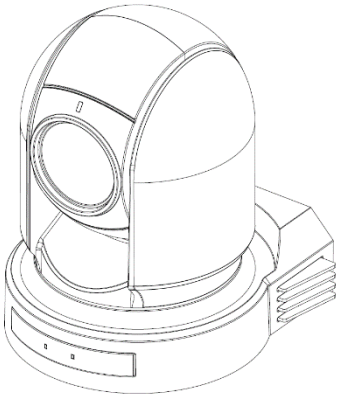
BOLIN TECHNOLOGY

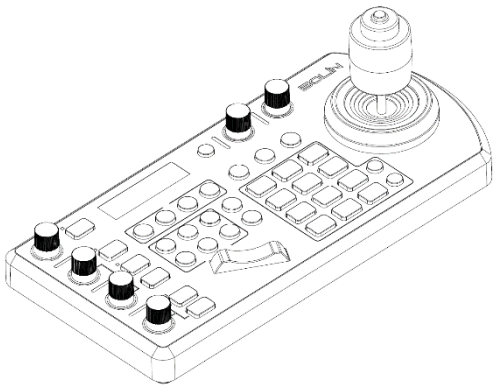
Bolin PTZ camera and Bolin Keyboard Controller Wire Connection Guide

USER MANUAL

For
1, 7, 8, 9 Series Camera
HDBaseT Receiver
KBD-1010

VERSION: UG-CKC-12222018





Contents

Operating Instructions

Thank you for purchasing our product. If there are any questions, please contact the authorized dealer.

Before operating the unit, please read this manual thoroughly and retain it for future reference.

Copyright

Trademark Acknowledgement

IMPORTANT INFORMATION

Legal Notice

Attention:
To ensure account security, please change the password after your first login. You are recommended to set a strong password (no less than eight characters). Password login does not apply to some models that do not need password login.

The contents of this document are subject to change without prior notice. Updates will be added to the new version of this manual. We will readily improve or update the products or procedures described in the manual.
Best effort has been made to verify the integrity and correctness of the contents in this document, but no statement, information, or recommendation in this manual shall constitute formal guarantee of any kind, expressed or implied. We shall not be held responsible for any technical or typographical errors in this manual.
The product appearance shown in this manual is for reference only and may be different from the actual appearance of your device.
This manual is a guide for multiple product models and so it is not intended for any specific product.
In this manual, the illustrations of displayed interface, parameters displayed, drawings and value ranges may vary with models. Please see the actual product for details.
Due to uncertainties such as physical environment, discrepancy may exist between the actual values and reference values provided in this manual.
Use of this document and the subsequent results shall be entirely on the user's own responsibility.

Symbols

Symbol	Description
WARNING!	Contains important safety instructions and indicates situations that may cause bodily injury.
CAUTION!	User must be careful and improper operations may cause damage or malfunction of product.
NOTE!	Indicates useful or supplemental information about the use of product.

Safety Information

WARNING!
Installation and removal of the unit and its accessories must be carried out by qualified personnel. You must read all of the Safety Instructions supplied with your equipment before installation and operation.

Warnings:

- If the product does not work properly, please contact your dealer. Never attempt to disassemble the unit yourself. (We will not assume any responsibility for problems caused by unauthorized repair or maintenance.)
- This installation should be made by a qualified service person and should conform to all the local codes.
- When shipping, the unit should be packed in its original packaging.
- Make sure the power supply voltage is correct before connecting to the unit.
- Do not drop or subject the unit to physical shock.

Maintenance Precautions:

- Ensure that no moisture or liquid comes into contact with any surface of the keyboard, as liquid may damage the functions of the keyboard.
- Keep dust the RJ-45 ports free from dust and moisture
- Only use the original, uncut (not spliced) power supply that is included with the keyboard

Regulatory Compliance
FCC Part 15

This equipment has been tested and found to comply with the limits for digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

LVD/EMC Directive

This product complies with the European Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC.

WEEE Directive–2002/96/EC

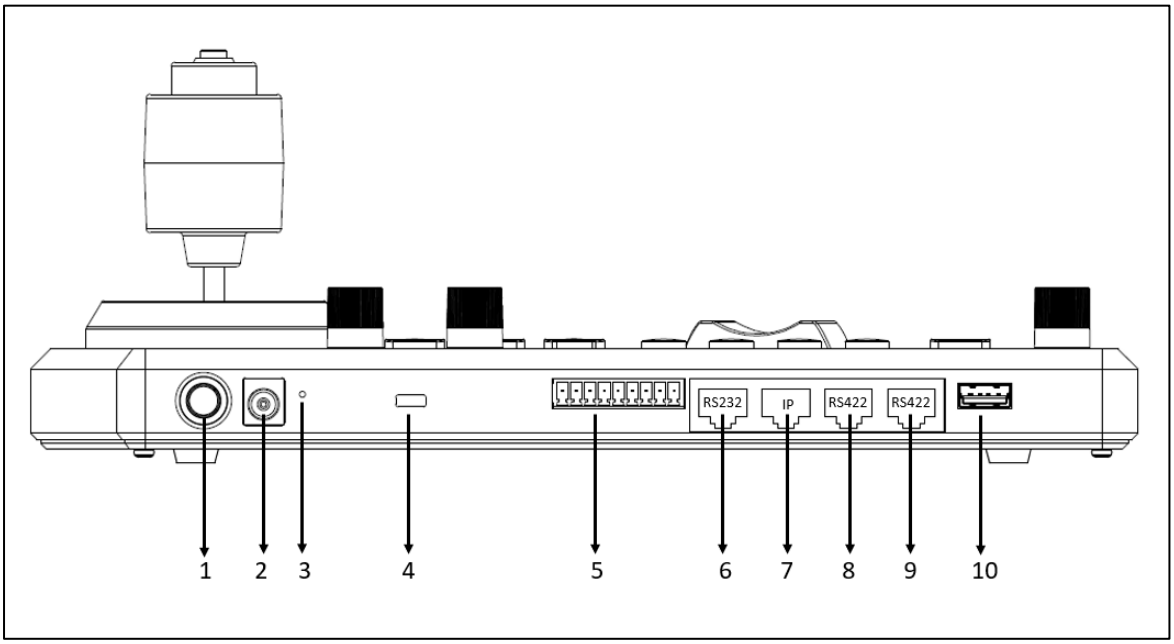
The product this manual refers to is covered by the Waste Electrical & Electronic Equipment (WEEE) Directive and must be disposed of in a responsible manner.

This section is as a sub-portion of the
KBD-1010 Keyboard Controller
1/7/8 Series Camera
HDBaseT Receiver
user guides for the cases where the KBD-1010 keyboard controller is being used to control Bolin cameras.

For the full operation guide, please refer to the product user guide, available at
https://bolintechnology.com

Keyboard Diagrams

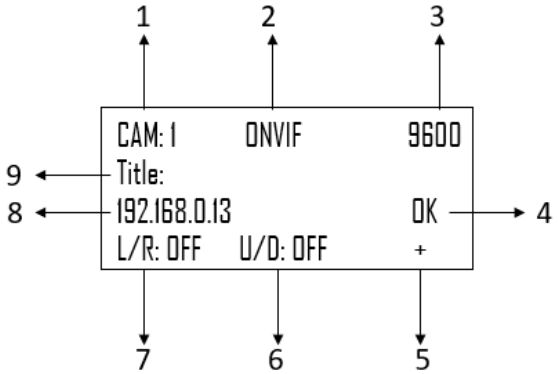
KBD-1010



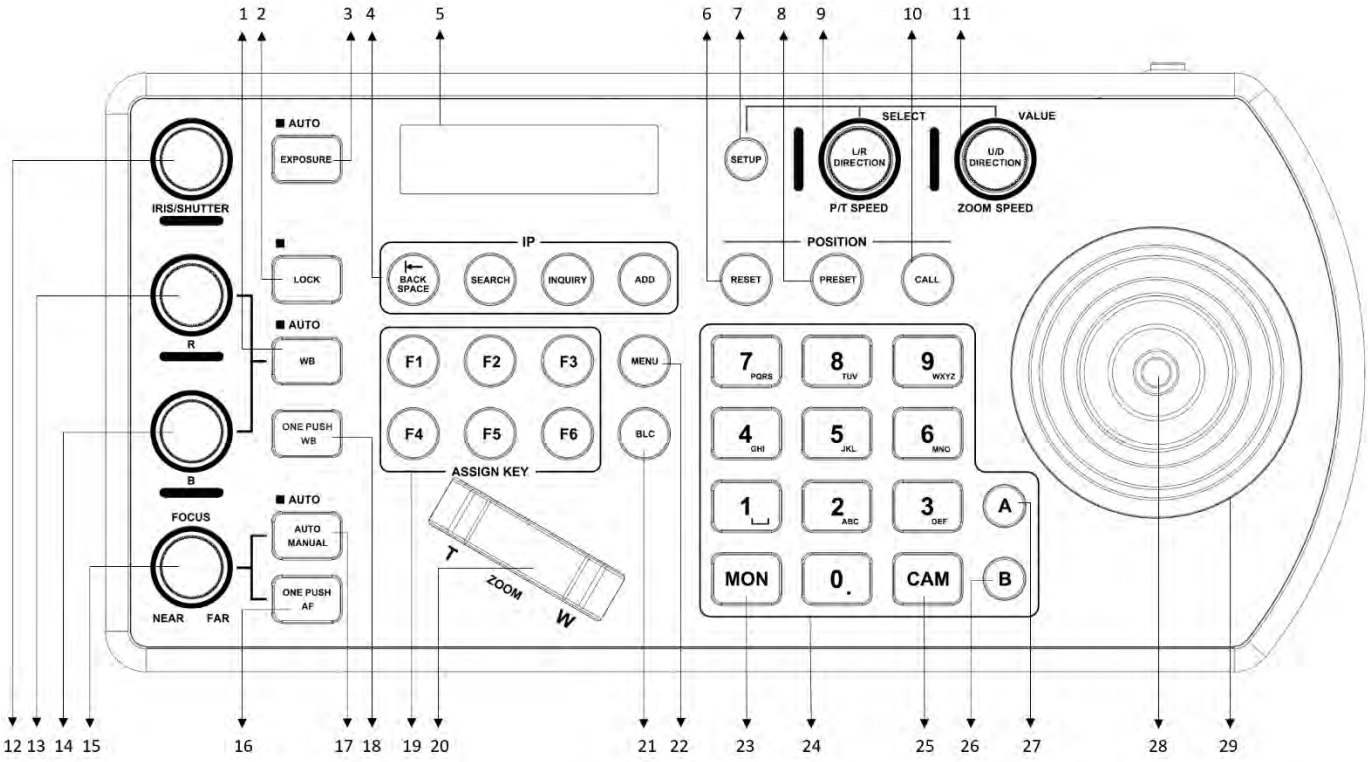
1. **Power Button**
   Power on / Power off the keyboard
2. **12V DC Power Port, wide range input tolerance from 5V-48VDC**
   Connect the supplied DC power adaptor and cord
3. **Firmware Interface Button**
   Engages firmware update mode on the keyboard
4. **Kensington Security slot**
   Use a lock to physically secure the keyboard in place
5. **Tally / Contact (GPI I/O connector)**
   Tally control interface
6. **RS232 interface / RJ-45 port**
   Connect RS232 adapter
7. **IP Interface / RJ-45 port**
   Connect the keyboard to a network
8. **RS422 (B) interface, use for RS485 as well / RJ-45 port**
   Connect an RS422 adapter to control up to 7 daisy-chained RS422 cameras (Group A)
9. **RS422(A) interface, use for RS485 as well / RJ-45 port**
   Connect an RS422 adapter to control up to 7 daisy-chained RS422 cameras (Group B)
10. **Firmware Upgrade USB port**

Home Screen

1. **Camera Identifier – Identifies which camera is being controlled, and the protocol being used**
2. **Protocol**
3. **Baud Rate**
4. **Communication indicator for current device**
5. **Network Connectivity indicator**
   a. **If the "+" appears, this means that the network is successfully connected**
   b. **If the "+" does not appear, this means that the network is not connected**
6. **Tilt Reversal Indicator**
7. **Pan Reversal Indicator**
8. **IP Address**
9. **Camera Title**

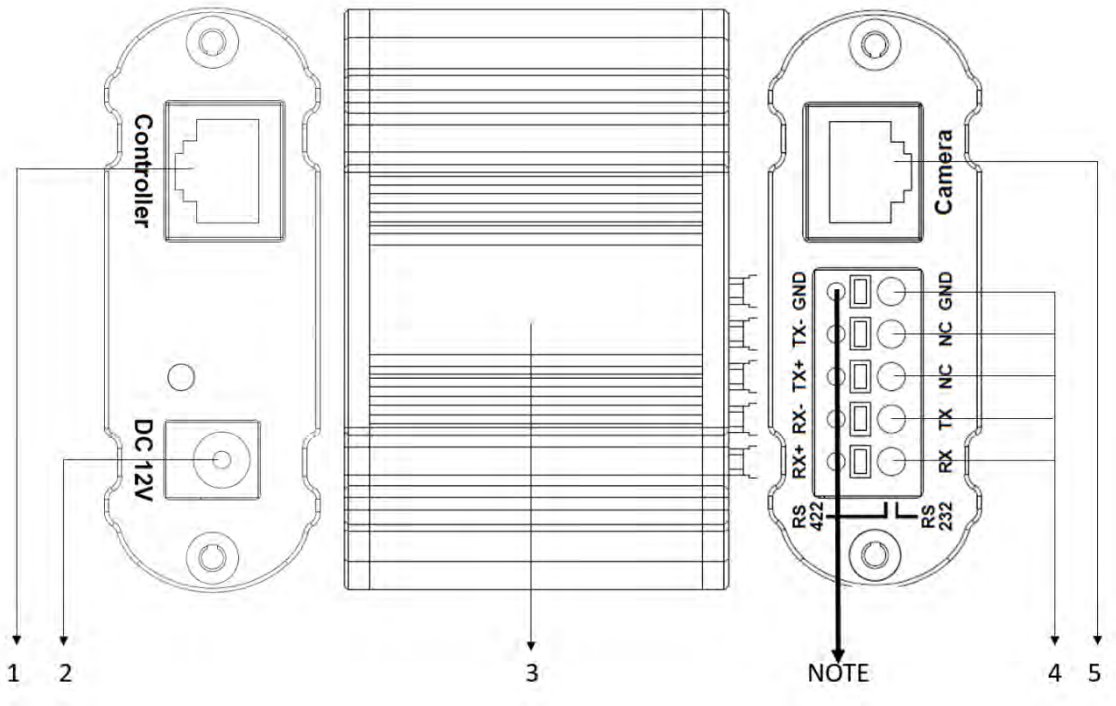


Keyboard



1. **White Balance, (Auto, Manual)**
    - **Press once for Auto**
    - **Press again to activate manual adjustments**
2. **Lock – locks all image adjustment buttons and dials**
3. **Exposure, (Auto, Iris PRI, Shutter PRI)**
4. **IP Interface Buttons – used to interact with IP cameras**
5. **LCD Screen – Display for navigating keyboard settings**
6. **Reset – used for clearing presets**
7. **Setup – used for keyboard menu setting**
8. **Preset – used for saving camera presets**
9. **Pan Tilt Speed knob**
    - **Rotate: Speed adjustment / Navigate (in menu)**
    - **Press: Select (in menu)**
    - **Long press: Invert L/R direction**
10. **Call – used for calling camera presets**
11. **Zoom Speed knob**
    - **Rotate: Zoom speed adjustment / Adjust value (in menu)**
    - **Press: Save (in menu)**
    - **Long press: Invert U/D Direction**
12. **IRIS / Shutter Adjustment for Exposure**
13. **Manual Red Adjustment for White Balance**
14. **Manual Blue Adjustment for White Balance**
15. **Manual Focus**
16. **One-Push Focus**
17. **Focus Auto/ Manual Toggle**
18. **OPW (One Push WB) For White Balance**
19. **Assign Keys – used to assign quick access to commands**
20. **Zoom Seesaw – For zoom in / zoom out**
21. **BLC (Back Light Compensation) – Toggles Back Light Compensation setting in camera**
22. **Menu for pulling out camera OSD menu**
23. **MON: For calling monitor number (* Not activated for current versions)**
24. **Alphanumeric Keypad – used for camera call, preset call, entering data (in menu)**
25. **CAM: For calling camera number**
26. **RS422 Group B Selection**
27. **RS422 Group A Selection**
28. **Enter Button for menu setting to Enter/Confirm data.**
29. **PTZ Joystick**

Junction Box



1. **RJ45 port for connection between Junction Box and The Keyboard Controller**
2. **12V DC Power Port**
   Connect the supplied DC power adaptor and cord
3. **Junction Box body**
4. **Terminal Contact connection for RS422 or RS232**
5. **RJ45 port for connection between Junction Box and The camera**
   Use Network cable to connect directly
6. **NOTE:** Do not use the top row of holes, as these are not contact ports. All labels apply to the **bottom row** (Item #4 in the chart)

