Musway M5 – 5-channel power amplifier with 9-channel DSP

5 channels on smallest space

After Musway established itself in the DSP amplifier sector with the classic M6, the range continues to grow. We examine the latest creation, the M5.

When Musway presented the first DSP power amplifier of the M series in Germany in 2018, this original M6 brought a breath of fresh air to the scene. For the first time, there was a serious DSP product that did not come from the usual suspects. Since then, the M6 has now been in its third generation as v3 and with the recently released M6Pro, Musway has come up with a performance hammer. In addition, there are the top models M12 and M10, which also score with serious performance and also supply complex audio installations. Now it is time to round off the program at the bottom, and with that our test candidate M5 enters the stage. It is available as M5Evo for 550 euros with a short cable set with loose ends, the version simply called M5 for 580 euros includes a 2.5 meter plug & play cable harness for ISO connectors

There are also specific cable harnesses for different vehicles available from Musway dealers. Let's stay with the accessories for a moment, because they are impressive. Not only is a plug & play adapter for subwoofers included, there is also a display remote control with DRC1, BTA2, BTS and BTS-HD and Bluetooth dongles as optional accessories. The Bluetooth extensions all enable audio streaming, the BTA2 also allows programming via app and BTS-HD streaming in BT5.0 quality including aptX-LL and aptX-HD. In any case, the M5 offers four high-level inputs, which are equipped with EPS for diagnostic circuits and a switch-on delay.

The PC software shows all essential functions in the main window

Master and sub levels in the Android app

EQ setting in the Android app

automation. There are also a pair of RCA inputs as an analogue AUX source. A digital input in the form of an optical S/PDIF is also included. The digital sources (including Bluetooth) can be switched when a signal is received, and conversely, vehicle sounds such as incoming calls can also be mixed in. After opening the tiny (15 x 10.5 x 4.5 centimetres) casing, the digital board is presented, on which we find the DSP, the connections to the PC, BT and digital source as well as the RCA sockets. A 32-bit ARM

The processor takes over the control, and we also find two very good key components, the DSP ADAU1452 from Analog Devices and the converter BB PCM3168 from Texas Instruments, which are found in a large number of DSPs. The PCM3168 offers 6 AD converters and 8 DACs with 24-bit resolution, which is exactly enough for the 4 high-level inputs and the stereo AUX input. The 8 D/A converters are supported by a small 2-channel DAC for the digital sources, so the 9 DSP channels can be handled - even a tenth would have been possible. But the

We are pleased with the 4 processed outputs, as there is often only one output for a subwoofer. Our M5 doesn't need one anyway, because after removing the digital board, the power amplifier is a super-compact treat with 4 + 1 channels in the smallest of spaces. Two two-channel amplifier chips supply the four small channels, which are filtered by the Class-D PWM clock in an audio-compatible manner by four encapsulated low-pass coils. Four macroscopic output transistors are available for channel 5 and the low-pass coil is significantly larger. The very thick power supply and the 40 amp fuse next to it show that with the M5 we have to be prepared for not just having a small sound booster box for the factory radio, but a serious five-channel power amplifier.

software

All Musway DSPs can be programmed using either PC desktop software or an Android app, the latter in conjunction with the optional BTA2 accessory. Apart from routing and a few minor details, all relevant settings are in one window. When routing, it is important to note that it is not enough to simply dose the inputs in the routing matrix; the correct check mark(s) must also be set in the main window. There are bandpass crossovers for all channels up to 48 dB/octave in three characteristics. Programming the crossovers is a bit fussy, for example with odd orders for Linkwitz or varying attenuations at the set crossover frequency. Basically, however, the crossovers work. The EQ bands can be set fully parametrically, and there is also a runtime correction for the outputs in 0.02 ms or 7 mm increments. It is very nice that the time or path is displayed precisely and in plain text without any frills such as coarse and fine adjustment. In the frequency window you can see clearly what is happening, and the EQs are also easy to operate (also via keyboard). The grouping of channels is well done, a bridge circuit can also be displayed and up to four channels can be combined into a subwoofer group, which is then recognized by the optional remote control. The extras are not numerous, but important. We have a power-saving shutdown for CAN vehicles, a setting for switching through the vehicle sounds and an auto-mute function to prevent crackling. The M12 also has an input pin for reverse gear, which then also feeds the vehicle sounds. This means that the Musway software is not the most complete on the market, but it allows you to work without problems in most cases. And a big plus point is the the Musway "Tunest" app, which in conjunction with the BTS2 allows the DSP to be fully programmed and also enables remote control functions such as master and sub levels, source selection and source selection.

