AVIOM®

ALLFRAME™

Multi-Modular I/O System

User Guide

P/N 9310 1024 0001F rev. 1.04

PRO 64®

A·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: EN 55103-1, EN 55103-2

Safety: EN 60065, UL 60065, CAN/CSA C22.2 No. 60065 + A1:2006

ETL/cETL Listed and RoHS Compliant

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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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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.

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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WARNING

When using AllFrame Modular I/O System devices with approved Power Over A-Net (PoA) power supplies, DO NOT hot-plug the Cat-5 connection between the Power Over A-Net (PoA) device and the F6 Modular I/O Frame unit.

Serious damage to the products connected to the power supply can occur.

Always power down the Power Over A-Net (PoA) power supply, the F6, and other Pro64 devices connected directly to the power supply before changing any powered A-Net connections.

- **Do not disconnect the factory-configured Cat-5e cable that runs between the power supply and the A-Net I/O jacks.**
- **Do not disassemble the or alter the POA80 assembly in any way.**
- **Do not block the ventilation ports on the power supply.**
- **Do not connect the POA80 port marked "DC Power Plus A-Net" to any device other than an F6 Modular I/O Frame's A-Net Port B.**

ALLFRAME™

Multi-Modular I/O System

Welcome

Thank you for purchasing the **AllFrame Multi-Modular I/O System™**. The AllFrame Multi-Modular I/O System replaces traditional analog I/O boxes with a modular digital solution. By digitizing the audio input signal where it connects to the network, the AllFrame system keeps analog cabling to a minimum, reducing system complexity and labor costs while delivering improved performance and overall flexibility.

All Pro64 products are powered by A-Net®, Aviom's proprietary data transmission protocol designed especially for the unique demands of live streaming audio.

In developing the Pro64 Series, we have made every effort to make the user interface as easy to use and understand as possible. This User Guide is designed to familiarize you with the features and functions of your new Pro64® products. We encourage you to read the manual completely, as some of the powerful features of your new product may not be immediately apparent.

AllFrame System Components

The AllFrame Multi-Modular I/O System is designed to be a fully modular, versatile addition to any Pro64 networked audio installation. It consists of the F6 Modular I/O Frame itself, along with optional I/O cards and accessories for mounting and deploying the system. The AllFrame is set up, programmed and controlled from a PC running the free **Pro64 Network Manager™** application (available from the Aviom website, www.Aviom.com).

The F6 Modular I/O Frame

The centerpiece of the AllFrame Multi-Modular I/O System is the **F6 Modular I/O Frame**, a multi-purpose network frame with six field-configurable I/O card slots as well as integrated Cat-5e/Cat-6 and fiber optic connectivity. The F6 measures just 10.6 by 12.6 by 3.85 inches (269 x 320 x 98mm), allowing it to be housed in a standard NEMA Type 1 electrical enclosure. It can be surface-mounted on a wall or flush-mounted in a wall within a stud cavity

and dressed with a custom flange. With the addition of the RK6 Rack Kit or SK6 Stage Kit, the F6 may also be mounted in a standard 19" equipment rack or placed directly on a stage near the audio sources.

The F6 Modular I/O Frame is a DC powered device capable of getting its power in a variety of ways; the F6 *does not* ship with a power supply.

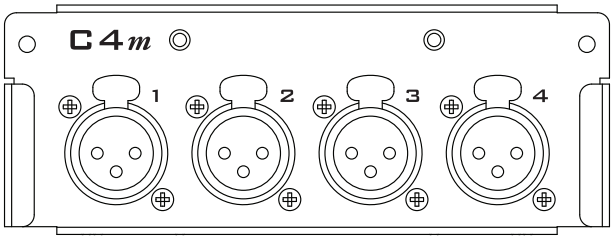
F6 Modular I/O Frame features:

- Six card slots, user configurable
- Up to 24 inputs, 24 outputs
- Continuously variable sample rates within two ranges
  39.7kHz-52kHz (44.1kHz ¬- 10% to 48kHz + 8.3%)
  79.4kHz-104kHz (88.2kHz - 10% to 96kHz + 8.3%)
- Configurable as network Control Master or slave
- Configurable as the network's clock master or slave
- Slave to external clock (requires at least one C4dio card)
- Two Pro64 A-Net ports, with EtherCon® RJ45 network connectors
- Two single- or multi-mode fiber ports for use with optional SFP optical transceivers
- Euroblock and 4-pin XLR DC power connectors
- Power over A-Net (PoA) using approved power supplies
- Redundant power connections
- Ultra-quiet low velocity fan cooling
- Thermal monitoring
- USB Type B jack for connection to Pro64 Network Manager PC application

C4m Card

The **C4m Mic/Line Input Card** provides four remote-controllable analog mic- or line-level inputs per card. The C4m mic preamp circuitry provides clean, transparent, archival quality sound without compromise.

- State-of-the-art mic preamps
- Four XLR female inputs
- Remote controllable over the Pro64 network via hardware using the optional RCI Remote Control Interface and MCS Mic Control Surface
- Remote controllable via software using Pro64 Network Manager
- Support for m-control™ for Yamaha® digital consoles with the 6416Y2 A-Net Interface Card installed
- Mute, phase, low cut, 48V phantom power, and 24dB pad per channel



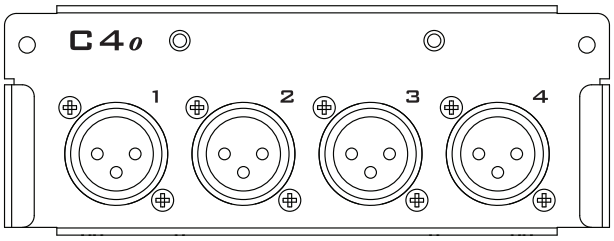
The C4m card can be configured and installed by the user.

All channel strip settings can be saved as part of a Device Preset from Pro64 Network Manager.

C4o Card

The **C4o Output Card** provides four XLR analog outputs with five variable output levels, controllable from the Pro64 Network Manager application. Output Level settings (per channel) include:

- +28dBu
- +24dBu
- +18dBu
- +4dBu
- Mic



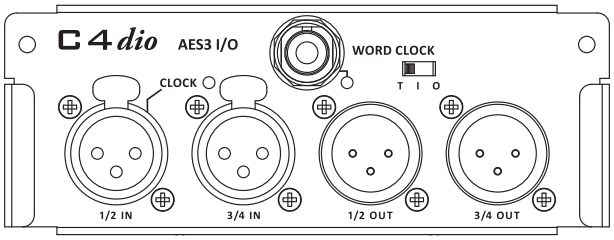
The C4o card offer mic- or line-level output.

Output level settings (per channel) can be saved as part of a Device Preset from Pro64 Network Manager for quick and easy recall of frequently used settings.

C4dio Card

The **C4dio Digital I/O Card** provides four AES3 digital inputs and four AES3 digital outputs per card. The C4dio also allows external clocks to be used with a AllFrame device.

- Four AES3 digital inputs; two XLR female jacks
- Four AES3 digital outputs; two XLR male jacks
- Clock sync support for AES3 devices
- External Word Clock support with BNC jack
- Configurable BNC clock jack can be set for: Input, Input With Termination, or Output.
- Sample Rate Converters for external digital devices



The 4x4 C4dio card also offers external clocking options.

The card's settings, including the sample rate converter's on/off status per channel pair, can be saved as part of a Device Preset from Pro64 Network Manager.

Accessories

A number of accessories are available for the AllFrame Multi-Modular I/O System.

RK6 Rack Kit

The **RK6 Rack Kit** is a set of rack ears for mounting the F6 in a standard 19" equipment rack. With the RK6 attached, the F6 requires 6U of space. See page 17.

SK6 Stage Kit

The **SK6 Stage Kit** allows the F6 to be mounted in a heavy-duty, protective steel case to provide extra protection to the unit making it suitable for applications that require extra protection for the device, such as on-stage use. See page 19.

LK4 Label Kit for C4m and C4o

The LK4 is a patchbay-style label kit for the C4m and C4o audio I/O cards for AllFrame. It attaches to the face plate of the C4m or C4o card and allows custom printed labels to be added to the AllFrame I/O. The LK4 is not suitable for use with the C4dio.

HK6 Security Hardware Kit for F6

The HK6 includes replacement hardware for making an AllFrame installation tamper resistant. The kit includes tamper-resistant Torx® pin-head screws and a driver bit to replace the standard screws used for mounting the I/O cards, fan tray, and access plate to the F6, as well as for mounting the F6.

Fan6 Replacement Fan Tray Assembly

The Fan6 Replacement Fan Tray Assembly is an exact replacement for the standard fan assembly in the F6. The Fan6 provides quiet and reliable cooling for the F6, ensuring safe operation in ambient temperatures up to 50°C. The Fan6 replacement fan tray for the F6 Modular I/O Frame can be installed by the user in the field.

PLT6-s Surface-Mount Finishing Plate for F6

The PLT6-s is an anodized aluminum plate that provides a clean finish for surface-mounted F6 Modular I/O Frames. The F6 and PLT-s assembly attaches to a standard NEMA electrical box with just four screws.

PLT6-f Flush-Mount Finishing Plate for F6

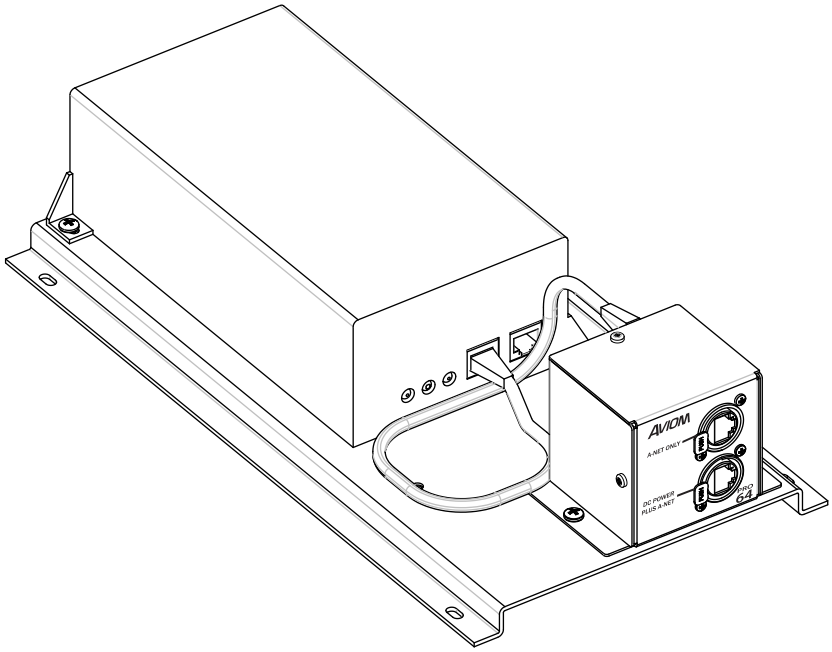
The PLT6-f is an anodized aluminum plate that provides a clean finish for flush-mounted F6 Modular I/O Frames. It attaches easily to the optional backing box used to hold the F6 with just four screws

Power Supplies

It is important to note that the AllFrame system's F6 Modular I/O Frame does not ship with a power supply. It is the responsibility of the installer to provide an adequate power supply suitable for the application according to the specifications listed later in this document. See page 23.

POA80 Power Over A-Net Power Supply

The **POA80** is a Power Over A-Net (PoA) power supply for the F6. The POA80 allows an F6 to receive its Pro64 A-Net data and DC power over a single Cat-5e/Cat-6 cable. See page 26.



The POA80 allows an AllFrame to be powered over the Cat-5 cable.

About A-Net

Aviom's A-Net® is the only networking technology conceived, designed, and optimized for managing and distributing audio using ordinary Cat-5e cables (or fiber by adding fiber optic SFP transceivers to the AllFrame F6 Modular I/O Frame or MH10f Merger Hub). As implemented in the Pro64® Series products, A-Net can transmit up to 128 channels of uncompressed 24-bit audio with the reliability and fidelity of analog, and the power and flexibility of a true digital network.

As implemented in the AllFrame Multi-Modular I/O System, Pro64 A-Net allows variable sample rates in two ranges, 44.1/48kHz and 88.2/96kHz, with ultra-low latency, jitter, and wander. Pro64 devices can be connected in any combination of serial (daisy-chain) or parallel (star) topologies. Cable runs between Pro64 devices can be up to 400 feet (120 meters) on Cat-5e, and miles on fiber optics (with Aviom fiber-capable equipment).

Because A-Net is designed specifically for audio, the technological limitations of Ethernet and Ethernet-based products are removed, while audio performance and system flexibility are increased. A-Net incorporates Aviom's unique patented and patent-pending algorithms for controlling clock jitter and wander, as well as system-wide latency—regardless of an installation's size, design, or clocking setup. A-Net offers significant advantages in fidelity, performance, and flexibility over Ethernet-based products.

A-Net uses the "physical" layer of Ethernet, but it eliminates all the protocol elements that are designed for computers and IT-style networking. In audio applications, these other layers reduce efficiency, impose system restrictions, and introduce latency and timing instability. By eliminating Ethernet data structures, A-Net creates a superior network with enhanced audio performance. With A-Net and the Pro64 Series, Aviom continues to break new ground in the design and development of innovative digital audio networking technologies and solutions.

AllFrame Supported Sample Rates		
Sample Rate	**Minimum**	**Maximum**
1x 44.1/48kHz	39.7kHz	52kHz
2x 88.2/96kHz	79.4kHz	104kHz

Clocking

The Pro64 network offers the most flexible clocking and synchronization options in the industry even when syncing to an external clock source.

Any Pro64 I/O device can be designated the Clock Master for the network, generating and distributing its internal clock. Digital I/O devices are capable of syncing to and distributing an external clock from a Word Clock or AES3 source to the network.

Control Data

The Pro64 version of A-Net has built-in, dedicated bandwidth for 14 channels of non-audio control data through the use of Aviom's innovative Virtual Data Cables™. These data streams are always available to carry MIDI, RS-232, RS-422, or GPIO (General Purpose I/O), and they never compete with the audio channels for network resources, regardless of the system configuration. (Not all VDC data types are supported on every Pro64 device.)

Because VDC inputs are simply incorporated into the A-Net stream, these control signals can be transmitted over very long cable runs and even across an entire Pro64 network, significantly expanding the applications possible with MIDI, RS-232/422, and GPIO.

It is important to note that although the AllFrame Multi-Modular I/O System does not have dedicated VDC I/O connections on its hardware, all VDC control data that enters the network stream from other Pro64 devices is retained in the A-Net stream for other devices to use. The control data is simply ignored by the AllFrame.

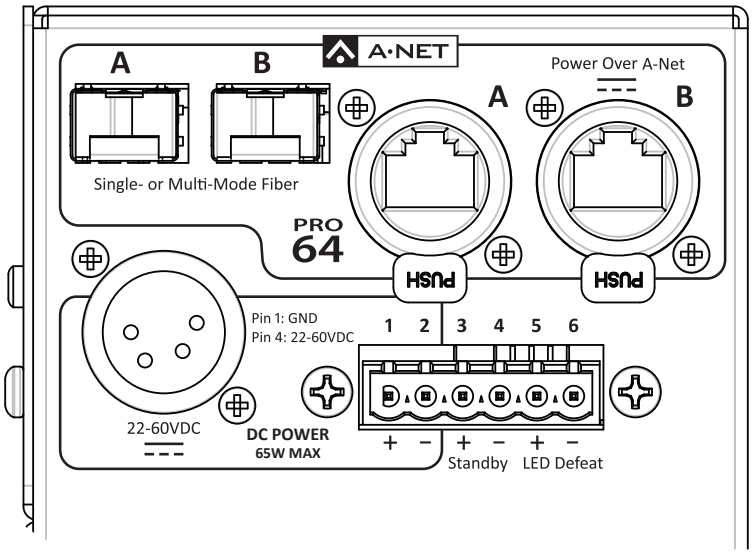
A-Net Ports

Pro64 I/O devices have dual A-Net ports, labeled **A** and **B**. Both ports carry a bidirectional A-Net stream at all times. (That is, both ports are always transmitting and receiving A-Net data.)

The F6 Modular I/O Frame has both copper-based Cat-5e connections and fiber optic ports (that require optional SFP transceivers). Each are labeled A and B. Any combination of the two types of ports can be used, but only two A-Net ports may be active at any time.

Pro64's Auto Mode provides a true audio network with 64 available "Slots" for transporting audio (at 44.1/48kHz). Every audio Slot is available everywhere in the network, with no upstream/downstream restrictions. In Auto Mode, there are no connection rules; devices can be connected in series, parallel, or combinations of series and parallel. Connect a Cat-5e (or fiber) cable to either the A or B A-Net port and the system does the rest. No addressing or IT configuration is required.

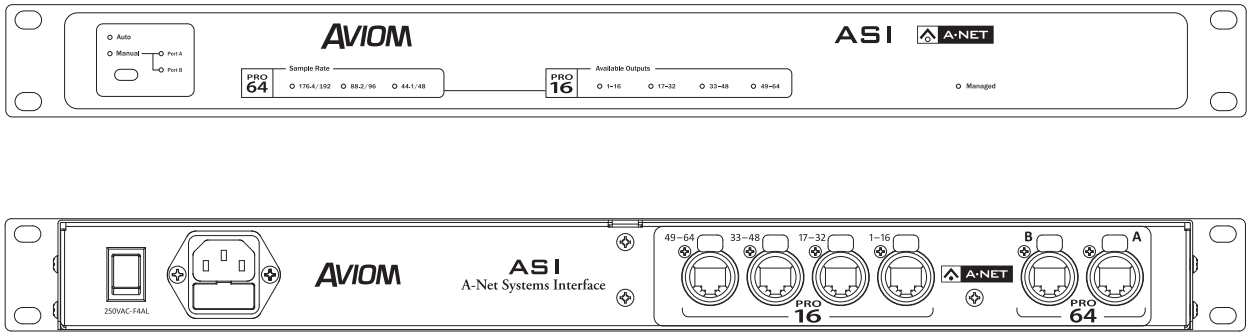
✓ **Note:** Manual Mode is not supported on AllFrame devices.



Copper Cat-5e and fiber optic A-Net ports on the top panel of the F6

Support For Pro16 Series Products

Pro64 Series products can be combined with Pro16® Series output products such as the Pro16 Monitor Mixing System by adding the Pro64 ASI A-Net Systems Interface. This 1U device converts Pro64 A-Net data to Pro16 data, providing up to four streams of 16-channel data (depending on the Pro64 sample rate) that can be used with A-16II and A-16R Personal Mixers, A-Net Distributors, and the AV-P2 and AN-16/o Output Modules.



Front and rear panels of the ASI A-Net Systems Interface

The ASI is not compatible with the A-Net output of Pro16 input devices such as the AN-16/i, AN-16/i-M, the Y1 console interface card (for Yamaha® digital products), and A-Net console cards built by third-party manufacturers for their digital console products.

Firmware Notice

All Pro64 devices in a network should be updated to use the most recent firmware version to ensure trouble-free operation.

As new Pro64 devices are released, older Pro64 products need to be updated so that they recognize the features and functions of the newer modules—something that is especially important if one of the older devices will be used as the network's Control Master.

Pro64 Network Manager is a free Windows software application designed for editing and managing your Pro64 devices; it also includes a built-in utility for updating the firmware in Pro64 Series products. The current version of Pro64 Network Manager can be downloaded from the Aviom website.

✓ **Note:** AllFrame devices in a Pro64 network require the Pro64 Network Manager application for all I/O routing and channel programming. There is no front panel user interface.

Pro64 Network Manager requires a direct RS-232 (serial) connection between the computer and the Control Master device on the Pro64 network. Normally this is accomplished by connecting a null modem DB9 cable between the RS-232 jack on the computer and the Pro64 device. Complete information on using RS-232 (and USB-to-RS-232 adapters) is available on the Aviom website. Updates take just a few minutes per module.

The AllFrame F6 Modular I/O Frame includes a USB connector on its front panel for connecting a computer when the device is used as the network's Control Master. No DB9 RS-232 cable is required when using the F6 as a Control Master.

Pro64 Network Manager is designed to run on a PC under Microsoft® Windows® XP, Vista, or Windows 7. There is no official Apple Mac support. However, Mac users can run Pro64 Network Manager using Windows running under Apple's Boot Camp or Parallels programs on Intel-based Macs.

Get Pro64 Network Manager and firmware update files from the Aviom website, http://www.aviom.com.

Assembling the AllFrame System

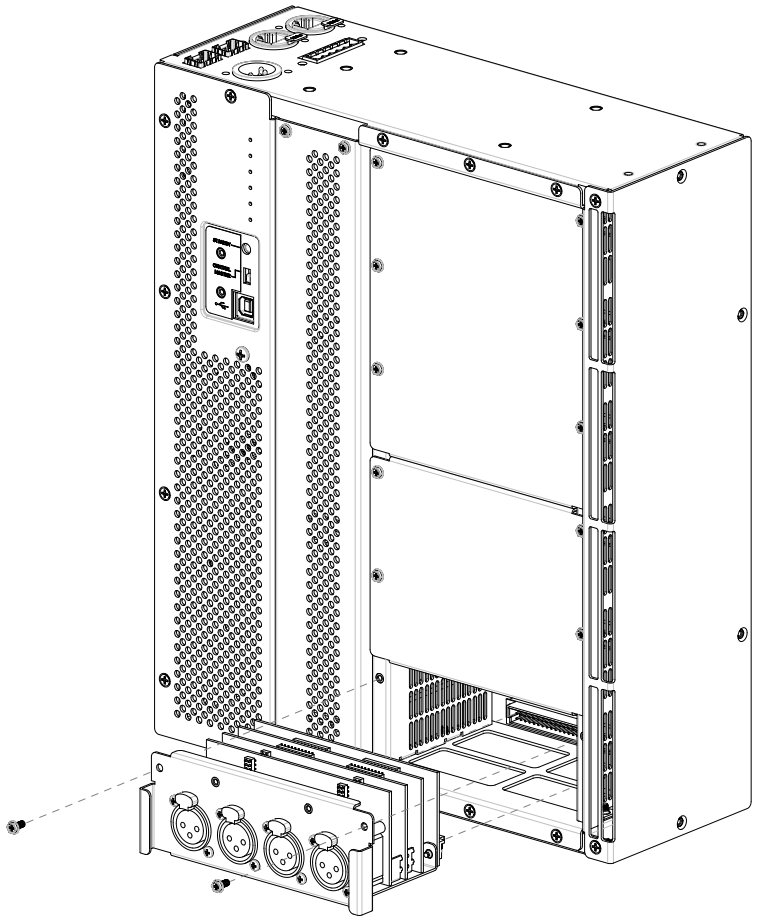
The AllFrame Multi-Modular I/O System is user-configurable, and is designed to be easy to modify and reconfigure as your needs change.

Prior to installing the unit in an electrical wall box, equipment rack, or other enclosure, the user must connect the mounting brackets, install I/O cards, configure the power options for the F6 Modular I/O Frame, and provide Pro64 A-Net via Cat-5/Cat-6 or fiber.

Once the F6 is assembled and connected to the network, you can apply power to the device and start to manage the network using Pro64 Network Manager.

Installing I/O Cards

The F6 Modular I/O Frame has six I/O card slots that can be configured by the user to contain any combination of analog and/or digital I/O cards. The I/O cards can be installed in any order and into any of the six available slots (labeled A through F) in the F6. Cards can be installed using only a Phillips screwdriver or nut driver.



Installing an I/O card in the F6

To install an I/O card in an F6 card slot:

1. Start with all power to the F6 Modular I/O Frame off.
   Do not remove or install I/O cards while the F6 is powered on.
2. Place the F6 on a clean, level work surface with the I/O slots facing up.
3. Use a size #1 Phillips screwdriver or 3/16-inch hex nut driver to remove the screws that hold the card slot's cover plate in place.
4. Retain the blank cover plates that ship with the F6 Modular I/O Frame for future use; they will help protect the I/O connectors and keep dust out of the F6 unit.
5. Remove the I/O card from its packaging.
6. Align the multi-pin connector on the rear of the I/O card with the matching connector on the F6 Modular I/O Frame.
7. Press firmly on the I/O card, applying firm, even pressure enough to seat the card in its backplane connector on the F6.
8. Reattach the two screws removed from the cover plate to secure the card to the F6 unit. *
9. Repeat this procedure for any remaining I/O cards to be installed.

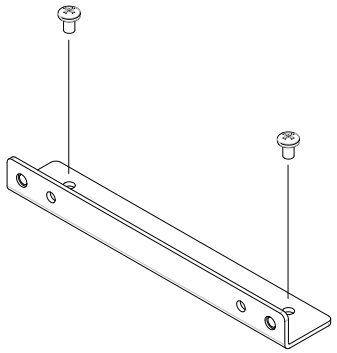
✓ **Note:** Always secure all installed I/O cards using the screws provided before transporting the F6.

* The optional HK6 Security Hardware Kit for F6 can be used instead of the standard screws if additional security is required for an installation.

Installing the F6 Mounting Brackets

The F6 Modular I/O Frame ships with a pair of right angle mounting brackets that can be used to attach the F6 to a flush-mount or surface-mount plate when the device is installed into an electrical box, floor pocket, stage box, etc. The brackets attach to the F6 with a pair of screws; only a Phillips screwdriver is required for installation. Each bracket also has two threaded inserts designed to accept size 8-32 bolts when mounting the assembled F6 to a wall plate. (The brackets are not required for rack-mount installations.)

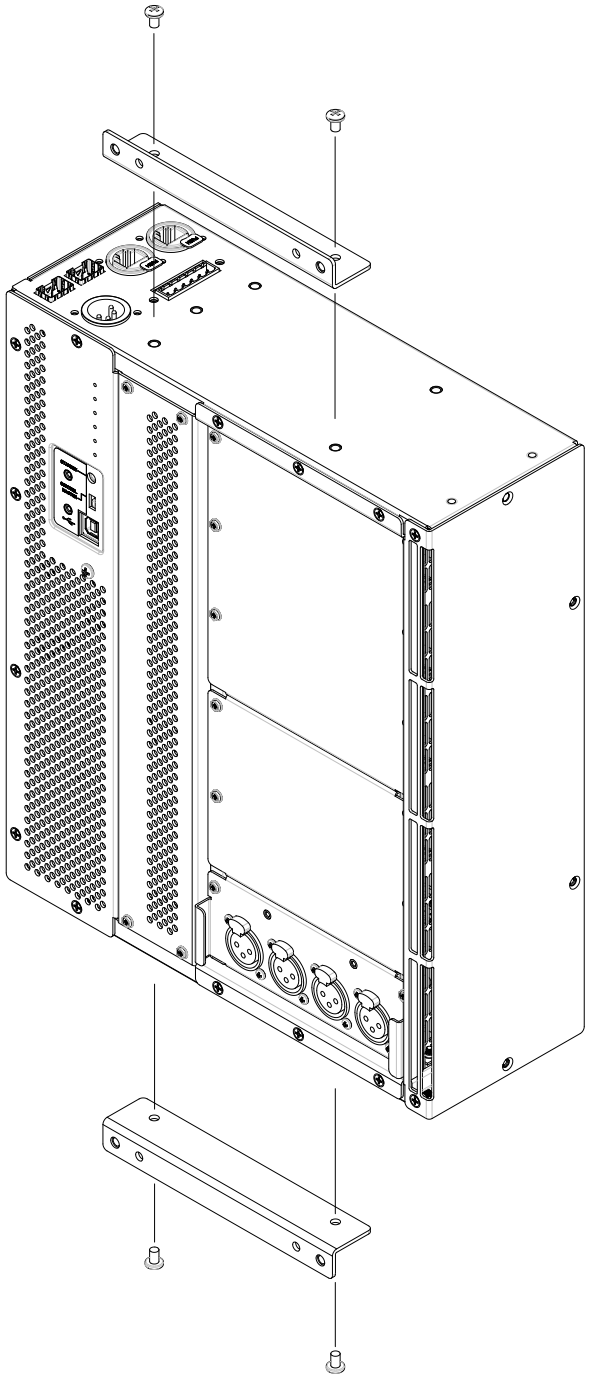
For maximum installation flexibility, the brackets can be installed flush with either the front or rear face of the F6 Modular I/O Frame. If desired, the brackets can also be used to secure the F6 directly to a wall or other solid surface without a surrounding electric box.



The F6 mounting bracket attaches with two screws to the F6.

To install the mounting brackets:

1. Place the F6 on a clean, level work surface.
2. Align the non-threaded holes in the bracket with the threaded holes in either the front or rear mount positions in the top panel of the F6.
3. Install the included Phillips screws through the holes in the bracket and into the F6, tightening them securely.
4. Repeat for the remaining bracket on the bottom panel of the F6.



Attach the mounting brackets to the F6 Modular I/O Frame with the screws provided

Installing SFP Fiber Transceivers

There are two sets of A-Net ports on the top face of the F6—two copper (Cat-5e, Cat-6) ports and two 100 Mbps fiber optic ports (requires optional SFP transceivers not included with the F6). Only two A-Net ports can be active at a time; these can be mixed and matched in any of the four combinations shown below:

A-Net Port A	A-Net Port B
Cat-5e	Cat-5e
Cat-5e	Fiber
Fiber	Cat-5e
Fiber	Fiber

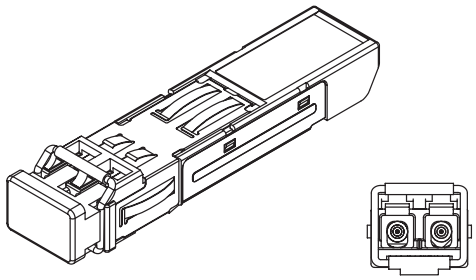
✓ **Note:** Always power down the F6 Modular I/O Frame before installing or removing SFP transceivers.