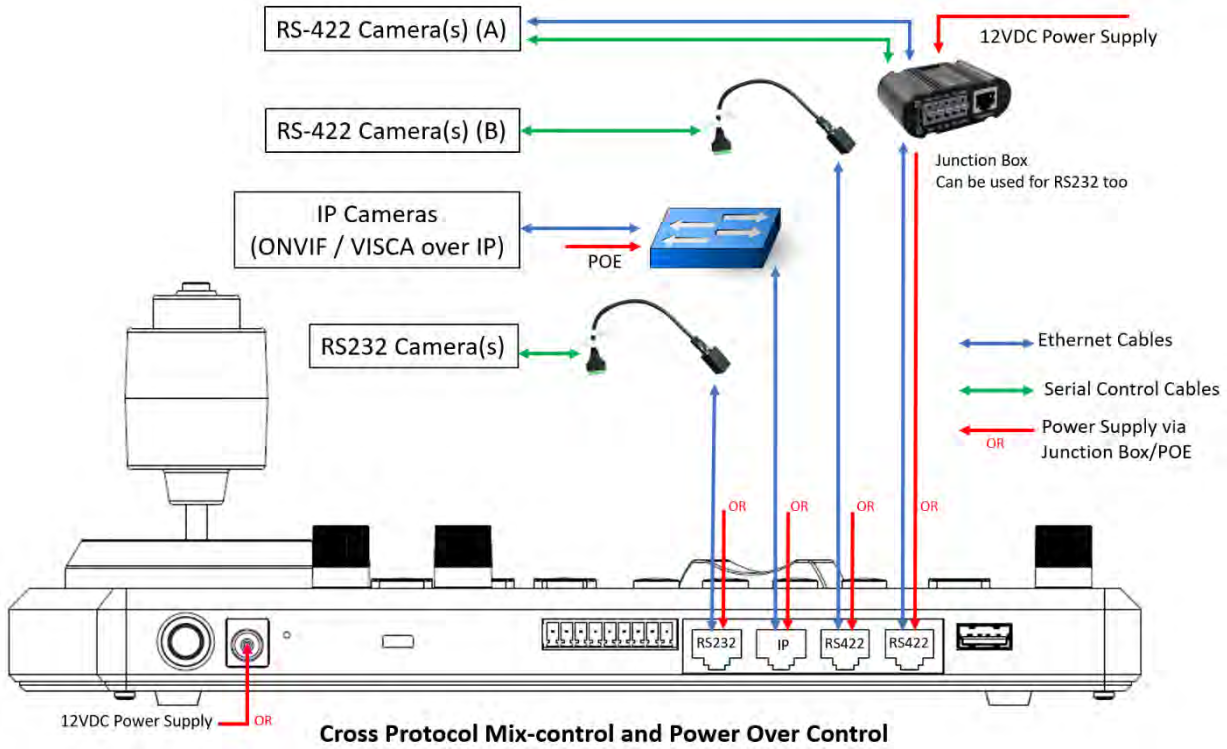
System Overview

Cross Protocol Mix-control with RS232/RS422 and IP in one single system

Cross-Protocol Mix Control

Figure 1 - When the junction box is powered, it will provide power to the keyboard via any port that it is connected to --RS232, IP, RS422(A), RS422(B). ***No additional power supply is required for the keyboard a powered junction box is being used.***

Please Note regarding Serial Control protocols (RS422/RS485 and RS232):



Cross Protocol Mix-control and Power Over Control

- When controlling only RS232 cameras, the keyboard can control a total of 7 RS232 cameras
- When controlling RS422 and RS232 cameras simultaneously, the keyboard can control a total of 7 RS232 and RS422 cameras
- When controlling only RS422 cameras, the keyboard can control up to 14 RS422 cameras (2 daisy chains of 7)
- When controlling only RS485 cameras, the keyboard can control up to 255 RS485 cameras.

The keyboard is capable of simultaneously controlling up to 255 cameras, between mixed protocols (RS422, RS232, and IP)

Connection

The controller supports serial RS232/RS422 and IP Cross protocol mix-control. It allows you to use RS232/RS422/IP control on one controller to control cameras (Protocol support: VISCA, PELCO D/P, ONVIF, VISCA over IP, CGI*) in a single system.

Depending on the protocol being used to control the cameras, you may need to connect one or more of the following:

IP port to network switch

- Used for logging in to web interface of KBD-1010
- Used to control the following PTZ protocols:
  - VISCA over IP
  - ONVIF IP

RS232 Connection

- RS232 Connection1 to 1 connection with keyboard and camera
- Keyboard connection to RS232 daisy chain

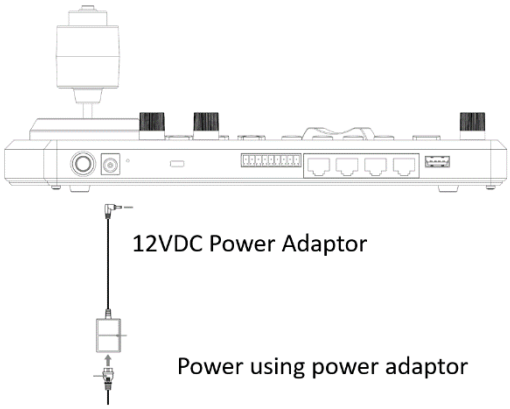
RS422 Connection

- Keyboard RS422 (A or B) RJ-45 port to RS422 adapter to RS422 cameras (daisy chain)
- Keyboard RS422 (A or B) RJ-45 port to RS422 adapter to RS485 cameras.

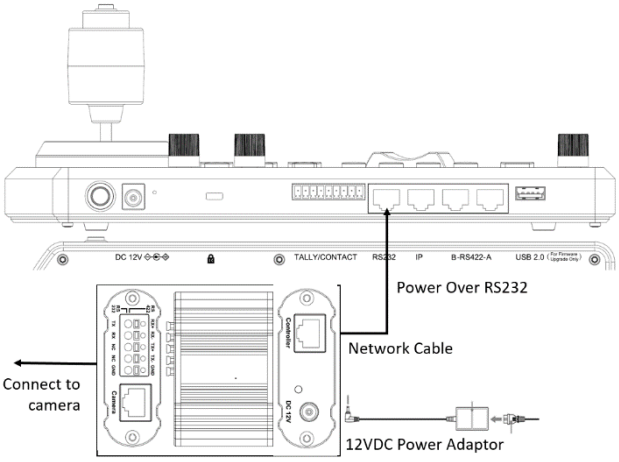
Power

Power up the controller using one of the following options:

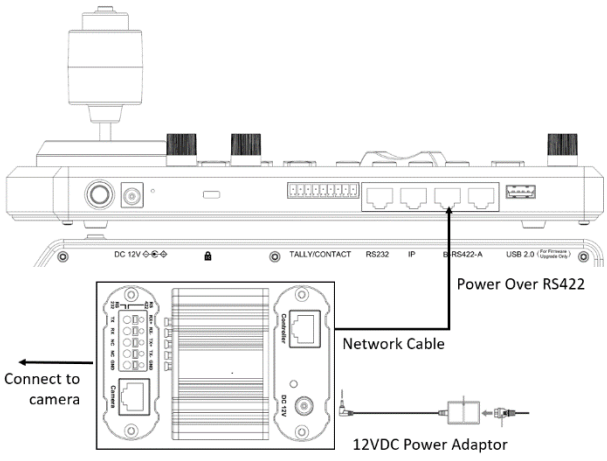
1. **Power supply (included)**
   - **Power Voltage Tolerance 5V – 48V**
   - **The keyboard can be powered with at least 5VDC. This allows for longer power runs between the power source and the keyboard**
   - **The keyboard can also tolerate 48VDC power, which makes the keyboard suitable for vehicle use (Broadcast vans, commercial vehicles, etc.)**
2. **Use POE (connect Ethernet IP port to POE switch)**
   - **Maximum distance 80M using CAT6 Plus cable**
3. **Use included junction box**
   - **Connect junction box to power supply**
   - **Connect Ethernet cable from "Controller" port on the junction box to the RS422 or RS232 port on the KBD-1010**
   - **When using Junction Box to provide power to the keyboard via RS422 or RS232 port on the keyboard. Does not need extra power supply for keyboard.**



Power using power adaptor



Power using Junction Box Power Over RS232



Power using Junction Box Power Over RS422

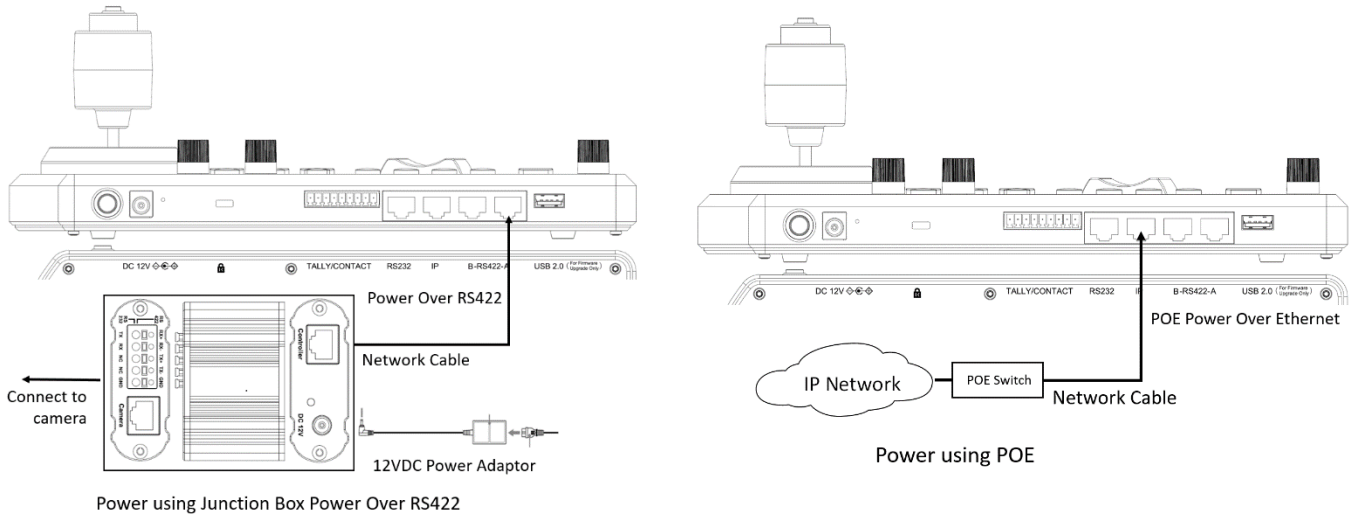
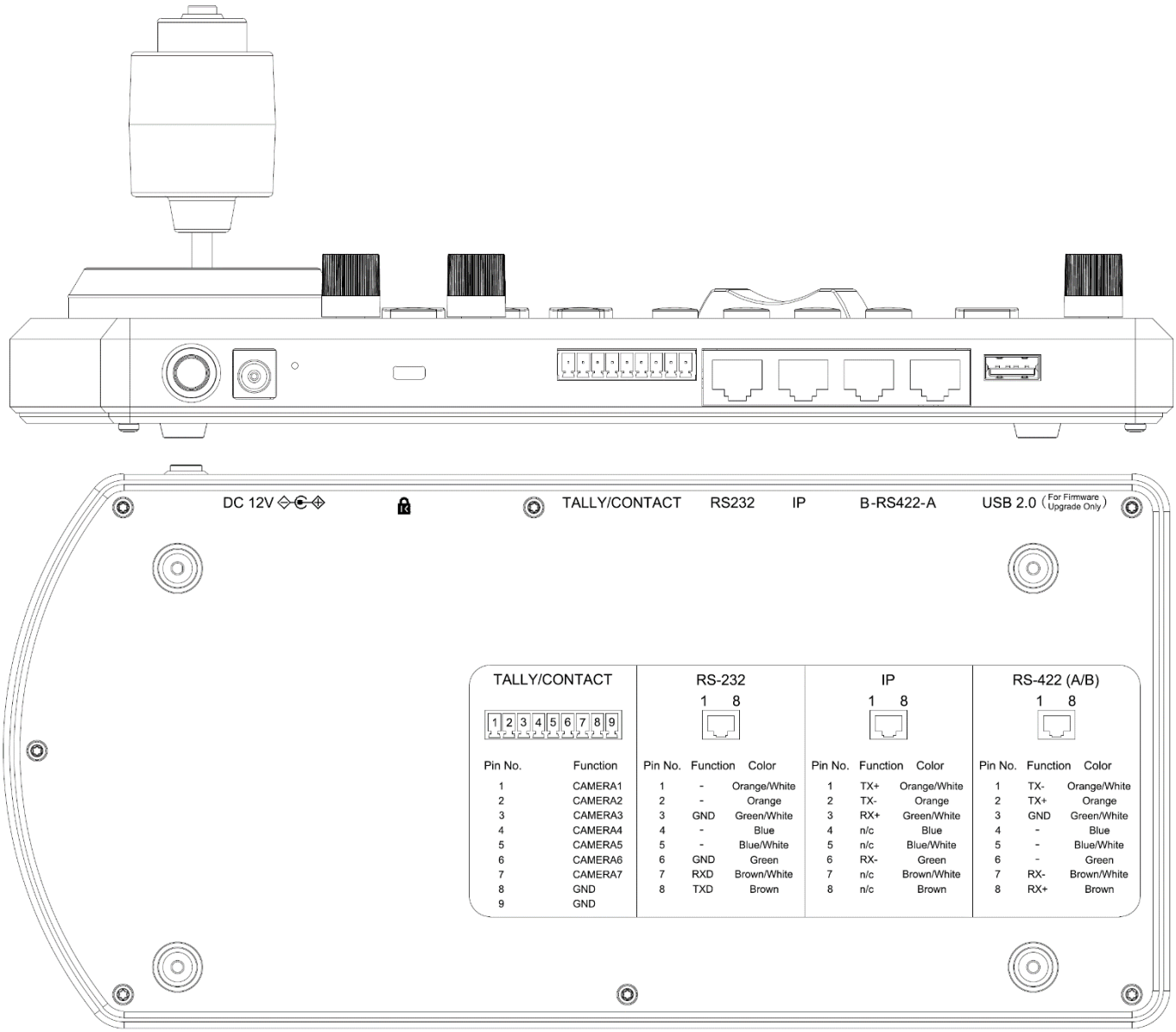
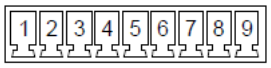


Figure 2 - Power supply is required at EITHER the keyboard OR the Junction Box. If the junction box is powered, no additional power supply is needed for the keyboard, as the junction box will provide power to the keyboard via the control port

Connector Pinout Definition



TALLY/CONTACT



Pin No.	Function
1	CAMERA1
2	CAMERA2
3	CAMERA3
4	CAMERA4
5	CAMERA5
6	CAMERA6
7	CAMERA7
8	GND
9	GND

RS-232

Pin No.	Function	Color
1	-	Orange/White
2	-	Orange
3	GND	Green/White
4	-	Blue
5	-	Blue/White
6	GND	Green
7	RXD	Brown/White
8	TXD	Brown

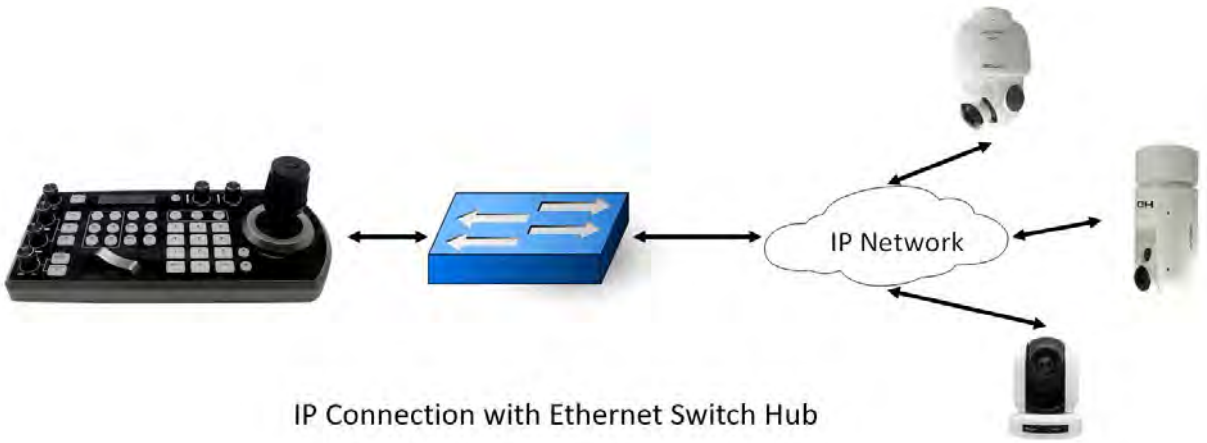
IP

Pin No.	Function	Color
1	TX+	Orange/White
2	TX-	Orange
3	RX+	Green/White
4	n/c	Blue
5	n/c	Blue/White
6	RX-	Green
7	n/c	Brown/White
8	n/c	Brown

RS-422 (A/B)

Pin No.	Function	Color
1	TX-	Orange/White
2	TX+	Orange
3	GND	Green/White
4	-	Blue
5	-	Blue/White
6	-	Green
7	RX-	Brown/White
8	RX+	Brown

