RVZEN

AMDA RYZEN Master 1.5 – Quick Reference Guide

PREFACE

© 2018 Advanced Micro Devices, Inc. All rights reserved

- The information contained herein is for informational purposes only, and is subject to change without notice. While every precaution has been taken in the preparation of this document, it may contain technical inaccuracies, omissions and typographical errors, and AMD is under no obligation to update or otherwise correct this information. Advanced Micro Devices, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this document, and assumes no liability of any kind, including the implied warranties of non-infringement, merchantability or fitness for particular purposes, with respect to the operation or use of AMD hardware, software or other products described herein. No license, including implied or arising by estoppel, to any intellectual property rights is granted by this document. Terms and limitations applicable to the purchase or use of AMD's products are as set forth in a signed agreement between the parties or in AMD's Standard Terms and Conditions of Sale.
- Trademarks
 - AMD, the AMD Arrow logo, Ryzen, Threadripper, and combinations thereof are trademarks of Advanced Micro Devices, Inc.
 - Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies.
 - Microsoft and Windows are registered trademarks of Microsoft Corporation.

GUIDANCE TERMS AND CONDITIONS

- ▲ This AMD Ryzen[™] Processor, AMD Ryzen[™] Threadripper[™] Processor and AMD Ryzen[™] Master Quick Reference Guide ("Guidance") and the AMD Ryzen Master application ("AMD Ryzen Master") are provided subject to the following terms and conditions:
- The Guidance in no way modifies, alters or supersedes AMD's officially published specifications for any AMD product (the "Specifications").
- Operation of an AMD product outside of the Specifications or outside of factory settings, including but not limited to the conducting of overclocking (including use of the Guidance), may result in damage to an AMD product and/or lead to other problems, including but not limited to, damage to the AMD product-based computer system components (e.g. the motherboard and components thereon); system instabilities (e.g. data loss and corrupted images); reduction in system performance; shortened product, system component and/or system life; and in extreme cases, total unrecoverable system failure.
- AMD does not provide support or service for issues or damages related to use of an AMD product outside of the Specifications or outside of factory settings and Recipient assumes any and all liability and risk associated with such usage, including by providing motherboards or other components that facilitate or allow usage outside of the Specifications or factory settings.
- THE GUIDANCE IS PROVIDED TO YOU ON AN "AS IS" BASIS WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THOSE ARISING FROM CUSTOM OR TRADE. AMD DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS AS TO THE CORRECTNESS, ACCURACY OR RELIABILITY OF THE GUIDANCE (INCLUDING THE PERFORMANCE OF THE AMD PRODUCT) AND MAY MODIFY, AMEND, DELETE OR RETRACT THE GUIDANCE AT ANY TIME. TO THE FULLEST EXTENT ALLOWED BY LAW, IN NO EVENT WILL AMD BE LIABLE TO YOU OR ANY OTHER PARTY FOR ANY DIRECT OR INDIRECT DAMAGES, LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTIAL OR CONSEQUENTIAL DAMAGES WHICH MAY ARISE OUT OF OR RELATE TO THE GUIDANCE.

WARNING

- WARNING: AMD processors, including chipsets, CPUs, APUs and GPUs (collectively and individually "AMD processor"), are intended to be operated only within their associated specifications and factory settings. Operating your AMD processor outside of official AMD specifications or outside of factory settings, including but not limited to the conducting of overclocking (including use of this overclocking software, even if such software has been directly or indirectly provided by AMD or an entity otherwise affiliated in any way with AMD), may damage your processor, affect the operation of your processor or the security features therein and/or lead to other problems, including but not limited to damage to your system components (including your motherboard and components thereon (e.g., memory)), system instabilities (e.g., data loss and corrupted images), reduction in system performance, shortened processor, system component and/or system life, and in extreme cases, total system failure. It is recommended that you save any important data before using the tool. AMD does not provide support or service for issues or damages related to use of an AMD processor outside of official AMD specifications or outside of factory settings. You may also not receive support or service from your board or system manufacturer. Please make sure you have saved all important data before using this overclocking software. DAMAGES CAUSED BY USE OF YOUR AMD PROCESSOR OUTSIDE OF OFFICIAL AMD SPECIFICATIONS OR OUTSIDE OF FACTORY SETTINGS ARE NOT COVERED UNDER ANY AMD PRODUCT WARRANTY AND MAY NOT BE COVERED BY YOUR BOARD OR SYSTEM MANUFACTURER'S WARRANTY.
- This information describes methods to change factory settings and operate the processor outside of AMD's published operating specifications. Recipient understands that operation of the product outside of AMD's published specifications will void any AMD warranty and that overclocking of the processor may impact its functionality and longevity.