The F6 only checks for installed SFP transceivers at power-up. Any A-Net port (A or B) with an SFP installed will have its corresponding copper Cat-5 port disabled. When the F6 Modular I/O Frame detects an installed SFP transceiver at power-up, it places the corresponding copper port and its PHY chip in a lower power state, even if no fiber cables are connected.

Though it can't be used for a Pro64 network connection, the AllFrame *can* be powered through A-Net port B when an SFP transceiver is installed in port B.

SFP Transceivers

Small form-factor pluggable (SFP) is a specification for a series of modular, physically compact optical transceivers. The two 100 Mbps SFP format fiber optic ports on the F6 Modular I/O Frame allow the user to connect optional single-mode or multi-mode fiber optic transceivers that can transmit Pro64 A-Net data over longer distances than Cat-5 based cabling can provide.



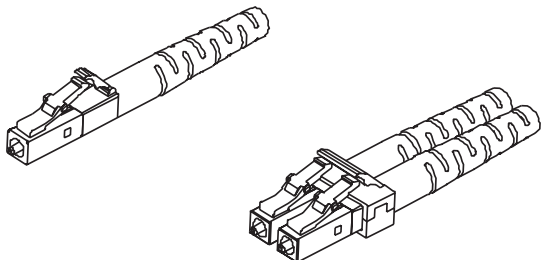
The SFP fiber optic transceiver is shown with its dust cap on (left) and from the front (right) with its transmit and receive connectors exposed.

When connecting Pro64 devices via fiber, always use the same type of SFP transceiver in each unit—for example, use a 100 Mbps single-mode SFP transceiver with the same light wavelength specifications in each device. You cannot connect a multi-mode fiber transceiver to a single-mode transceiver.

Always leave the optical transceiver's dust cap on when the SFP transceiver is not in use to avoid damage to the internal optical connections.

LC Connectors

SFP transceivers typically use a connector known as LC. For bidirectional transmission, two fiber cables per SFP transceiver are required, one to transmit and the other to receive. The SFP transceiver can accept single (simplex) or dual (duplex) type connectors. Aviom suggests using duplex connectors with Pro64 devices to avoid transmit/receive errors caused by the connection/removal of individual fiber cables.



A simplex LC connector (left) and a duplex connector (right).

✓ **Note:** Do not operate the F6 with only one fiber cable connected to the SFP transceiver.

Cat-5e Cables

All Cat-5e connections between A-Net devices should use Unshielded Twisted Pair (UTP) cable. The cable can be of the stranded or solid type; solid wire performs better over long distances while stranded wire is more flexible and easier to manipulate and therefore easier to work with in a performance situation.

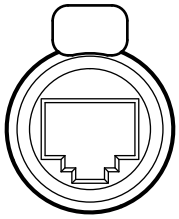
Cables designated as Cat-5e in Pro64 documentation can be interchanged with any Cat-6 (or better) cable. Cables will be referred to simply as "Cat-5e." For best long distance performance, use Cat-6 cabling. Remember, all cables are not created equally. Distance performance will be impacted by numerous factors including cable build quality, the type of wire used to make the cable (solid core or stranded), connector quality, the number of splice points (such as patch bay interconnect points), and the preservation of the cable's twisted wire pairs.

Connectors on Cat-5e cables can be of the standard RJ45 variety or of the locking Neutrik EtherCon type.

EtherCon Connector

Pro64 Series products feature locking connectors for all network I/O. The Neutrik® EtherCon connector is a dual RJ45-type connector that can receive a standard Cat-5e or Cat-6 cable or a cable fitted with the special locking EtherCon connector.

When using a standard Cat-5e or Cat-6 cable, plug the cable into the center of the EtherCon jack; release the cable by pressing on the small plastic tab built into the cable connector.



The EtherCon panel-mount jack

The locking EtherCon connector is similar to an XLR plug, the kind commonly used on microphone cables. 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.

✓ **NOTE:** Neutrik also makes a Cat-6 EtherCon connector. It is a different size than their Cat-5 connector and will not fit into the Cat-5 EtherCon jacks used on the F6.

RK6 Rack Kit

The optional RK6 Rack Kit It can be mounted to an F6 Modular I/O Frame using only a Phillips head screwdriver. The kit allows the F6 to be mounted with the rack ears facing either the front or rear of the product.

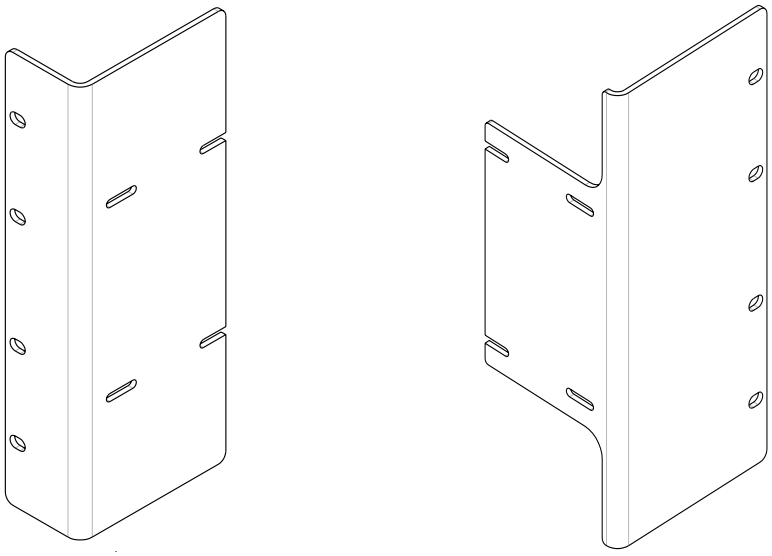
The RK6 kit includes individual left and right rack ears, plus the 8 screws required to secure the rack ears to the sides of the product. The right-side rack ear has special cutouts to allow it to clear the connectors on the F6 body.

The mounting brackets that ship with the F6 are not required for rack-mount installation. Remove them prior to installing the F6 in an equipment rack if they have been previously installed.

Installing the RK6

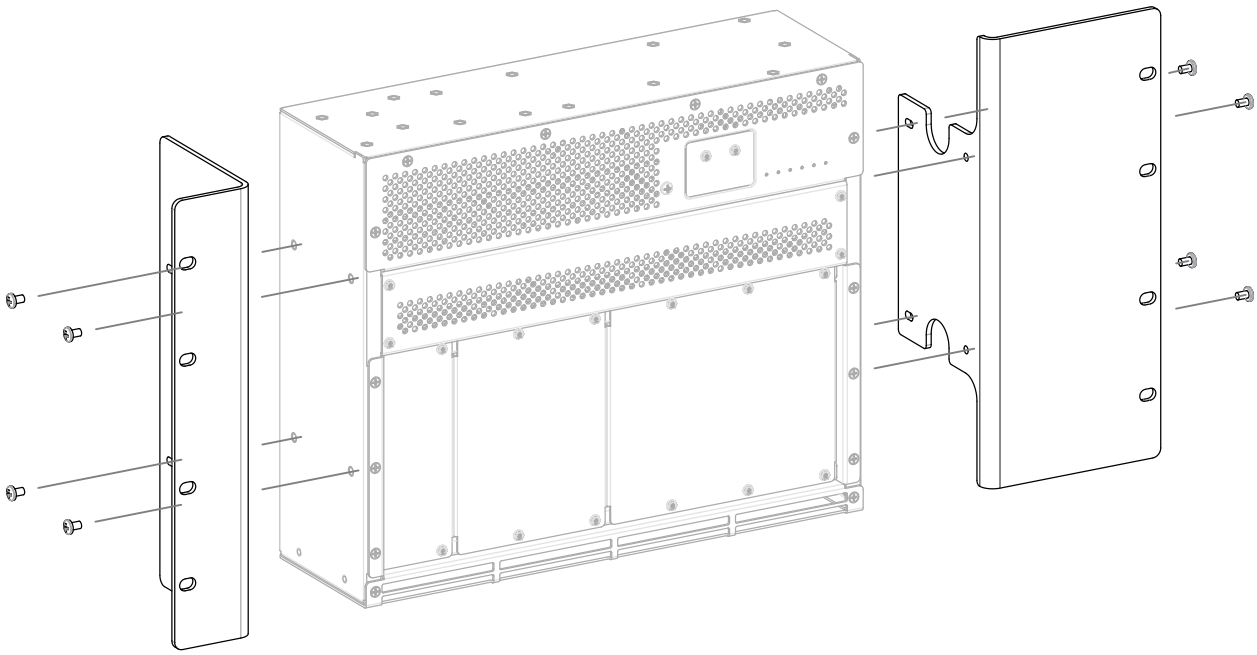
To mount he RK6 kit on an F6 Modular I/O Frame:

1. Place the F6 Modular I/O Frame on a clean work surface.
2. Align the left rack ear with the holes in the F6 case.
3. Attach the four screws to secure the left rack ear.
4. Repeat this procedure for the right side rack ear.

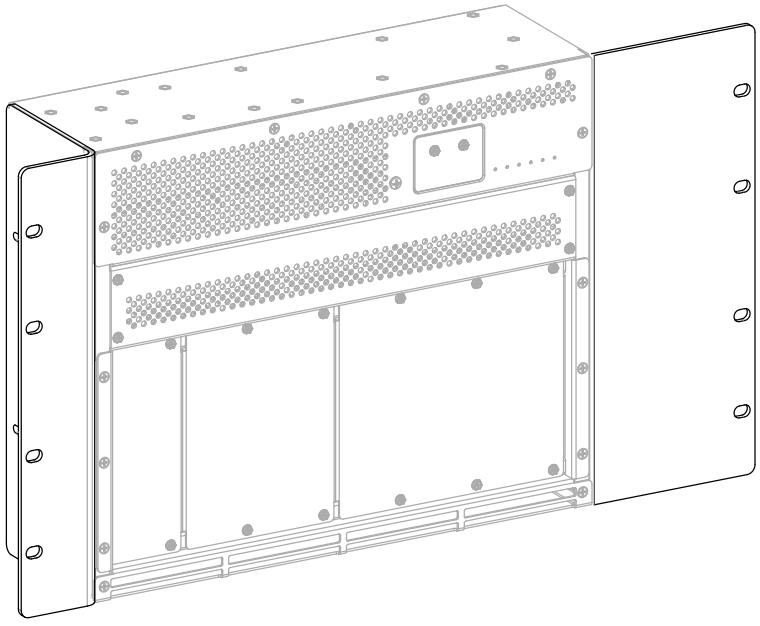


Rack ears for the F6 can be mounted facing the front or rear of the device.

The F6 Modular I/O Frame is now ready to be mounted into any standard 19" rack or case. Always use four rack mount screws per side when mounting the F6 in an equipment rack. The use of nylon washers between the rack screws and the F6 is suggested to avoid marring the finish on the product's rack ears.



The F6 is shown with the rack ears facing the front and ready to be installed.



The F6 shown with optional rack ears attached

SK6 Stage Kit

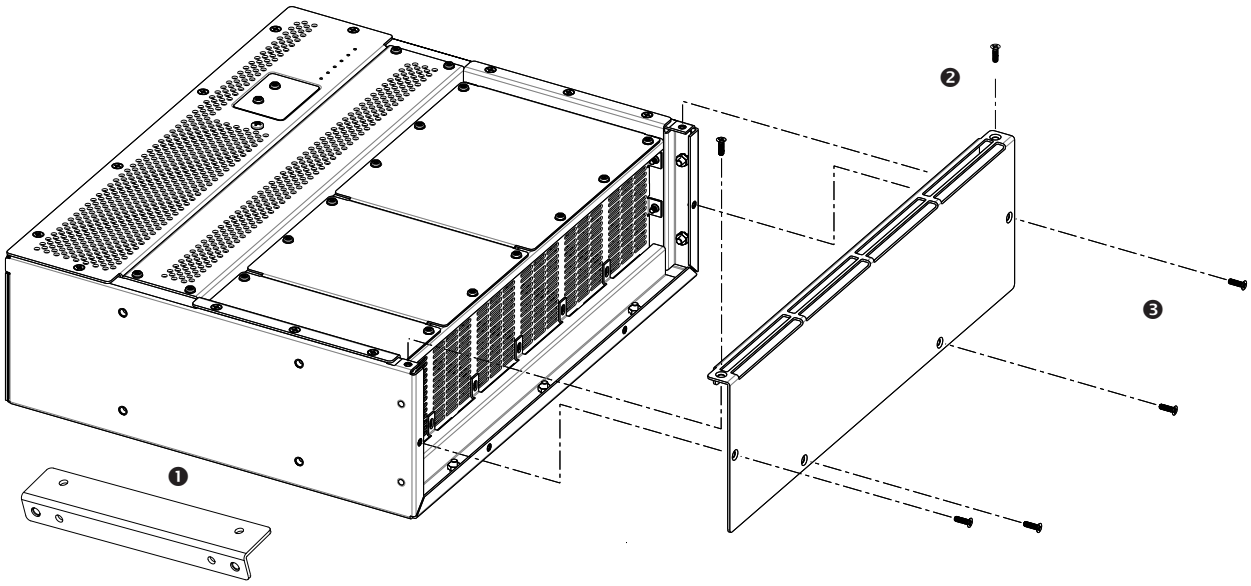
The SK6 Stage Kit is designed as a protective stage box for an F6 Modular I/O Frame, part of the AllFrame system of modular I/O products. The SK6 Stage Kit also provides shock mount protection for the assembly when an AllFrame is transported or used on stage as a drop box.

The kit includes the protective metal case with shock mount foam, a replacement ventilation panel, plus the screws required to secure the SK6 Stage Kit components. A Phillips screwdriver is required for assembly.

Installing the SK6

Remove the Original Side Ventilation Panel:

1. Place the F6 Modular I/O Frame with its front face up on a clean work surface.
2. Remove the L-shaped mounting brackets from the top and bottom of the F6 if they were installed for a previous application ❶.
3. Remove the two Phillips screws from the top face of the side ventilation panel of the F6 ❷.
4. Remove the four screws from the side panel of the ventilation panel ❸.
5. Set the ventilation panel aside. (The screws will be reused in the following steps.)

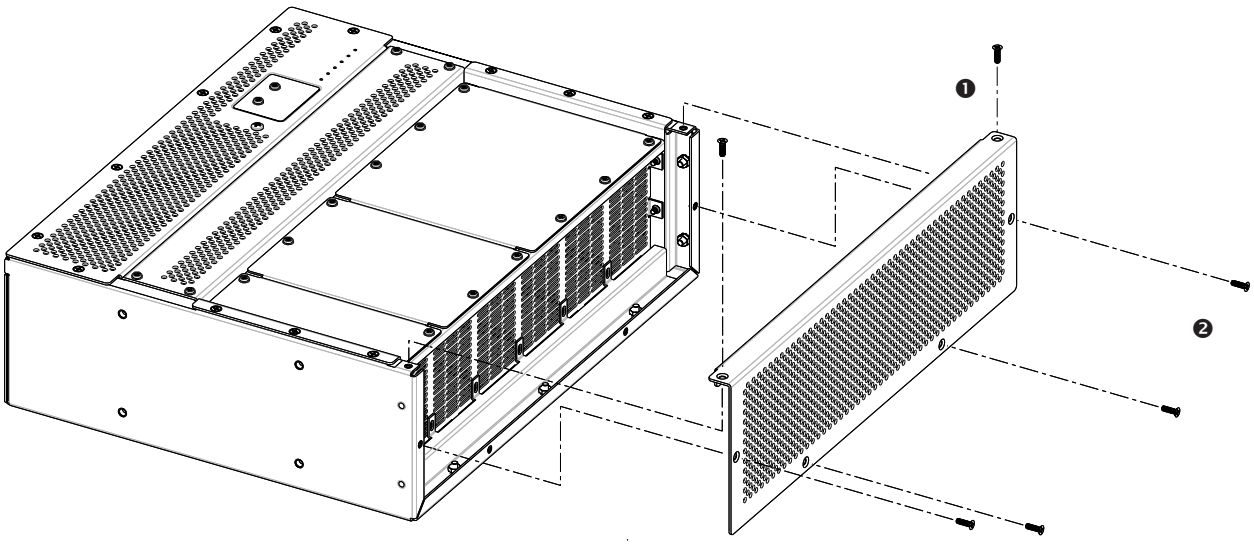


Remove the side ventilation panel and any previously installed mounting brackets.

✓ **Note: Save the original side ventilation panel for future use in case the F6 is installed in a different type of enclosure. The design of the ventilation panel is an integral part of the F6 cooling system.**

Install the SK6 Side Ventilation Panel:

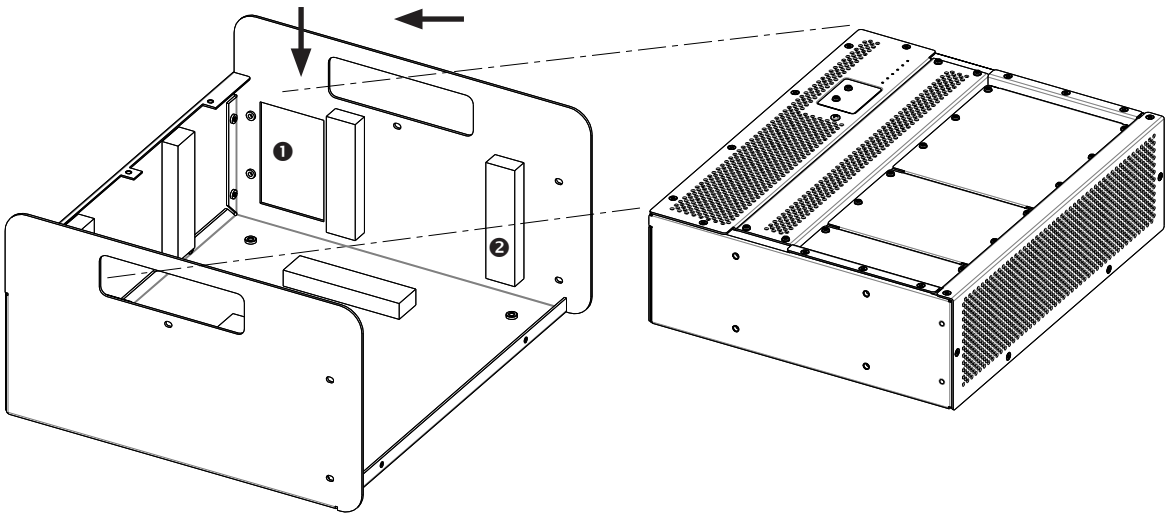
1. Align the replacement SK6 side ventilation panel with the side of the F6.
2. Install two screws through the holes in the ventilation panel into the top of the F6 ❶.
3. Install the four screws that secure the side of the ventilation panel ❷.
4. Tighten all six screws.



Install the new ventilation panel.

Place the Completed F6 into the Stage Kit:

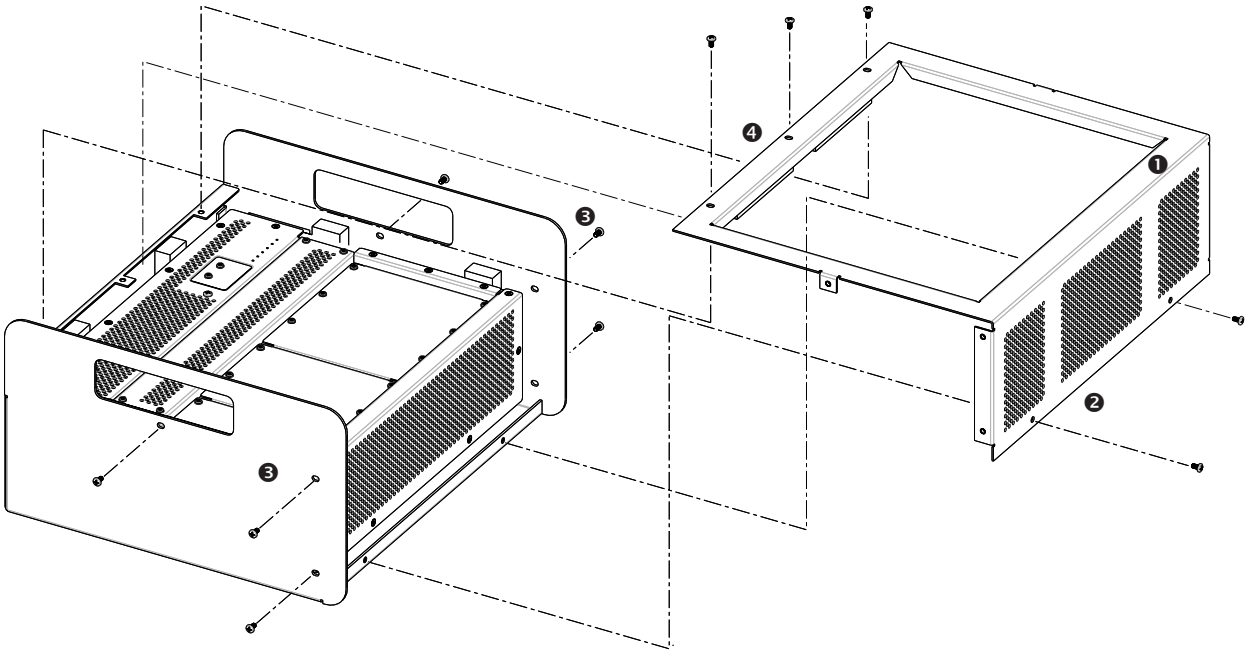
1. Orient the SK6 case so that the opening for the network connections ❶ is aligned as shown in the diagram.
2. Slide the F6 into the SK6 case from the top down (to allow the EtherCon connectors clear the foam) until it fits snugly against the foam shock mounts on all sides ❷.



Place the F6 into the SK6 case, oriented as shown.

Install the Stage Kit Cover:

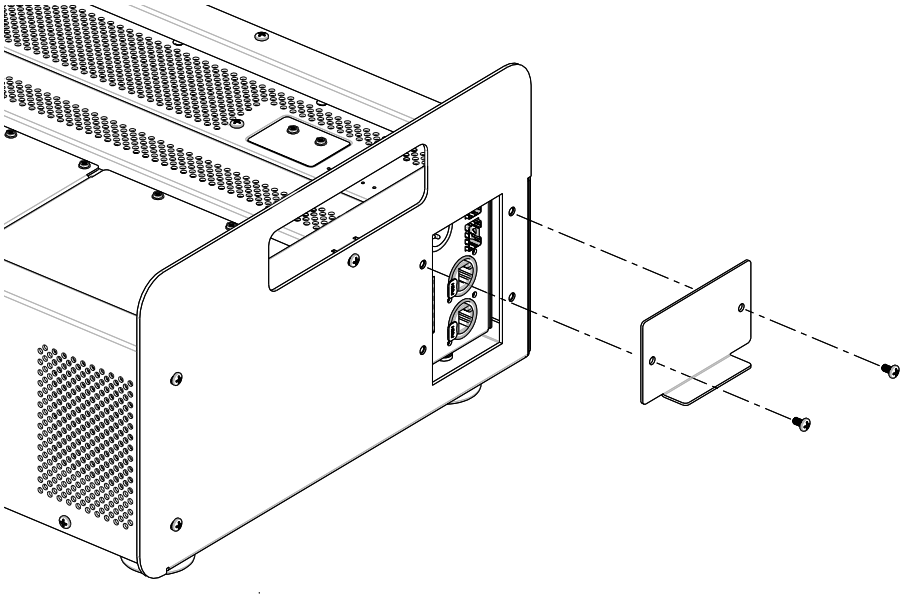
1. Carefully align the stage kit cover panel as shown ❶. Be sure that the tabs on the sides of the cover panel are on the inside of the case.
2. Install the two screws to hold the side panel in place ❷.
3. Install three screws in the both the left and right sides of the stage kit ❸.
4. Finally, install the three screws to secure the top panel ❹.



Secure the top of the stage kit with the screws provided.

Install the Connector Cover:

The SK6 Stage Kit ships with an optional connector cover plate that can be added to provide extra protection to cables connected to the I/O section of the F6 when it is installed in a stage kit. The cover plate can be installed on either side of the I/O section. The angled flange on the plate should be oriented as shown for maximum cable protection.



The optional cover plate can be installed on either side of the I/O section.

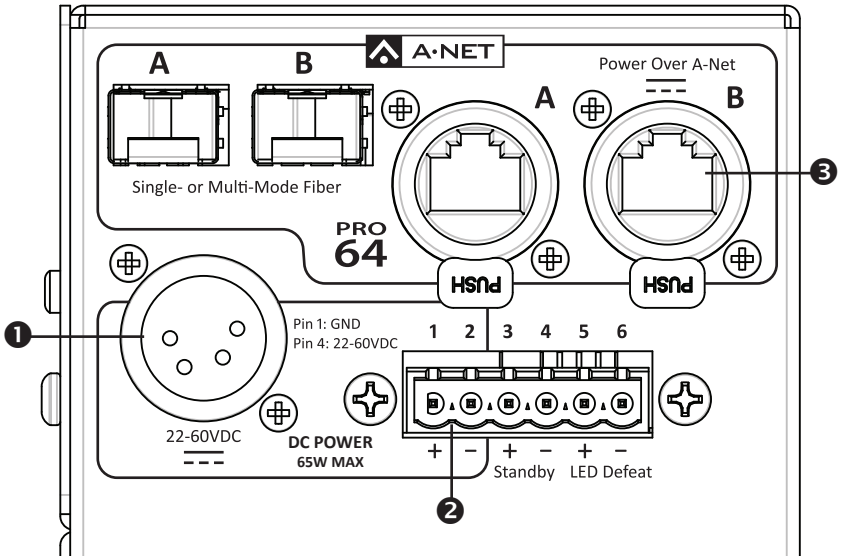
Powering the F6 Modular I/O Frame

The F6 Modular I/O Frame is a DC-powered device that can be powered in a variety of ways:

- Via the 4-pin XLR connector on the F6 top panel
- Via the 2-pin Euroblock connector on the F6 top panel
- Over the A-Net cable using an approved Power Over A-Net (PoA) power supply such as the Aviom POA80 connected to A-Net Port B

All three DC power sources can be connected at the same time to provide power source redundancy without harming the F6 Modular I/O Frame.

✓ **Note:** The F6 Modular I/O Frame does not ship with a power supply. It is the installer's responsibility to provide a power source best suited for the application where the AllFrame products will be used.



DC Power to the F6 Modular I/O Frame can be supplied through the 4-pin XLR (1), the Euroblock terminals #1-2 (2), and/or over the A-Net cable using the A-Net B port (3).

Power Safety Warnings

Please heed the following warnings related to the various types of power supplies that can be used with the F6 Modular I/O Frame.

For Power Over A-Net

When powered through the copper (Cat-5) A-Net Port B connector, the F6 Modular I/O Frame shall be connected to an Aviom POA80 power supply, a UL60950-1 Certified/Listed ITE power supply having a SELV (Safety Extra Low Voltage) rated output.

No other power supply should be connected to this A-Net port.

Turn off the POA80 power supply before removing or patching any Cat-5 connections.

For DC Power via the XLR or Euroblock

When powered through the Euroblock terminal block or 4-pin XLR connectors, the F6 Modular I/O Frame shall be connected to a UL60950-1 Certified/Listed ITE power supply having a SELV (Safety Extra Low Voltage) rated output voltage between 22 and 60V DC. To guarantee proper startup, this supply should be rated for at least 100 watts.

System Connections

The copper (RJ45) and fiber A-Net ports can both be used for intra-building connections. Any inter-building connections should only be made using the fiber ports.

Power Supply Requirements

DC Power supplies used with the F6 and connected to the Euroblock terminal connector or the 4-pin XLR jack must meet the following requirements:

Power Supply Rating	Requires a UL60950-1 Certified/Listed ITE power supply having a SELV (Safety Extra Low Voltage) rated output voltage between 30 and 60V DC
Voltage (measured at the input of the F6 Modular I/O Frame)	30-60VDC, inclusive of tolerance
Maximum Current (varies with input voltage) (voltage at the input of the F6 Modular I/O Frame)	1.08A @ 60V 1.16A @ 56V 1.35A @ 48V 1.41A @ 44V 2.70A @ 24V 2.95A @ 22V

✓ **Note:** When powering the F6 Modular I/O Frame through the Euroblock or 4-pin XLR input with a switching power supply, an in-line EMI filter may be needed to meet the conducted emissions requirements of EN 55103-1 and FCC Class B. This filter is not required when the unit is powered by a linear supply.

Power Cable Lengths

Maximum usable distances for DC power cables used with the F6 and connected to the 4-pin XLR or Euroblock terminal block connectors will vary based on the gauge of the wire, and the voltage and power rating of the supply. The cable will dissipate some of the power as heat resulting in a voltage drop on the cable that increases with cable length.

The following table presents power cable length as a function of wire gauge and supply voltage/power rating.

