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Railway VA-6500 EVAC System

Content

01

System
Overview

System overview

The **VA-6500 EVAC System** is a must to respond quickly for the train management of urban railway system; it has two main role as follow:

- 1. Business Broadcast & BGM: basic information service such as train arrivals, departures, line transfers, time schedule changes, train delays, safety conditions, etc; play BGM for a better waiting mood;

- 2. Emergency Broadcast: it serves as emergency alarm and evacuation broadcast tool.

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Design Standard

itc

※ *Metro Design Code GB 50157-2013*

※ *Technical specification of urban rail transit GB50490-2009*

※ *China Compulsory Product Certification System -CCC certificate*

※ *Fire control linkage control system GB 16806-2006*

※ *Fire detection and fire alarm systems EN 54-16-2008*

※ *Public Address System Engineering Technical Specifications GB50526-2010*

※ *Quality management system certification -ISO9001*

※ *Guangzhou Baolun Electronics Corporation Enterprise Standard ITC-BZ-2015-V0.4*
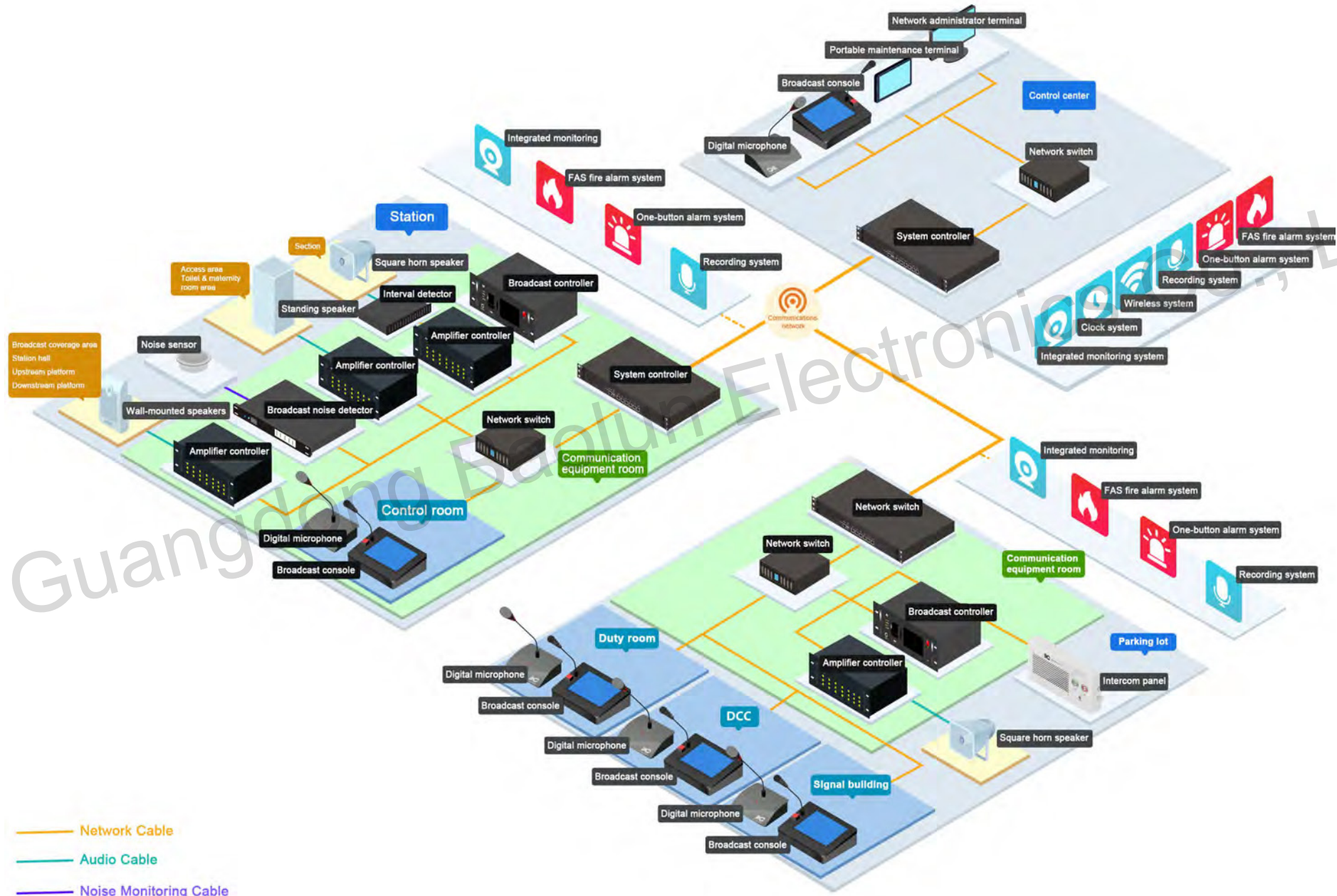
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02

System Introduction

System architecture

Function

Platform

- Group broadcast
- Single broadcast
- Telephone broadcast
- Wireless broadcast
- Auto broadcast
- Emergency broadcast
- Timed broacast
- Platform broadcast
- TTS broadcast
- Monitor
- Record
- Log
- Time synchronization
- Intercom
- Network administrator
- Voice broadcast
- Role priority
- Chime
- BGM
- Volume auto adjustment
- Manual program

Hardware

- Main/spare power auto switch
- Audio long distnace transmission
- Recording output
- Cross-device backup
- Hot plug
- Amplifier auto switch
- Line detection
- Fault auto detection

. . . . . .

System advantage

- Support long distance audio transmission.

- Support analog audio backup in case of overall network failure.

- Support timed broadcast.

- Support multi-channel (MAX 128-channel) broadcast.

- Independent developed digital audio transmission patented technology makes audio transmission delay less than 5ms.

- Dual power supply. Power switch with 0 delay.

- Standardized general-purpose interfaces and test tools are adopted for less connection workload and time.

- Cabinet adopts mixed board plugging design to automatically identify boards, so you can play as soon as card pluged or configured manually.

- The position of backup amplifier is mobile, namely, you can arbitrarily choose the location.Support cross-device backup, support a maximum of 8 main and 1 backup amplifier;

- Unitized packaging design, ultra-high space utilization, 3U cabinet supports up to 14 boards.

- Hot-swap design. Anti-current spark, anti-surge.

