

Installing macOS on Apple Silicon M1

DFU Mode, macOS Recovery, System Recovery, USB
Installer, Security Policy, IPSW Firmware Restores via AC2

Ryan - Mr. Macintosh

A little bit about me

- Supporting the Macintosh for 20 Years
- I am employed by a fortune 500 company
- My job title is Macintosh Platform Engineer
- I am responsible for deployment and security
- ClassicII on MacAdmins Slack
- MrMacintosh.com
- youtube.com/mrmacintoshblog
- I collect and restore vintage Mac computers



Boot your Apple Silicon Mac to macOS Recovery

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Booting to the new Apple Silicon Startup Manger

Boot up your Mac By holding down the Power Button.

- After holding down the power button you will see 2 different loading screens.
- You can let go of the power button once you see "Loading startup options"
- Booting into macOS recovery with this method is called 1TR or One True Recovery
- You can no longer boot to recovery with NVRAM commands like you could on a Intel Mac



Continue holding for startup options...



Loading startup options....

New Apple Silicon Startup Manager

- Different Options at the Boot Picker Selection Screen
- 1. Select Options to boot to macOS Recovery
- 2. Select Macintosh HD to boot back to macOS
- Little known options
- 1. Safe Mode - Click on Macintosh HD (Shift Key)
- 2. HW Diagnostics mode - Command D
- 3. Select Default Boot Disk - Option Key



