Introduction to the

Commodore®

AMIGA® 500

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Commodore®

AMIGA® 500

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About This Manual

This manual is designed to let you set up and start using your Amiga 500 with a minimum of effort. The manual includes nine chapters, a set of appendices, a glossary and an index. Here's a brief description of each part of this manual:

Chapter 1, *Introduction,* summarizes the general features and capabilities of the Amiga 500.

Chapter 2, *Setting Up the Amiga 500,* shows how to put your Amiga together. If you're using an Amiga for the first time, read Chapter 3, *Getting Started,* to learn the basics.

Chapter 4, *Using the Workbench,* describes the nuts and bolts of using Workbench—to familiarize yourself with elements like icons, menus, and using the mouse.

Chapter 5, *Workbench Tools,* tells about the useful tools available through the Workbench disk, including Amiga's built-in clock, calculator, notepad, icon editor, speech synthesizer, graphic dump, and international keymap selector.

Chapter 6, *Using Preferences,* explains how to customize your Amiga by changing the settings on the Preferences utility of Workbench.

Chapter 7, *AmigaDOS and the CLI,* explains how to use the Amiga Disk Operating System by typing in commands directly, via the Command Line Interface (CLI).

Chapter 8, *Adding to the Amiga 500,* describes printers, extra memory, disk drives, modems and other hardware peripherals available for your Amiga.

Chapter 9, *Caring for the Amiga 500,* gives advice on how to keep your Amiga in good working order.

Appendix A, *Technical Reference,* contains technical specifications, diagrams of input/output connectors, theory of operation, memory map and a block diagram.

Appendix B, *AmigaDOS Reference,* contains summaries of AmigaDOS CLI and screen editor (ED) commands, as well as a list of Amiga error numbers and what to do when you get the errors.

Appendix C, ***Using** the Amiga 500 Keyboard,* describes the four sections of the keyboard and tells you which keys to use to perform typical mouse functions, such as moving the pointer, selecting, and using menus. This appendix also includes key maps for different Amiga 500 keyboard configurations.

Appendix D, *Printer Escape Codes,* summarizes the escape codes the Amiga uses to communicate with printers.

Appendix E, *Amiga Bibliography,* lists the guides and reference books for the Amiga system available from publishers.

Appendix F, *Amiga Schematics,* contains detailed technical diagrams of the inner workings of the Amiga.

The *Glossary* defines important special terms. (Terms from the glossary are shown in *italics* when they first appear in the text.)

The *Index* lists the pages containing information on any specific subject.

For More Information

The capabilities of the Amiga 500 are so extensive that they cannot be fully covered in a single book. For more information on how the Amiga works, see the *Amiga Hardware Manual,* the *Amiga ROM Kernel Manual,* the *AmigaDOS Manual,* and *Intuition: The AMIGA User Interface.* These manuals are available from your Amiga dealer, or your local bookstore.

See Appendix E for a listing of current Amiga reference guides and other books.

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Chapter 1

Introducing the Amiga 500

This chapter introduces you to the Amiga 500 by briefly describing its capabilities and potential.

The first part of the chapter describes the components of the Amiga system and summarizes how they work; this section is addressed primarily to those who are not familiar with microcomputers in general or with the Amiga series of computers in particular.

The second part of the chapter summarizes the key features of the Amiga 500. This material will be of interest to programmers, developers, etc. However, you can set up and run application software without understanding (or even without reading) this material.

The third part of the chapter shows how the varied features and capabilities of the Amiga 500 have been incorporated in a variety of software programs. You will find that whatever your level of experience or your interests, there are Amiga programs that meet your computing needs. And you will also find that these programs are substantially less expensive than similar programs for other microcomputers—even though in many cases the Amiga programs let you do things that are just not possible with the other computers.

Introducing The Amiga 500

The Amiga 500's spectrum of capabilities is wide, sophisticated, versatile and yet affordable. And all this power and sophistication have been made so accessible, so easy to control that even a computer novice can be up and running with a minimum of effort.

The Amiga 500 retains all the features that inspired reviewers to dub the original Amiga 1000 "the Maserati of microcomputers"—high speed/high efficiency processing; superb graphic and video resources; advanced stereo sound and music capabilities; the ability to perform a number of tasks simultaneously (multitasking operation); a unique file structure that allows programs to exchange data of various types (program code, graphics, sound); easy expandability; and more. In the Amiga 500, these features are enhanced and new ones are added. For example, the Amiga 500 comes equipped with 512 K of RAM, expandable to a full megabyte internally (by adding the A501 memory expansion unit). All this RAM is directly accessible, eliminating the time that other microcomputers must spend in indirectly accessing expansion RAM (e.g., by using a RAM disk scheme). This gives the Amiga a considerable advantage in processing speed.

Later in this chapter there is a section describing the major features of the Amiga 500. These descriptions demonstrate that in selecting the Amiga 500 you have chosen one of the most advanced microcomputers available today.

The Amiga 500 combines a number of components—keyboard, disk drive, and CPU—in one unit, called the *main unit.* A typical Amiga 500 system consists of the main unit and additional components. The capsule descriptions following identify these components and describe their basic functions. Chapter 2 tells how to connect all the components so you can begin computing.

- The *Main Unit* contains the computer circuitry, the keyboard, and a built-in 3½ inch floppy disk drive. The main unit houses the *CPU* (central processing unit) and other microchips containing memory and processing circuitry (e.g., the sound and graphics chips). On the bottom of the main unit there is an expansion slot into which you can insert optional additional memory. On the back, there are several *jacks, connectors* and *ports,* into which you can plug *peripherals* (optional external equipment, like printers, modems, and extra disk drives).

- The *Keyboard,* on the main unit, resembles a typewriter keyboard with some extra keys. The keyboard is used to enter commands and data and to respond to *prompts* (messages) sent from the computer. With 94 keys, the Amiga keyboard is among the most complete keyboards available in the microcomputer field. See Appendix C for details on keyboard layout and functions.

  Note on the Keyboard:
  Your Amiga keyboard may have a Commodore key replacing the Amiga key to the left of the space bar. These keys are functionally identical, differing only in what is painted on the key cap. All references in software package instructions to the left Amiga key are valid for the Commodore key. All references to the Commodore key apply to the left Amiga key.

- The *Disk Drive* is located on the right side of the main unit. When you insert the *software disks* into the disk drive, the computer can read information *from* them and write information *to* them.

- The *Mouse* is a small hard ball enclosed in a palm-sized housing. You use the mouse to move a pointer from place to place on the display screen in order to select Amiga functions and capabilities. The mouse is connected to one of the ports on the main unit.

- The *Software Disks* are *3½* inches square and contain instructions that tell the computer what to do.

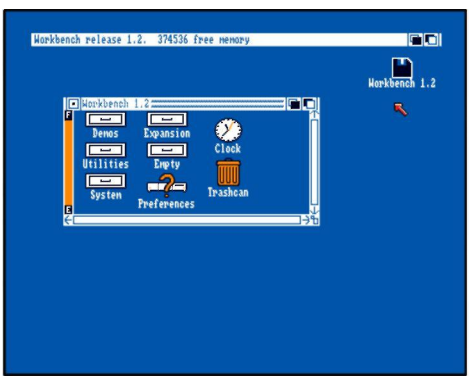
- The *Power Supply* has two cables. One cable plugs into a port on the main unit; the other cable plugs into an electrical receptacle. The On/Off switch for the computer is located on the power supply.

- The *Monitor* displays information in response to actions taken by you or the computer. The monitor (which may be one of several types, and which is not included as part of the Amiga 500 package) is connected to the back of the console unit.

See Chapter 2 for setup and connection instructions.

How the Amiga Works

The Amiga 500 is a *window/icon/mouse/menu/pointer* type system. In general terms, this means that you use the *mouse* to move a *pointer* (shaped like a small arrow) around the display screen to point to *icons* (i.e., small pictures) that identify some item or function that you want to select. In some cases the selection involves the display of a *menu* (a list of options), from which you can choose the appropriate item. The display and selection process may also involve one or more *windows* (i.e., discrete areas of the display that can accept or display information). In working with the Amiga, you will often be using a software tool known as the *Workbench,* which incorporates menus and windows and other Amiga items as well. For more details on how the Amiga icon-driven system works, see Chapters 3, 4, 5 and 6.



If you don't want to use the Workbench system of menus and icons, you can communicate directly to the AmigaDOS via the keyboard using the *CLI* (Commands Line Interface), which is described in Chapter 7.

Key Features of the Amiga 500

The Amiga's list of features is second to none in the microcomputer field. Many features are unique to the Amiga; others are advanced beyond similar features on other microcomputers. The key features of the Amiga 500 are summarized in the following paragraphs.

Sophisticated Color Graphics

The advanced graphics capabilities of the Amiga 500 can produce colorful, high resolution screen in static or animated mode. Normal screen resolution is 320 x 200 or 320 x 400 pixels. High resolution is 640 X 200 or 640 x 400 pixels. Depending on the graphic mode, you can select 16 or 32 colors for display at a time; you can select from a palette of 4096 colors.

Digitized Stereo Audio

The Amiga 500 provides a versatile two-channel, four-voice stereo sound capability, with the four voices being output as two voices per channel. Various options (such as a MIDI interface) can be added to take advantage of the Amiga 500's sophisticated digitized stereo sound and music capabilities.

Multitasking—Running Several Programs at the Same Time

Multitasking—the ability of a computer to perform a number of tasks simultaneously—is a capability unique to Amiga computers among microcomputers in or near their price range. For example, with the Amiga 500 you can run an accounting program and a word processing program at the same time. If there is any competition between the programs for system resources, the computer allocates the system resources according to priorities you set. Because multitasking lets you do things like printing out one report while you're working on another, your productivity is greatly enhanced.

Direct Text-to-Speech Conversion

Typed words can be directly converted into speech through use of the *SAY* speech synthesizer. This is another feature unique to Amiga microcomputers.

Standard File Format for Easy Interchange of Data Among Programs

The Amiga computers use a special file format known as **Interchange File Format** or simply **IFF.** This format provides a standard structure for all Amiga files, regardless of what kind of data a file contains: e.g., program code, graphic data or sound data. With the IFF format, the Amiga 500 can interchange data among programs of different types. This file handling ability is unique to the Amiga among microcomputers.

Graphics, Windows, and Sound Support for Standard Languages

The Amiga's sophisticated graphics, windowing and sound features can be used in both of the Amiga's standard programming languages: **BASIC** and **C.**

Multiple Disk Type Capability

The Amiga 500 can use 3½ inch and 5¼ inch Floppy disks.

Expandability

Among the most important features of the Amiga 500 are its versatile expansion capabilities, which include:

Internal Memory Expansion

The Amiga 500 memory is internally expandable up to 1 MByte (by adding the A501 memory expansion unit), and the operating system directly addresses it all. This results in a considerable speed advantage, since the Amiga does not have to resort to time-consuming indirect methods of accessing expanded RAM, such as the RAM disk schemes used by almost every other microcomputer.

Addition of External Disk Drives

You can attach up to two external disk drives: another 3½" drive and one 5¼" drive.

MIDI Interface

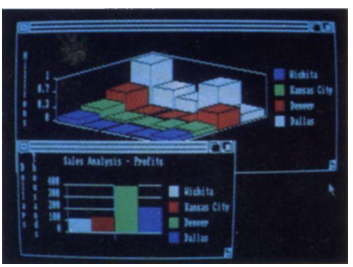
Equipped with an optional MIDI interface, the Amiga 500 allows you to connect and control a wide variety of sophisticated computer-compatible music components, like synthesizers and drum machines. By coupling these MIDI capabilities with the Amiga's extremely flexible built-in multivoice stereo sound generation capabilities, you have at your disposal a state-of-the-art digital music and sound system.

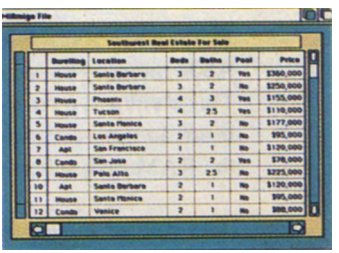
Amiga 500 Software

Software is what puts all the power of the Amiga 500 in your hands.

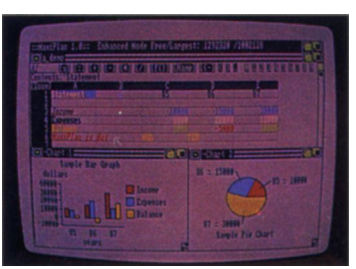
As the following paragraphs show, Amiga 500 software covers a wide and ever-expanding range, including business and productivity graphics, sound, education, recreation, programming, and telecommunications.

Productivity

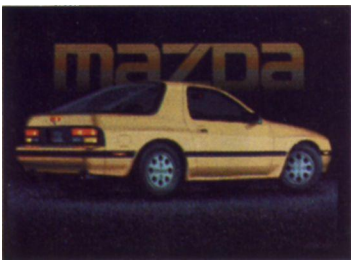




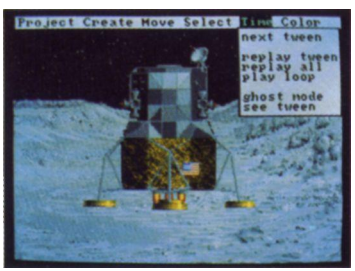
The Amiga 500 gives you a powerful business tool. You can do recordkeeping, budgeting, accounting, word processing, forecasting, scheduling, and more. The Amiga's excellent graphics can enhance business reports and presentations. Sophisticated spreadsheets let you analyze numerical data and financial budgets, and even include what-if capabilities. You can keep ledgers, and use the data to create bar graphs and pie charts. The Amiga can strengthen your control over business activities, with programs for time management and tracking orders and expenses. Database programs let you create a sophisticated filing system on your Amiga where you can keep track of everything from client lists to digitized pictures. With the power of the Amiga, complex data management becomes easy.



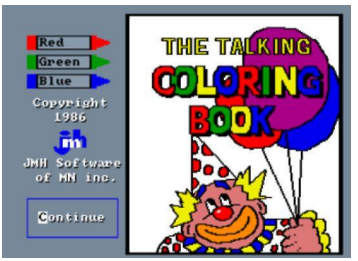
Graphics and Art



The Amiga offers almost unlimited capabilities for graphic design and creation. These capabilities are unlocked by a variety of graphics programs available for the Amiga. You can control all the 4,096 colors the Amiga uses to create your own art masterpieces. Some programs allow you to animate your images, or produce video effects. You can create storyboards and graphic presentations, slide shows, and other special effects.



Education

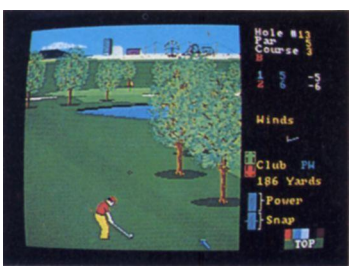


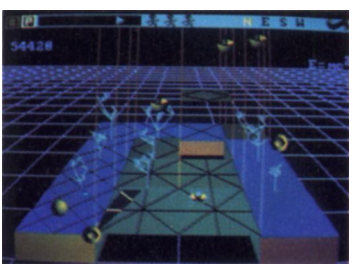
Computers are popular in education, and the Amiga's capabilities send it to the head of the class. Education programs utilize the Amiga's graphics, sound and speech capabilities to create exciting, interesting learning experiences. Learning on the Amiga is not just for kids—there are programs to teach you to type, to prepare for the SAT, to learn French—even to develop and master business skills.

From helping preschoolers recognize shapes and colors to quizzing high-schoolers on trigonometry, you and your family will find education on the Amiga colorful and stimulating.

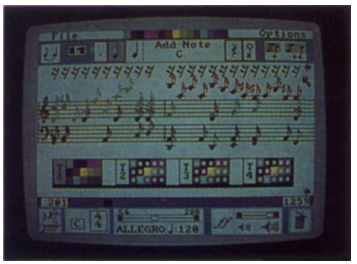
Recreation

The Amiga's spectacular graphics, digitized sound, and realistic animation make for excellent entertainment. No matter what your own special interests are, the Amiga has something for you. The Amiga's processing speed and graphic and sound capabilities give game designers the tools to create breathtaking games, and the available memory allows the game play to match the appearance. Whether you enjoy a reflex-challenging shoot-em-up, or prefer the intense concentration of a high-level chess challenge, you'll find your thirst for recreation quenched by the Amiga.



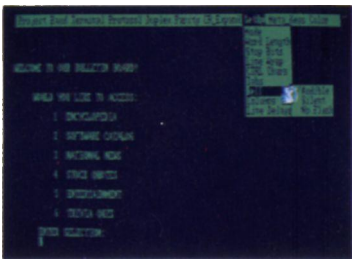


Music and Sound

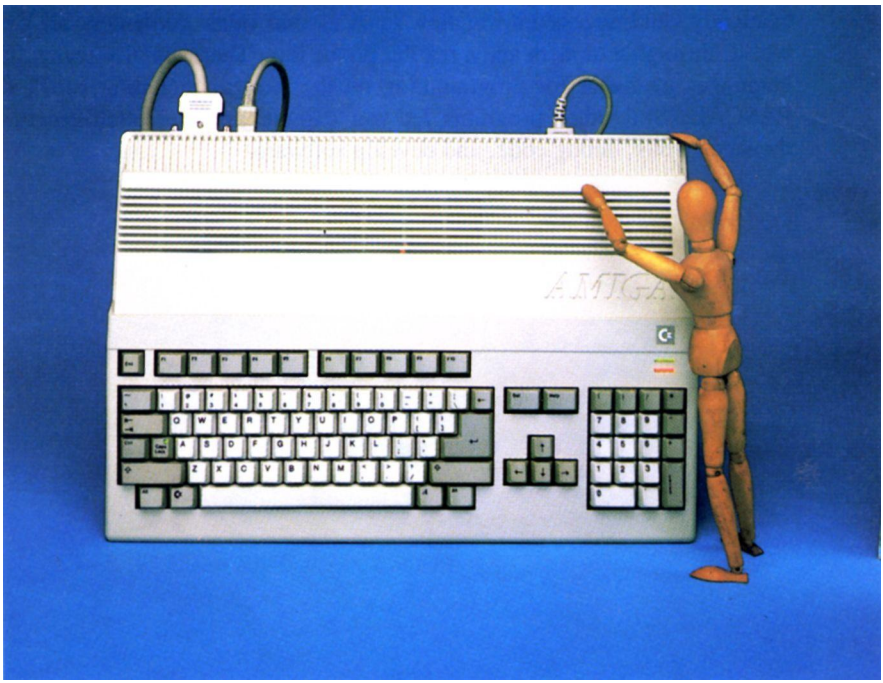


You can make beautiful music with the Amiga's high-quality digitized stereo sound. You can play synthesized instruments, write pieces for more than one voice, or just play around on a keyboard. You can even "jam" along with the computer. You can design realistic sound effects, or utilize the Amiga's speech capabilities to make your computer "talk." Programs are also available to utilize sophisticated recording studio capabilities. Compose, edit, record, play, listen—the potential of sound on the Amiga is incredible.

Telecommunications, Computer Languages...And More



There are many other types of useful programs available for the Amiga. Telecommunication programs let you do your banking, send and receive mail electronically, and access information services and other computers all over the world, through a modem and a regular phone line. There are also many different languages available for programming on the Amiga, including LISP, C, and PASCAL. Still other programs let you explore artificial intelligence, repair damaged disks, debug code, and develop software.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Chapter 2

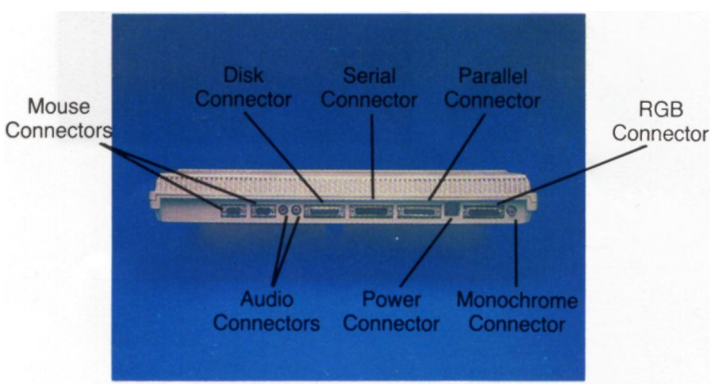
Setting Up the Amiga 500

Your Amiga takes only a few minutes to put together. Here are the pieces of the Amiga 500 to set up:

- the *main unit*
- the power supply
- the *mouse*
- the monitor (available from your Amiga dealer)
- A501 memory expansion unit (optional)

Where to Find the Connectors

On the back of the main unit, you'll find a number of *connectors.* These are places where you attach cables and other devices:



Before You Start

Before setting up your Amiga, **be sure to read each instruction carefully.** While it's not difficult to assemble the Amiga, it *is* possible to damage it if you don't follow the instructions.

