Smart Lecture Hall

Guangdong Baolun Electronics Co., Ltd

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Project Overview

The design integrates LED display system, 5GWIFI wireless digital conference system, professional sound system, centralized control system, HD seamless hybrid matrix system, conference recording system, stage lighting system, stage machinery and other systems. The venue features advanced design concepts, stable systems, and complete functions, and is suitable for daily meetings, multi-functional meetings, and theatrical performances, etc.

Functional Positioning

The lecture hall is mainly used for holding various report meetings, speeches, academic meetings, report performances, multimedia teaching training, watching teaching videos and other activities. Therefore, it needs to provide excellent sound quality, clear picture display and convenient centralized control.

Conference System Design in Lecture Hall

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Multifunctional hall

- Wireless voting system
- Stage lighting system
- Conference recording system
- Simultaneous interpretation system
- Digital conference system
- Distributed management system
- LED display system
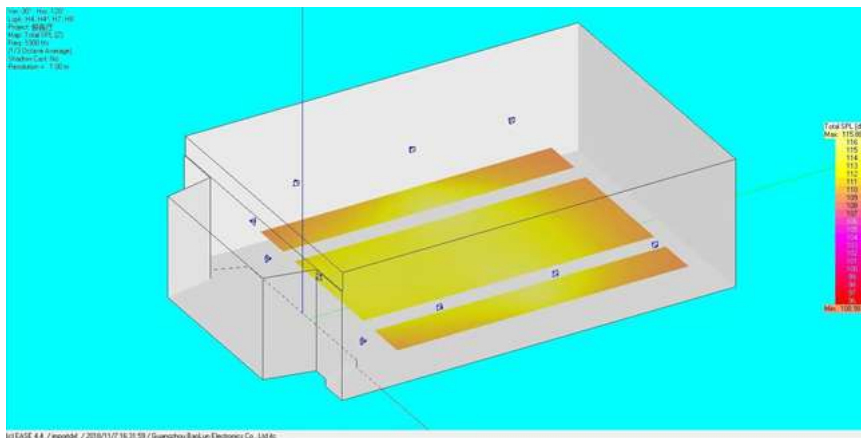- Video conference system
- Professional sound system

According to the characteristics and needs of the lecture hall, the system design takes the conference system as the medium and integrates advanced technologies such as the Internet of Things, multimedia and big data, to create a highly intelligent centralized management system to achieve confidentiality, environmental protection, and visualization of meetings.
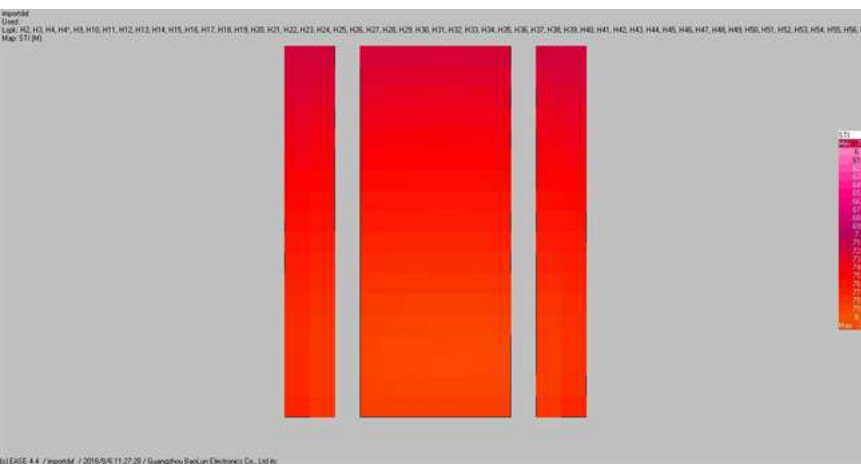
System Design

SPL modeling calculation

Rasti modeling calculation

Acoustic characteristic index of conference sound system

| Level	Max SPL (peak)	Transmission frequency	Acoustic gain	Steady state sound field unevenness	STIPA	Total system noise level	Total noise level
Level 1	Within the rated pass band: ≥98dB	Taking the average SPL of 125Hz~4000Hz as 0dB, the allowable range in this frequency band: -6dB~+4dB	Average value of 125Hz~4000Hz≥ -10dB	≤ 8dB at 1000Hz and 4000Hz	>0.5	NR-20	NR-30
Level 2	Within the rated pass band: ≥95dB	Taking the average SPL of 125Hz~4000Hz as 0dB, the allowable range in this frequency band: -6dB~+4dB	Average value of 125Hz~4000Hz≥ -12dB	≤ 10dB at 1000Hz and 4000Hz	≥0.5	NR-25	NR-35

