MAGIC DABMUX Go RF

MAGIC DABMUX Go RF RM

Small-Scale Ensemble Multiplexer

Hardware and Software Manual

AVT Audio Video Technologies

Release date: September 18

Version 1.1

INHALT

1   INTRODUCTION

MAGIC DABMUX Go RF and *MAGIC DABMUX Go RF are* DSP-based Ensemble Multiplexers with an integrated modulator in accordance with standard ETSI EN 300401 V2.1.1 – optimized for Small-Scale DAB headends. Up to 20 program providers can be connected via external Audio Encoders. The configuration of the system can be carried out via a web browser.

MAGIC DABMUX Go RF is available in a 3 x 11 x 27.6 cm housing with an external 12V power supply. *MAGIC DABMUX Go RF RM* is a 19" system with an integrated power supply.

1.1   Conventions

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

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

The **Note** symbol marks general notes to observe.

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

1.2   Safety

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

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.

1.3   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 personal 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 are authorised to remove and override safety measures, and to carry out the maintenance of the system.

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

- Use only tested and virus-free date carriers.

1.4 Construction

The functions of the **MAGIC DABMUX Go RF** are impended in a single unit and available as 3 x 11 x 27.6 cm system with external 12V power supply. **MAGIC DABMUX Go RF RM** has the same functionality in a full 19" x 1U housing with an integrated wide area power supply.

Both systems are available with an RF output, for connection to an amplifier/antenna and a GPS input, for connection of a GPS antenna.

MAGIC DABMUX Go RF Front View

MAGIC DABMUX Go RF Rear View

MAGIC DABMUX Go RF RM Front View

MAGIC DABMUX Go RF RM Rear View

For **MAGIC DABMUX Go RF RM** a redundant power supply is as an option available.

MAGIC DABMUX Go RF RM with 2nd power supply

1.5   Functionality

MAGIC DABMUX Go RF and *MAGIC DABMUX Go RF RM* are implemented on a signal processor-based hardware platform which is assembled in an optimised way and achieves best values in terms of power consumption and reliability. Despite its size, all features such as re-configuration (manually and scheduled), extraction of Sub Channels of other Multiplexers, integration of PAD and NPAD data services, creation of Service Information etc. are integrated.

Up to 20 program providers can be connected via external Audio Encoders. An installation of the Encoders directly in the studio avoids effectively an interference in Audio quality because of Codec cascading.

Audio Services can be supplied via the AVTMUX or the EDI(ETI) protocol from external Multiplexers. As output signal both Multiplexer variants supply an EDI signal for transmission to the transmitters. With the RF version, which has an integrated modulator, you can alternatively activate a power amplifier directly. This possibility is particularly of interest if you have only one transmitter site.

The synchronisation is done via NTP or in case of the RF version via the integrated GPS receiver. The RF input is intended for future applications.

