

RELAY

AoIP Stream Monitor

User Guide

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To obtain the latest documentation and software downloads, please visit:

www.lawo.com/lawo-downloads

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1. Introduction

Welcome to **AoIP Stream Monitor**.

About this Manual

This document describes how to install, configure and operate the system.

Look out for the following which indicate:

Notes - points of clarification.

Tips - useful tips and short cuts.

Attention: Alert you when an action should *always* be observed.

Software Updates

The latest User Guides and software are available from the **Downloads** area at www.lawo.com (after **Login**).

Lawo User Registration

For access to the **Downloads** area and to receive regular product updates, please register at:

www.lawo.com/registration.

2. Product Overview

AoIP Stream Monitor can be used to check the status of audio streams on an AES67/RAVENNA network. It provides a useful diagnostics tool for master control and service technicians.

The software must be installed on a Windows PC, and can run either as an application or service. This allows the GUI to connect either to your local computer (localhost) or a remote PC on the network.

Stream Monitor GUI



The GUI provides live monitoring of up to 16 streams, where each stream can be mono, stereo or multi-channel.

➤ To assign a stream to one of the monitoring windows, click on the stream number. Then use the "[Available Streams](#)" dialog box to ADD (or REMOVE) a stream.

Once assigned, each monitoring window provides the following information:

- **Stream Name** – this is the string used to identify the stream to the network.
- **Peak Level Metering** – the blue bargraphs show the peak level of the individual audio channels (in dBFS). The bargraph size is automatically adjusted according to the format of the stream. For multi-channel streams, you will see as many channels as possible.
- **Loudness Measurement** – the white text shows the average energy of the summed component channels measured using a short-term integration time (3 second sliding window). The loudness measurement conforms to the ITU-R BS1770 standard and is displayed in LUFS (Loudness Units Full Scale).
- **UNDER & OVER** - these indicators light if the short term loudness measurement goes above or below the levels defined in the "[Settings -> Stream Monitor](#)" menu.
- **ERROR** - this indicator lights if a stream error is detected.

➤ To interrogate a stream further, click anywhere inside its monitoring window (the outline turns blue). Additional information about the stream appears on the right of the GUI. Use the **STATUS**, **SDP**, **NIC 1** and **NIC 2** tabs to view the corresponding details. When **SDP** is selected, the **COPY** button can be used to copy the SDP information. This allows you to save the SDP as a text file for use on another streaming node.

➤ Click on the headphone icon to listen to audio channels from the selected stream (the headphone icon turns blue). The audio is routed to the prelisten device defined in the [Settings -> Stream Monitor](#) menu. If the stream is stereo or multi-channel, then click on the button above the headphone icon to scroll through the available channels: first in stereo pairs (1+2, 3+4, etc.) and then in mono (1, 2, 3, 4, etc.)

3. Installation

This chapter describes how to install the software and activate the license.

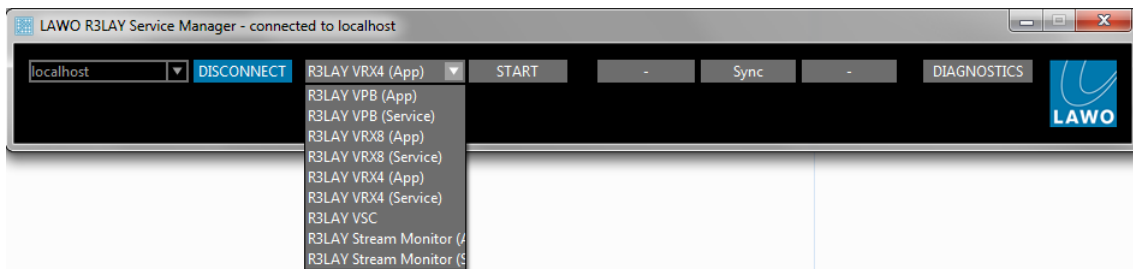
3.1 Preparation

AoIP Stream Monitor is delivered as a software download. You will need a customer login to download the installer and a license code to activate the product. To host the software, you will need a Windows PC which is not supplied.

3.1.1 Installing Multiple RELAY Products on a Single PC

The **RELAY** product family comprises several independent products: **VRX⁴** and **VRX⁸ (Virtual Radio Mixers)**, **VSC (Virtual Sound Card)** and **VPB (Virtual PatchBay)**. In addition, the **AoIP Stream Monitor** provides a tool for monitoring RAVENNA streaming connections. **VRX**, **VPB** and **Stream Monitor** can run either as an application (with full GUI control) or as a service (in the background) whenever you start the PC.

You can install multiple products on the same PC, but they cannot run at the same time. If more than one flavour of **RELAY** is installed, you can choose to stop and then start a different service or application from the **RELAY Service Manager**:



3.1.2 Controlling RELAY Services on a Remote PC

If multiple **RELAY** PCs are connected to the network, then you can use the **RELAY Service Manager** to connect to a remote PC, and then start or stop a **RELAY** application or service running on the remote host. See [Connecting to a Local Host or Remote PC](#).

All settings are stored locally on the connected PC. If you wish to start **RELAY VRX**, **VPB** or **Stream Monitor** as an application, then a user must be logged in on the remote PC (in order to open the application GUI).

3.2 System Requirements

RELAY Virtual Radio Mixer applications are processor-intensive, and can be very demanding on a computer's resources, especially the CPU.

While it is virtually impossible to keep track of the ever-changing list of CPUs available, we do have some guidelines that can assist you in making your selection. These have been selected to help ensure that your RELAY software operates properly using any combination of included features.

Look for CPUs and PCs with the following characteristics:

- A multicore processor specified for desktop or server applications.
- Processor should have a CPU benchmark score of 8,000 points, minimum.
- System must have 8GB minimum RAM.
- Operating system should be Windows 7, 8, 8.1,10 (32 and 64 Bit), Server2012 R2 or Server2016.
- Dedicated graphics card recommended for improved performance.
- Gigabit Ethernet LAN connection. Better results are more likely to be achieved by using separate NICs for "normal" traffic and streaming.

To help you determine the best CPU for your RELAY system, we recommend PassMark's excellent website. You may be familiar with their benchmarking software; they also maintain a large list of CPUs with performance scores at https://www.cpubenchmark.net/cpu_list.php.

In general, you must select a CPU with 8,000 points or higher for optimal results. A score lower than 8,000 will likely result in performance problems. The more programs and tasks required to run while using RELAY, and the more streams the computer has to work with, the higher the CPU benchmark should be.

Warning Notices

Operating systems not listed above have not been thoroughly tested by Lawo. Although you may be able to run RELAY on these untested operating systems, we cannot support such installations; neither can we support RELAY on any computers using pre-release or beta OS versions.

Although RELAY may run on computers with CPUs which do not meet the benchmark requirements stated here, we cannot ensure that all software features will operate correctly unless that power requirement is met, and cannot support RELAY on any computers which do not meet the minimum hardware requirements.

Additional Notes

As some audio devices and network interface cards behave in a different and unpredictable manner after recovering from a power-saving sleep state, it is recommended NOT to allow your computer to enter a sleep state while using such devices with RELAY. You can configure your power plan in Windows®, by selecting the "Control Panel -> Power Options" - choose a plan which does not put the computer to sleep.

3.2.1 Running RELAY in a Virtual Machine

Lawo is a VMWare Partner, and so to run RELAY in a Virtual Machine we recommend VMWare Server 6.5 and VSphere.

To familiarize yourself with the VMWare environment, please read the following Technical White Papers (from VMWare):

- [Deploying Extremely Latency-Sensitive Applications in VMware vSphere 5.5](#)
- [Best Practices for Performance Tuning of Telco and NFV Workloads in VSphere](#)

When configuring VMWare for use with RELAY, it is essential to use the latency sensitivity settings (mentioned in the white papers), and to follow the “100% reservation rule” for CPU and memory.

In addition to VMWare’s recommendations, it is essential to configure a separate, standalone network for streaming, with additional NICs and an additional VSwitch.

3.3 Installing the Software

The latest **LawoR3LAYStreamMonitorSetup** installer can be downloaded from www.r3lay.com/pages/manuals-downloads.

1. Copy the installer onto your computer and double-click on its icon to start the setup wizard.

If an earlier version or another **R3LAY** product is running on the computer, then it is best to [stop](#) and [disconnect](#) the current service, and then [close](#) the Service Manager GUI before continuing.

2. Select **Next** and follow the Wizard's instructions accepting the default options provided.

When the "Select Additional Tasks" screen appears, you may choose the following options. Note that the installer will detect which RAVENNA Network drivers are currently installed; if there is a newer version, then the option is selected; if you already have the latest version, then the option is not ticked. If in doubt, leave the default options selected.

➤ RAVENNA

- **Network Driver** - installs the RAVENNA network driver. The driver optimises network packet transmission for RAVENNA streaming.
- **Add firewall rules** - adds pre-determined firewall rules which may be required by the **Network Driver**.
- **Activate HPET (High Precision Event Timer)** - appears if you are running an OS prior to Windows 10. In this instance, HPET should be activated for proper RAVENNA timing.

Note that Windows 10 uses an improved internal clocking mechanism named "TSC_INVARIANT", which by default is active. Therefore, when running Windows 10, you will not see the **Activate HPET** option.

- **Licensing** - tick this option to install the **CodeMeter Runtime** software required for [licensing](#). If the software is already installed, then selecting this option will update the CodeMeter release and configure a new Cm container.
- **Additional icons** - tick this option to create a desktop icon for the application.

4. Select **Next** followed by **Install** to proceed with the installation.

If an existing **R3LAY** service is running, then the install may fail and an error dialog box will appear. Select the option to "automatically close the application(s)", **Abort** the install and then re-run the installer from step 1. Once the active **R3LAY** service or application has been closed, the installer should run successfully.

5. After the **R3LAY** installation, the **CodeMeter Runtime** Wizard appears (if **Licensing** has been selected during step 3). Select **Next** to install the licensing software. Or, **Cancel** to quit this part of the installation - for example, if the PC is already running the latest **CodeMeter Runtime** release.

6. After a successful install, a confirmation window appears - you will be prompted to restart the computer (if any of the "requires new start" options were selected during step 3). Select **Yes** (or **No**) and then click on **Finish**.

After the restart, you should see the **R3LAY Service Manager** icon in the taskbar:



If you have any problems with the software installation, please contact your local Lawo representative or email support@lawo.com.

3.4 Uninstall & Updates

The software can be uninstalled in the usual Windows manner:

1. First, [stop](#) and [disconnect](#) the current application or service, and then [close](#) the Service Manager GUI.
2. Then open the "Uninstall or change a program" Control Panel, select the **AoIP Stream Monitor** program and click **Uninstall**.

To update to a new version, follow the installation procedure described earlier. There is no need to remove older versions of the application. The latest configuration is stored locally and is loaded automatically after the update, see [Saving the Configuration](#).

3.5 Licensing

Once the software has been started, the system checks periodically for an active software license. This can be installed into a local container (on your PC), a remote container (on a networked server), or onto a USB dongle (for portability). If you wish to use a dongle, then this must be ordered separately.

The license is activated and managed by the CodeMeter Runtime licensing system from [WIBU systems](#). The license code can be found on the delivery note supplied with the software.

3.5.1 Checking the License Status

If no license is found, then the GUI screen will flash repeatedly. Once an active license is successfully located, the screen stops flashing and operates normally.

3.5.2 Using a Dongle

All dongles are specially-configured USB memory sticks which can be purchased from either [Lawo](#) or [WIBU systems](#). The dongles supplied for software and hardware products ship with different file systems, so please take care not to mix up the different types. If you have purchased a dongle for **AoIP Stream Monitor**, then this will have a metal "LAWO logo" tag attached as shown below. Multiple **RELAY** products and other Lawo software can be licensed from a single dongle.

USB Dongle (for Lawo software)



3.5.3 Preparing for Activation

To activate a license, you will need:

- A PC with an internet connection (and USB port if using a dongle). If your PC does not have an internet connection, then the offline activation method can be used.
- The WIBU systems USB memory stick (if using a dongle).
- The license code. This can be found on the delivery note shipped with the system. It takes the form of a 25-digit ticket number such as the one shown below.

License Code Example

Ticket:
7MAMJ-8HZ95-N9VW5-3MKX6-LWUYM

Once activated, it is strongly recommended that you backup your licenses (using the **CodeMeter** [WebAdmin](#) portal). This will allow you to restore a license if the original is lost or damaged.

3.5.4 Installing CodeMeter Runtime

To activate a license, your PC must be installed with **CodeMeter Runtime** (from WIBU systems). The correct version is installed automatically with the setup software for your product.

You can check the installation by looking in the Windows taskbar where you should see the following icon.

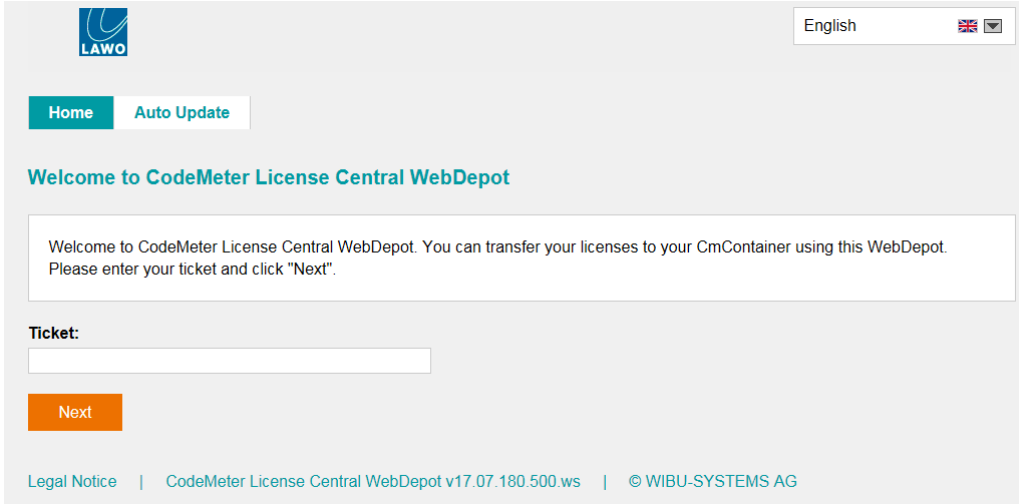


This shows that a Cm container (for local license storage) has been installed.

3.5.5 Activating a License Online

To use this method, your PC must have an internet connection. If installing onto a dongle, then this should be connected to the PC's USB port.

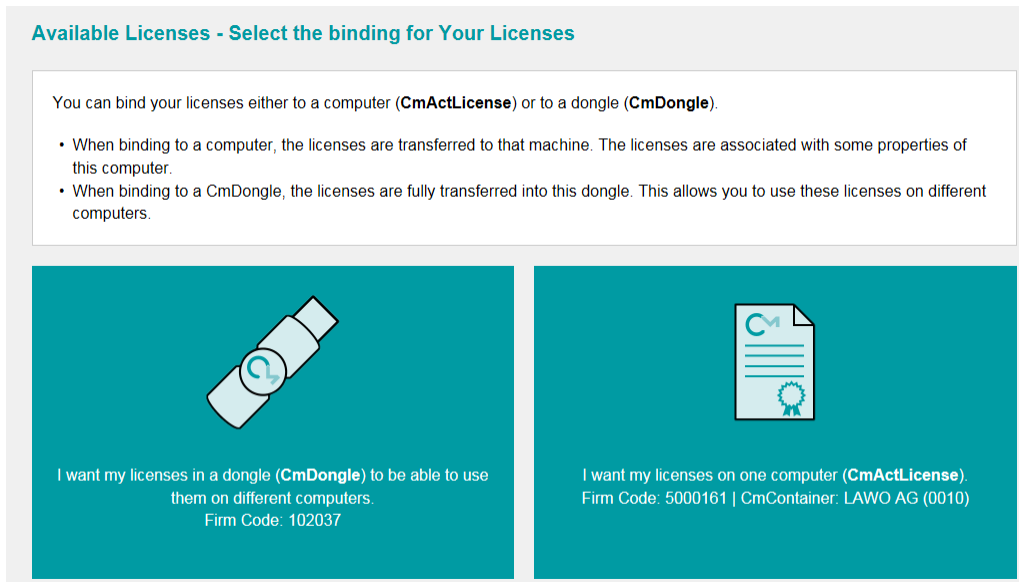
1. Open the Lawo licensing web page by copying the following URL into your web browser:
<https://licenseportal.lawo.com>



If necessary you can choose a different language using the drop-down menu at the top right of the page.

2. Copy your license ticket number - this is the 25-digit number code - into the **Ticket** field and select **Next**.
3. The WebDepot searches for and displays your licenses - select **Activate Licenses** to continue.
4. At the next page, select the storage method for your license - note that this cannot be altered later.

Choose either **CmDongle** (to create a USB dongle) or **CmActLicense** (to bind the license to the local computer).



5. At the next page, select the licenses you wish to activate and the **CmContainer** to be used for the license storage.

