

# MAGIC ACip3

# MAGIC ACip3 2M

High-quality IP and E1 Audio Codec

---

Hardware Manual

A publication of  
AVT Audio Video Technologies GmbH

Nordostpark 91  
90411 Nuernberg  
Germany

Phone +49-911-5271-0  
Telefax +49-911-5271-100

© AVT Audio Video Technologies GmbH  
All Rights reserved. Reproduction in  
whole or in parts is prohibited without the  
written consent of AVT GmbH.  
Subject to changes.

Release date: January 2019

# INDEX

1	Introduction .....	4
1.1	Conventions .....	5
1.2	Safety .....	5
1.3	General safety requirements .....	6
1.4	Construction.....	7
1.5	Functionality .....	8
2	Putting MAGIC ACip3 into operation .....	9
2.1	Mounting .....	9
2.2	Connection to the mains voltage .....	10
2.3	Operational elements at the front side.....	11
2.4	Front status LEDs .....	11
2.5	Wiring.....	12
2.6	Proper disposal .....	12
3	Interfaces .....	13
3.1	LAN interfaces .....	14
3.2	E1 interface (only MAGIC ACip3 2M) .....	14
3.3	TTL/Relay interface .....	15
3.4	RS232 interfaces .....	16
3.5	Audio interfaces .....	17
3.5.1	Headphone interface .....	17
3.5.2	Analogue Audio interfaces.....	17
3.5.3	Digital AES Audio interfaces.....	18
3.6	Power supply.....	19
3.6.1	AC power supply interface.....	19
3.6.2	Additional DC power supply connection.....	19
3.7	SD Card Slot.....	19
4	Technical Data.....	20
5	General .....	23
5.1	Order numbers.....	23
5.2	Scope of delivery.....	23
5.3	Declaration of conformity .....	23
6	Service Information.....	24
6.1	Software and firmware updates .....	24
6.2	Support .....	24
6.3	Repairs .....	24

## 1 INTRODUCTION

The **MAGIC ACip3** is a pure IP Audio Code and provides three Ethernet interfaces which can be used for Audio over IP transmissions, to control the system with the Windows PC software or to integrate it into a network management system via SNMP. Alternatively, **MAGIC ACip3 2M** provides an E1 interface in order to implement the classic feed via 2 Mbit networks.

The Audio programmes can – flexibly and freely assignable – be fed in or given out, respectively, via an analogue and two digital stereo interfaces (1 x Stereo analogue XLR, 2 x Stereo digital AES SUB-D 15-pin). Furthermore, both systems provide a headphones interface for audio monitoring. For external signalling and switching commands six programmable TTL interfaces and six relays are available.

The systems support the G.711, G.722, ISO/MPEG Layer 2, Opus coding algorithms and PCM 16/20/24 Bit in the standard delivery version. Optionally, the Audio Codecs can be upgraded with Enhanced apt-X 16/24 Bit, AAC-LD/AAC-ELD and AAC-LC+V1/V2.

MAGIC ACip3 and MAGIC ACip3 2M are designed as 19" system with integrated wide area power supply and provide optionally an external **redundant power supply**. The systems feature a signal processor-based hardware platform without fan.

Via LAN, two operating modes are available: the system can be used for dial-up AoIP connections according to the EBU Tech 3326 standard or IP Leased Line connections. In AoIP mode, the system can register at 5 different SIP servers and automatically accept incoming calls from this SIP server. Audio connections in IP Leased Line and in AoIP dial-up Mode can be established with the **Secure Streaming** functionality for a highly reliable transmission. With this feature, a connection can be established via two independent IP links to ensure highest reliability. It is possible to use either one or two Ethernet interfaces for this functionality.

In case that no connection at all can be established, it is also possible to play an emergency programme from an **SD card**. With the Backup Upgrade a main and a backup connection can be configured.

The systems encode one stereo programme in the standard version and can optionally be upgraded to a **second stereo programme** by software activation (2-Channels Upgrade Package).

The Audio Codecs can be operated via the front panel or even more comfortably via the Windows PC Software supplied with the delivery.

Via the **Ember+** protocol 64 inputs and 64 outputs can be programmed, an easy communication between Audio Codec and e.g. DHD or LAWO mixing consoles is possible.

With the optional **Distribution Upgrade** MAGIC ACip3 can be used as Audio contribution codec for Studio-Transmitter-Links. 10, 20 or up to 50 participants can dial into a central codec via SIP. In the integrated access protection list up to 50 participants can be entered.

