



HRAD

**MIXING
CONSOLE
COMMANDER**

Model of 1967

OPERATOR'S MANUAL rev. 1967/X/1.0

SALUT

Thank you for purchasing this Xaoc Devices product. Hrad is an expander for our Praga four-channel stereo mixer that adds new functionality and enhancements. Hrad features a master section with stereo volume control over the overall mix with five-bar LED stereo level indicator, a stereo sum output that is switchable between eurorack and line level, a headphone output with volume control that is independent of the main attenuator, a special **CUE** input that can be auditioned with and without the mix, four control inputs for automated muting/unmuting of individual channels, four inputs for voltage control over the aux send levels, four insert points in the aux sends, and two stereo attenuators for Praga's two AUX return pairs.

Hrad may be used alongside a single Praga unit. If you have more than one Praga chained, it is best to pair with the last Praga in the chain. Please bear in mind that all features related to AUX channels and muting will refer to the Praga that is connected to Hrad. It is also possible to connect a separate Hrad to every Praga in the chain so as to have access to the extra functionalities in every unit. However, please take into account the substantial power requirements of such a complex setup.

INSTALLATION & SETUP

The module requires 10hp worth of free space in the Eurorack cabinet and it is best located next to your Praga. Hrad does not have its own separate power connection as it draws power from Praga and adds its own 50mA to what Praga consumes.

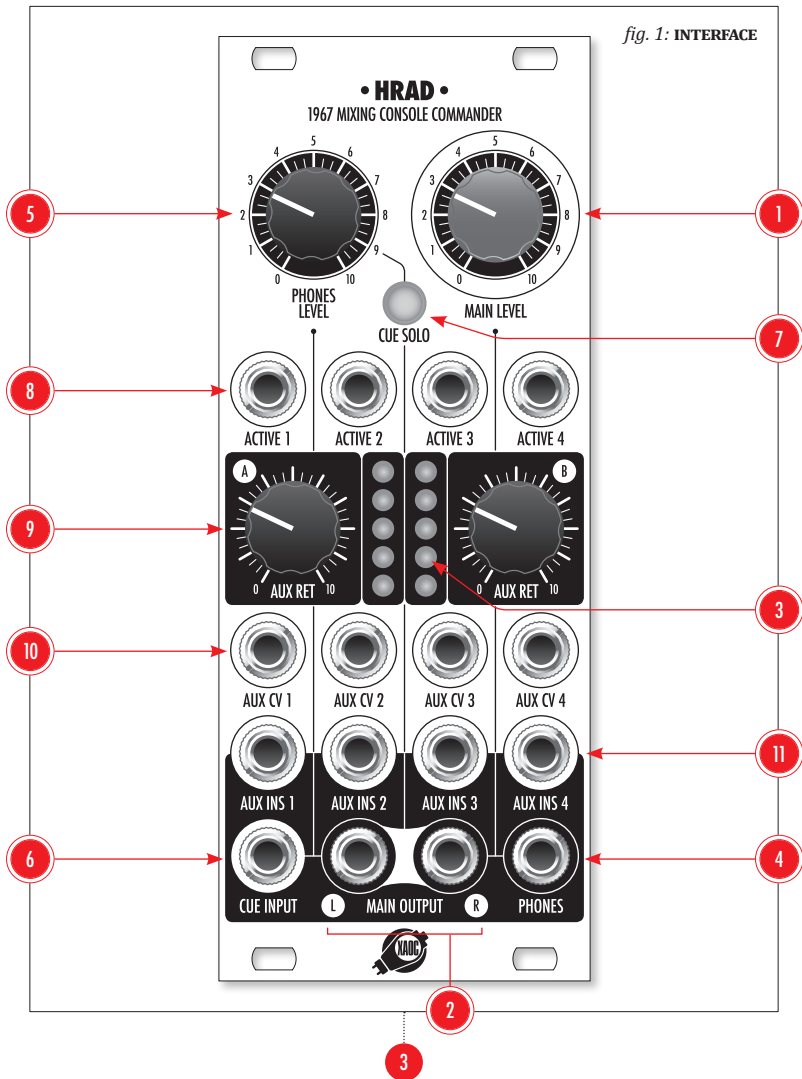
ATTENTION: NEVER CONNECT ANY POWER CABLE TO ANY PIN HEADER ON THE BACK OF YOUR HRAD—IT WILL DESTROY THE UNIT!

