Helix M FOUR DSP + M ONE X – M Amplifier Series Expanded

The expansion strategy

The M ONE X (shown on top) offers plenty of adjustable filters. The M FOUR DSP is fully packed with inputs and outputs

Helix's M series should be compact and affordable. This worked out so well that the series is now being expanded with two new models.

In the Helix amplifier range, we find analog and digital high-end with the noble C and P amplifiers at the top. In the affordable range, on the other hand, normal analog amplifiers of the D and G series await price conscious customers. In the middle lies the M-Series, which is perfectly placed in an affordable frame, but thanks to modern Class-D technology and the associated efficiency, this is quite compact and therefore very trendy. Until now, there were universal six-channel and four-channel power amplifiers with M SIX and M FOUR and a bass amplifier with the M ONE in the same handy aluminium housing. The two new models are now added, namely the M ONE X, which brings in some extra power in the extended housing compared to the M ONE, and the M FOUR DSP. With the latter, Helix is in the trend again, as more and more manufacturers are going to equip even cheaper amplifiers with a signal processor. And who can do that better than Helix — the factory in Sauerland has probably the most extensive and sophisticated range of DSP products on the market, if you add the sister brands Brax and Match.

M FOUR DSP

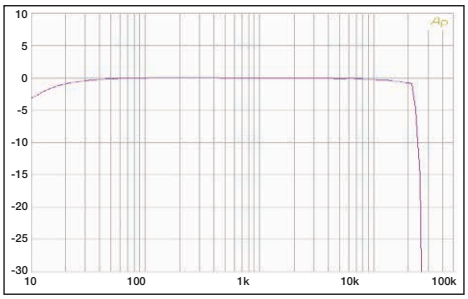
Let's stay with the new DSP level, which is priced at 550 euros. As for the four-channel amplification, naturally, we are looking an M FOUR. The board is neatly constructed with a fairly compact power supply and an absolutely modern amplification. Especially with Helix, it is not surprising that amplifier ICs are used in the final amplification instead of regular transistors. Under the board there are two two-channel specimens, which are even bridgeable. The power amplifier also got a lot of electronics on board, as it performs equally at 4 and 2 ohms. For example, the performance was already exhausted at 4 ohms and no longer increased in favor of a compact housing at 2 ohms. The new feature of the M FOUR DSP is, of course, the digital

The DSP board of the M FOUR DSP replaces the analog input board of the M FOUR

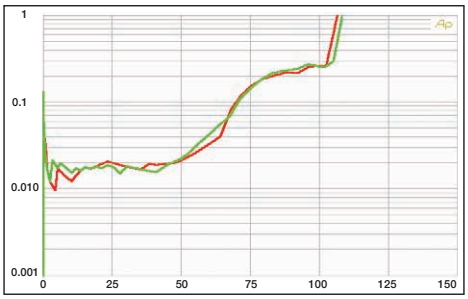
board that replaces its analogue counterpart in the M FOUR. There we find all the typical ingredients from Helix that we are used to. The powerful 32-bit controller ensures that the in-house ACO platform is also integrated into the M FOUR DSP, so that even the affordable M FOUR DSP can implement all the goodies of the DSP software. The core is the ADAU1452 DSP chip from Analog Devices, which also drives most of the company's other DSP products. And also with the converters everything is at its best. Both ADC and DAC are noble 32-bit types, so all signal processing can be done at 32 bit depth. The only smear that the M FOUR DSP user has to take is the lack of Hi-Res capability. Though the amplification of the M FOUR still made it to the 40 kHz mark, the DSP is locked off by 48 kHz sampling rate, so that the audio frequency response is limited to 22 kHz. On the other hand, it creates space for the various features of the DSP channels, and that's quite a lot. The M FOUR DSP has no less than 10 DSP channels, so that in addition to the 4 amplifier channels, 6 processed outputs are available. The M FOUR DSP is therefore highly recommended as a control centre for extensive sound systems. For example, enhanced by a normal M FOUR and one or two M-Monos, it controls a full-fledged HiFi chain, which also does not shy away from full active operation, center, rear and ambient, etc.

