BlueRiver platform

BlueRiver Manager (Demo client)
User Guide

Revision History

Version	Date	Revision
2.1	May 17, 2018	Modification made to Advanced Mode section to clarify first time programming.
2.0	April 16, 2018	AptoVision Manager renamed to BlueRiver Manager (Demo Client). Also, major release for the BlueRiver platform added functionality to enable initial programming from the BlueRiver Manager.
1.2	November 28, 2017	Formatted to reflect Semtech format. New firmware release added new features.
1.1	July 10, 2017	New release of AptoVision Manager software 2.1.6, rework of complete document content and format completed.
1.0	June 07, 2017	Add/remove functions due to Audio and RS-232 management changes.
0.9	February 24, 2017	New Genlock Scaler video mode added.
0.8	December 6, 2016	Added RX limitation reference when 2x downrate conversion applied to native TX output stream.
0.7	November 11, 2016	Added Multiview Routing tab.
0.6	November 04, 2016	Typo.
0.5	August 22, 2016	Corrections to section 1.1.
0.4	July 12, 2016	Edits and improvements. Updated screenshots.
0.3	April 18, 2016	Update all screenshots
0.2	March 28, 2016	Reviewed.
0.1	March 24, 2016	Preliminary

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1 Introduction

The `BlueRiver Manager (Demo Client)` is a demonstration control software used to configure and control signal extension, routing and switching between BlueRiver NT1000 and/or NT2000 devices (transmitters and receivers). May be referred to as BlueRiver TX (Encoder) and RX (Decoder) devices.

Note: Hardware functionality and features vary depending on the BlueRiver board being evaluated (NT1000 vs. NT2000 chipset). The BlueRiver Manager may therefore include or exclude some tabs and options based on the hardware version being evaluated.

The target audience for this document is anyone involved in analyzing and testing the BlueRiver platform, this includes but is not limited to project managers, hardware or software designers and system integrators.

For an in-depth look at the BlueRiver platform, including the features, architecture and components that create a BlueRiver system refer to the BlueRiver platform Technical Overview Guide (ug-0022).

1.1 Architectural Overview

The BlueRiver Manager does not directly communicate with or control the NT1000/NT2000 devices. Instead it communicates using a separate process. The BlueRiver Control Server functions as a proxy between the BlueRiver Manager (Demo Client) clients; and the BlueRiver end points (TX/RX) on the network.

The computer hosting the BlueRiver Manager (Demo Client) can be connected to any 10GbE switch port, except the switch management/console port. Alternately it could also be connected to the Gigabit port on any of the BlueRiver endpoint devices.

The BlueRiver Control Server can be run on the same computer as the BlueRiver Manager (Demo Client) or on a separate device on the same network.

For details on the communication protocols and Network Switch requirements refer to the document, BlueRiver platform Technical Overview.

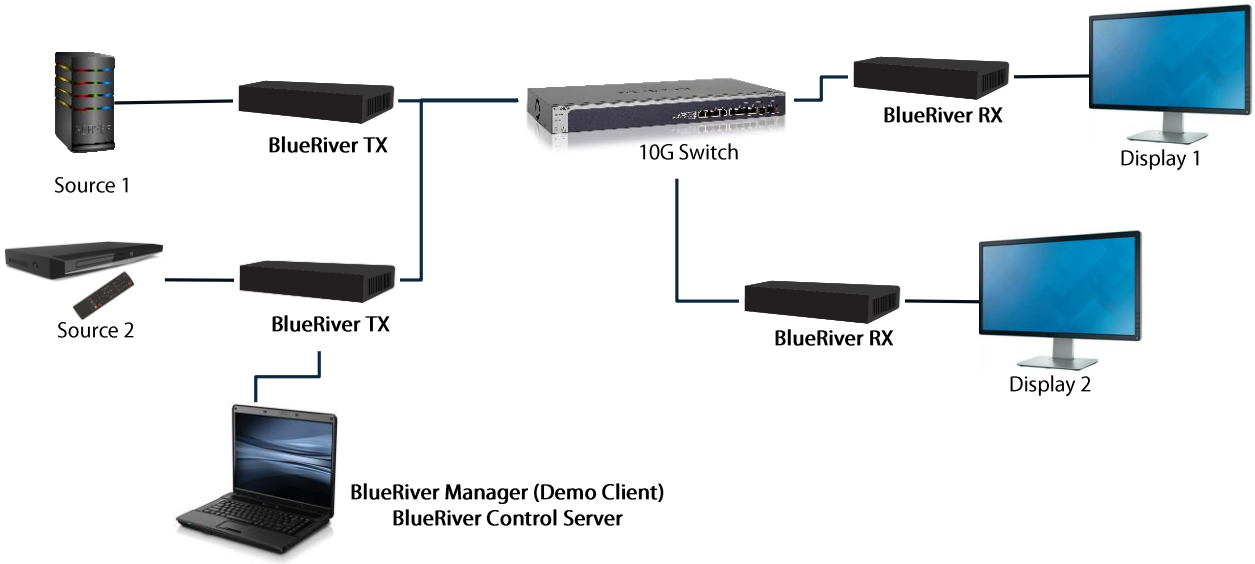

Figure 1: Example of a typical BlueRiver evaluation setup

1.2 System Requirements

The BlueRiver Control Server is a background process (daemon in Linux lingo) that acts as a proxy between the BlueRiver Manager (Demo Client) and the BlueRiver devices.

The BlueRiver Manager (Demo Client) can be loaded on any Windows computer running Windows 7 SP1 or later. It should be noted however, that Microsoft .NET Framework 4.0 or higher is required.

The BlueRiver Control Server (API) is supported for the following host environments:

Table 1: Supported Computing Environments for BlueRiver Control Server

Platform	Operating System
X86 (Intel and AMD)	Windows 7 or later, 32-bit Windows 7 or later, 64-bit Linux 32-bits / Linux 64-bit
ARMv4 or later	Linux 32-bit soft-float ABI
ARMv6 or later with VFP (Vector Floating Point) extension	Linux 32-bit hard-float ABI port, e.g. Debian/Raspbian
Apple Mac (on request)	Mac OS 10.12 or later

Comment: If a BlueRiver Manager Evaluation package (Windows OS only) is installed then both components, the BlueRiver Manager (Demo Client) and the BlueRiver Control Server, are installed simultaneously on the host PC and a desktop icon provided.

2 Starting the BlueRiver Manager (Demo Client)

To run the BlueRiver Control Server, start the executable provided by Semtech. Example screenshots shown below are shown running on Windows 10.

1. Launch the `BlueRiver Manager (Demo Client)` using one of the options outlined below:
   a. If the BlueRiver Manager (Demo Client) was installed using the BlueRiver Manager Evaluation package installer and the desktop shortcut option selected, a `BlueRiver Manager (Demo Client)` launch icon will be present on the Windows desktop.
      - Double click the desktop icon and both the BlueRiver Control Server and BlueRiver Manager (Demo Client) will automatically launch simultaneously.
   b. However, if the BlueRiver Control Server and the BlueRiver Manager (Demo Client) were installed individually:
      - Launch the BlueRiver Control Server (blueriver_control.exe) first.
      - Then once the Control Server is running, launch the BlueRiver Manager (Demo Client) (blueriver_manager.exe).
2. The BlueRiver Manager (Demo Client) Graphical User Interface (GUI) will load.
3. Next detect all BlueRiver transmitter (TX) and receiver (RX) devices on the Network.
   a. Enter the IP address of the computer hosting the BlueRiver Control Server in the field next to the `IP address of BlueRiver Control Server`.
   b. Click the `Connect` button, located beside the label `IP address of BlueRiver Control Server`.

Notes:

i. If the Control Server is running on same computer as the BlueRiver AptoVision client, it is possible to use the IP address `127.0.0.1`, which is the IPV4 loop-back address for 'localhost'.
ii. Do not modify the default port number of `6970`. The BlueRiver Control Server currently requires port 6970 as it only listens to this port.

Figure 2: BlueRiver Manager (Demo Client) IP Address and Connect

4. Once connected to the BlueRiver Control Server, the application displays all discovered BlueRiver NT1000 and NT2000 transmitter (encoder) and receiver (decoder) devices on the Network as green tiles.

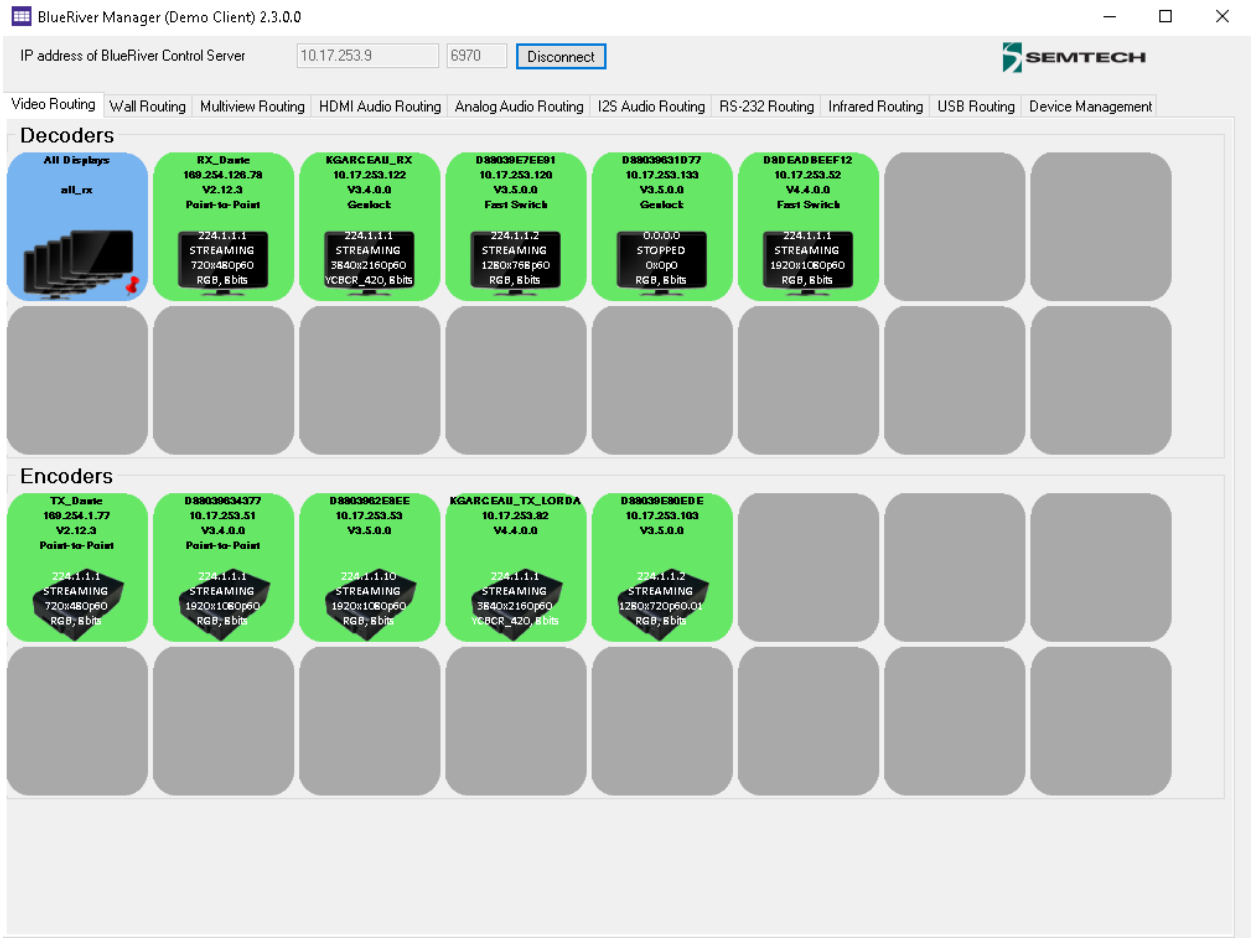

Figure 3: BlueRiver Manager (Demo Client) displaying detected devices

2.1 BlueRiver device status

The BlueRiver Manager (Demo Client) indicates the status of the BlueRiver decoders and encoders discovered on network. Each status is assigned a colour code for easy recognition:

Green Device active

Gray Device previously discovered but not currently active. If in the device tab and an update file has been loaded devices that are detected as not appropriate for the update are also shown as gray tiles.

Yellow Device booted from the Golden image file.

3 Data Routing and Switching Overview

The BlueRiver Manager (Demo Client) application has a series of tabs that provide tools to control the various types of routing supported by the BlueRiver platform, including:

- Video (default)
- Wall
- Multiview
- HDMI Audio
- Single I2S (Analog) Audio
- Quad I2S Audio
- RS-232
- Infrared (IR)
- USB

An additional tab, the Device Management tab is also provided.

Note: Each tab is covered in a separate chapter later in this document.

When referring to Video routing in relation to the BlueRiver platform, it means that the current video source displayed by a Decoder (RX) device can be exchanged for another source coming from a different Encoder (TX) device.

Joining streams from a receiver to a transmitter is supported by the supported BlueRiver video processing modes to support the requirements of Pro AV applications.

For example, when a receiver is set in `Genlock` mode the display is genlocked to the source at zero-frame latency. Whereas, when set in `Fast Switch` mode the latency between the display and source is between 1 and 2 video frames; however, switching between sources occurs seamlessly (instantaneous to the human eye).

Configuring and managing video modes is outlined in Section 9.1 Video Routing tab.

Details on the supported video modes and their capabilities and functionality is outlined in the BlueRiver platform Technical Overview document (ug-0022).

4 BlueRiver Manager (Demo Client) Interface

The BlueRiver Manager (Demo Client) graphic interface is divided into sections:

- The upper area of the user interface is labeled `Decoders`.
  - All BlueRiver receiver (RX) devices detected on the network are displayed in this section.
- The lower area of the user interface is labeled `Encoders`.
  - All BlueRiver transmitter (TX) devices detected on the network are displayed in this section.

Each discovered Decoder and Encoder device is represented in the BlueRiver Manager (Demo Client) by a tile. In turn, each tile provides helpful information specific to an individual device. Active devices are shown as green tiles and inactive devices as grey tiles.

Tile information displayed includes a device's Hostname, IP Address and Firmware Version.

Note: The default Hostname assigned to a BlueRiver device is the device's MAC address. This can be modified and the change is persistent during power recycling, unless a factory reset is performed.

For details on managing the BlueRiver receiver (decoder) network settings refer to Section 10.2.4 Decoder Network Interface Settings and for the BlueRiver transmitter (encoder) network settings refer to Section 10.3.3 Encoder Network Interface Settings.

If a source device (example a Blu-ray player) is connected to the HDMI Input port of a BlueRiver NT1000/NT2000 encoder (TX) device, a picture representing the source appears within the associated tile.

Additionally, data is also provided regarding the HDMI stream. This includes the multicast address used for streaming, the video resolution and the video color space information.

Similarly, if a display is connected to a BlueRiver NT1000 or NT2000 decoder (RX) device, an illustration of a display appears within the corresponding decoder's tile.

If there is no device visible within a tile, this indicates that the BlueRiver NT1000/NT2000 device is detected but currently there is either no source or display device connected.

For Receivers, the video mode is also displayed indicating what mode a device is currently operating in, such as **Fast Switch**, **Genlock** or **Wall** mode.

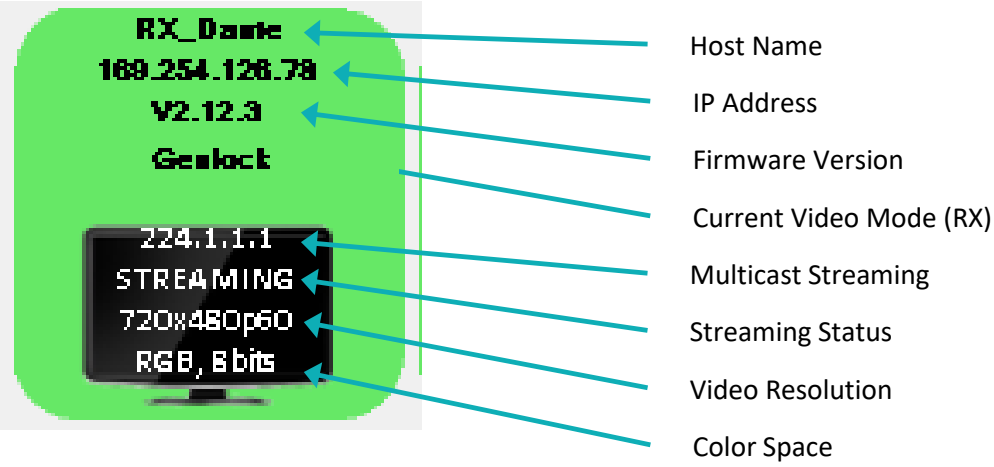

Figure 4: Example of data displayed for BlueRiver decoder (RX) device tile

5 BlueRiver Video Modes

For the majority of Pro AV applications, the HDMI Video is considered the most important signal type that the BlueRiver NT1000/NT2000 chipsets route and manage.

The `Video Routing` tab is used to setup and manage video routing. This tab is used to join BlueRiver decoder (RX) devices to a specific BlueRiver encoder (TX) HDMI Video stream.

A BlueRiver decoder (RX) device can be set to operate in one of the following five video modes:

- `Genlock` mode (NT1000 and NT2000)
- `Fast Switch` mode (NT2000)
- `Genlock` Scaler mode (NT2000)
- `Wall` mode (NT2000)
- `Multiview` mode (NT2000)

Note: For descriptions and detailed information on the BlueRiver video processing modes refer to the BlueRiver platform Technical Overview Guide (ug-0022).

For information about configuring and managing the processing modes refer to:

- `Genlock` mode refer to Section 9.3 Genlock mode.
- `Fast Switch` mode refer to Section9.4 Fast-Switch Mode.
- `Genlock Scaling` mode refer to Section9.5 Genlock Scaling mode.

- `Wall` mode refer to Section 9.6 Wall Routing tab.
- `Multiview` mode, refer to Section 9.7 Multiview Routing tab.
    - For more information on the BlueRiver platform Multiview setup and configuration, refer to the document, BlueRiver Multiview How-To (an-0011).

6 HDMI Audio Routing from BlueRiver Manager

To allow for HDMI audio to be routed separately from the HDMI video, the audio data is extracted from the HDMI input on the BlueRiver encoder (TX) side.

Note: The BlueRiver Manager (Demo Client) automatically applies the split audio BlueRiver API command.

Important to note however, that when operating in `Genlock` mode, the audio follows the video and is always unchanged regardless of the audio format (LPCM, Dolby, DTS, Stereo, Surround).

Notes:

i. For BlueRiver NT2000 encoder (TX) devices the original multichannel (up to 8 channels) audio and downmixed 2-channel (stereo) is sent to BlueRiver decoder (RX) devices.
ii. For BlueRiver NT2000 encoder (TX) devices, if the HDMI audio received from the source is in LPCM format it is possible to "locally" breakout the audio as downmixed 2-channel and then output as an additional audio stream.
iii. BlueRiver decoder (RX) devices receiving HDMI audio can either:
    a. Embed the audio into the HDMI output signal; or
    b. Extract the audio over Quad I2S or;
    c. Extract the downmixed audio version over Single I2S.

For descriptions and detailed information on the BlueRiver audio processing capabilities refer to the BlueRiver platform Technical Overview Guide (ug-0022).

For more information about configuring and managing audio through the BlueRiver chipsets refer to:

- `HDMI Audio` routing refer to Section 9.8 HDMI Audio Routing tab.
- `Single IS2 (Analog) Audio` routing refer to Section 9.9 Analog Audio Routing tab.
- `Quad IS2 Audio` routing refer to Section 9.10 I2S Audio Routing tab.

7 RS-232 and Infrared (IR) routing

RS-232 and Infrared (IR) data is routed between BlueRiver encoders (TX) and decoders (RX) using Unicast or Broadcast protocols when sending data to one or all devices respectively.

Unlike audio and video, where data is always routed from a BlueRiver encoders (TX) to one or more BlueRiver decoders (RX), transmitters (TX) and receivers (RX) devices can both send and receive RS-232 and IR data. Therefore, all BlueRiver encoders (TX) and decoders (RX) are shown as both `Senders` and `Receivers`.

When a Receiver is joined to a Sender, a one-directional data tunnel is created.

- To establish two-way RS-232 or IR communication, the devices must be joined twice.
- Once as a sender and then again as a receiver.

Note: RS-232 and IR data transport is not limited to communication between devices only, it is also possible to inject RS-232 and IR data through the BlueRiver Control Server.

For more information on RS-232 and Infrared functionality refer to the BlueRiver platform Technical Overview Guide (ug-0022).

For details on configuring and managing:

- `RS-232 data` routing refer to Section 9.11 RS-232 Routing tab.
- `IR data` routing refer to Section 9.12 Infrared Routing tab.

8 USB 2.0 Routing

Routing of USB 2.0 data between BlueRiver encoders (TX) and decoders (RX) is done using ExtremeUSB over LAN chip technology from Icron Technologies. Icron ExtremeUSB eliminates the USB's 5-meter distance limitation, enabling applications where the host computer or USB device is required to be located away from the user.

Comment: For details on the Icron Extreme functionality implemented into the BlueRiver platform refer to the BlueRiver platform Technical Overview Guide (ug-0022).

For details on configuring and managing USB routing, refer to Section 9.13 USB Routing tab.

9 Using BlueRiver Manager (Demo Client)

9.1 Video Routing tab

The `Video Routing` tab is used to setup and manage Video/HDMI routing between the BlueRiver encoders (TX) and BlueRiver decoders (RX). After connecting to the BlueRiver Control Server, the BlueRiver Manager (Demo Client) by default loads the `Video-Routing` tab.

There are three modes available for Video Routing: `Genlock / Fast Switch / Genlock Scaling`

9.2 Confirming which Encoders joined to Decoder

Note: To verify which Decoders (RX) and Encoders (TX) are joined together, with the left mouse click on the BlueRiver decoder (RX) or BlueRiver encoder (TX) tile it is desired to see the connection status for. All the associated "joined" tiles will be highlighted in orange.

Figure 5 Example of BlueRiver decoders joined to BlueRiver encoder

9.3 Genlock mode

As mentioned earlier, the primary benefit of the Genlock mode is very low (zero-frame) latency between the source and the BlueRiver decoder.

When Genlock is applied, what is sent to the BlueRiver decoder (RX) display is a byte-by-byte replication of what was received from the source. The display is genlocked to the source as if it is directly connected, making it the closest representation to a wire.

The only exception is in the occasional instance when the input video has too high a bandwidth to fit into the 10G network link. In these cases, the video is lightly compressed to allow the stream to fit into the 10G network pipe. An example of a signal that is over 10G is a UHD 60Hz with full color sampling (RGB or YCbCr 444).

9.3.1 Setting BlueRiver decoder to Genlock mode

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

Reminder: All the discovered BlueRiver receiver (RX) devices are listed in the top half of under the header, `Decoder` and all the BlueRiver transmitter (TX) devices are listed on the bottom half under the header, `Encoder`.

1. Verify if the BlueRiver Encoder (RX) (green tile) is indicating that the device(s) is currently set to the `Genlock` mode.

   If it is indicated that it is presently in Genlock mode, skip to step 4 below.

   Note: Refer to Figure 4: Example of data displayed for BlueRiver decoder (RX) device tile.

2. If `Genlock` is not currently the active mode, apply the setting as follows:

   a. Right mouse click over the appropriate Decoder (RX) tile.
   b. In the menu that appears under the `Set Video Mode` heading select Genlock.

3. Next join the BlueRiver decoder (RX) to the BlueRiver encoder (TX).

   a. In the Encoder section, select a BlueRiver encoder (TX) by clicking on its associated active (green) tile with left mouse button.
   b. While holding down the left button, drag the BlueRiver encoder (TX) over the BlueRiver decoder (RX) tile it is to be joined with.
   c. Release the mouse button to drop the TX tile onto the RX tile.
   d. The BlueRiver encoder and decoder devices are now joined.

