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ASTi
Iris Audio Interface Module
Technical & User Guide

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Advanced Simulation Technology inc. 500A Huntmar Park Drive, Herndon, Virginia, 20170 USA
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Product Name: Iris

ASTi Iris Audio Interface Module Technical & User Guide

ASTi

500A Huntmar Park Drive

Herndon, VA 20170

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Iris General Information

Description

The Iris module is the audio and input/output (I/O) unit for ASTi's Telestra platform. Iris permits installation close to operator positions, and takes advantage of digital audio and I/O distribution to reduce noise and cross-talk susceptibility. This unit may be connected to ASTi's Axis, Prism (2-channel version), and Spectrum hardware, or daisy-chained from another Iris*.

See the Appendices for additional 2, 4 and 6-Channel Iris extended and local options.

* Not supported in all configurations.

Features

- Two (2) independent, software-configurable audio inputs and outputs (1 per channel)
- Six (6) Digital Inputs (3 per channel)
- Two (2) Digital Outputs (1 per channel)
- Two (2) RS-422 serial ports
- Two (2) ASTi USB connections
- +15 VDC required

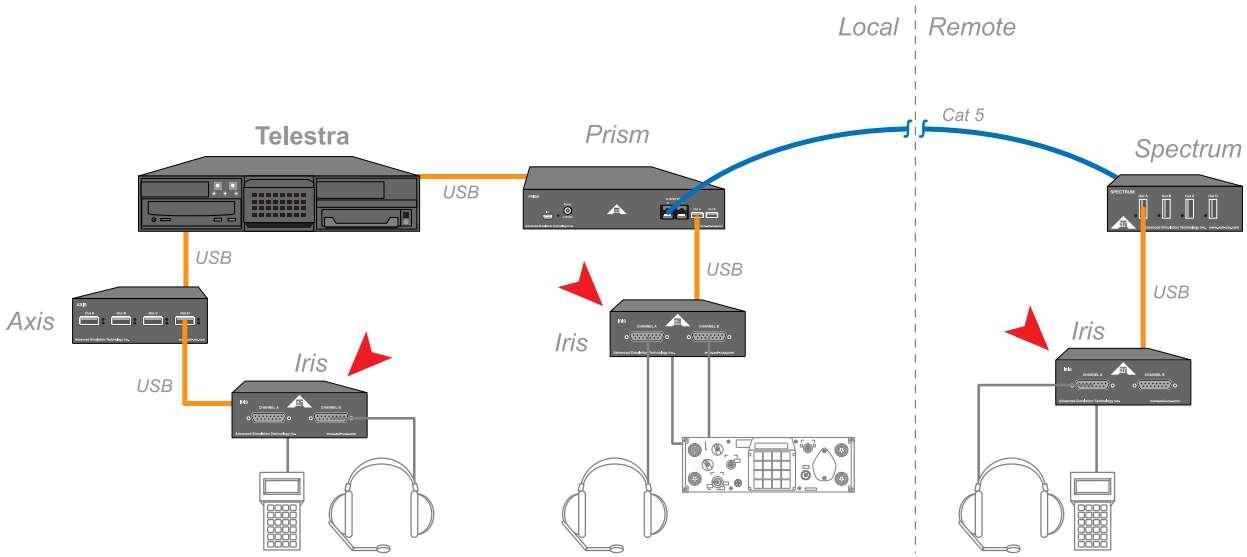

Figure 1: Telestra Hardware Connection and Functionality Diagram

Physical Specifications

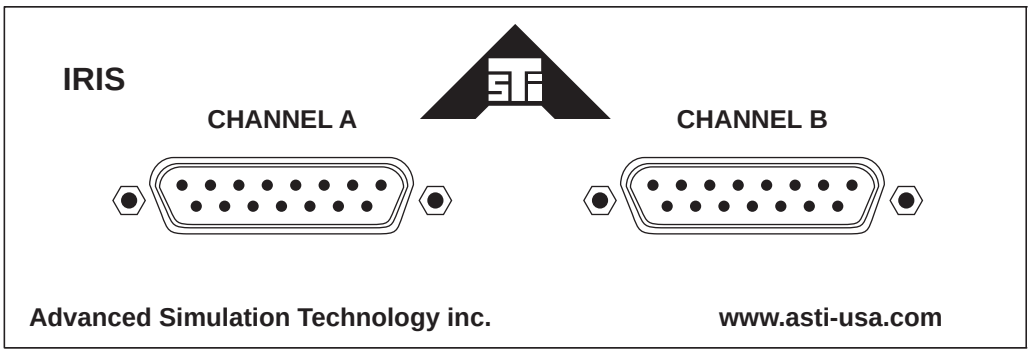

Figure 2: Iris Front Panel

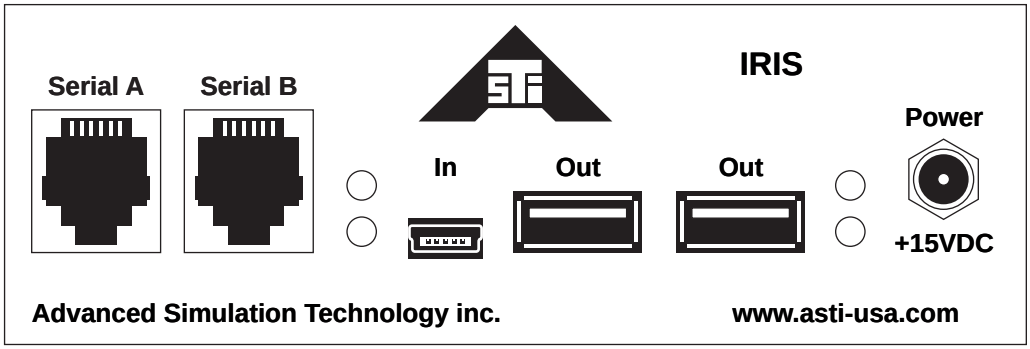

Figure 3: Iris Rear Panel

Dimensions

5.50” wide x 1.53” high x 6.01” deep

Allow at least 2” or more of space to the front and rear of module for cable access and clearance.

For detailed dimensions, refer to drawing CDHW-AU-001.

Weight

Iris only: 1.75 lbs.

Iris with power supply: 2.5 lbs.

