MSI MPG Z490 CARBON EK X

MSI MPG Z490 CARBON EK X Gaming Motherboard User Manual

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of your MSI MPG Z490 CARBON EK X Gaming Motherboard. Designed for 10th Gen Intel Core / Pentium Celeron processors with an LGA 1200 socket, this motherboard features an integrated EK custom-designed monoblock for CPU and VRM water cooling, DDR4 memory support up to 5000(OC) MHz, and advanced connectivity options including Lightning Gen 4 Solution readiness and 2.5G LAN with Wi-Fi 6.



Figure 1.1: MSI MPG Z490 CARBON EK X Motherboard, box, and included accessories.

2. Setup and Installation

Careful installation is crucial for optimal performance and system stability. Follow these steps to set up your motherboard.

2.1. Component Overview



Figure 2.1: Top-down view of the MSI MPG Z490 CARBON EK X Motherboard, highlighting the integrated EK monoblock and M.2 Shield Frozr.

2.2. Processor Installation

1. Ensure the CPU socket (LGA 1200) lever is open.
2. Carefully align the notches on your 10th Gen Intel Core / Pentium Celeron processor with the socket.

3. Gently place the CPU into the socket without forcing it.
4. Close the socket lever to secure the CPU.

2.3. Memory (RAM) Installation

The motherboard supports DDR4 memory up to 5000(OC) MHz. Refer to the motherboard's manual for specific memory slot population guidelines for dual-channel operation.

1. Open the clips on the DDR4 memory slots.
2. Align the memory module's notch with the key in the DIMM slot.
3. Press down firmly on both ends of the memory module until the clips snap into place.

2.4. Storage Device Installation (M.2 SSDs)

This motherboard features Dual M.2 Slots with M.2 Shield Frozr for optimal thermal management.

1. Locate the M.2 slots on the motherboard.
2. Remove the M.2 Shield Frozr heatsink if present.
3. Insert the M.2 SSD into the slot at an angle.
4. Gently push down the SSD and secure it with the provided screw or retention mechanism.
5. Reattach the M.2 Shield Frozr heatsink for cooling.

2.5. Water Cooling System Setup

The MPG Z490 CARBON EK X features a pre-installed EK custom-designed monoblock for integrated CPU and VRM water cooling. This requires connection to a custom liquid cooling loop.

1. Connect your liquid cooling loop's tubing to the inlet and outlet ports on the EK monoblock. Ensure all fittings are securely tightened.
2. Fill your liquid cooling system with appropriate coolant.
3. Perform a leak test using the included EK Leak Tester or a similar tool before powering on the system.

