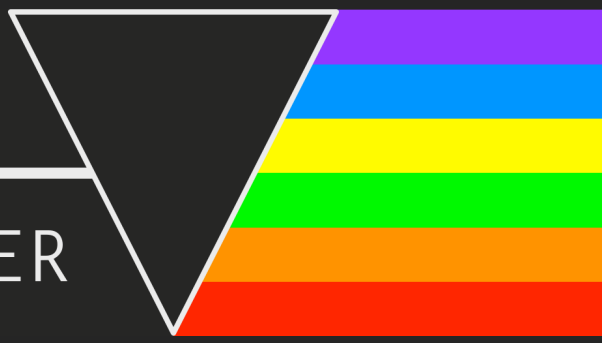
PHOTON

PARTICLE SPLITTER



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WELCOME

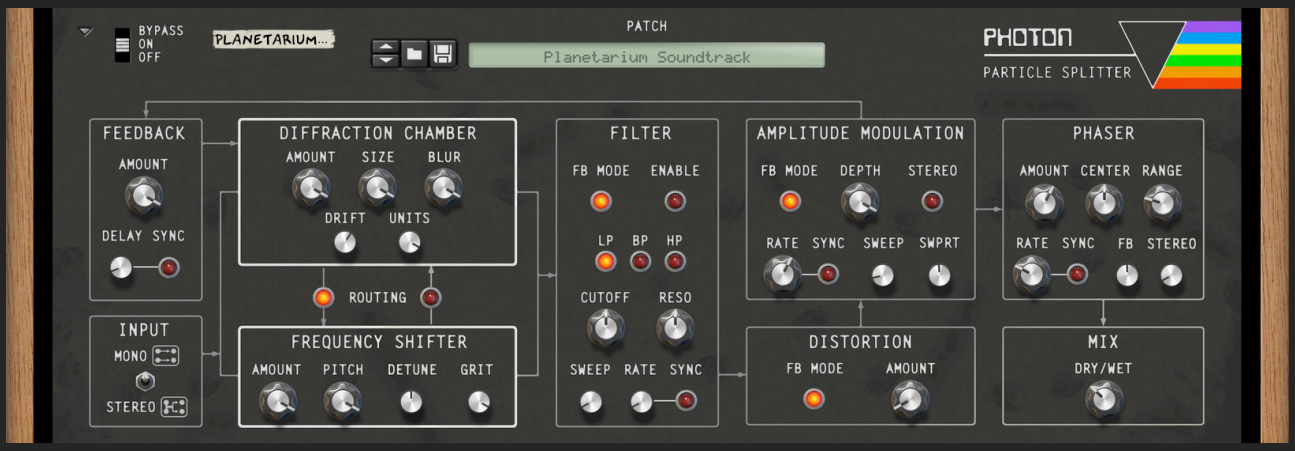
Our sincerest thanks for purchasing Photon!

Photon is a variation of a classic audio effect often referred to as "shimmer" or "shimmerverb". The sound was popularised by Brian Eno and Daniel Lanois in the early 1980s through albums such as "Apollo: Atmospheres & Soundtracks" (Brian Eno, Roger Eno, Daniel Lanois, 1983) and "The Unforgettable Fire" (U2, 1984).

The classic shimmer sound is achieved by creating a feedback loop between a reverb and a pitch shifter. The output from the reverb is pitched shifted one octave up and is then fed back into the reverb, which produces yet another octave of pitch shift, and so on. The result is a slowly evolving "glittery" sound.

