User's manual

X102FD

XCELLENCE

July 2023

Safety Instructions

1. All safety instructions must be read before using this device.

2. The exclamation mark in the triangle indicates internal components which if replaced can affect safety.

3. The lightning symbol within the triangle indicates the presence of dangerous uninsulated voltages.

4. This device must not be exposed to rain or humidity. It must not be used for example near swimming pools, fountains or any other place where it might be affected by liquids.

5. Only clean the device with a dry cloth.

6. Do not situate the equipment where its ventilation system might be interfered with.

7. Do not install the device near heat sources such as radiators, heaters or other heat-emitting elements.

8. The equipment must be repaired by qualified technical service personnel when:

A. The mains supply cable is damaged, or
B. Any object or liquid has damaged the device; or
C. The equipment does not function normally or correctly; or
D. The equipment has been exposed to the rain; or
E. The chassis is damaged

9. Disconnect the device in the case of electric storms or during long periods of disuse.

10. Never hang the equipment by its handle.

11. Only use manufacturer recommended accessories.

1. INTRODUCTION

1.1. General product information

Amate Audio thanks you for the trust placed in our Xcellence loudspeaker systems. The Xcellence series combines the convenience of a self-powered system and the flexibility of the DSP (digital system processing) for cabinet control. More than 45 years' experience in amplifier and acoustic cabinet design using the highest technology and components come together to give you a product ideal for a multitude of applications, especially those which require high levels of sound pressure. Stadiums, theatres or big events will become the perfect places for their use. We suggest you read the following information with attention, assured that it will be of maximum use in helping you to achieve the best results and optimum performance.

1.2. Features and presentation

X102FD

- Self-powered two-way acoustic system
- XLR electronically balanced input & XLR parallel link
- AC PowerCon input & link
- EtherCon RJ45 input & link
- 1 Gbps Ethernet connectivity with DanteTM audio networking
- 2500W class D amplifier for mid-bass range
- 500W class D amplifier for high range
- 24-bit AD/DA converters with 112 dB dynamic input, 48 kHz sampling rate
- DSP Controls (presets, parametric EQs, delay, mute, volume and limiter)
- Amplifier self-diagnostics: input level, temperature, limiter active
- Overvoltage protection (>250V-400V)
- Ethernet connectivity with Dante^{TM} audio networking
- 2 x 10" neodymium woofers with 2.5" voice coil coupled to 2 x mid phase plugs
- 3" titanium diaphragm neodymium driver coupled to a rotatable horn
- 80 x 60º dispersion horn

2. X102FD FEATURES

The X102FD cabinet is ideal for a multitude of applications. It includes 2500W bi-amplification for the low range woofers, 500W for the high range compression driver and digital signal control by DSP. The manufacturer presets make it easy, flexible and user-friendly. The result is a clean, high quality sound whether for nearfield listening or at full power in larger sites.

2.1. Technical description

The X102FD cabinet comes with DSP control and full range sound delivery thanks to its direct radiation transducers and acoustic bass reflex cabinet. As a full range system, its response is 58Hz-19kHz (-10dB).

It has 3000W continuous amplification (2500W + 500W), thermal protection, output short circuit protection, independent peak and RMS power limiters for each channel, and protection against overvoltage. The DSP includes several presets which can be selected either accessing the cabinet's rear control panel or via the computer with Ethernet connection.

The X102FD cabinet is connected using the XLR balanced connector. Mains supply is through PowerCon. It is built in birch plywood, which has a high resistance to vibrations and humidity with black Polyurea paint coating. The front face is protected by a 1.5 mm thick steel grille with acoustically transparent grey cloth. It includes two in-built back handles for an easy and comfortable transport.
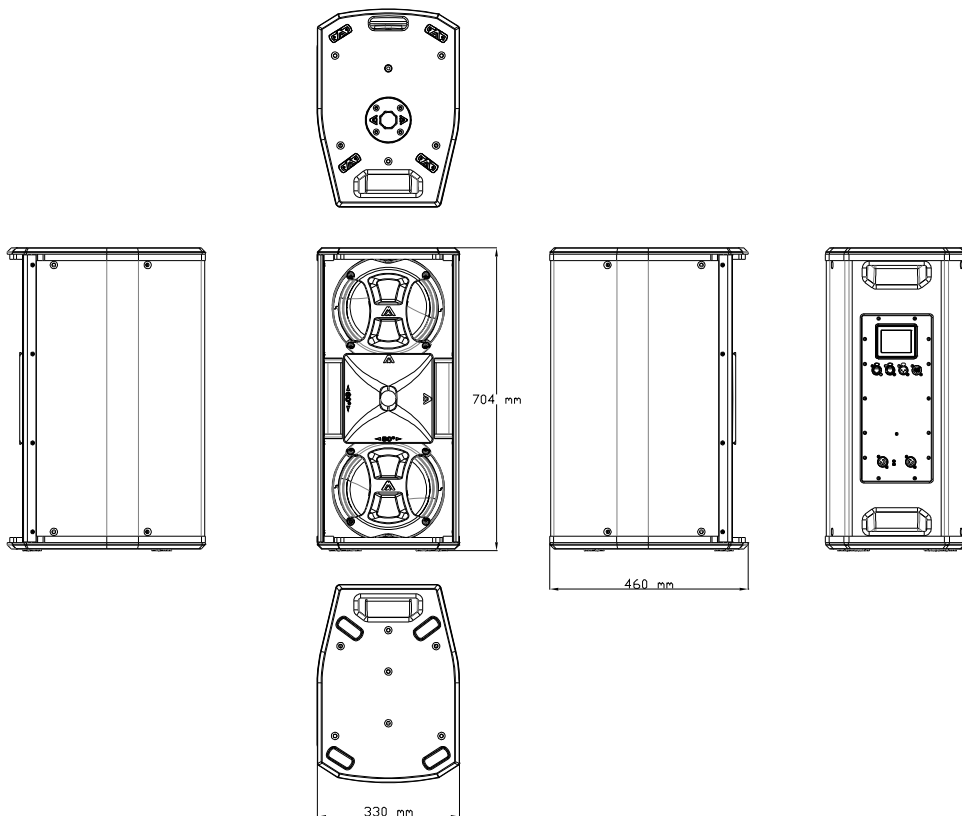

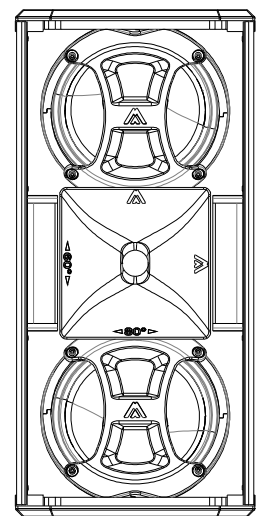**Fig. 1.** X102FD external dimensions

3. PRESETS
The X102FD includes several manufacturer presets for different types of application. The DSP system can also store up to 25 other presets, depending on user requirements.

PRESET 1: FR Flat
Single enclosure without subwoofer,
full range, flat response

[FR Flat]

Fig. 2. Preset [FR Flat] configuration

PRESET 2: FR Longthrow
Several enclosures without subwoofer,
full range. If you need to use the upper
cabinet as Longthrow cabinet please
choose [FR Longthrow] preset.
For the lower cabinet you may use
[FR Flat] preset.
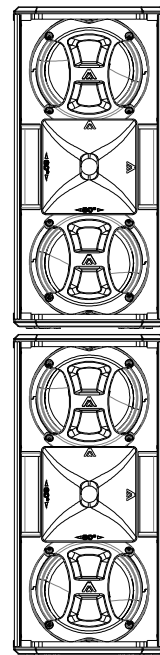
[FR Longthrow]

[FR Flat]

Fig. 3. Preset [FR Longthrow] configuration

PRESET 3: HPF90 Flat
Single enclosure with subwoofer, with HPF90 Hz, flat response.
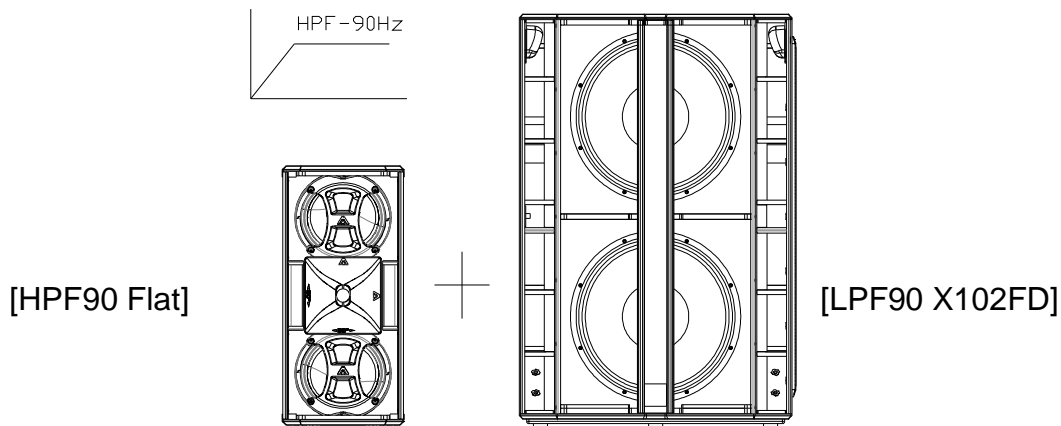Use [LPF90 X102FD] on X218WFD subwoofer.

