



PRAGA

VOLTAGE
CONTROLLED
STEREO MIXING
CONSOLE

Model of 1967

OPERATOR'S MANUAL rev. 1967/1.0

SALUT

Thank you for purchasing this Xaoc Devices product. Praga is an expandable four-channel voltage controlled mixer featuring a stereo mixing bus, two auxiliary sends with stereo returns, clickless muting, dedicated modes for unipolar and bipolar voltage control over volume, DC-coupling, and a super-clean signal path obtained via high-quality VCA and op-amp chips.

We have carefully crafted Praga's voltage control response to achieve what we believe to be the optimal user experience found in an eurorack mixer. The design features an elaborate control circuit that combines the internal voltages generated by the panel potentiometers with external CV over volume and pan (fig. 2). The result is a natural attenuator response that constrains VCA gain to an usable range while minimizing distortion.

INSTALLATION

The module requires 20hp worth of free space in the eurorack cabinet. The ribbon type power cable must be plugged into the bus board, paying close attention to polarity orientation. The red stripe indicates the negative 12V rail and should align with the dot, **-12V** or **RED STRIPE** marks on both the unit and the bus board. The module itself is protected against reversed power connection, however reversing the 16-pin header **MAY CAUSE SERIOUS DAMAGE** to other components of your system by short-circuiting the +12V and +5V power rails. The module should be fastened by mounting the supplied

screws before powering up. To better understand the device, we strongly advise the user to read through the entire manual before using the module.

