AVK-901

Digital Signage Video/Audio Streaming over IP

Installation and User's Manual

Date: April 18, 2012

1. Introduction

The KV-901T/AV-901R is a solution of Audio/Video extension over IP Ethernet LAN. The KV-901T is Transmitter (TX), the AV-901R is Receiver (RX). The TX connects with PC or any source with VGA/DVI/Audio output. The RX connects with display and speaker. Any 100M, Giga or Fiber Ethernet LAN switch can be used to inter-connect the TX and RX. They are flexible in one-to-one Unicast mode, or in one-to-many/many-to-many Multicast mode.

1.1 Specification

Input video & resolution

Input video can be VGA or DVI-D in all standard resolutions from 640 x 480 to 1920 x 1080 @ 60Hz ~ 70Hz and the following special resolutions 1440 x 900, 1400 x 1050, 1680 x 1050, 1360 x 768.

Output video & resolution

Output video can be VGA or DVI-F in all standard resolutions from 640 x 480 to 1920 x 1080 @ 60Hz ~ 70Hz and the following special resolutions 1440 x 900, 1400 x 1050, 1680 x 1050, 1360 x 768.

Output frame rate

640X480@70fps, 800X600@70fps, 1024X768@60fps, 1280X1024 @30fps, 1600X1200@30fps, 720X480@60fps, 720X576@50fps, 1280X720@30fps, 1440x900@30fps, 1400x1050@30fps, 1680x1050@30fps, 1360x768@30fps, 1920X1080@25fps

Scalar support: Allows difference input and output resolution, also support input-VGA/output DVI-D, input DVI-D/output VGA

LAN: 10/100Mbps, Auto-MDIX, Flow control.
IR Bridge: IR in/out, 38 KHz. (optional)
Remote PC Control: PS2 or USB (optional).
Audio/Microphone: 48 KHz stereo audio and microphone.
RS232 Bridge: AV-901R support remote RS232, baud 2400 ~ 115200 (optional).

2. Installation Setup

2.1 Install KV-901T Transmitter

1. The DVI input of the KV-901T is **[DVI-I]** (VGA + DVI-D). You can use the accessory of VGA-to-DVI cable to connect KV-901T to PC VGA-Out. Or you can prepare a DVI-to-DVI cable to connect KV-901T to PC DVI-Out.
2. There is a **[VGA-Out]** on the KV-901T for the VGA loop-out. It is only available when the input video is DVI-A (or VGA). You can attach a VGA monitor on this **[VGA-Out]** for local display.
3. Use accessory of audio cable to connect KV-901T **[Line-IN]** to the PC Line-Out.
4. Use optional accessory of Mini USB-to-A cable to connect KV-901T **[Mini USB]** to PC USB for keyboard/mouse remote control.
5. Use optional accessory of IR blaster cable to connect KV-901T **[IR Out]** and adjust the IR blaster LED face to the IR receiver of your Media Center PC, TV tuner card or DVD player.
6. Use CAT5e/6/7 cable to connect KV-901T **[Ethernet]** to the Ethernet switch (or directly to the AV-901R). All of KV-901T and AV-901R must be put in the same network and should not be inter-connected with router.
7. Use the included 12V DC power adapter to connect KV-901T **[DC IN]** power socket and plug the power supply to wall.
8. There is a [Status] LED and 2 RJ45 LEDs on the KV-901T, please refer to the below table for the status of KV-901T:

[Status] LED		RJ45 LED		Status
Red	**Green**	**Green**	**Orange**	
On				System OK, network is not connected
Blink			On	System software trap error
	On	Blink		System OK, network is connected
	On	On	On	System OK, transmit rate exceeds 50Mbpsd
On (**Orange**)			On	LED shows as indicated when [Reset] button is pressed, and it stays on until system reboots.

9. The [Reset] button on the KV-901T Rear panel can be used for entering "Advance Setup Mode", please refer to Chapter 4.

