instruction for use

cassiopeia 500 tube saturation
lyra 500 tube saturation

Saturation made simple

You´re about to explore the unique sound of tube saturation. Cassiopeia & Lyra are composed around vacuum tubes to add that missing bit to your productions. In order to do so, the vacuum tubes are driven out of spec, which means in a mode of saturation or non – linear. The resulting effect is the creation of overtones and harmonics, which are different from transistor or digital approaches; they are less sharp but more pleasing. The saturated signal benefits from adding overtones and harmonic distortion in a way that its sound becomes richer, warmer, and fuller. A nice side effect is that the signal will be slightly compressed.

The inspiration for Cassiopeia & Lyra came from the fact that vacuum tubes tend to create a variety of pleasing overtones, especially when the tube is driven into saturation. This has been done by guitarists ever since the introduction of electric amplifiers in the 1950s, operating their amplifiers with a ton of gain. Especially these days, more than half a century later, a majority of productions run strictly “in the box” and are described as “cold” or without the analogue feel that we all have come to enjoy. Cassiopeia & Lyra will add that missing link, adding overtones and harmonic distortion in a subtle yet pleasing way, which in the mix will make these tracks shine more or give them the analog character they deserve.

Manufacturer:

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1. Table of Content

2. Precautions

WARNING: High Voltage

• Risk of electric shock.

• Refer service to qualified service staff only.

• Do not expose this device to rain or moisture.

• Do not use this device near water, e.g. swimming pool, bathtub or wet basement.

• Only use API500 rack with installed fuses and surge protection.

CAUTION: Temperature

• Surfaces of the device may become hot during operation.

• Do not install this device near any heat source such as radiators, stoves or other heat sources.

• Always allow enough ventilation space around the unit for air circulation.

• Do not cover circulation vents.

• It´s highly recommended to use a API500 rack with good air ventilation or heat conduction

CAUTION: Connecting & Mounting

• Never connect the output of a power amplifier to this device.

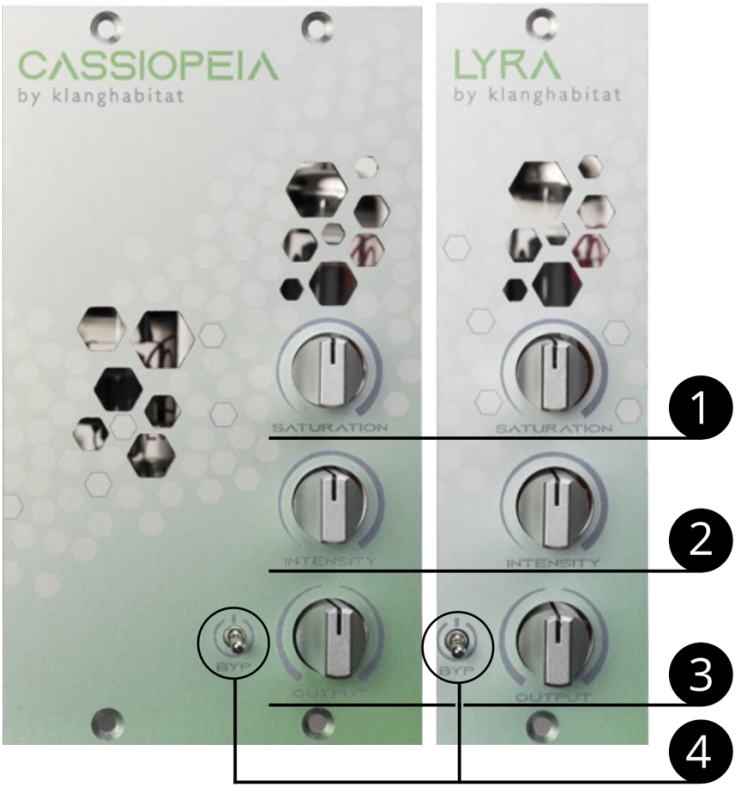
• Place the unit on a rigid board or place it in an appropriate rack.

• Use the device according to this manual only.

CAUTION: Humidity

• If this device is moved from a cold place to a warm room, condensation can occur inside the device. To avoid damaging the unit, please allow it to reach room temperature before switching it on.

