ASRock Z790 PRO RS

ASRock Z790 Pro RS Motherboard User Manual

Intel Z790 Series CPU (LGA1700) DDR5 Memory Compatible ATX Motherboard

1. Introduction

This manual provides detailed instructions for the installation, operation, maintenance, and troubleshooting of your ASRock Z790 Pro RS motherboard. The ASRock Z790 Pro RS is an ATX motherboard designed to support 13th and 12th Gen Intel Core Processors, featuring DDR5 memory compatibility and a robust 14+1+1 phase power design with Dr.MOS for VCore+GT. It includes multiple PCIe 5.0 and 4.0 slots, M.2 sockets, and comprehensive connectivity options.
For optimal performance and stability, please read this manual thoroughly before proceeding with installation or configuration.

2. Setup and Installation

2.1. Package Contents

Verify that your package contains the ASRock Z790 Pro RS motherboard and essential accessories. Missing items should be reported to your vendor.

2.2. Motherboard Layout

Familiarize yourself with the motherboard's components and connectors.



Figure 1: An overhead view of the ASRock Z790 Pro RS motherboard, showcasing its layout, heatsinks, and various slots.

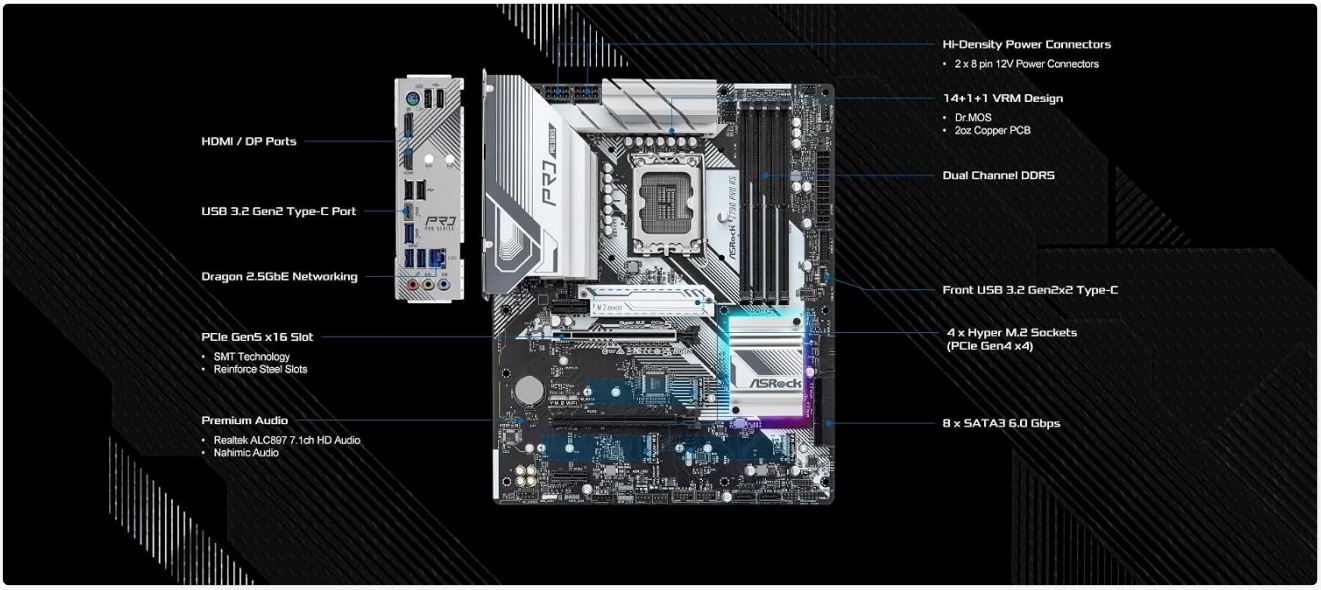


Figure 2: A detailed diagram highlighting key components and ports on the ASRock Z790 Pro RS motherboard, including power connectors, VRM design, DDR5 slots, PCIe slots, M.2 sockets, SATA ports, and rear I/O.

