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RAVENNA ASIO & Core Audio Guide
For Merging Technologies NADAQ

Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction</td>
<td>5</td>
</tr>
<tr>
<td>Scope</td>
<td>5</td>
</tr>
<tr>
<td>2 Introduction to RAVENNA Technology</td>
<td>6</td>
</tr>
<tr>
<td>3 Merging NADAC RAVENNA ASIO Driver (PC)</td>
<td>9</td>
</tr>
<tr>
<td>ASIO</td>
<td>9</td>
</tr>
<tr>
<td>System Requirements</td>
<td>9</td>
</tr>
<tr>
<td>Installing the RAVENNA ASIO Driver</td>
<td>10</td>
</tr>
<tr>
<td>Bundled Applications and Documentation</td>
<td>13</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>14</td>
</tr>
<tr>
<td>4 Merging NADAC RAVENNA Core Audio Driver (Mac)</td>
<td>16</td>
</tr>
<tr>
<td>Core Audio</td>
<td>16</td>
</tr>
<tr>
<td>System Requirements</td>
<td>16</td>
</tr>
<tr>
<td>Installing the Merging RAVENNA Core Audio Driver</td>
<td>17</td>
</tr>
<tr>
<td>Mac OS recommended Configuration Settings</td>
<td>21</td>
</tr>
<tr>
<td>Uninstalling the Merging RAVENNA Core Audio Driver</td>
<td>22</td>
</tr>
<tr>
<td>Bundled Applications and Documentation</td>
<td>22</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>23</td>
</tr>
<tr>
<td>5 General Troubleshooting</td>
<td>27</td>
</tr>
<tr>
<td>6 MT Discovery</td>
<td>29</td>
</tr>
<tr>
<td>Overview</td>
<td>29</td>
</tr>
<tr>
<td>Using MT Discovery</td>
<td>29</td>
</tr>
<tr>
<td>Additional Information</td>
<td>29</td>
</tr>
<tr>
<td>7 Contacting Merging</td>
<td>31</td>
</tr>
<tr>
<td>International Office</td>
<td>31</td>
</tr>
<tr>
<td>UK:</td>
<td>31</td>
</tr>
<tr>
<td>USA:</td>
<td>31</td>
</tr>
<tr>
<td>8 Index</td>
<td>32</td>
</tr>
</tbody>
</table>
RAVENNA ASIO & Core Audio
For MERGING + NADAC
1 Introduction

The Network

Merging NADAC connects on the network using the Ethernet based RAVENNA protocol to any Music Server, Player or Streamer supporting ASIO on Windows, CoreAudio/DoP on MacOSX and through a direct RAVENNA connection on Linux. The Precision Time Protocol (PTP2 or IEEE 1588-2008) is at the heart of the RAVENNA protocol, ensuring an ultimate clock precision of one nanosecond and a full compatibility with the AES Audio-over-IP standard AES67.

The flexibility of RAVENNA allows for the NADAC to easily connect from the front panel menu to any Music Server, Player or Streamer on the network and receive multichannel PCM, DXD or DSD. The main outputs and the headphones outputs of NADAC can connect to different playlists or zones, or even different server, player or streamer, allowing for instance to preview your next song on the headphones while listening to your current track on the main outputs.

RAVENNA

RAVENNA is a solution for real-time distribution of audio and other media content in IP-based network environments. It was designed primarily by a company called ALC NetworX, RAVENNA utilizes standardized network protocols and technologies and can operate in existing network infrastructures. Performance and capacity scale with the capabilities of the underlying network architecture.

For more information about RAVENNA technology, please see Introduction to RAVENNA Technology on page 6 and:

http://ravenna.alcnetworx.com/

Scope

This document is intended to get you up and running RAVENNA in ASIO/CoreAudio with your Merging Technologies NADAC on your PC Windows system or MAC OS X system.
2 Introduction to RAVENNA Technology

Scope
The information in this chapter is provided as background of the philosophy and technology behind RAVENNA.

Overview
RAVENNA is a technology for real-time distribution of audio and other media content in IP-based network environments. Utilizing standardized network protocols and technologies, RAVENNA can operate on existing network infrastructures. RAVENNA is designed to meet the strict requirements of the pro audio market featuring low latency, full signal transparency and high reliability.

RAVENNA is suitable for deployment in many pro audio market segments including broadcast, live sound, studios the install market and location music recording. Possible fields of application include (but are not limited to) in-house signal distribution in broadcasting houses, theaters, concert halls and other fixed installations, flexible setups at venues and live events, OB van support, interfacility links across WAN connections and in production & recording applications.

