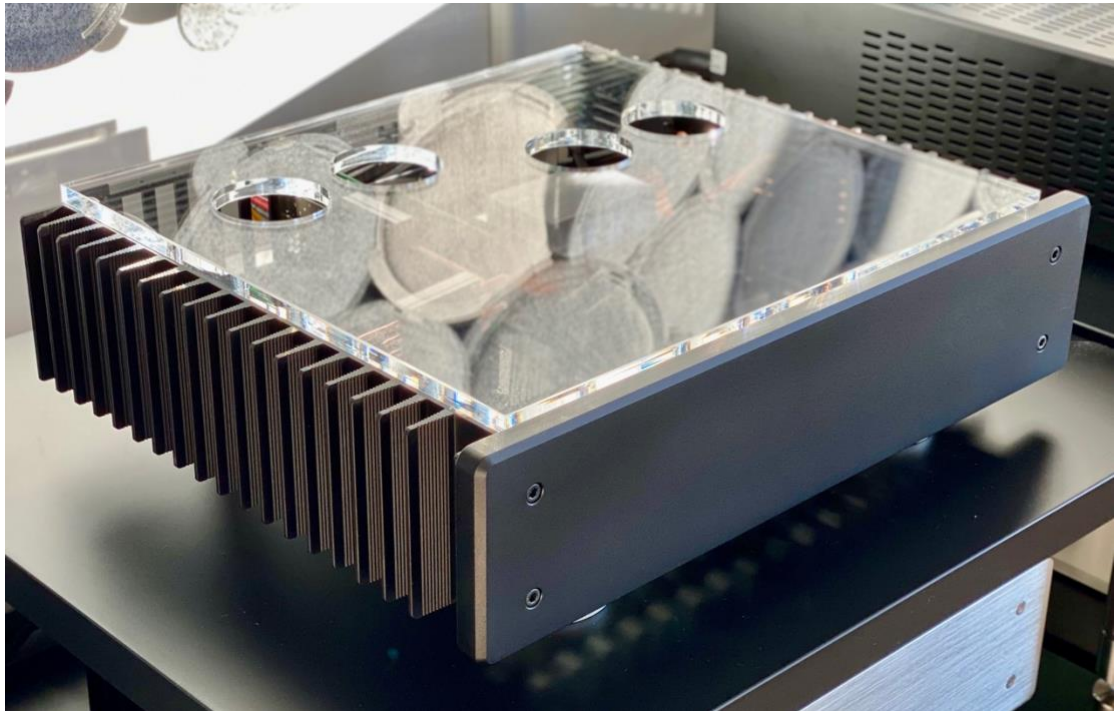




USER MANUAL



Created by Grigg Audio Solutions

03.08.2022 Version 1.4



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INTRODUCTION

Thank you for purchasing the fis Audio PC. The abbreviation fis stands for finest innovative systems. With innovative elements (depending on the equipment) like

- our audiophile interference-free cabling,
- an absolutely silent design with a highly effective passive cooling,
- a "real" high performance with a high-performance CPU of the latest 12th Intel processor generation and
- a galvanically isolated network connection via optical fiber with lowest latencies

we support the demanding music enjoyment.

This high-end system is capable of playing digitally stored or streamed music at the highest level. The fis Audio PC is characterized by high performance.

Your DAC (Digital-to-Analog Converter) has nowhere near the immense processing power of our fis Audio PC. Therefore let your DAC play back the music stress-free in NOS (Non Over Sampling) mode. The fis Audio PC even allows you to digitally control the volume in best quality without a preamplifier. This is achieved with a hardware selected under sound aspects. About the software you decide.



HARDWARE

When selecting the hardware, we pay attention to current-stable components of high quality. The components must be long-term stable and temperature-resistant. For the processors and memory elements, interference-free and latency-minimized designs are important to us.

FANLESS CASE

We use the HDPLEX H5 fanless chassis in the 3rd version. This supports a TDP (Thermal Design Power) of 125W with a sophisticated heat pipe system. TDP is the maximum thermal power dissipation based on which a cooling solution is designed. This does not mean running the fis audio PC at this high power. In fact, the average power for example when upsampling to DSD1024 is between 40W to 50W.

For the cooling to work well, the case must be free-standing with enough distance to other cases. Do not place it in a closed cabinet, as it can lead to heat accumulation. The ventilation openings must be free.

The best ventilation is achieved with our acrylic lid (retrofittable).

The fis Audio PC is switched on and off by the switch on the right side.

MOTHERBOARD

The motherboard MSI MPG-Z690-EDGE-WIFI-DDR4 is installed in the case.

MSI (Micro-Star International Co. Ltd.) is based in Taiwan. With the new motherboards, you have to decide whether you want to use the RAM according to the new DDR5 or the old DDR4 standard. We chose DDR4 due to low latencies and lower power consumption.

The passive cooling with heatsinks on the VRM (Voltage Regulator Module), the Intel® Z690 chipset and the M.2 SSDs of the motherboard is very good.

The power design also knows how to convince with a direct 16 phase 75A supply.

