# AIXpressor - Overview


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# Overview




## Introduction

The **AIXpressor** is a flexible, software-defined audio processing and interface platform. Unlike traditional stand-alone processors, where functionality is closely tied to fixed hardware and firmware, AIXpressor runs the **flexAI** software platform. This allows processing functions, codecs, metadata tools, interfaces, and other features to be added or extended through software updates and licensing.

AIXpressor combines real-time audio processing with a wide range of physical and IP-based audio interfaces. Native Audio over IP support includes **Livewire+**, **AES67**, and **SMPTE ST 2110**, while conventional interfaces such as analog audio, AES3, and MADI provide connectivity to existing baseband infrastructure.

This makes AIXpressor suitable both as a stand-alone audio processor and as an interface between traditional audio systems and IP-based environments.

## Hardware

AIXpressor is built around a high-performance x86 multi-core processing platform. The main processor handles real-time audio processing, measurement, routing, codecs, Audio over IP, system services, and the web-based user interface.

A high-performance FPGA manages the connection between the processing system and the physical audio interfaces.

The main hardware features include:

- **Chassis:** 19-inch, 1RU rack-mount unit
- **Display:** 16.5 cm touch-sensitive front-panel display
- **Status Indicators:** Multicolor system status indication
- **Power Supplies:** Redundant power supplies with individual power controls
- **Headphones:** 6.3 mm (1/4") front-panel headphone output
- **Ethernet:** Four Gigabit Ethernet ports for control, management, and Audio over IP

- **USB Type A:** One front-panel and one rear-panel USB 3.0 connector
- **USB Type B:** One rear-panel USB 2.0 connector
- **External Sync:** BNC input supporting Word Clock, AES3/AES11, Black Burst, and Tri-Level Sync

## On-board Audio Interfaces

AIXpressor includes the following audio interfaces as standard:

- **AES3:** 8 inputs / 8 outputs or 4 inputs / 12 outputs
- **Analog:** 8 inputs / 8 outputs or 4 inputs / 12 outputs
- **2 SFP interfaces:** MADI or Jünger Audio tieLight, depending on the installed SFP modules
- **Audio over IP:** Native support for Livewire+, AES67, and SMPTE ST 2110

MADI and tieLight require different SFP module types. Refer to the corresponding interface section for details.

## Expansion Slots

Four expansion slots allow additional physical interfaces to be installed. Each slot provides connectivity for high-channel-count audio applications.

Available interface modules may include:

- SD/HD/3G-SDI
- Optical or coaxial MADI
- Audinate Dante
- AES3 I/O
- Analog I/O
- Analog outputs
- Microphone inputs

The exact channel count and capabilities depend on the installed interface module.

## Software

AIXpressor runs the **flexAI** software platform. flexAI separates audio processing functionality from the physical hardware, allowing new applications and features to be added as the software platform evolves.

Processing modules are available in different channel configurations where applicable, ranging from mono and stereo to surround and immersive formats such as 7.1.4.

Available and optional processing functions may include:

- **Level Magic** loudness management based on ITU-R BS.1770 and related international loudness standards
- True Peak Limiting
- Spectral Signature dynamic filtering
- Compression
- Parametric equalization and filtering
- Phase rotation
- De-essing
- Expansion and gating
- Voice-over mixing
- Automatic mixing
- Multichannel and immersive upmixing
- Automatic failover
- FM conditioning
- Object-based metadata authoring and rendering
- Audio codecs

The exact set of available functions depends on the installed flexAI software version and licenses.

# Audio I/O and Routing

AIXpressor provides analog, AES3, MADI, and Audio over IP connectivity as part of its standard hardware. Additional interfaces can be added using the four expansion slots.

The built-in AES3 and analog interfaces can each be configured as either **8 Inputs / 8 Outputs** or **4 Inputs / 12 Outputs**. The 4-in / 12-out configuration provides additional output capacity for multichannel and immersive audio formats such as 7.1.4.

The two SFP interfaces can be configured for **MADI** or the proprietary Jünger Audio **tieLight** interface. tieLight provides a high-channel-count, low-latency optical connection between compatible systems.

Audio from physical and IP-based interfaces is available to the internal flexAI routing system. Routing operates at channel level, allowing signals from different interface types to be freely combined, rearranged, processed, and routed to available destinations.

Routing configurations can also be stored and recalled as presets.

# Control

AIXpressor is primarily operated through its browser-based web interface.

