

# UNIX System V Release 4

## Amiga Version 2.1

### Addendum

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This addendum supplements the documentation provided with **Amiga UNIX** Version 2.1. It describes the new features in Version 2.1, known problems, and specific configuration issues relating to AmigaDOS and the A2410 TIGA graphics adapter.

The addendum contains:

#### Hardware Requirements

- Pages 2-6                    **Hardware Requirements**  
What does an Amiga need in order to run UNIX?

#### Release notes

- Pages 7-22                **Release Notes**  
changes in this version  
known problems  
special notes about this version

#### Notes about AmigaDOS

- Pages 23-24              **AmigaDOS**  
notes about using AmigaDOS

#### Upgrading from a previous version

If you are upgrading from a previous version, be sure to backup any data you want to save. All files on your hard disk root partition will be erased when you load the installation tape. Backup your personal files, boot your system with the install floppy in the drive, and follow the directions in *Installing Amiga UNIX*. Be careful when you restore your backup files; you do not want to replace any new system files.

# Amiga UNIX

## Hardware Requirements

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### Processor (CPU/MMU/FPU)

**Amiga UNIX** Version 2.1 is available as a software-only upgrade for existing Amiga systems. An Amiga computer must meet certain hardware requirements in order to run UNIX.

All A3000 series computers include a processor appropriate for running UNIX. A2000 series computers must have an appropriate processor card. UNIX requires a 68020 processor with a 68851 Memory Management Unit, or a 68030 processor. A 68881 or 68882 Math Coprocessor is also required. The A2620 and A2630 processor accelerator boards meet these requirements.

### Main Memory (Fast RAM)

UNIX requires at least 4 Megabytes of main memory. Additional memory will increase performance. The Amiga Chip RAM **does not** count as main memory.

This version of **Amiga UNIX** can only access one contiguous area of memory, so it is possible that some combinations of memory cards will result in some memory being unused.

### Hard disk

A minimal **Amiga UNIX** installation requires about 50 megabytes of hard disk space. The standard installation fills a 100 megabyte hard disk.

### SCSI interface

**Amiga UNIX** requires a SCSI interface to the hard disk. The interface must conform to the Amiga AU-TOCONFIG and RigidDiskBlock standards. **Amiga UNIX** includes device drivers for the following SCSI interfaces:

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## **Kickstart/Boot ROM**

## **A2620/A2630 ROMs**

A2090 card,  
A2091 card,  
A3000 built in SCSI interface.

To install UNIX using some other type of SCSI interface or on a non-SCSI disk drive will require special device drivers which are not provided.

The A2090 card does not use the RigidDiskBlock standard and can not boot UNIX in the normal way. See the description of the "*Old Boot Method*" on the next page.

UNIX and AmigaDOS can not share a single hard disk on an A2090 card.

To boot UNIX, the Amiga must have the current version of the Amiga Kickstart ROMs or A3000 boot ROMs. Kickstart 2.04 (37.175) or later is recommended.

If it is impossible to update the Kickstart ROM in an A2000 series computer, the "*Old Boot Method*" can be used with some machine configurations (see the next page).

A2000 series computers that are using an A2620 or A2630 processor accelerator card must have a current version of the ROMs on that card. The older versions of these ROMs interfere with the new Boot Menu and partition boot priority facilities of the Kickstart ROM.

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## Cartridge tape drive

**Amiga UNIX** is distributed on a QIC-150 format tape cartridge. Device drivers are included which access the A3070 tape drive. There is no standard software interface to SCSI tape drives, so only certain types can be used with **Amiga UNIX**. The Caliper, Sankyo, and Wangtek brands of SCSI QIC-150 tape drives are known to work. The tape drive must be set to SCSI address 4.

You only need a tape drive when installing UNIX from tape, or when using tape for backups or file transfer.

# Old Boot Method

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## Which systems need the old boot method

Since some A2000 owners are not able to update their ROMs, **Amiga UNIX** Version 2.1 provides an alternative boot method. However, if this method is used, some features (such as the two-mouse-button "Boot Menu") will not work as described in the documentation.

The old boot method only works on an A2000 with an A2620 or A2630 processor accelerator card, and an A2090 or A2091 SCSI interface. In this case, these are the configurations with which the old boot method can (and will) be used:

- An old A2090 card is used for booting UNIX
- or -
- The Kickstart ROMs have not been updated to AmigaDOS 2.0 or later.

