LinuxPPC Installation Manual for MIT

By Brian Fisher, panda@mit.edu

The purpose of this manual is to allow Mac users here at MIT to run LinuxPPC so they can do work that would otherwise necessitate the purchase of a PC to run Linux or Windows. For example, many Computer Science courses require the use of a programming language called Scheme. MIT does not have a compatible version of Scheme for the Mac, but Scheme can easily be compiled for LinuxPPC. Furthermore, Unix based systems (including LinuxPPC) form the basis of MIT's computing environment. With Unix, people can use other machines to run software, but have the user interface of the software display on their own machine. Thus, even if some software cannot be compiled for LinuxPPC, the Mac will still be useful as a display, reducing the need to use often overcrowded computing clusters.

LinuxPPC requires you have at least a 1 gigabyte hard drive, 32 megabytes of RAM, and one of the following Macs:

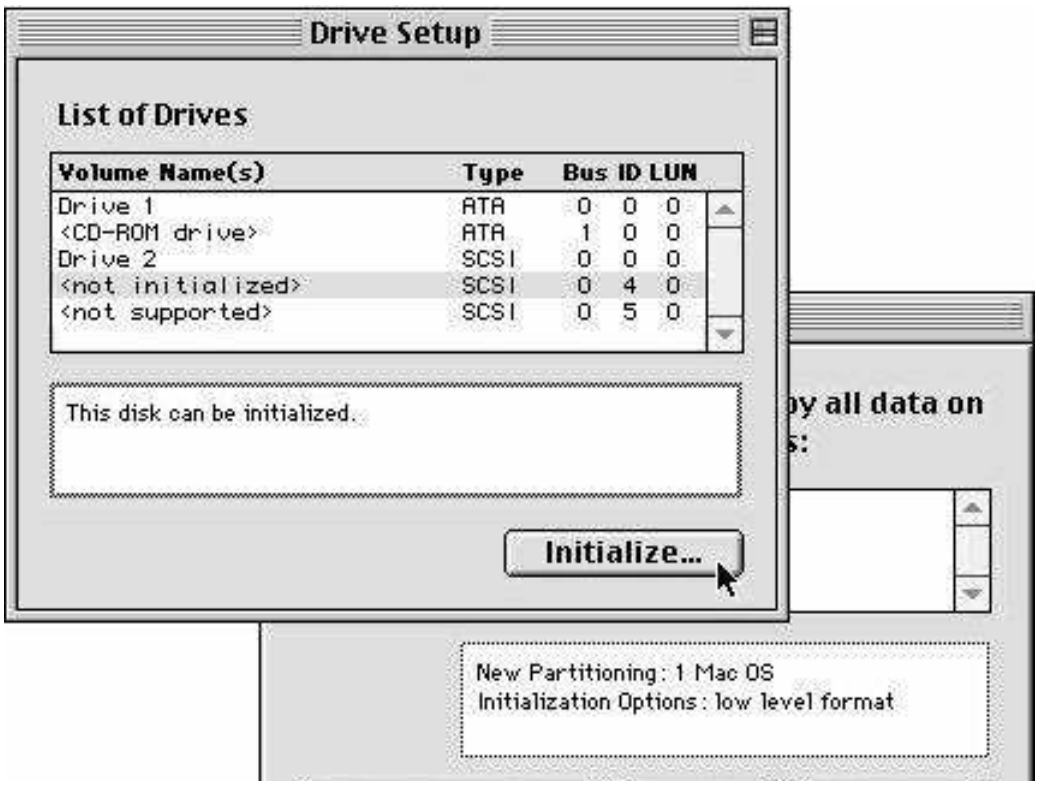
PowerMac	4400, 5400, 5500, 6400, 6500, 7200, 7300, 7500, 7600, 8200, 8500, 8600, 9500, 9600, G3
PowerBook	2400, 3400, G3
Other	iMac, iBook, G3, G4, Twentieth Anniversary Mac
Mac clones	clones based on the aforementioned models