For integration with external control, automation, and monitoring systems, flexAI supports protocols including:

- **Ember+** for external parameter control
- **NMOS IS-04 and IS-05** for discovery and connection management in IP-based environments
- **SNMP** for system monitoring and hardware health information

The available control functions may depend on the installed software version and system configuration.

# Applications and Use Cases

The flexible combination of processing, routing, conventional audio interfaces, and Audio over IP allows AIXpressor to be used in a wide range of broadcast and professional audio applications.

Typical applications include:

- Ingest and contribution
- Radio and television studios
- Master control rooms
- Playout systems
- Loudness and dynamics processing
- Format conversion
- Audio over IP gateways
- Multichannel and immersive audio workflows
- Rebroadcasting and distribution
- Centralized or distributed audio processing

AIXpressor can operate as a dedicated stand-alone processor or as part of a larger flexAI installation with multiple interconnected processing systems.

# Physical Installation

## Physical Installation

AIXpressor is a **1RU, 19-inch rack-mount unit** intended for permanent installation in a standard equipment rack. Secure the unit to the rack using four suitable rack screws.

AIXpressor is actively cooled. Viewed from the front, cooling air is drawn in on the **left-hand side** of the unit and exhausted on the **right-hand side**. Make sure that the corresponding ventilation openings are not obstructed and that sufficient airflow is available around the unit.

Additional free rack space above or below the AIXpressor is normally not required, provided that adequate ventilation is maintained. In installations with high ambient temperatures or restricted airflow, additional spacing may help improve cooling.

## Power

AIXpressor is equipped with two redundant power supplies, each with its own IEC mains inlet and On/Off switch.

For redundant operation, connect both power supplies. If one power supply or its mains feed fails, the second supply can continue to power the unit.

For installations requiring maximum availability, connect the two power supplies to **independent mains circuits** whenever possible. Ideally, the circuits should also use separate UPS feeds or other suitable backup power arrangements. This helps maintain operation not only in case of a power supply failure, but also if one mains circuit becomes unavailable.

Each power supply can be switched on and off independently.

The power supply modules are located inside the chassis. Replacing a power supply therefore requires opening the unit. Although replacement may technically be possible while the second power supply remains active, this is generally not practical while the unit is installed in a rack.

> **Important -** Please read Safety Informationon proper grounding and electrical safety.

# Front and Rear Panel

## Front Panel




The AIXpressor front panel provides direct access to the following connections and controls:

- **USB:** USB 3.0 Type A connector for removable storage and other supported USB devices
- **Headphones:** 6.3 mm (1/4") stereo headphone output
- **Display:** 1440 × 240 TFT touch display for local operation and status information

## Rear Panel




The rear panel provides power, network, synchronization, audio I/O, and expansion connections.

### Power

- **Redundant Power Supplies:** Two auto-ranging mains inputs with individual power switches
- The two power supplies operate redundantly and share the system load during normal operation.

For maximum redundancy, connect the two power supplies to independent mains circuits as described in the **Power** section.

### Network

- **Ethernet:** Four Gigabit Ethernet RJ45 ports for control, management, and Audio over IP
- **LAN 3 and LAN 4** are internally connected through an integrated network switch.

The assignment of the network ports depends on the system and AoIP configuration.

## USB and Service

- **USB Type A:** One USB 3.0 Type A connector
- **USB Type B:** One USB 2.0 Type B connector; currently unused
- **Status LED:** Provides a general indication of the system state. Green indicates normal operation.
- **Init / Reset:** Service function intended for use in consultation with Jünger Audio support.

## MADI / tieLight

Two SFP cages provide the built-in **MADI / tieLight** interfaces.

The operating mode of each interface is selected in the software. MADI and tieLight require different SFP module types.

> Depending on the installed module, MADI connections can be provided as optical single-mode, optical multi-mode, or **coaxial BNC** interfaces.

## External Synchronization

A 75 Ω BNC connector provides the external synchronization input.

Supported synchronization formats include:

- Word Clock
- AES3 / AES11
- Black Burst
- Tri-Level Sync

## AES3 I/O

The built-in AES3 interface uses a 25-pin D-Sub female connector.

It can be configured as:

- **8 AES3 inputs / 8 AES3 outputs**, or
- **4 AES3 inputs / 12 AES3 outputs**

AES3 is also commonly referred to as **AES/EBU**.

