Axiom

Audio Extension I/O Modules

User Manual

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614-0006363

IMPORTANT SAFETY INSTRUCTIONS

The symbols below are internationally accepted symbols that warn of potential hazards with electrical products.

This symbol, wherever it appears, alerts you to the presence of un-insulated dangerous voltage inside the enclosure -- voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and third grounding prong. The wider blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by Attero Tech
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. When permanently connected, on all-pole mains switch with a contact separation of at least 3mm in each pole shall be incorporated in the electrical installation of the building.
16. If rack mounting, provide adequate ventilation. Equipment may be located above or below this apparatus but some equipment (like large power amplifiers) may cause an unacceptable amount of hum or may generate too much heat and degrade the performance of this apparatus.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

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WARRANTY INFORMATION

For a copy of the QSC Limited Warranty, visit the QSC website at www.qsc.com

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules and EN55022. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

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1 – Axiom Bus Overview

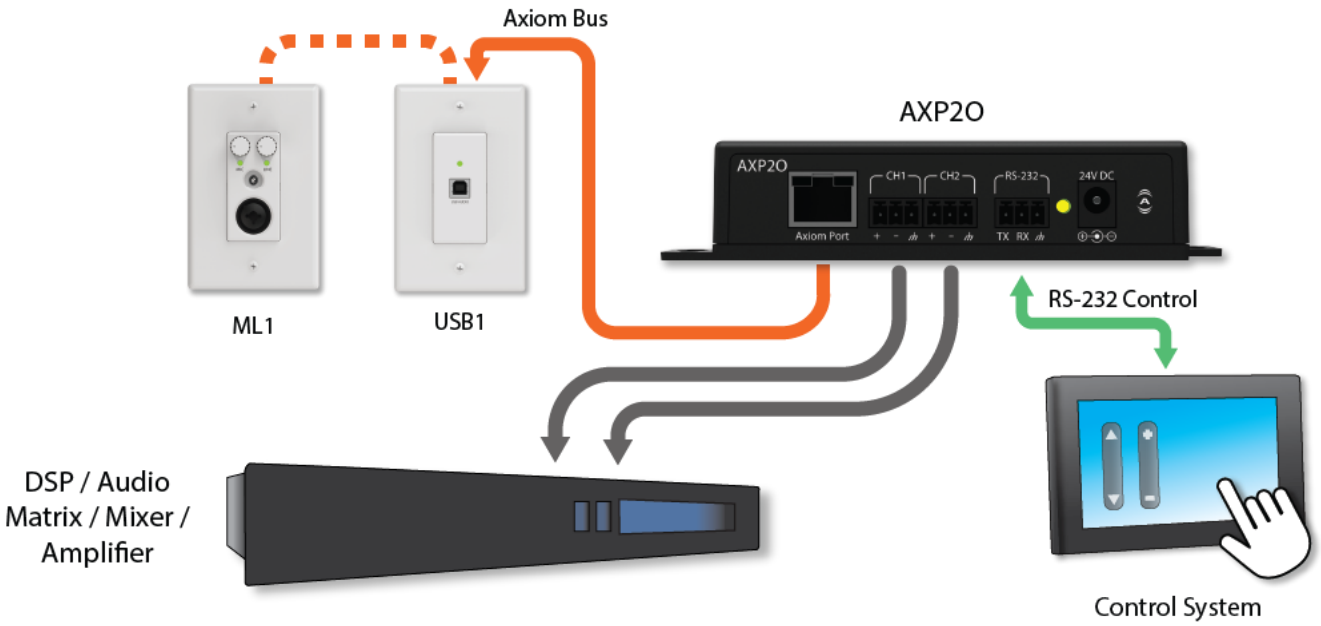
The Attero Tech Axiom bus is a proprietary analog extension solution that leverages unshielded twisted pair cabling (CAT 5/6) to transmit two balanced audio channels, RS-232 control and 24V DC power for audio signal extension applications.

