HDMI KVM & USB, RS232 , IR ,Analog Audio CAT5 Extender over IP

ITEM NO: HKM01BT, HKM01BR HDMI KVM over IP with USB, RS232, IR, Analog Audio

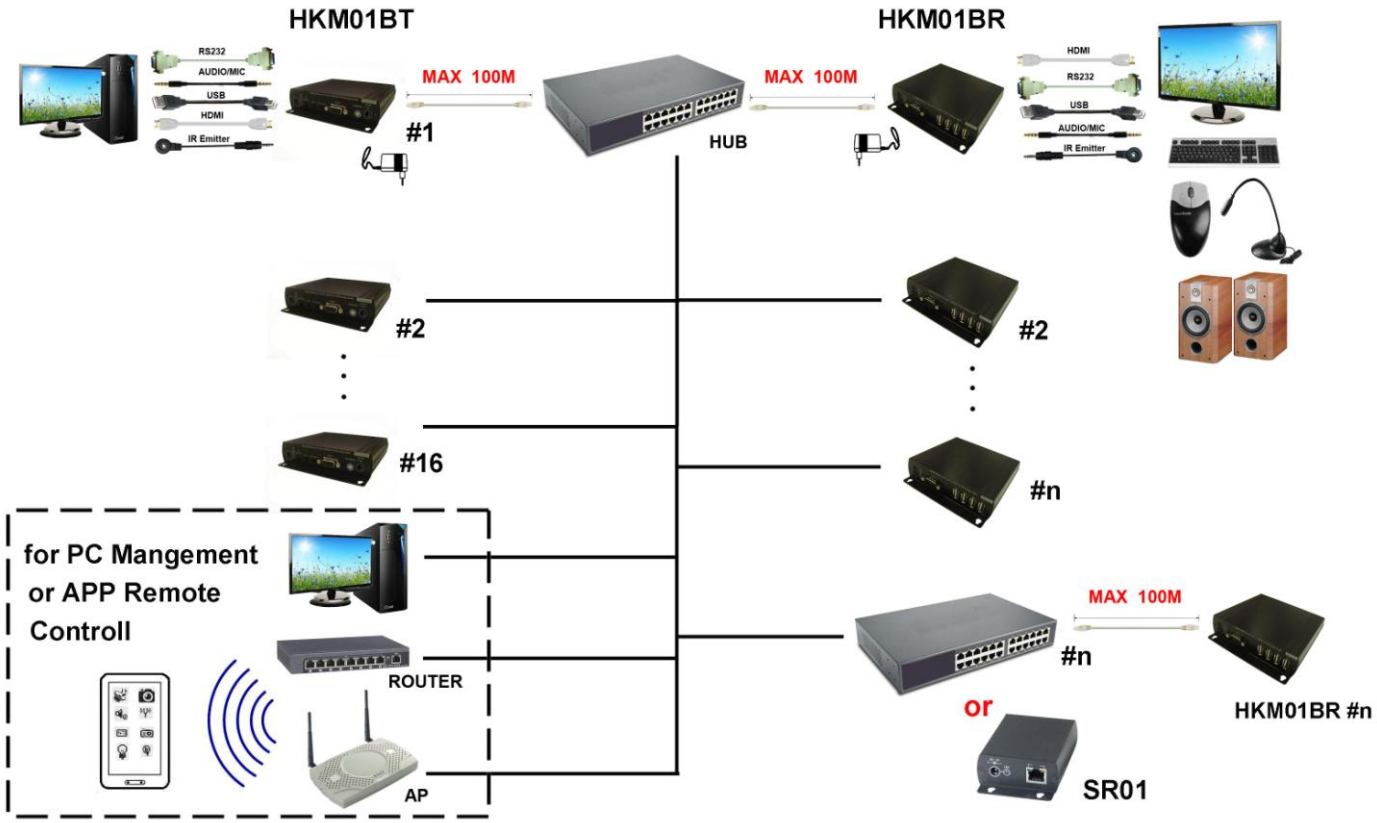
The HKM01B HDMI KVM, USB with Analog audio, RS232, and IR CAT5 extender design for extends and distribute all signals over one CAT5 up to 150 meters, with local HDMI monitor output. It provides superior video quality up to 1920 x 1200 resolutions, and using cost effective Cat5e cable, instead of HDMI, RS232 cables, for an easy, neater and reliable installation. The local and remote units can be connected together for a Point-to-Point connection via CAT5e/6 cable or a Point-to-Many connection via a managed network switch. It is optimized for applications at broadcasting system, multimedia display and multi-data sharing, digital signage, home network integration, and industrial control, hospital, education, security, Matrix network system and system control over RS232 and equipment control over IR.

Features:

- Extend HDMI, RS232, IR and USB, analog audio signals over one CAT5E/CAT6 cable.
- **Supports resolutions up to 1080p Full HD and 1920 x 1200 (WUXGA) 32bpp@ 60 Hz**
- **Transmission range up to 150M over CAT5e, 180M over CAT6.**
- Supports 2-way RS232 commands at baud rate 115200 (control software on a PC, or other automated control system hardware) to control devices attached to the matrix using RS232. Full Duplex data communication.
- HDMI 1.3b and HDCP compliant.
- HDMI audio support up to LPCM 7.1@192Khz
- Built in Bi-Directional analog audio.
- Built in Bi-Directional IR.
- Use IGMP and Jumbo frame protocol Gigabit Switch Hub to do HD signal distribution and transmission.
- **Support PC software and Android/iOS APP control.**
- **HKM01BR receiver input source select could be from IR remote control or front panel button.**
- **HKM01BT transmitter unit built in HDMI loop output.**
- **HKM01BR receiver built in IR programmable module, allow using IR remote control to do IR/RS232 command.**
- Receiver unit with 4 ports USB devices (1 port USB 1.1 & 3 Port USB 2.0), to extend USB peripheral devices, such as flash disk, hard disk, keyboard, mouse, etc.
- **Support point to point and multiple source devices to multi-display connections via Gigabit network switch.**
- **Work with HKM01B (HDMI), DKM01B (DVI), VKM03B (VGA) serials products.**
- Perfect for control remote machines and security monitoring systems, digital signage application.
- Optional model: SR01 signal repeater for longer distance application.