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 lessthan-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 <u>here</u>
 - 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 currentprocessor 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

AMDZI RYZEN MASTE

- A Ryzen Master 1.5 adds support for AMD Ryzen[™] Threadripper[™] 2970WX and 2920X CPUs
 - See the <u>RM1.3 Quick Reference Guide</u> 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

																- 12
Configure your CPU - AMD	Ryzen Threadripp	er 2990WX 32	-Core Process	or									more	∏ Reset	Help	o ^{to} Settings
Temperature, Speed,	Tempe	erature		Peak Sp	eed		PPT (CPU)	v	TD0	C (CPU)		EDC (C	CPU) 300 A		PTC (CPU)	
Power & Current	47.0	00 °C		3.425 0	GHz		Limit 1000 W	i'	Limi	t 1000 A		Limit 5	00 A		95 °C	
	1 *	2	3	4 •	5	6 •	7	8 ★	9	10 🖈	11	12 •	13	14 *	15 •	16
Core	3425	3425 CCX 1 (Die 1	3425 1) Cores	3425	3425	3425 CCX 2 (Die	3425 : 1) Cores	3425	3425	3425 CCX 1 (Die	3425 2) Cores	3425	3425	3425 CCX 2 (E	3425 Vie 2) Cores	3425
speeu (Mnz)	17	18	19 •	20 ★	21	22 •	23	24 🛣	25	26 •	27 📩	28	29 •	30 ★	31	32
	1957	3425 CCX 1 (Die 3	3425 3) Cores	3425	3425	3425 CCX 2 (Die	3425 3) Cores	3425	2000	2000 CCX 1 (Die	2000 4) Cores	2000	1957	1957 CCX 2 (D	1957 Vie 4) Cores	3425
Voltage Control (V)	CPU Voltage 1.14375															
								Precision Bo	ost Overdrive					Manual		
Control Mode	РРТ 250				TDC 215				EDC 300							
Additional Control	Sir	multaneous Mu	ultithreading			OFF				Memory Acc	ess Mode				NA	
	Ŀ	egacy Compati	ibility Mode			OFF 1	/2 1/4	÷.		Dynamic Lo	ocal Mode			OF	FON	
		Me	mory Clock (M	MHz)							1600					
	CAS Latency 14 bus clocks				Row Precharg 14 bus clocks	e Delay			RAS Active Tin 34 bus clocks	ne			Read Row-Co 14 bus clocks	olumn Delay		
Memory Control	Write Row-Colu 14 bus clocks	ımn Delay			Row Cycle Tin 73 bus clocks	ne			CPU On-Die Te 53.3 Ohms	ermination			CAS Write La 14 bus clocks	tency		
	MEM VDDIO NA				MEM VTT NA				VDDCR SOC 1							
						G	urrent Profil	e is Read-Oni	ly .							
Current	Creator Mode	Game	Mode	Profile 1		Profile 2			-			C				xport

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	Limited to Ryzen Threadripper 2000-Series models Subject to motherboard enablement	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

