



User Manual **V1.0** **(English)**

**Please read this user manual
thoroughly before using.**

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1. Brief Introduction

1.1 Notice

- Please read this manual thoroughly before use, and keep it handy for future reference.
- Do not use or store AV-3104 in the environment where the product is exposed to rainwater, moisture vapor, salty water, oil, etc.
- Do not place the controller close to any exothermic object for a long time.

1.2 Functions and features

- AV-3104 is equipped with RS485/ RS422/ RS232 serial control ports. It can control up to 255 cameras max.
- Support PELCO-D, PELCO-P and VISCA protocols.
- Metal housing, with computer keyboard buttons.
- Adopt 3D joystick for camera pan/ tilt/ zoom and speed control.
- Control camera rotation, zoom, aperture, focus and other camera parameter settings.
- English & Chinese LCD display; real-time working status of the connected decoder and matrix.
- Selectable button sound on/off.
- Advanced control code learning function that supports user-defined control code commands.
- Any device connected via RS485 can be set with identical protocol and baud rate separately.
- Over-current protection functions for RS422 interface, in case the controller needs to recover from short circuit.
- Max communication distance is up to 349ft (1200m, w/ 0.5mm twisted pair cable).

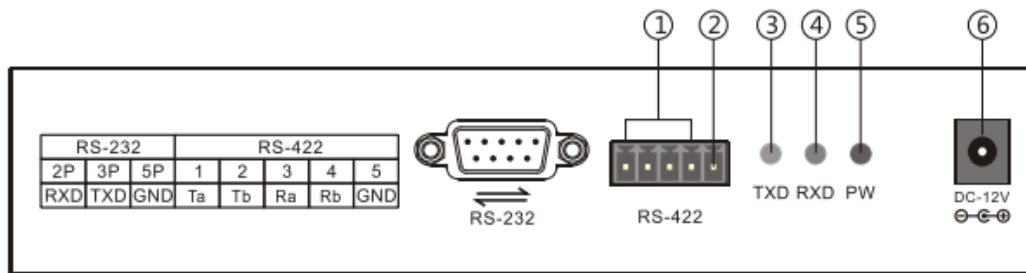
1.3 Items included

Please check the items in the package once get the keyboard. Check whether all parts are included and are in good condition.

3-axis control keyboard.....	1 pc
5pin plug.....	1 pc
DC-12V power adapter.....	1 pc
RS232 cable.....	1 pc
(9-Pin DB-9 Female to 8-Pin Mini-DIN Male)	
User manual.....	1 pc
Warranty card.....	1 pc

2. Interface Illustrations

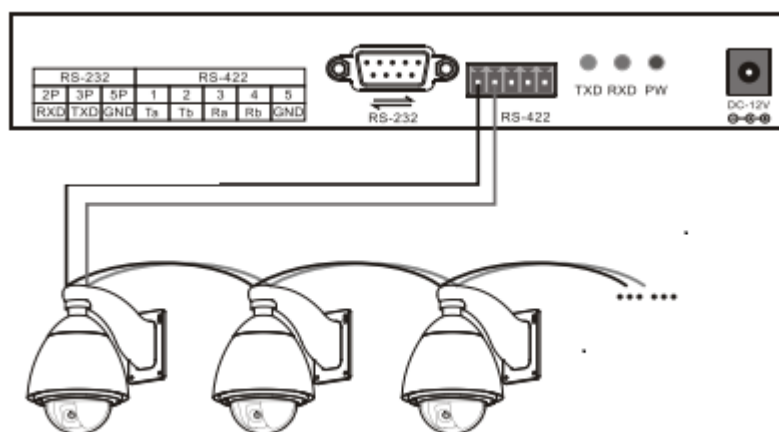
2.1 Rear panel



	Port	Physical interface	Description
①	RS-422	Control output (Ta,Tb,Ra,Rb)	- Connect with RS-485: Ta -> RS485+; Tb -> RS485- - Connect with RS422: Ta -> RXD IN-; Tb -> RXD IN+ Ra -> TXD IN-; Rb -> TXD IN+
②	Ground	Ground (G)	Signal control line to ground
③	PW	Power indicator light	The light is always red when keyboard is working
④	TXD	Sending data indicator light	The light will flicker in green when the unit is sending data
⑤	RXD	Receiving data indicator light	The light will flicker in green when the unit is receiving data
⑥	DC-12V	Power jack	DC12V power input

