DATA SHEET

DELTA 12.4-DSP

Hoellstern®

AUDIO AMPLIFIERS

Hoellstern® amplifies.
Unusually good – strikingly audiophile – with superior cost-effectiveness.

Hoellstern® audio amplifiers are „engineered and made in Germany". This means for you:
designed and manufactured in premium quality. The no-compromise component selection and a circuit design according to space technology criteria provide ultimate reliability.

Since January 2004 Hoellstern® audio amplifiers have proven their high reliability under the toughest conditions – live.

Amplifier (Option)	In x Out	Output Power							
		8 ohm	6 ohm	4 ohm	2.7 ohm	2 ohm	1.6 ohm	1 ohm	Bridged
DELTA7.2(-DSP)	2x2	1 000 W	1 325 W	2 000 W	3 000 W	4 000 W	5 000 W	–	10 000 W
DELTA12.2(-DSP)	2x2	2 200 W	2 900 W	4 400 W	6 300 W	8 000 W	–	–	16 000 W
DELTA12.4(-DSP)	4x4	600 W	800 W	1 150 W	1 700 W	2 200 W	2 600 W	4 400 W	8 000 W
DELTA8.4-DSP	4x4	1 300 W	1 700 W	1 700 W MODE: OFF	–	–	–	–	3 400 W MODE: OFF
DELTA13.4(-DSP)	4x4	1 300 W	1 700 W	2 600 W	3 800 W	3 400 W MODE: OFF	–	–	7 600 W
DELTA14.4(-DSP)	4x4	1 300 W	1 700 W	2 600 W	3 800 W	5 000 W	–	–	10 000 W

Options	Description
-DSP	2 channel amplifier: 2 IN – 2 OUT DSP build-in loudspeaker management
	4 channel amplifier: 4 IN – 4 OUT DSP build-in loudspeaker management
DSP-Library	Hoellstern® Premium Service: Global DSP loudspeaker library
Software	Hoellstern® Konfigurator1 and Konfigurator2

	Common data		
AC mains input	180 VAC to 265 VAC, operative from 70 VAC		iCVP®
AC-Fuse	2 channel amplifier	DELTA 7.2: 10 A (class B)	iCVP®
		DELTA 12.2: 16 A (class B)	iCVP®
	4 channel amplifier	16 A (class B)	iCVP®
Size	Width: 19" – Height: 2 RU – Depth: 30 cm (!)		
Weight	10 kg – 12 kg		

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Technical Data – DELTA12.4-DSP

DELTA12.4-DSP Audio Amplifier

The DELTA12.4-DSP amplifier is a high-performance four-channel power amplifier with a built-in DSP loudspeaker management. The integration of Hoellstern's proprietary DSP controller gives the DELTA12.4-DSP amplifier extra benefits over traditional solutions with separate components. Due to the precise and comprehensive Hoellstern® loudspeaker libraries the DELTA12.4-DSP amplifier offers additional benefits as a loudspeaker brand independent solution with a decisive advantage over conventional system components.

With their four individual audio inputs and four individual audio outputs Hoellstern® amplifiers are perctly suited for all applications. The high sound quality, the extraordinary flexibility and the great overall quality are lasting guarantors for a future-proof investment which will amortise quickly and make the daily routine of professional sound technicians a lot easier.

Hoellstern® Amplifier Technology:

- 4 (instead of 2) individual inputs and 4 outputs
- 0.000 ms latency, ZeroLatency™ technology
- Exemplarily load stable high-current audio outputs
- 4 x 2.2 kW at 2 ohms (> 2,6 kW at 1.6 ohms)
- 2 x 6 kW at 2 ohms (> 7,5 kW at 1.6 ohms)
- 4 different practical operating modes
- Comprehensive protective functions
- Damping factor 1500 at 8 ohms
- Strikingly audiophile, high-resolution, neutral sound
- Amazingly well-controlled bass response
- Digitally controlled amplifier setup
- Robust RS-485 network (and RS-232 interface)
- Deterministic Hoellstern® network protocol
- Active mains relieving PFC circuit
- Rugged iCVP® switching power supply technology
- Intelligent AC mains management for 16 A breaker (B)
- AC mains voltage from 75 V to 265 V (> 100 VDC)
- AC mains frequency between 40 Hz and 100 Hz
- Very high overall efficiency
- Maintenance-free design
- Reinforced Neutrik® PowerCON® mains socket
- Reinforced high-current Neutrik® SpeakON® connectors
- Full-metal Neutrik® XLR sockets and plugs
- Sturdy, vacuum-cleanable spring steel air filter grids
- Black powder-coated full-metal housing
- All heatsinks screwed to housing for reinforcement
- Mechanically protected rotary controls and LEDs
- 2 RU housing weighting only 12 kg (26 lbs)
- 2 RU housing of only 29 cm depth (from rack ears)
- Replaceable 2 RU rack ears
- Top-grade temperature-controlled fans
- Front sucking fans
- Top-grade rear-panel switches (ball mechanism)
- Safe operation in damp and soiled ambience
- Permissible start-up temperature -40 °C
- All functions internally controlled by firmware
- All technologies successfully introduced since 01 / 2004
- Engineered and made in Germany

