XAOC ®

# TALLIN

## SALUT

Thank you for purchasing this Xaoc Devices product. Tallin is a dual voltage controlled amplifier (VCA) with overdrive, offering some unusual control features and a range of attractive tonal characteristics. Each of the two identical channels offers two simultaneously available inputs for voltage control over signal attenuation or gain, with linear and exponential response to CV. Volume control knobs offer manual gain settings ranging from fully closed (-80dB) up to +18dB. A color LED indicator displays output signal levels. A soft-clip circuit avoids harsh clipping distortion, while a switchable overdrive circuit offers two carefully crafted distortion responses, simulating the sound of classic tube amplifiers.

Since both CV inputs are simultaneously active, they can be jointly exploited within patches featuring more complex volume control that otherwise would require using two traditional VCAs in series. As the signal path is DC-coupled, Tallin can also be used for handling the control voltages.

## INSTALLATION

The module requires 6hp 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 is supposed to match the dot, **–12V**, or **RED STRIPE** marks on both the unit and the bus board. The module itself is secured against reversed power connection, however, reversing the 16-pin header **MAY CAUSE SERIOUS DAMAGE** to other components of your system, because it will short-circuit 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 reading through the entire manual before using the module.
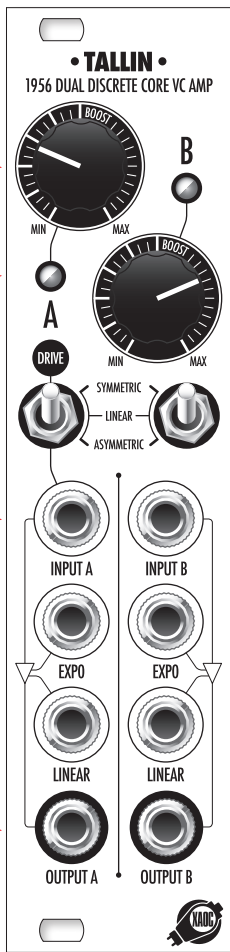
## MODULE OVERVIEW

Tallin consists of two completely independent but functionally identical channels, **A** and **B** (fig. 1). Each channel is built around a "modern vintage" discrete VCA core with a matched transistor pair and multiple feedback topology. This gives Tallin a specific character not present in other VCAs that use mathematically precise and sonically pure integrated gain cell VCA chips. With Tallin, we opted for a discrete core, to provide a thick and charming sound that reflects Xaoc's tonal idiosyncrasy.

The signal **INPUTS** ❶ accept Eurorack signal levels (typically 10Vpp, but capable of handling up to 20Vpp). They can also accept normal studio level (+4dBu) signals which can be amplified to the modular levels, thanks to the gain reserve of up to +18dB. The knobs ❷ control the attenuation or gain by scaling the corresponding control voltages. Thus, in a **MIN** position, they fully silence the channel, regardless of whatever control voltage is applied to the VCA. Turning a knob up will gradually open the VCA, offering a significant boost when above the 12 o'clock position (depending on the control voltage patched in).

There are two CV inputs in each channel, respectively featuring an exponential ❸ and linear ❹ control response. Both controls are available simultaneously, and they jointly determine the gain of the VCA. A CV of 0V at

fig. 1



• TALLIN •
1956 DUAL DISCRETE CORE VC AMP

BOOST

B

MIN          MAX

A

BOOST

MIN          MAX

DRIVE

SYMMETRIC
LINEAR
ASYMMETRIC

INPUT A          INPUT B

EXPO          EXPO

LINEAR          LINEAR

OUTPUT A          OUTPUT B

XAOC

2
7
1
6
5
3
4

3

either jack will close the VCA entirely, however both jacks are internally normalized to a constant voltage, so it is possible to use both, just one, or—for manual control only—neither. It is convenient to think of each channel of Tallin as consisting of two VCAs in series (exponential followed by linear), even though the internal implementation is a single circuit. Both CV inputs are optimized for voltages up to 8V, however they can handle envelopes as hot as 10V, or as low as 5V (although the VCA may not open fully in such a case). The internal normalization of both CV inputs is set to 8V. Tallin's response to combined CV and manual settings is discussed in next section.