The Axiom bus is designed to support distances of up to 100m (total run length). The Axiom bus also supports daisy chain connectivity of up to two Axiom devices to provide flexible modularity for various audio device connectivity in installed AV systems.

8P8C Pin	TIA 568A Pair: Color	TIA 568B Pair: Color	Axiom Port Function
1	3: Green/White	2: Orange/White	Analog Audio 1+
2	3: Green	2: Orange	Analog Audio 1-
3	2: Orange/White	3: Green/White	Analog Audio 2+
4	1: Blue	1: Blue	RS-232 TXD)
5	1: Blue/White	1: Blue/White	RS-232 RXD
6	2: Orange	3: Green	Analog Audio 2-
7	4: Brown/White	4: Brown/White	+24 VDC
8	4: Brown	4: Brown	GND

Table 1 - Axiom Bus Details

Application Diagram



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2- ML1 – Overview

Figure 1 – ML1 Front Panel

The Axiom ML1 provides an installation friendly simple to operate analog audio extension solution for analog mic and line level sources in cost-sensitive applications such as small and medium sized retail, restaurant, education, and hospitality venues.

2.1 – ML1 – What's in the Box

The ML1 comes supplied with the following:

- Axiom ML1 device
  - Includes interchangeable white and black Decora-style inserts
- (1) White US Single Gang Decora® cover plate w/screws
- (1) Black US Single Gang Decora® cover plate w/screws
- (2) Wall plate mounting screws

Figure 2 - Product Overview

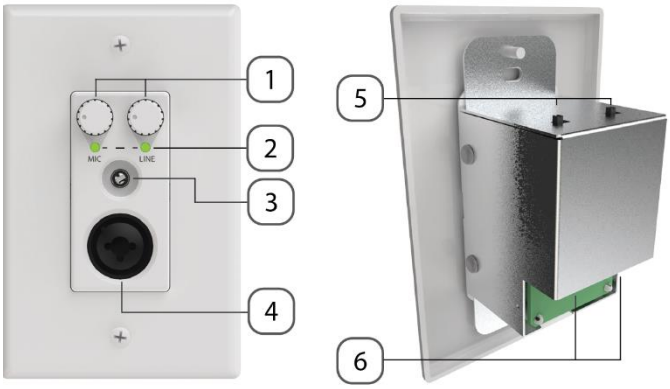

Figure 3 - Product Overview

ID	Description
1	Gain Adjust Knobs
2	Signal Presence Indicators
3	3.5mm Input
4	XLR/TRS Input (1/4" TRS Padded for +20dBu support)
5	Axiom Port A Configuration Switches
6	Axiom Ports (A & B)

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3 – Device Installation

3.1 ML1 – Mounting

A typical installation will involve mounting the wall plate into a pre mounted wall box or mounting bracket. Before installation, make sure the wall box where the ML1 is to be installed is pre-wired with a suitable cable back to an Axiom-enabled expander/injector.

Prior to ML1 installation, ensure the power sourcing device (Axiom expander/injector) is powered off.

Attach and unshielded CAT-5/6 cable from the Axiom-enabled device to the Axiom port A of the ML1.

With the cable attached, carefully place the ML1 into the wall box taking care to not trap the cabling. Once in place, secure it with the screws provided. Once the unit is secured in the wall box, fit the Decora plate and secure it with the screws provided.

Now you may apply power to the Axiom-enabled expander/injector, the unit will power up and the signal presence LEDs should blink once quickly.

The ML1 comes in a single gang US Decora style form factor and may be mounted in most US single old and new work back boxes and mud-rings. Given the single gang size, the ML1 may be mounted in larger gang boxes with other single gang form factor products to provide flexible AV system modularity where needed.