In short, it represents a new take on the third generation form of audio interconnect, where the first generation of interconnect is analogue point-to-point copper, the second generation uses digital codes representing the analogue signal, conveyed point to point over copper or fibre-optic cabling and the third generation also employs digital codes representing the analogue audio but transported as packets over network infrastructure.

RAVENNA is very well suited to areas where complex audio routing / mixing systems are deployed. For example; in-house distribution in broadcasting centers and WAN connections to satellite studios, OB vans, where hook up to venues with the same infra-structure becomes simple, in venues themselves for local signal distribution and connection to just such OB vehicles when required. For live events and concerts it offers highly flexible temporary installation possibilities and in theatres, opera houses and houses of worship it can provide low cost local signal distribution. Notwithstanding all of the above, RAVENNA is also an excellent candidate for relatively simple point to point interconnects such as computer to audio interface.

However, RAVENNA, leaving aside the other advantages touted, is an open standard based on the ubiquitous IP protocol. Specifically, protocol levels on or above layer 3 of the OSI reference model. Since RAVENNA is purely based on layer 3 protocols, it can operate in most existing network environments. Unlike layer 1 or layer 2 solutions, it does not, in principle, require its own network infrastructure. IP can be therefore be transported on virtually any LAN and is used as the base layer for communication across WAN connections (including the internet). Although in most cases Ethernet will be deployed as the underlying data link layer, IP is in general infrastructure- agnostic and can be used on virtually any network technology and topology. All the protocols and mechanisms used in RAVENNA are based on well-established and commonly used methods from the IT and audio industries and comply with various standards defined and maintained by the international standards bodies.
A RAVENNA system requires a carefully configured IP network, a master clock device and any number of RAVENNA enabled I/O nodes. The master clock can be either a dedicated device or any RAVENNA node capable of serving as a grandmaster. The preferred time domain reference is GPS. Simple streaming across a network can be achieved without any synchronization at all but in pro audio applications tight synchronization between all devices and streams is absolutely mandatory. While playback synchronization in most applications requires sample accuracy, one goal for RAVENNA is to provide superior performance by offering phase-accurate synchronization as an option thus rendering separate reference word clock distribution throughout a facility or venue redundant.

**Flexibility**

The system design approach allows for operation with or without centralized services for configuration / connection management. ALC NetworX recommends that basic device configuration (e.g. initial settings and setup of audio streams) should be executed via a web interface (http). However, other methods may be used in addition or as an alternative.

Device discovery is accomplished with DNS-SD (via an mDNS or DNS Service). In small networks, without DHCP / DNS servers, the zeroconf mechanism - a fully automatic, self-configuring method - is used for auto-IP assignment and service advertisement & discovery.

Streams available on the network are represented by SDP records with extended information (i.e. a clock domain identifier, RTP time stamp association, etc.) Clients can connect to streams via RTSP or SDP/http.

**Resilience**

As you would expect RAVENNA supports redundancy. Although modern network infrastructures can be configured to guarantee a high level of transport security and reliable 24/7 operation for added security there is the option of full network redundancy. Some RAVENNA devices can include two independent network interfaces which can be connected to independent physical networks. By duplicating any outgoing stream to both network links, any destination device will receive the full stream data on both network interfaces independently. If data from one link is corrupted, or one network link fails completely, the uncorrupted data is still present on the other link. Changeover in the event of the failure of a network link is automatic.
Streaming

Unicast

Unicast (one-to-one) is used in application scenarios such as an individual stream between two devices (e.g. a multi-channel stream between a console, a DAC and a recorder/DAW). This uses a point-to-point connection between the sender and receiver. Since each additional receiver adds its own individual connection network traffic increases with every additional unicast stream.

Multicast

Multicast (one-to-many) streaming is used in scenarios where a single source is to be distributed to many potential recipients (e.g. program stream to journalists’ desks). At the sending end this only requires one connection per stream. Network switches are aware which participants (receivers) should receive any particular multicast and forward packets only to registered nodes. In multicast set-ups the network traffic only increases on the last (closest to receiver node) segment(s) of the network path.