---

## 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 data carriers.

---

## 1.4 Construction

**MAGIC ACip3** and **MAGIC ACip3 2M** can be controlled via the front keypad and the graphic display. Five LEDs give information about the status and connections. A headphone interface is also on the front.

The other interfaces of the system (3 LAN interfaces, Audio interfaces, RS232 and GPIO interfaces as well as power supply connections, SD card slot and for the 2M version E1 interface) are on the rear side.



MAGIC ACip3 Front View



MAGIC ACip3 Rear View



MAGIC ACip3 2M Front View



MAGIC ACip3 2M Rear View

---

## 1.5 Functionality

**MAGIC ACip3** encodes the audio signal at the analogue or digital AES/EBU inputs, according to the configured algorithm, with the specified data rate and outputs it via the configured IP line interface (and E1 line interface with MAGIC ACip3 2M). In addition, you can key in PAD data, which is applied to one of the RS232 interfaces, into the encoded audio signal.

The complete signal processing is taken over by three digital signal processors. In this way the following functions are realized

### **DSP1:**

- G.711 Codec
- G.722 Codec
- ISO/MPEG Layer 2, Layer 3
- MPEG 4: AAC-LD, AAC-ELD, HE-AAC-LC (V1 und V2)
- Opus
- Control of the complete system (Keypad, display, relays, TTL, RS232)

### **DSP2:**

- apt-X Codec

### **DSP3:**

- Second apt-X Codec

The configuration and operation can be carried out via the front keypad and the illuminated display.

Configuration and control are especially comfortable with the Windows PC software which is included in delivery and which communicates with the system via one of the LAN interfaces. As a special feature the system offers an NTP synchronization of the audio transmission.



## 2 PUTTING MAGIC ACIP3 INTO OPERATION

---

### 2.1 Mounting

With its dimensions of (width x height x depth) 434 mm x 44.5 mm (1 U) x 260 mm the **MAGIC ACip3** system can either be used as desktop device or mounted into a 19-inch rack. Corresponding 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 ACip3 Audio Codec 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 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%.

---



**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

---

**MAGIC ACip3** must be earthed. The earthing can be carried out via the earthing screw on the back side of the unit.

**MAGIC ACip3** may only be used with the included power cable. The power cable must not be replaced by an inadequately dimensioned power cable.



**MAGIC ACip3** may only be operated with one of the included power supplies listed below:

- Sunny Model SYS1541-2412 (100-240 Vac; max. 1,0 A; 50-60 Hz / 12 Vdc; 2,0 A (EN60950 – LPS))
  - Sunny Model SYS1357-2412 (100-240 Vac; max. 1,0 A; 50-60 Hz / 12 Vdc; 2,0 A (EN60950 – LPS))
- 

After plugging the power cable and switching on the device, the unit boots in a few seconds.

A +12 V DC voltage can be supplied to the +12 V socket, which takes over the backup operation in case of failure of mains voltage.

---

### 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), two buttons for accepting/dropping calls as well as an OK button. The numerical pad supports in addition to the numerical characters 0...9, the '\*'- and '#'-key. For text entries the numerical pad can also be used as a normal keypad.

---

### 2.4 Front status LEDs

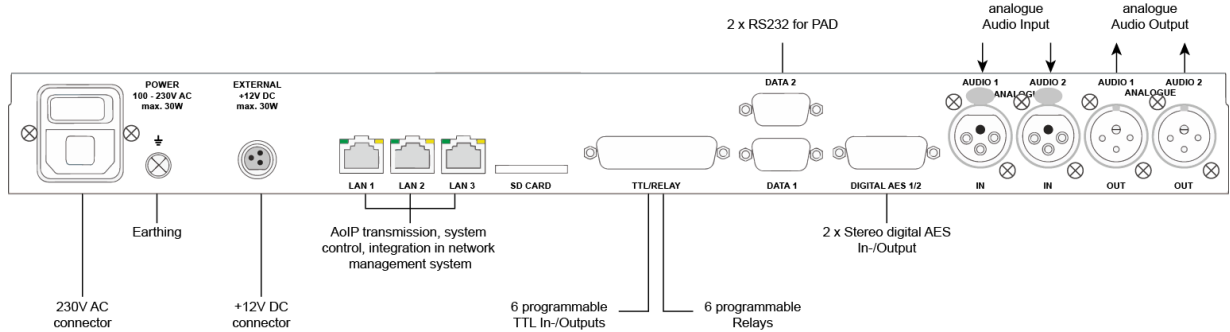
The system has five LEDs for status indication at the front side.