Interface Connectors

Audio Interface Pinout

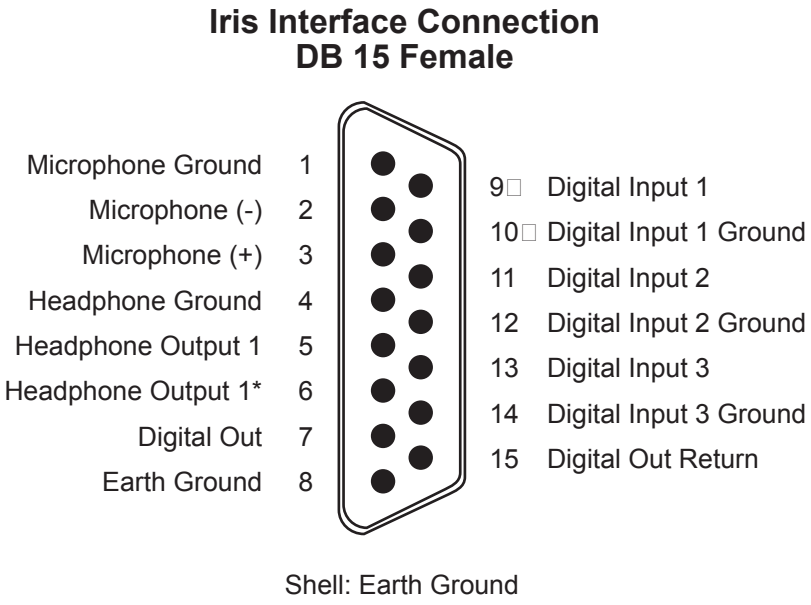

Figure 4: Iris DB-15 (F) Connector Pinout Diagram

* Pins 5 and 6 are usually tied together, as shown in Figures 9 and 10 of this document.

Serial Port Connection

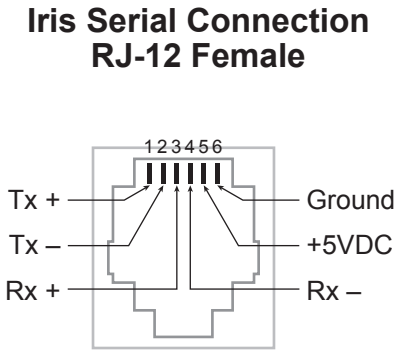

Figure 5: Iris RJ-12 (F) Serial Connector Pinout Diagram

Note: 6-Channel Irises do not have serial port connection (see Addendum).

Module and Cabling Requirements

Power Requirements

Input to PSL-UM-001	100-240 VAC, 50-60 Hz, 1.5Arms (120VAC), 0.75Arms (240VAC)	
Power connector	Inside Diameter 0.100", Outside Diameter 0.218", bushing 0.219”, locking, center positive	
	Connector Part #	Switchcraft 712RA supplied with P2439 Hex Nut (5/16-32) and P2441 Washer
	Mating Connector Part #	Switchcraft 760k
Power consumption (of Iris, Spectrum, Axis, Prism)	15 VDC, 800 mA	

The Iris module can be powered by an individual power supply (included at shipment), or by ASTi's Power Distribution Module (sold separately).

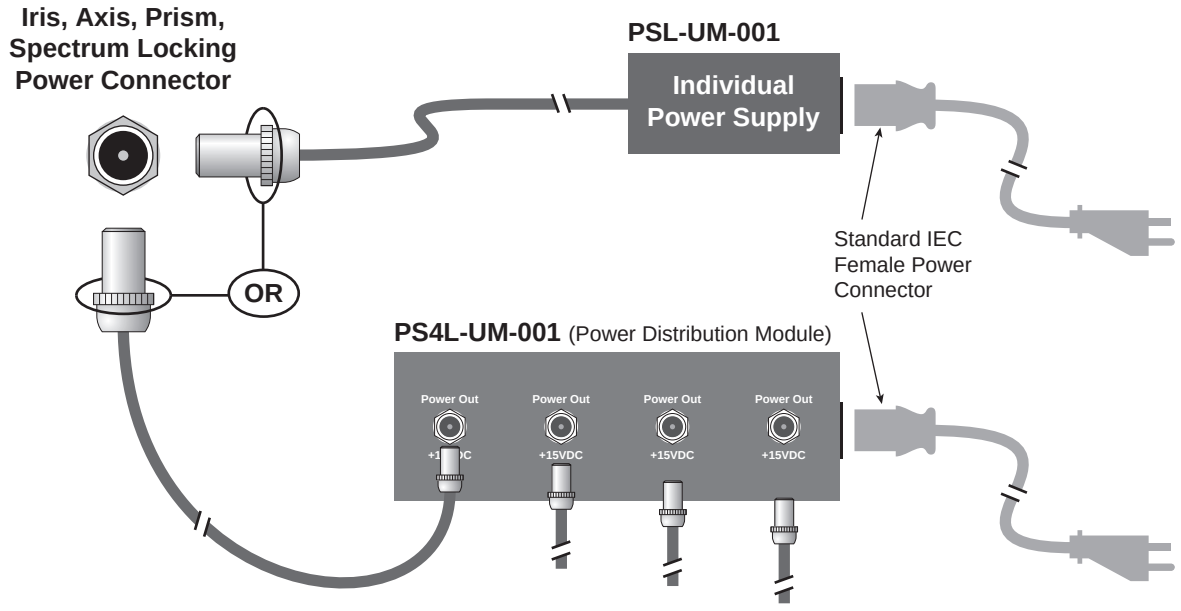

Figure 6: Iris Power Supply Options

The power adapter inlet connector is an IEC320 type C14 or C8, requiring a matching cordset equipped with an IEC320 C13 or C7 connector (female line cord). Country-specific power connectors must be acquired separately for international use.

Other types of power supplies may be used, given that the power output is 15 VDC, 800mA, with the properly fitting power connector.

Grounding

Connect earth ground to pin 8 of Channel A or Channel B (female DB-15 connectors). Earth ground should be as short as possible. Pin 8 of Channels A and B are tied to the Iris chassis.

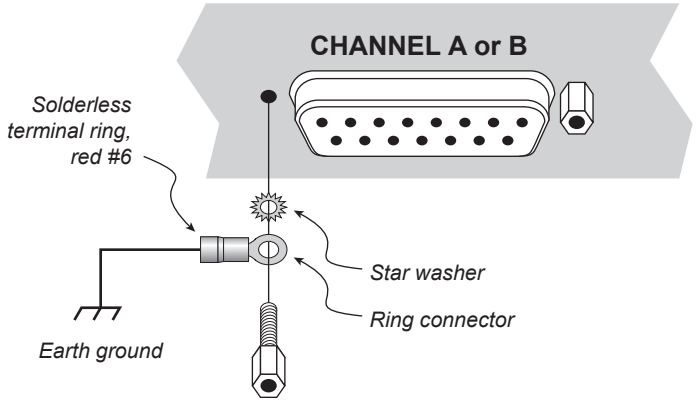

Figure 7: Attaching Earth Ground Wire to Iris Chassis

1. Remove jackscrew.
2. Slip ring connector over threaded end of jackscrew, followed by star washer.
3. Put small amount of Loctite™ on end of jackscrew and carefully thread back into screw hole on Iris chassis. ***Caution: Do not crossthread or over-tighten jackscrew when reattaching***.
4. The ground wire attached to the ring connector should be as short as possible.

