

## Musway M12 - 12-channel DSP power amplifier of superlatives

# 12-channel DSP



**Musway had already struck out in 2020 and announced the M12. This simple abbreviation hides a truly superlative power amplifier with no fewer than 12 amplifier channels and 16 DSP channels, which we now have for testing.**

The M12 is the undisputed top model of Musway DSP amplifiers. 12 x 85 W (12 x 120 W at 2 ohms) are in the technical data, so we are dealing with a real buzzer. If you don't need twelve channels, you can also use the M6 or the D8, which is significantly less expensive. But sometimes there have to be twelve channels, namely if you are either planning a fully active XXL system or want to retrofit a multi-channel factory system. In addition, the M12 is extremely sociable, with its 12 high-level inputs up to 23 volts, it also takes signals from larger factory equipment. In addition, there are 6 cinch inputs for an aftermarket radio and two additional cinch inputs for an additional source. But that's not all, the M12 can also be digital: the optical digital input is standard and available as an accessory

three Bluetooth dongles that dock to the M12 via USB. The customer can choose between audio streaming (BTS), audio streaming plus DSP programming (BTA2) and the new BTS-HD, which allows wireless streaming of high-resolution music files thanks to Bluetooth 5 and aptX HD. This is recommended, even if the M12 "only" reproduces the audio bandwidth up to 22 kHz. HiRes Bluetooth also extends the dynamic range to 24 bits, which is at least as important as the increased frequency range. The large number of inputs and outputs are on the long side, with the high-level inputs and the speaker outputs being combined in 12-channel Molex connectors - it's nice that the speaker cables have a decent cross-section for the enormous power.

In addition, there are the cinch sockets for inputs, outputs and AUX source and finally, in addition to the digital inputs, we also find three sensitivity controls for channels 1-6, channels 7-12 and AUX. As soon as we unscrew the M12, we immediately believe that there is a lot of power in it. One third of the board is reserved for signal conditioning, one third for amplification and the last third for power supply. And it's laid out really generously, and there are two of them. Instead of normal mains transformers, those with heavy-duty flat wire coils are used, and they are impressive in size, no fewer than 14 transistors and diodes do their job, as does lavish buffering. The amplification is provided by six dual-channel chips that are located on the underside of the circuit board and rest against the heat sink there. A fan also blows in a targeted manner between the circuit board and the housing, so that nothing can go wrong here, even under difficult conditions. An aluminum brings additional cooling



Clean construction with an extremely powerful double power supply with flat wire coils and a row of 12 low-pass coils under the narrow heat sink for the 6 amplifier ICs

nium heat sink on the top of the board, which runs alongside the twelve Class D low-pass coils. Most of the signal processing is hidden, with a bunch of op-amps bustling on the top of the board and the EPS bypassing diagnostic circuitry on some factory systems. It gets exciting on the underside, where the controller, the digital receiver and the DSP are located. Musway also relies on the popular ADAU1452 from Analog Devices, which has rightly established itself on the market.

With 32 bits (64 in "boost mode"), it guarantees depth of calculation and thus sound quality. In addition, it has enough power to calculate the 16 DSP channels of the M12, 48 kHz sampling rate are still possible. Musway also relies on proven quality for the converters, in this case from Texas Instruments and Burr Brown.

### Software

Along with the M12, Musway also relaunched the programming software. The new interface is similar to what you've seen before, but thanks to common technology across Musway's DSP products, there's now one software for everyone. Except for the routing and a few small things, we find all the relevant settings in one window.

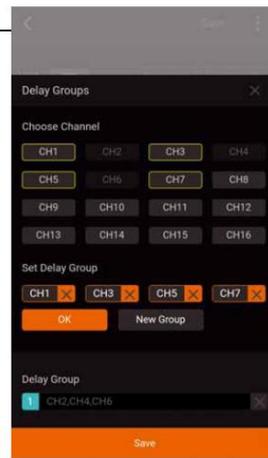
There are bandpass crossovers up to 48 dB/octave in three characteristics for all channels. The programming of the crossovers is somewhat casual, eg with odd orders with Linkwitz or varying damping at the set crossover frequency. Basically, however, the points work. The EQ bands can be set fully parametric, and there is also a runtime correction of the off

in 0.02 ms or 7 mm increments. It is very pleasant that the time or the distance are now displayed precisely and in plain text without frills such as coarse and fine adjustment. In the frequency window you can clearly see what is happening, and the EQs are also easy to operate (also via the keyboard).

