Basic BIOS Guide for CTR 2.1 (beta 6)





Whats new? V1.1

- Added the hint to disable PBO after checking CO values, on each of the summary slides (in the step by step guide it was already correctly described)
- Added a explanation for Asus Boards: Extreme Tweaker = AI Tweaker on some boards
- Some polishing

Basic BIOS Guide for CTR

The aim of this guide is to bring the basic BIOS setting for CTR closer to both the absolute beginner and the more experienced user.

Content

• Step by step guide (for the absolute beginner)

| | page 3-11 |
|----------|------------|
| /SRock | page 12-20 |
| GIGABYTE | page 21-28 |
| 🗑 msi | page 29-36 |

• Summary of BIOS settings (more experienced user)







Go into "Extreme Tweaker" slide

On some Asus boards it is called "AI Tweaker"!

Set following settings to...

- Core Performance Boost -> Auto
- CPU Core Ratio -> Auto
- Performance Bias -> Auto

Scroll down

Set following settings to...

- CPU Core Voltage -> Auto
- CPU SOC Voltage -> Manual
 - Set VDDSOC Voltage Override to 1.15 1.20 V
- VDDG CCD Voltage Control -> 0,95 0,975 V

Scroll up



| LIFEL BIOS LItility - Advanced Mode | | |
|---|--|--|
| 02/21/2021 19:42 [♥] ⊕ English ⊡ MyFavorite(F3) % Qfan Control(F6) | 오 EZ Tuning Wizard(F11) ? Search(F9) 챮 AURA | (F4) See ReSize BAR |
| My Favorites Main <u>Extreme Tweaker</u> Advanced | Monitor Boot Tool Exit | Hardware Monitor |
| ← Extreme Tweaker\Precision Boost Overdrive | | |
| PBO Fmax Enhancer | Auto 👻 | Frequency Temperature 3700 MHz 49°C |
| Precision Boost Overdrive | Auto 👻 | |
| Precision Boost Overdrive Scalar | Auto 👻 | 100.00 MHz 1.473 V |
| Max CPU Boost Clock Override | Auto | Ratio 37x |
| Platform Thermal Throttle Limit | Auto 👻 | Memory |
| | | Frequency Voltage |
| | | 3733 MHz 1.360 V |
| | | Capacity 32768 MB |
| | | Voltage |
| | | |
| | | 12.208 V 5.000 V |
| (j) | | +3.3V 3.328 V |
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| Version 2.20.1271. Copyright (C) 20 | Last Modified EzMode(F7) - <u>-</u>] Hot K 121 American Megatrends, Inc. | Keys ? Search on FA |
| | | |
| UEFI BIOS Utility – Advanced Mode | | |
| 02/21/2021 19:40 DEnglish MyFavorite(F3) & Qfan Control(F6) | © EZ Tuning Wizard(F11) ? Search(F9) | (F4) ReSize BAR |
| My Favorites Main <u>Extreme Tweaker</u> Advanced | Monitor Boot Tool Exit | Hardware Monitor |
| Target FCLK Frequency : 1866MHz | | |
| Ai Overclock Tuner | Auto 👻 | |

Go into "Precision Boost Overdrive" menu

Set ALL options to Auto

Go back to "Extreme Tweaker" slide

Go into "External Digi+ Power Control"

Memory Frequency DDR4-3733MHz 100.00 MHz 1.473 V FCLK Frequency 1866MHz • Core Performance Boost CPU Core Ratio CPU Core Ratio (Per CCX) Keep Current Settings 3733 MHz Performance Bias Auto -32768 MB Precision Boost Overdrive ➤ DRAM Timing Control ➤ External Digi+ Power Control 5.000 V 12.208 V Last Modified EzMode(F7) Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc

| 02/23/2021 02:11 [¢] ⊕ English ∰MyFavorite(F3) & Q Tuesday | fan Control(F6) 😳 EZ Tuning Wizard(F11) 🕐 Search(F9) 滋 AUR | A(F4) BResize BAR |
|--|--|---|
| My Favorites Main <u>Extreme Tweaker</u> A | dvanced Monitor Boot Tool Exit | Hardware Monitor |
| ← Extreme Tweaker\External Digi+ Power Control | | |
| Voltage Monitor | Die Sense 👻 | Frequency Temperature 3700 MHz 48°C |
| CPU Load-line Calibration | Auto | |
| CPU Current Capability | 130% - | 100.00 MHz 1.465 V |
| CPU VRM Switching Frequency | Auto 👻 | Ratio 37x |
| VRM Spread Spectrum | Auto 👻 | Mamoru |
| CPU Power Duty Control | T.Probe 🔹 | Frequency Voltage |
| CPU Power Phase Control | Power Phase Response - | 3800 MHz 1.384 V |
| Manual Adjustment | Ultra Fast 👻 | Capacity 32768 MB |
| CPU Power Thermal Control | 120 | |
| VDDSOC Load-line Calibration | Auto 👻 | Voltage |
| VARSAC Switching Fragmanos | | +12V +5V 12.208 V 5.000 V |
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| UEFI BIOS Utility - Advanced Mode | | |
| UEFI BIOS Utility - Advanced Mode | fan Control(F6) ♀EZ Tyfing Wiard(F11) ⑦Search(F9) 选AUR | NF4) PER Resize BAR |
| UEFI BIOS Utility – Advanced Mode 0221/021 Sunday My Favorites Main <u>Extreme Tweaker</u> A | fan Control(F6) 및 EZ Tyring Wizard(F11) ⑦Search(F9) 쌆 AVR dvanced Monitor Boot Tool Exit | N(H) ¹ to Resize BAR |
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| UEFI BIOS Utility - Advanced Mode 2021/2021 19:42 | fan Control(F6) Q EZ Tyning Weard(F11) [] Search(F9) & AUR dvanced Monitor Boot Tool Exit | Yiti) Pag Boster BAR → Hardware Monitor CPU Frequency Temperature 3700 MHz 49°C BCL& Core Voltage 100.00 MHz 1.473 V Ratio 373 Memory Frequency Voltage 3733 MHz 1.360 V Capacity 32766 MB -12V + 5V 12.208 V 5.000 V -3.3V 3.328 V |

