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AI-Delta Technical User Guide

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Product Name: AI-Delta

AI-Delta Technical User Guide

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ASTi

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Revision history

Date	Revision	Version	Comments
12/8/2017	A	0	Initial baseline version.
4/5/2018	B	0	Added "Ports, protocols, and services" and "Environmental ranges."
5/11/2018	C	0	Added "Status indicator lights."

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1.0 ASTi Interface - Delta (AI-Delta)

The ASTi Interface – Delta (AI-Delta) is a compact audio and I/O distribution device that connects local or remote operator headsets, speakers, control panels, and other peripherals to the network via Ethernet. The ASTi server routes audio, control, and I/O data to and from each AI-Delta over a local area network (LAN) or wide area network (WAN). Depending on the user's or program's needs, the AI-Delta can connect to a variety of endpoints:

- Live radios
- Press-to-talk (PTT) devices and headsets
- Microphones
- Powered speakers

The following figure shows an example of an AI-Delta network configuration:

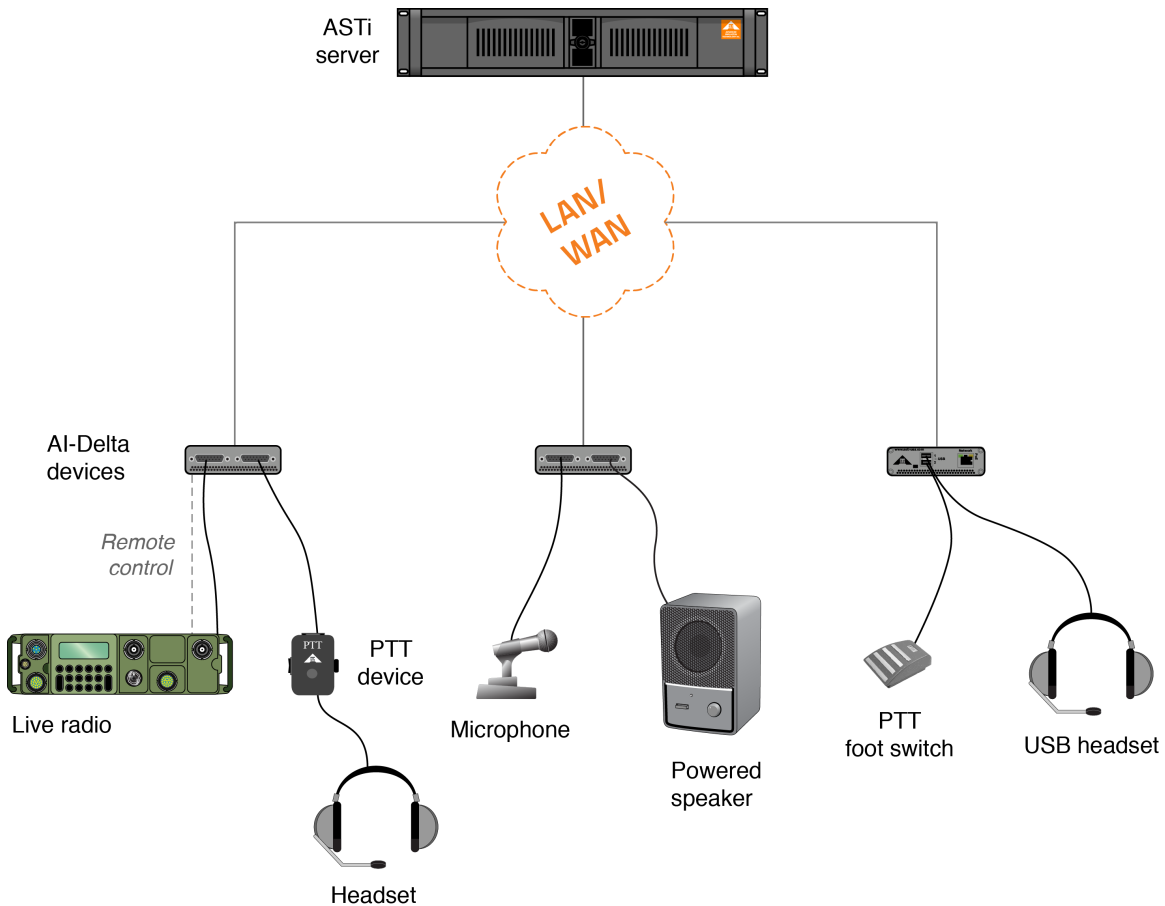


Figure 1: AI-Delta hardware diagram

The AI-Delta includes the following features:

- *Stereo support*: supports stereo operation (i.e., independent left and right output) on a single connector, reducing cabling complexity.
- *Reduced footprint*: takes up little space and fits easily on a desktop.
- *Software-configurable*: includes adjustable preamplifier gains and sidetone for easy, direct connection to a variety of audio or communications systems and peripherals.
- *Routable*: supports IPv4 and IPv6 LAN and WAN topologies.
- *Integrated I/O*: includes configurable digital and analog I/O for direct connection of PTT units, volume controls, switch detection, radio PTT activation, and other control applications.
- *Dual USB ports*: provides ability to connect USB peripherals based on need (e.g., USB headset and foot switch).

2.0 Specifications

The AI-Delta has the following specifications:

Compatible With	Voisus
Weight	A packaged AI-Delta weighs 14 oz.
Power Source	Ethernet port via Power over Ethernet (PoE) IEEE 802.3af
Power Consumption	<12.5 w @ 56 VDC
Mean Time Between Failure (MTBF)	32,552.67 hours (COTS) 27,150.44 hours (MIL)

Figure 2: AI-Delta specifications

On the front panel, the AI-Delta has two DB-15 connectors:

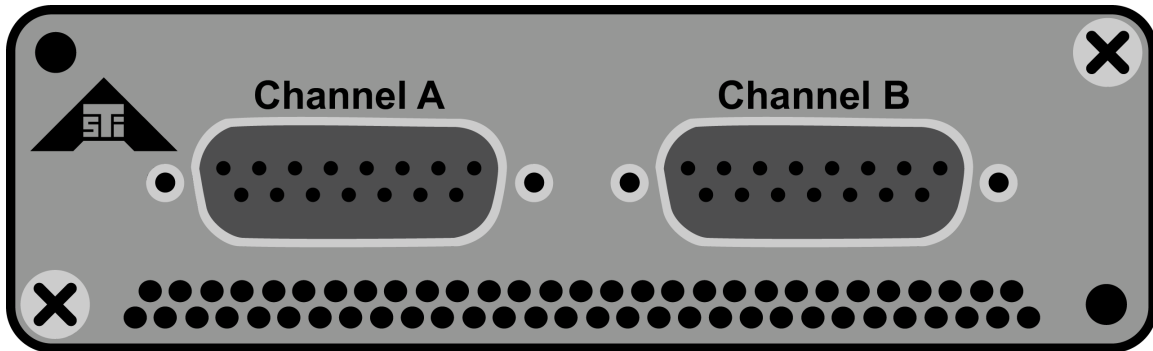


Figure 3: AI-Delta front panel

On the rear panel, the AI-Delta has two USB ports and a Power over Ethernet (PoE) port:

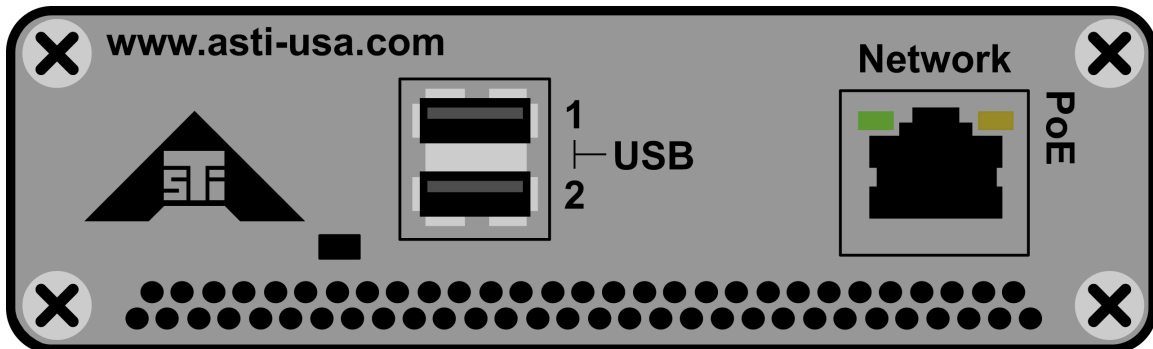


Figure 4: AI-Delta rear panel

The AI-Delta's dimensions are 6.56" L × 4.18" W × 1.33" H, as shown below:

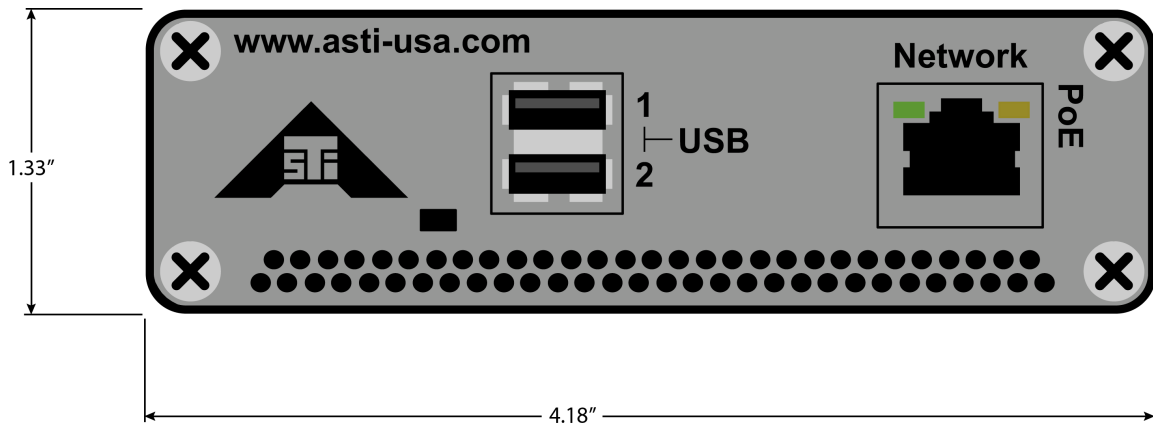


Figure 5: AI-Delta dimensions

3.0 Audio input and output

The AI-Delta supports two types of audio I/O:

- 2 USB ports
- 2 DB-15 connectors

The following table shows the DB-15 connector's audio input values:

Characteristic	Value
Input impedance	1.65 k Ω
Input level	4.5 Vpp max (2.2 Vpp differential)
Input gain	0 dB, +10 dB to +65 dB, software configurable (go to note below)

Table 1: DB-15 audio input values



Note: The AI-Delta gain covers a total range of 65 dB. You can set the range of 10–65 dB in 1 dB steps; however, you cannot select the range of 1–9 dB as a function of design.

The following table shows the DB-15 connector's audio output values:

Characteristic	Value
Impedance	10 Ω
Max. power	150 mW at 32 Ω
Max. output signal	3.75 Vpp at 150 Ω 2.4 Vpp at 8 Ω
Frequency response	20 Hz to 20 kHz

Table 2: DB-15 audio output values

3.1 Audio interface pinout

The following figure shows the DB-15 connector pinout for the AI-Delta:

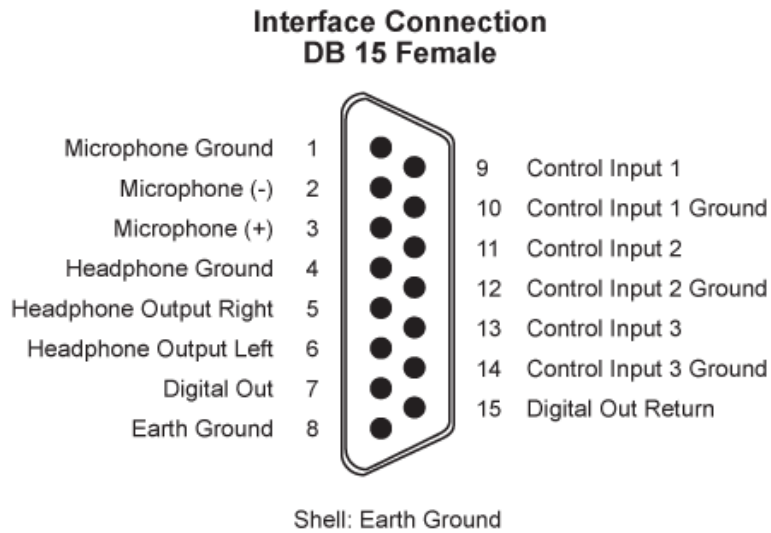


Figure 6: DB-15 connector pinout diagram

3.2 Status indicator lights

The AI-Delta LED indicator light displays AI-Delta status:

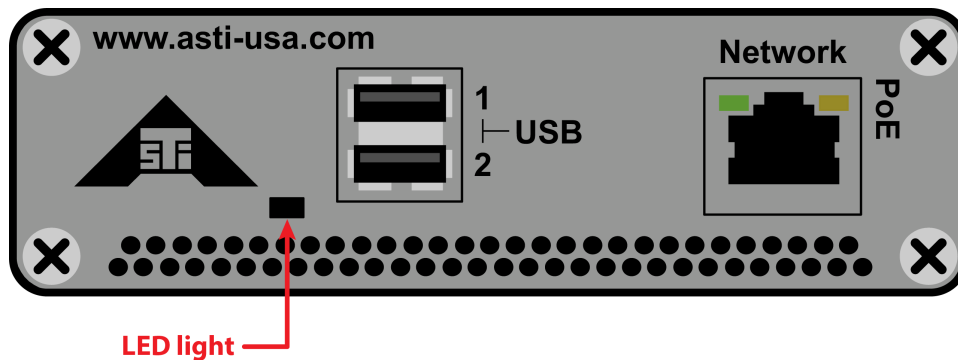


Figure 7: AI-Delta status indicator lights

The following table defines each status indicator light for the AI-Delta:

LED Light	Status
White	Power on.
Solid red	Hardware Error #1: Remove and reapply power.
Red blink every 500 ms	Hardware Error #2: Remove and reapply power.
Solid teal	Firmware Error #1: Remove and reapply power.
Solid blue	No network connection/link down.
Blue blink every 200 ms	The device cannot detect any active Voisus servers.
Green blink every 500 ms	Normal state and in use by an active Voisus scenario.
Yellow blink every 200 ms	A firmware update is being uploaded to the device.
Yellow blink every 100 ms	A firmware update is being applied. Do not power off the device.
Purple every 200 ms	A "Find Me" LED state to help identify the device.
Off	Firmware Error #2: Remove and reapply power.

Table 3: AI-Delta status indicator lights

4.0 Control inputs and digital outputs

The AI-Delta's two USB connectors and DB-15 connectors also function as control inputs. The following sections describe the AI-Delta's control inputs and digital outputs, explaining how to use the control input as a digital input or analog output.

4.1 Control inputs

The control inputs are contact-sensing; no voltage is required. Simply connect the control input and control input ground lines together using a switch or other suitable device, such as a press-to-talk (PTT) device. The control input can logically function as either a digital or an analog input.