Because of the 16 channels, input selection, muting and runtime are a bit cramped, so you have to keep an eye on all the ticks here. The grouping of channels is well solved, 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-save cut-off for Can vehicles, a setting to pass through the vehicle sounds and an auto-mute function against crackling. Furthermore, the M12 offers an input pin for reverse gear, which then also feeds in the vehicle sounds. Thus, the Musway software is not the most complete on the market, but in most cases it allows you to work without any problems. And a big plus is the Musway "Tunest" app, which in connection with the BTA2 allows the complete programming of the DSP and also enables remote control functions such as master and sublevel, source selection and source selection.

### measurements and sound

In the measurement laboratory, the M12 impresses with a lot of power. However, it is not just the 73 and 116 watt channel power that we determined that are impressive, but also how confidently the Musway delivers the power. Because the Musway



Runtime groups in the Android-App



Master and sub levels in the Android app

can be bridged, 4-ohm subwoofers enjoy almost 260 watts. Even at full control, no background noise escapes from the housing, and the heat sink does not get hot either. The M12 gives the impression that it could do even more. That's not far off, because notice at 2 ohms

### Specifications Musway M12

- Dimensions** 340 x 172 x 48 mm
- inputs**
  - 6-Channel RCA
  - 12-Kanal High-Level mit Autosense, 2 x Gainregler
  - 1 x digital S/PDIF (optical)
  - 1 x AUX (RCA, Stereo) with Gainregulator
  - Empfindlichkeit 6 V (RCA), 24 V (Hochpegel)
- exits**
  - 4-channel RCA (processed)
  - Remote-out
- DSP software (V 3.2 in test)**
- Equalizer**
  - Fully parametric EQ on outputs, 31 bands per channel
  - 20 – 20kHz, 1Hz steps
  - +15 – -15 dB, Q 0,1 – 10
- crossovers**
  - 20 – 20k Hz, Butterworth, Bessel, Linkwitz, 1 Hz steps
  - Edge steepness up to 48 dB/oct.
- time and level**
  - Time-of-flight correction (48 kHz), up to 17.7 ms/601 cm, 0.02 ms/7 mm increments
  - Phase reversal 0, 180°
  - Level adjustment outputs 0.1 dB steps, mute function
- Furnishing**
  - 6 Presets
  - Inputs and outputs can be routed as required
  - Start-stop capability up to 7.1 V
  - EPS (Error Protection System) for diagnostic function
  - Automatic switching to Bluetooth
  - Switching to high level for vehicle sounds
  - Choice of high-level or RCA inputs
- Optional accessories**
  - Bluetooth-Dongle BTS (Audiostreaming)
  - Bluetooth-Dongle BTS-HD (Audio streaming in HiRes quality)
  - Bluetooth dongle BTA2 (audio streaming and app control of all functions)
  - Remote-Controller DRC1 (volume, bass level, sources, setups)

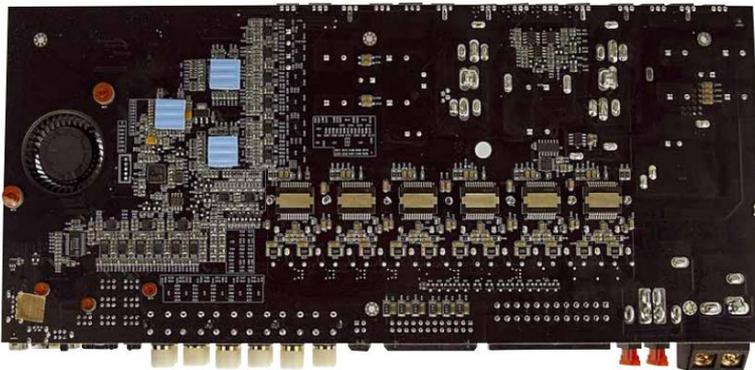


Connection diversity with 6 x RCA, AUX and 4 processed outputs. The 12 high-level inputs and loudspeaker outputs are designed as Molex connections



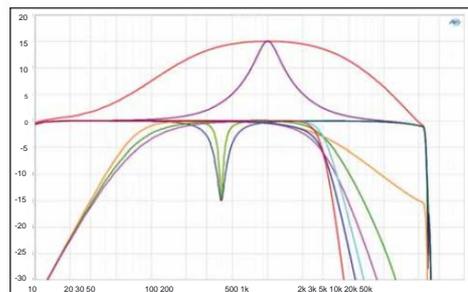
The PC software shows all the essentials functions in main window

The 6 amplifier chips are clearly visible on the underside of the circuit board. On the left, the fan blows between the circuit board and the housing, next to it are the DSP chip and the converters under the thermal pads



we have a limiting protection circuit that kicks in at 116 watts. The distortion values are particularly convincing at 4 ohms and small to medium outputs, i.e. in the "sound range". Overall, the Musway leaves the test course as a very good power amplifier with its head held high. In the sound check, she then shows her whole class. It always delivers powerful sound that puts you in a good mood. Bass hits come with sovereign pull and exactly to the point. In the midrange, the M12 plays rousing and puts in a lot of effort with vocals.