## How to use the old boot method

To install UNIX using the old boot method, follow these steps:

- Make sure that the A2620 or A2630's J304 jumper is set in the "UNIX" position.
- Make sure that the SCSI disk to be installed is configured for SCSI address 0 (zero).
- Access the A2620 or A2630 boot menu by resetting the Amiga with only the right mouse button pressed or with both mouse buttons pressed, depending on the version of the A2620 or A2630 boot

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## Update your ROMs

ROMs. You should see choices like "68000" and "68020" or "68030".

- Insert the UNIX boot floppy, ("Install floppy 1").
- Select the "68020" or "68030" option with the mouse. **DO NOT** select the "Amix" or "Unix" option, if there is one. The system should then access the floppy disk for about a minute and begin the installation procedure.
- Install the system normally.

When your system is set up for the old boot method, the Kickstart "boot menu" can not be used to choose between UNIX and AmigaDOS. To boot AmigaDOS, you must access the A2620 or A2630 boot menu and select "68020" or "68030". To boot UNIX, just turn on the machine.

When possible, update your Kickstart ROMs and A2620/A2630 ROMs as described in the previous section. Then reinstall AmigaDOS and UNIX to insure you are using the full capabilities of your Amiga system.

# Amiga UNIX

## Version 2.1 release notes

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### Major changes

Version 2.1 is a major upgrade to the **Amiga UNIX** product. It incorporates updated software from AT&T / Unix Systems Laboratories, new Amiga-specific features, bug fixes, usability improvements, and performance enhancements. New user manuals describe unique aspects of **Amiga UNIX**, and provide entry-level explanations of essential System V Release 4 operations.

Version 2.1 includes the following changes from version 1.1:

### TIGA Color X

Full support for the Commodore A2410 TIGA graphics board is implemented in this version of **Amiga UNIX**. The regular Amiga video output must be used for the system console and for installing software, but once the system is running, X can be started on the A2410 display. To run X on the A2410 in 1024 by 768 resolution, give the "**-tiga**" option to the X server. For an 800 by 600 resolution display, suitable for the 1950 monitor, also add the "**-tm 3**" option.

So, if you invoke **OPEN LOOK** using the "**olinit**" command, you would access an A2410 card and 1950 monitor like this:

```
olinit -- -tiga -tm 3
```

To avoid the inconvenience of logging in on the Amiga display, and running X on the TIGA display, investigate the **xdm** facility which allows logging in directly to the X server.

- Many bug fixes and improvements in the kernel

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have increased performance and stability.

- Some subsystems, such as the print services system and the networking system, are new versions from AT&T / Unix Systems Laboratories. They fix problems with the previous versions and provide new functionality.
- GCC, the GNU C Compiler is now the default C compiler. It supports source debugging with the **sdb** or **gdb** debuggers (also included), and better code generation than the old AT&T C compiler.
- The entire UNIX system including the kernel has been compiled with GCC, resulting in performance improvement.
- The kernel object modules and configuration files are provided, allowing the creation of a custom kernel with additional modules or device drivers.
- An entirely new release of the X Window System from MIT is included. This new release, X11 Release 4, provides substantial performance increases and new capabilities.
- A new version of the **OPEN LOOK** user interface is included.
- The **Amiga UNIX** distribution has been split into individual packages which can be selectively installed or omitted. These packages can be added or removed at any time without reinstalling the whole system. See the **amixpkg**, **pkginfo**, **pkgchk** and **pkgrm** commands.



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- A new mechanism (`/etc/screendefs`) exists for managing the virtual terminal screens. A screen menu can be accessed, allowing convenient management of the active virtual screens.
  - The floppy disk device driver can now access the 720K 3.5" format of the IBM-PC. A floppy may be formatted with an MSDOS filesystem, and UNIX files may be copied to and from the MSDOS floppy using the "mtools" utilities that are included.
  - The kernel is now stored in a relocatable format, eliminating the need for multiple kernels for varying Amiga memory configurations. The kernel and the bootstrap loader now automatically adjust to memory size.
  - The Berkeley file system ("`ufs`") is now functional and reliable. The installation software allows the creation and use of a `ufs` root file system.
  - The device driver for the built-in Amiga serial port has been rewritten. It now provides reliable operation at rates up to 38400 baud and correct hardware (CTS/RTS) flow control.
  - Drivers written by Frank Edwards for the Archive Viper tape unit are now included with Amiga UNIX. Type Ctrl-D at the first prompt of the installation procedure. Type "viper\_kludge". Then type Ctrl-D to resume the installation.
  - The MX driver software allows several IBM style serial I/O port boards connected to the MAX-125 interface adapter (available from Palomax, Inc.) to operate under Amiga UNIX

