MAGIC AE1 DAB+
DAB+ Audio Encoder

Hardware/Software Manual

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Subject to changes.

Release date: (10.16)

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C o n t e n t

INTRODUCTION

The system *MAGIC AE1 DAB+* is implemented as DAB+ Audio Encoder and has analogue and digital AES/EBU audio interfaces. Each system has its own monitoring decoder inside which allows you to check the system's functionality and to evaluate the audio quality.

The HE-AAC-V2 DAB+ audio encoder is an implementation of the FhG (Fraunhofer Gesellschaft) in Erlangen.

The configuration of the system can be carried out via the Windows PC Software included in delivery or via the front keypad and display of the unit.

SAFETY

Introduction

The unit described has been designed to the latest technical parameters and complies with all current national and international safety requirements. It operates on a high level of reliability because of long-term experience in development and constant and strict quality control in our company.

In normal operation the unit is safe.

However, some potential sources of danger for person, material and optimal operation remain - especially if daily routine and technical errors coincide.

This manual therefore contains basic safety instructions that must be observed during configuration and operation. It is essential that the user reads this manual before the system is used and that a current version of the manual is always kept close to the equipment.

General safety requirements

To keep the technically unavoidable residual risk to a minimum, it is absolutely necessary to observe the following rules:

– Transport, storage and operation of the unit must be under the permissible conditions only.

– Installation, configuration and disassembly must be carried out only by trained personnel on the basis of the respective manual.

– The unit must be operated by competent and authorised users only.

– The unit must be operated in good working order only.

– Any conversions or alterations to the unit or to parts of the unit (including software) must be carried out by trained personnel authorised by the manufacturer. Any conversions or alterations carried out by other persons lead to a complete exemption of liability.

– Only specially qualified personnel is authorised to remove or override safety measures, and to carry out the maintenance of the system.

– External software is used at one's one risk. Use of external software can affect the operation of the system.

– Use only tested and virus-free data carriers.

Text Conventions

In this manual the following conventions are used as text markers:

Accentuation: Product names or important terms

LCD TEXT: Labelling on the front display of the system

PC Text: Labelling in the PC Software

TIP

The symbol *TIP* marks information which facilitates the operation of the system in its daily use.

NOTE

The symbol *NOTE* marks general notes to observe.

ATTENTION

The symbol *ATTENTION* marks very important advice that is absolutely to observe. In case of non-observance disfunctions and even system errors are possible.

1   CONSTRUCTION

The functions of the *MAGIC AE1 DAB+* are implemented in a single unit. The system is equipped with a module for HE-AAC-V2 coding. The system is designed for mounting in a 19" rack (1 U). 19" brackets are part of the delivery.

FIG. 1   FRONT VIEW: MAGIC AE1 DAB+ AUDIO ENCODER

2   SYSTEM DESCRIPTION

The functional elements of the system are pictured in Fig. 2.

FIG. 2   FUNCTIONAL ELEMENTS OF MAGIC AE1 DAB+ AUDIO ENCODER
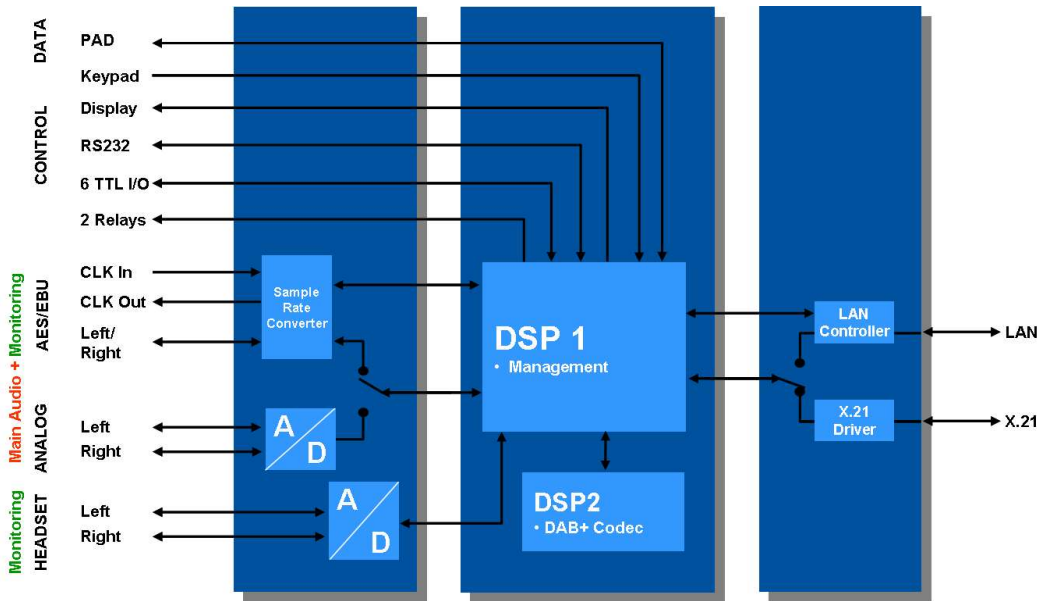
2.1   Functionality

The *MAGIC AE1 DAB+ Audio Encoder* is equipped with a *LAN* interface for a direct connection to the *AVT MAGIC DAB MUX Multiplexer* based on the Fraunhofer Content Server® technology or to other Ensemble Multiplexers supporting *EDI*. For the connection to Fraunhofer Multiplexers, the *FhG MUXENC protocol* is optionally available.

NTP is used for the synchronisation of the systems' clocks when the Encoder is connected to a Multiplexer. The communication between the Encoder and the Multiplexer is realised via the *EDI protocol* or via the *FhG MUXENC protocol*.

Additionally, the *MAGIC AE1 DAB+* system incorporates an *X.21* interface for a connection to all standard Ensemble Multiplexers (e.g. *R&S DM-001*) which do not provide a LAN interface. The X.21 clock is derived from the Ensemble Multiplexer clock.

NOTE   The *MAGIC AE1 DAB+ Audio Encoder* Firmware and PC Software supports the *X.21 operating mode* until *software version 2.320*. With later software releases only the LAN operating mode is possible.

The complete signal processing is taken over by two digital signal processors. In this way the following functions are realised:

DSP1:

- – Digital audio router

- – Signalling management

- – Control of the complete system (Keypad, display, relays, TTL, RS232)

- – PAD multiplexer

DSP2:

- – HE-AAC-V2 DAB+ Encoder and Decoder

Via the main audio channel the high quality Stereo or Mono audio signal is inserted analogue or digitally. If the digital AES/EBU audio interface is used, a Sample Rate Converter is available for automatic clock synchronisation between network and audio source. For external clocking a clock input and a clock output are available.

The audio outputs can be used for monitoring purposes. The encoded signal is looped continuously to the HE-AAC-V2 decoder. The decoded audio signal is available as analogue or digital audio output signal. As second audio monitoring interface a headphone interface is available.

All relevant basic settings can be made the front keypad and the illuminated display.

Configuration and control is especially comfortable with the *MAGIC AE1 DAB+ Windows PC Software* which is included in delivery and which communicates with the system via the *RS232* interface or the *LAN* interface. Via the *MAGIC AE1 DAB+ LAN Software* up to 60 systems can be monitored and selected for control.

Six programmable *TTL contacts* can be used for external signalling. Two *relays* are available for status indication.

3   PUTTING THE SYSTEM INTO OPERATION

3.1   Mounting

With its dimensions (W × H × D) of 431 mm × 44,5 mm (1 U) × 250 mm the *MAGIC AE1 DAB+* system can be used either as desktop device or mounted in 19 inch racks. Corresponding 19" mounting brackets are included in delivery.

When mounting the unit please keep in mind that the bending radius of the cables is always greater than the minimum allowed value.

When the *MAGIC AE1 DAB+* audio encoder is installed, please make sure that there is sufficient ventilation: It is recommended to keep a spacing of ca. 3 cm from the openings. In general, the ambient temperature of the system should be within the range of +5°C and +45°C. These thresholds are especially to observe if the system is inserted in a rack. The system works **without** ventilation.

TIP

The system temperature can be indicated on the display (*MENU STATUS INFORMATION* (see CHAPTER A1.4, Page 89))

During operation air humidity must range between 5% and 85%.

ATTENTION

Incorrect ambient temperature and humidity can cause functional deficiencies.
Operation outside the threshold values indicated above leads to a loss of warranty claim.

3.2   Connection to the mains voltage

The system can be operated with mains voltages in the range from 90 V to 253 V. The frequency can vary from 45 Hz to 65 Hz. The maximum power consumption is 15W (typically 12W).

After plugging the mains connector and switching on the system boots within a few seconds. In stand-by mode the *MAGIC AE1 DAB+* logo is shown on the display.

3.3   Earthing of the system

For EMC reasons an earthing via the earthing screw of the system is recommended.

ATTENTION

Earthing
A lacking earthing can cause functional deficiencies within the unit.

3.4 Operational elements on the front side

The system has an illuminated graphical display with a resolution of 160 x 32 Pixels and 19 operating buttons.

On the right next to the display there are two softkeys whose current functions are indicated on the display. In the middle there are two buttons for navigation ($\wedge$ and $\vee$), two buttons for establishing ($\searrow$)/dropping ($\phone$) connections as well as an *OK* button. The numerical pad supports in addition to the numerics *0...9* the '*'* and '*#*' key. For text entries the numerical pad can also be used as normal keypad.

The operation is similar to standard mobile telephones.

FIG. 3   **OPERATIONAL ELEMENTS ON THE FRONT SIDE**

Establish connection
Drop connection/
Main menu
Graphical display
Softkeys
Navigation buttons/
Headphone Level
Confirm entry
Status window
Keypad for text entry
Display shift
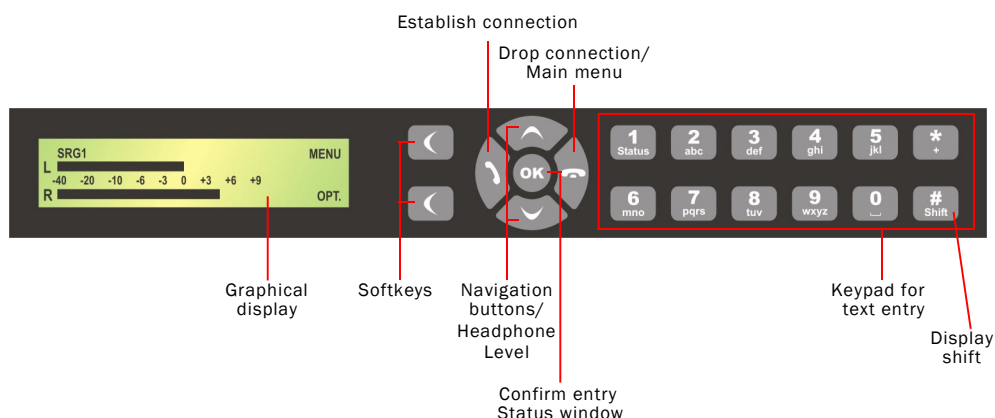
3.5   Wiring diagram

The figure below show the typical wiring diagrams of a DAB+ system depending on the interface in use - X.21 or LAN.

FIG. 4   **WIRING DIAGRAM USING THE X.21 INTERFACE**
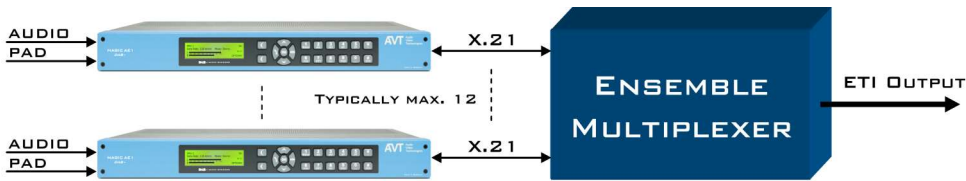
FIG. 5   **WIRING DIAGRAM USING THE LAN INTERFACE**
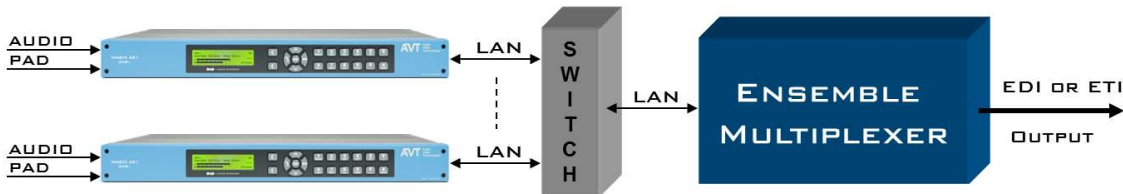
The standard interfacing of the system is shown Fig. 6.

FIG. 6   **WIRING & CONNECTION DIAGRAM**

4   OPERATION VIA DISPLAY AND KEYPAD
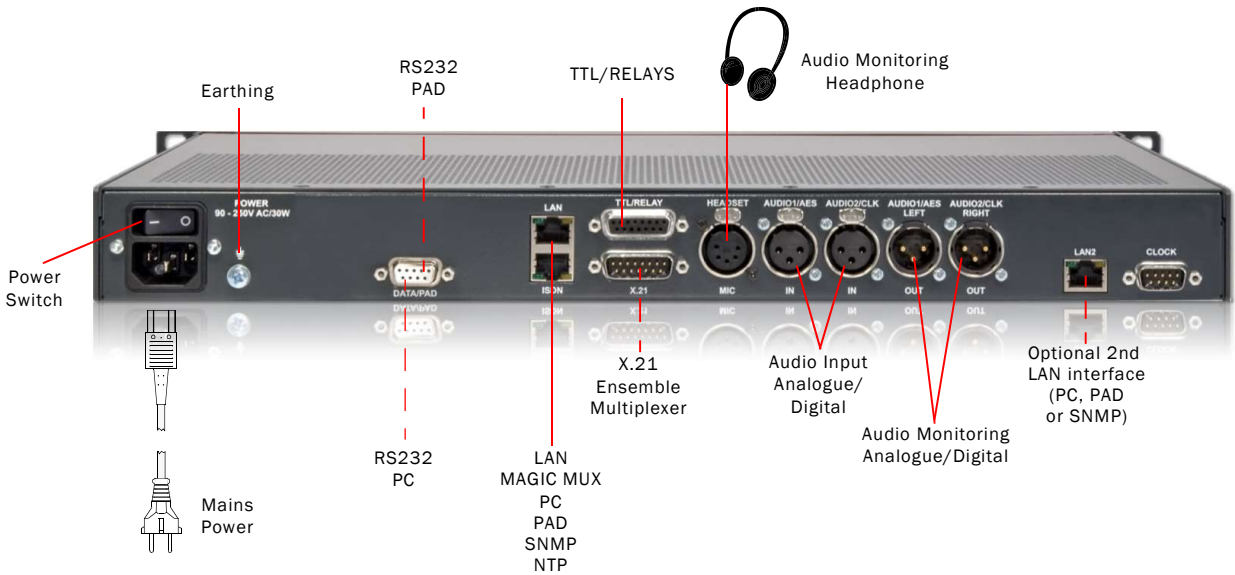
In this chapter a few basic settings which can be made on the *MAGIC AE1 DAB+* front keypad and display are explained. An overview of the menu structure you will find in the annex under CHAPTER A1.

Of course, all configurations can also be comfortably made via the *MAGIC AE1 DAB+ Software* included in delivery.

NOTE   For the details of most functions, please have a look at the PC Software description from CHAPTER 5.

4.1   Standard functions

Keypad lock

To avoid that keys are pressed accidentally you can enable a keypad lock. For activation please press the *MENU* key followed by the **✱** (star) button. If the keypad lock is enabled the display illumination is turned off immediately.

The keypad lock is deactivated by entering the key sequence *MENU ✱* a second time.

Softkey Menu

Using the softkey *MENU* you can change all parameters of the system at any time. The menu structure is given in *CHAPTER A1.1 ... CHAPTER A1.5* (see Page 86).

Reading out the factory number

When contacting our support or for the activation of fee-based software upgrade, you might need the factory number of the system.
For this please use the softkey *MENU* and go to *STATUS INFORMATION* using the cursor keys ⌃ and ⌄. Press *SELECT* and go to *VERSION* again using the cursor keys. Press *SELECT* and you will see the *FACTORY NUMBER* displayed.

4.2   **Basic configurations**

In the following some specific basic configurations of *MAGIC AE1 DAB+* are described in detail.

Menu reference number

NOTE   All menus can be reached directly via a *QuickMenu* key sequence. For this purpose each menu item is marked with a cypher in the upper left corner (in the example on the left it is e. g. *3*). To reach a certain menu directly please enter from the main menu the key sequence *MENU <DIGIT> <DIGIT>* whereby <digit> marks the respective menu reference number. Please notice that the menu reference number can change depending on the configuration.

4.2.1   **Selecting the menu language**

In delivery status *ENGLISH* is selected as standard menu language. In order to select *GERMAN* as menu language, please follow the instructions below:

NOTE   If you are not in the main menu please press the ☎ key first.

First press the softkey ❰ *MENU* and select *SYSTEM SETTINGS* using the softkey ❰ *SELECT*. Press the cursor key ⌃ once until the option *LANGUAGE* is displayed in the menu. Via the *SELECT* softkey you directly reach the options for the

desired language. With the help of the cursor keys ⌃ and ⌄ please choose the language and press again *SELECT*.

Please confirm your entry be pressing the *OK* button or the *OK* softkey.

To get back to the main menu, please press the ☎ key. Now you are asked if you want to *SAVE SETTINGS?* Via the *YES* softkey the settings are stored permanently in the system.

NOTE   If you press *NO*, all settings that you have made are lost when the unit is switched off.

4.2.2   **Configuration of the LAN Interface**

To configure the LAN interface follow the instructions below:

– Press the *MENU* softkey.

– Please mark the option *SYSTEM SETTINGS* via the cursor keys ⌃ and ⌄ and press the *SELECT* softkey.

– Use the cursor keys ⌃ and ⌄ to get to the option *LAN INTERFACE* and press the *SELECT* softkey.

Select *LAN 1* and to enter or change the IP Address of the system, mark the option *IP ADDRESS* and press the *SELECT* softkey.

NOTE   The default IP address is 192.168.96.102. For further information take a look at Page 30.

– Now you can enter the correct IP Address via the numerical keypad.

– Press the ☎ key to get back to the main menu. Now you are asked if you want to *SAVE SETTINGS?*. Via the *YES* softkey, the configuration is stored in the system.

TIP

You reach the settings for the *IP ADDRESS* directly via the key sequence: *MENU 1 3 1 1*.

The currently allocated IP address of the system can also be displayed by pressing the telephone button ☎ on the front keypad of the system twice if currently no Audio connection is established. During a connection you can go to *MENU - STATUS INFORMATION - LAN STATUS* to check the IP address.

NOTE

Maybe further settings which can also be found under the option *LAN INTER-FACE* are necessary (e.g. *SUB NET MASK*, standard: 255.255.0.0, and *DEFAULT GATEWAY*). Please ask your network administrator for the correct settings.

4.2.3   Setting the Audio interface: Analogue or digital

MAGIC AE1 DAB+ incorporates analogue as well as digital Audio interfaces which you can adjust separately. The digital *AES/EBU interfaces* have integrated *Sample Rate Converters* to adjust the digital Audio source to the transmission clock. Additionally, clock inputs/outputs are also available. To configure the Audio interface please follow the instructions below:

NOTE

If you are not in the main menu please press the ☎ button first.

– First press the softkey ◖ *MENU* and select *SYSTEM SETTINGS* via the softkey ◖ *SELECT*.

– With the use of the *SELECT* softkey you reach the option *AUDIO INTERFACE*.

– Please mark the option *INPUT MODE* or *OUTPUT MODE* using the cursor keys ⌃ and ⌄ and press again *SELECT*. Now the options *ANALOGUE* and *DIGITAL* are displayed.

