# Backing Up Your Mac

Why Backup Your Mac

- Can you afford to lose everything on your computer?
  - Yes, no need to back up
  - No, you should be doing backups
- Can you afford to have the data recovered?
  - Drive Savers recovery in 2006 cost $2337
  - Other places may be cheaper, but there is no guarantee that everything will be recovered

What Kind of Backup

- Clone Backups
  - Contain everything on your startup hard drive and you can reboot from them and continue working

- Data Backups
  - Simple copy backups contain just the latest version of the data you back up
  - Versioned backups also contain previous versions & deleted files

Booting from a Clone

- Go to System Preferences and select Startup Disk
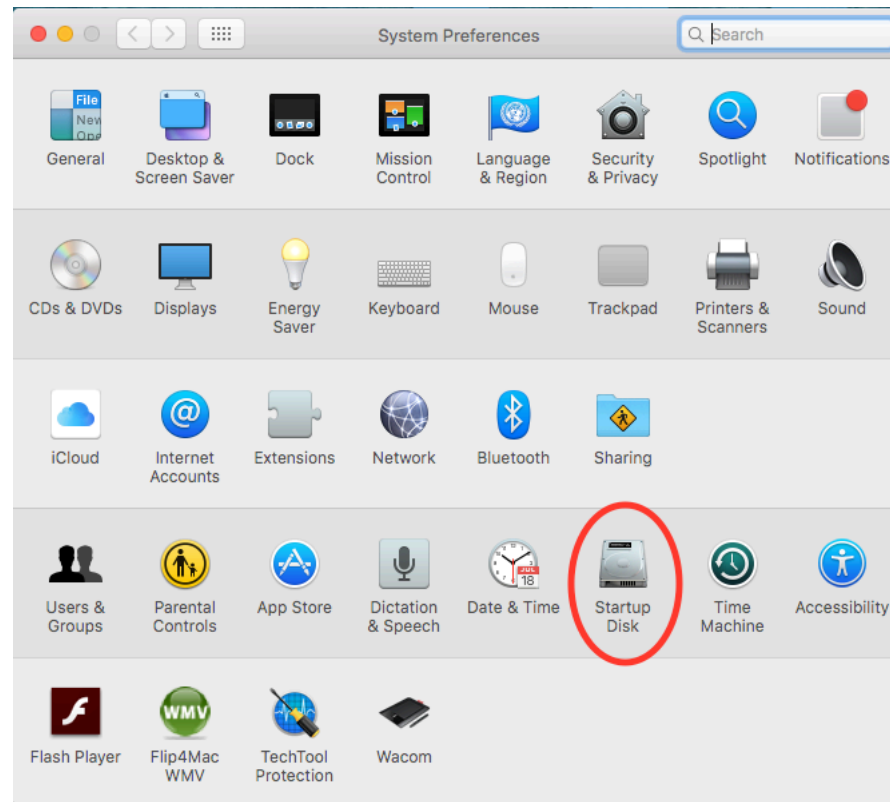
Booting from a Clone

Backup Software

- Carbon Copy Cloner
  - Does clone backups and data backups
  - Costs $39.95, can use free for 30 days
  - https://bombich.com/
- SuperDuper!
  - Does clone backups and data backups
  - Costs $27.95, can use free for full backups
  - http://www.shirt-pocket.com/SuperDuper/SuperDuperDescription.html
- Prosoft Data Backup
  - Does clone backups, data backups, and versioned data backups
  - Costs $49, free with many hard drive purchases from OWC, also a free trial version available
  - https://www.prosofteng.com/databackup-mac-backup-software/
- Other software is also available

Carbon Copy Cloner User Guide
(282 pages)

CARBON COPY CLONER

Carbon Copy Cloner 4 Documentation
Table of Contents

SuperDuper! User Guide
(60 pages)

SuperDuper!
Heroic System Recovery
For Mere Mortals.

Welcome to the SuperDuper! User's Guide!

This guide is designed to get you up and running as fast as possible. We've taken the most common tasks people perform with SuperDuper!, each placed in its own chapter, and have provided step-by-step guidance (including lots of pictures).

In here you'll find out how to:

- Back up your Macintosh for the first time
- Update an existing backup
- Schedule one or multiple backups
- Store a backup alongside other files on a destination drive
- Back up your Macintosh over a network
- Exclude a folder from a backup
- Restore files from a backup

Data Backup User Guide
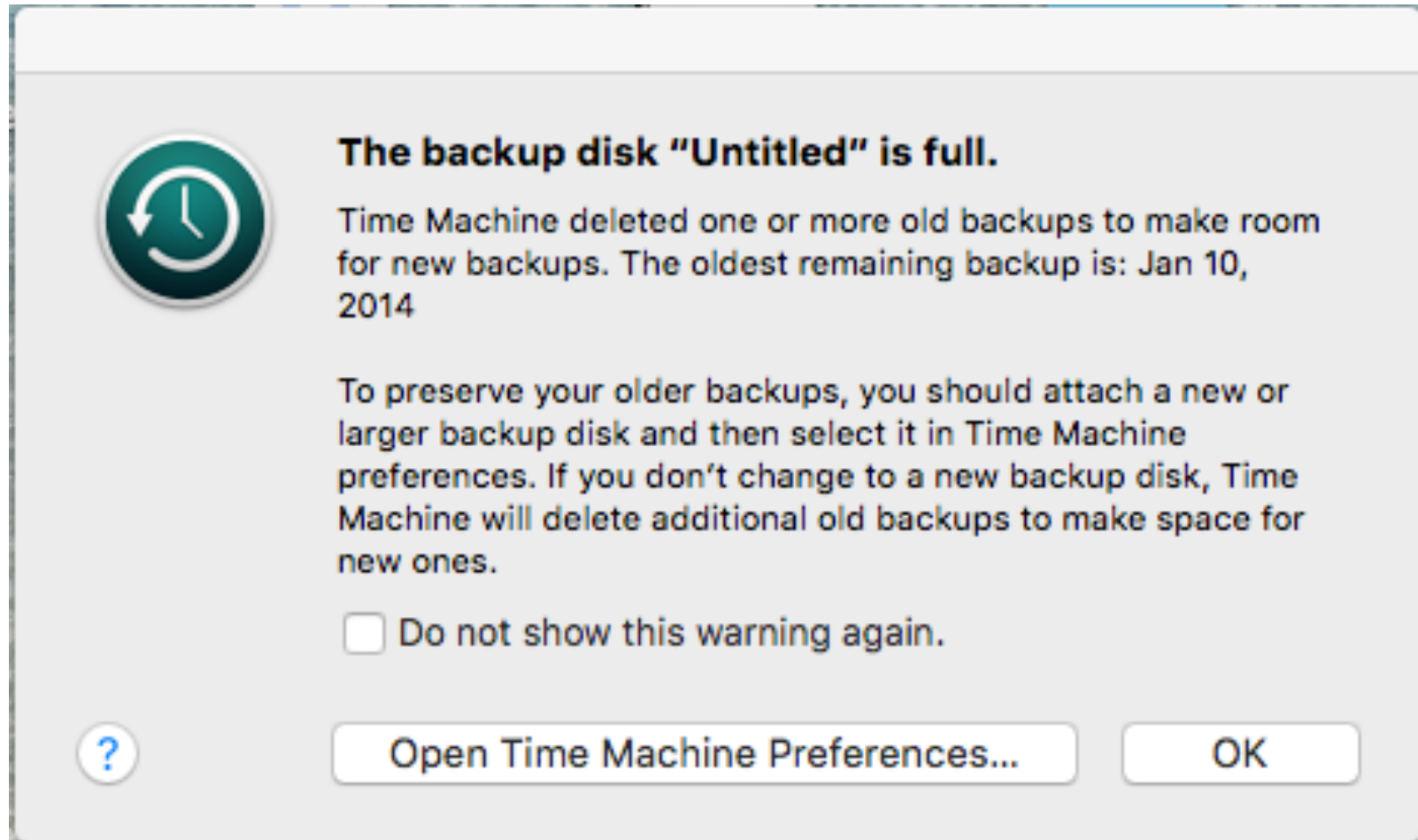# (45 pages)

Data Backup 3.1
User Guide

Data Backup User Guide

What About Time Machine?