Options at the M1 Boot Picker

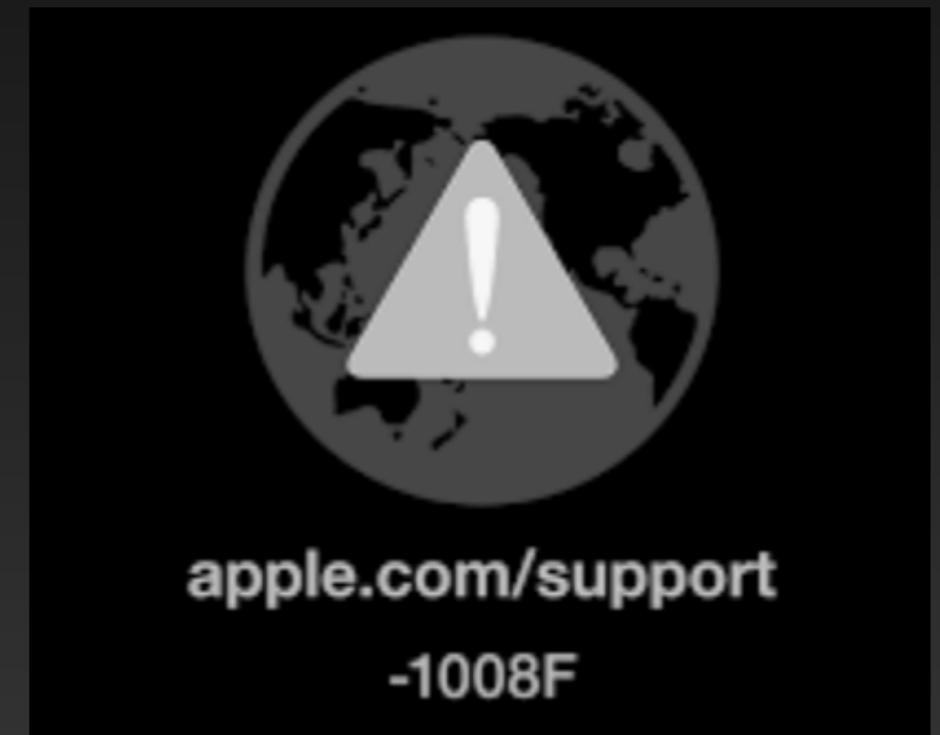
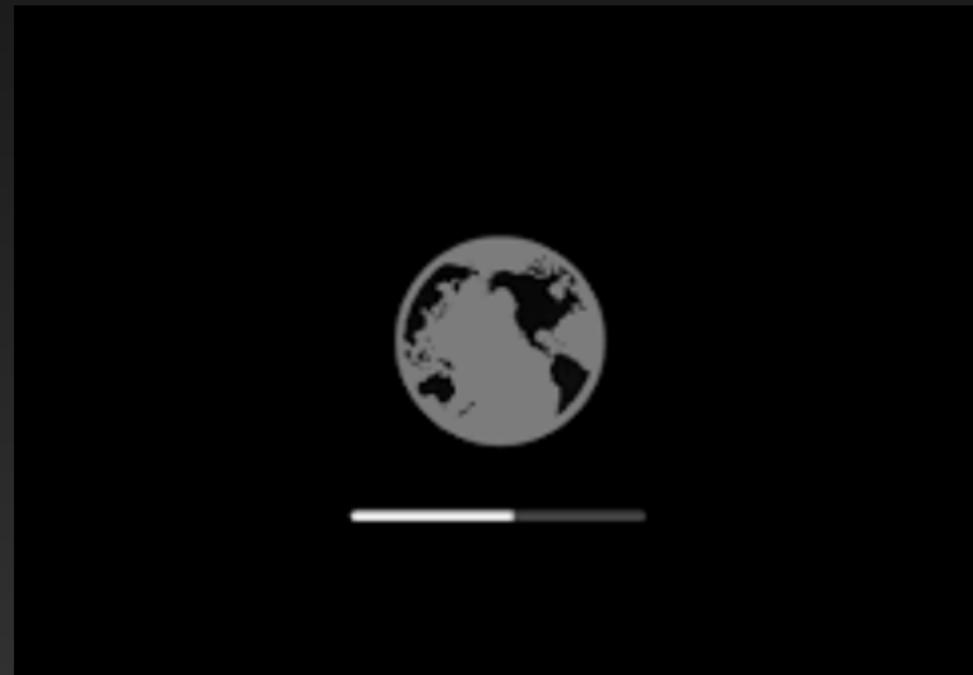
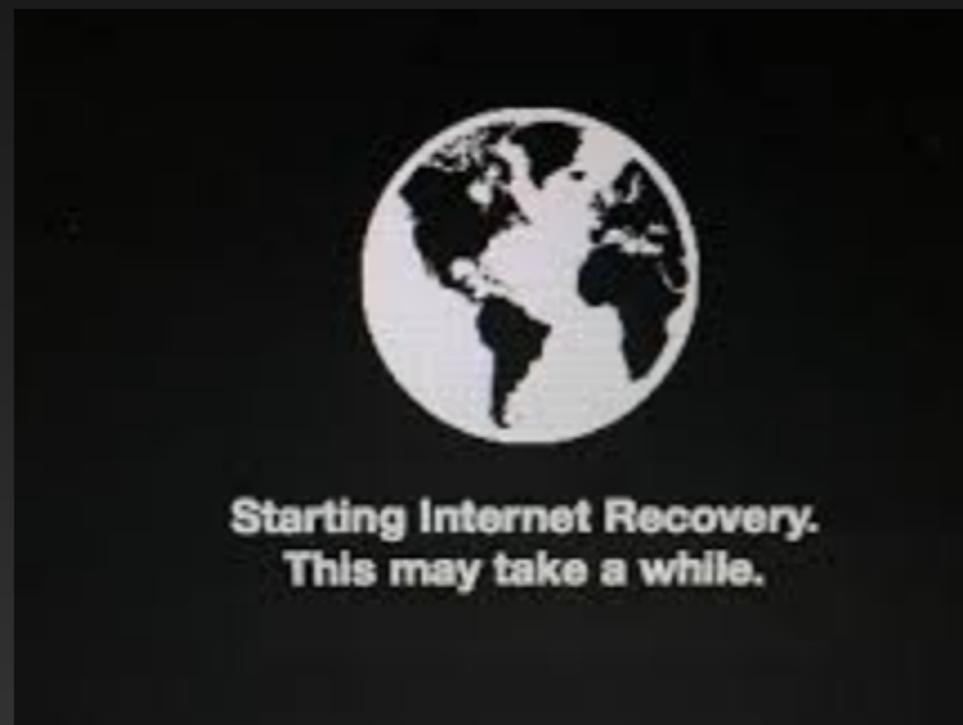
- Diagnostics - Safe Mode - Default Boot



Internet Recovery is DEAD!!!

RIP Network timeouts

- Everything is handled from macOS Recovery. If macOS Recovery fails the Mac now has a backup called System Recovery / FallBack Recovery



2 Different Recovery Environments

macOS Recovery & System Recovery

- macOS recovery & System Recovery are located on the main disk that can not be deleted or removed.

