MAGIC ACX

Dante® WAN Bridge

Hardware Manual

AVT Audio Video Technologies

Version: 1.2

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1   INTRODUCTION

The **MAGIC ACX Dante® WAN Bridge** system enables the transmission of up to 32 uncompressed *PCM* audio signals via wide area networks (WAN). Optionally, encoded transmissions in *MPEG Layer 2* and *G.711/G.722* formats are also possible, which drastically reduces the required transmission bandwidth.
With the *Leased Line Distribution* and *SIP Distribution Upgrade*, distribution options for up to 20 remote sites are available. The *RX Stream Destination Upgrade* enables the distribution of a received encoded data stream without decoding and encoding again.

Audio input/output is provided by the integrated 32-channel Dante® interface, which has redundant GbE interfaces and supports AES67.

The convenient Windows PC software provides management and visual monitoring of up to 10 systems. Up to five workplaces can access a **MAGIC ACX** simultaneously.

The front display of the system provides information about the status of the transmission and can also be used for basic configuration.

The **MAGIC ACX** is designed with a digital signal processer (DSP) that enables fanless operation. It requires 1U in a 19" rack for mounting and 1U above the unit for cooling.

The device is powered by an integrated wide range power supply. An additional power supply socket for connecting an external 5 V power supply unit is optional.

The **MAGIC ACX** features 2 Ethernet interfaces for control and audio transmission.

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.

This manual 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 based on the respective manual.

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

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

- The device must be protected from water.

- The device may only be installed in indoor rooms.

- The device may only be cleaned with a dry cloth.

- 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 MAGIC ACX can be controlled via the front keypad and the graphic display. Five LEDs give information about the system status and the audio transmission.

On the back there are connectors for

- Power cord
- Earthing
- 2x 100 Mbit/s Ethernet interface for control and audio transmission
- 2x GbE interface for primary and secondary Dante® audio network
- TTL and Relay GPIOs
- External power supply

MAGIC ACX front view

MAGIC ACX rear view

MAGIC ACX rear view with optional redundant power supply upgrade

1.5 Functionality

The **MAGIC ACX** receives audio signals via the Dante® network. A configurable number of audio channels is multiplexed into one IP stream and transmitted via Ethernet to the remote **MAGIC ACX**. The receiver feeds the audio channels into the local Dante® network.

The **MAGIC ACX** acts transmitter and receiver. Audio can be transmitted in both directions simultaneously.

With the **Leased Line Distribution** and **SIP Distribution Upgrade**, distribution options for up to 20 remote sites are available. The **RX Stream Destination Upgrade** enables the distribution of a received encoded data stream without decoding and encoding again.

The audio transmitted is PCM encoded @ 48 kHz with a bit depth of 16 bps or 24 bps.

The optional *MPEG Layer 2 Upgrade* allows the transmission of 10 encoded stereo audio signals (20 Dante® channels) at very high quality and moderate latency (approx. 125 ms). The bit rate and the encoding mode (mono, dual channel, stereo, joint stereo) are freely selectable.

With the optional *G.711/G.722 Upgrade,* up to 32 mono channels can be transmitted encoded with a low latency of approx. 25 ms. The required transmission bandwidth here is 2.5 Mbit/s.

The complete signal processing is done by two digital signal processors (DSPs).

DSP 1:

- Operating the Ethernet interfaces for control and audio transmission

- Multiplexing and demultiplexing of the IP audio stream

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

DSP 2:

- Reserved for future use.

2   PUTTING THE MAGIC ACX INTO OPERATION

2.1   Mounting

With its dimensions of (width x height x depth) 434 mm x 44.5 mm (1U) x 270 mm the **MAGIC ACX** system can either be used as desktop device or mounted into a 19-inch rack. 19"mounting brackets are included in delivery. When mounting the unit please keep in mind that the bending radius of the connected cables is always greater than the minimum allowed value.

When the **MAGIC ACX** is installed, please make sure that there is sufficient cooling: 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 specially to observe if the system is inserted in a rack. The system works without ventilation.

The system temperature can be indicated on the display under MENU > STATUS INFORMATION > DEVICE TEMPERATURE or in the software under Extras > System Monitor > System Temperature.

During operation humidity must range between 30 % and 85 %.

Attention! Incorrect ambient temperature and humidity can cause functional deficiencies.