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Set following settings to...

- CPU Load-line Calibration -> Auto
- CPU Current Capability -> 130%
- CPU Power Duty Control -> T.Probe
- CPU Power Phase Control
 - Manual Adjustment -> Ultra Fast

Go back to "Extreme Tweaker" slide

Go into "Precision Boost Overdrive" menu

Set ALL options to Auto

Switch to "Advanced" slide

-> Power Phase Response

V 1.1





V 1.1

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| | My | Favorites | Main | Ai T | weaker | Adva | nced | Monitor | Boot | Tool | Exit | |
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| | СР | J Configuration | | | | | | | | | | |
| | SAT | TA Configuration | | | | | | | | | | |
| | On | board Devices (| Configuratio | 'n | | | | | | | | |
| | AP | M Configuration | | | | | | | | | | |
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| Go into | "AMD | CBS" | menu |
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| My Favorites Main Ai Tweaker Advanced Monitor Boot Tool Exit Advanced/AMD CBS Core Performance Boost Auto Auto Auto IOMMU Auto Global C-state Control Power Supply Idle Control Auto DRAM ECC Enable NBIO Common Options Auto Auto | 07/11/2019 20: Thursday | BIOS Utility 22 [✿] ⊕ | – Advanced N English 🗐 MyFav | lode orite(F3) | n Control(F6) | | ing Wizard(F | =11) ?s | earch(F9) |
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| Core Performance Boost Auto Memory Interleaving Auto IOMMU Auto Global C-state Control Auto Power Supply Idle Control Auto DRAM ECC Enable Auto | ← Advanced\Al | ND CBS | | | | | | | |
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Set "Global C-state Control" to Enabled

Go into "NBIO Common Options"

| UEFI BIOS Utility - Advanced Mode | | |
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| 02/21/2021 19:45 ♀ ⊕ English ⊫MyFavorite(F3) みQfan Control(F6) Sunday | 2 EZ Tuńing Wizard(F11) 2 Search(F9) 2 AURA(| F4) Tag ReSize BAR |
| My Favorites Main Extreme Tweaker <u>Advanced</u> M | Monitor Boot Tool Exit | Hardware Monitor |
| AdvancedVAMD CBS/NBIO Common Options/SMU Common Options SMU Common Options cTDP Control | Auto | CPU Frequency Temperature 3700 MHz 50°C |
| EfficiencyModeEn | Auto | BCLK Core Voltage 100.00 MHz 1.473 V |
| Package Power Limit Control APBDIS | Auto | 37x |
| DF Cstates | Auto • | Memory Frequency Voltage |
| CPPC Preferred Cores | Enabled • | 3733 MHz 1.360 V Capacity 32768 MB |
| | | Voltage +12V +5V 12.208 V 5.000 V |
| | | +3.3V 3.328 V |
| Version 2.20.1271. Copyright (C) 202 | Last Modified EzMode(F7) - Hot Kr 1 American Megatrends, Inc. | eys ? Search on FAC |

Set following settings to...

- CPPC
- CPPC Preferred Cores
- -> Enabled -> Enabled
- Go back to "Advanced" slide

| | Utility | – Advanced N | lode | | | | | |
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| 7/11/2019 20:22 | ₽ ⊕ E | nglish 🗐 MyFav | orite(F3) 🕹 Qfa | n Control(F6) | EZ Tuni | ng Wizard(F | 11) ? Search(F9 | |
| My Favorites | Main | Ai Tweaker | Advanced | Monitor | Boot | Tool | Exit | |
| ➤ AMD fTPM configure | ration | | | | | | | |
| ➤ CPU Configuration | | | | | | | | |
| ➤ SATA Configuration | | | | | | | | |
| Onboard Devices C | Configuratio | on | | | | | | |
| ➤ APM Configuration | | | | | | | | |
| ➤ PCI Subsystem Set | tings | | | | | | | |
| USB Configuration | | | | | | | | |
| ► HDD/SSD SMART In | nformation | | | | | | | |
| ➤ NVMe Configuration | on | | | | | | | |
| Network Stack Con | figuration | | | | | | | |
| AMD CBS | | | | | | | | |
| AMD Overclocking | | | | | | | | |
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| AMD Overclocking Se | etup Page | | | | | | | |
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Go into "AMD Overclocking" menu



V 1.1



Accept the warning!



