

# 4K HDMI KVM USB/RS232/IR/Analog Audio CAT5e Extender over IP Series

## ITEM NO:

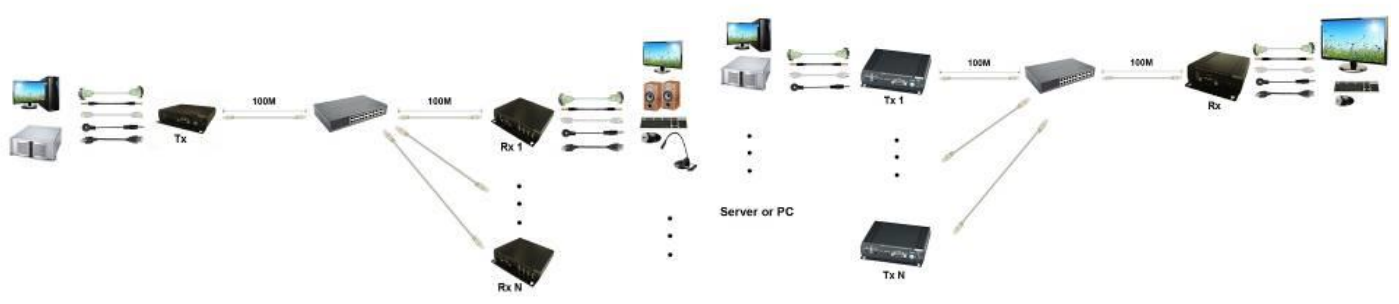
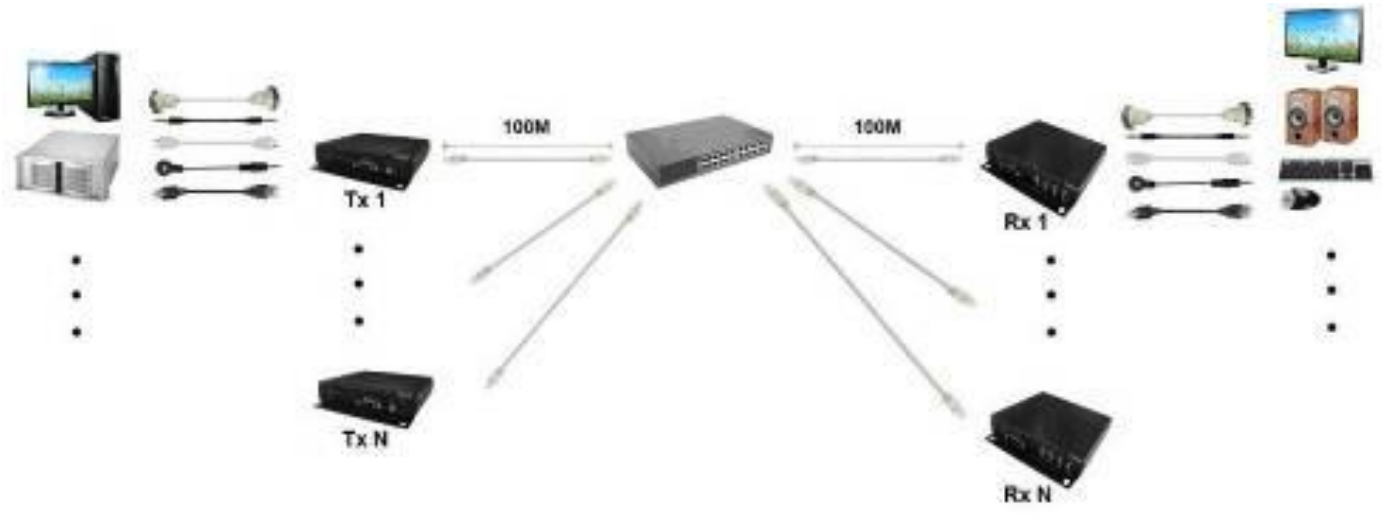
**HKM01BT-4K: 4K HDMI KVM over IP - Transmitter**

**HKM01BR-4K: 4K HDMI KVM over IP - Receiver**



## Features:

- Extend and distribute 4K HDMI signal with bi-directional RS232, USB signal, IR and analog audio signals over LAN.
- Supports resolutions up to 4K@30Hz Ultra HD.
- HDCP 2.2 compliant.
- Transmission range up to 150M over CAT5e/CAT6.
- Support SFP optical transceiver, single mode transmission distance up to 60KM.
- Support Windows based management software, using PC for easy setting input/output link.
- Support Android/iOS APP for channel select and management.
- Support IR remote control or front panel button for channel select and management.
- Support up to 8x8 video wall.
- Support output resolution up/down scale: 2160p 60Hz(YUV420) input to 2160p 30Hz or 1080p 60Hz output.
- Supports full duplex Bi-Directional RS232 communication (115200 MAX) by control software on a PC, or other automated control system to control devices attached to the extenders.
- Built in RS232 distribution function, to send RS232 signal from one TX to multiple RX.
- RS232 port support external Keypad/Console control. (Custom made available)
- Support Dolby TrueHD®, and DTS-HD Master™, LPCM audio up to 7.1 channels 192Khz
- Built in Bi-Directional analog audio transmission (only in unicast mode).
- Built in Bi-Directional IR extension.
- HKM01BT-4K transmitter unit built in HDMI local loop output.
- HKM01BR-4K receiver unit with 4 ports USB devices (2 port USB 1.1 front & 2 Port USB 2.0 rear), to extend USB peripheral devices, such as flash disk, hard disk, keyboard, mouse, etc.
- Use IGMP and Jumbo frame protocol Gigabit Switch Hub to do HD signal distribution and transmission.
- Support point to point and multiple source devices to multi-display connections via Gigabit network switch.
- Support total of transmitter unit up to 1000 pieces, receiver unit over 60000 pieces based on the number of ports on your network switch.
- Perfect for large scale remote HD content access and security monitoring systems, digital signage applications.
- Option Model: TPN002U  
1U 19" Rack Mounting Panel, allow fix two unit of HKM01BT-4K, HKM01BR-4K



## HDMI, DVI, VGA MATRIX over IP

**Support 4K HDMI**

**Transmitter x 256**

- 1 Handycam →
- 2 Handycam → HDMI
- 3 BD →
- 4 BD →
- 5 Media player →
- 6 Game → HDMI
- 7 PC → DVI
- 8 PC → VGA
- 9 NB →