2.3. Physical Installation Steps

1. **Prepare the Case:** Ensure your computer case supports the ATX form factor. Install standoffs in the appropriate locations.
2. **Install the CPU:** Carefully open the CPU socket lever. Align the CPU with the socket, ensuring the gold triangle on the CPU matches the triangle on the socket. Gently place the CPU into the socket without force. Close the lever to secure the CPU.
3. **Install the CPU Cooler:** Follow the cooler manufacturer's instructions to install the CPU cooler. Connect the CPU fan cable to the designated header on the motherboard.
4. **Install DDR5 Memory:** Open the clips on the DDR5 DIMM slots. Align the memory modules with the slots, ensuring the notch on the module matches the key in the slot. Press down firmly on both ends until the clips snap into place. For dual-channel operation, refer to the motherboard manual for recommended slot population.
5. **Mount the Motherboard:** Carefully place the motherboard into the case, aligning the screw holes with the standoffs. Secure the motherboard with screws.
6. **Install M.2 SSDs:** Locate the Hyper M.2 sockets. Remove the M.2 heatsink/screw. Insert the M.2 SSD into the slot at an angle, then gently push it down and secure it with the provided screw or standoff. Reattach the heatsink if applicable.
7. **Install PCIe Expansion Cards:** Insert graphics cards or other PCIe cards into the appropriate PCIe slots (e.g., PCIe 5.0 x16 for graphics). Secure them with the case's retention mechanism.
8. **Connect Power Cables:** Connect the 24-pin ATX power connector and the 8-pin + 8-pin 12V CPU power connectors from your power supply to the motherboard.
9. **Connect Storage Devices:** Connect SATA data cables from your storage drives to the SATA3 ports on the motherboard. Connect SATA power cables from your power supply to the drives.
10. **Connect Front Panel Cables:** Connect the power button, reset button, HDD LED, power LED, and front panel USB/audio headers to their respective pins on the motherboard. Refer to the motherboard's detailed manual for pin assignments.

3. Operating Instructions

3.1. Initial Boot and BIOS/UEFI Setup

Upon first power-on, the system will typically enter the BIOS/UEFI setup utility. Press the designated key (usually **Del** or **F2**) during startup to access the BIOS/UEFI.

- **System Information:** Verify CPU, memory, and storage device detection.
- **Boot Order:** Configure the boot order to prioritize your operating system drive.
- **XMP Profile:** Enable the Extreme Memory Profile (XMP) for your DDR5 memory to achieve advertised speeds (e.g., 6800+(OC)).
- **Save and Exit:** Save your changes and exit the BIOS/UEFI to boot into your operating system installer.

3.2. Driver Installation

After installing your operating system, install the necessary drivers for the motherboard's components. These typically include chipset drivers, LAN drivers, audio drivers, and any specific utility drivers. Drivers can usually be found on the ASRock support website for your specific motherboard model.

4. Maintenance

4.1. Cleaning

Regularly clean your computer's interior to prevent dust buildup, which can lead to overheating and component failure. Use compressed air to remove dust from fans, heatsinks, and other components. Ensure the system is powered off and unplugged before cleaning.

4.2. BIOS Updates

BIOS updates can provide improved compatibility, stability, and new features. Visit the ASRock support website for the latest BIOS versions and update instructions. Note that the ASRock Z790 Pro RS motherboard does not feature a dedicated BIOS Flashback button, meaning a compatible CPU (typically a 12th Gen Intel Core processor) is required to boot and update the BIOS if your current CPU (e.g., 13th Gen) is not supported by the installed BIOS version.

4.3. CMOS Battery

The motherboard uses a CR2032 coin cell battery to retain BIOS settings and the system clock when the computer is powered off. If you experience issues with incorrect time or lost BIOS settings, the battery may need replacement.

