

# OpenCore Bootloader aktuelle und ältere Versionen

Beitrag von „Noir0SX“ vom 24. Mai 2019, 17:16

OpenCorePkg

<https://github.com/acidanthera/OpenCorePkg>

## Im Forum

- [Anleitungen und Builds](#)
- [Apps und Tools](#)
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## Credits

- The HermitCrabs Lab
- All projects providing third-party code (refer to file headers)
- [Download-Fritz](#)
- [Goldfish64](#)
- [savvamirofanov](#)
- [vit9696](#)

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Beitrag von „Noir0SX“ vom 24. Mai 2019, 17:17

## v0.0.1

- Initial developer preview release

**WARNING:** This release is a developer preview, i.e. it targets experienced engineers and developers. Configuration and feature set are under works, i.e. refinements are expected to happen with 1.0.0 release.

## Beitrag von „Noir0SX“ vom 24. Mai 2019, 17:18

### v0.0.2

- Documentation improvements (see Differences.pdf)
- Platform information database updates
- Fixed misbehaving Debug -> Target enable bit
- Added `ResetLogoStatus` ACPI quirk
- Added `SpoofVendor PlatformInfo` feature
- Replaced `ExposeBootPath` with `ExposeSensitiveData`
- Added builtin implementation of Data Hub protocol
- Dropped `UpdateSMBIOSMode Auto` mode in favour of `Create`
- Fixed SMBIOS CPU detection for Xeon and Core models
- Moved `ConsoleControl` configuration to `Protocols`
- Added `Security` -> [ScanPolicy](#) preference
- Fixed invalid `board-rev` exposure in Data Hub
- Fixed SMBIOS Type 133 table exposure
- Added support for SMBIOS Type 134 table exposure

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## Beitrag von „Noir0SX“ vom 3. Juli 2019, 15:39

### v0.0.3

- Added complete modern platform database (2012+)
- Added `DisableIoMapper` kernel quirk
- Fixed ACPI modification failures with nested multiboot
- Dropped `IgnoreForWindows` quirk legacy
- Added basic AMD Zen CPU support
- Added `Misc` -> `Tools` section to add third-party tools
- Added `Kernel` -> `Emulate` section for CPUID patches
- Added `CustomSMBIOSGuid` quirk for Custom SMBIOS update mode
- Added `PanicNoKextDump` quirk to avoid kext dump in panics
- Switched to EDK II stable and reduced image size

- Added `LapicKernelPanic` kernel quirk
- Added `AppleXcpmExtraMsrs` quirk and improved XCPM patches
- Added `(external)` suffix for external drives in boot menu
- Added `UsePicker` option, do enable for OC boot management
- Added `nvr.plist` loading for legacy and incompatible platforms
- Improved instructions for legacy and Windows installation
- Added Windows Boot Camp switching support
- Added basic hibernation detection & support
- Added `ResetHwSig` ACPI quirk to workaround hibernation
- Removed `Custom` subfolder requirement from ACPI tables
- Fixed kext injection in 10.7.x and 10.8.x
- Added ESP partition type detection to [ScanPolicy](#)
- Added support for third-party user interfaces

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## Beitrag von „Noir0SX“ vom 11. August 2019, 12:40

### v0.0.4

- Fixed kext injection issues with dummy dependencies
- Fixed kext injection issues with reused vtables
- Fixed Custom SMBIOS table update patches
- Added timestamp to the log file and changed extension to txt
- Enhanced `LogoutHook` script used for emulated NVRAM saving
- Fixed multiple operating system support in APFS containers
- Added `AvoidHighAlloc` UEFI quirk to avoid high memory allocs
- Updated builtin firmware versions for 10.15 beta support
- Added `Booter` section for Apple bootloader preferences
- Dropped `AptioMemoryFix.efi` support for `Booter` and `FwRuntimeServices.efi`
- Fixed hibernation issues in Windows with `RequestBootVarRouting`
- Significantly improved boot stability on APTIO
- Added support for Windows & OpenCore on the same drive through `BlessOverride`
- Added advanced user-specified boot entries through `Misc -> Entries`
- Added `DisableVariableWrite` quirk to disable hardware NVRAM write in macOS

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## **Beitrag von „Noir0SX“ vom 7. September 2019, 15:49**

