



2N[®] Net Audio system

Public Address and Paging system



User Manuals

Firmware:

Version: 2.1

www.2n.cz

The 2N TELEKOMUNIKACE a.s. is a Czech manufacturer and supplier of telecommunications equipment.



The product family developed by 2N TELEKOMUNIKACE a.s. includes GSM gateways, private branch exchanges (PBX), and door and lift communicators. 2N TELEKOMUNIKACE a.s. has been ranked among the Czech top companies for years and represented a symbol of stability and prosperity on the telecommunications market for almost two decades. At present, we export our products into over 120 countries worldwide and have exclusive distributors on all continents.



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2N TELEKOMUNIKACE a.s. administers the FAQ database to help you quickly find information and to answer your questions about 2N products and services. On www.faq.2n.cz you can find information regarding products adjustment and instructions for optimum use and procedures „What to do if...”.



2N TELEKOMUNIKACE a.s. hereby declares that the 2N[®] product complies with all basic requirements and other relevant provisions of the 1999/5/EC directive. For the full wording of the Declaration of Conformity see the CD-ROM (if enclosed) or our website at www.2n.cz.



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



The 2N TELEKOMUNIKACE a.s. is the holder of the ISO 9001:2009 certificate. All development, production and distribution processes of the company are managed by this standard and guarantee a high quality, technical level and professional aspect of all our products.

Content:

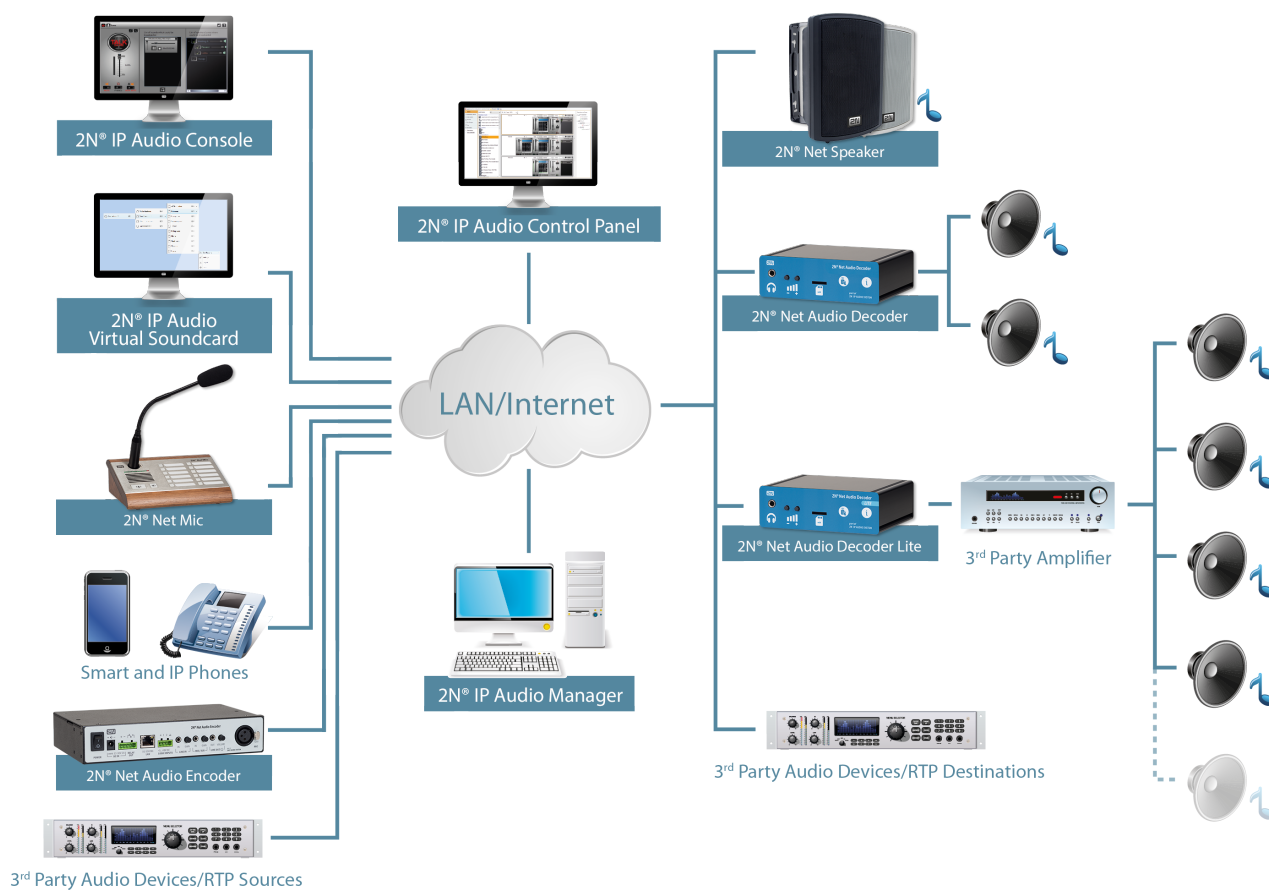
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Introduction

2N IP Audio system is an IP audio system which allows you to play an acoustic message or any other audio stream from any LAN/WAN – connected PC. All you have to do to get a virtual broadcasting exchange is connect a standard loudspeaker or amplifier to your **2N[®] Net Audio Decoder**. The virtual exchange helps you play any audio system and create separate zones with different communication contents. You can make use of your existing LAN/WAN while installing your **2N[®] Net Audio Decoder** system to save the total implementation time and, of course, cut your wiring costs.

The **2N IP Audio system** consists of two basic components – a server and an audio converter. The Control Panel software has been developed to configure the whole broadcasting system. **2N[®] IP Audio Console** and **2N[®] IP Audio Virtual Sound Card** are software products designed for everyday use – broadcasting messages via a microphone and easy music playing respectively.



2N IP Audio system Layout

Refer to the **Quick Start** section for basic information on quick system installation of the 2N® IP Audio Manager.

Limits and Specifications

Supported OS:

2N[®] IP Audio Manager

- Linux Debian 7.7.0 32/64 bit
- WIN 7 32/64 bit
- WIN Server 2008 R2*
- WIN Server 2012 R2*
- WIN 8 32/64 bit
- WIN 8.1 32/64 bit
- WIN 10 32/64 bit

2N[®] IP Audio Console, 2N[®] IP Audio Virtual Sound Card

- WIN VISTA 32/64 bit
- WIN 7 32/64 bit
- WIN 8 32/64 bit
- WIN 8.1 32/64 bit
- WIN 10 32/64 bit

Requirements

- In order to perform correctly, all components are required to use exactly the same software version – **2N[®] IP Audio Manager, Control Panel, Virtual Sound Card and Console.**
- Windows Media Player 11
- Microsoft Visual C + + 2008 Redistributable Package (x86) – installation is required to avoid problems with stability
- Microsoft Visual C + + 2013 Redistributable Package (x86) – installation is required to avoid problems with stability
- Microsoft. NET Framework 4 redistributable package
- Desktop Experience feature is required on Windows Server products (part of User Interface and Infrastructure in MS Windows Server 2012)
- Windows Firewall service running during installation, otherwise the **2N IP Audio System** rules have to be added manually

VoIP

Without Registration: Counterparty calls on the IP address of the predefined **2N[®] IP Audio Manager** and port for the VoIP trunk (5061, e.g.).

With Registration: **2N[®] IP Audio Manager** is only the client, the **2N[®] IP Audio Manager** gets registered with the PBX. It cannot be switched to the Registrar = SIP Proxy mode (no phones can register with it).

Communication Protocols

Way of communication	Port	Protocol
Control Panel >> IP Audio Manager	6990	proprietary
Console >> IP Audio Manager	6992	proprietary
Virtual Sound Card >> IP Audio Manager	6992	proprietary
IP Audio Manager >> Net Audio device (passive mode)	6998	proprietary
Net Audio device >> IP Audio Manager	6999	proprietary
IP Audio Manager >> RTP destination	adjustable	RTP
PC >> Net Audio device	23	Telnet

SYSLOG

The **2N[®] IP Audio Manager** allows you to send logs to the syslog server. The **2N[®] IP Audio Manager** was tested with **rsyslog server** and **Watcher**. For more details on settings and use refer to the **Advanced configuration Control Panel Manual Administrator** menu.

TELNET

When **2N[®] Net Audio Decoder** gets connected to the server, Telnet is disabled by default and reactivated automatically after disconnection. To enable Telnet while **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** is connected to the server, allow this on the Destinations and Zones tab in the Control Panel for the particular device.

Minimum Transfer Rates

Audio transfer between the IP Audio Manager and **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** units:

Audio	Option	IP Audio Manager – Net Audio Decoder transfer	Net Audio Decoder – IP Audio Manager transfer
unicast	32 kbps mono	100 kbps/unit	60 kbps/unit
	64 kbps mono	135 kbps/unit	60 kbps/unit
	128 kbps mon /ster	190 kbps/unit	60 kbps/unit
multicast	32 kbps mono	70 kbps/group	–
	64 kbps mono	100 kbps/group	–
	128 kbps mon /ster	145 kbps/group	–

Communication between SW or Audio Components:

Communication	Type of data	Transfer rate
Control Panel IP Audio Manager	signalling	20 kbps
Virtual Sound Card IP Audio Manager	audio + signalling	1650 kbps
Console IP Audio Manager	audio + signalling	1650 kbps
Net Mic IP Audio Manager	audio + signalling	1650 kbps
Net Audio Decoder IP Audio Manager	audio + signalling	1650 kbps
IP Audio Manager Expander	audio + signalling	1600 kbps/stream

Audio Transfer from 2N[®] IP Audio Manager to RTP Destinations:

Option	IP Audio Manager Net Audio device
G.711 – uLaw	85 kbps
G.711 – uLaw	85 kbps
Linear PCM 16bit 44.1kHz Stereo	1500 kbps
Linear PCM 16bit 44.1kHz Mono	800 kbps

Test Results

HW – CPU, Chipset	Intel Atom Z530	Intel Core i5	Intel XEON E5645
Count of different streams (Win 7, Win 8)	6	20	-
Count of different streams (Win Servers)	-	-	100
Net Audio devices (Win 7, Win 8)	40	300	-
Net Audio devices (Win Servers)	-	-	1000
Count of users (all OS)	1000	1000	10000
Count of SIP trunks (all OS)	10	100	100
Count of concurrent calls (all OS)	2	10	100

Audio Transfer from NET MIC

	NET MIC IP Audio Manager	
Sampling frequency (Hz)	Channel count	
	MONO	STEREO
8000	239 kbps	367 kbps
11025	288 kbps	463 kbps
12000	303 kbps	495 kbps
16000	367 kbps	624 kbps
22050	465 kbps	817 kbps
24000	495 kbps	880 kbps
32000	624 kbps	1137 kbps
44100	819 kbps	1586 kbps
48000	880 kbps	1729 kbps

Terms and Symbols Used

The following symbols and pictograms are used in the manual:

Safety

- Always abide by this information to prevent persons from injury.

Warning

- Always abide by this information to prevent damage to the device.

Caution

- Important information for system functionality.

Tip

- Useful information for quick and efficient functionality.

Note

- Routines or advice for efficient use of the device.

2N[®] Net Audio Decoder Quick Start

What you should know

- 2N[®] IP Audio Manager requires administrator rights for installation.
- The firewall may block the 2N[®] IP Audio Manager and also connection of the 2N[®] Net Audio Decoder units to the 2N[®] IP Audio Manager.
- Virtual Network adapters may cause malfunction of some 2N[®] IP Audio Manager components.
- 2N[®] IP Audio Manager allows you to use all features of this system for 800 hours, which is a trial licence. Without licences, you can use up to 5 2N[®] Net Audio devices or 2N[®] Net Speaker units and 1 RTP destination.
- Please contact your reseller to get an extended warranty.



Warning!

- From version 2.0 not supported downgrade to version 1.5

2N[®] Net Audio Decoder Quick Start

2N Net Audio System consists of software application 2N[®] IP Audio Manager and number of end points (2N[®] Net Audio Decoder, 2N[®] Net Audio Decoder Lite, 2N[®] Net Audio Encoder, 2N[®] Net Mic and 2N[®] Net Speaker). 2N[®] Net Audio Decoder can be ready for playing in a few minutes. The purpose of the Quick Start manual is to provide easy system installation for use in home or business environment. Just follow the quick steps below.

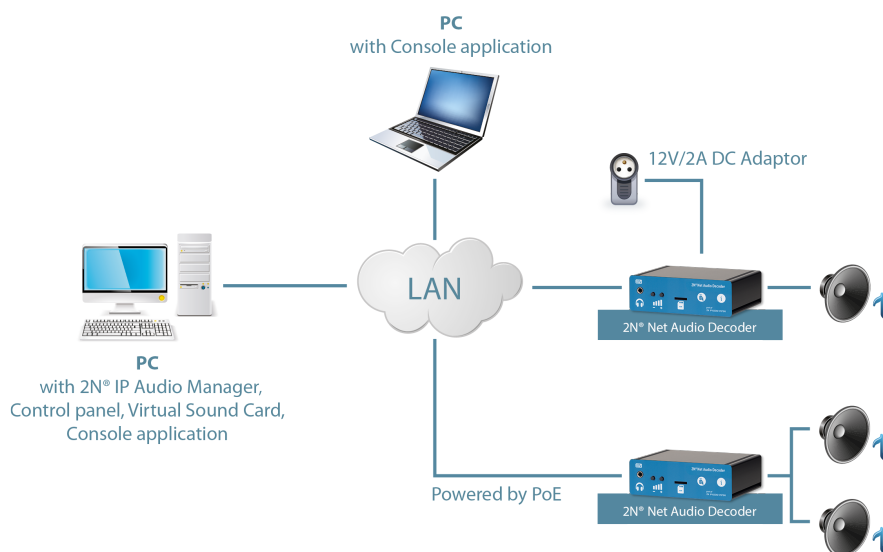
Box Contents

- 2N[®] Net Audio Decoder unit,
- 2x terminal (1x 5pin, 1x 4pin *),
- 4 adhesive rubber feet and this Quick Start manual. Refer to www.2n.cz for the latest 2N IP Audio System control and playing software version.

* item is not included in 2N[®] Net Audio Decoder Lite package (Part No. 914013)

Installation Preparation

You need your **2N[®] Net Audio Decoder** unit, a 12 V / 2 A DC power supply or PoE switch (except for **2N[®] Net Audio Decoder Lite** and **2N[®] Net Audio Decoder Lite PCB**), the UTP cable and a PC with Windows Vista or later or Windows Server for installation.

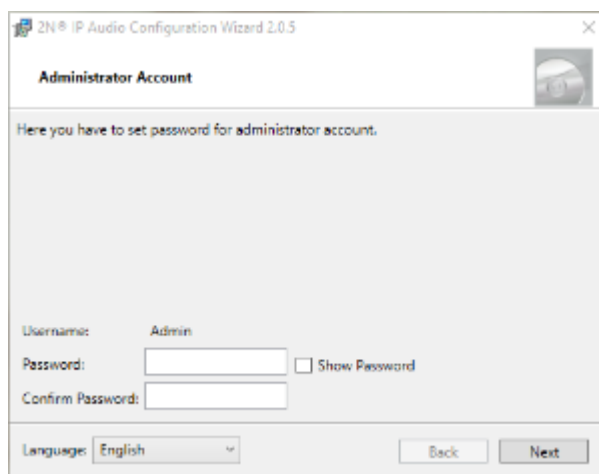


2N[®] Net Audio Decoder in Network Environment

Installation

2N[®] IP Audio Manager installation and configuration:

- Launch the **2N[®] IP Audio Manager** installer on the PC used as a server.
- The **2N IP Audio Configuration Wizard** starts automatically after installation is complete (see the figure below).

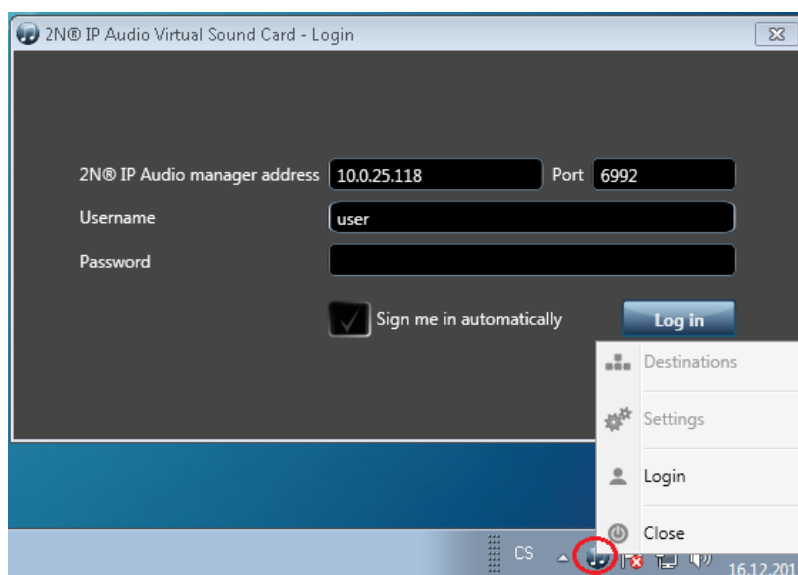


2N® IP Audio Configuration Wizard

- Follow all the Configuration Wizard steps to configure your system.

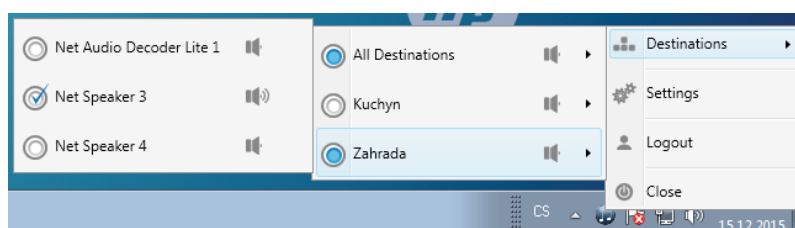
2N® IP Audio Virtual Sound Card installation and configuration:

- Launch the 2N® IP Audio Virtual Sound Card installation wizard.
- Start the 2N® IP Audio Virtual Sound Card, use the right mouse button to access the menu and log in using the username and password created by Configuration Wizard.



Login via 2N® IP Audio Virtual Sound Card

- Now you can control **2N[®] Net Audio Decoder** in your network (see the figure below) and play music from your favourite player or service.



2N[®] Net Audio Decoder Selection via 2N[®] IP Audio Virtual Sound Card Application

All the above mentioned steps should be sufficient for a successful **2N[®] Net Speaker** setup in your LAN. In the case of troubles or for a more advanced setup please refer to the **2N Net Audio System** manual at manuals.2n.cz or the **2N[®] IP Audio Control Panel**.

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FC This device complies with Part 15 of the FCC Rules. Its operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2N® Net Audio Encoder Quick Start

What you should know

- 2N® Net Audio Encoder provides announcements to the Session with logic input if 2N® Net Audio Encoder is added to the **Audio source** for this Session.
- We recommend you to use the power adapter supplied by 2N TELEKOMUNIKACE to make 2N® Net Audio Encoder work properly.
- Please contact your reseller to get an extended warranty.



Warning!

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2N[®] Net Audio Encoder Quick Start



2N Net Audio System consists of software application 2N[®] IP Audio Manager and number of end points (2N[®] Net Audio Decoder, 2N[®] Net Audio Decoder Lite, 2N[®] Net Audio Encoder, 2N[®] Net Mic and 2N[®] Net Speaker).

Despite the gradual modernisation of audio systems to IP technology, customers are still encountering the need to connect an IP audio system to a traditional music sources such as FM radio stations, CD players or microphones.

2N[®] Net Audio Encoder can transfer traditional audio sources to IP technology and then ensure audio distribution over an IP network to various destinations.

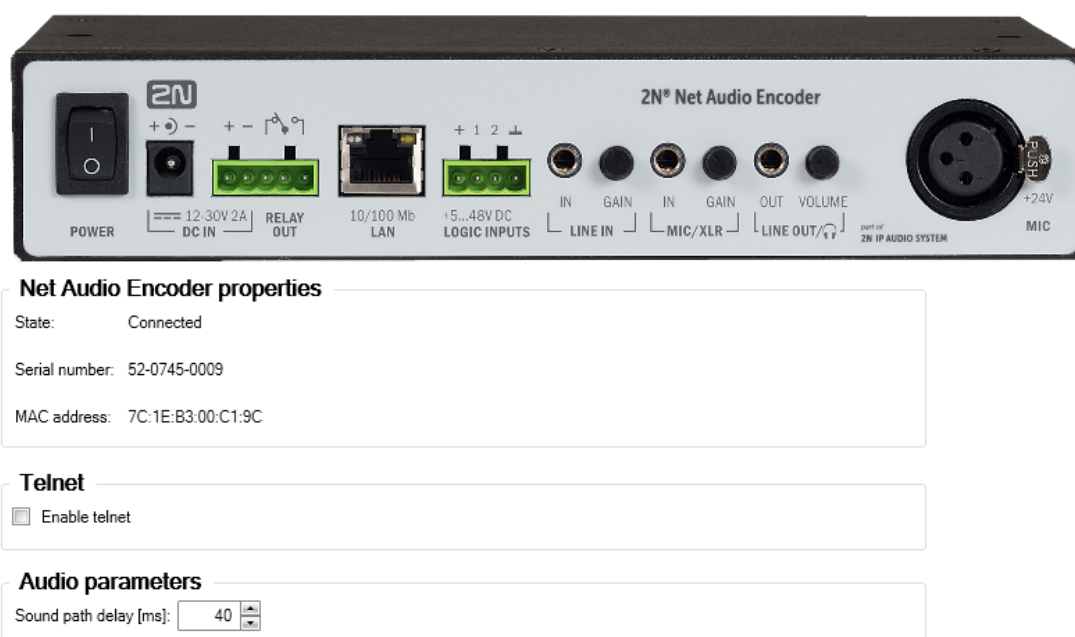
Installation Preparation

You need a 2N[®] Net Audio Encoder unit, a power supply (12 V / 2 A DC) or PoE switch (Power over Ethernet switch), an Ethernet cable and a PC with the 2N[®] IP Audio Manager installation. Connect 2N[®] Net Audio Encoder to the LAN using PoE or a power adapter (12 V / 2 A DC).

2N[®] Net Audio Encoder Setting

How to configure 2N[®] Net Audio Encoder via the 2N[®] IP Audio Control Panel:

- Launch the 2N[®] IP Audio Control Panel installer.
- Launch the 2N[®] IP Audio Control Panel application. Now click **Audio sources** **Net Audio Encoder** to display the 2N[®] Net Audio Encoder setting window.



Initial View of 2N[®] Net Audio Encoder



Caution

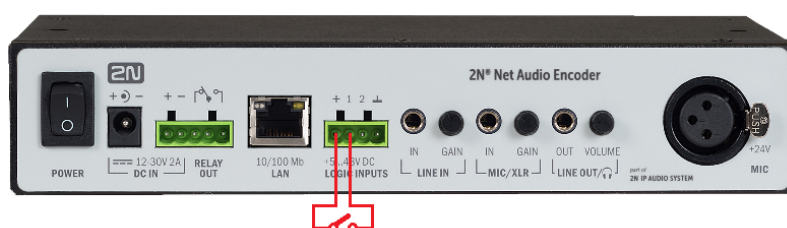
- 2N[®] Net Audio Encoder provides announcements to the Session with logic input if 2N[®] Net Audio Encoder is added to the **Audio source** for this Session.

Logic input

To control the logic inputs are two options. The first option is that you are connecting to the input labeled **+** (galvanically isolated supply + 7 V) and the input labeled **1** (0 V). The second possibility is that the input will respond to voltage switches to the input labeled **1** (0 V) and **GND**.

Logic input can operate in both latching and momentary states.

When using a switch across the logic input, a stream can be activated by a brief 'press and release' to start followed by a 'press and release' to stop (latching). Alternatively, a constant press of a switch will activate the stream for the duration that the switch is pressed, stopping the stream upon release (momentary).



The steps above should be sufficient for the basic settings of 2N[®] Net Audio Encoder in your network. In the case of troubles or advanced feature requirements refer to the 2N[®] IP Audio Control Panel Manual or manuals.2n.cz for more details.

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2N® Net Mic Quick Start

What you should know

- 2N® Net Mic provides announcements to the Session with button A if 2N® Net Mic is added to the **Audio source** for this Session.
- In the event of button action (playing playlist to zone or live announcements to zone), 2N® Net Mic transmits with the highest priority.
- Click the preset 2N® Net Mic button and button A to generate the live announcement to zone action.
- Button B is not supported in this version
- We recommend you to use the power adapter supplied by 2N TELEKOMUNIKACE to make 2N® Net Mic work properly.
- Please contact your reseller to get an extended warranty.



Warning!

- From version 2.0 not supported downgrade to version 1.5

Explanatory notes:



... A ... button for announcing



... B ... not supported in this version



... C ... function buttons 1-12 for playing playlist or making announcements to Zone/Net Audio Decoder/Net Speaker

2N[®] Net Mic Quick Start

2N Net Audio System consists of software application 2N[®] IP Audio Manager and number of end points (2N[®] Net Audio Decoder, 2N[®] Net Audio Decoder Lite, 2N[®] Net Audio Encoder, 2N[®] Net Mic and 2N[®] Net Speaker).

2N[®] Net Mic is a hardware console with microphone, which enables you to make live announcements or broadcast pre-prepared files to different zones. It is a hardware alternative to the 2N[®] IP Audio Console software application, which is primarily intended for such public facilities as schools, courts, railway stations, airports, medical facilities, amusement parks, swimming pools and sport centres. This manual describes how to set up quickly a simple audio stream playback from the 2N[®] Net Mic console to 2N Net Audio System.

Box Contents

In the box you find the supplied microphone, two serial number labels for indication, a 2N[®] Net Mic unit and this Quick Start manual. Refer to www.2n.cz for the latest 2N IP Audio Sytem playback and control software.

Installation Preparation

You need a **2N[®] Net Mic** unit, a power supply (12 V / 2 A DC) or PoE switch (Power over Ethernet switch), an Ethernet cable and a PC with the **2N[®] IP Audio Manager** installation. Connect **2N[®] Net Mic** to the LAN using PoE or a power adapter (12 V / 2 A DC).

2N[®] Net Mic Setting

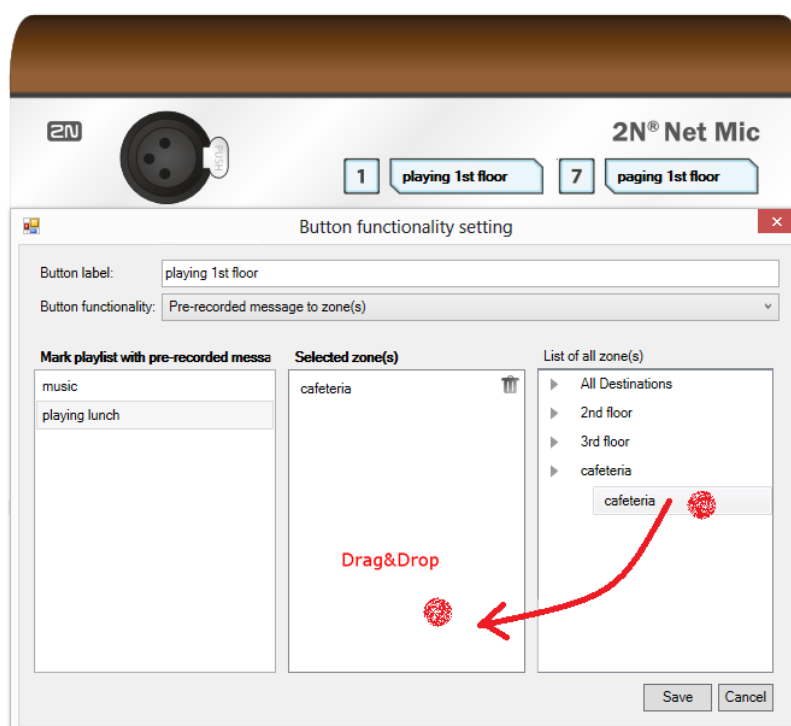
How to configure **2N[®] Net Mic** via the **2N[®] IP Audio Control Panel**:

- Launch the **2N[®] IP Audio Control Panel** installer.
- Launch the **2N[®] IP Audio Control Panel** application. Now click **Audio sources** **Net Mic** to display the **2N[®] Net Mic** setting window.



Initial View of **2N[®] Net Mic** via **2N[®] IP Audio Control Panel**

In the window above, set live announcements or playing files to **2N[®] Net Audio Encoder** or **2N[®] Net Speaker** to the **2N[®] Net Mic** buttons. Click a number to set the function key.



2N[®] Net Mic Button Function Setting

Select a playlist and drag it to the **Selected zone** to set Broadcasting to zone for the 2N[®] Net Mic button. Change the Button function item into **Paging zone selection** and drag the selected zone as mentioned above to assign live announcements to a zone. Now click **Save** and start using the 2N[®] Net Mic preset buttons.

The steps above should be sufficient for the basic settings of 2N[®] Net Mic in your network. In the case of troubles or advanced feature requirements refer to the 2N[®] IP Audio Control Panel Manual or manuals.2n.cz for more details.

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2N® Net Speaker Quick Start

What you should know

- 2N® IP Audio Manager requires administrator rights for installation.
- The firewall may block the 2N® IP Audio Manager and also connection of the
- 2N® Net Speaker units to the 2N® IP Audio Manager.
- Virtual Network adapters may cause malfunction of some 2N® IP Audio Manager components.
- 2N® IP Audio Manager allows you to use all features of this system for 800 hours, which is a trial licence. Without licences, you can use up to 5 2N Net Audio devices or 1 RTP destination.
- Please contact your reseller to get an extended warranty.



Warning!

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2N[®] Net Speaker Quick Start

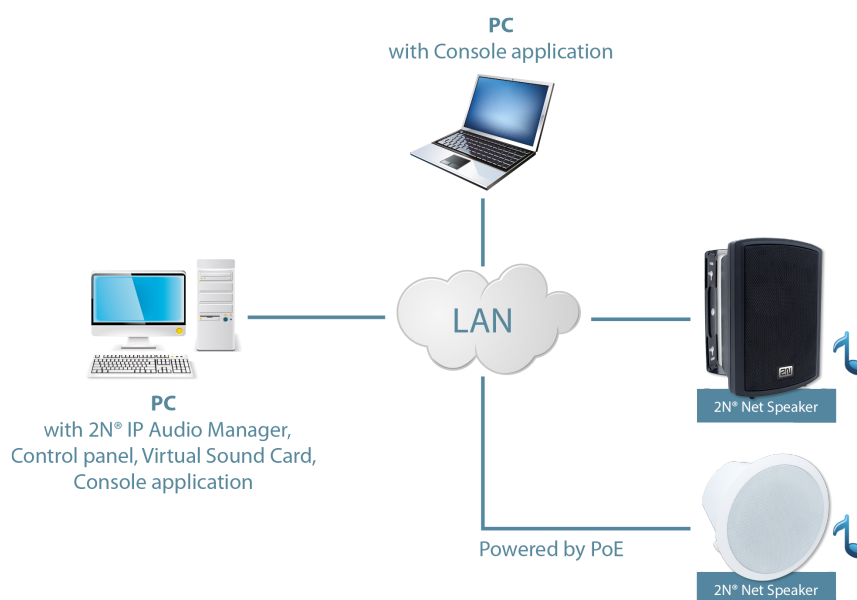
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Box Contents

2N[®] Net Speaker unit and this Quick Start manual. Refer to www.2n.cz for the latest 2N IP Audio System control and playing software version.

Installation Preparation

You need your 2N[®] Net Speaker unit, a 12 V / 2 A DC power supply or PoE switch, the UTP cable and a PC with Windows Vista or later or Windows Server for installation.

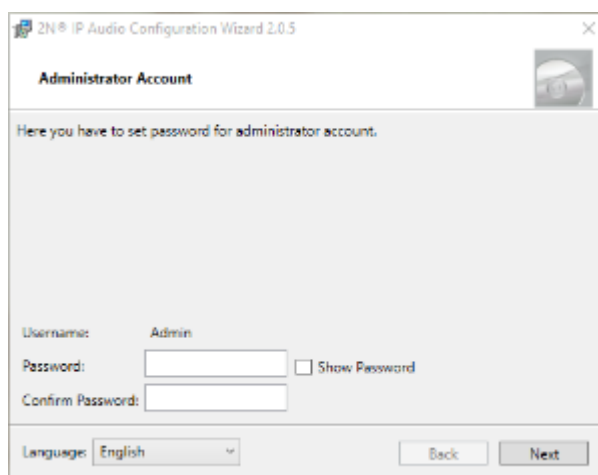


2N[®] Net Speaker in Network Environment

Installation

2N[®] IP Audio Manager installation and configuration:

- Launch the 2N[®] IP Audio Manager installer on the PC used as a server.
- The 2N IP Audio Configuration Wizard starts automatically after installation is complete (see the figure below).

