XMG NEO 16 (A25): FCLK & UCLK introduction

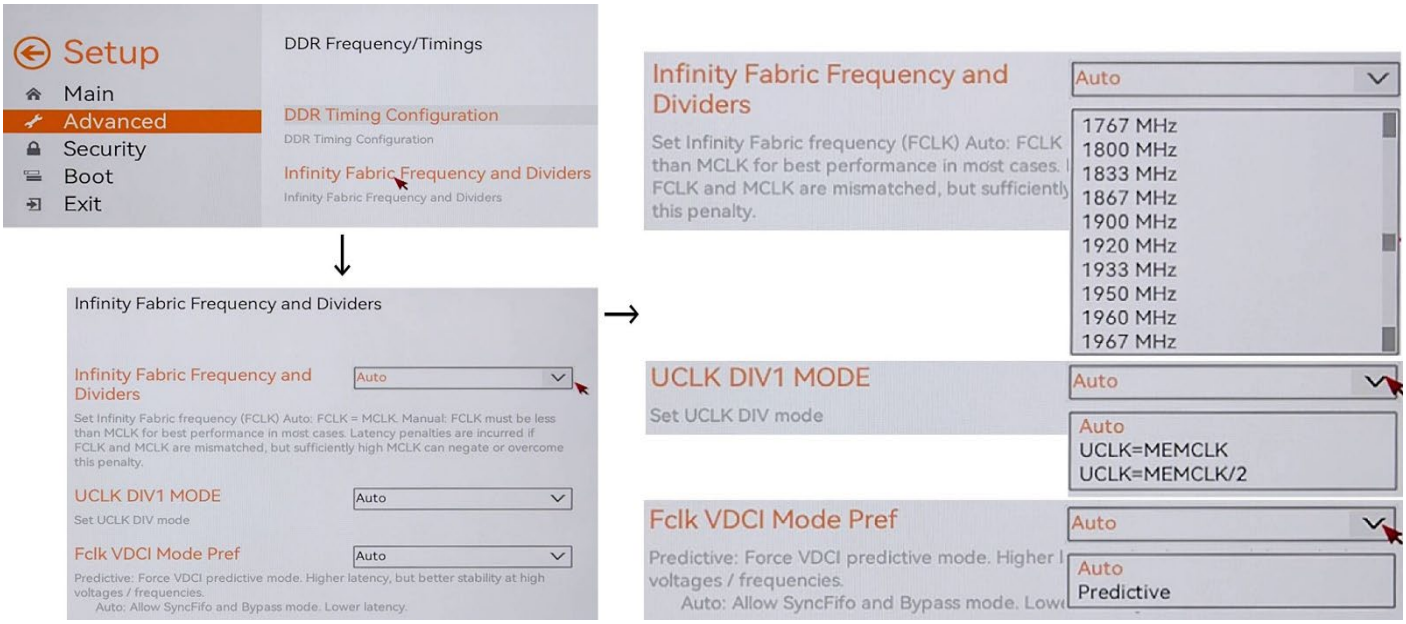
Introduction

This guide is for advanced users who already follow the general BIOS tuning guide and understand the risks of CPU/RAM tuning. Possible outcomes include reduced performance, instability, or “no boot” scenarios that require recovery via CMOS reset. Please see warranty information on page 2.

Screenshots and video

Video: https://go.xmg.gg/xne16a25-bios-fclk-uclk-introduction-video

Screenshots:



Options

Option	Description	Default
Infinity Fabric Clock	Set Infinity Fabric Clock (FCLK). Typical range is between 1600 and 2000 MHz. Unstable setting may require CMOS reset for recovery.	Auto
UCLK Ratio	Set Unified Memory Controller Clock (UCLK). UCLK=MEMCLK (also known as 1:1) reduces memory latency but might be unstable at higher DRAM speeds or large capacities. UCLK=MEMCLK/2 (also known as 1:2) enables higher DRAM data rates with a small latency cost. MEMCLK in MHz is half of Memory Speed in MT/s. Unstable setting may require CMOS reset for recovery.	Auto
Fabric VDCI Mode	Auto: Uses standard training (allows SyncFIFO/Bypass) for lowest latency when stable. Predictive: Applies a more conservative, predictive training path that can improve stability at higher frequencies/voltages or near-edge configs, at the cost of slightly higher latency and longer training.	Auto

Warranty information

Please note:

- Overvolting, undervolting, and changes to the clock rate and timings of system memory can impair system stability. We offer no guarantee of performance or efficiency gains with CPU and memory tuning, and no guarantee of system stability.
- We recommend to reset all adjustments before any firmware update, as unstable tunings may otherwise cause firmware updates to fail, leading to potentially unrecoverable damage ("brick"). Such situations would not fall under warranty.

