



# Clock Tuner for Ryzen™ 2.1 RC5

Before we start reviewing new features, let's go over what **CTR HYBRID OC** is:

**CTR HYBRID OC** is a ready-made individualized collection of profiles (PX, P2, and P1) which are switched depending on the load on the CPU. These profiles are created during the diagnostics process for Zen 3 CPUs and during tuning for Zen 2 CPU. By default, the base voltages for these profiles are lower than those AMD uses, but user can increase them if needed or desired. The profile creation process for Zen 3 is fully automatic, and you just need to press 1 button: "**Diagnostics**". Profile creation can take up to 7 minutes. Zen 2 requires input of recommend reference frequencies and voltages for P1 and P2, but this is the only additional step. Each profile is unique to your CPU. CTR evaluates Vdroop, VRM features, cooling system, and the potential of the silicon itself. This allows CTR to create dynamic universal profiles, each with their own frequency and voltage setting synced to your usage requirements.

In CTR 2.1 RC5, the profile switching speed has reached **62 times per second**. This profile switching is twice as fast as in the original Zen 1 and Zen + processors, but 16 times slower than Zen 2 or Zen 3. The profile switching rate is artificially limited, and this allows CTR to utilize a tiny amount of your CPU's processing power (down to 0.1-0.2% in case of Ryzen 5 5600X, for example).

**CTR HYBRID OC** is equipped with built-in features to protect your CPU against overheating and other negative effects. Communication with the SMU has three levels of protection, and this allows you and CTR to communicate quickly and safely with your computer's subsystems.

I know many of you are wondering, "what's so special about these profiles?" and "why use CTR instead of Curve Optimizer?"

I suggest we compare a 4-thread load and a multi-thread load. This comparison (pretty rough) is due to the fact that this is an ideal scenario to simulate a typical user load (work or games).

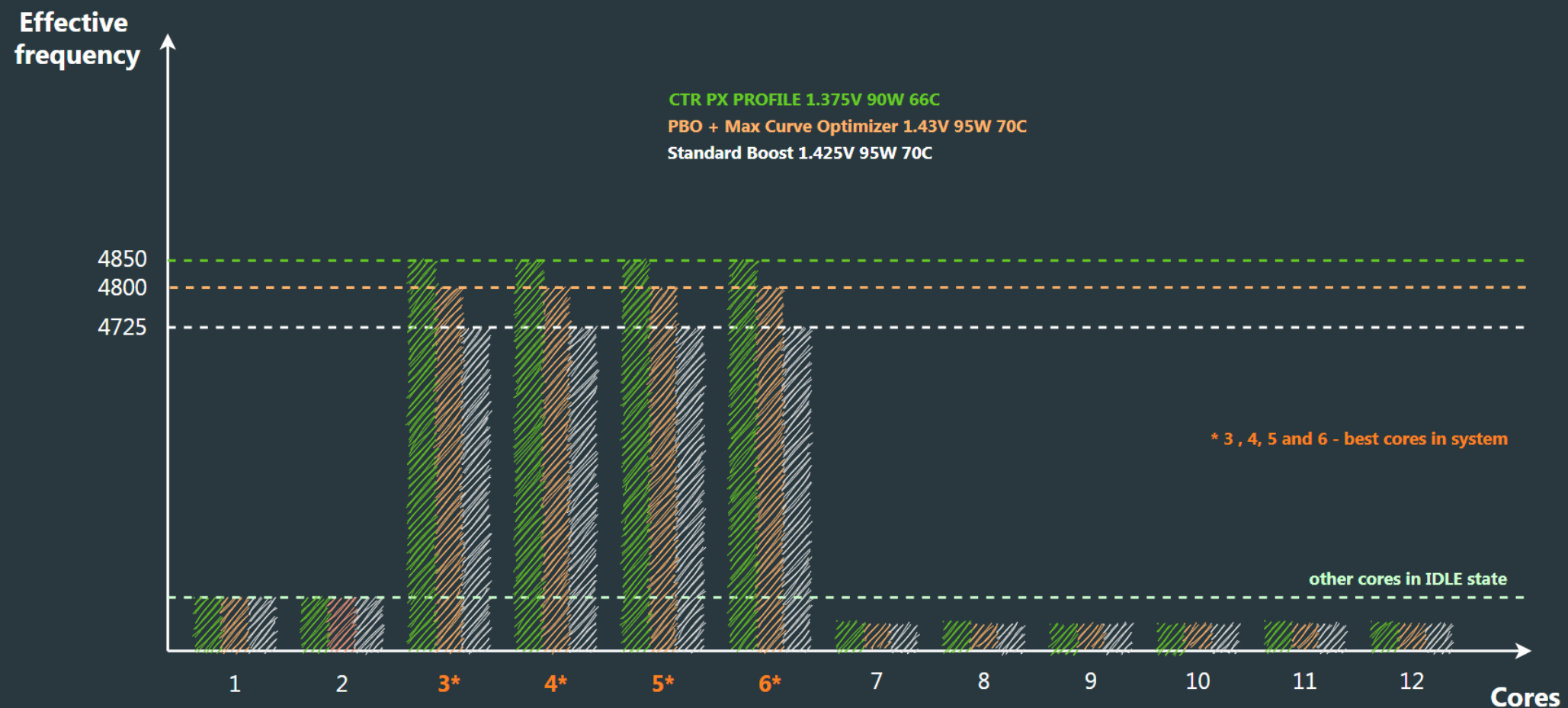
Here we go!