The configuration, operation and monitoring are carried out via a HTML5 web browser. An alarm can also be signalled via SNMP. The system has a GBit Ethernet network interface, which allows the configuration of up to three IP addresses as well as VLANs.
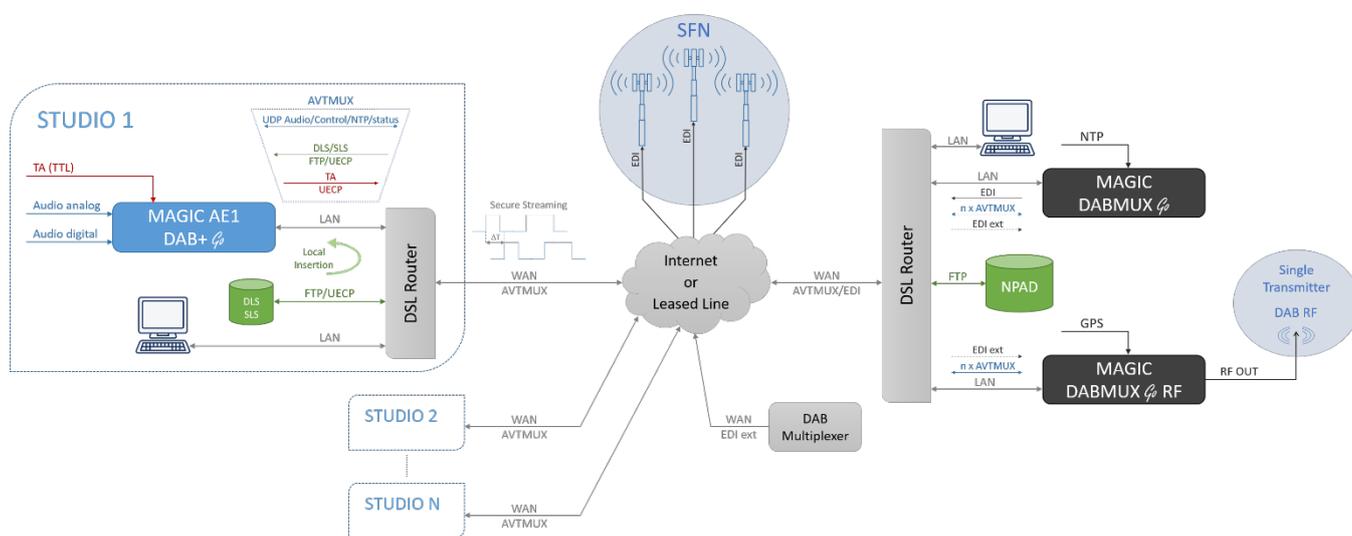
Small Scale DAB headend

2   PUTTING MAGIC DABMUX GO RF INTO OPERATION

2.1   Mounting

With its dimensions (W × H × D) of 440 mm × 44,5 mm (1 U) × 175 mm the **MAGIC DABMUX Go RF RM** system can be used either as desktop device or mounted in 19-inch racks. The mounting brackets are already integrated in the front panel. Mounting brackets for the small **MAGIC DABMUX Go RF** system are not available.

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

Although the system has an integrated fan for proper cooling, it is recommended to have sufficient ventilation. The ambient temperature of the system should be within the range of +5°C and +45°C. This threshold is specially to observe if the system is inserted in a rack.

The temperature of the system can be displayed via the System Monitor of the web interface.

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

Incorrect ambient temperature and humidity can cause functional deficiencies.

Operation outside the threshold values indicated above leads to a loss of warranty claim.

2.2   Connection to the main voltage

The system can be operated with mains voltage in the range of 100V and 230V. The mains frequency can range from 45 Hz to 65 Hz. The maximum power consumption is 15W.

After plugging in the external 12V power supply adapter (**MAGIC DABMUX Go RF**) or after plugging the main connector (**MAGIC DABMUX Go RF RM**), the unit boots in a few seconds.

For **MAGIC DABMUX Go RF RM** a redundant power supply is as an option available.

2.3   Operational elements at the rear side

The system has three buttons at the rear side.

- B1: Press at power on for factory reset
- B2: Press at power on for boot loader start (192.168.96.102/24)
- RST: Reset of the system

2.4   Rear status LEDs

The system has four LEDs for status indication at the rear side:

- **CLK**   static red

    - GPS or NTP signals faulty

    green flashing

    - NTP signal ok, but GPS signal faulty

    switched off

    - No alarm

- **INF**   static orange

    - Indicates an alarm without confirmation

    orange flashing

    - Indicates a pending alarm

    switched off

    - No alarm

- **TX**   orange flashing

    - Indicates RF output signal or EDI output signal

    switched off

    - Indicates error

- **RX**   orange flashing

    - Indicates input data signals from DAB Encoders or EDI signals from Ensemble MUX

    switched off

    - Indicates error

2.5   Wiring of the system

The wiring of **MAGIC DABMUX Go RF** and **MAGIC DABMUX Go RF RM** is simple as possible. One LAN interface is available. This interface can be used for the connection to DAB Audio Encoders, to DAB Ensemble Multiplexers (EDI format), to DAB transmitter (EDI format) to control the system via a web interface or for SNMP.