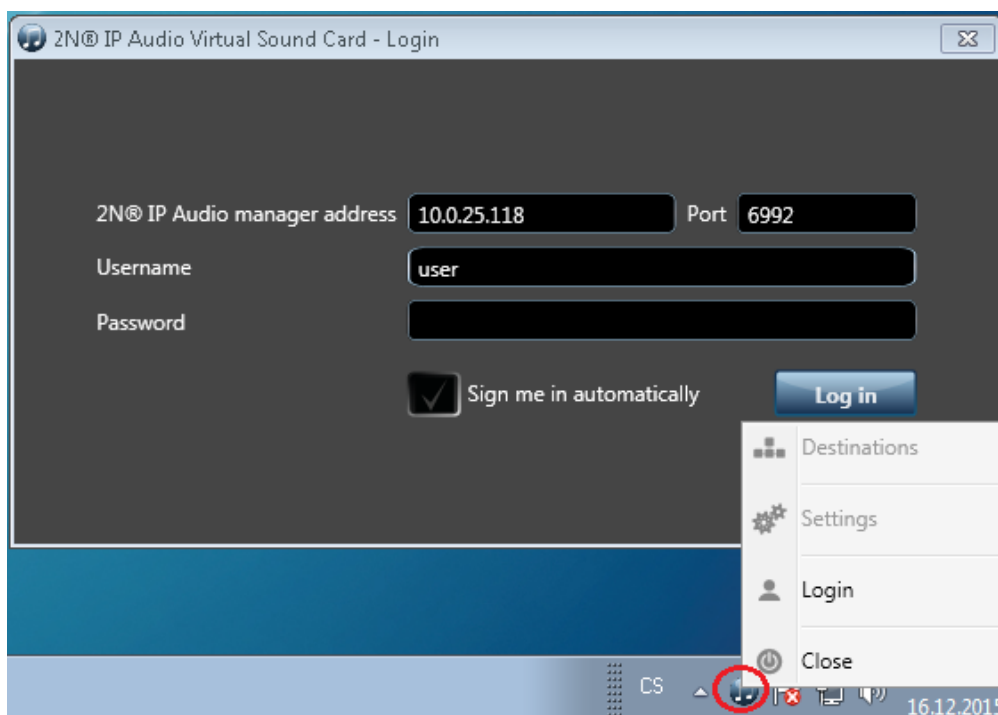


2N[®] IP Audio Configuration Wizard

- Follow all the Configuration Wizard steps to configure your system.

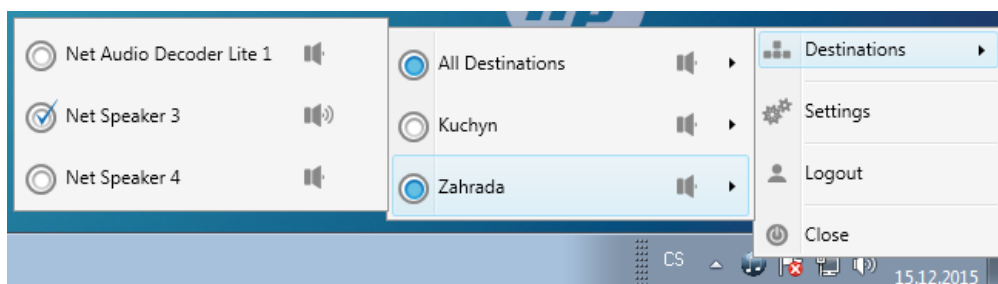
2N[®] IP Audio Virtual Sound Card installation and configuration:

- Launch the 2N[®] IP Audio Virtual Sound Card installation wizard.
- Start the 2N[®] IP Audio Virtual Sound Card, use the right mouse button to access the menu and log in using the username and password created by Configuration Wizard.



Login via 2N® IP Audio Virtual Sound Card

- Now you can control 2N® Net Speaker in your network (see the figure below) and play music from your favourite player or service.



2N® Net Speaker Selection via 2N® IP Audio Virtual Sound Card Application

All the above mentioned steps should be sufficient for a successful **2N Net Audio System** setup in your LAN. In the case of troubles or for a more advanced setup please refer to the **2N Net Audio System** manual at manuals.2n.cz or the **2N® IP Audio Control Panel**.

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User Manuals

This section provides you with basic information on the **2N IP Audio System** system and use of such user applications as the **2N[®] IP Audio Console** and **2N[®] IP Audio Virtual Sound Card**.

Here is what you can find in this section:

- **2N[®] IP Audio Console Application**
- **2N[®] IP Audio Virtual Sound Card Application**

2N® IP Audio Console Application

What you should know

- The 2N® IP Audio Console application helps you send audio from a microphone or play files.
- 2N IP Audio System recognises 3 levels of rights managed by the system administrator.
- **CAUTION:** Freeride is the highest priority user role and shall be preferred in all zones.

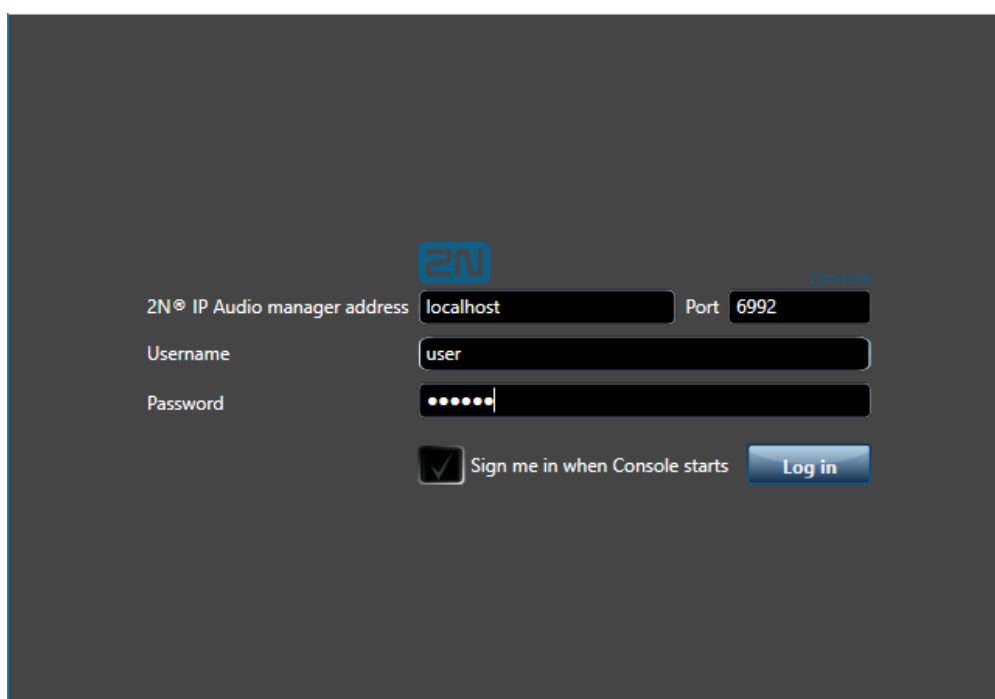
The Console program is used for broadcasting to predefined sessions or inputs for 2N IP Audio System users. It is primarily designed for broadcasting audio from your microphone or music in the mp3 format.

Connection and Setting

The login screen is displayed upon the 2N[®] IP Audio Console start. Create the user name and password using the 2N[®] IP Audio Control Panel program or ask your system administrator to create and assign the rights to you.

Enter the username and password into the dedicated fields in the Console window upon start. Moreover, configure the correct host name or IP address for login. Click on the setting pictogram in the program header, see the figure below, and then on **Server settings** to get into configuration.

Use the **Language settings** to modify the application language.

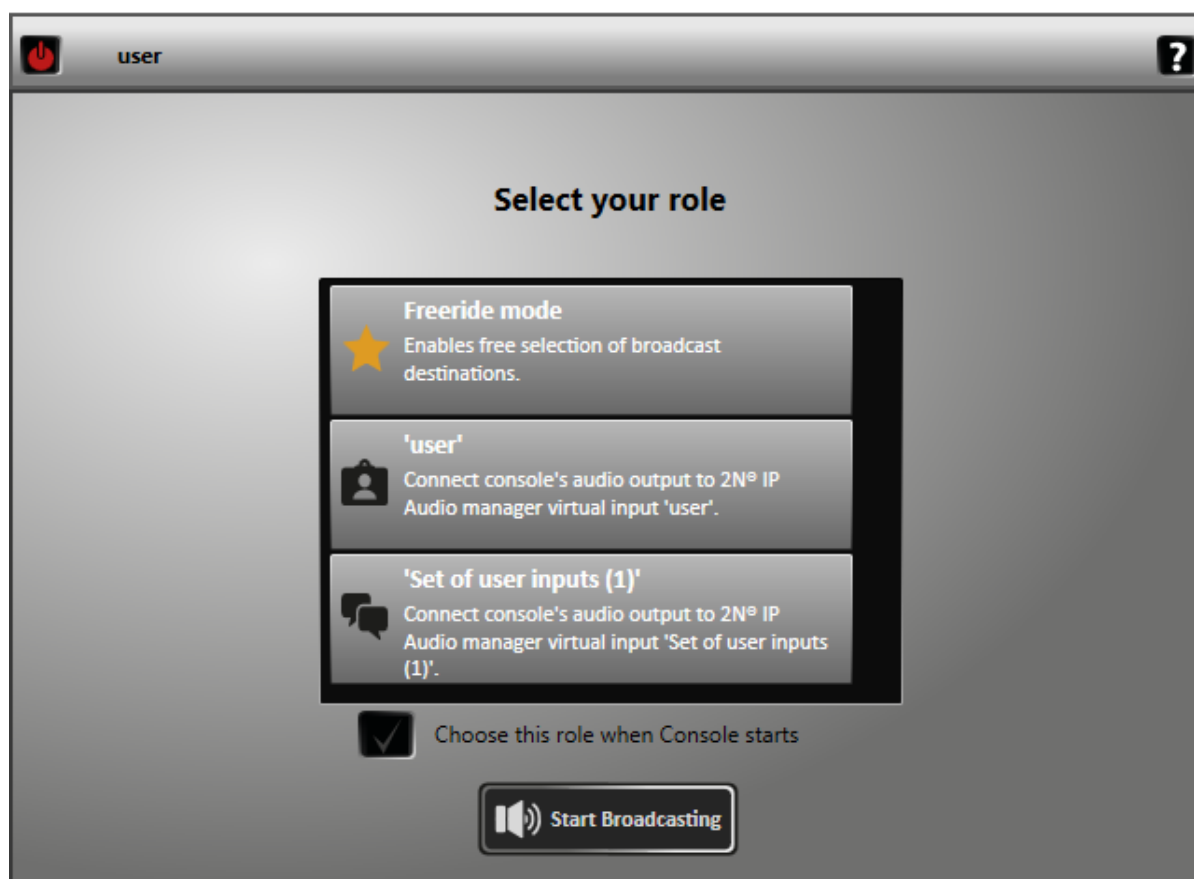


Login via 2N[®] IP Audio Console

Having set all the necessary parameters and entered your username and password, log in. If your login is successful, you get to the 2N[®] IP Audio Console screen to select your role.

User Roles

This screen helps you select a role after login to the 2N[®] IP Audio Console program. The figure below shows the window for a user with all roles. Refer to other parts of the manual for role details.



2N[®] IP Audio Console Roles

When you have selected a role, the screen will display the selected role, but the appearance is similar in all cases. New pictograms and the role name get displayed in the application header. To change the role, use the **"figure"** symbol, which returns you to the **role selecting window**. The **"power off"** pictogram is used for **logout** from the 2N[®] IP Audio Console application.

General Console Control

Primarily, the Console is designed for broadcasting sounds **via a microphone** or audio/music in the .mp3 format. The left section with the microphone picture controls the microphone and the middle section – List of sounds – helps play audio files. Click the Add button to add a sound to the application. The right-hand section is used for input check and control. Refer to the figure below for the 2N[®] IP Audio Console program control.



View of 2N[®] IP Audio Console Control

Output – there are different outputs for different roles.

List of sounds – or list of audio/music sources in files. Click **Add** and select the required file. Play this file using the **Play** button.

Microphone – the left window section controls the hardware microphone of the PC where Console is running.

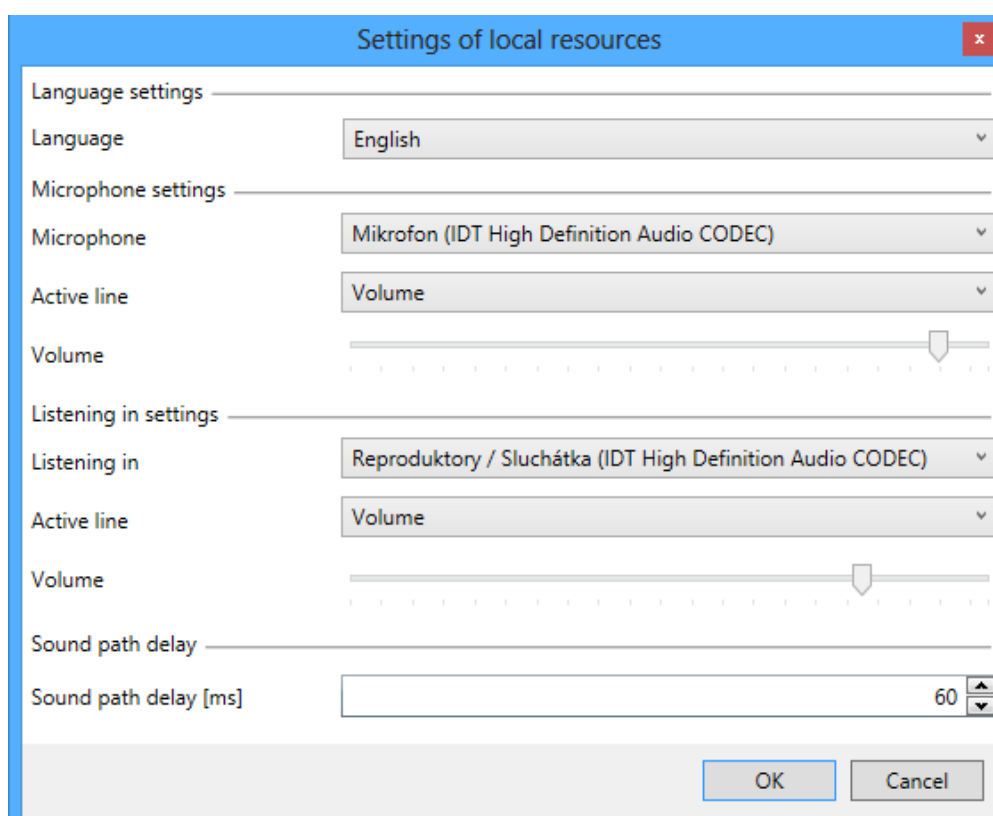
- **TALK button** – used for microphone activation. Upon activation, the ON AIR sign goes on and the button changes into **MUTE**. You can broadcast even during audio playing from a file.

- **AUTOMUTE button** – used for enabling the "Automatic microphone activation" function. When you press the button, the **Automute** sign goes on. Let us **give an example**: The "College radio" broadcasts a few songs every evening and the presenter announces every song. In this case, the presenter selects a song from the file at the beginning of broadcasting. He or she selects **Automute** and can talk when the song is over – **Automatic microphone activation**. When the Play button is pushed for another song, the microphone is **automatically deactivated** and the listeners do not hear the studio noise.

You can enable **Listening in** in the 2N[®] IP Audio Console application too. To do so, push the **ON** button to the right of the lower screen. Listening in is used for activation of local listening to played files or microphone sound. Select the device to listen in via the **Setting icon** in the right-hand upper corner.

Settings

Settings allows you to select the application language, set the microphone and device for listening in. Also, you can define the sound path delay to increase the audio transmission quality.



2N[®] IP Audio Console Settings

Freeride Mode Broadcasting

The Freeride user is assigned the highest user rights and can thus broadcast and play with the highest priority. This user selects the destination itself by ticking off the 2N[®] Net Audio Decoder or 2N[®] Net Speaker units in the **List of devices/zones**. Refer to the figure below.



Freeride Role

Broadcast as User

Logged in as a user, you cannot choose where to broadcast. Your user role authorises you to broadcast to sessions to which you are assigned as a user input. Contact your system administrator for more information.

Broadcast as Set of User Inputs

Logged in as a set of user inputs, you cannot choose where to broadcast. Your user role authorises you to broadcast to sessions which contain the set of user inputs assigned to you. Contact your system administrator for more information details on the roles.

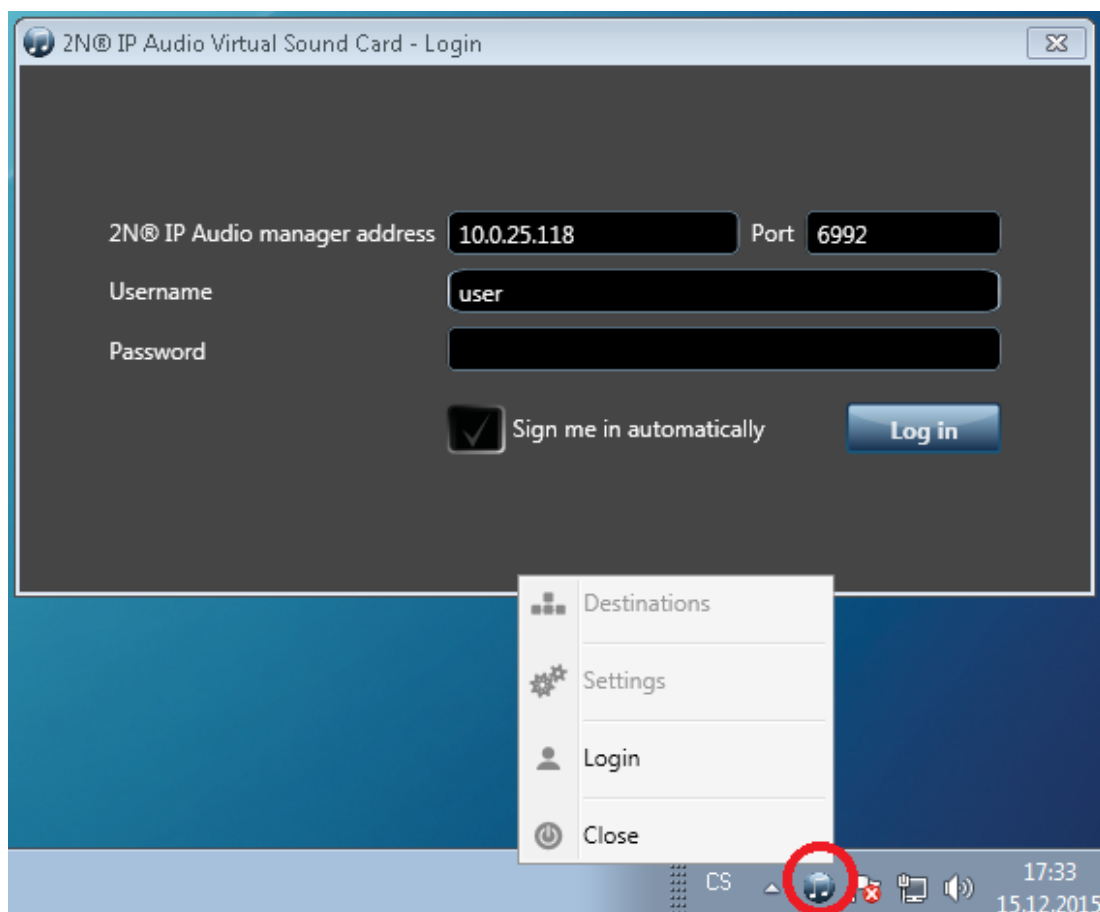
2N® IP Audio Virtual Sound Card Application

What you should know

- The 2N® IP Audio Virtual Sound Card application and 2N® IP Audio Manager are the minimum requirements for streaming audio to the 2N IP Audio System systems in households and/or small restaurants.
- The 2N® IP Audio Virtual Sound Card also plays Windows system sounds by default. It should be disabled in the Windows Control Panel Sound Change System Sound by choosing "No sound".

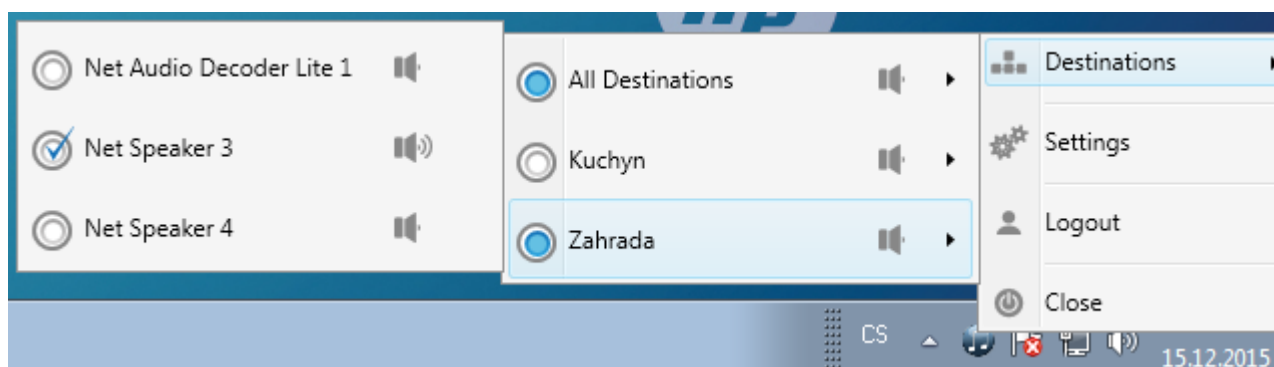
The 2N® IP Audio Virtual Sound Card helps you play audio files and playlists in a simple and comfortable manner. The application uses the existing audio applications (iTunes, Windows Media Player, Winamp) to stream the currently playing audio into 2N® Net Audio Decoder or 2N® Net Speaker.

When the application is launched, an icon gets displayed in the notification area and you can choose **Login** to log in. The network administrator assigns you a username or you can set a username of your choice via the Configuration wizard, which starts after the 2N® IP Audio Manager installation. Refer to the 2N® Net Audio Decoder Quick Start Manual.



2N® IP Audio Virtual Sound Card Application

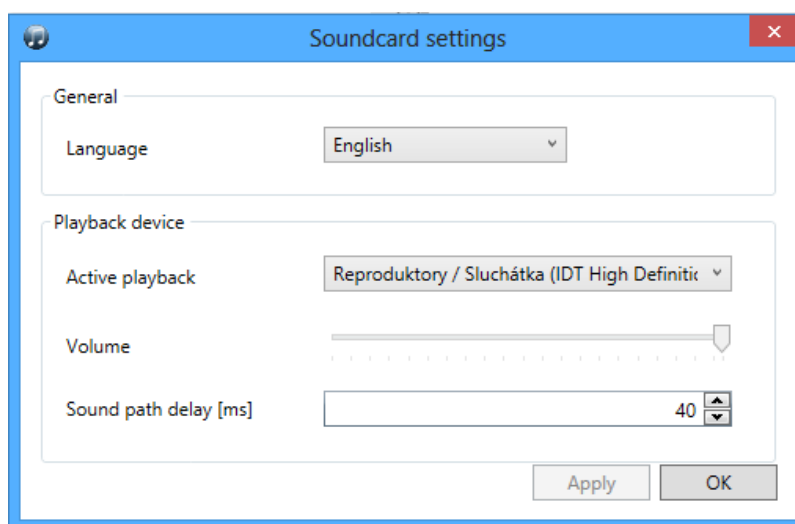
The next step is to select the destination for the currently playing music/sounds. Use the right mouse button to retrieve the menu over the Virtual Sound Card icon in the notification area; see the figure below.



2N® Net Audio Decoder or 2N® Net Speaker selection

Settings

Settings allows you to select the application language, set volume and select the "Active playback" device for copying the audio stream to 2N[®] Net Audio Decoder or 2N[®] Net Speaker. Also, you can define the sound path delay to increase the audio transmission quality.



2N[®] IP Audio Virtual Sound Card Settings

System Administration

This section provides you with all information on the **2N IP Audio System** and advanced configuration via the **2N[®] IP Audio Control Panel**.

Here is what you can find in this section:

- **2N[®] IP Audio Manager for Linux**
- **2N[®] IP Audio Control Panel Manual**
- **2N[®] IP Audio Web Scheduler**
- **Configuring 2N Net Audio device via Telnet Server**

2N® IP Audio Manager for Linux

2N® IP Audio Manager supports Linux version Debian 7.8.



Upload installation package (e.g. `ip-audio-manager_2.0.1_i386.deb`) to `/root` directory on the Linux computer. Start the installation by running:

```
dpkg -install ip-audio-manager_2.0.1_i386.deb
```

This command installs the entire 2N® IP Audio Manager system with all required dependencies.

2N® IP Audio Manager will be started after installation.



Caution

- When using a 64bit computer, you need to add i386 architecture first. Install 2N® IP Audio Manager by running these commands instead:

```
dpkg --add-architecture i386
aptitude update
aptitude upgrade
aptitude install libva1:i386
aptitude install libp11-kit0:i386
aptitude install libffi5:i386
dpkg --install ip-audio-manager_2.0.1_i386.deb
```


What you should know

- To check 2N[®] IP Audio Manager status or to start or stop it, use following commands:

`service ip-audio-manager status` – shows 2N[®] IP Audio Manager status (running, stopped)

`service ip-audio-manager start` – starts server

`service ip-audio-manager stop` – stops server

Caution

- In order to use 2N[®] IP Audio Manager with 900 or more 2N[®] Net Audio Decoder or 2N[®] Net Speaker units, it is necessary to increase the maximum allowed number of open files in `"/etc/security/limits.conf"` by adding these values:

```
* soft nofile 4096
root hard nofile 4096
```

2N® IP Audio Control Panel Manual

What you should know

- The 2N® IP Audio Control Panel application may allocate a higher amount of the memory as it keeps logs from the entire system. We recommend you to close the application when unused.

The 2N® IP Audio Control Panel is a user-friendly application used for 2N® IP Audio Manager administration.

Here is what you can find in this section:

- Sessions
- Destinations & Zones
- Audio Sources
- Scheduler
- Users
- Administration

Sessions

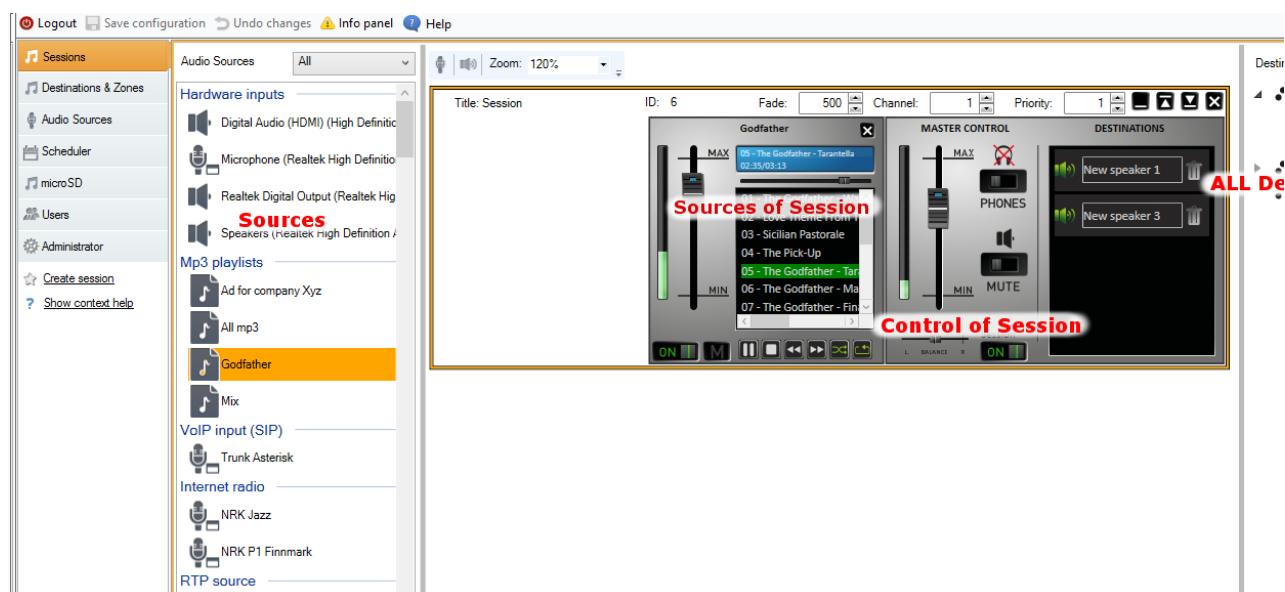
What you should know

- Audio sources can be type/filtered in the **Input sources** header.
- Upon power up, the server automatically launches and starts playing all the sessions that were active before power off.
- A higher priority of the active Session **always guarantees** that this Session will occupy all Destinations assigned to it.
- Licences can cause that some 2N[®] Net Audio Decoders or 2N[®] Net Speakers will not play. Refer to Licences in the **Administration** tab for more details.

The session determines the Source - Destination connection, i.e. defines which source will be played to which destination (Zones). The left session part defines and helps control the source, the right session part determines the destination and session options.

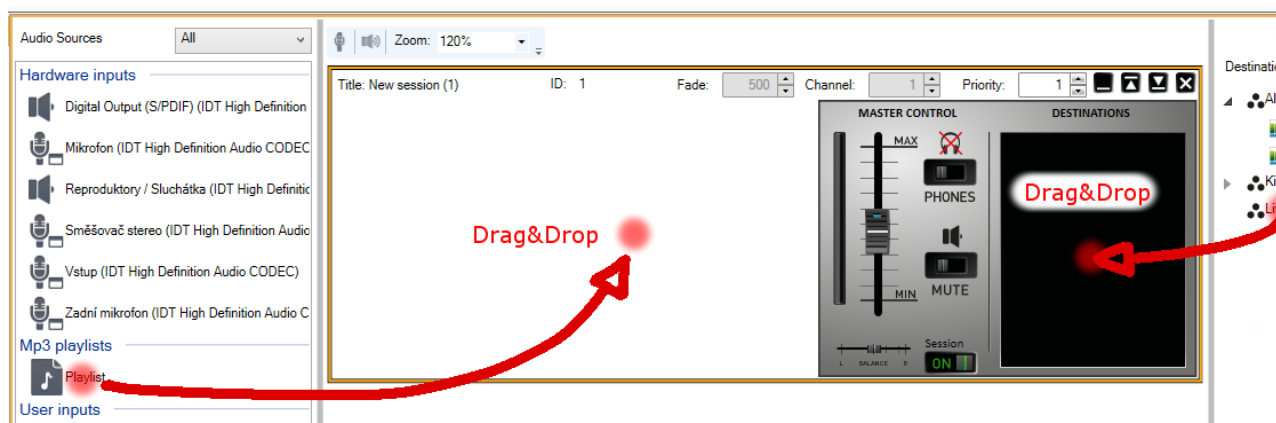
Session Creation and Preparation for Playing

Click on **Session Create empty session** to create a session. You can perform this and other actions by retrieving the floating menu by the right mouse-click. Or, you can create a session in the **Audio sources** menu.



Session Window Layout

Use **drag&drop** to add a source included in the source list to the session and a destination to the destination list – **Destination targets**. Whether you add destinations by speakers or zones, the resultant functionality will be the same. You can assign speakers to zones in the **Destinations & Zones** menu.



