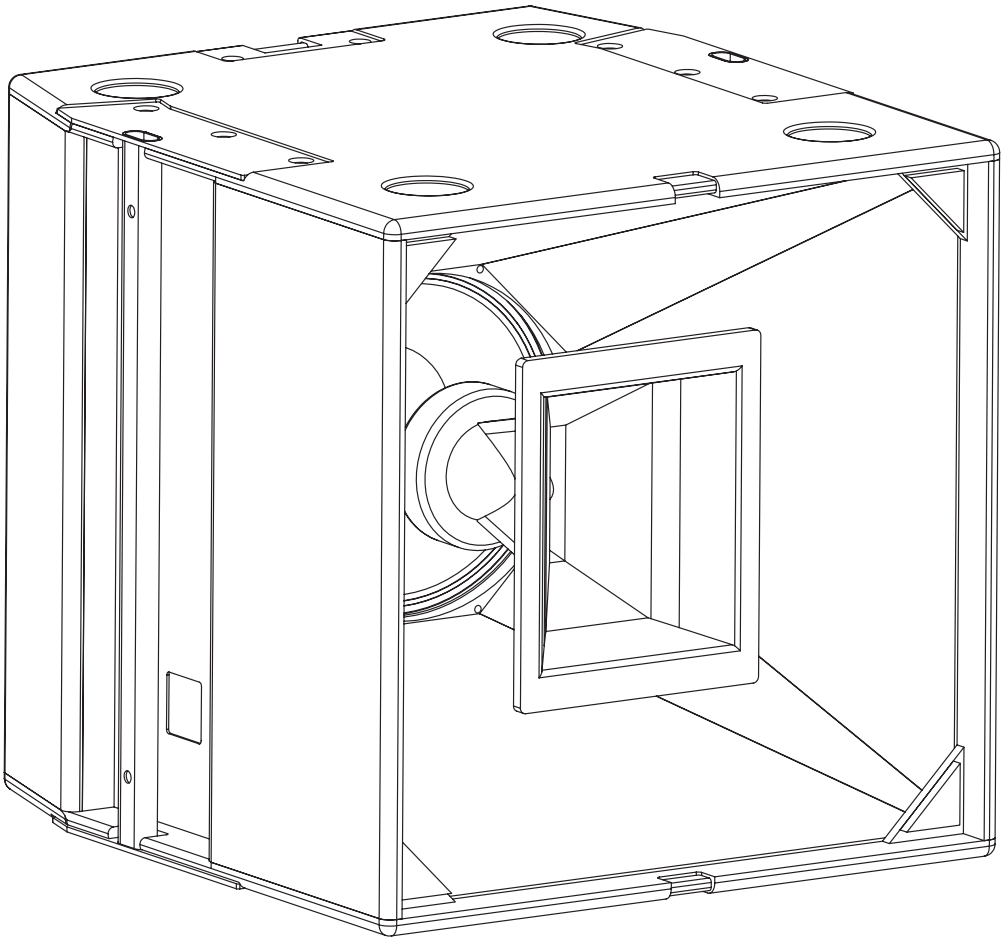

CLASSIC LINE

User's manual

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1. Safety instructions

It is very important that loudspeakers systems are used in a safe manner. Professional loudspeakers are capable of producing extremely high sound levels and should be used with care. Hearing loss is cumulative and can result from levels above 90 dB if people are exposed for a long period. Never stand close to loudspeakers driven at high level. For stacking, ensure that the floor or stage is level and solid. Do not stack speakers too high outdoors where winds could topple the stack.

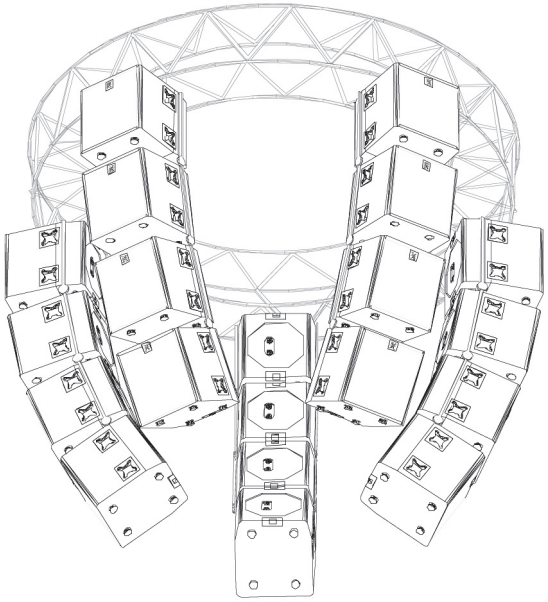


Fig. 1 Classic Line systems, flying configuration

Flying systems should only be assembled by a trained and experienced crew, working in association with professional riggers. All **Classic Line** custers must be hung from secure and appropriately load rated rigging points.

