D6686-Functions and Applications of Immersive Sound System

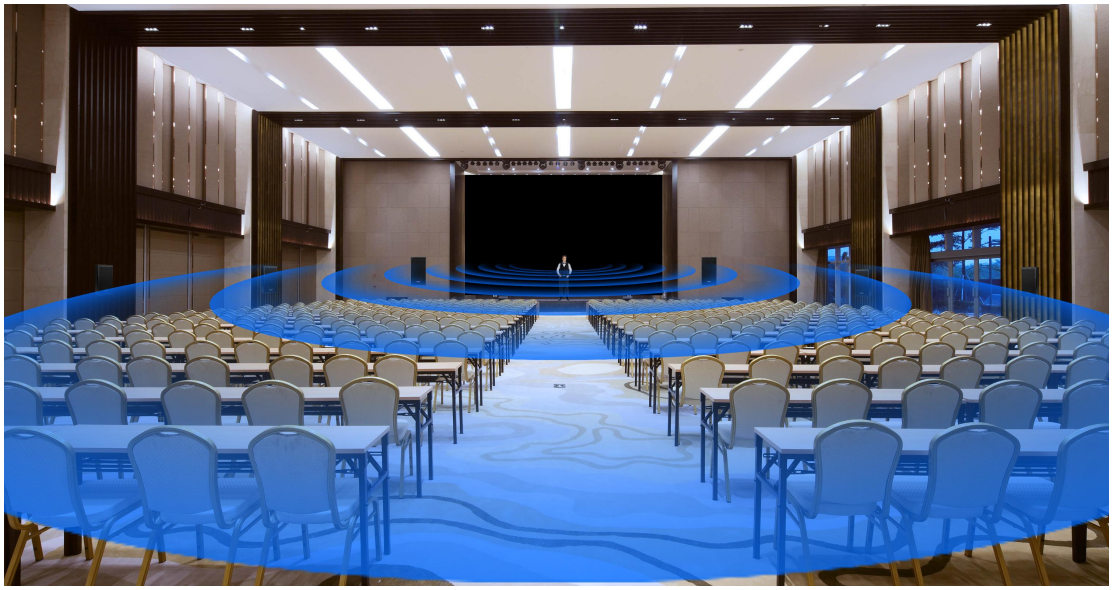
I. Solution Description

In traditional PA systems, to ensure the rear audience enjoy a sufficient sound pressure level and more even sound field, speakers are usually placed on either side or above the podium (stage, podium), or positioned at the back of the hall, even in the ceiling. Hence, there is a long-standing inconsistency between the sound perceived by the audience and the orientation of sound source (speech, presentation, singing, instrument playing, etc.). There are two problems to be specific:

1) For stationary sources, panning varies from audience to audience;
2) For motion sources, panning remains the same for audience.

Out of demand, DSPPA has developed an Immersive Sound System to provide a new sound experience of "consistency between the perceived voice and source orientation". We use patented algorithms to achieve high-precision sound source positioning and provide a wider acoustic space so that to give audience a sense of immersive acoustic encirclement. By doing so, precise positioning of sound can be achieved, immersive, dynamic sense can be made, and consistency between the sound and sound source can be realized.

Effect of Immersive Sound System



II. System Introduction

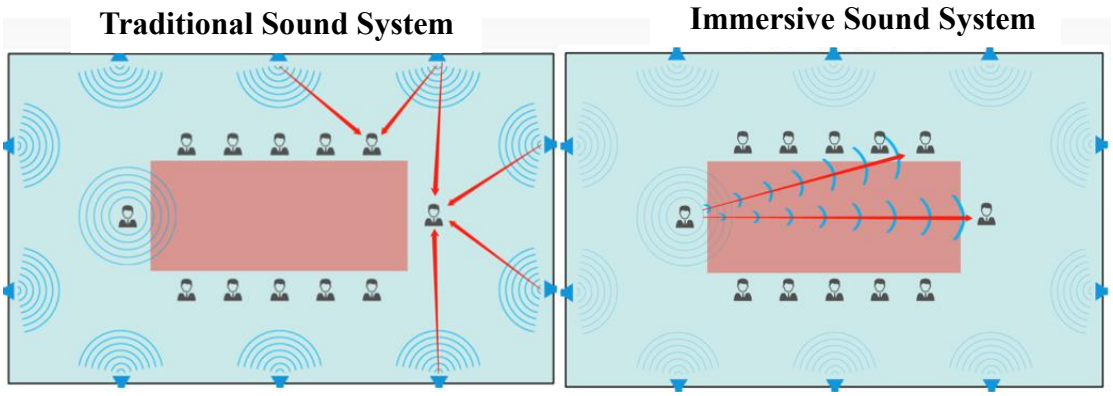
- **Product Introduction: D6686** Immersive Sound Processor