Additional Control	0	Sim	ultaneous Multithreading gacy Compatibility Mode]	OFF	F Control turning DLM on or off	,	Memory Access Mode Dynamic Local Mode		NA OFF ON		
		CAS La Sico 14 bus Wind	Memory Clock	(MHz) vated at first 1 pus	recharge Delay clocks	r⊠ Task Manager File Options View Processes Performance App histo	ory Start	up Users Details Service	s	_		×
Memory Control	0	Ryzen Master installation		ycle Time clocks TT	Name AMDDynamicLocalModeService	PID 2588	Description AMD Dynamic Local Mod	e Service	Status Running	Group	^	
Current		Creator Mode	Game Mode	Profile 1	Profile 1 A Profile 2	Save Profile	ces	Reset Profile	Copy Current	I	mport/Expor	t

CONSOLIDATED MEMORY CONTROL GROUP

		Memory Clock (M	Hz)				1600		
	CAS Latency 14 bus clocks		∧ Row ∨ 14 b	v Precharge Delay ous clocks	Ŷ	RAS Active Time 34 bus clocks	Ŷ	Read Row-Column Del 14 bus clocks	lay
Memory Control	Write Row-Column 14 bus clocks	n Delay	∧ Row ∨ 73 b	r Cycle Time ous clocks	Ŷ	CPU On-Die Termination 53.3 Ohms	¢	CAS Write Latency 14 bus clocks	(
	MEM VDDIO NA		∧ Mem ∨ NA	1VTT		VDDCR SOC 1	Ŷ		
				Las	t Applied Profile: Profile	1			
Current	Creator Mode	Game Mode	Profile 1	Profile 2	Save Profile	Reset Pro	file (Copy Current	Import/Export

- 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

	AMDZ RYZEN MAS	STER			_ 🗆 ×
	System 1		Settings		
	CPU Type:	Advanced Micro Devices, Inc. AMD Ryzen Threadripper 2990WX 32- Core Processor	Live Monitoring	OFF ON	
	Package Type: CPU Cores:	Socket SP3r2 32\64 (Physical\Logical)	Speed	OFF ON	
	L1 Data Cache:	32 x 32 KB 32 x 64 KB	Temperature	OFF ON	
	L2 Cache: L3 Cache:	32 x 512 KB 65536 KB	Show Histogram		
	BIOS Vendor: BIOS Version:	American Megatrends Inc. 1402	Update Interval	1	
	BIOS Date: Windows Version:	2018/08/03 Windows 10	PROCHOT	Click to Disable	
	Al	bout	RM Animations	OFF ON	
	Product Name: AMD Ryzen Master Version: 1.5.0.0824		Stress Test Duration	Time (in Sec)	
	©2018 Advanced Micro Devices, I	nc.	Stress Test Type	Options 🔨 CPU Only	
These features have been added to			Ryzen Master Update	Check for Updates	
check for updates manually and to set the update-check interval			AMD Update Interval	In Days 15	
	Follow AMD 🕴 💆 🖸	D 9		Restore Defaults OK Cancel	Apply

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 <u>Version 1.3 Quick Reference Guide</u> 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

AMDA RYZEN MASTER



_ 🗆 ×

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	Ryzen Threadripper 2000-Series	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



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



AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019

Profiles for user-defined configurations

PRECISION BOOST OVERDRIVE (PBO)

AMDO RYZEN MASTER Configure your CPU - AMD Ryzen Threadripper 2990WX 32-Core Processor Apply & Test Discard 0 Settings more... Apply Help Temperature Peak Speed PPT (CPU) TDC (CPU) EDC (CPU) PTC (CPU) Temperature, Speed, -- % of 300 A, 23 % of 250 W, 2 % of 215 A, Power & Current 27.25 °C 3.675 GHz Limit 500 W Limit 430 A Limit 600 A 95 °C 14 🔺 15 2 1 4 . 5 10 11 . 12 📩 13 16 . 6 1 8 4 9 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 CCX 2 (Die 1) Cores CCX 2 (Die 2) Cores CCX 1 (Die 1) Cores Core 0 • Precision Boost Overdrive allows the processor to Speed (MHz) 20 • 21 23 📩 31 32 18 * 19 automatically use the full power headroom of the 30 📩 motherboard above warranted CPU limits, 3000 3000 3000 3000 3000 3000 3000 3000 3000 3000 potentially increasing maximum and average core speed. • This feature works best with premium cooling and All Cores CCX 2 (Die 3) Cores CCX 1 (Die 3) Cores CCX 2 (Die 4) Cores a cool ambient environment **CPU Voltage** 0 Voltage Control (V) Auto Precision Boost Overdrive Manual Control Mode 0 PPT ∧ TDC ∧ EDC ~ V 300 250 V 215 -V • 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