Recovering your Mac

macOS not available

Use macOS Recovery

- Re-install macOS to recover



Recovering your Mac

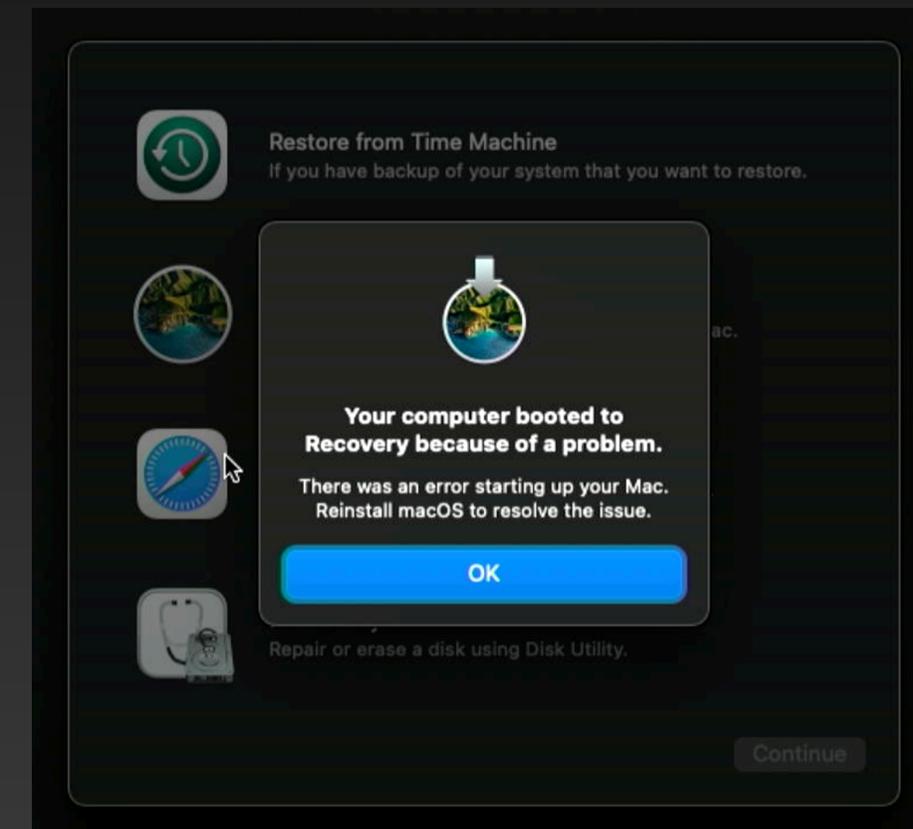
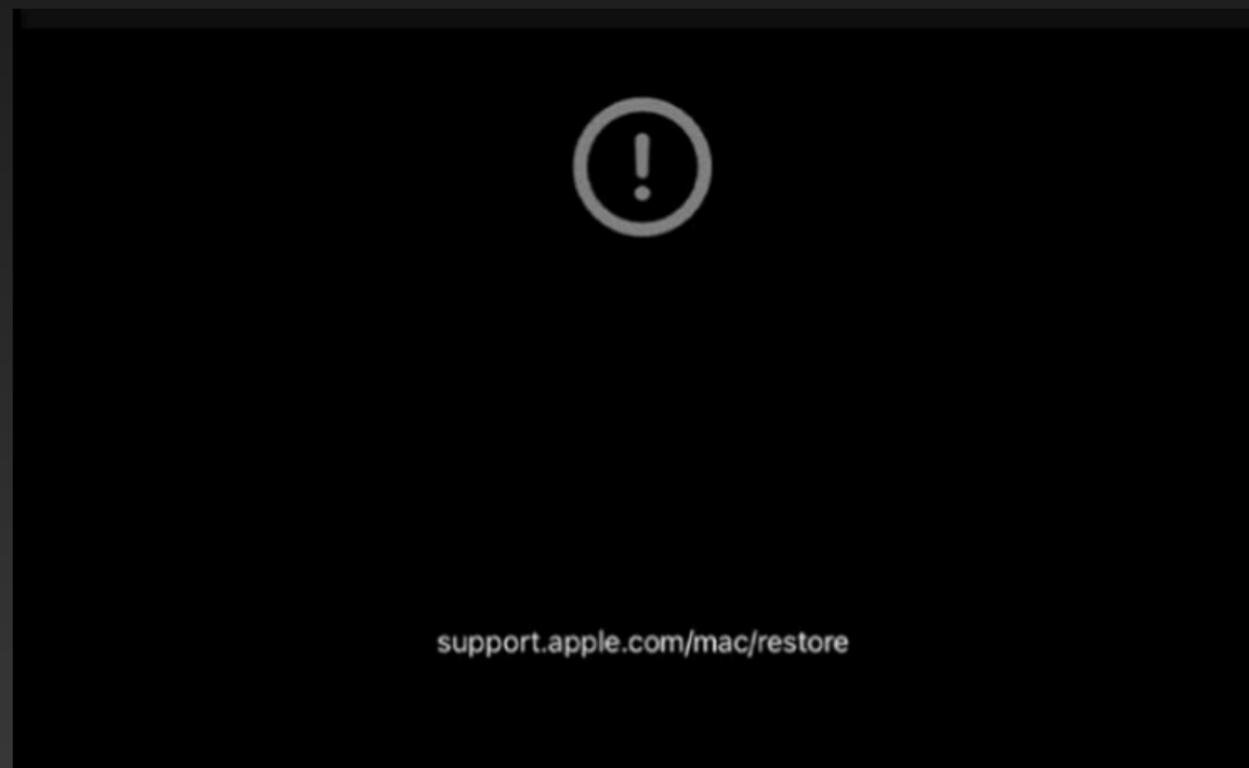
System Recovery NEW