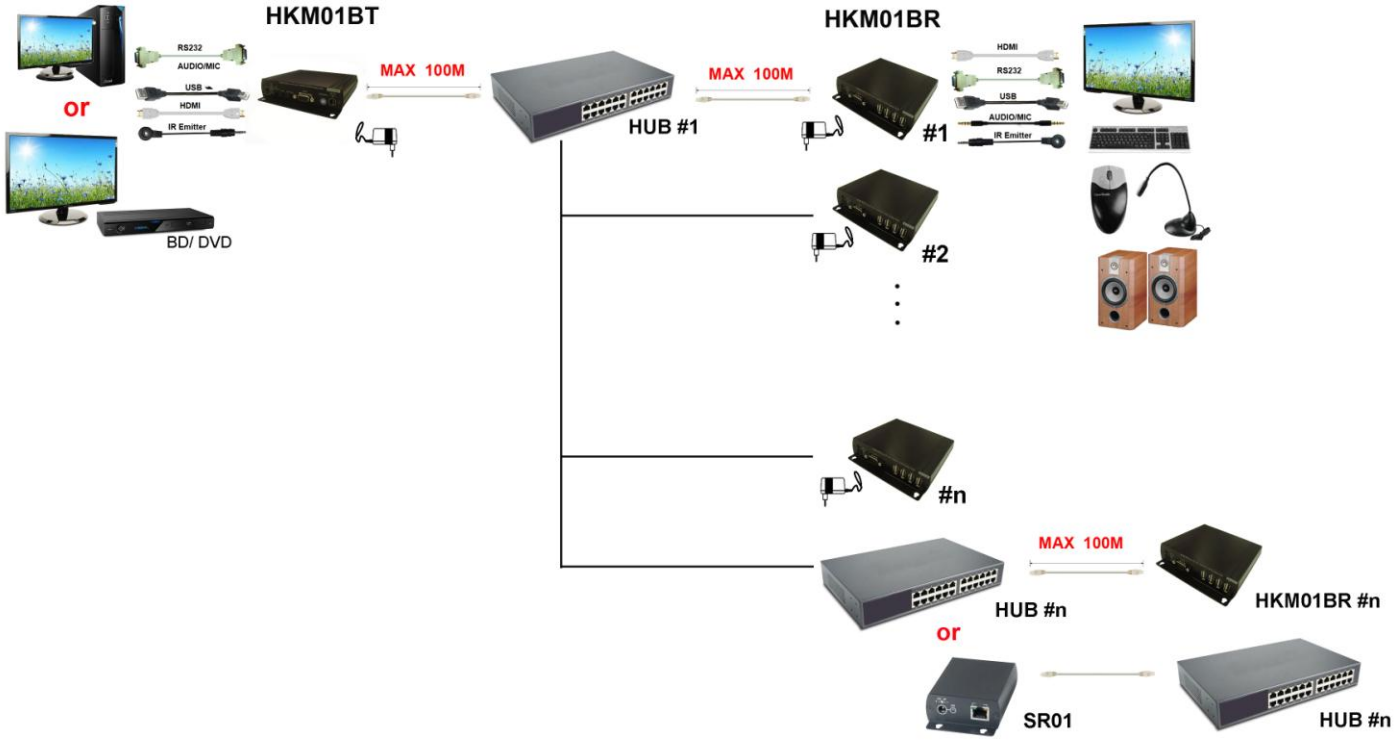
Installation View:

Multiple Transmitters to Multiple Receivers Connection: (Matrix Switcher)

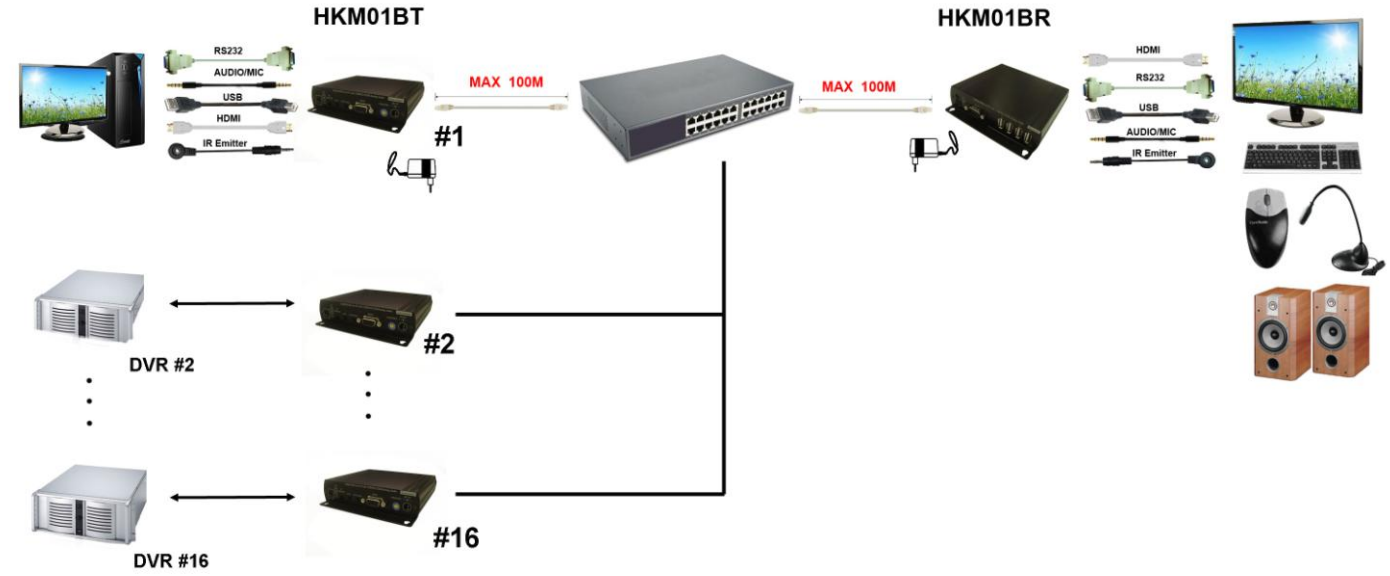


Point to Point Direct Connection: (Extender)