Go into "Precision Boost Overdrive" menu





| UEFI BIOS Utility - Advanced Mode | | | |
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| My Favorites Main Extreme Tweaker <u>Adva</u> | nced Monitor Boot Tool Exit | 🔄 Hardwa | re Monitor |
| ← Advanced\AMD Overclocking\AMD Overclocking\Precision Boost | Overdrive\Curve Optimizer | | |
| | | Frequency 3700 MHz | Temperature 47°C |
| Curve Optimizer | All Cores 🔫 | BCLK 100.00 MHz | Core Voltage 1.473 V |
| All Core Curve Optimizer Sign | Negative 👻 | | |
| All Core Curve Optimizer Magnitude | | | |
| | | Memory | |
| | | | |
| | | 3733 MHz | 1.360 V |
| | | Capacity 32768 MB | |
| | | Voltage | |
| | | | |
| | | 12.208 V | 5.000 V |
| Allows the user to shift the Voltage / Frequency (AVFS) curve to include values). The larger the value entered the larger the magnitude of the volume of the value of the values. | higher voltages (positive values) or lower voltages (negative Itage shift | +3.3V 3.328 V | |
| | | | |
| | Last Modified EzMode(F7) | Kevs 2 S | earch on FAC |
| Version 2.20,1271, Copy | right (C) 2021 American Megatrends, Inc. | | |
| | | | |

Set following settings to...

- Precision Boost Overdrive -> Advanced
- PBO Limits
- Precision Boost Scalar
- Max CPU Boost Override -> 0Mhz
- Platform Thermal Throttle Limit -> Auto

Go into "Curve Optimizer" menu

Set "Curve Optimizer" to All Cores

Make sure the "All Core Curve Optimizer Magnitude" is 0

-> Auto

-> Auto

"All Core Curve Optimizer Sign" doesn't matter!

Set "Curve Optimzer" to Per Core

Make sure all of the "Core Curve Optimizer Magnitude" are 0

Set "Curve Optimizer" to disabled



V 1.1

| UEFI BIOS Utility - Advanced Mode | 1/ , , |
|--|---|
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| My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit | Hardware Monitor |
| AdvancedVAMD Overclocking/AMD Overclocking/Precision Boost Overdrive Precision Boost Overdrive | CPU Frequency Temperature 3700 MHz 50°C |
| Precision Boost Overdrive Advanced | BCLK Core Voltage |
| PBO Limits Auto Precision Boost Overdrive Scalar Auto | Ratio 37x |
| > Curve Optimizer | Memory |
| Max CPU Boost Clock Override | Frequency Voltage 3733 MHz 1.360 V |
| Platform Thermal Throttle Limit Auto 👻 | Capacity 32768 MB Voltage |
| | +12V +5V 12.208 V 5.000 V |
| Increases the maximum CPU frequency that may be automatically achieved by the Precision Boost 2 algorithm. | +3.3V 3.328 V |
| Last Modified EzMode(F7)]- Hot Version 2.20.1271. Copyright (9 2021 American Megatrends, Inc. | Keys ? Search on FAQ |

Go back to "Precision Boost Overdrive" menu

Set "Precision Boost Overdrive" to disabled

You are done!

Summary of BIOS settings for



V 1.1

Extreme Tweaker

- Core Performance Boost -> Auto ۲
- CPU Core Ratio -> Auto \bullet
- Performance Bias -> Auto \bullet
- CPU Core Voltage -> Auto
- CPU SOC Voltage -> Manual \bullet
 - Set VDDŠOC Voltage Override to 1.15 1.20 V
 VDDG CCD Voltage Control -> 0,95 0,975 V
- \bullet

External Digi+ Power Control menu

- CPU Load-line Calibration -> Auto
- CPU Current Capability -> 130% \bullet
- CPU Power Duty Control -> T.Probe \bullet
- CPU Power Phase Control -> Power Phase Response
 - Manual Adjustment -> Ultra Fast
- CPU Power Thermal Control -> 120

Curve Optimizer and PBO

- All options to Auto! \bullet
- Make sure all Curve Optimizer values are 0 in both menus (All Core and Per Core). Due to a bug it can be that these \bullet settings are still activated even though Curve Optimizer is set to disabled!
- After that, set PBO to disabled •

AMD CBS menu

- Set Global C-state Control to Enabled \bullet
- Set CPPC to Enabled \bullet
- Set CPPC Preferred Cores to Enabled

