HDMI over IP (with RS232, IR, Analog Audio) Series

ITEM NO: HE05BT   HDMI over IP - Transmitter
HE05BER HDMI over IP - Receiver
HE05BR   HDMI over IP with RS232, IR, Analog Audio Receiver

HE05B series products are Multicast HDMI video over an IP network to over 254 screens for faster, more efficient HD content sharing and distribution. It is ideal for distributing digital signage content or other HD video and audio across an Ethernet network. Because the transmitter and receivers install directly into your existing LAN infrastructure, integration is easy.

It works in point-to-point or point-to-multipoint and multipoint to multipoint configurations.   Built in window based management software, easy to use computer to setup transmitter/receiver linking and transmission. It is perfect application for any digital signage application with screens in different buildings or stores, such as distributing high-quality medical imaging video across a hospital campus, streaming video to classrooms in schools, multicasting video in command and control room setups, corporate video sharing and training.

Features:
- Extend HDMI, RS232, IR signals over one CAT5e/CAT6 cable.
- Supports resolutions up to 1080p Full HD @ 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 transmission (only in point to point mode).
- Built in Bi-Directional IR.
- Use IGMP and Jumbo frame protocol Gigabit Switch Hub to do HD signal distribution and transmission.
- Support window based management software, using PC computer for easy setting input/output link.
- Support Android/iOS APP control.
- Receiver input source select could be from IR remote control or front panel button.
- HE05BT transmitter unit built in HDMI loop output.
- Support point to point and multiple source devices to multi-display connections via Gigabit network switch.
- Perfect for large scale remote HD content access and security monitoring systems, digital signage applications.
- Optional model:
  SR01:   Signal repeater for longer distance application.
  IRM01: Programmable IR module for HE05BR, HKM01BR, VDKM01BR receiver which allow using IR remote control to do IR/RS232 command.

HDMI Over IP Series :

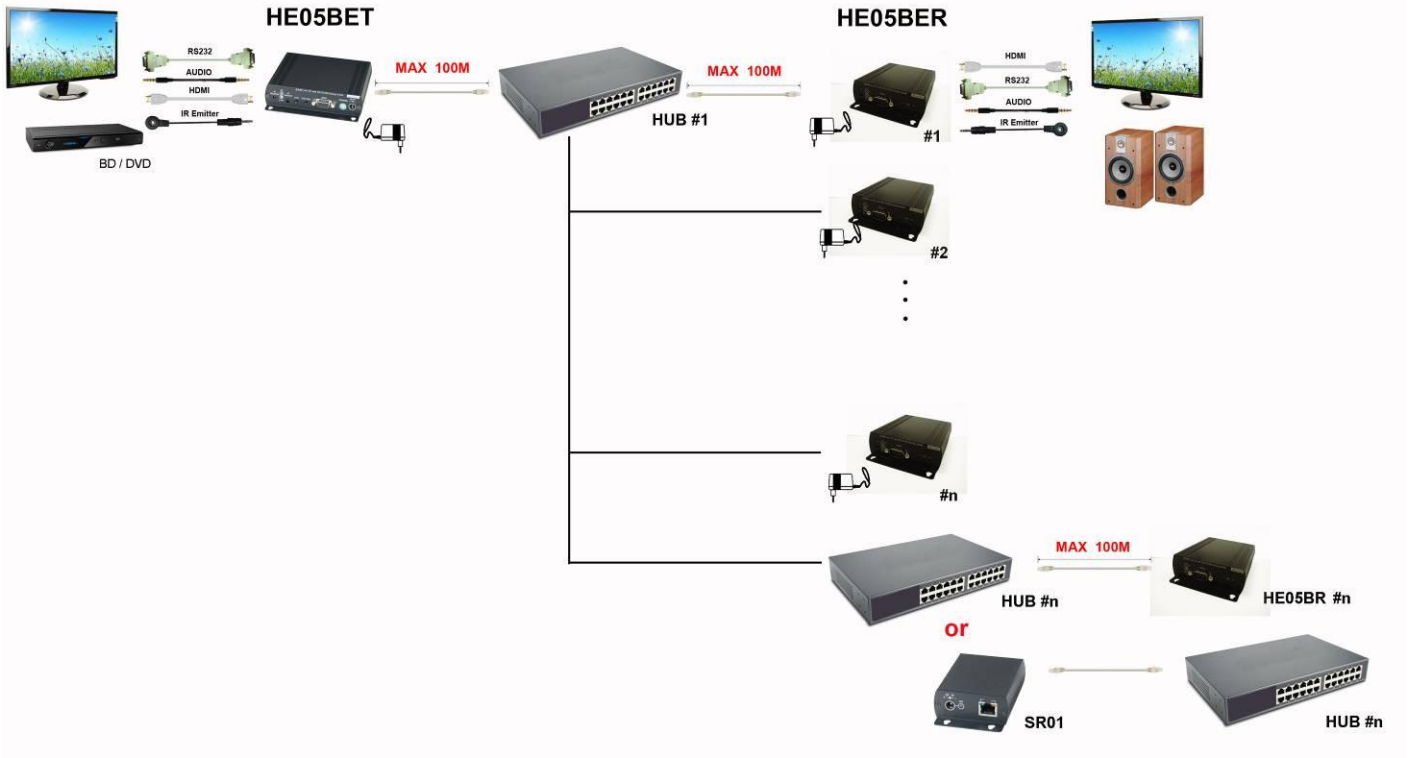| ITEM NO.	Video Interface	Resolution	TX	RX	USB	RS232	IR	Audio	IR Control
HE05BT	HDMI	1080p	V			V	V	V	
HE05BR	HDMI	1080p		V		V	V	V	V
HE05BER	HDMI	1080p		V				V	V