03
Function module

Central architecture
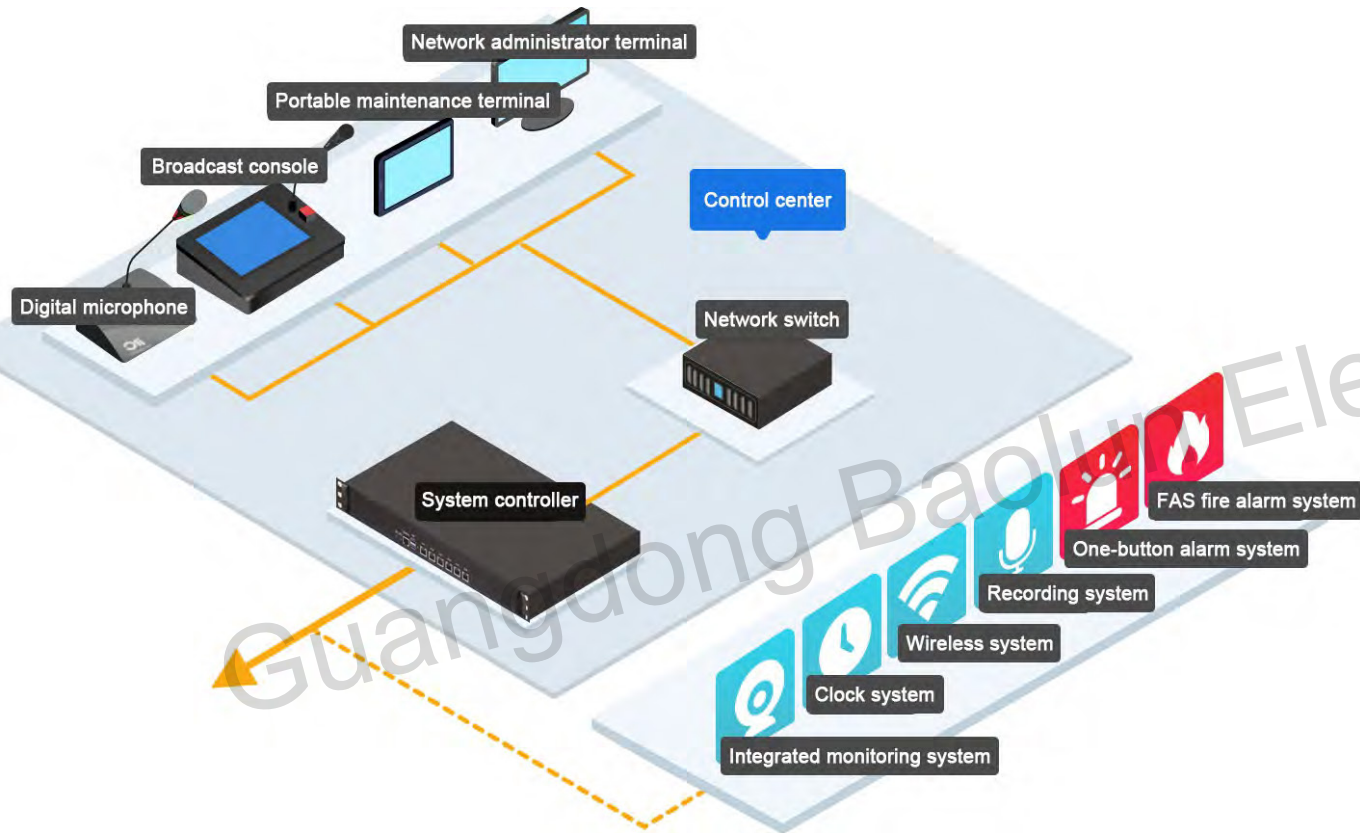
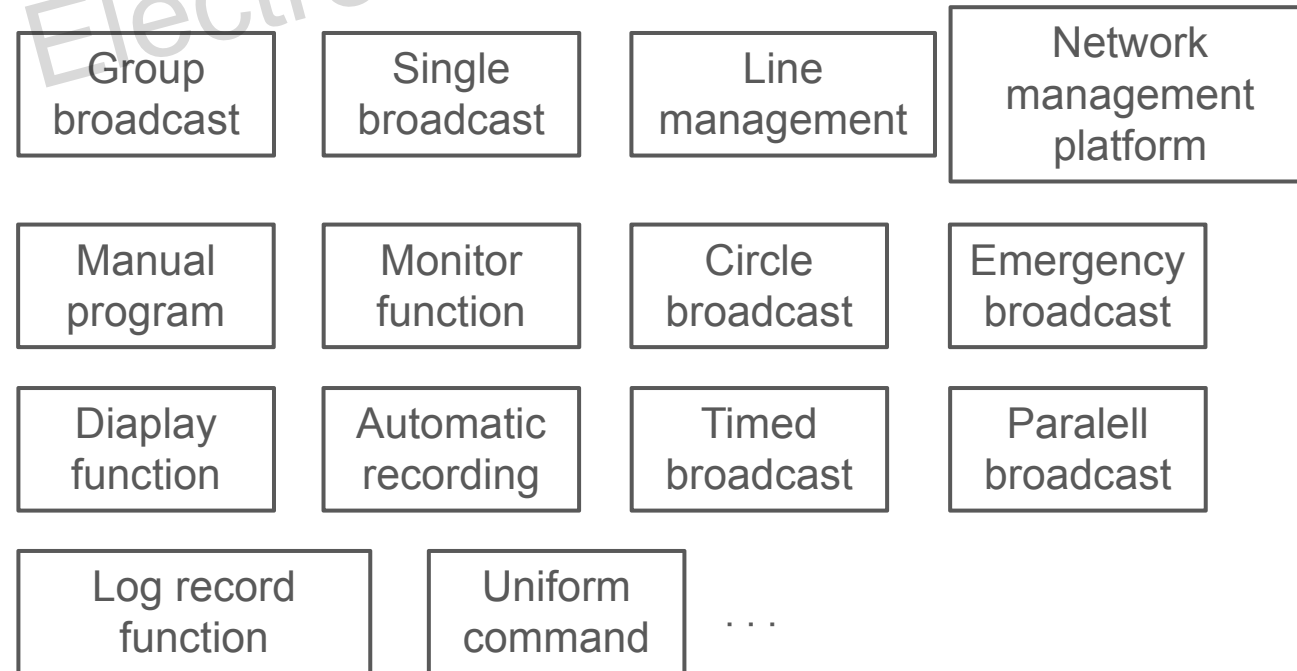| Main equipment		
System controller	VA-6502HC1	Central broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.
Broadcast console	VA-6504BA1	Full-featured broadcast console
Digital Mic	VA-6504BC1	Full digital microphones for stations & centers, with monitoring and intercom function which is controlled by comprehensive monitoring software
System software		
Central interface software	VA-6503AC1	Integrate with the whole line and COCC
Center Management Software	VA-6503SC1	Line center management software for broadcasting on all stations of this line
System network management software	VA-6503SD1	System network management software
Equipment maintenance software	VA-6503SM1	System maintenance management software
Speech tp text software (TTS)	VA-6503SS2	Optional
Transfer line control software	VA-6503SL1	Optional,custmized for different project
Recording software	VA-6503SR1	Stations recording software to record all broadcast activities, with a maximum of 16-channel simultaneous recordings

Central broadcast

The Central Broadcast is applied in the control center of the subway line, which is a combination of multi-level station broadcast. The central broadcast system is connected to various station broadcast system through the network for monitoring.

| Group broadcast | Single broadcast | Line management | Network management platform |

| Manual program | Monitor function | Circle broadcast | Emergency broadcast |

| Diaplay function | Automatic recording | Timed broadcast | Paralell broadcast |

| Log record function | Uniform command | . . . |

Advantage：

- **Digital audio technology**

  The technology is independently developed by itc. The audio transmission delay is less than 5ms, enabling ultra-low latency.

- **Multi-channel network access**

  Support 6-channel network independent access, network isolation

- **Parallel broadcast**

  The system supports a maximum of 128 channels of independent broadcast.