## Analog I/O

The built-in analog interfaces use two 25-pin D-Sub female connectors:

- One connector provides **8 balanced analog outputs**.
- The second connector provides **8 balanced analog inputs**, or can be configured as **4 balanced inputs / 4 balanced outputs**.

This allows the complete analog interface to operate as either:

- **8 inputs / 8 outputs**, or
- **4 inputs / 12 outputs**

## Expansion Slots

AIXpressor provides four interface expansion slots, **IF 1 – IF 4**, for optional interface boards.

Each slot supports up to **64 bidirectional audio channels**, depending on the installed interface module.

Available expansion modules include interfaces for applications such as SDI, MADI, Dante, AES3, analog audio, and microphone inputs.

# Network Connections

## General Network Considerations

By default, **DHCP is enabled on all AIXpressor network interfaces**. When connected to a network with an active DHCP server, each interface automatically obtains an IP configuration.

The IP address assigned to **LAN 1 CTRL** is shown on the front-panel display. If no DHCP server is available, a static IPv4 address can be configured for LAN 1 CTRL from the front panel to establish an initial network connection.

AIXpressor also supports **Zero Configuration Networking (mDNS/Bonjour)** and can therefore be reached by its `.local` host name on compatible networks.

> **Note -** The network settings available from the front panel apply to **LAN 1 CTRL** only.

> **Note -** When integrating the AIXpressor into a managed network, coordinate the required IP addressing and network settings with the network administrator.

## Accessing the Web Interface

To connect using the IP address shown on the front panel, enter the address in a web browser:

`https://<IP-address>`

If the AIXpressor is using its factory-installed self-signed certificate, the browser may initially display a certificate warning.

If your computer supports mDNS, the unit can alternatively be reached using its `.local` host name.

For example:

`https://AIXpressor-00080.local`

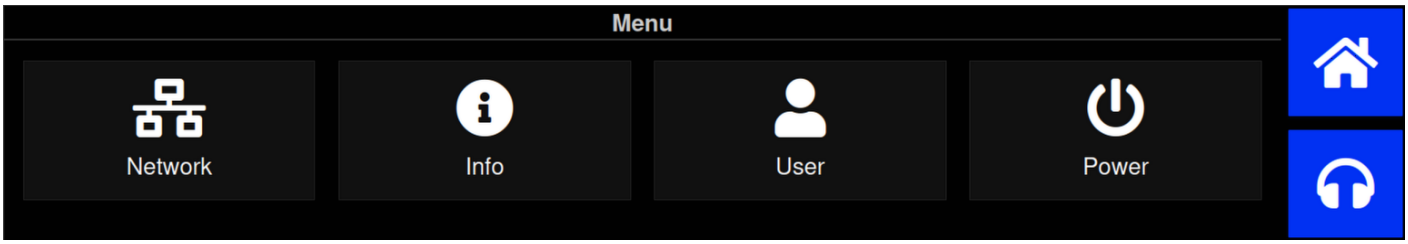
The exact host name is shown on the front-panel display.

The AIXpressor user interface is web-based and can be accessed with a modern desktop or mobile web browser.

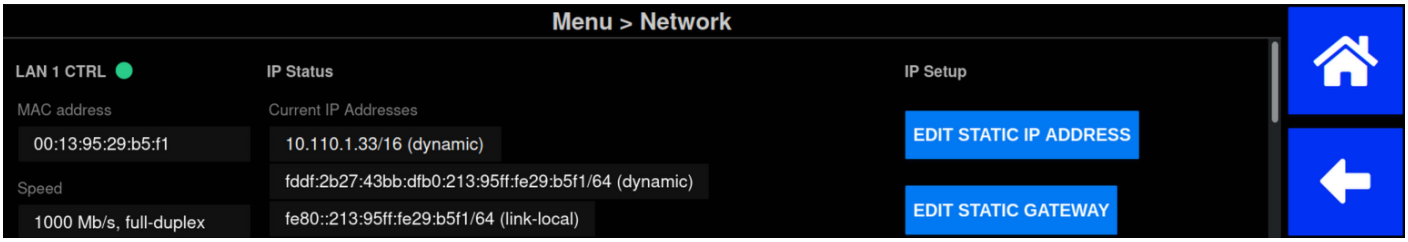
## Setting a Static IP Address from the Front Panel

A static IP address can be configured from the touch-sensitive front panel. This is useful when no DHCP server is available or when the AIXpressor must first be placed on a specific network before the web interface can be reached.