**Note:* *CAD drawings can be downloaded from the Attero Tech website. Please contact Attero Tech for any further product related information that is not accessible on the website.*

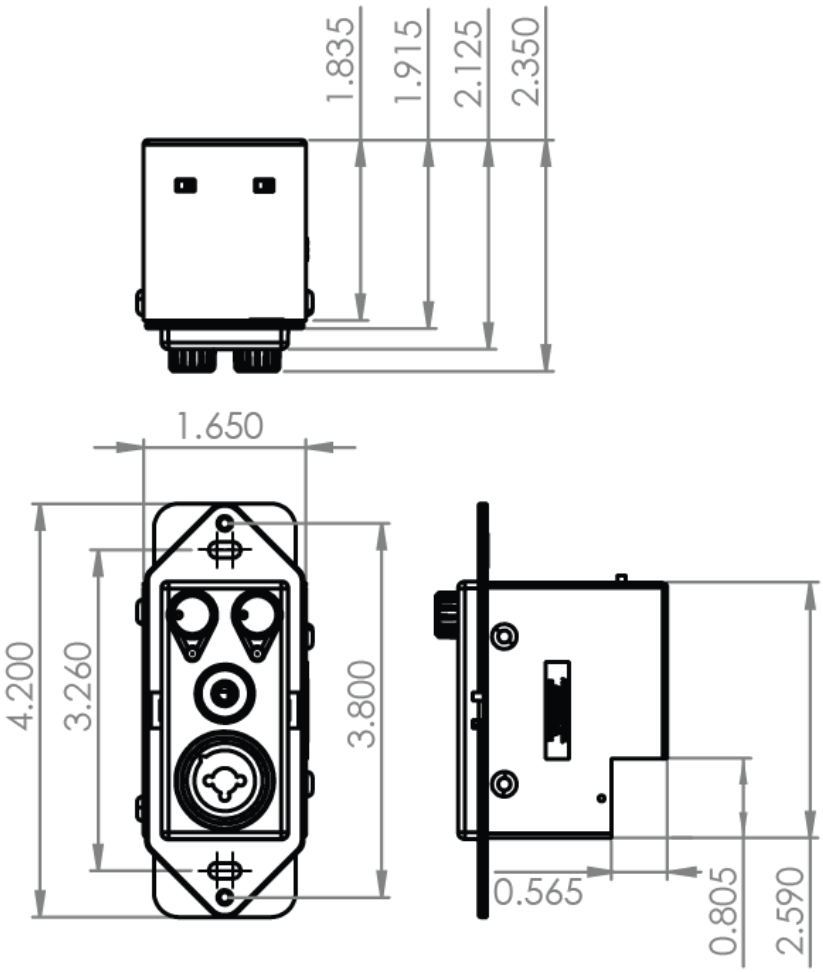

Figure 4 - Dimensional Drawing

3.2 – Signal Metering LED Indications

The ML1 is equipped with two LED indicators below the rotary encoders for each the ¼"/XLR Mic input and the 3.5mm line input. The following chart indicates the available LED status information:

Figure 5 – LED Signal Metering

LED State	Status
Off	No signal present
Green	-60 dBFS to < -20 dBFS
Yellow/Amber	-20 dBFS to < -3 dBFS
Red	-3 dBFS to 0 dBFS

Note: The full scale output of the Axiom bus is optimized for +20dBu levels, so 0dBFS in terms of metering refers to +20 dBu

3.3 – Controls

The ML1 controls the desired input gain simply using the coinciding input knob (see Figure 4). Turning the knob clockwise raises the level, while counter-clockwise lowers.