# Clock Tuner for Ryzen™ 2.1 – PX PROFILE

## CTR 2.1 PX PROFILE for HYBRID OC

AMD RYZEN 9 5900X, CINEBENCH R23 - 4 THREADS, AVG FREQUENCY



A key feature of the PX profile is the significant reduction to operating voltage in comparison to default/stock settings. This is due to how the 7nm process – and the Zen 3 architecture – reacts to voltage and temperature. The silicon self-heating chain reaction: where as the temperature increases, it requires more and more voltage to achieve the same frequency, higher voltages leads to even higher temperature, limiting max frequency. CTR allows a significant improvement of the voltage/frequency ratio (**up to 7%**) by staying within the sweet spot and not starting the self-heating chain-reaction.

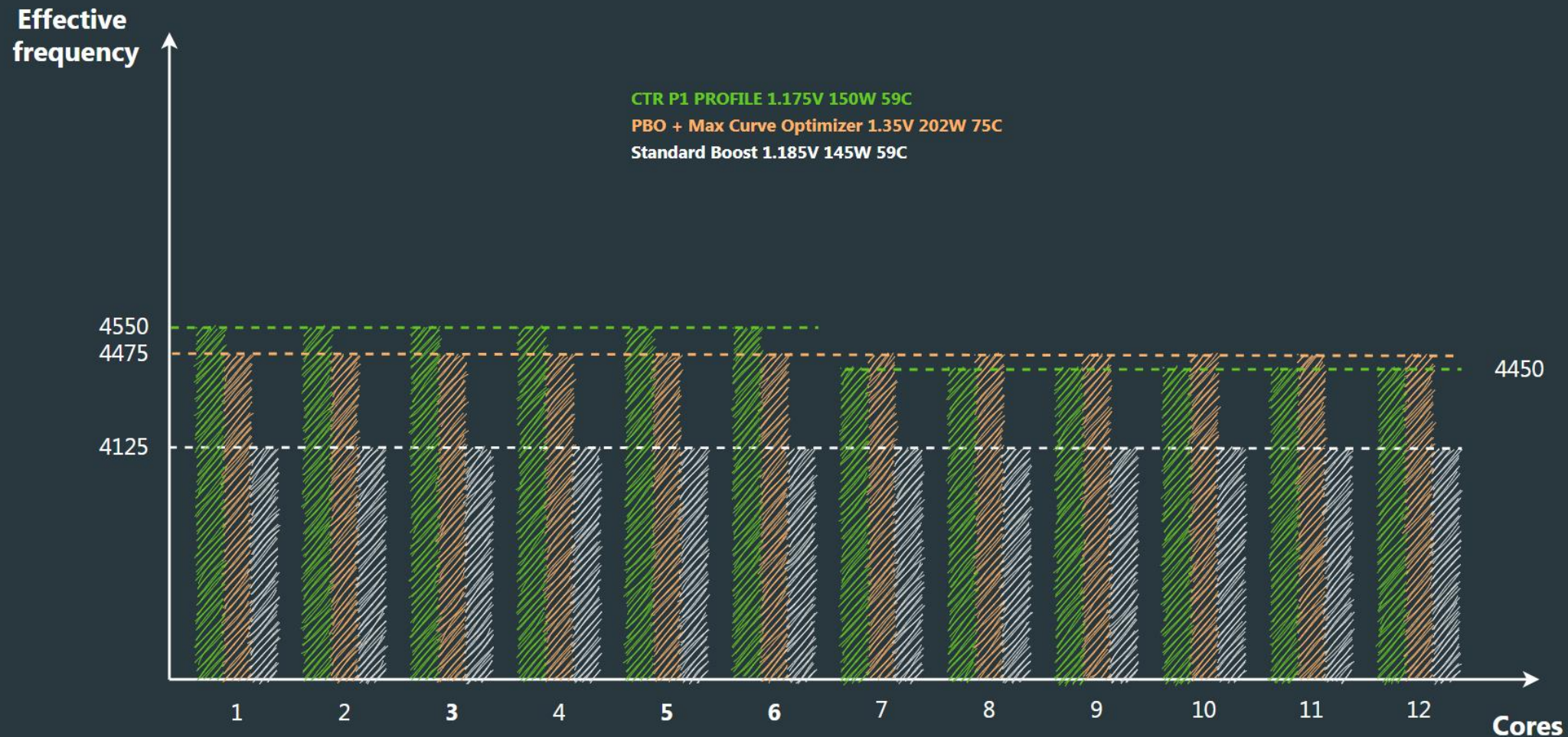




# Clock Tuner for Ryzen™ 2.1 – P1 PROFILE

## CTR 2.1 P1 PROFILE for HYBRID OC

AMD RYZEN 9 5900X, CINEBENCH R23 - MT, AVG FREQUENCY



For multi-threaded loads, using PBO + max CO significantly increases performance, but at the cost of increased power consumption: 202W vs 145W. More wattage means more heat, which increases voltage required. In turn, the P1 PROFILE operates at a default voltage of only 1.175V, which is 175mV less than PBO + CO on average (~1.350v), all while achieving a higher frequency on average. The voltage/frequency ratio difference is now over **15.7% (3.31 vs 3.83)** while the performance is identical. To summarize this example, using the CTR profile allows you to have a 16°C cooler processor while drawing 52W less than PBO + Max CO.



# Clock Tuner for Ryzen™ 2.1 – DYNAMIC PROFILES (Zen 3)

Introducing Dynamic Profiles! It works on top of **P1, P2, and PX profiles that can increase or decrease frequency relative to the capabilities of the silicon and the current core load.** It doesn't matter if you are playing a game or rendering on Blender, dynamic profile can make frequency changes **62 times per second, by steps of 25 – 50 MHz** in order to adapt to the current load. In order to know what changes to make, CTR evaluates the telemetry data **every 16ms** and make the frequency changes if required, these frequency changes are seamless and only takes a few ms. This means that **CTR has no effect on 0.1% and 1% FPS events in games.**

Dynamic profiles technology is closely related to an incredible feature from AMD called Curve Optimizer, but with several improvements. The main advantage is the full user control of the operating voltage, which allows maximum performance relative to power consumption. The user can customize the processor to his or her needs. You get to determine what kind of multi-threaded and low-threaded performance you want to see at the same time. The processor is now fully under your control, and you get to decide how it performs and its operating voltage.

The next advantage is the granularity of the step, which is only 1mV. Value name - OB (over - boost). Similar to the CO coefficients, this allows you to adjust the maximum "boost" frequency in the dynamic profile.

The individual OB for each CCX allows processors with few CCDs at different frequencies to achieve maximum efficiency and performance (example on the previous page).

**What does it take?** OB values are calculated during the diagnostics phase and can take up to 15 minutes. Just 15 minutes is enough to determine which value of OB will be stable for AVX and non-AVX workloads, you don't need to spend an incredible amount of time searching for CO ratios with stress tests or be a professional overclocker. With each new release, the CTR project gets closer and closer to the "1-click" concept.