CURRENT VIEW – POWER MONITORING

AMDA RYZE	N MASTER					_ 🗆 ×
Configure your CPU - AM	D Ryzen Threadripper 2990	WX 32-Core Processor				more 🛱 Reset 🍞 Help 🔗 Settings
Temperature, Speed, Power & Current	Temperature 38.38 ℃	Peak Speed 3,300 GHz	PPT (CPU) 102 % of 250 W, Limit 500 W	TDC (CPU) 90 % of 215 A, Limit 430 A	EDC (CF % of 3(Limit 60	PU) PTC (CPU) 00 A, 0 A 95 ℃
> Core Speed (MHz)	1 2 3250 3250 CCX 1 17 18 3250 3275 CCX 1	CPU consumption of socket powe at stock or PBO setting limit. Turn yellow at 90%, red at 95%. PBO maximum limit displayed for	r 0 3250 3250 (2 (Die 1) Cores CPU consump (2 (Die constrained cur	y 10 3250 CCX 1 (Die 2) tion of power supply the rrent delivery capacity at	11 ● 12 3250 ★ Cores ermally- t stock or	13 3250 3262 CPU consumption of power supply electrically-constrained current delivery capacity. PBO maximum limit displayed f
Voltage Control (V)	CPU Voltage 1.0625	Telefence.	PBO setting. T PBO maximu	urns yellow at 90%, red m limit displayed for refe	at 95%. erence.	reference. EDC reporting not supported on Ryzen Threadripper 2000-Series
Control Mode	РРТ 250	Auto TDC 215	Precision I	Boost Overdrive EDC 300		Manual
			Current Profile is Read-0	mly		
Current	Creator Mode	Game Mode Profile 1	Profile 2			Copy Current

CORE PERFORMANCE POTENTIAL INDICATORS

AMDA RYZEN MASTER

_ 🗆 ×

Configure your CPU -	AMD R	Ryzen Threadripp	per 2990WX :	32-Core Proces	sor						more	🗸 Apply	🧹 Apply	& Test 🕕	Discard (Pelp	o ^o Settings
Temperature, Speed, Power & Current		Temp 27.	perature .50 ℃		Peak Sp 3.775 (eed iHz		PPT (CPU) 23 % of 250 V Limit 500 W	Ν,	т 29 Ці	DC (CPU) 6 of 215 A, mit 430 A		EDC (C % of 3 Limit 60	CPU) 300 A, 00 A		PTC (CPU) 95 ℃	
		1	2 ★	3	4 •	5	6 🖈	7	8 •	9	10	11 •	12 🔶	13	14 ★	15	16 •
		3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Core	0		- + CCX 1 (Di	e 1) Cores	- +			ie 1) Cores		1-1-1-1-	- + CCX 1 (Di	e 2) Cores			CCX 2 (Die	e 2) Cores	
Speed (MHz)	~	17	18 ★	19	20 •	21	22	23 😭	24 •	25	26 ★	27 •	28	29 •	30 📩	31	32
		3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
All Cores		- +	CCX 1 (Di	e 3) Cores			CCX 2 (Di	— + ie 3) Cores	- +	- +	— + CCX 1 (Di	e 4) Cores		-	CCX 2 (Die	e 4) Cores	
Voltage Control (V)	0	CPU Voltage		Core no	orformance	indicato	rs provida	d for each	8-core are								
Control Mode	0	РРТ 250		• Core pe • The cor speeds •	e with the will be inc Gold star i Gray and g Gray dots	potentia licated. s fastest gold stars are secor	l for the h overall are fastes	ighest ove st per CCX per CCX	erclocking	St Overdrive	3 Jul]		Ċ	-	Manual	-	
Current		Creator Mode		Game Mode	P	rofile 1	Рго	file 2		Save Profile		1	Reset Profile			Copy Current	

