonator** and **Isolator**. The colour coded leds indicate the selected mode (the colour code is located between the upper and lower slider rows).

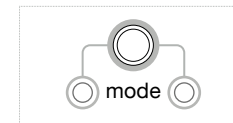


Fig. 3. Operating mode colour code. **Resonator**: orange; **Isolator**: blue.

## Resonator

**Resonator** mode sets the filters into a triple bandpass alignment. The distance between bands is set by the **span** control (Fig. 1), and **reso** sets the q factor for all three filters.

## Isolator

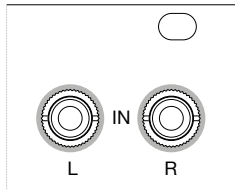
**Isolator** mode is similar to a state-variable topology, with the addition of a variable-width mid-band. **Span** sets the **mid** filter's bandwidth, and simultaneously affects the **low** and **high** filters' frequency cutoff (Fig.2). **Reso** sets the q factor for all three bands.

**N.B.** The variable-width mid output has two resonant peaks.

# Main Inputs, Outputs, OPX

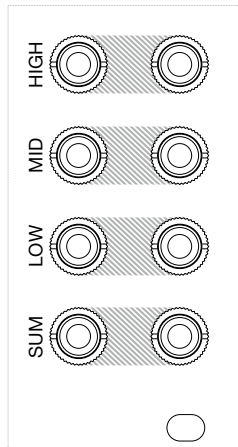
## Main Inputs

DC-coupled input pair sent to all three filter bands. Can be used as a stereo pair, or dual-mono inputs with shared controls. If the right input (**R**) is left unpatched, it receives a copy of the left input (**L**). If only the right input is patched, there will be no signal present at the left outputs.



## Outputs

The **low**, **mid**, and **high** bands each have their own output. The **sum** output is a mix of the individual bands. The band level sliders set the amplitude of both the individual bands and the **sum** output. The **sum** output soft clips at +/-9v.



## OPX

The OPX expander module adds individual input pairs for each filter band. OPX inputs are summed with the main inputs.

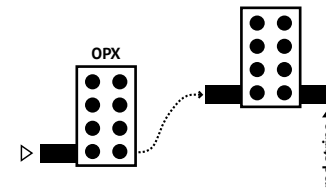


Fig. 4. The OPX expander connects to the Opalina module via an 8-lead cable. Align the red stripe on the cable with the rows indicated on either module's pin header.

# Specifications, Calibration, Block Diagram

## Technical Specifications

**Input impedance:** 100K ohm

**Output impedance:** 100 ohm

**DC coupling:** all inputs and outputs

**Band gain scale:** unity gain at +5V, no Q.

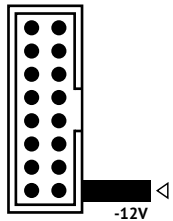
**Reso cv scale:** 0v to +5v

**Module width:** 14HP, OPX 2HP

**Power consumption:** +95/-95 mA

**Module depth:** 35mm

**Installation:** Red stripe on -12V



## Calibration

Opalina comes factory calibrated. Should future adjustments become necessary, there are two trimmer potentiometers that adjust filter behaviour.

**v/oct:** sets the mid filter's tracking.

**span:** sets the peak span of the mid filter in Isolator mode.

## Block Diagram