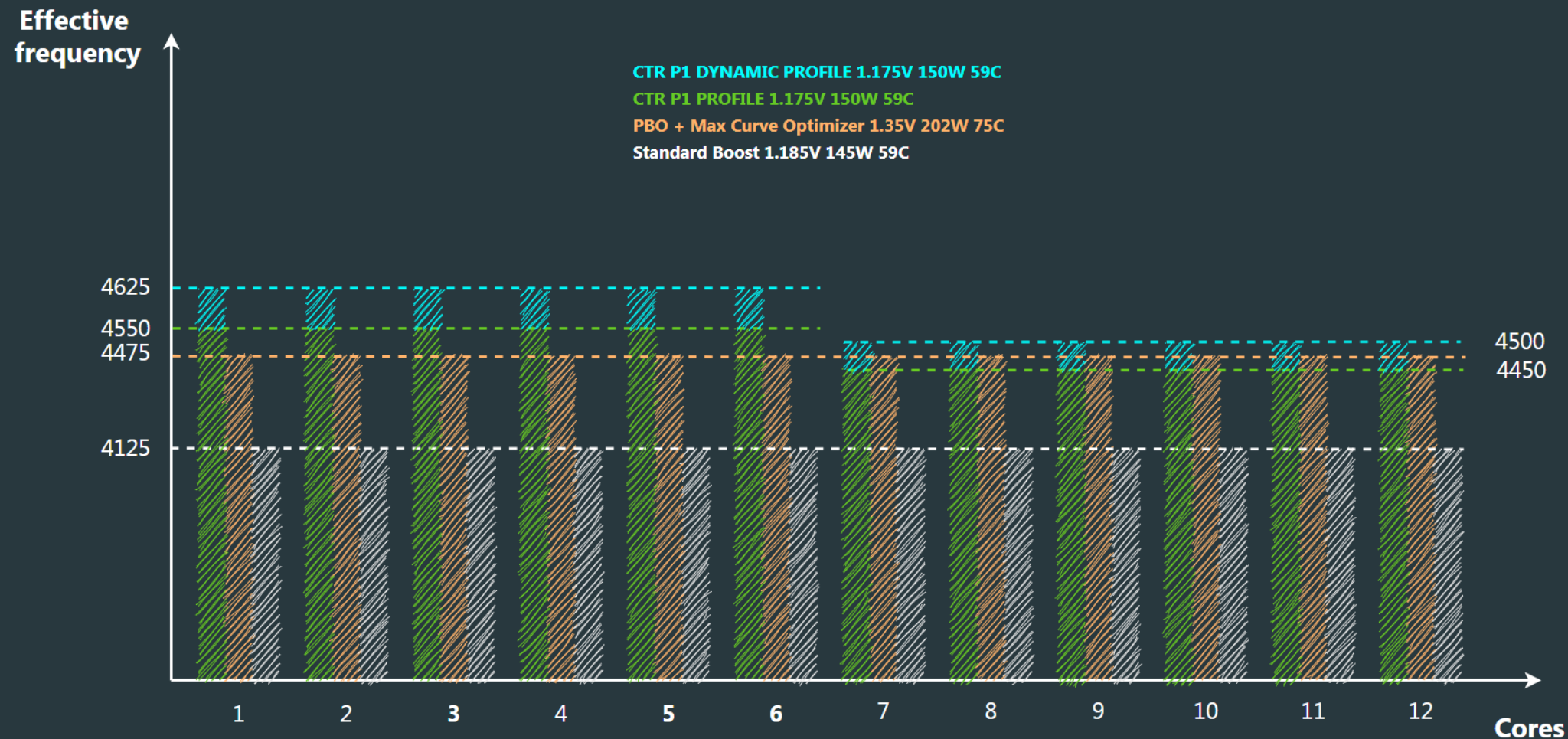




# Clock Tuner for Ryzen™ 2.1 – DYNAMIC PROFILES (Zen 3)

## CTR 2.1 P1 DYNAMIC PROFILE

AMD RYZEN 9 5900X, CINEBENCH R23 - MT, AVG FREQUENCY



In this example, we see that Cinebench R23 is not putting too much load on the CPU, and so CTR has determined that it is safe to increase the frequency for each CCX. **+75 MHz for CCX1 and +50 MHz for CCX2**. The final difference (V/F) between PBO + Max CO and CTR in this example was **17.2% (3.31 vs 3.88)**. You can see a demonstration of the dynamic P1 under different loads [here](#).



# Clock Tuner for Ryzen™ 2.1 – DYNAMIC PROFILES (Zen 3)

The image displays two side-by-side screenshots of the AIDA64 Cache & Memory Benchmark window, comparing baseline performance (left) with performance after applying a dynamic profile (right).

	Read	Write	Copy	Latency
Memory	59310 MB/s	58320 MB/s	56217 MB/s	56.5 ns
L1 Cache	3219.7 GB/s	1500.2 GB/s	3299.0 GB/s	0.8 ns
L2 Cache	1634.9 GB/s	1538.3 GB/s	1664.5 GB/s	2.4 ns
L3 Cache	869.36 GB/s	868.20 GB/s	865.43 GB/s	10.6 ns

**CPU Information:**  
CPU Type: 12-Core AMD Ryzen 9 5900X (Vermeer, Socket AM4)  
CPU Stepping: VMR-B0  
CPU Clock: 4950.3 MHz  
CPU FSB: 100.0 MHz (original: 100 MHz)  