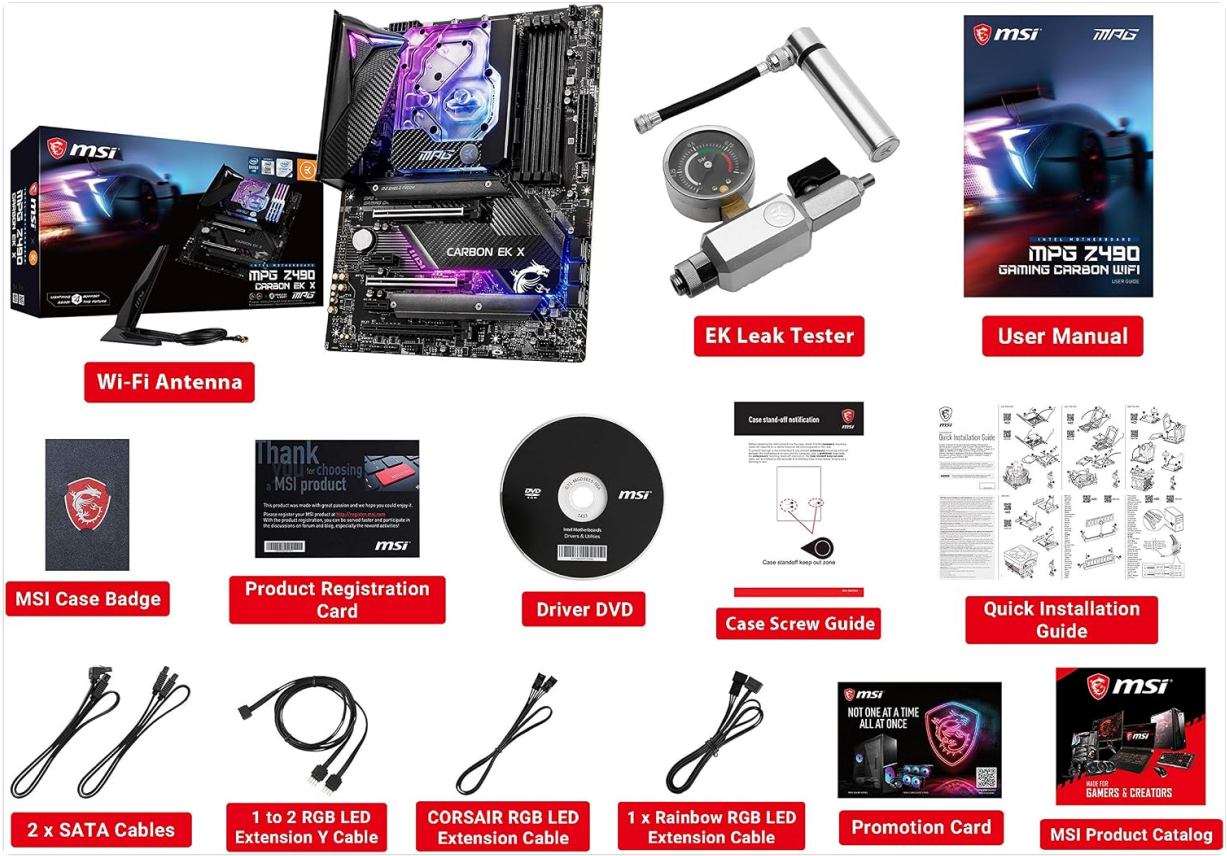


Figure 2.2: Included accessories, featuring the EK Leak Tester for verifying loop integrity.

2.6. Rear I/O Panel Connections

Connect your peripherals to the appropriate ports on the rear I/O panel.

