

2-Wire Analog Audio Indoor Monitor

User Manual



V1.0.1

Foreword

General

This manual introduces the structure, functions, and operations of the EACH indoor monitor (hereinafter referred to as "the VTH"). Read carefully before using the device, and keep the manual safe for future reference.

Safety Instructions

The following signal words might appear in the manual.

Signal Words	Meaning
 DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
 CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, reductions in performance, or unpredictable results.
 NOTE	Provides additional information as a supplement to the text.

Revision History

Version	Revision Content	Release Time
V1.0.1	Reviewed the diagram.	December 2025
V1.0.0	First Release.	December 2025

Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, fingerprints, and license plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited: Providing clear and visible identification to inform people of the existence of the surveillance area and provide required contact information.

About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.
- We are not liable for losses incurred due to operating the product in ways that are not in compliance with the manual.
- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user manual, use our CD-ROM, scan the QR code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.

- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please contact customer service for the latest program and supplementary documentation.
- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguard and Warnings

This section introduces content covering the proper handling of the device, hazard prevention, and prevention of property damage. Read carefully before using the device, and comply with the guidelines when using it.

Installation Requirements



- Do not connect the power adapter to the device while the adapter is powered on.
- Do not connect the device to two or more kinds of power supplies, to avoid damage to the device.
- Please follow the electrical requirements to power the device.
 - ◇ Following are the requirements for selecting a power adapter.
 - The power supply must conform to the requirements of IEC 60950-1 and IEC 62368-1 standards.
 - The voltage must meet the SELV (Safety Extra Low Voltage) requirements and not exceed ES-1 standards.
 - When the power of the device does not exceed 100 W, the power supply must meet LPS requirements and be no higher than PS2.
 - ◇ When selecting the power adapter, the power supply requirements (such as rated voltage) are subject to the device label.



- Personnel working at heights must take all necessary measures to ensure personal safety including wearing a helmet and safety belts.
- Do not place the device in a place exposed to sunlight or near heat sources.
- Keep the device away from dampness, dust, and soot.
- Install the device on a stable surface to prevent it from falling.
- Install the device in a well-ventilated place, and do not block its ventilation.
- Use an adapter or cabinet power supply provided by the manufacturer.
- Use the power cords that are recommended for the region and conform to the rated power specifications.
- The device is a class I electrical appliance. Make sure that the power supply of the device is connected to a power socket with protective earthing.
- The device must be installed at a height of 2 meters or below.

Operation Requirements



Battery Pack Precautions

Preventive measures (including but not limited to):

- Do not transport, store or use the batteries in high altitudes with low pressure and environments with extremely high and low temperatures.
- Do not dispose the batteries in fire or a hot oven, or mechanically crush or cut the batteries to avoid an explosion.

- Do not leave the batteries in environments with extremely high temperatures to avoid explosions and leakage of flammable liquid or gas.
- Do not subject the batteries to extremely low air pressure to avoid explosions and the leakage of flammable liquid or gas.



- Check whether the power supply is correct before use.
- Do not unplug the power cord on the side of the device while the adapter is powered on.
- Operate the device within the rated range of power input and output.
- Transport, use and store the device under allowed humidity and temperature conditions.
- If the device is powered off for longer than a month, it should be placed in its original package and sealed. Make sure to keep it away from moisture, and store it under allowed humidity and temperature conditions.
- Do not drop or splash liquid onto the device, and make sure that there is no object filled with liquid on the device to prevent liquid from flowing into it.
- Do not disassemble the device without professional instruction.

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1 Production Overview

1.1 Introduction

The 2-wire Analog Audio Indoor Monitor (VTH) uses its 2-wire system for communication. It performs audio with VTOs, and supports 2 channels alarm input.



Power supply must be certified by our company.

1.2 Functions

2-Wire Communication

Supports the 2-wire communication system.

Braille

Supports Braille.

Alarm Input

Supports 2-channel alarm input, which can be used to connect to doorbells.

Low Power Consumption

When the device is in standby mode, it is in sleep mode with extremely low power consumption and supports quick wake-up by calling or pressing the button.

Receiving Calls via the Handset

Supports receiving and hanging up via the handset.



Only devices with the handset support this function.

Machine Button

With just one-click, you can answer, hang up, unlock, turn on DND, and mute the device.

Adjustable Volume

Supports adjusting the ringtone volume and intercom volume.

Selectable Ringtones

Provides 4 kinds of ringtones.

Indicators

Provides 4 kinds of indicators with different states.

Controllable Power Indicator

Supports controlling the power indicator to be turned on or off independently.

2 Network Diagram

2.1 Network Diagram for Villa Scenario

The network diagram below displays all the networking scenarios.

The following images are for reference only. Different devices may differ according to the actual models.



When multiple VTHs are connected in the cascade mode to the port on the branch terminal, to reduce signal reflection, the 14th DIP switch of the farthest VTH from the port needs to be turned on.



The product appearance is for reference only.

Wiring 1 VTO and 1 VTH



- The two wires connected to the positive and negative terminals of OUT cannot be short-circuited.
- The line termination terminal and branch terminal are optional in this scenario.

Figure 2-1 Network diagram (without line termination terminal and branch terminal)