IP connection



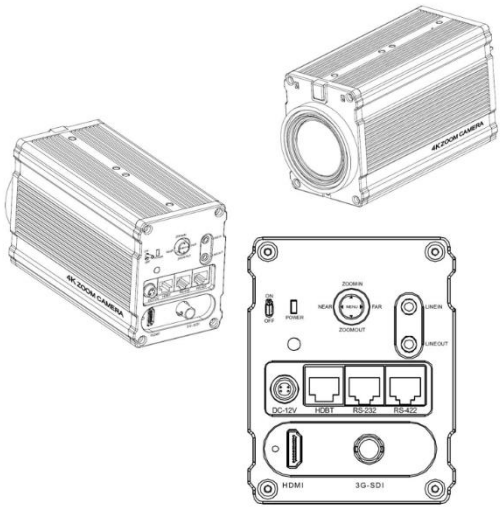
IP Connection with Ethernet Switch Hub

Connect the keyboard's "IP" port to a port on an Ethernet switch

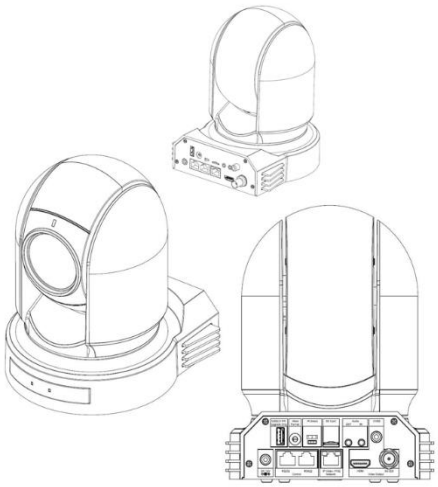
For more information regarding adding ONVIF and VISCA over IP cameras to be controlled by the keyboard, please see the section on Keyboard IP Configuration

Connection with Bolin Camera

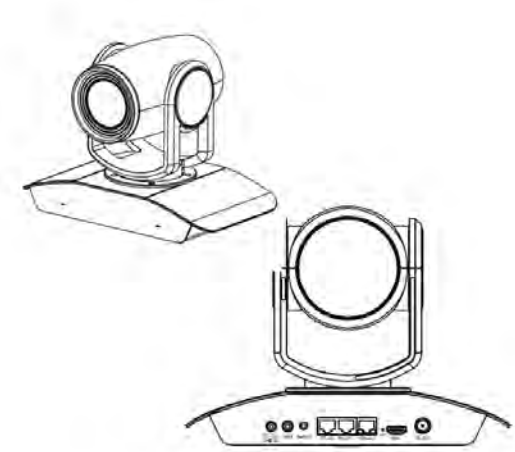
This User Guide is suitable for following Bolin cameras:



1 Series camera
with RJ45 Type Serial Control Port

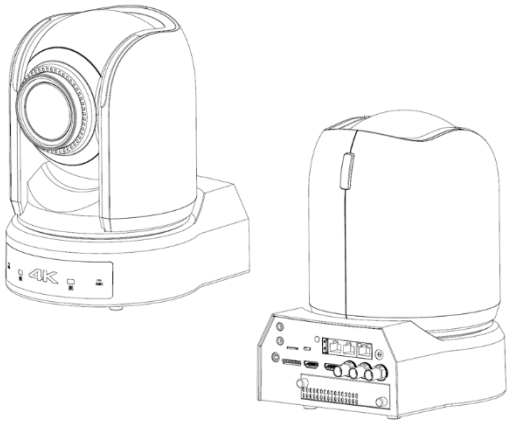


7 Series camera
with RJ45 Type Serial Control Port

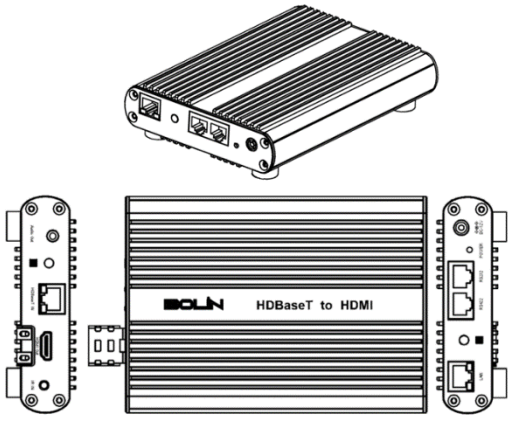


8 Series camera
with RJ45 Type Serial Control Port

Camera with Regular
Type Serial Control Port



9 Series camera
with RJ45 Type Serial Control Port



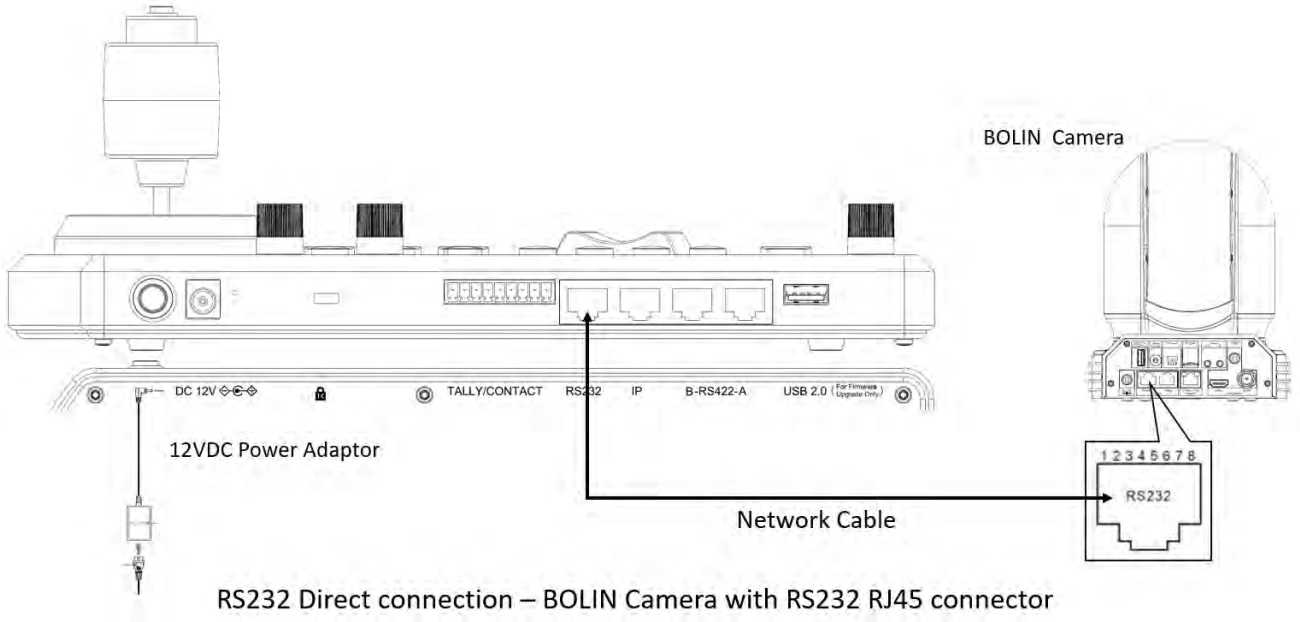
HDBaseT Receiver
with RJ45 Type Serial Control Port

Serial Port Connection

RS232 connection with Bolin Camera

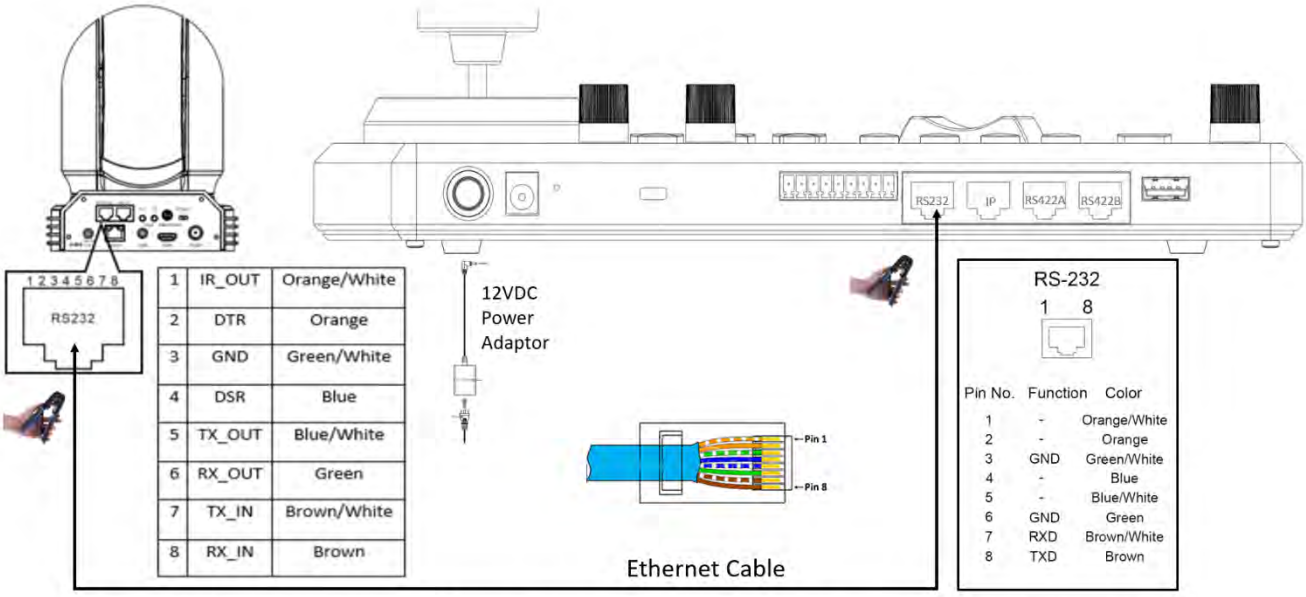
Follow the diagram below for the following options:

1. **RS232 Direct connect:**
    a. **1 to 1 connection, Bolin camera ONLY - Use the included (Premade) Ethernet cable or T-568B standard Ethernet cable direct connect between the controller and the camera.**



RS232 Direct connection – BOLIN Camera with RS232 RJ45 connector

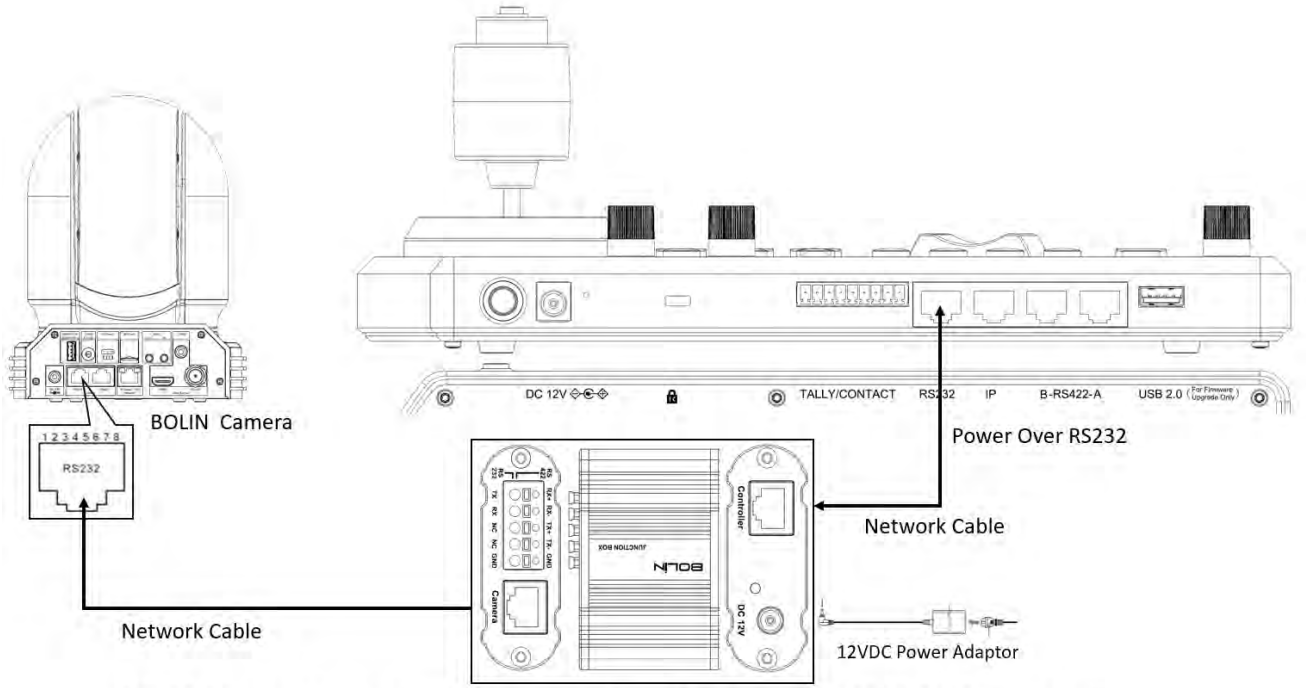
b. 1 to 1 connection – Follow the pinout for the RS232 port on the keyboard to use CAT5/6 T-568B Standard Ethernet cable to make a cable suitable for controlling your camera.



1	IR_OUT	Orange/White
2	DTR	Orange
3	GND	Green/White
4	DSR	Blue
5	TX_OUT	Blue/White
6	RX_OUT	Green
7	TX_IN	Brown/White
8	RX_IN	Brown

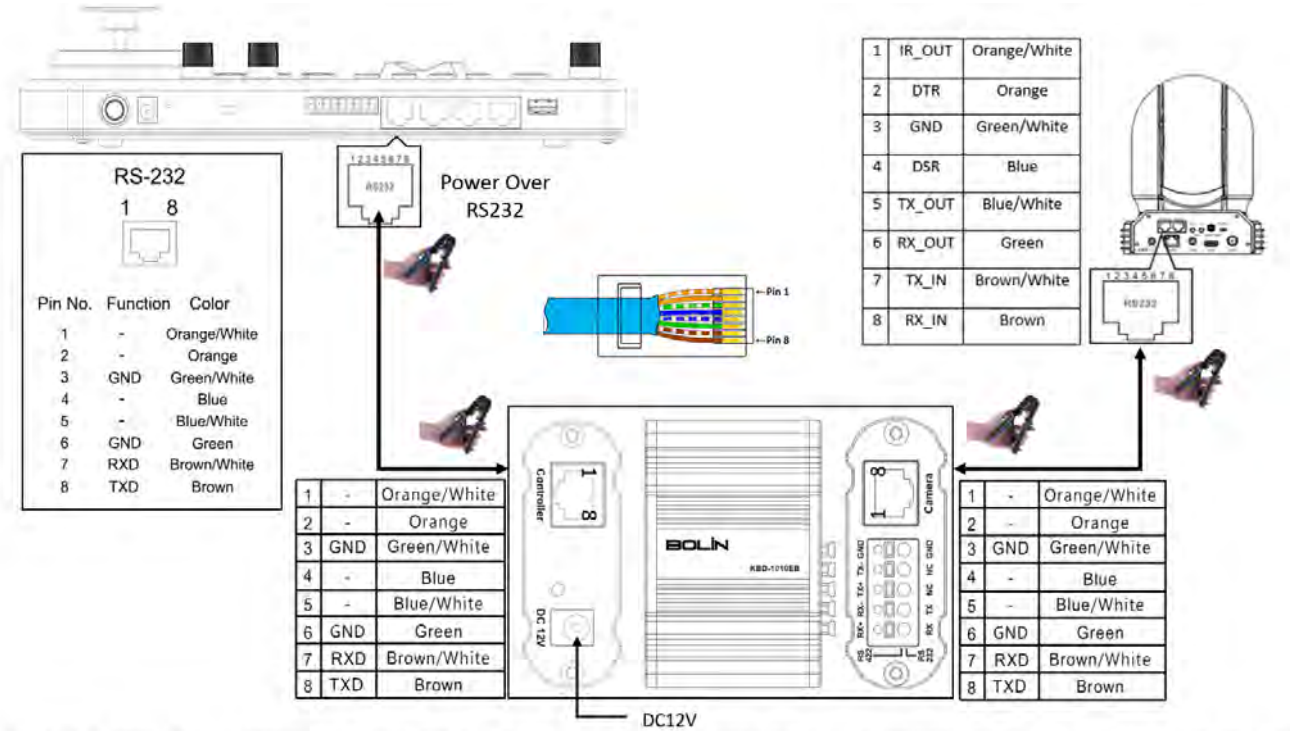
RS232 Direct connection – Make a network cable - BOLIN Camera with RS232 RJ45 connector

c. **Use Junction Box, 1 to 1 connection, Use the included (Premade) Ethernet cable or T-568B Standard Ethernet cable direct connect between the Bolin camera and the controller.**