LAN

Gigabit Ethernet Switch

APP Control

**Receiver x 60000**

**Support Video Wall**

1		
1	2	3
4	5	6
7	8	9

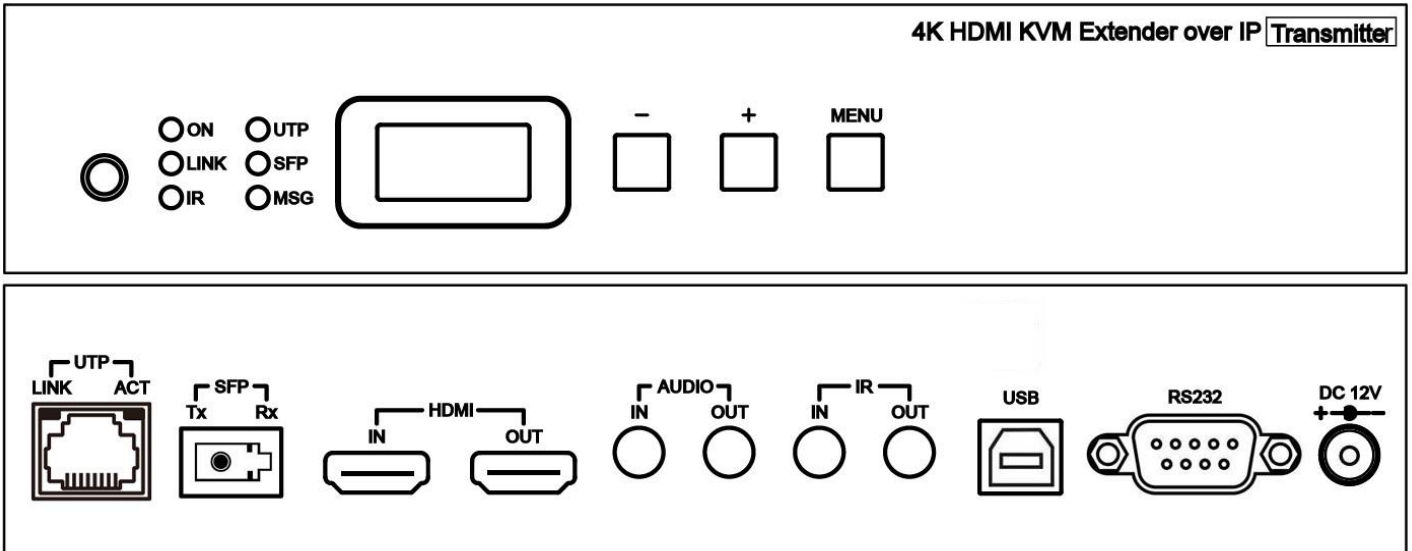
2		1
6		3
7		8

RoHS CE FC

**Panel View:**

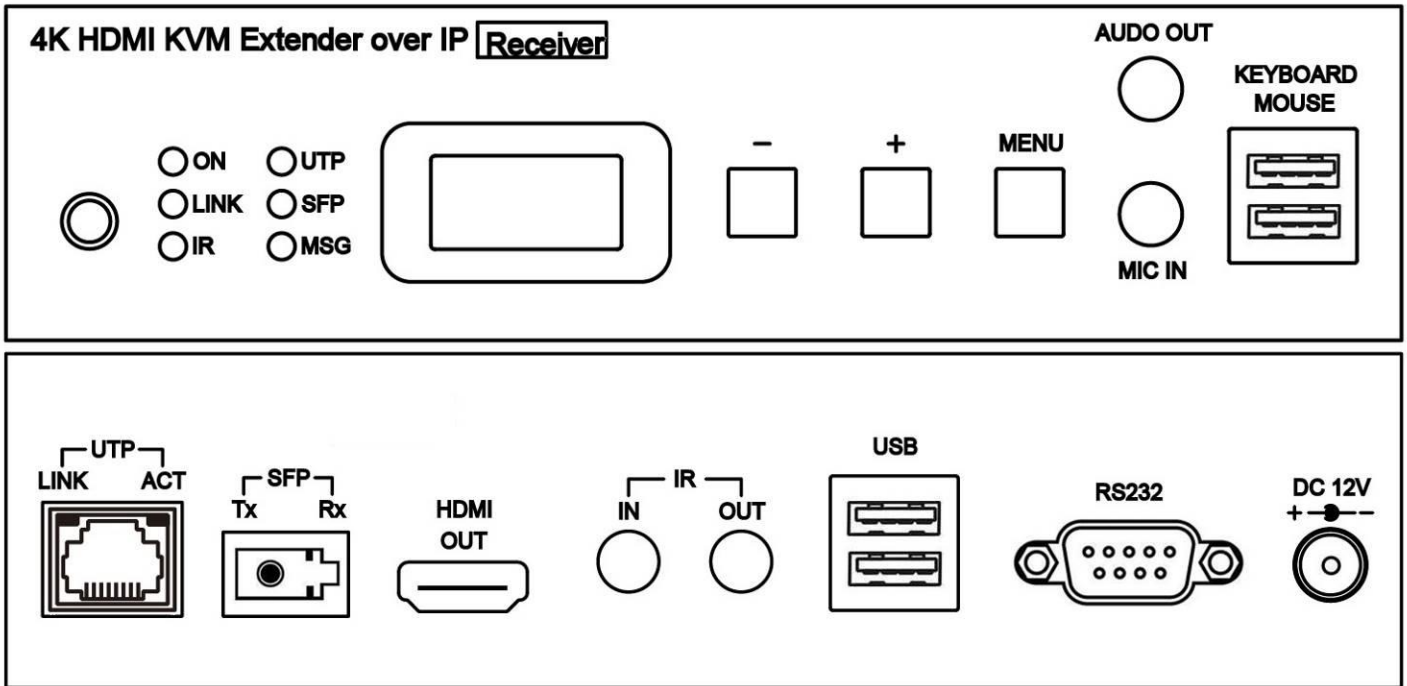
**Transmitters**

HKM01BT-4K



**Receivers**

HKM01BR-4K



**Panel Button Function:**

Button	-	+	Menu
Short Press	Reduce Value	Increase Value	Menu/Cancel
Press together	Enter		
Press 3 seconds	Carry	Decomposition	Lock/Unlock Button
Press 6 seconds			
Press and hold then power on	Factory Default	Engineering Mode	Set Factory Default then enter Engineering Mode

In engineering mode Power and Link LED will be flash together, IP address of unit will be set to **Static IP 192.168.0.88** temporarily, users can login to the web page by browser to change settings or update firmware.

**LED Indication Status:**

Panel LED	Status	Description
Power Green LED	On	Boot completed
	Flash Twice	Booting
	Flash Slowly	Transmitter: standby( by IR remote power button only) Receiver: video output be turned off
	Breathing(Fading)	Screen saver mode (not available for transmitter)
Link Blue LED	On	Connected & video is streaming
	Flash	Connecting, or no source input from transmitter
IR Red LED	On	Transmitting /receiving IR signal
UTP Green LED	On	Connected by UTP RJ45 port
	Flash	Transmitting /receiving data from UTP RJ45 port
SFP Blue LED	On	Connected by Fiber SFP port
	Flash	Transmitting /receiving data from Fiber SFP port
MSG Red LED	On	Other message (IR, RS232, System, Error, Warning...)

**RJ45 LED Indication Status:**

RJ45 LED	Status	Description
LINK Green LED	On	Ethernet connected
ACT Orange LED	Flash	Data transmission

**RJ45 pin define:**

Link Cable (TIA/EIA-568-B)

1. Orange-white    Data 1 +  
 2. Orange            Data 1 -  
 3. Green-white    Data 2 +  
 4. Blue                Data 3 +

5. Blue-white        Data 3 -  
 6. Green              Data 2 -  
 7. Brown-white     Data 4 +  
 8. Brown              Data 4 -

### **Cable & Transmission Distance:**

Link Cable use high quality Cat.5e UTP/STP/FTP or Cat.6 UTP cable

Transmission distance will be affected by equipment (Switch HUB), cable quality...etc.

When using CAT.5e/CAT.6 cable connect transmitter and receiver directly without Ethernet switch, the maximum transmission distance up to 150M.

You can also use model no: SR01 repeater for extended longer distance or using Gigabit Switch hub which support **IGMP** protocol and **Jumbo Frame 8K** for signal distribution or extend distance.

### **System Default Settings:**

Transmitter / receiver support **Unicast** and **Multicast** two mode, default is Multicast.

In Multicast mode it could be one to one, one to multi, multi to on or multi to multi applications.

The analog audio output of transmitter and input of receiver will be off in this mode, analog audio only from transmitters send to receivers.

Unicast mode suitable for one to one or multiple transmitters to one receiver applications.

Analog audio bi-direction transmission only in **Unicast** mode.

System default IP setting is **Auto IP**, it will assign **169.254.X.X** (submask **255.255.0.0**) to transmitters and receivers, you could also set to DHCP or Static IP, please refer to web setting chapter: IP Setup.

### **Bandwidth Chart:**

The bandwidth will be varied based on different resolution. Higher resolution may not request bigger bandwidth. Below Chart is the resolution and bandwidth status for reference.

Resolution (@60Hz)	Average Bandwidth (Mbps)	Resolution (@60Hz)	Average Bandwidth (Mbps)
3840x2160 (2160p)	218 (146~268)	1280x1024 (SXGA)	113 (79~150)
1920x1080 (1080p)	133 (80~210)	1024x768 (XGA)	81 (72~120)
1280x720 (720p)	147 (112~177)	800x600 (SVGA)	66 (49~82)
1600x1200 (UXGA)	81 (57~105)	640x480 (VGA)	43 (29~56)

Above bandwidth chart not include USB transmission, it cost up to 50 Mbps when transferring mass data.