- **Network intercom**

  Support network intercom(central to various local station) function

- **Recording function**

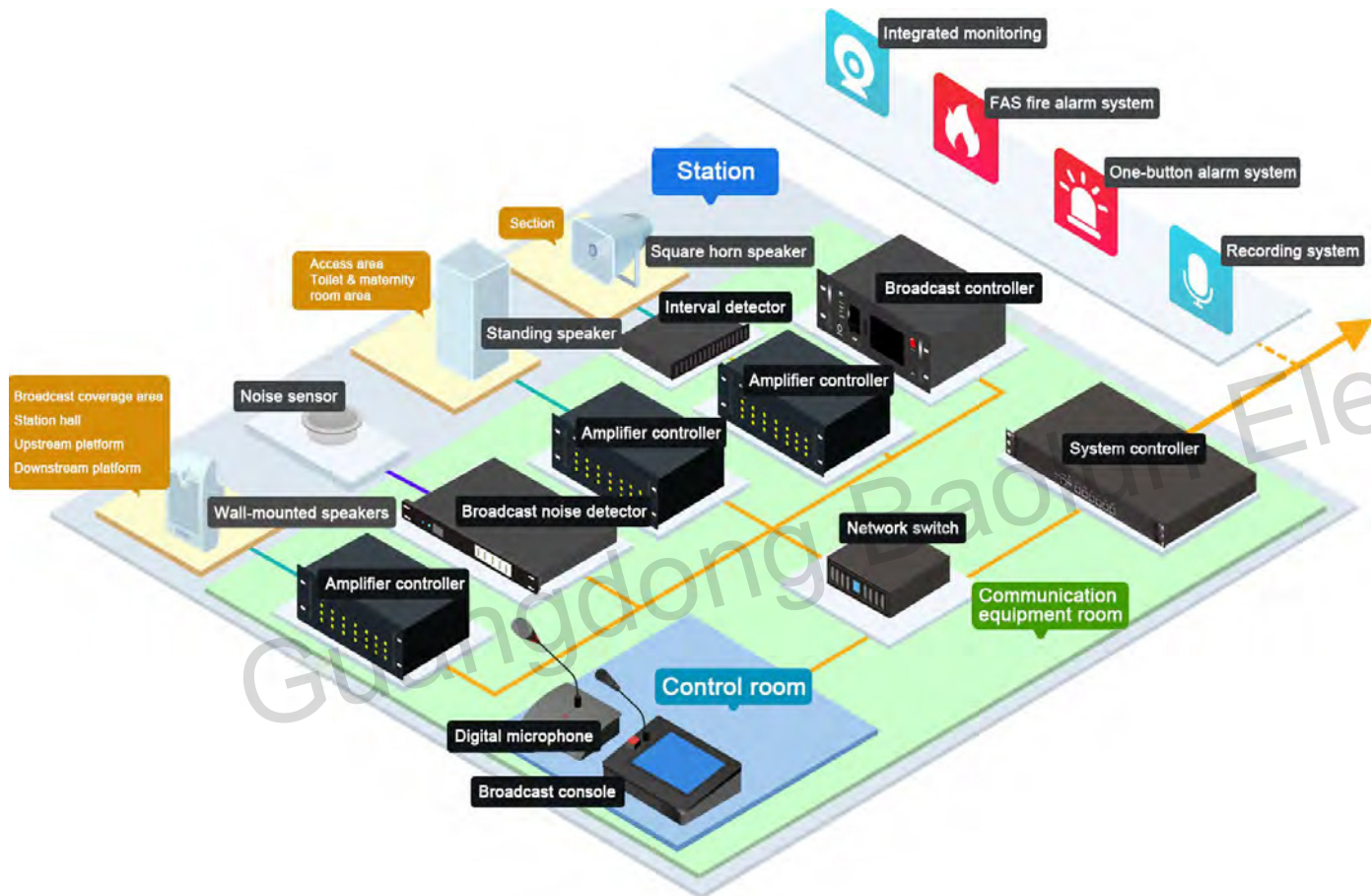 Support prerecording and real-time recording

- **Priority setting**

  Support a maximum of 1000 priority levels

- **User permission setting**

  Support role permission limitation
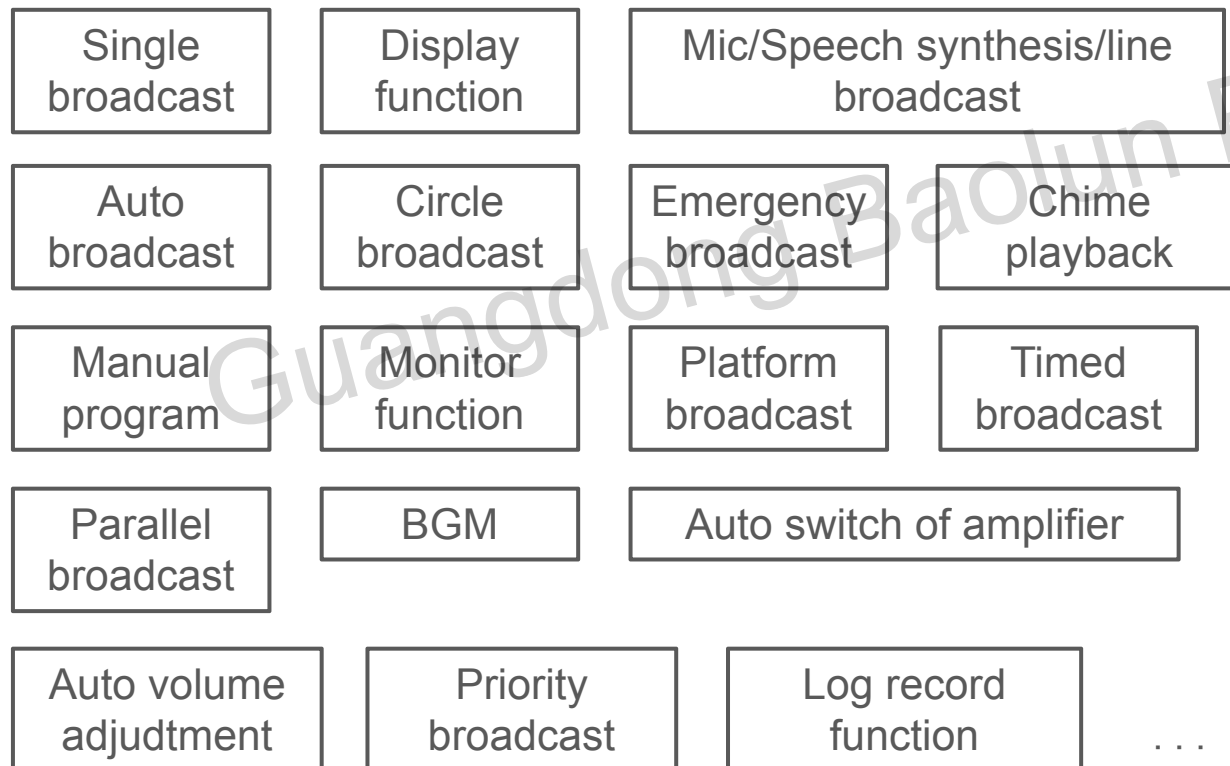
Station architecture

Main equipment		
System controller	VA-6502HS1	Central broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.
Broadcast controller	VA-6500	Integrated broadcast host/card-plugging broadcast host
Amplifier controller	VA-6501	Integrated broadcast amplifier/card-plugging broadcast amplifier
Brodcast console	VA-6504BA1	Full-featured broadcast console
Digital Mic	VA-6504BC1	Full digital microphones for stations & centers. Support monitoring and intercom function. It is managed and dispatched by comprehensive monitoring software
Noise detection controller	VA-6505NC1	Noise detection controller, 1U
Noise sensor	VA-6505NT1	Universal noise detection probe, non-real-time noise detection, RVV three-wire connection. The detection distance is up to 1 km
Interval detector	VA-6511	Ultra long audio transmission distance in tunnel interval
System software		
Station management software	VA-6503SS1	Station broadcasting management software
Station interface software	VA-6503AS1	Station business interface software integrates with communication system, clock and other systems
Text to speech(TTS)	VA-6503SS2	Optional
Recording software	VA-6503SR1	Recording software records all broadcast activities in station, with a maximum of 16-channel simultaneous recordings

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Station broadcast

The console of the integrated monitoring system in the control room of each station supports **station broadcasting**. It can broadcasts in all selected zones, multiple selected zones or single selected zone. The audio source includes the control center broadcast, the local microphone broadcast, pre-recorded voice, BGM, etc.