- Does versioned backups only
  - Default mode is to back up everything
  - Can be configured to omit folders like the System
- Requires access to a hard drive
  - Airport Time Capsule supports wireless backups
  - Prices start at $299 for a 2TB Airport Time Capsule
- I use Time Machine on my iMac, but not on my MacBook Pro
  - My 1 TB Time Machine hard drive keeps running out of space even though I have only about 130 GB of data on my internal hard drive
  - My versioned backup of User Files only uses about 80 GB

Time Machine

The backup disk "Untitled" is full.

Time Machine deleted one or more old backups to make room for new backups. The oldest remaining backup is: Jan 10, 2014

To preserve your older backups, you should attach a new or larger backup disk and then select it in Time Machine preferences. If you don't change to a new backup disk, Time Machine will delete additional old backups to make space for new ones.

☐ Do not show this warning again.

Open Time Machine Preferences...   OK

Types of Hard Drive connections

- FireWire 800 — not available on new computers
- Thunderbolt — available on new computers
- USB
  - USB 2 — not available on new computers
  - USB 3 — available on new computers
- My 2010 iMac has FireWire 800 & USB 2 connections
- My 2012 MacBook Pro has FireWire 800, Thunderbolt & USB 3 connections

Connection Speeds

Interface	Max Mbits/s	Max MB/s	OWC benchmark for 7200 RPM/32MB cache drive	
USB 2.0	480	60	39	
USB 2.0 Benchmark	312	39		
USB 3.0	5000	625	124	
USB 3.0 Benchmark	992	124		
FireWire 800	800	100	84	
Firewire 800 Benchmark	672	84		
Thunderbolt	10000	1250		Needs solid state device to reach this speed
Ethernet 1000BASE-T	1000	125		
Wireless 802.11n	248	31		
My FIOS	25	3		

Max Data Transfer Rates
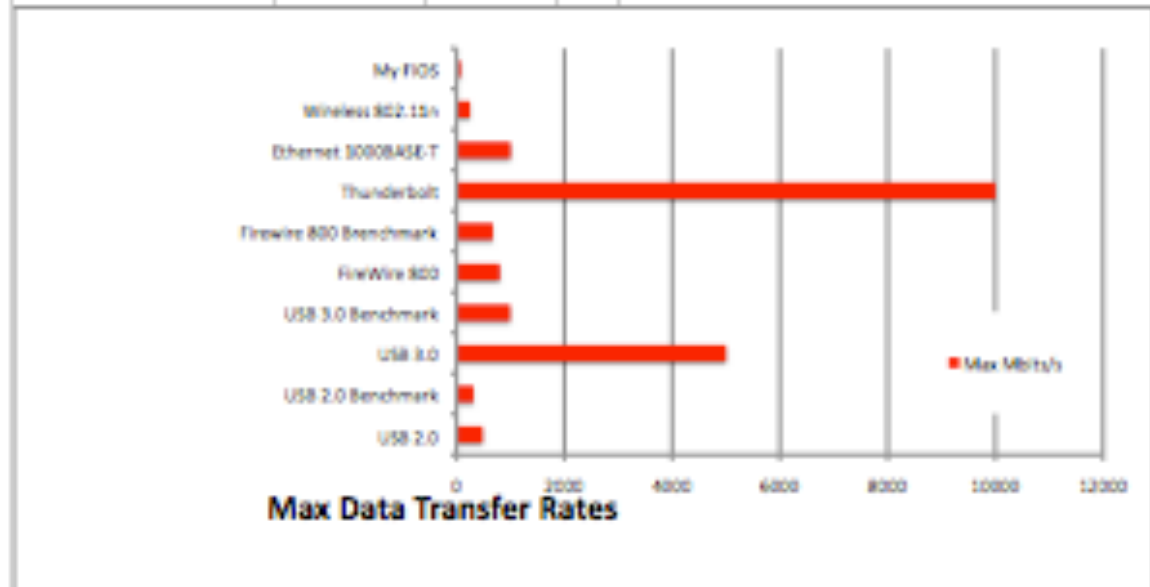
Backup Speed to a 7200 rpm drive

- Full clone backup of my iMac (7200 rpm drive) using SuperDuper! — 130 GB
  - USB 2 connection   2:14:55
  - FireWire 800 connection   1:44:40
- Full clone backup of my MacBook Pro (5400 rpm drive) using SuperDuper! — 183 GB
  - FireWire 800 connection   2:23:58
  - USB 3 connection   2:03:53

Types of Backup Drives

- Mobile drives — bus powered, no AC adapter
  - USB 3.0/2.0
  - USB 3.0/2.0 & FireWire 800 with daisy chain port
  - Thunderbolt
  - USB-C

- Desktop drives — use AC adapter
  - USB 3.0 with daisy chain port
  - USB 3.0, FireWire 800 with daisy chain port & eSATA
  - Thunderbolt

USB Ports

- Laptops generally have 2 USB ports
- Desktops have 4 USB ports
- USB Hubs provide additional ports
  - Unpowered USB hubs may not provide enough power for mobile drives (they don't provide enough power to charge mobile devices)
  - USB 2 hubs only support USB 2 speeds
  - Powered USB 3 hubs available for 4 to 13 ports cost $20 to $80 but may only offer one charging port

What Hard Drives to Buy and Where

- SuperDuper! documentation recommends
  - LaCie
    http://www.lacie.com/
  - Other World Computing
    https://www.macsales.com/
- Apple Store carries
  - LaCie USB 3.0 1 TB and larger drives from $84.95
  - Seagate USB 3.0 1TB and larger drives from $69.95
  - And others

