



2N[®] NetSpeaker

Audio Decoder with Amplifier



User Manual

Version 1.0.0
Firmware 1.0.0

www.2n.cz

The 2N TELEKOMUNIKACE joint-stock company 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.



2N[®] is a registered trademark of 2N TELEKOMUNIKACE a.s.. Any product and/or other names mentioned herein are registered trademarks and/or trademarks or brands protected by law.



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



Declaration of Conformity

2N TELEKOMUNIKACE hereby declares that the 2N[®] SIM Star 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 enclosed and at www.2n.cz.



The 2N TELEKOMUNIKACE company is the holder of the ISO 9001:2000 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.

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1

Product Overview

In this section, we introduce the **2N® NetSpeaker** product, outline its application options and highlight the advantages following from its use. The section also includes safety precautions.

Here is what you can find in this section:

- Product Description
- Associated Products
- Changes in Documentation
- Terms and Symbols Used

1.1 Product Description

The 2N[®] NetSpeaker System is a universal sound transmission system for IP networks. Its purpose is to replace classic wire broadcasting systems using a broadcast centre, obsolete 100V analogue circuits and loudspeakers. It finds a variety of applications - in schools, hospitals, office buildings, hotels, production halls, shopping centres, bus terminals, airports and so on. Compared with the classic analogue solution, the system has a lot of advantages: uses the existing LAN infrastructure, provides easy connection to vast or remote areas, helps users send anything from anywhere to any place, shows no zone or sound source limitations and, in general, is very flexible and easily extendable.

2N[®] NetSpeaker is a stand-alone sound decoder and converter with an amplifier working as a terminal audio device for the 2N[®] NetSpeaker System. 2N[®] NetSpeaker communicates with the 2N[®] NetSpeaker System via the local area network (LAN), decodes the audio stream converting it into an analogue signal, which is then amplified by an integrated power amplifier.

2N[®] NetSpeaker is available in two versions:

- Module with an amplifier (Part No. 914010E), which can be connected to an external loudspeaker/an external amplifier or used with headphones.
- Module with an amplifier and a loudspeaker (Part No. 914020E), designed for direct wall mounting (wall/flush/ceiling mounting).

This User Manual applies to Part No. 914010E.

Basic Features

- 10/100Base-TX LAN interface
- 12V DC/2A or PoE 802.3af power supply
- Integrated 14W STEREO/MONO amplifier
- Line/headphone output
- Colour LED operation status indicators
- Universal galvanically isolated output
- Universal digital input
- MicroSD card slot
- Two universal programmable buttons
- Infrared remote control

Optional Accessories

12V DC/2A Power Supply Adapter

- Universal power supply adapter for 2N[®] NetSpeaker. With it, you can make the best of the integrated amplifier power.

PoE 802.3af Injector

- Universal PoE injector for the 2N[®] NetSpeaker power supply. Useful for places where 12V power supply is unavailable or a 12V adapter cannot be used.

Remote control

- Infrared remote control for comfortable volume or channel adjustment.

1.2 2N® NetSpeaker Components and Associated Products

Basic Unit



914010E

2N® NetSpeaker with Amplifier

Accessories



91378100

PoE Injector



914102E

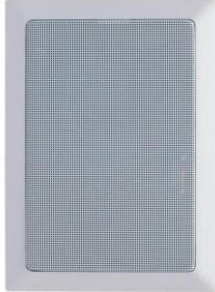
12V DC/2A Adapter



914101E

Remote Controller

Associated Products

**914020E**

2N® NetSpeaker with
Loudspeaker for Soffit
Mounting

**914110E**

Flush Mounting
Box

**914120E**

Wall Mounting
Box

1.3 Changes in Documentation

The manufacturer reserves the right to modify 2N[®] NetSpeaker in order to improve its qualities.

Manual Version	Changes in Documentation
1.0.0	<ul style="list-style-type: none">■ The User Manual corresponds to 2N[®] NetSpeaker FW version 1.0.0.



Caution

- The manufacturer keeps improving the firmware according to the clients' requirements. Refer to the 2N web sites www.2n.cz for the current 2N[®] NetSpeaker firmware and User Manual versions.

1.4 Terms and Symbols Used

Symbols Used in Manual



Safety Warning

- **Always** abide by this information to prevent injury of persons.



Warning

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



Caution

- **Important information** for system functionality.



Tip

- Useful advice for quick and efficient functionality.



Note

- Routines or advice for efficient use of the device.

Future Functions and Features

The grey-marked text in this document designates the functions and features that are under preparation or development at present.

2

Description and Installation

This section describes the **2N® NetSpeaker** product and its installation.

