



AMD

# RYZEN Master 1.5 – Quick Reference Guide

October 2018

# PREFACE

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# A NOTE ON RYZEN MASTER GENERAL USAGE

- ▲ AMD Ryzen and Ryzen Threadripper processors are designed for outstanding performance out-of-the-box, on first use, with any Windows application, without AMD Ryzen Master
- ▲ AMD Ryzen Master is a tool for enthusiast users
  - Who use the various controls to experiment with processor and system configurations
  - Often outside of specified and warrantied range of operation
  - Attempting to further optimize general performance or performance of a specific application or set of tasks
  - Who accept the risk that some control settings may result in lower performance or instability and system crashes
- ▲ The Ryzen Master Game Mode profile is offered as a preconfigured group of settings
  - Intended only for Ryzen Threadripper processors when running games
  - Not intended for Ryzen 3, Ryzen 5, and Ryzen 7 processors, as it will show no benefit on these models
  - Only use Game Mode if the stock processor settings, also pre-configured as the 'Creator Mode' profile, produce less-than-expected game performance
  - If so, try 'Game Mode' and use the settings that delivers the highest performance in the game

# RYZEN MASTER USAGE TIPS

- ▲ AMD recommends the following Windows 10 Power Options settings when using Ryzen Master for any purpose
  - High Performance power plan selected
  - Uncheck “Turn on fast startup” under Power Options > Choose what the power buttons do > Shutdown Settings
  
- ▲ For a Ryzen Master configuration change that requires a restart or shutdown
  - Ryzen Master will always tell you if a restart requires you to push the system power button and restart Ryzen Master
  - If Ryzen Master causes the system to power off, you must restart using the power button, and then restart Ryzen Master after booting to Windows.
  - If Ryzen Master doesn’t prompt the user to power off the system, the system will restart without user intervention, and Ryzen Master will restart itself in time; wait for it.  
In this case, it may take on the order of 10 seconds for Ryzen Master to appear, depending on core and performance settings.

# **RYZEN MASTER INSTALLATION AND CONFIGURATION**

# INSTALLING RYZEN MASTER

- ▲ The Ryzen Master application installer is available to download from AMD [here](#)
  - Along with this Quick Reference Guide
- ▲ Ryzen Master will only install on a Windows 10 PC running an AMD Ryzen desktop processor
- ▲ If Ryzen Master will not install, it may not be enabled:
  - In the case of a pre-built PC, the manufacturer has control over whether the PC is allowed to overclock. If the PC has been blocked from overclocking, Ryzen Master will advise of such and will not install.
  - Windows 10 Virtualization-Based Security must be disabled for Ryzen Master to function.
- ▲ During the installation process, a legal disclaimer and click-through license agreement must be accepted
  - Ryzen Master allows the user to configure the processor beyond stock operating conditions which may result in system instability, loss of or corruption of data from open applications, processor failure and system damage
  - The user must accept these risks to proceed with the installation
- ▲ If Ryzen Master fails to uninstall or upgrade properly when a new version is being installed, use the Microsoft install/uninstall troubleshooter to clean up the Ryzen Master elements so that Ryzen Master can be cleanly installed
  - See [Microsoft application installation troubleshooter](#)
- ▲ On first use after installation, Ryzen Master uses the current processor parameters to establish default reset parameters
  - If the processor is first configured in BIOS to other than default parameters, these changes will be reflected in the Ryzen Master default settings
  - If the processor is changed after Ryzen Master installation, please uninstall then re-install Ryzen Master to associate the new processor
  - If a new system BIOS is installed, please uninstall then re-install Ryzen Master to link supporting BIOS elements
  - These steps will assure that Ryzen Master is accessing the correct information for the new processor and new BIOS
- ▲ Ryzen Master checks for updates
  - After installation, Ryzen Master checks for new updates every 15 days
  - The user can check manually by starting the AMD AutoUpdate task through Windows Start > AMD AutoUpdate



# **RYZEN MASTER VERSION 1.5**

## ***NEW FEATURE REVIEW***

# WELCOME TO AMD RYZEN MASTER 1.5

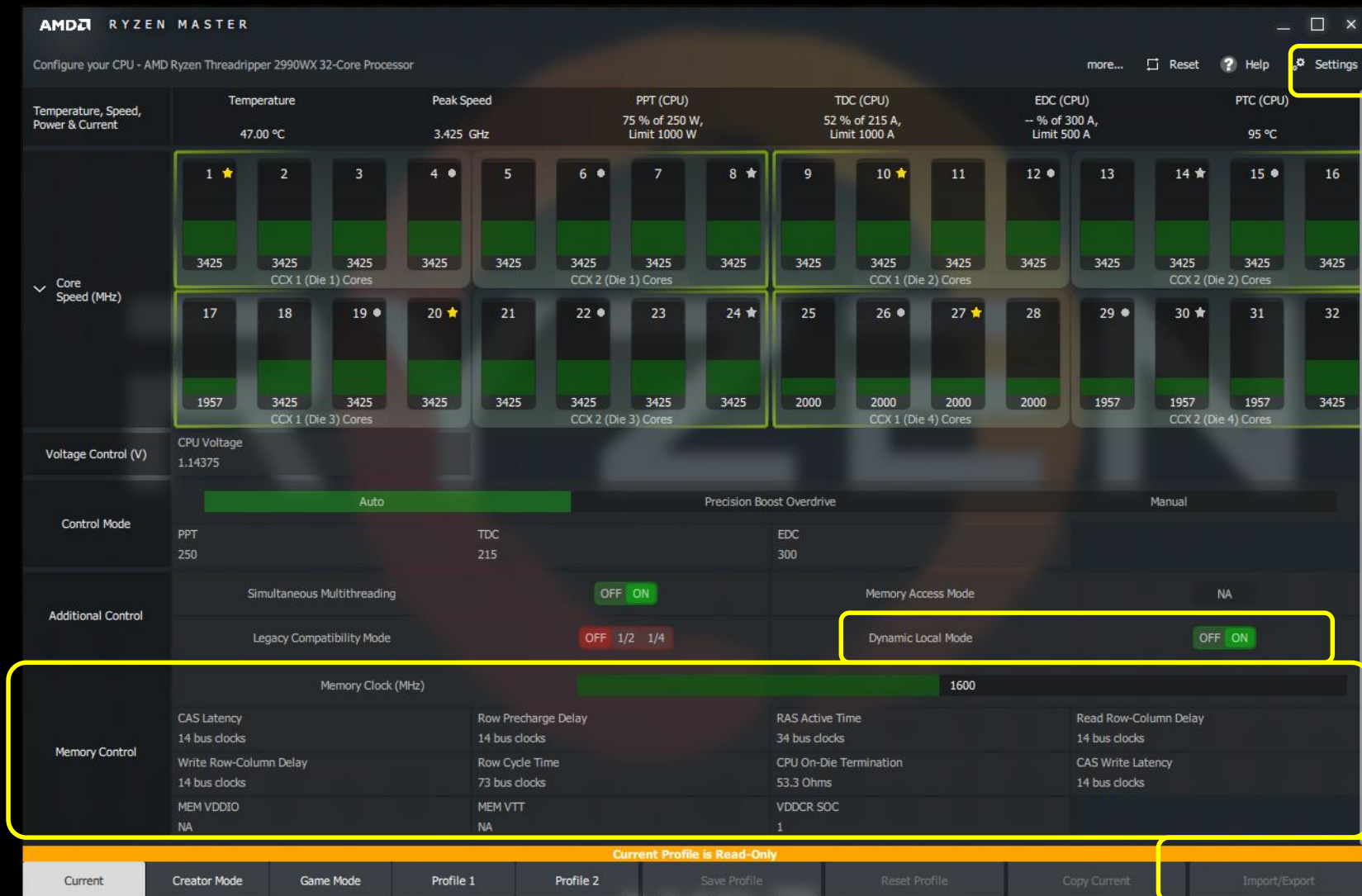
## SUPPORTING AMD RYZEN AND AMD RYZEN THREADRIPPER DESKTOP PROCESSORS

### ▲ Ryzen Master 1.5 adds support for AMD Ryzen™ Threadripper™ 2970WX and 2920X CPUs

- See the [RM1.3 Quick Reference Guide](#) for the basics

### ▲ New Features in version 1.5:

- Profile export and import
- Dynamic Local Mode
  - Specifically for AMD Ryzen™ Threadripper™ WX Series processors
  - automatically improves performance in select applications
  - Toggle control for user experimentation
- All memory controls in one Group
- Keyboard entry of any field
- Auto-update configuration through Settings page



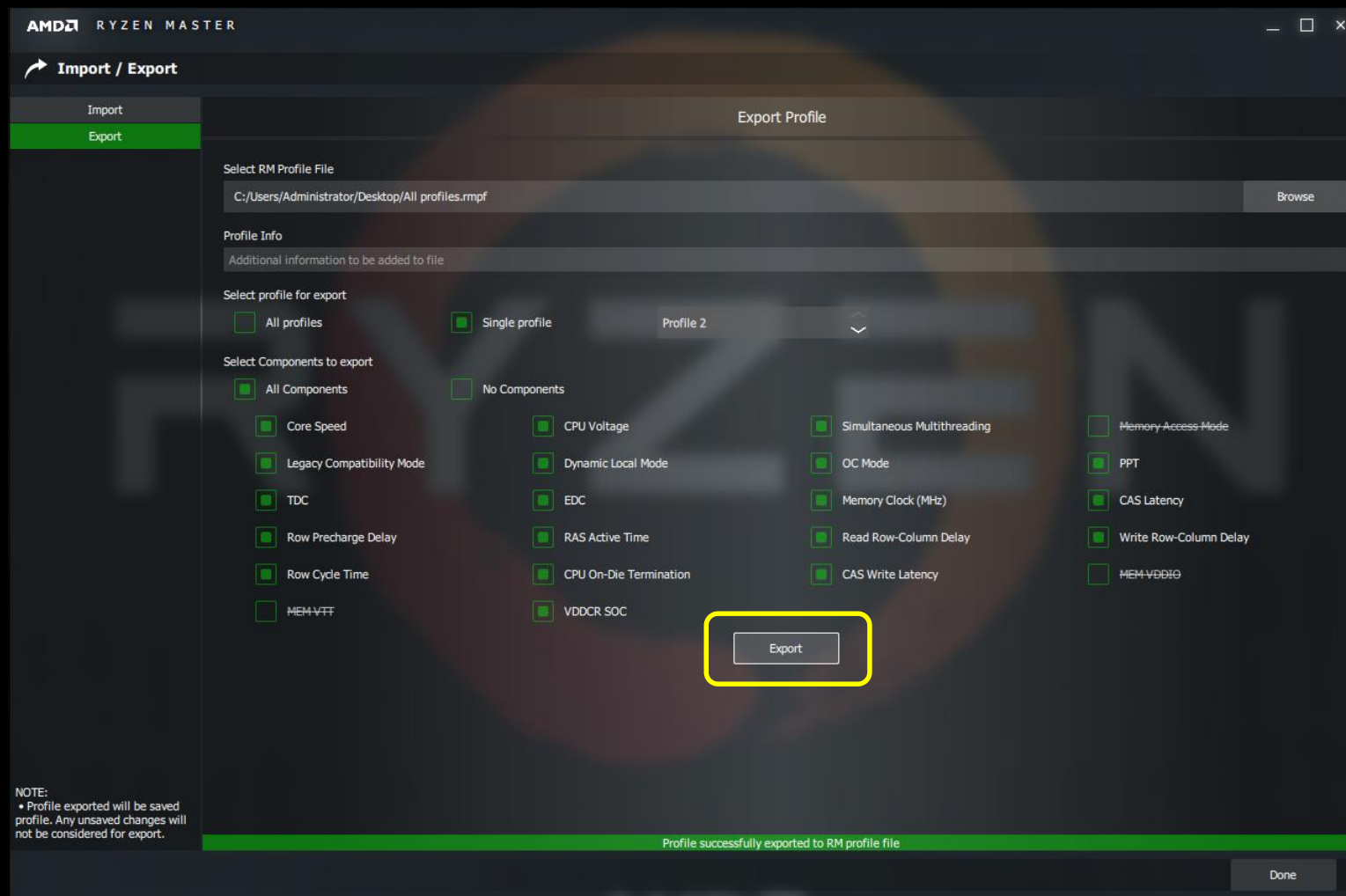
# RYZEN MASTER FEATURE SUPPORT FOR RYZEN PROCESSORS

▲ Ryzen Master 1.5 supports all Ryzen processors, but not all features are available for all processors:

Feature	Ryzen and Ryzen Threadripper 2000-Series Processors	Ryzen with Radeon Vega Graphics Processors	Ryzen and Ryzen Threadripper 1000-Series Processors
Core speed overclocking	All cores same speed, cores speed per CCX, and per-core speeds	All cores at same speed	All cores at same speed
Precision Boost Overdrive	Yes	No	No
Core performance indicators	Yes	No	No
Core disabling	In user-defined pairs, and full CCX disable (core symmetry across die required for Ryzen Threadripper)	In pairs	Ryzen 3/5/7: In core pairs Ryzen Threadripper: In core quads
Control Mode Auto/Manual switching	Yes	No	No
Integrated GPU overclocking	No (no GPU)	Yes	No (no GPU)
Stability stress test	Yes (Cores & Memory)	No	No
Power and current monitoring	Yes (EDC monitoring not available for Ryzen Threadripper 2000-Series)	Yes	No
Dynamic Local Mode service and Ryzen Master toggle control	Only for Ryzen Threadripper 2990WX and 2970WX	No	No

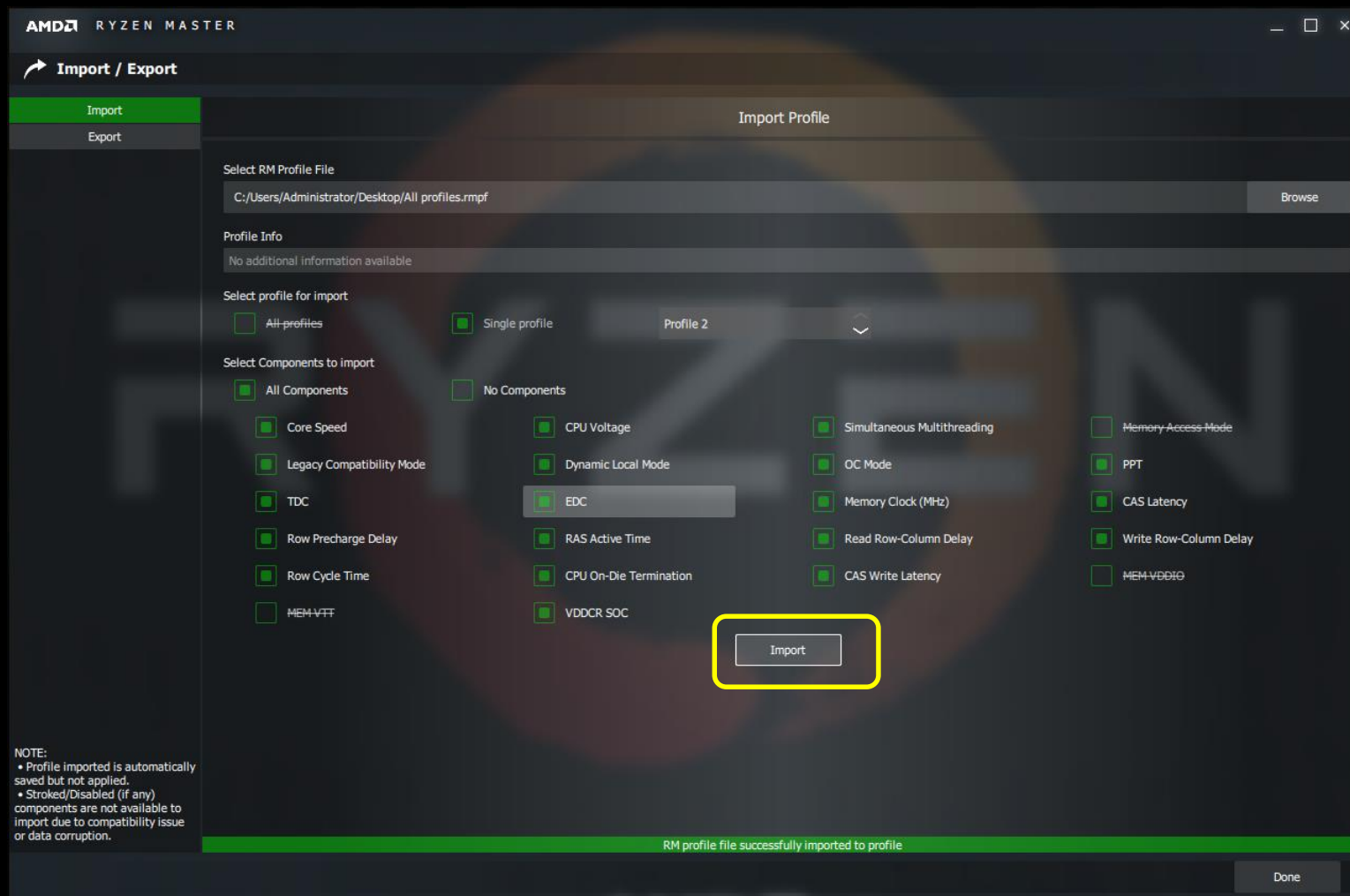
# PROFILE EXPORT

- ▲ User's may wish to save profiles to load later
- ▲ Each profile tab offers export of
  - Specific or all profiles
  - User-specified or all parameters
  - With a field for describing the profiles
- ▲ The exported file is encrypted to discourage tampering
- ▲ Use the Export button to complete the profile export
- ▲ Use the Done button to return to the profile



# PROFILE IMPORT

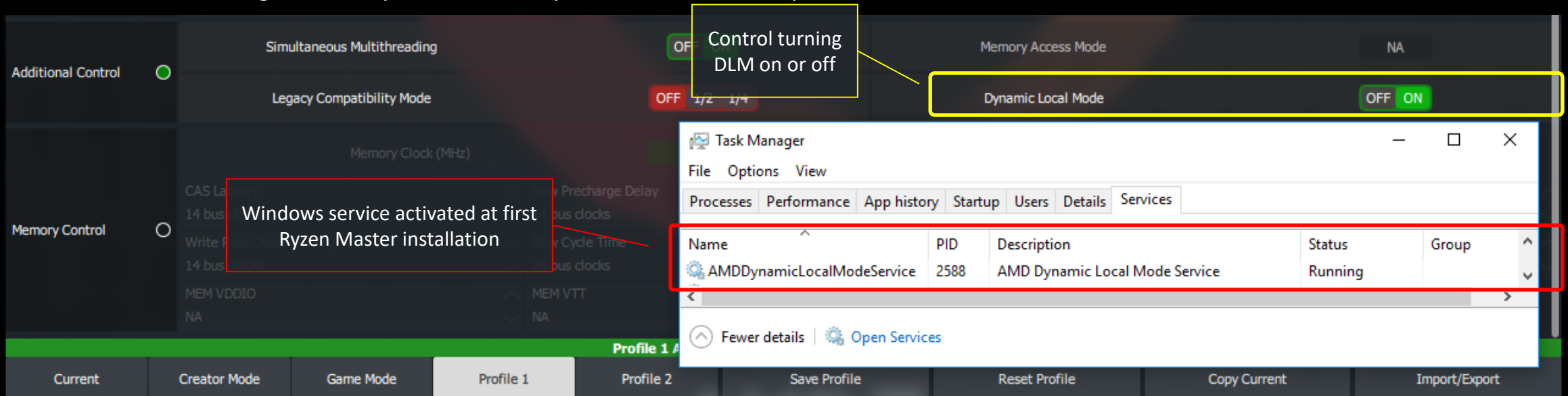
- ▲ A profile file can be loaded for the user to Apply
- ▲ After selecting the profile file to load, the user can select which parameters to load
- ▲ Use the Import button to load the saved profile's parameters and insert them into the current profile
- ▲ Use the Done button to return to the profile
- ▲ The user must still click 'Apply' for the imported profile to take effect



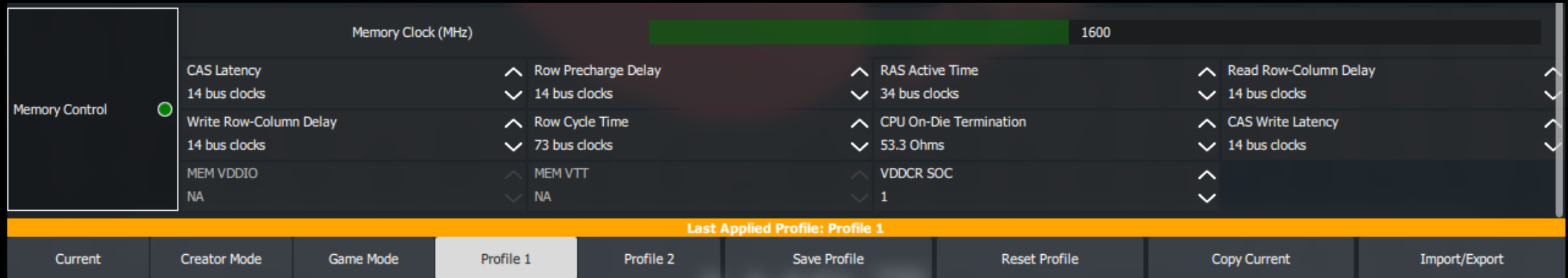
# AMD DYNAMIC LOCAL MODE (DLM)

ONLY AVAILABLE ON RYZEN THREADRIPPER 2990WX AND 2970WX PROCESSORS

- ▲ The Dynamic Local Mode feature is a Windows service
  - Installed and activated with the installation of Ryzen Master 1.5 only to the Ryzen Threadripper 2990WX and 2970WX processors
  - This service can be turned on and off through Ryzen Master profile controls in the Additional Control group
  - Do NOT start or stop this service through the Task Manager/Services interface. If you do, reboot the system.
- ▲ DLM dynamically associates the threads scheduled for an application with cores of die directly attached to memory to reduce memory latency, improving performance
- ▲ Recommended operation should be with DLM on. Ryzen Master allows the user to experiment with different settings to optimize performance for applications that have not yet been profiled
- ▲ Note that the DLM setting active in Ryzen Master will persist after both the Ryzen Master Current view Reset and a soft or hard reboot



# CONSOLIDATED MEMORY CONTROL GROUP

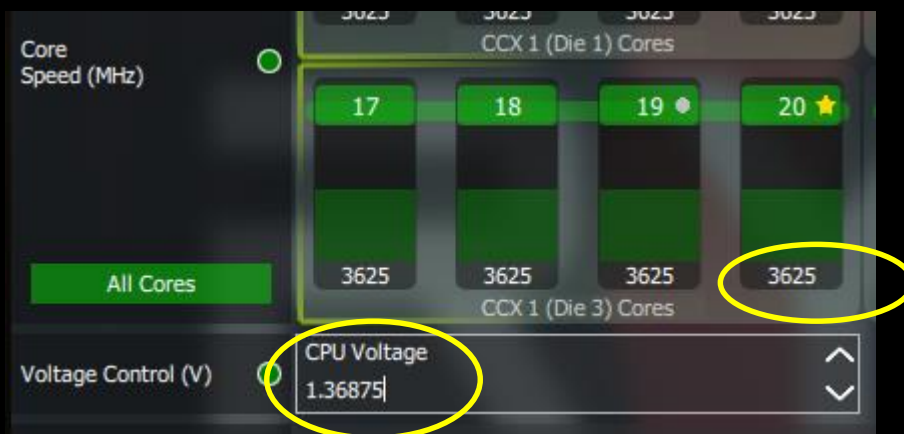


- ▲ All Ryzen Master settings that control system memory performance are now in a single Memory Control group, including memory clock, memory timings, module voltage (MEM VDDIO) and processor memory controller voltage (VDDCR SOC)
- ▲ When the Memory Control group is active, any change to any group parameter requires a reboot and all parameters are applied, not just the ones that have changed. This insures that the BIOS-level memory training uses all profile Memory Control parameters in the re-training attempt.