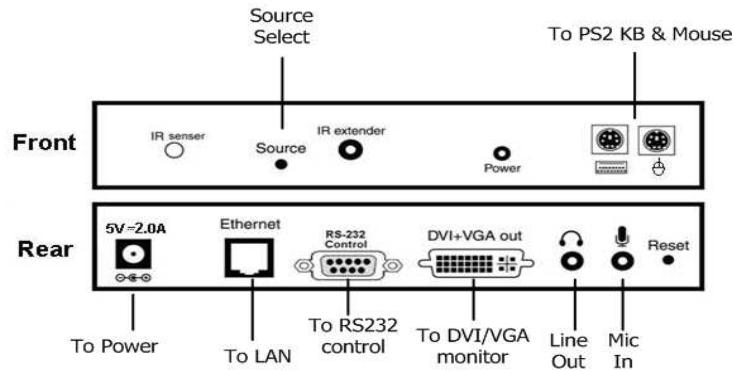**The AV-901T panel diagram is shown as below:**
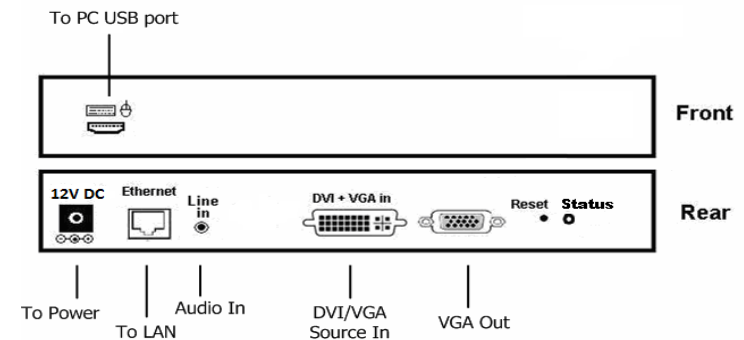
2.2 Install AV-901R Receiver

1. The DVI output of the AV-901R is **[DVI-I]** (VGA + DVI-D). You can use the accessory of VGA-to-DVI cable to connect AV-901R to the VGA monitor. Or you can prepare a DVI-to-DVI cable to connect AV-901R to the DVI monitor.
2. Use accessory of audio cable to connect AV-901R **[Line Out]** to speaker and plug microphone into the **[Mic In] port.**
3. If you need remote keyboard/mouse function, plug keyboard and mouse to the **[PS2]** or optional **[USB]** port.
4. If you need remote RS232 function, plug RS232 cable to the **[RS232]** port.
5. If you need remote IR function, connects optional IR receiver cable to the **[IR extender]** port and positioned the receiver to be visible from the front of the Display.
6. Use CAT5e/6/7 cable to connect AV-901R **[Ethernet]** to the Ethernet switch (or directly to the KV-901T). All of KV-901T and AV-901R must be put in the same network and should not be inter-connected with router.
7. Connect the included DC 5V 2A power adapter to the DC-IN and plug the power supply to wall. To avoid damage to the AV-901R, please use power adapter in the package.
8. There is a **[Source]** button on the front panel for the system OSD operation menu. Please refer to Chapter 3 for detail.
9. There is a [Power] LED and 2 RJ45 LEDs on the AV-901R, please refer to the below table for the status of AV-901R:

[Power] LED		[RJ45]		Status
Red	**Green**	**Green**	**Orange**	
Off				No Power
On				System OK, network is not connected
Blink			On	System software trap error
On		On		System OK, network is connected, but not able to link with Transmitter
	On	On		System OK, linked with Transmitter
On	On	On		System OK, dis-connected with Transmitter (the [Power] LED in orange color)
	On	On	On	System OK, but jpeg frame error due to video data lost inevitable during transmission. Monitor screen may or may not be OK, depending on how worse data lost is.
On (**Orange**)			On	LED shows as indicated when [Reset] button is pressed, and it stays on until system reboots.

10. The [Reset] button on the AV-901R Rear panel can be used for entering "Advance Setup Mode", please refer to Chapter 4.