The modeling calculation results using EASE4.4 sound field simulation analysis software are as follows:

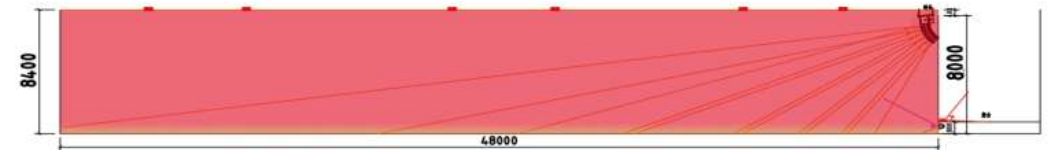**1000HZ total SPL (unevenness 7.70dB, max SPL 126.36dB)**

Alcon%	Rasti
1.49% - 6.24%	0.72-0.79

Design Schematic
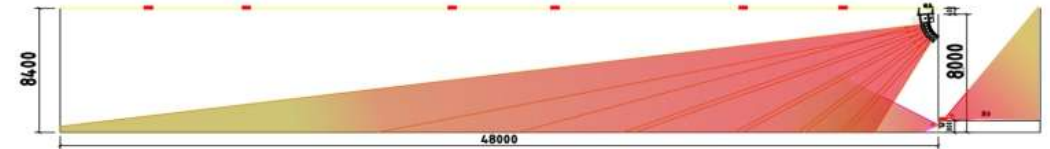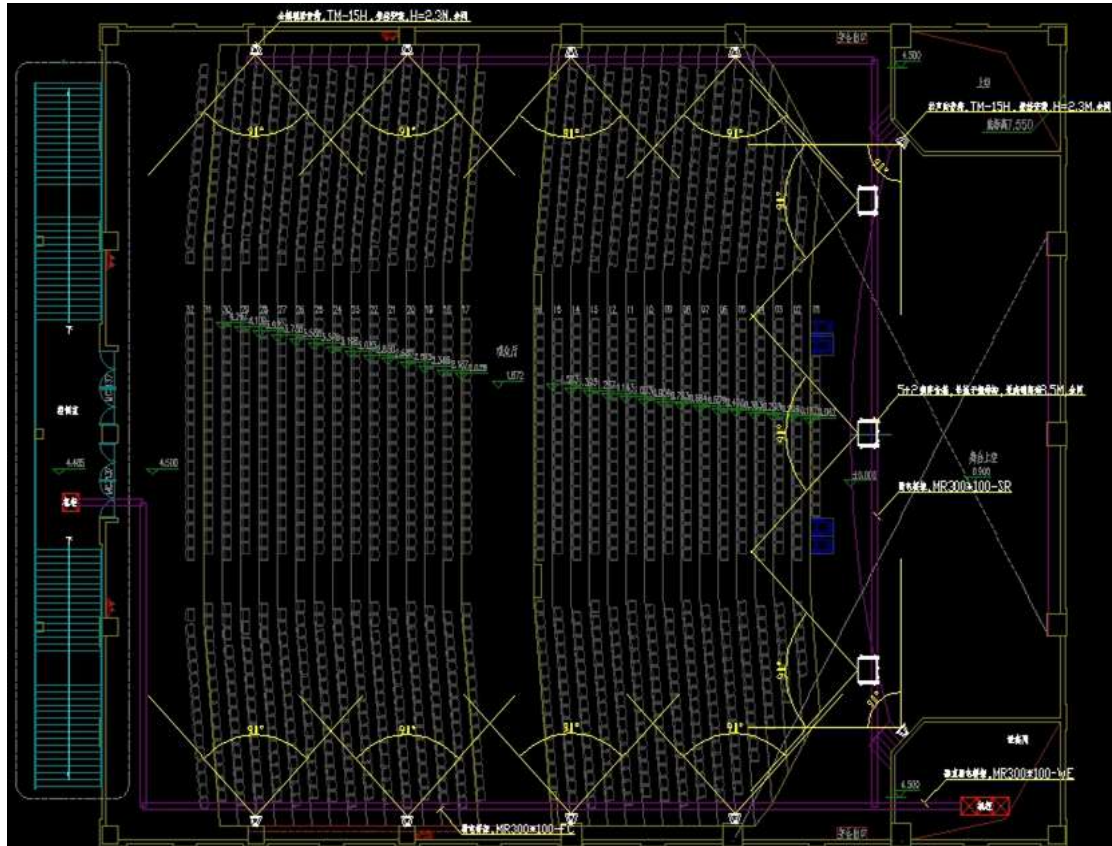
Sound field of the main linear array speaker