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## Minor improvements

- **Amiga UNIX** now supports installation and operation on more Amiga systems, including the A2500.
- Greatly improved support for the A2410 TIGA graphics adapter is included (see page 7). Support is provided by Digital Micronics, Inc. for their Resolver TIGA graphics adapter. Support for the 1600GX graphics adapter is available separately from Ameristar Technologies, Inc.
- Netnews support has been upgraded to the much faster `cnews`, and `trn` threaded news reader has also been integrated with the system. `Trn` provides `rn` compatibility when run under the name `rn`.

These additional improvements have been made since version 1.1:

- The `color` program has improved input and output formats. The console screen driver allows full control over color and gray levels on color and monochrome (A2024) monitors.
- Serial and Parallel PostScript printers are now fully supported by `troff` and the printing system.
- `adb` now fully supports ELF files, including the relocatable kernel and dynamically linked programs.
- Manual pages have been added for several Amiga-specific device drivers.
- The console screen driver allows using a second bitplane for the cursor.

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- The **sar** command now works.
  - The installation floppy disks now can and should be write-protected.
  - It is now possible to store the date and time in the hardware clock such that AmigaDOS and UNIX will have the same time.
  - **shutdown** can be run from any console screen, and now defaults to run level 0 (system halt) for convenient system shutdown.
  - The **ksh time** command now works correctly.
  - **cpio** can now create and read multi-volume tape archives.
  - **cpio** and **tar** can now read and write tar archives containing directories indicated by a trailing "/".
  - A security hole in the login program was fixed.
  - A new program, **amixadm**, provides commonly used system administration functions in an easy-to-use style.
  - An implementation of SL/IP, the serial line internet protocol, is provided.
  - A new "**format**" command formats floppy disks conveniently.
  - More recent versions of important free utility programs (such as GNU Emacs and GCC) are included.

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- A version of "g++", the GNU C++ compiler is provided.
  - A new **fractal** program is included. See the **fractal(1A)** man page.
  - The install floppy now has a "repair" option, which allows booting from floppy for repairing an unbootable system.

## Other notes

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### **2 user or unlimited user license**

Amiga UNIX is available in 2-user or unlimited-user versions.

### **Screen Menu**

A new screen menu appears when you log out of a screen or press ALT-ESC. This menu lists the active screens and provides an alternate way of selecting a screen (in addition to the ALT function keys).

### **/etc/screendefs and pmadm**

Characteristics of the virtual terminal screens are now controlled through the file `"/etc/screendefs"` instead of `"/etc/inittab"`. Screens are turned on or off through the `pmadm` program.

### **Swap space**

The recommended minimum amount of swap space for a two user system is now 18 megabytes.

### **Adjust high resolution monitors**

A2024 and Moniterm monitors can display erratic flickering effects or alternating black-and-white quadrants. One quarter of the screen sometimes looks normal while the rest of the screen is completely blacked out. This is not a software problem; it is fixed by adjusting the tuning knob on the back of the A2024 monitor or on the Moniterm video adapter board.

### **Using modems with UNIX**

Modems should be configured to have DCD reflect the actual carrier state, to hang up when DTR drops, and not to echo commands or give result codes. This configuration is normally done via DIP switches or software commands to adjust non-volatile RAM.

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## PostScript printing

The procedure for setting up a PostScript printer has changed. Use commands like:

```
lpadmin -p ser -v /dev/term/ser -T PS -I PS -m PS -o nobanner
lpadmin -d ser

lpadmin -p par -v /dev/par -T PS-b -I PS -m PS -o nobanner
lpadmin -d par
enable ser
accept ser
```

to define a PostScript printer on the built in Amiga serial or parallel port. Note: `-T PS-b` must be used if the printer is connected to the parallel port. When printing a PostScript file, the `"-o postscript"` option from version 1.1 `lp` is no longer valid; use `"lp -Tpostscript"` instead.

`troff` supports PostScript output; use `"troff -Tpost"` and pipe the output to `"lp -Ttroff"`.

## Copyrights

The entire software package of **Amiga UNIX** is covered by copyright and a license agreement between you and Commodore. You may only make copies of **Amiga UNIX** for backup purposes. However, some files provided with **Amiga UNIX** are freely distributable; their authors allow you to copy those particular files. Different files have different limitations; the details are specified in the "Shareware and Public Domain source code" package.