Available Licenses

To activate your licenses:

1. Select the licenses you want to activate.
2. Select the locally connected CmContainer to which you want to transfer the licenses.
3. Click "Activate Selected Licenses Now".

<input checked="" type="checkbox"/>	Name	Activated On	CmContainer	Status
<input checked="" type="checkbox"/>	*Product Name* <small>(License Quantity: 1)</small>			Available

Select CmContainer

128-2311304 (LAWO AG) ↻

Activate Selected Licenses Now Offline license transfer

[◀ Select binding](#)
[◀ My Licenses](#)

You can store multiple licenses in the same container. If no Cm containers are available, then you will see an option to **"Get CmContainer automatically"**.

6. Click on **Activate Selected Licenses Now** and wait for a few seconds - a confirmation pop-up appears once the activation is successful:

Online License Transfer

! **Please wait!** The selected licenses are transferred. **This process may take several minutes to complete.** Please do not remove the CmContainer during this process and do not reload this page.

Starting license transfer.
Creating license request.

Online License Transfer

Starting license transfer.
Creating license request.
Downloading license update.
Importing license update to CmContainer.
Creating receipt.
Uploading receipt.

✔ License transfer completed successfully!

OK

7. After selecting **OK**, a summary appears:

Home
My Licenses
Auto Update

My Licenses

Name	Activated On	CmContainer	Status
Product Name <small>(License Quantity: 1)</small>	2018-07-05 18:33:51	128-2311304	Available: 0 (1)

Re-Host Licenses

8. You can now close the browser and return to your Lawo software application or install the USB dongle. For information on re-hosting a license, offline activation, backup/restore and using a license server, please see the [Advanced Licensing Features](#) appendix.

4. Operation

This chapter describes how to operate **AoIP Stream Monitor**.

4.1 Starting the Application

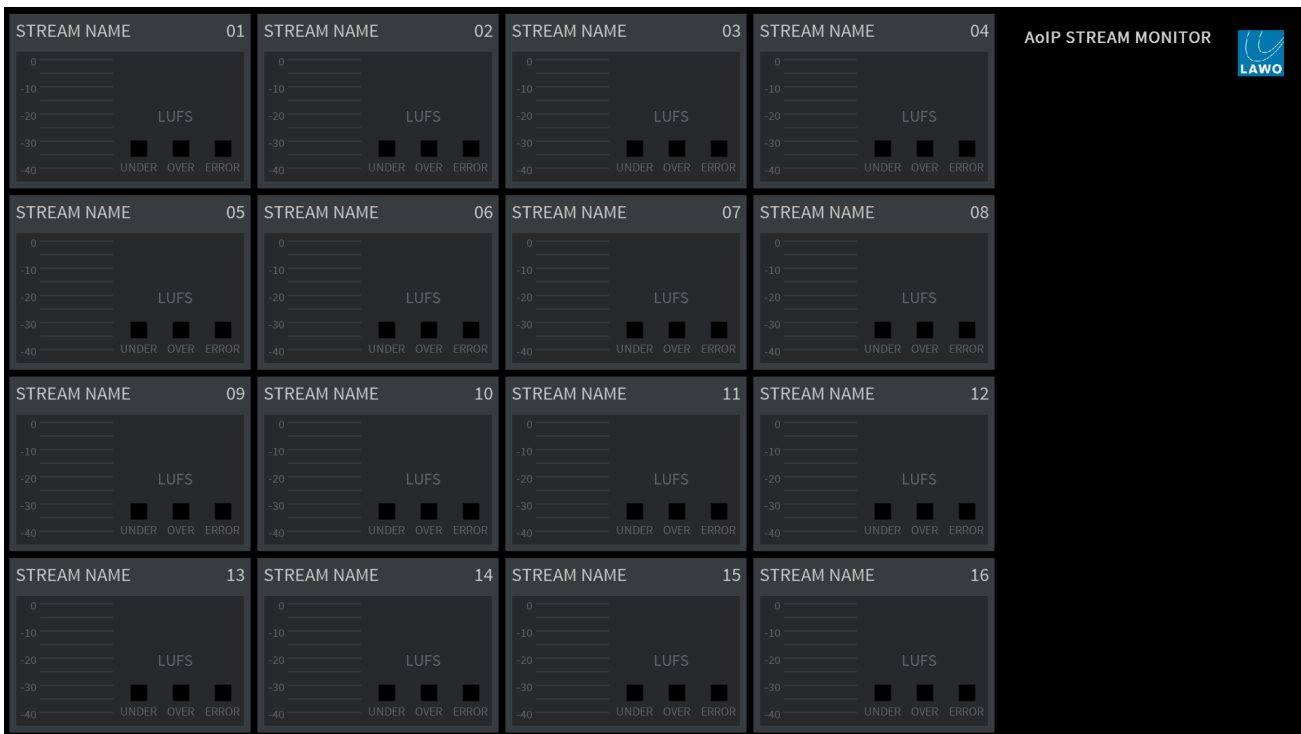
The simplest way to start **AoIP Stream Monitor** is by double-clicking on its desktop icon or selecting the program from the Windows START menu.

AoIP Stream Monitor can also be started from the [Service Manager GUI](#).

By default, the application opens in full screen. **AoIP Stream Monitor** can be opened as a window, that can be re-sized, minimized, etc., by editing the advanced options (described [later](#)).

If this is the first time you have started the software, then there will be no streams assigned to any of the monitoring windows:

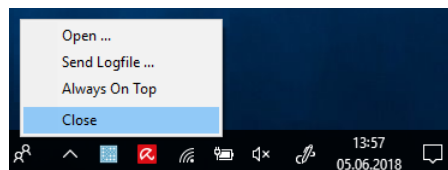
Stream Monitor GUI (no streams assigned)



Only one instance of **RELAY** may be running at a time. Therefore, you may see the message "This program is already started...." if **AoIP Stream Monitor** (or another **RELAY** product) is already running. In this instance, check your taskbar icons and close the application, or use the **Service Manager** to [stop](#) the active service.

4.2 Closing the Application

To close **AoIP Stream Monitor**, right-click on the notification icon in the taskbar and select **Close**:



AoIP Stream Monitor can also be stopped (and restarted) from the [Service Manager GUI](#).

4.3 Configuring the Network Interface Card (TCP/IP Settings)

AoIP Stream Monitor connects to the RAVENNA network via the host PC's Network Interface Card (NIC). If the PC supports more than one NIC, then you can choose which interface will be used from the "[Settings -> Stream Monitor](#)" menu.

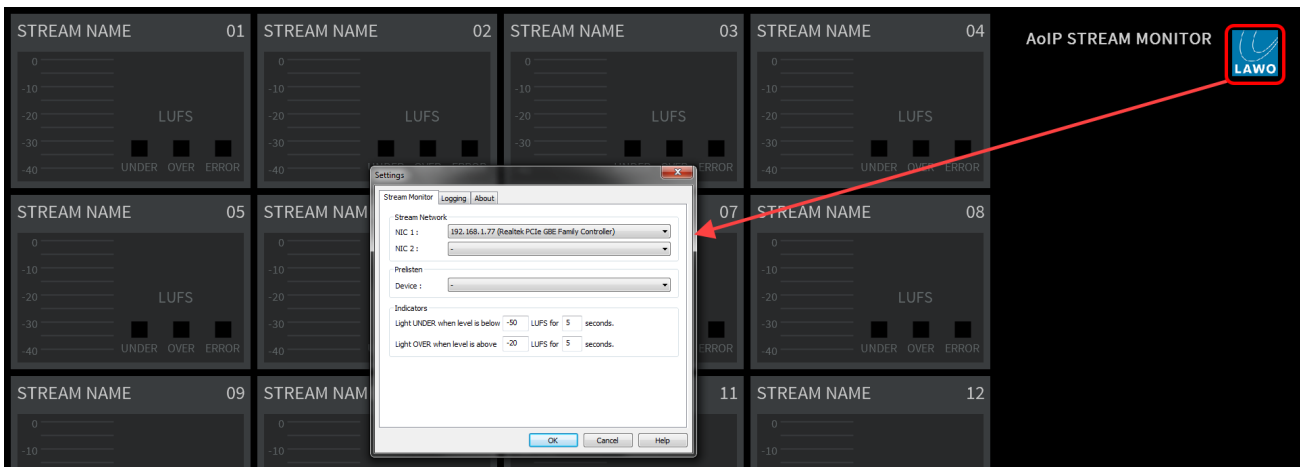
To establish communication, you must first configure the TCP/IP settings of the NIC as follows. The exact steps vary depending on your OS version.

- **IP Address** - this must be unique and lie within the same IP address range as the other streaming nodes connected to the network.
- **Netmask** - this must match the subnet mask of the other streaming nodes.
- **Gateway** - this setting is required if data packets are to be redirected. For example, if the streaming nodes are connected via a network switch with Layer 3 routing capability. Please contact your network administrator if this is the case.

AoIP Stream Monitor supports both DHCP and static IP addresses. If you are using **AoIP Stream Monitor** with other Lawo RAVENNA hardware devices, then static IPs are recommended.

4.4 Defining the Global Options

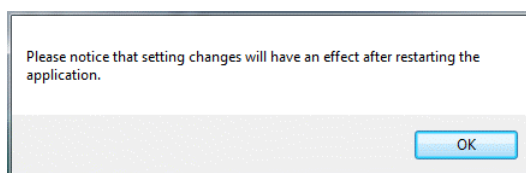
The Network Interface Card(s) and other program options are defined from the "Settings" dialog box. This is opened by clicking on the Lawo logo at the top right of the GUI:



Select the **Stream Monitor** tab and edit the settings as follows:

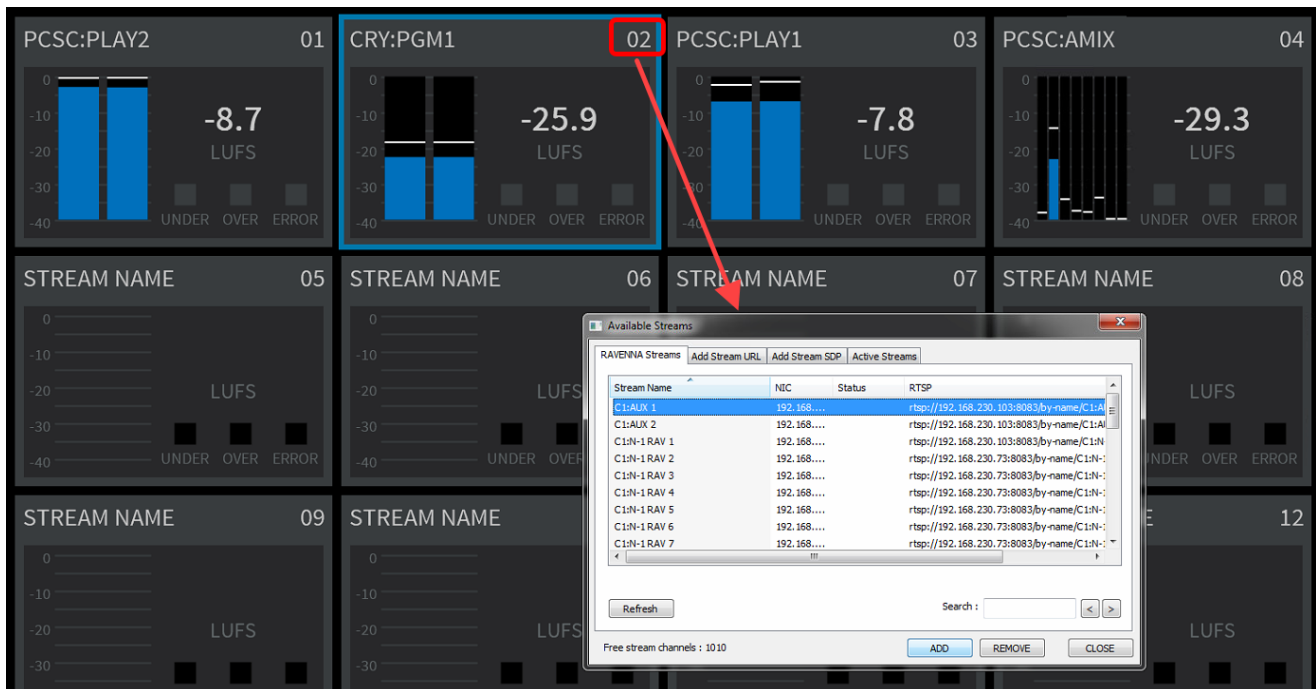
- **Stream Network** - use the **NIC 1** and **NIC 2** fields to assign the Network Interface Card(s) connected to the streaming network. The drop-down menus list all available network interface cards fitted to your computer. Up to two NICs can be assigned. Only one NIC is required; the second is optional. If your network supports SMPTE ST2022-7 compatible streaming, then it is recommended to use two NICs to connect to both network paths: primary and secondary.
- **Prelisten** - use the **Device** field to assign the local audio device used for the prelisten function.
- **Indicators** - these fields define the thresholds for the "UNDER" and "OVER" indicators, and the length for which they will remain lit once the threshold is exceeded.

Select **OK** to exit the dialog box and save the settings. If the following message appears, you will need to close and restart the application (as described [earlier](#)).



4.5 Assigning the Streams

The GUI provides live monitoring of up to 16 streams. To assign a stream to one of the monitoring windows, click on the stream number - the "Available Streams" dialog box appears:



From here you can assign a stream by name, URL or SDP, and also view all active streams.

4.5.1 RAVENNA Streams

1. Select the **RAVENNA Streams** tab to see all of the streams announced by Bonjour to the network. The list will include incoming streams from other devices plus local streams published from this device.
2. Select a stream and then click on **ADD** - the stream is assigned to the monitoring window, and its Status updates to **Added**.

Click on **Refresh** to update the list.

You can search the Stream Names by entering a text string into the **Search** field and clicking on **Refresh**. Use the arrow keys to select the next or previous occurrence.

The number of available channels is indicated by the **Free stream channels** counter - the total number of RAVENNA channels (used by sending + receiving streams) cannot exceed the maximum permitted by your license.

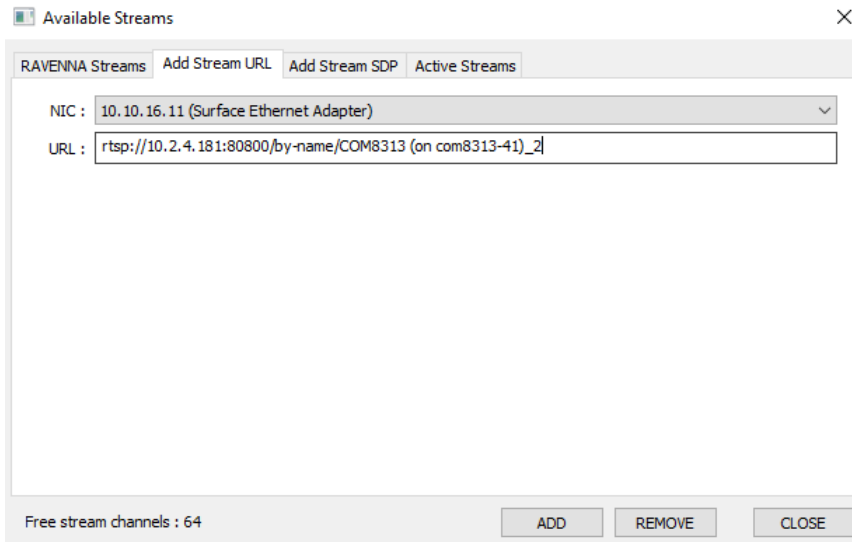
3. To remove a stream, select an **Added** stream from the list followed by **REMOVE**.
4. To close the dialog box, click on **CLOSE**.

The remaining tabs in the "Available Streams" dialog box work in a similar manner and are described over the next few pages.

4.5.2 Add Stream URL

Select this tab to assign a RAVENNA stream with a specific URL - for example, if your network uses rtsp addresses.

1. Select the Network Interface Card (NIC) which is receiving the stream from the drop-down menu.
2. Enter the URL - the maximum length of an accepted URL is 200 characters.

