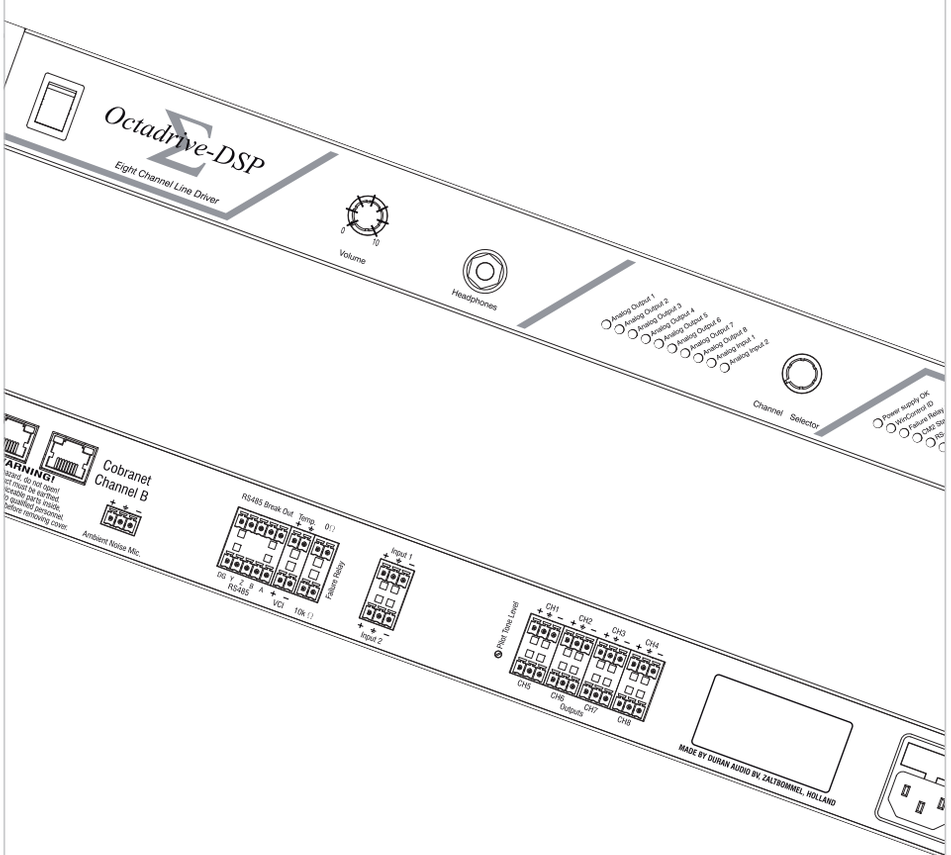
OCTADRIVE DSP-CN

Datasheet

Applies to Part Number:

391030

Octadrive DSP-CN*



*This unit has a CobraNet® interface installed

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1. Architectural and engineering specifications

The unit shall be constructed in a 1U 19" rack enclosure. It shall be a multi channel line driver with on-board DSP and RISC processor that is intended for use in professional audio installations.

All signal processing functions, necessary to properly control and monitor each output channel shall be implemented on-board in order to reduce the overhead costs related to external processors. The electronics shall consist of a 2 channel analogue audio input module, 8 digital audio inputs via CobraNet®, a Digital Signal Processor with 10 inputs and eight transformer balanced analogue outputs. Additional functionality shall be provided to allow specific audio paths to be broadcast from the Octadrive via CobraNet.

The analogue audio inputs shall be transformer balanced. All necessary signal processing shall be implemented in the digital domain by means of a 32 bits floating point DSP.

The DSP shall realize appropriate output channel gain, equalisation filters and delays. Besides the aforementioned, the DSP shall be able to realize EQ, pre-delay, volume and autogain, and compression as required. The DSP software and coefficients shall reside in non-volatile memory in order to facilitate adaptations and software updates. Audio AD and DA conversion shall be performed with high quality 24 bits converters.

The output section shall be equipped with eight independent low impedance drive channels. Each output shall be transformer balanced and be equipped with circuitry to compensate for the distortion created by the transformers. Hardware bypass functionality from analogue input 1 to all analogue outputs shall be provided. A headphone amplifier shall also be provided to allow local monitoring of all analogue inputs and outputs.

The device shall be controllable over RS-485 as well as over Ethernet. The RS-485 interface shall be implemented as a fully isolated full-duplex serial network interface. Access over Ethernet shall be realized by using the CobraNet® Serial Bridge protocol. An additional RS-485 'break-out' shall be provided to allow monitoring and control over CobraNet® Serial Bridge of devices which are not supported with a CobraNet® interface.