The AV-901R panel diagram is shown as below:

**The AV-901R100 panel diagram is shown as below:**
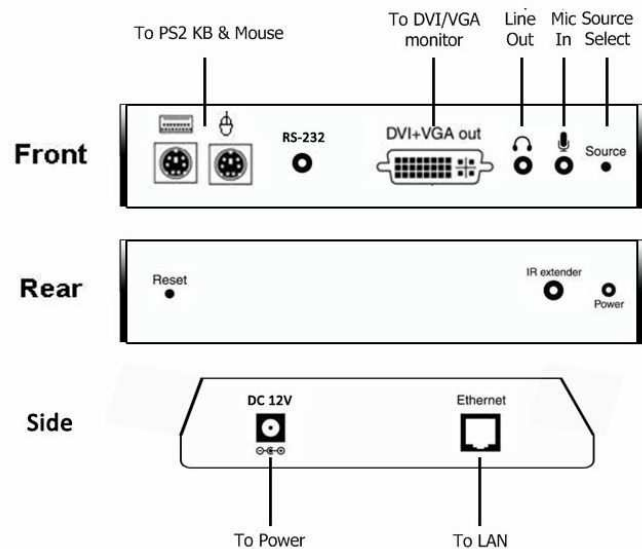
System Menu (OSD)

2 types of OSD (On Screen Display) menu in AV-901R Receiver: Transmitter List menu and System menu. You can enter Transmitter List menu by pressing <Ctrl><Ctrl> hotkey. Pressing the AV-901R **[Source]** button will bring you to the System menu.

2.3 Transmitter List menu

To active the Transmitter List menu, press the <Ctrl> key twice within two seconds, you may see the OSD menu showing a list of all KV-901T Transmitters as below.
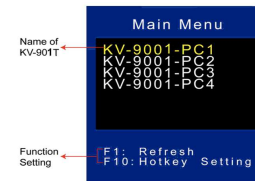
The menu shows 4 x KV-901T are found in the network with name of KV-9001-PC1, … KV-9001-PC4. Navigate to the desired Transmitter with the arrow keys, and press <Enter>. The selected KV-901T appears on the display, and you can use keyboard/mouse to control the selected PC.
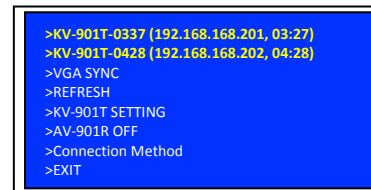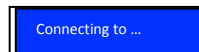
Press [F1] to refresh Transmitters list.
Press [F10] to change hotkey option: <CTRL>, <SHIFT>, or <ALT>.

2.4 System menu

When the AV-901R Receiver is turned on, it will search all KV-901T available on the network and show on the System menu:

Press the **[Source]** button to select KV-901T, after 3 seconds the AV-901R will connect to that KV-901T as below:

After the connection is established, the AV-901R will display the screen that is connected to that KV-901T.

2.5 Other System menu Functions

When the **[source]** button of AV-901R is pressed, the system menu OSD will pop out. You can press the **[source]** button to navigate other System menu functions.

2.5.1 VGA SYNC: This function is only available when the KV-901T is connected with VGA input, when the picture shifts from screen, use this function to auto adjust the picture.

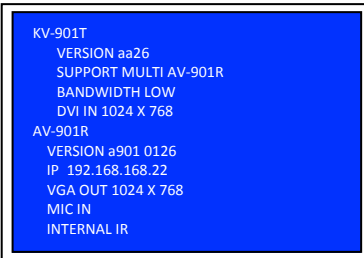**2.5.2 REFRESH:** To refresh the KV-901T Transmitters list.

2.5.3 KV-901T SETTING: Use this function to setup KV-901T:

```
>MULTI/ONE AV-901R
>BANDWDITH SETTING
>INFORMATION
>EXIT
```

2.5.3.1 MULTI/ONE AV-901R: To set KV-901T in Multicast mode (for one-to-many) or Unicast mode (for one-to-one).

2.5.3.2 BANDWIDTH SETTING: KV-901T has 3 levels of bandwidth: LOW, MID, HIGH. Please note to set LOW, it will use lower network bandwidth and get a more efficient performance but will come with lower image quality.

2.5.3.3 INFORMATION: Show the KV-901T/AV-901R basic information:

```
KV-901T
    VERSION aa26
    SUPPORT MULTI AV-901R
    BANDWIDTH LOW
    DVI IN 1024 X 768
AV-901R
    VERSION a901 0126
    IP  192.168.168.22
    VGA OUT 1024 X 768
    MIC IN
    INTERNAL IR
```

2.5.4 AV-901R OFF: To disable the connection between the AV-901R and the currently connected KV-901T. To enable the connection, press the push button again.
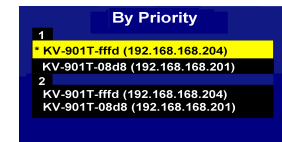
```
AV-901R off
```
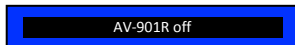
2.5.5 Connection Method: The system provides 3 connection method:

```
>First Available
>By Priority
>Dedicated
>EXIT
```

8
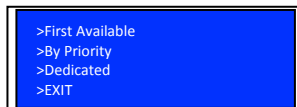
2.5.5.1 First Available: This function sets the AV-901R to connect to the first available KV-901T which it found first.