– Select the desired interface with the help of the cursor keys ⌃ and ⌄ and by pressing the softkey *SELECT*.

– Confirm your entry by pressing the ⏺ button or the softkey *OK*.

– To get back to the main menu please press the ☎ button. Now you are asked if you want to *SAVE SETTINGS?*. Via the softkey *YES* the setting is stored permanently in the system.

TIP

You reach the settings for the *AUDIO INPUT* or *AUDIO OUTPUT* via the key sequence: *MENU 1 2 1* or *MENU 1 2 2*

4.2.4 Configuring the DAB+ parameters

If the *MAGIC AE1 DAB+* works together with a *MAGIC DAB MUX Multi-plexer*, the Encoder parameters can be easily configured from the Multiplexer. If required, the DAB+ parameters can be adjusted via the front panel under the menu *DAB+ PARAMETERS*. For more information please refer to CHAPTER 5.5.2.1.3, Page 44.

NOTE

If you are not in the main menu please press the 🕿 button first.

– First press the softkey 《 *MENU* and select *OPERATION SETTINGS* via the softkey 《 *SELECT*.

– With the use of the *SELECT* softkey you reach the option *DAB+ PARAMETER*.

– Please mark the option *AUDIO DATA RATE* using the cursor keys ⌃ and ⌄ and press again *SELECT*. Now the desired maximum Audio bit rate can be set.

– Confirm the selection with *SELECT* and press *OK*.

– To configure the desired mode select the menu *MODE*. Up to five possibilities depending on the bitrate are available:

– *MONO*

– *MONO + SBR*

– *STEREO*

– *STEREO + SBR*

– *PARAMETRIC STEREO + SBR*

– Confirm the selection with *SELECT* and press *OK*.

– Select now *SAMPLING FREQUENCY* to configure the Sampling Frequency. If you have selected a *SBR* mode only the low sampling frequencies *16-KHZ* and *24-KHZ* are possible

– Confirm the selection with *SELECT* and press *OK*.

– If you have selected a *MONO* mode you have three further possibilities for the *MONO MODE*:

– *MONO L+R/2*.

– *MONO LEFT*

– *MONO RIGHT*

– Confirm the selection with *SELECT* and press *OK*.

– To get back to the main menu please press the 🕿 button. Now you are asked if you want to *SAVE SETTINGS?*. Via the softkey *YES* the setting is stored permanently in the system.
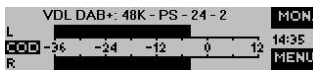
4.3   **The Status Display - Operation during a connection**

TIP   The status window can always be reached by pressing the ⊙**ok** button.

When the connection is established the level meter as well as the status for the selected monitoring signal is displayed.

In the first row the program name, audio bitrate, coding mode (M=Mono, S=Stereo, PS=Parametric Stereo), sampling frequency (16, 24, 32, 48) and PAD bitrate (in kbit/s) is shown.

Softkey Monitor

During a connection you can switch via the softkey *MON.* between original audio signal which is feed into the encoder and the decoded audio signal. Both the audio output (XLR) and the head phone will be switched to the selected audio signal. The display shows the monitoring status as follows:

– *ORG*, if you monitor the original audio input signal

– *COD*, if you monitor the coded audio signal
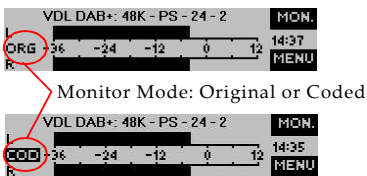
Softkey Menu

Using the softkey *MENU* you can change all parameters of the system at any time.

Headphone Level

If a connection is established you can adjust the headphone level with the navigation buttons ⌃ and ⌄. The current selected level will be shown in the display.
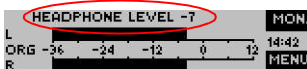
Dropping a connection

The connection is dropped by pressing the telephone receiver button ☎. If no connection exists, the main menu is displayed after a few seconds. To avoid errors you must confirm the drop request.

Establishing a connection

The connection is normally establishing automatically after power on. After dropping a connection manually you can reconnect the line by pressing the telephone receiver button ☏.

4.4   **Working with Presets**

The *MAGIC AE1 DAB+* differentiates between *SYSTEM SETTINGS* and *OPERATION SETTINGS*.

System Settings are settings that do **not** change during normal operation like e.g. display contrast, date/time etc. These parameters **cannot** be saved as preset since a configuration is usually only required when the system is put into operation.

Operation Settings need to be reconfigured depending on the application. To easily recall recurring configurations you can store up to 10 presets in the system.

You reach the menu for the Presets by pressing the *MENU* softkey once, the cursor key⌄ twice and by pressing the softkey *SELECT* once as confirmation.

In the input field *PRESETS* you can search for a certain Preset. As soon as you enter a character, the corresponding entries of the Preset list are filtered out.

Alternatively, you can select a Preset from the list using the cursor keys⌃ and ⌄.

If you now press the OK button, the selected Preset is loaded immediately.

By the softkey *OPT.* (Options) the following functions which you can select via the softkey *SELECT* are realised:

– *LOAD*: The stored Preset is loaded.

– *NEW*: With the help of this function you can create a new Preset. All current Operation Settings are stored.

– *SAVE*: The currently selected Preset is overwritten with the current Operation Settings. For safety reasons a confirmation is required.

– *DELETE PRESET*: The currently selected Preset is deleted. For safety reasons a confirmation is required.

– *LOAD FACTORY SETTINGS*: All settings will reset to the factory settings. For safety reasons a confirmation is required.

NOTE   If the configuration has changed, you are asked if you want to *SAVE SETTINGS?* when you leave the Preset menu. Via the *YES* softkey the configuration is stored permanently in the system. This Preset is loaded automatically by the system after the unit is connected to the power supply.

5   WINDOWS PC SOFTWARE

The configuration of the system is particularly comfortable via the Windows PC Software included in delivery.

5.1   Hardware requirements

The PC must meet the following minimum requirements:

– IBM PC AT, IBM PS/2 or 100% compatible

– Pentium Prozessor (> 1 GHz) recommended

– Windows 7/8/10

– ca. 600 kByte available RAM

– 100 MB available hard disk space

– Screen resolution with 800 x 600 Pixels

– LAN interface or RS232 interface

– Microsoft, IBM PS/2 or 100% software compatible mouse

5.2   Installing the Windows PC Software

Please insert the CD included in delivery in your CD ROM drive. The software automatically starts your Internet browser. Possible safety warnings can be ignored for the moment. Please press under *Install Software* the *MAGIC AE1 DAB+* button. Subsequently, the setup program is executed.

Alternatively, you can install the software directly from the CD. You will find the installation file *setup.exe* in the folder *Software\MAGIC AE1 DAB & DAB+* on the CD.

Please note that this software can be used with *MAGIC AE1 DAB* as well as *MAGIC AE1 DAB+* systems.

Please follow the instructions of the installation routine.

After the installation the software can be started by clicking on the *MAGIC AE1 DAB+* icon.

Please connect your PC via a serial 1:1 cable (only Pin 2 and Pin 3 are used, Pin 5=ground) or preferably via LAN cable with the system.

The standard *COM Port* settings are: *38400 Baud*

The default IP addresses and the default ports are:

IP address 1:	192.168.96.102[1]
IP address 2: (optional LAN2 interface)	192.168.96.103
Audio Port:	7000
Control Port 1:	10000
Control Port 2:	10001
Control Port 3:	10002
Control Port 4:	10003

Operation via Windows PC software

In the following chapters all functions of the PC software are described in detail.

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[1] The configured system IP address can be checked via the display (*MENU* → *OPERATION SETTINGS* → *LAN INTERFACE* → *IP ADDRESS*).

5.3 MAGIC AE1 DAB+ main window

After starting the *MAGIC AE1 DAB+* application, the main window is displayed automatically (see Fig. 7).

The connection status between PC and system is displayed in the top right corner of the window:

PC ONLINE: Connection is okay.

NO CONNECTION: Connection with PC is faulty

Following further status messages are possible:

PC ONLINE ALARM: Upcoming alarm (see *System Monitor*, blinking)

NOTE   If the connection is faulty, please check the following points:
– Power supply cable of the system is plugged in and the system is switched on (display available)
– Serial 1:1 cable or LAN is connected with PC and system
– Using RS232 interface: Correct COM port and same baud rate are selected in the software as well as in the system (*Configuration → Control Interface*, see Page 34)
– Using LAN interface: Correct IP address and port is selected in the software as well as in the system (*Configuration → Control Interface*, see Page 34)

FIG. 7   **MAIN WINDOW OF THE PC SOFTWARE**
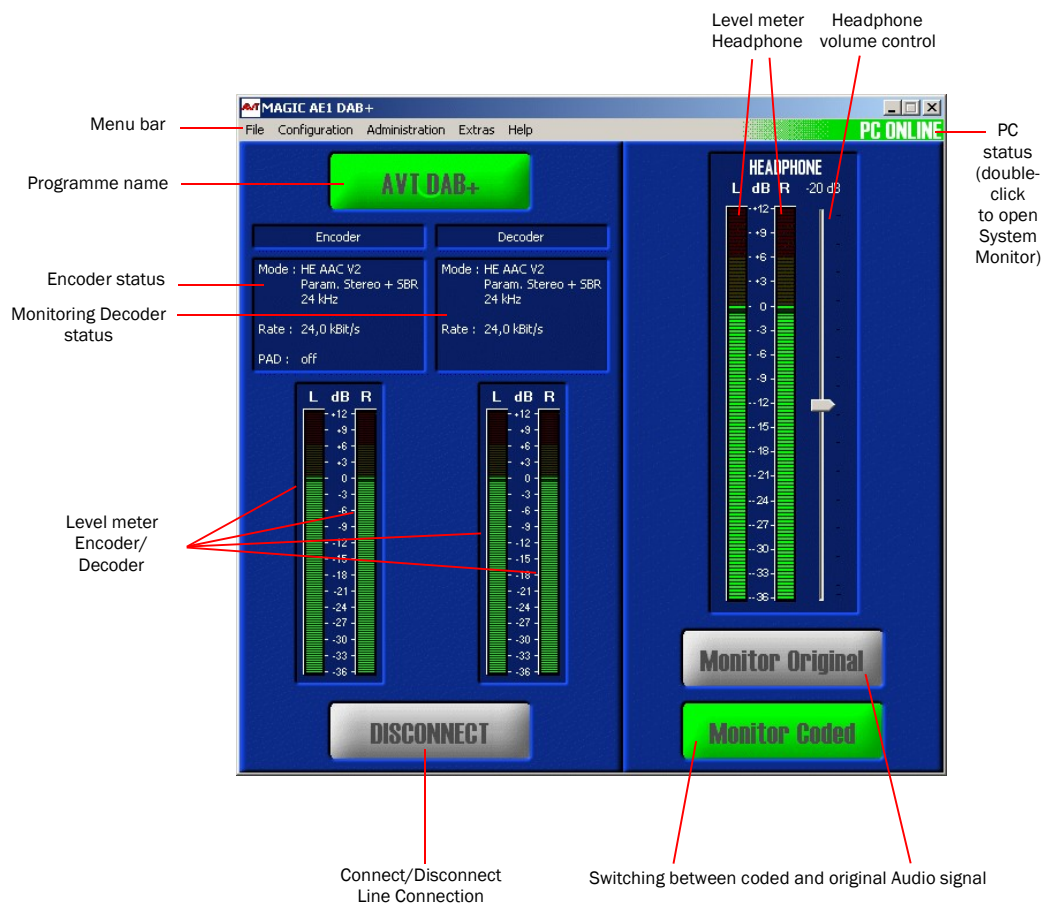
5.3.1   Operating elements

Info button

On the **Info button** the programme name is shown. The programme name can be configured via **Configuration** → **MAGIC AE1 DAB+** → **Operation Settings** → **Encoder Parameters** → **Programme Name**.

Connect/Disconnect button

To stop the transmission you can press the **Disconnect** button. For security reasons you must confirm this action.

FIG. 8   CONFIRMATION OF DROPPING A CONNECTION

NOTE   If the connection is dropped, the level meter for the encoder as well as the Info button will be displayed grey coloured.

Monitoring Coded/Original

Via the **Monitor Coded** and **Monitor Original** buttons you can select the output of the monitoring decoder. The currently selected source is highlighted in green.

To adjust the headphone level use the **Headphone Volume Control**, which allows an adjustment in a of range of -40 ... 0 dB.

5.4	**Menu file**

FIG. 9   **MENU FILE**

5.4.1   Operation Settings Presets

To *Import*/*Export All* the different presets please use the submenu *Opera-tion Settings Presets*. The file format (*.pst*) is binary and cannot be edited.

5.4.2   System Settings

To *Import*/*Export* the system configuration please use the submenu *System Settings*. The file format (*.tcg*) is binary and cannot be edited.

5.4.3   Submenu Exit

Via the submenu *Exit* you close the *MAGIC AE1 DAB+* software.

5.5	Menu Configuration

FIG. 10   MENU CONFIGURATION
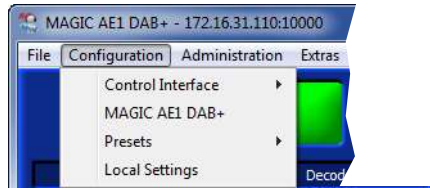
5.5.1	Submenu Control Interface

The system can be connected via the serial **RS232** interface with a 1:1 connecting cable or via the **LAN** interface to a PC. The configuration of the **Control Interface** of the PC can be carried out under **Configuration → Control Interface → Configuration**.

Using the RS232 interface

If you want to use the RS232 interface select via the drop-down list **Interface → RS232**.

FIG. 11   CONFIGURATION OF THE COM PORT
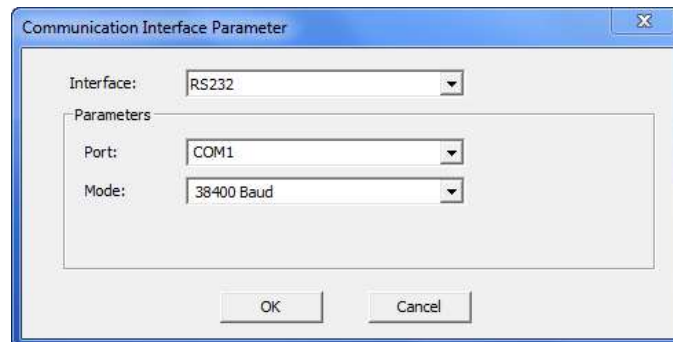
As **Port** you select the interface of your PC which is connected to the **MAGIC AE1 DAB+**.

Under **Mode** you can set the desired operating mode:

– **9600 Baud**

– **19200 Baud**

– **38400 Baud**

– **57600 Baud**

– **115200 Baud**

All further parameters like **Data Bits**, **Parity** and **Stop Bits** cannot be configured.

Using the LAN interface

To control the system via your local network you can connect the LAN interface of the system to your IP network. Select via the drop-down list **Interface → LAN**.

FIG. 12   CONFIGURATION OF THE LAN INTERFACE
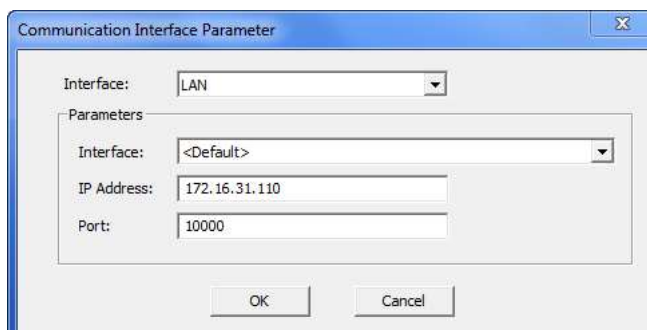
Under **Parameter** you have to select the used LAN interface of your PC. If only one **Network Card** is installed you shall use the setting **<Default>**.

Enter the right **IP Address** and **Port** of the desired system[1].

Control of multiple systems via the Control Interface List

If you have more than one system connected via the LAN or RS232 interface you can manage all connection parameters via the **Control Interface List**.

FIG. 13   USING THE CONTROL INTERFACE LIST
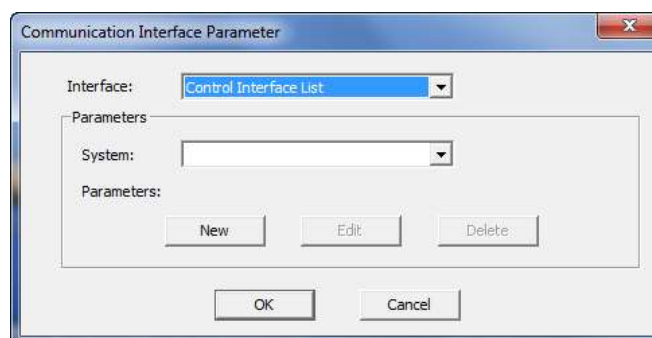
Press **New** to add a new system.

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[1] The configured LAN settings can be checked via the display (*MENU → OPERATION SETTINGS → LAN INTERFACE → IP ADDRESS*).

FIG. 14   ADDING A NEW SYSTEM
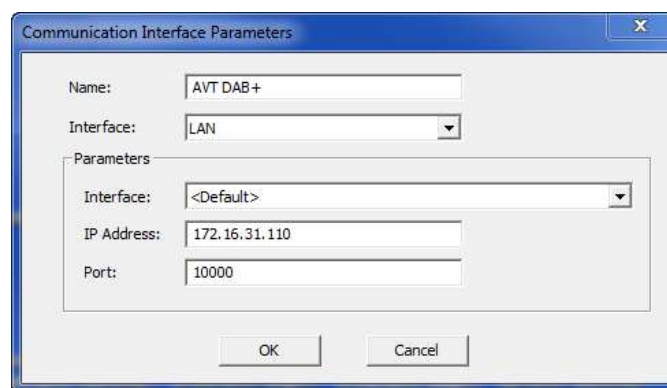
Enter a **Name**, the used interface **LAN** or **RS232** for the desired system and the correct communication parameters.

FIG. 15   EDITING OR DELETING A SYSTEM
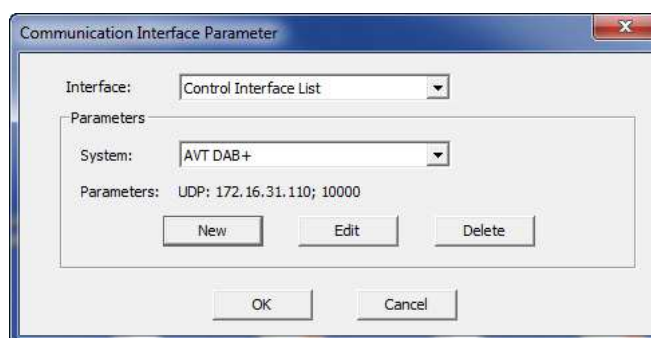
With the **Edit** button you can change the parameters of the selected system.

With **Delete** you can remove the system from the **Control Interface List**.

If you have added all systems to your list you can simply select via **Configuration → Control Interface** the desired system.

FIG. 16   SELECTION OF A SYSTEM VIA LIST
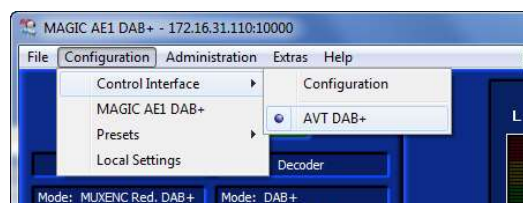
NOTE   With the **MAGIC AE1 DAB LAN** software which is also included in the delivery up to 60 systems (tree display) can be monitored and controlled.