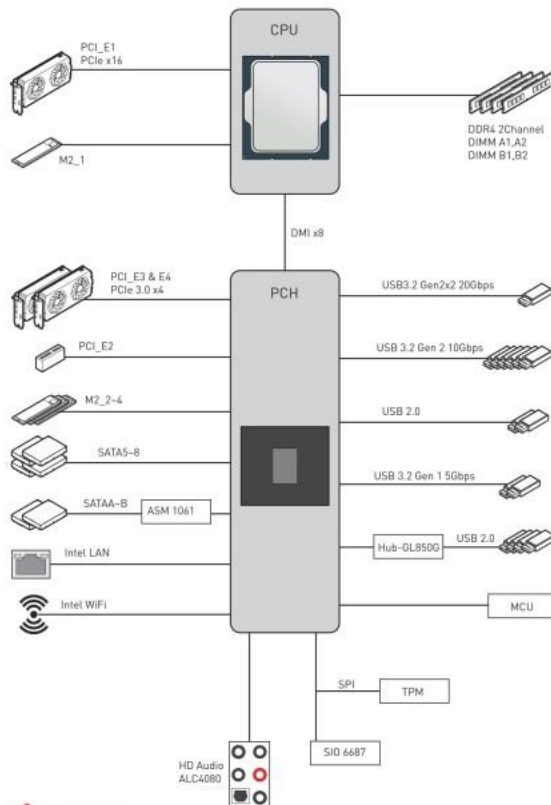
One M.2 storage and one PCIe slot are directly connected to the CPU. These slots are ideal for low latencies and high bandwidths.



BLOCK DIAGRAM

The most powerful PCIe card is mounted at the PCI_E1 position and the SSD with the operating system is mounted at the M2_1 position so that the data exchange takes place directly with the CPU without detours.

Block Diagram

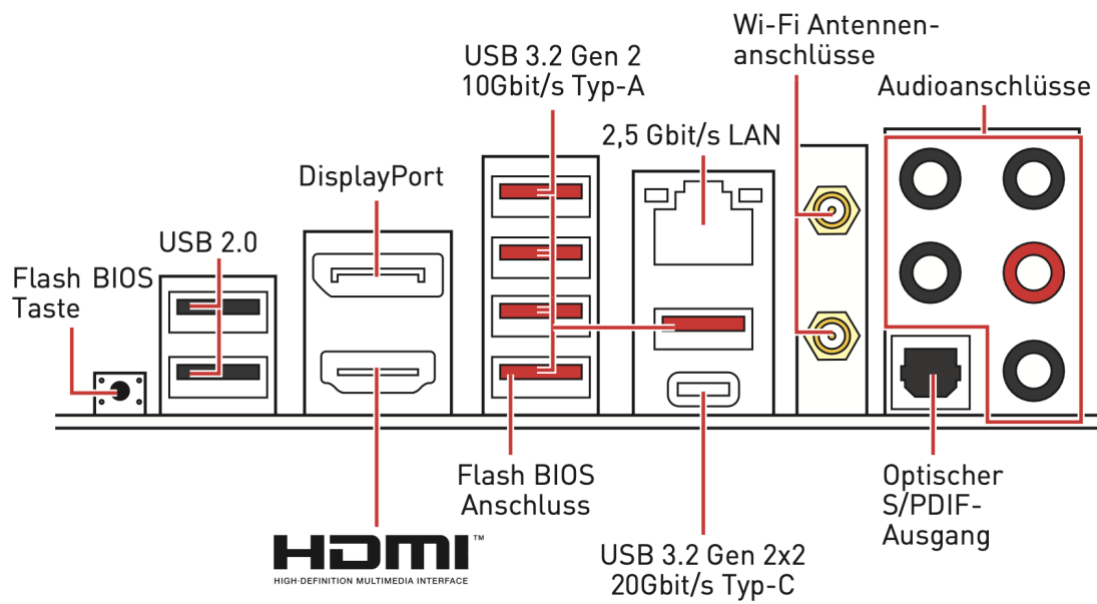


Important
The icons above are for reference only.

BACK SIDE I/O PANEL

The motherboard's ports are accessible on the back of the fis Audio PC. To avoid interference, we disabled Wi-Fi and the audio ports in the BIOS. We disable the 2.5 GBit/s LAN port when a high-quality PCIe card establishes the Ethernet connection. If you want to change the BIOS settings, you have to use and a keyboard (and a mouse if necessary) on the USB 2.0 ports and a display on the HDMI port.

For data exchange via USB or for booting via USB, we recommend using the USB Type C port.



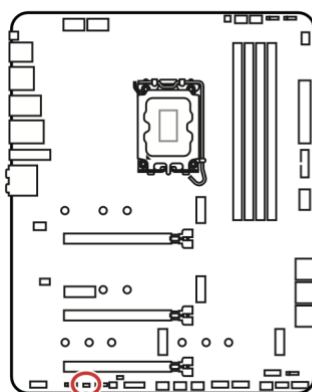
CLEAR CMOS PLUG BRIDGE (RESET BIOS)

If the system no longer boots and the BIOS is no longer accessible, you must reset the BIOS. Disconnect the computer completely from the mains.