- Minimal macOS
- Separate hidden container
- Let you - re-install macOS and macOS Recovery



What happens macOS Recovery has a problem, or both System Recovery are not available?

- If your M1 Mac is unable to boot, it might auto boot to recovery.
- If macOS Recovery and System Recovery are unavailable you will get an exclamation point error. AC2 is required
- Mac mini has SOS Mode



Apple Silicon macOS Recovery

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FileVault Enabled

Password Protected Recovery

- If FileVault is disabled, macOS recovery will automatically load
- If FileVault is enabled, macOS recovery will prompt for a SecureToken Admin Account Password. If the Mac does not have a SecureToken enabled Admin Account, you will be prompted for the FV2 Recovery Key



macOS Recovery FV2 Password Protection

This mechanism is the same on an Intel Mac running macOS Catalina or Big Sur

- If FileVault is not enabled, all user data is accessible via macOS recovery terminal access. (Same on a Intel Mac)



macOS Recovery

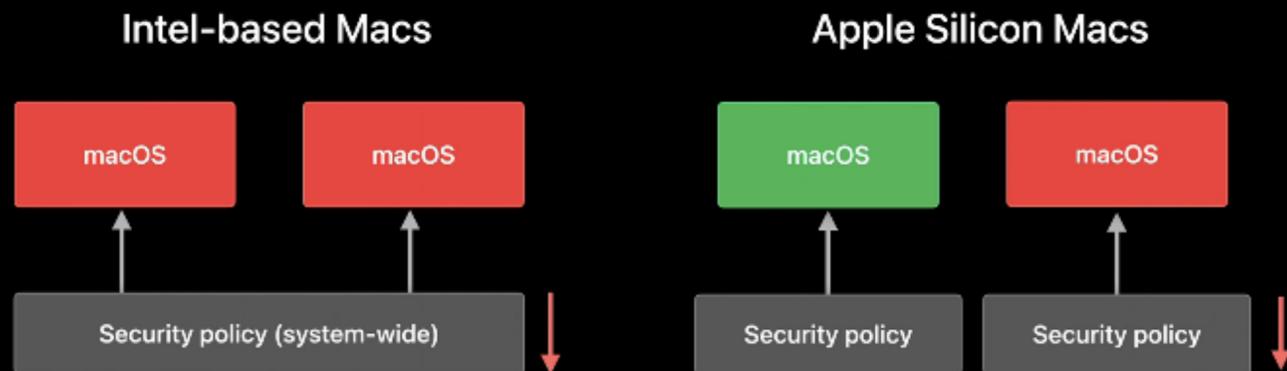
- The Apple Silicon macOS recovery is almost exactly the same as Intel Recovery with a few changes.
- Startup security utility redesigned (Startup disk GUI look)
- Firmware Password Option Removed
- External Boot Option Media Removed (External USB Install media is now always enabled)
- Share Disk Mode added (Target disk mode removed)



Startup Security Utility

- Per-OS Security policy
- Full & Reduced Security
- Unlike iOS you will be able to run previous versions of macOS that are unsigned