CPU Multiplier: 49.5x North Bridge Clock

**Memory Bus Information:**  
Memory Bus: 1900.1 MHz  
DRAM:FSB Ratio: 57:3  
Memory Type: Dual Channel DDR4-3800 SDRAM (16-16-16-32 CR1)  
Chipset: AMD B550, AMD K17.7 FCH, AMD K17.7 IMC  
Motherboard: MSI MEG B550 Unify-X (MS-7D13)  
BIOS Version: A.24 (AGESA: ComboAM4v2PI 1.2.0.2)

AIDA64 v6.32.5600 / BenchDLL 4.5.841.8-x64 (c) 1995-2020 FinalWire Ltd.

Buttons: Save, Start Benchmark, Close

	Read	Write	Copy	Latency
Memory	59212 MB/s	58198 MB/s	56168 MB/s	53.6 ns
L1 Cache	3553.6 GB/s	1659.7 GB/s	3321.5 GB/s	0.8 ns
L2 Cache	1664.8 GB/s	1492.7 GB/s	1638.1 GB/s	2.4 ns
L3 Cache	1172.2 GB/s	864.38 GB/s	1038.4 GB/s	10.2 ns

**CPU Information:**  
CPU Type: 12-Core AMD Ryzen 9 5900X (Vermeer, Socket AM4)  
CPU Stepping: VMR-B0  
CPU Clock: 4550.3 MHz  
CPU FSB: 100.0 MHz (original: 100 MHz)  
CPU Multiplier: 45.5x North Bridge Clock

**Memory Bus Information:**  
Memory Bus: 1900.1 MHz  
DRAM:FSB Ratio: 57:3  
Memory Type: Dual Channel DDR4-3800 SDRAM (16-16-16-32 CR1)  
Chipset: AMD B550, AMD K17.7 FCH, AMD K17.7 IMC  
Motherboard: MSI MEG B550 Unify-X (MS-7D13)  
BIOS Version: A.24 (AGESA: ComboAM4v2PI 1.2.0.2)

AIDA64 v6.32.5600 / BenchDLL 4.5.841.8-x64 (c) 1995-2020 FinalWire Ltd.