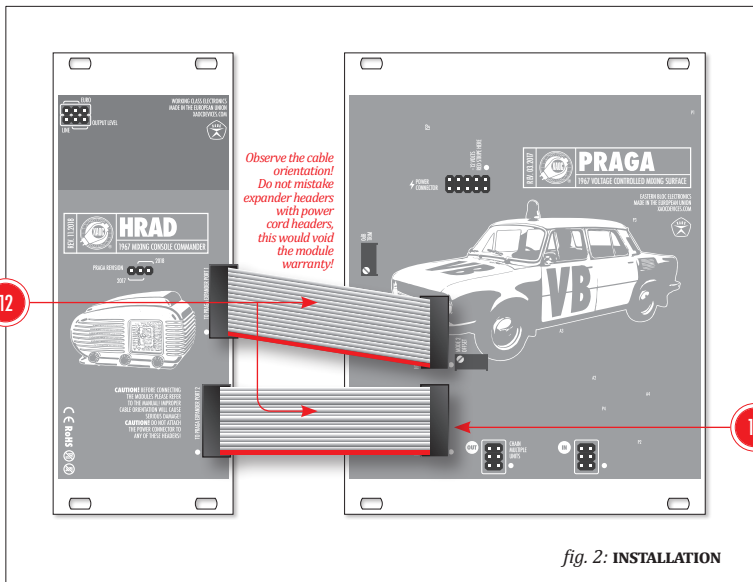
Hrad connects to Praga using the two 16-pin ribbon cables ⑫ supplied with the unit (see fig. 2). **NOTE:** these cables are deliberately short and should not be replaced with longer ones for the sake of safety as well as keeping interference and noise to a minimum. Prior to making the connection, you must remove all jumpers from the lower pin header ⑬ of your Praga (you will have to put them back if you ever decide to use your Praga without Hrad, otherwise the unit will not work properly). Next, carefully connect the cable going from the upper and lower headers of Hrad to the upper and lower headers of Praga paying attention to not mix them up or rotate them as **THIS WOULD SERIOUSLY DAMAGE BOTH UNITS!**

Locate the jumper labeled **PRAGA REVISION** ⑬ on the back of Hrad (see fig. 3) and set it according to what is printed on the PCB of your Praga. Improper setting of this jumper is not dangerous, however, the AUX channels will not work as designed. While you are there, you may also decide to set the output level of your Hrad. If Praga is the last stage of your Eurorack system, it may be reasonable to switch the pair of **OUTPUT LEVEL** jumpers ⑭ from **EURO** (default) to **LINE** position.

Both Praga and Hrad 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.

fig. 1: INTERFACE





MODULE OVERVIEW

Hrad's front panel topology (see fig. 1) resembles the master section of a small mixer. The **MAIN LEVEL** knob ❶ controls the stereo sum signal at the **MAIN OUTPUT** ❷. The final signal level is shown by the 5-bar LED indicator ❸. The headphone volume at the **PHONES** output ❹ is set by the **PHONES LEVEL** knob ❺. The **CUE INPUT** ❻ allows auditioning of an additional signal in your headphones, with or without the main mix as selected by the **CUE SOLO** button ❼. The four **ACTIVE** inputs ❽ offer remote muting and unmuting of Praga's four individual input channels. The two **AUX RET** knobs ❾ offer

attenuation of signals plugged into Praga's **AUX RETURN** pairs. The four **AUX CV** inputs ❿ offer voltage control over Praga's **AUX send** levels. The four **AUX INS** inputs ⓫ are insert points for Praga's individual **AUX sends**.

