Kommander-KA02

USER GUIDE

Aluminum 200W amplifier and
processing solution

K-ARRAY
Unique Audio Solutions

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Kommander-KA02

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IMPORTANT SAFETY INSTRUCTIONS

Read these instructions - Keep these instructions
Heed all warnings

Warning. Failure to follow these safety instructions could result in fire, shock or other injury or damage to the device or other property.

Installation and commissioning may only be carried out by qualified and authorized personnel.

Switch-off the mains power supply before carrying out any connection or maintenance operations.

Symbols

K-array declares that this device is in compliance with applicable CE standards and regulations. Before putting the device into operation, please observe the respective country-specific regulations!

WEEE
Please dispose of this product at the end of its operational lifetime by bringing it to your local collection point or recycling center for such equipment.

This symbol alerts the user to the presence of recommendations about the product's use and maintenance.

The lighting flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated, dangerous voltage within the product enclosure that may be of magnitude to constitute a risk of electrical shock.

This device complies with Restriction of Hazardous Substances Directive.

General heed and warnings

- Read these instructions.
- Keep this instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Only use attachments/accessories specified by the manufacturer.
- 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.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- This loudspeaker system is intended for professional use.
- Beware of sound levels. Do not stay within close proximity of loudspeakers in operation. Loudspeaker systems are capable of producing very high sound pressure levels (SPL) which can instantaneously lead to permanent hearing damage. Hearing damage can also occur at moderate level with prolonged exposure to sound. Check the applicable laws and regulations relating to maximum sound levels and exposure times.
- Before connecting the loudspeakers to other devices, turn off the power for all devices.
- Before turning the power on or off for all devices, set all volume levels to minimum.
- Use only speaker cables for connecting speakers to the speaker terminals.
- Be sure to observe the amplifier's rated load impedance particularly when connecting speakers in parallel. Connecting an impedance load outside the amplifier's rated range can damage the devices.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as 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.
- K-array will not shoulder any responsibilities for products modified without prior authorization.
- K-array cannot be held responsible for damage caused by improper use of the loudspeakers.

Kommander-KA02

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Thank you for choosing this K-array product!

To ensure proper operation, please carefully read this owner's manual and safety instruction before using the product.
After reading this manual, be sure to keep it for future reference.

Should you have any questions about your new device please contact K-array customer service at support@k-array.com or contact the official K-array distributor in your country.

Your new amplifier has Spotify Connect built in.
You need a Spotify account to take advantage of Spotify Connect.
Spotify Connect lets you control the music playing on your device, using the Spotify app on your mobile, tablet or PC. Listening is seamless. You can take calls, play games, even switch your phone off – all without interrupting the music. Learn more at spotify.com/connect
The Spotify software is subject to third party licenses found here: www.spotify.com/connect/third-party-licenses

Listen out loud with Spotify Connect

1. Connect your Kommander-KA02 to your local network;
2. Open up the Spotify app on your phone, tablet or laptop using the same network;
3. Play a song and select Devices Available;
4. Select your Kommander-KA02 and start listening.

Kommander-KA02

User Guide

Unpacking

Each K-array amplifier is built to the highest standard and thoroughly inspected before leaving the factory. Upon arrival, carefully inspect the shipping carton, then examine and test your new amplifier. If you find any damage, immediately notify the shipping company. Check that the following parts are supplied with the product.

A. Kommander-KA02 amplifier unit

B. Power supply with power cords

C. 2x Phoenix MC 1,5/ 3-ST-3,81 BK
3 pin balanced input connectors

D. 1x Phoenix MSTB 2,5/ 4-ST-5,08 BK
4 pin output speaker connector

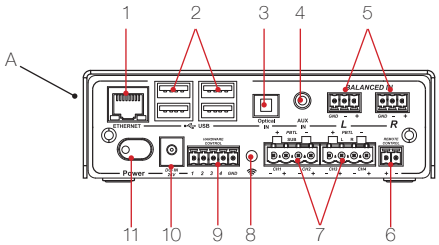
E. 2x Phoenix MSTB 2,5/ 2-ST-5,08 BK
2 pin output speaker connectors