2.5.5.2 By Priority: This function sets the AV-901R to connect to the KV-901T according to the priority. You can set the 1st and 2nd priority for 2 different KV-901T. As the following picture, there are two sections, each has a list of all

```
By Priority
1
* KV-901T-fffd (192.168.168.204)
  KV-901T-08d8 (192.168.168.201)
2
  KV-901T-fffd (192.168.168.204)
  KV-901T-08d8 (192.168.168.201)
```

Transmitters that are currently on the network; just press the source button to move the highlight to the desired Transmitter, wait a few seconds, and the settings will be saved and restart. The prefixed "*" indicate the Transmitter with that priority setting.

2.5.5.3 Dedicated: Set the AV-901R to connect with a dedicated KV-901T Transmitter.

```
Dedicated TX
* KV-901T-fffd (192.168.168.204)
  KV-901T-08d8 (192.168.168.201)
```
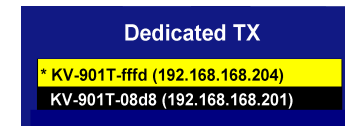
2.6 The AV-901R Setting

From the System menu, push the AV-901R **[source]** button and navigate to the **">REFRESH"**, **push the button again during the system is still showing** "Searching KV-901T …". The menu with "AV-901R SETTING" will be shown as below:

```
>KV-901T-0337 (192.168.168.201, 03:27)
>REFRESH
>AV-901R SETTING
>AV-901R OFF
```
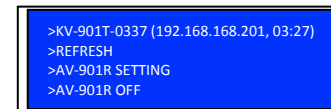
Push the **[source]** button again to navigate to the **">AV-901R SETTING"**, it will show the following OSD menu:

```
> AUDIO INPUT
> IR INPUT
> Connection  Method
> RETURN
```

9
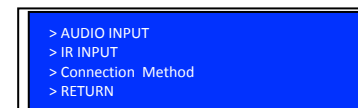
2.6.1 AUDIO INPUT:
To enable/disable the microphone input function.

2.6.2 IR INPUT: There are 3 options for IR input:
    IR DISABLE: Turn off the IR function.
    INTERNAL IR: To set the IR receiver from internal socket.
    EXTERNAL IR: To set the IR receiver from extension cable.

2.6.3 Connection Method: Please refer to 3.3.5.

4. Advanced Setup

This section is in detail for how to assign IP address for KV-901T and AV-901R, and how to upgrade firmware.

4.1 Setup IP address

A HTTP server is embedded in KV-901T and AV-901R for changing IP and firmware upgrade. However, the changing IP and firmware upgrade is available in **Setup Mode** only, not in **Normal Mode**.

For the AV-901R, there are 2 internal IP: the operation IP and configuration IP. The operation IP is changeable but the configuration IP is always fixed at 192.168.168.22.

For the KV-901T, the operation IP is same as configuration IP. The factory default IP is shown on the label under the box. That means, you should remember the final IP, otherwise, you will not be able to configure the KV-901T. In case of missing the final IP, you should use a special software tool to find IP out.
Please follow below steps to configure the IP settings:

Step 1: For AV-901R, assign your PC IP address in between 192.168.168.1 and 192.168.168.254, excluding 192.168.168.22, and the subnet mask with 255.255.255.0.

For KV-901T, the factory default IP is shown on the label that stuck on the bottom of the KV-901T. The PC IP address need to be on the same network as KV-901T. For example, if the KV-901T IP is 10.100.1.10, you might set your PC IP address as 10.100.1.1 and the subnet mask as 255.0.0.0.

**Step 2:** Unplug the power plug, hold the **[Reset]** button of the device.

Step 3: Keep holding the **[Reset]** button and plug the power on.