Both systems have a RF output, for connection to an amplifier/antenna and a GPS input, for connection of a GPS antenna.

3   THE WEB INTERFACE OF MAGIC DABMUX GO RF

To allow an access via web browser on the multiplexer, the IP address have to be entered into the address line of your browser.

- The standard IP address of the system is 192.168.96.102 and the subnet mask is 255.255.255.0.

Please note that only **one** user can access the system via the web browser simultaneously.

We recommend using one of the following web browsers:

- Firefox (version 47 or higher)

- Google Chrome (version 53 or higher)

- Safari (version 9 or higher), also on iPad or iPhone

- Internet Explorer (version 11 or higher)

After entering the IP address into the address line of your browser you should be automatically connected to MAGIC DABMUX Go RF or MAGIC DABMUX Go RF RM. The dashboard below shows the ON AIR Multiplex. It indicates the details of all services and components.
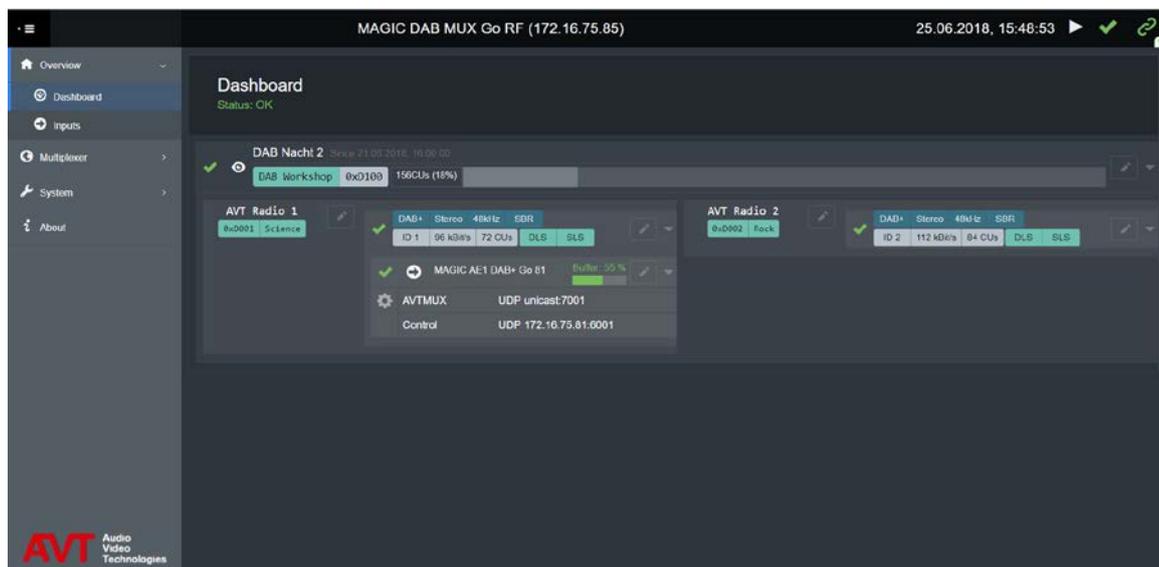
3.1 System Configuration

Press the *Menu* button in the left corner and open *System* to display the System Configuration menu.

- Network

  - IP Address, Subnet Mask, Gateway

- Time

  - Clock Source (if NTP is selected: NTP Server IP and Port address)

  - Time Zone

- EDI Output

  - IP and Port addresses of the destination (Multicast or Unicast IP address)

  - EDI parameter, e.g. "FEC level"