Installation View:

Multiple Transmitters to Multiple Receivers Connection: (Matrix Switcher)
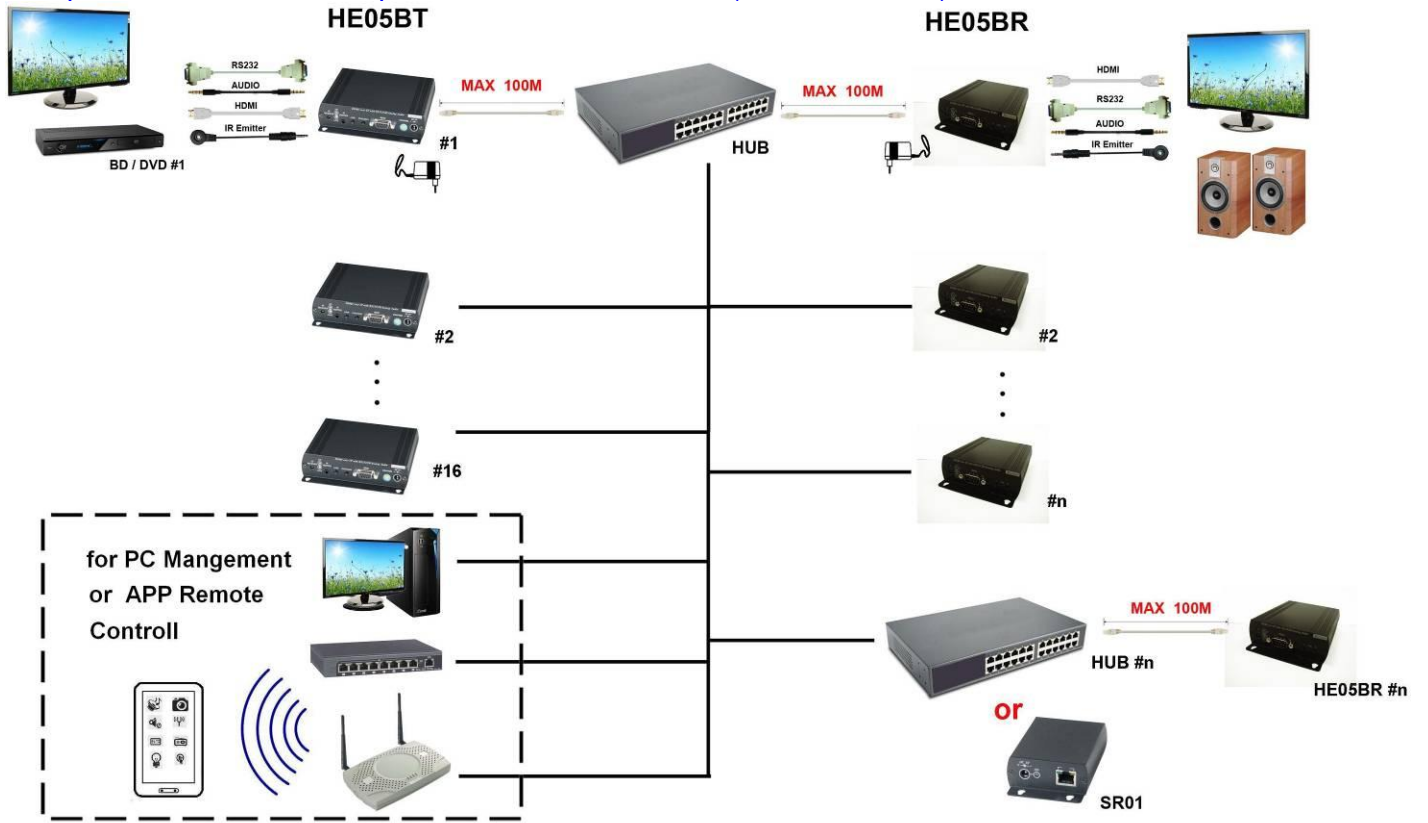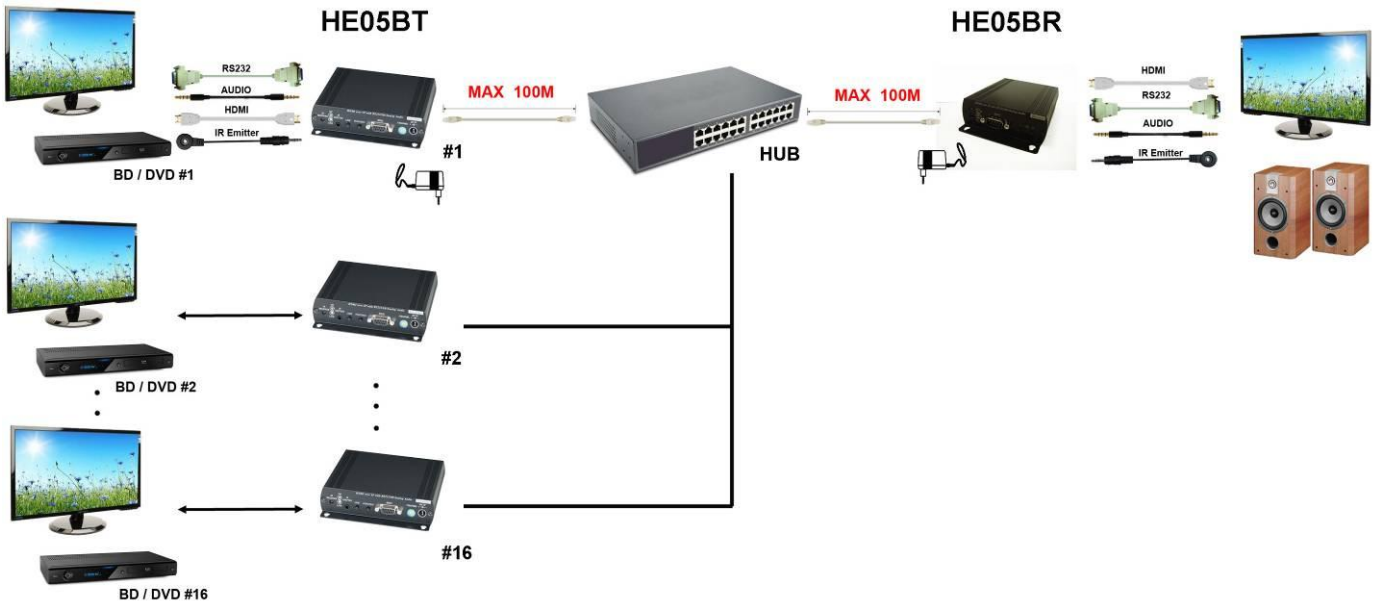