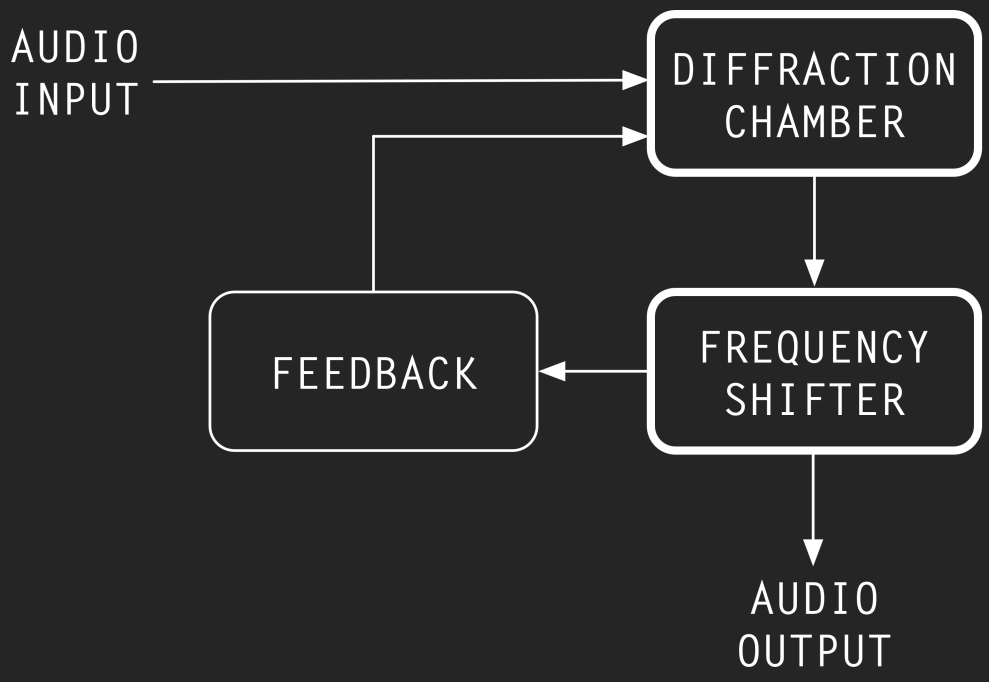
Photon is built around the same core feedback loop, but with a number of additional features that allows you to shape and tweak the basic sound.

We hope that you will find many creative uses for Photon!



THE BASICS

At its core, Photon consists of a DIFFRACTION CHAMBER and a FREQUENCY SHIFTER in a feedback loop:



The diffraction chamber can create different kinds of echoes and room-like ambiances, but it also has the ability to create interesting and strange "reverse"-like sounds.

The frequency shifter uses a granular engine that splits the input sound into tiny pieces and shifts their pitch, up to an octave up/down.

The feedback unit sends the output from the frequency shifter back into the diffraction chamber. You can control how much of the signal that is fed back. You can also delay the feedback if you like.

We will now look at these three modules in more detail.

DIFFRACTION CHAMBER

The diffraction chamber consists of 16 "echo units". Each unit acts like a miniature delay line, with an internal feedback loop. Taken together, they are capable of creating a huge number of chaotic echoes. When these echoes are blurred together the result is a room-like ambiance.

The AMOUNT knob controls how much of the input that should be processed. It is essentially a "dry/wet" knob for the diffraction chamber.

The SIZE knob controls the apparent size of the chamber. Turning it towards the left makes the chamber sound smaller, while turning it to the right makes the chamber sound larger.

The BLUR knob blurs the echoes of the chamber. Turing it towards the left makes the chamber sound like a delay. Towards the middle, the chamber sounds like it reverses the input. Towards the right, the chamber sounds like a reverb.

The DRIFT knob adds fluctuation to the apparent chamber size.

The UNITS knob sets the number of active echo chamber units. The more units you introduce, the "longer" the echo chamber sound becomes.

FREQUENCY SHIFTER

The frequency shifter continuously extracts short snippets ("grains") from the input signal. When these grains are played back at a different speed, the result is a "gritty" pitch shifted version of the input.

The AMOUNT knob controls how much of the input to the frequency shifter that should be processed. It is essentially a "dry/wet" knob for the frequency shifter.

The PITCH knob controls the amount of pitch shift, from -12 semitones to +12 semitones.