LaCie Drives

- Mobile
  - USB 3.0
    - 500 GB for $64.99
    - 1TB for $79.99 or $89.99
    - 2TB for $119.99 or $129.99
  - USB 3.0 & FireWire 800 with daisy chain port
    - 500 GB for $109.99
    - 1TB for $149.99
    - 2TB for $189.99
  - USB 3.0 SSD also available
  - USB-C also available
- Desktop
  - USB 3.0
    - 3TB for $129.99 or $139.99
  - USB 3.0, FireWire 800 with daisy chain port & eSATA
    - 3TB for $219.99
- Thunderbolt drives also available, but are more expensive
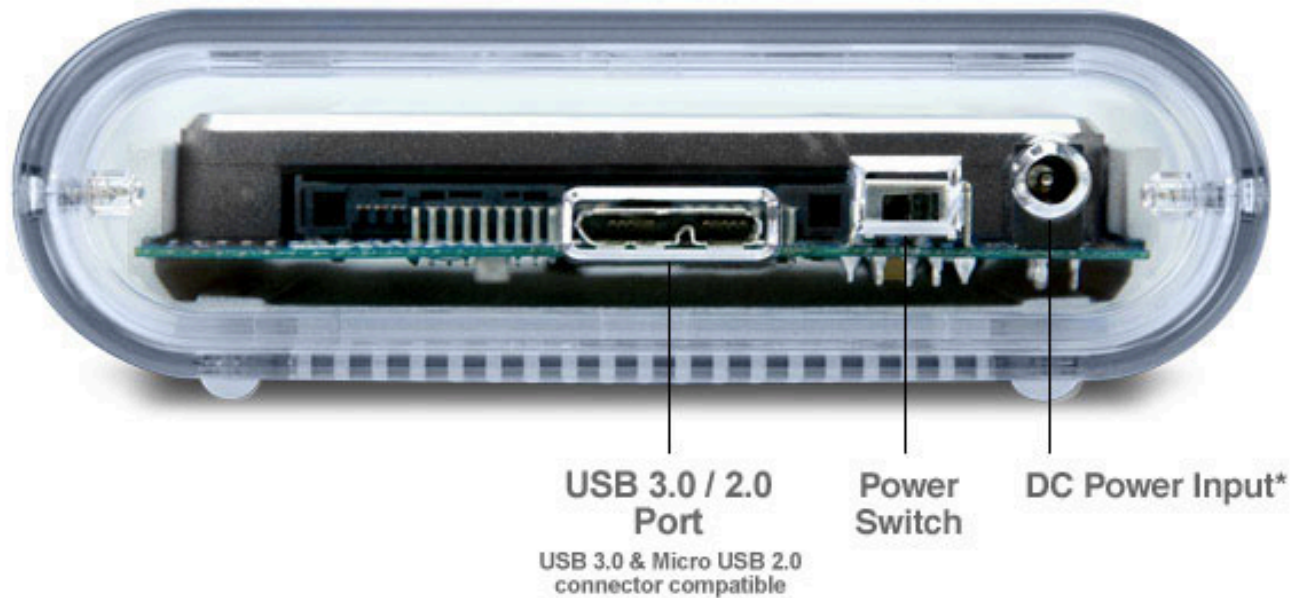
LaCie Mobile Drive

LaCie Desktop Drive

Other World Computing Drives

- Mobile
  - USB 3.0
    - 500 GB 5400 rpm for $59.99 or 7200 rpm for $81.99
    - 1 TB 5400 rpm for $81.75 or 7200 rpm for $99.75
    - 2 TB available for 5400 rpm
  - USB 3.0 & FireWire 800 with daisy chain port
    - 500 GB 5400 rpm for $112.99 or 7200 rpm for $127.75
    - 1 TB 5400 rpm for $133.99 or 7200 rpm for $149.00
    - 2 TB & 3 TB available for 5400 rpm
  - USB 3.0 & eSata
    - 500 GB 5400 rpm for $89.99 or 7200 rpm for $99.97
    - 1TB 5400 rpm for $104.99 or 7200 rpm for $124.99
    - 2 TB & 3 TB available for 5400 rpm
  - USB 3.0 SSD drives also available
  - Optional power connector available
- Desktop (7200 rpm drives)
  - USB 3 with daisy chain port
    - 500 GB for $99.97
    - 1 TB for $112.99
    - Larger sizes also available
  - USB 3, FireWire 800 with daisy chain port & eSATA
    - 500 GB for $129.00
    - 1 TB for $139.99
    - Larger sizes also available
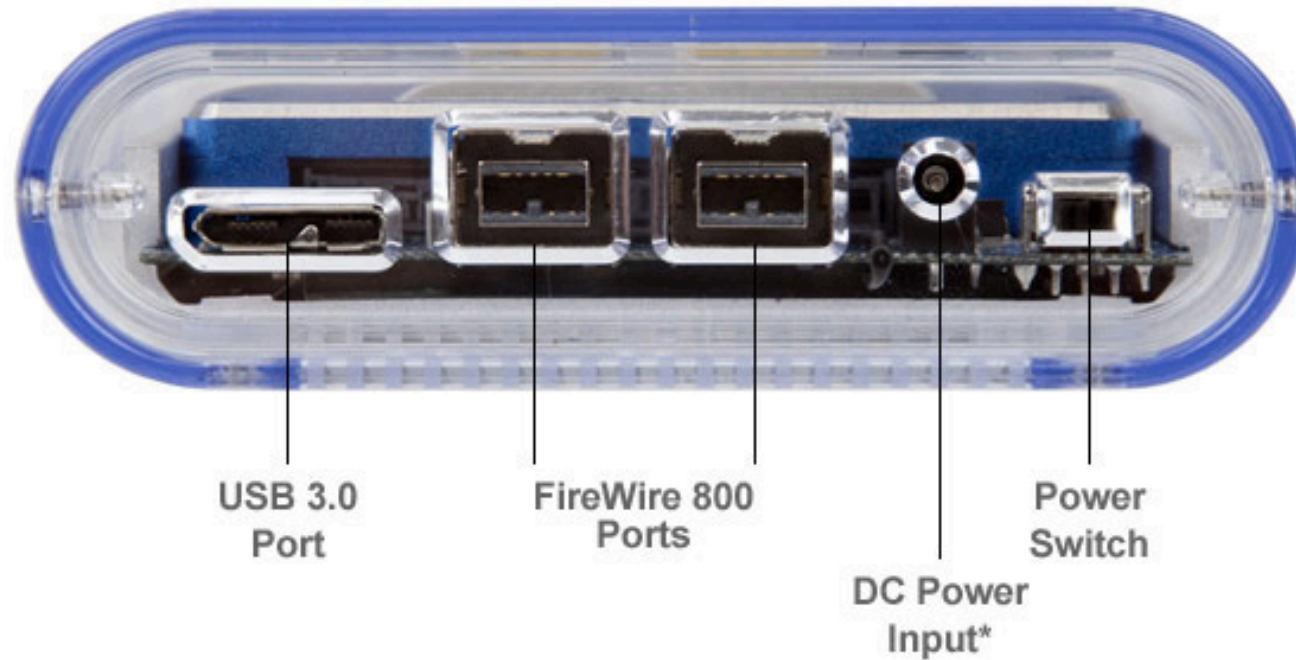- Thunderbolt drives also available but are more expensive

OWC Mobile Drive 1

USB 3.0 & 2.0

USB 3.0 / 2.0 Port
USB 3.0 & Micro USB 2.0 connector compatible

Power Switch

DC Power Input*

*On-The-Go Pro is powered via interface connections. Use of a power adapter is optional and not included.

OWC Mobile Drive 2

USB 3.0 & 2.0 / FireWire 800

USB 3.0 Port · FireWire 800 Ports · DC Power Input* · Power Switch

*On-The-Go Pro is powered via interface connections. Use of a power adapter is optional and not included.

