

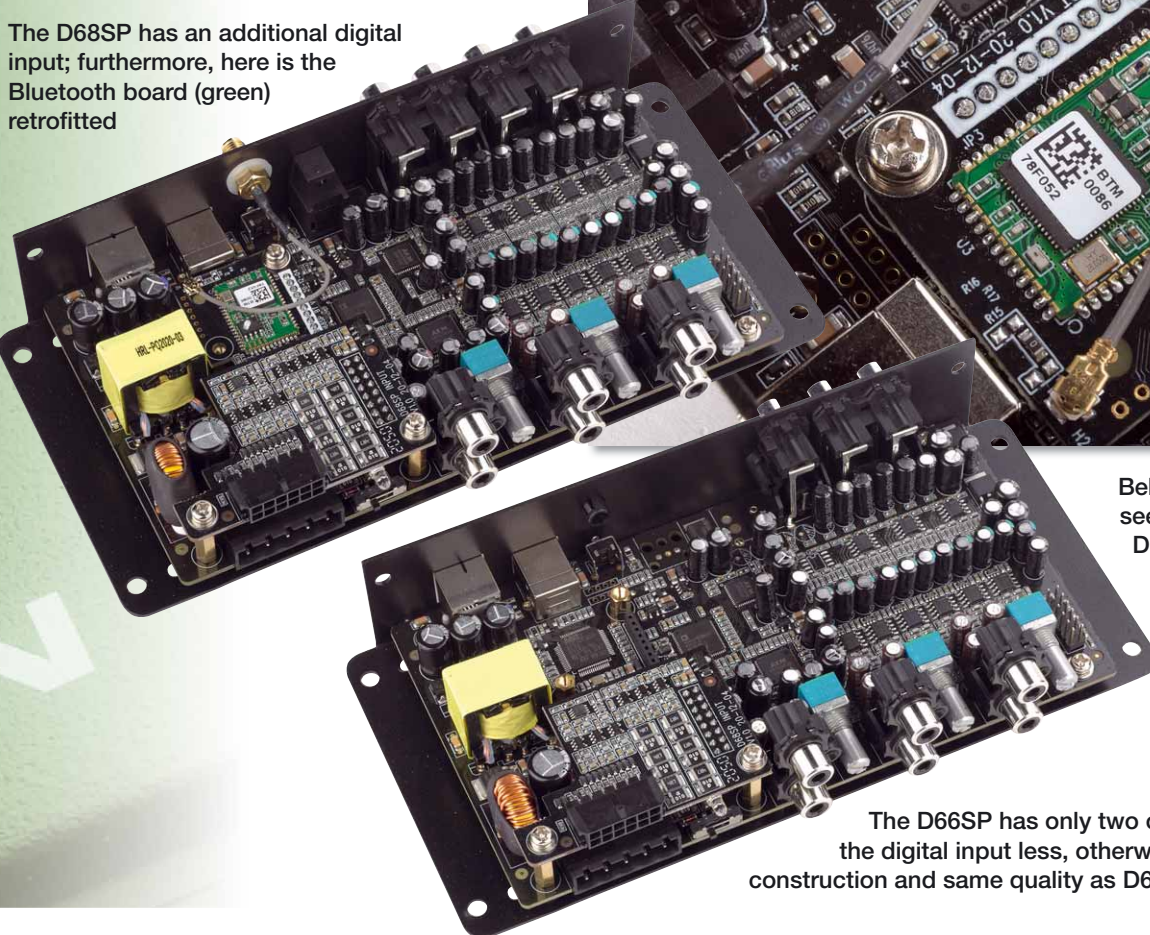


ESX D66SP + D68SP - 6- and 8-channel DSPs for sound freaks

New ESX DSP generation

► Now that the ESX DSP and DSP power amplifiers have a few years under their belt, ESX has relaunched its DSP lineup. The first two are the small stand-alone D66SP and D68SP processors.