FIG. 17   MAGIC AE1 DAB LAN - MULTI CONTROL (LIST VIEW)

LIST OF
ALL CONNECTED
DAB/DAB+ ENCODER
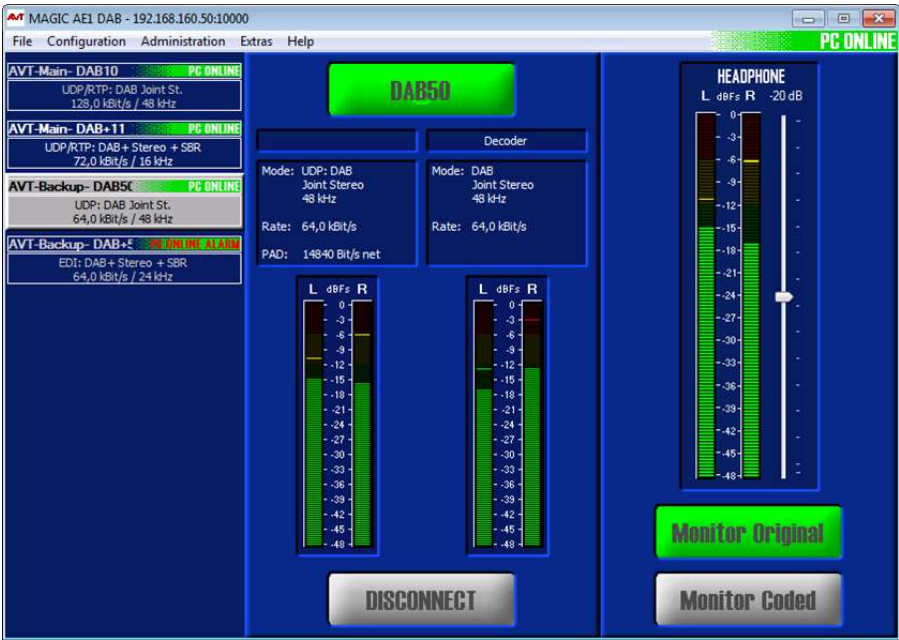
When the PC Software is executed, the *MAGIC AE1 DAB LAN Software* is automatically installed together with the *MAGIC AE1 DAB Software*. To start the *MAGIC AE1 DAB LAN Software*, simply click on the corresponding desktop icon.

The Encoders in the connection list are displayed with their status *PC Online*, *PC Offline* or *PC Online Alarm* (see Page 31). You can also see the Programme's name and the connection details.

The configuration of the systems which are to be connected to the multi control software can be carried out under *Configuration → Control Interface*.

FIG. 18   CONTROL PORT SETTINGS
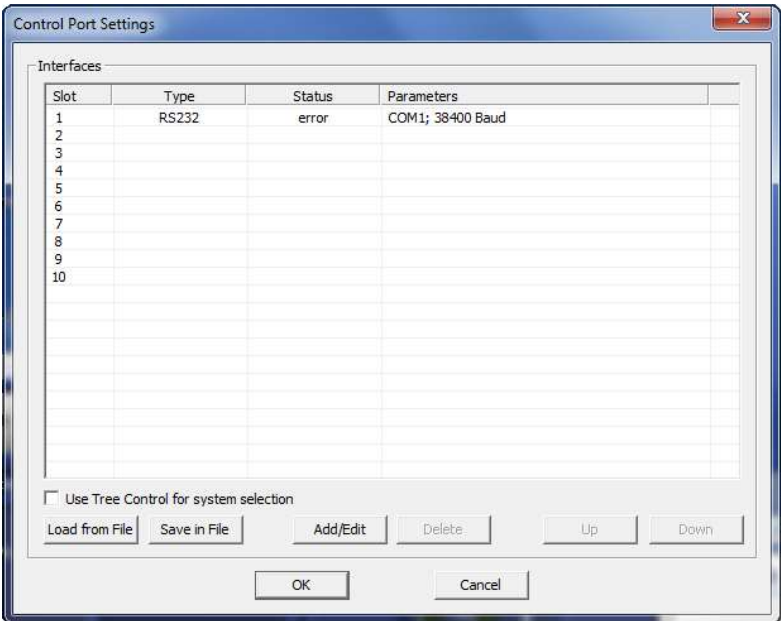
Press **Add/Edit** to add a new system or double-click on a free line.

FIG. 19   ADDING A NEW SYSTEM
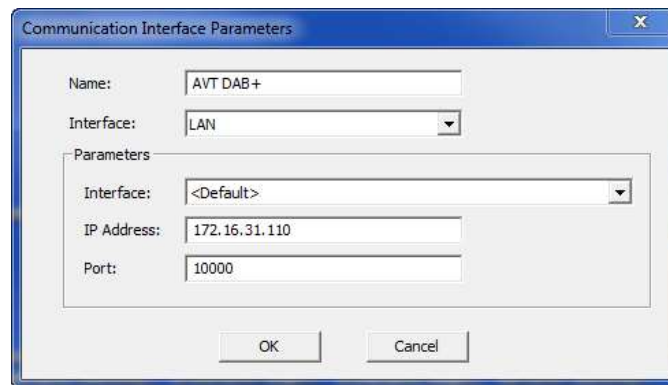
Enter a **Name**, the used interface **LAN** or **RS232** for the desired system and the correct communication parameters.

FIG. 20   CONTROL PORT SETTINGS 2
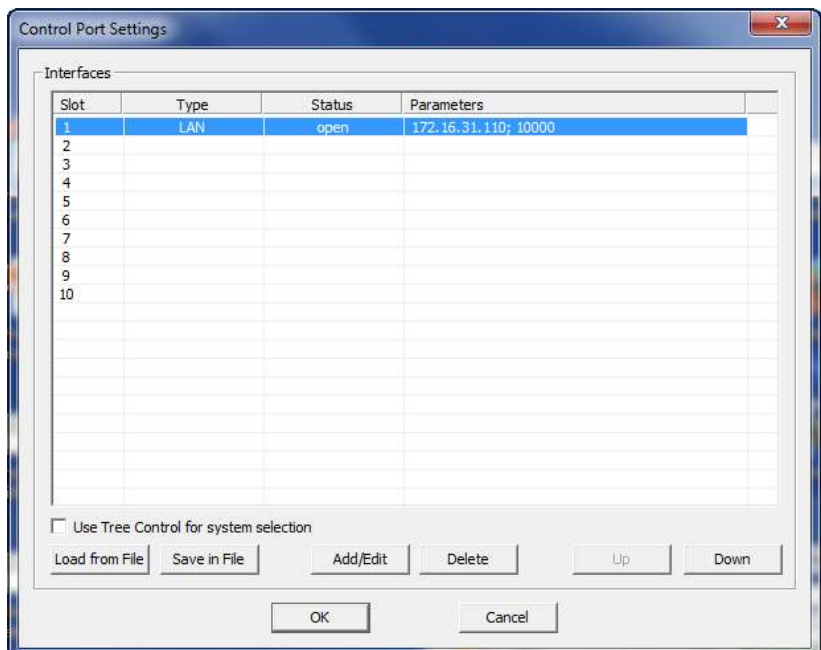
With the **Add/Edit** button you can change the parameters of the selected system.

With **Delete** you can remove the system from the connection list.

It is also possible to save the connection list in a file (**Save in File**) e.g. as backup or for importing it at another workplace. The file has the extension **.ifl**.

With **Load from File** you can import an existing **.ifl** file.

The buttons **Up** and **Down** can be used to change the order of the entries.

In the standard list, maximum 10 systems can be displayed. By using the tree display you can enter up to 60 systems. For this, please activate the function **Use Tree Control for system selection**.

FIG. 21   **MAGIC AE1 DAB LAN - MULTI CONTROL (TREE VIEW)**
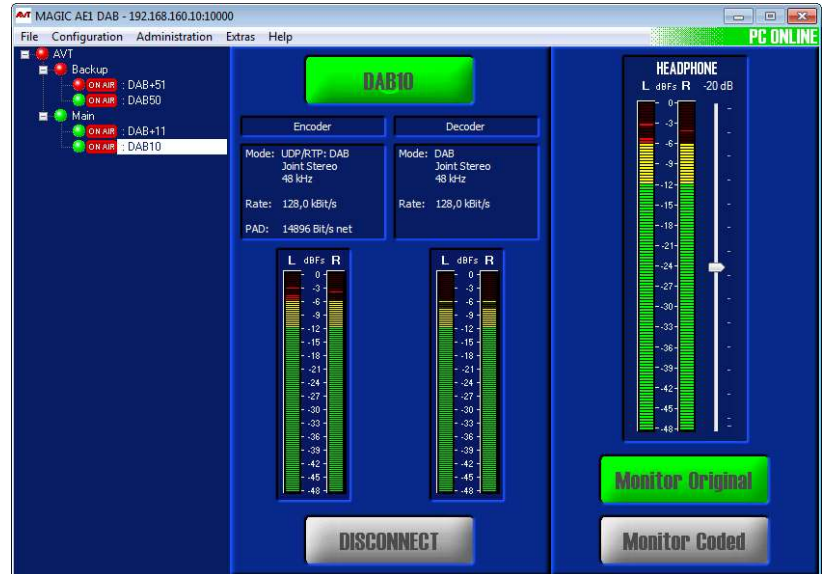
With entering a group name under **System Settings → General → System Name** several Encoders can be summarized in groups (e.g. MAIN & BACKUP) for the tree view. As a separator the "-" character is used:

Syntax: **<Group>-<System>**

The **System Name** consists of maximal 15 characters (A-Z, a –z and 0-9 plus the '-').

If configured in the settings of the **MAGIC DAB MUX Multiplexer**, the Encoders in the connection list are marked with the symbols [ON AIR] (Encoder is ON AIR), [INACT.] (Encoder is inactive, e.g. Backup Encoder) or [DISC.] (Encoder is deactivated).

The LEDs can be displayed in three different colours:

– green: no alarm

– red: active alarm

– blue: alarm has occurred but is no longer active

5.5.2   Submenu MAGIC AE1 DAB+

Via the submenu **MAGIC AE1 DAB+** the system can be configured comforta-
bly. It is distinguished between **System Settings**, which do not have to be
changed during the operation and **Operation Settings** for the current appli-
cation. In contrast to a operation setting, the system settings **cannot** be saved
as **Preset** (see CHAPTER 5.5.3).

5.5.2.1   Operation Settings

NOTE   All listed settings made under **Operation Settings** can be saved as **Preset**.

5.5.2.1.1   Line interface

Under **Line Interface** you can configure the settings which are necessary for
the connection between Audio Encoder and Ensemble Multiplexer.

FIG. 22   LINE INTERFACE
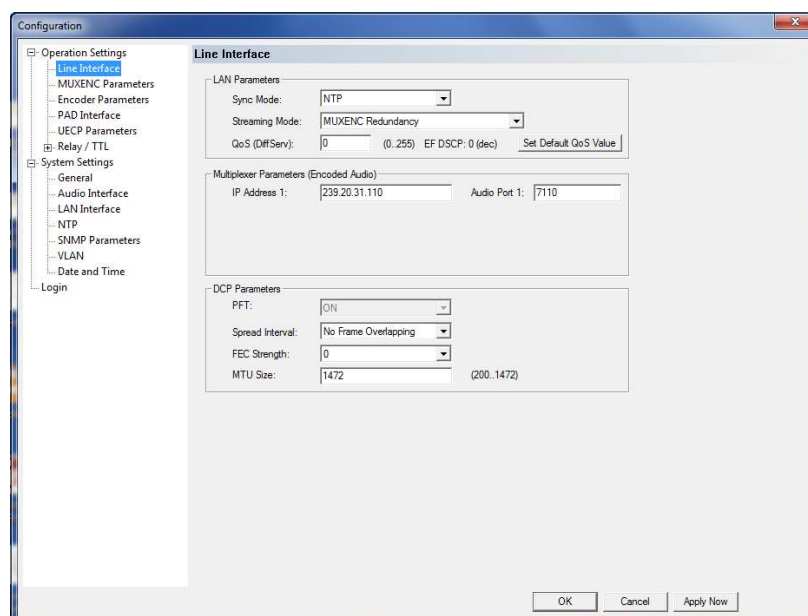
LAN Parameters

- First, you need to select which **Sync Mode** you want to use to synchronise
  the Audio Encoder and the Ensemble Multiplexer. The following modes
  can be configured:

  – **AES/EBU**: If you want to use the digital AES/EBU clock to synchronise
    the systems, please select this setting. Please note that a GPS clock is
    necessary in this case.

  – **NTP**: If your **MAGIC AE1 DAB+ Encoders** are connected to the **AVT MAGIC
    DAB MUX Multiplexer**, please select **NTP** as **Sync Mode**. The NTP Server
    which is providing the clock has to be configured under **System Set-
    tings → NTP**.

  – **Internal**: This setting should only be selected if no other clock is avail-
    able. In this case, it is very likely that dropouts will occur.

– *Auto*: In this mode, the Encoder detects automatically which mode to use. First choice is *NTP*. If *NTP* is not configured or if the NTP Server is not available, the system switches to *AES/EBU*. If also the AES/EBU clock is not available, it switches to *Internal*.

- Under *Streaming Mode* you have to configure which protocol is used for the communication between Audio Encoder and Ensemble Multiplexer. The options are:

    – *UDP stream using RTP*: Set this option if you want to use UDP with RTP. You must set the RTP option on both sides (Encoder and Multiplexer). Please select this protocol if the Encoder is connected to a *VDL D-Vaudax Multiplexer*.

    The RTP[1] protocol describes the transmission of multimedia content (e.g. audio or video) via IP networks. The sequence numbers included in RTP allow the receiver to reconstruct the sender's packet sequence, but sequence numbers might also be used to determine the proper location of a packet.
    Note that RTP itself does not provide any mechanism to ensure timely delivery or provide other quality-of-service guarantees, but relies on lower-layer services to do so. It does not guarantee delivery or prevent out-of-order delivery, nor does it assume that the underlying network is reliable and delivers packets in sequence.

    – *EDI (optional)*: Select this option if you want to use the EDI protocol for the communication between Audio Encoder and Ensemble Multiplexer. The EDI protocol is a fee-based software option (product ID 800989).

    – *MUXENC (optional)*: If your *MAGIC AE1 DAB+ Encoders* are connected to the *AVT MAGIC DAB MUX Muliplexer* and you do **not** have a redundant setup, please select *MUXENC* as *Streaming Mode.* This allows also a configuration of the Encoders as well as PAD insertion via the Multiplexer. The MUXENC protocol is a fee-based software option (product ID 800999).

    – *MUXENC Redundancy (optional):* If your *MAGIC AE1 DAB+ Encoders* are connected to the *AVT MAGIC DAB MUX Muliplexer* and you have a **re-dundant setup**, please select *MUXENC Redundancy* as *Streaming Mode.* This allows a configuration of the Encoders as well as PAD insertion via the Multiplexer. The MUXENC protocol is a fee-based software option (product ID 800999).

NOTE If you have purchased a complete headend from AVT with the *MAGIC DAB MUX Basic or Professional Multiplexer*, the *EDI Upgrade* and the *FhG MUXENC Upgrade* (for MUXENC and MUXENC Redundancy) are activated free of charge in your Audio Encoders.

- If your network supports Quality of Service (Differentiated Services) you can enter the desired value between *0...255* under *QoS (DiffServ)*. Or you can also use the *Set Default QoS Value* button. This button sets the value to *184*.

---

[1] RTP = Real Time Transport Protocol (RFC 3550)

Multiplexer Parameters (Encoded Audio)

- **IP Address 1**: Here you have to enter the IP address of your Ensemble Multiplexer.

NOTE If you want to use a redundant multiplexer with the same Audio Encoder the IP multicast[a] function can be used. In this case you have to use a multicast IP address (range: 224.0.0.0 to 239.255.255.255).

a   Otherwise the IP packets are transmitted in unicast mode.

- **Audio Port 1**: Here you have to enter the Audio Port which is used for the transmission between the Audio Encoders and the Multiplexer.

DCP Parameters

NOTE If your *MAGIC AE1 DAB+ Audio Encoder* is connected to the *MAGIC DAB MUX Multiplexer* and the *MUXENC* protocol is used, the **DCP Parameters** can be selected in the Multiplexer configuration and are transmitted automatically to the Audio Encoder.

- The **PFT** (Protection, Fragmentation & Transport Layer) is always set on and cannot be switched off.

- Under **Spread Interval** you can select how many frames are overlapping during the transmission. The higher the spread interval (more frames overlapping), the better the protection when a burst error occurs. However, a higher spread interval also increases the delay because a higher buffer is required.

- Under **FEC Strength** you can select which protection level you would like to use (**0...3**). The higher the protection level, the higher the required transmission bit rate. The FEC strength defines the number of packets that can be recovered via FEC. However, please note that the higher the FEC strength, the higher is also the number of packets transmitted.

- Under **MTU Size** (maximum transmission unit) the maximum packet size can be defined.

5.5.2.1.2   MUXENC Parameters

If you have selected a **Streaming Mode** which uses the **MUXENC protocol** under the **Line Interface** menu, the **MUXENC Parameters** menu will be displayed.

FIG. 23   **MUXENC PARAMETERS**
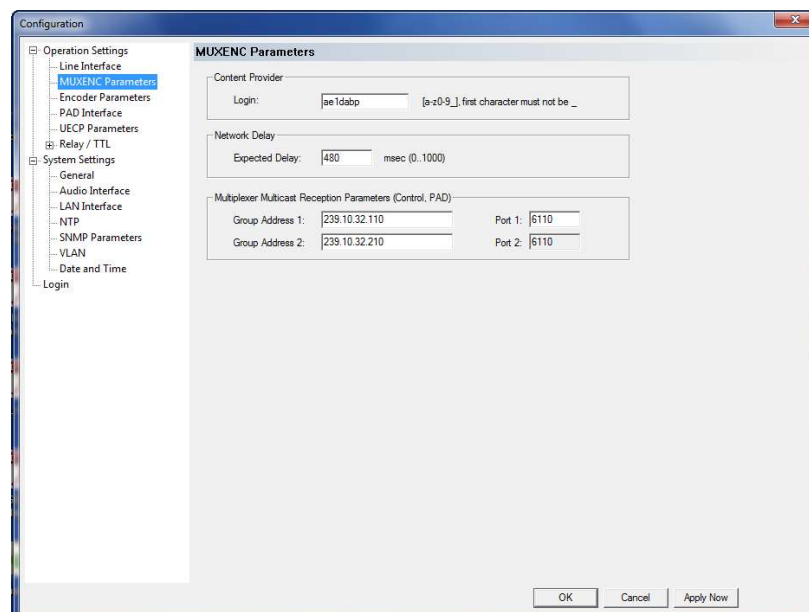
Content Provider

Under **Login** you have to enter the name which you have defined in the
MAGIC DAB MUX Multiplexer configuration under **Content Provider Login**
when setting up the **MAGIC AE1 DAB+ Audio Encoder** as Service Component.

Network Delay

• Please enter your expected network delay in msec under **Expected Delay**.
  Values from **0** to **1000 msec** are allowed.

Multiplexer Multicast Reception Parameters (Control, PAD)

Here you have to define the backchannel from the Multiplexer to the Audio
Encoder so that they can be controlled via the Multiplexer and PAD can be
transmitted from the Multiplexer to the Audio Encoder.

• Please enter under **Group Address 1** the IP Address of your **MAGIC DAB
  MUX Multiplexer** as well as the respective **Port 1**. If you have a redundant
  setup, you have to enter the IP address of the backup Multiplexer under
  Group Address 2 and enter **Port 2**.