F. 1x Phoenix MC 1,5/ 5-ST-3,81 BK
5 pin General Purpose Input connector

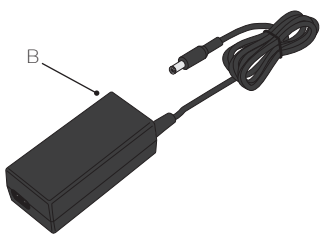
Note about the Power supply

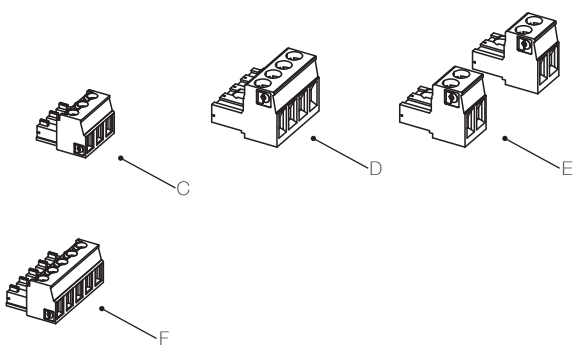
The Kommander-KA02 amplifier unit is provided with a dedicated 24 V_{DC} LPS power supply, suiting any nominal input operating voltage in the range 100-240 V_{AC} - 50/60Hz.

> It is strongly recommended to use certified 24 V_{DC}, 4.0 A LPS power supply only



1. Ethernet port
2. USB ports
3. Optical input
4. 3,5 mm jack analog input
5. Balanced analog inputs
6. Remote control connector
7. Output connections
8. Wi-Fi reset switch
9. GPIO port
10. DC inlet
11. Power switch





Introduction

The Kommander-KA02 is the smallest amplifier unit in the Kommander line with an incredibly compact size of 144 x 46 x 144 mm (5.7 x 1.8 x 5.7 in).

The amplifier features two balanced analog inputs and a fiber optical input working up to 192 kHz. It boasts Bluetooth connectivity, mini jack input and USB ports for using MP3, WAV, FLAC, AAC, ecc., files.

Converted by AKM's quality ADC, the audio is processed by a powerful DSP working at 192 kHz – 32 bit and amplified by a 4-channel Class D module with digital I2S inputs.
With the backing of 200W, the KA02 can be arranged in multiple output configurations such as 4 x 50W, 2 x 100W, 2 x 50W + 1 x 100W.

The onboard Quad Core 1.2 GHz – 64-bit processor allows the end user to connect to the Internet in a multitude of connectivity options. With the possibility to be controlled via Wi-Fi by a dedicated app, the KA02 has the ability to access music through the onboard Spotify and Web Radio streaming.

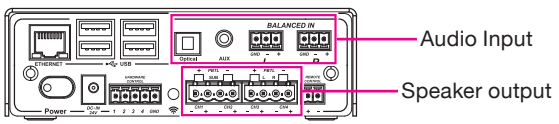
The Kommander-KA02 amplifier unit can drive a number of K-array loudspeakers in multiple unit configuration. Refer to Output Channel Configurations, page 6 for more details about connectivity.

Getting Started

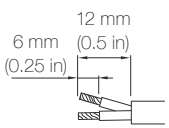
1. Set the proper loudspeaker configuration, according to the ones compatible with the Kommander-KA02 unit.
2. Unpack your new Kommander-KA02 unit and identify the connectors bundle (see Unpacking, page 4).
3. Prepare the connectors and wiring (see Wirings, page 6).
4. If available, connect the K-REMUCTRL wireless remote control USB receiver to one of the free USB ports in the Kommander-KA02 rear panel (see Wireless Remote, page 7).
5. Plug all the connectors (audio input, output, GPIO etc.) to the Kommander-KA02 unit, assigning the output channels according to the loudspeaker configuration.
6. It is strongly suggested to connect the Kommander-KA02 to the local network via a wired Ethernet connection (see Remote Connectivity, page 8).
7. Switch the system on: please consider that the output routing is muted by default.
8. Connect to the Kommander-KA02 to access the Azimut Control Interface (see Azimut Control Interface, page 8).
9. It is strongly suggested to update the system software at this step to unlock new features (see System Update, page 12).
10. In order to unmute the output routing, set the output configuration according to the loudspeaker models and the output channel routing (see Output Configuration, page 14).
11. If needed, assign the built-in General Purpose Inputs to the hardware controls (see Hardware Control Setup, page 13).
12. Play music and start tuning your K-array system.

Wirings

In order to set the proper connections with the input and output devices, a set of terminal connectors are provided within the package.

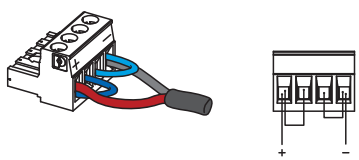


Speaker output

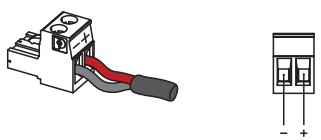


Use only high quality speaker cables. Wire gauges must comply with the loudspeaker nominal impedance according to the cable run.

