

Why OpenCore over Clover and 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

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist

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

Desktop Skylake

Support	Version
Initial macOS Support	OS X 10.11, El Capitan

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!

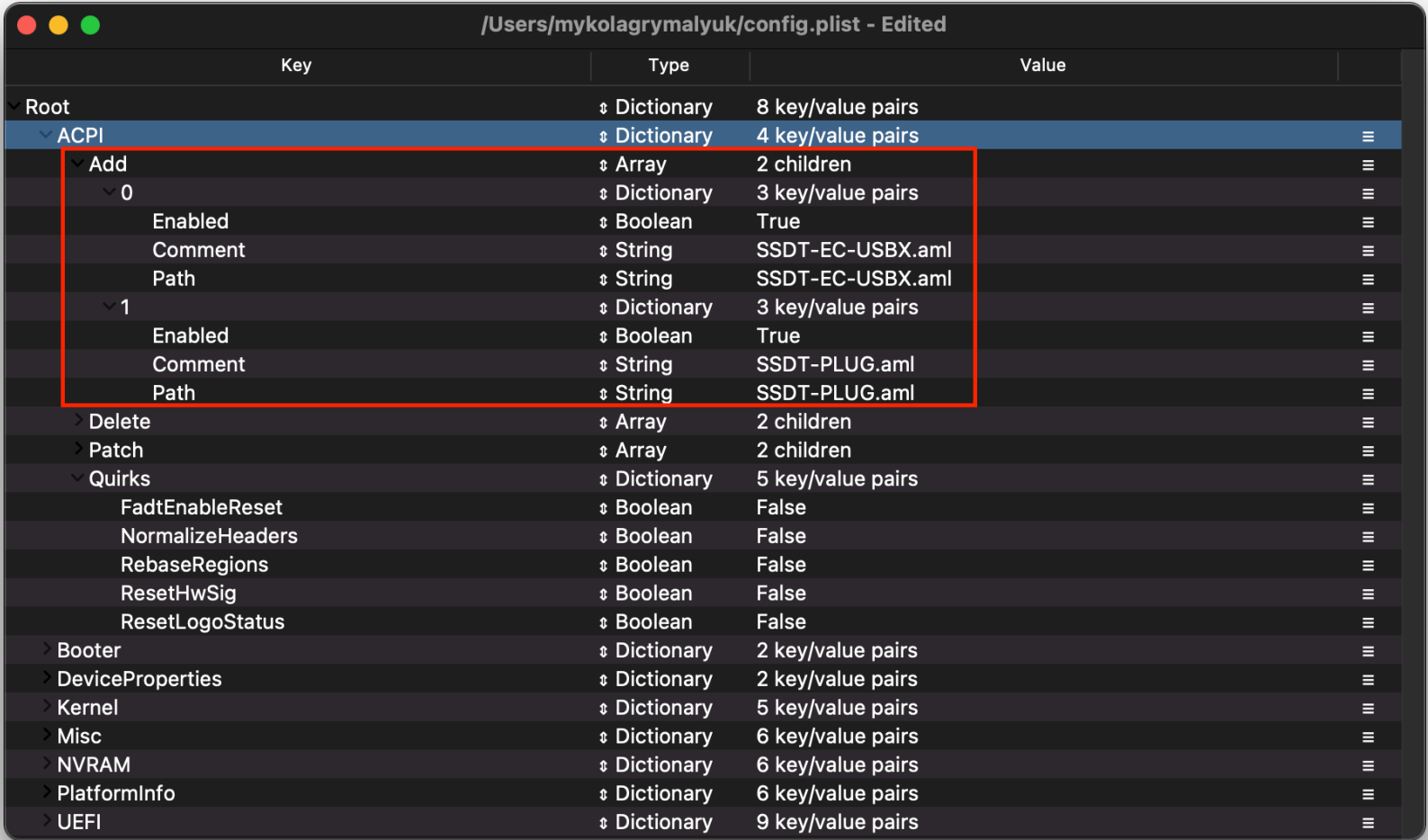
Now with all that, a quick reminder of the tools we need

- [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](#)

For us we'll need a couple of SSDTs to bring back functionality that Clover provided:

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.