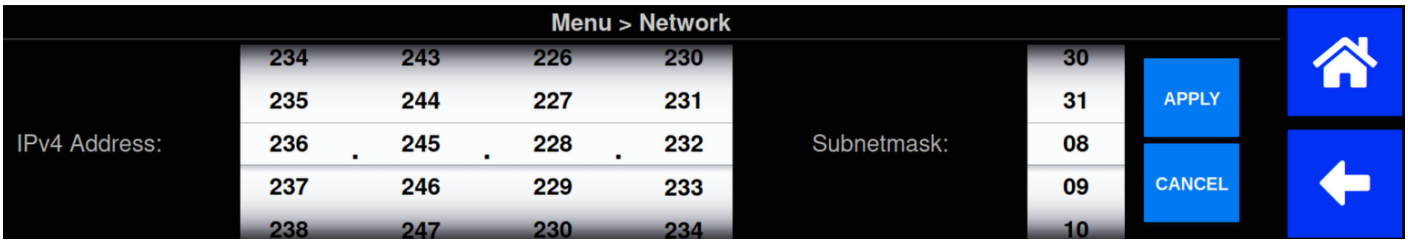
1. Open the **Menu** on the front panel.




2. Select **Network** to display the LAN 1 CTRL settings.




3. Select **Edit Static IP Address**.
4. Set the required **IP Address** and **Subnet Mask**.




5. Select **Apply** to save the configuration.

# Safety Information

**Critical information - Please read carefully.**

# Safety Information

## Electrical Safety

- **Safety Classification:** AIXpressor is a Class I grounded product and must be operated with a protective earth connection.
- **Mains Connection:** Connect the unit only to properly grounded mains outlets. The power cords must remain accessible so that the unit can be disconnected from mains power when required.
- **Power Switches:** Each power supply has its own On/Off switch located next to the corresponding mains inlet on the rear panel. The switch positions are marked **I** for On and **O** for Off.
- **Redundant Power Supplies:** AIXpressor is equipped with two power supplies and therefore uses two mains power cords. Both connections must be disconnected to completely remove mains power from the unit.
- **Protection from Water:** Do not expose the unit to dripping or splashing water. Do not place containers filled with liquid on or directly above the unit.

## Service Safety

Service work should only be carried out by qualified personnel.

Before opening or servicing the unit:

1. Switch off both power supplies.
2. Disconnect both mains power cords.
3. Make sure that the power cords cannot be reconnected accidentally while service work is in progress.

Do not perform service work on the unit while it is connected to mains power unless the procedure specifically requires this and is carried out by suitably qualified personnel.

# Installation and Operation

- Install AIXpressor on a stable surface or securely mount it in a standard **19-inch equipment rack**.
- When installed in a rack, make sure that the unit is adequately supported and securely fastened.
- AIXpressor is actively cooled. Viewed from the front, cooling air enters on the **left-hand side** and exits on the **right-hand side**. Keep these ventilation openings clear and provide sufficient airflow around the unit.
- Do not operate the unit with covers or panels removed.
- Use only mains power cords that are suitable for the product and approved for use in the country or region of installation.
- If the unit, power cords, connectors, or other components appear damaged, disconnect the unit from mains power and have it inspected by qualified service personnel before further use.

# Internal Battery

AIXpressor contains an internal lithium battery.

> The battery must only be replaced with the specified type and by qualified service personnel. Using an incorrect battery type or installing it incorrectly may present a risk of fire or explosion.

# Software installation

# Install AIXpressor Software from a USB Stick

> Important: Use this procedure only when Jünger Audio Support explicitly instructs you to reinstall or replace the software on an AIXpressor system.

This article describes how to install AIXpressor software from a bootable USB stick. The procedure is intended for service and recovery situations and should not be used during normal operation.

## Before You Start

Make sure that you have:

- The software ISO file provided or approved by Jünger Audio Support
- A USB stick suitable for creating bootable installation media
- A USB keyboard
- Physical access to the front and rear of the AIXpressor
- Access to the AIXpressor power supply switch

> Warning: Creating a bootable USB stick erases the contents of the USB stick. Back up any files from the USB stick before continuing.

## Create a Bootable USB Stick

Create a bootable USB stick from the ISO file before connecting it to the AIXpressor.

You can use a tool such as balenaEtcher to write the ISO image to the USB stick.

General procedure:

1. Insert the USB stick into your computer.
2. Open the USB imaging tool.
3. Select the ISO file provided by Jünger Audio Support.
4. Select the USB stick as the target device.
5. Write or flash the ISO image to the USB stick.
6. Wait until the process has completed.
7. Eject the USB stick safely.

