AN-16/i v.2
A-Net Input Module

A-Net In

Power

+ Tip
− Ring
± Sleeve

Thru ⊥
In ⊥

AVIOM®

AN-16/i v.2
Input Module

User Guide

PRO 16®   PRO 16e®   △·NET®

READ THIS FIRST

Important Safety Instructions

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 a third grounding prong. The wide blade or third prong are provided for your safety. If the provided plug does not fit 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 the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as when the 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. No on/off power switches are included in the system. The external power supply should be used to control power to an Aviom device. This power supply should remain readily operable.
16. The solid line over dashed line symbol (⎓) indicates that the input voltage must be a DC voltage.
17. The box within a box symbol (▣) indicates that the external power supply is double insulated.

WARNING!

⚠   ⚠

TO REDUCE THE DANGER OF ELECTRICAL SHOCK DO NOT REMOVE COVERS.

NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

To reduce the risk of fire or electrical shock, do not expose this product to rain or other types of moisture.

To avoid the hazard of electrical shock, do not handle the power cord with wet hands.

Replace fuse with same type and rating.

Operating Temperature: 0˚C to 50˚C (32˚F to 122˚F)

Risque de choc électrique – ne pas ouvrir. Pour réduire le risque de feu ou de choc électrique, ne pas exposer cet équipement à la pluie ou la moisissure. Pour réduire le risque de choc électrique, ne pas retirer le couvercle. Pièces non remplaçables par l'utilisateur. Confier la réparation à une personne qualifiée. Attention – utiliser seulement un fusible de rechange de même type.

Cet appareil est conforme à la section 15 de la norme FCC. Son fonctionnement est soumis aux conditions suivantes : (1) cet équipement ne doit pas causer des interférences nocives, et (2) cet équipement doit accepter toute interférence captée incluant les interférences pouvant causer des opérations indésirables.

Cet appareil numérique de Classe B est conforme à la norme NMB-003 du Canada.

IMPORTANT:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to the product not expressly approved by Aviom, Inc. could void the user's FCC authority to operate the equipment.

CAUTION:

- Using any audio system at high volume levels can cause permanent damage to your hearing.
- Set your system volume as low as possible.
- Avoid prolonged exposure to excessive sound pressure levels.

Certifications

EMC: EN55103-1:2009
EN 55103-2: 2009
EN 55022:2006 / CISPR 22:1997
CAN/CSA-CEI/IEC CISPR 22:02
FCC 47 CFR, Part 15

Safety: UL 60065, 7th Edition, Rev.: 09/21/2012;
CAN/CSAC22.2 No. 60065:03 (R2012)

ETL/cETL Listed and RoHS Compliant

Notice of Rights

Trademarks

Aviom, A-Net, the A-Net icon, Pro16, Pro16e, Pro64, AllFrame, m-control, and Virtual Data Cable are trademarks of Aviom, Inc.

All other trademarks are the property of their respective owners.

Information is subject to change without notice.

Aviom, Inc. Limited Warranty

Aviom, Inc. warrants this product against defects in materials and workmanship for a period of **one year** from the date of the original retail purchase.

This warranty does not apply if the equipment has been damaged due to misuse, abuse, accident, or problems with electrical power. The warranty also does not apply if the product has been opened or modified in any way; if the product serial number has been damaged, modified, or removed; or if the original Quality Assurance label has been damaged, modified, or removed.

If a defect is discovered, first write or call Aviom, Inc. to obtain a Return Authorization number. No service will be performed on any product returned without prior authorization. Aviom, Inc. will, at its option, repair or replace the product at no charge to you. The product must be returned during the warranty period, with transportation charges prepaid to Aviom, Inc., 1157 Phoenixville Pike, Suite 201, West Chester, PA 19380. You must use the product's original packing materials for shipment. Shipments should be insured for the value of the product. Include your name, address, phone number, description of the problem, and copy of the original bill of sale with the shipment. The Return Authorization number should be written on the outside of the box.

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SOME STATES DO NOT ALLOW EXCLUSIONS OR LIMITATION OF IMPLIED WARRANTIES OR LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Warranty Information

Please record the following information for future reference:

Your Authorized Aviom Dealer:

Name: _____

Address: _____

_____

_____

Phone: _____

Serial Numbers of Your Aviom Products: _____

_____

_____

Date of Purchase: _____

Your Authorized Aviom Dealer is your primary source for service and support. The information recorded above will be helpful in communicating with your Authorized Aviom Dealer should you need to contact Aviom Customer Service. If you have any questions concerning the use of this unit, please contact your Authorized Aviom Dealer first. For additional technical support, or to find the name of the nearest Authorized Aviom Repair Station, check the Aviom web site at www.aviom.com.

To fulfill warranty requirements, your Aviom product should be serviced only at an authorized Aviom service center. The Aviom serial number label must appear on the outside of the unit, or the Aviom warranty is void.

Table of Contents

AN-16/i v.2 Input Module

*Thank you for purchasing the **Aviom AN-16/i v.2 Input Module**. This User Guide is designed to familiarize you with your new product's features and to have your Pro16® or Pro16e™ system up and running as quickly as possible.*
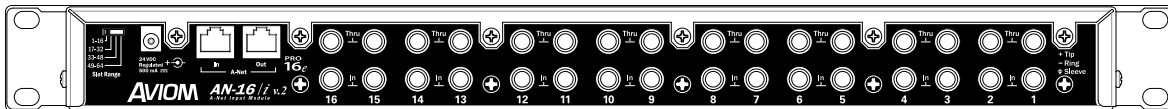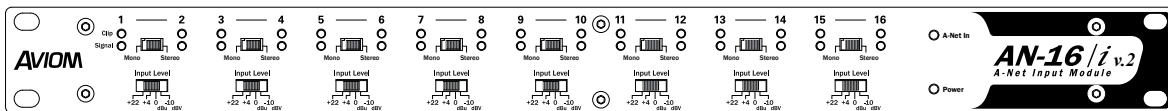
Features

The AN-16/i v.2 is part of Aviom's Pro16® Series of products; it can be combined with Pro16 and Pro16e devices to create personal mixing systems, digital snakes, and audio distribution systems for applications in live performance, broadcast, and recording.

The AN-16/i v.2 Input Module's main features include:

- Sixteen balanced line-level 1/4-inch TRS jacks for audio input connections
- Sixteen balanced 1/4-inch TRS jacks for audio Thru connections
- High quality A-to-D conversion at 48kHz, 24-bit
- Adjustable input level switches per channel pair
- Eight stereo channel Link switches
- Signal and Peak LEDs on each channel
- A-Net® In and A-Net Out jacks
- 4-position Slot Range switch for Pro16e applications

Conventions Used in This Document

AN-Series

The AN-16/i v.2 Input Module, original AN-16/i Input Module, AN-16/i-M Mic Input Module, and AN-16/o Output Module are referred to generically as the **AN-Series** of products.

When describing audio network configurations, the AN-16/i-M Mic Input Module and most Pro16 console interface cards can be substituted anywhere the AN-16/i is used.

Using Personal Mixers

It is possible to create an audio distribution and personal monitor system using any combination of Aviom AN-Series and Personal Mixer products, including the A360, A-16II, and A-16R.

When referring to the use of the Personal Mixers in a system in general, the term **Personal Mixer** is used to describe a case where an A360 Personal Mixer, A-16II Personal Mixer, or a A-16R Rack-mount Personal Mixer (with/without the optional A-16CS Control Surface) can be used.

Cat-5 Cables

In most cases unshielded (UTP) Cat-5e, Cat-6, and Cat-6e cables can be interchanged. When speaking about interconnections between components in a system, the term **Cat-5** is used generically to indicate the use of any of the applicable cable types.

A-Net Distributors

The A-16D and A-16D Pro A-Net Distributors are referred to generically as **A-Net Distributors**. Both are used to copy an A-Net digital signal and split it into multiple copies so that devices may be connected in parallel.

Package Contents

The AN-16/i v.2 Input Module box includes:
- AN-16/i v.2 Input Module
- DC Power supply for the AN-16/i v.2
- Documentation

Options for your system include:
- Cat-5e/Cat-6 UTP interconnect cables
- AN-16SBR System Bridge
- Aviom Personal Mixer products such as the A360 Personal Mixer, A-16II Personal Mixer, or A-16R Rack-mount Personal Mixer for creating a monitoring system
- Pro16 output devices such as the AN-16/o Output Module or AV-P2 Output Module
- A-16D and/or A-16D Pro A-Net Distributors

Also included with the system is a Warranty Registration, found within this User Guide. Be sure to fill out the form and return it to Aviom, Inc. via mail or fax as soon as possible. Warranty info may also be submitted on the Aviom website, www.Aviom.com.

About A-Net

A-Net® is a proprietary high-speed data transmission protocol developed by Aviom, capable of sending and receiving high-quality digital audio using readily available Cat-5 cables.

A-Net is based on the physical layer of Ethernet, a Local Area Network (or LAN) technology. This provides A-Net with a mature and robust base on which to build. However, it is important to note that A-Net devices are not compatible with Ethernet devices.

Some of the benefits of using A-Net to transmit digital audio are:
- Virtually no latency; analog in to analog out is always less than one millisecond
- No ground loops
- Easy cabling using readily available components
- An unlimited number of A-Net devices can be used in a system
- Ease in spanning long distances between system components

There are two versions of Pro16 A-Net: the original Pro16 A-Net signal carries sixteen channels of digital data while the enhanced Pro16e® version of A-Net is capable of carrying up to 64 channels of digital audio data. Like standard Pro16 A-Net, Pro16e is a point-to-point digital audio protocol.

Pro16e A-Net data is intended for use with the A360 Personal Mixer which can take advantage of the higher network channel count that Pro16e provides.

Compatibility

The AN-16/i v.2 Input Module is compatible with Pro16, Pro16e, and Pro64 A-Net devices as detailed below.

Pro16 Products

The following Pro16 and Pro16e products may be connected to the AN-16/i v.2 **A-Net Out**:

- A360 Personal Mixer
- A-16II Personal Mixer
- A-16R Rack-mount Personal Mixer
- A-16D A-Net Distributor
- A-16D Pro A-Net Distributor
- AN-16/o Output Module
- AV-P2 Output Module
- Another AN-16/i v.2 Input Module

✓ **Note:** The AN-16/i v.2 Input Module's Pro16e A-Net Out is not compatible with the original A-16 Personal Mixer, discontinued in 2004. Some A-16R Personal Mixers produced prior to the release of the Y1 A-Net Card are also not compatible.

The **A-Net Out** from the following Pro16 devices may be connected to the AN-16/i v.2 Input Module's **A-Net In** port:

- AN-16/i v.2 Input Module
- AN-16/i Input Module
- AN-16/i-M Mic Input Module
- AV-M8 Mic Input Module
- Aviom16/o-Y1 A-Net Card for Yamaha® devices
- A-16D and A-16D Pro A-Net Distributors
- Third-Party Pro16 A-Net console cards

Pro64 Products

Adding the ASI A-Net Systems Interface to a Pro64® digital snake or audio network allows Pro64 channels to be translated into Pro16 data. The ASI separates the 64-channel Pro64 stream into up to four 16-channel Pro16 outputs, depending on the Pro64 sample rate being used. Any of the four Pro16 A-Net outputs from the ASI may be connected to the A-Net In on the AN-16/i v.2.

About Category 5

The term Category 5 (also referred to as *Cat-5*) is broadly used to describe a type of high performance network cabling used for data transmission purposes to connect computer networks and other devices. A standard patch cable consists of four twisted pairs of copper wire terminated by RJ45 male connectors. The cable assembly is used to provide connectivity between any two Cat-5 female RJ45 jacks.

A variation of the cable, called Category 5e (or Cat-5e), has largely replaced Cat-5 in the field; it uses additional twists in the cable's wire pairs to reduce interference in high-speed network applications. Additional wire pair variations are found in Cat-6 and Cat-6e cables, typically used with gigabit networking devices. **Use Unshielded Twisted Pair (UTP) cables for all A-Net applications.**
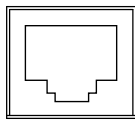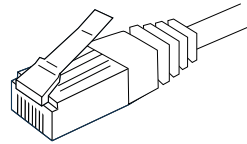
RJ45 Jack   Cat-5e Cable

✓ **NOTE:** While the Cat-5e cables and connectors used on your Aviom products look like typical computer Ethernet network connections, <u>do not </u>connect computers, routers, or other home and business networking equipment to your Aviom products.

Cat-5 Cables

Any standard Category 5e (Cat-5e) UTP cable may be used with your Aviom products. If you need a longer cable for a particular application, any computer store should be able to supply you with an appropriate cable. A qualified technician should be able to build custom cables to any length.

For fixed or permanent installations, you have the option of running Cat-5 cables inside walls and terminating them with readily available wall panel connectors that include the RJ45 jack. (Solid wire is recommended for permanent installations.)

In addition to standard Category 5e cables, Category 6 (Cat-6) cables can also be used.

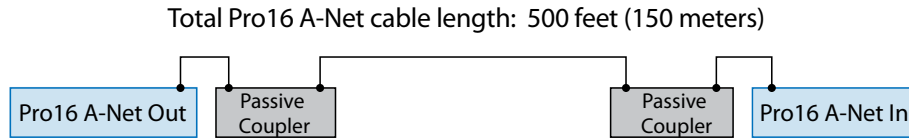✓ **NOTE:** When purchasing Category 5e cables, be sure to buy only standard Cat-5e UTP cables, not those sold as crossover cables. A crossover cable is used for file transfer between two computers and is not compatible with your Aviom equipment.
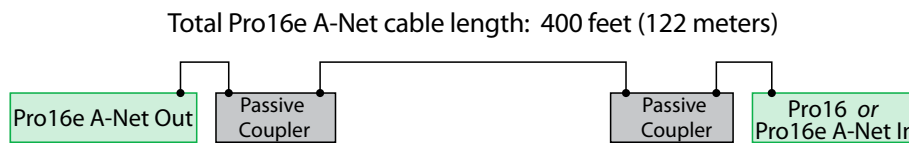
Cable Lengths

For Pro16 applications—connecting one **Pro16** device to another—the Cat-5e cables used with your Aviom products may be up to 500 feet (approximately 150 meters) in length between devices. For example, connecting an AN-16/i-M Mic Input Module to an AN-16/o Output Module is a Pro16-to-Pro16 connection.

Total Pro16 A-Net cable length: 500 feet (150 meters)

Pro16 A-Net Out	Passive Coupler		Passive Coupler	Pro16 A-Net In

When using **Pro16e**—such as the A-Net Out from an AN-16/i v.2 to *any other* Pro16 or Pro16e device—Cat-5e cables may be up to 400 feet (approximately 122 meters) in length between compatible devices due to the larger amount of data being transmitted to accommodate Pro16e's higher channel count.

Total Pro16e A-Net cable length: 400 feet (122 meters)

Pro16e A-Net Out	Passive Coupler		Passive Coupler	Pro16 *or* Pro16e A-Net In

The maximum cable length specification applies to the total cable length between an **A-Net Out** port on one device and the **A-Net In** port on the next A-Net capable device in your system.

Your cable length performance will be affected by a number of factors including the quality of the cables used, and the number of passive devices such as cable couplers or passive wall panel interconnections in use.

Stranded or solid Cat-5e cable may be used; stranded cable is easier to deploy on a stage while solid core cable provides slightly better maximum distance performance. Solid core wire is typically used in permanent instillations in walls and across ceilings.

When using the optional AN-16SBR System Bridge with Pro16 and Pro16e devices, the cable length specification applies to the *total* cable length between the two active A-Net devices being connected with the passive AN-16SBR System Bridge, plus all cables. This is also true when using an inline coupler to extend cable lengths.