5.5.2.1.3   Encoder Parameters

FIG. 24   **ENCODER PARAMETERS**
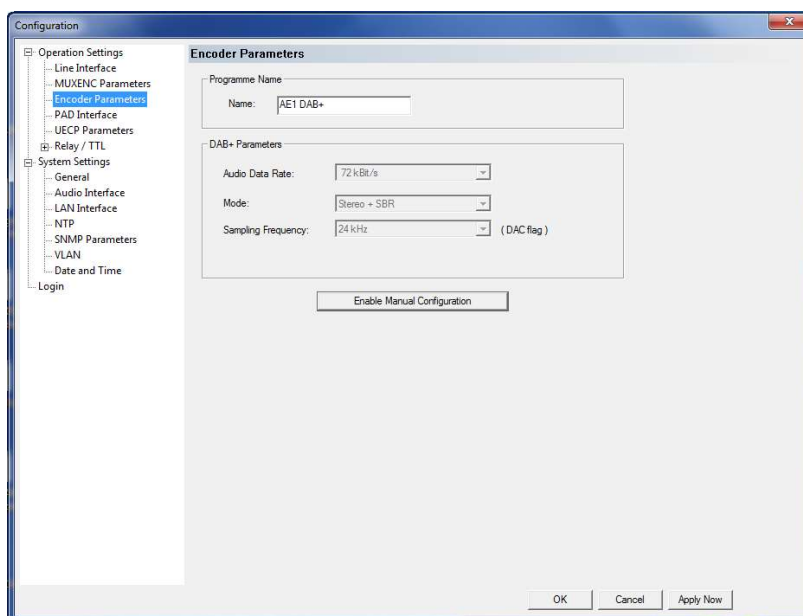
Programme Name

- Here you can enter the **Name** of the programme. It will be displayed on the **Info button** in the main user interface of the PC Software as well as in the connection list if you are using the multi control **MAGIC AE1 DAB+ LAN Software**.

DAB+ Parameter

All possible data rates, modes and sampling frequencies you can see in TAB. 1, Page 45.

NOTE   If your **MAGIC AE1 DAB+ Audio Encoder** is connected to the **MAGIC DAB MUX Multiplexer** and the **MUXENC** protocol is used, the **DAB+ Parameters** can be selected in the Multiplexer configuration and are transmitted automatically to the Audio Encoder.

- **Audio Data Rate**: With this setting you can define the data rate of the coded Audio signal.

- **Mode**: This option allows to configure the coding mode. Five options depending on the selected bitrate are available:

    – **Mono**

    – **Mono + SBR**

    – **Stereo**

    – **Stereo + SBR**

    – **Parametric Stereo + SBR**

- **Sampling Frequency**: Depending on the selected bitrate you can define here the desired sampling frequency. The following sampling frequencies are possible:

- **16 kHz (only in SBR mode)**

- **24 kHz (only in SBR mode)**

- **32 kHz**

- **48 kHz**

- **Mono Mode**: If you have selected a **Mono** mode you have the following Mono options:

  - **Mono L**: Only the left channel of the audio input will be encoded

  - **Mono R**: Only the right channel of the audio input will be encoded

  - **Mono (L+R)/2**: If you have connected a Stereo signal this setting allows the generation of a Mono signal.

TAB. 1   POSSIBLE DATA RATES AND MODES

Bitrate kbit/s	Possible Coding Modes	SBR[a]	PS[b]	Possible Sampling Frequencies kHz
8	Mono	-	-	32, 48
16	Mono, Stereo	„	„	32, 48 (16, 24)[c]
24	Mono, Stereo	„	„	32, 48 (16, 24)
32	Mono, Stereo	„	„	32, 48 (16, 24)
40	Mono, Stereo	„	„	32, 48 (16, 24)
48	Mono, Stereo	„	„	32, 48 (16, 24)
56	Mono, Stereo	„	„	32, 48 (16, 24)
64	Mono, Stereo	„	„	32, 48 (16, 24)
72	Mono, Stereo	„	-	32, 48 (16, 24)
80	Mono, Stereo	„	-	32, 48 (16, 24)
88	Mono, Stereo	„	-	32, 48 (16, 24)
96	Mono, Stereo	„	-	32, 48 (16, 24)
104	Mono, Stereo	„	-	32, 48 (16, 24)
112	Mono, Stereo	„	-	32, 48 (16, 24)
120	Mono, Stereo	„	-	32, 48 (16, 24)
128	Mono, Stereo	„	-	32, 48 (16, 24)
136	Mono, Stereo	„	-	32, 48 (16, 24)
144	Mono, Stereo	-	-	32, 48
152	Mono, Stereo	-	-	32, 48
160	Mono, Stereo	-	-	32, 48
168	Mono, Stereo	-	-	32, 48
176	Mono, Stereo	-	-	32, 48
184	Mono, Stereo	-	-	32, 48
192	Mono, Stereo	-	-	32, 48

a   SBR = Spectral Band Replication

b   PS = Parametric Stereo

c   In brackets = Sampling frequencies, if SBR is activated

5.5.2.1.4 PAD Interface

If the *MAGIC AE1 DAB+ Audio Encoder* is connected to the *MAGIC DAB MUX Multiplexer*, PAD[1] can be configured and inserted via the Multiplexer.

The data insertion works dynamically: If data is available the **audio bit rate** will be reduced automatically according to the PAD bit rate. Otherwise the full frame is used for audio.

FIG. 25   **PAD INTERFACE - MUXENC**
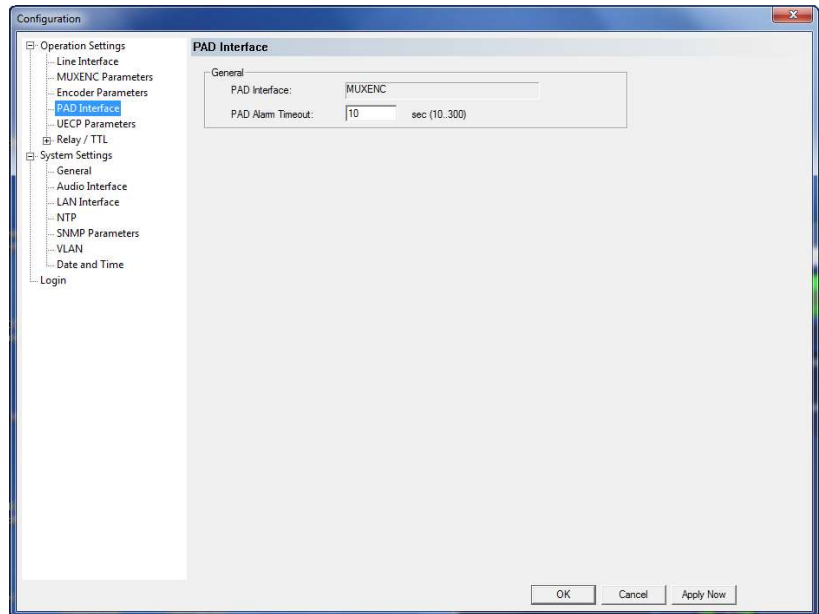
General

- Under *PAD Interface* you will see that *MUXENC* is displayed when the Encoder is connected to the *MAGIC DAB MUX Multiplexer*. PAD can be transmitted using the MUXENC protocol from the Multiplexer to the Audio Encoder.

- Under *PAD Alarm Timeout* a threshold value can be defined. If no PAD is received or inserted during the defined time frame, PAD alarms will be set (see Page 80).

Alternatively, you can enable the PAD Insertion from an external PAD inserter. The standard settings are compliant to the synchronous frame mode of the *IRT* Recommendation.

To enable the PAD transmission you must select your *PAD Interface*. The available options are:

- *OFF*

- *ON - using RS232*

- *ON - using UDP*

- *ON - using UDP (with redundancy)*

---

[1] PAD = Program Associated Data

FIG. 26   **PAD INTERFACE - EXTERNAL PAD INSERTER**
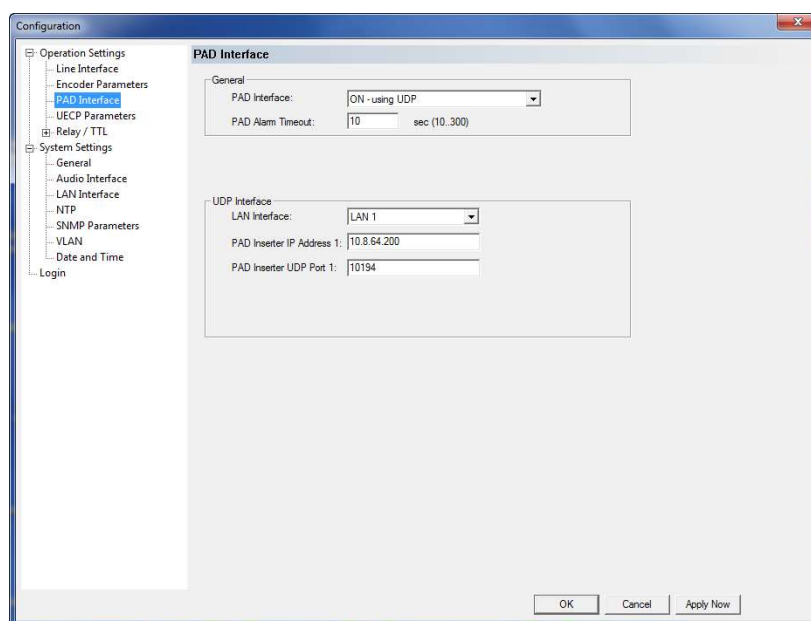
If you select **UDP** as your **PAD Interface**, the following parameters must be configured under **UDP Interface**.

- **LAN Interface**: Please select via which LAN interface (LAN 1 or optionally LAN 2) the Encoder receives PAD.

- **PAD Inserter IP Address 1**: Here you must enter the IP address of your PAD inserter.

- **PAD Inserter UDP Port 1**: Here you must enter the UDP Port that is used.

- If you have a redundant PAD Inserter, the entry fields **PAD Inserter IP Address 2** and **PAD Inserter UDP Port 2** are also available and must be filled in.

If you select **RS232** as your **PAD Interface**, the selected **Baudrate** must be conform to the connected PAD inserter. Available baudrates are **38400**, **57600**, and **115200** Baud. The **Parity** and **Stop Bits** cannot be changed. The standard settings are: 38400 Baud, Parity None and 1 Stop Bit.

The maximum bitrate for PAD insertion is defined in the **ETSI TS 102 563** standard.

TAB. 2   **MAXIMUM BITRATE OF F-PAD AND X-PAD DATA**

Sampling Rate	F-PAD 2 byte	X-PAD max. 196 bytes
16-kHz	267 bps	26133 bps
24-kHz	400 bps	39200 bps
32-kHz	533 bps	52267 bps
48-kHz	800 bps	78400 bps

5.5.2.1.5 UECP Parameters

If UECP messages are to be inserted via the LAN interface, the parameters can be defined in this menu.

FIG. 27 **UCEP PARAMETERS**
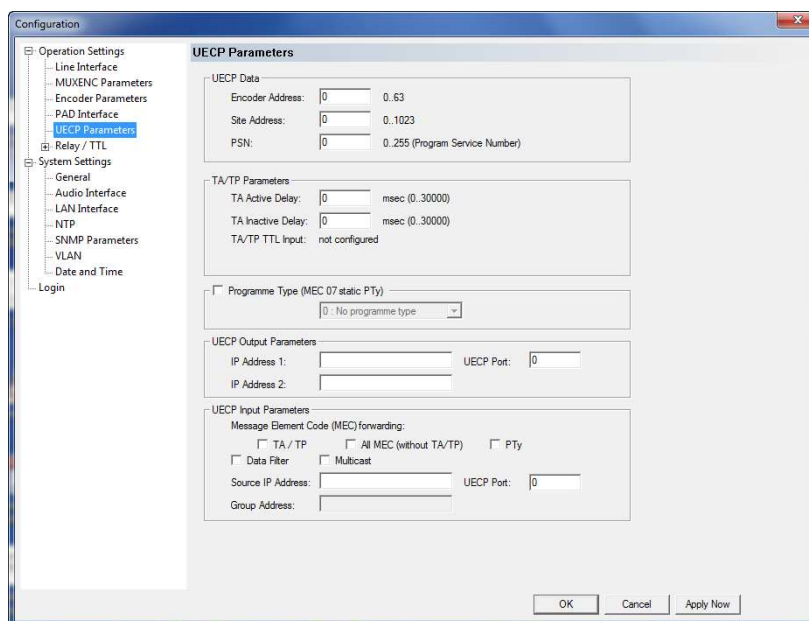
UECP Data

Under UECP Data you can enter the header data of the UECP Encoder if necessary. You can enter

– *Encoder Address*

– *Site Address*

– *PSN (Program Service Number)*

TA/TP Parameters

The transmission of the TA UECP messages can be delayed if required. This can be e.g. useful if UECP messages from an FM programme are used since the DAB+ signal will be transmitted with a delay (due to buffer, FEC etc.).

• Under *TA Active Delay* the transmission delay of the TA Active UECP message can be entered in *msec*. The maximum delay is 300 000 msec.

• Under *TA Inactive Delay* the transmission delay of the TA Inactive UECP message can be entered in *msec*. The maximum delay is 300 000 msec.

• Under *TA/TP TTL Input* it is displayed if a TTL Input is configured for sending TA UECP messages.

Programme Type (MEC 07 static PTy)

- If you want to configure and transmit a static Programme Type, please activate the checkbox and select your **Programme Type** from the dropdown list.

UECP Output Parameters

- Please enter under **IP Address 1** the IP address of your Multiplexer and under **UECP Port** the Port which is used.

- If you have a redundant setup, please enter the IP address of your backup Multiplexer under **IP Address 2**.

UECP Input Parameters

- Under **Message Element Code (MEC) forwarding** you can select which parameters of the UECP message are analysed and forwarded.

  - **TA/TP:** Traffic Announcement/Traffic Programme

  - **All MEC (without TA/TP):** e.g. Dynamic Label

  - **PTy:** Programme Type

- If the checkbox **Data Filter** is enabled, only UECP messages that have the data header with the values entered under **UECP data** are forwarded.

- Under **Source IP Address** please enter the IP Address from which the UECP messages are received as well as the **UECP Port.**

- If the UECP messages are received from a multicast address, you have to activate the **Multicast** checkbox and enter the multicast address under **Group Address**.

5.5.2.1.6 Relay/TTL

The **MAGIC AE1 DAB+** system incorporates six **GPIO** Pins (TTL) which can be programmed separately as input or output. Additionally, two **Relays** are available.

The operating mode of a TTL Pin - **Input** or **Output** is selected via the option **Direction**.

The following specification accounts for all three configuration windows **TTL1** … **TTL6**.

TTL Pin as input

FIG. 28   TTL PIN AS INPUT
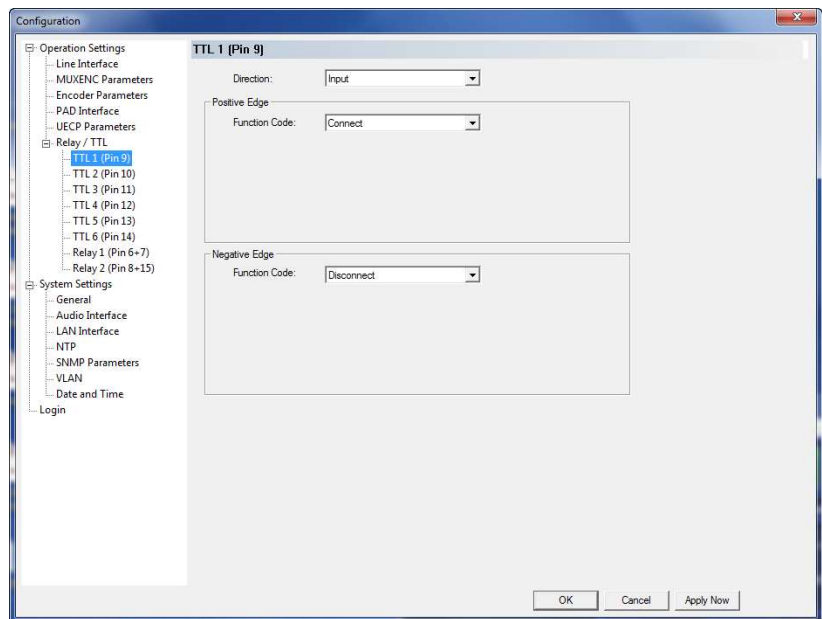
If you use a TTL Pin as **Input**, you can program two different functions separately when edges change:

- **Positive edge**: The event is activated when the voltage on the TTL Pin changes from 0V to +3,3V.

- **Negative edge**: The event is activated when the voltage on the TTL Pin changes from +3,3V to 0V.

    The following functions can be configured (**Function Code**):

    – **-**: No function, the negative edge is not used.

    – **Connect**:
    Via this function you can establish a connection.

    – **Connect (level triggered)**:
    Same function as **Connect**, but the event is activated level triggered and not edge triggered.

    – **Disconnect**: If you activate this function, a connection can be disconnected.

– **Load Preset**: Via this function it is possible to load a preset which you have to select under **Preset**.

– **Send UECP TA active**: With this function, you can send the UECP TA active message.

– **Send UECP TA inactive**: With this function, you can send the UECP TA inactive message.

Example:

You want to connect the LAN line with TTL 1. After the transmission has been finished the connection is to be cleared with TTL 1.

Programming:

Positive edge:

Function Code: Disconnect

Negative edge:

Function Code: Connect

FIG. 29   **SEQUENCE OF EVENTS FOR THE EXAMPLE**

Switch

Switch is opened:
Pin 9 = TTL 1 is on +3,3 V (via internal 10 KOhm series resistance)

Switch is closed:
Pin 9 =TTL 1 is set to 0V (Pin 5):
Connection is established

Switch is opened:
Pin 9 =TTL 1 is set to +3,3V:
Line is disconnected

15-pol. SUB-D connector
to MAGIC AE1 DAB+
(TTL/RELAY)
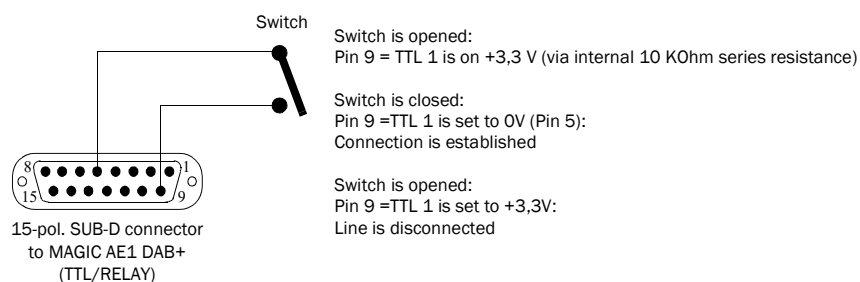
TTL Pin as Output

ATTENTION

Please pay attention to the maximum switch current of 10 mA respectively the maximum switch voltage of 3,3V per TTL output.

FIG. 30   **TTL PIN AS OUTPUT**
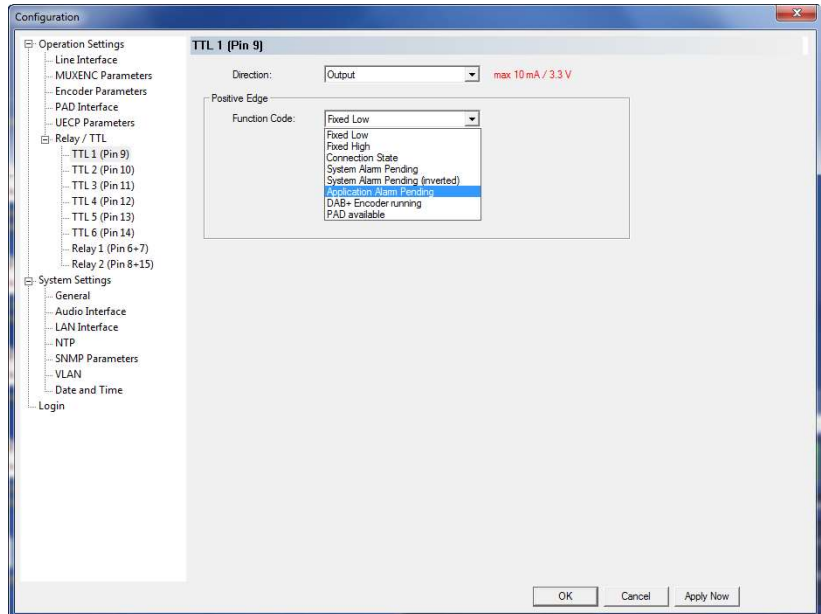
If a TTL Pin is configured as **Output**, the event is signalled as change of voltage on the TTL Pin from 0V to+3,3V.