OWC Mobile Drive 3

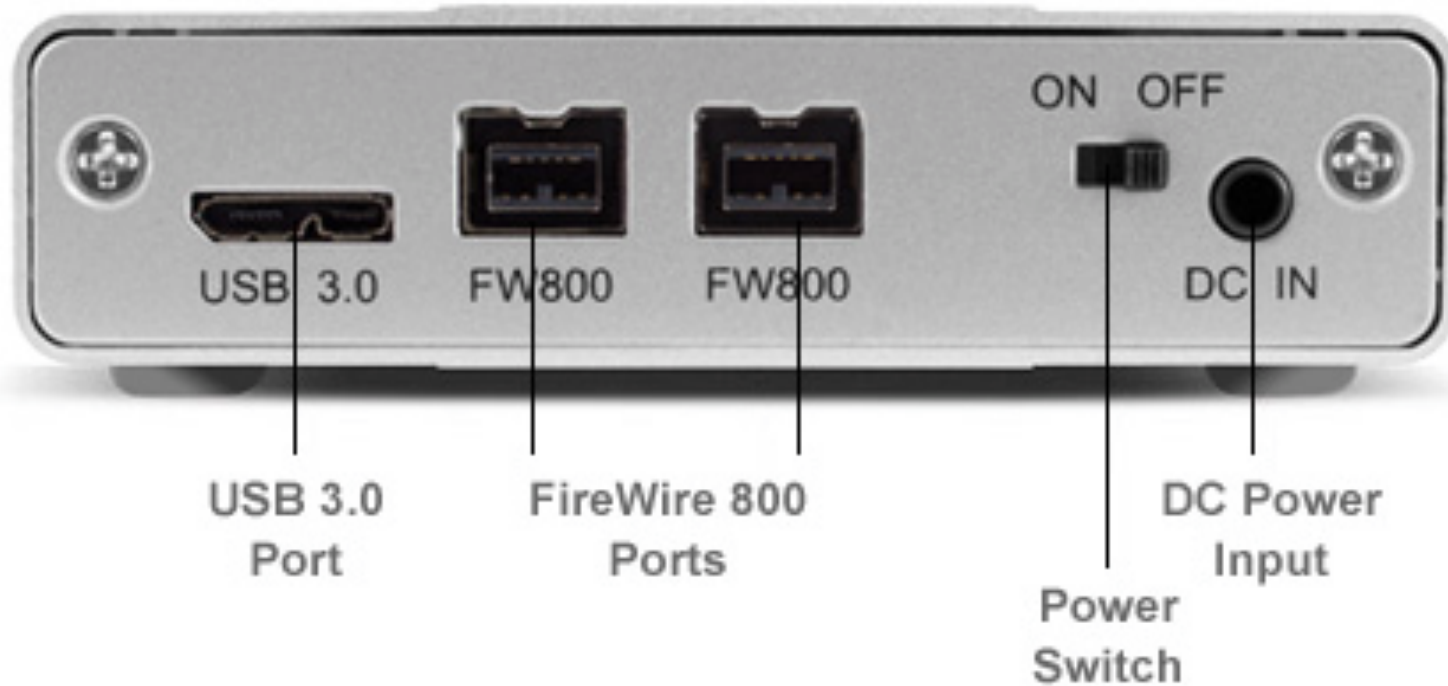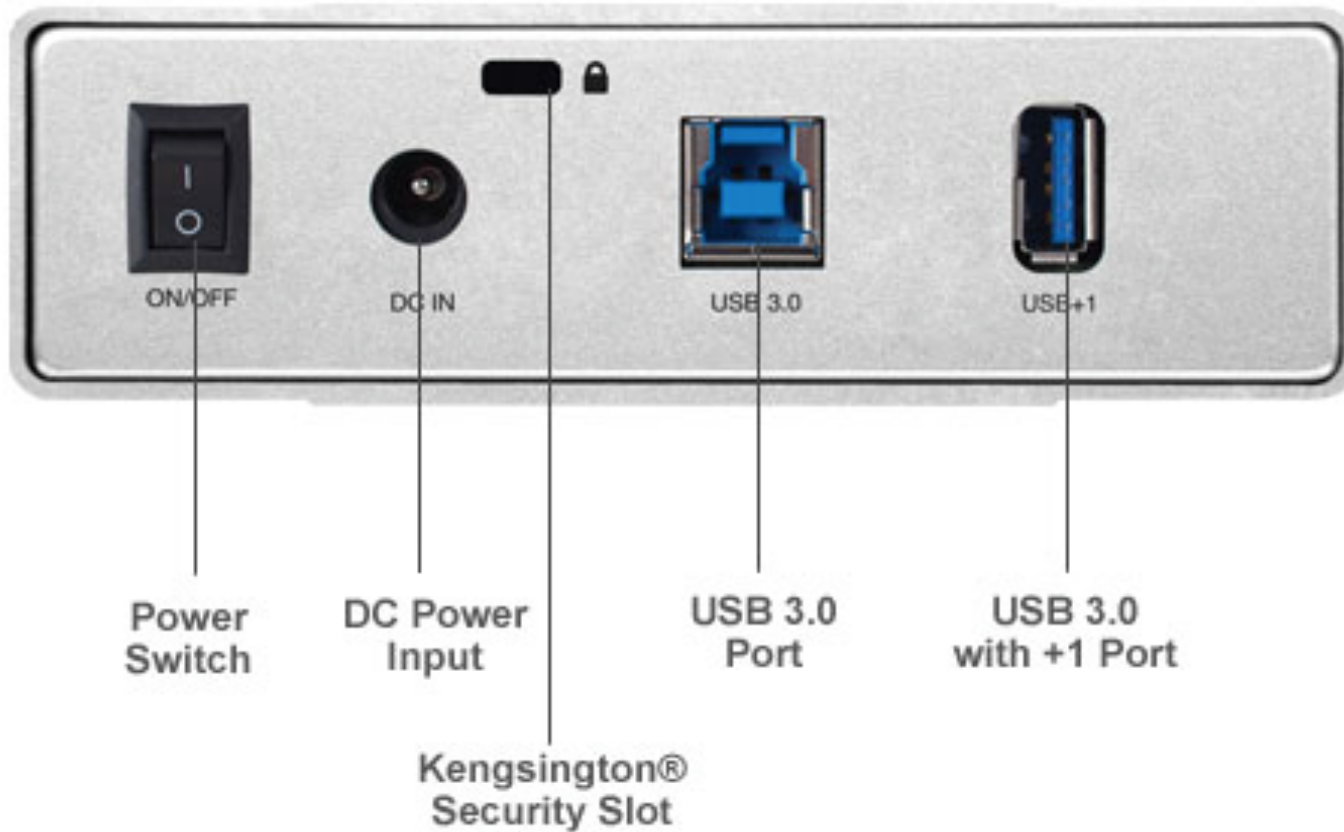USB 3.0 & 2.0 / FireWire 800