Single broadcast	Display function	Mic/Speech synthesis/line broadcast	
Auto broadcast	Circle broadcast	Emergency broadcast	Chime playback
Manual program	Monitor function	Platform broadcast	Timed broadcast
Parallel broadcast	BGM	Auto switch of amplifier	
Auto volume adjudtment	Priority broadcast	Log record function	. . .

Advantage：

- **Interval ultal long distance audio transmission.**
  A new solution of ultra long distance audio transmission, low cost and easy maintenance.

- **Analog audio backup**
  When the network fails, the broadcast amplifier automatically connects to analog audio for emergency broadcast

- **Parallel broadcast**
  The system supports a maximum of 128 channels of independent broadcast.

- **Digital audio technology**
  The technology is independently developed by itc. The audio transmission delay is less than 5ms, enabling ultra-low latency.

- **Online backup power supply**
  The main equipment of the system adopts the dual power supply of IT server level. When the main power supply fails, it is automatically switched to the backup power supply with zero delay to ensure normal operation.

- **Mixed card plugging**
  Support automatically identify cards,play as soon as card is pluged. It can be also configured manually.

- **Flexible location of the spare amplifier**
  The location of backup amplifier is mobile, namely, you can arbitrarily choose the location. Support cross-device backup, support a maximum of 8 main and 1 backup amplifier;
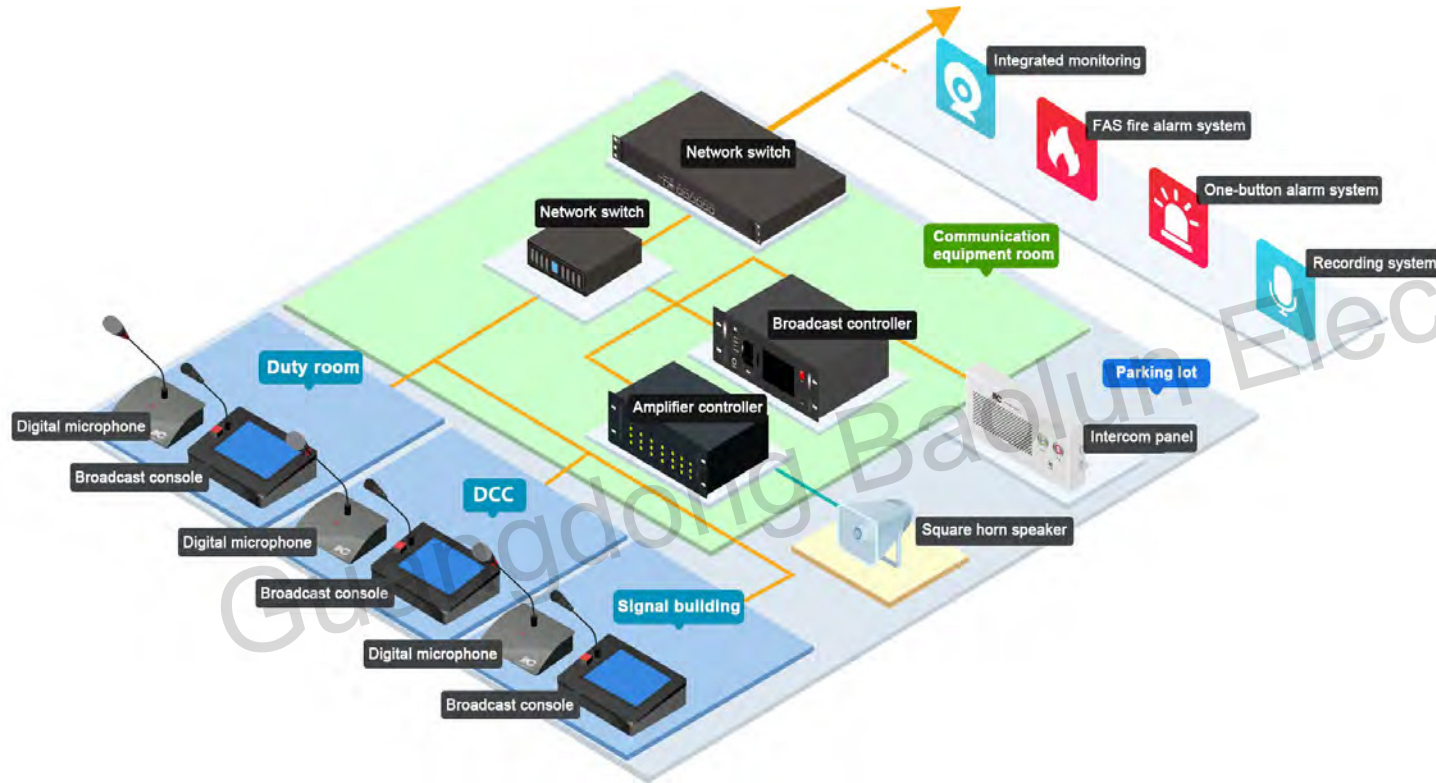
- **Ultal high utilization**
  Unitized packaging design, ultra-high space utilization, 3U cabinet supports up to 14 boards.

- **Hot swap design**

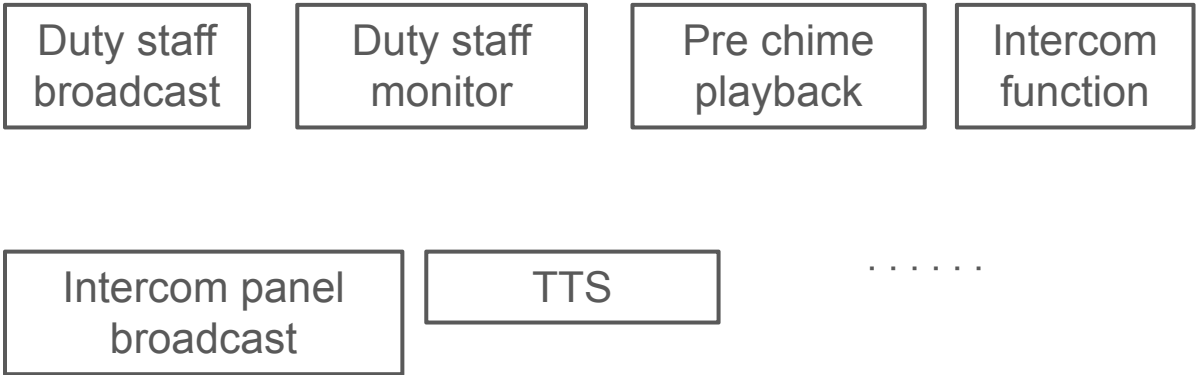 Anti-current spark, anti-surge, safe and reliable.