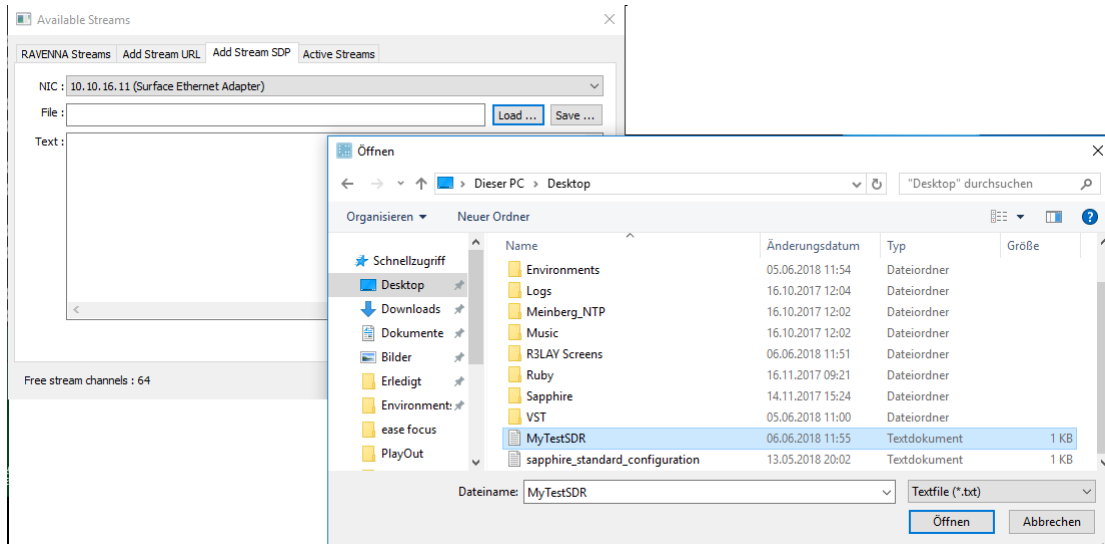


3. Click on **ADD** to assign the stream to the monitoring window.

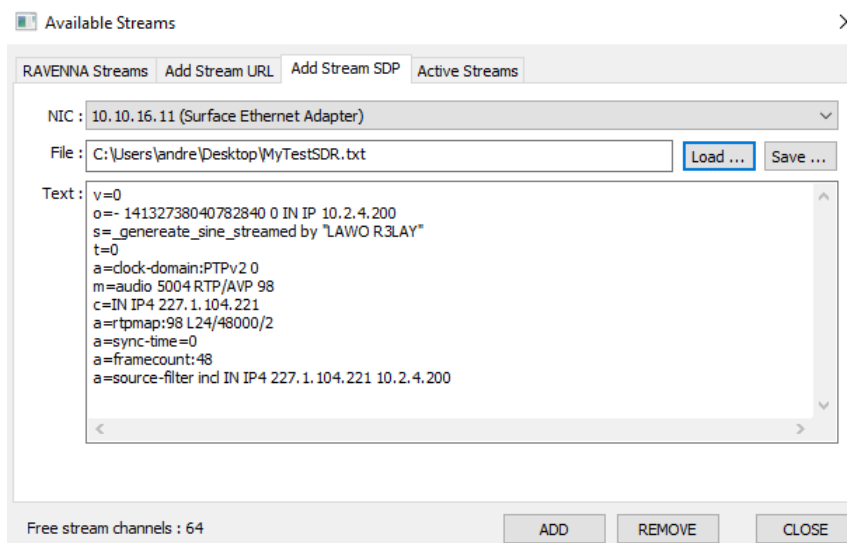
4.5.3 Add Stream SDP

Select this tab to assign a RAVENNA stream identified by a stream description (SDP). The SDP can either be loaded (from a file) or entered manually (by typing in the text, or using copy/paste to paste the information from another location).

1. Select the Network Interface Card (NIC) which is receiving the stream from the drop-down menu.
2. To load an SDP, click on File **Load..** to select the file location:



Then select **Open** - the file contents are displayed in the Text area:



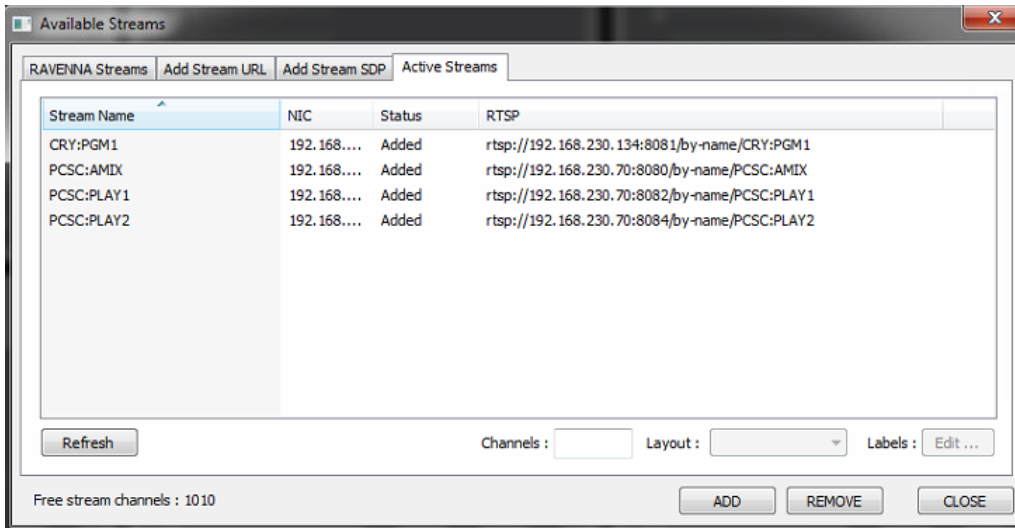
3. Alternatively, type in the SDP information into the Text area (or use copy/paste to paste text from another location).

The **Save..** button can be used to save the SDP Text content (under a new filename).

4. Click on **ADD** to assign the stream to the monitoring window.

4.5.4 Active Streams

Select this tab to display all active streams (those already assigned to a monitoring window):

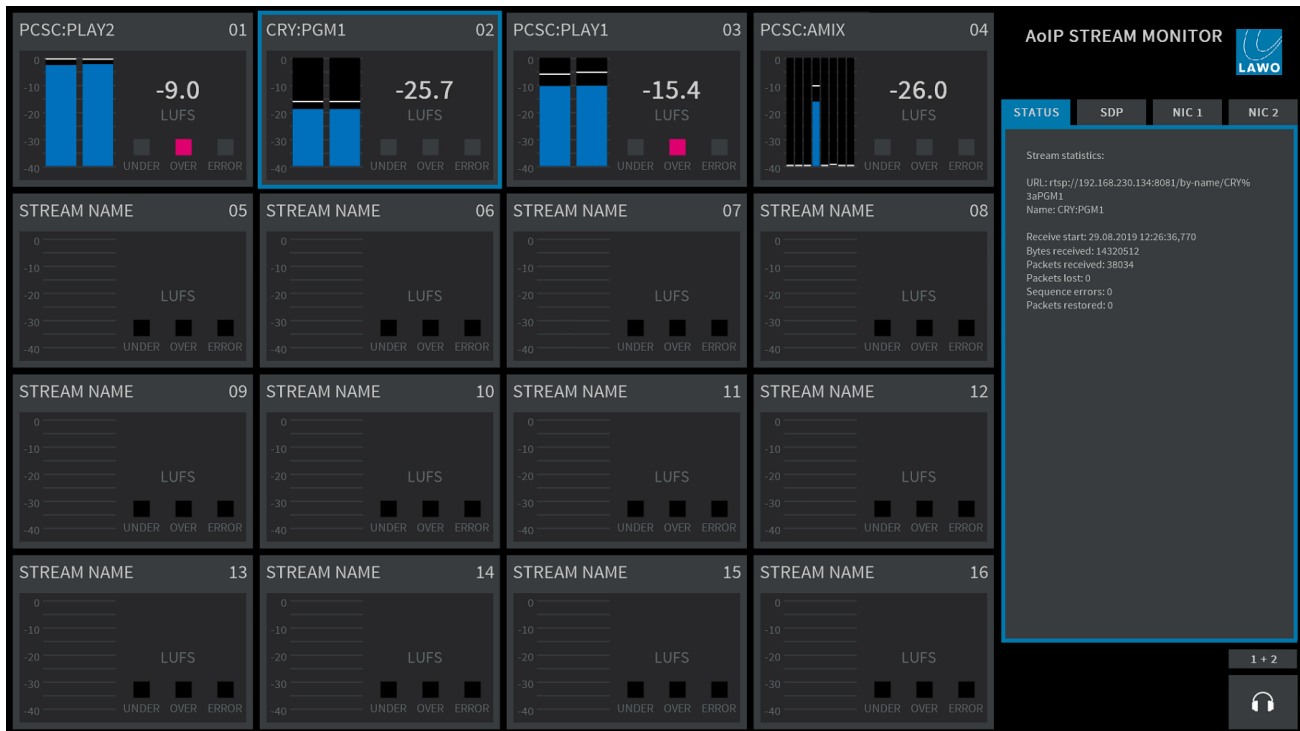


Click **Refresh** to update the list.

Note that the **Channels**, **Layout** and **Labels** fields are reserved for future implementation.

4.6 Monitoring the Status of the Streams

Stream Monitor GUI (example)



Once a stream is assigned, each monitoring window provides the following information:

- **Stream Name** – this is the string used to identify the stream to the network.
- **Peak Level Metering** – the blue bargraphs show the peak level of the individual audio channels (in dBFS). The bargraph size is automatically adjusted according to the format of the stream. For multi-channel streams, you will see as many channels as possible.
- **Loudness Measurement** (optional*) – the white text shows the average energy of the summed component channels measured using a short-term integration time (3 second sliding window). The loudness measurement conforms to the ITU-R BS1770 standard and is displayed in LUFS (Loudness Units Full Scale).
- **UNDER & OVER** - these indicators light if the short term loudness measurement goes above or below the levels defined in the "[Settings -> Stream Monitor](#)" menu.
- **ERROR** - this indicator lights if a stream error is detected.

*Optionally, the loudness measurement can be switched off to reduce the demand on the computer's CPU. In this instance, only the peak level metering is shown. By default, the loudness measurement is turned on. It can be disabled by editing the advanced options (described [later](#)).

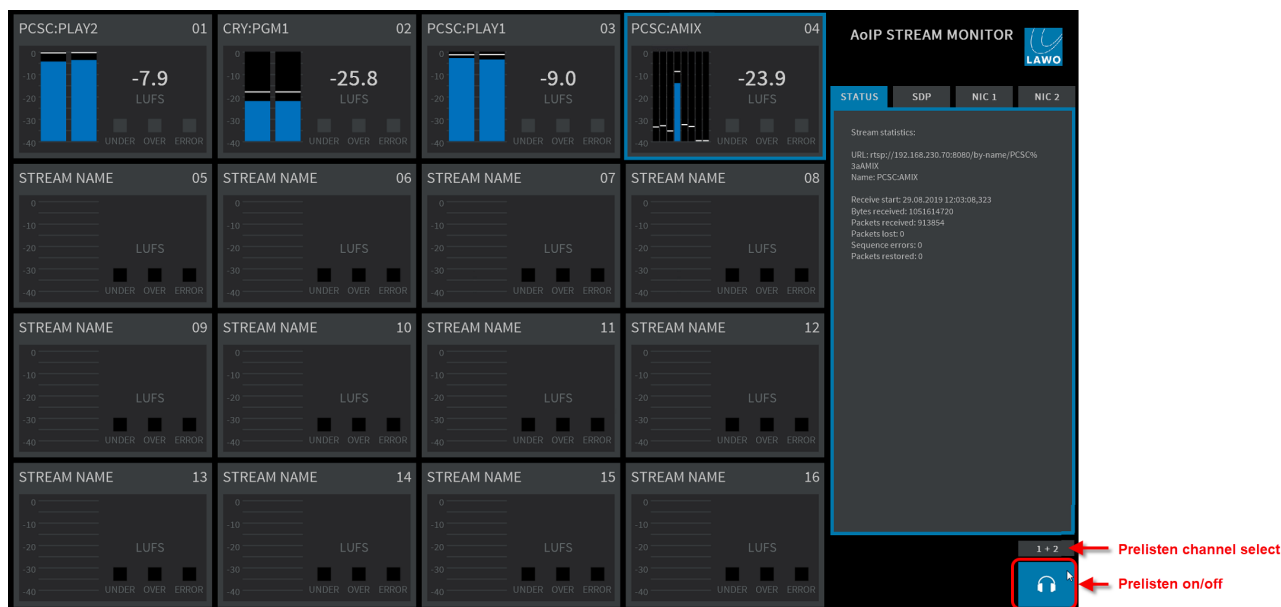
To interrogate a stream further, click anywhere inside its monitoring window (the outline turns blue). Additional information about the stream appears on the right of the GUI.

Use the **STATUS**, **SDP**, **NIC 1** and **NIC 2** tabs to view the corresponding information:



When **SDP** is selected, the **COPY** button can be used to copy the SDP information. This allows you to paste the Stream SDP into the "Available Streams -> [Add Stream SDP](#)" dialog box so that it can be saved as a text file for use elsewhere on the network.

4.7 Listening to Audio from a Stream



Click on the headphone icon at the bottom right of the GUI to listen to audio channels from the selected stream - the headphone icon turns blue. The audio is routed to the pre-listen device defined in the [Settings -> Stream Monitor](#) menu.

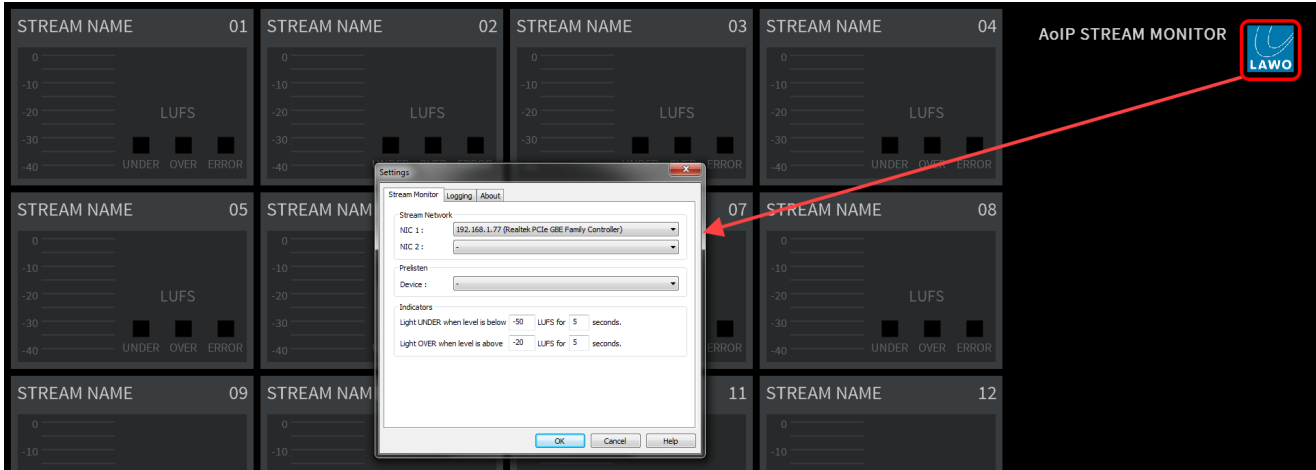
The button above the headphone icon shows which channels you are listening to. From here you can:

- Left-click to scroll through the available channels: first in stereo pairs (1+2, 3+4, etc.) and then in mono (1, 2, 3, 4, etc.).
- Right-click to step back through the channel sequence.
- Press and hold **SHIFT** and then click to skip over multiple channels.
- Press and hold **CTRL** and then click to change from stereo to mono, or vice versa.

5. Settings

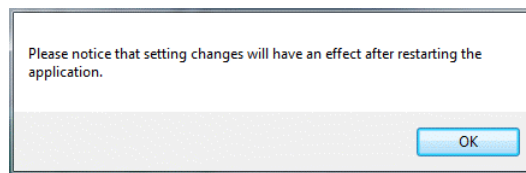
This chapter describes the program's global settings.

1. Open the "Settings" dialog box by clicking on the Lawo logo (top right):



2. Select a tab and edit the settings.
3. Select **OK** to save any changes and close the dialog box.

If the following message appears, you will need to close and restart the application (as described [earlier](#)).

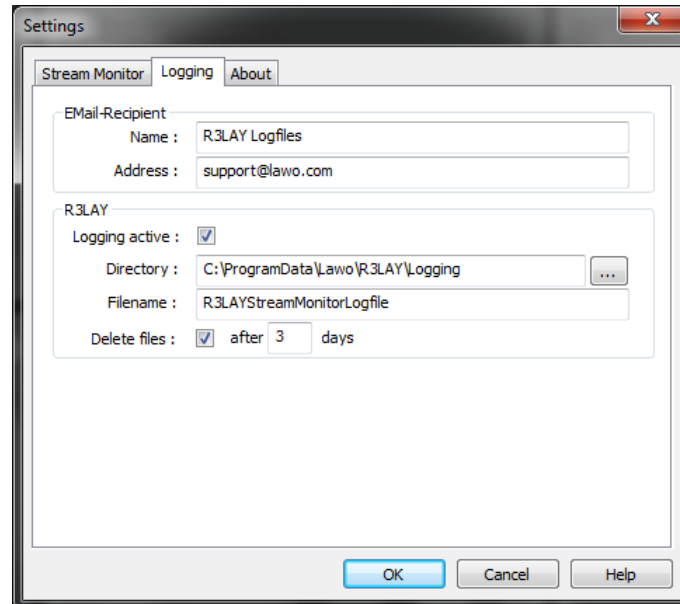


All Settings are stored with the rest of the configuration, see [Saving the Configuration](#).

5.1 Stream Monitor

This tab defines the global options described [earlier](#).