### **v0.5.0**

- Added builtin firmware versions for new models 2019
- Fixed LogoutHook leaving random directories in \$HOME
- Fixed FSBFrequency calculation on Xeon Scalable CPUs (thx [@mrmiller](#))
- Fixed ARTFrequency specifying on Intel server and atom models
- Increased log size to 256 KB by default
- Added ReplaceTabWithSpace quirk to improve Shell experience
- Added ClearScreenOnModeSwitch quirk to avoid visual glitches
- Added MISC\_PWR\_MGMT patch to AppleXcpmExtraMsrs quirk (thx [@mrmiller](#))
- Added DevirtualiseMmio quirk to Booter section
- Added FileVault 2 user interface protocols formerly in AppleUISupport
- Improved kernel patch logging to include configuration comments
- Added MSFT basic data and Linux root fs recognition to [ScanPolicy](#)
- Fixed RT region protection restoration regression (thx Sniki)
- Added OPT, CMD+R, CMD+OPT+P+R boot action hotkey support
- Added PollAppleHotKeys to register boot.efi hotkeys in the picker
- Added DisableSingleUser quirk to prohibit single user mode
- Upgraded EDK II base package to edk2-stable201908
- Prohibited argument changing by BootNext

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## **Beitrag von „Noir0SX“ vom 8. Oktober 2019, 16:35**

### **v0.5.1**

- Added support of kernel resource kext injection
- Added support for 0.25% clock slowdown on Xeon Scalable CPUs (thx [@mrmiller](#))
- Replaced MatchKernel with MinKernel and MaxKernel
- Added Arguments to Tools and Entries sections
- Fixed broken timer for 300 series Intel chipsets

- Added `Input` section for mouse and keyboard aggregation
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## Beitrag von „Noir0SX“ vom 31. Oktober 2019, 09:01

### v0.5.2

- Fixed `MinKernel` and `MaxKernel` logic (thx [@dhinakg](#), [@reitermarkus](#))
- Fixed ASSERT when booting non-Apple OSES without arguments from the DEBUG version
- Added `MmioWhitelist` configuration option
- Added `PowerTimeoutKernelPanic` kernel quirk
- Fixed erratic cursor appearing in release builds
- Moved `ReconnectOnResChange` to a user-configurable quirk to avoid freezes
- Added OpenCore version to picker ui, configured by `ExposeSensitiveData`
- Added hypervisor CPUID support to work with virtualization (thx [@Leoyzen](#))

Please note that newly found issues may be fixed in the [development version](#).

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## Beitrag von „Noir0SX“ vom 2. Dezember 2019, 17:32

### v0.5.3

- Update builtin firmware versions
- Fixed interpreting letters in boot menu
- Fixed timeout abortion with `PollAppleHotKeys` quirk
- Fixed rare kext injection failure due to plist-only kext in prelinkedkernel
- Fixed error reporting for dmg loading
- Added various debugging improvements
- Added new crypto stack resulting in vault key format changes
- Added `UnblockFsConnect` UEFI quirk to fix missing filesystems on some laptops
- Added `RequestBootVarFallback` UEFI quirk to circumvent firmware boot option issues
- Added `ThirdPartyDrives` kernel quirk fixing SSD trim and 10.15 SATA hibernation (thx [@lvs1974](#))
- Removed `ThirdPartyTrim` kernel quirk in favour of `ThirdPartyDrives`
- Added Intel Xeon E5 (Broadwell-EP) support (thx [@crazyi](#))
- Switched to edk2-stable201911, which is now the minimum supported EDK II version

Please note that newly found issues may be fixed in the [development version](#).

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## Beitrag von „Noir0SX“ vom 13. Januar 2020, 17:09