Main equipment		
System controller	VA-6502HS1	Station/Railway vehicle broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.
Broadcast controller	VA-6500	Integrated broadcast host/card-plugging broadcast host
Amplifier controller	VA-6501	Integrated broadcast amplifier/card-plugging broadcast amplifier
Brodcast console	VA-6504BA1	Full-featured broadcast console
Digital Mic	VA-6504BC1	Full digital microphones for stations & centers. Support monitoring and intercom function. It is managed and dispatched by comprehensive monitoring software
Intercom panel	VA-6504BD1	Railway vehicle application, digital intercom panel support one-key broadcast, support one-key intercom to the control center
System software		
Station management software	VA-6503SS1	Station broadcasting management software
Station interface software	VA-6503AS1	Station business interface software integrats with communication, clock and other systems
Text to speech(TTS)	VA-6503SS2	Optional
Recording software	VA-6503SR1	Recording software records all broadcast activities in station, with a maximum of 16-channel simultaneous recordings

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Railway vehicle broadcast

The **railway vehicle broadcast system** is a set of independent regional broadcasting systems for the operating personnel, and duty staff at site can communicate with operating personnel through the intercom wall panel. The personnel in the broadcast console can monitor the broadcasting coverage area. And t is recommended to include the parking lot broadcast network in the centralized network system for unified network management.

Duty staff broadcast	Duty staff monitor	Pre chime playback	Intercom function

Intercom panel broadcast	TTS	. . . . . .

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Advantage：

- **Analog audio backup**

- **Parallel broadcast**

- **Digital audio technology**

- **Online backup power supply**

- **Mixed card plugging**

- **Flexible location of backup amplifier**

- **Hot swap design**

- **Professional intercom system**

  Support full-digital full-duplex intercom function, and speakerphone

- **Customized zone broadcast**

  Through the system management software, we can customize broadcast area. Intercom panel supports one-button broadcast.

Platform broadcast

Platform broadcast: platform staff can carry the wireless broadcast terminal with him, which can broadcast to the specified zone if necessary.

Advantage:

- **Zone selection**

The platform staff can select the broadcast zone by the knob or button of the wireless handheld terminal, long press the PTT button of the terminal for manual voice broadcasting, and release the button to end it

Quick command

The system can set up quick commands, and the platform staff can realize the pre-recorded audio source broadcast of the selected zone through the handheld terminal button.

Multiple access

Support a maximum of 64-channel wireless intercom signals for simultaneous access

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Ultra-long-distance audio transmission

Design ideas :
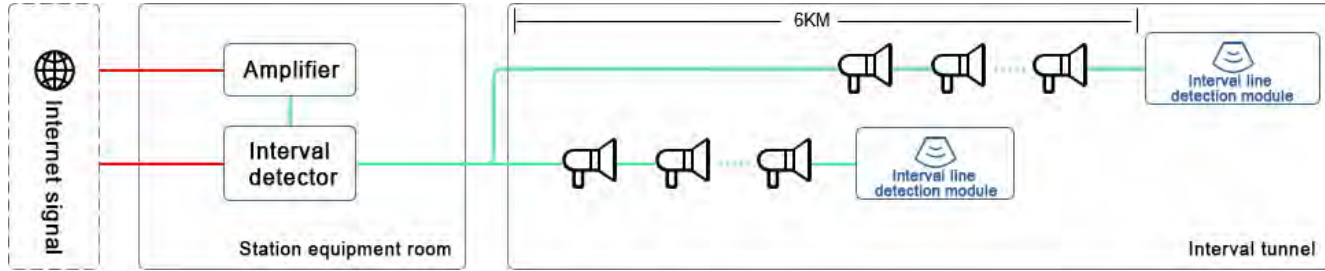
Technological breakthrough :

- Ultra long distance audio transmission. The maximum distance can reach more than 6Km

- Solve the problem of speaker loop detection under strong electric field interference to accurately detect loop faults

Commercial value :

- The equipment is installed in the station equipment room for centralized management and easy maintenance.

- Compared with the traditional solution, the cables quantity is massively reduced, and the cost is only about 1/10 of the traditional one.

Patent :

Applied for Invention Patent and Utility Model Patent

For the audio broadcasting in the tunnel, this solution hereby solves the problems that exist in the traditional interval broadcasting audio transmission over a long distance

04
Equipment introduction

- Support zone status and device status display

- Come with mode switch button and emergency microphone, support manual/automatic switch into emergency mode

- Support fault audio & light prompt, manual fault reset

- Support zone monitoring function

- Support dry contact trigger input/output

- Support to broadcast external audio source

- Support CAN interface linkage with external system, communication mode is main device mode

- Backup power supply. When the main power supply fails, it automatically switch to the backup power.

Front panel
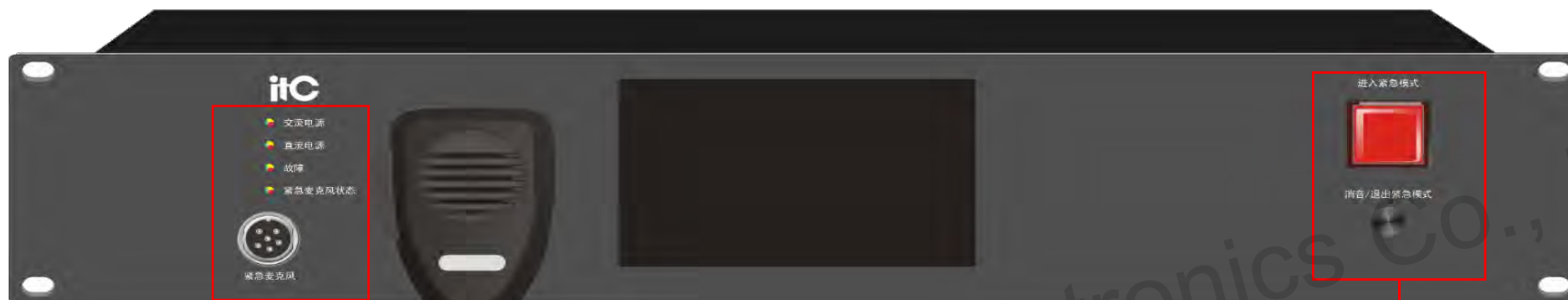
- ➢AC power indicator
- ➢DC power indicator
- ➢Equipment fault indicator
- ➢Emergency microphone status indicator
- ➢Aviation plug
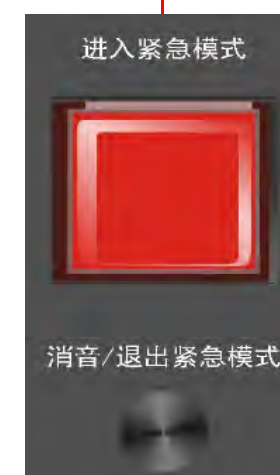
- ➢ Emergency button
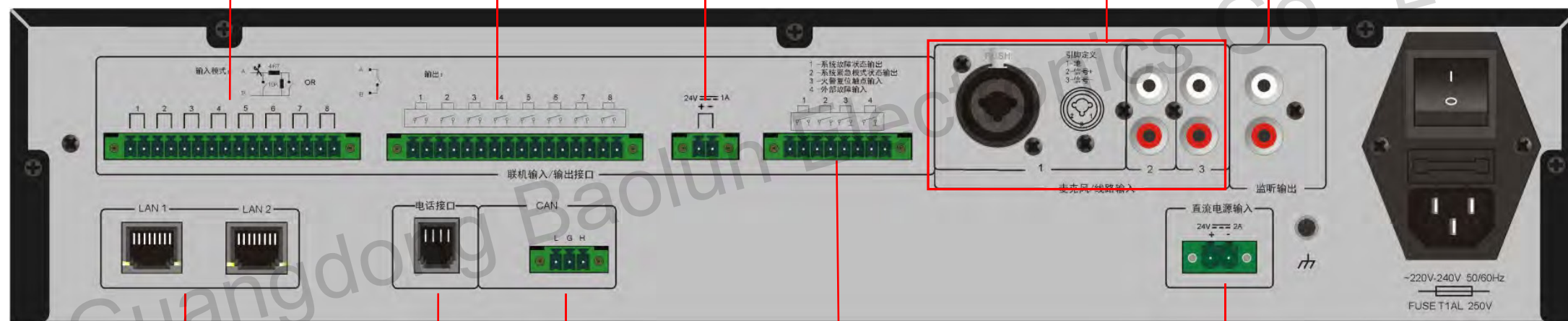
- ➢ Mute button