Then short-circuit the two pins on JBAT1 for about 10 seconds.

If you don't have a jumper at hand, you can also use a conductive screwdriver.

This will reset the BIOS to factory defaults and you will have to set it up again. It is best to use our included BIOS profile for this.




Daten
beibehalten
(Standardwert)


CMOS-Daten
löschen/ Reset
des BIOS



CPU (CENTRAL PROCESSING UNIT)

We exclusively use the 12th generation Core (Core 12000) from Intel (also called Alder Lake). One of the main features is that the CPUs are equipped with E-cores (Efficient) and P-cores (Performance).

Small, highly efficient processor cores, which were previously more familiar from Atom, are supported by a varying number of large performance cores, known from the Core CPUs.

A maximum of 16 cores are possible, which are divided between 8 E-cores and 8 P-cores. With hyperthreading of the P-cores, i.e. the distribution of the load on two virtual cores, a total of 24 threads can be used.

We always buy the so-called boxed version, even if the tray (bulk) versions are cheaper. The boxed version comes completely new from the manufacturer and has a manufacturer's warranty. Tray versions only have the legal warranty and may be returns.

We also use the K-versions because the heatspreaders are soldered and thus allow better heat dissipation.

RAM

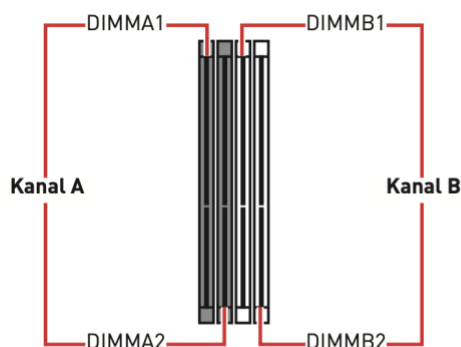
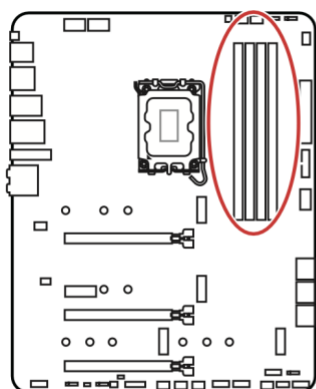
We pay special attention to the working memory, since ideally all music processing is buffered with minimized latency. Efficient cooling is important for the working memory to avoid throttling. We also attach importance to lowest latencies.

The G.Skill RipJaws V black DIMM Kit 16GB, DDR4-3200, CL14-14-14-34 memory meets these criteria.

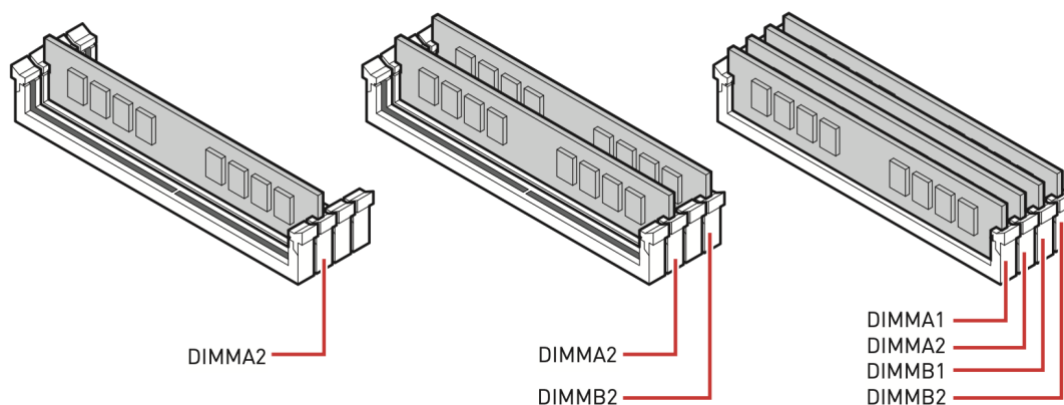
The heatspreaders cool passively very well. The latencies are at a very low ~8.75ns (CAS Latency CL14).

Other RAMs can also be used depending on the customer's requirements.

In case of a possible exchange, the correct assembly in the motherboard must be observed. See operating manual of the motherboard manufacturer.



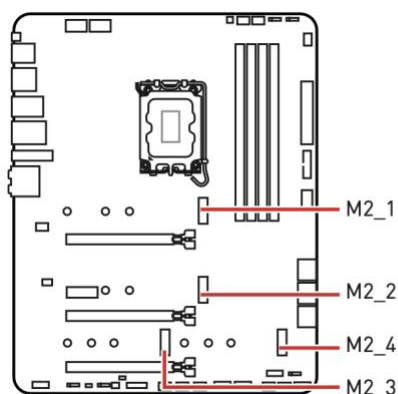
Speichermodul-Installationsempfehlung



SSD

We only recommend SSDs (solid-state disks) with the M.2 form factor and PCIe connection. The operating system should be installed on the M.2 slot, which is directly connected to the CPU. See block diagram in the motherboard chapter. A total of 4 M.2 slots are available.