One Transmitter to Multiple Receivers Connection: (Splitter)



Multiple Transmitters to One Receiver Connection: (Switcher)



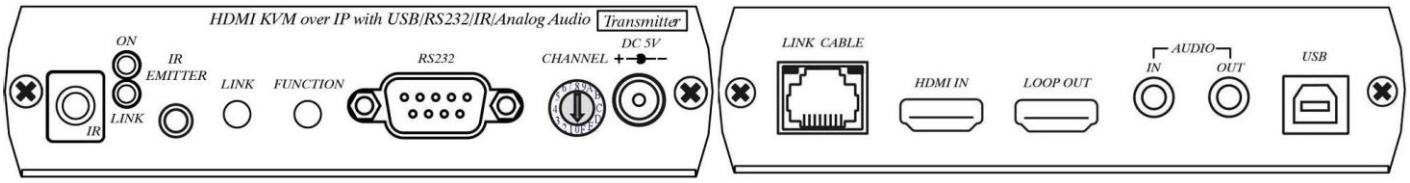
Optional Model: SR01 Signal Repeater (order separately)

- Extend data signal for an additional 120meters.
- Application for HKM01B signals for extra long range transmission.
- Ability to cascade connection with multiple SR01 for long range transmission
- Built in LED status indication.
- External power required.
- Plug and play for easy installation.

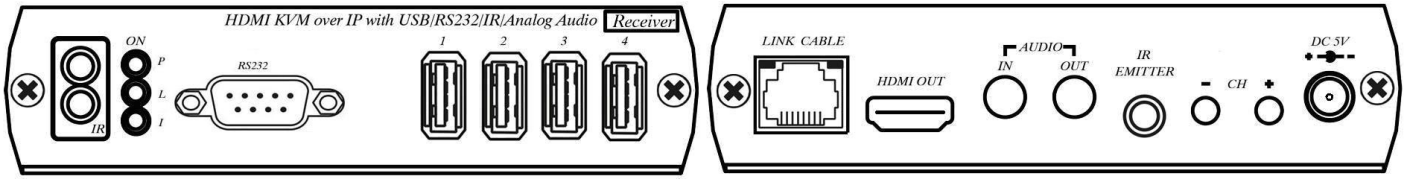
Work with HKM01B CAT5 Extender:

Panel View:

Transmitter



Receiver



LED Indication Status:

Power (Green LED):	Flash	Booting
	ON	Boot completed
Link (Blue LED):	Flash	Connecting or connected but no HDMI input
	ON	Transmitter connected with Receiver
RJ45 LED:	Green Flash	Data transmission
	Orange On	Ethernet connected
Receiver IR (Red LED):	On	Received IR signal
	Flash	IR signal status / Enter IR learning mode

Back Panel Rotary Switch Function:

HKM01BT and HKM01BR must setting at same channel in order to do mutual transmission.
Rotary switch to be follow 16 HEX, could switch " 0 ~ F " total 16 channels, A = channel 10, B = channel 11, others channel same as 16 hex conversion.
HKM01BT channel setting must be unique to avoid conflict with any other transmitters.

Front Panel Button Function:

ITEM	HKM01BT	
Button	LINK	FUNCTION
Short Press	Remote output (**on** / off)	**Video Mode** / Graphic Mode*
Long Press (3 seconds)	Loop output (**on** / off)*	Anti-Dither (1/2/**off**)*
Press to power on (Hold until Green LED Flash)	N/A	Update EDID from loop output
Press to power on (Hold until Green and Blue LED Flash)	RESET to Default*	N/A

ITEM	HKM01BR	
Button	CH. -	CH. +
Press together	Confirm / Enter menu	
Short Press	Reduce the numbers of Channel/Menu/Value	Increase the numbers of Channel/Menu/Value

Above "bold font" part as the default

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 the max. Transmission distance up to 150M, using CAT.6 cable up to 180M.

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:

HKM01B 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.
Analog audio bi-direction transmission only in Unicast mode, please refer to the web setting chapter: Casting 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.

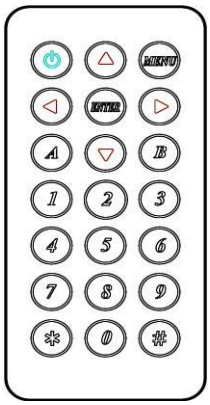
Resolution (@60Hz)	Average Bandwidth (Mbps)
1080p	77 (24 ~ 91)
720p	46 (29 ~ 150)
480p	63 (36 ~ 73)
1600x1200 (UXGA)	59 (24 ~ 73)
1280x1024 (SXGA)	58 (31 ~ 76)
1024x768 (XGA)	118 (56 ~ 138)
800x600 (SVGA)	83 (64 ~ 107)

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 HE05BT Transmitter allow maximum up to 10pcs for simultaneous video streaming.

USB Hot Key Function：

In multicast mode HKM01B 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 to establish USB FLASH drive /hard disk connection.

Remote Control Function:



If you do not use PC computer management to setup HKM01BR, then you could use the IR infrared remote control to preset channel selection. Using the IR remote control to the front of HKM01BR 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 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		Function
	Power	Temporarily turn off the screen output /setup remote control Remote ID
	MENU	Quick menu selection, input numbers after press menu button
	LEFT	previous channel
	RIGHT	next channel
	UP	previous quick Menu selection
	DOWN	next quick Menu selection
	ENTER	Confirmation / display the current channel
	1	number 1
	2	number 2
	3	number 3
	4	numuber4
	5	number 5
	6	number 6
	7	number 7
	8	number 8
	9	number 9
	0	number 0
	*	cancel / exit
	#	clear input number
	A	no function
	B	no function

Remote Control Operation:

Select Channel：

Mode 1: use  or  select channel, if no any action after 3 seconds then it is the select channel or press  immediately to confirm the input channel.