Rear panel

➤ 8-channel trigger input interface (short circuit mode, electrical level mode)

➤ 8-channel trigger output interface

➤ 24V Voltage output interface

➤ Microphone / line in interface

➤ Monitor output interface

➤ Network interface

➤ CAN Interface (reserved)

➤ System fault status output
➤ System emergency mode status output
➤ Fire alarm reset trigger input
➤ External fault input

➤ DC24V spare power input interface

➤ Telephone interface (reserved)

- Support zone status and device status display

- Support dry contact trigger input/output

- Support 4 main and 1 backup power amplifier switching

- Support real-time monitoring of speaker lines, automatic isolation of short circuit

- Support sleep mode and automatic wake-up function when power amplifier is supplied by DC power

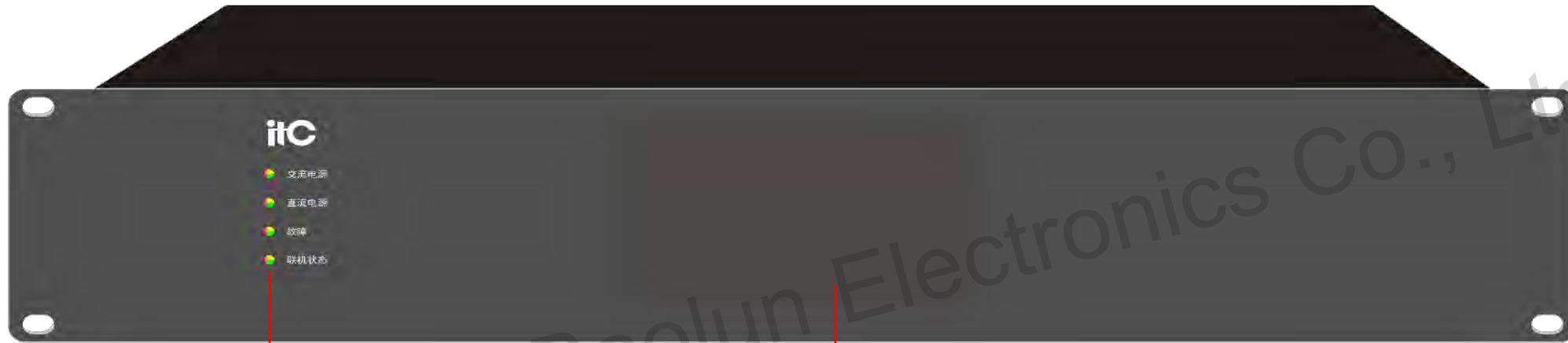- Backup power supply. When the main power supply fails, it automatically switch to the backup power.

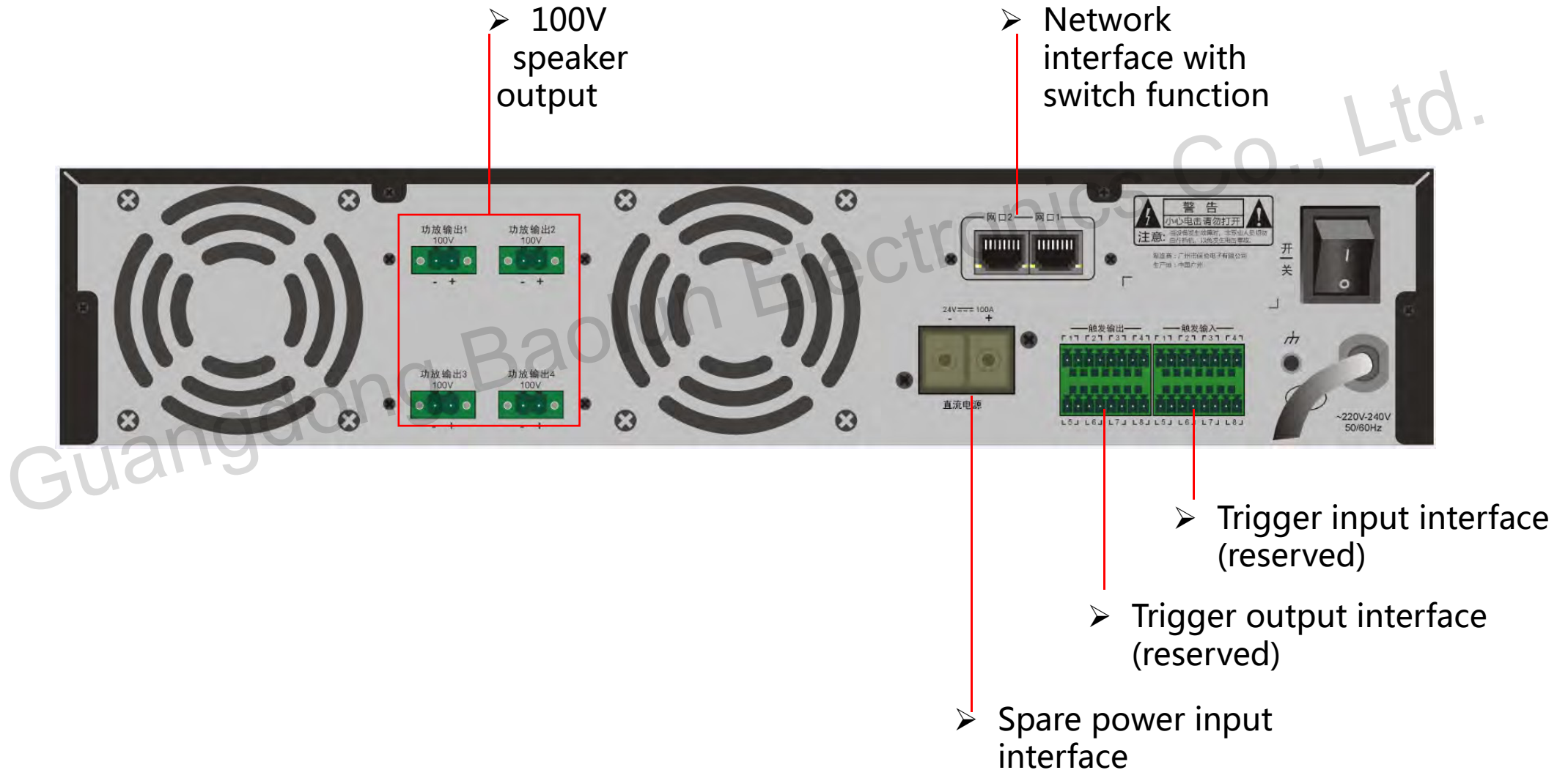VA-6501P01：120W

VA-6501P02：240W

VA-6501P03：350W

VA-6501P05：500W

Front panel

itC

> AC power indicator
> DC power indicator
> Equipment fault indicator
> Online status indicator