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.

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ►

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

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.

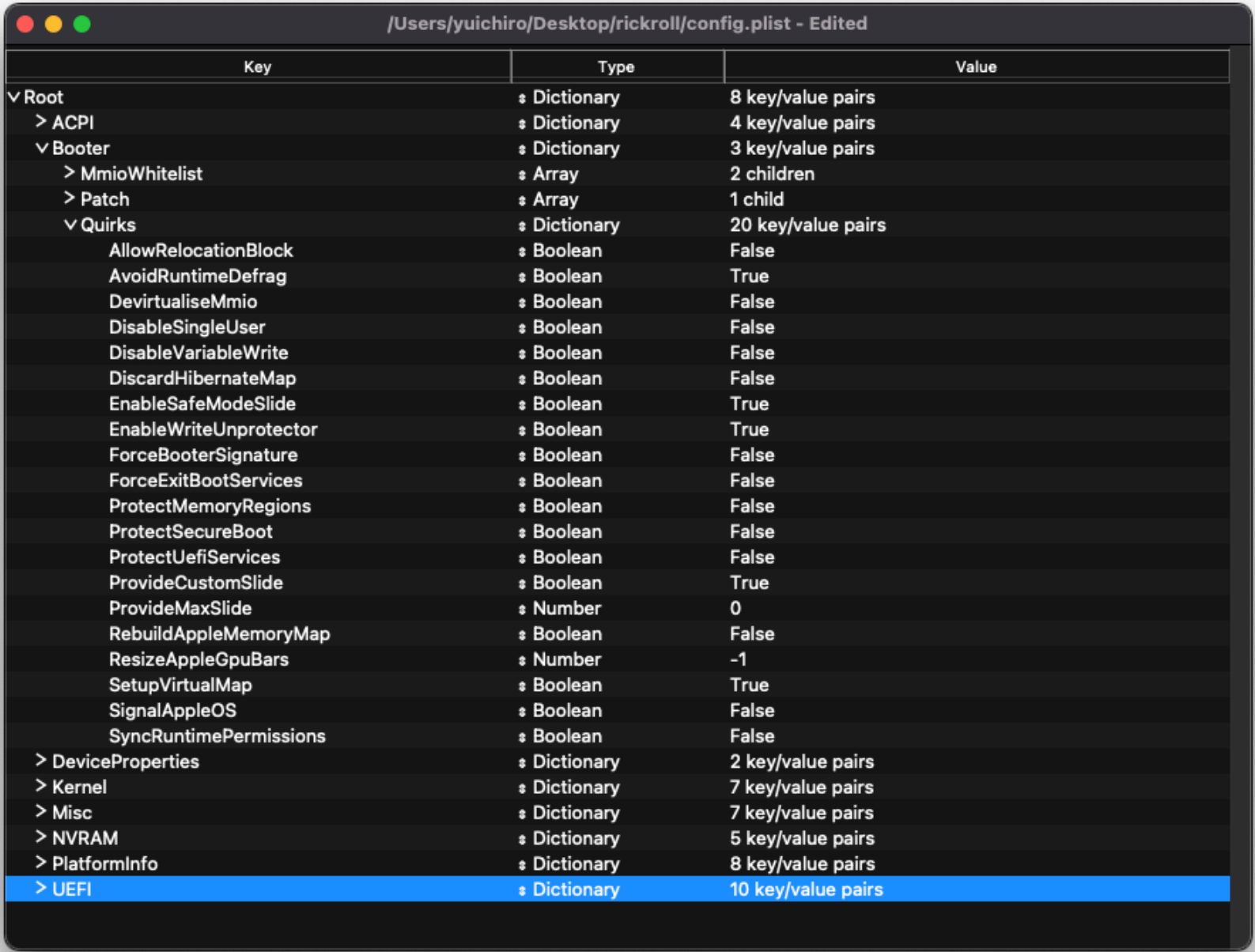
Patch

This section allows us to dynamically modify parts of the ACPI (DSDT, SSDT, etc.) via OpenCore. For us, our patches are handled by our SSDTs. This is a much cleaner solution as this will allow us to boot Windows and other OSes with OpenCore