The only files in **Amiga UNIX** that you may freely copy are the ones in the "Shareware and Public domain programs", "Shareware and Public domain source code", "GNU source code", and "X11R5 source code" packages, which load into the `/usr/public`, `/usr/src/pub`

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## Using SL/IP

and `/usr/x11r5` directory trees.

Example lines are provided in the file `"/etc/inet/network-config"` for setting up a static ("permanent") SL/IP connection. Dial-up SL/IP is not provided in this version. See the **man** page `slattach(1A)`.

## XDM

The `xdm` facility is provided, allowing the X Window System to be started up automatically by the system. Users can then log on completely using X. `xdm` is partially set up for a permanent X login screen on ALT-F10. To enable `xdm`, execute the commands:

```
pmadm -d -p screens -s con10
sacadm -s -p xdm
```

Comments in `/usr/X/lib/xdm/Xservers` explain how to modify the mode in which `xdm` runs X.

To make `xdm` start automatically at bootup, edit `/etc/saf/_sactab` per the comments in that file.

## Use a file as swap space

The system can automatically use a disk file as swap space. If you create a file of any size called `"/SWAP-FILE"`, it will automatically be recognized by the system when it boots. To create such a file, use a command like:

```
dd if=/dev/zero of=/SWAPFILE oseek=20480 count=1
```

This example creates a 10 megabyte file (the `count` argument must be 2048 times the number of

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megabytes).



# Known problems and limitations

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## RAM must be contiguous

UNIX can only access one contiguous region of memory. This means that some configurations of plug-in memory cards will not work. The bootstrap loader chooses the largest piece of memory, and UNIX loads into and uses that memory.

## Screens use "Chip RAM"

**Amiga UNIX** is shipped with 10 login screens active. Each screen uses a certain amount of Amiga Chip RAM. An Amiga with less than 1 megabyte of Chip RAM may not be able to display all 10 screens. Some of them must be turned off using **pmadm**.

## m68k ABI (Application Binary Interface)

Due to continuous changes in the m68k ABI during the development of **Amiga UNIX**, Version 2.1 is **not fully** compatible with the m68k ABI.

When implemented, the ABI will allow applications developed for other m68k ABI computer systems to be run on an **Amiga UNIX** system. The m68k ABI standard has now been finalized, and a future release of **Amiga UNIX** will be compatible with the current m68k ABI specification.

## Miscellaneous problems

- Many functions of the **sysadm** program are missing or do not work.
- The **crash** program doesn't work on a relocatable kernel. A special fully-linked kernel can be built if the **crash** program is needed for kernel debugging.
- Remote printing does not work completely.
- A kernel bug causes some programs to run out of

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virtual memory even when free swap space remains. This happens most often when running **OPEN LOOK** with less than 20 megabytes of swap space. The symptoms usually include the inability to start programs from the **OPEN LOOK** workspace manager, error messages referring to "too many processes" or "error 11", messages about the dynamic linker not being able to **mmap** libraries, or messages about **as\_map** retrying. A workaround is to add more swap space.

- Some programs, such as **sysadm**, use the graphics characters in the alternate character set. These characters are not displayed properly when a font other than 8 by 8 pixels is used.
- The kernel does not save panic messages or physical memory after a system panic, so post-mortem debugging is not possible. If you get a panic when running the standard kernel, you must write down the messages and backtrace addresses for Commodore to track down the problem.
- The **sdb** debugger has several bugs. **gdb** works much better.
- The **rsh** command sometimes discards some data at the end of its standard input or standard output stream.

# Kernel configuration

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## Install kernel configuration package

## Make changes in /usr/sys

## Build the kernel

The kernel configuration package, if installed, allows you to modify the UNIX kernel in various ways. This procedure is not fully automated in this version, and therefore requires some UNIX and C programming experience.

You can add or remove device drivers or modify kernel parameters. You can even modify the provided Amiga device drivers, although this is not recommended.

The kernel configuration package in this version of **Amiga UNIX** is very primitive; it is likely to change in future versions.

These are the steps to build a custom kernel:

Kernel configuration is an optional package, which you can install via "**amixpkg**".

In the `/usr/sys` directory you will find a "**Makefile**" and several subdirectories containing the components of the kernel. If you add a device driver or other type of module, you should place its source or object files in the "**local**" directory. You will need to edit "**local/Makefile**" and possibly "**master.d/kernel.c**" or "**master.d/filesys.c**".