### v0.5.4

- Added Enter key handling in boot menu for quick proceed
- Update builtin firmware versions
- Bundled FwRuntimeServices driver with OpenCore
- Allowed writing to non-volatile variables with disabled write
- Fixed microcode reading on Intel CPUs
- Fixed SMBIOS Type4 External Clock values
- Improved Windows compatibility on some setups ([acidanthera/bugtracker#614](#))
- Added SupportsCsm and option in PlatformInfo/Generic
- Added OSInfo protocol support
- Added SignalAppleOS Booter quirk to enable IGPU on Macs in other OS
- Added AppleSmcIoprotocol support (replaces VirtualSmc UEFI driver)
- Added AuthRestart security property for VirtualSMC authenticated restart
- Fixed input protocol initialisation on VMware fusion
- Added arrow key handling in boot menu
- FileVault 2-like key input is now the only supported input in boot menu
- Fixed 5 second delay when exiting Shell to OpenCore Picker
- Added default boot option update and AllowSetDefault Security option
- Fixed CPU package detection on configurations with multiple CPUs
- Bundled CleanNvram and VerifyMsrE2 tools for debugging
- Added screen clearing after choosing boot entry in picker
- Added WriteFlash NVRAM option to enable writing variables in Add
- Added LegacyOverwrite NVRAM option to allow overwriting variables by nvram.plist
- Added AppleXcpmForceBoost kernel quirk to maximise select Xeon performance
- Bundled NvmExpressDxe and XhciDxe drivers for platforms that need them
- Added IncreasePciBarSize kernel quirk for select platforms with PCI space issues

Please note that newly found issues may be fixed in the [development version](#).

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## Beitrag von „Noir0SX“ vom 3. Februar 2020, 15:29

### v0.5.5

- Fixed CPU bus ratio calculation for Nehalem and Westmere
- Fixed CPU package calculation on MacPro5,1 and similar
- Improved OpenCore rerun detection for new versions
- Fixed loading picker on boot failure when it is hidden
- Added PMC ACPI sample for 300-series chipsets
- Improved driver connection performance on APTIO IV
- Fixed boot option saving in LogoutHook.command
- Added support for OEM information in ExposeSensitiveData
- Improved SanitiseClearScreen to avoid mode switching
- Replaced SupportsCsm with AdviseWindows enabling UEFI mode
- Fixed issues with default boot path selection on some boards
- Update builtin firmware versions
- Fixed AdviseWindows not setting FirmwareFeatures in NVRAM
- Added TakeoffDelay option for improved action hotkey support
- Added Mac GOP support to ProvideConsoleGop quirk
- Added experimental BuiltinTextRenderer boot option
- Added DummyPowerManagement kernel quirk to disable CPU PM

## Beitrag von „Noir0SX“ vom 2. März 2020, 18:20

### v0.5.6

- Various improvements to builtin text renderer
- Fixed locating DMG recovery in APTIO IV firmwares on FAT32
- Fixed loading DMG recovery in APTIO IV firmwares on FAT32
- Removed AvoidHighAlloc quirk due to removed I/O over 4GB
- Moved ConsoleMode, Resolution options to Output section
- Moved console-related UEFI quirks to Output section
- Replaced ConsoleControl and BuiltinTextRenderer with TextRenderer
- Removed ConsoleBehaviourOs and ConsoleBehaviourUi
- Fixed providing ConsoleOutHandle GOP when running from Shell
- Added PickerAttributes option to colour picker
- Added ProtectSecureBoot option through FwRuntimeServices
- Replaced RequireVault and RequireSignature with Vault
- Added BootKicker tool to support launching Apple BootPicker
- Added BootPicker support as an external UI in OC through PickerMode
- Added DirectGopRendering option to use direct GOP output
- Multiple memory corruption and performance fixes for PNG support
- Fixed DefaultBackgroundColor variable handling

- Added `HideAuxiliary` and `Auxiliary` options
- Fixed picker timeout and log timestamps for VMware
- Fixed NULL parent `DeviceHandle` for launched tools
- Added bundled `HiiDatabase` driver for very old firmwares
- Added SSE2 support in memory intrinsics for better performance
- Improved ACPI PM timer CPU frequency calculation performance
- Improved `LapicKernelPanic` compatibility with newer macOS versions
- Fixed drivers starting with # not being skipped
- Added audio support through `AudioDxe` with optional boot chime
- Added VoiceOver accessibility support in `boot.efi` for 10.13+
- Added `PickerAudioAssist` option for audio assistance in picker
- Added `HdaCodecDump.efi` tool in default package
- Added legacy `AudioDxe` and Microsoft namespaces to Reset NVRAM
- Merged `OcSupportPkg` with `OpenCorePkg` for easier bisection
- Disabled warnings in release versions of NVMe and XHCI drivers