PER-CCX CONTROL OF CORE SPEEDS



RYZEN THREADRIPPER GAME MODE PROFILE

AMDZ RYZEN MASTER

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

Apply 1 Apply & Test II Discard 2 Help Settings more... Temperature Peak Speed PPT (CPU) TDC (CPU) EDC (CPU) PTC (CPU) Temperature, Speed, 23 % of 250 W, 2 % of 215 A, -- % of 300 A Power & Current 26.50 °C 3.900 GHz Limit 500 W Limit 430 A Limit 600 A 95 °C 2 🛊 4 . 7 10 11 . 12 📩 13 14 🔺 15 16 🔹 3 5 6 8 . 9 The 'Game Mode' profile (intended Disabled Disabled Disabled Disabled Disabled 3000 3000 0000 000 3000 3000 3000 3000 Disable exclusively for Threadripper Disat Disa processors) pre-configures a limit of 8 active cores for legacy games that may CCX 2 (Die 1) Cores CCX 1 (Die 1) Cores CCX 2 (Die 2) Cores run better under a limited-core 20 • 25 26 1 27 . 28 29 . 30 📩 31 32 17 18 🗌 19 21 22 23 😭 24 🖤 Disabled Disabled sabled Disabled 70 Disabled Ba B Disabled Disabled Disabled Disable ā ă The normal Control Modes remain accessible for the user, All Cores CCX 2 (Die 4) Cores including Manual mode for manual core overclocking. CPU Voltage • Memory overclocking is also available. 0 Voltage Control (V) Auto Manual Precision Boost Overdrive 0 Control Mode PPT TDC EDC OFF ON Simultaneous Multithreading Memory Access Mode NA Additional Control 0 OFF 1/2 1/4 Legacy Compatibility Mode Last Applied Profile: Profile 1 Game Mode Profile 1 Profile 2 Save Profile Copy Current Current Creator Mode Reset Profile

resource.

RYZEN MASTER VERSION 1.3 *QUICK REFERENCE GUIDE*

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



OVERVIEW AND OPERATION

CURRENT VIEW – PERFORMANCE MONITORING



GETTING AROUND THE PROFILES INTERFACE



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

Save Profile

Reset Profil

Copy Current

Profile 2

- 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



SETTINGS CONTROL BEHAVIOR OF SOME FEATURES

AMDA RYZEN MASTER

System	m Information		
Provider:	Advanced Micro Devices, Inc.	¢.	
СРИ Туре:	AMD Ryzen 7 2700X Eight-Core Processor	Live Monitoring	
Package Type:	Socket AM4		
CPU Cores:	8\16 (Physical\Logical)	Speed	
L1 Data Cache:	8 x 32 KB		
L1 Instruction Cache:	8 x 64 KB	Temperature	
L2 Cache:	8 x 512 KB		
L3 Cache:	16384 KB	Show Histogram	
BIOS Vendor:	Insyde Corp.		Time
BIOS Version:	RMP1002CA	Update Interval	
BIOS Date:	2018/03/19		
Windows Version:	Windows 10	PROCHOT	C
Windows Architecture:	x86_64		
		RM Animations	
	About		
Product Name: AMD Ryzen Maste Version: 1.3.0.0593	er	Stress Test Duration	Time 15
©2018 Advanced Micro Devices,	Inc.	Stress Test Type	Optio All
	Time that each of CF tests take when App depends on Str	PU, GPU and Memory stress blied in a Profile. Total time ress Test Type selected.	
	Selection of which S Applie	tress Tests to execute when ed in a Profile.	

Master toggle for Speed, Temperature and Histogram functions

Toggle for sampling core frequencies

Toggle for sampling die temperature

ON

Sec)

k to Disable

) OFF

Sec)

~

 \sim

V

Restore Defaults

ОК

Cancel

Toggle for displaying histogram on Current view. Enabling histogram display can present a small but noticeable load on the processor cores.