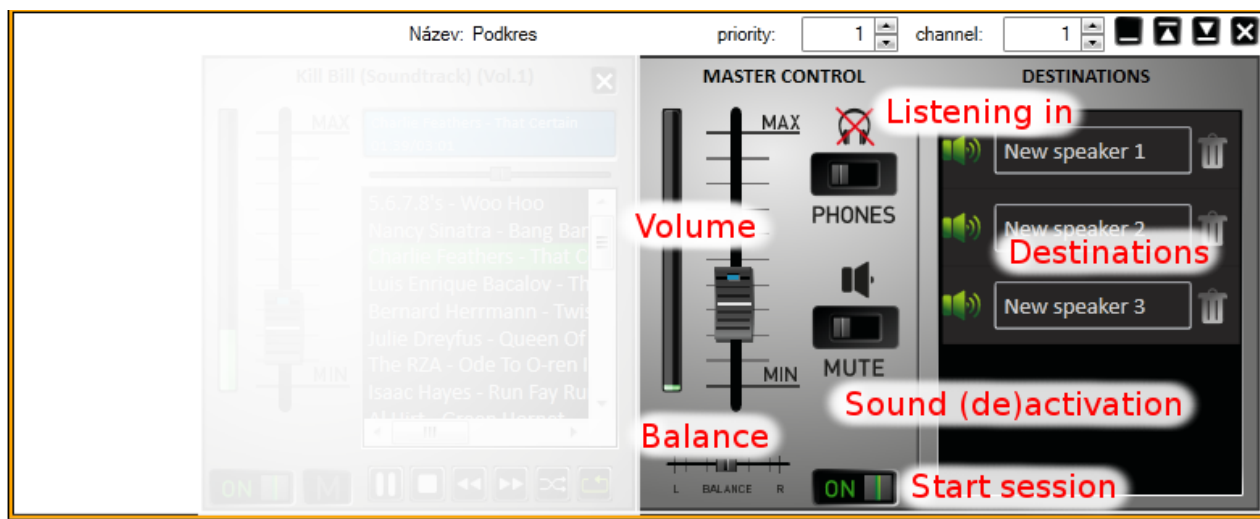
Adding of Sources and Destinations to Session

The created session is ready for broadcasting to destination(s). If no more parameters are needed, simply click **PLAY** and the added source or another source will start playing. See the figure at the very end for two types of sources. The common bar contains volume control settings.

Session Control and Launch

Click **ON** in the Session control section to launch a session; refer to the figure below. The figure below also shows additional session controls.

- **Balance** – set balance for the right/left channel.
- **Listening in** – enable this parameter to listen to remote destinations locally.
- **Volume** – set the main session volume.
- **Sound activation/deactivation** – enable/disable sound for the active session.
- **Destinations** – list of used destinations and zones.



Session Control

Additional Session Setting Options

Besides the basic settings mentioned in the Session Creation and Preparation for Playing above, there are additional session settings such as **Priority**, **Channel** or **Fade** situated in the right-hand upper corner.

- **Priority** – set the session priority. The **highest** priority session is always preferred to lower priority sessions. A higher priority of the active Session **always guarantees** that the Session will occupy the destinations assigned to it (the source will play in the destination). The priority range is <1;10>, where priority 10 is automatically assigned to Freeride role broadcasting.
- **Channel** – set the channel for each session. 2N[®] Net Audio Decoder and 2N[®] Net Speaker supports 4 channels for 4 different sources. Set the channel for the 2N[®] Net Audio Decoder or 2N[®] Net Speaker units on the **Destinations & Zones** tab or by a remote controller on the site.
- **Fade** – set the session fade. The parameter can be used for a gradual sound volume change. The fade range is <500;2000> ms.



Priority, Channel and Fade Settings

Audio Sources

You can add multiple sources to each session. Use the **Audio source** tab to create a source (refer to **Audio Sources** for details). Add the sources in the **Bar** format. There are two types of bars – one is designed for the Playlist and the other for the rest of the sources. Fig.5 shows the two types.



Volume Bars

Common bar – helps you control volume, balance and sound activation/deactivation. The Internet radio contains a status line displaying information on playing.

Playlist – here you can, besides basic functions, control mp3 files with play/stop, pause, next, previous, shuffle and repeat. Moreover, you can minimise the playlist bar.

Destinations & Zones

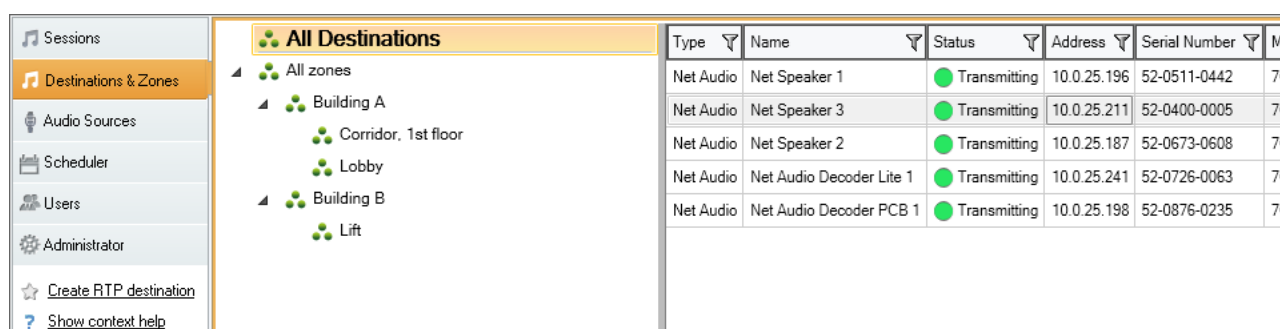
What you should know

- Zones are logical units used for **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** grouping.
- A zone can be added to a Session if you want to play the same music or announce news.
- **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** with the active mode setting connects to the server automatically.
- The scanner helps you administer unconnected **2N[®] Net Audio Decoders** or **2N[®] Net Speakers** via the **Administration** tab.
- When **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** gets connected to the server, Telnet is disabled by default unless enabled in the speaker configuration.
- A licence is necessary for a proper function of more than one RTP destinations.

This tab helps you administer **2N[®] Net Audio Decoders** or **2N[®] Net Speakers** by assigning them to zones and changing their parameters. The tab includes a Zones tree, a Net Audio Decoder and Net Speaker panel (speakers, zones including contents) and a Zone/Net Speaker Properties panel.

Zones

Zones helps divide objects logically and assign 2N[®] Net Audio Decoders or 2N[®] Net Speakers to zones for easier handling (by assigning zones to **Sessions**) in extensive installations. Basically, zones can be regarded as 2N[®] Net Audio Decoder or 2N[®] Net Speaker groups.

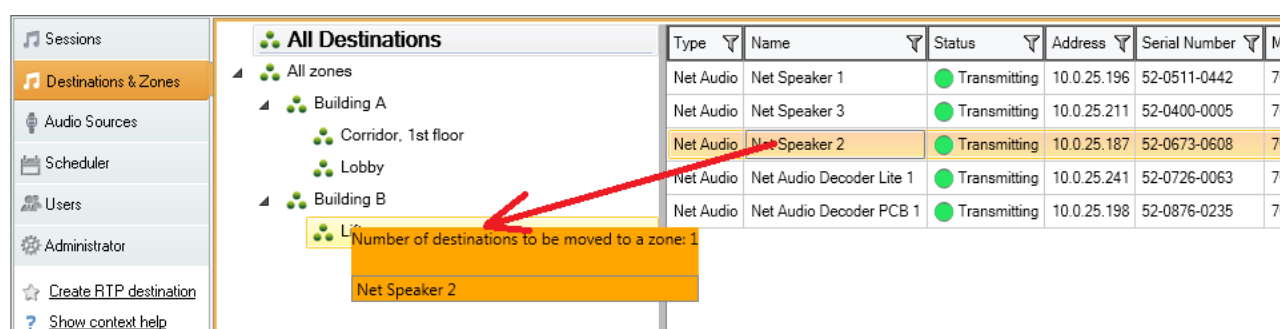


Type	Name	Status	Address	Serial Number	M
Net Audio	Net Speaker 1	Transmitting	10.0.25.196	52-0511-0442	70
Net Audio	Net Speaker 3	Transmitting	10.0.25.211	52-0400-0005	70
Net Audio	Net Speaker 2	Transmitting	10.0.25.187	52-0673-0608	70
Net Audio	Net Audio Decoder Lite 1	Transmitting	10.0.25.241	52-0726-0063	70
Net Audio	Net Audio Decoder PCB 1	Transmitting	10.0.25.198	52-0876-0235	70

View of Destinations & Zones

To create a **Zone**, click the **All Zones** selection menu **Create zone** or retrieve the floating menu with the right mouse click and select **Create zone** again. Retrieve the floating menu via the **Zone name** **Rename** to rename a zone.

The figure below shows how to add a 2N[®] Net Audio Decoder or 2N[®] Net Speaker using drag&drop into a zone. In **All Destinations** you can see the list of all 2N[®] Net Audio Decoders or 2N[®] Net Speakers and RTP destinations and you can use this list to add a 2N[®] Net Audio Decoder or 2N[®] Net Speaker to a zone.



Type	Name	Status	Address	Serial Number	M
Net Audio	Net Speaker 1	Transmitting	10.0.25.196	52-0511-0442	70
Net Audio	Net Speaker 3	Transmitting	10.0.25.211	52-0400-0005	70
Net Audio	Net Speaker 2	Transmitting	10.0.25.187	52-0673-0608	70
Net Audio	Net Audio Decoder Lite 1	Transmitting	10.0.25.241	52-0726-0063	70
Net Audio	Net Audio Decoder PCB 1	Transmitting	10.0.25.198	52-0876-0235	70

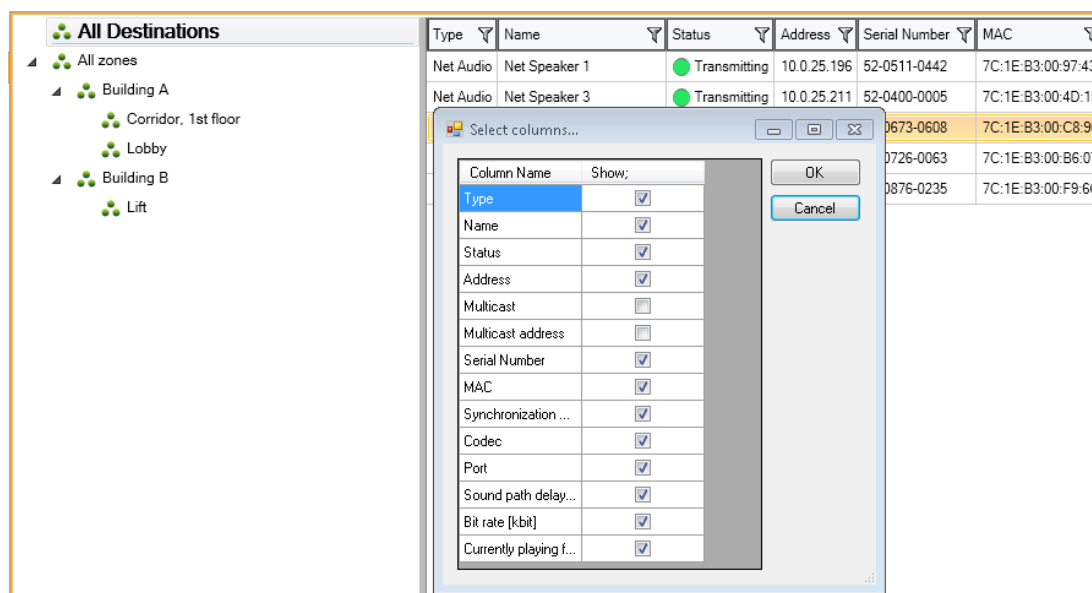
Number of destinations to be moved to a zone: 1

Net Speaker 2

Adding 2N[®] Net Audio Decoders or 2N[®] Net Speakers to Zone

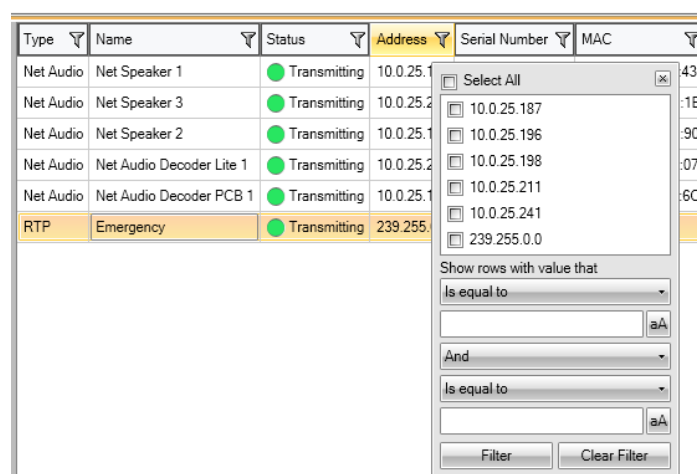
Destination List and Filter

The Destination list is included in a simple table and allows you to choose which columns shall be visible. Retrieve the floating menu with the right mouse button and choose "Select columns". Destinations can then be displayed in the descending /ascending order for one of the used columns.



Destination List Columns

Moreover, you can use a filter in this table, which is extremely helpful for large installations. Click the funnel symbol to retrieve the filter settings. See the figure below for filter settings and simple queries.



Destination List Filter

2N[®] Net Audio Decoders or 2N[®] Net Speakers

Use the **drag&drop** function to move the selected speaker from the list of speakers to the required zone. Use the floating menu **Remove** to remove a speaker from the zone to the speaker list.

The 2N[®] Net Audio Decoder or 2N[®] Net Speaker properties are divided as follows:

Type	Name	Status	Address	Serial Number	MAC	Codec	Port	Sound path delay [ms]	Bit rate [kb/s]	Impedance
Net Audio	Net Speaker stul	Transmitting	10.0.25.230	52-0511-0442	7C:1E:B3:00:97:43	MP2		250	192	
Net Audio	Net Audio Decoder 1	Connected	10.0.25.222	52-1355-0297	7C:1E:B3:01:85:E8	MP2		250	192	
Net Audio	Net Speaker repro	Transmitting	10.0.25.184	52-0671-0515	7C:1E:B3:00:A6:91	MP2		250	192	
Net Audio	Net Audio Decoder Lite 1	Transmitting	10.0.25.205	52-0726-0063	7C:1E:B3:00:B6:07	MP2		250	192	
Net Audio	Net Audio Decoder PCB 1	Connected	10.0.25.203	52-0470-0161	7C:1E:B3:00:60:1D	MP2		40	192	
Net Audio	NetSpeaker konzole	Connected	10.0.25.199	52-0876-0235	7C:1E:B3:00:F9:6C	MP2		40	192	
Net Audio	Net Audio Decoder PCB 2	Connected	10.0.25.212	52-0876-0205	7C:1E:B3:00:F9:55	MP2		40	192	
RTP	Emergency	Transmitting	239.255.0.0			u-Law	6999			

Properties

NetSpeaker information

Speaker name: Net Speaker stul Restart

Assigned connection: Blink

SD card state: Mounted

Serial number: 52-0511-0442

MAC address: 7C:1E:B3:00:97:43

Playback priority settings

From SD card - triggered by log input: 0 disabled

From SD card - back: 0 disabled

General 3 rd party RTP stream: 3 disabled

Do not set the priorities for the same value (including Sessions). It can cause undesirable behavior.

Audio parameters

Volume: 100% 0% Mute

Power supply: PoE

Left speaker impedance: 5.1 Ohm

Right speaker impedance: 5.3 Ohm

Sound path delay [ms]: 250

Sampling frequency [Hz]: 44100

Bits per sample: 16

2N[®] Net Audio Decoder or 2N[®] Net Speaker Settings

Speaker Information

Here find the speaker name, which can be changed and connection if existing. Click the **Restart** button to restart 2N[®] Net Audio Decoder or 2N[®] Net Speaker and **Blink** to enable LED blinking and sound notification to discover 2N[®] Net Audio Decoder or 2N[®] Net Speaker on site.

- **Speaker name**
- **Assigned connection** – name and assigned connection in case Net Audio Decoder or Net Speaker is in the passive mode.
- **SD card state** – shows whether or not the SD card is inserted or being loaded, or an error has been detected.
- **Serial number**

- MAC address

Playback Priority Settings

- From SD card – triggered by log input
- From SD card – card
- General 3rd party RTP stream



Upozornění

- Do not set the priorities for the same value (including Sessions). It can cause undesirable behavior.



Good to know

- Refer to [here](#) for more details.

Audio Parameters

This section is devoted to speaker sound parameters.

- **Volume and mute** – use this parameter to set the loudspeaker volume. This setting will not be active until saved. Use remote control or press the **2N[®] Net Audio Decoder** buttons.
- **Power supply** – **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** detects this parameter to inform the server of the type of power used.
- **Speaker impedance** – is automatically detected if **2N[®] Net Audio Decoders** or **2N[®] Net Speakers** uses speaker(s). This information is provided during the **2N[®] Net Audio Decoders** or **2N[®] Net Speakers** start.
- **Maximum gain** – select a power supply and speaker type to determine the maximum gain.
- **Sound path delay** – set the expected **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** delay (buffer size) for Wi-Fi installations or potentially unreliable packet deliveries (500 ms or more).
- **Sampling frequency** – set the audio signal sampling frequency.
- **Bits per sample** – define the count of bits per audio signal sample.

- **Channels** – define the count of audio signal channels – stereo/mono bridged
 - stereo – two independent audio channels are used for two independent speakers.
 - mono – only one channel is used for audio transmission and both speakers produce the same sound.
- **Bit stream** – define the count of bits to be transmitted in 1 s of the audio signal. The IP packet overhead is not included in this information.

Advanced Settings

- **Disable multicast** – multicast is a Point-to-Multipoint transmission option, which saves the network capacities (if implemented in network elements) and server resources. Multicast can be adjusted for each speaker individually.
- **Disable remote control** – disable remote **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** setting.
- **Enable Telnet** – Telnet connection is disabled by default for security reasons upon **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** unit – **2N IP Audio Manager** connection. You can select this option to enable Telnet during this connection. This option, however, is not recommended for security reasons.
- **Switch on relay while transmitting** – select this option, for example, to switch on /off the external amplifier if available.
- **Channel** – set the **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** channel.
- **Button mode** – select the HW button mode – channel switching or volume setting. Or, deactivate the buttons.
- **Expander** – is an advanced feature of the **2N IP Audio system**, which enables load balancing through the network of expanders and this option is used to assign **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** to the particular Expander.

Generic RTP Output

Generic RTP output enables sending of the audio from the **2N[®] IP Audio Manager** to all the devices that support audio via the RTP protocol with codec G711, L16. Codec is defined in this output. The audio stream will be sent to the defined IP address and port. The so-defined output can then be used as an audio output from the session with which the RTP output must be interconnected. A **licence** is necessary for a proper function of the **RTP destinations**.

Type	Name	Status	Address	Serial Number	MAC	
RTP	Emergency	● Transmitting	239.255.0.0			Destination
Net Audio	Net Speaker 3	● Transmitting	10.0.25.211	52-0400-0005	7C:1E:B3:00:4D:1B	Audio codec
Net Audio	Net Speaker 1	● Transmitting	10.0.25.196	52-0511-0442	7C:1E:B3:00:97:43	IP Address:
Net Audio	Net Speaker 2	● Transmitting	10.0.25.187	52-0673-0608	7C:1E:B3:00:C8:90	Port:
Net Audio	Net Audio Decoder Lite 1	● Transmitting	10.0.25.241	52-0726-0063	7C:1E:B3:00:B6:07	TTL
Net Audio	Net Audio Decoder PCB 1	● Transmitting	10.0.25.198	52-0876-0235	7C:1E:B3:00:F9:6C	Licences ov

RTP Destination Settings

Properties of RTP Destinations

This section is devoted to RTP destinations.

- **Destination name** – this parameter shows the name of the RTP destination and can be changed.
- **Audio codec** – allows you to select the required audio codec . You can choose one of the following 4 options:
 - G711 u-Law
 - G711 A-Law
 - Liner PCM 16 bit Stereo
 - Liner PCM 16 bit Mono
- **IP Address** – set the multicast IP address.
- **Port** – set the port.
- **TTL** – set the TTL (Time to Live) for multicast packets: -1 means system default and we recommend you not to change this parameter. This parameter may cause network overload if not used in cooperation with a network specialist.
- **Licence owned** – shows if a valid licence was successfully added.

Bulk Settings

Bulk settings allows you to save settings for multiple 2N[®] Net Audio Decoders or 2N[®] Net Speakers. If you select multiple 2N[®] Net Audio Decoders or 2N[®] Net Speakers, a grey strip shows up to indicate that you can change settings for more 2N[®] Net Audio Decoders or 2N[®] Net Speakers. First select the parameter to be changed. Then change this parameter and click Enter. The final step is to save the modification with the Save button. See the figure below.

Type	Name	Status	Address	Serial Number	MAC	Codec	Port	Sound path delay [ms]	Bit rate [kbit/s]	Im
Net Audio	Net Speaker stul	Transmitting	10.0.25.230	52-0511-0442	7C:1E:B3:00:97:43	MP2		250	192	
Net Audio	Net Audio Decoder 1	Connected	10.0.25.222	52-1395-0297	7C:1E:B3:01:86:E8	MP2		250	192	
Net Audio	Net Speaker repro	Transmitting	10.0.25.184	52-0671-0515	7C:1E:B3:00:A6:91	MP2		250	192	
Net Audio	Net Audio Decoder Lite 1	Transmitting	10.0.25.205	52-0726-0063	7C:1E:B3:00:86:07	MP2		250	192	
Net Audio	Net Audio Decoder PCB 1	Connected	10.0.25.203	52-0470-0161	7C:1E:B3:00:60:1D	MP2		40	192	
Net Audio	NetSpeaker konzole	Connected	10.0.25.199	52-0876-0235	7C:1E:B3:00:F9:6C	MP2		40	192	
Net Audio	Net Audio Decoder PCB 2	Connected	10.0.25.212	52-0876-0205	7C:1E:B3:00:F9:55	MP2		40	192	
RTP	Emergency	Transmitting	239.255.0.0			u-Law	6999			

Properties

NetSpeaker information

Speaker name:

Assigned connection:

SD card state:

Serial number:

MAC address:

Playback priority settings

From SD card - triggered by log input: 0 = disabled

From SD card - back: 0 = disabled

General 3 rd party RTP stream: 0 = disabled

Do not set the priorities for the same value (including Sessions). It can cause undesirable behavior.

Audio parameters

Volume:

Mute: ☐

Power supply

Sound path delay [ms]: 40

Sampling frequency [Hz]:

Bits per sample:

Channels:

Bit rate [kbit/s]:

1. ☐

2. ☐

3.

2N[®] Net Audio Decoder or 2N[®] Net Speaker Bulk Settings

Audio Sources

What you should know

- It is **necessary to assign** the created working source (SIP, playlist, microphone...) to a session in the **Session** menu to define where the contents should be played.
- **2N[®] Net Speaker** supports several types of input sources for specific applications.
- The HW sources are based on the **server PC** sound card. External sound cards can be used too.
- **2N[®] Net Mic** provides announcements to a session via button A if added to the **Audio source** for the particular session.
- **2N[®] Net Audio Encoder** provides announcements if added to the **Audio source** for the particular session.
- In the event of button action (playing playlist to zone or live announcements to zone), **2N[®] Net Mic** transmits with the highest priority.
- Click the preset **2N[®] Net Mic** button and button A to generate the live announcement to zone action.

Explanatory notes for 2N[®] Net Mic buttons:



... A ... button for announcing



... B ... not supported in this version



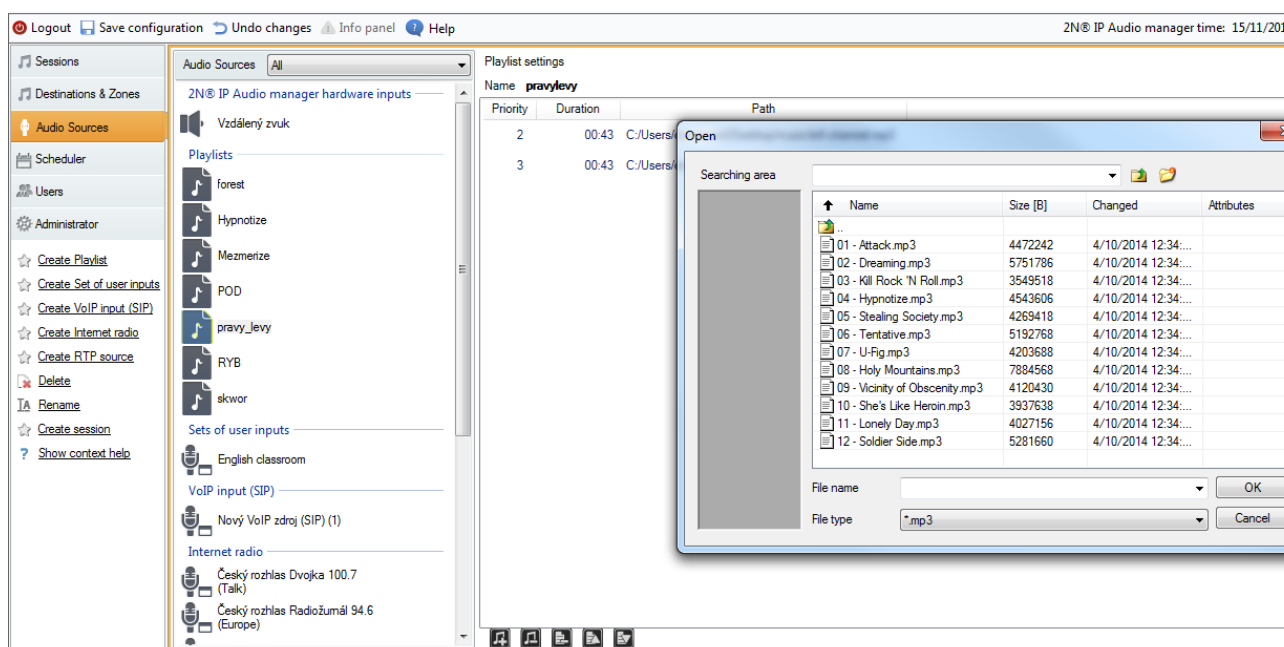
... C ... function buttons 1-12 for playing playlist or making announcements to Zone/Net Audio Decoder/Net Speaker

Hardware Inputs

HW inputs are inputs of your server – PC on which the 2N® IP Audio Manager is running; refer to the system architecture in **Introduction**. A microphone, internal /external sound card and/or mixer are used for playing locally stored music using a standard audio player.

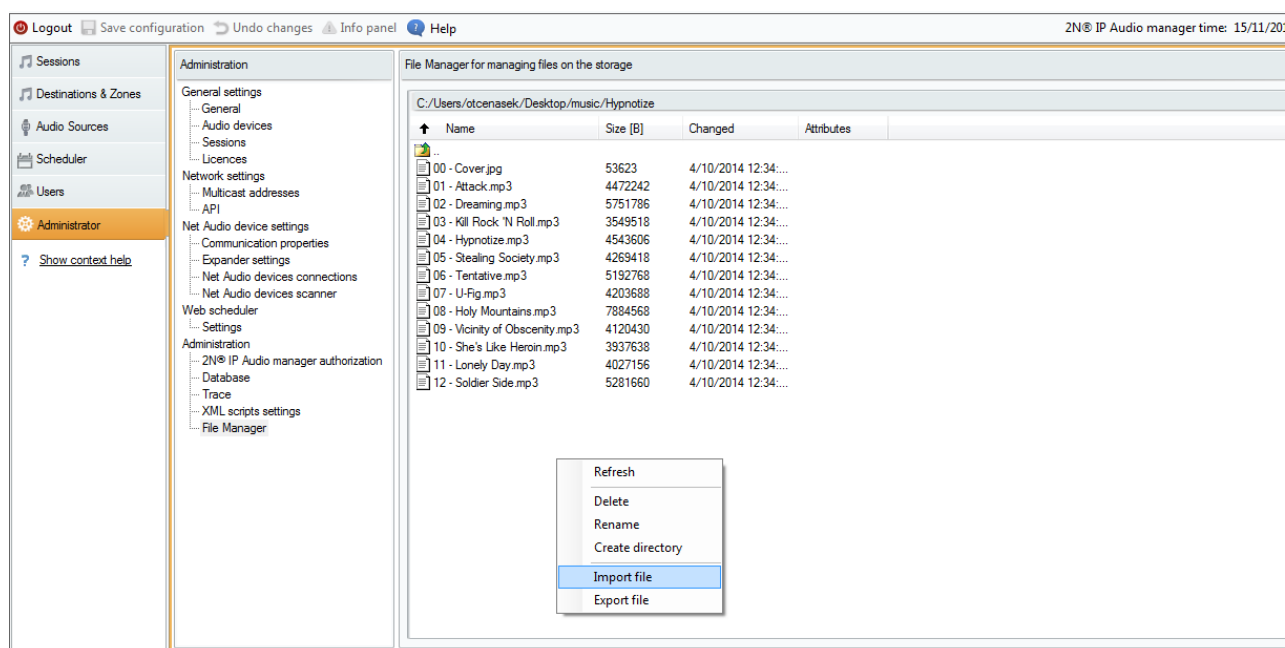
Playlists

A classic playlist creation principle is used like in common music players. Click the '+' button and add **mp3**, **wma** or **wav** files to create a new playlist. You can select more files than one (with Shift/Ctrl).



Adding Audio Files to Playlist

To add files to the new playlist from a PC other than that on which the server is running, use the Import file option in the Administration > File manager menu.



File Manager

In this way you can fill the server with mp3 files even remotely via the WAN.

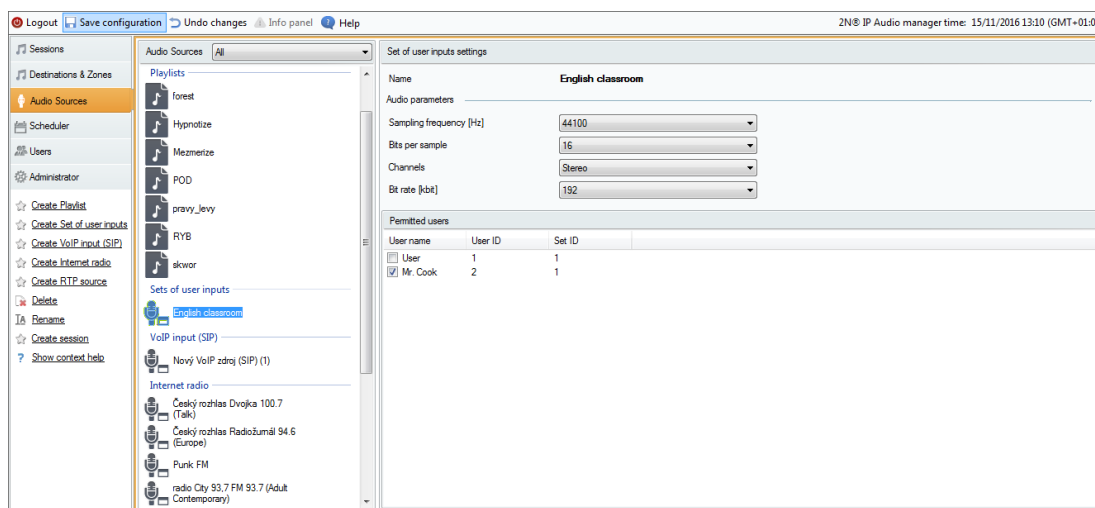
Sets of User Inputs

Set of user inputs is a group of rules rather than an actual input. The rules define users with the right to use the input and also assign inputs to rooms if necessary.

Example: Suppose a language school has English and German classrooms. There are 4 teachers in the school: Mr. Cook, Ms. Scott, Hr. Himmel and Fr. Moselle. Use the set of user inputs to create **English classroom input** and **German classroom input**.

- Enable the "English classroom" virtual input for Mr. Cook and Ms. Scott.
- Enable the "German classroom" virtual input for Hr. Himmel and Fr. Moselle.