VOLUME CONTROL

The **MAIN LEVEL** attenuator controls the stereo signal at the output of Hrad without affecting the **STEREO SUM** on Praga. **NOTE:** it is possible to overload the **SUM** output in Praga when several hot audio signals are mixed with high **VOL** settings. If this happens, you can simply lower Hrad's **MAIN** level attenuator to achieve a clean

signal thanks to the additional 12dB of headroom provided by Hrad's internal connection to Praga.

The default output level on Hrad can be switched between the normal Eurorack (+20dBu) and studio line (+4dBu) using a pair of jumpers at the back of the unit (see fig. 3).

HEADPHONE OUTPUT

The dedicated stereo **PHONES** output on Hrad can drive a wide range of studio and consumer grade headphones with a dual high-quality OPA2134 per channel. Note that the maximum loudness and low-frequency range may vary with impedance. The recommended headphone impedance is 80 to 300 Ohm.

The **PHONES LEVEL** knob is independent of the **MAIN LEVEL** attenuator, hence you can hear your mix before your audience does. The **CUE INPUT** allows you to audition an additional center-panned mono signal in the context of your mix or alone (after pressing the **CUE SOLO** button). Note the amplitude of this input is attenuated for your listening comfort.

MUTE/ACTIVITY CONTROL INPUTS

By feeding gate signals to the four **ACTIVE** inputs in Hrad it is possible to remotely control the opening/closing of each individual channel in Praga exactly in the same way as clicking its front panel buttons. A gate-on signal (about +2.4V or more) activates the channel, while gate-off (0V) mutes it (in a clickless way). Note that even with the gate signal plugged in, the panel buttons still remain op-

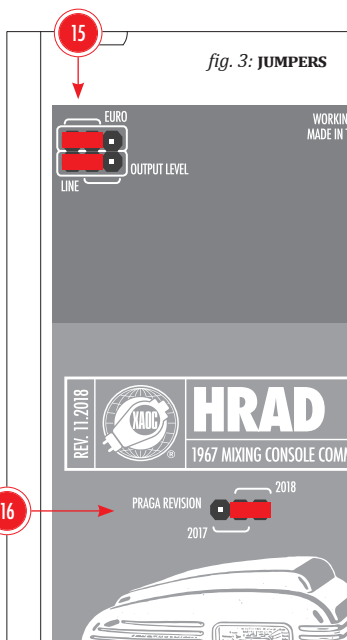


fig. 3: JUMPERS

erational, however unplugging the signal will leave your channel muted.

SIGNAL PATH OF AUX CHANNELS

The pair of Praga and Hrad features an unorthodox signal path offering maximum flexibility with minimum footprint. Fig. 4 shows the diagram of a single AUX path from a single input channel in Praga.

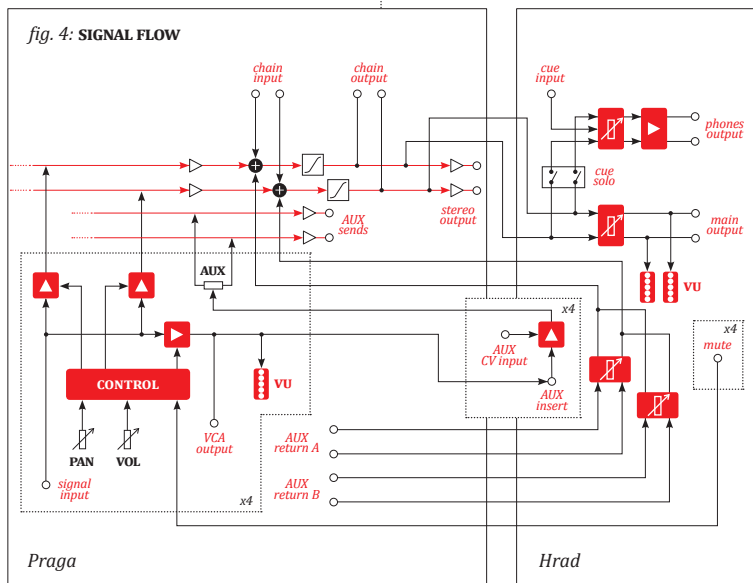
The signal passes through the three VCA cores in parallel—two of them form the stereo pair that is mixed at the summing bus. The third core forms the direct signal which is delivered

to the **VCA OUT** socket in Praga. This same signal is used for the auxiliary send (post fader). However, before the **A/B** knob on Praga, it may be replaced by its processed version (or any other signal) thanks to the **AUX INS** inputs in Hrad. It then goes through one of the four additional VCA cores (one per Praga channel) where the send level can be controlled by the external CV plugged into the corresponding **AUX CV** input.