- **POWER** green  
**Permanent green:** when system is ready for operation.
- **SYNC** green or red flashing  
Provides a common signal based on the status of INFO 1 and INFO 2.  
**Permanent green:** One codec connection: INFO1 or INFO2 lights green  
**Permanent green:** Two codecs connections: INFO1 and INFO2 lights green  
**Flashes red:** One codec connection: INFO1 or INFO2 flashes red  
**Flashes red:** Two Codecs connections: INFO1 or INFO2 or both flash red.
- **ALARM** red or red flashing  
**Permanent red:** in case of System alarms: Hardware alarms such as Ethernet 1, 2 or 3 interface error, DSP1 or 2 error, overheating etc.  
**Flashes red:** in case of Application alarms: AES/EBU interfaces are configured as interfaces for Codec 1 or Codec 2 and AES/EBU input signal is missing
- **INFO 1/2** green or red flashing  
Bi-directional connection  
**Permanent green:** Codec 1/2 is connected, and Decoder 1/2 is synchronized  
**Flashes red:** Codec 1/2 is connected, but Decoder 1/2 is not synchronized.  
Unidirectional connection  
**Permanent green:** Encoder 1/2 is connected

---

## 2.5 Wiring

The figure below shows the systems' wiring.



The system offers three LAN interfaces, which can be used for Audio transmission. The example applications show a unidirectional Audio transmission, a bidirectional transmission as leased line connection between two devices and an IP dial-up connection.

---

## 2.6 Proper disposal

All electrical and electronic equipment must be disposed separately from general household waste via authorised collection points or disposal companies. Proper disposal and separate collection of old appliances serves to prevent potential damage to the environment and health. The device contains valuable raw materials that can be reused. Therefore, return the appliance to an appropriate collection point.



Detailed information on the disposal of your old appliances can be obtained from your local authority, your waste disposal service, the specialist dealer where you purchased the product or your sales contact.

These statements apply only to equipment installed and sold in the countries of the European Union. Countries outside the European Union may have different regulations for the disposal of electrical and electronic equipment.



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

---

### 3 INTERFACES

Five LEDs give information about the status and connections at the front side. A headphone interface is also on the front.

The other interfaces of the system (3 LAN interfaces, Audio interfaces, RS232 and GPIO interfaces as well as power supply connections, SD card slot) are on the rear side.



MAGIC ACip3 Front View



MAGIC ACip3 Rear View

MAGIC ACip3 2M provides an additional E1 interface at the rear side.



MAGIC ACip3 2M Front View



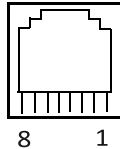
MAGIC ACip3 2M Rear View

### 3.1 LAN interfaces

The LAN 1, LAN 2 and LAN 3 interfaces can be used for Audio over IP transmissions, for system control via Windows PC management software and for integration into a network management system via SNMP. RJ-45 sockets are used for the LAN interfaces.

Pin assignment: LAN Interfaces

Socket: RJ-45



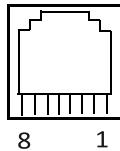
Pin	Signal		Electrical characteristics
1	TX+	Data out +	Recommendation: IEEE 802.3/Ethernet Data rate (Auto neg.): 10/100 Mbit/s Recommended cable: CAT5 or higher Max. cable length: 100m
2	TX-	Data out -	
3	RX+	Data in +	
4	not used		
5	not used		
6	RX-	Data in -	
7	not used		
8	not used		

### 3.2 E1 interface (only MAGIC ACip3 2M)

A symmetrical E1 interface is optionally available for classic audio feed via 2 Mbit networks. The pin assignment is shown below.

Pin assignment: E1 Interface

Socket: RJ-45



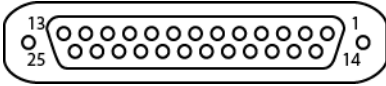
Pin	Signal		Electrical characteristics
1	RXD b	Data in b	Recommendation: G.703/G.704 Data rate: 2.048 Mbit/s Max. cable length: 100m CLK: TTL input
2	RXD a	Data in a	
3	not used		
4	TXD b	Data out b	
5	TXD a	Data out a	
6	not used		
7	CLK in b		
8	CLK in a		

### 3.3 TTL/Relay interface

The TTL/relay interface is realised as a 25-pin socket. It provides six TTL inputs/outputs as well as six relay contacts, which offer the NC and the NO function.