This control unit shall serve four main functions:

- Remote monitoring of parameters like status of the DSP, monitoring and control of the internal fan, external pilot tone detection, status of the optional ambient noise sensing microphone, ambient noise level, ambient temperature, control for the input section etc.
- Remote control of DSP parameters: volume, pre-delay, EQ, output sections, autogain configuration and surveillance related parameters.
- Updating DSP software and factory unit programming.
- Configuration of the CobraNet® node (Ethernet interface only).

The device shall provide two voltage free failure relay contacts for monitoring purposes. The relay contacts shall NOT be individually switched, however one contact pair shall have internal resistors to allow for a direct connection to external impedance-sensing monitoring equipment.

The device shall be fitted with an opto-isolated control voltage input which shall trigger an "emergency preset".

The analogue audio signal inputs and outputs shall be connected to Phoenix type MC 1,5/ 3-ST-3,81 connectors. The device shall be equipped with two RJ-45 sockets to allow connection to a fully redundant CobraNet® network. The normal as well as the 'break-out' RS-485 signal shall be connected to Phoenix type MC 1,5/ 5-ST-3,81 connectors. The unit shall be equipped with an IEC mains inlet connector.

The enclosure shall be constructed of steel finished with a nickel plating. All connectors shall be grouped together on the rear of the chassis, with the exception of the headphone socket which shall be on the front of the unit. The front of the enclosure shall accommodate a mains switch, various status and failure LEDs, a headphone socket, headphone volume control and a source selector control for the headphone output.

Dimensions are: 43.5 mm H x 482 mm W x 232 mm D. Weight 3.7 kg. The unit shall be the AXYS® model Octadrive DSP-CN.

2. Specifications

Electrical:

Analogue audio inputs[1]	- Number of inputs	:	2
	- Nominal level	:	0 dBV (RMS, line input)
	- Maximum level	:	+21 dBV (peak, line input)
	- Type	:	dual line input, transformer balanced
	- Impedance (balanced)	:	6k8 Ω
	- Frequency range	:	25 to > 22k Hz (-3 dB, analogue in to analogue out, 100k Ω load)
	- CMRR	:	> 60 dB (1k Hz), > 70 dB (50 Hz)
Analogue audio outputs[2]	- Number of outputs	:	8
	- Nominal gain	:	2 dB (@ 1k Hz, 'low' gain setting, from analogue input) 16 dB (@ 1k Hz, 'high' gain setting, from analogue input)
	- Maximum level	:	5 dBV (RMS, @ 1k Hz, 'low' gain setting, default limiters) 19 dBV (RMS, @ 1k Hz, 'high' gain setting, default limiters)
	- Output impedance	:	< 50 Ω (@ 1k Hz)
	- Type	:	transformer balanced, distortion compensated
Digital audio interface[3]	- Number of inputs	:	8
	- Number of outputs[4]	:	8
	- Format	:	48 kHz / 24, 20 or 16 bit
	- Type	:	Dual 100 Mb/s CobraNet® Ethernet (IEEE 802.3u) connection
General	- Dynamic range[5]	:	> 90 dB
	- THD + N	:	< 0.005 % @ 1k Hz (3 dB below max. output level, > 300 Ω load) < 0.02 % @ 50 to 10k Hz (3 dB below max. output level, > 300 Ω load)
DSP module	- Type	:	floating point 900 MFLOPS 32 bits
	- Memory	:	128 Mb SDRAM + 3 Mb non volatile
	- AD - DA conversion	:	24 bits sigma-delta 128 x oversampling
	- Auxilliary processor	:	200 nsec single cycle RISC
	- Sample rate	:	48.0 kHz (default)
	- Latency	:	3.45 ms (analogue in to analogue output)
	- Signal processing	:	- input channel delay (10 x 1.3 sec) - main pre-delay (21 sec) - output channel delay (43 sec per output) - equalizer - volume - individual RMS and peak limiters on each output - ambient noise level dependent gain adaptation ('fail-safe') - eight output filters + delay ringbuffers - individual output EQ, gain and polarity control - input configuration (10 inputs)
	- CobraNet® transmission routing	:	- Slot 1 Analogue out 1 or ANS mic (software configurable) - Slot 2 Analogue out 2 or ANS mic (software configurable) - Slot 3 Analogue out 3 - Slot 4 Analogue out 4 - Slot 5 Analogue in 1 - Slot 6 Analogue in 2 - Slot 7 Analogue in processed 1 (before input selection processing) - Slot 8 Analogue in processed 2 (before input selection processing)