Parameter sample rate: higher

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.

When off, parameter sampling continues but the histogram display is suspended. When enabled, the accumulated histogram history is presented. This limits the load Ryzen Master puts on the processors while still capturing processor information to view.

Apply

AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019

Follow AMD 🕴 🛩 😵 💶 😰 👂

BASIC OVERCLOCKING

RYZEN MASTER – UNDERSTANDING PROCESSOR POWER DOMAINS



- 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



AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019

CHANGES, RESTARTS AND SHUTDOWNS

These Ryzen Master configuration changes	require this system change and user action.
 Control Mode to Manual Core speed, core voltage, per-core speed 	No restart or shutdown required, activated on Apply
 From Manual to Auto mode Disabling any cores Disabling Simultaneous Multithreading Disabling or Enabling Memory Access Mode or Legacy Compatibility Mode Any Memory Voltage or Memory Control change 	Ryzen Master-initiated restart, no user action required
 Enabling all cores Enabling Simultaneous Multithreading 	Ryzen Master-initiated shutdown then User-initiated power-on and re-start Ryzen Master

CONFIGURATION & OVERCLOCKING PERSISTENCE THROUGH RESTARTS AND SHUTDOWNS

	State after rebo	ot to Windows
Type of reboot	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



CURRENT VIEW AT IDLE

AMDA RYZEN	MASTER						– 🗆 ×
Configure your CPU - AMD	9 Ryzen 5 2400G with Radeon Vega	Graphics				more 🗋 Reset	? Help ° Settings
Current and Power	Total Socket Power 8.91 %	VDDCR CPU Power 1.22 W	VDDCR SOC Power 5.77 W	TDC (CPU) 1.73 %	EDC (CPU) 33.93 %	TDC (SOC) 8.38 %	EDC (SOC) 23.28 %
Core							4
Peak Speed	*						*
Temperature 29.50 °C			I.		ľ		I
Speed (MHz)					1600		600
Cores Disabled				2 Cores			
Voltage Control (V)	CPU Voltage 0.925						
Additional Control	Simultaneous Multith		ON			Distributed	Local
	Legacy Compatibilit						
APU GFX Speeds	APU GFX Clock 400 MHz						
Memory Voltage Con	MEM VDDIO 1.252	MEM V 0.626		VDDCR SOC 1.2			
	Memory Clock 1,467 MHz						
Memory Control	CAS Latency 16 bus clocks Write Row-Column Delay	Row Pro 18 bus Row Cy	echarge Delay clocks cle Time	RAS Active Til 36 bus clocks CPU On-Die T	me "ermination	Read Row-Column Delay 18 bus clocks CAS Write Latency	
	18 bus clocks	51 bus	locks	60 Ohms		12 bus clocks	
Current	Creator Mode Game	Mode Profile 1	Current Profile Profile 2	s is Read-Only Save Profile	Reset	Profile	Copy Current

...AND WITH A HEAVY CPU LOAD

AMDZI RYZEN	MASTER						– 🗆 ×
Configure your CPU - AM	D Ryzen 5 2400G with Radeon Ve	ga Graphics				more 🛱 Res	et 🕜 Help 👌 Settings
Current and Power	Total Socket Power 80.71 %	VDDCR CPU Power 60.79 W	VDDCR SOC Power 6.62 W	TDC (CPU) 70.46 %	EDC (CPU) 80.01 %	TDC (SOC) 10.60 %	EDC (SOC) 19.66 %
Core							
Peak Speed	ļ		+		+		+
Speed (MHz)			3850		3850		3850
Cores Disabled				2 Cores			
Voltage Control (V)	CPU Voltage 1.4						
Additional Control			ON		Memory Access Mode		Local
Additional Control							
APU GFX Speeds	APU GFX CM 260 MH						
Memory Voltage Con	MEM VDDIO 1.252	MEM V 0.626		VDDCR SOC 1.2			
Memory Control	Memory Cle 1,467 ME	iz					
	CAS Latency 16 bus clocks	Row Pr 18 bus	echarge Delay clocks	RAS Active Time 36 bus clocks		Read Row-Column De 18 bus clocks	lay
	Write Row-Column Delay 18 bus clocks	Row C) 51 bus	cle Time clocks	CPU On-Die Term 60 Ohms	nination	CAS Write Latency 12 bus clocks	
			Current P	rofile is Read-Only			
Current	Creator Mode Gai	ne Mode Profile	1 Profile 2				