Installation Preperation

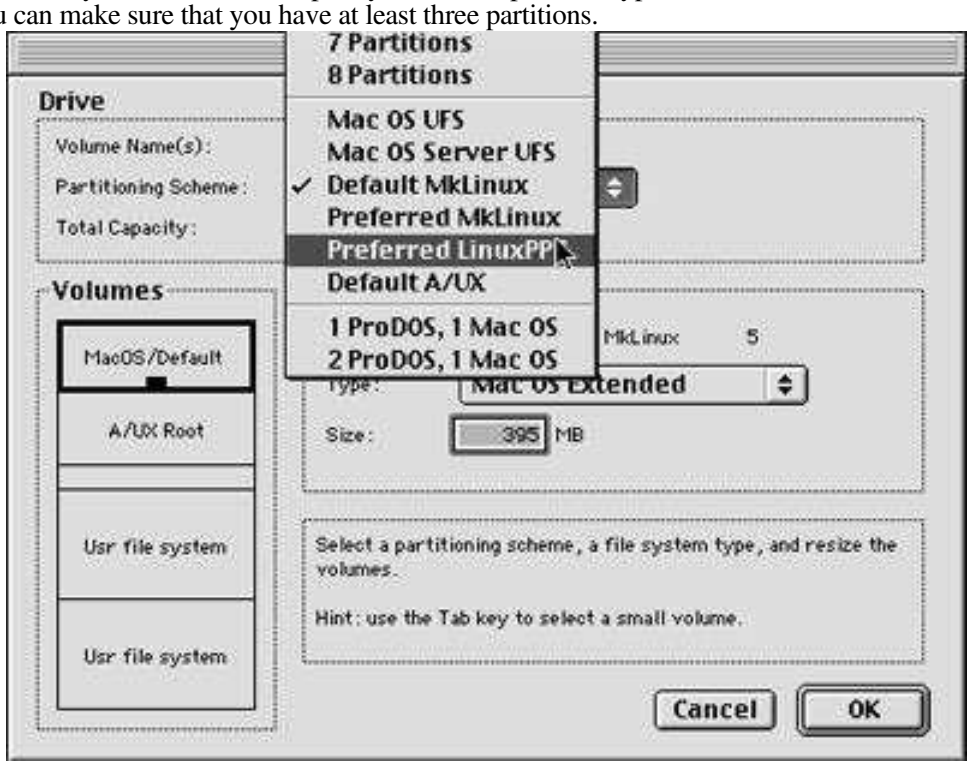
Before installation, you should back up your Macintosh to another storage medium, such as CD-R, Jaz, or Zip disks. The installation process will require you to reformat your drive, so anything important will be lost unless it is backed up. Once you have done this, you should boot from a Mac OS Installation CD. If you do not have one of these, you can get one from the MIT Computing Connection (x3-7686), the Computing Helpdesk (x3-1101), or by purchasing a copy from a retailer. Make a note of what version of the Mac OS is contained on the CD.

You can boot from the Mac OS Installation CD by holding down the 'C' key as the computer starts up. After the Mac starts up:

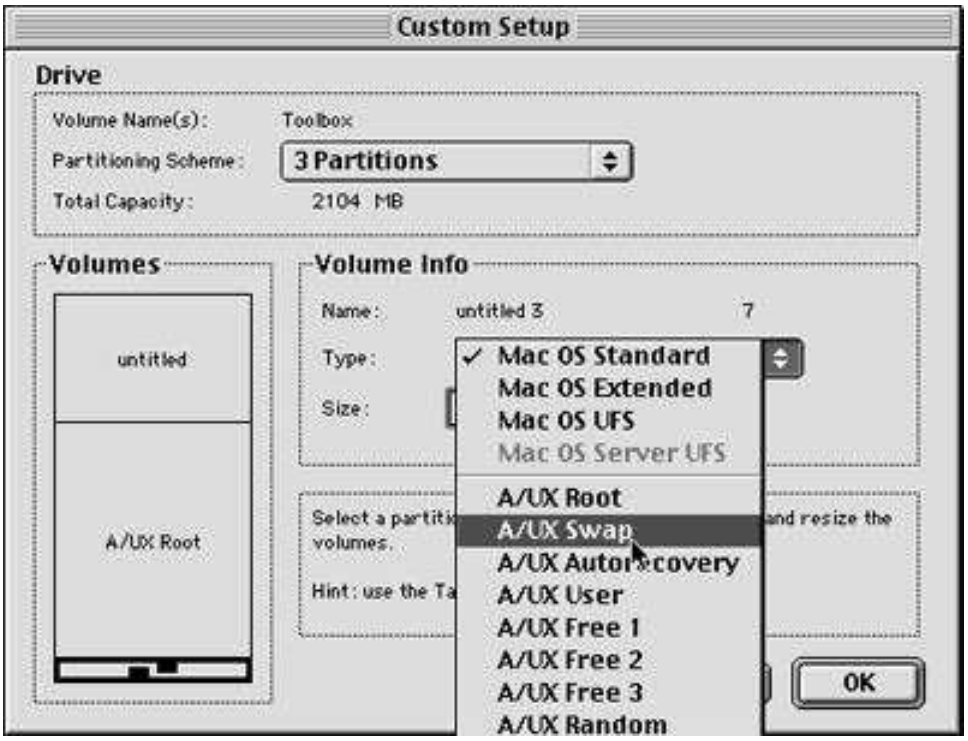
- **1**. Locate and open Drive Setup in the Utilities folder. A window will open which shows a list of disks connected to the Mac.
- **2**. Click on the row which contains the names of your hard drives.
- **3**. Then click on the "Initialize..." button as shown in the figure.
- **4**. Click on the "Custom Setup..." button in the dialog box that appears. Make sure you have at least two partitions, one for the Mac OS, and the other for LinuxPPC.



If you happen to be using a Mac OS 9 installation CD, you will be able to specify what each partition type is. You can select "LinuxPPC Preferred" from the top menu, or you can make sure that you have at least three partitions.



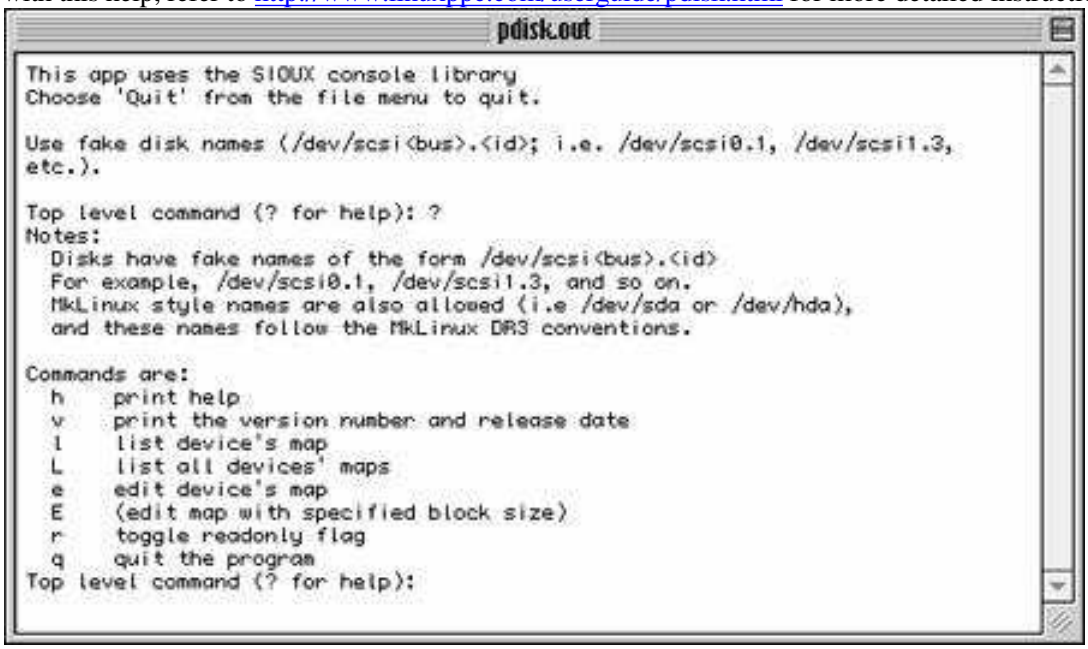
- **1**. One of these partitions should be no larger than 128 megabytes. This partition is known as the "swap" partition. Choose A/UX Swap as the partition type for this partition.
- **2**.Another partition of at least 850 megabytes should be a root partition. The type of this partition will be A/UX Root.
- **3**. At least one of the remaining partitions should either be a Mac OS Standard or Mac OS Extended partition and greater than 200 MB in size.