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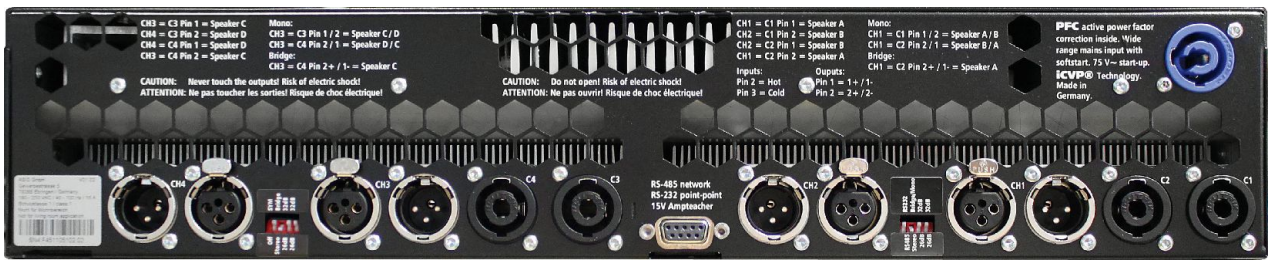
Hoellstern® DSP Controller Technology:

- 4 (instead of 2) individual inputs
- Fully integrated 56-bit DSP controller
- True DSP bypass circuit, ZeroLatency™
- 0.2 ms latency with active DSP, QuasiAnalog™
- Comprehensive Hoellstern® loudspeaker library
- Free programmability with Konfigurator2
- Open DSP architecture, Hoellstern® DSPSoftEngine™
- Separate peak limiters and true RMS limiters
- Forecast™ Limiter
- Classic IIR and FIR filtering
- All IIR filters fully parametric
- DSP hardware integrally melded with amplifier
- All DSP technologies successfully introduced since 2006
- Engineered and made in Germany

The Hardware

Since its market launch in 01/2004, the Hoellstern® amplifier platform has been a trend-setting pioneer in the professional sound industry. It's not for nothing that competitors have been trying for years to emulate the technical properties of Hoellstern® amplifiers. With our no-compromise design and an equally uncompromising component selection we combine huge output powers with a high efficiency in a compact four-channel construction. Output currents of up to 120 A_{peak} and voltages of up to 95 V_{peak} add to the load independent, strikingly audiophile and neutral sound: a synonym for Hoellstern® amplifiers. Double output power with halved impedance provides stress-free limiter settings and gives the sound technician at the console a feeling of ultimate control over a PA system. By the exceptionally high current delivering ability a 2 ohms bridge operation is with 190 V_{peak} at 120 A_{peak} unproblematic. Setting new standards, all Hoellstern® amplifiers have an active power factor correction (PFC) circuit integrated into their super performance switching power supply.

Together with the intelligent software-controlled power management (iCVP®- intelligent Constant Voltage Power), this technology allows huge output powers and a safe operation at surprisingly small mains fusings with 16 A (class B circuit breaker). The broad AC mains input voltage range ensures constant high output powers even with AC mains fluctuations and AC mains frequency variations. For a longterm stressless and maintenance-free operation in rough environments, the electronic modules have been sealed against soil and humidity. A dependable cold start temperature of minus 40 °C documents the high quality standard of Hoellstern® amplifiers. In the event of failure, sophisticated protection circuits (LIMIT / LF / HF / TEMP) with intelligent software algorithms will gently limit the hardware without cutting out abruptly. Their high efficiency, relatively moderate heat generation, low heatsink temperatures and outstanding overall quality of workmanship are reflected in high reliability and a long service life.



