



OpenCore

Reference Manual (0.8.~~0~~.1)

[2022.05.09]

2. **AppleXcpmCfgLock**
Type: plist boolean
Failsafe: false
Requirement: 10.8 (not required for older)
Description: Disables PKG_CST_CONFIG_CONTROL (0xE2) MSR modification in XNU kernel, commonly causing early kernel panic, when it is locked from writing (XCPM power management).
Note: This option should be avoided whenever possible. Refer to the `AppleCpuPmCfgLock` description for details.
3. **AppleXcpmExtraMsrs**
Type: plist boolean
Failsafe: false
Requirement: 10.8 (not required for older)
Description: Disables multiple MSR access critical for certain CPUs, which have no native XCPM support.
This is typically used in conjunction with the `Emulate` section on Haswell-E, Broadwell-E, Skylake-SP, and similar CPUs. More details on the XCPM patches are outlined in `acidanthera/bugtracker#365`.
Note: Additional not provided patches will be required for Ivy Bridge or Pentium CPUs. It is recommended to use `AppleIntelCpuPowerManagement.kext` for the former.
4. **AppleXcpmForceBoost**
Type: plist boolean
Failsafe: false
Requirement: 10.8 (not required for older)
Description: Forces maximum performance in XCPM mode.
This patch writes 0xFF00 to MSR_IA32_PERF_CONTROL (0x199), effectively setting maximum multiplier for all the time.
Note: While this may increase the performance, this patch is strongly discouraged on all systems but those explicitly dedicated to scientific or media calculations. Only certain Xeon models typically benefit from the patch.
5. **CustomPciSerialDevice**
Type: plist boolean
Failsafe: false
Requirement: 10.7
Description: Performs change of PMIO register base address on a customised PCI serial device.
The patch changes the PMIO register base address that the XNU kernel uses for serial input and output, from that of the default built-in COM1 serial port 0x3F8, to the base address stored in the first IO BAR of a specified PCI device or to a specific base address (e.g. 0x2F8 for COM2).
Note: By default, serial logging is disabled. `serial=3` boot argument, which enables serial input and output, should be used for XNU to print logs to the serial port.
Note 2: In addition to this patch, `kext Apple16X50PCI0` should be prevented from attaching to have `kprintf` method working properly. This can be achieved by setting (i.e. `Delete`, then `Add`) the `class-code` property of the PCI serial port device to FFFFFFFF in `DeviceProperties` section. As an alternative solution, a code-less `kext PCISerialDisable.kext` shown in the spoiler `PCISerialDisable.kext/Contents/Info.plist` at `acidanthera/bugtracker#1954`, may also be used. [In addition, for certain Thunderbolt cards the IOKit personality IOPCITunnelCompatible also needs to be set to true, which can be done by the PCISerialThunderboltEnable.kext attached at acidanthera/bugtracker#2003.](#)
Note 3: For this patch to be correctly applied, `Override` must be enabled with all keys properly set in `Custom`, under section `Misc->Serial`.
Note 4: This patch is for PMIO support and is therefore not applied if `UseMmio` under section `Misc->Serial->Custom` is false. For MMIO, there are boot arguments `pcie_mmio_uart=ADDRESS` and `mmio_uart=ADDRESS` that allow the kernel to use MMIO for serial port access.
Note 5: The serial baud rate must be correctly set in both `BaudRate` under section `Misc->Serial->Custom` and via `serialbaud=VALUE` boot argument, both of which should match against each other. The default baud rate is 115200.

This option enables Aquantia AQtion based 10GbE network cards support, which used to work natively before macOS 10.15.4.

Note: In order for Aquantia cards to properly function, `DisableIoMapper` must be disabled, DMAR ACPI table must not be dropped, and VT-d must be enabled in BIOS.

Note 2: While this patch should enable ethernet support for all Aquantia AQtion series, it has only been tested on AQC-107s based 10GbE network cards.

Note 3: To address AppleVTD incompatibilities after applying this quirk, the Reserved Memory Region section of the corresponding device in the DMAR ACPI table might be removed. This table should be disassembled and edited, then recompiled to AML with tool iASL. For the patched DMAR table to be added, the original one should be deleted. More details can be found at comment on commit 2441455.