USB 3.0 Port

FireWire 800 Ports

Power Switch

DC Power Input
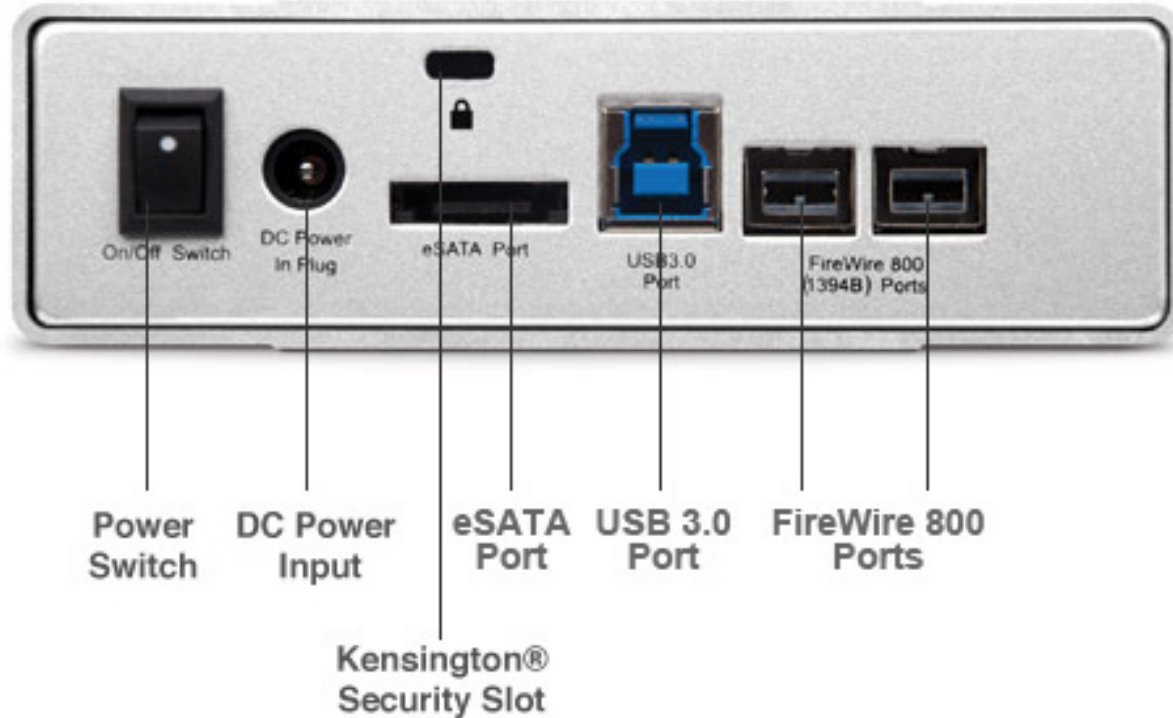
OWC Mobile Drive 4

USB 3.0 & 2.0 / eSATA 6G
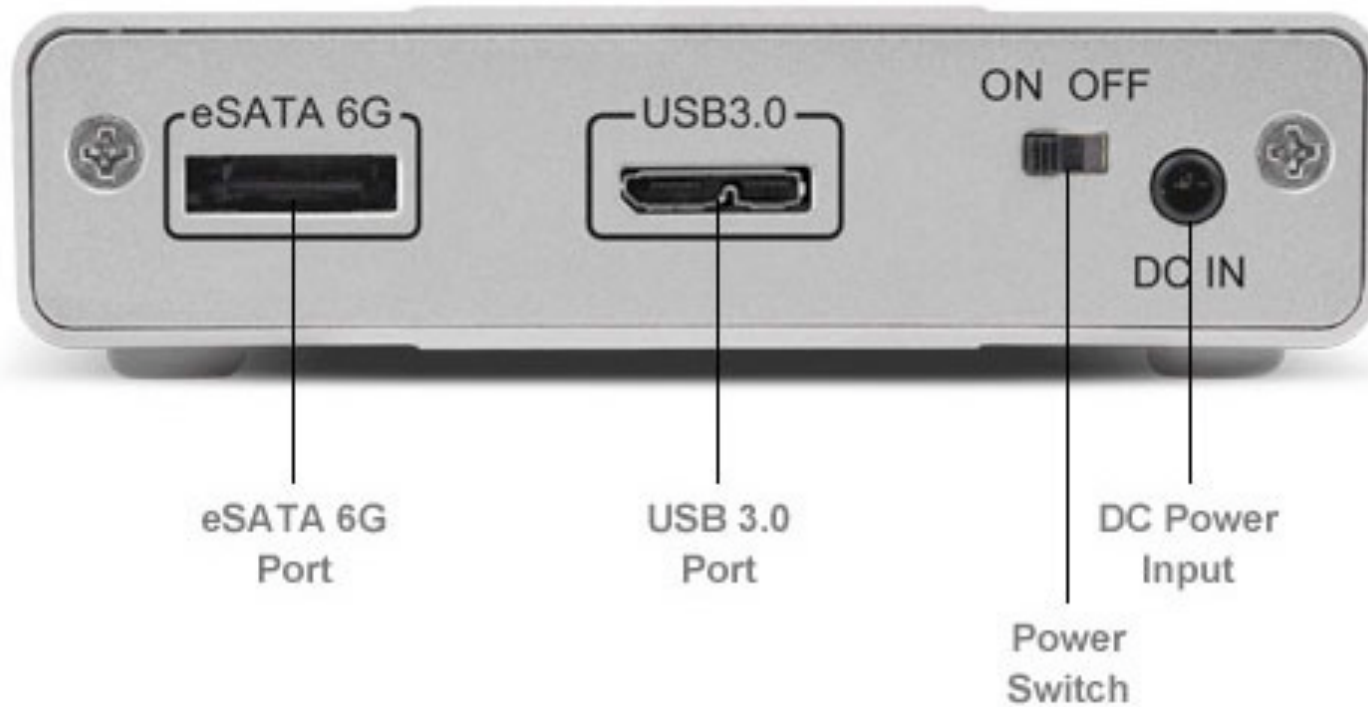
OWC Desktop Drive 1

OWC Desktop Drive 2

USB 3.0 & 2.0 / FireWire 800 / eSATA

On/Off Switch — DC Power In Plug — eSATA Port — USB3.0 Port — FireWire 800 (1394B) Ports