Software

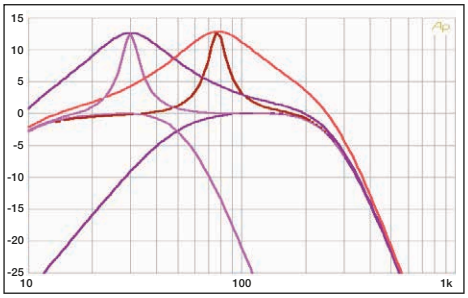
The DSP functions are of course controlled via the in-house "DSP PC tool", which is the most comprehensive and powerful tool available on the market. In no way is the M FOUR DSP slimmed down with the functions, it has a full program with all the features of the more expensive DSPs and DSP amplifiers. In addition to 30 EQs per channel, time alignment of both inputs and outputs and of course freely programmable crossovers, VCP (Virtual Channel Processing) is available with the possibility to process channel groups as virtual channels between inputs and output channels. For example, a three-way front system with six output channels for right and left sides can be managed from the virtual channels on front left and right. The time alignment of the individual speakers, the crossing of tweeter, midrange and woofer are performed at the output channels, the peculiarities of the installation situations are also corrected here. However, the sound decisive equalizing can be done conveniently



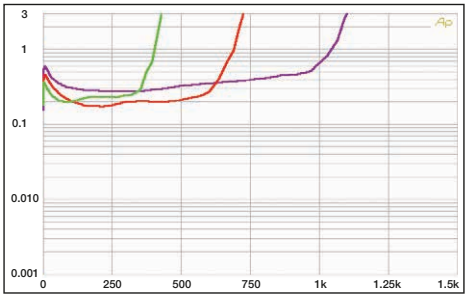
The DSP in M FOUR DSP works with a sampling rate of 48 kHz, therefore the usable audio frequency range is theoretically up to 24 kHz; in reality, because of the low pass filter, we get to 22 kHz at best.



Whether at 4 or at 2 ohms, the M FOUR DSP delivers 100 watts per channel. This is achieved with very low distortion



The M ONE X is sporting a complete filter equipment. Bass boost, frequency and Q can be controlled



At 1 ohm, the M ONE X easily cracks the kilowatt. The distortion is still low at 0.2 - 0.5% regardless of the load

Helix M FOUR DSP

Inputs
- 6-channel high level
- 6-channel RCA
- 1 x digital S/PDIF (optical)
- Sensitivity 8 V (RCA), 32 V (high in)

Outputs
- 6-channel RCA (8 V)
- Remote-out

DSP-Software (V 4.71)

Equalizer

Inputs:
- param., 5 bands per channel

Virtual channels:
- param., 30 bands per channel

Outputs:
- param., 30 bands per channel, +6 – -15 dB
- 20 – 20k Hz, 1 Hz increments, Q 0,5 – 15
- Shelf 25-10k Hz, Q 0,1-2
- Allpass filters 1st or 2nd order, f and Q adjustable

Crossovers

Outputs:
- 20 – 20k Hz, 1 Hz increments
- Bessel, Butterworth, Chebychev, Linkwitz, User, 6-42 dB/Okt.

Time and level
- Samplerate 48 kHz, 7 mm increments (0,02 ms)

Inputs:
- 0 – 5,19 ms, 256 samples

Virtual channels:
- 0 – 354 cm (10,40 ms), 512 Samples
- Phase 0, 180° (fullrange), 0 – 360° (22,5°increments)
- Adjustable level increments 0,1 - 1 dB

Outputs:
- 0 - 708 cm (20,82 ms), 1024 Samples
- Phase 0, 180° (fullrange), 0 - 360° (22,5°increments)
- Adjustable level increments 0,1 - 1 dB

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
- ISA for measuring, summing and correcting inputs
- Time Machine for taking back and restoring adjustments
- Standard programming or VCP, 8 virtual channels, user-defined routing, EQ, time alignment and FX-Processing