Pre-made cables in a variety of lengths and colors are available at most computer outlets. Cables may be extended by using a simple passive device called an *inline coupler* to add length to existing cables (as long as you do not exceed the specified maximum cable length). If you need a longer cable on occasion, this is a simple solution. Note that the maximum cable length performance can be compromised by using inline couplers or other passive connection devices.

AC Line Conditioning

Aviom products are digital devices and as such are sensitive to sudden spikes and drops in the AC line voltage. Changes in the line voltage from lightning, power outages, etc. can sometimes damage electronic equipment.

To minimize the chance of damage to your equipment from sudden changes in the AC line voltage, you may want to plug your equipment into a power source that has surge and spike protection. Power outlet strips are available with built-in surge protection circuits that may help protect your equipment.

Other options for protection of your equipment include the use of an AC line conditioner or a battery backup system (sometimes referred to as an *uninterruptible power supply*, or UPS).
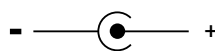
Power Supplies

Your Aviom product uses a DC power supply that has a two-prong power cord. The prongs on the power supply are identical, meaning that there is no need to orient the plug in a specific direction in the power outlet. Some products with two-prong power cords have polarized plugs that can only be inserted into an electrical outlet one way.

The power supply that is shipped with your Aviom product is a universal switching type. It is capable of working with voltages from 90 to 240 volts AC. This means that a separate power supply is not needed to use the products with the AC power systems found in most countries. You should always use the power supply that shipped with your product. When travelling, you may need plug adapters to use the power supply with the AC outlet plug shape variations in use throughout the world.

Should you need to replace the power supply that came with your product, we recommend using only a power supply that meets the following specifications.

Type	Switching	
Input Voltage	90-240 volts	50/60Hz 30VA
Output	24Vdc	0.5A
Polarity	Outer = negative; Inner = positive	
Plug Size	2 mm	

Note that polarity of the plug found on the DC power supply needs to match that of the original power supply that came with your Aviom equipment. Aviom products use a center positive power supply. The outer contact is negative, the inner contact is positive.

Power Supply Polarity

Installing in an Equipment Rack

The AN-16/i v.2 Input Module is designed to be installed in a standard 19-inch audio equipment rack. This design is both for easy transportation of the unit and for protection. Each unit takes up one standard rack space (19 inches wide by 1.75 inches high).

The rack ears on each side of the device are designed to support the weight of the AN-16/i v.2 without additional hardware. Each rack ear contains holes for two screws per side. Always support the unit with all four screws.

To rack mount the AN-16/i v.2, position it in the equipment rack at the desired location. Use standard rack-mounting screws (10-32 size) to attach the unit to your rack hardware. Tighten all four screws firmly, but avoid overtightening.

You may want to use non-metallic washers between the rack-mounting screws and the device's finished surface to avoid marring the painted finish on your Aviom products.

Always allow adequate ventilation for devices mounted in equipment racks. Avoid placing your Pro16 product directly above or below other rack-mounted devices that produce high levels of heat, such as power amps.

Cleaning and Maintenance Information

The exterior of your Aviom products should be cleaned with a dry, soft, lint-free cloth. For tougher dirt, you can use a cloth slightly dampened with water or with a mild detergent.

When cleaning your Aviom products, never spray cleaners directly onto the product surfaces. Instead, spray a small amount of the cleaning solution onto a clean cloth first. Then use the dampened cloth to clean the product.
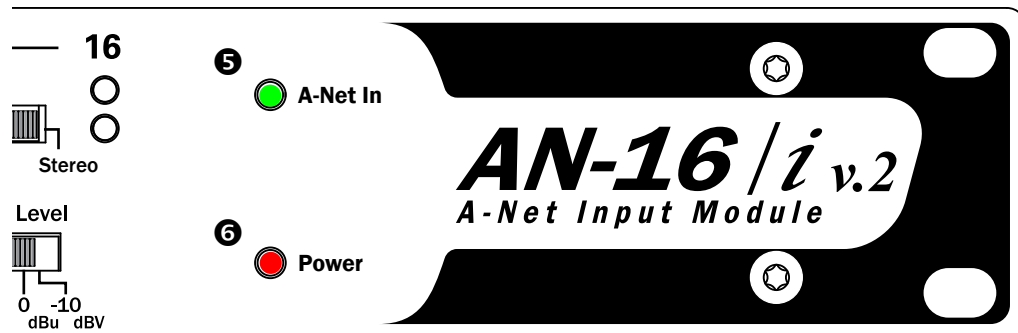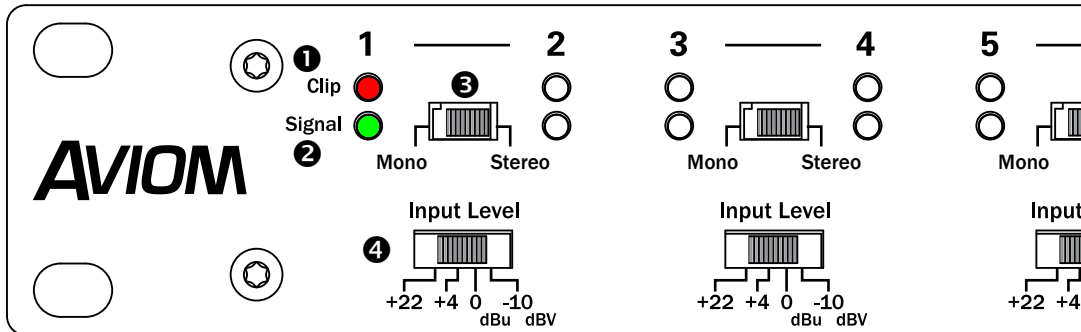
✓ **NOTE:** Never use solvents or abrasive cleaners on the finished surfaces of your Aviom products.

AN-16/i v.2 Front Panel

Use the following diagrams to become familiar with the components of the front and rear panels of the AN-16/i v.2 Input Module.

|	Function
1	Clip LED, red – Lights when the audio signal is 3dB below full scale (0dB)
2	Signal Present LED, green – Lights to show that an audio signal is present on a channel
3	Stereo Link Switch – In the left position, each channel is mono; in the right position, the channels are linked as a stereo pair
4	Input Level Switch – Selects one of four available operating levels; selectable for each channel pair
5	A-Net In LED, green – Indicates that the AN-16/i v.2 is receiving a valid A-Net signal from another Pro16 device
6	Power LED, red – Indicates that the AN-16/i v.2 is powered on

AN-16/i v.2 Rear Panel
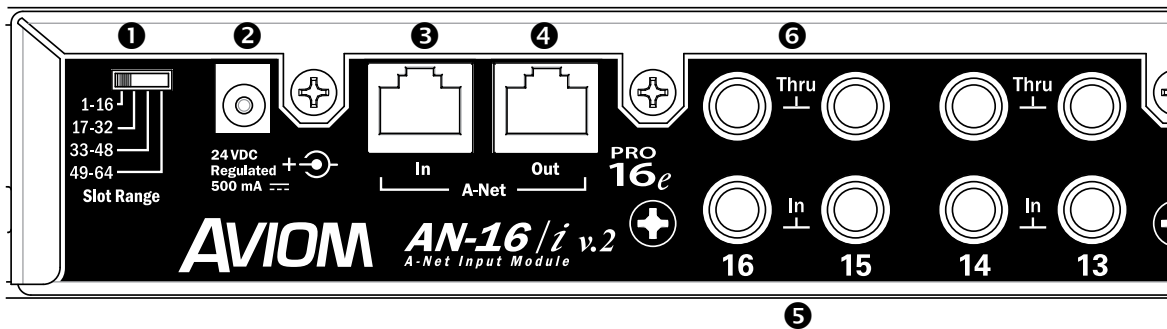
	Function
1	Slot Range Switch – Sets the network Slot Range that the unit will transmit its inputs in
2	DC Power Jack – Connect the DC power supply here
3	A-Net In Jack – Connect the A-Net Out of another Pro16 or Pro16e device here
4	A-Net Out Jack – Connects to the A-Net In of a Pro16 or Pro16e A-Net compatible device
5	Analog Audio Input – TRS balanced 1/4-inch jack accepts any balanced/unbalanced line-level audio signal
6	Thru Jack – A copy of the balanced/unbalanced analog audio from the Audio In jack

AN-16/i v.2 Features

This section explains the basic layout of your new Aviom Pro16 product and its functions.
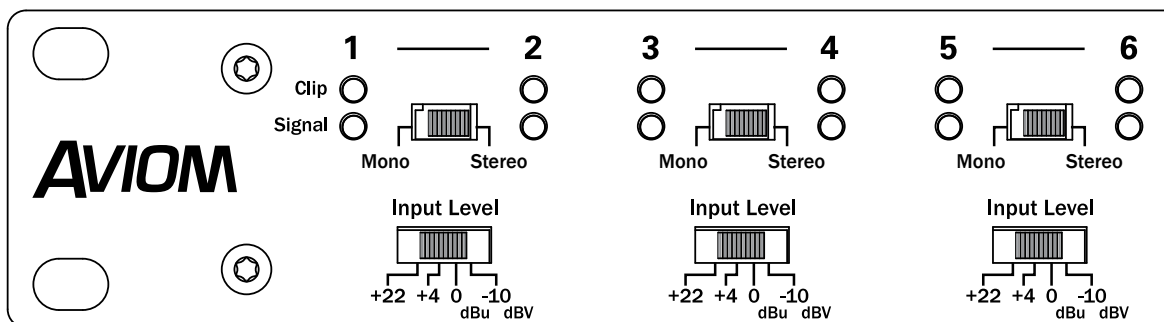
The front panel of the AN-16/i v.2 contains the channel information, Mono/Stereo link switches, Signal Present LEDs, Clip LEDs, A-Net In and Power indicators, and the Input Level switches.

Channel LEDs

The numbered Channels on the AN-16/i v.2 front panel correspond to the sixteen line-level analog audio inputs on its rear panel. They are grouped together in pairs—Channels 1 and 2, Channels 3 and 4, etc. Each channel contains two LEDs, one showing that there is an audio signal present, and another used to indicate that the input to a channel is causing audio clipping. Signal and Clip LEDs appear directly beneath the channel numbers.

The lower LED, marked Sɪɢɴᴀʟ, will light as long as an audio signal of at least -40dB is present on the channel. It provides an easy way to confirm that audio is indeed passing into the AN-16/i v.2 and being converted to A-Net.

The upper LED is marked Cʟɪᴘ. It will light if a signal reaches a point that is within 3dB of full scale (0dB). In general, you want to operate the system so that the Clip LED lights only occasionally (the transients of percussive sources will typically peak for a few milliseconds, for example). If the LED is on constantly, you should either lower the level of the source audio coming into the AN-16/i v.2 or try different Input Level settings.

Input Level Switch

The AN-16/i v.2 has been designed to accept a wide range of professional and semi-professional audio levels. There are four Input Level gain settings available. Changes to the input level on the AN-16/i v.2 front panel affect a pair of channels at a time.

The four levels are +22dBu, +4dBu, 0dBu, and -10dBV. To select the proper Input Level setting, choose the Input Level position that most closely matches the maximum output level of the audio gear being connected to the AN-16/i v.2 rear panel TRS jacks.

As a general guideline, try the +22dB setting for the output of professional mixing consoles; use the -10dBV setting for devices such as consumer MP3 devices and CD/DVD players.

Input Level

+22 +4 0   -10
            dBu   dBV
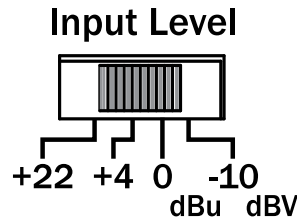
The AN-16/i v.2 has four input level options per channel pair.

To maximize the signal-to-noise ratio when setting up your Aviom products it is important to understand how the input and output settings on these products interact. Proper calibration and gain staging with all devices in an audio system is essential. The AN-16/i v.2 Input Module has four input gain range settings: +22dBu, +4dBu, 0dBu, and -10dBV, accommodating a wide range of input signal sources. Choose the setting that allows maximum input signal level without clipping.

The AN-16/i v.2 has a maximum input level of +22dBu. Signal levels above +22dBu will clip the input stage of the device and cause digital distortion.

The selected input gain setting on the AN-16/i v.2 front panel changes the headroom available for the input signal, but remember that the maximum input level will always be +22dBu regardless of the selection. See the table below.

AN-16/i v.2 Input Level Setting	Clip Point
-10dBV	+4dBV
0dBu	+14dBu
+4dBu	+18dBu
+22dBu	+22dBu

With the input gain switch set to 0dBu, for example, input signals ranging from -∞ to +14dBu in level can be used without clipping. A +14dBu signal level will be transmitted to all line-level output modules as a full-code signal. Signals above +14dBu will clip the input stage of the AN-16/i v.2, and that clipped audio data will be sent downstream to all Pro16 output modules and Personal Mixers. There are two options if a signal level above +14dBu needs to be connected to the AN-16/i v.2 input: attenuate (lower) the output level of the device feeding the AN-16/i v.2 channel input to eliminate clipping, or choose another input setting. In this situation using the +4dBu setting provides more headroom, allowing a maximum signal level of +18dBu to be used.

Check the specifications of your audio gear if you are unsure about its maximum output level. Although you won't harm the AN-16/i v.2 or your audio devices by using an incorrect level setting, you do want to avoid distorting the audio that passes through the system.
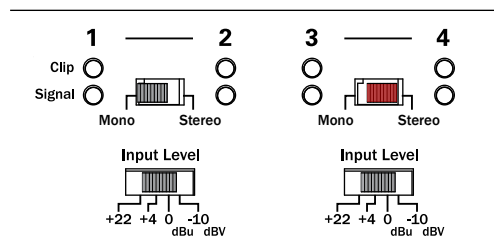
Mono/Stereo Link Switch

The AN-16/i v.2 Input Module provides an easy solution for stereo input sources such as mixer sub-groups, keyboards, DSP effects device outputs, computers, and MP3 or CD/DVD player outputs when incorporating the AN-16/i v.2 into a personal mixing system.

There are eight stereo link switches on the front panel of the AN-16/i v.2. They can be used in any combination, as your needs require. The Mono/Stereo link switch is located between two channels—one odd and one even. Stereo links always affect adjacent channels (for example, channels 1 and 2, channels 13 and 14, etc.).

The Mono/Stereo link switch is used to turn a pair of adjacent channels into a stereo channel that can be controlled as a single source on the Pro16 series of Personal Mixers, including the A360 Personal Mixer. A-16II and A-16R Personal Mixers treat a stereo pair as adjacent linked channels. The A360 Personal Mixer can use stereo channels in two ways: in Pro16 mode where adjacent channels are treated as they are on the A-16II and A-16R, or in Default or Custom mode where the incoming stereo pair is assigned to a single mix channel button. For more information on using stereo sources with the A360, see page 32.

When using the AN-16/i v.2 Input Module with Pro16 output modules to create a digital snake or audio distribution network, the setting of the Mono/Stereo switch will have no effect.

The default setting, Mono, with the switch to the left, allows independent control of each input channel from Personal Mixers connected to the system. To link channels together as a stereo input, move the Mono/Stereo link switch to the right to the Sᴛᴇʀᴇᴏ position. Moving the switch to the Sᴛᴇʀᴇᴏ position causes all Personal Mixers connected to the system, including the A-16CS Control Surface (the remote controller used with the A-16R), to instantly update their channel status (except when an A360 Personal Mixer is set for Custom mode).

Channels 1 and 2 are mono; channels 3-4 are stereo linked.

Using Stereo Links

Some things to keep in mind about linked channels:

- The position of the Mono/Stereo link switch does not affect the audio in Pro16 output modules such as the AN-16/o.

- Linking channels affects all Personal Mixers connected to the system.

- Channels cannot be unlinked at the Personal Mixer

- Any combination of stereo and mono channels can be used.

- If you want to control two input channels as a stereo source, they must be connected to an odd and even pair of channels, as indicated by the graphics on the AN-16/i v.2 front panel.

