

AUDIOLINEAR



AXIS

PASSIVE MONITORING CONTROLLER

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Audiolinear reserves the right to modify and improve product design in line with advances in technology

Safety Notices

- Read and keep this manual
- Follow all instructions and heed all warnings
- **ALWAYS FOLLOW THE QUICK START GUIDELINES**
- Disconnect product when cleaning and clean with a slightly damp cloth
- Do not exceed any voltage limits or load ratings outside those detailed in the product specification. This will damage the internal circuitry and may damage other outboard equipment
- Do not apply any external signals if product has been exposed to any liquid, excessive moisture or has been physically damaged
- There are no user serviceable parts inside the unit and dismantling the product may invalidate warranty. Refer all servicing to qualified service personnel
- This product is NOT designed to route signals directly to monitor loudspeakers (these will require power amplification)
- As this product is specifically designed to route signals to amplified loudspeakers, be aware that prolonged and excessive exposure to high sound levels may cause permanent noise-induced hearing loss – or even deafness. For guidance please refer to official websites in your jurisdiction (UK: HSE, USA: OSHA, EU: OSHA Europa).

Restriction of Hazardous Substances

This equipment fully complies with RoHS 2 Directive 2011/65/EU.

Correct disposal of this product



The WEEE symbol on the product or on its packaging indicates that the product must not be disposed of with normal household waste (WEEE Directive 2012/19/EU). Instead such marked waste equipment must be disposed of by arranging to return to a designated collection point for the recycling of waste electrical and electronic equipment. By separating and recycling this waste equipment at the time of disposal will help to conserve natural resources and ensure that the equipment is recycled in a manner that protects human health and the environment.



Axis Passive Monitoring Controller

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AXIS Features

OVERVIEW:

AXIS is a zero compromise, high-end desktop monitor controller - entirely passive in design - and offers a completely transparent signal path. There are no active electronics to add any interference or distortion to your source.

INHERENT QUALITY:

AXIS has a high-quality, Swiss-made, 24-position stepped output volume attenuator, with large 64mm Ø dial. The positions are ultra-smooth with 2dB steps from 0dB to -30dB and 5dB steps thereafter to -65dB. The attenuator uses high-quality 1% resistors throughout its network.

Each output has a dedicated trim control on the top panel. The controls are all high-quality, smooth-turn potentiometers, made by ALPS. Each control has a range of -20dB to 0dB.

REAR PANEL CONNECTORS:

Two stereo inputs via 1/4" TRS Jack sockets, for connection from your audio interface or other line-level equipment. Accepts both TS and TRS jack connections.

One stereo input via RCA/Phono sockets, for connecting CD players or other unbalanced equipment.

One stereo 3.5mm TRS mini-jack socket, for quick referencing to any device with a similar socket (e.g. Smartphones, Laptops, Tablets).

Three stereo outputs via 1/4" TRS jack sockets.

Quick Start Guidelines

Before connecting any equipment to the AXIS unit, such that no unwanted configurations or excessive signal levels are routed though the AXIS system, please ensure that the following controls are set as follows:

Volume control:	OFF
Output trimmers:	0dB
MONO:	OFF
DIM:	OFF
MUTE:	ON
INPUT:	Channel 1
OUTPUT:	Channel A

Select the input channel you wish to work with and similarly select the output channel.

Once all external equipment has been connected, checked and activated, UNMUTE the system and slowly bring up the main central volume control to listening levels that are safe to work with.

REAR PANEL FEATURES:



The layout of the rear panel is fairly self-explanatory. As you view the rear panel, there are four stereo inputs on the RHS and three stereo outputs on the LHS.

See explanation later in this used guide with respect to TS and TRS jacks, unbalanced and balanced signals and how the passive nature of the AXIS controlled handles these configurations w.r.t. cable noise cancellation.