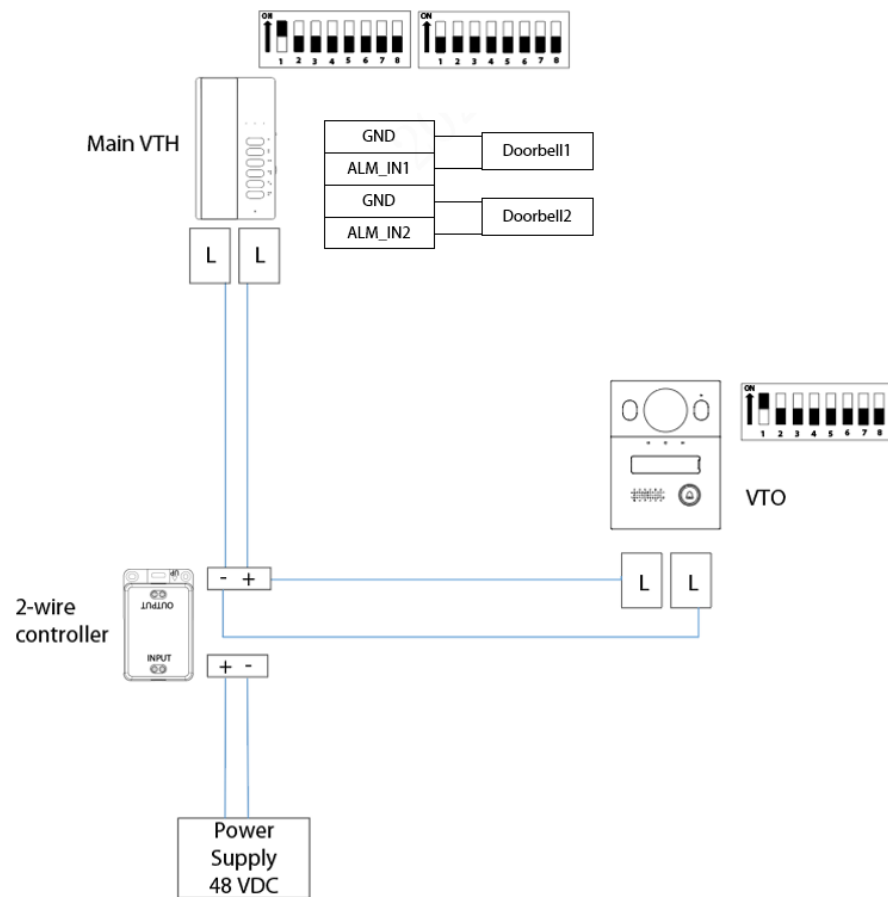
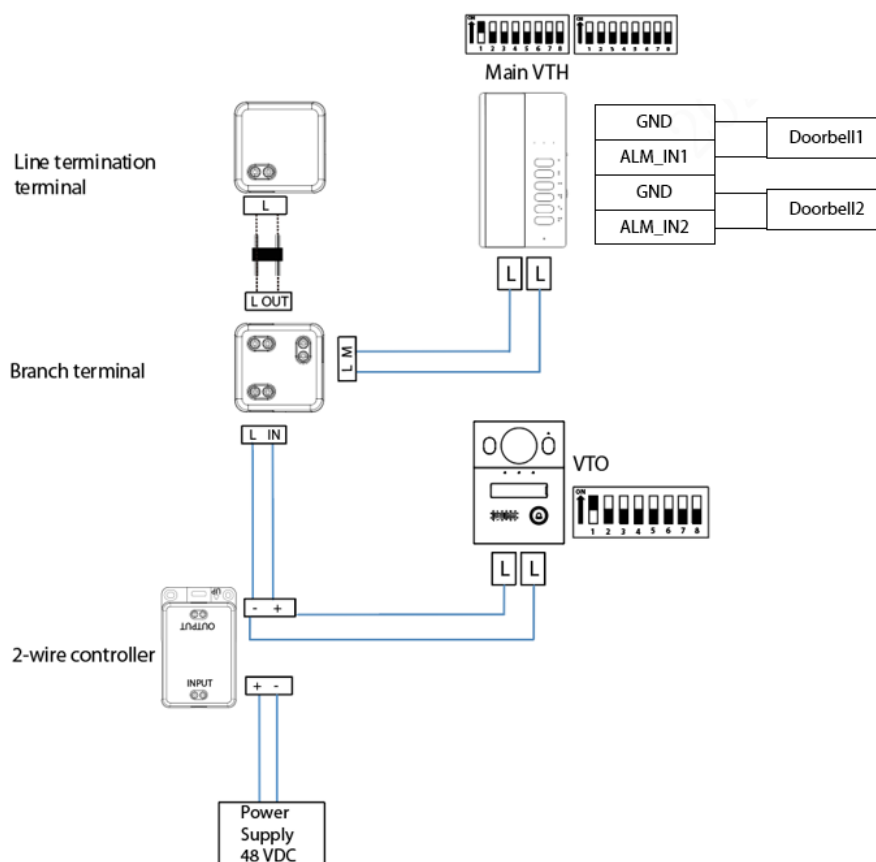


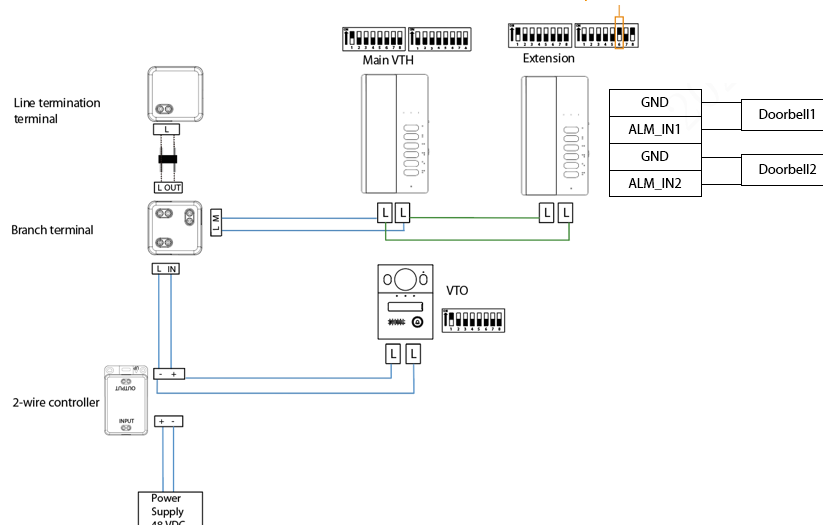
Figure 2-2 Network diagram (with line termination terminal and branch terminal)



Wiring 1 VTO and 2 VTHs (Cascade Connection)

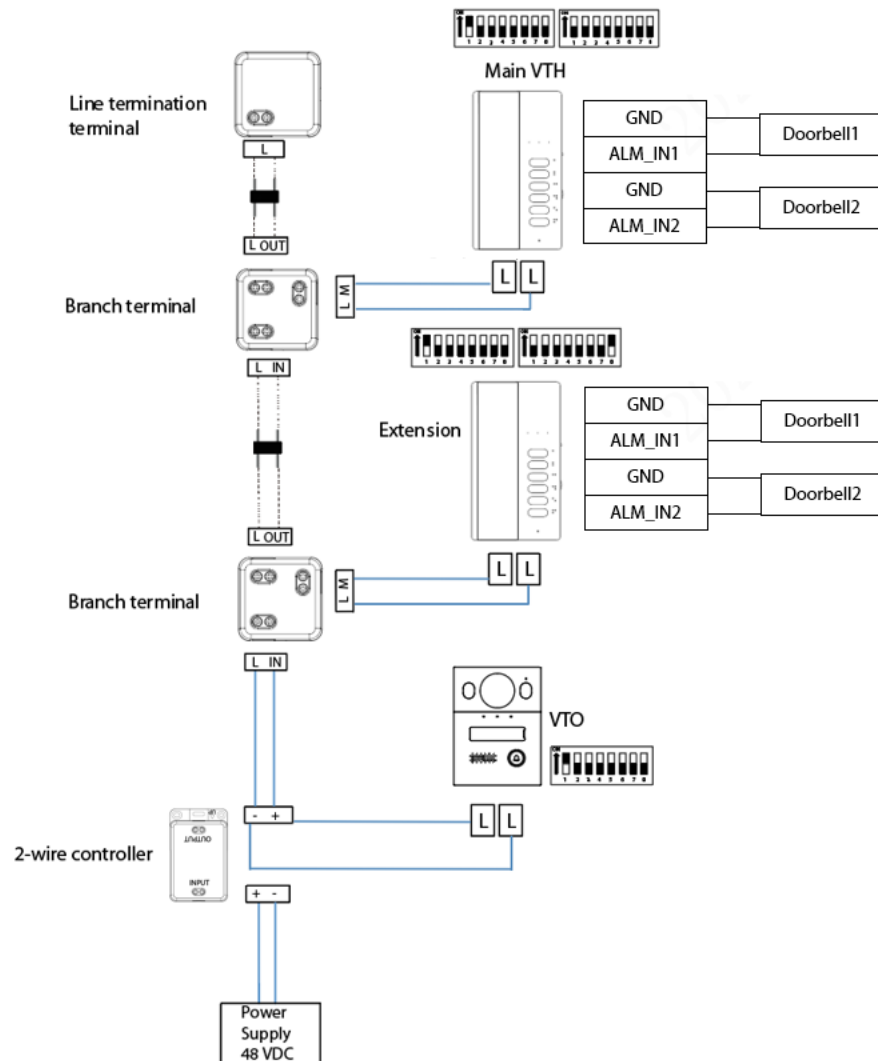
Figure 2-3 Network diagram

When multiple indoor monitors are connected in the cascade mode to the port on the branch terminal, to reduce signal reflection, the 14th DIP switch of the farthest indoor monitor from the port needs to be turned on.