- RF Output

  - Frequency and level
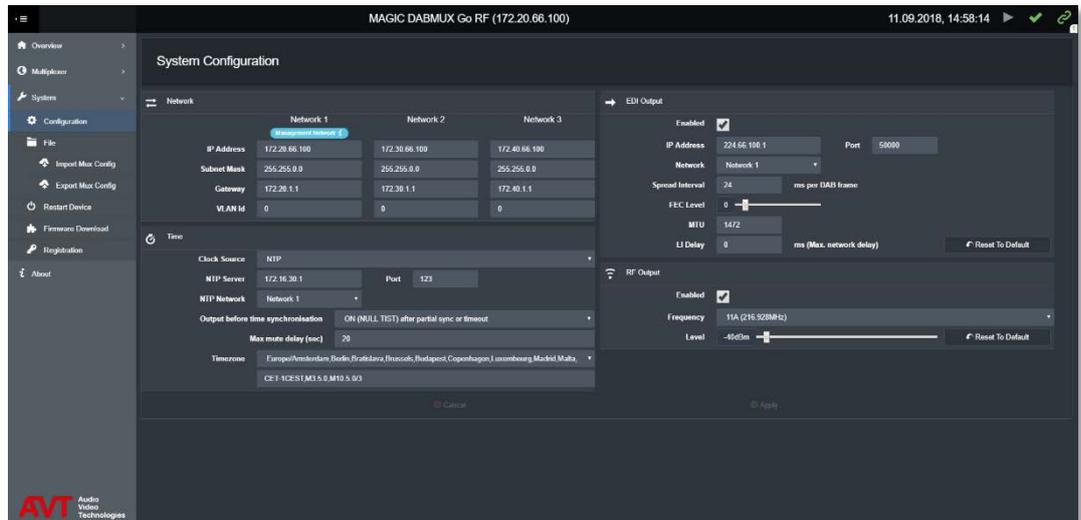
3.2   Input Configuration

Press the *Menu* button in the left corner and open *Multiplexer* to configure the Input.

- New Input

- Input Setup

    o   Name: name of the Input Source

    o   Type: protocol of Encoder and Multiplexer

        ▪   EDI

        ▪   AVTMUX

    o   Control IP: IP address of the Encoder

    o   Audio Port: UDP port of the encoded audio

    o   Control Port: UDP port for the encoder control

    o   Input IP: only used for Multicast group addresses
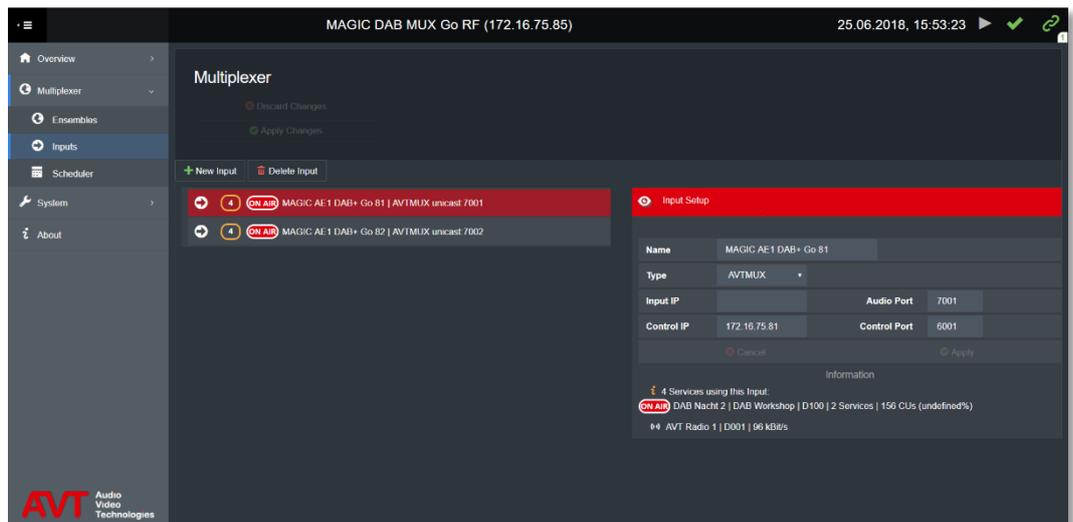
3.3   Ensemble Setup

Press the *Menu* button in the left corner and open *Multiplexer* to configure the Ensembles.