Step 4: Release the [Reset] button when you see the **[Status]** (or **[Power]**) LED starts blinking red.

Step 5: After the **[Reset]** button is released, in case of AV-901R, the **[Power]** LED will become orange; in case of KV-901T, the **[Status]** LED will become orange blinking. This indicates the device is entered Setup Mode and you can start to setup and get access to the HTTP server of the device. If you are not in this status, any setup process is in vain.

Step 6: Use a straight Ethernet Cable to connect the PC with the device. (The **[Status]** or **[Power]** LED is still lit in orange.)

Step 7: Ping the connected device through the sequence, Start, Run, cmd, ping [TX IP] or ping 192.168.168.22 (for RX). If you receive the reply, it means the device is ready for setup mode. Use IE browser to open the setup page. For AV-901R, the URL is http://192.168.168.22. For KV-901T, the URL is http://[TX IP]. In this page, you can setup IP address, subnet mask, gateway, device name, network protocol and destination.
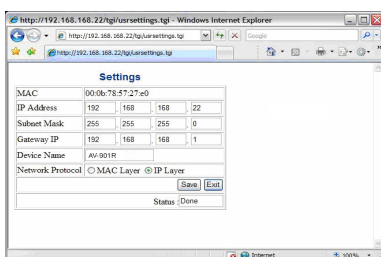
Device Name: the name of the device.

Network protocol: To be on the safe side, always use IP Layer, and don't use MAC Layer.

Destination: this setting is for KV-901T only. For one-to-one application, you can use **Unicasting.** For one-to-many application, you must use **Multicasting**.

Step 8: After click **[Save]** button, the settings will be saved and the device will restart.

4.2 Firmware Upgrade

To upgrade the KV-901T and AV-901R, you should save the new firmware into your PC first. **Please disable antivirus software and firewall until the firmware upgrade process is accomplished.**

Step 1: Save the new firmware into your PC first.

Step 2: For AV-901R, assign your PC IP address to 192.168.168.11 and the subnet mask with 255.255.255.0.

For KV-901T, assign your PC IP address to the same network as KV-901T. For example, if the KV-901T IP is 10.100.1.10, you might set your PC IP address as 10.100.1.1 and the subnet mask as 255.0.0.0.

Step 3: Hold the **[Reset]** button of the device.

**Step 4:** Keep holding the **[Reset]** button and plug the power on.

Step 5: The KV-901T **[Status]** or AV-901R **[Power] LED** will blink red. Then you can release the **[Reset]** button.

Step 6: After the **[Reset]** button is released, in case of AV-901R, the **[Power]** LED will become orange; in case of KV-901T, the **[Status]** LED will become orange blinking. This indicates the device is entered **Setup Mode** and you can get access to the HTTP server for firmware upgrade.

Step 7: Use a straight Ethernet Cable to connect the PC with the device. (The **[Status]** or **[Power]** LED is still lit in orange.)

Step 8: Ping the connected device through the sequence, Start > Run > cmd > ping 192.168.168.22 or ping [KV-901T IP]. You will receive the reply if the connection is established. Disable the antivirus and firewall software and use IE browser to get access the web server.
Type http://[IP]/upg.htm to upgrade the KV-901T firmware. Type http://192.168.168.22/upg.htm to upgrade the AV-901R firmware.

Step 9: Navigate to the firmware file and click [**Upgrade**]. Upgrade process may take a few minutes. Please do not turn off PC or the device or unplug the Ethernet cable. It will cause damage of the device. After firmware upgrade is accomplished, turn off the device.
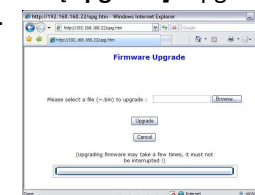
Note: **You have to disable antivirus software and firewall software before you upgrade firmware.** Firmware upgrade process cannot be interrupted so please do not turn off your computer or the upgraded device or disconnect the Ethernet cable until the process is finished. Otherwise the system will crush.

5. Management Software

The system provides a Windows-based Management software for the system administrator to manage all KV-901T and AV-901R devices from his/her PC. You should download and install the below software before installing this Management software.