Note the cardboard sleeve in the disk drive. Believe it or not, many Amiga returns are made simply because care was not taken in removing the cardboard piece protecting the disk drive. This sleeve sits inside the disk drive opening and was designed to protect the drive during shipping. Make sure you press the drive button before you remove the cardboard piece, to release the cardboard piece so it slides out easily. Also, save the piece to replace in the drive unit opening for protection during transportation.

Turn the computer **off** before inserting or removing any connectors.

Note where the on/off switch is located: it's on the power supply.

You may find this inconvenient to reach, but **do not turn the Amiga off by pulling out the plug.** That could damage the power supply or the Amiga.

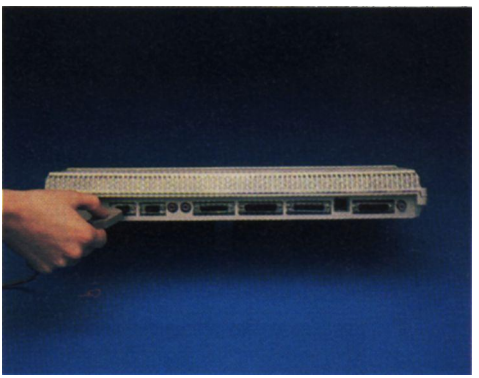
We suggest getting a multi-outlet electrical power strip from a hardware store. This would allow you to connect all the electrical plugs from your Amiga system components, and power them all on or off with a single on/off switch—no plug-pulling, no deep-knee bends.

Also, when connecting cables to the Amiga, make sure you're plugging the correct cable into the proper connector. The diagram below should help you with these connections. Remember, don't try to **force** a cable into a connector; double-check to make sure the cable matches that connector.

Attaching the Mouse

Before attaching a new mouse, turn the mouse upside down and pull out the piece of foam that holds the *mouse ball* in place. (If you don't get all the foam out, see the "Cleaning the Mouse" section in Chapter 9 to find out how to uncover the mouse ball.)

To attach the mouse, just plug the end of the mouse's cable into the connector labeled JOY 1 on the back of the main unit. It's a tight fit; this helps keep the plug in place. Be sure to press firmly.



If you're right-handed, you'll probably want to place the mouse to the right of the computer. If you're left-handed, try putting the mouse to the left. Make sure that the place you set aside for the mouse is at least 12 inches by 12 inches (30 centimeters by 30 centimeters) and that it's clean and flat.

Attaching the Video Monitor

The *video monitor* displays visual information. There are three kinds of video monitors you can use with the Amiga:

- an *analog RGB color monitor.* The *Amiga Monitor* available from Amiga dealers is an RGB monitor. RGB monitors normally produce the best-quality display. The Amiga 1080™ and 2002™ monitors feature an analog RGB input which allows display of the Amiga's 4,096 colors on a screen with 640 x 400 pixel resolution.

- a *digital RGB color monitor.* Digital monitors, such as those used with an IBM-PC® can only display sixteen colors instead of the full range of 4,096. While it is possible to use this monitor with the Amiga (with the correct cable), it is not recommended.

- a *monochrome (composite video) monitor*. Monochrome monitors display output in a single color. Monochrome monitors provide a sharp picture for text, and some are suitable for using the Amiga in interlace mode (see Chapter 6 for more on interlace mode). The monochrome composite video output provides a grey scale which utilizes 4,096 different shades (not just black and white).

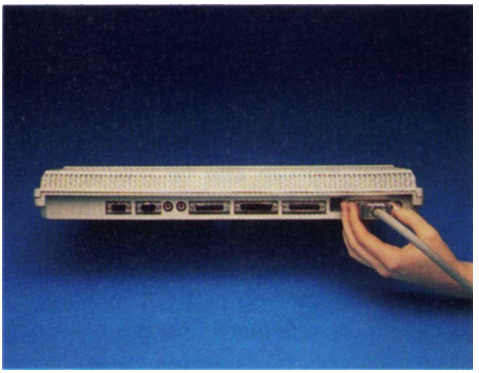
- a television. Conventional televisions (those without video input connectors) can also be used as monitors for the Amiga with an optional modulator that plugs into the RGB port.

When choosing a monitor, note that televisions and NTSC monitors cannot display as much information as RGB monitors. RGB monitors can show 80 characters clearly on each line on the display, while most televisions and NTSC monitors can show only 60 characters clearly.

Attaching an RGB Monitor

To attach an Amiga RGB Monitor, use the *video cable* supplied with the monitor. Plug the small end of the video cable into the connector on the back of monitor:

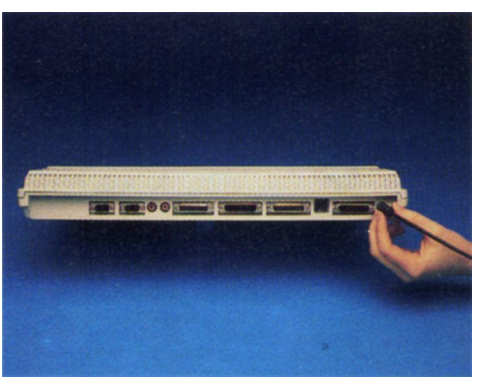
Plug the large end of the cable into the *RGB connector* on the back of the Amiga:



To attach other RGB monitors, see your Amiga dealer for the correct cable and instructions.

Attaching a Monochrome Monitor

To attach a monochrome composite video monitor to the Amiga, use a shielded cable with an *RCA phono plug* at each end. (You can get this cable from your Amiga dealer.) Plug one end of the cable into the appropriate connector on the monitor, then plug the other end into the monochrome video jack on the back of the Amiga:



Attaching a Television

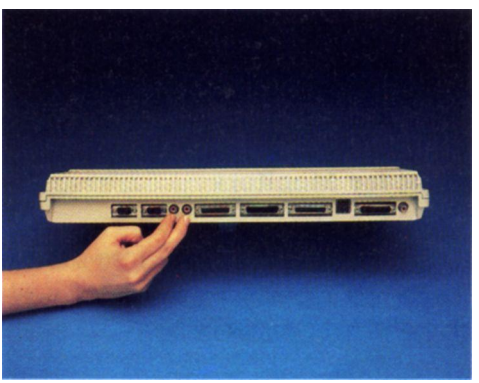
To use a conventional television as a monitor, you need:

- a *TV modulator*
- a *TV modulator cable*
- a *TV switch box*

You can get these from your Amiga dealer. You'll find instructions packaged with them.

Connecting Audio Equipment

The Amiga produces digitized sound. There are two connectors on the back of the Amiga for connecting the Amiga to audio equipment:

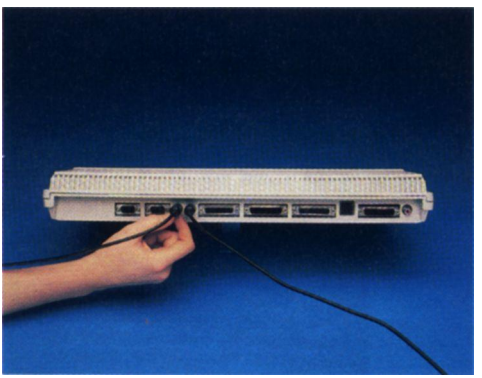


Unless you've attached a conventional television to the Amiga with a TV modulator, you need to connect the Amiga to either an audio system or the audio connector found on some monitors to hear sounds produced by the Amiga.

Connecting the Amiga to a Stereo System

To connect the Amiga to a stereo system, you need two cables. Each cable must have on one end a plug that fits the input connector on your amplifier or receiver (this is most often an RCA phono plug) and on the other end an RCA phono plug to fit into the Amiga.

On most stereo systems, there are extra inputs, often labeled "Auxiliary" or "Aux," to which you attach one end of each cable. On the back of the Amiga are two *audio connectors,* one for the left audio signal and one for the right audio signal. Insert the other end of each cable into the appropriate audio connector:

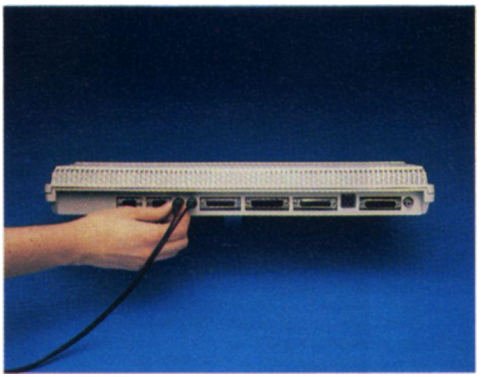


Sound Connections for Monitors

Some monitors, including the Amiga 1080 and 2002 Monitors, have a built-in speaker. To connect a monitor for sound, you need to connect the special "Y" cable (included with the Amiga monitor).

You can get "Y" adapters and connecting cables from many stores that carry radio and electronic parts, if they are not supplied with your monitor.

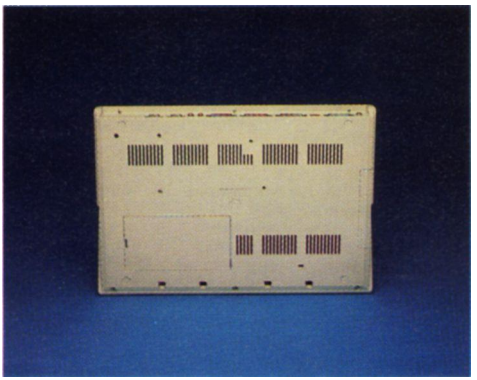
To connect the monitor, insert the two phono plugs at the top of the "Y" into the audio connectors on the back of the Amiga:



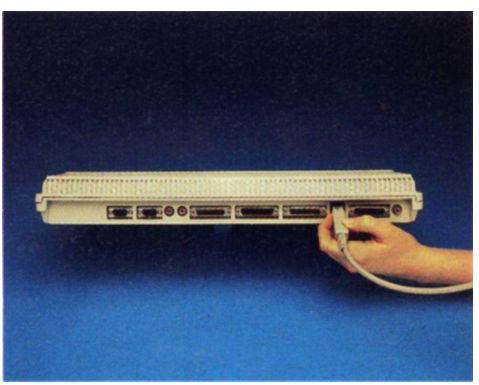
Now insert the single end of the "Y" adapter cable into the connector on the monitor:

Plugging It In

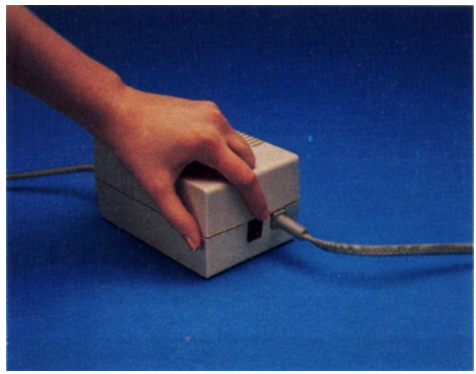
You're almost done putting your Amiga together. Before you plug it in and turn it on, make sure there's nothing covering the ventilation slots on the main unit:



Remember to turn the power off before hooking up the power supply. Plug the square end of the power cord into the main unit:



Plug the other end of the power cord into a grounded outlet, and you're ready to start using your Amiga. You'll find the on/off switch on the power supply unit.



Chapter 3

Getting Started

In this chapter, you'll learn the basics of using your Amiga, including:

- how to use the mouse
- using icons and menus
- using disks

When you're done, you'll be ready to start using the *tools* included on your Workbench disk that let you work with the Amiga.

A Note About the Mouse

The descriptions in this chapter (and throughout the rest of this manual) assume you're using a mouse. There are, however, certain keys on the keyboard you can use in place of the mouse. To learn how, see the section in the appendix on Using the Amiga Without a Mouse.

Using Disks

Start by getting the two microdisks, the *Workbench disk* and the *Extras disk* that came with your Amiga. These disks contain important information used by the Amiga. In addition, have two blank microdisks ready. (You can get blank microdisks from your Amiga dealer.) You'll copy the information from the original disks onto these blank disks and keep the originals in a safe place.

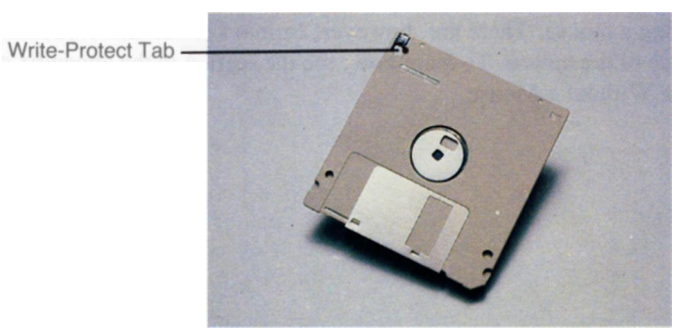
You must use high-quality double-sided double-density diskettes, typically identified with a "2DD" marking on the packaging.

To ensure the data stored on your microdisk remains safe, observe the following precautions:

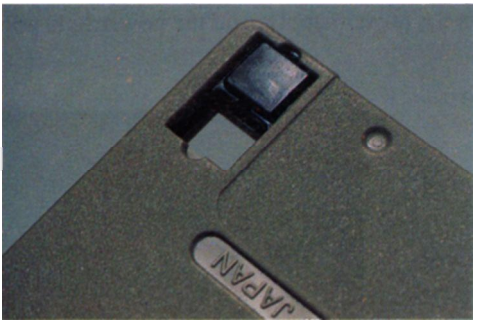
- Store your disks in a clean, dust-free container.
- Do not place disks on top of your monitor, power supply, telephone, or any other device with strong magnetic fields present.
- Insert the disk straight into the disk drive opening, not at an angle; do not try to force it in.

More information on the care of your disks can be found in Chapter 9.

Your original Amiga disks may have ***write-protect*** *tabs.* These are small plastic tabs on the backs of the disks. If you find protect tabs on the original disks, slide each tab toward the edge of the disk until it clicks into place. When you do, you'll be able to see through a small hole in each disk:



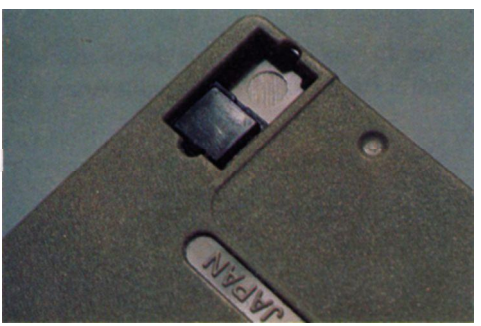
Disk is protected



By putting the protect tabs in this position, you prevent the information on the disks from being changed while they're in the Amiga.

On each of the two blank disks, make sure that the protect tab is toward the middle of the disk, so that it covers the hole. With the tab in this position, you can add new information to a disk:

Disk is unprotected

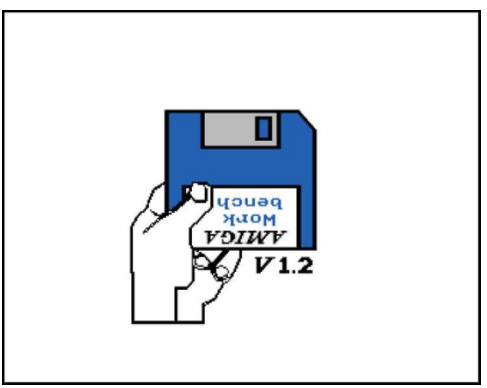


The On/Off switch is on the power supply. To turn on the Amiga, press the switch on the power supply, and the power light above the Amiga keyboard will light up.

A word of warning:

Whenever you turn off the Amiga, always wait AT LEAST 5 seconds before turning it on again. If you don't observe this precaution, you may damage the Amiga.

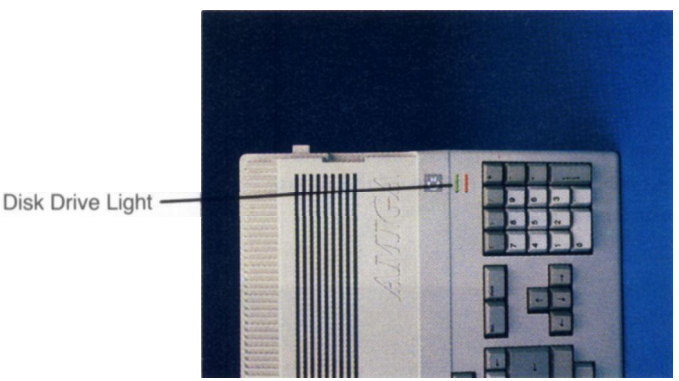
Next, turn on the monitor or television attached to your Amiga. In a few moments, you'll see a picture of a hand holding a disk:



Assuming that you have already removed the cardboard (or plastic) disk protector (see page 2-2), this is your cue to insert the Workbench disk metal end

in, label side up into the *disk drive*, the device that reads information from disks and adds information to them. Push in the disk until it clicks into place:

After you put in the disk, you'll hear sounds from the Amiga. These are the sounds the disk drive makes as it gathers information. In less than a minute, the Amiga will get the information it needs from the Workbench disk with the help of the disk drive. Notice that while the disk drive is working, the *disk drive light* above the keyboard is on:

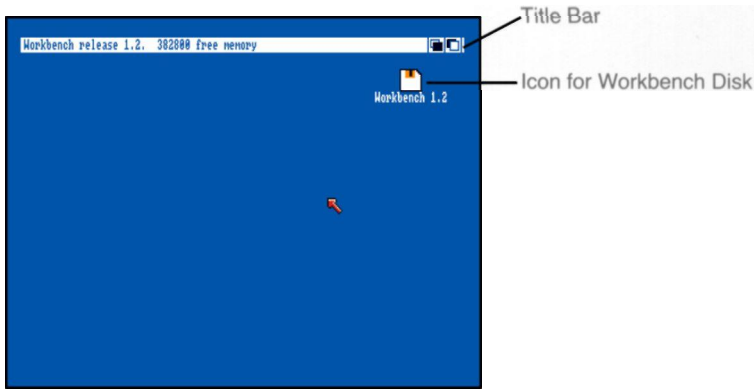


A word of warning:

NEVER remove a disk when the disk drive light is on.

The disk drive light tells you that the Amiga is using the disk.
Taking a disk out too soon may make it impossible for the Amiga to finish an important task, such as reading the information from the Workbench disk. Even worse, taking a disk out too early may ruin the information on a disk. Always wait for the disk drive light to turn off before you remove a disk.

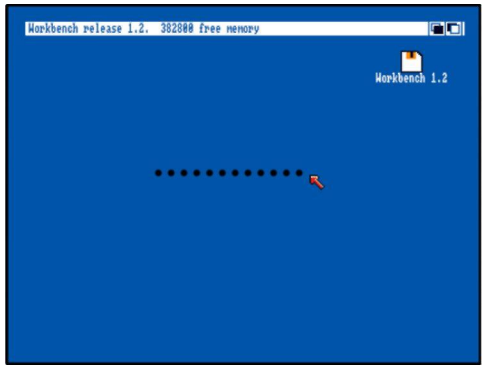
In a few moments, you'll see the *Workbench:*



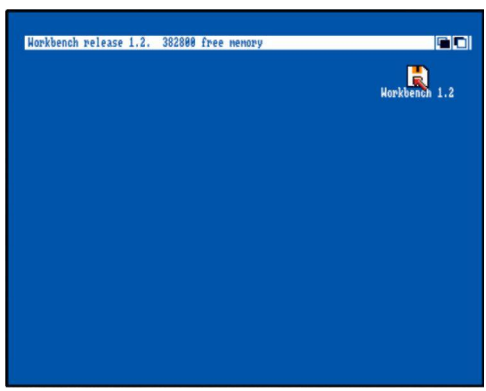
At the top is a *title bar* that identifies the Workbench. On the Workbench is an *icon,* a small picture that represents the Workbench disk. You'll learn more about icons later in this chapter.