Run "**make**" in the `/usr/sys` directory. This will attempt to build a new kernel called "unix".

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## Make a test floppy

You can test the new kernel without installing it by making your own boot floppy. That way if the kernel does not work, you can still boot your system to try again.

Put a formatted floppy disk in floppy drive 0 and run "**make floppy**" in the **"/stand"** directory. The kernel will be written to the floppy disk. Shutdown the system and reboot with this floppy in the drive.

## Install the kernel

To install the new kernel, copy it to a new name in the **"/stand"** directory, such as **"/stand/newunix"**. Then use these commands:

```
cd /stand
ln newunix unix
make
```

If you ever need to switch back to the original unmodified kernel, it is in the **/stand** directory, called **"2.1\_unix"** (if your system is version 2.1). Just do:

```
cd /stand
ln 2.1_unix unix
make
```

and the original kernel will be reinstalled.

## Using "crash"

To use the **crash** program for kernel debugging, a non-relocatable kernel must be built. The standard **Makefile** will do this if you enable the **LINKARGS** line which uses the **"-dn"** and **"-M"** options, and change **MACHINE=reloc** to **MACHINE=A3008**, for example, for an A3000 with 8 MB of RAM. See the **mapfiles** in

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**amiga/config.**

# Networking Notes

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## Domain Name Service (DNS)

Here are some miscellaneous tips for using networking.

To use a remote network server for looking up network host names, you can use the Domain Name Service (DNS). To set up DNS, you must rename two files, like this:

```
ln /usr/lib/libsockdns.so /usr/lib/libsocket.so
mv /etc/netconfig /etc/netconfig.TCP
ln /etc/netconfig.DNS /etc/netconfig.
```

and create the file `/etc/resolv.conf` to contain lines like:

```
domain DNS_domainname
nameserver IP_address
```

where *DNS\_domainname* is the name of your server's DNS domain, and *IP\_address* is the decimal IP address of the name server.

## Using uucp over a TCP network

The system is already set up for using uucp over TCP/IP; you just need to add a line to `/etc/uucp/Systems` containing the TCP address in hexadecimal of each remote system.

The format of the line is described in the *UNIX Network Administrators Guide* from AT&T. In this example:

```
sysname Any tcp - \x00020401nnnnnnnn0000000000000000
```

*sysname* is the remote system name, and *nnnnnnnn* must be replaced with the system's hex IP address.

# Using AmigaDOS

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## Sharing hard disk space with AmigaDOS

AmigaDOS 2.04 and later versions are capable of sharing a SCSI hard disk with **Amiga UNIX** Version 2.1. UNIX must be installed first, since its installation software offers the opportunity to leave some disk space empty for AmigaDOS. The AmigaDOS 2.04 install floppy will recognize and use the empty space left during UNIX installation. Do not use earlier versions of AmigaDOS install software on a UNIX system.

## AmigaDOS documentation

All the information relating specifically to AmigaDOS is provided with the AmigaDOS software, either as a separate bundle in an Amiga hardware system package, or with the AmigaDOS 2.0 Enhancer package.

## AmigaDOS/UNIX "Bridge Book"

See the new **Amiga UNIX** manual, *Working Together: Amiga UNIX and AmigaDOS* for detailed discussion of using AmigaDOS and UNIX together.

## Be careful - the UNIX hard disk is sensitive

Be careful if you use AmigaDOS. As a personal operating system, it provides utilities that can easily erase a hard disk, with none of the restrictions common in the UNIX world. From AmigaDOS, you can destroy your UNIX file system.

## Battery-backed clock

AmigaDOS stores "local time" in the battery-backed clock hardware. UNIX normally stores standard Universal Coordinated Time (GMT) there, to allow for UNIX's automatic timezone and daylight savings time adjustment. If you will be running AmigaDOS frequently, you can have UNIX store local time in the hardware clock, allowing both operating systems to

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## Moving files between AmigaDOS and UNIX

access the time correctly. UNIX will no longer automatically adjust for daylight savings time, and this will have to be done manually when needed (twice a year in most of the U.S.).

To have UNIX store local time in the hardware clock, execute the following commands under UNIX (logged in as **root**):

```
echo :localtime >/etc/clkzone  
setclk -s
```

The best way to move files between AmigaDOS and UNIX is to use the **bru** program (available on either operating system) to create a floppy or tape archive.