

A large outdoor stadium with a red running track and green field. In the foreground, there is a professional sound system consisting of a tall stack of black speakers, a large black subwoofer, and two silver DSP units. The background shows the stadium seating and a clear blue sky with some clouds.

# Professional Sound System for Large Outdoor Stadiums

# Solution Overview

## Stadium Description

- The stadium is mainly used for sports games and rallies, and the professional sound system is required for opening ceremony, mass games, live commentary of football match, etc.. While considering the functional requirements of various sports competitions in the future, theatrical performances should also be taken into account. The professional sound system plays an important role in the weak current system of the football field.
- In order to allow the audience to get the information sent by the referee during the game, the system is required to have a better sound transmission gain. Generally, the auditorium around the stadium is high, while the competition terrain is low. Speakers often are suspended under the canopy for zone sound reinforcement, as the directional characteristics of the speaker system are utilized to ensure that the auditorium has sufficient sound pressure level and good speech intelligibility. In order to mask the impact of noise, the sound pressure is generally required to be around 100dB .

## Design Objective

- The sound system of sports field is primarily a real-time amplification of the speaker's voice to the listener, and the speaker and listener are usually in the same acoustic environment. A successful sound reinforcement system must be loud enough (sufficient sound gain) and clear enough (low percentage of speech consonant articulation loss), and be able to evenly cover the audience while not covering areas where there is no audience.

## Design Approach

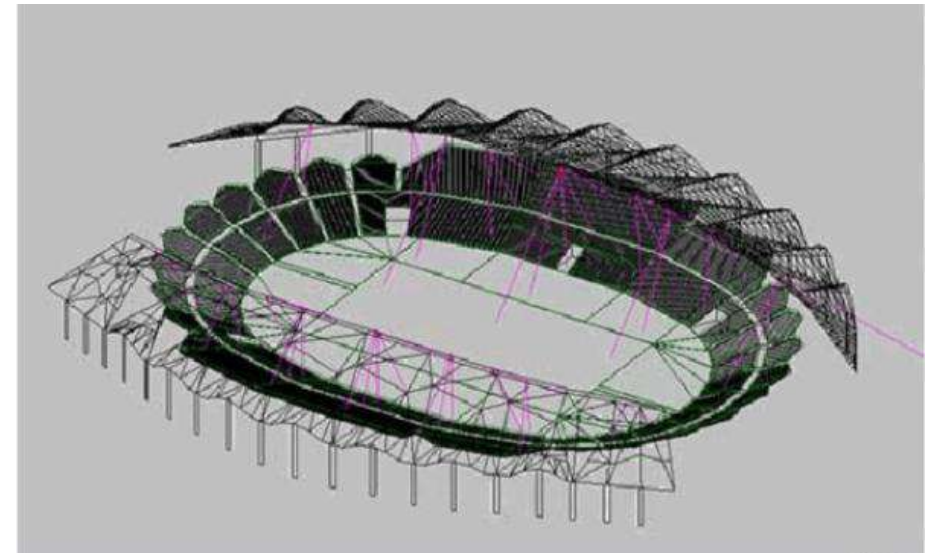
- According to the outdoor arrangement and the function positioning, we adopt decentralized sound reinforcement to meet the uniformity of sound pressure in the sound field of the venue. Under the condition of meeting the sound pressure requirements, combined with the suggestion of use, the speakers we designed are used for playground performance at ordinary times.
- According to the national acoustic characteristic index standard for outdoor sound reinforcement system design, the maximum sound pressure level in the open field quasi-peak state: 125-4000Hz, with an average greater than or equal to 98dB. However, the audio sound reinforcement system we designed meets and exceeds the national standard, which reflects the superior performance of the system. The sound effect of the professional sound system meets the first-level standard of language and music in the GYJ125 Acoustic Characteristic Index for Outdoor Sound Reinforcement System Design, achieving clear language, no distortion, sufficient sound pressure margin, and uniform sound field distribution.