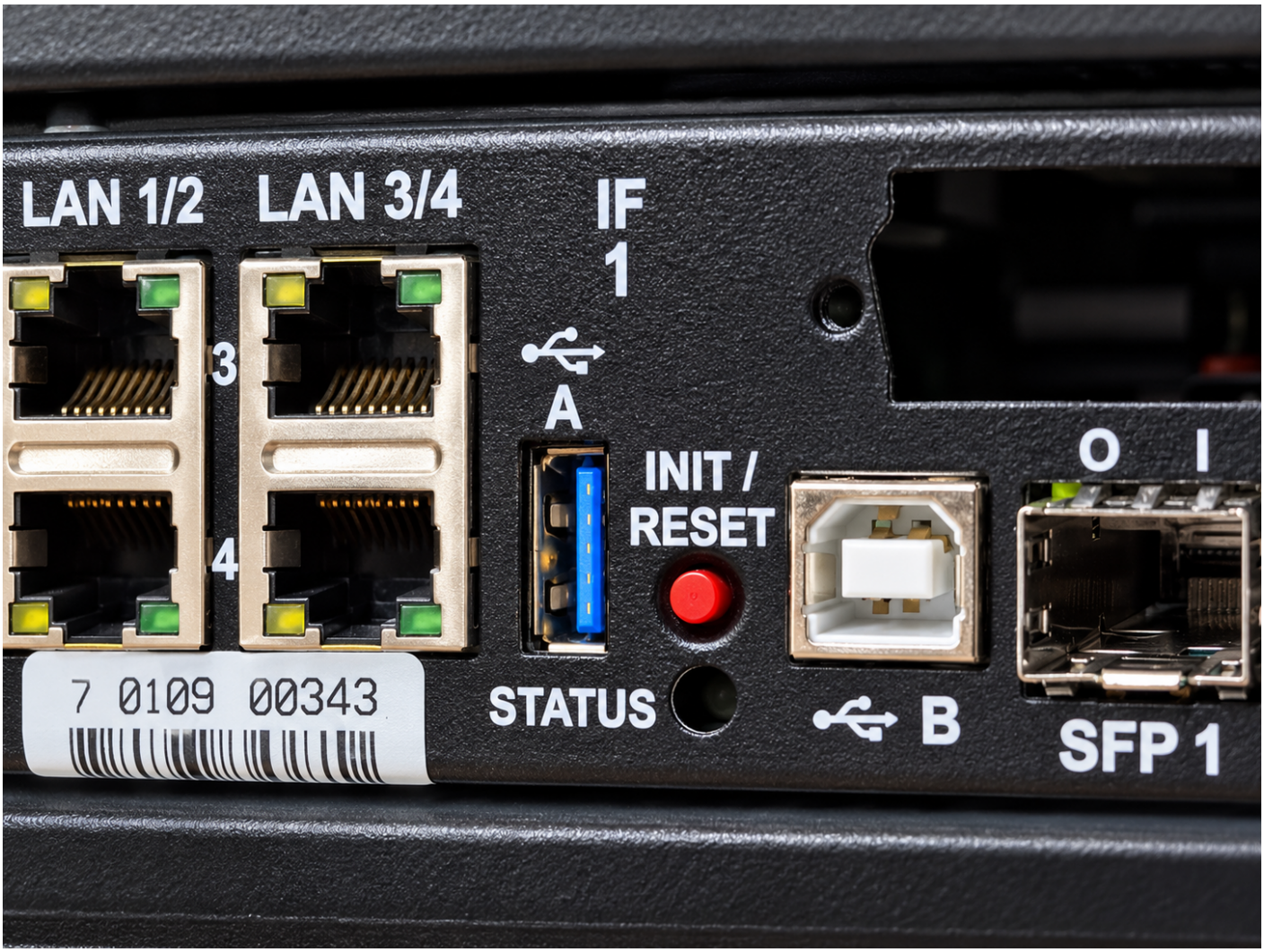
> Note: Do not copy the ISO file to the USB stick as a normal file. The ISO image must be written to the USB stick as bootable installation media.

# Connect the USB Stick and Keyboard

1. Connect the bootable USB stick to a USB connector on the rear panel of the AIXpressor.
2. Connect a USB keyboard to the front USB connector of the AIXpressor.