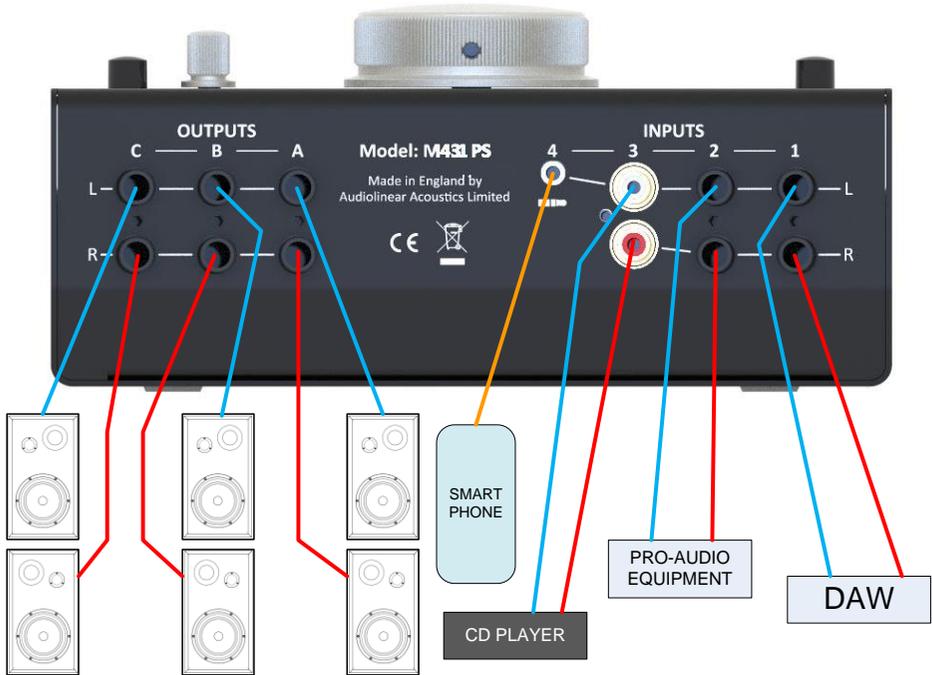
INPUTS:

Two the four input channels (1 and 2) are Neutrik stereo 1/4" jack sockets arranged in pairs for LEFT and RIGHT channels accordingly. They accept an unbalanced TS jack or a balanced TRS jack. Input channel 3 is a standard RCA stereo phono connector accepting unbalanced signals. Input channel 4 is a 3.5mm stereo TRS jack socket (Tip = LEFT, Ring = RIGHT, Sleeve = Common) – these signals are inherently unbalanced.

OUTPUTS:

Each of the three output channels (A, B and C) are Neutrik stereo 1/4" jack sockets arranged in pairs for LEFT and RIGHT channels accordingly. They can output signals to an unbalanced TS jack or a balanced TRS jack (note: as this is a passive controller, signal outputs are NOT driven as a differential balanced signal).

REAR PANEL CONNECTIVITY:



The connectivity example shown above is just one way the unit can be configured in a studio setting.

Although the prime function of the AXIS Monitoring Controller is to route signals to amplified monitor loudspeakers, all four inputs can carry any signal from any source up to 34dBu and may be routed to any equipment of your choosing.

Connector types, acceptable signal levels, impedances and frequency response are all defined in the specifications at the end of his user guide.

FRONT PANEL FEATURES:



The front panel controls are presented as an organised workflow. Input selection to the LHS, the master signal level setting in the middle (attenuation dB) and output selection to the RHS. As viewed from the top, the input connectivity on the rear panel is on the LHS – and the output connectivity is on the RHS.

An additional input function is MONO where the LEFT and RIGHT signals of the selected input channel are mixed before being routed to the master signal level control and then on to the output channel selector.

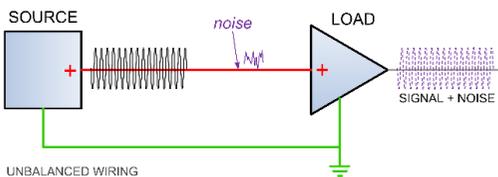
For each of the 3 output channels, an individual TRIM control allows for that channel to be attenuated from 0dB to -20dB. This allows accurate balance of sound levels across all three outputs.

There are two additional output functions of MUTE and DIM. MUTE disconnects the routed input signal and fully attenuates the selected output channel (i.e. fully OFF). The DIM function quietens the selected output signal by 25dB but still allowing the channel to be heard. Note that MUTE overrides all selected settings.

An overview of Unbalanced and Balanced Wiring

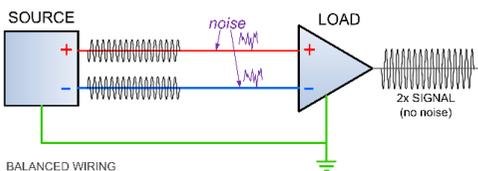
Unbalanced wiring

The clear advantage of unbalanced wiring is its simplicity. The cable has only two conductors and the source equipment only has to provide a single-ended signal w.r.t. ground. Unfortunately, any noise or interference induced in the cable will add to the wanted signal. By its very nature, this noise is difficult (if not impossible) to eliminate without affecting the wanted signal. Cable lengths have to be limited to a few meters to keep the noise levels within acceptable limits. When using ¼" TS jacks, the tip is 'signal' and the sleeve is the 'return signal' (also called the ground signal).



