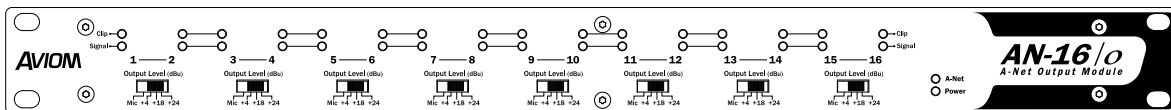


# AVIOM®

## **AN-16/o** A-Net Output Module



## User Guide

## 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 is 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 62368-1 Ed 2.0; Proposal Number 500542870;  
Testing done to UL 62368-1 first edition  
Can/CSA C22.2 62368-1

ETL/cETL Listed and RoHS Compliant



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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.

THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE (OR JURISDICTION TO JURISDICTION). AVIOM'S RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS LIMITED WARRANTY STATEMENT. ALL EXPRESS AND IMPLIED WARRANTIES FOR THE PRODUCT, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE WARRANTY PERIOD SET FORTH ABOVE. NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER SUCH PERIOD.

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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](http://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.

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Although every effort has been made to ensure the accuracy of the text and illustrations in this manual, no guarantee is made or implied as to the accuracy of the information contained within.

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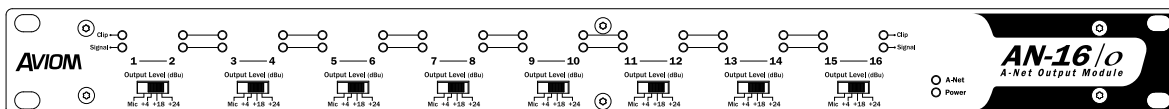
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# AN-16/o v.4 Output Module

Thank you for purchasing the **Aviom AN-16/o v.4 Output Module**. This User Guide is designed to familiarize you with your new product and to have your Pro16® products up and running as quickly as possible.



## Features

The AN-16/o v.4 is part of Aviom's Pro16® Series of products; it can be combined with other Pro16 devices to create digital snakes, audio distribution systems, and personal mixing systems for applications such as live performance, broadcast, and recording.

AN-16/o v.4 Output Module Features:

- Sixteen balanced line level outputs
- Two D-Sub DB25 multipin audio output connections, each carrying eight channels of balanced audio data
- Adjustable output level switches per channel pair
- Signal and Peak LEDs on each channel
- A-Net In, Out, and Expansion jacks
- 1U-high rack-mountable enclosure

## Conventions Used in this Document

### Using Personal Mixers

When referring to the use of the Personal Mixers in a personal mixing system in general, the term **Personal Mixer** is used to describe a case where an A320 Personal Mixer or A360 Personal Mixer can be used. Legacy personal mixers such as the A-16II and A-16R may also be used.

### Cat-5 Cables

In most cases 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 Aviom D800, D800-Dante, D400, D400-Dante, A-16D and A-16D Pro A-Net Distributors are referred to generically as **A-Net Distributors**. These are used to supply power to a Personal Mixer and to copy an A-Net digital signal and split it into multiple copies so that Personal Mixers may be connected in parallel.

## Channels and Slots

Analog input devices and digital console cards used with Aviom personal mixing systems typically provide 16 input channels each to the Pro16 network. Once a part of the network, we refer to these resources as **Slots** rather than channels.

## Button Presses

When instructed to press a specific button on a product a special font style is used. For example, when referring to an A320 Personal Mixer, "Press the **Solo** button."

## Package Contents

---

The AN-16/o v.4 Output Module box includes:

- One AN-16/o v.4 Output Module
- One DC Power supply
- Documentation

Options for your system include:

- Cat-5e interconnect cables
- SB4 System Bridge
- Aviom Personal Mixer products such as the A360 and/or A320 Personal Mixers for creating a personal mixing system
- 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.

## 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 A320 and A360 Personal Mixers which can take advantage of the higher network channel count that Pro16e provides.

## Compatibility

---

The AN-16/o v.4 Output Module is compatible with current and legacy Pro16, Pro16e, and Pro64 A-Net devices as detailed below.

### Pro16 Products

The **A-Net Out** from the following devices may be connected to the **A-Net In** on the AN-16/o v.4 Output Module to provide 16 channels of A-Net data:

- AN-16/i v.2 Input Module
- AN-16/i-M Mic Input Module
- AV-M8 Mic Input Module
- Aviom16/o-Y1 A-Net Card for Yamaha® devices
- Third-Party Pro16 A-Net digital console cards
- D400 A-Net Distributor
- D400-Dante A-Net Distributor
- D800 A-Net Distributor
- D800-Dante A-Net Distributor

The **Mixes Out** port on the D800 and D800-Dante A-Net Distributors may also be connected to the **A-Net In** on the AN-16/o v.4 Output Module.

*Compatible Legacy Products:*

- AN-16/i Input Module
- A-16D A-Net Distributor
- A-16D Pro A-Net Distributor

### Pro64 Products

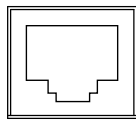
Adding the ASI A-Net Systems Interface to a Pro64® digital snake or audio network allows Pro64 channels to be translated into Pro16 data. The ASI separates the 64-channel Pro64 stream into up to four 16-channel Pro16 outputs, depending on the Pro64 sample rate being used. Any of the four Pro16 A-Net outputs from the ASI may be connected to the A-Net In on an A-Net Distributor to supply A-Net data and DC power to Personal Mixers. The ASI's Pro16 A-Net outputs can also be connected directly to the A-Net In on the AN-16/o v.4 Output Module.

## About Category 5

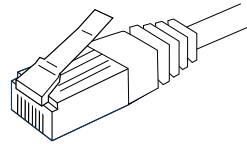
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The term Category 5 (also referred to as *Cat-5*) is broadly used to describe a type of high performance network cabling used for data transmission purposes to connect computer networks and other devices. A standard patch cable consists of four twisted 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.



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, do not connect computers, routers, or other home and business networking equipment to your Aviom products.

---

## Cat-5e Cables

---

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.) A Cat-5 cable wiring pinout table is included at the end of this document. See page 26.

In addition to standard Category 5e cables, Cat-6 and Cat-6e cables may also be used.