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

- 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

...AND WITH A HEAVY GRAPHICS LOAD



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

- 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 1.5 Quick Reference Guide | Update March 2019

PER-CORE SPEED CONTROL FOR EACH CORE COMPLEX



CORE DISABLE SELECTION WITHIN CORE COMPLEX

AMDZ RYZEN MASTER



AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019

ISOLATING A SINGLE CORE



AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019

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

AMDA RYZEN	MASTER							_ 🗆 ×
Configure your CPU - AM	0 Ryzen 5 2400G with Radeon \	/ega Graphics					more 🛱 Re	set 🕐 Help 😽 Settings
Current,Power & Tem	TSP 13 %	CPU Power 5 W	SOC Power 4 W	TDC (CPU) 6 %	EDC (CPU) 84 %	TDC (SOC) 8 %	EDC (SOC) 20 %	РТС 95 °C
Core		1		2		3		4
Peak Speed 4.00 GHz								+
33.25 °C		4000		-		4000		-
эреец (мп2)		4000		4000		4000		4000
Cores Disabled	0 Cores				2 Cores			0
Voltage Control (V)	CPU Voltage 1.4							
Additional Control	Simultaneo	us Multithreading						
APU GFX Speeds	APU 41	GFX Clock 00 MHz						
Memory Voltage Con	MEM VDDIO 1.2		MEM VTT 0.6		VDDCR SOC 1.01875			
	Mer 1,1	nory Clock D67 MHz		•				
Memory Control	CAS Latency 15 bus clocks Write Row-Column Delay 15 bus clocks		Row Precharge Delay 15 bus clocks Row Cycle Time 51 bus clocks		RAS Active Time 36 bus clocks CPU On-Die Termination 60 Ohms		Read Row-Column Delay 15 bus clocks CAS Write Latency 11 bus clocks	
				Current Profile i	s Read-Only			
Current	Creator Mode	Game Mode	Profile 1	Profile 2				

RYZEN WITH RADEON VEGA GRAPHICS PROCESSORS

AMDZ RYZ	EN	MASTER											
Configure your CPU	AMD	Ryzen 5 2400G with Radeor	n Vega Graphic								more 🧹 Apply	Discard	? Help 。* Settings
Current,Power & Terr	ı	TSP 12 %		CPU Power 5 W	SOC Power 4 W	\$	TDC (CPU) 5 %	EDC (CPU) 84 %		TDC (SOC) 8 %	EDC (SOC) 20 %		ртс 95 °C
Core			1			2			3			4	
Peak Speed 4.00 GHz Temperature 35.25 °C			+			Ì						+	
Speed (MHz)	0		4000		$\hat{\mathbf{v}}$	4000		\$	4000		¢	4000	Ŷ
Cores Disabled	0	0 Cores						2 Cores					0
Voltage Control (V)	0	CPU Voltage 1.4			\$								
Additional Control	0	Simultan	eous Multithre	ading									
APU GFX Speeds	0	APU GFX C 1,220 M	lock Hz				•				APU GFX Voltage		Ŷ
Memory Voltage Con	. 0	MEM VDDIO 1.356			✓ MEM VTT ✓ 0.66			SOC Voltage			Ŷ		
		M	lemory Clock 1,467 MHz		a 			•					
Memory Control	0	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 Terminal 60 Ohms 	tion		 Read Row-Column D 18 bus clocks CAS Write Latency 12 bus clocks 	elay	<><>
						Profile 1 Sa	ve: Success 09:	21:55 Thu,12 Apr					
Current		Creator Mode	Gai	ne Mode	Profile 1	Profile	2	Save Profile		Reset	t Profile	Co	py Current