Wiring 1 VTO and 2 VTHs (Parallel Connection)

Figure 2-4 Network diagram

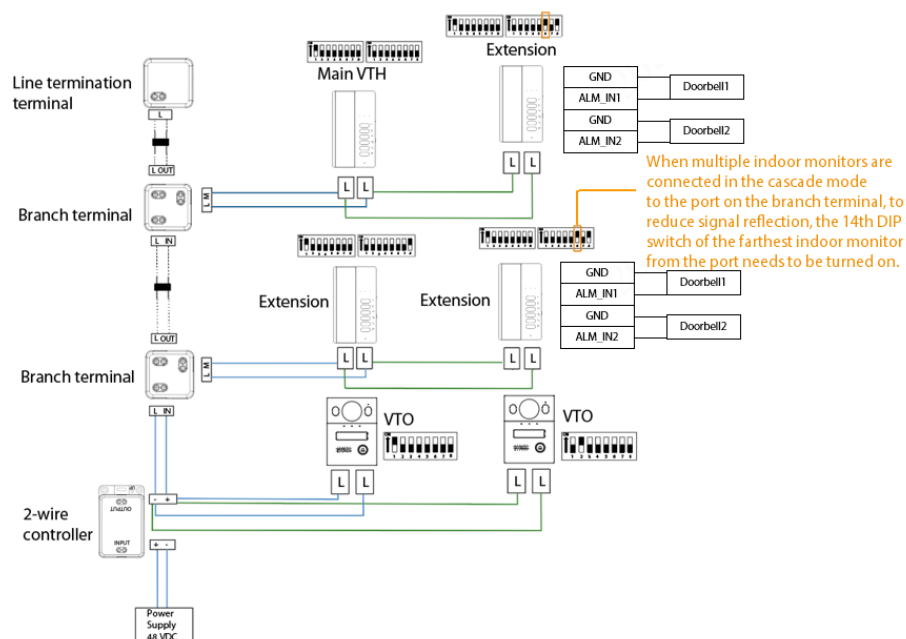


Wiring 2 VTOs and 4 VTHs



The DIP number of each VTO cannot be the same. Otherwise, the connection might fail.

Figure 2-5 Network diagram



Wiring Distance Between the VTH and VTO



- It is recommended that the distance between the line termination terminal and the 2-wire controller does not exceed 3 meters.
- Max distance (A) refers to the distance between the VTH and the VTO.
- Max distance (B) refers to the distance between the 2-wire controller and the VTH.

Figure 2-6 Max distance

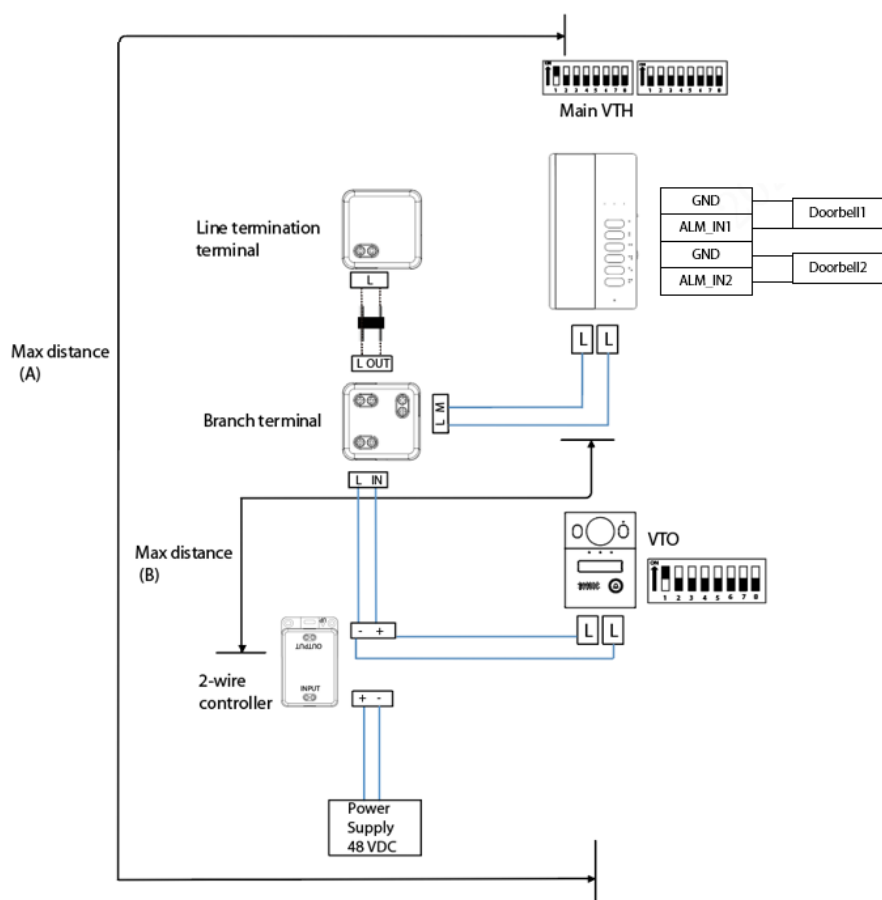


Table 2-1 Wiring distance

RVV Cable	AWG	Max. Distance (A)	Max. Distance (B)	Max. Quantity of Terminals
2 × 0.5 mm ² (Recommend)	20	180 m	100 m	6
2 × 1.5 mm ²	15	180 m	100 m	6

Table 2-2 Wiring distance

RVVP Cable	AWG	Max. Distance (A)	Max. Distance (B)	Max. Quantity of Terminals
2 × 0.5 mm ²	20	150 m	100 m	6

Table 2-3 Wiring distance

Network Cable	AWG	Max. Distance (A)	Max. Distance (B)	Max. Quantity of Terminals
Cat5e Single Pair	24	100 m	35 m	6
Cat5e Single Pair	24	100 m	50 m	4

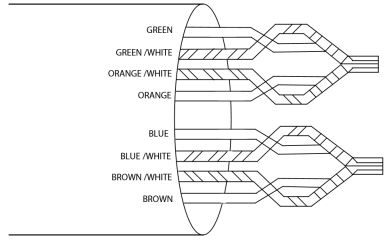
Network Cable	AWG	Max. Distance (A)	Max. Distance (B)	Max. Quantity of Terminals
Cat5e Multi Pair Cable 	24	200 m	100 m	6

Table 2-4 Wiring distance

Telephone Wire	AWG	Max. Distance (A)	Max. Distance (B)	Max. Quantity of Terminals
Telephone Wire	24	20 m	20 m	2