- Changes to the Mono/Stereo link status can be made on the fly, with audio running through the system; all Personal Mixers update immediately (except A360 Personal Mixers in Custom mode).

- The Stereo link status is not stored when you save a mix preset on the A360, A-16II, or A-16R Personal Mixers. Links are created at the input device.

- Changing the channel link status will affect Groups you have created on Personal Mixers in some cases.

- Audio may change as a result of changes made to the stereo link status, which may be evident on the A360 Personal Mixer which has more per-channel controls. When changing from mono to stereo, for example, the Pan setting will change from its current state to a default full stereo spread. Audio settings for the right channel of the stereo pair—channel volume, reverb, and tone—are inherited from the left channel.

Power and A-Net LEDs

The right side of the AN-16/i v.2 Input Module contains the **POWER** LED. When the AN-16/i v.2 is powered up, a valid A-Net Out signal is always being generated. The **A-NET IN** LED lights whenever a valid A-Net signal from a compatible Pro16 device is connected to the rear-panel **A-NET IN** port.
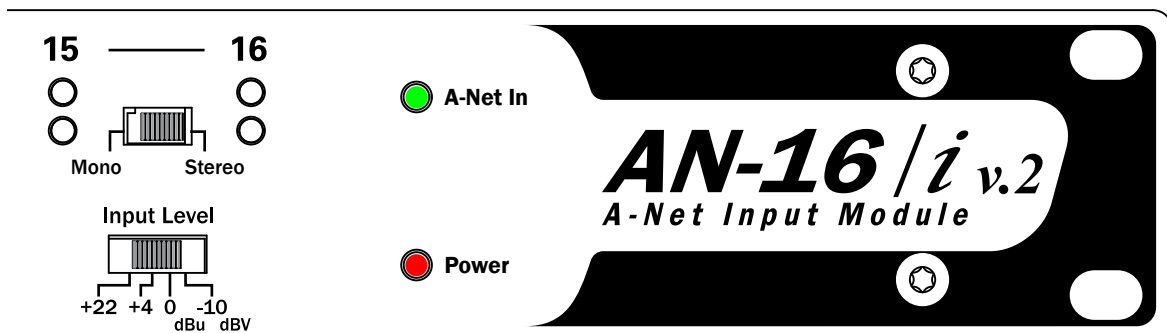
The A-Net In LED lights only when another A-Net device is connected to the A-Net In port on the rear panel.

AN-16/i v.2 Rear Panel

On the rear of the AN-16/i v.2 Input Module you will find the DC power connector, A-Net connections, Slot Range switch, sixteen balanced TRS analog audio inputs, and the sixteen audio Thru jacks.

Signal routing into and out of the AN-16/i v.2 Input Module has been designed to be extremely flexible, allowing the AN-16/i v.2 to integrate into virtually any audio environment.
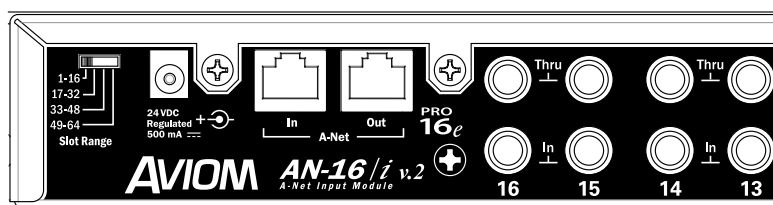
AN-16/i v.2 rear panel connections

Power Connector

The AN-16/i v.2 Input Module comes with a switching-type power supply. This type of power supply can be used with a wide range of AC wall current outputs. This means that you do not need to replace the power supply if the unit will be used in countries where current voltages are different if you travel with your Aviom gear occasionally. (You may, however, need plug adapters to allow the power supply to be connected to wall outlets internationally since many countries use different physical plug layouts for their power systems.)

A-Net Connections

Two A-Net connections appear on the rear panel of the AN-16/i v.2; they are marked **A-NET IN** and **A-NET OUT**.

A-Net In

The **A-NET IN** port accepts the Pro16 or Pro16e A-Net data from another A-Net compatible device. Any A-Net data connected to this port will be merged with the digital data generated by the AN-16/i v.2 and output as a single Pro16e data stream intended for use with the A360 Personal Mixer. It is important to set the Slot Range switch to the correct position on each AN-16/i v.2 in a system when making use of the data merging capabilities provided by the A-Net In port. When creating a system that has only 16 or fewer inputs, the A-Net In port will not be used; in this case the Slot Range switch must be set to **1-16**.

Use any standard Cat-5e cable for connections between devices. Remember that the maximum cable length between devices is 400 feet (122 meters).

See page 31 for additional information about setting up Pro16e personal mixing systems with the A360 Personal Mixer.

A-Net Out

The **A-NET OUT** port sends the merged Pro16e A-Net data (up to 64 channels total) from the AN-16/i v.2 to an A-Net compatible device such as the A360 Personal Mixer, A-16II Personal Mixer, or AN-16/o Output Module. See page 26 for information about configuring personal mixing systems; see page 38 for digital snake setup.

When a proper A-Net connection between the AN-16/i v.2 Input Module and a Pro16 Personal Mixer or output module exists, the A-Net LED on the receiving device will light.

Slot Range Switch

The enhanced version of Pro16 A-Net, Pro16e, allows up to 64 channels of audio data to be made available to A360 Personal Mixers in a single data stream. Each AN-16/i v.2 in a system may be set to provide one of four banks of channels: 1-16, 17-32, 33-48, or 49-64. The Slot Range switch on the AN-16/i v.2 determines which bank of channels each device's TRS balanced inputs will be assigned to as the data streams are merged.
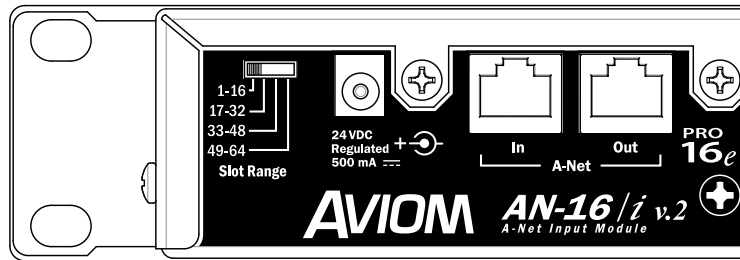
The Slot Range switch has four bank settings.

For a 16-channel system set the switch to **1-16**; this setting is compatible with A360, A-16II, and A-16R Personal Mixers and the AN-16/o and AV-P2 Output Modules.

✓ **NOTE:** Pro16 devices, including A-16II and A-16R Personal Mixers, and the AN-16/o and AV-P2 Output Modules cannot use any channel data beyond the 1-16 range.

For Pro16e personal mixing systems of 32 channels and above, each AN-16/i v.2 in a system must be set to a unique Slot Range. Set the first AN-16/i v.2 to Slot Range **1-16**. Connect its **A-NET OUT** port to the **A-NET IN** port on the second AN-16/i v.2. Set the Slot Range on this AN-16/i v.2 to **17-32**. The A-Net Out of this AN-16/i v.2 now provides a 32-channel Pro16e A-Net Stream.

The following table shows how the daisy chain connection of one through four AN-16/i v.2 Input Modules can create a 64-channel Pro16e stream.

AN-16/i v.2	Set its Slot Range to:	A-Net Out is:
1 *	1-16	16 channels
2	17-32	32 channels
3	33-48	48 channels
4	49-64	64 channels

A Pro16 device—original AN-16/i, AN-16/i-M, Y1 A-Net card, or a third-party console card—may be substituted for the first AN-16/i v.2; a legacy device automatically defaults to Slot Range 1-16.

Connect up to four AN-16/i v.2 Input modules in this manner. Connect the **A-NET OUT** of the final AN-16/i v.2

in the device chain to an A-Net Distributor or A360 Personal Mixer. The order in which the AN-16/i v.2 Input Modules are connected does not matter, but each *must* be set to a unique Slot Range. See page 35 for additional Pro16e system setup details. If two devices are set to the same slot range the last device in the input module chain's audio will be heard.

Channel Input Jacks

The rear panel of the AN-16/i v.2 Input Module contains sixteen analog input jacks (labeled **In**). These jacks can accept balanced (TRS) or unbalanced (TS) signals on ¼-inch plugs.

Balanced signals are found on many professional audio devices. The ¼-inch connector used for balanced audio connections on the AN-16/i v.2 has three conductors: the tip, the ring, and the sleeve (sometimes referred to as TRS). Balanced wiring is ideal for keeping noise out of the audio signal from sources such as radio frequency interference (sometimes called "RF").

Unbalanced audio signals are found on many DSP effects processors, music keyboards, and consumer electronics. Only two connectors are used, the tip and the sleeve (TS). A standard musical instrument cable (sometimes called a guitar cord) uses this configuration, for example.
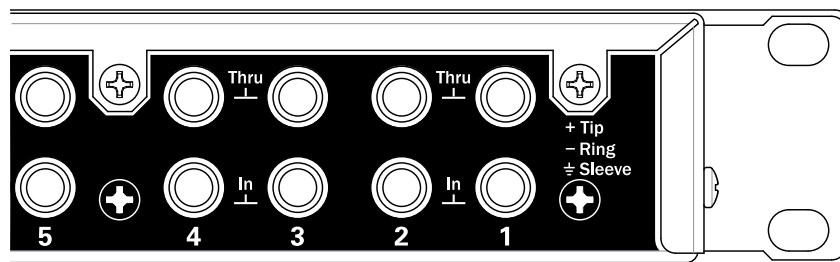
Input and Thru jacks are TRS balanced.

Channel Thru Jacks

The sixteen balanced audio **Thru** jacks on the AN-16/i v.2 provide the user with an exact copy of the signal plugged into the **In** jack just below it. This can be used as a way to insert the AN-16/i v.2 Input Module into a signal path without giving up audio patching flexibility or for creating multi-zone personal mixing systems.

See page 24 for information about configuring a system with and without effects processing; see page 30 to learn how to set up a multi-zone personal mixing system.

Connecting Audio

The are many ways to get audio into the AN-16/i v.2 Input Module for processing. Depending on your application— stage, studio, broadcast, etc.—the types of signals and equipment available will vary. This section will give examples of some typical setups that you can modify to suit your individual needs.

Connections on the AN-16/i v.2 Rear Panel

There are two rows of balanced TRS connectors marked **In** and **Thru** on the rear of the AN-16/i v.2 Input Module.

The audio in connections on the AN-16/i v.2 accept balanced or unbalanced ¼-inch cables. The AN-16/i v.2 can accept a wide variety of signal levels; gain settings are changed on the front panel of the AN-16/i v.2 per channel pair.
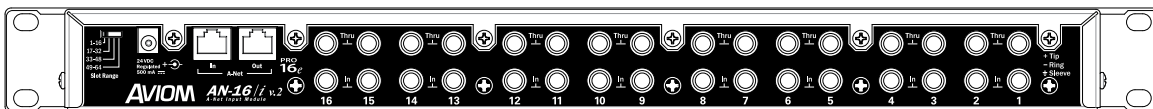
AN-16/i v.2 rear panel connections

The audio design of the AN-16/i v.2 allows you to connect it at virtually any point in your existing audio system. The AN-16/i v.2 can accept audio coming from:

- Mixing console main mix outputs
- Mixing console direct outputs
- Mixing console insert sends only
- Mixing console insert send and return loops
- Mixing console group or bus outputs
- Line-level output from mic preamps
- Line-level outputs from keyboards and other music devices
- MP3, CD, or DVD players
- Digital Audio Workstations (DAWs)
- Computer sound cards
- DSP effects processors
- Video devices, cameras, etc.

The built-in audio Thru connections allow source signals to be connected to the AN-16/i v.2 Input Module first before being connected to a mixing console to allow maximum patching flexibility.

Connecting a Mixing Console to the AN-16/i v.2

Almost any line-level audio output can be used with the AN-16/i v.2. Depending on the topology of your particular mixing console (hardware or virtual as part of a DAW), some or all of the following signal types could be available.

Direct Output

A direct output is typically found at the channel level of a mixing console. That is, each channel on the console has its own dedicated direct output jack that sends an exact copy of the audio signal present in each channel out of the console without interrupting the signal being sent to the main part of the console.

If your mixing console has direct outputs available, a cable from each channel that you want to be part of the personal mixing system or audio network is connected to one of the AN-16/i v.2 inputs. A maximum of sixteen direct outputs can be plugged into a single AN-16/i v.2 Input Module.

✓ NOTE: For best results, set the direct output to be pre-fader rather than post-fader so that changes an engineer makes in the process of mixing do not affect the signal levels being sent to the AN-16/i v.2.

Insert Send/Return Points

The insert loop on an audio mixing console is typically used as a means of extending the processing capabilities of the mixing console on a channel-by-channel basis. An effects device such as a compressor can be added to the channel so that only that specific channel is affected by the processing.

An insert on a mixing console consists of a *Send* and a *Return*. The Send is used to get the channel's audio into the effects processor. The processed signal coming from the effects device goes back to the console via the Return path.

The physical jack layout of an effect Send/Return loop on a console varies depending on the model and manufacturer. Two types are common: a single TRS jack, and discrete Send and Return jacks.

TRS Inserts

Some mixing consoles use a single jack to perform both send and return functions. In this case the jack would use tip-ring-sleeve (TRS) wiring, with one of the signal wires performing the Send function, the other being used for the Return. Both Send and Return share the common ground wire. For TRS inserts, it is common to use a "Y" cable, one that has a TRS plug on one end and then a split into two mono tip-sleeve (TS) cables on the other.
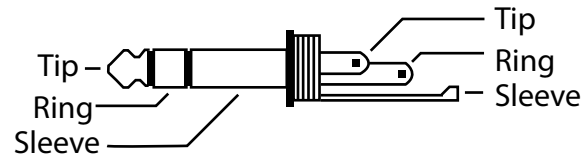
Tip Ring Sleeve (TRS) plug
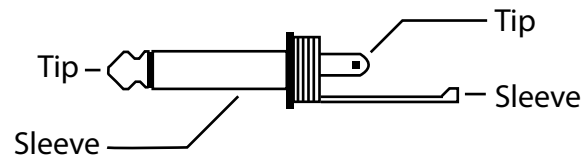
Tip Sleeve (TS) plug

A typical insert cable is wired as seen below:
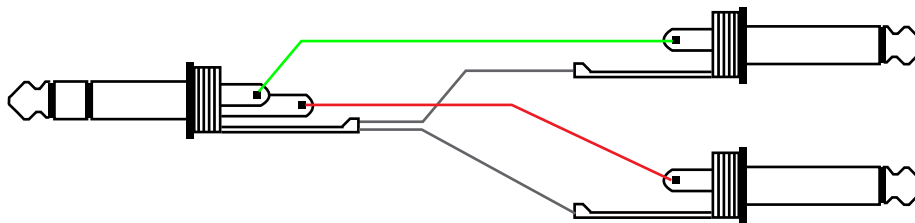
Insert cable wiring

Using a TRS insert, the DSP effects device would have the insert Send cable plugged into its input and the insert Return cable plugged into its output. This wiring completes the signal loop without interrupting the audio being played though the console.
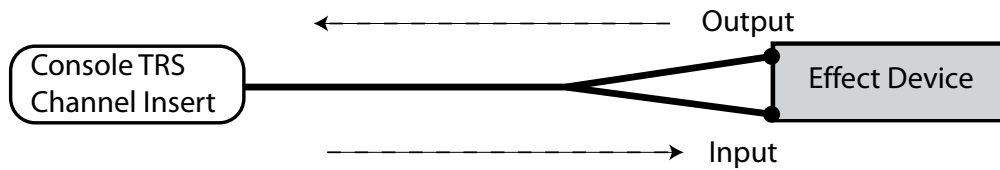
Audio flows from the console insert point into the effect device and then back to the console using a Y-cable.

