

CAN CAN



MANUAL V1.0

APOLLO VIEW 

WARNING!

THIS MODULE GETS LOUD

ALWAYS ENSURE VOLUME CONTROLS ARE TURNED
DOWN BEFORE CONNECTING HEADPHONES

Exposure to high sound levels can lead to irreversible hearing damage known as noise-induced hearing loss. It's crucial to maintain a moderate volume level. The following guidelines, based on occupational noise exposure regulations, should be adhered to minimize the risk:

- Maximum of 85 decibels (dB) Sound Pressure Level (SPL) for up to 8 hours
- Maximum of 88 dB SPL for up to 4 hours
- Maximum of 91 dB SPL for up to 2 hours
- Maximum of 94 dB SPL for up to 1 hour
- Maximum of 97 dB SPL for up to 30 minutes
- Maximum of 100 dB SPL for up to 15 minutes

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LIMITED WARRANTY

Apollo View Modular Ltd warrants this product to be free from defects in materials or construction for a period of one year from the date of purchase (proof of purchase/invoice required).

This warranty does not cover any damage caused by misuse of the product, or any unauthorised modification of the product.

Apollo View Modular Ltd reserves the right to determine what qualifies as misuse at their discretion. Examples of misuse include, but are not limited to:

1. Exposure to extreme heat or moisture
2. Malfunction resulting from wrong power supply voltages, backwards or reversed Eurorack bus board cable
3. Issues related to third party products
4. Any condition resulting from incorrect or inadequate maintenance or care.
5. Damage resulting from misuse, abuse, negligence, accidents or shipping damage.
6. Dissatisfaction due to buyer's remorse
7. Normal wear and tear
8. Damage to the product caused by excessive physical force or abuse of the product, removing knobs, changing faceplates

This warranty does not cover any other causes determined by Apollo View Modular Ltd to be the fault of the user, and standard service rates will apply.

Apollo View Modular Ltd agrees, at its option during the warranty period, to repair any defect in material or quality or to furnish a repaired or refurbished product of equal value in exchange without charge (except for a fee for shipping, handling, packing, return postage, and insurance which will be incurred by the customer). Such repair or replacement is subject to verification of the defect or malfunction and proof of purchase as confirmed by showing the model number on the original dated sales receipt.

Apollo View Modular Ltd implies and accepts no responsibility for harm to persons or apparatus caused through the operation of this product.

Please contact info@apolloviewmodular.com with any questions, requests for a return to the manufacturer, or any needs & comments.

<https://www.apolloviewmodular.com/>

INTRODUCTION

WHAT IS IT?

CanCan is a dual-channel headphone amplifier engineered for Eurorack format. Its low output impedance yields a high damping factor for consistent low-frequency response throughout a wide impedance range from 16 to 600 ohms (Ω). Whether you're fine-tuning sounds on stage with in-ear monitors, or exploring the sonic depths of your Eurorack in the studio, CanCan captures and delivers every nuance with fidelity.

The amplifier's design is committed to high-fidelity performance, ensuring an pure studio-quality audio experience. Twin independent channels provide the versatility needed for both collaborative and solo endeavours. Dual 8-segment LED meters offer precise visual feedback for gain staging, aiding in the prevention of clipping and ensuring a pristine audio signal path. CanCan's low output impedance ensures broad compatibility across the full spectrum of headphones (Cans), making it an essential component in any Eurorack setup.

CANCAN TECHNICAL BACKGROUND

To fully grasp the function of headphone amplifiers, it's essential to consider the technical aspects that dictate their performance with various Cans. Sensitivity, impedance, damping factor, frequency range, and volume control are all critical in how an amplifier drives headphones and shapes the listening experience. CanCan is engineered with these factors at the forefront, guaranteeing studio-quality sound for various headphone types.

SENSITIVITY

Sensitivity measures a headphone's ability to convert an electrical signal into sound, expressed in dB SPL/mW. Headphones with high sensitivity output greater volume for less input power, making them responsive even to subtle audio signals. This characteristic is particularly evident with in-ear monitors, which can reveal any noise present in the amplification process. CanCan's design focuses on minimal noise, ensuring that all headphones, especially highly sensitive ones, reproduce audio without adding unwanted sounds, thus preserving the fidelity of the original signal.