Under **Positive edge** you can select one of the following **Function Codes**:

– **Fixed Low**: The TTL Pin is set to 0V permanently.

– **Fixed High**: The TTL Pin is set to +3,3V permanently.

– **Connection State**: Via **Connection State** you can signal the connection state of a line. The following configurations are possible:

  – **Disconnect**

  – **Connect**

– **System Alarm Pending**: If one of the possible system errors (see CHAPTER 5.7.1) occurs, it can be astonished by selecting this option.

– **System Alarm Pending (inverted)**: Same function as above, but output is inverted.

– **Application Alarm Pending**: This function offers a signalling of applications alarms. You can combine up to three alarms:

  – **No Audio Level** (left, right, left or right). See also the settings for the Audio Level Alarm, Page 59.

  – **Encoder not running**, **No AES/EBU frame**, **Enc. not running or No AES/EBU frame**

- *No NTP, No PAD, No PAD or NTP*

– *MPEG Encoder running*: If the encoder detect **no** error, the TTL Pin will be set.

– *PAD available*: If the PAD insertion is activated (see CHAPTER 5.5.2.1.4, Page 46) and the encoder receives data the TTL Pin will be set.

Relay

ATTENTION

⚠

Please pay attention to the maximum switch current of 200 mA respectively the maximum switch voltage of 48V per relay output.

The following description applies for both configuration windows *Relay 1* and *Relay 2*.

FIG. 31   RELAY
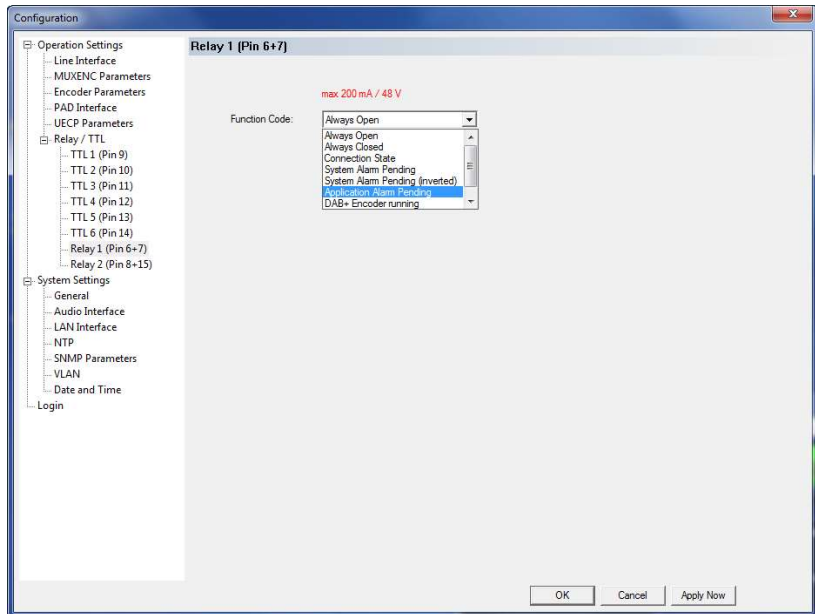
The options for the relay configuration are identical with the configuration of a TTL-Pin. The following *Function Codes* are available:

– *Always Open*: The relay is always open.

– *Always Closed*: The relay is always closed. This can be used for example for surveillance of the power supply.

– *Connection State*: Via Connection State you can signal the connection state of a line. The following configurations are possible:

  – *Disconnect*

  – *Connect*

– *System Alarm Pending*: If one of the possible system errors (see CHAP-TER 5.7.1) occurs, it can be signalled by selecting this option.

– *System Alarm Pending (inverted)*: Same function as above, but output is inverted.

– *Application Alarm Pending*: This function offers a signalling of applications alarms. You can combine up to three alarms:

  – *Audio Level* (left, right, left and right). See also the settings for the Audio Level Alarm, Page 59.

– *Encoder not running*, *No AES/EBU frame*, *Enc. not running or No AES/EBU frame*

– *No NTP, No PAD, No PAD or NTP*

– **MPEG Encoder running**: If the encoder detect **no** error, the relay will be closed.

– **PAD available**: If the PAD insertion is activated (see CHAPTER 5.5.2.1.4, Page 46) and the encoder receives data the relay will be closed.

5.5.2.2 **System Settings**

NOTE   All configurations made under **System Settings** cannot be saved as **Preset** (see CHAPTER 5.5.3).

5.5.2.2.1 **General**

FIG. 32   **GENERAL**
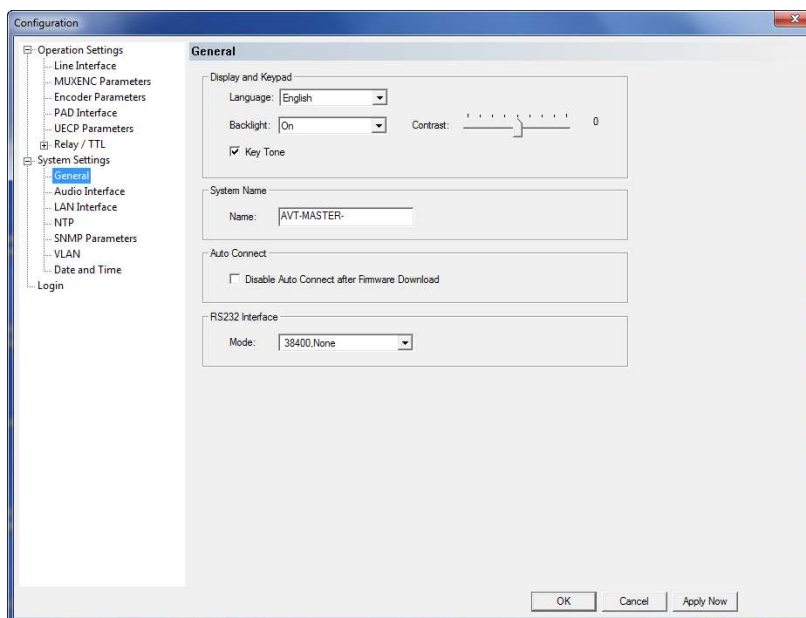
Display and Keypad

• You can select **German** or **English** as **Language** for the display.

NOTE   The PC Software is only available in English.

• The **Display** has a backlight. Under the setting **Backlight** you can switch it **ON** permanently. If you select the option **Auto off** the backlight is turned off automatically **60** seconds after the last keystroke. The backlight is activated again by pressing any key (e.g. **OK**).

NOTE   Please note that if the keypad lock is activated, the backlight is only switched on again by pressing the key sequence *MENU* [*] .

• Via the slide control **Contrast** you can adjust the contrast in the range **-4 ... 4** for the display.

• To activate the **Key Tone**, please tick the respective checkbox.

System Name

• The entered **Name** of the system will be shown in the connection list of the **MAGIC AE1 DAB+ LAN Software** (see Page 37).

By entering a group name, you can summarize several Encoders in groups (e.g. MAIN & BACKUP) for the tree view. As a separator the "-" character is used.

Syntax: ***<Group>-<System>***

The **System Name** consists of maximal 15 characters (A-Z, a –z and 0-9 plus the ´-´).

Auto Connect

- You can use the function **Disable Auto Connect after Firmware Download** to stop the Audio Encoder from re-connecting to the Multiplexer after a firmware download. If this function is not activated, the Encoder will re-establish the connection to the Multiplexer automatically after a firmware update.

RS232 Interface

- If you want to operate the system with the PC, you must set under **Mode** the data rate in accordance with the interface of the system (see CHAPTER 5.5.1, Page 34). There are five baud rates available:

    - ***9600, None***

    - ***19200, None***

    - ***38400, None***

    - ***57600, None***

    - ***115200, None***

5.5.2.2.2 Audio Interface

MAGIC AE1 DAB+ supports analogue as well as digital AES/EBU Audio interfaces. If the digital interfaces are used, a separate Sample Rate Converter is available for the input and the output so that external adjustments are not required if there are different digital sources and drains.

FIG. 33   AUDIO INTERFACE
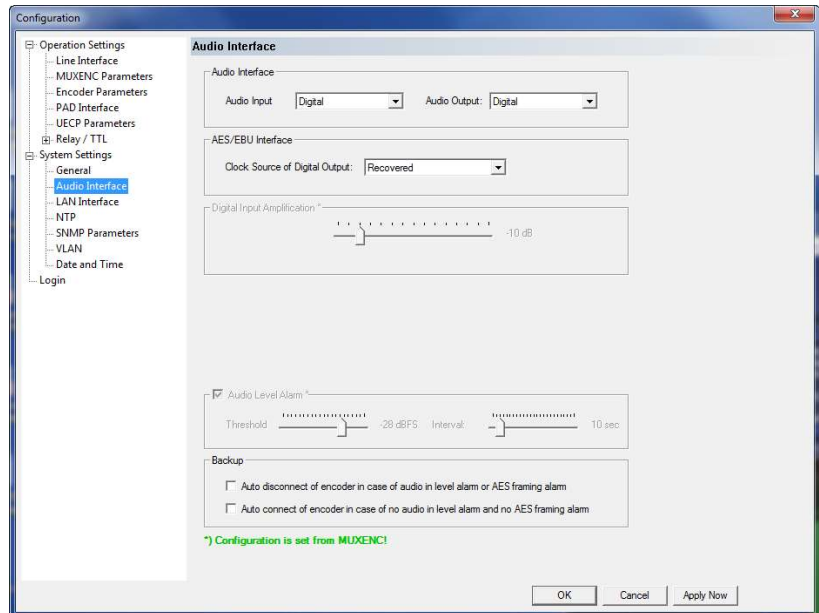
Audio Interface

- The operating mode *analogue* or *digital* can be set separately for the *Audio Input* and the *Audio Output*.

AES/EBU Interface

- If the output is set *digital*, additionally the configuration for the *AES/EBU Interface* is displayed. Under *Clock Source of digital output* you can select the following options:

  – *Internal*: The AES/EBU output clock is derived from the internal system clock.

  – *External*: The AES/EBU output clock is derived by the external clock connected via the interface *Audio 2/CLK IN*. The clock rate of the connected clock must be 48-kHz.

  – *Recovered*: The AES/EBU output clock is derived from the digital input signal of the interface *Audio 1/AES IN*. This configuration is usually to be selected if you use the digital input of the system. In this way a synchronous functioning of the transmission chain is ensured

NOTE   The AES/EBU input always works with recovered clock, therefore only a configuration of the output is required.
For clock synchronisation to other systems you can use the Audio output *Audio 2/CLK OUT*. The clock rate of the output clock is 48-kHz.

Analogue/Digital Input Amplification

Here you can adjust the amplification for the Audio level of the inputs.

NOTE   If your *MAGIC AE1 DAB+ Audio Encoder* is connected to the *MAGIC DAB MUX Multiplexer* and the *MUXENC* protocol is used, the *Analogue/Digital Input Amplification* can be configured via the Multiplexer web interface and is transmitted automatically to the Audio Encoder.

Main Nominal Level

- If you operate the input or the output in analogue mode, the corresponding slide control for adjusting the nominal Audio level of the Audio interface (*Main Nominal Level*) is displayed. The nominal level can be adjusted separately for the input (*Level In*) and for the output (*Level Out*) in the range of *-3 ... +9 dBu* in 1-dB steps.

- The *Audio Headroom* can be adjusted between *0...15 dBr*.

Audio Level Alarm

The system has also an integrated Audio level monitor. Activate this function by enabling the option *Audio Level Alarm*. With the slider *Threshold* you can define the sensitivity in a range of *-100...0 dBFS*.

The monitoring *Interval* can be adjusted in a range of *0...120 sec*onds.

The alarm is displayed in the *System Monitor* (see CHAPTER 5.7.1) and can be also defined as TTL or relay output (see CHAPTER 5.5.2.2.7).

NOTE   If your *MAGIC AE1 DAB+ Audio Encoder* is connected to the *MAGIC DAB MUX Multiplexer* and the *MUXENC* protocol is used, the *Audio Level Alarm* settings can be configured in the Multiplexer and are transmitted automatically to the Audio Encoder.

Backup

- With the option *Auto disconnect of encoder in case of audio in level alarm or AES framing alarm* the backup switching behaviour of the encoder can be adjusted. As soon as the encoder signals an Audio In Level Alarm or an AES Framing Alarm, it switches to the backup encoder.

- If the checkbox *Auto connect of encoder in case of no audio in level alarm and no AES framing alarm* is activated, the encoder is reactivated when no Audio In Level Alarm and no AES Framing Alarm is detected anymore.

5.5.2.2.3 LAN interface

The LAN interface can be used simultaneously for the transmission of the coded Audio signal as well as for control, PAD and monitoring.

FIG. 34   **LAN INTERFACE**
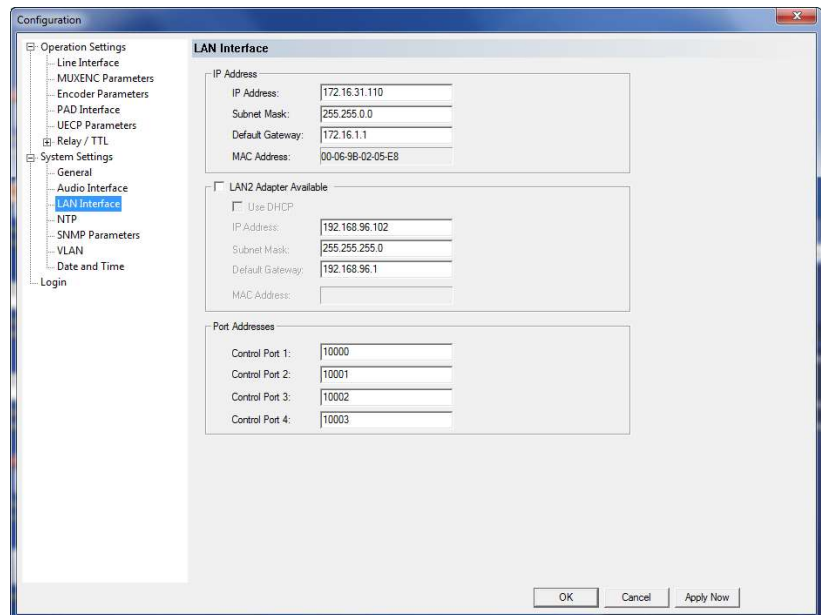
IP Address

- Under **IP Address** you have to enter the system's local system IP address. This IP address must be unique in your network.[1]

- Enter also the correspondent **Subnet Mask.**

- Please enter the **Default Gateway** (IP address of the gateway) if the Ensemble Multiplexer is not in your local network, otherwise you can leave this field empty.

LAN2 Adapter Available

If you have a LAN2 Adapter connected to your system or if you have an integrated second LAN interface, please mark the checkbox. The LAN2 interface can be used for control, PAD or SNMP.

- If you are connected to a DHCP Server, you can activate the checkbox **Use DHCP** to receive the correct IP parameters automatically.

- Alternatively, you can enter the **IP Address**, **Subnet Mask** and if required the **Default Gateway** manually.

---

[1] DHCP is currently not supported, but is planned for a later release.

Port Addresses

The *MAGIC AE1 DAB+ Encoder* can be accessed via four PCs simultaneously. In this way, it can be monitored from 4 workplaces at the same time. At each PC a different control port in the *Control Interface* settings in the PC Software. Please note that the configuration dialogue can be opened only once at the same time.

- – *Ctrl. Port 1*: The default port is 10000.
- – *Ctrl. Port 2*: The default port is 10001.
- – *Ctrl. Port 3*: The default port is 10002.
- – *Ctrl. Port 4*: The default port is 10003.

5.5.2.2.4 NTP

If the *MAGIC AE1 DAB+ Audio Encoder* is connected to a *MAGIC DAB MUX Multiplexer*, NTP is used for clock synchronisation. The parameters for the NTP Server can be configured in this menu

FIG. 35 NTP
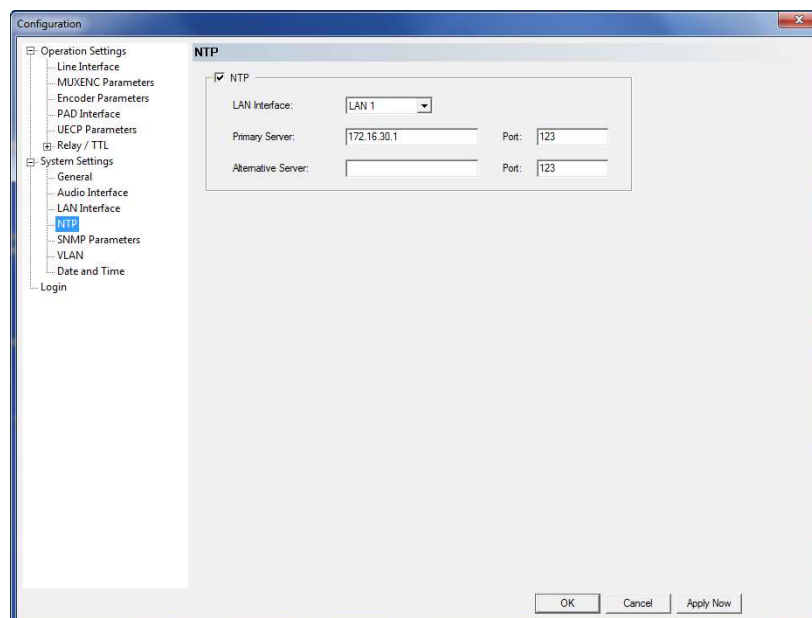
To use NTP please enable the *NTP* checkbox.

- You can enter a *Primary Server* and as backup an *Alternative Server*. Please enter also the *Port* that is used.

5.5.2.2.5   **SNMP Parameters**

The *MAGIC AE1 DAB+ Audio Encoder* supports the SNMP protocol to integrate the system into a network management system.

FIG. 36   SNMP PARAMETERS
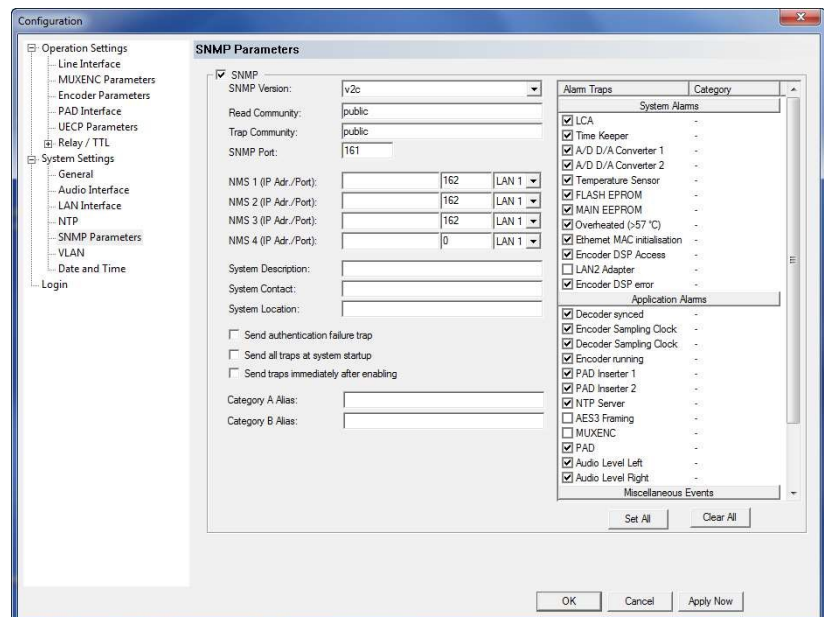
- The SNMP function is enabled when you mark the box **SNMP**.