| /ISRed: Taichi | | | | | | Go into "OC Tweaker" slide | |
|---|---------------|---|---|--|--|---|-----------------|
| 🗮 Main 🌼 <u>Oƙ Tweak</u> er 🖈 Adv | vanced 🔀 Tool | ⊕H/W Monitor | 🖲 Security | ن Boot | Exit | | |
| Dverclock Mode(Bus Speed) CPU Frequency and Voltage(VID) Change CPU Core (Per CCX) SoC/Uncore 0C Voltage(VID) CLD0 VDDP Voltage Control CLD0 VDDG CCD Voltage Control CLD0 VDDG IOD Voltage Control CLD0 VDDG ScD Voltage Control ScD VOLTAGE SCD VOLTA | DDR4-3200 | Auto Auto Auto Auto Auto Auto XMP 2.0 Profile 1: DDR4-3200 | De De De Marn PCIe De o O Inst Plea au over be u supp | escription escrip | also the ses will use system fore d00's may ng is not connected | Set following settings to CPU Frequency and Voltage (VID) Soc/Uncore OC Voltage(VID) VDDG CCD Voltage Control Set voltage to 0,95-0,975 V | Au 1,1 Ma |
| DRAM Voltage | 1.350V | 1.350 | via | the onboard D-Sub/VGA co | onnector. | Go into "External Voltage Settings and Load-L | ine |
| I Infinity Fabric Frequency and Dividers Ⅰ | | Auto | | | | Calibration" | |
| 📹 External Voltage Settings and Load-Line (| Calibration | | Get | details via QR code | | | |
| Profile 1: Empty | | | | | | | |

- **CPU Frequency and Voltage (VID)** \bullet
- Soc/Uncore OC Voltage(VID) \bullet
- VDDG CCD Voltage Control \bullet
 - Set voltage to 0,95-0,975 V

-> Auto

ISRock

-> 1,15-1,20 V

V 1.1

-> Manual

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| | W UK Iweaker | Auvaliceu | × 1001 | GH/W MOITLOF | Security | OBOOL | JEXIL | Set ALL settings |
| OC Tweaker \ | xternal Voltage Sett | ings and Load-Li | ne Calibration | | _ / 7 | | | |
| I Voltage Mode | | | | Normal Mode | | 15 | | |
| CPU CORE/Cache \ | oltage | | | Auto | 6// | the second | IN NOV | N |
| CPU CORE/Cache L | oad-Line Calibration | | Level 3 | Auto | | E (37.3 | REEDO | |
| I CPU VDDCR_SOC Vo | ltage | | | Auto | 🖉 Des | cription | | Go back and swi |
| I CPU VDDCR_SOC Lo | ad-Line Calibration | | Level 3 | Auto | [OC]: | Larger range vol | ltage for | |
| I VPPM | | | 2.520V | Auto | overc [NORM | locking. ALl: Smaller rang | e voltage for | |
| <pre>I VTT_DDR Offset \</pre> | oltage(mV) | | | Auto | norma | l system. | | N |
| I CPU VDD 1.8 Volt | age | | 1.800V | Auto | | | ſ | |
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tch to the "Advanced" slide

13





Go into "AMD Overclocking menu"





Go into "Precision Boost Overdrive" menu



Switch "Precision Boost Overdrive" from Auto to Advanced



V 1.1

1SRock



Set the following settings to...

- PBO Limits
- Precision Boost Overdrive Scalar
- Max CPU Boost Clock Override
- Platform Thermal Throttle Limit

Go into "Curve Optimizer" menu

-> Auto

15Roc

- -> Auto
- -> Auto / 0 Mhz

V 1.1

-> Auto

Set "Curve Optimizer" to All Cores

Make sure the "All Core Curve Optimizer Magnitude" is 0

"All Core Curve Optimizer Sign" doesn't matter!

Set "Curve Optimizer" to Per Core



Make sure that all of the "Curve Optimizer Magnitude" are 0

15Roc

"All Core Curve Optimizer Sign" doesn't matter!

Set "Curve Optimizer" to disabled

Go back to "Precision Boost Overdrive"

Set "Precision Boost Overdrive" to disabled (If there is no disabled option, set it to Auto) Go back twice to the Advanced slide V 1.1



Go into "AMD CBS" menu



V 1.1

//SRock



Set the following settings to...

- **Core Performance Boost**
- **Global C-state Control**

Go back to "AMD CBS" menu

- -> Auto
- -> enabled

15Rock



Go into "NBIO Common Options"



V 1.1



Go into "SMU Common Options" menu



Set the following settings to...

- CPPC
- CPPC Preferred Cores
- BoostFmaxEn

- -> Enabled
- -> Auto
- -> disabled

You are done!

V 1.1

15Rock

Summary of BIOS settings for

OC Tweaker menu

- CPU Frequency and Voltage (VID) Soc/Uncore OC Voltage(VID) VDDG CCD Voltage Control ۲
- \bullet
- - Set voltage to 0,95-0,975 V 0
- Load-Line Calibration

-> 1,15-1,20 V -> Manual

-> Auto

-> Auto

AMD CBS menu

- Core Performance Boost -> Auto
- Global C-state Control -> enabled

AMD CBS / NBIO / SMU Common Options

CPPC \bullet

- -> Enabled
- CPPC Preferred Cores -> Auto -> disabled
- BoostFmaxEn

Curve Optimizer and PBO

- All options to Auto! \bullet
- Make sure all Curve Optimizer values are 0 in both menus (All Core and Per Core). Due to a bug it can be that these settings are still activated even though Curve Optimizer is set to disabled!
- After that, set PBO to disabled \bullet