1. **Status display**
2. **Input/output indicators**
3. **8-channel audio out connector**
4. **4-channel audio in connector**
5. **RS232/RS485 control interface**
6. **RJ45 interface**
7. **Dante protocol interface**
8. **Power switch**

DSPPA Immersive Audio System adopts the new sound reinforcement concept of "spatialization of sound" to create a virtual reality sound experience of "consistency between the perceived voice and source direction". With an immersive sound processor (D6686), using innovative placement and sound processing algorithms, participants and speakers can stay highly aligned with panning rooted in complex and efficient DSP data processing and high-precision acoustic source positioning analysis, acquiring a sense of immersion. The system has resolved the above-mentioned inconsistency, realizing that the audience in different corners perceive the sound of the same volume from the actual source. Audience's perception of panning varies from moving sound sources.

- **Traditional Digital Conference VS Immersive Sound Conference:**

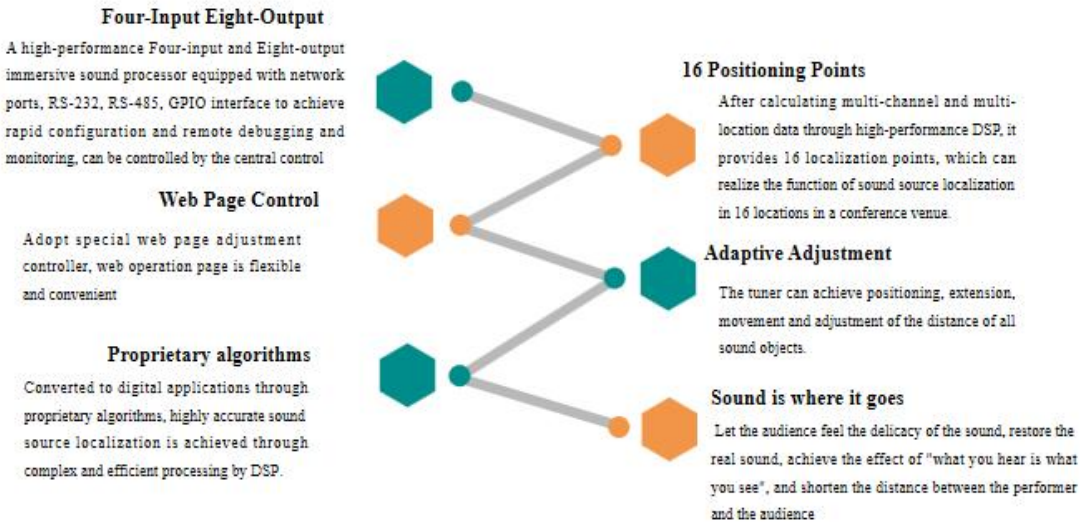
Traditional Digital Conference System: The sound to each seat comes from the closest speaker (e.g. If the spokesperson stands in front of the speaker, the he/she feels bad as sound comes from behind).



Immersive Sound Conference System: In this system, highly realistic sound can be provided and precise positioning can be realized. Regardless of the speaker's orientation, and wherever the audience is, the sound perceived by each seat is heard from the speaker's direction, ensuring the

consistency of sound and source, as well as the powerful sound effect and giving participants better sense of immersion.