	Maximum Cable Distance For Various Power Supplies		
Wire Gauge	**24V, +/-5% @ 100 Watts**	**48V, +/-5% @ 100 Watts**	**48V, +/-5% @ 120 Watts**
12	75 feet, 23 meters	900 feet, 274 meters	1800 feet, 548.5 meters
14	48 feet, 15 meters	550 feet, 168 meters	1150 feet, 350.5 meters
16	30 feet, 9 meters	450 feet, 137 meters	725 feet, 221 meters
18	18 feet, 5.5 meters	300 feet, 91.5 meters	450 feet, 137 meters
Power Dissipation Of Cable	2.4 Watts	8 Watts	20 Watts

Power Over A-Net (PoA)

To use Power Over A-Net with the F6 Modular I/O Frame, the Aviom POA80 power supply is required. This power supply has been tested and approved for use with the F6 Modular I/O Frame.

Power Over A-Net only works with A-Net Port B on the F6 I/O Frame. Do not connect any other power supply to the A-Net inputs of the F6.

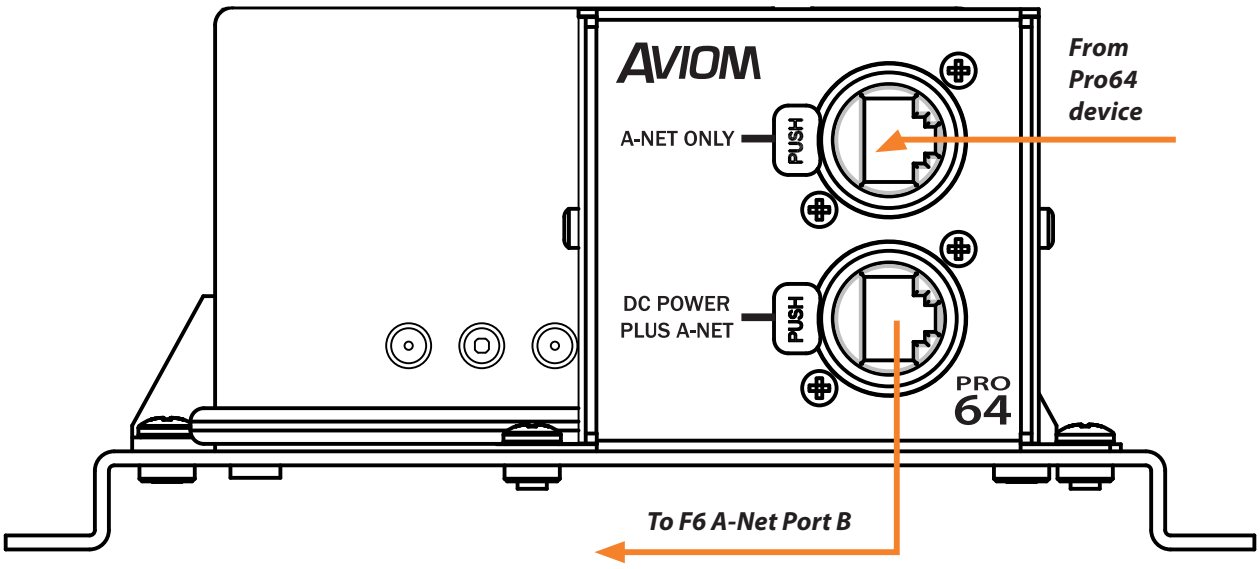
The POA80 power supply accepts one EtherCon RJ45 Cat-5e or Cat-6 A-Net input coming from a Pro64 device and outputs the Pro64 A-Net data plus the DC voltage required to power the F6 Modular I/O Frame.

When using the F6 Modular I/O Frame with an approved Power Over A-Net (PoA) power supplies, DO NOT patch the Cat-5 connection between the Power Over A-Net (PoA) device and the F6 Modular I/O Frame unit with power applied. Power down the (PoA) power supply first and wait until all of its LED indicators are off.

Connecting the POA80 Power Supply

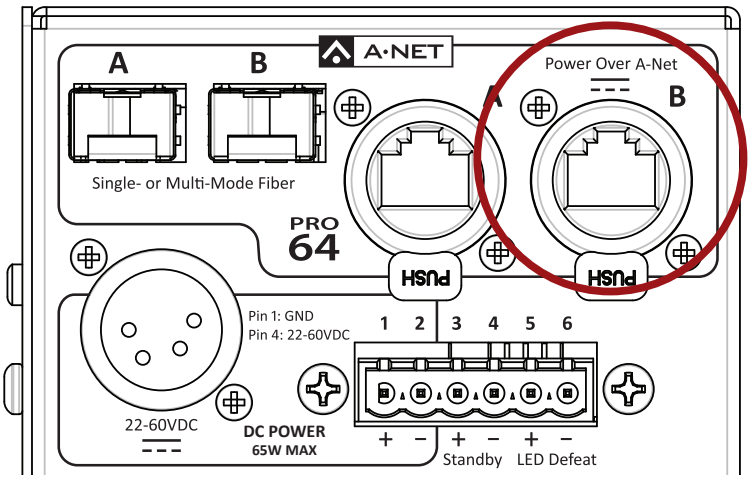
Follow these steps to connect a POA80 Power Over A-Net (PoA) power supply to the F6 Modular I/O Frame:

1. Make sure that the POA80 power supply is disconnected from the AC power source.
2. Power down the Pro64 source device that will feed the A-Net data to the POA80 power supply.
3. Connect a Cat-5e/Cat-6 cable between either A-Net port on the source Pro64 device to the **A-Net Only** port on the POA80 power supply.
4. Connect another Cat-5e from the POA80 power supply's RJ45 **DC Power Plus A-Net** port to the **A-Net B** port on the F6 Modular I/O Frame.
5. It is now safe to power up the POA80 power supply and the network's Pro64 devices.



Connect A-Net coming from the Pro64 network to the **A-Net Only** port of the POA80 power supply. Connect another cable from the **DC Power Plus A-Net** port of the power supply to **A-Net B** port on the F6.

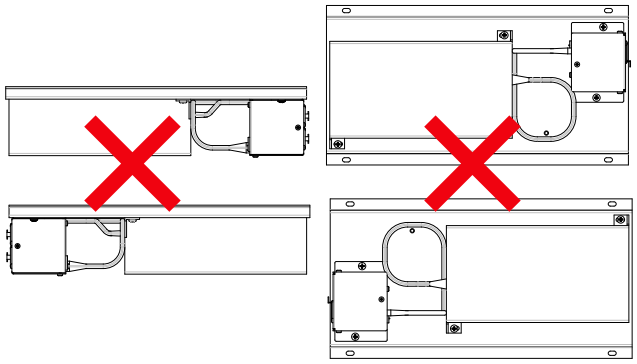
✓ **NOTE:** Do not connect a Power Over A-Net cable from the POA80 to the **A-NET A** port on the F6 or to the A-Net ports on any other Pro64 device.



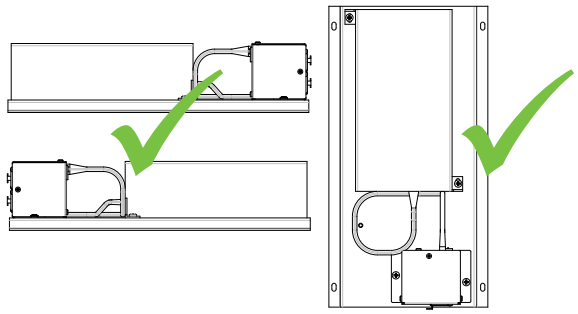
Connect Power Over A-Net cables only to the A-Net B port on the F6.

Mounting the POA80

The POA80 can be mounted on both horizontal and vertical surfaces. However, do not mount the POA80 horizontally on a vertical surface such as a wall or interior of a rack, and do not mount the POA80 upside down.



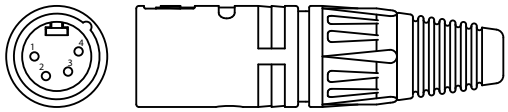
Do not mount a POA80 upside down or horizontally on a wall.



These orientations allow for proper ventilation of the POA80.

DC Power via the 4-Pin XLR

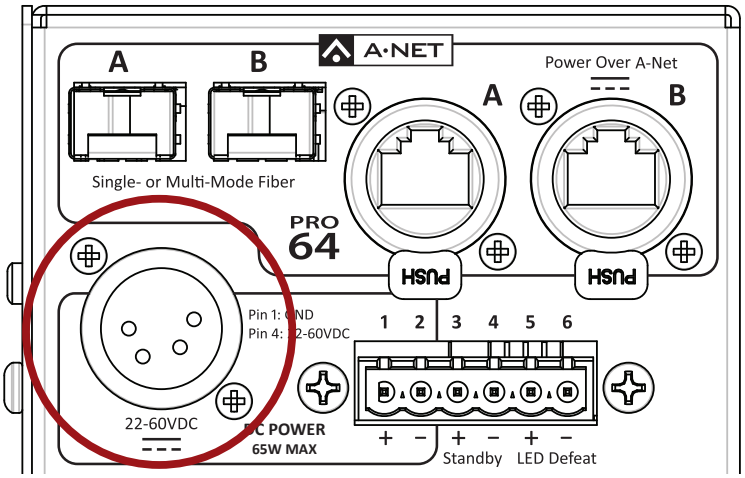
Power for the F6 Modular I/O Frame can be supplied via the 4-pin XLR connector on the top panel of the F6. Refer to the Power Supply Requirements on page 25 for more information.



The 4-pin XLR male plug

The 4-pin XLR jack providing power to the F6 should be wired as seen in the table below.

Connector Type	4-pin XLR
Pinout	Pin 1: Ground Pin 2/3: No Connect Pin 4: 30-60VDC



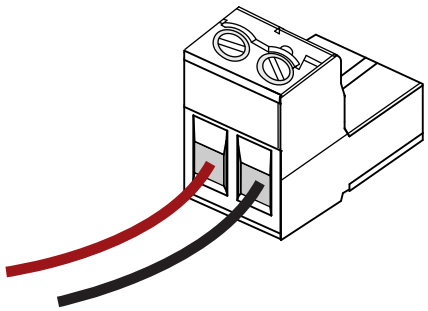
Connect DC power to the 4-pin XLR input on the F6.

DC Power via the Euroblock Connectors

On the top panel of the F6, terminals 1 and 2 of the 6-pin Euroblock terminal connector can be used when connecting a DC power supply. See the Power Supply Requirements on page 25 for more information about selecting a properly sized power supply.

The terminal block connector connected to the F6 should be wired as seen in the table below.

Connector Type	2-pin terminal block
Pinout	Pin 1: 30-60VDC (+) Pin 2: Ground (-)
Terminal Blocks	Phoenix Contact part number 17 54 44 9 Size: 5mm; 2 contacts per unit

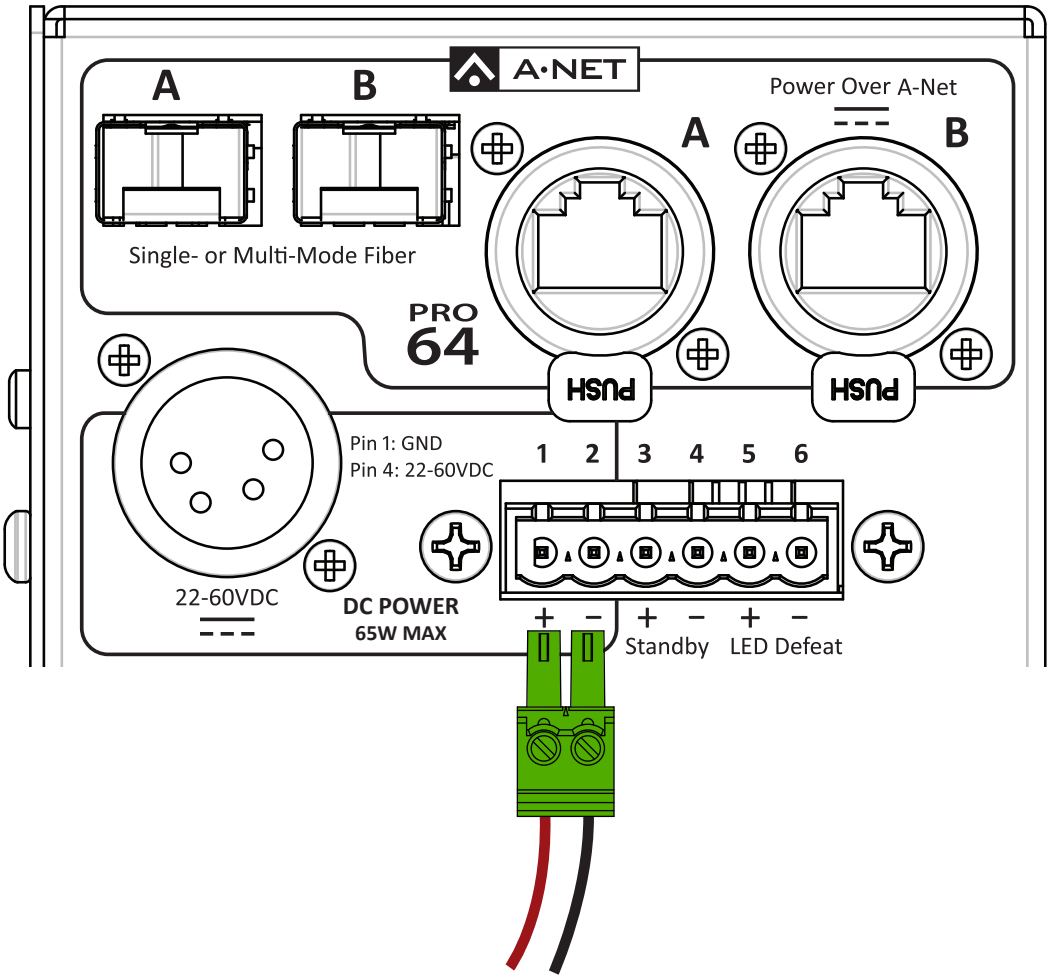


Use a small screwdriver to secure the power supply wires to the terminal block.

To connect a power supply to the terminal block connector:

1. Carefully remove a small amount (about 1/4-inch, 6mm) of the insulation from each of the power supply's wires.
2. Optionally, tin the ends of each bare wire with solder.
3. Insert the positive 30-60VDC (+) wire into the **Pin 1** (left) opening in the terminal block.
4. Secure the wire into place by tightening the screw on the top of the terminal block using a small screwdriver.
5. Insert the ground (-) wire into the **Pin 2** (right) opening in the terminal block and secure it in place by tightening the screw.
6. Install the terminal block into connectors 1-2 on the top of the F6, pressing the connector firmly in place.

✓ **Note:** Do not connect DC power to any terminal block except #1-2 on the top of the F6 frame.



Press the assembled power supply connector firmly into place.

To remove the terminal block from the mating connector, pull the plug assembly straight up; do not twist the terminal block connector.

Pro64 User Interface

This section outlines the basic concepts of operation for Pro64 products. Pro64 I/O devices have some common user interface elements that make setting up an audio network easy to understand.

Common elements include:

- A-Net Slot selection
- Sample Rate
- Managed operation via Pro64 Network Manager software

In addition, each I/O device in a Pro64 network has the ability to be set as the Control Master and/or Clock Master (depending on the actual makeup of the analog/digital devices in the audio network). Only one device can have control of these functions at a time in a properly configured Pro64 network.

A-Net Slot

Pro64 I/O devices come in a variety of configurations. To allow a large number of hardware audio input devices to be available to the Pro64 audio network, Aviom has implemented the concept of the A-Net Slot to simplify the configuration of potentially complex audio networks.

A Pro64 audio network will always have a finite number of A-Net Slots available that can be addressed by an unlimited number of hardware channels. The actual number of available Slots is determined by the current sample rate.

Slots versus Channels

You might be wondering why Aviom chose to refer to the audio I/O resources in the Pro64 Series products as "slots." Why not just call them "channels"?

We did this to avoid confusion between references to *hardware* audio resources and *network* audio resources. The word "channel" is ambiguous and may cause confusion when configuring an audio network. "Channel" appears in many contexts, including audio mixing consoles, mic preamps, DSP processors, and DAW software.

We use the word "channel" when referring to the *physical* audio inputs—analog or digital—on a piece of hardware (such as the mic/line XLR input jacks on the C4m Mic Input Module used with the F6 in an AllFrame system). Each of these audio inputs can be made active and added to the network individually, and it is only when *activated* that they use any network resources (the A-Net Slots). To enable this powerful feature, Pro64 products separate the hardware input and output resources from the available network resources, allowing each hardware input channel to be added to the network as needed.

It is these activated hardware resources that are being referred to as "Slots." Pro64 audio networks can potentially have a greater number of audio channels and hardware I/O devices connected than the network can make use of at one time. This provides flexibility without requiring constant re-patching or complicated computer programming.

Keep in mind that a Pro64 A-Net network can only manage a specific number of Slots at a time, and this number varies with the sample rate being used. The maximums when incorporating AllFrame devices are 64 Slots at the 48kHz sampling rate and 32 Slots at 96kHz.

In summary, think of "channels" as hardware resources that can be added to the network as needed and "Slots" as locations within the digital audio network pipeline that A-Net uses to move data throughout the network.

A-Net Slot Example

The following example shows the power of the Pro64 network and the A-Net Slots concept. The range of A-Net Slots used in the example has been limited to a group of 16 inputs for simplicity.

This graphic below represents a 16-channel Pro64 product; its hardware input channels can be assigned to the network's Slots by activating them individually.

Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

For the example system, one 16-channel Pro64 input device is placed in each of four rooms of a production facility, designated as Locations A, B, C, and D. One 16-channel output device is installed in the facility's Location E. All devices are set to operate within the same Slot range, 1-16.

Location A Inputs															
Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Location B Inputs															
Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

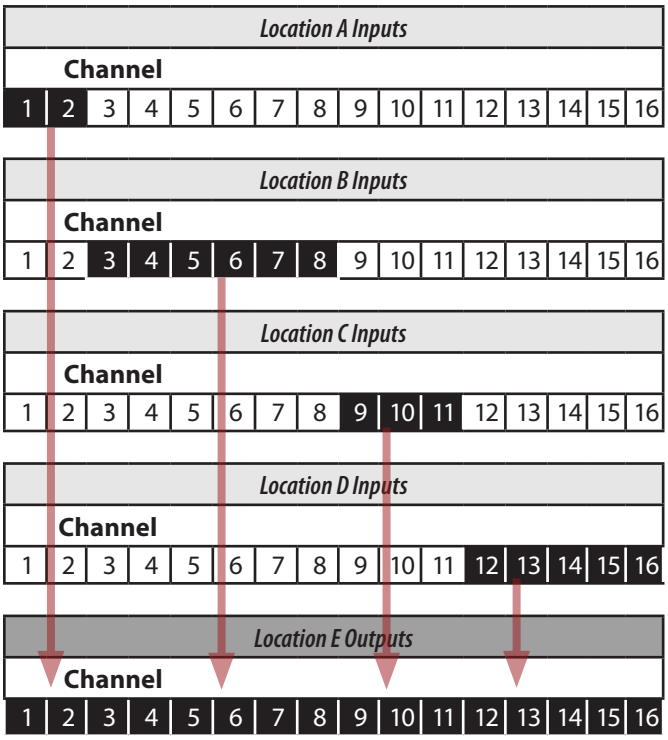
Location C Inputs															
Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Location D Inputs															
Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Location E Outputs															
Channel															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

By activating a group of channels on each of the four input devices, a total of sixteen inputs are used (indicated by reverse text). All of these inputs are available on the network at every Pro64 output device. The operator in Location E can use the sixteen inputs from Locations A, B, C, and D simultaneously.

The order in which the Pro64 devices are connected is irrelevant.



This makeup of this network can be reconfigured simply by activating a different set of channels. The input devices can come from any combination Pro64 devices as well as any mix of signals types such as line-level, mic-level, digital, or those derived from Yamaha format console cards.

Slots and Sample Rate

The current network-wide sample rate will determine the number of A-Net Slots that are available.

Sample Rate	A-Net Slots
44.1kHz	64
48kHz	64
88.2kHz	32
96kHz	32

Even though the network sample rate may change the available number of A-Net Slots, the capacity of a hardware device does not change. That is, a 16-channel input device in a 96kHz network can still have all of its channels activated; all of its physical inputs can operate at 96kHz.

Network Settings

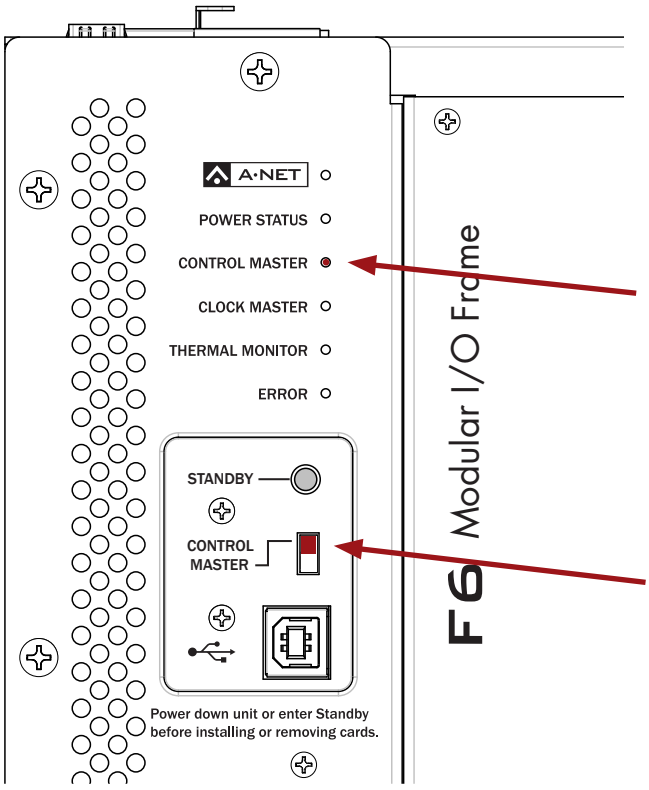
There are a few basic concepts that need to be understood when setting up a Pro64 network. Some of the functions described below do not need to be set on every Pro64 device in the network as they only need to be set up on the network's Control Master, the Pro64 device in charge of network resource management.

The network's Control Master device is also used as the connection point for a PC when the Pro64 Network Manager software is used to program and configure the network.

Control Master

One Pro64 device in every network must be designated as the Control Master. To set the F6 I/O Frame as the Control Master, the slide switch found under the recessed access panel on the front of the device is used. To use the F6 as the Control Master, first power off the F6 and then set this DIP switch to the up position. Ensure that no other Pro64 device is set to be the Control Master and then power up the network.

When the F6 is powered up, the network will be enumerated and the blue A-Net LEDs on all connected Pro64 devices will be lit. On the Control Master device, its red Control Master LED will also be lit. The Control Master LED will be off on all remote/slave devices in the network.



The F6 Control Master LED and switch

The functions of the Control Master include:

- System resource and information management
- Setting network mode (Auto or Manual*)
- Management of active channels in Auto Mode
- System-level command and control functions
- Keeping track of all Pro64 devices in the network (by type and quantity)
- Control of the current system-wide sample rate
- Clock Master
- System lock via password* on/off
- Management of Virtual Data Cable (VDC) resources
- Management of stereo link status
- Communication with a PC via the Pro64 Network Manager software.

The Control Master status is identified with a red LED on the front panel of the Pro64 device currently assigned as the Control Master.

* Not available on the F6 Modular I/O Frame.

Control Master Functions

This section describes the individual functions that the designated Control Master device in a Pro64 network oversees.

Enumeration

When the Control Master is powered on, its first job is to identify and count all connected A-Net devices in the network in a process called *enumeration*, similar to a PC booting up and loading its operating system. The time for this process will vary based upon the number of devices in a network and cable distances between devices.

Enumeration is an automated process performed by the command and control portion of A-Net. There are no user-controllable functions or settings.

During the enumeration process, all connected A-Net devices will flash their A-Net LEDs, indicating that a request to be added to the Pro64 network is being made. Once granted entry by the Control Master, the individual device's blue A-Net LED will light solid to indicate that it is now receiving valid A-Net packets and is part of the network.

The blue LED in the A-Net icon is used to indicate network status on rack mount Pro64 devices.

If valid A-Net packets are not received, the device will continue to flash its A-Net LED and wait until a valid A-Net stream is detected and communication with the Control Master is established.

During enumeration, any conflicts will also be resolved. For example, consider a new Auto Mode installation using eight input devices set to the same A-Net Slot range with all of their input channels activated during a bench configuration. When all these input devices are connected and then powered up, only one of them will be allowed to have all 16 channels activated. The remaining seven devices will have their audio channels deactivated. The Control Master device will determine which connected device gets the active A-Net Slots.

Adding Pro64 Devices to a Network

When a new Pro64 device is added to an existing network, the new device makes a request to the Control Master for inclusion in the network. During this time, the new device's blue A-Net LED will flash. When the new device has been enumerated by the Control Master, its blue A-Net LED will then light solidly to indicate that the Control Master has granted the device access to the network. Adding a new device will interrupt network operation briefly, including the output of audio. The amount of time will vary based on the size and complexity of the network and cable distances.

Control Master Errors

The following rules apply to the Control Master and active Pro64 networks.

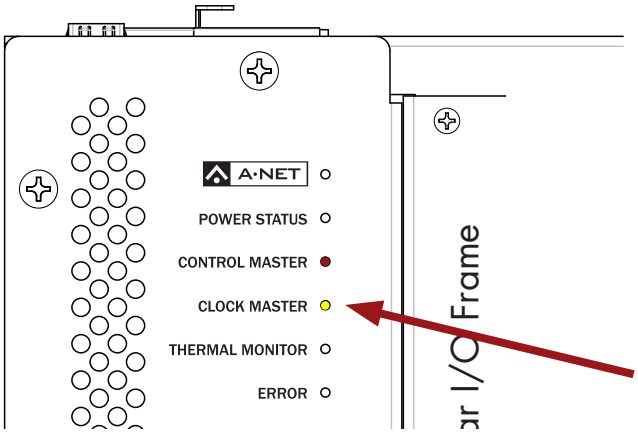
If a slave device that is already part of an active network is incorrectly switched to be a Control Master (in addition to the network's already functioning Control Master), that device's red Control Master LED will light and its blue A-Net LED will go out to indicate the error. The Control Master LED will remain lit until the device is returned to slave status, at which point the A-Net LED will light to indicate that the device is now part of the network. Note that if this situation occurs in the middle of a daisy chain run of Pro64 devices, the new, incorrect Control Master device can inadvertently create a second Pro64 network that cannot communicate with the original network.

If a new device set to be the Control Master is added to an active running network (one that already has a valid Control Master), the new device's Control Master LED will light but its A-Net LED will not. Its audio I/O resources will remain unavailable until the device is returned to slave status. All audio on this device will be muted until the device is set to be a slave.

If the Control Master is removed from a functioning network (by being disconnected, power failure, etc.), all slave units will reset and audio will be muted. Slave units will wait for a new Control Master to be designated and at that point will begin the enumeration process. Once the network has valid A-Net communication, audio resources will become available.

Clock Master

One device in a Pro64 network will always be set as the network's Clock Master; the device set as the Clock Master will have its yellow Clock Master LED lit. If an F6 with only analog I/O cards installed is set as the Control Master, it is also set to be the Clock Master by default.



The yellow Clock Master LED lights when the Pro64 device is the Clock Master.

Control Master and Clock Source

When an analog I/O device is the Control Master, there is no other analog device that can be used as a clock source. When a digital I/O device such as the AllFrame with a C4dio card installed is part of an audio network, the digital I/O device can be used as a Clock Master for the network and external clock sources can be connected.