The D68SP has an additional digital input; furthermore, here is the Bluetooth board (green) retrofitted



Behind the BT module, you can see the three main players: The DSP from Analog Devices and the two 32-bit converters from AKM

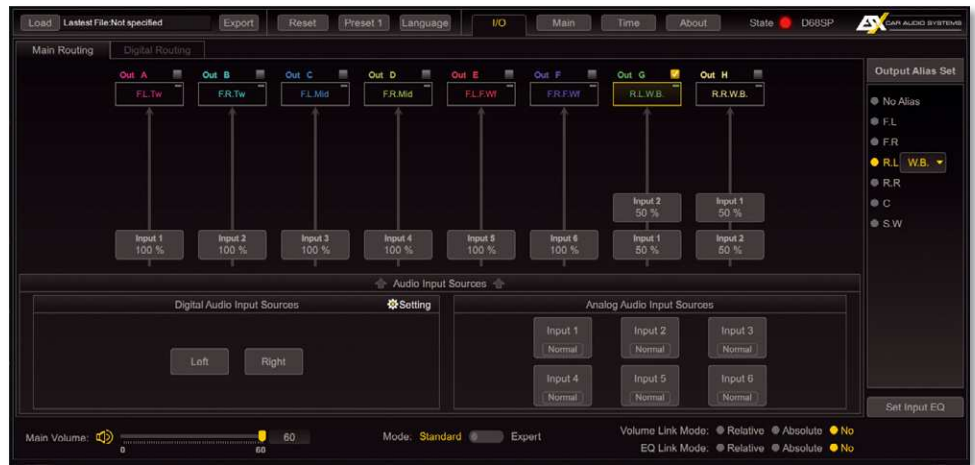
The D66SP has only two outputs and the digital input less, otherwise same construction and same quality as D68SP



Equalizers and crossovers are set on the main screen. Master and channel levels are available, and absolute or relative linking of channels is possible

Digital and analog inputs can be freely routed to the outputs. On the right, all outputs can be designated as right/left tweeter, midrange, etc.

ESX was one of the pioneers in the market with compact and powerful multichannel amplifiers with integrated DSP. Now the developers saw the time come to approach the topic DSP anew. The new DSPs are upgraded successors of the existing products and new DSPs developed from scratch with the latest hardware and completely reprogrammed software. The D66SP and D68SP are the forerunners of a new generation of DSP products currently under development. Master of the initially white sheet of paper is Dominic Langenberg, for two years in the service of the ESX mother Audiodesign, busy with the DSPs for one and a half years, and a proven expert in his field. Among other things, he was able to gain experience in the OEM sector (e.g., Harman) and is now applying it in the aftermarket sector at ESX. During the development of the ESX DSPs, the highest priority was given to sound quality so that no savings had to be made on the components. Even the exact typing and the use of the individual components were allowed to follow purely sonic criteria. Therefore these two small DSPs are no entry-level



devices, despite the favorable prices of only 330 and 370 Euro respectively, but constructions that must be taken seriously. By the way, the only essential difference between the D66SP and the D68SP is the number of output channels. Everything else shares the same technical level. The D66SP aims at those who can get by with six channels, e.g., for a sound upgrade for BMW or Mercedes, as cheap as possible. The D68SP with digital input and eight channels is a suitable solution for sound freaks who want a complete retrofit system.

Hardware

Looking at the inner workings reveals only the finest components and shows how high the tech level is. A modern 32-bit ARM processor takes

over as the control center of the DSP. The DSP chip itself is none other than Analog Devices' ADAU1452, the drug of choice at the moment and in use in many high-class DSPs. The converters are top AKM types of the 555x and 445x series. At the input, we find the ADC AK5556 with six input channels; behind the signal conversion, the AK4456 or AK4458 DACs with six and eight channels, respectively, are waiting. All converters belong to the best that can be found in the car audio world. They are 32-bit converters with enormously high dynamic capabilities. The power supply and the operational amplifiers are no slouches either - nothing entry-level, everything is of the finest and on the level of the best DSPs on the market.