Control & monitoring	- Interface[6]	:	RS-485 or CobraNet® Serial Bridge protocol
	- RS-485 interface type	:	serial full-duplex RS-485, autoswitching 115k2, 57k6, 38k4,19k2 baud, optically isolated
	- Maximum number of units[7]	:	126 units
	- Remote surveillance	:	- general status (DSP running, signal monitoring etc.) - pilot tone detection on analogue inputs (20k - 30k Hz, level > -22 dBV) - pilot tone detection on CobraNet® inputs (19k2 to 23k5 Hz, software configurable threshold) - monitoring of optional external ambient noise sensing microphone - ambient temperature monitoring and frost protection - CobraNet® status - control voltage input status
	- Failure	:	- internal hardware bypass circuit for analogue audio input 1 to all analogue outputs - failure relay contacts 1 (external connector, maskable conditions) SPST 100 mA / 24 V - failure relay contacts 2 with 10k / 20k Ω internal resistors (external connector, maskable conditions) SPST 100 mA / 24 V - failure status indicated at front by bi-colour LED
	- Output pilot tone frequency	:	27.5k Hz
	- Output pilot tone level	:	- adjustable with trimmer - min. level < -90 dBV - max. level -3 dBV (for 'high' analogue output gain setting)
	- Control voltage input	:	- optically isolated control input - state low for Vin <= 3.3 VDC - state high for Vin >= 3.4 VDC - max. input level 48 VDC
Headphone output	- Connector	:	1/4" stereo jack
	- Monitoring	:	all analogue inputs and outputs
	- Channel select	:	rotary control and LED indication
	- Control	:	volume
	- Frequency range	:	20 to 45k Hz (+/- 3 dB)
	- Maximum output level	:	17.5 dBV (RMS, @ 1k Hz, 300 Ω load)
Connectors[8]	- Analogue audio inputs	:	Phoenix type MC 1,5/ 3-ST-3,81 (2 x)[9] p1 = Line +, p2 = GND, p3 = Line -
	- Analogue audio outputs	:	Phoenix type MC 1,5/ 3-ST-3,81 (8 x) p1 = Line +, p2 = GND, p3 = Line -
	- CobraNet® interface	:	RJ-45 (2 x)[3]
	- RS-485 interface	:	Phoenix type MC 1,5/ 5-ST-3,81 p1 = DGND, p2 = Y, p3 = Z, p4 = B, p5 = A
	- RS-485 break-out	:	Phoenix type MC 1,5/ 5-ST-3,81 p1 = DGND, p2 = A, p3 = B, p4 = Z, p5 = Y
	- Ambient noise sensor	:	Phoenix type MC 1,5/ 3-ST-3,81 p1 = In +, p2 = GND, p3 = In -
	- Ambient temperature sensor (NTC)	:	Phoenix type MC 1,5/ 2-ST-3,81 p1 = In, p2 = GND
	- Control Voltage Input	:	Phoenix type MC 1,5/ 2-ST-3,81 p1 = +, p2 = -

	- Failure relays[10]	:	Phoenix type MC 1,5/ 2-ST-3,81 (2 x) contacts 1 : short / open circuit contacts 2 : 10k / 20k Ω
	- Headphone socket	:	1/4 inch jack: tip = +, ring = -, sleeve = ground
	- Mains	:	IEC connector
Indicators	- Supply monitoring LED	:	green (OK) / off (failure)
	- ID indication LED	:	green (front and back)
	- Failure relay LED	:	green (OK) / red (failure)
	- CobraNet® node state LED	:	green (OK) / red (failure)
	- RS-485 activity LED	:	green (rcv) / red (xmt) / orange (rcv and xmt)
	- RS-485 'break-out' activity LED	:	green (rcv) / red (xmt) / orange (rcv and xmt)
	- Monitoring indication LEDs	:	green (channel selected)
PSU	- Type	:	Switched-mode
	- Mains voltage	:	100 V to 240 V, 50 or 60 Hz
	- Mains fuse(s)	:	1 x 3.15 A (slow type, integrated in IEC mains connector)
	- Power consumption	:	15 W typical, 26 VA
	- Protection	:	- thermal protection - output current limiting - under-voltage and over-voltage lock out

General:

Temperature range (ambient)	:	0 to 40 °C (32 - 104 °F)
Dimensions (H x W x D)	:	43.5 x 482 x 232 mm (1U 19" rack enclosure)
Weight	:	3.7 kg (8 lbs)
Finish	:	Nickel Plated

Notes:

1. The device supports 2 analogue audio inputs and 8 digital CobraNet® inputs.
2. The analogue output gain for all outputs is software configurable in 2 steps (with 14 dB gain difference). All measurements with 100k Ω load unless stated otherwise.
3. The device is equipped with 2 RJ-45 sockets for a redundant CobraNet® connection.
4. Various signals can be routed to the 8 CobraNet® transmit channels, see section 'DSP module' for details.
5. A-weighed, 10 to 22k Hz analyzer bandwidth, open input, 100k Ω load.
6. The device can either be accessed over RS-485 or over Ethernet by using the CobraNet® Serial Bridge protocol. The interfaces cannot be used simultaneously. The RS-485 break-out is provided to allow local devices without CobraNet® to be connected to WinControl via the CobraNet® Serial Bridge.
7. Maximum number that can be connected to one subnet, multiple subnets can be controlled by one host PC. This also applies when accessing over the CobraNet® Serial Bridge.
8. All Phoenix type numbers refer to the required cable parts, a complete set of Phoenix connectors is supplied with the product.
9. For solid and stranded wires with conductor cross sections from 0.14 to 1.5 mm^2.
10. Contact 1 pins are shorted in case the device is powered and the status is OK (no masked failure). The impedance between contact 2 pins is 10k Ω in that case.

3. Octadrive DSP-CN measurement plots

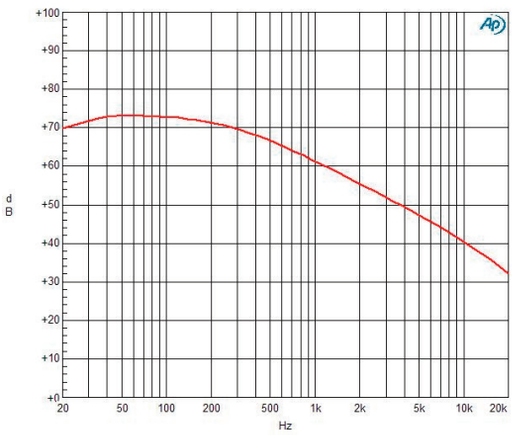


Fig 1 CMRR versus frequency.

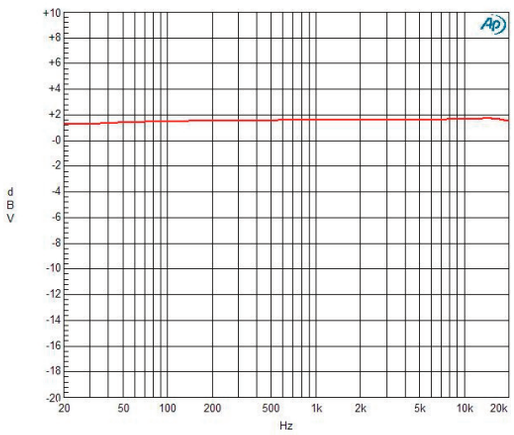


Fig 2 Magnitude vs frequency, 600 Ω loaded, 0 dBV in, 'low' gain setting.

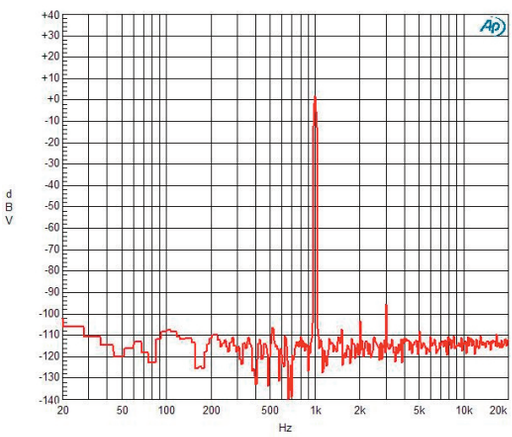


Fig 3 FFT, analogue in to analogue out, 600 Ω loaded, 0 dBV in, 'low' gain setting.

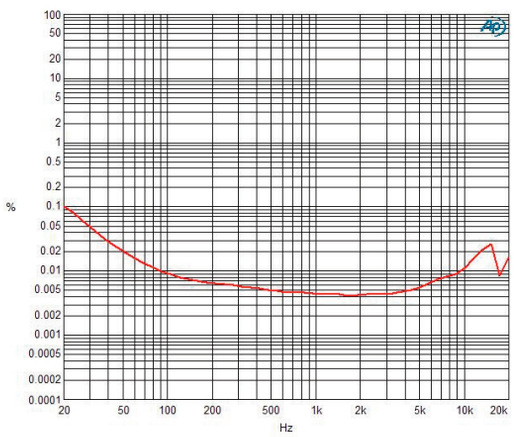


Fig 4 THD+N vs frequency, 600 Ω load, 1.2 Vrms output level (@ 1k Hz).