The DETUNE knob can be used to increase or decrease the pitch further, from -1/2 semitone to +1/2 semitone.

The GRIT knob controls the length of the grain snippets. Turning it to the left makes the output sound more "continuous". Turning it to the right makes the output sound more "gritty".

FEEDBACK

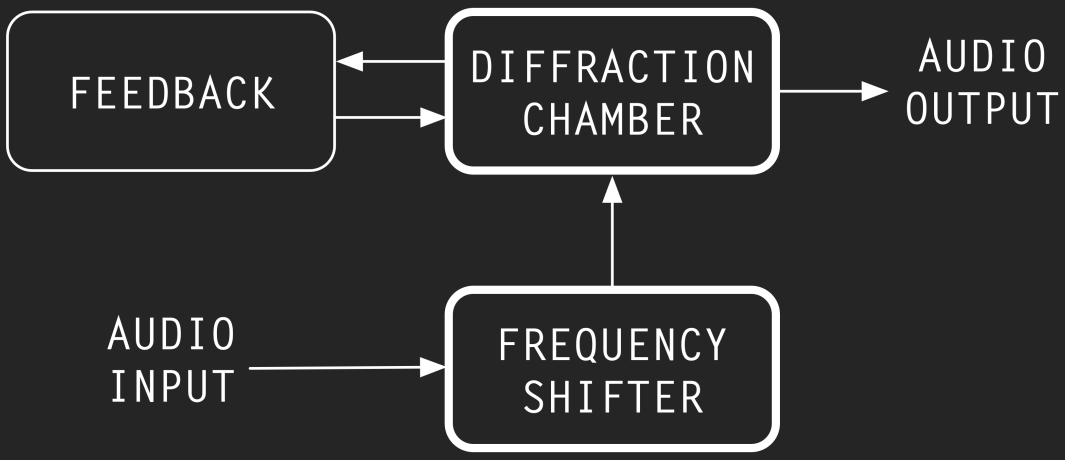
The key to Photon's ability to create "huge" sounds is the feedback loop between the diffraction chamber and the frequency shifter.

The AMOUNT knob controls how much of the sound that should be fed back into the diffraction chamber.

The DELAY knob adds an optional delay to the feedback. The SYNC button specifies whether the delay should be based on the current sequencer tempo or not.

ALTERNATIVE ROUTING

As described above, Photon can recreate classic shimmer effects by creating a feedback loop from diffraction chamber to frequency shifter. But Photon also has the ability to invert the signal flow so it looks like this:



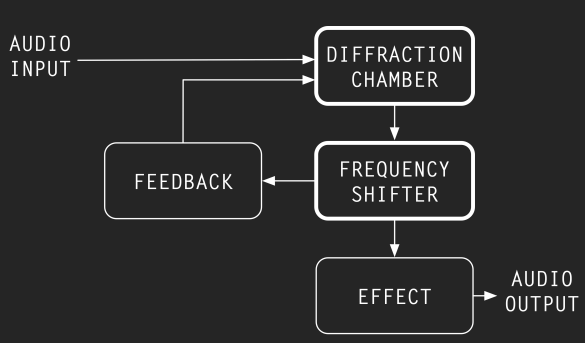
In this configuration, the input audio is sent to the frequency shifter first. The output from the frequency shifter is sent to the diffraction chamber, and from there into the feedback loop. The feedback loop routes the sound back into the diffraction chamber. The result is that the shift in pitch becomes a more prominent part of the sound.

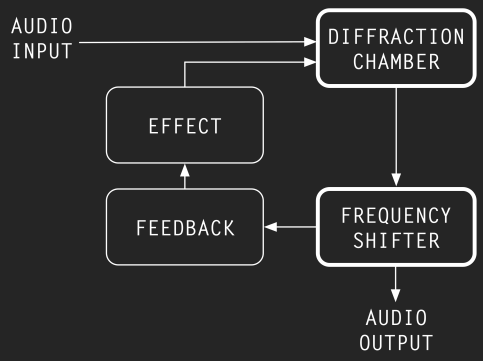
The ROUTING radio buttons on the Photon front panel specifies which of the two routing configurations that is currently in use. The arrows indicate whether the sound is sent from diffraction chamber to frequency shifter, or vice versa.