Sound field of the auxiliary speaker

According to the actual usage of the lecture hall, combined with the principles of architectural acoustics, we have formulated the following implementation plans:
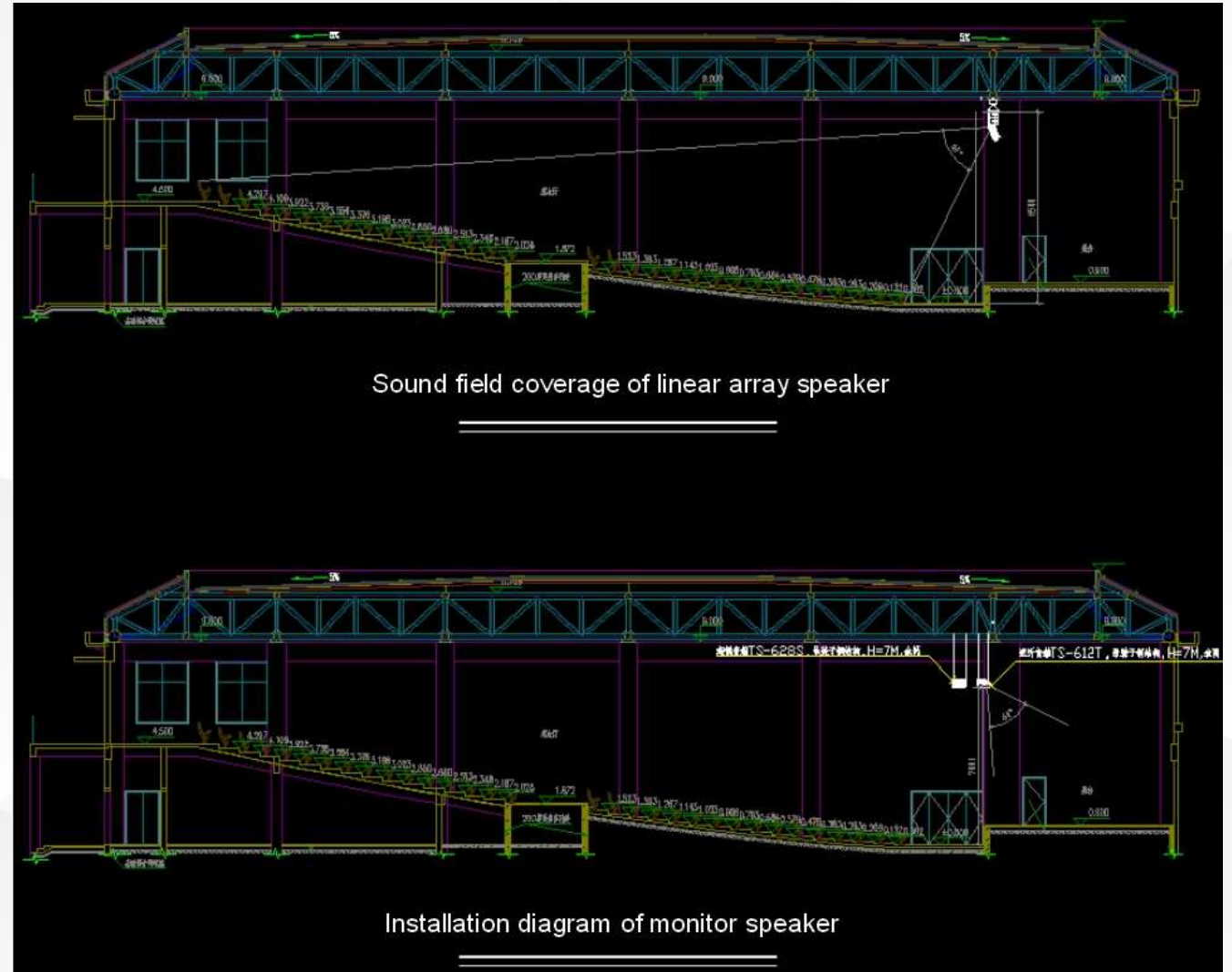
➤ Main linear array speaker: 6 tweeters + 1 woofer(hoisting installation), a total of 3 strings. Adjust the projection angle of each teeter to ensure that there are no dead angles in the coverage.

➤ Auxiliary tweeter: 4 on the left and right (wall-mounted installation), so that the direct sound of the entire audience venue is saturated.

➤ Audiovisual speaker: 1 on each side (wall-mounted installation), so that the audience in the front row can hear the perfect direct sound.

System Overview

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Speaker selection and elevation of the venue

In the figure, we can see that with the linear array fulcrum as the center, the entire sound field angle is 60 degrees, and it is completely covered by 6 full-range linear array speakers without any dead angles.