Mode 2: select the channel number and press  to confirm the input channel.

Select Function：

Mode 1: use  or  select function, press  to confirm.

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

Basic Menu Number:

0	MAC Address	Display equipment MAC Address.
1	IP Address	Display equipment IP Address
2	Host IP Address	Display current connected Host IP Address
3	Enable advance menu	Enable advance menu
4	Disable advance menu	Disable advance menu

Advance Menu Number:

5	Device No	Display device number
6	Group No	Display group number
7	Party No	Display party number
8	Remote ID	Display current Remote ID setting
9	System Version	Display system version
10	Restart Link	Reconnect with Host
11	Stop Link	Stop the connection with Host
12	Video or Graphic Mode	Switch Host Video (default) or Graphic Mode
13	Anti-Dithering	Switch Host Video Anti-Dithering define, default is off
15	Set Device No	Set device number to 0~999
16	Set Group No	Set group number to 0~99
17	Set Party No	Set party number to 0~99
18,	Set Remote ID	Set Remote ID to 0~9
20	Enable Channel Button	Enable Channel Button
21	Disable Channel Button	Disable Channel Button
22	Enable IR Remote	Enable IR Remote
23	Disable IR Remote	Disable IR Remote
24	Enable IR Extender	Enable IR Extender
25	Disable IR Extender	Disable IR Extender
26	Enable RS-232 Assign Mode	Enable RS-232 Assign Mode, auto reboot after setting
27	Disable RS-232 Assign Mode	Disable RS-232 Assign Mode, auto reboot after setting

IR Module Menu Number: (display when IR module be installed)

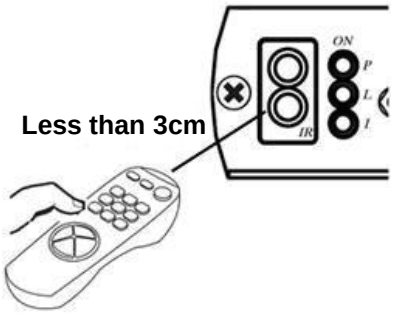
30	Send IR Key	Send learned IR Key 0~31
31	Learn IR Key	Learn IR Key 0~31
32	Delete IR Key	Delete learned IR Key 0~31
33	Delete All IR Key	Delete all learned IR Key

System Maintains Menu Number:

300	Force Update EDID of a Target Client	Set host EDID from current monitor
333	Reset to Factory Default	Reset to Factory Default
999	Reboot	Restart the system

IR Key Learning：

IR KEY function is use IR module which built-in HKM01BR receiver to learn IR signal of TV remote control and saved in the module, then you could use programmable RS232 command from HKM01BT transmitter to control the IR module send and IR signal to TV.
It could control all kinds of TV but do not need RS232 port on it.



How To Learn IR Key :

First, press the menu: e.g. IR Key 0 press MENU 3 1 MENU (Learn IR Key) then press 0 MENU, the screen OSD will show “Start IR Learning Key 0” , press the button of the remote control you want to learn and closed to (3cm) IR receiver of HKM01BR receiver in 10 seconds. It will show “Learn Succeed” or “IR Key 0 Learning Error. Try Again” after learning.

After learning you could double check if it works correctly, e.g. press MENU 3 0 MENU (Send IR Key) then press 0 MENU, it will send the IR Key 0 immediately.

RS-232 Assign Mode：

User could use RS-232 port of transmitters at baud rate 115200bps (8-N-1) to operate/setup the receivers at same channel

Command format: >CMD_Address> Command Parameters
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:

Mxxxx	The last 4 digits of MAC Address	e.g.: 221868860123 = M0123
Ixxxx	The last 2 column of IP Address (HEX)	e.g.: 169.254.012.034 = I0C22
Dxxxx	Device No	e.g.: Device No 1234 = D1234
Gxx	Group No	e.g.: Group No 12 = G12
Pxx	Party No	e.g.: Party No 34 = P34
CHx	Channel No (HEX)	e.g.: Channel 12 = CHC
ALL	All receivers	

Response format: <ACK_Address< Response character
Receivers will response message to transmitter as above format, if multiple receivers operate at the same time they will not response to the transmitter

Command and Parameters List:

Command	Function	Parameters	Response
CHANNEL	Select Channel	0 ~ 15 (Channel No.) ? (display setting)	OK = Setting successful ERROR = Setting fail
REMOTE_ID	Set Remote ID	0-9 (Remote ID No.) ? (display Remote ID No.)	OK = Setting successful ERROR = Setting fail
BUTTON	Set button	ON OFF ? (display setting)	OK = Setting successful ERROR = Setting fail
IR_REMOTE	Set IR remote	ON OFF ? (display setting)	OK = Setting successful ERROR = Setting fail
IR_EXTENDER	Set IR Extender	ON OFF ? (display setting)	OK = Setting successful ERROR = Setting fail
DEVICE	Set Device Number	0 ~ 9999 (Device No.) ? (display setting)	OK = Setting successful ERROR = Setting fail
GROUP	Set Group Number	0 ~ 99 (Group No.) ? (display setting)	OK = Setting successful ERROR = Setting fail
PARTY	Set Party Number	0 ~ 99 (Party No.) ? (display setting)	OK = Setting successful ERROR = Setting fail
OSD_ON	Display character on screen 60 seconds	Character (alphabet and numbers)	OK = Setting successful ERROR = Setting fail
OSD_OFF	Turn off the OSD	0 ~ 60000 (Delay time , based on ms)	OK = Setting successful ERROR = Setting fail
SCREEN	Turn on/off screen	ON OFF	OK = Setting successful ERROR = Setting fail
REBOOT	System reboot	N/A	SYSTEM REBOOT
MODULE	Display installed module	N/A	US / EU = module installed NI / no response = module not installed
IR_KEY	Send IR KEY	0 ~ 31 (IR Key numbers	OK = IR KEY Send completed ERROR = module not installed NOT LEARN = the IR KEY not learned