Point to Point Direct Connection: (Extender)

One Transmitter to Multiple Receivers Connection: (Splitter)

Multiple Transmitters to One Receiver Connection: (Switcher)

Optional Model: (order separately)

SR01 Signal Repeater

- **Extend data signal for an additional 120meters.**
- Application for HKM01B,DKM01B,VKM03B 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 HDMI, DVI, VGA KVM over IP series:

IRM01: Programmable IR module for HE05BR Receiver

- **Optional with HE05BR which allow using IR remote control to do IR/RS232 command.**
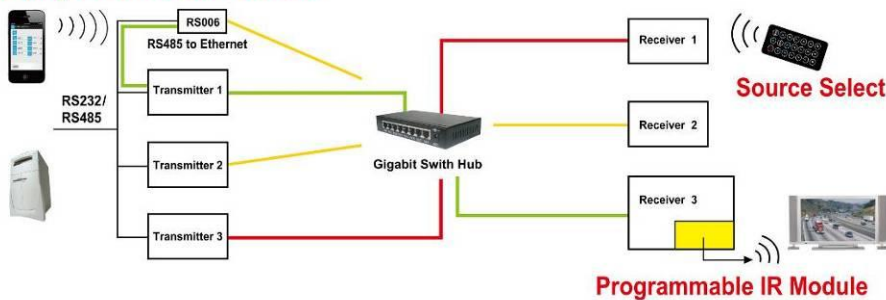
Panel View:

Transmitter
HE05BT
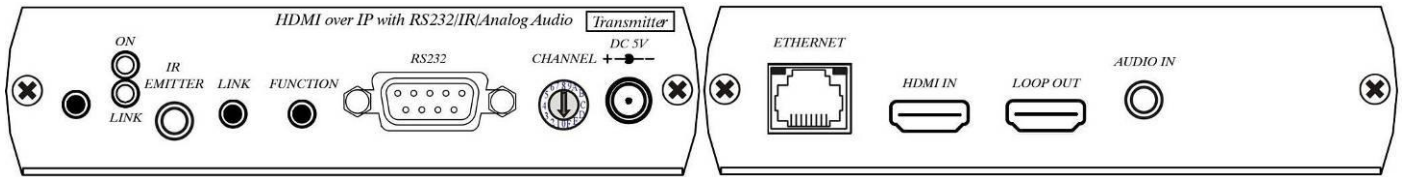
Receiver
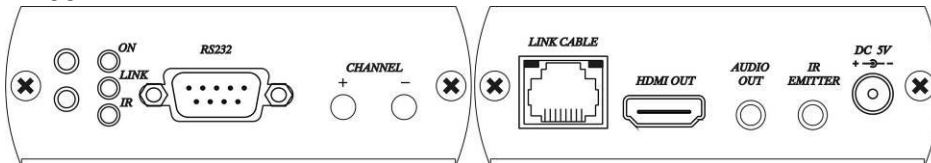
HE05BR
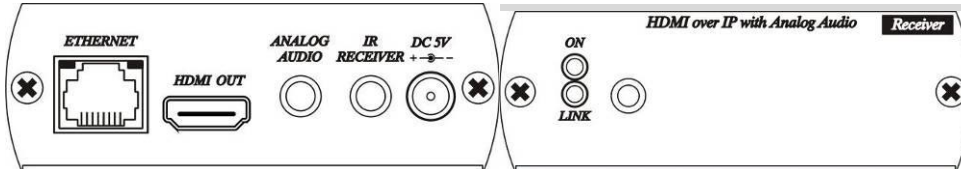
HE05BER

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	Enter IR learning mode

Back Panel Rotary Switch Function:

HE05BT and HE05BR 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.
HE05BT channel setting must be unique to avoid conflict with any other transmitters.