3. Controls



1 SATURATION

Controls the amount of saturation applied by the vacuum tubes. Turning the knob clockwise increases the saturation.

2 INTENSITY

This control acts as a wet/dry blend, allowing you to determine how much of the processed (saturated) signal is mixed into the output. In the fully clockwise position, 100% of the saturated signal is sent to the output. In the fully counterclockwise position, only the input (dry) signal is heard at the output.

3 OUTPUT

Adjusts the output level. Turning the knob fully counterclockwise reduces the output by -12 dB, while turning it fully clockwise boosts the output by +12 dB. In the center position, the output is at unity gain.

4 BYP (Bypass)

When the bypass is engaged, the clean (unprocessed) signal is heard. The tube/tubes will light up green to indicate bypass mode is active.

4. How to use

4.1. Installation

Follow these steps to install your Cassiopeia or Lyra module:

1. Switch off your API 500 series compatible rack/lunchbox and disconnect the power cable from the mains.

2. For a Lyra module: Insert Lyra into an available slot in your rack. For a Cassiopeia module: Insert Cassiopeia into two free, adjacent slots in your rack. Ensure that the PCB connector(s) aligns with the rack connector(s).

3. Gently push the module into place. Avoid using excessive force.

4. Secure the front panel with two screws per slot, as provided by your rack manufacturer.

5. Connect your audio cables following the rack manufacturer's instructions and restore power to your rack.

4.2. Preheat

Before starting, the vacuum tubes need to preheat for approximately 15 minutes to achieve optimal performance. To preheat the vacuum tubes, the modules must be installed in the rack, with the rack powered on. During preheating, the modules will light up amber.

4.3. Dial in

To use Cassiopeia and Lyra, simply run your chosen audio files through the modules. Depending on the desired outcome, the most crucial control is the **SATURATION** dial. This control determines how the vacuum tube reacts to the incoming audio signal. The further you turn the dial clockwise, the more the signal is processed. The tube' s backlight will indicate how much the tube is reacting during processing.

The output signal is influenced by the position of the **INTENSITY** dial. The more you turn this dial clockwise, the more of the processed signal is sent to the output. When fully clockwise, the output will consist of 100% of the processed signal. Typically, this control is used to fine-tune the exact amount of processed signal that is forwarded to the output.

Lastly, the **OUTPUT** control is used to match gain between devices in your signal chain, ensuring that all elements operate at their optimal signal levels.

4.4. How it works

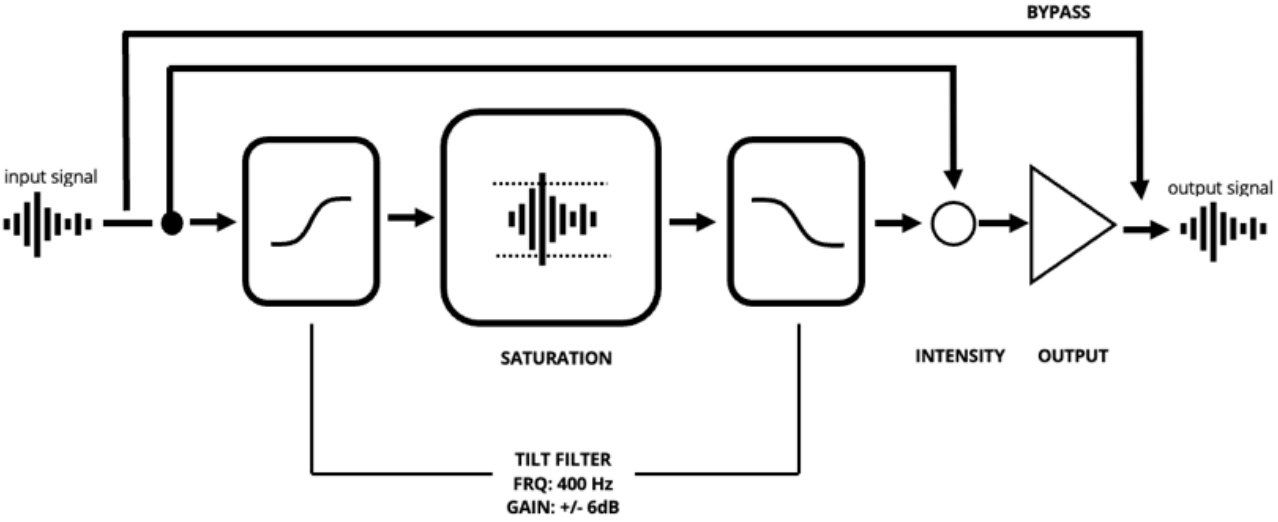
Cassiopeia and Lyra leverage the "natural" characteristics of vacuum tubes operated in saturation. This means the tubes are intentionally driven outside their original design specifications.