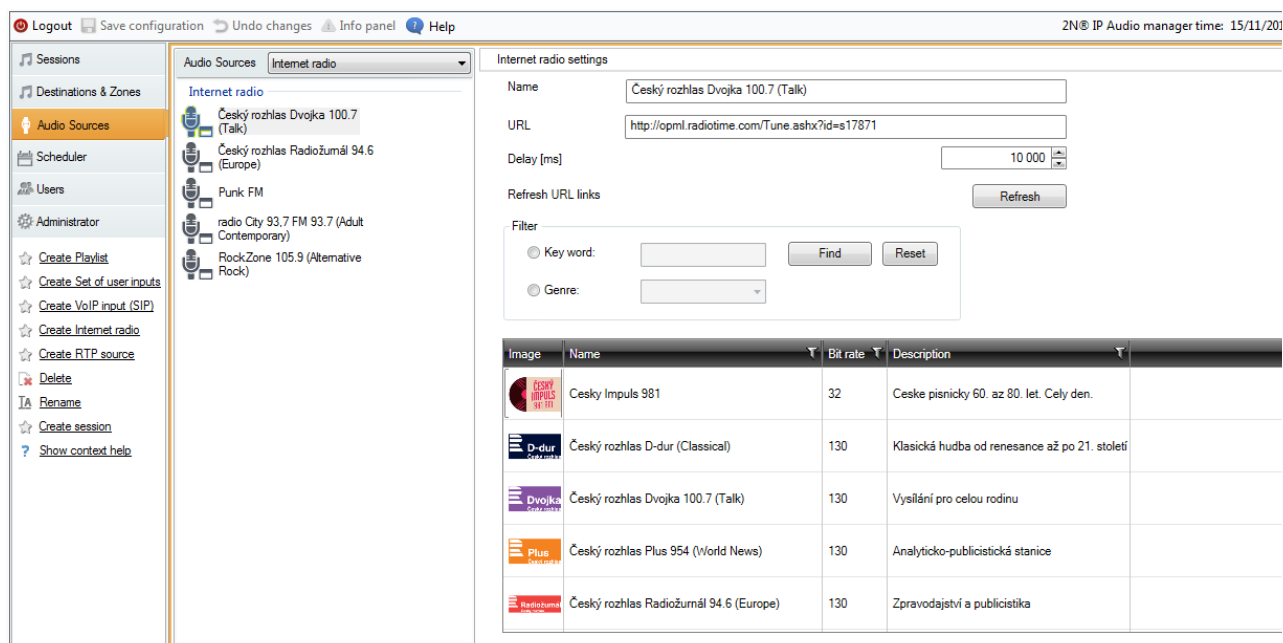
Doing this, you have created the possibility to play audio in the classrooms and let the teachers simply choose classrooms using the Console tool.



Adding English Teachers to Set of User Inputs

Internet Radio

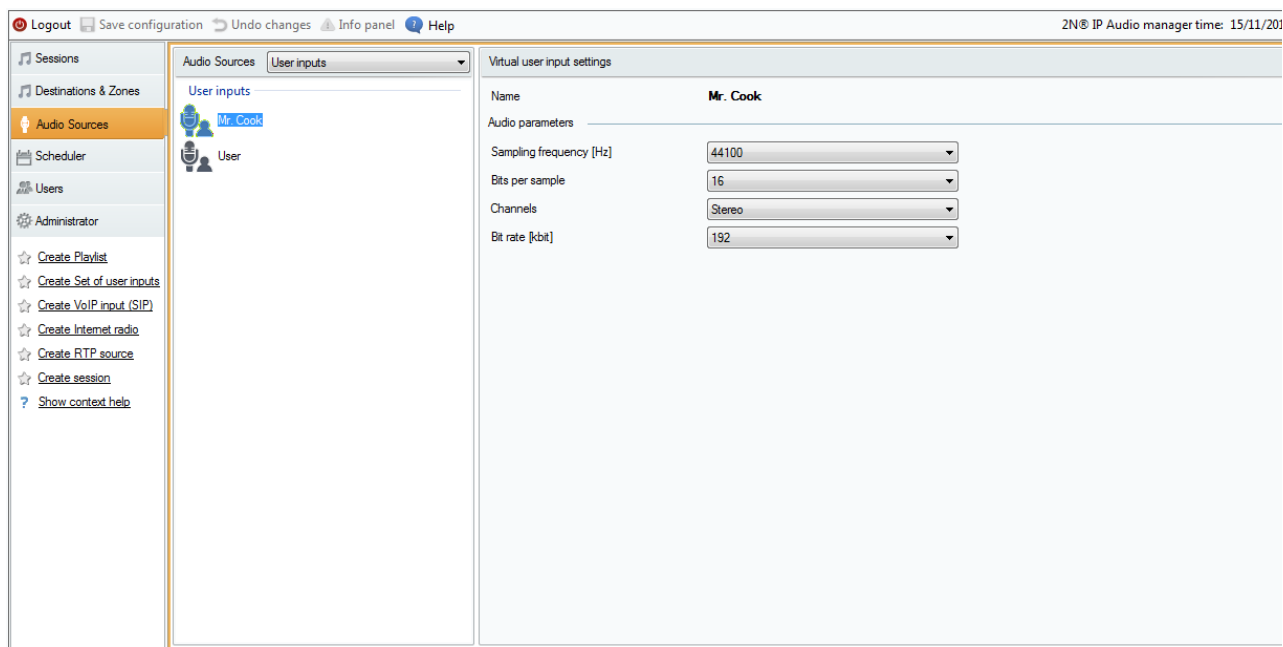
The **Internet radio** source allows you to insert URI of the selected radio and set radio delay (in ms) – characterises the radio buffer size. The supported radio formats are **mp3** and **wma**. In exceptional cases, the services providing internet radio management and playback may fail. For this reason, it is good to have a backup of at least one of the supported Internet radios from <http://www.mikesradioworld.com/>



Internet Radio Parameters

User Input

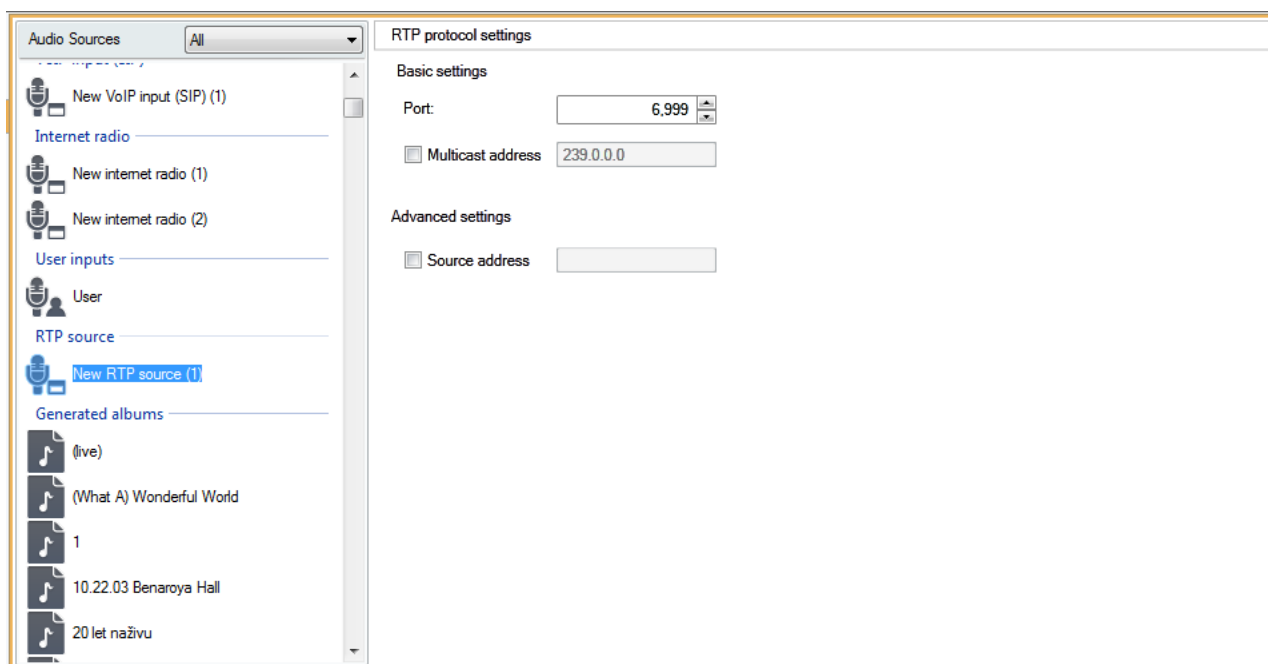
User input is assigned to the user and defines the user audio stream parameters when playing from the Console is used, for example. The figure below shows the default input settings.



User Input Parameters

Generic RTP Input

Generic RTP input is a common audio input. All the devices that can transmit audio using RTP protocol and codec G711, L16 can serve as a sound source for the session. The sound source is defined by the listening port, the IP address (unless unicast, i.e. IP address of the server). If the **2N[®] IP Audio Manager** listens on the defined multicast address, it is necessary to enter this address (then the specified port + IP multicast is considered). You can define the source IP address to make the sound source secure.

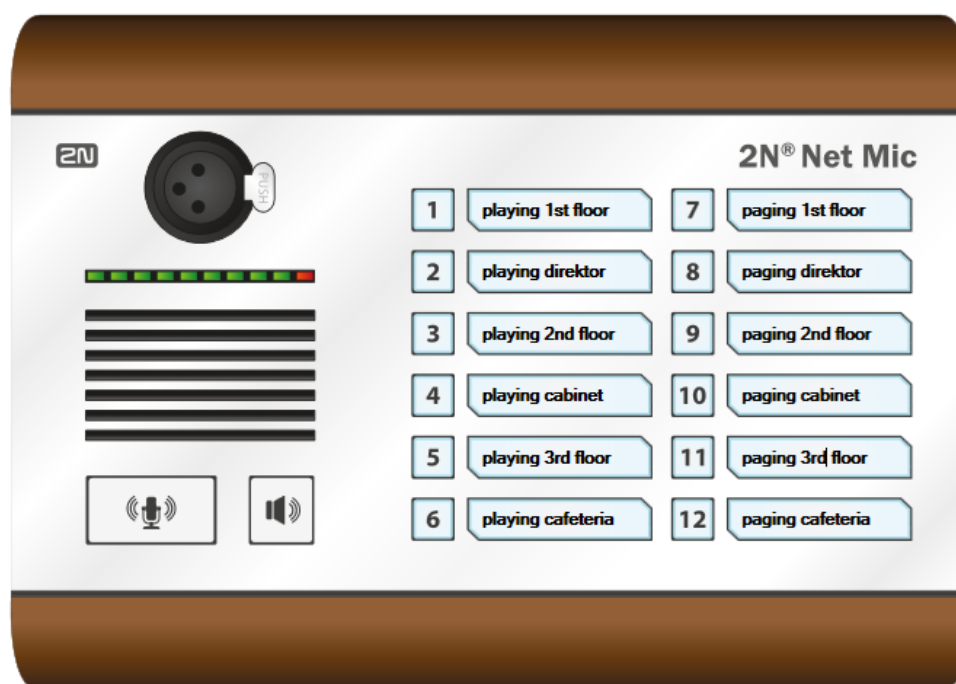


Generic RTP Input

Net Mic

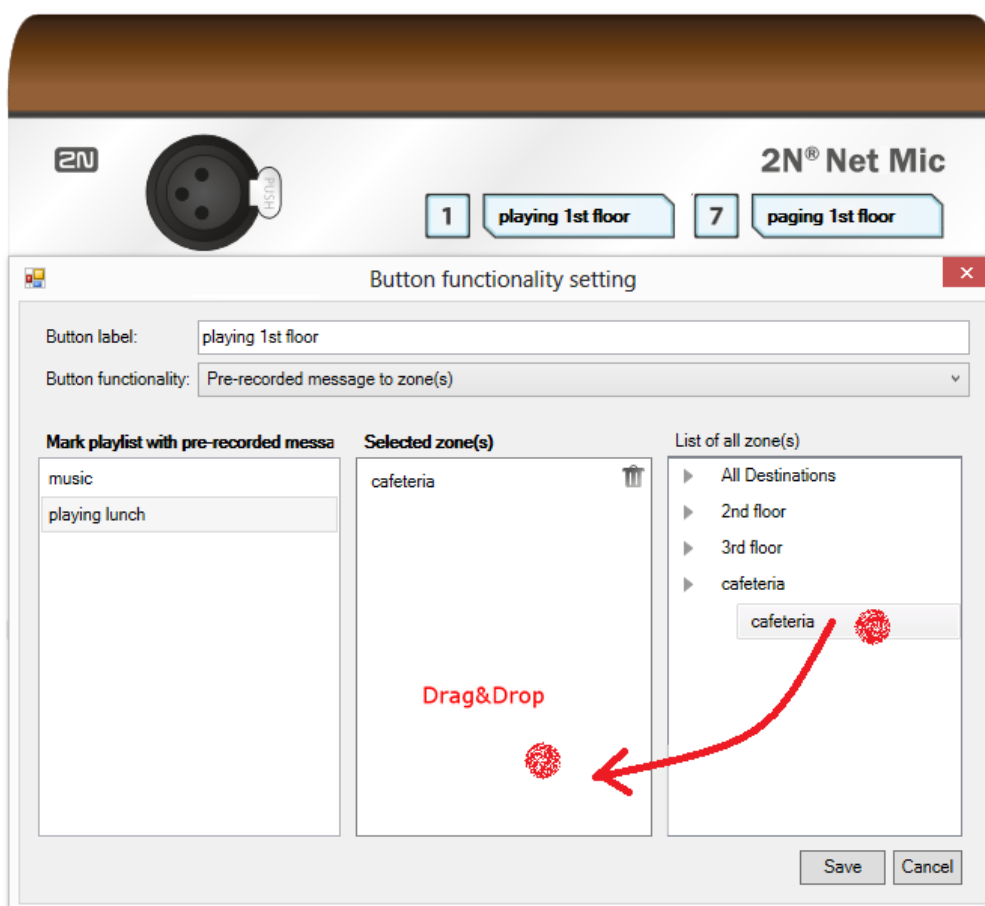
2N[®] Net Mic is a **hardware console** with microphone, which enables you to make live announcements or broadcast pre-prepared files to different zones. You can define the audio path delay according to your network conditions to improve the communication quality.

To access 2N[®] Net Mic, click **Audio Sources** **Net Mic** to display the 2N[®] Net Mic setting window.



Initial View of 2N[®] Net Mic via 2N[®] IP Audio Control Panel

In the window above, set live announcements or playing files to 2N[®] Net Audio Decoder or 2N[®] Net Speaker to the 2N[®] Net Mic buttons. Click a number to set the function key.



2N[®] Net Mic Button Function Setting

Select a playlist and drag it to the **Selected zone** to set Broadcasting to zone for the 2N[®] Net Mic button. Change the Button function item into **Paging zone selection** and drag the selected zone as mentioned above to assign live announcements to a zone. Now click **Save** and start using the 2N[®] Net Mic preset buttons.

Net Audio Encoder

Despite the gradual modernisation of audio systems to IP technology, customers are still encountering the need to connect an IP audio system to a traditional music sources such as FM radio stations, CD players or microphones. 2N[®] Net Audio Encoder

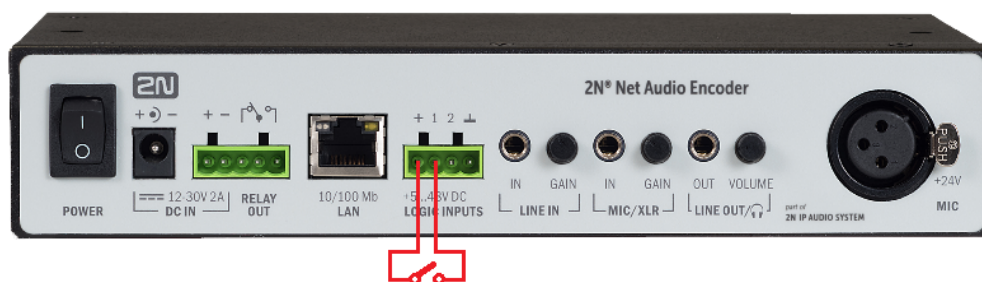
can transfer traditional audio sources to IP technology and then ensure audio distribution over an IP network to various destinations. 2N[®] Net Audio Encoder provides announcements to the Session with logic input if 2N[®] Net Audio Encoder is added to the **Audio source** for this Session.

Logic input

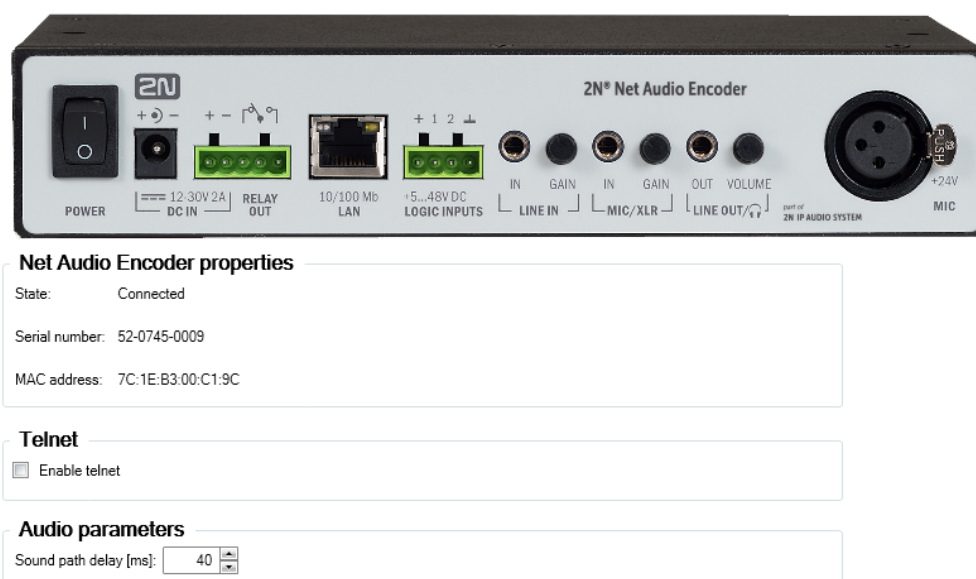
Connecting the logic input of the 2N[®] Net Audio Encoder. There are two options how to control logic inputs. The first option is that you are connecting to the input labelled **+** (galvanically isolated +7 V supply) and the input labelled **1** (0 V). The other option is that the input responds to voltage and switches to the input labelled **1** (0 V) and **GND**.

A logic input can operate in both the latching and momentary states.

When a switch is used across the logic input, the stream is started by a brief 'press and release' and stopped by 'press and release' (latching). Alternatively, a constant press of the switch activates the stream and the stream is stopped upon release (momentary).



To access 2N[®] Net Audio Encoder, click **Audio Sources** **Net Audio Encoder** to display the 2N[®] Net Audio Encoder setting window.



Initial View of 2N[®] Net Audio Encoder via 2N[®] IP Audio Control Panel

VoIP Input

The SIP source helps you connect 2N[®] **Net Speaker** to a VoIP (Voice over IP) PBX as a VoIP station via the SIP or a VoIP trunk. You have to know the PBX IP address, username and password (if requested) and the port to establish connection to the PBX. Refer to the subsections below for the parameters and setting options.

Another option is to allow direct VoIP calls to the 2N[®] **IP Audio Manager** by choosing Local SIP input. Then you have to assign the source to a session. Now the 2N[®] **IP Audio Manager** is able to receive direct VoIP calls from VoIP phones.

Logout Save configuration Undo changes Info panel Help 2N® IP Audio manager time: 15/11/2

Sessions
Destinations & Zones
Audio Sources
Scheduler
Users
Administrator
Create Playlist
Create Set of user inputs
Create VoIP input (SIP)
Create Internet radio
Create RTP source
Delete
Rename
Create session
Show context help

Audio Sources All
2N® IP Audio manager hardware inputs
Vzdálený zvuk
Playlists
forest
Hypnotize
Mezmerize
POD
pravy_levy
RYB
skwor
Sets of user inputs
English classroom
VoIP input (SIP)
Nový VoIP zdroj (SIP) (1)
Internet radio
Český rozhlas Dvojka 100.7 (Talk)
Český rozhlas Radiožurnál 94.6 (Europe)
Punk FM
radio City 93.7 FM 93.7 (Adult Contemporary)
RockZone 105.9 (Alternative Rock)

Stack status Ready
☐ Local VoIP input (SIP) ☒ VoIP (SIP) Trunk and Proxy registration

Local settings
Listening port: 5059
Realm (Domain): 10.0.25.42
Via/Contact: IP address 5060
Authorisation required: ☐
Extended parameters
UDP min: 30000
UDP max: 32000
NAT source:
Preferred codec: u-Law
NAT: ☒ None ☐ Fixed IP ☐ Stun IP

Remote SIP server parameters
Connect to: 10.0.25.42:5060
Protocol: UDP/TCP
☒ Register line: 205 Expiry: 3600
Username: 205
Password: ***
☐ Trustful IP addresses
IP addresses:

Advanced

SIP Source Setting

Source Status

Refer to the upper menu section for information on the stack (communication protocol) type and current status.

- **SOCK_TCP_ERROR** – TCP socket failed to open.
- **SOCK_UDP_ERROR** – UDP socket failed to open.
- **CREDS_IN_ERROR** – authorisation server unavailable.
- **CREDS_OUT_ERROR** – authorisation client unavailable.
- **REALM_CONFLICT** – realm collides with another port's realm/alias.
- **STUNNING** – public address obtaining from STUN server in progress.
- **STUN_TIMEOUT** – STUN server inaccessible.
- **EXPIRED** – public address validity expired.
- **SIP_REGISTERING** – gateway registration in progress.
- **REG_TIMEOUT** – REGISTRAR server inaccessible.
- **REG_NOT_AUTH** – registration unauthorised.
- **REG_REJECTED** – registration rejected with error.

Local Settings

- **Listening port** – is a local port of the **2N[®] IP Audio Manager** via which the given gateway is communicating with the counterparty.
- **Realm (Domain)** – define the domain over which this gateway is communicating. The domain and port specified here are relevant for subsequent call routing to the **2N[®] IP Audio Manager**. The Request-URI field including Realm (Domain) + port are checked for incoming INVITE messages. If the values match the SIP GW setting, the packets are routed to the **2N[®] IP Audio Manager**. The INVITE messages are served too whose Request-URI values are included in the **Aliases** field.
- **Via/Contact header** – define the contents of the Via and Contact headers. The following options are available:
 - **IP address** – fill in the unique PBX IP address.
 - **FQDM** – the header includes the PBX Host Name, which can be filled on the PBX IP interface.
 - **NAT** – fill in the fixed public IP address and NAT port to which signalling messages for the PBX should be sent by the counterparty. Packets are routed to the PBX based on the set port routing IP address on the router.
 - **STUN** – fill in the STUN server address and port to identify the current address behind the NAT router.

- **Authorisation required** – activate authorisation request for incoming calls from the counterparty. User login data are used for call authorisation. All logins are always searched through.

Remote SIP Server Parameters

- **Connect to** – set the IP address or DNS name of the counterparty (operator or another PBX) to which you want to connect the 2N[®] IP Audio Manager via a trunk (where call and registration requests shall be routed). To use a port other than 5060, specify the port behind the colon (192.168.122.43:5071).
- **Protocol** – specify whether UDP and/or TCP shall be used for transmission. If you choose NAPTR (Name Authority PoinTeR), a query to the DNS is made first and, depending on the reply, the proper transmission protocol is set. The **Use DNS SRV** parameter can be used with this setting and suitable DNS only.
- **Register line** – enable registration with the counterparty and specify the gateway registration number (Caller ID). No call setup requests can be resent to an unregistered gateway.
- **Validity** – set the registration validity term. The resultant value can be defined by the counterparty (if shorter).

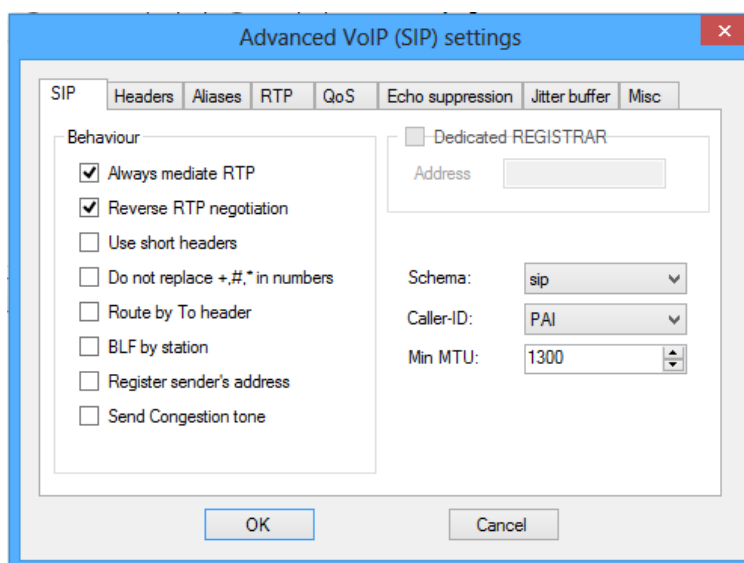
Authorisation Data

- **Name** – user name for registration with the counterparty.
- **Password** – password for registration with the counterparty.

Trustful IP Addresses

The parameter helps secure the 2N[®] IP Audio Manager against undesired call attempts via the given SIP gateway. Tick off this option to make the PBX process only the requests coming from trustworthy IP addresses included in the list. Add, remove or modify an IP address to/in the list using the buttons to the right of the IP address list or the context menu retrieved in the IP address list with the right-hand mouse button.

SIP Parameters



Advanced VoIP Settings

- **Always mediate RTP** – enable this parameter to route the RTP stream via the PBX VoIP card in all cases. Otherwise, the RTP stream might be routed outside the PBX (for VoIP – VoIP connections) and the PBX processes only signalling for such a call.
- **Reverse RTP negotiation** – tick off this option to set the codec negotiating method. If you do not tick off this option, the PBX offers codecs in the INVITE message.
- **Use short headers** – tick off this option to use abbreviated header items for outgoing SIP packets. Example: From = f, To = t, Via = v. This optimisation helps minimise data to be transmitted.
- **Do not replace +, #, * in numbers** – if you do not tick off this option, the above mentioned characters will be replaced with adequate strings %xx in numbers. Tick off the option to send the characters.
- **Route by To header** – if you tick off the option, incoming call routing on the port will obey the **To** header setting. Otherwise (and by default!), **calls are routed by the Request URI header**.
- **Dedicated Registrar** – is used for the gateway only and helps route registration to another server.
- **Address** – IP address of the selected Registrar server.
- **Port** – port of the selected Registrar server.
- **Scheme** – set the **sip** or **tel** scheme in the "To" and "From" headers of the SIP. **tel** is used for networks based on the numbering plan according to recommendation E.164.
- **Min. MTU** – set the minimum packet length for obligatory use of TCP in the UDP&TCP mode. The recommended maximum value is 1448 bytes.

Headers

- **Complete domain** – specify the domain to be used within the **From** and **To** headers.
- **Send information – P-Asserted-Identity** – activate the P-Asserted-Identity header for the INVITE message. This header is used for CLIR transmission to the counterparty, giving it information on the calling number even in the case of active CLIR (Calling Line Identification Restriction). By default, the header is enabled on the SIP Gateway and disabled on the SIP Proxy.

Aliases

Use this option to specify additional Realms (Domains) to be accepted on this port. Such incoming calls (their INVITEs) will be routed to this port whose Request-URIs match the given SIP GW or SIP Proxy settings and Domains or Aliases.

RTP

- **DSP** – here you can optimise data to be transmitted. Packets are not sent while the user is not speaking. VAD stands for Voice Activity Detection.
 - **Disabled VAD**
 - **VAD acc. to G.729 Annex B**
 - **VAD light**
- **Generate comfort noise** – enable comfort noise generating. As users of classic analogue lines are used to some background noise, this option simulates a similar call impression to them.
- **Mask lost packets** – enable optimised computing of probable contents of lost packets.

QoS

The **TOS/DiffServ** section helps you set outgoing packet parameters which define the packet priority for processing by network elements.

- **SIP** – hexadecimal priority value for SIP packets.
- **RTP** – hexadecimal priority value for RTP packets.
- **Default values** – restore the default values for the two parameters.

Echo Suppression

Use this tab to activate various echo cancelling methods.

- Suppression disabled
- Profile G.168 8 ms
- Profile G.168 16 ms
- Profile G.168 32 ms
- Profile G.168 64 ms
- Profile G.168 128 ms
- Delay [ms]
- Adaptive suppression
- Non-linear processing
- Reuse of coefficients
- Automatic control

Jitter Buffer

Set the parameters in this tab to optimise packet delay fluctuation during network passage.

- Delay [ms]
- Depth [ms]
- Automatic adaptation
- Short adaptation parameters
- Low [ms]
- High [ms]
- Threshold

Miscellaneous

- Receive marks in call
 - **Mode** – set the supported DTMF receiving mode for calls.
- Send marks by INFO method
 - **DTMF** – select one of the two DTMF sending modes using the SIP INFO method. The modes have different formats of the DTMF transmitting message.
- KeepAlive
 - **Period** – define the KeepAlive packet sending interval. The default value is 10s.
- **STUN server** – The STUN server helps NAT clients (i.e. PCs behind the firewall) set up telephone calls with the VoIP provider hosted outside the LAN.
 - **Address** – complete the STUN server address (IP or domain name) to be used if the STUN IP method is selected in the port RTP interface configuration. The default value is **stunserver.org**.
 - **Port** – set the port to be used for STUN. The default value is **port 3478**.

SD Card



Warning

- SD card is not included in the Sound sources that are managed by the Control Panel.

What you should know

- Make sure before inserting the SD card for the first time that the card has been formatted via the **FAT32** file system.
- The **violet** LED flashes to signal SD card loading, the **green** LED flashes three times to signal successful loading and **orange** LED flashes three times to signal loading failure.
- Upon the first SD card insertion, four **playlists** (OFFLINE, USER0, USER1 and USER2 folders) and **inifile (2NAudio.ini)** are created.
- The playlist includes all .mp3 files from the folder, arranged alphabetically in English. All subfolders are also included alphabetically, i. e. following the files.
- Up to 4,000 files can be loaded.
- The **OFFLINE** playlist is used for SD card playing in the case of connection failure.
- The **USER0** playlist is used for SD card playing when the logic input is activated.
- Press the button (logic input activation) to start playing and repress it to stop playing – you do not have to keep the button pressed to activate playing.
- Edit **inifile** to set the folders in greater detail.

Inifile

[OffLine] – parameters related to the given playlist

Folder – folder name

NowPlaying – currently played file

StartDelay – start delay (ms)

InterFileDelay – inter file delay (ms)

FromBegin – set 1 to play the playlist from the beginning

OneShot – set 1 to stop playing when the playlist is completed

WholeFile – stop playing after the current file is completed

```
[OffLine]
Folder=OFFLINE
NowPlaying=
StartDelay=0
InterFileDelay=0
FromBegin=0
OneShot=0
WholeFile=0
```

```
[User0]
Folder=USER0
NowPlaying=
StartDelay=0
InterFileDelay=0
FromBegin=0
OneShot=0
WholeFile=0
```

```
[User1]
Folder=USER1
NowPlaying=
StartDelay=0
InterFileDelay=0
FromBegin=0
OneShot=0
WholeFile=0
```

```
[User2]
Folder=USER2
NowPlaying=
StartDelay=0
InterFileDelay=0
FromBegin=0
OneShot=0
WholeFile=0
```

Scheduler

What you should know

- If the Create actions for session activation and deactivation automatically option is enabled, session activation/deactivation is set together with the first action for the session.
- If you power up the server while the event 'is in progress', the actions will not be performed. The server must always be activated **before the beginning** of the event.
- The session activation action automatically enables all playlists in the session.