5.2 Logging



AoIP Stream Monitor produces a very detailed log of many events and statistics. These options define:

- **Email-Recipient** - enter the **Name** and **Address** of your chosen recipient - e.g. support@lawo.com.
- **Logging active** - saves a log file whenever there is a problem with the software.
- **Directory** and **Filename** - sets the filename and location for the log file(s) - each file is automatically suffixed with a different number to make it unique.
- **Delete Files** - select this option to delete the log files after **x** days.

5.3 About

This page provides information about the **AoIP Stream Monitor** release and its drivers.

You can also display information about the third-party modules and/or Open Source libraries by selecting **Show Modules and Libs...**

The **Activate License** button opens the 'Lawo License' web browser page. If the button is greyed out, then a full license is already active.

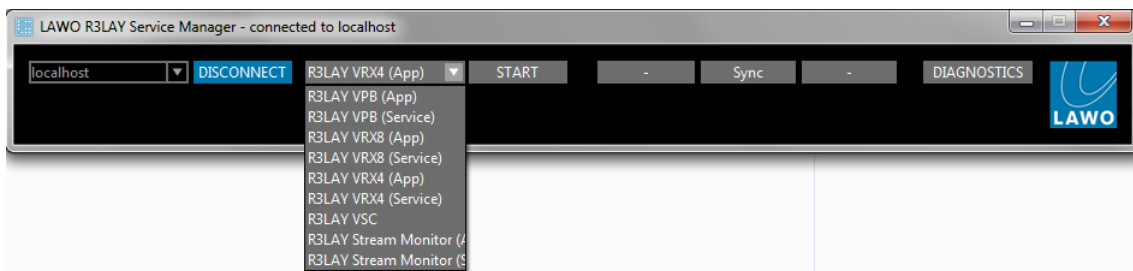
6. The Service Manager

This chapter describes the **R3LAY Service Manager** which is included with **AoIP Stream Monitor**. It can be used to start and stop a **R3LAY** service or application (running on either the local or remote host).

6.1 Architecture

Once **AoIP Stream Monitor** is installed, the user sees only the GUI. However, there are three executables:

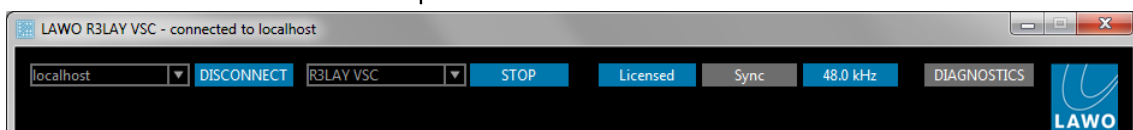
- **R3LAY Stream Monitor** - this is the program which deals with all audio handling and RAVENNA streaming configuration. It can run either as an application (with full GUI control) or as a service (in the background) whenever you start the PC. The default file path is: "C:\Program Files (x86)\LAWO\R3LAYStream Monitor\R3LAYStream Monitor.exe".
- **R3LAY Service Manager** - this service is required to start and stop the application or service (described above). It runs automatically in the background whenever you start the PC. The default file path is: "C:\Program Files (x86)\LAWO\R3LAYServiceManager\R3LAYServiceManager.exe".
- **R3LAY Service Manager GUI** - this is the GUI application which controls the Service Manager, which in turn starts and stops the **R3LAY** application or service. The GUI can connect to either the local host or a remote PC, and can start and stop any flavour of **R3LAY**. The default file path is: "C:\Program Files (x86)\LAWO\R3LAYServiceManager\R3LAYServiceManagerGUI.exe".



6.2 Opening the Service Manager GUI

1. To open the **R3LAY Service Manager** GUI, either click on the taskbar icon or select the application from the Windows START menu.

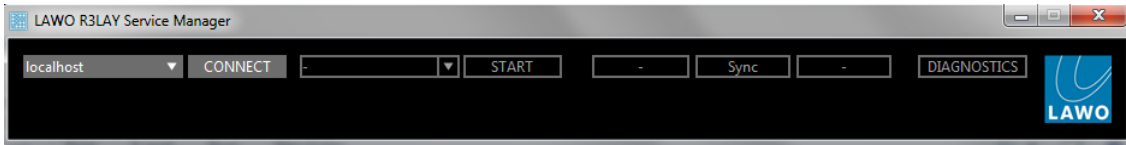
The GUI opens with an automatic connection to the local host's active **R3LAY** service - in our example, **R3LAY VSC**. This is indicated by the 'LAWO **R3LAY VSC** - connected to localhost' text in the title bar, and the **localhost** and **R3LAY VSC** fields at the top of the GUI:



Only one **R3LAY** application or service may be running at a time. To switch to another application or service, you will need to stop the current service and [start](#) a new one.

6.3 Connecting to a Local or Remote Host

If you see the following window, then the host has been disconnected:

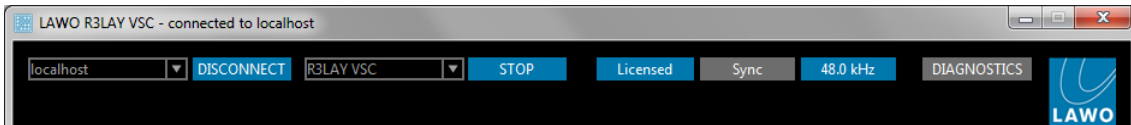


The connection status is also indicated by the taskbar icon - a green dot appears when the service is connected:



➤ To connect to a Local Host:

1. Select **localhost** from the drop-down menu (top left).
2. Click **CONNECT** - the GUI connects to the active **R3LAY** service running locally on this computer, in our example to **R3LAY VSC**:



➤ To connect to a Remote Host:

1. Select **DISCONNECT** - to disconnect the local host.
2. Type either the IP address or network name of the remote PC's Network Interface Card into the 'connected host' field - for example:



3. Click **CONNECT** - the GUI connects to the active **R3LAY** service running on the remote PC.

The Standard Port Number

The standard port used for a **R3LAY** connection = 9997. If you are not using the standard port, then you will need to add this number (after a colon) to the IP address or network name - for example, type "localhost:9997", "192.163.10.33:9997" or "MyPCName:9997" and then select **CONNECT**.

If you wish to use a different port number (other than 9997), then edit the number in the "C:\ProgramData\Lawo\R3LAY\R3LAYServiceManager.ini" file on the PC running the **R3LAY** service. The line to edit is "EmberPort=9997".

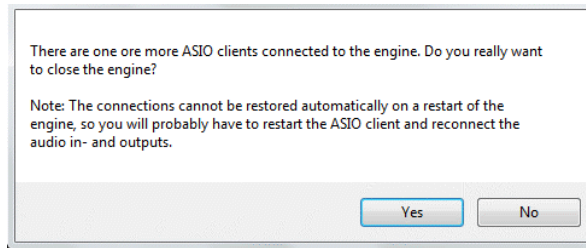
6.4 Starting and Stopping the Service

Only one **R3LAY** application or service may be running at a time. Therefore, if you have installed **R3LAY VRX**, **VPB** or **Stream Monitor** (which can run as either an application or service), or have multiple flavours of **R3LAY** installed on the same PC, you will need to stop the current service before starting a new one:

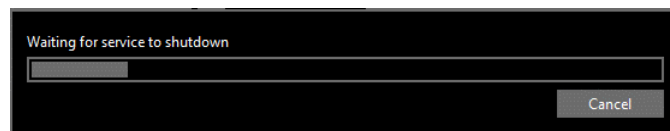
1. Select **STOP** to stop the active service:



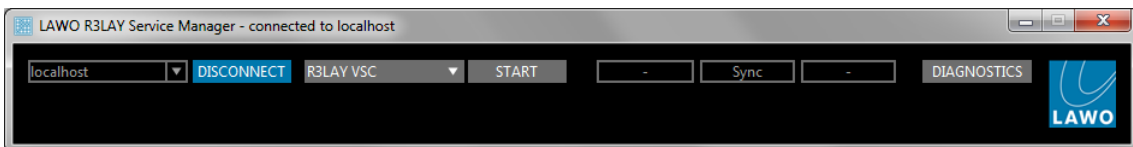
If an ASIO client is running, then you will be asked for confirmation:



Select **Yes** to continue - the software **saves** the current configuration and stops the service. This may take a few seconds:



When the shutdown is complete, you will see a reduced GUI:



2. Select the new application or service from the drop-down service field - note that you will only see the options installed on the connected host:



3. Select **START** - a pop-up appears showing the progress; it may take a few seconds to start a new service. At the end of the start-up, the software loads the latest configuration file:
 - For **R3LAY VRX**, **VPB** or **Stream Monitor** applications, the application GUI opens in a separate window.
 - For **R3LAY VRX**, **VPB** or **Stream Monitor** services, you will see a reduced Service Manager GUI (as shown above) - the service is now running in the background.
 - For **R3LAY VSC**, the Service Manager expands to reveal the full VSC GUI.

You need to restart your ASIO clients and reconnect their audio input/output devices following a service restart.

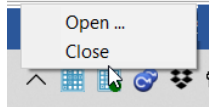
If the connection is to a remote PC, and you start a **R3LAY VRX**, **VPB** or **Stream Monitor** application, then a user must be logged in on the remote PC (in order to open the application GUI). To start **R3LAY** services on a remote PC, no user login is required.

6.5 Closing the GUI

The **RELAY Service Manager** GUI can be minimised or closed in the usual windows manner (from the top right of the window):



Alternatively, right-click on the taskbar icon and select **Close**:



Note that closing the GUI only closes the Service Manager GUI - all **RELAY** services continue to run in the background, meaning that any audio connections and RAVENNA streams remain active. If you wish to stop the active service, then use the **STOP** button. See [Starting and Stopping the Service](#).

To reopen the GUI, click on the taskbar icon.

7. Saving the Configuration

The **AoIP Stream Monitor** configuration is stored locally on the connected host, each time you [stop](#) the **AoIP Stream Monitor** service or shut down the **AoIP Stream Monitor** PC.

What is Saved?

The complete configuration is saved, including all settings (defined in the [Settings](#) dialog) and all assignments to the monitoring windows. The data is stored in the "R3LAYStreamMonitor.ini" file in the "c:\ProgramData\Lawo\R3LAY" folder for all users. It is important that Windows Administrator rights grant full access to the ".ini" file for every user.

Restarting

All background services start automatically whenever you restart the **AoIP Stream Monitor** PC. This means that any connections and streams which were active at the last shutdown will be reinstated after a restart. Note that connections can only be re-instated if the relevant RAVENNA streams are available, and you have a valid sync signal.

AoIP Stream Monitor may be started either as an application (with full GUI control) or as a service (where a prepared configuration runs in the background). The latter is ideal for Playout Servers or remote-controlled **R3LAYs**, where you wish to restrict the user access.

To start **AoIP Stream Monitor** as an application, either click directly on its icon (from the desktop or Windows START menu), or start the application from the [Service Manager](#) by selecting the **AoIP Stream Monitor (App)** option. The operating window appears.

To start **AoIP Stream Monitor** as a service, close the application (if open), and then start the service from the [Service Manager](#) by selecting the **AoIP Stream Monitor (Service)** option. In this mode, the operating window is not visible and the service runs automatically in the background.

In both instances, the software loads the latest active configuration at startup. This means that any RAVENNA streams stored in the configuration will be reinstated after a restart. Note that connections can only be re-instated if the same hardware interfaces and RAVENNA streams are available. For RAVENNA streams, you must also have a valid sync signal.

When the PC next restarts, the operating mode (application or service) is reinstated. This allows you to start **AoIP Stream Monitor** as an application to edit the configuration. Then, stop and restart **AoIP Stream Monitor** as a service. From then on, PC will start up with **AoIP Stream Monitor** running as a service (i.e. with the active configuration running in the background).

8. Appendices

This chapter includes further information which you may find useful.

8.1 Third-Party Modules & Open-Source Libraries

AoIP Stream Monitor uses the following third-party modules and/or Open Source libraries. Please click on the links below for more information about the code and license.

Live555

<http://www.live555.com/liveMedia>

<http://www.live555.com/liveMedia/#license>

Portaudio V19

<http://www.portaudio.com/>

<http://www.portaudio.com/license.html>

Rapidxml

<http://rapidxml.sourceforge.net/>

<http://rapidxml.sourceforge.net/license.txt>

reSIProcate

<https://www.resiprocate.org/>

<https://www.resiprocate.org/License>

Steinberg ASIO & VST

<https://www.steinberg.net/de/company/developer.html>

This program uses ASIO Technology by Steinberg Media Technologies GmbH. VST is a trademark of Steinberg Media Technologies GmbH.

Info-Zip

<ftp://ftp.info-zip.org/pub/infozip/license.html>

8.2 Advanced Options

RELAY supports a number of options which can be enabled (or disabled) by editing the "RELAYxxx.ini" file, where xxx is the application name: VSC, VRX4, VRX8, VirtualPatchBay or StreamMonitor.

The file can be found in the "C:\ProgramData\Lawo\R3LAY\" folder on the PC running the **RELAY** service. If more than one **RELAY** product is installed, then you will see a separate ".ini" file for each application.

In each case, use the following steps to update the file:

1. Using a plain text editor, add the correct syntax to the ".ini" file.
2. Save the file, taking care to retain the same file name and folder location.
3. [Stop](#) and then [restart](#) the **RELAY** application - the software will read the ".ini" file contents and update its feature set accordingly.

An ".ini" file [template](#) can be used to distribute parameters across several workstations or **RELAY** applications.

8.2.1 Using an "*.ini" File Template

A separate *.ini" file can be used to distribute parameters across several workstations or **RELAY** applications. The template can be stored locally or on a centralized file server.

This feature works as follows. On start up, **RELAY** always reads its local "RELAYxxx.ini" file. If a template is specified using the syntax given below, then the template is also read and its entries appended or overwritten to the local file.

Syntax

To enable this feature, add the following syntax to the local "RELAYxxx.ini" files:

```
[IniTemplates]
PathLocalTemplate=\\fileserver\Lawo\R3lay\R3layTemplate.ini
```

The file name used can be any, providing it matches the name and path defined above.

Implementation

Then edit the template "*.ini" file and move it to the specified folder location.

When you next [stop](#) and [start](#) the **RELAY** application on each workstation, the software will update the local ".ini" file contents as described above.

The examples below demonstrate some of the ways you can use this feature.

Example 1: Adding Workstation Names to Stream Names

If the following syntax is added to the "R3layTemplate.ini" file, then the result will be that Bonjour is switched off, and the workstation name will be automatically added to the stream names on all connected workstations:

```
[Debug]
UseBonjour=0
StreamNameAddComputerName=0
```

Example 2: Automatic Editing of Stream Parameters

Similarly, you can use variables to define certain stream parameters. So, if the following syntax is added to the "R3layTemplate.ini" file, the first stream can have a different Name and Multicast Address:

```
[R3layVRX8\RTSPSource\0]
Instance=1
Name=R3LAY%REGISTRY:HKEY_LOCAL_MACHINE\SOFTWARE\DSA\VisTool:StationID:String%_sla
MulticastAddr=230.155.139. %REGISTRY:HKEY_LOCAL_MACHINE\SOFTWARE\Lawo\R3layVRX8:MulticastStream0:DWORD%
```

Example 3: Using Different Templates for Different Workstations and Users

It is also possible to use variables within the template name. Thus you can specify a different template for each workstation or user.