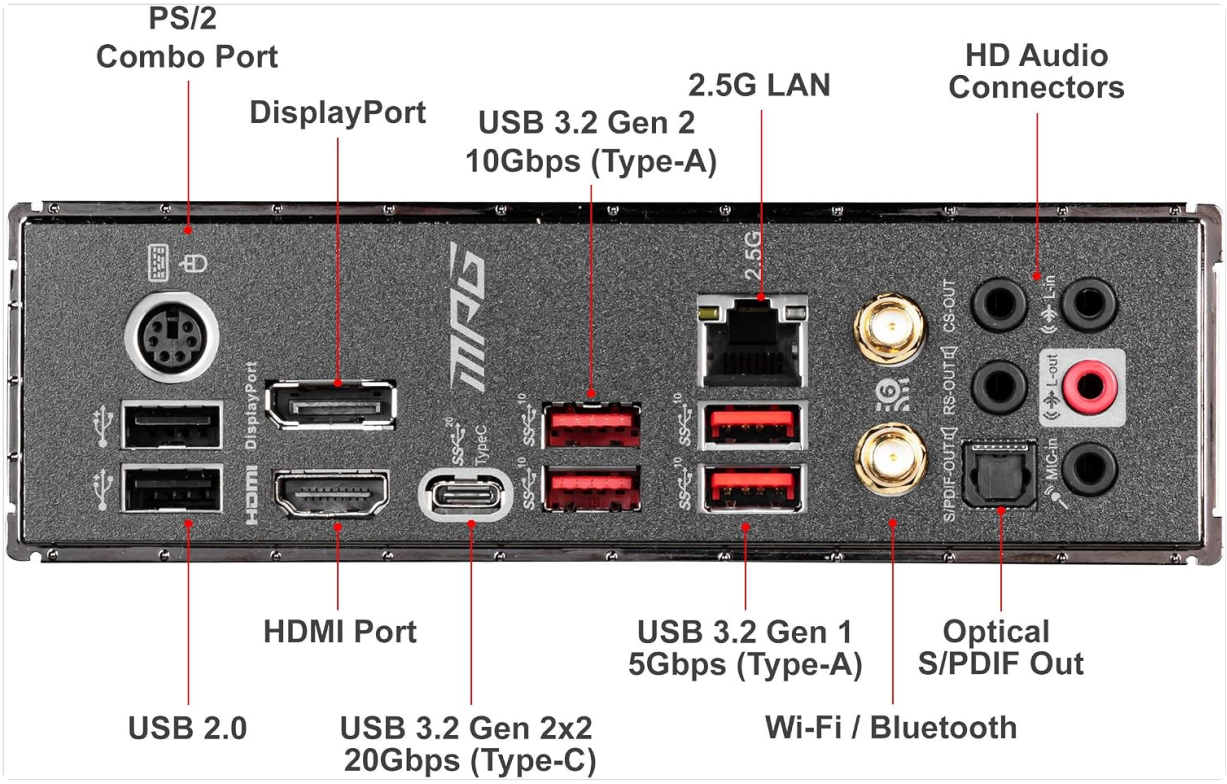


Figure 2.3: Detailed view of the Rear I/O Panel, showing various ports including USB 3.2 Gen 2, 2.5G LAN, DisplayPort, and HDMI.

- **PS/2 Combo Port:** For legacy keyboard or mouse.
- **USB 2.0 Ports:** For general USB devices.

- **DisplayPort & HDMI Port:** For video output (requires integrated graphics on CPU).
- **USB 3.2 Gen 2 10Gbps (Type-A) & USB 3.2 Gen 1 5Gbps (Type-A) Ports:**For high-speed USB devices.
- **USB 3.2 Gen 2x2 20Gbps (Type-C) Port:** For ultra-high-speed Type-C devices.
- **2.5G LAN Port:** For high-speed wired network connection.
- **Wi-Fi** / **Bluetooth Antenna Connectors:** Attach the included Wi-Fi antenna for wireless connectivity.
- **HD Audio Connectors & Optical S/PDIF Out:** For audio input/output.

3. Operating Instructions

Once your system is assembled, you can proceed with operating it.

3.1. Initial Boot and BIOS/UEFI Setup

1. Power on your system.
2. Press the **DEL** key during startup to enter the BIOS/UEFI setup utility.
3. Configure boot order, system time, and other essential settings.
4. Save changes and exit BIOS/UEFI to boot into your operating system installer.

3.2. Mystic Light RGB Control

The motherboard supports Mystic Light with 16.8 million colors and 29 effects. You can control these lighting effects via the MSI Dragon Center software in your operating system.



Figure 3.1: The motherboard showcasing its Mystic Light RGB capabilities.

3.3. Overclocking

The MPG Z490 CARBON EK X is designed for enthusiasts, supporting DDR4 memory overclocking up to 5000+ MHz and CPU overclocking. Adjust these settings within the BIOS/UEFI for enhanced performance. Exercise caution and consult advanced guides when overclocking.

3.4. Network Connectivity

Utilize the integrated 2.5G LAN for high-speed wired internet or the Wi-Fi 6 module for fast and reliable wireless connections. Ensure the Wi-Fi antenna is properly connected for optimal wireless performance.

4. Maintenance

Regular maintenance helps ensure the longevity and stable operation of your motherboard.

4.1. Cleaning

- Periodically clean dust from the motherboard and surrounding components using compressed air.
- Ensure the system is powered off and unplugged before cleaning.