Power Switch — DC Power Input — eSATA Port — USB 3.0 Port — FireWire 800 Ports

Kensington® Security Slot
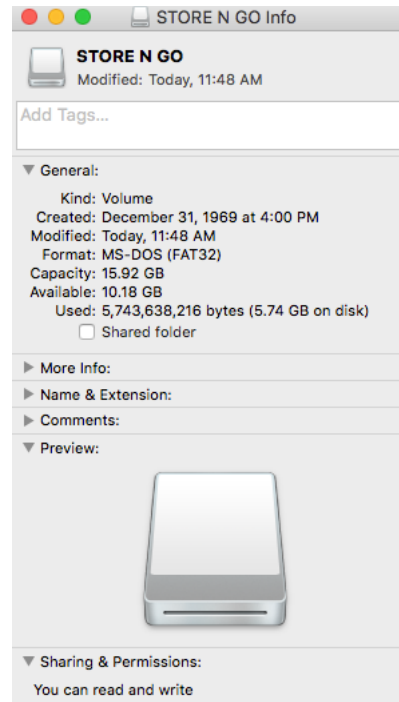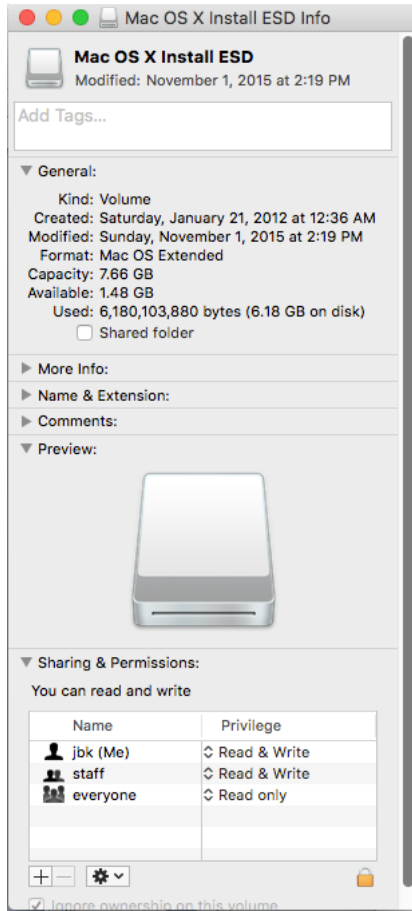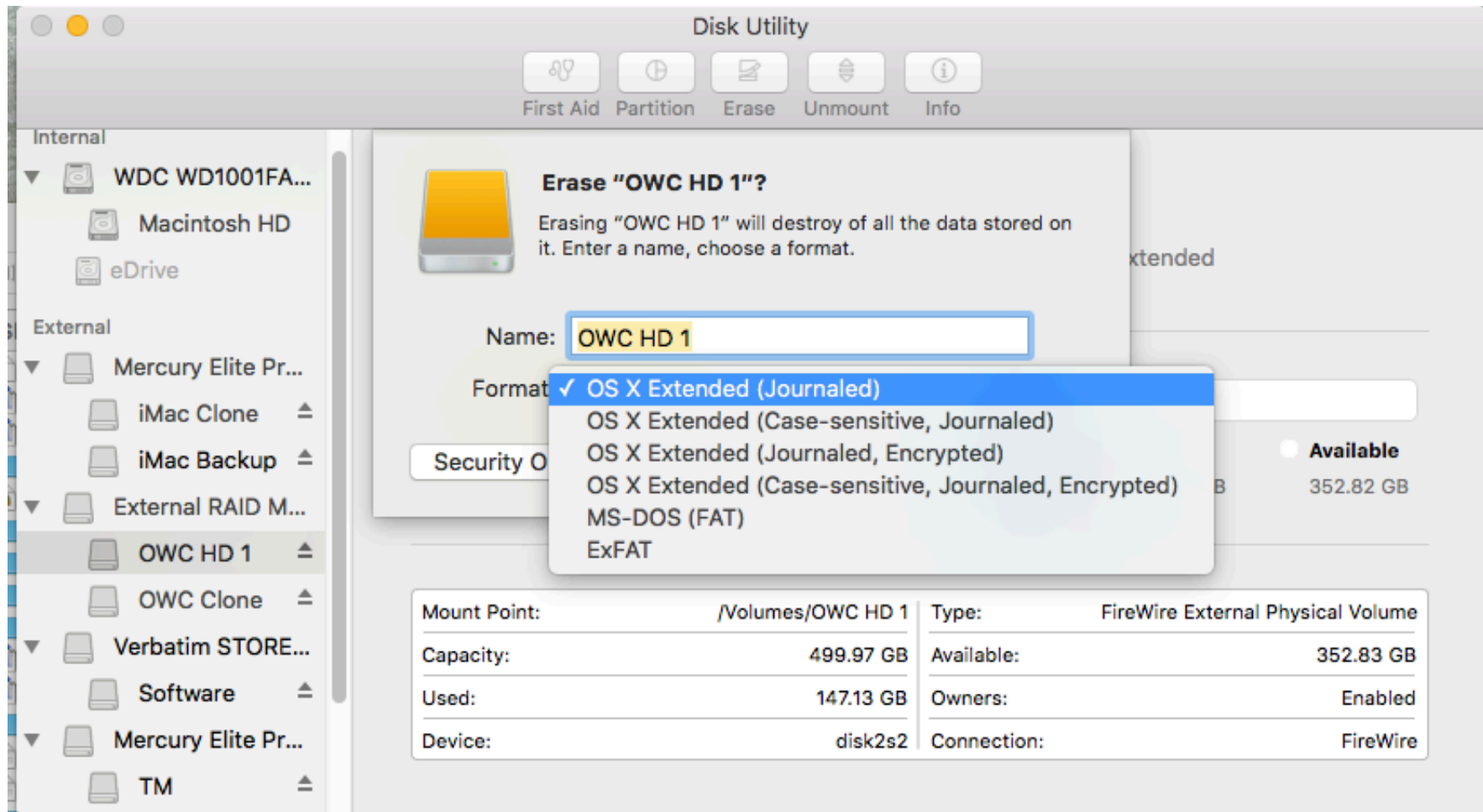
Hard Drive Formats

- Windows formats
  - ExFat
  - FAT32
  - NTFS
- Mac formats
  - Mac OS X Extended (Journaled)
- Cloning requires Mac OS X Extended
- Disk Utility can format and partition hard drives

What Format is My Drive?
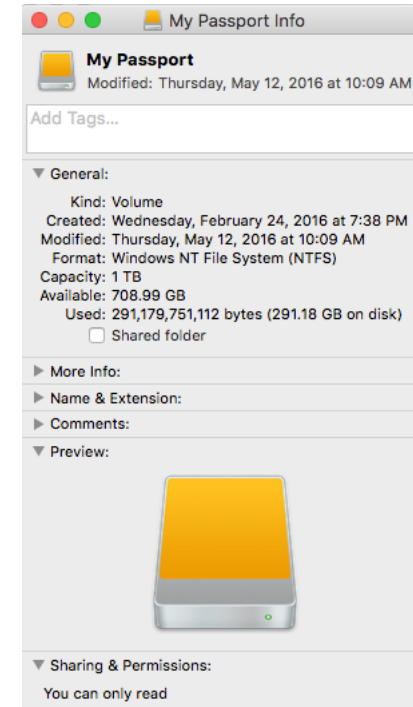
Disk Utility Formatting

Full vs. Incremental Backups

- Full backups copy everything
- Incremental backups only copy new and modified files
  - My daily iMac backups take about 2 – 15 minutes depending on how many files have changed (usually not many changes since I don't use the iMac as much as I do my MacBook)
  - My weekly MacBook Pro backups usually take about 15-20 minutes unless there has been a system upgrade, then it takes longer

Daily iMac Backups

Name	Start time	End time
Summary backup log for Tue, May 3, 2016	03-May-2016 00:00	03-May-2016 00:02
Summary backup log for Tue, May 3, 2016	03-May-2016 03:00	03-May-2016 03:01
Summary backup log for Wed, May 4, 2016	04-May-2016 00:00	04-May-2016 00:02
Summary backup log for Wed, May 4, 2016	04-May-2016 03:00	04-May-2016 03:01
Summary backup log for Thu, May 5, 2016	05-May-2016 00:00	05-May-2016 00:03
Summary backup log for Thu, May 5, 2016	05-May-2016 03:00	05-May-2016 03:06
Summary backup log for Fri, May 6, 2016	06-May-2016 00:00	06-May-2016 00:02
Summary backup log for Fri, May 6, 2016	06-May-2016 03:00	06-May-2016 03:02
Summary backup log for Sat, May 7, 2016	07-May-2016 00:00	07-May-2016 00:06
Summary backup log for Sat, May 7, 2016	07-May-2016 03:00	07-May-2016 03:17
Summary backup log for Sun, May 8, 2016	08-May-2016 00:00	08-May-2016 00:02

Weekly MacBook Backups

Name	Start time	End time
Summary backup log for Wed, Apr 27, 2016	27-Apr-2016 13:46	27-Apr-2016 14:03
Summary backup log for Wed, Apr 27, 2016	27-Apr-2016 14:13	27-Apr-2016 14:26
Summary backup log for Thu, May 5, 2016	05-May-2016 18:08	05-May-2016 18:21
Summary backup log for Thu, May 5, 2016	05-May-2016 18:30	05-May-2016 18:42
Summary backup log for Wed, May 11, 2016	11-May-2016 12:46	11-May-2016 13:17
Summary backup log for Wed, May 11, 2016	11-May-2016 13:18	11-May-2016 13:40
Summary backup log for Wed, May 18, 2016	18-May-2016 09:32	18-May-2016 09:56
Summary backup log for Wed, May 18, 2016	18-May-2016 10:08	18-May-2016 10:48
Summary backup log for Wed, May 25, 2016	25-May-2016 13:02	25-May-2016 13:39
Summary backup log for Wed, May 25, 2016	25-May-2016 13:39	25-May-2016 14:03
Summary backup log for Wed, Jun 1, 2016	01-Jun-2016 10:09	01-Jun-2016 10:24

What to Back Up

- My MacBook Pro has a 750 GB hard drive, but only about 183 GB are used

- Hard Drive contents
  - Applications Folder   ~24 GB
  - Library Folder   ~19 GB
  - System Folder   ~9 GB
  - Users Folder   ~114 GB