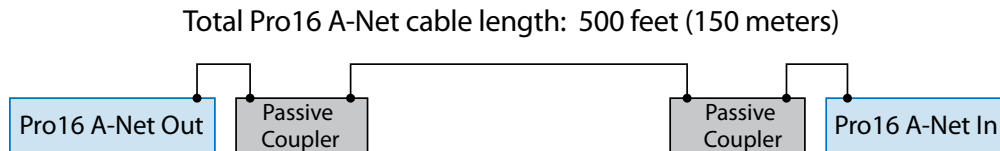
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✓ **NOTE:** When purchasing Category 5e cables, be sure to buy only standard Cat-5e cables, not those sold as crossover cables. A crossover cable is used for file transfer between two computers and is not compatible with your Aviom equipment.

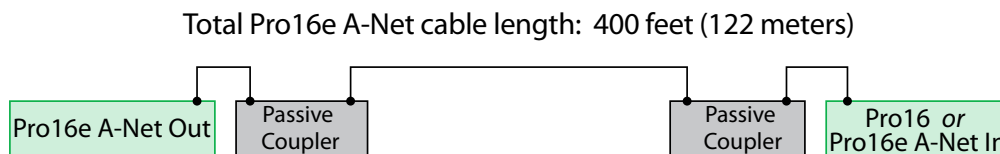
---

## 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 a Y1 console card from a Yamaha digital console to the **A-Net In** on a D800 A-Net Distributor is such a connection.



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.



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 installations in walls and across ceilings.

When using the optional SB4 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 System Bridge, plus all cables. This is also true when using a passive 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.

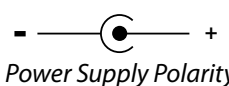
Other options for protection of your equipment include the use of an AC line conditioner or a battery backup system (sometimes referred to as an *uninterruptible power supply*, or UPS).

## 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.

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

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. (See the diagram above.)

## Installing in an Equipment Rack

---

The AN-16/o v.4 Output 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). Optionally, you can place the units on a table top or other flat surface such as a shelf.

The rack ears on each side of the device are designed to support the weight of the AN-16/o 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/o, 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.

## Locking Cat-5 Connector

---

The AN-16/o v.4 Output Module is built with locking dual RJ45 type Cat-5 connectors. It can receive a standard Cat-5e cable or a cable fitted with the special heavy-duty EtherCon connector.

When using a standard Cat-5e cable, plug the cable into the center of the jack; release the cable by pressing on the small plastic tab built into the cable connector.

The locking EtherCon connector is similar to an XLR cable, the kind commonly used on microphones. Insert an EtherCon equipped cable into the jack until it clicks and locks in place. To remove the cable, press on the metal release tab at the top of the panel-mounted EtherCon jack and pull the connector outward.

## 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.

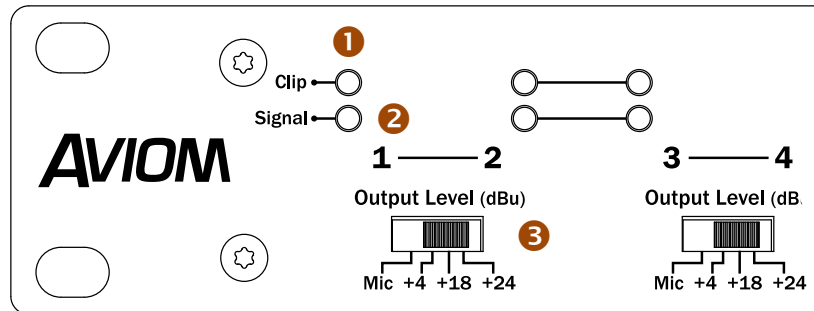
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✓ **NOTE:** Never use solvents or abrasive cleaners on the finished surfaces of your Aviom products.

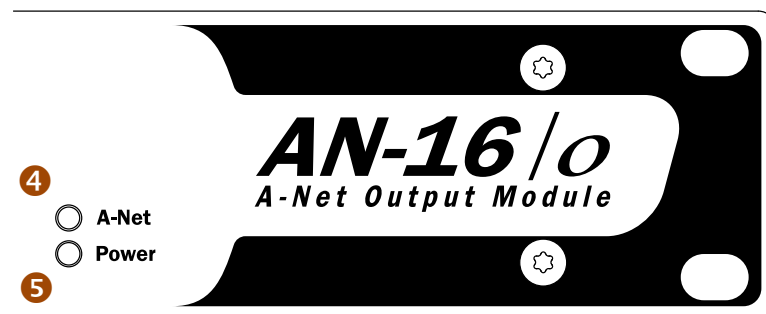
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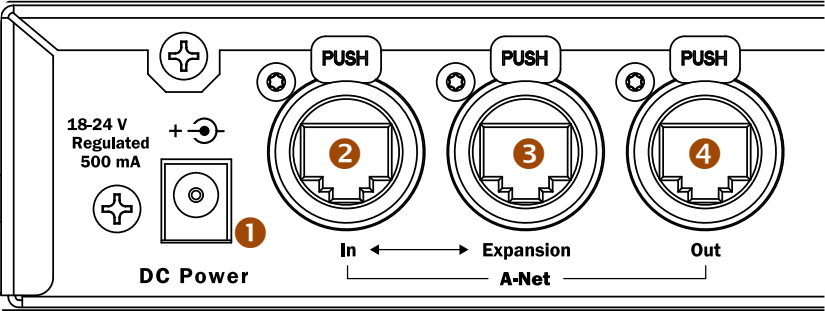
## Front Panel



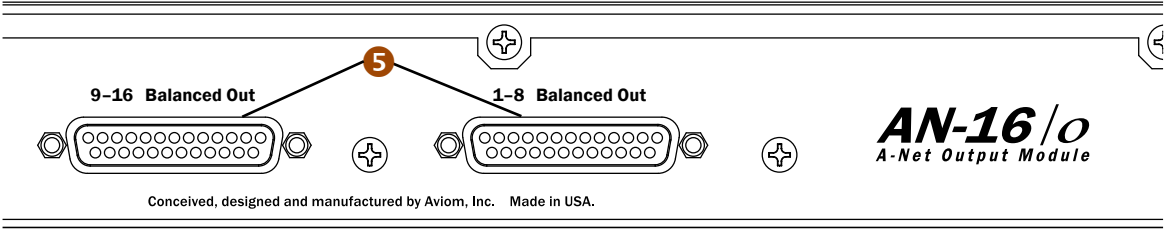
FUNCTION	
1	Clip LED, red - lights when the audio signal hits (0dB) full scale at the input module, indicating that the source audio signal is too high.
2	Signal Present LED, green - lights to show that an audio signal is present on a channel
3	Output Level Switch - in the left position, the channel pair is output at mic level; move the switch to the right to select +4dBu, +18dBu, or +24dBu line-level output.
4	Power LED - indicates that the AN-16/o is on
5	A-Net LED - indicates that the AN-16/o is receiving valid A-Net data