External clock sources on the can include:

- Word Clock - via the dedicated BNC Word Clock jack
- AES3 (AES/EBU) - from AES3 digital stream 1/2

Clock Errors

Common causes for a clock error include:

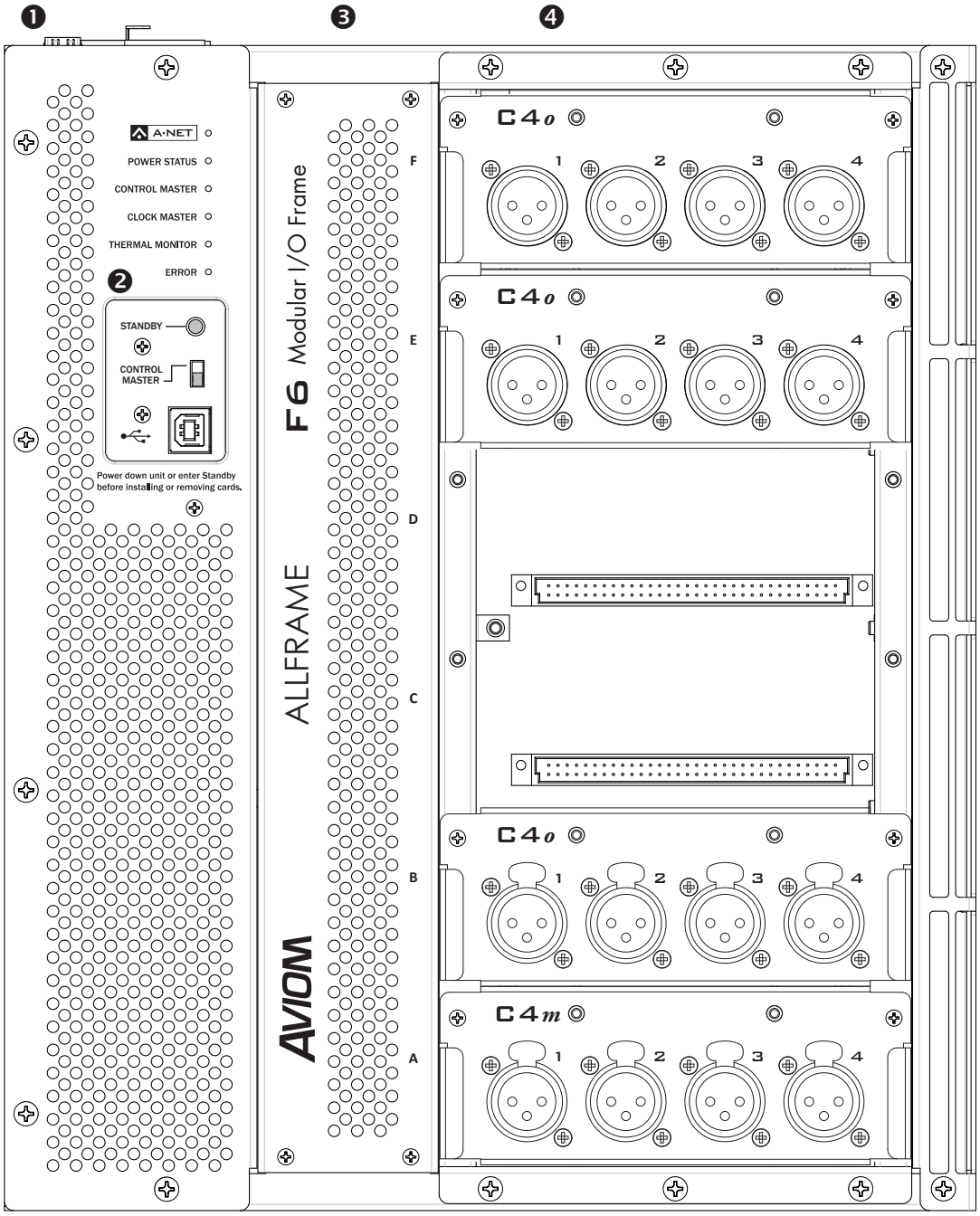
- Attempting to change the sample rate on an analog device other than the Clock Master in an all-analog network
- Attempting to change the clock source when the network is password protected
- Removing or changing external clock sources on a digital I/O device (the network defaults to using its internal clock until the external clock is restored)
- Loss of an external clock source (word clock or AES3) on a digital I/O device caused by intermittent connections, etc., on the external device

Sample Rates and A-Net Slots

Changing the network sample rate has a direct effect on the availability of A-Net Slots. For example, setting the sample rate to 96kHz makes only 32 Slots available, numbers 1 through 32. Slot numbers above 32 are no longer available.

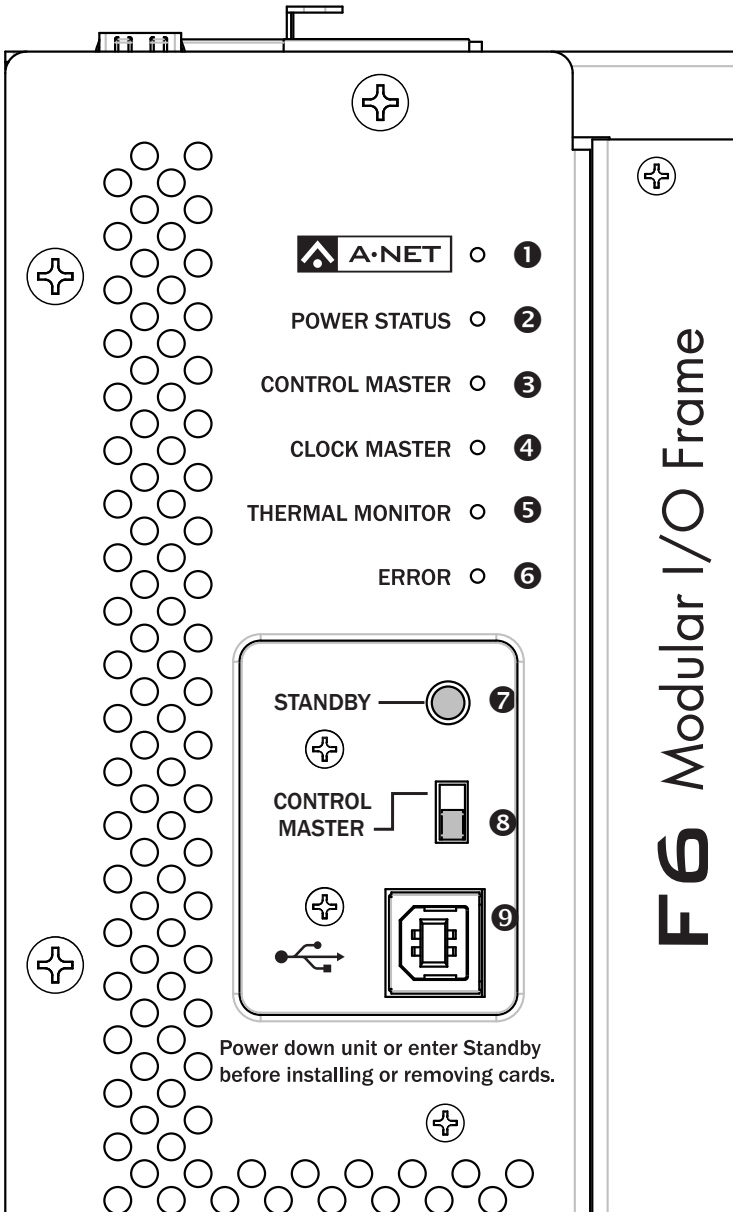
If at the 48kHz sample rate an input-capable device such as the AllFrame F6 or 6416m is set to use the Slots starting at 33 or higher *and* has active channels, these channels will be deactivated when the sample rate changes to 96kHz. These Slot assignments no longer exist in the 96kHz network.

F6 Front Panel Components



The front panel of the F6 Modular I/O Frame is divided three sections: the main board area with its status LEDs (1) and control panel beneath a removable cover plate (2), the fan tray (3), and the configurable audio I/O section (4), shown here with four cards installed and the two remaining protective cover plates removed.

F6 Front Panel Components



1. A-Net LED
2. Power Status LED (bi-color)
3. Control Master LED
4. Clock Master LED
5. Thermal Monitor LED
6. Error LED
7. Standby Switch (under cover plate)
8. Control Master Switch
9. USB Type B Connector

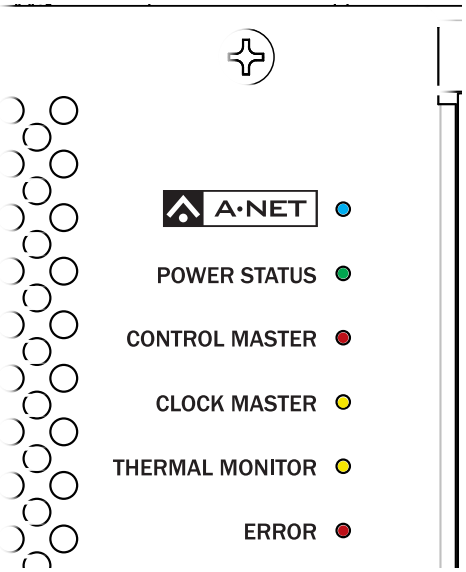
Front Panel LEDs

A-Net LED

The A-Net LED lights solid blue to indicate that the F6 Modular I/O Frame is on a valid Pro64 network and that A-Net data is flowing. The blue LED flashes during a firmware update and at any time the F6 is waiting to enter a Pro64 network.

Power Status LED

The Power Status LED is a bi-color LED that is used to indicate the two power states that the F6 can operate in. It will glow green when the F6 running in full power mode; the Power Status LED glows red when the F6 is placed in standby mode.



The LED section of the main board panel showing the colors associated with each feature

Control Master LED

When an F6 Modular I/O Frame is used as the network's Control Master device, the Control Master LED will light in red. The Control Master status (on/off) is set using the switch found beneath the cover plate in the main board section of the F6 front panel. Remember that only one Pro64 device per network can be set to be the Control Master.

Clock Master LED

The Clock Master LED indicates that a Pro64 device is providing the master clock sync for the Pro64 network. When an F6 Modular I/O Frame is used as the network's Control Master, it automatically becomes the Clock Master. With at least one C4dio Digital I/O card installed in the F6, external clocks can also be used to sync the network. External clock choices include Word Clock or the clock embedded in an AES3 digital stream.

Thermal Monitor LED

The F6 Modular I/O Frame constantly monitors its internal temperature as well as the status of its built-in fan unit. If the device's internal temperature gets too high, the Thermal Monitor LED will begin to blink to indicate that temperature of the F6 and its surrounding enclosure should be checked. If the temperature continues to rise, the LED will light solid when the temperature reaches an unacceptable level. Correct the ambient temperature problem as soon as possible to avoid damaging the product.

Fan Monitoring

The Thermal Monitor LED is also used in conjunction with the onboard firmware to monitor the condition of the built-in fans used to keep the F6 cool. In case of a fan failure, the yellow LED will blink slowly to indicate the problem. Replace the fan as soon as possible if this warning occurs. The Fan6 Replacement Fan Tray Assembly is an optional accessory that is an exact replacement for the standard fan assembly in the F6.

Error LED

This red LED will be activated by software when a hardware error is detected. For example, if an unrecognized I/O card is installed, the Error LED will flash to indicate the incompatibility. Updating the F6 firmware and/or version of the Pro64 Network Manager software should correct and clear this error state.

Control Panel

The covered control panel area of the front of the F6 contains the Standby switch, the Control Master switch, and the USB Type B connector.

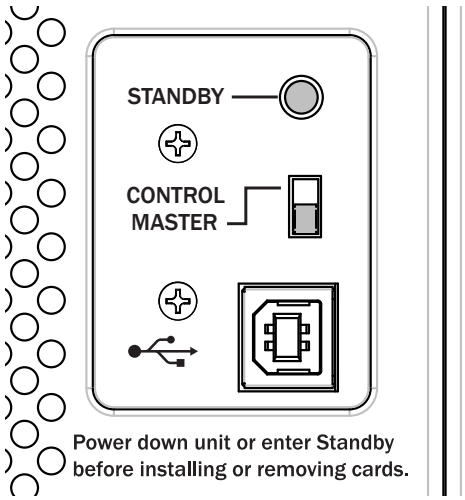
To access the switches and connector in the control panel area, remove its cover using a #1 Phillips screwdriver or 5/16-inch hex nut driver.

Standby Switch

The Standby switch is a momentary switch that can be used to force the F6 to enter or exit Standby mode, allowing I/O cards to be added or removed without having to power-down the entire F6 Modular I/O Frame unit or disrupt the flow of the A-Net network data to other devices. Standby can also be used when the F6 I/O resources are not required for a particular application but the F6 needs to remain connected via Cat-5e or fiber to other Pro64 devices in the network. Standby can also be activated when using Pro64 Network Manager to monitor the network by using the Standby radio button found in the AllFrame Device Window.

A-Net data always flows through an F6 Modular I/O Frame when it is placed in Standby mode. Always enter Standby mode or power down the F6 before attempting to remove or reconfigure an F6's I/O cards.

✓ **Note:** Do not add or remove I/O cards while the F6 Modular I/O Frame is operating in its full power mode. Damage to the I/O cards and/or F6 frame itself can occur.



The control panel area with its cover plate removed

The F6 cannot be brought out of Standby mode if the internal temperature is at or above an unacceptable level caused by the surrounding enclosure's ambient temperature. The state of Standby mode is preserved across power cycles.

Control Master Switch

To use the F6 Modular I/O Frame as the Pro64 network's Control Master device, move the **Control Master** switch to the up position. Remember that only one Pro64 device per network can be set as the Control Master.

USB Connector

Beneath the front panel cover plate on the F6 is a USB Type B connector to allow a computer to be connected for firmware updates or for when the F6 Modular I/O Frame is used as a connection point for the Pro64 Network Manager software used to program and control the network. The F6 must be the network's Control Master to use the USB connection to send control information from Pro64 Network Manager.

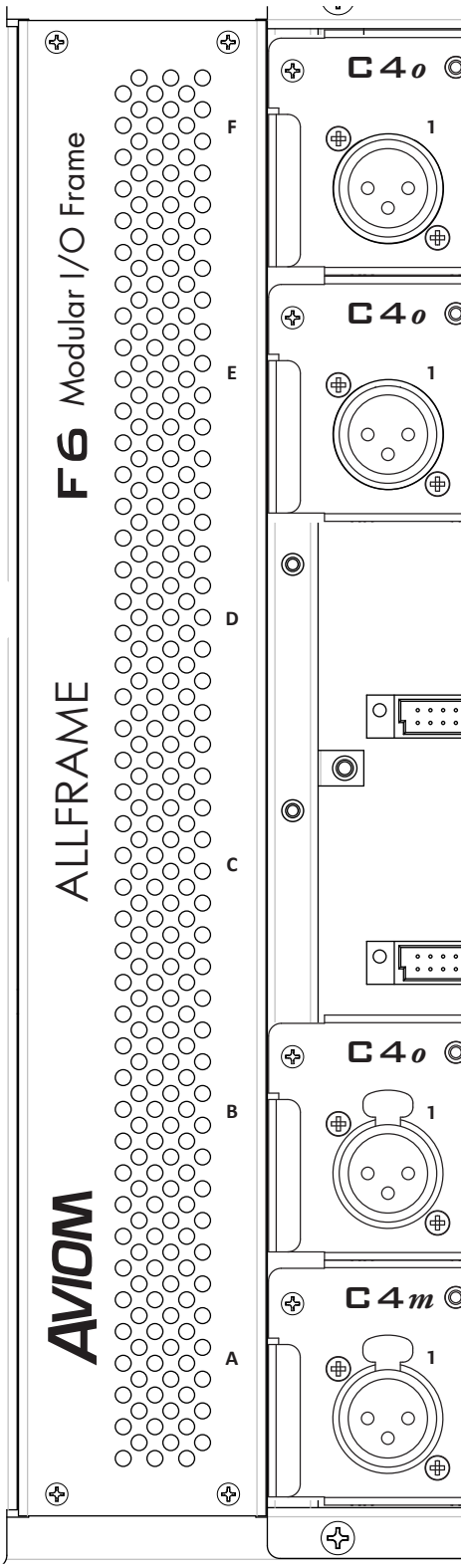
The USB driver is installed during the Pro64 Network Manager software installation.

Fan Tray

The fan tray occupies the center section of the F6 Modular I/O Frame. The unit can be accessed for servicing by removing the four screws holding the assembly to the F6.

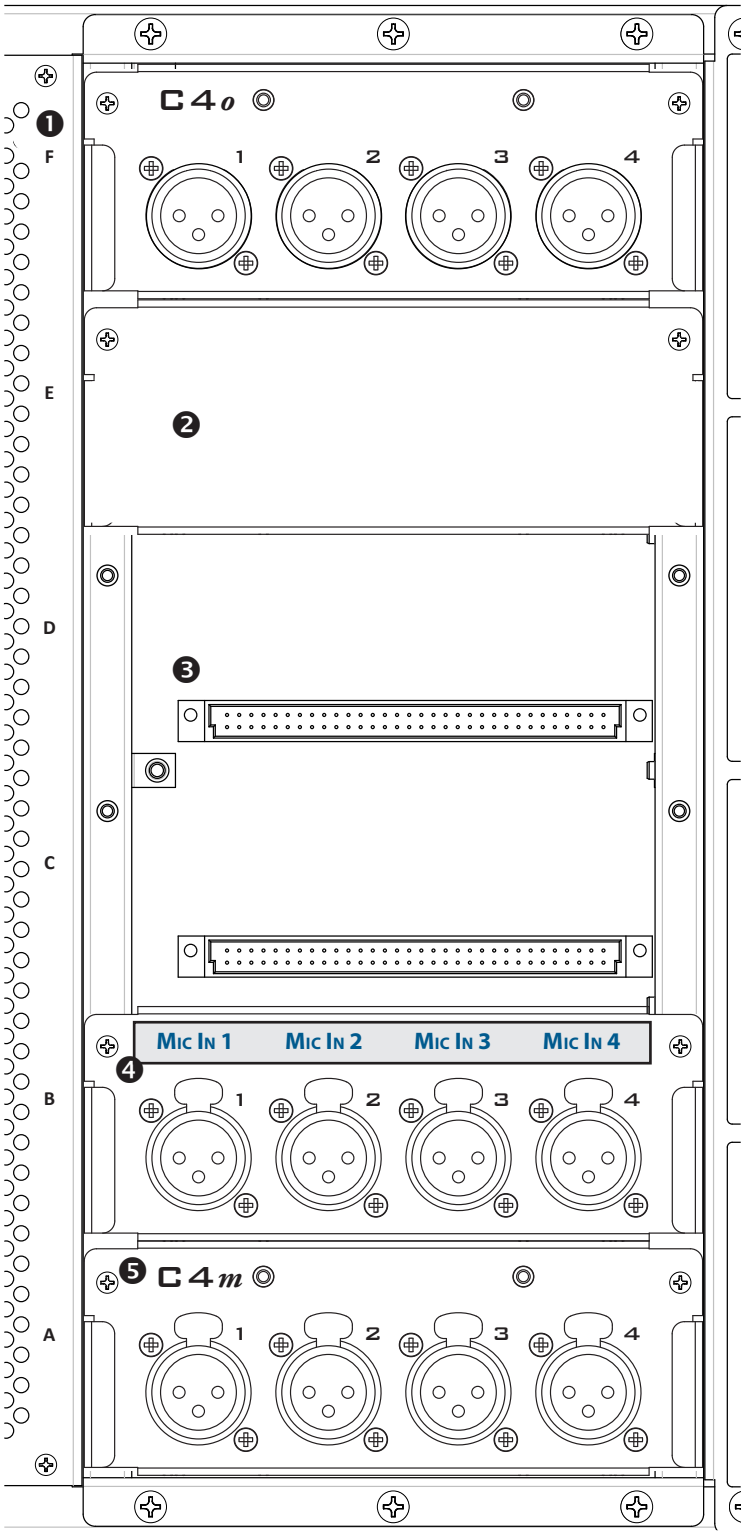
The letters A-F on the fan tray are used to identify the card slots in the neighboring I/O panel.

A field-replacement fan assembly for the F6 is available as the Fan6 Replacement Fan Tray Assembly



I/O Card Slots

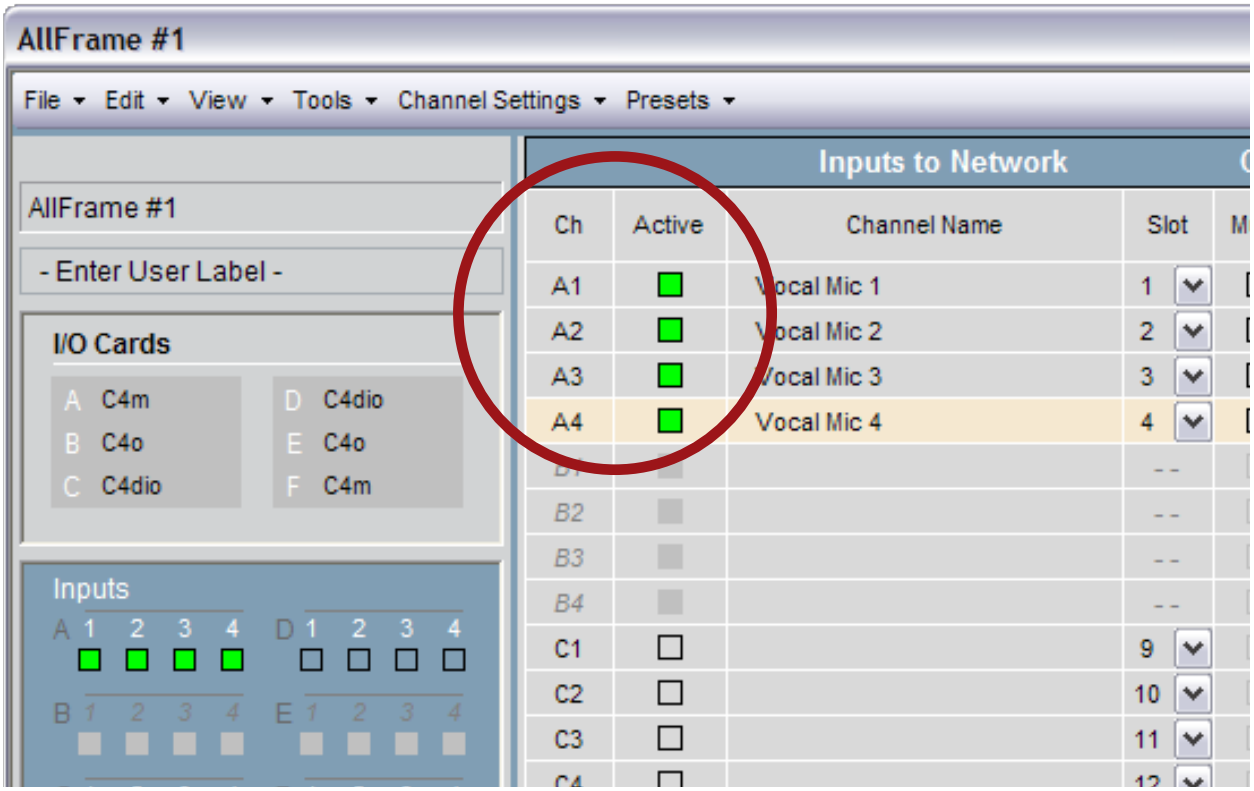
1. Card Slot ID, A-F
2. Card Slot cover plate
3. Cover plate removed showing F6 backplane connectors
4. I/O Card label area (shown with optional laminate label strip applied)
5. Installed I/O card



Card Slot ID

The letters A through F are used to designate the six available I/O card slots on the F6 Modular I/O Frame. When an optional I/O card is installed, that card and its I/O resources will be referenced by letter and channel number in the Pro64 Network Manager software used to program the AllFrame.

For example, when a C4m Mic/Line Input Card is installed into I/O card slot **A** in the F6, the four mic preamps on the card will be referred to as A1, A2, A3, and A4 in the AllFrame Device Window of the software.



The AllFrame Device Window within Pro64 Network Manager showing a C4m card installed into I/O card Slot A

Installed I/O Cards

Each I/O card installed in the F6 frame appears as a programmable resource in the Pro64 Network Manager software. The specific set of I/O cards installed in an F6 Modular I/O Frame as well as their installed location (A through F) is saved as part of the Pro64 Network Manager project and its associated Scenes.

✓ **Note:** Always use standby mode or power down the F6 unit before changing I/O cards.

I/O Card Cover Plates

Metal cover plates ship with the F6 Modular I/O Frame covering the I/O expansion card slots. To remove a cover plate, use a #1 Phillips screw driver or 3/16-inch hex nut driver. Retain the cover plates and screws for future use. See page 11 for additional information about installing I/O cards in the F6.

✓ **Note:** Keep the cover plates on when I/O cards are not installed to protect the F6 backplane area.

I/O Card Label Area

Each I/O card used with the F6 Modular I/O Frame contains an area that can be used for channel labelling.

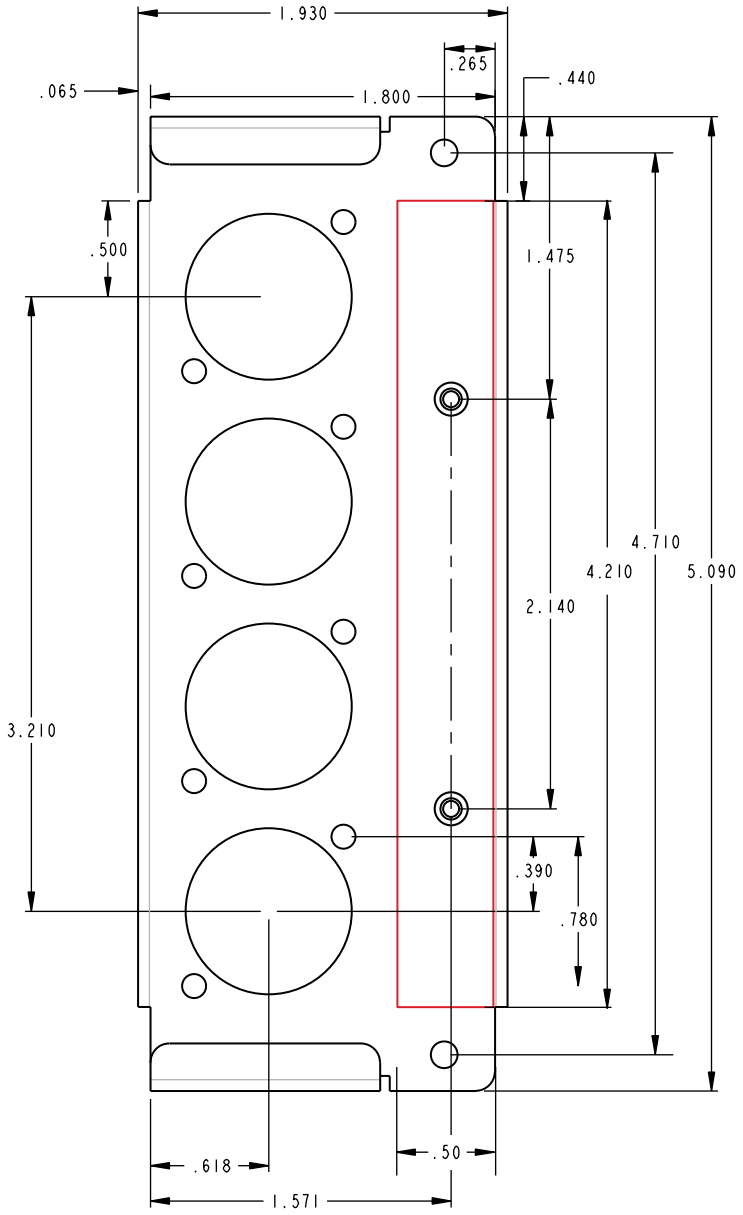
Permanent custom-made labels can be created and affixed to the area using 2- or 3-ply laminated engraving stocks (sometimes branded as "Lamicoid"). The engraved labels can be secured with stick-on adhesive or with screws using the built-in threaded mounts

✓ **Note:** When adding custom-made labels to an I/O card be sure to measure correctly so that the finished labels do not interfere with the operation of the XLR I/O connector's lock tabs.

The area available for affixing engraved laminated labels measures 4.2 x 0.5 in. (106.68 x 12.7 mm).

The label area also includes threaded connectors that can be used to secure patch bay style label strips or engraved multi-ply plastic laminate labels. The threaded inserts are PEM FEOX-440 which accept a #4 machine screw with 40 threads per inch. Maximum screw length is 0.25 inch.

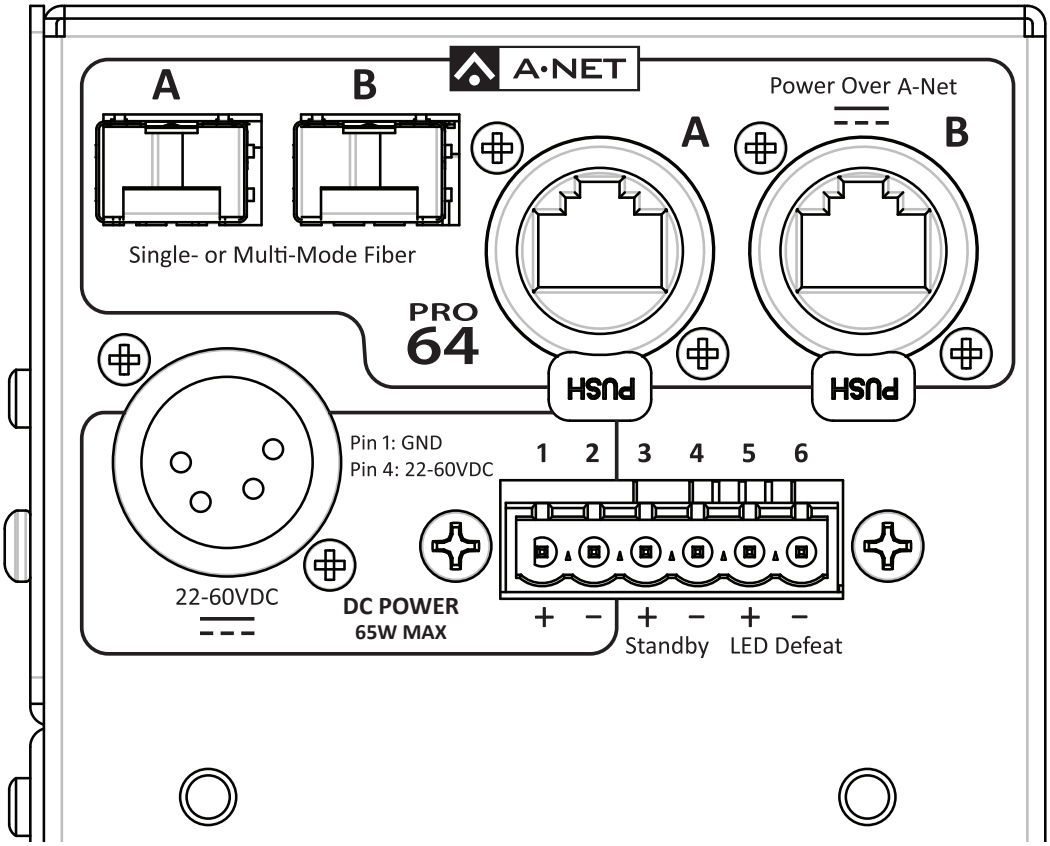
The diagram that follows can be used as a guide when creating custom labels for the I/O cards. The area shown in red is the suggested maximum size for a laminate label; note that clearance must be allowed for the tabs on the mic input XLR jacks to operate freely.