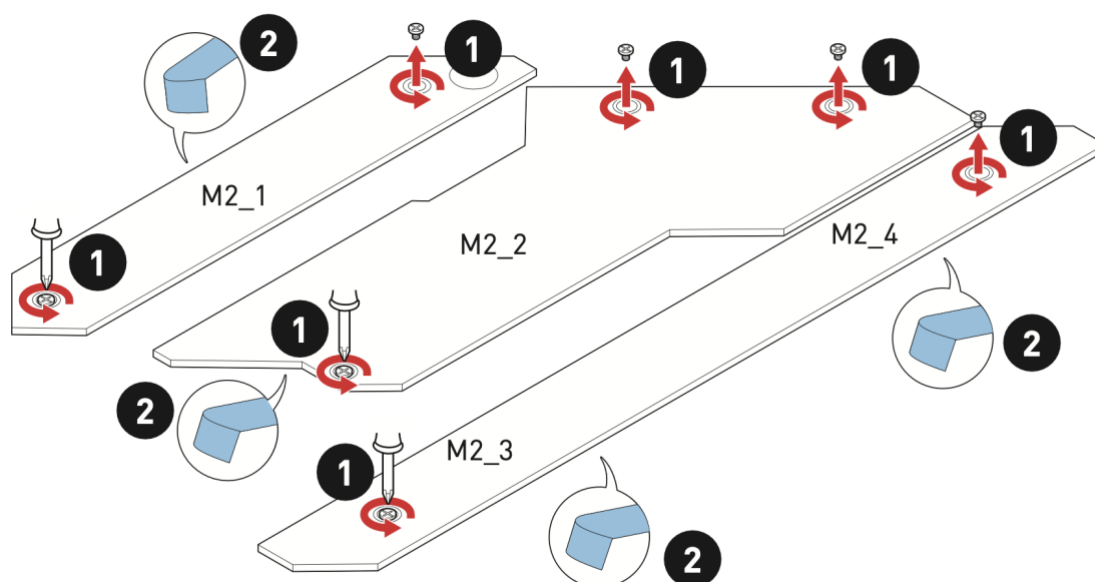
Intel Optane SSDs, such as the M10, are highly recommended because of the very low latencies.



Wichtig

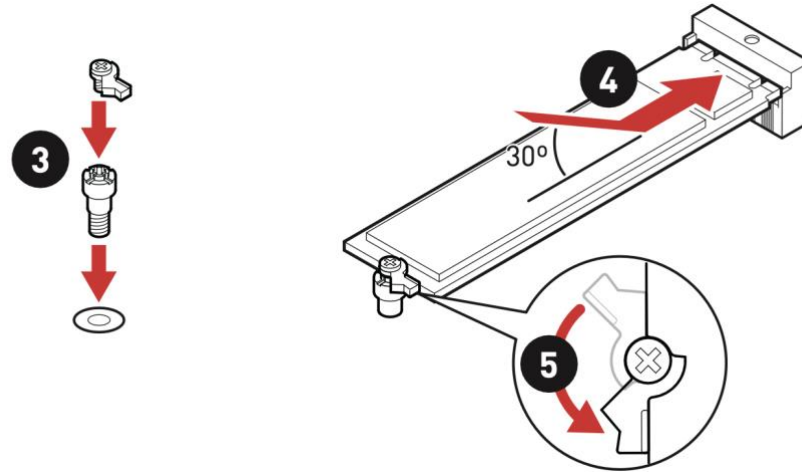
- Intel® RST unterstützt nur PCIe M.2 SSD mit UEFI ROM.
- M2_2~4 unterstützt Intel® Optane™ Memory

The heatsinks and screws to be loosened are shown in the following diagram. Please make sure to remove the protective foil from the heat conduction pad on the heatsink when inserting it. Only good cooling ensures trouble-free operation without throttling.





Insert the M.2 SSD into the M.2 slot at a 30-degree angle. Rotate the EZ M.2 Clip to secure the M.2 SSD. You do not need to unscrew the screw with the EZ M.2 Clip, just loosen it and tighten it again after installation.



Do not use SATA hard drives. They are slow, have high latencies, require a SATA controller and have to be connected on the cable side. We deactivate the SATA controller, which adds unwanted electronic noise, in the BIOS.

PCIE (PERIPHERAL COMPONENT INTERCONNECT EXPRESS) CARDS

One of the strengths of the fis Audio PC is its flexibility. The music can only be as good as the PC interfaces in the input/ and output allow.

For example, if the LAN connection of the motherboard is used, the signal can quickly become jittery and electronically noisy. For this purpose we offer PCIe cards for the Ethernet. One of our highlights are fiber optic cards from XILINX Solarflare for perfect galvanic isolation and lowest latencies.

Passing the signal via USB to the DAC through the motherboard connector very often has negative sonic effects. Even if the signal as such remains bit-identical, high latencies, jitter and RF (radio frequency interference) can hinder the DAC quite significantly in its work. For USB we offer excellent audiophile PCIe cards with their own clean power supply and reclocking.