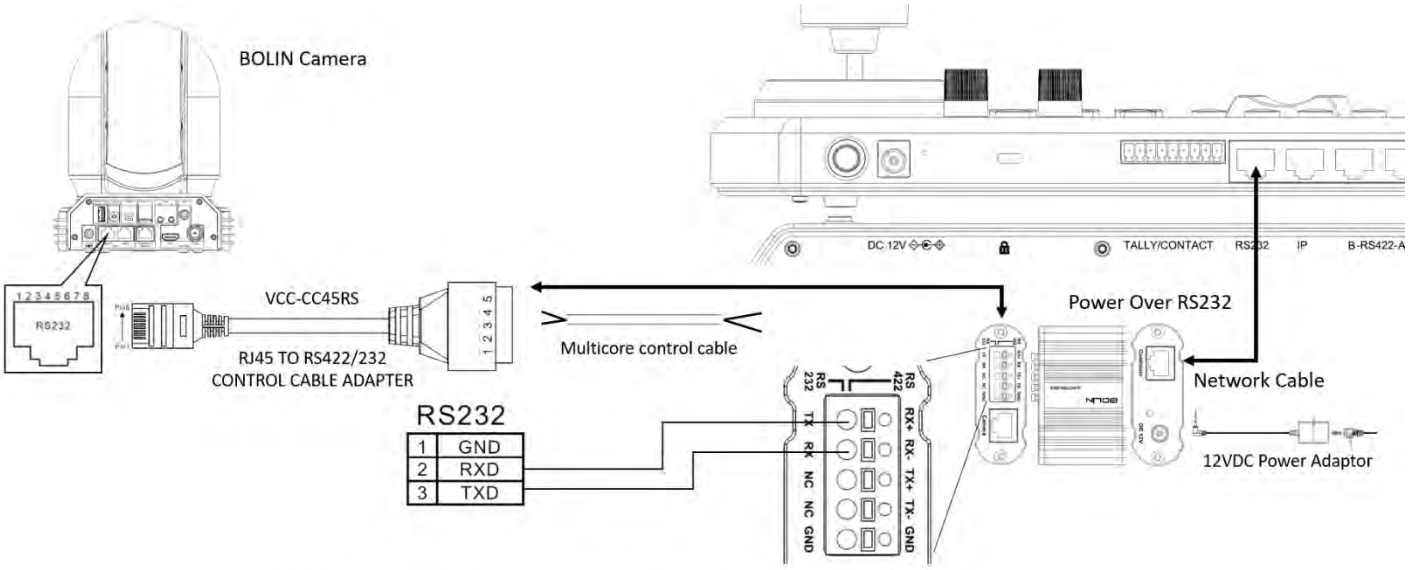
RS232 Direct connection – Via Junction Box - Camera with RS232 RJ45 connector

d. **1 to 1 connection – Follow the pinout for the RS232 port on the keyboard and Junction Box to use CAT5/6 cable (T-568B) to make a cable suitable for controlling your camera via Junction Box.**



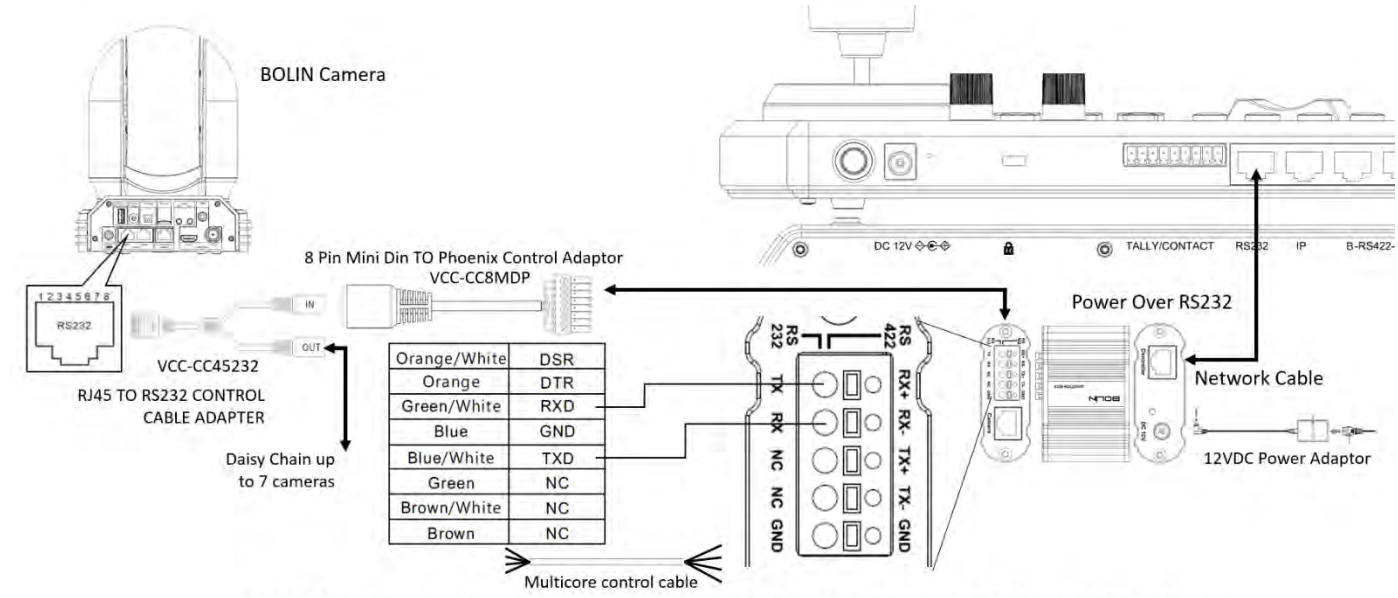
RS232 Direct Connection – Via Junction Box to make a network cable - Camera with RS232 RJ45 connector

2. RS232 connection using RJ45-RS232 phoenix adapter via Junction Box.



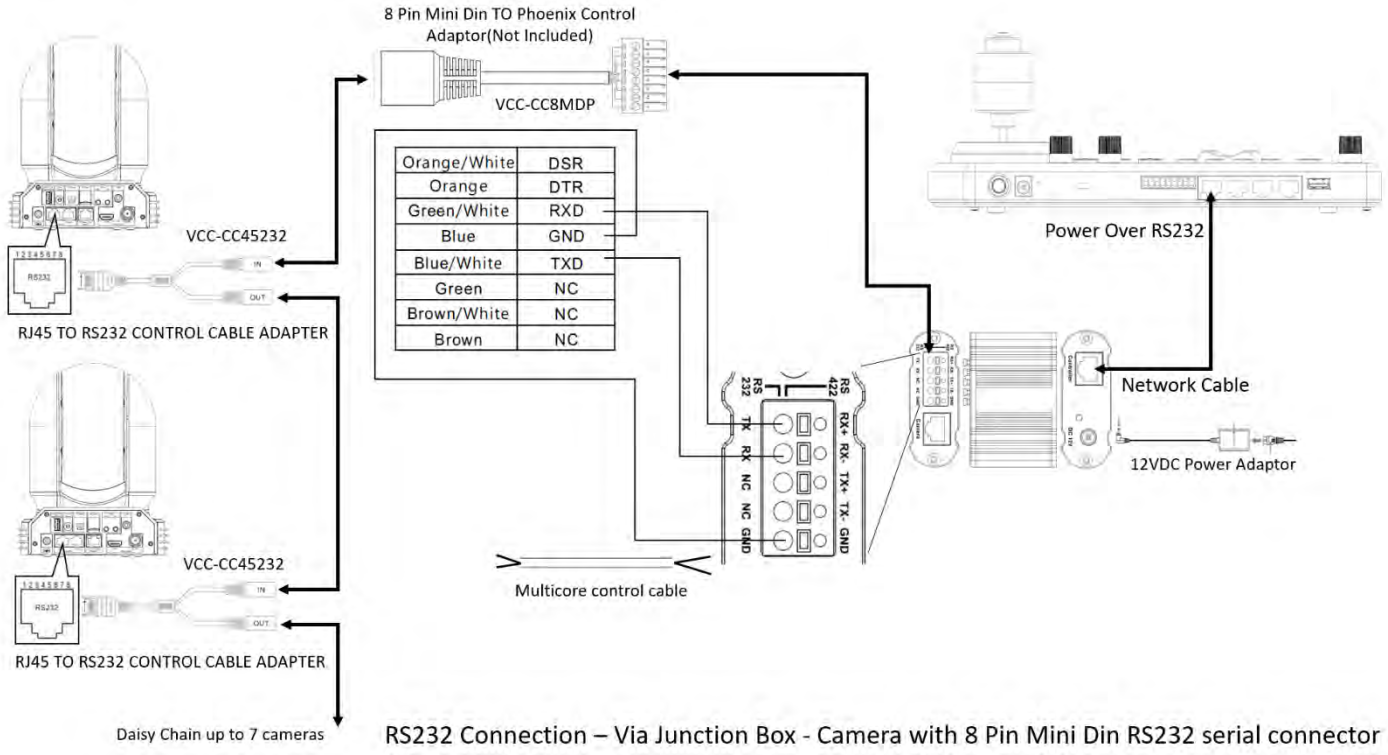
RS232 Connection – Via Junction Box - Camera using RJ45 to Phoenix adaptor

3. RS232 connection using RJ45-RS232 8 Pin Mini Din adapter via Junction Box.

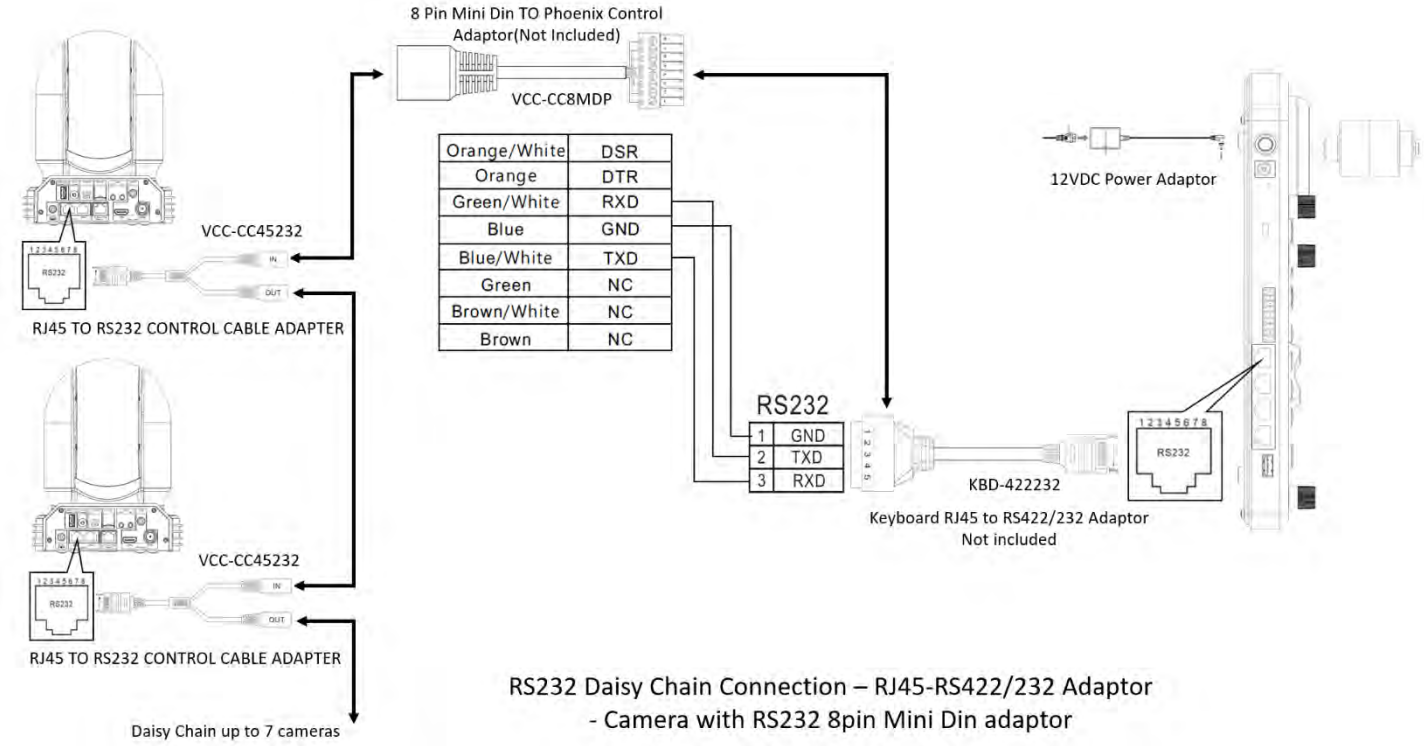


RS232 Connection – Via Junction Box - Camera with 8 Pin Mini Din Connector adaptor

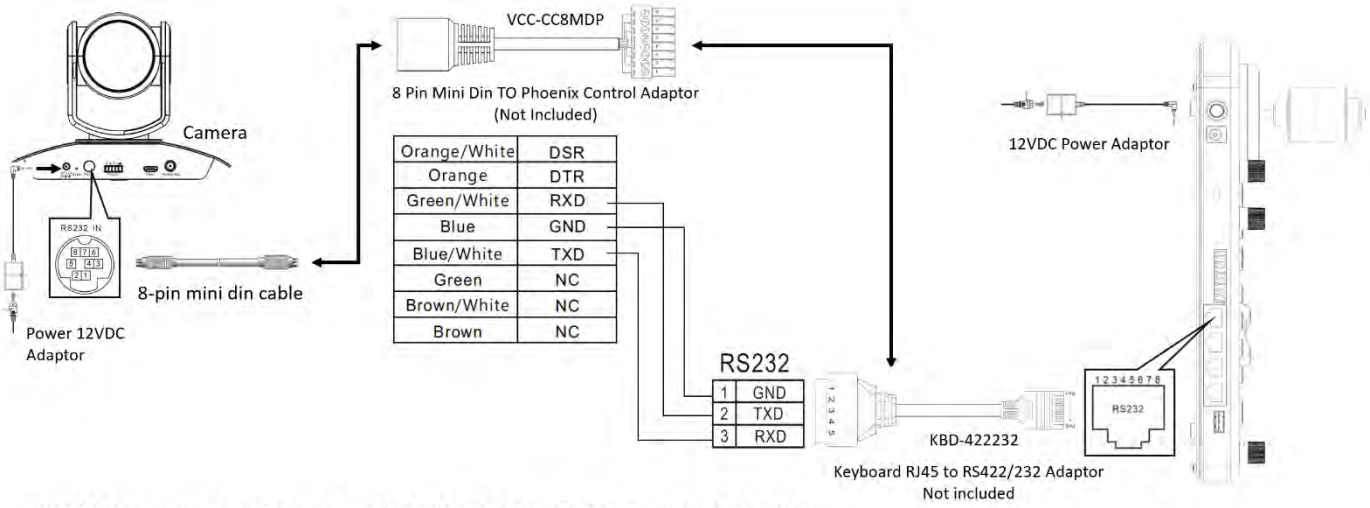
4. RS232 Daisy Chain Multiple Cameras connection.