Quirks

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

Booter



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 passthrough 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 leave it as default

► More in-depth Info

DeviceProperties

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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

🔍 < > 📄 Skylake.plist > No Selection

Key	Type	Value
▼ Root	Dictionary	(7 items)
▶ ACPI	Dictionary	(4 items)
▼ DeviceProperties	Dictionary	(2 items)
▼ Add	Dictionary	(2 items)
▼ PciRoot(0x0)/Pci(0x1b,0x0)	Dictionary	(1 item)
layout-id	Data	<05000000>
▼ PciRoot(0x0)/Pci(0x2,0x0)	Dictionary	(3 items)
AAPL,ig-platform-id	Data	<00001219>
framebuffer-patch-enable	Data	<01000000>
framebuffer-stolemem	Data	<00003001>
▶ Block	Dictionary	(0 items)
▶ Kernel	Dictionary	(5 items)
▶ Misc	Dictionary	(3 items)
▶ NVRAM	Dictionary	(4 items)
▶ PlatformInfo	Dictionary	(6 items)
▶ UEFI	Dictionary	(4 items)

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.

`AAPL,ig-platform-id` is what macOS uses to determine how the iGPU drivers interact with our system, and the two values choose between are as follows:

AAPL,ig-platform-id	Comment
00001219	Used when the Desktop iGPU is used to drive a display
01001219	Used when the Desktop iGPU is only used for computing tasks and doesn't drive a display

Note: If booting macOS Ventura, you need to [spoof your iGPU](#) as the closest Kaby Lake model.

We also add 3 more properties, `framebuffer-patch-enable` , `framebuffer-stolenmem` and `framebuffer-fbmem` . The first enables patching via WhateverGreen.kext, the second sets the min stolen memory to 19MB and third sets the framebuffer memory to 9MB. This is usually unnecessary, as this can be configured in BIOS(64MB recommended) but required when not available.

- Note:** Headless framebuffers(where the dGPU is the display out) do not need `framebuffer-patch-enable` , `framebuffer-stolenmem` and `framebuffer-fbmem`

And extra note for P530 users, your iGPU is not natively supported so you will need to add the following property:

Key	Type	Value
device-id	Data	1B190000

Once you're done, you should have something similar:

Key	Type	Value
AAPL,ig-platform-id	Data	00001219
framebuffer-patch-enable	Data	01000000
framebuffer-stolenmem	Data	00003001
framebuffer-fbmem	Data	00009000
device-id	Data	1B190000

(This is an example for a desktop HD P530 without a dGPU and no BIOS options for iGPU memory)

PciRoot(0x0)/Pci(0x1b,0x0)

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-arg `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.

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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

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

Blocks certain kexts from loading. Not relevant for us.

Patch

Patches both the kernel and kexts.

Quirks

Info

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

Why OpenCore over Clover and 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 ▾

[Penryn](#)

[Clarkdale](#)

[Sandy Bridge](#)

[Ivy Bridge](#)

[Haswell](#)

[Skylake](#)

[Starting Point](#)

[ACPI](#)

[Booter](#)

[DeviceProperties](#)

[Kernel](#)

[Misc](#)

[NVRAM](#)

[PlatformInfo](#)

[UEFI](#)

[Cleaning up](#)

[Intel BIOS settings](#)

[Kaby Lake](#)

[Coffee Lake](#)

[Comet Lake](#)

[Intel Laptop config.plist](#) ►

[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](#)

AppleXcpmCfgLock	YES	Not needed if <code>CFG-LOCK</code> is disabled in the BIOS
DisableIoMapper	YES	Not needed if <code>VT-D</code> 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+