Optional accessories
- Wired remote control (programmable)
- Display remote control director with memory, USB, etc.
- WIFI Control for wireless programming
- Measurement microphone MTK1

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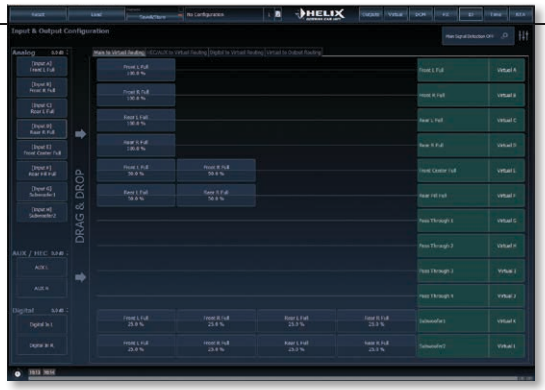
'over all' with the virtual front channels, for the entire front system and across all crossover frequencies. The virtual channel can also be used to "move" the entire three-way side with time alignment or with gain controller. The FX sound effects now also affect the virtual front, center and rear channels, which can also be used to control two-way centers perfectly. The algorithms for optimizing center, front and bass can be activated in the FX(Effects) section. First of all, the RealCenter is a blessing by its existence, a center channel signal is calculated here by real audio processing. Thus, the RealCenter is not a makeshift solution such as a monosum or a reversed sum of left and right. For center and front, there is a Clarity Expander, which affects center playback, for example, the voices. The front can also be "pulled apart" to broaden the stage imaging. The bass processing includes a SubXpander, which adds deep tones to the music by creating subharmonics to existing frequencies. There is also a dynamic bass boost, which raises the bass depending on the playback volume. This works great with factory woofers and subwoofers with limited power handling. For all FX functions there are adjustment sliders that can be used to influence the extent and function in a targeted manner. Furthermore, the M FOUR DSP supports the latest measurement functions of the PC tool. In addition to the well-known RTA (real-time frequency response measurement with optional microphone), the ISA (Input Signal Analyzer) is an electrical measurement function for the analog inputs. If, for example, the speaker lines of the vehicle are connected to the inputs of the DSP, you can determine the nature of incoming signals. The PC Tool offers a frequency response measurement of all input channels, so that you can immediately see if a usable full-range signal is present. In addition to the above, sums of several inputs can be measured, so you can find hidden all-pass filters that remain inconspicuous in the individual measurement. This electrical measurement of the inputs saves the installer a lot of time in troubleshooting and tuning of the DSP, because at the same time with the measurement the input EQs (and the input time) can be set, with immediate success check. Finally, in the current version of the PC tool we have ATM (Automatic Time Measurement), which allows a fully automatic time alignment of the entire system. The advantage here is that the measurement signal is played as a sound file like a piece of music via the head unit, which is possible in all vehicles. The measurement is then carried out with measurement signals programmed by Helix and a lot of audio processing, whereby the runtime of all loudspeakers in the system is compared with a reference loudspeaker and then calculated. Finally, the M FOUR DSP benefits from the numerous integration features such as power-save mode for CAN vehicles or bypass circuits for diagnostic programs of some factory radios and a freely configurable source management with automatic switching of sources and vehicle tones. The in-house ADEP.3 system is able to bypass the loudspeaker diagnosis of some vehicles, bypassing error codes or even the shutdown of channels. Overall, the M FOUR DSP is a powerful control center whose DSP functions are in no way inferior to the top range models.