To use the AN-16/i v.2 with this insert layout, both the **In** and **Thru** jacks on the AN-16/i v.2 are used. The main console's Insert Send should be plugged into the **In** jack on the AN-16/i. v.2 The **Thru** jack on the AN-16/i v.2 is used to return the signal to the console, completing the audio loop. In this case the AN-16/i v.2 Input Module acts like an effects device, but it has no audible effect and does not change the audio signal in any way.
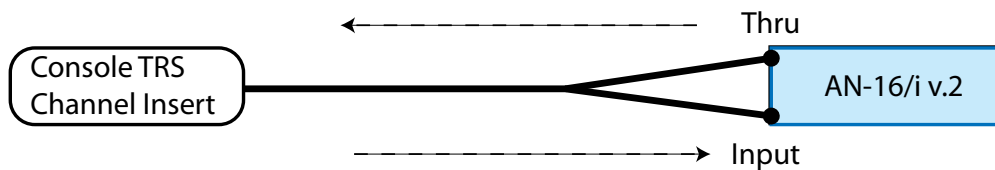
Audio flows from the TRS console insert point into the AN-16/i v.2 and then back to the console.

Discrete Insert Send and Return Jacks

If a mixing console uses separate jacks for its insert Send and Return functions, the cable connections are much more obvious. The Send from the insert point on the console is connected to the AN-16/i v.2 **In** jack. A cable from the **Thru** jack on the AN-16/i v.2 is connected to the **Return** jack on the console to complete the loop. Both balanced and unbalanced versions of this wiring exist on mixing consoles. Consult your mixing console's documentation for additional information; use balanced cables if the option exists.
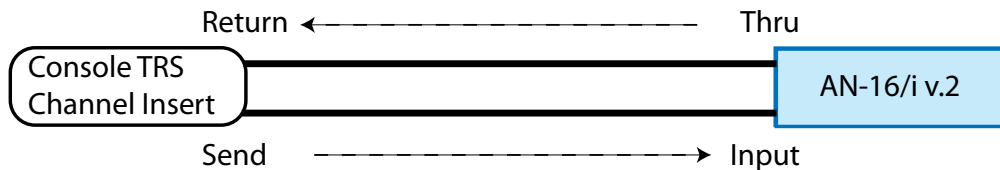
Audio flows from the Send jack of the console insert point into the AN-16/i v.2 and then back into the console via the Insert Return jack.

Adding Effects

Console insert points offer a convenient way to patch audio into the AN-16/i v.2 Input Module. But, there are times when the insert send/return points will be needed for use with a DSP effect processor such as a compressor. There are some optional ways of both getting audio into the AN-16/i v.2 and patching in effects devices.

A-Net Audio Without the Effect

- Connect the console insert Send to an input on the AN-16/i v.2.
- Connect the AN-16/i v.2 Tʜʀᴜ jack from the same channel as above to the input of the effect processor.
- Connect the output of the effect processor to the console's insert Return jack.

The Send/Return loop on the console is complete. The audio sent thru the Aviom input module is *not* processed by the effect device.
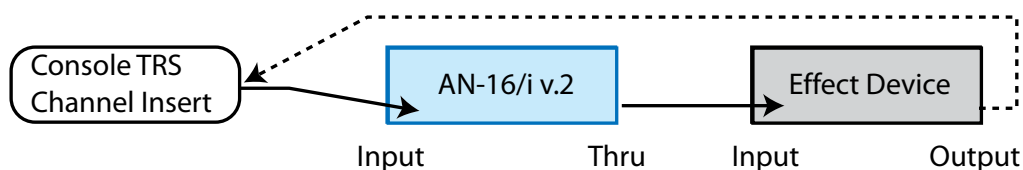
Audio flows from the console insert point into the AN-16/i, then into the effect device, and returns to the console.

A patch bay may simplify this patching.

A-Net Audio With the Effect

- Connect the console insert Send to the input on the effect device.
- Connect the output of the effect processor to an input on the AN-16/i v.2.
- Connect the Thru jack from the same channel as above to the console's insert Return.

Audio passing through the Aviom input module is heard *with* the effect processing.
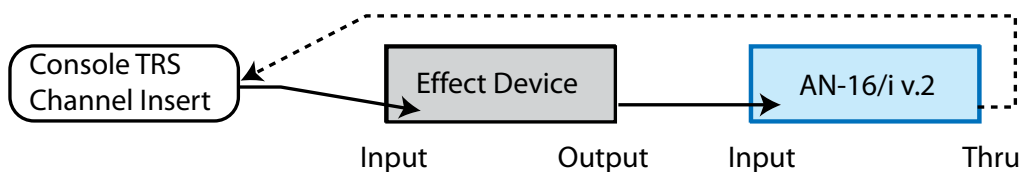
Audio flows from the console insert point into the effect device, then into the AN-16/i, and returns to the console.

Submixing

When creating a personal mixing system it is important to consider exactly what content should be sent to the performers. Most performers will not need every element of a drum mix, for example. Instead, providing the kick, snare and a stereo mix of the remaining drum kit elements can provide a better monitoring experience. After all, the performer's job is to play and sing, not engineer a mix. An overly complex set of channels actually defeats some of the benefits of a user-controlled monitor mix.
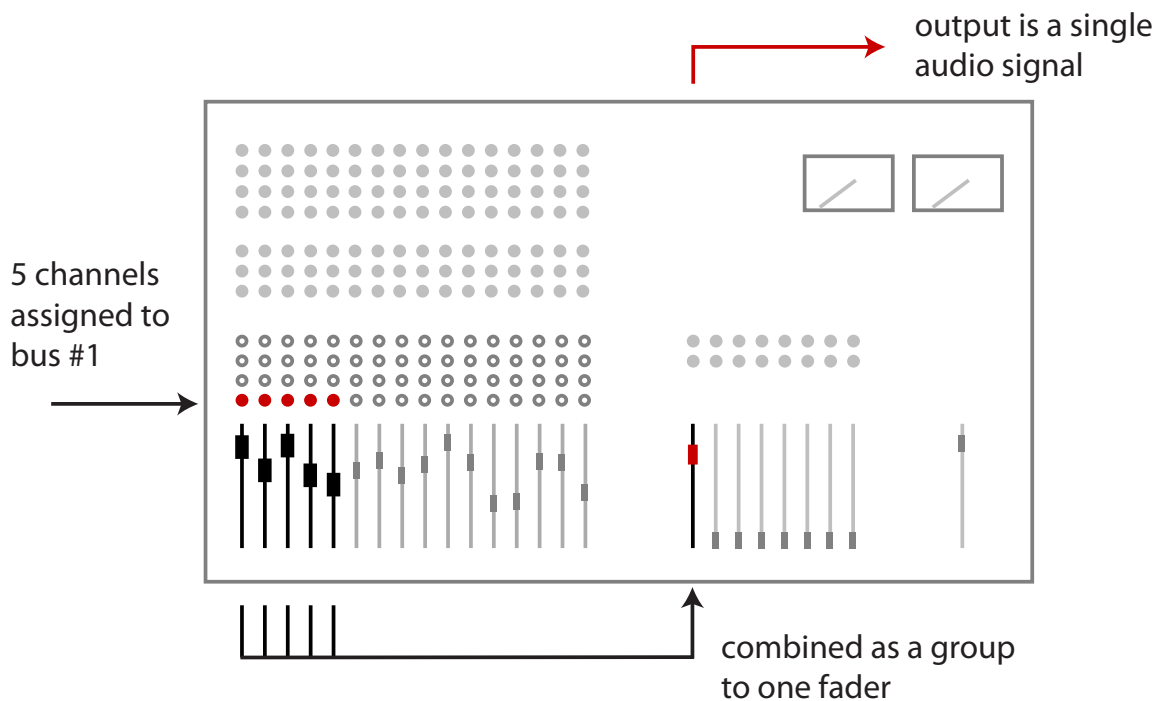
Five channels are combined and can be output as a single channel of audio.

As an example, all the channels of the mixing console devoted to drums can be assigned to a bus. The relative mix of all the components of the drum kit would remain the same; the levels are based on the individual channel's level settings. By sending all the drum channels to a bus, the entire drum kit's volume can be raised or lowered from a single fader. Patching the output of that bus into the AN-16/i v.2 allows the performers to hear the submix on a single channel of a personal mixing system and control its level in their mix.

Stereo Submix

A stereo submix with panning can be created by using a pair bus outputs. Stereo submixes preserve the left-right positioning information for a group of related channels (drums, singers or horns, for example) and can more accurately reproduce the spatial relationships between the elements of a live mix. This allows the performers to make a mix that more closely replicates the performing ensemble's physical layout while at the same time allowing them to monitor at a lower listening level because each element can be heard more clearly.

Signals for the stereo group are assigned to two bus outputs, usually consecutive numbers such as 1 and 2, or 3 and 4. The stereo pan (or left/right balance) from the source audio is then set by using the mixing

console's Pan knobs. To get an element of the group into only the right side of the submix, its pan knob should be turned to the fully clockwise position. The left/right outputs of the submix get connected to two input channels on the AN-16/i v.2 where the channels can be linked as a stereo pair; performers mix and monitor the submix in stereo on their Personal Mixers.

Aux Sends (Effects Sends)

An Auxiliary Send (also called an Aux Send or effects send) is typically used on mixing console to send the signal from one or more channels into an effect device such as a reverb. Using a dedicated set of knobs found in each channel strip, each channel can have a different amount of the effect applied as needed.

An Aux Send does not have to be used exclusively with effects, though. You can think of an Aux Send as another mini mixing console; it functions in a similar manner to a bus output. It is used to pass the audio signals from the console to another destination. You can use any combination of available line-level audio sources with the AN-16/i v.2 Input Module.

The method for using an Aux Send to create a source for a monitor mix is similar to that described for using a bus output. Most consoles have from two to eight Aux Sends. Some console designs also allow Aux Sends to be pre- or post-fader. Choose pre-fader if the option exists so that an engineer's changes to a channel's volume will not change the level going into a personal mixing system. The number of independent audio signals that can be sent to the AN-16/i v.2 Input Module via Aux Sends will depend upon the design of the mixing console you are using.

The following diagram shows multiple mixing console channels sending various amounts of signal to one aux send; the output of the aux send is connected to one input on the AN-16/i v.2 Input Module.
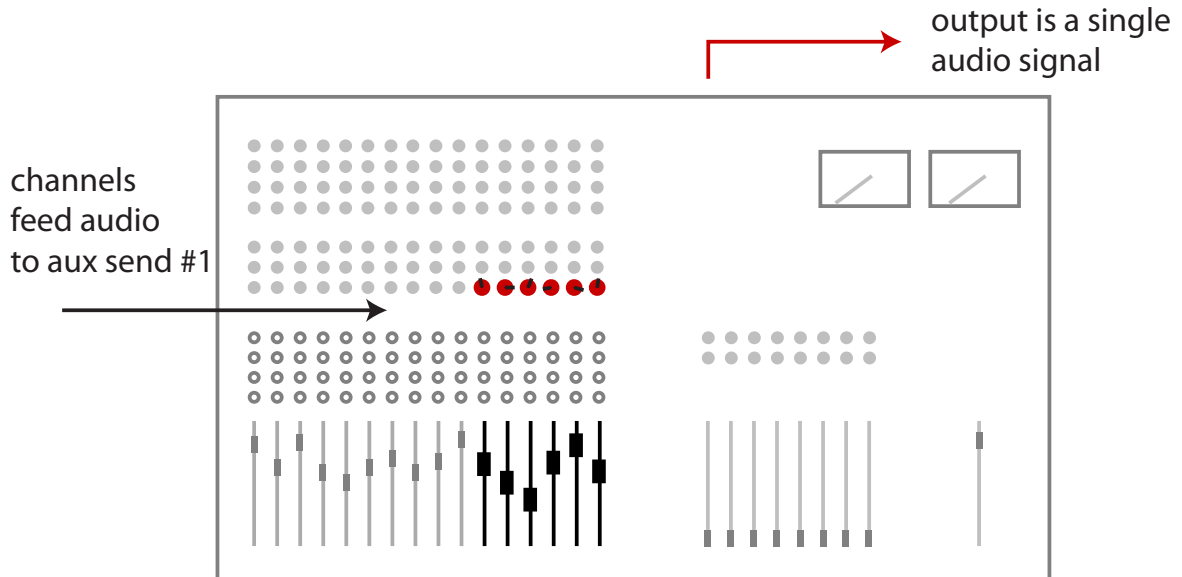
An pre-fader Aux Send allows each channel to be routed to an output independent of the channel fader level.

Line-level Devices

In addition to connecting a traditional mixing console, there are numerous other audio sources that can be used with the AN-16/i v.2. There is no requirement that your audio sources be connected to a mixing console first.

Using some creative patching, you'll find numerous ways to get audio into a personal mixing or audio distribution system. Here are a few examples:

- Connect the stereo outputs of multiple CD/DVD players to inputs on the AN-16/i v.2 Input Module to distribute a variety of music programs to multiple rooms. No mixing console is needed.

- Patch a drum machine output or line output from a computer sound card or DAW into the AN-16/i v.2 to provide a click track for musicians.

- Connect multiple keyboards directly to the AN-16/i v.2. Then patch the Thru jacks on the AN-16/i v.2 to the main mixing console inputs.

- Connect outputs from stereo guitar processors or amp simulators.

- Virtual drums can be connected directly into the AN-16/i v.2 Input Module before being connected to a mixing console.
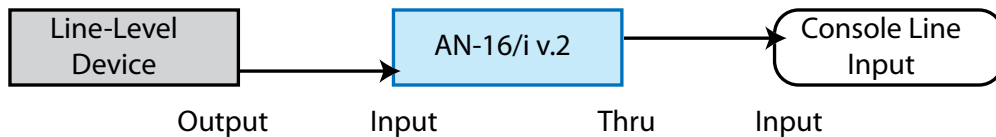
A line-level device is connected to the input module before being connected to the console's line input.

Patching devices into the AN-16/i v.2 *before* they get plugged into the mixing console can save configurable console outputs that may be needed for other purposes.

Configuring Monitor Systems

Aviom's A360, A-16II, and A-16R Personal Mixers are powerful tools designed to improve the monitoring experience for performers on stage and in the studio. The A-16II and A-16R use the Pro16 version of A-Net and support a maximum of 16 channels. The A360 Personal Mixer is compatible with the legacy Pro16 version of A-Net and also supports the higher channel count enhanced version of A-Net called Pro16e, which is capable of creating a network pool of up to 64 total channels that can be used to deliver customized monitor mix content to a performer on a per-mixer basis.

Pro16 Personal Mixing Systems

When creating a simple 16-channel personal mixing system that will be used with A360, A-16II and/or A-16R Personal Mixers (in any combination), only one AN-16/i v.2 Input Module is required. Up to sixteen channels of audio content are connected to the balanced TRS line-level inputs of the AN-16/i v.2, which digitizes the audio and turns it into an A-Net stream for distribution to the Personal Mixers.

