USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

# Laptop Coffee Lake and Whiskey Lake

| Support | Version |
| --- | --- |
| Initial macOS Support (Coffee Lake ) | macOS 10.13, High Sierra |
| Initial macOS Support (Whiskey Lake ) | macOS 10.14.1, Mojave |

## Starting Point

So making a config.plist may seem hard, it's not. It just takes some time but this guide will tell you how to configure everything, you won't be left in the cold. This also means if you have issues, review your config settings to make sure they're correct. Main things to note with OpenCore:

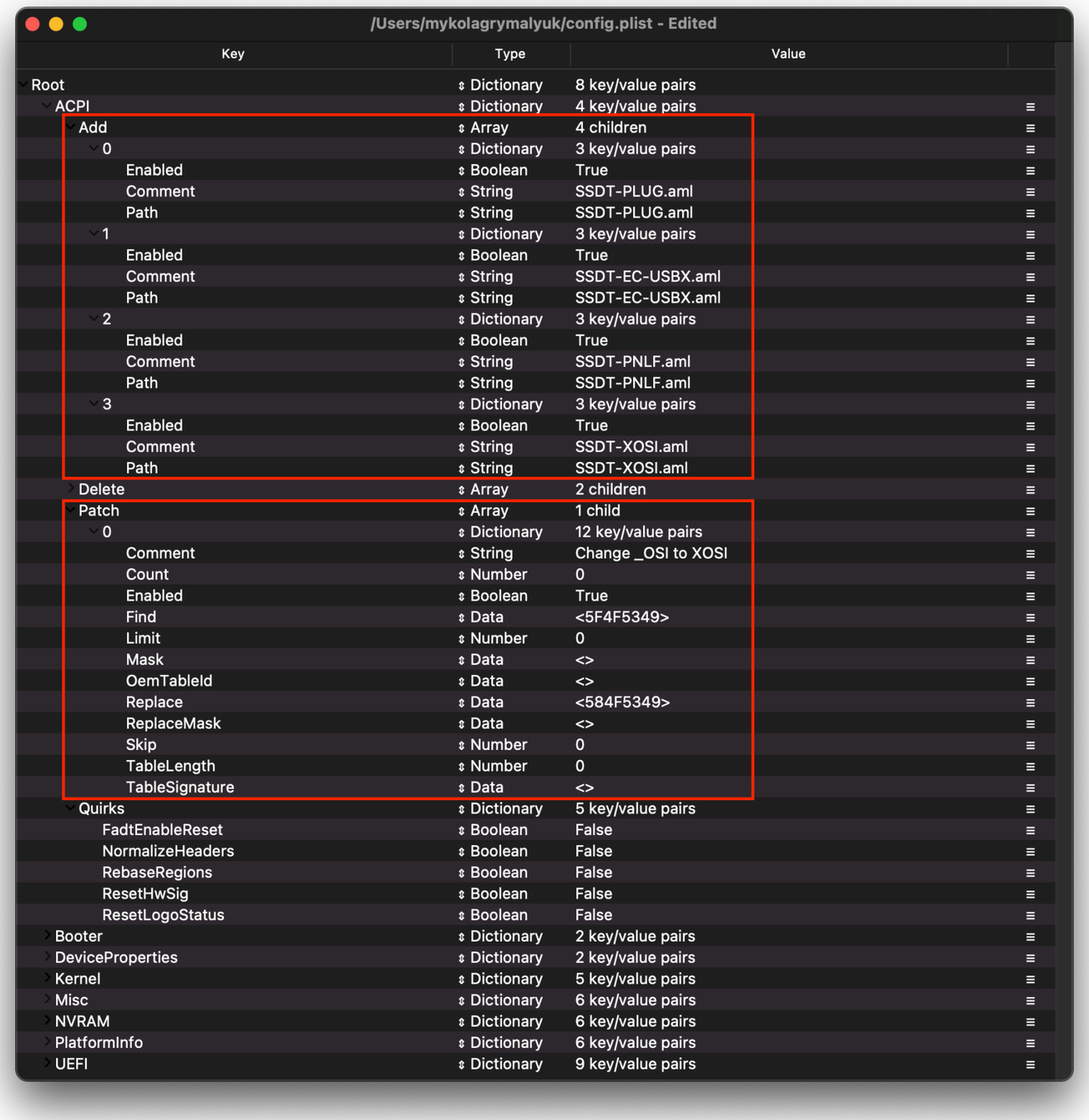
- **All properties must be defined**, there are no default OpenCore will fall back on so **do not delete sections unless told explicitly so**. If the guide doesn't mention the option, leave it at default.
- **The Sample.plist cannot be used As-Is**, you must configure it to your system
- **DO NOT USE CONFIGURATORS**, these rarely respect OpenCore's configuration and even some like Mackie's will add Clover properties and corrupt plists!

Now with all that, a quick reminder of the tools we need

- ProperTree
  - Universal plist editor
- GenSMBIOS
  - For generating our SMBIOS data
- Sample/config.plist
  - See previous section on how to obtain: config.plist Setup

> **WARNING**
>
> Read this guide more than once before setting up OpenCore and make sure you have it set up correctly. Do note that images will not always be the most up-to-date so please read the text below them, if nothing's mentioned then leave as default.

## ACPI




### Add

> **Info**
>
> This is where you'll add SSDTs for your system, these are very important to **booting macOS** and have many uses like USB maps , disabling unsupported GPUs and such. And with our system, **it's even required to boot**. Guide on making them found here: **Getting started with ACPI**

Others

## USB Creation

Creating the USB
- Making the installer in macOS
- Making the installer in Windows
- Making the installer in Linux

Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

## Configs

Intel Desktop config.plist
Intel Laptop config.plist
- Arrandale
- Sandy Bridge
- Ivy Bridge
- Haswell
- Broadwell
- Skylake
- Kaby Lake
- Coffee Lake and Whiskey Lake
  - Starting Point
  - ACPI
  - Booter
  - DeviceProperties
  - Kernel
  - Misc
  - NVRAM
  - PlatformInfo
  - UEFI
  - Cleaning up
  - Intel BIOS settings
- Coffee Lake Plus and Comet Lake
- Ice Lake

Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

## Installation

Installation Process

## Troubleshooting

General Troubleshooting
- OpenCore Boot Issues
- Kernel Issues
- Userspace Issues
- Post-Install Issues
- Miscellaneous Issues

OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

## Post Install

Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

## Extras

Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

## Misc

Supporting the guides
Credits

| Required SSDTs | Description |
|---|---|
| SSDT-PLUG | Allows for native CPU power management on Haswell and newer, see Getting Started With ACPI Guide for more details. |
| SSDT-EC-USBX | Fixes both the embedded controller and USB power, see Getting Started With ACPI Guide for more details. |
| SSDT-GPIO | Creates a stub so VoodooI2C can connect, for those having troubles getting VoodooI2C working can try SSDT-XOSI instead. Note that Intel NUCs do not need this |
| SSDT-PNLF | Fixes brightness control, see Getting Started With ACPI Guide for more details. Note that Intel NUCs do not need this |
| SSDT-AWAC | This is the 300 series RTC patch , required for most B360, B365, H310, H370, Z390 and some Z370 boards which prevent systems from booting macOS. The alternative is SSDT-RTC0 for when AWAC SSDT is incompatible due to missing the Legacy RTC clock, to check whether you need it and which to use please see Getting started with ACPI page. |

Note that you **should not** add your generated `DSDT.aml` here, it is already in your firmware. So if present, remove the entry for it in your `config.plist` and under EFI/OC/ACPI.