V 1.1

15Rock

| Favorites (F11) | Tweaker | Settings | | Boot | Save & Exit | |
|---|--------------------|--|---|--------------------|---|---|
| vorites (Press 'Insert' Key To +/- U Clock Ratio U Clock Control treme Memory Profile(X.M.P.) U Vcore U Vcore Loadline Calibration M Support | Items From Other 1 | abs Or Below) Auto Auto Profile1 Auto Auto Enabled | 38.00 100.00MHz DDR4-3600 16- 1.200V | ·16-16-36-52-1.35V | CPU Frequency 3815.65MHz Temperature 50.0°C | BCLK 100.41MHz Voltage 1.368 V |
| | | | A | | Memory Frequency 3614.83MHz Ch A/B Volt 1.368 V | Size 16384MB |
| | | | | | Voltage CHIPSET Core 1.001 V +12V 12 024V | +5∨ 4.980 V |

Help (F1)

Easy Mode (F2)

Smart Fan 5 (F6)

O-Flash (F8

If it doesn't look like this: press F7

Go into "Tweaker" menu

| | ADVAN | | | | 07/05/2019 15:22 |
|--|--------------------------|----------------------------|-------------------|-------------------------|--------------------|
| Favorites (F11) Tweaker | Settings | | Boot | Save & Exit | |
| CPU Clock Control CPU Clock Ratio | * Auto * Auto | 100.00MHz 38.00 | | CPU | BCLK |
| - Advanced Cr o Sectings | | | | 3815.65MHz | 100.41MHz |
| Extreme Memory Profile(X.M.P.) XMP High Frequency Support System Memory Multiplier Advanced Memory Settings | Profile1 Auto Auto | DDR4-3600 16-1 36.00 | 16-16-36-52-1.35V | Temperature 51.0 *C | Voltage 1.440 V |
| CPU Vcore Dynamic Vcore(DVID) | * Auto | 1.200V +0.00000V | | Memory | Size |
| | Auto | 1.200V | | 3614.83MHz | 16384MB |
| CPU VDD18 CPU VDD19 CPU VDDP | Auto Auto Auto | 1.800V | | Ch A/B Volt 1.368 V | |
| PM_CCD012 PM_1VSOC | Auto | 1.000V | | | |
| PM_1V8 | Auto | 1.800V | | Voltage | |
| DRAM Voltage (CH A/B) DDRVPP Voltage (CH A/B) DRAM Termination (CH A/B) | Auto Auto Auto | 1.200V 2.500V 0.600V | | CHIPSET Core 1.001 V | +5V 4.980 V |
| CPU/VRM Settings | | | | +12V 11.952 V | |

Set following settings to...

- CPU Clock Control -> Auto
- CPU Clock Ratio -> Auto
- CPU Vcore
- Vcore SOC
- -> 1.15 V 1.20 V

-> Auto

Go into "Advanced CPU Settings" menu

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V 1.1

| K K CPU MM dode Disabled AND Coold&Quiet function Enabled PC Adjustment Pstate 0 PC Adjustment Pstate 0 Power Supply lufe Control Auto Control Auto Prequency Size 35.0 °C 1.056 V Downcore Control Auto CPPC Preferred Cores Auto Voltage 16384MB CPPC Preferred Cores Size Voltage 16384MB CPPC Preferred Cores Auto | Favorites (F11) | Tweaker Settings | System Info. | E Boot Save & Exit | 10 Fr | 0/16/2020 16:09 | Set f | followi | ng sett | ings to |) | | |
|--|---|---|------------------|--------------------|---|---|-------|--------------------------------------|---|---|-----------------------------------|---|--------------------------|
| +5V +12V 4.980 V 11.952 V | Core Performance Boost SVM Mode AMD CoolsQuiet function PPC Adjustment Clobal C-state Control Power Supply Idle Control CCD Control Downcore Control SMT Mode CPPC CPPC Preferred Cores | Auto Disab Enabi PStat Auto Auto Auto Auto Auto | led ed e D | | CPU Frequency 3807.60MHz Temperature 35.0 *C Memory 2137.60MHz Ch A/B Volt 1.248 V Voltage +SV 4.980 V | BCLK 100.20MHz Voltage 1.056V Size 16384MB +12V 11.952 V | • • • | Core AMD Globa CPPC CPPC | Perfor Cool& al C-Sta C Prefe | mance Quiet fu ate Cor rred Cc | Boost unction ntrol ores | -> Auto -> Enab -> Enab -> Enab -> Enab | led led led led |

Q-Flash (F8)

Enable/Disable Turbo mode. Turbo mode opportunistically and automatically allows the processor to run faster than it's marked frequency if the processor is operating below power, temperature and current specifications.

nts different level of over-current protection for the Vcore

| | | 1/10/10 | | | | 07/05/2019 15:24 |
|---|---------|------------------------|-----------------------|--------|--------------------------------------|--------------------|
| Favorites (F11) | Tweaker | Settings | | Boot , | Save & Exit | |
| PU Vcore Loadline Calibration core SOC Loadline Calibration PU Vcore Protection | | * Auto Auto Auto | 350.0mV | | CPU Frequency 3815.65MHz | BCLK 100.41MHz |
| PU VCORE SOC Protection PU Vcore Current Protection WM Phase Control | | Auto Auto Auto | 350.0mV | | Temperature 48.0 °C | Voltage 1.356 V |
| | | | | | Memory Frequency | |
| | | | | | 3614.83MHz Ch A/B Volt 1.368 V | 16384MB |
| | | | \blacktriangleright | | Voltage | |
| | | | | | CHIPSET Core 1.001 V | +5V 4.980 V |
| | | | | | +12V 11.952 V | |

Help (F1)

Easy Mode (F2) Smart Fan 5 (F6)

Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8)

Go back and into "CPU / VRM Settings"

Set following settings to...

