Polaris

Versatile Multimode VCF / Phaser

Manual Revision: 2018.09.13

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Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Intellijel Designs, Inc. could void the user's authority to operate the equipment.

Any digital equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

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

EMC: 2014/30/EU
EN55032:2015 ; EN55103-2:2009 (EN55024) ; EN61000-3-2 ; EN61000-3-3

Low Voltage: 2014/35/EU
EN 60065:2002+A1:2006+A11:2008+A2:2010+A12:2011

RoHS2: 2011/65/EU

WEEE: 2012/19/EU

Installation

Intellijel Eurorack modules are designed to be used with a Eurorack-compatible case and power supply. We recommend you use Intellijel cases and power supplies.

Before installing a new module in your case, you must ensure your power supply has a free power header and sufficient available capacity to power the module:

- Sum up the specified +12V current draw for all modules, including the new one. Do the same for the -12 V and +5V current draw. The current draw will be specified in the manufacturer's technical specifications for each module.

- Compare each of the sums to specifications for your case's power supply.

- Only proceed with installation if none of the values exceeds the power supply's specifications. Otherwise you must remove modules to free up capacity or upgrade your power supply.
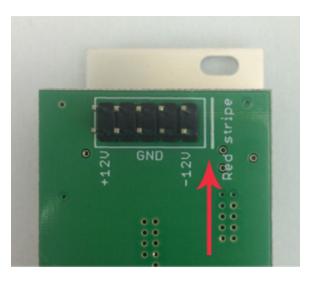
You will also need to ensure your case has enough free space (hp) to fit the new module. To prevent screws or other debris from falling into the case and shorting any electrical contacts, not leave gaps between adjacent modules, and cover all unused areas with blank panels. Similarly, do not use open frames or any other enclosure that exposes the backside of any module or the power distribution board.

You can use a tool like ModularGrid to assist in your planning. Failure to adequately power your modules may result in damage to your modules or power supply. If you are unsure, please contact us before proceeding.

Installing Your Module

When installing or removing a module from your case always turn off the power to the case and disconnect the power cable. Failure to do so may result in serious injury or equipment damage.

Ensure the 10-pin connector on the power cable is connected correctly to the module before proceeding. The red stripe on the cable must line up with the -12V pins on the module's power connector. The pins are indicated with the label -12V, a white stripe next to the connector, the words "red stripe", or some combination of those indicators.
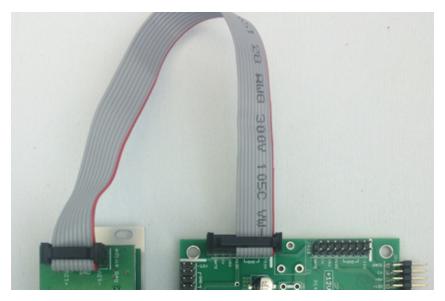
Most modules will come with the cable already connected but it is good to double check the orientation. Be aware that some modules may have headers that serve other purposes so ensure the cable is connected to the right one.

The other end of the cable, with a 16-pin connector, connects to the power bus board of your Eurorack case. Ensure the red stripe on the cable lines up with the -12V pins on the bus board. On Intellijel power supplies the pins are labelled with the label "-12V" and a thick white stripe:

If you are using another manufacturer's power supply, check their documentation for instructions.

Once connected, the cabling between the module and power supply should resemble the picture below:

Before reconnecting power and turning on your modular system, double check that the ribbon cable is fully seated on both ends and that all the pins are correctly aligned. If the pins are misaligned in any direction or the ribbon is backwards you can cause damage to your module, power supply, or other modules.

After you have confirmed all the connections, you can reconnect the power cable and turn on your modular system. You should immediately check that all your modules have powered on and are functioning correctly. If you notice any anomalies, turn your system off right away and check your cabling again for mistakes.

Overview

The Intellijel Polaris is a 4-stage cascaded OTA filter designed by David Dixon. It builds on the lineage of the Dr. Octature and Atlantis filters, but with a totally revised core and resonance control. Along with dedicated LP, HP and BP outputs it features a configurable MULTI output capable of an unprecedented 27 different filter modes.

With drive turned down the Polaris is capable of buttery smooth filtering, and the cutoff control range has been fine-tuned for playability. With the drive dialled up and the new asymmetric multi distortion circuit engaged it creates a more aggressive sound. Not content to be just a filter, the Polaris's AP phaser mode combined with frequency modulation can be used to achieve a phaser effect.
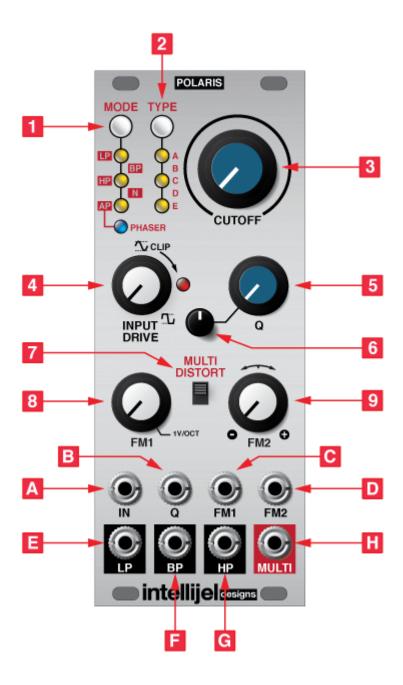
With so much versatility in a modest size, the Polaris is an ideal filter for a starter system and an excellent addition to the tonal palette of a larger modular.