For those wanting a deeper dive into dumping your DSDT, how to make these SSDTs, and compiling them, please see the **Getting started with ACPI page.** Compiled SSDTs have a **.aml** extension(Assembled) and will go into the `EFI/OC/ACPI` folder and **must** be specified in your config under `ACPI -> Add` as well.

### Delete

This blocks certain ACPI tables from loading, for us we can ignore this.

### Patch

#### Info

This section allows us to dynamically modify parts of the ACPI (DSDT, SSDT, etc.) via OpenCore. For us, we'll need the following:

- OSI rename
  - This is required when using SSDT-XOSI as we redirect all OSI calls to this SSDT, **this is not needed if you're using SSDT-GPIO**

| Comment | String | Change _OSI to XOSI |
|---|---|---|
| Enabled | Boolean | YES |
| Count | Number | 0 |
| Limit | Number | 0 |
| Find | Data | `5f4f5349` |
| Replace | Data | `584f5349` |

### Quirks

Settings relating to ACPI, leave everything here as default as we have no use for these quirks.

## Booter

## USB Creation

Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

## Configs

Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

## Installation

Installation Process

## Troubleshooting

General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

## Post Install

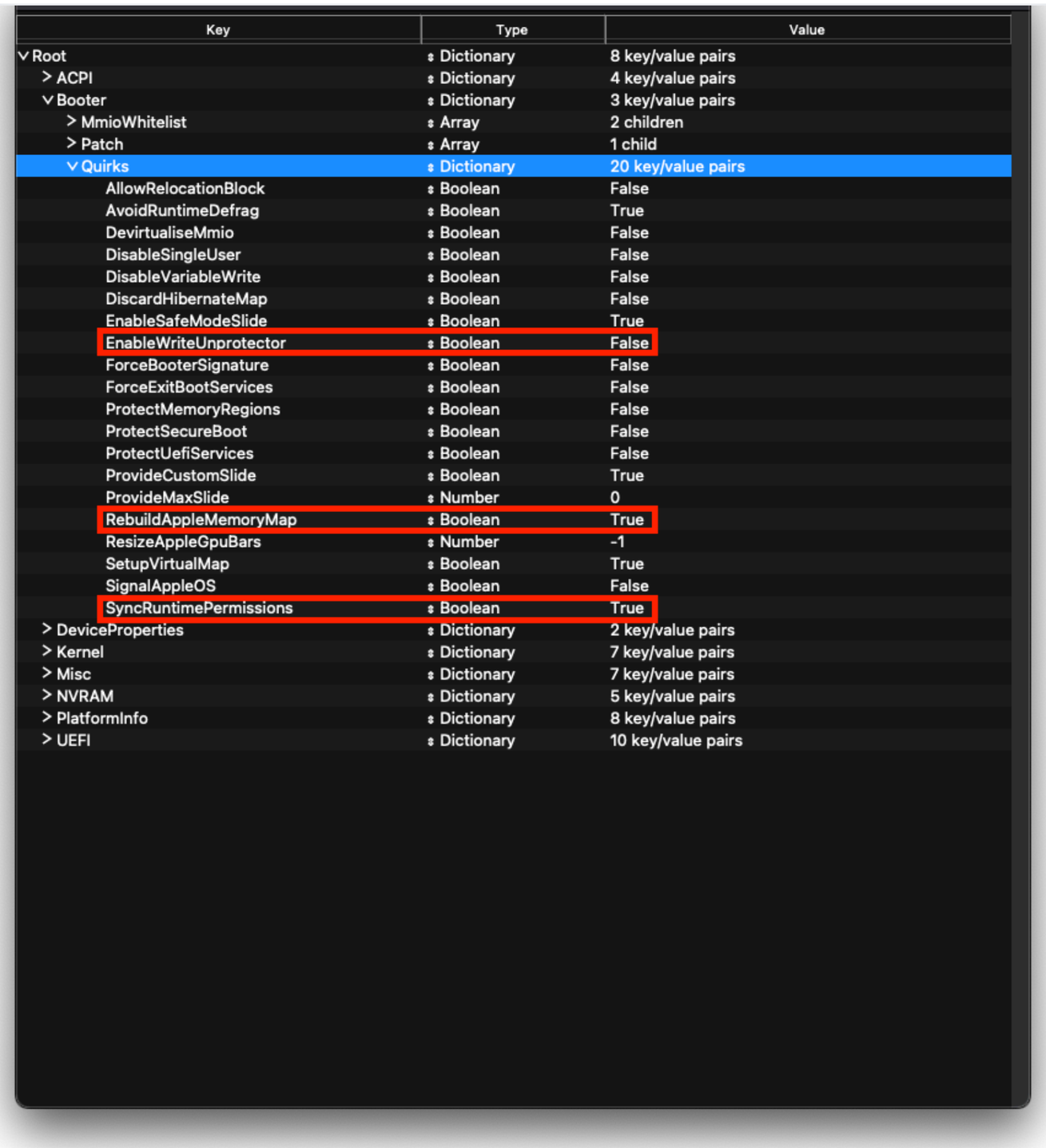
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

## Extras

Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

## Misc

Supporting the guides
Credits




This section is dedicated to quirks relating to boot.efi patching with OpenRuntime, the replacement for AptioMemoryFix.efi

## MmioWhitelist

This section is allowing spaces to be pass-through to macOS that are generally ignored, useful when paired with `DevirtualiseMmio`

## Quirks

### Info

Settings relating to boot.efi patching and firmware fixes, for us, we need to change the following:

| Quirk | Enabled | Comment |
| --- | --- | --- |
| EnableWriteUnprotector | NO | |
| ProtectMemoryRegions | YES | Only for Chromebooks, leave disabled otherwise. |
| RebuildAppleMemoryMap | YES | |
| SyncRuntimePermissions | YES | |

▶ More in-depth Info

## DeviceProperties

Others

## USB Creation

Creating the USB
- Making the installer in macOS
- Making the installer in Windows
- Making the installer in Linux

Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

## Configs

Intel Desktop config.plist
Intel Laptop config.plist
- Arrandale
- Sandy Bridge
- Ivy Bridge
- Haswell
- Broadwell
- Skylake
- Kaby Lake
- Coffee Lake and Whiskey Lake
  - Starting Point
  - ACPI
  - Booter
  - DeviceProperties
  - Kernel
  - Misc
  - NVRAM
  - PlatformInfo
  - UEFI
  - Cleaning up
  - Intel BIOS settings
- Coffee Lake Plus and Comet Lake
- Ice Lake

Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

## Installation

Installation Process

## Troubleshooting

General Troubleshooting
- OpenCore Boot Issues
- Kernel Issues
- Userspace Issues
- Post-Install Issues
- Miscellaneous Issues

OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

## Post Install

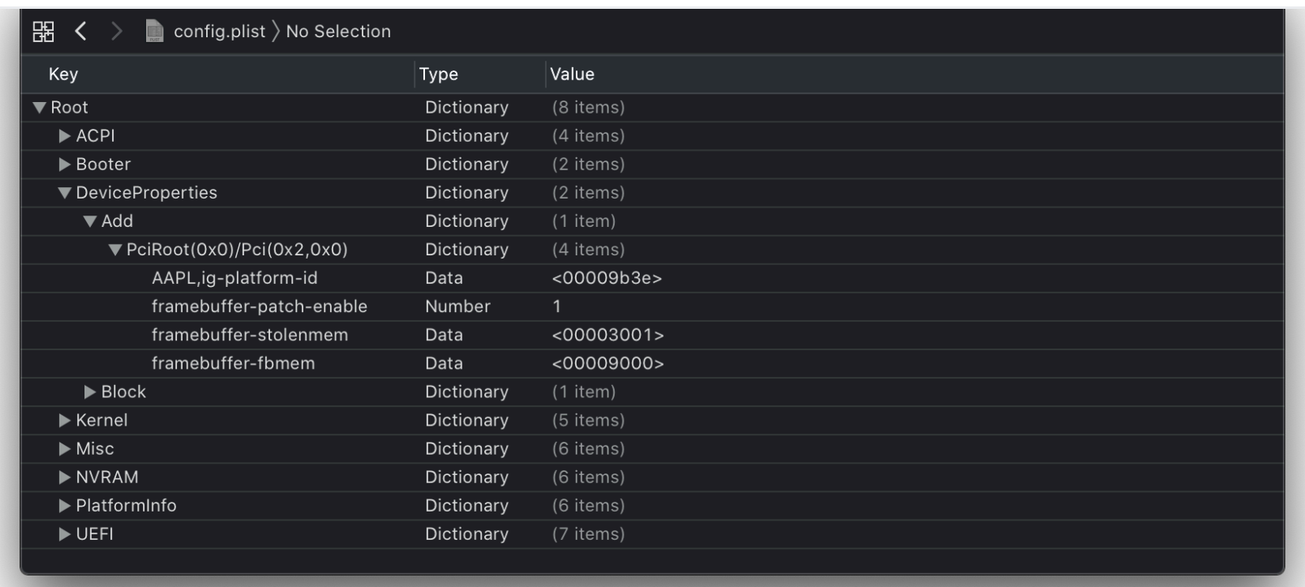
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

## Extras

Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

## Misc

Supporting the guides
Credits




## Add

Sets device properties from a map.

### PciRoot(0x0)/Pci(0x2,0x0)

This section is set up via WhateverGreen's Framebuffer Patching Guide and is used for setting important iGPU properties.

The config.plist doesn't already have a section for this so you will have to create it manually.

When setting up your iGPU, the table below should help with finding the right values to set. Here is an explanation of some values:

- **AAPL,ig-platform-id**
  - This is used internally for setting up the iGPU
- **Type**
  - Whether the entry is recommended for laptops(ie. with built-in displays) or for Intel NUCs(ie. stand alone boxes)

Generally follow these steps when setting up your iGPU properties. Follow the configuration notes below the table if they say anything different:

1. When initially setting up your config.plist, only set AAPL,ig-platform-id - this is normally enough
2. If you boot and you get no graphics acceleration (7MB VRAM and solid background for dock), then you likely need to try different `AAPL,ig-platform-id` values, add stolenmem patches, or even add a `device-id` property.

| AAPL,ig-platform-id | Type | Comment |
|---|---|---|
| `0900A53E` | Laptop | Recommended value for UHD 630 |
| `00009B3E` | Laptop | Recommended value for UHD 620 |
| `07009B3E` | NUC | Recommended value for UHD 620/630 |
| `0000A53E` | NUC | Recommended value for UHD 655 |

#### Configuration Notes

- For UHD 630 you likely do not need to fake the `device-id` as it is already `0x3E9B`. If it's anything else, you may use `device-id = 9B3E0000`:
  - You can check under Device Manager in Windows by bring up the iGPU, opening properties, selecting details, and clicking Hardware IDs.

| Key | Type | Value |
|---|---|---|
| device-id | Data | `9B3E0000` |

- A UHD 620 in a Coffee Lake CPU **requires** `device-id = 9B3E0000`:

| Key | Type | Value |
|---|---|---|
| device-id | Data | `9B3E0000` |

- In some cases where you cannot set the DVMT-prealloc of these cards to 64MB higher in your UEFI Setup, you may get a kernel panic. Usually they're configured for 32MB of DVMT-prealloc, in that case these values are added to your iGPU Properties

| Key | Type | Value |
|---|---|---|
| framebuffer-patch-enable | Data | `01000000` |
| framebuffer-stolenmem | Data | `00003001` |
| framebuffer-fbmem | Data | `00009000` |

USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

`layout-id`

- Applies AppleALC audio injection, you'll need to do your own research on which codec your motherboard has and match it with AppleALC's layout. AppleALC Supported Codecs .
- You can delete this property outright as it's unused for us at this time

For us, we'll be using the boot argument `alcid=xxx` instead to accomplish this. `alcid` will override all other layout-IDs present. More info on this is covered in the Post-Install Page