After completing this partitioning process, you may close Drive Setup. If you are using Mac OS 8.1 through 8.6 on the Mac OS partition (so that you can continue using the Mac programs you love), click on that icon on the desktop, then select

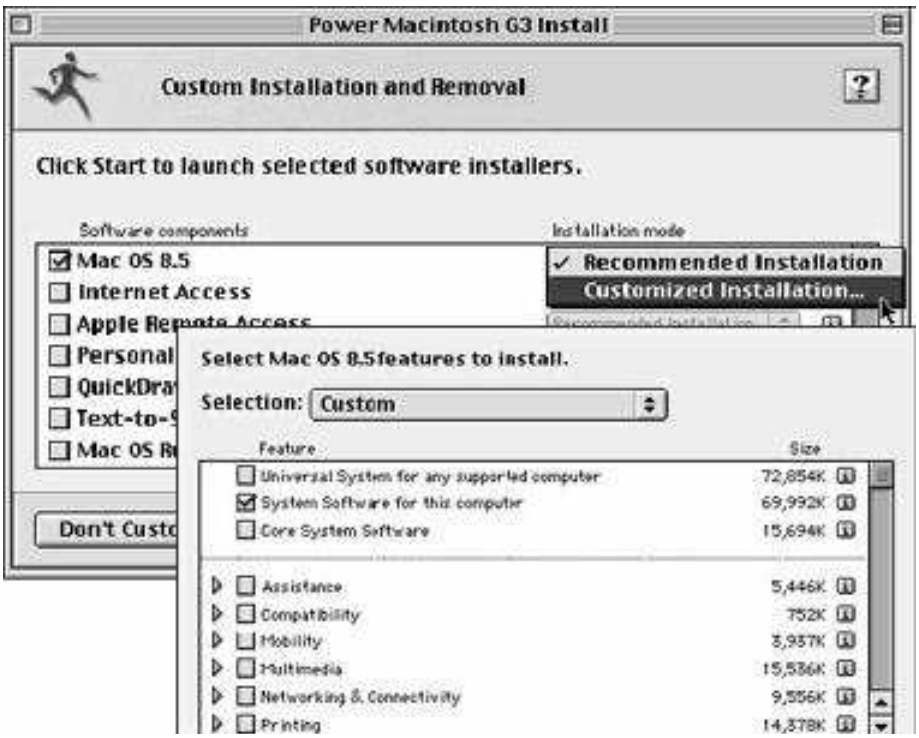
the “Erase Disk...” command from the Special menu. Name the disk what you want, but specify the format as “Mac OS Extended”.

If you do not have a Mac OS 9 CD handy, then you will need to use a program called pdisk to partition your hard disk. You can download this program from ftp://rufus.w3.org/linux/linuxPPC/linuxppc-pre-R5/install/MacOS.utils/pdisk.sit Built in help guides you here. Pdisk’s text based interface does not behave like most Macintosh applications, so if you are uncomfortable with this help, refer to http://www.linuxppc.com/userguide/pdisk.html for more detailed instructions.