Features

- Dedicated LP, BP and HP outputs.
- MULTI output with 27 selectable filter types: 4 x LP, 5x BP, 4 x HP, 5 x Notch, 4x AP and 4 x Phaser (AP mode with inverted dry blend).
- Input drive control with soft clipping distortion.
- MULTI output asymmetric distortion.

Front Panel

Controls

1. **MODE -** This button cycles between the different filter modes of the MULTI output. The LED's below the button indicate the currently selected mode. The modes are LP (Low pass), BP (Band pass), HP (High pass), N (Notch), and AP (All pass). After AP there is a 6th "PHASER" setting which activates a special phaser effect that is a blend of the all-passed signal and the original input.
2. **TYPE** - This button is used to cycle between filter types for the currently selected mode. Each filter mode has up to 5 variations with different numbers of poles, this button cycles between them. See the "MULTI Modes" section of the manual for more details.
3. **CUTOFF** - Sets the cutoff frequency of the filter. The knob position is combined with the FM1 and FM2 inputs.
4. **INPUT DRIVE** - Sets the drive, or amplification, of the input signal. Unity gain is at the 12 o'clock position. At higher settings signal will begin to experience a clipped distortion.
5. **Q** - Sets the resonance of the filter. The knob position is combined with the Q input.
6. **Q Attenuator** - Attenuator for Q CV input.
7. **MULTI DISTORT** - When in the up position engages the distortion circuit on the MULTI output.
8. **FM1** - Controls the amount of attenuation of the FM1 input. The input tracks 1 V / octave when this knob is fully clockwise.
9. **FM2** - Controls the amount and polarity of the FM2 input. The input passes unmodified when the knob is fully clockwise, inverted when fully counter-clockwise, and has no effect when at the 12 o'clock position.

Inputs & Outputs

A. **IN** - Audio input to the filter.
B. **Q** - CV input for the Q control. The CV amount is attenuated by the black attenuator connected to the Q knob.
C. **FM1** - CV input for the cutoff frequency. Attenuation is controlled by the FM1 knob.
D. **FM2** - CV input for the cutoff frequency. Attenuation is controlled by the FM2 knob.
E. **LP** - 4-pole (24 dB / oct) low pass filter output.
F. **BP** - 2-pole (12 dB / oct) band pass filter output.
G. **HP** - 4-pole (24 dB / oct) high pass filter output.
H. **MULTI** - Configurable filter output, configured by the MODE and TYPE buttons and processed through the distortion circuit if it is enabled.

Multi Modes

The **MODE** and **TYPE** buttons are used to select the filtered signal available at the **MULTI** output. Pressing either button cycles through the respective options and the current selection is indicated by the illuminated LED's. For the labels in between two LED's, such as modes BP and N, the two LED's surrounding the label will both be lit to indicate that it is active. Not every mode has 5 types of filters so some of the types may not be used.

The module remembers the last selected type for each mode as well as the last selected mode when it power down.

The types for each mode are arranged such that the filter slope increases with each filter type. For example LP mode A is a 1-pole low pass, B is a 2-pole, etc.
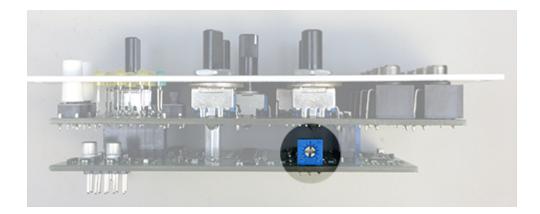
MODE	TYPE	Description
LP	A	1-pole 6 db/oct lowpass
LP	B	2-pole 12 db/oct lowpass
LP	C	3-pole 18 db/oct lowpass
LP	D	4-pole 24 db/oct lowpass
BP	A	1-pole 6 db/oct bandpass
BP	B	2-pole 12 db/oct bandpass
BP	C	3-pole 18 db/oct bandpass
BP	D	4-pole 24 db/oct bandpass
HP	A	1-pole 6 db/oct highpass
HP	B	2-pole 12 db/oct highpass
HP	C	3-pole 18 db/oct highpass
HP	D	4-pole 24 db/oct highpass
N	A	
N	B	
N	C	
N	D	
N	E	
AP	A, B, C, D	Allpass. Varying phase responses.
PHASER		

Trimmers

The side of the Polaris PCB has a resonance balance trimmer that can be used to set the balance of the self-resonating feedback of the filter with the input signal. This trimmer can be adjusted to change the sound of the filter when in self-resonance. Use a phillips head screwdriver to set the balance to taste.

The position of the trimmer is highlighted in the photograph below:

Technical Specifications

Width	10 hp
Maximum Depth	40 mm
Current Draw	60 mA @ +12V 56 mA @ -12V