Buttons: Save, Start Benchmark, Close

Another important advantage of dynamic profiles is to improve L2/L3 cache latency, DRAM latency and L3 cache throughput.





# Clock Tuner for Ryzen™ 2.1 – INTRO

## System requirements:

- .NET Framework 4.8
- BIOS for Zen 3 with AGESA 1.1.0.0 path D or newer
- BIOS for Zen 2 with AGESA (any)
- BIOS for APU with AGESA 1.2.0.0 or newer
- Windows 10 x64 (with all updates)
- BIOS settings **without** manual CPU OC, **without** PBO (Fmax too or Curve) and **without** Performance Enhancer (or other similar technologies)
- Each new version requires a single push **“CLEAR CONFIG & CLOSE”** button.
- **CPPC** – Enabled (Enabled = Auto by default)
- **VRM settings** - your optimal LLC
- **CBP (Core boost performance)** – Enabled (Enabled = Auto by default)
- **Preferred cores** – Enabled (Enabled = Auto by default)
- **Cool & Quiet** – Enabled (Enabled = Auto by default)
- **C-state** – Enabled (Enabled = Auto by default)
- **Power plan** – Balanced (Zen 3) / Ryzen balanced (Zen 2)
- **Stable RAM overclocking or Stable XMP!\*** VDDG CCD 0.95V, VDDG IOD 1.05V and VSOC 1.15 - 1.2V.

## Supported CPU:

- Zen 3: Ryzen 9 5950X, Ryzen 9 5900X, Ryzen 7 5800X, Ryzen 5 5600X
- Zen 2: Threadripper 3970X, Threadripper 3960X, Ryzen 9 3950X, Ryzen 9 3900X, Ryzen 9 3900XT, Ryzen 9 3900, Ryzen 7 3800XT, Ryzen 7 3800X, Ryzen 7 3700X, Ryzen 5 3600XT, Ryzen 5 3600X, Ryzen 5 3600, Ryzen 5 3500X, Ryzen 5 3500, **Ryzen 3 3300X and Ryzen 3 3100 (partially)**
- APU: Ryzen 7 PRO 4750G, Ryzen 7 PRO 4650G, Ryzen 3 PRO 4350G

\* CTR comes bundled with TM5. You can use this programme to check RAM stability and diagnose any RAM OC issues.



# How to create dynamic profiles? (Zen 3)

Before you start the diagnostic process, you must make sure that all requirements are met! [Requirements](#). **Failure to do so can lead to instability or crashing (this crashing will not harm your computer). Automatic process recovery is present (called "Phoenix"), you do not need to do anything. Just wait for the process to finish.**

CTR 2.1 RC5 does not require any special action to create profiles. Just click "**DIAGNOSTIC**" and wait for the process to finish. At the end of the process, the computer may reboot, but after a minute and a half, the CTR will start automatically. Profiles are also automatically filled in during diagnostics or reboot.

The screenshot shows the CTR 2.1 RC5 interface with the following components:

- Header:** CTR 2.1 RC5 Optimization for ZEN2+ CPUs
- Left Sidebar:** TUNER, PROFILES, RESULTS, ABOUT & HELP, SCREENSHOT, DONATE & UPGRADE, MINIMIZE, TO TRAY, EXIT
- Top Panel:** A grid of CCX (CCX1, CCX2, CCX3, CCX4) and core (C01-C12) temperature and voltage data.
- Settings mode:** Advanced mode with various parameters like Testing mode (AVX Light), Cycle time (360s), CCX delta (75MHz), and Polling period (1000ms).
- Info Panel:** System information including AMD Ryzen 9 5900X 12-Core Processor, MSI MEG B550 UNIFY-X (MS-7D13), and active profile details (P1, P2).
- Bottom Panel:** A row of buttons: **DIAGNOSTIC** (highlighted with a red box), TUNE, STOP, CHECK STABILITY, and BOOST TESTER.





# How to create dynamic profiles? (Zen 3)

You can see the created profiles (red outline) on the "**PROFILES**" tab. If one of the profiles has not been created, run the diagnostics again. If you want to change the voltages for one of the profiles, but do not wait for full diagnostics just click on the "**CALCULATE P PROFILE**" (green outline).