Scheduler

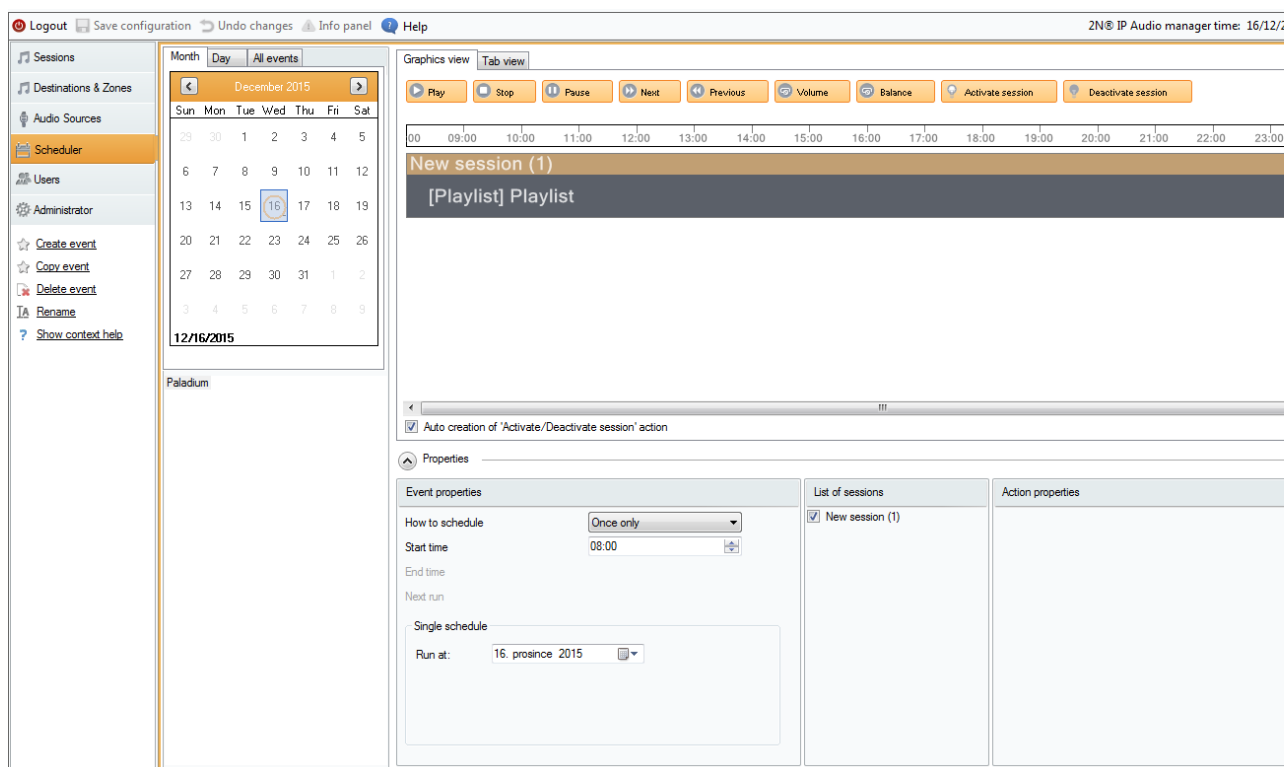
Scheduler is used for creating actions used for control of playlists or sessions. You can schedule various actions for the playlists and assign them to time. A set of actions for playlists is called **Event** and you can control multiple playlists in multiple sessions within one event. Fig.1 shows an example of event with two sessions. One contains a playlist, the other is without a playlist.

Event Creation

As mentioned above, the event is a set of actions that are executed over playlists or other sources included in sessions. Therefore, prepare a session including the required playlists before creating an event. Only then you can start creating an event as follows:

Procedure:

Create a new event – use one of the following methods: click the **Scheduler** tab and then **Create event**, or use the floating menu. Also, you can assign an event to a date before creation by clicking the required day and then **Create event**.



Scheduler Tab

Set event start – click **Event** to display the event setting option to the left. Set the type, starting time and repeating intervals. The setting options depend on the action type: **Action setting options**:

- **Not scheduled** – this event will never be performed.
- **Daily** – the event will start at the set time every day (or **Every xth day**).
- **Weekly** – the event will start at the set time of the set days every week or **Every xth week**.
- **Monthly** – select a day in the month for the action start and also in which months the action shall occur **Once only**.

Event properties

New event (1)

How to schedule: Weekly (selected), Not scheduled, Daily, Weekly, Monthly, Once only

Start time

Next run

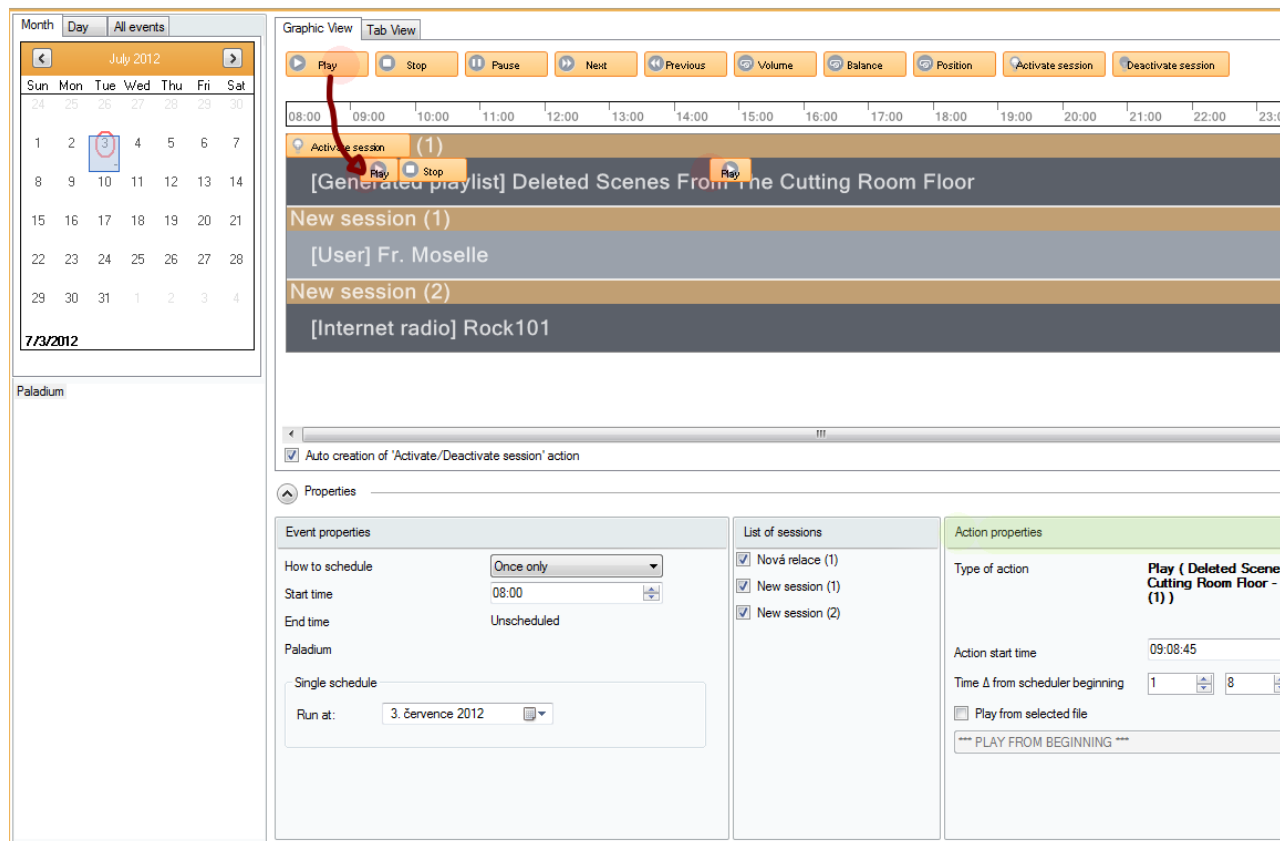
Single schedule

Run at: 16. dubna 2012

Event Settings

Action Setting

Having created an event according to section above, specify the contents of the event, i.e. what shall be played and when.



Action Setting and Display

The Action Setting and Display figure above shows an example of a scheduled action. The **Activate/Deactivate session** actions are added automatically to the beginning and end of each event. If you disable this property, however, the scheduled actions will not start running in an inactive session. Also, **all playlists are switched on automatically** in a session that moves into the **active** state. Therefore, assign the **STOP** action to the beginning of the playlists that are not to be played.

Drag&drop the required action above the time axis of the event from the **offer of actions** in the time axis header (see the figure). **Always** move the action to the playlist to be controlled within one session. A session can contain multiple playlists and all the playlists can be administered.

You can modify the actions created as mentioned above according to the requirements of the given event. Click an action and edit its parameters in the Action setting window. Refer to the Action Setting and Display figure for details on the **Play** action.

You can set other parameters than as shown in Fig. 3 for different types of actions. You can set the start time only for most action types and other properties for some of them:

- **Play, Stop, Others, Previous** and **Activate/Deactivate session** – set the start time only.
- **Volume** – set the playlist volume – the volume level plus a smooth volume change.
- **Balance** – set the playlist balance – in addition to start time, set a smooth balance change via the **Change duration time** option.

In the **List of sessions** it is possible to choose the sessions that shall be used for the event.

Event Display

There is an event list in the left part of the Scheduler tab. Display the list in any of the following views: **Month**, **Day** or **All events** by selecting a card.

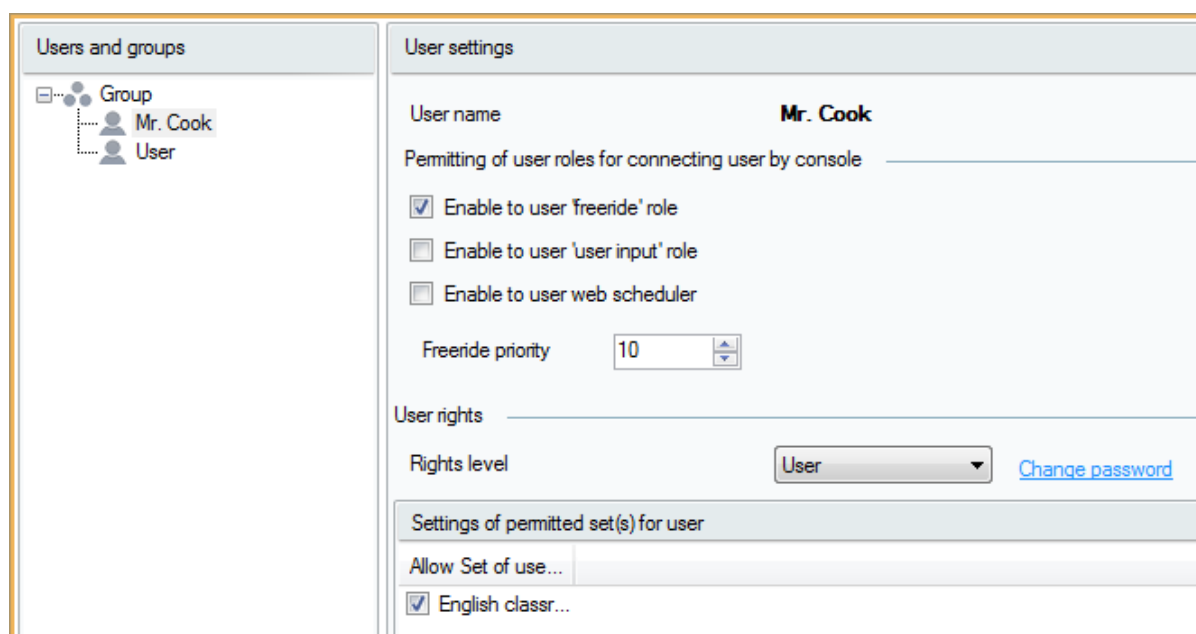
- **Month view** – select this card to display a calendar for navigation. Click a date to run the events associated with the selected date.
- **Day view** – having selected a date in the Month view, click the Day card to display the required day details. Like with the Month card, you can only see the actions assigned to the selected date.
- **All events** – select this card to display all the events available.

Users

What you should know

- This menu helps you create users and specify user rights.
- A created user can log in to the ControlPanel, Virtual Sound Card, Console and/or mobile applications (Android, iPhone).
- **2N IP Audio System** uses 2 levels of authorisation - User and Administrator.
- **2N IP Audio System** uses 3 levels of user roles - user input, freeride and web scheduler.

The **Users** tab is used for user administration. It helps you create and delete users and change user rights (user roles).



The screenshot shows the 'Users and groups' tab in the 2N IP Audio System interface. On the left, a tree view shows a 'Group' containing 'Mr. Cook' and a 'User'. The main area displays the 'User settings' for 'Mr. Cook'. The settings include:

- User name:** Mr. Cook
- Permitting of user roles for connecting user by console:**
 - ☒ Enable to user 'freeride' role
 - ☐ Enable to user 'user input' role
 - ☐ Enable to user web scheduler
- Freeride priority:** 10
- User rights:**
 - Rights level:** User (dropdown menu)
 - [Change password](#)
- Settings of permitted set(s) for user:**
 - ☒ English classr...

Users Tab Layout

The figure shows the Users tab with the **User settings** to the right. You can define the user rights for the Console or Virtual Sound Card user connection.

- **Freeride role** – the user itself defines what and where to be played. This user has the right to play without restrictions and without using pre-defined sessions. The user has access to all destinations and its broadcasting has the highest priority.
- **User input role** – this user will be assigned the "home" session for broadcasting by the system administrator.
- **Web scheduler role** – this user can access the Web Scheduler via the web interface.

Rights level – select the User or Administrator level. The Administrator cannot log in to the Console and Virtual Sound Card, but may use the 2N[®] IP Audio Control Panel software.

Sets of User Inputs

The system administrator defines the set of user inputs for certain sessions; refer to **Audio Sources** for details. These inputs can then be assigned/provided to users in the **Permit user connection to set of user inputs** section. This section includes a list of all sets of user inputs and helps you assign a user to an input by ticking off the option.

Administration

What you should know

- Your network can be overloaded by wrong settings made in this tab.
- Trace can be saved and help communicate your problem to the **2N Technical Support** department.
- Multicast is disabled in **2N IP Audio System** by default.
- The scanner allows you to see **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** even if **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** does not obtain the IP address from the network. For a proper function you have to assign the IP address manually in this case. This, however, works in switched networks only.
- Virtual Network adapters may cause malfunction of the Net Audio devices scanner.
- Access via API is restricted to 10 clients by default and can be changed.

The **Administrator** tab helps you set other **2N IP Audio System** parameters and monitor the state of the system. The tab contains general settings and administration.

General Settings

General

General allows you to set the Control Panel language and external syslog server for logs.

The **language** can be chosen by the Application language selector.

The **SYSLOG server** is used for sending the **2N[®] IP Audio Manager** logs onto an external Syslog server. After the IP address and destination port are set, the server messages will be sent automatically. The **TCP protocol** is used for packets and therefore it is necessary to enable TCP connection on your syslog server.

Log description:

```
1,RADIO_DISCONNECT,"New session (1)","http://api.play.cz/danceradio192.  
mp3.  
m3u","New internet radio (1)"  
Par1: 1 - id of message. After server restart number is set to 0.  
Par2: RADIO_DISCONNECT - type of message (see below)  
Par3: "New session (1)" - source of message  
Par4: "http://api.play.cz/danceradio192.mp3.m3u" - subject of change  
Par5: "New internet radio (1)" - name of subject
```

The parameters are UTF-8 encoded and Type writer double quotes (" ") are used. If the text contains ' " ', then prefix '\ ' is used. It means that Speaker "Kitchen" will be encoded as "Speaker \"Kitchen\"" in the parameters.

Types of logs:

```
SPEAKER_LOGIN - NetSpeaker has been logged in; Par3=Speaker
SPEAKER_LOGOUT - NetSpeaker has been logged off; Par3=Speaker
SPEAKER_CONNECT - NetSpeaker has been connected to session;
Par3=Speaker,Par4=Session
SPEAKER_DISCONNECT - NetSpeaker has been disconnected from session;
Par3=NetSpeaker name
FILE_CONNECT - Session starts playing song; Par3=Session,Par4=name of
file with full path,Par5=Name of playlist
FILE_DISCONNECT - Session stops playing song; ,Par3=Session,Par4=name
of file with full path,Par5=Name of playlist
USER_CONNECT - User was connected to session; Par3=Session,Par4=User
USER_DISCONNECT - User was disconnected from session; Par3=Session,
Par4=User
VIRTUAL_CONNECT - Virtual input was connected to session; Par3=Session,
Par4=Virtual input
VIRTUAL_DISCONNECT - Virtual input was disconnected from session;
Par3=Session,Par4=Virtual input
RADIO_CONNECT - URL input (radio) was connected to session;
Par3=Session,Par4=URL address,Par5=Name of radio
RADIO_DISCONNECT - URL input (radio) was disconnected from session;
Par3=Session,Par4=URL address,Par5=Name of radio
HW_CONNECT - HW input was disconnected to session; Par3=Session,Par4=HW
input source's name
HW_DISCONNECT - HW input was disconnected from session; Par3=Session,
Par4=HW input source's name
VOIP_CONNECT - VoIP input was connected to session; Par3=Session,
Par4=Voip source's name
VOIP_DISCONNECT - VoIP input was disconnected from session;
Par3=Session,Par4=Voip source's name
RTP_CONNECT - RTP source was connected to session; Par3=Session,
Par4=Rtp source's name
RTP_DISCONNECT - RTP source was disconnected from session; Par3=Session,
Par4=Rtp source's name's name
SESSION_MUTED - Session was muted; Par1=Session source's name's name
SESSION_UNMUTED - Session was unmuted; Par1=Session source's name
```

Audio Devices

Audio devices allows you to select the local sound device for listening in. Listening in is a capability to listen to sessions locally, which makes troubleshooting easier. Select the device to which the sound will be routed. These devices depend on the PC configuration.

Sessions

Sessions allows to set more session parameters.

- **Show sessions from connected consoles** – view even sessions that are created by the Console and Player users with the Freeride privilege.

Licences

This tab is used for licence administration. Licences are obligatory for advanced functions of the **2N IP Audio System**. The licence will keep valid after your PC Windows /HW upgrade. In any case contact the Technical Support.

Without a licence you can use up to 5 **2N[®] Net Audio Decoders** or **2N[®] Net Speakers** and 1 RTP destination. By default, an 800 h trial licence is active and allows you to use all features of the **2N IP Audio System** system without any limitations.

The screenshot displays the 'Licences settings' page in the 2N IP Audio System web interface. The interface includes a sidebar with navigation options: Sessions, Destinations & Zones, Audio Sources, Scheduler, Users, and Administrator (highlighted). The main content area shows the 'Licences settings' section. At the top, there is a 'Computer identification' field with a long alphanumeric string. Below this, there is a 'Licence files' table with columns for File, ID, and Status. A single row is visible with the file '2.key', ID 'NSPKLIC-G91c7ee4a67bbe6599', and Status 'OK'. To the right of this table is a context menu with options: 'Add licence', 'Remove licence', and 'Download licence'. Below the 'Licence files' table is an 'Add licence' button. At the bottom, there is a 'Licence features' table with columns for Feature, Type, Licensed, and Requested. Two rows are visible: 'General RTP Port' with 100 Licensed and 1 Requested, and 'Net Audio devices count' with 1400 Licensed and 7 Requested.

File	ID	Status
2.key	NSPKLIC-G91c7ee4a67bbe6599	OK

Feature	Type	Licensed	Requested
General RTP Port		100	1
Net Audio devices count		1400	7

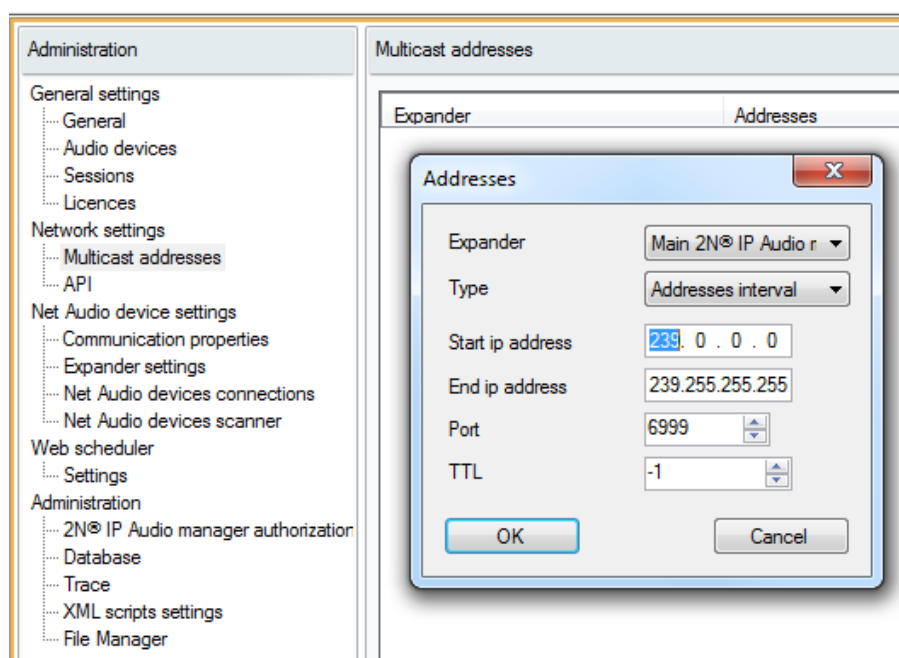
Licence Settings

Network Settings

Multicast Addresses

Set the multicast addresses. Select multicast for the address range, multicast for the port range or single IP address transmission. The default address scope is 239.0.0.0/8. The figure below shows the default setting for the address range. If the range of addresses is set, then multicast is used. Each group of speakers with the same settings (session, delay, bitrate...) use one multicast stream.

The TTL parameter allows to change **time to live** for multicast packets. **Use -1 to ensure that the system default is used!** Some special 2N IP Audio System applications require a change of these settings but it should be done only in cooperation with a network specialist.



Multicast Setting Options

API

The **API** settings helps you set the port for **2N IP Audio System API** connection and client restriction.

XML API allows an external 3rd party application (e.g. iPhone application, tablet application) to control the system. **HTML API** allows to send basic commands to the **2N[®] IP Audio Manager** and control sessions. HTML API is primary used by VoIP phones or intercoms but the command can be also sent from a web application.

Net Audio device settings

Communication Properties

Communication properties helps you set the manager domain for the connected **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** units to avoid connection to another **2N[®] IP Audio Manager** in the network.

Expander Settings

Expander is an advanced function of **2N IP Audio System**, which allows for traffic load balancing through the **2N[®] Net Speaker Expanders** used in the network. Contact **2N TELECOMMUNICATION a.s.** for more information.

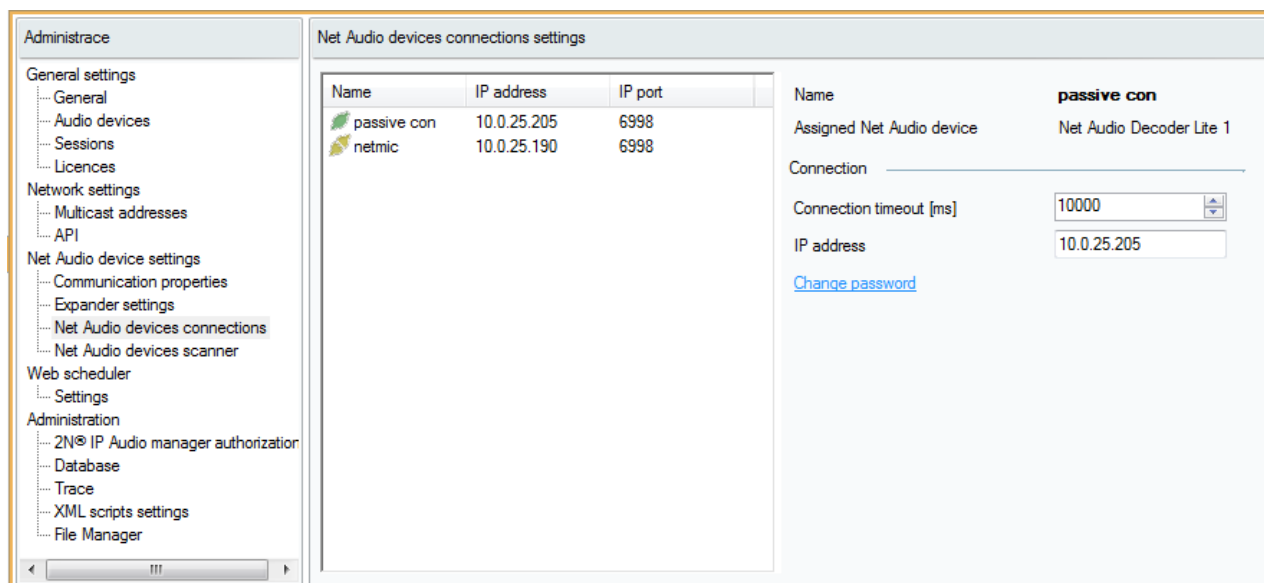
Net Audio devices connections

Set the connection parameters for **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** in the passive mode (refer to the scanner below). **Save** the parameters to establish connection to **2N[®] Net Audio Decoder** or **2N[®] Net Speaker**.

Parameters:

- **Connection timeout** – define the time interval between the connection making attempts.
- **IP address** – set the **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** IP address.
- **IP port** – set the **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** port; 6998 is the default value.

- **Automatic firmware upgrade** – disable the 2N[®] Net Audio Decoder or 2N[®] Net Speaker firmware upgrade.



Connection Parameters

Net Audio devices scanner

Use the scanner to search for the 2N[®] Net Audio Decoder or 2N[®] Net Speaker units and their settings in the network. All speakers available in the network are displayed to the left. Having selected a speaker, you can change its parameters in the right-hand part to make it connect to the 2N[®] IP Audio Manager automatically (active mode), or using the **connections** parameters.

**Caution:**

- If there is a yellow-highlighted Net Audio Decoder or Net Speaker in the scanner, please check the domain (both on the manager and end device sides), or check the license for excessive count of devices for trial use.

Parameters:

- **Description** – enter optional details on the selected 2N[®] Net Audio Decoder or 2N[®] Net Speaker unit.
- **MAC address**
- **Serial number**
- **Domain** – 2N[®] Net Audio Decoder or 2N[®] Net Speaker with the set domain is assigned to the server with the same domain.
- **Mode** – select the passive/active/search mode.
 - **Passive mode** means that it is necessary to set connection to 2N[®] Net Audio Decoder or 2N[®] Net Speaker from the server side in the **Net Audio device settings** **Net Audio devices connections** section.
 - **Active mode** means that 2N[®] Net Audio Decoder or 2N[®] Net Speaker gets connected to the 2N[®] IP Audio Manager automatically using the **Server IP address** parameter.
 - **Search mode** means that 2N[®] Net Audio Decoder or 2N[®] Net Speaker finds the 2N[®] IP Audio Manager in the network automatically, takes over the domain and gets connected to the server.
- **2N[®] IP Audio manager IP address**
- **2N[®] IP Audio manager TCP port**
- **IP address** – actual 2N[®] Net Audio Decoder or 2N[®] Net Speaker IP address.

- DHCP client on – select on/off to determine whether 2N[®] Net Audio Decoder or 2N[®] Net Speaker shall use the network setting obtained from the network via the DHCP, or use the statically set parameters.
- IP address – 2N[®] Net Audio Decoder or 2N[®] Net Speaker IP address.
- IP mask – network mask.
- IP gateway – network gateway.

Administrace

- General settings
 - General
 - Audio devices
 - Sessions
 - Licences
- Network settings
 - Multicast addresses
 - API
- Net Audio device settings
 - Communication properties
 - Expander settings
 - Net Audio devices connections
 - Net Audio devices scanner
- Web scheduler
 - Settings
- Administration
 - 2N[®] IP Audio manager authorization
 - Database
 - Trace
 - XML scripts settings
 - File Manager

Net Audio devices scanner settings

Extended search mode

Start

Description	DHCP	IP address	Domain	Serial number
Net Audio Decoder PCB 1	DHCP	10.0.25.203	testteam-13	52-0470-0161
Net Speaker stul	DHCP	10.0.25.230		52-0511-0442
Net Speaker repro	DHCP	10.0.25.184		52-0671-0515
Net Audio Decoder Lite 1	DHCP	10.0.25.205		52-0726-0063
Net Mic 1	Static	10.0.25.190	testteam-13	52-0745-0008
Net Audio Encoder 1	DHCP	10.0.25.208		52-0745-0009
Net Audio Decoder PCB 2	DHCP	10.0.25.212		52-0876-0205
NetSpeaker konzole	DHCP	10.0.25.199		52-0876-0235

Description: Net Mic 1

MAC address: 7C:1E:B3:00:BD:BE

Serial number: 52-0745-0008

Domain: testteam-13

Mode: Active ?

2N[®] IP Audio manager IP address: 10.0.25.99

2N[®] IP Audio manager TCP port: 6999

IP address: 10.0.25.190

☐ DHCP client on

IP address: 10.0.25.190

IP mask: 255.255.255.0

IP gateway: 10.0.25.1

Restart

Blink

Scanner

Web Scheduler

Settings

- Sunday is first day of week

Administration

2N[®] IP Audio manager authorization

- Server authentication to 2N[®] Net Audio Decoder or 2N[®] Net Speaker – set the password for manager authentication to 2N[®] Net Audio Decoder or 2N[®] Net Speaker.

- **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** authentication to server – set the password for **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** authentication to manager.
- **Administrator login authentication password** – change the main administrator password of the **Administrator** user.



Caution:

- to set **2N[®] IP Audio Manager** authentication to **Net Audio device** set-up parameter **pwd** via telnet
- to set **Net Audio device** authentication to **2N[®] IP Audio Manager** set-up parameter **srvpwd** via telnet
- refer to **Configuration via Telnet Server** for details about using telnet

Database

Database displays database tables. Changes of the parameters in the DB are possible but **reckless changes may corrupt the 2N[®] IP Audio Manager!**

The **Cfg_PollTout** parameter in the **MSGBT_CHAN** table sets the communication timeout. A 2,500 ms timeout is set by default and 4x2,500 ms represents a timeout for communication between the **2N[®] IP Audio Manager** and the **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** units or **2N[®] IP Audio Control Panel**. This parameter can improve the **2N IP Audio System** performance in networks with complicated structures.

The **Cfg_Port** parameter in the **MSGBT_LL_TCPSRV** table allows you to change default ports for incoming communication from the **2N IP Audio devices** to the **2N[®] IP Audio Manager** (port 6999) and from the **2N[®] IP Audio Control Panel** to the **2N[®] IP Audio Manager** (6990). If a change of this parameter is made on the server side, it has to be made on the client side too.

The **NTPQueryTimeout** parameter in the **NSPK_SRVT_GLOBAL** table allows you to change the time synchronisation timeout. This parameter can improve the **2N IP Audio System** performance in networks with complicated structures.

The **NSPK_SRVSTATS_SND_BUFFER** table shows statistical data on communication for short (10s - 60s) and overall time periods.

Trace

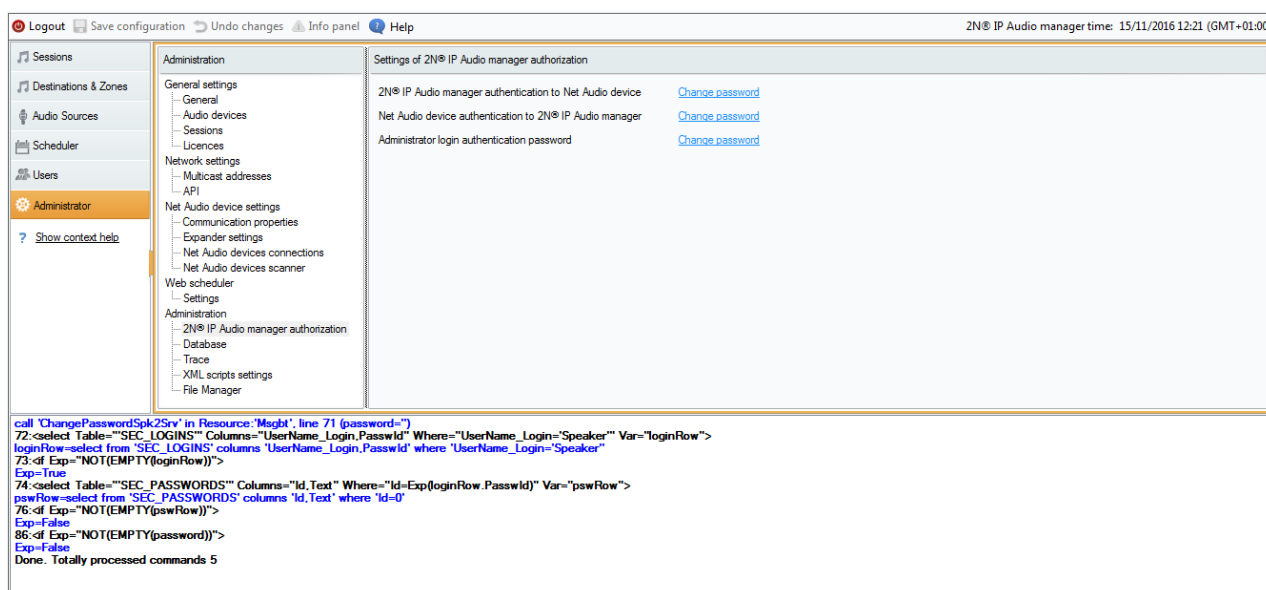
Trace provides full listing of information exchange between the **2N IP Audio System** system components. Use the floating menu to retrieve more functions such as:

- **Settings** – set automatic trace saving onto a disk of the PC where the ControlPanel is running.
- **Filter** – create a filter for existing IDs or characters (**string**).
- **Save to file** – save the current system trace using the floating menu **Save to file**.
- **Import/Export settings** – save settings of colour rules for filters.