- **Advantages of Immersive Sound System**

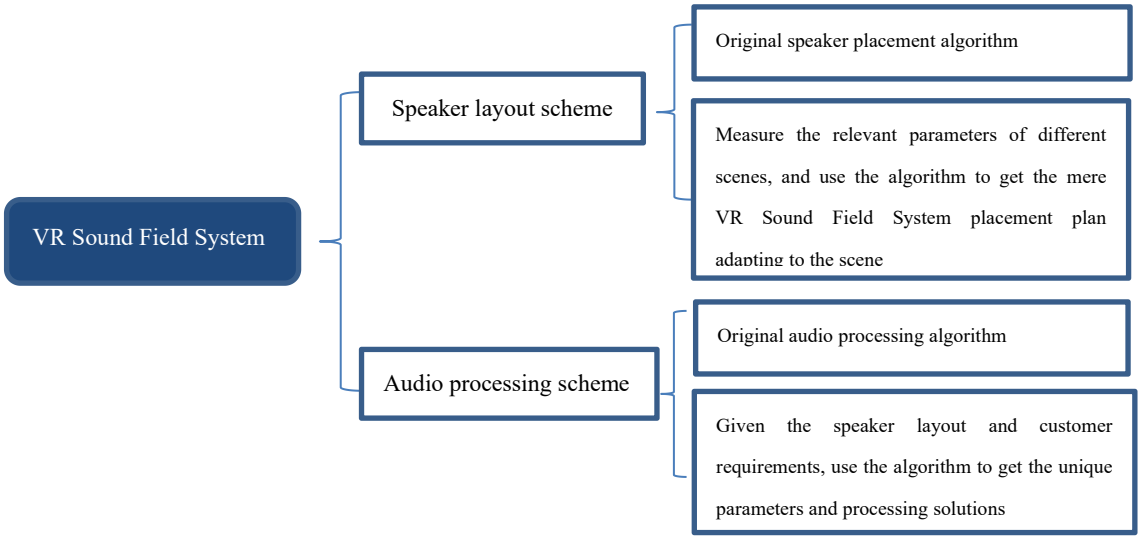


III. System Architecture:

- **Steps of System Architecture are as follows:**

Immersive Sound System is designed for live sound spatialization and immersive experiences, enabling listeners to perceive the location and movement of sound sources in two- or three-dimensional space. The system has two algorithms that determine the placement of the speakers and the processing of the sound signal. Establish a three-dimensional model based on measurement information of the targeted space. The system use the core algorithm to determine the placement of the surrounding boundary speakers, top speakers, bottom speakers within the three-dimensional model, and adjust and output the speaker parameters.

1) Establishing a three-dimensional model based on the measurement information from the targeted space, including the spatial stereoscopic shape, the position of the speaker and audience, and the effective area;
2) Determine the placement of the top speaker and the projection area of the effective area at the top of the space;
3) Determine the placement of the bottom-middle speakers and set the center area that spokesperson faces within the effective area as the primary speaker point;