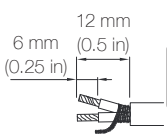
Parallel Bridge Tied Load PBTL



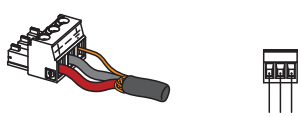
Single Ended SE



Balanced Audio Input



Use only high quality signal cables with proper grounding shield



Output Channel Configurations

The Kommander-KA02 output channels can be arranged in multiple loudspeakers configurations. The following table shows the maximum power delivered at the minimum load impedance by each output channel according to the output configuration.

CH1	CH2	CH3	CH4
SE 50W @ 4Ω	SE 50W @ 4Ω	SE 50W @ 4Ω	SE 50W @ 4Ω
PBTL 100W @ 2Ω		SE 50W @ 4Ω	SE 50W @ 4Ω
PBTL 100W @ 2Ω		PBTL 100W @ 2Ω	

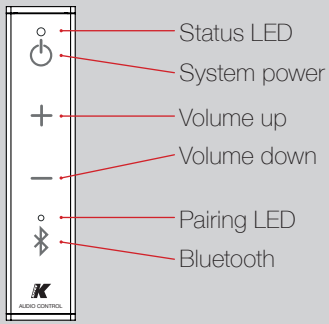
Ensure the amplifier's minimum loading impedance is matched, especially when connecting multiple loudspeakers in parallel

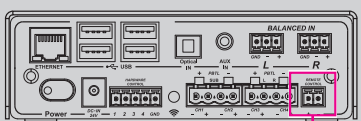
The following table shows the maximum number of K-array loudspeaker that can be connected to a single output channel according to the amplifier driving capabilities.

Loudspeaker Name	Loudspeaker load impedance	Max number of loudspeaker in parallel per ch
Lyzard-KZ1	16 Ω	4
Lyzard-KZ14	16 Ω	4
Vyper-KV25	8 Ω	2
Tornado-KT2	8 Ω	2
Domino-KF26	8 Ω	2*
Truffle-KTR24	4 Ω	2**
Truffle-KTR25	4 Ω	2**
Truffle-KTR26	2 Ω	1**
RAIL	48 Ω	12*

* Not to full power
** 2ch Parallel Bridge-Tied Load – PBTL

Wired Remote

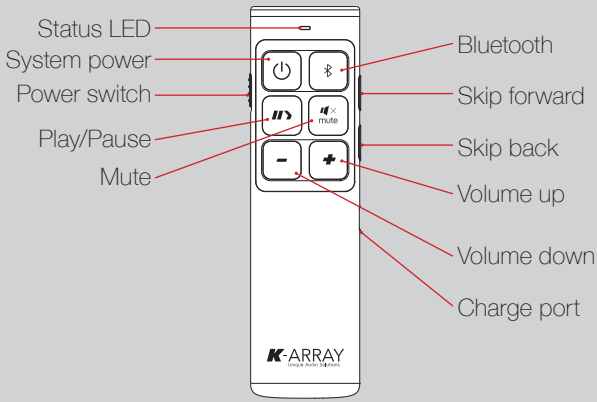




	Standby	Power On
Status LED	pulse blinking	solid white

Bluetooth Pairing	Hold down the Bluetooth button for 10 seconds to set the system to Bluetooth Pairing mode

Wireless Remote



The wireless remote provides complete control over the Azimut playback features.
The remote includes a high-efficiency rechargeable battery with a switch that can extend the batter life when powered off. When the battery discharges to approximately 10% remaining life, the Status LED begins flashing: connect the remote's charge port to a standard USB port to recharge the internal battery; use the provided cable.

	Command		Battery low
	received	not received	
Status LED	single blink	long blinking	flashing

Bluetooth Pairing	Press the Bluetooth button to set the system to Bluetooth pairing mode

Remote Connectivity

The Kommander-KA02 amplifier can be controlled remotely by a mobile device or desktop PC via the Azimut Control Interface.

For instant playing the Bluetooth connectivity allows to pair the KA02 amplifier to any streaming Bluetooth device.
Featuring the Spotify Connect, the music playing can be controlled by any device using the Spotify app (you need a Spotify account to take advantage of Spotify Connect).

Bluetooth pairing

Bluetooth Connectivity enables direct audio streaming to the Kommander-KA02 from any device supporting the Bluetooth 4.1 protocol. The table below shows how to set the KA02 unit in Bluetooth Pairing mode. Once in Pairing mode, the listening mode lasts in 180 s.