Front Panel Button Function:

ITEM	HE05BT	
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

Above "bold font" part as the default

ITEM	HE05BR	
Button	CH. -	CH. +
Press together	Confirm / Enter menu	
Short Press	Previous channel or menu item	Next channel or menu item

Above "bold font" part as the default

For HE05BER please use IR remote control or APP/PC Software for channel setting.

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:

HE05B 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)

System scalability is limited only by uplink and stacking connector bandwidths but can accommodate up to 16 Full HD video sources at once.

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 10pcs for simultaneous video streaming.

Remote Control Function:
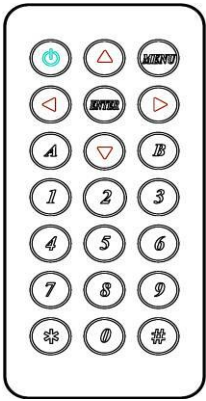
If you do not use PC computer management to setup HE05BR, then you could use the IR infrared remote control to preset channel selection.   Using the IR remote control to the front of HE05BR will be ok.

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

To setting the IR 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	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	Number 4
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 ENTER immediately to confirm the input channel.

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

Select Function：

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

Mode 2: press MENU, then input function number as below , press ENTER 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
301	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.

Less than 3cm
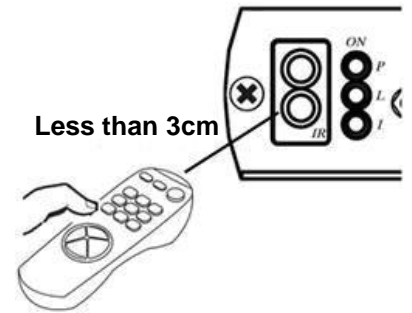
How To Learn IR Key :

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 receiver in 10 seconds. It will show "IR Key 0 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(not available for HE05BER)：

System default setting of RS-232 is extender, the connection topology same as the channel connection. RS232 ports of receivers only connect to the transmitter with same channel ID.
You could enable RS232 assign mode to fix the connection of RS232 without channel setting.

After the receivers and transmitter you want to keep RS232 connection established then press IR remote button (MENU)(2)(6)(ENTER) to enable RS-232 assign mode.
If IP address of transmitter has been changed you have to enable RS232 assign mode for recovers again.

To disable RS232 assign mode press IR remote button (MENU)(2)(7)(ENTER)

RS-232 Control command：

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:
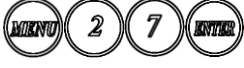
Mxxxx	The last 4 digits of MAC Address	e.g.: 221868860123 = M0123	
Ixxxx	The last 2 column of IP Address (HEX)	e.g.: 169.254.012.034 = I0C22	
Dxxxx	Device No	e.g.: Device No 1234 = D1234	
Gxx	Group No	e.g.: Group No 12 = G12	
Pxx	Party No	e.g.: Party No 34 = P34	
CHx	Channel No (HEX)	e.g.: Channel 12 = 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 by default.
To enforce response function please add "**!**" before commands and receivers will respond in sequence by device number X 15ms.

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 IR 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   (Receiver 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. Using computer or mobile APP management the IP address should be set in same network segment.
5. Computer software operation, please refer to software operating instruction.