# Professional Sound System - Configuration Solution for Outdoor Stadiums

- **Pickup Part:** We choose true diversity wireless handheld microphone and wired condenser microphone to ensure the broadcast of the event and the speech of the leaders. Meanwhile, we adopt antenna amplification system to ensure that there will be no wireless signal loss or crosstalk.
- **Regulation and Control Part:** We apply the digital mixing console, digital audio matrix and feedback suppressor to regulate and control the whole system. The digital mixing console is simple in interface display yet powerful in function, and has various audio signal input and output interfaces to meet the connection of mobile sound reinforcement system, radio and television broadcast output, large screen system, recording and calling system, press release area and background broadcasting system. It allows the operator to quickly perform the mixing operation and can be extended for subsequent system expansion. The digital audio matrix has rich built-in peripheral modules, which can carry out various processing operations on the whole system, and supports DANTE transmission, thus eliminating the trouble of long-distance wiring, ensuring the signal-to-noise ratio and reducing the failure rate. The feedback suppressor greatly reduces the possibility of on-site sound howling, ensuring the operation of the entire system.
- **Sound Reinforcement Reduction System:** We use highly directional dual 10" line array speakers for decentralized sound reinforcement. The line array speakers not only have large sound pressure level, but can be adjusted in the vertical angle according to the listening surface. Each group is also equipped with a single 18" subwoofer to compensate the lower limit of low and medium frequency. The 400W constant resistance horn speaker is used to supplement the sound in the area that cannot be covered by line array speakers, and the monitor speaker is used to help the operator to better understand the state of the sound source.
- **System Protection:** To ensure the safety and reliability of the system equipment in use, especially in case of accidents, it can protect the equipment from damage. It is mainly equipped with power sequence controllers.

## System Advantages

- This system can not only meet the national acoustic standards for stadiums, but meet the requirements for live broadcast and rebroadcast of various sports events, featuring intelligence, digitization and scalability.
- DANTE audio processor solves the problem of long-distance transmission and wiring while reducing the sound delay. As the array speaker has high sensitivity, the sound in the whole sound field is clear and bright. On the premise of meeting the requirements of sound pressure level, it enjoys wide horizontal coverage area, small vertical projection angle and concentrated distribution of sound field, ensuring the intelligibility of the projected sound field.
- To ensure normal use in various functions and situations, the system can be manually intervened and adjusted at any time, so that the sound engineer can adjust and control the system as needed at any time.



# Pro Sound System Connection Diagram

No.	Model	Product Name	Quantity
-----	-------	--------------	----------

## Audio Source Part

1	D5821	Wireless Handheld MIC System	2 sets
2	D6656	Antenna Receiver	1 set
3	D6657	Antenna Distributor	1 piece
4	D6558Z	Wired Microphone	2 pieces

## Regulation and Control Part

1	DN20	Digital Mixing Console	1 piece
2	D6643HD	Audio Processor	7 pieces
3	D6644HD	Audio Processor	1 piece
4	D6573	Feedback Suppressor	1 piece

## Sound Reinforcement Reduction System

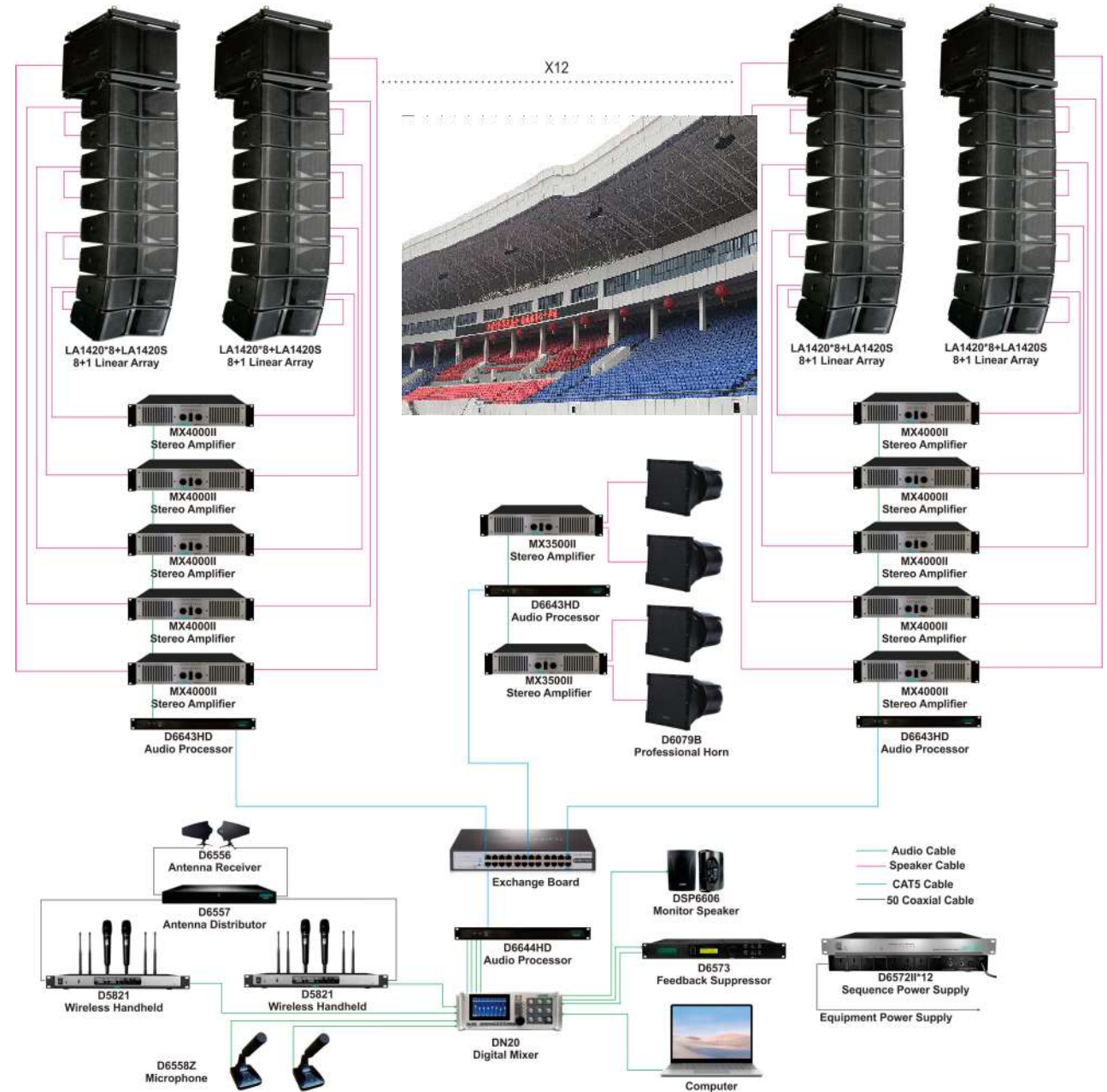
1	MX4000II	Professional Amplifier	30 pieces
2	MX3500II	Professional Amplifier	2 pieces
3	LA1420	Line Array Full-Range Speaker	96 pieces
4	LA1420S	Line Array Subwoofer	12 pieces
5	D6079B	Fill Horn Speaker	4 pieces
6	DSP6606	Monitor Speaker	1 piece