HPF—90Hz

[HPF90 Flat]   +   [LPF90 X102FD]

Fig. 4. Preset [HPF90 Flat] configuration

PRESET 4: HPF90 Longthrow
Several enclosures with subwoofer,
with HPF90 Hz. If you need to use
the upper cabinet as Longhthrow
cabinet please choose
[HPF90 Longthrow] preset.   [HPF90
For the lower cabinet you   Longthrow]
may use [HPF90 Flat] preset.
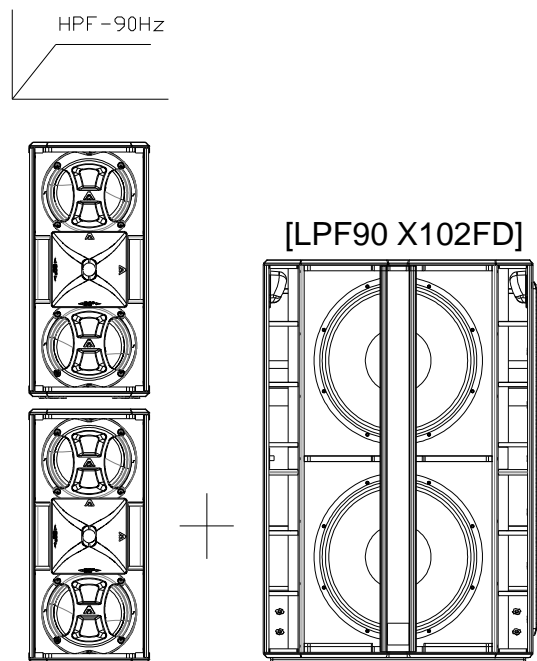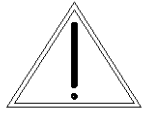
HPF—90Hz

[LPF90 X102FD]

[HPF90 Flat]

Fig. 5. Preset [HPF90 Longthrow]
configuration

⚠ **SYSTEM ALIGNMENT**
The system is pre-aligned from the factory. Do not forget to add the geometric delay depending on the configuration used.

4. CONTROL AND CONNECTION PANEL

The X102FD control panel contains the following elements:

Fig. 6. X102FD control and connection panel

A) TOUCHSCREEN: Displays information about the System status: current preset, network IP, amplifier temperature and signal input level. Allows the user to configure the system without the need of an external computer: IP address setting, Preset selection, Delay, Gain, Limiter, ECO mode on/off, Signal LEDs on/off, etc. For more information about the available functionality, read the Annex I of this manual.

NOTE: The default PIN to access the setup menu is "1234"

B) AC INPUT/OVERVOLTAGE PROTECTION: These LEDS show the status of the AC mains supply.

- **POWER ON:** (Blue) when lit, the equipment is ON and the AC input level is within the permitted range (up to 250 VAC).
- **>250V:** (Red) when activated, the AC voltage is permanently out of the permitted range of the equipment, so it will remain under protection until this condition is solved. Revise your connections and mains power installation and consider that other equipment connected to this line may have been damaged.

C) NETWORK: Two 8-pin RJ45 / EtherCon® compatible connectors for connection to Ethernet network up to 1Gbps. This connection can be used for remote control via software (DSPStudio) and for streaming audio via Dante^{TM}. Please refer to Amate Audio DSPStudio Quick Installation Guide for more information on remote connection. The two connectors are interconnected by means of an internal switch, so they can be used interchangeably and allow the chain connection of several boxes.

IMPORTANT: If Dante is used it is not recommended to chain more than eight units, due to latency reasons.

D) BALANCED INPUT/LINK:
XLR-3 Female balanced signal connector for signal input.
XLR-3 Male connector for parallel connection of various cabinets with the same input signal.
Nominal Input sensitivity: +8dBu (2 Vrms)
Maximum Input Voltage without input compression: +14dBu (4Vrms)
Maximum Input Voltage without clipping: +20dBu (8Vrms)
IMPORTANT: Please always use balanced microphone cable with the following pin assignment:
        1= Shield (Ground)   2= Live (+)   3= Return (-)

E) AC MAINS INPUT/LINK: Mains supply connection via PowerCon.

- Blue connector for AC in.
- Grey connector to feed other units in parallel. Linking up to four units is possible, provided that a quality cable of a minimum section of 3x2.5mm^2 is used. Connecting more than four units in parallel may lead to a voltage drop in the cable that will reduce the equipment performance.
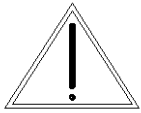
Always use mains power cable supplied by manufacturer.
Never connect the Xcellence cabinets to an unearthed mains supply or by using an unearthed mains cable.

5. CONNECTING

5.1. Parallel connection
Analog Audio Signal:
Connect the signal (mixing desk output) to INPUT on the first unit. Use the LINK output to transfer the INPUT signal to the second unit and thus sequentially for further units. All of the units in this chain must be switched on.

Mains Power:
For the mains connection in parallel use the cable with grey Neutrik PowerCon NAC3FCB at one end and the blue Neutrik PowerCon NAC3FCA at the other end.
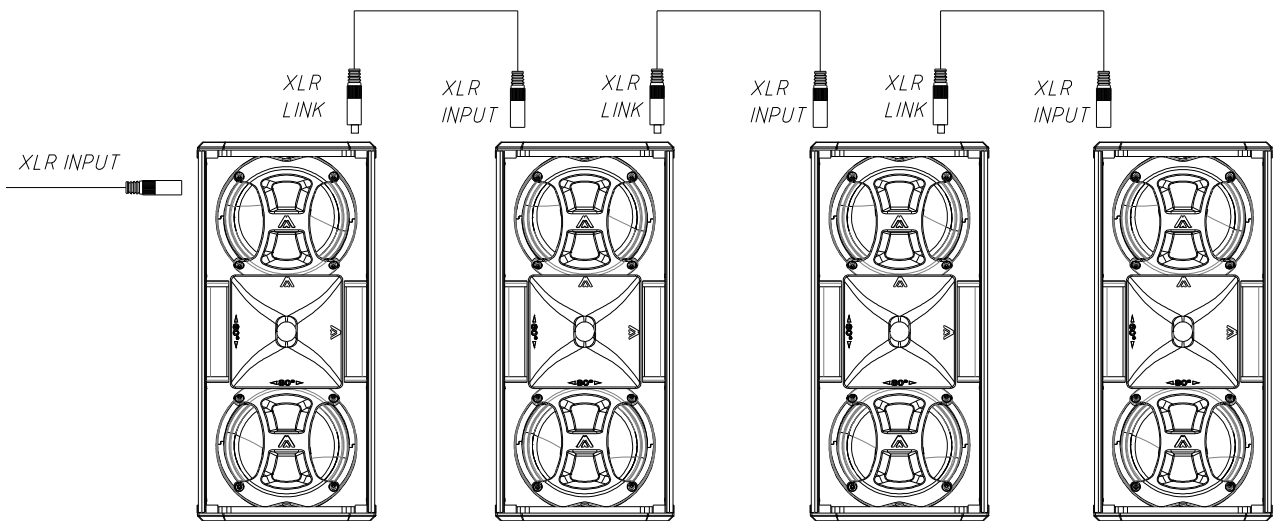

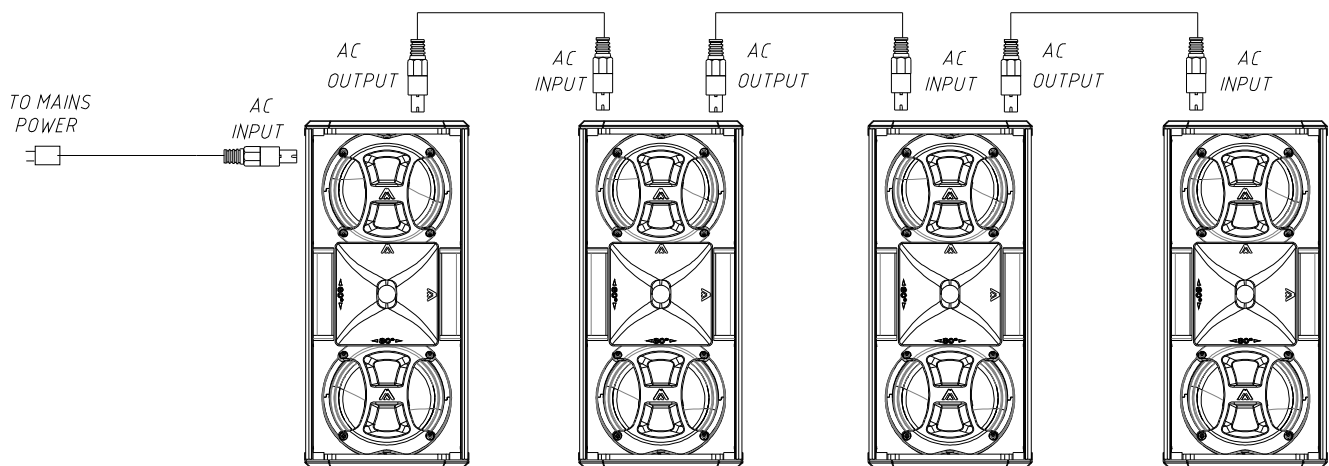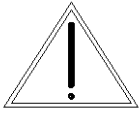**Fig. 7.** Parallel connection for the X102FD (signal)

Fig. 8. Parallel connection for the X102FD (mains). You can link up to four units

⚠ Do not connect more than four X102FD units using the AC Mains link connector. Do not connect Xcellence series units in parallel using PowerCon-PowerCon without earth.

