

# HELIX DSP.3S

## Refining our standards

The HELIX DSP.3S is our new definition of the standard for digital signal processors. Continuously refined, this 8-channel DSP presents numerous improvements in detail. Besides the obligatory optical digital input, an additional coaxial digital input now provides the best conditions for connecting high-resolution signal sources with a sampling frequency of up to 192 kHz.

## Most advanced technology for ultimate High-Res sound experience

The 64 Bit audio DSP of the latest Sigma350 generation and a throughout, native high resolution signal processing with 96 kHz sampling rate as well as A/D and D/A signal converters from BurrBrown provide outstanding sound quality. This makes the DSP.3S perfectly prepared for processing High-Res audio signals with a bandwidth of more than 40 kHz.

## ACO – Advanced 32 Bit CoProcessor platform

Of course, the DSP.3 is also equipped with our proprietary 32 Bit ACO platform. This not only takes over all control tasks ultra-fast, but also the lightning-fast switching between up to ten possible sound setups. But ACO offers much more – fantastic sound effects such as Augmented Bass Processing or StageXpander are implemented as well as a channel-separated Input EQ including Input Signal Analyzer (ISA) for easy analysis and compensation of input signals of OE radios, which already include a sound setup by default.

## Practice-oriented features for maximum connectivity

The sophisticated features of the DSP.3S offer everything for easy connection to factory radios or multi-channel factory sound systems. In addition to the smart highlevel input with ADEP.3 circuit, an optical and now also a coaxial digital input, an Auto Remote switch as well as a HEC slot for system expansions such as Bluetooth® HD audio streaming etc. are also part of the basic equipment.

But that's not all – The new Smart Control Port (SCP) was implemented during the DSP.3S review process. This allows the multifunctional connection of accessory products and now even takes over their complete power supply. The solid design with snap-in function guarantees a stable connection while helping to prevent plug and cable damage and thus facilitates compact, space-saving installation concepts.

## Focus on the essentials

HELIX-typical, clean and very compact design – therefore, the DSP.3S offers ideal conditions for quick and easy integration.

## DSP PC-Tool – fine tuning for highest demands

There is no doubt – the HELIX DSP.3S is easily configurable via our professional and yet very user-friendly DSP PC-Tool software. The numerous adjustment options leave nothing to be desired and thus guarantees extremely precise sound adaptation even with complex system configurations.

## Features

- Extremely powerful 64 Bit “fixed point” Audio DSP with 1.2 billion MAC operations per second
- High Resolution audio bandwidth up to more than 40 kHz for unrivalled sound quality
- A/D and D/A signal converters from BurrBrown
- Advanced CoProcessor (ACO) for extended feature set
  - Input Signal Analyzer (ISA) and InputEQ
  - DSP Sound Effects (SFX) such as the “Augmented Bass Processing” which dynamically optimizes the bass response of the subwoofer, the “StageXpander” that significantly widens the stereo perspective, the “RealCenter” function, which allows a perfectly focussed sound staging for both driver and co-driver and much more
  - 10 internal memory locations for sound setups
- Smart highlevel input with ADEP.3 circuit and Auto Turn-On function
- Optical (max. 96 kHz) and coaxial (max. 192 kHz) digital input in SPDIF format
- Compact, future-proof Smart Control Port (SCP)
- HEC slot for system expansions for additional input / output modules like Bluetooth® Audio Streaming, High Resolution Audio Streaming via USB etc.
- Freely definable signal routing with separate matrices for line, SPDIF and HEC/AUX
- Optimal signal path and power supply for further improved sound quality
- “Ground lift” switch to avoid ground loops
- Compact dimensions for easy integration into the vehicle
- Easiest configuration via the intuitive DSP PC-Tool V4 software

## Special features:

### 96 kHz sampling rate

The HELIX DSP.3S allows to handle all signals with the doubled sampling rate of 96 kHz. Thus the audio bandwidth is no longer limited to usual values like 22 kHz but allows an extended frequency response to more than 40 kHz. Doubling the sampling rate requires significantly higher DSP power as the number of possible arithmetic operations is halved. Only the implementation of the latest DSP chip generation allows raising the sampling rate to 96 kHz and adding new features at the same time.

### ACO – Advanced 32 Bit CoProcessor

The HELIX DSP.3S incorporates an extraordinary powerful 32 Bit CoProcessor of the latest generation for all monitoring and communication tasks, both internally and externally. In opposite to the 8 Bit predecessor generation this MCU achieves way higher speeds with

respect to setup switching and data communication with our DSP PC-Tool software. A further significant advantage is the integrated, native boot loader of the CoProcessor. It allows software upgrades of all components of the DSP in order to adjust the microcontroller-controlled ADEP.3 circuit for example at future modifications / changes in the diagnostic system of factory radios or if the device will be extended with additional interfaces. In addition, thanks to the new flash memory, the ACO offers 10 memory locations for sound setups instead of the common two.