System scalability is limited only by uplink and stacking connector bandwidths, for example under Gigabit Ethernet network, the total flow must not exceed 1000Mbps to avoid any delay on video streaming. If the video play with 1080p resolution, the transmitter allow maximum up to 7 pcs for simultaneous video streaming.

For 8~16 sources: use switches which support 802.3ad Link Aggregation or smart (or intelligent) switches to get 2 Gbps or more bandwidth.

For over 16 sources: use switches which support SFP+ uplink or stackable switches to get 10 Gbps bandwidth.

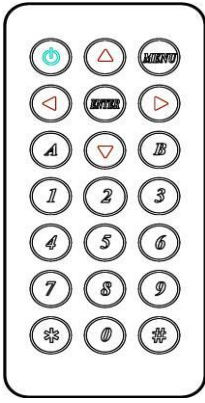
### **USB Hot Key Function:**

In multicast mode support multi USB keyboard and mouse in each receivers, just plug and play, but only one USB FLASH drive / hard disk could be used at same time.

You have to click "Pause/Break" key three times of the keyboard on the receiver or IR remote MENU function 14 to establish USB FLASH drive /hard disk connection.





## Remote Control Function:
























You could use the IR infrared remote control to preset channel selection. Using the IR remote control aim to the front panel of receiver or external IR receiver cable will be ok.

Initial at first time use the remote control or after change battery of remote control, the IR remote control and the equipment Remote ID must be using same ID. The default Remote ID for transmitter is 7, for receiver is 8.

To setting the Remote ID, Press and hold power button, then press button 8 to complete the setting.  + .(for example)

## Remote Control Button Function:

Symbol	Button	Receiver Function	Transmitter Function
	POWER	Turn Off/On Video Output	Connect/Disconnect Receiver
		Setup Remote Control ID	
	MENU	Menu selection, input numbers after press menu button	
	UP	Increase Value	
	DOWN	Reduce Value	
	LEFT	Carry	
	RIGHT	Decomposition	
	ENTER	Enter / Show Channel Information (When no other Menu operation)	Enter
	ASTERISK	Cancel	
	NUMBER	Recall Previous Value	
	A	Favorite Channel Switching / Add Channel to Favorite List in Menu	Not Available
	B	Back to Previous Channel /Remove Channel from Favorite list in Menu	
	1	Number 1	
	2	Number 2	
	3	Number 3	
	4	Number 4	
	5	Number 5	
	6	Number 6	
	7	Number 7	
	8	Number 8	
	9	Number 9	
	0	Number 0	

## Remote Control Operation:

### Select Channel:

Mode 1: use ◀ or ▲ or ▼ or ▶ to select channel and press **ENTER** to confirm.

Mode 2: enter the channel number and press **ENTER** to confirm the input channel.

### Select Function:

Mode 1: press **MENU** then use ◀ or ▲ or ▼ or ▶ to select function, press **ENTER** to confirm.

Mode 2: press **MENU**, then input function number as below, press **ENTER** to confirm.

No.	Menu	Description	Option / Remark	RX	TX
A	Add Favorite Channel	Add current channel to favorite channel list	Max. 32 channels	V	X
B	Remove Favorite Channel	Remove current channel from favorite channel list		V	X
0	System Information	System Information		V	V
1	Network Information	Network Information		V	V
2	Routing Information	Routing Information		V	X
3	Channel Information	Channel Information		V	X
4	Favorites Information	Favorites Information		V	X
5	Function Information	Function Information		V	V
6	Control Information	Control Information		V	V
7	Video & Audio Information	Video & Audio Information		V	V
8	RS-232 Control Information	RS-232 Control Information		V	V
10	Advanced Menu	Display advance menu	0 = Hide 1 = Display	1	X
11	Reconnection	Reconnect with TX/RX		V	V
12	Disconnection	Disconnection (keep routing channel)		V	X
13	Stop Connection	Stop all connection (Include routing channel)		V	V
14	Starting USB	Get USB control priority (in multicast mode only)		V	X
15	Casting Mode	Casting Mode setting	0 = Unicast 1 = Multicast	1	1
16	Jumbo Frame	Jumbo Frame setting	0 = Disable	1	1
17	Free Routing	Free Routing setting	1 = Enable	1	1
20	Video Routing	Video Setting at Free Routing	F = Follow Channel 0 ~ 999 = Specific Channel	F	X
21	Audio Routing	Audio Setting at Free Routing			
22	USB Routing	USB Setting at Free Routing			
23	RS-232 Routing	RS-232 Setting at Free Routing			
24	IR Routing	IR Setting at Free Routing			
25	GPIO Routing	GPIO Setting at Free Routing			
26	Load Routing Mapping	Load Free Routing Mapping	0 ~ 4	V	X
27	Save Routing Mapping	Save Free Routing Mapping		V	X
30	Video Function	Video Extender setting	0 = Disable 1 = Enable	1	1
31	Audio Function	Audio Extender setting		1	1
32	USB Function	USB Extender setting		1	1
33	RS-232 Function	RS-232 Extender setting		1	1
34	IR Function	IR Extender setting		1	1
35	GPIO Function	GPIO Function setting (OEM Version)		0	0
40	Button Control	Button Control setting	0 = Disable	1	1
41	IR Control	IR Control setting	1 = Enable	1	1
42	IR Control ID	IR Remote ID setting	0 ~ 9 = IR Control ID 10 = User Define Controller	8	7
43	RS232 Control	RS-232 Control setting	0 = Disable 1 = Enable (Case Sensitive) 2 = Case Insensitive	1	1
44	Device No	Device No. for RS232 control	0 ~ 999	0	X
45	Group No	Group No. for RS232 control	0 ~ 99	0	X
46	Party No	Party No. for RS232 control		0	X

50	Video Select	Video output resolution setting	0=Pass-Through 1=HD 720p 60Hz, 2=Full HD 1080p 60Hz 3=Full HD 1080p 50Hz 4=Ultra HD 2160p 30Hz 5=Ultra HD 2160p 25Hz 6=WXGA 1366x768 60Hz 7=WXGA+ 1440x900 60Hz 8=WUXGA 1920x1200 60Hz 9=SXGA+ 1400x1050 60Hz 10=Customize	0	X
51	Video Quality	Video Quality setting	0 = Graphic Mode 1 ~ 5 = Mode 1 ~ 5 6 = Video Mode	X	6
52	Anti-Dither	Anti-Dither setting	0 = Disable 1 ~ 2 = Mode 1 ~ 2	X	0
53	Audio Select	TX Audio Input Select /RX Audio Output Select	0 = HDMI 1 = Analog 2 = Auto	2	2
54	Analog Input Volume	Analog Input Volume	0 = Mute	85	85
55	Analog Output Volume	Analog Output Volume	1 ~ 100 = Volume %	85	85
56	RS-232 Select	RS-232 Port Mode Select	0 = Disable 1 = Extender 2 = Keypad 3 = Auxiliary 4 = Console	1	1
60	RS-232 Baudrate	RS-232 Extender Baudrate	0 = 115200 bps 1 = 57600 bps 2 = 38400 bps 3 = 19200 bps 4 = 9600 bps 5 = 4800 bps 6 = 2400 bps 7 = 1200 bps 8 = 600 bps 9 = 300 bps	0	0
61	RS232 Newline	RS232 Control Newline setting	0 = Linux (0x0A) 1 = Windows (0x0D, 0x0A) 2 = Mac (0x0D) 3 = Other (0x0A, 0x0D)	1	1
62	RS232 Trigger	RS232 Control Trigger setting		1	1
63	Auxiliary Baudrate	Auxiliary Baudrate	0 = 115200 bps 1 = 57600 bps 2 = 38400 bps 3 = 19200 bps 4 = 9600 bps 5 = 4800 bps 6 = 2400 bps 7 = 1200 bps 8 = 600 bps 9 = 300 bps	0	0
64	Auxiliary Newline	Auxiliary Newline setting	0 = Linux (0x0A) 1 = Windows (0x0D, 0x0A) 2 = Mac (0x0D) 3 = Other (0x0A, 0x0D)	1	1
65	Auxiliary Trigger	Auxiliary Trigger setting		1	1
70	Fast Switch	Switch without stop link	0 = Disable	0	0
71	Conflict Check	Check existing TX channel	1 = Enable	X	1
72	Channel Name	Display Channel Name	0 = Hide 1 = Display	0	X
73	Only Favorites	Only Favorites Channel Available	0 = Disable	0	X
74	Lock Favorites	Lock Favorites Channel	1 = Enable	0	X
75	Auto Sort Favorites	Auto Sort Favorites Channel		0	X
76	Sort Favorites	Sort Favorites Channel		V	X
77	Scan Channel To Favorites	Scan Channel To Favorites		V	X