Per-OS security policy



Share Disk Mode

Replaces Target Disk Mode

- New data transfer mode is now located in macOS Recovery



How to Reinstall macOS on Apple Silicon

I will show you 5 different ways
to install macOS on Apple Silicon

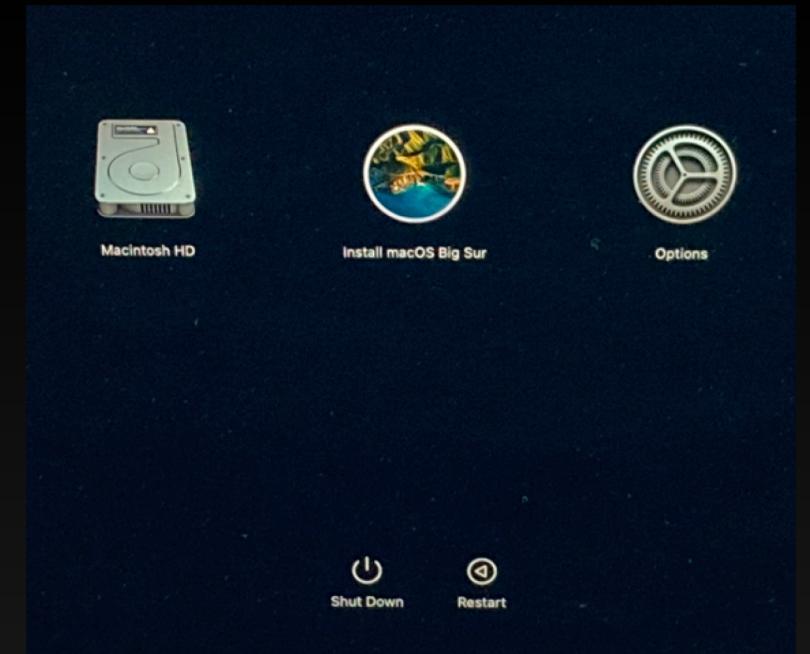
#1 macOS Recovery

Boot to macOS recovery by holding down the Power Button

- Select Options from the New Startup Manager
- You will now be in macOS recovery
- Use Disk Utility to erase the drive
- Install macOS
- Skip erasing the drive and perform a reinstall (retains user data and apps)
- Full macOS Big Sur installer is downloaded from Apple
- Install Time - 1-2 Hours

#2 External USB macOS installer

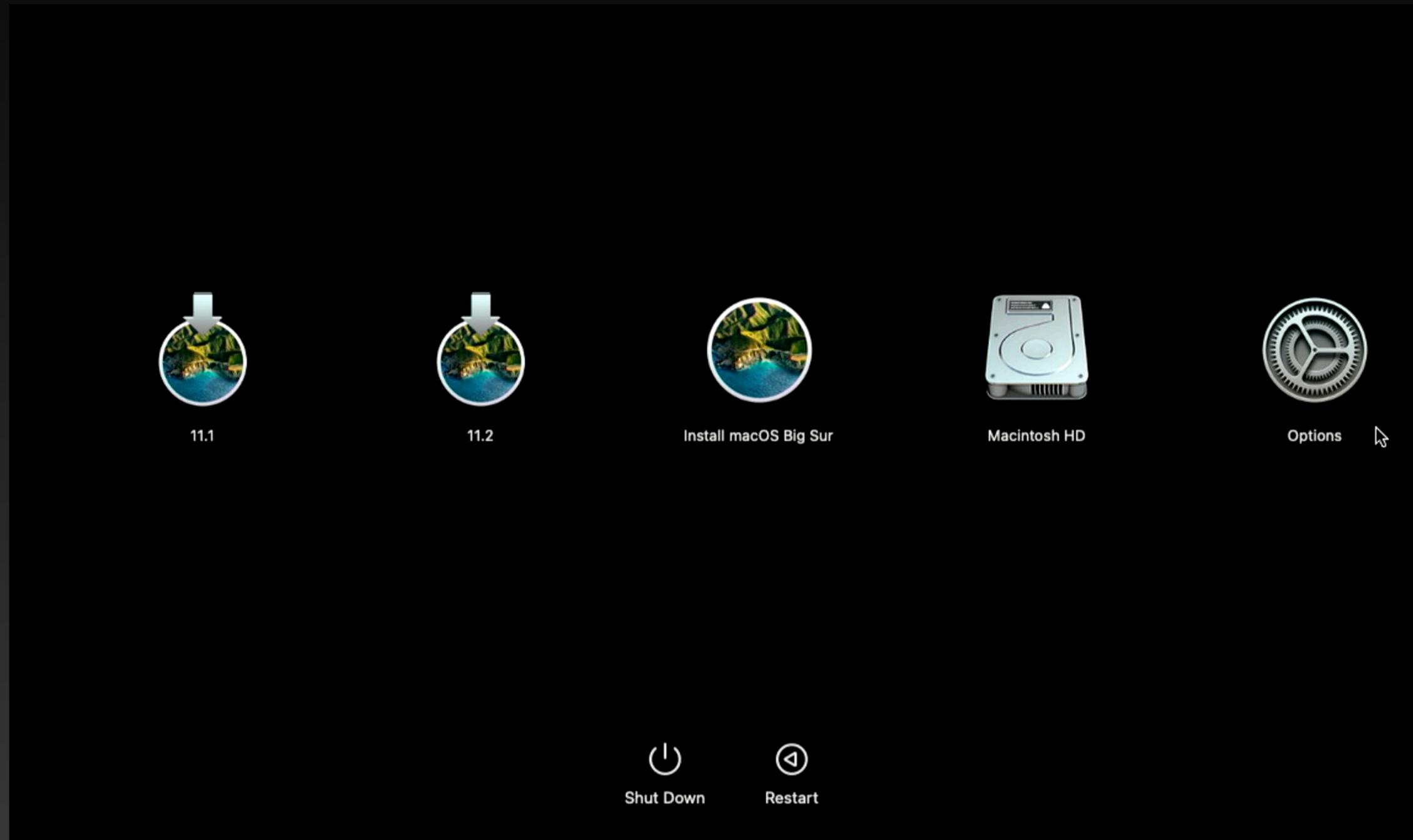
External Boot is enabled by default on M1 Macs