5. Troubleshooting

This section addresses common issues you might encounter.

5.1. No Power / No Boot

- Ensure all power cables (24-pin ATX, 8-pin + 8-pin CPU) are securely connected.
- Verify the power supply is switched on and functioning correctly.
- Check front panel connections, especially the power button header.
- Try booting with minimal components (CPU, one RAM stick, GPU if no integrated graphics) to isolate the issue.

5.2. No Display Output

- Ensure your monitor is connected to the correct display output (either motherboard's HDMI/DisplayPort for integrated graphics or dedicated graphics card).
- Reseat the graphics card and ensure its power connectors are attached.
- If using a 13th Gen Intel CPU, ensure the BIOS is updated to a version that supports it. Older BIOS versions may not recognize newer CPUs, preventing boot.
- Verify that your CPU has integrated graphics if you are not using a discrete graphics card.

5.3. Memory (RAM) Issues

- Ensure DDR5 memory modules are fully seated in their slots.
- Try booting with only one memory stick installed, testing each stick individually in different slots.
- Check the ASRock website for the Qualified Vendor List (QVL) to ensure your memory is compatible.

5.4. CPU Compatibility

The ASRock Z790 Pro RS supports 13th Gen and 12th Gen Intel Core Processors. It is crucial to ensure your CPU is compatible with the motherboard's BIOS version. If you are using a 13th Gen CPU and experience boot issues, an older BIOS version might be installed. As this motherboard lacks a BIOS Flashback feature, you may need a 12th Gen CPU to update the BIOS before installing a 13th Gen CPU.

CPU Support List

1. CPU performance may be limited due to system configuration. A top down CPU cooler is recommended.
2. Some CPUs do not have integrated graphics. A PCIe graphics card must be added for output.