### Delete

Removes device properties from the map, for us we can ignore this

## Kernel

/Users/mykolagrymalyuk/Downloads/OpenCore-0-21/Docs/config.plist - Edited

| Key | Type | Value |
|---|---|---|
| Root | Dictionary | 8 key/value pairs |
| ACPI | Dictionary | 4 key/value pairs |
| Booter | Dictionary | 2 key/value pairs |
| DeviceProperties | Dictionary | 2 key/value pairs |
| Kernel | Dictionary | 7 key/value pairs |
| Add | Array | 7 children |
| 0 | Dictionary | 8 key/value pairs |
| Arch | String | x86_64 |
| BundlePath | String | Lilu.kext |
| Comment | String | Patch engine |
| Enabled | Boolean | True |
| ExecutablePath | String | Contents/MacOS/Lilu |
| MaxKernel | String | |
| MinKernel | String | 12.0.0 |
| PlistPath | String | Contents/Info.plist |
| 1 | Dictionary | 8 key/value pairs |
| 2 | Dictionary | 8 key/value pairs |
| 3 | Dictionary | 8 key/value pairs |
| 4 | Dictionary | 8 key/value pairs |
| 5 | Dictionary | 8 key/value pairs |
| 6 | Dictionary | 8 key/value pairs |
| Block | Array | 1 child |
| Emulate | Dictionary | 5 key/value pairs |
| Force | Array | 1 child |
| Patch | Array | 6 children |
| Quirks | Dictionary | 17 key/value pairs |
| AppleCpuPmCfgLock | Boolean | False |
| AppleXcpmCfgLock | Boolean | True |
| AppleXcpmExtraMsrs | Boolean | False |
| AppleXcpmForceBoost | Boolean | False |
| CustomSMBIOSGuid | Boolean | False <- Enable for Dell or VIAO systems |
| DisableIoMapper | Boolean | True |
| DisableLinkeditJettison | Boolean | True |
| DisableRtcChecksum | Boolean | False |
| ExtendBTFeatureFlags | Boolean | False |
| ExternalDiskIcons | Boolean | False |
| IncreasePciBarSize | Boolean | False |
| LapicKernelPanic | Boolean | False <- Enable for HP systems |
| LegacyCommpage | Boolean | False |
| PanicNoKextDump | Boolean | True |
| PowerTimeoutKernelPanic | Boolean | True |
| ThirdPartyDrives | Boolean | False |
| XhciPortLimit | Boolean | True |
| Scheme | Dictionary | 3 key/value pairs |
| Misc | Dictionary | 6 key/value pairs |
| NVRAM | Dictionary | 6 key/value pairs |
| PlatformInfo | Dictionary | 7 key/value pairs |
| UEFI | Dictionary | 9 key/value pairs |

### Add

Here's where we specify which kexts to load, in what specific order to load, and what architectures each kext is meant for.

By default we recommend leaving what ProperTree has done, however for 32-bit CPUs please see below:

▶ More in-depth Info

### Emulate

Needed for spoofing unsupported CPUs like Pentiums and Celerons

- **Cpuid1Mask**: Leave this blank
- **Cpuid1Data**: Leave this blank

### Force

Used for loading kexts off system volume, only relevant for older operating systems where certain kexts are not present in the cache(ie. IONetworkingFamily in 10.6).

For us, we can ignore.

### Block

Others
USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

### Patch

Patches both the kernel and kexts.

### Quirks

#### Info

Settings relating to the kernel, for us we'll be enabling the following:

| Quirk | Enabled | Comment |
|---|---|---|
| AppleXcpmCfgLock | YES | Not needed if `CFG-Lock` is disabled in the BIOS |
| DisableIoMapper | YES | Not needed if `VT-D` is disabled in the BIOS |
| LapicKernelPanic | NO | HP Machines will require this quirk |
| PanicNoKextDump | YES | |
| PowerTimeoutKernelPanic | YES | |
| XhciPortLimit | YES | Disable if running macOS 11.3+ |

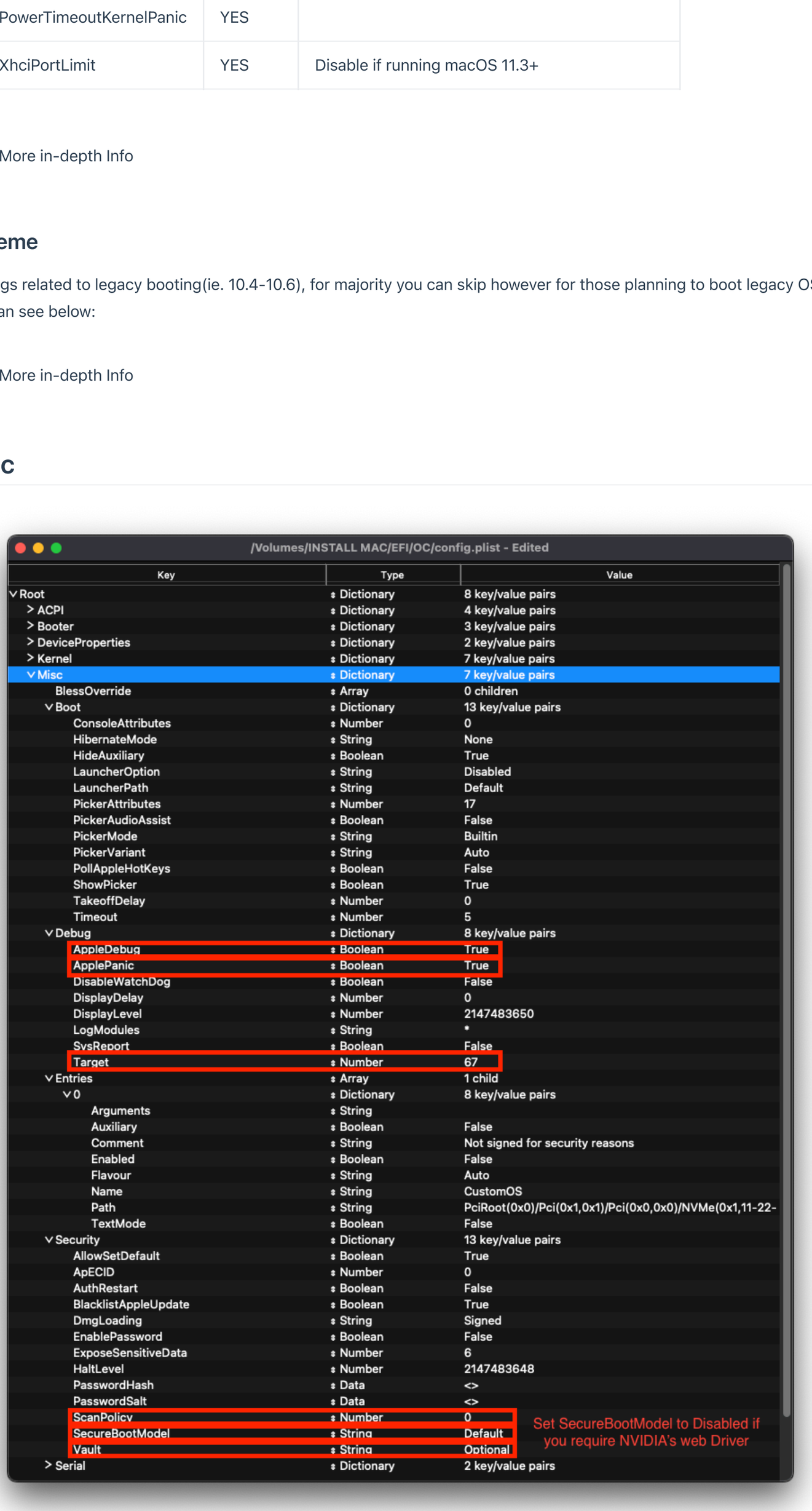
▶ More in-depth Info

### Scheme

Settings related to legacy booting(ie. 10.4-10.6), for majority you can skip however for those planning to boot legacy OSes you can see below:

▶ More in-depth Info

## Misc




### Boot

Others

USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

Installation
Installation Process

Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

Misc
Supporting the guides
Credits

| Quirk | Enabled | Comment |
| --- | --- | --- |
| HideAuxiliary | YES | Press space to show macOS recovery and other auxiliary entries |

▶ More in-depth Info

## Debug

### Info

Helpful for debugging OpenCore boot issues(We'll be changing everything *but* `DisplayDelay` ):

| Quirk | Enabled |
| --- | --- |
| AppleDebug | YES |
| ApplePanic | YES |
| DisableWatchDog | YES |
| Target | 67 |

▶ More in-depth Info

## Security

### Info

Security is pretty self-explanatory, **do not skip**. We'll be changing the following:

| Quirk | Enabled | Comment |
| --- | --- | --- |
| AllowSetDefault | YES | |
| BlacklistAppleUpdate | YES | |
| ScanPolicy | 0 | |
| SecureBootModel | Default | Leave this as `Default` for OpenCore to automatically set the correct value corresponding to your SMBIOS. The next page goes into more detail about this setting. |
| Vault | Optional | This is a word, it is not optional to omit this setting. You will regret it if you don't set it to Optional, note that it is case-sensitive |

▶ More in-depth Info

## Serial

Used for serial debugging (Leave everything as default).

## Tools

Used for running OC debugging tools like the shell, ProperTree's snapshot function will add these for you.

## Entries

Used for specifying irregular boot paths that can't be found naturally with OpenCore.

Won't be covered here, see 8.6 of Configuration.pdf for more info

## NVRAM

## USB Creation

Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

## Configs

Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

## Installation

Installation Process

## Troubleshooting

General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

## Post Install

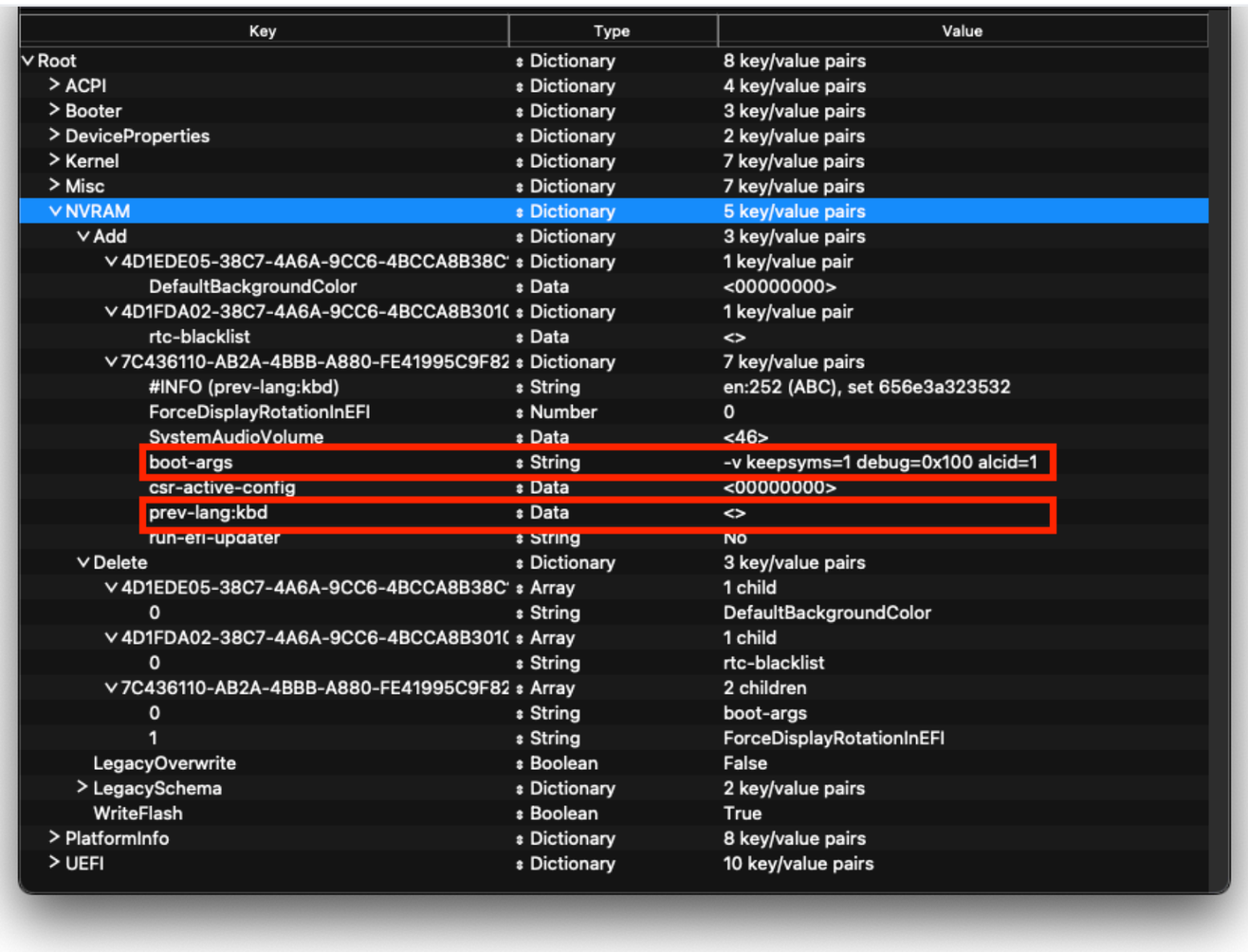
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