80	Direct Access Menu	Run menu function even hide		1	1
81	Menu Item "Advanced Menu"	Display/Hide "Advanced Menu"	0 = Disable 1 = Enable	1	X
82	Screensaver	Screen Saver setting		0	X
83	Screen Off Option	Behavior After Screen Off	0 = No Option 1 = Mute Analog Audio 2 = Stop Connection	1	X
84	Diagnostic Information	Diagnostic Information		1	X
85	Message Redirect	Message Redirect to Auxiliary	0 = Disable 1 = Enable	X	1
86	Command Redirect	Command Redirect to Auxiliary		1	1
90	TV Wall	TV Wall setting		0	0
91	HDCP Always On	HDCP setting	0 = Disable 1 = Enable	1	1
92	HDCP 2.2 Always On	HDCP 2.2 setting		1	1
93	HDMI 5V Control	Cut HDMI 5V when switching	0 = Disable 1 = Enable	0	X
94	Use Client EDID	Copy EDID from RX monitor		V	X
95	Use Default EDID	Use default EDID of TX		X	V
100	Backup Setting	Backup Setting to bank 0~4	0 ~ 4	V	V
101	Restore Setting	Restore Setting from bank 0~4		V	V
102	System Setting	System Setting (Debug)		V	V
103	Application Setting	Application Setting (Debug)		V	V
333	Reset To Default	Reset to factory default		V	V
999	System Reboot	System Reboot		V	V

**V = Available X = Not available Numbers = default value**

- Press any key of IR remote or panel button to exit screen saver mode
- Press **POWER** of IR remote or panel button **CH-** and **CH+** together to turn on video output
- **Menu 17, 20~25** Free Routing function only works in Multicast mode, and must be enabled.
- **Menu 42**, customize IR remote need to be import to RX by RS-232 or telnet command
- **Menu 50**, customize resolution need to be setup by RS-232 command or web page
- **Menu 56**, Extender = RS-232 extender, Keyped = for RS-232 keypad or number key in terminal software, Auxiliary = auxiliary mode debug, Console = console debug
- **Menu 70** Fast Switch mode works best when: resolution, frame rate, scan mode (interlaced/non-interlaced), color depth, color space, interface (HDMI/DVI), HDCP mode (ON/OFF) all above are the same.  
**Disable:** Stop link before channel switch, is will show black screen between switching, if switch to the channel which not exist it will show diagnostic Information.  
**Enable:** Keep link when channel switch, if switch to the channel which not exist may cause screen freeze 1~2 seconds then show diagnostic Information.
- **Menu 71** Conflict Check will check existing TX channel number first, then switch to if no duplicate channel.
- **Menu 72** Channel Name will show full name instead of number only, the position of channel name is center of screen. Channel name can set by RS232 command or import from telnet port.
- **Menu 85** Message Redirect forward MENU message to TX RS232 port (Auxiliary mode) instead OSD.
- **Menu 86** Command Redirect run RS232 command from Web or telnet port (Auxiliary mode).
- **Menu 91** HDCP Always On when enabled, the monitor must support HDCP.
- **Menu 92** HDCP 2.2 Always On when enabled, the monitor must support HDCP 2.2.
- **Menu 93** HDMI 5V Control set enable for monitor which will check HDMI 5V status to enter screen saver mode.

## **RS-232 Control:**

User could use RS-232 port of transmitters to operate/setup the receivers at same channel by program like Hyper Terminal which built-in Windows XP and before version.

Hyper Terminal setting: [ **115200 bps (8-N-1), Flow control: None** ] (Properties -> Settings -> ASCII Setup... and select "**Send line ends with line feeds**" & "**Echo typed characters locally**")

★**We recommend set the RS232 routing for all receivers to one transmitter to avoid RS232 connection broken by video channel switching.**

Command format: >CMD\_Address> Command Parameters

**Address, command and parameters are char, not hex code**

**Enter (LF or CR+LF) is required to execute the command**

All accord receivers will run the command and parameters, we also add 3 kinds of user defined numbers except MAC & IP (Device No \ Group No \ Party No) for flexible application:

Mxxxxxx	The last 6 digits of MAC Address of receiver	e.g.: 2218680123AB = M0123AB
Ixxxx	The last 2 column of IP Address (HEX) of receiver	e.g.: 169.254.012.034 = I0C22
Dxxx	Device No	e.g.: Device No 123 = D123
Gxx	Group No	e.g.: Group No 12 = G12
Pxx	Party No	e.g.: Party No 34 = P34
Cxxx	Channel No	e.g.: Channel 123 = C123
ALL	All receivers	

Response format: <ACK\_Address< Response character

Receivers will response message to transmitter as above format and send Newline after

When send command to multiple receivers(address as Gxx, Pxx, Cxxx, and ALL) they will not response.

Command and Parameters List:

Command	Parameters	Description	Remark
CHANNEL	?	Show current channel number	Transmitter not support parameter NAME Receiver not support parameter CHECK
	[ 0~999 ]	Switch to specified channel	
	[ 0~999 ] NAME ?	Check current channel name	
	[ 0~999 ] NAME "string"	Set channel name, 28 character MAX	
	NAME ?	Show channel name setting	
	NAME [ ENABLE   DISABLE ]	Enable/disable channel name	
	NAME CLR	Clear all channel name	
	NAME IMPORT	Import channel name	
	FAST ?	Status of current fast switch	
	FAST [ ENABLE   DISABLE ]	Enable/disable fast switch	
FAVORITE	CHECK ?	Status of channel conflict check	Transmitter not support parameter FAVORITE
	CHECK [ ENABLE   DISABLE ]	Enable/disable channel conflict check	
	?	Usage of favorite channel (MAX.32)	
	ADD	Add current to favorite channel	
	ADD [ 0~999 ]	Add specified channel to favorite	
	DEL	Delete current from favorite channel	
	DEL [ 0~999 ]	Delete specified channel from favorite	
	CLR	Clear favorite channel list	
	ONLY ?	Status of favorite channel only	
	ONLY [ ENABLE   DISABLE ]	Enable/disable favorite channel only	
VIDEO	AUTO ?	Status of auto sort favorite channel	Receiver not support parameter QUALITY and DITHER
	AUTO [ ENABLE   DISABLE ]	Enable/disable auto sort favorite	
	SORT	Sort favorite channel immediately	
	FUNC ?	Status of video extension	
	FUNC [ ENABLE   DISABLE ]	Enable/disable video extension	
	ROUTING ?	Status of video routing	
	ROUTING [ FOLLOW   0~999 ]	Set video routing follow or specified	
	SELECT ?	Status of video output resolution	
	SELECT [ 0~9   10 ]	Set video output resolution 10=customize	
	CUSTOMIZE ?	Status of customize resolution	
AUDIO	CUSTOMIZE integer	Set customize resolution	Transmitter not support parameter ROUTING
	QUALITY ?	Status of video quality	
	QUALITY [ 0   1~5   6 ]	Set video quality	
	DITHER ?	Status of video dither	
	DITHER [ 0   1~2 ]	Set video dither	
	FUNC ?	Status of audio extension	
	FUNC [ ENABLE   DISABLE ]	Enable/disable audio extension	
	ROUTING ?	Status of audio routing	
	ROUTING [ FOLLOW   0~999 ]	Set audio routing follow or specified	
	SELECT ?	Status of audio setting	
USB	SELECT [ 0~2 ]	Select audio of TX input/ Rx output	Transmitter not support parameter ROUTING and REQUEST
	IN ?	Status of audio input volume	
	IN [ 0   1~100   101 ]	Set audio input volume	
	OUT ?	Status of audio output volume	
RS232	OUT [ 0   1~100   101 ]	Set audio output volume	Transmitter not support parameter ROUTING
	FUNC ?	Status of USB extension	
	FUNC [ ENABLE   DISABLE ]	Enable/disable USB extension	
	ROUTING ?	Status of USB routing	
	ROUTING [ FOLLOW   0~999 ]	Set USB routing follow or specified	
	REQUEST	Request USB access (multicast only)	
	FUNC ?	Status of RS232 extension	
	FUNC [ ENABLE   DISABLE ]	Enable/disable RS232 extension	
	ROUTING ?	Status of RS232 routing	
	ROUTING [ FOLLOW   0~999 ]	Set RS232 routing follow or specified	
	CTRL ?	Status of RS232 control setting	
	CTRL [ DISABLE   ENABLE   INSENSITIVE   0~2 ]	Set RS232 control disable/enable/case insensitive	
BAUD ?	Status of baud rate		
BAUD [ 0~9 ]	Set baud rate		
NEWLINE ?	Status of newline format		
NEWLINE [ 0~3 ]	Set newline format		
TRIGGER ?	Status of trigger		
TRIGGER [ 0~3 ]	Set trigger format		