Cable Insertion Loss

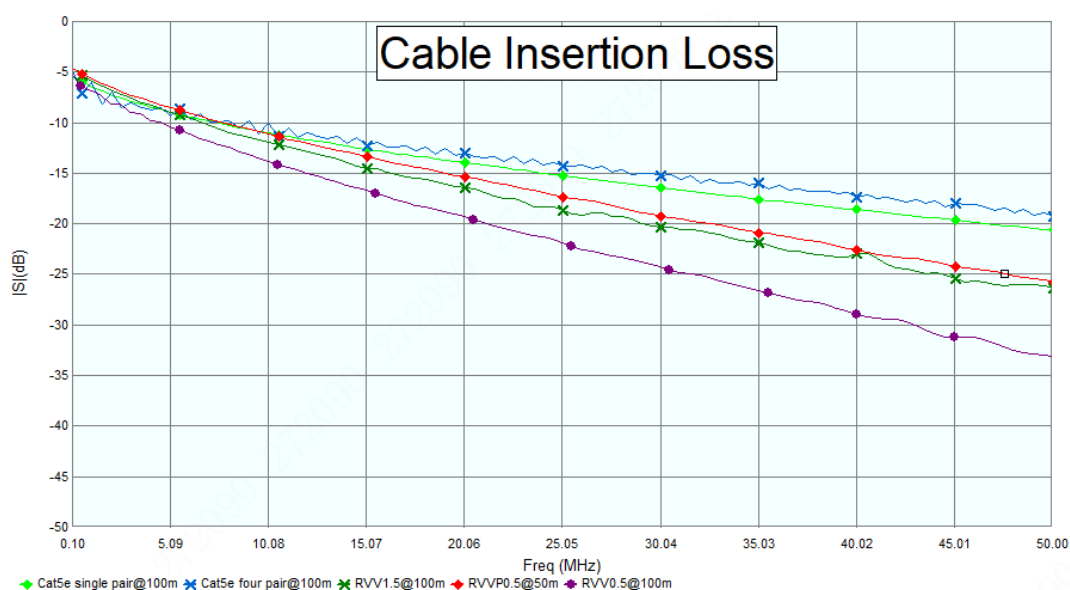
Insertion loss refers to sending a signal from one end of the cable and receiving the signal at the other end of the cable.

The calculation of cable insertion loss is as follows: $\text{Insertion Loss} = 20 \times \log (\text{signal received}/\text{signal sent})$



The cable insertion loss followed is collected from the laboratory environment, and is for reference only. The actual data might differ from that collected in the test environment.

Figure 2-7 Cable insertion loss



2.2 Network Diagram for Apartment Scenario



When multiple VTHs are connected in the cascade mode to the port on the branch terminal, to reduce signal reflection, the 14th DIP switch of the farthest VTH from the port needs to be turned on.

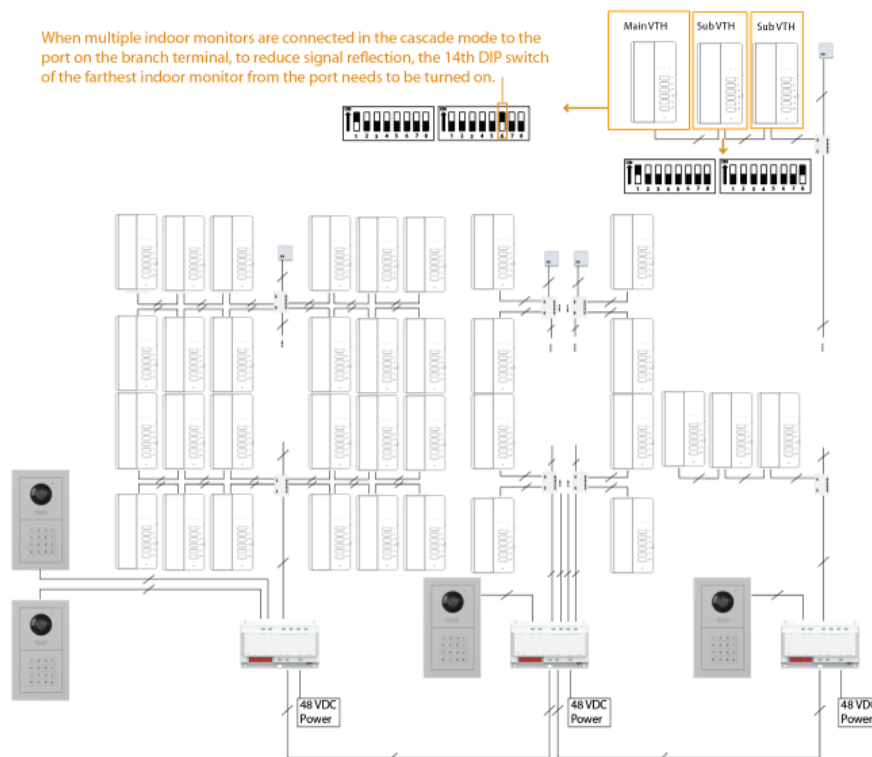
Refer to the following image to configure the DIP switch of the device in the cascade. The DIP switch of ID should be configured according to the actual situation.



The product appearance is for reference only.

Network Diagram

Figure 2-8 Network diagram

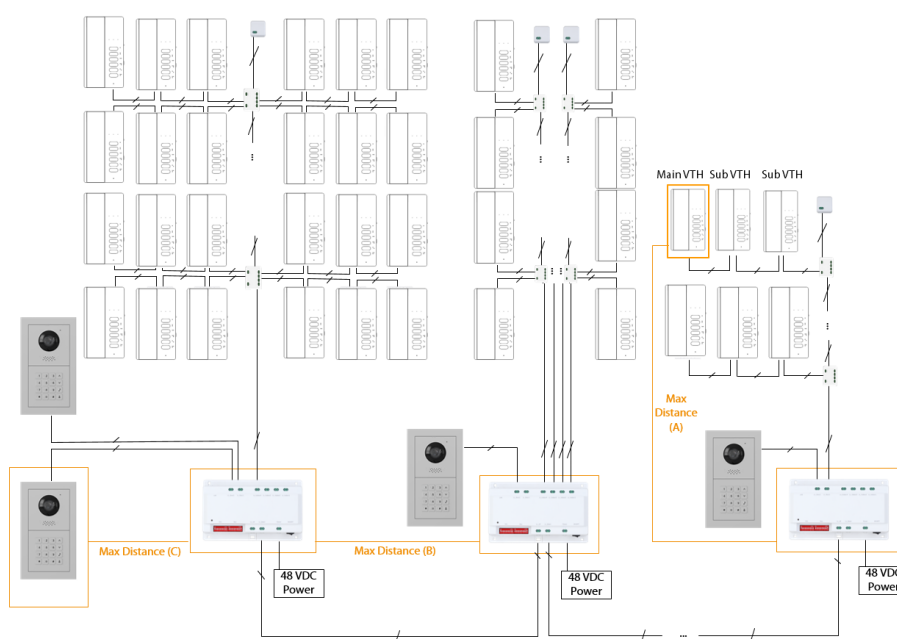


Wiring Distance between the Controller, VTH and the VTO



- Max distance (A) refers to the distance between the 2-wire controller and the VTH. $A \leq 100$ m.
- Max distance (B) refers to the distance between the cascading 2-wire controllers. $B \leq 100$ m.
- Max distance (C) refers to the distance between the 2-wire controller and the VTO. $C \leq 100$ m.
- The number of cascading controllers must be less than or equal to 10.
- For systems with multiple VTHs in a cascade, the number of devices must be less than or equal to 10 in each branch.