4.2. Water Cooling Loop Maintenance

For the integrated EK monoblock, regular inspection and maintenance of your custom liquid cooling loop are essential.

- Check coolant levels and clarity regularly. Replace coolant as recommended by the manufacturer (typically every 6-12 months).
- Inspect tubing and fittings for any signs of leaks or degradation.
- Clean radiators and fans to maintain optimal heat dissipation.

4.3. BIOS/UEFI Updates

MSI periodically releases BIOS/UEFI updates to improve compatibility, stability, and performance. Visit the official MSI website for the latest updates and instructions on how to perform a BIOS flash.

5. Troubleshooting

This section addresses common issues you might encounter.

5.1. No Power / No Boot

- Verify all power cables (24-pin ATX, 8-pin CPU) are securely connected to the motherboard and power supply.
- Ensure the power supply is switched on.
- Check front panel power button connections to the motherboard.

5.2. No Display Output

- Confirm your monitor is connected to the correct video output port (either on your dedicated graphics card or the motherboard's integrated graphics ports if your CPU supports it).
- Reseat your graphics card and memory modules.
- If using integrated graphics, ensure your CPU has integrated graphics capabilities.

5.3. System Instability / Crashes

- Check CPU and GPU temperatures. Overheating can cause instability.
- Ensure RAM is properly seated and compatible. Test with one RAM stick at a time.
- If overclocking, revert to default settings to check for stability.
- Verify liquid cooling loop integrity and check for leaks, especially with the integrated monoblock.

5.4. Diagnostic LEDs

The motherboard may feature diagnostic LEDs (EZ Debug LED) that light up to indicate the status of key

components (CPU, DRAM, VGA, BOOT) during startup. Consult the full motherboard manual for specific LED codes and their meanings.

6. Specifications

Key technical specifications for the MSI MPG Z490 CARBON EK X Gaming Motherboard.