The voltage response of this VCA is the same as in Praga (please refer to its manual for details). The CV inputs are internally normalized to 8V.

From the VCA, the signal passes through the bipolar **AUX** attenuator on Praga where one of the auxiliary channels (**A** or **B**) may be selected, and the amount of send may be set manually. The mixed aux send signal from all four channels is available at the **AUX SEND** socket in Praga.

When a return signal from external processing is plugged into the stereo **AUX RETURN** pair in Praga, it goes again to Hrad, where it may be attenuated with the corresponding **AUX RET (A or B)** knob. From the attenuator, the signal is routed to the stereo summing bus in Praga.



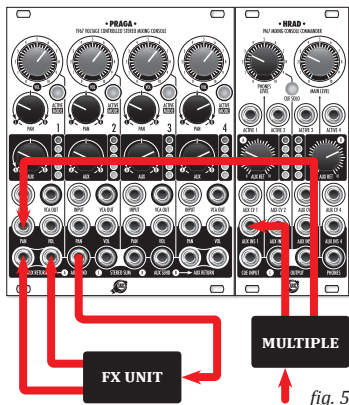


fig. 5

PATCH EXAMPLES

Standard (post-fader) operation: When using your Praga and Hrad in a traditional setup, you can add two external effects (e.g. a reverb and delay) with the auxiliary channels (post-fader). Patch the **AUX SEND** signal to your effect processor input, and patch its outputs back to the **AUX RETURN** pair. Now, you can decide on the amount of the effect being mixed to your audio via the corresponding **AUX RET** attenuator. By using additional modulation plugged into the **AUX CV** you can dynamically control which parts of the audio will have the reverb or delay added to them.

Pre-fader operation: Split the signal going to an **INPUT** in Praga, and feed a copy of it to the corresponding **AUX INS** jack in Hrad (fig 5). This will bypass the **VOL** and **VCA** controls on Praga for your auxiliary send, which allows for pre-fader operation. In other words, you

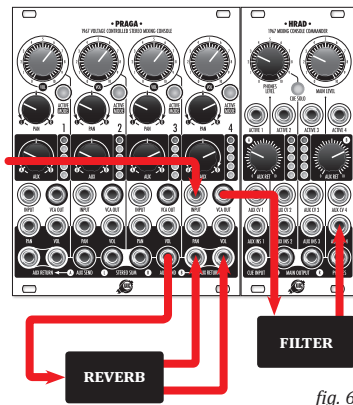


fig. 6

can have an effected portion of the signal audible while the separate dry signal is turned down. You can even plug any other signal into that socket, and have additional sounds added (under CV control) to your effect bus.

AUX channel inserts: Take the **VCA OUT** signal from a channel in Praga and process it through an additional module (e.g. a filter, or bit crusher), and plug the result into the corresponding **AUX INS** input in Hrad (fig. 6). With this patch, you could have a reverb on high frequencies only, or distorted echos of the sounds that are clean in the main mix.

Extra stereo input: Sometimes you run out of input channels in Praga but don't need more than one send effect. You can plug a mono or a stereo pair into the unused **AUX RETURN** sockets, and its volume will be controlled by the **AUX RET** attenuator in Hrad. •

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EASTERN BLOC TECHNOLOGIES



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MAIN FEATURES

Expander for Xaoc Praga mixer module

CV inputs for controlling AUX sends

Two stereo AUX return attenuators

Four insert points for AUX sends

Main volume control with level indicator

Switchable Euro/line level outputs

Headphone driver with additional cue input

Gate inputs for channel muting control

TECHNICAL DETAILS

Eurorack synth compatible

10hp, skiff friendly

Current drawn from Praga: +50mA/-35mA

No reverse power protection!