Device	Pairing instruction
Wireless Remote	Press the Bluetooth button to set the Kommander-KA02 to Bluetooth Pairing mode
Wired Remote	Hold down the Bluetooth button for 10 seconds to set the system to Bluetooth Pairing mode
Azimut Control Interface	1. Open the Main menu and navigate the Network & Bluetooth section 2. In the Bluetooth section click on the Pairing button
Hardware Control	Press on the button linked to the General Purpose Input terminal assigned to the Bluetooth pairing action
Azimut Remote App	Press the Bluetooth button to set the Kommander-KA02 to Bluetooth pairing mode

Azimut Discovery App

The Azimut Discovery app allows to discover and access the Azimut Control Interface on the Kommaner-KA02 amplifier unit and Azimut systems within the network.
Download the Azimut Discovery App suiting your mobile device:

Download on the App Store

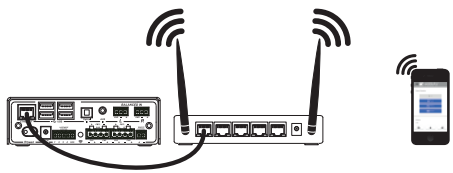
Google play

Azimut Control Interface

The Azimut Control Interface is a web application built-in the Kommander-KA02 unit and can be accessed by either directly connecting to the amplifier's built-in Wi-Fi (the amplifier's Wi-Fi SSID is written on a label on the unit's bottom plate), or via an Ethernet connection in a LAN environment.
Once connected to the amplifier, launch the Azimut Discovery App to find and access the Azimut Control Interface.

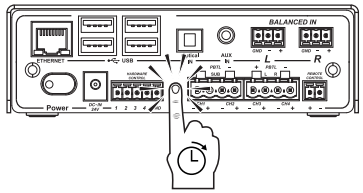
Wi-Fi SSID: look on the label on the unit's bottom plate
Default password: 12345678
Default IP: 192.168.10.1

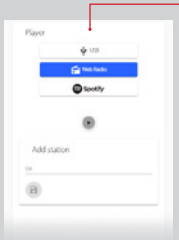
We strongly suggest to implement the Kommander-KA02 amplifier unit within your local network environment and then access its features relying on your wireless access point or wired devices.

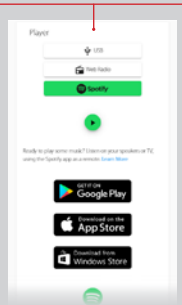


Reset Network Parameters

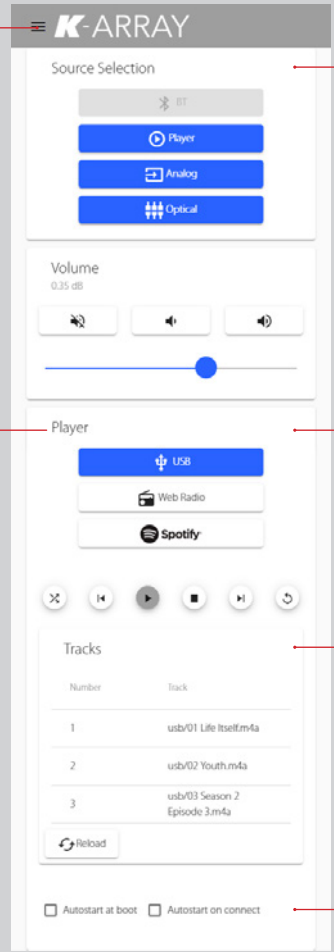
With the system on, hold down the Network Reset button on the rear panel for 10 seconds to revert the network parameters to the default factory settings.
The Network Addressing mode reverts to DHCP and the default Wi-Fi IP address and password are restored.



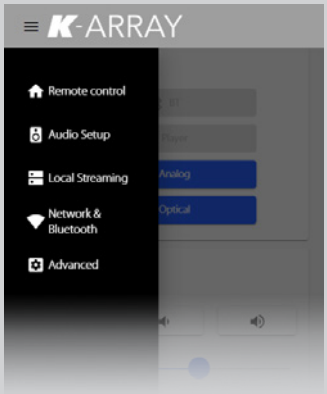




Azimut Control Interface



Main Menu



Remote Control
The default view with Audio Sources and Players Selections.

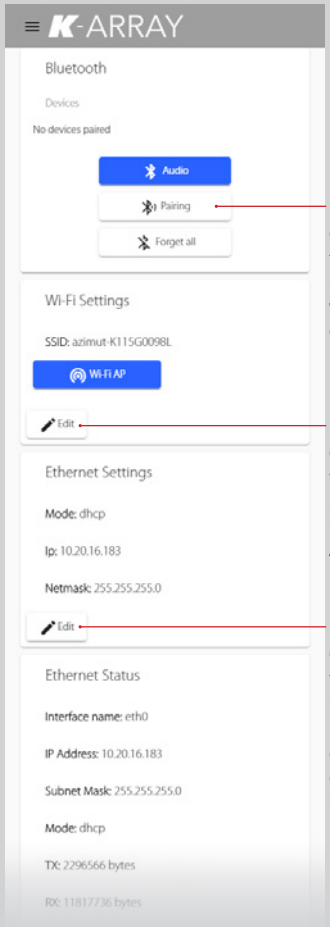
Audio Setup
User equalizer and level tuning.