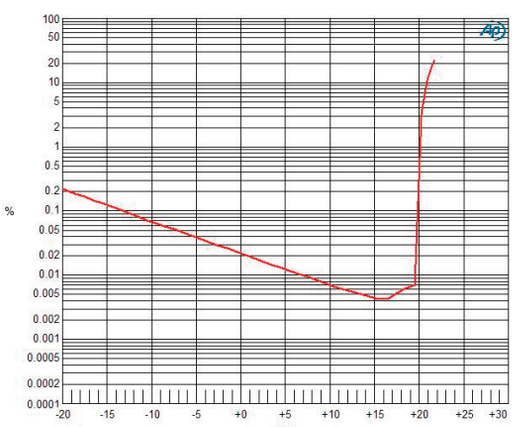


Fig 5 THD+N vs output level, 1k Hz, 600 Ω load, output limiters not active, 'high' gain setting.

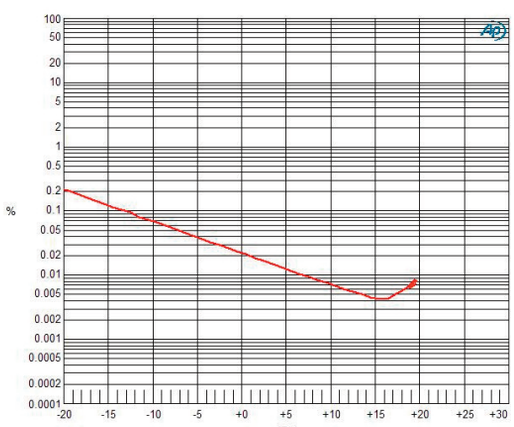
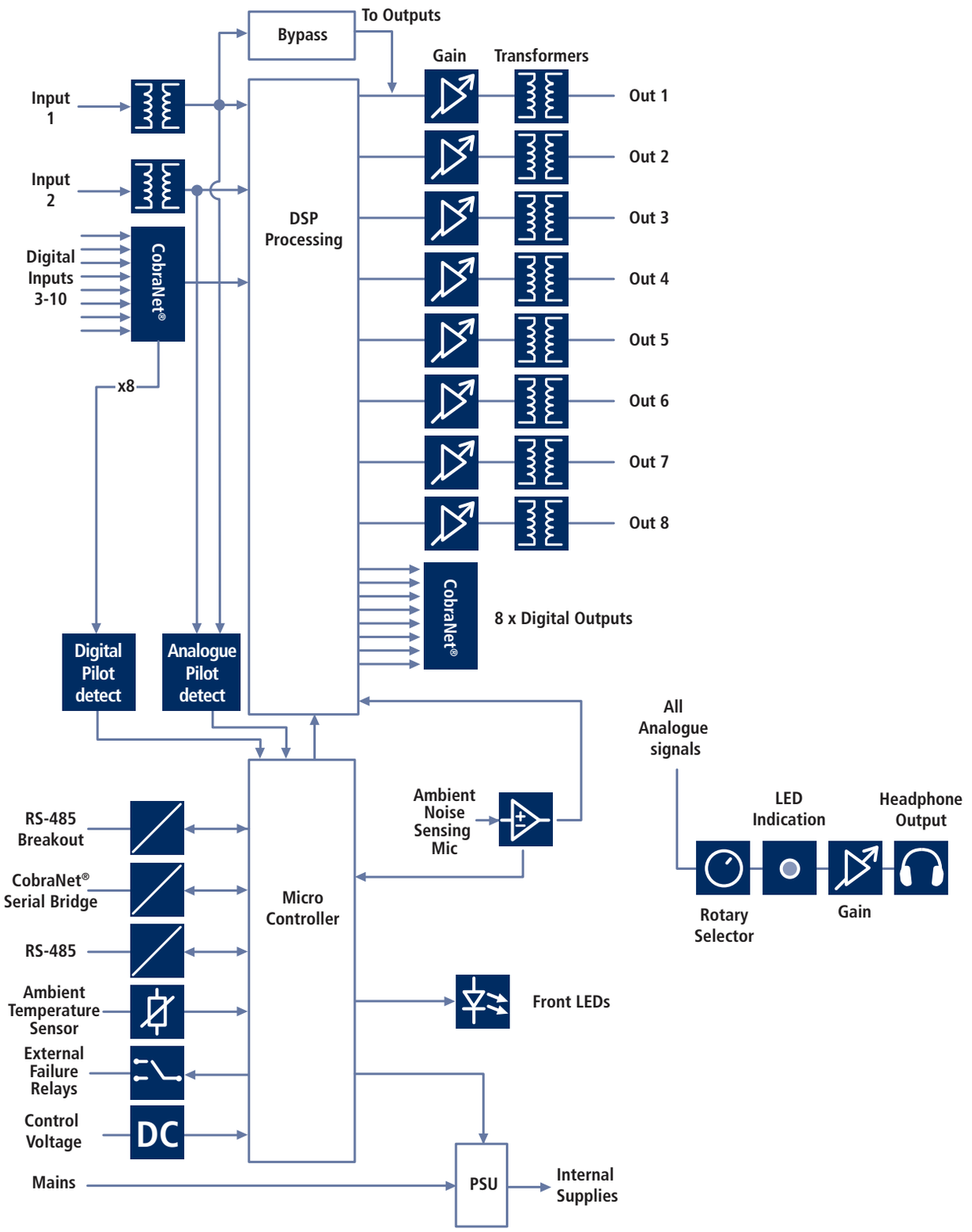