On the stage, all the monitor speakers and professional subwoofers are all hoisted on the steel structure to provide accurate information to the audiences and actors, etc.
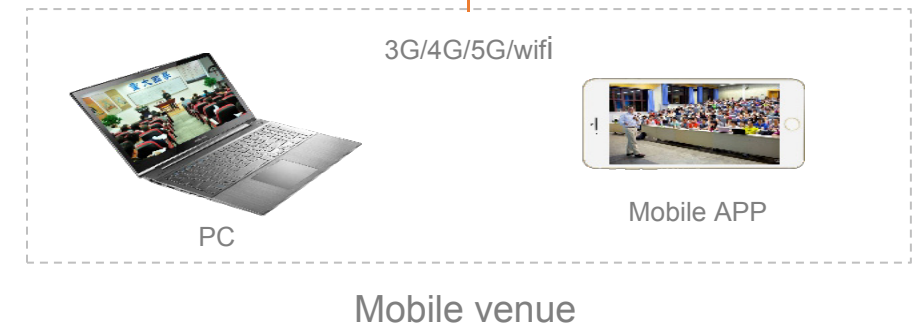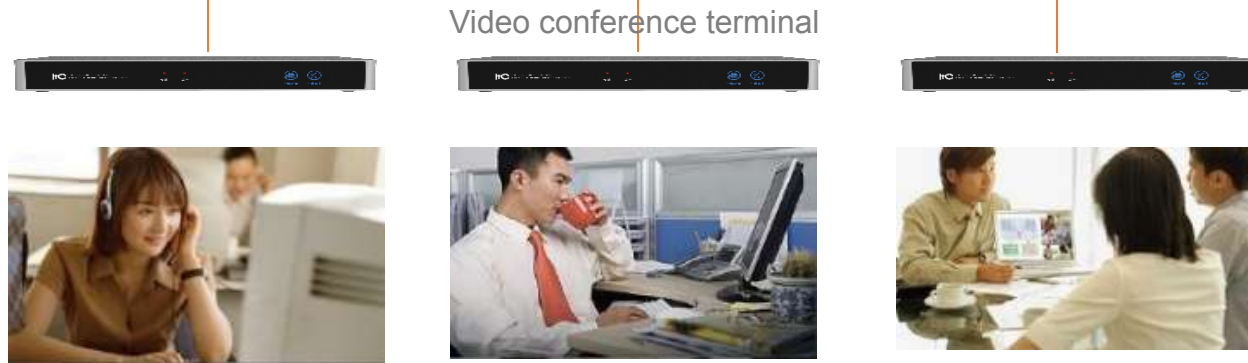

Sound field coverage of linear array speaker

Installation diagram of monitor speaker

Collaborative Office

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Backstage management

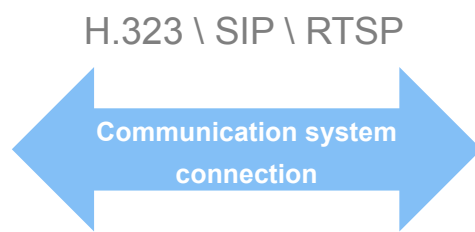Central MCU

Collaborative office realizes real-time audiovisual interaction and conference discussion between various conference halls and external venues.

IP network

Video conference terminal

3G/4G/5G/wifi

PC

Mobile APP

Mobile venue

System Integration

Video conference system

H.323 \ SIP \ RTSP

Communication system connection
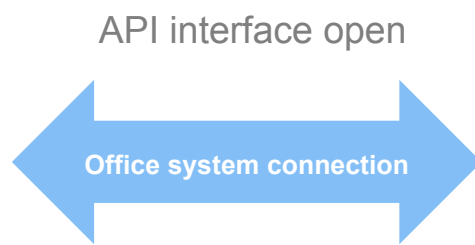
API interface open

Office system connection

- Compatible with the brand that supports H.323\SIP protocol

- Camera\monitoring\recording system that supports RTSP protocol

- Support API connecting with third-party OA system

- Connect with SMS and mail systems for convenient notification

Part 3 | LED Display System

System Overview

In the lecture hall, the LED display screen can be used as the background wall of the performance to render the atmosphere. It can divide into multiple video screens as needed, and can be used independently or in combination to play related background or live screens. In daily meetings, it can also play PPT content, etc.

System Advantage

Adopting high-precision processing technology and module-level fine tuning, the display is smooth without unevenness and bright or dark lines.

UHD display

Fine pitch LED display:

1. LED encapsulation: SMD2121 black light
2. Physical pixel pitch: 2.5mm
3. Resolution: 160000 dots/m²
4. Lamp bead/IC: conventional/ICN2053
5. Pixel configuration: 1R1G1B
6. Module resolution: 128*64
7. Module size (mm): 320*160
8. Cabinet resolution: 256*256

Part 4 | **Distributed Management System**

System Overview

◆ Through the tablet computer, the visualized audiovisual management of the lecture hall can be realized, and also the functions of video signal splicing, roaming, superimposition and preview.