Network:
The two available Ethernet ports via the EtherCon RJ-45 connector are internally switched and both can be used as input and link to other cabinets. All of the units in this chain must be switched on.
The number of units allowed in parallel or daisy-chain depend on whether Dante audio networking is being used.
When using Dante, a maximum number of 8 cabinets is recommended due to latency reasons. When not, there is no specific limit for daisy-chaining (control and monitoring using DSPStudio®).
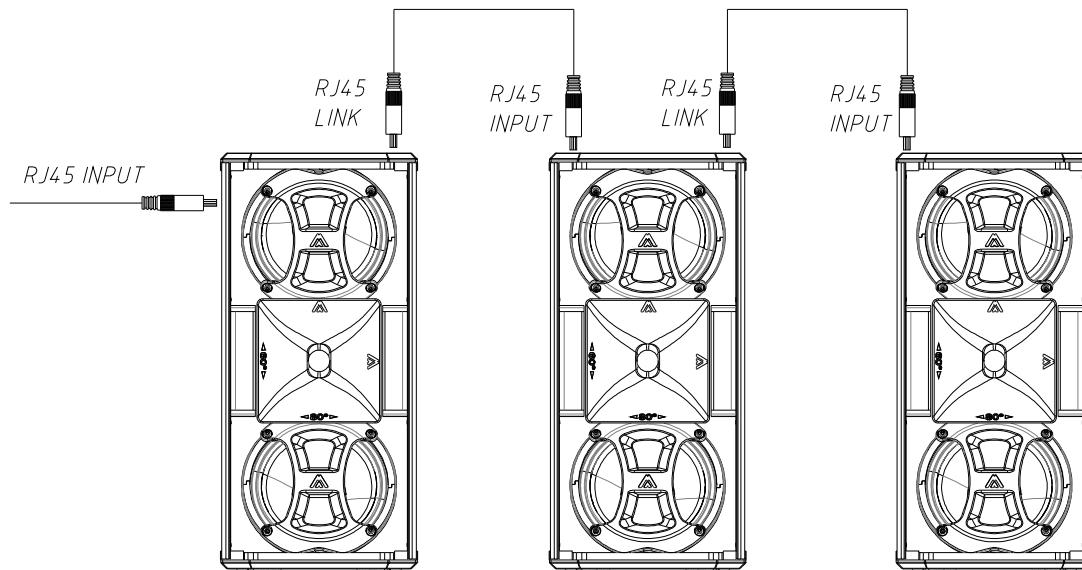

Fig.9. Parallel connection for the X102FD (network). You can link up to eight units when using Dante networking, or more when not using it.

5.2. Parallel connection with subwoofer
You can connect the X102FD in parallel with the X218WFD subwoofers. Please, follow the same parameters as explained in figures 7, 8 and 9.
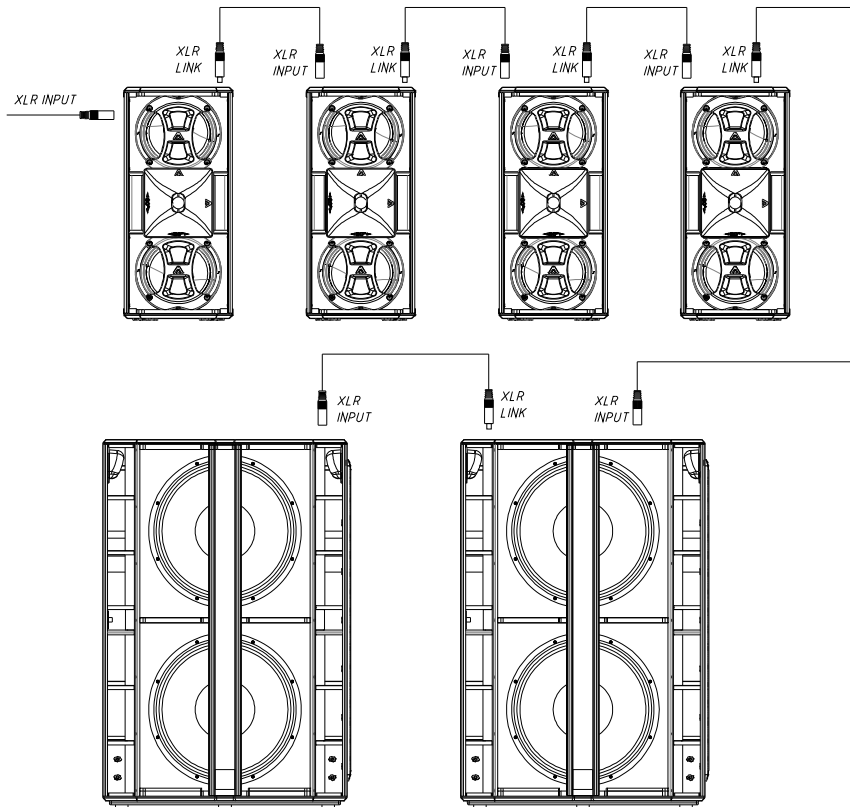
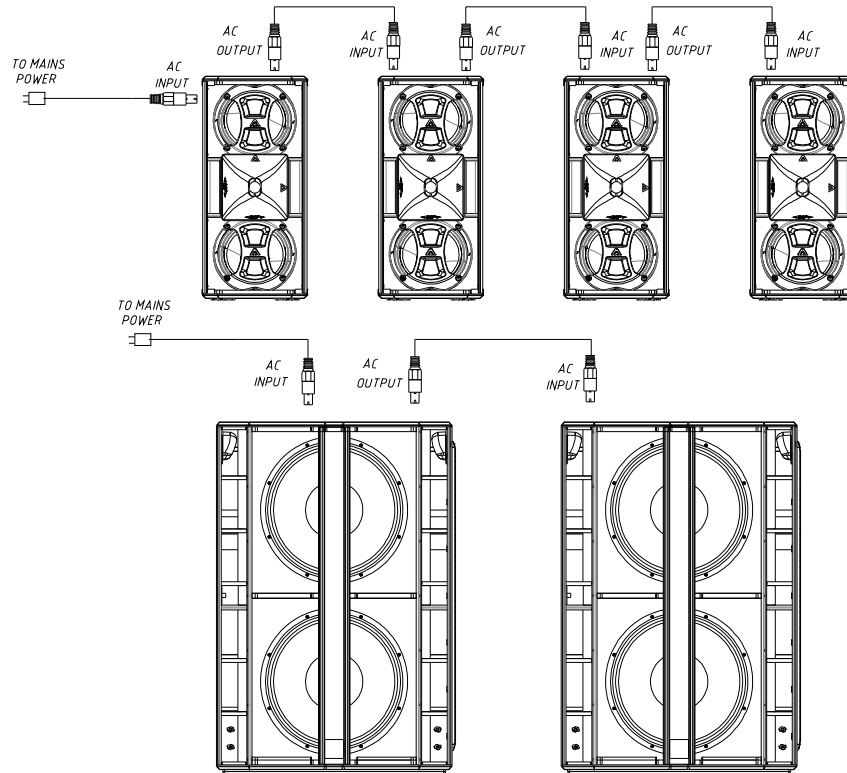**Fig. 10.** Parallel connection for the X102FD and X218WFD (signal)