Web Setting Function：

HE05B 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 (MENU)(1)(ENTER)(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 (MENU)(2)(ENTER) 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.
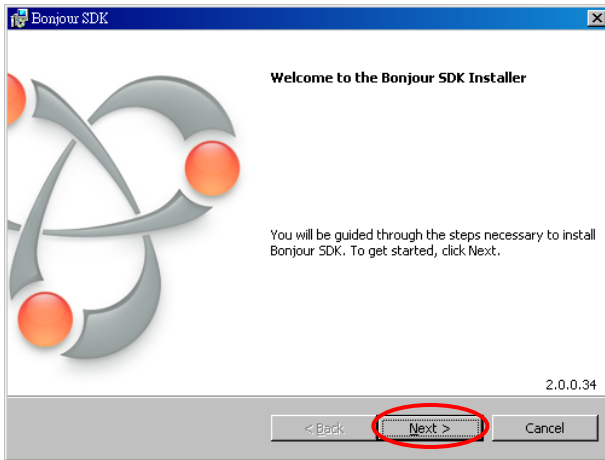For receivers: press remote control (MENU)(3)(3)(3)(ENTER) to reset to default.
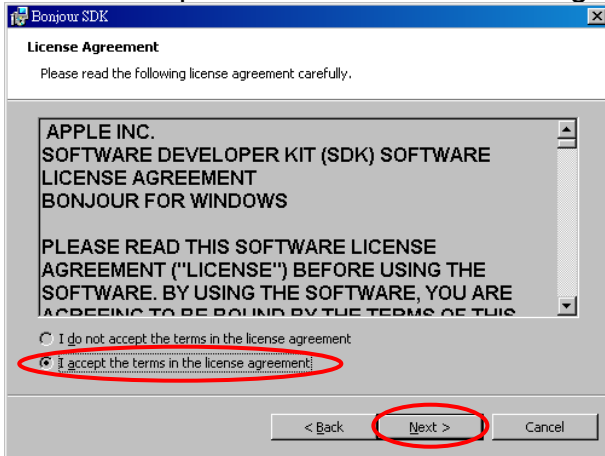
Bonjour plug-in installation:

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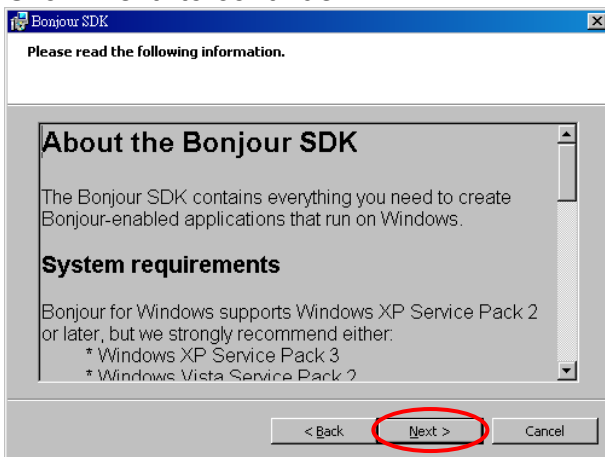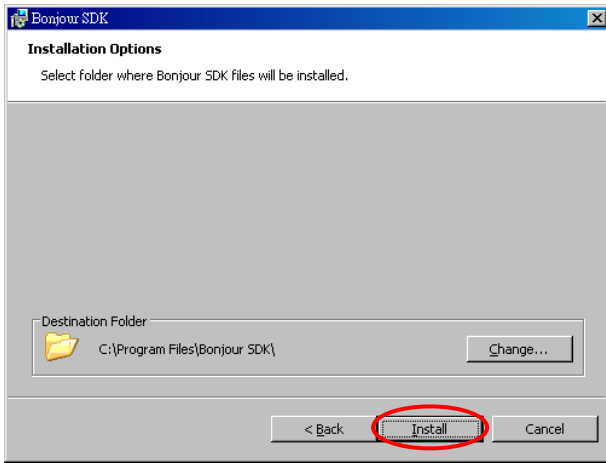

b. Click "Next" to continue.