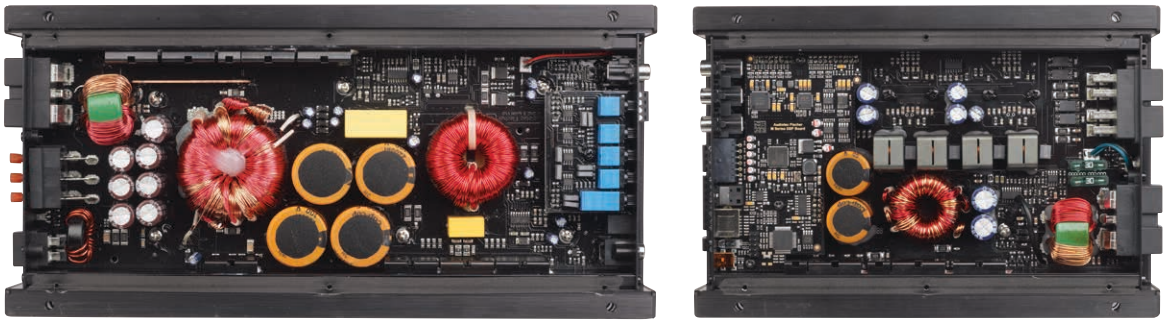
Routing Step 1: The inputs are routed to the virtual channels, as usual for main/analog, HEC and digital inputs. The virtual channels are subtly highlighted in green

The setup of the virtual channels is similar to that of the output channels, only without crossovers. The virtual front EQ and FX front processing then affect all output channels routed from there

In the ISA, any inputs and their sums can be measured. EQ (with allpass) and time alignment are adjusting the incoming signal

M ONE X

In order to satisfy the desire for more power on the subwoofer, Helix introduces the M ONE X along with the M ONE. The extended version has become 9 centimeters longer and, in turn, offers the full kilowatt compared to the 600 watts of its little sister. For this purpose, the X was thoroughly upgraded inside. Everything is much thicker than with the compact M ONE, so we find a very powerful mains transformer plus a buffering of 4 x 2200 microfarads in a generous 100 V version. The final amplification is a classic Class-D design and does not pose any puzzles for the user. Helix didn't save money on the equipment of the M ONE X. Both low pass and subsonic are on board as well as a bass boost. This can be controlled not only in the level, but also in the frequency and even in the quality. Finally, a phase controller



With the M ONE X (left), lots of copper provide a full kilowatt of power. The M FOUR DSP, on the contrary, works with two small amplifier ICs

completes the filters and the cable remote control is part of the standard scope. High level inputs including ADEP for diagnostic functions and an automatic switch-on ensure best cooperation with factory systems.

Measurements and sound

We already know the laboratory performance of the M FOUR DSP from the M FOUR. Already at 4 ohms there are a full 4 x 110 watts, which is quite admirable considering the compact housing size. At 2 ohms it is significantly higher (around 150), until the power amplifier runs into the limiter. Then the power is also limited to 100 W at 2 ohms until it is switched off. The chips deliver very clean performance, just 0.013% THD+N at 5 watts and only 0.033% at half load are excellent numbers. Of course, the M ONE X can only laugh about such power numbers. Already at 4 ohms are more than 400 watts, at 2 ohms the load resistors moan over just under 700 watts. And at 1 ohms the kilowatt mark falls with 1054 watts — goal achieved! The distortion does not look quite as rosy as with the M FOUR DSP, but this is not a crucial requirement for a subwoofer amplifier. THD+N is between 0.2 and 0.4%, so it is still in the zone.

In terms of sound, the M FOUR DSP shows very decent performance. It shines with joy and dynamics, and the slapped bass plays accordingly. Even with quieter tones, it still convinces with the adequate sensitivity and balanced sound. Despite the chips and the compact case, it delivers a confident performance in the bass range, here it draws a lot of pressure from any compo system. The pressure underneath is then the motto for the performance of the M ONE X, because it presents a generous portion here. Even the control over heavy subwoofer membranes is no problem for it. I'm down to 1 ohm, the control is perfectly retained, no blurring. Lastly, it processes ultra-deep sound just as well, so that its playback is limited by the subwoofer - not by the M ONE X.

Conclusion

The two newcomers are a perfect addition to the M-Series. With the M FOUR DSP there is now the complete set of DSP features of the house with their immense possibilities. And in the M ONE X we received a proficient market driver for power-hungry subwoofers.