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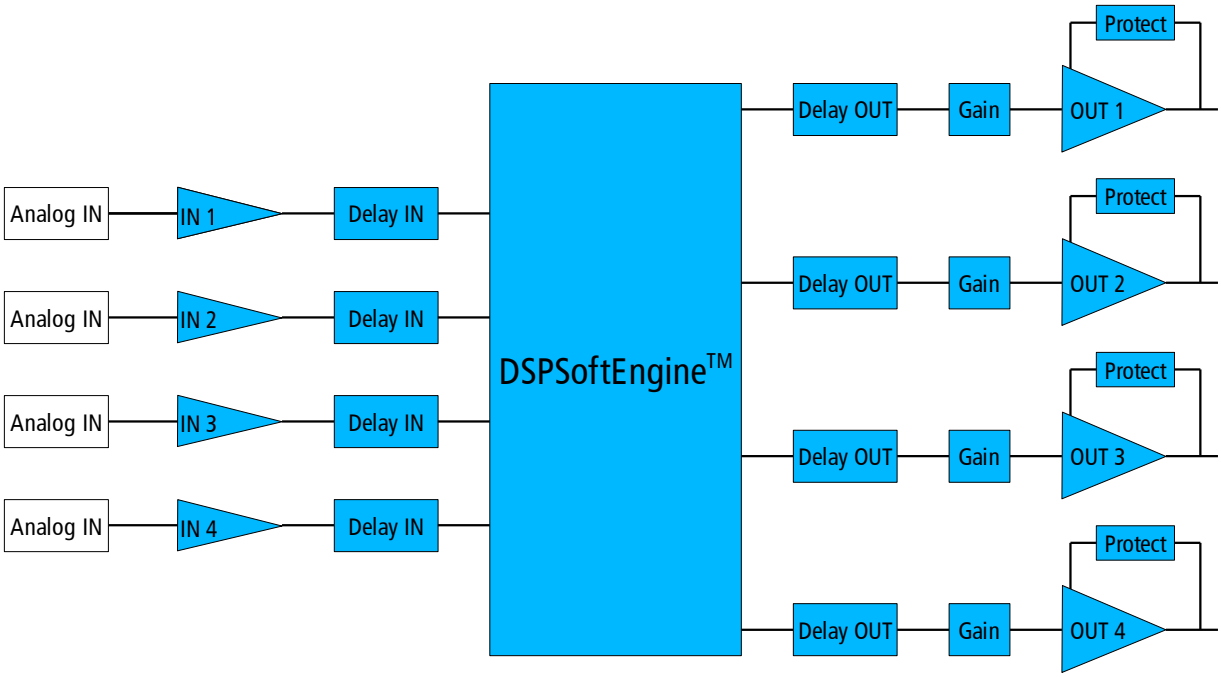
The DSP Controller

To meet the high demands of Hoellstern® amplifiers, the internal DSP controller is a proprietary development by Hoellstern®. Supported by free programmability (Konfigurator2™) and the extensive manufacturer-independent Hoellstern® loudspeaker library (Konfigurator1™ and Konfigurator2™), the 56-bit DSP controller which is fully integrated into the Hoellstern® amplifiers forms a comprehensive loudspeaker management system. Its contemporary pioneering role makes the Hoellstern® loudspeaker library a true innovation for the professional PA industry. Four individual audio inputs, an extremely short latency of 0.2 ms (7 cm sound path distance, QuasiAnalog™), a high 56-bit DSP computing power and the Hoellstern® DSPSoftEngine™ architecture allow the successful emulation of all external controllers and DSP power amplifiers currently available on the market. With 300 DSP memory locations there will always be enough configuration options on hand. Integrated into the amplifiers, the Hoellstern® DSP controller constitutes a manufacturer-independent system solution which allows to handle very economically the most diverse sound reinforcement applications on the highest level.

The DSP controller provides all the required elements: Classic IIR filters and FIR filtering plus combinations thereof. As a novelty the DSP architecture, the DSP resources and the DSP signal flow which are best suited for the individual application and loudspeaker library, are selected over the Hoellstern® DSPSoftEngine™ per drag and drop for each DSP memory location. The Hoellstern® DSPSoftEngine™ technology greatly increases your flexibility and provides the perfect solution for every possible sound reinforcement task. The eight digital delay blocks always work separately from the selected DSP architecture. Even with extreme audio signals sophisticated TrueRMS limiters and peak limiters guarantee that the loudspeakers are driven in a safe and reliable way. According to the selected DSP architecture the signal limiters function in an anticipatory manner (Hoellstern® ForecastLimiter™) which produces a pleasant listening effect with high levels. Thanks to the internal DSP controller solution and the Hoellstern® loudspeaker library, an integrative system electronics may be used for all loudspeakers and sound reinforcement applications: the Hoellstern® amplifiers.