13. `ForceSecureBootScheme`

Type: plist boolean

Failsafe: false

Requirement: 11

Description: Force x86 scheme for IMG4 verification.

Note: This option is required on virtual machines when using `SecureBootModel` different from `x86legacy`.

14. `IncreasePciBarSize`

Type: plist boolean

Failsafe: false

Requirement: 10.10

Description: Allows IOPCIFamily to boot with 2 GB PCI BARs.

Normally macOS restricts PCI BARs to 1 GB. Enabling this option (still) does not let macOS actually use PCI devices with larger BARs.

Note: This option should be avoided whenever possible. A need for this option indicates misconfigured or defective firmware.

15. `LapicKernelPanic`

Type: plist boolean

Failsafe: false

Requirement: 10.6 (64-bit)

Description: Disables kernel panic on LAPIC interrupts.

16. `LegacyCommpage`

Type: plist boolean

Failsafe: false

Requirement: 10.4 - 10.6

Description: Replaces the default 64-bit commpage bcopy implementation with one that does not require SSSE3, useful for legacy platforms. This prevents a `commpage no match for last panic` due to no available 64-bit bcopy functions that do not require SSSE3.

17. `PanicNoKextDump`

Type: plist boolean

Failsafe: false

Requirement: 10.13 (not required for older)

Description: Prevent kernel from printing kext dump in the panic log preventing from observing panic details. Affects 10.13 and above.

18. `PowerTimeoutKernelPanic`

Type: plist boolean

Failsafe: false

Requirement: 10.15 (not required for older)

Description: Disables kernel panic on `setPowerState` timeout.

An additional security measure was added to macOS Catalina (10.15) causing kernel panic on power change timeout for Apple drivers. Sometimes it may cause issues on misconfigured hardware, notably digital audio, which

- (g) As the `Default` value will increase with time to support the latest major released operating system, it is not recommended to use the `ApECID` and the `Default` settings together.
- (h) Installing macOS with Apple Secure Boot enabled is not possible while using HFS+ target volumes. This may include HFS+ formatted drives when no spare APFS drive is available.

The installed operating system may have sometimes outdated Apple Secure Boot manifests on the `Preboot` partition, resulting in boot failures. This is likely to be the case when an “OCB: Apple Secure Boot prohibits this boot entry, enforcing!” message is logged.

When this happens, either reinstall the operating system or copy the manifests (files with `.im4m` extension, such as `boot.efi.j137.im4m`) from `/usr/standalone/i386` to `/Volumes/Preboot/<UUID>/System/Library/CoreServices`. Here, `<UUID>` is the system volume identifier. On HFS+ installations, the manifests should be copied to `/System/Library/CoreServices` on the system volume.

For more details on how to configure Apple Secure Boot with UEFI Secure Boot, refer to the UEFI Secure Boot section.

8.6 Serial Properties

1. Custom

Type: plist dict

Description: Update serial port properties in `BaseSerialPortLib16550`.

This section lists the PCD values that are used by the `BaseSerialPortLib16550`. When option `Override` is set to `false`, this dictionary is optional.

2. Init

Type: plist boolean

Failsafe: false

Description: Perform serial port initialisation.

This option will perform serial port initialisation within OpenCore prior to enabling (any) debug logging.

Refer to the `Debugging` section for details.

3. Override

Type: plist boolean

Failsafe: false

Description: Override serial port properties. When this option is set to `false`, no keys from `Custom` will be overridden.

This option will override serial port properties listed in the `Serial Custom Properties` section below.

8.6.1 Serial Custom Properties

1. BaudRate

Type: plist integer

Failsafe: 115200

Description: Set the baud rate for serial port.

This option will override the value of `gEfiMdeModulePkgTokenSpaceGuid.PcdSerialBaudRate` defined in `MdeModulePkg.dec`.

2. ClockRate

Type: plist integer

Failsafe: 1843200

Description: Set the clock rate for serial port.

This option will override the value of `gEfiMdeModulePkgTokenSpaceGuid.PcdSerialClockRate` defined in `MdeModulePkg.dec`.

3. DetectCable

Type: plist boolean

[Failsafe: false](#)

[Description: Enable serial port cable detection.](#)

[This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialDetectCable defined in MdeModulePkg.dec.](#)

4. ExtendedTxFifoSize

Type: plist integer

Failsafe: 64

Description: Set the extended transmit FIFO size for serial port.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialExtendedTxFifoSize defined in MdeModulePkg.dec.