> 5 inch LCD without touch function

Rear panel

- 100V speaker output
- Network interface with switch function
- Trigger input interface (reserved)
- Trigger output interface (reserved)
- Spare power input interface

Card plugging broadcast controller VA-6500

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- Support zone status and device status display
- Come with mode switch button and emergency microphone, support manual/automatic switch into emergency mode
- Support fault audio & light prompt, manual fault reset
- Support zone monitoring function
- Support external audio source input and balanced audio output
- Support recording function, multi-channel recording output
- Support telephone broadcasting in designated area and two-way intercom to business microphone
- Support dry contact trigger input/output
- Support noise detection function. It can automatically adjust the broadcast volume according to environmental noise to broadcast clearly
- Support mixed card plugging
- Backup power supply. When the main power supply fails, it automatically switch to the backup power.
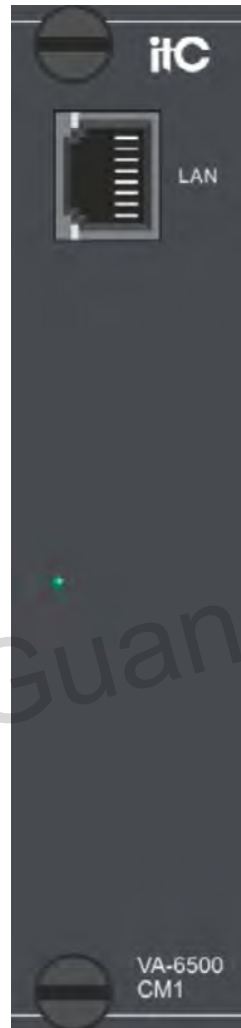
Chassis（VA-6500CC1）

Support to expand up to 14 boards, support system equipment status, partition status display, monitoring and emergency broadcast.

Main control board (VA-6500CM1)

Main functions:

1. Data interaction with interface host.

2. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 1 pcs

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Audio board (VA-6500CA1)

Main functions:

1. Receive the scheduling command to collect audio and play it to the designated area.

2. Receive scheduling command and output corresponding audio signal.

3. RS422 interacts with the external system to realize the forwarding of external system commands.

4. Through RS485 and the external system interaction, realize the external system command forwarding.

5. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 4 pcs

Recording board (VA-6500CR1)

Main functions:
1. Receive scheduling command to collect audio and push audio to the third-party device.
2. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 4 pcs

# Telephone interface board（VA-6500CT1）

Main functions:

1. Handle the call in operation, broadcast the telephone to the designated area according to the user's operation;
2. Receive dispatching command and initiate intercom to broadcast console or digital microphone;
3. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 1 pcs

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Noise detection board（VA-6500CN1）
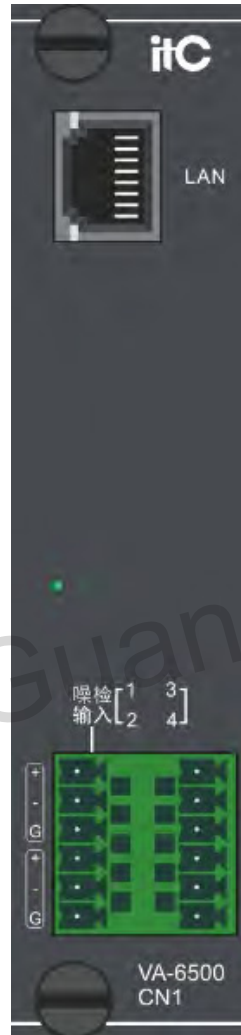
Main functions:

1. External noise detection probe, each noise detection channel can be connected with up to 8 noise detection probes. The environmental noise data is collected and uploaded to the system to automatically adjust the output volume of the area.

2. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 8 pcs

FAS Short circuit board（VA-6500CF1）

Main functions:

1. Collect the trunk node signal and execute the corresponding trigger task.

2. Receive the control command from the interface host and control the external output interface to execute the action.

3. Receive the scheduling command to collect audio and play it to the designated area.

4. Receive scheduling command and output corresponding audio signal.

5. Report the working status of the equipment: online status, fault status, etc.

Quantity of boards supported: 8 pcs

Power board（VA-6500CP1）

Main functions:

1. Power supply for power amplifier board of chassis

2. Indication of working status of supporting board

3. To support continuous maintenance, it is necessary to use the start stop function on the module

Quantity of boards supported: 2 pcs

- Support zone status and device status display

- Support dry contact trigger input/output

- Support 4 main and 1 backup power amplifier switching

- Support real-time monitoring of speaker lines, automatic isolation of short circuit

- Support sleep mode and automatic wake-up function when power amplifier is supplied by DC power

- Backup power supply. When the main power supply fails, it automatically switch to the backup power.

Power amplifier Chassis（VA-6501PC1）

Support to expand up to 7 boards and supports the indication of online status, fault status and standby status of each board.

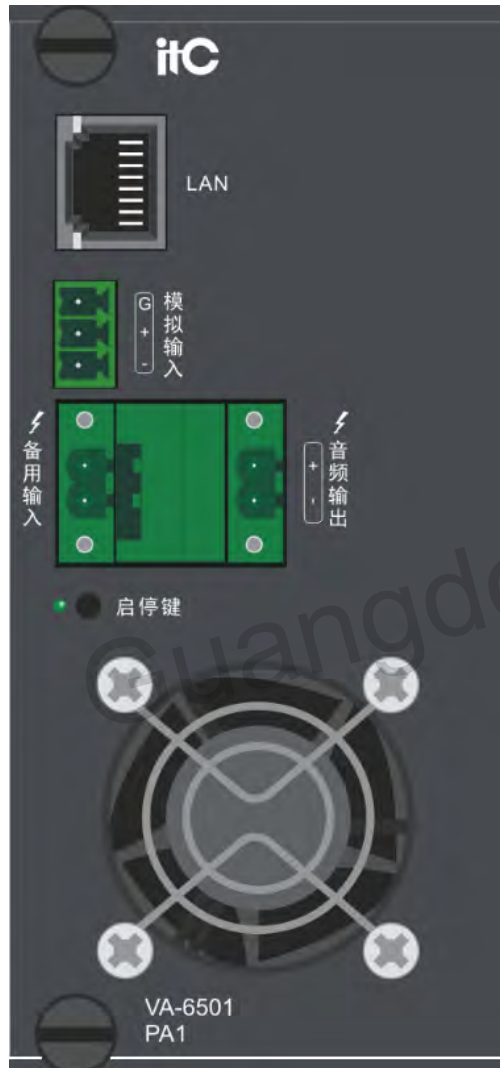MODERN COMMUNICATION TECHNOLOGY

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Power supply board (VA-6501PP1)

Main functions:

1. Power supply for power amplifier board of chassis

2. Indication of working status

Quantity of boards supported: 2 pcs

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Power amplifier board（VA-6501PA1/2/3/5）

VA-6501
PA1

Main functions:

1. High efficiency class D power amplifier

2. Built in digital decoder, decode network audio directly

3. Support local emergency audio input broadcast when network is disconnected

4. Loop state detection supporting output partition

5. Real time indication of the working state of power amplifier board

6. It supports the automatic fault switching of power amplifier board, and supports the switching mode of 8 active and 1 standby

7. To support continuous maintenance, it is necessary to use the start stop function on the module

Quantity of boards supported: 6 pcs

Note:
　　1. The analog input interface is connected with emergency audio signal. No matter there is network signal, when the analog input port has signal input, the analog signal is preferentially output.
　　2. The standby input interface is connected with the output interface of the standby power amplifier board

VA-6501PA1：120W
VA-6501PA2：240W
VA-6501PA3：350W
VA-6501PA5：500W

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Module	Description
VA-6502HC1	Central broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.
VA-6502HS1	Station/railway vehicle broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.
VA-6502HT1	Tunnel interval broadcast interface controller with operation interface software, management software to integrate with communication systems, etc.