Moving the Pointer

You use the *Pointer,* the small arrow on the display, to *point* to the things you want to work with. Moving the mouse moves the Pointer. Without pressing either of the *mouse buttons* on top of the mouse, try rolling the mouse. Hold the mouse as shown below:



To point, move the Pointer so that its tip is over the thing you want to point to:



When you first use the mouse, don't worry if it feels a bit clumsy. Once you're familiar with it, you'll find that using the mouse is very quick and convenient.

If you run out of room for your mouse before you get the Pointer where you want it, just lift the mouse and put it down where there's more room. Lifting the mouse doesn't move the Pointer.

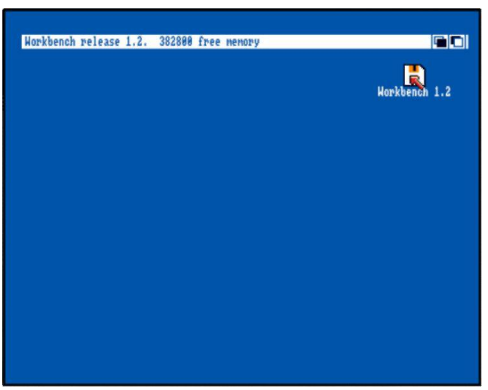
The pointer doesn't have to be an arrow; you can design your own pointer as any shape you like, using the Preferences option. This is explained in Chapter 6, "Using Preferences."

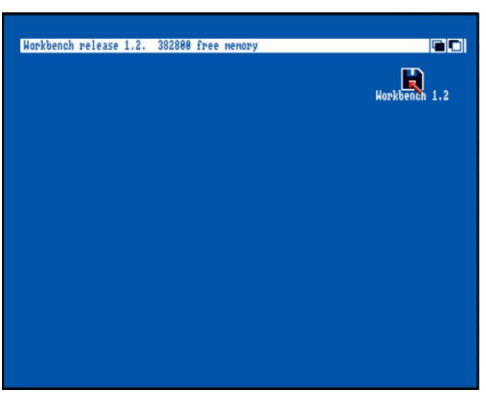
Selecting Icons

You use the *Selection button,* the left button on the mouse, to *select* icons and other features. Icons are the picture symbols on the screen. They can represent tools, projects, drawers or disks. When you want to use the item represented by the icon, you must select that item with the pointer. Try selecting the icon for the Workbench disk:

> Point to the Workbench disk icon, then *click twice* (press and quickly release) on the Selection button (the left button on the mouse).

This operation, known as *double-clicking,* "opens" the selected icon.

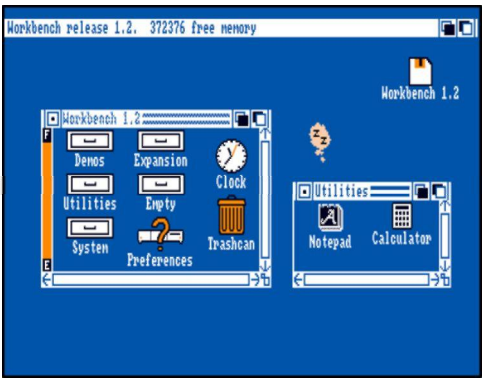




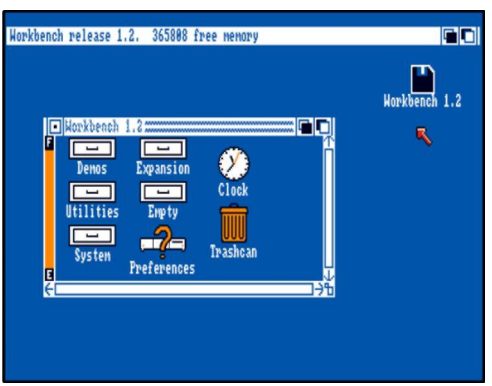
The icon for the Workbench disk is *highlighted* at the first press of the mouse button, to indicate that it's selected.

There are times when you double-click on an icon, but must wait for the Workbench to finish an activity before you can continue. When this happens, the Pointer changes shape and becomes a *Wait Pointer:*

Wait Pointer



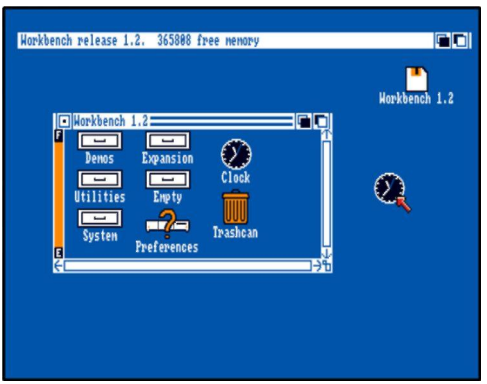
When the Pointer returns to its original shape, you can continue working.

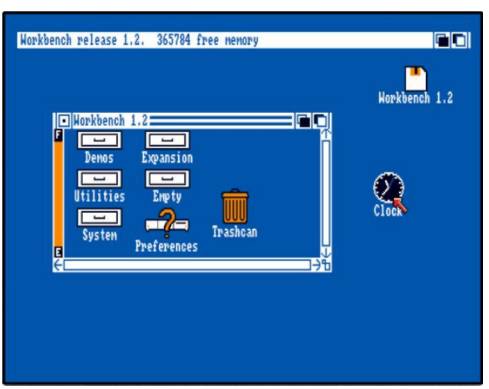


If you no longer want an icon selected, point to a place on the Workbench that isn't occupied by an icon or gadget, then click the Selection button.

Dragging

You move icons, windows, and screens by *dragging* them. To drag an icon, you point to it, hold down the Selection button, and move the mouse.





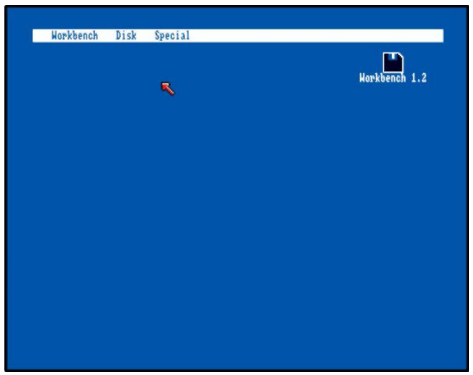
A copy of the icon moves and is repositioned at the point where you release the Selection button.

Using Menus

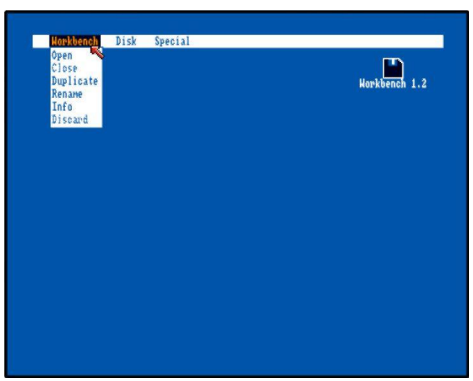
For most tools, including the Workbench, there are *menus* that list choices you can make. To use menus, you use the *Menu button,* the right-hand button on the mouse. The best way to learn how menus work is to try one:

Select the icon for the Workbench disk if it isn't already selected. Press the mouse button *only once.*

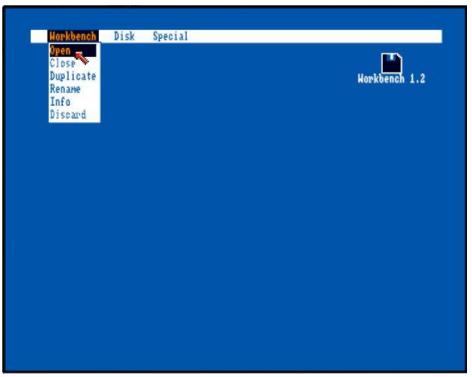
Hold down the Menu button (the right button on the mouse). When you do, the Menu Bar appears. In the Menu Bar are *titles* of menus:



Without releasing the Menu button, point to the title Workbench in the Menu Bar. The *Workbench menu* appears:

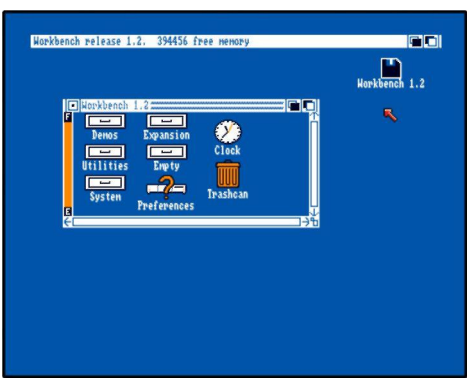


While keeping the Menu button down, point to Open in the menu. Open is highlighted:



Choose Open by releasing the Menu button while Open is highlighted.

By choosing the Open item from the Workbench menu, you *open* a *window* for the Workbench disk:

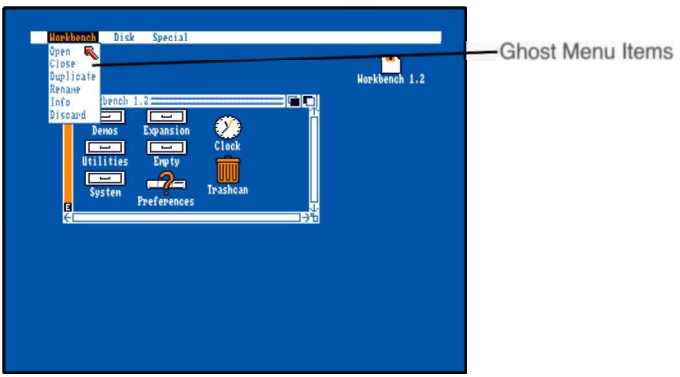


In the window, you see icons that represent the contents of the Workbench disk. This operation involving the menu is comparable to selecting an icon by double-clicking.

If you decide you don't want to choose a menu item, move the Pointer off the menu before releasing the Menu button.

To browse through a tool's menus, just hold down the Menu button while moving the Pointer along the Menu Bar. Without choosing an item, you'll get to look at the menu items that are available.

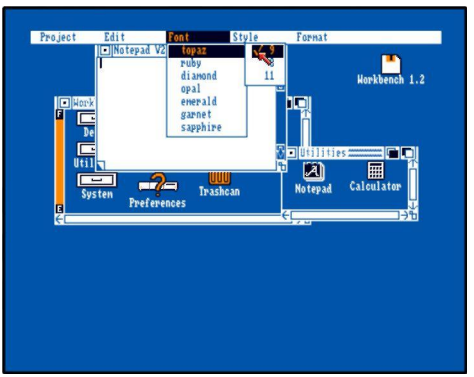
In some tools, not all menu items are available at all times. Menu items that you cannot choose appear as *ghost items:*



Commands and Options

In menus, there are two kinds of items. *Commands* are items that you choose to perform an action. One example of a command is the Open item in the Workbench menu. You chose Open to open a window.

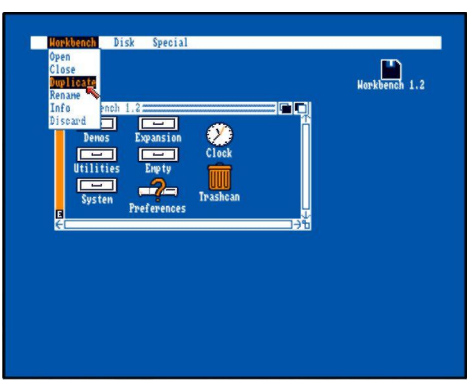
Options are choices that persist until you choose other, mutually exclusive options. Examples of options are the type styles available in the Amiga Notepad. Options you've chosen are indicated by check marks to the left of the menu items:



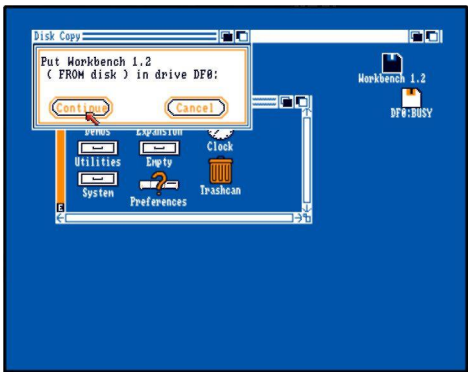
Duplicating Your Disks Using a Menu

It's important to make duplicates of your original disks and keep the originals in a safe place. You can use these duplicates, called *working disks,* for everyday use. Before you do anything else with the Workbench, follow these directions for duplicating disks:

Select the icon for the Workbench disk, then choose Duplicate from the Workbench menu:



A *requester* appears. A *requester* is something the Amiga uses to communicate with you. Here, the requester tells you how many times you'll have to change disks as you copy. Select Continue to go on:



A new requester asks you to put the disk you want to duplicate in drive df0: (Drive 0 is the disk drive in the main unit. Drive df1: is an external disk drive.) Since the Workbench disk is already in drive df0:, select Continue to go on.

Next you'll see a requester that asks you to insert the disk to receive the copy. Take out the Workbench disk, insert one of the blank disks, then select Continue.

Finally, there is a series of requesters asking you to exchange disks.
(In these requesters, "volume" is another term for "disk.") Insert the disk each requester asks for, then select Continue.

When you've finished copying the disk, remove the copy and label it using one of the self-adhesive disk labels packaged with most new disks.

Two warnings: Copying a disk destroys any previous information stored on the disk that receives the copy. If, when you copy a disk, you insert the destination disk in place of the source disk, you will not get a message telling you that you've inserted the wrong disk. Be sure to insert the correct disk.

Copy the other disk in the same way: insert the disk you want to copy, select the icon for the disk, choose Duplicate from the Workbench menu, then follow the instructions in the requesters. Be sure to label the copies when you're finished.

With an optional A1010 *external 3.5 inch disk drive* (available from your Amiga dealer), you eliminate the disk swapping involved in copying disks with a single drive.

When you've made copies of both disks, put the original in a safe place and use only the working disks. That way, if you lose or damage a working disk, you'll be able to make another copy from the original.

To learn about proper care for your disks, see Chapter 9, "Caring for the Amiga."

Resetting the Amiga

Before going on, you need to insert the newly copied Workbench disk, then *reset* the Workbench. To reset, **make sure the disk drive light is off,** hold down the CTRL key, the Commodore key, and the Amiga key at the same time for at least half a second, then release the keys. When you reset the Workbench, you clear the Amiga's *memory* the electronic circuits the Amiga uses to store information then the Workbench reappears. You're back to where you were when you first inserted the Workbench disk.

Two warnings:

NEVER reset the Workbench when a disk drive light on. Resetting when the light is on may damage the information on the disk.

When you reset the Workbench, any work that has not been saved to disk is lost. When you begin using the tools on the Amiga, remember to save your work before you reset.

Now that you're acquainted with the mouse, menus, and disk operations, you're ready to use the Workbench tools. Chapter 4 starts you working on Workbench projects, and Chapter 5 covers the many other things you can do with the Workbench.

AMIGA

Chapter 4

Using the Workbench

The Workbench is a tool you use to control the Amiga. This chapter describes the Workbench and the tasks you perform with it.

What Is the Workbench?

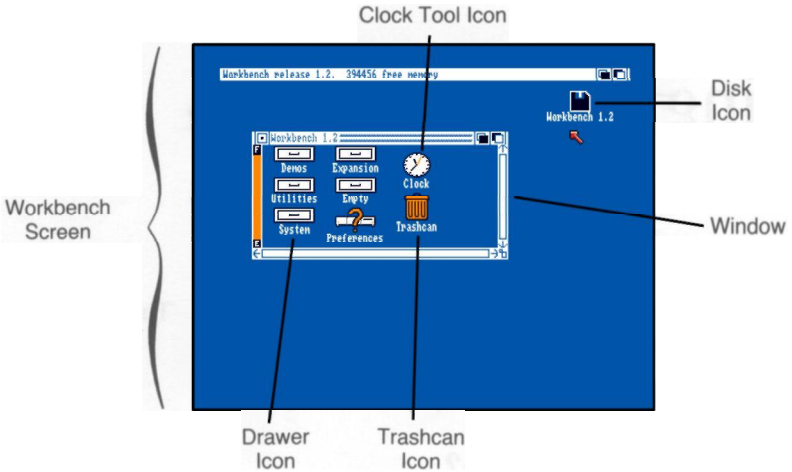
The Workbench is:

- a tool you use to control the Amiga. You open the Workbench by inserting a disk, called a *Workbench disk*, that contains the Workbench tool.

- an area of the display—a *screen*—set aside for the Workbench.

What's on the Workbench?

When you open the Workbench disk, here are the things you see on the Workbench screen:



Icons

Icons are small pictures that appear on the Workbench. They represent:

- tools
- projects
- disks
- *drawers,* places where you keep tools, projects, and other drawers
- the *Trashcan,* which you use to discard tools, projects, and drawers

Windows

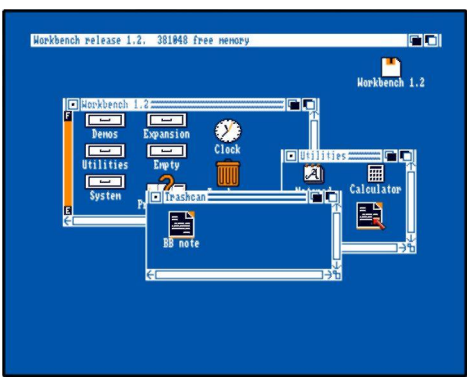
Windows let you see the contents of projects, drawers, disks, and the Trashcan. Each window has a *Title Bar* at the top to identify it. In addition, a window may have one or more *gadgets* that let you change what's being displayed or that let you communicate with a tool. Gadgets are described later in this chapter in the section "Workbench Operations."

Screens

On the Amiga, the way visual information is displayed can be different for different tools. To change the display, tools request different *video attributes.* These attributes include:

- horizontal resolution, the number of *pixels* that appear on each line of the display
- number of colors displayed in the screen
- color palette, the colors that appear in the screen
- interlace, which doubles the number of horizontal lines that appear in the screen

Screens are areas of the display with the same video attributes. They are always as wide as the display. Each screen contains one or more windows:



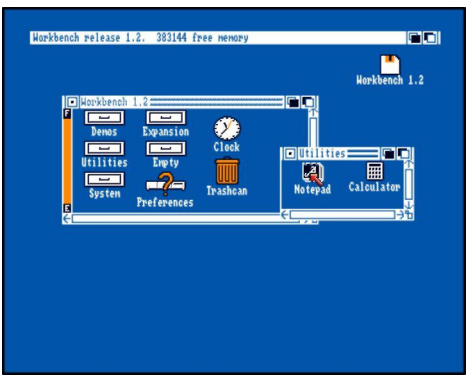
Creating a Project

You'll use most Amiga tools to create *projects.* Using the techniques described in the last section, you can use the Workbench to work with tools, projects, drawers, and disks. You move the Pointer, double-click to select, and use menus as introduced in the last chapter.

One example of a project is a note you write with the *Notepad*, a tool that is included on your Workbench disk. Notepad is reviewed later in the next chapter on Workbench tools, but to give you some experience with projects, let's use it now. All the Workbench operations are explained thoroughly following this example, but let's try creating a project just to get you started really **using** Workbench. Here's how to write a note:

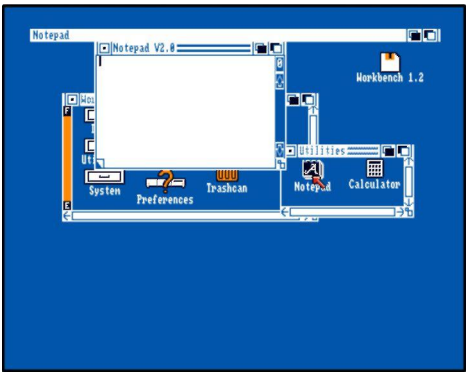
Select the Utilities drawer on the Workbench, then choose Open from the Workbench menu, or simply double-click on the Utilities drawer.

In the window that appears, you'll see the icon for the Notepad:

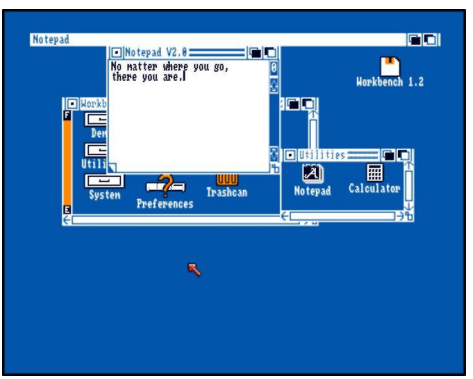


Open the Notepad by selecting its icon, then choosing Open from the Workbench menu, or by double-clicking on the Notepad icon.