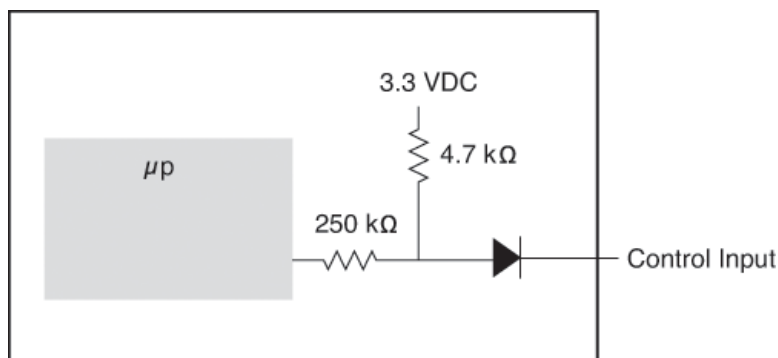


Figure 8: Control input circuitry

4.1.1 Control input as digital input

To use the control input as a digital input, simply short or open the required pins. For example, if you short Pins 9 and 10, Control Input 1 is True. If the pins are open, Control Input 1 is False. In this example, the control input acts like an on and off switch.

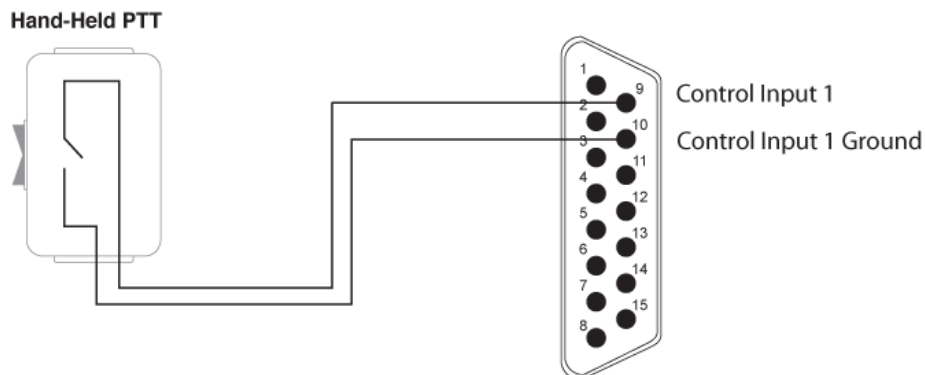


Figure 9: Digital In

4.1.2 Control input as analog input

To use the control input as an analog input, insert a resistance between the control input and control input ground pins. The four-channel selector knob, for example, contains a switch that changes the resistance between the control input and control input ground pins.

Four-channel selector knob

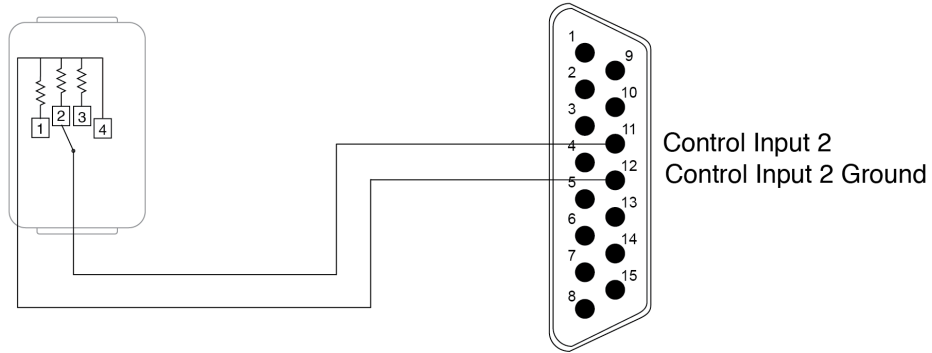


Figure 10: Analog In

4.2 Digital output

The digital output circuitry consists of an opto-isolated, solid-state relay for switching power to external loads. The following table summarizes the AI-Delta's digital output opto-isolated field effect transistor (FET) values:

Type	Opto-isolated FET
Maximum continuous current rating	120 mA
Maximum power dissipation	300 mW