Fig. 11. Parallel connection for the X102FD and X218WFD (mains). Do not connect more than four units of X102FD or two units of X218WFD using the AC Mains link connector.
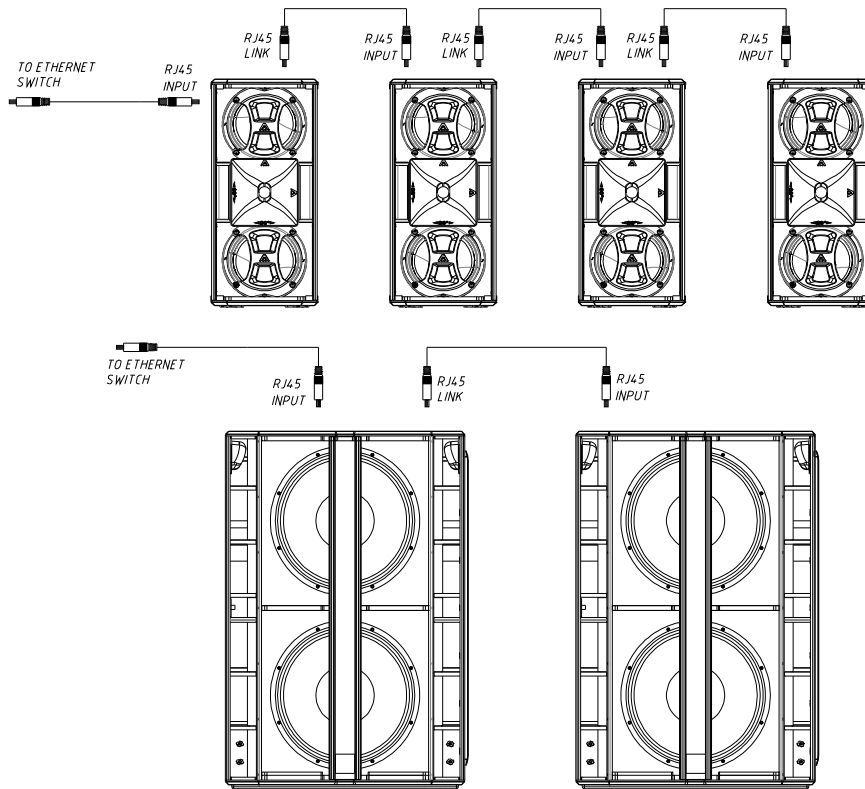
Fig.12. Parallel connection for the X102FD and X218WFD (network). Do not daisy-chain more than eight units of each when using Dante networking (as in the diagram).

6. OVERVOLTAGE PROTECTION
The active Xcellence series models incorporate an exclusive protection by Amate Audio against mains voltage overload and other related problems (loss of neutral, connection between phases, etc). In the mains input an electronic circuit compares the input voltage with a reference value. When the input exceeds 250 Volts, the circuit reacts by blocking the input tension until it returns to its correct limits (230V +/- 10%). When the ">250V" LED lights up red, the unit stops running, until the correct voltage is re-established.

Generally the cause of such an anomaly tends to be a neutral voltage drop or incorrect connection of the equipment to 400V supply. Whenever the overvoltage LED lights up, check the tension of the electrical phases: other devices in the sound system are also at risk of electrical fault and severe damage.

7. MOUNTING AND INSTALLATION
Flying an X102FD system is easy, fast and secure. To perform any operations related to flying the system, read the present document, and act on the warnings and advice given.

Only experienced installers with adequate knowledge of the system and local safety regulations should fly speaker cabinets.

It is the user's responsibility to ensure that the systems to be flown and the flying accessories (such as chains, eyebolts, lock pins...) comply with state and local regulations. They should be regularly inspected and replaced if in doubt.

When flying enclosures from ceiling support structures, extreme care should be taken to assure the load bearing capabilities of the structures. **Do not fly systems from unsafe structures.**

All flying accessories that are not supplied by Amate Audio are the user's responsibility. Use at your own risk. **Remember that no risks should be taken with regards to public safety.**

7.1. Placement

When possible, cabinets should be located in a high position, slightly inclined to the audience. If the loudspeakers are located too low, the listeners at the end of the room will not hear a good sound quality.
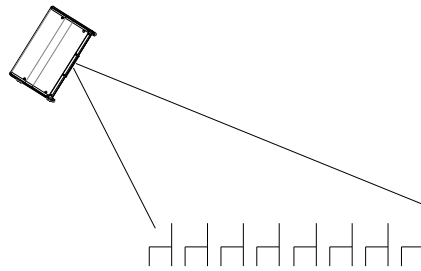
Fig. 13. Flying placement

7.2. X102FD with subwoofer

X102FD is equipped with a 35 mm socket for mounting the speaker on a subwoofer (use SP/CRTL bar). Be careful not to use this system on non-flat surfaces as it may become unstable. X102FD may be used with X218WF subwoofer (both in stacking application or flying application), as well.
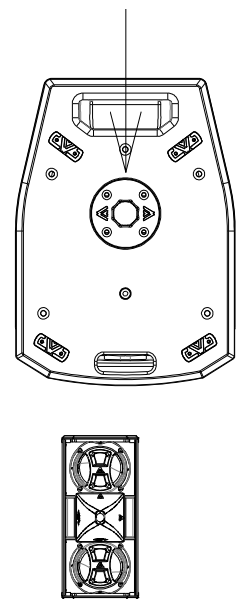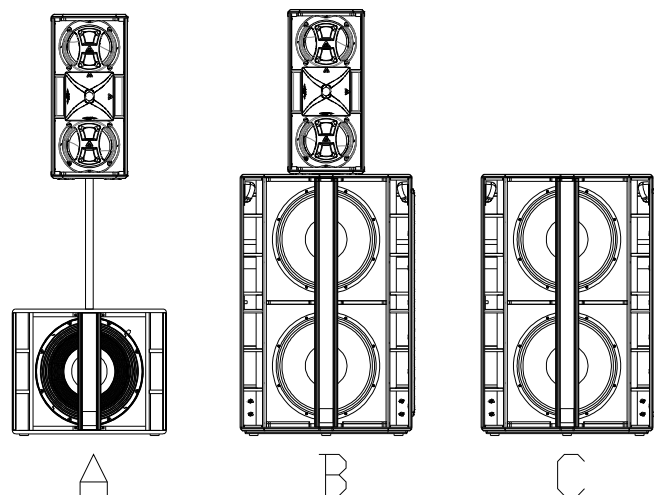
Fig. 14. X102FD 35 mm bottom socket

Fig. 15. X102FD with subwoofer (A: with pole, B: stacked, C: flown)

7.3. HF horn

The HF unit allows a quick change between the different angles of dispersion. In its original position, X102FD HF horn has a dispersion of 80⁰ (horizontal) x 60⁰ (vertical).

⚠️ Each horn has the "80⁰" and "60⁰" marks printed on the 80⁰ horizontal coverage side and the 60⁰ vertical coverage side, respectively.
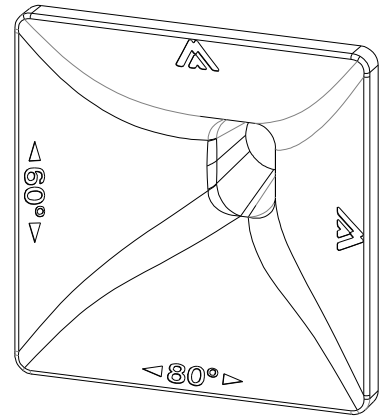

Fig. 16. X102FD HF unit

By default, the HF horn of the X102FD is oriented so that the horizontal dispersion angle is 80⁰ and the vertical dispersion angle is 60⁰. If you need to rotate the horn (and change the dispersion characteristics of the HF unit) read the following steps:

- Remove the front grille. You can do it in two different ways:

  - Remove the screws placed on both sides of the cabinet. Then carefully remove the grille or
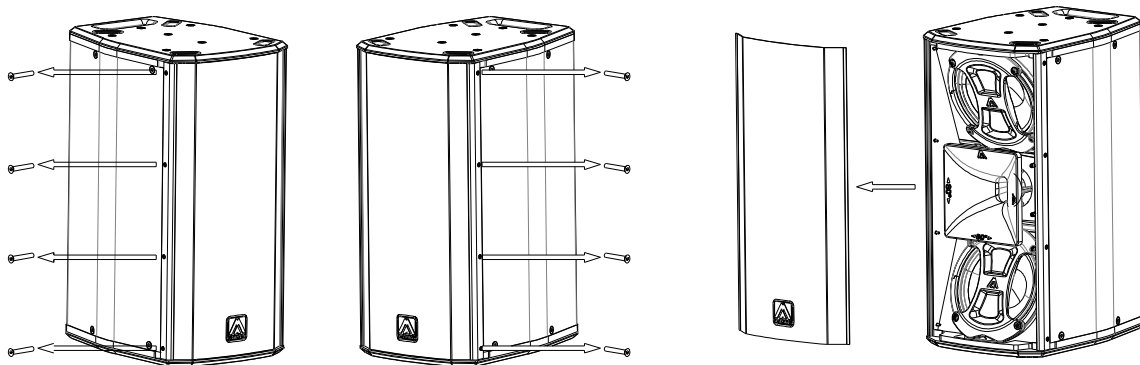
  - Insert your hand through the hole in the lower handle (1), press up (2) and the grille will come out by itself.
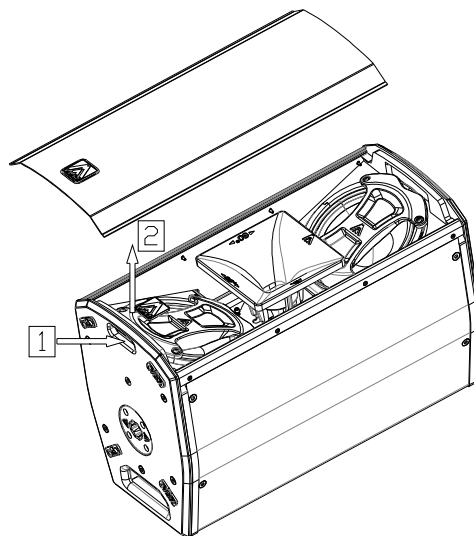
- Pull the horn and turn it 90º. We recommend you to put your hands on points "1" and "2" to make the process easy (edge of the horn)
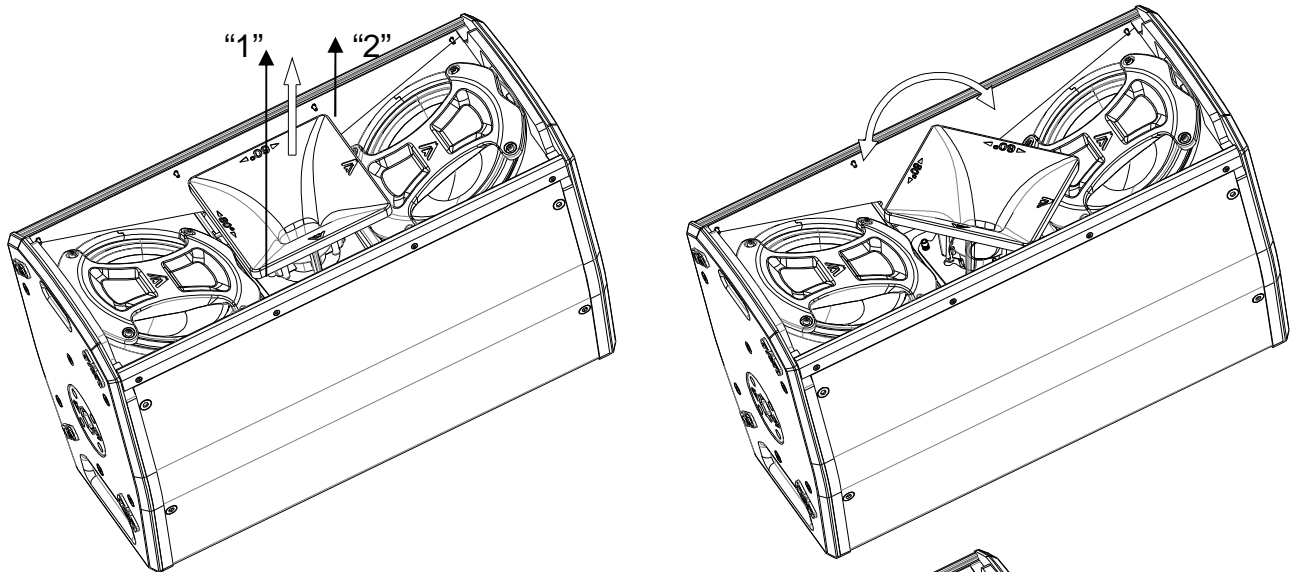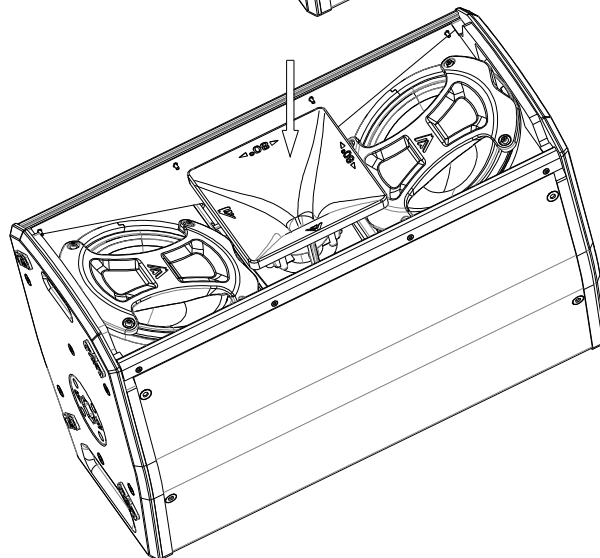

- Push the horn

- Put the front grille. You can do it in two different ways:

  - Place the grille on the front side and screw the screws on both sides or
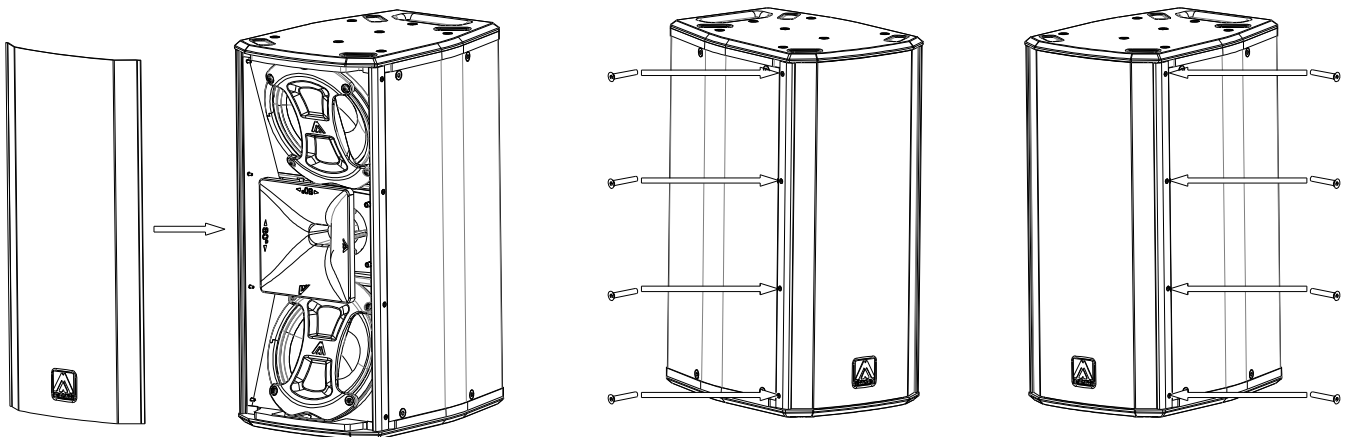
- Insert the grille through the slots of the side metal profiles (1) (2).
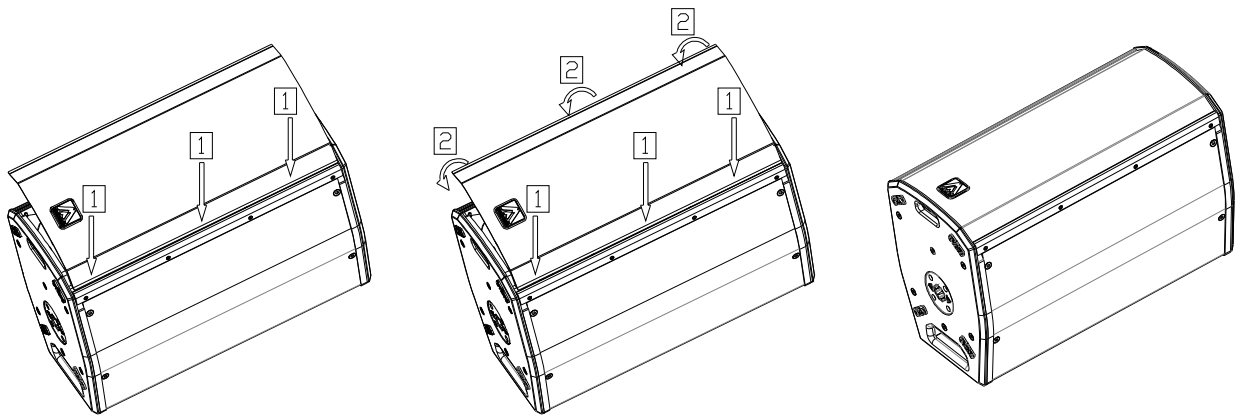
8. MOUNTING ACCESSORIES

8.1. ACRM8
The X102FD provides several M8 flying points. Their correct use will permit the flying in horizontal or vertical position.