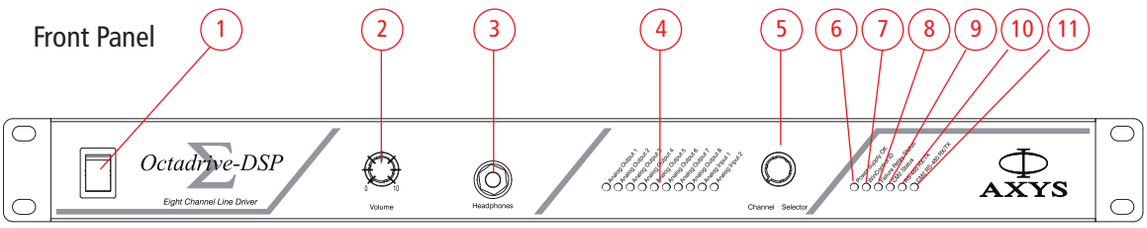
Fig 6 THD+N vs output level, 1k Hz, 600 Ω load, output limiters with default params, 'high' gain setting.

4. **Functional Diagram** (part number 391030)

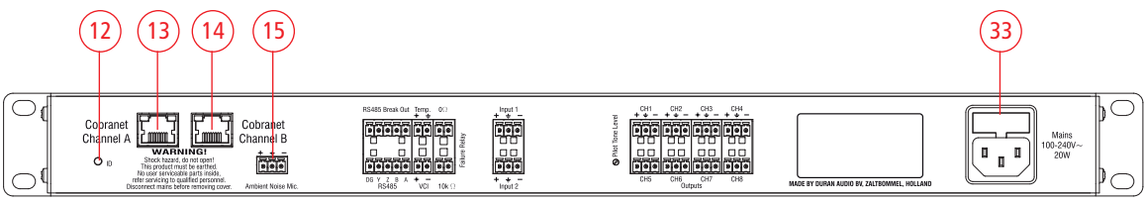


5. **Mechanical Details** (part number 391030)