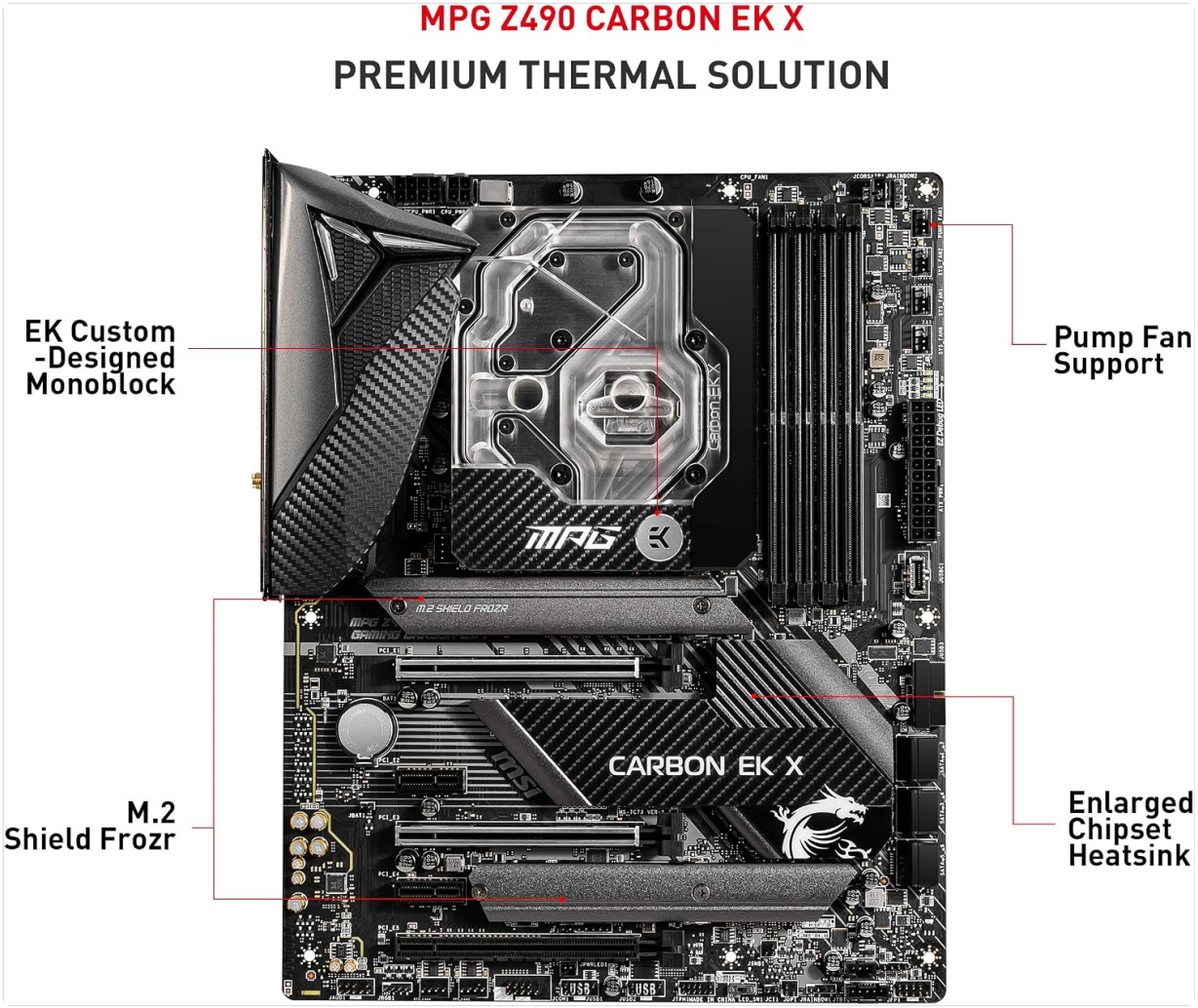


Figure 6.1: Premium Thermal Solution features, including the EK Custom-Designed Monoblock and M.2 Shield Frozr.

Feature	Specification
Brand	MSI
Model Name	MPG Z490 CARBON EK X
CPU Socket	LGA 1200
Compatible Processors	10th Gen Intel Core / Pentium Celeron
RAM Memory Technology	DDR4
Memory Speed	Up to 5000(OC) MHz
Chipset Type	Intel Z490
Storage Interface	Dual M.2 Slots, SATA 6Gb/s

Networking	2.5G LAN, Wi-Fi 6
USB Ports	USB 3.2 Gen 2x2 Type-C, USB 3.2 Gen 2 Type-A, USB 3.2 Gen 1 Type-A, USB 2.0
Video Output	DisplayPort, HDMI
Dimensions (LxWxH)	12 x 9.6 x 1.5 inches (ATX Form Factor)
Weight	6.69 pounds