# KEYBOARD ENTRY FOR CORE SPEEDS AND VOLTAGE

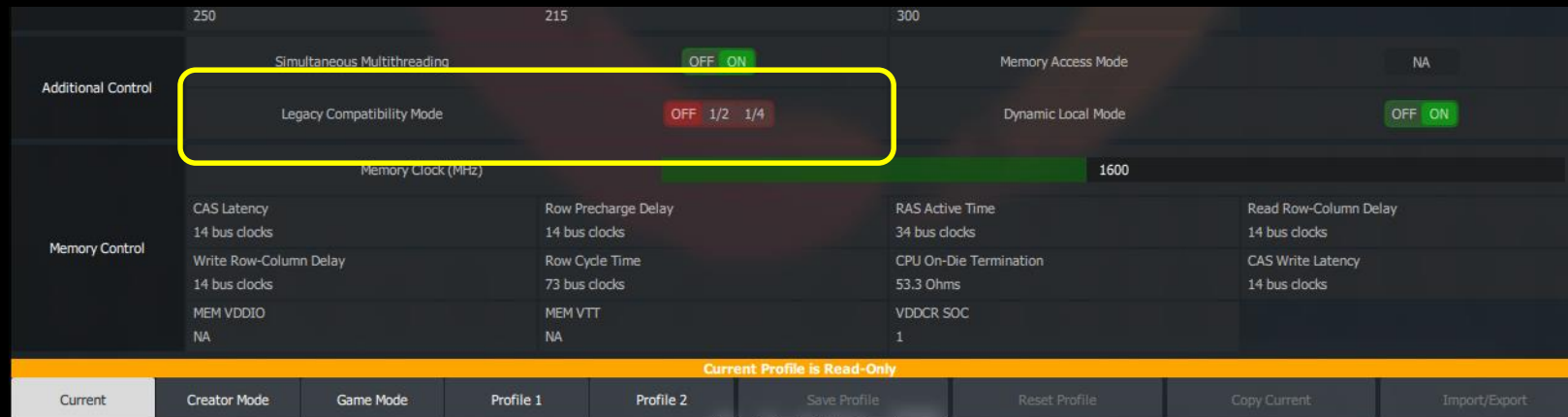
- ▲ Fields containing values can now be entered by keyboard
- ▲ Note that voltage and frequency values are limited to increments that the processor will set to when Applying a value entered
- ▲ The Ryzen Master Current View will reflect the actual setting
- ▲ To see the actual setting in a profile, use the Copy Current command of the profile



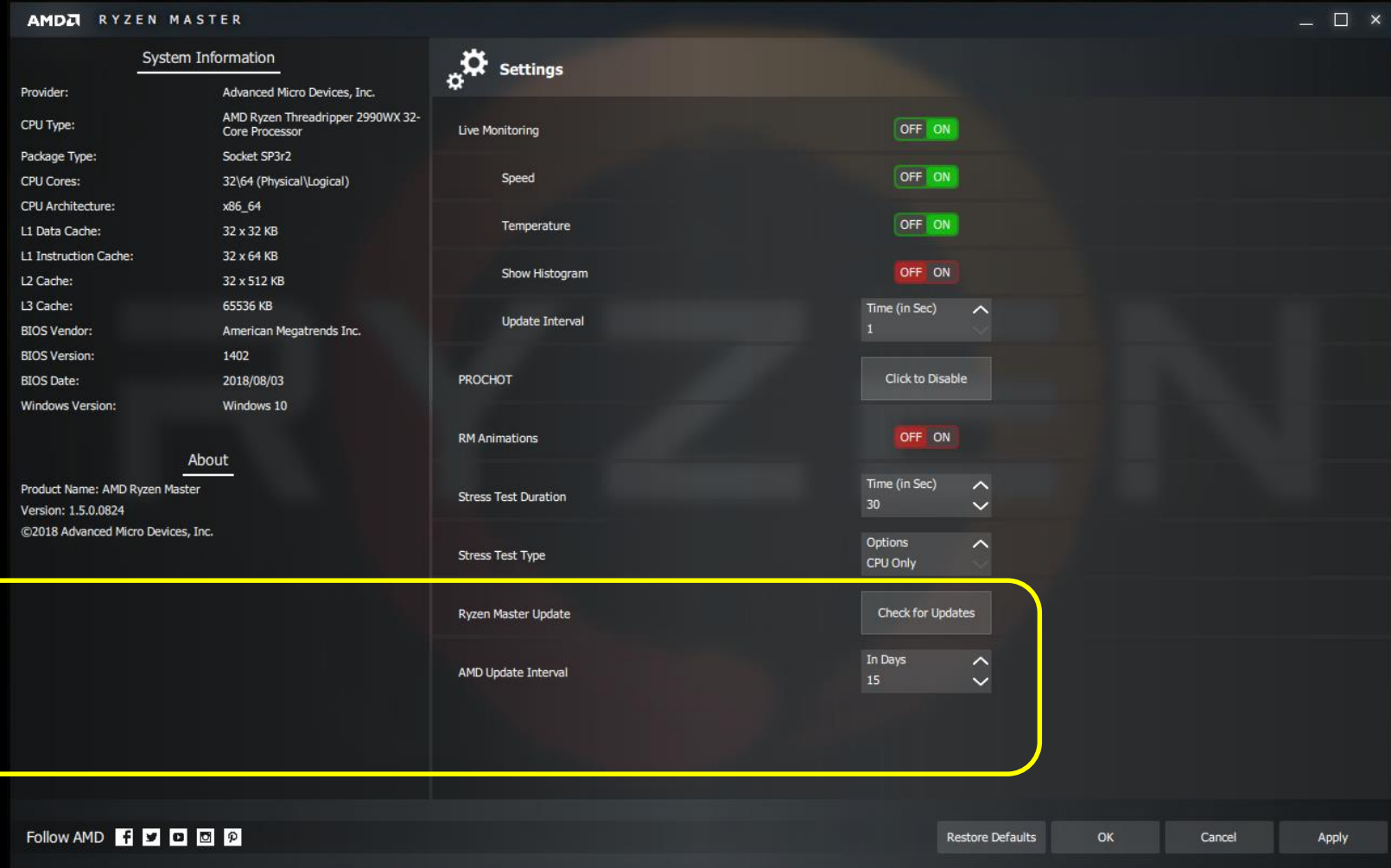


# LEGACY COMPATIBILITY MODE LIMITED TO >8 CORES FOR ANY PROCESSOR

- ▲ The Legacy Compatibility Mode (LCM) feature has been restricted to processors of more than 8 cores
  - where the feature may improve performance of some legacy applications
  - subject to user experimentation per application
- ▲ For processors of 8 cores or less, LCM is deactivated and displayed as “NA”
  - The Game Mode profile remains useful even with LCM deactivated
  - Use the profile to tune other parameters for your favorite game
  - Hint: Overclocking memory is your best, first step to improving legacy and modern game performance for any processor



# CHECKING FOR RYZEN MASTER UPDATES



These features have been added to check for updates manually and to set the update-check interval

# **RYZEN MASTER VERSION 1.4**

## ***FEATURE REVIEW***

# WELCOME TO AMD RYZEN MASTER 1.4

## SUPPORTING AMD RYZEN AND AMD RYZEN THREADRIPPER DESKTOP PROCESSORS

- ▲ Ryzen Master 1.4 adds new features to Ryzen Master 1.3
  - See the [Version 1.3 Quick Reference Guide](#) for the basics
- ▲ New to Ryzen Master 1.4 for Ryzen & Ryzen Threadripper 2000-Series
  - Precision Boost Overdrive feature (PBO)
    - Allows the CPU to use the full power headroom of the motherboard
    - Performance results scale with premium cooling and low ambient temperature
  - Real-time power monitoring
    - Motherboard power resources for PPT and TDC reported as a % of the current limit
    - Board maximum limit displayed for manual PBO optimization
  - Fastest and second-fastest cores identified
    - Expanded to cover each die of the Ryzen 3/5/7 and Threadripper processors
  - Improved user interface for per-CCX and per-core clock control



# RYZEN MASTER FEATURE SUPPORT FOR RYZEN PROCESSORS

▲ Ryzen Master 1.4 supports all Ryzen desktop processors, but not all features are available for all processors:

Feature	Ryzen and Ryzen Threadripper 2000-Series	Ryzen with Radeon Vega Graphics	Ryzen and Ryzen Threadripper 1000-Series
Core speed overclocking	All cores same speed, cores speed per CCX, and per-core speeds	All cores at same speed	All cores at same speed
Precision Boost Overdrive	Yes	No	No
Core performance indicators	Yes	No	No
Core disabling	In user-defined pairs, and full CCX disable (core symmetry across die required for Ryzen Threadripper)	In pairs	Ryzen: In pairs Ryzen Threadripper: In quads
Control Mode Auto/Manual switching	Yes	No	No
Integrated GPU overclocking	No (no GPU)	Yes	No (no GPU)
Stability stress test	Yes (Cores & Memory)	No	No
Power and current monitoring	Yes (EDC monitoring not available for Ryzen Threadripper 2000-Series)	Yes	No

# INTERFACE VIEWS

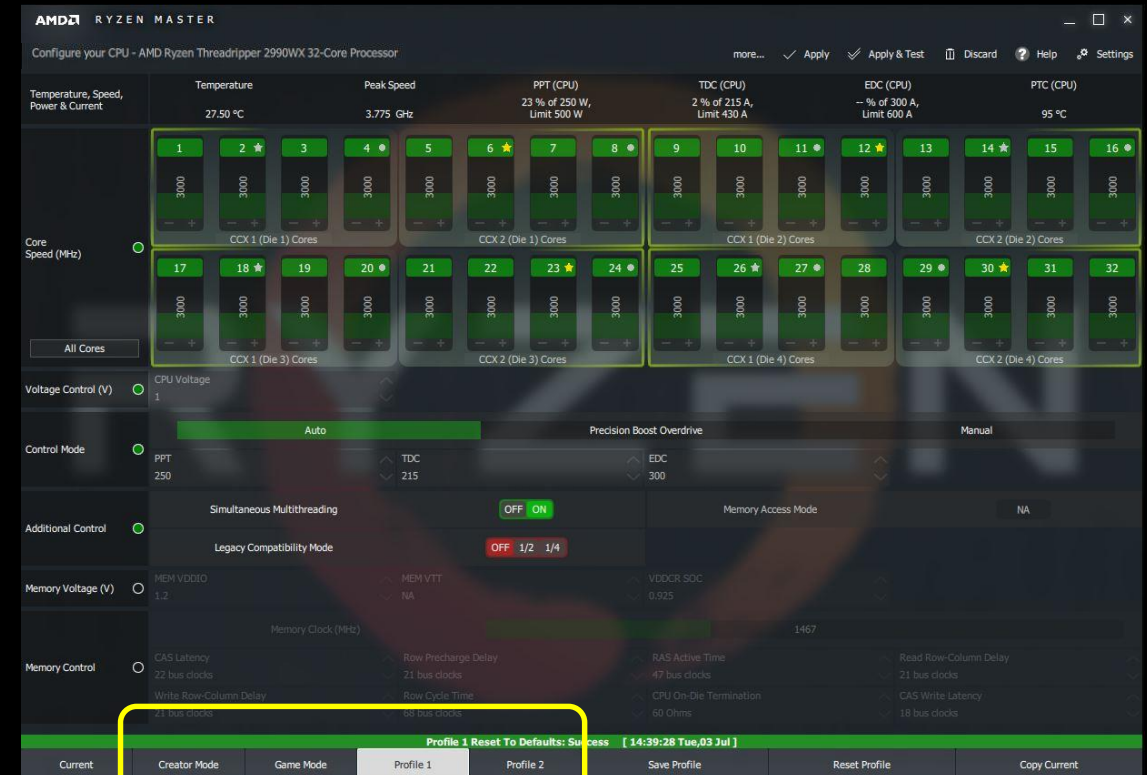
## Current view

- The dashboard of the current configuration
- With performance monitoring
- *Not* for changing configuration – Use a profile



## Profiles for user-defined configurations

- Editing parameters, running stress tests
- ‘Creator Mode’ and ‘Game Mode’ partially pre-configured for those application types
- Profiles 1 & 2 fully configurable
- Click profile tab to change the name





# PRECISION BOOST OVERDRIVE (PBO)

The screenshot displays the AMD Ryzen Master application window for an AMD Ryzen Threadripper 2990WX 32-Core Processor. The interface is divided into several sections:

- Top Bar:** Includes the AMD logo, "RYZEN MASTER", and a title bar. Below the title bar, it says "Configure your CPU - AMD Ryzen Threadripper 2990WX 32-Core Processor". On the right, there are buttons for "more...", "Apply", "Apply & Test", "Discard", "Help", and "Settings".
- Summary Section:** Displays key metrics: Temperature (27.25 °C), Peak Speed (3.675 GHz), PPT (CPU) (23 % of 250 W, Limit 500 W), TDC (CPU) (2 % of 215 A, Limit 430 A), EDC (CPU) (— % of 300 A, Limit 600 A), and PTC (CPU) (95 °C).
- Core Speed (MHz) Section:** Shows a grid of 32 cores, organized into four groups of eight (CCX 1 (Die 1) Cores, CCX 2 (Die 1) Cores, CCX 1 (Die 3) Cores, and CCX 2 (Die 3) Cores). Each core has a speed indicator (e.g., 3000 MHz) and a boost indicator (e.g., star or dot). A yellow box highlights the first eight cores (CCX 1 and CCX 2 (Die 1) Cores).
- Voltage Control (V) Section:** Shows "CPU Voltage" set to 1.
- Control Mode Section:** Features a slider between "Auto" and "Manual", with "Precision Boost Overdrive" selected in the middle. Below the slider, there are dropdown menus for "PPT" (set to 250), "TDC" (set to 215), and "EDC" (set to 300). Yellow lines connect these dropdowns to a text box at the bottom.