Here is what you can find in this section:

- Product Description
- Before You Start
- Mounting

2.1 Product Description

2N[®] NetSpeaker is a LAN audio converter designed for public sound distribution through the 2N[®] NetSpeaker System. It is connected to the 2N[®] NetSpeaker System via the local area network (LAN). It communicates with the 2N[®] NetSpeaker Server, receives the audio stream, decodes it and converts it into an analogue signal. 2N[®] NetSpeaker is equipped with an integrated 14W amplifier for direct loudspeaker connection.

2N[®] NetSpeaker can be controlled by two front panel buttons or an infrared remote controller.

2N[®] NetSpeaker is equipped with a digital input and output, which extend the converter options and may be helpful in special applications.

2N[®] NetSpeaker helps you extend the internal FLASH memory using MicroSD memory cards.

Use the integrated Telnet server to make basic settings for connection of 2N[®] NetSpeaker into the LAN (refer to the Basic Parameter Settings). Apply the 2N[®] NetSpeaker Software for configuration and use of all functions (refer to the 2N[®] NetSpeaker Software User Manual).

2N[®] NetSpeaker Front and Back Panels

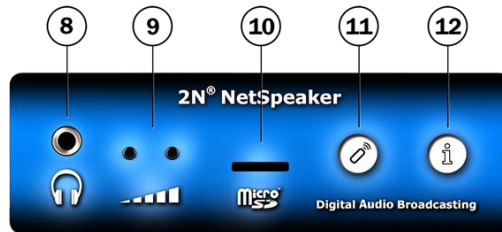


Fig. 2.1 - 2N[®] NetSpeaker Front Panel

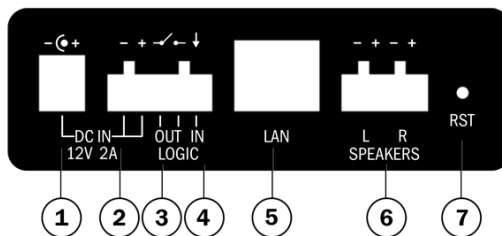


Fig. 2.2 - 2N[®] NetSpeaker Back Panel

1. 12V DC/2A power supply adapter connector
2. Alternative power supply connection terminals
3. Relay output with galvanic isolation for external 24V/1A AC/DC load switching
4. Digital input (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. Operational status colour LED indicators
12. Infrared signal receiver for remote control

2.2 Before You Start

Product Completeness Check

Before installing this product, check whether the product delivery includes:

- 1 2N[®] NetSpeaker
- 2 wall mounting L-profiles
- 4 6mm dowels
- 4 3.5x35mm screws
- 4 self-adhesive device feet
- 1 5-pin terminal block
- 1 4-pin terminal block
- Quick User Manual
- CD-ROM with User Manual and Software
- Certificate of Warranty

Installation Conditions

- 2N[®] NetSpeaker is to be connected to the LAN.
- 2N[®] NetSpeaker is designed for indoor use.
- 2N[®] NetSpeaker may not be operated in damp environments.

2.3 Mounting

If you intend to use your 2N[®] NetSpeaker 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 included L-profiles to mount your 2N[®] NetSpeaker 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.

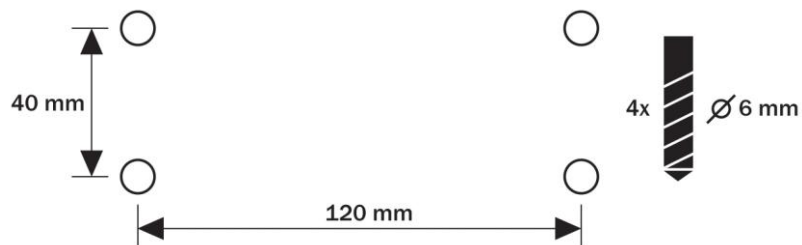


Fig. 2.3 – Mounting Holes

2.4 Electric Installation

Electric Installation Step by Step

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

- Connect a loudspeaker, headphones or an external amplifier.
- Connect the digital input and output.
- Insert the MicroSD card.
- Connect the UTP cable.
- Connect a 12V power supply (unless PoE is used).



Caution

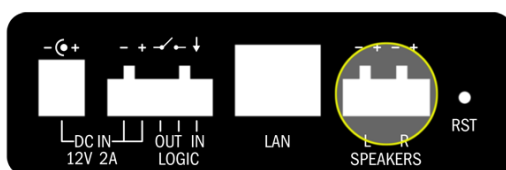
- Be sure to connect the 2N[®] NetSpeaker power supply as the last step. The same applies to PoE supply from the LAN.