IMPEDANCE

Impedance, quantified in ohms (Ω), is the combined resistive and reactive resistance that headphones offer to an electrical signal. Low-impedance Cans (16 to 32 Ω) are typically louder for a given input power due to their efficiency, but their performance can also be influenced by sensitivity and source output. High-impedance Cans (250 to 600 Ω), while requiring more power, are favoured in studios for their detailed sound reproduction, though this is also a result of their overall design quality.

CanCan is crafted to drive headphones across this broad impedance spectrum effectively. It provides ample power for high-impedance headphones while ensuring low-impedance Cans receive a clean, well-controlled signal. This ensures a high damping factor, essential for maintaining accurate transient response and solid bass across all headphone types.

DAMPING FACTOR

The damping factor, defined as the ratio of headphone impedance to amplifier output impedance, is pivotal for audio clarity. With CanCan's exceptionally low output impedance of 0.5Ω, it maintains a high damping factor even with low-impedance Cans, ensuring comprehensive control over the headphone drivers. The high damping factor yields a tight bass response and sharpens transient sounds, enabling headphones to respond swiftly and accurately to the audio signal. Such precision ensures that CanCan facilitates the faithful reproduction of every auditory detail, offering consistently high-quality audio for all headphones.

FREQUENCY RANGE

CanCan's frequency response is optimised for the audible spectrum, ranging from 20Hz to 20,000Hz. This ensures that all frequencies within the range of human hearing are accurately represented, providing a seamless audio experience. While sub-audio frequencies and potential electromagnetic interference are minimised to prevent distortion and intermodulation. CanCan's design also considers the importance of a clean phase response and transient behaviour at the edges of the audible range. Consequently, listeners enjoy a pure and uncoloured sound, free from distortions and artefacts, for an immersive listening experience.

ACTIVE VOLUME CONTROL

CanCan features a Braxandall Active Volume Control circuit that goes beyond the limitations of traditional passive volume designs commonly found in Eurorack modules. This active method reduces the noise and variability typically associated with high-resistance potentiometers used in standard voltage divider configurations. By actively controlling volume, CanCan achieves a consistent frequency response and avoids the imbalance caused by conventional potentiometers' electrical resistance variance ($\pm 20\%$ tolerance). This results in precise channel balance, with soundstage and imaging accurately preserved without distortion, noise, or colouration.

SUMMARY

CanCan is engineered for high-fidelity, ensuring accurate sound reproduction across a diverse range of headphones. Its design, featuring a low output impedance and comprehensive control of audio parameters, provides consistent quality in a Eurorack format. CanCan integrates seamlessly with both in-ear monitors and studio-grade cans, upholding the integrity of your audio signal in every use case.

INSTALLATION CANCAN

POWER

Before installing CanCan, ensure your Eurorack system is powered off. CanCan is supplied with a 10-pin to 16-pin power cable. Carefully align the 10-pin end with the 2x5 pin header on the module's rear. The red stripe on the cable indicates -12V and must align with the !RED! marking on IOU for proper polarity.

Next, find a 4 HP slot in your Eurorack case for CanCan. Connect the other end of the power cable to your Eurorack power supply, ensuring the red stripe aligns with the -12V rail. With the power connection established, mount the module into your case using appropriate screws and power on your Eurorack system.