- Please select under **SNMP Version** if you are using SNMP **v1** or **v2c**.

- The **Read Community** entry is an identifier to read data. The name has to be identical with the name in your Management System. By default, the name **public** is used.

- Under **Trap Community** you define the name for the trap datagrams. The name has to be identical with the name in your Management System.

- Please enter the port on which **MAGIC AE1 DAB+** *System* receives messages under **SNMP Port**. The default setting is **161**.

- **MAGIC AE1 DAB+** allows the addressing of up to four different Network Management Systems. Please enter the corresponding IP addresses and Ports under **NMS 1 (IP Adr./Port)**, **NMS 2 (IP Adr./Port)**, **NMS 3 (IP Adr./Port)** and **NMS 4 (IP Adr./Port)**.

- Under **System Description** you can assign a name for the system.

- Under **Contact** an email address can be entered.

- In the entry field **System Location** you can write the location of the Audio Encoder.

- You can enable the option **Send authentication failure trap** to send the authentication failure trap. This happens when the system detects a access trial with a wrong community string.

- With the option **Send all traps at system startup** the system sends all traps after the system has booted. In this way the system status can be easily checked via SNMP.

- With the option **Send traps immediately after enabling** the system sends the activated traps immediately after they have been selected.

- Under **Alarm Traps** you can select which traps should be sent via SNMP. You can also activate several **Application Alarms** and **Miscellaneous Events** to be sent via SNMP. To enable all listed traps, alarms and events you can press the **Set All** button. Via the **Clear All** button the selection will be cleared.

- Under **Category** you can assign the traps to **Category A** or **Category B.** If you do not want to use a category, you can select **No category**. Under **Miscellaneous Events** you can also select that you would like to receive all traps marked with **Category A** or **Category B**.

5.5.2.2.6 **VLAN**

MAGIC AE1 DAB+ supports the VLAN (Virtual LAN) feature. In this way, separate virtual networks can be defined for different services (e.g. PC control, Audio/PAD) and each of these networks can have a different priority.

NOTE   Please make sure that your network switches also support VLAN if you want to use this feature.

FIG. 37   VLAN
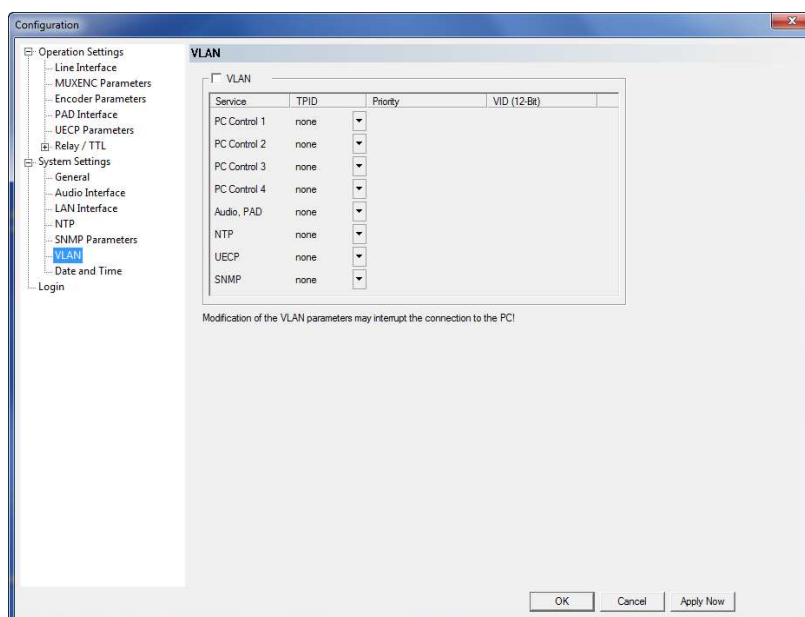
To activate **VLAN**, simply mark the respective checkbox.

- Now you can select for each **Service** for which you want to use VLAN the **802.1Q Tag** under **TPID**.

- Under **Priority** you can define the priority level from **0 (Default, Best Effort)** to **7 (Network Control)**.

- Under **VID** you must enter the correct VLAN ID which you usually get from your network administrator.

NOTE   Please note that a modification of the VLAN parameters may interrupt the connection to your PC.

5.5.2.2.7   **Date and Time**

Via the panel **Date and Time** it is possible set the internal clock of the system.

FIG. 38   DATE AND TIME
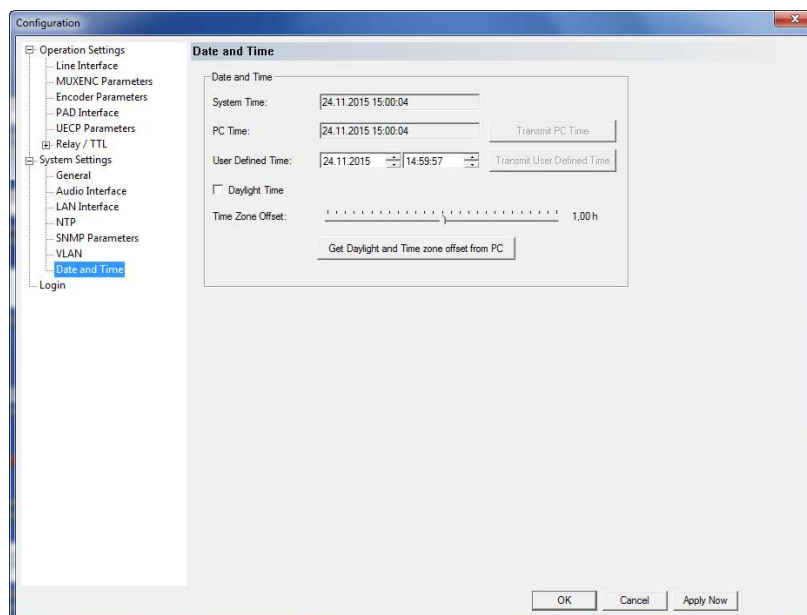
- To synchronise the **System Time** to the **PC Time** press the button **Transmit PC Time**.

- To setup another time e.g. for other time zones you can enter a **User Defined Time**. To set the time in the system press the button **Transmit User Defined Time**.

- Please activate the checkbox **Daylight Time** if you want to use daylight time.

- Here you can enter the **Time Zone Offset** for your local time.

- It is also possible to activate the option **Get Daylight and Time Zone Offset from PC** to receive these settings from your PC.

5.5.2.3   Login

To protect the system from re-configurations, two password levels with different user rights are available.

ATTENTION

⚠️

The entered password is saved in the system. It is highly important that you enter your password carefully. If you have forgotten your password, only the AVT Service can re-activate the system.

- Under **USER** you assign the user **Password**. For safety reasons you must confirm the password under **Confirm Password**.

- Under **ADMINISTRATOR** you assign the Administrator **Password**. For safety reasons you must confirm the password under **Confirm Password**.

NOTE

There is no differentiation between upper and lower case for the password entry.

FIG. 39   LOGIN
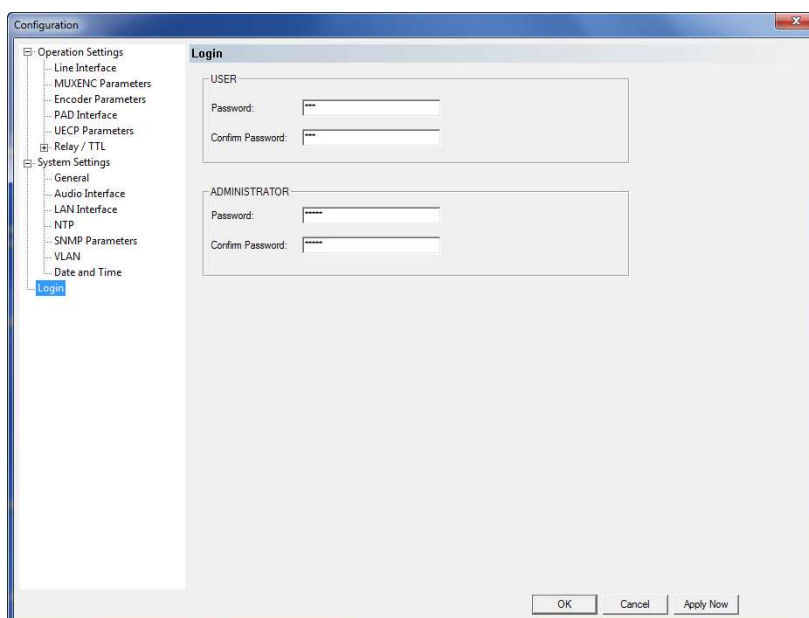
When you have assigned a password, the window for the password entry is automatically displayed when you click on a menu with password protection. Please enter the User Password or the Administrator Password.

FIG. 40   PASSWORD LOGIN
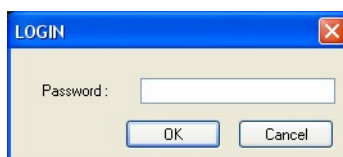
The authorisation levels are defined as follows:

(1) Only **Administrator Password** is configured: The password must be entered for configuration changes. Immediately available menus:

– **File → Operation Settings Presets → Export**

– **File → System Settings → Export**

– **Configuration → Presets → „Configuration Name"**

– **Administration → Registration**

– **Extras → System Monitor**

– **Help → About MAGIC AE1 DAB+**

(2) Only **User Password** is configured: The password must be entered always. Afterwards all menus are available. Immediately available menus:

– **Help → About MAGIC AE1 DAB+**

(3) **User Password** and **Administrator Password** are configured: The password must always be entered.

User Password is entered:

Under **Configuration → Configuration → Login** the **USER** password can now be changed.

Via **Configuration → Presets** the desired configuration can be loaded.

Immediately available menus:

– **Extras → System Monitor**

Administrator Password is entered: All menus are available.

NOTE   Please pay attention to the configuration options of the system if a password is assigned (see CHAPTER A1).

5.5.3   **Submenu Presets**

Via **Presets** you can load already created configurations.

FIG. 41   **SELECTION OF A PRESET**
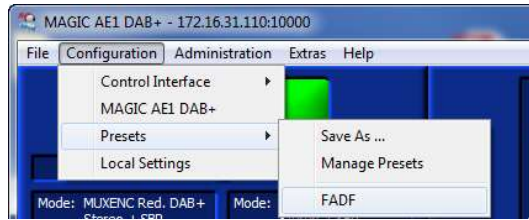
5.5.3.1   **Manage Presets**

Your created **Presets** can be managed via the menu **Configuration → Presets → Manage Presets**.

FIG. 42   **MANAGE PRESETS**

All already existing configurations are displayed in the list.

- With the use of the **New** button you create a new configuration. The current configuration of the system is not changed or loaded by this function. First, select an expedient name. The length of the name must not surpass 8 characters. Special characters and space characters are **not** allowed. Please mind that you use unique names.

  Subsequently, the configuration dialogue is opened for the editing of the **Presets**. The current configuration is always displayed as basis of a **Preset** which you can adjust according to your wishes. The following configurations can be saved as Preset:

  – **Line interface** (see Page 40)

  – **MUXENC Parameters** (see Page 42)

  – **Encoder Parameters** (see Page 44)

  – **PAD Interface** (see Page 46)

  – **UECP Parameters** (see Page 48)

  – **Relay/TTL** (see Page 50)

- By using the button **Edit** the currently selected configuration can be edited. The current configuration of the system is not changed or loaded with this function.

- Via the button **Delete** the configuration selected from the list is deleted. For safety reasons you have to confirm your selection.

- To activate a configuration selected from the list, press the **Select** button. For safety reasons you have to confirm your selection.

- Via the button **Import** a configuration can be imported from a data carrier (disk, USB stick etc.). The file extension of the configuration file is always '*.pst*'. A click on the button opens the file browser in which the desired file can be selected.

- Likewise, it is possible to export configurations to a data carrier. The button **Export** saves the configuration selected from the list as '*.pst*' file. By clicking on the button the file browser is opened and you can choose the location where the file is saved.

  With **Export All** all configurations displayed in the list are saved in a directory of your choice. A separate data file with the file extension '*.pst*' is generated for each configuration.

TIP   If you need to configure several systems in the same way, set up one system first and export all configurations to a disk. To configure all further systems easily, import the configurations from the disk.

This is also possible for the **System Settings**. Via the **Import/Export** function under **File** (see CHAPTER 5.4) you can comfortably save all information and load on other systems.

5.5.3.2   Activation of a Preset

All Presets are displayed under **Configuration** → **Presets** → **„Preset Name"** and can be activated with a click.

For safety reasons a confirmation is required.

5.5.4   **Submenu Local Settings**

Under this submenu you can configure the storage location for the local settings.

FIG. 43   **LOCAL SETTINGS**
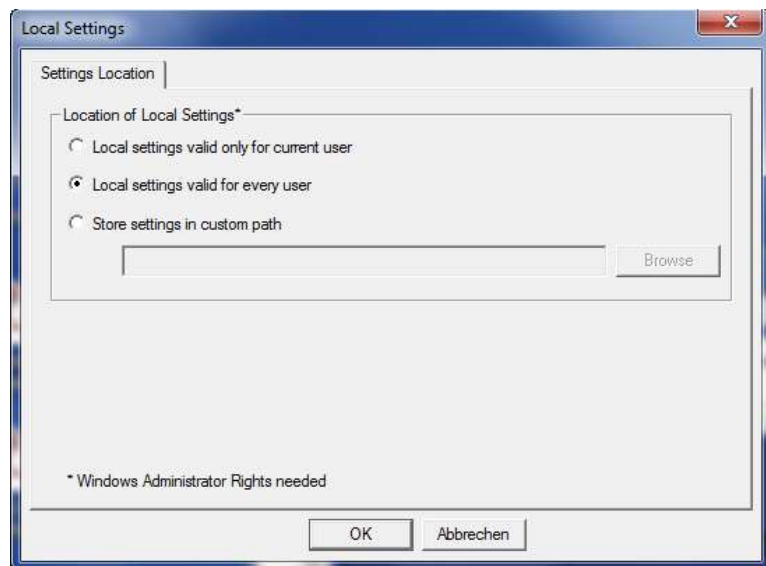
Settings Location

- To store your settings only for the current user, select the option ***Local settings only valid for current user***.

- To store the settings globally for all users, select the option ***Local settings valid for every user***.

- Alternatively, you can select the option ***Store settings in custom path*** to define a specific folder in which your settings are stored.

NOTE   You need Windows administrator rights to change the storage location of the local settings.

Depending on the storage location, you might have to start the Windows PC Software with administrator rights to make changes in the configuration.

5.6   **Menu Administration**

FIG. 44   MENU ADMINISTRATION
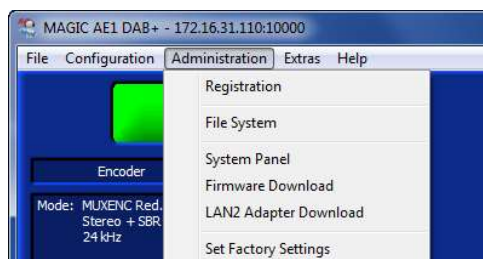
5.6.1   **Submenu Registration**

The system's production data as well as the enabled options can be displayed under the submenu *Registration*.

FIG. 45   SUBMENU REGISTRATION
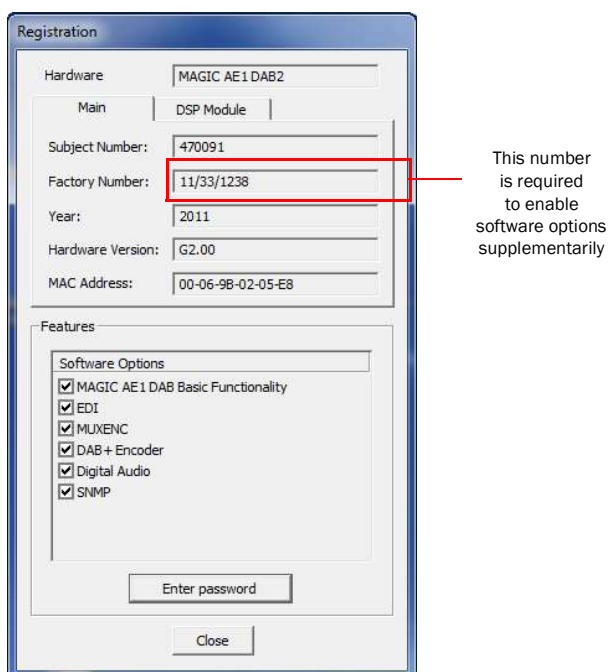
The data of the unit include the following information:

– **Hardware**

– **Subject Number**

– **Factory Number**

– **Year** of production

– **Hardware Version**

– **MAC Address**

- Under *Features* the available and activated *Software Options* of the *MAGIC AE1 DAB+* are displayed. Deactivated options can be activated via a password. This password is assigned according to the *Factory Number*. If you bought an option supplementarily, please enter the password that you received from us under *Enter Password*.

FIG. 46   PASSWORD ENTRY TO ENABLE AN OPTION
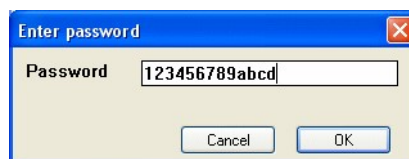
Subsequently, the system executes a warm start. Afterwards, the functions are activated.

ATTENTION   Please enter the password carefully.

If you enter a wrong password **three times**, you must switch off the system and switch it on again.

5.6.2 Submenu File System

Selecting the submenu *File System* the storage system (similar to a PC's hard drive) of the system is displayed.

ATTENTION

Please do not use the File System unless our Service requested a specific action.

FIG. 47   SUBMENU FILE SYSTEM
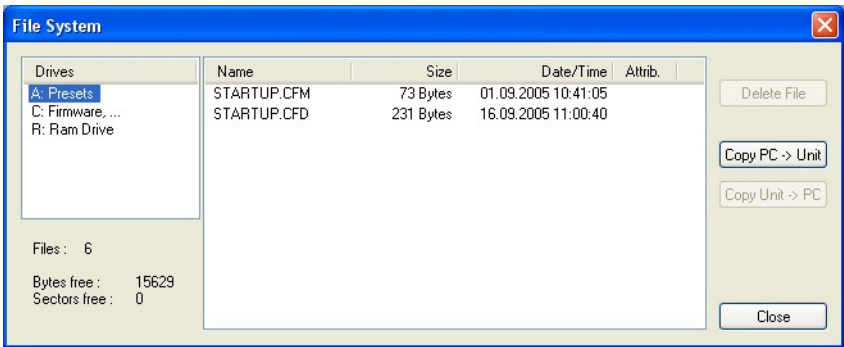
• The button *Delete File* deletes the currently selected file from the system.

ATTENTION

Please do not delete any file unless our Service requested a specific action. Otherwise a disfunction of the system is possible.

• Via the button *Copy PC -> Unit* you can copy a file from the PC to the system.

ATTENTION

Please use the Software Download and the File Import functionalities respectively to copy files to the system.

• Via the button *Copy Unit -> PC* you can copy a file from the system to the PC.

ATTENTION

Please use the File Export functionalities to copy files to the PC.

5.6.3   Submenu System Panel

The **System Panel** is only for service purposes. Please enter only commands in the prompt, if our Support requested it from you.

