

The 10D amplifier



10D amplifier

The 10D amplifier represents the next generation of four channel Class D installation amplifiers using Digital Signal Processing (DSP) to incorporate loudspeaker specific configurations and user definable setups, equalization and delay functions.

The amplifier is designed to drive applicable d&b loudspeakers and provide comprehensive management and protection capabilities.

The high performance amplifier provides the power density required for installation purposes while the powerful signal processing extends the level of functionality of the on-board features.

The onboard Web Remote interface features direct access via Ethernet for initial startup and configuration as well as remote control using a standard web browser.

The front panel provides status monitoring LEDs for either POWER, MUTE, DATA or signal states.

The user definable equalizer features two independent 16-band EQ groups within each channel. These provide parametric, notch, shelving and asymmetric filters as well as a graphic EQ (via the d&b R1 Remote control software).

The delay capability covers a range of up to 10 sec..

All loudspeaker specific functions such as CUT, HFA, HFC, CSA or CPL are available.

The DSP unit of the amplifier has a fixed latency of 0.3 ms.

The amplifier enables up to eight input channels and provide four analog inputs as well as four AES3 channels with corresponding link outputs. Each input channel can be routed to any of the output channels.

For applicable d&b loudspeakers, d&b LoadMatch enables the amplifier to preserve tonal balance when cable lengths of up to 70 m (230 ft) are used.

The amplifier utilize a switch mode power supply with active PFC to produce a clean current draw and ensure stable and efficient performance under adverse mains conditions.

Remote control and full system integration are realized using the d&b ArrayCalc simulation software and R1 Remote control software. The amplifier include two Ethernet and CAN-Bus ports on RJ 45 connectors. Both, Ethernet (OCA/AES70) and dbCAN protocols are incorporated.

Up to five opto-coupled GPIO pins are provided as additional digital control lines. This enables external control and detection functions.

An additional FAULT contact is provided allowing a general device error to be remotely indicated.

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Operating conditions

Temperature range*	-10 °C ... +40 °C / +14 °F ... +104 °F
	* continuous operation
Temperature range**	-10 °C ... +50 °C / +14 °F ... +122 °F
	** reduced output power or short term operation
Storage temperature	-20 °C ... +70 °C / -4 °F ... +158 °F
Humidity (rel.), long term average	70%

Audio data (linear setting with subsonic filter)

Maximum output power per channel (THD + N < 0.5%, all channels driven)	
CF = 6 dB @ 4/8 ohms	4 x 700 / 350 W
CF = 12 dB @ 4/8 ohms	4 x 700 / 350 W
Maximum output voltage	82 V
Frequency response (-1 dB)	35 Hz - 25 kHz
THD+N (20 Hz - 20 kHz, 200 W @ 4 ohms)	< 0.5%
S/N ratio (unweighted, RMS)	
Analog input	> 101 dB
Digital input	> 103 dB
Damping factor (20 Hz - 200 Hz into 4 ohms)	> 80
Crosstalk (20 Hz - 20 kHz)	> -45 dB
Gain (Linear mode @ 0 dB)	31 dB

Protection circuits

Output current protection	45 A
Overvoltage protection	Up to 400 V AC
Self-resetting overtemperature protection	
Output DC offset protection	
Output HF Voltage Limiter	
Output pop-noise suppression	

Power supply

Universal range switched mode power supply with active power factor correction (PFC)	
Mains connector	powerCON®
Rated mains voltage	100 to 240 V, 50 - 60 Hz
Mains fuse	internal

Power consumption (typical values)

Standby	9 W
Idle	48 W
Max. power consumption (short term RMS)	1.3 kW

Audio input connectors

Analog INPUT (A1 - A4)	3-pin Phoenix Euroblock male
	also used as link output wired in parallel
Pin assignment	GND, neg., pos.
Input impedance	38 kOhms, electronically balanced
Common mode rejection (CMRR @ 100 Hz/10 kHz)	> 60/50 dB
Maximum input level (balanced/unbalanced)	+23/29 dBu
	+27 dBu @ 0 dBFS
Digital INPUT (D1/2, D3/4)	3-pin Phoenix Euroblock male, AES3
Pin assignment	GND, AES Signal, AES Signal
Input impedance	110 ohms, transformer balanced
Sampling rate	48/96 kHz
Synchronization	Word-Sync: PLL-locked to source (slave mode)
Digital LINK (D1/2, D3/4)	3-pin Phoenix Euroblock male
	electronically balanced
	analog signal buffering (refresh), power fail relay (Bypass)

Output connectors

SPEAKER OUTPUTS A/B/C/D	2 x 4-pin Phoenix Euroblock female
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Network connectors