Local Streaming
Manage a group of devices by a single Azimut system.

Network & Bluetooth
Modify network and Bluetooth settings.

Advanced
Set advanced features.

Network & Bluetooth



Pairing
Click this button to set the system in Pairing mode waiting for a connection.

Edit Password
Click this button to set a new password for the local Wi-Fi of the Azimut system

Edit Ethernet
Click this button to change Ethernet settings (i.e. a static IP address and a different netmask)

Local Streaming

Master
This device will stream audio to any Slave system in the network

Free
This device will playback audio from local sources or Internet independently.

Slave
This device will playback the same audio played by the Master device

Local Streaming

This feature allows a group of Kommander-KA02 amplifiers to be managed by a single device.

Preliminary setup:

- Connect all the Kommander-KA02 to the same network;
- Set a unique name on each device in order to simplify dectection and setup (see Advanced Settings, page 12);
- Select one system as Master device on the network: this device will stream its music to any other Kommander-KA02 marked as Slave.

Local streaming setup:

1. Connect to one Kommander-KA02 amplifier and access its Azimut Control Interface;
2. Browse the **Main Menu** and click on **Local Streaming**: the view will show the complete list of the systems within the network of the amplifier you are connected to;
3. For each listed system you can:
   - set it as **Master**: this device will stream the music to any other Slave amplifier in the network.
     WARNING: only one Master device is allowed within the network
   - set it as **Slave**: this device will play back the music streamed by the Master;
   - toggle the Standby mode in order to wake up or turn off the system (resume or stop playback accordingly);
   - set the playback volume.

By accessing the Azimut Control Interface of a Kommander-KA02 amplifier it is possible to override the Local Streaming setting and free the device from the streaming group.

Advanced Settings

System Update

The Kommander-KA02 power amplifier can be easily updated in the Advanced Settings view.

1. Connect to the Kommander-KA02 amplifier and access its Azimut Control Interface;
2. Browse the **Main Menu** and click on **Advanced**;
3. Expand the **Version Info** section: if the amplifier is connected to the Internet, the device will look for updates on K-array website. When a new firmware version is available, the **Download** button lights up.
4. Click on the **Download** button and wait for the firmware update file to be saved onboard.
5. When the **Install** button lights on, click on the Install button to start the system update.

Do not reboot the amplifier until the alert message appears.

During firmware update, do not modify any parameter of the device on the web interface.

Update via USB

1. Download the firmware packages from the Support webpage at www.k-array.com;
2. Format the USB memory stick with FAT16 or FAT32 file system;
3. Create a folder named “update” (case sensitive) in the root of the USB memory stick;
4. Copy the firmware packages marked as “update” into the update folder: files must follow the correct naming pattern, and both .package and .package.sha256 files must be present into the folder:

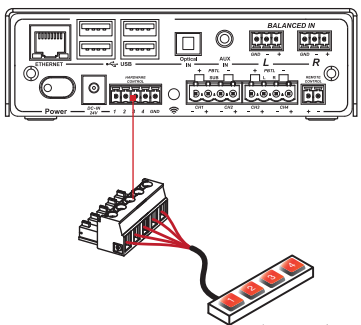
```
|-update\
    |-rootfs-update-1.0.5.0.package
    |-rootfs-update-1.0.5.0.package.sha256
```

5. Connect the USB memory to the Kommander-KA02 amplifier;
6. Connect to the amplifier and access its Azimut Control Interface;
7. Browse the **Main Menu** and click on **Advanced**;
8. Expand the **Version Info** section;
9. Click on the **Install via USB** button.

Hardware Control Setup

The Kommander-KA02 power amplifier provides a General Purpose Input connector designed to connect up to four external normally open (NO) switches* to be set as further remote user customizable controls.
In order to bind the remote control to a Kommander-KA02 operating functionality (actions) follow these step:

1. Connect the external NO switch to the ground (GND) terminal and to one of the four available terminals of the flying plug;
2. Plug the flying plug to the Hardware Control port on the Kommander-KA02 back panel;
3. Open the Azimut Control interface, click on the Main Menu icon and select Advanced;
4. Scroll down to the Hardware Control section;
5. Find the control with the number corresponding to the hardware control terminal where you plugged the remote switch and set the proper action;
6. Enable the remote control;
7. Click on Save Setup to make the settings effective.