Infrastructure

The network infrastructure must be able to transport IP packets and must support a number of standard operating protocols, e.g. RTP/RTCP for streaming since this is used widely and supports a wide variety of standard pay-load formats. Some of these formats are mandatory for all RAVENNA devices, others are optional. For example this protocol offers the possibility of standard media player applications subscribing to RAVENNA streams. Synchronization across all nodes is achieved via the IEEE1588-2008 (PTPv2 Precision Time Protocol). This is another standard protocol which can be used on IP. PTPv2 provides a means for synchronizing local clocks to a precision as defined in AES-11. Accurate synchronization can even be achieved across WAN connections when GPS is used as a common time domain.

Quality of Service

For the QoS (Quality of Service) protocol DiffServ has been chosen since it is widely supported by most modern managed switches. Since other traffic can co-exist with RAVENNA on the same network, RAVENNA traffic must be on the fast track. RAVENNA packets are assigned a high priority classification to ensure expedited transport across the network, while other packets with lower priority are treated as best-effort traffic. Even within RAVENNA there are different priorities assigned to different classes of traffic. Synchronization is assigned the highest priority, immediately followed by any real-time media traffic, while control and configuration traffic will be on a lower priority level. Any non-RAVENNA traffic would receive the lowest (standard) priority and be treated as best-effort traffic. Performance and capacity scale with the capabilities of the underlying network architecture.
3 Merging NADAC RAVENNA ASIO Driver (PC)

Overview
The NADAC RAVENNA ASIO Driver is intended for owners of a NADAC who wish to work in ASIO RAVENNA mode.

Merging also provides the Merging Audio Device (MAD) to NADAC users requiring WDM Support and Multi-ASIO support. Refer to the Merging Audio Device (MAD) page for more details
https://www.merging.com/products/merging_audio_device
https://confluence.merging.com/pages/viewpage.action?pageId=70221956

ASIO

Steinberg’s Audio Stream Input/Output (ASIO) provides audio stream connectivity between software applications and audio hardware on Windows.

System Requirements

Wintel platforms tend to increase in number of cores, speed and performance at a tremendous rate. New and faster processors are released almost on a monthly basis.

We maintain a list of up to date PC configurations in the Support Section of our website at:
http://www.merging.com/pages/pccfg

Certified PC Operating Systems (OS)

We highly recommend installing the NADAC ASIO driver under Windows 7 Professional 64 bit or Windows 10 Professional 64 bit

Note: Although not certified, it has also been observed to work under the Home editions of Windows 10 (64-bit) and Windows 7 (64-bit). The ASIO driver is NOT supported under XP, Vista and Windows 8.1 or any 32bit OS version.

Warning: NEVER attempt to install the Driver on Windows NT Server

The ASIO Driver has been tested and qualified on Windows 7 Professional 64 bit and Windows 10 Professional 64 bit

Notes

• The NADAC RAVENNA ASIO driver supports sampling rates starting from 44.1 kHz up to 384 kHz, DXD, DSD64, DSD128 or DSD256

• The ASIO Driver is not multi-client, i.e. it cannot be used with multiple applications at the same time. Only one application at a time can use the ASIO Driver on the same system.

• A separate sound card for other general work is recommended

Tips

• RAVENNA requires that the NADAC is connected to a Gigabit Ethernet port

• NADAC will follow the Sampling rate changes provided by the ASIO host

• We strongly recommend users to disable their Antivirus and Windows Public Firewall

Note: The Merging MassCore PCIe Ethernet card NET-MSC-GBEX1 cannot be used with the NADAC RAVENNA ASIO driver since it is specific to MassCore. A Merging Technologies NET-INT-GBEX1 card is available for users needing a PCIe Ethernet Gigabit Adapter card. Please contact your Merging Technologies Sales Partner for details.
Installing the RAVENNA ASIO Driver

Prerequisites
The Merging NADAC RAVENNA ASIO Driver can be installed on PC systems running Windows 7-SP1 (64bit) or Windows 10 (64bit)

Installation Procedure
1. Disable Windows UAC. (User Account Control) Set it to **Never Notify** and restart the PC.

![User Account Control Settings](image)

Choose when to be notified about changes to your computer

User Account Control helps prevent potentially harmful programs from making changes to your computer.

Tell me more about User Account Control settings

Always notify

- -

Never notify me when:

- Programs try to install software or make changes to my computer
- I make changes to Windows settings

Not recommended. Choose this only if you need to use programs that are not certified for Windows 7 because they do not support User Account Control.