Each channel of Tallin features a 3-position **DRIVE** switch ❺ that selects between the non-distorted linear operation (switch in middle position), a symmetric overdrive yielding mostly 3rd harmonic distortion (switch in up position), or a non-symmetric overdrive yielding mostly 2nd harmonic distortion (switch in down position). See "Overdrive Operation" for more details.

The amplified signals are available at the **OUTPUT** jacks ❻. Signals that would exceed 18Vpp are subject to internal soft clipping to avoid harsh distortions due to the limited dynamic range (20Vpp) of Tallin's operational amplifiers.

The multi-color LEDs ❼ indicate output signal levels in four stages, from silence to the normal 10Vpp level (gradually lit green), exceeding it (by changing to yellow), and finally, reaching very hot levels (by turning orange), and engaging the soft clipping circuit (by turning red).

## OPERATING THE VOLUME CONTROL

The volume knobs are scaled so that the central position yields 0dB, or 100% of original amplitude, provided there is either nothing patched to the CV inputs, or there is a control voltage of 8V (fig. 2). Turning the knob past the central position will engage a **BOOST** allowing the amplification of quiet signals up to modular levels. Keep in mind that if the input is a modular level signal you should expect soft clipping to engage quickly and provide a heavy distortion by the end of the knob's travel.

The **EXPO** input offers an exponential control of the output amplitude, which means the amplitude will decrease rapidly as the voltage approaches zero (fig. 3). Since human sensitivity to sound intensity is nearly exponential, this exponential input yields a natural sounding loudness decrease when using CV sources that change linearly in time. Since there is a significant variety of envelope amplitudes in eurorack, the sensitivity of this input can be adjusted to adapt to the provided control source by using the knob. It is optimally suited to 8V envelopes in the central (12 o'clock) position, and should be turned down to the 10 o'clock position when using a 10V envelope. Using 10V envelopes without turning down the knob will result in a severely compressed response, that delivers a thick, and somewhat unnatural, sound which can be creatively abused if that's your preference. For 5V envelopes, the output will be very quiet. This can be compensated with the **BOOST** range of the knob, however you may be unable to reach overdrive levels in this case.
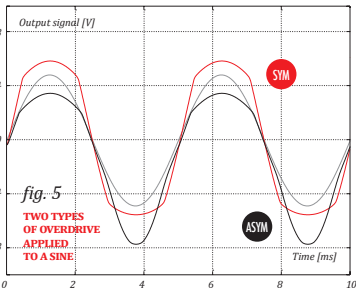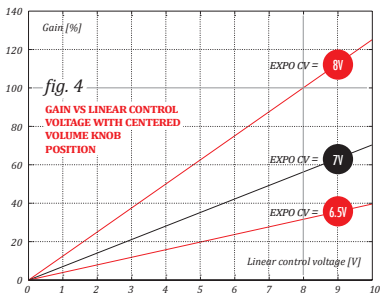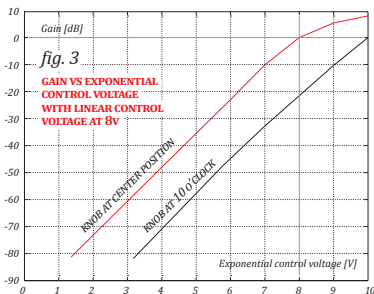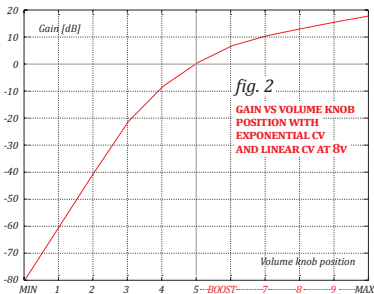
The **LINEAR** input offers linear control, which means the output amplitude will scale proportionally to the CV (fig. 4). If you have an exponential envelope, it's a good idea to use this input, because it will result in signal amplitude that follows the envelope, decaying towards zero with a natural exponential tail. Envelopes with amplitude different from 8V can be easily used here, requiring only a small adjustment of the knob to compensate.

## OVERDRIVE OPERATION

The overdrive circuit in Tallin offers two distinctive distortion characteristics switchable via the **DRIVE** toggles. The upper, **SYMMETRIC** position activates a bi-polar parabolic distortion curve that equally amplifies and squashes both peaks of the waveform (fig. 5), yielding a spectrum dominated by 3rd order harmonic overtone. The resulting slightly brightened sound is modeled after an overdriven push-pull power amplifier.