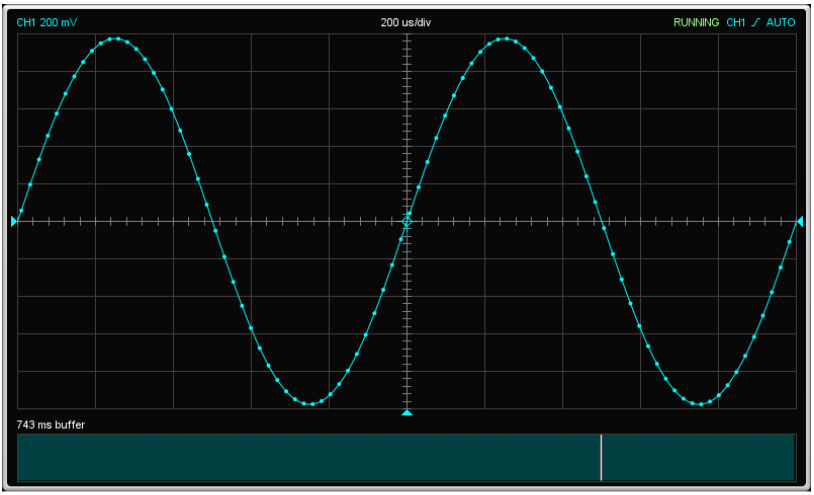
This effect is controlled using the **SATURATION** dial, which adjusts how the incoming signal interacts with the tube. The further the control is turned clockwise, the more the vacuum tube is pushed outside its specifications. This process is advantageous as it creates desirable overtones. One of the key benefits of using tubes in this context is the soft manner in which clipping occurs.

The **INTENSITY** control allows for blending the saturated signal with the original, unprocessed signal. This feature is particularly useful when the Saturation control is pushed to high levels, but only a subtle amount of the processed (wet) signal is desired in the final output.

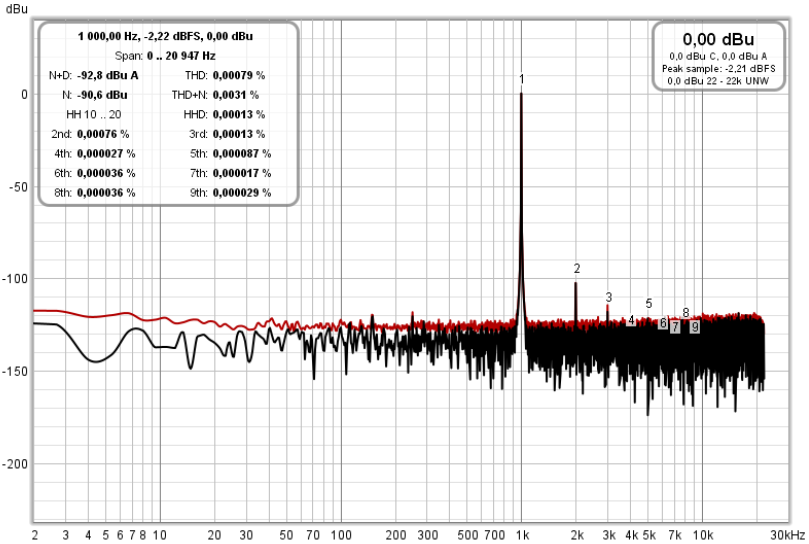
The final stage is the **OUTPUT** control, which enables the user to set the appropriate signal level for the next device in the signal chain.