One of three Bluetooth sources: The BT-HD can stream audio in HiRes quality

The M5 offers four processed outputs and two RCA jacks for the AUX input. The speakers dock via a Molex connector

The remote control controls master and sub volume, Subwoofer groups and muting

Technical data

Inputs
- 4-channel high level with autosense
- 1 x digital S/PDIF optical
- 1 x AUX (RCA, stereo)
- Sensitivity 6 V (RCA), 18 V (high level)
- 1 x gain control (high level), 1 x gain control (AUX)

Outputs
- 4-channel RCA (processed)
- Remote out

DSP channels
- 10

DSP software (V 3.4 beta in test)

equalizer

Outputs
- fully parametric EQ on outputs, 31 bands per channel
- 20 – 20k Hz, 1 Hz steps
- + 15 – -15 dB, Q 0.1 – 10

Crossovers
- 20 – 20k Hz, Butterworth, Bessel, Linkwitz, 1 Hz steps
- Slope up to 48 dB/oct.

Time and level
- Sample rate 48 kHz, 7 mm steps (0.02 ms)

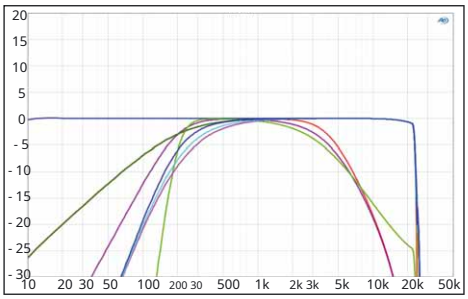
Outputs
- 0 – 602 cm (17.7 ms), 1024 samples
- Phase reversal 0, 180°
- Level adjustment outputs 0.1 dB steps, mute function

equipment
- 6 presets
- Remote Out
- 2 x gain controls
- EPS (Error Protection System) for diagnostic function
- Automatic switching to Bluetooth
- Adjustable switching to high level for vehicle sounds
- Sub-Setup (bass channels for remote control)
- Power Save Mode
- Settings can be exported and imported via WhatsApp

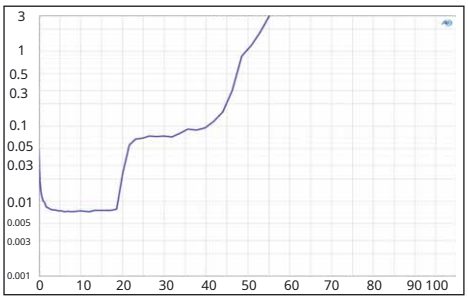
Optional accessories
- Bluetooth dongle BTS (audio streaming)
- Bluetooth dongle BTS-HD (audio streaming in HiRes quality)
- Bluetooth dongle BTA (audio streaming and app control of all functions)
- Remote controller RC1 (volume, bass level, sources, setups)
- RCA adapter MPK-RCA6, MPK-RCA6-PP for ISO
- Vehicle cable sets (Mercedes, BMW, Audi, etc.)

Measurements and sound

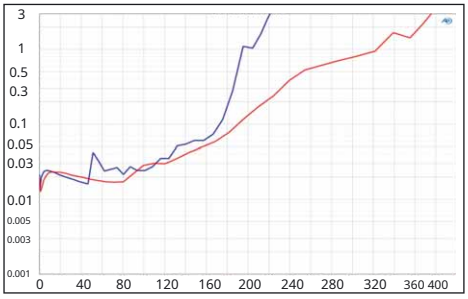
Like all Musway DSP products, the M5 does not have a HiRes frequency range or a high sampling rate. This is the usual 48 kHz, resulting in 0.02 milliseconds or 7 millimeter steps in the runtime correction. It takes very little time to get used to the audio functions of the PC software and app; everything works clearly and is not a mystery (except for the filter edges for the high and low pass, which sometimes only have a distant connection to the terms Butterworth, Bessel and Linkwitz). Overall, however, the M5 is convincing in practice; with the 9-channel DSP, the user has a powerful sound tool in their hands. The laboratory test of the power amplifier channels leaves little to be desired. The four small channels deliver 50 watts at 4 ohms, enough for door speakers, and the performance is also clean, especially at the important lower power levels. However, we would never have expected what comes out of channel 5.