2. General information

The X-Treme Classic Line loudspeaker systems are highly efficient touring products suitable for a wide variety of medium and large scale live sound applications.
XTH is a highly efficient two-way (MF-HF) speaker with a 12" horn loaded midrange loudspeaker and 2" compression HF driver. The coaxial structure of the two medium-high sections allows an extraordinary degree of freedom from phase distortions and also controls the polar diagram perfectly. The compact design and angular response free from obstructive side lobes allow the arrangement of both simple as well as complex horizontal and vertical clusters.

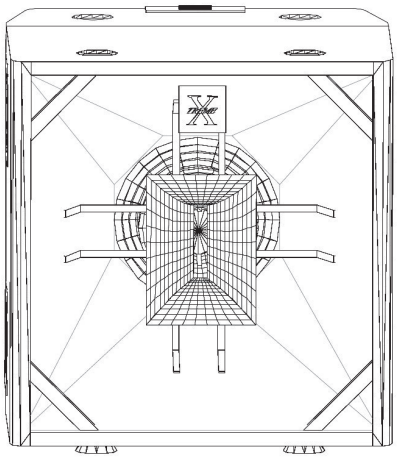


Fig. 2 XTH loudspeaker system

Originally conceived for live concerts applications, the XTH element can equally well be used wherever the best reproduction of voice, songs and solo musical instruments is required.
The cabinet is made of 0.6" (15 mm) thick birch wood able to withstand any kind of mechanical stress without vibrating; it is designed to make cluster installations starting from single modules easier in accordance with the sound dispersion angles on the horizontal plane.
Being the XTH system conceived to reproduce the frequency range between 150 and 18k Hz, we recommend use of woofer-type acoustic speaker, such as the **XTL**, to allow full extension of the frequency response on low notes.

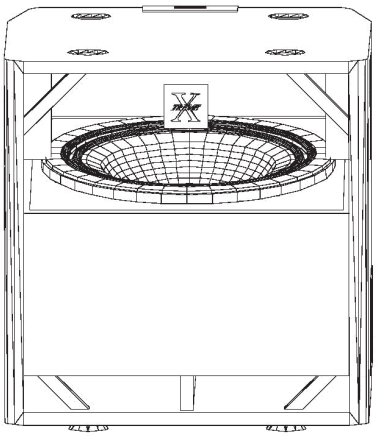


Fig. 3 XTL woofer

Purposely designed to reproduce the first octave of the band, the XTL is the natural complementary system of the XTH loudspeakers. Its overall dimensions are designed to make the arrangement of array set up with the other speakers of the series easier. The XTL is fitted with 18" woofer with high standard dynamics able to support acoustic power as high as 1700 Watt. The XTL cabinet is made of plywood with very high structural density and rigidity. The development and the section of the loading were designed according to loudspeaker parameters in order to guarantee the best total efficiency and extension response. Finally, in order to complete the series with a subwoofer able to provide reinforcement on the deeper low frequencies, the **XTS** model has been developed.

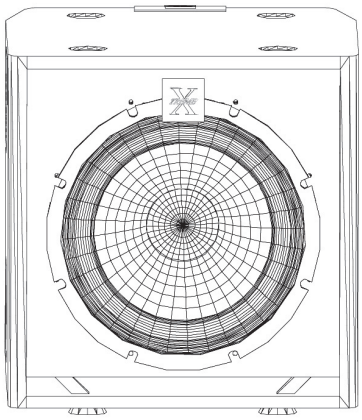


Fig. 4 XTS subwoofer

The XTS is equipped with high dynamics 18" woofer mounted in direct radiation in order to reproduce the frequency range between 30 and 90 Hz. Cabinet dimensions are the same as those of other loudspeaker system of the series, so as to facilitate the stack use.

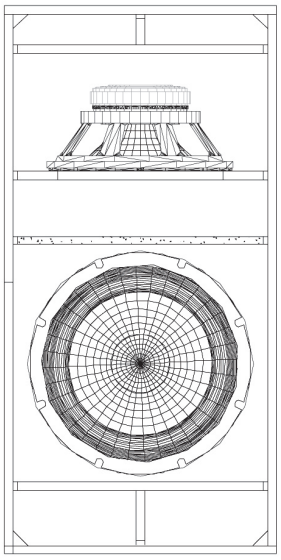


Fig. 5 XTHPS33 double subwoofer

The **XTHPS33** is a double subwoofer which combines an 18" in reflex configuration and a 15" in pass band system. The 18" is dedicated to the lowest frequency range, while the 15" works better in higher octaves. In this way, the first octaves frequency extension (20÷40 Hz) is coupled with the "punch" effect typical of the second and third octaves (80÷100 Hz), thanks to the pass-band configuration. All is made to increase efficiency, to reduce distortion, to get a good "punch" effect without renouncing the range of frequency response.
The correct use is with electronic crossover set at 150 Hz with 24 dB/oct slope. The best performance is with an amplifier able to deliver power into 4 ohm with high current capability.
The subwoofer height corresponds exactly to two XTH and XTL stacked speakers.