Reinstalling Mac OS

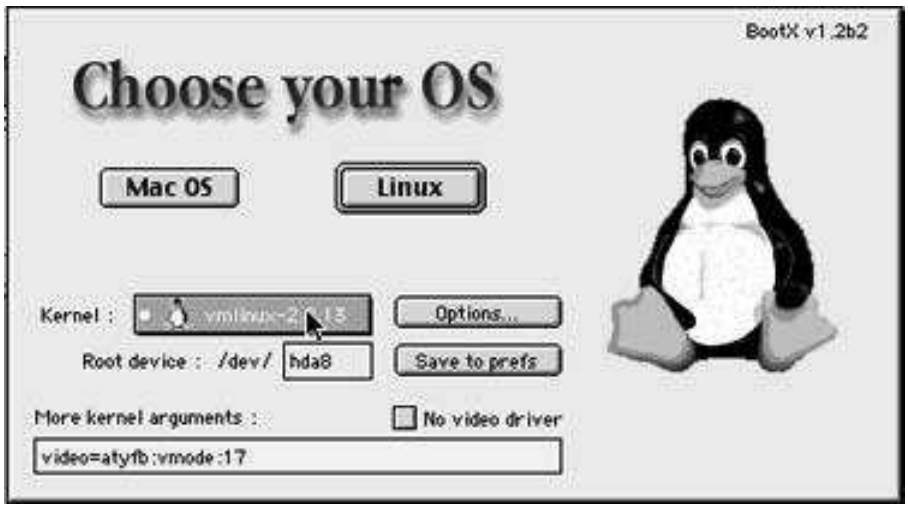
- **1**. Double click the Mac OS Install icon on the CD you started up off of.
- **2**.Following the licensing agreements, choose the partition you wish to reinstall Mac OS onto.
- **3**.Click on the customize button. Deselect all the items but the Mac OS option. Select “Customized Installation...” and choose only the System Software for your computer.
- **4**.Let the installation process finish, then restart the Mac without holding down the C key.
- **5**.Restore all of the files you backed up earlier.



Preparing to install LinuxPPC

Several alternatives exist for installing LinuxPPC. You can install the software by downloading files from the internet onto your hard drive, by using a CD with the LinuxPPC installer on it, or by doing an FTP install. This paper will concentrate on doing an FTP install. If you wish to get information about other installation options, go to http://www.linuxppc.com/userguide/

- **1**. BootX, a piece of software that allows you to choose to boot Mac OS or LinuxPPC needs to be installed. This software can be downloaded from http://calvaweb.calvacom.fr/bh40/
- **2**.If your Mac does not automatically expand the files in the archive you downloaded, use Stuffit Expander to expand them.
- **3**.Move the file "* BootX Extension" to the Extensions Folder within the System Folder on the Mac and move "BootX App" to the Control Panels folder within the System Folder.
- **4**.Download the kernel appropriate for your Macintosh from: ftp://rufus.w3.org/linux/linuxPPC/linuxppc-1999/kernels/ and drag it into the Linux Kernels folder within the System Folder. The name of the file should contain "vmlinux". Do not attempt to expand the file.
- **5**.Download the ramdisk from ftp://rufus.w3.org/linux/linuxPPC/linuxppc-1999/install/ramdisk.image.gz The file called ramdisk.image.gz also belongs inside the System Folder.
- **6**.From the Apple menu, select Control Panels and select TCP/IP. Copy down the settings here, as you will need them later on in the installation process.
- **7**.In the same menu that you found TCP/IP, there is also an item named BootX App. See the figure for proper configuration:



- **8**. Click the "Options.." button and make sure the "Use RAM Disk" option is selected. Many Macs require "No Video Driver" to be selected for the installer to work properly. You can experiment with this, or check it off. "No Video Driver" forces Linux to use the Mac OS video driver rather than the native linux one. Click on the "Linux" button. This will start the Linux installer.

Using the FTP Linux Installer

Unlike what you are probably accustomed to, the installer requires the use of the keyboard and not the mouse. If there are problems, you should write down what is shown on the computer display after pressing Command (the Apple key) along with each of the following keys: F1, F2, F3, F4, and F5.

During the installation process, use the arrow or tab keys to highlight options and the space bar to select them. Hitting the return key will press buttons. This process will be similar to that of installing Red Hat Linux on the PC. The first item you might wonder about is what kind of keyboard you have. If you have an iBook, iMac, Blue and White G3, or G4, then you have a USB keyboard. Otherwise you have an ADB keyboard.

A box will come along asking what the installation method is. Select FTP and hit Ok. Another box will follow asking where to download the files from. For MIT, you will want to use the FTP server rufus.w3.org and the installer will get the files from the linux/linuxPPC/linuxppc-1999/RedHat/ directory. When the installer gets to the Disk Setup screen, select "fdisk". Select the disk to be partitioned at the appropriate time. Make sure you select the correct disk, or else you will be restoring files from backup again.