5. RS232 connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately)



6. RS232 connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately) to connect 8 Pin Mini Din RS232 Port:

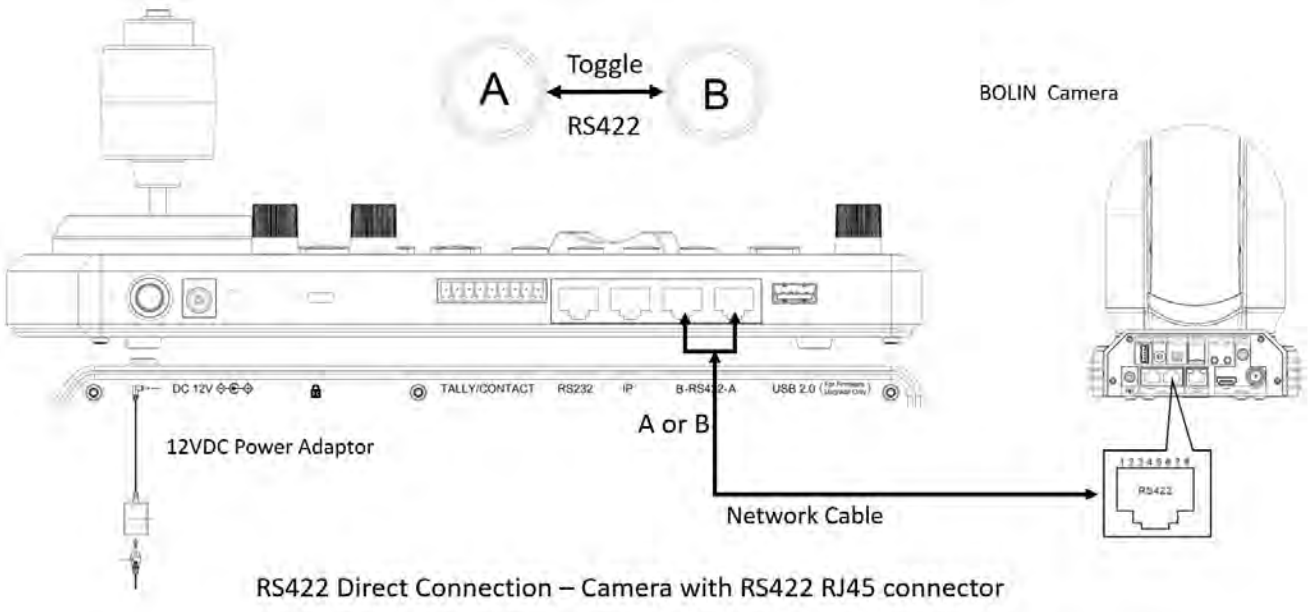


RS232 Connection – Camera with RS232 8pin Mini Din port and adaptor

RS422 connection with Bolin Camera

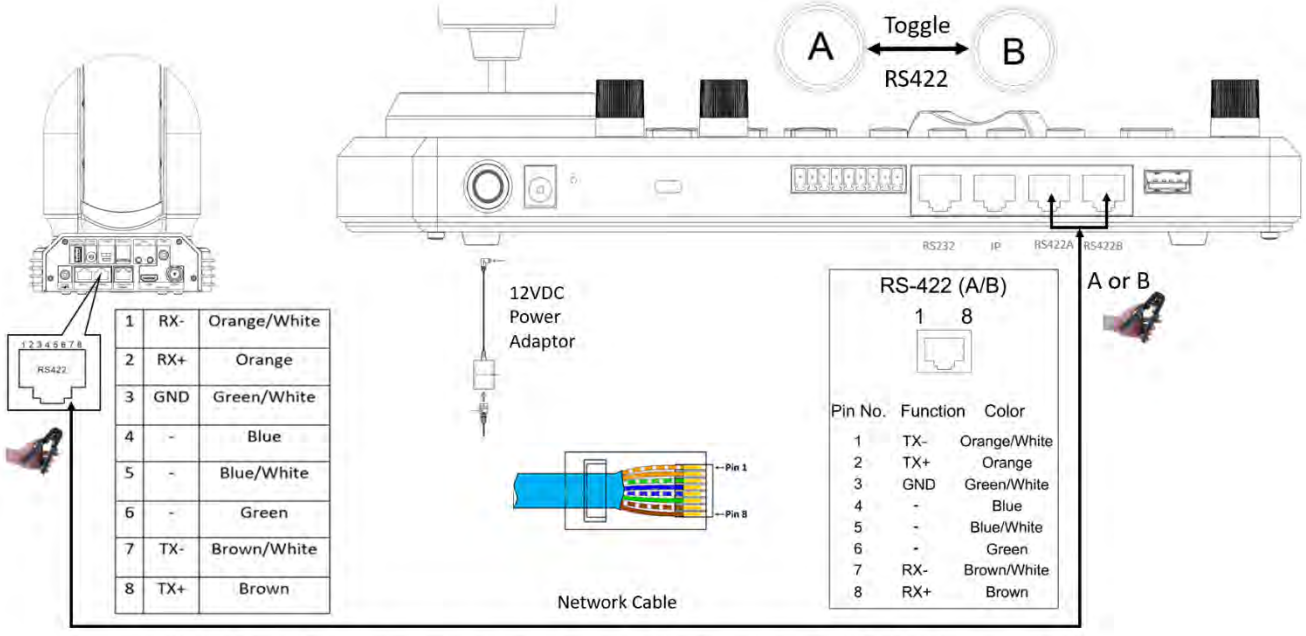
Follow the diagram below for the following options:

1. **RS422 Direct connect:**
   a. **1 to 1 connection, Use the included (Premade) Ethernet cable or T-568B Standard Ethernet cable direct connect between the controller and the camera.**



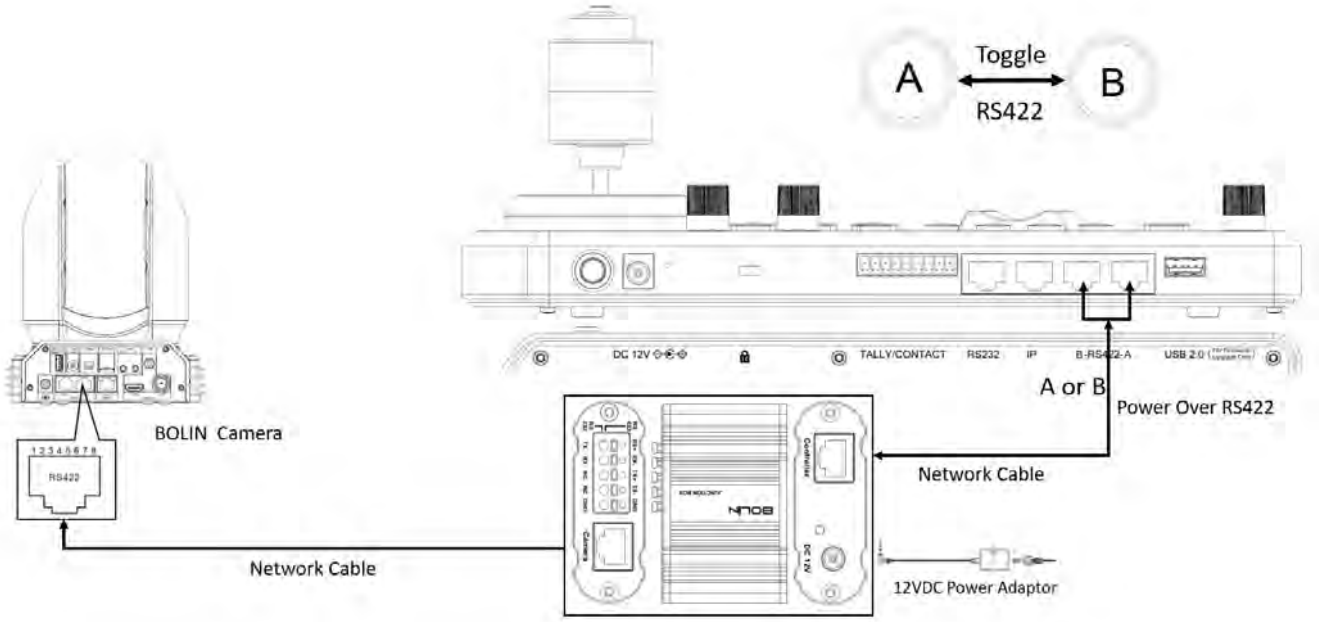
RS422 Direct Connection – Camera with RS422 RJ45 connector

   b. **1 to 1 connection – Follow the pinout for the RS422 port on the keyboard to use CAT5/6 cable (T-568B) to make a cable suitable for controlling your camera.**



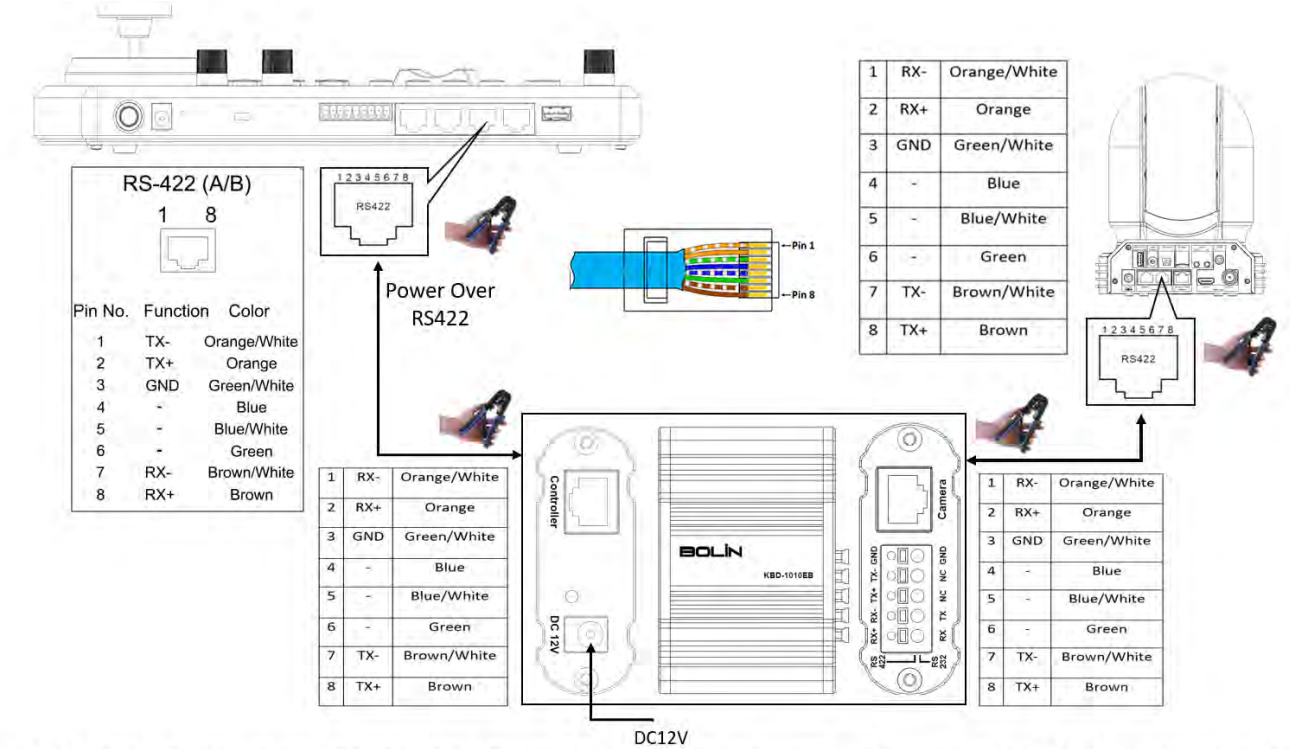
RS422 Direct Connection – make a network cable - Camera with RS422 RJ45 connector

c. **Use Junction Box, One-To-One Camera Connection, 1 to 1 connection, use the included (premade) Ethernet cable or T-568B Standard Ethernet cable direct connect between the camera and the controller.**



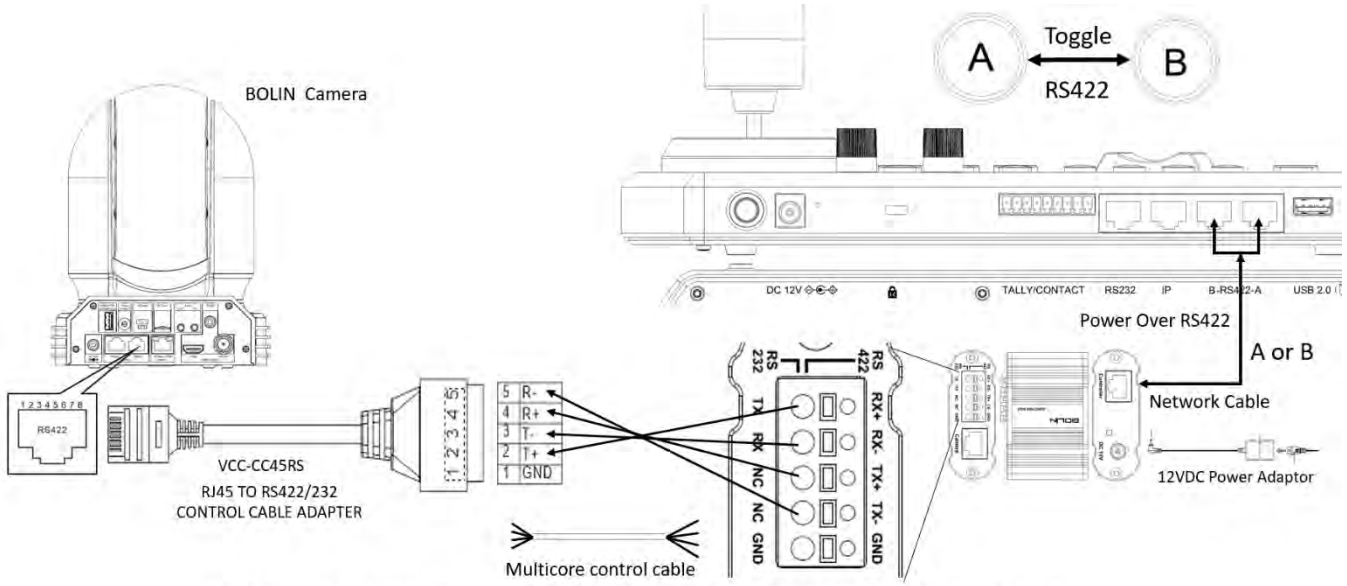
RS422 Direct Connection – Via Junction Box - Camera with RS422 RJ45 connector

d. **1 to 1 connection – Follow the pinout for the RS422 port on the keyboard and Junction Box to use CAT5/6 cable (T-568B) to make a cable suitable for controlling your camera via Junction Box.**



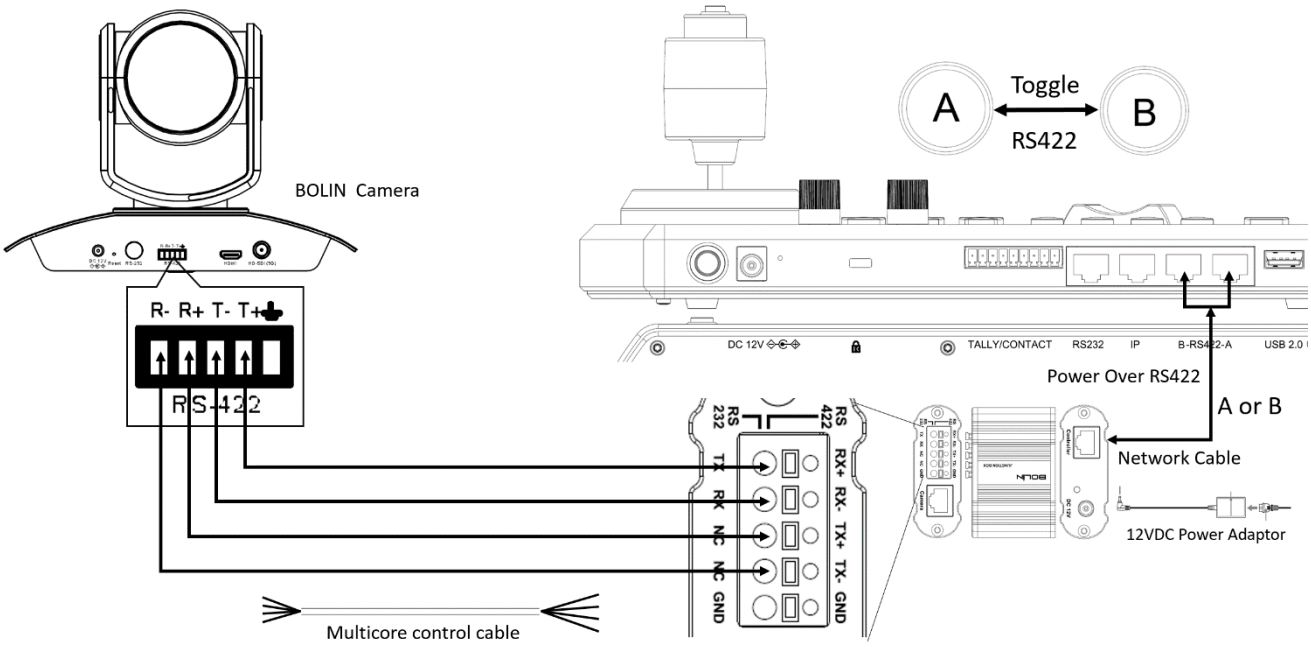
RS422 Direct Connection – Via Junction Box to Make a network cable - Camera with RS422 RJ45 connector

2. **1 to 1 connection – Use multicore control cable to connect from the controller to Bolin camera with the RS422 RJ45 connector via Junction Box.**



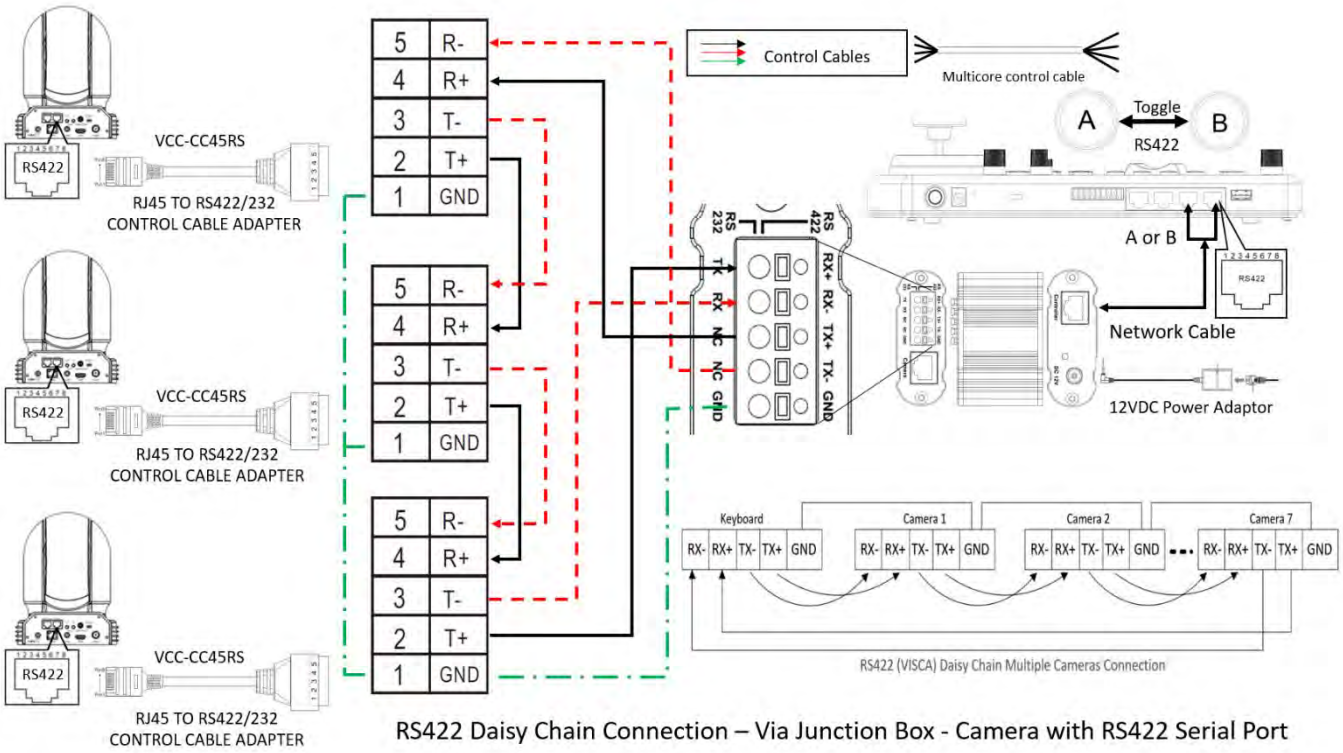
RS422 Connection – Via Junction Box - Camera with RS422 RJ45 to Phoenix adapter