User Data

- Multiple User Folders in my MacBook
  - JBK   114 GB
    - Contains multiple folders — Applications, Desktop (5 GB), Documents (7 GB), Downloads, Dropbox, Library (14 GB), Movies, Music (30 GB), Pictures (53 GB), Public, Sites, Software (25 GB)
  - Shared   30 MB
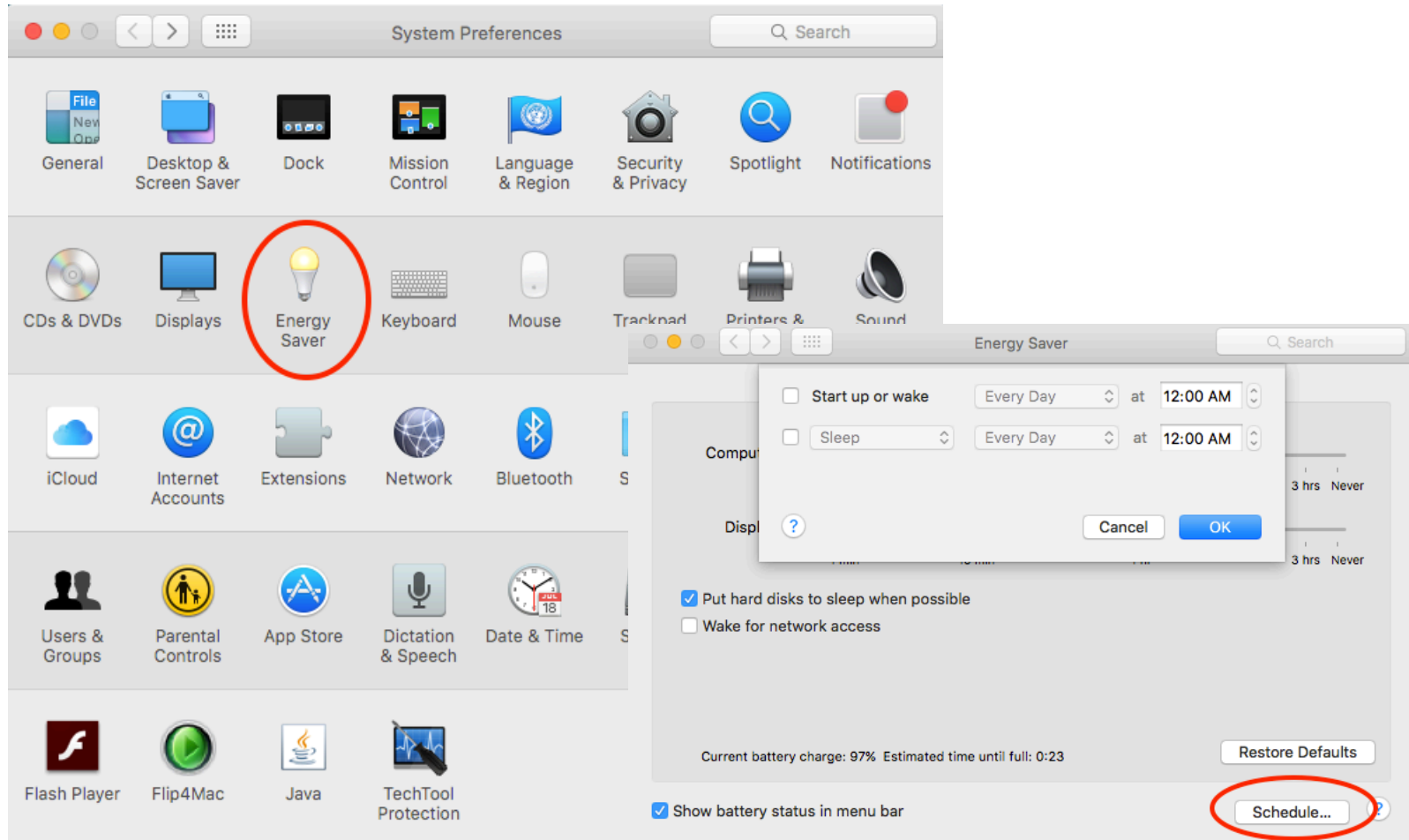 - Testing   3 GB

Carbon Copy Cloner

- Clone backups
  - Full backup copies all files
  - Smart backup only copies new/changed files
- User file backups
  - Full backup copies all files
  - Smart backup only copies new/changed files
- Scheduled backups
  - Specify days, times, or events to run
  - CCC can schedule a wake or power on event to activate the computer
  - No one needs to be logged in
  - Will not work if FileVault is used and power on is needed

SuperDuper!

- Clone backups
  - Full backup copies all files
  - Smart backup only copies new/changed files
- User file backups
  - Full backup copies all files
  - Smart backup only copies new/changed files
- Scheduled backups
  - Specify days, times to run
  - Must schedule computer to be awake for backup and user to be logged in and active and screen unlocked