CPU Vcore Loadline Calibration -> Auto \bullet

Go back and switch the tab to "Settings"

GIGABYTE

V 1.1

| Tuesday Curve (C) Tuesday C) Curve (C) • Platform Power • < | | | | NCED MODE | | | 03/19/2019 23.21 | Go into "AMD CBS" |
|--|--|---------|----------|--------------|-----------------------|-------------------------|-----------------------|-------------------|
| Platform Power < | AURUS Favorites (F11) | Tweaker | Settings | System Info. | Boot Sa | ave & Exit | Tuesday 23.2 P | |
| Macelaneous AMD Overclocking PC Health Smart Fan 5 Memory Frequency Size Ch A/B Volt 12.56V Voltage Ch A/B Volt 12.56V Voltage CHIPSET Core Sy79V 12.168V Voltage Help (P1) Easy Mode (F2) Smart Fan 5 (F6) O-Flash (F8) | Platform Power IO Ports | | | | | CPU | всік | |
| AMD Overclocking PC Health Smart Fan 5 Memory Frequency 2403/24412 32780HB Gh 23780HB Gh 2403/24412 Size 2403/24412 Size Size Gh 2403/24412 Gh 23780HB Gh 2403/24412 Gh 23780HB Gh 2403/24412 <l< td=""><td> Miscellaneous AMD CBS </td><td></td><td></td><td></td><td></td><td>3613.39MHz</td><td>100.37MHz</td><td></td></l<> | Miscellaneous AMD CBS | | | | | 3613.39MHz | 100.37MHz | |
| | = AMD Overclocking = PC Health | | | | | Temperature 26.0 °C | Voltage 0.996 V | |
| Frequency, 2408,22M1z Size 32768MB Ch.A/B Volt 1.236 V | Smart Fan 5 | | | | | Memory | | |
| Ch AfB Volt 1236 V Voltage CHIPSET Core 0.979 V 5.070 V +122.168 V VOItage CHIPSET Core 0.979 V 5.070 V +122.168 V Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8) | | | | | | Frequency 2408.92MHz | Size 32768MB | |
| Voltage CHIPSET Core 1979 V *12V 12.168 V *12V 12.168 V *12 | | | | | | Ch A/B Volt 1.236 V | | |
| CHIPSET Core +5V 0.979 V 5.070 V +12V 12.168 V Option Description AMD CBS Setup Page Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8) | | | | | | Voltage | | |
| +12V 12.168 V Option Description AMD CBS Setup Page Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8) | | | | | | CHIPSET Core 0.979 V | +5V 5.070 V | |
| Option Description AMD CBS Setup Page Help (F1) Easy Mode (F2) Smart Fan 5 (F6) OF Flash (F8) | | | | | | +12V 12.168 V | | |
| Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8) | Option Description AMD CBS Setup Page | | | | | | | |
| | | | | H | elp (F1) Easy Mode (F | F2) Smart Fan 5 (F6) | Q-Flash (F8) | |

| | | ADVAN | | | | 03/19/2019 2 2 . 1 0 | |
|---|---------|----------------------|--------------|------|-------------------------|----------------------|---|
| ADRUS Favorites (F11) | Tweaker | Settings | System Info. | Boot | Save & Exit | Tuesday 23.13 | G |
| | | | | | СРШ | | |
| Performance Prefetcher settings Memory interleaving | | Auto | | | Frequency 3613.39MHz | BCLK 100.37MHz | |
| DRAM Controller Configuration XFR Enhancement cTDP Control | | Auto | | | Temperatur 28.0 °C | e Voltage 0.996 V | |
| ACS Enable PCIe ARI Support Package Power Limit Control | | Auto Auto Auto | | | Memory | | |
| CPPC Preferred Cores | | Auto | | | Frequency 2408.92MHz | Size 32768MB | |
| | | | | | 1.236 V | | |
| | | | | | Voltage | | |
| | | | | | CHIPSET Cor 0.979 V | e +5V 5.070 V | |
| | | | | | +12V 12.168 V | | |
| | | | | | | | |
| Performance | | | | | | | |

Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8)

Go into "XFR Enhancement"

GIGABYTE



VDDG represents voltage for the data portion of the Infinity Fabric. It is derived from the CPU SoC/Uncore Voltage (VDD_SOC). VDDG (input in mV) can approach but not exceed VDD_SOC.