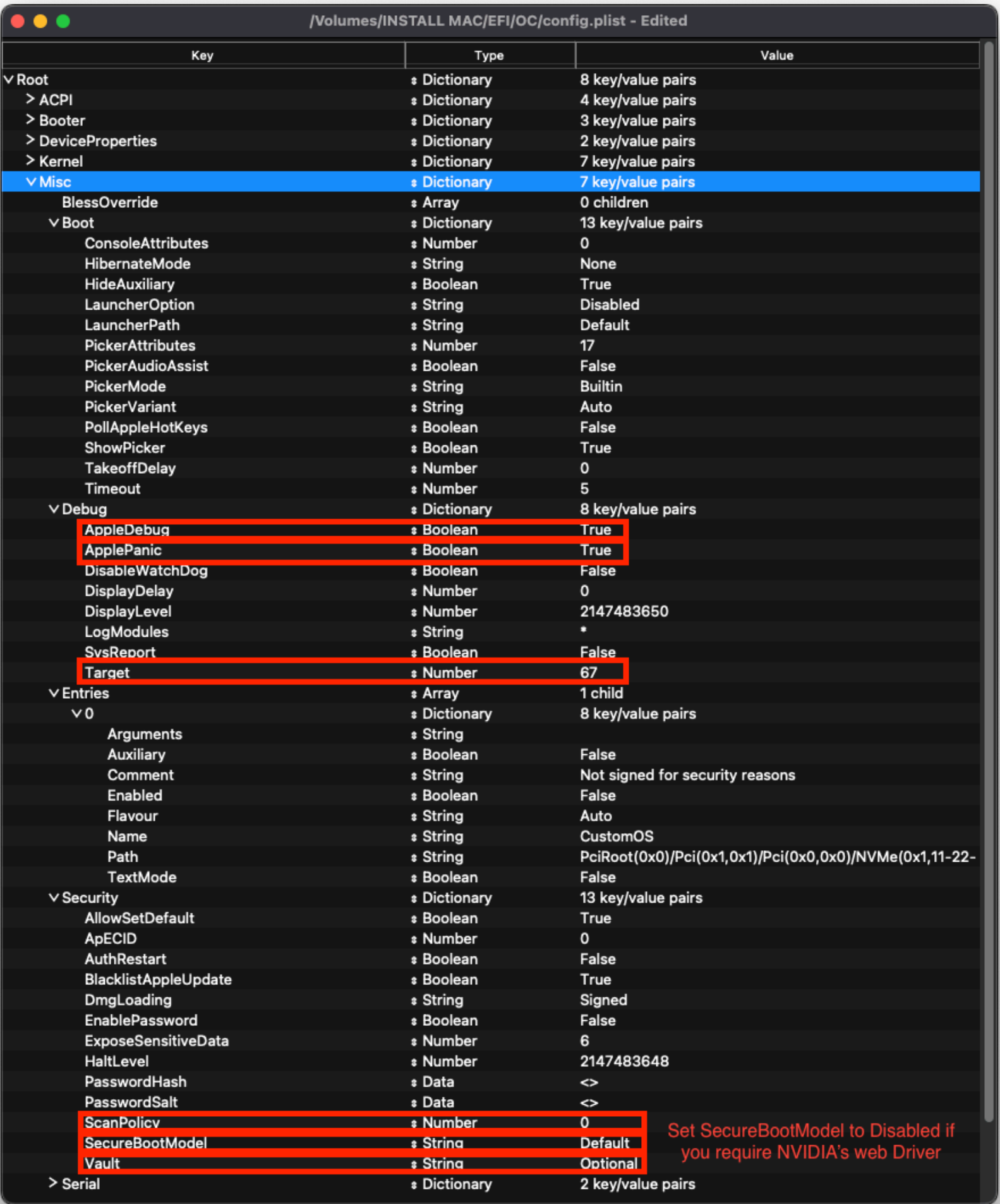
► [More in-depth Info](#)

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

Info

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

► [More in-depth Info](#)

Debug

Why OpenCore over Clover and 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 ▾

- Penryn
- Clarkdale
- Sandy Bridge
- Ivy Bridge
- Haswell

Skylake

- Starting Point
- ACPI
- Booter
- DeviceProperties
- Kernel
- Misc
- NVRAM
- PlatformInfo
- UEFI
- Cleaning up
- Intel BIOS settings
- Kaby Lake
- Coffee Lake
- Comet Lake

Intel Laptop config.plist ▶

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

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 <code>Default</code> 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