You will be asked to capture trace if you are communicating with the 2N Technical Support. It can be done by the right mouse click into the trace space and choice of **Save to file**.

XML Script Setting

Display the XML scripts while configuring **2N IP Audio System** as full or simplified listings – listing of debug functions.

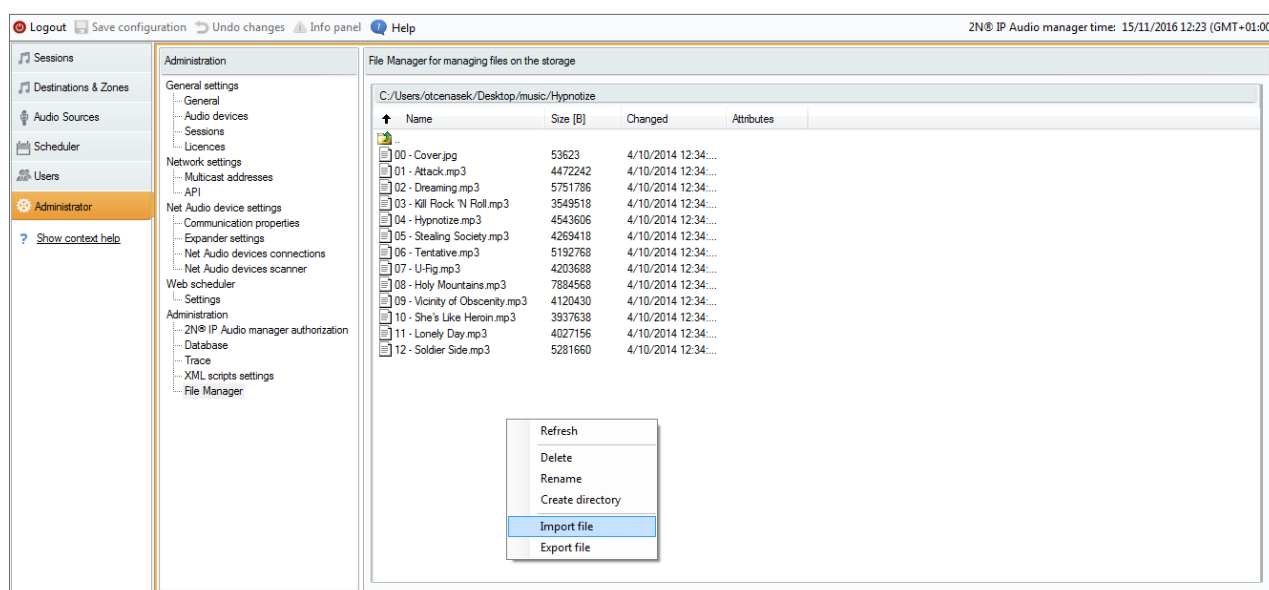


XML Script for Password Saving

File Manager

File manager allows you to manage the folders and files on your discs.

- **Refresh** – refresh the current path in the folder.
- **Delete** – delete a file/folder.
- **Rename** – rename a file/folder.
- **Create directory** – create a directory in the current folder.
- **Import file** – copy a file to the current folder.
- **Export file** – copy a file from the current folder.



File Manager

2N® IP Audio Web Scheduler

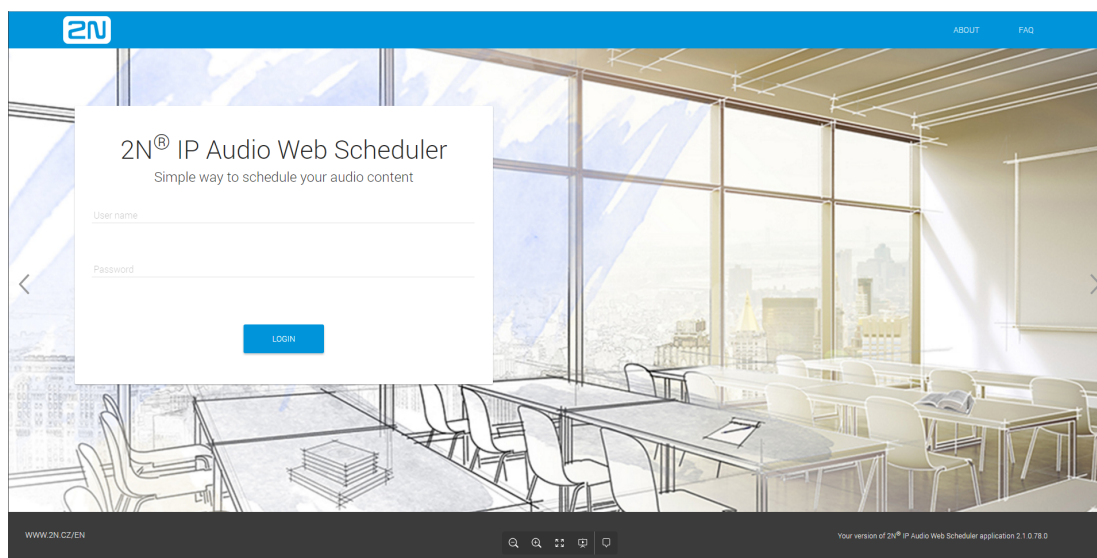
Good to know

- Make sure that you have been assigned a user name, password and proper rights by your system administrator via the Control Panel to log in to the Web Scheduler.
- Web Scheduler is available at https://manager_ip_address:4433 or <https://web.scheduler.cz:4433> if the network administrator sets a domain name for access.

2N® IP Audio Web Scheduler helps you create day plans for playlist control. You can schedule different times for events and load them to predefined destinations. An **event** consists of start time and the playlist to be played. Multiple playlists can be controlled via one day plan.

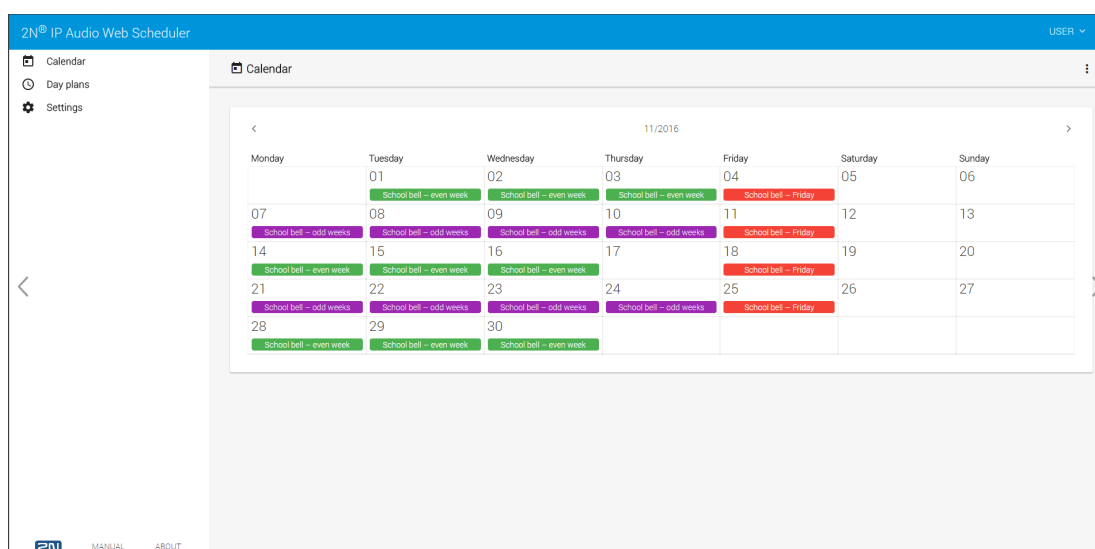
Login

Enter the address into the browser to display the login page. Enter your user name and password and confirm.

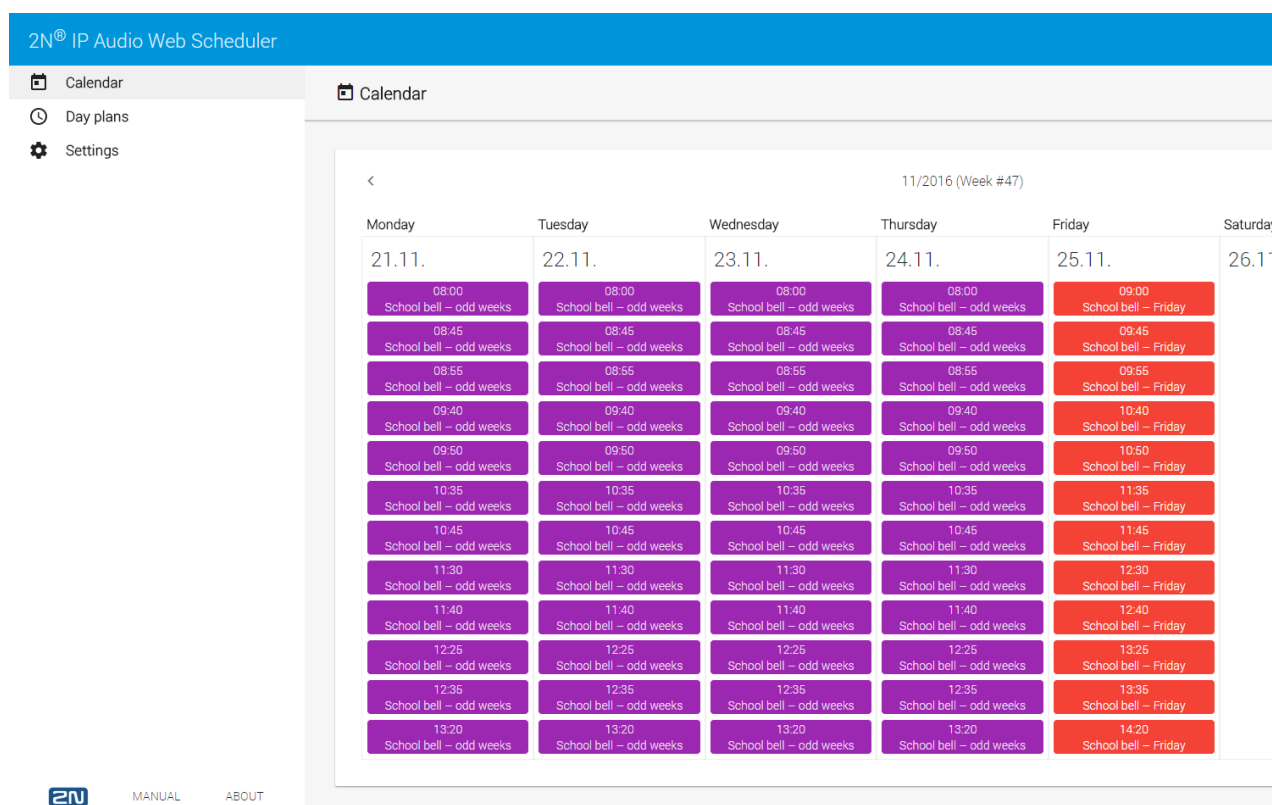


Calendar

View the calendar in a weekly or monthly mode. The month view shows the day plan events for each day of the month.



The week view displays the event time too. Click the event to display the day plan detail.



Day Plans

The Day plans menu displays a list of all daily plans created.

2N® IP Audio Web Scheduler

Calendar

Day plans

Settings

Day plans

Name ↑	Color	Priority
School bell – even week	GREEN	9
School bell – Friday	RED	9
School bell – odd weeks	PURPLE	9

2N

MANUAL

ABOUT

The list includes the following columns:

- Name – day plan name
- Colour – colour in the calendar
- Priority – day plan priority
- Delete – delete a day plan

Click a list row to display the day plan details.

Click  to create a new day plan.



Events



No item has been added



Destination

No item has been added



Recurrence

Start
18. 11. 2016

Recur every day

Recur every week



Exceptions

No item has been added



General properties

Name
ZacatekPriority
1

Add

Events



Events



Time	Type	Name	
09:00	Playlist	bell	
09:45	Playlist	bell	
09:55	Playlist	bell	
10:40	Playlist	bell	
10:50	Playlist	bell	
11:35	Playlist	bell	
11:45	Playlist	bell	
12:30	Playlist	bell	
12:40	Playlist	bell	
13:25	Playlist	bell	
13:35	Playlist	bell	
14:20	Playlist	bell	

- Time – event start time
- Type – even type (playlist only for now)
- Name – playlist name
- Delete

Click  to create a new event.

Click an event in the list to edit the event details.

Create event

Time
12:00

☒ Playlist

Select playlist

CANCEL

CREATE

Good to know

- As the whole playlist is always played, make sure that the playlist content is as long as the event duration.

Destination

- Name
- Delete

Click  to create a new destination.

Good to know

- You can add devices, zones or all destinations.

Add destination

☐ All Destinations

☐ Net Speaker stul

☐ Net Audio Decoder

☐ Net Speaker sit 27

☐ Net Audio Decoder Lite 1

☐ Emergency

☐ Net Audio Decoder 6

☐ Net Speaker konzole

☐ Net Speaker kulaty

☐ Net Speaker 3

☐ Net Audio Decoder Lite 4

☐ Net Audio Ondra stul

☐ Net Audio Decoder 8

☐ Net Audio Decoder 9

☐ Net Audio Decoder 10

☐ Net Audio Decoder Lite 3

☐ Net Audio Decoder Lite 5

☐ Net Speaker 4

☐ Net Audio Decoder 7

☐ New zone

CANCEL

ADD

Recurrence

 Recurrence



Start

31. 10. 2016

Recur in certain weekdays

Fr

Recur every week

Use the  icon or click any of the Recurrence parameters to set recurrence.

Start  31. 10. 2016 

- Daily recurrence

- Weekly recurrence

- Days in a week—

- ☐ Select All
- ☐ Monday
- ☐ Tuesday
- ☐ Wednesday
- ☐ Thursday
- ☒ Friday
- ☐ Saturday
- ☐ Sunday
- ☐ Holidays

CANCEL

UPDATE

 Exceptions +		
Date	Day plan	
28. 2. 2017	Apply	
1. 5.	Do not apply	
8. 5.	Do not apply	

- Date – exception date
- Day plan – apply/do not apply the day plan on this day
- Delete

Click  to create a new exception.

Click an exception in the list to edit the exception details.

Create exception



09. 02. 2017

Do you want to use the day plan on this day?

No

☒

Yes

☐
Apply every year

CANCEL

CREATE

- Exception date
- Apply/Do not apply the day plan on this day
- Apply every year

General Properties

General properties

Name

School bell – Friday

Priority

9

RED

- Name – day plan name
- Priority – day plan playing priority
- Colour – day plan colour in the calendar



Note

- Do not set identical priority values (including sessions) to avoid unwanted behaviour.

Use the  icon, click any of the General properties or click the colour mark in the right-hand upper corner to set recurrence.

General properties



Name

School bell – Friday

Priority

9

Color

Red



COLOR PREVIEW

CANCEL

UPDATE

Setting

The menu consists of the following two sections:

- Holidays – define holidays
- User account – language (English or Czech) and calendar (Show weekends in the Calendar) settings

Holidays

Click  to add a holiday. Click a holiday in the list to edit the holiday details.

2N® IP Audio Web Scheduler

 Calendar

 Day plans

 Settings

 Settings

 Holidays

Date

17. 11.

24. 12.

25. 12.

 User account

Language

English

 Show weekends in the Calendar: Yes

 [MANUAL](#) [ABOUT](#)

Configuring 2N Net Audio device via Telnet Server

By default, the parameters have the following factory values:

Parameter	Value
General	
SpkClient	1 (ON)
SpkSearch	1 (ON)
SpkVolume	1024
SpkDomain	Value is empty until set
SpkDescr	Value is empty until device is connected to server
SpkV01Dwgrd	0
SpkKeyVolOn	1
Ethernet	
DHCPClient	1 (ON)
StatIPAddr	192.168.1.100
StatIPMask	255.255.255.0
StatIPGate	192.168.1.1
Server	
UserName	Server
Password	-

Parameter	Value
Client	
SrvIPAddr	192.168.1.2
SrvTCPPort	6999
SrvUserName	Speaker
SrvPassword	-
ScannerIpAddr	239.255.254.1
ScannerUdpPort	6996
Rtp	
RtpEnable	0
RtpRawUdp	0
RtpDstIPAddr	239.0.0.10
Rtp DstPort	4242
Rtp SrcIPAddr	0.0.0.0
Rtp SrcPort	0
RtpPriority	0
RtpDropoutTout	5000
SdOffline	
SdOfflinePriority	0
SdOfflineEnable	0

Parameter	Value
SdOfflinePlaylist	0
SdLogInput0	
SdLogInput0Priority	0
SdLogInput0Enable	0
SdLogInput0Playlist	1
Ssh	
SshEn	1

Use the integrated Telnet server for basic **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** settings. For connection, use any Telnet Client application downloaded from the Internet, for example. By default, the Telnet server listens at port 23.

Basic Parameter Settings

When the connection has been established, **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** displays its serial number and the current firmware version. Enter the password, which is equal to the connection authorisation password from the **2N[®] IP Audio Manager** (i.e. **Password** parameter).

Telnet Commands to 2N[®] Net Audio Decoder or 2N[®] Net Speaker

2N[®] Net Audio Decoder or **2N[®] Net Speaker** can be controlled using the commands included in the table below. Enter the LC characters only, separate parameters, if any, with a space and confirm every row with Enter.

help	This command displays the list of available commands.
set (parameter) (value)	This command sets the parameter to a selected value. Example: set DHCPClient 1
get (parameter)	This command displays the current parameter value. Example: get DHCPClient
print	This command writes out all parameters including values.
exit	This command quits connection with the Telnet server.
reboot	This command resets the equipment.
factory	This command makes factory reset of 2N[®] Net Audio Decoder or 2N[®] Net Speaker .

**Upozornění**

- Once reboot (restart) is executed and **2N[®] IP Audio Manager** is connected, the parameters are overwritten according to the **2N[®] IP Audio Control Panel** unit. Changes made via Telnet are not transmitted to the **2N[®] IP Audio Manager** and the **2N[®] IP Audio Manager** settings are always preferred to those made via Telnet.

List of Parameters

- SpkClient**

- 2N[®] Net Audio Decoder** or **2N[®] Net Speaker** is connecting actively to the **2N[®] IP Audio Manager**. Remember to set the **SrvIPAddr** and **SrvTCPPort** parameters correctly if 1 is selected.
- Setting options:

0	2N[®] Net Audio Decoder or 2N[®] Net Speaker passive mode. The server connection is initiated by the 2N[®] IP Audio Manager .
1	2N[®] Net Audio Decoder or 2N[®] Net Speaker active mode. The server connection is initiated by 2N[®] IP Audio Manager .

- Default setting: 1

- SpkSearch**

- 2N[®] Net Audio Decoder** or **2N[®] Net Speaker** is searching for the **2N[®] IP Audio Manager** in the network and uses the Server's domain.
- Setting options:

0	Searchmode is disabled
1	Searchmode is enabled

- Default setting: 1

- **SpkVolume**
 - Volume settings for **2N[®] Net Audio Decoder** or **2N[®] Net Speaker**, where 0 is the minimum and 4096 the maximum value.
 - Default setting: 1024
- **SpkDomain**
 - Domain settings used by **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** for communication.
 - Default setting:

Poznámka

- If there is just one **2N[®] IP Audio Manager** in the network, domains need not be set for the units.

- **SpkDescr**
 - Descr is an optional parameter describing **2N[®] Net Audio Decoder** or **2N[®] Net Speaker**. It is possible to use any string.
 - Default setting: *MAC address*
- **SpkKeyVolOn**
 - The parameter sets whether the hardware buttons on the unit are used for volume or channel control.
 - Default setting: 1
- **DHCPClient:**
 - The parameter enables/disables automatic obtaining of network parameter settings from the DHCP server in the LAN.
 - Setting options:

0	Automatic network parameter obtaining is disabled. Use manual settings: StatIPAddr , StatIPMask and StatIPGate .
1	Automatic network parameter obtaining is enabled.
 - Default setting: 1
- **StatIPAddr**
 - **2N[®] Net Audio Decoder** or **2N[®] Net Speaker** static IP address. Use this setting if **DHCPClient** is set to 0.

- Default setting: 192.168.1.100
- **StatIPMask**
 - Network mask for static IP address setting. Use this setting if **DHCPClient** is set to 0.
 - Default setting: 255.255.255.0
- **StatIPGate**
 - Default gateway for packets routed outside the LAN. Use this setting if **DHCPClient** is set to 0.
 - Default setting: 192.168.1.1
- **Password**
 - **2N[®] Net Audio Decoder** or **2N[®] Net Speaker's** own password for authorising connection initiated by the **2N[®] IP Audio Manager**. The same password must be stored in the **2N[®] IP Audio Manager** global settings and must be identical for all **2N[®] Net Speaker** units in the system. This password is used for Telnet server connection authorization too.
 - Default setting: No password
- **SrvIPAddr**
 - **2N[®] IP Audio Manager** IP address. Use the setting in the active mode, i.e. if SpkClient 1.
 - Default setting: 192.168.1.1
- **SrvTCPPort**
 - **2N[®] IP Audio Manager** communication port. Use the setting in the active mode, i.e. if SpkClient 1.
 - Default setting: 6999
- **SrvPassword**
 - **2N[®] IP Audio Manager** connection authorisation password. Used both in the active and passive modes of **2N[®] Net Audio Decoder** or **2N[®] Net Speaker**. The password must be identical with the **2N[®] IP Audio Manager** password.
 - Default setting: No password
- **ScannerIpAddr**
 - Multicast address used for the **2N[®] IP Audio Control Panel** scanner.

- Default setting: 239.255.254.1
- **ScannerUdpPort**
 - Port used for 2N[®] IP Audio Control Panel scanner.
 - Default setting: 6996

**Warning**

- Change **ScannerIpAddr** in exceptional cases only (multicast IP address collision, e.g.). Make the change for every unit and 2N[®] IP Audio Control Panel to avoid the 2N[®] IP Audio Control Panel scanner malfunction (units would be invisible to the scanner).

- **RtpEnable**
 - Enable/disable direct RTP stream receiving for 2N[®] Net Audio Decoder or 2N[®] Net Speaker: 0 – disable, 1 – enable.
 - Default setting: 0
- **RtpRawUdp**
 - Enable/disable direct UDP stream receiving for 2N[®] Net Audio Decoder or 2N[®] Net Speaker: 0 – disable, 1 – enable.
 - Default setting: 0
- **RtpDstIPAddr**
 - Set the RTP stream target address for 2N[®] Net Audio Decoder or 2N[®] Net Speaker.
 - Default setting: 239.0.0.10
- **RtpDstPort**
 - Set the target RTP stream port.
 - Default setting: 4242
- **RtpSrcIPAddr**
 - Set the RTP stream source IP address to ignore streams from other IP addresses.
 - Default setting: 0.0.0.0
- **RtpSrcPort**
 - Set the RTP stream source port if **RtpSrcIPAddr** has been changed.

- Default setting: 0
- **RtpPriority**
 - Set the RTP stream priority.
 - Default setting: 0

**Warning**

- Do not set identical **priority** values (including sessions) to avoid unwanted behaviour.

- **RtpDropoutTout**
 - Set the RTP stream failure timeout (**ms**) after which the unit moves to another (top priority) source.
 - Default setting: 5000
- **SdOfflinePriority**
 - Set the SD card playing priority in case of connection failure. Setting options: 1-9.
 - Default setting: 0
- **SdOfflineEnable**
 - Enable/disable SD card playing in case of connection failure: 0 – disable, 1 – enable.
 - Default setting: 0
- **SdOfflinePlaylist**
 - Set the playlist to be used. Setting options: 0-3.
 - Default setting: 0
- **SdLogInputOPriority**
 - Set the playing priority if logic input is activated. Setting options: 1-9.
 - Default setting: 0
- **SdLogInputOEnable**
 - Enable/disable playing if logic input is activated: 0 – disable, 1 – enable.
 - Default setting: 0
- **SdLogInputOPlaylist**
 - Set the playlist to be used. Setting options: 0-3.
 - Default setting: 1
- **SshEn**
 - Enable/disable ssh access (only if the hardware allows so): 0 – disable, 1 – enable.
 - Default setting: 0

**Warning**

- Do not change **SshEn** as the ssh access is used for servicing purposes only.

- **Examples direct RTP stream:**

- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:std{access=udp,mux=raw,dst=239.0.0.10:4242} :sout-all :sout-keep`
- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:std{access=udp,mux=raw,dst=192.168.3.224:4242} :sout-all :sout-keep`
- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:std{access=udp,mux=raw,dst=192.168.3.224:4242} :sout-all :sout-keep`
- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:rtp{dst=239.0.0.10,port=4242,ttl=1} :sout-all :sout-keep`
- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:rtp{dst=192.168.3.224,port=4242,ttl=1} :sout-all :sout-keep`
- `:sout=#transcode{vcodec=none,acodec=mp3,ab=128,channels=2,samplerate=44100}:rtp{dst=192.168.3.224,port=4242,ttl=1} :sout-all :sout-keep`

HW Description

This section provides you with full HW description of the **2N IP Audio** devices.

Here is what you can find in this section:

- 2N® Net Audio Decoder
- 2N® Net Audio Decoder Lite
- 2N® Net Audio Decoder Lite PCB
- 2N® Net Audio Decoder mono PCB
- 2N® Net Audio Encoder
- 2N® Net Mic
- 2N® Net Speaker

2N® Net Audio Decoder



2N® Net Audio Decoder – Basic Unit, Part No. 914010E

Accessories:

- PoE injector, Part No. 91378100x (E – Europe, US – USA)
- 12 V DC / 2 A adapter, Part No. 914102x (E – Europe, GB – Great Britain, US – USA)
- Mounting set for Net Audio Decoder/ Net Audio Decoder Lite, Part No. 914105E

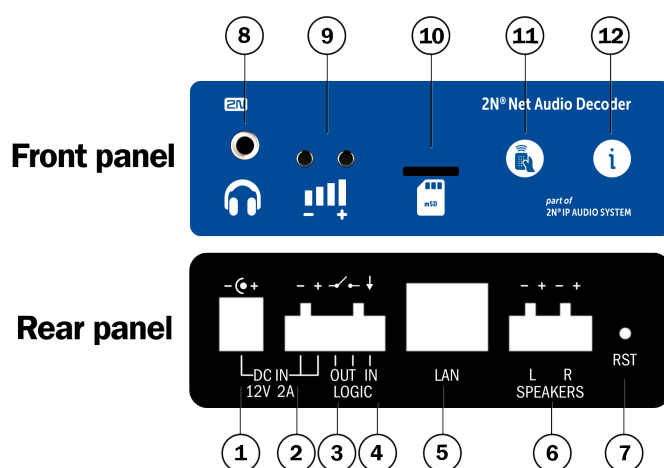
Package Contents:

- 1 2N® Net Audio Decoder
- 2 green terminal boards (5 pins, 4 pins)
- 4 rubber self-adhesive feet
- Start manual

Product Description

2N IP Audio System is an IP audio system which allows you to play an acoustic message or any other audio stream from any LAN/WAN – connected PC. It communicates with the 2N® IP Audio Manager, receives the audio stream, decodes it

and converts it into an analogue signal. **2N[®] Net Audio Decoder** is equipped with an integrated 14W amplifier for direct (loud)speaker connection. **2N[®] Net Audio Decoder** can be controlled by two front panel buttons or an infrared remote controller. **2N[®] Net Audio Decoder** is equipped with a digital input and output, which extend the converter options and may be helpful in special applications. **2N[®] Net Audio Decoder** helps you extend the internal FLASH memory using microSD memory cards. Use the integrated Telnet server to make basic settings for your **2N[®] Net Audio Decoder** LAN connection (refer to the Basic Parameter Settings). Apply the **2N IP Audio System** software for configuration and use of all functions (refer to the **2N[®] Net Audio Decoder Quick Start** and **2N IP Audio Administration** manuals for more details).



2N[®] Net Audio Decoder – Front and Rear Panel

1. 12 V DC / 2 A power supply adapter connector
2. Alternative power supply connection terminals
3. Relay output with galvanic isolation for external 24 V / 1 A AC/DC load switching
4. Digital input 5–24 V (without galvanic isolation) for external sensor/button, etc.
5. 10/100BASE-TX LAN RJ-45 connector
6. Integrated amplifier output terminals for 1 or 2 loudspeakers
7. RESET button
8. Headphone/line output for standard headphones/external amplifier
9. Universal buttons with programmable functions

- 10. MicroSD card slot for higher internal memory capacity
- 11. Infrared signal receiver for remote control
- 12. Operational status colour LED indicators

2N[®] Net Audio Decoder Parameters

Parameter	Value
Dimensions	105 x 34 x 86 mm
Dimensions (incl. L-profiles)	130 x 34 x 86 mm
Weight	300 g
External power supply	12 V DC / 2 A
LAN supply	PoE IEEE 802.3af
Status signalling	LED on front panel
Local control	2 buttons on front panel
Remote control	infrared sensor on front panel
LAN connection	RJ/45 connector on back panel, TX with Auto-MDIX function
Power amplifier output	4 terminals on back panel, STEREO/MONO with auto detection
Frequency range	20 Hz - 20 kHz (+/- 0.5dB)
Harmonic distortion	0.05 % @ 1 kHz

Parameter	Value
Signal-to-noise ratio	91 dB
Headphone/Line output	STEREO 3.5 mm jack on front panel
VRMS	1.25 VRMS
Impedance	60 Ω
Volume control gain	-80 to 0 dB
Digital output	24 V 1 A AC/DC relay output, galvanically isolated
Digital input	5 to 24 V DC digital input, galvanically non-isolated
Memory capacity extension	MicroSD card slot on front panel
Sound compression	MPEG-1 Audio Layer II (MP2)
Bandwidth	32-320 kbps



Caution

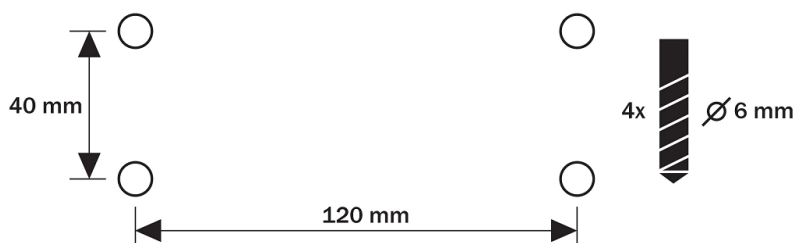
- Be sure to connect the **2N[®] Net Audio Decoder** power supply as the last step. The same applies to PoE supply from the LAN.

Installation

If you intend to use your **2N[®] Net Audio Decoder** unit in various interiors, please stick the four feet included in the delivery onto the bottom side of the device to avoid scratching of the underlying surface.

Surface Mounting:

Use the L-profiles (Part No. 914105E) to mount your **2N[®] Net Audio Decoder** unit on a wall or another solid surface. Insert the L-profiles in the sides of the assembly and fit them with four screws to keep the device in place. You can use the dowels and screws included in the delivery. Follow the instructions below while drilling the mounting holes.



2N[®] Net Audio Decoder – Mounting Holes

- Electric Installation
- Electric Installation Step by Step

It is very easy to connect **2N[®] Net Audio Decoder** electrically. Follow the steps below to avoid equipment damage or electrical injury:

1. Connect the loudspeaker, headphones or an external amplifier.
2. Connect the digital input and output.
3. Insert the microSD card.
4. Connect the UTP cable.
5. Connect a 12 V power supply (unless PoE is used).

Loudspeaker Connection

2N[®] Net Audio Decoder is equipped with a power amplifier for 1 (MONO) or 2 (STEREO) loudspeakers. The speakers to be used must have the nominal impedance of 4 Ω – 16 Ω . Possible configurations and related maximum power outputs (sinus, THD < 1%) are included in the table below:

Loudspeaker	12 V / 2 A Supply	PoE Supply
2x 4 Ohm STEREO	2x 2.5 W	2x 2.5 W
2x 8 Ohm STEREO	2x 7 W	2x 4 W
2x 16 Ohm STEREO	2x 4 W	2x 4 W
4 Ohm MONO	1x 14 W	1x 8 W
8 Ohm MONO	1x 8 W	1x 8 W

Use the 2N[®] Net Audio Decoder back panel terminals marked L + and L - for the left channel and R + and R - for the right channel. Use the left channel terminals for the MONO mode.