# Rear Panel

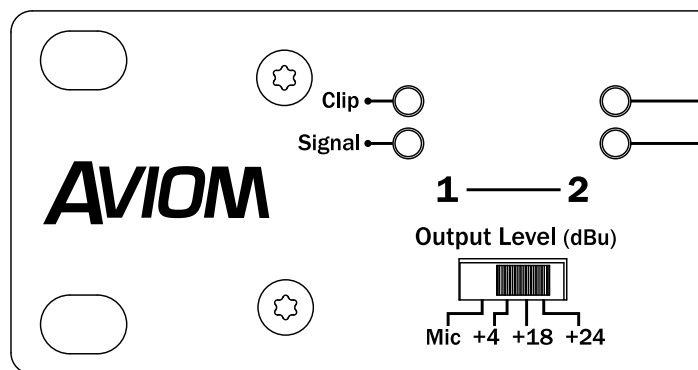


FUNCTION	
1	DC Power Jack - connect the DC power supply here
2	A-Net In Jack - connect the Cat-5 cable from the A-Net input module or console card here
3	A-Net Expansion Jack - used when creating a 32-channel system with two AN-16/i and two AN-16/o units
4	A-Net Out Jack - connects to any A-Net compatible device
5	Analog Audio Outputs - DB25 d-sub jack supplies a balanced line-level audio signal; eight channels per jack



## AN-16/o v.4 Output Module Front Panel

The front panel of the AN-16/o v.4 Output Module contains the channel Output Level switches, Signal Present LEDs, Clip LEDs, the A-Net LED, and the Power indicator.



The AN-16/o v.4 front panel

### Channel LEDs

The sixteen numbered Channels on the AN-16/o v.4 front panel correspond to the line-level analog audio outputs on the rear panel. Each Channel contains two LEDs, one showing that there is an audio signal present, and another used to indicate that the channel's input source is clipping. Signal and Clip LEDs appear directly above the Channel numbers.

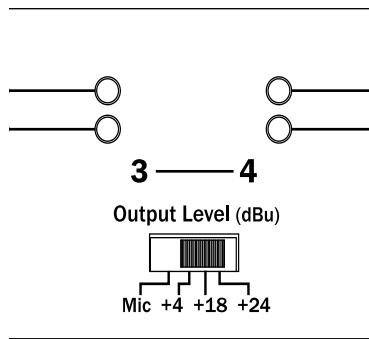
The lower LED, marked *Signal*, will light as long as an audio signal of at least -40dB is present on the channel. It provides an easy way to confirm that audio is present on a channel of the AN-16/o v.4 Output Module.

The upper LED is marked *Clip*. It will light if the input signal coming into your Pro16 input module (AN-16/i v.2 or AN-16/i-M Input Module, console card, etc.) is too high, causing the audio outputs of the AN-16/o v.4 to sound distorted. In general, you want to operate the system so that the Clip LED on the Pro16 input module lights only occasionally. If the LED is on constantly, you should either lower the volume of the source audio coming into the input module or try different Input Level settings. When using a compatible Pro16 console card as the input module, avoid clipping the host console's inputs.

### Output Level Switches

The AN-16/o v.4 has been designed to work with a wide range of professional audio gear. There are four Output Level settings available on the front panel—mic level and +4dBu, +18dBu, and +24dBu line level.

The **Mic** setting is appropriate for use with the mic preamp input on mixing consoles, audio interfaces for DAWs, etc. Use this setting if the device you are connecting to has no available line-level inputs.

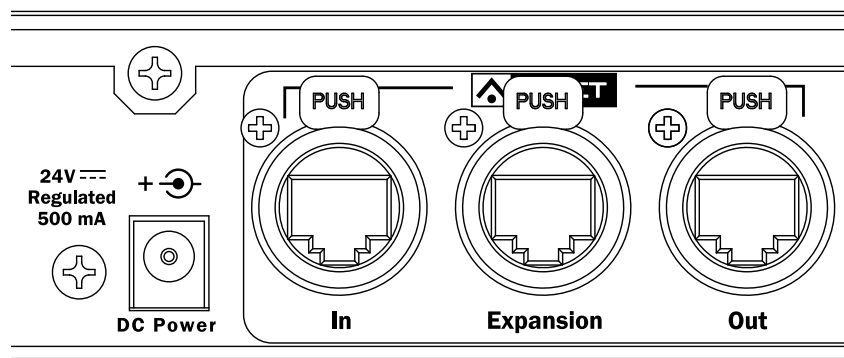


Output level switches on the AN-16/o v.4 affect a pair of channels at a time.

Choose a line-level output level setting based on the receiving device's maximum input level before clipping. Check the specifications of your audio gear if you are unsure about its maximum input level. Although you won't harm the AN-16/o v.4 or your audio devices by using an incorrect level setting, you do want to avoid sacrificing signal-to-noise ratio or distorting the audio that passes through the system.

## AN-16/o v.4 Output Module Rear Panel

On the rear of the AN-16/o v.4 Output Module you will find the A-Net connectors, the power supply input, and the balanced line-level multipin audio outputs.



A-Net connections on the AN-16/o v.4 rear panel

## DC Power Input

Connect the 24V DC power supply to the jack on the rear of the AN-16/o v.4 Output Module. Use only power supplies designed for use with your Aviom products.

## A-Net Connections

There are three A-Net connectors on the rear of the AN-16/o v.4 Output Module, marked **In**, **EXPANSION**, and **Out**.