Balanced wiring

The clear disadvantage of balanced wiring is its complexity. The cable now has three conductors (two signal wires, often twisted together, and an outer shield). And the source equipment now has two amplifiers which output the source signal in anti-phase to each other. To maintain fidelity, these amplifiers must be closely matched in gain, phase and frequency response – all adding to cost and complexity. In addition, the receiving equipment now has to have a differential input amplifier which sums the two incoming signals. The main advantage of this configurations is that any noise or interference induced in the cable will be equally induced in each signal wire (in phase and amplitude). And when combined in the receiving input amplifier will be cancelled out – leaving a clean signal. Cable lengths can now be increased to over 100m for properly shielded cable. When using ¼" TRS jacks, the tip is 'in phase signal', the ring is the 'anti-phase signal' and the sleeve is the 'shield'.



Using Unbalanced and Balanced Wiring with the AXIS Monitor

The Axis Monitoring Controller is a fully passive system. By its very design it has no active electronics and therefore has no differential amplifiers on its inputs or outputs. As such, there are limitations to its capability in dealing with cable borne noise and interference. Balanced wiring considerations only apply to inputs 1 & 2 and all three outputs – all of which have ¼" TRS jack sockets.

Unbalanced input or output wiring

As with all unbalanced wiring, any noise or interference induced in the input or output cables will pass through and be present at the input stage of the destination receiving equipment.

Balanced input wiring

The 'in phase' signal on the TRS tip connection is routed through the Axis system. The 'anti-phase signal' on the ring connection is wired to ground through a 4k7Ω resistor to ensure that the source equipment sees a balanced load.

Any noise or interference induced on the input cable will not be eliminated, even though the source equipment is outputting a balanced signal.

Balanced output wiring

The 'in phase' signal on the TRS tip connection is the signal which has been routed through the Axis system. The 'anti-phase signal' on the ring connection is wired to ground through a 470Ω resistor to ensure that the receiving equipment does not have a floating 'anti-phase' signal wire.

Any noise or interference induced on the output cable will be eliminated, if the receiving equipment has a balanced input stage.

Any noise or interference induced on the output cable will not be eliminated, if the receiving equipment has a unbalanced input stage.

Axis Specifications

Product code: M431PSv12

Frequency Response (all configurations)

0dB/-1dB DC to 530kHz

0dB/-3dB DC to 1020kHz

Distortion (all configurations)

0.003% 10Hz to 100kHz

Noise Floor

Same as source. Adds no additional distortion.

Dynamic Range

Same as source.

Signal Voltage Rating

All inputs: +4dBu/+35dBu (nominal/maximum)

All outputs -1.15dB w.r.t. input (with trim and volume controls at 0dB)

Crosstalk

Left on Right -83dB

Right on Left -83dB

Adjacent inputs -96dB

Mute level -115dB

Level control

24 position stepped output volume attenuator with large 64mm \emptyset dial

ultra-smooth, high quality Elma switch

- 3 μ m gold plated contacts over copper alloy, ceramic wafers, Swiss made

smooth 2dB steps to -30dB, 5dB steps thereafter to -65dB

- uses quality 1% resistors on attenuator network

- calibrated dial for standard 100 Ω source and 10k Ω load impedances

- OFF position is fully off

Trim control

Individual output trim controls on each output

High quality, smooth turn, ALPS audio potentiometers

- calibrated -20dB to 0dB

Stereo/Mono select pushbutton

mono mixes selected LH and RH signals

Mute/unMute pushbutton

mute is OFF - output is resistor grounded

mutes both LH and RH signals together

Dim/unDim pushbutton

- dim attenuates selected channel by 25dB
- dims both LH and RH signals together
- provides a 'quiet' listen, speak over function

Inputs

- (1) Neutrik stereo ¼" jack pair (to interface to pro-audio gear) ^{*note}
- (2) Neutrik stereo ¼" jack pair (to interface to pro-audio gear) ^{*note}
- (3) Switchcraft stereo RCA phono (for interfacing to domestic audio equipment)
- (4) Schurter stereo 3.5mm jack (for interfacing to Smartphone, Laptop or Tablet)