Headphone/External Amplifier Connection

2N[®] Net Audio Decoder is equipped with a headphone/external amplifier connector. The 3.5 mm jack is available on the front panel.

Digital Input and Output

2N[®] Net Audio Decoder is equipped with a relay switch for light signalling/external amplifier/alarm/activation. The **output** is available on terminals marked LOGIC OUT and allows for switching of up to 24 V / 1 A AC/DC loads. Program the output either as N/O (normally open) or N/C (normally closed).

Warning

- Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.

2N[®] Net Audio Decoder is equipped with a digital **input** for an optional button, sensor of movement or other applications. This input is available on the LOGIC IN terminal. From 5 to 24 V DC voltage can be applied to the input against the ground terminal marked DC IN -. In the case of an external button, the DC IN + terminal can be used, see the figure below.

Warning

- Do not exceed the maximum voltage values (24 V) applied to the LOGIC IN input to avoid irreversible damage of the equipment.



2N[®] Net Audio Decoder – Logical Input

Memory Card

2N[®] Net Audio Decoder is equipped with a microSD card slot for storing music or voice in case the equipment is not connected to the LAN permanently or temporarily. The microSD card slot is available on the **2N[®] Net Audio Decoder** front panel.

2N[®] Net Audio Decoder Status Indicator (LED)

LED Colour	LED Status	Meaning
Yellow	shining	2N [®] Net Audio Decoder is booting or restarting
Green	shining	2N [®] Net Audio Decoder is playing audio from 2N [®] IP Audio Manager
Violet	shining	2N [®] Net Audio Decoder is playing audio from SD card
Violet	flashing	2N [®] Net Audio Decoder is loading SD card
Green	flashing slowly 3 times	2N [®] Net Audio Decoder has loaded SD card successfully
Blue	flashing	2N [®] Net Audio Decoder is ready, but not connected to server
Blue	shining	2N [®] Net Audio Decoder is ready and connected to server
Yellow	flashing	2N [®] Net Audio Decoder is upgrading or starting from default after factory reset
Orange	flashing fast	Volume + / - / infra
Orange	flashing slowly 3 times	Blink
Orange	shining	2N [®] Net Audio Decoder is in MUTE state

2N[®] Net Audio Decoder Connection

2N[®] Net Audio Decoder can be connected to a standard local area network using a LAN interface via the RJ-45 connector on the back panel. Always use CAT-5d or higher class cables for reliability reasons. The LAN interface is equipped with the Auto MDIX function for automatic detection of a straight or crossed cable.

The LAN interface can also be used for the 2N[®] Net Audio Decoder power supply through active network elements or injectors meeting the IEEE 802.3af standard.

Note: With PoE, the integrated amplifier power output is limited to 8 W. To utilise the maximum power output of the amplifier, feed 2N[®] Net Audio Decoder from an external 12 V DC / 2 A power supply.

Caution

- With PoE, the integrated amplifier power output is limited to 8 W. To utilise the maximum power output of the amplifier, feed 2N[®] Net Audio Decoder from an external 12 V DC / 2 A power supply.

2N[®] Net Audio Decoder can be fed using active network elements or PoE injectors via the LAN interface. In case this option is unavailable, use a 12 V DC / 2 A (Part No. 914102E) power supply, or another power supply on condition that you keep the nominal values included in the Electric Parameters subsection.

Connect the 12 V DC power supply either to the back panel supply connector marked DC IN, or terminals marked DC IN + and DC IN -.

Warning

- If you use an adapter other than the recommended one, do not exceed the nominal supply voltage value of 12 V. Also make sure that the supply voltage polarity is correct. Exceeding nominal values and/or incorrect connection may lead to irreversible damage of the equipment.

2N[®] Net Audio Decoder Factory Reset

In some cases, it may be useful to reset the 2N[®] Net Audio Decoder factory values using the RESET button on the back panel. Do this, for example, if 2N[®] Net Audio Decoder ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Use a thin rigid tool to press the RESET button on the back panel.
2. Keep the RESET button pressed (for approx. 15 s).
3. Release the button as soon as the LED starts shining violet. This operation takes about 50 s. Do not disconnect the device from power supply during this period.

Firmware Upgrade

The 2N[®] Net Audio Decoder firmware upgrade starts automatically whenever 2N[®] Net Audio Decoder gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104° F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N® Net Audio Decoder Lite



2N® Net Audio Decoder Lite – Basic Unit, Part No. 914013E

Accessories:

- 12 V DC / 2 A adapter, Part No. 914102x (E – Europe, GB – Great Britain, US – USA)
- Mounting set for Net Audio Decoder / Net Audio Decoder Lite, Part No. 914105E

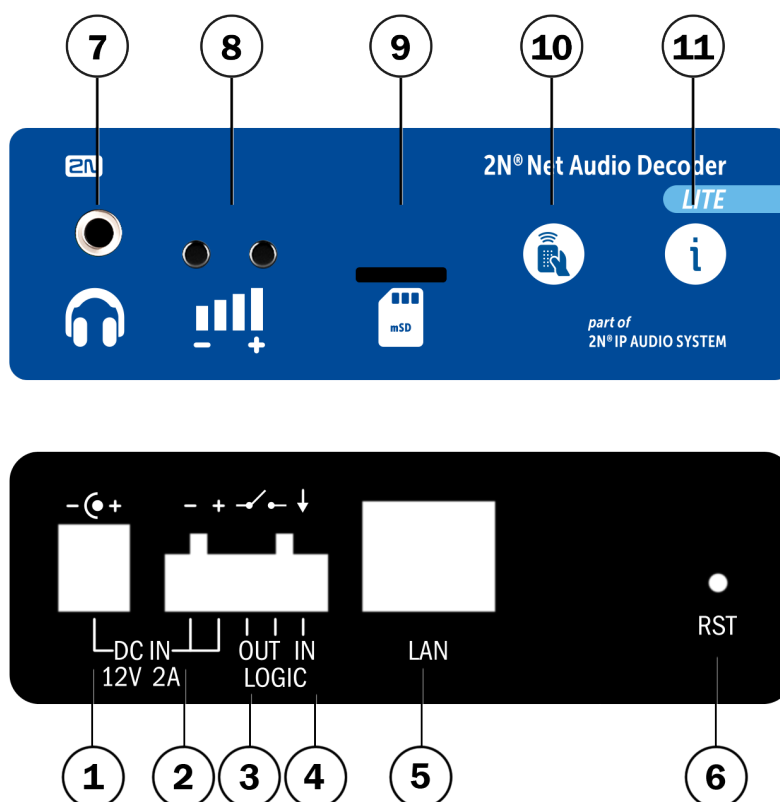
Package Contents:

- 1 2N® Net Audio Decoder
- 1 green terminal board (5 pins)
- 4 rubber self-adhesive feet
- S t a r t m a n u a l

Product Description

2N® Net Audio Decoder Lite is a LAN audio converter designed for public sound distribution through the 2N IP Audio System. It is connected to the 2N IP Audio System via the local area network (LAN). It communicates with the 2N® IP Audio Manager,

receives the audio stream, decodes it and converts it into an analogue signal. **2N[®] Net Audio Decoder Lite** can be controlled by two front panel buttons or an infrared remote controller. **2N[®] Net Audio Decoder Lite** is equipped with a digital input and output, which extend the converter options and may be helpful in special applications. **2N[®] Net Audio Decoder Lite** helps you extend the internal FLASH memory using microSD memory cards. Use the integrated Telnet server to make basic settings for connection of **2N[®] Net Audio Decoder Lite** into the LAN (refer to the Basic Parameter Settings). Apply the **2N IP Audio System** software for configuration and use of all functions (refer to the **2N[®] Net Audio Decoder Quick Start** and **2N IP Audio Administration manuals** for more details).



2N[®] Net Audio Decoder Lite Front and Rear Panel

1. 12 V DC / 2 A power supply adapter connector
2. Alternative power supply connection terminals
3. Relay output with galvanic isolation for external 24 V / 1 A AC/DC load switching
4. Digital input 5–24 V (without galvanic isolation) for external sensor/button, etc.

5. 10/100BASE-TX LAN RJ-45 connector
6. RESET button
7. Headphone/line output for standard headphones/external amplifier
8. Universal buttons with programmable functions
9. MicroSD card slot for higher internal memory capacity
10. Infrared signal receiver for remote control
11. Operational status colour LED indicators

2N[®] Net Audio Decoder Lite Parameters

Parameter	Value
Dimensions	105 x 34 x 86 mm
Dimensions (incl. L-profiles)	130 x 34 x 86 mm
Weight	300 g
External power supply	12 V DC / 2 A
LAN supply	not supported
Status signalling	LED on front panel
Local control	2 buttons on front panel
Remote control	infrared sensor on front panel
LAN connection	RJ-45 connector on back panel, TX with Auto-MDIX function
Power amplifier output	not supported

Parameter	Value
Frequency range	20 Hz – 20 kHz (+/- 0.5 dB)
Harmonic distortion	0.05% @ 1 kHz
Signal-to-noise ratio	91 dB
Headphone/Line output	STEREO 3.5mm jack on front panel
VRMS	1.25 VRMS
Impedance	60 Ω
Volume control gain	-80 to 0 dB
Digital output	24 V 1 A AC/DC relay output, galvanically isolated
Digital input	5 to 24 V DC digital input, galvanically non-isolated
Memory capacity extension	microSD card slot on front panel
Sound compression	MPEG-1 Audio Layer II (MP2)
Bandwidth	32–320 kbps



Caution

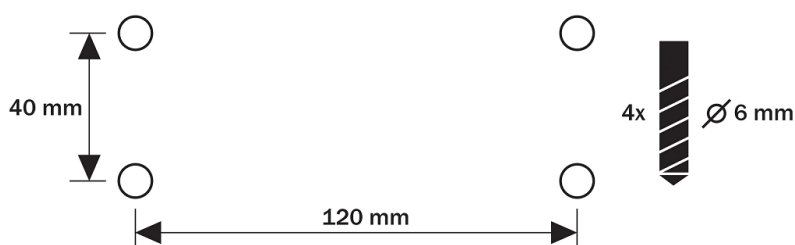
- Be sure to connect the 2N[®] Net Audio Decoder Lite power supply as the last step.

Installation

If you intend to use your **2N[®] Net Audio Decoder Lite** unit in various interiors, please stick the four feet included in the delivery onto the bottom side of the device to avoid scratching of the underlying surface.

Surface Mounting:

Use the L-profiles (order no. 914105E) to mount your **2N[®] Net Audio Decoder Lite** unit on a wall or another solid surface. Insert the L-profiles in the sides of the assembly and fit them with four screws to keep the device in place. You can use the dowels and screws included in the delivery. Follow the instructions below while drilling the mounting holes.



2N[®] Net Audio Decoder Lite Mounting Holes

Electric Installation:

It is very easy to connect **2N[®] Net Audio Decoder Lite** electrically. Follow the steps below to avoid equipment damage or electrical injury:

1. Connect the speaker, headphones or an external amplifier.
2. Connect the digital input and output.
3. Insert the microSD card.
4. Connect the UTP cable.
5. Connect a 12 V power supply.

Headphone/External Amplifier Connection

2N[®] Net Audio Decoder Lite is equipped with a headphone/external amplifier connector. The 3.5 mm jack is available on the front panel.

Digital Input and Output

2N[®] Net Audio Decoder Lite is equipped with a relay switch for light signalling /external amplifier/alarm/activation. The **output** is available on terminals marked LOGIC OUT and allows for switching of up to 24 V / 1 A AC/DC loads. Program the output either as N/O (normally open) or N/C (normally closed).

Warning

- Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.

2N[®] Net Audio Decoder Lite is equipped with a digital **input** for an optional button, sensor of movement or other applications. This input is available on the LOGIC IN terminal. From 5 to 24 V DC voltage can be applied to the input against the ground terminal marked DC IN -. In the case of external button, the DC IN + terminal can be used, see the figure below.

⚠ Warning

- Do not exceed the maximum voltage values (24 V) applied to the LOGIC IN input to avoid irreversible damage of the equipment.



2N[®] Net Audio Decoder Lite Logical Input

Memory Card

2N[®] Net Audio Decoder Lite is equipped with a microSD card slot for storing music or voice in case the equipment is not connected to the LAN permanently or temporarily. The microSD card slot is available on the 2N[®] Net Audio Decoder Lite front panel.

2N[®] Net Audio Decoder Status Indicator (LED)

LED Colour	LED Status	Meaning
Yellow	shining	2N [®] Net Audio Decoder is booting or restarting
Green	shining	2N [®] Net Audio Decoder is playing audio from 2N [®] IP Audio Manager

LED Colour	LED Status	Meaning
Violet	shining	2N [®] Net Audio Decoder is playing audio from SD card
Violet	flashing	2N [®] Net Audio Decoder is loading SD card
Green	flashing slowly 3 times	2N [®] Net Audio Decoder has loaded SD card successfully
Blue	flashing	2N [®] Net Audio Decoder is ready, but not connected to server
Blue	shining	2N [®] Net Audio Decoder is ready and connected to server
Yellow	flashing	2N [®] Net Audio Decoder is upgrading or starting from default after factory reset
Orange	flashing fast	Volume + / - / infra
Orange	flashing slowly 3 times	Blink
Orange	shining	2N [®] Net Audio Decoder is in MUTE state

Power Supply Connection

2N[®] Net Audio Decoder Lite can be connected to a standard local area network using a LAN interface via the RJ-45 connector on the back panel. Always use CAT-5d or higher class cables for reliability reasons. The LAN interface is equipped with the Auto MDIX function for automatic detection of a straight or cross-over cable.

2N[®] Net Audio Decoder Lite can be fed using a 12 V DC / 2 A (Part No. 914102E) power supply, or another power supply on condition that you keep the nominal values included in the Electric Parameters subsection.

Connect the 12V DC power supply either to the back panel supply connector marked DC IN, or terminals marked DC IN + and DC IN -.

 Warning

- If you use an adapter other than the recommended one, do not exceed the nominal supply voltage value of 12 V. Also make sure that the supply voltage polarity is correct. Exceeding nominal values and/or incorrect connection may lead to irreversible damage of the equipment.

2N[®] Net Audio Decoder Lite Factory Reset

In some cases, it may be useful to reset the 2N[®] Net Audio Decoder Lite factory values using the RESET button on the back panel. Do this, for example, if 2N[®] Net Audio Decoder Lite ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

- a. Use a thin rigid tool to press the RESET button on the back panel.
 - b. Keep the RESET button pressed (for approx. 15 s).
 - c. Release the button as soon as the LED starts shining violet.

This operation takes about 50 s. Do not disconnect the device from power supply during this period.

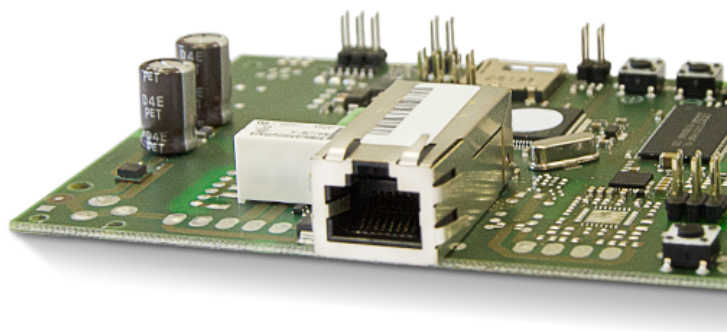
Firmware Upgrade

2N[®] Net Audio Decoder Lite firmware upgrade starts automatically whenever 2N[®] Net Audio Decoder Lite gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104 °F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N[®] Net Audio Decoder Lite PCB



2N[®] Net Audio Decoder PCB, Part No. 914053E

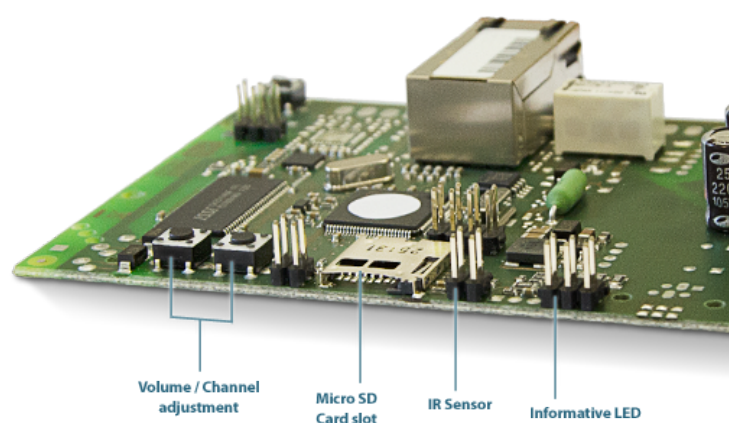
Accessories:

- 12 V / 2 A DC adapter, Part No. 914102x (E – Europe, GB – Great Britain, US – USA)

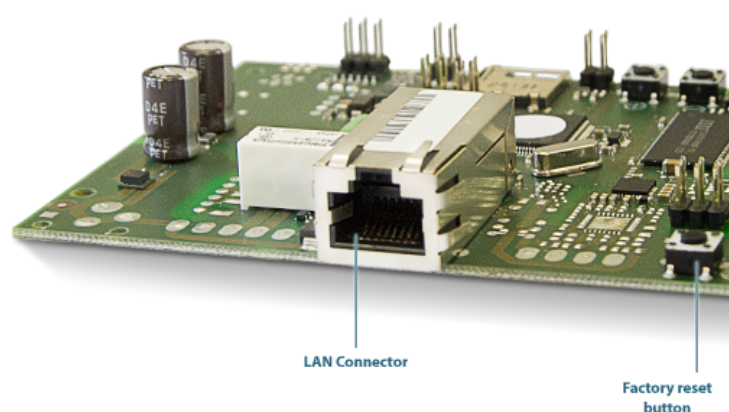
Product Description

The 2N[®] Net Audio Decoder Lite PCB is a LAN audio converter designed for public sound distribution through the 2N IP Audio System. It is connected to the 2N IP Audio System via the local area network (LAN). It communicates with the 2N[®] IP Audio Manager, receives the audio stream, decodes it and converts it into an analogue signal. The 2N[®] Net Audio Decoder Lite PCB can be controlled by two buttons in the front or an infrared remote controller. The 2N[®] Net Audio Decoder Lite PCB is equipped with a digital input and output, which extend the converter options and may be helpful in

special applications. The 2N[®] Net Audio Decoder Lite PCB helps you extend the internal FLASH memory using microSD memory cards. Apply the 2N IP Audio System software for configuration and use of all functions (refer to the 2N[®] Net Audio Decoder Quick Start and 2N IP Audio Administration manuals for more details).



2N[®] Net Audio Decoder Lite PCB Front View



2N[®] Net Audio Decoder Lite PCB Back View

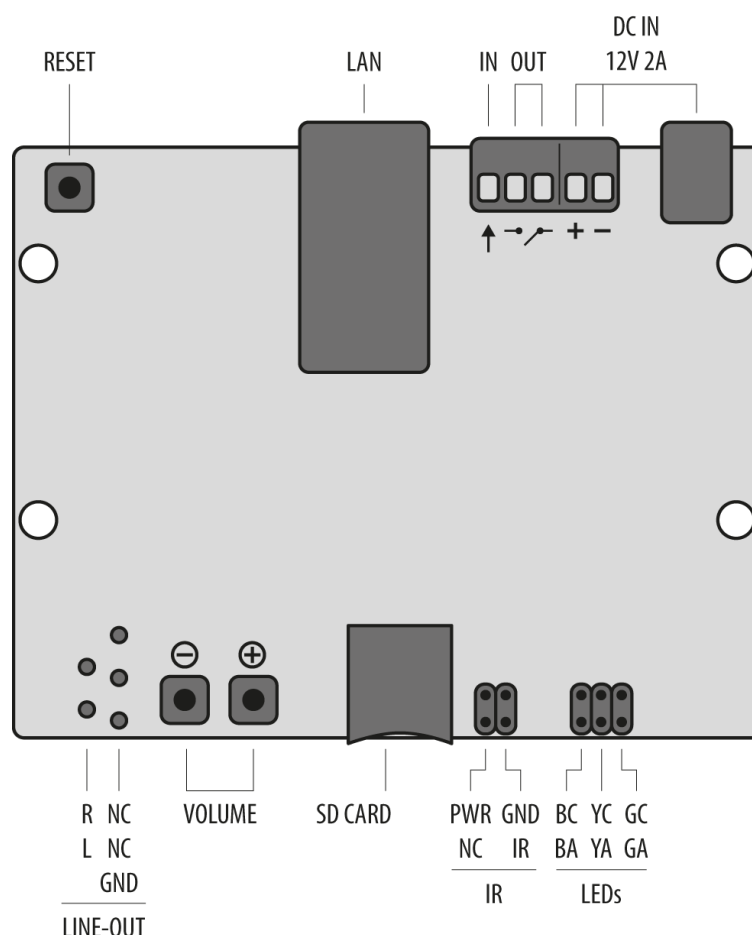
2N[®] Net Audio Decoder Lite PCB Parameters

Parameters	Value
Board dimensions	100 x 80 x 15 mm
External power supply	12 V DC / 2 A
LAN supply	not supported
Status signalling	LED at the front
Local control	2 buttons at the front
Remote control	infrared sensor at the front
Headphone/Line output	3.5 mm stereo jack at the front
LAN connection	RJ-45 connector at the back, TX with Auto-MDIX function
Power amplifier output	not supported
Frequency range	20 Hz - 20 kHz (+/- 0.5 dB)
Harmonic distortion	0.05% @ 1 kHz
Signal-to-noise ratio	91 dB

Parameters	Value
Digital output	24 V 1 A AC/DC relay output, galvanically isolated
Digital input	5 to 24 V DC digital input, galvanically non-isolated
External memory	MicroSD card slot at the front
Sound compression	MPEG-1 Audio Layer II (MP2)
Bandwidth	32–320 kbps

Installation

View of the 2N[®] Net Audio Decoder Lite PCB inputs/outputs:



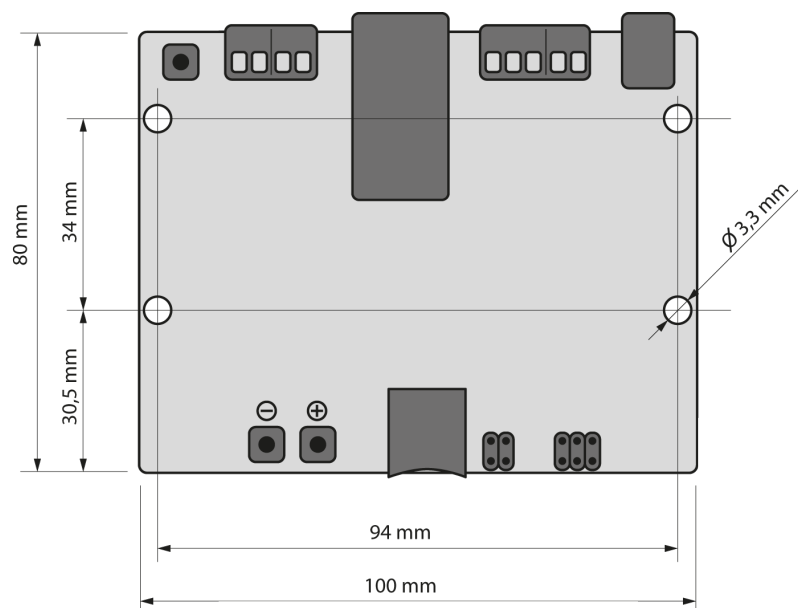
Description of 2N[®] Net Audio Decoder Lite PCB Motherboard Connectors and Inputs

- 12 V / 2 A DC power supply adapter connector
- Alternative power supply connection terminals
- Relay output with galvanic isolation for external 24 V / 1 A AC/DC load switching
- Digital input 5–24 V (without galvanic isolation) for external sensor/button, etc.
- 10/100BASE-TX LAN RJ-45 connector
- RESET button
- Line output for external amplifier
- Universal buttons with programmable functions (volume/channel)
- MicroSD card slot for higher internal memory capacity
- Infrared signal receiver for remote control
- Operational status colour LED indicator

**Caution**

- You are advised to make the Reset button accessible to the user for factory reset.

Mounting Hole Spacing and Motherboard Size



2N[®] Net Audio Decoder Lite PCB Mounting Hole Spacing and Motherboard Size

Electric Installation

It is very easy to connect 2N[®] Net Audio Decoder Lite PCB electrically. Follow the steps below to avoid equipment damage or electrical injury:

1. Connect the audio signal output with an external amplifier.
2. Connect the digital input and output.
3. Insert the microSD card.
4. Connect the UTP cable.
5. Connect a 12 V power supply.

Digital Input and Output

The 2N[®] Net Audio Decoder Lite PCB is equipped with a relay switch for light signalling/external amplifier/alarm/activation. The **output** is available on terminals marked LOGIC OUT and allows for switching of up to 24 V / 1 A AC/DC loads. The relay is controlled by the audio stream sent to the 2N[®] Net Audio Decoder Lite PCB.

 Warning:

Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.

The 2N[®] Net Audio Decoder Lite PCB is equipped with a digital **input** for an optional button, sensor of movement or other applications. This input is available on the LOGIC IN terminal. 5 to 24 V DC voltage can be applied to the input against the ground terminal marked DC IN-. In the case of external button, the DC IN+ terminal can be used.

 Warning:

Do not exceed the maximum voltage values (24V) applied to the LOGIC IN input to avoid irreversible damage of the equipment.

Memory Card

The 2N[®] Net Audio Decoder Lite PCB is equipped with a microSD card slot for storing music or voice in case the equipment is not connected to the LAN permanently or temporarily. The microSD card slot is available at the 2N[®] Net Audio Decoder Lite PCB front.

2N[®] Net Audio Decoder Status LED Indicator

LED colour	LED status	Meaning
Yellow	shining	2N [®] Net Audio Decoder Lite PCB is booting or restarting
Green	shining	2N [®] Net Audio Decoder Lite PCB is playing audio from 2N [®] IP Audio Manager
Violet	shining	2N [®] Net Audio Decoder Lite PCB is playing audio from SD card
Violet	flashing	2N [®] Net Audio Decoder Lite PCB is loading SD card
Green	flashing slowly 3 times	2N [®] Net Audio Decoder Lite PCB has loaded SD card successfully
Blue	flashing	2N [®] Net Audio Decoder Lite PCB is ready, but not connected to server
Blue	shining	2N [®] Net Audio Decoder Lite PCB is ready and connected to server
Yellow	flashing	2N [®] Net Audio Decoder Lite PCB is upgrading or starting from default after factory reset
Orange	flashing fast	Volume + / - / infra
Orange	flashing slowly 3 times	Blink
Orange	shining	2N [®] Net Audio Decoder Lite PCB is in MUTE state

Power and Connection

The **2N[®] Net Audio Decoder Lite PCB** can be connected to a standard local area network using a LAN interface via the RJ-45 connector on the backside. Always use CAT-5d or higher class cables for reliability reasons. The LAN interface is equipped with the Auto MDIX function for automatic detection of a straight or crossed cable.

The **2N[®] Net Audio Decoder Lite PCB** can be fed using a 12 V / 2 A DC (Part No. 914102E) power supply, or another power supply on condition that you keep the nominal values included in the Electric Parameters subsection.

Connect the 12 V DC power supply either to the back supply connector marked DC IN, or terminals marked DC IN+ and DC IN-.

Warning:

If you use an adapter other than the recommended one, do not exceed the nominal supply voltage value of 12 V. Also make sure that the supply voltage polarity is correct. Exceeding nominal values and/or incorrect connection may lead to irreversible damage of the equipment.

2N[®] Net Audio Decoder Lite PCB Factory Reset

In some cases, it may be useful to reset the **2N[®] Net Audio Decoder Lite PCB** factory values using the RESET button in the back. Do this, for example, if the **2N[®] Net Audio Decoder Lite PCB** ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Use a thin rigid tool to press the RESET button on the back panel.
2. Keep the RESET button pressed (for approx. 15 s).
3. Release the button as soon as the LED starts shining violet.
4. This operation takes about 50 s. Do not disconnect the device from power supply during this period.

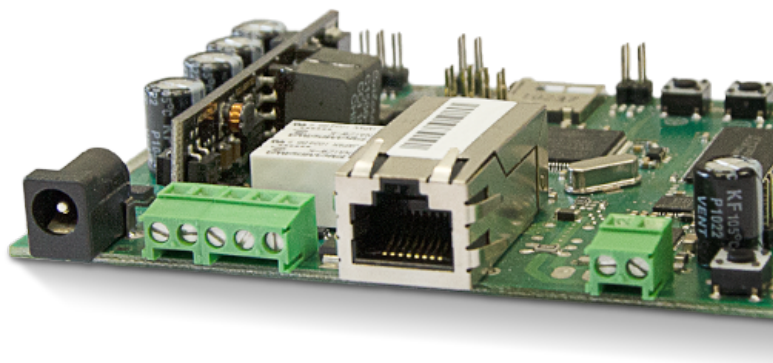
Firmware Upgrade

The 2N[®] Net Audio Decoder Lite PCB firmware upgrade starts automatically whenever the 2N[®] Net Audio Decoder Lite PCB gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104 °F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N[®] Net Audio Decoder mono PCB



2N[®] Net Audio Decoder mono PCB, Part No. 914050E

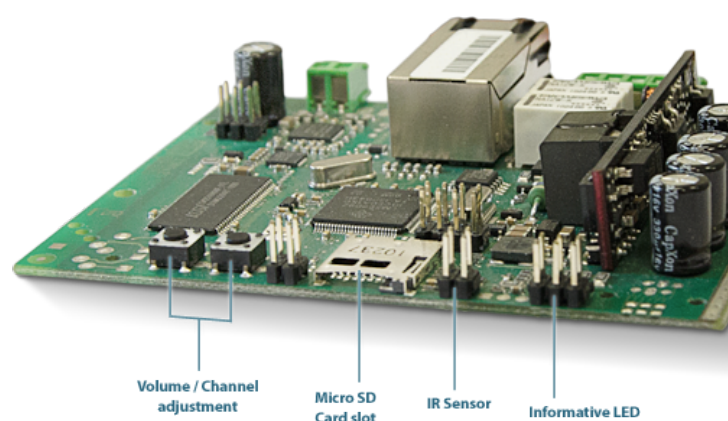
Accessories:

- 12 V / 2 A DC adapter, Part No. 914102x (E – Europe, GB – Great Britain, US – USA)

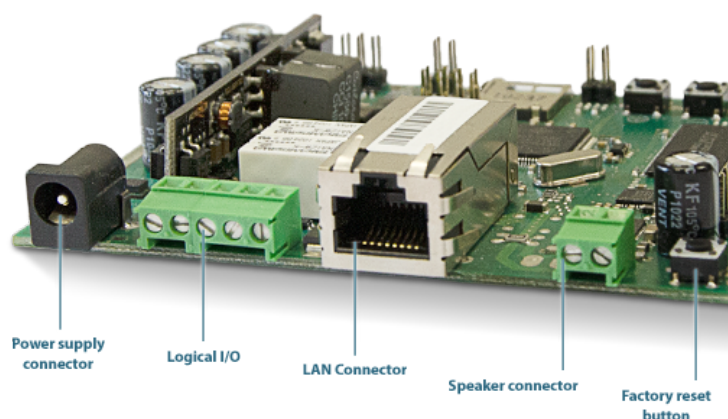
Product Description

The 2N[®] Net Audio Decoder mono PCB is a LAN audio converter designed for public sound distribution through the 2N IP Audio System system. It is connected to the 2N IP Audio System via the local area network (LAN). It communicates with the 2N[®] IP Audio Manager, receives the audio stream, decodes it and converts it into an analogue signal. The 2N[®] Net Audio Decoder mono PCB can be controlled by two front buttons or an infrared remote controller. The 2N[®] Net Audio Decoder mono PCB is equipped with a digital input and output, which extend the converter options and may be helpful in special applications. The 2N[®] Net Audio Decoder mono PCB helps

you extend the internal FLASH memory using microSD memory cards. Apply the **2N IP Audio System** software for configuration and use of all functions (refer to the **2N[®] Net Audio Decoder Quick Start** and **2N IP Audio Administration** manuals for more details).