Horizontal flying	4&5 or 8&9 (front rigging points)
	6&7 or 10&11 (back tilt points)

Vertical flying	1&2 (front rigging points)
	3 (back tilt point)

Fig. 17. X102FD horizontal and vertical flying points
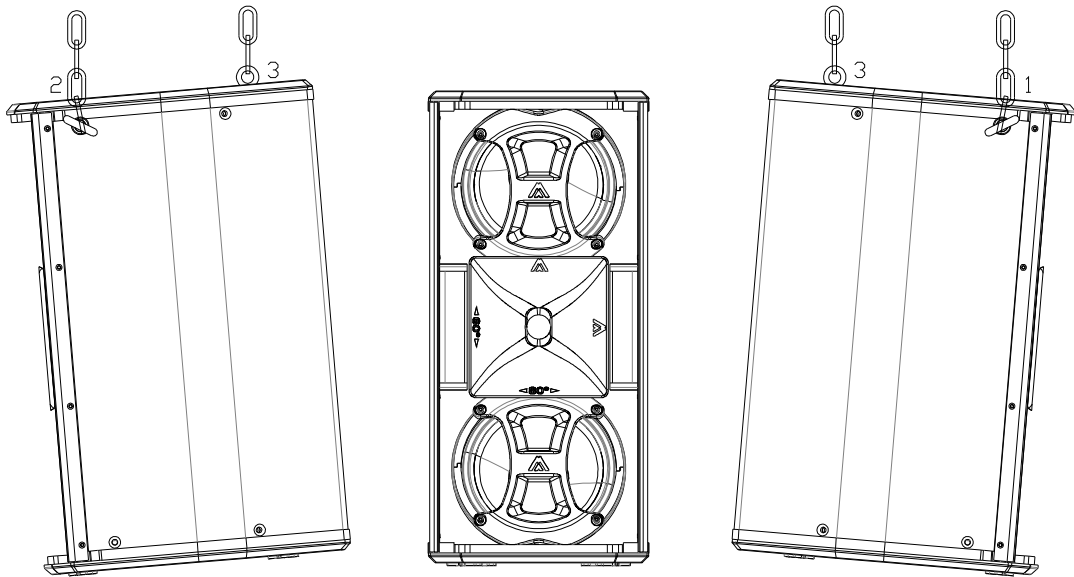
Fig. 18. X102FD vertical flying
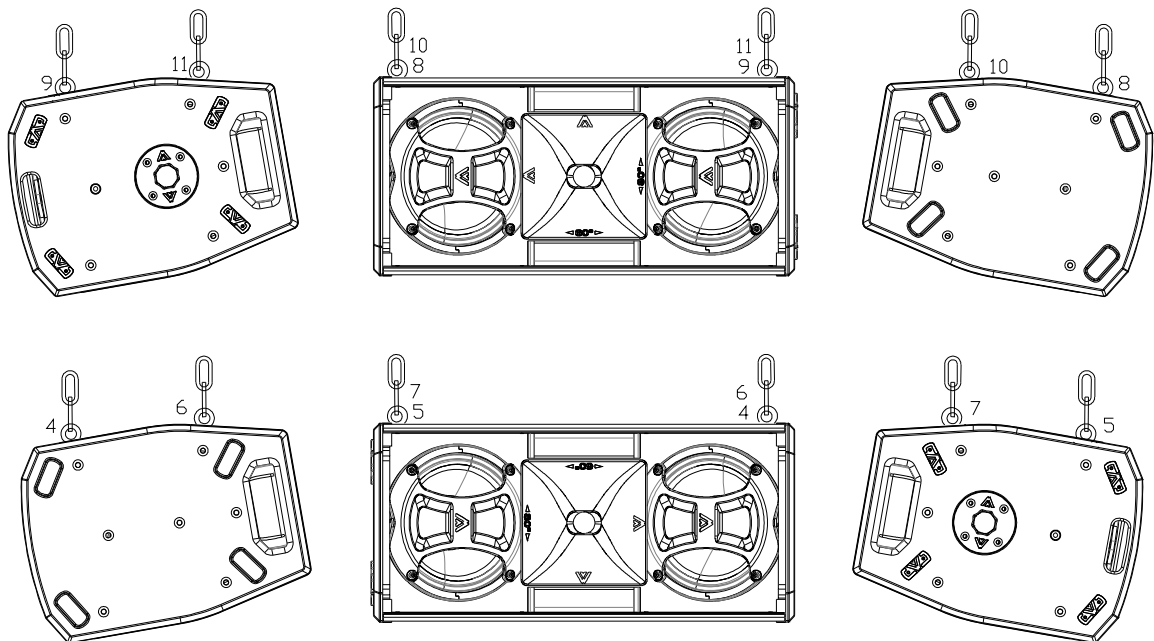
Fig. 19. X102FD horizontal flying

8.2. HR-L102

The HR-L102 is an optional accessory for flying two X102FD, one below the other. (see "HR-L102 user's manual" for more information).
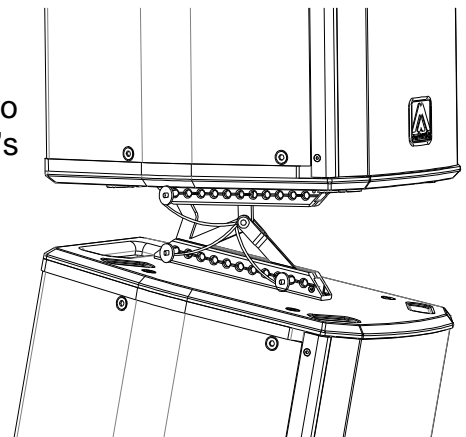
Fig. 20. Flying of two units X102FD with HR-L102

8.3. HR-L

The HR-L is an optional accessory for flying one X102FD (vertical orientation) (see "HR-L and HR-L/GT user's manual" for more information).
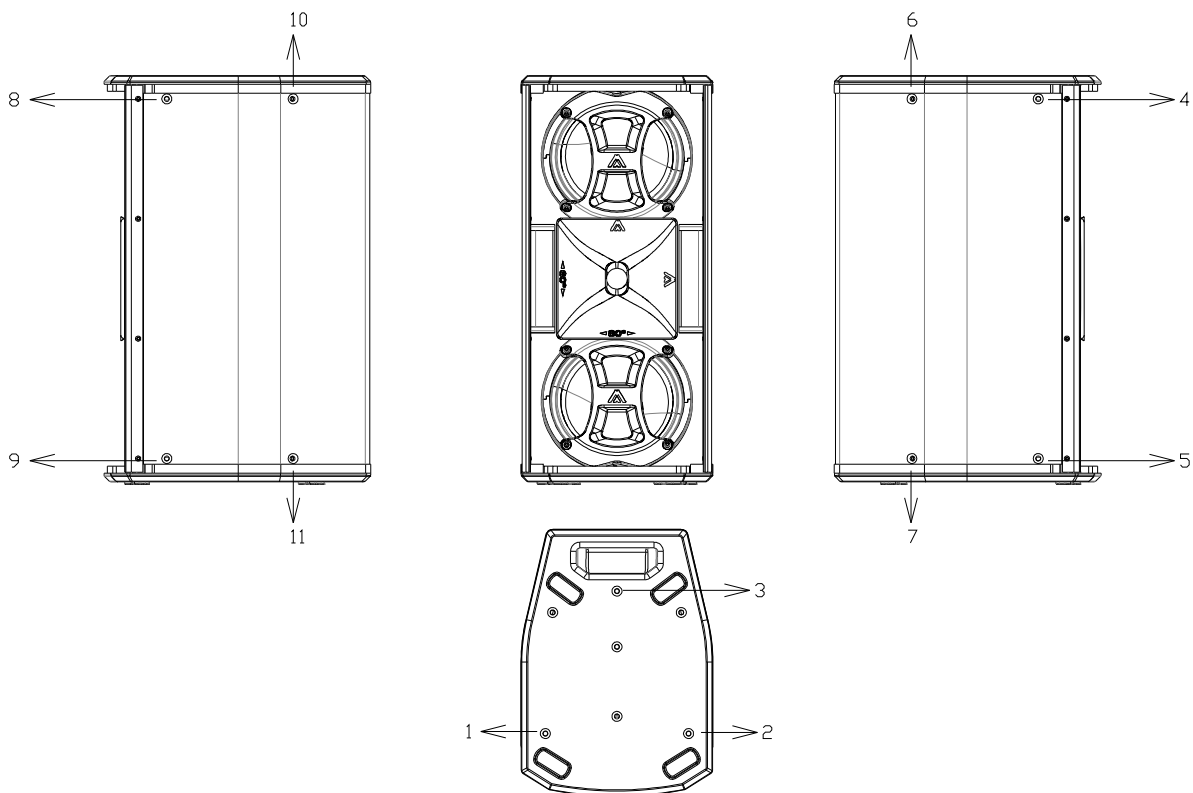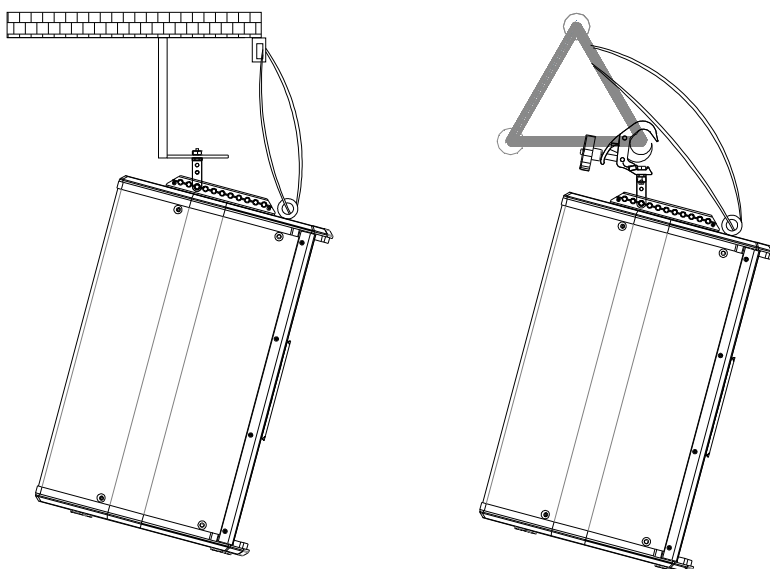
Fig. 21. Flying of one unit X102FD with HR-L and HR-L/GT