- You can boot macOS with a USB macOS Installer External drive
- Use createinstallmedia to create the USB installer (Same as Intel)
- You will now see a 3rd option “Install macOS” this is your USB drive
- Selecting “Install macOS Big Sur” will boot your M1 Mac to macOS Recovery
- “Booting to USB Installer” is not what’s happening. You are now booting to macOS recovery and then running the macOS Big Sur app in recovery.
- You can confirm this by checking “sw_vers” in the recovery terminal.

Apple Silicon Boot Picker Menu

USB Installer plugged in with multiple versions of Big Sur



#3 In macOS Install macOS Installer.app

You can reinstall macOS or upgrade with the GUI Installer

- This is the same as it is on an Intel Mac
- You can use the Install macOS Installer.app downloaded from the Mac App Store to reinstall macOS or Upgrade to a new version.
- This option is very important if you have having problems with software update.
- Apple has removed stand alone update pkgs.
- Using the full installer is the way to update if software update is having problems. You can update in the OS or perform reinstall in recovery.

#4 Install macOS startosinstall

If you would like to automate the install you can use this command

- The startosinstall binary command was added in 10.13.
- The primary function of this command is to automate the install/upgrade of macOS
- The command can be used with software update - - fetch-full-installer to automate the download and install of macOS
- You can use the - - eraseinstall option to erase the drive and install macOS
- You can now use startosinstall in recovery on Apple Silicon
- Startosinstall now REQUIRES user authentication
- Check out MDS from Tim Perfitt @ twocanoes.com

#5 Use Apple Configurator 2 to erase and install macOS

This is a new option for Apple Silicon Macs for rapid deployment

- You can now use Apple Configurator 2 to do the following
- 1. New Full macOS install .ipsw file now available for each version of macOS
- 2. Boot target Mac into DFU mode
- 3. Connect target Mac to host Mac with USB-C cable
- 4. Open Apple Configurator 2
- 5. Drag full install over to Apple Configurator 2 app
- 6. Target drive will be erased and macOS will be installed.

5 Use Apple Configurator 2 Continued

More information

- Different Modes
- 1. Revive - will ONLY reinstall macOS Recovery (Data Retained)
- 2. Restore - Full Erase of ALL Settings, Data + reinstall macOS, macOS Recovery & System Recovery (Fallback Recovery)
- 3. Download newest IPSW full macOS Big Sur Install from Apple
- 4. Manually Download macOS IPSW file - drag and drop into AC2
- 5. Install time 8-10 Min! You can perform this action on multiple Macs!
- mrmacintosh.com/apple-silicon-m1-full-macos-restore-ipsw-firmware-files-database/

Boot your Apple Silicon Mac to DFU Mode for Recovery

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Important Notes

- Erase Mac - This new function is the proper way to erase a Mac. It erases Macintosh HD & Macintosh - Data volumes, all NVRAM Settings and volume owners. As of macOS 11.2 an Erase Mac is required when you erase the volume.
- Activate Mac - Activation is required after an Erase Mac is performed. This action checks for any active Activation locks, contacts the activation server to get an activation certificate.
- When you perform a DFU Restore, NVRAM settings are NOT erased! This includes saved WIFI. This could be a bug, convenience, or a way to help enforce DEP.
- Apple Silicon does not support SMC or PRAM Resets.
- You can clear NVRAM by using the nvram binary with `nvram -C`
- After clearing NVRAM you will need to reselect Macintosh HD as your main Boot disk. This will restore default NVRAM settings.