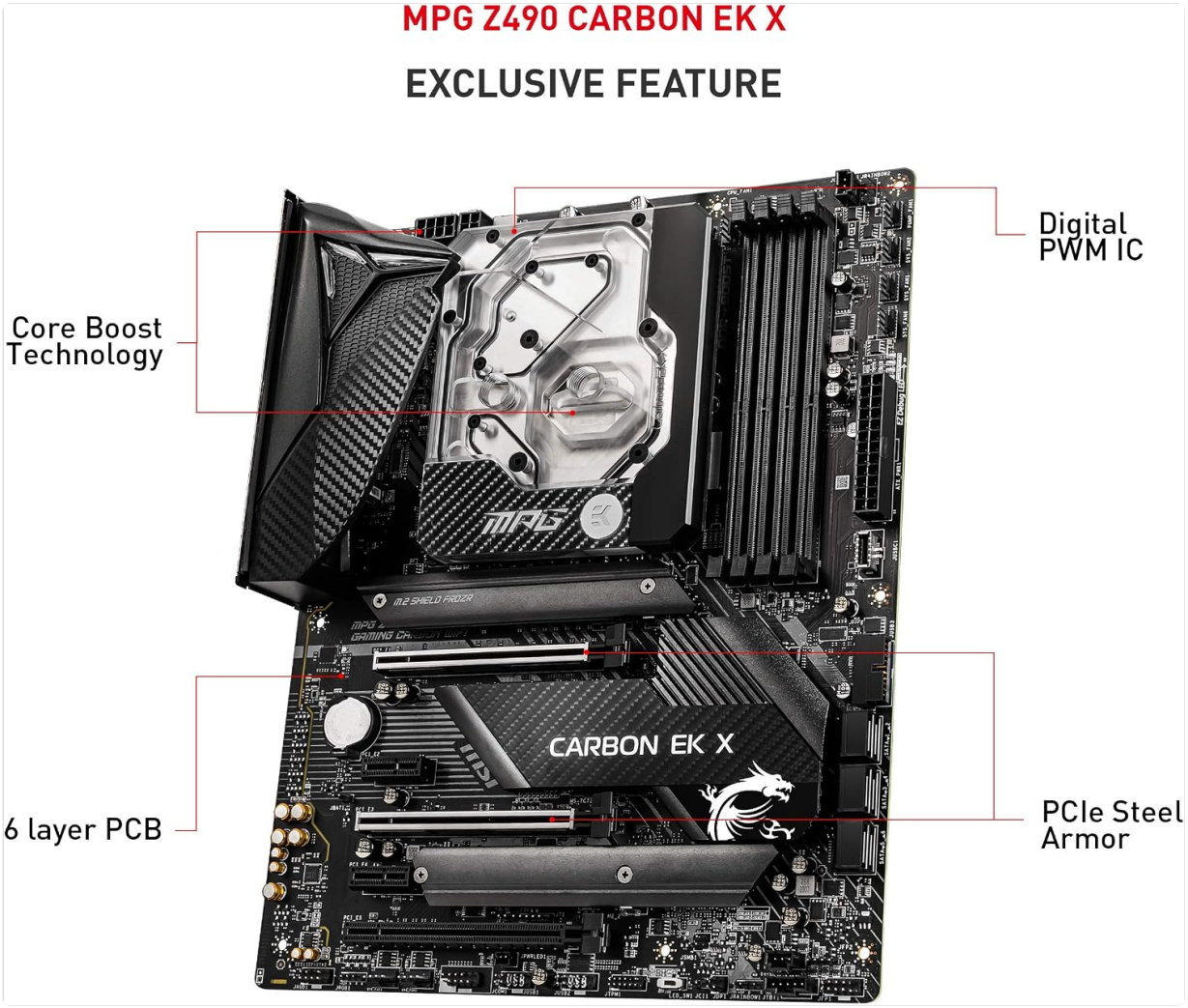


Figure 6.2: Exclusive features such as Core Boost Technology and PCIe Steel Armor.