# Start the AIXpressor in USB Boot Mode

1. Make sure the AIXpressor power supply is switched off.
2. Press and hold the red **INIT / RESET** button on the rear panel.



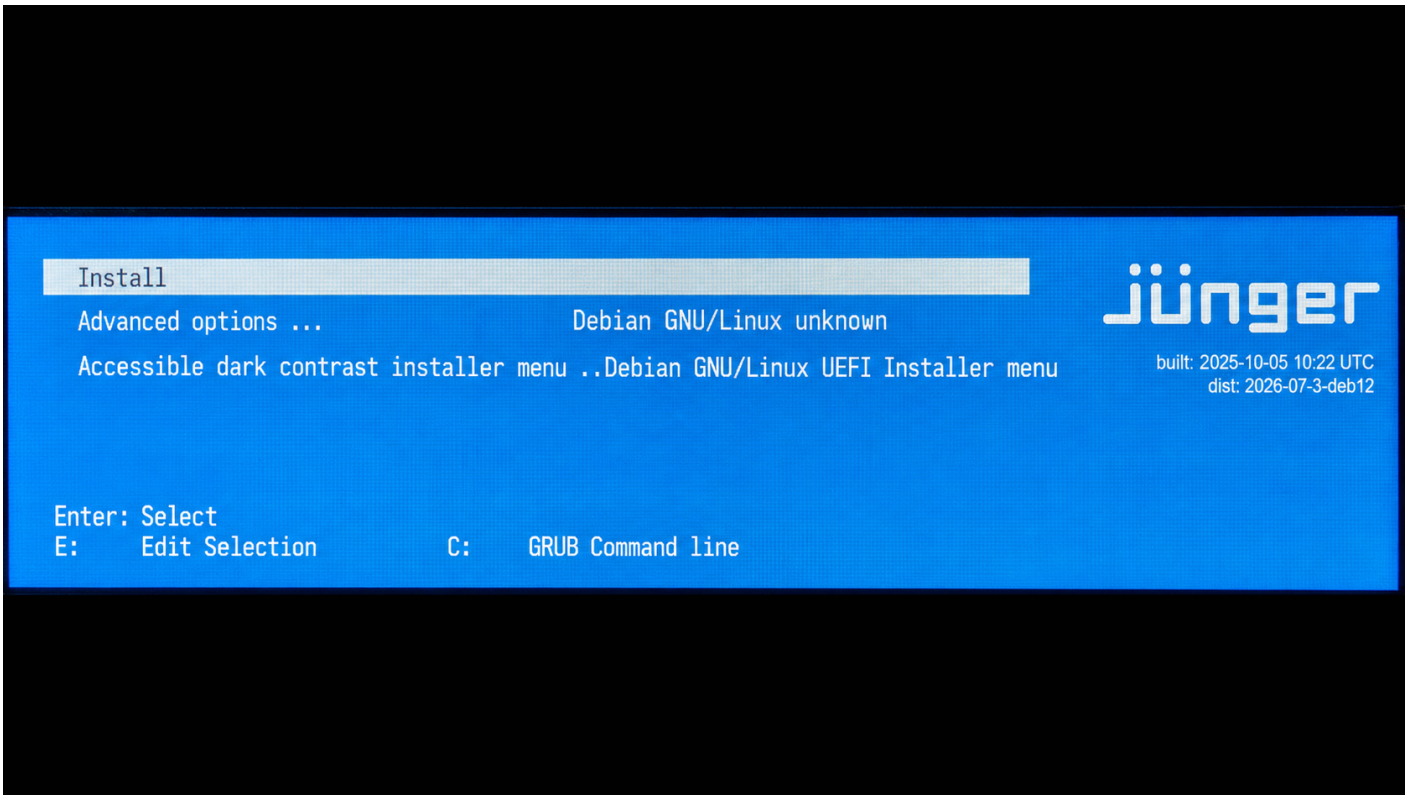

3. While holding the red button, switch on the AIXpressor power supply.
4. Keep holding the red button until the rear status LED starts flashing blue.
5. Release the red button.

The AIXpressor now starts from the USB installation media.

# Start the Installation

After the AIXpressor has started from the USB stick, the installation menu appears on the front display.

1. Use the keyboard to select **Install**.
2. Press **Enter**.




The installation process starts. Follow the instructions shown on the front display.

# Enter the Host Name

During installation, the system asks for a host name.

Enter a host name for the AIXpressor. The host name should identify the system in the network.