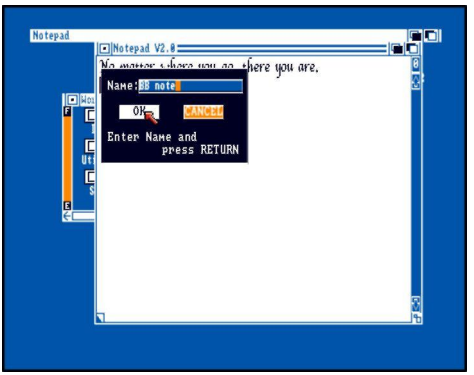
In a few moments, a window for the Notepad appears:



Using the keyboard, type in your note:

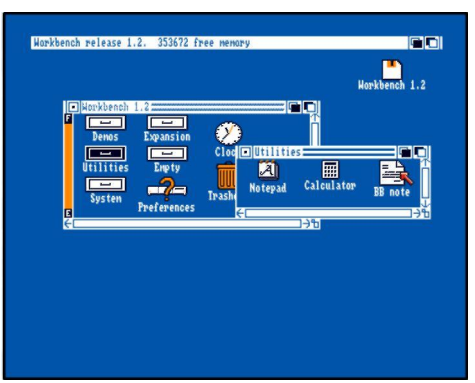


To save your note, choose Save As from the Project menu. (Because the Notepad window is selected, you'll see menus for the Notepad in place of the Workbench menus.) Select the box that appears to the right of the word "Name:", type in a name for your note (the name can be up to 25 characters long), press the Return key on the keyboard, then select the OK gadget.



If you make a mistake in typing, don't worry. Just use the cursor keys to reposition the cursor next to the error. Then press the **Backspace** key to delete the character to the left, or the **DELETE** key to delete the character to the right. Then type the correct letters, and they are automatically inserted.

When you're done, choose Quit from the Project menu. The next time you open the Utilities drawer, you'll see a new icon. This is the icon for your note:



If you want to get back your note, open it by pointing to its icon and double-clicking the Selection button. When you reopen your note, the Notepad is also reopened. You can then add to or change the note.

Now that you're acquainted with the Workbench, menus, and projects, you're ready to use other Amiga tools. Take time now to become familiar with the aspects of how to operate Workbench. When you're done, you can read Chapter 5 to learn the many other things you can do with the Workbench.

Operations Involving Tools and Projects

Opening Tools and Projects

When you open a tool or project, you open a window that lets you see the contents of the project or lets you communicate with the tool. To review, there are two ways to open a tool or project:

- Select the icon for the tool or project, then choose Open from the Workbench menu.

- Point to the icon, then double-click the Selection button.

Opening a project automatically opens the tool used to create it.

On the Amiga, you can have more than one tool open at the same time. This ability is called *multi-tasking,* meaning the Amiga is able to perform several tasks at once. Note, however, that each new tool you open requires a certain amount of *memory.* Memory is the set of electronic circuits within the Amiga used to keep information.

If, when you try to open an additional tool, there isn't sufficient memory for it, the Workbench gives you the message "Cannot open [name of the tool]. Error 103" at the top of the screen.

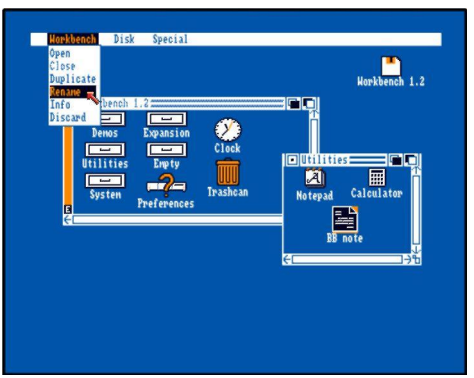
Duplicating Tools and Projects

Duplicating a tool or project means making an identical copy in the drawer in which the tool or project resides. To duplicate, select the icon for the tool or project, then choose Duplicate from the Workbench menu.

The name of the new tool or project is "copy of" added to the name of the tool or project that was copied. For example, duplicating the Clock gives you a new tool named "copy of Clock."

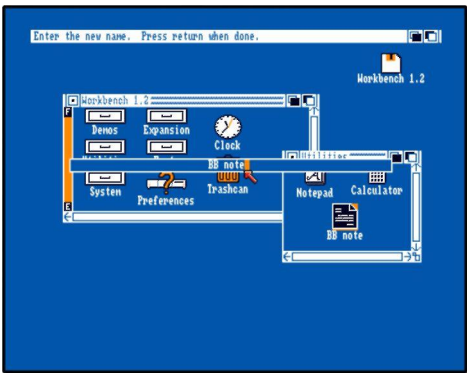
Renaming Tools and Projects

To rename a tool or project, select its icon, then choose Rename from the Workbench menu. A message appears in the Title Bar and a *gadget* in the middle of the screen containing the name of the icon.



A gadget is a box Workbench gives you to enter information, to communicate with the Amiga. Type in a new name, and press the Return key. If you click the

Menu button while the gadget is displayed, your input will not be accepted. To reselect the gadget so that you can type in the name, point anywhere within the gadget and click the Selection button.



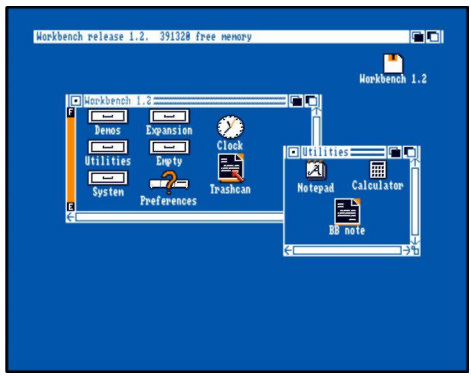
About String Gadgets. The gadget that appears is called a *String Gadget.* (The term *string* refers to a set of one or more characters.) As you use the Amiga, you'll find that String Gadgets appear in requesters when a tool needs information in the form of text. When you use String Gadgets, note that you can change the string that appears in the gadget. Press the DEL key to delete the characters at and to the right of the *Text Cursor* (the marker that appears in the gadget). Press the Backspace key to delete characters to the left of the text cursor. You can erase what appears in the gadget by pressing the Amiga key and the X key at the same time. You can get back what was in the gadget before you made any changes by pressing the Amiga key and the Q key at the same time.

Getting Information About Tools and Projects

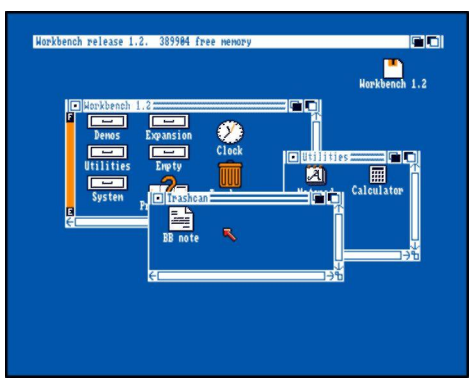
To get information about tools and projects, select the icon for the tool or project, then choose Info from the Workbench menu. The information includes the *type* (project, tool, drawer, or disk) of the object you've selected, as well as various measures of its size (note that some of these are only of interest to software developers and others who must deal with the inner workings of the Amiga). You can also change the *status* of the object by selecting one of the gadgets below the word STATUS. The normal setting is DELETEABLE, which allows you to delete an object. Select NOT DELETEABLE if you want to prevent an object from being deleted.

Discarding Tools and Projects

To discard a tool or project, drag its icon over a Trashcan icon. When you do, the tool or project is kept in a special drawer maintained by the Trashcan.



It remains in this drawer until you select the Trashcan icon, then choose Empty Trash from the Disk menu. If you haven't emptied the trash since you last put something in the Trashcan, you can retrieve what you discarded by opening the Trashcan in the same way you open a project, then dragging its icon to an open drawer somewhere on the Workbench. Note that when you discard something, you do not reclaim disk space until you choose Empty Trash.



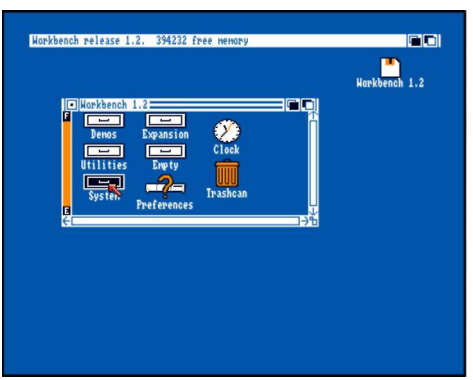
You can also discard a tool or project by selecting its icon, choosing Discard from the Workbench menu, then selecting Retry in the requester that appears. **WARNING: When you choose Discard to discard a tool or project, you cannot get the tool or project back.**

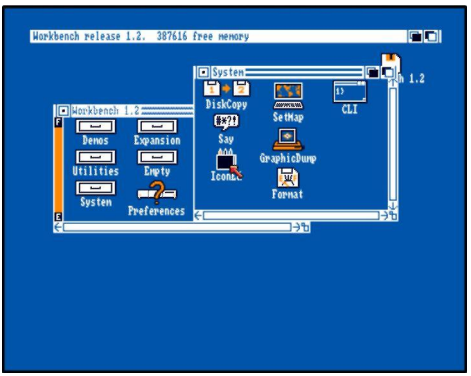
Operations Involving Drawers

Drawers are places where you can keep tools, projects, and other drawers. You can use drawers to keep order on the Workbench and to keep related items together.

Opening Drawers

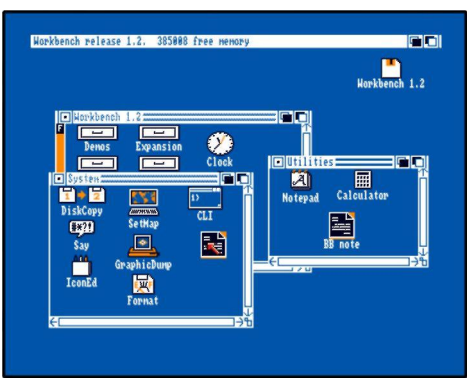
You open a drawer in the same way you open a tool or project: either point to the icon for the drawer and double-click the Selection button or select the icon for the drawer, then choose Open from the Workbench menu. Opening a drawer gives you a window in the Workbench screen.





Moving Tools, Projects, and Drawers

To move a tool, project, or another drawer into a drawer, open the drawer into which you want to put the tool, project, or drawer, then drag the icon into the drawer's window:



Another way to move a tool, project, or another drawer into a drawer is to drag the icon over the icon for the drawer into which you want to put it.

Duplicating Drawers

To duplicate a drawer, select the icon for the drawer, then choose Duplicate from the Workbench menu. A new drawer, whose name is "copy of" added to the name of the drawer that was duplicated, appears in the window.

To create a new drawer, you duplicate another drawer. The quickest way is to duplicate the empty drawer that appears on the Workbench, then give the new drawer a new name.

Renaming Drawers

To rename a drawer, select the icon for the drawer, then choose Rename from the Workbench menu. A message then appears asking you for a new name. Select the window that appears, type in a name, then press the Return key.

Discarding Drawers

To discard a drawer, drag the icon for the drawer over the Trashcan icon. Putting a drawer in the Trashcan does not free disk space until you select the Trashcan icon, then choose Empty Trash from the Disk menu.

You can also discard a drawer by selecting the icon for the drawer, choosing Discard from the Workbench menu, then selecting Retry in the requester that appears. **WARNING: When you choose Discard to discard a drawer, you cannot get the drawer back.**

Special Drawers: Disks and the Trashcan

Disks and the Trashcan are special kinds of drawers. Disks differ from other drawers in these ways:

- You cannot discard a disk by dragging its icon over the Trashcan icon.
- You cannot move a disk into another drawer.

The Trashcan differs from other drawers in these ways:

- You cannot move the Trashcan into another drawer.
- You cannot duplicate the Trashcan.
- You cannot discard the Trashcan.
- You can discard all tools, projects, and drawers in the Trashcan by selecting the Trashcan icon, then choosing Empty Trash from the Disk menu.

Operations Involving Windows

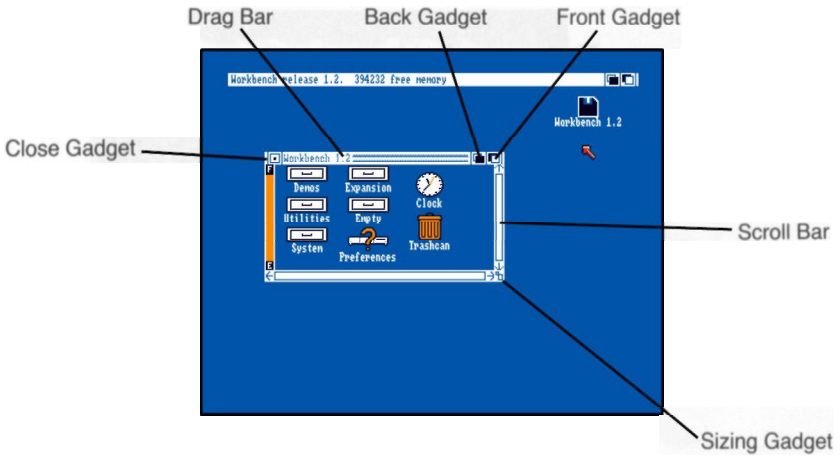
When you open a tool, project, drawer, disk, or the Trashcan, a window appears on the Workbench. This newly opened window appears in front of any other windows with which it overlaps.

Windows appear within screens. They cannot be moved from one screen to another. While all the windows in a screen can display information, only one window can accept information from you at a time. This window is called the *selected window.*

To select a window, point anywhere within the window and click the Selection button.

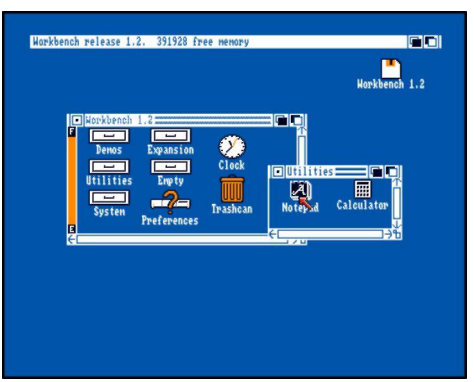
Using Gadgets

You change the size of a window, change what's displayed in the window, move the window, and do other things with windows with the help of gadgets. You also use gadgets to communicate with tools. Here are some common gadgets found in windows:



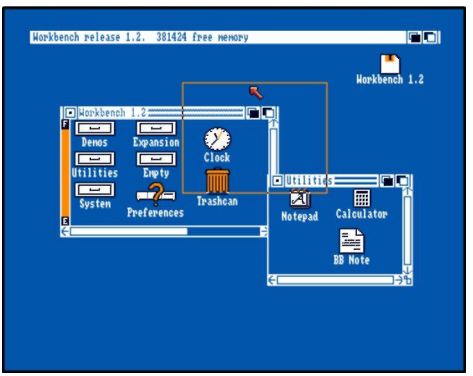
Windows can contain all, some, or none of these gadgets. In addition, windows can contain other gadgets needed for a particular tool.

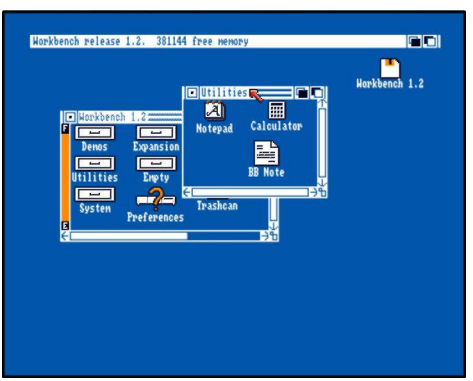
Like menu items, gadgets in a window can appear as *ghost gadgets.* Here, a ghost Drag Bar indicates that the window is not selected:



Dragging Windows

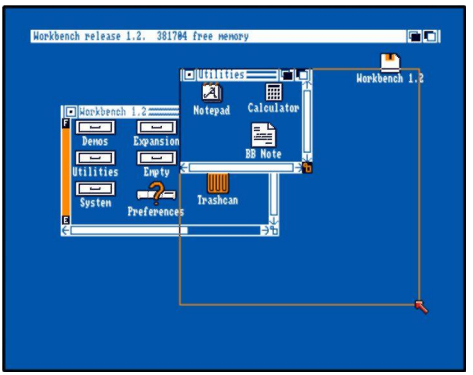
You drag a window by pointing anywhere in the window's Title Bar that is not occupied by other gadgets (the *Drag Bar)*, holding down the Selection button, and moving the mouse:

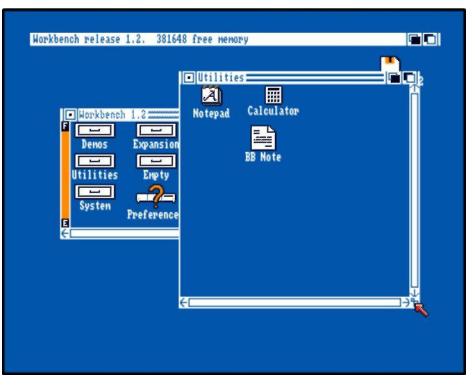




Sizing Windows

To change the size of a window, you drag its *Sizing Gadget:*



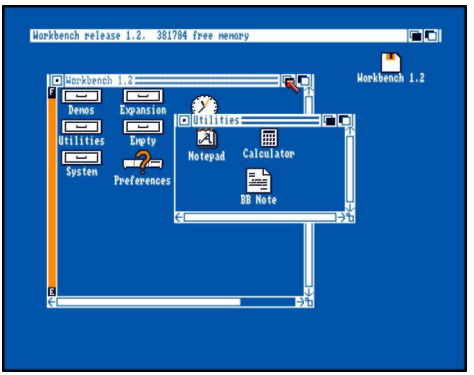


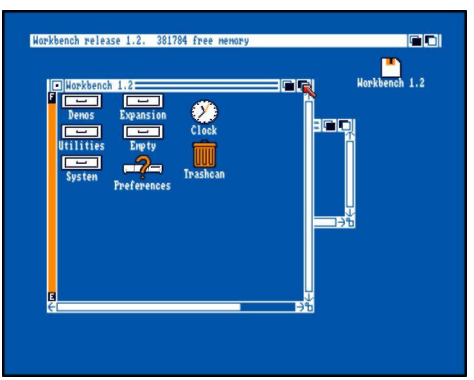
Note that some windows have a maximum size that is smaller than the screen in which they reside, like the window for the calculator tool.

Moving Windows in Front of Other Windows

When windows overlap, one window appears in front of the others.