Voltage and memory tuning may impair stability and void your warranty in the event of a failed firmware update. Reset tunings before updating!

Typical range and known limits

On a representative sample configured with 2×48 GB DDR5-5600 (effective 5600 MT/s, MCLK 2800 MHz), exploratory tuning revealed the following boundaries:

- Setting FCLK ≥ 2200 MHz consistently led to no POST, requiring a CMOS/training reset to recover
- Forcing UCLK = MCLK (1:1) at the full 5600 MT/s (i.e., UCLK ≈ 2800 MHz) passed firmware POST, but crashed during OS boot.

These observations are platform- and sample-dependent and should be treated as guidance, not guarantees. Approach the above thresholds in small increments, and be prepared to revert if training retries or boot failures appear.

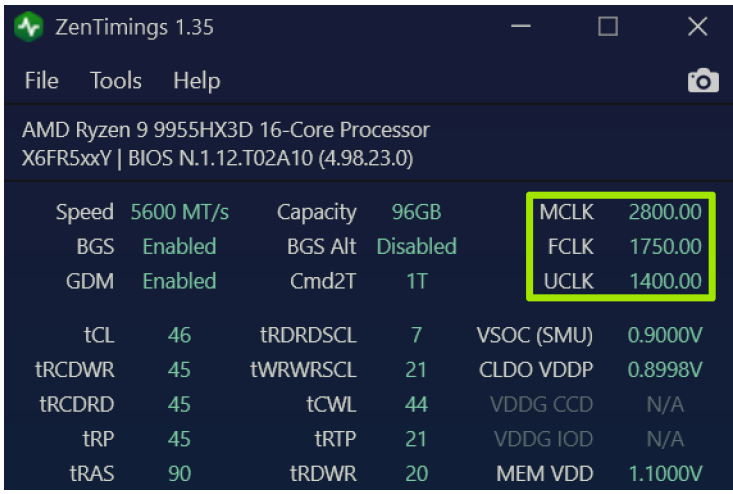
Validation

The currently applied FCLK and UCLK values can be displayed by the software ZenTimings.

Download: https://zentimings.com/

ZenTimings helps you to first check the current values on “Auto”, and then to check if your modifications have been applied successfully.

The screenshot to the right shows default (automatic) values with 2×48 GB DDR5-5600.



Notice

Please note: AMD reduces memory clock speed in idle (impacts hardware monitoring tools)

This AMD Ryzen platform is able to reduce the memory clock speed when the memory is idle or in low load.

When you check your clock speeds with tools such as **HWiNFO64**, **CPU-Z**, **AIDA64** or **ZenStates**, you may observe lower clock speeds in real-time monitoring tools.

Check the clock speeds of your tuning setup during a memory-intensive workload such as Prime95 stress test. When taking screenshots of your tuning results for other users, you may also want to take the screenshot during such high load in order to avoid public confusion.

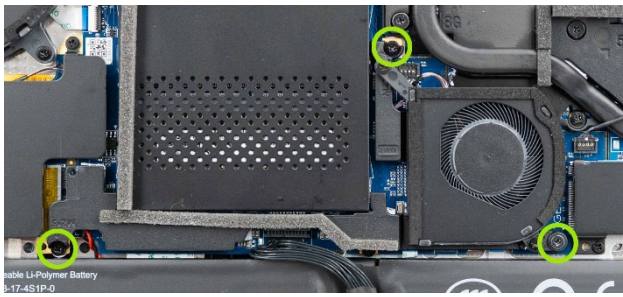
“No boot” scenario & recovery procedures

Invalid settings for FCLK and UCLK cannot be recovered automatically. Instead, they need a manual CMOS reset (battery removal).