Proper grounding and shielding are the keys to keeping unwanted signals separate from intended signals. The two most important factors of good shielding are conductivity and continuity/connectivity. By following a few basic guidelines, electro-mechanical (EMI) and radio frequency (RFI) interference can be minimized, especially over longer cable runs.

Conductivity of a shield is characterized by its ability to transfer signals which have been induced upon it. High conductivity, as found with copper shielding, allows for good transfer of unwanted signals to ground.

The second characteristic of good shielding is continuity/connectivity. In order to perform properly, a shield must completely enclose the signal carrying conductors. Compromises to the structural integrity of a shield can lead to holes or breaks which will allow interfering signals to reach the main conductors. Connectivity is also related to continuity; a cable's shield must make good contact with the chassis of the terminating equipment. A shield must make one continuous connection across all equipment and cables in order to provide a pathway to ground.

The D-Sub connectors on ASTi interface electronics have a dedicated pin, which is directly tied to the chassis ground. Cable connections (to headphones, power amplifiers, etc.) should have their shields tied directly to the chassis ground pin. By doing this, any extraneous signal, EMI and RFI, will be properly shunted to the ground.

If you are at all unsure of the correct grounding arrangement for a specific installation please contact ASTi support (support@asti-usa.com) for advice. If possible, include a full description of the installation and equipment involved, and attach any relevant cable drawings/installation schematics (PDF format preferred).

Temperature & Humidity Ranges

Operating temperature range	+10°C to +40°C (50°F to 104°F)
Operating max. temperature gradient	20°C (68°F) per hour
Operating humidity range	10% to 90% non-condensing
Storage temperature range	-10°C to +70°C (14°F to 158°F)
Storage max. temperature gradient	30°C (86°F) per hour
Storage humidity range	5% to 95%

Power-On Ordering Requirements and Lost USB Devices

The USB audio distribution architecture has specific requirements regarding the power on sequencing of devices in order to achieve a working system. The Telestra processor system must perform a discovery process in order to find all the devices that are connected, and hence this system is started last in the sequence of elements. The discovery process runs as part of the system framework boot process, or it is manually initiated from RMS, by clicking the “Hardware” tab, and then the “Reset USB network” link. Prior to this all other elements of the USB sub-system must be connected, and powered on. **Note** that the Prism/Spectrum extender architecture should be powered on before or simultaneously with the Iris audio interface units.

If any element of the USB sub-system is powered off and then back on again without rebooting the Telestra processor, or initiating a manual USB discovery, then the result will be that those devices are “lost” to the system, and will no longer process audio. The most effective way to check for this condition is to look at the RMS system, select the “Hardware” tab, and then the “Layout” tab. Any Iris units that were connected at the time of system boot and have been subsequently powered off will show up with a red ‘X’ through the device. If profiling is turned on (see Telestra 3 User Guide for details), then any device that is not active on the USB sub-system will be reported with a red ‘X’. To recover from this situation, power on the required USB devices (Prism devices first, Iris devices last), and then either reboot the Telestra, or initiate a manual USB re-discovery using RMS. If using RMS, once the re-discovery process has completed, it will be necessary to reload the model.

Installation USB Cabling & USB Ports

For complete information on connecting Telestra USB devices, see the “Telestra USB Device Connections Matrix” document (ASSY-01-UMCX-IN-1).

Note: Due to the nature of the USB extension, the Iris must be powered on after the Prism.

Iris Indicator LEDs

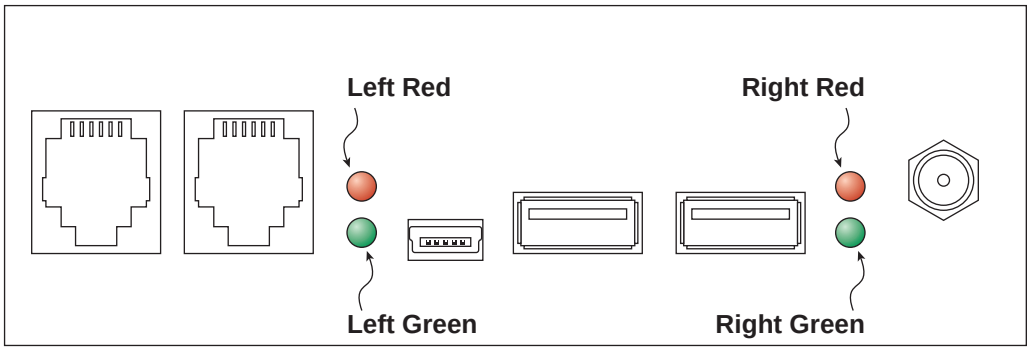

Figure 8: Iris Rear Panel Indicator Lights

Left Red LED	**Left Green LED**	**Right Red LED**	**Right Green LED**
Blinks fast with Left Green LED when unit is being detected by Telestra, or when Iris application code is being downloaded. This LED is normally OFF during operation.	Blinks slowly while unit is in operation. Steady ON if unit is powered, but not operating. Fast blink when downloading application code.	Lit when the unit is attached to and detected by Telestra software. Off when not detected by Telestra software or improper/no connection between Iris and upstream hub device.	Indicates power is applied to the Iris. Off when insufficient/no power is present.