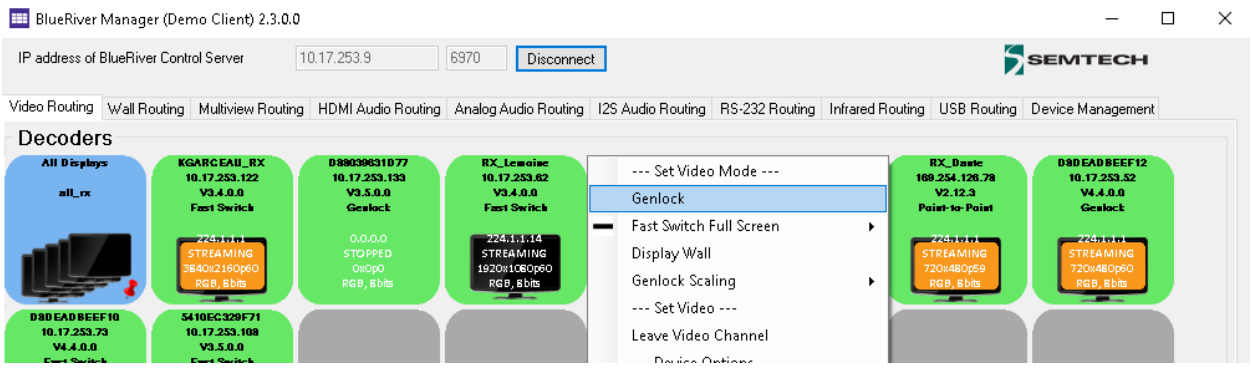

Figure 6: Applying Genlock Mode to a BlueRiver decoder (RX)

4. Video source connected to the BlueRiver encoder (TX) now appears on the display connected to the BlueRiver decoder (RX).

If the video is not being displayed, then verify the following:

- Ensure that the network switch is properly configured.
- Confirm that the display supports the source resolution being sent.
- Also, verify that the HDMI cable used is of high quality. This is particularly important for 4K 60Hz which requires a **premium** HDMI cable.

9.3.2 Assigning new source to single BlueRiver decoder (RX)

To assign a new source to a BlueRiver decoder (RX), repeat the above steps.

That is drag the BlueRiver encoder (TX) with the desired source over the appropriate BlueRiver decoder (RX) to join the receiver itself to the new source.

9.3.3 Sending single source to one or multiple BlueRiver decoders

To feed the source of an BlueRiver encoder (TX) to one or more additional BlueRiver decoders (RX), drag and drop the encoder tile over each of the decoder devices the source is desired to be output from.

The same source will then be displayed and visible on all the associated displays.

Reminder that when in Genlock mode, since each of the BlueRiver decoder (RX) displays are synchronized to the source, they are all synchronized to each other.

9.3.4 Sending single source to all BlueRiver decoders (RX)

To send the same source to `ALL` BlueRiver decoders (RX), drag and drop the BlueRiver encoder (TX) that the desired source is connected to onto the blue tile labeled `All Displays`. This tile is found in the `Decoder` section.

All the BlueRiver decoders (RX) will now be synchronized to the source and since in Genlock mode to each other.

9.3.5 Stopping/Starting Video

To stop video being transmitted out of a BlueRiver encoder (TX), right click over the appropriate TX and select `Stop Video`.

To start or restart video transmission, right-click over the appropriate BlueRiver encoder (TX) and then select `Start Video`.

It is also possible to stop video and free the multicast IP addresses assigned to the streams. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

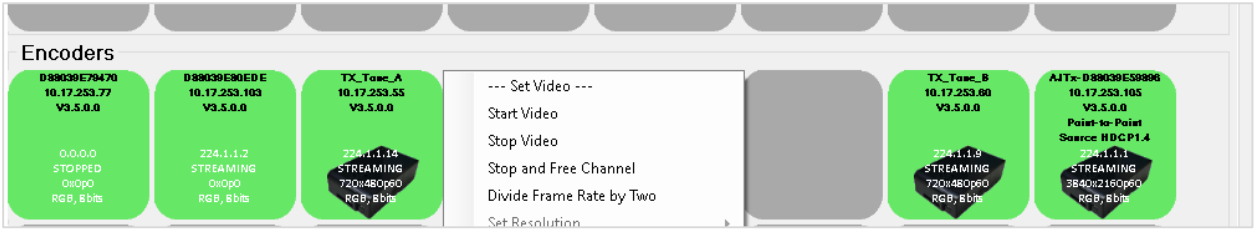

Figure 7 Start/Stop options of BlueRiver encoder (TX) menu

9.3.6 Disconnecting source from BlueRiver decoder (RX)

To disconnect/unsubscribe a BlueRiver decoder (RX) from a BlueRiver encoder (TX) source, right click over the appropriate decoder tile and select `Leave Video Channel`. This will unsubscribe only the decoder in question from the BlueRiver encoder stream.

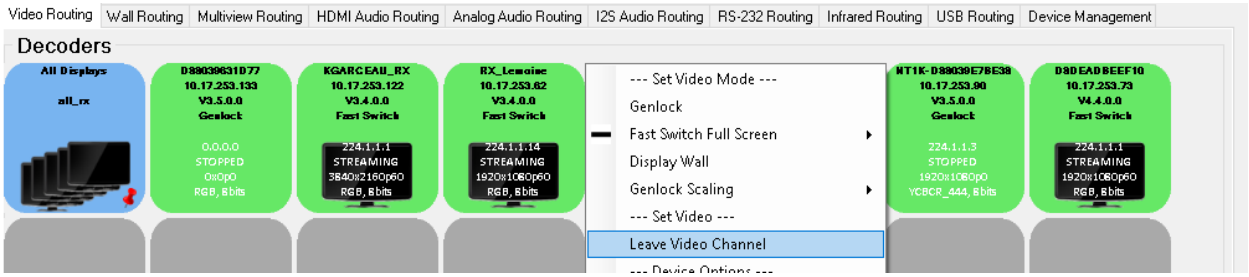

Figure 8 Leave Video Channel option of BlueRiver decoder (TX) menu

Disconnecting a BlueRiver encoder leaves the BlueRiver encoder (TX) stream active and available to other BlueRiver encoder (RX) devices that are currently subscribed to it.

9.4 Fast-Switch Mode

The Fast Switch mode is only available on BlueRiver NT2000 chipset. One of the main advantages to using the Fast-Switch mode is that when a source change is requested the switch occurs very quickly, in fact it appears seamless to the human eye.

9.4.1 Setting BlueRiver decoder to Fast Switch mode

To implement `Fast Switch`:

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

Reminder: All the discovered BlueRiver receiver (RX) devices are listed in the top half of under the header, Decoder and the BlueRiver transmitter (TX) devices are listed on the bottom half under the header, Encoder.

1. Verify if the BlueRiver Encoder (RX) (green tile) is indicating that the device(s) is currently set to the `Fastswitch` mode.

   If it is indicated that it is presently in `Fastswitch` mode, skip to step 4 below.

   Note: Refer to Figure 4: Example of data displayed for BlueRiver decoder (RX) device tile.

2. If `Fast Switch`, as well as the correct resolution, is not the currently active mode apply the setting(s) as follows.

   a. Right mouse click over the appropriate `Decoder` (RX) tile.
   b. Select `Fast Switch Full Screen`.
   c. Select the desired `Framebuffer mode`. Example: `Crop to Fit> HD 1080p 60Hz`.
   d. Then select the desired `Video Mode` from the list provided.

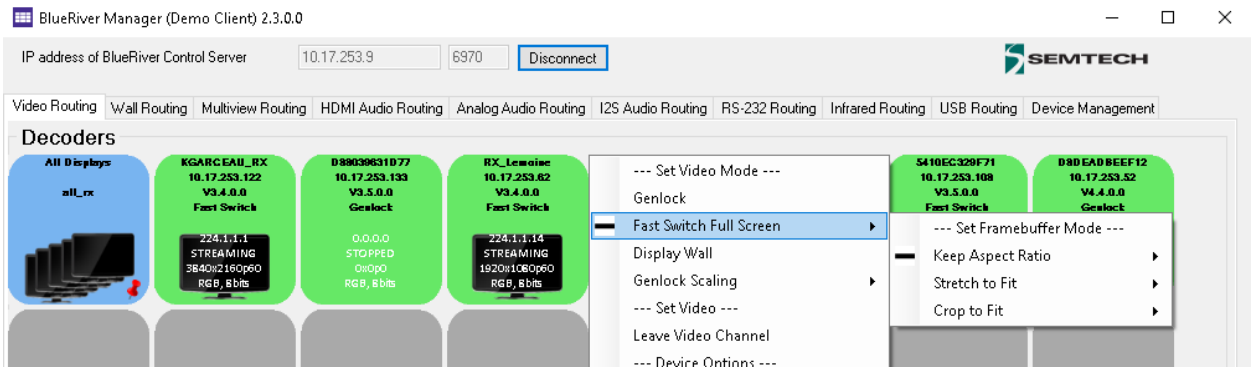

Figure 9: Applying Fast Switch Mode to a BlueRiver decoder (RX)

3. Next `join` the BlueRiver decoder (RX) to the desired BlueRiver encoder (TX).

    a. In the `Encoder` section, select a BlueRiver encoder (TX) by clicking on its associated active (green) tile with left mouse button.
    b. While holding down the left button, drag the BlueRiver encoder (TX) over the BlueRiver decoder (RX) tile it is to be joined with.
    c. Release the mouse button to drop the TX tile onto the RX tile.
    d. The BlueRiver encoder and decoder devices are now joined.

4. Video source connected to the BlueRiver encoder (TX) now appears on the display connected to the BlueRiver decoder (RX).

    If the video is not being displayed, then verify the following:

    - Ensure that the network switch is properly configured.
    - Confirm that the display supports the source resolution being sent.
    - Also, verify that the HDMI cable used is of high quality. This is particularly important for 4K 60Hz which requires a **premium** HDMI cable.

9.4.2 Assigning a new source to single BlueRiver decoder (RX)

To assign a new source to a BlueRiver decoder (RX), repeat the above steps.

That is drag the BlueRiver encoder (TX) with the desired source over the appropriate BlueRiver decoder (RX) to associate the receiver itself to the new source.

9.4.3 Sending single source to one or multiple BlueRiver decoders

To feed the source of an BlueRiver encoder (TX) to one or more additional BlueRiver decoders (RX), drag and drop the encoder tile over each of the decoder devices the source is desired to be output from.

The same source will then be displayed and visible on all the associated displays.

9.4.4 Sending a single source to all BlueRiver decoders (RX)

To send the same source to `ALL` BlueRiver decoders (RX), drag and drop the BlueRiver encoder (TX) that the desired source is connected to onto the blue tile labeled `All Displays`. This tile is found in the `Decoder` section.

9.4.5 Stopping/Starting Video

To stop video being transmitted out of a BlueRiver encoder (TX), right click over the appropriate TX and select `Stop Video`.

To start or restart video transmission, right-click over the appropriate BlueRiver encoder (TX) and then select `Start Video`.

It is also possible to stop video and free the multicast IP addresses assigned to the streams. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

Refer to Figure 7 Start/Stop options of BlueRiver encoder (TX) menu

9.4.6 Disconnecting source from BlueRiver decoder (RX)

To `disconnect/unsubscribe` a BlueRiver decoder (RX) from a BlueRiver encoder (TX) source, right click over the appropriate RX tile and select `Leave Video Channel`.

Disconnecting a BlueRiver encoder leaves the BlueRiver encoder (TX) stream active and available to other BlueRiver encoder (RX) devices that are currently subscribed to it.

Refer to Figure 8 Leave Video Channel option of BlueRiver decoder (TX) menu

9.5 Genlock Scaling mode

The Genlock Scaling mode is only available on BlueRiver NT2000 chipset. This mode combines the low latency and source locking benefits of the Genlock mode with the output scaler found in the Fast Switch mode.

9.5.1 Setting BlueRiver decoder to Genlock Scaling mode

1. If not currently running, launch the BlueRiver Manager (Demo Client) application.

   Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

   All the discovered BlueRiver receiver (RX) devices are listed in the top half of under the header, Decoder and the BlueRiver transmitter (TX) devices are listed on the bottom half under the header, Encoder.

2. Verify if the BlueRiver Encoder (RX) (green tile) is indicating that the device(s) is currently set to the `Genlock Scaling` mode.

   If it is indicated that it is presently in `Genlock Scaling` mode, skip to step 4 below.

   Note: Refer to Figure 4: Example of data displayed for BlueRiver decoder (RX) device tile.

3. If `Genlock Scaling` is not the currently active mode apply the setting(s) as follows.

   a. Right mouse click over the appropriate `Decoder` (RX) tile.
   b. Select `Genlock Scaling`.
   c. Then select the desired `Video Mode` from the list provided.

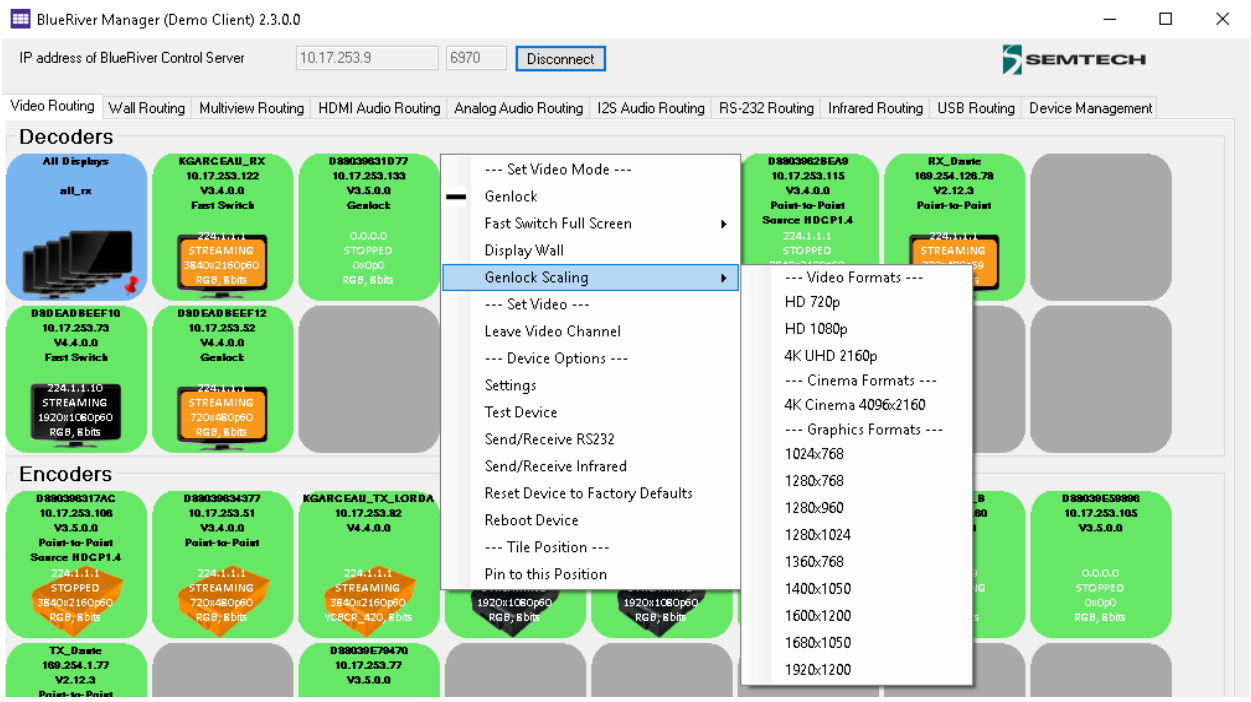

Figure 10: Applying Genlock Scaling Mode to a BlueRiver encoder (RX)

4. Next `join` the BlueRiver decoder (RX) to the desired BlueRiver encoder (TX).

    a. In the `Encoder` section, select a BlueRiver encoder (TX) by clicking on its associated active (green) tile with left mouse button.
    b. While holding down the left button, drag the BlueRiver encoder (TX) over the BlueRiver decoder (RX) tile it is to be joined with.
    c. Release the mouse button to drop the TX tile onto the RX tile.
    d. The BlueRiver encoder and decoder devices are now joined.

5. Video source connected to the BlueRiver encoder (TX) now appears on the display connected to the BlueRiver decoder (RX).

    If the video is not being displayed, then verify the following:

    - Ensure that the network switch is properly configured.
    - Confirm that the display supports the source resolution being sent.
    - Also, verify that the HDMI cable used is of high quality. This is particularly important for 4K 60Hz which requires a **premium** HDMI cable.

9.5.2 Assigning new source to single BlueRiver decoder (RX)

To assign a new source to a BlueRiver decoder (RX), repeat the above steps.

That is drag the BlueRiver encoder (TX) with the desired source over the appropriate BlueRiver decoder (RX) to associate the receiver itself to the new source.

Comment: To verify which RX and TX are joined together, with the left mouse click on the BlueRiver decoder (RX) or BlueRiver encoder (TX) tile it is desired to see the connection status for. All the associated "joined" tiles will be highlighted in orange.

9.5.3 Sending single source to one or multiple BlueRiver decoders

To feed a source input of an BlueRiver encoder (TX) to one or more additional BlueRiver encoders (RX), drag and drop the TX to each of the RX devices the source is desired to be output from.

The same source will then be displayed and visible son all the associated displays. In Genlock mode since each of the BlueRiver decoder (RX) displays are synchronized to the source, they are all synchronized to each other.

9.5.4 Sending a single source to all BlueRiver decoder (RX)

To send the same source to `ALL` BlueRiver decoders (RX) devices, drag and drop the BlueRiver encoder (TX) device that the desired source is connected to onto the blue tile located in the `Decoder` section labeled `All Displays`.

All decoders (RX) will be synchronized to the encoder (TX) and since in Genlock mode to each other.

9.5.5 Stopping/Starting Video

To stop video being transmitted out of a BlueRiver encoder (TX), right click over the appropriate TX and select `Stop Video`.

To start or restart video transmission, right-click over the appropriate BlueRiver encoder (TX) and then select `Start Video`.

It is also possible to stop video and free the multicast IP addresses assigned to the streams. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

Refer to Figure 7 Start/Stop options of BlueRiver encoder (TX) menu

9.5.6 Disconnecting source from BlueRiver decoder (RX)

To `disconnect/unsubscribe` a BlueRiver decoder (RX) from a BlueRiver encoder (TX) source, right click over the appropriate RX tile and select `Leave Video Channel`.

Disconnecting a BlueRiver encoder leaves the BlueRiver encoder (TX) stream active and available to other BlueRiver encoder (RX) devices that are currently subscribed to it.

Refer to Figure 8 Leave Video Channel option of BlueRiver decoder (TX) menu

9.6 Wall Routing tab

`Wall Routing` allows for a single source of a BlueRiver encoder (TX) to be assigned to multiple BlueRiver decoders (RX). Then each BlueRiver decoder (RX) will display an assigned portion of the source allowing for it to be distributed across multiple displays as a single synchronized wall.

The Wall mode is only available on BlueRiver NT2000 chipset.

For details on the BlueRiver Wall feature, limitations and bezel correction refer to the BlueRiver platform Technical Overview Guide (ug-0022).

9.6.1 Overview of the Wall Routing tab

The `Wall Routing` tab is divided into a few sections:

- The `Wall Parameter` section provides a series of parameters that specify:
    - The BlueRiver `Wall Size` represents the number of displays that will make up the Video wall. It is adjusted by changing the number of rows and columns.
    - `Bezel correction values` are specified in number of image pixels. The Bezel default value is set to 16 pixels. Increasing this value applies a thicker bezel correction, while a value of zero would indicate no bezel correction is to be applied
- The `Wall Decoders` section is reserved for configuring and setup of the Wall itself. It is a graphical representation of the displays that assemble the Wall.
- The bottom portion of the Wall Routing tab is divided into two sub-sections where all available `Decoders` (BlueRiver receivers) and `Encoders` (BlueRiver transmitters) are listed.

Figure 11 below illustrates the Wall Routing tab of the BlueRiver Manager (Demo Client).

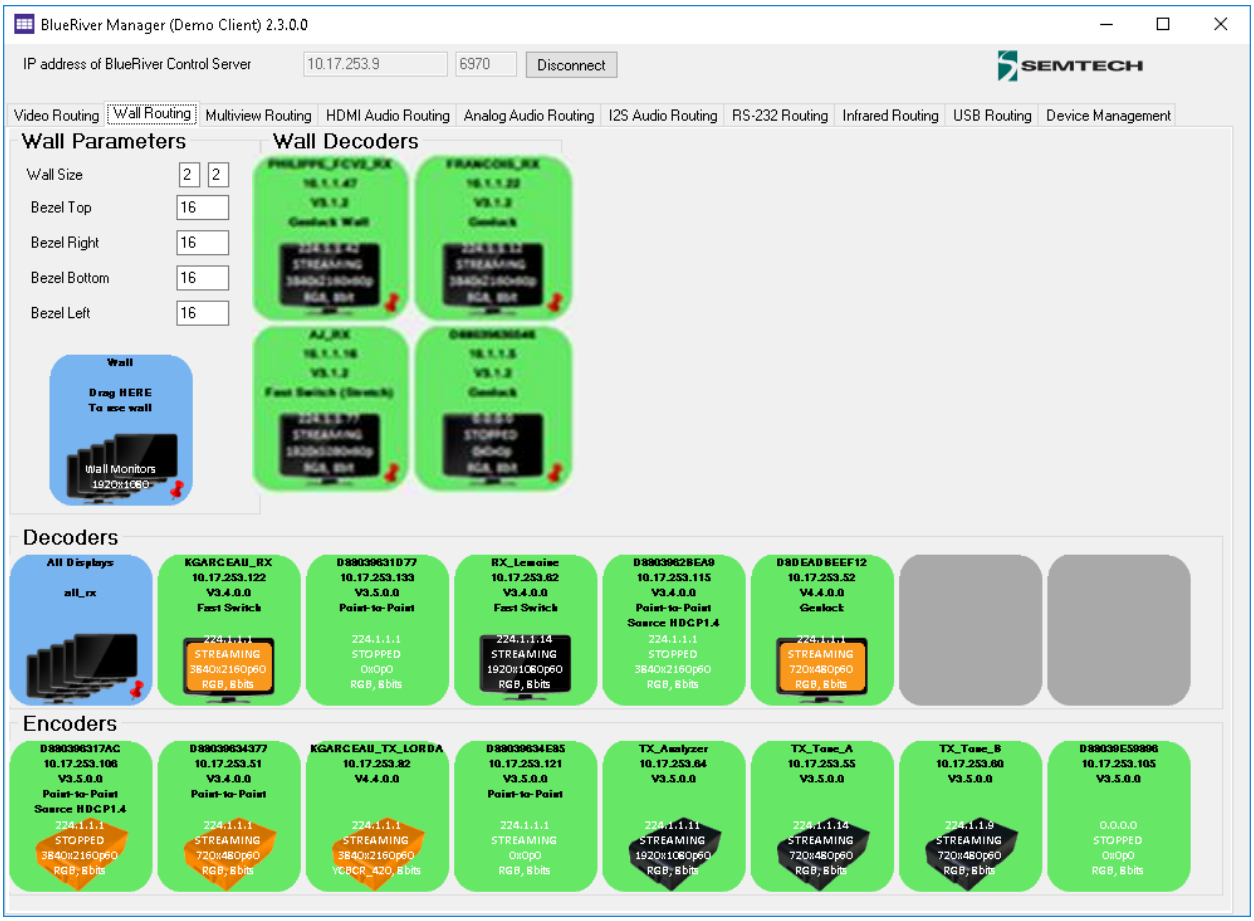

Figure 11: Wall Routing tab

9.6.2 Configuring a Wall

In this section the procedure to configure and assign a Wall setup using the BlueRiver Manager (Demo Client) is reviewed.

Specifically, this section outlines:

- Specifying the Wall size.
- Assigning BlueRiver decoders (RX's) to a Video Wall display.
- Assign a source from a BlueRiver encoder (TX) to a Wall.
- Adjusting Bezel correction.

Prior to configuring the Wall, if not currently running it is necessary to first launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. Select the tab labeled `Wall Routing`. 选择进入墙切换

   All the discovered BlueRiver receiver (RX) devices will appear under the header, `Decoder` and the BlueRiver transmitter (TX) devices under the header, `Encoder`.

2. Specify the `Wall Size`. 定义墙的尺寸

   Under the `Wall Parameter` heading enter the number of displays in rows and columns that make up the Video Wall array.

   Examples:
   - Enter 2x2 beside heading `Wall Size` to specify four displays mounted in a 2x2 array.
   - Or enter 2x3 to represent six displays mounted in a two vertical and three horizontal array.

3. Assign the appropriate BlueRiver decoders (RX) to the Wall. 将解码器放置在视频墙中

   Drag and drop each of the tiles that represent the BlueRiver decoders (RX) that are attached to the displays that are to create the wall onto the Wall Decoders tile located in the position it is to be assigned to. Example, upper left tile or bottom right tile, etc.

   a. From the `Decoders` section, left click on BlueRiver decoder (RX) that is to be assigned to the Wall.
   b. Drag and drop it over the tile on the `Wall Decoders` layout it is to be assigned to.