.Net Framework 2.0 or above
WinPcap 4.1.2, Downloadable at:
http://www.winpcap.org/install/default.htm

To install, double click SETUP.EXE and follow the setup wizard:

After the installation is finished, click "LAN Manager 5.0" icon to start the Management Software:
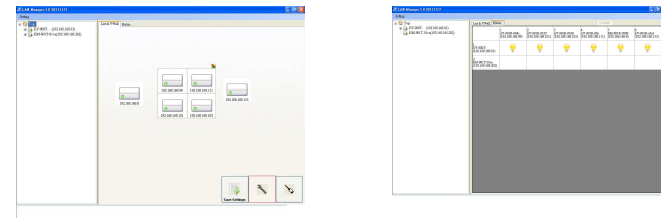
The Management screen is split into two frames: on the left is a Tree view of the Transmitters (TX) and the connected Receivers (RX); on the right is a two-tab view, one named "List & VWall" is a List view of the RX, and the other, "Matrix", is a matrix view of TX and RX. The "List & VWall" tab, List tab for short, features one intriguing function: Video Wall. The Matrix Tab displays a matrix table in a coordinate style: the horizontal axis is a list of RX and
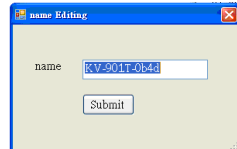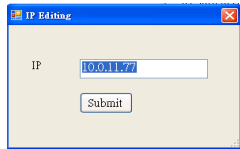
the vertical axis is of TX. If the intersected cell shows a light bulb, it means the RX and TX is connected.

5.1 Change IP and change Name

Right-click the device you desire to change, and a context menu will show up:
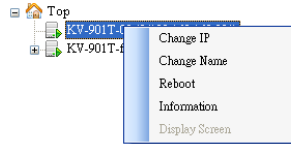
Select **[Change IP]** or **[Change Name]** and type the IP or name on the pop-up window, and click [Submit]:

5.2 Reboot the device

Right-click the device you desire to reboot, select **[Reboot]** from the menu.

5.3 Information

Right-click the device, select **[Information]**, a window will pop up with information about the device. The value in the version field may or may not display the version; when it fails to detect the version, it will display "N/A".
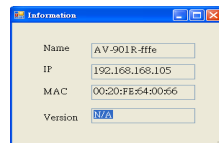
5.4 Display the KV-901T video

When the KV-901T transmitter is connecting with at least one AV-901R, it will have a **[Display Screen]** function enabled as below picture.
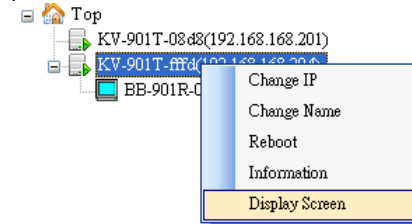
Select a KV-901T transmitter and right-click the **[Display Screen]** function, a window will pop up displaying that KV-901T screen source. Depending on the performance of your PC and network bandwidth, you can activate multiple windows for multiple KV-901T screen sources.

The default frame rate for the KV-901T is 30 frames per second. You can change the frame rate by clicking [Setting] > [Tx Frame Rate Setting] on the upper left corner of the Management Main screen. Click it and a window will pop up, and from here you can specify the FPS (Frames per second) for the KV-901T transmitter (1 ~ 30).

Note: This function is effective only on TX of version b204 or above).

6. Managing Receivers and Video Wall

This section describes the functions of the List tab ("List & VWall").

6.1 Configuration Mode and Operation Mode

On the lower right corner, there are two buttons, the one with a wrench icon is for Configuration Mode, and the other with a wand icon is for Operation Mode. These two modes are mutually exclusive, and the clicked one will be surrounded with a red border line. In addition, the mouse pointer will turn into an icon that resembles wrench or wand.

In Configuration Mode, also the default mode when the program starts, users can do things related to configuration, like arranging the locations of the RX, and setting up video walls. And users can save the settings by click the "Save Settings" button ; next time when the program activates, the tab panel will reveal the layout as previously set.

In Operation Mode, users are allowed to actually make receivers work; these works include switching from one transmitter to another, setting UART baud rate, sending UART messages, changing the connection method, rebooting, setting receivers to an on or off state, and manipulating Video Wall.

6.2 Multi-Selecting RX

There are times when you may want to apply an action to more than one RX on the List tab. The way to do it is simple: just drag your mouse pointer over the panel, and there will appear a filled rectangle, and the RX that resides within the region will be selected.