Windows User Account Control Settings

2. Users must disable their Windows Public Firewall and any Antivirus software then working in RAVENNA ASIO

3. Download the latest Merging RAVENNA ASIO Driver from:

   [http://www.nadac.merging.com](http://www.nadac.merging.com)

**Note:** The installer may warn of pending requirements (Bonjour & Microsoft Redistributable C++) Accept and proceed with these installations.
4. When installation is complete accept the software licence agreement

5. Restart the computer.

6. When the PC has rebooted open the NADAC RAVENNA ASIO Panel.
   Windows Start Menu - All Programs > Merging Technologies > Merging Ravenna ASIO Driver > NADAC Panel

8. Configure Merging RAVENNA ASIO Settings:

   **Settings**
   
   **Ethernet adapter**: Lists all available network ports. Select the network port the NADAC is connected to.

   **Zones**: Select your Zone configuration

   - **Main**: Provides one zone of 8 channels outputs that is meant to be connected to the NADAC Main output (being NADAC 8CH or 2CH)

   - **Main + Headphones**: Provides two zone that can be connected by both the NADAC Main and NADAC Headphone separately, it is under the responsibility of the application using the Driver to manage two Zones or playlist and send two set of audio to those two Zones.
Status:

- **Sample Rate**: Shows the current Driver Sampling Rate
- **State**: Shows the connected ASIO Host or warn user if no ASIO Host is connected

Online RAVENNA Devices:

- Your NADAC will appear in the online devices when properly connected
- Mouse clicking on the NADAC icon will open the NADAC app which allows some remote control functions
- Leaving you mouse over the NADAC icon will give you the addressing details

**Warning**: If your NADAC icon is as such, it indicates that your MERGING+NADAC cannot be reached.

Clicking on the NADAC icon will give you the status error at cause

**Example**: Not Reachable. Verify your set up connections and reboot your MERGING+NADAC

**Example**: Wrong Firmware version. Please contact your Merging Sales Partners as you will need restart NADAC in maintenance mode and update your Firmware.

9. Ensure that the NADAC is connected to a Gigabit Ethernet port and launch your Player application

10. Select the NADAC ASIO driver within the application you will use it with

**Note**: some application such as JRiver will load the ASIO driver when the playback is started, in such case only will the Audio Sources within the NADAC OLED screen be available for connection.

Once your Driver is configured and the ASIO driver running connect the Audio Sources within the NADAC OLED screen
11. Go to the NADAC OLED display

12. Long Push the NADAC Rotary button

13. Select Sources Menu

14. Select an Output Source

15. The Source will then be selected as such and you should be able to monitor your source/player.

*Note: If the source is written in Red this would indicate that the Source is not valid. Please verify your connections and configuration in such cases.*
**Bundled Applications and Documentation**

Additional applications and documentation are installed with the Merging NADAC RAVENNA ASIO drivers. Look in the Windows Start menu - All Programs > Merging Technologies > to find the entries below:

> **Documentation**
The folder contains documentation on all applications and utilities.

> **MTDiscovery**
MT Discovery is a standalone application that searches your network for Bonjour Services. It allows quick and easy access to Merging’s Web Services based on Bonjour, such as the NADAC remote access pages. These pages will open in your computer’s default browser.

The MT Discovery application window displays a tree view of all the devices it finds on the Bonjour Network. It refreshes automatically when a device is connected or disconnected.

![](mtdiscovery.png)

**Color Coding**
The color of RAVENNA Device entries indicates the network they are on. Same color = same network.

Note: NADAC and the Driver entry must be the same color in order to work together in RAVENNA mode.

![](network_colors.png)

**Actions**
Right-clicking (Ctrl+click on Mac) on an item on the tree view displays a contextual menu, which lists the actions available for the item.

**Open**
Open is what you will want to do most of the time. It will show the main page of the device in your computer’s default web browser. This can also be achieved by double-clicking on a device, or by hitting Enter when the device is selected.

**Open Advanced**
Open Advanced will attempt to display the main settings page of the device in the computer’s default web browser. This can also be achieved by holding down Ctrl (Cmd on Mac) and double-clicking on a device, or by hitting Ctrl + Enter (Cmd + Enter on Mac) when the device is selected.
**Troubleshooting**

Firewall and Antivirus

**Windows Firewall**
The Windows Firewall can block communication between MassCore and NADAC. As mentioned in the install procedure, we recommend disabling the Public Network Firewall.

**Procedure**
1. Go to Windows Control Panel > Windows Firewall.
2. Click on Turn Windows Firewall on or off.
3. Go to the Public Network section and select Turn Off Windows Firewall.