- Support to control the system through touch operation

- Come with mode switch button and emergency microphone, support manual/automatic switch into emergency mode

- Support zone monitoring and internal two-way intercom

- Support timed task configuration, task list view and management

- Support voice broadcast and TTS broadcast tasks, support TTS converted media file saving

- Support recording tasks, which can be saved as a local media or broadcast tasks

- Support local media library management, including upload and deletion

- Built in self-developed data transmission module, it supports end-to-end transmission with extremely low delay

- Support zone monitoring and internal two-way intercom

- Support paging to the designated area through system management software
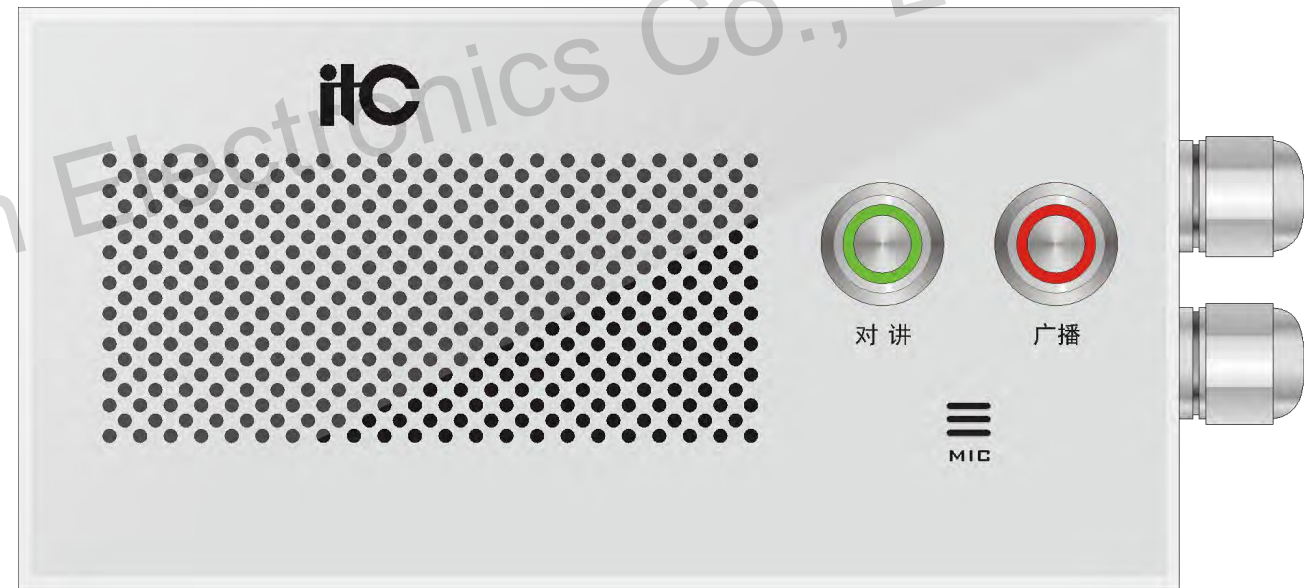
- Support AEC function. Network echo is completely suppressed

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- Support one-button paging

- Support full duplex two-way intercom function

- Support IP55 waterproof and dustproof

- Support AEC function. Network echo is completely suppressed

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The broadcast noise detector is used to keep the background music and broadcast sound clear when there is a large amount of people flowing into the environment. Its built-in environment noise control (ANC) function can automatically control the output volume according to the change of environmental noise, so as to keep the background music and broadcasting clear.

1. Function display screen
2. Function knob
3. Monitor light
4. Ch1 input level indication

5. Ch1 through / automatic control switch
6. Ch1 output level indication

1. DC 24 V standby power input interface
2. Monitor output
3. Ch1 signal input
4. Ch1 signal output

5. PC serial port
6. Network interface
7. Communication interface of noise detection probe
8. Monitoring input interface of noise detector probe

The full digital noise acquisition probe is used with the noise detector to collect the ambient noise. After processing, the signal is sent back to the broadcast noise detector to automatically control the output volume of the related area.

Four groups of independent constant voltage 100V input interfaces are built in the interval detector, and each group provides four groups of independent constant voltage 400V output after boosting through the internal audio transformer of the equipment. The optimized 100V constant voltage output is attenuated after long-distance transmission, and further sound reinforcement transmission distance is achieved through internal audio boost。

➢ 100V Audio input, external power amplifier output

➢ 400V output
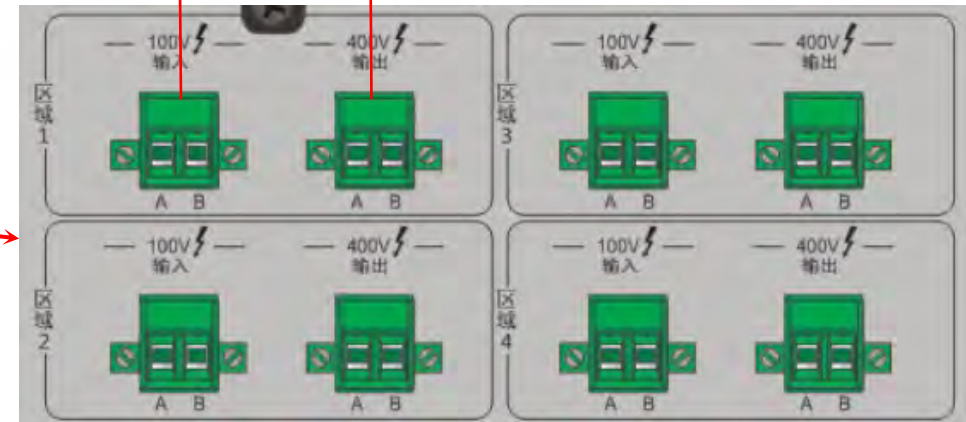
05
Project
Sharing

Project Sharing

Guangzhou Metro

The project covers a special broadcast subsystem for Line 3 East extension, line 5 East extension, line 7 phase II, line 10, line 11, line 12, line 13 phase II, line 14 phase II, line 18 and line 22 in Guangzhou Metro.

Guangzhou South Railway Station

It can obtain vehicle information timetable, calculate the execution time of each task, and automatically broadcast after the train enters the station, etc.

Project Sharing

Hainan Roundabout Railway

Adopt full digital railway system, integrated design, TCP/IP network, efficient audio data transmission technology. Audio supports multiple channels, equipment meets CCCF requirements, and meets the demand of railway platform broadcasting

Beijing-Tianjin Intercity Railway

The project solves the basic business demands of the system, including line detection, server backup, terminal backup, station broadcasting, emergency broadcasting. The highlight of the project is the redundant lines dedicated to emergency broadcasting

Project Sharing

Lanzhouxi Railway Station

In addition to the basic business of the platform, it also solves the **broadcast coverage of the long platform**. It is the first major breakthrough in the industry that **uses the digital docking protocol as a standard protocol**

Guanhui Intercity Railway

Hefu Railway Station

Other projects

Anhui Railway Station   Intercity Railway   Fengling Passenger Station

Shanxi Huairen Station   Chifeng West Square Station   · · · · · ·

More project is coming...

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