Help (F1) Easy Mode (F2) Smart Fan 5 (F6) Q-Flash (F8)

| 05 | Favorites (F11) | Tweaker | Settings | | Boot | Save & Exit | |
|--------------------|-----------------|---------|----------|-----------------------|------|-------------------------|--------------------|
| latform | Power | | | | | CPU | |
| iscellan MD CBS | eous | | | | | Frequency 3815.65MHz | BCLK 100.41MHz |
| | erclocking | | | | | Temperature 48.0 °C | Voltage 1.452 V |
| Smart Fa | n 5 | | | | | Memory | |
| | | | | | | Frequency 3614.83MHz | Size 16384MB |
| | | | | | | Ch A/B Volt 1.368 V | |
| | | | | \blacktriangleright | | Voltage | |
| | | | | | | CHIPSET Core 1.001 V | +5V 4.980 V |
| | | | | | | +12V 11.952 V | |

Go into "AMD Overclocking"

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| | | ADVANC | ED MODE | | | 07, | ^{/05/2019} 15:25 |
|---|---|---|------------|------|----------|-------------------------|---------------------------|
| Favorites (F11) | Tweaker | Settings | | Boot | Save & E | xit | day |
| | | | | | | | |
| Manual CPU Overclocking | | | | | | CPU | |
| DDR and Infinity Fabric Frequency/ | Timings | | | | | Frequency 3815.65MHz | BCLK 100.41MHz |
| Precision Boost Overdrive Soc Voltage | | | | | | Temperature 49.0 °C | Voltage 1.380 V |
| VDDP Voltage Control VDDG Voltage Control | | | | | | Mamoni | |
| Onboard Voltage Controls | | | | | | Frequency 3614.83MHz | Size 16384MB |
| | | | | | | Ch A/B Volt 1.368 V | |
| | | | | | | Voltage | |
| | | | | | | CHIPSET Core 1.001 V | +5∨ 4.980 V |
| | | | | | | +12V 11.952 V | |
| | | | | | | | |
| Configure a custom CPU core freque factory clockspeed limits. Power sa | uency and voltage aving features for | e. Disables Precision Boost ar idle cores (e.g. cc6 sleep) ren | nd nain | | | | |

Go into "Precision Boost Overdrive" menu

| | Favorites (F11) | Tweaker | Settings | System Info. | Boot | Save 8 |
|-------|--------------------|---------|----------|---------------------|------|--------|
| cisio | n Boost Overdrive | | | | | |
| cisio | on Boost Overdrive | | Auto | | | |
| | | | | | | |
| | | | | | | |
| | | | Pre | | | |
| | | | Pie | | | |
| | | | | Auto Disable | | |
| | | | | Enabled Advanced | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

operation

Select "Precision Boost Overdrive" and set it to "Advanced"

V 1.1

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| Favorites (F11) | weaker Settings | | Boot Save & E | Set following settings to… | |
|---|---|-----------------------------|--------------------------|---|---------------------|
| Precision Boost Overdrive PBO Limits Precision Boost Overdrive Scalar Curve Optimizer Max CPU Boost Clock Override Platform Thermal Throttle Limit | Advance Auto OMHz Auto | d | | PBO Limits -> Disabled / Auto Precision Boost Overdrive Scalar Max CPU Boost Clock Overdrive Platform Thermal Throttle Limit A Then go into "Curve Optimizer" menu | Auto Mhz Auto |
| Precision Boost Overdrive: Enabled: Allows Processor to ru EDC, VDD, CPU TDC, VDD, SOC EI and allows it to boost at higher operation. Back | in beyond defined values for PPT, VDC DC, VDD_SOC TDC to the limits of the voltages for longer durations than del | D_CPU board, aultHelp | (F1) 📕 Easy Mode (F2) Sr | | |

| Favorites (F11) Tweaker | Settings | System Info. | Boot | Save & |
|--------------------------------|----------|--------------|------|--------|
| ve Optimizer | All Co | res | | |
| Core Curve Optimizer Nagnitude | 0 | | | |
| | | | | |
| | | Δ | | |
| | | | | |
| | | | | |

Set "Curve Optimizer" to "All Cores" and make sure that "All Core Curve Optimizer Magnitude" is set to 0.

"All Core Curve Optimizer Sign" doesn't matter.

Switch "Curve Optimizer" from "All Cores" to "Per Core"

ADVANCED MODE Settings Positive Core 0 Curve Optimizer Sign Core O Curve Optimizer Magnitude Positive Core 1 Curve Optimizer Sign Core 1 Curve Optimizer Magnitude 0 Core 2 Curve Optimizer Sign Positive Core 2 Curve Optimizer Magnitude Core 3 Curve Optimizer Sign Positive Core 3 Curve Optimizer Magnitude Core 4 Curve Optimizer Sign Positive Core 4 Curve Optimizer Magnitude Positive Core 5 Curve Optimizer Sign Core 5 Curve Optimizer Magnitude Positive Core 6 Curve Optimizer Sign Core 6 Curve Optimizer Magnitude Positive Core 7 Curve Optimizer Sign Core 7 Curve Optimizer Magnitude 0 Positive Core 8 Curve Optimizer Sign Core 8 Curve Optimizer Magnitude Positive Core 9 Curve Optimizer Sign Core 9 Curve Optimizer Magnitude 0 Positive Core 10 Curve Optimizer Sign Allows the user to shift the Voltage / Frequency (AVFS) curve to include higher voltages (positive values) or lower voltages (negative values). The larger the value entered the larger the magnitude of the voltage shift Help (F1) Easy Mode (F2) Sn

esc Back

Make sure that "All Core Curve Optimizer Magnitudes" are set to 0.