**Antivirus**
Merging also recommends disabling their Antivirus, as mentioned in the install procedure. Some Antivirus software such as Avast have been known to block the NADAC discovery and RAVENNA I/O Connections.

**NADAC Firmware update:**
If you need to update your NADAC's firmware:
[https://confluence.merging.com/display/PUBLICDOC/NADAC+Firmware+Update+Procedure](https://confluence.merging.com/display/PUBLICDOC/NADAC+Firmware+Update+Procedure)

Refer to the Support NADAC Space for more troubleshooting information
[https://confluence.merging.com/display/PUBLICDOC/NADAC+space](https://confluence.merging.com/display/PUBLICDOC/NADAC+space)
4 Merging RAVENNA Core Audio Driver (Mac)

Overview
The Merging NADAC RAVENNA Core Audio Driver is intended for owners of a NADAC using Mac OS X who wish to work in RAVENNA Core Audio mode.

Core Audio
Apple’s Core Audio is a standardized audio driver system for all Macintosh computers running Mac OS X. Core Audio is an integral part of Mac OS X, allowing access to all Core Audio compatible audio interfaces.

System Requirements

Certified MAC Operating Systems (OS)

Certified MAC Operating Systems (OS) The Core Audio driver is qualified under Mac OS:

- X Yosemite v10.10.5 : RAVENNA Core Audio version 2.0.31254.dmg
- El Capitan v10.11.x : RAVENNA Core Audio version 2.0.31254.dmg
- Sierra 10.12.x : RAVENNA Core Audio version 2.0.31254.dmg and higher
- High Sierra 10.13.x : RAVENNA Core Audio version 2.0.37039.dmg and higher
- Mojave 10.14.1 to 10.14.4: RAVENNA Core Audio version v2.0.36877.dmg and higher
- Mojave 10.14.5 and 10.14.6: RAVENNA Core Audio version 2.1.41964.dmg and higher
- Catalina 10.15.1 and 10.15.2: RAVENNA Core Audio version 2.1.41964.dmg and higher
- Catalina 10.15.3 to 10.15.7 RAVENNA Core Audio version 2.1.45186 and higher

*Warning: MacOS Big Sur and New Mac Silicon M1 processors not supported*

- IMPORTANT:
  If the Driver is not well authorized a warning should be displayed in the NADAC Core AudioPanel

macOS High Sierra 10.13.X, Mojave 10.14.X and Catalina 10.15.X might requires you to immediately authorized the Driver by going to the System Preferences>Security&Privacy and Allow the driver if it is listed in the General Settings under “Software Developer”.

The “ALLOW” button might not be clickable in remote access please connect a mouse locally and have a local access to the mac in order to select the “Allow” option.

Notes
- The RAVENNA Core Audio driver supports sampling rates from 44.1Khz up to 8fs - 352.8 kHz – 384 kHz - DSD64 – DSD128 – DSD256*.
  *support DSD256 DoP1.1 with Audirvana 2.2.4.3 and higher
- The driver can be used as default device and System (alert) device.

mac OS configuration Guidelines.

https://confluence.merging.com/display/PUBLICDOC/Mac+Configuration+Guide
Installing the Merging RAVENNA Core Audio Driver

Prerequisites
The Merging RAVENNA Core Audio Driver can be installed as a stand-alone driver

OS
Refer to system requirements above

Installation Procedure

1. Download the NADAC RAVENNA Core Audio Installer for MAC.
   [http://www.nadac.merging.com](http://www.nadac.merging.com)

2. Open the Merging NADAC RAVENNA Core Audio Installer .dmg file.

Mac Desktop with installer selected
3. Click on **Continue** to proceed with the installation.

![Installation dialog](image)

4. Follow the installer instructions. You will be prompted to enter the Administrator password.

5. When the install is complete it will display **Successful**. Click **Close** to exit.

6. Restart the MAC after the driver installation is completed.

7. Go into **MAC System Preferences**, in **Other** open the **NADAC** icon.

![System Preferences](image)
8. Configure the NADAC RAVENNA CoreAudio Settings:

- **Interface**: lists all available network ports. Select the network port on which the NADAC is connected to.
  - gray: no interface or interface not properly configured
  - green: interface at 1Gb
  - yellow: interface at 100Mb

- **Zones**: Two Zones are available:
  - Main: Provides one zone of 8 channels outputs that is meant to be connected to the NADAC Main output (being NADAC 8CH or 2CH)
  - Main + Headphones: Provides two zone that can be connected by both the NADAC Main and NADAC Headphone separately, it is under the responsibility of the application using the Driver to manage two Zones or playlist and send two set of audio to those two Zones.