IR	FUNC ?	Status of IR extension	Transmitter not support parameter ROUTING
	FUNC [ ENABLE   DISABLE ]	Enable/disable IR extension	
	ROUTING ?	Status of IR routing	
	ROUTING [ FOLLOW   0~999 ]	Set IR routing follow or specified	
	CTRL ?	Status of IR control setting	
	CTRL [ ENABLE   DISABLE ]	Enable/disable IR control	
	ID ?	Status of IR remote ID	
	ID [ 0~10 ]	Set IR remote ID	
	KEY [ 0~32 ] ?	Status of IR key setting	
	KEY [ 0~32 ] = address, command	Set mapping of third party IR remote	
	KEY IMPORT	Import IR key setting	
GPIO	FUNC ?	Status of GPIO extension	Transmitter not support parameter ROUTING
	FUNC [ ENABLE   DISABLE ]	Enable/disable GPIO extension	
	ROUTING ?	Status of GPIO routing	
	ROUTING [ FOLLOW   0~999 ]	Set GPIO routing follow or specified	
BUTTON	CTRL ?	Status of button control	
	CTRL [ ENABLE   DISABLE ]	Enable/disable button control	
	LOCK ?	Status of button lock	
	LOCK [ ENABLE   DISABLE ]	Enable/disable button lock	
HDMI	CTRL ?	Status of HDMI 5V control	Transmitter not support parameter CTRL
	CTRL [ ENABLE   DISABLE ]	Enable/disable HDMI 5V control	
	HDCP ?	Status of HDCP Always On	
	HDCP [ ENABLE   DISABLE ]	Enable/disable HDCP Always On	
	HDCP 2.2 ?	Status of HDCP 2.2 Always On	
	HDCP 2.2 [ENABLE   DISABLE]	Enable/disable HDCP 2.2 Always On	
EDID	CLIENT	Copy EDID from receiver monitor	Transmitter not support parameter CLIENT
	DEFAULT	Use default EDID from transmitter	Receiver not support parameter DEFAULT
SCREEN	?	Status of screen settings	Transmitter not support this command
	[ ON   OFF ]	Screen on/off	
	SAVER ?	Status of screen saver	
	SAVER [ ENABLE   DISABLE ]	Enable/disable screen saver	
	OPTION ?	Status of behavior after screen off	
	OPTION [ 0~2 ]	Set behavior after screen off	
OSD	ON "string"	Show "string" on screen (30 seconds)	Transmitter not support this command
	OFF	Turn off OSD immediately	
	OFF ?	Status of OSD duration (ms)	
	OFF [ 0~65535 ]	Set duration of OSD (ms)	
ROUTING	?	Status of free routing	Transmitter not support parameter LOAD and SAVE
	[ ENABLE   DISABLE ]	Enable/disable free routing	
	LOAD [ 0~4 ]	Load free routing setting	
	SAVE [ 0~4 ]	Save free routing setting	
NET	RECONNECT	Reconnect with TX/RX	Transmitter not support parameter DISCONNECT
	DISCONNECT	Disconnection (keep routing channel)	
	STOP	Stop all connection (Include routing channel)	
	CAST ?	Status of casting mode	
	CAST [ 0   1 ]	Set 0=unicast, 1=multicast mode	
	MTU ?	Status of MTU	
	MTU [ 1500   8000 ]	Set MTU size, 8000 = Jumbo Frame Enabled	
	MODE ?	Status of IP mode	
	MODE [ AUTO   STATIC   DHCP ]	Set of IP mode: Auto, static and DHCP	
	IP ?	Status of static IP address	
	IP [ xxx.xxx.xxx.xxx ]	Set static IP address	
	NETMASK ?	Status of subnet mask	
	NETMASK [ xxx.xxx.xxx.xxx ]	Set subnet mask	
	GATEWAY ?	Status of gateway	
	GATEWAY [ xxx.xxx.xxx.xxx ]	Set gateway	

QUERY	IP	Status of current IP address	
	MAC	Status of MAC address	
	RESOLUTION	Status of video resolution	
	VERSION	Status of firmware version	
AUXILIARY	BAUD ?	Status of auxiliary baudrate	
	BAUD [ 0~9 ]	Set auxiliary baudrate	
	NEWLINE ?	Status of auxiliary newline	
	NEWLINE [ 0~3 ]	Set auxiliary newline	
	TRIGGER ?	Status auxiliary trigger	
	TRIGGER [ 0~3 ]	Set auxiliary trigger	
	VERSION	Status of auxiliary versions	
LOAD	DEFAULT	Load default to current setting	When load default the settings will be auto saved.
	[ 0~4 ]	Load system setting from bank 0~4	
SAVE		Save current system setting	
	[ 0~4 ]	Save system setting to bank 0~4	
REBOOT		Reboot	
CONSOLE	command	Run console API command	For debug using, if input incorrect value will cause unpredictable problem, adjust by professional installer only.
SYSTEM	[ 0~255 ] ?	Status of system function	
	[ 0~255 ]	Set system function	
APPLICATION	[ 0~255 ] ?	Status of application function	
	[ 0~255 ]	Set application function	

※RS232 command not support backspace, delete or up, down, left, right to modification. If you enter command or parameters with wrong typing, please enter newline and re-enter full command and parameters again.

※Parameters with gray shading means need to reboot to take effect.