Annotations and Callouts:

- A yellow box highlights the first eight cores (CCX 1 and CCX 2 (Die 1) Cores).
- A yellow box contains the following text:
  - Precision Boost Overdrive allows the processor to automatically use the full power headroom of the motherboard above warranted CPU limits, potentially increasing maximum and average core speed.
  - This feature works best with premium cooling and a cool ambient environment
- Yellow lines connect the "PPT", "TDC", and "EDC" dropdown menus to a text box at the bottom.

- These manual PBO values are applied when PBO is selected, allowing the user to override the default values up to the board's maximum limits.

# PRECISION BOOST OVERDRIVE AT BOARD LIMITS

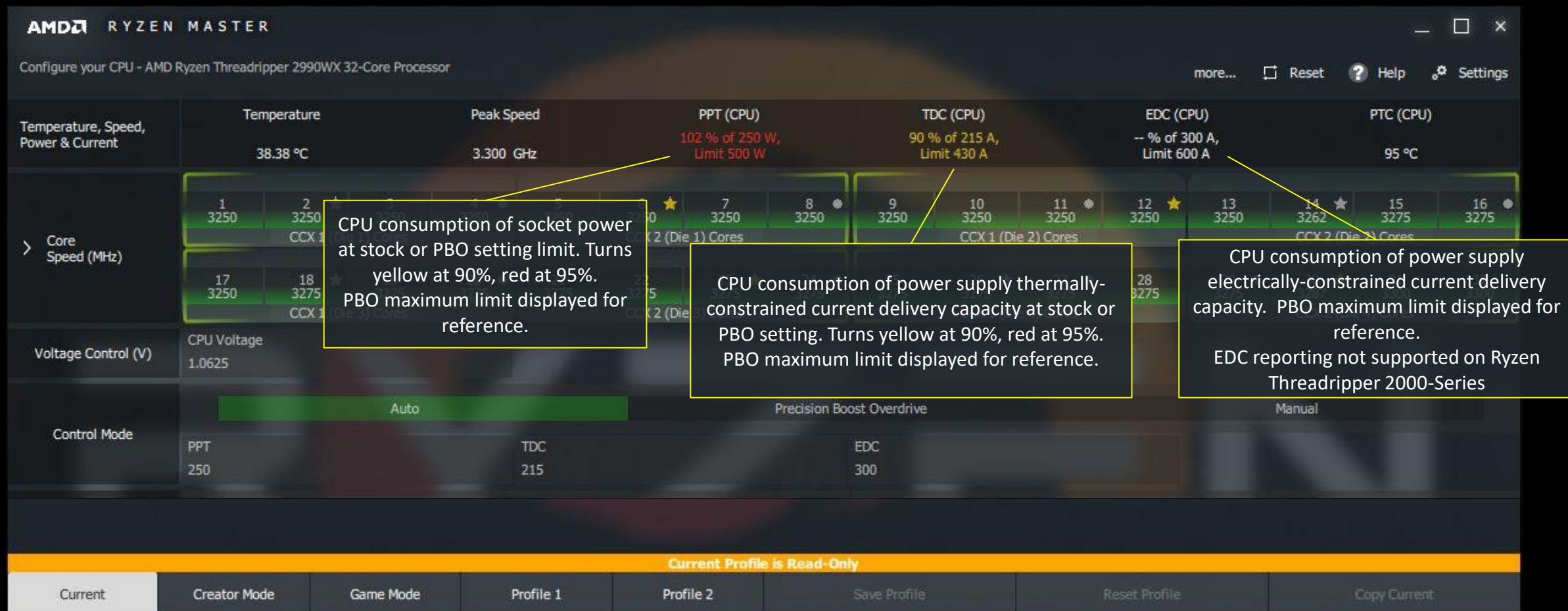
The screenshot displays the AMD Ryzen Master interface for an AMD Ryzen Threadripper 2990WX 32-Core Processor. The interface is divided into several sections:

- Temperature, Speed, Power & Current:** Shows overall system metrics: Temperature (27.13 °C), Peak Speed (4.200 GHz), PPT (CPU) (11 % of 500 W, Limit 500 W), TDC (CPU) (1 % of 430 A, Limit 430 A), EDC (CPU) (-- % of 600 A, Limit 600 A), and PTC (CPU) (95 °C).
- Core Speed (MHz):** A grid of 32 core speed controls, organized by CCX (CCX 1 and CCX 2) and Die (Die 1, Die 2, Die 3, and Die 4). Each core has a speed slider and a status icon. A yellow box highlights the 'Apply' button in the top right corner, with a text overlay stating: "PBO values set by user to board limits take effect using the 'Apply' button".
- Voltage Control (V):** Shows CPU Voltage (1.0 V).
- Control Mode:** A slider between 'Auto' and 'Manual', currently set to 'Auto'. Below the slider, the PPT, TDC, and EDC limits are displayed: PPT 500, TDC 430, and EDC 600.

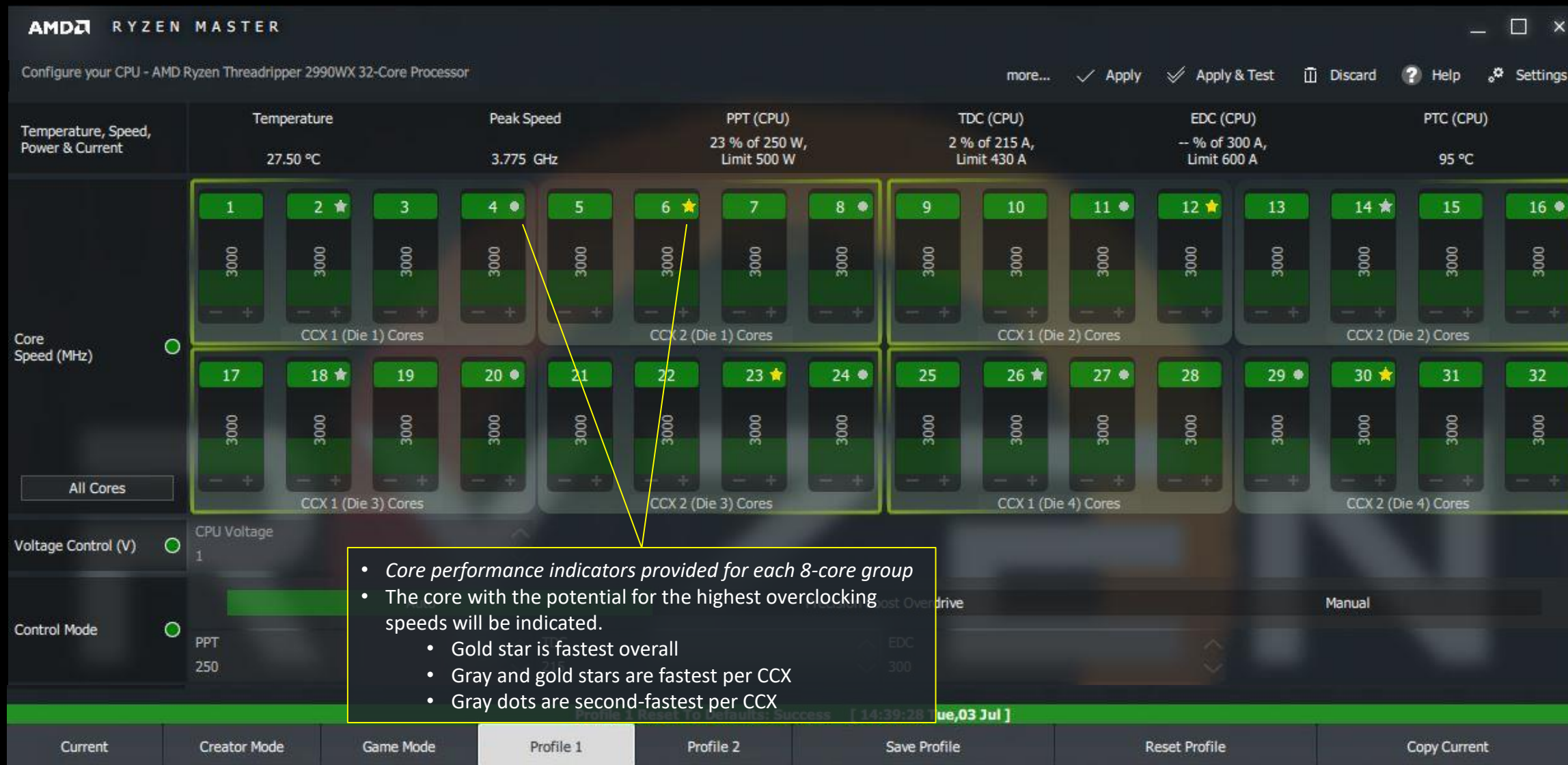
Yellow lines connect the 'Apply' button to the PPT, TDC, and EDC limit values, indicating that these values are set by the user to board limits and take effect when the 'Apply' button is pressed.



# CURRENT VIEW – POWER MONITORING



# CORE PERFORMANCE POTENTIAL INDICATORS





# PER-CCX CONTROL OF CORE SPEEDS

- All Cores button (green) enables all cores to match the speed changes as you adjust a single core
- When off (red), each core is adjusted individually

- The CCX button allows setting the speeds of the CCX's cores together (green) or individually (red).



# RYZEN THREADRIPPER GAME MODE PROFILE

- The 'Game Mode' profile (intended exclusively for Threadripper processors) pre-configures a limit of 8 active cores for legacy games that may run better under a limited-core (MHz) resource.

**AMD RYZEN MASTER**

Configure your CPU - AMD Ryzen Threadripper 2990WX 32-Core Processor

more... ✓ Apply ✓ Apply & Test 🗑 Discard ? Help ⚙ Settings

Temperature, Speed, Power & Current	Temperature	Peak Speed	PPT (CPU)	TDC (CPU)	EDC (CPU)	PTC (CPU)
	26.50 °C	3.900 GHz	23 % of 250 W, Limit 500 W	2 % of 215 A, Limit 430 A	-- % of 300 A, Limit 600 A	95 °C

Core	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Frequency	3000	3000	3000	3000	3000	3000	3000	3000	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
CCX	CCX 1 (Die 1) Cores				CCX 2 (Die 1) Cores				CCX 1 (Die 2) Cores				CCX 2 (Die 2) Cores			

Core	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Frequency	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
CCX	CCX 1 (Die 3) Cores				CCX 2 (Die 3) Cores				CCX 1 (Die 4) Cores				CCX 2 (Die 4) Cores			

**Control Options:**

- Voltage Control (V): ☒ CPU Voltage 1
- Control Mode: ☒ Auto ☐ Precision Boost Overdrive ☐ Manual
- PPT: 250 TDC: 215 EDC: 300
- Additional Control: ☒ Simultaneous Multithreading (OFF ON) ☐ Memory Access Mode (NA)
- Legacy Compatibility Mode: OFF 1/2 1/4

**Last Applied Profile: Profile 1**

Current Creator Mode **Game Mode** Profile 1 Profile 2 Save Profile Reset Profile Copy Current

- The normal Control Modes remain accessible for the user, including Manual mode for manual core overclocking.
- Memory overclocking is also available.