**Status**

- **Sample Rate**: Shows the current Driver Sampling Rate

- **Driver**:
  - Red: no NADAC available on the network (verify your Ethernet port connection)
  - Green: Running properly

- **PTP**:
  - Green: PTP locked
  - Yellow: PTP locking
  - Red blinking: PTP unlocked
Online RAVENNA Devices

- The online RAVENNA Device will be discovered if properly connected
- Leaving you mouse over the NADAC icon will give you the addressing details

Warning: If your NADAC icon is as such ![icon], it indicates that your MERGING+NADAC cannot be reached.

Clicking on the NADAC icon will give you the status error at cause

Example: Not Reachable. Verify your set up connections and reboot your MERGING+NADAC

![Information:]

Name: NADAC_100001
URL: http://192.168.201:80
Version: 3.2.0000070
Status: not reachable!

Example: Wrong Firmware version. Please contact your Merging Sales Partners as you will need restart NADAC in maintenance mode and update your Firmware.

![Information:]

Name: NADAC_100001
URL: http://192.168.201:80
Status: Wrong Firmware version! must be >= 3.2.0000

- Mouse clicking on the NADAC icon will open the NADAC app which allow some remote control functions
9. Configure the application you wish to use so that the I/O connections use the Merging NADAC Core-Audio Driver.

10. Go to the NADAC OLED display

11. Long Push the NADAC Rotary button

12. Select Sources Menu

13. Select an Output Source

14. The Source will then be selected as such and you should be able to monitor your source/player.

*Note: If the source is written in Red this would indicate that the Source is not valid. Please verify your connections and configuration in such cases*
Core Audio Speaker Configuration:
The NADAC Core Audio Driver allow you to configure your Speaker set

Procedure:

- Open the MAC Audio MIDI Setup and select the

- Select Merging + NADAC

- Select the Configure Speakers option and the lower right of the dialog

- Configure your Stereo or MultiChannel Speaker set
Mac OS recommended configuration

Configure Energy Saver Parameters

1. Open System Preferences
2. Click ‘Energy Saver’.
3. Disable the Automatic Graphic Switching option
   - Do one of the following (available option depends on your computer model).
4. If present, set the ‘Computer sleep’ slider to ‘Never’
   - Otherwise, check the box that says ‘Prevent computer from sleeping automatically when the display is off.’
5. Un-check the box for ‘Put hard disks to sleep when possible’.
6. Un-check the box for ‘Enable Power Nap’

Disable FileVault protection
This optimization will allow your hard drive to work more efficiently.

1. Open System Preferences.
2. Click ‘Security & Privacy’.
3. Click on the ‘FileVault’ tab.
4. In this window find where it states: ‘FileVault protection is (on/off) for the hard disk...’.
   - If FileVault is on, click the button to ‘Turn Off FileVault’.

Disable Gatekeeper
The Gatekeeper feature on macOS keeps your Mac safe from installing software from third-party developers. When installing trusted drivers or DAW softwareUpdates, allow them access to macOS. You can also allow access after installation by going to the General menu within Security & Privacy. Learn more from Apple about how to safely open apps on your Mac.

- In the General menu, for “Allow apps downloaded from:” select App Store and identified developers.
- In the General menu, immediately after installing an audio or MIDI driver, click Allow to unblock the software from loading.
- In the FileVault menu, turn off FileVault. If turned on, user your iCloud account or recovery key to turn it off.
- In the Firewall menu, turn off the Firewall.
- In the Privacy menu, under Location Services, disable Location Services.
- In the Privacy menu, under Analytics, uncheck Share Mac Analytics and Share with App Developers.
- In the Privacy menu, under Microphone, check all apps (DAWs, anything that uses your audio devices) that you want to record audio with.
- In the Privacy menu, under Accessibility, check iLok and all other necessary audio or licensing apps.

Optimize Energy Saver
This optimization will free up system resources as well as prevent the computer from going to sleep or standby mode which can cause audio dropouts with software and hardware.

- Uncheck “Automatic graphics switching”.
- Move the slider to Never for “Turn display off after:”
- Check “Prevent computer from sleeping automatically when the display is off”.
- Uncheck “Put hard disks to sleep when possible”.
- Uncheck “Wake for network access”.
- Uncheck “Start up automatically after a power failure”.