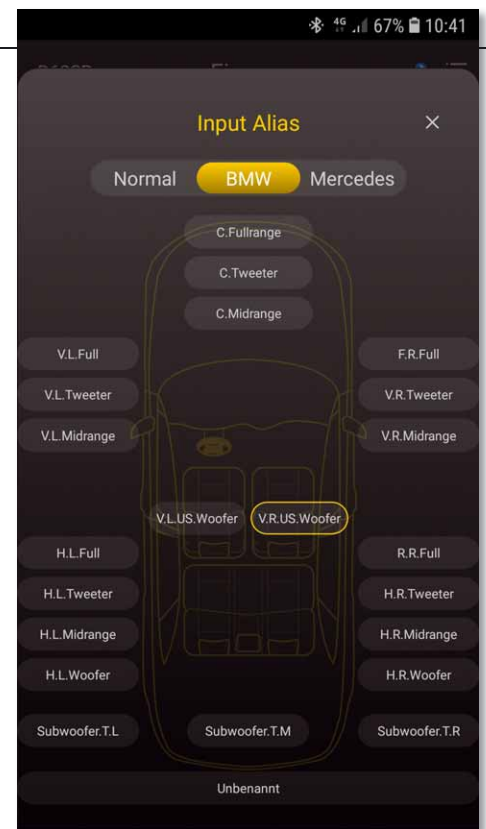


Here the delay time of the outputs is adjusted. The loudspeakers are placed nicely in the car – here Mercedes with footwell woofers

Equipment

Both D66SP and D68SP have six inputs, which are available as RCA and high level. The high-level inputs can be optimized for the range up to 15 V or 15 - 45 V, which serves the fine-tuning of the sound; regardless of

this setting, everything always works. Still, if the circuit feels most comfortable in terms of input and output impedance, it just sounds a little better. The eight-channel D68SP was given a digital input, which was omitted from the six-channel version. Both offer the option of retrofitting Bluetooth, for which there is a small board that docks inside, so no ugly USB dongle. Furthermore, a wired remote control with a display is available for an additional charge, which controls volumes, sources, and setups. Speaking of setups, ESX also has the „convertible pin“ that switches to a selected one of the

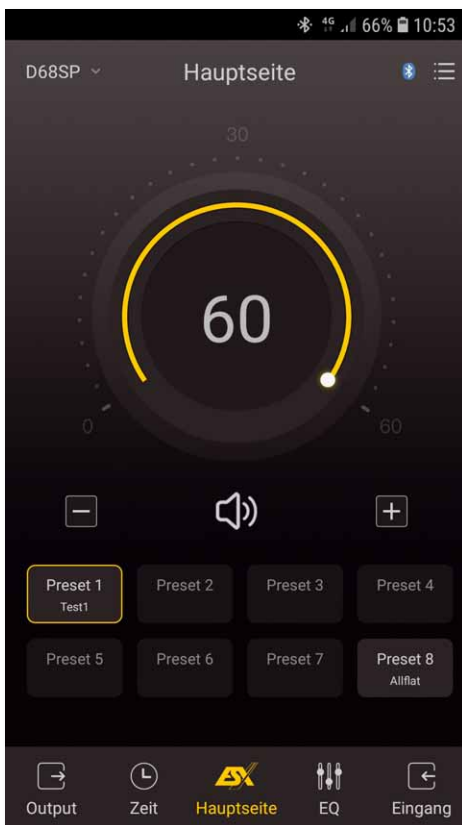


BMW and Mercedes also offer the app as system suggestions. Otherwise, the individual speakers can be freely selected

eight setups when the ground is applied. Nice things like an automatic switch-on according to voltage or current and the Error Protection System EPS against diagnostic radios can ESX already for a long time.