4. Next assign the source that will feed the Wall.

   Drag the BlueRiver encoder (TX) source tile and drop it onto the blue tile that is labeled `Wall`.

   a. From the `Encoders` section, left click on TX that will feed the source to the Wall.
   b. Drag and drop it over the `Wall` tile.

5. The source will now be distributed across the complete Wall matrix.

6. If appropriate adjust the Bezels correction values (top-right-bottom-left), to adjust the Bezel thickness that is to be applied. Reminder that Bezel correction is applied in image pixels.

   Note: To apply the new bezel values, it may be necessary to reassign the transmitter to the wall. This is completed by reassigning the source to the Wall. i.e. Drag-and-drop of the BlueRiver `encoder` (TX) onto the blue `Wall` tile.

9.6.3 Removing BlueRiver decoder (RX) from Wall

This section reviews the process to remove (unassign) a BlueRiver decoder (RX) from a Wall configuration using the BlueRiver Manager (Demo Client).

1. To remove a BlueRiver decoder (RX) from the Video Wall:
    a. Under the header `Wall Decoders`, right mouse click over the Wall tile that represents the BlueRiver decoder (RX) that is to be removed from the wall.
    b. Then from the menu that appears, select the option `Remove from wall`.

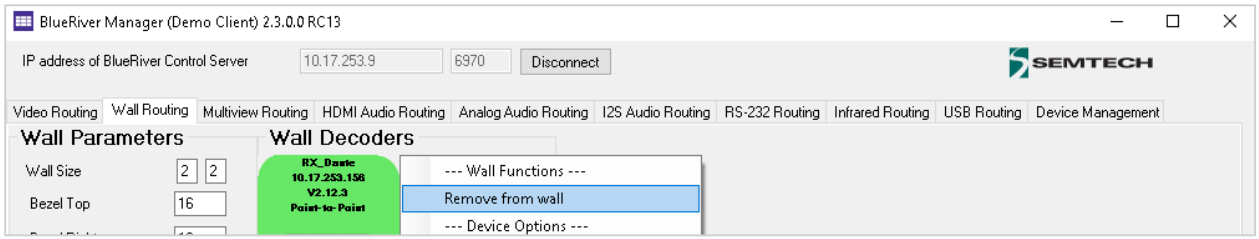

Figure 12: Removing BlueRiver decoder (RX) from Wall

9.6.4 Changing Output Resolution

It is possible to manage the output resolution for the BlueRiver decoders (RX) assigned to a Video Wall.

Note: When using the BlueRiver Manager (Demo Client), the selected output resolution is applied to the whole of the Video Wall. The BlueRiver Control Server supports applying different output resolutions to each BlueRiver decoder (RX), but should be noted this could result in notable distortion to the source.

1. To control the BlueRiver decoder output resolution, right click over the blue `Wall` tile.
2. Select `Wall Monitors Resolutions` and then choose the appropriate resolution from list of available options. See figure below for supported resolutions.
3. The selected output resolution is applied to all the BlueRiver decoders (RX) that are assigned to the wall.

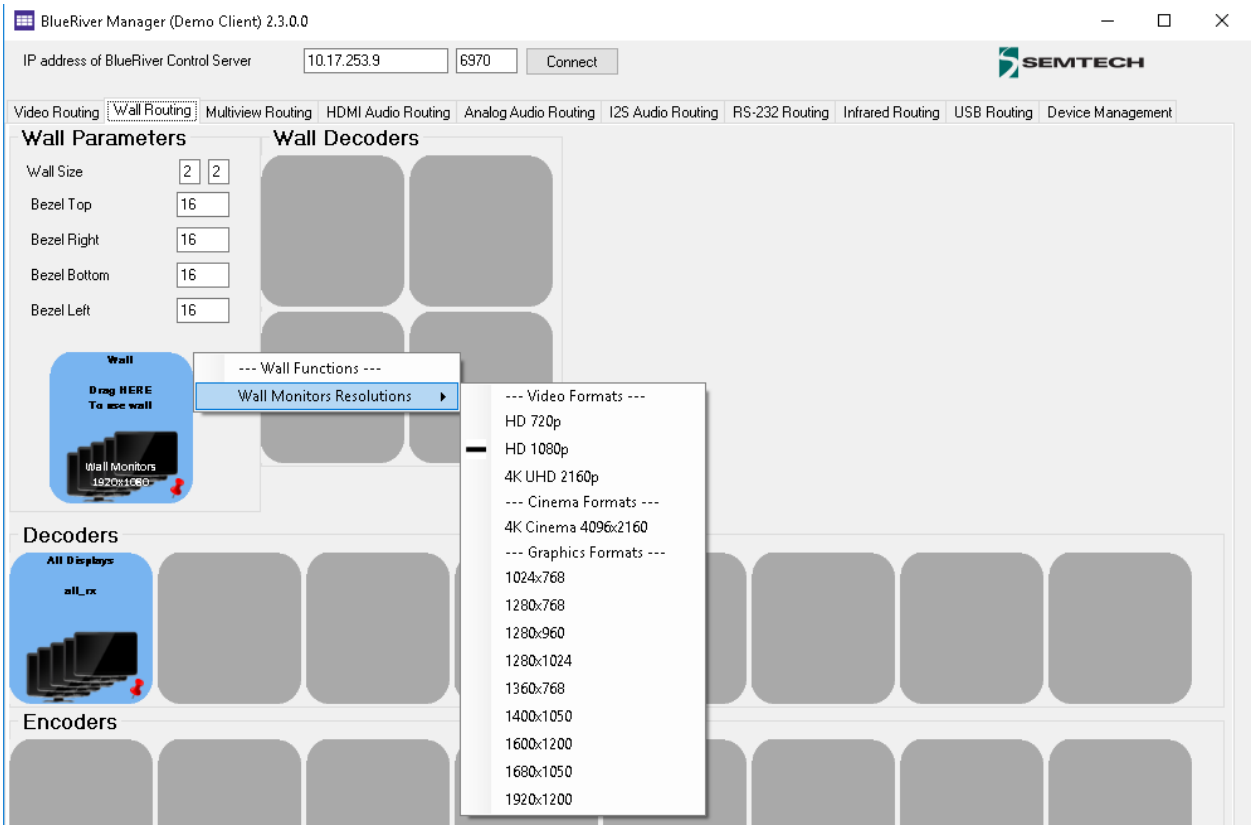

Figure 13: Changing Wall Resolutions

9.7 Multiview Routing tab

The BlueRiver NT2000 chipset supports the ability to display multiple sources from BlueRiver encoders (TX's) on a single BlueRiver decoder (RX) output display. The Multiview Routing tab is used to create and setup the Multiview layouts, as well as switch between configured Multiview layouts.

Notes:

i. Information on the Multiview mode is contained in the **BlueRiver platform Technical Overview Guide** (ug_0022). This includes a description of this mode and its limitations.

ii. For more in-depth information on using the Multiview mode there is an application note available the **BlueRiver Multiview How-To** (an_011). This document is dedicated to the BlueRiver Multiview mode and reviews details of using the Multiview feature including descriptions, terminology, command list as well as the managing the default Script file.

9.7.1 Multiview Routing: Loading sample layout

The BlueRiver Manager (Demo Client) provides an example script, **example-layouts.txt**. This script defines a series of sample layouts that can be loaded during the evaluation of the BlueRiver platform.

To view these files:

1. If not currently running, launch the BlueRiver Manager (Demo Client) application.

   Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

2. From the BlueRiver Manager (Demo Client) select the tab labeled, `Multiview Routing`.

3. Then click the button labeled, `Load`.

4. Select the script file provided by Semtech, `example-layouts.txt` from the dialog box that appears.

   Note: By default, the example script is in the same folder as where the BlueRiver Manager (Demo Client) executable is installed.

5. The Multiview script will load the sample layouts into the BlueRiver Control Server.

   The default Multiview layouts provided with the example script are:

   `example_picture_in_picture_1080p`: This layout has a size of 1920x1080 pixels that displays picture-in-picture.

   `example_4k_single_source_2x2_1080p`: This layout has a size of 3840x2160 that displays a single 1080p video source four times in a 2x2 arrangement.

   `example_4k_three_sources_1080p_half_1080p_640x480`: This is a more complex layout with a size of 3840 x 2160 pixels that displays a 1080p video source (source 0) in the center with two smaller sources repeated around the first: 960x540 video source (source 1) and a 640x480 video source (source 2).

   In addition, the Multiview layout drop box provides one predefined layout that supports the "legacy" BlueRiver NT+ chipsets:

   `Compatibility_4k_2x2`: This is a layout is set with a total size of 3840x2160 pixels that display four 1080p video sources in a 2x2 arrangement. It is a read only layout and therefore not modifiable.

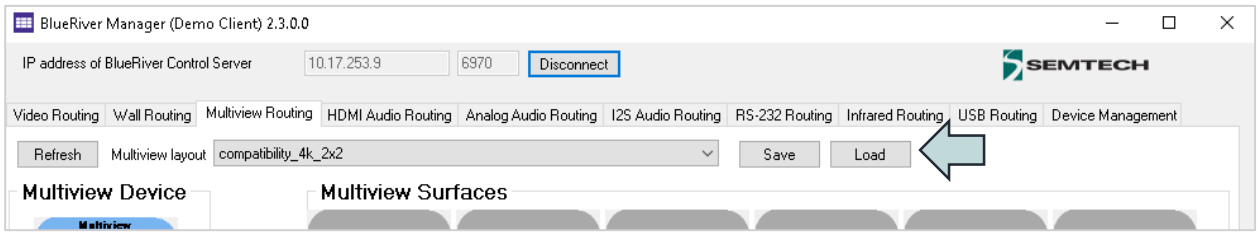

Figure 14: Loading the Multiview layout script

6. Next apply a layout and assign to a BlueRiver decoder (RX):

   a. From the drop-down list beside the heading `Multiview layout`, select the layout to load.

   b. Then drag the appropriate BlueRiver decoder tile from the `Decoders` section and drop it over the blue `Multiview` tile.

      This option is found in the top-left corner of the interface under the label, `Multiview Device`. The `Multiview` tile contains the message, `Drag HERE To use Multiview`.

   c. The layout is applied and the various video subscriptions are shown in the `Multiview Surfaces` panel, located in top of the interface immediately beneath the `Multiview layout` drop-down list.

      - The surfaces that are associated with a window in the selected layout will have a display screen icon displayed.

Figure below is a screen capture of the `Multiview Routing` tab, outlining the four distinct areas the Multiview Routing tab is divided into:

1. `Multiview Device` – assign Encoder here by dragging and dropping it over the Multiview tile.
2. `Multiview Surfaces` – indicates a display for the selected layout showing the active tiles.
3. `Decoders` – displays the discovered Decoders (RX) on the network.
4. `Encoders` – displays the discovered Encoders (TX) on the network

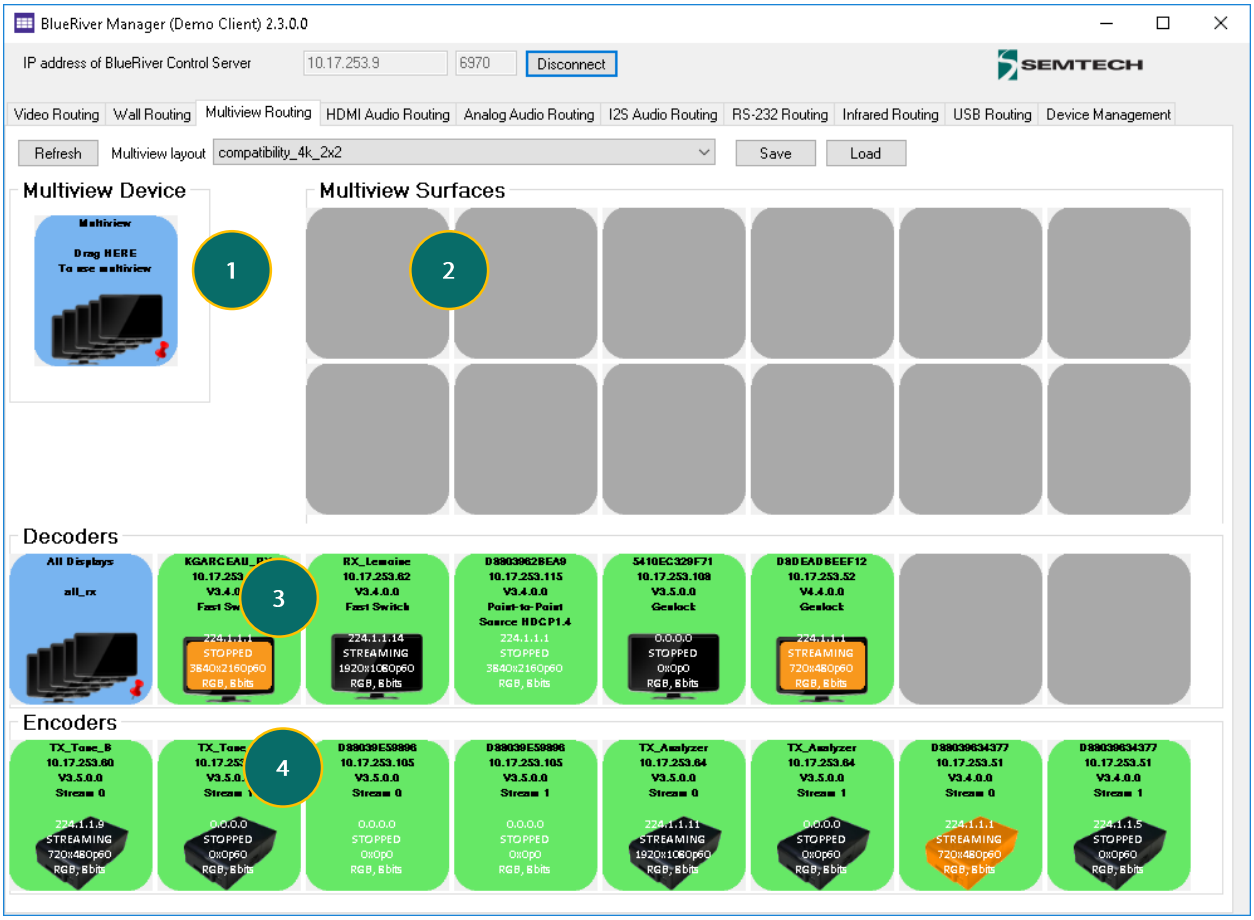

Figure 15: Multiview Routing Interface

9.7.2 Joining Encoders to Multiview Decoder

To subscribe a BlueRiver encoder(s) to the Multiview layout, drag and drop the desired encoder stream onto the subscription(s) that are associated to a layout window.

The `Encoders` panel displays a tile for each of the two (2) streams for each individual BlueRiver NT2000 encoder (TX) device:

Stream 0 Provides the native stream and is available to all receivers on the network. The receivers can use it when in Genlock, Fast Switch, Genlock Scaling, Video Wall or Multiview mode.

Stream 1 A scaled stream, which is also available to all receivers. While it is meant for Multiview, it can be used by decoders operating in Fast Switch mode. The scaled down stream is not available to receivers operating in Genlock, Genlock Scaling or Video Wall modes.

Figure 16: Examples of BlueRiver encoder tiles for Stream 0 and Stream 1

9.7.3 Multiview mode Tips and Warnings

For these tips, the BlueRiver Manager (Demo Client) `Multiview Routing` tab with the `compatibility_4K_2x2` layout loaded is being used as the example.

As explained earlier, this layout has size of 3840x2160 pixels and displays four 1080p video sources in a 2x2 layout arrangement. Total of 4 subscriptions are available, each connected to a layout window.

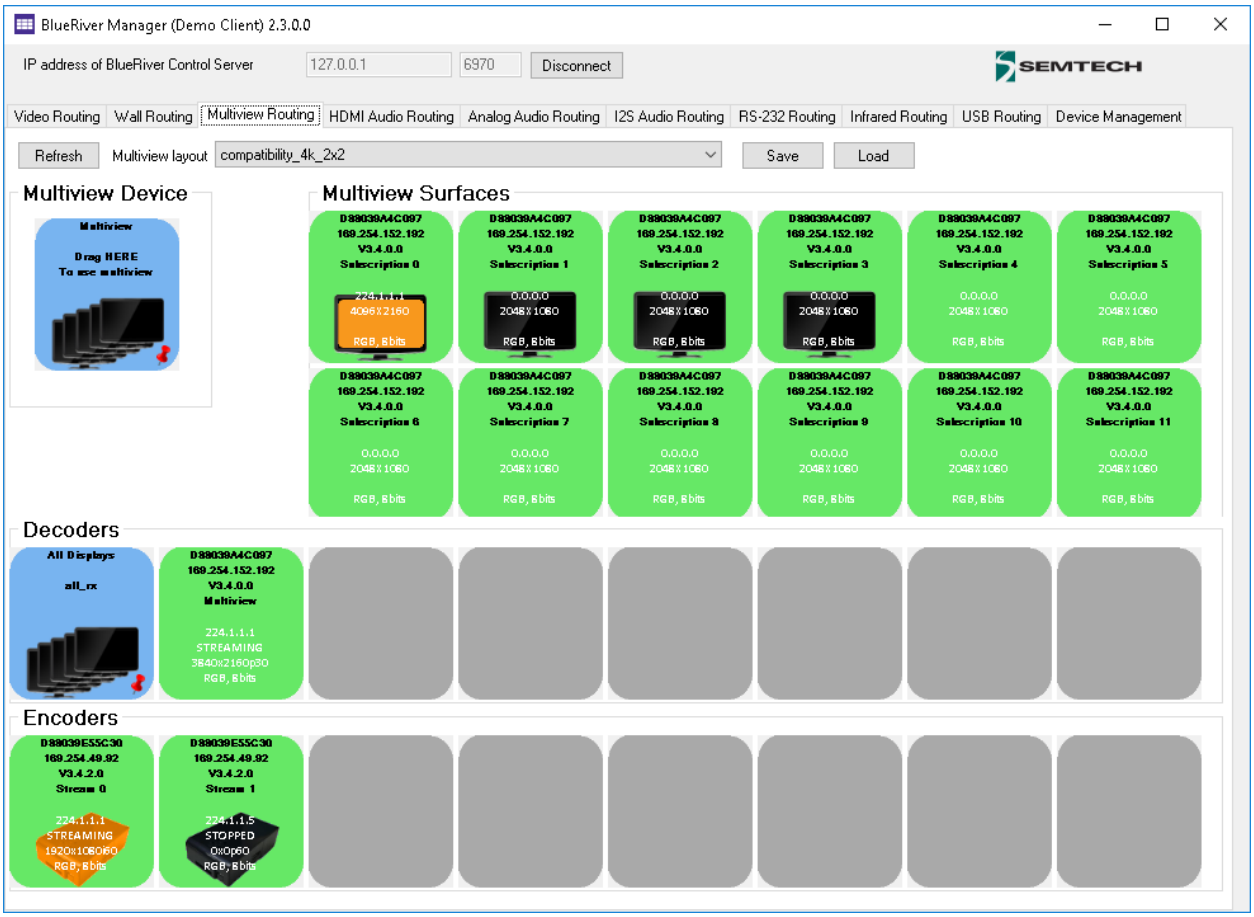

Figure 17: Example using compatibility_4K_2x2 layout

9.7.3.1 Tips:

When using one of the sample layouts, drag-and-drop an Encoder source onto each Multiview tile to subscribe the source to the layer.

For the example layout loaded here, we would drag-and-drop four different 1920x1080 Encoder streams onto each of the 'active' subscriptions.

- If streams do not automatically start, right click over the appropriate BlueRiver encoder (RX) and select `Start Video`.
- To change the current resolution of a Scaled stream:
    - Right click on the BlueRiver encoder "`Scaled`" stream.
    - From the menu that appears, select `Set Resolution`.
    - Select desired Scaler resolution from the list provided.
    - Refer to Figure 18: Changing Multiview Resolution for an example.
- Divide Frame Rate by Two option:
    - If the total bandwidth usage is going to surpass the 10GbE network pipe, then apply the frame rate conversion option to lower the total bandwidth used.
    - Looking at the above example, if sources are 60Hz, four 1920x1080 60Hz streams will exceed the 10Gbit bandwidth on the decoder.
    - To drop the frame rate down to 30Hz, right click over the Encoder and select `Divide Frame Rate by Two`. This will reduce the bandwidth usage.

9.7.3.2 Warnings!

i. If Divide Frame Rate by Two is applied to the native stream (stream 0) it will no longer be able to be used by a Decoder (RX) operating in Genlock, Genlock Scaling or Wall Routing modes.
ii. The RX can still use native stream (stream 0) when in Fast Switch or Multiview mode.
iii. Multiview cannot use native stream (stream 0) if the native stream is interlaced (not progressive), uses sub-sampled color space (i.e. YUV 422 or 420) or has a higher than 8-bit color depth. In these cases, the scaled stream (stream 1) will need to be applied.

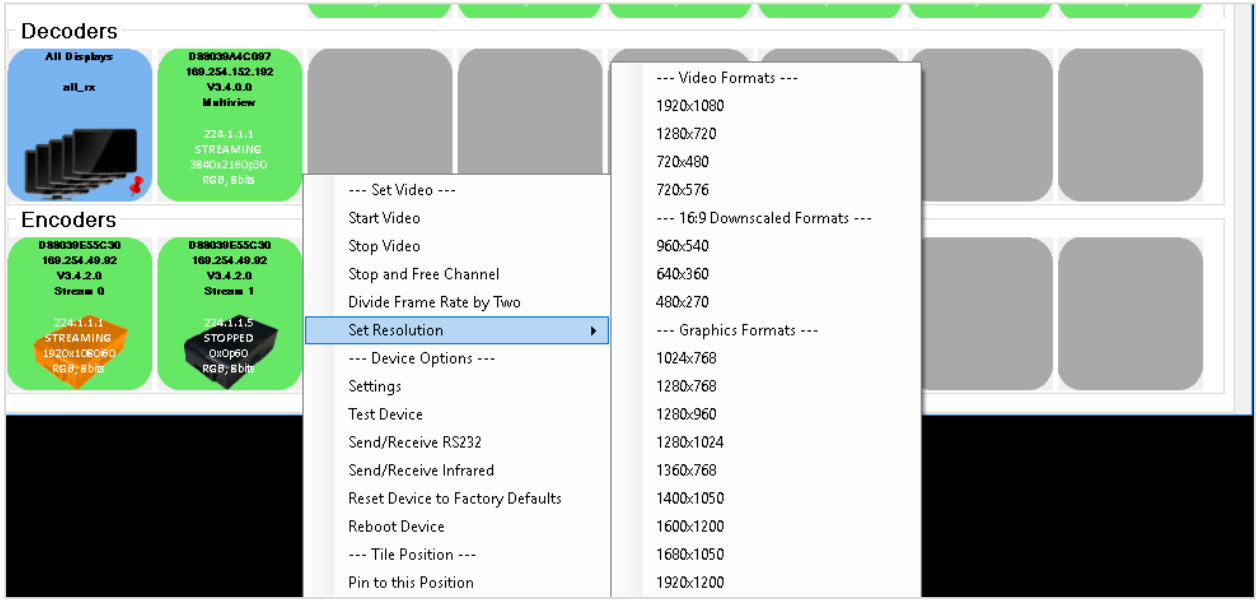

Figure 18: Changing Multiview Resolution

9.7.4 Multiview Script file

A BlueRiver Multiview script consists of actual BlueRiver API commands.

The API commands are a set of text commands that control software, in this case the BlueRiver Manager (Demo Client), sends to BlueRiver Control Server to control and manage BlueRiver devices on the network.

When a Multiview script file is loaded through the BlueRiver Manager (Demo Client), the GUI reads each command within the script and issues it as a text command to the BlueRiver Control Server. The BlueRiver Control Server then sends each of the commands to the appropriate BlueRiver devices.

As outlined earlier a default sample script is provided with the BlueRiver Manager (Demo Client), however, it is possible to create custom layout scripts. For details on managing the Multiview script refer to the BlueRiver Multiview How-To application note (an-0011).

To create and/or apply additional Multiview layouts, the example file can either be modified to include new Multiview layouts or a new text file can be created to hold the API commands to manage the layouts. In fact, the text file can contain additional supported API commands, then when the script is applied these commands will automatically be executed.

Example of commands that could be included in the script:

- Join encoders to layout subscriptions;
- Start streams;
- Scale the native stream;
- Reduce video frame rate coming from an encoder.

To load a new script file, use the `Load` button of the BlueRiver Manager (Demo Client) and browse to location of the new file and select it.

9.8 HDMI Audio Routing tab

When using the BlueRiver Manager (Demo Client) the HDMI audio is routed separately from the video. The HMDI Audio Routing tab is used to manage HDMI audio.