For example, if the following syntax is added to the local "RELAYxxx.ini" files, then each workstation will read its own "*.ini" template from a centralized server:

```
[IniTemplates]
PathLocalTemplate=\\fileserver\Lawo\R3lay\R3layTemplate%REGISTRY:HKEY_LOCAL_MACHINE\SOFTWARE\DSA\VisTool:StationID:String%.ini
```

Similarly, the variable can be based on the environment variable username:

```
[IniTemplates]
PathLocalTemplate=\\fileserver\Lawo\R3lay\R3layTemplate%USERNAME%.ini
```

8.2.2 ".ini" File Options

Stream Setup

Name	Syntax & Description	Values
Setup SPS Connections	[Debug] StreamingUseHitlessMerge=0 This option enables SMPTE ST2022-7 compatible streaming, otherwise known as Seamless Protection Switching (SPS) or Hitless Merge. Once enabled, you can transmit and receive streams using two NICs: default (NIC 1) and alternate (NIC 2). Note that SPS is NOT supported by RELAY VSC.	0 or 1, default is 0
Setup Automatic Multicast Address Generator	[Streaming] MulticastIPv4Pattern=239.NIC3.NIC4.n This option allows you to set your own default pattern for the multicast address generator. The value is an IPv4 pattern, where: <ul style="list-style-type: none"> the number is a fixed value in the range 0 to 255. NIC3 / NIC 4 is the corresponding number of the NIC sending the stream (NIC1 to NIC4 are permitted). n is an increasing number in the range 0 to 255. x is a random number in the range 0 to 255. 	as per description
Define Offset for Second Multicast Address	[Streaming] SecondMulticastIPv4Offset=0.0.0.1 When sending Hitless Merge streams, you can add an offset to the multicast address for the second stream. The value is an IPv4 pattern which defines the offset for each digit.	as per description
Add Support for Source Specific Multicast (SSM)	[Streaming] UseStreamSinkSSM=0 This option adds support for Source Specific Multicast (SSM) to the network driver. The driver version must be >= 1.4.0.11 For SSM to work, the value must be set to 1 on all IGMPv3 members. SSM is a method of delivering multicast packets in which the only packets delivered to a receiver originate from a specific source address. Thus, SSM reduces demands on the network and improves security.	0 or 1, default is 0
Define Default RTP Media Payload	[Ravenna] StreamPayloadType= This option defines the default RTP media payload type if it is not specified elsewhere (i.e. via Ember+).	leave empty or enter value (95 to 255), default is empty
Direct Audio Switching	[Debug] UseStreamReceiverDirectConnection=0 This option activates direct audio routing for streams switched to stream receivers. Once enabled, the connections from the receiver itself are used as a template for how to connect the stream.	0 or 1, default is 0
Define WAN Connections (in addition to LAN Connections)	[Debug] WanNICDefault= WanNICAlternate= This option supports two additional WAN NICs to support stream translations between LAN and WAN. In this instance, you may have up to two NICs for WAN and two NICs for LAN.	leave empty or enter NIC name
Setup Additional Values	[Debug] DialogAddStreamSourceNbChannels=1,2,4,8,12,16,24,32,48,64 DialogAddStreamSourceSamplesPerFrame=4,8,12,16,24,32,48,64,96,128,192,240,256,480,512 DialogSettingsHostSamplerates=32000,44100,48000,88200,96000 This option defines the values that appear in the drop-down menus when you add a stream: Channels, Frame Size (samples per packet) and Sample Rate. Any value is permitted, so please take care to enter only reasonable values. For the number of channels, any value can be added from 1 to 64. For sample rates, note that WDM drivers support only 44.1kHz and 48kHz, while ASIO clients and streaming support other options. A typical example is shown above.	as per description
Define New Stream Delay Time	[Debug] NewStreamInfoDelayMilliSec=5000 This option defines the time (in ms) between the arrival of a stream announcement and the stream being made available inside RELAY.	enter value in ms (0 to 30000), default is 5000

Stream Announcement

Name	Syntax & Description	Values
Setup Bonjour	<pre>[Debug] UseBonjour=INT</pre> <p>This option defines the type of Bonjour implementation or deactivates Bonjour. The default value (INT) uses the internal C++ flavour. All other values result in Apple's mDNSResponder. (From Version 3.0.0.181, the value DSA is not supported.)</p>	0, 1, TRUE, APPLE or INT, default is INT
Define Node Names	<pre>[Debug] BonjourNodeNameDefault= BonjourNodeNameAlternate=</pre> <p>This option defines the node names published to the network via Bonjour for your computer's NICs. The alternate name applies if SPS / Hitless Merge is enabled.</p>	leave empty or enter node name
Define Stream Name	<pre>[Debug] StreamNameAddComputerName=1</pre> <p>This option adds the computer name to all stream names, resulting in names like "stream01 (on xxxx)". This makes it easy to identify streams on the network.</p>	0 or 1, default is 1
Setup mDNS Announcement Rings	<pre>[Debug] UseBonjour=INT UseBonjourAddress1=224.0.0.251 UseBonjourPort1=5353 UseBonjourAddressName1=Ring 1 UseBonjourAddress2=224.0.0.252 UseBonjourPort2=5353 UseBonjourAddressName2=Ring 2 UseBonjourAddress3=224.0.0.253 UseBonjourPort3=5353 UseBonjourAddressName3=Ring 3 UseBonjourAddress4=224.0.0.254 UseBonjourPort4=5353 UseBonjourAddressName4=Ring 4</pre> <p>This option allows you to define up to four separate mDNS announcement rings. The system listens on all of the defined rings for stream announcements, and allows you to select an individual ring or rings when you add a stream.</p> <p>The "UseBonjourAddressName" values name the rings in the GUI.</p>	leave empty or set (as shown)
Setup SAP Support	<pre>[Debug] UseSAP=1 (default 0) UseSAPDoSDPSort=1 (default 1) UseSAPAddress1=239.255.255.255 UseSAPPort1=9875 UseSAPAddress2= UseSAPPort2=9875 UseSAPAddress3= UseSAPPort3=9875 UseSAPAddress4= UseSAPPort4=9875</pre> <p>If this option is enabled, the software listens for SAP announcements, and announce streams to the network via SAP. This provides an alternative method of stream detection to the usual mDNS/Bonjour. Up to four SAP announcement rings can be specified.</p> <p>The "UseSAPDoSDPSort" value affects the ordering of SDP lines within the SAP message.</p>	0 or 1, default is 0
Define TTL for mDNS Packets	<pre>[Debug] UseBonjourTTL=0</pre> <p>This option defines a TTL for outgoing mDNS UDP packets.</p>	0 to 255, default is 0 (which results in OS default TTL=1)
Define TTL for SAP Packets	<pre>[Debug] UseSAPTTL=0</pre> <p>This option defines a TTL for outgoing SAP UDP packets.</p>	0 to 255, default is 0 (which results in OS default TTL=1)
Setup UniCast without RTSP	<pre>[Debug] StreamingUseDirectUnicast=0</pre> <p>This option can be used to do unicast without RTSP communication. When the option is enabled, you can enter stream destination IPs which are not multicast. Any IP address can be entered in the Multicast Address field, and there will be no test to check if the value is a valid multicast address.</p>	0 or 1, default is 0

Name	Syntax & Description	Values
Define Send Multicast Join/Leave	[Debug] StreamSenderJoinMulticast=0 When this option is enabled, the stream senders issue a multicast join/leave. This can be used to avoid UDP packet flooding on certain types of network switch.	0 or 1, default is 0
Send Stream SDPs as mDNS Packet	[Debug] UseBonjourSDPExtension=0 This option supports an mDNS extension to send stream SDPs directly in a mDNS packet.	0 or 1, default is 0
Define the Media Index inside SDP	[Ravenna] NICDefaultSDPMediaSelection=MediaIndex:0 NICDefaultSDPMediaSelection=MediaID:primary This option is needed only in routed networks, such as a Nevon network. It defines the part of the SDP which should be used for the default NIC. The syntax is shown below. For the MediaIndex, enter either an index number (starting from 0) or id (defined in the SDP line "a=mid:...").	as per description
Support Static SDP Stream List	[SDPStreams] NbStreams=1 [SDPStream_1] Interface=Default Name="Rav.Out8" SDP="v=0\r\no=- 06904238260008 0 IN IP4 10.2.20.90\r\ns=Rav.Out8\r\nt=0 0\r\na=clock-domain\ :PTPv2 0\r\na=ts-refclk\ :ptp=IEEE1588-2008\ :00-0B-72-FF-FE-05-85-A8\ :0\r\na=mediaclk\ :direct=0\r\nm=audio 5004 RTP/AVP 98\r\nnc=IN IP4 239.20.90.8/5\r\na=source-filter\ : incl IN IP4 239.20.90.8 10.2.20.90\r\na=rtpmap\ :98 L24/48000/2\r\na=framecount\ :32\r\na=recvonly\r\na=ptime\ :0.66 6\r\na=sync-ime\ :0\r\na=mediaclk\ :direct=0\r\n" This option supports a static SDP stream list. A typical example is shown above. Please note the SDP escapement.	as per description
Setup Search Text	[Debug] DialogAddStreamSinkUseSearchAsFilter=0 When this option is enabled, the "Search" field in the 'Available Streams' dialog box can be used to filter the list of streams. Enter your filter text into the "Search" field and press Refresh - all streams which match the filter are shown. Clear the "Search" field and press Refresh again to see the complete list. Note that the search text is case sensitive.	0 or 1, default is 0

Synchronization

Name	Syntax & Description	Values
Set WDM Clock to PTP	[Debug] UsePTPtoWDMClockSyncFactor=0 This option sets the WDM clock to PTP by transmitting the PTP clock factor from the application to the WDM driver. This options requires a WDM driver version >= 1.6. You can check the WDM driver version from the About menu (click on the Lawo logo and then select "About").	0 or 1, default is 0
Setup PTP Delay Request	[Debug] PTPUseSyncOnly=1 This option deactivates PTP Delay Request messages. This can slightly improve the precision of PTP. Under normal circumstances, it is not needed.	0 or 1, default is 1
Define PTP "Not Valid" Delay Message	[Debug] PTPMaxValidMessageTimeoutMilliSec=5000 This option defines the time in milliseconds without receiving PTP before the software reports the sync signal as lost.	enter value in ms (1000 to 300000), default is 5000
Define Minimum Number of Valid PTP Sync Signals	[Debug] PTPMinSyncs=50 This option defines the minimum number of valid PTP syncs received before the software switches the sync to active. ATTENTION! It is recommended to leave this option unchanged, as setting the value too low can result in sync issues.	enter value (5 to 100), default is 50

Name	Syntax & Description	Values
Define Valid Number of PTP Delay Requests	[Debug] PTPMinDelayRequests=5 This option defines the minimum number of valid PTP delay request responses received before the software switches the sync to active.	enter value (1 to 20), default is 5
Setup Seamless PTP Switching	[Debug] UseSeamlessPTPSwitching=1 When this option is enabled and the PTP master is lost, the software uses the latest computed values until a new valid PTP master is available. Thus, the system switches seamlessly between PTP masters.	0 or 1, default is 1
Setup Internal Streams without PTP	[Debug] UseInternalSyncedStreams=0 This option adds an additional sync mode to send streams based on the internal clock. The option must be enabled in both the sender and receiver. In the receiver, the streams are called "R3lay" streams and are displayed in a separate tab from the Ravenna tab.	0 or 1, default is 0
Define Internal Streams without PTP as Ravenna Streams	[Debug] AnnounceNonPTPStreamsAsRavenna=0 This option announces the internal streams as Ravenna streams even though they are not synchronized to PTP.	0 or 1, default is 0

RTSP

Name	Syntax & Description	Values
Define RTSP URL Escape Characters	[Debug] RtspUrlEscapeCharacters=":/?#[]@!\$%&'()*+,-;= % " This option defines the list of characters to be used for RTSP URL escapement. Please include the reserved characters like ":" and "?". If the list is left empty, then the internal escape characters are used.	leave empty or set (as shown)
Define First RTSP Server Port	[Streaming] InitialRTSPSourcePort=8000 This option defines the port number of the first RTSP server.	enter port number
Setup RTSP Ping Timeout	[Streaming] RTSPPingTimeoutSecs=0 This option defines the RTSP behaviour if the ICMP ping to Unicast receiver fails. The value sets the number of seconds after which the stream is stopped. If the value is 0, then no ICMP ping check is done.	0 to 14400, default is 0
Define RTSP Behaviour for 0 Bytes	[Streaming] RTSPCloseSessionOnEmptyNewBytes=0 This option defines the RTSP behaviour if a remote socket dies and a 0 bytes reading is reported. In this instance, the unicast stream is stopped.	0 or 1, default is 0
Setup RTSP Timeout for 0 Bytes	[Streaming] RTSPLivenessTimeoutSecs=0 This option defines the RTSP behaviour if the connection breaks and there is no further RTSP communication. The value sets the number of seconds after which the unicast stream is stopped. Note that the receiver must send periodic dummy RTSP commands to use this feature.	0 to 14400, default is 0

Network Compensation

Name	Syntax & Description	Values
Setup Wait Time Before Processing Buffer	[Debug] SampleDataBufferTimeout=15 This option sets the wait timeout in milliseconds for data buffers before the buffer is processed.	1 to 1000, default is 15
Setup Wait Time Before Processing Connection	[Debug] SampleDataConnectionTimeout=15 This option sets the wait timeout in milliseconds for data buffers before a connection is processed.	1 to 1000, default is 15

Name	Syntax & Description	Values
Setup Wait Time Before Processing WDM Driver	[Debug] WMDriverTimeout=5 This option sets the wait timeout in milliseconds for WDM drivers before the buffer is processed.	1 to 50, default is 5
Setup Window Resend Size if Packets are too late	[Debug] StreamDiscardPacketsTooLateMilliSecs=0 Packets which are too late by this amount of time are discarded and not sent. The option can be used to avoid heavy packet bursts. A value of 0 means no discarding of packets even if they are late. The time is set in milliseconds.	1 to 100000, default is 15
Define What To Do in Case Of Drifting Streams	[Debug] ClockDriftCompensation=NONE This option defines what happens if a connection needs to be corrected due to under or overruns (caused by drifting clocks or performance jitter). The possible values are "NONE", "CROSSFADE", "CHECKPHASE" or "CHECKCLOCK". The default is "NONE". <ul style="list-style-type: none"> • CROSSFADE - a small crossfade is added to smooth the audio correction. • CROSSFADE CHECKPHASE - the software performs a phase check to find an appropriate sample position and then adds a small crossfade. • CHECKCLOCK - the software attempts to compensate for the different sample clocks by adding or dropping random samples. 	as per description
Setup Cross Fade Behaviour in Case of Drifting Streams	[Debug] DropoutCrossfadeSamples=64 In the case where a crossfade is applied, this option sets the crossfade duration (in samples).	0 to 512, default is 64
Define Search Area for Phase Auto Correction in Case Of Drifting Streams	[Debug] DropoutPhaseSearchSamples=0 In the case where a phase check is performed, this option defines the range of samples searched to find the best match for the audio correction.	0 to 512, default is 0
Define Audio Buffer Size	[Debug] SampleDataBufferSizeMilliSec=-1 This option sets the buffer size for each audio object inside RELAY. Defining a large buffer size can be used to compensate for high jitter values in the incoming or outgoing audio signals.	500 to 30000, or -1 for default

Ember+

Name	Description	Values
Setup Stream Switching via Ember+	[Streaming] UseEmber=0 This option allows stream parameters to be read and controlled via Ember+. For example, to switch streams to and from RELAY.	0 or 1, default is 0
Define EMBER+ Stream Interval	[Interfaces] EmberStreamInterval=50 This option sets the number of milliseconds until a new value is sent for Ember+ streams (i.e. peakmeter values).	10 to 5000, default is 50
Improved Performance for Large Matrix	[Debug] UseSinkSourceEmberMatrix=0 This option switches the SourceToSink matrix to an Ember+ matrix for each streaming connection. It can be used to improve the performance of a large matrix.	0 or 1, default is 0
VRX: Setup Extended EMBER+ Tree for GUI	[Debug] UseJadeStudioFullEmber=0 This option applies to RELAY VRX4 and VRX8. When enabled, the Ember+ tree is extended to allow control of the complete GUI.	0 or 1, default is 0
VPB: Define Additional EMBER+ Matrix View	[GUI] EmberMenuCommands=0 This option applies to RELAY VirtualPatchBay. It allows you to add individual inputs, outputs and summing points to the Ember+ tree (via the context menu in the VPB routing matrix).	0 or 1, default is 0

Diagnostics

Name	Syntax & Description	Values
Setup Alert Manager	<pre>[Debug] UseAlertManager=0</pre> <p>This option activates the Alert Manager to monitor events that are not obvious to the user. Once enabled, a dialog box appears if an alert is detected. The Alert Manager detects the following situations:</p> <ul style="list-style-type: none"> • NICs using more than one IP address. • Suddenly missing UDP stream packets. • Duplicated multicast addresses. 	0 or 1, default is 0
Setup AlarmLog and Matrix Server Connections	<pre>[Interfaces] AlarmLogActive=1 AlarmLogNIC1= AlarmLogIPAddress1=x.y.z.t AlarmLogPort1=18200 AlarmLogNIC2= AlarmLogIPAddress2=x.y.z.t AlarmLogPort2=18200 AlarmLogMatrixServerActive=0 AlarmLogMatrixServerIDOffset=0</pre> <p>This option supports connections to a DSA Alarmlog PC and/or Matrix Server.</p> <p>The "AlarmLogActive" and "AlarmLogMatrixServerActive" values can be set to either 0 or 1, the default is 0.</p> <p>The "AlarmLogIPAddress1" and "AlarmLogIPAddress2" values define the IP address of the main and redundant Alarmlog PC. In each case, enter either an IP address or name.</p> <p>The "AlarmLogMatrixServerIDOffset" sets a general offset for all IDs from 0 to 65535.</p>	as per description
Setup Latency Measuring	<pre>[Debug] UseLatencyMeasuring=0</pre> <p>This option should only be used by an administrator in the case of latency issues. It can be used to measure and define the total latency of samples received in a stream and sent to a stream.</p>	0 or 1, default is 0

SysLog

Name	Syntax & Description	Values
Setup SysLog	<pre>[Interfaces] SysLogActive=0</pre> <p>Activates the sending of some syslog messages.</p>	0 or 1, default is 0
Define SysLog IP	<pre>[Interfaces] SysLogIPAddress=127.0.0.1</pre> <p>Defines the IPv4 address of the syslog server.</p>	enter IP address
Define SysLog Port	<pre>[Interfaces] SysLogPort=514</pre> <p>Defines the port number of the syslog server.</p>	enter port number