Socket	Family	Number	Core	Frequency	Cache	Power	Validated BIOS	Bootable since BIOS
1700	Core i9	i9-14900T(B0)	Raptor Lake-S Refresh	1.1GHz	36MB	35W	9.07	8.02
1700	Core i9	i9-14900KS(B0)	Raptor Lake-S Refresh	3.2GHz	36MB	150W	10.05	8.02
1700	Core i9	i9-14900KF(B0)	Raptor Lake-S Refresh	3.2GHz	36MB	125W	9.07	8.02
1700	Core i9	i9-14900K(B0)	Raptor Lake-S Refresh	3.2GHz	36MB	125W	9.07	8.02
1700	Core i9	i9-14900F(B0)	Raptor Lake-S Refresh	2.0GHz	36MB	65W	9.07	8.02
1700	Core i9	i9-14900(B0)	Raptor Lake-S Refresh	2.0GHz	36MB	65W	9.07	8.02
1700	Core i7	i7-14790F(B0)	Raptor Lake-S Refresh	2.1GHz	36MB	65W	9.07	8.02
1700	Core i7	i7-14700T(B0)	Raptor Lake-S Refresh	1.3GHz	33MB	35W	9.07	8.02
1700	Core i7	i7-14700KF(B0)	Raptor Lake-S Refresh	3.4GHz	33MB	125W	9.07	8.02
1700	Core i7	i7-14700K(B0)	Raptor Lake-S Refresh	3.4GHz	33MB	125W	9.07	8.02
1700	Core i7	i7-14700F(B0)	Raptor Lake-S Refresh	2.1GHz	33MB	65W	9.07	8.02
1700	Core i7	i7-14700(B0)	Raptor Lake-S Refresh	2.1GHz	33MB	65W	9.07	8.02
1700	Core i5	i5-14600T(B0)	Raptor Lake-S Refresh	1.8GHz	24MB	35W	9.07	8.02
1700	Core i5	i5-14600KF(B0)	Raptor Lake-S Refresh	3.5GHz	24MB	125W	9.07	8.02
1700	Core i5	i5-14600K(B0)	Raptor Lake-S Refresh	3.5GHz	24MB	125W	9.07	8.02
1700	Core i5	i5-14600(B0)	Raptor Lake-S Refresh	2.7GHz	24MB	65W	9.07	8.02
1700	Core i5	i5-14500T(B0)	Raptor Lake-S Refresh	1.7GHz	24MB	35W	9.07	8.02
1700	Core i5	i5-14500(C0)	Raptor Lake-S Refresh	2.6GHz	24MB	65W	9.07	8.02
1700	Core i5	i5-14490F(C0)	Raptor Lake-S Refresh	2.8GHz	24MB	65W	9.07	8.02
1700	Core i5	i5-14400T(C0)	Raptor Lake-S Refresh	1.5G	20MB	35W	9.07	8.02
1700	Core i5	i5-14400F(C0)	Raptor Lake-S Refresh	2.5GHz	20MB	65W	9.07	8.02
1700	Core i5	i5-14400F(B0)	Raptor Lake-S Refresh	2.5GHz	20MB	65W	9.07	8.02
1700	Core i5	i5-14400(C0)	Raptor Lake-S Refresh	2.5GHz	20MB	65W	9.07	8.02
1700	Core i5	i5-14400(B0)	Raptor Lake-S Refresh	2.5GHz	20MB	65W	9.07	8.02
1700	Core i3	i3-14100T(H0)	Raptor Lake-S Refresh	2.7GHz	12MB	35W	9.07	8.02
1700	Core i3	i3-14100F(H0)	Raptor Lake-S Refresh	3.5GHz	12MB	58W	9.07	8.02
1700	Core i3	i3-14100(H0)	Raptor Lake-S Refresh	3.5GHz	12MB	60W	9.07	8.02
1700		300T(H0)	Raptor Lake-S Refresh	3.4GHz	6MB	35W	9.07	8.02
1700		300(H0)	Raptor Lake-S Refresh	3.9GHz	6MB	46W	9.07	8.02
1700	Core i9	i9-13900T(B0)	Raptor Lake-S	1.1GHz	36MB	35W	2.02	All
1700	Core i9	i9-13900KS(B0)	Raptor Lake-S	3.2GHz	36MB	150W	4.14	All
1700	Core i9	i9-13900KF(B0)	Raptor Lake-S	3GHz	36MB	125W	2.02	All
1700	Core i9	i9-13900K(B0)	Raptor Lake-S	3GHz	36MB	125W	2.02	All
1700	Core i9	i9-13900F(B0)	Raptor Lake-S	2GHz	36MB	65W	2.02	All
1700	Core i9	i9-13900(B0)	Raptor Lake-S	2GHz	36MB	65W	2.02	All
1700	Core i7	i7-13790F(B0)	Raptor Lake-S	2.1GHz	33MB	65W	9.07	8.02
1700	Core i7	i7-13700T(B0)	Raptor Lake-S	1.4GHz	30MB	35W	2.02	All
1700	Core i7	i7-13700KF(B0)	Raptor Lake-S	3.4GHz	30MB	125W	2.02	All
1700	Core i7	i7-13700K(B0)	Raptor Lake-S	3.4GHz	30MB	125W	2.02	All
1700	Core i7	i7-13700F(B0)	Raptor Lake-S	2.1GHz	30MB	65W	2.02	All
1700	Core i7	i7-13700(B0)	Raptor Lake-S	2.1GHz	30MB	65W	2.02	All