Loudspeaker Connection

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

Loudspeaker(s)	12V/2A	PoE
2 x 4Ω STEREO	2 x 2.5W	2 x 2.5W
2 x 8Ω STEREO	2 x 7W	2 x 4W
2 x 16Ω STEREO	2 x 4W	2 x 4W
4Ω MONO	1 x 14W	1 x 8W
8Ω MONO	1 x 8W	1 x 8W

Use the 2N[®] NetSpeaker 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.



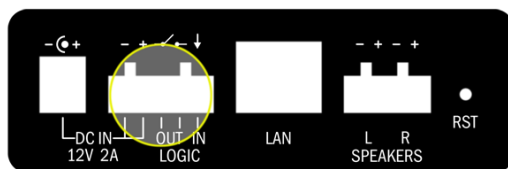
Headphone/External Amplifier Connection

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



Digital Output Use

2N[®] NetSpeaker 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 24V/1A AC/DC loads.



Program the output either to the N/O (normally open) or N/C (normally closed) mode.



Warning

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

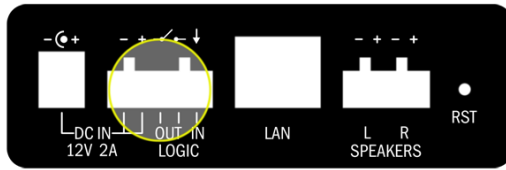


Note

- The current 2N[®] NetSpeaker FW version does not support this function. Refer to www.2n.cz for 2N[®] NetSpeaker FW updates. Contact the 2N TELEKOMUNIKACE Technical Support staff please for more information.

Digital Input Use

2N[®] NetSpeaker 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. Up to 5 to 24V DC voltage can be applied to the input against the ground terminal marked **DC IN -**.



Warning

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



Note

- The current 2N[®] NetSpeaker FW version does not support this function. Refer to www.2n.cz for 2N[®] NetSpeaker FW updates. Contact the 2N TELEKOMUNIKACE Technical Support staff please for more information.

Memory Card Use

2N[®] NetSpeaker 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[®] NetSpeaker front panel.

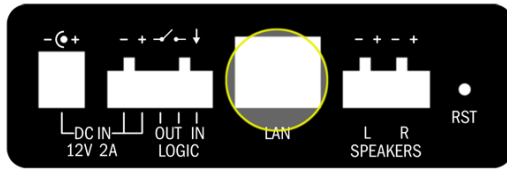


Note

- The current 2N[®] NetSpeaker FW version does not support this function. Refer to www.2n.cz for 2N[®] NetSpeaker FW updates. Contact the 2N TELEKOMUNIKACE Technical Support staff please for more information.

LAN Connection

2N[®] NetSpeaker 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.

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



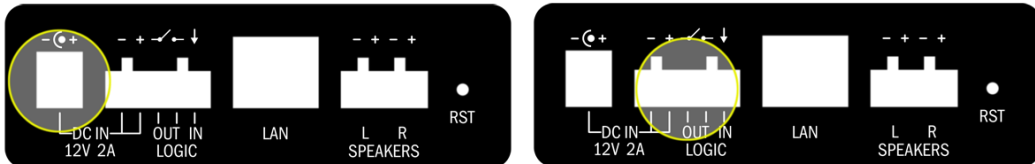
Note

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

Power Supply Connection

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

3

2N[®] NetSpeaker Configuration

This section describes the **2N[®] NetSpeaker** configuration.

Here is what you can find in this section:

- Default Setting
- Basic Parameter Settings
- Firmware Upgrade

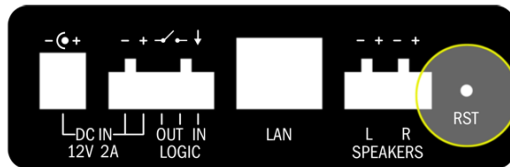
3.1 2N® NetSpeaker Configuration

Default Setting

In some cases, it may be useful to reset the 2N® NetSpeaker factory values using the RESET button on the back panel. Do this, for example, if 2N® NetSpeaker 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 (a toothpick or a paperclip) to press the RESET button on the back panel.



2. Keep the RESET button pressed as long as the front panel LED is shining green (approx. for 5s).
3. Release the button as soon as the LED starts flashing yellow quickly. It means that the configuration in the internal FLASH memory is being deleted. This operation takes about 50s. Do not disconnect the device from power supply during this period.