▪
Uncheck “Enable Power Nap”.

Disable Automatic Updates
1. Open System Preferences.
2. Click 'App Store'.
3. Make sure the box labeled 'Automatically check for updates' is unchecked

Disable App Nap for Roon
App Nap can negatively affect Roon.
1. Go to your Applications folder.
2. Select the Roon application
3. Right-click or control+click the Roon application
4. Choose Get Info
5. In the Roon Info window, under General, you will see an option to prevent App Nap, disable this checkbox.

Disable the Mac Parental Control
1. Choose Apple menu > System Preferences, then click Parental Controls.
   Note: When you open Parental Controls preferences, if you see the message “There are no user accounts to manage,” see Add a managed user.
2. Click the lock icon to unlock it, then enter an administrator name and password.
3. Then Disable Parental Controls.

Uninstalling the Merging NADAC RAVENNA CoreAudio Driver

Use the uninstaller to remove the Merging NADAC RAVENNA Core Audio driver installation cleanly.
Bundled Applications and Documentation

Additional applications and documentations are installed along with the RAVENNA Core Audio installer. Look under Places to find all the necessary tools and information in order to work in RAVENNA mode.

MTDiscovery
MT Discovery is a standalone application that searches your network for Bonjour Services. It allows quick and easy access to Merging’s Web Services based on Bonjour, such as the NADAC configuration page. These pages will open in your computer’s default browser.

Users can also use MT Discovery for NADAC remote access and in order to update the NADAC Firmware. Please see: MT Discovery on page 37

Uninstaller
Use the uninstaller to remove the Merging RAVENNA Core Audiodriver installation cleanly.

Documentation
Here you will find relevant documentation on all applications and utilities.

Apple Store App
A NADAC app will shortly be available for free on the Apple App Store
Troubleshooting

NADAC RAVENNA Core Audio Settings
For proper driver functioning check that the NADAC RAVENNA Core Audio panel is showed with all LEDS showing green.

**Note:** When the NADAC is shown as available (yellow or green led), the system could take some time to configure the interface (several seconds).

Latency and Clicks
Audible pops and clicks can occur when using some third-party audio player or depending on the speed of the processor. To avoid this problem adjust the Buffer size. You should aim for the lowest possible I/O buffer size value that doesn't introduce clicks, pops, and crackles in the audio.

Security Firewall
The Mac Firewall can block communication between RAVENNA and NADAC.

![Mac Security panel - Firewall Tab](image)

**Recommendation:** Disable by switching it **Off**

**NADAC Firmware update:**
If you need to update your NADAC’s firmware:
[https://confluence.merging.com/display/PUBLICDOC/NADAC+Firmware+Update+Procedure](https://confluence.merging.com/display/PUBLICDOC/NADAC+Firmware+Update+Procedure)

Refer to the Support NADAC Space for more troubleshooting information
[https://confluence.merging.com/display/PUBLICDOC/NADAC+space](https://confluence.merging.com/display/PUBLICDOC/NADAC+space)
5 General Troubleshooting

RAVENNA: NADAC & Network configuration
1. First check the IP address of the NADAC device in Setup page > Network
   To be able to see each other, the Ethernet port and the NADAC must be in the same range of addresses.
   (for example 169.254.x.x).
2. The NADAC IP address can be set and checked in the NADAC Setup page > Network.
   Note: Some laptops require an Ethernet card driver update (2012) in order to work with
   NADAC/RAVENNA in certain address ranges.

Working With Multiple NADAC Over a Network
Please refer to the RAVENNA Network Guide (for Merging Technologies Products) for all details about
configuration and setup.

Connections:
If you cannot connect a Player Sources with your NADAC make sure that you have the latest NADAC Firmware
and the latest RAVENNA ASIO or Core Audio driver.

MERGING+PLAYER users should not be running in fixed IP mode, we recommend that you leave the
MERGING+PLAYER Network page configuration setting to “Auto” IP mode.

Mac – High Sierra & Mojave:
Under macOS High Sierra or Mojave it is important that you immediately authorized the Driver by going to the System
Preferences > Security & Privacy and Allow the driver if it is listed in the General Settings under “Software Developer”.
If the Driver is not well authorized a warning should be displayed on the NADAC Core Audio Panel.