- Ensembles

- Ensemble Setup

    - Name: name of the Ensemble

    - Long Label: Complete name of the Ensemble, e.g. "DAB Workshop" (max. 16 chars)

    - Short Label: short name of the Ensemble, e.g. "DAB Work" (max. 8 chars, content of Long Label)

    - Country: country where the Multiplexer is installed

    - ID: Ensemble ID
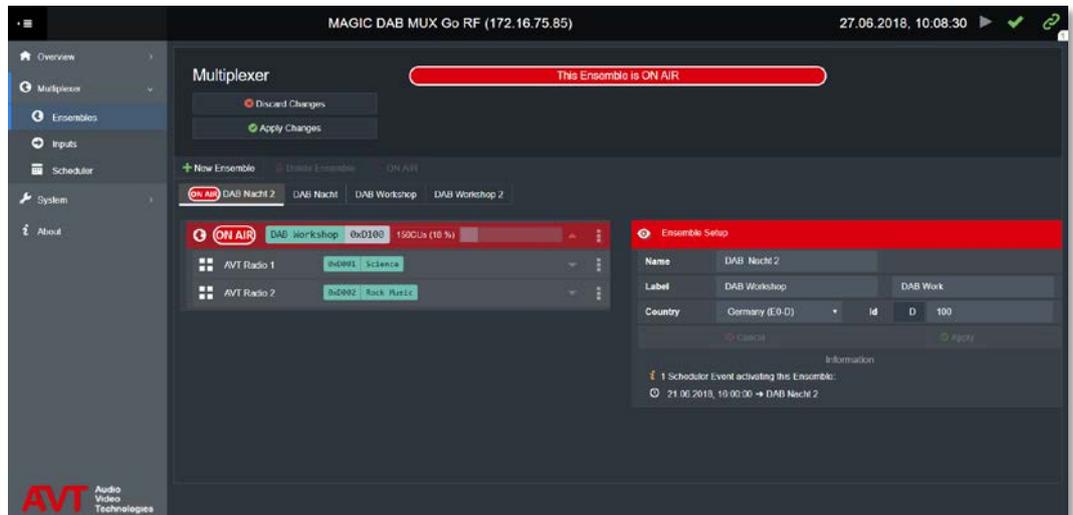
3.4   Service Setup

Press the *Menu* button in the left corner and open *Multiplexer* to display the
Ensemble Setup. Press on the Ensemble for the Service Setup.

- Service Setup

    o   Long Label: name of the Program, e.g. "AVT Radio 1"
        (max. 16 chars)

    o   Short Label: short name of the program, e.g. "AVT 1"
        (max. 8 chars, content of Long Label)

    o   Country: country where the Multiplexer is installed

    o   ID: Service ID

    o   PTy: Programme type, e.g. "Pop Music"
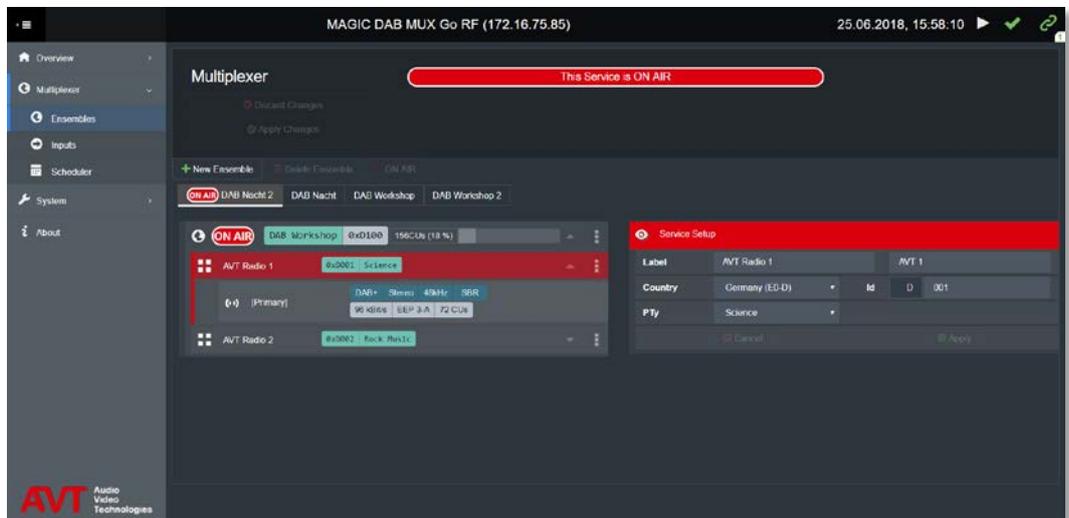
3.5   Component and Subchannel Setup

Press the *Menu* button in the left corner and open *Multiplexer* to display the Component and Subchannel Setup (right site).