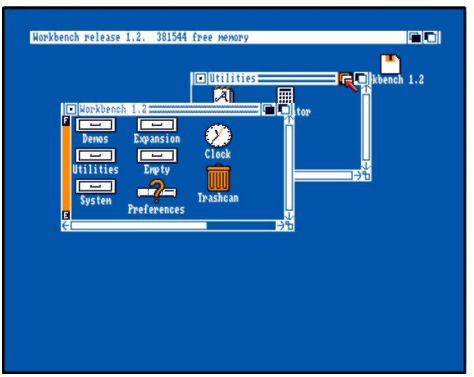
To move a window in front of other windows, select the *Front Gadget:*

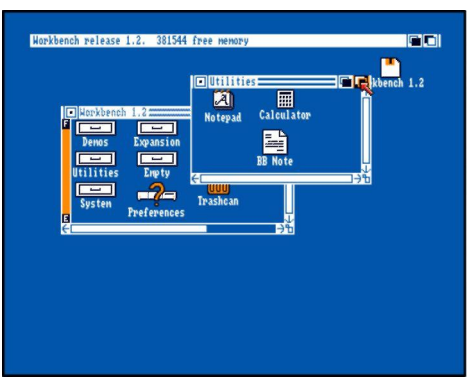




Pushing Windows Behind Other Windows

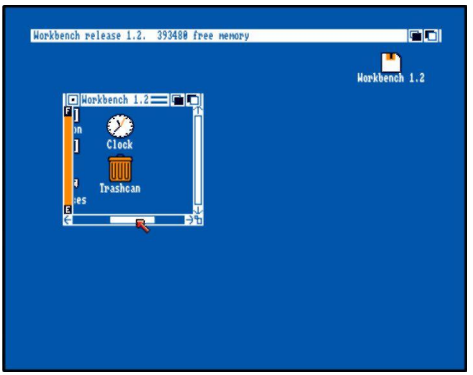
To move a window behind other windows with which it overlaps, select the *Back Gadget:*



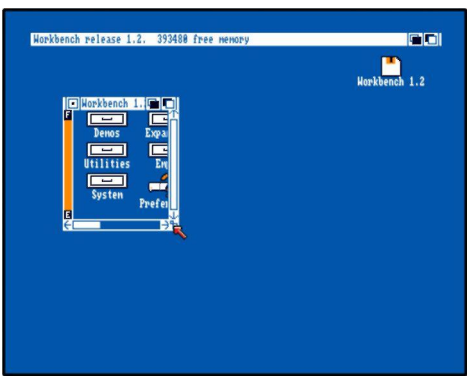


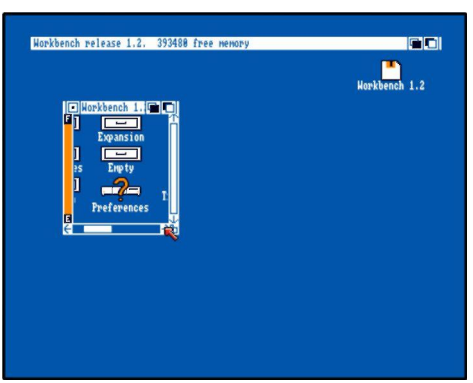
Scrolling the Contents of a Window

For many windows, you can't display everything that can appear within the window at once. Because of this, windows often have *Scroll Bars* that let you move what appears in the window:



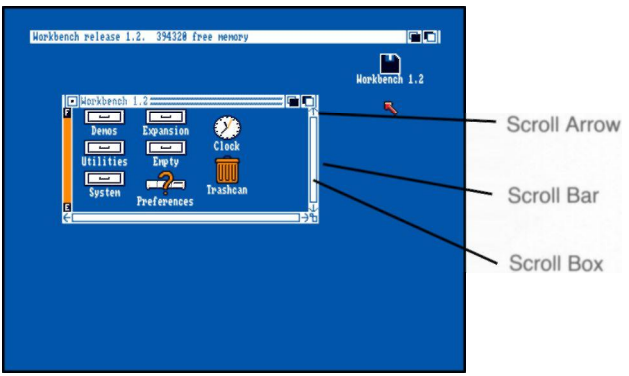
You can move half a window at a time by selecting a *Scroll Arrow* at either end of the Scroll Bar:





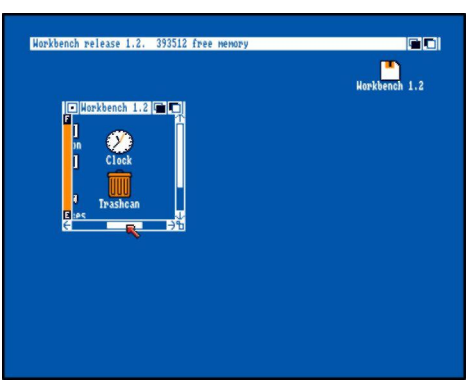
Pressing the Shift Key while selecting a Scroll Arrow moves the window one pixel.

Scroll Boxes change size according to how much can appear in a window. If the window is as wide as what can appear, the Scroll Box in the horizontal Scroll Bar fills the entire space between the Scroll Arrows:

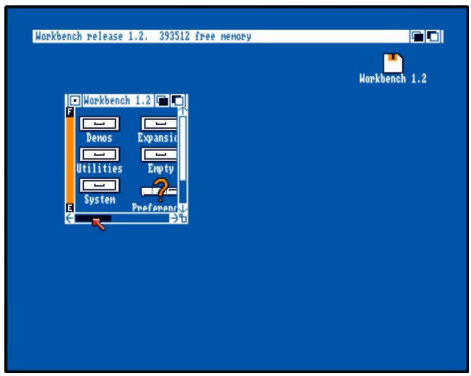


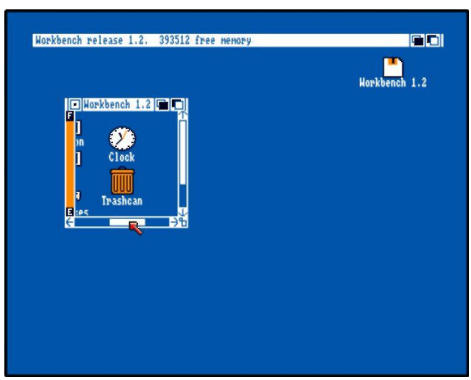
If, for example, only half of what can appear is within the window, the Scroll Box fills only half the space between the Scroll Arrows.

The position of the Scroll Box indicates what part you're seeing:



To move what appears in a window, you can drag the Scroll Box:

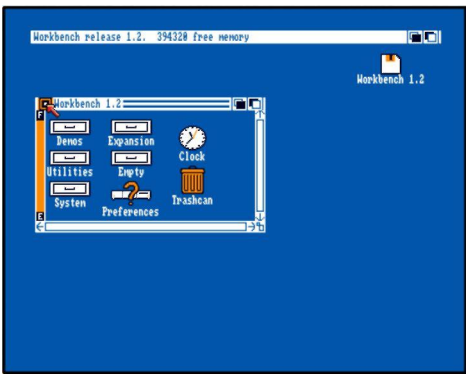




Selecting the space to either side of the Scroll Box causes the box and the window to move in that direction.

Closing Windows

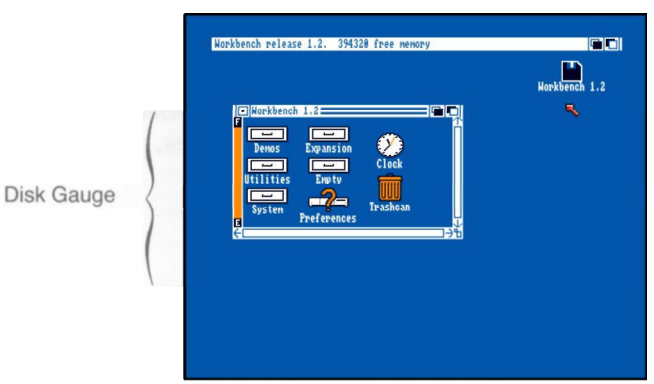
To close a window, select the *Close Gadget:*



You can also close a window for a drawer by selecting its icon, then choosing Close from the Workbench menu.

Disk Gauges

When you open a disk, the window that appears has a *disk gauge* along its left edge:



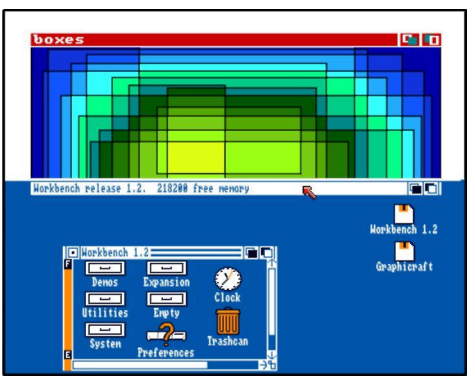
This gauge shows how full the disk is. The closer the colored center bar is to the top, the less free storage space there is on the disk. If the disk is completely full, the colored bar fills the entire space between the "E" and "F" marks.

To free disk space, move tools, projects, or drawers to the Trashcan, select the Trashcan icon, then choose Empty Trash from the Disk menu.

Operations Involving Screens

As noted earlier, screens are areas of the display with different video attributes. When a window is opened for a tool, it appears in a screen whose video attributes are appropriate for it.

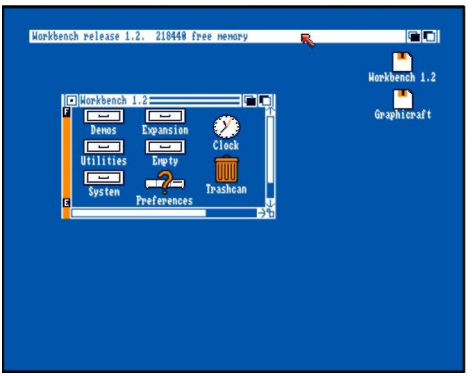
Screens are always as wide as the display, and are no larger than the display. Although the height of a screen is fixed, part of a screen can be off the display:

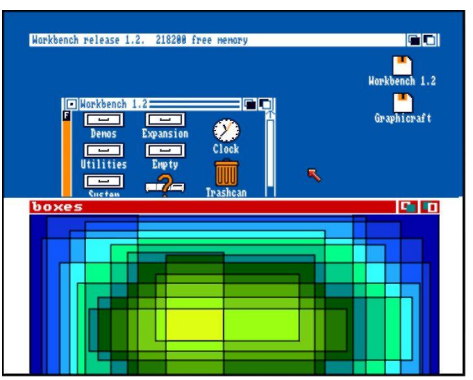


Screens, like windows, can contain gadgets. Note that a window within the screen can cover the screen's gadgets. If this happens, you must drag or resize the window to reveal the gadgets underneath.

Dragging Screens

To drag a screen, point anywhere in the screen's Title Bar that is not occupied by other gadgets (the screen's *Drag Bar),* hold down the Selection button, then move the mouse:



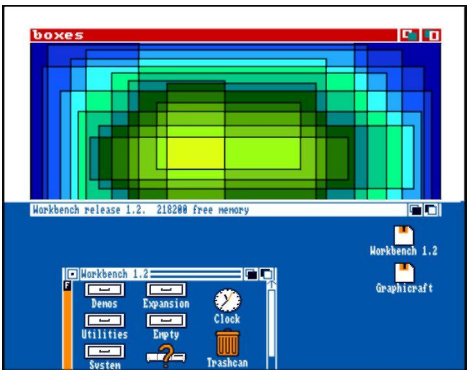


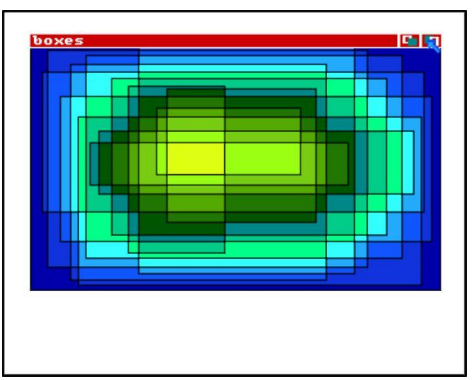
You can drag a screen down so that part of it is off the bottom of the display. Note that you cannot drag a screen up so that the bottom of the screen is above the bottom of the display.

If a screen occupies less than the entire display area, when you drag it down the monitor will show all of the screen that will fit on the display. However, you will not be able to move the pointer to any icons that are below the bottom of the original screen position.

Moving Screens in Front of Other Screens

To move a screen in front of other, overlapping screens, select the screen's Front Gadget:

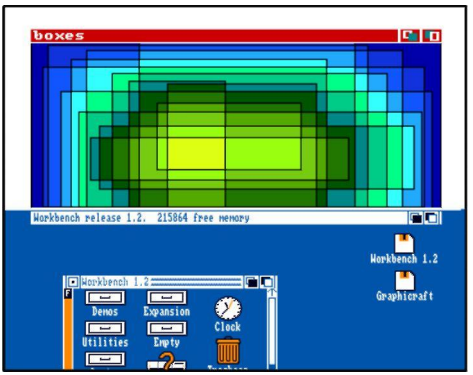


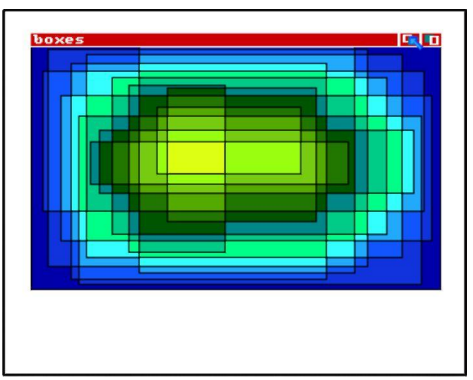


For the Workbench screen, there is a selection shortcut you can use to move it to the front: while holding down the Commodore key, press the N key.

Pushing Screens Behind Other Screens

To move a screen behind other, overlapping screens, select the screen's Back Gadget:

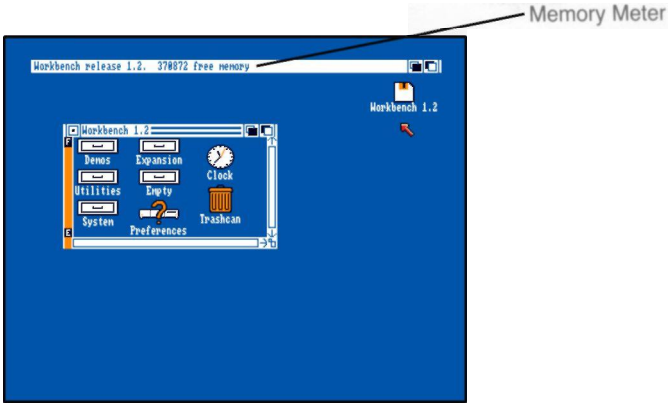




For the Workbench screen, there is a selection shortcut you can use to push it to the back: while holding down the Commodore key, press the M key.

The Memory Meter

At the top of the Workbench screen is a *memory meter:*



The meter shows the amount of free *RAM (random-access memory)* available to you.

Operations Involving Requesters

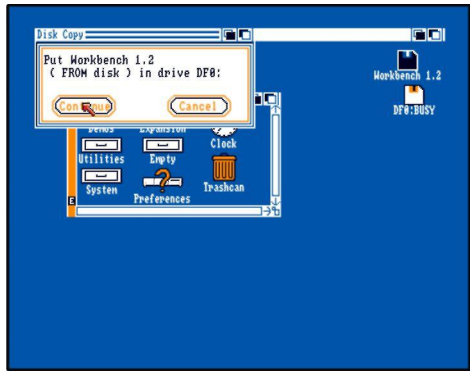
A *requester* is an area within a window that a tool uses to communicate with you. Requesters are automatically selected when they appear.

A *system requester* is a requester that appears when AmigaDOS or another program needs a response from you. An example is a requester that asks you to insert a disk.

A system requester can appear in any screen. If the screen containing a system requester is obscured by another screen, the screen containing the requester is brought to the front; this ensures that the requester is visible.

When you've replied to the requester, you can move the screen to the back by selecting the screen's Back gadget (at the upper right of the screen). If the requester appears in the Workbench screen, you can also move the screen back by holding down the Commodore key while you press the M key.

Here is an example of a requester:



To respond to a requester, use the gadget or gadgets it provides. Among the gadgets, there are always one or more *exit gadgets* that you select to close the requester. In many requesters, the OK gadget is an exit gadget. Many requesters also have a Cancel gadget you select if for any reason you don't want to perform an action.

Autorequest requesters contain only two gadgets: a Retry or Continue gadget and a Cancel gadget. Select by pointing to the gadget and clicking on the Selection button in the usual way.

You can also use the keyboard to select: hold down the Commodore key while pressing the V key to select Resume or Continue. To select Cancel using the keyboard, hold down the Commodore key and, with the key still down, press the B key.

Some requesters use string gadgets that accept text. For example, the gadget that appears when you choose Rename from the Workbench menu is a string gadget. String gadgets contain a cursor you can move with the cursor keys or the pointer and Selection button. If you click the Menu button outside the gadget, the cursor goes away and the gadget is no longer selected. To select the gadget again, move the pointer to anywhere inside the gadget and press the Selection button.

Alerts are messages the Amiga provides if there is something seriously wrong with your Amiga or with the tools you're using. Alerts are hard to ignore; they appear in boxes with flashing red borders.

At the top of alerts are the words "Software Failure" or "Not enough memory." If you get an alert, jot the number at the bottom of the box on a piece of paper if you can; refer to Appendix B, "AmigaDOS Reference," for an explanation.

Operations Involving Disks

Initializing Disks

To use a new disk with the Amiga, it must be *initialized.* If you copy a disk, the new disk is initialized as it receives the copy. To initialize a disk without making a copy, insert the disk in a disk drive, select the disk icon that appears on the Workbench, then choose Initialize from the Disk menu. The disk drive light will come on until the initialization is completed.

Duplicating Disks

To duplicate a disk, select the icon for the disk, then choose Duplicate from the Workbench menu. Note that when you choose Duplicate, the Amiga makes use of only one disk drive even if there are two or more drives.

Copying Disks

In the last chapter, you saw how to copy disks using menus. The quick way to copy a disk is to drag its icon over the icon for a disk that will receive the copy. If you have more than one disk drive, a requester asks you to insert the disk you want to copy (the *source disk)* into one of the drives, and the disk to receive the copy (the *destination disk)* into another. (Note that "drive df0:" referred to in the requester is the internal drive. "Drive df1:" is the external drive.)

Two warnings:

Copying a disk destroys any previous information stored on the disk that receives the copy.

If, when you copy a disk, you insert the destination disk in place of the source disk, you will not get a message telling you that you've inserted the wrong disk. Be sure to insert the correct disk.

Moving a Tool, Project, or Drawer to a New Disk

To move a copy of a tool, project, or drawer to a new disk, open the disk you want to move it to, then drag the icon into the window for the disk.

Renaming Disks

To rename a disk, select the icon for the disk, then choose Rename from the Workbench menu. A message then appears asking you for a new name. Select the window that appears, type in a name, then press the RETURN key.

RAM Disk

A *RAM disk* is an area of the Amiga's random access memory used for operations that normally involve disks. When you use the CLI to create a RAM disk, or when a program you are using creates a RAM disk for you, an icon for the RAM disk appears on the Workbench. The advantage in using a RAM disk is that programs stored in the RAM disk are accessed much faster than when loaded from a disk drive.

Once an icon for a RAM disk appears on the Workbench, it remains there until you reset or turn off your Amiga. You cannot create a RAM disk directly from the Workbench. See Chapter 7 on the CLI for a brief discussion on how to do this, and the *AmigaDOS Manual* published by Bantam Books for a more thorough explanation.

Expansion Drawer

The Workbench contains an *Expansion drawer* into which you can place icons for expansion devices (such as a hard disk) that you may add to your Amiga system. To install these icons, first open the Expansion drawer. Then simply drag the icon that represents the driver file for the device into the Expansion drawer. The driver file and its icon are supplied by the manufacturer of the device.

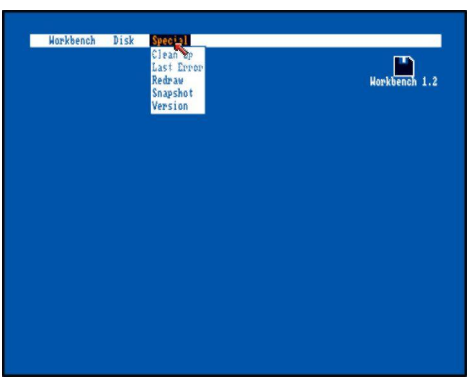
Resetting the Workbench

Resetting the Workbench means to set it up again. When you do, you start again with only the Workbench, and the Amiga's memory is cleared. If a tool malfunctions, you may be forced to reset before you can resume work. To reset the Workbench, hold down the CTRL key and both the Commodore and Amiga keys at the same time for at least half a second, then release the keys.

WARNING: Always make sure the disk drive light is off before resetting the Workbench.

Other Workbench Operations

There are five other tasks you perform on the Workbench. You choose each task—straightening up the Workbench icons, displaying the last error message, *redrawing* the display, saving the positions of icons and windows, and showing the internal version number of the Workbench—from the Special menu for the Workbench.



Cleanup

If a drawer is open and the icon you selected to open the drawer is currently selected, choosing Cleanup straightens up icons in the drawer.

Last Error

Choosing Last Error from the Special menu displays the last message that appeared in the Title Bar for the Workbench. Messages that appear in the Title Bar normally disappear as soon as you select something on the Workbench. (For explanations of error numbers that appear in the Title Bar, see Appendix B, "AmigaDOS Messages.")

Redraw

Choosing Redraw redraws some or all of what appears in the Workbench screen. Should a tool malfunction and disturb what appears in the Workbench screen, choosing Redraw may restore the screen.

Snapshot

Choosing Snapshot saves on disk the positions of currently selected icons. It also saves the sizes and the positions of windows that appear when you open any of the disk or drawer icons that are selected. (Note, however, that the positions of unselected icons within those windows are not saved.) Of course, to save this information on disk, the write-protect tab on the diskette must be "covered" to make the disk write-enabled.