(before selecting)   (selecting)   (selected)

6.3 Arranging RX Location

When the program starts, it will try to load settings from a setting file that keeps a record of the RX location and Video Wall, and display them on the List tab panel accordingly. It will also search the network for RX; if an RX recorded in the setting does not exist on the network, the RX icon will be shown with a gray-filled circle in the lower left corner; otherwise, it will be shown with a green-filled circle.

(on-line)   (off-line)

If the setting file does not exist, the program will list the RX icon starting from the upper left corner.

The network searching is not persistent; it is not going to go on over and over, so it is possible that the program fails to detect all of the RX on the network at a time, especially when there are quite many RX. Or if the RX joins the network right after the program finishes searching, the program will not detect the new arrival. You will have to right-click on the List tab panel and select "Reload" to recollect Rx from the network.

It's easy to change the location of the RX; just make sure it's in Configuration Mode, and just use mouse pointer to drag-drop them. One thing to notice is that you can multi-select RX, but you cannot move them all; you can simply move one Rx at a time.

6.4 Managing Video Wall

6.4.1 Creating Video Wall

To create a video wall, here are steps: first, select one or more RX, or even select none; second, right-click and select "Create Video Wall" in the context menu. A new window will show up as the picture on the right:
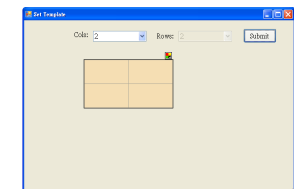
The default size is 2 columns by 2 rows. Change the size as you wish by changing the drop-down. Note that the Rows are not

allowed to change, which means the Video Wall is supposed to be a square. The video wall size will change according to your selection of the column.

Next, edit the layout. Note that there is a small icon on the top of the upper right corner. Try clicking on the icon, and you will see the video wall changes into a different layout as the picture below; click it again, and the layout will change back into the original.

As the picture implies, one big color that encompasses all of the screens means the four RX screens together will display the source as a whole. The other layout with four different colors, however, means that each screen will be showing their sources separately.

Decide on either layouts and click "Submit" to finish the editing to return to List tab panel.
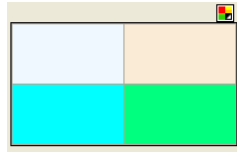
6.4.2 Editing Video Wall

As you come back to the List view panel, you will find a 2X2 grid located on the upper left corner with 4 selected RX placed in the cells. Also, there is a small square icon on the top of the upper right corner of the grid; clicking the icon will bring up a new window where you will get a video wall previously edited; this is how you modify your layout.
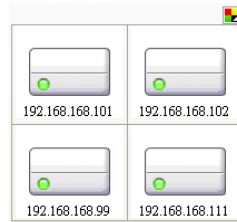
6.4.3 Assigning TX on Video Wall

When you are finished with Video Wall configuration, you can click the button with a wand icon to enter the operation mode, and you will see the video wall becomes color-filled with a list box inside. See the picture below:

The list box is a list of TX; clicking on one of the list item will cause the program to send commands to the RX, which will display the TX
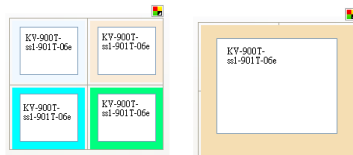
source according to the layout.

On the upper left is an icon where you can click to swap the layout instantly. Here is the other place where you can modify the layout.

6.4.4 Arranging Video Wall Location

The video wall grid, in Configuration Mode, is moveable; move your mouse pointer over the boundary of the grid, and start dragging once the cursor becomes cross-shaped.

6.4.5 Removing Video Wall

Removing can be done by moving your mouse over the video wall, the same way as you manage to move it, and right-click to bring up a context menu, select the "Remove Video Wall" item to get it done.

6.4.6 Arranging RX Location in and out of Video Wall

Once a video wall is created, not only the layout can be modified, but also the RX in the cells. It's easy to move RX from cell to cell or from inside to outside or vice versa. Just drag the RX icon to any place you like and drop it. If you want to move an RX to a cell that has already another RX inside, you need to move that resident out of the cell before you can move in the new one.