Virtual Machine (VM)

Name	Syntax & Description	Values
Setup VM Mode	<pre>[Debug] UseVMWareAPI=0</pre> <p>When this option is enabled, the software tries to load a vmware dll to detect whether it is running on a Virtual Machine and improve migration.</p>	0 or 1, default is 0
Fallback Monitor Rate in VM	<pre>[Debug] UseMonitorRefreshRateFallback=0</pre> <p>This option may be needed if the software is running on a Virtual Machine and the monitor refresh rate cannot be detected. If the VM shows an error message such as "The monitor refresh rate could not be detected...", then the option should be set to 1.</p>	0 or 1, default is 0

General

Name	Syntax & Description	Values
Setup Defaults for Silence Detection	[Debug] SilenceDetectionThresholdHigh=-20 SilenceDetectionTimeoutHigh=0 SilenceDetectionThresholdLow=-50 SilenceDetectionTimeoutLow=5 This option sets the default values for silence detection. This feature can be used to indicate when the signal on a channel falls below a certain level. The silence detection Active state is published to the network via Ember+ (if Ember+ is enabled), and be used by an Ember+ consuming device.	enter threshold in dBFs (-90 to 0), enter timeouts in seconds (0 to 60), default values are as shown.
Setup Audio Plug-in	[Debug] UseAudioFilterFileSource=0 Adds the possibility to add a plug-in that can playback linear PCM wave files and be controlled via Ember+ (if Ember+ is enabled).	0 or 1, default is 0
Setup Double Touch Event Delay	[GUI] SuppressDoubleTouchMilliSecs=100 This option determines what happens when the user presses the same button in quick succession. If the time between presses is less than, or equal to, the value, then the software responds only to the first press. If the time between presses is greater than the value, then the software responds to the second press and actions another event. The time is set in milliseconds.	50 to 2000, default is 100
Setup Process Priority	[Host] ProcessPriority=REALTIME This option defines the processing priority of RELAY. You can use this to increase the CPU resources allocated to RELAY compared to other PC tasks. The possible values are "NORMAL", "ABOVENORMAL", "HIGH", "REALTIME". The default is "REALTIME".	as per description
Define SRC for ASIO (CPU Load)	[Debug] ASIOClientsSRC=BEST_QUALITY This option defines the quality of Sample Rate Conversion (SRC) for ASIO clients running at a different sample rate. Note that a higher quality results in a higher CPU load. The possible values are "BEST_QUALITY", "MEDIUM_QUALITY", "FASTEST", "ZERO_ORDER_HOLD" and "LINEAR". The default is "BEST_QUALITY".	as per description
Setup WLAN NICs	[Debug] UseNIC=ALL Enables the use of WLAN NICs. ATTENTION! Only for testing purposes as Admin.	leave empty or set (as shown)
Setup Custom AutoMix Parameters	[Debug] AutoMixAttackMilliSecs=5 AutoMixReleaseMilliSecs=250 AutoMixFloorDb=-45 This option can be used to define custom parameters for the AutoMix function: <ul style="list-style-type: none"> • Attack Time in ms, from 1 to 1000 (default is 5) • Release Time in ms, from 1 to 2000 (default is 250) • Floor Level in dB, from -100 to 0 (default is -45) Note that AutoMix is NOT supported by RELAY VSC.	as per description
Activate Windows Mixer Volume	[Debug] WDMDriverUseMixerVolume=0 This option activates the Windows mixer volume for all WDM driver instances. It allows you to use the Windows volume control to adjust the level to RELAY. The WDM driver version must be 1.8.0.5 or later.	0 or 1, default is 0

R3LAY VSC

Name	Syntax & Description	Values
Maximum Connection Latency	<p>[VSC] MaxConnectionLatencyWDMToStream=1024 MaxConnectionLatencyASIOToStream=1024 MaxConnectionLatencyStreamToWDM=1024 MaxConnectionLatencyStreamToASIO=1024</p> <p>This option applies to R3LAY VSC. It defines the maximum latency for each type of connection. If a value is entered, then this overrides the settings-defined value: "short", "medium" or "long".</p>	leave empty or enter value (64 to 16384), default is empty
Define Fixed RTSP Ports	<p>[Streaming] VSCUseFixedRTSPPortPerSlot=0</p> <p>This option applies to R3LAY VSC. It assigns a fixed RTSP port for each connection slot.</p>	0 or 1, default is 0

R3LAY VRX

Name	Syntax & Description	Values
Define Preset Workflow with Open Faders	<p>[Debug] MuteChannelOnPresetSwitch=0</p> <p>This option applies to R3LAY VRX. When enabled, a channel with an open fader mutes when the user changes the signal processing preset.</p>	0 or 1, default is 0
Define User Keys for Stream Connects	<p>[Debug] UseJadeStudioStreamReceiveConnect=0</p> <p>This option applies to R3LAY VRX. When enabled, VRX user keys can be defined to connect an incoming stream to a stream receiver.</p>	0 or 1, default is 0
Define User Keys to Open Sources	<p>[Debug] UseJadeStudioOpenSource=0</p> <p>This option applies to R3LAY VRX. When enabled, VRX user keys can be defined to open and close source channels. On opening, the fader returns to its last known position.</p>	0 or 1, default is 0
Define User Keys to Talk	<p>[Debug] UseJadeStudioTalkDirect=0</p> <p>This option applies to R3LAY VRX. When enabled, VRX user keys can be defined to talk to the direct out.</p>	0 or 1, default is 0
Define PPM	<p>[Debug] PeakmeterType=PPM10</p> <p>This option applies to R3LAY VRX and affects the PPM metering in the Taskbar. It sets the peak meter characteristics to match those used in Lawo's mc² Audio Production Consoles. The possible values are "PPM0", "PPM1", "PPM10" and "VU". The default is "PPM10".</p>	as per description
Setup PPM Level for Red Marker	<p>[Debug] StudioRedLevel=-6</p> <p>This option applies to R3LAY VRX and affects the PPM metering in the Taskbar. It sets the level at which the meter color turns red. The value is set in dBFS from -32 to 0. In VRX8, the default is -6. In VRX4, the default is -3.</p>	as per description
Define Range for Pop-up Arrows	<p>[R3LAYVRX8\Settings\Global\GUI] ButtonUnfoldHeightPercent=50</p> <p>This option applies to R3LAY VRX. It applies to the four User Keys in the headline of the GUI which support a second function via the pop-up arrow. It defines how much of the button is used for the arrow and how much is left for the main function. When the value is set to 50%, the button is split equally. i.e. users must click on the upper half of the button to action the User Key function, and click on the lower half to open the drop-down menu. If you wish to make it easier to operate the User Key functions, then reduce the value to make the arrows smaller.</p>	enter value (10 to 90), default is 50
Enable switching Fullscreen / WindowMode	<p>[Debug] R3LAYVRXnUseWindow=0 (n = 4 or 8)</p> <p>This option applies to R3LAY VRX. It is a special option which prevents the application switching into full screen view. To activate, click on the TASKBAR icon while pressing left SHIFT + CTRL + ALT.</p>	0 or 1, default is 0

Name	Syntax & Description	Values
Setup Extended EmBER+ Tree for GUI	[Debug] UseJadeStudioFullEmber=0 This option applies to R3LAY VRX. When enabled, the Ember+ tree is extended to allow control of the complete GUI.	0 or 1, default is 0
VRX4: Define Default Support Channel in Taskbar	[R3LAYVRX4\Settings\Global\General] StartupAppBarChannel=PHONES This option applies to R3LAY VRX4. It defines the default channel assigned to the "Channel Selection" box in Taskbar View.	"Phones", "Speaker" or leave empty, default is empty
VRX8: Setup Processing for PGM and REC Bus	[Debug] UseVRX8OutputProcessing=0 This option applies to R3LAY VRX8. It allows you to assign signal processing presets to the PGM and Record busses (in Admin Mode).	0 or 1, default is 0
VRX8: Show Options: Copy RTSP Link & Copy SDP	[Debug] UseStreamClipboardCopy=0 This option applies to R3LAY VRX8 and VPB. By default, the option is disabled. When enabled, it reveals two additional buttons when you add streams to VRX8: Copy RTSP Link and Copy SDP. These options copy the selected information to the clipboard, so that it can be used to setup a new stream. For example, via the Add Stream URL or Add Stream SDP windows in R3LAY VRX8.	0 or 1, default is 0
VRX8: Setup Additional Values for Number of Channels to/from ASIO Client	[Debug] DialogSettingsNbAsioChannels=1, 2, 4, 8, 12, 16, 24, 32, 48, 64 This option applies to R3LAY VRX8. It defines the values that appear in the Number of Inputs and Number of Outputs menus for the R3LAY ASIO Driver (in the Global Settings -> Audio tab). Any value from 1 to 256 is permitted, so please take care to enter only reasonable values. A typical example is shown above.	as per description

R3LAY VPB

Name	Syntax & Description	Values
Define Loop Visibility	[GUI] PreventClientLoops=1 This option applies to R3LAY VPB. When enabled, any connections in the routing matrix that could result in loops are hidden from view.	0 or 1, default is 1
Setup AutoMix Context Menu	[Debug] UseAutoMix=0 This option applies to R3LAY VPB. It adds the AutoMix function to the context menu for summing points, in the routing matrix, so that users can apply automatic level adjustment.	0 or 1, default is 0
Setup Stream Statistics	[Debug] UseShowStatisticsInContextMenu=0 This option applies to R3LAY VPB. It activates a context menu option to open a stream statistics window for the selected stream. To open the statistics window, right-click on a stream and select "Show Statistics...".	0 or 1, default is 0
Show Options: Copy RTSP Link & Copy SDP	[Debug] UseStreamClipboardCopy=0 This option applies to R3LAY VRX8 and VPB. By default, the option is disabled. When enabled, it reveals two additional context menu options in the VPB "Routing" view when you right-click on a stream: Copy RTSP Link and Copy SDP. These options copy the selected information to the clipboard, so that it can be used to setup a new stream. For example, via the Add Stream URL or Add Stream SDP windows in R3LAY VPB.	0 or 1, default is 0

R3LAY Stream Monitor

Name	Syntax & Description	Values
Open App as Window	[Debug] R3LAYStreamMonitorUseWindow=0 This option applies to R3LAY Stream Monitor. When enabled, the application opens as a window that can be resized, minimized, etc. By default the option is disabled so that the application opens in full screen.	0 or 1, default is 0

Name	Syntax & Description	Values
Disable Loudness Measurement	<pre>[Debug] UseStreamMonitorLUFS=1</pre> <p>This option applies to R<small>ELAY</small> Stream Monitor. It can be used to switch off the loudness measurement to reduce the demand on the computer's CPU. In this instance, the stream monitoring window shows only the peak level metering (in dBFS). By default, the loudness measurement is turned on and so both dBFS and LUFS are shown.</p>	0 or 1, default is 1

OnAir4

Name	Syntax & Description	Values
Setup OnAir4	<pre>[Interfaces] OnAir4Active=0 OnAir4UseFixedIPAddress=1 OnAir4FixedIPAddress=a.b.c.d</pre> <p>This option activates the connection to an OnAir4 (supported by R<small>ELAY</small> VRX4, VRX8 and VPB).</p>	0 or 1, default is 1
VRX8: Setup All Headphones for OnAir4	<pre>[Interfaces] OnAir4UseMultiHeadphone=1</pre> <p>This option applies to R<small>ELAY</small> VRX8. It activates all four headphone outputs on the OnAir4 with independent level control from the GUI, and via Ember, for each output.</p>	0 or 1, default is 0 for existing and 1 for new installations
Setup Image Check on OnAir4	<pre>[Interfaces] OnAir4CheckImageVersion=1</pre> <p>This option suppresses the image check of the OnAir4 (when the value = 0). ATTENTION! Only for testing purposes as Admin.</p>	0 or 1, default is 1

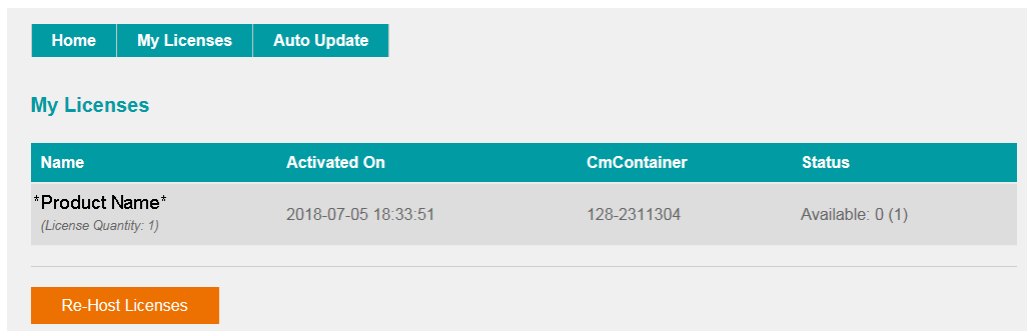
8.3 Advanced Licensing Features

This appendix describes the more advanced features of the CodeMeter Runtime licensing system.

8.3.1 Re-Hosting a License

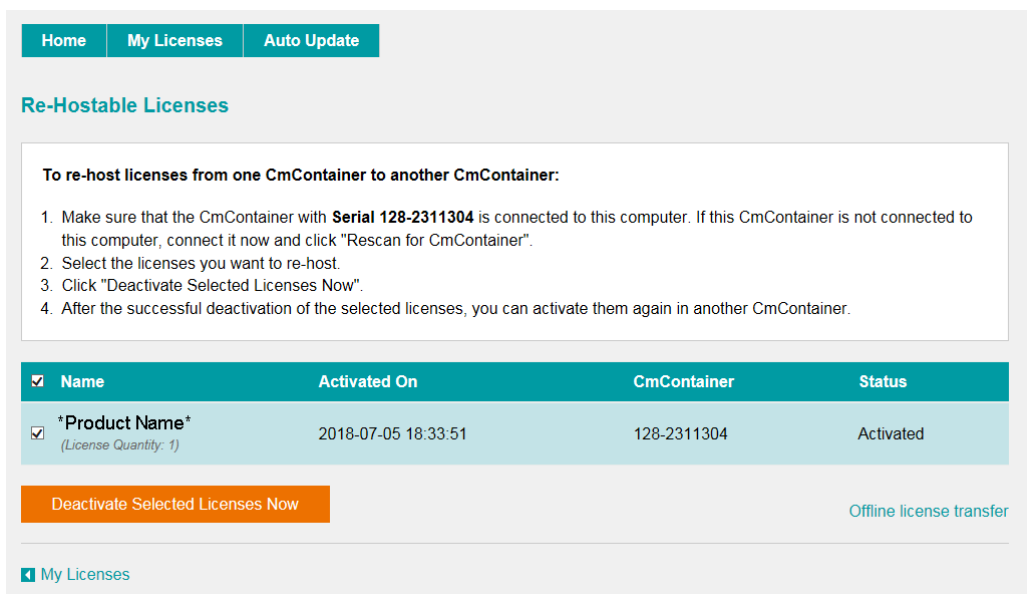
To move a license from one Cm container to another, you will need to re-host the license as follows. This requires you to first de-activate the license from its existing Cm container, and then choose the new storage container.

1. Follow the first two steps from the [online activation](#) method:
 - Open the 'Lawo License' web browser page at <https://licenseportal.lawo.com>.
 - Copy your license ticket number - this is the 25 number code - into the **Ticket** field and select **Next**.
2. At the "My Licenses" summary window, select **Re-Host Licenses**:



Name	Activated On	CmContainer	Status
Product Name <small>(License Quantity: 1)</small>	2018-07-05 18:33:51	128-2311304	Available: 0 (1)

3. Make sure that the Cm container is connected to the computer, select the licenses you wish to re-host and select **Deactivate Selected Licenses Now**.



To re-host licenses from one CmContainer to another CmContainer:

1. Make sure that the CmContainer with **Serial 128-2311304** is connected to this computer. If this CmContainer is not connected to this computer, connect it now and click "Rescan for CmContainer".
2. Select the licenses you want to re-host.
3. Click "Deactivate Selected Licenses Now".
4. After the successful deactivation of the selected licenses, you can activate them again in another CmContainer.

<input checked="" type="checkbox"/>	Name	Activated On	CmContainer	Status
<input checked="" type="checkbox"/>	*Product Name* <small>(License Quantity: 1)</small>	2018-07-05 18:33:51	128-2311304	Activated

Wait for a few seconds - a confirmation pop-up appears once the de-activation is successful.

You can follow steps 3 to 7 from the [online](#) activation method, or perform an [offline](#) license transfer, to activate the license using a new storage container.