Typical Headset Connections

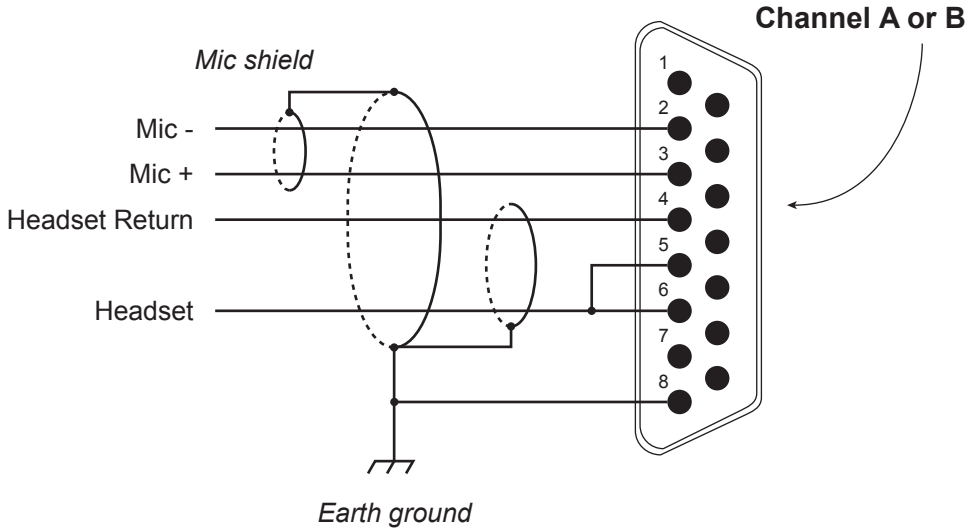

Figure 9: Typical Mono Headset Connection

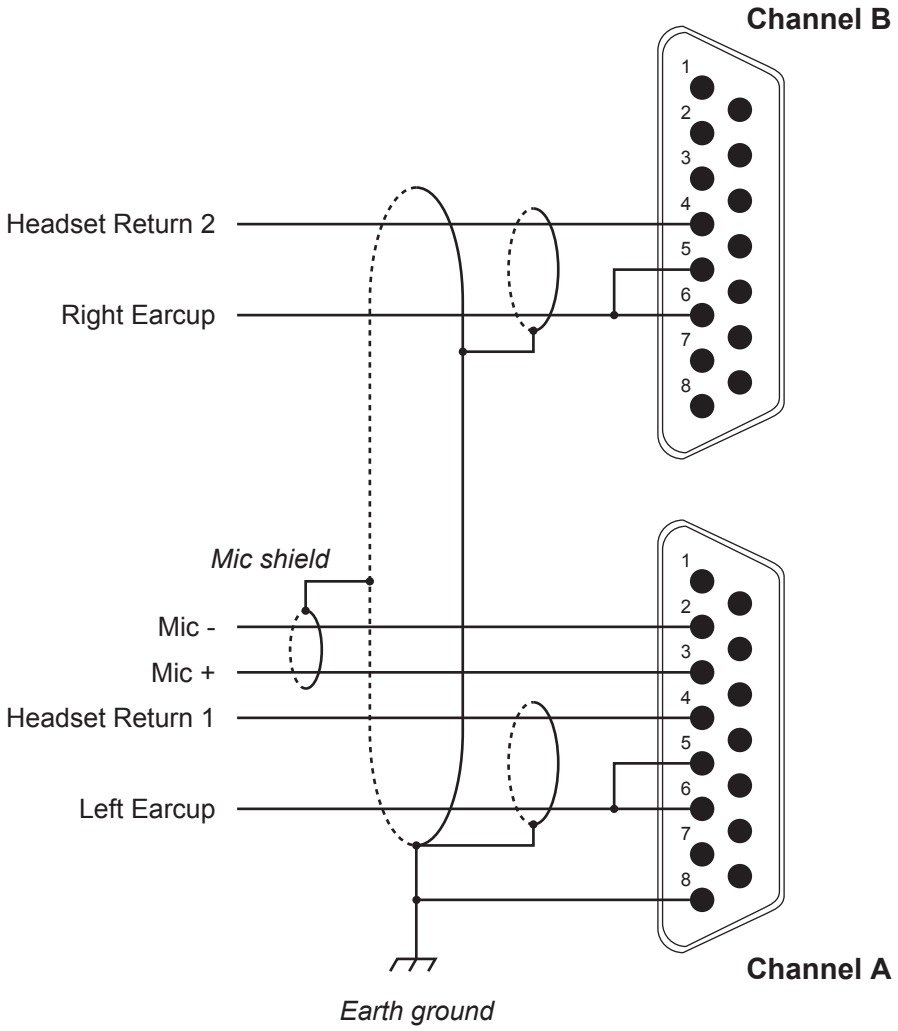

Figure 10: Typical Stereo Headset Connection

Audio Input

Characteristic	Line Mode	Microphone Mode
Input Impedance	32 kOhms	1.5 kOhms
Input Level	+/– 2.25 Vp-p max at 0dB gain	+/– 2.2 Vp-p max at 0 dB gain
Input Gain	–20 to +20 dB software configurable	0 to +52 dB software configurable
Microphone Power for Condenser Microphones	n/a	Selectable T-Power at 13.8 VDC, current limited with 3.24 kOhms. Software enabled/disabled
Total Harmonic Distortion (THD) + noise	0.0456% from 20 Hz to 20 kHz input Typical: 0.040% at 1 kHz	0.064% from 20 Hz to 20 kHz Typical: –0.048% at 1kHz
Frequency Response	+/– 3 dBv from 20 Hz to 20 kHz Typical = 0.4 dBv at 20 Hz, –2.7 dBv at 20 kHz	+/– 3.5 dBv from 20 Hz to 20 kHz Typical = +/– 3.5dBv from 20 Hz to 20 kHz
Common mode rejection	–78 dBv at 60 Hz, –56.4 dBv at 20 kHz	59 dBv at 60 Hz, –46 dBv at 20 kHz
Noise at unity gain	–96 dBv	–67 dBv
Working Signal to Noise ratio at 20 dB headroom	89 dBv	60 dBv

WARNING! Do not plug a microphone requiring phantom power into an active T-power circuit, this will cause damage to the microphone! If you are unsure of the difference between T-power and phantom power, please contact the microphone manufacturer or ASTi before connecting equipment. Note: Most military headsets use T-power.

Electret Microphones

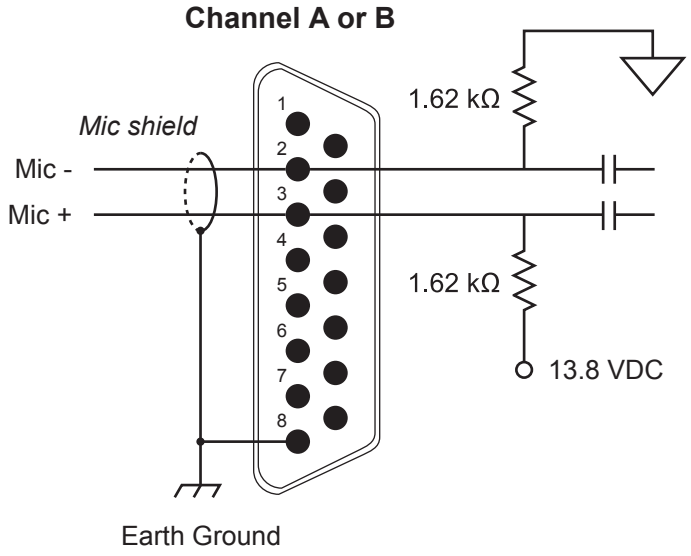

Figure 11: T-Power Circuit for Electret Microphones

T-Power is selectable in software (see warning above). Input may be selected between line mode and microphone mode in software.