### A-Net In

The **A-Net In** jack accepts

- the A-Net signal coming from an AN-16/i v.2 or AN-16/i-M Input Module, Y1 card (Yamaha) or compatible third-party Pro16 console card
- A-Net from the Expansion jack of an AN-16/o v.4 Output Module or an AN-16/i or AN-16/I-M Mic Input Module
- the A-Net signal coming from the A-Net Out jack of an A-16II Personal Mixer
- the A-Net Out signal from an A-Net Distributor
- the Mixes Out A-Net data from the D800 or D800-Dante A-Net Distributor

## A-Net Out

The **A-Net Out** jack is used to connect the incoming digital A-Net data to another A-Net device. This will send the same sixteen audio channels being received by the AN-16/o v.4 Output Module to the next A-Net device, creating a digital split. An unlimited number of A-Net devices can be connected in series using this method. Any A-Net device, including A-Net Distributors can be connected here.

## A-Net Expansion

The **A-Net EXPANSION** jack is used when a 32-channel system is created by using two AN-16/i (or AN-16/i-M) Input Modules and two AN-16/o v.4 Output Modules. Using A-Net Expansion allows thirty-two channels of audio to travel down a single Cat-5 cable, up to the maximum of 500 feet, 150 meters.

## Audio Outputs

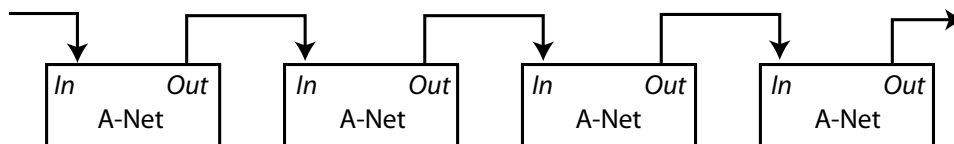
The DB25 multipin outputs on the rear of the AN-16/o v.4 Output Module can be used with any device that can accept a mic- or line-level audio output, such as mixing consoles, wireless transmitters, recording devices, and powered speaker systems. The DB25 connections are wired to the Tascam® analog standard. Breakout cables are readily available from a variety of manufacturers.

## A-Net Connections

In a simple Pro16 system, the easiest connection method uses what is called a *daisy chain*. That is, each A-Net device is connected in series. The first device in the chain receives the A-Net signal from the Pro16 input module such as the AN-16/i v.2 Input Module or a compatible Pro16 console card. Each successive A-Net compatible device gets its A-Net connection from the A-Net Out jack of the device preceding it in the chain.

### Series Connection of A-Net Devices

The diagram below illustrates a series connection of A-Net devices.



In this diagram, A-Net is connected from device to device using Cat-5e cable. The A-Net Out port on the first device connects to the A-Net In port on the next, and so on.

There is one drawback to this connection method, however. If one A-Net device in the chain is disconnected from the A-Net signal chain, all units beyond this point will not get any audio until the unit is reconnected to a valid A-Net source.

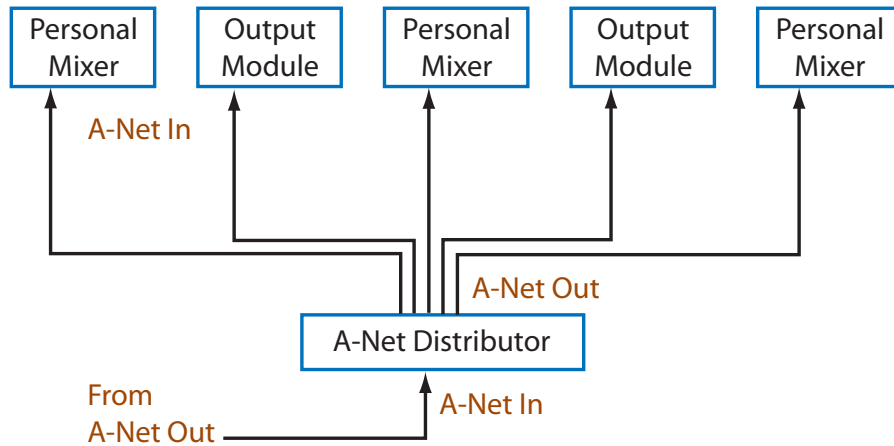
A parallel A-Net connection solves that problem. By using an A-Net Distributor, parallel A-Net connections are possible. In fact, any combination of series and parallel connections can be used to solve even the most complex audio routing problems.

## Parallel A-Net Routing

Connecting A-Net devices in parallel involves the addition of an A-Net Distributor. Any number of A-Net Distributors can be added, creating an infinite number of digital splits.

### Using an A-Net Distributor

A variety of A-Net compatible components are shown connected in parallel to an A-Net Distributor in the diagram below.



The A-Net outputs from an A-Net Distributor are connected to each A-Net compatible device with a Cat-5e cable. Removing one A-Net device has no effect on the other A-Net devices being used.

When designing an A-Net system, Pro16 modules can be connected in any order; simply connect **A-Net Out** to **A-Net In** as needed.

## Multi-Channel Systems

---

When more than sixteen channels of audio are required in a Pro16 digital snake or audio distribution network, Aviom offers the SB4 System Bridge as an option. The System Bridge allows up to four A-Net streams to be combined onto a single Cat-5e cable for distribution over long distances.

## 32-Channel Systems

---

Aviom's products work in modules of sixteen channels. Thirty-two channel systems can be configured as:

- 32 channels send by zero channels return (32 x 0)
- 16 channels send by 16 channels return (16 x 16)
- 0 channels send by 32 channels return (0 x 32)

The descriptions above are similar to those used for traditional multi-core analog audio snakes. The configurations refer to the number of audio channels used as inputs on each side of the snake. For example, the "32" in the 32 x 0 configuration means that 32 audio inputs can be connected at the stage to send to the front-of-house (FOH) mix position. The "0" means that on the there are no audio inputs used to send audio back to the stage position.

A thirty-two channel system is comprised of four AN-Series units, two input modules and two output modules. Since the system is modular, you can connect the AN-Series units as needed, making any of the configurations mentioned previously available at any time. Simply move and re-patch the units.



## 64-Channel Pro16 Systems

When used with the optional SB4 System Bridge, the AN-16/i and AN-16/i-M Input Modules along with the AN-16/o v.4 Output Module can create digital snakes or audio networks of up to sixty-four channels. Up to four Pro16 input modules and four output modules can be used in a variety of combinations to create a flexible and reconfigurable audio distribution network.