# **RYZEN MASTER VERSION 1.3**

## ***QUICK REFERENCE GUIDE***

# HOVER THE MOUSE OVER A CONTROL TO GET TOOL TIPS FOR IN-LINE HELP

The screenshot displays the AMD Ryzen Master 1.5 software interface for configuring an AMD Ryzen 7 2700X processor. The interface is divided into several sections: a top status bar, a core speed control section, a voltage control section, an additional control section, a memory voltage section, and a memory control section. A yellow tooltip box is overlaid on the 'Core Speed (MHz)' section, pointing to the 'Set the CPU core voltage' option. The tooltip text reads 'Set the CPU core voltage'. The 'Core Speed (MHz)' section shows eight cores with their respective speeds: Core 1 (4000 MHz), Core 2 (3200 MHz), Core 3 (2675 MHz), Core 4 (1800 MHz), Core 5 (3950 MHz), Core 6 (2650 MHz), Core 7 (2650 MHz), and Core 8 (1775 MHz). The 'Voltage Control (V)' section shows the CPU Voltage set to 1.375V. The 'Control Mode' section shows the mode set to 'Manual'. The 'Additional Control' section shows 'Simultaneous Multithreading' as 'ON' and 'Legacy Compatibility Mode' as 'OFF'. The 'Memory Voltage (V)' section shows 'MEM VDDIO' at 1.356V, 'MEM VTT' at 0.66V, and 'VDDCR SOC' at 1.1V. The 'Memory Control' section shows the 'Memory Clock (MHz)' set to 1600 MHz and various memory timing parameters.

AMD RYZEN MASTER

Configure your CPU - AMD Ryzen 7 2700X Eight-Core Processor

more... ✓ Apply ✓ Apply & Test 🗑 Discard ? Help ⚙ Settings

Temperature, Speed, ...	Temperature	Peak Speed	PPT (CPU)	TDC (CPU)	EDC (CPU)	PTC (CPU)
	31.00 °C	4.000 GHz	--	--	--	--

Core Speed (MHz)

Example

Set the CPU core voltage

All Cores

Core	Speed (MHz)
1	4000
2	3200
3	2675
4	1800
5	3950
6	2650
7	2650
8	1775

Voltage Control (V)

CPU Voltage 1.375

Control Mode

Auto Precision Boost Overdrive Manual

Additional Control

Simultaneous Multithreading ON

Memory Access Mode Distributed NA Local

Legacy Compatibility Mode OFF

Memory Voltage (V)

MEM VDDIO 1.356

MEM VTT 0.66

VDDCR SOC 1.1

Memory Control

Memory Clock (MHz) 1600

CAS Latency 16 bus clocks

Write Row-Column Delay 18 bus clocks

Row Precharge Delay 18 bus clocks

Row Cycle Time 51 bus clocks

RAS Active Time 53 bus clocks

CPU On-Die Termination 60 Ohms

Read Row-Column Delay 18 bus clocks

CAS Write Latency 16 bus clocks

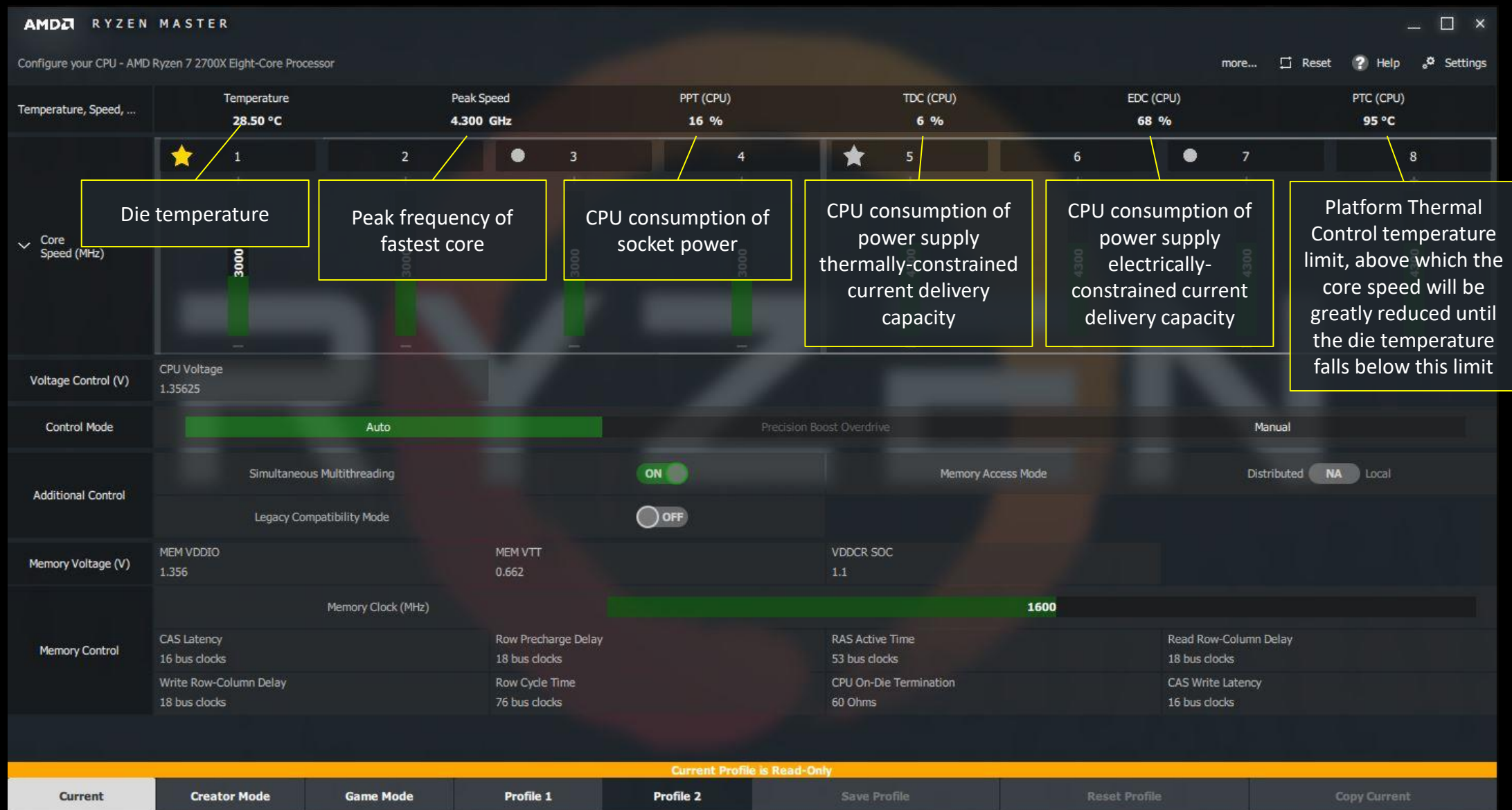
Last Applied Profile: Profile 1

Current Creator Mode Game Mode Profile 1 Profile 2 Save Profile Reset Profile Copy Current



# OVERVIEW AND OPERATION

# CURRENT VIEW – PERFORMANCE MONITORING





# GETTING AROUND THE PROFILES INTERFACE

The screenshot displays the AMD Ryzen Master 1.5 software interface for an AMD Ryzen 7 2700X processor. The interface is divided into several functional areas, each highlighted with a yellow box and a label:

- Actions:** Located in the top right corner, this panel contains buttons for "more...", "Apply", "Apply & Test", "Discard", "Help", and "Settings".
- Processor gauges:** A horizontal bar at the top displays key metrics: Temperature (31.00 °C), Peak Speed (4.000 GHz), PPT (CPU), TDC (CPU), EDC (CPU), and PTC (CPU).
- Control Groups:** A vertical sidebar on the left provides access to different configuration sections: "Core Speed (MHz)", "Voltage Control (V)", "Control Mode", "Additional Controls", "Memory Voltage (V)", and "Memory Control".
- Overclocking controls:** The central area of the interface contains various sliders and toggle switches for fine-tuning the system, including Core Speed (MHz) for each of the 8 cores, CPU Voltage, Control Mode (Auto, Precision Boost Overdrive, Manual), Simultaneous Multithreading, Legacy Compatibility Mode, MEM VDDIO, MEM VTT, VDDCR SOC, Memory Clock (MHz), and various memory timing parameters like CAS Latency, Row Precharge Delay, RAS Active Time, Read Row-Column Delay, Write Row-Column Delay, Row Cycle Time, CPU On-Die Termination, CAS Write Latency, and Read Row-Column Delay.
- Tabs for viewing and setting conditions:** A row of tabs at the bottom allows switching between different views: "Current", "Creator Mode", "Game Mode", "Profile 1", and "Profile 2".
- Profile functions:** A panel on the bottom right contains buttons for "Save Profile", "Reset Profile", and "Copy Current".

The interface also features a "Last Applied Profile: Profile 1" indicator and a "Memory Access Mode" section with "Distributed", "NA", and "Local" options.

# PROFILE USAGE DETAILS

- ▲ The left edge green buttons determine whether the control group is considered for changes when Applied
  - Selected (green): Apply group on Apply
  - De-selected (gray): Ignore group on Apply
  - This can be useful when you have multiple changes across groups but wish to apply them one group at a time to test for effect
- ▲ Changes to the following parameters require a restart:
  - Cores disabled, SMT, any Memory Voltage Control group value, any Memory Control value
- ▲ Ryzen Master presents the most commonly-applied and significant memory over-clocking parameters
  - Support of memory overclocking from Ryzen Master depends on motherboard BIOS enablement
  - Parameters that are not active indicate the BIOS does not support them at the application level
  - The BIOS also controls how many memory training attempts are made with the overclocked settings before a default is used
- ▲ Influence of Windows Power Options/Power Plans
  - In High Performance mode, cores will run at the top, overclocked power-state speed they are set for  
*This mode is key for the Copy Current function to capture the top speeds*
  - In Balanced mode, cores will modulate between the top, overclocked speed and the lower-speed power states.  
*Using Copy Current in this mode may result in sampling lower power-state speeds.*



- ▲ After selecting Manual Control Mode and setting the speed of all or some CPU cores
  - always set or confirm the core voltage THEN Apply
  - A core voltage too low for the frequency requested will be instable
- ▲ For Ryzen processors with graphics, the GFX Voltage is referenced to the SOC Voltage
  - The GFX Voltage can be raised above the SOC Voltage without reset
  - If the GFX Voltage is lowered below the SOC Voltage, the GFX Voltage will be automatically set to the SOC Voltage
  - If SOC Voltage is raised, a restart will then reset GFX Voltage to the new SOC Voltage

# PROFILE ACTIONS

The screenshot shows the AMD Ryzen Master interface for an AMD Ryzen 7 2700X processor. The interface includes a top bar with 'Apply', 'Apply & Test', 'Discard', 'Help', and 'Settings' buttons. Below this, there are sections for Temperature, Speed, PPT (CPU), TDC (CPU), EDC (CPU), and PTC (CPU). The main area displays four profiles (1, 2, 3, 4) with their respective Core Speed (MHz) and Voltage (V) settings. The 'Control Mode' is set to 'Manual'. The 'Additional Control' section is expanded, showing 'Memory Voltage (V)' and 'Memory Control' settings. The 'Last Applied Profile' is 'Profile 1'. The bottom bar shows the 'Current' profile and buttons for 'Creator Mode', 'Game Mode', 'Profile 1', 'Profile 2', 'Save Profile', 'Reset Profile', and 'Copy Current'.