Booting to the new Apple Silicon Mac to DFU Mode

Desktops

- Desktops - Mac mini + (Future iMac & Mac Pro)
- 1. Disconnect Power
- 2. Hold down Power Button
- 3. Continue holding Power + Plug In Power cord and wait for LED to turn Orange.
- 4. Let go of power button
- 5. Mac is now in DFU mode
- 6. Confirm in Apple Configurator 2

Booting Apple Silicon M1 Portables to DFU Mode

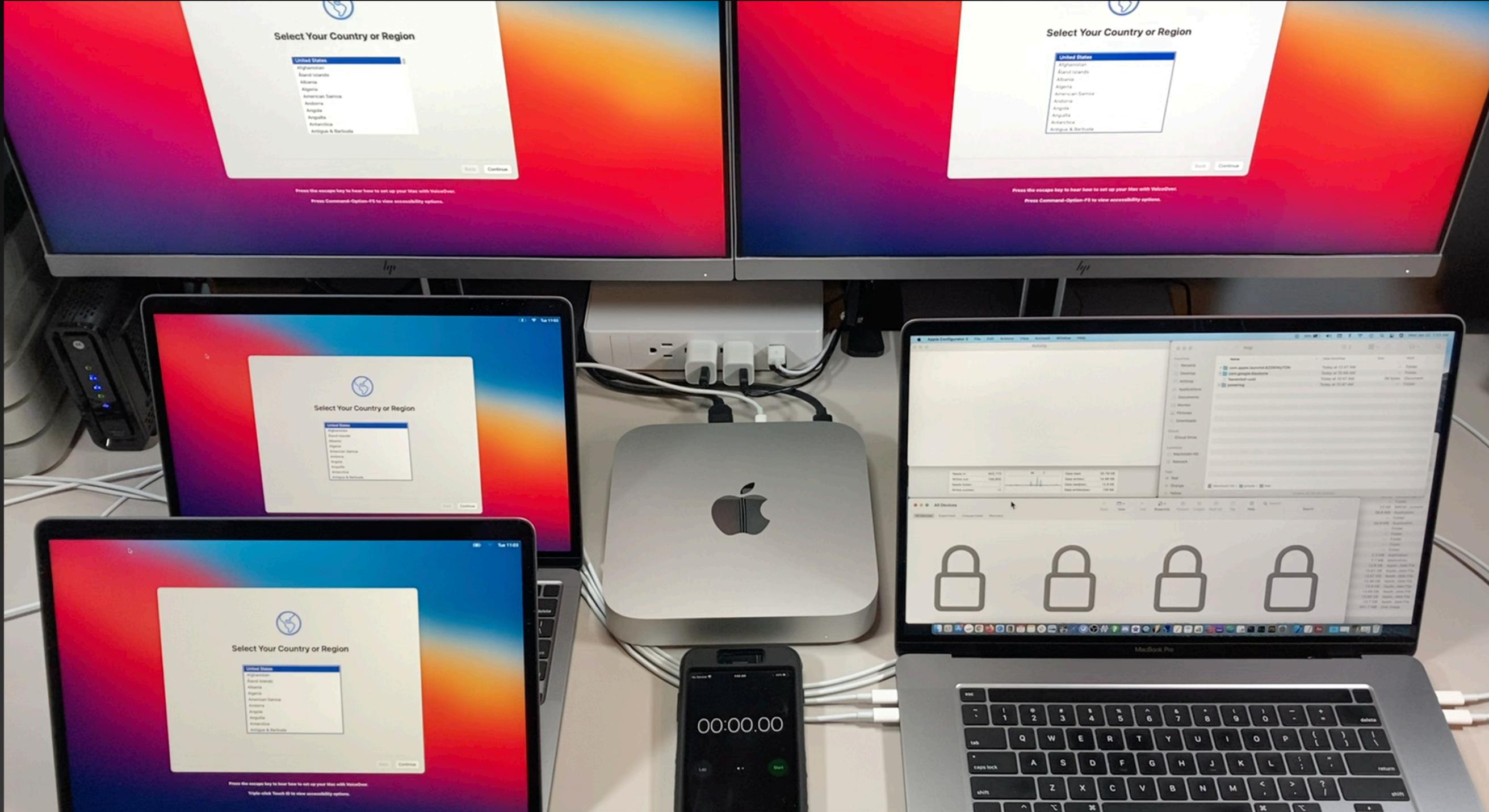
MacBook Pro & MacBook Air

How to Boot your Apple Silicon Mac into DFU mode



1. Press and hold the power button, right shift, left option & left control keys for 10 seconds.
2. One you get to 10 seconds, let go of all keys except for the power button.
3. Continue holding down the power button for an additional 8 seconds until you get to 18 seconds total. You should now see the DFU icon in AC2.