Table 4: Digital output rating and dissipation

The following figure shows the AI-Delta's digital output circuitry:

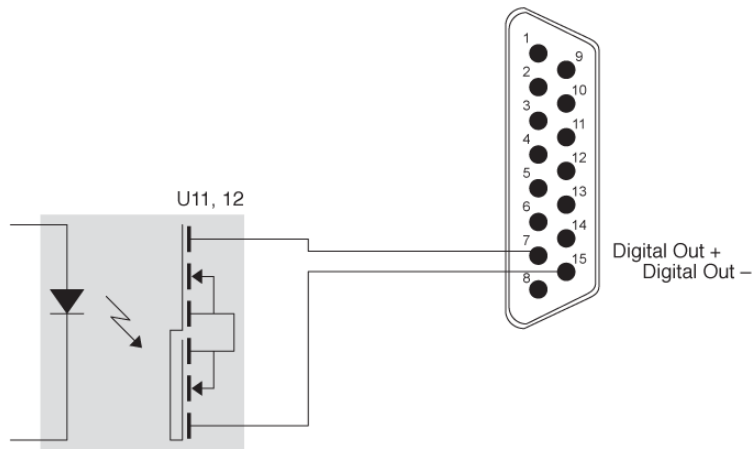


Figure 11: Digital output circuitry

5.0 Ports, protocols, and services

The AI-Delta requires the following ports, protocols, and services:

Port	Protocol	Service
8000	TCP	HTTPS server for device configuration
68	UDP	DHCP client port (bootpc)
9990	UDP	Device detection multicast port
63001	UDP	Voisnet control packets port
63002	UDP	Voisnet audio packets port

Table 5: AI-Delta ports, protocols, and services

6.0 Memory devices

The following table summarizes AI-Delta devices with volatile and non-volatile memory. Volatile memory is erased when you unplug the device, while non-volatile memory is retained.

Type	Size	User Modifiable	Function	Process to Clear
Volatile				
CPU internal cache	512 KB	No	Internal cache for CPU	Remove Power Count to 30 Restore Power
Internal cache	128 KB	No	Internal cache	Remove Power Count to 30 Restore Power
RAM	1 GB	No	RAM	Remove Power Count to 30 Restore Power
Non-Volatile				
eMMC	4 GB	Yes	Application	Contact ASTi for more information.

Table 6: AI-Delta memory

7.0 Environmental ranges

The following table summarizes the AI-Delta's environmental ranges:

Range Type	Suggested Range
Operating temperature	0°C to +32°C (32°F to 90°F)
Operating max. temperature gradient	20°C (68°F) per hour
Operating humidity	10–70 percent non-condensing
Storage temperature	-10°C to 55°C (14°F to 135°F)
Storage max temperature gradient	30°C (86°F) per hour
Storage humidity	5–95 percent
Max altitude	2000 meters

Table 7: AI-Delta environmental ranges

8.0 Typical headset settings

The AI-Delta supports a mono or stereo headset connection for the DB-15 connector. The following figure shows a typical mono headset connection for the AI-Delta:

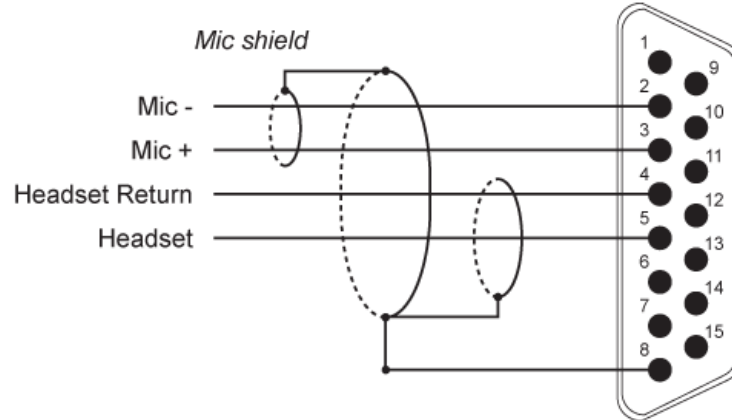


Figure 12: DB-15 mono headset connection

The following figure shows a typical stereo headset connection for the AI-Delta:

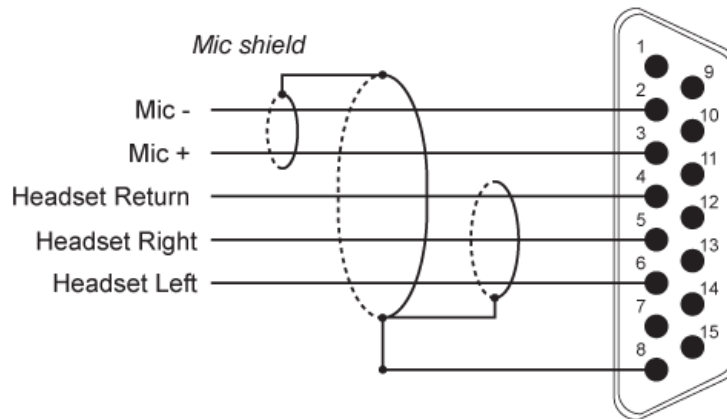


Figure 13: DB-15 stereo headset connection

Appendix A: Warranty information

ASTi covers the equipment by warranty for one year following purchase. For equipment upgrades, the warranty applies to the upgraded component's original shipment date. Unless otherwise stated, ASTi also covers other provided or purchased commercial equipment (e.g., monitors, amplifiers, speakers, and fiber optic links).

The warranty does not cover improper equipment handling or improperly packaged returns. Extended warranties are available. Contact ASTi for details at (703) 471-2104.



***Caution:** This device does not contain any user-serviceable components. Opening equipment (e.g., a chassis) voids the warranty. ASTi does not support board-level repair; therefore, fuses are not user-replaceable.*

A-1 Repairs and returns

To return equipment to ASTi, observe the following procedures:

1. Request a Return Material Authorization (RMA) number through the form on the RMA User Account at <https://rma.asti-usa.com/rma>. ASTi's Production department cannot receive a repair without an RMA number. The shipping label must also include the RMA number. Any items received from customers without RMA numbers or appropriate contact information will not be tested. After 60 days, ASTi reserves the right to scrap all hardware received in this condition.
2. When packaging the equipment in question, make sure it is well-protected. Failure to properly package the equipment during shipping could void the warranty.
 - a. Always double-box the device.
 - b. The inner container should employ some semi-rigid, contour-fitting foam, while the exterior container should use a more pliant, shock-absorbing material, such as styro-foam peanuts.
 - c. To prevent possible Electrostatic Discharge (ESD) damage, properly enclose the device in an antistatic bag.
3. Do not send accessory pieces, such as rack mount kits, power supplies, or software. Only include items that do not work.

4. Describe the problem, noting the following information:
 - Serial number for the unit in question
 - Point of contact information (i.e., name, telephone number, and equipment return address)

Failure to include this information could extensively delay the return of equipment.

5. If you are an international customer, include the correct product value on all shipping documents. For proper harmonized tariff codes, contact ASTi. The customer is responsible for duties, taxes, and fees incurred during shipment.

ASTi evaluates equipment free of charge and does not begin work without prior customer approval.

The customer is responsible for shipping charges to ASTi for warranty and non-warranty repairs. If equipment is not under warranty, a purchase order is required to cover any repairs. ASTi will provide a quote for all non-warranty items, including return shipping. The customer is responsible for return shipping charges on non-warranty equipment. ASTi ships equipment still under warranty back to the customer via FedEx, unless otherwise directed. ASTi is responsible for return shipping charges on domestic items under warranty.

If ASTi does not receive the equipment 30 days after the RMA was issued, ASTi closes the RMA and designates it as unused.