The lower **ASYMMETRIC** position of the switch activates a distortion curve that is more concave in one direction while it is convex in the opposite direction (fig. 5), yielding a spectrum dominated by 2nd order harmonic overtone. The resulting mellow and warm sound is modeled after a classic single-ended tube amplifier. •



fig. 2
GAIN VS VOLUME KNOB POSITION WITH EXPONENTIAL CV AND LINEAR CV AT 8v



fig. 3
GAIN VS EXPONENTIAL CONTROL VOLTAGE WITH LINEAR CONTROL VOLTAGE AT 8v



fig. 4
GAIN VS LINEAR CONTROL VOLTAGE WITH CENTERED VOLUME KNOB POSITION



fig. 5
TWO TYPES OF OVERDRIVE APPLIED TO A SINE

## WARRANTY TERMS

XAOC DEVICES WARRANTS THIS PRODUCT TO BE FREE OF DEFECTS IN MATERIALS OR WORKMANSHIP, AND TO CONFORM WITH THE SPECIFICATIONS AT THE TIME OF SHIPMENT FOR A PERIOD OF ONE YEAR FROM THE DATE OF PURCHASE. DURING THAT PERIOD ANY MALFUNCTIONING OR DAMAGED UNITS WILL BE REPAIRED, SERVICED, AND CALIBRATED ON A RETURN-TO-FACTORY BASIS. THIS WARRANTY DOES NOT COVER ANY PROBLEMS RESULTING FROM DAMAGES DURING SHIPPING, INCORRECT INSTALLATION OR POWER SUPPLY, IMPROPER WORKING ENVIRONMENT, ABUSIVE TREATMENT OR ANY OTHER OBVIOUS USER-INFLICTED FAULT.

## LEGACY SUPPORT

IF SOMETHING WENT WRONG WITH A XAOC PRODUCT AFTER THE WARRANTY PERIOD IS OVER, NO NEED TO WORRY, AS WE'RE STILL HAPPY TO HELP! THIS APPLIES TO ANY DEVICE, WHEREVER AND WHENEVER ORIGINALLY ACQUIRED. HOWEVER, IN SPECIFIC CASES, WE RESERVE THE RIGHT TO CHARGE FOR LABOR, PARTS AND TRANSIT EXPENSES WHERE APPLICABLE.

## RETURN POLICY

THE DEVICE INTENDED FOR REPAIR OR REPLACEMENT UNDER WARRANTY NEEDS TO BE SHIPPED IN THE ORIGINAL PACKAGING ONLY, SO PLEASE KEEP IT JUST IN CASE. ALSO, A FILLED RMA FORM MUST BE INCLUDED. XAOC DEVICES CAN NOT TAKE ANY RESPONSIBILITY FOR DAMAGES CAUSED DURING TRANSPORT. PRIOR TO SENDING US ANYTHING, PLEASE CONTACT US AT **SUPPORT@XAOCDEVICES.COM.** NOTE THAT ANY UNSOLICITED PARCEL WILL BE REJECTED AND RETURNED!

## GENERAL INQUIRIES

FOR USER FEEDBACK SUGGESTIONS, DISTRIBUTION TERMS, AND JOB POSITIONS FEEL FREE TO CONTACT XAOC DEVICES AT **INFO@XAOCDEVICES.COM.** PLEASE VISIT THE XAOCDEVICES.COM FOR INFORMATION ABOUT THE CURRENT PRODUCT LINE, USER MANUALS, FIRMWARE UPDATES, TUTORIALS, AND MERCHANDISE.

# WORKING CLASS ELECTRONICS®

EASTERN BLOC TECHNOLOGIES

RADA WZAJEMNEJ POMOCY GOSPODARCZEJ

MADE IN THE EUROPEAN UNION

## MAIN FEATURES

*Discrete core analog VCA circuitry*

*Simultaneous linear and exponential voltage control*

*DC-coupled for control voltage processing*

*Multi-color signal level indication*

*Two distinct amp overdrive characteristics*

## TECHNICAL DETAILS

*Eurorack synth compatible*

*6hp, skiff friendly*

*Current draw: +50mA / –50mA*

*Reverse power protection*