Figure 2-9 Max distance



Network capacity for VTH

The capacity for the VTH indicates the maximum number of VTHs that can be connected to one VTH port on the 2-wire controller.

Each controller can connect up to 22 VTHs with Wi-Fi function or up to 100 VTHs without Wi-Fi function.



- The 2-wire VTHs with the Wi-Fi function can work at the same time. The number of 2-wire VTHs without the Wi-Fi function that work at the same time is 5% of the maximum capacity according to different cable specifications and distances.
- The capacity values are based on the default settings for voice and screen brightness, and standard cables that are mentioned in the following table.
- In the network, if you want to replace the VTH with Wi-Fi function to the VTH without Wi-Fi function, the conversion ratio is 1:8.

For example, if you want to reduce 1 VTH with Wi-Fi function in the network, you can connect to 8 VTHs without Wi-Fi function.

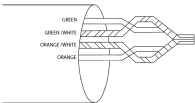


The maximum number of VTHs with Wi-Fi function cannot exceed 22.

The maximum number of VTHs without Wi-Fi function cannot exceed 100.

Table 2-5 Network capacity for VTH (240 W power supply as an example)

Cable Type	Cable Specification	AWG	Device Type	A=0–25 m	A=26–50 m	A=51–75 m	A=76–100 m
Regular cable	RVV 2 × 1.5 mm ² (Recommend)	AWG 15	With Wi-Fi	22	22	22	17
			Without Wi-Fi	100	100	100	100

Cable Type	Cable Specification	AWG	Device Type	A=0–25 m	A=26–50 m	A=51–75 m	A=76–100 m
	RVV 2 × 1 mm ²	AWG 17	With Wi-Fi	22	22	18	13
			Without Wi-Fi	100	100	100	100
	RVV 2 × 0.5 mm ²	AWG 20	With Wi-Fi	22	17	11	8
			Without Wi-Fi	100	100	91	68
Network cable  Connect the cables according to the cable color.	Cat5e Double Pair 	AWG 24	With Wi-Fi	22	14	9	7
			Without Wi-Fi	100	100	75	56
	Cat5e Single Pair	AWG 24	With Wi-Fi	14	7	4	3
			Without Wi-Fi	100	56	37	28

Network capacity for 2-wire controller

The capacity for the 2-wire controller indicates the maximum number of controllers that can be connected to one corresponding port on the controller.



The capacity values are based on standard cables that are mentioned in the following table.

Table 2-6 Network capacity for the controller

Cable Type	Cable Specification	AWG	B=0–100 m
Regular cable	RVV 2 × 1.5 mm ²	AWG 15	8
	RVV 2 × 1 mm ²	AWG 17	10
	RVV 2 × 0.5 mm ² (Recommend)	AWG 20	10
Network cable	Double-pair network cable	AWG 24	10
	Single-pair network cable	AWG 24	10

Network capacity for VTO

The capacity for the VTO indicates the maximum number of VTOs that can be connected to one 2-wire controller.

Up to 2 VTOs can be connected to one 2-wire controller.



The capacity values are based on standard cables that are mentioned in the following table.

Table 2-7 Network capacity for the VTO

Cable Type	Cable Specification	AWG	C=0–25 m	C=26–50 m	C=51–75 m	C=76–100 m
Regular cable	RVV 2 × 1.5 mm ² (Recommend)	AWG 15	2	2	2	2
	RVV 2 × 1 mm ²	AWG 17	2	2	2	2
	RVV 2 × 0.5 mm ²	AWG 20	2	2	2	2
Network cable	Double-pair network cable	AWG 24	2	2	2	2
	Single-pair network cable	AWG 24	2	2	1	1

3 Structure

3.1 Front Panel

Figure 3-1 Front panel (VTH with handset)

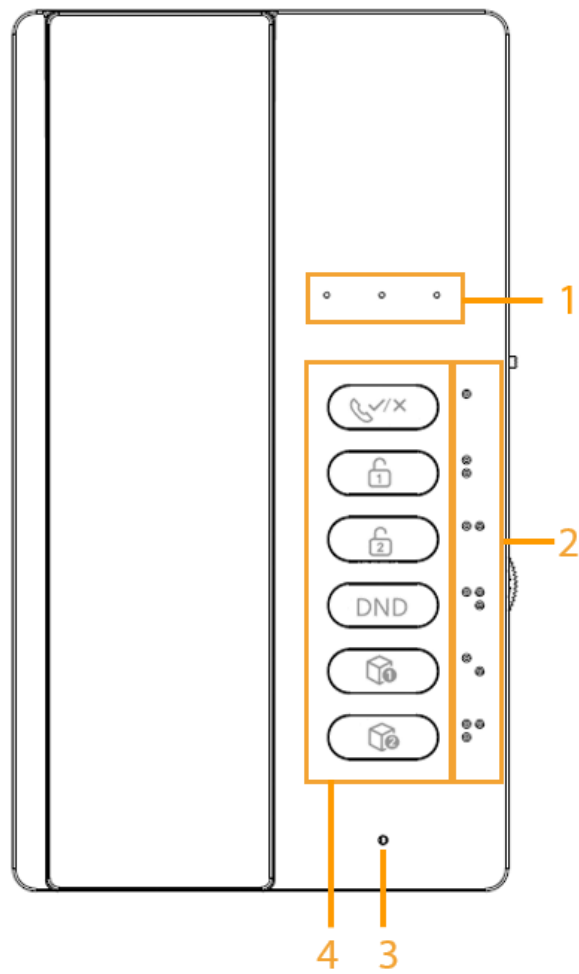


Figure 3-2 Front panel (VTH without handset)

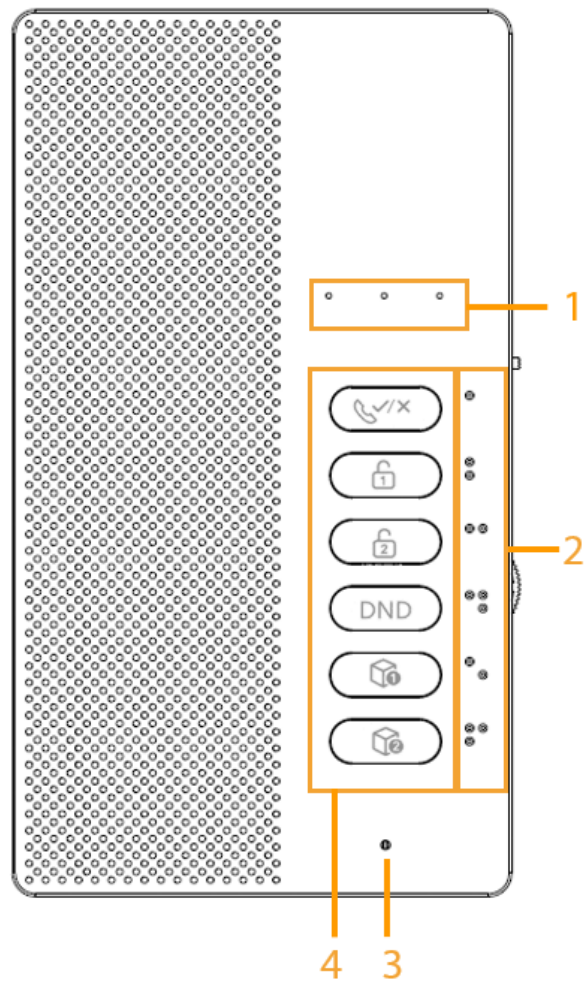
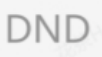