The break-off edge is at 22 kHz due to the sample rate, the crossovers are programmed in a casual manner, here high-pass filters at 200 Hz (But, Bes, Lin) and low-pass filters at 3 kHz



Channels 1-4 are 4 ohm stable and deliver approximately 50 watts



The subwoofer channel delivers very clean (full-range) power, namely 200 watts at 4 ohms and 324 watts at 2 ohms

BEST PRODUCT
Top class
CAR&HiFi 5/2024

EMC TIP
Undisturbed radio reception
CAR&HiFi 5/2024

Musway M5Evo

Price	around 550 euros
distribution	Audio Design, Kronau
Hotline	07253 9465-0
Internet	www.musway.de

Evaluation

sound	40%	1.1	- - - - -
Bass foundation	8%	1.0	- - - - -
neutrality	8%	1.0	- - - - -
transparency	8%	1.5	- - - -
Spatiality	8%	1.0	- - - - -
dynamics	8%	1.5	- - - -
laboratory	35%	1.6	- - - -
Performance	20%	2.0	- - -
Damping factor	0%	—	
Signal-to-noise ratio	5%	1.0	- - - - -
Distortion factor	10%	1.0	- - - - -
Practice	25%	0.8	- - - - - -
equipment	15%	0.5	- - - - - -
Processing Electronics	5%	1.5	- - - -
Processing mechanics	5%	1.0	- - - - -

Technical data

Channels	7
Channel power 4 Ohm W	4x49 + 1x195
Channel power 2 Ohm W	1x324
Channel power 1 Ohm W	–
Bridge power W	–
System power W	449
Sensitivity max. mV	500
Sensitivity min. V	6.0
THD+N (<22kHz) 5W%	0.007/0.021
THD+N (<22 kHz) Half load %	0.028/0.024
Signal-to-noise ratio dB(A)	91/91
Damping factor 20 Hz	77/131
Damping factor 80 Hz	76/131
Damping factor 400 Hz	78/128
Damping factor 1 kHz	72/115
Damping factor 8 kHz	16/14
Damping factor 16 kHz	4/4

equipment

Low pass	20 – 20kHz
High pass	20 – 20kHz
Bandpass	20 – 20kHz
Bass boost	- 15 – 15 dB/20 – 20k Hz
Subsonic filter	via HP
Phase shift	0, 180°/LZK via DSP
High-level inputs	•
Automatic switch-on.(Auto sense)	• , DC
RCA outputs	• 4CH, processed
Start-stop capability	– (7.6V)
Dimensions(L x W x H in mm)	150x105x45
Miscellaneous	9-channel DSP

Musway M5Evo

Top class 1.2

CAR&HiFi 5/24

Price/performance: very good

"Mini with power for the entire system."

The digital board houses the DSP and the inputs for Blue-tooth and S/PDIF

It also runs up to 22 kHz and delivers almost 200 watts at 4 ohms, and at 2 ohms it delivers a solid 324 watts at 1% THD+N - that's just wow! The system output, measured at 4 x 4 ohms + 1 x 2 ohms, is also impressive at 449 watts, which is a very decent 86% of the total channel output. The M5 also performs exemplary in other respects, with very good to excellent values for distortion and noise. In terms of sound, the M5 pleases with its lively and fluid musical performance. There is nothing missing anywhere or anything gives a cheeky impression. Voices and instruments come to the ear uncolored and the bass scores with clean, not exaggerated play and enough punch. The small M5 really packs a punch on the subwoofer, and there are also acoustic wow moments here when the bass really hits, and that with almost no visible power amplifier.

Conclusion

The M5 is not only an affordable power amplifier with a plug & play option, it is a real blast. One that is easy to overlook when you are standing in front of it. But the small box contains plenty of power for door speakers and subwoofers, and the 9-channel DSP opens all doors to an XL active system. You can only take your hat off to the M5!

Elmar Michels

Powerful power supply and amplifier ICs for the four small channels, the bass channel works with MOSFETs