Dimensions for the label area on an I/O card; all sizes shown in inches

F6 Top Panel Features

All F6 top panel features and functions are described in this section.



The F6 Modular I/O Frame top panel connectors

A-Net Ports

Two EtherCon jacks and two SFP fiber optic ports are provided for Pro64 A-Net connections; each set is labeled **A** and **B**. The fiber and Cat-5e jacks are associated in pairs. Only one type of A-Net connection per pair can be used at a time.

The F6 Modular I/O Frame scans its A-Net ports only on power-up to determine which ports to enable. If an SFP transceiver is installed, the matching Cat-5e port is disabled, even if no fiber cable is connected to the SFP. Power the F6 down and restart it if the cabling to/from the F6 and other Pro64 devices needs to be changed.

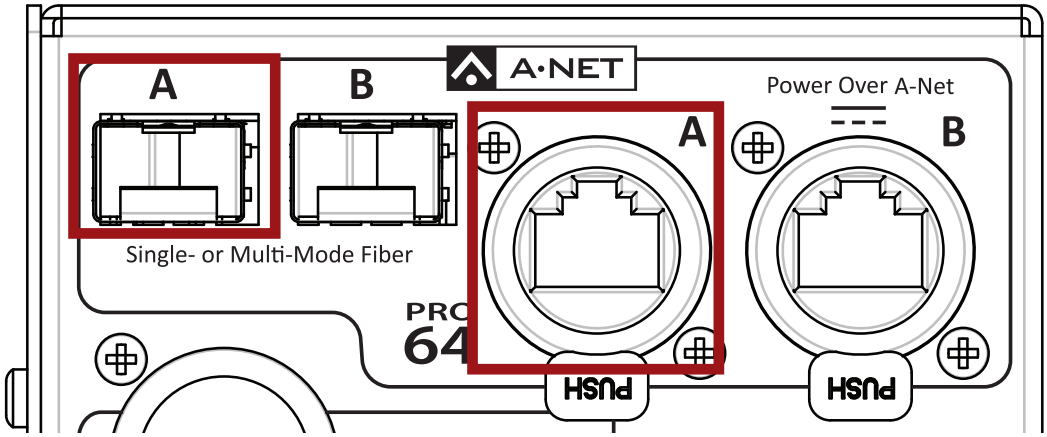
A-Net Via Cat-5e

The Cat-5e/Cat-6 connections can use standard RJ45-style cables or cables outfitted with the Cat-5 version of the locking EtherCon connector. Once connected, cables with the EtherCon connector can be released from the jack by pressing down on the jack's tab and then pulling the cable outward.

A-Net Via Fiber

When an optional single- or multi-mode fiber optic SFP (Small Form-factor Pluggable) transceiver is installed in either the A or B fiber port, the matching RJ45 Cat-5e port is disabled. When both fiber ports are in use, A-Net data to both Cat-5e ports is disabled but the Power Over A-Net (PoA) feature is still usable as a means of powering the F6 Modular I/O Frame.

✓ **Note:** Always power down the F6 Modular I/O Frame before installing or removing SFP fiber optic transceivers to avoid damaging the SFP transceiver and/or F6 electronics.



Each pair of Cat-5e and Fiber ports (A and B) are linked.

Using fiber connectivity increases the usable maximum distance between Pro64 devices in a network beyond what standard Cat-5e cabling can provide. The actual distances that can be achieved are dependent upon the type of fiber cabling used (single- or multi-mode), the number of junctions, patch points and connections made in the fiber run itself, plus the power budget and light handling specifications of the SFP transceivers used.

SFP transceivers used with Pro64 devices should be capable of working with Fast Ethernet data rates (up to 155 Mbps); many Gigabit Ethernet SFP transceivers (up to 1.25 Gbps) are capable of working with Fast Ethernet data rates as well.

Consult the SFP transceiver manufacturer's product specifications to determine if a particular SFP transceiver is appropriate for the application.

✓ **Note:** When fiber connectivity is not required for an application, the SFP transceivers should be removed from the F6 to enable the Cat-5e ports.

Optical Transceiver Safety

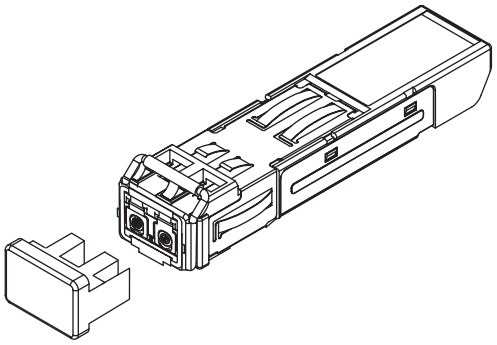
Observe the following guidelines when using SFP transceivers with your Aviom product.

An SFP is a Class 1 laser product. Avoid exposure to laser radiation and do not stare into open fiber apertures when no fiber cable is connected.

SFP transceivers are sensitive to ESD (Electrostatic Discharge). Wear an ESD-preventive wrist strap that is connected

to the product chassis in order to prevent ESD damage when handling the SFP.

The optical connections in SFP transceivers are dust sensitive; always store them with the dust covers supplied by the device's manufacturer installed in the optical openings when not in use.



Protect the SFP when not in use by leaving its dust cap on.

Power Connections

The top panel of the F6 Modular I/O Frame has three connection points for DC power: the 4-pin XLR connector, the Euroblock terminal block connectors #1-2, and the Power Over A-Net (PoA) feature that delivers DC power via the connecting A-Net cable. Refer to the *Powering the F6 Modular I/O Frame* section of this document for power requirements and connection information; see page 23.

Standby Connectors

The 6-pin Euroblock connector on the top panel of the F6 Modular I/O Frame uses the middle two pins, numbers 3-4, for the hardware Standby feature, activated by a contact closure. It is designed for situations where the AllFrame will be installed in an enclosure with a door, allowing the AllFrame to be placed in Standby when it is not in use by simply closing the door and activating the contact. This second version of the Standby feature differs from the front-panel button and software versions of Standby in that the AllFrame cannot be brought out of Standby unless the contact closure is open.

Standby places the AllFrame into a low-power mode that allows Pro64 A-Net network data to flow through the device, but disables its front panel interface and audio connections.

LED Defeat

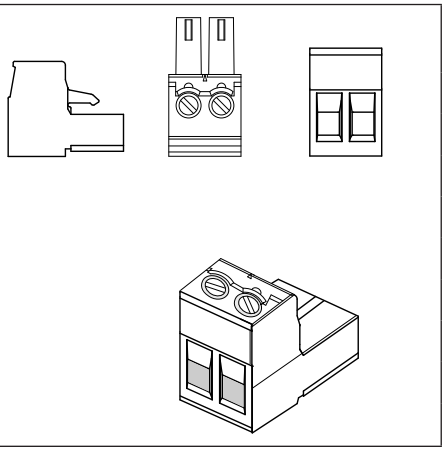
Terminals 5 and 6 on the top panel 6-pin Euroblock connector can be used when a switch is required to turn on/off the front panel LEDs.

This feature is not yet available.

Terminal Block Connectors

The terminal blocks (also referred to as Euroblocks) used with the F6 Modular I/O Frame ship with the Phoenix Contact component outlined in this section. If replacement parts are needed, connectors meeting the specifications below can be used.

Terminal Block	Phoenix Contact part # 17 54 44 9
Pitch	5 mm
Number of positions	2
Screw thread	M3
Tightening torque, min	0.5 Nm
Tightening torque, max	0.6 Nm
Minimum AWG according to UL/CUL	30
Maximum AWG according to UL/CUL	12



Building a Pro64 Network

Configuring a Pro64 network involves a few basic steps: selecting I/O devices and/or merger hubs for the application, connecting I/O devices with Cat-5e or fiber optic cables, assigning hardware inputs to an A-Net Slot, and activating input channels to make them available to output devices in the network.

Any number of Pro64 I/O devices, MH10/MH10f Merger Hubs and RCI Remote Control Interfaces can be connected and located anywhere in a Pro64 network.

Connecting Pro64 Devices

Start by setting one (and only one) Pro64 device to be the network Control Master. Because there are some operations that can only be executed at the Control Master, be sure that the device designated as the Control Master is accessible. Once all Pro64 devices in the network are enumerated (indicated by illuminated A-Net LEDs), you can activate and route audio channels and VDCs as needed.

Basic Routing

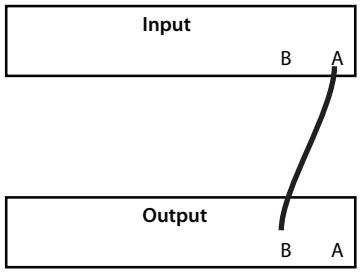
To output the mic/line audio inputs connected to the F6 Modular I/O Frame, the device must be connected to another Pro64 device somewhere in the network that can output its data. This device can be a standalone Pro64 analog or digital device, or a console interface card such as the 6416Y2 console card for use in Yamaha digital products supporting the MY expansion card format.

The diagrams that follow use generic input and output device icons. Any Pro64 I/O device can be substituted unless otherwise noted. Connect an RCI Remote Control Interface at any convenient location in the diagrams that follow to provide a monitor station and hardware remote control of active mic preamp parameters.

A-Net Connections

In Auto Mode, the A-Net ports on a device can be connected to other Pro64 devices interchangeably. In the following examples, network performance and functionality are unaffected by the changes in cabling.

***Example 1**: Port A connected to Port B*

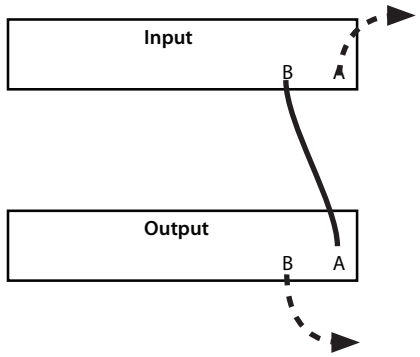


The A-Net cable can be connected to either Port A or Port B. Reversing the A-Net connections creates the same network pathway. Either unused port can be used to further expand the network.

Additional Pro64 devices can be connected using either Port A or Port B to expand the network. In both cases, the active channels will be available at the output device. On an F6, either the Cat-5 or fiber ports can be used.

Remember that the entire 64-channel A-Net stream (at 44.1/48kHz) is always received and transmitted through every Pro64 device. When using remote control via the RCI and MCS, the RCI can be connected to any open A-Net port anywhere in the network.

***Example 2**: Port B connected to Port A*



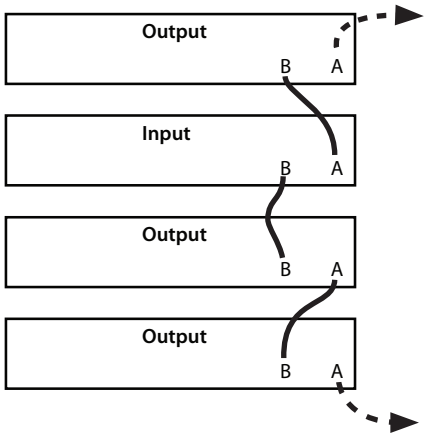
In this diagram, note that additional Pro64 devices can be connected to any available port as indicated by the dotted line.

Here, Port B of the input device is connected to Port A of the output device, the opposite of Example 1. The same results can be achieved by connecting Port A on the input device to Port A on the output device and by connecting Port B on the input device to Port B on the output device.

Digital Copies (Splits)

Any number of digital copies (also referred to as digital splits) can be created by simply connecting additional Pro64 output devices and setting them to use the same A-Net Slots as the input source. The order and location of the devices in the network does not matter; output devices can be connected before or after any input device in a daisy chain. Optionally, Pro64 devices can be connected in parallel using a Pro64 merger hub such as the MH10 or MH10f.

***Example 3**: One input device and three digital copies*



In this example, note that the A-Net connections between devices can be any combination of the A and B ports. Any open port can be used to connect additional Pro64 devices.

The order of the Pro64 devices connected in series in Example 3 above can be changed without affecting the ability of the network to distribute the same incoming audio channels to all three output devices shown. A-Net ports always transmit and receive the entire network (audio and VDC data) at all times.

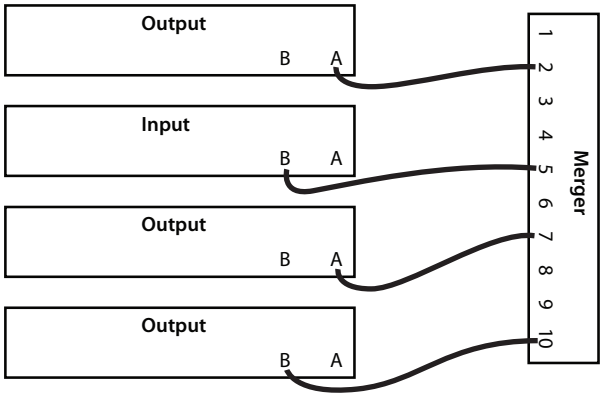
The rules are the same when larger networks are created. Simply set a different A-Net base Slot on the I/O devices to use more A-Net Slots (in sequential order 1-16, 17-32, 33-48, or 49-64) or activate the matrix from Pro64 Network Manager to map channels as needed. Network cables can be connected to any available A-Net port, A or B. Remember that the maximum number of active channels at 48kHz will be 64. I/O devices can be mic, line, digital, or console cards as needed.

Adding a Merger Hub

For more wiring options, an A-Net Merger Hub such as the MH10 or fiber-capable MH10f can be added to a network. Using a merger hub enables parallel connection of A-Net devices. Multiple merger hubs can be used to simplify rack wiring and/or the distribution of digital signals amongst the various subsections of a large Pro64 digital audio network.

✓ **Note:** Standard Ethernet hubs and networking products are not compatible with Pro64 products. Use only A-Net compatible devices.

***Example 4**: One input device and three output devices connected using an MH10/MH10f*



Pro64 devices can be connected to any port on the MH10/MH10f.

Note that in the example, it does not matter which A-Net port (A or B) on the I/O devices is connected to the MH10. Likewise, on the MH10, the choice of A-Net port (1 through 10) does not matter. Any audio channel made active on the input device in the diagram will be available to all output devices. Remember that the devices shown in the diagrams can be analog, digital, or console interface cards as needed. Likewise, the RCI can be connected to any available A-Net port to add remote control capabilities.

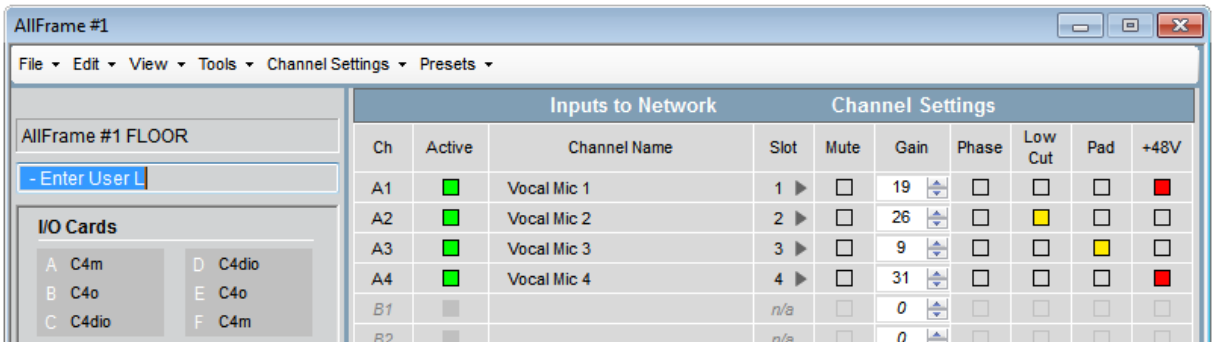
C4m Card Features

This section describes the features of the C4m Mic/Line Input Card. All features are accessed using the Pro64 Network Manager software. Most of these features can also be remote controlled by adding the optional RCI Remote Control Interface and MCS Mic Control Surface to a Pro64 network, or by using m-control from a Yamaha device when a 6416Y2 card is installed. Once programmed, a mic preamp's settings are retained across power cycles as well as when the controlling PC and software are not present.

Channel Strip Controls

Each channel of a C4m mic preamp contains a complete channel strip and has the following settings available:

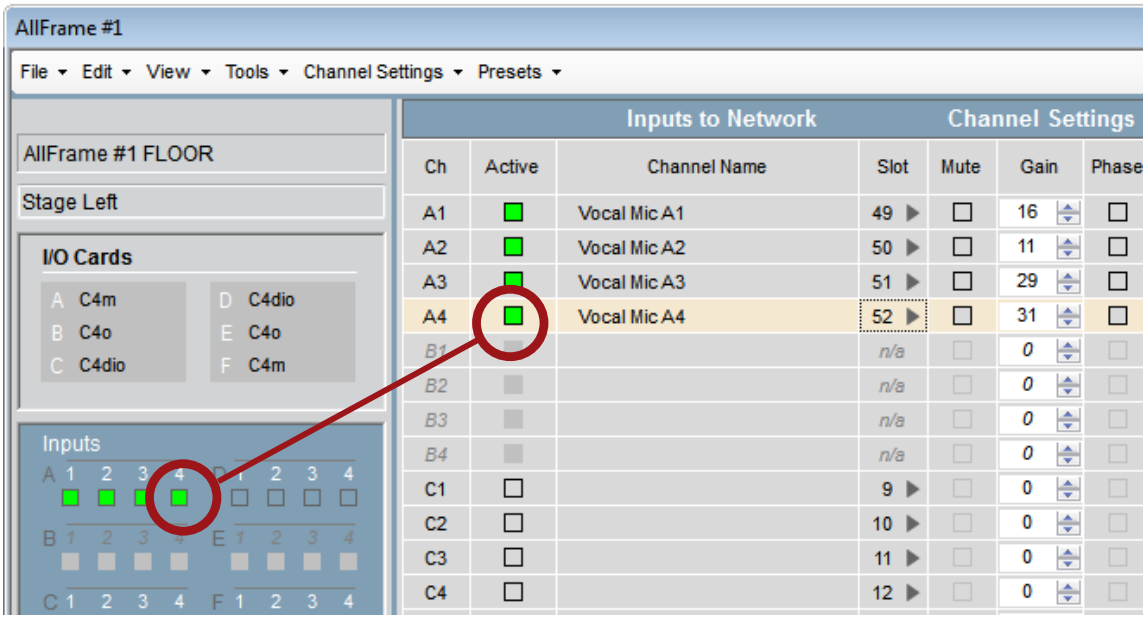
- Slot Activation
- Stereo Link
- Channel Name
- Slot Assignment
- Mute
- Gain
- Phase
- Low Cut Filter
- Pad
- 48V Phantom Power



Channel strip settings include Mute, Gain, Phase, Low Cut, Pad, and 48V phantom power.

Channel Activation

Each of the four mic/line input channels on the C4m Mic/Line Input Card can be made active on the network individually. Activating an input channel assigns it to an A-Net Slot, making it part of the network and available to any output device or console interface card in the Pro64 network. An input must have a Slot assignment before it can be made active.



Click either Active button to enable an input channel.

Each active A-Net Slot in the network is unique. The Control Master manages the availability of A-Net Slots and will grant or deny a channel activation request from an input device based on the current makeup of the network, the sample rate, and the Slots already in use.

To activate a C4m input channel click on the **Active** button for the desired channel in the AllFrame's Device Window in Pro64 Network Manager. If the Slot is available, the Control Master will enable the Slot and the channel's green LED will light. If the Slot is not available, the LED will not light and a dialog box will appear with information about the requested Slot's use elsewhere in the network.

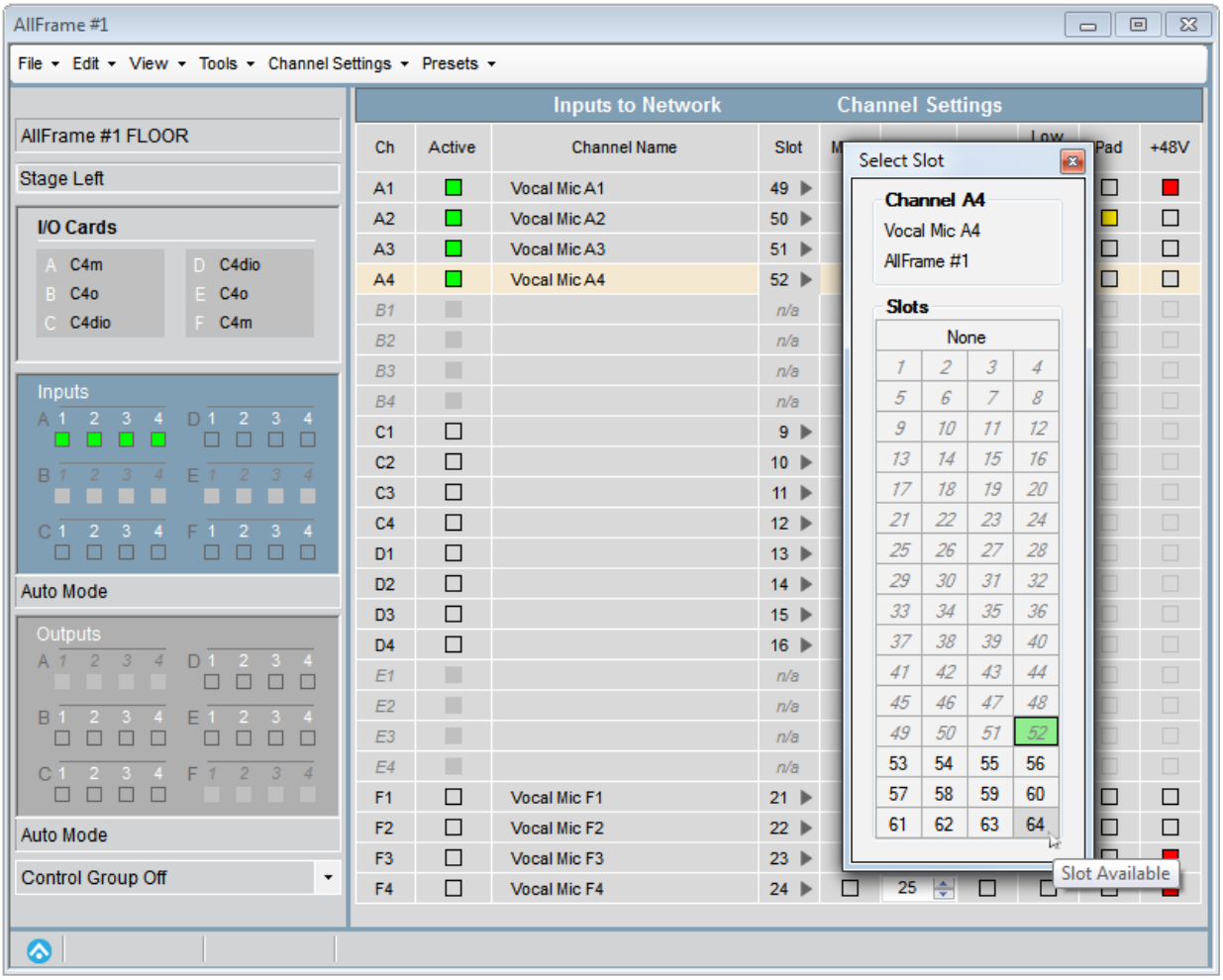
✓ **Note:** Channels on the C4m cannot be activated from the RCI/MCS remote control hardware.

Click an enabled channel's **Active** button to deactivate it and free the Slot resource for use elsewhere in the Pro64 network. Save frequently used channel settings as a Device Preset in Pro64 Network Manager.

Assigning a C4m Channel to a Network Slot

Each XLR input on the C4m Mic/Line Input Card can be assigned to any Slot in the network. The number of Slots available depends on the current sample rate being used; whether or not the Slot can be made active is determined by the network's Control Master device. Remember, only one hardware input can actively occupy a given network Slot at a time.

Inputs on the F6 Modular I/O Frame are always ready to be assigned to network Slots via the built-in matrix.



The drop-down menu is used to assign an input to a network Slot.

To assign an input on the C4m card to a network Slot, click on the drop-down arrow in the **Slot** column of the **Inputs to Network** view of the Device Window. Choose a Slot from the list. Slots that are already assigned in the network are displayed in italics text. The currently assigned Slot is displayed with a green highlight.

If the channel on the C4m being assigned is already active in the network, the Slot activation rules will apply and a warning dialog box will appear if you attempt to assign the channel to an in-use Slot.

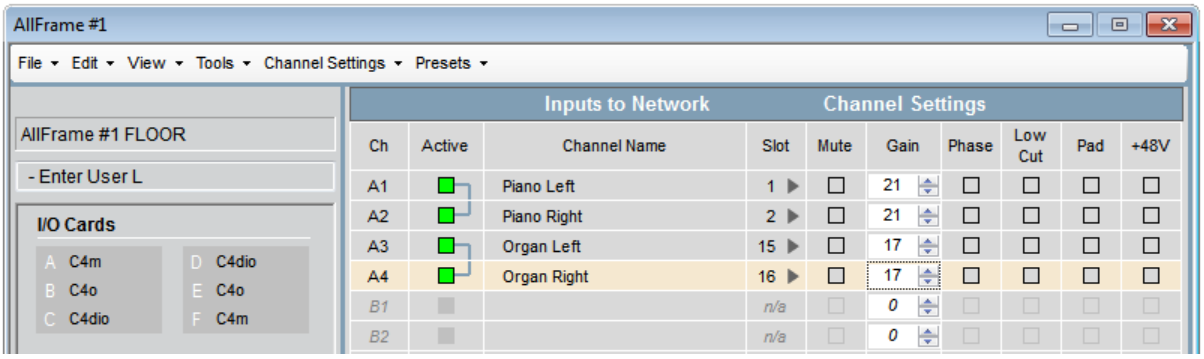
Save frequently used routings and channel strip settings as a Device Preset in your Project.

Stereo Link

Adjacent pairs of channels on each C4m installed in an F6 Modular I/O Frame can be linked together as a stereo pair. The channels must be an odd-even pair, such as A1-A2, D3-D4, etc. The activated pair of channels must also be assigned to sequential odd-even Slots in the network.

To link a pair of channels, both channels must be active on the network first; the Active LED must be lit on both channels as seen in Pro64 Network Manager. Once the two channels are active, right clicking on either channel's

Active button will reveal the link options. Select **Stereo Link On** from the menu; the two channels immediately; no confirmation is required. To remove the stereo link, right click on either channel's Active button and choose **Stereo Link Off** from the menu or deactivate either of the channels.



To link a pair of channels, both channels must be made active first.

Linked Slots will be displayed on all Pro64 output devices. Link information can be used by Pro16 output devices such as the A-16II and A-16R Personal Mixers. Add the ASI A-Net Systems Interface to a Pro64 network in order to make use of Pro16 output devices.

Channel Mute

Click the on-screen **Mute** button in the AllFrame Device Window to silence an active mic preamp channel while leaving it assigned to a Slot and active in the network; the on-screen LED lights red. Click on the **Mute** button again to release the channel from the muted state.

Each channel's Mute state is saved as part of a Device Preset, which is stored along with all other Pro64 device and project information when the project is saved using Pro64 Network Manager.

Channel Phase

Click the on-screen **Phase** button to invert the polarity of the input signal on the selected mic preamp channel. Use the Phase reverse function to eliminate anomalies that occur when using two or more microphones on the same source (such as a drum kit).

The yellow LED in the selected channel strip will light to indicate that the function is enabled. To return the audio on the selected channel to its original state, click **Phase** again; the LED will go out.

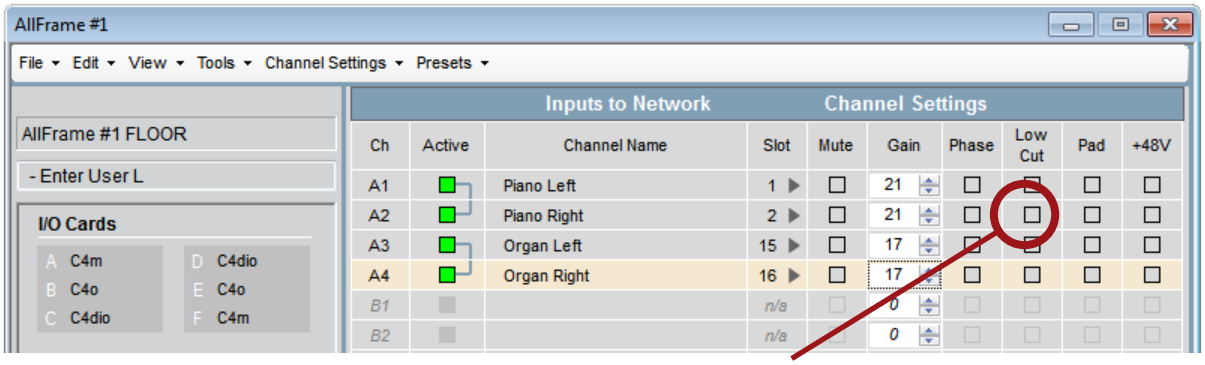
The state of the Phase button is saved with a Device Preset.