Table 3-1 Front panel description

No.	Model	Description
1	Indicators	The meanings of the 3 indicators from left to right are as follows. ● It is blue when a call is in coming or during the intercom. ● It is blue when it is unlocked. ● It is blue when it is in DND.
2	Braille	The device supports Braille.
3	MIC	—
4		● When a call comes in, press the button to start the call ● During a call, press the button to end the call
		When a call from the VTO comes in, press the button to open the local lock of the VTO.
		When a call from the VTO comes in, press the button to open the external lock of the VTO.

No.	Model	Description
		- When there is no call, press the button to enable or disable the DND function. Once the DND function is enabled, the VTH does not respond to any calls, and there are no signals on the VTO indicating the DND status of the VTH and the VTO remains in a call waiting status. - When a call comes in, press the button to mute the ringtone, and press it again to restore the ringtone.  It only takes effect for a single call, the status will be reset after the ring ends. - During a call, press the button to turn off the speaker sound, and press it again to turn it on.  It only takes effect for a single call, the speaker sound will be reset after the call ends.
		You can customize the function for 2 buttons through configuring the DIP codes. For details, see "6 DIP Configuration".
		

3.2 Rear Panel

Figure 3-3 Rear panel

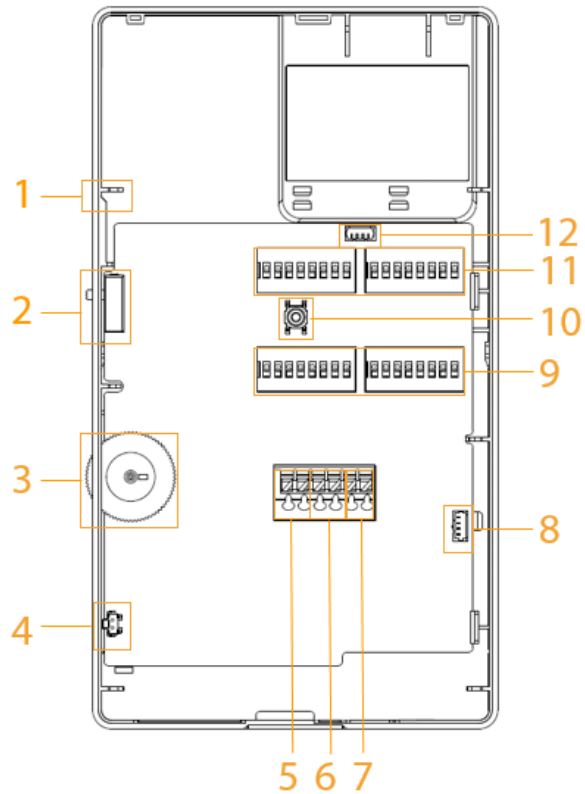


Table 3-2 Rear panel description

No.	Description	No.	Description
1	Power indicator. When it is powered on, it is red.	7	Alarm input port 2
2	3-stage button for adjusting the system volume: High, medium, low (mute).	8	Updating port
3	Scroll wheel button for adjusting the intercom volume.	9	Lower DIP switch For details about DIP configuration, see Table 6-2 .
4	Reset button	10	Updating button
5	2-wire port	11	Upper DIP switch For details about DIP configuration, see Table 6-1 .
6	Alarm input port 1	12	Debugging port

4 Installing and Wiring

Installing



- Do not install devices in environments that have condensation, high temperatures, dust corrosive substances and direct sunlight.
- Installation should be done by professional teams. Do not disassemble or repair the device by yourself to avoid damaging the device. Contact after-sales service if you need any help.
- The recommended installation height of the device is 1.6 m from the ground.

There are 3 installation methods with different holes. For details, see the following diagram.

Figure 4-1 Installation holes

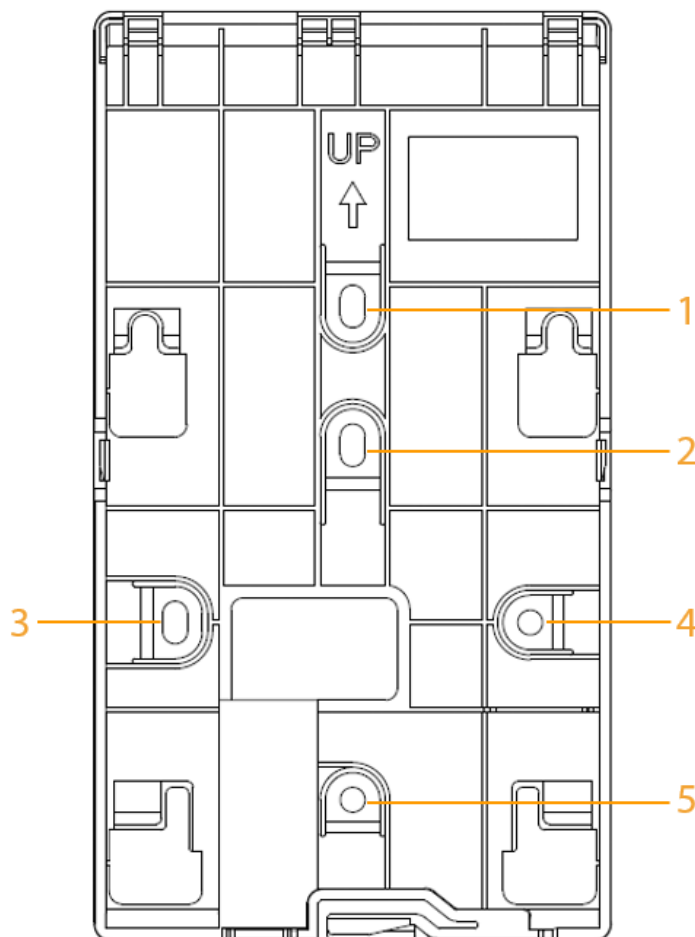


Table 4-1 Installation holes description

Installation holes	Description
1 and 5	These 2 holes are for 503 box mounting.
2 and 5	These 2 holes are for round junction box mounting or 86 box vertical mounting.