Note 1. You may also notice that unnecessary visual elements are hidden and "Holding time" has been deleted. Holding time are now calculated automatically.

The screenshot displays the CTR 2.1 RC5 software interface for Zen 3 CPUs. The interface is divided into several sections:

- Header:** CTR 2.1 RC5, Optimization for ZEN2+ CPUs.
- Left Sidebar:** Navigation menu with icons for TUNER, PROFILES, RESULTS, ABOUT & HELP, SCREENSHOT, DONATE & UPGRADE, MINIMIZE, TO TRAY, and EXIT.
- Profile Configuration:**
  - PX PROFILE:** Includes input fields for HIGH (MHz), MID (MHz), LOW (MHz), HIGH (mV), MID (mV), LOW (mV), OB HIGH (mV), OB MID (mV), and OB LOW (mV). A red outline highlights this section. Buttons for CALCULATE PX PROFILE, SAVE PX PROFILE, and ACTIVATE PX PROFILE are on the right.
  - P2 PROFILE:** Includes input fields for VID (mV), CCX1 OB (mV), CCX2 OB (mV), CPU usage min (%), CCX1 (MHz), and CCX2 (MHz). A red outline highlights this section. Buttons for CALCULATE P2 PROFILE, SAVE P2 PROFILE, and ACTIVATE P2 PROFILE are on the right.
  - P1 PROFILE:** Includes input fields for VID (mV), CCX1 OB (mV), CCX2 OB (mV), CPU usage min (%), CCX1 (MHz), and CCX2 (MHz). A red outline highlights this section. The VID (mV) field is highlighted with a green outline. A button for CALCULATE P1 PROFILE is also highlighted with a green outline. Buttons for SAVE P1 PROFILE and ACTIVATE P1 PROFILE are on the right.
- PROFILES SETTINGS:** Includes Autoload profile(s) (toggle), CTR HYBRID OC (toggle), PX OB LIMIT (dropdown: +125), and PX PRESET (dropdown: MIX). A CALCULATE OB button is present.
- PROFILES STATISTIC:** Shows statistics for PX HIGH, PX MID, PX LOW, P2, P1, and IDLE, all currently at 0.



# How to create dynamic profiles? (Zen 3)

If for some reason you have OB values in cells equal to zero - calculate the OB using the "CALCULATE OB" button.

Note 1. **At the end of the test an automatic reboot of the computer is possible.**

The screenshot displays the CTR 2.1 RC5 software interface for Zen 3 CPUs. The interface is divided into several sections:

- PX PROFILE:** Contains input fields for HIGH (MHz), MID (MHz), LOW (MHz), HIGH (mV), MID (mV), LOW (mV), OB HIGH (mV), OB MID (mV), and OB LOW (mV). The OB values are currently set to 0. Buttons for "CALCULATE PX PROFILE", "SAVE PX PROFILE", and "ACTIVATE PX PROFILE" are present.
- P2 PROFILE:** Contains input fields for VID (mV), CCX1 OB (mV), CCX2 OB (mV), CPU usage min (%), CCX1 (MHz), and CCX2 (MHz). The CCX1 and CCX2 OB values are currently set to 0. Buttons for "CALCULATE P2 PROFILE", "SAVE P2 PROFILE", and "ACTIVATE P2 PROFILE" are present.
- P1 PROFILE:** Contains input fields for VID (mV), CCX1 OB (mV), CCX2 OB (mV), CPU usage min (%), CCX1 (MHz), and CCX2 (MHz). The CCX1 and CCX2 OB values are currently set to 0. Buttons for "CALCULATE P1 PROFILE", "SAVE P1 PROFILE", and "ACTIVATE P1 PROFILE" are present.
- PROFILES SETTINGS:** Includes "Autoload profile(s)" and "CTR HYBRID OC" toggle switches, "PX OB LIMIT" and "PX PRESET" dropdown menus, and a prominent "CALCULATE OB" button.
- PROFILES STATISTIC:** A table showing current values for PX HIGH, PX MID, PX LOW, P2, P1, and IDLE.

Profile	Value
PX HIGH	0
PX MID	0
PX LOW	0
P2	0
P1	0
IDLE	0





# How to activate dynamic profiles (Zen 3)

To activate CTR HYBRID OC, you must first enable "Autoload profile with OS" and "CTR HYBRID OC". Then you should **activate the P1, P2, and PX** in that order. Done! After loading Windows, CTR will automatically start and activate all of your profiles. You can find the CTR icon in the tray near your system clock.

Note 1. Additional saving after activation is no longer required. CTR remembers the activation status of the profiles automatically. Also, please note that CTR will now automatically reactivate when your system comes out of Sleep Mode.