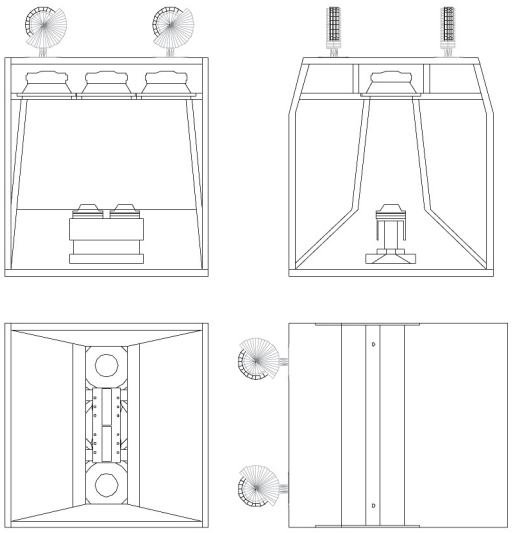


Fig. 6 Cross section of the long throw module XTLT

The **XTLT** is an extremely efficient 2 way system with a horn mid-range with three 6" drivers and a tweeter with two 1" throat diameter compression drivers. The system is a mid-high frequency *long throw* module, designed to produce a planar wave front from an 8"x1" rectangular throat. It employs a pair of compression drivers and three mid-range speakers; the special *dual wave guide* contains a shared vertical slot able to radiate a coherent planar wave front. It can be used as long throw module for traditional "Classic Line" clusters. The main advantage of these types of system is the energy savings arising from the narrowing of the vertical directivity and having highly directive sources that, in addition, generate sound waves that attenuate by only 3 dB for every doubling of distance as opposed to 6 dB for conventional systems. The XTLT neodymium drivers are mounted on a special aluminium heat sink for increased power handling and reduced power compression. While the *planar wave driver* is a distinctive new transducer engineered to radiate a coherent planar wave front from a rectangular piston without internal diffraction, the XTLT horn loading system uses more conventional wave guide design techniques to reshape the compression driver's spherical wave front into planar wave front.

3. Instructions

The "Classic" configuration consists of the XTH, XTL, XTS and XTLT speakers which can be set directly on the floor as well as suspended. The back angle of the cabinets allows the correct arrangement of the speakers, so that the nominal scattering values in the horizontal plane are respected. A homogenous horizontal covering without any phase interference is made possible by the application of the configuration formed by two XTH and XTL systems. Floor stacks are generally made by placing the loudspeaker systems directly one on top of the other. Specifically, as there is no vertical angulation among the different XTH speakers in a stacked configuration, a coupling effect on the medium-high frequencies is obtained, increasing the vertical directivity and allowing the achievement of an extraordinary coverage, even at a long distance.
Classic Line clusters can be created by placing different XTH speakers side by side, with angles between twenty and thirty degree on the horizontal plane.
In case of angles of lower degree between cabinets, you will get a lower horizontal coverage and a higher acoustic pressure level in the central axis of the cluster.
In any case the horizontal plane coverage should not exceed the listening area in order not to send out emissions to areas that might create undesired sound reverberation and interference or that may lie outside the musical event.
The positioning of a vertical cluster of loudspeaker systems depends on both the height of the system from the floor as well as the required coverage area. We generally recommend you employ an angle of *five degree* between two adjacent module cabinets in a suspended cluster.