※ The maximum of OSD_ON is 30 characters, not support comma sign「, 」, some characters must use \x## format to display, ## means the characters number in ASCII 16 code
e.g.: **\x0a** is change to next line, **\x28** is **(** brackets sign, **\x22** is **“** sign

e.g.:

>CMD_M1234> CHANNEL 12	(Set receivers which last 4 digits MAC Address is 1234 to Channel 12)
<ACK_M1234< OK	(All receivers which last 4 digits MAC Address is 1234 response OK)
>CMD_D123> BUTTON OFF	(Turn off the button function of the receiver which Device number is 123)
<ACK_D123< OK	(Receiver which Device number is 123 response OK)
>CMD_P5> !IR_KEY 31	All receivers which Party number is 5 send IR Key 31 and response.
<ACK_M0219< OK	Receiver which last 4 digits MAC Address is 0129 response OK
<ACK_M021B< NO LEARN	Receiver which last 4 digits MAC Address is 021B response NO LEARN

>CMD_ALL> !OSD_ON Hello! \x28123\x29 \x22ABC\x22 Show「Hello! (123) “ABC”」to all monitor and send response

<ACK_M0219< OK	Receiver which last 4 digits MAC Address is 0129 response OK
<ACK_M021B< OK	Receiver which last 4 digits MAC Address is 021B response OK
<ACK_M021C< OK	Receiver which last 4 digits MAC Address is 021C response OK
>CMD_ALL> OSD_OFF 10000	All receiver turn off OSD after 10 seconds

Caution：

1. Not recommend to work with general LAN connection to avoid large video, data transmission or multicast packets to slow down your other LAN devices.
2. Gigabit switch hub muse use support IGMP protocol and Jumbo Frame over 8K Ethernet Switch Hub in order to achieve the best transmission quality
3. If monitor shows green screen or video not smooth, please check if the switch running under gigabit and Jumbo Frame function enabled.
4. If multiple receivers in one channel, when the receivers send RS232 data to transmitter, the interval time must over one second to prevent signal conflict.
5. Using computer or mobile APP management the IP address should be set in same network segment.
6. Computer software operation, please refer to software operating instruction.

Web Setting Function：

HKM01B provide detail settings over web browser, you have to know the IP address before setting.

There are three ways to get the IP address of receiver:
1.Local IP shows on right bottom screen when booting.
2.Press remote control button 

(IP Address)
3.Install Internet explorer plug-in: Bonjour , click device name to enter web setting page to get the IP address(please refer software installations manual)

There are two ways to get the IP address of transmitter:
1.Connect a transmitter and receiver and set in the same Channel, press remote control button 

at receiver side (Host IP Address), it will shows the transmitter IP Address on screen(must remove the HDMI cable of transmitter or turn off the video source).
2. Install Internet explorer plug-in: Bonjour , click device name to enter web setting page to get the IP address(please refer software installations manual)

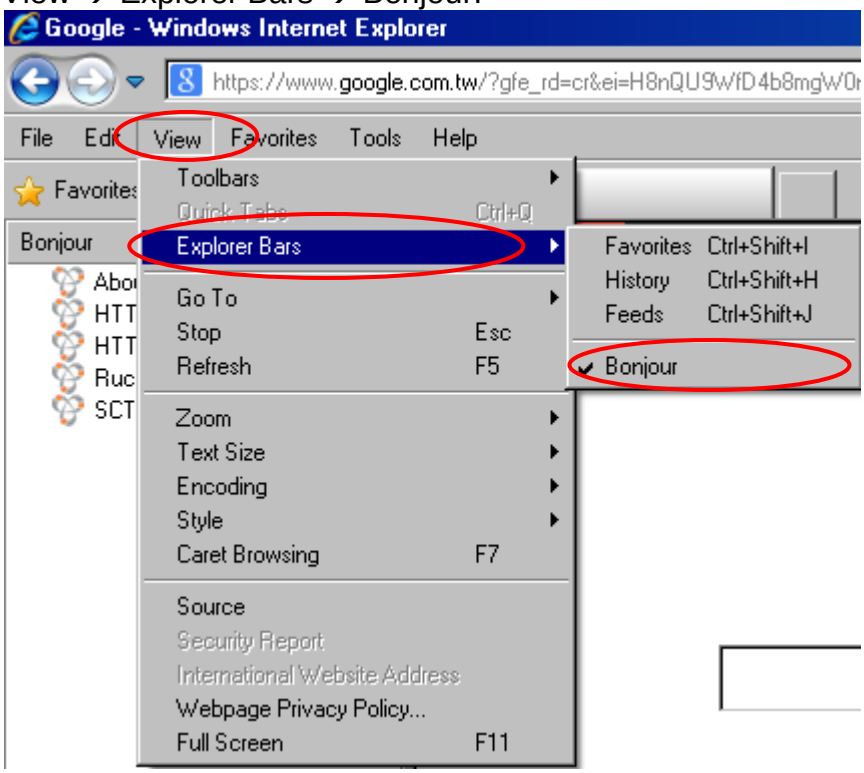
System default IP setting is Auto IP, it will assign 169.254.X.X (subnet mask 255.255.0.0) to transmitters and receivers, you could also set to DHCP or Static IP.
You computer must set in same subnet mask to enter the web setup page.