## Beitrag von „Noir0SX“ vom 6. April 2020, 15:19

### v0.5.7

- Added `TimeMachine` detection to picker
- Added early preview version of `OpenCanopy`
- Fixed FS discovery on NVMe with legacy drivers
- Added `DirectGopCacheMode` option for FB cache policy
- Added `KeyFiltering` option to workaround buggy KB drivers
- Added tool and custom entry separation in audio assistant
- Added `OpenControl` tool to configure full NVRAM access from Shell
- Added `boot.efi` debug protocol support for 10.15.4+
- Added `boot.efi` performance logging for 10.15.4+
- Added `ProtectUefiServices` quirk to fix `DevirtualiseMmio` on Z390
- Replaced `BOOTCAMP` `Windows` with `Windows` to match the original
- Added bundled `OpenShell` originally available as `OpenCoreShell`
- Rework `readlabel` utility into `disklabel` with encoding support
- Renamed `FwRuntimeServices` driver to `OpenRuntime`
- Renamed `AppleUsbKbDxe` driver to `OpenUsbKbDxe`
- Update builtin firmware
- Fixed `PowerTimeoutKernelPanic` on 10.15.4
- Fixed 4K section alignment in `OpenRuntime` to fix Linux booting on SKL
- Introduced `SyncRuntimePermissions` to fix multiple memory permission flaws

- Introduced `RebuildAppleMemoryMap` to fix macOS booting on Dell 5490
  - Removed `ShrinkMemoryMap` in favour of more advanced `RebuildAppleMemoryMap`
  - Marked `EnableWriteUnprotector` as deprecated on modern systems
  - Introduced `ProtectMemoryRegions` to fix memory region handling
  - Removed `ProtectCsmRegion` in favour of `ProtectMemoryRegions`
  - Renamed `PickerAttributes` to `ConsoleAttributes`
  - Introduced `PickerAttributes` as a matter of UI configuration
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## Beitrag von „Noir0SX“ vom 4. Mai 2020, 15:40

### v0.5.8

- Fixed invalid CPU object reference in SSDT-PLUG
  - Fixed incorrect utilities and resources packaging
  - Fixed `Custom UpdateSMBIOSMode` modifying SMBIOSv3 table
  - Updated docs to cover separating SMBIOS via `UpdateSMBIOSMode`
  - Fixed rendering macOS installer icons in OpenCanopy
  - Added APFS support with Fusion Drive and enhanced security
  - Added AppleEvent mouse support in OpenCanopy
  - Fixed AppleEvent and OpenCanopy compatibility with OVMF TPL restrictions
  - Added mouse drivers to the package as OVMF needs one
  - Added memory region reservation support
  - Added `RtcRw` tool to manipulate RTC memory
  - Added `PatchAppleRtcChecksum` kernel quirk
  - Added `AppleRtcRam` protocol implementation
  - Renamed `Protocols` to `ProtocolOverrides` for clarity
  - Added `ResetSystem` tool to allow shutdown/reset actions in the menu
  - Added experimental `BootProtect Security` option
  - Fixed kext injection in 10.8 installer
  - Added timeout support to OpenCanopy user interface
  - Fixed handling 24-bit screen resolutions
  - Added `Ps2KeyboardDxe` driver for DuetPkg
  - Updated `BootInstall DuetPkg` version (now opensource)
  - Added partial HiDPI support in OpenCanopy
  - Update builtin firmware
  - Fixed invalid checksum checks when creating vault (thx [@dakanji](#))
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## Beitrag von „NoirOSX“ vom 1. Juni 2020, 16:38