8.4. SP-WHR

The SP-WHR is an optional accessory for hanging one X102FD on wall (vertical orientation) (see "SP-WHR user's manual" for more information).
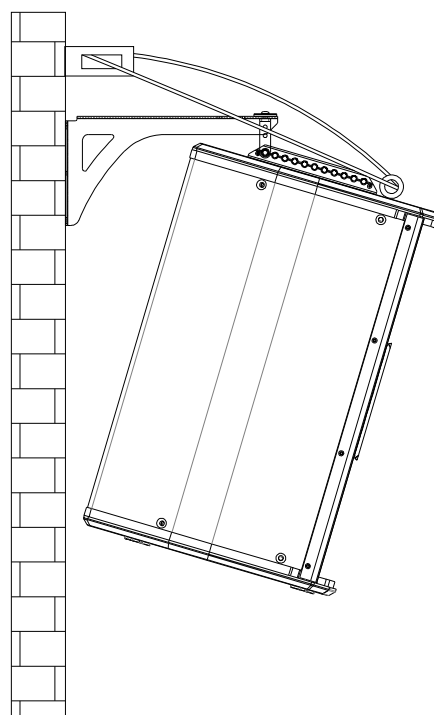
Fig. 22. Flying of one unit X102FD with SP-WHR

9. TROUBLESHOOTING

System not powering up

• Check the Overvoltage Protection leds
  - No LED lit: Check if voltage is arriving to the PowerCon socket, and if mains cable is in good condition. If yes, the overvoltage circuit may be damaged. Contact support.
  - Red (>250V). Voltage arriving to the PowerCon socket is above 250VAC. Check the mains voltage is in the rated limits (230VAC +/-10%). If mains voltage is OK, the overvoltage circuit may be damaged. Contact support.

- Blue (Power On): Overvoltage circuit is functioning properly. If none of the Status LEDs or the touchscreen are being lit, the fuse in the power module may be blown. The replacement of this fuse must be carried out by specialized personnel as it is an internal component of the amplifier module.

No output sound

• Check with the indicators (Signal Present LED & Touchscreen) that the signal is being received by the system.

• Check that the signal cables are in good condition and connected at both ends

• The mixer output level must not be at minimum.

• Check that the mixer channel is not muted.

• Check that the system is not in MUTE or STANDBY (MUTE LED or STANDBY LED) not lit. If yes, go inside the menu using the touchscreen and deactivate them:
- To disable the Standby go to SETUP and select STANDBY OFF.
- To disable the MUTE go to AUDIO, GAIN and push the icon with a loudspeaker.

• Check that the system GAIN is not set to the minimum. To do that, go to the AUDIO setting using the touchscreen, select GAIN and move the slider to the 0dB position.

Distorted output signal

• The system is being saturated with a very high input signal, frequently caused by the same mixer. Check the output level or mixer gain channels.

Poor bass levels

• Check the polarity on the signal connections between the mixer and cabinets. If any of the Pins (1, 2 or 3) have been inverted at the cable ends, this will cause significant performance and sound quality loss.

Noise and Hum

• Check that all the connections to the active units are in good condition.

• Avoid intertwining between mains supply cables or proximity to transformers or Electromagnetic (EMI) emitting devices.

• Check there is no light intensity regulator in the same AC circuit as the unit. ALWAYS connect the sound and light circuits in different phases.

• Check that there is a proper connection to EARTH in the electrical installation.

Forgotten PIN for Touchscreen

• The default PIN is "1234".

• Should you have changed the PIN and forgotten it, follow these steps:
- Turn the system off.
- Turn the system on.
- When the display shows the word "Initializing", press anywhere on the touch screen during at least 5 seconds.
- The PIN will be restored to its default value "1234".

10. TECHNICAL FEATURES

	X102FD
Analog Audio Input	
Sensitivity	+8dBu – 1.94V
Impedance	20kΩ balanced
Audio Network Input	
Type	Dante^{TM} Audio Networking
Channels	1 channel @ 48kHz
Mains Supply	
Type	Univ. switch mode power supply
Nominal input	85-265 VAC/45-65 Hz
Average current draw	3.3 A
AD/DA converters	24 bit / 48 kHz
DSP architecture	64 bit
Frequency response (-10 dB)	58Hz-19kHz
Maximum output level (1m/continuous)	136 dB
Amplifier (program)	2500+500W
Nominal directivity (-6dB)	80º x 60º
Components	
LF	2 x 10" neodymium woofers (2,5" voice coil)
HF	1 x 3" titanium diaphragm neodymium driver
Cabinet	
Type	Bass-reflex
Height	704 mm
Width	330 mm
Depth	460 mm
Weight (net)	32 Kg
Connectors	2 x AC PowerCon (input, link)
	2 x XLR (input, link)
	2x Ethercon RJ45 for Ethernet/DANTE (connection/link)
Material	Multilayer birch plywood, steel front grille with acoustic grey cloth
Finish	Hi-resistance black Polyurea coating and protective rubber profiles

ANNEX I. TOUCH PANEL OPERATION

Amate Audio's X102FD internal DSP parameters could be tuned using its integrated LCD touchscreen. The main specs of the screen are:

- TFT-LCD screen

- 320x240 pixels resolution

- Vision angle of 180 degrees

- 16.7 Millions of colours

I.1. Main screen

Just after turning on the loudspeaker unit, a first screen shows the: Amate Audio's logo, firmware version and the processing version. Once the system is initialized, a welcome screen shows a picture of the system and the serial number.

When all the start-up process finish, the main screen is shown like:
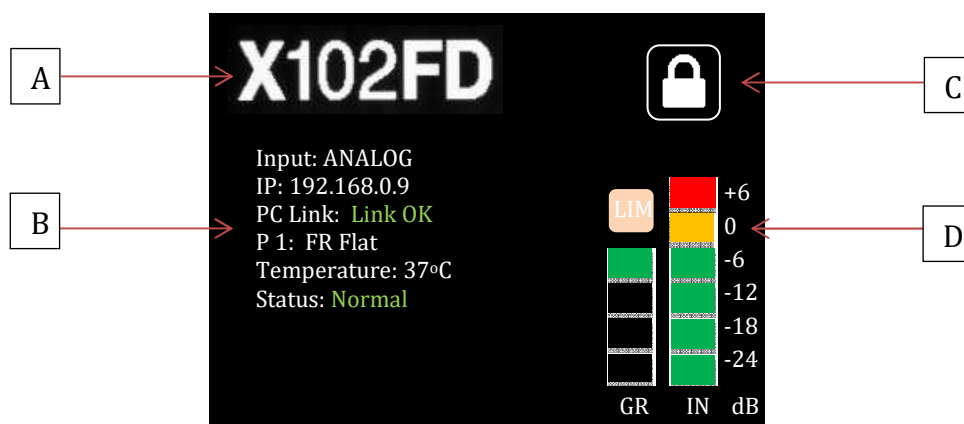
A. Loudspeaker model

B. System status

   o INPUT: Shows the selected audio source. The options are: **ANALOG** for XLR analogue input, **DANTE** for the RJ45 VoIP Dante digital audio input or **AUTO** for an automatic selection of the audio source. In presence of Dante VoIP audio a message *Flow OK* is shown

o <u>IP</u>: IP address of the Ethernet module

o <u>PC Link</u>: Connection status with DSP Studio. There's three states: **Initializing** when IP is configuring, **Waiting** for no connection established and **Link OK** when the unit achieves successful connection with DSPStudio

o <u>P *X/M_X*</u>: Current preset loaded into the DSP. For user's memories the name starts with *M_*

o <u>Temperature</u>: Internal amplifier temperature

o <u>Status</u>: DSP status indicator. The options are: **Normal** for common operation, **Mute** when DSP have been configured for muting the audio input, **Standby** for this energy saving mode and **Protect** when the internal processor is protecting the loudspeaker unit against over-voltage.

C. PIN lock indicator: If a PIN lock was entered in settings, the lock icon is shown closed. In this case the unit will claim for a valid PIN. For unlocking the unit, push on the lock. When the unit is unlocked, the lock will be open.

D. Signal indicators: The right one shows the current input signal level (**IN**) in decibels. The left one shows the current status of the Limiter. LIM icon light on when the limiter is working. **GR** stands for Gain Reduction; it shows the gain reduction Limiter is applying for trying to protect the loudspeaker from *clipping.*

I.2. Settings screen

For accessing to the settings menu just push anywhere in main screen
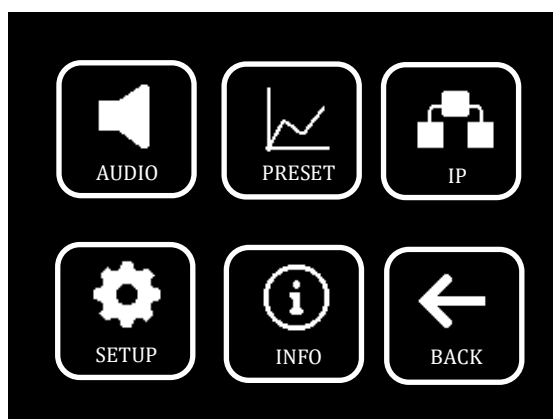
Each sub-menu contains the following settings:

- AUDIO: General audio parameters set-up

- PRESET: Preset selection. It's possible to save user's presets.