FIG. 48   **SUBMENU SYSTEM PANEL**
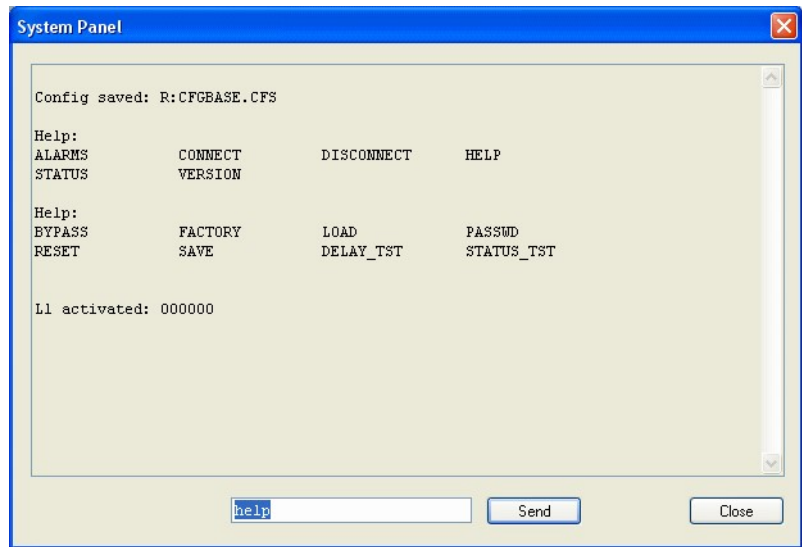
5.6.4 Submenu Firmware Download

The required firmware for the *MAGIC AE1 DAB+* system is always included in the PC software: Via the *Firmware Download* you can comfortably download the firmware on your system.

By using the *Browse* button you select the firmware file. It is always located in the same directory in which you installed the *MAGIC AE1 DAB+* application. The standard installation directory is:

C:\Program Files\MAGIC AE1 DAB

The file name of the firmware is „*ae1dab2.ssw*".

FIG. 49   SUBMENU FIRMWARE DOWNLOAD
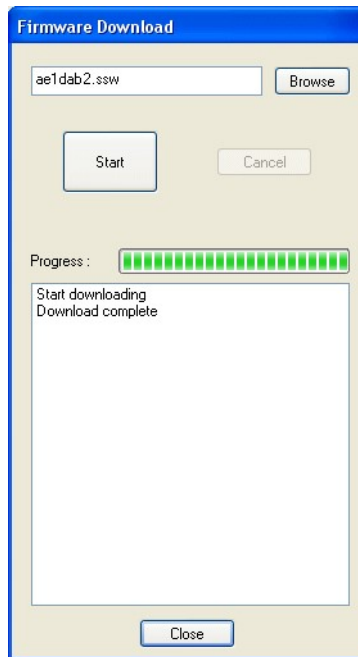
Please press the *Start* button to download the firmware. The *Progress* bar displays the progress of the download. The process is finished after about two minutes. If the download was successful, a corresponding message is displayed. After your confirmation the system is reset.

ATTENTION

If the download was not successful, you will see in the display the message *BOOT SOFTWARE*.
In this case you must use the RS232 interface to download the software again. If you are using the LAN interface you must change your settings in the PC software to the following values (see also Page 35, Using the LAN interface):
– IP Address: 192.168.96.102
– Port: 10000
These LAN settings are already stored in the boot eprom which guarantees that you will get a connection to the system via IP.

5.6.5   **Submenu LAN2 Adapter Download**

If your system has been extended with the LAN2 Adapter (external adapter or integrated 2nd LAN interface), you can execute a firmware download for the LAN2 Adapter via this submenu if necessary.

FIG. 50   **EXTERNAL LAN2 ADAPTER**

The required firmware for the *LAN2 Adapter* of the *MAGIC AE1 DAB+* is always included in the PC software: Via the *LAN2 Adapter Download* you can comfortably download the firmware on your adapter.

By using the *Browse* button you select the firmware file. It is always located in the same directory in which you installed the *MAGIC AE1 DAB+* application. The standard installation directory is:

C:\Program Files\MAGIC AE1 DAB

The file name of the firmware is „*lan2.romz*"

FIG. 51   **LAN2 ADAPTER DOWNLOAD**
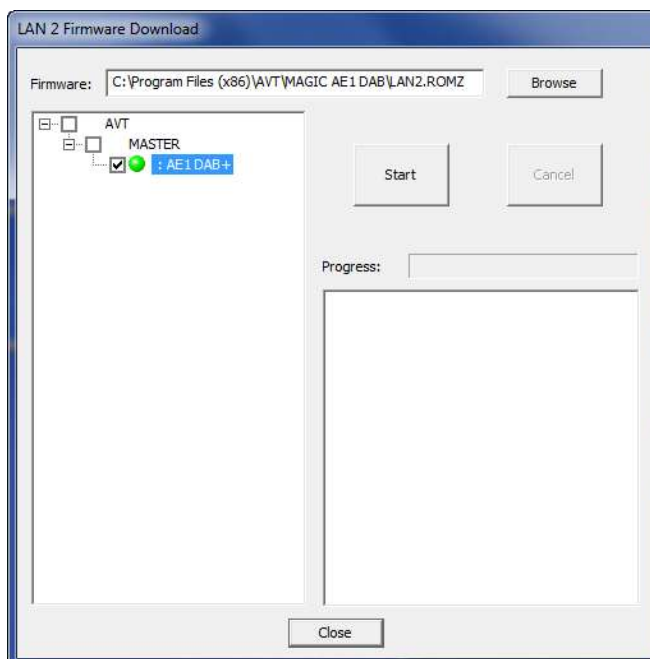
Please select the system for which you want to update the LAN2 Adapter firmware on the left side. Now press the **Start** button to download the firmware. The **Progress** bar displays the progress of the download. The process is finished after about one minute. If the download was successful, a corresponding message is displayed.

5.6.6 Submenu Set Factory Settings

By using the submenu **Set Factory Settings** the system can be reset to the initial state.

For safety reasons you have to confirm your selection.

5.7 Menu Extras

FIG. 52   **MENU EXTRAS**

5.7.1 Submenu System Monitor

Via the menu **System Monitor** you receive information about the system status.

FIG. 53   **SUBMENU SYSTEM MONITOR**
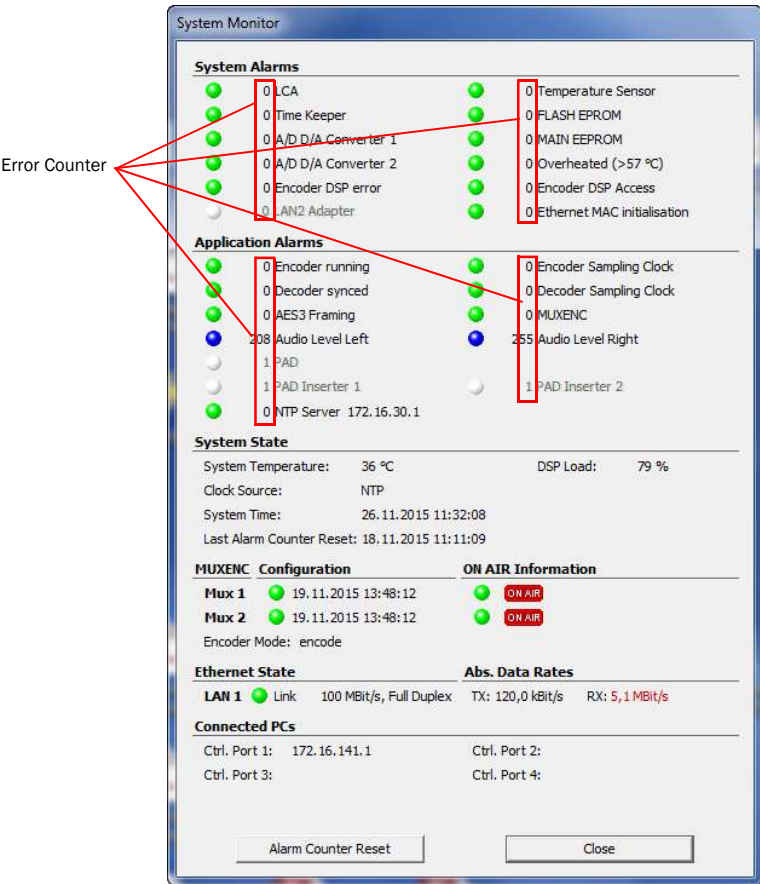
| | |
| TIP | An alarm can also be configured as TTL (see Page 50) or relay output (see Page 54). |

A red LED signals a currently existing alarm. A blue LED shows that an alarm has occurred but is no longer active. How often the alarm occurred since switching on is displayed by the corresponding error counter. A green LED means no current alarm.

To reset all error counter press the button **Alarm Counter Reset**.

NOTE
If an alarm occurs frequently or over a longer period disconnect the unit from electricity. If the error occurs again after switching on, there is probably a hardware defect.

System alarms

• Under **System alarms** all potential system alarms are displayed:

   – **LCA**: The communication with a programmable component is faulty.

   – **Time Keeper**: The communication with the integrated clock module is faulty.

   – **A/D D/A Converter 1**: The communication with the first ADDA converter is faulty.

   – **A/D D/A Converter 2**: The communication with the second ADDA converter is faulty.

   – **Temperature Sensor**: The communication with the temperature sensor is faulty.

   – **FLASH EPROM**: The communication with the permanent memory is faulty. Configurations cannot be saved or read anymore.

   – **MAIN EEPROM**: The communication with the permanent memory is faulty. Configurations cannot be saved or read anymore.

   – **Overheated**: The system sets this alarm if the system temperature is higher than 57°C. Disconnect the unit from electricity or cool down the ambient temperature.

   – **Encoder DSP error**: This alarm occurs if an error on the DSP module is detected.

   – **Encoder DSP Access**: This alarm occurs if the Encoder cannot access the DSP module.

   – **LAN2 Adapter** (only if the systems has a LAN2 Adapter): The LAN2 Adapter is not working properly.

   – **Ethernet MAC initialisation**: The initialization of the ethernet module has failed.

Application Alarms

• Under **Application alarms** all codec alarms are centralised:

   – **Encoder running**: If the encoder is not running, this alarm will be set.

   – **Encoder sampling clock**: This alarm occurs if the hardware sampling clock do not fit with the expected sampling clock of the encoder.

   – **Decoder synced**: For monitoring purposes the coded signal is decoded at any time via the integrated DAB+ decoder. If the Decoder is not synced, the corresponding alarm is set.

   – **Decoder sampling clock**: This alarm occurs if the hardware sampling clock do not fit with the expected sampling clock of the decoder.

   – **AES3 Framing**: If the digital Audio interface is configured, but no signal is received, the AES3 Framing Alarm is signalled.

- **MUXENC**: The MUXENC protocol transmits the control and ON AIR information from Multiplexer to Encoder. If one of this information is missing, the systems sets an alarm.

- **Audio level left**: This alarm occurs if the left audio input level is during the configured time **interval** lower than the configured **threshold** (see Page 59, **Audio Level Alarm**).

- **Audio level right**: This alarm occurs if the right audio input level is during the configured time **interval** lower than the configured **threshold** (see Page 59, **Audio Level Alarm**).

- **PAD**: If PAD is activated, but no data is inserted at the PAD interface e.g. because the frame counter does not match, this alarm will be set. The threshold value can be defined in the **PAD** configuration menu under **PAD Alarm Timeout** (see Page 46).
  In addition to the alarm LED, the IP address and Port of the connected PAD Server are displayed.

TIP
If a **MAGIC MUX DAB Multiplexer** is connected to the **MAGIC AE1 DAB+** system, the Multiplexer can be used also as PAD Server.

- **PAD Inserter 1**: This alarm is set if no PAD is received from the PAD Inserter 1 although PAD is activated. The threshold value can be defined in the **PAD** configuration menu under **PAD Alarm Timeout** (see Page 46).

- **PAD Inserter 2**: This alarm is set if no PAD is received from the PAD Inserter 2 although PAD is activated. The threshold value can be defined in the **PAD** configuration menu under **PAD Alarm Timeout** (see Page 46).

- **NTP Server**: This alarm shows you if the connection with the NTP Server is ok. You can also see here the IP address of NTP Server.

System State

- The actual system temperature is displayed in °C under **System Temperature**. The regular system temperature ranges from 30...45°C.

- Under **DSP Load** the load of the system is displayed. The usual load is about 40 to 65%.

- Under **Clock Source** the selected clock source, e.g. NTP, is displayed.

- The **System Time** shows the date and the time in hh:mm:ss.

- The **Last Alarm Counter Reset** informs you when the alarm counter has been reset the last time.

MUXENC Configuration

- If the Encoder is connected with a **MAGIC DAB MUX Multiplexer** or an FhG Content Server™ and uses the **MUXENC** protocol, the connection status of the main Multiplexer and optional redundant Multiplexer are displayed here.

- The date and time of the last (re-)configuration of the Multiplexer is displayed under **Configuration**.

ON AIR Configuration

- Here you can see here if the Encoder is marked as ON AIR Encoder , inactive Encoder (e.g. Backup Encoder) or deactivated Encoder in the configuration of the main and backup *MAGIC DAB MUX Multiplexer*.

Ethernet State

- The *Link* LED shows if the *LAN 1* connection and optionally the *LAN 2* connection is ok. Here you find also some information on the connected network.

Abs. Data Rates

- Here you can see the absolute data rates in *TX* (transmit) direction and *RX* (receive) direction.

NOTE The value for the RX direction is displayed in red as soon as it exceeds 500 kbit/s. Usually, we expect a lower value since only PAD and control data is received.
In case of a higher bit rate it is likely that something is wrong with your network configuration.

Connected PCs

- Up to four PCs can be connected simultaneously to the *MAGIC AE1 DAB+ Audio Encoder.* The IP addresses of the currently connected PCs are displayed under *Ctrl. Port 1...4*. It is also indicated if the configuration dialogue is opened at one of the connected PCs.

5.7.2   **Submenu Locate MAGIC AE1 DAB**

This submenu can help you to locate the system to which you are currently connected if you have several **MAGIC AE1 DAB+ Encoders** installed in a rack.

By clicking on the submenu, the display of the respective system is blinking five times.

5.7.3   **Sync System Time With PC Time**

With this function you can sync the time of the MAGIC AE1 DAB+ system with your PC time. If you see a checkmark, the system time is synced already with your PC time.

5.8   **Menu Help**

FIG. 54   MENU HELP

5.8.1   **Submenu About MAGIC AE1 DAB+**

In the **About MAGIC AE1 DAB+** dialogue you find the software versions of the PC software (**PC Version**) and of the system (**Firmware Version**). Besides, you can find our contact details there.

FIG. 55   SUBMENU ABOUT MAGIC AE1 DAB+

A 1   **MENU STRUCTURE**

On the following pages you will find the complete menu structure if you select *ENGLISH* as menu language

With the use of the softkey *MENU* you get to the configuration of the system.

The configuration menu is divided in five submenus:

– *SYSTEM SETTINGS*

– *OPERATION SETTINGS*

– *PRESETS*

– *STATUS INFORMATION*

– *LOGIN*

NOTE   Please note that depending on the selected operating mode some menu items are not displayed.

If you use an Administrator and/or User Password, the display looks as it is described below:

(1)   Only **Administrator Password** configured: The password must be entered for changes to the basic settings and operation settings only. Immediately available menus:

– *PRESETS*

– *STATUS INFORMATION*

– *LOGIN*

(2)   Only **User Password** configured (instead of *MENU*, *LOGIN* is displayed): The password must always be entered. Subsequently, all menus are available.

(3)   **User** and **Administrator Password** configured (instead of *MENU LOGIN* is displayed):

– **User Password** is entered: The menus *PRESETS, STATUS INFORMATION* and *LOGIN* are available

– **Administrator Password** is entered: All menus are available.

NOTE   There is no differentiation between upper and lower case for the password entry.