RYZEN WITH RADEON VEGA GRAPHICS PROCESSORS SETTINGS VIEW

AMDA RYZEN	MASTER					_ 🗆 ×
	System Information	Ö Sattinge				
Provider:	Advanced Micro Devices, Inc.					
CPU Type:	AMD Ryzen 5 2400G with Radeon Vega Graphics	Live Monitoring	<u></u>)		
Package Type:	Socket AM4					
Active CPU Cores:	4\8 (Physical\Logical)	Speed				
L1 Data Cache:	4 x 32 KB					
L1 Instruction Cache:	4 x 64 KB	Temperature	ON)		
L2 Cache:	4 x 512 KB		~			
L3 Cache:	4096 KB	Show Histogram		2		
BIOS Vendor:	Insyde Corp.			~		
BIOS Version:	RMP1003C	Update Interval	1 sec			
BIOS Date:	2018/04/04					
Windows Version:	Windows 10	PROCHOT	Click to Disa	ble		
Windows Architecture:	x86_64					
	About					
Product Name: AMD Ryze	n Master					
Version:1.3.0.0605						
©2018 Advanced Micro D	evices, Inc.					
Follow AMD 🕇 🗹	8 D D P			Restore Defaults C	DK Cancel	Apply

RYZEN 1000-SERIES PROCESSORS

CURRENT VIEW



RYZEN 1000-SERIES PROCESSORS PROFILES VIEW



RYZEN 1000-SERIES PROCESSORS SETTINGS VIEW

AMDZI RYZEN M	IASTER			_ 🗆 ×
S Provider:	ystem Information	Settings		
CPU Type: Package Type:	AMD Ryzen 7 1800X Eight-Core Processor Socket AM4	Live Monitoring		
Active CPU Cores: L1 Data Cache:	8\16 (Physical\Logical) 8 x 32 KB	Speed	ON	
L1 Instruction Cache: L2 Cache:	8 x 64 KB 8 x 512 KB	Temperature		
L3 Cache: BIOS Vendor:	16384 KB Insyde Corp.	Show Histogram	OFF	
BIOS Version: BIOS Date:	RMP1003C 2018/04/04	Update Interval	1 sec	
Windows Version: Windows Architecture:	Windows 10 x86_64	PROCHOT	Click to Disable	
Product Name: AMD Ryzen Ma Version:1.3.0.0605 ©2018 Advanced Micro Device	About_ nster es, Inc.			
Follow AMD 📑 🗾 🖁	3 D 🖸 9		Restore Defaults OK	Cancel Apply

RYZEN THREADRIPPER 1000-SERIES PROCESSORS

CURRENT VIEW



RYZEN THREADRIPPER 1000-SERIES PROCESSORS PROFILES VIEW



RYZEN THREADRIPPER 1000-SERIES PROCESSORS SETTINGS VIEW

AMDA RYZE	N MASTER						_ 🗆 ×
	System Information	Settings					
Provider:	Advanced Micro Devices, Inc.						
CPU Type:	AMD Ryzen Threadripper 1950X 16-Core Processor	Live Monitoring		ON			
Package Type:	Socket SP3r2						
Active CPU Cores:	16\32 (Physical\Logical)	Speed					
L1 Data Cache:	16 x 32 KB						
L1 Instruction Cache:	16 x 64 KB	Temperature					
L2 Cache:	16 x 512 KB	Show Histogram		OOFF			
L3 Cache:	32768 KB	Show histogram					
BIOS Vendor:	American Megatrends Inc.	Update Interval	1	sec ^			
BIOS Version:	0318						
BIOS Date:	2017/08/11						
Windows Version:	Windows 10	PROCHOT	Ci	ck to Disable			
Product Name: AMD Ryz Version: 1.3.0.0605 ©2018 Advanced Micro I	<u>About</u> en Master Devices, Inc.						
Follow AMD f	y 8 0 0 9			Restore Defaults	ок	Cancel	Apply

AMDA RYZEN Master

AMD Ryzen Master 1.5 Quick Reference Guide | Update March 2019