Low Cut Filter

The Low Cut function applies a bass rolloff filter centered at 85Hz to the selected channel. Use this to eliminate low frequency interference such as microphone handling noise, rumble, etc.

Click the **Low Cut** button to activate; the yellow LED in the selected channel strip will light to indicate that the function is enabled. Click **Low Cut** again to turn the filter off.

The Low Cut filter can also be controlled from a Yamaha device using m-control. The filter's on/off state is saved with a Device Preset as well as globally when a project is saved.



Click the Low Cut button in a channel strip to turn the filter on/off.

Pad

To lower the level of the selected C4m input channel by 24dB, click the **Pad** button. Since changes to the overall level of a channel caused by the use of the Pad can cause abrupt changes in level, confirmation is required to complete the operation. In the dialog box that appears, click **Yes** to proceed with the edit or click **No** to exit without making a change.

When the 24dB pad is in use, the Pad LED in the selected channel strip will be lit. When using m-control to control the C4m from a Yamaha device, the preamp's Pad will turn on/off automatically in response to gain change messages from the Yamaha device, allowing the full range of the Aviom mic preamp to be accessed remotely.

Pro64 Network Manager Device Presets save the Pad state for each channel.

+48V Phantom Power

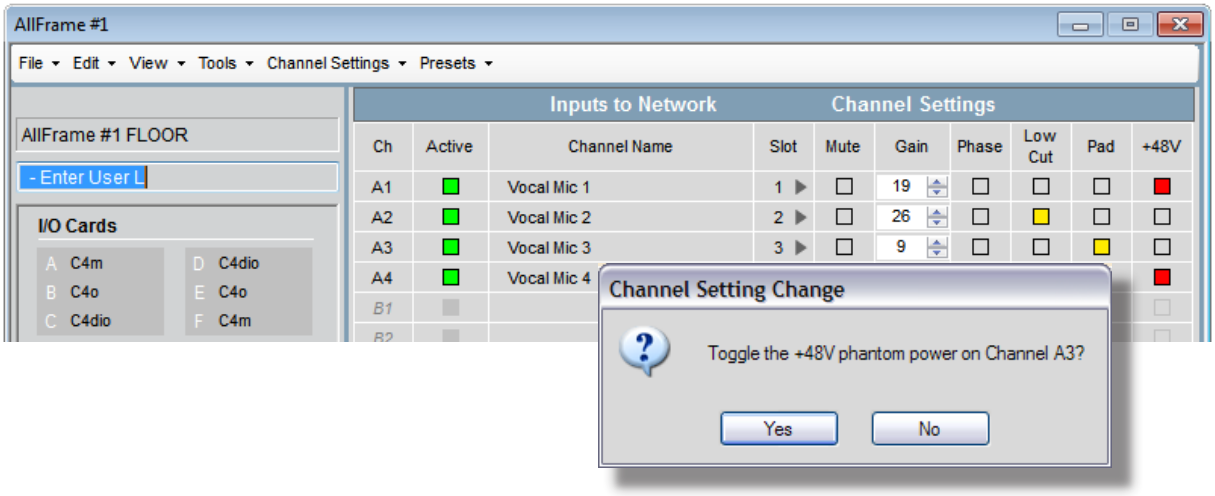
Phantom power for devices such as condenser mics is available for each mic preamp channel.

Avoid potential damage to your hearing or audio equipment by muting the mic channel first if you are unsure about the use of phantom power.

To turn phantom power on, click the **+48V** button once. In the dialog box that appears, click **Yes** to proceed with the edit or click **No** to exit without making a change.

To turn a channel's phantom power off when it is enabled, click the **+48V** button. In the dialog box that appears, click **Yes** to proceed with the edit.

When phantom power is enabled, the selected channel strip's +48V LED will be lit. The on/off state of the +48V phantom power is saved for every channel in each Device Preset. Phantom power on/off can also be controlled from a Yamaha device when using m-control.



Turning on phantom power or the 24dB Pad requires confirmation.

Channel Gain

Each input channel on the C4m card has an individual gain setting controlled by a numeric readout with up/down arrows.

Gain is set in 1dB steps and has a range of 0-55dB. For line-level sources, use the 0dB input gain setting or engage the channel's Pad before setting a gain level. Channel gain can be controlled from a Yamaha device using m-control when a 6416Y2 A-Net Interface Card is installed. Each channel's gain setting is saved as part of a Device Preset.

In the AllFrame Device Window, click the up/down arrows to choose a gain level, or click in the numeric readout and type in the desired value. (The **Inputs to Network** view must be showing to access the gain controls.)

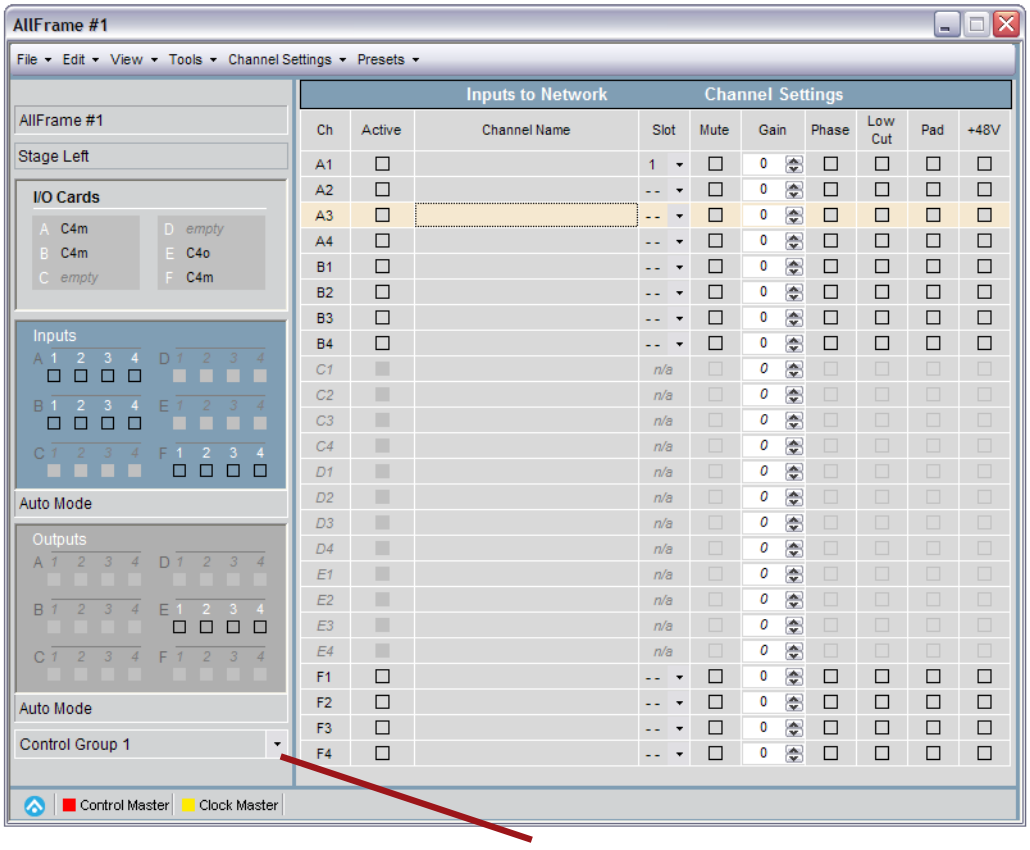
Control Group

Each Pro64 mic input device in a Pro64 network (such as the F6 Modular I/O Frame or a 6416m) can be set to one of four Control Groups. This allows multiple zones of mics and their associated preamps to be remote controlled by different users if desired by adding the optional RCI Remote Control Interface and MCS Mic Control Surface.

A mic preamp device must be set to one of the four Control Groups in order to be remote controlled using an RCI and MCS, m-control from a Yamaha device, or the Pro64 Network Manager software. All mic preamp cards installed in an AllFrame F6 Modular I/O Frame belong to the same Control Group. Click on the Control Group drop-down menu in the Device Window to select a Control Group for the device.

✓ **NOTE:** The Control Group settings for the F6 Modular I/O Frame and the RCI Remote Control Interface, m-control device, and/or Pro64 Network Manager software must match to enable mic preamp control.

Refer to the Pro64 Network Manager documentation for additional information about configuring a Pro64 network and saving projects, device presets, and scenes.



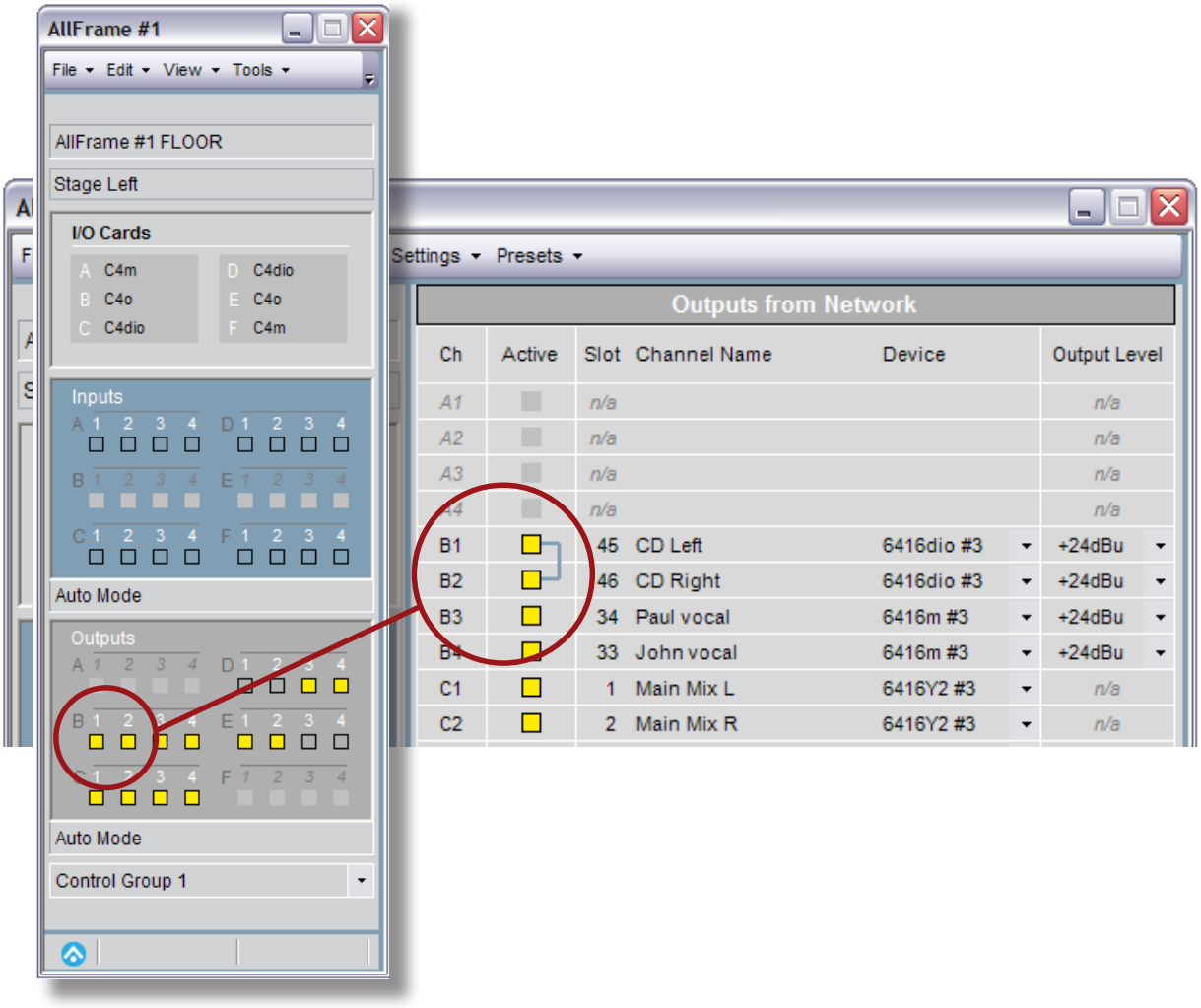
Change the Control Group by clicking on the drop-down menu.

C4o Card Features

The features of the C4o Output Card are accessed using the Pro64 Network Manager software. Any active Pro64 network Slot resource can be routed to any XLR output on the card.

Output Activation

The C4o Output Card is capable of outputting any active network Slot as analog audio. Each of the four output channels on the C4o Output Card can be turned on or off individually; the on/off switches act like mute switches on a mixing console and do not use any network resources as Pro64 input devices do.



Click either Active button to turn an output channel on/off.

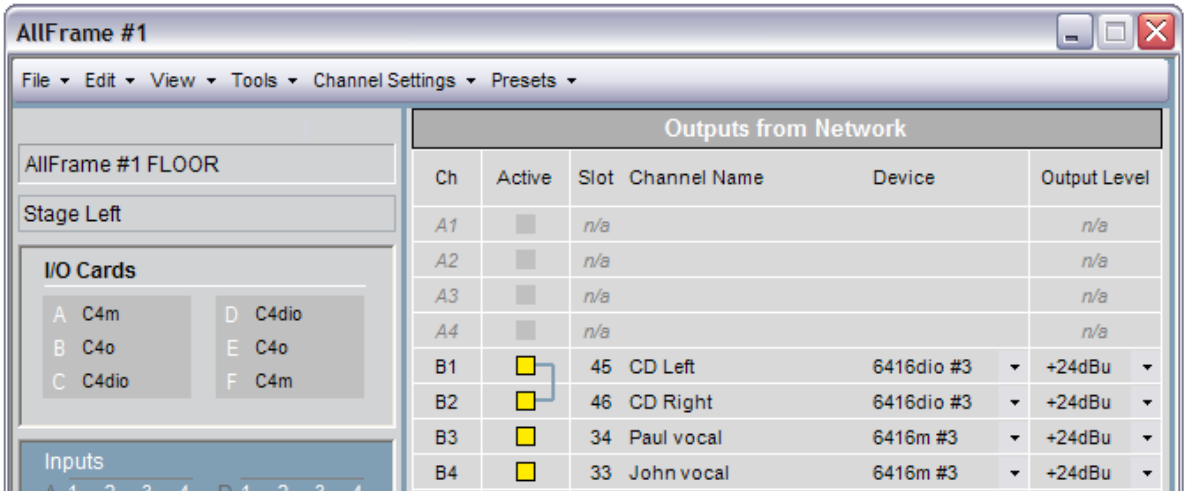
Click the on-screen **ACTIVE** button for the desired channel in the AllFrame's Device Window in Pro64 Network Manager to toggle it on/off. The channel's yellow LED will light.

Save frequently used channel settings and matrix routings as a Device Preset in Pro64 Network Manager.

✓ **NOTE:** Channels on the C4o cannot be turned on/off from the RCI/MCS remote control hardware.

Stereo Link

Adjacent pairs of channels on input devices that are linked as a stereo pair will be displayed with a bracket when active on the C4o Output Card. Stereo Link can only be set on input devices, either from the hardware's front panel or from the Pro64 Network Manager software. Stereo Link is a read-only field on an output device in Pro64 Network Manager.



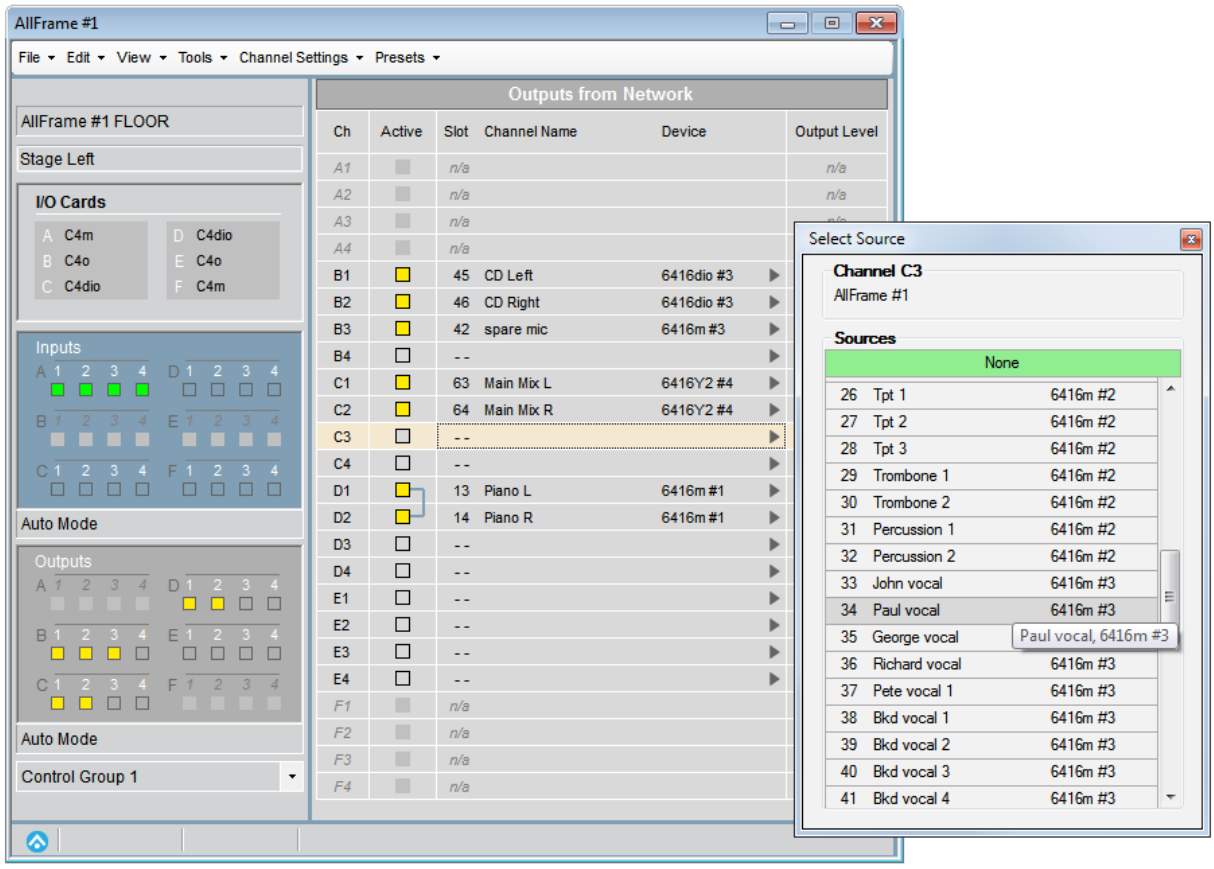
Outputs B1 and B2 are linked as a stereo pair.

Linked channels will be displayed on all Pro64 output devices. Link information can be used by Pro16 output devices such as the A-16II and A-16R Personal Mixers. Add the ASI A-Net Systems Interface to a Pro64 network in order to make use of Pro16 output devices.

Choosing a Slot to Output

The F6 Modular I/O Frame is always ready to use the built-in Pro64 matrix. Each hardware output on a C4o card can be configured to output any network Slot, even if the Slot is not currently active.

To assign an output, click on the arrow found in the **Device** column of the **Outputs From Network** view of the Device Window. From the scrolling Select Source menu that appears, select the desired active network Slot by channel name and device name, or choose an inactive Slot by picking a Slot whose info reads **No Active Input**. To assign no routing to a C4o card output, click the **None** button at the top of the Source list. The assignment in the Device Window will be displayed as double dashes "- -".



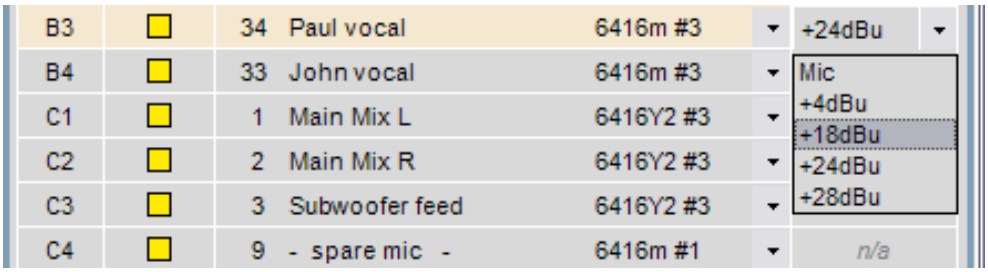
Choose any network Slot from the scrolling list to assign it to an output.

Channel Output Level

Each output channel on the C4o card has an individual Output Level setting controlled by a drop-down menu.

Five output levels are available: +28dBu, +24dBu, +18dBu, +4dBu, and Mic. Choose the output level setting that best matches the input level requirements of device that the C4o output is connected to.

To change the output level, click the arrow in the output Level field and select the desired level setting.

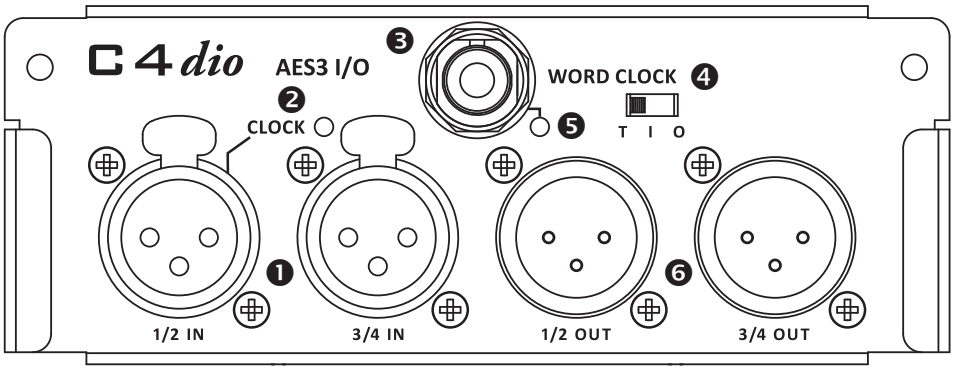


Output Level settings in the drop-down menu

Output Level settings for every output channel are saved with the project and can be saved as part of a Device Preset if desired.

C4dio Card Features

The 4-in, 4-out C4dio Digital I/O Card provides AES3 digital I/O for the AllFrame. Its I/O is configured using the Pro64 Network Manager software (version 3 or higher). Inputs on the C4dio can be made active in the network individually, with optional sample rate converters available per channel pair. Any active Pro64 network Slot can be routed to any one of the four C4dio digital outputs.



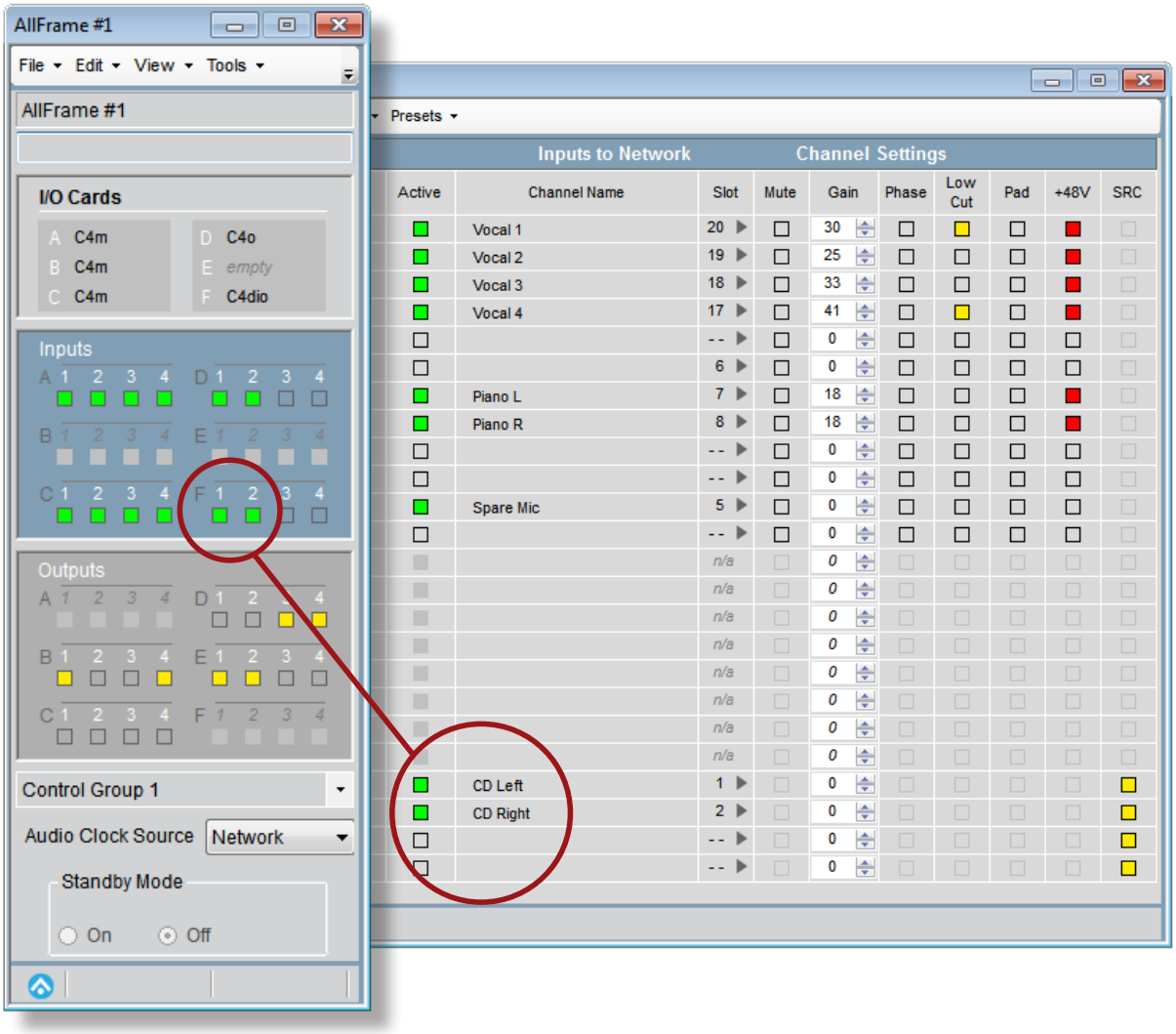
C4dio front panel features

1	AES3 Inputs 1/2 and 3/4; XLR female
2	AES3 bi-color clock LED, red/green
3	BNC Word Clock I/O
4	Word Clock mode switch: Word Clock Input With Termination (T), Word Clock Input (I), Word Clock Output (O)
5	Word Clock bi-color clock LED, red/green
6	AES3 Outputs 1/2 and 3/4; XLR male

✓ **Note:** The C4dio Digital I/O Card requires firmware v5.xx or higher in the AllFrame F6 to be recognized.

Input Activation

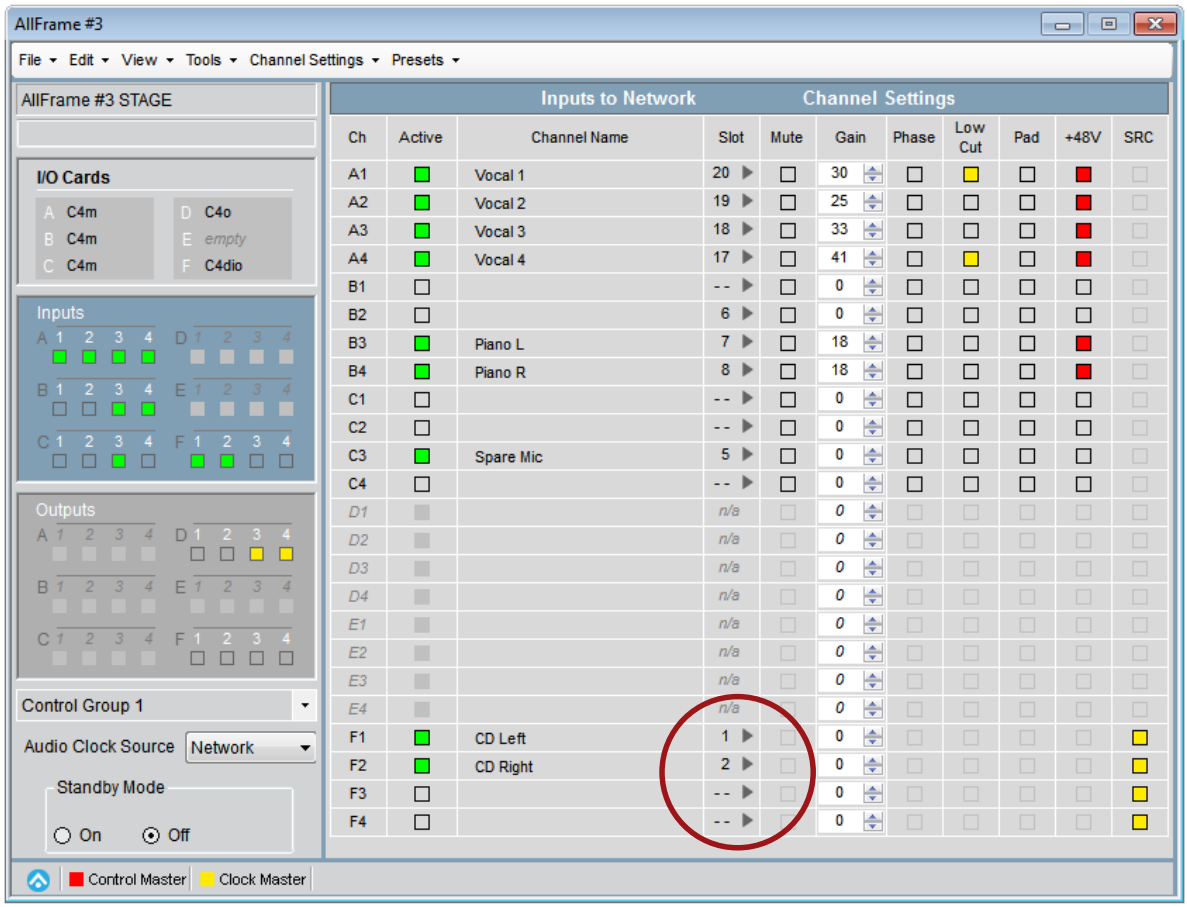
AES3 format digital signals are presented in channel pairs, as per the AES3 format specifications; each of the female XLR input jacks on the C4dio carries two assignable resources. Each channel within an AES3 digital stream can be activated into a network Slot individually. An AES3 input channel from a C4dio card can be activated from the AllFrame Device Window's Overview or from its Inputs to Network view once it is assigned to a Slot .