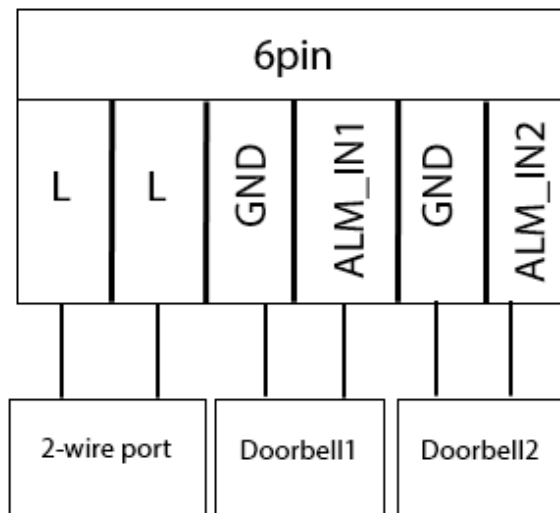
Installation holes	Description
3 and 4	These 2 holes are for round junction box mounting or 86 box horizontal mounting.
1, 3, 4 and 5	These 4 holes are for wall mounting. For details, see paper installation guide.

Wiring



If the device behaves abnormally after you turn it on, cut off the power supply at once and unplug the network cable. Power on again after you finish resolving the issue.

Figure 4-2 Wiring port



5 Upgrading

There is a main control program and a micro-controller unit (MCU) program, both of which support upgrading via the USB.

Prerequisites

- Prepare a blank USB flash drive.
- Prepare workplace USB cable, please contact technical support for details.

Procedure

Step 1 Format the blank USB flash drive to FAT32 format on the computer.



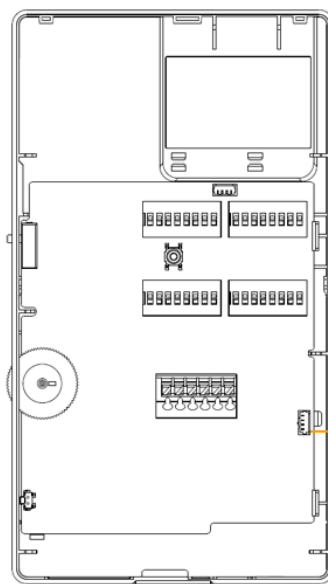
The USB flash drive should be no more than 32 G. If the capacity is too large, it cannot be formatted into FAT32 format.

Step 2 Create a new folder named **Upgrade** in the root directory of the USB flash drive, which is used to save the files that need to be upgraded.

- Main control program: General_VTH0003A-Hybrid-A-Russell_App_MCU_XXX.pkg.
- Micro-controller unit (MCU) program: General_VTH0003A-MCU_App_XXX.bin.

Step 3 Connect the workplace USB cable to the device, insert the USB flash drive, and then power on the device.

Figure 5-1 Workplace USB cable port

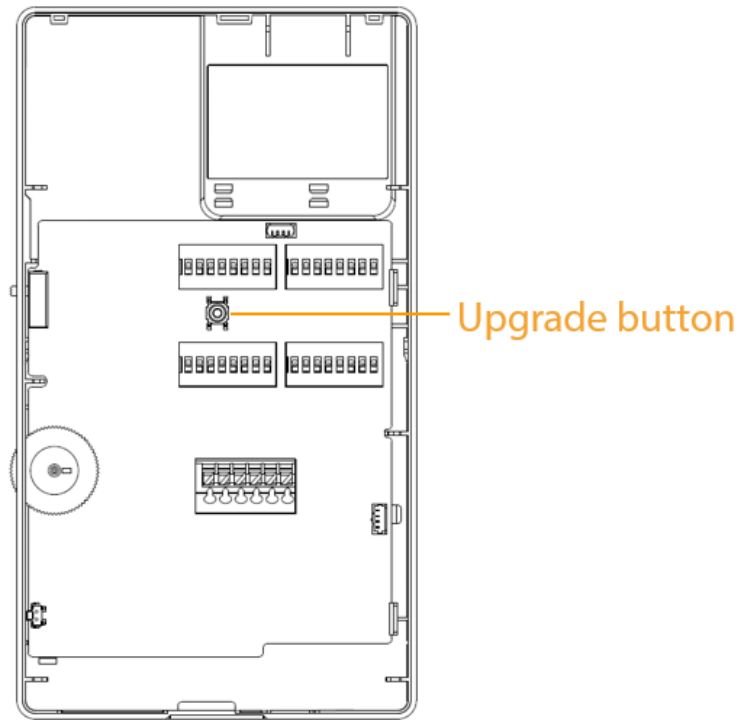


Workplace USB cable port

Step 4 Press any key to activate the device, press the upgrade button again, and then the device will upgrade.

- Main control program: The calling and unlock indicators will start flashing until the upgrade is completed.
- Micro-controller unit (MCU) program: The power and DND indicators will start flashing until the upgrade is completed.

Figure 5-2 Upgrade button



6 DIP Configuration



Move the actuator completely to the top or bottom position. If the actuator is in the middle position, it is considered to be in the top position.

6.1 DIP Switch Basic Mapping Rule

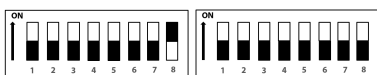
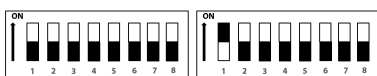
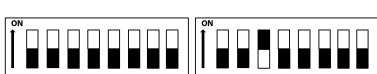
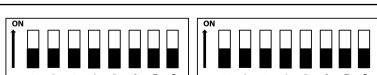
Table 6-1 DIP Switch mapping relations and function on the upper

DIP Switch No.		Corresponding Address No.	Function
DIP 1		1	- Used to program the address of the VTH. - You can set a maximum of 4,094 VTH address by using the 12 DIP switches.
DIP 2		2	
DIP 3		4	
DIP 4		8	
DIP 5		16	
DIP 6		32	
DIP 7		64	
DIP 8		128	
DIP 9		256	
DIP 10		512	
DIP 11		1024	
DIP 12		2048	
DIP 13		—	Turn off the power indicator.

DIP Switch No.		Corresponding Address No.	Function
DIP 13		—	Turn on the power indicator.
DIP 14		—	For systems with multiple VTHs in a cascade, you need to turn on the 14th DIP switch of the last device in the cascade to reduce the impact of signal reflection on devices.
DIP 15		—	For systems with multiple VTHs in a cascade, when the image is disrupted due to environmental or other factors, the 15th bit of the DIP switch on the last device in corresponding branch can be set as ON .
DIP 16		—	ON : Set the VTH as the extension.
DIP 16		—	OFF : Set the VTH as the main VTH.  The main VTH and extension VTH must be connected to the same distributor (2-wire Controller).

Table 6-2 DIP Switch mapping relations and function on the lower

DIP Switch No.	DIP Switch No.	Function
DIP 1		Reserved.
DIP 2		
DIP 3		
DIP 4		

DIP Switch No.	DIP Switch No.	Function
DIP 5		
DIP 6		
DIP 7		
DIP 8		
DIP 9		
DIP 10		
DIP 11 and DIP 12		The default function of the button  (NA).
		The first extended function of the button  one-click mute (disable MIC).
		The second extended function of the button  (Reserved).
		The third extended function of the button  (Reserved).
DIP 13 and DIP 14		The default function of the button  (NA).
		The first extended function of the button  (Reserved).
		The second extended function of the button  (Reserved).
		The third extended function of the button  (Reserved).
DIP 15 and DIP 16		Ringtone 1.
		Ringtone 2.

DIP Switch No.	DIP Switch No.	Function
		Ringtone 3.
		Ringtone 4.

6.2 DIP Switch Coding Rules

This section introduces how to configure the VTH ID through the coding rules of DIP switches. By setting the switches in combination, you can get any value from 1-4,094.