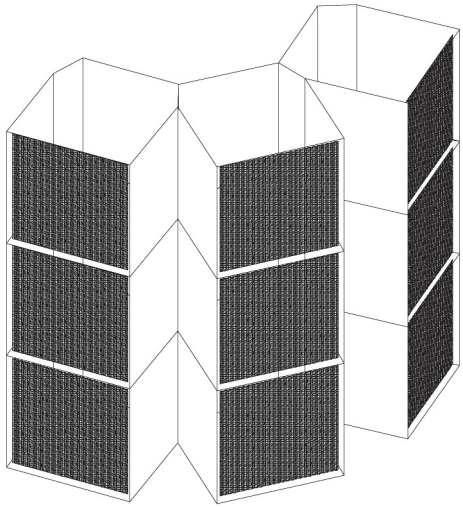


Fig. 7 Clusters for a 180° horizontal coverage

4. Stacking or flying?

Although suspended systems are generally preferred by most sound engineers, there are good arguments to support both solutions. In many cases the answer is dictated by logistics that are venue-specific, i.e. sometimes it is not possible to hang the PA.
Stacking on stage lowers the perceived sound image to stage level which is beneficial in small venues. Stacking also offers more low frequency SPL due to enhanced floor coupling and, since XTH has less SPL attenuation from the front to the back of the audience than traditional systems, this allows a stacked system to project further. In addition, for geometric reasons a stacked array can provide more extended vertical coverage than a flying one. For these reasons, stacking makes sense in small configurations where only a few elements can optimize audience coverage.
Flying systems are the best solution to achieve uniform sound pressure level and even tonal balance over the entire audience only if the number of elements arrayed is sufficient to provide the necessary front to rear coverage. Flying is also an excellent solution for sightline problems - that commonly occur - and provides better high frequency penetration into the audience with reduced shadowing effects. For hung configurations, additional speakers are added to cover center or front-fill requirements and to help pull the localization image down towards the stage for the first 10-20 rows of the audience.

5. Stacking Guidelines

The sound designer must know if the audience is standing or seated, but the bottom of the cluster should - in any case - be higher than the heads of the first rows of the audience and the lowest element tilted downwards.
If the cluster is too low, the first rows receive too much SPL and audience members directly in front of the system act as an acoustic screen for the rows behind them (*shadowing*). Ideally, the MF-HF speakers should be slightly above the audience (not lower than 2 m or 6.5 ft above floor level), with a proper volume regulation as necessary.
Note: for extended bandwidth applications, a stack of 2 XTHPS33 subwoofers, in horizontal position, provides a convenient stacking platform at a height of 1.2 m above ground level.

6. Subwoofers

Subwoofers are used to extend the frequency response of the standard system (XTH+XTL) up to to 25-30 Hz and to increase the overall SPL without increasing the potential for audience hearing loss.

7. General Guidelines for the use of subwoofers

The number of subwoofers to be used depends on 3 parameters:
1) Number of XTH-XTL elements. The standard number of XTS subwoofers recommended is a **1:1** ratio.
2) Type of program material. Standard subwoofer ratios are recommended for classical music or for background music. For these applications, subwoofers act as a low frequency extension for XTH+XTL system and provide approximately 6 dB of low frequency contour. In this case, the overall system functions as an extended bandwidth 4-way system in tri-amplification. For more demanding rock music applications, a ratio of **1:2** (1 XTH+XTL - 1 XTS) is recommended to provide a more suitable low frequency contour).
3) Type of venue or installation. In open-air, when subs are ground stacked, the quantity remains standard.

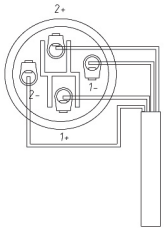
8. Amplification

X-Treme Classic Line speakers are designed to be used with professional power amplifiers capable of producing the following outputs into 8 Ohm:
XTH: 550 W
XTL: 850 W
XTS: 1200 W
and into 4 Ohm:
XTLT: 460 W
Care should be taken to avoid amplifier clipping. It is important to understand that a low power amplifier driven into clipping is more likely to damage a loudspeaker then a higher power amplifier used within its ratings. This is because music signals have a high peak-to-average factor. When an amplifier is severally overdriven, its output waveform is clipped (its peaks are squared off) – reducing the crest factor. In extreme cases, the waveform can approach that of a square wave. Furthermore, an amplifier normally consumes far more electric power under these conditions than its undistorted rated power output. The use of very high power amplifiers with output greater than those recommended is discouraged.
Care should be taken to avoid switch-on surges, which can result in momentary power peaks in excess of specified ratings.
When powering up a sound system it is important *to switch on the amplifiers after the electric supply of the mixer and control electronics have stabilised*. When powering down the system, reverse the sequence and switch off the amplifiers first.

9. Connectors

The rear panel of Classic Line loudspeaker systems are fitted with two Neutrik Speakon NL4 connectors. All four pins of both connectors are wired in parallel. The XTH and XTLT uses pin assignments 2+/2-. Pins 1+/1- are designed to XTL and XTS. Using the male connector as the input, the female connector allows for direct connection to additional speakers (link or bridge connection).