Factory Settings

By default, the parameters have the following factory values:

Parameter Name	Default Value
dhcpcclient	0 (OFF)
ipaddr	192.168.1.100
ipmask	255.255.255.0
defaultgw	192.168.1.1
pwd	admin
activemode	0 (Passive mode)
srvipaddr	192.168.1.2
srvport	6999
srvpwd	admin

Basic Parameter Settings

Telnet - 2N® NetSpeaker Connection

Use the integrated Telnet server for basic 2N® NetSpeaker settings. For connection, use any Telnet Client application, integrated **telnet.exe** in Microsoft Windows or **putty.exe** application downloaded from the Internet, for example. The Telnet server listens at standard port 23.



When the connection has been established, 2N® NetSpeaker displays its serial number and the current firmware version. Enter the password, which is equal to the connection authorisation password from the 2N® NetSpeaker Server (i.e. pwd parameter). The default password is **admin**.

Telnet Commands to 2N® NetSpeaker

2N® NetSpeaker can be controlled using the commands included in the table below. Enter 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.

save

This command saves all parameters changes into the 2N® NetSpeaker memory.

exit

This command quits connection with the Telnet server.

reboot

This command resets the equipment.

List of Parameters

dhcpclient

This parameter enables/disables automatic obtaining network parameter settings from the DHCP server in the LAN.

<i>Setting options</i>	0	<i>Automatic network parameter obtaining is disabled. Use manual settings: ipaddr, netmask and defaultgw.</i>
	1	<i>Automatic network parameter obtaining is enabled.</i>
<i>Default setting:</i>	0	

ipaddr

2N® NetSpeaker static IP address. Use this setting if **dhcpclient** is set to 0.

Default setting: **192.168.1.100**

netmask

Network mask for static IP address setting. Use this setting if **dhcpclient** is set to 0.

Default setting: **255.255.255.0**

defaultgw

Default gateway for packets routed outside the LAN. Use this setting if **dhcpcclient** is set to 0.

Default setting: **192.168.1.1**

pwd

2N® NetSpeaker's own password for authorising connection initiated by the 2N® NetSpeaker Server. The same password must be stored in the 2N® NetSpeaker Server global settings and must be identical for all 2N® NetSpeaker units in the system. This password is used for Telnet server connection authorisation too.

Default setting: **admin**

activemode

2N® NetSpeaker is connecting actively to the 2N® NetSpeaker Server. Remember to set the **srvipadr** and **srvport** parameters correctly if 1 is selected.

Setting options **0** 2N® NetSpeaker passive mode. The server connection is initiated by the 2N® NetSpeaker Server.
1 2N® NetSpeaker active mode. The server connection is initiated by 2N® NetSpeaker.

Default setting: **0**

srvipadr

2N® NetSpeaker Server IP address. Use the setting in the active mode, i.e. if **activemode=1**.

Default setting: **192.168.1.1**

srvport

2N® NetSpeaker Server communication port. Use the setting in the active mode, i.e. if **activemode=1**.

Default setting: **6999**

srvpwd

2N® NetSpeaker Server connection authorisation password. Used both in the active and passive modes of 2N® NetSpeaker. The password must be identical with the 2N® NetSpeaker Server password.

Default setting: **admin**

Firmware Upgrade

2N® NetSpeaker firmware upgrade runs automatically whenever 2N® NetSpeaker gets connected to the 2N® NetSpeaker Server. This guarantees that all connected devices have identical and latest firmware versions. Refer to www.2n.cz for the latest firmware version.

Firmware Installation

Refer to the 2N® NetSpeaker Software User Manual for details on 2N® NetSpeaker firmware installation and control.

4

Function and Use

This section provides the basic and extended functions of the **2N® NetSpeaker** product.

Here is what you can find in this section:

- 2N® NetSpeaker Button Control
- 2N® NetSpeaker Remote Control
- 2N® NetSpeaker LED Status Signalling

4.1 Basic Functions

2N[®] NetSpeaker Button Control

2N[®] NetSpeaker is equipped with two buttons on the front panel.



Use these buttons to adjust volume or change the channel number. Select the button control mode in the configuration menu for each 2N[®] NetSpeaker unit in the 2N[®] NetSpeaker Control Panel application; refer to the 2N[®] NetSpeaker Software User Manual.

2N[®] NetSpeaker Remote Control

2N[®] NetSpeaker is equipped with an infrared remote control receiver.



Use the remote controller (Part No. 914101E) for volume adjustment and channel selection.



Tip

- The remote controller is not part of the standard delivery. Order it under Part No. 914101E.

Be sure to set the remote controller into the 2N[®] NetSpeaker compatible mode before the first use of after every battery replacement. Follow the steps below:

Remote Controller Setting

1. Press and hold the MAGIC button until the controller flashes twice.
2. Press sequentially the following buttons: once the left button, once the right button, twice the middle button and once the left button.