You can take a snapshot of more than one icon at a time by using Extended Selection, which is explained on the next page.

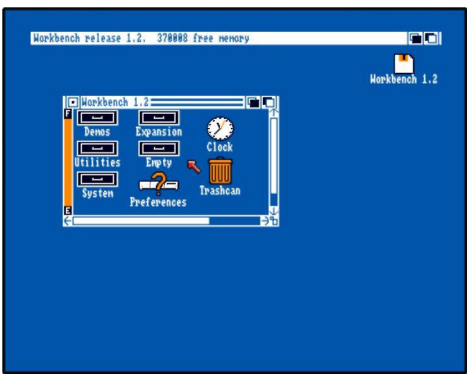
Version

Choose Version to display the internal version number of the Workbench in the Workbench Title Bar. This version number is important only for software developers and support personnel.

Mouse Tricks

This section describes a few helpful techniques of mouse manipulation that may save you time once you get used to using Workbench.

Extended Selection is a technique for selecting more than one icon in the same operation. To use it, hold down the Shift key while you select icons. Release the Shift key when you're done selecting:



You may use Extended selection to move several icons as a group, retaining their relative positions. To do this, hold down the Shift key, move to the icons you wish to select, and press the Selection button.

When you select the final icon to be moved, do not release the Selection button. Instead, release the Shift key. Now, while still holding down the Selection button, move the group of icons to the new location.

Now release the Selection button.

When you use extended selection for Cleanup or Snapshot, the entire group of icons you selected are affected.

Multiple Choice is a technique for choosing more than one menu item in the same operation. To use it, hold down the Menu button, then click the Selection button with the Pointer over each of the items you want to choose.

When you're done choosing, release the Menu button.

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AMIGA

Chapter 5

Workbench Tools

The Workbench disk contains several tools. The ones described in this chapter include:

- The *Clock*, the *Notepad*, the *Calculator* , the *Icon Editor*, the *Say* speech synthesizer, the *Graphic Dump*, and the *SetMap* keyboard selector.

- In addition, there are demonstrations that show the graphics abilities of the Amiga.

You can find these graphic demonstration tools in the *Demos drawer* on the Workbench. To start a demonstration, select one of the icons in the Demos drawer, then choose Open from the Workbench menu. To stop a demo, select the Close Gadget in the upper left-hand corner of the demonstration's window.

The Clock

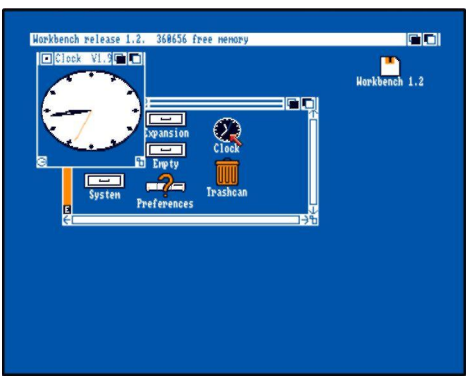
The Clock tool lets you show the current time. In addition, you can use the Clock as an alarm.

Setting the Time

To set the time for the Clock, use the Preferences tool. (To learn about Preferences, see Chapter 6.)

Opening the Clock

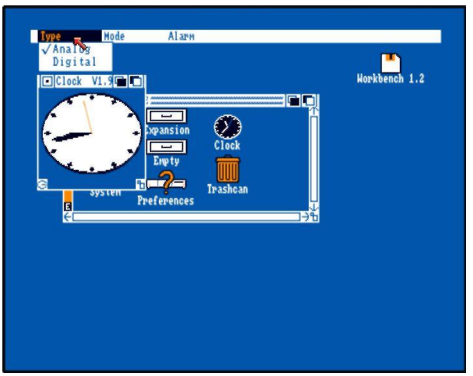
To open the Clock, double-click on the Clock icon in the Workbench disk drawer. When you do, an analog clock with a second hand appears in a window.

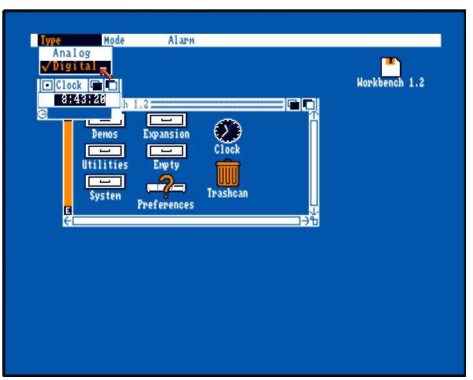


To choose from the menus described below, you must first select the window in which the Clock appears.

Changing the Clock from Analog to Digital

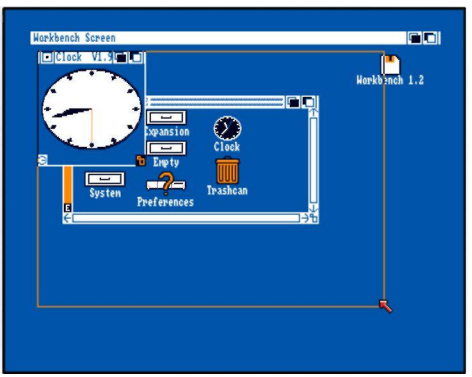
Choose the type of clock you want (either analog or digital) from the Type menu. The type currently chosen is indicated by a check mark.



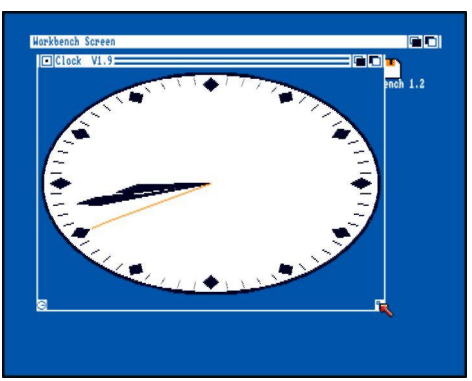


Changing the Size and Position of the Clock

To change the size of an analog clock, drag the Sizing Gadget at the lower right-hand corner of the window. (You cannot change the size of a digital clock's window.)



To move the Clock to a new location, drag the window by its Drag Bar.

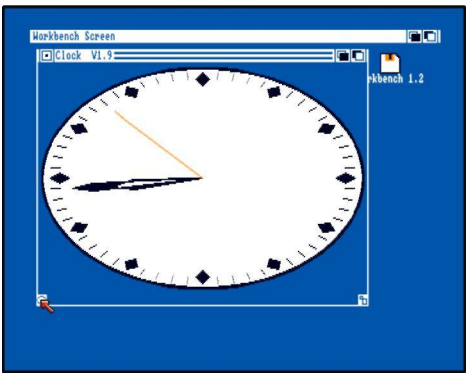


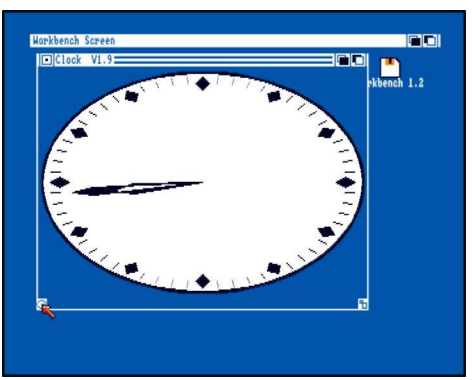
Changing from a 12- to a 24-Hour Clock

You can display either a 12-hour or 24-hour clock by choosing 12 Hour or 24 Hour from the Mode menu. The current setting is indicated by a check mark.

Displaying the Seconds

If you don't want to display the second hand on an analog clock or the digits for the seconds on a digital clock, select the Seconds gadget in the lower left corner of the Clock window. Selecting the Seconds gadget again restores the second hand or the seconds digits.

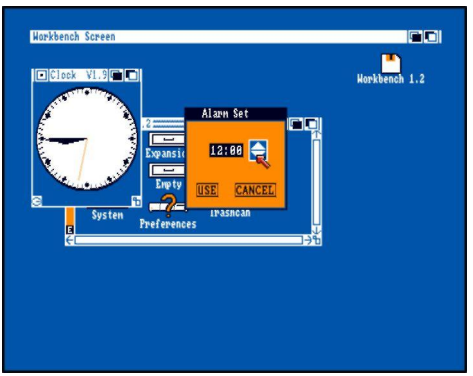




Setting the Alarm

The items in the Alarm menu let you use the Clock as an alarm clock. The "alarm" is a brief flash on the display (the same flash that appears when an error occurs) accompanied by an equally brief "beep" sound if your Amiga is attached to audio equipment. The window for the clock appears in front of all

other Workbench windows. To set the alarm, choose Set. In the requester that appears, the time is shown using either a 24-hour clock or a 12-hour clock with "AM" or "PM" indicated. To change the hour setting, point to the digits for the hours, click the Selection button, then select either the up arrow (to move the time ahead) or the down arrow (to move the time back). To change the setting for minutes, point to the digits for the minutes, click the Selection button, then select either the up or down arrow. Selecting AM or PM switches the setting.



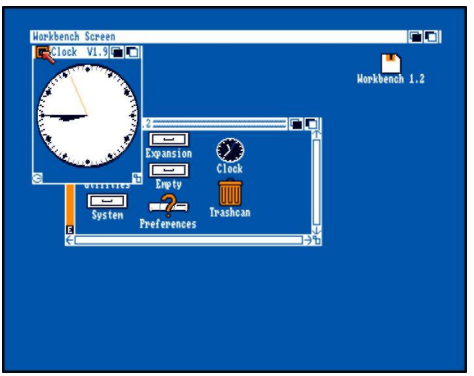
When the time is set correctly, select USE. If, instead, you want to restore the previous alarm setting, select CANCEL.

To turn on the alarm clock, choose Alarm On from the Alarm menu. To turn it off, choose Alarm Off.

NOTE: If you close the Clock, the alarm is no longer set.

Closing the Clock

To close the Clock, select the Close gadget in the upper right-hand corner of the window.

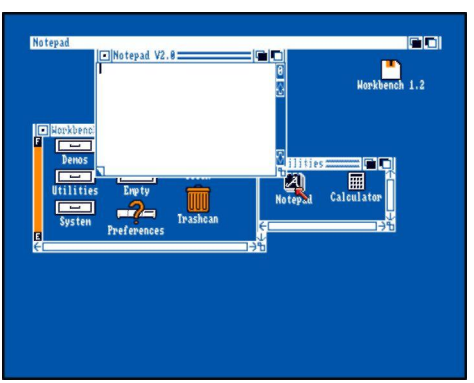


The Notepad

With the Notepad tool, you can keep notes or create short documents. You can find the Notepad in the Utilities drawer on the Workbench disk.

Opening the Notepad

You can open the Notepad by double-clicking on its icon. When you do, a window for the Notepad appears, and the Notepad fonts are loaded. The Notepad is ready to accept text when its window changes color.

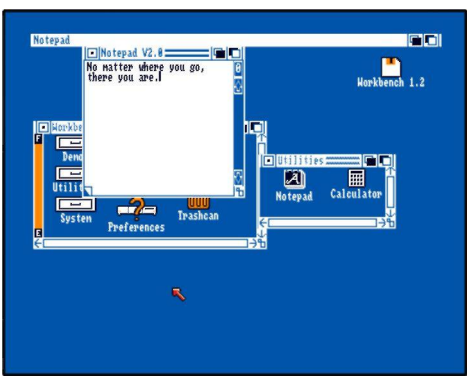


To open the Notepad without loading fonts from the disk, select the Notepad icon, chose Info from the Workbench menu, and select the Tool Types string window. Type "FLAGS = nofonts", press the Return key, and select the Save gadget.

If you open the Notepad without loading fonts from disk, you can choose the Read Fonts item in the Project menu to read the fonts into memory.

Entering Text

To enter text, select the Notepad window (if it isn't already selected), then type. The characters you type appear to the left of the Text Cursor (the vertical bar that appears in the window). As you add characters, any characters to the right of the Text Cursor move to the right or, if they're at the right edge of the window, down a line. (To see how this works, try adding characters.)



When you're typing and you reach the bottom of the window, the contents of the window are scrolled upward.

There is a limit to the number of lines you can include in a Notepad note. This varies, depending on the size of the fonts you use. (With the plain. 9-point Topaz font, which is the default font for Notepad, you can enter 163 lines.) When you reach the limit, characters you type no longer appear in the Notepad window.

Moving the Text Cursor

To move the Text Cursor, point to a place within your note, then click the Selection button. (Note that you cannot move the Text Cursor to a point in the window beyond where you've entered characters.) You can also move the Text Cursor by pressing the cursor keys. Note that when you press the up or down cursor key and you reach the top or bottom of the window, the contents of the window are scrolled.

You can move to the top or bottom of the current Notepad page by holding down the Shift key while pressing the Up cursor key to go to the top of the current page or the Down cursor key to go to the bottom of the page.

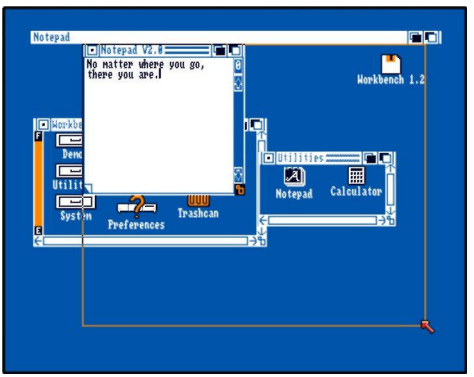
Holding down the Shift key while you press the Left cursor key moves the Text cursor to the beginning of the current line, while the Right cursor key moves you to the end of the line.

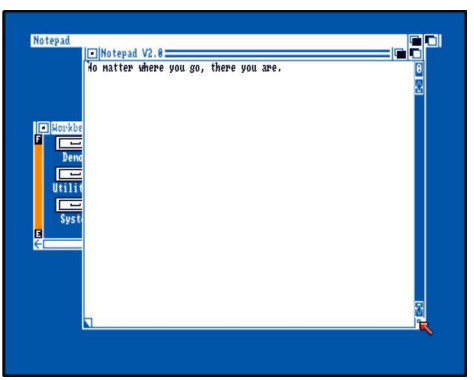
Tabbing

The Notepad contains predefined tab stops at eight-column intervals, i.e. the first tab is in column 8, the second in 16, etc. Press the TAB key to move to the next tab stop to the right of the cursor position.

Changing the Size of the Notepad Window

You can change the size of the Notepad window by dragging the Sizing Gadget at the lower right. When you do, your note is automatically reformatted.





Moving through the text

You can move through the text of a note a line at a time using the Scroll Gadgets at the right of the Notepad window. The Up Scroll Gadget is the arrow-shaped gadget immediately below the Previous Page Gadget. Selecting it moves the text in the window up one line. The Down Scroll Gadget immediately above the sizing gadget moves the text in the window down one line.

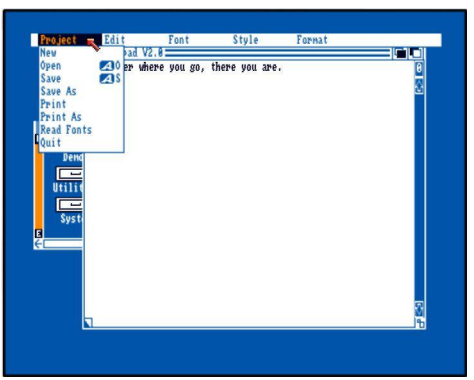
Moving from Page to Page

There are two additional gadgets in the Notepad window. The gadget at the lower left of the window is the Next Page Gadget. Select this gadget to display the next page of your note. The gadget at the upper right is the Previous Page Gadget. Select this gadget to display the previous page of your note. When a note is displayed, the page number of the current page appears in the Page Gadget.

The Notepad Menus

The Notepad has five menus: Project, Edit, Font, Style and Format. These are described below.

The Project Menu



New

Choose New to start a new note.

Open

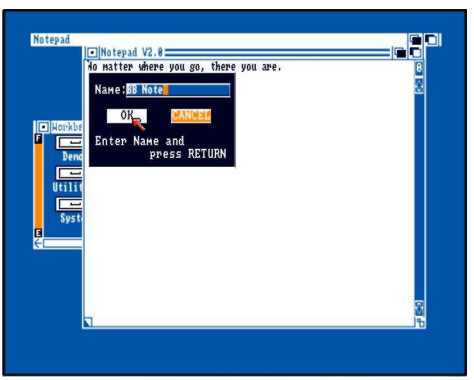
Choose Open to open a note you previously saved. When you do, a requester appears. Select the gadget to the right of "Name:" and then change the name, if one appears, to make it the name you want.

To change what appears in the gadget, press the Del key to delete the characters at and to the right of the Text Cursor. Press the Backspace key to delete characters to the left of the cursor. You can use the left and right cursor keys to move the cursor. You can erase what you've typed in the gadget by pressing the Amiga key and the X key at the same time. You can get back what was in the gadget before you started by pressing the Amiga key and the Q key at the same time.

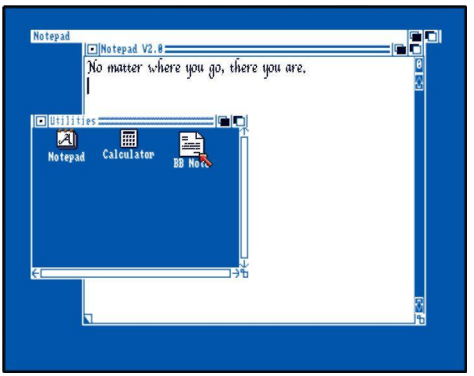
When you're done, press the Return key, then select the OK Gadget. The note whose name you type replaces the current note.

Save

Choose Save to save the current note. If you haven't already saved your note, a requester appears and lets you give it a name. Type a name, press the Return key, then select the OK Gadget.



If you save a project that you have changed with the Notepad and you do not specify an AmigaDOS directory name, the project is saved in the same drawer as the Notepad.



Save **As**

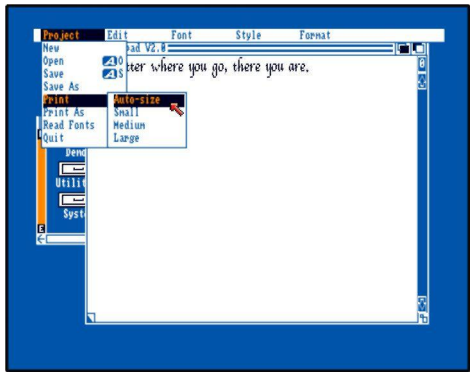
Choose Save As to save the current note under a new name. A requester appears containing the previous name of the project.

To change what appears in the gadget, press the Del key to delete the characters at and to the right of the Text Cursor. Press the Backspace key to delete characters to the left of the cursor. You can use the left and right cursor keys to move the cursor. You can erase what you've typed in the gadget by pressing the Amiga key and the X key at the same time. You can get back what was in the gadget before you started by pressing the Amiga key and the Q key at the same time.

When you're done, press the Return key, then select the OK gadget. Note that when choosing either Save or Save As, your note is saved in the drawer whose window was selected when you opened the Notepad.

Print

To print your note, you choose one of the items from the Print submenu. (To choose from the submenu, point to Print, then, with the Menu button still held down, move the Pointer to the right, point to one of the options explained below then release the Menu button.)



Choosing the Auto-size option prints an image that is approximately the same size as the image on the display. By choosing the Small option, you print an image whose width is one-quarter the width of the printer paper. (Use the Preferences tool to specify the width of the paper you're printing on. However, note that specifying different dimensions for the paper affects only notes printed when Draft option is chosen. The Draft option is described below.) By choosing the Medium option, you print an image whose width is one-half the width of the printer paper. By choosing the Large option, you print an image whose width is the full width of the printer paper.

If the Graphic option in the Print As submenu is chosen (see below), you print, for each page, a picture of what appears in the Notepad window. If the Draft option in the Print As submenu is chosen, you print plain text; different type sizes, styles, and fonts are not displayed.

Print As

From the submenu, choose Graphic if you want to print a pixel-by-pixel representation of the window in which your note appears. (If you have a color printer, you can print the note in color.) Choose Draft if you want to print only the text of the note.

If your note covers more than one page, you may wish to have a blank space at the top of each page. To add blank lines, select form-feeds from the Print As submenu.

