

Brax DSP – unparalleled signal processor

HIGHLIGHT
Soundprocessor
CAR & HiFi 1/2019

As good as can be



► There had never been a Brax DSP before, even though some aficionados may certainly have been waiting for a true high-end solution in the field of processors. Now it is here and we will show you what it can do.

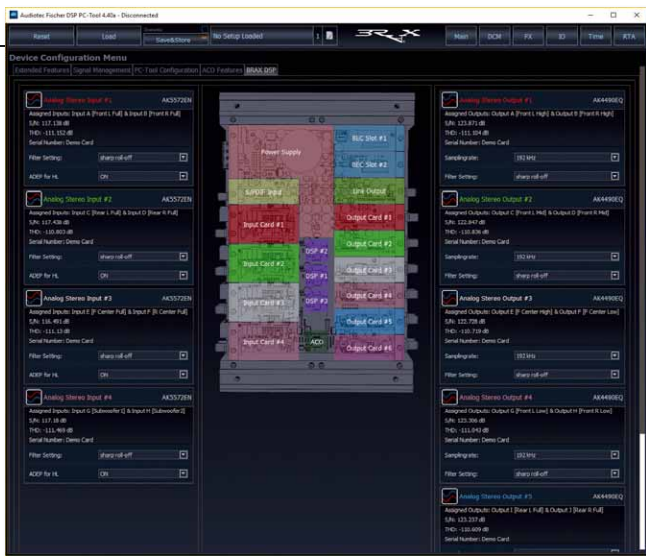
The simple reason for the previous non-existence of a Brax DSP had been that the Sauerland manufacturer Audiotec Fischer so far had not dared to stick the label of its high-end brand onto any DSP, even though there had been thoroughly ambitious projects. Even the top model of the affiliated brand Helix can safely be described as high-end. But if something is to bear the name of Brax, it must be clear that it could not be any better. Hence, the long development time of three years (seven years in total), in which many ideas were conceived and overthrown with respect to conceptualization and implementation. Even the almost marketable DSP from the beginning of this year was found to leave room for improvement – and the

development engineers continued to work on it for almost a year. But now it is here, the Brax DSP, and it is no surprise that it outshines everything we have ever seen in terms of effort and sophistication. Already its outward appearance is impressive – the aluminum housing alone is reminiscent of a massive safe. And the Brax DSP is not small. Still, its inside is pretty crowded, which is no wonder with 2583 components. The Brax DSP furthermore is completely different in structure than normal DSPs, for it is modular. Its eight inputs and twelve outputs are located on plug-in boards with two channels each. The unique feature is that users can choose with respect to every stereo board whether they prefer it to be analog or digital. The

analog input boards include both low-level inputs in the form of gold-plated RCA jacks and high-level inputs for simple cables. Furthermore, each analog input board comprises an AD converter so that the communication on the entire motherboard is completely digital. If you select a digital board, an optical and a coaxial electrical input are available. The same is the case on the output side. Either you choose analog and get gilded RCA outputs together with a DA converter on the board or you select the digital version with optical and coaxial outputs. Thus, the Brax DSP can be set up as a completely analog version with four analog stereo inputs and six analog stereo outputs or as a completely digital variant – and of course random mixed forms are also possible. An integral digital input is available in addition, so that even with eight analog inputs you do not have to do without a digital input. But that is not



In- and output ports are two-channel modules that can be individually configured either analog or digital



The software provides information about residual noise and distortions of the converters. In addition, there are converter filters for different sound characteristics. The output converters allow for adjustable sampling rates



The Brax uses the DSP tool well known from the company's other DSP products. The main screen is used to operate filters and equalizers, it handles easily and shows lots of information

all: two further stereo inputs are available in the form of the BEC slots. Here, the extension cards familiar in principle already from the affiliated brands Helix and Match can be connected, so that the Brax fan can also enjoy HiRes audio streaming via USB or Bluetooth audio streaming in CD quality.

Hardware

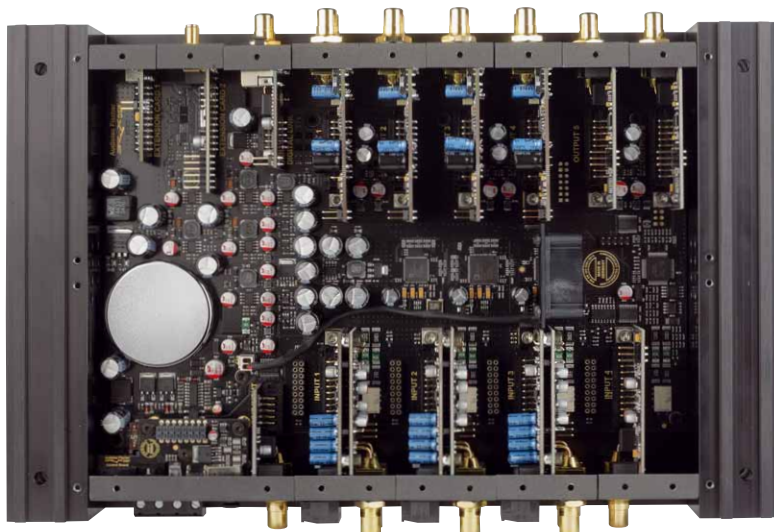
This enormous variety of connections naturally takes place at the highest level of quality. All components are of exquisite quality, the op amps on the in- and output modules are among the best just like the converters. Here, the Brax developers were allowed to access the top shelf of the renowned component specialist AKM. Both ADC and DAC are the very best types with 32 bits and sampling rates up to 768 kHz. It cannot be any better, and yet, if there were more desirable parts in the future, it would be possible to offer new modules thanks to the modular design. Matching the high-end converters, there are state-of-the-art signal processors on