Elmar Michels

Helix M ONE X

Distributor		Audiotec Fischer, Schmallenberg
Hotline		02972 9788 0
Internet		www.audiotec-fischer.com
Sound	20 %	1,1
Bass foundation	5 %	1,0
Bass pressure	5 %	1,0
Accuracy	5 %	1,5
Dynamics	5 %	1,0
Lab	55 %	1,4
Power	40 %	1,0
Damping factor	5 %	1,5
Signal-to-noise ratio	5 %	3,0
Distortion	5 %	2,5
Practice	25 %	1,2
Features	15 %	1,0
Build quality electronics	5 %	1,5
Build quality mechanics	5 %	1,5

Technical Specifications

Channels	1
Power 4 ohms	407
Power 2 ohms	694
Power 1 ohms	1054
Sensitivity max. mV	520
Sensitivity min. V	6,3
THD+N (<22 kHz) 5 W	0,375
THD+N (<22 kHz) Half Power	0,252
Signal-to-noise ratio dB(A)	58
Damping factor 20 Hz	145
Damping factor 40 Hz	160
Damping factor 60 Hz	160
Damping factor 80 Hz	160
Damping factor 100 Hz	166
Damping factor 120 Hz	160

Features

Low pass	50 – 250 Hz
High pass	–
Band pass	10 – -250 Hz
Bass boost	0 – 12 dB/30 – 80 Hz
Subsonic filter	10 – 50 Hz/12 dB
Phase shift	0 – 180°
High-level inputs	•
Automatic switchon (Autosense)	• DC
RCA output	• (master/slave)
Start/stop capable	• (6 V)
Dimensions (L x W x H in mm)	320 x 145 x 50
Others	Remote control

Rating

Price		350 Euro
Sound	20 %	1,1
Lab	55 %	1,4
Practice	25 %	1,2

Helix M ONE X

Absolute Top Class
Top Class
Upper Class
Middle Class
Entry Level

1,3
Price-Performance: excellent

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"Full performance in a compact form."

BEST EMC
Undisturbed FM reception
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Helix M FOUR DSP

Distributor		Audiotec Fischer, Schmallenberg
Hotline		02972 9788 0
Internet		www.audiotec-fischer.com
Sound	40 %	1,3
Bass	8 %	1,5
Neutrality	8 %	1,0
Transparency	8 %	1,5
Spatial imaging	8 %	1,5
Dynamics	8 %	1,0
Lab	35 %	1,8
Power	20 %	2,0
Damping factor	5 %	2,0
Signal-to-noise ratio	5 %	1,5
Distortion	5 %	1,0
Practice	25 %	0,8
Features	15 %	0,5
Build quality electronics	5 %	1,0
Build quality mechanics	5 %	1,5

Technical Specifications

Channels	4
Power 4 ohms	110
Power 2 ohms	107
Power 1 ohms	0
Bridged Power 4 ohms	214
Bridged Power 2 ohms	0
Sensitivity max. mV	var.
Sensitivity min. V	var.
THD+N (<22 kHz) 5 W	0,013
THD+N (<22 kHz) Half Power	0,033
Signal-to-noise ratio dB(A)	87
Damping factor 20 Hz	149
Damping factor 80 Hz	149
Damping factor 400 Hz	144
Damping factor 1 kHz	135
Damping factor 8 kHz	19
Damping factor 16 kHz	5

Features

Low pass	10 – 20k Hz
High pass	10 – 20k Hz
Band pass	10 – 20k Hz
Bass boost	-12 – 12 dB/10 – 20k Hz
Subsonic filter	via HP
Phase shift	0 – 180°/LZK via DSP
High-level inputs	•
Automatic switchon (Autosense)	• DC
RCA output	•, 6 CH processed
Start/stop capable	• (6 V)
Dimensions (L x W x H in mm)	230 x 154 x 50
Others	DSP, digital input

Rating

Price		550 Euro
Sound	40 %	1,3
Lab	35 %	1,8
Practice	25 %	1+

Helix M FOUR DSP

Absolute Top Class
Top Class
Upper Class
Middle Class
Entry Level

1,4
Price-Performance: excellent

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"Powerful control center."