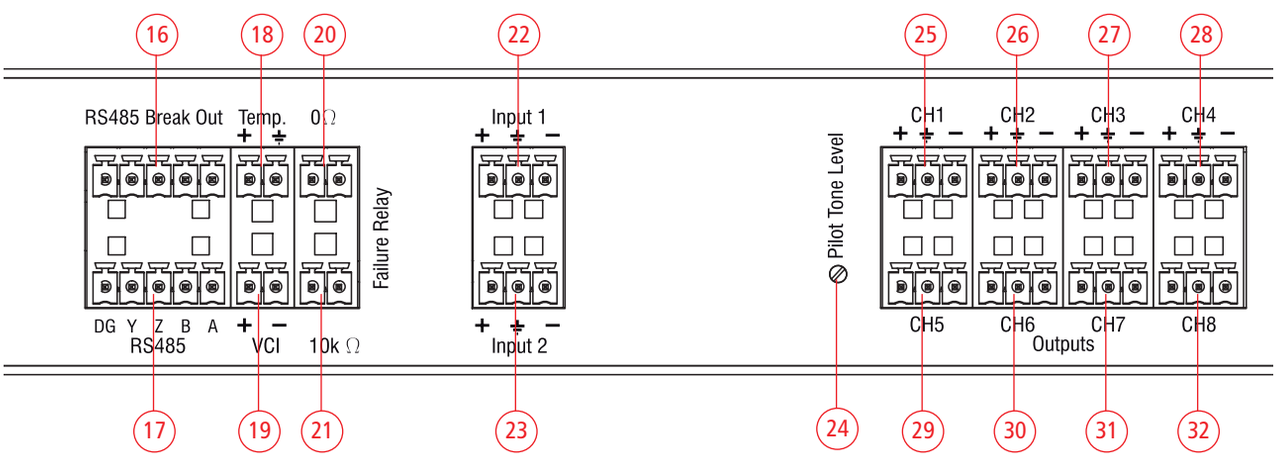
Front Panel



Rear Panel

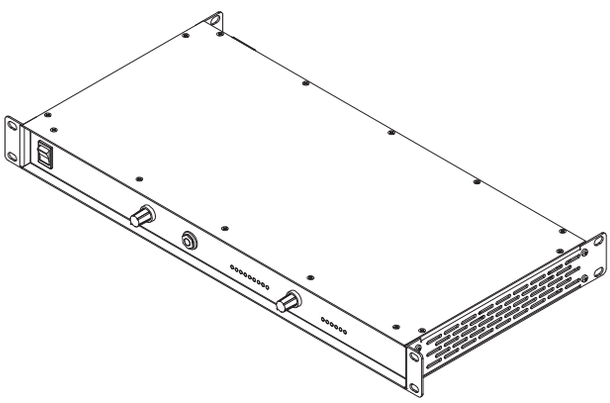


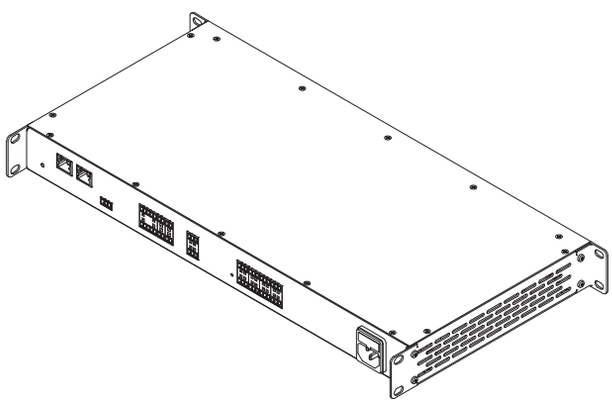
Detailed view of Input / Output panel

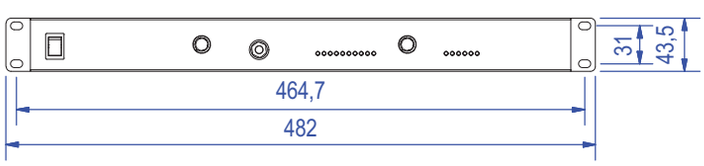


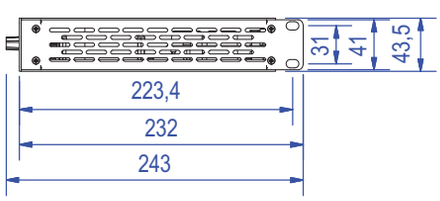
1. Mains Switch
2. Headphone volume control
3. Headphone socket
4. Source selection LEDs
5. Headphone source selector encoder wheel
6. Supply monitoring LED
7. ID indication LED
8. Failure relay LED
9. CobraNet® node state LED
10. RS-485 activity LED
11. RS-485 'break-out' activity LED
12. ID indication LED (rear)
13. CobraNet A
14. CobraNet B
15. Ambient noise microphone
16. RS-485 break-out
17. RS-485
18. Ambient temperature sensor
19. Control voltage input
20. Failure relay contacts 1
21. Failure relay contacts 2
22. Input 1
23. Input 2
24. Output pilot tone level
25. Output 1
26. Output 2
27. Output 3
28. Output 4
29. Output 5
30. Output 6
31. Output 7
32. Output 8
33. IEC Mains Inlet

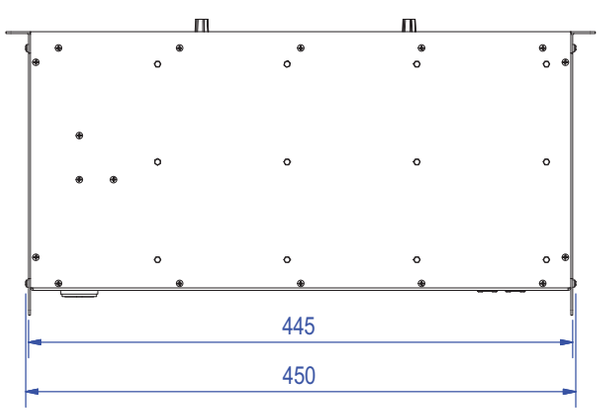
5. **Mechanical Details** (part number 391030)