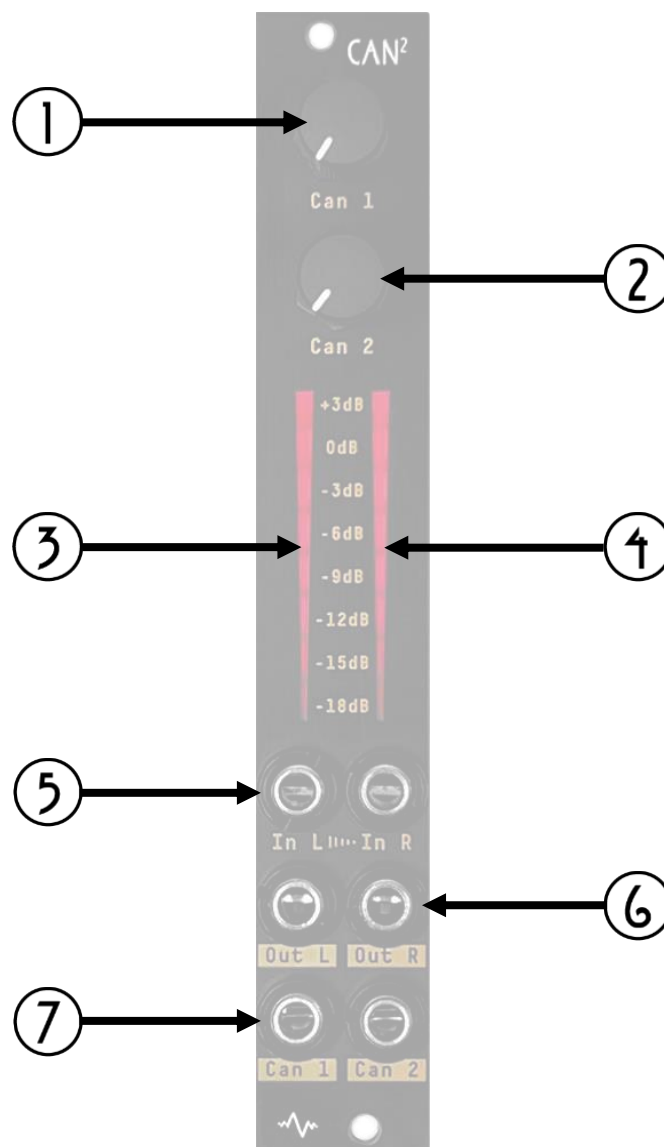


The module has reverse protection diodes, which will divert the reverse current to ground in case of incorrect installation.

CANCAN FUNCTIONALITY

KEY

1. Active Volume Control for Can1
2. Active Volume Control for Can2
3. Level Meter Left Channel
4. Level Meter Right Channel
5. Mono Inputs Left & Right
6. Mono Outputs Left & Right
7. Stereo Headphone Outputs 1 & 2



INPUT

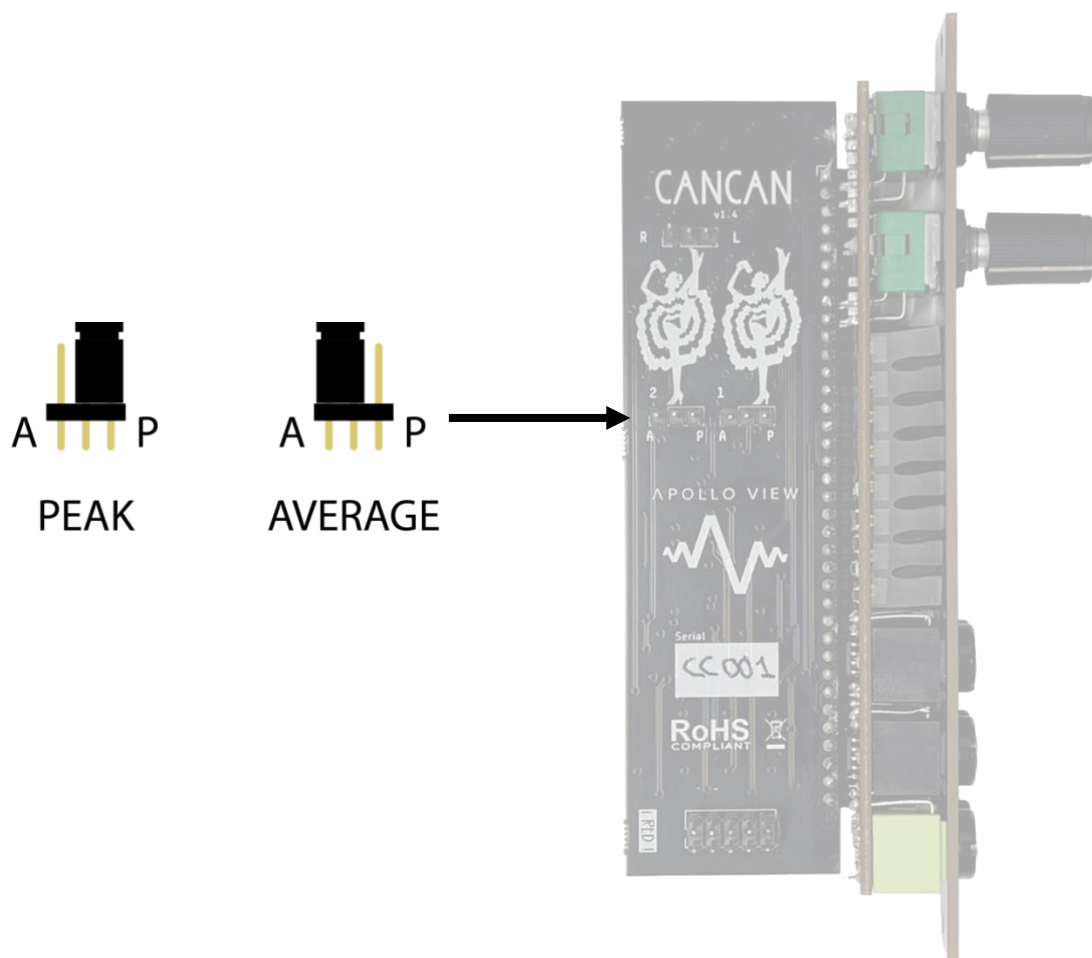
In L & In R - These are AC-coupled and electromagnetically filtered inputs for the left and right channels. The Left input is automatically routed to the Right if no Right input is patched, providing a mono-to-stereo functionality. Connecting a cable to the Right input will override this normaling feature.