Click either Active button to turn an output channel on/off.

A channel on an AllFrame device must be assigned to a network Slot *first* before it can be activated. See the section **Assigning a Channel to a Network Slot** on page 56 for additional information. Once a resource is assigned to a Slot, click the on-screen **Active** button for the desired channel in the AllFrame's Device Window in Pro64 Network Manager to toggle it on/off. The channel's green LED will light and that resource is now available to all output devices in the network.

Save frequently used channel settings and matrix routings as a Device Preset in Pro64 Network Manager.



Channels F1 and F2 of the AllFrame are assigned to network Slots 1-2; sample rate converters are on.

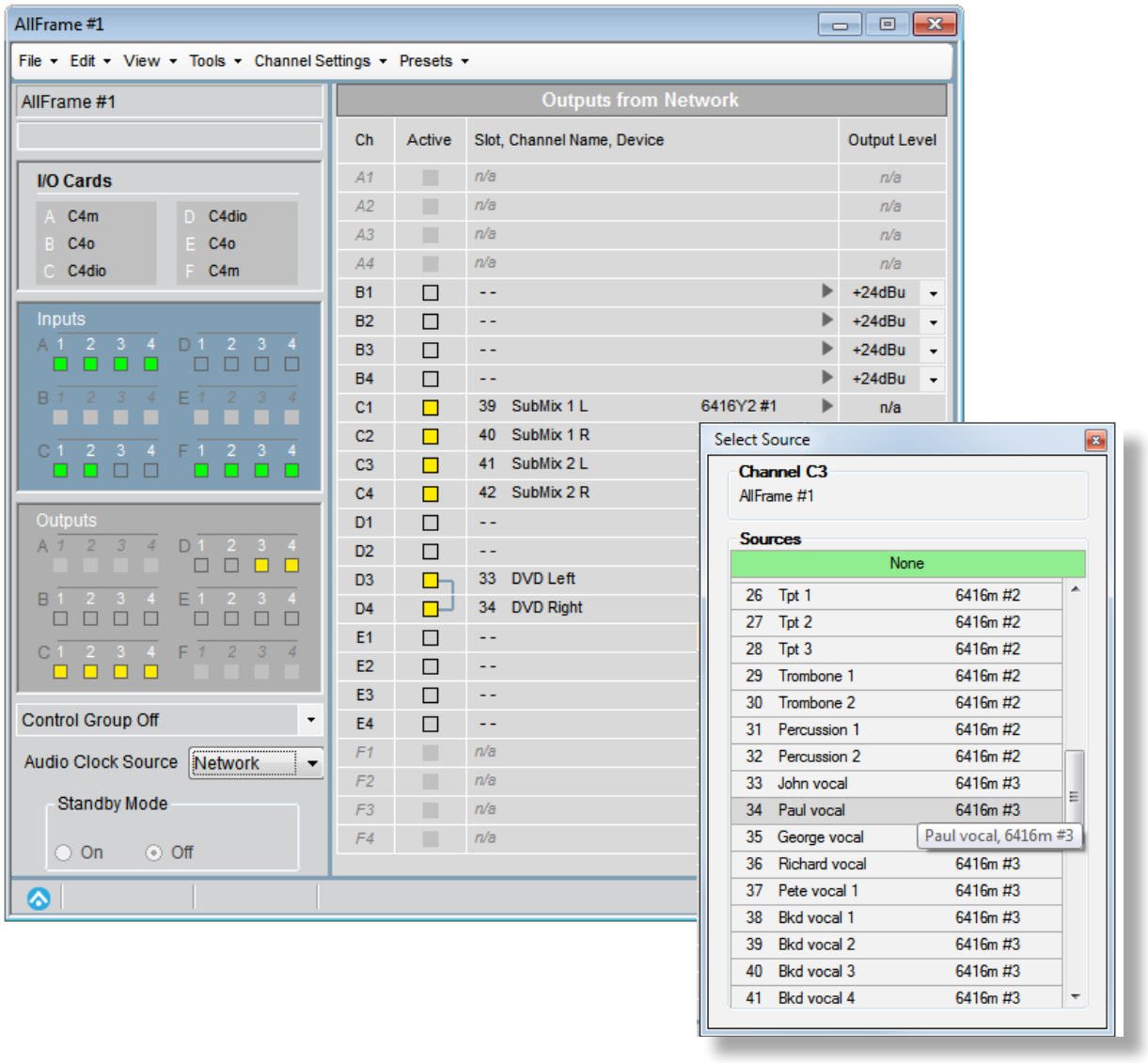
Sample Rate Converters

Each AES3 input has an optional sample rate converter (SRC) available in the Inputs to Network view of the AllFrame's Device Window. Sample rate converters are switched on/off in pairs, 1-2 and 3-4. The default setting for the sample rate converter is 'on'. Use the sample rate converter whenever a digital device that has no external clock sync input capabilities needs to be connected to the network to avoid clock sync issues. The SRC can convert input sample rates between 28.0kHz and 216.0kHz to any supported network sample rate.

Sample rate converters are indicated with yellow LED icons in the SRC column of the Inputs to Network view of the AllFrame Device Window. The on/off state of the SRC is saved with a device preset.

Choosing a Slot to Output

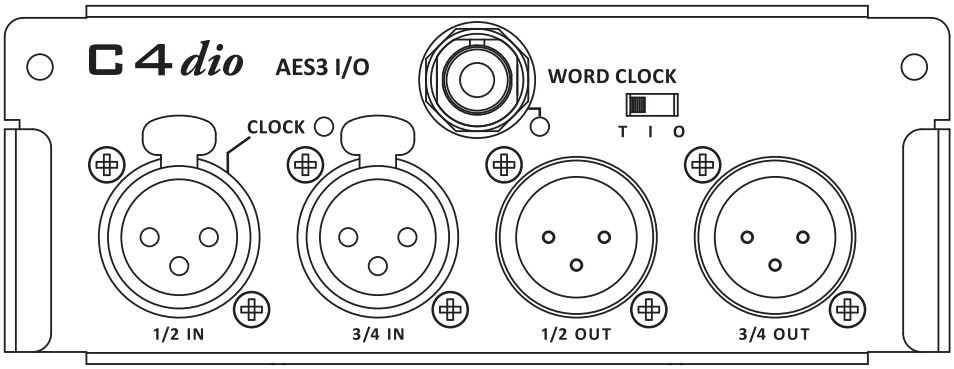
To assign an active network Slot to a C4dio output, click on the arrow found in the **Slot, Channel Name, Device** column of the **Outputs From Network** view of the Device Window. From the scrolling Select Source menu that appears, select the desired active network Slot by channel name and device name, or choose an inactive Slot by picking a Slot whose info reads **No Active Input**. To assign no routing to an output, click the **None** button at the top of the Source list. The output assignment in the Device Window will be displayed as double dashes "- -".



Choose any network Slot from the scrolling list to assign it to an output.

C4dio External Clock Options

The C4dio allows external clock sync sources to be used with the AllFrame and the Pro64 network. Two clock types are supported—Word Clock and the clock signal embedded within an AES3 digital stream.



The C4dio offers Word Clock and AES3 clock sync options.

Word Clock

A locking BNC bayonet style connector with a three-position switch is provided to support Word Clock. The three-position Word Clock switch is labeled T, I, and O, corresponding to the following:

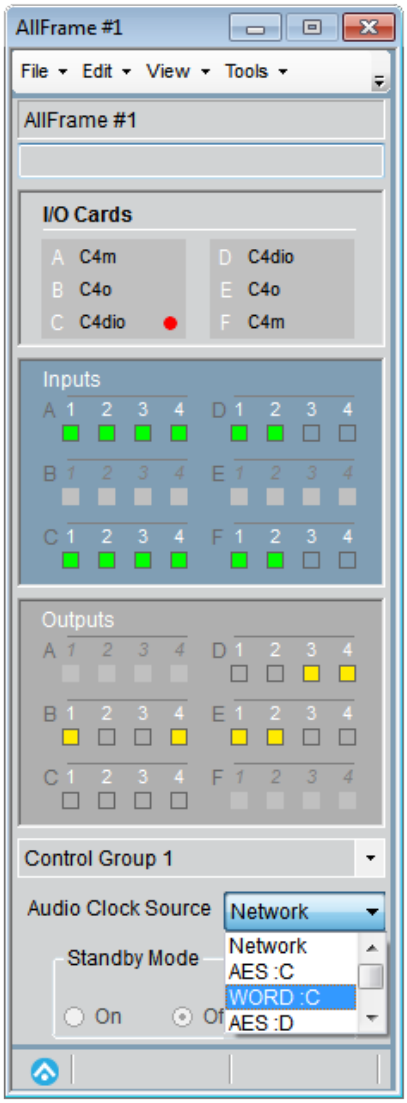
- **T** — The BNC jack operates as a Word Clock input with termination.
- **I** — The BNC jack is a Word Clock input, without termination
- **O** — The BNC jack provides a Word Clock out at the current Pro64 network sample rate

Word Clock cables connected to the C4dio should use coax cable with a 75 ohm impedance. Typically, the last device in a clock distribution chain uses termination.

To Sync to Word Clock

To use an external Word Clock source with the network:

1. Make the AllFrame the network's Control Master.
2. On the AllFrame F6, set the Word Clock switch on the front of the C4dio card to the **T** or **I** position as appropriate for the application. Use the Terminated setting if the AllFrame is the last device in a clock chain.
3. Connect the external clock source to the **Word Clock** jack on the C4dio card using a properly configured locking BNC cable.
4. Open Pro64 Network Manager and connect to the network online.
5. In the AllFrame Device Window, choose the C4dio where the external clock is connected from the drop-down menu labeled **Audio Clock Source** in the Overview. (Card locations are denoted with letters and clock type, e.g. Word :C)
6. The green LED on the C4dio card next to the BNC Word Clock jack lights solid to indicate that the external clock is in use.
7. On screen, a red dot is added to the I/O Cards list found in the Overview in the AllFrame's Device Window indicating that the card is set as the clock source.



External clock source selections for a C4dio

Word Clock LEDs

The Word Clock LED on the C4dio front panel is a bi-color LED. When the network is set to use the C4dio's incoming Word Clock, *and* a valid clock is preset at the BNC jack, the LED will light green. If the external Word Clock is removed, stops, or becomes intermittent for any reason, the Word Clock LED on the C4dio front panel will light red. The network will switch over to use the network's internal clock until the external clock is restored, at which point the Word Clock LED will return to green.

Output Word Clock to an External Device

The Pro64 network clock, based on the sample rate currently being used, can be output to external devices using the BNC Word Clock connection on a C4dio.

To output the current network clock:

1. Set the Control Master clock to Network (internal) clock.
2. On the AllFrame, set the **Word Clock** switch on the front of the C4dio card to the **O** (Output) position.
3. Connect the **Word Clock** jack on the C4dio card to the external device's Word Clock input using a BNC cable.
4. The network clock is output to the external device at the current sample rate. Changes to the network sample rate will also be sent to the C4dio Word Clock output.

AES3 Clock

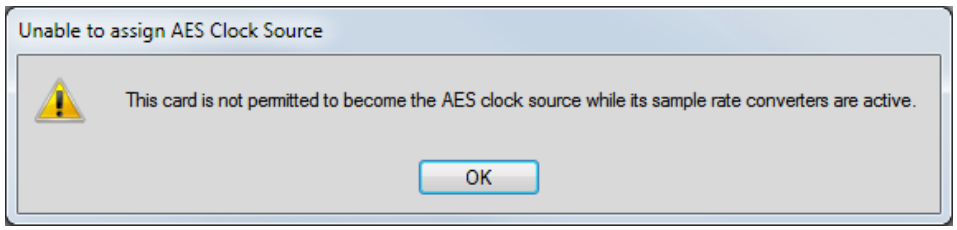
A digital AES3 signal connected to inputs 1/2 on the C4dio can be used to sync the Pro64 network to an external clock source. No audio need be present in the AES3 stream to allow it to be used as a clock source.

To Sync to AES3 Clock

To use an external AES3 clock source to sync the network:

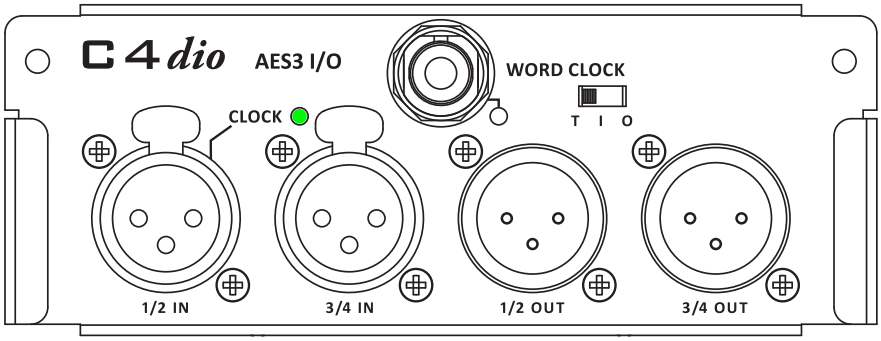
1. Make the AllFrame the network's Control Master.
2. Connect the external device's AES3 output to the **AES3 1/2 In** jack on the C4dio card using an XLR cable.
3. Open Pro64 Network Manager and connect to the network online.
4. In the AllFrame Device Window's **Inputs to Network** view, turn off any sample rate converters (SRC) that are on.
5. In the Overview section of the Device Window, choose the C4dio where the external AES3 clock is connected from the drop-down menu labeled **Audio Clock Source** in the Overview. (Card locations are denoted with letters and clock type, e.g. AES :C)
6. The green LED on the C4dio card next to the **AES3 1/2 In** jack lights solid to indicate that the external AES3 clock is in use.
7. On screen, a red dot is added to the I/O Cards list found in the Overview in the AllFrame's Device Window.

Attempting to sync to an external AES3 clock while the sample rate converters are on will cause a warning dialog box to appear.



Turn off sample rate converters before using a C4dio card as an AES3 clock source.

✓ **NOTE:** Only **AES3 1/2** In can be used as a clock source.



The Clock LED lights green when the network is using an external AES3 clock source.

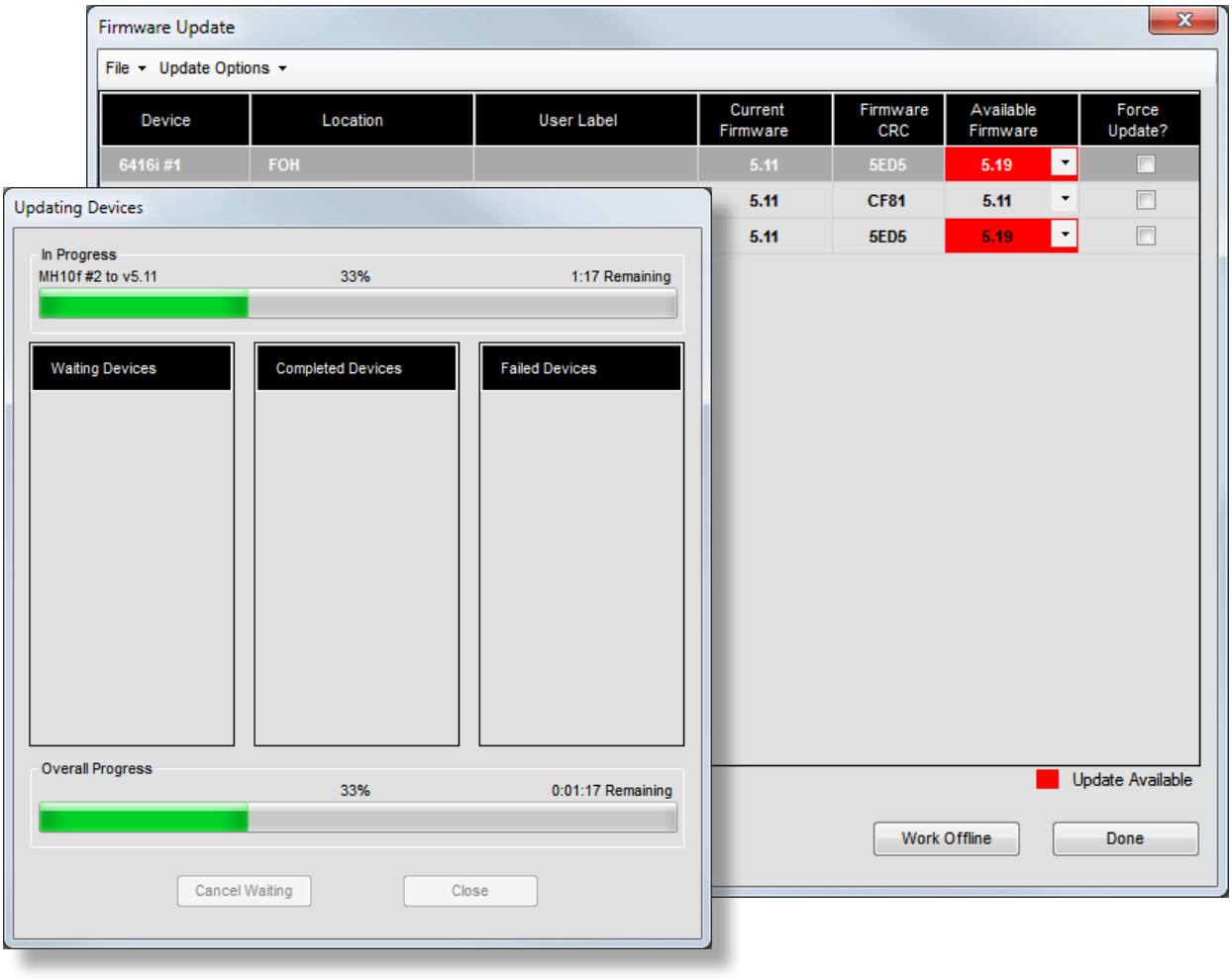
If the external AES3 clock is removed, stops, or becomes intermittent for any reason, the Clock LED on the C4dio front panel will light red. The network will switch over to use the network's internal clock until the external clock is restored, at which point the Clock LED on the C4dio will return to green.

Firmware Update

Pro64 devices can be updated in the field using a PC and the Pro64 Network Manager application. Devices can be updated over A-Net, while part of an active audio network, or individually when no other network devices are connected at the time the update is being performed (such as may be required for a bench configuration when setting up devices prior to installation).

Updating an AllFrame F6 Modular I/O Frame when the F6 is set to be the network's Control Master requires a PC running the Pro64 Network Manager software application and a USB cable with one Type A and one Type B connector.

If a rack mounted Pro64 I/O (such as the 6416m Mic Input Module) is used as the network's Control Master device, a PC host computer with RS-232 connection capability and a null modem DB9 cable are required.

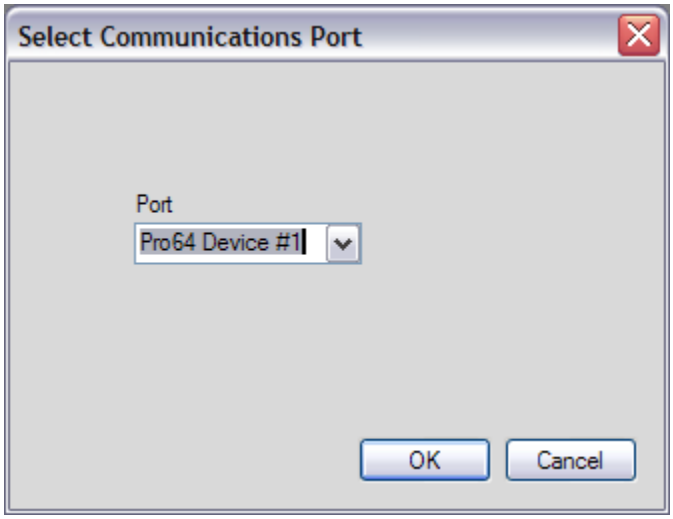


The Firmware Update windows in Pro64 Network Manager

Updating the Firmware

To update the firmware in an F6 Modular I/O Frame when it is the network's Control Master, connect a USB cable with a Type B connector to the USB port found in the control panel area of the F6 front panel (the cover plate may need to be removed to access the USB port). Plug the other end of the USB cable (with the Type A connector) into the PC.

See the Pro64 Network Manager documentation for additional information about the software and its functions. Run the Pro64 Network Manager software and connect to the F6 Modular I/O Frame by selecting **Work Online...** from the **Network** menu. In the **Select Communications Port** dialog box that appears, choose the COM port; it should read **Pro64 Device #1**.



COM port selection

Open the Firmware Update window by choosing **Update Firmware...** from the **Tools** menu. With the Firmware Update window open, click the **Auto Update** button to update all Pro64 devices in the network that require updating. The process takes 3-5 minutes per device to complete.

✓ **Note:** Timing communication and tolerances are critical between the PC and Control Master device during firmware updates. For best performance during a firmware update keep USB and RS-232 cabling to minimum lengths and avoid the use of serial-to-USB converters if possible. Also, anti-virus programs that run at a higher priority than other applications can cause communication failures. Disable these types of programs during updates.

Troubleshooting

The following section provides troubleshooting tips for the AllFrame when it is part of a Pro64 network.

Problem	Possible Solutions
A new I/O card not recognized; the Error LED is flashing	▪ Update the firmware on the F6. ▪ The C4dio card requires firmware 5.xx or higher.
All F6 front panel LEDs are blinking in sequence	▪ The blinking indicates an F6 device whose firmware is out of date. ▪ Run the firmware update utility.
Power LED is red instead of green	▪ The AllFrame is in standby mode.
Cannot go online with Pro64 Network Manager	▪ Check that the AllFrame is set as the network's Control Master. ▪ Check or replace the USB cable.
In Pro64 Network Manager, an AllFrame device's Status icon is gray in the Network Overview.	▪ The AllFrame is in standby.
Project will not load in Pro64 Network Manager	▪ Check that the I/O card configuration of the AllFrame is exactly the same as when the project was saved.
Audio dropouts, clicks, etc. when an external AES3 digital device is connected	▪ In the AllFrame's Device Window in Pro64 Network Manager, make sure that the sample rate converter (SRC) is on for the C4dio card channels where the device is connected.
External Word Clock input is not working	▪ On the C4dio, check that the Word Clock switch is set for Input (I) or Input With Termination (T). ▪ The AllFrame must be the Control Master in order to sync the network to an external Word Clock connected to the C4dio. ▪ Check the BNC cable. ▪ In the AllFrame's Device Window in Pro64 Network Manager, check the proper C4dio card and clock type are selected in the **Audio Clock Source** menu.
The C4dio's Word Clock LED is red	▪ The C4dio is set to use Word Clock, but the clock source is missing or intermittent. ▪ External clock source is out of range.

Problem	Possible Solutions
External AES3 clock input is not working	▪ On the C4dio, check that the device providing the AES3 clock is connected to the XLR jack labeled **1/2 In**. ▪ The AllFrame must be the Control Master in order to sync the network to an AES3 clock connected to the C4dio's 1/2 In jack. ▪ In the AllFrame's Device Window in Pro64 Network Manager, check the proper C4dio card and clock type are selected in the **Audio Clock Source** menu.
The C4dio's AES3 Clock LED is red	▪ The C4dio is set to use AES3 clock, but the clock source is missing or intermittent. ▪ External clock source is out of range.
Cannot send Word Clock to an external device	▪ On the C4dio, check that the Word Clock switch is set for Output (O). ▪ Check the BNC cable. ▪ Check that the external device is set to receive an external clock at the current network sample rate.
All channels: no audio in or out	▪ Check that the AllFrame is not in Standby Mode; the Power LED on the its front panel should be green.
The AllFrame's Power LED is red	▪ The AllFrame is in Standby. ▪ Press the gray momentary **Standby** switch on the F6 front panel. ▪ If Standby was initiated by a contact closure, the contact must be opened manually.
No audio for one input channel	▪ Check that the corresponding channel is active in the network by opening the Device Window for the AllFrame. On screen, the channel's green Active LED should be on. ▪ Check that another Pro64 device is not already using the desired network Slot.
Low output level from a C4o channel	▪ Open the Device Window for the AllFrame. Check the Output Level menu for the channel; change the setting using the drop-down menu.
Cannot remote control an AllFrame mic preamp channel	▪ The channel must be active in the network to be remote controlled. ▪ Make sure the AllFrame is set to the same Control Group as the device sending the remote control commands (found in the AllFrame's Device Window in Pro64 Network Manager).
The Cat-5 A-Net connection (A or B) is not working	▪ Check that an SFP transceiver is not plugged into the same-named port. Only one type of connection is possible at a time. ▪ The Cat-5 jack is disabled when an SFP transceiver is plugged in.
4-pin XLR power connection is not working	▪ Check the connections on the XLR pins: Pin 1: Ground; Pin 2/3: no connect; Pin 4: 30-60VDC.

Product Care and Maintenance

Follow the guidelines below regarding the care and upkeep of your new Aviom products.

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.

Although the F6 Modular I/O Frame is a DC powered device, proper care should be taken to protect any AC power supply devices used with the system.

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).

Cleaning

Before cleaning a Pro64 product, turn off the device and unplug the unit from the power source.

To clean the surface of the Pro64 product, use a clean, soft lint-free cloth that has been slightly moistened with water only. For tougher dirt, use a cloth slightly dampened with water or with a mild detergent. Always be sure to dry the surface of the unit before proceeding with use.

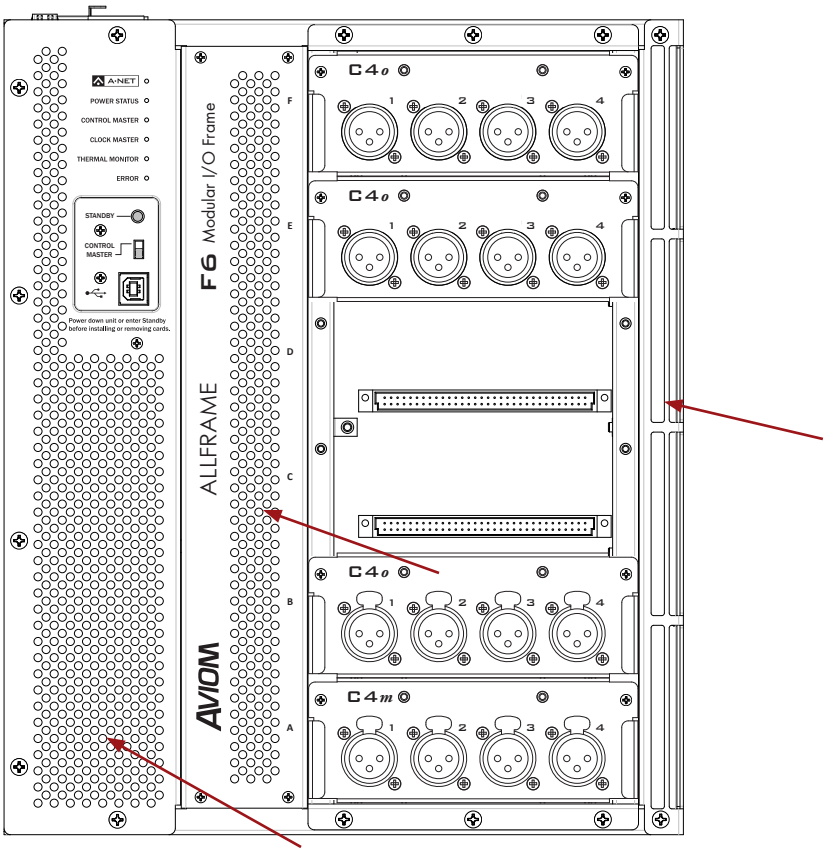
When cleaning your Aviom products, never spray cleaners directly onto the product surfaces. Instead, spray a small amount of the cleaning solution onto a clean cloth first. Then use the dampened cloth to clean the product.

Never use solvents or abrasive cleaners on the finished surfaces of your Aviom products.

Ventilation

The F6 Modular I/O Frame is fan cooled using three low velocity, ultra-quiet fans. Always allow adequate ventilation for devices mounted in electrical boxes, equipment racks, floor pockets, etc. Do not block the built-in cooling vents on the F6 case. Avoid placing your Pro64 product directly above or below other devices that produce high levels of heat, such as power amplifiers.