- IP: Configuration of the Ethernet's module in order to enable communications with our control software DSP Studio.

- SETUP: Other unit's parameters configuration

- INFO: Detailed system information and system status

- BACK: Go back to main screen

I.3. AUDIO submenu

- GAIN: Gain reduction setup. It could be configured using a *fader* with a resolution of half a dB. Moreover, a mute button is available. An X in front of the speaker icon is shown when the unit is muted.

- LIMITER: Limiter threshold configuration. A Gain Reduction level indicator is available for proper threshold check.

- DELAY: Adjustment of the time shift among input and desired output. There's two ways of setting it: In meters or in milliseconds. Simply we've to push in the corresponding box. The space-time conversion is automatically computed. In addition, a polarity control button is available: **+** for positive polarity, **-** for negative polarity.

- EQ: This sub-menu helps to check the status of current filters in the DSP. These filters are applied on the top of the chosen base preset. An Ethernet communication with DSP Studio is mandatory in order to enable each filter. For the enabled filters a bypass button is available for controlling each one directly from the loudspeaker unit.

- SAVE: Access to DSP internal memory. Here we can save all the audio configuration in one of the free internal memory space the unit has. Push on the *Memory* box for choosing one available. Push on *Memory name* for naming it. After the previous steps, push on Save button for writing on the DSP the memory

- BACK: Go back to settings screen

I.4. PRESET submenu
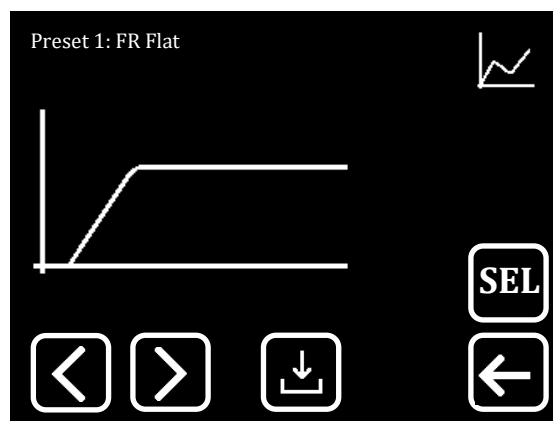
The loudspeaker unit contains several sound presets we can check inside this submenu. The browsing arrows allow us to change between presets. Press *SEL* button for loading the preset in the DSP. There is a shortcut for internal memory, so we can save a preset straight from this sub-menu.

I.5. IP submenu
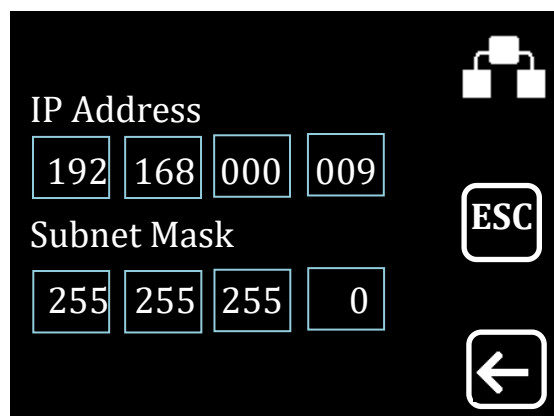
In this screen we can configure the internal Ethernet module. This loudspeaker unit doesn't have *Dynamic Host Configuration Protocol,* so is necessary to set up a fixed IP address. We recommend using the same values shown in the top image for the loudspeaker unit. In the control PC/laptop we recommend using with the same subnet mask and IP 192.168.0.1

I.6. SETUP submenu

The SETUP submenu is composed of two pages, which can be browsed using the NEXT/BACK buttons.
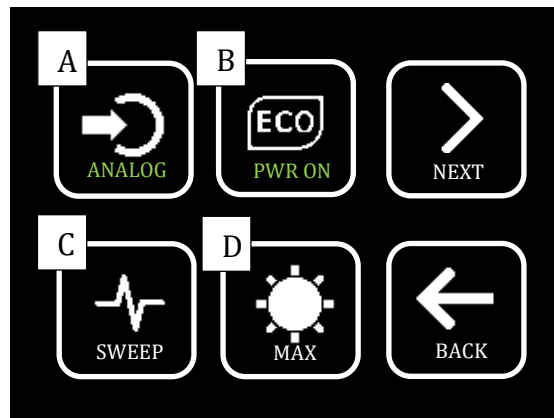
A. Input selection: Here we can choose which signal input the internal processor will use. The options are: ANALOG, DANTE or AUTO. In AUTO mode the unit automatically choose the signal input according to the presence of signal. If a conflict happens (Simultaneously use of analogue and digital connectors) the unit priories digital AoIP Dante signal. In case Dante signal is no longer available, the unit will switch to use the analogue input.

B. ECO mode: Enabling/disabling the energy saving mode. The options are:

   o PWR ON: The energy saving mode is enabled

   o Standby: The energy saving mode is disabled

   o Auto: The energy saving mode will be enabled automatically after three minutes without input signal

C. SWEEP: Diagnosis mode. The loudspeaker will emit frequency sweep.

D. Backlight: Three backlight intensities: MAX (Maximum), MED (Medium), MIN (Minimum)

On the next page:
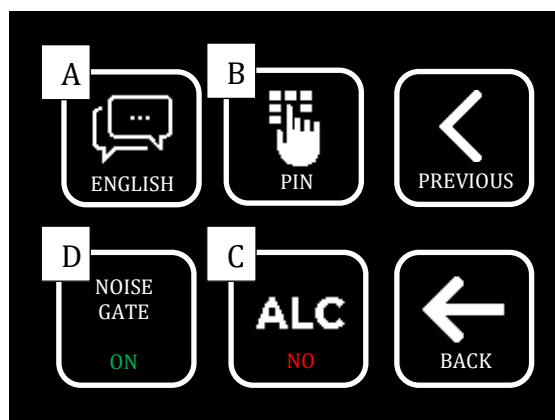
A. Language: Select the interface language. The options are: ESPAÑOL, CATALA or ENGLISH.

B. PIN lock: Configure the access code for the unit when locked. When the loudspeaker unit is locked, a closed key lock icon is shown in the main menu. Push on it for unlocking the unit.

C. ALC: Enabling/Disabling the *Automatic Loudness Compensation* algorithm. This algorithm have been developed basing in psycho-acoustical studies stating the human earing losses sensitivity to low and high frequencies when the sound pressure level increases. It compensates this non-lineal behaviour augmenting low and highs when signal input decreases. We don't recommend using the algorithm for live sound applications but it's perfect for fixed installations for piped music applications.

D. NOISE GATE: By default, this unit has a built-in noise gate, that reduces the noise of the system when there is no signal at the input. To deactivate the noise gate, press this button (Word OFF will be displayed)

I.7. INFO submenu

Here we can find advanced information about the unit, as well as the most relevant configurations parameters.

DECLARATION OF CONFORMITY

In accordance with EN 45014:1998

Manufacturer's Name:	"AMATE AUDIO S.L."
Manufacturer's Address:	C/ Perpinyà 25, Polígon Industrial Nord 08226 Terrassa, (Barcelona), SPAIN
Brand:	"AMATE AUDIO"

We declare under our own responsibility that:

Product:	Active speaker systems with DSP. Audio apparatus for professional use
Name:	Xcellence X102FD

Conforms to the following product specifications:

Safety: IEC 60065-01 + A1

EMC: EN 55022:2006
EN 55103-1:2009
EN 55103-2 2009
FCC Part 15

WARNING:

In accordance to EN55022, this is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Supplementary Information
The product herewith complies with the requirements of the:

Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC
RoHS Directive 2002/95/EC
WEEE Directive 2002/96/EC

With regard to Directive 2005/32/EC and EC Regulation 1275/2008 of 17 December 2008, this product is designed, produced, and classified as Professional Audio Equipment and thus is exempt from this Directive.

Date of issue: October 12th., 2020

Signature:

AMATE AUDIO S.L.
N.I.F: B59103481
Violinista Vellsolà, 18
Tel: +34 93 736 23 90
08222 – Terrassa
Barcelona – SPAIN

Juan Amate Lopez
General Manager

C E

Conformity
Marking

Amate Audio S.L.

EXPORT & CUSTOMER SERVICE
Perpinyà, 25 · Polígon Industrial Nord
08226 Terrassa · Barcelona – SPAIN
T. +34 93 735 65 65
export@amateaudio.com

R&D, FACTORY AND MANAGEMENT
Violinista Vellsolà, 18
08222 Terrassa · Barcelona – SPAIN
T. +34 93 736 23 90
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Perpinyà, 25 · Polígon Industrial Nord · 08226 Terrassa
T. +34 93 735 65 65 – F. +34 93 735 60 48 –
info@amateaudio.com

R&D and FACTORY:
Violinista Vellsolà, 18 · 08222 Terrassa

Barcelona – SPAIN

www.amateaudio.com