3.4 – Device Configuration and Workflow

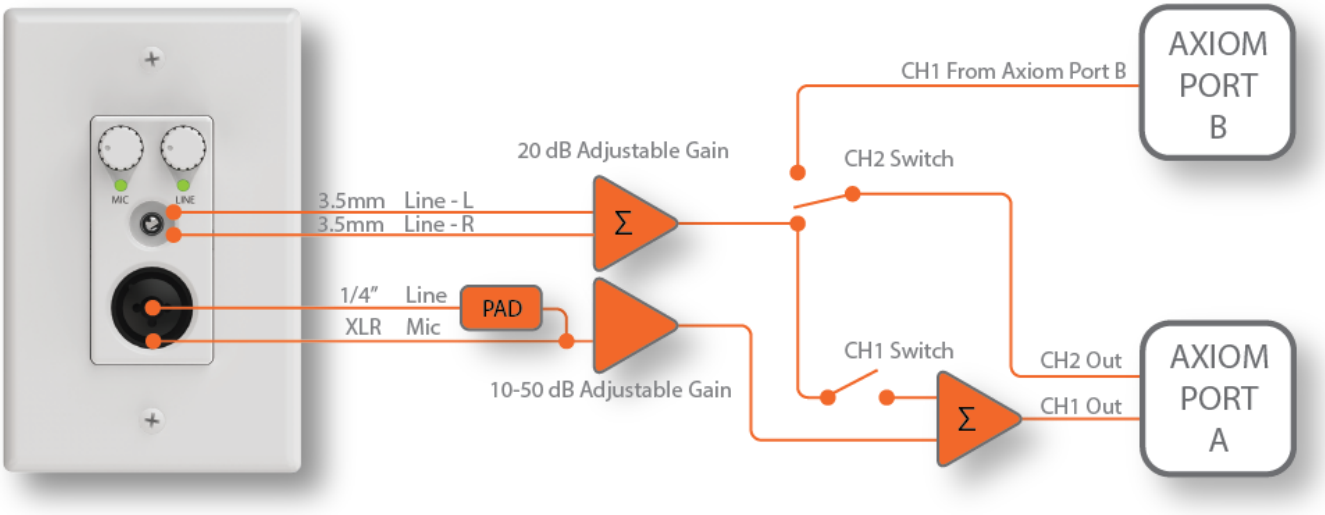

Figure 7 - Signal Flow

Overview

The ML1 may be configured for single use, or daisy-chained with one other Axiom device.

The default configuration is for single device use with Port B disabled and XLR enabled.

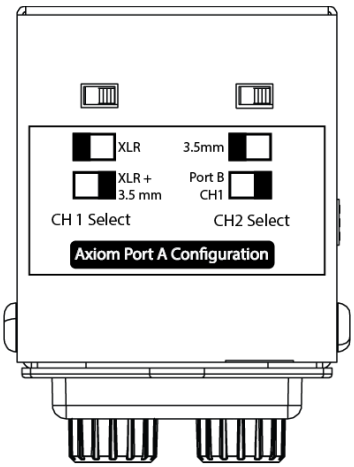

Figure 6 - Switch Label/Config Options

The CH1 Select switches allows the integrator to route either the XLR or a sum of the XLR and 3.5mm inputs to the CH1 output of Axiom Port A.

The CH2 Select allows the integrator to route either the 3.5mm input or the Axiom Port CH1 (daisy chained Axiom device) to the CH2 output of Axiom Port A.

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4 – AXP2O – Overview

Figure 8 – AXP2O Front Panel

The Axiom AXP2O provides analog audio output breakout, power injection and control system connectivity to Attero Tech's Axiom endpoint products. The installer friendly form factor allows it to be placed on an equipment rack shelf or mounted to any flat surface.

Features:

- Analog Output - Two balanced line-level analog outputs for connectivity to mixers, amplifiers and signal processors.
- Axiom port - Supports connectivity to any Attero Tech Axiom endpoint.
- RS-232 - Provides RS-232 connectivity to control systems for extending control to supported Axiom products (limited to one control enabled Axiom endpoint on the Axiom bus)
- LED indication of power status

4.1 – AXP2O – What's in the Box

The AXP2O comes supplied with the following:

- Axiom AXP2O device
- 24V AC/DC Power Supply

4.2 – USB1 – Device Installation

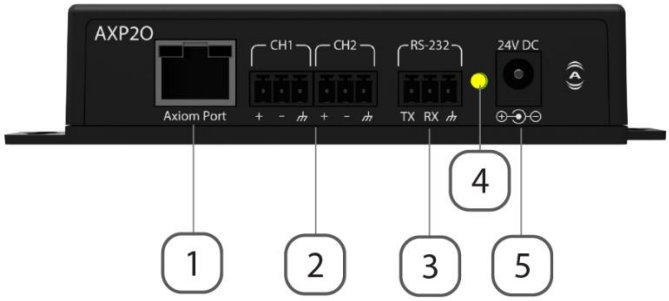

Figure 9 - Product Overview

ID	Description
1	Axiom Port
2	Balanced Audio Output Terminal Blocks
3	RS-232 Terminal Block
4	Power Status LED
5	24V DC Power Input

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4.3 – Mounting

A typical installation will involve mounting an Axiom wall plate into a pre mounted single-gang or larger wall box, standard drywall bracket or mud ring. Before starting, make sure the wall box where the Axiom device is to be installed is pre-wired with a suitable unshielded CAT5/6 cable back to the AXP2O break out box.

With the AXP2O powered off, attach the CAT cable from the Axiom port of the AXP2O to the RJ45 on the Axiom device.

Apply power by plugging in the 24V DC power supply to the DC power input on the AXP2O. The power LED on the AXP2O should illuminate green. Additionally, the Axiom wall plate should also start up and become ready to operate.

With the cable attached, carefully place the Axiom wall plate into the wall box taking care to not trap the cabling. Once fully in place, secure it with the screws provided. Once the unit is secured in the wall box, fit the Decora plate over the front of the unit and secure it with the screws provided with it. It is recommended to not over-tighten the screws that attach the included Decora wall plate to prevent cracking it.

**Note:* *CAD drawings can be downloaded from the Attero Tech website. Please contact Attero Tech for any further product related information that is not accessible on the website.*