Rear Panel Setup

On the rear panel of the AN-16/i v.2 set the **Slot Range** switch to the left, the **1-16** position. This assigns the incoming audio signals to the first sixteen slots of the A-Net stream. For personal mixing systems 16 or fewer channels this is the only setting that should be used. Slot Range switch settings of **17-32**, **33-48**, and **49-64** are ignored by the A-16II and A-16R Personal Mixers as well as the AN-16/o and AV-P2 Output Modules.
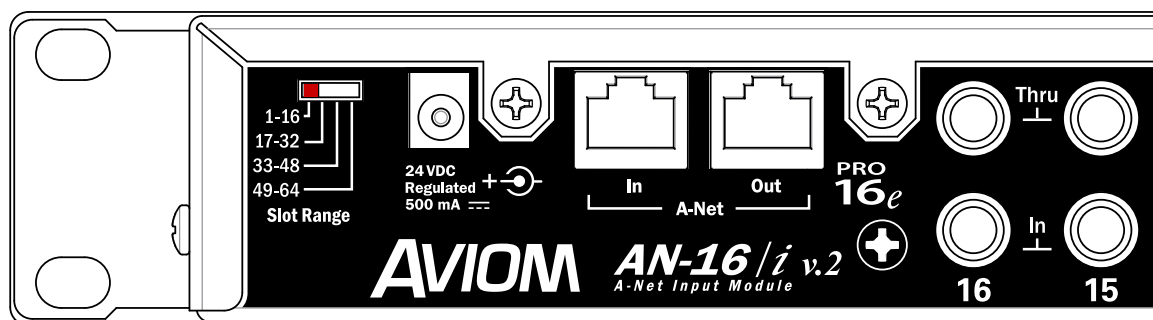
A 16-channel application requires the Slot Range switch to be set to the 1-16 position.

Connect the audio sources to the balanced TRS audio inputs 1 through 16 as needed. The input sources will appear on the Personal Mixers in the same order.

Daisy Chain Personal Mixing System Connections

The digital output from the AN-16/i v.2 **A-N**ᴇᴛ **O**ᴜᴛ jack may be connected directly to an A-16II or A-16R Personal Mixer with a Cat-5e UTP (or better) cable to start a personal mixing system. Personal Mixers connected in this manner need to be daisy chained, connecting the **A-N**ᴇᴛ **O**ᴜᴛ of the first Personal Mixer to **A-N**ᴇᴛ **I**ɴ on the next and so on. There is no practical limit to the number of Personal Mixers that can be connected in this manner. Any combination of the A-16II and A-16R may be used.
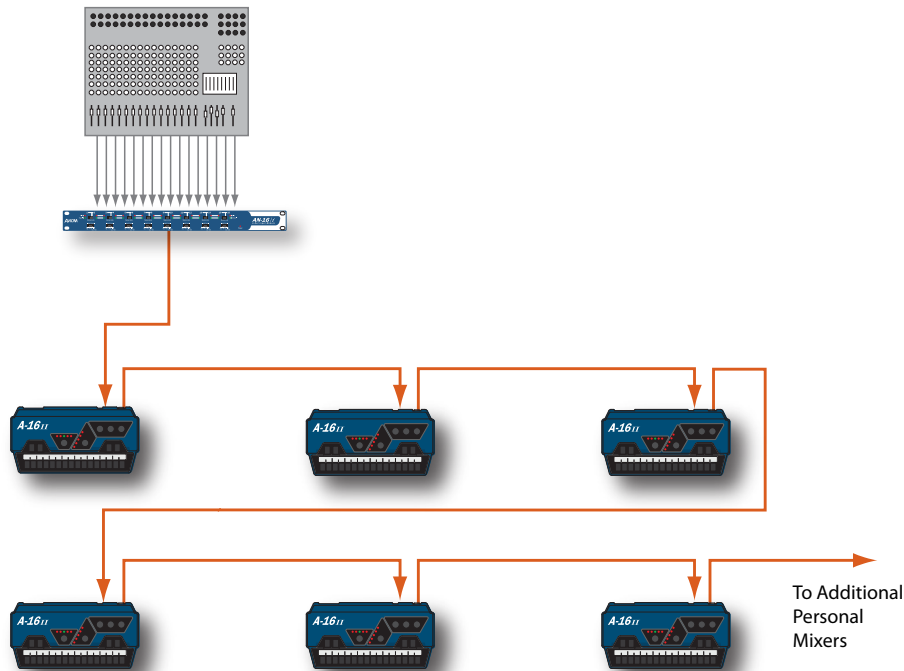
A personal mixing system with six A-16II Personal Mixers connected in a daisy chain.

One A360 Personal Mixer may be used in a daisy chain personal mixing system, but because the A360 has only one A-Net connection, it may be used in a daisy chain only if it is placed *last* in the chain. The use of multiple A360 Personal Mixers requires an A-Net distributor for parallel connections.
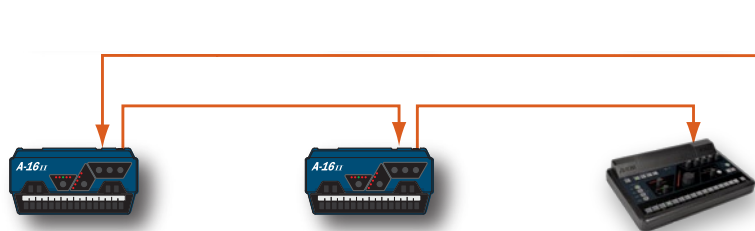
An A360 may be used as the last device in a daisy chain.

An A360 Personal Mixer used as the last device in a daisy chain system will require the optional PS-120 Power Supply.

Using an A-Net Distributor

The digital A-Net output from the AN-16/i v.2 may be connected to an A-Net distributor such as the A-16D or A-16D Pro to allow Personal Mixers to be connected in parallel while at the same time being powered over the Cat-5 cable. Using an A-Net distributor simplifies setup, eliminates the need for local DC power supplies for the Personal Mixers, and cleans up the appearance on stage and in the recording studio.

To use an A-Net distributor with a personal mixing system:

1. Connect a Cat-5 cable from the **A-Net Out** on a AN-16/i v.2 to the **A-Net In** of an A-16D Pro A-Net Distributor.

2. From the A-16D Pro, connect Cat-5 cables from any of its eight parallel A-Net outputs to the **A-Net In** port on a Personal Mixer.

The Personal Mixers will not need local DC power supplies when connected in this manner.
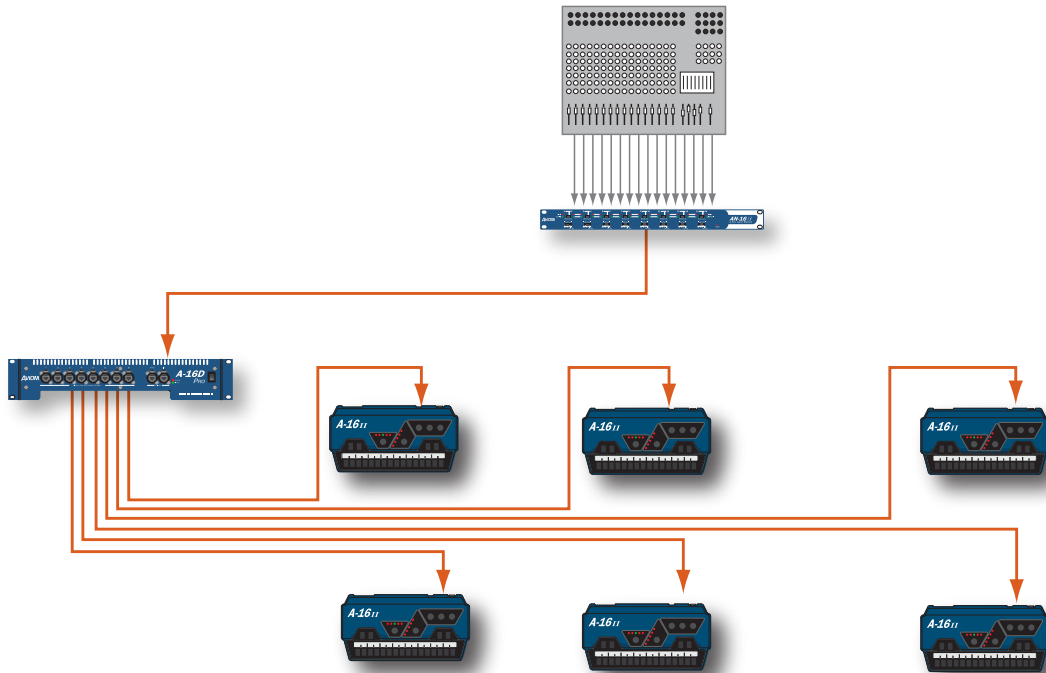
A personal mixing system with six A-16II Personal Mixers connected in parallel with an A-16D Pro A-Net Distributor.

The Personal Mixers receive the same content in the same channel order from the AN-16/i v.2 as when the devices are daisy chained.

When using an A-Net distributor with a Pro16 personal mixing system, any combination of A360, A-16II, and A-16R Personal Mixers may be used.
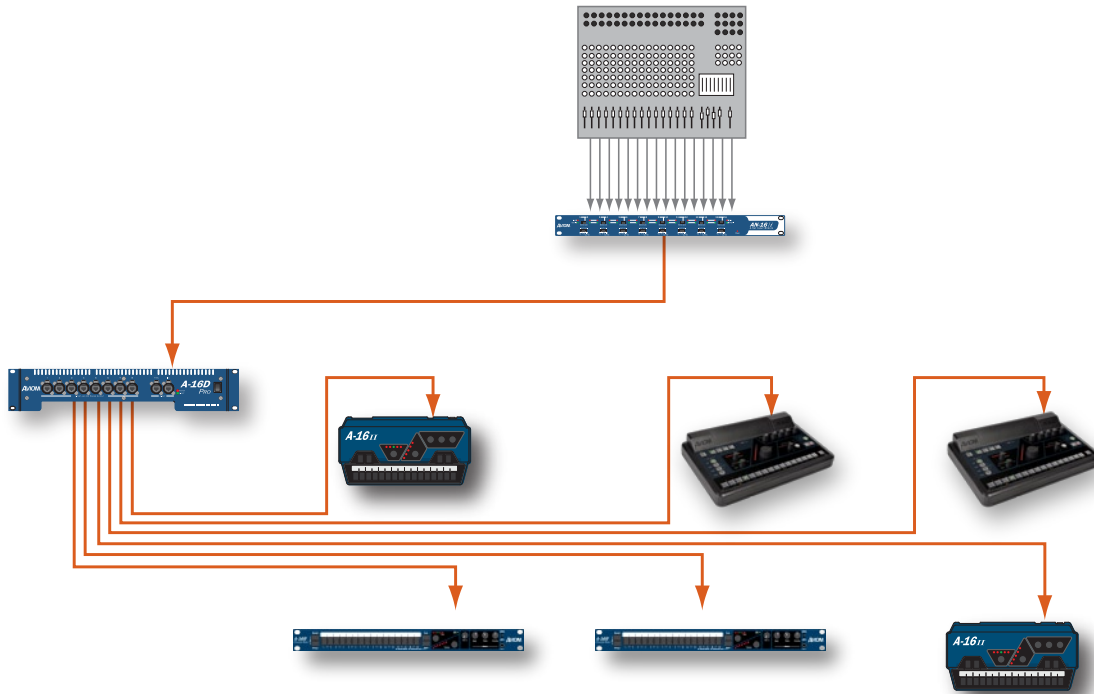
The A-16D Pro can power the A360, A-16II, or A-16R Personal Mixers.

A personal mixing system using an A-Net Distributor can be expanded by adding more A-Net Distributors which can connect via the built-in **A-Net Thru** jack on the front panel of the A-16D Pro.

Multi-Zone 16-Channel Monitor Systems

Creating a personal mixing system with two or more mix zones is a simple way to provide customized monitor content to the various parts of an ensemble using A-16II and A-16R Personal Mixers. For example, take an ensemble that has five singers plus a five-piece horn section. The singers want to have each voice appear on a separate channel of a Personal Mixer and would prefer a stereo submix of the horns on a pair of channels. The horn players want the opposite; they want each horn on its own channel and a stereo submix of the singers. The remaining elements—guitar, piano, bass, and drums—are common to each mix. A multi-zone system makes that possible.

All that's required to create a multi-zone personal mixing system is one more input module. The THRU jacks on each AN-16/i v.2 allow channels common to both mix zones to be patched from the first input module into a second.

In the example below, the first ten channels are common to each zone; those inputs are connected via the THRU jacks. The last six channels on each AN-16/i v.2 in each zone are unique.
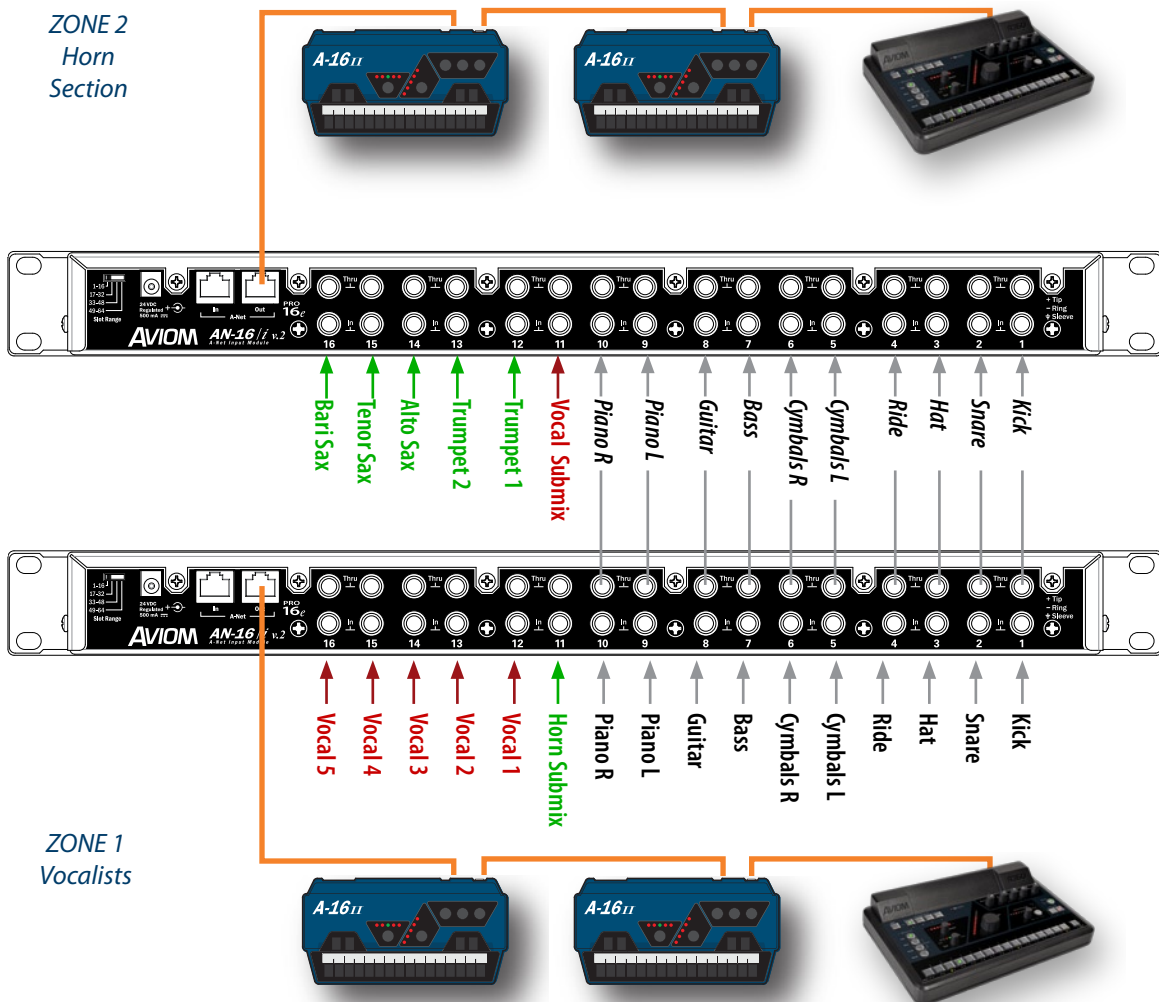
Patching for a typical multi-zone personal mixing system requires two input modules.

Higher Channel Count Personal Mixing Systems

The Pro16e version of A-Net offers increased channel capacity and routing flexibility, allowing more stereo channels to be delivered to performers for a more realistic monitoring experience.