**Temperature, Speed, ...**  
Temperature: 31.00 °C  
Peak Speed: 4.000 GHz  
PPT (CPU): --  
TDC (CPU): --  
EDC (CPU): --  
PTC (CPU): --

**Core Speed (MHz)**  
All Cores: 4000, 3200, 2675, 1800

**Voltage Control (V)**  
CPU Voltage: 1.375

**Control Mode**  
Auto, Precision Boost Overdrive, Manual

**Additional Control**  
OFF

**Memory Voltage (V)**  
1.356

**Memory Control**  
CAS Latency: 16 bus clocks, Write Row Precharge Delay: 18 bus clocks, Row Precharge Time: 18 bus clocks

**Last Applied Profile: Profile 1**

**Current** | Creator Mode | Game Mode | **Profile 1** | Profile 2 | Save Profile | Reset Profile | Copy Current

**Callouts:**

- Apply:** The most important Action control: The 'Apply' button applies the profile's settings to the processor and reports the status of the Apply below.
- Apply & Test:** This button Applies the profile and initiates the stress tests as configured in the Settings
- Discard:** This button discards changes to the profile of focus since the saved version of the profile
- Settings:** Opens the application Settings page
- Profile 1:** Four profiles provide user configurations to edit, save and apply now or later
  - Profiles 1 & 2 are general purpose.
  - Creator Mode enables all cores and stock processor configuration
  - Game Mode reduces cores by half and constrains memory access such that some legacy games may perform better. This profile is typically useful only to AMD Ryzen Threadripper processors.
- Save Profile:** Saves the profile of focus. Does not Apply the profile. If you switch to another view without saving your profile, the profile reverts to the last saved version when you return.
- Reset Profile:** Resets the profile to the processor's condition when Ryzen Master was installed. This will include BIOS-level settings that were active at install that Ryzen Master also controls. Does not Apply the profile.
- Copy Current:** Copies the current conditions to the profile of focus. This is a very useful feature when starting with the settings of another profile that has been applied as a starting point to create the new profile. Does not Apply the profile.

# SETTINGS CONTROL BEHAVIOR OF SOME FEATURES

The screenshot shows the AMD Ryzen Master 1.5 Settings window. The left sidebar contains 'System Information' and 'About' sections. The main area is titled 'Settings' and contains several toggle switches and dropdown menus. Yellow callout boxes provide detailed explanations for specific settings.

**System Information:**

- Provider: Advanced Micro Devices, Inc.
- CPU Type: AMD Ryzen 7 2700X Eight-Core Processor
- Package Type: Socket AM4
- CPU Cores: 8\16 (Physical\Logical)
- L1 Data Cache: 8 x 32 KB
- L1 Instruction Cache: 8 x 64 KB
- L2 Cache: 8 x 512 KB
- L3 Cache: 16384 KB
- BIOS Vendor: Insyde Corp.
- BIOS Version: RMP1002CA
- BIOS Date: 2018/03/19
- Windows Version: Windows 10
- Windows Architecture: x86\_64

**About:**

- Product Name: AMD Ryzen Master
- Version: 1.3.0.0593
- ©2018 Advanced Micro Devices, Inc.

**Settings:**

- Live Monitoring:** ON (Master toggle for Speed, Temperature and Histogram functions)
- Speed:** ON (Toggle for sampling core frequencies)
- Temperature:** ON (Toggle for sampling die temperature)
- Show Histogram:** OFF (Toggle for displaying histogram on Current view. Enabling histogram display can present a small but noticeable load on the processor cores.)
- Update Interval:** 1 (Parameter sample rate: higher)
- PROCHOT:** Click to Disable (FOR EXTREME AND EXPERT USE ONLY: Disabling PROHOT causes the processor to ignore the temperature of the board's voltage regulators and assumes the user is monitoring and cooling the regulators separately, typically for extreme overclocking record-setting only.)
- RM Animations:** OFF
- Stress Test Duration:** 15 (Time that each of CPU, GPU and Memory stress tests take when Applied in a Profile. Total time depends on Stress Test Type selected.)
- Stress Test Type:** All (Selection of which Stress Tests to execute when Applied in a Profile.)

**Footer:**

- Follow AMD [Social Media Icons]
- Restore Defaults OK Cancel Apply

# **BASIC OVERCLOCKING**



# RYZEN MASTER – UNDERSTANDING PROCESSOR POWER DOMAINS

## CPU Power Domain



VDDCR CPU Power W  
TDC (CPU) % of max  
EDC (CPU) % of max

CPU Voltage setting

**CPU  
Cores**

Core speed control  
Core Disable control  
SMT control

## SOC Power Domain



VDDCR SOC Power W  
TDC (SOC) % of max  
EDC (SOC) % of max

SOC Voltage setting

**Memory  
Controller**

Memory Clock control  
Board memory VDDIO &  
VTT settings

APU GFX Voltage  
setting  
**Graphics**

APU GFX Clock control

- ▲ The CPU Voltage setting determines how far the CPU Cores frequency can be driven to a point of instability
- ▲ Ryzen Master now reports CPU-domain-sampled values for
  - CPU Power in Watts
  - CPU Thermal Design Current (TDP) as a % of board capacity
  - CPU Electrical Design Current (EDC) as a % of board capacity

- ▲ The SOC Voltage setting drives the overclocking potential for the memory controller and, if an APU, for the Graphics (GFX)
  - The APU GFX Voltage is derived from the SOC Voltage and determines how far the GFX frequency can be driven to the point of instability
- ▲ Ryzen Master now reports SOC domain sampled values for
  - SOC Power in Watts
  - SOC Thermal Design Current (TDP) as a % of board capacity
  - SOC Electrical Design Current (EDC) as a % of board capacity

# BASIC OVERCLOCKING FOR ALL RYZEN PROCESSORS

The screenshot displays the AMD Ryzen Master application window. At the top, it identifies the CPU as an AMD Ryzen 7 2700X Eight-Core Processor. A summary bar shows overall metrics: Temperature (39.13 °C), Peak Speed (4.250 GHz), PPT (CPU) (11 %), TDC (CPU) (5 %), EDC (CPU) (68 %), and PTC (CPU) (95 °C). Below this, eight core speed sliders are shown, each with a star icon and a '+' button. The 'Core Speed (MHz)' section is currently set to 'All Cores' with a value of 4150 MHz. The 'Voltage Control (V)' section shows 'CPU Voltage' at 1.3875V. The 'Control Mode' is set to 'Manual' (with 'Auto' and 'Precision Boost Overdrive' also visible). The 'Additional Control' section includes 'Simultaneous Multithreading' (ON) and 'Legacy Compatibility Mode' (OFF). The 'Memory Voltage (V)' section shows 'MEM VDDIO' at 1.356V, 'MEM VTT' at 0.66V, and 'VDDCR SOC' at 0.875V. The 'Memory Control' section shows 'Memory Clock (MHz)' at 1600 MHz, with various timing parameters like CAS Latency (16 bus clocks), Row Precharge Delay (18 bus clocks), RAS Active Time (53 bus clocks), and Read Row-Column Delay (18 bus clocks). The bottom of the window features a profile management bar with buttons for 'Current', 'Creator Mode', 'Game Mode', 'Profile 1' (selected), 'Profile 2', 'Save Profile', 'Reset Profile', and 'Copy Current'.

- Toggle cores to disable or enable them
- Drag sliders or use +/- to adjust core speeds
- **Core voltage must be set with manually-overclocked core speeds**
- Select Manual mode to set speeds and voltage or return to stock Auto control
- Set memory module voltage
- Set processor memory controller voltage
- Set memory module speed and key memory overclocking parameters

## CHANGES, RESTARTS AND SHUTDOWNS

These Ryzen Master configuration changes	require this system change and user action.
<ul style="list-style-type: none"> <li>Control Mode to Manual</li> <li>Core speed, core voltage, per-core speed</li> </ul>	No restart or shutdown required, activated on Apply
<ul style="list-style-type: none"> <li>From Manual to Auto mode</li> <li>Disabling any cores</li> <li>Disabling Simultaneous Multithreading</li> <li>Disabling or Enabling Memory Access Mode or Legacy Compatibility Mode</li> <li>Any Memory Voltage or Memory Control change</li> </ul>	Ryzen Master-initiated restart, no user action required
<ul style="list-style-type: none"> <li>Enabling all cores</li> <li>Enabling Simultaneous Multithreading</li> </ul>	Ryzen Master-initiated shutdown then User-initiated power-on and re-start Ryzen Master

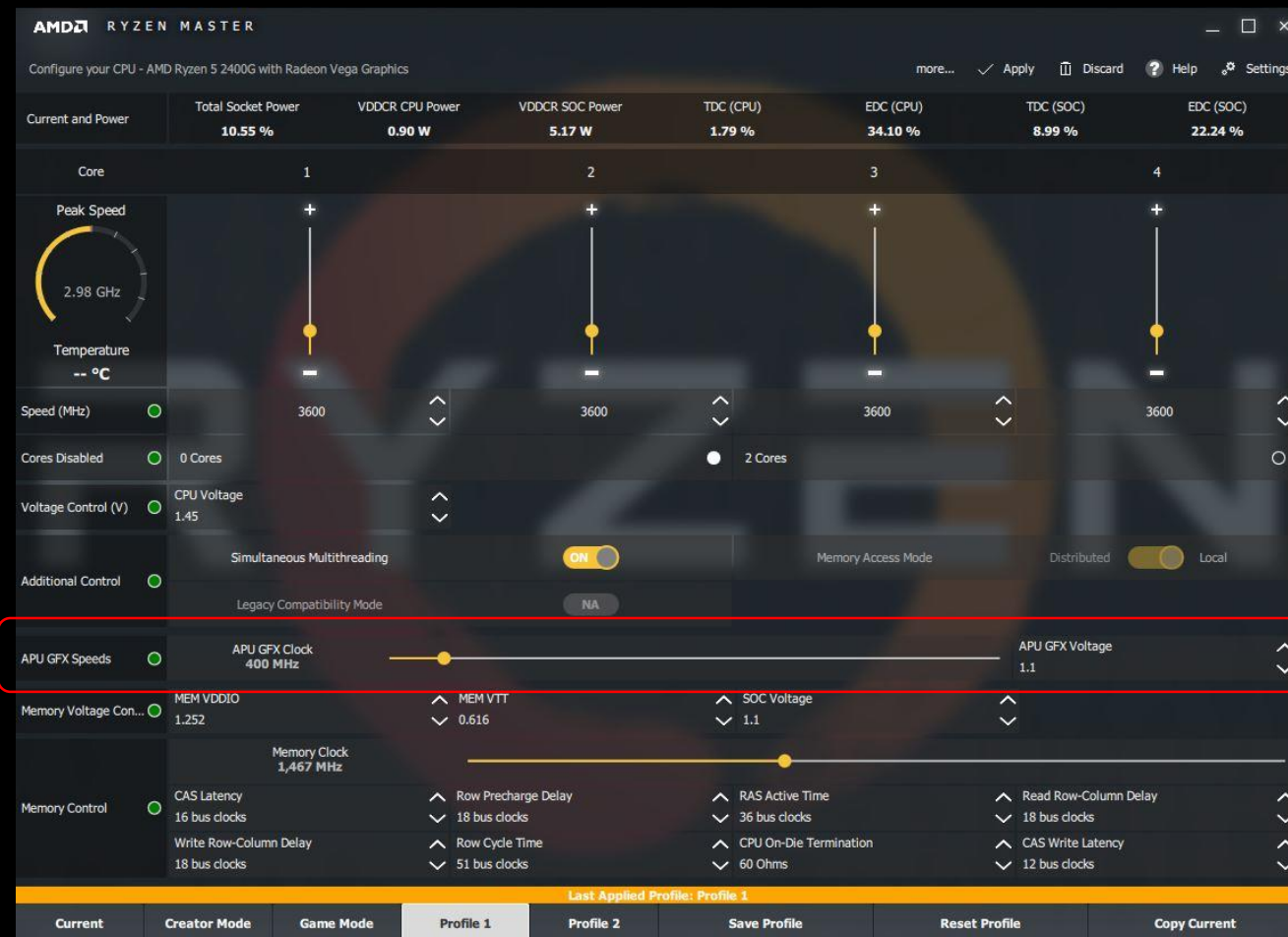
## CONFIGURATION & OVERCLOCKING PERSISTENCE THROUGH RESTARTS AND SHUTDOWNS

Type of reboot	State after reboot to Windows	
	Active cores, SMT setting	Control Mode & OC frequency
Ryzen Master restart	Per profile Applied	Per profile Applied
Ryzen Master shutdown	Per profile Applied	Stock. Please re-apply the profile.
User-initiated Windows Restart Shutdown	At the configuration when Shutdown	Stock
Reload BIOS defaults & restart	Stock	Stock