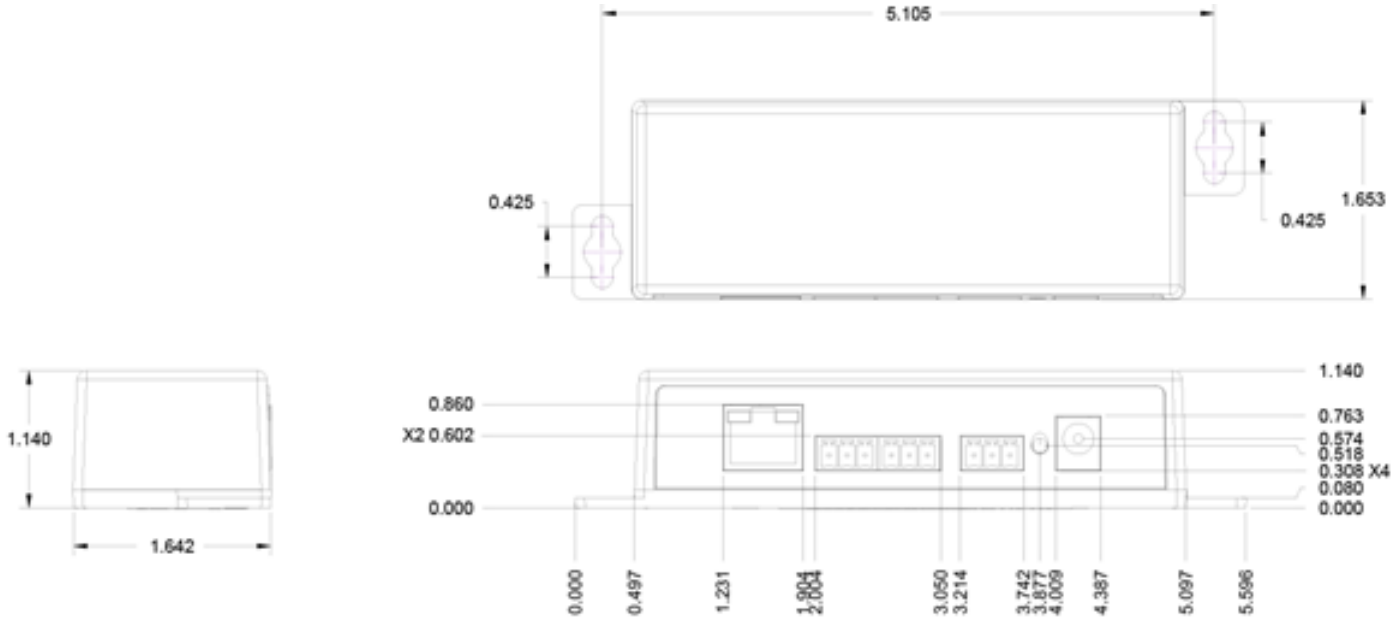

Figure 10 - AXP2O Dimensional Drawings

4.4 – Audio Connections

The AXP2O provides balanced audio outputs to external analog audio equipment. Refer to the following diagrams for connecting the outputs of the AXP2O to audio devices.

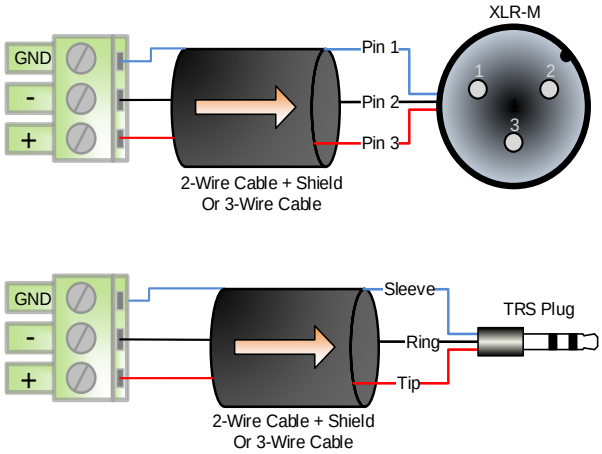

Figure 11 - AXP2O to Balanced Input Wiring Guide

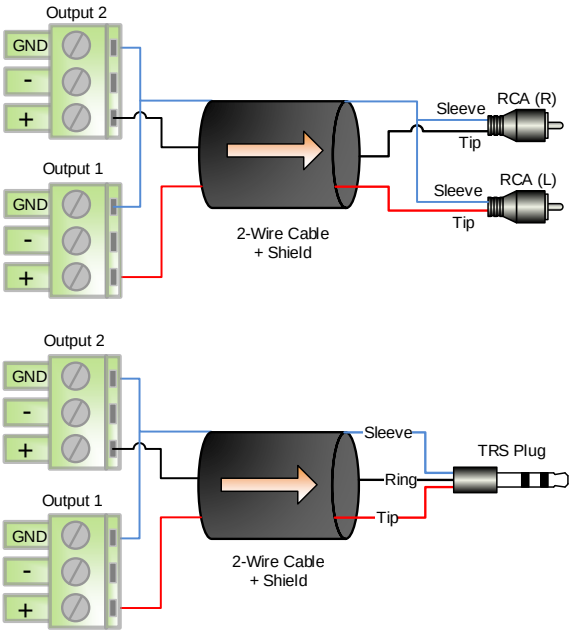

Figure 12 - AXP2O to Unbalanced Input Wiring Guide

4.5 – 3rd Party Control

The RS-232 port on the AXP2O break-out box is intended for connectivity to 3rd party control systems for extended integration of Axiom into professional AV applications.

4.6 – RS-232 Interface

The RS-232 interface on the AXP2O is a pass through interface to the Axiom port. Actual serial port settings can be found on select Axiom products that support R2-232 control integration features.

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ARCHITECTS & ENGINEERS SPECIFICATION

ML1

The single gang mount interface unit shall have two potentiometers on the front panel for gain control of the 3.5mm input and the balanced input independently.

The unit shall have a 3.5mm stereo consumer level input and a ¼"/XLR combo Mic/Line input. This input is amplified and sent to the Axiom bus. The XLR input shall be dedicated for dynamic microphone signals, while the ¼" input may be used to interface balanced line level audio sources to the Axiom bus.