Note: The BlueRiver Manager issues the BlueRiver API split audio command automatically when it launches. In many use cases, it is required to route HDMI audio separately. As an example, routing the HDMI audio to additional or different decoders than the HDMI video.

Exception: When in `Genlock` mode, the HDMI audio follows the Video when one or more BlueRiver decoders (RX) are joined with a BlueRiver encoder (TX) from any of the video routing tabs (Video, Wall, Multiview, etc.). Simply put this means that when an BlueRiver decoder (RX) is in Genlock, it receives both the HDMI video and the HDMI audio.

9.8.1 Routing HDMI Audio

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. To route HDMI audio, select the tab labeled `HDMI Audio Routing`.

   All the discovered BlueRiver receiver (RX) devices are listed under the header, `Decoder` and the BlueRiver transmitter (TX) devices are listed on the bottom half under the header, `Encoder`.

2. Verify if the BlueRiver decoder (RX) is currently joined to the appropriate BlueRiver encoder (TX).

   a. Click on the Decoder (RX) and the Encoder (TX) it is joined to will be highlighted by orange.
   b. Selecting the TX will highlight all the RX's that the TX is joined too.
   c. Refer to section 9.2 Confirming which Encoders joined to Decoder for details.

3. If presently the appropriate BlueRiver encoder (TX) is not joined to the desired BlueRiver decoder (RX) proceed to join them:
    a. In the `Encoder` section, select a BlueRiver encoder (TX) by clicking on its associated active (green) tile with the left mouse button.
    b. Drag and drop the TX tile over the BlueRiver decoder (RX) tile it is to be joined with.
    c. The TX and RX are now joined.
    d. Repeat above steps if additional decoders (RX) are to be joined to the encoder (TX).
4. To specify where the HDMI audio is sent out on the BlueRiver decoder (RX)complete the following steps:
    a. Right click over the `BlueRiver decoder (RX)` tile that the audio is to be configured for and from the menu that is displayed select `Settings`.
    b. To direct audio to the HDMI output, select the `HDMI Encoder` tab and then choose one of the following options:
        - `HDMI Audio (All Available Channels)` to select the original multichannel audio.
        - `HDMI Audio (Stereo Downmix)` to select downmixed 2-channel audio (NT2000 only).
        - `Analog Audio` option to send the audio to the `Analog output connector`.
        - `I2S Audio` to send the audio to the quad I2S output connector.
5. Click `Save` to apply changes.
6. The sound device connected to the BlueRiver decoder (RX) will now play out the HDMI audio stream.

Tip: If audio is not playing out, confirm that the BlueRiver encoder (TX) device is streaming. Also, verify that the BlueRiver decoder (RX) audio output settings are correct.

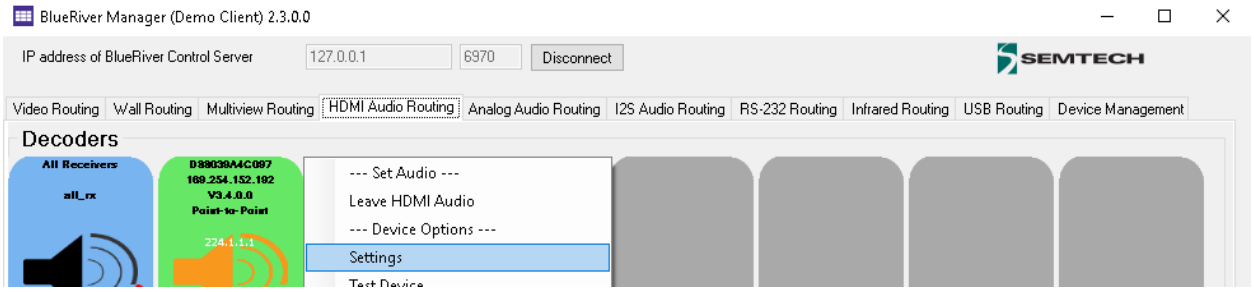

Figure 19: HDMI Audio Routing tab – Settings option

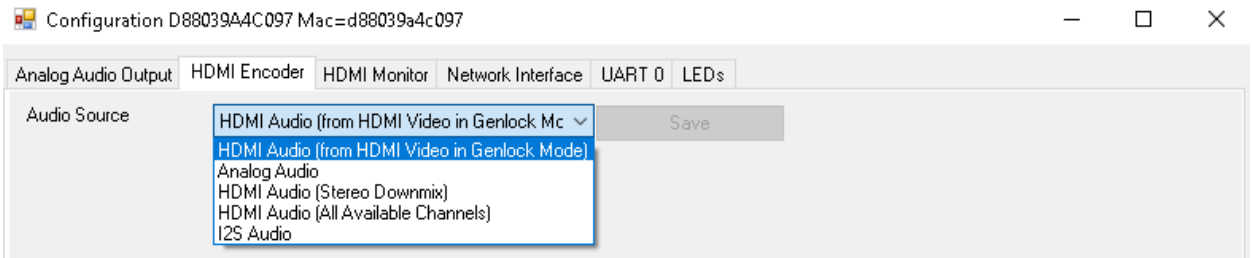

Figure 20: BlueRiver decoder (RX) HDMI Audio Source selection of HDMI Encoder tab

9.8.2 Sending HDMI Audio source to all BlueRiver decoders

To distribute the HDMI audio from a single BlueRiver encoder (TX) device to `all` BlueRiver decoder (RX) devices, from the `HDMI Audio Routing` tab drag and drop the appropriate `Encoder` onto the blue tile labeled `All Receivers`.

9.8.3 Starting/Stopping HDMI Audio

To `stop` HDMI Audio being transmitted from a BlueRiver encoder (TX) device, right click over the TX device and select `Stop HDMI Audio`.

To `start` or `restart` the audio transmission, right-click over the appropriate BlueRiver encoder (TX) device and select `Start HDMI Audio`.

It is also possible to stop the HDMI audio and free the multicast IP addresses assigned to the stream. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

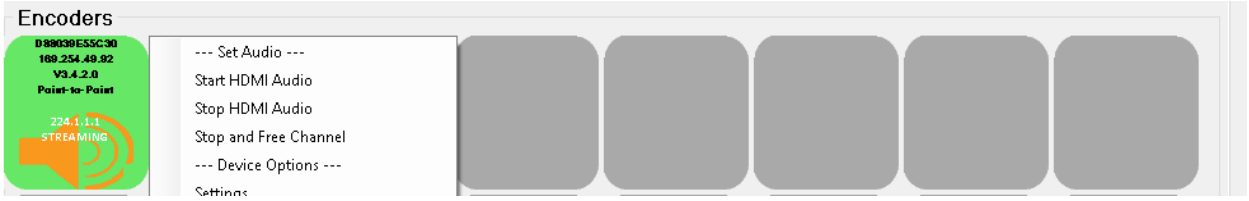

Figure 21: BlueRiver encoder (TX) HDMI Audio tab - Start/Stop options

9.8.4 Disconnecting HDMI Audio source from BlueRiver decoder

To `disconnect` a BlueRiver decoder (RX) device from a BlueRiver encoder (TX) source, right click over the RX tile and select `Leave HDMI Audio`.

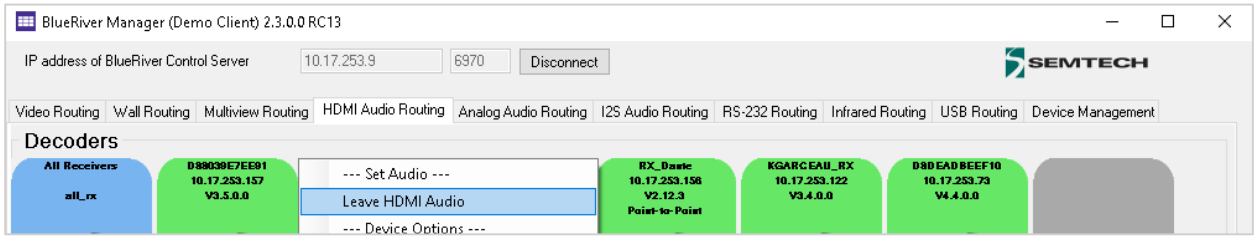

Figure 22: BlueRiver decoder (RX) HDMI Audio tab - Leave option

9.9 Analog Audio Routing tab

The `Analog Audio` tab is used to setup and manage Analog Audio (Single IS2 Audio) Routing between BlueRiver decoder (TX) devices and BlueRiver encoder (RX) devices.

9.9.1 Routing Analog Audio

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. Select the tab labeled `Analog Audio routing`.

   All the discovered BlueRiver receiver (RX) devices are listed under the header, `Decoder` and the BlueRiver transmitter (TX) devices are listed on the bottom half under the header, `Encoder`.

2. Verify if the BlueRiver decoder (RX) is currently joined to the appropriate BlueRiver encoder (TX).

   a. Click on the Decoder (RX) and the Encoder (TX) it is joined to will be highlighted by orange.
   b. Selecting the TX will highlight all the RX's that the TX is joined too.
   c. Refer to section 9.2 Confirming which Encoders joined to Decoder for details.

3. If presently the appropriate BlueRiver encoder (TX) is not joined to the desired BlueRiver decoder (RX) proceed to join them:

   a. In the `Encoder` section, select a BlueRiver encoder (TX) by clicking on its associated active (green) tile with the left mouse button.
   b. Drag and drop the TX tile over the BlueRiver decoder (RX) tile it is to be joined with.
   c. The TX and RX are now joined.
   d. Repeat above steps if additional decoders (RX) are to be joined to the same encoder (TX).

To control where and how Analog Audio is sent out complete the following steps:

1. Connect a speaker or any type of analog audio receiver to the BlueRiver decoder (RX).
2. Right click on the BlueRiver decoder (RX) and select `Settings`.
3. Next to choose how the Analog audio is to be sent out on the `Analog output connector` port complete the following steps:

   a. Click on the `Analog Audio Output` tab
   b. Choose the desired audio output option from the drop-down list provided:
      - `HDMI Audio (Downmix)` - BlueRiver NT2000 chipset only.
      - `Analog Audio`
      - `I2S Audio`

4. Click `Save` to apply changes.
5. The sound device connected to the BlueRiver decoder (RX) will now play out the Analog audio stream.

Tip: If audio is not playing out, confirm that the BlueRiver encoder (TX) device is streaming. Also, verify the BlueRiver decoder (RX) audio output settings are correct.

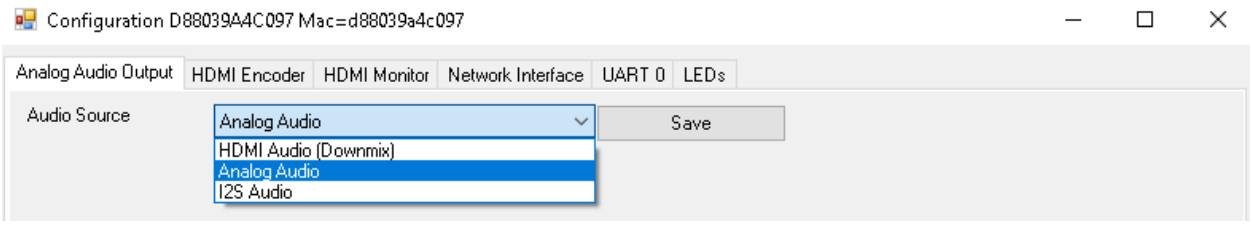

Figure 23: Analog Audio Routing tab -- Settings > RX Analog Audio Output tab

9.9.2 Sending single Analog Audio Source to all BlueRiver decoders

To distribute separate Analog audio from a single BlueRiver encoder (TX) device to `all` BlueRiver decoder (RX) devices, in the `Analog Audio Routing` tab drag and drop the `Encoder` onto the blue tile labeled `All Receivers`.

9.9.3 Starting/Stopping Analog Audio

To `stop` Analog Audio being transmitted from a BlueRiver encoder (TX) device, right click over the TX device and select `Stop Analog Audio`.

To `start` or `restart` the audio transmission, right-click over the appropriate BlueRiver encoder (TX) device and select `Start Analog Audio`.

It is also possible to stop the Analog audio and free the multicast IP addresses assigned to the stream. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

Figure 24: BlueRiver encoder (TX) Analog Audio tab - Start/Stop options

9.9.4 Disconnecting Analog Audio source from BlueRiver decoder

To `disconnect` a BlueRiver decoder (RX) device from a BlueRiver encoder (TX) source, right click over the BlueRiver decoder (RX) tile and select `Leave Analog Audio`.

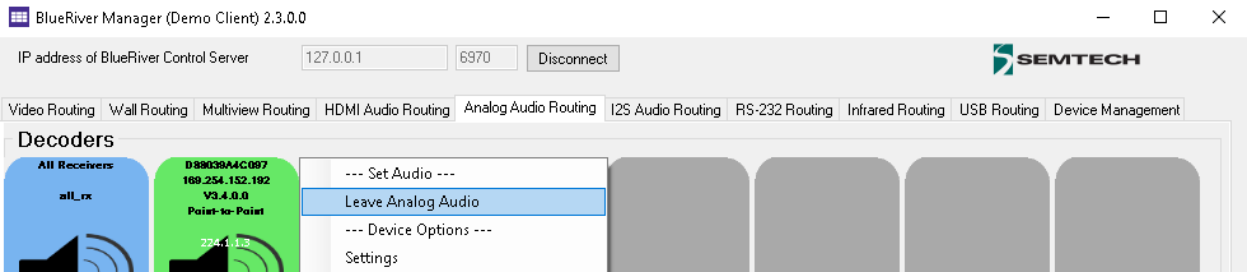

Figure 25: BlueRiver decoder (RX) Analog Audio tab - Leave option

9.10 I2S Audio Routing tab

The `I2S Audio` tab is used to setup and manage Quad I2S audio routing between BlueRiver encoder (TX) devices and BlueRiver encoder (RX) devices.

Each device discovered on the network, whether it is a BlueRiver encoder (TX) or BlueRiver decoder (RX) is listed as both a Sender and a Receiver. This is because each device can potentially send or receive I2S Audio data.

Note: I2S may not be present in all hardware designs, if available the I2S tab will automatically appear.

9.10.1 Routing I2S Audio

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. Select the tab labeled `I2S Audio routing`.

   All the discovered BlueRiver devices, encoders (TX) and decoders (RX) are listed both groups, `Receivers` and `Senders`.

2. Verify if the Receiver(s) is currently joined to the appropriate Sender.

   a. Click on the `Sender` or `Receiver` and the BlueRiver devices it is joined to will be highlighted by orange.

3. If presently the appropriate BlueRiver senders and receivers are not joined proceed to join them:

   a. In the `Encoder` section, select a `Sender` by clicking on its associated active (green) tile with the left mouse button.
   b. Drag and drop the tile over the `Receiver` tile it is to be joined with.
   c. The BlueRiver devices are now joined.
   d. Repeat above steps if additional devices are to be joined.

To control where and how I2S Audio is sent out complete the following steps:

1. Right click a `Receiver` and select `Settings`.
2. Choose how the Quad I2S audio is to be managed on the `I2S Input`:

   a. Click on the I2S Audio Input tab
   b. Set the desired `Sampling Frequency` from the drop-down list provided.
      - 22.05kHz through to 768kHz range supported.
   c. Click `Save` to apply changes.
   d. Select the number of channels from the `Nb of channels` drop-down list.
      - From 2-to-8 channels supported.
   e. Click `Save` to apply changes.

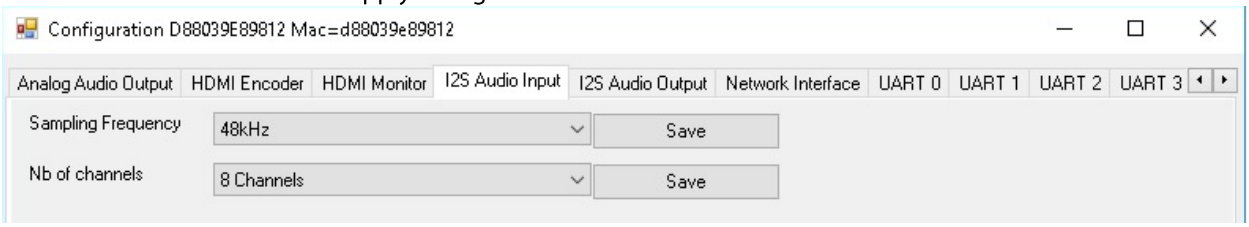

Figure 26: Quad I2S Settings window – IS2 Audio Input options

3. Choose how the audio is to be managed on the `I2S Output`:

   a. Click on the `I2S Audio Output` tab
   b. Select the Audio Source to `I2S Audio`.

4. If it is appropriate, set either `I2S Audio` or `I2S Audio Local Loop Out` as the `Analog Audio Output`.

    a. Select the `Analog Audio Output` tab.
    b. From the `Audio Source` drop-down list select `I2S Audio`.
    c. Click Save to apply changes.

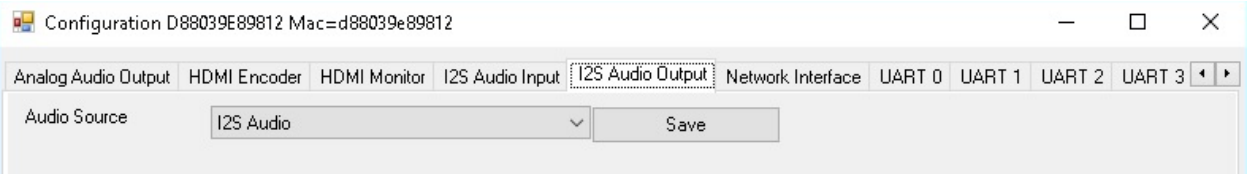

Figure 27: Quad I2S Settings window – IS2 Audio Output option

5. The sound device connected to the Receiver will now play out the Analog audio stream.

Tip: If audio is not playing out, confirm that the I2S Audio is streaming. Also, verify the Receiver audio output settings are correct.

9.10.2 Sending Quad I2S Audio source to all Receivers

To distribute Quad I2S audio from a single Sender to `all` Receivers, from the `I2S Audio Routing` tab drag and drop the `Sender` onto the Blue tile labeled `All Receivers`.

9.10.3 Starting/Stopping Quad I2S Audio

To `stop` Quad IS2 Audio being transmitted from a BlueRiver sender (TX) device, right click over the TX device and select `Stop I2S Audio`.

To `start` or `restart` the audio transmission, right-click over the appropriate BlueRiver sender (TX) and select `Start I2S Audio`.

It is also possible to stop the I2S audio and free the multicast IP addresses assigned to the stream. This is done with the `Stop and Free Channel` option.

Warning! If there are any BlueRiver decoders currently subscribed to the multicast IP in question, they will remain subscribed. To prevent these decoders from potentially streaming an incorrect source, in the event the multicast is assigned to a new stream, it is recommended to disconnect the decoder before freeing the channel. See the next section.

Figure 28: BlueRiver Sender I2S Audio tab - Start/Stop options

9.10.4 Disconnecting Quad I2S Audio source from Receiver

To `disconnect` an Receiver from a Sender source, right click over the Receiver tile and select `Leave I2S Audio`.

9.11 RS-232 Routing tab

The `RS-232 Routing` tab is used to setup and manage RS-232 data routing for BlueRiver devices.

The BlueRiver chipset supports up to four UART ports.

The BlueRiver Manager (Demo Client) application will display a tab for each available port based on the hardware configuration. These tabs are labeled `UART0` through `UART3` respectively. See figure below for example.

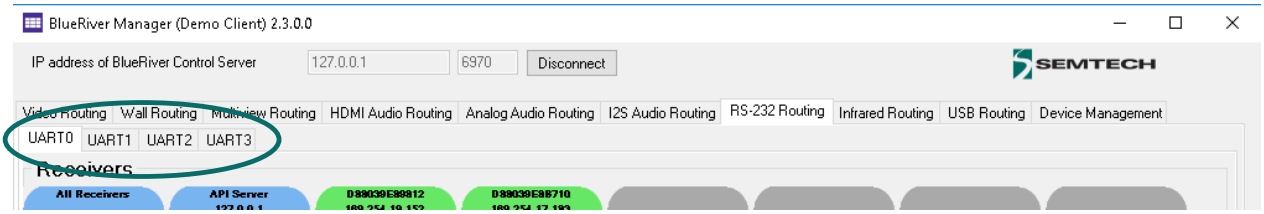

Figure 29: RS-232 UART ports 0-3

9.11.1 Pairing RS-232 Receivers and Senders

The RS-232 Routing tab is divided into two sections in the BlueRiver Manager (Demo Client), first is labeled `Receivers`, while the second is labeled `Senders`.

Each device discovered on the network, whether it is a BlueRiver encoder (TX) or BlueRiver decoder (RX) is listed in both groups. This is because each device can potentially send or receive RS-232 data.

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. Select the tab labeled `RS-232 routing`.
2. Verify which `Senders` and `Receivers` are joined.
    a. Using the left mouse, click on the BlueRiver device tile it is desired to see the connection status of. All the joined tiles will be highlighted in orange.

9.11.1.1 Pairing a Sender to a Receiver

1. Proceed to pair a device by dragging the tile representing the `Sender` and dropping it over the desired `Receiver` to create one-way communication.
2. To create a two-way RS-232 path between two devices, two separate pairings are required, repeat step 4 but in reverse to create the second pairing. Demonstrated in the figure below.

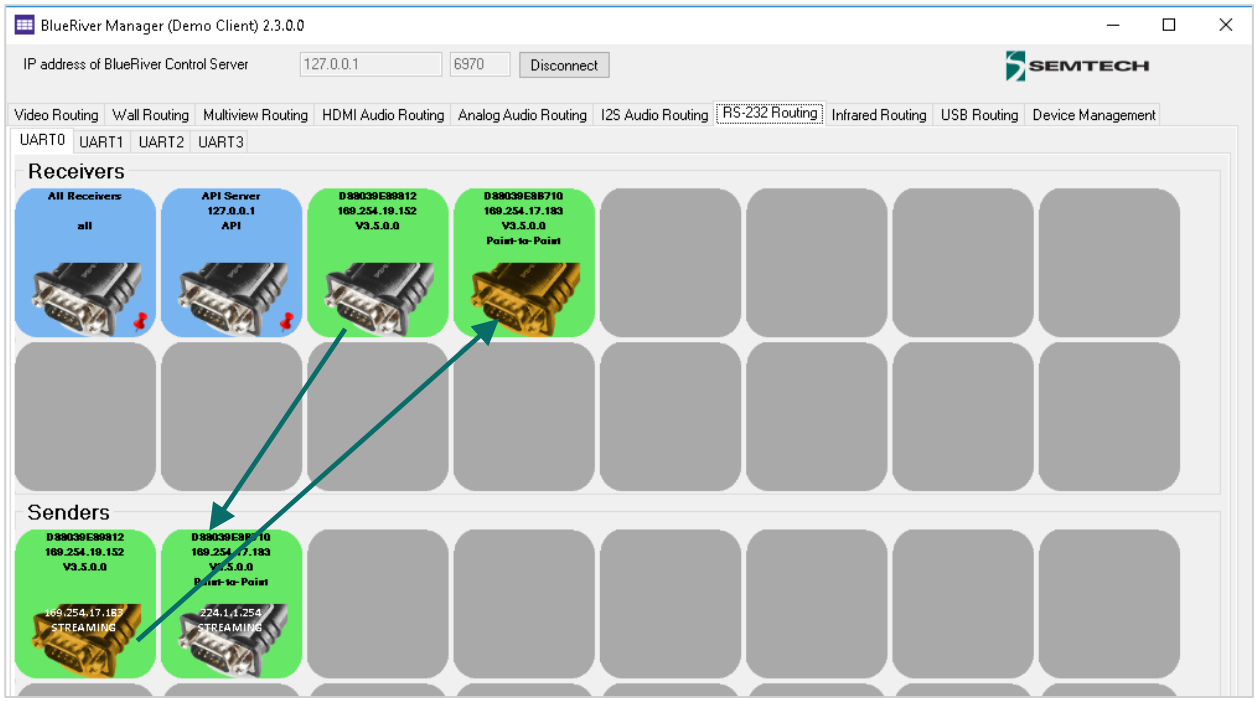

Figure 30: RS-232 Routing - 2-Way Pairing of Devices

9.11.1.2 Pairing a Sender to all Receivers

To distribute RS-232 data from a single BlueRiver Sender device to all receiving devices, drag and drop the respective `Sender` tile onto the blue tile labeled `All Receivers` located in the Receivers section of the RS-232 Routing tab.