"All Core Curve Optimizer Sign" doesn't matter.

Select "Curve Optimizer" again and set it to disabled

You are done!

GIGABYTE[™]

Summary of BIOS settings for

GIGABYTE

V 1.1

Tweaker menu

- CPU Clock Control -> Auto
- CPU Clock Ratio -> Auto
- CPU Vcore -> Auto
- Vcore SOC -> 1.15 V 1.20 V
- Core Performance Boost -> Auto
- AMD Cool&Quiet function -> Enabled
- Global C-State Control -> Enabled
- CPPC -> Enabled
- CPPC Preferred Cores -> Enabled
- CPU Vcore Loadline Calibration -> Auto

Settings / AMD CBS / XFR Enhancement

- VDDG Voltage Control -> Manual
- VDDG Voltage -> 0,95 0,975 V

Curve Optimizer and PBO

- All options to Auto!
- Make sure all Curve Optimizer values are 0 in both menus (All Core and Per Core). Due to a bug it can be that these settings are still activated even though Curve Optimizer is set to disabled!
- After that, set PBO to disabled





If it doesn't look like this: press F7

Go into "OC" menu

Set following settings to...

- CPU Ratio Apply Mode
- CPU Ratio

- -> All Core
- -> Auto



Scroll down

Set following settings to...

- CPU Core Voltage
- CPU NB/SoC Voltage
- Override CPU NB/Soc Voltage
- VDDG IOD Voltage

Go into "DigitALL Power" menu

- -> Auto
- -> Override Mode
- -> 1.15 V 1.20 V
- -> 0,95 V 0,975 V

-> Auto

-> 600 KHz

-> 600 KHz

Set following settings to...

- CPU Loadline Calibration Control
- CPU Switching Frequency
- CPU NB/SoC Switching Frequency

Go back to "OC" menu







Go into "Advanced CPU Configuration" menu

Go into "AMD Overclocking" menu





V 1.1



Select "Precision Boost Overdrive" and set it to "Advanced"

Make sure ALL options are set to Auto



V 1.1



Change "Curve Optimizer" from "All Cores" to "Per Core" and make sure everything is set to 0

(Curve Optimizer Sign does not matter!)

Go into "Curve Optimizer" menu and make sure that ALL "All Core Curve Optimizer Magnitude" are set to 0

(All Core Curve Optimizer Sign does not matter!)



V 1.1



Go back to "AMD Overclocking" and change "Precision Boost Overdrive" back to Auto



Go back to "Advanced CPU Configuration" and go into "AMD CBS" menu



| OFF | A-XMP | CPU Speed 3.70 GH DDR Speed 3800 M CPU Core Temperature: 2°C Motherboard Temperature: 3°C Boot Friently | Iz MB: MAG Hz CPU: AM VCore: 1. DDR Volt: BIOS Ver BIOS Buil | X570 TOMAH) Ryzen 9 5900 Size: 16384ME 474V age: 1.572V E7C84AMS.1 d Date: 01/20 | AWK WIFI (MS-7084) 13-Core Processor 3 50 /2021 |
|----------------------|--|---|---|---|---|
| | Overclocking\Adv | anced CPU Configuration\AMD CBS | | | HELP |
| Motherboard settings | AMD CBS Core Perfor Global C-sta Power Supp | - CPU Common Options mance Boost te Control ty Idle Control | [Auto] [Enabled] [Auto] | | Sets the Core Performance Boost. |
| SETTINGS | AMD CBS NUMA node | - DF Common Options s per socket | [Auto] | | E |
| | IOMMU LN2 Mode 1 Package Por | wer Limit | [Auto] [Auto] Auto | | |
| ос | CPPC Prefet | rred Cores | [Enabled] | | |
| | | | | | = |
| | | | | | ↑J→→-: Move Enter: Select +/-: Value ESC: Exit F1: General Help |

Set the following settings to...

- Set Core Performance Boost to Auto
- Set Global C-state Control to Enabled
- Set CPPC to Enabled
- Set CPPC Preferred Cores to Enabled

You are done!

Summary of BIOS settings for



OC menu

- CPU Ratio Apply Mode -> All Core •
- CPU Ratio -> Auto \bullet
- CPU Core Voltage -> Auto \bullet
- CPU NB/SoC Voltage -> Override Mode \bullet
- Override CPU NB/Soc Voltage -> 1.15 V 1.20 V \bullet
- VDDG IOD Voltage -> 0.95 V - 0.975 V

Digit All Power menu

- CPU Loadline Calibration Control -> Auto \bullet
- CPU Switching Frequency -> 600 CPU NB/SoC Switching Frequency -> 600 KHz -> 600 KHz \bullet

Curve Optimizer and PBO

- All options to Auto! \bullet
- Make sure all Curve Optimizer values are 0 in both menus (All Core and Per Core). Due to a bug it can be \bullet that these settings are still activated even though Curve Optimizer is set to disabled!
- After that, set PBO to disabled

AMD CBS menu

- Set Core Performance Boost to Auto \bullet
- Set Global C-state Control to Enabled \bullet
- Set CPPC to Enabled
- Set CPPC Preferred Cores to Enabled