*external normally open (NO) switches are not provided in the amplifier package.

Actions
mute/unmute
set volume (max: +12, min: -90)
Increase volume
Decrease volume
play/pause
play/pause Spotify
bluetooth pairing

Output Configuration

This feature enables modifications of the loudspeaker assignment to the Kommander-KA02 amplifier output channels.
These configurations shall be set by professional operators.

WARNING: Incorrect loudspeaker selection may seriously damage the connected loudspeakers.

Routing

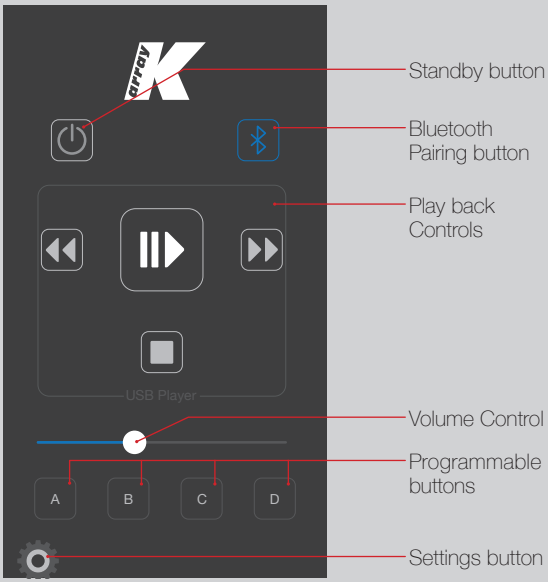
This feature enables modifications of the LEFT and RIGHT input channel assignment to the Kommander-KA02 amplifier output channels.

Azimut Remote App

Azimut Remote is a iOS application that allows the user to remotely control a single Kommander-KA02 amplifier unit via an Ethernet connection.

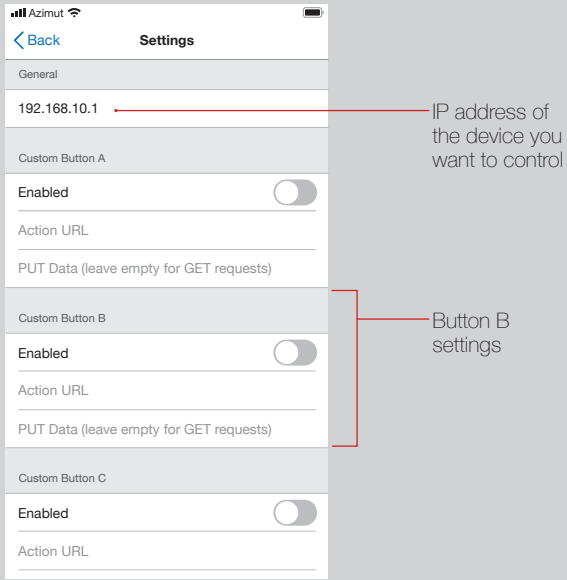
Download on the App Store

Azimut Remote offers an easy to use interface for managing audio playback and Bluetooth Pairing, as well as four completely user-programmable buttons. .



In order to connect the Azimut Remote to the Azimut system:

1. Be sure that the Azimut system and your iOS device are connected to the same network.
2. Launch the Azimut Discovery application (see Azimut Remote App, p. 15). The app will show the discovered Azimut Systems on the network: make note of the IP address of the device you want to control with the Azimut Remote app.
3. Launch the Azimut Remote app and open the Settings feature.
4. Insert the IP address of the device you want to control in the General field on top of the page.
5. Click on Back: the app is now linked to your Azimut System



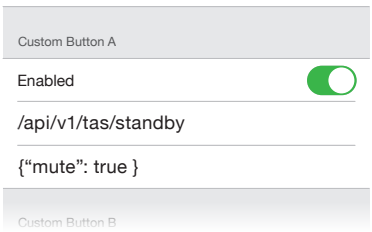
In order to customize the action associated to the four programmable buttons:

1. Select the button you want to program and set the proper action among the one listed in the table below.
2. Some actions require you to define the argument of the setting (e.g. the volume) in the PUT Data field. If not required, leave this field empty.
3. Enable the button to make it active.