8.3.2 Activating a License Offline

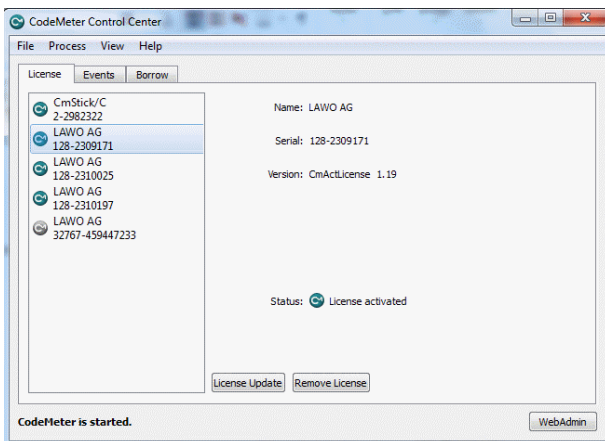
If your PC has no internet access, then you can activate a software license offline. This method involves three stages:

- **Create a license request file** - for the Cm storage container. Then copy the file onto a computer with internet access.
- **Activate the license** - using the 'Lawo License' web portal, copy the license update file back to the original computer.
- **Import the license update file** - to the Cm storage container.

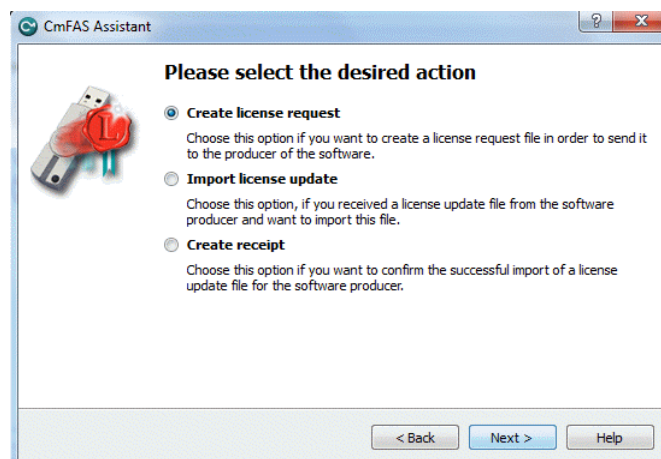
Creating the License Request File

On the computer you wish to license:

1. Open the '[CodeMeter Control Center](#)' (by clicking on the Cm taskbar icon), and select the container you wish to use for the license storage.
2. If the container is empty, select **Activate License**. Or, if the container already holds an active license, select **License Update**. This starts the 'CodeMeter Field Activation Service (CmFAS) assistant':

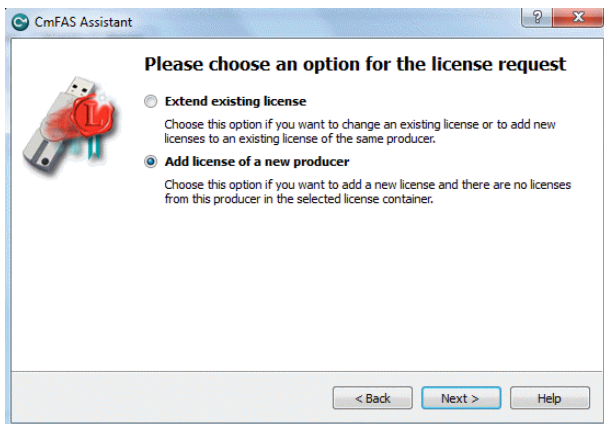


3. Select **Next:** and then **Create license request:**



At this stage, there are two additional steps (to add the correct firmcode) if you have selected a **CmStick** container. Enter the following Lawo FirmCode to create the license request file:

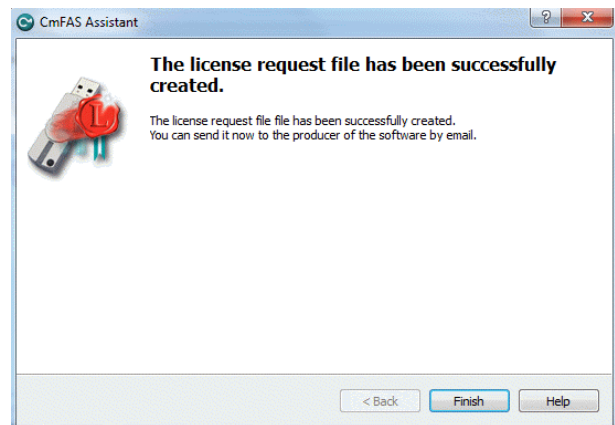
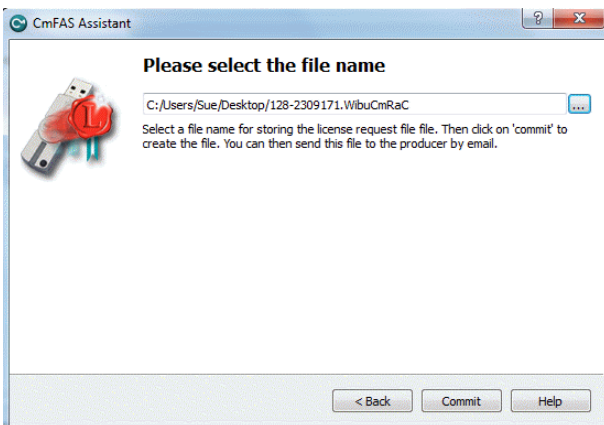
Select Add license of a new producer



Enter the Lawo FirmCode = 102037



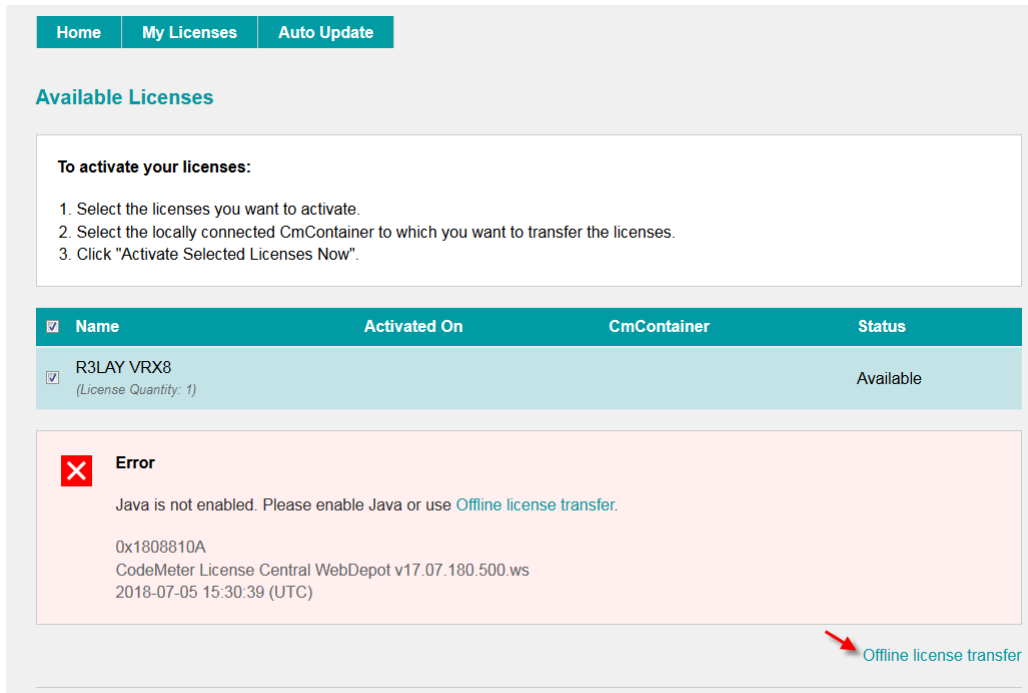
4. Select **Next**, and using Windows Explorer, enter a file path for the license request file. Choose somewhere easy to find, such as the Desktop. Then select **Commit** to create the request file:



5. Select **Finish** and copy the request file onto a computer with internet access. You will need both the license request file and the 25-digit ticket number (received with your license purchase).

Activating the License

1. On a computer with internet access, follow the first four steps from the [online activation](#) method:
 - Open the 'Lawo License' web browser page at <https://licenseportal.lawo.com>.
 - Copy your license ticket number - this is the 25 number code - into the **Ticket** field and select **Next**.
 - When your license is displayed, select **Activate Licenses** to continue.
 - Select the storage method for your license - either USB dongle or single computer.
2. At the **Available Licenses** page, select **Offline license transfer** to continue:



Home My Licenses Auto Update

Available Licenses

To activate your licenses:

1. Select the licenses you want to activate.
2. Select the locally connected CmContainer to which you want to transfer the licenses.
3. Click "Activate Selected Licenses Now".

<input checked="" type="checkbox"/>	Name	Activated On	CmContainer	Status
<input checked="" type="checkbox"/>	R3LAY VRX8 <small>(License Quantity: 1)</small>			Available

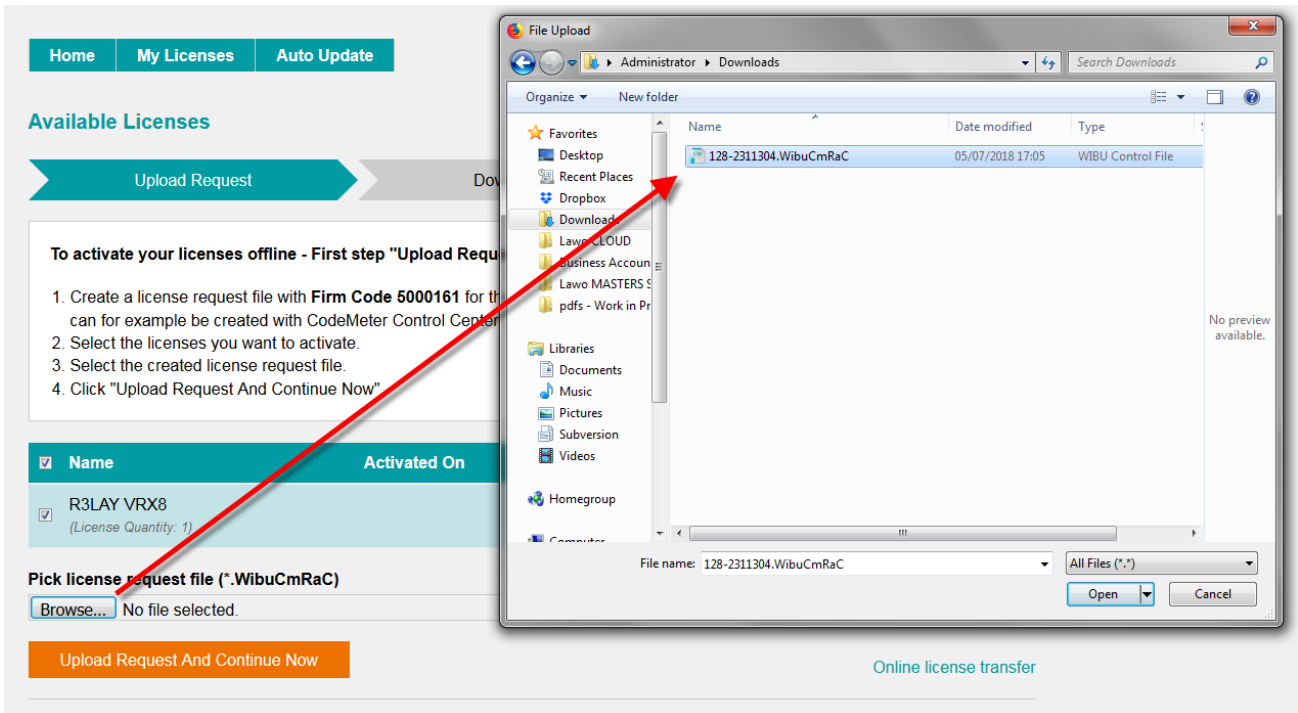
Error

Java is not enabled. Please enable Java or use [Offline license transfer](#).

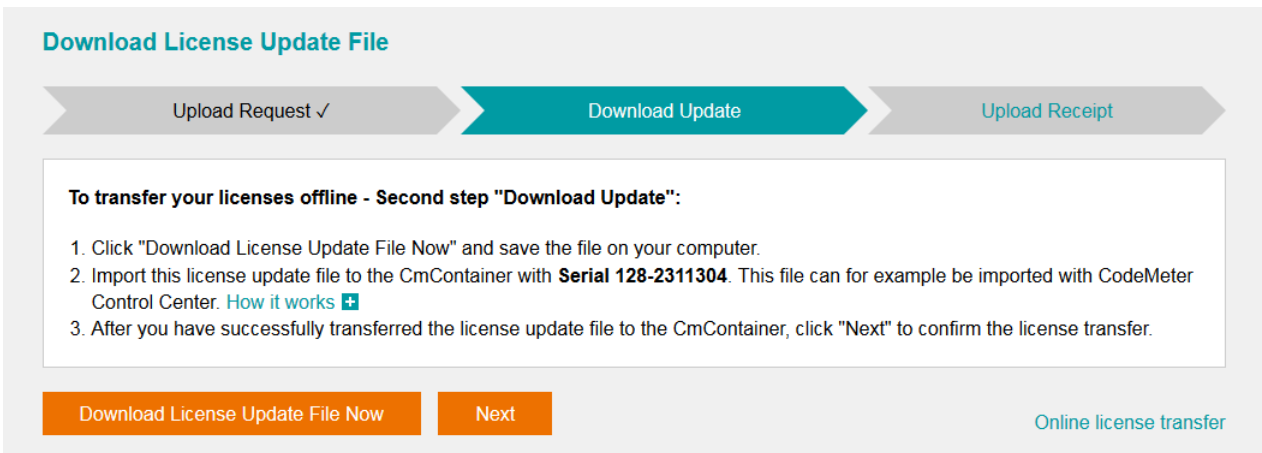
0x1808810A
CodeMeter License Central WebDepot v17.07.180.500.ws
2018-07-05 15:30:39 (UTC)

[Offline license transfer](#)

3. On the next page, select the license(s) you wish to activate, select **Browse...** and, using Windows Explorer, choose the request file (created earlier):



4. Then select **Upload Request And Continue Now** - the license request is processed and, if successful, you will have the option to Download the update:

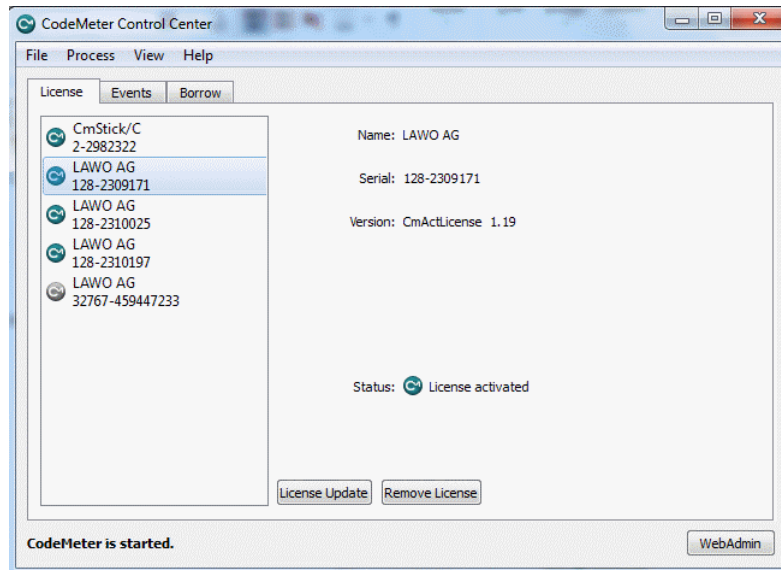


5. Select **Download License Update File Now** and, when prompted, choose the **Save** file option - the file is downloaded.

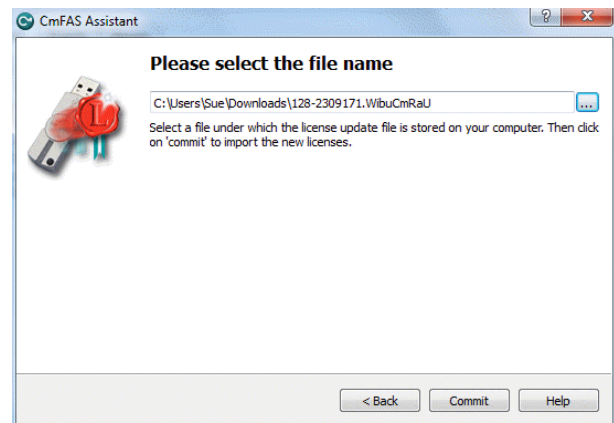
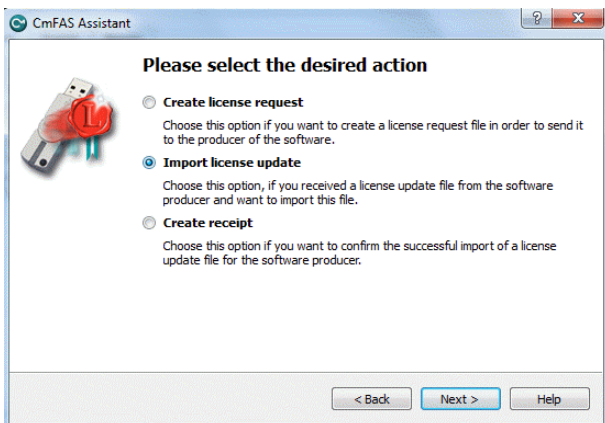
6. Copy the License Update file back to the original PC.