1700	Core i5	i5-13600T(C0)	Raptor Lake-S	1.8GHz	24MB	35W	2.02	All
1700	Core i5	i5-13600KF(B0)	Raptor Lake-S	3.5GHz	24MB	125W	2.02	All
1700	Core i5	i5-13600K(B0)	Raptor Lake-S	3.5GHz	24MB	125W	2.02	All
1700	Core i5	i5-13600(C0)	Raptor Lake-S	2.7GHz	24MB	65W	2.02	All
1700	Core i5	i5-13500T(C0)	Raptor Lake-S	1.6GHz	24MB	35W	2.02	All
1700	Core i5	i5-13500(C0)	Raptor Lake-S	2.5GHz	24MB	65W	2.02	All
1700	Core i5	i5-13490F(C0)	Raptor Lake-S	2.5GHz	24MB	65W	9.07	8.02
1700	Core i5	i5-13400T(C0)	Raptor Lake-S	1.3GHz	20MB	35W	2.02	All
1700	Core i5	i5-13400F(C0)	Raptor Lake-S	2.5GHz	20MB	65W	2.02	All
1700	Core i5	i5-13400F(B0)	Raptor Lake-S	2.5GHz	20MB	65W	2.02	All
1700	Core i5	i5-13400(C0)	Raptor Lake-S	2.5GHz	20MB	65W	2.02	All
1700	Core i5	i5-13400(B0)	Raptor Lake-S	2.5GHz	20MB	65W	2.02	All
1700	Core i3	i3-13100T(H0)	Raptor Lake-S	2.5GHz	12MB	35W	2.02	All
1700	Core i3	i3-13100F(H0)	Raptor Lake-S	3.4GHz	12MB	58W	2.02	All
1700	Core i3	i3-13100(H0)	Raptor Lake-S	3.4GHz	12MB	60W	2.02	All
1700	Pentium Gold	G7400T(H0)	Alder Lake-S	3.1GHz	6MB	35W	2.02	All
1700	Pentium Gold	G7400(H0)	Alder Lake-S	3.7GHz	6MB	46W	2.02	All
1700	Core i9	i9-12900T(C0)	Alder Lake-S	1.4GHz	30MB	35W	2.02	All
1700	Core i9	i9-12900KS(C0)	Alder Lake-S	3.4GHz	30MB	150W	2.02	All
1700	Core i9	i9-12900KF(C0)	Alder Lake-S	3.2GHz	30MB	125W	2.02	All
1700	Core i9	i9-12900K(C0)	Alder Lake-S	3.2GHz	30MB	125W	2.02	All
1700	Core i9	i9-12900F(C0)	Alder Lake-S	2.4GHz	30MB	65W	2.02	All
1700	Core i9	i9-12900(C0)	Alder Lake-S	2.4GHz	30MB	65W	2.02	All
1700	Core i7	i7-12700T(C0)	Alder Lake-S	1.4GHz	25MB	35W	2.02	All
1700	Core i7	i7-12700KF(C0)	Alder Lake-S	3.6GHz	25MB	125W	2.02	All
1700	Core i7	i7-12700K(C0)	Alder Lake-S	3.6GHz	25MB	125W	2.02	All
1700	Core i7	i7-12700F(C0)	Alder Lake-S	2.1GHz	25MB	65W	2.02	All
1700	Core i7	i7-12700(C0)	Alder Lake-S	2.1GHz	25MB	65W	2.02	All
1700	Core i5	i5-12600T(H0)	Alder Lake-S	2.1GHz	18MB	35W	2.02	All
1700	Core i5	i5-12600KF(C0)	Alder Lake-S	3.7GHz	20MB	125W	2.02	All
1700	Core i5	i5-12600K(C0)	Alder Lake-S	3.7GHz	20MB	125W	2.02	All
1700	Core i5	i5-12600(H0)	Alder Lake-S	3.3GHz	18MB	65W	2.02	All
1700	Core i5	i5-12500T(H0)	Alder Lake-S	2.0GHz	18MB	35W	2.02	All
1700	Core i5	i5-12500(H0)	Alder Lake-S	3.0GHz	18MB	65W	2.02	All
1700	Core i5	i5-12490F(C0)	Alder Lake-S	3GHz	20MB	65W	2.02	All
1700	Core i5	i5-12400T(H0)	Alder Lake-S	1.8GHz	18MB	35W	2.02	All
1700	Core i5	i5-12400F(H0)	Alder Lake-S	2.5GHz	18MB	65W	2.02	All
1700	Core i5	i5-12400F(C0)	Alder Lake-S	2.5GHz	18MB	65W	2.02	All
1700	Core i5	i5-12400(H0)	Alder Lake-S	2.5GHz	18MB	65W	2.02	All
1700	Core i5	i5-12400(C0)	Alder Lake-S	2.5GHz	18MB	65W	2.02	All
1700	Core i3	i3-12300T(H0)	Alder Lake-S	2.3GHz	12MB	35W	2.02	All
1700	Core i3	i3-12300(H0)	Alder Lake-S	3.5GHz	12MB	60W	2.02	All
1700	Core i3	i3-12100T(H0)	Alder Lake-S	2.2GHz	12MB	35W	2.02	All
1700	Core i3	i3-12100F(H0)	Alder Lake-S	3.3GHz	12MB	58W	2.02	All
1700	Core i3	i3-12100(H0)	Alder Lake-S	3.3GHz	12MB	60W	2.02	All
1700	Celeron	G6900T(H0)	Alder Lake-S	2.8GHz	4MB	35W	2.02	All
1700	Celeron	G6900(H0)	Alder Lake-S	3.4GHz	4MB	46W	2.02	All