The screenshot displays the CTR 2.1 RC5 interface with the following sections:

- Left Sidebar:** Contains navigation icons and labels: TUNER, PROFILES, RESULTS, ABOUT & HELP, SCREENSHOT, DONATE & UPGRADE, MINIMIZE, TO TRAY, and EXIT.
- Header:** "CTR 2.1 RC5 Optimization for ZEN2+ CPUs".
- PX PROFILE : activated!** (highlighted in yellow):
  - Inputs: HIGH (MHz) 4900, MID (MHz) 4825, LOW (MHz) 4750, HIGH (mV) 1375, MID (mV) 1375, LOW (mV) 1350, OB HIGH (mV) 66, OB MID (mV) 90, OB LOW (mV) 90.
  - Buttons: CALCULATE PX PROFILE, SAVE PX PROFILE, and DEACTIVATE PX PROFILE (highlighted in green).
- P2 PROFILE : activated!** (highlighted in yellow):
  - Inputs: VID (mV) 1275, CCX1 OB (mV) 50, CCX2 OB (mV) 34, CPU usage min (%) 28, CCX1 (MHz) 4675, CCX2 (MHz) 4550.
  - Buttons: CALCULATE P2 PROFILE, SAVE P2 PROFILE, and DEACTIVATE P2 PROFILE (highlighted in green).
- P1 PROFILE : activated!** (highlighted in yellow):
  - Inputs: VID (mV) 1175, CCX1 OB (mV) 50, CCX2 OB (mV) 34, CPU usage min (%) 81, CCX1 (MHz) 4525, CCX2 (MHz) 4425.
  - Buttons: CALCULATE P1 PROFILE, SAVE P1 PROFILE, and DEACTIVATE P1 PROFILE (highlighted in green).
- PROFILES SETTINGS:**
  - Autoload profile(s) (highlighted in green):
  - CTR HYBRID OC (highlighted in green):
  - PX OB LIMIT: +125 (dropdown)
  - PX PRESET: MIX (dropdown)
  - CALCULATE OB button.
- PROFILES STATISTIC:**
  - PX HIGH: 0, P2: 0
  - PX MID: 0, P1: 0
  - PX LOW: 0, IDLE: 1



# How to adjust the maximum frequency for the dynamic profile? (Zen 3)

In most cases, only the PX profile has a frequency margin. To adjust the frequency (increase or decrease) you need to change the value of **OB**.

Example. Close all unnecessary programs (browser, etc.). **To adjust the maximum PX HIGH frequency**, run Cinebench R23 in 2T mode. In the running state, change the OB value by Steps of - 5. The higher the OB value, the higher the maximum frequency will be. But remember, too high a value will crash the system.

The screenshot shows the CTR 2.1 RC5 software interface. The left sidebar contains navigation options: TUNER, PROFILES, RESULTS, ABOUT & HELP, SCREENSHOT, DONATE & UPGRADE, MINIMIZE, TO TRAY, and EXIT. The main area displays three profile settings sections:

- PX PROFILE : activated!**

HIGH (MHz)	4900	MID (MHz)	4825	LOW (MHz)	4750
HIGH (mV)	1375	MID (mV)	1375	LOW (mV)	1350
OB HIGH (mV)	66	OB MID (mV)	90	OB LOW (mV)	90

Buttons: CALCULATE PX PROFILE, SAVE PX PROFILE, DEACTIVATE PX PROFILE
- P2 PROFILE : activated!**

VID (mV)	1275	CCX1 OB (mV)	50	CCX2 OB (mV)	34	CPU usage min (%)	28
CCX1 (MHz)	4675						
CCX2 (MHz)	4550						

Buttons: CALCULATE P2 PROFILE, SAVE P2 PROFILE, DEACTIVATE P2 PROFILE
- P1 PROFILE : activated!**

VID (mV)	1175	CCX1 OB (mV)	50	CCX2 OB (mV)	34	CPU usage min (%)	81
CCX1 (MHz)	4525						
CCX2 (MHz)	4425						

Buttons: CALCULATE P1 PROFILE, SAVE P1 PROFILE, DEACTIVATE P1 PROFILE

**PROFILES SETTINGS**

Autoload profile(s)	<input checked="" type="checkbox"/>	PX OB LIMIT	+125	▼	CALCULATE OB
CTR HYBRID OC	<input checked="" type="checkbox"/>	PX PRESET	MIX	▼	

**PROFILES STATISTIC**

PX HIGH: 0	P2: 0
PX MID: 0	P1: 0
PX LOW: 0	IDLE: 1

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# How to adjust the maximum frequency for the dynamic profile? (Zen 3)

Note 1. OB is a value that is applied on the fly. Reactivation of the profile is not required, but don't forget to save the changes if you are satisfied with the result.

Note 2. To disable the dynamic profile, set OB value to **0**.

Note 3. If you observe a problem with PX stability, set the OB in each PX Profile to the same as P1 (green outline) or lower the base frequency (red outline) for the profile that is causing the problem.