the motherboard. Three(!) DSPs from Analog Devices' latest Sigma 350 generation can be found on the motherboard in a central position. If you consider what even one ADAU1452 can do like the one in the Helix DSP PRO MK2, it becomes obvious what immense power is gathered in the Brax DSP with an ADAU1467 and two 1466s. However, the DSPs are kept very busy with continuous 32-bit data processing and a continuous 192 kHz sampling rate. A small fan provides cool conditions when needed; furthermore, the DSPs are thermally coupled to the housing thanks to a special design. For the motherboard itself, of course, it had to be an 8-layered board – something no one else has and which is good for the EMC. The power pack with the voltage supply has of course become a work of art typical for Brax. Incidentally, the DSP is extremely particular when it comes to the voltage supply. No less than 55, in words: fifty-five, voltage controllers are found inside the unit to really keep every single voltage value of every single module as stable as possible. All

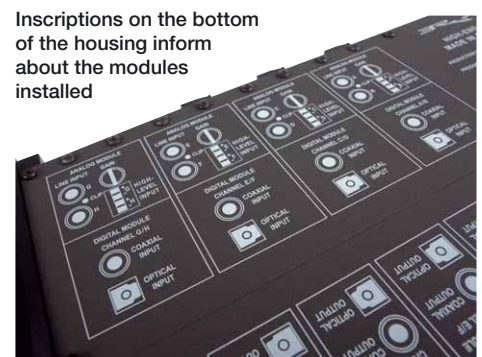
for the benefit of the – according to human judgment – best possible signal processing, and thus for the sound.

Software

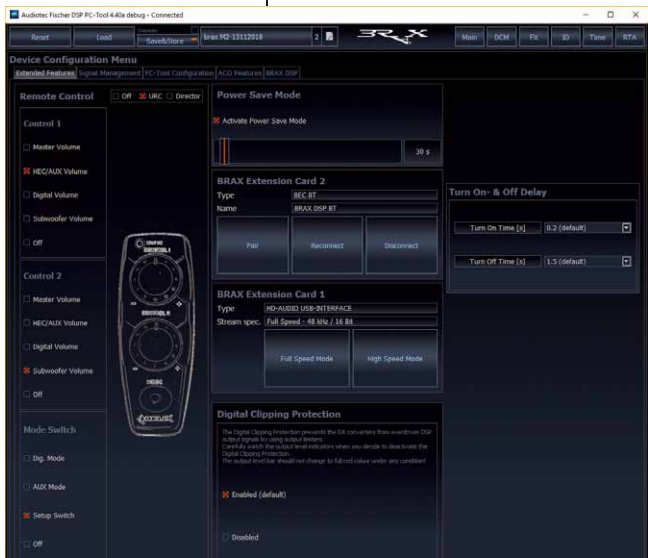
How good the components are and how many considerations were made concerning the functionality of the Brax DSP can be derived from the software. Here, in principle, the DSP tool familiar from Helix and Match is used, which, however, has a few Brax-specific specialties. At first glance, you immediately feel at home, for example in the main window with its three display options of cross-overs, EQ and frequency response window. It seems to go without saying that all channels have the full program, but actually, this is not a matter of course. 12 channels and 30 fully parametric EQ bands are not that easy to find. At least not with a sampling rate of 192 kHz, consuming a lot of computing power – hence the three DSP chips. The time alignment, which can be set to over 10 meters or 31 milliseconds for the outputs, at 192 kHz consumes plenty of resources. To be sure, you will not need that too often in your car, but provisions have already been made for extreme subwoofer corrections or for future application in your home environment.



