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Support	Version
Initial macOS Support	macOS 10.15, Catalina

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](#)

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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.
SSDT-RHUB	Needed to fix Root-device errors on many Icelake laptops

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.

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Others

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Key	Type	Value
Root	Dictionary	8 key/value pairs
ACPI	Dictionary	4 key/value pairs
Booter	Dictionary	2 key/value pairs
MmioWhitelist	Array	2 children
Quirks	Dictionary	17 key/value pairs
AvoidRuntimeDefrag	Boolean	True
DevirtualiseMmio	Boolean	True
DisableSingleUser	Boolean	False
DisableVariableWrite	Boolean	False
DiscardHibernateMap	Boolean	False
EnableSafeModeSlide	Boolean	True
EnableWriteUnprotector	Boolean	False
ForceExitBootServices	Boolean	False
ProtectMemoryRegions	Boolean	False
ProtectSecureBoot	Boolean	False
ProtectUefiServices	Boolean	True
ProvideCustomSlide	Boolean	True
ProvideMaxSlide	Number	0
RebuildAppleMemoryMap	Boolean	True
SetupVirtualMap	Boolean	False
SignalAppleOS	Boolean	False
SyncRuntimePermissions	Boolean	True
DeviceProperties	Dictionary	2 key/value pairs
Kernel	Dictionary	7 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

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

MmioWhitelist

This section is allowing devices to be pass-through to macOS that are generally ignored, for us we can ignore this section.

Quirks

Info

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

Quirk	Enabled	Comment
DevirtualiseMmio	YES	
EnableWriteUnprotector	NO	
ProtectMemoryRegions	YES	Chromebooks only, fixes kernel panics triggered by shutdown/restart.
ProtectUefiServices	YES	
RebuildAppleMemoryMap	YES	
SetupVirtualMap	NO	
SyncRuntimePermissions	YES	

► More in-depth Info

DeviceProperties

Key	Type	Value
Root	Dictionary	(8 items)
ACPI	Dictionary	(4 items)
Booter	Dictionary	(2 items)
DeviceProperties	Dictionary	(2 items)
Add	Dictionary	(1 item)
PciRoot(0x0)/Pci(0x2,0x0)	Dictionary	(1 item)
AAPL,ig-platform-id	Data	<0000528a>
Block	Dictionary	(1 item)
Kernel	Dictionary	(5 items)
Misc	Dictionary	(6 items)
NVRAM	Dictionary	(6 items)
PlatformInfo	Dictionary	(6 items)
UEFI	Dictionary	(7 items)

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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
- Port Count**
 - The number of displays supported

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

- When initially setting up your config.plist, only set AAPL,ig-platform-id - this is normally enough
- 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	Port Count	Comment
0000528A	6	Recommended G4/G7 value

Configuration Notes

- In some cases where you cannot set the DVMT-prealloc of these cards to 256MB 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	Number	1
framebuffer-stolenmem	Data	00003001
framebuffer-fbmem	Data	00009000

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 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

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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:

Quirk	Enabled	Comment
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

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LapicKernelPanic	NO	HP Machines will require this quirk
PanicNoKextDump	YES	
PowerTimeoutKernelPanic	YES	
XhciPortLimit	YES	Disable if running macOS 11.3+