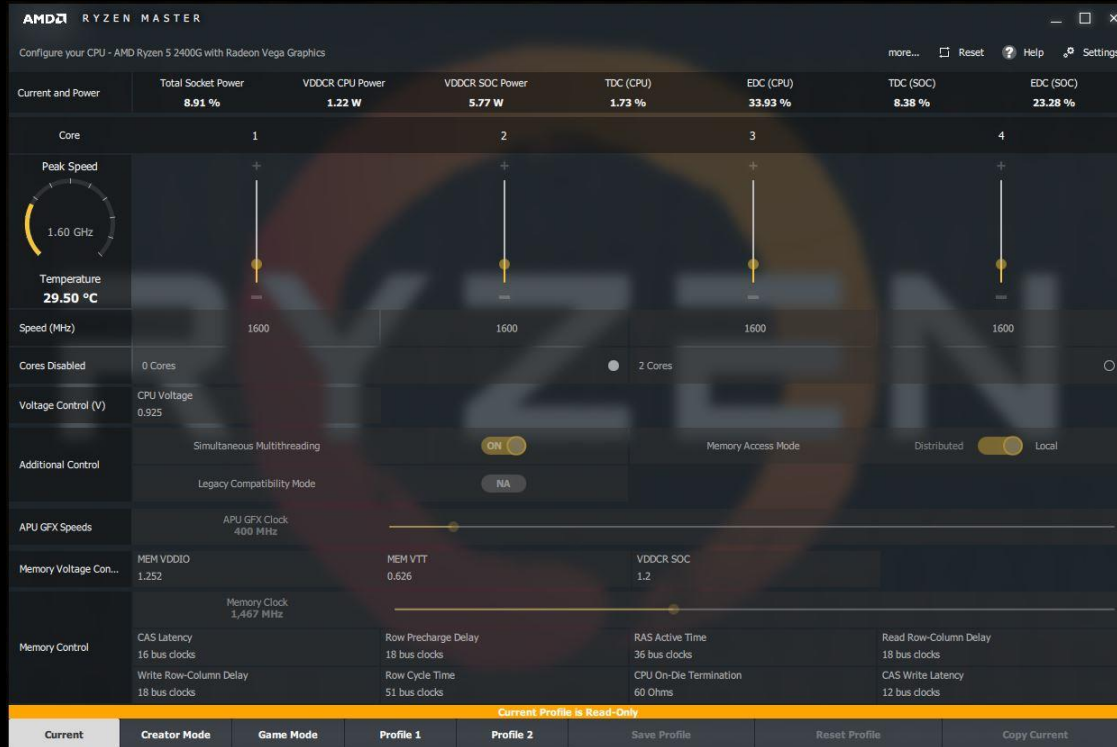


# CONTROLS FOR RYZEN PROCESSORS WITH RADEON VEGA GRAPHICS

- ▲ Graphics Clock control
- ▲ GFX Voltage control
  - Referenced from SOC Voltage



# CURRENT VIEW AT IDLE



## Current View of AMD Ryzen 5 2400G

- Stock configuration, no processor overclocking
- But with Memory overclocking to DDR4-2933
- At idle

# ...AND WITH A HEAVY CPU LOAD



## Under heavy core load, still under stock automation control

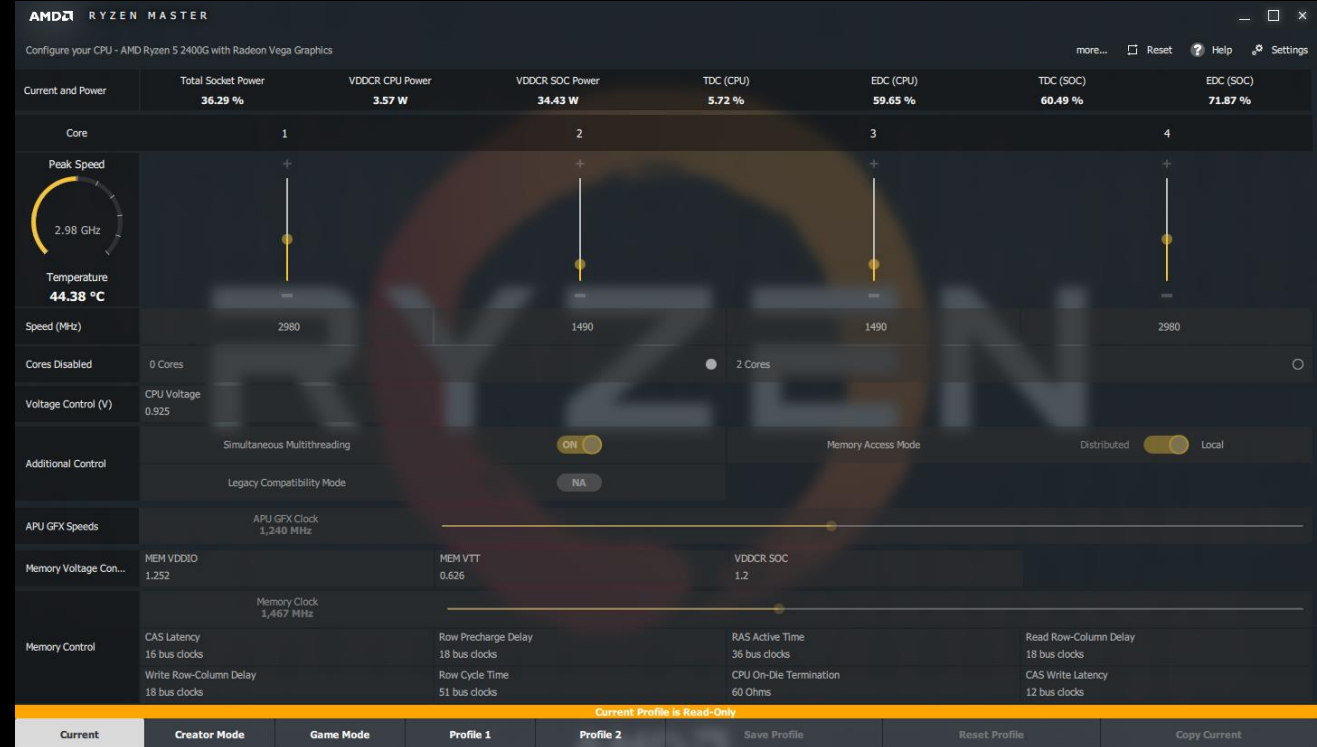
- Note higher CPU current, power, peak core speed, CPU Voltage, and temperature
- Note lower GFX Clock, not needed for a heavy core load
  - And thus lower SOC power and current

# CURRENT VIEW AT IDLE



- Current View of AMD Ryzen 5 2400G
  - Stock configuration, no processor overclocking
  - But with Memory overclocking to DDR4-2933
  - At idle

# ...AND WITH A HEAVY GRAPHICS LOAD



- Under heavy graphics load, some core load, still under stock automation control
  - Note higher SOC current, power, and GFX clock
  - Note lower CPU power, not needed for a heavy graphics load

# OVERCLOCKING EXAMPLE



- With user Profile 1
  - CPU voltage and speed raised
  - SOC Voltage and GFX Voltage raised
  - GFX Clock speed raised and Memory Clock set for DDR4-2933 speed
  - Memory voltages and parameters set



- Applying Profile 1 requires a restart
  - Note update of all settings

# **ADVANCED OVERCLOCKING**



# CORE PERFORMANCE POTENTIAL INDICATORS

AMD RYZEN MASTER

Configure your CPU - AMD Ryzen 7 2700X Eight-Core Processor

more... ✓ Apply ✓ Apply & Test 🗑 Discard ? Help ⚙ Settings

Temperature, Speed, ...

Temperature 30.75 °C

Peak Speed 4.000 GHz

Core Complex

Core Complex

EDC (CPU)

PTC (CPU)

Core Speed (MHz)

All Cores

CPU Voltage 1.211

Control Mode

Additional Control

Memory Voltage (V) 1.356

Memory Control

- Available only on Ryzen 2000-Series processors
- The core with the potential for the highest overclocking speeds will be indicated.
  - Gold star is fastest overall
  - Gray star is fastest per CCX
  - Gray dots are second-fastest per CCX
- When a user is optimizing maximum performance for a workload that uses fewer than all cores, the core speed indicator can be used
  - for choosing which cores to set to higher speeds.
  - for choosing which cores to disable.

Current Creator Mode Game Mode Profile 1 Profile 2 Save Profile Reset Profile Copy Current



# PER-CORE SPEED CONTROL FOR EACH CORE COMPLEX

AMD RYZEN MASTER

Configure your CPU - AMD Ryzen 7 2700X Eight-Core Processor

more... ✓ Apply ✓ Apply & Test Discard ? Help ⚙ Settings

Temperature, Speed, ...

Temperature 31.00 °C Peak Speed 4.000 GHz

Core Complex

TDC (CPU) EDC (CPU)

Core Complex

Core Speed (MHz)

All Cores

Core 1: 4000 MHz

Core 2: 3200 MHz

Core 3: 2675 MHz

Core 4: 1800 MHz

Core 5: 3950 MHz

Core 6: 2650 MHz

Core 7: 2650 MHz

Core 8: 1775 MHz

CPU Voltage 1.375

Control Mode

Additional Control

Memory Voltage (V) MEM VDDIO 1.356

Memory Control

CAS Latency 16 bus clocks

Write Row-Column Delay 18 bus clocks

Row Cycle Time 18 bus clocks

Row Cycle Time 51 bus clocks

Last Applied Profile: Profile 1

Current Creator Mode Game Mode Profile 1 Profile 2 Save Profile Reset Profile Copy Current

- Available only on Ryzen 2000-Series Processors
- The fastest core setting in the core complex sets the top speed reference.
- Any combination of cores in the complex can be set to the fastest speed of the complex.
- The top speeds can be different across the core complexes.
- Use the All Cores control to easily set all cores to the same speed.

- Other cores can be set lower and will snap on Apply to a fractional relationship with the fastest core in the complex. Those fractions are 80%, 66%, 57%, 50%, and 44% with a range of 1 (fastest) : 1/2.25 (slowest).
- After Apply, use the Copy Current function to reflect the actual speed relationship between cores.
- If a different core is raised above the current top speed reference core, after Apply, the other cores will snap to the new fractional relationship set by the raised core.
- If the current top speed reference core is lowered below the next fastest core, that next fastest core becomes the new reference. After Apply, the other cores will adjust to the new fractional relationship.

# CORE DISABLE SELECTION WITHIN CORE COMPLEX

The screenshot displays the AMD Ryzen Master interface for an AMD Ryzen 7 2700X Eight-Core Processor. The top section shows overall system metrics: Temperature (30.50 °C), Peak Speed (4.350 GHz), TDC (CPU) (3 %), EDG (CPU) (30 %), and PTC (CPU) (95 °C). Below these, eight cores are shown, grouped into two core complexes (1-4 and 5-8). Cores 1, 3, 5, and 7 are active (green), while cores 2, 4, 6, and 8 are disabled (red). A yellow box highlights the 'Core Complex' labels and the core disable status. A yellow callout box provides the following information:

- Available only on Ryzen 2000-Series Processors
- Cores can now be individually and specifically disabled, with some constraints:
  - An equal number of cores must be disabled between active core complexes.
  - If all cores in a core complex are disabled, that core complex is no longer active, thus the remaining active core complex can have any number of cores disabled.
  - At least one active core and one active core complex must remain across the core resources.
- Attempting to disable and Apply an imbalanced configuration will display an error message restating the balanced requirement.
- Before a different core configuration can be created, all cores must first be enabled and Applied, then a new configuration can be set and Applied.

The bottom section shows various control options, including Voltage Control (V), Control Mode (Auto), Additional Control (Simultaneous Multithreading, Legacy Compatibility Mode), Memory Voltage (V), Memory Control (CAS Latency, Write Row-Column Delay, Memory Clock (MHz)), and a status bar indicating the last applied profile is Profile 2.

# ISOLATING A SINGLE CORE

The screenshot displays the AMD Ryzen Master 1.5 software interface for an AMD Ryzen 7 2700X Eight-Core Processor. The interface is divided into several sections: a top status bar, a core speed control section, a voltage control section, and a memory control section. The core speed control section is the primary focus, showing eight cores in two groups of four. The first group (cores 1-4) is labeled 'Core Complex' and has a peak speed of 4.350 GHz. The second group (cores 5-8) is also labeled 'Core Complex' and has a peak speed of 4.350 GHz. Core 1 is highlighted with a yellow star and a green speed slider set to 3700 MHz. A yellow box with a bullet point states: 'One active core in one active complex.' The second group of cores (5-8) is labeled 'Core Complex' and has a peak speed of 4.350 GHz. A yellow box with a bullet point states: 'No active cores in inactive complex.' The voltage control section shows CPU Voltage at 1.2125V. The memory control section shows Memory Clock at 1600 MHz. The bottom of the interface shows the 'Last Applied Profile: Profile 2' and a row of buttons: Current, Creator Mode, Game Mode, Profile 1, Profile 2, Save Profile, Reset Profile, and Copy Current.