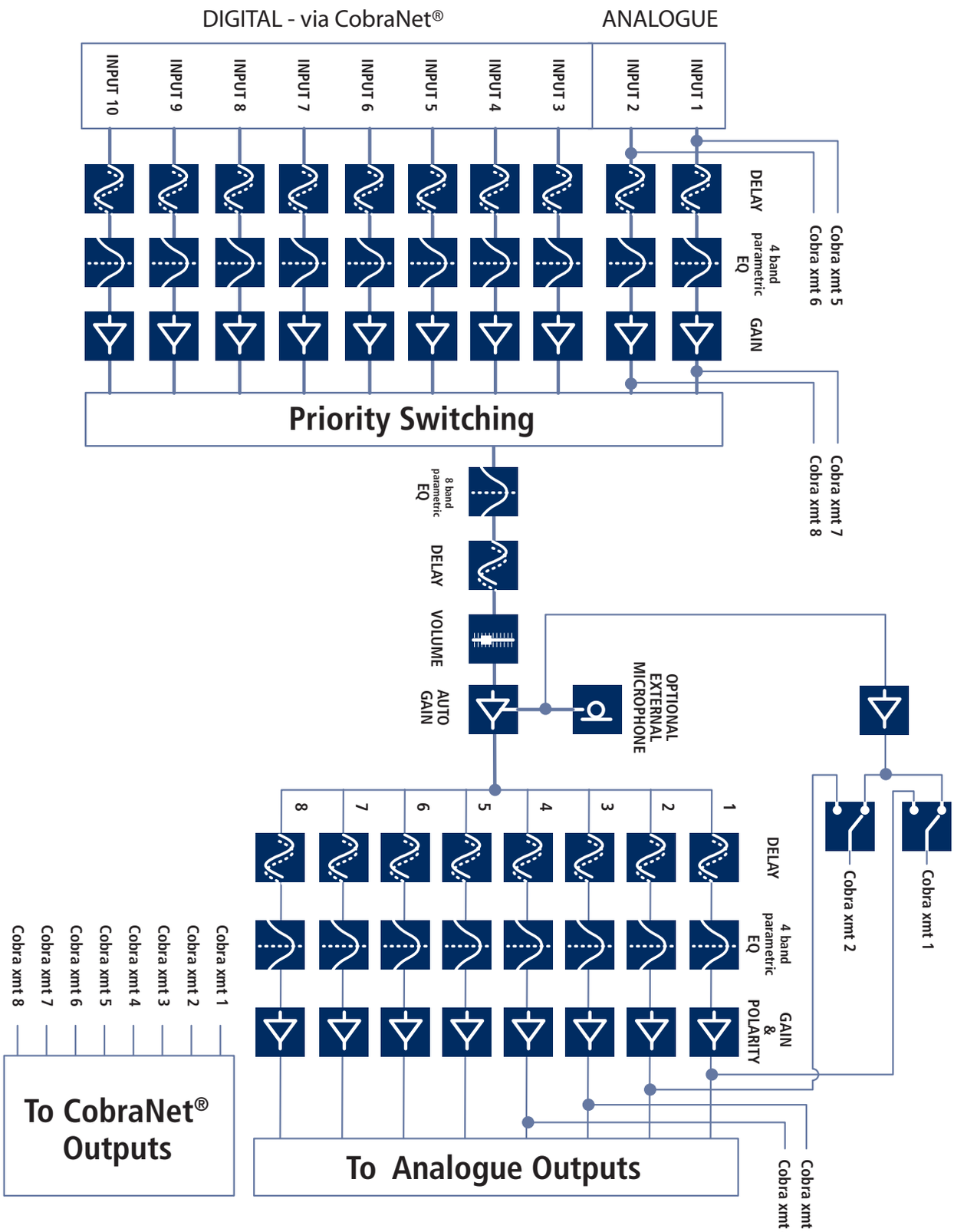








6. DSP Block Diagram



7. Optional Accessories

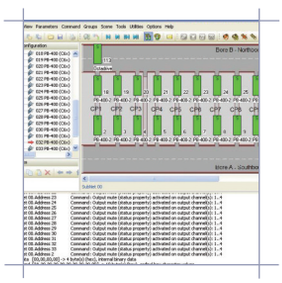
Ambient Noise Microphone
and Temperature Sensor
Order code: 97661101



USB-RS485 converter
Includes
Wincontrol and Drivers
Order code: 387802



WinControl Server
Order code: 386600





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