If you do not sure the IP address of transmitters/receivers you could reset the transmitters and receiver to default.
For transmitters: press the LINK button to power on (Press and hold until Green and Blue LED Flash) to reset to default.
For receivers: press remote control 

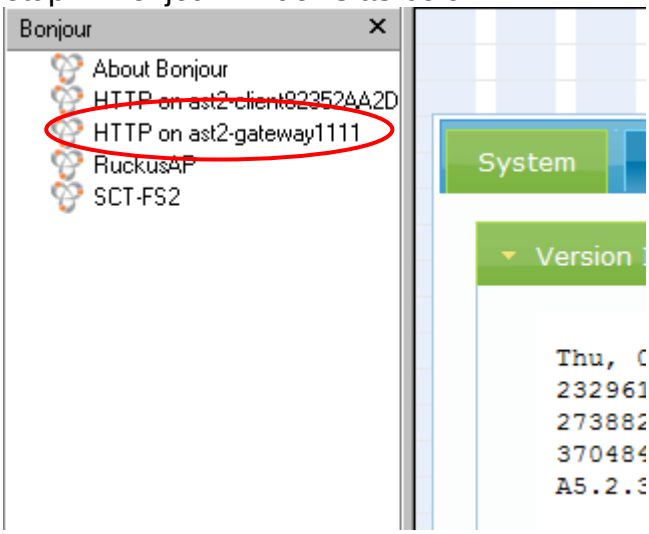
to reset to default.

Login in to the web setting:

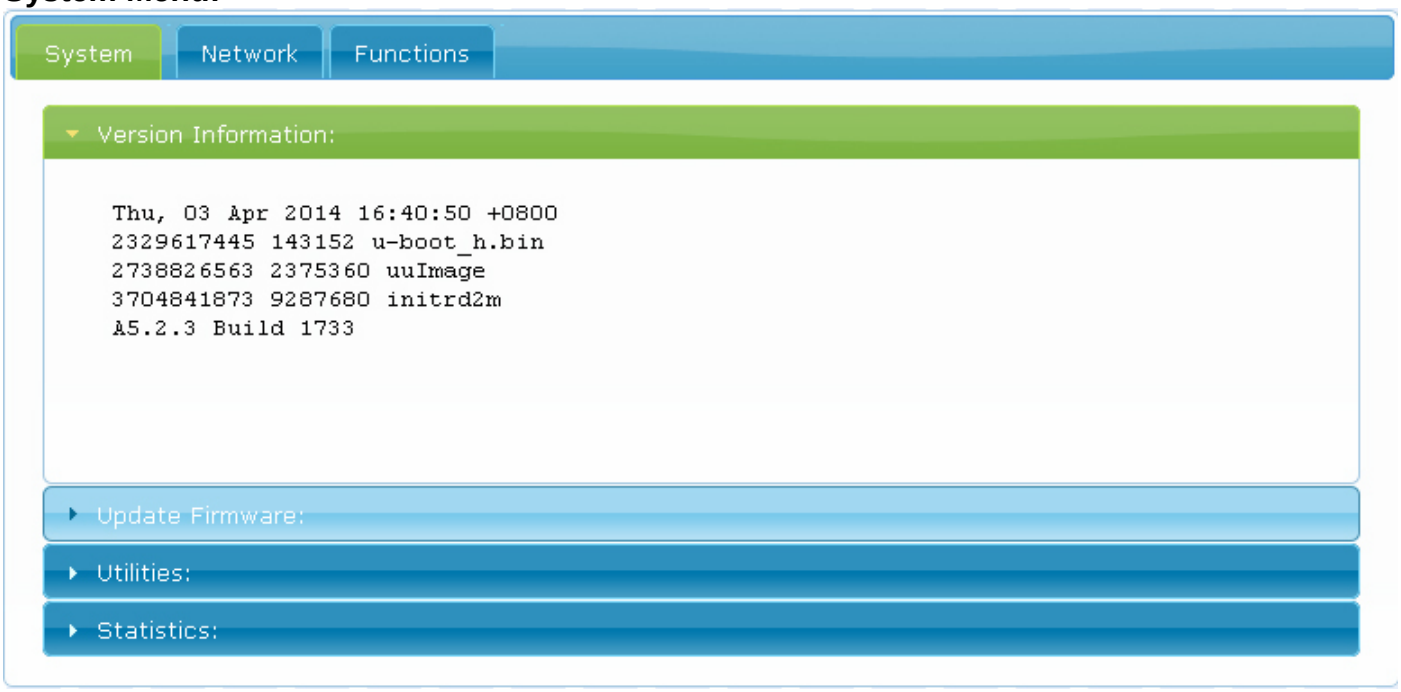
Use CAT5 cable to connect transmitter/receiver RJ45 port to PC LAN port, open IE browser then select View → Explorer Bars → Bonjour.



Double click on “HTTP on ast-gateway(HKM01BT)” or “HTTP on ast-client (HKM01BR)”, it will pop up web setup in Bonjour windows as below:

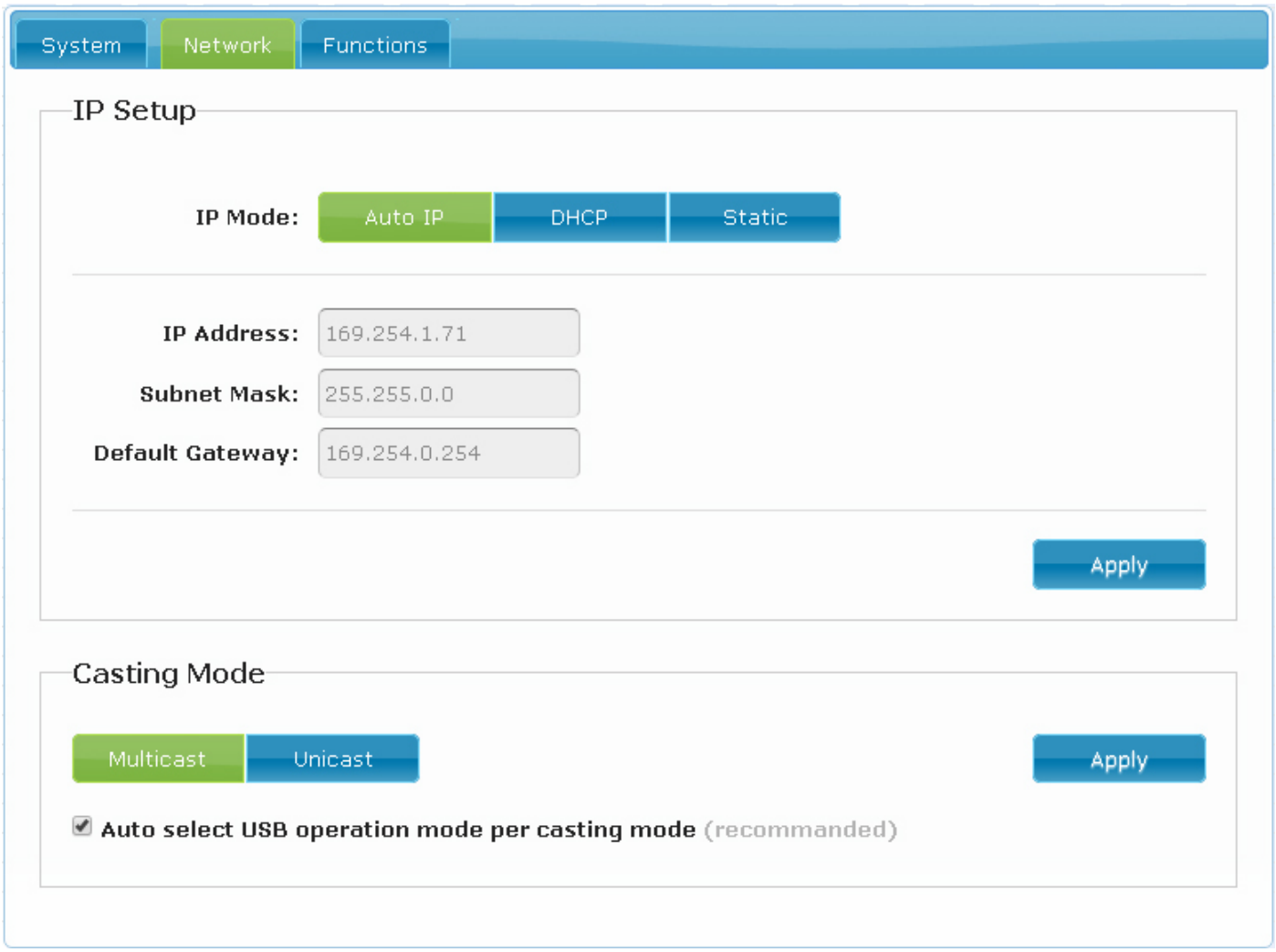


System Menu:



- 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

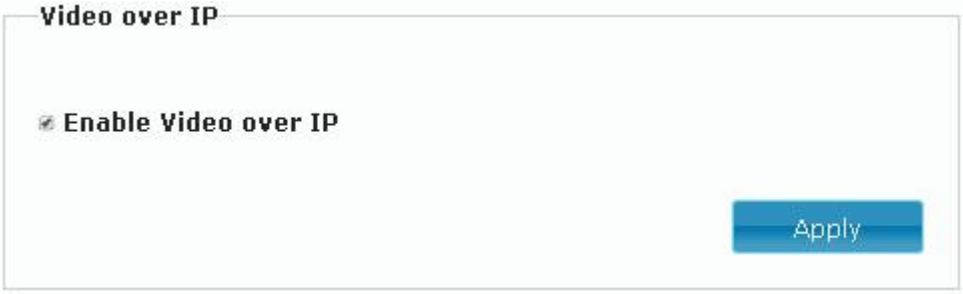
Network Menu:



IP Setup:

- IP Mode could be Auto IP, DHCP, Static three mode, default is Auto IP
- 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

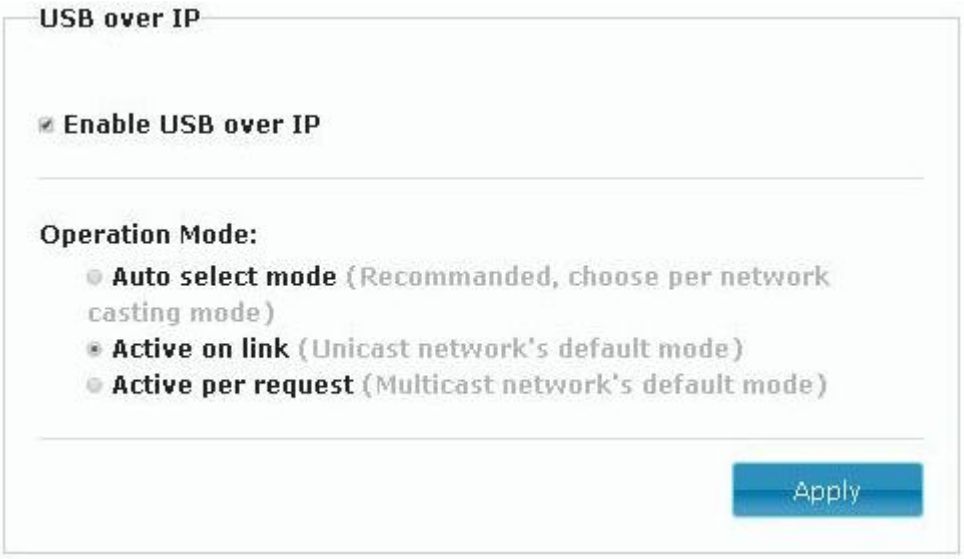
Functions Menu:



For HKM01BT Transmitter:
Video over IP:
This function setup the video signals send from network, default is checked.
Please note it will turn off HDMI output in same channel if this function be disabled, only analog audio output