Since you already partitioned the drive, you will only need to specify the mount point of each partition. The A/UX root partition has the mount point "/". If you selected the "LinuxPPC Preferred" option earlier, specify the mount point for that partition as "/home". The mount point for the A/UX Swap partition should be automatically recognized as "swap" by fdisk. Note that although Drive Setup earlier only showed the partitions created by you, there are actually other partitions which tell the Mac how to access the disk. The first partition from before will actually be the fifth partition here. The second from before will be the sixth partition, and so on. Make sure you do not make changes that affect the partitions other than the one you intended linux to be installed on.

Once you are done with fdisk, the LinuxPPC installer will ask you if you would like to format the partitions you created for linux. Unless you have a reason otherwise, format and check for bad blocks each partition related to Linux.

After this, install the items you would like to have on the System, and follow instructions in the installer to set up a root password. Once you reboot, you should have a functional LinuxPPC system!

Installing MIT specific software

Now that you have a basic system up and running, you will probably want to install programs. Like Red Hat Linux on the PC, the programs are packaged on the internet in the Red Hat Package Manager format. A great place to start is www.linuxppc.org to find out which new packages have been released. Another place you will want to go is http://web.mit.edu/mklinux/packages/ because there are packages which will give your LinuxPPC machine Athena-like features. You can install the packages by using a program called GnoRPM. This is located in the Gnome menu (the foot at the bottom of the screen)->System->GnoRPM. In the picture below, the foot is on the lower left side of the screen:

To install the packages you downloaded:

- **1**.Click on install.
- **2**.In the Window that comes up, click add.
- **3**.In the window that comes up, select all of the files you wish to install.
- **4**.Click install.

There are packages available at the http://web.mit.edu/mklinux/packages/ which will add some Athena like functionality to your system. If you wish to have an actual Athena machine, then you can try using a pre-release version of Athena 8.3 packages for LinuxPPC available at http://web.mit.edu/mklinux/packages/LinuxPPC-1999-Athena-8.3/ Unfortunately, these packages will only work if you are using the 2.2.6-15 kernel that comes with the LinuxPPC-1999 CD. If you are using a different kernel, you may want to become comfortable with using Linux and compiling programs before you do the following:

- **1**.Obtain the sources for Arla, the software that provides AFS compatibility, at ftp://ftp.stacken.kth.se/pub/arla/arla-0.25.tar.gz
- **2**.Compile the xfs kernel module for linux and install it in /usr/athena/bin in place of the current xfs.o module.
- **3**.Install the non-Arla rpms from the LinuxPPC-1999-Athena-8.3 directory.

If you have questions about this process, send an email to the linuxppc-help@mit.edu mailing list or contact SIPB on the 5th floor of the Student Center (W20).

Helpful Mac Utilities

Apple HD SC Setup formats SCSI drives if you are using System 7.5 or earlier (Drive Setup would be a better choice, is included with Mac OS 7.6 and higher Cds)	http://asu.info.apple.com/swupdates.nsf/artnum/n10071
ATI Rage 128 drivers for Linux (needed for accelerated video on the Blue and White G3, G4, and iMac DV)	ftp://devel.linuxppc.org/users/atong/aty128/
MountX mounts Linux partitions on the desktop. Extremely useful if a problem prevents you from logging into linux as root.	http://calvaweb.calvacom.fr/bh40/
pdisk for partitioning disks with Linux partitions if Mac OS is earlier than Mac OS 9.0	ftp://rufus.w3.org/linux/linuxPPC/linuxppc-pre-R5/install/Mac OS.utils/pdisk.sit
Stuffit Expander A Mac OS utility very useful for other things. It can expand many formats, including .tar, .sit, and .zip This can corrupt .gz files, so do not expand .gz files with this	http://www.aladdinsys.com/expander/expander_mac.html

Useful Linux Information Links

Slashdot: Linux news and discussion	http://www.slashdot.org
iMacLinux.net: similar to Slashdot, but specific to the iMac	http://www.imaclinux.net
Yellow Dog Linux:a more feature rich version of LinuxPPC. If there are problems installing LinuxPPC-1999 onto your Mac, try installing it instead.	http://www.yellowdoglinux.com
LinuxPPC.org: The site for LinuxPPC development and help	http://www.linuxppc.org

Sources of information for this document included the websites listed, personal experience, and emails on the linuxppc-help@mit.edu mail list. Comments or questions about this document should be directed to panda@mit.edu.