AMD RYZEN MASTER

Configure your CPU - AMD Ryzen 7 2700X Eight-Core Processor

more... ✓ Apply ✓ Apply & Test 🗑 Discard ? Help ⚙ Settings

Temperature, Speed, ...

Temperature 38.25 °C Peak Speed 4.350 GHz TDC (CPU) 4 % EDC (CPU) 13 % TCC (CPU) 95 °C

Core Speed (MHz)

★ 1 2 3 4 5 6 7 8

3700 Disabled Disabled Disabled Disabled Disabled Disabled Disabled Disabled

All Cores

Voltage Control (V)

CPU Voltage 1.2125

Control Mode

• One active core in one active complex.

Precision Boost Overdrive

• No active cores in inactive complex.

Manual

Additional Control

Simultaneous Multithreading ON

Memory Access Mode Distributed NA Local

Legacy Compatibility Mode OFF

Memory Voltage (V)

MEM VDDIO 1.356 MEM VTT 0.66 VDDCR\_SOC 1.1

Memory Control

Memory Clock (MHz) 1600

CAS Latency 16 bus clocks Row Precharge Delay 18 bus clocks RAS Active Time 53 bus clocks Read Row-Column Delay 18 bus clocks

Write Row-Column Delay 18 bus clocks Row Cycle Time 51 bus clocks CPU On-Die Termination 60 Ohms CAS Write Latency 16 bus clocks

Last Applied Profile: Profile 2

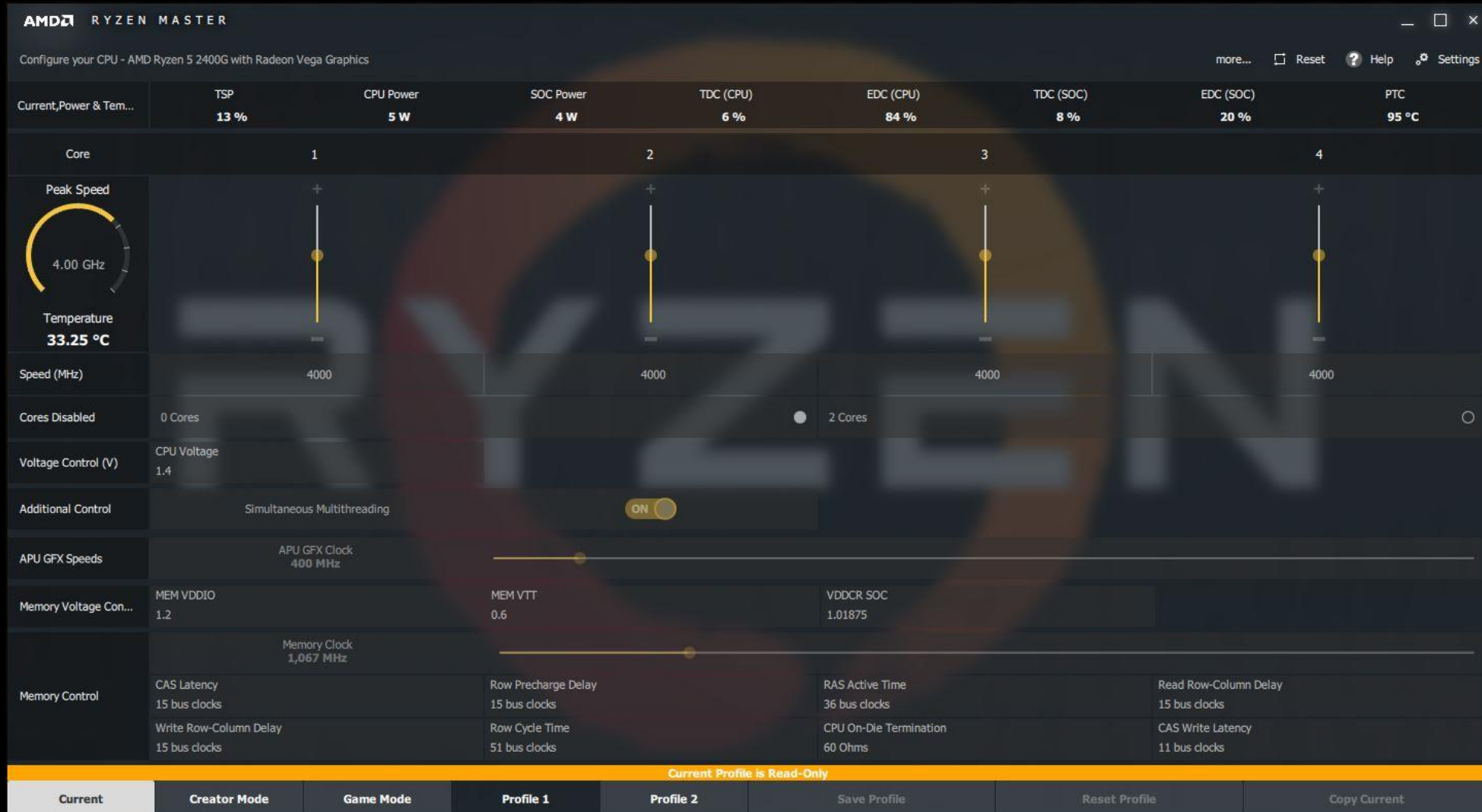
Current Creator Mode Game Mode Profile 1 Profile 2 Save Profile Reset Profile Copy Current

## **RYZEN MASTER INTERFACE VIEWS BY PREVIOUSLY RELEASED PROCESSORS FOR FEATURE REFERENCE**

- **RYZEN WITH RADEON VEGA GRAPHICS**
- **RYZEN 1000-SERIES PROCESSORS**
- **RYZEN THREADRIPPER 1000-SERIES PROCESSORS**

# RYZEN WITH RADEON VEGA GRAPHICS PROCESSORS

## CURRENT VIEW





# RYZEN WITH RADEON VEGA GRAPHICS PROCESSORS

## PROFILES VIEW





# RYZEN WITH RADEON VEGA GRAPHICS PROCESSORS

## SETTINGS VIEW



# RYZEN 1000-SERIES PROCESSORS

## CURRENT VIEW



# RYZEN 1000-SERIES PROCESSORS

## PROFILES VIEW

The screenshot displays the AMD Ryzen Master 1.5 software interface in the Profiles View. The window title is "AMD RYZEN MASTER" and the subtitle is "Configure your CPU - AMD Ryzen 7 1800X Eight-Core Processor". The interface is divided into several sections:

- Core Performance Section:** Features a "Peak Speed" gauge showing 3.70 GHz and a "Temperature" gauge showing 31.13 °C. Below these are eight vertical sliders, one for each core (1-8), all set to 4000 MHz.
- Speed (MHz):** A row of eight dropdown menus, all set to 4000.
- Cores Disabled:** Radio buttons for "0 Cores", "2 Cores" (selected), "4 Cores", and "6 Cores".
- Voltage Control (V):** A dropdown menu set to "CPU Voltage 1.4".
- Additional Control:** A toggle switch for "Simultaneous Multithreading" (ON) and a toggle switch for "Legacy Compatibility Mode" (OFF).
- Memory Voltage Control:** Dropdown menus for "MEM VDDIO 1.356", "MEM VTT 0.66", and "VDDCR SOC 1.1".
- Memory Control:** A "Memory Clock" slider set to 1,467 MHz. Below it are several dropdown menus for memory timing parameters: "CAS Latency 16 bus clocks", "Write Row-Column Delay 18 bus clocks", "Row Precharge Delay 18 bus clocks", "Row Cycle Time 51 bus clocks", "RAS Active Time 36 bus clocks", "CPU On-Die Termination 60 Ohms", "Read Row-Column Delay 18 bus clocks", and "CAS Write Latency 12 bus clocks".

At the bottom, there is a navigation bar with buttons: "Current", "Creator Mode", "Game Mode", "Profile 1" (selected), "Profile 2", "Save Profile", "Reset Profile", and "Copy Current".

# RYZEN 1000-SERIES PROCESSORS

## SETTINGS VIEW

AMD RYZEN MASTER

System Information

Provider:

Advanced Micro Devices, Inc.

CPU Type:

AMD Ryzen 7 1800X Eight-Core Processor

Package Type:

Socket AM4

Active CPU Cores:

8\16 (Physical\Logical)

L1 Data Cache:

8 x 32 KB

L1 Instruction Cache:

8 x 64 KB

L2 Cache:

8 x 512 KB

L3 Cache:

16384 KB

BIOS Vendor:

Insyde Corp.

BIOS Version:

RMP1003C

BIOS Date:

2018/04/04

Windows Version:

Windows 10

Windows Architecture:

x86\_64

About

Product Name: AMD Ryzen Master

Version: 1.3.0.0605

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Settings

Live Monitoring

ON

Speed

ON

Temperature

ON

Show Histogram

OFF

Update Interval

1 sec

PROCHOT

Click to Disable

Follow AMD

Restore Defaults

OK

Cancel

Apply

AMD Ryzen Master 1.5 Quick Reference Guide | October 2018

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# RYZEN THREADRIPPER 1000-SERIES PROCESSORS

## CURRENT VIEW





# RYZEN THREADRIPPER 1000-SERIES PROCESSORS

## PROFILES VIEW

The screenshot displays the AMD Ryzen Master software interface in the Profiles View. The window title is "AMD RYZEN MASTER". Below the title bar, it says "Configure your CPU - AMD Ryzen Threadripper 1950X 16-Core Processor". In the top right corner, there are buttons for "more...", "Apply", "Discard", "Help", and "Settings".

The main area shows 16 cores, each with a vertical slider for "Peak Speed" (ranging from 4.05 GHz to 4.5 GHz) and a "Temperature" gauge (showing 32.00 °C). Below the sliders, there are rows for "Speed (MHz)" (all set to 3400 MHz), "Cores Disabled" (0 Cores), "Voltage Control (V)" (CPU Voltage 1.125 V), "Additional Control" (Simultaneous Multithreading ON, Legacy Compatibility Mode OFF), "Memory Voltage Con..." (MEM VDDIO NA, MEM VTT NA, VDDCR SOC 1.1 V), "Memory Clock" (1,600 MHz), and "Memory Control" (CAS Latency 16 bus clocks, Write Row-Column Delay 18 bus clocks, Row Precharge Delay 18 bus clocks, Row Cycle Time 56 bus clocks, RAS Active Time 38 bus clocks, CPU On-Die Termination 60 Ohms, Read Row-Column Delay 18 bus clocks, CAS Write Latency 16 bus clocks).

At the bottom, there is a profile selection bar with buttons: "Current", "Creator Mode", "Game Mode", "Profile 1" (selected), "Profile 2", "Save Profile", "Reset Profile", and "Copy Current".

# RYZEN THREADRIPPER 1000-SERIES PROCESSORS

## SETTINGS VIEW

AMD RYZEN MASTER

System Information

Provider:

Advanced Micro Devices, Inc.

CPU Type:

AMD Ryzen Threadripper 1950X 16-Core Processor

Package Type:

Socket SP3r2

Active CPU Cores:

16\32 (Physical\Logical)

L1 Data Cache:

16 x 32 KB

L1 Instruction Cache:

16 x 64 KB

L2 Cache:

16 x 512 KB

L3 Cache:

32768 KB

BIOS Vendor:

American Megatrends Inc.

BIOS Version:

0318

BIOS Date:

2017/08/11

Windows Version:

Windows 10

Windows Architecture:

x86\_64

About

Product Name: AMD Ryzen Master

Version: 1.3.0.0605

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Settings

Live Monitoring

ON

Speed

ON

Temperature

ON

Show Histogram

OFF

Update Interval

1 sec

PROCHOT

Click to Disable

Follow AMD

Restore Defaults

OK

Cancel

Apply

# AMD RYZEN Master