◆ Real-time echo and preview of any signal source window are supported, and you can view the display effect of the entire video wall on the client, which is convenient for installation and construction, on-site debugging, and actual use.
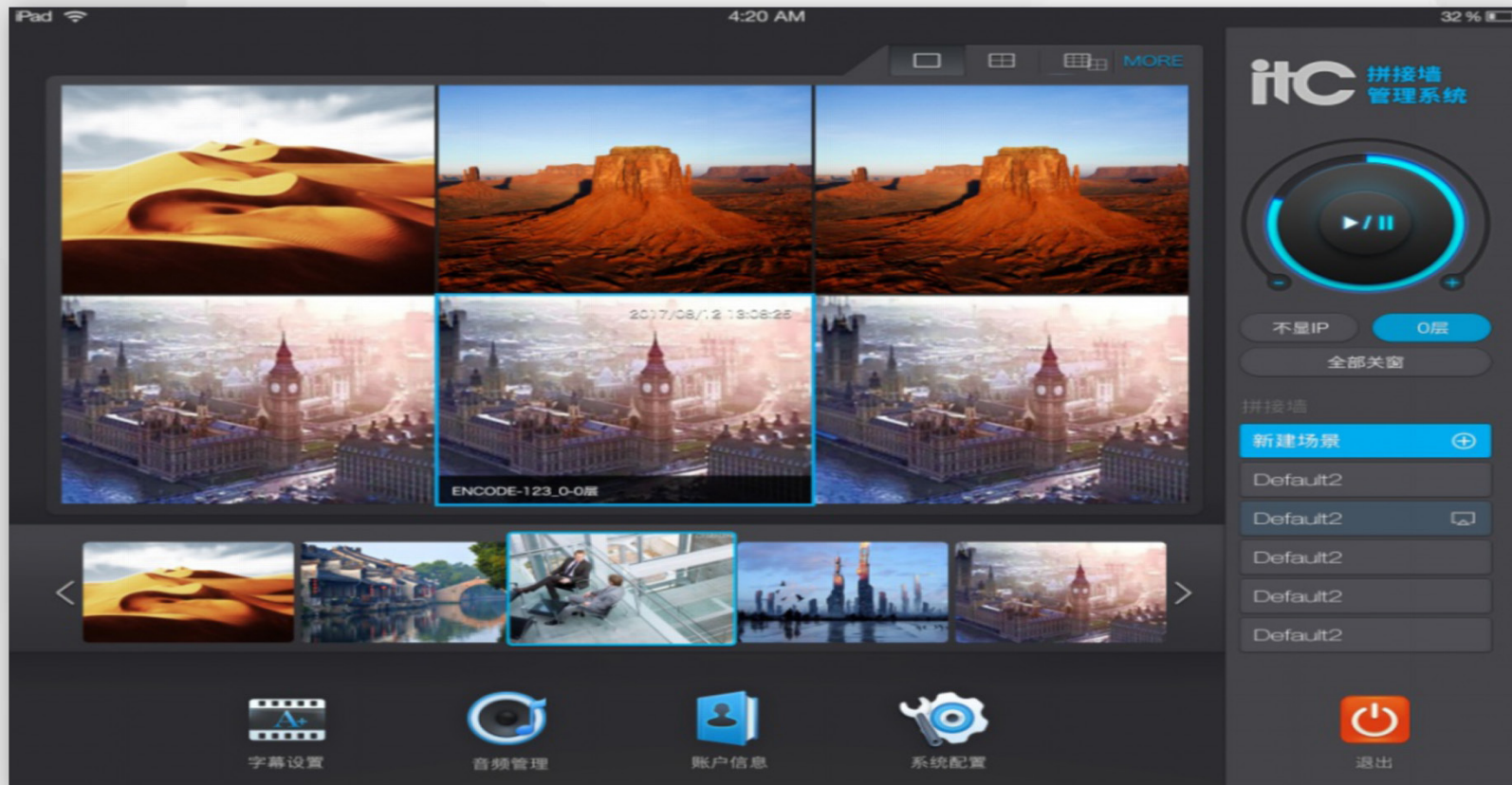
● Support the visualized operation of the splicing system through iPad or touch computer;

● Support window roaming and superimposition, window drag, pull, zoom in/out, etc. Support windows adhering to the screen boundary automatically.