In our testing, even the most extreme combinations (12000 MT/s & UCLK=MEMCLK & FCLK=3000) were recoverable via CMOS reset. However, we still advise to act with caution and avoid unbootable settings.

⚠ The CMOS reset seems to be reliable in resetting all possible tuning settings. But we still advise caution. Apply tuning only in small steps to avoid “no boot”.

Instructions: Manual CMOS reset



- Hold power button to completely shut down the system.
- Remove the power supply (charger) and open the bottom case of the laptop.
- Remove 4 screws from the 99 Wh battery.
- Shift the battery away from the mainboard to gain access to the battery connection cable.
- Unplug the battery connection cable from the mainboard.
- Remove 3 screws to remove the frame of the 3rd fan (see picture above).
    - Only remove the screws marked in the picture. The other two screws attach the fan to its frame – they do not need to be removed.
- Rotate the frame of the 3rd fan over its power cable to gain access to the CMOS battery connector.
    - You do not need to remove the fan’s power cable for this step.
    - Tilting the frame will reveal the CMOS battery connector (twisted red/black cable in the bottom left corner of the picture above).
- Unplug the CMOS battery connector and wait a few seconds.
    - Unplugging the connector may require gentle tools. Do not pull the cable. Instead, push out the white connector using fingernails on one side and an opening tool on the other side. Avoid using metallic tools. Do NOT use a screwdriver for this step.
    - A few seconds after the cable is unplugged, the CMOS reset should now be complete.
- At this point, you could raise the laptop on its side (like a book), plug in the charger (without closing the laptop’s bottom case) and check if the laptop is able to boot to BIOS setup again. If this is successful, shutdown and reassemble.
    - Attach the CMOS battery to the mainboard.
    - Assemble the frame of the 3rd fan.
    - Attach the 99 Wh battery to the mainboard.
    - Assemble all 4 screws of the 99 Wh battery.
    - Close and assemble the bottom case.

Contact & support

The following channels are available to answer questions and provide further guidance:

Contact page:	https://www.xmg.gg/en/contact/
Reddit thread:	https://go.xmg.gg/xne16a25-bios-tuning-reddit-thread
Reference table:	https://go.xmg.gg/xne16a25-bios-tuning-reference-table
Usage examples:	https://go.xmg.gg/memory-tuning-xmg-neo-a25-e25-results
Discord server:	https://discord.gg/xZykwQf
Download portal:	https://go.xmg.gg/xne16a25
This document:	https://go.xmg.gg/xne16a25-bios-fclk-uclk-introduction-guide

General step-by-step procedure for CPU and memory tuning

Patience is required for overclocking and undervolting. If you want to avoid instability and the dreaded "no boot" scenario, you must proceed according to the principle of "small, gradual adjustments".

⚠ This procedure applies in particular to RAM tuning, as improper memory settings will quickly lead to "no boot" situations.

Preparation:

- Make sure that you have installed the latest EC/BIOS versions.
- Download benchmarks for stability tests (e.g. Prime95, AIDA64).
- Create a backup of important data in case something goes wrong.

Step 1: Make a small adjustment

- Start with the default value (e.g. for frequency and timing).
- Make a small adjustment, such as slightly increasing the clock rate or reducing the latency by 1–2 steps.
- Do not overdo it! Excessive jumps can cause immediate instability or result in the system no longer booting up.

Step 2: Perform stability test

- Restart the system and run the first stability test (Prime95 w/o AVX; or AIDA64).
  - Prime95 "Small FFT" for CPU tuning
  - Prime95 "Large FFT" for RAM tuning
- Let the test run for at least 10-15 minutes to draw initial conclusions.
- Watch out for blue screens, crashes, freezes or graphics errors.

Step 3: Evaluate result

- System stable?
  - No problems? Good! Go back to step 1 and make another small adjustment.
- System unstable?
  - If you notice blue screens, crashes or other errors: Cancel the last adjustment immediately. Adjust the values back to the previous stable status or reset them to the default values.

Step 4: Repeat process

- Continue by repeating steps 1 to 3 until you achieve the desired result.
- Always proceed in **small steps**. Patience is the key to successful overclocking.

The illustration on the right shows the procedure described here as a flowchart.