- Component and Subchannel Setup
    - Content:
        - DAB+ (AAC)
        - DAB (Layer II)
        - Packet Data
    - Audio Codec:
        - Sampling frequency 24, kHz, 32kHz or 48 kHz
        - Mono, Stereo, Joint Stereo or Dual Channel
        - SBR or PS
    - PAD:
        - (DLS always activated)
        - SLS indicates whether SLS is included as PAD
    - Bitrate/ Prot:
        - Bitrate of the Audio Codec incl. PAD
        - Protection Level, e.g. "3A"
        - Subch. Id, e.g. "1"
    - Main Input:
        - Source for the main input, e.g. "Audio Codec"
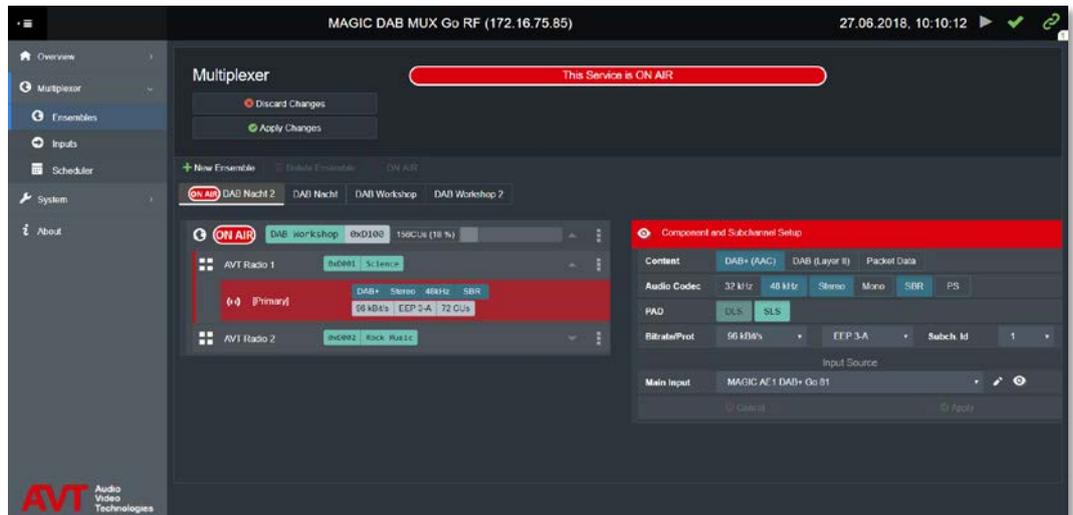
3.6   Scheduler Configuration

Press the *Menu* button in the left corner and open *Multiplexer* to display the Scheduler Configuration.