### v0.5.9

- Added full HiDPI support in OpenCanopy
- Improved OpenCanopy font rendering by using CoreText
- Fixed light and custom background font rendering
- Added `Boot####` options support in boot entry listing
- Removed `HideSelf` by pattern recognising `BOOTx64.efi`
- Added `BlacklistAppleUpdate` to avoid Apple FW updates
- Fixed accidental tool and NVRAM reset booting by default
- Fixed unrecognised select `com.apple.recovery.boot` entries
- Changed NVRAM reset not to erase `BootProtect` boot options
- Improved boot performance when picker UI is disabled
- Enforced the use of builtin picker when external fails
- Fixed warnings for empty NVRAM variables (e.g. `rtc-blacklist`)
- Added `ApplePanic` to store panic logs on ESP root
- Fixed `ReconnectOnResChange` reconnecting even without res change
- Fixed OpenCanopy showing internal icons for external drives
- Fixed OpenCanopy launching Shell with text over it
- Added partial hotkey support to OpenCanopy (e.g. `Ctrl+Enter`)
- Added builtin text renderer compatibility with Shell page mode
- Fixed `FadtEnableReset` with too small FACP tables and some laptops
- Fixed CPU detection crash with QEMU 5.0 and KVM accelerator
- Removed `RequestBootVarFallback` due to numerous bugs
- Added `DeduplicateBootOrder` UEFI quirk
- Removed `DirectGopCacheMode` due to being ineffective
- Fixed assertions on log exhaustion causing boot failures
- Fixed builtin text renderer failing to provide `ConsoleControl`
- Fixed compatibility with blit-only GOP (e.g. OVMF Bochs)
- Fixed ignoring `#` in `DeviceProperty` and NVRAM `Delete`
- Renamed `Block` to `Delete` in `ACPI,DeviceProperties`, and NVRAM
- Added `MacBookPro16,2` and `MacBookPro16,3` model codes
- Added PCI device scanning policy support (e.g. `VIRTIO`)
- Improved playback performance in `AudioDxe`
- Updated builtin firmware versions for SMBIOS and the rest
- Added improved CPU type detection for newer CPU types
- Added `ConfigValidity` utility and improved config validation
- Added serial port initialisation for serial debug logging
- Disabled empty debug log file creation to avoid ESP cluttering
- Added `TscSyncTimeout` quirk to workaround debug kernel assertions
- Added first-class Windows support to bless model

- Fixed `LapicKernelPanic` kernel quirk on 10.9
  - Added prebuilt version of `CrScreenshotDxe` driver
  - Fixed Hyper-V frequency detection compatibility
  - Added `SysReport` option for DEBUG builds to dump system info
  - Fixed crashes on some AMD firmwares when performing keyboard input
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## Beitrag von „Noir0SX“ vom 3. August 2020, 20:36

### v0.6.0

- Fixed sound corruption with `AudioDxe`
- Fixed icon choice for Apple FW update in `OpenCanopy`
- Fixed APFS driver loading on Fusion Drive
- Added Comet Lake HDA device code
- Fixed audio stream position reporting on non-Intel platforms
- Added `Firmware` mode to `ResetSystem` to reboot into preferences
- Replaced `BlacklistAppleUpdate` with `run-efi-updater` NVRAM variable
- Fixed reset value and detection in `FadtEnableReset` ACPI quirk
- Fixed freezes during boot option expansion with PXE boot entries
- Updated underlying EDK II package to `edk2-stable202005`
- Added `ProvideMaxSlide` quirk to improve laptop stability, thx [@zhen-zen](#)
- Fixed slide choice on platforms when 0 slide is unavailable, thx [@zhen-zen](#)
- Fixed assertions caused by unaligned file path access in DEBUG builds
- Renamed `ConfigValidity` utility to `ocvalidate` for consistency
- Added `GlobalConnect` for APFS loading to workaround older firmware issues
- Added 11.0 support for `AvoidRuntimeDefrag` Booter quirk
- Fixed 11.0 lapic kernel quirk as of DP1
- Improved boot selection scripts for macOS without NVRAM
- Added UGA protocol compatibility in `ProvideConsoleGop` quirk
- Added `UgaPassThrough` option to support UGA protocol over GOP
- Added `AppleFramebufferInfo` protocol implementation and override
- Fixed serial initialisation when file logging is disabled
- Fixed FSBFrequency reporting on Meron and similar CPUs
- Fixed incorrect volume icon dimension requirements in `OpenCanopy`
- Added preview version of `KernelCollection` injection code
- Fixed ACPI reset register detection in `DxeIpl`
- Added `MacBookPro16,4` model code
- Updated builtin firmware versions for SMBIOS and the rest
- Fixed OSXSAVE reporting when emulating CPUID on newer CPUs
- Added `SerialInit` option to perform serial initialisation separately

- Fixed OpenDuetPkg booting on Intel G33 with SATA controller in RAID mode
- PlatformInfo Automatic for all models
- Fixed 32-bit OpenDuetPkg booting on machines with over 4 GBs of RAM
- Fixed delays with OpenDuetPkg booting with certain SATA controllers in IDE mode
- Fixed display name for some high core count i9 CPUs like 7920X
- Fixed SSDT-EC-USBX

