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Support	Version
Initial macOS Support	OS X 10.5.6, Leopard
Last Supported OS	macOS 12 Monterey
Note	For Ventura information, see macOS 13 Ventura

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



/Volumes/INSTALL MAC/EFI/OC/config.plist - Edited			
	Key	Type	Value
▼	Root	Dictionary	8 key/value pairs
▼	ACPI	Dictionary	4 key/value pairs
▼	Add	Array	1 child
▼	0	Dictionary	3 key/value pairs
	Comment	String	SSDT-EC-DESKTOP.aml
	Enabled	Boolean	True
	Path	String	SSDT-EC-DESKTOP.aml
>	Delete	Array	2 children
>	Patch	Array	2 children
▼	Quirks	Dictionary	6 key/value pairs
	FadtEnableReset	Boolean	False
	NormalizeHeaders	Boolean	False
	RebaseRegions	Boolean	False
	ResetHwSig	Boolean	False
	ResetLogoStatus	Boolean	True
	SyncTableIds	Boolean	False
>	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
>	PlatformInfo	Dictionary	8 key/value pairs
>	UEFI	Dictionary	10 key/value pairs

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-EC 	Fixes the embedded controller, see Getting Started With ACPI Guide  for more details.

Note that you **should not** add your generated `SSDT.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.

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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

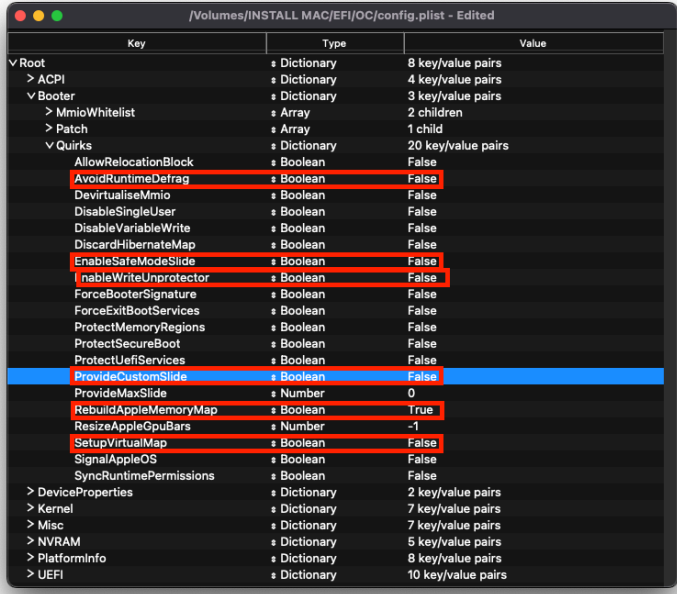
This section allows us to dynamically modify parts of the ACPI (DSDT, SSDT, etc.) via OpenCore. For us, our patches are handled by our SSDTs. This is a much cleaner solution as this will allow us to boot Windows and other OSes with OpenCore

Quirks

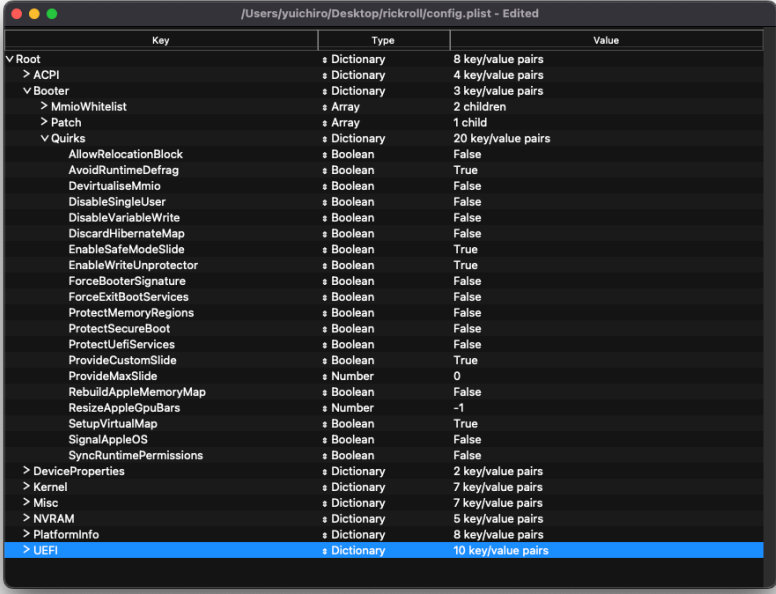
Settings relating to ACPI, leave everything here as default as we have no use for these quirks.