You can eventually control a different device within the network setting preceding the action string with the IP address of the target device; e.g. pause playback of the device with IP 192.168.10.100:

http://192.168.10.100/api/v1/player/pause

Description	Action	PUT data
Mute ON	/api/v1/dsp/main/mute	{“mute”: true }
Mute OFF	/api/v1/dsp/main/mute	{“mute”: false }
Set volume at value # (span from -90 to 12)	/api/v1/dsp/main/volume	{“volume”: # }
Volume UP	/api/v1/dsp/main/volume/up	{}
Volume DOWN	/api/v1/dsp/main/volume/up	{}
Start playback	/api/v1/player/play	
Pause playback	/api/v1/player/pause	
Skip backward	/api/v1/player/prev	
Skip forward	/api/v1/player/next	
Set standby ON	/api/v1/tas/standby	{“mute”: true }
Set standby OFF	/api/v1/tas/standby	{“mute”: false }
Set the device as SLAVE in a local streaming network	/api/v1/multiroom/slave	{“slave”: true}
Release the device from the local streaming network	/api/v1/multiroom/slave	{“slave”: false}
Set the device as MASTER in a local streaming network	/api/v1/multiroom/master	{“master”: true}
Release the local streaming network	/api/v1/multiroom/master	{“master”: false}

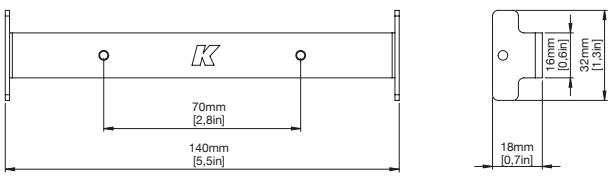


Mounting Kits

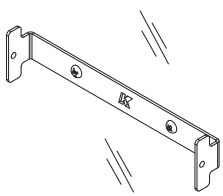
The Kommander-KA02 amplifier is designed to be controlled remotely, with no need of direct access the unit. This makes the devices easy to install, either in a recess or on top of a shelf or inside of a rack cabinet.
Two mounting kit are available:

- K-BRK bracketing system for single KA02 unit
- K-RACK2 rack mount 1U for three KA02 units.

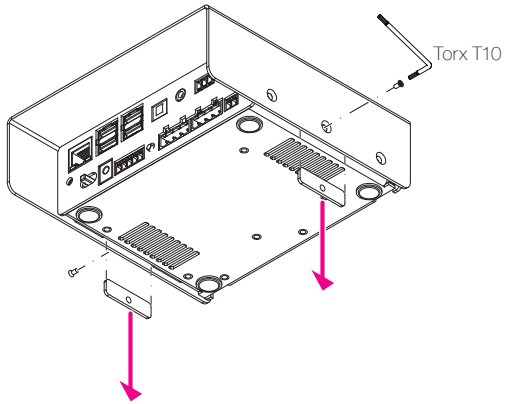
K-BRK Assembly



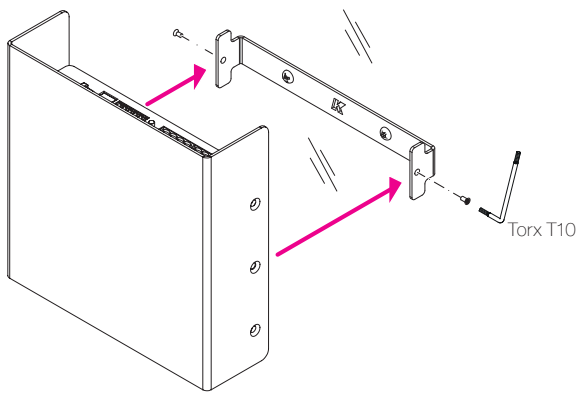
1. The Kommander-KA02 amplifier unit can be mounted on any surface with any orientation. Identify a comfortable position for the amplifier on the mounting surface and make two holes at the distance of 70 mm (2.8 in) to each other.
   Install the K-BRK bracket on the surface with the provided mounting kit.



2. Focus on the Kommander-KA02 unit: unscrew the lateral screws positioned at the center of the unit and remove the plates from the bottom of the amplifier. Keep the screws aside for further use.