6.5 Switch from one Transmitter to another

There are two ways you can switch RX from one TX to another TX. You can do it either on "List & VWall" or "Matrix" view.

In List & VWall, click the wand-icon button to enter the Operation Mode. Then select one or more RX items, and right-click it to bring up a context menu. Move the mouse over the "Switch to Transmitter" function, and select the TX from the sub-menu by clicking it.
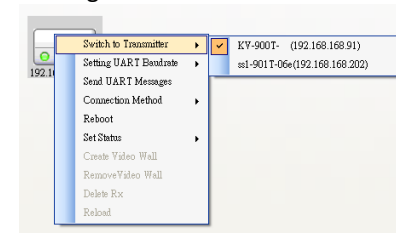
In Matrix view, click the intersected cell that represents a Transmitter with a Receiver. The selected cell is ticked "✓". You can select multiple cells one by one. Finally, click the [connect] button on the upper right corner to start connection. The tick sign ✓ in the checked cells will turn into light bulb in a few seconds if the connection is succeeded.


6.6 Set the AV-901R RS232 Baud Rate

In Operation Mode, select Receiver(s), right-click to get the context menu. Then mouse-over the "Setting UART Baudrate" item, the sub-menu will show up. Select one from the list to set the baud rate.
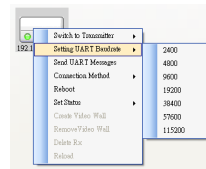
## 6.7 Send Messages to the AV-901R RS-232 port

Select Receiver(s), right-click to get the context menu. Then mouse-over the "Send UART Messages" item, and click it to bring up a window.

First, specify the message format: ASCII or Binary. If you specify Binary, the message is supposed to be like "00 01 … ff"; be sure to separate each byte with white space. Second, type the message in the "Request" text area.
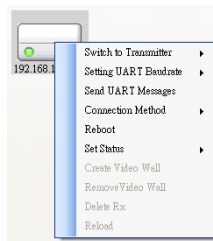

Third, click "Submit" to send the message. If there is response, it will be displayed in the "Response" text area.

You could also type the message and save it as a template, so that you could load it from the template without having to re-type it again. Click "Save as Template", and a window will pop-up; type the name of the template and click "Submit".
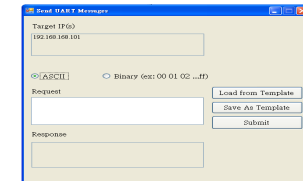

To load a template you previously saved, just click "Load from Template" to bring up a window that lists the templates you saved previously. Select the template and click "Select". Or if you want to delete the template, just click "Delete"
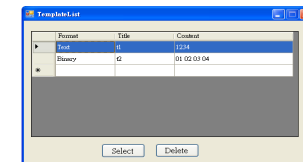
6.8 Manage Connection Method

This function is for RX with version **ab26** or above; if the RX is as far back as under ab26 or if the version information is "N/A", the "Connection Method" item will be disabled. There are three options for connection method: First Available, By Priority, Dedicated.
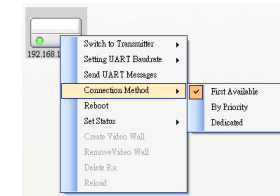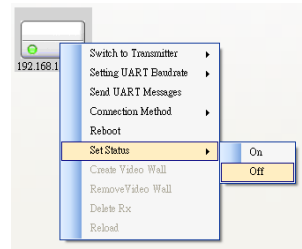

The default is "First Available", it means the RX will connect to whichever TX that first discovered. Click "First Available", a window will pop up; just click "Submit" to complete the setting.

"By Priority" means the RX will connect according to the priority list. Click "By Priority" and a similar window will pop up; you could specify up to two TX. Just place them in order of priority and click "Submit".

"Dedicated" means the RX will connect to the specified TX. Click "Dedicated" and a window will pop up. Select one TX from the list and click "Submit".

6.9 Rebooting & Setting status

When the RX is acting strangely for whatever reason, rebooting is often times a quick way to get the RX back to normal. Also, if you want to force the RX to stop playing temporarily, namely the off status, or if you want to bring it back to the on status, you need functions to send status-setting commands. Here is how you can achieve these purposes.
In Operation Mode, select the RX you want to work on, and right-click to bring up the context menu, and select "Reboot", or move to "Set Status" and select "On" or "Off".