*note: Accepts ¼" TS and ¼" TRS jacks

input select by 4 way interlocking pushbutton

- allows direct selection of non-adjacent channels
- interlocking can be overridden to provide a simple input mix function

input impedance = 3.8kΩ to 10.4kΩ (assuming 10kΩ load impedance)

- being a passive device, impedances vary dependent upon circuit conditions
(volume control position, trim control position and load impedance)

Outputs

- (1) Neutrik stereo ¼" jack pair (to interface to pro-audio gear) ^{*note}
- (2) Neutrik stereo ¼" jack pair (to interface to pro-audio gear) ^{*note}
- (3) Neutrik stereo ¼" jack pair (to interface to pro-audio gear) ^{*note}

*note: accepts ¼" TS and ¼" TRS jacks

output select by 3 way interlocking pushbutton

- allows direct selection of non-adjacent channels
- interlocking can be overridden to provide a multi output function

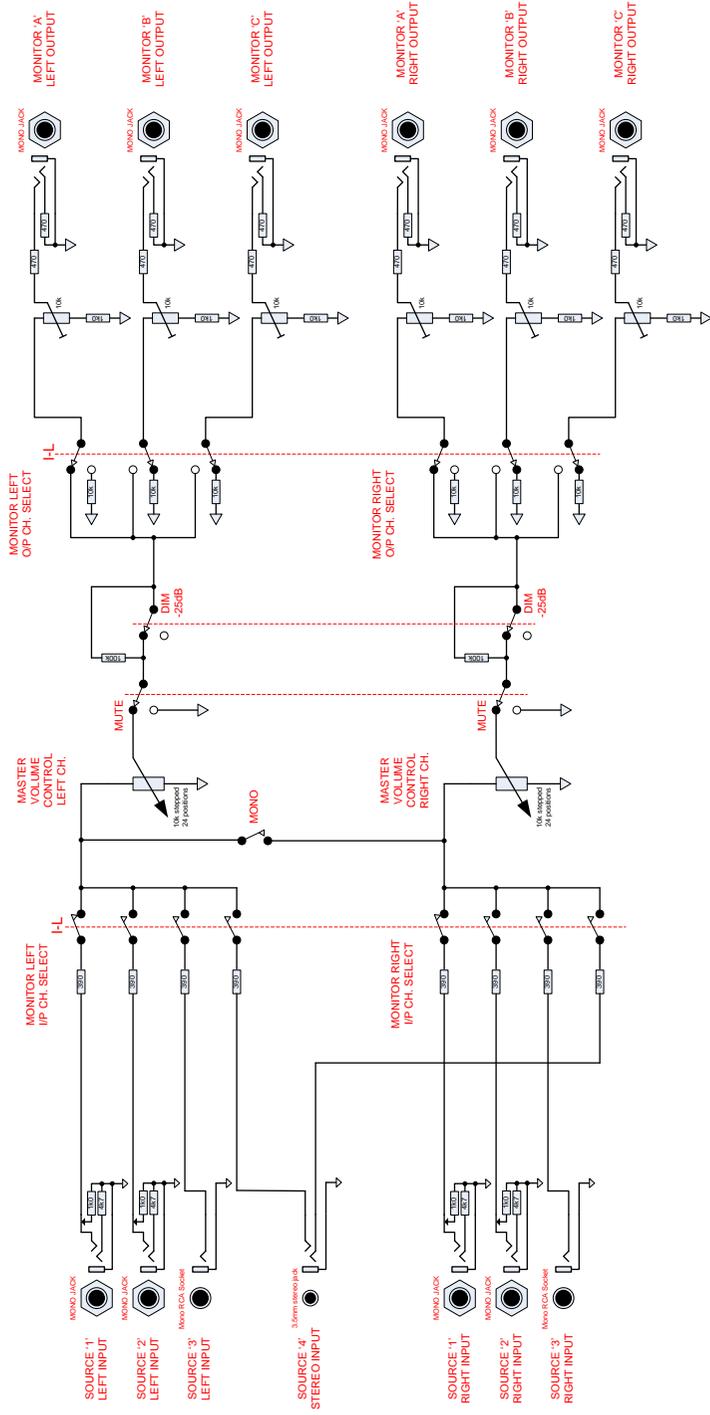
output impedance = 470Ω to 5010Ω (assuming 100Ω source impedance)

- being a passive device, impedances vary dependent upon circuit conditions
(volume control position, trim control position and source impedance)

Physical properties

- overall dimensions of 87.6 x 208.0 x 175.7mm (HxWxD)
- weight 1.87kg (4.12lbs)

AXIS MONITORING CONTROLLER SCHEMATIC





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