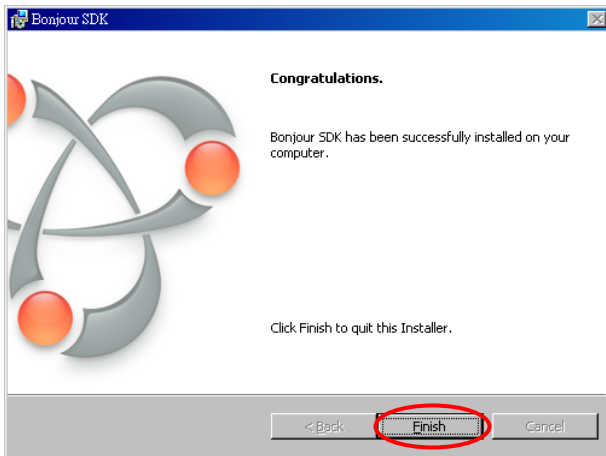c. Click "I accept the terms in the license agreement" to continue.
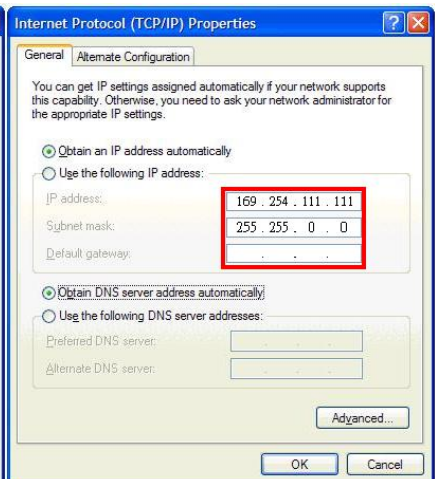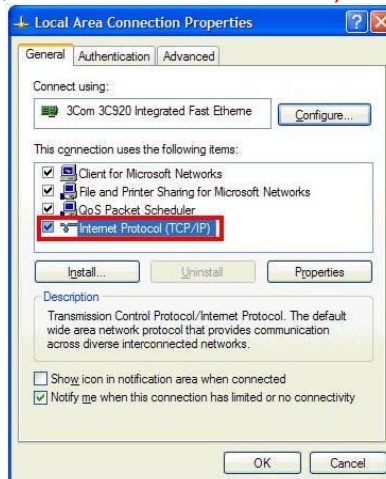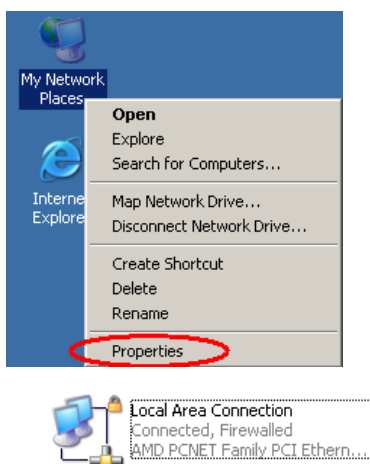

d. Click "Next" to continue.

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, open IE browser then select View → Explorer Bars → Bonjour.
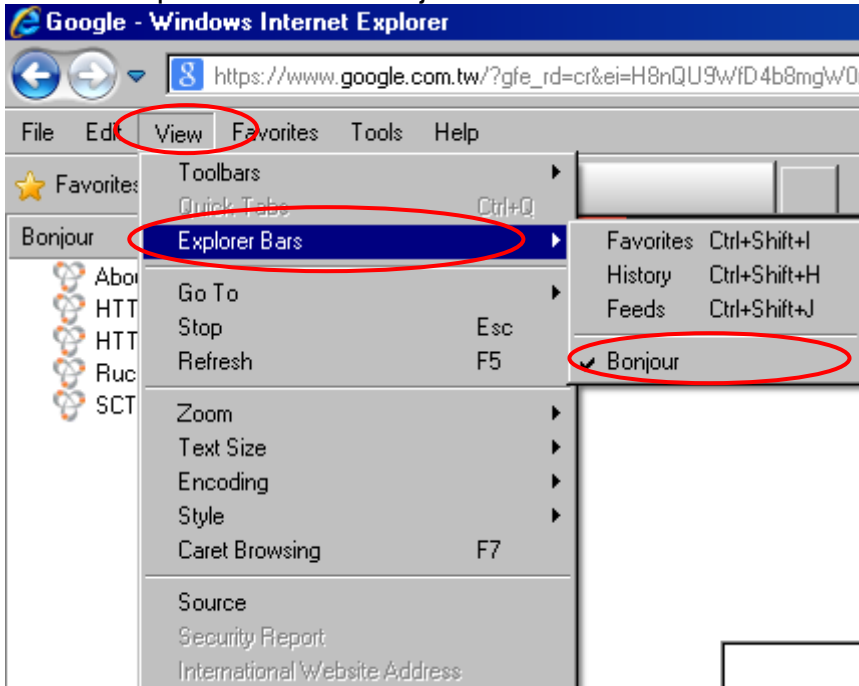
Double click on "HTTP on ast-gateway(transmitter)" or "HTTP on ast-client (receiver)", it will pop up web setup in Bonjour windows as below:
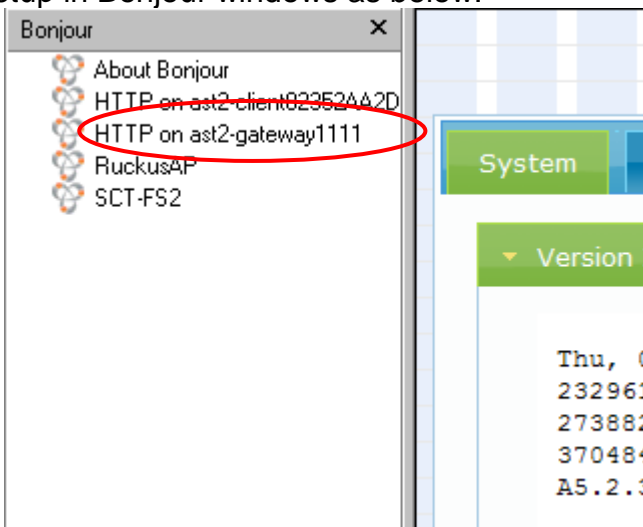
Click Network page you will see the IP address of transmitter/receiver