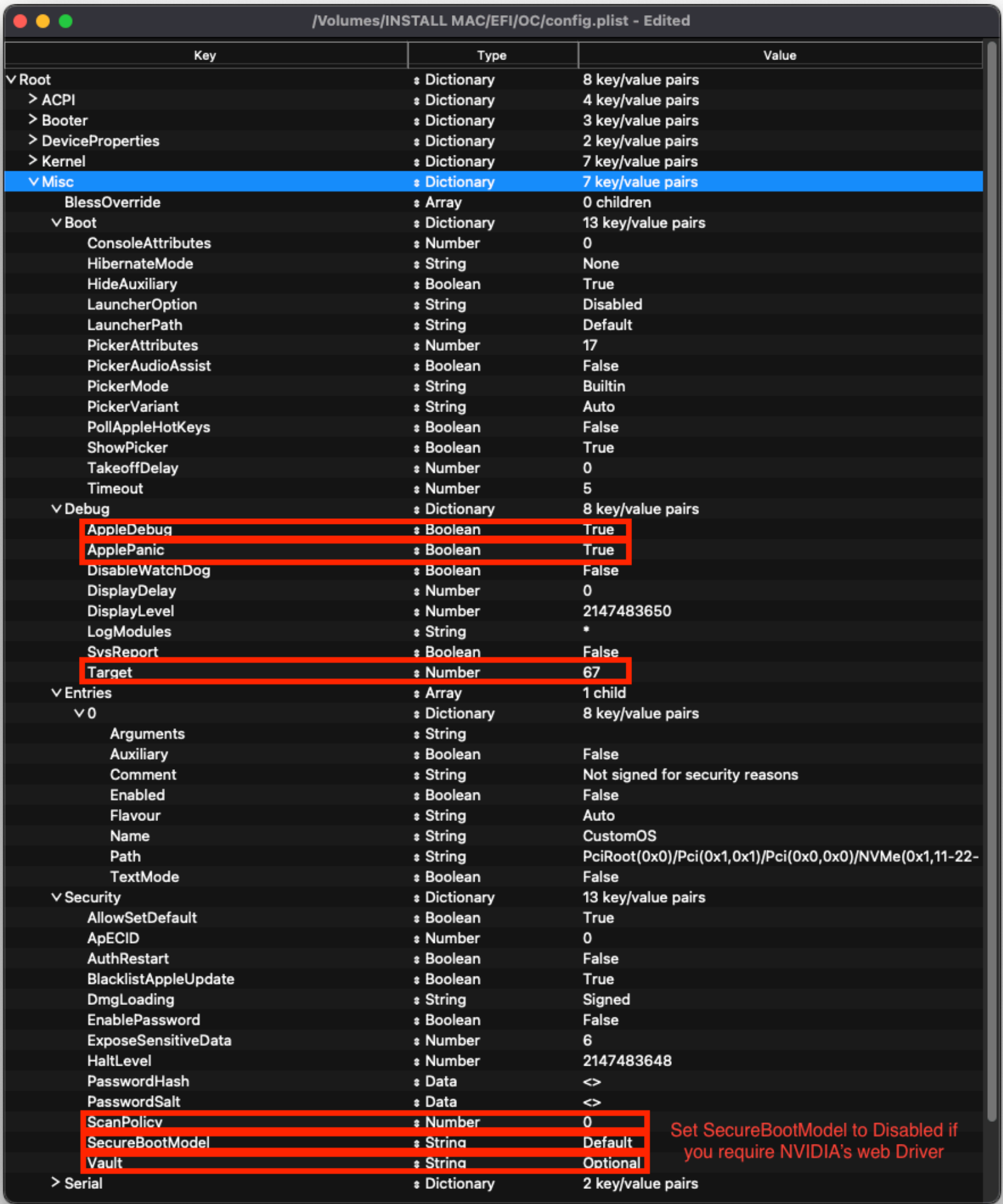
► More in-depth Info

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

Info

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

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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

/Volumes/INSTALL MAC/EFI/OC/config.plist - Edited			
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	
SvstemAudioVolume	Data	<48>	
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	

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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

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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 
-igfxcdc	Resolves Clock ID based kernel panics on Icelake CPUs, recommended for all users
-igfxdvtm	Similar to the above, resolves issue with some firmwares having 60MB reserved for iGPU memory which can cause kernel panics

- 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](#)