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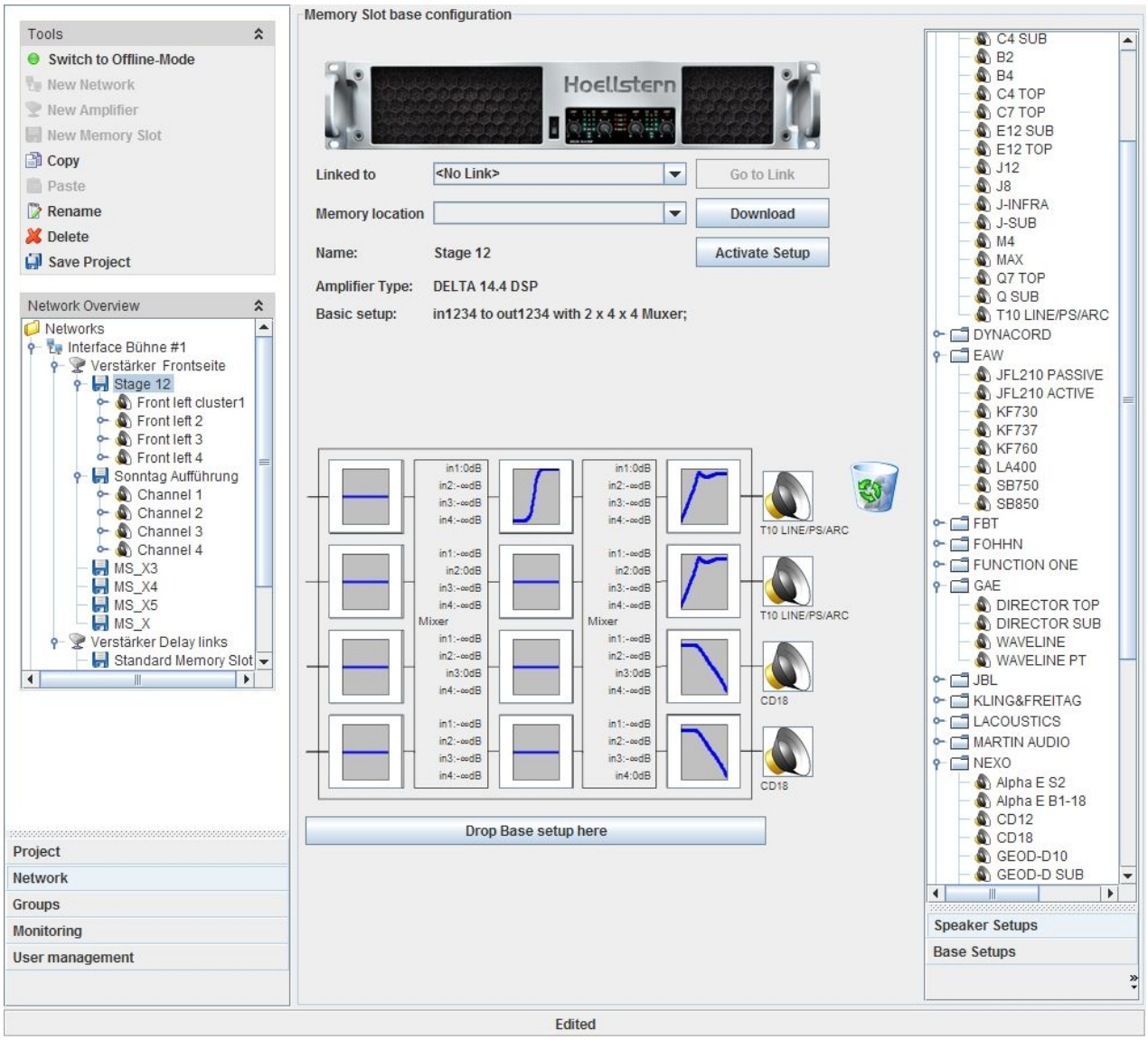
The Konfigurator2™

For configuring and monitoring the Hoellstern® amplifiers within the RS-485 network the Hoellstern® Konfigurator2™ is available. The Java-based Konfigurator2™ will run on Windows and Macintosh computers. Here all jobs are organised well-structured and safely with an extensive user rights administration in a project-oriented manner. Per drag and drop you can create networks, incorporate Hoellstern® amplifiers and configure memory locations as well as the available DSP elements such as filter, delay and limiter. By using drag and drop setups from the manufacturer-independent loudspeaker library are dragged on the channels and can then be configured in detail.