Pin assignment: TTL/Relay interface

Socket: SUB-D 25-pin



Pin	Signal		Electrical characteristics
1	GND		TTL interface: Maximum voltage: 3,3 V Maximum current: 10 mA Relay interface: Maximum voltage: 48 V Maximum current: 200 mA
2	TTL 1	input/output	
3	TTL 2	input/output	
4	TTL 3	input/output	
5	RELAY 1 (COMMON)		
6	RELAY 2 (NC)		
7	RELAY 2 (NO)		
8	RELAY 3 (COMMON)		
9	RELAY 4 (NC)		
10	RELAY 4 (NO)		
11	RELAY 5 (COMMON)		
12	RELAY 6 (NC)		
13	RELAY 6 (NO)		
14	TTL 4	input/output	
15	TTL 5	input/output	
16	TTL 6	input/output	
17	RELAY 1 (NC)		
18	RELAY 1 (NO)		
19	RELAY 2 (COMMON)		
20	RELAY 3 (NC)		
21	RELAY 3 (NO)		
22	RELAY 4 (COMMON)		
23	RELAY 5 (NC)		
24	RELAY 5 (NO)		
25	RELAY 6 (COMMON)		

NO = normally closed contact

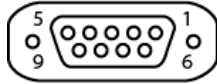
NC = normally open contact

### 3.4 RS232 interfaces

Besides the Audio transmission additional data for RDS can be typed in per stereo program via two separate RS232 interfaces.

Pin assignment: DATA/CONTROL & DATA/PAD interface

Socket: SUB-D 9-pin



Pin	Signal	Electrical characteristics	
1	not used	Level:	V.24 (RS232)
2	TXD RS232 Data (a)	Data rate:	max. 115200 Baud
3	RXD RS232 Data (b)	Scope:	max. 15 m (RS232)
4	not used		Protocol: 1 Start bit
5	GND		8 Data bits
6	not used		1/2 Stop bit
7	not used		Parity adjustable
8	not used		
9	not used		

a = ATTENTION: on this pin the MAGIC ACip3 sends data

b = ATTENTION: on this pin the MAGIC ACip3 receives data



---

### 3.5 Audio interfaces

#### 3.5.1 Headphone interface

For Audio monitoring a headphone interface is provided, integrated as Stereo 6.3 mm jack.

#### 3.5.2 Analogue Audio interfaces

The MAGIC ACip3 incorporates an analogue stereo input and output (Audio 1, Audio 2).

Two XLR sockets are available for the input and two XLR plugs for the output. The pin configuration of socket and plug are displayed below.

Pin assignment: Analogue Audio input

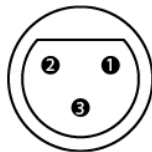
Socket: 3-pin XLR



Pin	Signal	Electrical characteristics
1	GND	Ground
2	A	+
3	B	-

Pin assignment: Analogue Audio output

Socket: 3-pin XLR



Pin	Signal	Electrical characteristics
1	GND	Ground
2	A	+
3	B	-

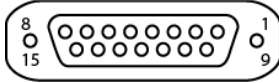
### 3.5.3 Digital AES Audio interfaces

The MAGIC ACip3 provides two digital stereo AES inputs and outputs.

A 15-pin SUB-D socket contains the digital AES interfaces. The pin configuration of the 15-pin SUB-D socket can be seen below.

Pin assignment: Digital Audio interface AES

Socket: SUB-D 15-pin

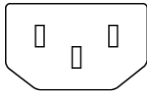


Pin	Signal	Electrical characteristics
1	AES 1 IN +	IEC 958
2	AES 1 IN -	
3	AES 2 IN +	
4	AES 2 IN -	
5	AES 1 OUT +	
6	AES 1 OUT -	
7	AES 2 OUT +	
8	AES 2 OUT -	
9	GND	
10	CLOCK IN/OUT	
11...15	GND	

---

### 3.6 Power supply

#### 3.6.1 AC power supply interface



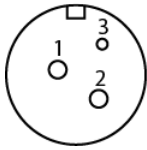
100 V – 230 V AC, 50/60 Hz, auto adjusting, max. 30 W

#### 3.6.2 Additional DC power supply connection

A DC voltage of +12V can be fed to the additional power supply input.

Pin assignment: Additional power supply

Socket: KYCON KPJ-S3



Pin	Signal	Electrical characteristics
1	GND	Voltage: +12V Power: max. 30W
2	+12V	
3	not used	

---

### 3.7 SD Card Slot

A slot for a standard SD/SDHC card with max. 32 GByte is available at the back of the system.