- 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

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

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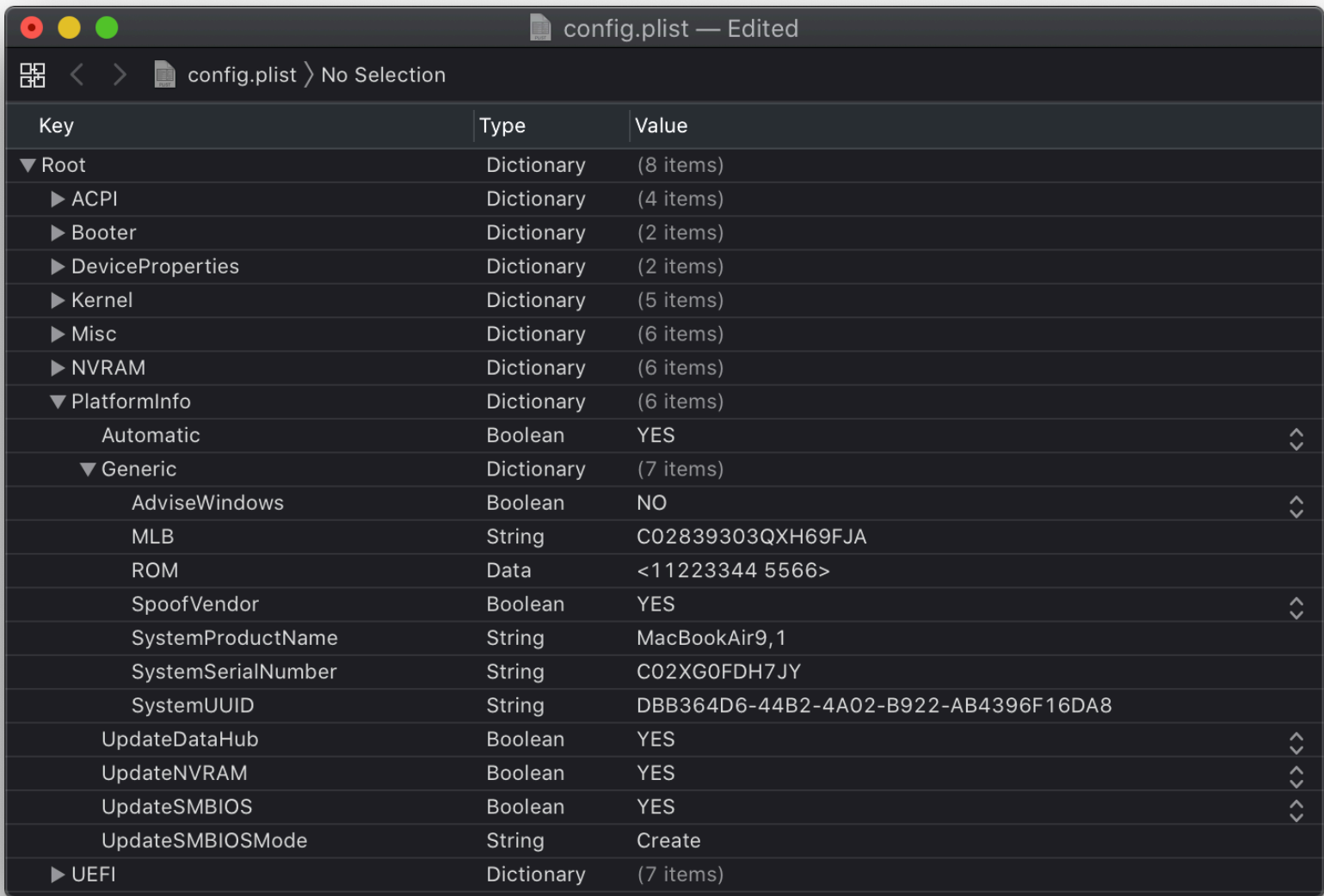
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- WriteFlash: YES
 - Enables writing to flash memory for all added variables.

PlatformInfo



Info

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

For this IceLake example, we chose the MacBookAir9,1 SMBIOS - this is done intentionally for compatibility's sake. The breakdown is as follows:

SMBIOS	CPU Type	GPU Type	Display Size	Touch ID
MacBookAir9,1	Dual/Quad Core 12W	iGPU: G4/G7	13"	Yes
MacBookPro16,2	Quad Core 28W	iGPU: G4/G7	13"	Yes

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:

```
#####sh
# MacBookAir9,1 SMBIOS Info #
#####

Type: MacBookAir9,1
Serial: C02XG0FDH7JY
Board Serial: C02839303QXH69FJA
SmUUID: DBB364D6-44B2-4A02-B922-AB4396F16DA8
```


- Note:** MacSerial currently does not support Linux, so you must grab a Windows or macOS machine to generate the MacBookPro16,2 values