CONTROLS

Can 1 & Can 2 Knobs – These knobs control the active volume for the left and right stereo outputs. To prevent any potential damage to your hearing or headphones, always turn these knobs fully anti-clockwise before connecting your headphones.

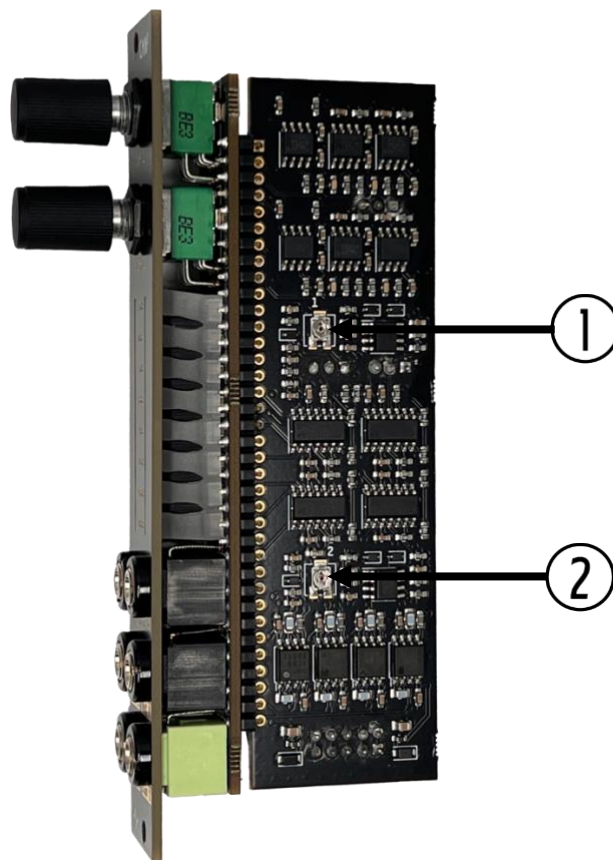
8-SEGMENT LED METERS

Configuration - The level meters can display either peak or average signal levels. This is configurable via a set of jumper pins on the back of the module. Jumper 1 configures the left channel, and jumper 2 configures the right channel. Place the jumper on the middle pin and either P (Peak) or A (Average) according to your preference.



Reading the Meters – In Peak mode, the 0dB indicator corresponds to a 10Vpp input signal level. The +3dB indicator corresponds to approximately 14Vpp, a high level that could cause clipping in subsequent stages. Aim for the 0dB LED to illuminate for optimal levels. Note that the meter will show a lower level in Average mode since it doesn't respond to quick transient peaks.

Meter Calibration – The meters are factory-calibrated. If recalibration is necessary, use the trimmers on the back of the module. For the Left meter, use trimmer 1; for the Right, use trimmer 2. With the meters set to Peak mode, input a 10Vpp 1kHz sine wave into the left input and adjust the trimmer until the 0dB LED illuminates.



OUTPUTS

Out L & Out R - These outputs provide mono signals derived from the respective inputs. They are AC-coupled and electromagnetically filtered, ideal for routing to other modules or a dedicated output stage.

Can1 & Can2 Outputs - These stereo outputs are designed for connecting headphones, providing high-quality sound for personal monitoring. They also offer the flexibility to drive active monitors with a stereo-to-mono [Y-splitter cable](#). To ensure safety and durability, these outputs feature resettable fuses that protect against short circuits. This means if a mono cable is mistakenly connected, the fuses will prevent any damage to the output stage, preserving the longevity and reliability of your module.

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