HDMI & USB, AUDIO, RS232, IR CAT5 Extender

## ITEM NO: HXU-1 HDMI KVM Over IP with USB,RS232, IR, Analog Audio

The HXU-1: HDMI, USB, Analog audio, RS232, and IR extender is designed to extend and distribute all signals over one CAT5e up to 150 meters, and provides a local HDMI monitor output. It provides superior video quality up to 1920 x 1200 resolutions using cost effective UTP cable instead of: HDMI, RS232, and other cables, for an easier, neater, more reliable installation. The transmitter and receiver units can be connected together for a Point-to-Point connection via CAT5e/6 cable; or a Point-to-Many connection via a gigabit fast network switch with IGMP snooping and 8K Jumbo Frame support. It is optimized for applications such as: broadcasting systems, multimedia displays, multi-data sharing, digital signage, home entertainment integration, industrial control, hospital, education, security, and HDMI over IP matrix switching.

Features:
- Extend HDMI, RS232, IR and USB 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.
- **HXU-1Tx transmitter unit includes built in HDMI loop output.**
- HXU-1Rx receiver unit features 4USB ports (1 USB 1.1 & 3 USB 2.0), to extend USB peripheral devices, such as flash disk, hard disk, keyboard, mouse, etc.
- **Supports point to point and multiple source devices to multi-display connections/HDMI matrix switc over IP via Gigabit network switch with IGMP Snooping and 8K Jumbo Frame support.**
- **Matrix extends USB, IR, and RS232 and is controllable via IP, IR, or RS232**
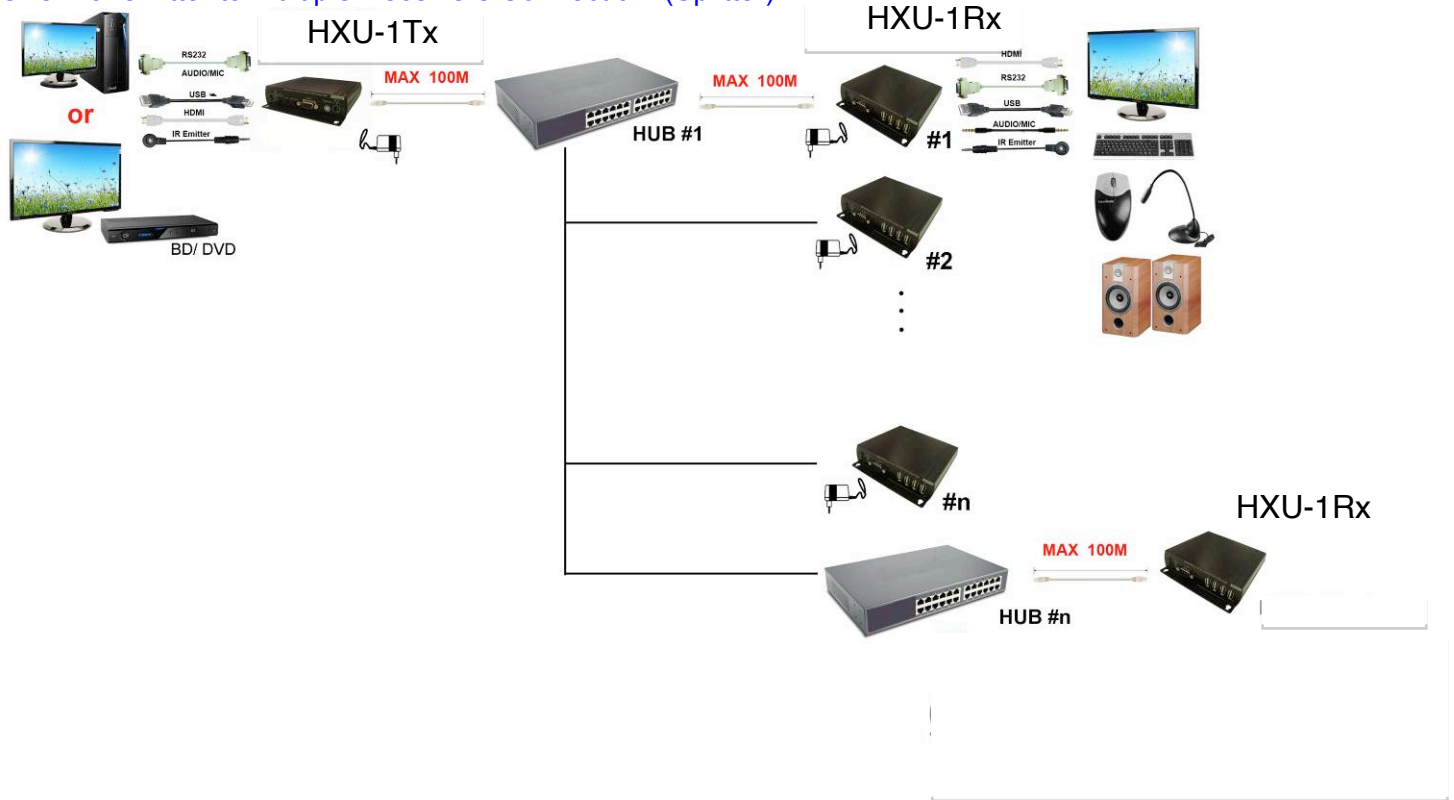
Installation View:

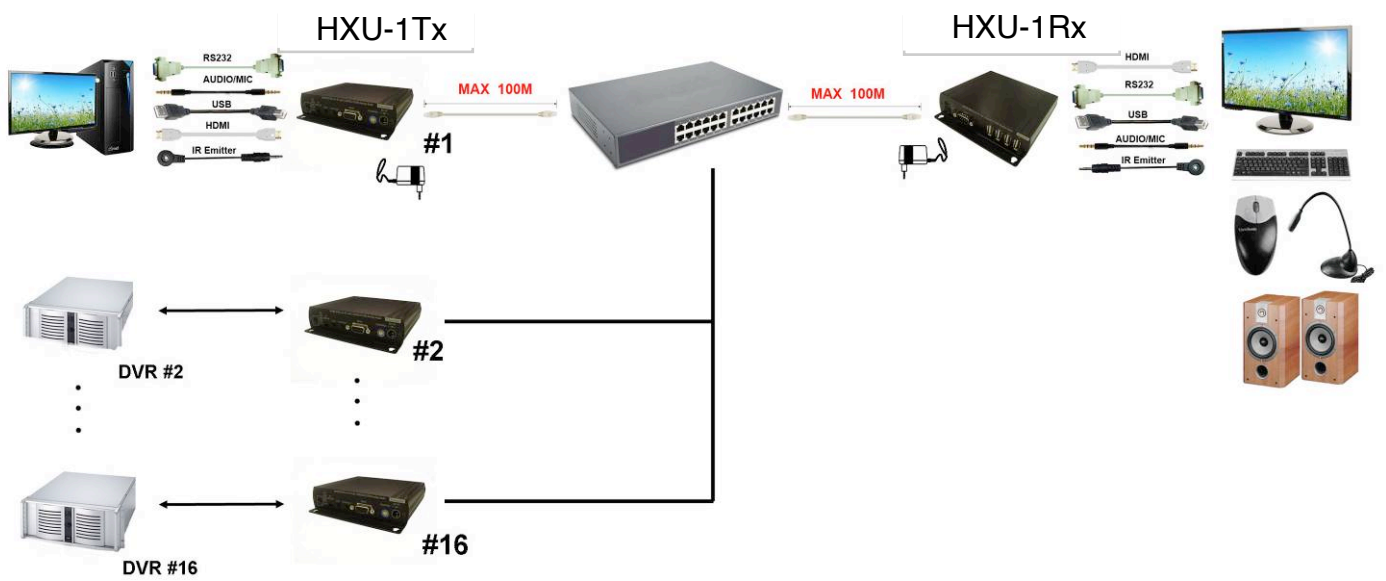Multiple Transmitters to Multiple Receivers Connection: (Matrix Switcher)