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

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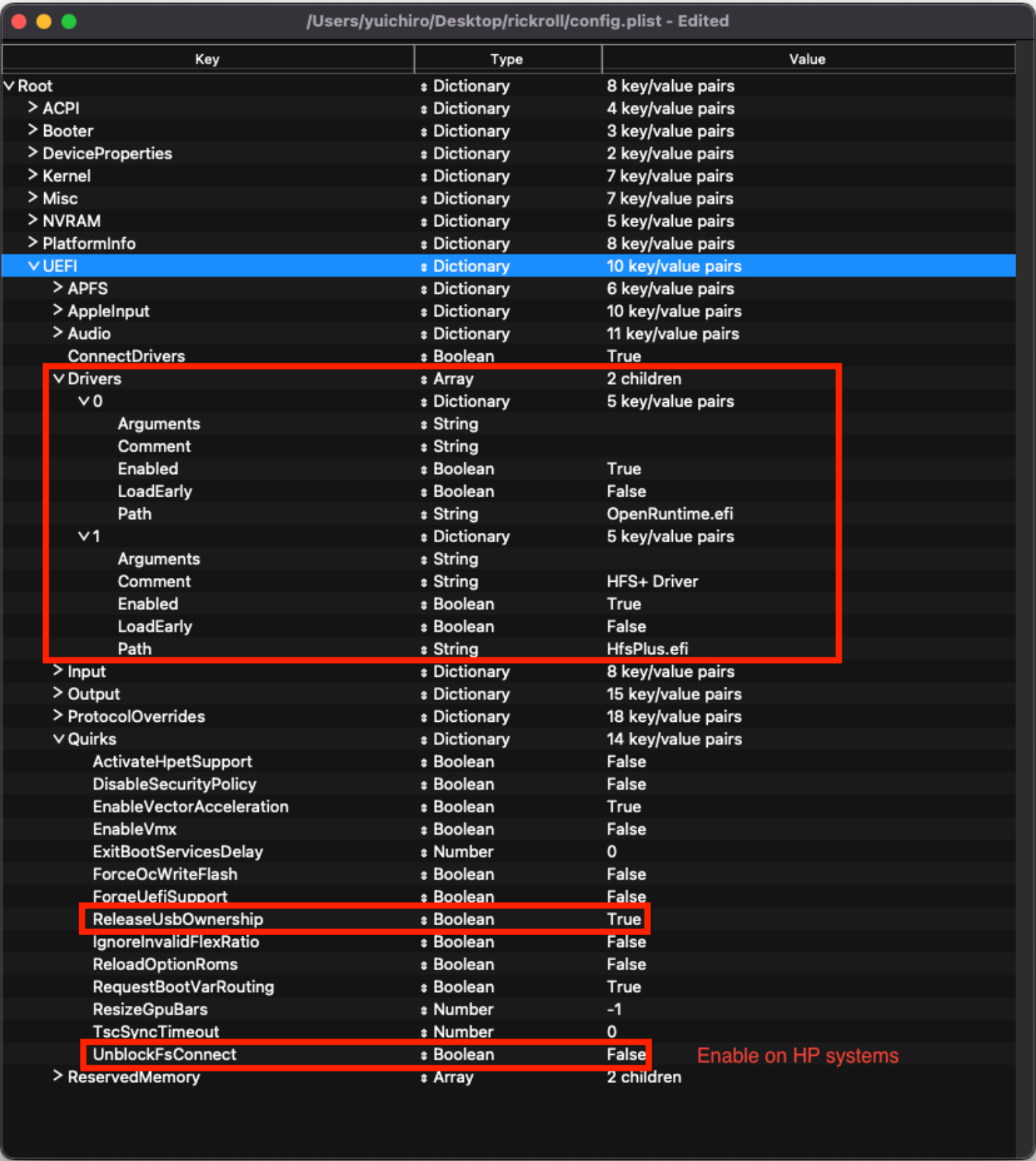
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UEFI



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

► More in-depth Info

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.

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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
- UEFI -> Quirks -> UnblockFsConnect -> True

Dell Users:

- 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

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- 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): 256MB
- 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

← [Coffee Lake Plus and Comet Lake](#)

[Nehalem and Westmere](#) →