## 4 TECHNICAL DATA

Coding algorithms:

- G.711
- G.722
- PCM 16/20/24 Bit
- ISO/MPEG Layer 2
- Opus

Optional:

- ISO/MPEG Layer 3
- MPEG4 AAC-LD/ELD
- MPEG4 AAC-LC
- MPEG4 HE-AACv1/v2
- Enhanced apt-X 16/24 Bit

Line interfaces:

- 3 x Ethernet 10/100 Mbit/s
- 1 x E1 (only MAGIC ACip3 2M)

Control interfaces:

- 3 x Ethernet 10/100 Mbit/s
- 6 x Relays
- 6 x TTL Input/Output

Audio interfaces:

- Analogue Stereo Audio IN
- Analogue Stereo Audio OUT
  - Electronic symmetrical input                      XLR socket
  - Electronic symmetrical output                     XLR plug
  - Impedance                     Input:                     > 25kOhm  
   Output:                    52 Ohm
  - Frequency response
    - G.711                             50 Hz ... 3400 Hz
    - G.722                             50 Hz ... 7000 Hz
    - MPEG                            20 Hz ... 20000 Hz  
(depending on bitrate)
- 2 x Stereo Digital Audio IN/OUT:
  - Format                             IEC-958 AES
  - Balanced inputs and outputs
  - Connection                      15-pin SUB-D socket
  - Impedance                        110 W
- 1 x Headphones:
  - 6.3 mm Stereo jack

Data interfaces:

- 2 x RS232

Sampling rates:

- 8, 16, 24, 32, 48 kHz (depending on coding algorithm)

Data rates (net):

- 8–2304 kBit/s (depending on coding algorithm)

SD Card Slot:

- 1 x SD/SDHC for max. 32 GByte card

Display:

- Graphical, resolution 160 x 32 pixels
- Lighted (can be switched off)

Power supply:

- Integrated power supply:  
AC 100 V – 230 V  
Power max. 30 W
- Redundant external power supply (opt.):  
DC +12 V  
Power max. 30 W

Power input:

- Typ. 15 W, max. 30 W

Dimensions (W x H x D):

- 434 mm x 44.5 mm x 260 mm

Weight:

- Ca. 3.7 kg

Further Information:

- Temperature Range +5°C – 40°C
- Relative humidity 30% – 85%
- Mains voltage 100V – 230V
- Mains frequency 50Hz – 60Hz
- Power consumption max. 30W

## 5 GENERAL

---

### 5.1 Order numbers

MAGIC ACip3 Audio Codec	803200
MAGIC ACip3 2M	803220
Backup Upgrade	338694
Enhanced apt-X Stereo Codec Upgrade	450312/13
MPEG Layer 3 Upgrade	450307
MPEG4 AAC-LD/ELD Codec Upgrade	450306
MPEG4 Upgrade	450314
2-Codex Upgrade Package	803222
12V external power supply	470080
AES/EBU/CLK Adapter Cable	490171

---

### 5.2 Scope of delivery

- MAGIC ACip3 & MAGIC ACip3 2M Audio Codec
    - 1 x power cable
    - 4 x Self-adhesive feet
    - 19" Mounting brackets (integrated in front panel)
- 

### 5.3 Declaration of conformity

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

## 6 SERVICE INFORMATION

---

### 6.1 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***.

---

### 6.2 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.

---

---

### 6.3 Repairs

If, contrary to expectations, your unit is defective please fill in the attached ***Service Request***<sup>1</sup> and send the unit to the following address:

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

---

<sup>1</sup> Or download from:

<http://avt-nbg.de/downloads/Info/Service%20Request%20AVT.pdf>



# CE EG-Konformationserklärung

## EU-Declaration of Conformity

**Name des Anbieters:** AVT Audio Video Technologies GmbH  
Supplier's name:

**Anschrift des Anbieters:** Nordostpark 91  
Supplier's address: 90411 Nürnberg  
Germany

erklärt, dass das Produkt  
declares, that the product

**Produktname(n):** MAGIC ACip3 Audio Codec 803200  
Product name(s): MAGIC ACip3 2M Audio Codec 803220

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

Elektromagnetische Verträglichkeit (EMV)  
*Electromagnetical compatibility (EMC)*  
2014/30/EU

Niederspannungs-Richtlinie  
*Low voltage directive*  
2014/35/EU

Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS)  
*Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)*  
2011/65/EU

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

- EN 61010-1
- EN 50581
- EN 55022
- EN 55016-2-3
- EN 55013
- EN 61000-3-3
- EN 61000-3-2
- 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, 20.05.2016  
Place, date:

**Name(n):** Wilfried Hecht  
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.