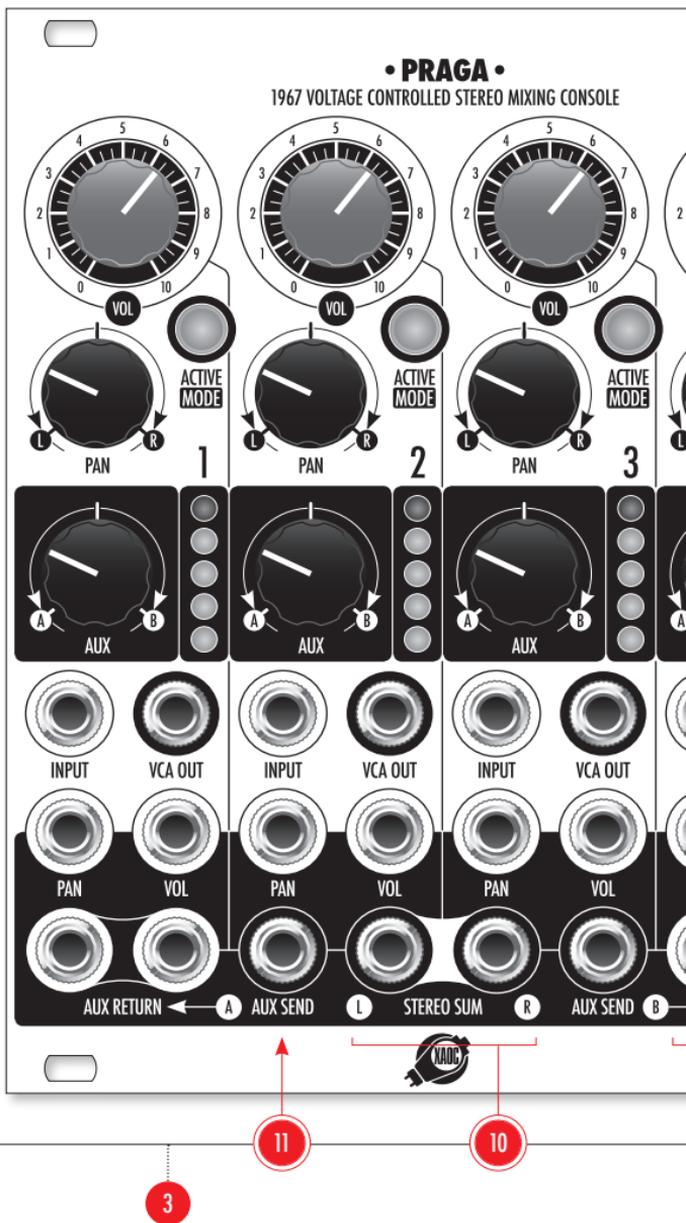
MODULE OVERVIEW

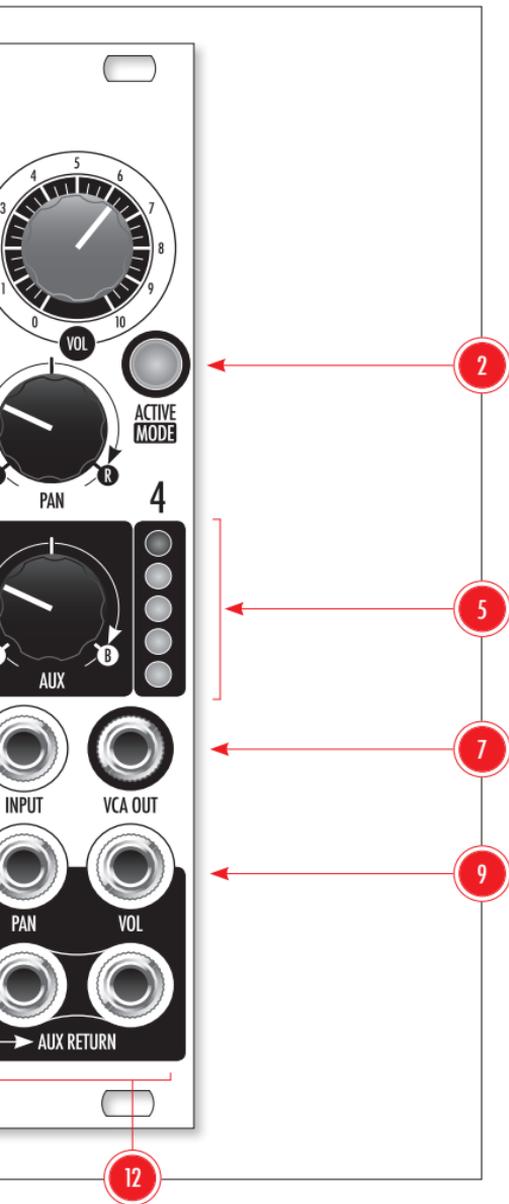
Praga's front-panel topology (see fig. 1) resembles a typical mixer with four identical channels. The **VOL** knobs ① allow for manual control of each channel's respective level. Each channel's response depends on the selected control mode (see: 'Volume Control' later in this manual). The illuminated **ACTIVE|MODE** button ② allows the user to mute the channel or switch between the two control modes. The **PAN** knob ③ adjusts the channel's position in the stereo panorama. The bipolar **AUX** knob ④ adjusts the amount of signal sent to either auxiliary channel. The five-bar LED level indicator ⑤ displays the channel's post-fader level, while the lower section contains the sockets for signal **INPUT** ⑥, direct **VCA OUT** ⑦, CV inputs for **PAN** ⑧ and **VOL** control ⑨. The bottom row of sockets is common to all four channels and consists of a pair of **STEREO SUM** outputs ⑩, two **AUX SEND** outputs ⑪ and two pairs of stereophonic **AUX RETURN** inputs ⑫.

VOLUME CONTROL

Praga offers two modes of combining incoming control voltages with attenuator settings. The mode is selected individually in each channel by a long press of the illuminated **ACTIVE|MODE** button. Mode switching is also possible while the channel is muted, confirmed by a short blink.

fig. 1





1. UNIPOLAR MODE

Unipolar mode (button lit green) is designed for unipolar control voltages commonly found in envelope generators. In this mode, the attenuator knob controls offsets to the incoming CV, allowing the dynamic response to CV to be retained regardless of attenuator position (fig. 4a, 4b). With attenuators at maximum, a CV of 8V opens the channels to 0dB, while closing the attenuators allows silencing the channels to -85dB. Control voltages above 8V are well-tolerated, however, the gain response is strongly tempered above 0dB, offering only up to +3dB so as to minimize distortion. This behavior affects the sound in a way similar to dynamic compression, however lowering the attenuators diminishes the effect, eventually bringing it down to a non-compressed operation.

2. BIPOLAR MODE

Bipolar mode (button lit red) is designed for bipolar control voltages commonly found in LFOs. In this mode, the attenuators act by scaling the CV together with an internally generated offset voltage. Therefore the depth of amplitude modulation (in dB) decreases as the channel is lowered. The response is optimized for control voltage in the range of -5V to +5V, whereby a fully-open attenuator offers 0dB at +5V and turning it fully counterclockwise yields an attenuation of -56dB with no modulation (see fig. 5a, 5b). Again, higher amplitudes of the CV are well-tolerated, however, the response is strongly compressed above 0dB.