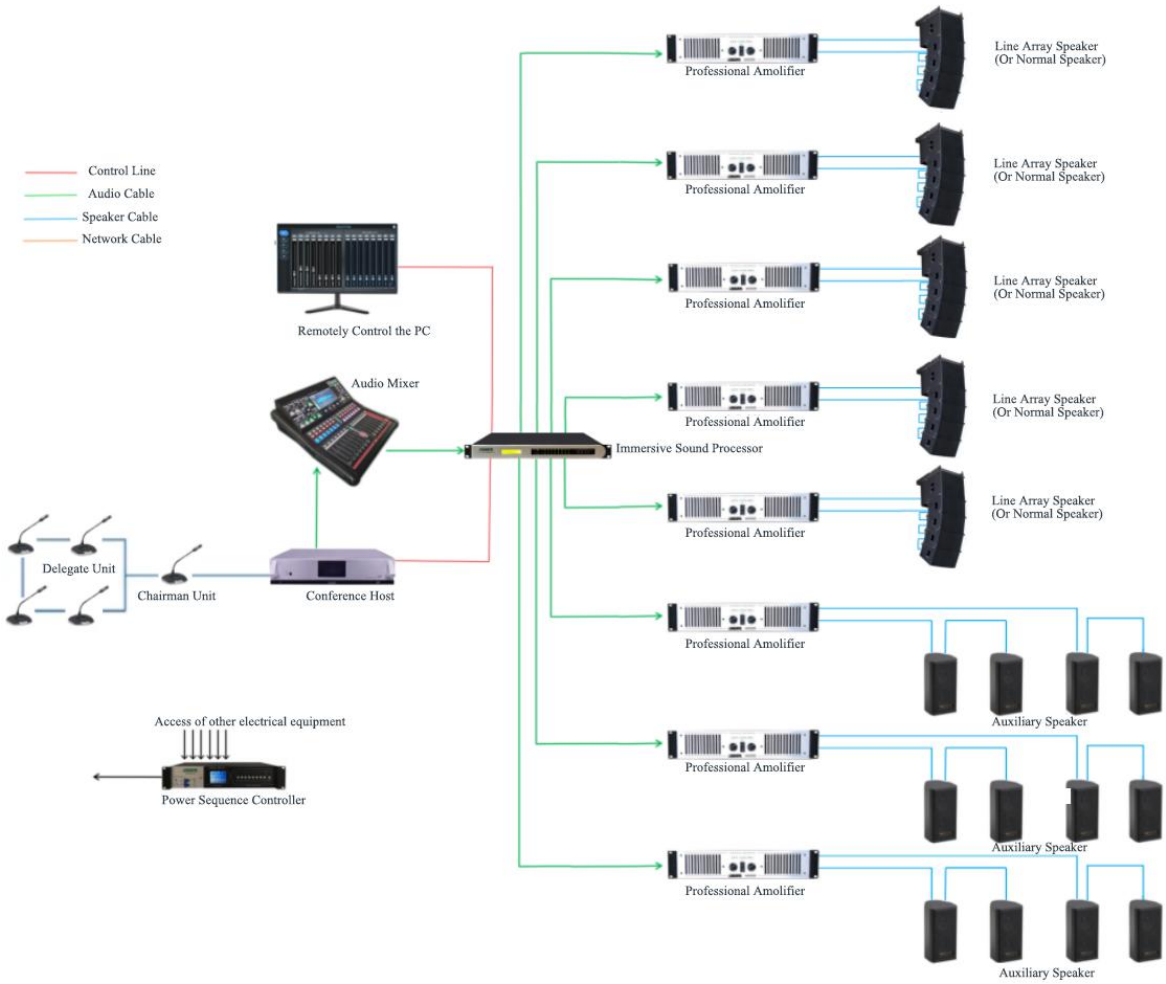
Effect Scene:

- **System Connection Diagram**

An immersive audio system can be built by the combination of an Immersive Audio Processor D6686, a central control host D6401, and multiple multichannel amplifiers, 4 serial array speakers and 12 professional wall-mounted speakers, as well as multiple Dante or digital hand-in-hand microphones.

The 4-channel audio signal input processor is vital to achieve sound spatialization, which conducts DSP multi-channel sound data processing in a high-speed and efficient manner. Each channel provides up to 16 preset positioning points, enabling source positioning up to 16 positions within a conference.

Four-in, eight-out immersive sound processors, in combination with multiple amplifiers and speakers, forms an immersive sound system



- **Unparalleled Benefits of System:**

(1) As the sound source expands,Immersive Sound System ensures an even sound field, allowing the audience to distinguish the specific orientation of the sound source, thus guaranteeing the consistency between the audience's perceived sound and the sound source, enhancing the audience's sense of nature, intimacy and involvement. The system fosters a good sound scene.

(2) The Immersive Sound System is easy to set up, and requires no post-production, complex analysis of the construction environment. With simple system commissioning, the system setup time is greatly reduced. With the help of user manual, relevant field technicians can quickly set up system and can fine-tune the scenarios to suit the desired scene, making it simple to operate.