※ The maximum of OSD\_ON is 30 characters, not support comma sign「,」, colon「:」 and double quotation marks 「”」, some characters must use \x## format to display, ## means the characters number in ASCII HEX code e.g.: \x0a is line feed, \x28 is ( brackets sign, \x22 is “ sign

Example:

>CMD\_M123456> CHANNEL 12 (Set receiver which last 4 digits MAC Address is 123456 to Channel 12)  
(HEX code: 3E 43 4D 44 5F 4D 31 32 33 34 35 36 3E 20 43 48 41 4E 4E 45 4C 20 31 32 0D 0A)  
<ACK\_M123456< OK (Receiver which last 4 digits MAC Address is 123456 response “OK”)  
(HEX code: 3C 41 43 4B 5F 4D 31 32 33 34 35 36 3C 20 4F 4B 0D 0A)

-----  
>CMD\_I0A12> CHANNEL 3 (Set receiver which IP Address is 169.254.10.18 to Channel 3)  
(HEX code: 3E 43 4D 44 5F 49 30 41 31 32 3E 20 43 48 41 4E 4E 45 4C 20 33 0D 0A)  
<ACK\_I0A12< OK (Receiver which IP Address is 169.254.10.18 response “OK”)  
(HEX code: 3C 41 43 4B 5F 49 30 41 31 32 3C 20 4F 4B 0D 0A)

-----  
>CMD\_G34> CHANNEL 5 (Set receivers which Group No is 34 to Channel 5)  
(HEX code: 3E 43 4D 44 5F 47 33 34 3E 20 43 48 41 4E 4E 45 4C 20 35 0D 0A)  
(No response from multiple receivers)

-----  
>CMD\_ALL> !OSD\_ON Hello! \x28123\x29 \x22ABC\x22 (Show 「Hello! (123) “ABC”」 to all monitor and send response)  
(HEX code: 3E 43 4D 44 5F 41 4C 4C 3E 20 21 4F 53 44 5F 4F 4E 20 48 65 6C 6F 21 20 5C 78 32 38 31 32 33 5C 78 32 39 20 5C 78 32 32 41 42 43 5C 78 32 32 0D 0A)  
(No response from multiple receivers)

-----  
>CMD\_ALL> OSD\_OFF 10000 (All receiver turn off OSD after 10 seconds)  
(HEX code: 3E 43 4D 44 5F 41 4C 4C 3E 20 4F 53 44 5F 4F 46 46 20 31 30 30 30 30 0D 0A)

**Caution:**

1. Transmitter/receiver boot time require 30 seconds and will be able to control after booting.
2. First time reboot after reset to default will be longer than 30 seconds.
3. Not recommend to work with existing LAN connection to avoid large video, data transmission or multicast packets to slow down your other LAN devices.
4. Gigabit switching hub muse support IGMP and Jumbo Frame over 8K in order to achieve the best quality
5. If monitor shows green screen, please check if the switch running under gigabit and IGMP/Jumbo Frame function enabled.
6. If video not smooth please check if IGMP function enabled or bandwidth of switch closes to maximum.
7. If UTP and SFP connected together the first connected one will get the priority, the other one will online automatically once another one failed.
8. If Ethernet is not connected may cause unpredictable problem or OSD message error, please connect to the Ethernet and reboot.
9. Default EDID is 1080p 7.1 audio, you can use Menu function 96 to copy EDID from monitor of RX.
10. If the screen shows shortly then turn into black but OSD shows properly, please check the HDCP version of monitor support is tally with the source required.
11. If receiver switch to transmitter which no video input, it will show blank screen or last still image for a while.
12. Fast switch mode might cause screen or audio abnormal briefly when switch channel.
13. In high resolution (like 1080p or 4K) the OSD response will be delayed a little bit.
14. The front panel IR will be disable when external IR cable plugged.
15. If IR remote not work properly, please check the battery (especial in low temperature) and reset IR ID.
16. Audio in of receivers is designed for mono Mic in, not for stereo Line in.
17. When using computer or mobile APP management the IP address should be set in same network segment.
18. Computer software and APP operation please refer to software operating instruction.



## **APP Control Function:**

**APP name: Remote Control Center (Basic control as IR remote for end user )**



**Google Play Download Link**

**iTunes Download Link**

**Google Play Download QR code**

**iTunes Download QR code**

**APP name: Remote Control Center PRO (Advanced control for installer)**



**Google Play Download Link**

**iTunes Download Link**

**Google Play Download QR code**

**iTunes Download QR code**

**For APP instruction please refer attached software CD  
To avoid confusion we do not recommend install multiple APP in one device**

## **Web Setting Function:**

System provide detail settings over web browser, you could input the IP address of transmitter / receiver at link column of browser if you know the exact IP address of them.

### **There are four ways to get the IP address of receiver:**

1. Connect monitor with receiver, **local IP** shows on right bottom screen when receiver booting or transmitter not connected( or no video input)
2. Press remote control button **MENU, 1, ENTER** (IP Address), it will shows the receiver IP Address on screen
3. Install Internet explorer plug-in: Bonjour , click device name to enter web setting page to get the IP address(please refer Bonjour plug-in installation)
4. Run "Device Manager" program in CD, enter the Client page(please refer software instruction)

### **There are four ways to get the IP address of transmitter:**

1. Connect monitor with receiver, connect receiver with transmitter and set in the same channel, **remote IP** shows on right bottom screen when receiver booting or no video input from transmitter
2. Install Internet explorer plug-in: Bonjour , click device name to enter web setting page to get the IP address(please refer Bonjour plug-in installation)
3. Run "Device Manager" program in CD, enter the Host page(please refer software instruction)

System default IP setting is Auto IP, it will assign 169.254.X.X (subnet mask 255.255.0.0) to transmitters and receivers, you could also set to DHCP or Static IP.

You computer must set in same subnet mask to enter the web setup page.

If you do not sure the IP address of transmitters/receivers you could reset the transmitters and receiver to default.

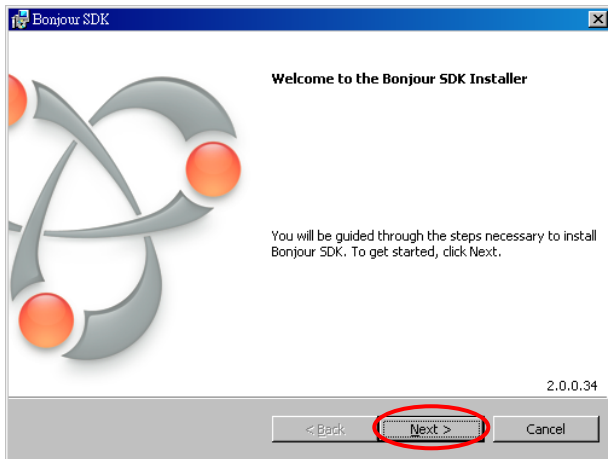
1. Press the channel button "-" than power on (power and link LED will be flash) to reset to default.
2. Press IR remote control **MENU, 3, 3, 3, ENTER** to reset to default.

# Bonjour plug-in installation:

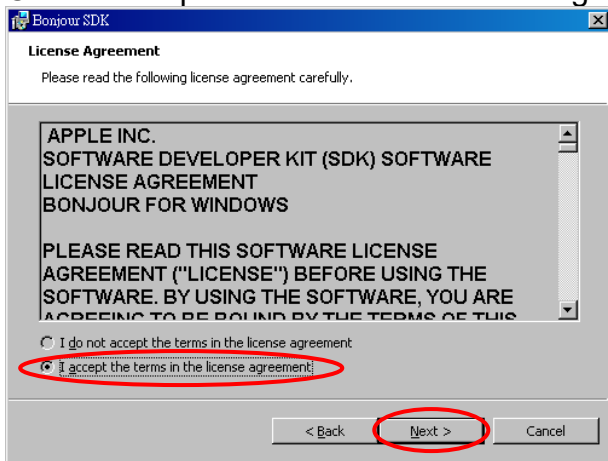
- a. Click "BonjourSDKSetup.exe" to install Bonjour plug-in for Internet Explorer.



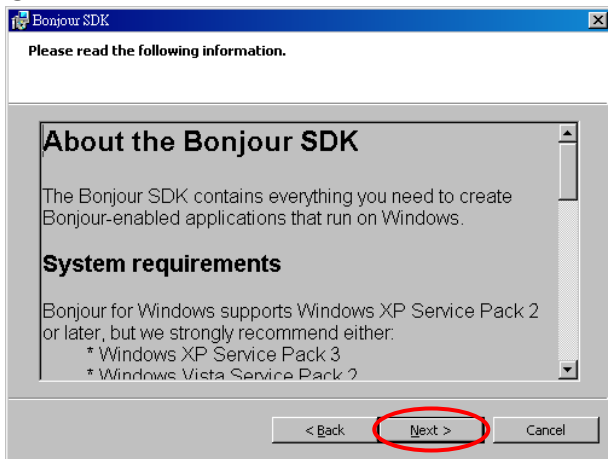
- b. Click "Next" to continue.