**CTR 2.1 RC5**  
Optimization for ZEN2+ CPUs

**PX PROFILE : activated!**

HIGH (MHz)	4900	MID (MHz)	4825	LOW (MHz)	4750
HIGH (mV)	1375	MID (mV)	1375	LOW (mV)	1350
OB HIGH (mV)	66	OB MID (mV)	90	OB LOW (mV)	90

**P2 PROFILE : activated!**

VID (mV)	1275	CCX1 OB (mV)	50	CCX2 OB (mV)	34	CPU usage min (%)	28
CCX1 (MHz)	4675						
CCX2 (MHz)	4550						

**P1 PROFILE : activated!**

VID (mV)	1175	CCX1 OB (mV)	50	CCX2 OB (mV)	34	CPU usage min (%)	81
CCX1 (MHz)	4525						
CCX2 (MHz)	4425						

**PROFILES SETTINGS**

Autoload profile(s)	<input type="checkbox"/>	PX OB LIMIT	+125
CTR HYBRID OC	<input type="checkbox"/>	PX PRESET	MIX

**PROFILES STATISTIC**

PX HIGH: 0	P2: 0
PX MID: 0	P1: 0
PX LOW: 0	IDLE: 1



# How to adjust the maximum frequency for the dynamic profile? (Zen 3)

A tool to control additional stability is the **PX OB LIMIT**. It avoids excessive frequency increases in the super light task. In some cases if you don't limit the maximum frequency a crash will happen. For example, my Ryzen 7 5800X generates frequency peaks above 5100 MHz. Ryzen 9 5950X – more than 5200.

It works very simply, **PX OB LIMIT + PX PROFILE frequency = maximum peak**. Beyond this value the frequency increase system will not be able to jump. Recommended value 125-150. **Depends on the CPU sample individually.**

The screenshot shows the CTR 2.1 RC5 software interface. The sidebar on the left contains icons for TUNER, PROFILES, RESULTS, ABOUT & HELP, SCREENSHOT, DONATE & UPGRADE, MINIMIZE, TO TRAY, and EXIT. The main area is divided into three profile sections: PX PROFILE, P2 PROFILE, and P1 PROFILE, each with 'activated!' status. The PX PROFILE section has input fields for HIGH (MHz), MID (MHz), and LOW (MHz) with values 4900, 4825, and 4750 respectively, and corresponding calculated peak values of 5025, 4950, and 4875. The P2 PROFILE section has fields for VID (mV), CCX1 OB (mV), CCX2 OB (mV), and CPU usage min (%). The P1 PROFILE section has similar fields. At the bottom, the PROFILES SETTINGS section includes a 'PX OB LIMIT' dropdown menu set to '+125' and a 'PX PRESET' dropdown set to 'MIX'. A 'CALCULATE OB' button is also present. The PROFILES STATISTIC section shows values for PX HIGH, PX MID, PX LOW, P2, P1, and IDLE.





# Clock Tuner for Ryzen™ 2.1 – INFO

There are different types of AVX load. Some AVX workloads are impossible to get in real computer applications, so I don't advise you to mock your processor. For testing OB CTR uses a Prime 95 preset with a FFT value of 4K/5K (Smallest FFTs).

**Testing 1-6 threads with any AVX stress-test is not required, you put the processor at risk because even in default state (AMD boost) I observe abnormally high voltages and temperatures. My recommendation is CB23. You can adjust the number of threads. This is a great stability test.**

Third-party monitoring programs can worsen the response speed of CTR on load changes or block CTR at all, which can lead to system crashes. From my side I can not affect this, because bad-code of third-party programs can not fix by CTR. Safe in my opinion are programs such as HWINFO and MSI Afteburner. Ryzen Master is a dangerous program because AMD does not use SMU-user communication protection (e.g. global PCI-mutex). AIDA64 it is also on the list of unsafe programs that block PCI-mutex for a long time.

Some of you have a very hard time imagining what OB is and some of you are afraid of it. OB does not add voltages or interfere with the CPU. This value exists only in CTR to recalculate the frequency relative to the voltage telemetry. CTR communicates with the processor and asks its opinion on what voltages are preferred for the current frequency, then CTR calculates the offset and uses it. A number of processor sensors are used to calculate the offset. This makes the dynamic profiles unique and the only thing currently available.

**The OB value is always individual for each system and depends on the VRM user settings. Also do not forget that the processor is a dynamic system and the booster frequency can fluctuate (25-50 MHz).** There are cases where the processor has no frequency reserve. In such cases you may see an OB value of less than 8.

For ease of your understanding, OB can be converted to CO (or vice versa).  $4 \text{ OB} = 1 \text{ CO}$ . That is, if you have CO 10 for the worst core (current CCX), you can calculate the OB for P1 and P2 very easily.  $10 * 4 = 40$ . Or just trust OB calculations.

The overall stability of the CTR is very dependent on the performance of the DRAM. Remember to run new diagnostics if you have changed the DRAM settings.