## Extras

Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

## Misc

Supporting the guides
Credits



| Key | Type | Value |
|---|---|---|
| Root | Dictionary | 8 key/value pairs |
| ACPI | Dictionary | 4 key/value pairs |
| Booter | Dictionary | 3 key/value pairs |
| DeviceProperties | Dictionary | 2 key/value pairs |
| Kernel | Dictionary | 7 key/value pairs |
| Misc | Dictionary | 7 key/value pairs |
| NVRAM | Dictionary | 5 key/value pairs |
| Add | Dictionary | 3 key/value pairs |
| 4D1EDE05-38C7-4A6A-9CC6-4BCCA8B38C | Dictionary | 1 key/value pair |
| DefaultBackgroundColor | Data | <00000000> |
| 4D1FDA02-38C7-4A6A-9CC6-4BCCA8B301 | Dictionary | 1 key/value pair |
| rtc-blacklist | Data | <> |
| 7C436110-AB2A-4BBB-A880-FE41995C9F82 | Dictionary | 7 key/value pairs |
| #INFO (prev-lang:kbd) | String | en:252 (ABC), set 656e3a323532 |
| ForceDisplayRotationInEFI | Number | 0 |
| SystemAudioVolume | Data | <46> |
| boot-args | String | -v keepsyms=1 debug=0x100 alcid=1 |
| csr-active-config | Data | <00000000> |
| prev-lang:kbd | Data | <> |
| run-efi-updater | String | No |
| Delete | Dictionary | 3 key/value pairs |
| 4D1EDE05-38C7-4A6A-9CC6-4BCCA8B38C | Array | 1 child |
| 0 | String | DefaultBackgroundColor |
| 4D1FDA02-38C7-4A6A-9CC6-4BCCA8B301 | Array | 1 child |
| 0 | String | rtc-blacklist |
| 7C436110-AB2A-4BBB-A880-FE41995C9F82 | Array | 2 children |
| 0 | String | boot-args |
| 1 | String | ForceDisplayRotationInEFI |
| LegacyOverwrite | Boolean | False |
| LegacySchema | Dictionary | 2 key/value pairs |
| WriteFlash | Boolean | True |
| PlatformInfo | Dictionary | 8 key/value pairs |
| UEFI | Dictionary | 10 key/value pairs |

## Add

### 4D1EDE05-38C7-4A6A-9CC6-4BCCA8B38C14

Used for OpenCore's UI scaling, default will work for us. See in-depth section for more info

▶ More in-depth Info

### 4D1FDA02-38C7-4A6A-9CC6-4BCCA8B30102

OpenCore's NVRAM GUID, mainly relevant for RTCMemoryFixup users

▶ More in-depth Info

### 7C436110-AB2A-4BBB-A880-FE41995C9F82

System Integrity Protection bitmask

- **General Purpose boot-args**:

| boot-args | Description |
|---|---|
| **-v** | This enables verbose mode, which shows all the behind-the-scenes text that scrolls by as you're booting instead of the Apple logo and progress bar. It's invaluable to any Hackintosher, as it gives you an inside look at the boot process, and can help you identify issues, problem kexts, etc. |
| **debug=0x100** | This disables macOS's watchdog which helps prevents a reboot on a kernel panic. That way you can *hopefully* glean some useful info and follow the breadcrumbs to get past the issues. |
| **keepsyms=1** | This is a companion setting to debug=0x100 that tells the OS to also print the symbols on a kernel panic. That can give some more helpful insight as to what's causing the panic itself. |
| **alcid=1** | Used for setting layout-id for AppleALC, see supported codecs to figure out which layout to use for your specific system. More info on this is covered in the Post-Install Page |

- **GPU-Specific boot-args**:

| boot-args | Description |
|---|---|
| **-wegnoegpu** | Used for disabling all other GPUs than the integrated Intel iGPU, useful for those wanting to run newer versions of macOS where their dGPU isn't supported |
| **-igfxnotelemetryload** | Prevents iGPU telemetry from loading. iGPU telemetry may cause a freeze during startup on certain laptops such as Chromebooks on macOS 10.15 and higher, see here for more information. |

- **csr-active-config**: `00000000`
  - Settings for 'System Integrity Protection' (SIP). It is generally recommended to change this with `csrutil` via the recovery partition.
  - csr-active-config by default is set to `00000000` which enables System Integrity Protection. You can choose a number of different values but overall we recommend keeping this enabled for best security practices. More info can be found in our troubleshooting page: Disabling SIP

others
USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

important as these firmware updates (meant for Macs) will not work.

- **prev-lang:kbd**: <>
  - Needed for non-latin keyboards in the format of `lang-COUNTRY:keyboard`, recommended to keep blank though you can specify it(**Default in Sample config is Russian**):
  - American: `en-US:0` ( `656e2d55533a30` in HEX)
  - Full list can be found in AppleKeyboardLayouts.txt
  - Hint: `prev-lang:kbd` can be changed into a String so you can input `en-US:0` directly instead of converting to HEX
  - Hint 2: `prev-lang:kbd` can be set to a blank variable (eg. `<>`) which will force the Language Picker to appear instead at first boot up.

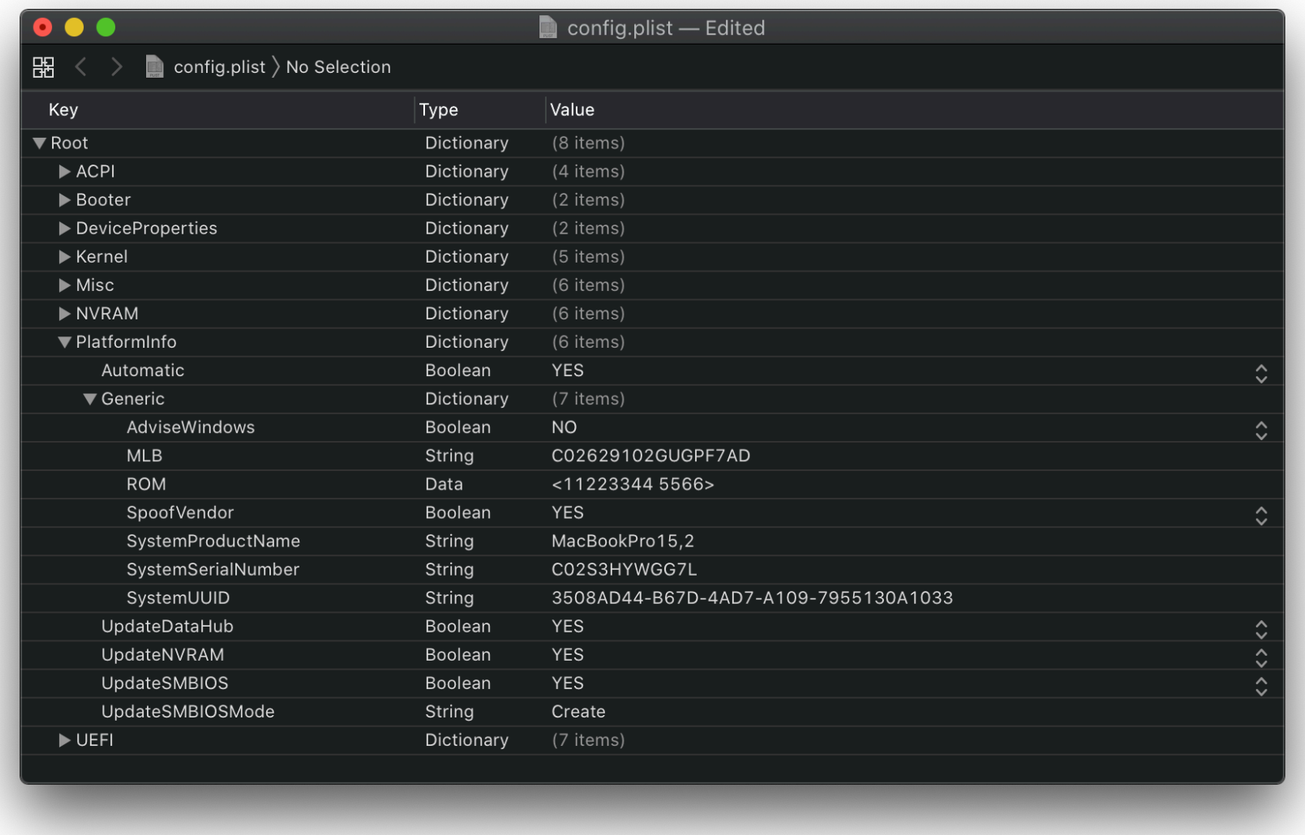
| Key | Type | Value |
| --- | --- | --- |
| prev-lang:kbd | String | en-US:0 |