There are also PCIe cards for I2S connections.

Consequences of interferences can be dropouts, quiet crackling like from records, a harsh sharp sound and a narrow spatial representation in the music.

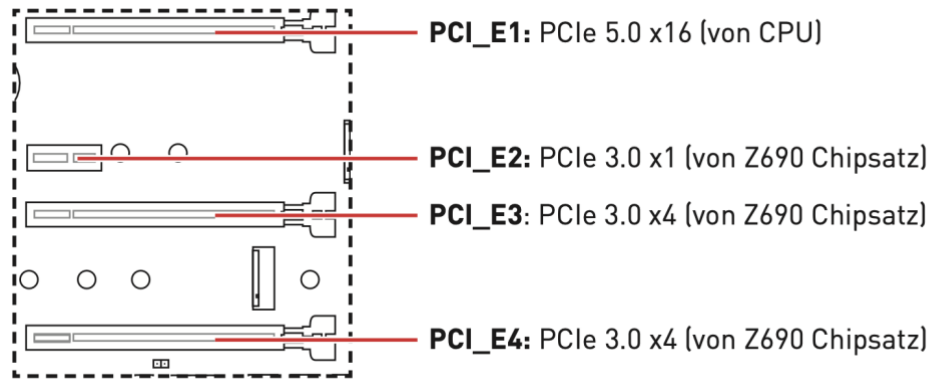
High-quality audiophile PCIe cards provide an analog-like room-filling performance without digital sharpening.

When changing or installing PCIe cards, make sure that they are well grounded. If you don't have a grounding cable at hand, ground yourself for example at a bare



metal of the heater. The fis Audio PC must be completely de-energized by unplugging it first. Make sure that the interface "clicks" into place. Do not use force if something is stuck, but make sure you have a good light to detect a problem. It helps to loosen the screw connection of the back plate to the case.

The motherboard supports 4 PCIe cards.

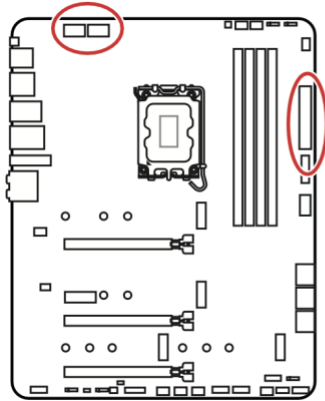


ATX POWER

Every PC requires direct current (DC). From 230V alternating current (AC), 19V direct current (DC) is usually generated in the first stage. In the second stage, the motherboard is supplied with 3.3V, 5V and 12V from these 19V according to the ATX standard. For a high performance audio PC, the current is an important criterion at first. The voltage must be kept stable. And last but not least, the ripple noise should have low values. The best power supply with lowest noise values is achieved by linear power supplies.



The motherboard has two CPU power connectors with 12V. So that the system can boot, at least one 8 pin Molex connector must be connected to CPU_PWR1.



CPU_PWR1-2			
8	5	4	1
1	Ground	5	+12V
2	Ground	6	+12V
3	Ground	7	+12V
4	Ground	8	+12V

The motherboard as such needs the power supply via a 24 pin Molex connector on ATX_PWR1.

ATX_PWR1			
12	24	1	13
1	+3,3V	13	+3,3V
2	+3,3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS-ON#
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	PWR OK	20	Res
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3,3V	24	Ground

Attention. Please ensure a good contact of all connectors. For the Molex connectors, the bracket must snap into place. Avoid stressing the cables by pulling and use the strain relief if available. We do not assume any liability for loosening of the connectors due to improper fastening or forces acting on the cables from outside. Loose cable connections can lead to short circuits and permanently damage the motherboard.



SOFTWARE

The configuration of the software is crucial to get the maximum sound quality (SQ) out of the hardware. We optimize everything for highest efficiency in combination with low power consumption and latency minimized settings.

Other than that, you control the software. You can rework or reinstall everything, because it is and remains a computer. Please keep in mind that we can't support self-installed software. Updates are provided by the manufacturers of the software.

BIOS

BIOS stands for "basic input/output system" and is the firmware on the motherboard. It is stored in a non-volatile memory on the motherboard of the PC and is executed immediately after it is switched on. This basic system is independent of the operating system and controls basic functions such as the computing power of the CPU, the memory capacity of the main memory (RAM), boot processes and sometimes even the latency behavior of PCIe cards. Components that are not needed can and should be turned off to reduce disturbances.

The settings in the BIOS are very extensive and can lead to the destruction of the hardware. Please be careful and always make a backup with the last working configuration on USB stick. In the delivery state, we have already done the BIOS update and settings for you. Therefore, we only describe the most important settings below.

BIOS CONFIGURATION FOR LOW POWER AND HIGH POWER

We basically distinguish between a configuration that is aimed at low performance and more noise-free (Low Power) or the highest performance with the lowest latencies (High Power).

With Low Power we lower the CPU clock rates below the base clock or overclock the CPU with High Power. The settings depend on your target image.

We also optimize the BIOS, among other things, as follows:

- Load XMP profile for RAM

This enables the optimal setting according to the manufacturer's XMP profile.