9.11.1.3 Pairing a Sender to the BlueRiver Control Server (API Server)

To distribute RS-232 data from a single BlueRiver `Sender` device to the BlueRiver Control Server (API Server), drag and drop the respective `Sender` tile onto the blue tile labeled `API Server` located in the `Receivers` section of the `RS-232 Routing` tab.

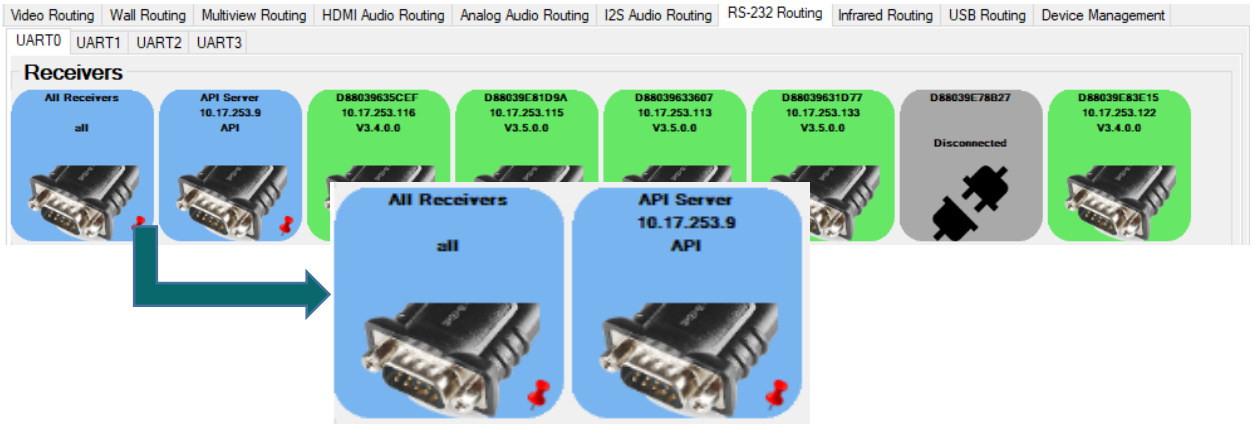

Figure 31: RS-232 Routing - All Receivers and API Server tiles

9.11.2 Sending RS-232 data

9.11.2.1 RS-232 data from Sender to paired Receiver(s)

To send RS-232 data from a `Sender` to only paired `Receiver`(s):

1. If not presently paired, pair the `Sender` to the desired `Receiver`.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile representing the `Receiver` sender to paired with.
2. Right click over the tile representing the appropriate `Sender` from the `Senders` section of the `RS-232 Routing` tab.
3. Select `Send/Receive RS-232`.
4. The `Send/Receive RS-232` dialog box opens.
5. Enter the RS-232 string that is to be sent in the field located next to the `Send` button.
6. Then click the `Send` button to send out the string.
7. Only the paired device will receive the RS-232 data.

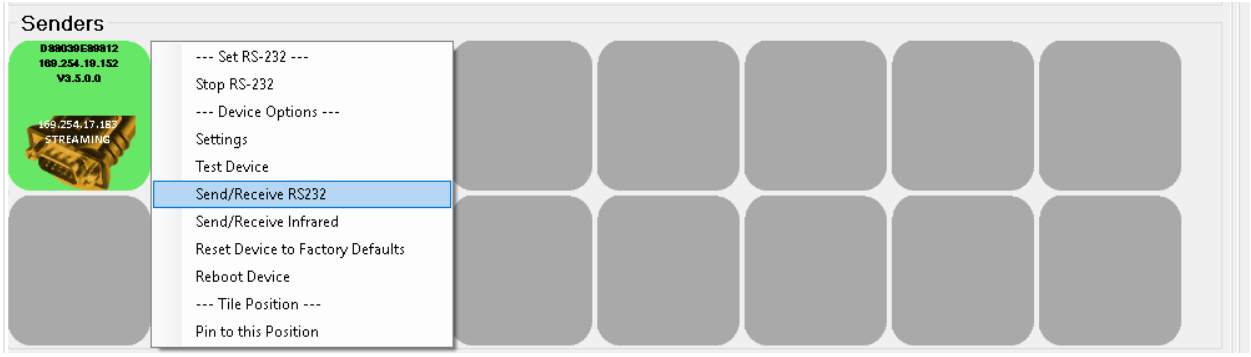

Figure 32: RS-232 Routing – Sending/Receive RS-232 data

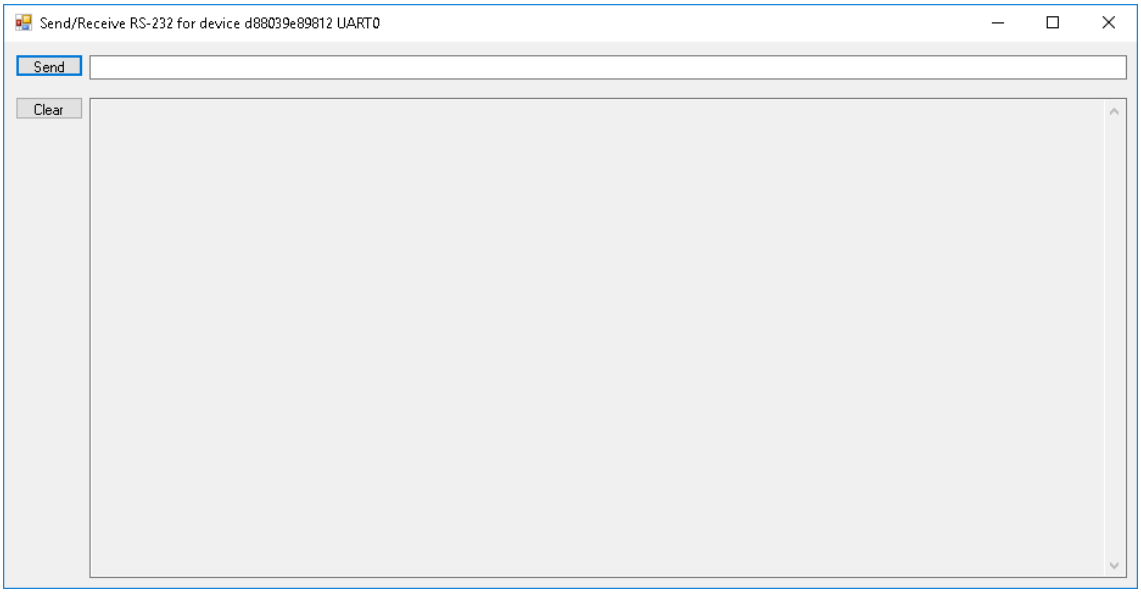

Figure 33: RS-232 Sending/Receive data window

9.11.2.2 RS-232 data from Sender to All Receivers

To send RS-232 data from a `Sender` to `All Receivers`:

1. If not presently paired, pair the appropriate `Sender` to the `All Receivers`.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile, `All Receivers`.
2. Right click over the tile representing the appropriate `Sender` from the `Senders` section of the `RS-232 Routing` tab.
3. Select `Send/Receive RS-232`.
4. The `Send/Receive RS-232` dialog box opens.
5. Enter the RS-232 string that is to be sent in the field located next to the `Send` button.
6. Then click the `Send` button to send out the string.
7. All receiver devices will receive the RS-232 data.

9.11.2.3 RS-232 data to BlueRiver Control Layer

To route RS-232 data from a `Sender` to the `BlueRiver Control Server` (API Server):

1. If not presently paired, pair the `Sender` to the `API Server`.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile, `API Server`.
2. Right click the appropriate tile and select `Send/Receive RS-232`.
3. The `Send/Receive RS-232` dialog box opens.
4. Enter the RS-232 string that is to be sent in the field located next to the `Send` button.
5. Then click the `Send` button to send out the string.
6. The BlueRiver Control Server will receive the RS-232 data.

9.11.3 RS-232 Limitations

The following limitations apply to the RS-232:

- Supported baud rate ranges from 9,600 bauds to 115,400 bauds.
- A Sender can either send RS-232 data to a specific device (unicast), all Senders or all Receivers (multicast) or broadcast to all devices active on the network (broadcast). Refer to BlueRiver platform Technical Overview guide (ug-0022) for details on BlueRiver system communication.
- Should be noted however, that a sender cannot send RS-232 data simultaneously to a range of devices using multi-unicast.
- During a BlueRiver device update do not send RS-232 commands.

9.12 Infrared Routing tab

Infrared data routing is setup and managed for BlueRiver devices from the `Infrared Routing` tab.

9.12.1 Pairing Infrared Receivers and Senders

The `Infrared Routing` tab is divided into two sections in the BlueRiver Manager (Demo Client), first is labeled `Receivers`, while the second is labeled `Senders`.

Each device discovered on the network, whether it is a BlueRiver encoder (TX) or BlueRiver decoder (RX) is listed in both groups. This is because each device can potentially send or receive Infrared (IR) data.

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

1. Select the tab labeled `Infrared routing`.
2. To verify which `Senders` and `Receivers` are joined, using the left mouse, click on the BlueRiver device tile it is desired to see the connection status of. All the joined tiles will be highlighted in orange.

9.12.1.1 Pairing a Sender to Receiver

1. Proceed to pair a device by dragging the tile representing the `Sender` and dropping it over the desired `Receiver` to create one-way communication.
2. It is not likely required to create a two-way Infrared path but is possible to do so. Create two separate pairings in the same way as it is done for RS-232, drag Sender to Receiver than repeat pairing in reverse. Refer to Figure 30: RS-232 Routing - 2-Way Pairing of Devices.

9.12.1.2 Pairing a Sender to all Receivers

To distribute infrared (IR) data from a single `Sender` to <u>all</u> Receivers, drag and drop the respective `Sender` tile onto the blue tile labeled `All Receivers` located in the `Receivers` section of the `Infrared Routing` tab.

Comment: To verify which Senders and Receivers are connected, using the left mouse, click on the device tile it is desired to see the connection status of. All the joined tiles will be highlighted in orange.

9.12.1.3 Pairing a Sender to BlueRiver Control Server (API Server)

To distribute Infrared data from a single BlueRiver `Sender` to the BlueRiver Control Server (API Server), drag and drop the respective `Sender` tile onto the blue tile labeled `API Server` located in the `Receivers` section of the `Infrared Routing` tab.

Figure 34: Infrared Routing - All Receivers and API Server tiles

9.12.2 Sending Infrared data

9.12.2.1 Infrared data from Sender to paired Receiver

To send Infrared data from a Sender to only paired Receiver:

1. If not presently paired, pair the Sender to the desired Receiver.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile representing the `Receiver` sender to paired with.
2. Right click over the tile representing the appropriate Sender from the Senders section of the Infrared Routing tab.
3. Select Send/Receive Infrared.
4. The Send/Receive Infrared dialog box opens.
5. Enter the Infrared data that is to be sent in the field located next to the Send button.
6. Then click the Send button to send out the string.
7. Only the paired device will receive the Infrared data.

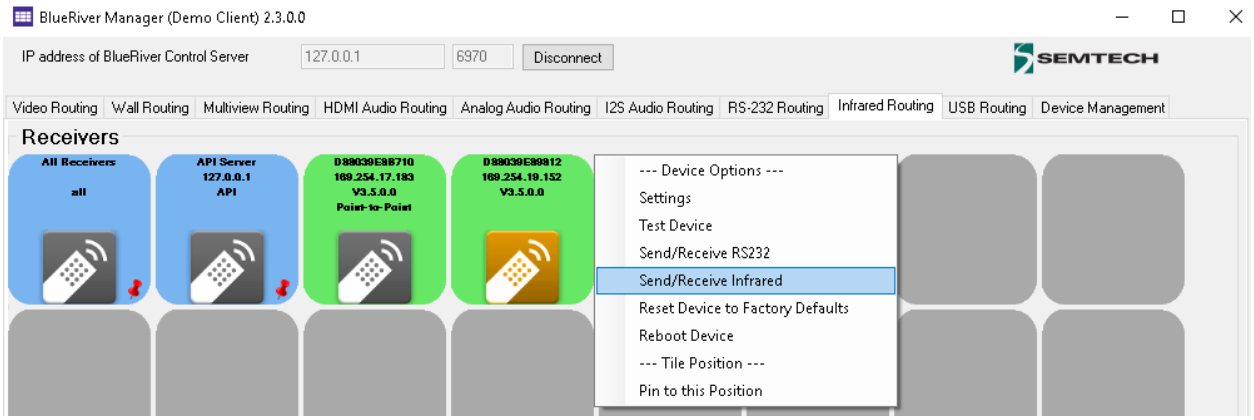

Figure 35: BlueRiver Infrared – Sending/Receive IR data

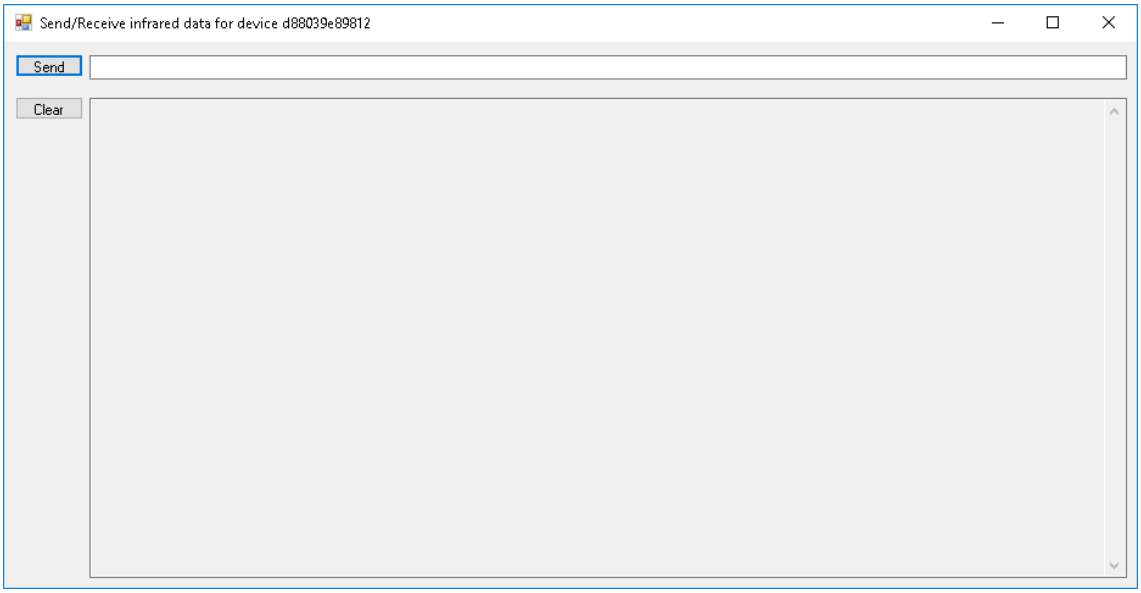

Figure 36: Infrared Sending/Receive data window

9.12.2.2 Infrared data from Sender to All Receivers

To send Infrared data from a `Sender` to `All Receivers`:

1. If not presently paired, pair the `Sender` to the `All Receivers`.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile, `All Receivers`.
2. Right click over the tile representing the appropriate `Sender` from the `Senders` section of the `Infrared Routing` tab.
3. Select `Send/Receive Infrared`.
4. The `Send/Receive Infrared` dialog box opens.
5. Enter the Infrared data that is to be sent in the field located next to the `Send` button.
6. Then click the `Send` button to send out the string.
7. All paired devices will receive the Infrared data.

9.12.2.3 Infrared data to BlueRiver Control Layer

To route Infrared data from a `Sender` to the `BlueRiver Control Server` (API Server):

1. If not presently paired, pair the `Sender` to the `API Server`.
    a. Left click on `Sender` tile.
    b. Drag and drop it over the Blue tile, `API Server`.
2. Right click the appropriate tile and select `Send/Receive Infrared`.
3. The `Send/Receive Infrared` dialog box opens.
4. Enter the Infrared data that is to be sent in the field located next to the `Send` button.
5. Then click the `Send` button to send out the string.
6. The BlueRiver Control Server will receive the Infrared data.

9.12.3 Infrared Limitations

Although a `Sender` can either send infrared (IR) data to a specific device (unicast) or broadcast to all devices active on the network (broadcast), it should be noted that a sender cannot send data simultaneously to a range of devices using multi-unicast.

9.13 USB Routing tab

The BlueRiver platform has integrated the Icron command protocol into the BlueRiver Manager (Demo Client) to control Icron's USB LEX and REX modules.

The `USB Routing` tab is used to setup and manage USB data routing between BlueRiver devices.

Note: For details on Icron USB setup and management refer to the documents Icron Extreme USB programing procedure (UG_0011) and the BlueRiver Icron Extreme USB How To user guide (ug_0012).

In the `Infrared Routing` tab of the BlueRiver Manager (Demo Client) is divided into two sections:

- `Remote Extenders (REX)`
- `Local Extenders (LEX)`

Each device discovered on the network, whether it is a BlueRiver encoder (TX) or BlueRiver decoder (RX) is listed in the section for which it has been configured. Devices configured in the hardware configuration file as REX are displayed in the `Remote Extenders (REX)` group and devices configured as LEX are displayed in the `Local Extenders (LEX)` group.

If not currently running, launch the BlueRiver Manager (Demo Client) application.

Refer to Section 2 Starting the BlueRiver Manager (Demo Client).

To verify which Remote Extenders (REX) and Local Extenders (LEX) are joined:

1. Select the tab labeled `USB Routing`.
2. Using the left mouse, click on the BlueRiver device tile it is desired to see the connection status of.
3. All the joined tiles will be highlighted in orange.

9.13.1.1 Pairing a Remote Extender (REX) and a Local Extender (LEX)

To pair USB devices together:

1. Select the `USB Routing` tab.
2. To pair a LEX module with a REX module, drag and drop the desired `LEX` tile over the `REX` tile it is desired to be joined to.
3. Release the left mouse button and the LEX/REX will be paired.
4. Try now to connect a mouse/keyboard or other USB device to the USB port on the Remote Extender (REX) device while connecting a computer to the USB port on the Local Extender (LEX) device that is to be the host.
5. The devices will now interact with the computer as if they were directly connected.

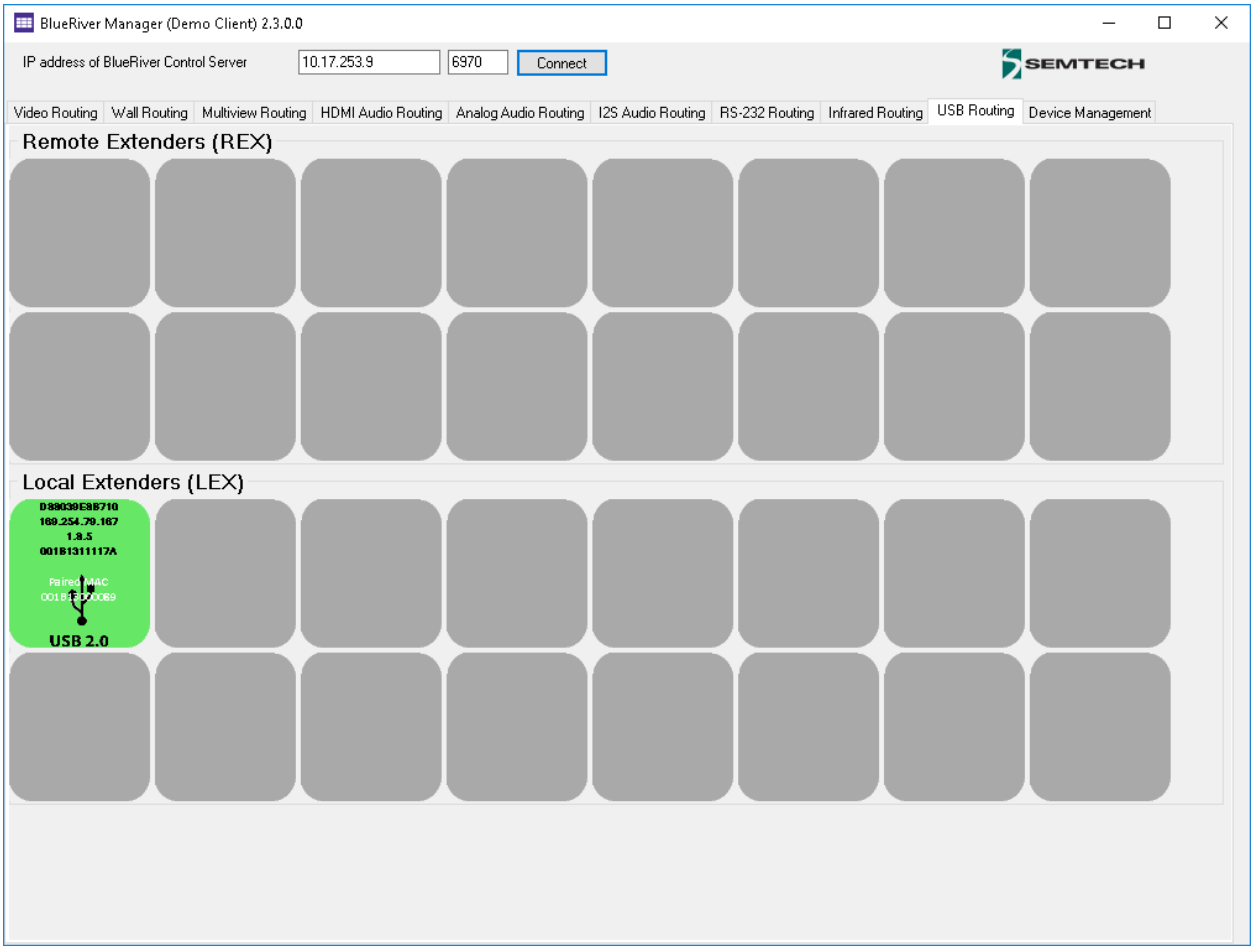

Figure 37: USB Routing tab

9.13.2 USB Routing Limitations

When using the BlueRiver Manager (Demo Client) to control the Icron USBExtreme functionality, there are some restrictions to be aware of, these are:

1. BlueRiver Manager (Demo Client) only supports one-to-one pairing between Icron LEX and REX modules.
    - Icron's protocol however, does support virtual hub function that allows for many REX devices to be connected to single LEX. Contact Icron for details.
2. BlueRiver Manager (Demo Client) assumes the BlueRiver Encoders (TX) to host LEX type devices, while the Decoders (RX) host REX type devices.
    - This is a limitation of the BlueRiver Manager (Demo Client).
    - The BlueRiver Control API does have the capability to switch an Icron device from LEX to REX and vice versa.
3. For the BlueRiver Manager (Demo Client) to find all Icron devices, ensure that the Control System, i.e. BlueRiver Control Server, is connected to the 10G network. If control server is connected to the Gigabit port of one of the devices, this local Icron module will not be visible.

9.14 Device Management tab

The primary function of the Device Management tab is to update the device firmware.

9.14.1 Updating Device Firmware

Device firmware updates are done over the network. BlueRiver has a special update protocol that is used to update an individual device or consecutively update all discovered devices with a single command.

Semtech AptoVision Group provides firmware updates (bit streams) as a file archive (.apz file).

In preparation of the update, place a copy of the update file (.apz) into the `update` folder. This folder must exist in the same directory as where the BlueRiver Manager (Demo Client) is installed. The BlueRiver Control Server is then instructed to update devices from a selected file archive.

Example of where the update folder would need to be created:

```
C:\Program Files (x86)\BlueRiver\update
```

9.14.2 Performing Device Firmware Update

To update BlueRiver device firmware follow the step by step procedure outlined below:

1. If not already completed, copy the new BlueRiver update file (`.apz`) containing the firmware update into the `update` folder.
   - Contact Semtech AptoVision Products Group support team for latest version of firmware.
2. By default, the `update` folder is located in the same directory as the BlueRiver Control Server (API) executable.

   Important! If the `update` folder does not exist, it is necessary create it.
3. Then select the `Firmware Update` tab in the BlueRiver Manager (Demo Client).
4. The BlueRiver Manager (Client Demo) will automatically discover all devices currently active on the network. These devices are not divided by function but all shown under heading `All Devices`.