You could also input the IP address of transmitter / receiver at link column of browser if you know the exact IP address of them.

System Menu:


```
Thu, 03 Apr 2014 16:40:50 +0800
2329617445 143152 u-boot_h.bin
2738826563 2375360 uuImage
3704841873 9287680 initrd2m
A5.2.3 Build 1733
```

- 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，

Functions Menu:

For HE05BT 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 HE05BR 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 HE05BR when receiver booting,
default is not checked.

In multiple connections transmitter will use default EDID 1080p with 2 channel audio, to prevent EDID conflict recommend check this box in Unicast mode only.

Serial over IP

☑ Enable Serial over IP

Operation Mode:

- ○ Type 1 (Need extra control instruction. For advanced usage.)
- ◉ Type 2 (Recommanded. Dumb redirection.)
- ○ Type 1 guest mode
- ○ Type 2 guest mode

Baudrate Setting for Type 2:

Baudrate:	115200 ▼
Data bits:	8 ▼
Parity:	None ▼
Stop bits:	1 ▼

[Apply]

Serial over IP(not available for HE05BER)：

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**

HE05BT Package Include:
Transmitter x 1
IR emitter cable x 1
DC 5V 2Amp power adapter x 1
Software CD x1

HE05BR Package Include:
Receiver   x 1
IR emitter cable x 1
IR remote control x1
DC 5V 2Amp power adapter x 1

HE05BER Package Include:
Receiver   x 1
IR receiver cable x 1
IR remote control x1
DC 5V 2Amp power adapter x 1

Specification:

ITEM NO.	HE05BT	HE05BR	HE05BER
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	
RS232 Connector	DB9 (Female) x 1	DB9 (Male) x 1	X
Link Connector	RJ45 x 1		
Audio Connector	3.5 mm Phone Jack x 1 (10KΩ / 1Vpp)		
IR Receiver (Internal)	30-60Khz / ±45° / 5M		38Khz / ±45° / 5M
IR Emitter (External)	3.5mm Stereo Phone Jack		X
IR Receiver (External)	X		3.5mm Stereo Phone Jack
Power Supply	DC 5V 2A		
Power Consumption	750mA (Typical) / 1000mA (Max)		
Temperature	Operation: 0 to 55℃, Storage: -20 TO 85℃, Humidity: up to 95%		
Dimensions mm	125 * 140 * 30	88 * 130 * 30	
Weight g	380	270	260

RoHS CE FC C

Rev. A