- Hyper-Threading

At Low Power we deactivate Hyper-Threading, at High Power we activate Hyper-Threading. This allows the computing load to be distributed better. The computing power of the cores is not doubled by this. However, twice as many calculations can take place at the same time due to the parallelization. This



significantly reduces latencies. Solarflare, the manufacturer of PCIe cards for Ethernet, advertises its low latencies and explicitly recommends Hyper-Threading.

- Undervolting

One of the main problems, especially with a passively cooled system, is temperature development. With the simple formula voltage in V x current in A = power in W, the adjusting screws are given. By reducing the voltage, the power and thus excessive temperature development can be avoided. However, if the voltage is set too low, this will cause the system to freeze. We use our many years of experience to ensure that this does not happen.

- Limits for power and temperature

To avoid exceeding certain values we set a LDP (Long Duration Power) limit for the permanent power consumption and a SDP (Short Duration Power) limit for the short term power consumption. We also set a temperature limit CPU OTP (Over Temperature Protection) for the CPU.

- Disable unneeded functions

Basically, all unneeded functions of the board should be disabled. This saves power and increases the trouble-free operation. We prefer M.2 SSDs in any case and therefore don't need the SATA controller. The SATA controller is considered quite loud in terms of electronic noise. We disable other possibly sound-disturbing features, such as WLAN, Bluetooth and the audio controller..

- Disable LED lighting

Illumination of the PCB looks nice, especially if you use our acrylic lid. Unfortunately, it can have negative sonic effects if the LEDs draw power from the motherboard. Therefore we disable the LEDs.

CALLING UP THE BIOS MENU

You can only use the BIOS menu with keyboard and screen. A mouse is not necessary but may be more intuitive. When you have everything connected, press the power button on the fis Audio PC and start clicking the DEL key in short intervals.

When the BIOS menu appears, it is best to switch to Advanced mode by pressing the F7 key.

FUNCTION KEYS

F1: General help

F2: Add/Remove a favorite item



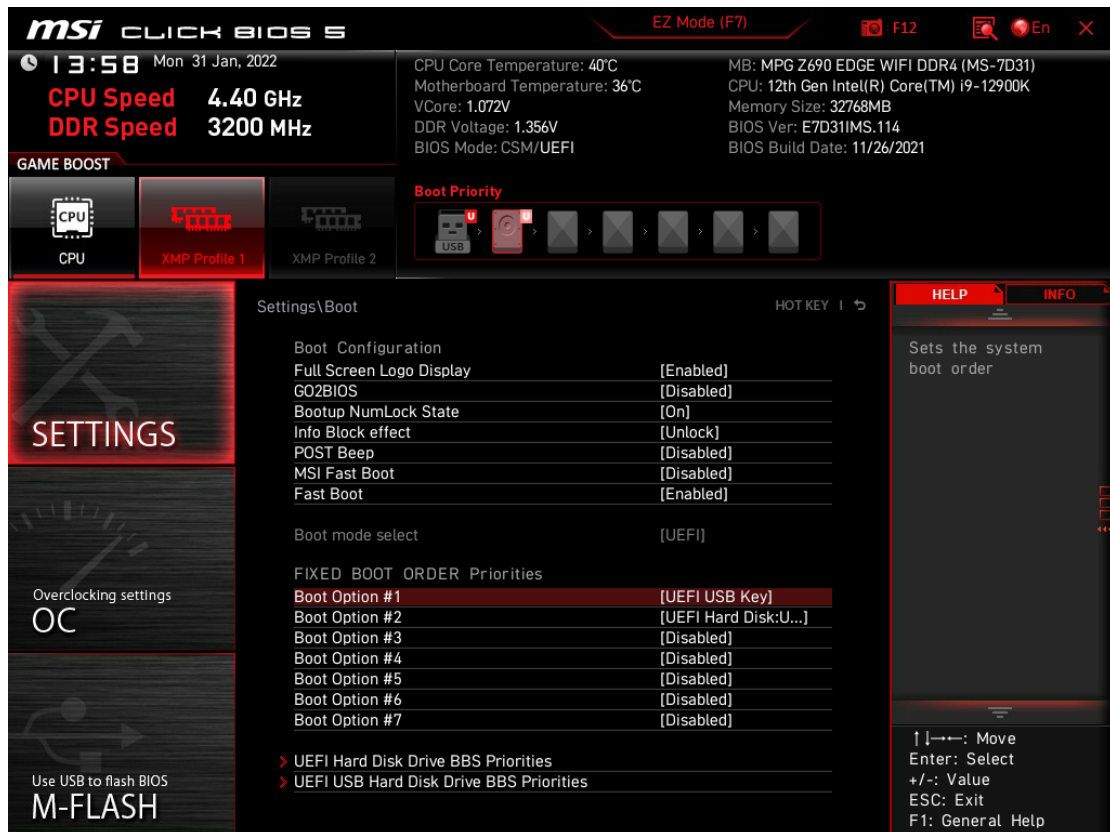
- F3: Open the Favorites menu
- F4: Open the CPU specifications menu
- F5: Open the Memory-Z menu
- F6: Load the original setup defaults
- F7: Switches between Advanced Mode and EZ Mode
- F8: OC profile is loaded from USB stick
- F9: OC profile is saved to USB stick
- F10: Saves or resets the changes
- F12: Takes a screenshot and saves it to a FAT/FAT32 USB drive.
- Ctrl+F: Opens the search page

CHANGE BOOT ORDER

Some audiophile players include the operating system and can be started directly from a USB stick. For example, Euphony or the HQPlayer OS. For this, the boot order has to be changed. These settings can be found under Settings/Boot.