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## Beitrag von „Raptortosh“ vom 9. April 2021, 10:00

### v0.6.8

- Switched to VS2019 toolchain for Windows builds
- Reduced legacy boot install interaction effort
- Increased OpenCanopy rendering performance
- Added OpenCanopy Shut Down and Restart buttons
- Reduced OpenCanopy mouse pointer input lag
- Fixed that cursor bounds could be different from OpenCanopy's
- Improved builtin picker rendering performance
- Added Memory Type decoding for SMBIOS in Automatic mode
- Properly support setting custom entries as default boot options
- Fixed creating log file when root file system is not writable
- Fixed DisableSingleUser not being enabled in certain cases
- Added ForceBooterSignature quirk for Mac EFI firmware
- Fixed OpenCanopy sometimes cutting off shown boot entries
- Further improved CPU frequency calculation on legacy CPUs
- Fixed SMBIOS SMC version encoding sequence
- Added TSC frequency reading from Apple Platform Info
- Added TSC frequency reading for Apple devices with nForce chipsets
- Added Base and BaseSkip lookup for ACPI patches
- Fixed ACPI table magic corruption during patching
- Fixed unnatural OpenCanopy and FileVault 2 cursor movement
- Fixed OpenCanopy interrupt handling causing missed events and lag
- Improved OpenCanopy double-click detection
- Reduced OpenCanopy touch input lag and improved usability
- Improved keypress responsiveness in OpenCanopy and builtin pickers
- Improved non-repeating key detection in OpenCanopy and builtin pickers
- Fixed Escape preventing OpenCanopy fade up until released, on some systems
- Fixed fast repeat then stall issue with key handling on some PS/2 systems
- Added accurate Shift+Enter/Shift+Index detection when using PollAppleHotKeys
- Added 'set default' indicator to builtin picker

- Replaced VerifyMsrE2 with ControlMsrE2 also allowing unlock on some firmwares
- Fixed OpenCanopy flicker when refreshing the entry view
- Added OpenCanopy TAB navigation support
- Added OpenCanopy graphical password interface
- Added OpenCanopy pulsing animation to signal timeout
- Added OpenCanopy 'set default' indicator
- Fixed OpenCanopy not aborting timeout on pointer click
- Fixed OpenCanopy intro animation not scaling with UIScale
- Add OpenCanopy boot entry label scrolling (fixes missing long labels)
- Added tabbable Shutdown and Restart buttons to builtin picker
- Fixed in-firmware shutdown for some systems running OpenDuet
- Added Zero as alias hotkey for Escape, to force show picker if hidden
- Added =/+ key as alias for CTRL to set default OS
- Added additional support for configuring correct key repeat behaviour with KeySupport mode
- Fixed CPU multiplier detection on pre-Nehalem Intel CPUs
- Fixed incorrect handling of multiple processors and processor cache in SMBIOS
- Matched default Apple boot picker cursor start position
- Updated OpenShell `devices` command to support misaligned device names returned by some Apple firmware
- Added `(.dmg)` suffix to DMG boot options in OpenCanopy
- Added identifiers for Rocket Lake and Tiger Lake CPUs
- Added PickerAudioAssist 'disk image' indication
- Fixed PickerAudioAssist indications played twice in rare cases
- Improved OpenCanopy pointer acceleration
- Added more precise control on `AppleEvent` protocol properties and features
- Added dynamic keyboard protocol installation on CrScreenshotDxe
- Support starting UEFI tools with argument support (e.g. `ControlMsrE2`) without arguments from picker
- Fixed OpenCanopy font height calculation, may reject previously working fonts and mitigate memory corruption
- Fixed incorrect identification of Xeon E5XXX/E5-XXXX and Xeon WXXXX/W-XXXX CPUs
- Added RSDP, RSDT, and XSDT handling to `NormalizeHeaders` ACPI quirk

## Beitrag von „Raptortosh“ vom 3. Mai 2021, 19:08

### v0.6.9

- Fixed out-of-sync cursor movement rectangle when loading e.g. CrScreenshotDxe
- Updated underlying EDK II package to edk2-stable202102