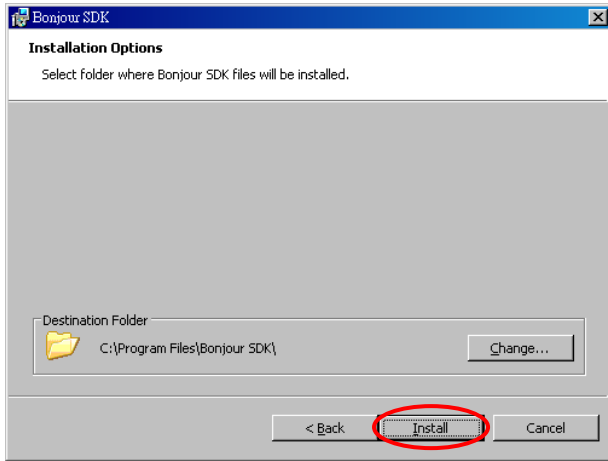
- c. Click "I accept the terms in the license agreement" to continue.



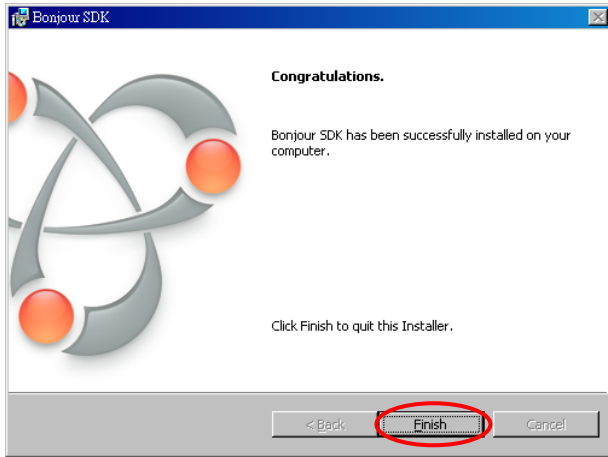
- d. Click "Next" to continue.



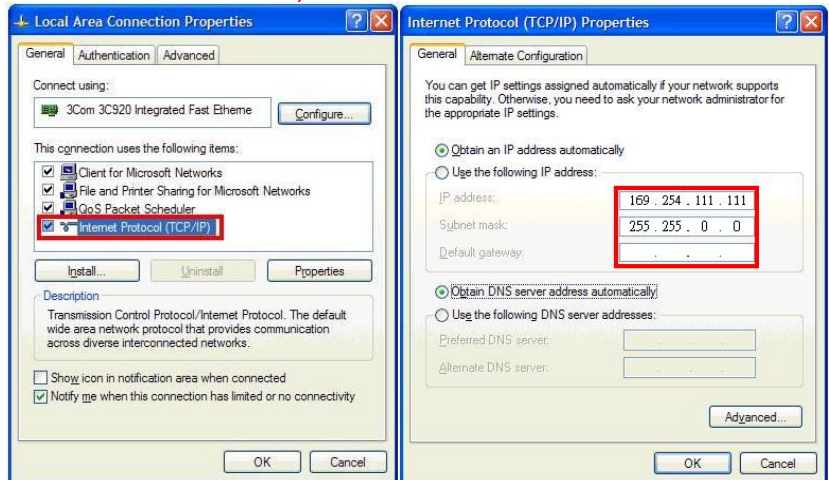
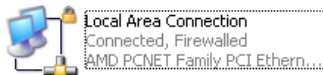
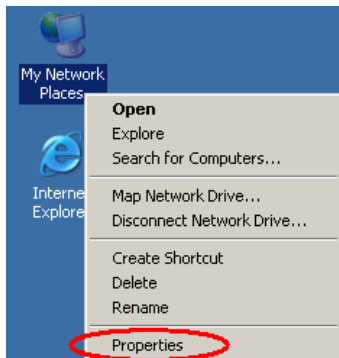
e. Click "Install" to start installation.



f. Click "Finish" to exit installation.

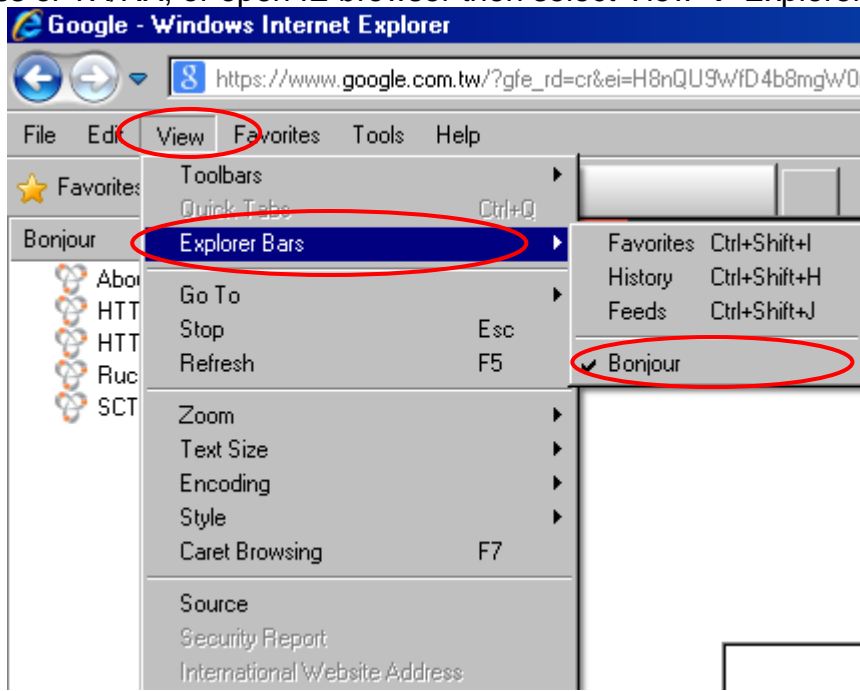


g. Right click on "My Network Place" → "Properties" then right click on "Local Area Connection" → "Properties" then double click on "Internet Protocol (TCP/IP)" to setting as below:  
(IP address **169.254.111.111**, sub mask **255.255.0.0**)

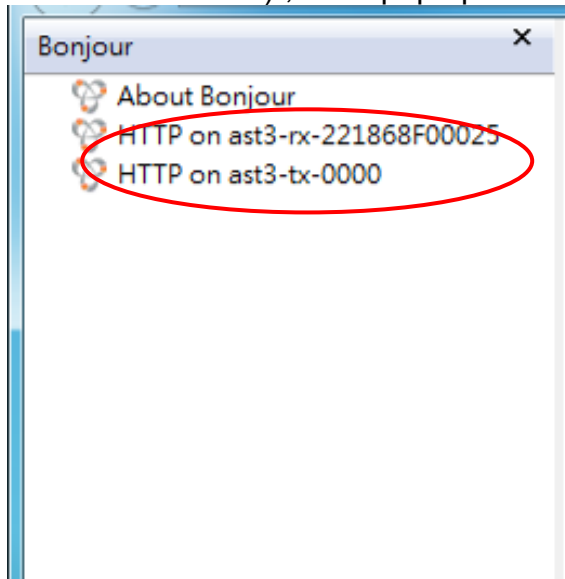


Login in to the web setting:

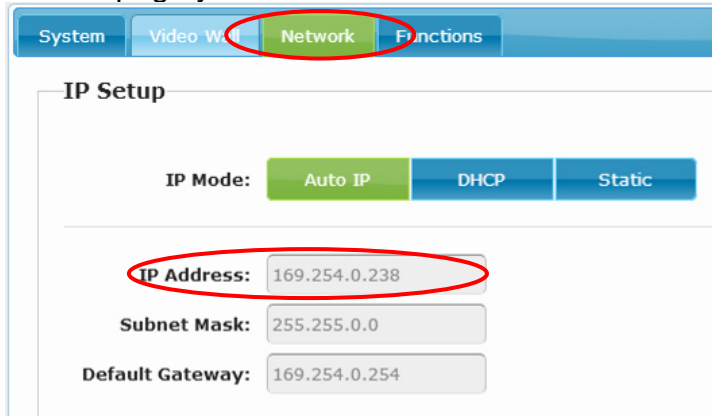
Use CAT5 cable to connect transmitter/receiver RJ45 port to PC LAN port, direct input known IP address of TX/RX, or open IE browser then select View → Explorer Bars → Bonjour



Double click on “HTTP on ast3-tx-xxxx(x= channel of transmitter)” or “HTTP on ast3-rx-xxxxxxxxxxxxxx (x= MAC address of receiver)”, it will pop up web setup in Bonjour windows as below:



Click Network page you will see the IP address of transmitter/receiver



# System:

System | Video Wall | Network | Functions

▼ Version Information:

```
Tue, 01 Aug 2017 17:30:50 +0800
2527631715 204988 u-boot_c.bin
1665365585 3128048 uuImage
597487637 13864960 initrd2m
A7.0.2 Build 3019
```

▶ Update Firmware:

▶ Utilities:

▶ Statistics:

- Version Information      Firmware version information
- Update Firmware      Update system firmware
- Utilities      System tools
  - Factory Default      Set system to factory default
  - Reboot      Reboot system
  - Default EDID      Set EDID to default
  - Console API Command      Run Console API command
- Statistics      System status



# Video Wall:

System Video Wall Network Functions

Basic Setup:

### Bezel and Gap Compensation

OW:

OH:

VW:

VH:

UNIT: 0.1mm

### Wall Size and Position Layout

Vertical Monitor Count:

Horizontal Monitor Count:

Row Position:

Column Position:

UNIT: Panel

## Basic Setup

- Bezel and Gap Compensation: Set screen, bezel and gap size
- Wall Size an Position Layout: Set video size, position and layout
- Preferences: Set extension way and rotation

System Video Wall Network Functions

Basic Setup:

Advanced Setup:

### Step 1: Choose Control Target

Show OSD

### Step 2: Control Options

Reset to Basic Setup:

Stretch Type:

Clockwise Rotate:

Screen Layout (Row x Column):  x

Row Position:

Column Position:

Horizontal Shift:

## Advance Setup:

- Step 1: Select target to control
- Step 2: Select option to apply

# Network:

The screenshot shows a web-based configuration interface for network settings. At the top, there are four tabs: 'System', 'Video Wall', 'Network' (which is selected and highlighted in green), and 'Functions'. Below the tabs, the 'IP Setup' section contains three radio buttons for 'IP Mode': 'Auto IP' (selected and highlighted in green), 'DHCP', and 'Static'. Below these are three input fields: 'IP Address' with the value '169.254.0.238', 'Subnet Mask' with '255.255.0.0', and 'Default Gateway' with '169.254.0.254'. An 'Apply' button is located at the bottom right of this section. The 'Casting Mode' section below it has two radio buttons: 'Multicast' (selected and highlighted in green) and 'Unicast'. Below these is a checkbox labeled 'Auto select USB operation mode per casting mode (recommended)', which is currently unchecked. An 'Apply' button is also present at the bottom right of this section.

## IP Setup:

- IP Mode could be Auto IP, DHCP, Static three mode  
**Host default setting is Static IP, client default setting is Auto IP**  
For mass deploying please use static or DHCP mode.  
**Notice: if there is no DHCP server in network the host/client will keep reboot, you need to set the host/client to factory default**  
Press channel button “-” than power on (power and link LED will be flash)
- Casting Mode : could be Multicast, Unicast mode, default is Multicast ,  
When using Multicast mode, please check the “Auto select USB operation mode per casting mode” box

# Functions:

## For transmitter:

Video over IP

Enable Video over IP

Enable Video Wall

Maximum Bit Rate: Best Effort

Maximum Frame Rate: Capture up to 100% of frames

Apply

- Enable Video over IP: This function setup the video signals send from network, default is checked.
- Enable Video Wall: This function setup the video wall, default is not checked.
- Maximum Bit Rate: Set maximum bit rate.
- Maximum Frame Rate: Set maximum frame rate.

## For Receiver:

Video over IP

Enable Video over IP

Enable Video Wall

Copy EDID from this Video Output (Default disabled under multicast mode)

Scaler Output Mode: Pass-Through

Timeout for Detecting Video Lost: 10 seconds

Turn off screen on video lost

Apply

- Enable Video over IP: This function setup the video signals send from network, default is checked.
- Copy EDID from this Video Output: Check this box will auto copy EDID from the TV connected to receiver when receiver booting (**unicast mode only**), default is not checked.
- Scaler Output Mode: Set video output resolution.
- Timeout for Detecting Video Lose: Set timeout for detecting video lose.
- Turn off screen on video lost: **Please do not check this box**

## USB over IP:

USB over IP

Enable USB over IP

---

Operation Mode:

Auto select mode (Recommended, choose per network casting mode)

Active on link (Unicast network's default mode)

Active per request (Multicast network's default mode)

---

Compatibility Mode:

Mouse not responding well (Check when USB mouse responding is slow and queer)

K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

Apply

- Enable USB over IP: Enable/disable USB extender function.
- Operation Mode: Set USB operation mode.
- Compatibility Mode: Set USB compatibility mode.

## Serial over IP :

Serial over IP

Enable Serial over IP

---

Operation Mode:

Type 1 (Need extra control instruction. For advanced usage.)

Type 2 (Recommended. Dumb redirection.)

Type 1 guest mode

Type 2 guest mode

---

Baudrate Setting for Type 2:

Baudrate:

Data bits:

Parity:

Stop bits:

Apply

This function setup Serial (RS232) signal sends from network

- Operation Mode:  
Default is "Type 2 (Recommended. Dumb redirection.)"
- Baudrate Setting for Type 2 : **default is 115200, 8, None, 1**

**Package:****HKM01BT-4K Package Include:**

Transmitter x 1

USB A to B cable x 1

IR emitter cable x 1

DC 5V 2Amp power adapter x 1

Software CD x1

**HKM01BR-4K Package Include:**

Receiver x 1

IR emitter cable x 1

IR remote control x1

DC 5V 2Amp power adapter x 1

**Specification:**

ITEM	HKM01BT-4K	HKM01BR-4K
Copper Distance	150M (Use Network Switch Max 100M)	
HDMI Video Support	Up to 4K UHD 4:4:4 @ 30Hz	
HDCP Compliant	HDCP 2.2	
HDMI Audio Support	Up to 7.1 LPCM 192Khz / Dolby True HD / DTS-HD Master Audio / ATMOS / DTS:X	
HDMI Input	HDMI Type-A	
HDMI Loop Output	HDMI Type-A	
HDMI Output		HDMI Type-A
Analog Audio Input	Line In, 3.5mm Stereo Phone Jack	Mic In, 3.5mm Mono Phone Jack
Analog Audio Output	Line Out, 3.5mm Stereo Phone Jack	
USB	USB 2.0 Type B x 1 (Rear)	USB 1.1 Type A x 2 (Front) USB 2.0 Type A x 2 (Rear)
IR Receiver (Int & Ext)	3.5mm Stereo Phone Jack 20-60Khz / $\pm 45^\circ$ / 5M	
IR Emitter (Ext)	3.5mm Stereo Phone Jack 20-60Khz / $\pm 45^\circ$ / 5M	
RS-232	DB9 Female	DB9 Male
Ethernet	Gigabit RJ45	
Fiber	SFP	
Power Consumption	600mA (Typical)	500mA (Typical, No USB Device)
Power Supply	DC 12V 1500mA	
Dimensions mm	210 x 123 x 40	167 x 103 x 40
Weight g	680	500



Rev.A1 V1.10