5. FifoControl

Type: plist integer

Failsafe: 0x07

Description: Configure serial port FIFO Control settings.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialFifoControl defined in MdeModulePkg.dec.

6. LineControl

Type: plist integer

Failsafe: 0x07

Description: Configure serial port Line Control settings.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialLineControl defined in MdeModulePkg.dec.

7. PciDeviceInfo

Type: plist data

Failsafe: 0xFF

Description: Set PCI serial device information.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialPciDeviceInfo defined in MdeModulePkg.dec.

Note: The maximum allowed size of this option is 41 bytes. Refer to acidanthera/bugtracker#1954 for more details.

Note 2: This option can be set by running the FindSerialPort tool.

8. RegisterAccessWidth

Type: plist integer

Failsafe: 8

Description: Set serial port register access width.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialRegisterAccessWidth defined in MdeModulePkg.dec.

9. RegisterBase

Type: plist integer

Failsafe: 0x03F8

Description: Set the base address of serial port registers.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialRegisterBase defined in MdeModulePkg.dec.

10. RegisterStride

Type: plist integer

Failsafe: 1

Description: Set the serial port register stride in bytes.

This option will override the value of gEfiMdeModulePkgTokenSpaceGuid.PcdSerialRegisterStride defined in MdeModulePkg.dec.

On certain firmware, the controllers that produce the console protocols (simple text out) must be reconnected when the screen resolution is changed via GOP. Otherwise, they will not produce text based on the new resolution.

Note: On several boards this logic may result in black screen when launching OpenCore from Shell and thus it is optional. In versions prior to 0.5.2 this option was mandatory and not configurable. Please do not use this unless required.

13. SanitiseClearScreen

Type: plist boolean

Failsafe: false

Description: Some types of firmware reset screen resolutions to a failsafe value (such as 1024x768) on the attempts to clear screen contents when large display (e.g. 2K or 4K) is used. This option attempts to apply a workaround.

Note: This option only applies to the **System** renderer. On all known affected systems, **ConsoleMode** must be set to an empty string for this option to work.

14. UIScale

Type: plist integer, 8 bit

Failsafe: -1

Description: User interface scaling factor.

Corresponds to 4D1EDE05-38C7-4A6A-9CC6-4BCCA8B38C14:UIScale variable.

- 1 — 1x scaling, corresponds to normal displays.
- 2 — 2x scaling, corresponds to HiDPI displays.
- -1 — leaves the current variable unchanged.
- 0 — automatically chooses scaling based on the current resolution.

Note 1: Automatic scale factor detection works on the basis of total pixel area and may fail on small HiDPI displays, in which case the value may be manually managed using the NVRAM section.

Note 2: When switching from manually specified NVRAM variable to this preference an NVRAM reset may be needed.

15. UgaPassThrough

Type: plist boolean

Failsafe: false

Description: Provide UGA protocol instances on top of GOP protocol instances.

Some types of firmware do not implement the legacy UGA protocol but this may be required for screen output by older EFI applications such as EfiBoot from 10.4.

11.15 ProtocolOverrides Properties

1. AppleAudio

Type: plist boolean

Failsafe: false

Description: Replaces Apple audio protocols with builtin versions.

Apple audio protocols allow OpenCore and the macOS bootloader to play sounds and signals for screen reading or audible error reporting. Supported protocols are beep generation and VoiceOver. The VoiceOver protocol is ~~specific to only provided natively by~~ Gibraltar machines (T2) ~~and~~, however versions of macOS which support VoiceOver will see and use the implementation provided by OpenCore, on screens such as FileVault 2 unlock. VoiceOver is not supported before macOS High Sierra (10.13). Older macOS versions use the AppleHDA protocol (which is not currently implemented) instead.

Only one set of audio protocols can be available at a time, so this setting should be enabled in order to enable audio playback in the OpenCore user interface on Mac systems implementing some of these protocols.

Note: The backend audio driver needs to be configured in **UEFI Audio** section for these protocols to be able to stream audio.

2. AppleBootPolicy

Type: plist boolean