The F6 employs thermal circuitry designed to monitor the product's internal temperature as well as the status of its built-in fans. The **Thermal Monitor** LED will blink if one or more fans is not operating properly and will light solid if the internal temperature has exceeded normal operating levels.



Do not restrict airflow to the F6 vented panels or fan intakes.

Do not block the vented openings in the product's case. The ambient temperature immediately around the unit and its enclosure should remain below 50°C (122°F).

F6 Modular I/O Frame Specifications

Channels	Up to 24 inputs Up to 24 outputs (Maximum: 24x24)
I/O Card Slots	6; User configurable
A-Net	2 EtherCon RJ45 connectors
	2 100Mbps Ethernet SFP fiber optic transceiver slots
A-Net I/O ports	2 copper Cat-5e and 2 fiber; 4 total;
Maximum simultaneously usable A-Net ports	A maximum of two A-Net ports can be active at any time; Auto sensing scans the Cat-5 copper and SFP fiber ports at power up to determine which ports are to be made active; Any combination of Cat-5 and/or fiber can be used.
SFP Fiber Optic Transceiver Requirements:	100 Mbps Fast Ethernet; Class 1 laser device SFP: use duplex LC connector Supports Single-mode or Multi-mode fiber **Note**: SFP fiber transceivers are not included and must be purchased separately.
A-Net Cable Length	400 feet (120 meters) Cat-5e between devices; Cat-6 cabling is suggested for best performance at long distances. Solid core (as opposed to stranded) cabling is suggested for best performance at long distances. Fiber optic distance performance varies according to the type of SFP transceivers used (single/multi) and the transceiver's light-handling specifications.
Sample Rates	1x: 39.7–52kHz; 2x: 79.4–104kHz; 24-bit resolution
Routing and Control	Via computer using Pro64 Network Manager software
Computer Interface	1x USB; Type B connector
Latency	Analog input to analog output: <800µs
Maximum Ambient Operating Temperature	0˚C to 50˚C (32˚F to 122˚F)
Cooling	3 ultra-quiet low-velocity fans; Thermal monitor circuitry provides warnings for fan failure or excessive temperature.
Voltage (measured at the input of the AllFrame F6)	22-60VDC, inclusive of tolerance

Maximum Current (varies with input voltage) (voltage at the input of the AllFrame F6)	1.08A @ 60V 1.16A @ 56V 1.35A @ 48V 1.41A @ 44V 2.70A @ 24V 2.95A @ 22V)
Power Over A-Net (PoA) Requirements	Requires an Aviom POA80; a UL60950-1 Certified/Listed ITE power supply having a SELV (Safety Extra Low Voltage) rated output voltage. Power Over A-Net (PoA) connects to A-Net B port only.
DC Power Requirements for Euroblock and XLR Connectors	Requires a UL60950-1 Certified/Listed ITE power supply having a SELV (Safety Extra Low Voltage) rated output voltage between 30 and 60V DC. To guarantee proper startup, this supply should be rated for at least 100 watts.
DC Power, Euroblock	2-pin Euroblock, 5mm Pin 1: (+) 30-60VDC; Pin 2 (-) Ground
DC Power, XLR	4-pin XLR Pin 1: Ground; Pin 2/3: no connect; Pin 4: 30-60VDC
	Capable of sourcing 5A of in-rush current for 5ms (0.1ms rise time)
Standby	2-pin Euroblock, 5mm Pin 3: (+) ; Pin 4 (-) Ground
LED Defeat	2-pin Euroblock, 5mm Pin 5: (+) ; Pin 6 (-) Ground
Euroblock, Terminal Blocks #1-6	Phoenix Contact part number 17 54 44 9 3 total; Size: 5mm; 2 contacts per unit;
I/O Module and Cover Plate Screws	Type: Phillips Hex Washer Head Size: 4-40 Length: 1/4-inch
	Use a #1 Phillips screwdriver or 3/16-inch hex nut driver.
Dimensions	10.504 x 12.60 x 3.852 in. 269.24 x 320.04 x 97.79 mm
Rack Mounting	Requires 6u space when using optional RK6 Rack Kit.
Weight	9 pounds (4.1 kg)
All Aviom products are designed and manufactured in the USA.	

C4m Mic/Line Input Card Specifications

Channels	4 inputs	Mic- or line-level
XLR Inputs	Pin 1: Shield; Pin 2: Hot; Pin 3: Cold	
Differential Input Impedance	3.6k ohms	
Preamp Control	Requires Pro64 Network Manager software for initial setup; Preamps can then be controlled from RCI/MCS or via m-control	
Input Gain Range	0–55dB, variable, in 1dB increments	
Maximum Input Level resulting in 0dBFS	0dB gain, Pad on = +24dBu 0dB gain, Pad off = 0dBu 55dB gain, Pad on = -31dBu 55dB gain, Pad off = -55dBu	
Pad	-24dB, switchable per channel	
Low Cut Filter	Per channel; -3dB @ 85Hz, 18dB per octave	
Phantom Power	+48V, individually selectable per channel	
Frequency Response	+/- 0.3dB 20-23kHz at 48kHz +/- 0.3dB 20-45kHz at 96kHz -3dB @ 2Hz (at all sample rates)	
THD +N	0.0015% @ 1.0kHz, -10dBFS 0.007% @ 1.0 kHz, -1dBFS	
Dynamic Range (noise floor)	112dB	
Crosstalk	-110dB @ 1kHz, 35dB gain	
Equivalent Input Noise (EIN)	-127dBu	
CMRR (common mode rejection ratio)	78dB @ 1.kHz / 75dB @ 10kHz, typical	
Threaded inserts	PEM FEOX-440; Use size #4 machine screw with 40 threads per inch.	
Dimensions	5.2 x 1.9 x 3.01 in. 132.08 x 48.26 x 76.45 mm	
Weight	0.5 pound (0.22 kg)	

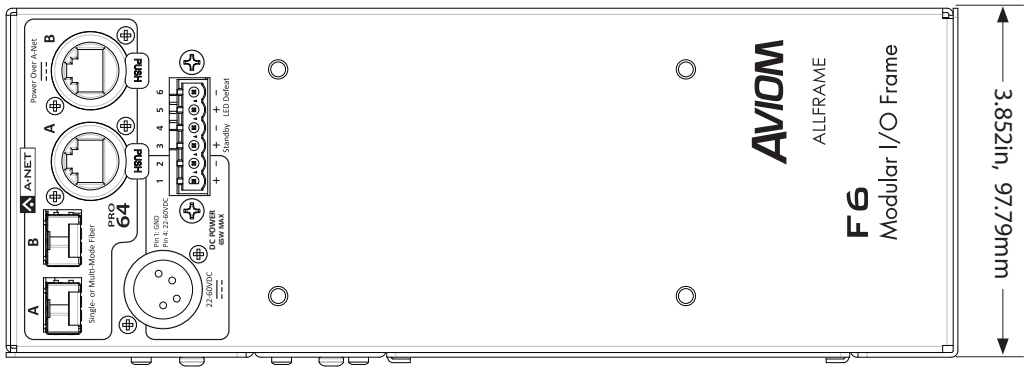
C4o Line Output Card Specifications

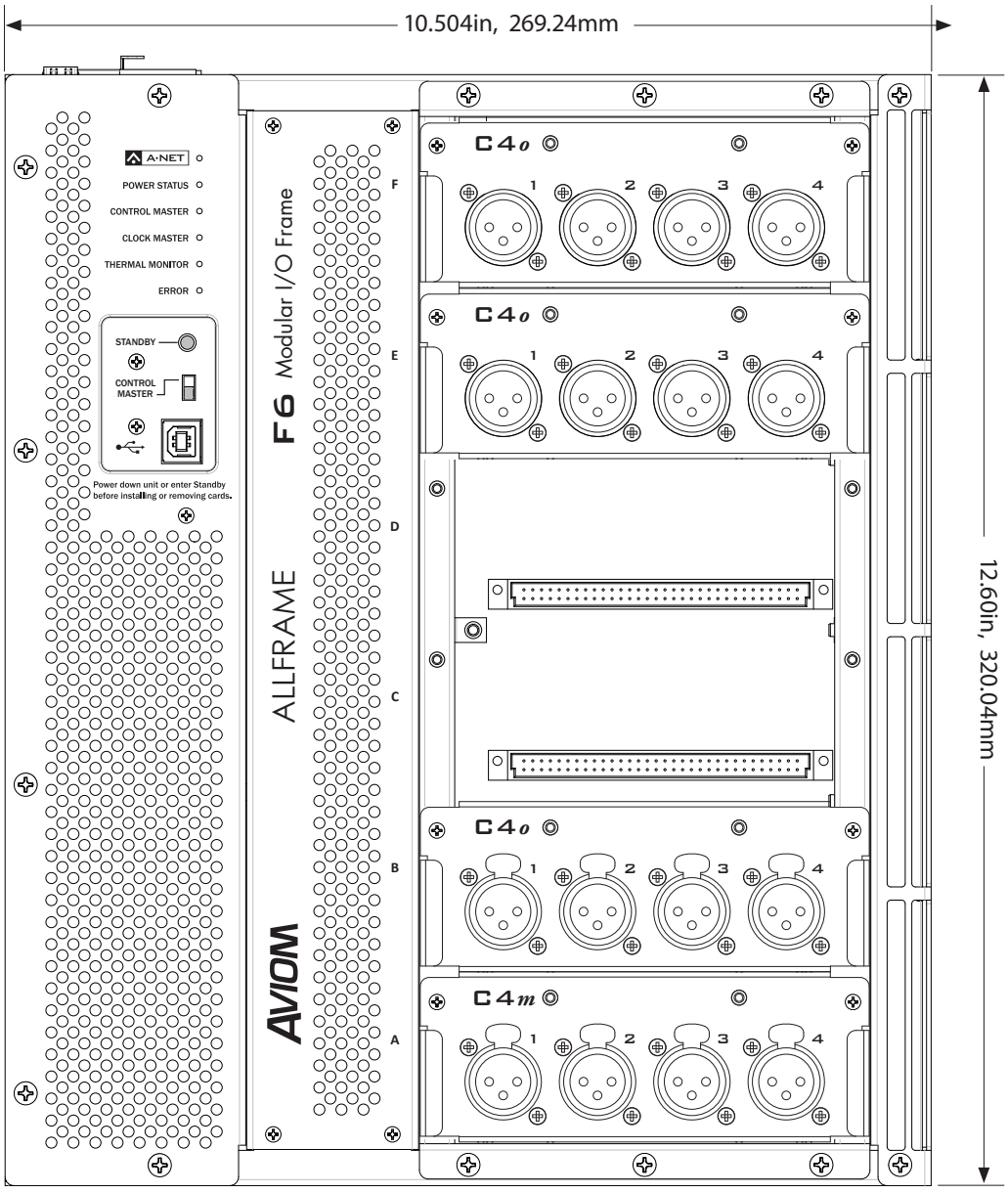
Channels	4 outputs	Mic- or line-level
XLR Outputs	Pin 1: Shield; Pin 2: Hot; Pin 3: Cold	
Output Impedance:	450 Ohms for +4dBu, +18dBu, +24dBu and +28dBu outputs; 200 Ohms for Mic	
Output Levels:	+28dBu, +24dBu, +18dBu, +4dBu, and Mic	
Frequency Response	-3dB: 2Hz and 23kHz ±0.5dB: 10Hz-22kHz (at 1x sample rate)	
THD +N	< .002% at -10dBFS	
Signal to Noise:	D/A: -111dB (unweighted)	
Crosstalk	<100dB at 1kHz	
Threaded inserts	PEM FEOX-440; Use size #4 machine screw with 40 threads per inch.	
Dimensions	5.2 x 1.9 x 3.01 in. 132.08 x 48.26 x 76.45 mm	
Weight	0.5 pound (0.22 kg)	

C2dio Digital I/O Card Specifications

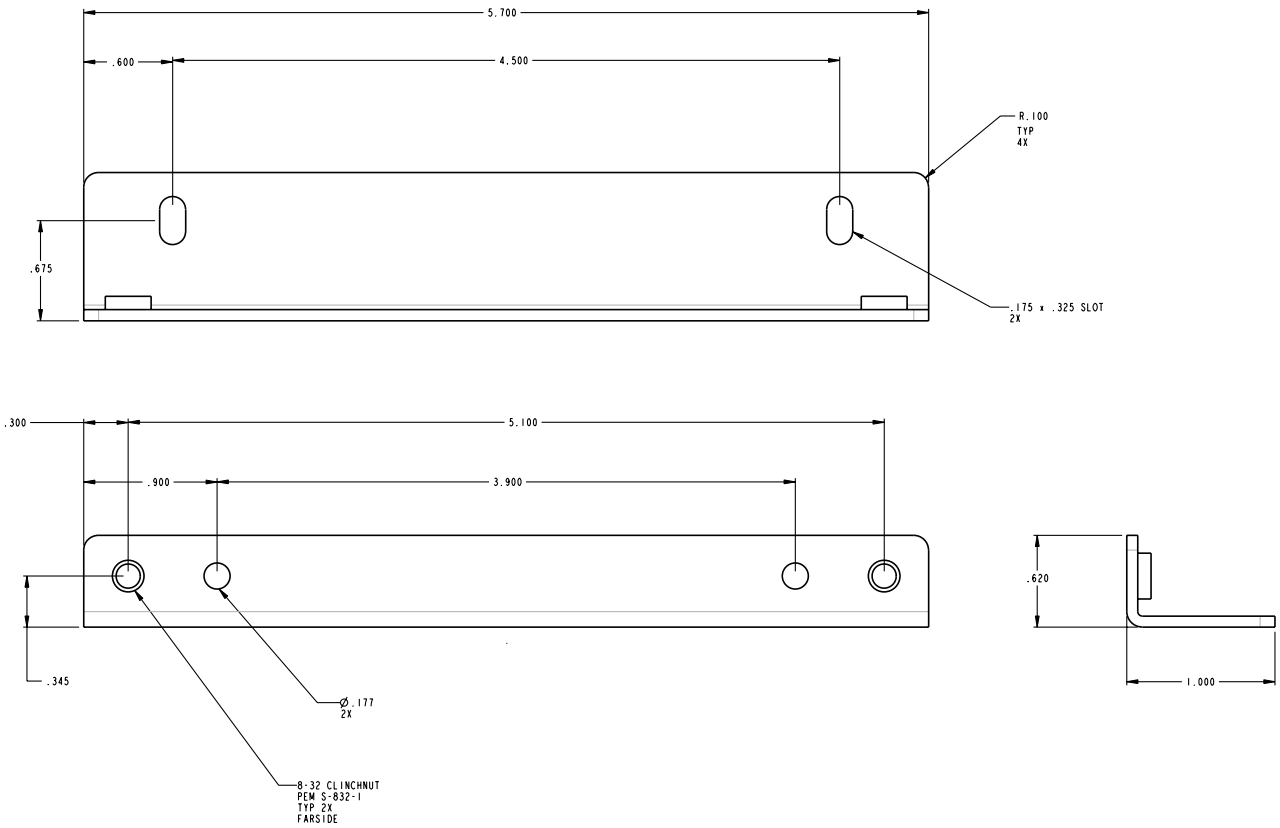
Channels	4 AES3 inputs	4 AES3 outputs
AES3 Inputs	Two XLR female, Channels 1/2 and 3/4; One bi-color clock LED for Channels 1/2; Channels 1/2 can be used as a clock source	
AES3 Outputs	Two XLR male, Channels 1/2 and 3/4;	
Word Clock I/O	One BNC connector; One bi-color LED; 3-position slide switch allows the BNC jack to be set for Word Clock Out (O), Word Clock In (I), or Word Clock In with Termination (T)	
Word Clock Input	Sensitivity: 0.2 to 5Vp-p Impedance: 75 ohms/70k ohms selectable	
Clock Sources	Internal (Network), Work Clock, AES3; AES3 Clock connects to Inputs 1/2 only	
Jitter Attenuation	Well below AES3 Jitter Transfer Function Mask	
Network Sample Rates	1x: 39.7–52kHz; 2x: 79.4–104kHz	
Sample Rate Conversion	Can convert input sample rates between 28.0kHz and 216.0kHz to any supported system sample rate THD+N: less than 130dB for full scale signals	
Sample Rate Conversion Time	Less than 0.42 ms (at all system sample rates)	
Dimensions	5.2 x 1.9 x 3.01 in. (132.08 x 48.26 x 76.45 mm)	
Weight	0.5 pound (0.22 kg)	

Dimensions - F6 Modular I/O Frame



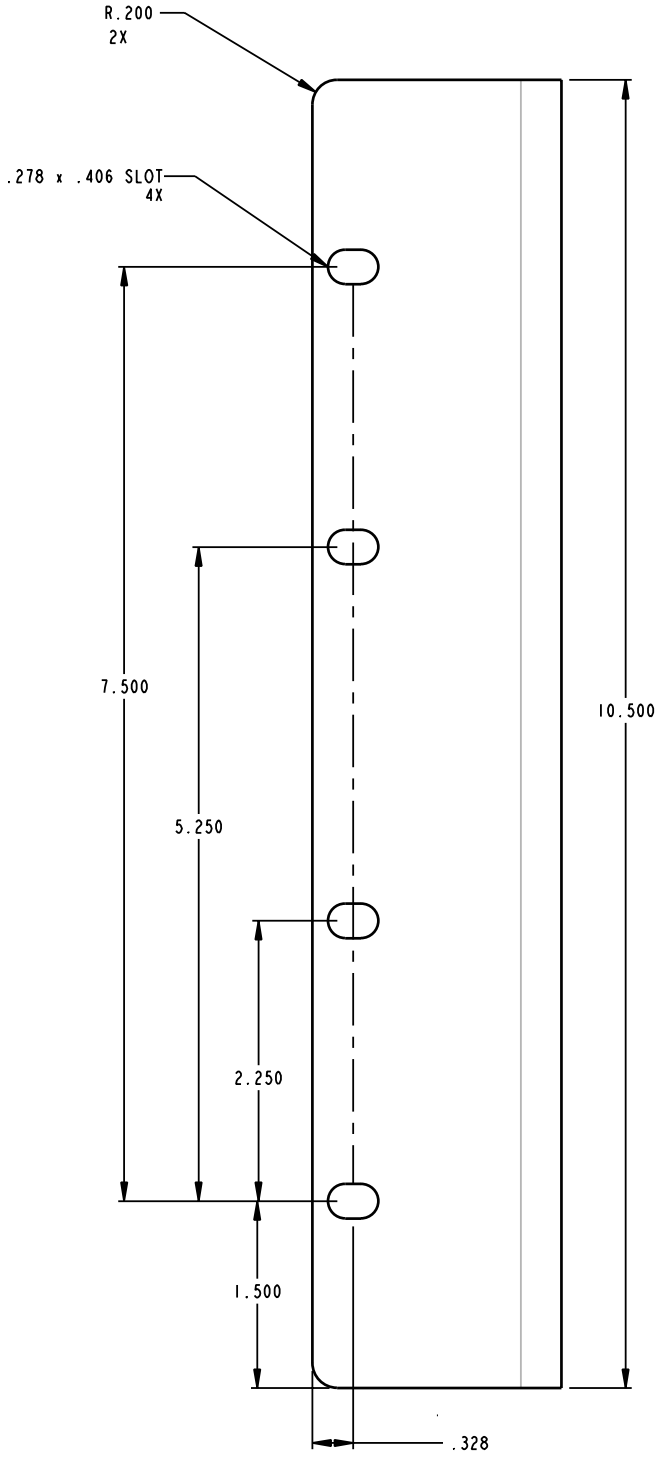


Dimensions - F6 Mounting Bracket



All dimensions shown are in inches.

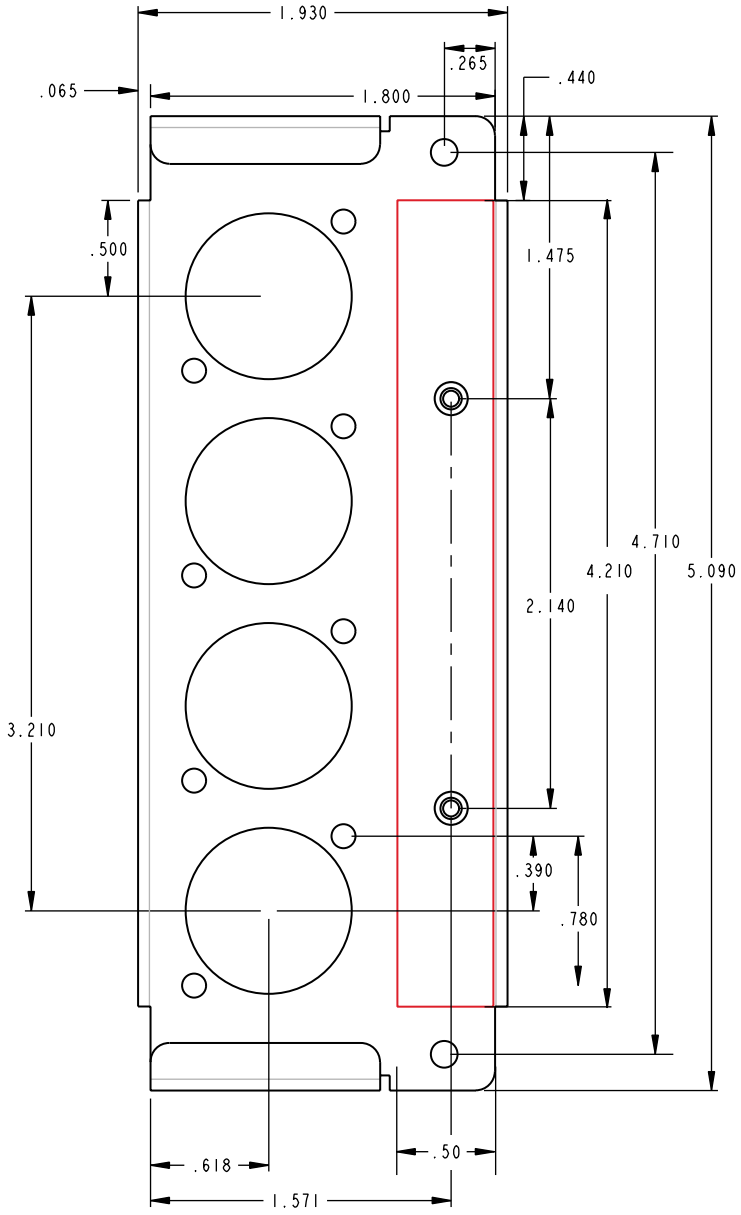
Dimensions - Rack Ear Spacing



All dimensions shown are in inches.

Dimensions - I/O Card Label Area

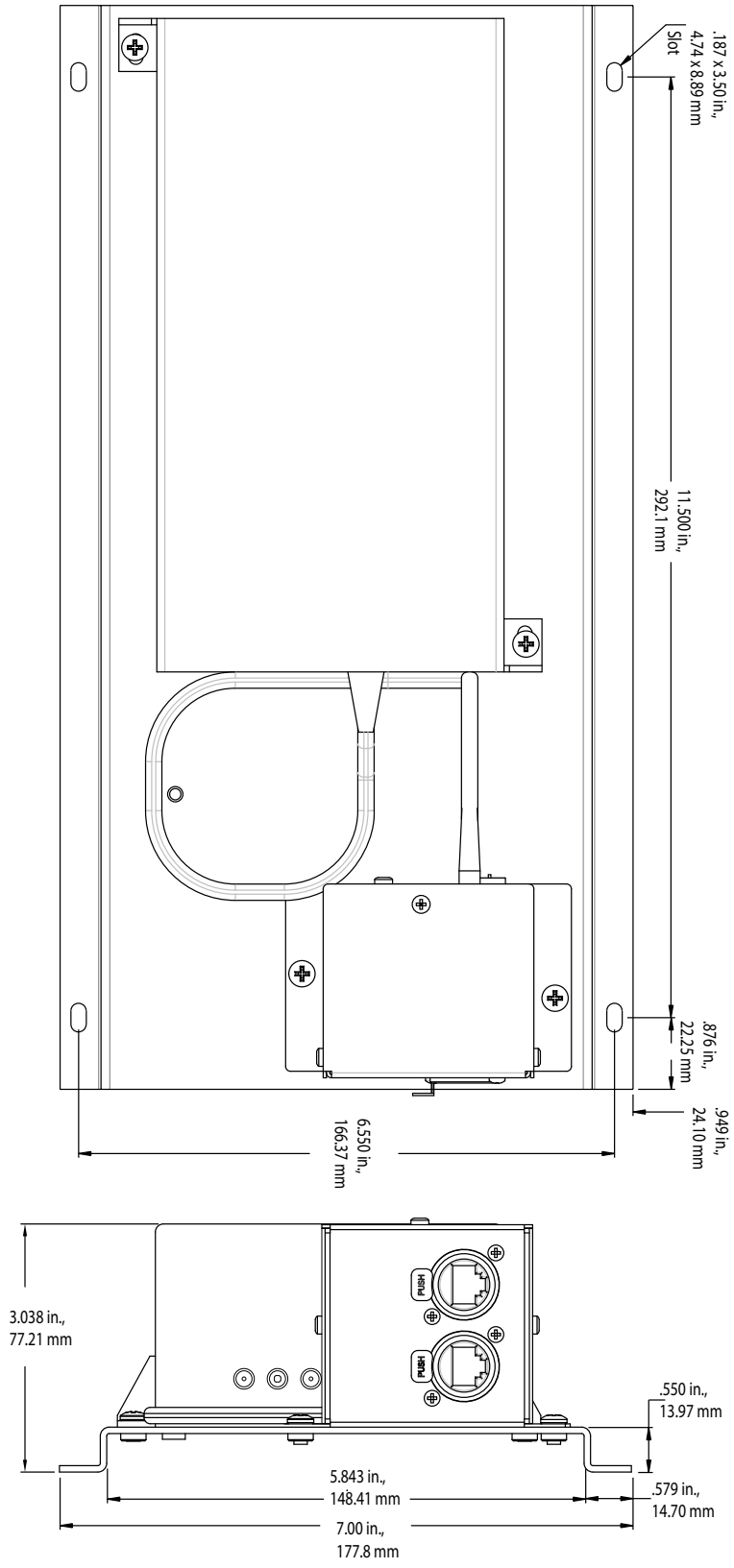
The label area shown is for the C4m and C4o cards only.



Shown actual size; suggested maximum label size shown in red.

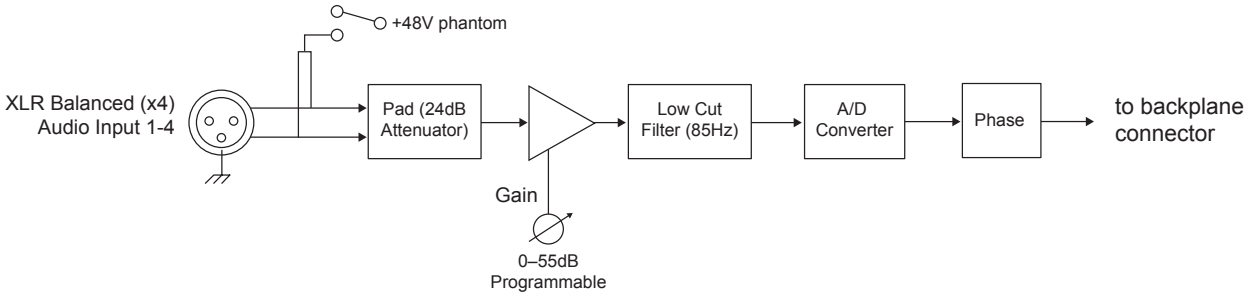
All dimensions shown are in inches.

Dimensions - POA80

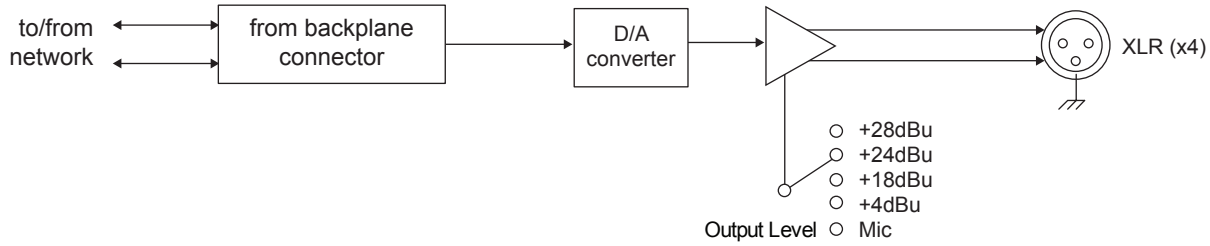


Block Diagrams

C4m Mic/Line Input Module



C4o Output Module



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Warranty Registration

Please take a moment to fill in this warranty registration form.

Return it to Aviom via mail or fax. All information will be kept confidential.

Model _____ Product Serial Number _____

Model _____ Product Serial Number _____

Model _____ Product Serial Number _____

Model _____ Product Serial Number _____

Date Purchased _____

Dealer Name _____

Dealer Location _____

_____

Your Name _____

Address _____

Address _____

City _____

State/Province _____

Zip/Postal Code _____

Country _____

Email Address _____

Fax this form to Aviom at +1 610-738-9950

ALLFRAME™

Multi-Modular I/O System

AVIOM®

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