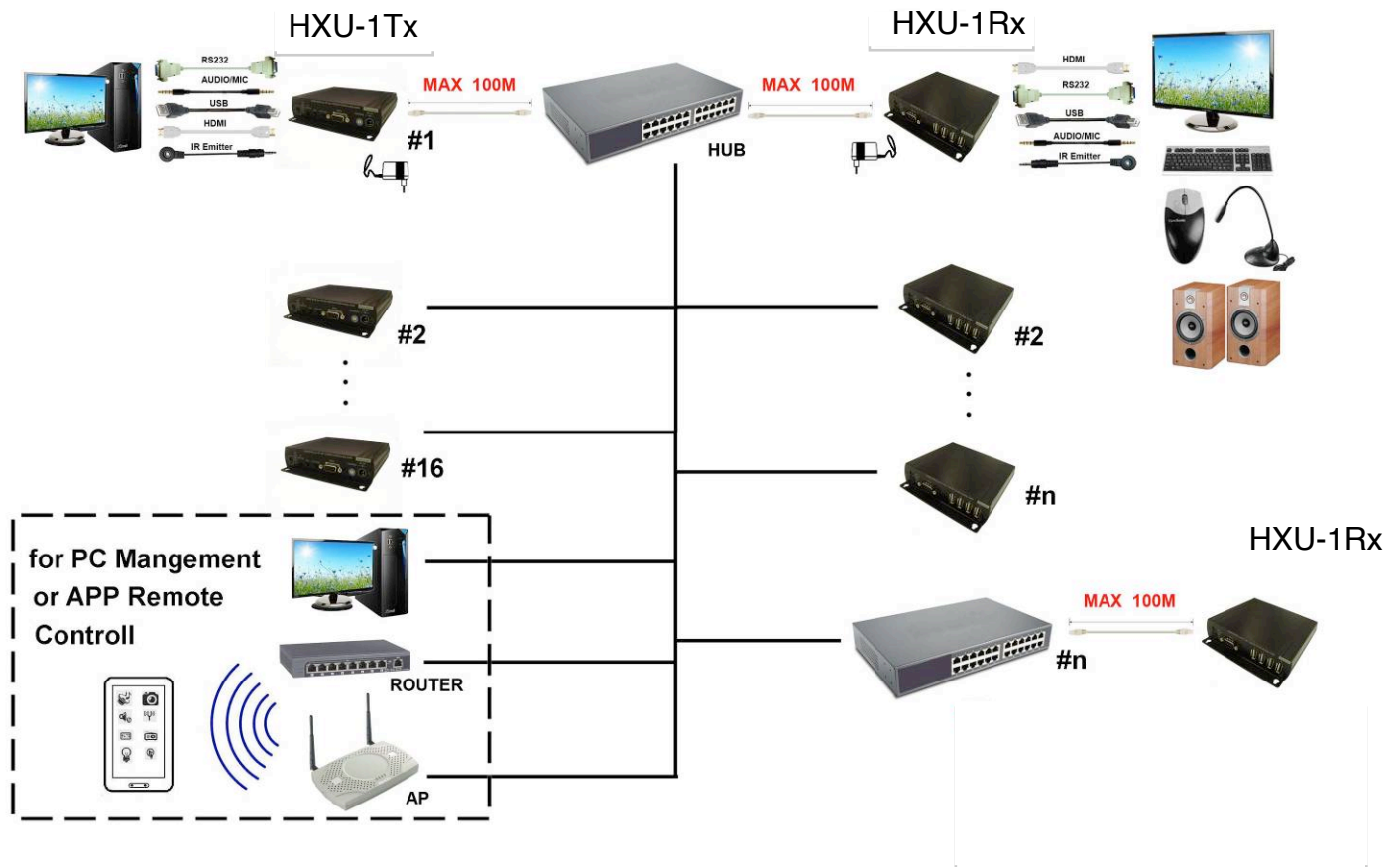
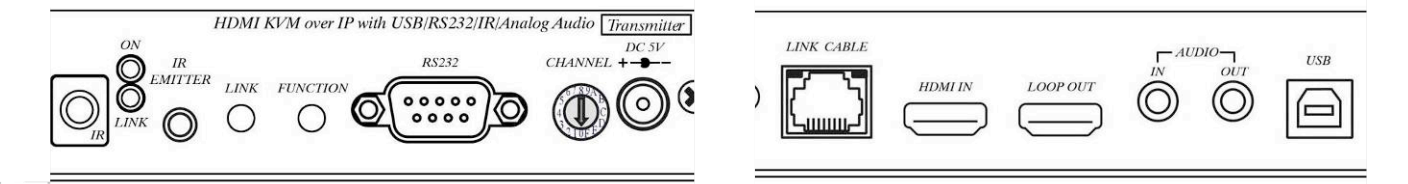Point to Point Direct Connection: (Extender)