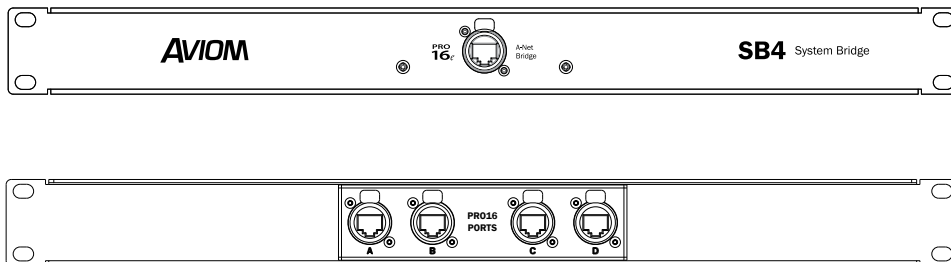
Aviom's Pro16 products work in modules of sixteen channels. Systems of up to sixty-four channels can be configured as:

- 64 channels send by zero channels return (64 x 0)
- 48 channels send by 16 channels return (48 x 16)
- 32 channels send by 32 channels return (32 x 32)
- 16 channels send by 48 channels return (16 x 48)
- 0 channels send by 64 channels return (0 x 64)

The AN-16/i-M Mic Input Module can be substituted for any AN-16/i shown in the following diagrams. Use the AN-16/i-M to add up to sixteen microphone signals per module to a digital snake or audio network. Digital console interface cards—including the Y1 card for Yamaha devices and those made by third-party manufacturers that support A-Net—can be substituted for input modules in the diagrams that follow.

### System Bridge

The SB4 System Bridge is an accessory that takes in up to four individual A-Net data streams at one location and combines them for transmission over a single Cat-5e cable. At the destination, another System Bridge is used to separate the A-Net streams. The four separate 16-channel A-Net data streams can then be connected to A-Net compatible devices as needed.



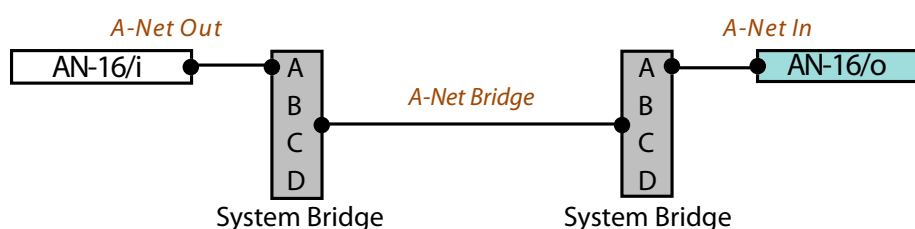
The front and rear panels of the rack-mounted SB4 System Bridge.

The System Bridge contains four A-Net connectors labeled A, B, C, and D. These accept standard Cat-5e cables. These jacks will always connect to an Pro16 A-Net compatible product.

The connection labeled *A-Net Bridge* will always connect to another System Bridge's A-Net Bridge connector.

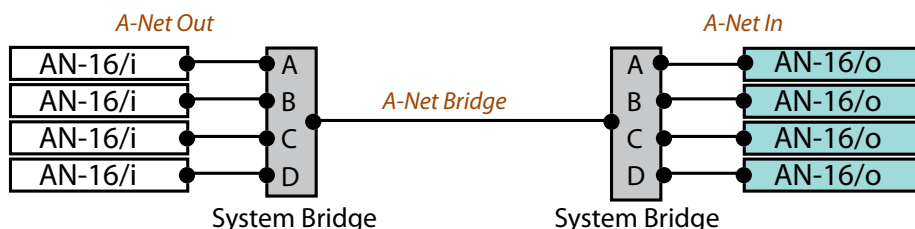
## Connecting the System Bridge

Adding a System Bridge to a digital snake is quite simple. Two System Bridges are needed to create a network. The four A-Net connectors (labeled A, B, C, and D) on one side of the digital snake are directly related to the A, B, C, and D connectors on the other side of the digital snake. That is, if you patch an AN-16/i Input Module into port "A" on one side of a System Bridge, an AN-16/o v.4 Output Module would be connected to port "A" on the other side of the System Bridge. See the following diagram.



This diagram shows the relationship of the A, B, C, and D ports on the System Bridge.

A complete digital snake using four units per side follows the same pattern. An input module connected to port B on one side of the digital snake connects to an output module via port B on the other side of the digital snake. The same goes for ports C and D, as seen in the following diagram.



A-Net ports A, B, C, and D are shown connected in a 64 x 0 configuration

To connect a 64 channel digital snake:

On the Send side:

1. Connect a Cat-5e cable from the **A-NET OUT** of the first AN-16/i to port A on the first System Bridge.
2. Repeat this process to connect the A-Net Out from the remaining three input modules to ports B, C, and D.

On the Receive side:

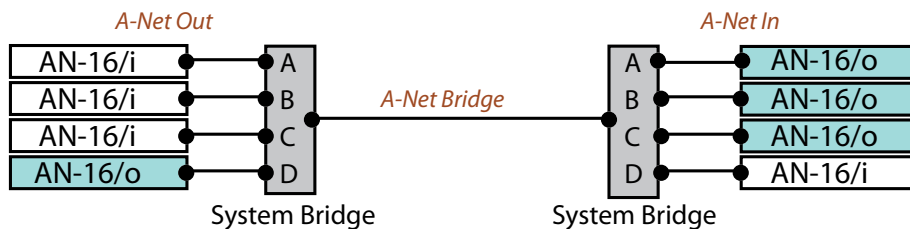
1. Connect a Cat-5e cable from port A on the second System Bridge to the **A-NET IN** jack on the first AN-16/o v.4 Output Module.
2. Repeat this process to connect ports B, C, and D to the remaining AN-16/o v.4 Output Modules.
3. Connect the two sides of the digital snake by running a Cat-5e cable (with or without an EtherCon connector) between the two **A-NET BRIDGE** jacks on the System Bridges.

---

✓ **NOTE:** Any combination of line-level AN-16/i and mic-level AN-16/i-M Input Modules can be substituted in the example above. Console interface cards such as the Y1 or those offered by third-party manufacturers can be substituted for input modules shown in the diagrams.