Four Apple Silicon M1 IPSW Installs at the same time

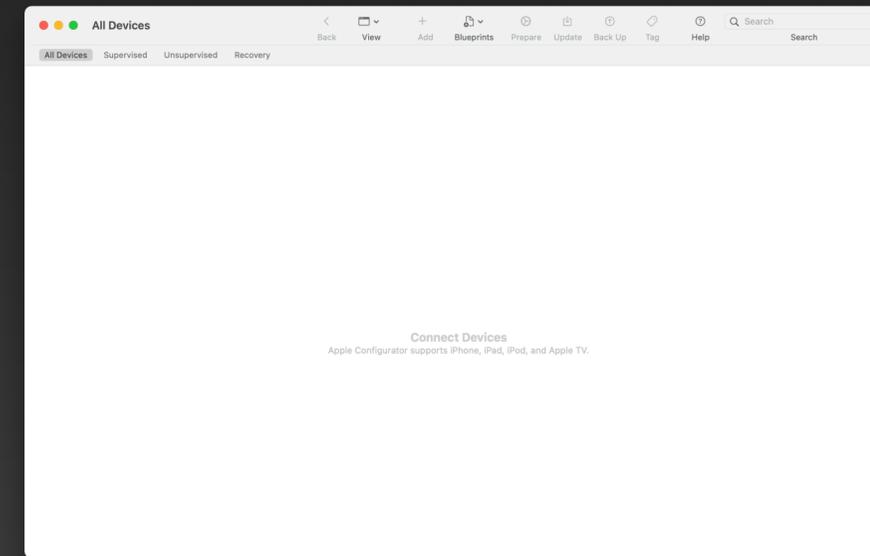
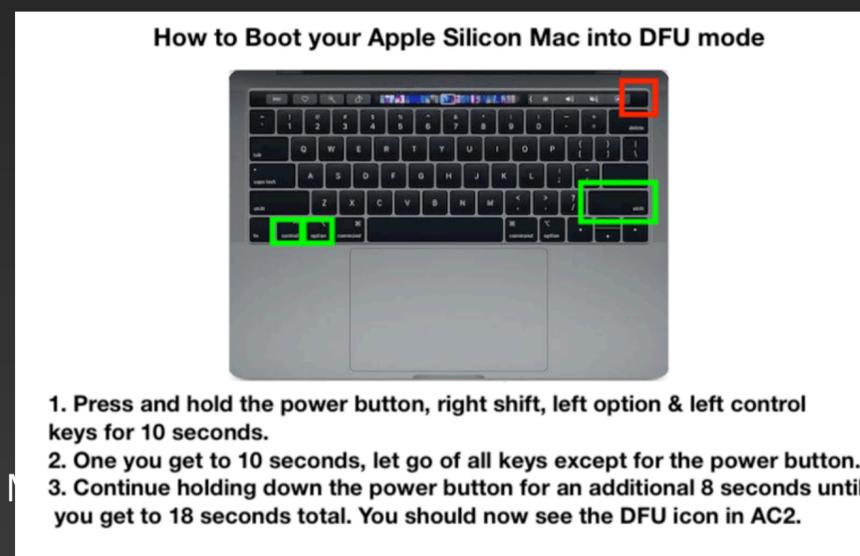


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Apple Configurator 2 DEMO!

New Recovery and Reinstall options!

- Apple Silicon Macs can now be quickly erased and restored using Apple Configurator 2.
- You can use AC2 to erase Macintosh HD then deploy a full install .ipsw
- This process is 2x-3x faster than a regular recovery install.
- You can also use Apple Configurator 2 to restore macOS recovery if something goes wrong with it.



Thank You!

Any Questions?

- Links
- MrMacintosh.com
- twitter.com/ClassicII_MrMac
- youtube.com/mrmacintoshblog
- mrmacintosh.com/how-to-reinstall-macos-on-your-apple-silicon-mac-everything-you-need-to-know/
- mrmacintosh.com/apple-silicon-m1-full-macos-restore-ipsw-firmware-files-database/