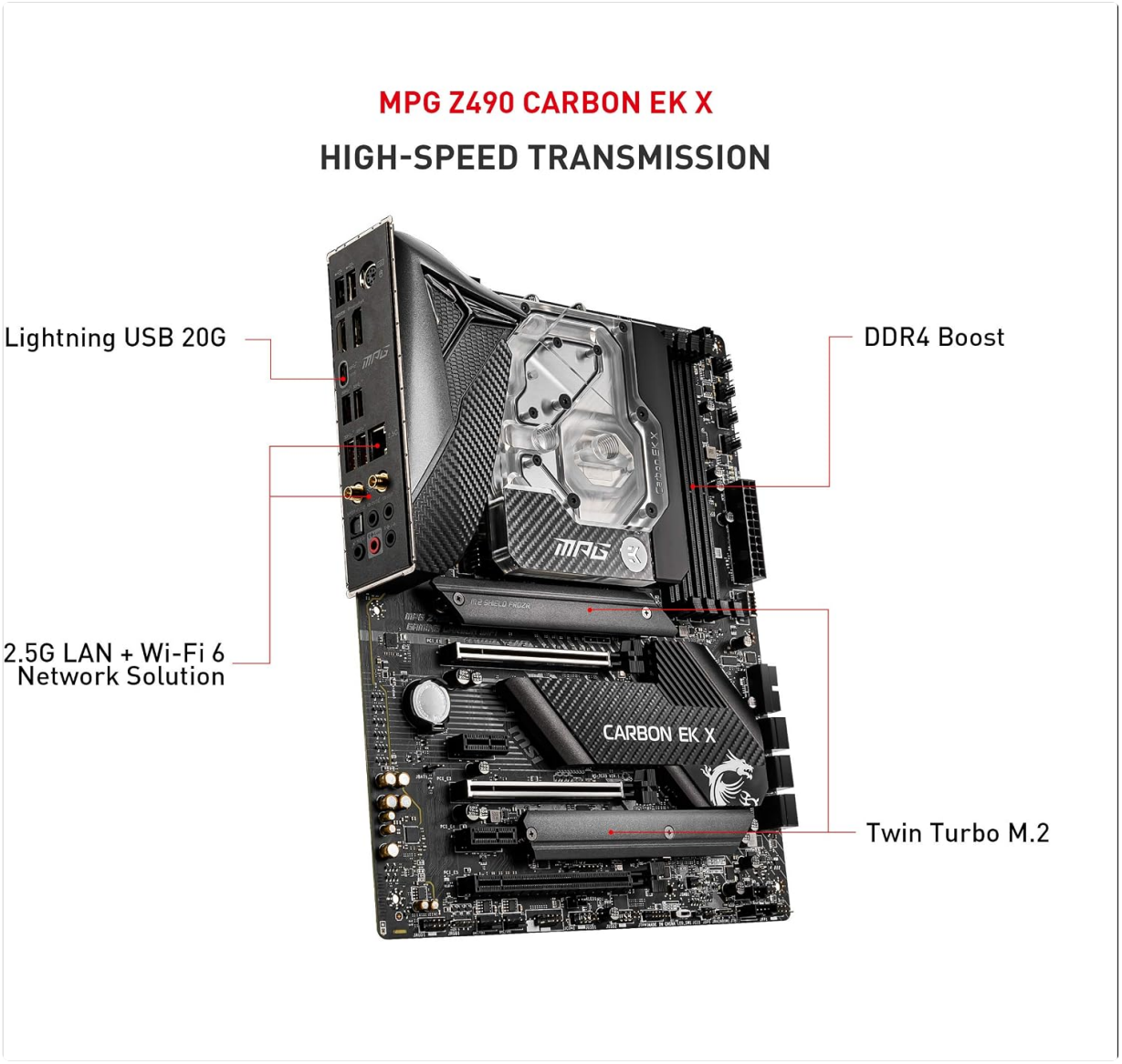


Figure 6.3: High-speed transmission features including Lightning USB 20G and Twin Turbo M.2.

7. Warranty Information

MSI products are covered by a limited warranty. The specific terms and duration of the warranty may vary by region and product. Please retain your proof of purchase for warranty claims.
For detailed warranty information, including coverage, limitations, and the claims process, please visit the official MSI website or contact MSI customer support in your region.

8. Support

For further assistance, technical support, driver downloads, and BIOS updates, please refer to the official MSI support resources.

- **MSI Official Website:** www.msi.com
- **Product Support Page:** Navigate to the support section on the MSI website and search for 'MPG Z490 CARBON EK X' to find drivers, manuals, and FAQs.
- **Customer Service:** Contact MSI customer service for direct assistance with product issues or inquiries.

9. Product Overview Video

Watch this official product overview for a visual guide to the MSI MPG Z490 CARBON EK X Motherboard.

Video 9.1: Official Product Overview of the MSI MPG Z490 CARBON EK X Motherboard, detailing its features and design.