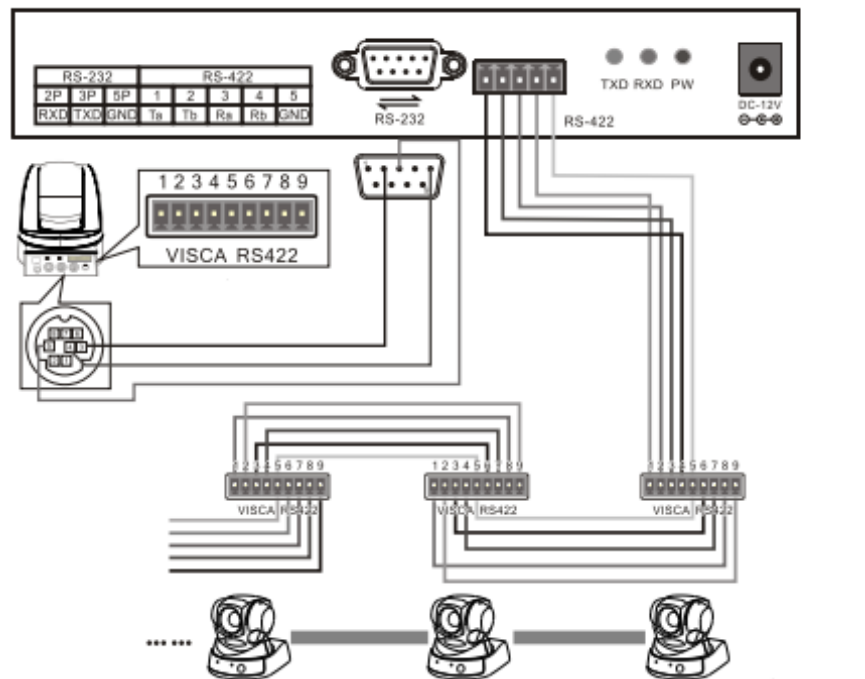
2.2 Wiring diagram

Connection with surveillance dome cameras:



Connection with PTZ cameras:

1. Connect the RS485+ on the cameras with Ta on the controller; RS485- with Tb.
2. Deputy control devices: either RS485 output from DVR or keyboard is available.



2.3 Connection between keyboard and camera

RS422:

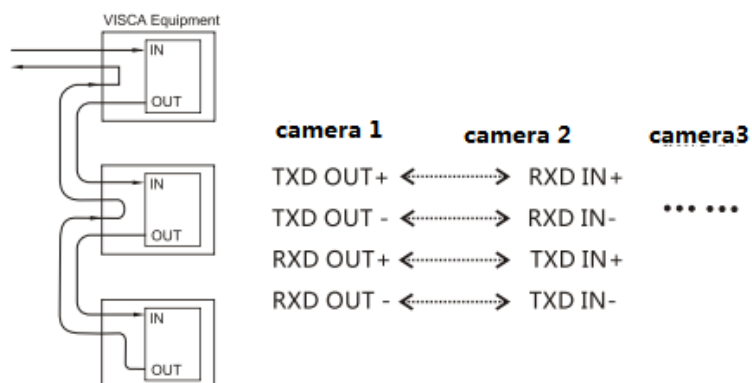
KBD	CAMERA
Ra <.....>	TXD IN-
Rb <.....>	TXD IN+
Ta <.....>	RXD IN-
Tb <.....>	RXD IN+

RS232:

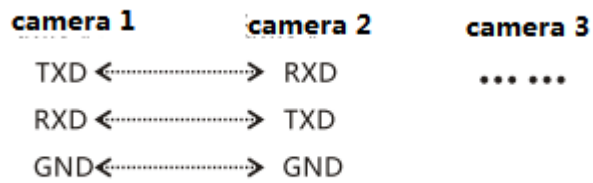
KBD	CAMERA
RXD <.....>	TXD
TXD <.....>	RXD
GND <.....>	RXD

2.4 Connection between cameras

RS422:



RS232:



3. Technical Specifications

3.1 General specifications

Communication mode	RS485 half-duplex, RS422 full duplex, RS232 serial port
Baud Rate	2400bps, 4800bps, 9600bps, 19200bps
Interface	5PIN Crimping terminal, RS232 Port
Joystick	3D control: up/ down/ left/ right/ rotate
Display	Backlight LCD screen
Input voltage	DC12V $\pm$ 10%
Power consumption	6W max
Temperature	-10°C~50°C
Humidity	$\leq$ 90%RH (No frosting)
Dimension	13*7*4 inch (320*179.3*106.4mm)

3.2 Input/ Output interface

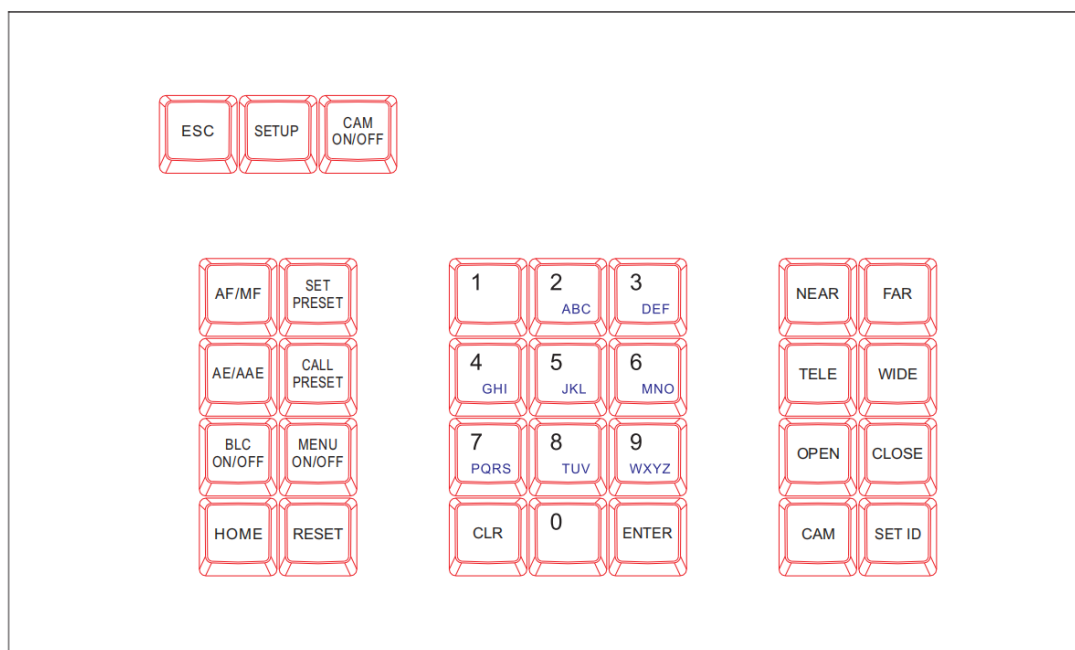
- Directly control: PELCO-P/PELCO-D/VISCA protocol
- Control interfaces: RS422, RS232, RS485

3.3 IPC features

- Communication frequency: 2400/4800/9600/ 19200 bps

4. Controller Operations

4.1 Keyboard



【ESC】 Exit or back to the previous menu.

【SETUP】 Parameter setting: press and hold the button for 3sec to enter the KBD parameter setting page.

【CAM ON/OFF】 Camera power on/off

【AF/MF】 Auto focus/ Manual focus (when choose Manual focus, focus adjustment is done by 【FOCUS+】 / 【FOCUS-】).

【SET PRESET】 Preset setting: to set a preset position, use key combination 【SET PRESET】 + number keys 【0~255】 + 【ENTER】.

【CALL PRESET】 Call preset: to call a preset position, use key combination 【CALL PRESET】 + number keys 【0~255】 + 【ENTER】.

【AE/AE】 Auto aperture / Aperture priority: when choose Aperture priority, aperture adjustment is done by 【OPEN】 / 【CLOSE】.

【BLC ON/OFF】 Back light compensation on/off.

【MENU ON/OFF】 keyboard controller menu on/off.

【HOME】 HOME position.

【RESET】 Pan/tilt position reset.