After a short trial period a freely chosen system setup can be created within seconds. Powerful group tools greatly facilitate the configuration of the amplifiers and considerably reduce the typical error sources. Everything is performed comfortably under one user surface: status monitoring, configuration and administration as well as service and firmware updates of Hoellstern® amplifiers. The Konfigurator2™ software and the useful and economic Hoellstern® loudspeaker library will be further expanded over the next years and may be downloaded free of charge. More details are described in the data sheet of the Konfigurator2™ software.



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The specifications

Number of individual inputs	4			
Number of individual outputs	4			
Output voltage$_{peak}$	95 V, all outputs, mode: ASYM			
Output current cut-out limit$_{peak}$ (with 5 retries)	Mode ASYM: Ch 1: 120 A, Ch 2: 120 A, Ch 3: 70 A, Ch 4: 70 A			
Output powers and permissible nominal loads	Output C1	Output C2	Output C3	Output C4
Mode: ASYM, 8 ohm	600 W	600 W	600 W	600 W
Mode: ASYM, 4 ohm	1150 W	1150 W	1150 W	1150 W
Mode: ASYM, 2.7 ohm	1700 W	1700 W	1700 W	1700 W
Mode: ASYM, 2 ohm [Bridge 2 ohm | 3.2 ohm]	2200 W [8000 W]	2200 W	2200 W [5000 W]	2200 W
Mode: ASYM, 1.6 ohm	2700 W	2700 W	2700 W	2700 W
Mode: ASYM, 1 ohm	4000 W	4000 W	2700 W @ 1.6 ohm	2700 W @ 1.6 ohm
Mode: SYM, 8 ohm	400 W	400 W	400 W	400 W
Mode: SYM, 4 ohm	800 W	800 W	800 W	800 W
Mode: SYM, 2.7 ohm	1200 W	1200 W	1200 W	1200 W
Mode: SYM, 2 ohm [Bridge 2 ohm | 2 ohm]	1600 W [6400 W]	1600 W	1600 W [6400 W]	1600 W
Mode: SYM, 1.6 ohm	2000 W	2000 W	2000 W	2000 W
Mode: SYM, 1 ohm	3000 W	3000 W	3000 W	3000 W
Mode: SYM, Bridge, 1.6 ohm	8000 W (for information only)		8000 W (for information only)	
THD at 1 kHz at 4 ohms and -3 dB	< 0.03 %			
Frequency response 20 Hz to 20 kHz at 8 ohms at -15 dB	+ / - 0.5 dB (typically + / - 0.05 dB)			
Damping factor at 8 ohms, 100 Hz	> 1000, typically 1500 comprising the SpeakON® connectors, typ. 5 mohms			
Latency without DSP or bypass (connector to connector)	0.000 ms, ZeroLatency™ technology			
Signal limiter	Yes			
Current monitoring	Yes			
LF limiter	Yes, reduces the gain gently			
HF limiter	Yes, reduces the gain gently			
AC mains supply monitoring / Power management	Yes, safe operation at 16 A circuit breaker			
Rearmounted gain factor toggle switch	26 dB and 32 dB basic gain			
Frontmounted rotary gain controls	0 dB to – 100dB, digitally controlled			
Rearmounted bridge mode switch	Channel 1 and 2: Yes		Channel 3 and 4: Yes	
AC mains supply input	1 x Neutrik® PowerCON®			
Analogue input and slave connectors	4 x 3-pin Neutrik® full metal socket and 4 x 3-pin Neutrik® full metal plug			
Amplifier output connectors	4 x 4-pin high current Neutrik® SpeakON®			
Resolution ADC input	24 bit			
Sampling frequency ADC input	96 kHz default, optionally 48 kHz and 192 kHz (selectable via DSPSoftEngine™)			
Latency with active DSP (connector to connector)	0.2 ms at 96 kHz sampling frequency, QuasiAnalog™ technology			
DSP delay	0 ms to 340 ms (115 m) in total per channel pair at 96 kHz			
DSP memory locations	300			
DSP RMS limiter	Yes, TrueRMS, optionally with ForecastLimiter™ by DSPSoftEngine™			
DSP peak limiter	Yes, optionally with ForecastLimiter™ by DSPSoftEngine™			
Hoellstern® DSPSoftEngine™	Yes, comprehensive basic setups, expandable as desired			
Remote control network	Yes, D-Sub 9 socket, RS-485 network, RS-232 point-to-point, Hoellstern® protocol			
Frontside status LEDs display	Standby, Signal Input, VU -6 dB, VU -3dB , VU 0dB and Signal Limit			
Frontside error LEDs display	Current, HF / LF Limiter, Temperature			
Frontside rotary controls	One rotary step control with digital sensing per channel			
Frontside switches	Standby / ON switch, software-controlled			
AC mains input	180 VAC to 265 VAC, operative from 70 VAC, 400 V tolerant			
Starting current	10 A softstart			
Intelligent AC mains power management	Yes, iCVP® technology, dual hard-regulated switching power supply			
AC mains fusing	16 A (class B breaker), for personal alarm systems class C circuit breaker or better			
Housing construction	Black powder-coated steel body , anodised aluminium front panel			
Handles and 19" rack ears	Yes, anodised aluminium, replaceable			
Air filter and grids	Open-pore foam, spring steel grids, black powder-coated, vacuum-cleanable			
Air rate and fans	3 fans, temperature-controlled speed, front sucking			
Dimensions	Width: 19" (483 mm), height: 2 RU (88 mm), overall depth: 290 mm from rack ears			
Weight	12 kg (26 lbs), shipping weight 14 kg (30 lbs)			