Software

For programming, there is the desktop software „DSP Toolkit“. If the



Main volume in the app. Below are the eight presets, with one marked as active and one as occupied



The digital inputs can be prioritized so that they are switched over when a signal is received. Here Bluetooth gets priority; after 5 seconds of silence, it will be switched back to analog



Both DSPs have six inputs as RCA and high level. In the power connector, the mode pin is integrated

D68SP with eight outputs, S/PDIF, and Bluetooth antenna output. The remote control connector on the right is a proper interface for future expansions

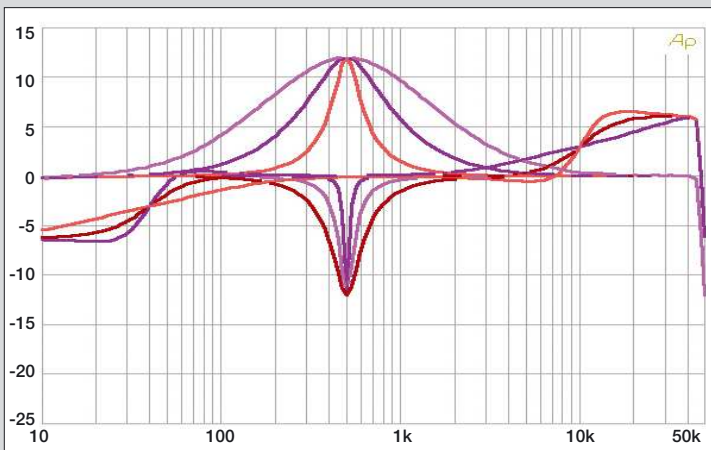
Bluetooth board is installed, an app for Android and Apple that masters all functions also helps. The software is programmed from scratch and in-house. You immediately feel at home on the user interface. Everything is logically arranged and largely self-explanatory. The settings are arranged in three windows, so it doesn't get too crowded in each. In the I/O panel, inputs and outputs are managed, of course with flexible routing. Names can be assigned to the inputs and outputs, e.g., Tweeter Front Left. These names are then found in other places, and in the auto diagram, the speakers are even placed correctly. This also applies to the predefined BMW and Mercedes setups with the corresponding under-seat and footwell woofers.



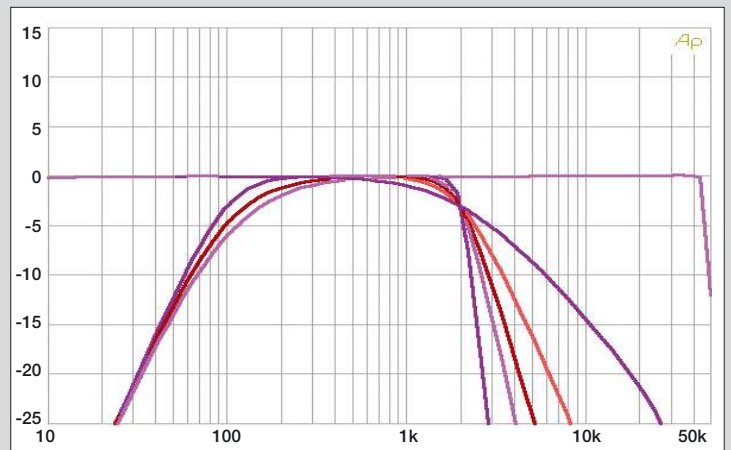
In general, there are several niceties besides the standard functions. For example, the channels designated as subwoofers (regardless of which ones) are automatically assigned to the subwoofer level of the remote control. In the setups, you can see which ones are active, full or empty, and you can also set a startup setup that is always active after switching on. The marker active/used/unused also runs through the main window, e.g., with the EQ bands, of which

there are 31 per output and can be either shelf or parametric EQ. As for the inputs, there is the „expert mode“ as a special feature. In standard mode, there are six inputs with fifteen EQ bands each. In Expert, there are thirty bands, but only for two usable inputs. This is very cleverly done to manage the DSP's resources as needed, as the DSPs have good work to do: Both ESX run at 96 kHz sampling rate, which gives them a HiRes frequency range up to