- Find the mapping relationship between the DIP switch number and the ID number you plan to configure from the table.

It follows a calculation rule that combines only the numbers listed in the **ID No.** to form a new ID number.

- Manually move the actuators corresponding to the DIP switches to the **ON** status, so that VTH ID can be configured.

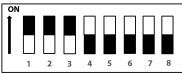
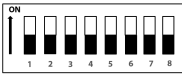
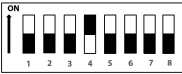
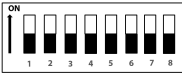
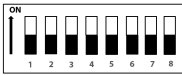
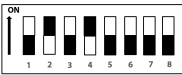
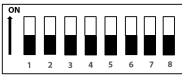
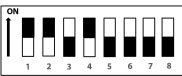
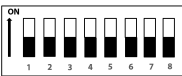
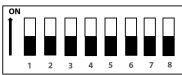
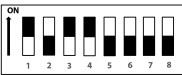
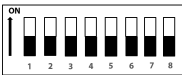
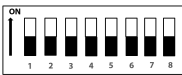
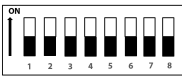
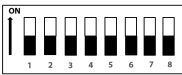
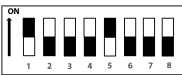
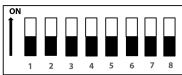
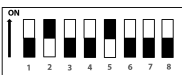
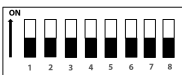
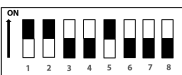
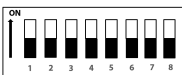
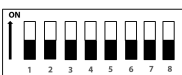
For example, if you want to set your VTH ID as 4, you need to first find the mapping relationship (DIP 3 equals to the ID number of 4) in the table, and then manually move the actuator of DIP 3 to the **ON** status. If you want to set your VTH ID as 3, you need to do the calculation ($1+2=3$; which equals to the value of DIP 1 and DIP 2 combined together in the mapping relationship), and manually move both the actuator of DIP 1 and DIP 2 to the **ON** status. If you want to set your VTH ID as 133, you need to do a more complex calculation ($128+4+1=133$, which equals to the value of DIP 8, DIP 3 and DIP 1 combined together in the mapping relationship), and then manually move the actuator of DIP 8, DIP 3 and DIP 1 to the **ON** status.



Here is the list of commonly used VTH ID (1-20) and their corresponding DIP switch number combinations.

Table 6-3 Common VTH ID (1-20) and DIP switch numbers

VTH ID	DIP Switch Combination	Coding Rule
1		DIP 1
2		DIP 2
3		DIP 2 + DIP 1
4		DIP 3
5		DIP 3 + DIP 1
6		DIP 2 + DIP 3

VTH ID	DIP Switch Combination	Coding Rule
7	 	DIP 3 + DIP 2 + DIP 1
8	 	DIP 4
9	 	DIP 4 + DIP 1
10	 	DIP 4 + DIP 2
11	 	DIP 4 + DIP 2 + DIP 1
12	 	DIP 4 + DIP 3
13	 	DIP 4 + DIP 3 + DIP 1
14	 	DIP 4 + DIP 3 + DIP 2
15	 	DIP 4 + DIP 3 + DIP 2 + DIP 1
16	 	DIP 5
17	 	DIP 5 + DIP 1
18	 	DIP 5 + DIP 2
19	 	DIP 5 + DIP 2 + DIP 1
20	 	DIP 5 + DIP 3

Appendix 1 Security Recommendation

Account Management

1. Use complex passwords

Please refer to the following suggestions to set passwords:

- The length should not be less than 8 characters;
- Include at least two types of characters: upper and lower case letters, numbers and symbols;
- Do not contain the account name or the account name in reverse order;
- Do not use continuous characters, such as 123, abc, etc.;
- Do not use repeating characters, such as 111, aaa, etc.

2. Change passwords periodically

It is recommended to periodically change the device password to reduce the risk of being guessed or cracked.

3. Allocate accounts and permissions appropriately

Appropriately add users based on service and management requirements and assign minimum permission sets to users.

4. Enable account logout function

The account logout function is enabled by default. You are advised to keep it enabled to protect account security. After multiple failed password attempts, the corresponding account and source IP address will be locked.

5. Set and update password reset information in a timely manner

The device supports password reset function. To reduce the risk of this function being used by threat actors, if there is any change in the information, please modify it in time. When setting security questions, it is recommended not to use easily guessed answers.

Service Configuration

1. Enable HTTPS

It is recommended that you enable HTTPS to access web services through secure channels.

2. Encrypted transmission of audio and video

If your audio and video data contents are very important or sensitive, it is recommended to use encrypted transmission function in order to reduce the risk of your audio and video data being eavesdropped during transmission.

3. Turn off non-essential services and use safe mode

If not needed, it is recommended to turn off some services such as SSH, SNMP, SMTP, UPnP, AP hotspot etc., to reduce the attack surfaces.

If necessary, it is highly recommended to choose safe modes, including but not limited to the following services:

- SNMP: Choose SNMP v3, and set up strong encryption and authentication passwords.
- SMTP: Choose TLS to access mailbox server.
- FTP: Choose SFTP, and set up complex passwords.
- AP hotspot: Choose WPA2-PSK encryption mode, and set up complex passwords.

4. Change HTTP and other default service ports

It is recommended that you change the default port of HTTP and other services to any port between 1024 and 65535 to reduce the risk of being guessed by threat actors.

Network Configuration

1. **Enable Allow list**

It is recommended that you turn on the allow list function, and only allow IP in the allow list to access the device. Therefore, please be sure to add your computer IP address and supporting device IP address to the allow list.

2. **MAC address binding**

It is recommended that you bind the IP address of the gateway to the MAC address on the device to reduce the risk of ARP spoofing.

3. **Build a secure network environment**

In order to better ensure the security of devices and reduce potential cyber risks, the following are recommended:

- Disable the port mapping function of the router to avoid direct access to the intranet devices from external network;
- According to the actual network needs, partition the network: if there is no communication demand between the two subnets, it is recommended to use VLAN, gateway and other methods to partition the network to achieve network isolation;
- Establish 802.1x access authentication system to reduce the risk of illegal terminal access to the private network.

Security Auditing

1. **Check online users**

It is recommended to check online users regularly to identify illegal users.

2. **Check device log**

By viewing logs, you can learn about the IP addresses that attempt to log in to the device and key operations of the logged users.

3. **Configure network log**

Due to the limited storage capacity of devices, the stored log is limited. If you need to save the log for a long time, it is recommended to enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

Software Security

1. **Update firmware in time**

According to the industry standard operating specifications, the firmware of devices needs to be updated to the latest version in time in order to ensure that the device has the latest functions and security. If the device is connected to the public network, it is recommended to enable the online upgrade automatic detection function, so as to obtain the firmware update information released by the manufacturer in a timely manner.

2. **Update client software in time**

It is recommended to download and use the latest client software.

Physical Protection

It is recommended that you carry out physical protection for devices (especially storage devices), such as placing the device in a dedicated machine room and cabinet, and having access control

and key management in place to prevent unauthorized personnel from damaging hardware and other peripheral equipment (e.g. USB flash disk, serial port).