System Design

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Scene mode

Meeting room

Meeting topic

Signal display

Classification screening

Signal preview

Quick layout

- ➤ **Human-computer interaction**
- ➤ **Operational cognitive habits**
- ➤ **Clear interface**
- ➤ **Visualized control**
- ➤ **Orderly management**
- ➤ **Simple operation**

Distributed management platform software interface-Display signal management

Part 5 | Digital Conference System

Speaking System

■ As a multi-purpose venue, the lecture hall is not only suitable for some report meetings, press conferences, important lectures, and company summary meetings, but also small and medium theatrical performances. Therefore, flexible mobile use should be considered in the speaking system.

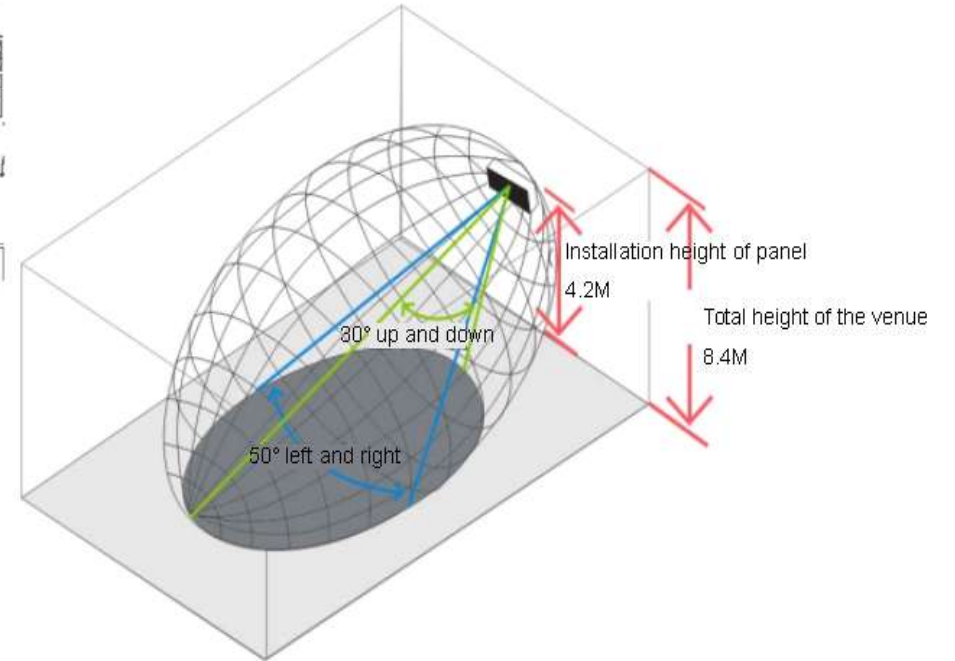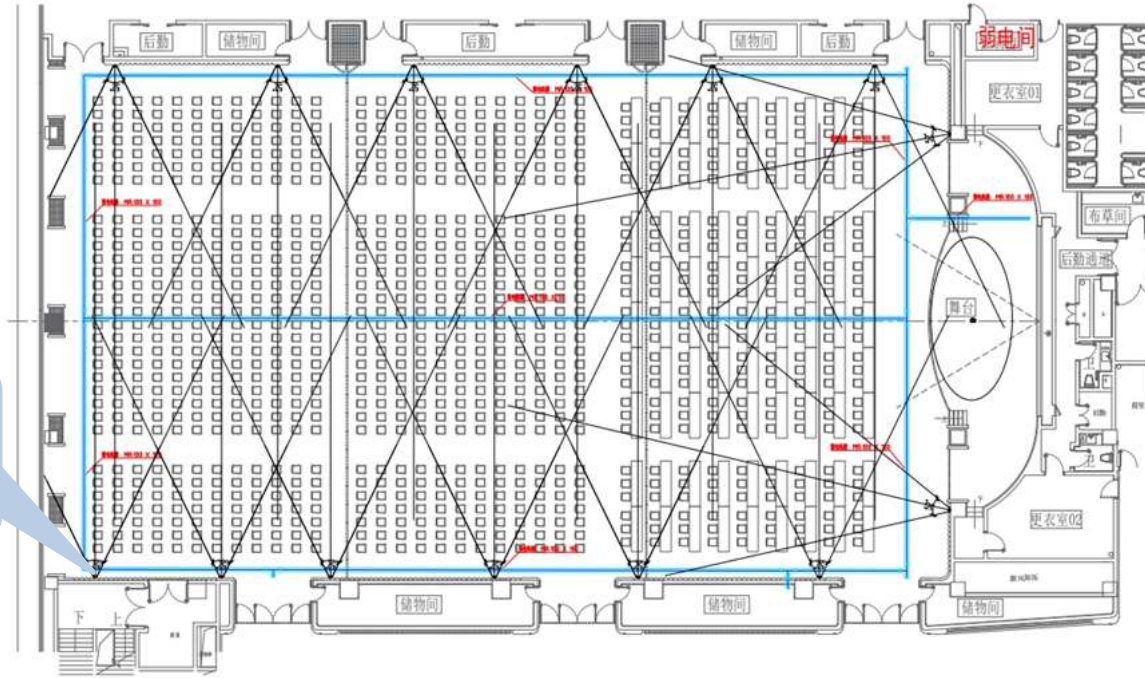True diversity mic (dual receiver)