2N[®] NetSpeaker Status Signalling

2N[®] NetSpeaker is equipped with colour LEDs on its front panel, which indicate operational statuses.



Refer to the table below for the list of available operational statuses:

Signalling	Status
Green (permanent light)	Supply voltage application status - 2N [®] NetSpeaker is starting.
Green (quick flashing)	LAN connection in progress. If this LED is shining continuously, check the LAN connection.
Green, blue (quick flashing)	2N [®] NetSpeaker Server connection in progress. If this LED is shining continuously, check the connection.
Blue (permanent light)	2N [®] NetSpeaker is connected to 2N [®] NetSpeaker Server but fails to receive the audio stream. Normal operational status in which 2N [®] NetSpeaker is not in the active audio session.
White (permanent light)	2N [®] NetSpeaker is connected to the 2N [®] NetSpeaker Server and is receiving audio stream.
Blue (slow flashing)	2N [®] NetSpeaker is connected to the 2N [®] NetSpeaker Server but has not been installed in the system. Use the 2N [®] NetSpeaker Console application for installation.
Yellow (quick flashing)	Internal FLASH memory deletion in progress during resetting.
Orange (quick flashing)	Device failure. Try to restart, disconnect from power supply or reset the device. If nothing helps, contact the 2N TELEKOMUNIKACE Technical Support staff.

5

Technical Parameters

This section describes the technical parameters of the **2N® NetSpeaker** product.

5.1 Technical Parameters

Mechanical and Electrical 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	12V DC / 2A																		
LAN supply	PoE IEEE 802.3af																		
Status signalling	1 RGB LED on front panel																		
Local control	2 buttons on front panel																		
Remote control	1 infrared sensor on front panel																		
LAN connection	RJ-45 connector on back panel, 10/100BASE-TX with Auto-MDIX function																		
Power amplifier output	4 terminals on back panel, STEREO/MONO with auto detection																		
Loudspeaker impedance	4-16Ω																		
Amplifier power output	<table border="1"> <thead> <tr> <th>Loudspeaker</th> <th>12V/2A</th> <th>PoE</th> </tr> </thead> <tbody> <tr> <td>2 x 4Ω STEREO</td> <td>2 x 2.5W</td> <td>2 x 2.5W</td> </tr> <tr> <td>2 x 8Ω STEREO</td> <td>2 x 7W</td> <td>2 x 4W</td> </tr> <tr> <td>2 x 16Ω STEREO</td> <td>2 x 4W</td> <td>2 x 4W</td> </tr> <tr> <td>4Ω MONO</td> <td>1 x 14W</td> <td>1 x 8W</td> </tr> <tr> <td>8Ω MONO</td> <td>1 x 8W</td> <td>1 x 8W</td> </tr> </tbody> </table>	Loudspeaker	12V/2A	PoE	2 x 4Ω STEREO	2 x 2.5W	2 x 2.5W	2 x 8Ω STEREO	2 x 7W	2 x 4W	2 x 16Ω STEREO	2 x 4W	2 x 4W	4Ω MONO	1 x 14W	1 x 8W	8Ω MONO	1 x 8W	1 x 8W
Loudspeaker	12V/2A	PoE																	
2 x 4Ω STEREO	2 x 2.5W	2 x 2.5W																	
2 x 8Ω STEREO	2 x 7W	2 x 4W																	
2 x 16Ω STEREO	2 x 4W	2 x 4W																	
4Ω MONO	1 x 14W	1 x 8W																	
8Ω MONO	1 x 8W	1 x 8W																	
Frequency range	20Hz – 20kHz (+/- 0.5dB)																		
Harmonic distortion	0.05% @ 1kHz																		
Signal-to-noise ratio	91dB																		
Headphone/Line output	STEREO 3.5mm jack on front panel																		

Parameter	Value
Digital output	24V 1A AC/DC relay output, galvanically isolated
Digital input	5 to 24V DC digital input, galvanically non-isolated
Memory capacity extension	MicroSD card slot on front panel
Sound compression	MPEG-1 Audio Layer III (MP3)
Bandwidth	32-320kbps

6

Supplementary Information

This section provides supplementary information on the **2N[®] NetSpeaker** product.

Here is what you can find in this section:

- Applicable Directives, Laws and Regulations
- List of Figures
- Trouble shooting
- List of Abbreviations

6.1 List of Abbreviations

- **FW** (Firmware)
Software responsible for system function.
- **HW** (Hardware)
For this purpose, hardware means an electronic device, circuit, board, component, etc..
- **LAN** (Local Area Network)
- **PC** (Personal Computer)
IBM PC compatible personal computer.
- **SW** (Software)



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