- Applied consistent enforcement of required minimum Apple OEM Apple Event protocol version
- Changed CustomDelays to less surprising boolean setting with failsafe of false
- Changed key repeat failsafes and sample values to Apple OEM values
- Changed PointerSpeedMul failsafe to Apple OEM value
- Updated docs to include configuration of key repeat settings with and without KeySupport
- Prevented 'set default' UI when action not permitted by security config
- Added `ForgeUefiSupport` quirk to workaround legacy EFI 1.x firmwares compatibility
- Added `ReloadOptionRoms` quirk to force-load Option ROMs on PCI devices
- Added `OC_ATTR_USE_MINIMAL_UI` to allow running pickers with no Shutdown and Restart buttons
- Added display of OpenCore version number to OpenCanopy as well as builtin picker, depending on existing ExposeSensitiveData bit
- Added support for case-insensitive argument handling in the UEFI tools
- Added vector acceleration of SHA-512 and SHA-384 hashing algorithms, thx [@MikhailKrichanov](#)
- Fixed wraparound when using arrow keys in OpenCanopy
- Updated builtin firmware versions for SMBIOS and the rest
- Added bundled Linux versions for userspace utilities
- Fixed fallback SMBIOS `Manufacturer` value to `NO_DIMM` for empty slots
- Fixed assertions when running OpenCanopy with low resolution, will fallbacks to builtin now

## Beitrag von „Raptortosh“ vom 7. Juni 2021, 18:02

### v0.7.0

- Fixed NVRAM reset on firmware with write-protected `BootOptionSupport`
- Improved direct GOP renderer performance for certain cases
- Added support for display rotation in direct GOP renderer
- Fixed handling multinode device paths in `LoadedImage` and elsewhere
- Changed OpenCanopy image directory to support directory prefixes
- Changed OpenCanopy preferred image set to `Acidanthera\GoldenGate`
- Removed `<BOOTPATH>.icns` and `<TOOLPATH>.icns` support
- Added content flavour system allowing custom boot entry icons compatible across icon packs
- Added automatic flavour detection for macOS boot entries
- Added `ProvideCurrentCpuInfo` quirk to provide correct TSC/FSB for Hyper-V virtual machines
- Added Hyper-V device path expansion to allow setting default boot volume

- Added `Apple` variant of `GopPassThrough` to handle only `AppleFramebufferInfo` handles
- Fixed further kernel patches not being processed if a patch was skipped due to arch mismatch
- Added optional Toggle `SIP` system boot menu option
- Added `CsrUtil.efi` tool, similar to `Apple csrutil`
- Removed support for `<TOOLPATH>.l1b1/.l2x` pre-drawn entry labels
- Fixed previous text not cleared before console mode tools and entries in `OpenCanopy`
- Fixed `DEBUG` build crashes with `GopPassThrough` and `UgaPassThrough`
- Added flavour for memory testing utilities
- Updated recommended `memtest86` config in sample `.plist` files
- Defined bootloader flavours
- Applied own flavour to OC build
- Added CPU topology fixes to `ProvideCurrentCpuInfo` quirk
- Updated OC default `SIP` disabled value
- Documented `SIP` values which affect macOS updates
- Added `csr-data` `Apple` NVRAM var to docs
- Fixed file alignment causing codesign issues with `CLANGPDB` images
- Replaced `AdviseWindows` with `AdviseFeatures` to support APFS

## Beitrag von „Raptortosh“ vom 6. Juli 2021, 09:41

### v0.7.1

- Added `SyncTableIds` quirk to sync modified table OEM identifiers
- Added CPU Info (MSRs) dumping to `SysReport`
- Updated builtin firmware versions for SMBIOS and the rest
- Fixed `PowerTimeoutKernelPanic` on macOS 12
- Fixed transparency click detection on `OpenCanopy` boot entries
- Added PCI device info dumping to `SysReport`
- Fixed `SetApfsTrimTimeout` on macOS 12
- Documented requirement for `SetDefault.icns` width to match `Selector.icns` width
- Added explicit warn and safe fallback to builtin picker on failure to match the above
- Added VSCode source level IDE debug config example to debug docs
- Added other minor debug docs updates
- Fixed incorrect timeout of built-in picker on IA32
- Added support for custom kernels on ESP partition
- Fixed `DEBUG ASSERT` on pressing change entry keys with single boot entry in `OpenCanopy`
- Added recommended `Apple12` and `Windows11` flavours
- Added `TpmInfo` tool to `DEBUG` TPM status