### Delete

Forcibly rewrites NVRAM variables, do note that `Add` **will not overwrite** values already present in NVRAM so values like `boot-args` should be left alone.

- **LegacySchema**
  - Used for assigning NVRAM variables, used with `OpenVariableRuntimeDxe.efi`. Only needed for systems without native NVRAM
- **WriteFlash**: YES
  - Enables writing to flash memory for all added variables.

## PlatformInfo




#### Info

For setting up the SMBIOS info, we'll use CorpNewt's GenSMBIOS application.

For this Coffee Lake example, we'll chose the MacBookPro15,1 SMBIOS - this is done intentionally for compatibility's sake. The breakdown is as follows:

| SMBIOS | CPU Type | GPU Type | Display Size | Touch ID |
| --- | --- | --- | --- | --- |
| MacBookPro15,1 | Hexa Core 45W | iGPU: UHD 630 + dGPU: Radeon Pro 555X/560X | 15" | Yes |
| MacBookPro15,2 | Quad Core 15W | iGPU: Iris 655 | 13" | Yes |
| MacBookPro15,3 | Hexa Core 45W | iGPU: UHD 630 + dGPU: Vega 16/20 | 15" | Yes |
| MacBookPro15,4 | Quad Core 15W | iGPU: Iris 645 | 13" | Yes |
| Macmini8,1 | NUC Systems | HD 6000/Iris Pro 6200 | N/A | No |

Run GenSMBIOS, pick option 1 for downloading MacSerial and Option 3 for selecting out SMBIOS. This will give us an output similar to the following:

Others
USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

```
##################################################

Type:         MacBookPro15,1
Serial:       C02XG0FDH7JY
Board Serial: C02839303QXH69FJA
SmUUID:       DBB364D6-44B2-4A02-B922-AB4396F16DA8
```

The `Type` part gets copied to Generic -> SystemProductName.

The `Serial` part gets copied to Generic -> SystemSerialNumber.

The `Board Serial` part gets copied to Generic -> MLB.

The `SmUUID` part gets copied to Generic -> SystemUUID.

We set Generic -> ROM to either an Apple ROM (dumped from a real Mac), your NIC MAC address, or any random MAC address (could be just 6 random bytes, for this guide we'll use `11223300 0000`. After install follow the Fixing iServices page on how to find your real MAC Address)

**Reminder that you need an invalid serial! When inputting your serial number in Apple's Check Coverage Page, you should get a message such as "Unable to check coverage for this serial number."**