For a clearer understanding of the signal flow, please refer to the block diagram:

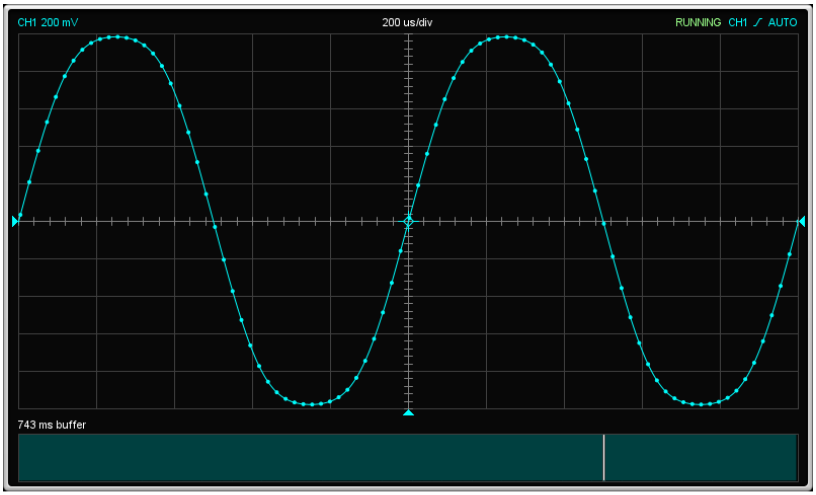

BYPASS
input signal
output signal
SATURATION
INTENSITY
OUTPUT
TILT FILTER
FRQ: 400 Hz
GAIN: +/- 6dB