Read Fonts

If you open the Notepad without reading fonts at that time (see above), select this option when you wish to read in the font library.

Quit

Choose Quit when you're done and want to close the Notepad.

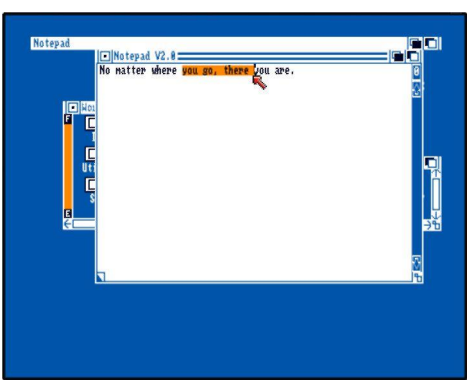
The Edit Menu

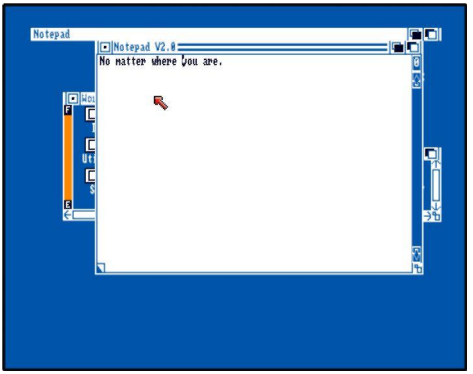
Cancel

If you have selected some text to cut or copy and make an error or change your mind, select Cancel. Similarly, this option can be used to terminate a find or replace (see below).

Cut

This is used to select text and put it on the Clipboard (a special "holding area" for text you want to manipulate) so that you can delete it (cut), or remove it from one location and insert it at another location (cut and paste). To cut, first point to the start of the text you want to cut and double-click the Selection button; then point to the end of the section of text and double-click the Selection button again. The selected text is now highlighted. To remove the highlighted text and place it on the Clipboard, choose Cut from the Edit menu.





Text stays "held" on the clipboard until you cut or copy new text.

You can also select text to cut by positioning the Text Cursor at the beginning of the text, choosing Mark Place from the Edit Menu, moving to the end of the text, then choosing Mark Place again.

Each time you cut or copy text, the text replaces the previous contents of the Clipboard.

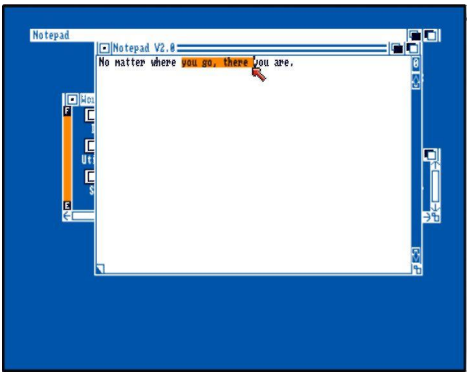
Paste

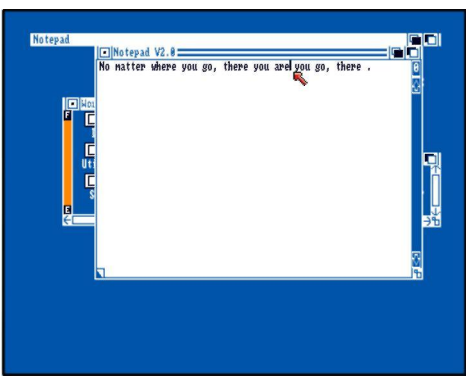
To paste text from the Clipboard into a note, point to the place in your note where you want the text to appear; click the Selection button to reposition the Text Cursor, then choose Paste from the Edit menu.

Your text is inserted at the new location.

Copy

Copy is used to duplicate text from one part of a note at another location. Select the text in the same manner as you would for Cut (point to the beginning and end of the section, double-clicking on the Selection button each time to indicate the position, or use Mark Place from the menu). Then choose Copy from the Edit menu. Position the Text Cursor at the new location and choose Paste. The text is duplicated.





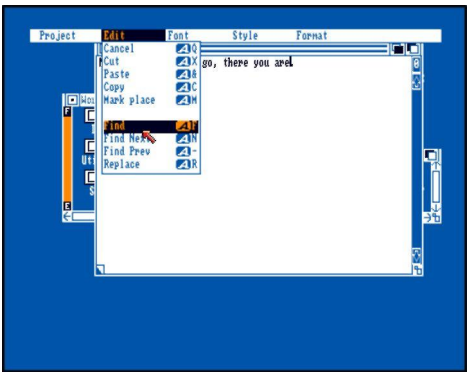
Each time you cut or copy text, it replaces the previous contents of the Clipboard.

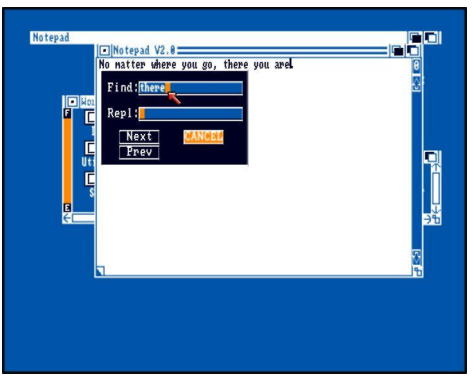
Mark Place

You can select the beginning or end of the text to be cut or copied by positioning the Text Cursor and choosing Mark Place.

Find

This is used to search for the occurrence of a character or group of characters in the note. Choose Find from the menu, and in the requester that appears, type in the text you want to search for, followed by the Return key. Now select the Next gadget to find the occurence following the Text Cursor position or Prev (for previous) to find the nearest occurrence before the Text Cursor position.





To automatically replace the character or group of characters with something else, select the Repl (replace) gadget, type in the new text and press the Return key before selecting Next or Prev. Then select the Replace option from the menu.

Find Next

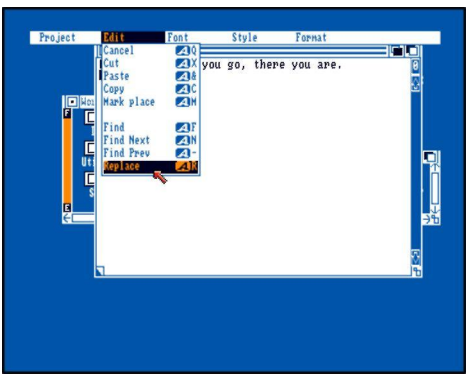
When you have located an occurence of the selected characters using the Find option above, to find the Next occurrence following, select the Find Next option from the Menu.

Find Prev

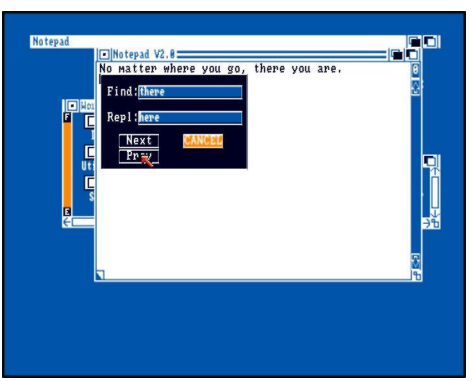
Once the occurrence of a character or group of characters has been located using the Find command, you can find the previous occurrence by selecting Find Prev from the menu.

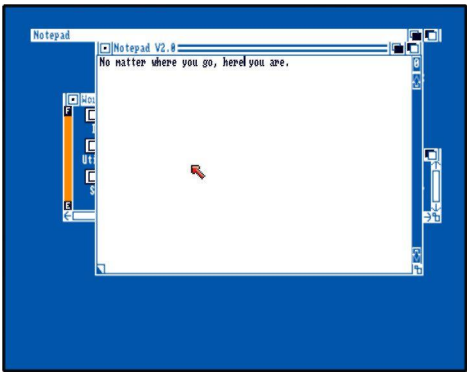
Replace

When an occurrence of selected characters has been found, to change it to a new character or group of characters, select Replace.



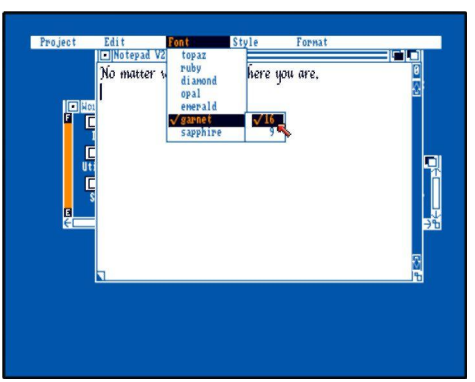
Whatever was typed into the Replace gadget in the Find requester now replaces the indicated character(s). If the Replace gadget is empty, the indicated character(s) are simply removed.

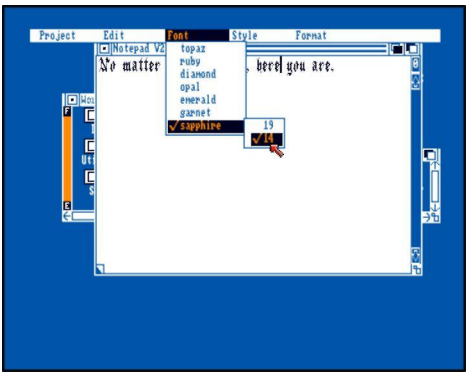




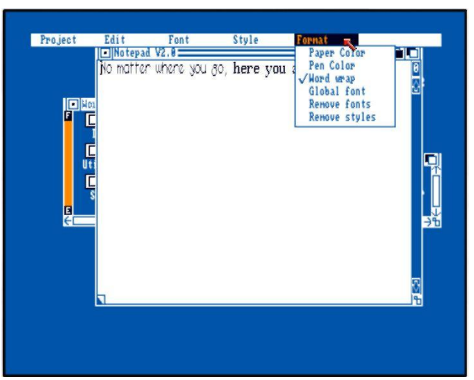
The Font Menu

From the Font menu, you can choose the typeface and type size for your note. The names of the seven different typefaces (Topaz, Ruby, Diamond. Opal. Emerald, Garnet, and Sapphire) are shown when you open the menu. The available type sizes for each typeface are shown in submenus. To choose from the Font menu, point to a name of a typeface; with the Menu button still held down, move the Pointer to the right into the submenu that appears, point to a type size, then release the Menu button.





To see the available typefaces and type sizes, type in a note, then select each of the choices. The currently chosen typeface is shown with a check mark to the left of the menu item. In addition, the currently chosen type size is shown with a check mark if there is more than one size for the currently chosen typeface.

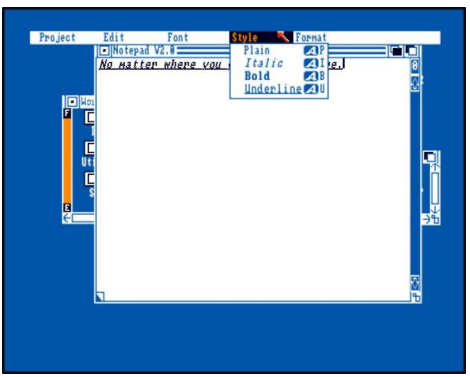


Note that the currently chosen typeface and type size apply to the entire note.

When you choose a new typeface and type size, a previous type size you chose for a different typeface may still have a check mark to the left of it. If this is the case and you attempt to choose the previous typeface again, nothing may happen. If this should occur, choose another type size for the previous face, then choose the size you want.

The Style Menu

From this menu, you can choose either standard (Plain) characters for your note, or change the type style by choosing Italic, Bold, Underlined, or any combination of the three. At any point in your note, you can choose a new type style; this sets a marker in your note and all the characters from this marker to the next (or to the end of the file, if there are no other markers) are changed to the new style. Try the different choices and watch how your note changes.



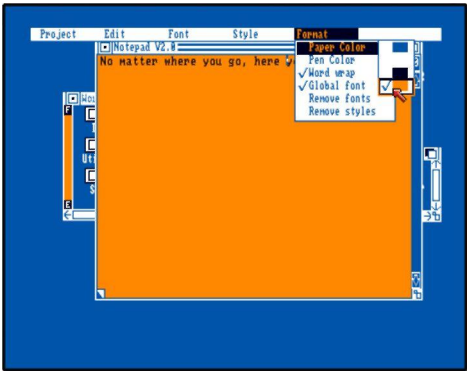
Note that when you choose Italic, Bold, or Underline, your choice stays in effect until you choose Plain.

There are command-key shortcuts for each of the items in this menu: press the Amiga key and the P key at the same time to choose Plain; the Amiga key and the I key to choose Italic; the Amiga key and the B key to choose Bold; the Amiga key and the U key to choose Underline. As a reminder, the shortcut for each item is shown in the menu to the right of the item.

The Format Menu

Paper Color

Choose Paper Color to change the background color for your note. You then choose a color from the four shown in the submenu (see the description of the Font menu above to learn how to choose from a submenu). The currently chosen color is indicated by a check mark.



Pen Color

Choose Pen Color to change the color of the characters in your note.
You then choose a color from the four shown in the submenu (see the description of the Font menu above to learn how to choose from a submenu).
The currently chosen color is indicated by a check mark.

Be sure that the pen color is different from the paper color; if you don't, you won't be able to read your note.

Word Wrap

This option, which is automatically selected when the Notepad is opened, ends each line of text at the end of a word. A check to the left of the Word wrap menu item indicates that the option is chosen. To turn off the Word wrap feature, choose the Word wrap item and to turn it back on, choose it again.

Global Font

This item determines whether your note contains a single font or a variety of fonts. It is automatically selected when Notepad is opened and there will be one font throughout your note. To change this so that you can use different fonts in different parts of your note, select the Global font option from the Format menu. The check mark no longer appears next to the option. To restore the Global fonts, choose the item again.

Remove Font

When a note has been created using more than one font, you can make the entire note appear in the same font by choosing Remove Font.

Remove Styles

You can remove all style changes (to and from italic, bold, underline, or plain text) in a note by choosing Remove styles from the Format menu.

Menu Shortcuts

Several of the menu options can be selected with a combination of keystrokes rather than using the pointer. These are shown to the right of the menu items. To use these short cuts, hold down the Amiga key, then with the key still held down, press the other key shown.

For reference, the other keys are listed below.

O	Open
S	Save
Q	Cancel
X	Cut
&	Paste
C	Copy
M	Mark Place
F	Find
+	Find Next
-	Find Previous
R	Replace
P	Plain
I	Italic
B	Bold
U	Underline

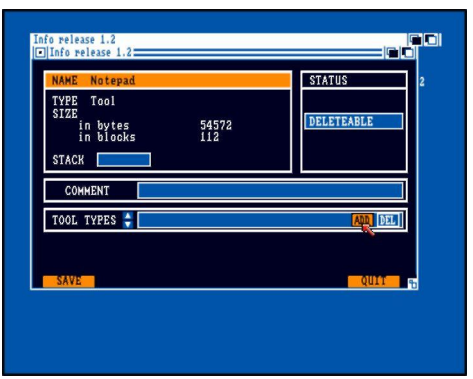
In addition, CTRL L redraws what appears in the Notepad window. (To enter a CTRL L character, hold down the CTRL key on the keyboard while you press the L key, then release both keys.)

Changing the Notepad Default Values

The default values of Notepad settings, such as window position, window size, font, print type, form feed, word wrap, etc., can be changed to suit your requirements. The procedures are explained below.

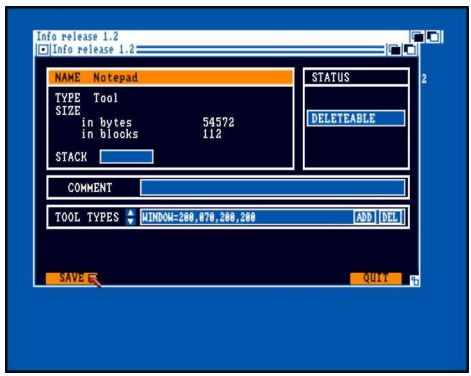
Changing the Notepad Window Default Position

You can specify the size and position where the Notepad window will appear whenever you open it. Select the icon for the Notepad, choose Info from the Workbench menu, and select the Add gadget. Type "WINDOW=" followed by:



- a three-digit number specifying the number of pixels from the left edge of the Workbench screen to the left edge of the window,
- a comma,
- a three-digit number specifying the number of pixels from the top edge of the Workbench screen to the top edge of the window,
- a comma,
- a three-digit number specifying the width of the window in pixels,

- a comma,
- a three-digit number specifying the height of the window in pixels. e.g. WINDOW=100,070,050,090



When you have completed your entry, press the Return key and select the Save gadget at the lower left of the requester. If the Notepad cannot create the window you have specified, it will ignore your request and continue to display the window in the previous position.

You can specify the position and size of the window for a note you have saved by selecting the icon for that note and then following the procedure described above.

Changing the Notepad Default Font

When the Notepad is selected so that the fonts are automatically loaded, the normal default font (the font in which you will type if you do not select anything else) is 9-point Topaz. You may change this default font by using the procedure outlined here. Select the Notepad icon, choose Info from the Workbench menu, and select the Add Gadget. Type "FONT=" followed by the name of the font (as shown in the Notepad's Font menu), a period and a number for the font size (e.g. FONT=emerald.20).

Then press the Return key and select the Save gadget.

Changing the Default Font of a Note

When you save a note, the last font you chose when the Global font option was on becomes the default font for the note. The default font is chosen automatically when you reopen the note.

After you save a note, you can specify a different default font for the note by selecting the icon for the note, choosing Info from the Workbench menu, and selecting the Add gadget. Type "FONT=" followed by the name of the font (as shown in the Notepad's font menu), a period, and a number for the font size (e.g. FONT=emerald.20). Finally, press the Return key and select the Save gadget.

Changing the Default Print Type

In the Notepad's submenu for Print As, the graphic option is the default.
To have the Draft option chosen automatically whenever you open Notepad, select the Notepad icon, choose Info from the Workbench menu, and select the Add gadget. Type "FLAGS=draft", press the Return key and select the Save Gadget.

Changing the Default to Form-Feed

Form-feed automatically adds a blank line to the top of every page.

To use this as the default setting, select the Notepad icon, choose Info from the Workbench menu, and select the Add gadget. Type "FLAGS=formfeed", press the Return key, and select the Save Gadget.

Specifying the Global Font Default

You can specify whether or not the Global font option is chosen when you open the Notepad or a note. To do this, select the icon for the Notepad, choose Info from the Workbench menu, and select the Add gadget.

To have the Global Fonts option chosen automatically when you open the Notepad or note, type "FLAGS=global" and press the Return key. To specify that the Global Font option is not chosen automatically, type "FLAGS=local". Press the Return key and select the Save Gadget.

If you enter FLAGS=global, font changes in a note are not preserved when you reopen the note; the characters all become the current default font.

Turning off the Word Wrap Default

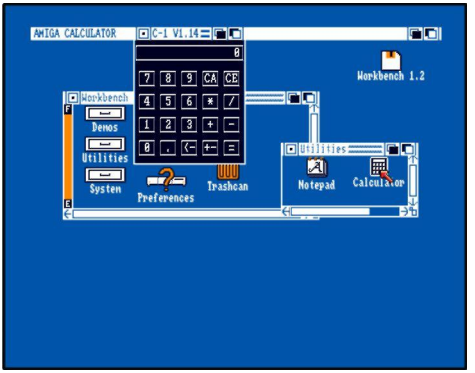
To change the default from Word Wrap on, select the Notepad icon, choose Info from the Workbench menu, and select the Add gadget. Type "FLAGS=nowrap", press the Return ke

The Calculator

The Calculator is a standard four-function calculator you can use to add, subtract, multiply, and divide numbers. You can find the Calculator in the Utilities drawer on the Workbench.

Opening the Calculator

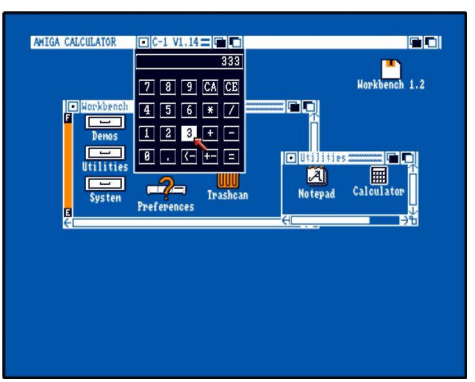
You open the Calculator by selecting its icon, then choosing Open from the Workbench menu. When you do, a window for the Calculator appears.