CAN	2 x RJ 45 parallel
ETHERNET	2 x RJ 45
	Dual Ethernet port with built-in 2-port Ethernet switch
	10/100 Mbit

GPIOs/FAULT contact

GND (↕) / GPIOs 1 - 5	1 x 6-pin Phoenix Euroblock male
	Opto-coupled (galvanic isolation)
DC voltage	24 V DC (±25% / 18 V DC - 30 V DC)
Maximum current draw	1 A
Source resistance	5.4 kΩ
Diode forward bias	1.2 V
FAULT contact	1 x 3-pin Phoenix Euroblock male

Controls

POWER	Mains power switch (rear panel)
RESET	Reset button (rear panel, recessed)

Indicators

POWER	Power indicator (green)
Data	Data stream indicator (yellow)
Mute A/B/C/D	Channel mute indicator (red)
	Channel/Device error indication
ISP A/B/C/D	Input Signal Present indicator (green)
GR A/B/C/D	Gain Reduction indicator (yellow)
OVL/Error A/B/C/D	Overload/Error indicator (red)

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Digital Signal Processing

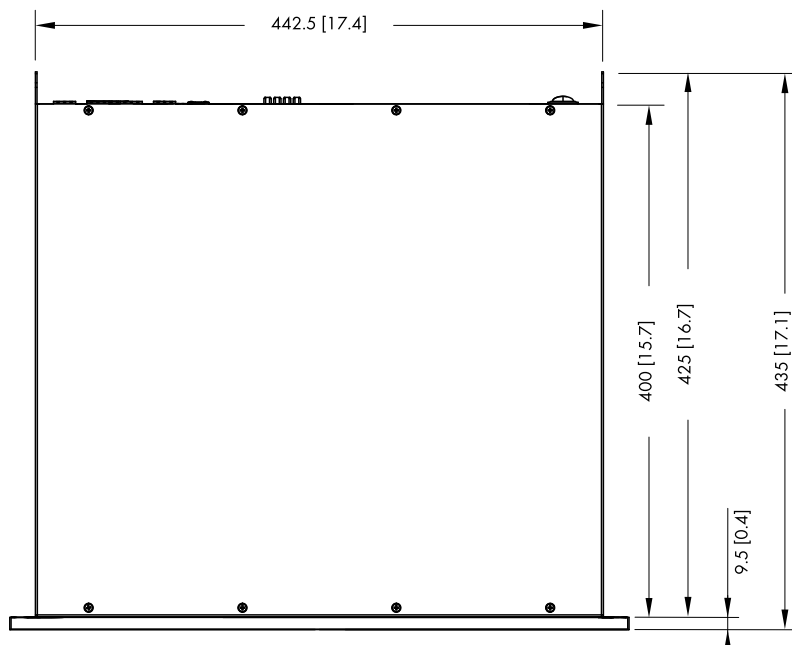
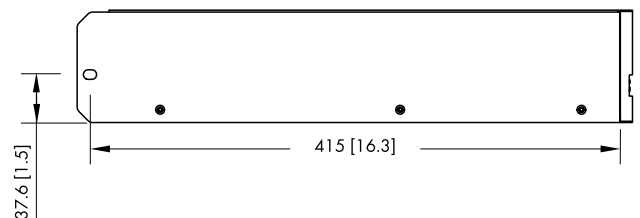
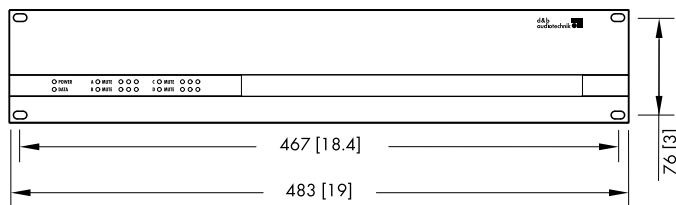
System start-up time.....	< 20 sec.
Conversion	96 kHz/27 Bit ADC/24 Bit DAC
Latency analog input	0.3 msec.
Latency digital input (AES).....	0.3 msec.
.....	48 kHz/96 kHz
Input dynamic.....	> 124 dB
ADC dynamic.....	> 110 dB
DAC dynamic.....	> 110 dB
Equalizer	two user definable 16-band equalizers
.....	Filter types: PEQ/Notch/HiShlv/LoShlv/Asym
Delay	0.3 msec. - 10 sec.
Frequency generator.....	Pink noise or Sine wave 10 Hz - 20 kHz

Fan noise emission

Rack mounted, measured on axis, 1 m to front panel, A-weighting	
Idle	32 dB(A)
Max. RPM.....	48 dB(A)
.....	Ambient temperature 22 °C / 71.6 °F

Dimensions and weight

Height x width x depth	2 RU x 19" x 435 mm
.....	2 RU x 19" x 17.1"
Weight	10.6 kg / 23.4 lb



10D dimension in mm [inch]

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Architectural specifications

The amplifier shall be four channel incorporating digital signal processors (DSP) to provide loudspeaker specific configurations and functions and dedicated protection circuits. It shall be equipped with digital and analog signal inputs as well as link outputs, remote control and monitoring capabilities via Ethernet (OCA) or CAN-Bus. User interface shall be a Web Remote interface and via remote control software.