## System Protection Part

1	D6572II	Power Sequence Controller	12 pieces
---	---------	---------------------------	-----------

## Supporting Materials

1	LA1420D	Mounting Bracket	12 pieces
2	LA142K	Shackle	48 pieces
3	Self-Provided	Switch	1 piece
4	Self-Provided	PC	1 piece



# System Equipment Highlights



## Dante Long-Distance Transmission (D6640HD)

- The audio source is connected to the LAN where D6644HD is located through Dante protocol for long-distance signal transmission, providing a low-latency, high-precision and low-cost solution for audio system connection.

## Waterproof Function (LA1420F)



## Outdoor Waterproof Protection Coating

Strong enough and scratch resistant to withstand harsh performance environments.

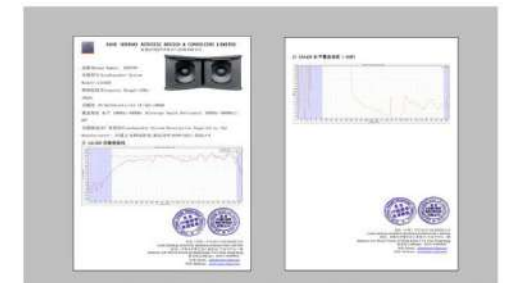
Customized

## EASE Certification (LA1420)

Free EASE and EASE FOCUS Libraries



LA1420 EASE Certification



# Product Details

Professional Array Subwoofer LA1420S



Unit Structure	LF 18" ×1
Rated Power	1000W
Rated Impedance	8Ω
Frequency Response	43Hz-250Hz
MAX. SPL.	126±2dB
Speaker Sensitivity (converted to 1m, 1W)	96±2dB
Color	Black
Dimensions (W×H×D)	600×555×760mm
Weight	60kg

Dual 10" Full-range Array Speaker LA1420



Frequency Response	50Hz-18KHz
Rated Power	650W
Rated Impedance	8Ω
Sensitivity (1W/m)	99±2dB
MAX. SPL.	128±2dB
System Composition	LF 10" ×2, HF 1.75" ×2
Radiation Angle (H×V)	120°×10°
Color	Black
Net Weight	24kg
Dimensions (H×W×D)	330×610×490mm





## Guangzhou DSPPA Audio Co., Ltd.

Address

NO.1 Xiahe Road, Jianggao, Baiyun,  
Guangzhou, Guangdong, China

Tel

+86-20-37166520

Public Address  
Division

export@dsppa.com  
www.dsppatech.com

ProAV  
Division

conference@dsppa.com  
www.dsppacs.com