Audio Output

Output Impedance	12 Ohms
Output Current	0.2125 A at 8 Ohms
Output Level	1.7 VAC rms into 8 Ohms
Output Power	1 lead: 0.36 W 2 leads: 0.5 W
Frequency Response	+/– 3dB from 20 Hz to 20 kHz
Total Harmonic Distortion THD + noise	< 0.07%

Audio Isolation Characteristics

Between	Isolation	Frequency Range
Headphone output channels	90 dBv	20 Hz to 20 kHz
Line 1 input to Line 2 input	99 dBv	20 Hz to 20 kHz
Mic 1 input to Mic 2 input	94 dBv	20 Hz to 20 kHz

Digital Input

The digital inputs are contact sensing; no voltage is required. þSimply connect the digital input + and digital input ground lines together using a switch or other suitable device, such as a PTT.

Digital Output

The digital output circuitry consists of an opto-isolated, solid-state relay for switching power to external loads.

Type	Opto-isolated FET
Maximum Continuous Current Rating	120 mA
Maximum Power Dissipation	180 mW
Maximum Frequency Response	500 Hz

Memory Devices

- Non-volatile ROM and EEPROM
- Microcontroller internal RAM

Mounting Options

- Flush mounting to a flat surface is possible.þRefer to the full sized template below.

  The three hole pattern on the mounting plate is compatible with NS-35 DIN rail mounting hardware adapter (sold separately).

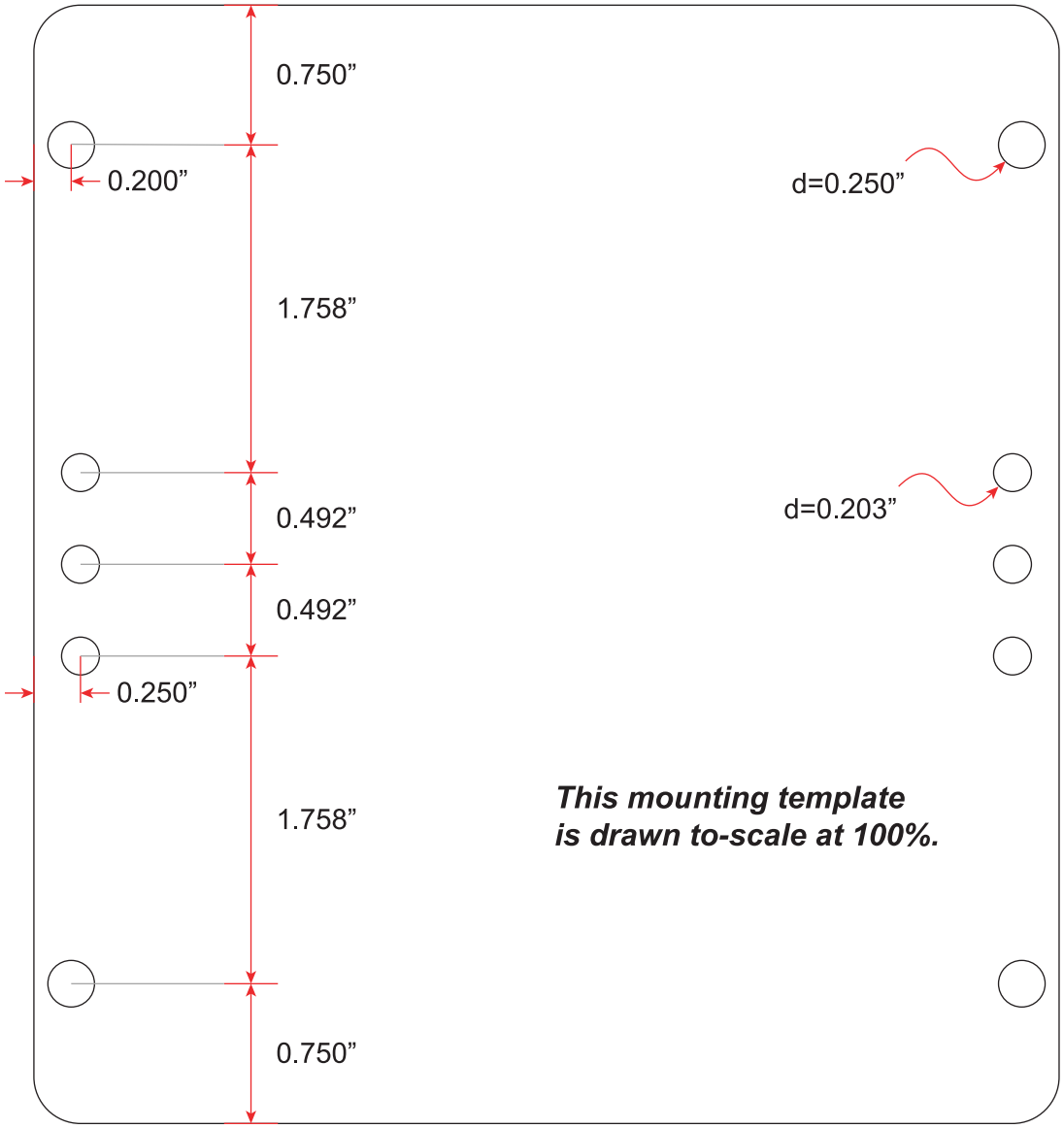

Figure 12: Iris Mounting Template

- 1U 19” shelf rack mount kit (for up to 3 units), ASTi part number RMK-UM-001.

Troubleshooting

All USB devices require ASTi cable "CA-UA-UMB-X", where X stands for length, for correct operation. For more information on connections refer to “Telestra USB Device Connections Matrix” document (ASSY-01-UMCX-IN-1).

***Symptom*:** All LEDs on IRIS are off.

Possible Cause:

1. The Iris is not receiving power from the power adapter.

Remedy:

1. Ensure that the power adapter is connected to the Iris.
2. Check that the power adapter is connected to a live source of power.

***Symptom*:** Both left and right green LEDs are on, but right and left red LEDs are off.

Possible Cause:

1. There is no connection or the connection is improper between the Iris and the upstream hub device.
2. Iris device has not been detected by software on Telestra.