The unit shall have selector switches for audio channel routing on the top of the unit.

There shall be two bi-color signal presence and level indicator LEDs on the front of the unit. One for the balanced input and one for the 3.5mm input.

The unit shall have two 8P8C RJ45 type connectors on the back side of the unit.

The unit shall support daisy chain of up to 1 other Axiom device, using 2 RJ45 (8P8C style connectors) for connectivity to CAT-X cabling.

The device shall support mounting the mounting of multiple units side by side in a multi-gang wall box or one unit in a single gang US wall box.

The unit shall be the Attero Tech Axiom ML1 product.

AXP2O

The device shall have an 8P8C connector for connectivity to Axiom bus compatible products.

Two 3-position de-pluggable terminal blocks provide balanced analog audio breakout from the Axiom port for connectivity to the balanced or unbalanced inputs of external audio equipment.

A single, 3-postion de-pluggable terminal block provides RS-232 pass through connectivity to the Axiom port

The 24VDC input provides power injection to the Axiom port/bus.

The interface shall be compliant with the RoHS directive.

The device shall be the Attero Tech Axiom AXP2O.

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Device Specifications

ML1 Specs

Audio Inputs (Mic/Line)	
Connector Type	XLR – ¼" Combo
Gain	0 to 50 dB
Input Impedance	>2kOhms at any gain (mic) >10kOhms Line
Maximum Input Levels	+20 dBu @ minimum gain (XLR) +18 dBu @ minimum gain (1/4")
THD+N	<0.05% @ 1 kHz, -3 dBFS input, 20-20kHz
Frequency Response	20-20 kHz, +/- 1 dB (1/4"), 50-20kHz +/- 1 dB (XLR)
Dynamic Range	>110 dB at minimum gain
EIN	-115 dBu
Audio Inputs (3.5 mm Line)	
Connector Type	3.5mm TRS
Gain	0 to 20 dB
Input Impedance	>10K ohms at any gain
Maximum Input Levels	+12 dBu @ minimum gain
THD+N	<0.05% @ 1 kHz, -3 dBFS input. 20-20kHz
Frequency Response	20-20 kHz, +/- 1 dB
Dynamic Range	>110 dB at minimum gain

Axiom	
Physical Layer	Analog Audio, RS-232 Control, 24V DC Power
Connector (s)	8P8C
Cable Quality	CAT-5e or better, UTP
Power Specifications	
DC Power	24V DC (center positive barrel jack)
Power Consumption	50mA @ 24V / 1.2W
Physical Dimensions	
Width	1.66"
Height	1.14"
Depth	2.35"
Weight	0.35 lbs.
Regulatory Compliance	
Certifications	WEEE RoHS REACH
Environmental Operating Specifications	
Operating Temperature	0 to 40° C

AXP2O Specs

Audio Outputs	
Connector Type	3.81mm, 3 position de-pluggable terminal blocks
Input Impedance	>2kOhms at any gain (mic) >10kOhms Line
Maximum Output Levels	+20 dBu
THD+N	<0.05% @ 1 kHz, -3 dBFS input, 20-20kHz
Frequency Response	20-20 kHz, +/- 1 dB
Dynamic Range	>100 dB
Control Port	
Connector Type	3.81mm, 3 position de-pluggable terminal blocks
Physical Layer	RS-232

Axiom Port	
Physical Layer	Analog Audio, RS-232 Control, 24V DC Power
Connector (s)	8P8C
Cable Quality	CAT-5e or better, UTP
Power Specifications	
DC Power	24V DC (center positive barrel jack)
Power Consumption	<30mA @ 24V / 0.72 W
Physical Dimensions	
Width	5.6"
Height	4.2"
Depth	1.66"
Weight	0.15 lbs.
Regulatory Compliance	
Certifications	WEEE RoHS REACH
Environmental Operating Specifications	
Operating Temperature	0 to 40° C

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