In the treble, the details are pleasing, which the M12 does not serve aggressively, but musically in the best sense of the word. The playing fl ow is also good overall, so that you never have to worry about the sound performance - a top-class performance across the board.



The demolition edge is due to the sample rate at 22 kHz, the Crossovers are programmed casually, here with a high pass of 70 Hz (But, Bes, Lin) and a low pass of 3 kHz (But, 6-48 dB can be bridged

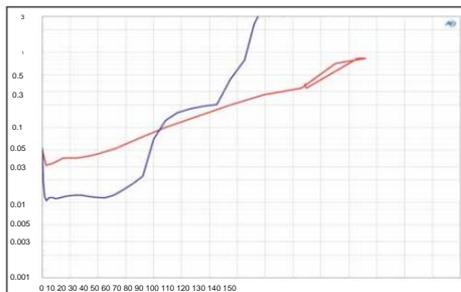
Conclusion

12 amplifier channels and 16 DSP channels, no retrofit device has more to offer. If you need the full dozen, the Musway M12 is a fine piece of amplifier technology that runs great and scores with solid performance.

Elmar Michels



One of three Blue tooth sources: The new BT-HD can stream audio in HiRes quality



At 4 ohms, the M12 delivers a very clean 73 W, at 2 ohms it is blocked at 116 W, and all channel pairs can be bridged

<b>HIGHLIGHT</b> Absolute top class <b>CAR &amp; HiFi</b> 2/2022	<b>EMV TIP</b> Undisturbed radio reception <b>CAR &amp; HiFi</b> 2/2022
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Musway M12

Price	around 1,300 euros
distribution	Audio Design, Kronau
Hotline	07253 9465-0
Internet	www.musway.de

valuation

<b>Klang</b>	40 %	1,1 yyyyyy
Bassfundament 8 %		1,0 yyyyyy
neutrality	8 %	1,0 yyyyyy
transparency	8 %	1,5 yyyyyy
spatiality	8 %	1,0 yyyyyy
dynamics	8 %	1,0 yyyyyy
<b>Labor</b>	35 %	1,1 yyyyyy
performance	20 %	1,0 yyyyyy
damping factor —		
signal-to-noise ratio 5%		1,5 yyyyyy
Klirrfactor	10 %	1,0 yyyyyy
<b>practice</b>	25 %	0,9 yyyyyy
equipment	15 %	0,5 yyyyyy
proc. Electronics 5% proc.		1,5 yyyyyy
Mechanics 5%		1,5 yyyyyy

Technical specifications

Channels	12
Power 4 ohms	12 x 73
Power 2 ohms	12 x 116
Power 1 ohm	0
Bridge power 4 ohms Bridge	6 x 232
power 2 ohms Sensitivity	0
max. mV Sensitivity min. V	320
THD+N (<22 kHz) 5 W THD+N	2,4
(<22 kHz) Half load signal-to-noise ratio dB(A)	0,011
	0,027
	89
Damping factor 20 Hz	66
Damping factor 80 Hz	71
Damping factor 400 Hz	69
Damping factor 1 kHz Damping	64
factor 8 kHz Damping factor 16	13
kHz	4

Furnishing

Low-pass	10 – 20k Hz
High-pass	10 – 20k Hz
Band-pass	10 – 20k Hz
Bass boost	-15 – 15 dB/10 – 20k Hz
Subsonic filter	via HP
Phase shift High-	0, 180°/LZK via DSP
level inputs Auto switch-on (Autocythe)	*, DC
RCA outputs Start-	*, 4CH, processed
stop capability Dimensions	• (7.1 V)
(L x W x H in mm)	340 x 172 x 48
Miscellaneous	16-channel-DSP

Musway M12

Absolute top class 1.



Price / offer: Very good

"The full program with 12 amplifier channels and 16 DSP channels."