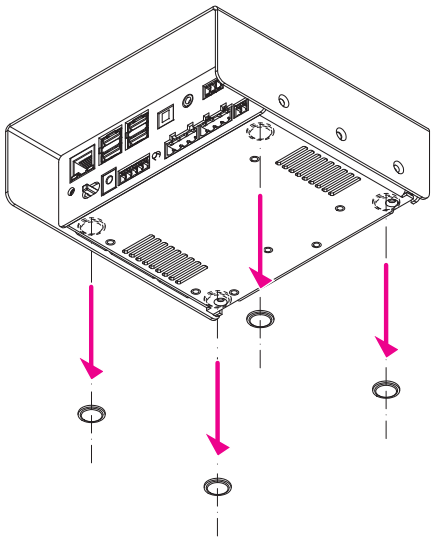


3. Position the amplifier unit on the bracket and use the screws to secure it.

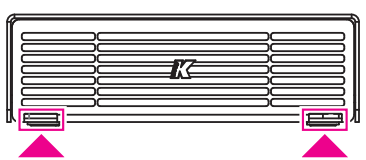


K-RACK2 Assembly

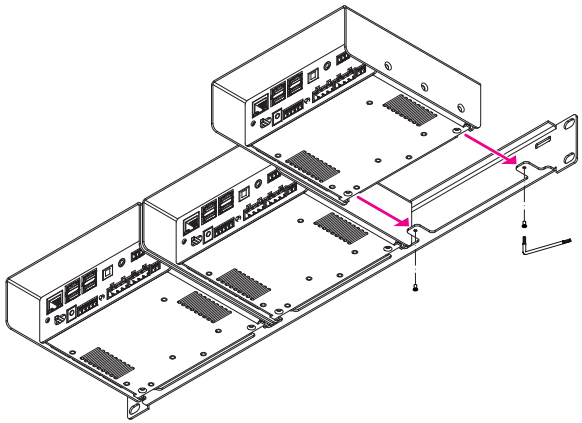
1. Remove the rubber feet from the bottom surface of the Kommander-KA02 amplifier unit.



2. Position the amplifier unit on the K-RACK2 so that the small tabs in the bracket enter the slots at the bottom of the amplifier front panel.

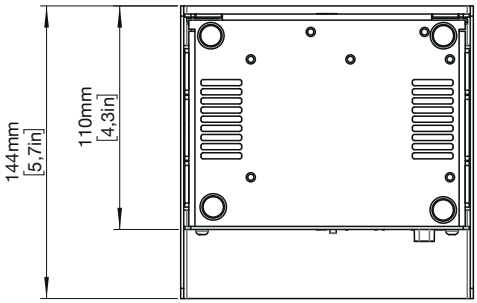


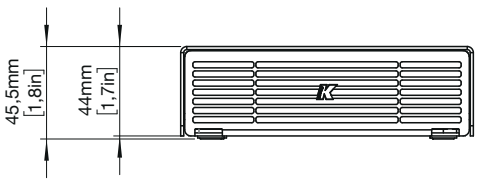
3. Use the screws provided with the K-RACK2 kit to secure the amplifier.

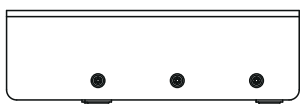


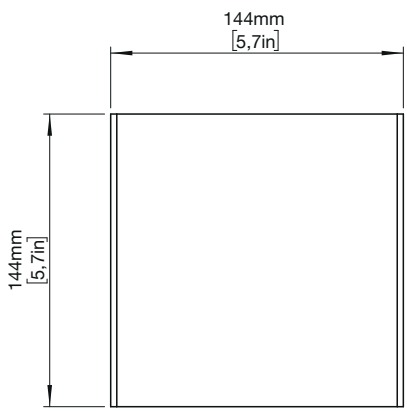
4. Up to three Kommander-KA02 amplifier units can be mounted on a single K-RACK2 occupying 1U in a rack cabinet.

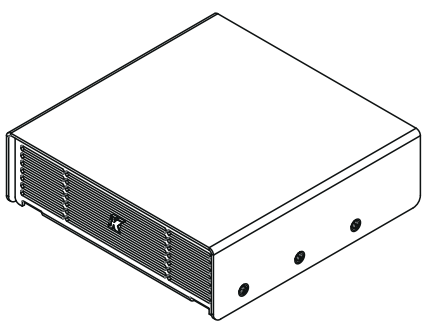
Mechanical Drawings











Technical Specifications

	Kommander-KA02	
Type	4-channel Class D audio amplifier	
Rated Power	4x 50W @ 4Ω	
Load impedance	minimum 4 Ω	
Frequency Response	20 Hz – 20 kHz (±1 dB)	
Connectivity	Bluetooth 4.1 Low Energy, Wi-Fi, Ethernet	2x Phoenix Connectors (bal) 3.5 mm Jack Stereo (unbal) Toslink Optical Connector
Control	Dedicated Azimut Control Interface / wired Remote Control	
Operating range	Dedicated AC/DC power adapter 100-240V ~ AC, 50-60 Hz input / 24 V, 4 A DC output	
Colors and Finishes	Black / Powder Matte	
Material	Aluminum	
Dimensions (WxHxD)	144 x 46 x 144 mm (5.6 x 1.8 x 5.6 in)	
Weight	0,5 kg (11 lb)	

Designed and Made in Italy

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