3. **1 to 1 connection – Use multicore control cable to connect from the controller to Bolin camera with the serial port via Junction Box.**



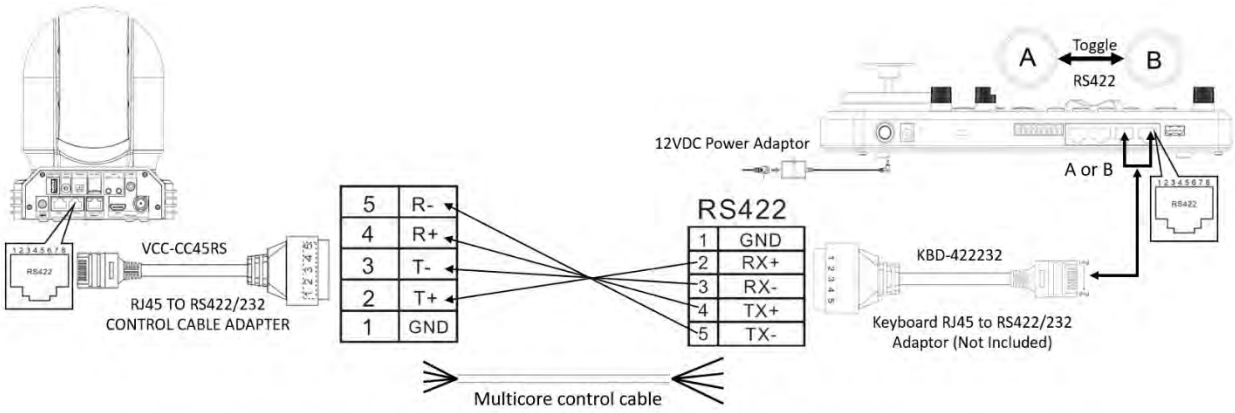
RS422 connection – Via Junction Box - Camera with RS422 Serial Port

4. RS422 Daisy Chain multiple camera connection:

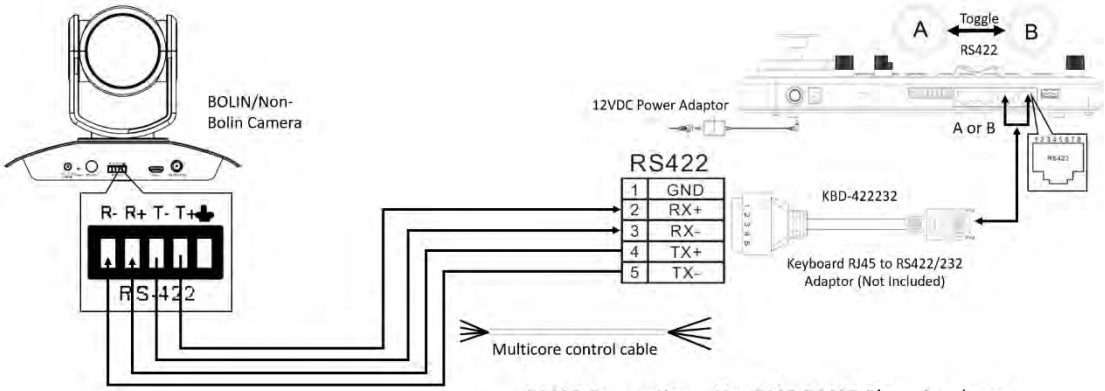


RS422 Daisy Chain Connection – Via Junction Box - Camera with RS422 Serial Port

5. RS422 connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately)

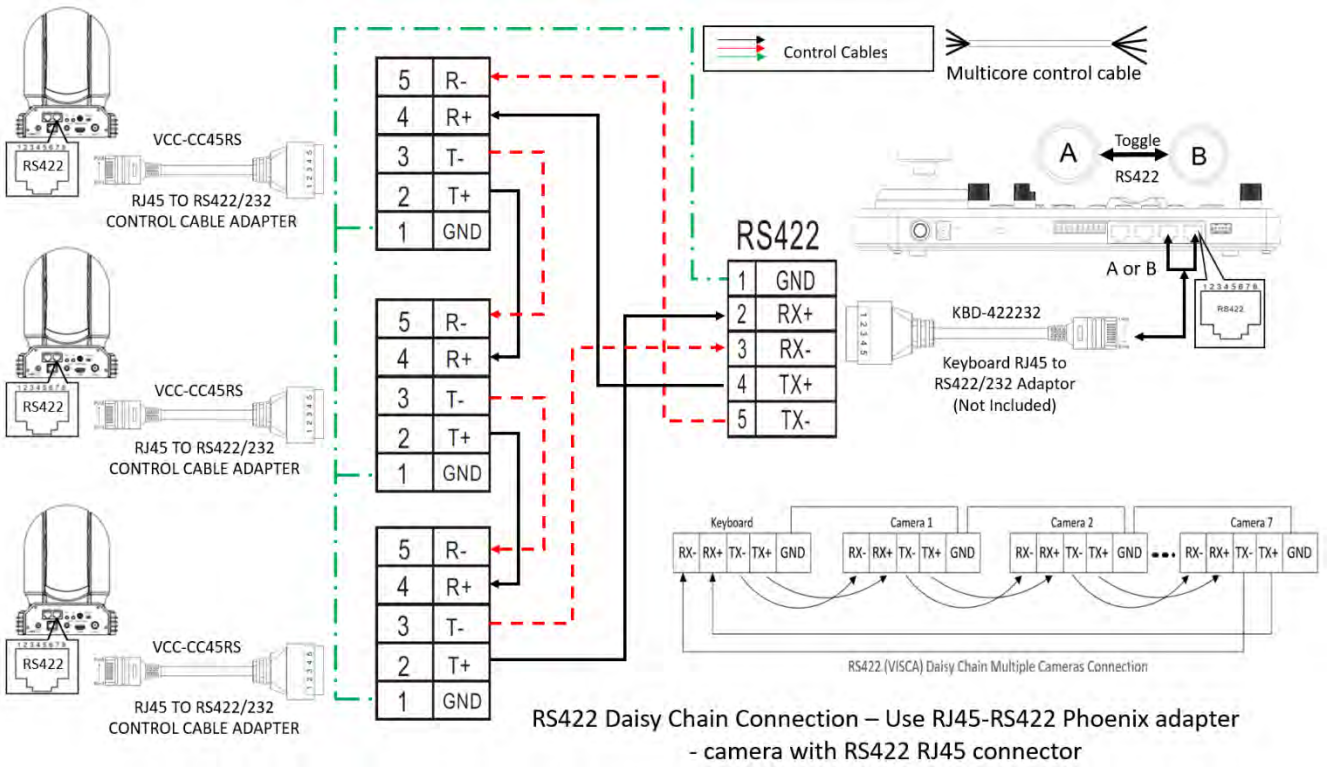


RS422 Connection - Use RJ45-RS422 Phoenix adapter - camera with RS422 RJ45 connector



RS422 Connection – Use RJ45-RS422 Phoenix adapter
- Camera with RS422 Serial Port

6. **RS422 Daisy Chain connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately)**



RS422 Daisy Chain Connection – Use RJ45-RS422 Phoenix adapter
- camera with RS422 RJ45 connector

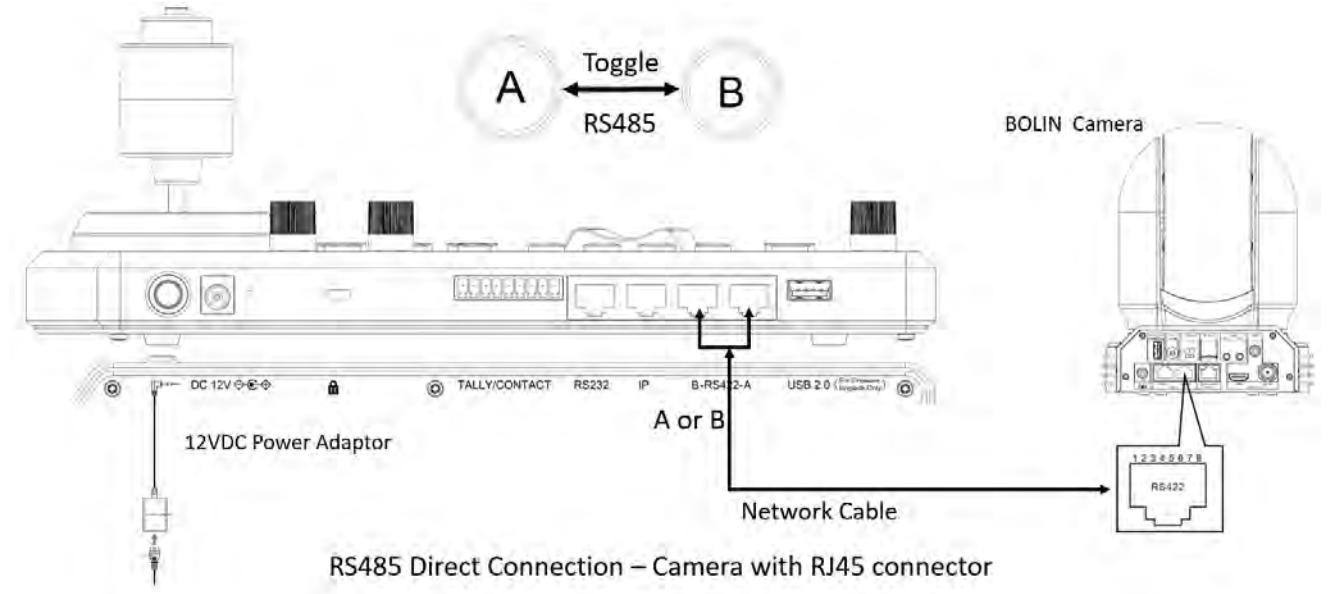
RS485 connection with Bolin Camera

Follow the diagram below for the following options:

NOTE:

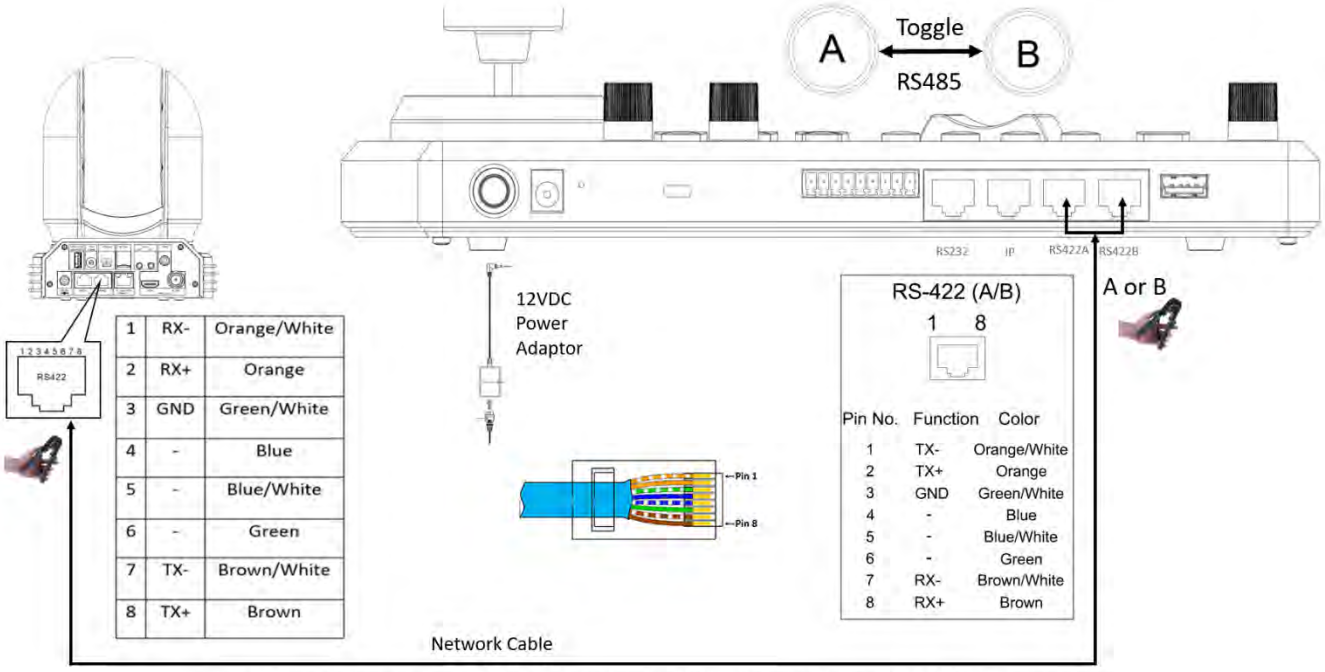
- *Use RS422 ports for RS485 connection.*
- *Only use TX+ and TX- for RS485 connection.*

1. **RS485 Direct connect:**
   a. **1 to 1 connection, use the included (Premade) Ethernet cable or T-568B Standard Ethernet cable direct connect between the controller and the camera.**



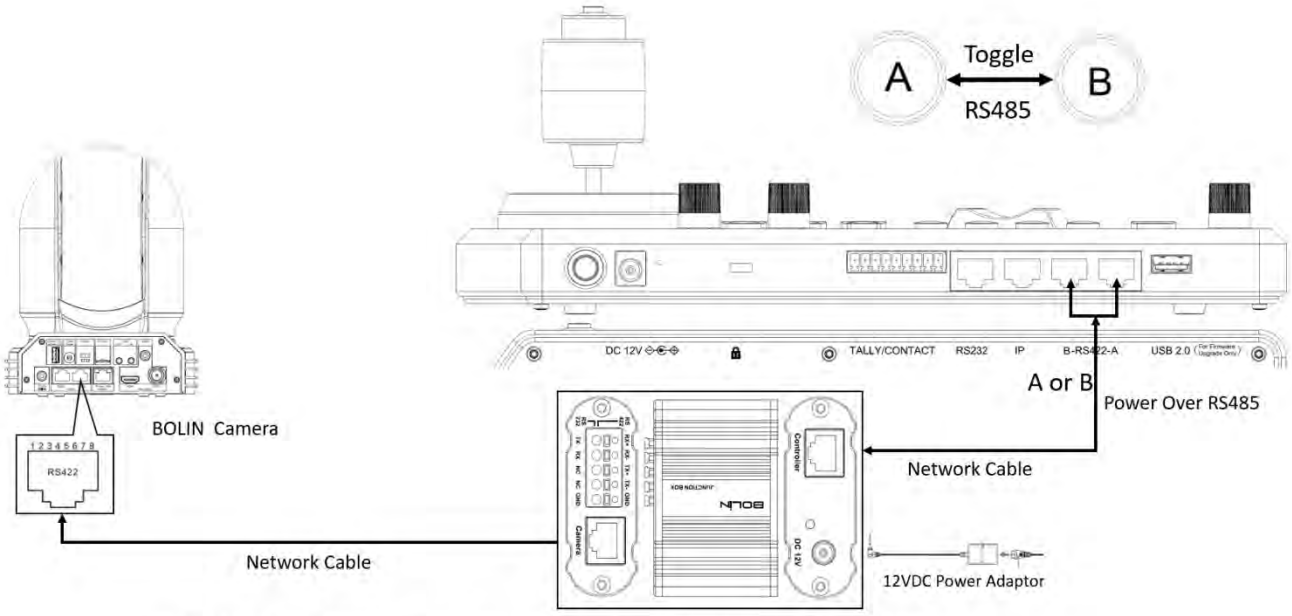
RS485 Direct Connection – Camera with RJ45 connector

b. Direct connect B: 1 to 1 connection – Follow the pinout for the RS422 port on the keyboard to use CAT5/6 cable (T-568B) to make a cable suitable for controlling your camera.