【CLR】 Clear current input.

【0】 ~ 【9】 Number keys.

【ENTER】 Confirmation key: confirm the current input.

【NEAR】 Focus in: manually focus in to make far distance objects clearer.

【FAR】 Focus out: manually focus out to make near distance objects clearer.

【TELE】 Narrow-angle button/ Zoom-in: reduce the field of view, zoom in to the target object.

【WIDE】 Wide-angle button/ Zoom out: expand the field of view, zoom out from the target object.

【OPEN】 Aperture +: Increase aperture. When the aperture is at its maximum, the image will display in full white. When the LCD shows the camera menu, press 【OPEN】 will enter the selected submenu.

【CLOSE】 Aperture -: Reduce aperture. When the aperture is at its minimum, the image will display in full black. When the LCD shows the camera menu, press 【CLOSE】 will go back to the previous menu.

【CAM】 Select the address of a target device (decoder or camera). Use with key combination number keys 【0~255】 + 【ENTER】 .

【SET ID】 Set ID: press and hold the button for 3sec to set the cascading camera protocol address.

4.2 LCD screen display

All operations will be displayed on the LCD screen. If there is no operation or movement for 30 sec, the controller will enter the power saving mode (with the lowest backlight), with the current status displayed.

4.3 Joystick control

Operation	Output Control	Operation	Output Control	Operation	Output Control
	UP		Down		Left
Operation	Output Control	Operation	Output Control	Operation	Output Control
	Right		Zoom In		Zoom Out

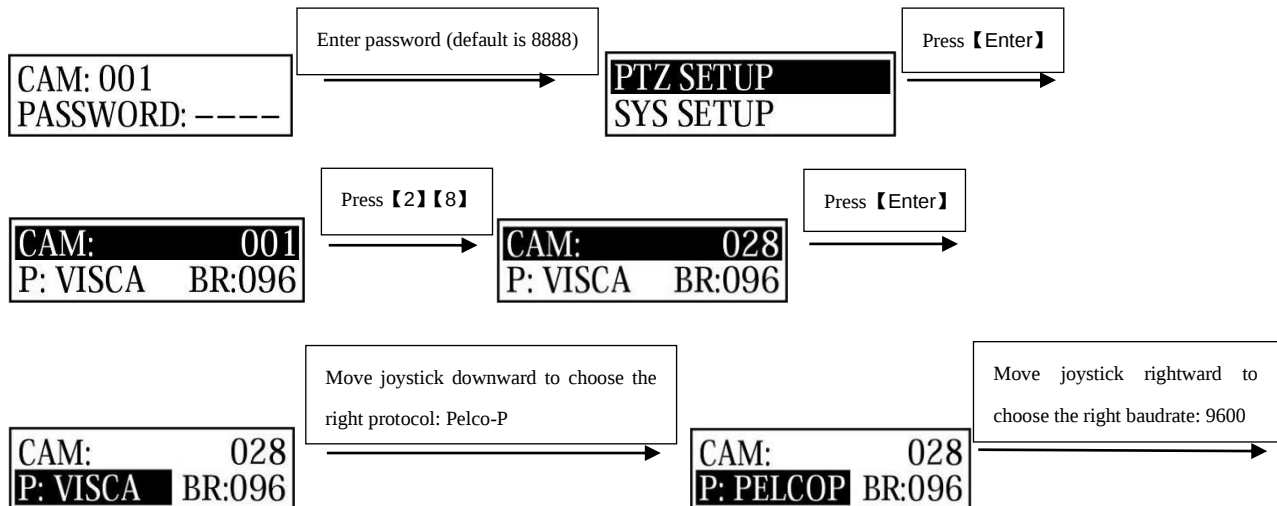
5. Keyboard Setups

5.1 PTZ setup

An example is used for instructions below:

- Camera Address (Camera ID): 28
- Protocol used: Pelco-P
- Baud rate: 9600 bps

Press and hold **【SETUP】** button for 3 seconds (under normal working mode), then follow the steps below:



Press **【ENTER】** to confirm the selected baud rate. There will be a 1-sec beep sound once the setup is complete.

Press **【ESC】** 3 times to exit the setup mode and return to normal working mode.