CAR & HIFI Laboratory



Each EQ band can also be assigned a shelf, and the adjustment range is +/- 12 dB



HiRes frequency range up to 44 kHz. Low pass Butterworth with 6-48 dB/oct. high pass Butterworth, Bessel and Linkwitz



44 kHz. This also allows for 3.5-millimeter steps or 0.01 milliseconds in runtime. The crossovers can do Butterworth, Bessel, and Linkwitz up to 48 dB/octave, which is all anyone ever needs. The digital input on the D68SP and the Bluetooth inputs can be prioritized in the software, which means that it is automatically switched to S/PDIF or Bluetooth when music is played. If you don't want to do without car sounds, they can be added in the mixer, meaning digital and analog sources can be integrated. Several additional functions (and devices) have been announced for the future and are currently under development. So this first release is just the beginning, the starting signal for a project that will be constantly expanded.

Who is Audio Design?

Founded 1984 in Kronau (Germany) as a speaker manufacturer, Audio Design GmbH has turned into an international distributor and developer of any kind of car audio aftermarket products. Audio Design is the owner of the HiFonics and Crunch brands in Germany, Austria and Switzerland as well as the ESX and Renegade brands worldwide. Distribution includes famous brands like Rockford Fosgate, Kicker, Autotek and MB Quart. The newest brand in Audio Design's portfolio is Musway, established 2018 and specialized in plug'n'play sound solutions and DSP products.

Conclusion

The ESX processors D66SP and D68SP make the beginning for an extremely promising concept. They are trimmed for sound and offer some of the best features on the

market. With the development entirely in Germany and a favorable production in the Far East, they are so sharply calculated that one must speak of combat prices.

Elmar Michels

ESX D66SP/D68SP

Price	330/370 Euro
Contact	Audio Design, Germany
Internet	www.audiodesign.de

Specifications

Dimensions

Inputs

- 6-channel high-level with autosense
- 6-channel RCA, gain control, paired gain control
- Sensitivity 6 V (RCA), 45 V (high level)
- 1 x digital S/PDIF optical (D68SP only)
- 1 x mode („convertible pin“) outputs

Outputs

- 6/8-channel RCA
- remote-out

DSP software (V 0.0.19 in test)

Equalizer

Inputs

- param., 15 bands per channel, 6-channel (Standard)
- param., 30 bands per channel, 2-channel only (Expert)

Outputs

- parametric, 31 band per channel, +12 – -12 dB
- 20 – 20k Hz, 1 Hz steps, Q 0.3 – 15
- optional shelf 25-10k Hz, Q 0.3-2

Crossovers

- 20 – 20k Hz, 1 Hz steps
- Bessel, Butterworth, Linkwitz, 6 – 48 dB/oct.

Time and level

- Sample rate 96 kHz, 3.5 mm steps (0.01 ms)

Outputs

- 0 – 680 cm (20.00 ms), 2048 samples

- Level steps 0.5 dB, Main: 1 dB

Features

- 8 presets
- Inputs and outputs arbitrarily routable
- Start-stop capability up to 7.2 V
- EPS (Error Protection System) for diagnostic function
- Signal dependent switching to Bluetooth or S/PDIF
- Coupling of channels (gain and EQ) absolute and relative possible
- Ground switch against hum interference
- Setup change via mode pin
- input sensitivity adjustable via jumper

Optional accessories

- Bluetooth module BT-DQ (audio streaming and app control of all functions)
- Remote controller RC-DQ (volume, bass level, sources, setups)

CAR & HiFi
INTERNATIONAL Germany 1/21

„Excellent hardware with 32-bit signal path and HiRes frequency range, plus outstanding usability in software, and all at an attractive price.“