- Scheduler
- Scheduler Event Setup:
    - Type
        - At a given Date and Time
        - Every Month at given Days and Time
        - Every Week at given Days and Time
        - Every Day at a given Time
        - Every Hour at a given Time
        - Never
    - Date (Day/Month/Year)
    - Time (h/m/s)
    - Ensemble: Name of the new Ensemble
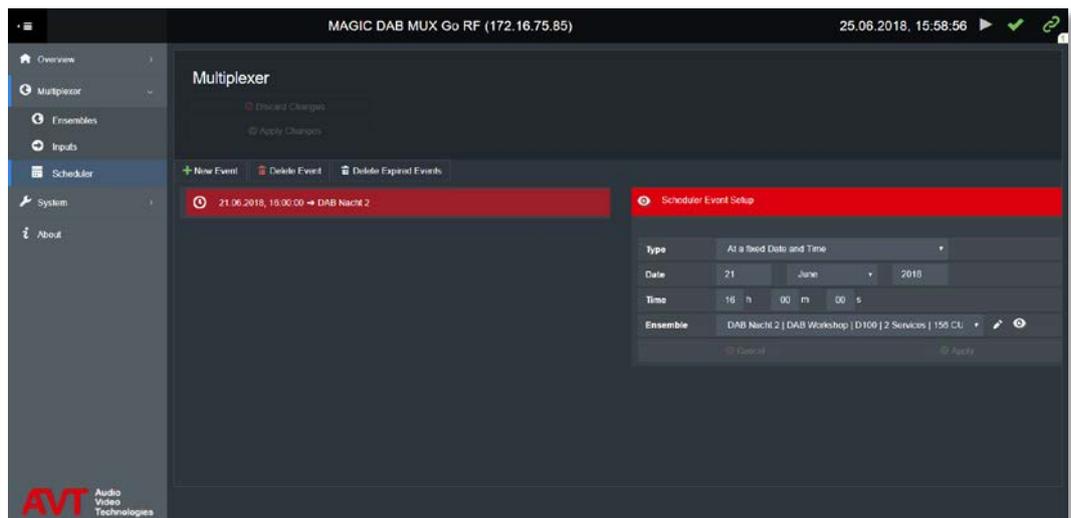
3.7   General settings

In the *About* dialogue, you will find the *Firmware version* of the system
Furthermore, you can find our contact information especially for support requests.

4   INTERFACES

On the front side of the unit the RF and GPS interfaces are available. The power supply and the LAN interface, as well as three buttons and four status LEDs are at the rear side. For MAGIC DABMUX Go RF RM a redundant power supply is optionally available.

MAGIC DABMUX Go RF
Front View

MAGIC DABMUX Go RF
Rear View

MAGIC DABMUX Go RF RM Front View

MAGIC DABMUX Go RF RM Rear View

MAGIC DABMUX Go RF RM with optional redundant power supply

4.1 LAN Interface

The LAN interface can be used as control interfaces. For the LAN interface a RJ45 socket is used. The pin assignment of the socket is shown below.
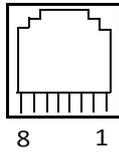
Table: LAN Interface

Pin	Signal		Electrical characteristics
1	TX+	Data out +	Socket: Western 8 pin, RJ45
2	TX-	Data out -	
3	RX+	Data in +	Recommendation: IEEE 802.3/Ethernet
4	not used		Data rate (Auto neg.): 10/100 Mbit/s
5	not used		Recommended cable: CAT5 or higher
6	RX-	Data in -	Max. cable length: 100m
7	not used		
8	not used		

8   1

4.2 RF IN/RF OUT/GPS IN

The RF Input has to be connected to an amplifier/antenna.

The RF Output is currently not in use.

The GPS Input is for the connection of a GPS antenna.

Table: RF IN Interface

Pin	Signal		Electrical characteristics
1	RF IN	RF input	Socket female: SMA
2	GND	Ground	Input level: -70 dBm … 0 dBm at 50 Ohm

Table: RF OUT Interface

Pin	Signal		Electrical characteristics
1	RF OUT	RF output	Socket female: SMA
2	GND	Ground	Output level: -40 dBm … -3 dBm at 50 Ohm

Table: GPS IN Interface

Pin	Signal		Electrical characteristics
1	GPS IN	GPS input	Socket female: SMA
2	GND	Ground	Input Sensitivity: -148 dBm at 50 Ohm

5 TECHNICAL DATA

- **DAB Ensemble Multiplexer**

  - According to ETSI EN 300 401 Version 2.1.1

  - Manual or scheduled reconfiguration

  - NPAD

  - Creation of Service Information

    - TA (will be available soon)

    - PTy (will be available soon)