Remedy:

1. Ensure that a USB cable is connected from the Iris to a Spectrum or Axis and the Iris must be powered on after the Prism.
2. Reset all devices in software.
3. Restart the Telestra.

***Symptom*:** Left Green LED is OFF while Iris is powered on.

Possible Cause:

1. Boot code is not programmed.
2. Boot code is corrupted.

Remedy:

1. Remove power and all cables from Iris device.
2. Reattach power cable only.
3. If only right green LED (power) is lit, the Iris device should be returned to ASTi for reprogramming.
4. If both green LEDs light, substitute the USB cables connected to the Iris device.

***Symptom*:** An Iris is connected (daisy-chained) to the USB Out port of another Iris, and the daisy-chained Iris has failed.

Possible Cause:

1. The Telestra software is not running.
2. There is an unsupported connection sequence.
3. The daisy-chained Iris device is faulty.

Remedy:

1. Ensure that the model is running, and that the second Iris has been detected. If not, reset all USB devices in software.
2. Ensure that the parent Iris device is connected to an Axis module. Daisy-chaining Iris modules is not supported downstream from a Spectrum module.
3. Connect the suspect Iris device to a different Iris, Axis, Prism or Spectrum and reset all USB devices in software. If the suspect Iris is detected, replace the cable between the original two Iris devices.
4. If changing the inter-Iris cabling does not resolve the issue, connect the daisy-chained Iris to the other USB Out port of the parent Iris device, and reset all USB hardware.

***Symptom*:** The Iris devices are taking a long time to be detected in software, or the two left LEDs are blinking rapidly when starting the Telestra system.

Possible Cause:

1. The Iris firmware is being updated; this is part of standard operating procedure.

Remedy:

1. None; it is normal for an Iris to have its firmware updated periodically.

***Symptom*:** The Iris device is reporting a serial number of "None."

Possible Cause:

1. Possibly bad cable or interference

Remedy:

1. Replace the USB cable to the Prism, Axis, or 6-Channel Iris with a shorter USB cable.

Warranty Information

The equipment is warranted for a period of one (1) year following purchase.

Repairs and Returns

If it becomes necessary to return equipment to ASTi please observe the following instructions:

1. Obtain an RMA number through ASTi's website: http://www.asti-usa.com/support/
2. When packaging the equipment in question, make sure it is well protected. The device should be properly enclosed in an antistatic bag to prevent possible ESD damage. Failure to properly package the equipment during shipping could void the warranty.
3. Do not include accessory pieces such as rack mount kits, power supplies or software. þOnly send items that do not work.
4. The shipping label must include the RMA number.
5. Include a description of the problem, point of contact, phone number, return address and unit serial number(s). Failure to include this information could extensively delay the return of the equipment.
6. If an RMA number is not used within sixty (60) days of issuing date, the request data and number issued will be closed and designated as unused.
7. Any items received from customers without RMA numbers or appropriate contact information included with shipment will not be tested. After sixty (60) days, ASTi reserves the right to scrap all hardware received in this condition.
8. If the equipment is not under warranty a Purchase Order will be required to cover the cost of any repairs. ASTi will provide a quote for all non-warranty repair items.
9. Equipment will be shipped back using Federal Express, unless otherwise directed. If the repair is non-warranty then shipping charges will be billed.

Disclaimer and Warnings

- The Iris is a sound production device. The user, by the act of installing and using the Iris and any associated equipment such as headsets and speakers, warrants and represents that he/she is aware that excessive audio levels can cause permanent hearing impairment; and he/she assumes all responsibility for configuring all equipment, including hardware and software, to achieve safe operating sound pressure levels under all conditions.
- Connect only ASTi-approved devices to the USB ports. Attempted use of non-ASTi USB devices may result in equipment damage.
- Do not use commercial extender cables with ASTi USB devices.
- There are NO user serviceable components in this device. Opening the chassis will void the warranty.

Appendix A: 1U Iris Local and Extended Options

In addition to the standard Iris, ASTi is now offering two options for the two-Channel Iris in a 1U chassis for local and extended USB distribution.

Option 1: Extended USB Distribution

The 1U Extended Iris is for remote USB distribution with a 1U enclosure containing one (1) standard Iris device and one (1) Spectrum. The 1U Extended Iris connects directly to the Prism USB extender module via a CAT 5 cable with a maximum of 300’.

Option 2: Local USB Distribution

The 1U Local Iris is for local USB distribution with a 1U enclosure containing one (1) standard Iris device and one (1) Axis. The19” Local Iris connects directly to the Telestra via a USB cable with a maximum of 3’.

For more information on USB connections see the Telestra USB Connections Matrix (ASSY-01-UMCX-IN-1).

Figure 13: 1U Local and Extended Iris Front Panel

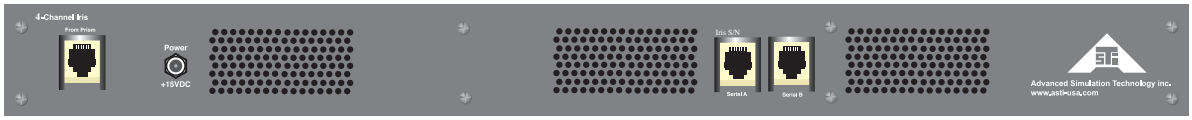

Figure 14: 1U Extended Iris Back Panel (UM-AU-2E-001)

Figure 15: 1U Local Iris Back Panel (UM-AU-2L-001)

Dimensions

17” wide x 1.75” high x 12.375” deep (including connectors on front)

Note: The 1U Iris also comes with optional brackets to mount into a 19” rack. (For more information see **Bracket Connection** below.)

Allow at least 2” or more to front and rear of module for cable access and clearance.

Weight

Weight will vary depending on local, extended and enclosure options. The maximum weight will not exceed 4.30 lbs. with attached mounting brackets.

Connections

The 1U Extended Iris must be connected directly to the Prism via a CAT 5 cable with a maximum length of 300’.

The 1U Local Iris must be connected directly to the Telestra via a USB cable with a maximum length of 3’.

For complete information on connecting Telestra USB devices, see the “Telestra USB Device Connections Matrix” document (ASSY-01-UMCX-IN-1).

Serial Ports

The 1U Local and Extended Iris have two (2) serial port connections.

Bracket Connection

There are two options to connect the brackets to the 1U Iris.