Two or more AN-16/i v.2 Input Modules may be used to create a personal mixing system of up to 64 input sources for use with A360 Personal Mixers. The Pro16e A-Net stream distributed to the A360 Personal Mixers contains all 64 channels and each A360 Personal Mixer may be set to use a unique set of channels chosen from that pool of data. A-16II and A-16R Personal Mixers may also be used, mixing the first 16 channels in these systems.
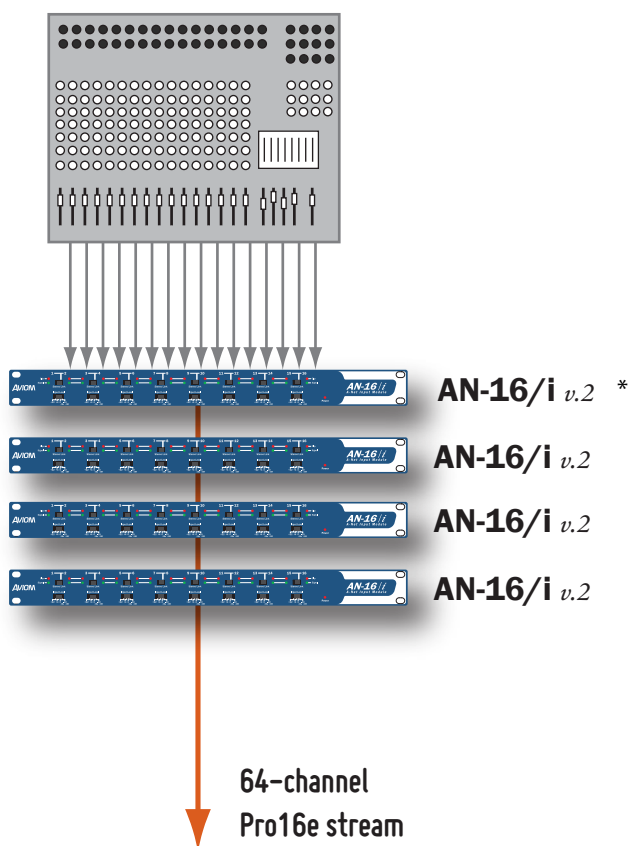
Four AN-16/i v.2 Input Modules can provide up to 64 audio sources for A360 Personal Mixers to select from.

When using multiple input modules in this manner, each provides one 16-channel bank of content to the network. The Slot Range switches on the rear panel of the AN-16/i v.2 control the bank assignment.

A Pro16 device—original AN-16/i, AN-16/i-M, Y1 A-Net card, ASI, or a third-party console card—may be substituted for the first AN-16/i v.2; a legacy device automatically defaults to Slot Range 1-16.

Channel Mapping on the A360

To accommodate the higher channel count provided by Pro16e A-Net, the A360 maps network channels to mixer buttons. More sophisticated algorithms are required for managing the default routing of Pro16e channels from input modules to A360 Personal Mixers, particularly to avoid unexpected results when channels are switched from stereo to mono (or vice versa) at an input module.

Stereo Input Channels

For Pro16e systems using the default channel mapping on A360 mixers, input module channels should generally be viewed as channel pairs, similar to a stereo channel on a mixing console or DAW. Thus channel 1 and channel 2 on an input module are the left and right halves of what will become channel button 1 on an A360 Personal Mixer. (Input channels 3 and 4 map to A360 channel button 2, channels 5 and 6 to A360 channel button 3, and so on.)
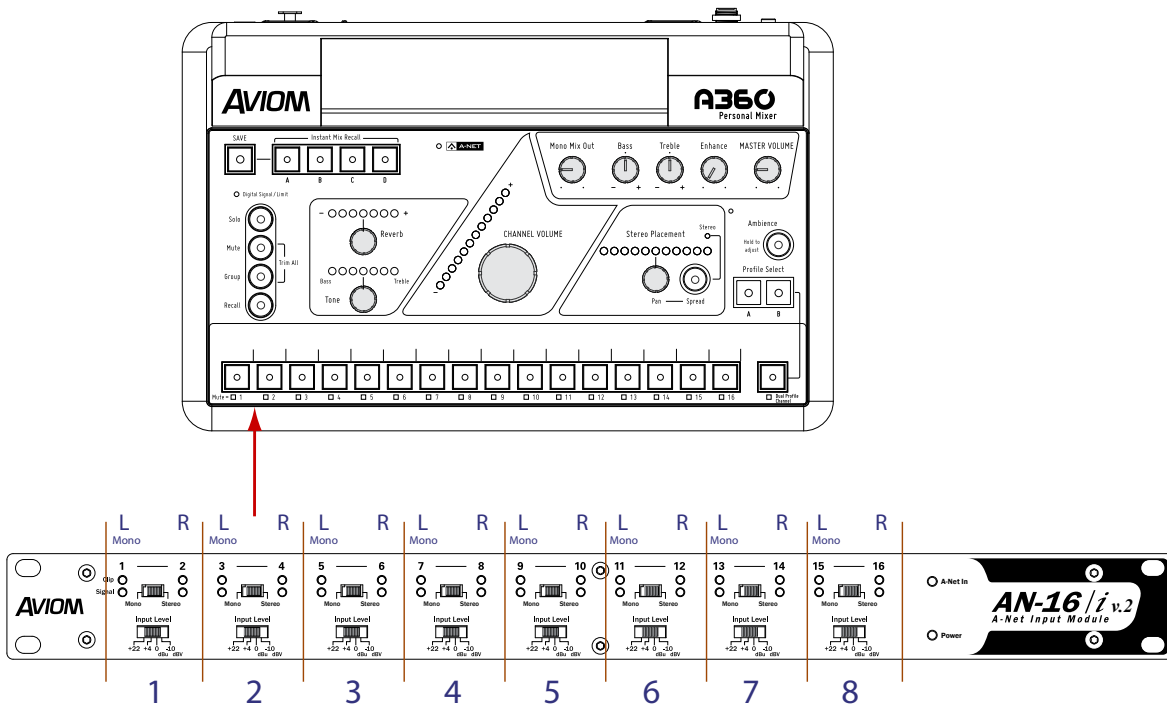
Inputs are treated as stereo pairs; audio sources connected to input jacks 3 and 4 become the second stereo pair when linked. They map to channel button 2 on an A360 Personal Mixer.

To link a pair of input channels on an AN-16/i v.2 move the front panel Mono/Stereo switch to the Sᴛᴇʀᴇᴏ position. The link is instantly transmitted throughout the network to all devices. Link switches may be changed at any time; updates are immediate. Remember that the input devices control the stereo linking; Personal Mixers cannot link channels locally.

How Stereo Links Work

When channels are stereo linked on the input module, both channels appear on the A360 as a stereo pair, using one mix channel button. The table shows the default mapping of 32 input sources to an A360.

AN-16/i v.2		Default A360 Channel	
Bank	Channel	If Stereo	If Mono
1-16	1	**1** *(left)*	**1**
	2	**1** *(right)*	*Ignored*
	3	**2** *(left)*	**2**
	4	**2** *(right)*	*Ignored*
	5	**3** *(left)*	**3**
	6	**3** *(right)*	*Ignored*
	7	**4** *(left)*	**4**
	8	**4** *(right)*	*Ignored*
	9	**5** *(left)*	**5**
	10	**5** *(right)*	*Ignored*
	11	**6** *(left)*	**6**
	12	**6** *(right)*	*Ignored*
	13	**7** *(left)*	**7**
	14	**7** *(right)*	*Ignored*
	15	**8** *(left)*	**8**
	16	**8** *(right)*	*Ignored*
17-32	1	**9** *(left)*	**9**
	2	**9** *(right)*	*Ignored*
	3	**10** *(left)*	**10**
	4	**10** *(right)*	*Ignored*
	5	**11** *(left)*	**11**
	6	**11** *(right)*	*Ignored*
	7	**12** *(left)*	**12**
	8	**12** *(right)*	*Ignored*
	9	**13** *(left)*	**13**
	10	**13** *(right)*	*Ignored*
	11	**14** *(left)*	**14**
	12	**14** *(right)*	*Ignored*
	13	**15** *(left)*	**15**
	14	**15** *(right)*	*Ignored*
	15	**16** *(left)*	**16**
	16	**16** *(right)*	*Ignored*

If the channels are *not* stereo linked, then only the odd (left) input module channel is utilized by the A360, and the even (right) input module channel is ignored (but may be used by A-16II mixers in the system or by A360 Personal Mixers that are running in Pro16 mode).
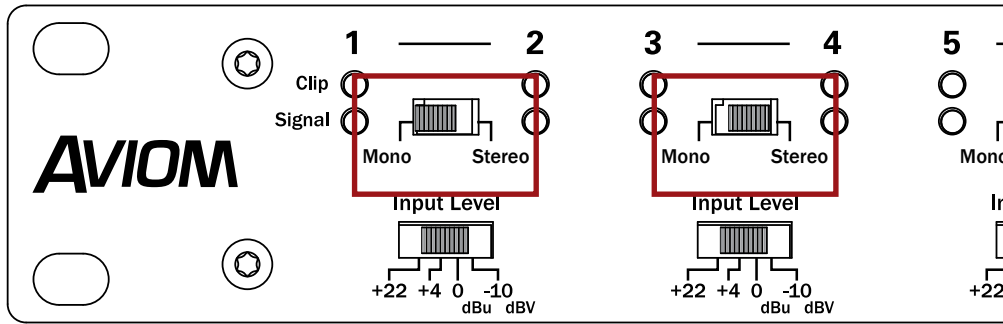
Inputs 1-2 are set to mono while inputs 3-4 are linked as a stereo pair.

For many Pro16e systems, the AN-16/i v.2 is better viewed as an input module with 8 stereo input channels rather than just 16 channels. This approach ensures predictable results and avoids any unexpected channel reassignment on the Personal Mixer as a result of a stereo link switch being changed on an input module. Stereo sources greatly benefit the performer. Keeping stereo keyboards, guitar processors, and submixes stereo preserves spatial information and allows a more accurate monitoring environment for the performer.

Beyond the Default Channel Mapping

Custom mode on the A360 in conjunction with the A360 Channel Manager software can be used to assign the network's input sources to the 16 mix channels, Dual Profile Channel and One-Touch Ambience buttons on each A360 Personal Mixer in a system, providing a custom channel layout for every performer. The table below shows a sample channel map for an A360 using Custom mode that includes stereo and mono sources.

A360 Channel Button	Slot Assignment	Source Name
1	1	Kick
2	2	Snare
3	7/8	Toms *Stereo*
4	11/12	Cymbals *Stereo*
5	17	Bass
6	31/32	Elec. Guitar 1 *Stereo*
7	15/16	Elec. Guitar 2 *Stereo*
8	9	Acoustic Guitar
9	23/24	Piano *Stereo*
10	21/22	Keyboards *Stereo*
11	35	Lead Vocal 1
12	40	Lead Vocal 2
13	37/38	Bkd. Vocals *Stereo*
14	49	Spare Mic
15	25/26	DAW Playback *Stereo*
16	5	Click Track
Dual Profile Channel	51/52	Video Playback *Stereo*
Ambience	Onboard Mic	A360 mic

Rear Panel Setup for Pro16e Systems

When creating a Pro16e personal mixing system it is important that the SLOT RANGE switch on each input module be set correctly. This switch assigns the incoming audio signals for each AN-16/i v.2 in use to a specific Slot Range within the Pro16e A-Net stream.

32-Channel Example

Using two AN-16/i v.2 Input Modules provides up to 32 mono or 16 stereo sources to A360 Personal Mixers. The 32-channel Pro16e A-Net stream created by this setup appears at the A-NET OUT on the *second* AN-16/i v.2. The first AN-16/i v.2 should be set to Slot Range **1-16**; the second AN-16/i v.2 should be set for **17-32**. Connect a Cat-5e UTP cable from A-NET OUT on the first AN-16/i v.2 to A-NET IN on the second AN-16/i v.2 Input Module.
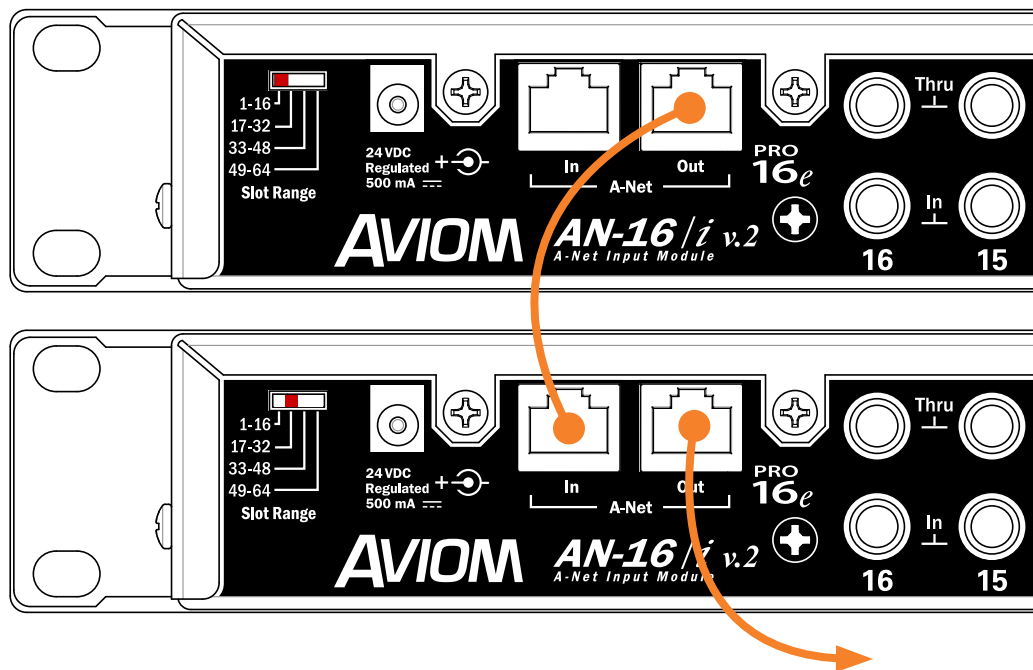
Set the Slot Ranges to 1-16 and 17-32 on the input modules.

Connect a Cat-5e cable from its A-NET OUT to the A-NET IN of an A-Net distributor and then connect Cat-5 cables from the distributor to the A360 Personal Mixers.

Connect audio sources to the AN-16/i v.2 audio inputs and then set the stereo link switches as needed per channel pair.

✓ NOTE: When adding the AN-16/i v.2 to an existing Pro16 system to expand the system's channel count for use with A360 Personal Mixers, the original input device in the system defaults to Slot Range 1-16. Connect the original input device's A-NET OUT to the A-NET IN on the AN-16/i v.2 and set the AN-16/i v.2 to Slot Range **17-32**.

64-Channel Example

Four AN-16/i v.2 Input Modules can provide up to 64 mono or 32 stereo sources to a personal mixing system using A360 Personal Mixers. Set the first AN-16/i v.2 to Slot Range **1-16**, the second AN-16/i v.2 to **17-32**; set the third input module to Slot Range **33-48** and the fourth to **49-64**.