Via UEFI USB Hard Disk Drive BBS Priorities you assign the bootable image. The USB stick has to be inserted into the rear I/O panel before booting. It is best to use a stick with USB C for this. Please note that the image is compatible with UEFI (Unified Extensible Firmware Interface).

Finish the input with the keys F10 and Enter. The fis Audio PC reboots and loads the desired operating system.



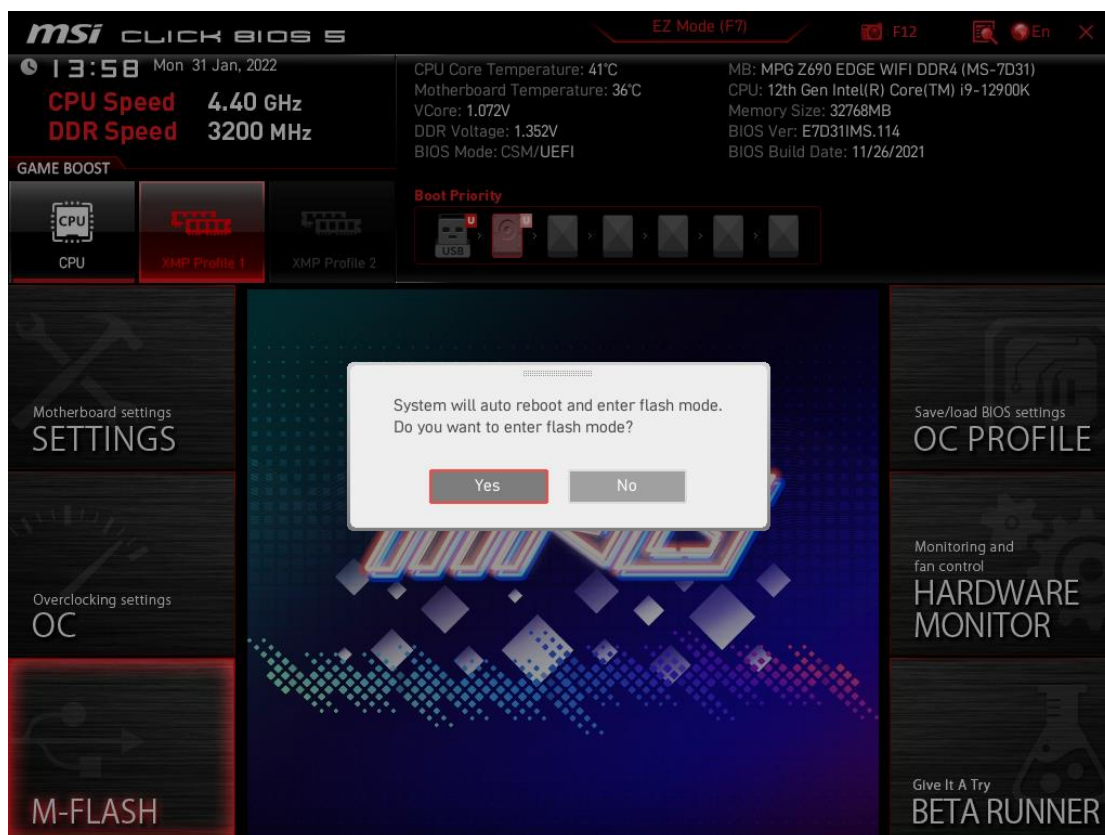
BIOS UPDATE

Never change a running system is especially true for BIOS updates. You should only do this if it is useful for you. Flashing is still quite simple. Unfortunately, all settings are discarded. In the best case, you can restore the settings via the BIOS profile. In the worst case, so much has changed that the old BIOS profile is no longer accepted.

Download the latest BIOS version from the official MSI website. Save the BIOS file on a USB stick. For better performance, it is best to use a USB C memory stick. Insert the USB stick into a free USB port at the back of the I/O panel before booting.