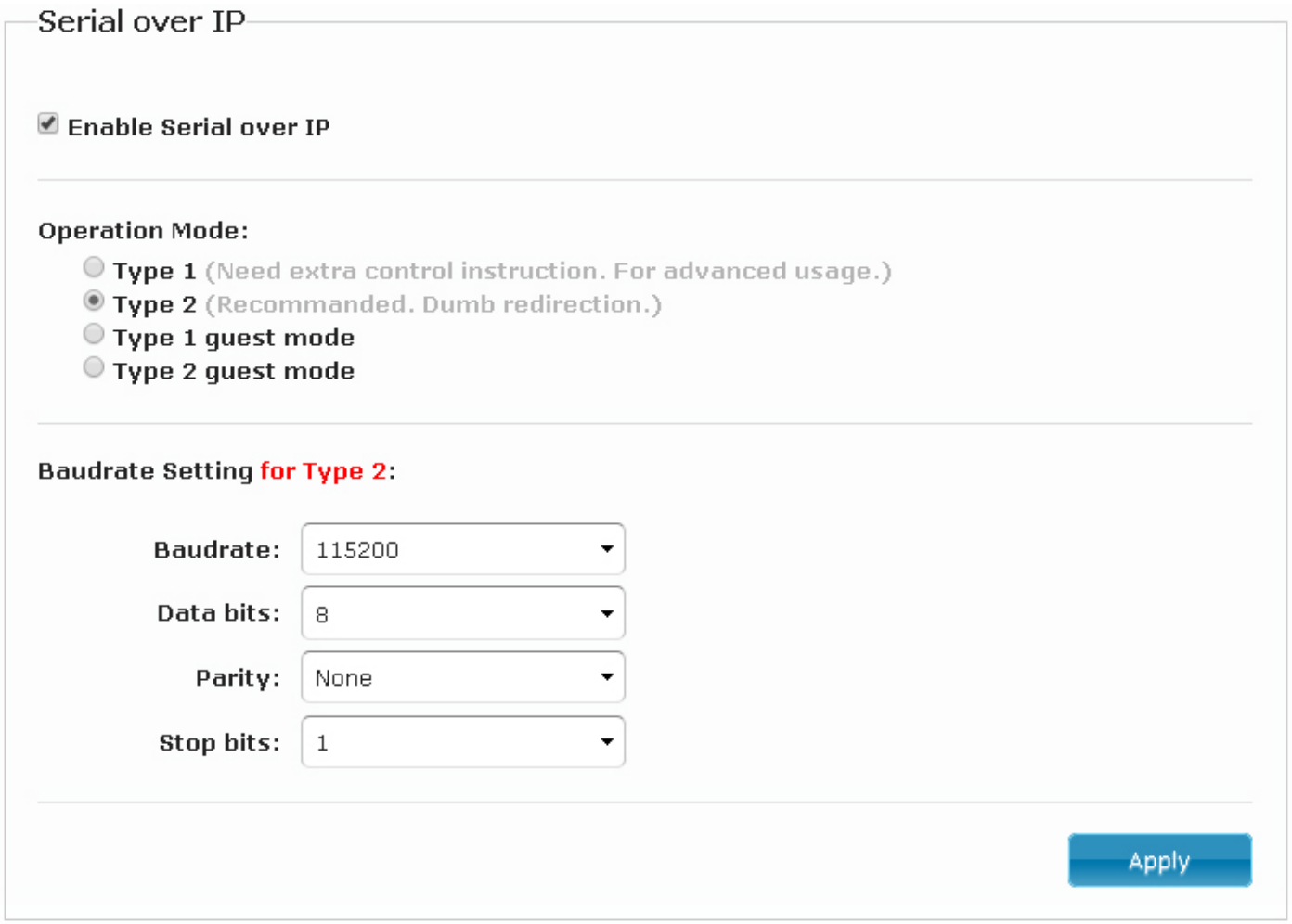
For HKM01BR Receiver:
Video over IP:
This function setup the video signals send from network, default is checked.
Please note it will turn off HDMI output of receiver if this function be disabled, only analog audio output

Copy EDID from this Video Output:
Check this box will auto copy EDID from the TV connected to HKM01BR when receiver booting, default is not checked.
In multiple connections the EDID will copy from the last connected receiver, to prevent EDID conflict recommend check this box in Unicast mode only.



USB over IP Setup:
This function setup the USB signals send from network, default is checked.

Operation Mode:
USB device operation setting, default is “Auto select mode”
In Unicast mode recommend set to “Active on link”.
In Multicast mode recommend set to “Active per request”.



Serial over IP：

This function setup Serial (RS232) signal sends from network

- Operation Mode:
  Default is “Type 2 (Recommended. Dumb redirection.)”
- Baudrate Setting for Type 2 :
  It could change Baud rate as below : 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 230400, **default is 115200**

Package Include:

HKM01BT Transmitter x 1
HKM01BR Receiver x 1
USB A to B cable x 1
IR emitter cable x 1
DC 5V 2Amp power adapter x 2

Specification:

ITEM NO.	**HKM01BT**	**HKM01BR**
Support Resolution	480i / 480p / 720p / 1080i / 1080p @ 24Hz、25Hz、30Hz、50Hz、60Hz	
Transmission Distance	CAT.5e：150M / CAT.6：180M (Max)	
HDMI Connector	HDMI Type A x 2	HDMI Type A x 1
USB Connector	USB Type B x 1	USB Type A x 4
RS232 Connector	DB9 (Female) x 1	DB9 (Male) x 1
Link Connector	RJ45 x 1	
Audio Connector	3.5 mm Phone Jack x 2 (10KΩ / 1Vpp)	
IR Receiver (Internal)	30-60Khz / ±45° / 5M	
IR Emitter (External)	3.5mm Stereo Phone Jack	
Power Supply	DC 5V 2A	
Power Consumption	700mA (Typical) / 1000mA (Max)	700mA (Typical) / 1000mA (Max) (Without USB Power Consumption)
Temperature	Operation: 0 to 55℃, Storage: -20 TO 85℃, Humidity: up to 95%	
Dimensions mm	125x140x30	125x140x30
Weight g	380	390

RoHS CE FC

Rev. A