---

To use other configurations, simply move any pair of input and output modules. In the following example, the devices connected to port D on the System Bridge have been swapped to create a 48 x 16 system.



A 48 x 16 system is created by exchanging the units connected to port D on the System Bridge.

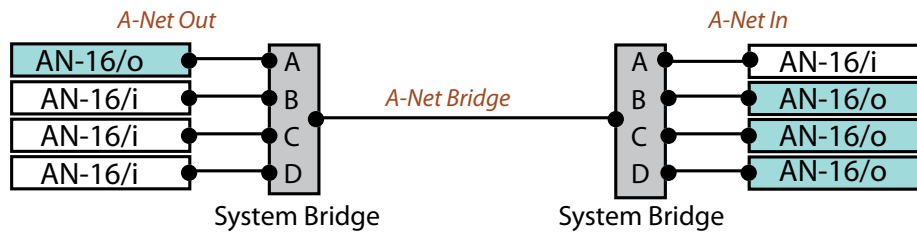
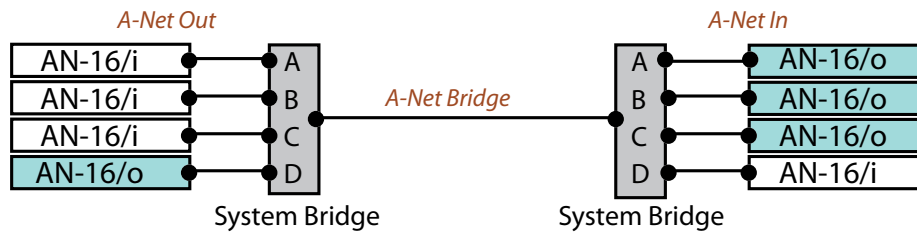
Remember, the total cable length between A-Net devices should not exceed 500 feet, 150 meters. Cables used to connect A-Net devices to the System Bridge are *included* in this calculation.

## Configuration Notes

When configuring 64-channel digital snake systems that send data in both directions, Aviom suggests the following module combinations. While not mandatory, these suggestions are made to accommodate the standard wiring practices that Ethernet uses. (Aviom's A-Net technology is based on Ethernet.) Some wire pairs in a standard Ethernet cable are not next to each other inside the jacket of the cable. This can account for slightly higher data errors in rare cases.

The configuration recommendations apply to systems configured as 16 x 48 and 32 x 32, not those sending data in only one direction. The module combinations are applicable especially when using long cable runs.

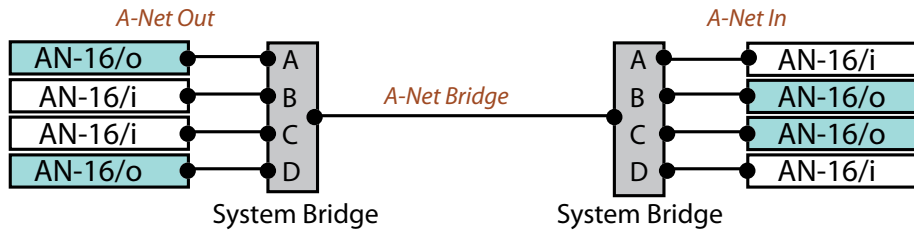
For 16 x 48 (or 48 x 16) digital snake configurations, place the three similar modules together, connected to either ports A, B, and C on the System Bridge or to ports B, C, and D. See the following diagrams.



Two 48 x 16 configurations

## 32 x 32 Digital Snake Configuration

For a 32 x 32 configuration, two input modules are connected to ports B, and C on the System Bridge, with matching output modules on the second System Bridge. The input modules connected to ports A and D are matched with AN-16/o Output Modules.



Ports A, and D use the same type of module; ports B and C contain the same type of module.

Note that the total A-Net cable length between devices is limited to 500 feet, calculated from the input module to the output module, including all patch cables.

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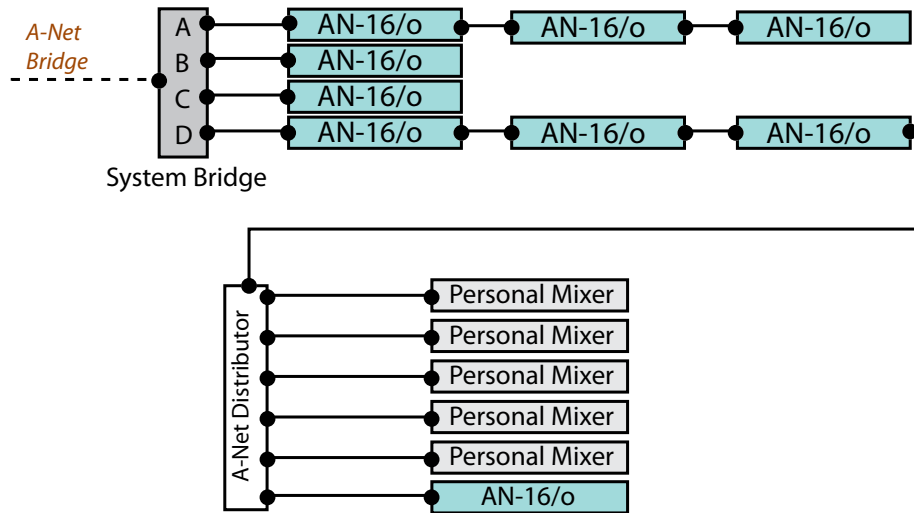
✓ **NOTE** The AN-16/i Input Modules shown in the preceding diagrams can be replaced with any compatible Pro16 input module or console interface card.

---

## Expanding a Pro16 Network

Any available A-Net Out jack on a Pro16 A-Net device can be used to expand an existing system and create a digital split. Any number of additional AN-16/o v.4 Output Modules can be added, as can any number of A-Net Distributors and Personal Mixers.

The following example shows one variation of an expanded system.



This system includes multiple digital splits and a monitor system.

This example starts as a 64 x 0 configuration (the input side of the system is not shown in the diagram). Two of the outputs are expanded with splits. Port A of the System Bridge has two AN-16/o v.4 Output Modules added. Port D has also two output modules which then feed an A-Net Distributor.