Note: if all the devices/ cameras are to be set to the same protocol and baud rate, please follow the steps as follows:

CAM: 0-255
P: VISCA BR:096

Enter the setup page and choose the corresponding protocol and baud rate.

Press **【ENTER】** to confirm. All the devices with an address of 0-255 will be set to the same protocol and baud rate.

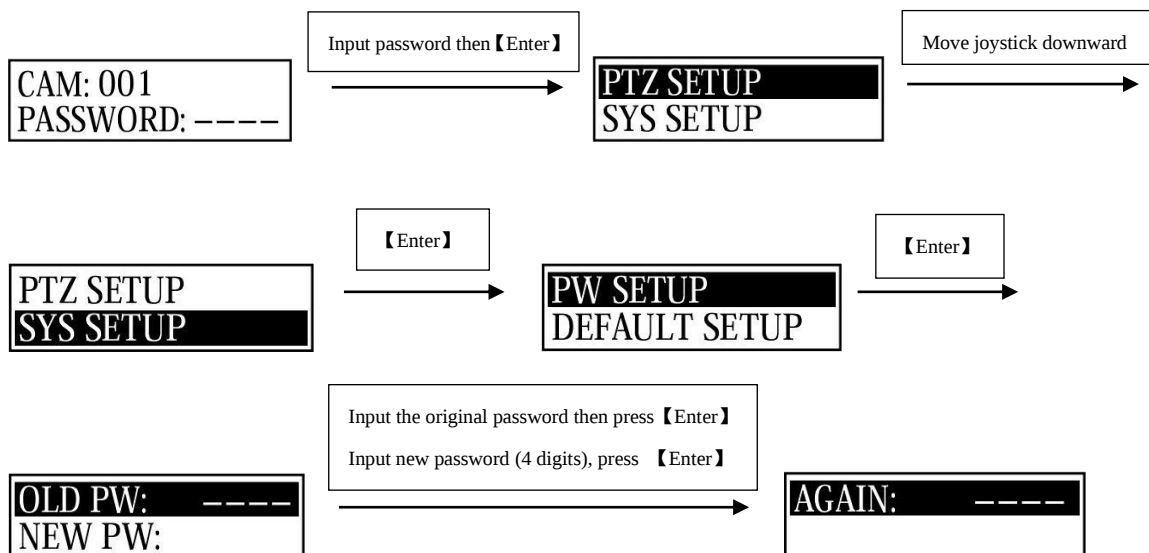
5.2 System setup

System setup includes:

- Change password
- Restore factory setting
- Indicate sound switch setting
- Keyboard ID
- Keyboard lock switch setting

5.2.1 Password setting

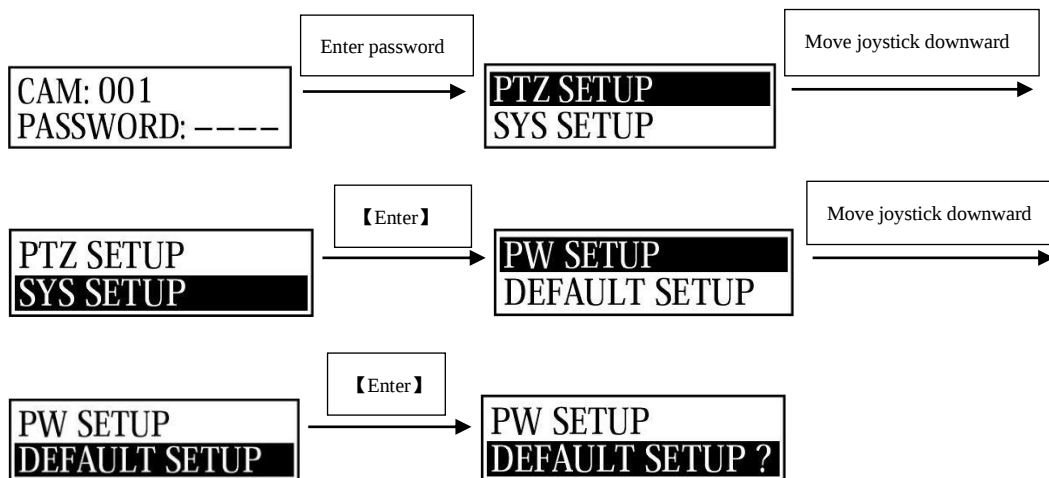
Press and hold **【SETUP】** for 3 seconds (under normal working mode), then follow the steps below:



Input the new password again then press **【ENTER】** . There will be a 1-sec beep sound once the setup is complete. Press **【ESC】** twice (2) to exit password setup page and return to the normal working mode.