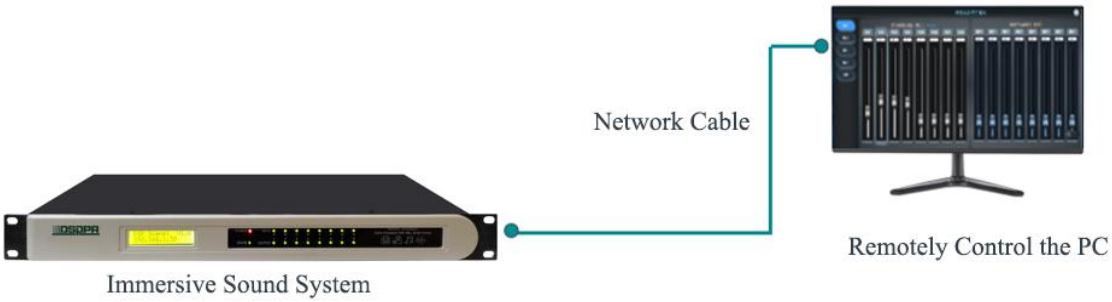
(3) The Immersive Sound System uses different delays, which greatly reduces the amount of feedback the speaker can give to the microphone during acoustic signal processing, reduces whistling, and makes the PA system more stable.

(4) The Immersive Sound System can be used in combination with face recognition (check-in, behavior analysis, etc.), paperless, and other solutions to create a smart, convenient, and user-friendly conference system.

IV. Introduction to the software function interface:

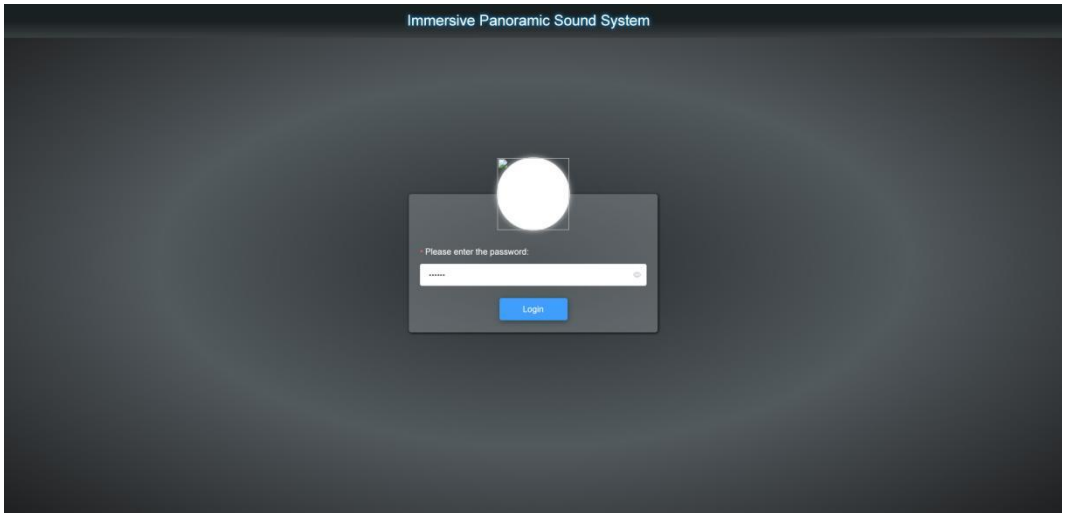
The D6686 Immersive Sound processor provides the flexibility to adjust key parameters for each input signal through the Web operation page. Using our patented algorithm for parameter calculation conversion can effectively improve the sound quality and sound effects, perfecting the live panoramic effect.

PS: Google Chrome; IP address: 192.168.1.30; Default password 123123.