PINS	1+	1-	2+	2-
NL4	LF+ (XTL) (XTS)	LF- (XTL) (XTS)	HF+ (XTH) (XTLT)	HF- (XTH) (XTLT)



4 pins Speakon connector:
1+: Positive (+) woofer - XTL, XTS
1-: Negative (-) woofer - XTL, XTS
2+: Positive (+) satellite - XTH, XTLT
2-: Negative (-) satellite - XTH, XTLT

10. Cable length

When connecting loudspeaker systems to an amplifier, it is recommended that the return resistance of the cable used is less than *one tenth* of the nominal impedance of the system or systems in parallel. The table below gives an indication of the maximum permissible cable runs for various conductor cross-sectional areas.

Maximum Cable Run		
Conductor CSA	**4 ohm**	**8 ohm**
1.0 mm^2	11 m	22 m
1.5 mm^2	17 m	34 m
2.0 mm^2	22 m	44 m
2.5 mm^2	29 m	58 m
4.0 mm^2	44 m	88 m
6.0 mm^2	66 m	132 m

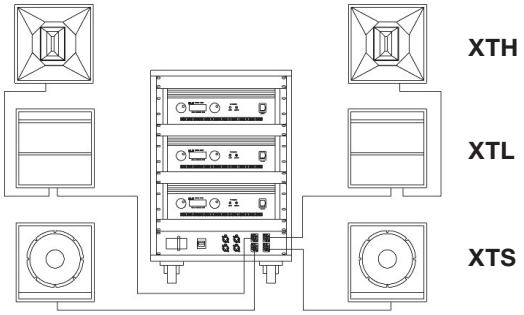
11. System configurations

X-Treme Classic Line enclosures can be used with analog controllers which perform system specific equalization, crossover and limiter functions. More complex set-ups will benefit from the use of a digital DSP - X-Treme Classic systems can be used with **XTDP26** *Digital Speaker Management* or any other professional digital controller. Whichever controller is used, it is important that it has fast attack limiters to prevent amplifiers from clipping. This requires that the controller's limiter thresholds be set to match the sensitivity of the amplifier. A system operated in this way - with amplifiers having a power rating as recommended and used by experienced professional sound engineers - should be sufficiently protected from overdriving. It is suggested that you refer to the controller user's guide for further information on how to set limiter thresholds.
The nominal horizontal coverage pattern of XTH is *60-degrees*. This has been found to be the optimum figure to meet the requirements of both small scale and larger scale use.

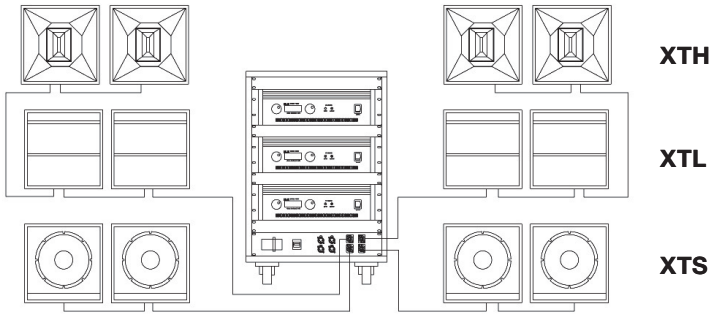
With the rear edges touching, the inter-cabinet angle between enclosures is the right one for having a correct overall dispersion. The nominal crossover point between the XTH and XTL is 200 Hz, an LPF on XTH - set at 200 Hz (slope >20 dB/oct) - and a HPF on XTL - at 150 Hz - are suggested.
Recommended crossover cut for subwoofers is 120 Hz.
X-Treme Classic Line systems combined with the appropriately configured controller exhibit an essentially flat on-axis frequency response.
Equalization to compensate for a particular acoustic environment mat be performed where required. When speakers are vertically positioned in many different clusters, they may benefit from equalization adjustement to reduce the effect of mid-low frequency build up inherent in the use of multiple arrayed enclosures.

Examples:

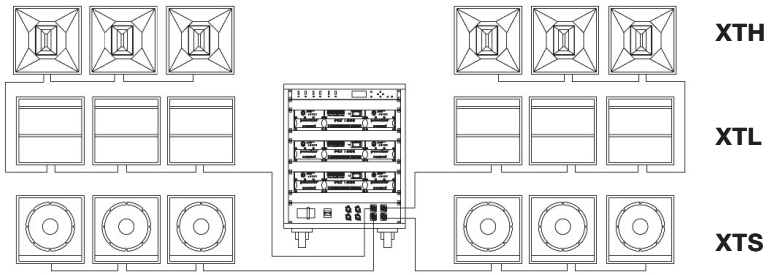
8 Ohm configuration



4 Ohm configuration



2.6 Ohm configuration



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