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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-9CC6-4BCCA8B301C	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-9CC6-4BCCA8B301C	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 <i>hopefully</i> 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
agdpmod=pikera	Used for disabling board ID checks on some Navi GPUs (RX 5000 & 6000 series), without this you'll get a black screen. Don't use if you don't have Navi (ie. Polaris and Vega cards shouldn't use this)
-radcodec	Used for allowing officially unsupported AMD GPUs (spoofed) to use the Hardware Video Encoder
radpg=15	Used for disabling some power-gating modes, helpful for properly initializing AMD Cape Verde based GPUs
unfairgva=1	Used for fixing hardware DRM support on supported AMD GPUs
nvda_drv_vrl=1	Used for enabling NVIDIA's Web Drivers on Maxwell and Pascal cards in macOS Sierra and High Sierra

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ►

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

-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
------------	--

- **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](#)
- **run-efi-updater:** `No`
 - This is used to prevent Apple's firmware update packages from installing and breaking boot order; this is 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

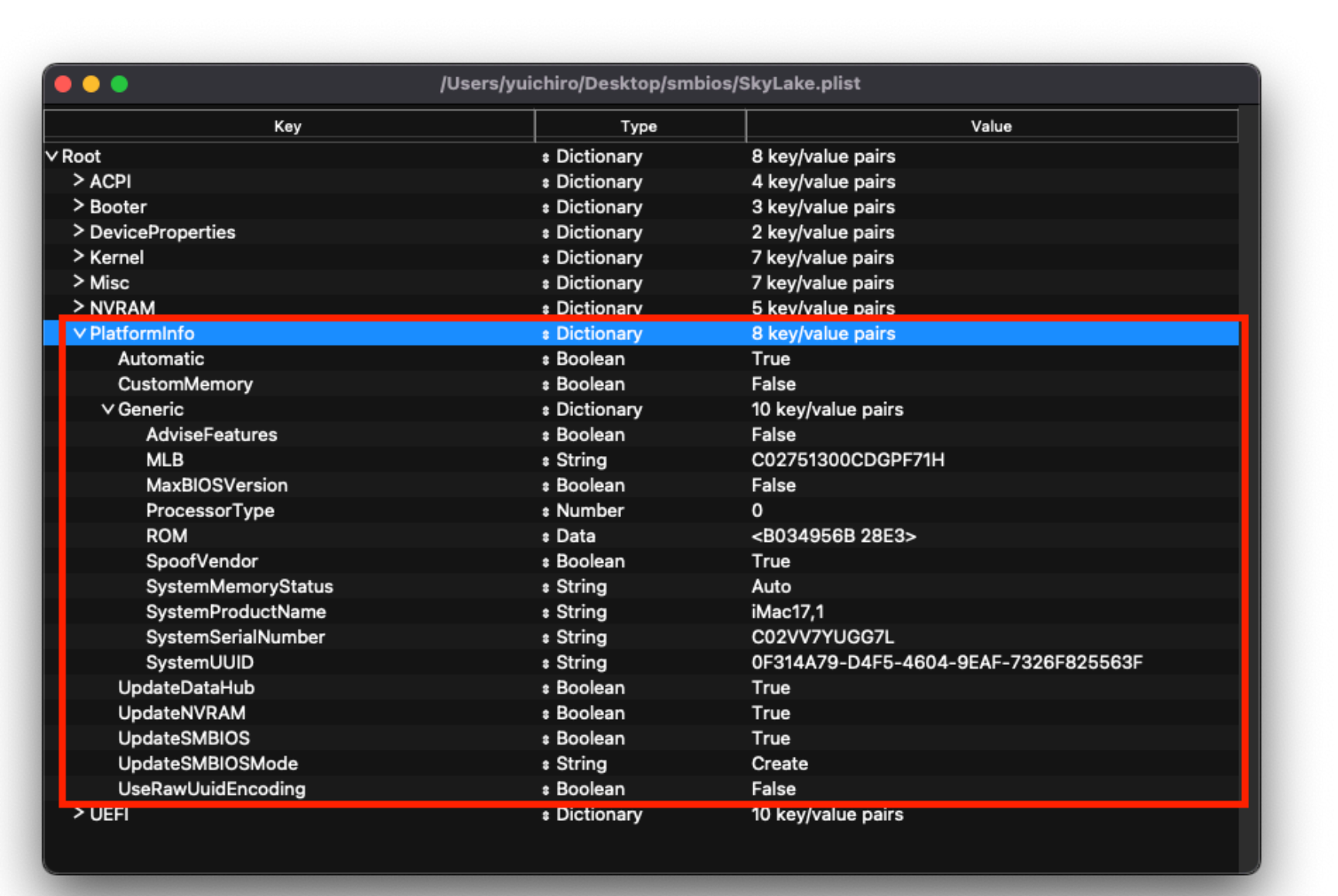
Info

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. For us, we'll be changing the following:

Quirk	Enabled
WriteFlash	YES

► More in-depth Info

PlatformInfo



Info

For setting up the SMBIOS info, we'll use CorpNewt's [GenSMBIOS](#)  application.

For this Skylake example, we'll choose the iMac17,1 SMBIOS.

Note 2: iMac17,1 was dropped in macOS Ventura. If running macOS Ventura, [use a Kaby Lake SMBIOS](#).

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:

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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:          iMac17,1
Serial:        C02S3HYWGG7L
Board Serial:  C02629102GUGPF7AD
SmUUID:        3508AD44-B67D-4AD7-A109-7955130A1033
```


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

/Users/bencredo/Downloads/Sample.plist - Edited		
Key	Type	Value