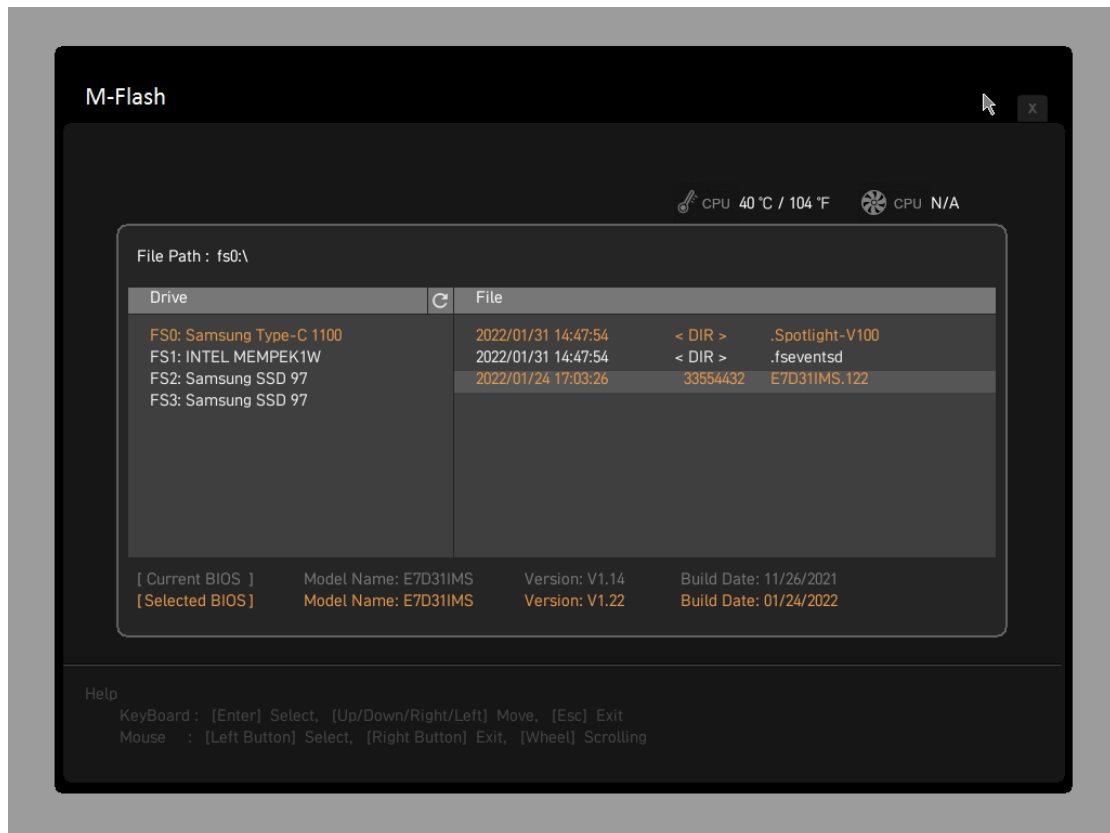


When the BIOS menu appears in advanced mode, click on M-FLASH. Confirm the flash mode with Yes.





After rebooting, the menu for selecting the BIOS file appears. Search for the flash file and confirm the selection with Enter.



It takes a while until the BIOS is reflashed. You will see a progress bar. The system automatically boots to a virgin state. To restore the ideal settings, load the BIOS profile as described in the next chapter.



OPERATING SYSTEM

While the BIOS represents the machine-level program, the operating system is geared towards the user. Typical operating systems are Linux, macOS or Windows. Only Linux or Windows can be installed for the fis Audio PC. These operating systems must first be optimized for music playback. There are also music players that come with their own optimized operating system, such as Roon-ROCK, HQPlayer Embedded Image or EUPHONY.

For certain programs we offer an installation of the operating system and perform (as far as possible) some optimizations to minimize latency. In addition, we take care of an automatic start of the player, which you operate by remote control, for example via a smartphone or tablet computer. We want you to listen to music and not bother with a software implementation. If drivers are needed, we always install the latest ones.

PLAYER

There are many applications for music playback. You have the free choice. As far as they are known to us, we provide a basic configuration and an automatic start when booting the fis Audio PC.

SOFTWARE UPDATES

The updates from hardware or software manufacturers often optimize the running operation and add new functions. However, functions may also be taken away or incompatibilities may occur.

Since the fis Audio PC uses commercially available components, the risk of deterioration due to software updates is low and the chance for improvements is high. Nevertheless we cannot give any liability for working updates, because they are out of our control.

Uncritical and for sound enhancing we consider basically the updates of the player software like for example Roon, Euphony or the HQPlayer.



SUPPORT

As a purchaser of the fis Audio PC, we are available to answer your questions and provide assistance. We can best help you if you describe the exact use case that you want to set up or that is causing problems. Often screenshots help.

The best way to contact us is by e-mail: info@griggaudio.de.

We usually respond to your request within 24 hours.

Address:

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Inh. Ronny Gabriel Grigg
Alexander-Fahrenheit-Weg 2, 18147 Rostock
Germany

LINKS

Below you will find links for information and self-help.

Hardware

Motherboard MSI MPG-Z690-EDGE-WIFI-DDR4

<https://www.msi.com/Motherboard/MPG-Z690-EDGE-WIFI-DDR4/support>

Treiber- und Software-Downloads für Xilinx Solarflare-Adapter

<https://support.solarflare.com/wp/drivers>

Software

Windows-Hilfe und -Learning

<https://support.microsoft.com/de-de/windows>

HQPlayer 4 Embedded

<https://www.signalyst.com/custom.html>

Euphony support

<https://euphony-audio.com/hesk/>