5G Wireless conference system

● For art performances, host, mobile use

● For report meeting, press conference, symposium

Part 6 | Simultaneous Interpretation System

Design Schematic

Wall-mounted simultaneous interpretation radiant panel

Installation height of panel
4.2M

Total height of the venue
8.4M

30° up and down

50° left and right
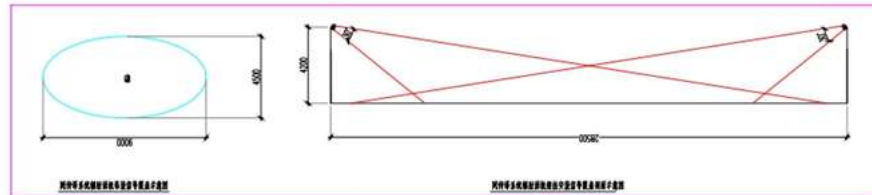
System Overview

➤ Send the speech of the speaker to the simultaneous interpretation system, and the interpretor can translate it through the translation unit and then transmit it through the infrared radiation panel.

➤ Support the functions of simultaneous interpretation, and indirect translation in 15+1 languages at the same time

Full digital conference controller

Simultaneous interpretation controller

Lecture hall

Radiant panel

Infrared reception

Translation room

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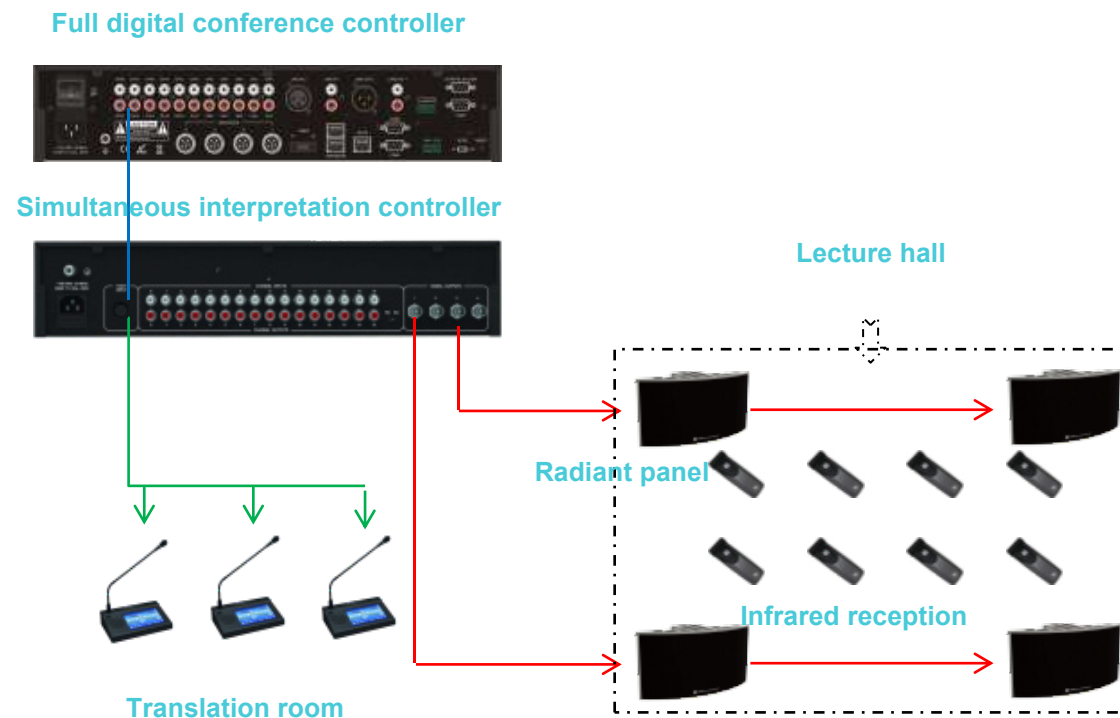
Part 7 | Conference Recording System

System Design

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HD collection and recording

- The recording controller supports simultaneous collection of 5 HD PTZ camera/Broadcast-grade camera + 2 computer DVI/VGA signals. The resolution of each video image reaches 1080P.