### **Smart highlevel input ADEP.3**

Modern, factory-installed car radios incorporate sophisticated possibilities of diagnosing the connected speakers. In particular the latest generation of car radios are equipped with additional monitoring functions so that failure messages and loss of specific features (e.g. fader function) quite often appear if a signal processor will be hooked up – but not with the DSP.3S.

The new ADEP.3 circuit (Advanced Diagnostics Error Protection, 3rd Generation) avoids all these problems without loading the speaker outputs of the OE radio during high volumes unnecessarily.

### **Start-Stop capability**

The switched power supply of the HELIX DSP.3S assures a constant internal supply voltage even if the battery's voltage drops to 6 Volts during engine crank.

### **Power Save Mode**

The Power Save Mode is incorporated in the basic setup. It allows to significantly reduce the power consumption of the amplifiers that are connected to the HELIX DSP.3S once there's no input signal present for more than 60 seconds. Please note that in many up-to-date cars with "CAN" or any other internal bus structures it may happen that the radio remains "invisibly" turned on for up to 45 min. even after locking and leaving the car! Once the "Power Save Mode" is active the remote output and therefore the connected amplifiers will be turned off. The HELIX DSP.3S will reactivate the remote output within a second if a music signal is applied. It is possible to either modify the turn-off time of 60 sec. or completely deactivate the "Power Save Mode" via the DSP PC-Tool software.

### **Automatic Digital Signal Detection**

The HELIX DSP.3S allows signal-controlled switching between the analog and the digital inputs. As soon as an input signal is detected on the Optical or Coaxial Input, the signal processor automatically switches to the appropriate input. This feature can be deactivated in the DSP PC-Tool software.

Alternatively you can use an optional remote control for manual switching between analog and digital inputs.

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## DSP features

### RealCenter

The “RealCenter” feature is an algorithm, developed by Audiotec Fischer, that emphasizes the music information which is present in both the left and right front channel to create a unique center signal. In contrast to common procedures, in which only the channels are summed up, the intensity of the center signal is also dynamically controlled by the stereophonic informational content of the left and right channel.

Sounds complicated but this effect is astonishing: That means if solely the left or right channel delivers an audio signal, the center channel will not reproduce a signal. In the case of common algorithms, the volume level of the center channel is only reduced by 6 dB (= half volume level). Audiotec Fischer’s “RealCenter” allows a unique, broadened sound staging for both driver and co-driver at the same time! Therefore, the disadvantages of a conventional center channel, such as an intrusive, small sound stage, are things of the past.

### Augmented Bass Processing

Audiotec Fischer’s proprietary “Augmented Bass Processing”, consisting of the two revolutionary sound features “Dynamic Bass Enhancement” and “SubXpander”, has been especially developed to dramatically improve the bass reproduction of subwoofers. The “Dynamic Bass Enhancement” ingeniously combines maximum deep bass and highest sound pressure – regardless of the music style or the tone controls in the head unit. Depending on the input signal, the “Dynamic Bass Enhancement” gains the lower frequency range and varies the cut-off frequency of the subsonic filter. The result is a significantly more powerful and deeper bass response at low and medium volume levels without the risk of overloading the subwoofer neither mechanically nor electrically at high volume levels. It is simply fascinating which bass performance is suddenly possible.

If you want an even lower and “darker” bass reproduction, the “SubXpander” can be additionally activated. Therefore, subharmonic tones are added to the fundamental tones in the frequency range between 50 and 100 Hz.

### StageXpander

Depending on the speaker arrangement in the vehicle, a more or less wide stereo sound stage can be created on the front seats. A center speaker may limit the spatial reproduction of the music additionally. This is where Audiotec Fischer’s new “StageXpander” comes into play – a sound feature which seems to break the acoustic limitations and thus allows to create a way broader stereo base without negatively affecting the precision of the

localization of voices or instruments!

The effect can be adjusted according to your personal preferences in four steps.

## **ClarityXpander**

You are looking for more transparency and substance in the treble reproduction? With the “ClarityXpander” Audiotec Fischer is now offering the right tool. Properly adjusted (and therefore selectable in three steps) the feature adds additional harmonics in the upper frequency range – this is especially useful if the original speakers lack some brilliance in the treble response. The extra treble-kick is not only available for the two front channels but also separately adjustable for the center channel. Even better – the center channel allows to activate an automatic and dynamic control so that music with “loads” of treble doesn’t fatigue your hearing.