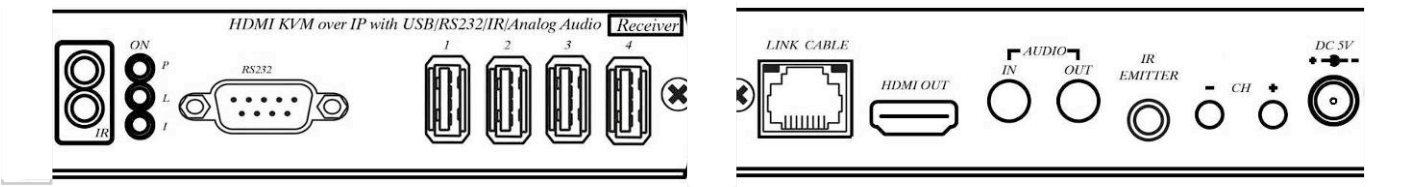# One Transmitter to Multiple Receivers Connection: (Splitter)

HXU-1Tx

HXU-1Rx

RS232
AUDIO/MIC
USB
HDMI
IR Emitter

or

MAX 100M

MAX 100M

HUB #1

HDMI
RS232
USB
AUDIO/MIC
IR Emitter

#1

BD/ DVD

#2

#n

HXU-1Rx

MAX 100M

HUB #n

Multiple Transmitters to One Receiver Connection: (Switcher)

HXU-1Tx

HXU-1Rx

RS232
AUDIO/MIC
USB
HDMI
IR Emitter

MAX 100M

MAX 100M

HDMI
RS232
USB
AUDIO/MIC
IR Emitter

#1

DVR #2

#2

DVR #16

#16

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

Back Panel Rotary Switch Function:

HXU-1Tx and HXU-1Rx must be set same channel in order to do mutual transmission.
HXU-1Tx is set via rotary switch to positions: " 0 ~ F " for a total of 16 channels, A = channel 10, B = channel 11, others channel same as 16 hex conversion.
HXU-1Rx channel is set via: console APIs (IP), RS-232, or IR.

Front Panel Button Function:

ITEM	HXU-1Tx	
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	HXU-1Rx	
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 is 150M, using CAT.6 cable increases max to 180M.

You can use a Gigabit Switch hub which supports **IGMP** snooping and **Jumbo Frame 8K** for signal distribution or extend distance.

System Default Settings:

The HXU-1 supports **Unicast** or **Multicast** mode, the default is Multicast.
Multicast mode can accommodate: one to one, one to multi, multi to one, or multi to multi applications.
The analog audio output of transmitters and input of receivers will be off in this mode, analog audio is only active in Point to Point mode.
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 HXU-1Tx Transmitter allow maximum up to 10pcs for simultaneous video streaming.

USB Hot Key Function：

In multicast mode the HXU-1 supports multiple USB keyboards and mice in each receiver, just plug and play, but only one USB FLASH drive / hard disk may be used at a 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 your HXU-1s, then you could use the IR infrared remote control to preset channel selection.

The IR remote control and the equipment Remote ID must be using same ID.   The default Remote ID is 8. Upon first use of the remote or after changing the remote's battery Remote ID will need to be reset.

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

Remote Control Button Function:

Symbol		Function
⏻	Power	Temporarily turn off the screen output /setup remote control Remote ID
MENU	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	ENTER	Confirmation / display the current channel
1	1	number 1
2	2	number 2
3	3	number 3
4	4	numuber4
5	5	number 5
6	6	number 6
7	7	number 7
8	8	number 8
9	9	number 9
0	0	number 0
*	*	cancel / exit
#	#	clear input number
A	A	no function
B	B	no function

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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	Control Version	Display IR control software version
10	Restart Link	Reconnect with Host
11	Stop Link	Stop the connection with Host
12	Graphic or Video Mode	Switch Host Video or Graphic(default) 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

System Maintains Menu Number:

333	Reset to Factory Default	Reset to Factory Default
999	Reboot	Restart the system

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. 3 types of user defined numbers are
available, in addition to 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 issue response message to transmitter in above format