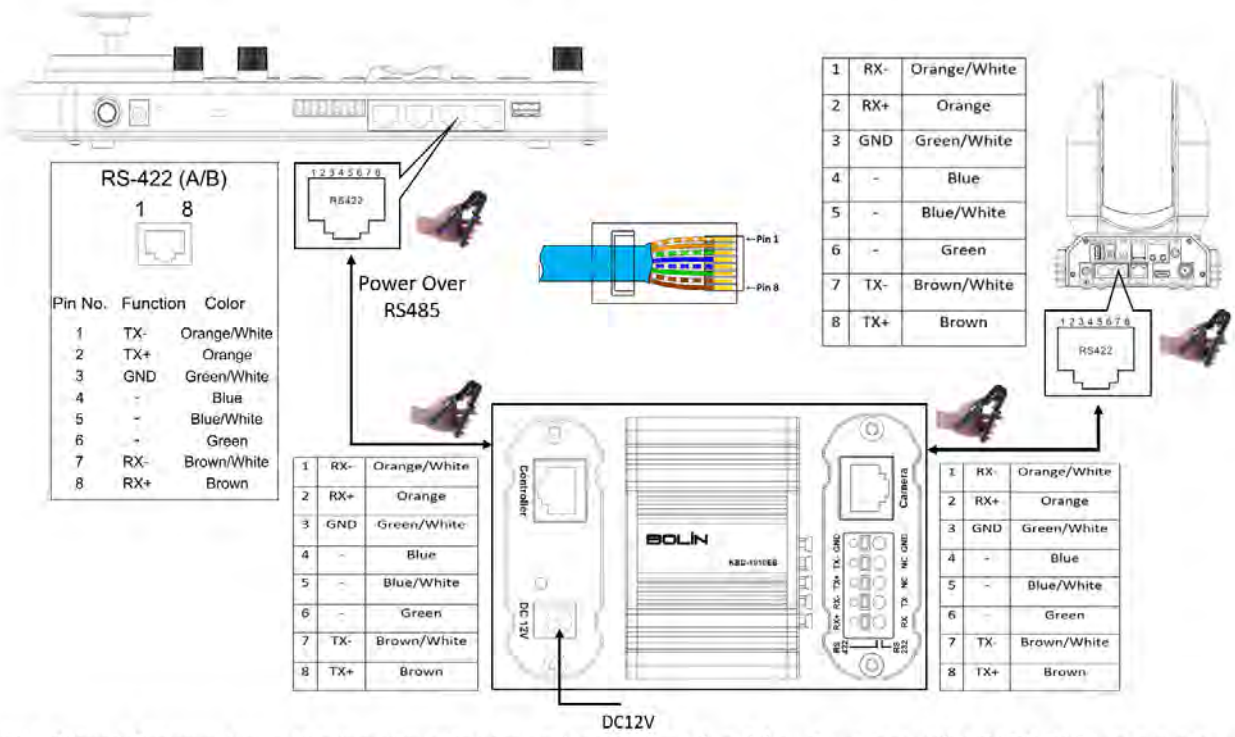
RS485 Direct Connection – Make a network cable - Camera with RS422 RJ45 connector

c. Use Junction Box, One-To-One Camera Connection, 1 to 1 connection, use the included (Premade) Ethernet cable or T-568B Standard Ethernet cable direct connect between the camera and the controller.



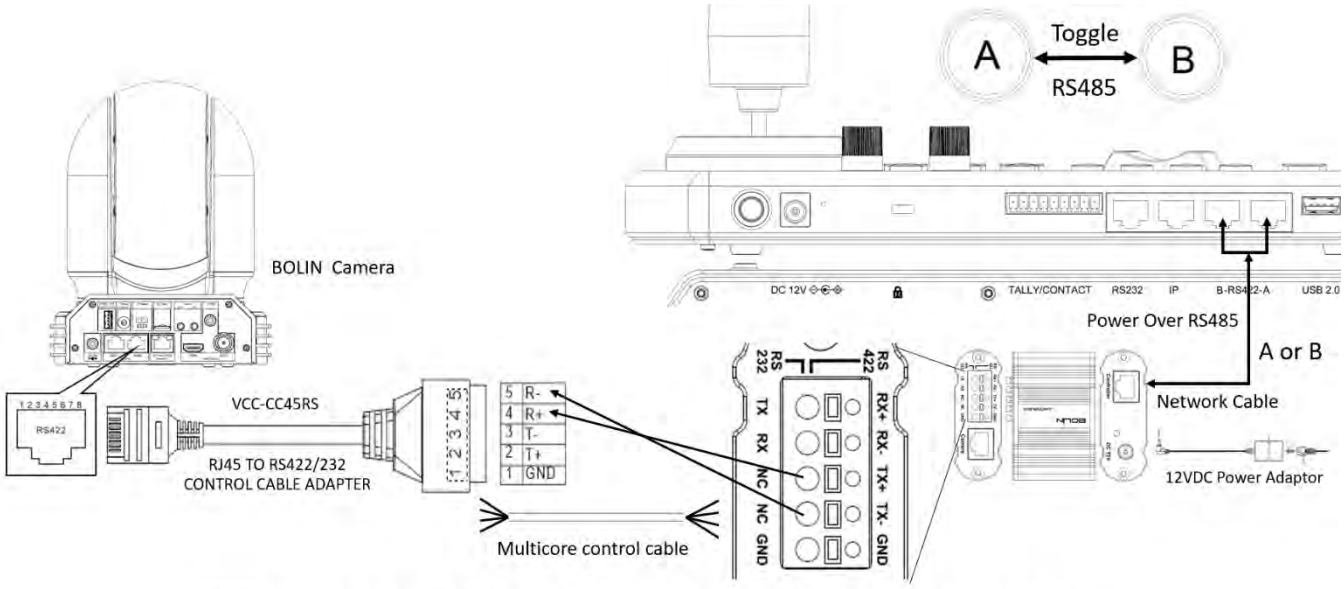
RS485 Direct connection – Via Junction Box - Camera with RJ45 connector

d. 1 to 1 connection – Follow the pinout for the RS485 port on the keyboard and Junction Box to use CAT5/6 cable (T-568B) to make a cable suitable for controlling your camera via Junction Box.



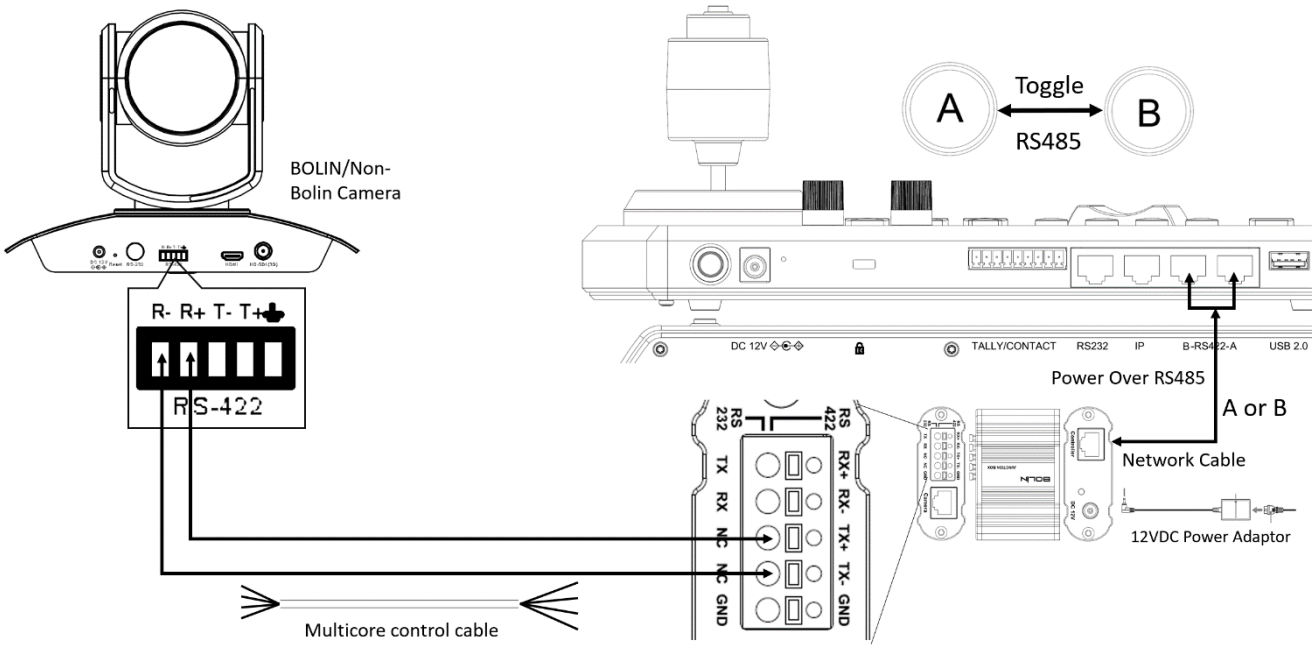
RS485 Direct Connection – Via Junction Box to make a network cable - Camera with RS422 RJ45 connector

2. 1 to 1 connection – Use multicore control cable to connect from the controller to Bolin camera with the RS485 RJ45 connector via Junction Box.



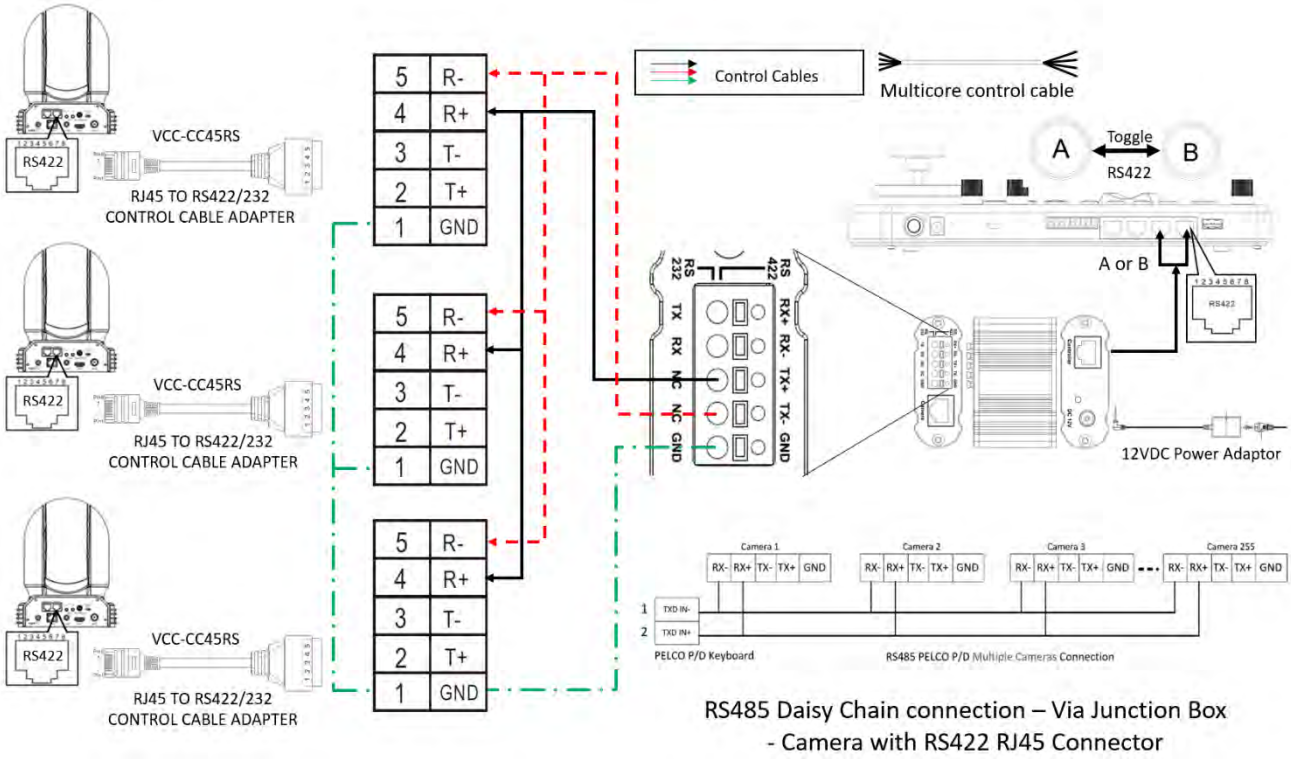
RS485 Connection – Via Junction Box - Camera with RS422 RJ45 to Phoenix adapter

3. **1 to 1 connection – Use multicore control cable to connect from the controller to Bolin camera with the serial port via Junction Box.**



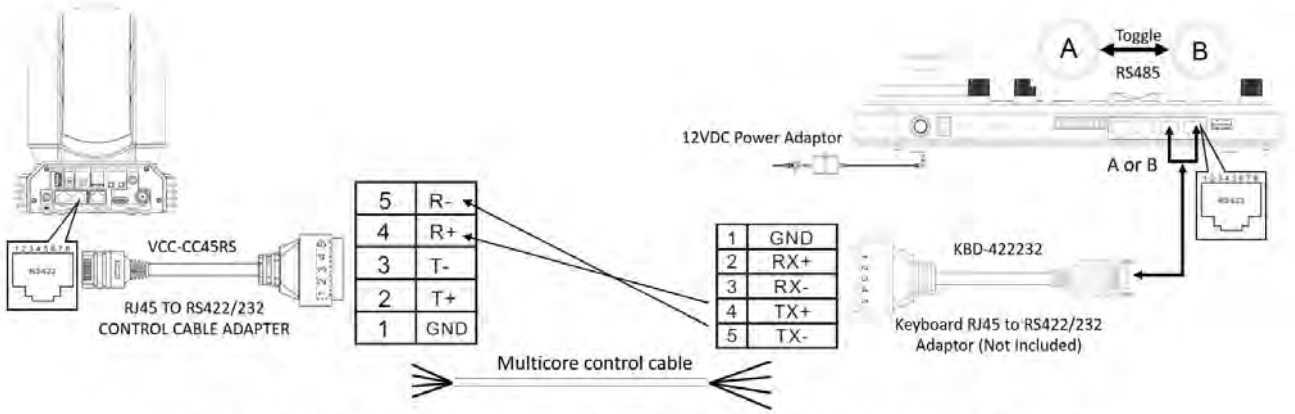
RS485 connection – Via Junction Box - Camera with Regular RS485 Serial Port connector

4. **RS485 Daisy Chain multiple camera connection**

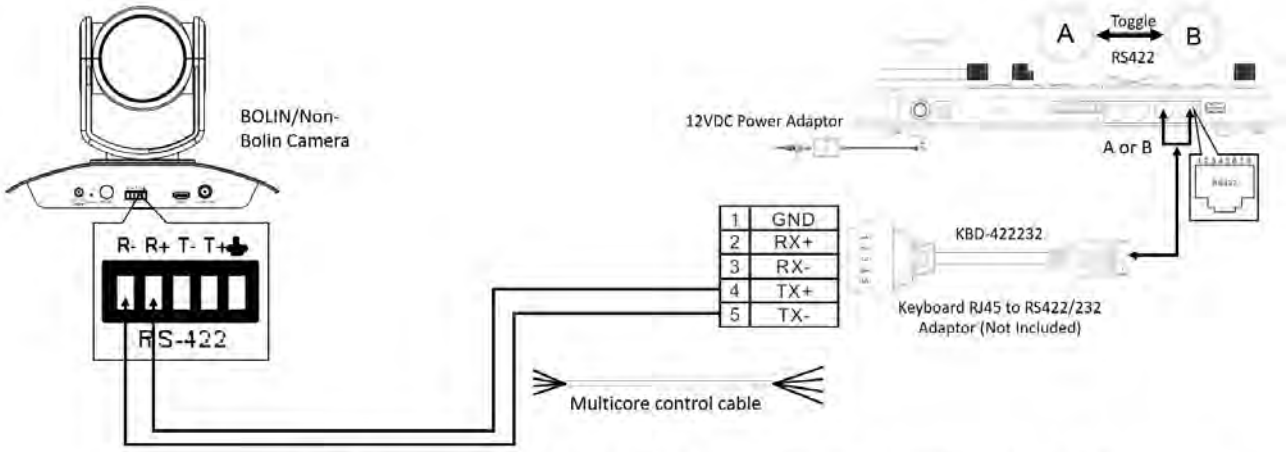


RS485 Daisy Chain connection – Via Junction Box
- Camera with RS422 RJ45 Connector