Booter

Legacy



UEFI



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, depending where your board has UEFI, you have 2 options depending what your motherboard supports:

Legacy Settings

Quirk	Enabled	Comment
AvoidRuntimeDefrag	No	Big Sur may require this quirk enabled
EnableSafeModeSlide	No	
EnableWriteUnprotector	No	
ProvideCustomSlide	No	
RebuildAppleMemoryMap	Yes	This is required to boot OS X 10.4 through 10.6
SetupVirtualMap	No	

UEFI Settings

Quirk	Enabled	Comment
RebuildAppleMemoryMap	Yes	This is required to boot OS X 10.4 through 10.6

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 < > config.plist > No Selection

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(0x1b,0x0)	Dictionary	(1 item)
layout-id	Data	<01000000>
▶ Block	Dictionary	(1 item)
▶ Kernel	Dictionary	(5 items)
▶ Misc	Dictionary	(6 items)
▶ NVRAM	Dictionary	(6 items)
▶ PlatformInfo	Dictionary	(6 items)
▶ UEFI	Dictionary	(6 items)

Add

Sets device properties from a map.


By default, the Sample.plist has this section set for audio which we'll be setting up by setting the layout ID in the boot-args section, so removal of `PciRoot(0x0)/Pci(0x1b,0x0)` is also recommended from the `Add` section.

TL;DR, delete all the PciRoot's here as we won't be using this section.

Delete

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

Kernel

 /Users/yuichiro/Desktop/rickroll/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
▼ Add	Array	2 children
▼ 0	Dictionary	8 key/value pairs
Arch	String	Any
BundlePath	String	Lilu.kext
Comment	String	Patch engine
Enabled	Boolean	True
ExecutablePath	String	Contents/MacOS/Lilu
MaxKernel	String	
MinKernel	String	8.0.0
PlistPath	String	Contents/Info.plist
> 1	Dictionary	8 key/value pairs
> Block	Array	1 child
> Emulate	Dictionary	5 key/value pairs
> Force	Array	1 child
> Patch	Array	10 children
▼ Quirks	Dictionary	22 key/value pairs
AppleCpuPmCfgLock	Boolean	True
AppleXcpmCfgLock	Boolean	False
AppleXcpmExtraMsrs	Boolean	True
AppleXcpmForceBoost	Boolean	False
CustomPciSerialDevice	Boolean	False
CustomSMBIOSGuid	Boolean	False
DisableIoMapper	Boolean	True
DisableLinkeditJettison	Boolean	True
DisableRtcChecksum	Boolean	False
ExtendBTFeatureFlags	Boolean	False
ExternalDiskIcons	Boolean	False
ForceAquantiaEthernet	Boolean	False
ForceSecureBootScheme	Boolean	False
IncreasePciBarSize	Boolean	False
LapicKernelPanic	Boolean	False
LegacyCommpage	Boolean	False
PanicNoKextDump	Boolean	True
PowerTimeoutKernelPanic	Boolean	True
ProvideCurrentCpuInfo	Boolean	False
SetApfsTrimTimeout	Number	-1
ThirdPartyDrives	Boolean	False
XhciPortLimit	Boolean	False
▼ Scheme	Dictionary	4 key/value pairs
CustomKernel	Boolean	False
FuzzyMatch	Boolean	True
KernelArch	String	Auto
KernelCache	String	Auto

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:

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Emulate

Needed for spoofing unsupported CPUs, thankfully Nehalem is officially supported so no patching necessary.

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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
AppleCpuPmCfgLock	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	If your board does not have USB 3.0, you can disable Disable if running macOS 11.3+

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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:

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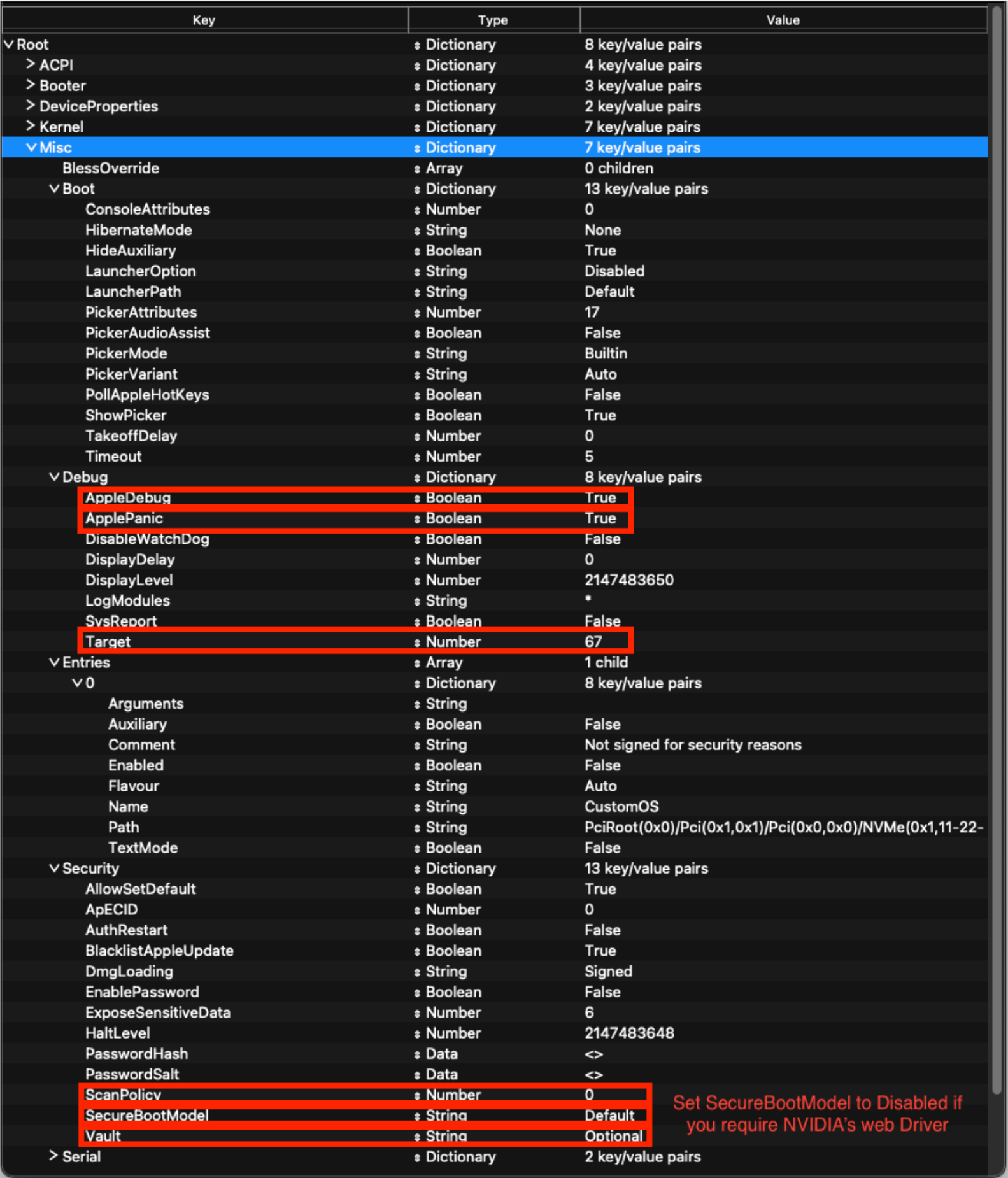
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Boot

Info

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

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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

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Security

Info

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

Quirk	Enabled	Comment
AllowSetDefault	YES	
BlacklistAppleUpdate	YES	

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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 <code>Optional</code> , note that it is case-sensitive

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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-9CC6-4BCCA8B301C	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-en-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

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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:**

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-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