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

e.g.:

>CMD_M1234> CHANNEL 12   (Set receivers with last 4 digits of MAC Address 1234, to Channel 12)
<ACK_M1234< OK   (All receivers with last 4 digits of MAC Address 1234, response OK)

>CMD_D123> BUTTON OFF   (Turn off the button function of the receiver with Device number 123)
<ACK_D123< OK   (Receiver with Device number 123 response OK)

>CMD_P5> OSD_ON   Hello!   (Display「Hello!」on the screen of receiver with Party number 5)
>CMD_P5> OSD_OFF 3000   (Turn off the OSD of receiver with Party number 5, after 3 seconds)

Setup for IR Control：

Each HXU-1Rx receiver has a built in IR sensor and can be assigned its' own unique IR remote ID for independent source switching via infrared remote control. The HXU-1 will also extend IR from Tx to Rx when in Multicast/Matrix mode. From a control system; affix IR emitter to (or flash) each HXU-1Tx, plug IR flasher included with HXU-1 into a HXU-1Rx's "IR TX" 3.5mm mini-jack, face that flasher at the IR sensor window on that Rx, and repeat for each receiver. For control of connected displays, add an IR splitter to the HXU-1Rx's "IR TX" 3.5mm mini-jack to connect multiple IR emitters/flashers (one for each connected device including the HXU-1Rx itself).

IR MACRO Programming:

For installation controlled with IR, it is likely to involve MACRO programming of a universal remote control. When needed, go to TE web site to download the IR Pronto Codes for keys described in the command sequence below.

[Start] [Address] [[Address No...]] [Command] [Command No] [Parameter] [[Parameter No...]] [End]

[Start]	Star button of remote control
[End]	End button of remote control
[Address]	Type of address:
[All]	All button of remote control, means all receivers
[D#]	D# button of remote control, means Device No.
[G#]	G# button of remote control, means Group No.
[P#]	P# button of remote control, means Party No.
[Address No]	
	Set Device No. from [0] ~ [9][9][9][9]
	Set Group No. from [0] ~ [9][9]
	Set Party No. from [0] ~ [9][9]
[Command]	Command [Cmd] button of remote control
[Command No]	Command numbers:
[0]	Start IR Extend ON/OFF Timer Countdown
[1]	Set IR Extend ON Timer
[2]	Set IR Extend OFF Timer
[3]	Channel selection
[4]	Screen ON/OFF
[Parameter]	Parameter [Para] button of remote control, the continued number is parameter
[Parameter No]	Parameter numbers:
	Set IR Extend ON/OFF Timer [0] ~ [6][5], based on second
	Channel [0] ~ [1][5]
	Screen [0] = OFF，[1] = ON

e.g.1: All receivers select channel 12
[Start] [All] [Command] [3] [Parameter] [1] [2] [End]

e.g.2: Receiver with Device No. 1234 select channel 5
[Start] [D#] [1] [2] [3] [4] [Command] [3] [Parameter] [5] [End]

e.g.3: Receivers with Party No. 9 select to channel 0
[Start] [P#] [9] [Command] [3] [Parameter] [0] [End]

e.g.4: Control the receiver with Device No. 123 with IR (all other receivers will not) in 30 seconds:

[Start] [All] [Command] [2] [Parameter] [0] [End]
(All receivers IR function ready to Off)

[Start] [D#] [1] [2] [3] [Command] [1] [Parameter] [3] [0] [End]
(IR function of the receiver with Device No. 123 ready to On, and set Timer to 30 seconds)

[Start] [All] [Command] [0] [End]
(Start 10 second countdown timer of the IR On / Off setting)

Caution：

1. Not recommended to work with general LAN connection so as to avoid large video, data transmission or multicast packets slowing down your other LAN devices.
2. Gigabit switch hub must support IGMP snooping and Jumbo Frame over 8K in order to achieve the best transmission quality.
3. If monitor shows green screen or video is not smooth, please confirm the switch is gigabit and Jumbo Frame function is 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：