Four analog input connectors shall be provided also acting as link output.

Two digital input connectors shall be provided, each accepting a 2 channel digital (AES3) audio signal.

Analog inputs shall be electronically balanced with an input impedance of 38 kOhm.

The digital inputs shall be transformer balanced with an input impedance of 110 ohm while the digital link output shall be electronically balanced providing analog signal buffering (refresh) and power fail relay (Bypass). Sampling shall be 48/96 kHz - 2 Ch/n Word-Sync: PLL-locked to source (slave mode) synchronization.

Connector type for all audio inputs and link outputs shall be 3-pin Phoenix Euroblock male (Phoenix MSTB 2.5 / 3-STZ).

Signal processing shall utilize 96 kHz sampling rate with 27 Bit ADC/24 Bit DAC conversion while the latency shall not exceed 0.3 msec.

The output connectors shall be 2 x Phoenix 4-pin Euroblock female (Phoenix IPC 5/4-STF-7.62).

Five GPIO lines shall be provided on an Phoenix 6-pin Euroblock male (Phoenix MSTB 2,5/6-STZ) as digital control lines which can be configured either as an input or output (In/Out) and shall allow either level (Hi/Lo active) or edge (rising/falling) triggering.

In addition a FAULT contact shall be provided on an 3-pin Phoenix Euroblock male (Phoenix MSTB 2,5/3-STZ) to allow a general device error to be remotely indicated.

It shall incorporate two user definable 16-band equalizers for independent application to each channel allowing parametric filters, notch, hi- and lo- shelf filters as well as asymmetric filters.

A signal delay capability of up to 10 sec. (3440 m / 11286 ft) shall be incorporated for independent application to each channel.

It shall contain a signal generator offering pink noise or sine wave program.

Compensation for cable length shall be incorporated to improve impulse response.

Load monitoring and System check functions shall be included to ascertain the status of the loudspeaker impedance. Load monitoring shall allow impedance monitoring to determine the status of an LF or HF driver in systems with multiple elements, even if these are crossed over passively.

Input monitoring shall be included to allow detection of incoming pilot signals.

A Fallback function shall be available to enable the definition of primary (Regular) and secondary (Fallback) signal paths for analog and digital input signals with two different modes (Manual or Auto). It shall ensure that any secondary or emergency signal fed to the Fallback inputs is transmitted when required.

An Override function shall be available to allow a dedicated analog input to be set as a major signal path with highest priority for general messages or emergency services.

An AutoStandby function shall automatically switch the amplifier to Standby mode after a predefined time when the incoming signal level at the individually specified inputs drops below a defined threshold. The function shall be independent of the mute status of the respective channels. An AutoWakeup function shall automatically repower the amplifier, when an input signal is present and exceeds a defined threshold.

A universal range switched mode power supply shall be incorporated and allow mains range of 100 to 240 V AC, 50 - 60 Hz mains power supply voltages. Mains voltage monitoring, mains inrush current limiter, self-resetting overtemperature, under- and overvoltage protection shall be incorporated.

Power factor compensation (PFC) shall be incorporated to provide a clean and efficient sinusoidal current draw.

It shall have temperature and signal controlled fans for cooling the internal assemblies.

The power amplifier channels shall have ground fault protection, output pop-noise suppression, DC offset protection, output HF voltage limitation, output current limitation/protection and self-resetting overtemperature protection.

The output power shall be 4 x 700/350 W into 4/8 ohms at a crest factor (CF) of 6 dB, all channels driven.

Damping factor (20 Hz - 200 Hz into 4 ohms) shall be >80 while the S/N ratio (unweighted, RMS) shall be >101 dBr (analog input) and >103 dBr (digital input).

The dimensions (H x W x D) shall not exceed 2RU x 19" x 435 mm (2RU x 19" x 17.1") and shall weigh no more than 10.6 kg (23.4 lb).

The amplifier shall be the 10D by:
d&b audiotechnik GmbH & Co. KG.