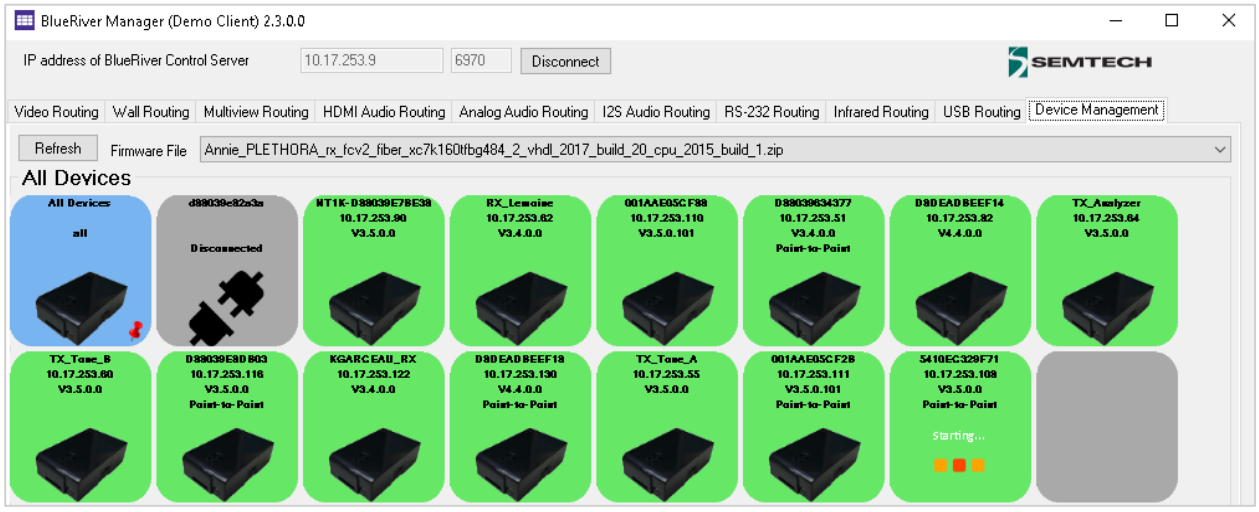

Figure 38: Device Management tab

5. Select the BlueRiver firmware update file (*.apz).

   a. Select update file from the drop-down box, located in the Device Management tab beside the heading `Firmware File`,.

      Example: `BlueRiver_rx_fcv2_fiber_build_3.5.apz`

6. From the BlueRiver Manager (Demo Client) right click over the tile that represents the BlueRiver device that is to be updated.

   If a device is selected to be programmed that is not compatible with the version selected, an error will be returned and device will fail to be programmed.

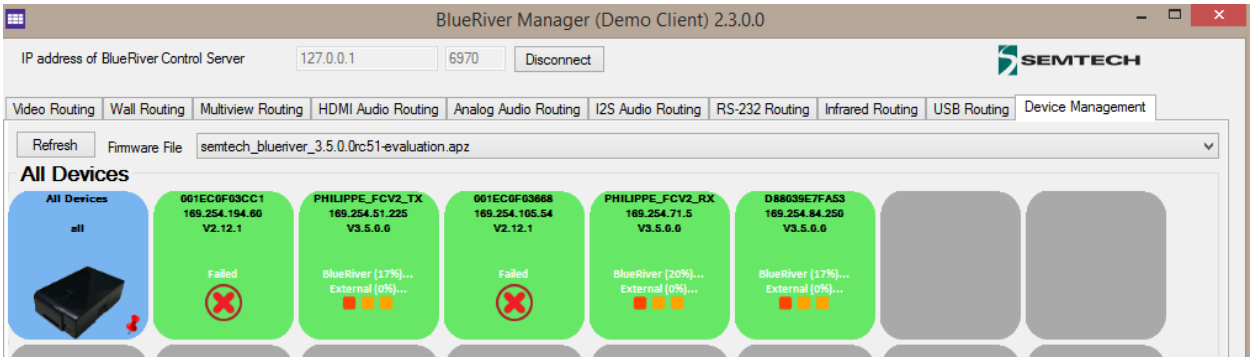

Figure 39: Example of programming status of BlueRiver devices (in progress and failed)

7. Begin the device update:

   a. To trigger upgrade of individual device, right-click over its associated device tile and select `Update Device`.

   b. To update all devices, right click over the blue tile labeled `All Devices` and select `Update Device`.

   Tip: If the error "Unable to connect to BlueRiver External Component Updater" is received, click `Yes` to proceed with the update.

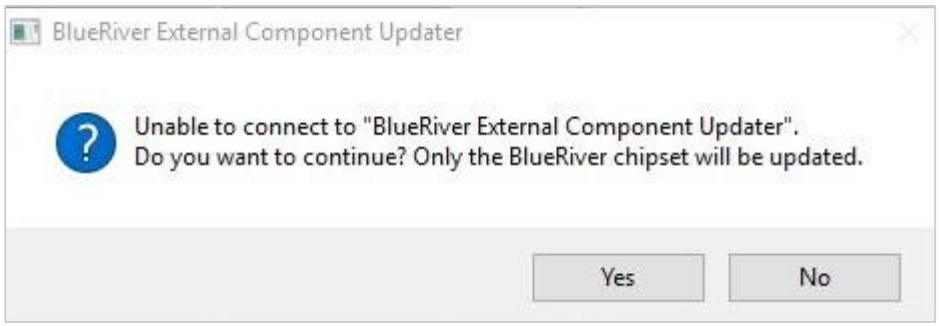

Figure 40: BlueRiver External Component Updater error

8. Selected device(s) will immediately begin to update their firmware.
9. The device tiles will show the progress of the update.
10. When the firmware update completes, the devices will provide a message to automatically initiate a reboot of all updated units.
11. Click on the `Reboot` button to initiate the reboot and apply the new firmware.
12. Once back on line verify the firmware version shown on the tile is the correct version.

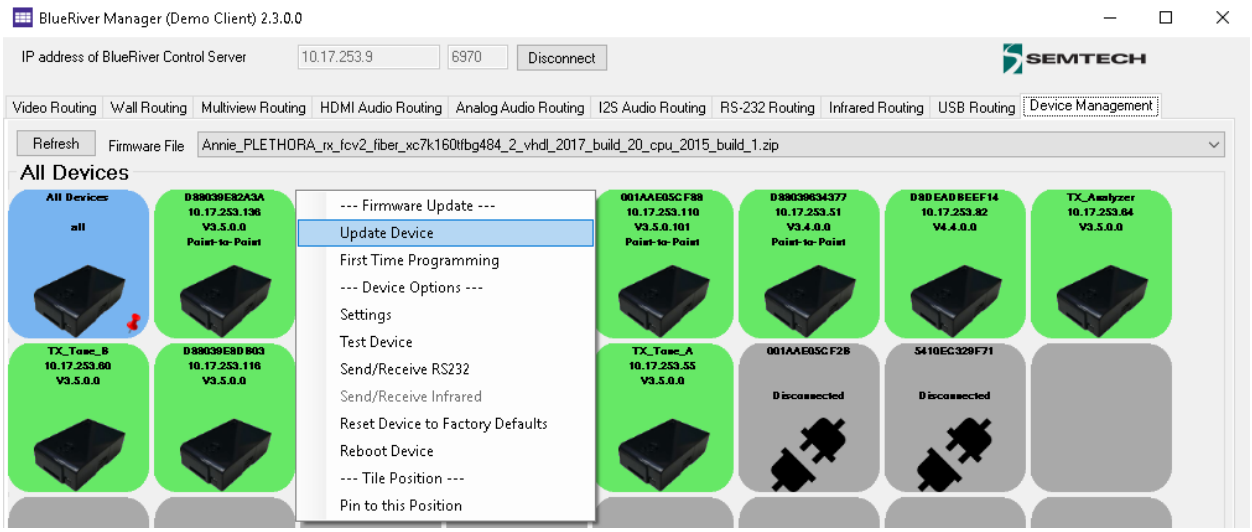

Figure 41: BlueRiver Device Update menu option

9.14.2.1 Managing the Update folder

If the "`update`" folder is not named this default name but was created with a different name, it is necessary to change the file's name in the BlueRiver Control Server configuration file.

To specify a different name for the update folder complete the following steps:

1. Go to the file folder where the BlueRiver Control Server (API) is installed and open the file labeled `blueriver.conf` with Notepad+ or another text editor.
2. Search for "`firmware_path`".
3. Replace `update` with the new folder name, for example `mettre_a_jour`.

Warnings!

i. Do not remove the `./` parameters.
ii. Also spaces are not supported.

For above example the firmware path would be modified as follows:

```
Firmware_path =./mettre_a_jour
```

Important! If the `'update'` folder does not exist, it is necessary create it with the name specified in the BlueRiver configuration file.

```
################################################################################
# Configuration file for BlueRiver Control Server
#
# Every line beginning with "#" is a comment line.
# There is one option per line.
################################################################################

#############################################################################
# Log File
#############################################################################
# The path must be Unix/Linux-style, even on Windows, where Cygwin is used.
# (e.g. C:\temp\blueriver.log becomes /cygdrive/c/temp/blueriver.log on Windows).
# Make sure the parent folder already exists. (it will not be created)
logfile_path         =./blueriver.log

# Allowed values, in decreasing order of severity:
#   NONE (no message will be logged/printed)
#   ERROR
#   WARNING
#   MESSAGE or DEFAULT
#   VERBOSE
#   DEBUG (Not for production use, log file will grow fast)
#   TRACE (Not for production use, log file will grow *very* fast)
logfile_log_level    = MESSAGE
stderr_log_level     = MESSAGE
stdout_log_level     = NONE

#############################################################################
# Firmware Update
#############################################################################
# The path must be Unix/Linux-style, even on Windows, where Cygwin is used.
# (e.g. C:\temp\update becomes /cygdrive/c/temp/update on Windows).
# Make sure the folder already exists. (it will not be created)
#
# Limitation: it is not possible to specify a relative path that goes up by
# more than one directory level (i.e. ../../update is not supported).
firmware_path =./update

# Maximum number of devices that can have their firmware updated at the same time. Other
# devices will wait for their turn.
max_concurrent_updates = 64
```

Figure 42: BlueRiver Configuration file (blueriver.conf)

10 Global Command Options and Settings

10.1 Device Options

To access a BlueRiver device's options, right mouse click over any device.

Available options include:

- `Update Device`
- `First Time Programming` (Production mode only)
- `Settings`
- `Test Device` (Production mode only)
- `Send/Receive RS-232`
- `Send/Receive Infrared`
- `Reboot Device`
- `Pin to Position`

Note: Device options are available only for detected devices (green tiles) from any of the BlueRiver Manager (Demo Client) tabs, Video Routing, HDMI Audio, etc.

Since some of the above have previously been covered this section will cover only the options not yet fully reviewed. This includes Settings, Reboot Device and Pin to Position.

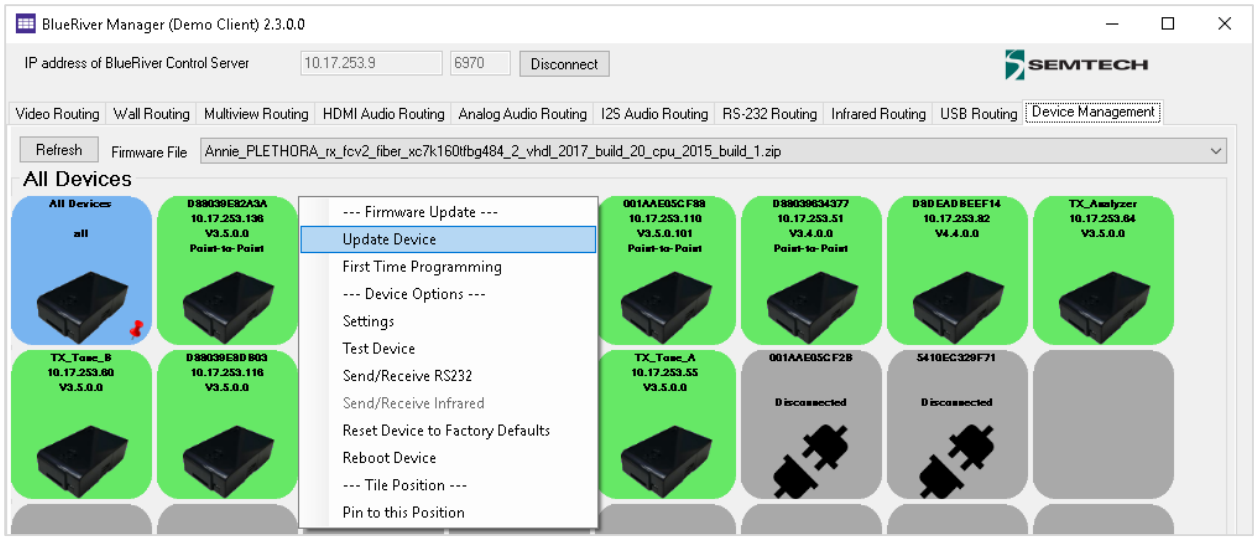

Figure 43: Right menu of the Device Management tab

10.1.1.1 Launching the Settings options

To launch the device `Settings` window:

1. Right click over the desired BlueRiver device tile, and from the menu that appears select `Settings`. These options are accessible from any of the `Routing` tabs.
2. The `Settings` option launches the `Configuration` window for the selected BlueRiver device.
3. The Configuration window presents access to the selected device's settings.

Comment: The settings provided for Decoders (RX) and Encoders (TX) are different. In the following sub-sections the decoder and encoder setting options are reviewed separately.

10.2 Decoder (RX) Settings options

In this section, the BlueRiver decoder (RX) device settings are reviewed in detail.

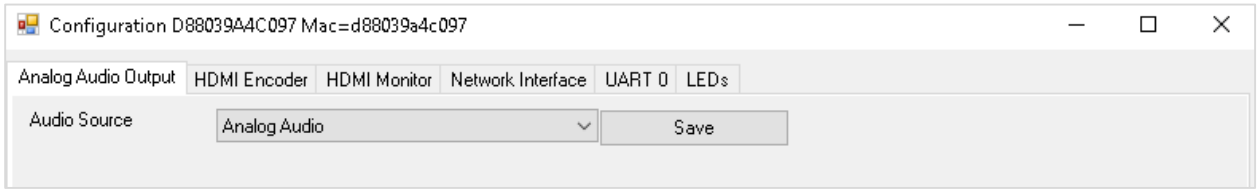

Figure 44: Example of Settings menu for a BlueRiver Receiver

10.2.1 Analog Audio Output Settings

This tab is used to manage the Audio source for the Analog Audio Output port.

There are three source options:

`Analog audio`:	Analog stream coming from an encoder
`HDMI Audio`:	2-channel downmixed version of the original HDMI audio from an encoder
`I2S Audio`:	I2S injected audio coming from an encoder

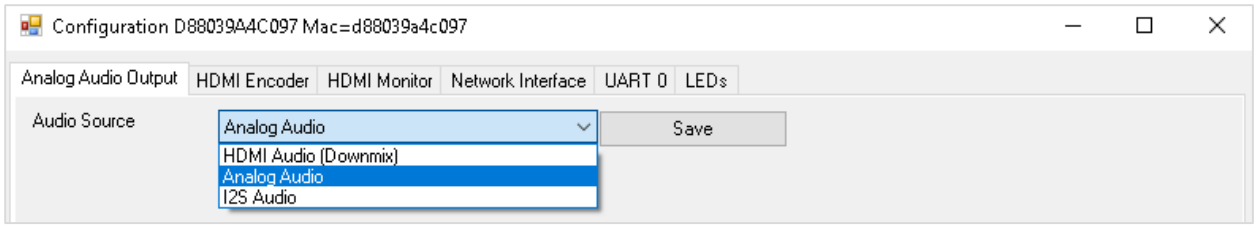

Figure 45: Analog Audio Output tab – Decoder (RX)

Note: Refer to the Audio Routing section of interest (HDMI Audio, Analog Audio or I2S Audio) for details on managing the Analog Audio Output.

10.2.2 HDMI Encoder Settings

The `HDMI Encoder` tab is used to control the audio source that will be fed out to the HDMI port.

The following options are available:

`HDMI Audio (HDMI Video in Genlock Mode)`: The original HDMI audio stream is received with the video from a BlueRiver encoder if the BlueRiver decoder is in Genlock mode. If the decoder is in any other video mode, then the HDMI audio is sent separately.

`Analog Audio`: The analog audio stream received from a BlueRiver encoder is embedded in the HDMI output.

`HDMI Audio (Stereo Downmix)`: The audio is embedded into the HDMI output signal. It is received as a separate HDMI audio stream from the BlueRiver encoder.

`HDMI Audio (All Available Channels)`: The multichannel audio (up to 8-channels) is embedded into the HDMI output signal. It is received as a separate HDMI audio stream from the BlueRiver encoder.

`I2S Audio`: Single I2S audio is injected into the HDMI output signal from the BlueRiver encoder.

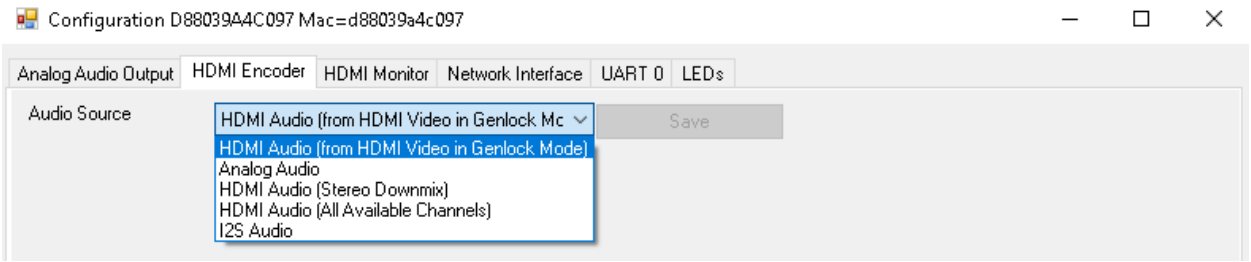

Figure 46: HDMI Encoder tab – Decoder (RX)

10.2.3 HDMI Monitor Settings

The `HDMI Monitor` tab provides the EDID information from the display that is connected to the BlueRiver Decoder (RX).

In addition, it is possible to save this information to a file.

- Use the `Save to File` button to save the EDID data to a file.
- Also, possible to select and copy the EDID Hex values directly (right click and select Copy) and paste this data into a text editor, such as Notepad or WordPad.

Comment: When there no display is connected to the Decoder the EDID view will be blank.

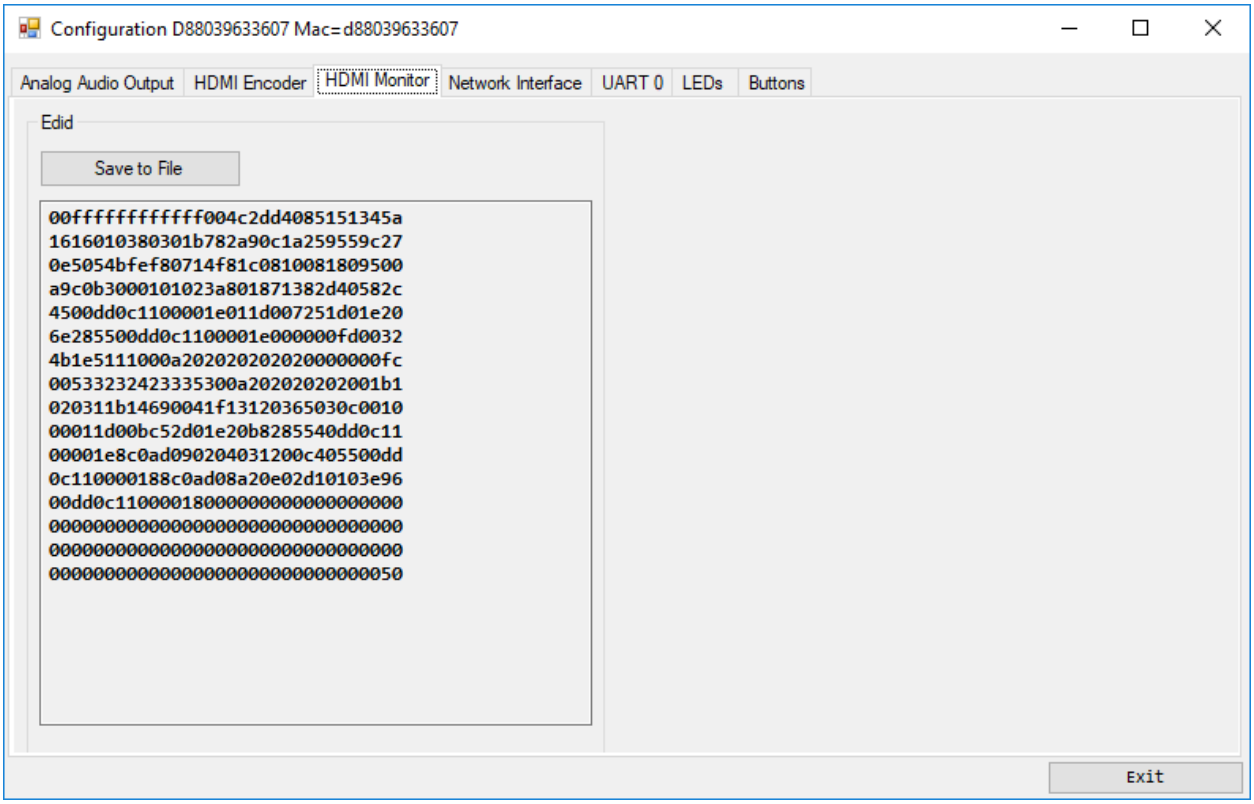

Figure 47: HDMI Monitor tab with EDID data present – Decoder (RX)

10.2.4 Decoder Network Interface Settings

The `Network Interface` tab is used to manage the device's network settings, including its `hostname` and `IP address` settings.

10.2.4.1 Device Host Name

By default, the device hostname equals the device's BlueRiver chipset MAC address.

Note: The BlueRiver Control Server API commands use the BlueRiver chipset MAC address as the device ID.

1. To rename a device, in the `Hostname` field enter the desired name. Example: `Decoder_room1`.
2. Then click the `Save` button to apply the new host name.

Note: The host name is persistent if a BlueRiver device is repowered. It is however, erased and set back to the MAC address if a device is forced back to factory default settings.

10.2.4.2 Device IP Address

Two options are supported for the IP address:

- `DHCP`
- `Manual`

Comment: For the BlueRiver evaluation devices, `DHCP` is the factory default mode.

To set a BlueRiver device in DHCP:

1. From the `Configuration` window, select the `Network Interface` tab.
2. Then beside the heading IP Mode, select **`DHCP`** from the drop-down list provided.
3. The BlueRiver Control Server will search for DHCP server.
4. In the event, there is no DHCP server present the IP will be assigned an Auto-IP address in the 169.254.X.X range. This is the default IP address range assigned by the BlueRiver Control Server.
5. Click `Save` to apply the setting.

To set a static/manual IP address (IPV4 address, subnet mask and gateway address):

1. From the `Network Interface` tab, `IP Mode` drop-down list, select `Manual`.
2. Then enter the desired IP information (IP Address/Mask/Gateway) and click `Save` to apply the change.

Note: IP settings are persistent if a BlueRiver device is repowered. However, if a device is forced back to factory default settings the IP settings are erased and the default factory setting of DHCP is applied.

Warning! Special attention is required when assigning a Manual IP address. The address must be both unique and reachable. Any mistake when entering the IP address, Subnet Mask or Gateway address can result in the device being unreachable.

Comment: For more details regarding BlueRiver network management and requirements, refer to the BlueRiver platform Technical Overview Guide (ug-0022).