5. **RS485 connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately)**

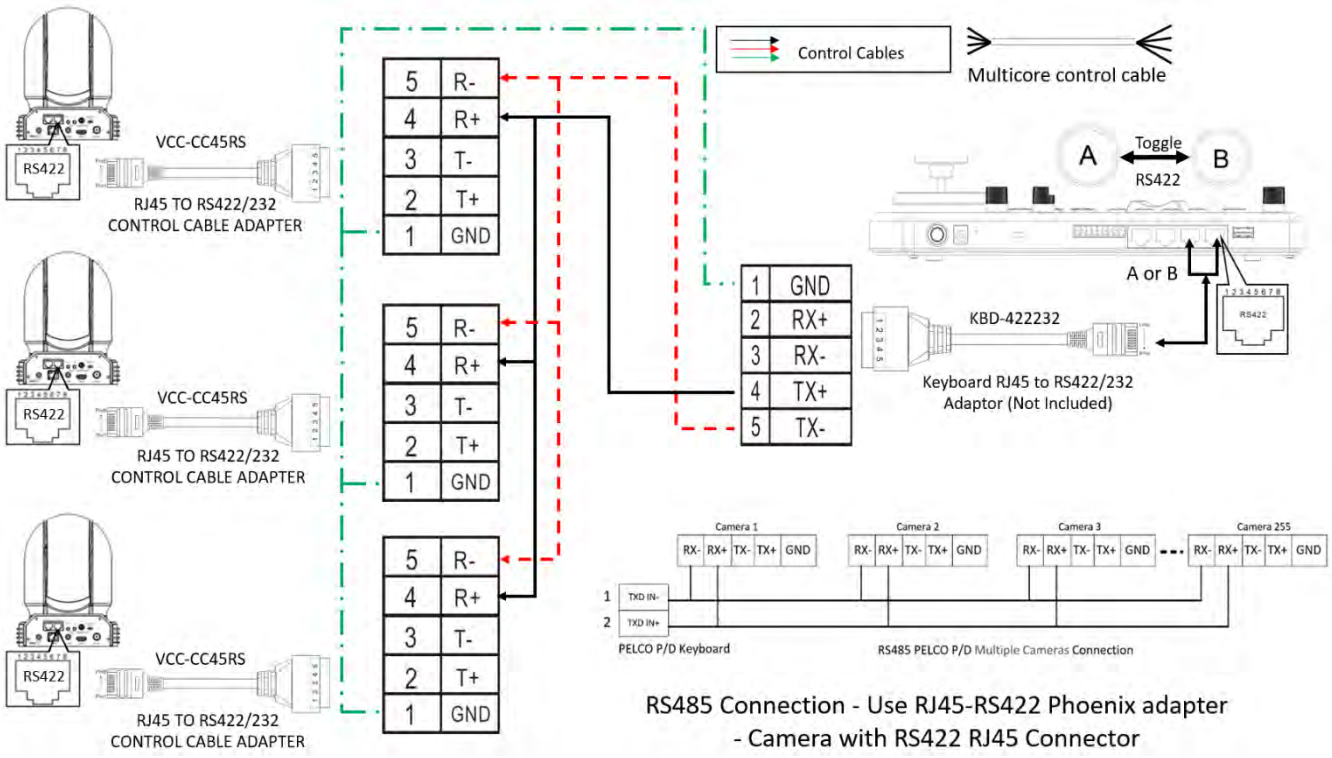


RS485 Connection - Use RJ45-RS422 Phoenix adapter - Camera with RS422 RJ45 connector



RS485 Connection - Use RJ45-RS422 Phoenix adapter - Camera with RS422 Serial Port

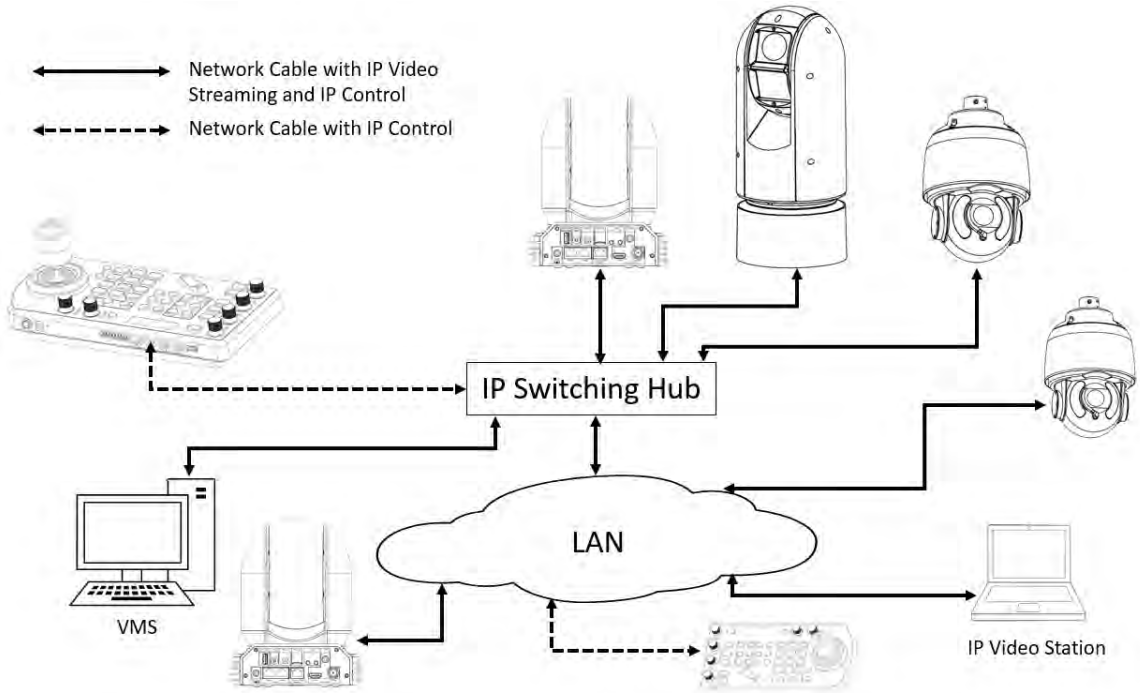
6. **RS485 Daisy Chain connection using RJ45 to Phoenix connector adaptor (Not Included, sold separately)**



RS485 Connection - Use RJ45-RS422 Phoenix adapter
- Camera with RS422 RJ45 Connector

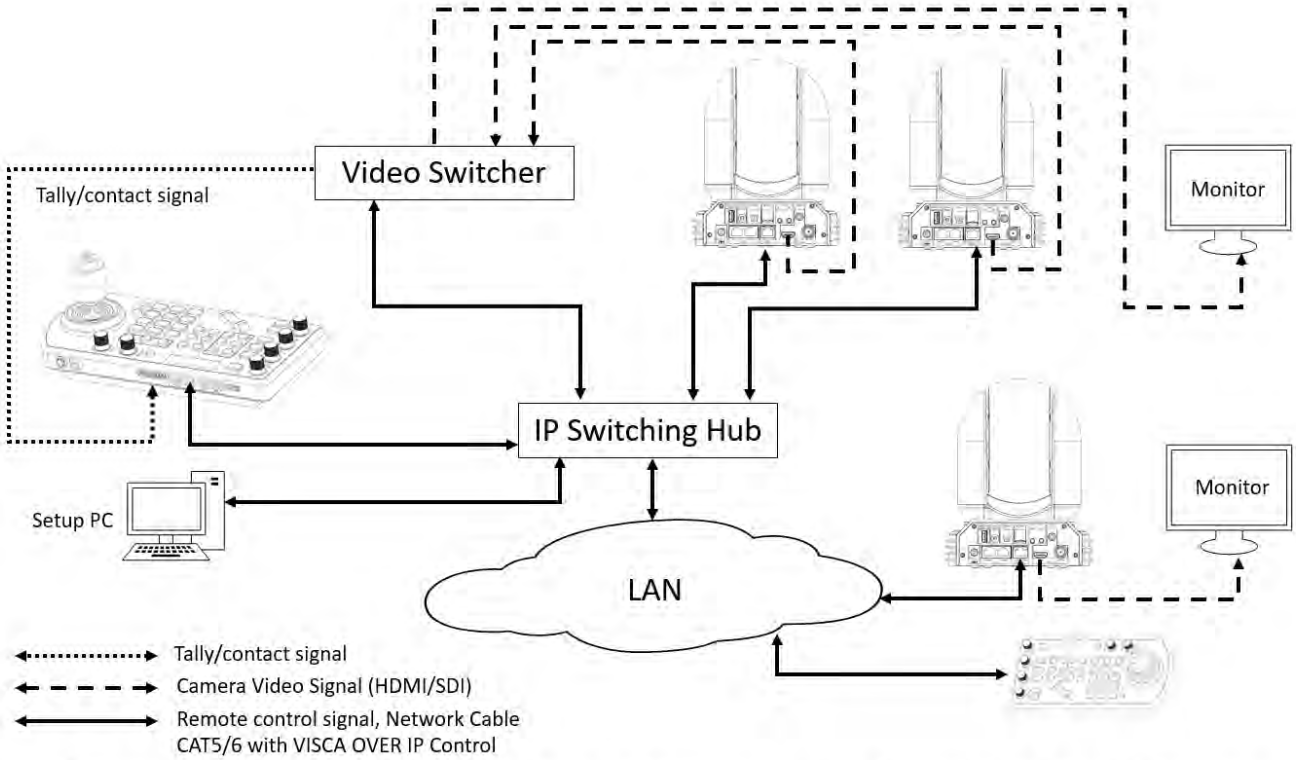
IP Control

Use ONVIF IP Control:



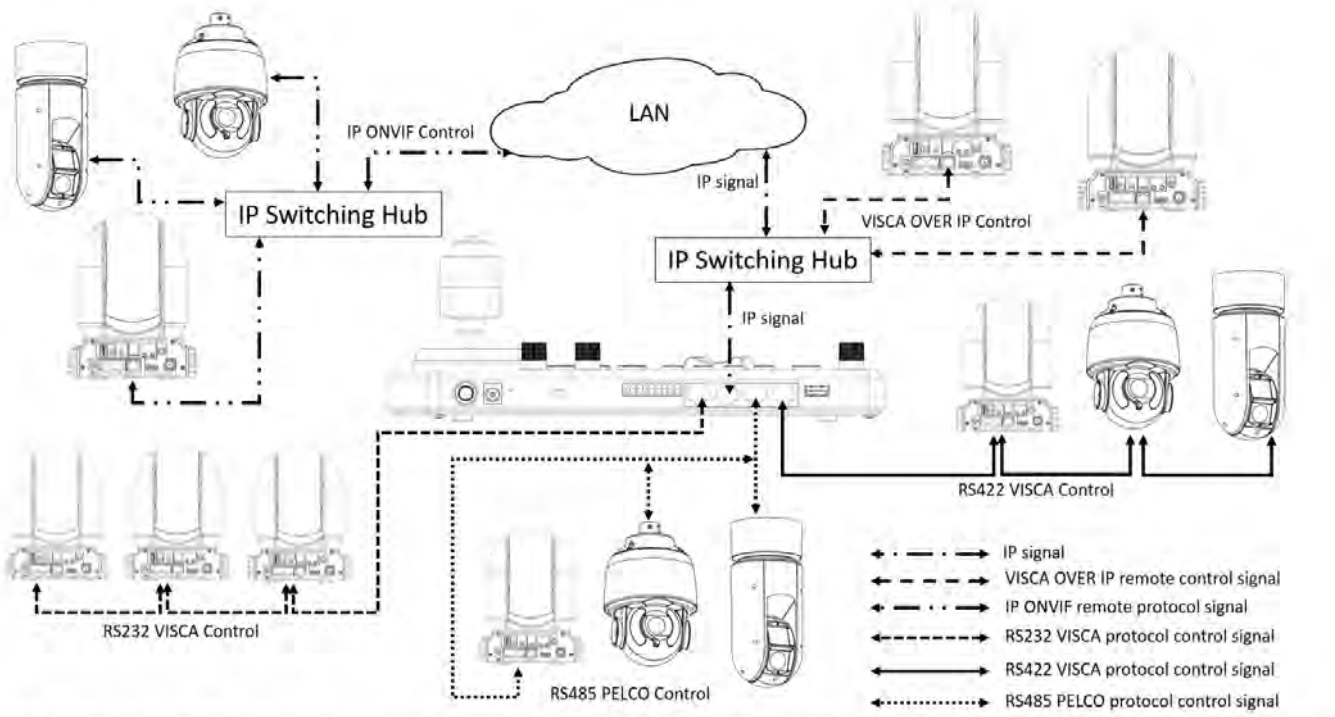
IP Connection – Using ONVIF IP Control Protocol – With IP Streaming Camera

Use VISCA OVER IP Control:



IP Connection – Using VISCA OVER IP Control Protocol – With Visca Over IP ready Camera

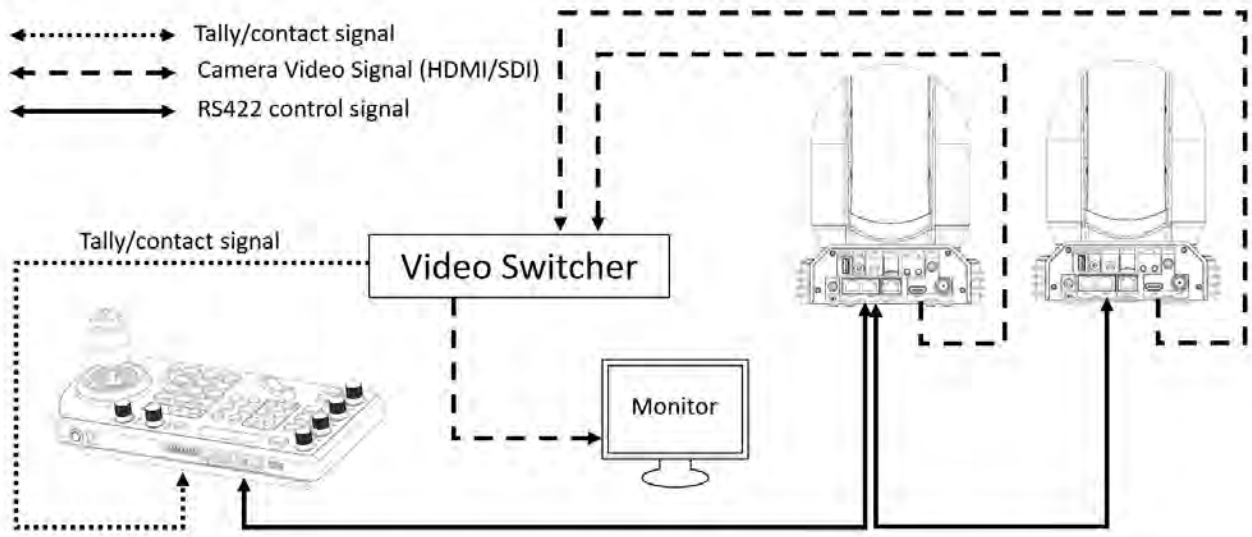
Cross-Protocol Mix Control



Cross-Protocol Mix Control - Using VISCA, PECLO, VISCA OVER IP, ONVIF IP Control Protocol in one single system.

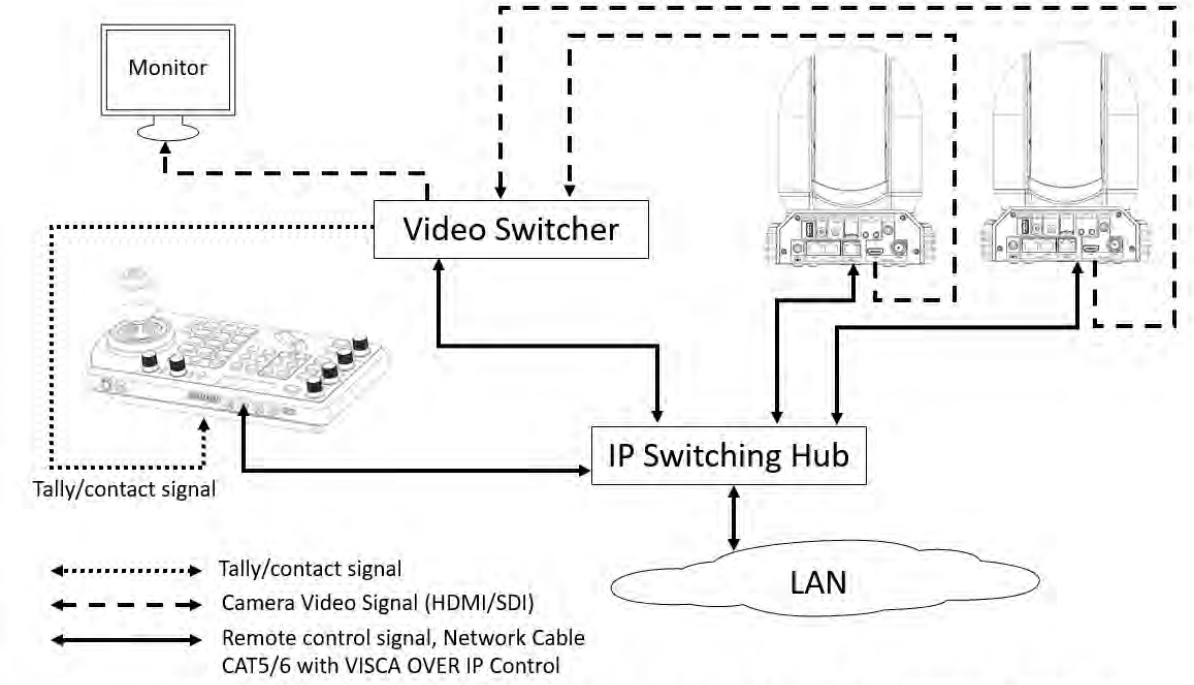
Tally Light GPI I/O connection

GPI connection with RS422 VISCA control connection



Tally Light GPI Connection – Using RS422 VISCA Control Protocol

GPI connection with VISCA OVER IP control connection



Tally Light GPI Connection – Using VISCA OVER IP Control Protocol – With Visca Over IP ready Camera

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