A1.1   System Settings

```
                                            1 – System Settings

                                                    1 - General

                                                        1 – Display  and Keypad

                                                                1- Language          Deutsch
                                                                                     English

                                                                2 - Backlight        On
                                                                                     Auto

                                                                3 - Contrast         Set Contrast

                                                                4 - Key Click        Enable/Disable

                                                        2 – System Name

                                                                Enter  System Name

                                                        3 – RS232 Interface

                                                                1 - Mode             9600, None
                                                                                     19200, None
                                                                                     38400, None
                                                                                     57600, None
                                                                                     115200, None

                                                                2 - Activation       Info

                                                    2 – Audio  Interface

                                                        1 – Input Mode
                                                                Analogue
                                                                Digital

                                                        2 – Analogue  Input
                                                                Nominal  level      Select value

         3 – LAN Interface                              3 – Digital Input
                                                                Amplification       Select value
             1 – LAN 1
                                                        4 – Output  Mode
Enter     1 - IP Address                                        Analogue
Enter     2 - Sub Net Mask                                      Digital
Enter     3 - Default Gateway
                                                        5 – Analogue  Output
             2 – LAN 2                                          Nominal  Level      Select value

Enter     1 - IP Address                                6 – Digital Output
Enter     2 - Sub Net Mask                                      Clock  Source       Recovered
Enter     3 - Default Gateway                                                       Internal
                                                                                    External
Enter     3 – Control Port 1 PC
                                                        6 – Headroom
Enter     4 – Control Port 2 PC                                 Select value

Enter     5 – Control Port 3 PC                         7 – Level Alarm
                                                                1 - Enable          Enable/Disable
Enter     6 – Control Port 4 PC
                                                                2 - Threshold       Select value

         4 – NTP                                                3 - Interval        Select value

Enable/Disable   1 – Enable                             8 – Backup
                                                                1 – Disconnect on Alarm    Enable/Disable
LAN 1            2 – LAN Interface
LAN 2                                                           2 – Connect when no alarm  Enable/Disable

                 3 – Primary Server

Enter     1 - IP Address
Enter     2 - Port

                 4 – Alternative  Server

Enter     1 - IP Address
Enter     2 - Port

         5 - VLAN

Enable

         6 - Date/Time

Enter     1 – Daten/Time

Enable/Disable   2 – Daylight  Time

Enter     3 – Timezone
```
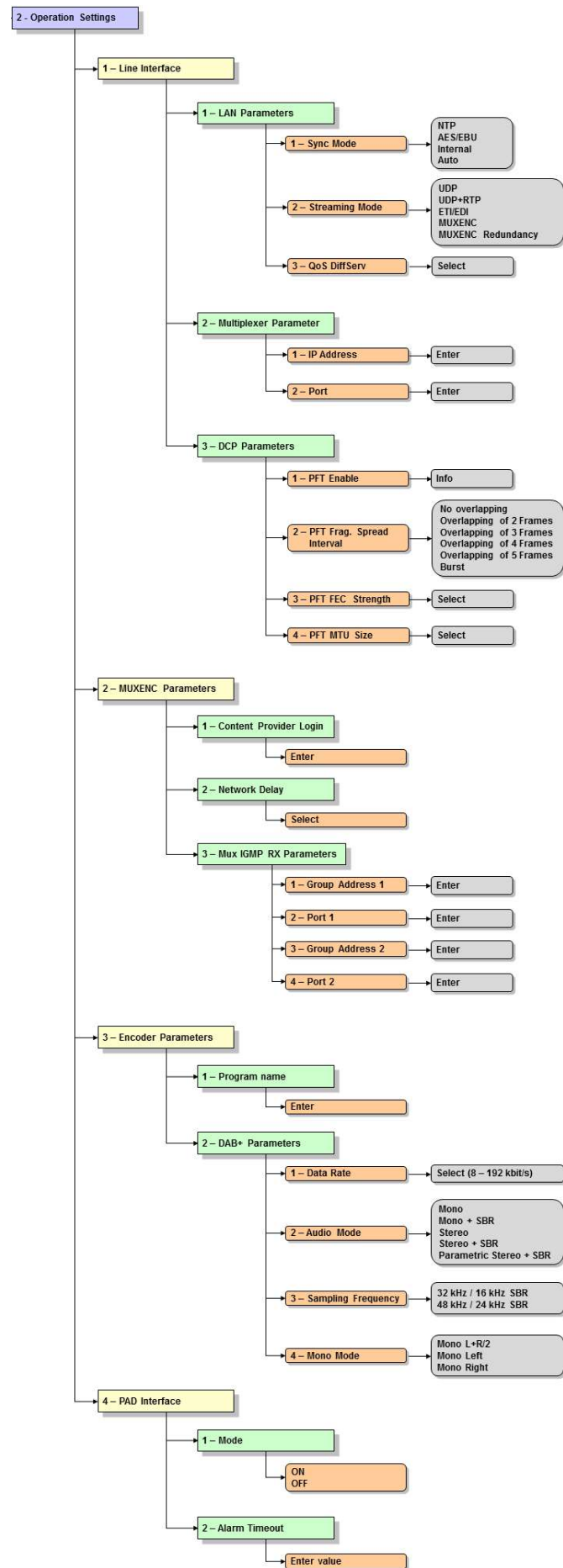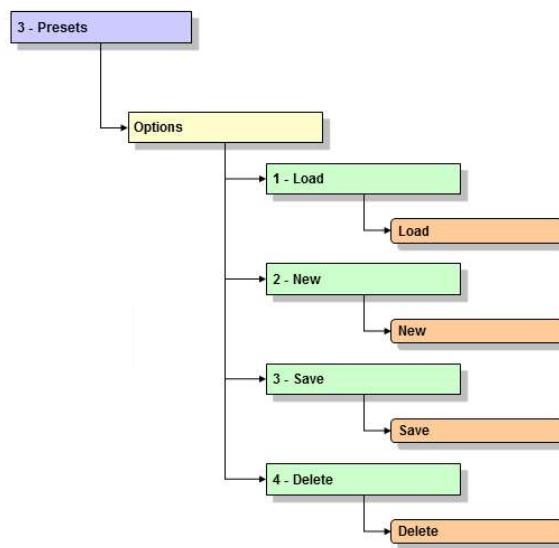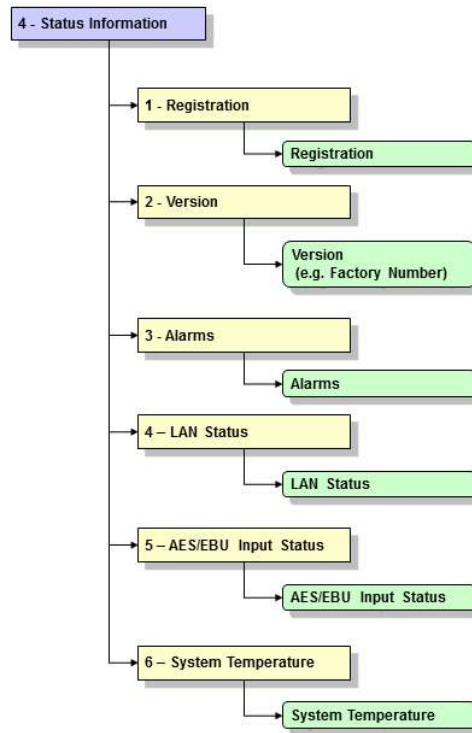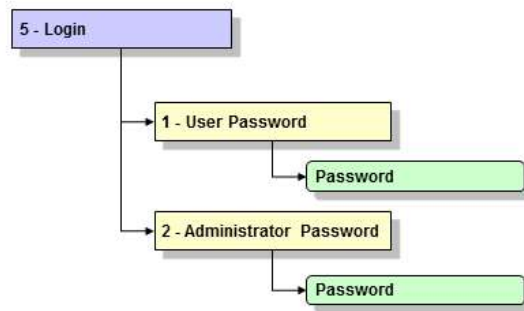
A1.2 **Operation Settings**

```
2 - Operation Settings
│
└── 1 – Line Interface
     │
     ├── 1 – LAN Parameters
     │    ├── 1 – Sync Mode ──► NTP / AES/EBU / Internal / Auto
     │    ├── 2 – Streaming Mode ──► UDP / UDP+RTP / ETI/EDI / MUXENC / MUXENC Redundancy
     │    └── 3 – QoS DiffServ ──► Select
     │
     ├── 2 – Multiplexer Parameter
     │    ├── 1 – IP Address ──► Enter
     │    └── 2 – Port ──► Enter
     │
     └── 3 – DCP Parameters
          ├── 1 – PFT Enable ──► Info
          ├── 2 – PFT Frag. Spread Interval ──► No overlapping / Overlapping of 2 Frames / Overlapping of 3 Frames / Overlapping of 4 Frames / Overlapping of 5 Frames / Burst
          ├── 3 – PFT FEC Strength ──► Select
          └── 4 – PFT MTU Size ──► Select

     2 – MUXENC Parameters
     │
     ├── 1 – Content Provider Login
     │    └── Enter
     │
     ├── 2 – Network Delay
     │    └── Select
     │
     └── 3 – Mux IGMP RX Parameters
          ├── 1 – Group Address 1 ──► Enter
          ├── 2 – Port 1 ──► Enter
          ├── 3 – Group Address 2 ──► Enter
          └── 4 – Port 2 ──► Enter

     3 – Encoder Parameters
     │
     ├── 1 – Program name
     │    └── Enter
     │
     └── 2 – DAB+ Parameters
          ├── 1 – Data Rate ──► Select (8 – 192 kbit/s)
          ├── 2 – Audio Mode ──► Mono / Mono + SBR / Stereo / Stereo + SBR / Parametric Stereo + SBR
          ├── 3 – Sampling Frequency ──► 32 kHz / 16 kHz SBR / 48 kHz / 24 kHz SBR
          └── 4 – Mono Mode ──► Mono L+R/2 / Mono Left / Mono Right

     4 – PAD Interface
     │
     ├── 1 – Mode ──► ON / OFF
     │
     └── 2 – Alarm Timeout ──► Enter value
```

A1.3   Presets

```
┌─────────────────┐
│ 3 - Presets     │
└─────────────────┘
         │
         │   ┌─────────────────────┐
         └──▶│ Options             │
             └─────────────────────┘
                     │
                     │   ┌─────────────────┐
                     ├──▶│ 1 - Load        │
                     │   └─────────────────┘
                     │           │   ┌─────────────────┐
                     │           └──▶│ Load            │
                     │               └─────────────────┘
                     │   ┌─────────────────┐
                     ├──▶│ 2 - New         │
                     │   └─────────────────┘
                     │           │   ┌─────────────────┐
                     │           └──▶│ New             │
                     │               └─────────────────┘
                     │   ┌─────────────────┐
                     ├──▶│ 3 - Save        │
                     │   └─────────────────┘
                     │           │   ┌─────────────────┐
                     │           └──▶│ Save            │
                     │               └─────────────────┘
                     │   ┌─────────────────┐
                     └──▶│ 4 - Delete      │
                         └─────────────────┘
                                 │   ┌─────────────────┐
                                 └──▶│ Delete          │
                                     └─────────────────┘
```

A1.4 Status Information

A1.5   Login

A 2   I N T E R F A C E S

The interfaces of the system are pictured in Fig. 56.

FIG. 56   REAR VIEW OF THE MAGIC AE1 DAB+ AUDIO ENCODER

All interfaces are described below.

A2.1	**Control and data interfaces**

A2.1.1	**DATA/PAD interface**

The DATA/PAD interface can be used for the transmission of Program Associated Data (PAD). The interface is realised compliant to **IRT Recommendation**[1].

ATTENTION

For maximum bit rates of the PDA channel please refer to TAB. 2, Maximum bitrate of F-PAD and X-PAD data.

To connect a standard PAD inserter you need a 1:1 connecting cable in which Pin 2 and Pin 3 are **not** crossed. Furthermore, Pin 5 GND must be connected.

NOTE

Please note that the function of the Pins RXD and TXD - input or output - is determined by the interface type DCE or DTE. The pin assignment for Pin 2 is always RXD and for Pin 3 it is always TXD.
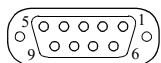
TAB. 3		PIN ASSIGNMENT: DATA/PAD INTERFACE	
Socket: SUB-D, 9-pole			
Pin	**Signal**		**Electrical characteristics**
1	not used		PC interface RS232:
2	RXD[b]	PAD Receive Data	Type (Pin 2, 3): DCE[a] Level: V.24
3	TXD[c]	PAD Transmit Data	Data rate: 115200 Baud Range: max. 15 m
4	not used		Protocol: programmable
5	GND	Earth	
6	not used		
7	not used		
8	not used		
9	not used		

a   DCE = Data Communication Equipment: to connect a PC a 1:1 cable is required

b   ATTENTION: On this Pin the MAGIC AE1 DAB+ **transmits** data

c   ATTENTION: On this Pin the MAGIC AE1 DAB+ **receives** data

---

[1]   Synchronous transmission mode: In the beginning of each ISO/MPEG frame the encoder transmit a SYN character (0x16). To realise frame synchronous PAD insertion the connected PAD inserter must transmit all data inside of this frame.

A2.2 ISDN interface

NOTE This interface is not supported in the *MAGIC AE1 DAB+* system.

1 **8**
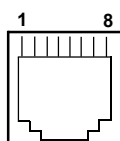
TAB. 4 **PIN ASSIGNMENT: S$_0$ INTERFACE (ISDN)**

Socket: Western (8-pole) RJ45			
Pin	Signal		Electrical characteristics
1	not used		Recommendation: I.430
2	not used		Data rate: B channel: 2 x 64-kbit/s D channel: 16-kbit/s Max. cable length: 100 m
3	TX (A)	Data out (A)	
4	RX (A)	Data in (A)	
5	RX (B)	Data in (B)	
6	TX (B)	Data out (B)	
7	not used		
8	not used		

A2.3 LAN interfaces

The system provides one LAN interface in the standard delivery. Optionally, it can be extended with a second LAN interface which can be integrated or implemented as external LAN2 adapter. The standard LAN interface can be used for audio transmission, control and monitoring purposes. The LAN2 interface can be used for control, PAD or SNMP.

1 **8**
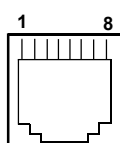
TAB. 5 **PIN ASSIGNMENT: LAN INTERFACE**

Socket: Western (8-pole) RJ45			
Pin	Signal		Electrical characteristics
1	TX (A)	Data out (A)	**Standard Ethernet /10Base-T (IEEE-802.3)** Speed: 10 MBit/s
2	TX (B)	Data out (B)	Cable type: Twisted Pair (CAT3) Max. cable length: 100 m
3	RX (A)	Data in (A)	
4	not used		**Fast Ethernet /100Base-T (IEEE-802.3u)** Speed: 100 MBit/s
5	not used		Cable type: Twisted Pair (min. CAT5) Max. cable length: 100 m
6	RX (B)	Data in (B)	
7	not used		
8	not used		

A2.4   **X.21 interface**

The X.21 interface is realised as DTE (Data Terminal Equipment) interface. The **MAGIC AE1 DAB+** can be connected via an X.21 cable directly to any Ensemble Multiplexer which supports the STI-D standard on the X.21 interface (e.g. R&S DM-001).
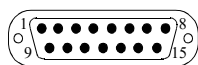
FIG. 57	PIN ASSIGNMENT: X.21 INTERFACE			
Connector: 15-pole SUB-D				
Pin	**Signal**		**Direction**	**Electrical characteristics**
1	SHIELD	Screen		Type: DTE
2	TX (A)	Transmit Data (A)	Out	Level: V.11, balanced
3	CTL (A)	Control (A)	Out	Data rates: n x 8 kbit/s n = 1 ... 24
4	RX (A)	Receive Data (A)	In	
5	IND (A)	Indicate (A)	In	Range: 100 m
6	SCLK (A)	Signal Element Timing (A)	In	
7	BCLK (A)[a]	Byte Timing (A)	In	
8	GND	Ground		
9	TX (B)	Transmit Data (B)	Out	
10	CTL (B)	Control (B)	Out	
11	RX (B)	Receive Data (B)	In	
12	IND (B)	Indicate (B)	In	
13	SCLK (B)	Signal Element Timing (B)	In	
14	BCLK (B)[a]	Byte Timing (B)	In	
15	not used			

a   Normally not used

NOTE   The **MAGIC AE1 DAB+ Audio Encoder** Firmware and PC Software supports the **X.21 operating mode** until **software version 2.320**. With later software releases only the LAN operating mode is possible.

A2.5   TTL/RELAY interface

Via this interface external control signals can be used. The programming of the available functions is possible via the Windows PC Software.
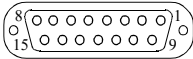
TAB. 6	PIN ASSIGNMENT: TTL/RELAY INTERFACE		
Socket: 15-pole SUB-D			
Pin	**Signal**	**Direction**	**Electrical characteristics**
1	not used		Specification of the TTL outputs: Maximum voltage: 5V
2	not used		Maximum current: 10mA
3	not used		Specification of the relays: Maximum voltage: 48V
4	not used		Maximum current: 200mA
5	GND		
6	RELAY 1 (A)	Out	
7	RELAY 1 (B)	Out	
8	RELAY 2 (A)	Out	
9	TTL1	In/Out	
10	TTL2	In/Out	
11	TTL3	In/Out	
12	TTL4	In/Out	
13	TTL5	In/Out	
14	TTL6	In/Out	
15	RELAY 2 (B)	Out	

A2.6   **Audio interfaces**

The system incorporates analogue and digital AES/EBU audio interfaces. For switching you can use display and keypad or the Windows PC software. The output interfaces can be used for monitoring purposes.

A2.6.1   **Analogue Audio interface**
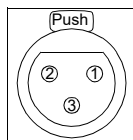
TAB. 7	PIN ASSIGNMENT: ANALOGUE INPUT (AUDIO 1/2 IN)	
Socket: 3-pole XLR		
Pin	**Signal**	**Electrical characteristics**
1	GND	Input level: adjustable -3 .... +9 dBu
2	AUDIO IN (A)	Impedance: > 25 kΩ
3	AUDIO IN (B)	Headroom: 6 dB
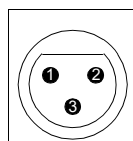
TAB. 8	PIN ASSIGNMENT: ANALOGUE OUTPUT (AUDIO 1/2 OUT)	
Connector: 3-pole XLR		
Pin	**Signal**	**Electrical characteristics**
1	GND	Output level: adjustable -3 .... +9 dBu
2	AUDIO OUT (A)	Impedance: < 50 Ω
3	AUDIO OUT (B)	Headroom: 6 dB

A2.6.2   **Digital AES/EBU Audio interface**

The *MAGIC AE1 DAB+* system incorporates a digital AES/EBU input and output. The input as well as the output has its own sample rate converter providing that a digital source with 32, 44.1 or 48-kHz can be connected directly. For external clocking (48-kHz only) the word clock input or output may be used.
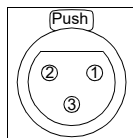
TAB. 9	PIN ASSIGNMENT: DIGITAL INPUT (AES IN)	
Socket: 3-pole XLR		
Pin	**Signal**	**Electrical characteristics**
1	GND	IEC-958
2	AUDIO IN (A)	
3	AUDIO IN (B)	
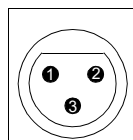
TAB. 10	PIN ASSIGNMENT: DIGITAL OUTPUT (AES OUT)	
Connector: 3-pole XLR		
Pin	**Signal**	**Electrical characteristics**
1	GND	IEC-958
2	AUDIO OUT (A)	
3	AUDIO OUT (B)	

A2.6.2.1   Digital AES/EBU Clock interface
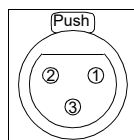
TAB. 11   PIN ASSIGNMENT: CLOCK INPUT (CLK IN)

Socket: 3-pole XLR

Pin	Signal	Electrical characteristics
1	GND	TTL
2	CLOCK IN	
3	not used	
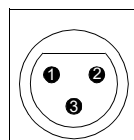
TAB. 12   PIN ASSIGNMENT: CLOCK OUTPUT (CLK OUT)

Connector: 3-pole XLR

Pin	Signal	Electrical characteristics
1	GND	TTL
2	CLOCK OUT	
3	not used	

A2.6.3   HEADSET/MIC interface

This interface allows a monitoring of the decoded audio signal as well as the audio inputs.

NOTE The microphone input is not available in this system.
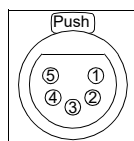
TAB. 13   PIN ASSIGNMENT: HEADSET/MICRO AUDIO INTERFACE

Socket: 5-pole XLR

Pin	Signal	Electrical characteristics	
1	not used	Output Power:	0,15 W
2	not used	Load (Min.):	8 Ω
		THD+N@1kHz:	0,25% (half power)
		PSRR[a]:	83 dB
3	GND	Level adjustment:	0 ... -40 dB
4	HEADPHONE left channel		
5	HEADPHONE right channel		

a   PSRR: Power Supply Rejection Ratio

A3   TECHNICAL DATA

Coding Algorithm

> HE-AAC-V2 (FhG Licence)
> ETSI TS 102 563

Sampling Frequencies:

> 16-kHz, 32-kHz, 24-kHz, 48-kHz

Data Rates:

> n x 8-kbit/s   n=1...24

Audio Interface Encoder:

> XLR, analogue, electronically balanced
> digital AES/EBU with integrated Sample Rate Converter

Audio Level:

> -3 ... +9 dBu

Headroom:

> adjustable

Impedance:

> 15 KOhm

THD+N:

> ~86 dB

Linearity:

> ± 0,3 dB

Monitoring Output:

    XLR, analogue, electronically balanced
    digital AES/EBU with integrated Sample Rate Converter
    Headphones output

Line Interfaces:

X.21	(STI-D protocol)
LAN	(UDP, IP Unicast, IP Multicast, IP Simulcast (three streams))

Data Interfaces:

PAD	V.24/RS232 IRT Rec. compliant 38400, 57600, 115200 Baud max. bit rate, see TAB. 2, Page 47

Control Interface:

LAN	
PC	V.24/RS232
GPIO	6 x TTL programmable 2 x Relays, programmable

Power Supply:

    90...253V AC

Frequency:

    50/60 Hz

Power Consumption:

    typical 12W, max. 15W

Dimensions (H x W x D):

    45 (1U) x 451 x 250 mm
    with brackets system fits into a 19" rack

A 4   G E N E R A L

A4.1   Ordering numbers

MAGIC AE1 DAB+   800405

Hardware Options

LAN2 Upgrade   800017
(2nd LAN interface,
available as external adapter or as integrated interface)

Software Options

EDI Upgrade   800989

FhG MUXENC Upgrade   800999

A4.2   Scope of delivery

- MAGIC AE1 DAB+

    - CD MAGIC AE1 DAB & DAB+ Updates(ID: 430283)

    - Manual

    - Mains power supply cable

    - 19'' Mounting Brackets and screws

    - 4 Rubber Feet

A4.3   Declaration of Conformity

You will find the declaration of conformity at the end of this manual.

A 5   S E R V I C E   I N F O R M A T I O N

A5.1   Software Updates

Free Software Updates you will find on our Homepage under

http://www.avt-nbg.de

MAGIC AE1 DAB & DAB+   **430282**

A5.2   Support

You can contact our Support via email:

support@avt-nbg.de

+49 911 5271-160   (09:00h - 17:00h)

To deal with your problem efficiently please have the factory number ready as well as the software version that you use.

A5.3   Repairs

If, contrary to expectations, your unit is defective please fill in the attached status report and send the unit to the following address:

AVT Audio Video Technologies GmbH
- Repairs -
Nordostpark 12
D-90411 Nuernberg
Germany

I N D E X

AVT

Audio
Video
Technologies

CE

DECLARATION OF CONFORMITY

Supplier's name:	AVT Audio Video Technologies GmbH
Supplier's address:	Nordostpark 12 D-90411 Nuernberg Germany

declares, that the product

Product name(s):	MAGIC AE1 DAB+

conforms to the standards of the following European directives:

Number/title:	EN 60950 A4 Safety

The conformity is evidenced by strictly meeting the following standards:

Harmonized Standards:	EN 55022, EN 55024, EN 300386, FCC Part 15 B
Place, date:	Nuernberg, 18.12.2007
Name:	Wilfried HECHT (Managing Director)
Legally binding signatures:	
Phone:	+49 911 5271-0

This declaration includes no warranty of properties.

The safety instructions specified in the product documentation delivered must be observed.