EFFECTS

Photon has an effects section that allows you to shape the sound in various ways. The effects section consists of a multi-mode filter unit, a distortion unit, an amplitude modulation unit, and a phaser.

The filter, distortion, and amplitude modulation units can each be routed in one of two ways:



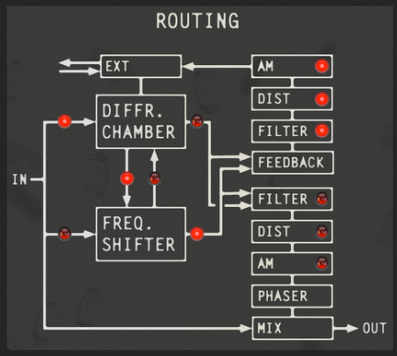


In the leftmost image above, the effect unit has been placed after the main feedback loop. This allows the effect unit to process the full output of the feedback loop.

The rightmost image, the effect unit has been placed inside the feedback loop. This means that the effect will be applied to each "cycle" of sound that is sent through the loop.

To set the routing for each of the effects units, use their respective FB MODE button. When FB MODE is enabled (as shown here), the unit is configured to sit inside the feedback loop, as in the rightmost image above.

Photon's back panel has a routing diagram with LEDs that show the current routing configuration.



In this example, the main feedback loop is in the default mode (from diffraction chamber to frequency shifter). The filter, distortion, and amplitude modulation units are all configured to sit inside the feedback loop.

(You may have noticed that the routing diagram has an EXT and a MIX module. We will look at these in detail later.)

FILTER

Photon's filter unit emulates an analog State Variable Filter. It has three modes: low pass, band pass, and high pass.

The FB MODE button controls how the filter should be routed (see EFFECTS above).

The ENABLE button enables or disables the filter.

The LP, BP, and HP radio buttons select the filter mode: low pass, band pass, or high pass.

The CUTOFF knob sets the cutoff frequency of the filter.

The RESONANCE knob sets the resonance of the filter.

The filter has an internal LFO that can sweep the cutoff frequency of the filter backwards and forwards. The SWEEP knob sets the range of the LFO sweep.

The RATE knob controls the rate of the sweep LFO.

The SYNC button selects if the sweep rate should be based on the current sequencer tempo or not.

DISTORTION

The distortion unit can be used to add "crunch" to the sound.

The FB MODE button controls how the distortion unit should be routed (see EFFECTS above).

The AMOUNT knob controls how much distortion to add. Turn it all the way to the left to disable the distortion unit.

AMPLITUDE MODULATION

The amplitude modulation, as the name suggests, modulates the amplitude of the sound signal. You can think of it as an LFO that turns a volume slider up and down. Amplitude modulation is usually used to to create "stereo ping-pong" or "wobbling" effects. But when pushed to extremes, amplitude modulation can add interesting overtones that adds an "analog radio" quality to the sound.

The FB MODE button controls how the amplitude modulation unit should be routed (see EFFECTS above).

The DEPTH knob controls how much amplitude modulation to add. Turn it all the way to the left to disable unit.

The STEREO button controls whether the amplitude modulation should be in sync across the left and right channels, or not. Enable it to create a "ping-pong" effect.

The RATE knob controls the rate of the modulation.

The SYNC button selects if the sweep rate should be based on the current sequencer tempo or not.

The amplitude modulation unit has an internal LFO that can sweep the amplitude modulation rate up and down. The SWEEP knob sets the amount of sweep.

The SWPRT sets the rate of the sweep LFO.

PHASER

Photon's phaser unit can be used to add a "swooshing" character to the sound.

Note that the phaser unit cannot be routed to the feedback loop. The reason is that phasing is an effect that amplifies frequencies that would cause the feedback loop to overflow.