The A-Net Distributor connects to five Personal Mixers for use as a monitor system for five musicians performing live. Another AN-16/o v.4 Output Module is connected to an open port on the A-Net Distributor, leaving two open ports for future expansion.

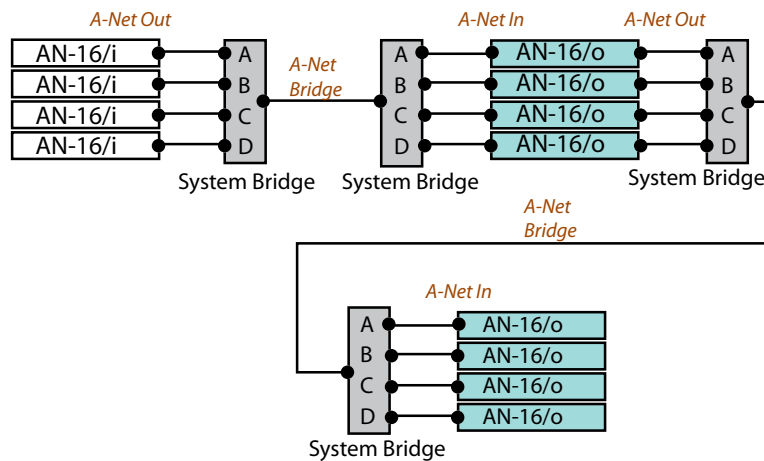
Expansion of a system can continue as your needs require. Any available A-Net Out can be used to connect to the A-Net In on any compatible device. Each A-Net cable used can be up to 500 feet (150 meters) long, making this system capable of spanning long distances between rooms, floors, etc.

## Using Multiple System Bridges

Expansion of a system can include multiple SB4 System Bridges. This allows audio to be fed to different locations as needed. Using multiple System Bridges follows the same connection rules as outlined previously. (Port A on one System Bridge always connects data to Port A on another System Bridge, etc.)

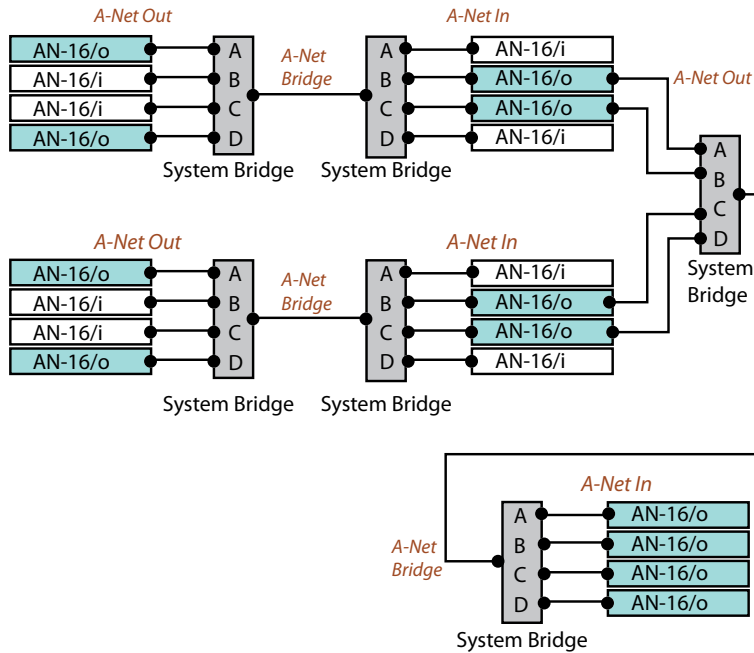
System Bridges can also be used to combine A-Net streams from multiple digital snakes or audio networks in an installation, allowing, for example, ports A and B from Network #1 to be sent along with streams B and C from Network #2 to a third area, creating Network #3.

The example below uses another pair of System Bridges to add a digital split. The A-Net Out from the four AN-16/o v.4 Output Modules is connected to a System Bridge allowing a long distance to be spanned with a single Cat-5e cable. Finally, a fourth System Bridge is used to separate the data into individual 16-channel data packets that are connected to four more AN-16/o v.4 Output Modules.



A second set of System Bridges move 64 channels of audio over one Cat-5e cable to another destination.

The following example shows a more complex system that combines A-Net from two different networks, sending 32 output channels from each location to a third user.



Data from two Pro16 networks is combined and distributed to a third location.

As with all A-Net compatible devices, any available A-Net Out can be used as a starting point for expansion.

In the preceding diagrams, any Pro16 input module can be substituted for the AN-16/i modules. These include:

- AN-16/i-M - 16 mic/line inputs
- Y1 card - for use with Yamaha digital mixing consoles; routes audio from the Yamaha interface to A-Net
- Digital console cards from third-party manufacturers that support Pro16 A-Net



## DB25 Pinout Info

The rear panel of the AN-16/o v.4 uses a pair DB25 multipin connectors for its balanced line-level analog audio outputs. Each provides eight channels of audio.

### Audio Connections

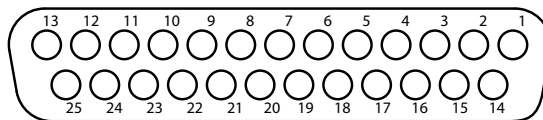
The two DB25 multipin connectors on the AN-16/o v.4 are wired to Tascam analog pinout standards. This allows easy interfacing with a variety of audio equipment with the use of readily-available multipin breakout cables or patch bays.

Each DB25 jack carries eight balanced audio channel outputs. To wire a custom cable for use with the AN-16/o v.4 DB25 output jacks, use the following table:

Cable Number	DB25 Pin Number		
	Hot	Cold	Ground
1	24	12	25
2	10	23	11
3	21	9	22
4	7	20	8
5	18	6	19
6	4	17	5
7	15	3	16
8	1	14	2
<b>No Connect</b>	13		

### DB25 Pin Numbers

The pins on the panel-mounted DB25 jacks on the AN-16/o v.4 Output Module are numbered according to the following diagram.











Each DB25 jack carries eight of the balanced line-level audio signals—channels 1-8 or channels 9-16.