Improper use of the unit can lead to a loss of warranty claim.

2.2   Connection to the mains voltage

Attention! High touch current possible! Before connecting the power supply, MAGIC ACX must be earthed.

For this purpose, the earthing cable must have a conductor cross-section of at least 2.5mm² if it is mechanically protected, or otherwise 4.0mm².

The following graphic symbols are located on the rear of the unit to indicate the correct and safe use.

After plugging the power cable and switching on the device, the unit boots within 30 seconds.

An additional power supply socket for connecting an external 5 V power supply unit is optional.

2.3   Operational elements at the front side

The system has an illuminated graphical display with a resolution of 160 x 32 pixel 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 cursor buttons (upwards/downwards) as well as an OK button. The numerical pad supports includes the characters 0...9, '*' and '#'

2.4   Front status LEDs

The system has five LEDs for status indication at the front side.

- *POWER*
  Permanent green: when system is ready for operation.

- *SYNC*
  Signals whether audio stream transmission and reception are ok.

- *ALARM*
  Signals whether there is a system alarm (hardware) or an application alarm (software) pending.

- *INPUT 1*
  Signals whether the Ethernet link status of the Dante® module is ok.

- *INPUT 2*
  Signals whether the Ethernet link status of the Ethernet port used for audio transmission and reception is ok.

2.5   Wiring

The figure below shows the systems' wiring.
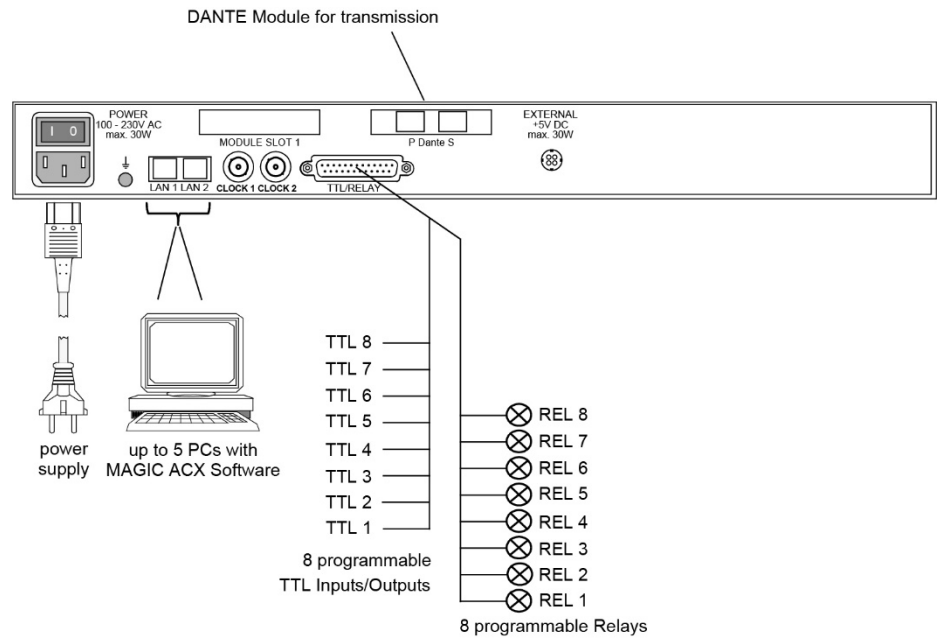
The system offers two Ethernet interfaces on the base board for audio transmission and control via PC software.

The Ethernet interfaces P and S on the Dante® module are used to connect the **MAGIC ACX** to the primary (P) and secondary (S) Dante® network.
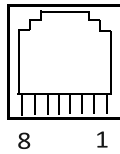
3   INTERFACES

3.1   Ethernet interfaces LAN 1 / LAN 2

The LAN 1 and LAN 2 interfaces can be used for audio transmission, for system control via Windows PC management software and for integration into a network management system via SNMP.

Pin assignment: Ethernet Interfaces LAN 1 / LAN 2
Socket: RJ-45

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

3.2   Ethernet interfaces Dante®

The Ethernet interfaces P and S on the Dante® module are used to connect the device to a Dante® network. 32 audio inputs/outputs can be connected over IP to Dante or AES67 compatible audio equipment.