- **Input protocols**

  - AVTMUX with Secure Streaming

  - 2 x EDI (Sub Channel Extraction) – ETSI TS 102 693 Version 1.1.2

- **Output protocols**

  - EDI (ETI) – ETSI TS 102 693 Version 1.1.2

- **Audio services**

  - Max. 20 Audio Encoders can be connected

  - Data rates: 16-kbps up to 384-kbps

  - SBR, PS, Mono, Stereo, Joint Stereo, Dual Channel

- **RF output**

  - Modulated RF signal for the connection to a power amplifier

  - For one transmitter

  - Synchronisation via integrated GPS receiver

- **Control software**

  - Web interface

- **Dimensions (H x W x D)**

    o   MAGIC DABMUX Go RF   30 x 110 x 176 mm

    o   MAGIC DABMUX Go RF RM   44,5 x 434 x 175 mm

- **Weight**

    o   MAGIC DABMUX Go RF   0,415 kg

    o   MAGIC DABMUX Go RF RM   2,35 kg

- **Additional Information**

    o   EMC   CISPR 32

    o   Electric safety   EN 60950

    o   Temperature Range   +5 °C to 45 °C

    o   Relative humidity   5% to 85%

6 GENERAL

6.1 Order numbers

MAGIC DABMUX Go RF	804301
MAGIC DABMUX Go RF RM	804303
Redundant Power Supply (only RM)	804309

6.2 Scope of delivery

- MAGIC DABMUX Go RF

  o 1 x 12 V plugin

  o 4 x Self-adhesive feet

- MAGIC DABMUX Go RF RM

  o 1 x power cable

  o 4 x Self-adhesive feet

  o 19'' Mounting brackets (integrated in front panel)

6.3 Declaration of conformity

The declaration of conformity you will find at the end of this manual.

7   SERVICE INFORMATION

7.1   Software and Firmware Updates

On our homepage you can download software updates for free. Go to

> *http://www.avt-nbg.de*

and select *Download Software*.

7.2   Support

Our support is available on working days:

Monday until Friday from 09.00h – 17.00h CET:

Phone number: **+49 911 5271-110**

Email: **support@avt-nbg.de**

⚠ To deal with your problem efficiently please note down the factory number of the unit as well as the software version that you use.

The factory number is visible in the software under *Administration → Registration*.

If you bought the system via your local dealer, please contact him first.

7.3   Repairs

If, contrary to expectations, your unit is defective please fill in the attached *Service Request*[1] and send the unit to the following address:

AVT Audio Video Technologies GmbH
- Repairs -
Nordostpark 91
D-90411 Nuernberg
Germany

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[1] Or download from:
http://avt-nbg.de/downloads/Info/Service%20Request%20AVT.pdf

CE Conformity

Declaration of Conformity

Name des Anbieters: Supplier's name:	AVT Audio Video Technologies GmbH
Anschrift des Anbieters: Supplier's address:	Nordostpark 91 D-90411 Nürnberg Germany

erklärt, dass das Produkt
declares, that the product

Produktname(n): Product name(s):	MAGIC DABMUX Go RF MAGIC DABMUX Go RF RM	804301 804303

mit den Vorschriften folgender Europäischer Richtlinien übereinstimmt:
conforms to the standards of the following European directives:

Nummer/Text: Number/title:	EN 60950 A4	**Gerätesicherheit** Safety

Die Übereinstimmung wird nachgewiesen durch vollständige Einhaltung folgender Normen:
The conformity is evidenced by strictly meeting the following standards:

Harmonisierte Normen: Harmonized Standards:	• CISPR 32 • Radiocommunications (Short Range Devices) Standard 2014 (referencing AS/NZS 4268) • Radiocommunications (Low Interference Potential Devices) Class Licence 2015

Ort, Datum: Place, date:	Nürnberg, 23.07.2018
Name(n): Name:	Wilfried Hecht
Rechtsverbindliche Unterschrift: Legally binding signatures:	
Telefon: Phone:	+49 911 5271-0

Diese Erklärung beinhaltet keine Zusicherung von Eigenschaften.
This declaration includes no warranty of properties.

Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
The safety instructions specified in the product documentation delivered must be observed.