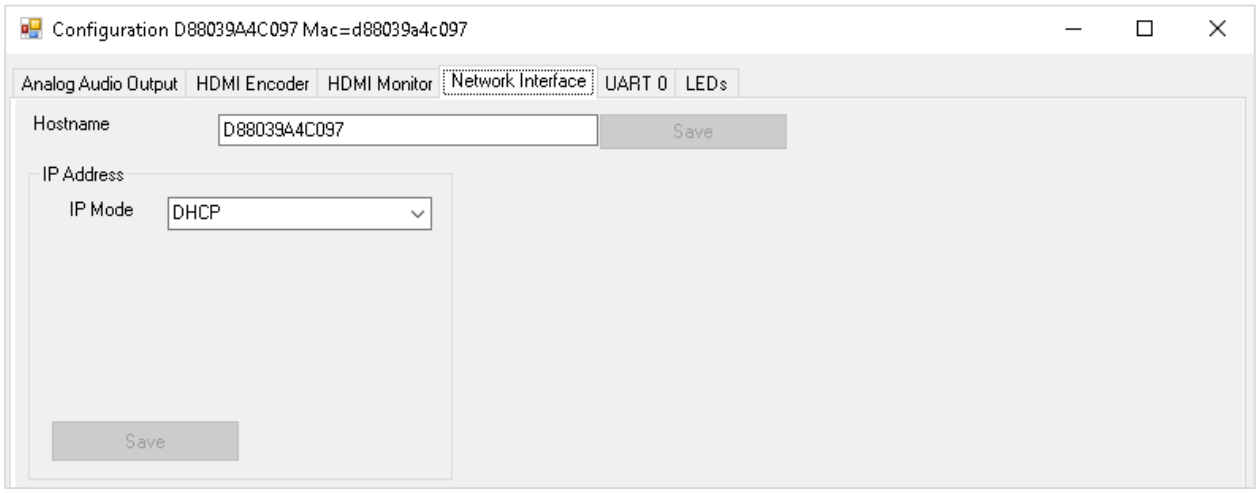

Figure 48: Network Interface tab DHCP mode– Decoder (RX)

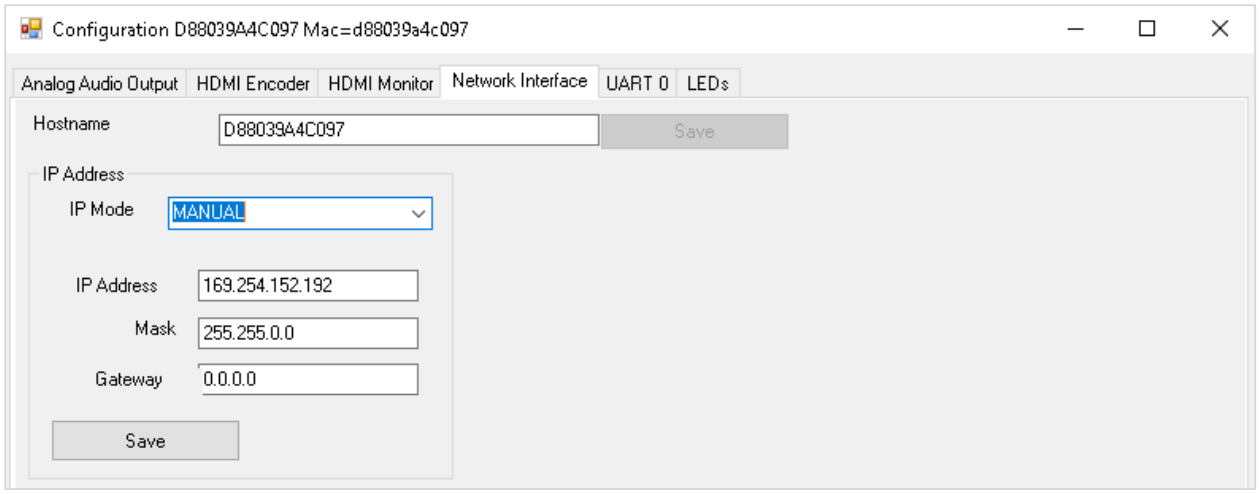

Figure 49: Network Interface tab Manual mode– Decoder (RX)

10.2.5 UART Settings

The `UART` tab is used to manage the UART and RS-232 settings.

1. From the `Configuration` window, select the appropriate `UART` tab.

   Note: Based on the hardware design of the BlueRiver decoder or encoder it is possible to have up to four UART ports present. A separate tab is shown for each, `UART 0` through to `UART 3`.

2. Under the `Parameters` settings, select the appropriate port settings for each:

   - `Baud Rate`
   - `Data Bit`
   - `Stop Bit`
   - `Parity`

3. Click the `Save` button to apply the updated RS-232 configuration.

Note: The `UART` settings are persistent if a device is repowered. However, they are reset back to default settings if a factory reset is performed.

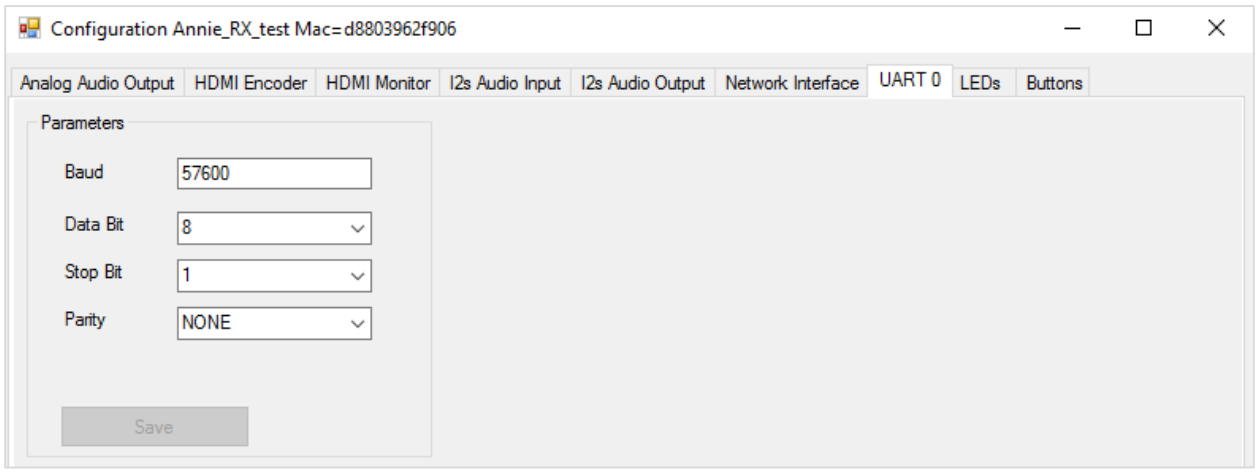

Figure 50: UART 0 tab – Decoder (RX)

10.2.6 LEDs Settings

The `LEDs` tab is used to manage and control the state of external LEDs. Each LED has a specific function by default, such as Power On, Video Indicator or 10G activity.

It is possible to overwrite the default LED function, it can be turned permanently `ON`, `OFF` or set to `BLINK`. The latter is often useful when it is necessary to identify a specific physical unit located in a rack.

1. From the `Configuration` window, select the `LEDs` tab.
2. From the drop-down list provided, select the desired LED state beside each LED provided.
3. Then click the `Save` button next to the LED to apply the changes.

Note: The LEDs settings are persistent if a unit is repowered. They will however, be erased if a device is forced back to factory default settings.

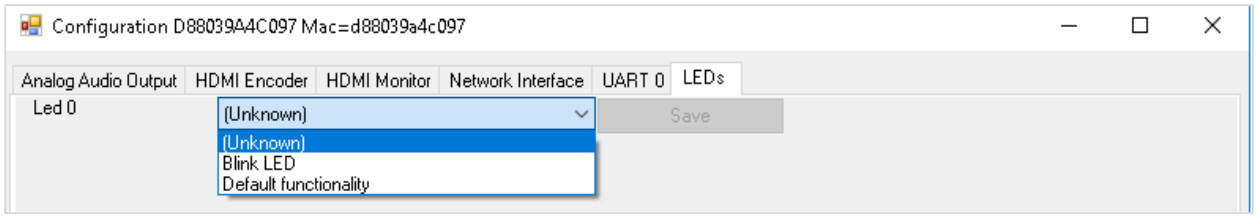

Figure 51: LEDs tab – Decoder (RX)

10.2.7 Buttons Settings

Based on the hardware design, the `Buttons` tab may be available to manage and control the function of the device's push button(s). The Push buttons have predefined functions that can be enabled or disabled.

1. From the `Configuration` window, select the `Buttons` tab.
2. Beside the appropriate button, i.e. Button 0, select either the desired function from the drop-down list provided or `No action`.
3. Then click the `Save` button next to the button that is to have the changes applied.

Button 0

- Button 0 is button `sw(1)` in legacy BlueRiver hardware reference design.
- The button is labeled '`P2`' on BlueRiver Evaluation devices. Current available function for Button 0 on Decoder (RX) units is: `Send monitor EDID to all transmitter devices`.
- This option is disabled by default.

Button 1

- Button 1 is push button `sw(2)` in BlueRiver hardware reference design.
- Also, the button is labeled 'P1' on BlueRiver Evaluation Units.
- No function is currently assigned to Button 1.

Note: In newer BlueRiver hardware reference designs, such as Taizi, push buttons are managed through the external microprocessor and not controlled through the BlueRiver Control Server.

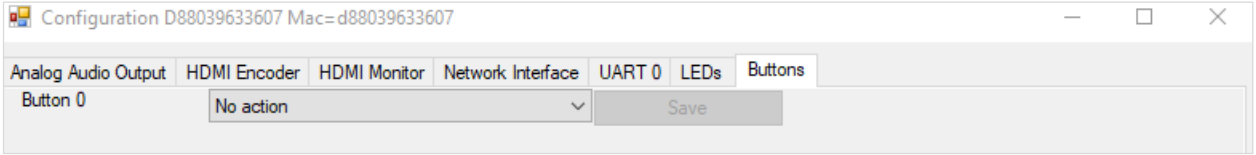

Figure 52: Buttons tab – Decoder (RX)

10.3 Encoder (TX) Settings options

The following section illustrates the BlueRiver encoder (TX) device settings dialog box.

10.3.1 Analog Audio Input/Output Settings

This tab is used to manage the Audio direction for the Analog Audio Output port.

The direction can set to either Audio In or Audio Out.

1. Select the `Analog Audio Input Output` tab.
2. Beside the heading `Direction`, select from the drop-down list provided the Analog Audio direction, either `INPUT` or `OUTPUT`.
3. Once the direction is selected click the `Save` button located next to the direction drop-down list to apply the change.

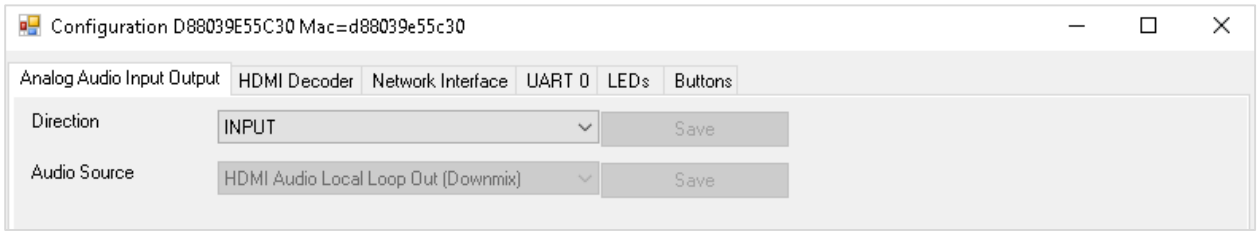

Figure 53: Analog Audio Output tab – Encoder (TX)

Notes:

i. When configured as an Input, Analog audio source can be connected to the BlueRiver encoder (TX) and the audio then routed to one or more BlueRiver decoders (RX).

ii. When configured as an output, the BlueRiver encoder (TX) breaks out the 2-channel downmixed version (NT2000 chipset only) of the HDMI audio coming into the encoder (TX). It can then be sent out through the local Analog Audio port or I2S Audio (Audio return channel).

iii. For the Audio Output to function, the initial HDMI audio must be uncompressed LPCM audio. BlueRiver NT2000 downmix does not support any Dolby, DTS or compressed audio.

iv. For details on the BlueRiver audio capabilities refer to the BlueRiver platform Technical Overview Guide (ug-0022).

10.3.2 HDMI Decoder Settings

The `HDMI Decoder` tab is used to access and manipulate the BlueRiver encoder (TX) EDID display data; it reveals to the source BlueRiver devices the ability to change, save or load EDID data from a file.

1. Select the `HDMI Decoder` tab.
2. If prompted, select the input port is available from the drop-down list provided and then click the `Save` button.

`HDMI Input 1`
`Display Port Input` (BlueRiver Duke hardware design only)
`Automatic Selection` If both the HDMI and Display Port are connected, the HDMI input will take precedence.

3. If it is desired that the BlueRiver encoder (TX) not support HDCP 2.2 then select the check box labeled, `Disable HDCP 2.2. Support`.

Notes:

i. If HDCP support is disabled, streaming video from a HDCP source to a display will result in a black image being displayed on the screen.

ii. It is possible to enable only `HDCP 1.4` by checking the `Disable HDCP 2.2 Support`.

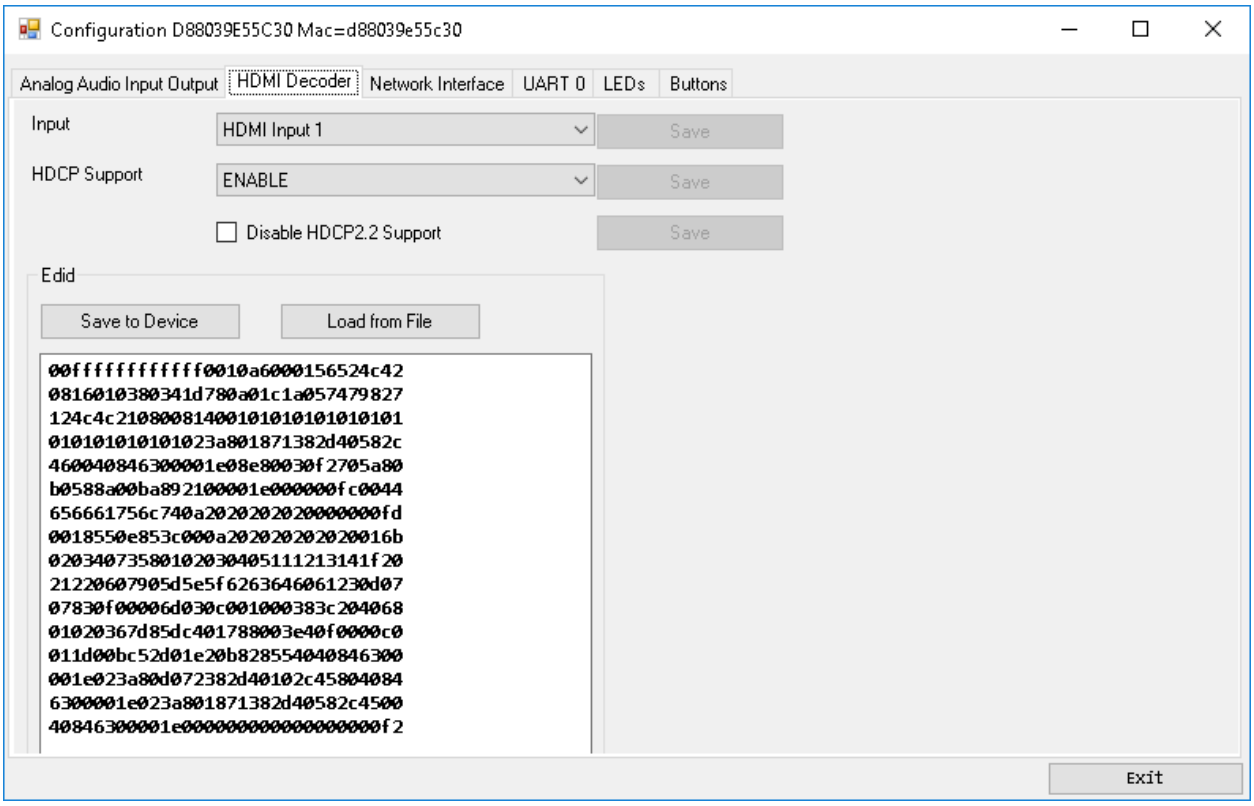

Figure 54: HDMI Decoder tab – Encoder TX

10.3.3 Encoder Network Interface Settings

The `Network Interface` tab is used to manage the device's network settings, including its `hostname` and `IP address` settings.

10.3.3.1 Device Host Name

By default, the device hostname equals the device's BlueRiver chipset MAC address.

Note: The BlueRiver Control Server API commands use the BlueRiver device MAC address as the device ID.

1. To rename a device, in the `Hostname` field enter the desired name. Example: `Encoder_room1`.
2. Then click the `Save` button to apply the new host name.

Note: The host name is persistent if a BlueRiver device is repowered. It is however, erased and set back to the MAC address if a device is forced back to factory default settings.

10.3.3.2 Device IP Address

Two options are supported for the IP address:

- DHCP
- Manual

Comment: For the BlueRiver evaluation devices, DHCP is the factory default mode.

To set a BlueRiver device in DHCP:

1. From the Configuration window, select the Network Interface tab.
2. Then beside the heading IP Mode, select DHCP from the drop-down list provided.
3. The BlueRiver Control Server will search for DHCP server.
4. In the event, there is no DHCP server present the IP will be assigned an Auto-IP address in the 169.254.X.X range. This is the default IP address range assigned by the BlueRiver Control Server.
5. Click Save to apply the setting.

To set a static/manual IP address (IPV4 address, subnet mask and gateway address):

1. From the Network Interface tab, IP Mode drop-down list, select Manual.
2. Then enter the desired IP information (IP Address/Mask/Gateway) and click Save to apply the change.

Note: IP settings are persistent if a BlueRiver device is repowered. However, if a device is forced back to factory default settings the IP settings are erased and the default factory setting of DHCP is applied.

Warning! Special attention is required when assigning a Manual IP address. The address must be both unique and reachable. Any mistake when entering the IP address, Subnet Mask or Gateway address can result in the device being unreachable.

Comment: For more details regarding BlueRiver network management and requirements, refer to the BlueRiver platform Technical Overview Guide (ug-0022).

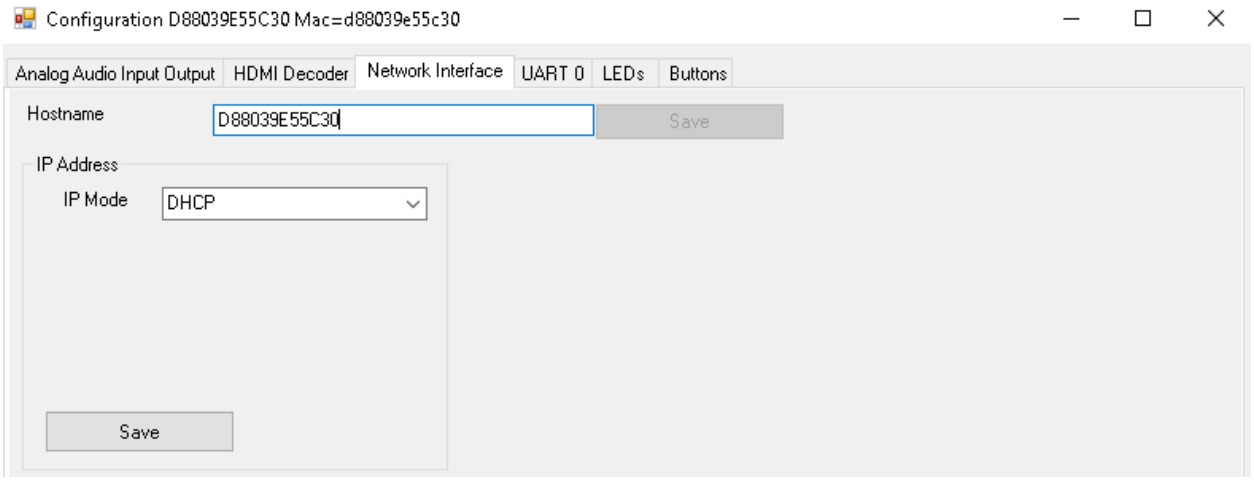

Figure 55: Network Interface tab – Encoder (TX)

10.3.4 UART Settings

The UART tab is used to manage the UART and RS-232 settings.

1. From the Configuration window, select the UART 0 tab.

   Note: Based on the hardware design of the BlueRiver decoder or encoder it is possible to have up to four UART ports present. A separate tab is shown for each, UART 0 through to UART 3.

2. Under the Parameters settings, select the appropriate port settings for each:

   - Baud Rate
   - Data Bit
   - Stop Bit
   - Parity

3. Click the Save button to apply the updated RS-232 configuration.

Note: The UART settings are persistent if a device is repowered. However, they are reset back to default settings if a factory reset is performed.

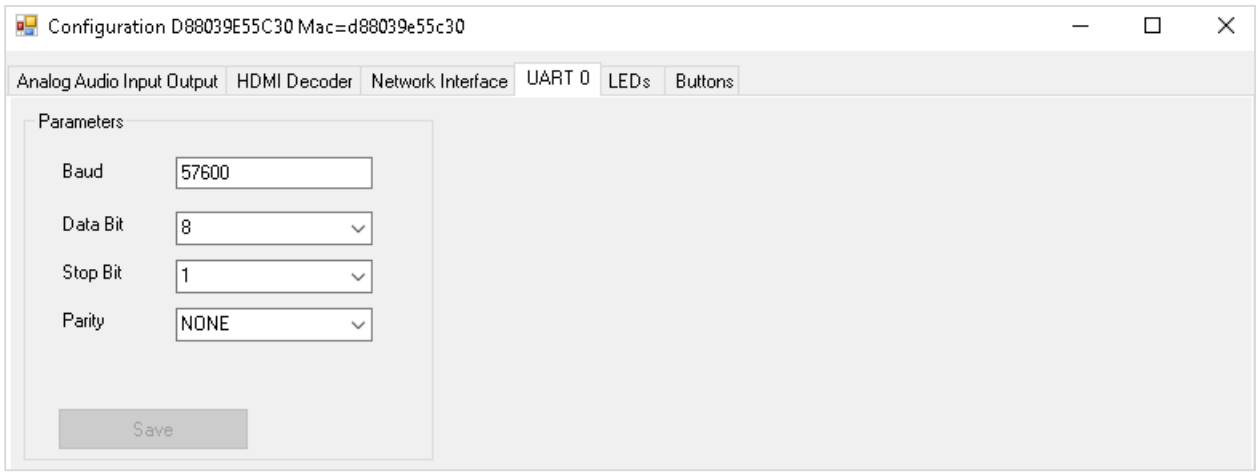

Figure 56: UART 0 tab – Encoder TX

10.3.5 LEDs Settings

The LEDs tab is used to manage and control the state of the external LEDs. Each LED has a specific function by default, such as Power On, Video Indicator or 10G activity.

It is possible to overwrite the default LED function, it can be turned permanently ON, OFF or set to BLINK. The latter is often useful when it is necessary to identify a specific physical unit located in a rack.

1. From the Configuration window, select the LEDs tab.
2. From the drop-down list provided, select the desired LED state beside each LED provided, potentially there is three options available:

   a. Unknown
   b. Blink LED
   c. Default functionality

3. Then click the Save button next to the LED to apply the changes.

Note: The LEDs settings are persistent if a unit is repowered. They will however, be erased if a device is forced back to factory default settings.

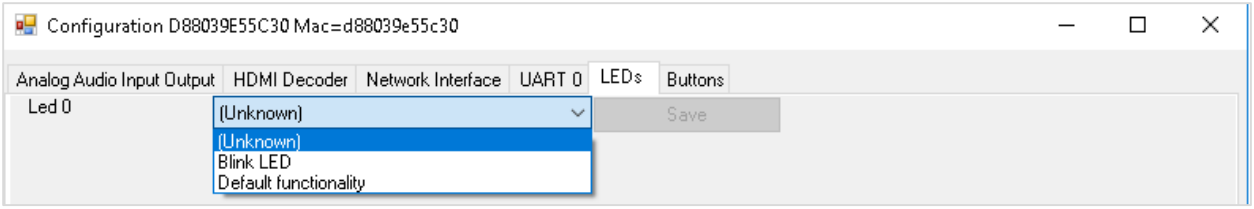

Figure 57: LEDs tab – Encoder (TX)

10.3.6 Buttons Settings

Based on the hardware design, the `Buttons` tab may be available to manage and control the function of the device's push button(s). The Push buttons have predefined functions that can be enabled or disabled.

1. From the `Configuration` window, select the `Buttons` tab.
2. Beside the appropriate button, i.e. Button 0, select either the desired function from the drop-down provided or `No action`.
3. Then click the `Save` button next to the button that is to have the changes applied.

Button 0

- Button 0 is button `sw(1)` in legacy BlueRiver hardware reference design.
- The button is labeled '`P2`' on BlueRiver Evaluation devices. Current available function for Button 0 on Decoder (RX) units is: `Send monitor EDID to all transmitter devices`.
- This option is disabled by default.

Button 1

- Button 1 is push button `sw(2)` in BlueRiver hardware reference design.
- Also, the button is labeled 'P1' on BlueRiver Evaluation Units.
- No function is currently assigned to Button 1.

Note: In newer BlueRiver hardware reference designs, such as Taizi, push buttons are managed through the external microprocessor and presently not controlled or managed through the BlueRiver Control Server.