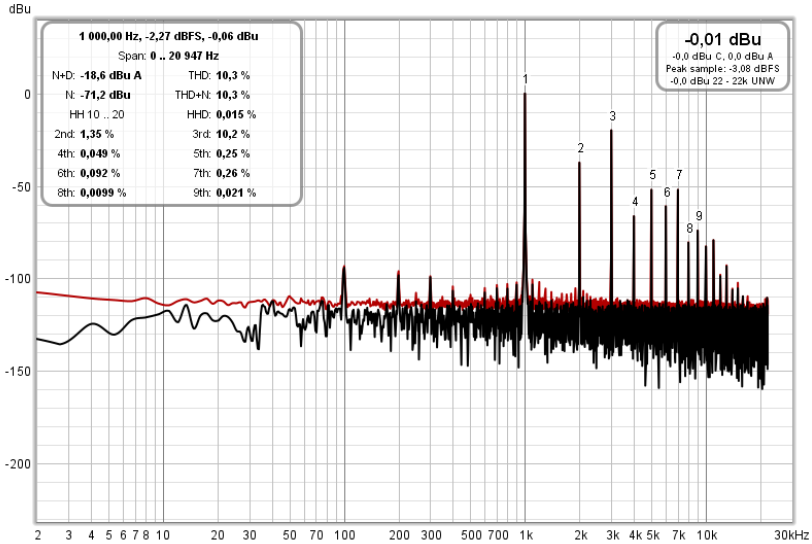
Saturation 0%



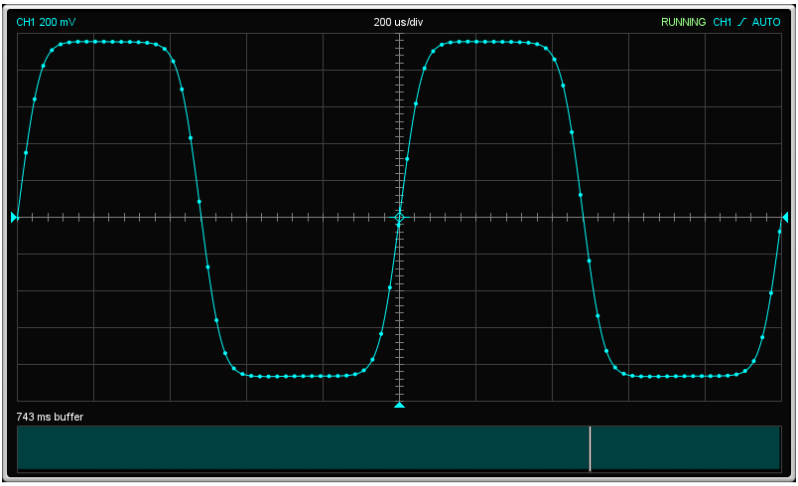
Saturation 0%



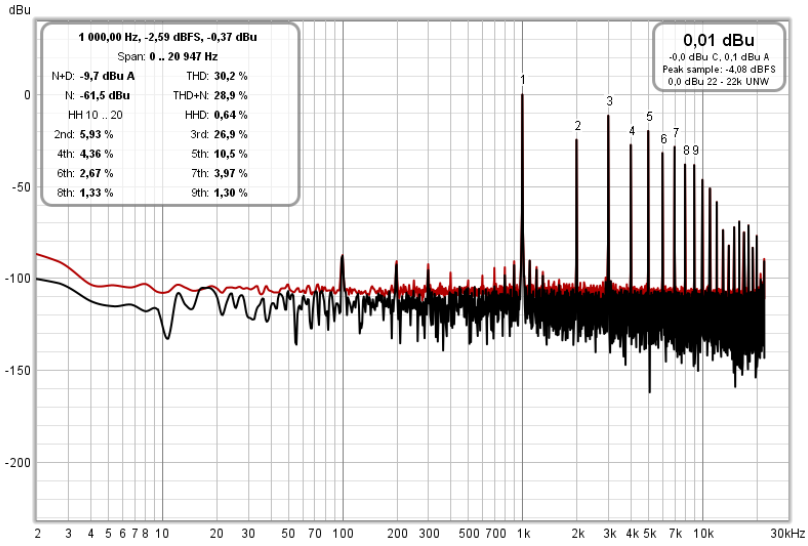
Saturation 50 %



Saturation 50%



Saturation 90 %



Saturation 90%

5. Maintenance

5.1. Maintenance

Maintaining an API 500 module that operates with a tube requires periodic checks to ensure optimal performance and longevity. The tube itself is a critical component that will degrade over time due to heat and regular use. It is recommended to inspect the tube every 6 to 12 months, depending on the intensity of use. If signs of wear such as noise, loss of signal quality, or unusual distortion occur, the tube may need to be replaced. Always use manufacturer-recommended tubes for replacement to ensure compatibility and performance. Additionally, ensure that the module is ventilated properly to prevent overheating, and clean the contacts and connectors regularly to maintain clear signal paths.

5.2. Tube replacement

To replace the tube, first uninstall the module from the rack by following the steps outlined in the installation guide (section 4.1) in reverse order.

Gently pull the defective tube out of its socket. The tube is not soldered, so it can be easily removed. Take a new tube and carefully insert it into the socket, ensuring that the tube's pins are properly aligned with the socket connector.

Once the tube is properly installed, reinstall the module into the rack by following the installation guide (section 4.1).

5.3. Spare Parts

Article: 60001 – Vacuum Tube ECC83s / 12AX7

6. Trouble shooting

No Power or No Signal:

- Ensure the module is properly seated in the API 500 rack.
- Check the power supply and confirm the rack is powered on.
- Inspect the fuse in the power supply if applicable.

Distorted or Noisy Audio:

• Verify the module's gain settings to avoid clipping or distortion.
• Check for issues with the tube (if applicable) – replace if worn or damaged.
• Ensure proper grounding to avoid hum or interference.

Intermittent Signal:

• Clean the edge connectors of the module and rack slots with contact cleaner.
• Ensure proper alignment of the module in the rack.
• Check for faulty cables or connections between the rack and other equipment.

Module Overheating:

• Verify proper ventilation around the module and rack.
• Ensure the ambient temperature is within safe operating limits.

Uneven or Low Output Level:

• Test the output with a known good cable and different equipment to rule out external issues.

Noisy Tube:

• Test the tube by replacing it with a known working one.

Module Not Recognized by Rack:

• Confirm the API 500 rack is compatible with the module.
• Inspect the module's connectors and the rack's power supply connections.