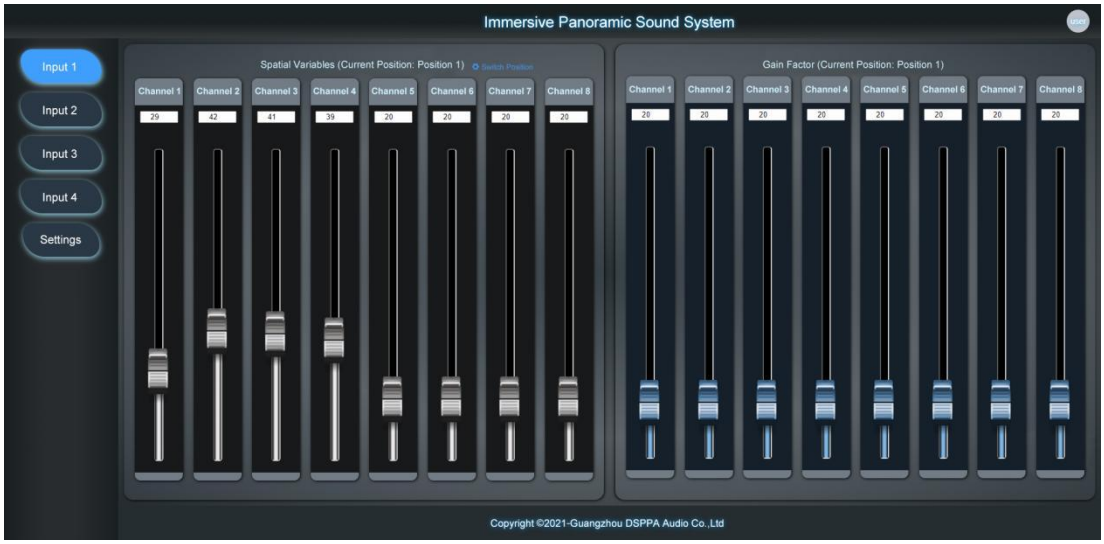
Login Interface

The Immersive sound processor is connected to the computer via a network cable. By entering the address and password on Google Chrome browser, you can log in to the processor control interface and perform visual control operations on the line array, which is convenient and easy to operate.



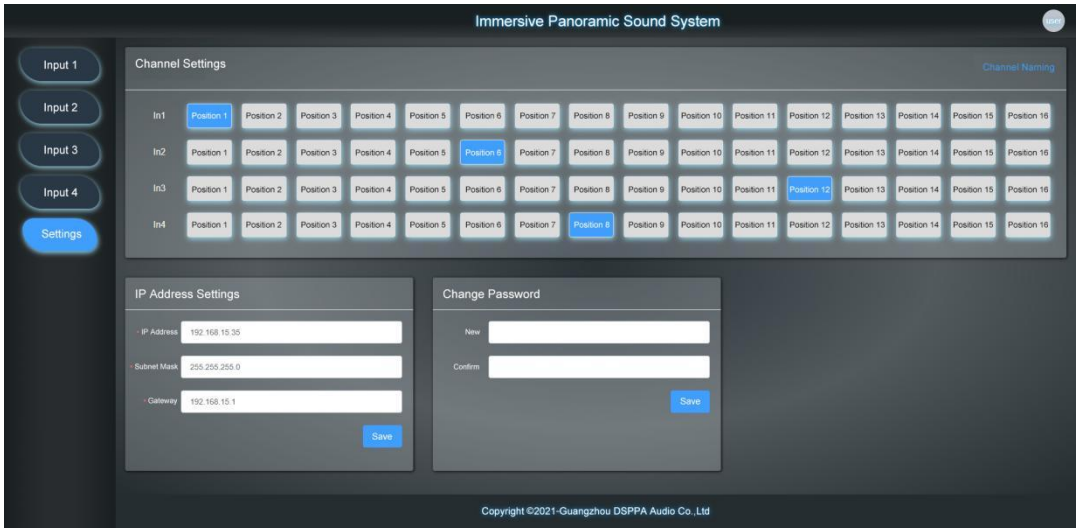
Main Interface

The immersive sound processor can conduct high-speed and efficient data processing, providing 16 positioning points after multi-channel multi-positioning data calculation, which can realize the function of sound source positioning in 16 locations within meeting room.



Positioning Operation Interface

Immersive sound processor sound source positioning function can be adapted, and linked through the central control and other systems.



V. Applications

Conference room, Lecture hall: Immersive sound processor can carry out high-speed and efficient data processing, providing multiple positioning points based on multiple-channel multi-positioning data calculation by high-performance DSP.

It will realize panoramic sound immersive experience in the meeting, speech and other occasions, so that participants and speakers can maintain a high degree of sound direction unity, ensuring the consistency between the sound and the source.


Concert hall: Immersive sound processor can can carry out high-speed and efficient data processing, provide multiple positioning points based on multiple-channel multi-positioning data calculation by high-performance DSP and ensure panorama sound experience for performances and other occasions.

It will realize the omnidirectional tracking of the performer's voice, so that the sound perceived and source orientation can be consistent.


Experience Center: The DSPPA Audio Museum