On the top left, the BEC ports are to be found, on their side, there are the link port, 4 analog and 2 digital cards. In the middle, there are the three DSP chips; the 1466 to the right is hiding under the cooling fan



Inscriptions on the bottom of the housing inform about the modules installed



In the configuration menu, remote controls, extension cards and power saving mode can be set. Furthermore, there are switching-on and off delays and a clipping protection for the output converter

The still rather new algorithms for center, front and bass of course are also available with the Brax DSP, so that a functioning center signal can be generated or for goodies such as stage expanders or sub-expanders to come into play. One Brax specialty becomes evident in the DCM menu, where various features for remote controls, source management, and the software itself are configured. There is a hardware overview now, in which the individual in- and outputs of the DSP are displayed with their related details. For example, you will always see the current signal-to-noise ratio and distortions of the converters. Want an example? The ADCs are currently running at a signal-to-noise ratio of 117 dB and a THD of -111 dB. The 111 dB equal a THD of .0003% – you have to savor this one! To be sure, this is a self-assessment only for the converter, but it seems plausible that in the development department a new measurement system had to be acquired especially for the Brax DSP, which even advances into this measuring range. Settings are also possible, namely the sampling rate of every individual digital card, which can be reduced to 96 or 48 kHz as needed, depending on the equipment connected to the unit. Secondly, various filter

Each Brax DSP is signed by hand and of course „Made in Schmallenberg“



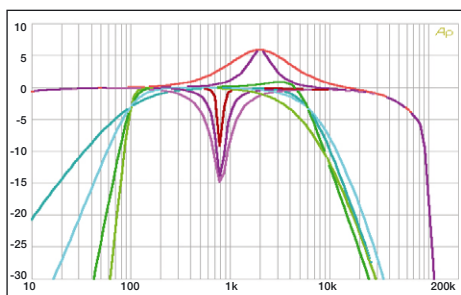
characteristics are available for each converter, affecting the sound – a feature already familiar from the Helix DSP PRO MK2, which also uses an AKM converter. Also only on the Brax DSP, there is an option of configuration (and switch-off) with respect to the ADEP.3 diagnostic bypass system, and another

unique highlight emerges: the Brax DiSAC volume control. The Brax DSP is able to transmit not only audio data to the MX4 PRO power amplifier via a digital connection, but also volume information. The latter is picked up at the level control and then „merged“ with the S/PDIF audio signal. The receiver decrypts the volume information and ensures that it is regulated analogly only following digital signal processing, i.e. only directly before the output stage. In this way, it is ensured that the entire signal processing in the DSP and also the digital-to-analog conversion of the power amplifier can be done at full scale (i.e. the best possible quality). This is unique in the market in this form and represents the technically clean solution. Once again, the obligation of perfection applies to Brax.

Conclusion

With three DSPs, continuous 192 kHz and 32 bits and uncompromising features, the Brax DSP sets standards. Its quality in workmanship and components and its uncompromising high-end claim leave no doubt that the Brax DSP is the best car audio DSP of all time.

Elmar Michels



The Brax will spoil you with a bandwidth of up to 80 kHz. Of course, it comes with all kinds of refinements at crossovers and other filters

Brax DSP

Price	4.900 Euro
Distributor	Audiotec Fischer, Schmallenberg
Hotline	02972 9788 0
Internet	www.audiotec-fischer.com

Specifications

Dimensions	310 x 200 x 55 mm
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Inputs

- 8-channel analog (high-level and RCA) or digital S/PDIF (optical and coaxial)
- 1 x digital S/PDIF (optical and coaxial)
- 2 x BEC expansion port

Outputs

- 12-channel analog (high-level and RCA) or digital S/PDIF (optical and coaxial)
- 1 x digital link (optical and coaxial)
- Remote out

DSP software

Equalizer

- fully parametric EQ with graphical repr., 30 bands per channel, +6 – -15 dB
- 20 – 20 kHz, 1 Hz increments, Q .5 – 15
- Shelf 25 – 10 kHz, Q 1 – 2
- All-pass filter 1st or 2nd order, f and Q adjustable
- Input EQ with 5 param. bands each for all inputs and BECs

Crossovers

- 20 - 20 kHz, 1 Hz increments
- Bessel, Butterworth, Chebychev, Linkwitz, User, 6 - 42 dB/oct.

Time and level

- Runtime 192 kHz, 6000 samples
- Runtime 0 – 1063 cm (31.24 ms), 1.8 mm increments (.005 ms)
- Input delay 0 - 5.2 ms
- Phase 0, 180° (full range), 0 – 360 ° (22.5° increments)

Features

- 10 setups with fast switchover
- User-defined routing of in- and output ports
- Control connector for programmable remote controls and accessories
- Start-stop capability up to 6V
- Signal-dependent switching to digital or Aux inputs
- Automatic putting through of all vehicle tones
- Power save mode
- (configurable) ADEP.3 error protection circuit for factory radios with speaker recognition
- RTA real-time frequency curve measurement (with optional microphone)
- FX menu with dynamic bass, center and front processing
- In- and output modules with SNR and THD display, filter settings and variable sampling rate (DACs)

Optional accessories

- In- and output ports HD-AUDIO USB-INTERFACE (HiRes audio up to 32 bits/192 kHz), BT (Bluetooth aptX audio streaming + add. S/PDIF out), Aux-in (3.5 mm jack input + add. S/PDIF out), Optical-in (optical S/PDIF input)
- Wired remote control (programmable)
- Display remote control director with memory, USB, etc.

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„At DSP, the Brax is number one, and then there is nothing for quite a while.“