Mechanical or Loose Components:

• Ensure all screws and components are securely fastened.
• Listen for any rattling noises that may indicate loose parts inside the module.

By following these troubleshooting steps, you can isolate and resolve common issues with API 500 modules, ensuring consistent and reliable performance.

Technical specification

	Cassiopeia	Lyra
Frequency response:	<10 Hz – 22 kHz	
Dynamic range, 20 Hz – 22 kHz:		
Maximum input level:	+20 dBu	
Maximum output level:	+20 dBu	
Input impedance:	10 kOhm	
Output impedance:	68 Ohm	
Intensity (0 %) THD+N:		
@ 0 dBu	0.0031%	
@ +10 dBu	0.01 %	
Intensity (100 %) THD+N:		
@ 0 dBu Saturation 0 %	0.024 %	
@ 0 dBu Saturation 100 %	26.3 %	
Noise floor 20 Hz - 22kHz:		
INTENSITY (0 %)	-90 dBu	
INTENSITY (100 %)	-88 dBu	
Power consumption:	2,4 W per slot	2,4 W per slot
Power supply:	+/-16 VDC; 150 mA per slot	+16 V / -16 VDC; 150 mA per slot
Socket:	Power distribution by API500 Rack (not included)	Power distribution by API500 Rack (not included)
Tube pre-heating before use:	15 min	
Steps per knob:	42 steps by 270 degrees	
Environmental		
Operating temperature in C°:	+5 to 35	
Storage temperature in C°:	-20 to 50	
Dimensions		
Size (h x w x d) in cm:	133,35 x 76,2 x 165,9 cm	133,35 x 38,1 x 165,9 cm
Weight:	0,3 kg	0,2 kg

7. CE Conformity

Herewith klanghabitat GbR, placed Bergstraße 27, 19370 Parchim, Germany declares with sole responsibility that this products complies with the following norms and directives:

- 2023/988/EU General Product Safety Regulation
- 2006/95/EG Low Voltage Directive
- 89/336/EWG EMC (Electromagnetic Compatibility) Directive
- DIN EN 55032:2022-08 - Electromagnetic compatibility of multimedia equipment - Emission requirements
- DIN EN 55035:2018-04 – Electromagnetic compatibility of multimedia equipment - Immunity requirements
- 2011/65/EU Restriction of Certain Hazardous Substances (RoHS)

This declaration becomes invalid by any unapproved modification of the device.

Parchim, 01.10.2024 – Christian Sager & Marvin Carbuhn

8. Warranty Info

The modules come with a limited warranty of 2 years, covering defects in parts and labor from the date of purchase. Normal wear and tear is not included in this warranty. Repairs or replacements do not extend the original warranty period.

This warranty applies solely to the original purchaser and is non-transferable. klanghabitat only honors warranties for products purchased through authorized klanghabitat dealers. The warranty is valid only in the country of the original purchase, unless pre-authorized by klanghabitat.

The warranty becomes void if the product has been damaged due to misuse, accident, neglect, modification, tampering, or unauthorized repairs by anyone other than authorized service personnel.

The warrantor is not liable for property damage or any incidental or consequential damages resulting from product failure. Any implied warranties of merchantability and fitness for a particular purpose are limited to the duration of the expressed warranty.

klanghabitat does not cover express or overnight shipping costs, nor does it cover shipments to locations outside of Germany. Any transport-related damages are not covered by this warranty.

This warranty grants you specific legal rights, and you may have additional rights depending on your location. Some of the above limitations may not apply to you.

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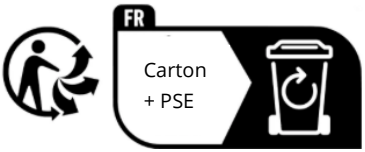
The PUR foam used to protect this product is marked with the recycling symbol and can be recycled where facilities exist. Please check your local recycling guidelines for appropriate disposal.



This product is manufactured according to the 2011/65/EU directive. The purpose of this directive of the European Union is the Restriction of Hazardous Substances (RoHS) in electronic equipment in order to protect health and nature.