Importing the License Update

1. On the original computer re-open the 'CodeMeter Control Center' and select the Cm container for the license update. Note that this must be the same container as the one selected earlier (during the License Request).



2. Select **License Update** and follow the instructions given by the 'CmFAS Assistant' - when prompted, select Import License update and choose the update file (downloaded from the License portal):



3. Select **Commit** to action the update - the license is activated and you can close the 'CodeMeter Control Center'.
4. You can now return to your Lawo application or install your USB license dongle - all licensed features should be available.

8.3.3 The CodeMeter Control Center

The 'CodeMeter Control Center' is used to manage the license containers and perform a backup or restore.

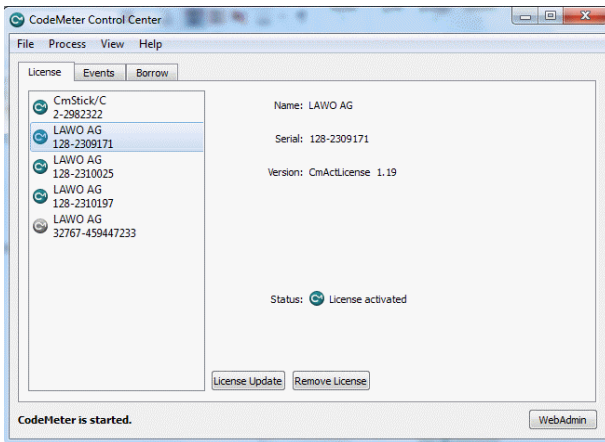
1. Click on the Windows taskbar Cm icon to open the 'CodeMeter Control Center' - the icon may be hidden from view or vary in color (depending on your taskbar configuration).



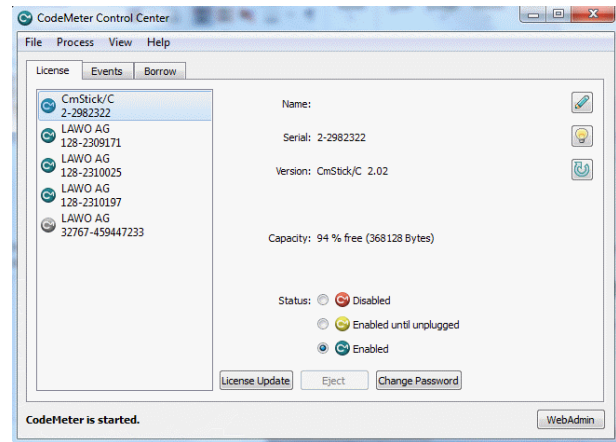
The 'CodeMeter Control Center' shows all the Cm containers which can be used for license storage.

A new local computer container is created each time you run the **CodeMeter Runtime** install wizard. Therefore, if you have installed multiple Lawo products or software versions, you will see several **LAWO AG** containers. If a USB dongle is connected, you will see a container labelled **CmStick**.

Local Computer Container (LAWO AG)



USB Dongle Container (CmStick)

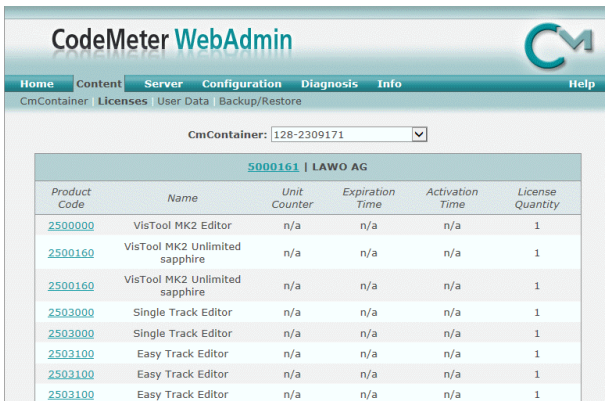


The **Serial** numbers identify each container. The icon colours indicate: green = license activated; grey = container is empty; red = license deactivated.

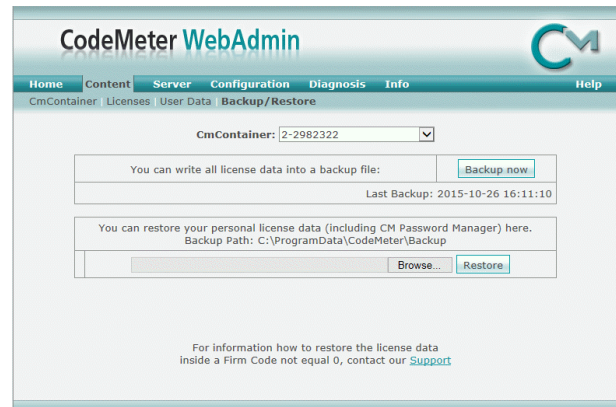
A single Cm container can contain multiple licenses - simply select the same container during the [activation](#) process.

2. Select **WebAdmin** (bottom right) to open the WebAdmin portal in your default browser. The portal has many functions including license interrogation, and backup/restore functions for licenses stored on a **CmStick** (USB Dongle):

WebAdmin Content Cm Container



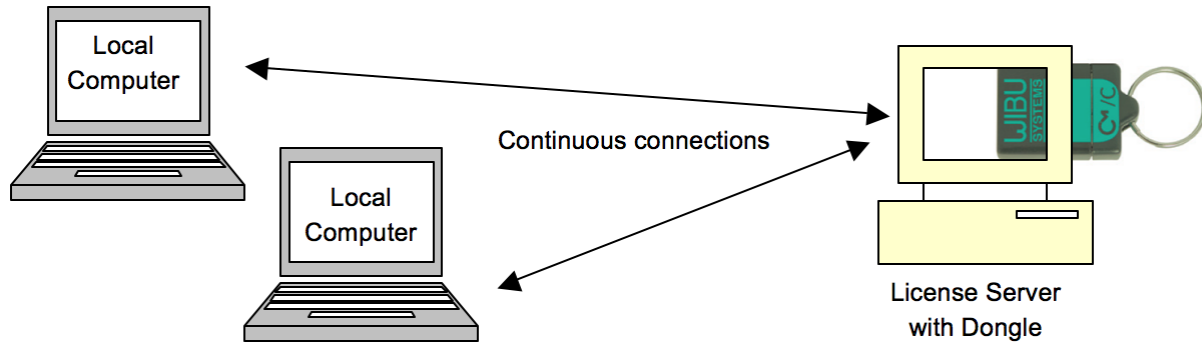
WebAdmin Backup/Restore



For further information, please refer to the **CodeMeter Runtime** documentation at wibu.com.

8.3.4 License Configuration via a Server

This license storage method can be used to administrate licenses centrally within a local network. For example, when starting a Lawo application such as **VisTool**, the local computer asks the server to borrow the relevant license. The license is then used by the **VisTool** client until the application is closed. On closing, the license is handed back to the server where it may then be used by a different **VisTool** client.



Preparing the Server

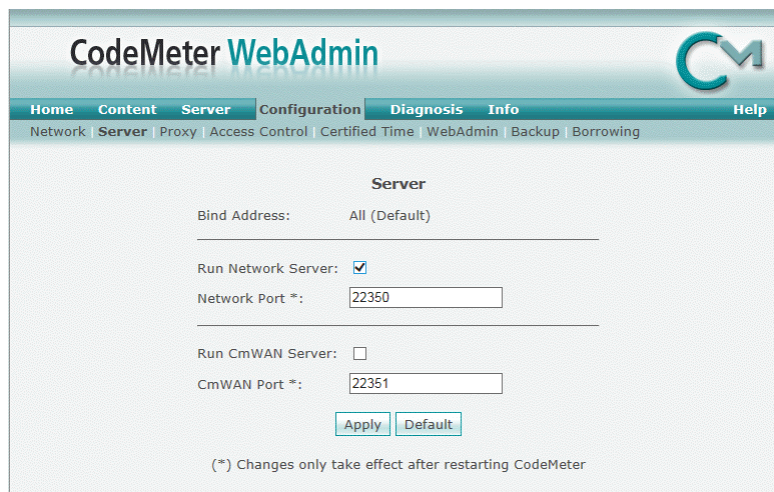
1. First, install the **Codemeter Runtime** software (Version 5.10 or above) on the central server. (Or, on a virtual machine on the server).

The latest release of CodeMeter Runtime can be downloaded from WIBU systems at wibu.com.

2. Activate all licenses in the usual manner.

If a virtual machine is being used, set up a connection between the virtual machine and USB dongle.

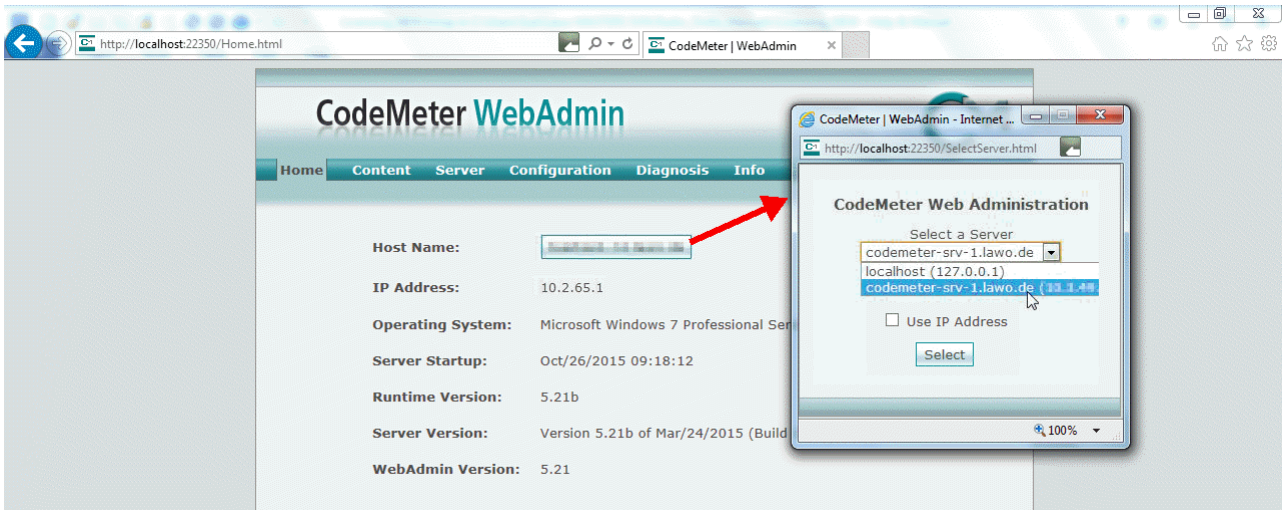
3. Open the [CodeMeter Control Center](#) and select **WebAdmin**.
4. Under **Configuration -> Server**, select the **Run Network Server** checkbox:



5. Click **Apply** and restart the **CodeMeter Runtime** software.

Preparing the Clients

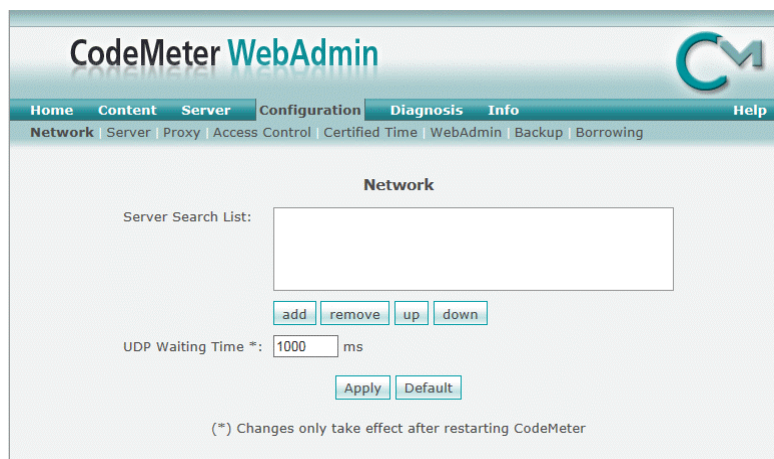
1. Install the **Codemeter Runtime** software (Version 5.10 or above) on each of the client computers.
2. Connect the clients (and server) to the network - on startup, the **CodeMeter Runtime** software sends a broadcast message across the network to find all license servers.
3. On each client computer, open the [Codemeter Control Center](#) and select **WebAdmin**.
4. From the **Home** page, select the name of the computer - a dialogue box should appear listing all the available license servers:



5. Choose the correct server from the drop-down list and click on **Select**.

If the license server is not found, then your firewall or network policy may not allow messages to be broadcast. In this case, you will need to add the server's IP settings to the search list, manually, as follows:

Under **Configuration** -> **Network**, add the correct IP settings into the **Server Search** list:



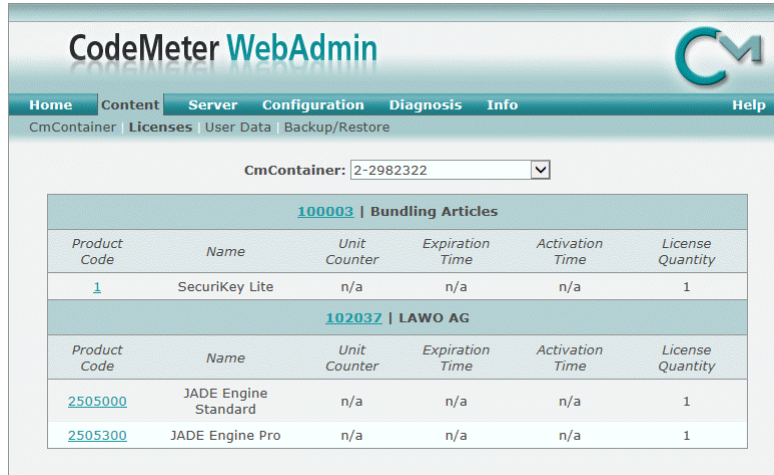
Click **Apply** and restart the **CodeMeter Runtime** software.

Note that once the **Server Search list** has an entry, all other license servers (announced automatically to the network) will be ignored.

Choosing a License

Once a connection to the license server is established, you can borrow one of the server licenses as follows:

1. On the client computer, open the [Codemeter Control Center](#) and select **WebAdmin**.
2. Under **Content** -> **Licenses**, choose the **CmContainer** (holding the server licenses) and select the desired license file:



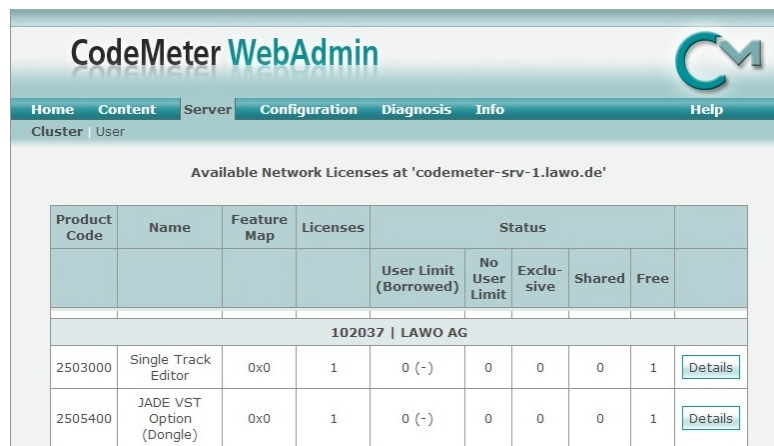
The screenshot shows the CodeMeter WebAdmin interface. The 'Content' tab is selected, and the 'Licenses' sub-tab is active. A dropdown menu shows 'CmContainer: 2-2982322'. Below this, there are two tables of licenses. The first table is for '100003 | Bundling Articles' and the second is for '102037 | LAWO AG'.

100003 Bundling Articles					
Product Code	Name	Unit Counter	Expiration Time	Activation Time	License Quantity
1	SecuriKey Lite	n/a	n/a	n/a	1

102037 LAWO AG					
Product Code	Name	Unit Counter	Expiration Time	Activation Time	License Quantity
2505000	JADE Engine Standard	n/a	n/a	n/a	1
2505300	JADE Engine Pro	n/a	n/a	n/a	1

If the licenses is in use, then a warning message appears.

You can check which licenses are available (free) by selecting **Server** and **Cluster**:



The screenshot shows the CodeMeter WebAdmin interface with the 'Server' tab selected and the 'Cluster' sub-tab active. The page title is 'Available Network Licenses at 'codemeter-srv-1.lawo.de''. Below this, there is a table showing available licenses.

Product Code	Name	Feature Map	Licenses	Status						
				User Limit (Borrowed)	No User Limit	Exclusive	Shared	Free		
102037 LAWO AG										
2503000	Single Track Editor	0x0	1	0 (-)	0	0	0	1	Details	
2505400	JADE VST Option (Dongle)	0x0	1	0 (-)	0	0	0	1	Details	