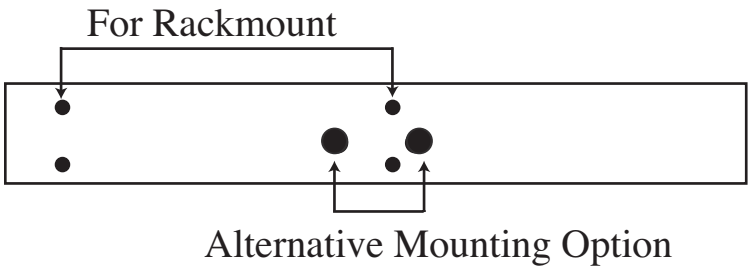

Figure 16: 1U Iris Side view

Rackmount Option

The brackets can be connected to the front holes in the sides of the 1U Iris for mounting in the standard 19” rack. To attach the brackets simply line up the holes and insert the screws as shown below. The long part of the bracket will attach to the 1U Iris with four (4) screws. The short part of the bracket will extend in line with the front of the 1U Iris mounting to the rack with two (2) screws.

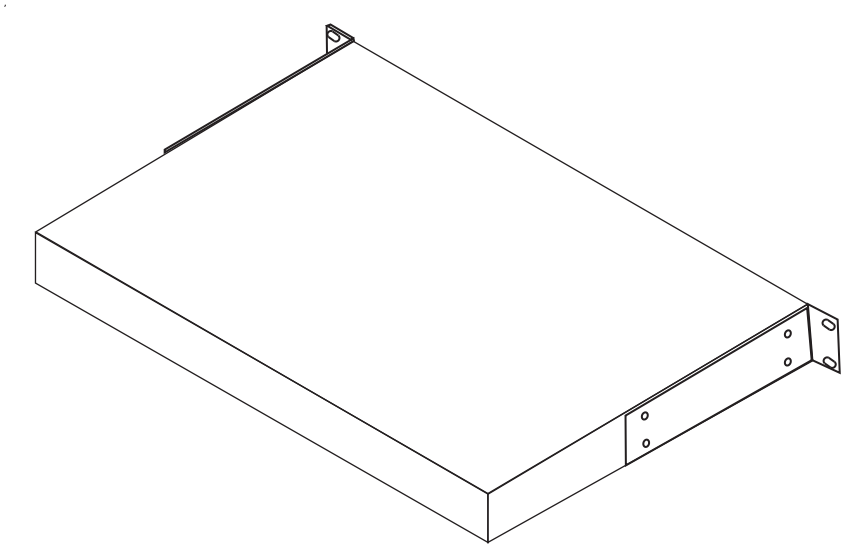

Figure 17: 1U Iris with Bracket Connected for Rackmount

Alternative Mounting Option

The brackets can also be connected to the middle holes in the sides of the 1U Iris for mounting (under-desk mount, etc.). To attach the brackets simply line up the holes and insert the screws as shown below. The short part of the bracket will attach to the 1U Iris with two (2) screws. The longer part of the bracket will extend in line with the top of the 1U Iris and mounts with four (4) screws.

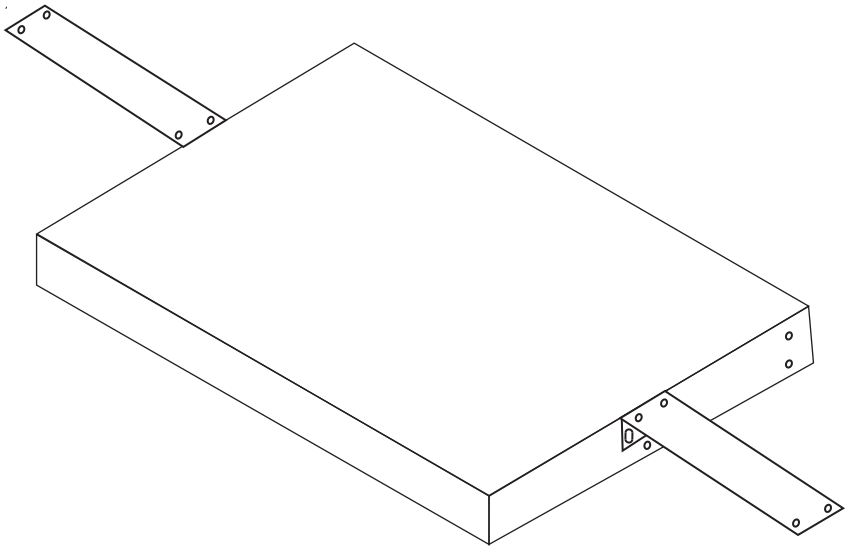

Figure 18: 1U Iris with Bracket Connected for Under-Desk Mount

Appendix B: 4-Channel Iris

In addition to the standard Iris, ASTi is now offering two 4-Channel Iris device options.

Option 1: Extended USB Distribution

The 4-Channel Extended Iris is for remote USB distribution with a 1U enclosure containing two (2) standard Iris devices and one (1) Spectrum. The 4-Channel Extended Iris connects directly to the Prism USB extender module via a CAT 5 cable with a maximum of 300'.

Option 2: Local USB Distribution

The 4 Channel Local Iris is for local USB distribution with a 1U enclosure containing two (2) standard Iris devices and one (1) Axis. The 4-Channel Local Iris connects directly to the Telestra via a USB cable with a maximum of 3'.

For more information on USB connections see the Telestra USB Connections Matrix (ASSY-01-UMCX-IN-1).

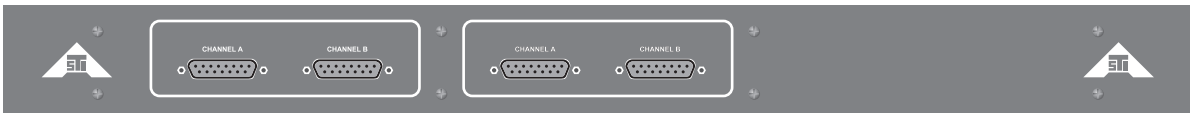

Figure 19: 4-Channel Iris Front Panel

Figure 20: 4-Channel Extended Iris Back Panel (UM-AU-4E-001)

Figure 21: 4-Channel Local Iris Back Panel (UM-AU-4L-001)

Dimensions

17" wide x 1.75" high x 12.375" deep (including connectors on front)

Note: The 4-Channel Iris also comes with optional brackets to fit into a 19" rack. (For more information see **Bracket Connection** above in Appendix A.)

Allow at least 2" or more to front and rear of module for cable access and clearance.

Weight

Weight will vary depending on local, extended and enclosure options. The maximum weight will not exceed 4.30 lbs. with attached mounting brackets.