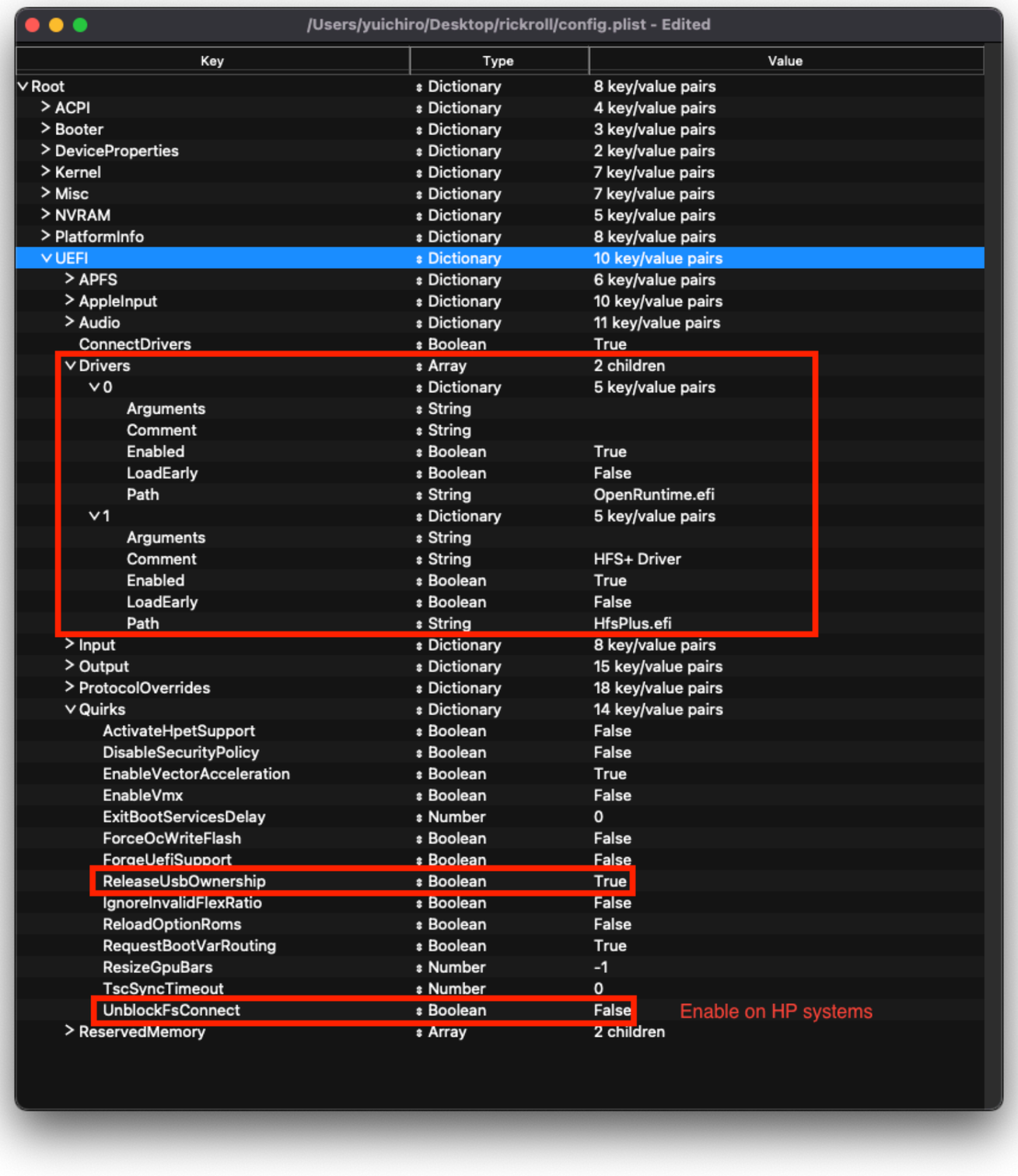
**Automatic**: YES

- Generates PlatformInfo based on Generic section instead of DataHub, NVRAM, and SMBIOS sections

### Generic

▶ More in-depth Info

## UEFI




**ConnectDrivers**: YES

- Forces .efi drivers, change to NO will automatically connect added UEFI drivers. This can make booting slightly faster, but not all drivers connect themselves. E.g. certain file system drivers may not load.

### Drivers

Add your .efi drivers here.

Only drivers present here should be:

- HfsPlus.efi
- OpenRuntime.efi

Others

USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup

Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot

Installation
Installation Process

Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth

Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous

Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS

Misc
Supporting the guides
Credits

## APFS

By default, OpenCore only loads APFS drivers from macOS Big Sur and newer. If you are booting macOS Catalina or earlier, you may need to set a new minimum version/date. Not setting this can result in OpenCore not finding your macOS partition!

macOS Sierra and earlier use HFS instead of APFS. You can skip this section if booting older versions of macOS.

#### APFS Versions

Both MinVersion and MinDate need to be set if changing the minimum version.

| macOS Version | Min Version | Min Date |
|---|---|---|
| High Sierra ( `10.13.6` ) | `748077008000000` | `20180621` |
| Mojave ( `10.14.6` ) | `945275007000000` | `20190820` |
| Catalina ( `10.15.4` ) | `1412101001000000` | `20200306` |
| No restriction | `-1` | `-1` |

## Audio

Related to AudioDxe settings, for us we'll be ignoring(leave as default). This is unrelated to audio support in macOS.

- For further use of AudioDxe and the Audio section, please see the Post Install page: Add GUI and Boot-chime

## Input

Related to boot.efi keyboard passthrough used for FileVault and Hotkey support, leave everything here as default as we have no use for these quirks. See here for more details: Security and FileVault

## Output

Relating to OpenCore's visual output, leave everything here as default as we have no use for these quirks.

▶ More in-depth Info

## ProtocolOverrides

Mainly relevant for Virtual machines, legacy macs and FileVault users. See here for more details: Security and FileVault

## Quirks

#### Info

Relating to quirks with the UEFI environment, for us we'll be changing the following:

| Quirk | Enabled | Comment |
|---|---|---|
| ReleaseUsbOwnership | YES | |
| UnblockFsConnect | NO | Needed mainly by HP motherboards |

▶ More in-depth Info

## ReservedMemory

Used for exempting certain memory regions from OSes to use, mainly relevant for Sandy Bridge iGPUs or systems with faulty memory. Use of this quirk is not covered in this guide

# Cleaning up

And now you're ready to save and place it into your EFI under EFI/OC.

For those having booting issues, please make sure to read the Troubleshooting section first and if your questions are still unanswered we have plenty of resources at your disposal:

- r/Hackintosh Subreddit
- r/Hackintosh Discord

## Config reminders

**HP Users**:

- Kernel -> Quirks -> LapicKernelPanic -> True
  - You will get a kernel panic on LAPIC otherwise

others
USB Creation
Creating the USB
Making the installer in macOS
Making the installer in Windows
Making the installer in Linux
Adding The Base OpenCore Files
Gathering files
Getting started with ACPI
config.plist Setup
Configs
Intel Desktop config.plist
Intel Laptop config.plist
Arrandale
Sandy Bridge
Ivy Bridge
Haswell
Broadwell
Skylake
Kaby Lake
Coffee Lake and Whiskey Lake
Starting Point
ACPI
Booter
DeviceProperties
Kernel
Misc
NVRAM
PlatformInfo
UEFI
Cleaning up
Intel BIOS settings
Coffee Lake Plus and Comet Lake
Ice Lake
Intel HEDT config.plist
AMD Desktop config.plist
Apple Secure Boot
Installation
Installation Process
Troubleshooting
General Troubleshooting
OpenCore Boot Issues
Kernel Issues
Userspace Issues
Post-Install Issues
Miscellaneous Issues
OpenCore Debugging
Understanding the macOS Boot Process
System Debugging: In-depth
Post Install
Post-Install
Universal
Laptop Specifics
Cosmetics
Multiboot
Miscellaneous
Extras
Fixing KASLR slide values
Disabling GPU
macOS 13: Ventura
Clover Conversion
Choosing the right SMBIOS
Misc
Supporting the guides
Credits

Dell users:

For Skylake and newer:

- Kernel -> Quirk -> CustomSMBIOSGuid -> True
- PlatformInfo -> UpdateSMBIOSMode -> Custom

## Intel BIOS settings

- Note: Most of these options may not be present in your firmware, we recommend matching up as closely as possible but don't be too concerned if many of these options are not available in your BIOS

### Disable

- Fast Boot
- Secure Boot
- Serial/COM Port
- Parallel Port
- VT-d (can be enabled if you set `DisableIoMapper` to YES)
- Compatibility Support Module (CSM) (**Must be off in most cases, GPU errors/stalls like `gIO` are common when this option is enabled**)
- Thunderbolt(For initial install, as Thunderbolt can cause issues if not setup correctly)
- Intel SGX
- Intel Platform Trust
- CFG Lock (MSR 0xE2 write protection)(**This must be off, if you can't find the option then enable `AppleXcpmCfgLock` under Kernel -> Quirks. Your hack will not boot with CFG-Lock enabled**)

### Enable

- VT-x
- Above 4G Decoding
- Hyper-Threading
- Execute Disable Bit
- EHCI/XHCI Hand-off
- OS type: Windows 8.1/10 UEFI Mode (some motherboards may require "Other OS" instead)
- DVMT Pre-Allocated(iGPU Memory): 64MB or higher
- SATA Mode: AHCI

# Once done here, we need to edit a couple extra values. Head to the Apple Secure Boot Page