2N[®] Net Audio Decoder mono PCB Front View



2N[®] Net Audio Decoder mono PCB Back View

2N[®] Net Audio Decoder mono PCB Parameters

Parameter	Value
Board dimensions	100 x 80 x 15 mm
External power supply	12 V DC / 2 A
LAN supply	not supported
Status signalling	LED at the front
Local control	2 buttons at the front
Remote control	infrared sensor at the front
Headphone/Line output	3.5mm stereo jack at the front
LAN connection	RJ-45 connector at the back, TX with Auto-MDIX function
Power amplifier output	not supported
Line output	speaker connector at the back
Type loudspeaker	8 Ω / 6 W
Frequency range	20 Hz - 20 kHz (+/- 0.5 dB)
Harmonic distortion	0.05 % @ 1 kHz

Parameter	Value
Signal-to-noise ratio	91 dB
Digital output	24 V 1 A AC/DC relay output, galvanically isolated
Digital input	5 to 24 V DC digital input, galvanically non-isolated
External memory	microSD card slot at the front
Sound compression	MPEG-1 Audio Layer II (MP2)
Bandwidth	32–320 kbps

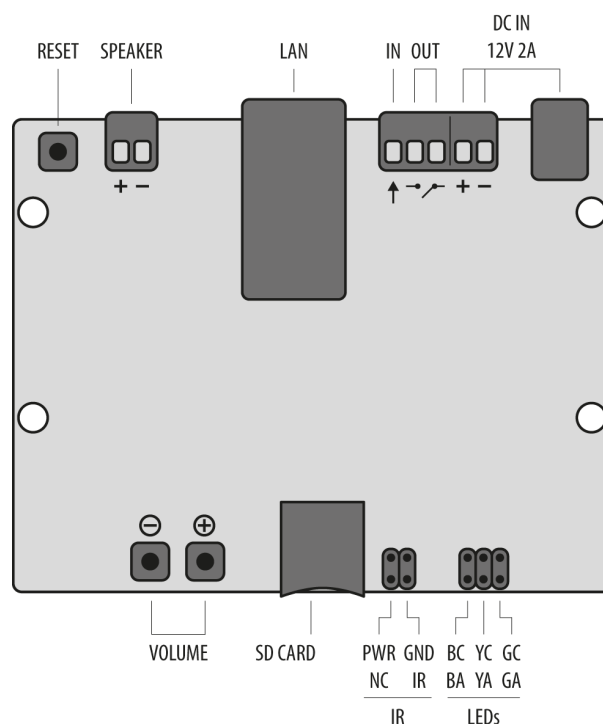


Caution

- Be sure to connect the 2N[®] Net Audio Decoder mono PCB power supply as the last step.

Installation

View of the 2N[®] Net Audio Decoder mono PCB inputs/outputs:



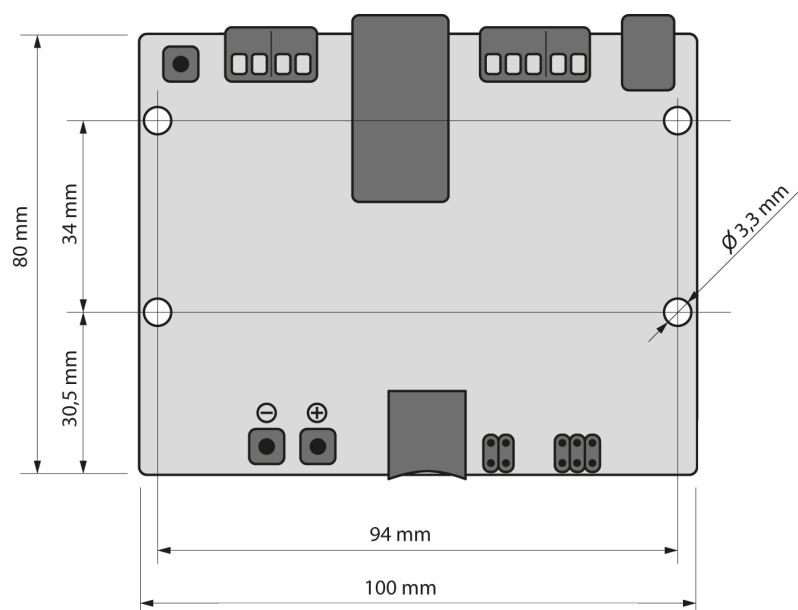
Description of 2N[®] Net Audio Decoder mono PCB Connectors and Motherboard Inputs

- 12 V / 2 A DC power supply adapter connector
- Alternative power supply connection terminals
- Relay output with galvanic isolation for external 24 V / 1 A AC/DC load switching
- Digital input 5-24 V (without galvanic isolation) for external sensor/button, etc.
- 10/100BASE-TX LAN RJ-45 connector
- RESET button
- Universal buttons with programmable functions (volume/channel)
- MicroSD card slot for higher internal memory capacity
- Infrared signal receiver for remote control
- Operational status colour LED indicator

**Caution**

You are advised to make the Reset button accessible to the user for factory reset.

Mounting Hole Spacing and Motherboard Size



2N[®] Net Audio Decoder mono PCB Mounting Hole Spacing and Motherboard Size

Electric Installation

It is very easy to connect 2N[®] Net Audio Decoder mono PCB electrically. Follow the steps below to avoid equipment damage or electrical injury:

Connect an 8 Ω / 6 W speaker.

Connect the digital input and output.

Insert the microSD card.

Connect a UTP cable with PoE, or a UTP cable and a 12 V power supply.

Digital Input and Output

The 2N[®] Net Audio Decoder mono PCB is equipped with a relay switch for light signalling/external amplifier/alarm/activation. The **output** is available on terminals marked LOGIC OUT and allows for switching of up to 24 V / 1 A AC/DC loads. The relay is controlled by the audio stream sent to the 2N[®] Net Audio Decoder Lite PCB.

Warning:

Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.

The **2N[®] Net Audio Decoder mono PCB** is equipped with a digital **input** for an optional button, sensor of movement or other applications. This input is available on the LOGIC IN terminal. 5 to 24 V DC voltage can be applied to the input against the ground terminal marked DC IN-. In the case of external button, the DC IN+ terminal can be used; see the figure below.

Warning:

Do not exceed the maximum voltage values (24 V) applied to the LOGIC IN input to avoid irreversible damage of the equipment.

Memory Card

The **2N[®] Net Audio Decoder mono PCB** is equipped with a microSD card slot for storing music or voice in case the equipment is not connected to the LAN permanently or temporarily. The microSD card slot is available at the **2N[®] Net Audio Decoder mono PCB** front.

Status LED Indicators

LED colour	LED status	Meaning
Yellow	shining	2N[®] Net Audio Decoder mono PCB is booting or restarting
Green	shining	2N[®] Net Audio Decoder mono PCB is playing audio from 2N[®] IP Audio Manager
Violet	shining	2N[®] Net Audio Decoder mono PCB is playing audio from SD card
Violet	flashing	

LED colour	LED status	Meaning
		2N [®] Net Audio Decoder mono PCB is loading SD card
Green	flashing slowly 3 times	2N [®] Net Audio Decoder mono PCB has loaded SD card successfully
Blue	flashing	2N [®] Net Audio Decoder mono PCB is ready, but not connected to server
Blue	shining	2N [®] Net Audio Decoder mono PCB is ready and connected to server
Yellow	flashing	2N [®] Net Audio Decoder mono PCB is upgrading or starting from default after factory reset
Orange	flashing fast	Volume + / - / infra
Orange	flashing slowly 3 times	Blink
Orange	shining	2N [®] Net Audio Decoder is in MUTE state

Power and Connection

The mono PCB can be connected to a standard local area network using a LAN interface via the RJ-45 connector on the backside. Always use CAT-5d or higher class cables for reliability reasons. The LAN interface is equipped with the Auto MDIX function for automatic detection of a straight or cross-over cable.

The **2N[®] Net Audio Decoder** mono PCB can be fed using a 12 V / 2 A DC (Part No. 914102E) power supply, or another power supply on condition that you keep the nominal values included in the Electric Parameters subsection.

Connect the 12 V DC power supply either to the backside supply connector marked DC IN, or terminals marked DC IN+ and DC IN-.

Warning:

If you use an adapter other than the recommended one, do not exceed the nominal supply voltage value of 12 V. Also make sure that the supply voltage polarity is correct. Exceeding nominal values and/or incorrect connection may lead to irreversible damage of the equipment.

2N[®] Net Audio Decoder mono PCB Factory Reset

In some cases, it may be useful to reset the **2N[®] Net Audio Decoder** mono PCB factory values using the RESET button on the backside. Do this, for example, if the **2N[®] Net Audio Decoder** mono PCB ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Use a thin rigid tool to press the RESET button on the back panel.
2. Keep the RESET button pressed (for approx. 15 s).
3. Release the button as soon as the LED starts shining violet.

This operation takes about 50 s. Do not disconnect the device from power supply during this period.

Firmware Upgrade

The firmware upgrade starts automatically whenever the **2N[®] Net Audio Decoder** mono PCB gets connected to the **2N[®] IP Audio Manager**. This guarantees that all connected devices have identical and latest firmware versions. Refer to **www.2n.cz** for the latest firmware version.

Operating Terms and Transport

Operating temperature: 0 to 40 °C (32 to 104 °F)

Operating humidity: 10 to 85 % (not condensing)

Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N® Net Audio Encoder

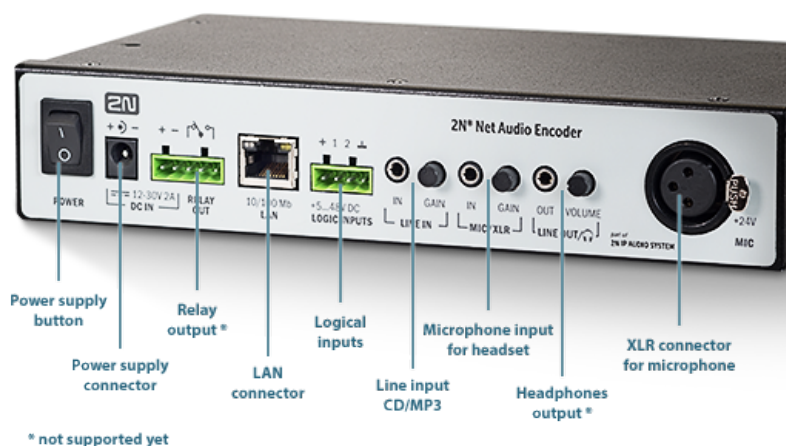


Accessories:

- PoE Injector, Part No. 91378100x (E - Europe, US - USA)
- 12 V DC / 2 A adapter, Part No. 914102x (E - Europe, GB - Great Britain, US - USA)
- Rack mounting kit 1U, Part No. 914106E

Product Description

Despite the gradual modernisation of audio systems to IP technology, customers are still encountering the need to connect an IP audio system to a traditional music sources such as FM radio stations, CD players or microphones. **2N® Net Audio Encoder** can transfer traditional audio sources to IP technology and then ensure audio distribution over an IP network to various destinations.



View of 2N[®] Net Audio Encoder Front Panel

2N[®] Net Audio Encoder Parameters

Parameter	Value
Dimensions	209 x 142 x 65 mm
External power supply	12-32 V DC / 1 A
LAN supply	PoE IEEE 802.3af
LAN connection	RJ-45 connector on front panel, TX with Auto-MDIX function
Frequency range	20 Hz – 20 kHz (+/- 0.5 dB)

Parameter	Value
Harmonic distortion	0.05 % @ 1 kHz
Signal-to-noise ratio	91 dB
Digital input	one 5 to 48 V DC digital input, galvanically isolated or 1 contact input
Digital output	max. 48 V / 1 A relay output NO/NC, galvanically isolated
Headphones output	3.5 mm stereo jack, 2x 30 mW, min. 16 Ohm, DR 101 dB, THD+N -85 dB
Main microphone input	symmetric, XLR, Phantom Supply 24 V, DR 88 dB, THD+N -82 dB
Headset microphone input	3.5 mm jack, integrated powering for electret microphones, DR 84 dB, THD+N -78 dB
Line input	3.5 mm jack , symmetric mono or asymmetric stereo, DR 93 dB, THD+N -82 dB
Sound compression	PCMA, 44.1 kHz, 16 bit, stereo (1650 kbps)



Caution

- Be sure to connect the power supply as the last step. The same applies to PoE supply from the LAN.

⚠ Warning

- Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.
- Connector to connect a microphone on the front panel is powered.

Firmware Upgrade

2N[®] Net Audio Encoder firmware upgrade starts automatically whenever 2N[®] Net Audio Encoder gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

2N[®] Net Audio Encoder Configuration

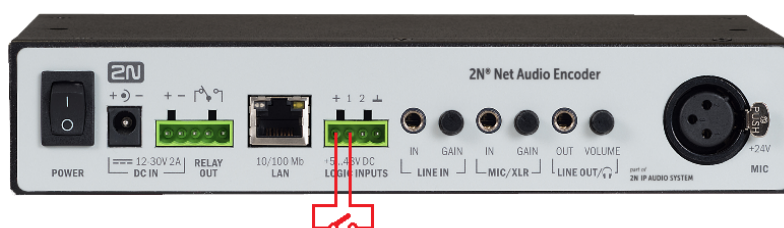
2N[®] Net Audio Encoder allows set audio source to the **Session** via the 2N[®] IP Audio Control Panel. Refer to the **Audio sources** for more details on the 2N[®] Net Audio Encoder settings. To active the stream use the logic input.

Logic input

Connecting the logic input of the 2N[®] Net Audio Encoder. To control the logic inputs are two options. The first option is that you are connecting to the input labeled **+** (galvanically isolated supply +7 V) and the input labeled **1** (0 V). The second possibility is that the input will respond to voltage switches to the input labeled **1** (0 V) and **GND**.

Logic input can operate in both latching and momentary states.

When using a switch across the logic input, a stream can be activated by a brief 'press and release' to start followed by a 'press and release' to stop (latching). Alternatively, a constant press of a switch will activate the stream for the duration that the switch is pressed, stopping the stream upon release (momentary).



Factory Reset

In some cases, it may be useful to reset the **2N[®] Net Audio Encoder** factory values using the RESET button on the lower panel. Do this, for example, if **2N[®] Net Audio Encoder** ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Use a thin rigid tool to press the RESET button on the lower panel.
2. Keep the RESET button pressed for 10 s.
3. Release the button.

This operation takes about 50 s. Do not disconnect the device from power supply during this period.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104 °F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N® Net Mic



Accessories:

- PoE Injector, Part No. 91378100x (E - Europe, US - USA)
- 12 V DC / 2 A adapter, Part No. 914102x (E - Europe, GB - Great Britain, US - USA)

Product Description

2N® Net Mic is a hardware console with microphone, which enables you to make live announcements or broadcast pre-prepared files to different zones. It is a hardware alternative to the 2N® IP Audio Console software application, which is primarily intended for such public facilities as schools, courts, railway stations, airports, medical facilities, amusement parks, swimming pools and sport centres.

For button labels, download [HERE](#) 

2N[®] Net Mic Colour States

Action	Button colour	State
Push button A	Green on button A	Play to the Session that is set in 2N [®] IP Audio Control Panel.
Push button C	Green on function button	Play the playlist to the selected zones or 2N [®] Net Audio Decoder or 2N [®] Net Speaker units.
Push button C	Yellow on function button	Select the zone or 2N [®] Net Audio Decoder or 2N [®] Net Speaker for live announcements. Press button A for live announcements.
Push button C + then push button A	Green on function button + green on button A	Provide information about ongoing announcements to selected zones or 2N [®] Net Audio Decoder or 2N [®] Net Speaker units. The selected zone shines yellow. Press button A to make a live announcement.
Push button B	Button B	Not supported in this version.

Explanatory notes:



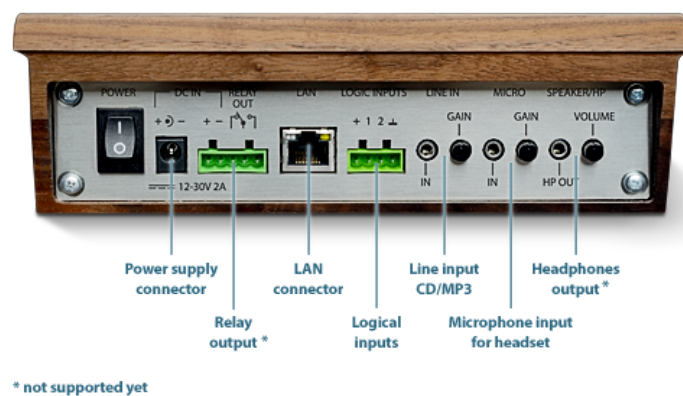
... A ... button for announcing



... B ... not supported in this version



... C ... function buttons 1-12 for playing playlist or announcing to Zone/Net Audio Decoder/Net Speaker



View of 2N[®] Net Mic Back Panel

2N[®] Net Mic Parameters

Parameter	Value
Dimensions	209 x 142 x 65 mm
Weight	1.600 g
External power supply	12-32 V DC / 1 A
LAN supply	PoE IEEE 802.3af
Status signalling	signalling microphone volume level
Local control	14 buttons on front panel
Speakers	two 1 W stereo built-in speakers

Parameter	Value
LAN connection	RJ-45 connector on back panel, TX with Auto-MDIX function
Power amplifier output	4 terminals on back panel, STEREO/MONO with auto detection
Frequency range	20 Hz – 20 kHz (+/- 0.5 dB)
Harmonic distortion	0.05 % @ 1 kHz
Signal-to-noise ratio	91 dB
Digital input	two 5 to 48 V DC digital input, galvanically isolated or 1 contact input
Digital output	max. 48 V / 1 A relay output NO/NC, galvanically isolated
Headphones output	3.5 mm stereo jack, 2x 30 mW, min. 16 Ohm, DR 101 dB, THD+N -85 dB
Main microphone input	symmetric, XLR, Phantom Supply 24 V, DR 88 dB, THD+N -82 dB
Headset microphone input	3.5 mm jack, integrated powering for electret microphones, DR 84 dB, THD+N -78 dB
Line input	3.5 mm jack , symmetric mono or asymmetric stereo, DR 93 dB, THD+N -82 dB
Sound compression	PCMA, 44.1 kHz, 16 bit, stereo

**Caution**

- Be sure to connect the power supply as the last step. The same applies to PoE supply from the LAN.

**Warning**

- Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.
- Connector to connect a microphone on the front panel is powered.

Firmware Upgrade

2N[®] Net Mic firmware upgrade starts automatically whenever 2N[®] Net Mic gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

2N[®] Net Mic Configuration

The 2N[®] Net Mic hardware console allows you to set the buttons via the 2N[®] IP Audio Control Panel. Refer to the **Audio Sources** for more details on the 2N[®] Net Mic settings.

Logic input

Connecting the logic input is equivalent to pressing the **A** button on the front panel of the 2N[®] Net Mic. To control the logic inputs are two options. The first option is that you are connecting to the input labeled **+** (galvanically isolated supply +, 7 V) and the input labeled **1** (0 V). The second possibility is that the input will respond to voltage switches to the input labeled **1** (0 V) and **GND**.

Factory Reset

In some cases, it may be useful to reset the 2N[®] Net Mic factory values using the RESET button on the lower panel. Do this, for example, if 2N[®] Net Mic ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Use a thin rigid tool to press the RESET button on the lower panel.
2. Keep the RESET button pressed for 10 s.
3. Release the button.

This operation takes about 50 s. Do not disconnect the device from power supply during this period.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104 °F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

2N[®] Net Speaker



2N[®] Net Speaker, Wall Mounted, Part No. 914033W white

2N[®] Net Speaker, Wall Mounted, Part No. 914033B black

2N[®] Net Speaker, Ceiling, Part No. 914031E

Accessories:

- PoE injector, Part No. 91378100x (E - Europe, US - USA)
- 12 V DC / 2 A adapter, Part No. 914102x (E - Europe, GB - Great Britain, US - USA)
- 2N[®] LoudSpeaker, Wall Mounted, White, Part No. 914034W
- 2N[®] LoudSpeaker, Wall Mounted, Black, Part No. 914034B

Product Description

2N IP Audio System is an IP audio system which allows you to play an acoustic message or any other audio stream from any LAN/WAN - connected PC. It communicates with the **2N[®] IP Audio Manager**, receives the audio stream, decodes it and converts it into an analogue signal. Apply the **2N IP Audio System** software for configuration and use of all functions (refer to the **2N[®] Net Speaker Quick Start** and **2N[®] NetSpeaker Administration** manuals for more details).



2N[®] Net Speaker, Wall Mounted – connectors in the back

2N[®] Net Speaker, Ceiling – connectors in the back

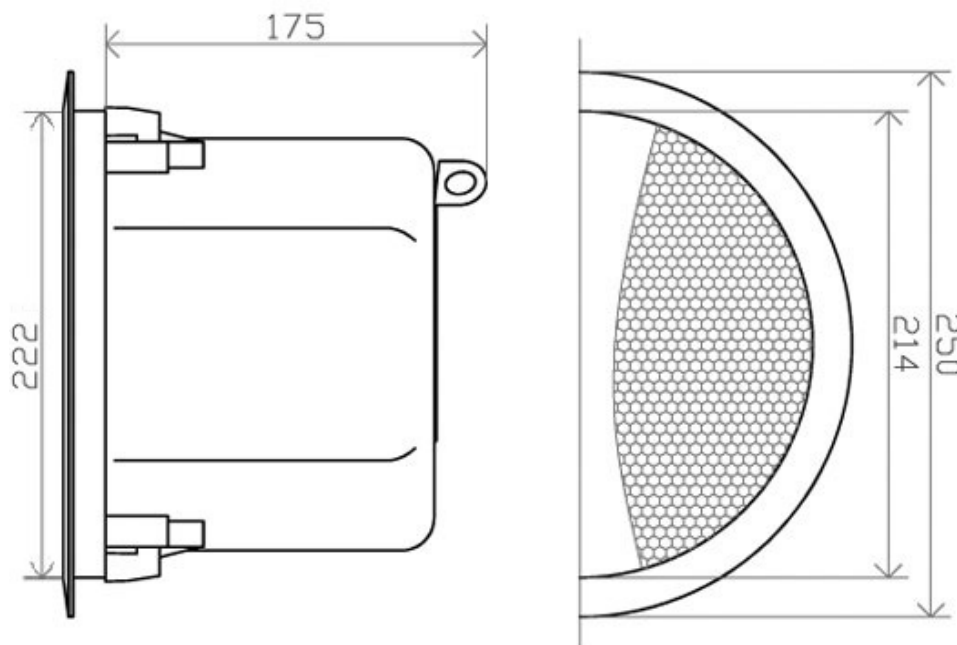
1. 12 V DC / 2 A power supply adapter connector
2. 10/100BASE-TX LAN RJ-45 connector
3. Connector for second passive speaker
4. RESET button

2N[®] Net Speaker Parameters

Parameter	2N [®] Net Speaker Wall Mounted	2N [®] Net Speaker Ceiling
Dimensions	250 x 176 x 143 mm	250 x 175 mm
Colour	white / black	white
Weight	3 kg	4,6 kg
External power supply	12 V DC / 2 A	12 V DC / 2 A
LAN supply	PoE IEEE 802.3af	PoE IEEE 802.3af
LAN connection	RJ-45 connector, 10/100BASE-TX	RJ-45 connector, 10/100BASE-TX
Amplifier	8 W / 14 W	8 W / 14 W
Sound pressure level (SPL 1W /m)	89 dB	104 dB
Frequency range	75 Hz - 20 kHz	90 Hz - 23 kHz
Sound compression	MPEG-1 Audio Layer II (MP2)	MPEG-1 Audio Layer II (MP2)
Bandwidth	32-320 kbps	32-320 kbps

Installation

To mount the device use the bundled mounting accessories.



2N[®] Net Speaker, Ceiling

Electric Installation

It is very easy to connect 2N[®] Net Speaker electrically. Follow the steps below to avoid equipment damage or electrical injury:

- Connect the UTP cable.
- Connect a 12 V power supply (unless PoE is used).

Caution

- Be sure to connect the 2N[®] Net Speaker power supply as the last step. The same applies to PoE supply from the LAN.
- Wall Mounted 2N[®] Net Speaker it may be connected to the second passive speaker that will play in mono mode.

 Warning

- Do not exceed the upper voltage and current limits to avoid irreversible damage of the equipment.

2N[®] Net Speaker Connection

2N[®] Net Speaker can be connected to a standard local area network using a LAN interface via the RJ-45 connector on the back panel. Always use CAT-5d or higher class cables for reliability reasons. The LAN interface is equipped with the Auto MDIX function for automatic detection of a straight or crossed cable.

The LAN interface can also be used for the 2N[®] Net Speaker power supply through active network elements or injectors meeting the IEEE 802.3af standard.

2N[®] Net Speaker can be fed using active network elements or PoE injectors via the LAN interface. In case this option is unavailable, use a 12 V DC / 2 A (Part No. 914102E) power supply, or another power supply on condition that you keep the nominal values included in the Electric Parameters subsection.

Connect the 12 V DC power supply either to the back panel supply connector marked DC IN, or terminals marked DC IN + and DC IN -.

 Warning

- Do not exceed the maximum voltage values (24 V) applied to the LOGIC IN input to avoid irreversible damage of the equipment.

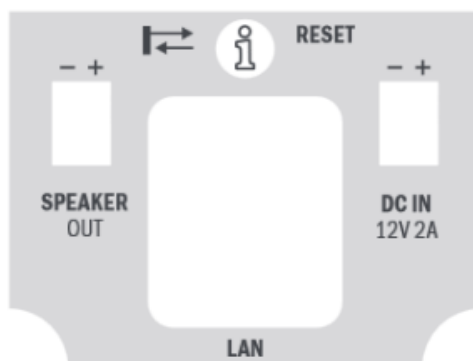
2N[®] Net Speaker Factory Reset

In some cases, it may be useful to reset the 2N[®] Net Speaker factory values using the RESET button on the back panel. Do this, for example, if 2N[®] Net Speaker ceases to respond, which may be caused by incorrect LAN settings, LAN configuration changes, forgotten password and so on.

Resetting Procedure:

1. Turn RESET button to the right

2. Keep the RESET button in this position (around 15 seconds)
3. Turn RESET button to the left as soon as the LED starts shining violet.



Firmware Upgrade

The 2N[®] Net Speaker firmware upgrade starts automatically whenever 2N[®] Net Speaker gets connected to the 2N[®] IP Audio Manager. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

Operating Terms and Transport

- Operating temperature: 0 to 40 °C (32 to 104 °F)
- Operating humidity: 10 to 85 % (not condensing)
- Permitted temperature range for product transport: -25 to +60 °C (-13 to 140 °F)

Developer documentation

The developer documentation is available on this link: <https://wiki.2n.cz/nadd/latest/en>

2N® IP Audio Manager API manuál

The developer documentation is available on this link: <https://wiki.2n.cz/nadd/latest/en>

2N® IP Audio Manager HTTP API Manual

Supplementary Information

This section provides you with all regulatory and supplementary information on the 2N IP Audio System.

Here is what you can find in this section:

Table of content:

- Troubleshooting
- Directives, Laws and Regulations
- General Instructions and Cautions

Troubleshooting



For the most frequently asked questions refer to faq.2n.cz.

2N[®] Net Audio Decoder or 2N[®] Net Speaker is not displayed in the Destinations & Zones menu

Make sure that that DHCP is enabled for your network, or you must know the IP address, subnet mask and gateway which can be assigned to 2N[®] Net Audio Decoder or 2N[®] Net Speaker. When the other LAN devices receive the IP address automatically, 2N[®] Net Audio Decoder or 2N[®] Net Speaker may not get it due to restrictions set by the IT department. This setting then automatically assigns IP addresses only to the known/registered LAN devices based on their MAC addresses.

Firewall may also block the 2N[®] Net Speaker connection

When 2N[®] Net Audio Decoder or 2N[®] Net Speaker disconnects and then tries to reconnect to the same port, the active firewall may not permit such connection.

2N IP Audio System sound is jerky

You can set the **Sound path delay** for 2N[®] Net Audio Decoder or 2N[®] Net Speaker and all intercommunicating components on the **Destinations & Zones** tab. The default value is 40 ms, which is typically sufficient for local area networks (LAN), or you can increase the value to up to the maximum of 10,000 ms. You can also set the **Sound path delay** for the other system applications: 2N[®] IP Audio Console or 2N[®] Virtual Sound Card in the respective application settings.

Missing licence for multiple 2N[®] Net Audio Decoder or 2N[®] Net Speaker unit connection

An 800-hour trial licence for all licensed features is started automatically upon every new installation. The count of 2N[®] Net Audio Decoder or 2N[®] Net Speaker units connected and the count of RTP destinations generated is unlimited for the first 800 hours. When the trial licence expires, the count of 2N[®] Net Audio Decoder or 2N[®] Net Speaker units is limited to 5 and no more units may be connected to the 2N[®] IP Audio Manager. Purchase a new licence to connect more units than 5.

2N[®] Net Mic is not visible in Destination & Zones

2N[®] Net Mic is not displayed in Destination & Zones but in Audio sources.

Directives, Laws and Regulations

Europe

2N[®] IP Audio System conforms to the following directives and regulations:

Directive 1999/5/EC of the European Parliament and of the Council, of 9 March 1999 - on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity

Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

Directive 2004/108/EC of the Council of 15 December 2004 on the harmonisation of the laws of Member States relating to electromagnetic compatibility

Commission Regulation (EC) No. 1275/2008, of 17 December 2008, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

Directive 2012/19/EC of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment.

Industry Canada

This Class B digital apparatus complies with Canadian ICES-003. / Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FCC

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**Caution**

- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- Always use the product for the purpose it was designed and manufactured for, in compliance herewith.
- The manufacturer reserves the right to modify the product in order to improve its qualities.
- This device contains no environmentally harmful components. When the product's service life is exhausted and you would like to dispose of it please do so in accordance with applicable legal regulations.

General Instructions and Cautions

Please read this User Manual carefully before using the product. Follow all instructions and recommendations included herein.

Any use of the product that is in contradiction with the instructions provided herein may result in malfunction, damage or destruction of the product.

The manufacturer shall not be liable and responsible for any damage incurred as a result of a use of the product other than that included herein, namely undue application and disobedience of the recommendations and warnings in contradiction herewith.

Any use or connection of the product other than those included herein shall be considered undue and the manufacturer shall not be liable for any consequences arisen as a result of such misconduct.

Moreover, the manufacturer shall not be liable for any damage or destruction of the product incurred as a result of misplacement, incompetent installation and/or undue operation and use of the product in contradiction herewith.

The manufacturer assumes no responsibility for any malfunction, damage or destruction of the product caused by incompetent replacement of parts or due to the use of reproduction parts or components.

The manufacturer shall not be liable and responsible for any loss or damage incurred as a result of a natural disaster or any other unfavourable natural condition.

The manufacturer shall not be held liable for any damage of the product arising during the shipping thereof.

The manufacturer shall not make any warrant with regard to data loss or damage.

The manufacturer shall not be liable and responsible for any direct or indirect damage incurred as a result of a use of the product in contradiction herewith or a failure of the product due to a use in contradiction herewith.

All applicable legal regulations concerning the product installation and use as well as provisions of technical standards on electric installations have to be obeyed. The manufacturer shall not be liable and responsible for damage or destruction of the product or damage incurred by the consumer in case the product is used and handled contrary to the said regulations and provisions.

The consumer shall, at its own expense, obtain software protection of the product. The manufacturer shall not be held liable and responsible for any damage incurred as a result of the use of deficient or substandard security software.

The consumer shall, without delay, change the access password for the product after installation. The manufacturer shall not be held liable or responsible for any damage incurred by the consumer in connection with the use of the original password.

The manufacturer also assumes no responsibility for additional costs incurred by the consumer as a result of making calls using a line with an increased tariff.

Electric Waste and Used Battery Pack Handling



Do not place used electric devices and battery packs into municipal waste containers. An undue disposal thereof might impair the environment!

Deliver your expired electric appliances and battery packs removed from them to dedicated dumpsites or containers or give them back to the dealer or manufacturer for environmental-friendly disposal. The dealer or manufacturer shall take the product back free of charge and without requiring another purchase. Make sure that the devices to be disposed of are complete.

Do not throw battery packs into fire. Battery packs may not be taken into parts or short-circuited either.



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