- The video processor adopts the top H.264 high profile HD video coding technology.

- AAC HD audio encoding technology, CD-level sound quality.

System Design

Multi-stream recording and screen selection

- Simultaneous recording of multi-channel HD videos can be recorded into single-stream files & multi-stream files.

- Single-stream files can choose single-picture mode/picture-in-picture mode/picture-outside-picture mode.

- Multi-stream stores 4 video streams simultaneously, one of which is used as a recording stream, and the other three (5 recording cameras + 1 computer) are saved as material streams.

System Design

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Online live broadcast and VOD on PC/mobile terminal

- Without other auxiliary equipment, the recording controller can conduct remote live broadcast and VOD viewing.
- No need to install any software, the client realizes web live broadcast; supports multiple mobile terminals such as Windows/IOS/Android.

Part 8 | Stage Lighting System

System Overview

Lecture hall: The overall lighting design meets the requirements of conferences and various theatrical performances. The stage lighting layout is divided into the inner zone and the outer zone, working with basic lighting positions. They can be flexibly adjusted to meet the functional purposes such as performances.

Stage lighting is the soul of stage art. And perfect lighting is a necessary condition for a successful performance.

Reasonable illuminance and uniformity are the basic conditions to ensure the visibility of objects. In this design, we use the ratio of the maximum illuminance value to the minimum illuminance value or its reciprocal to control it, which is approximately within the range of 3:2 or 2:1.

Design Index

Illuminance index

The average stage illumination is not less than 1200LUX. There are no less than three directions of light in the performance area, and the maximum white light in each direction (single light) is not less than 1000 lux; the maximum white light of the main performance area is greater than 1500 lux.

Color temperature

Conventional lamp 3200K, follow spot light 6000K.

Anti-interference index

Each performance position has at least four directions of projection angles, forming a three-dimensional sense of light. It prevents glare, reflected light and useless light spots.

Fixture Configuration

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-Ceiling light

The ceiling light is mainly used to illuminate the front performance area of the stage, and the performers on the stage.

- A line of ceiling light: 20 200W fixed imaging lights.
- Cross projection: enhance the brightness of the center area and depth of the stage;
- Key projection: strengthen the lighting of the local performance area.

-Top light and back light

Above the stage, the top lights are set every 1.2M-2.0M, hung under the light batten. The top light includes forward light and back light, which can be overlapped on the same batten.

- Top light 1: 17 90*3W PAR lights, 12 200W adjustable temperature LED panel light.
- Top light 2: 17 90*3W PAR lights, 8 17R moving head beam lights.
- Backlight 1: 17 90*3W PAR lights, 12 7R moving head beam lights.

Fixture Configuration

-Side light

The side light is projected from the side of the stage to create a three-dimensional feeling for the actors in the main performance area, to provide auxiliary lighting for the actors' outlines, and to enhance the layeing of the scene, etc.

- On both sides of the main stage is arranged a light batten respectively, and 6 90*3W PAR lights on each batten.

-Stand spot light

It is arranged on the ground or on a bracket, or behind the side curtain of the stage. Its position and projection angle are adjustable as needed.

- Arranged on the ground of the rear stage, with 8 17R moving head beam lights.
- The angle between the stand spot light and the actors basically forms 45°-90° from the audience's perspective.

System Advantage

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●High luminous efficiency, no infrared radiation

●Long service lifespan, up to tens of thousands of hours

●Easy to control the light and color change with its own voltage change and dimming circuit

●Small in size, easy to install and transport

●Strong compatibility, support 220V voltage transformation to 110V, and 3-channel DMX512 line control of dimming and color adjustment

Part 9 | Wireless Voting System

System Overview

The wireless voting system is specially developed for the voting of various proposals of the government, enterprises and institutions, democratic appraisal, personnel election, evaluation and scoring, etc. The system adopts wireless communication technology. Compared with wired voting, it takes advantages in reliability, security, and greatly reduces the costs, making it suitable for popularization.

- ✓ Complete function
- ✓ Safe and reliable
- ✓ Strong confidentiality
- ✓ Simple operation
- ✓ Reliable hardware design
- ✓ Strong confidentiality
- ✓ Intuitive user operation

System Advantage

- **Three-key voting: for, abstain, against**
- **Five-key voting: 1, 2, 3, 4, 5**
- **Five-key rating: --, -, 0, +, ++**
- **Scoring mode: valid from 0 to 100 points**
- **Custom voting mode, 2 to 5 custom options**

Sign in

Voting

Evaluation

Election

Scoring

Ranking

Real name

Anonymous

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Part 10 | Successful Cases

Clifford Hotel Guangzhou

Arcadia International Resort Hotel

Thanks for watching!