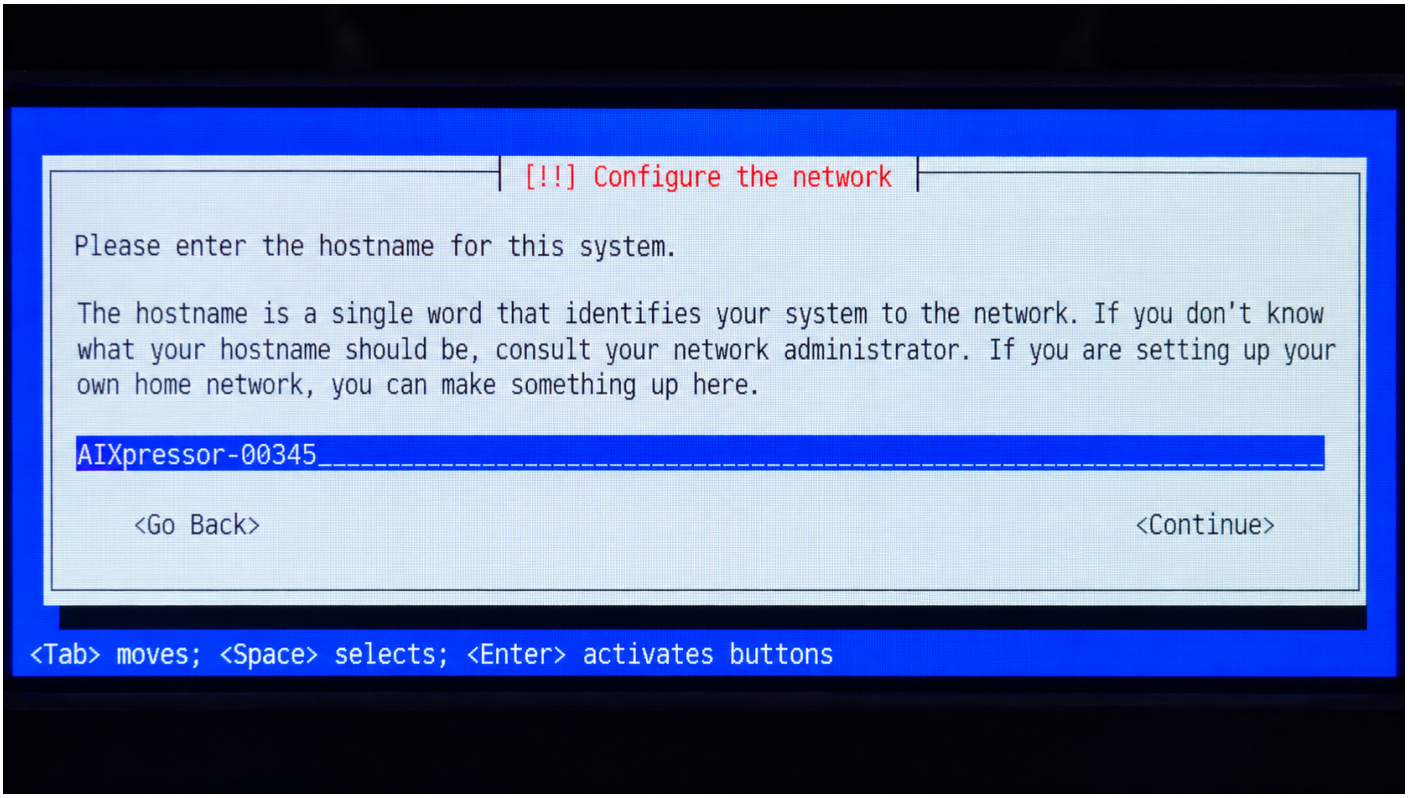
Recommended format:

```
AIXpressor-<serial number suffix>
```

Example:

```
AIXpressor-00119
```

You may also choose a different host name if required by the installation or network environment.