UEFI	Dictionary	10 key/value pairs
APFS	Dictionary	6 key/value pairs
EnableJumpstart	Boolean	True
GlobalConnect	Boolean	False
HideVerbose	Boolean	True
JumpstartHotPlug	Boolean	False
MinDate	Number	0
MinVersion	Number	0
AppleInput	Dictionary	10 key/value pairs
Audio	Dictionary	11 key/value pairs
ConnectDrivers	Boolean	True
Drivers	Array	2 children
0	Dictionary	4 key/value pairs
Arguments	String	
Comment	String	HFS+ Driver
Enabled	Boolean	True
Path	String	HfsPlus.efi
1	Dictionary	4 key/value pairs
Arguments	String	
Comment	String	
Enabled	Boolean	True
Path	String	OpenRuntime.efi
Input	Dictionary	8 key/value pairs
KeyFiltering	Boolean	False
KeyForgetThreshold	Number	5
KeySupport	Boolean	True
KeySupportMode	String	Auto
KeySwap	Boolean	False
PointerSupport	Boolean	False
PointerSupportMode	String	ASUS
TimerResolution	Number	50000
Output	Dictionary	15 key/value pairs
ProtocolOverrides	Dictionary	18 key/value pairs
Quirks	Dictionary	14 key/value pairs
ActivateHpetSupport	Boolean	False
DisableSecurityPolicy	Boolean	False
EnableVectorAcceleration	Boolean	True
EnableVmx	Boolean	False
ExitBootServicesDelay	Number	0
ForceOcWriteFlash	Boolean	False
ForgeUefiSupport	Boolean	False
IgnoreInvalidFlexRatio	Boolean	False
ReleaseUsbOwnership	Boolean	False
ReloadOptionRoms	Boolean	False
RequestBootVarRouting	Boolean	True
ResizeGpuBars	Number	-1
TscSyncTimeout	Number	0
UnblockFsConnect	Boolean	False
ReservedMemory	Array	2 children

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

► More in-depth Info

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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
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](#) 

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

Why OpenCore over Clover and 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 ▾

Penryn

Clarkdale

Sandy Bridge

Ivy Bridge

Haswell

Skylake

Starting Point

ACPI

Booter

DeviceProperties

Kernel

Misc

NVRAM

PlatformInfo

UEFI

Cleaning up

Intel BIOS settings

Kaby Lake

Coffee Lake

Comet Lake

Intel Laptop config.plist ▶

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

- 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](#)

Help us improve this page! 

Last Updated: 7/11/2023, 12:59:44 AM

← [Haswell](#)

[Kaby Lake](#) →