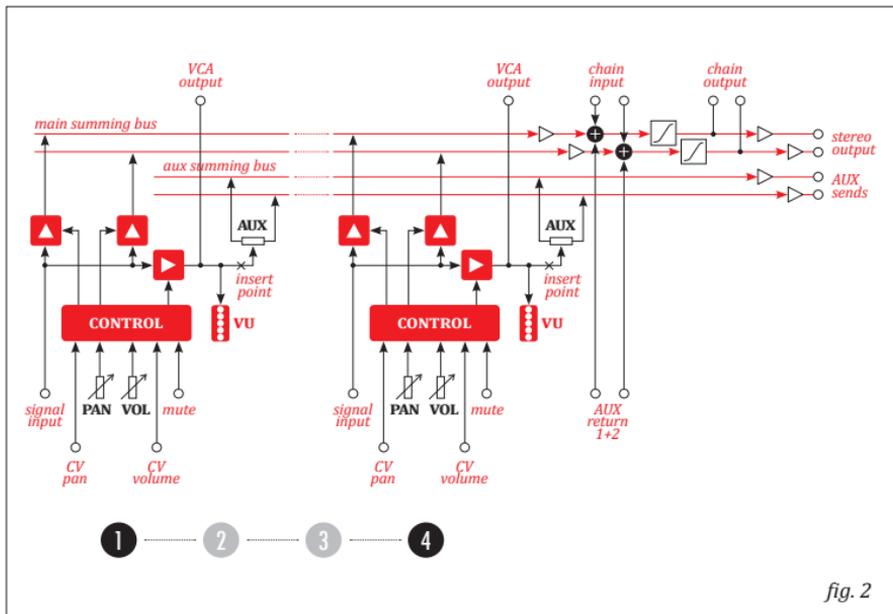


fig. 2

CHANNEL MUTING

Regardless of the current mode, a short-press on the **ACTIVE|MODE** button silences the corresponding channel. This state is indicated by the deactivation of the corresponding LED. Clickless action is achieved by introducing a few-millisecond fade-out to near -90dB. Pressing the button again brings the channel back through a similar clickless fade-in and reactivates the LED.

The operation of mutes can be controlled remotely through the expander pins at the back of the unit. The planned Hrad expansion module offers four gate inputs for automated channel muting.

PAN CONTROL

Praga offers both manual and CV control over the position of each channel in the output stereo panorama. The **PAN** knobs act as offsets to the **PAN** input control voltages which are expected in the range of -5V to +5V. The response of the combined controls provides equal loudness in a near-field monitoring setup (3dB pan law), however as channel gain approaches 0dB, the response is slightly compressed so as to prevent an increase of loudness (see fig. 6).

VCA OUTPUTS

A direct **VCA OUT** on each channel uses a separate VCA chip to provide a pure copy of the

attenuated signal unaffected by the **PAN** control. The purpose of these outputs is to offer individual mix components for multitracking, as well as to offer insert functionality with the Hrad expander.

AUXILIARY OUTPUTS

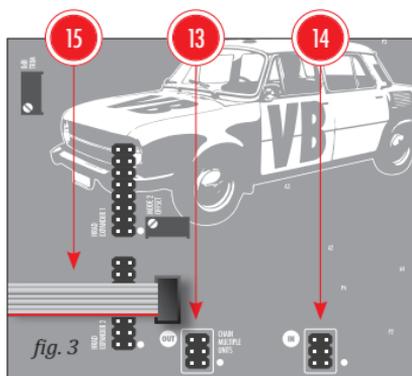
Two **AUX SEND** outputs, together with two pairs of stereo **AUX RETURN** sockets allow the user to patch two send effects. A dedicated bipolar **AUX** knob in each channel allows for manual control of the sends. By turning the knob to the left or right of center, the signal is sent to auxiliary channel A or B respectively. Sends are post-fader only, as they are derived from the **VCA OUT** signals.

The expander header on the back of the module features insert points between each channel's **VCA** and the **AUX** selector to provide channel inserts and voltage control over the **AUX** level through dedicated Hrad inputs.

LEVEL INDICATORS AND MIXING BUS LEVELS

Each of Praga's channels features an individual post-fader level indicator. The five LEDs show the state of a standard volume detector with thresholds at -32dB , -20dB , -12dB , -6dB and 0dB referenced to a 10Vpp signal. Bear in mind that eurorack electronic circuits cannot handle voltages greater than 10V , therefore it is impossible to mix four signals of 10Vpp without serious distortion.