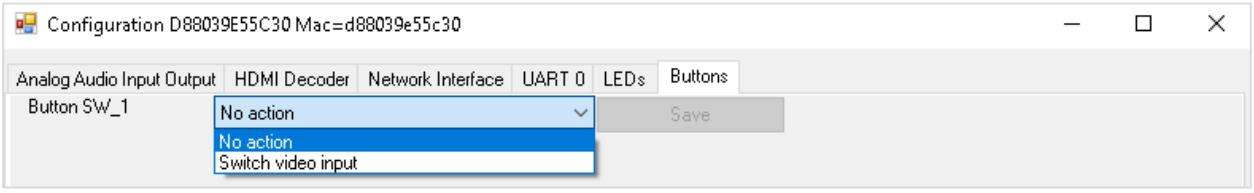

Figure 58: Buttons tab – Encoder (TX)

10.4 Device Options available to both Decoders and Encoders

The following options are available from the BlueRiver Manager (Demo Client) device menu of both BlueRiver decoders and encoders.

10.4.1 Send/Receive RS-232

For details of sending and viewing RS-232 data refer to Section 9.11.2 Sending RS-232 data.

10.4.2 Send/Receive Infrared

For details of sending and viewing IR data refer to Section 9.12.2 Sending Infrared data.

10.4.3 Reboot device

This option allows for a device to be rebooted easily from the BlueRiver Manager (Demo Client).

1. Right mouse click over the BlueRiver device to be rebooted.
2. Select `Reboot` from the menu options listed in the device menu.

   Note: The tile representing the device will disappear from the GUI and then re-appear once the reboot has been completed.

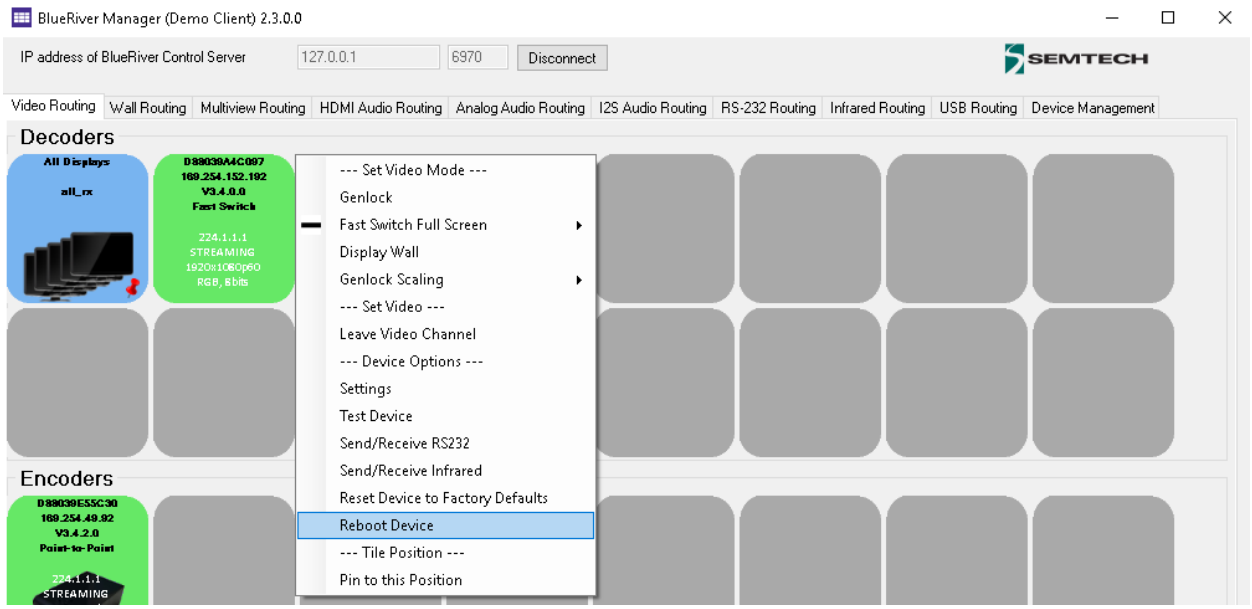

Figure 59: Reboot option for BlueRiver decoder (RX)

10.4.4 Reset Device to Factory Defaults

This option allows for a device to be rebooted easily from the BlueRiver Manager (Demo Client).

1. Right mouse click over the BlueRiver device to be restored to factory settings.
2. Select `Reset to Factory Defaults` from the menu options listed in the device menu.
3. Device will be restored to the factory default settings that were stored in the firmware file it was programmed with. If these settings are customer specific they will be reset successfully.
4. Once notice received that device restored to factory defaults, it is necessary to reboot the device.
5. Right mouse click over the BlueRiver device that was restored to factory settings and select Reboot Device from the menu.

   Note: The tile representing the device will disappear from the GUI and then re-appear once the reset has been completed.

10.4.5 Tile Position

When the BlueRiver Manager (Demo Client) is resized, the device tiles will potentially change their current position and move elsewhere. To prevent a tile from changing its position it is possible to "`pin`" a device tile to a location.

To pin a tile's position:

1. From the BlueRiver Manager (Demo Client) right click over the tile that is to have its position pinned.
2. In the menu that appears select the option `Pin to this position`.
3. An image of a pin will occur in the bottom right corner of the tile indicating it has been pinned to the current position.

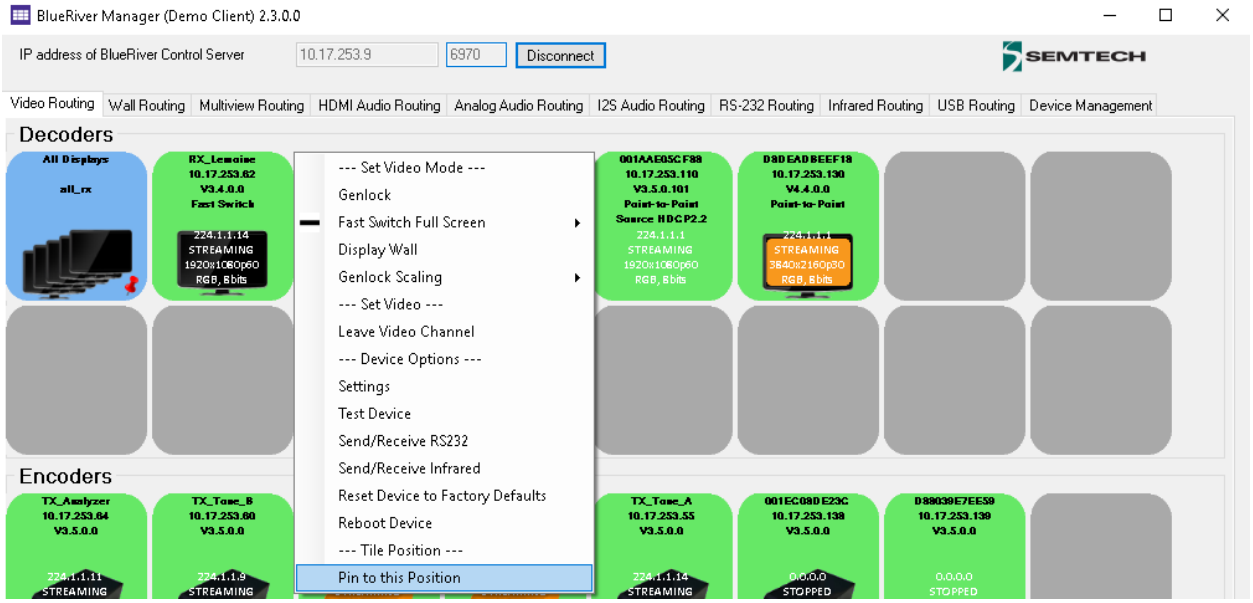

Figure 60: Pin to this Position option of BlueRiver device menu

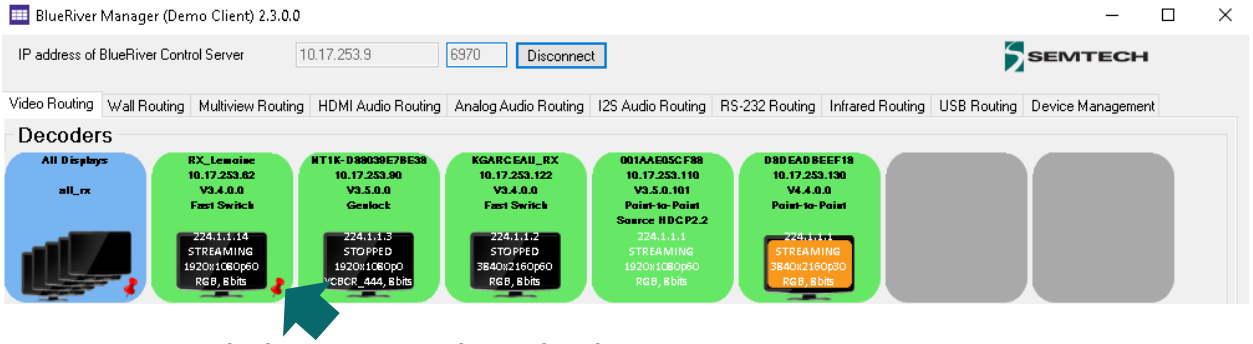

Figure 61: Example showing a pinned Decoder tile

4. To unpin a tile, repeat the above process. The pin will be removed indicating the tile is no longer pinned to the location.

NOTE: The BlueRiver Manager (Demo Client) version loses the pin position when devices are disconnected from the network and then reconnected or when a device disconnects from the BlueRiver Control Server (API).

10.5 All Devices tile

The BlueRiver Manager (Demo Client) supports issuing commands to all BlueRiver decoders or All BlueRiver devices simultaneously. The menu presented is relevant to the selected tab.

The command issued performs as described for the command elsewhere in this document but is applied to all currently active BlueRiver devices (green tiles).

Example, if Update Device selected all highlighted tiles will have the selected update file applied.

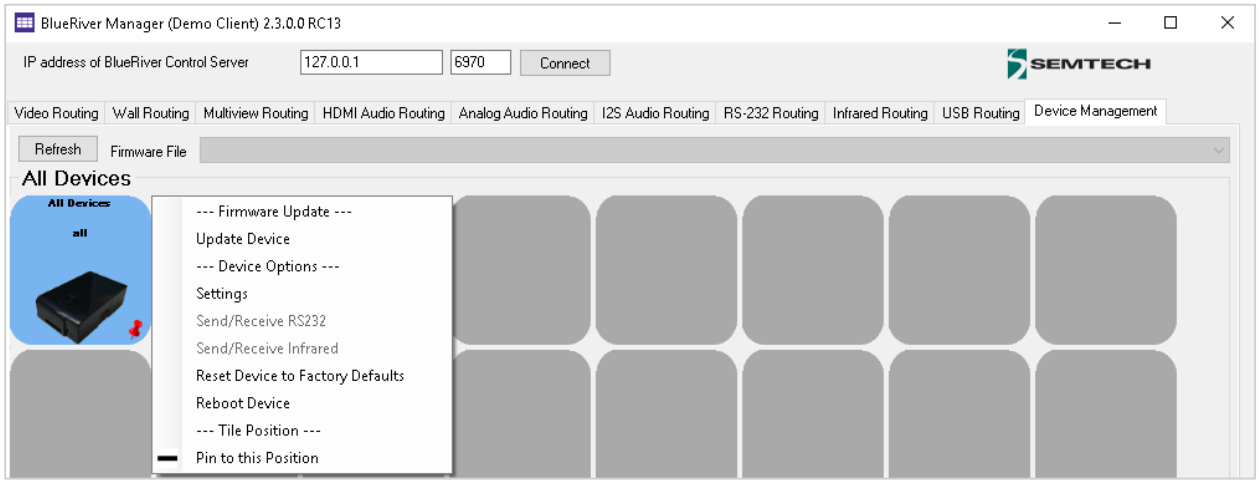

Figure 62: Example of All Devices tile of the Device Management tab

11 BlueRiver Manager Advanced mode

The BlueRiver Manager (Demo Client) has an additional command set available with the following advanced functions:

- Memory test for the BlueRiver chipset
- First-time programming
- Enabling programming of the Icron USBExtreme.

11.1 Launching BlueRiver Manager in Advanced mode

To launch the BlueRiver Manager (Demo Client) in advanced mode it is necessary to run the blue_river_manager.exe file through either a command prompt or by creating a shortcut pointing to this .exe file with the -a option included.

1. Launch the BlueRiver Manager (Demo Client) in advanced mode.
    a. Open a command prompt and change to the directory where the BlueRiver Manager executable (blueriver_manager.exe) file is located.

        Example: `C:\Program Files (x86)\Semtech\`

    b. Then launch the BlueRiver Manager (Demo Client) in advanced mode.

        a. This is done by adding -a to the executable, so type at the command prompt:

        ```
        blueriver_manager.exe -a
        ```

Notes:

i. If the BlueRiver Manager (Demo Client) is to be used frequently in the advanced mode it is possible to create a desktop shortcut to launch it in this mode.

ii. Be sure to create the shortcut using `blueriver_manager.exe -a`.

Example if installed in default folder the shortcut path is:

```
"C:\Program Files (x86)\Semtech\blueriver_manager.exe" -a
```

iii. Do not use the BlueRiver shortcut created when the BlueRiver Evaluation kit was installed. This shortcut points to a different .exe file that launches the BlueRiver Manager, BlueRiver Control Server and BlueRiver External Component Updater simultaneously.

iv. Prior to launching the BlueRiver Manager (Demo Client) it is necessary to first launch the BlueRiver Control Server. Refer to section 2 Starting the BlueRiver Manager (Demo Client).

2. The BlueRiver Manager (Demo Client) graphical user interface will load in the advanced mode allowing access to additional advanced options.

11.2 First Time Programming

It is possible to reprogram a BlueRiver chipset with an initial programming image after the first-time programming was previously completed. The option is present from the BlueRiver Manager (Demo Client) when it is run in the advanced mode. This option is labeled as `First Time Programming` and has been supported since version 2.3.0.0 in the BlueRiver Manager (Demo Client) 2.3.0.0.

Note: Initial programming is typically part of production or done in a lab environment on beta hardware. The full process involves programming additional external elements to the BlueRiver chipset, such as the Kintex-7 160T or Aquantia AQLX107. Initial programming can also involve programming an external microprocessor or HDMI interface. These are not normally completed during the evaluation of the BlueRiver platform so are not covered in detail in this documentation. For details on the first-time programming of virgin BlueRiver hardware refer to the application note, BlueRiver Initial Programming How-to (an_0025).

Follow the steps outlined below to program a BlueRiver chipset to initial programming state:

1. Start the BlueRiver Manager (Demo Client) in the `advanced` mode.
2. Select the `Device Management` tab.
3. Select the BlueRiver firmware update file (*.apz).
    a. Select update file from the drop-down box, located in the Device Management tab beside the heading `Firmware File`,.

    Example: `BlueRiver_rx_fcv2_fiber_build_3.5.apz`
4. The BlueRiver Manager (Demo Client) automatically detects the devices that are available on the network and illustrates them as green tiles.
5. From the BlueRiver Manager (Demo Client) right click over the tile that represents the BlueRiver device that is to be programmed to initial programming state.

    If a device is selected to be programmed that is not compatible with the version selected, an error will be returned and device will fail to be programmed.

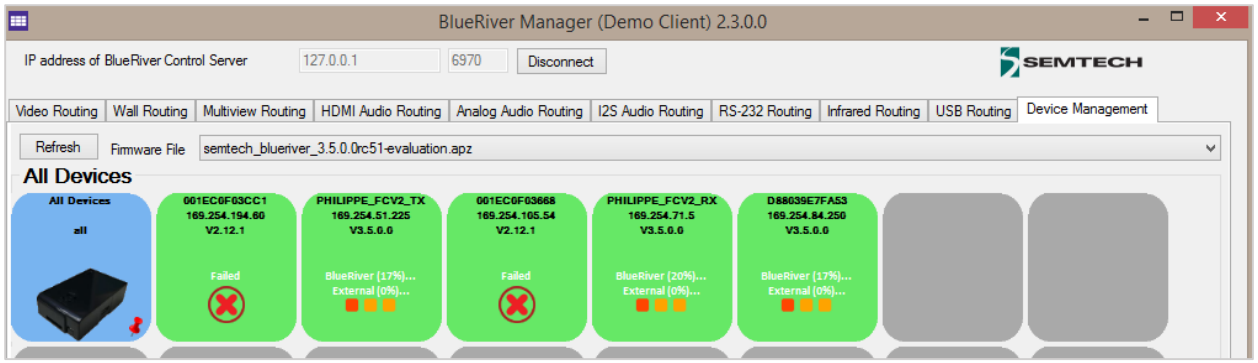

Figure 63: Example of programming status of BlueRiver devices (in progress and failed)

6. In the menu that appears select the option `First Time Programming`.
7. In the window that appears enter the Vendor ID and Product ID.
    a. `Vendor ID` provided by Semtech BlueRiver support.
    b. `Product ID` also currently provided by Semtech BlueRiver support.
    c. Click `Okay`.

Warning! Ensure that the vendor ID and product ID entered are correct for the product. Mistakenly entering the vendor ID or product ID of an incorrect product can render the device incapable of communicating over the network (i.e. bricked). To resolve this situation, the full first time programming procedure would then be required. This process requires tools typically only available in a manufacturing or R&D laboratory environment. Refer to the application note BlueRiver Initial Programming Guide (an-0025) for details.

Tip: If the above situation does occur prior to resorting to the full initial programming procedure, try to complete the initial programming from the 1GbE port on the BlueRiver device using the BlueRiver Manager (Demo Client). Use this procedure as outlined.

8. BlueRiver Manager (Demo Client) will proceed to apply the initial programming to the selected BlueRiver device.
9. Once completed reboot the device to complete the initialization.

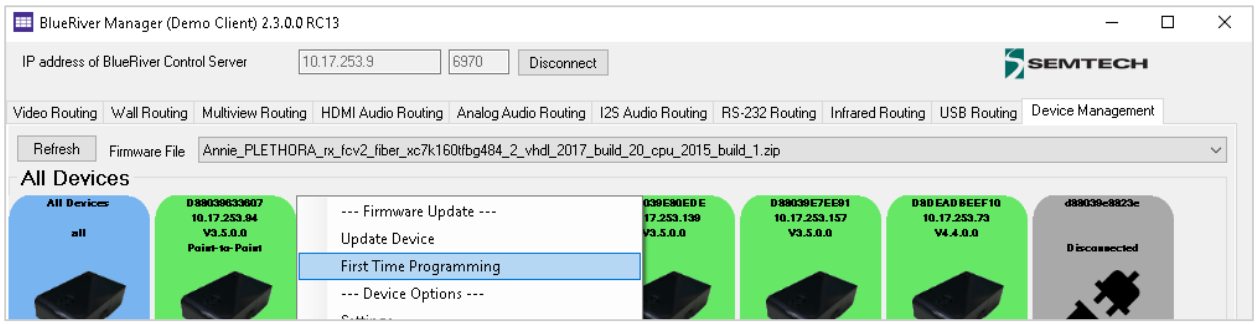

Figure 64: First Time Programming menu

11.3 Test Device

It is possible to test a BlueRiver chipset from the BlueRiver Manager (Demo Client) when it is run in the advanced mode.

To run a memory test of a BlueRiver chipset:

1. Start the BlueRiver Manager (Demo Client) in the advanced mode.
2. From the BlueRiver Manager (Demo Client) right click over the tile that is to be programmed to initial programming state.
3. In the menu that appears select the option `First Time Programming`.
4. In the window that appears enter the Vendor ID and Product ID.
    a. Vendor ID provided by Semtech BlueRiver support.
    b. Product ID also currently provided by Semtech BlueRiver support.
    c. Click Okay.
5. BlueRiver Manager (Demo Client) will proceed to apply the initial programming to the selected BlueRiver device.
6. Once completed reboot the device to complete the initialization.

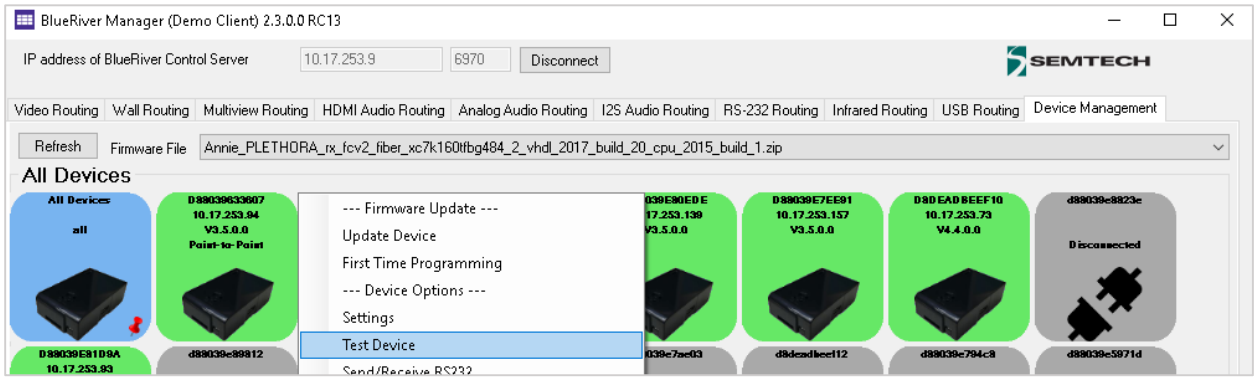

Figure 65: Test Device menu

11.4 Enable/Disable USB Programming

When run in the advanced mode, it is possible to enable or disable the ability to program the Icron USBExtreme IC from the BlueRiver Manager (Demo Client).

Important! The Icron USBExtreme IC is programmed using the Icron **Express link software** in conjunction with the BlueRiver Manager (Demo Client).

Refer to the Semtech Icron ExtremeUSB Programming Procedure User Guide (ug_0011). for the details on the procedure required to be followed to program the Icron USBExtreme IC.

To enable or disable the programming of the Icron USBExtreme IC:

1. Start the BlueRiver Manager (Demo Client) in the advanced mode.
2. From the BlueRiver Manager (Demo Client) select a tab, example `USB Routing`, right click over the BlueRiver device that is to be programmed.
3. Then from the menu that appears select the appropriate Icron option:
    a. `Enable Program Icron Chip by RS232`
    b. `Enable Program IctronEeprom by RS232`
    c. `Disble Program Icron by RS232`

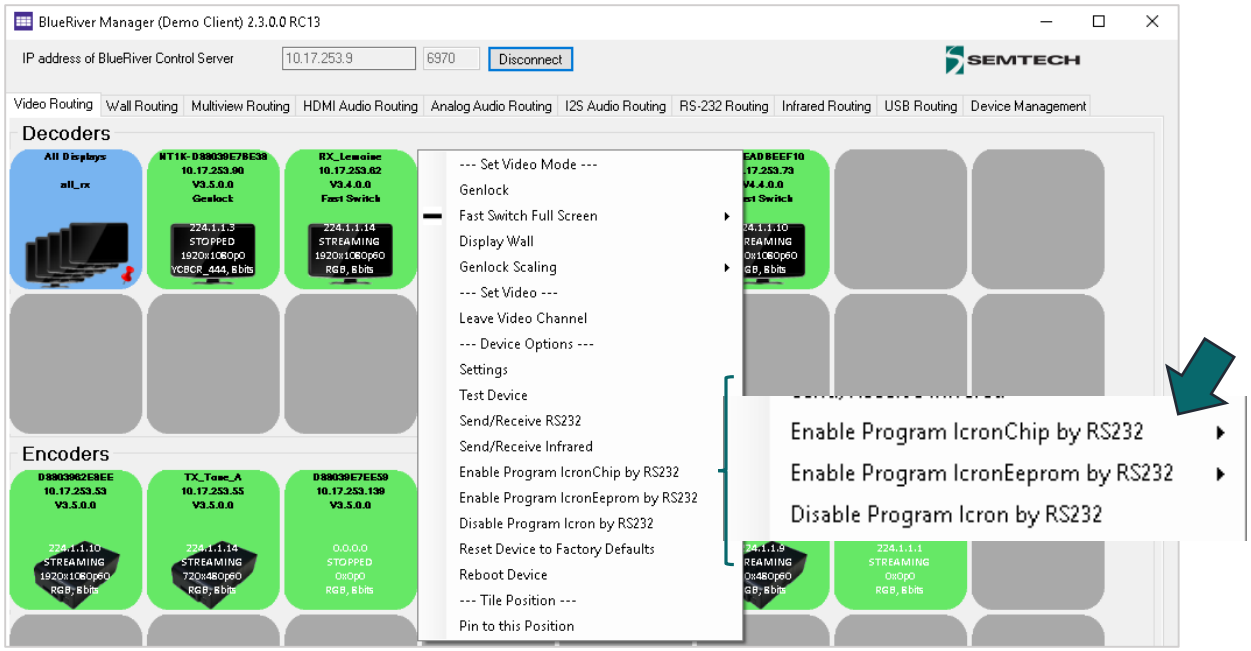

Figure 66: Example of the BlueRiver Manager (DEMO Client) interface – Enable program of Icron Chip

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