- Fixed incorrect OpenCanopy initial display when default entry beyond right of screen
  - Fixed `ProvideCurrentCpuInfo` MSR patch on macOS 12
  - Fixed `AppleXcpmForceBoost` patch on macOS 12
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## Beitrag von „Raptortosh“ vom 8. September 2021, 23:46

### v0.7.3

- Improved SSDT-PNLF compatibility with CFL+ graphics
  - Fixed OpenCanopy performance loss due to redrawing introduced in 0.6.9
  - Added pattern-based automatic variable initialisation for better security
  - Updated underlying EDK II package to edk2-stable202108
  - Updated Apple Secure Boot variables for `x86legacy`
  - Updated Linux variants in `Flavours.md`
  - Implemented Boot Entry Protocol, allowing plug-in boot entry drivers
  - Added `StringBuffer` and `FlexArray` libraries
  - Updated Drivers to support arguments (requires `config.plist` update, see samples)
  - Added `OpenLinuxBoot` driver: OC-native Linux autodetect and boot without chaining via GRUB
  - Fixed overlong boot entry names breaking text flow in builtin menu
  - Added `ForceOcWriteFlash` UEFI quirk to enable writing OC system variables
- 

## Beitrag von „Raptortosh“ vom 2. November 2021, 21:43

### v0.7.4

- Fixed Linux kernel sort order
- Added Linux detection optional log detail
- Fixed CPU core count detection for more legacy CPUs
- Added ability to fully override autodetect Linux boot options
- Added large `BaseSystem` support in `AdviseFeatures`
- Updated builtin firmware versions for SMBIOS and the rest
- Added tool to extract vendor secure boot certificate from GRUB shim file
- Added `BridgeOSHardwareModel` NVRAM variable to fix T2 SB AP models on macOS 12
- Changed `Default` Apple Secure Boot model to match SMBIOS for macOS 12
- Fixed `opencore-version` not being added to NVRAM variables

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## Beitrag von „Raptortosh“ vom 2. November 2021, 21:44

### v0.7.5

- Revised OpenLinuxBoot documentation
- Supported Linux ostree boot layout
- Fixed external drive icons for Boot Entry Protocol
- Added GPU Resize BAR quirks to reduce BARs on per-OS basis
- Fixed OpenLinuxBoot hang bug after correct detection of some [distros](#)
- Added DMG signature check during download, thx [@jspraul](#) and [@zhangyoufu](#)
- Updated builtin firmware versions for SMBIOS and the rest
- Updated recovery downloading commands to include macOS 11 and 12

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## Beitrag von „Raptortosh“ vom 22. August 2022, 20:03

- v0.8.3
- Added ext4 file system driver
- Added support for macOS 13 DP3 Kernel Collection
- Added --force-device option to AudioDxe, allowing UEFI audio on HDA controllers which misreport themselves as non-HDA audio devices
- Provided optional unsafe fast file logging (suitable only for firmware with a fully compliant FAT32 driver)
- Fixed incorrect OSBundleLibraries\_x86\_64 handling during cacheless injection
- Changed RsaTool not to link against system ssl on macOS
- Fixed crash during cacheless injection when kext blocking is enabled
- Removed default codec connection delay from AudioDxe
- Added optional --codec-setup-delay argument to AudioDxe
- Changed units of Audio -> SetupDelay from microseconds to milliseconds (divide previous value by 1000 if using this setting)
- Fixed incorrect FAT binary slice being selected under macOS 10.4.11 when performing a cacheless boot
- Fixed rare assertion caused by label animation initialisation in OpenCanopy
- Added --show-csr option for Toggle [SIP](#) boot menu entry
- Added macOS 10.4 and 10.5 support to AllowRelocationBlock Booter quirk
- Added CPU cache info injection for macOS 10.4 to ProvideCurrentCpuInfo quirk
- Added emulated NVRAM driver for use separately from OpenDuet

- Added support for NVRAM reset and set default boot entry when using emulated NVRAM
- Upgraded emulated NVRAM logout script to allow unsupervised installation of recent macOS OTA updates
- Added Driver -> LoadEarly for drivers which need to be loaded before NVRAM init