Connections

The 4-Channel Extended Iris must be connected directly to the Prism via a CAT 5 cable with a maximum length of 300’.

The 4-Channel Local Iris must be connected directly to the Telestra via a USB cable with a maximum length of 3’.

For complete information on connecting Telestra USB devices, see the “Telestra USB Device Connections Matrix” document (ASSY-01-UMCX-IN-1).

Serial Port Connection

The 4-Channel Iris has four (4) serial port connections.

4-Channel Iris Module and Cabling Requirements

Power Requirements

Input to PSL-UM-001	100-240 VAC, 50-60 Hz, 1.5Arms (120VAC), 0.75Arms (240VAC)	
Power connector	Inside Diameter 0.100", Outside Diameter 0.218", bushing 0.219", locking, center positive	
	Connector Part #	Switchcraft 712RA supplied with P2439 Hex Nut (5/16-32) and P2441 Washer
	Mating Connector Part #	Switchcraft 760k
Power consumption (of Iris, Spectrum, Axis, Prism)	15 VDC, 800 mA	

The Iris module can be powered by an individual power supply (included at shipment), or by ASTi's Power Distribution Module (sold separately).

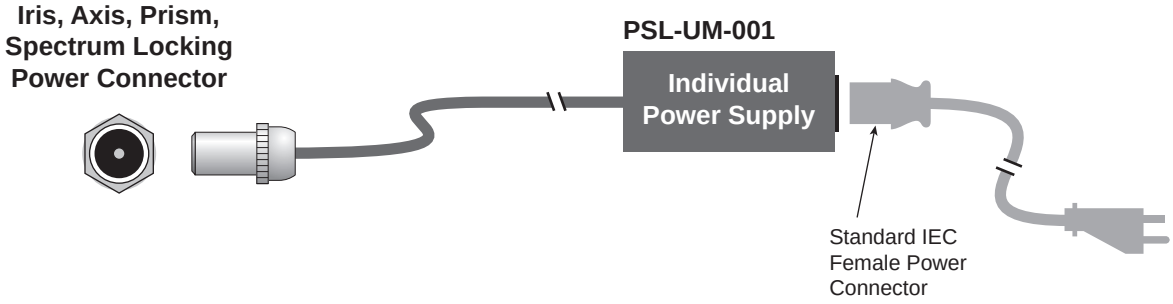

Figure 22: 4-Channel Iris Power Supply Options

The power adapter inlet connector is an IEC320 type C14 or C8, requiring a matching cordset equipped with an IEC320 C13 or C7 connector (female line cord). Country-specific power connectors must be acquired separately for international use.

Other types of power supplies may be used, given that the power output is 15 VDC, 3 A, with the properly fitting power connector.

Appendix C: 6-Channel Iris

In some custom configurations, a 6-Channel Iris device may be shipped. In reality, this 6-Channel Iris is a single 1U enclosure containing three (3) standard Iris devices and one (1) Axis local distribution module.

All the information contained in this Appendix applies to the enclosed 6-Channel Iris device.

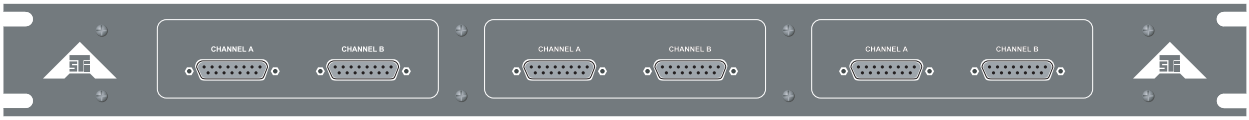

Figure 23: 6-Channel Iris Front Panel

Figure 24: 6-Channel Iris Back Panel

Dimensions

19” wide x 1.75” high x 15.25” deep (including connectors on front)

Allow at least 2” or more to front and rear of module for cable access and clearance.

Weight

Weight will vary depending on enclosure options. The maximum weight will not exceed 5.25 lbs. with attached mounting brackets.

USB Connection

The 6-Channel Iris must be connected directly to the Telestra base system. Connection is made via standard USB cable with standard type A connector on one end, and a miniature type B connector on the other. For complete information on connecting Telestra USB devices, see the “Telestra USB Device Connections Matrix” document (ASSY-01-UMCX-IN-1).

Serial Port Connection

The 6-Channel Iris does **not** have a serial port connection.

6-Channel Iris Module and Cabling Requirements

Power Requirements

Input to PSL-UM-001	100-240 VAC, 50-60 Hz, 1.5Arms (120VAC), 0.75Arms (240VAC)
Power connector	Inside Diameter 0.100", Outside Diameter 0.218", bushing 0.219", locking, center positive Connector Part # Switchcraft 712RA supplied with P2439 Hex Nut (5/16-32) and P2441 Washer Mating Connector Part # Switchcraft 760k
Power consumption (of Iris, Spectrum, Axis, Prism)	15 VDC, 3 A

The Iris module can be powered by an individual power supply (included at shipment), or by ASTi's Power Distribution Module (sold separately).

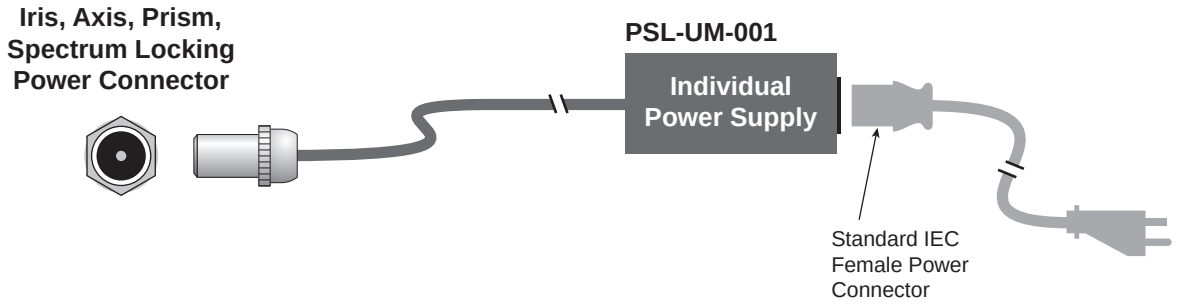

Figure 25: 6-Channel Iris Power Supply Options

The power adapter inlet connector is an IEC320 type C14 or C8, requiring a matching cordset equipped with an IEC320 C13 or C7 connector (female line cord). Country-specific power connectors must be acquired separately for international use.

Other types of power supplies may be used, given that the power output is 15 VDC, 3 A, with the properly fitting power connector.