Pin assignment: Ethernet Interfaces Dante®
Socket: RJ-45
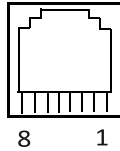
Pin	Signal		Electrical characteristics
1	RX/TX A P	Pair A +	Recommendation: IEEE 802.3/Ethernet
2	RX/TX A N	Pair A -	Data rate (Auto neg.): 100/1000 Mbit/s
3	RX/TX B P	Pair B +	Recommended cable: CAT5 or higher
4	RX/TX C N	Pair C +	Max. cable length: 100m
5	RX/TX C P	Pair C –	
6	RX/TX B N	Pair B -	
7	RX/TX D P	Pair D +	
8	RX/TX D N	Pair D -	

8   1

3.3 TTL/Relay interface

The TTL/relay interface is realised as a 25-pin socket. It provides eight TTL inputs/outputs as well as eight relay contacts.

Pin assignment: TTL/Relay interface
Socket: SUB-D 25-pin
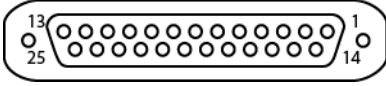
Pin	Signal		Electrical characteristics
1	TTL 1	input/output	**TTL interface:**
2	TTL 2	input/output	Capacity of the TTL outputs:
3	TTL 3	input/output	Maximum voltage: 3.3V
4	TTL 4	input/output	Maximum current: 10mA
5	TTL 5	input/output	
6	TTL 6	input/output	**Relay interface:**
7	TTL 7	input/output	Capacity of the relays:
8	TTL 8	input/output	Maximum voltage: 48V
9	RELAY 4 (B)	output, NO	Maximum current: 200mA
10	RELAY 5 (B)	output, NC	
11	RELAY 6 (B)	output, NC	
12	RELAY 7 (B)	output, NO	
13	RELAY 8 (B)	output, NO	
14	RELAY 1 (A)	output, NC	
15	RELAY 1 (B)	output, NC	
16	GND		
17	RELAY 2 (A)	output, NC	
18	RELAY 2 (B)	output, NC	
19	RELAY 3 (A)	output, NO	
20	RELAY 3 (B)	output, NO	
21	RELAY 4 (A)	output, NO	
22	RELAY 5 (A)	output, NC	
23	RELAY 6 (A)	output, NC	
24	RELAY 7 (A)	output, NO	
25	RELAY 8 (A)	output, NO	

NO = normally open contact

NC = normally closed contact

3.4 Power supply

3.4.1 AC power supply socket

100 – 230 V AC, 50 – 60 Hz, auto adjusting, max. 30 W
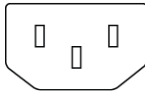
3.4.2 Optional DC power supply socket

Only use the +5 V DC power supply provided by AVT.

Pin assignment: 5 V power supply socket
Socket: KYCON KPJ-S4

Pin	Signal	Electrical characteristics
1,3	GND	Voltage: + 5V
2,4	+5 V	Power: max. 30W

4   TECHNICAL DATA

Coding algorithms:

- PCM 16/24 Bit

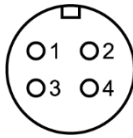- *Optional:* MPEG Layer 2

- *Optional:* G.711/G.722

Line interfaces:

- 2x Ethernet 10/100 Mbit/s

Control interfaces:

- 2x Ethernet 10/100 Mbit/s

- 8x Relays

- 8x TTL Input/Output

Audio interfaces:

- Dante® module

    o   1x Primary 1 GbE

    o   1x Secondary 1 GbE

    o   32x32 channels

    o   AES67 compatible

Data rates (Distribution Mode, Codec PCM 16/24 Bit):

- 1 Mono Channel: 16 Bit @48 kHz   768 kbit/s + 2 Mbit/s overhead

- 1 Stereo Channel: 16 Bit @48 kHz   1.536 kbit/s + 2 Mbit/s overhead

- 16 Stereo Channels: 16 Bit @48 kHz   24.576 kbit/s + 2 Mbit/s overhead

- 1 Mono Channel: 24 Bit @48 kHz   1.152 kbit/s + 2 Mbit/s overhead

- 1 Stereo Channel: 24 Bit @48 kHz   2.304 kbit/s + 2 Mbit/s overhead

- 16 Stereo Channels: 24 Bit @48 kHz   36.864 kbit/s + 2 Mbit/s overhead

Sampling rate:

- 48 kHz

Display:

- Graphical, resolution 160 x 32 pixels

- Illuminated (can be switched off)

Power supply:

- Integrated power supply:
  AC   100 – 230 V
  Power   max. 30 W

- Redundant external power supply (opt.):
  DC   +5 V
  Power   max. 30 W

Power consumption:

- Typ. 15 W, max. 30 W

Dimensions (W x H x D):

- 434 mm x 44.5 mm x 270 mm

Weight:

- Ca. 3.7 kg

Further Information:

- Temperature Range   +5 – 45 °C

- Relative humidity   30 – 85 %

- Mains voltage   100 – 230V

- Mains frequency   50 – 60 Hz

- Power consumption   max. 30 W

5   GENERAL

5.1   Order numbers

MAGIC ACX Dante® WAN Bridge   803230

Redundant Power Supply Upgrade   802035
       5V Tabletop PSU

5.2   Scope of delivery

- MAGIC ACX Dante® WAN Bridge

    - 1 x power cable

    - 4 x Self-adhesive feet

    - 19'' Mounting brackets

5.3   Declaration of conformity

Find the declaration of conformity at the end of this document.

6   SERVICE INFORMATION

6.1   Software and firmware updates

Download software updates from our website. No registration required.

https://www.avt-nbg.de

Navigate to *Downloads > Software*.

6.2   Support

Our support is available on working days:

Monday to Friday from 09:00 - 16:30 CET.

Support portal:	**https://avt-nbg.zammad.com**
Email:	**support@avt-nbg.de**
Phone number:	**+49 911 5271-110**

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 them first.

6.3   Repairs

If your unit is defective, please contact us before sending in the device.

To send in the **MAGIC ACX** please fill in the included *Service Request*[1] and send the unit to the following address:

AVT Audio Video Technologies GmbH

- Repairs -

Nordostpark 91

90411 NÜRNBERG

GERMANY

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[1] Or download from:
https://avt-nbg.de/download/other/service-request-avt.pdf

6.4   WEEE (Directive on Waste Electrical and Electronic Equipment)

Due to Directive 2012/19/EU on waste disposal, this device must be recycled.

All electrical and electronic equipment must be disposed of separately from general household waste via approved collection points or disposal companies. The proper disposal and separate collection of old electrical and electronic equipment serves to prevent possible damage to the environment and health. The device contains valuable raw materials that can be recycled.

For proper recycling, send the device to us:

AVT Audio Video Technologies GmbH

- Recycling -

Nordostpark 91

90411 NÜRNBERG

GERMANY

WEEE Reg. No. DE83099164

Only prepaid parcels will be accepted!

These instructions only apply to appliances installed and sold in countries of the European Union. In countries outside the European Union, other regulations may apply to the disposal of electrical and electronic equipment.

Always recycle packaging material and electrical appliances or their components through authorised collection points or disposal companies.

$C\epsilon$ EU-Konformitätserklärung

EU-Declaration of Conformity

Name des Anbieters:
Supplier's name:

AVT Audio Video Technologies GmbH

Anschrift des Anbieters:
Supplier's address:

Nordostpark 91
90411 Nürnberg
Germany

erklärt, dass das Produkt
declares, that the product

Produktname(n):
Product name(s):

MAGIC ACX Dante® WAN Bridge   803230

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

Elektromagnetische Verträglichkeit (EMV)   2014/30/EU
Electromagnetic compatibility (EMC)

Niederspannungs-Richtlinie   2014/35/EU
Low voltage directive

Beschränkung der Verwendung bestimmter gefährlicher   2011/65/EU
Stoffe in Elektro- und Elektronikgeräten (RoHS)   incl. amendment 2015/863/EU

Restriction of the use of certain hazardous substances in
electrical and electronic equipment (RoHS)

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

- EN IEC 62368-1
- EN IEC 63000
- EN 55032
- EN IEC 61000-6-2
- EN IEC 61000-6-4
- EN 55016-2-1

- EN 55016-2-3
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4

- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-8
- EN 61000-4-11

Ort, Datum: Nürnberg, 01.07.2022   **Name(n):**   Wolfgang Peters
Place, date: Name:

Rechtsverbindliche Unterschrift:
Legally binding signatures:

Telefon: +49 911 5271-0
Phone:

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.