The AMOUNT knob controls the amount of phasing to add. Turn it all the way to the left to disable the unit.

The CENTER knob sets the center frequency of the phaser.

The RANGE knob sets the frequency range of the phaser.

The RATE knob sets the sweep rate of the phaser.

The SYNC button selects if the sweep rate should be based on the current sequencer tempo or not.

The FB knob controls the amount of internal feedback in the phaser unit. Turn it towards the right to add more depth to the phasing effect.

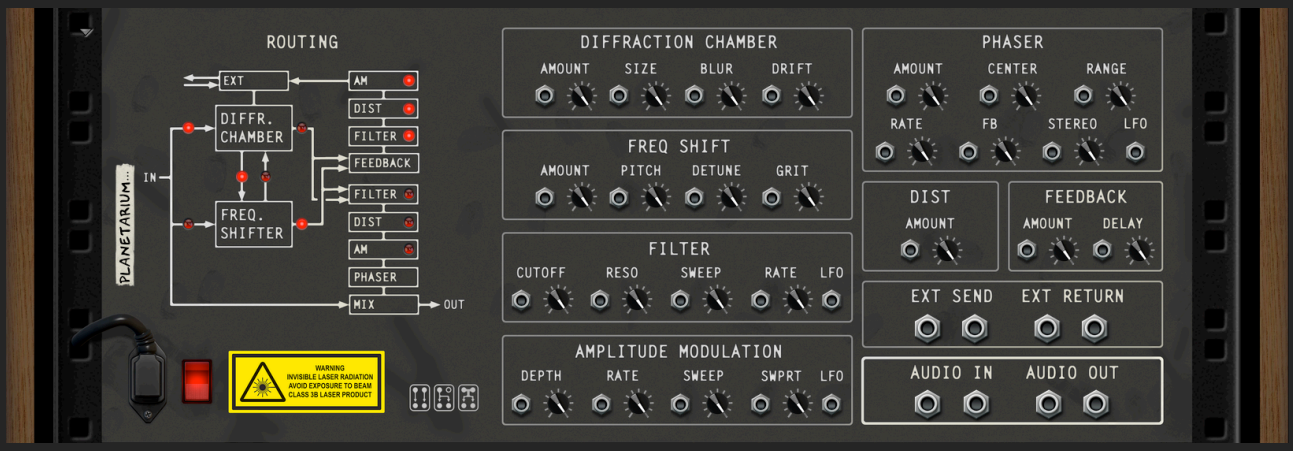
The STEREO knob controls the amount of offset between the left and right audio channel.

MIX

The MIX knob allows you to control the dry/wet ratio of Photon's output signal. Turn the knob towards the left to add more of the dry signal. Turn it towards the right to add more of the wet signal.

Note that by convention, the mix setting is not stored in patches. (It is stored in songs, though.) If you want to create a patch with a specific mix setting, put Photon inside a Combinator.

BACK PANEL



Photon's back panel, while busy, is fairly straightforward.

The audio inputs and outputs can be found in the bottom right corner.

Above the audio in/out, you will find the EXT SEND and EXT RETURN sockets. These sockets allow you to add external effects to Photon's main feedback loop, as suggested by the ROUTING diagram. To add an external effect, connect EXT SEND to the audio input of the external effect. Then connect the output of the external effect to EXT RETURN. Note that by chaining external effects, you can add as many effects units as you like to Photon's feedback loop!

The rest of the back panel consists of CV sockets and CV trim knobs. The sockets labeled with front-panel controls are all CV inputs. Send a bipolar (-1 to +1) signal to these sockets to offset the current front-panel knob setting. Use the trim knobs to reduce the value of the input CV signal.

The sockets labeled LFO are output CV sockets. They send the current internal LFO value for the filter, amplitude modulation, and phaser, respectively, as a bipolar value. Their primary use is to sync Photon's LFOs with other external effects.