## 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	

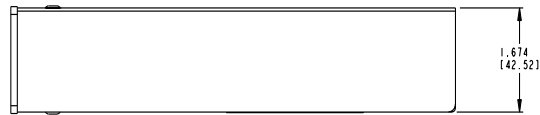
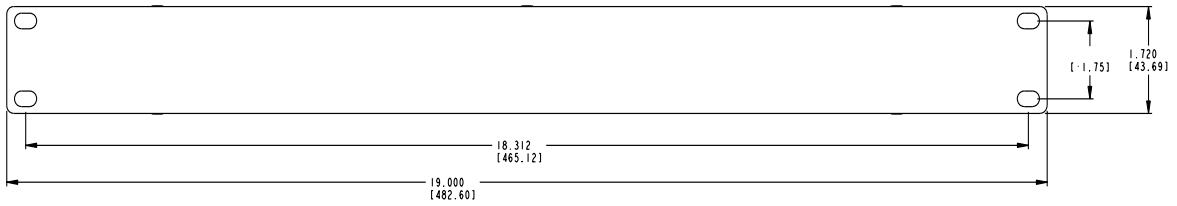
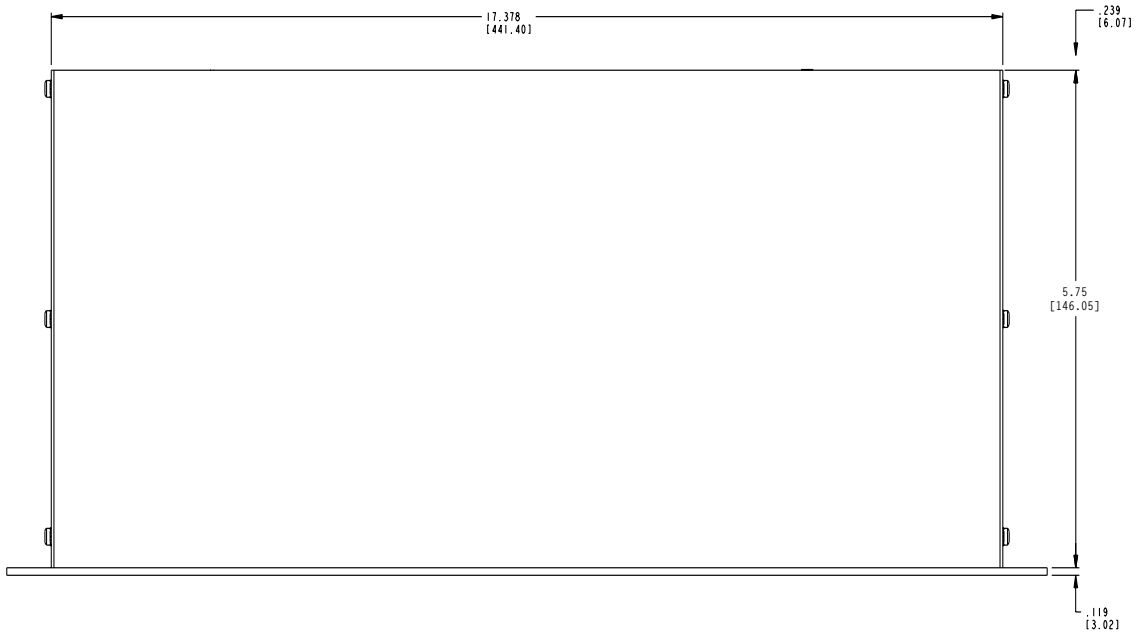
### T568B

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

## Specifications

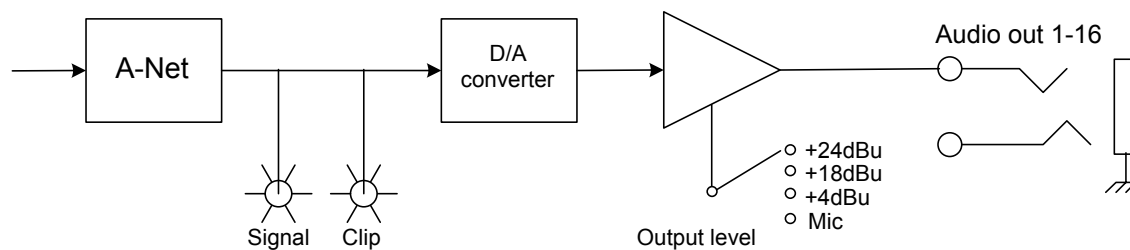
<b>Audio Outputs</b>	16 channels, balanced
	DB25 multipin connectors (2), analog pinout
	Impedance balanced outputs for the Mic, +4dBu, and +18dBu settings; Differential output for the +24dBu output
<b>D/A Conversion</b>	48kHz, 24-bit
<b>Operating Levels</b>	4-position switch, per channel pair
	+24, +18, and +4dBu line-level, or mic-level
<b>Max. Output Level</b>	+24dBu
<b>Metering</b>	LEDs; green: Signal Present; red: Clip; per channel
<b>Output Impedance</b>	226 ohms (+18dBu, +24dBu); 100 ohms (+4dBu, Mic)
<b>Freq. Response</b>	4Hz-22kHz +0.2dB/-3dB
<b>THD +N</b>	< 0.004%
<b>Crosstalk</b>	-90dB
<b>Signal to Noise (unweighted)</b>	92dB typical, A/D to D/A
	Measured from AN-16/i Input Module to AN-16/o v.4 Output Module
<b>Bit Error Rate (BER)</b>	10 <sup>-12</sup>
<b>Digital Connections</b>	A-Net In: 1; A-Net Out: 1; A-Net Expansion: 1; Locking EtherCon connectors
<b>A-Net</b>	Uses unshielded Cat-5e UTP (or better) cable
<b>Latency</b>	0.620 msec (measured from analog input to analog output)
<b>Power Supply Input Voltage Output Voltage Plug Size</b>	External, DC, universal switching type 100-240 volts, 50/60Hz, 30VA 24 VDC, 0.5 amp 2 mm
<b>Dimensions</b>	19" (482.6 mm) wide x 5.75" (146 mm) deep; 1U high
<b>Weight</b>	6.8 lb. (3.08 kg)
<b>Options</b>	SB4 System Bridge; used to combine up to four A-Net streams for transmission over one Cat-5e cable
<i>All Aviom products are designed and manufactured in the USA.</i>	

# Dimensions



## Block Diagram

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