- 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

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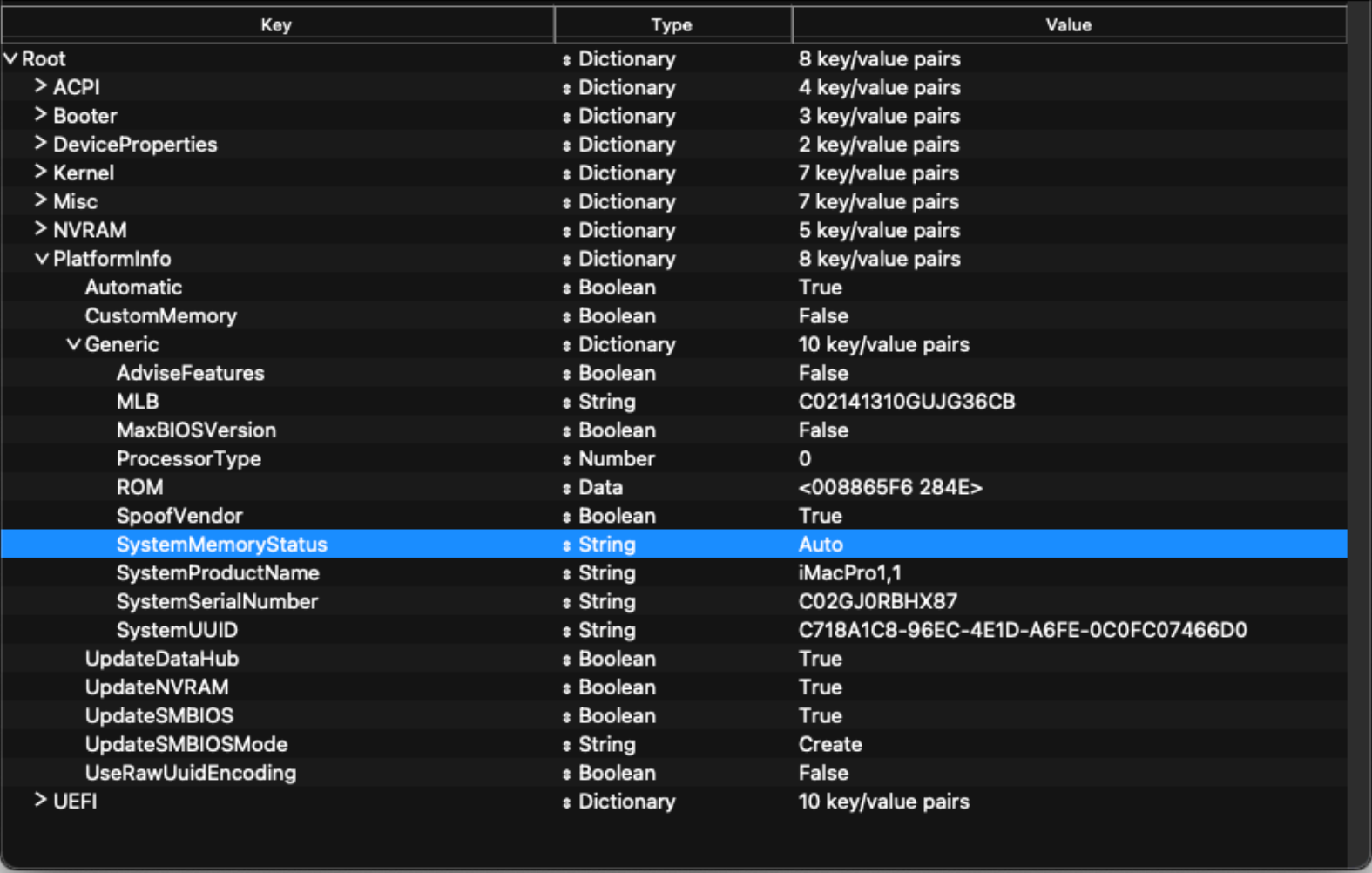
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Info

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

For this Nehalem example, we have a few SMBIOS to choose from:

SMBIOS	Hardware
MacPro5,1	Mojave and older
MacPro6,1	Catalina and newer

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:

```
#####
#                               MacPro5,1  SMBIOS  Info                               #
#####


Type:      MacPro5,1
Serial:     C02YX0TZXH87
Board Serial: C029269024NJG36CB
SmUUID:     DEA17B2D-2F9F-4955-B266-A74C47678AD3
```


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

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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
> PlatformInfo	⌘ Dictionary	8 key/value pairs
▼ UEFI	⌘ Dictionary	10 key/value pairs
> APFS	⌘ Dictionary	6 key/value pairs
> AppleInput	⌘ Dictionary	10 key/value pairs
> Audio	⌘ Dictionary	11 key/value pairs
ConnectDrivers	⌘ Boolean	True
▼ Drivers	⌘ Array	2 children
▼ 0	⌘ Dictionary	5 key/value pairs
Arguments	⌘ String	
Comment	⌘ String	
Enabled	⌘ Boolean	True
LoadEarly	⌘ Boolean	False
Path	⌘ String	OpenRuntime.efi
▼ 1	⌘ Dictionary	5 key/value pairs
Arguments	⌘ String	
Comment	⌘ String	HFS+ Driver
Enabled	⌘ Boolean	True
LoadEarly	⌘ Boolean	False
Path	⌘ String	HfsPlus.efi
> Input	⌘ Dictionary	8 key/value pairs
> 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
ReleaseUsbOwnership	⌘ Boolean	False
IgnoreInvalidFlexRatio	⌘ Boolean	True
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:

- HfsPlusLegacy.efi
- OpenRuntime.efi

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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

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Output

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

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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
IgnoreInvalidFlexRatio	YES	
UnblockFsConnect	NO	Needed mainly by HP motherboards

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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
- 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 `gI0` 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 `AppleCpuPmCfgLock` 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)
- SATA Mode: AHCI

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

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