The HXU-1 provides detailed settings over your 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.
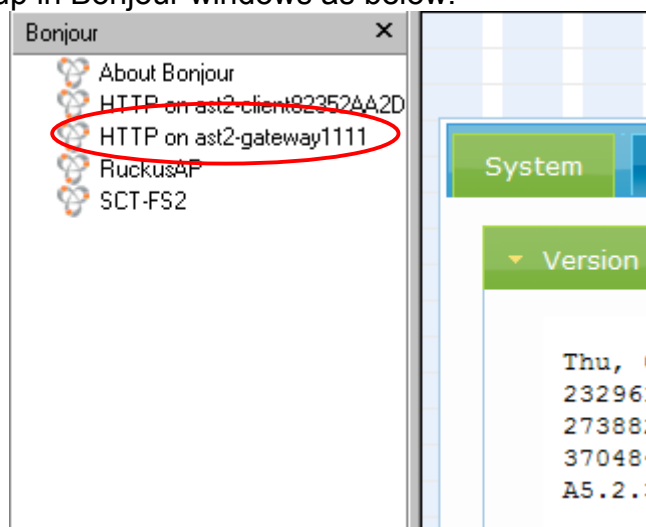
For receivers: press remote control (MENU)(3)(3)(3)(ENTER) to reset to default.
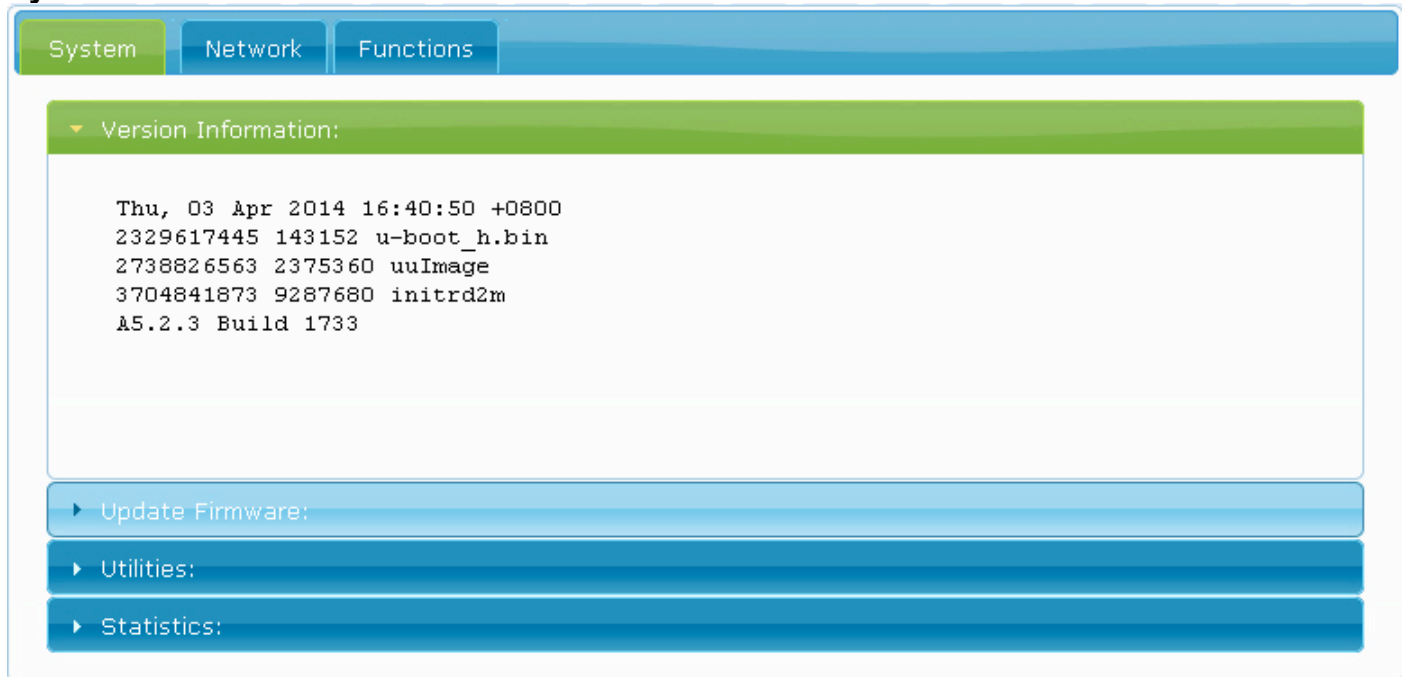
Login in to the web setting:

Use CAT5 cable to connect transmitter/receiver RJ45 port to PC LAN port, open IE browser then select View → Explorer Bars → Bonjour.
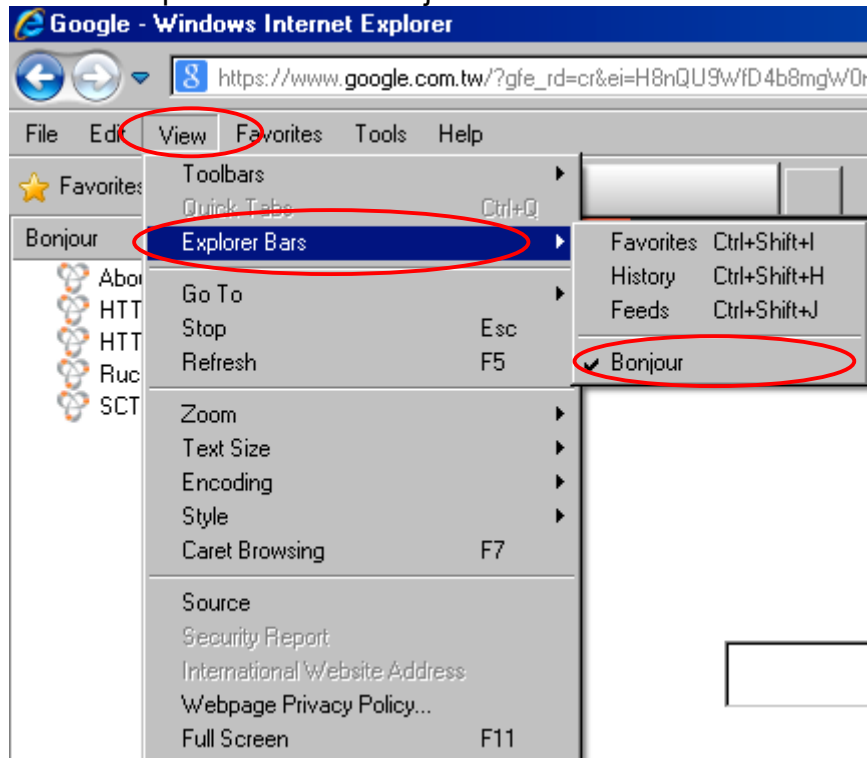
Double click on "HTTP on ast-gateway(HXU-1Tx)" or "HTTP on ast-client (HXU-1Rx)", it will pop up web setup in Bonjour windows as below:

System Menu:


```
System    Network    Functions

▼ Version Information:

     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

▶ 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

Network Menu:

IP Setup:
- IP Mode could be Auto IP, DHCP, Static three mode, default is Auto IP
- Casting Mode : can be Multicast or Unicast mode, default is UniCast
    Select Multicast mode, please check the "Auto select USB operation mode per casting mode" box

    Once MultiCast and Auto USB are selected, click Apply. A Pop-Up will direct you to reboot the HXU-1. To reboot; select the 'System' tab at the top of the page, then select the 'Utilities' dropdown, and finally select 'Reboot'.

Functions Menu:

For HXU-1Tx Transmitter:
Video over IP:
This function enables video signals to be sent over a network. Default is checked.
Please note HDMI output is OFF when this function is disabled, only analog audio output

For HXU-1Rx 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:
Checking this box will auto copy EDID from the TV connected to HXU-1Rx when receiver reboots, default is not checked.
In multiple connections the EDID will copy from the last connected receiver.
To prevent EDID conflict, check this box in <u>UNICAST</u> mode <u>ONLY</u>.

USB over IP Setup:
This function allows USB signals to be transmitted over the 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 allows Serial (RS232) signals to be transmitted over the 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**

Tx Package Includes:

HXU-1Tx Transmitter x 1
USB A to B cable x 1
IR emitter cable x 1
DC 5V 2Amp power adapter x 1
Support CD   x 1

Rx Package Includes:

HXU-1Rx Receiver   x 1
IR Remote Control   x 1
IR emitter cable   x1
DC 5V 2Amp power adapter x 1
Instruction Manual   x 1

Specification:

ITEM NO.	HXU-1Tx	HXU-1Rx
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

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