Connect Cat-5e cables as shown in the example from **A-Net Out** on the first AN-16/i v.2 to **A-Net In** on the subsequent AN-16/i v.2 modules.
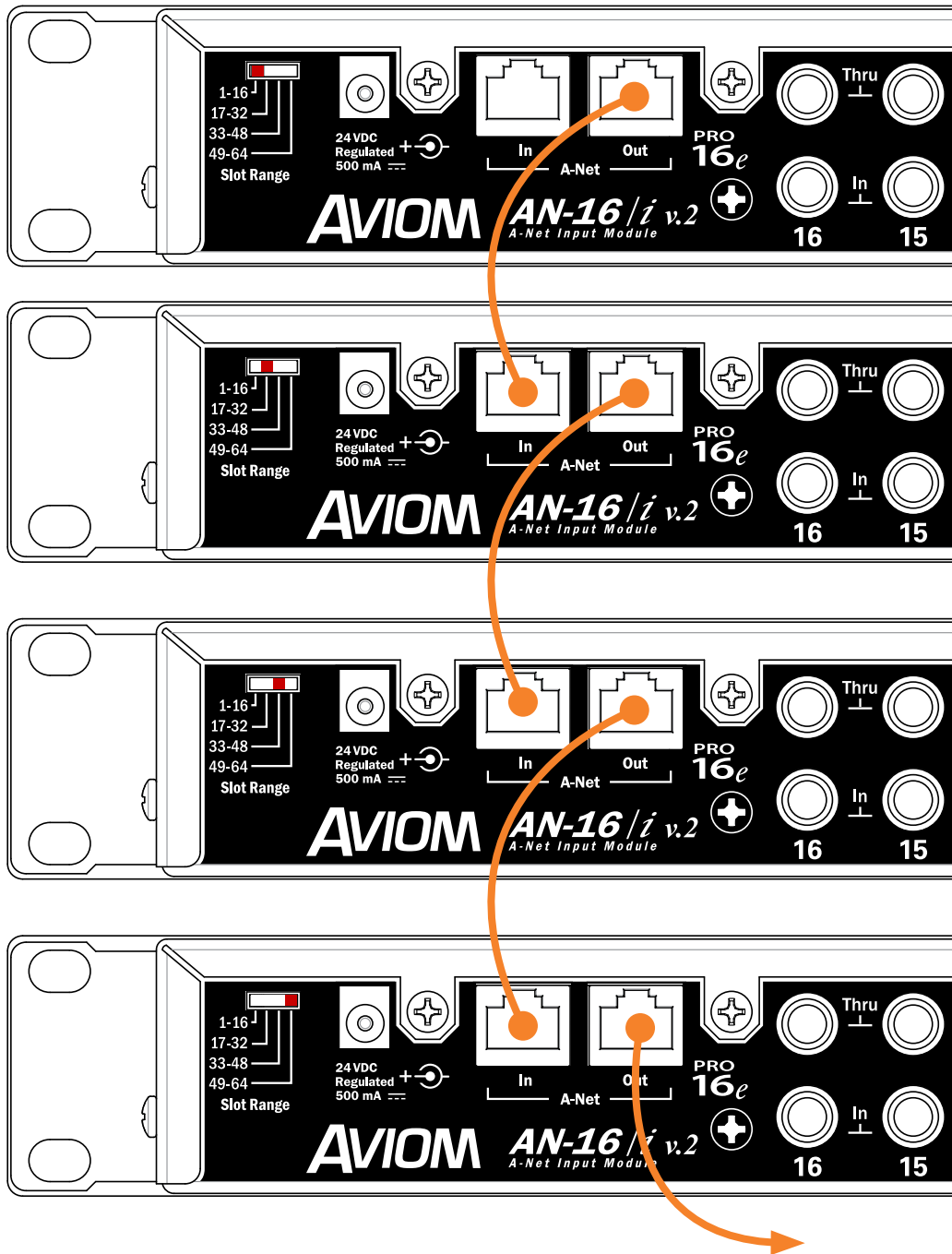
Slot Ranges and Cat-5 cabling for a 64-channel personal mixing system

Once the Cat-5 cables are configured as shown in the example, the 64-channel Pro16e stream created by this setup appears at the **A-Net Out** on the last (fourth) AN-16/i v.2. Connect a Cat-5e cable from its **A-Net Out** to the **A-Net In** on an A-Net distributor such as the A-16D Pro and then connect Cat-5 cables from the distributor to the A360 Personal Mixers.

Using Legacy Input Hardware

The *first* input device in a daisy chain of input devices may be a legacy Pro16 input module (e.g., original AN-16/i or AN-16/i-M Mic Input Module) or console card (e.g., Aviom's Y1 card for Yamaha® devices or a partner card). These channels are automatically assigned to channels 1-16, and other AN-16/i v.2 Input Modules in the system must be set to Slot Range 17-32, 33-48, and/or 49-64.
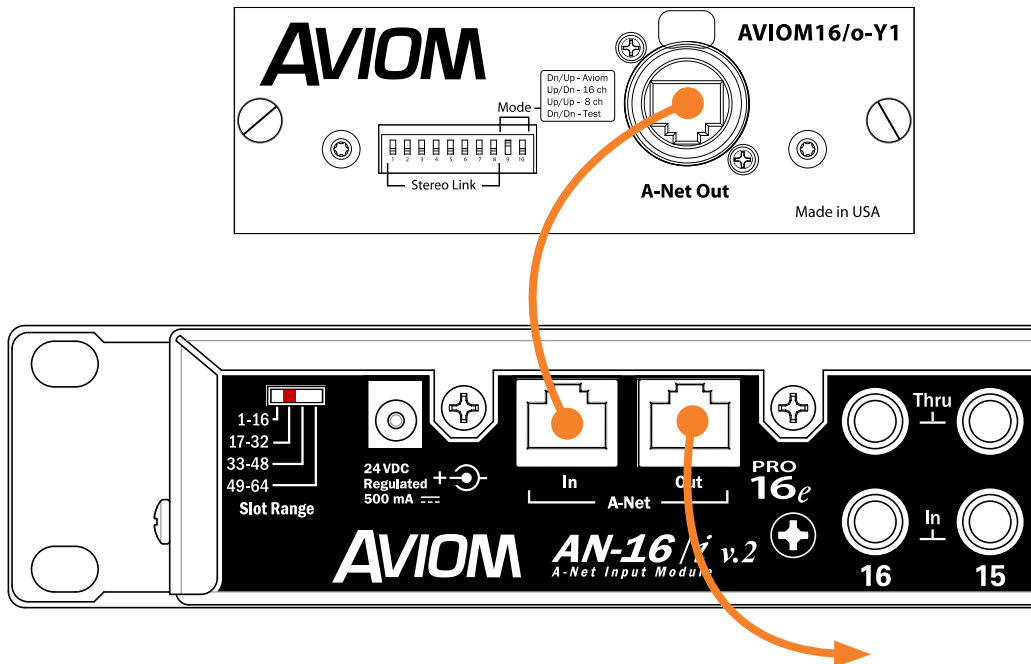
A legacy device such as a digital console card defaults to Slot Range 1-16 when connected to an AN-16/i v.2.

To use a legacy Pro16 device in a Pro16e personal mixing system:

1. Connect a Cat-5 cable from the **A-Net Out** on the legacy device to **A-Net In** on the AN-16/i v.2 input Module.

2. Set the AN-16/i v.2 Slot Range to **17-32**.

3. To add more channels, connect additional AN-16/i v.2 Input Modules with Cat-5 cables in the same manner; set their Slot Ranges to **33-48**, and/or **49-64**.

At this time, there is no ability to connect multiple legacy Pro16 input devices, including console cards, to create expanded channel count for A360 Personal Mixers. Systems with digital consoles may use a single Pro16 A-Net card but must use analog outputs from the console to connect to AN-16/i v.2 Input Modules for additional channels and a Pro16e stream.

Digital Snakes

Combining Pro16 input and output modules allows multi-channel audio to be easily distributed over long distances using a single Cat-5 cable. Up to 64 channels may be distributed in a variety of configurations. Pro16's plug-and-play simplicity allows digital snakes to be easily reconfigured, adding to their flexibility.

Basic Digital Snake Configuration

When designing a digital snake using Pro16 devices, each input module will be paired with an output module. There is a one-to-one correspondence between inputs and outputs. A source connected to input channel #1 on an input module appears at output channel #1 on the output module. No matrix patching or channel routing is possible.

The most basic digital snake uses a single AN-16/i v.2 Input Module paired with one AN-16/o Output Module. On the AN-16/i v.2 set its Slot Range switch to the **1-16** position. Then simply connect the **A-Net Out** on the AN-16/i v.2 Input Module to the **A-Net In** on the AN-16/o Output Module.
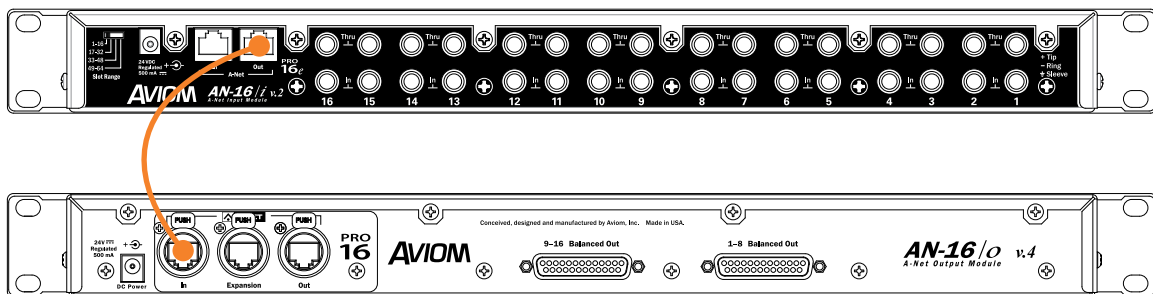
A basic 16 x 0 digital snake sends 16 line-level sources over one Cat-5 cable.

This configuration would be called 16 x 0, or 16 sends and no returns. The Cat-5 cable used between the input and output devices may be up to 400 feet (122) meters) in length.

System Bridge

The AN-16SBR System Bridge is used to simplify the Cat-5 wiring when configuring Pro16 digital snakes. This passive device takes four Pro16 or Pro16e A-Net streams and enables all four streams to be transported over a single Cat-5 cable. In a typical digital snake this will be the longest cable, so the AN-16SBR offers substantial savings in the amount of cable used as well as the time and labor to connect it.
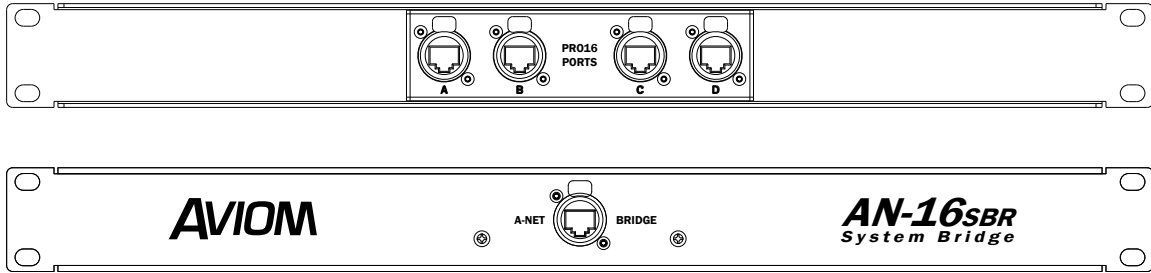
AN-16SBR System Bridge front and rear panels are shown.

The AN-16SBR is sold as a pair; each has four A-Net ports on the rear (labeled **A**, **B**, **C**, and **D**) and a **BRIDGE** port on the front. Each rear panel port supports one input/output pair of A-Net devices.

Digital Snake - 16 x 16

To configure a 16 x 16 (16 Sends, 16 Returns) digital snake, two AN-16/i v.2 Input Modules and two AN-16/o Output Modules are used, connected via the System Bridge.

Setup On Stage

Place the following on stage:

- one AN-16/i v.2 Input Module
- one AN-16/o Output Module
- one AN-16SBR

Make these connections:

1. Set the Slot Range switch on the AN-16/i v.2 Input Module to **1-16.**

2. Connect the **A-Net Out** of the AN-16/i v.2 to port **A** on the System Bridge.

3. Connect the **A-Net In** of the AN-16/o Output Module to port **D** on the System Bridge.
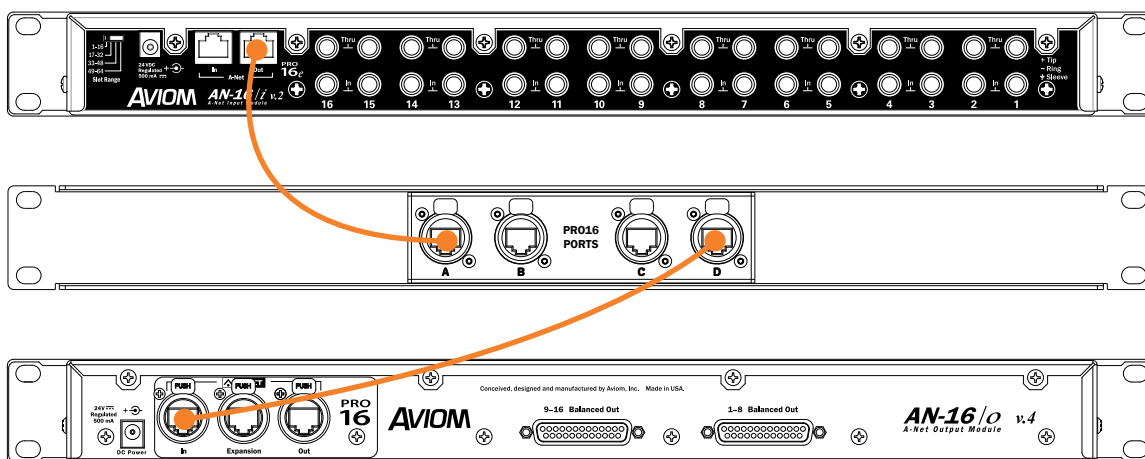
Cat-5 connections on stage for the 16 x16 digital snake are shown.

Setup at Front-of-House (FOH)

Place the following at front-of-house:

- one AN-16/i v.2 Input Module
- one AN-16/o Output Module
- one AN-16SBR

Make these connections:

1. Set the Slot Range switch on the AN-16/i v.2 Input Module to **1-16.**
2. Connect the **A-Net Out** of the AN-16/i v.2 to port **D** on the System Bridge.
3. Connect the **A-Net In** of the AN-16/o Output Module to port **A** on the System Bridge.
4. Finally, connect the stage to the FOH position with a Cat-5 cable connected between the two **Bridge** ports on the System Bridges.
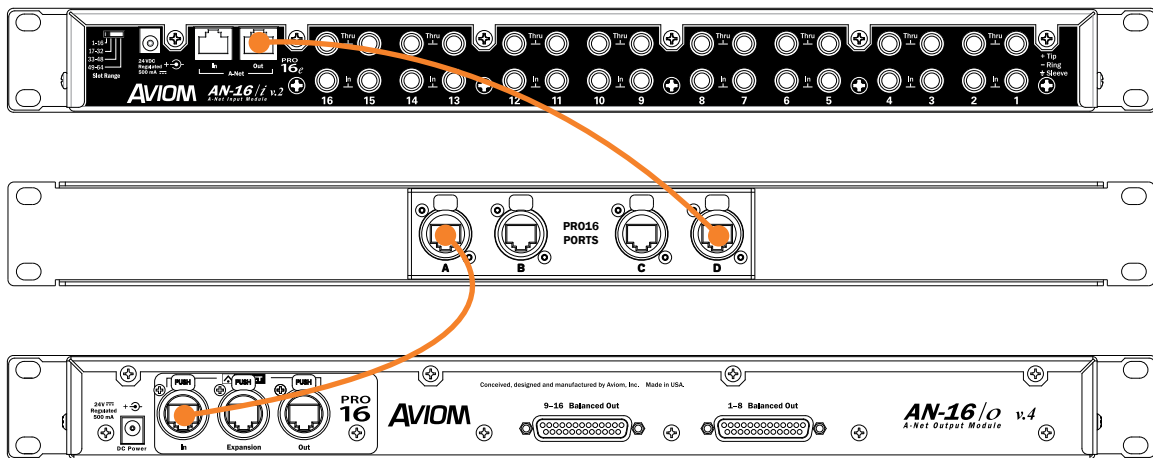
The FOH configuration

✓ **Note:** Remember that the maximum cable distance must not exceed 400 feet (122 meters) measured from the AN-16/i v.2 on stage to the AN-16/o at FOH.