Scheduling Wake Up
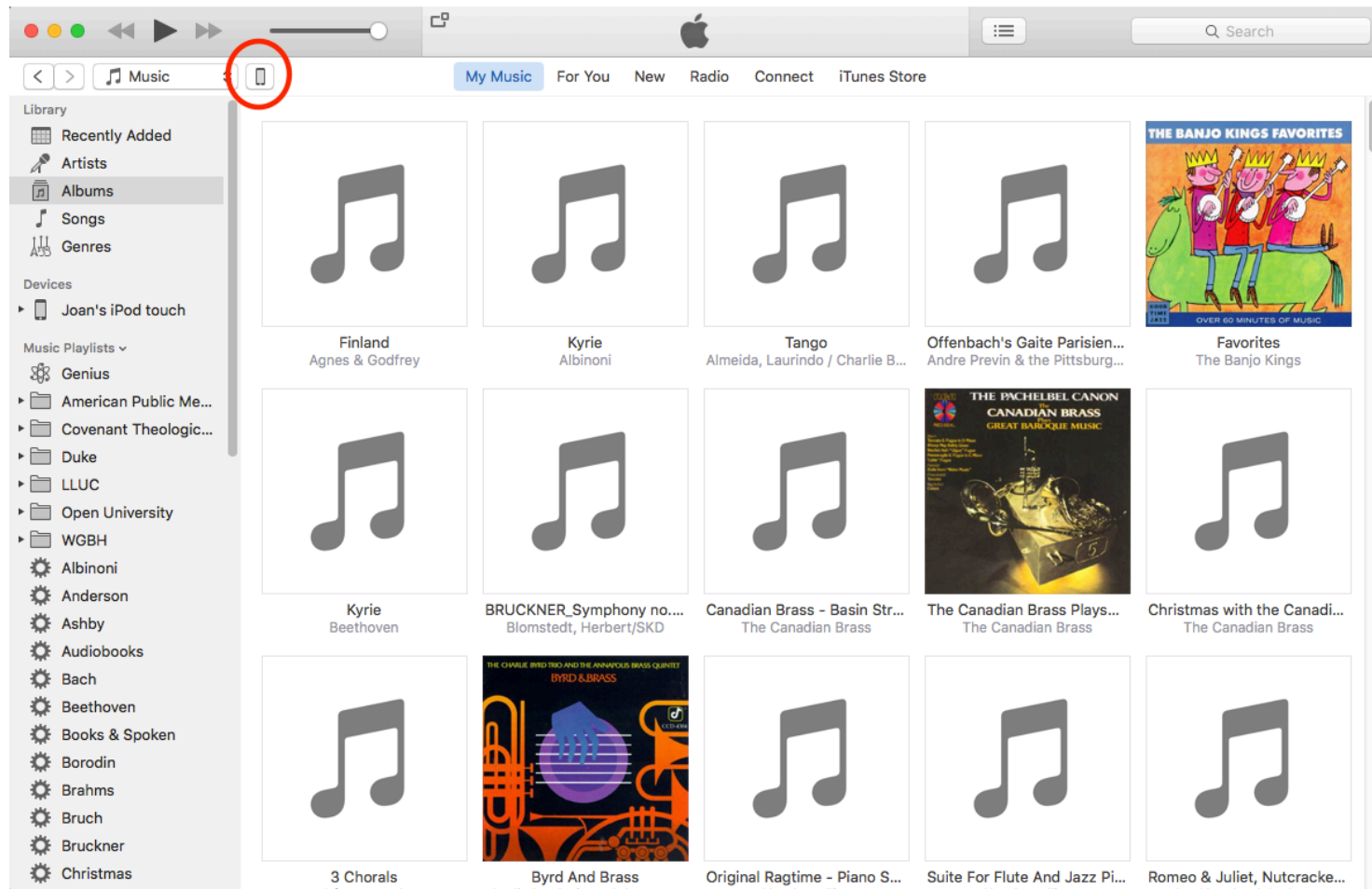
Prosoft Data Backup

- Clone backups
  - Full backup copies all files
  - Incremental backup only copies new/changed files
- User file backups
  - Full backup copies all files
  - Incremental backup only copies new/changed files
  - Versioned backup keeps old versions of files
  - Can backup to CDs/DVDs
  - Can synchronize files on different computers
- Scheduled backups
  - Specify days, times to run
  - Specify backup to run when disk appears (good for flash drive backups of certain folders or for laptop that is only connected to the backup drives when you want to do a backup)
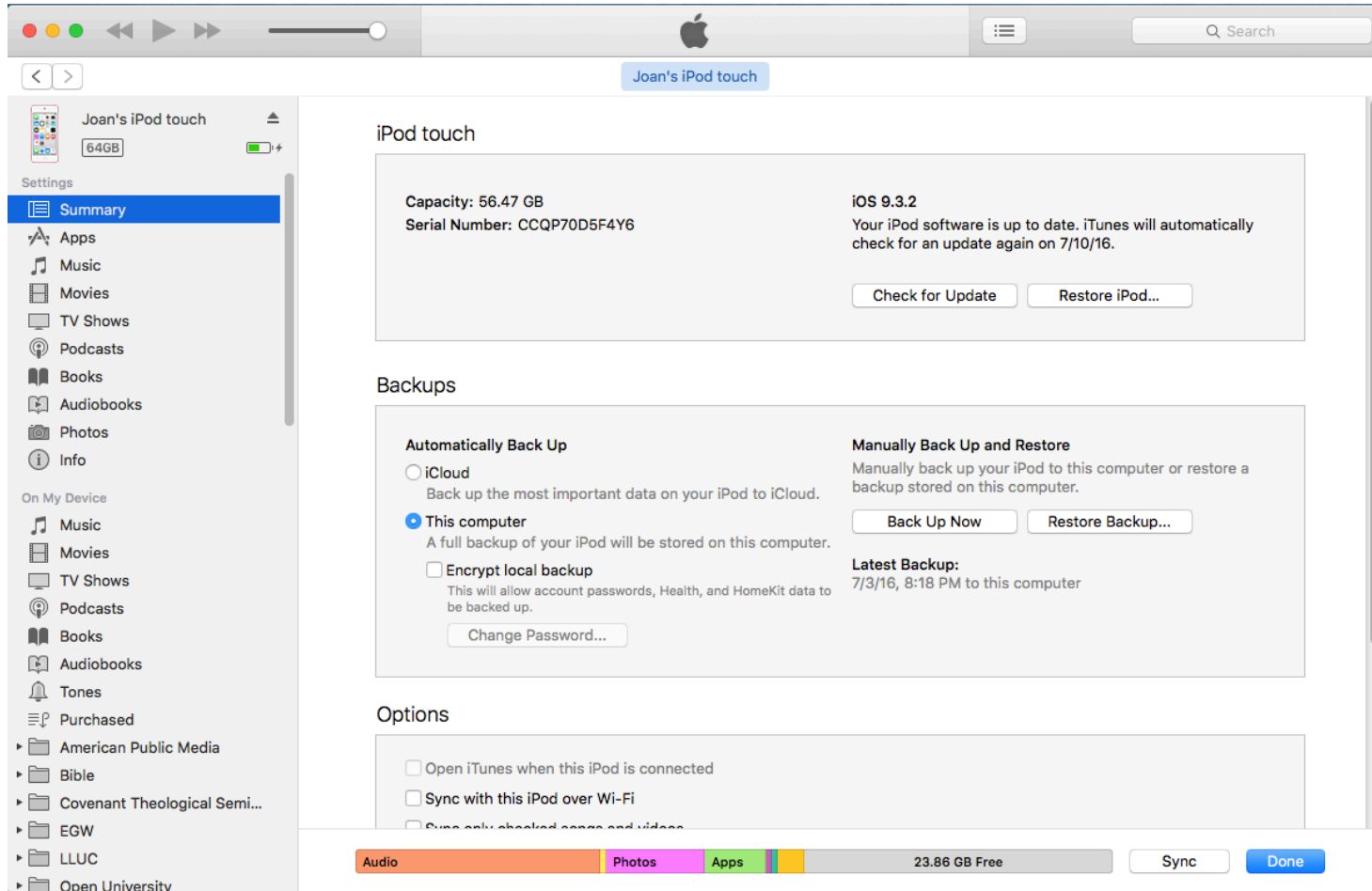
Backing up Your Mac Guide

- 208 pages
  - Ebook for $9.99,
  - Paperback for $14.99
- https://joeontech.net/
- Learn about
  - Offsite backups
  - Cloud backups
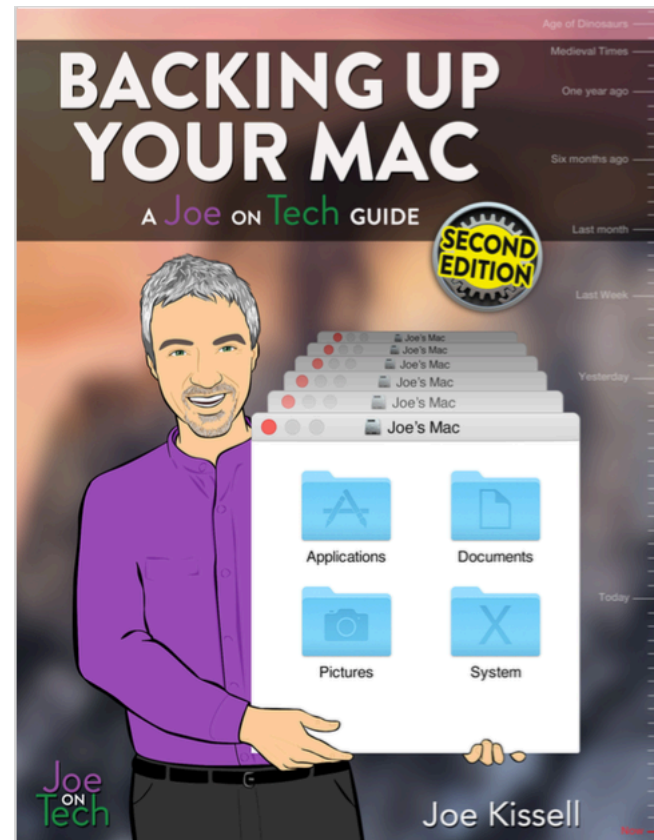
Backing Up Your iPhone, iPad, iPod

iTunes Backup Options

Demo

- Rebooting from Clone Backup

- Disk Utility

- Carbon Copy Cloner

- SuperDuper!

- Prosoft Data Backup