5.2.2 Restore factory settings

Press and hold **【SETUP】** for 3 seconds (under normal working mode), then follow the steps below:



Press **【ENTER】** to confirm. There will be a 1-sec beep sound once the setup is complete. Press **【ESC】** twice (2) to exit password setup page and return to the normal working mode.

5.3 Keyboard menu

> PTZ Setup	Camera address: 0-255 (to be set)	Protocol	PELCO-D, PELCO-P, VISACA
		Baud Rate	2400/ 4800/ 9600/ 19200
	Camera address: 0-255 (uniform settings for all devices)	Same as above	
> SYSTEM Setup	> SET PASSWORD	OLD PW: old password	4 digits
		NEW PW: new password	4 digits
		AGAIN PW: confirm change	4 digits
	> LOAD DEFAU (restore factory setting)	Confirm?	Press 【ENTER】 to confirm Press 【ESC】 to exit
> SYSTEM Setup	> SOUND SETUP (button sound switch setting)	ON	Move joystick right/left to select
		OFF	Press 【ENTER】 to confirm
	> HOST ID SET	Keyboard address	Number 【0】 - 【15】
	> LEARN SETUP (keyboard lock setting)	ON	Move joystick right/left to select
		OFF	Press 【ENTER】 to confirm

5.4 Keyboard parameters

Protocol: X Baud rate: X	Current control protocol and baud rate		
Camera query	Camera protocol: 001	Protocol	Corresponding protocol
		Baud rate	Corresponding baud rate
System query	Model number: XXXXXXXX	10 digits max	
	Serial number: XXXXXXXX	8-digit serial number on camera	
	Device number: XX	2-digit keyboard ID number	
	Keyboard lock: ON/OFF	Display the current keyboard lock setting	
	Sound: ON/OFF	Display the current button sound prompt setting	

6. Appendix

6.1 Transmission distance:

When a 0.56mm (24AWG) twisted pair cable is used as the communication cable, the theoretical value of the maximum transmission distance varies with different baud rate settings:

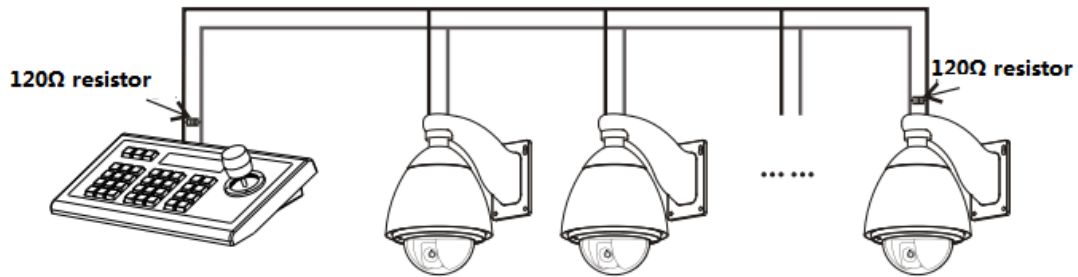
2400bps: 5900ft (1800m)

19200bps: 1960ft (600m)

When using a thinner communication cable, or when the product is used in an environment with strong electromagnetic interference, or when too many devices are connected to the same controller, the maximum transmission distance will be shortened accordingly.