Digital Snake - 32 x 16

Adding 16 more inputs to the 16 x16 digital snake configuration is simple; one more AN-16/i v.2 is added on the stage and another AN-16/o Output Module is required at front-of-house.

Starting with the 16 x16 configuration described previously, make these connections:

1. On stage, make sure that the Slot Range switch is set to **1-16** on the AN-16/i v.2 being added.

2. Connect the **A-NET OUT** of the AN-16/i v.2 Input Module to port **B** on the System Bridge.

3. At front-of-house, connect the **A-NET IN** of the AN-16/o Output Module to port **B** on the System Bridge.
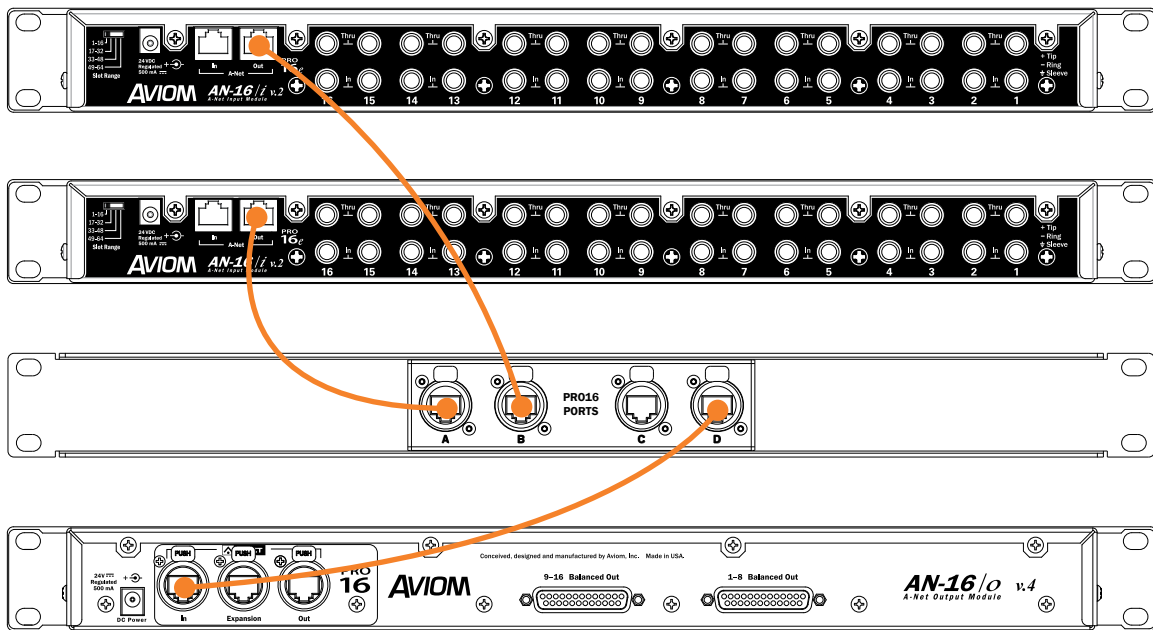
This shows the Cat-5 patching for the 32 x 16 configuration on stage.

Digital Snake - 48 x 16

To increase the digital snake to its maximum size using all four ports of the System Bridge, one more AN-16/i v.2 is added on the stage connected to another AN-16/o Output Module at front-of-house.

Starting with the 32 x16 configuration described previously, make these connections:

1. On stage, make sure that the Slot Range switch is set to **1-16** on the AN-16/i v.2 being added.

2. Connect the **A-NET OUT** of the AN-16/i v.2 Input Module to port **C** on the System Bridge.

3. At front-of-house, connect the **A-NET IN** of the AN-16/o Output Module to port **C** on the System Bridge.
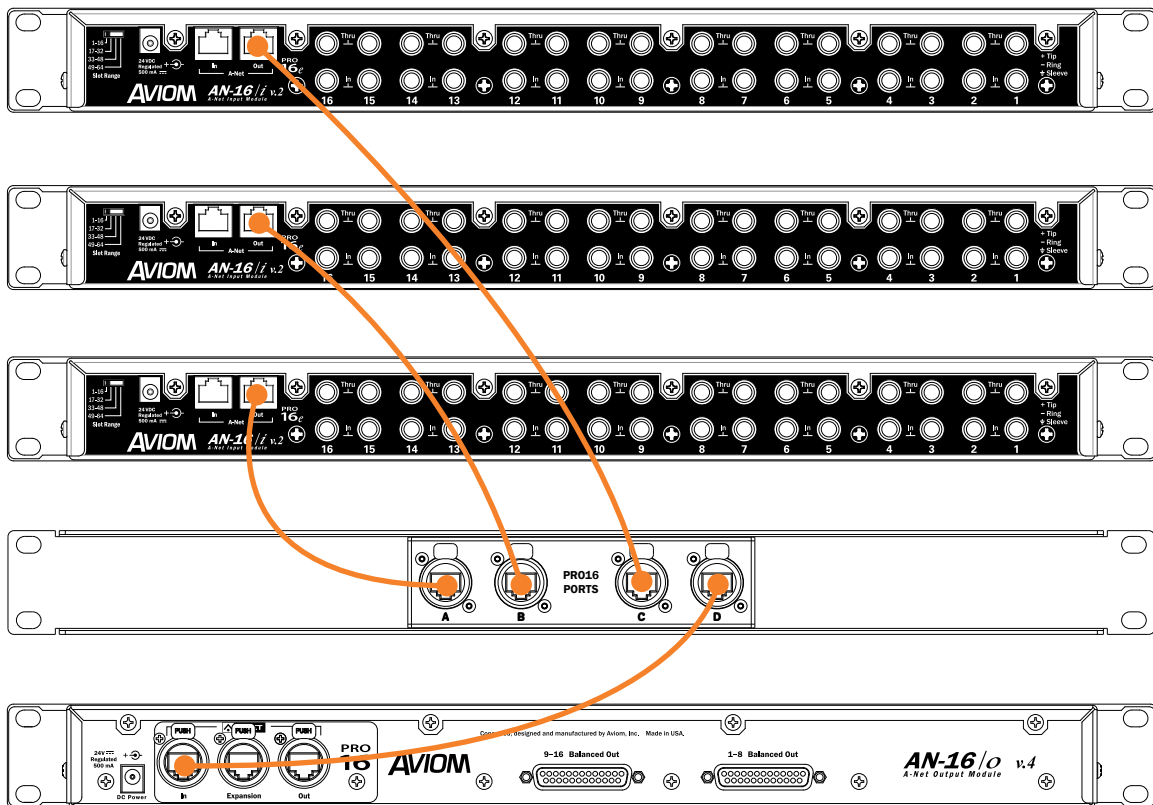
Cat-5 patching for the 48 x 16 configuration on stage

✓ **NOTE** The AN-16/i v.2 Input Modules shown in the preceding diagrams may be replaced with any compatible Pro16 input module or console interface card.

Adding Audio Outputs - Splits

The A-Net Out ports on the AN-16/o Output Modules are not used when configuring and patching a digital snake system (with or without a System Bridge). This allows additional output modules to be added as needed to suit a variety of audio situations, creating a digital split—an exact copy of the digital audio sent to the device via A-Net.

Any Pro16 A-Net compatible product that has an **A-Net In** port can be connected to an **A-Net Out** port of a device used in a digital snake. This includes:

- AN-16/o Output Module
- AV-P2 Output Module

To add a split:

1. First start by configuring the digital snake according to your basic needs (16 x 16, or 32 x 16, etc.).

2. Connect a Cat-5e cable from the **A-Net Out** port of the AN-16/o Output Module whose audio you wish to copy to the **A-Net In** port on the AN-16/o Output Module being used for the split.

✓ **Note:** The Cat-5e cable connected to the output device used for the digital split may be up to 400 feet (122 meters) in length for Pro16e devices or up to 500 feet (150 meters) if Pro16 A-Net devices are connected.

In a digital snake application a Personal Mixer may also be added to create a monitor station, quality control checkpoint, recording feed, etc. Compatible products include:

- A360 Personal Mixer
- A-16II Personal Mixer
- A-16R Rack-mount Personal Mixer

Specifications

Audio Inputs	16, balanced line-level
TRS Inputs	Tip: Audio +; Ring: Audio -; Sleeve: Ground
TRS Thru	Tip: Audio +; Ring: Audio -; Sleeve: Ground
A/D Conversion	48kHz, 24-bit
Input Level / Gain Settings	+22dBu, +4dBu, 0dBu, -10dBV 4-position gain switch, per channel pair
Metering	Two LEDs per channel; green: Signal Present, red: Clip;
Stereo Operation	Stereo link, per channel pair; Two-position switch (Mono, Stereo)
Maximum Input Level	+22dBu
Input Impedance	17.8k ohms
Frequency Response	4Hz-22kHz +0.2dB/-3dB
THD +N	< 0.003%
Crosstalk	-90dB
Signal to Noise (unweighted)	90dB typical, A/D to D/A; Measured from AN-16/i v.2 to AN-16/o Output Module
Bit Error Rate (BER)	10^{-12}
Digital Output	1 A-Net Out; RJ45 connector
Digital Input	1 A-Net In; RJ45 connector
A-Net Pro16e Slots	4-position Slot Range switch assigns the A-Net output to occupy Slots 1-16, 17-32, 33-48, or 49-64
A-Net	Uses unshielded Cat-5e UTP (or better) cable
A-Net Cable Length	400 feet (122 m)
Latency	<0.880 msec (measured from analog input to analog output)
Power Supply **Input Voltage** **Output Voltage** **Plug Size**	External, DC, universal switching type 100-240 volts, 50/60Hz, 30VA 18-24 VDC, 0.5 amp 2 mm
Dimensions	19" (482.6 mm) wide x 5.75" (146 mm) deep; 1U high
Weight	6.8 lb. (3.08 kg)
Options	AN-16SBR System Bridge; used to combine up to four A-Net streams for transmission over one Cat-5e cable

All Aviom products are designed and manufactured in the USA.

Dimensions

17.378
[441.40]

.239
[6.07]

5.75
[146.05]

.119
[3.02]

1.720
[43.69]

[.1.75]

18.312
[465.12]

19.000
[482.60]

1.674
[42.52]

Block Diagram

Audio Input 1-16

Audio Thru 1-16

Input Level
- +22dBu
- +4dBu
- 0dBu
- -10dBv

A/D converter

A-Net In

A-Net

Signal   Clip

Stereo channel link
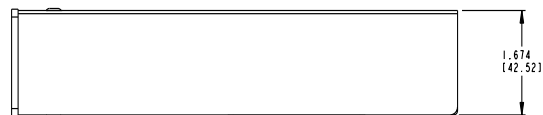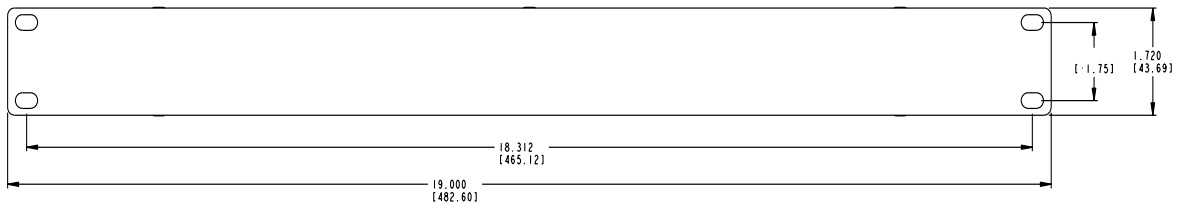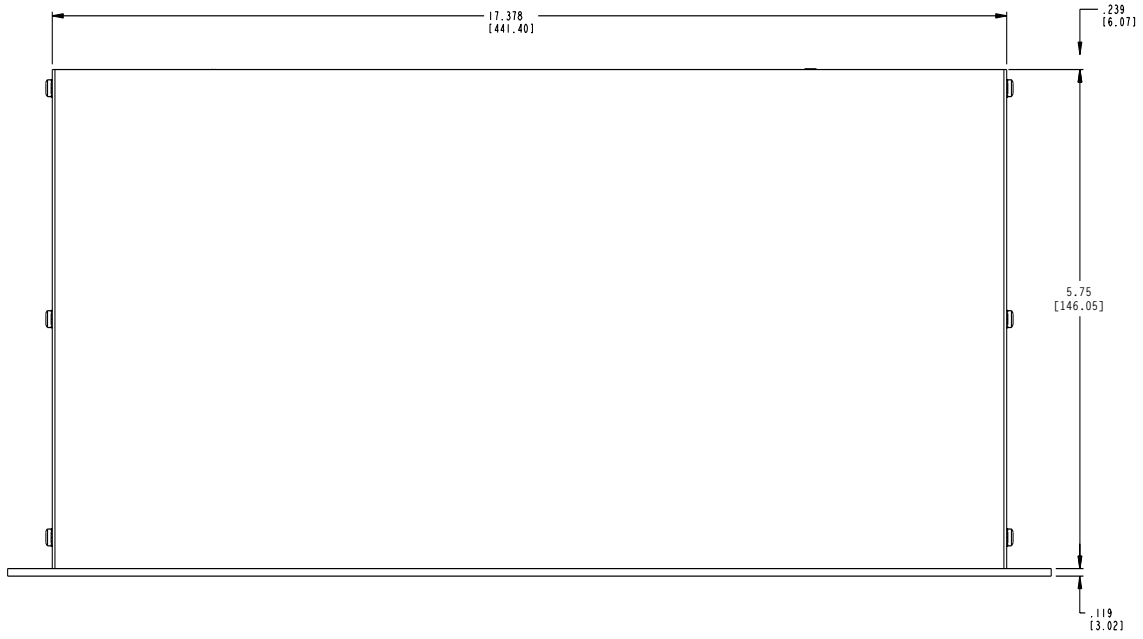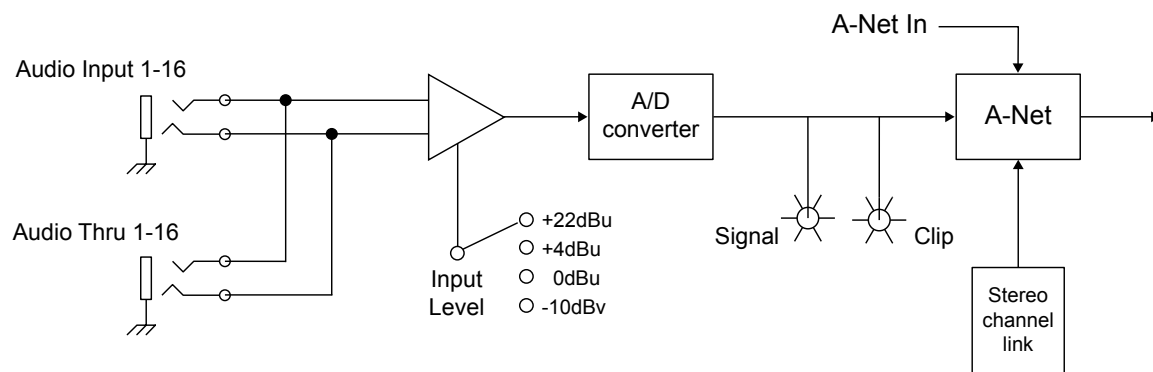
Cat-5 Cable Pinout

The tables below detail the two wiring pinout variations for Cat-5 cables. When making custom cables, either pinout can be used, but both ends of a cable must use the same wiring pattern.

T568A

RJ45 Pin	Wire Color	
1	White/Green	
2	Green	
3	White/Orange	
4	Blue	
5	White/Blue	
6	Orange	
7	White/Brown	
8	Brown	

T568B

RJ45 Pin	Wire Color	
1	White/Orange	
2	Orange	
3	White/Green	
4	Blue	
5	White/Blue	
6	Green	
7	White/Brown	
8	Brown	

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A

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