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Annotations:
Beyond a certain total output power the values are measured with practice-oriented burst signals. Besides other factors our technology ensures the outputs to be load stable and capable of high currents. Measured from the back of the 19" rack ears, the handles have a height of 33 mm. All information in this data sheet were provided to the best of our knowledge. In this respect technical specifications, dimensions and weights do not constitute a promised qualitiy. ASID GmbH reserves the right to alter specifications to take account of the latest technological developments. All company names, product names, product designations and logos mentioned in this document are registered trademarks owned by the respective holders of rights. Copyright © 2011 ASID GmbH, all rights reserved.
Version number: 008, effective 2013 / 01.

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Environment

„The typewriter I'm using contains aluminium, probably from Jamaica or Surinam, iron from Sweden, magnesium from Czechoslovakia, manganese from Gabon, chrome from Rhodesia (today's Zimbabwe), vanadium from the USSR, zinc from Peru, nickel from New Caledonia, copper from Chile, tin from Malaysia, cobalt from Zaire, lead from Yugoslavia, molybdenum from Canada, arsenic from France, tantalum from Brazil, antimony from South Africa, silver from Mexico as well as traces of other metals from remote spots of the world.

The paint may contain titanium from Norway; the plastic parts are made of mineral oil which comes from the Middle East and which has been cracked by catalysts won from American mined rare earths; they contain chlorine that was separated by using mercury from Spain. The moulding sand for the cast metal frame comes from an Australian beach, the machine tools for the production contained tungsten from China, the coal for the required energy came from the Ruhr district – and the final product is now consuming too many Scandinavian spruce trees in the form of paper."

Thus wrote Armory B. Lovins, Head of the Rocky Mountain Institute in the USA in his book „Openpit Mining" in the year 1973. Already then he was aware of what has been proven in many studies today:

There are products which use up extremely many resources and therefore cause serious environmental issues in the end. Unfortunately, audio power amplifiers also fall into this category.

Copper which is used for transformers and chokes may serve as the best example:

For the extraction and production of 1 kg of copper we have to spend 1.18 tons of materials and resources.

The extraction of copper (Cu) takes place in several production phases. On the mining level (mines) coppery ore is lifted in surface (about 2/3) or underground mining (1/3).

The mined crude ores have a very low copper content between 0.5 % and 4 %. This low copper content of the crude ores necessitates a considerable use of energy during production and refinement.

For every ton of copper an average of 219 tons of mining waste accrue.

During the processing stage the crude ores are enriched to form concentrates with a copper content of mostly 25 % to 35 %.

This is followed by other beneficiation processes and hence more consumption of energy and resources and more emissions to provide copper for the production of e.g. transformers and chokes.

Likewise, for the production of aluminium and steel frightening figures could be presented. To this we still need to add the routes of transportation between mining, extraction and processing which also devour energy and are therefore pollutive.

By these examples it becomes clear very fast that digital high-performance power amplifiers which don't require heavy transformers and heat sinks and which also have a small frame size, go easy on the resources of our Earth.

The Hoellstern® audio amplifiers help to keep the emissions and the consumption of resources needed for their production and during their operation as low as possible.

Into the future with a good conscience!

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