Figure 3: A table detailing compatible Intel CPUs for the ASRock Z790 Pro RS motherboard, including their specifications and required BIOS versions. Consult this list for CPU compatibility and necessary BIOS updates.

6. Specifications

Below are the key technical specifications for the ASRock Z790 Pro RS motherboard:

Feature	Specification
Brand	ASRock
Model Name	Z790 PRO RS
CPU Socket	LGA 1700
Compatible Processors	Intel 13th Gen & 12th Gen Core
Chipset Type	Intel Z790
RAM Memory Technology	DDR5
RAM Capacity	Up to 128 GB
Memory Speed (OC)	Up to 6800+ MHz
PCIe Slots	1 x PCIe 5.0 x16, 1 x PCIe 4.0 x16, 2 x PCIe 3.0 x1
M.2 Sockets	4 x Hyper M.2 (PCIe Gen4x4)
SATA Ports	8 x SATA3 6.0 Gbps
Graphics Output	1 x HDMI, 1 x DisplayPort, eDP
Audio	7.1 CH HD Audio (Realtek ALC897 Audio Codec), Nahimic Audio
LAN	Realtek 2.5G LAN
Wireless Type	2.4 GHz Radio Frequency, 5 GHz Radio Frequency, 802.11a/b/g/n/ac, Bluetooth (via M.2 Key-E for WiFi)
USB Ports (Rear)	1 x USB 3.2 Gen2 Type-C, 1 x USB 3.2 Gen2 Type-A, 2 x USB 3.2 Gen1, 4 x USB 2.0
USB Ports (Front)	1 x USB 3.2 Gen2x2 Type-C, 2 x USB 3.2 Gen1, 4 x USB 2.0
Form Factor	ATX
Dimensions (LxWxH)	19.69 x 19.69 x 11.02 inches (approximate)
Item Weight	1.3 pounds



Figure 4: Diagram illustrating the ATX form factor and physical dimensions (9.6 inches by 12 inches) of the ASRock Z790 Pro RS motherboard.

7. Warranty and Support

7.1. Warranty Information

ASRock products are covered by a limited warranty. The specific terms and duration of the warranty may vary by region and retailer. Please retain your proof of purchase for warranty claims. For detailed warranty information, refer to the warranty card included with your product or visit the official ASRock website.

7.2. Technical Support

For technical assistance, driver downloads, BIOS updates, and further product information, please visit the official ASRock support website. You can also find FAQs and troubleshooting guides there.
Visit the ASRock Store for more products and information:ASRock America Store

© 2024 ASRock. All rights reserved.

Ask a question about this manual

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. Privacy details.

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question