It is recommended to keep your attenuators between 50% and 80% of the full range (un-

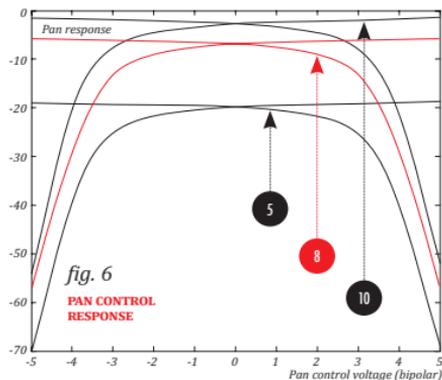
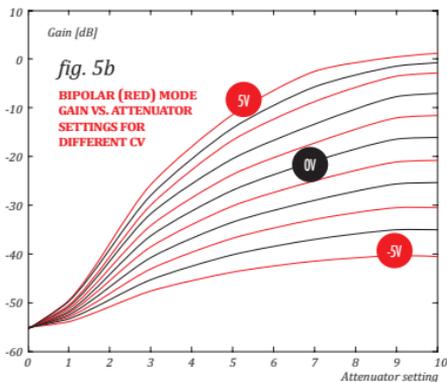
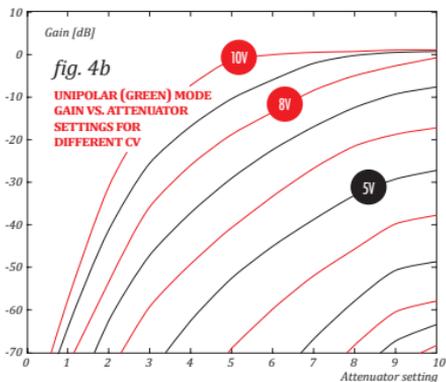
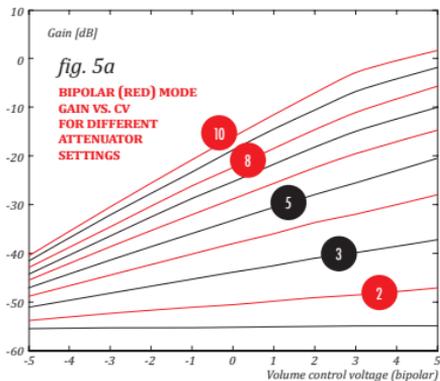
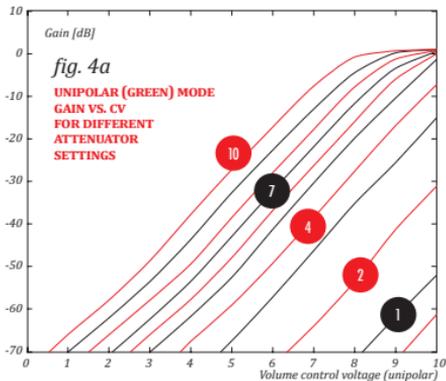


less your sources are very quiet). The mixing bus in Praga features a soft clipping circuit that offers a gentle overdrive for signals exceeding 16Vpp . This solution prevents the harsh sounding distortion resulting from hard clipping should the sum of your signals exceed the dynamic range of the output stage. Additional control over the sum level is offered by the Hrad expander at its dedicated **STEREO SUM** outputs.

CHAINING MULTIPLE UNITS

Multiple Praga units may be chained to provide a cascaded sub-mix setup such that the content of the mix bus of all upstream units is injected 1:1 into the mix bus of every subsequent unit appearing at its **STEREO SUM** outputs. The chaining headers at the back of the module should be connected with a 6-pin ribbon cable 15 so that the **OUT** header 13 of the preceding unit goes into the **IN** header 14 of the following unit (fig. 3). The **IN** header of the first unit and the **OUT** header of the last unit should remain unconnected. •

CONTROL CHARACTERISTICS



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MAIN FEATURES

Intuitive volume control behaviour

Voltage control over volume and pan

Dedicated modes for unipolar and bipolar voltage control over volume

DC-coupled signal path

Channel level indicators

Two auxiliary sends with stereo returns

Clickless channel muting

Expandable by chaining more units and optional Hrad expander module

TECHNICAL DETAILS

Eurorack synth compatible

20hp, skiff friendly

Current draw: +210mA/-180mA

Reverse power protection