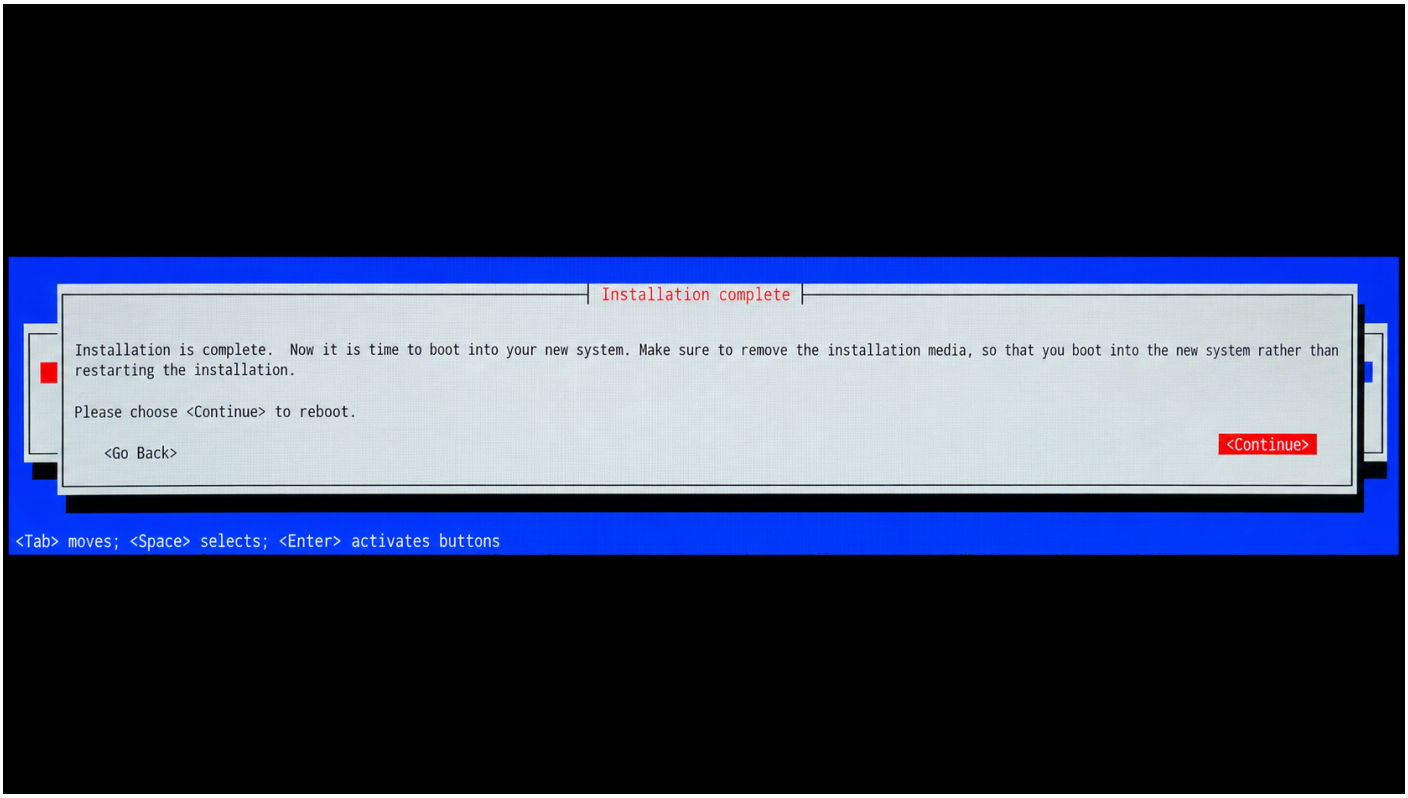



# Complete the Installation

Continue through the installation steps shown on the front display.

When the installation is complete, the display shows the final installation screen and asks you to continue to reboot.

1. Remove the USB installation media.
2. Select **Continue**.
3. Press **Enter** to reboot the system.




Warning: Do not switch off the AIXpressor before selecting **Continue** and starting the final reboot from the installer.

# Power Cycle the AIXpressor

After the final reboot has been started, perform a power cycle to make sure the AIXpressor leaves USB boot mode and starts normally from the internal system drive.

1. Wait until the reboot has started.
2. Switch off the AIXpressor power supply.
3. Wait a few seconds.
4. Make sure the USB installation media has been removed.
5. Switch on the AIXpressor power supply again.
6. Do not press the red **INIT / RESET** button during this normal startup.

> Important: The power cycle is required after installation. If the system is not power-cycled, it may start in USB boot mode again.

# After Installation

After the AIXpressor has restarted normally:

1. Open the flexAI Web UI from a computer in the same network.
2. Log in with the initial credentials or the credentials provided by Support.
3. Check the network configuration.
4. Create or restore the required system configuration.
5. Install or update the license if required.
6. Create a backup after the initial setup has been completed.

Detailed information about the first login and basic configuration can be found in the **Connect and Basic Setup** article.