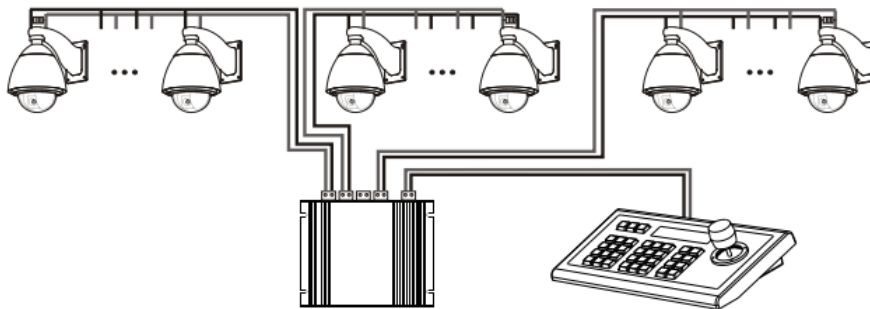
6.2 Connection method and terminating resistor

RS485 industrial bus standard requires daisy chain connections between devices. The two ends must be connected with a 120Ω termination resistor, and the balance distance must be within 22ft (7m).



6.3 Applications

A star link is in most real cases used when there is a switcher/router, requiring a terminating resistor to be used on the two devices on both ends. However, it does not meet the RS485 industry standards. When the distance between each device are too long, signal reflection and anti-interference ability is like to reduce, and will decrease the reliability of the control signal. It means the camera will not be responsive as expected. In this case, RS485 is recommended, so that you may convert the star link mode to RS485 industry standard. It will help avoid connection issues and improve the communication reliability.



6.4 Trouble shooting

Issue	Analysis	Solution
PTZ cameras not responsive	Check RS485 cable	Step 1: whether the RS485 A and B are reversed Step 2: whether the RS485 line is short-circuited
	Check the correspondence of camera protocol and baud rate settings and those of the controller	Step 1: change the protocol and baud rate Step 2: restore the KBD default settings and change the camera settings accordingly
	Check whether the PTZ indicator light flickers when move the controller	PTZ indicator light flickers: check other possibilities; PTZ indicator light does not flicker: check if the RS485 connection is secure. If the connection is normal, please contact AViPAS for repairing.
Part of the connected cameras not responsive	Check cable connections	Check and secure all connecting cables
	Check protocol & baud rate settings	Check whether the current protocol and baud rate of each camera are correspondent.
	Check star wiring	Step 1: at the farthest end of RS485, connect a 120Ω resistor Step 2: use a RS485 splitter to the star connection
Cameras move together	Check camera address (camera ID) setting	Check if the address numbers of the cameras (those moving together) are the same. Set identical address to each camera Note: you need to reboot the camera after changing settings
Forgot password	Press and hold 【SETUP】 to enter the system settings menu. Reset the password.	

7. Maintenance Service Terms

7.1 Range of warranty

- AViPAS warrants its new product against defects in materials and workmanship for a period of ONE (1) YEAR from the date of original invoice.
- Within three months after the 1-year warranty, if the product is noticed to have the same malfunction as before the warranty ends, it will obtain free maintenance service.
- This warranty does NOT cover problems or damage resulting from, but not limited to, any of the following: any accident, disassembly, or misapplication; any improper operation that is not in accordance with the supplied product instructions; any other cause which does not relate to a product defect in materials or workmanship.
- Please avoid stress, vibration or soakage during transport, storage and installation. Problems or damage resulting from the above are NOT covered by warranty.
- Please remain the way of fission package and our original package for transport. Any damage resulting from integrated package or customer package are NOT covered by warranty.
- This warranty does NOT cover any problem or damage resulting from unauthorized repair or disassembly.
- Our company does offer repair services to out-of-warranty products. Please notice that service fees will be charged.
- For the defected products: if it's still under warranty, please fill out the warranty form with all the information needed, describing the problems in detail. Customers may be asked to furnish proof of ownership and date of purchase by showing the sales receipt/purchase invoice/warranty card.
- We are not responsible for the damage or loss caused by specific usage or applications. Any compensation made by the company regarding breach of contract, negligence or infringement won't exceed the amount of the product. The factory won't bear any responsibility for special, unexpected or continue damage caused by any other reasons.
- Our company has the final right of explanation for the above terms.

7.2 Warranty conditions

- Customers may be asked to send the warranty card and a detailed description of the problem together with the product for repair.

7.3 Shipping

- If the product needs to be sent back to the manufacturer for repair, the customer can send it back to the manufacturer directly or through the supplier. If sending back to the manufacturer directly, please contact us first to speed up the process. Our company is only responsible for the one-way shipping fee from the manufacturer to customer after repair or maintenance.

Copyright Notice

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