One other way to find out is by following the procedure below.
1. Open a Mac Terminal
2. Type `kextstat -v com.apple` and enter
3. If you see the entry `com.com.merging.audio.MergingRAVENNAudioDriver` listed there then it should be well
   authorized.

Example in image.

Refer to the Support NADAC Space for more troubleshooting information
https://confluence.merging.com/display/PUBLICDOC/NADAC+space
6 MT Discovery

Overview

MT Discovery is a standalone application that searches your network(s) for Bonjour Services. It enables quick and easy access to Merging Technologies Web Services based on Bonjour, such as the NADAC configuration page. These pages will be open in your computer's default browser. MT Discovery can be used to update the NADAC Firmware. Please refer to the NADAC User Manual for detailed information about this procedure.

**Note:** The default web browser is determined by a computer setting, not from MTDiscovery. It will most probably be one of the following applications:

- Microsoft Internet Explorer
- Apple Safari
- Mozilla Firefox
- Google Chrome.

Google Chrome or Apple Safari are recommended for use with Merging Technologies products.
Using MT Discovery

**Note:** The information in this chapter refers to Windows. Mac implementation is similar.

Launch MTDiscovery
Launch the MT Discovery application from the Windows Start Menu:

**All Programs > Merging Technologies > MT Discovery**

or by clicking on the desktop icon.

![MT Discovery Window](image)

The MT Discovery application window displays a tree view of all the devices it finds on the Bonjour Network. It refreshes automatically when a device is connected or disconnected.

Groups
MT Discovery will sort all devices into groups automatically (displayed like folders), depending on the characteristics of the devices.

The different groups are:

- **RAVENNA Devices**
  This group contains devices which have the RAVENNA protocol enabled and sorts them into different subgroups:
    - NADAC
    - Horus/Hapi
    - MassCore
    - Asio/Core Audio
    - Other RAVENNA
• Servers
  • Emotion Servers
  • Pyramix Servers
  • VCube MXFix Servers
  • Ovation Servers
  • Others

The Others group contains all Bonjour devices that could not be identified by MT Discovery. Printers are likely to be found in here.

Note: The number in brackets near a collapsed folder indicates how many devices this folder contains.

Actions
Right-clicking (Ctrl+click on Mac) on an item on the tree view displays a contextual menu, which lists the actions available for the item.

Open
Open is what you will want to do most of the time. It will show the main page of the device in your computer’s default web browser. This can also be achieved by double-clicking on a device, or by hitting Enter when the device is selected.

Open Advanced
Open Advanced will attempt to display the main settings page of the device in the computer’s default web browser. This can also be achieved by holding down Ctrl (Cmd on Mac) and double-clicking on a device, or by hitting Ctrl + Enter (Cmd + Enter on Mac) when the device is selected.

Note: Some devices will not support this, and your web browser will report a 404 - page not found error. In this case, we recommend you access the main page with command Open, described above, then browse to the setup page in your web browser directly.

Expand/Collapse
Only available for Groups, shows/hides the contents of a folder in the tree view. This can also be achieved by clicking on the +/- sign on the left side, or by double-clicking on the Group name.

Color Coding
The color of RAVENNA Device entries indicates the network they are on. Same color = same network.

Note: NADAC and Core Audio entries must be the same color in order to work together in RAVENNA mode.

Additional Information
The MT Discovery application is located in the following folder:
On Windows: C:\ProgramFiles\Merging Technologies\MTDiscovery
On Mac: TBA
On Linux: TBA
7 Contacting Merging

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For all documentation inquiries or suggestions for improvement:
http://www.merging.com
8 Index

A
ASIO Driver 9
RAVENNA ASIO Configuration 11
Bundled Applications and Documentation 13

C
Contacting Merging 28
Core Audio 16
Bundled Applications and Documentation 22

I
Infrastructure 8
Installing the Merging RAVENNA Core Audio Driver 17
Installing the RAVENNA ASIO Driver 10
Introduction 5
Introduction to RAVENNA Technology 6

M
Mac
Prerequisites 18
Security Firewall 30
MT Discovery 25
Actions 26
Additional Information 26

N
Network MT Discovery
Color Coding 26
Groups 26
Overview 25
Using 25
Multicast 8

P
PC Operating Systems (OS) 9

Q
Quality of Service 8

R
RAVENNA Core Audio Driver (Mac) 16
RAVENNA Technology 6

S
Streaming 8

T
Troubleshooting
ASIO 14
General 24
Troubleshooting Core Audio 23

U
Unicast 8