The Calculator Keys

In the Calculator window, each of the Calculator's "buttons" is a gadget. When the Calculator window is selected, there are two ways you can "press a button":

- Select the gadget by pointing within it, then clicking the Selection button on the mouse.



- For all but the < - and + - "buttons," type the character or characters shown in the gadget. For example, you can clear the current entry by pressing the C key on the keyboard, then the E key.

The buttons for digits, the decimal point, and addition and subtraction are the same as those on other calculators. To multiply, use the * button. To divide, use the / button.

Selecting the CE button clears the current entry, while selecting the CA button clears the current entry and any previous entries.

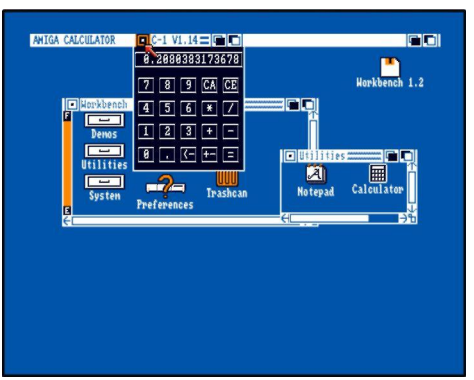
Pressing the + - button changes the sign of the current entry. If the current entry is a positive number, it is changed to the negative number that corresponds to it. If the entry is negative, it becomes positive.

When you're entering a number, pressing the <- button deletes the last digit you entered.

To get a result, use the = button. From the keyboard, you can get a result by pressing the = key, the Return key, or the Enter key.

Closing the Calculator

To close the Calculator, select the Close gadget in the upper left corner of the Calculator window.



The Icon Editor

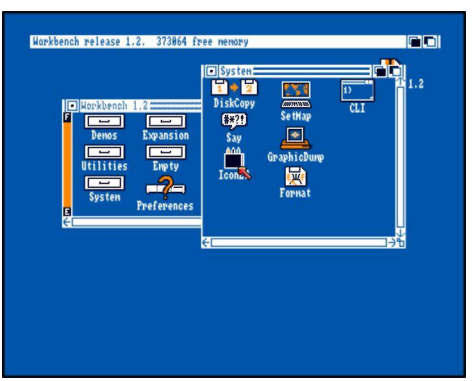
With the Icon Editor, you can change the appearance of icons that appear on the Workbench. You can find the Icon Editor in the System drawer on the Workbench.

To use the Icon Editor, you must be familiar with the Amiga Disk Operating System (AmigaDOS) and the conventions it uses for file names. To learn about AmigaDOS, see Chapter 7 in this manual and the *AmigaDOS Manual* from Bantam Books.

If you are a software developer, you can also use the Icon Editor to create icons for new tools, projects, and drawers. To learn how to create new icons, see the *Amiga ROM Kernel Manual,* available from Addison-Wesley.

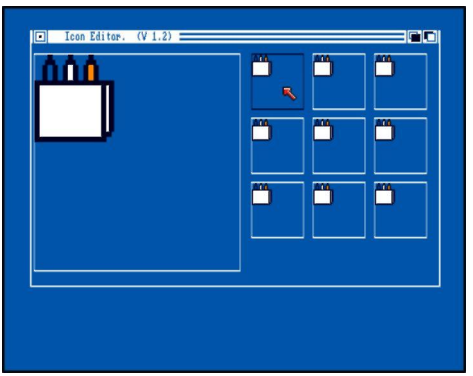
Opening the Icon Editor

You open the Icon Editor by selecting its icon, then choosing Open from the Workbench menu. When you do, a window for the Icon Editor appears. Next, a requester appears in the window that describes the different kinds of icons. Select the OK gadget to continue. (For information about the different icon types, see the *Amiga ROM Kernel Manual.)*



Loading an Icon

To select an icon you want to change, first select a frame one of the nine boxes to the right of the Icon Editor window by pointing within the frame, then clicking the Selection button. When you first open the Icon Editor, each of the nine frames contains the Icon Editor icon. The icon you select will replace what appears in the currently selected frame.



Next, choose Load Data from the Disk menu. In the requester that appears, select the gadget immediately below the words "Enter Icon Name (.info Will Be Added)", then enter the AmigaDOS description for the file or directory whose icon you want to change.
This description can be either:

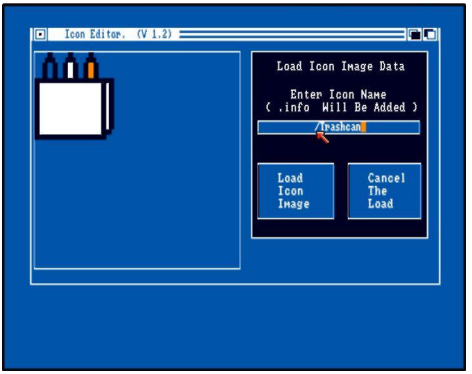
- the complete AmigaDOS file or directory description.

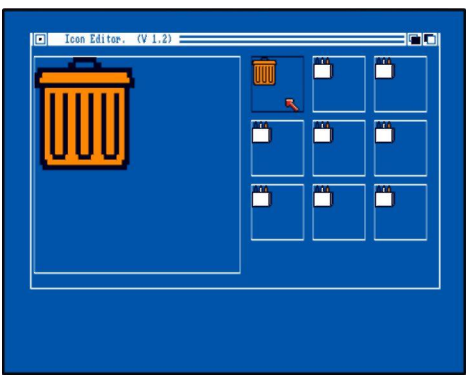
- an abbreviated description that specifies the relationship of the file or directory to the directory in which the Icon Editor resides.

For example, you can load the icon for the Trashcan by entering either:

```
df0:Trashcan

/Trashcan
```





NOTE: the icon *types* shown in the requester that appears when you open the Icon Editor are **not** the names of icons. To find the name of a file whose icon you want to change, use the AmigaDOS DIR command.

After you select the gadget, characters you type appear to the left of the Text Cursor (the marker that appears in the gadget when you select it). To move the cursor, use the left and right cursor keys.

There may already be text in the gadget when you select it. You can delete characters at and to the right of the Text Cursor by pressing the Del key. Press the Backspace key to delete characters to the left of the Text Cursor.

There are shortcuts you can use to change what appears in the gadget and to move the Text Cursor:

- Press the Amiga key and Q key at the same time to get back what was in the gadget before you selected it.

- Press the Amiga key and the X key at the same time to erase what appears in the gadget.

- Press the Shift key and the left cursor key at the same time to move the Text Cursor to the leftmost character in the gadget.

- Press the Shift key and the right cursor key at the same time to move the Text Cursor to the right of the rightmost character in the gadget.

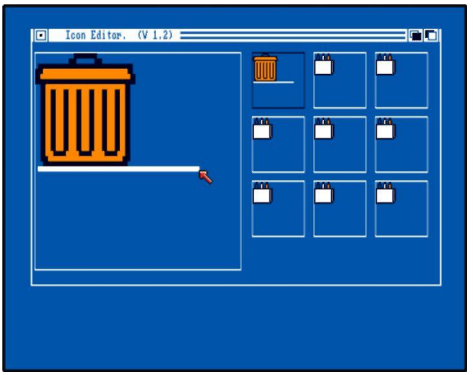
When you've finished entering the file description, select Load Icon Image. If you decide not to select an icon, select Cancel The Load.

Selecting Additional Icons

With the Icon Editor, you can work with up to nine icons at the same time. To select an additional icon, first select the frame in which you want the icon to appear, then choose Load Data from the Disk menu.

Changing an Icon

A magnified view of the currently selected frame is shown at the left of the Icon Editor window. To change the appearance of an icon, you select the frame in which it appears, then change what appears in the magnified view. The techniques for changing the view are described below.

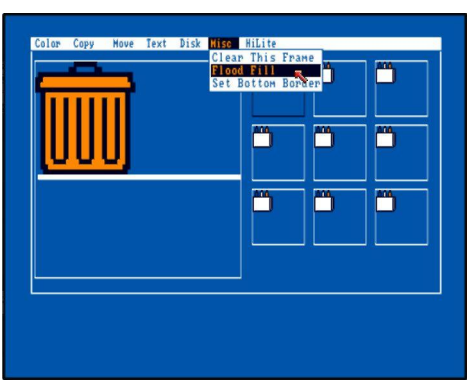


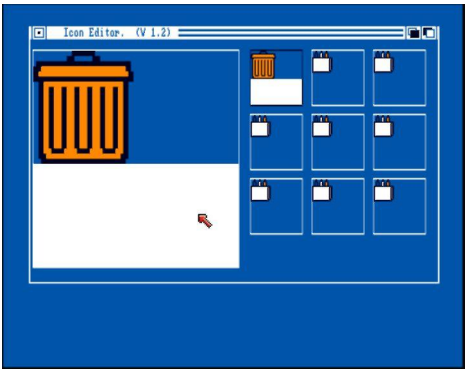
Changing an Icon's Colors

To change the color of an individual pixel in an icon, choose a color from the Color menu, point to the pixel you want to change in the magnified view, then click the Selection button. By holding down the Selection button while you slowly move the mouse, you can add color to larger areas.

Filling Areas

With the Icon Editor's Flood Fill feature, you can fill a contiguous area that is all the same color with another color. To fill an area, choose the color you want to fill with from the Color menu, then choose Flood Fill from the Misc menu. Next, point to the area in the magnified view that you want to fill, then click the Selection button.



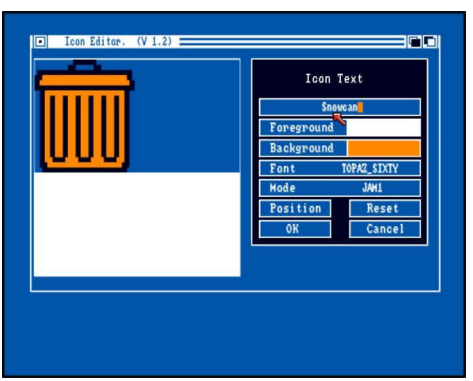


Adding Text to an Icon

There are six steps to adding text to an icon:

1. Choose Write Into Frame from the Text menu.

2. In the requester that appears, select the gadget immediately below the words "Icon Text," then enter up to eight characters that you want to add to the icon. The characters you type appear to the left of the Text Cursor (the marker that appears in the gadget when you select it). To move the cursor, use the left and right cursor keys.



There may already be text in the gadget when you select it. You can delete characters at and to the right of the cursor by pressing the DEL key. Press the Backspace key to delete characters to the left of the cursor.

There are shortcuts you can use to change what appears in the gadget and to move the Text Cursor:

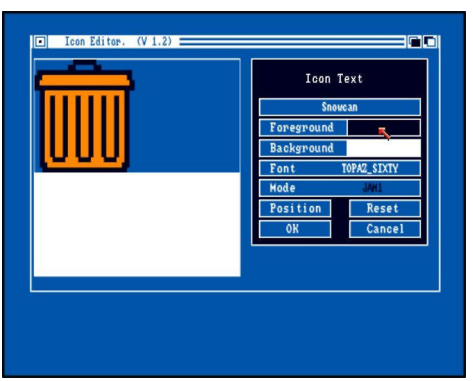
- Press the Amiga key and Q key at the same time to get back what was in the gadget before you selected it.

- Press the Amiga key and the X key at the same time to erase what appears in the gadget.

- Press the Shift key and the left cursor key at the same time to move the Text Cursor to the leftmost character in the gadget.

- Press the Shift key and the right cursor key at the same time to move the Text Cursor to the right of the rightmost character in the gadget.

3. Select the foreground and background colors for the text. (How the foreground and background colors are used to display text depends on the display mode you select. Display modes for text are described below.) To change the foreground color, point within the color immediately to the right of the word Foreground, then click the Selection button one or more times until the color you want appears. Select the background color in the same way.



4. There is only one font you can choose for your text. This font, called Topaz, is the same one used by the Workbench for menus and icons. You can, however, select one of two font sizes: TOPAZ_SIXTY is the larger, TOPAZ_EIGHTY the smaller. If the size you want does not appear in the gadget labeled Font, select the gadget to change to the other size.

5. Select one of the four display modes for text. These modes are:
   - JAM**1**, where text is shown in the currently selected foreground color without a background

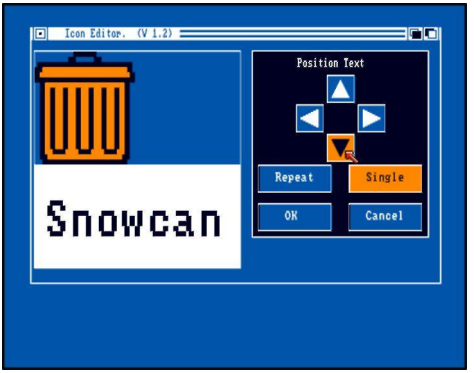
   - JAM2, where text is shown in the foreground color against the currently selected background color

   - COMPLEMENT, where each pixel that makes up the text is the color "opposite" the color of the pixel that it replaces. (To see how this works, add text to an icon containing all four colors, then move the text as described below.)

   - INVERSVID, ground color. When you add INVERSVID text to an icon, the background for the text replaces existing pixels in the icon while the text itself does not.

   To change the display mode, point within the gadget labeled Mode, then click the Selection button one or more times until the name of the mode you want appears. In the gadget, note that the name of the mode is displayed in the gadget using the currently selected foreground color, background color, and display mode.

6. Select the Position gadget to add the text to the icon. In the requester that appears, select the arrows to move the text up, down, left, or right. Select the Single gadget if you want the text to move only a single pixel each time you select an arrow. Select Repeat if you want the text to continue to move if you hold down the Selection button after you select an arrow. When the text is where you want it, select OK. If you change your mind, select Cancel to return to the previous requester without adding text to the icon.



When you're through adding text, select OK. If you want to start over with the icon as it was before you chose Write Into Frame, select Reset. If you decide you don't want to add text to the icon, select Cancel.

Using the Undo Feature

If you think that a change you're about to make to an icon may not turn out the way you want, choose Snapshot Frame from the Copy menu before you make the change. When you do, the Icon Editor saves a copy of the currently selected frame. If things go wrong, you can get back what you had before by choosing Undo Frame from the Copy menu.

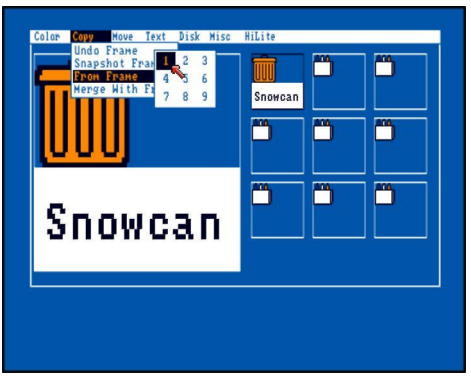
NOTE: When you choose Undo Frame, the frame that was saved when you last chose Snapshot Frame replaces the **currently selected frame.** After you choose Undo Frame, **the previous contents of the currently selected frame are no longer available.**

Working with Frames

The Icon Editor's nine frames let you work with more than one icon at the same time. You can also use the frames to keep and compare more than one version of the same icon. Listed below are techniques you can use when working with frames.

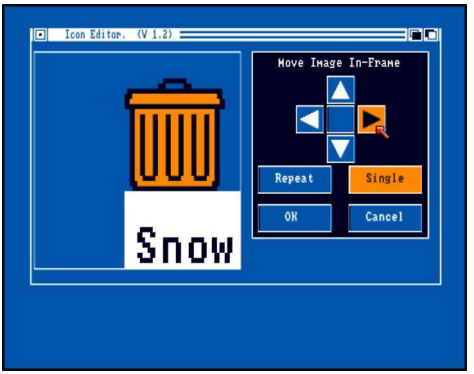
Copying a Frame

To copy a frame, first select the frame into which you want to make the copy. Next, choose the frame you want to copy from the submenu that appears when you point to From Frame in the Copy menu.



Moving the Image within a Frame

To move the image within a frame, choose In-Frame from the Move menu. In the requester that appears, select the arrows to move the image up, down, left, or right. Select the Single gadget if you want the image to move only a single pixel each time you select an arrow. Select Repeat if you want the image to continue to move if you hold down the Selection button when you select an arrow.

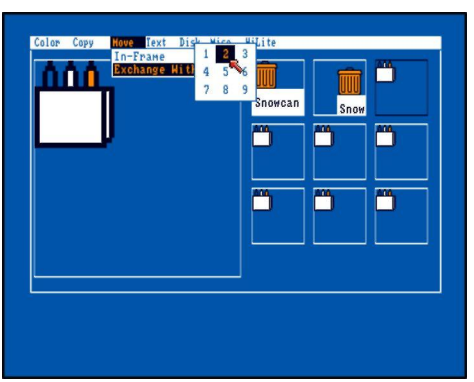


The square gadget surrounded by the arrows is the Restore gadget. Select this gadget to put the image back where it was before you chose In-Frame.

When the image is where you want it, select OK. If you change your mind, select Cancel to get back what you had before you chose In-Frame.

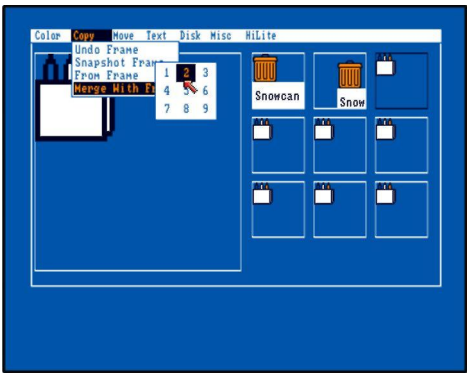
Exchanging Frames

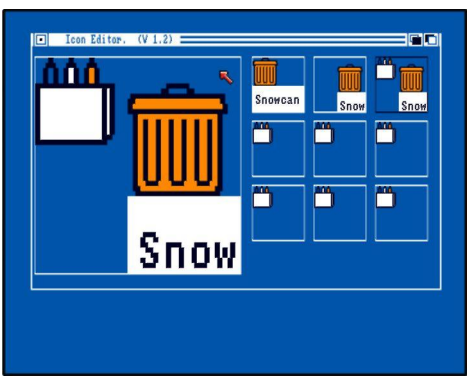
To switch the positions of two frames, first select one of the two frames. Next, choose the other frame from the submenu that appears when you point to Exchange With Frame in the Move menu.



Merging Frames

To combine the contents of two frames, first select one of the frames. (The combination you create will replace what appears in this frame.) Next, choose the other frame from the submenu that appears when you point to Merge With Frame in the Copy menu.





When pixels in the two frames overlap, the color that appears is determined as follows:

- If color 0 (the color at the top of the Color menu) overlaps with any other color, the other color is displayed.

- If color 3 (the color at the bottom of the Color menu) overlaps with any other color, color 3 is displayed.

- If colors 1 and 2 (the two colors in the middle of the Color menu) overlap, color 3 (the color at the bottom of the Color menu) is displayed.

Highlighting an Icon

When you select an icon on the Workbench, it is highlighted to indicate that it's selected. There are two ways an icon can be highlighted:

- It can be shown in inverse video. In inverse video, any part of an icon normally shown using color 0 (the color at the top of the Color menu) becomes color 3 (the color at the bottom of the Color menu); color 1 (the color just below color 0 in the menu) becomes color 2; color 2 becomes color 1; color 3 becomes Color 0.

- It can be "backfilled." A backfilled icon is the same as an icon shown in inverse video, with one exception: contiguous areas of an icon normally shown in color 0 that adjoin any of the borders of the icon remain color 0 when the icon is highlighted.

To highlight an icon in inverse video, choose Inverse from the HiLite menu before you save the icon. To backfill a highlighted icon, choose Backfill from the HiLite menu before you save the icon.

Specifying the Border Width

Below each icon on the Workbench is the name of the file that the icon represents. The Icon Editor lets you choose either to put one blank line between the icon's image and its name or not to put space between the icon and the image. From the Misc menu, choose either 0 (for no space) or 1 (for one line between the image and the name) from the submenu that appears when you point to the Set Bottom Border item.

Saving an Icon

When you save an icon, you replace an icon on the Workbench with the icon in the currently selected frame. However, the type of the icon you replace and the type of the icon that was most recently loaded into the currently selected frame must be the same. There are five types of icons:

TYPE	REPRESENTS	EXAMPLE
Disk	Disk drawers	Workbench disk icon
Drawer	Drawers other than disk drawers	System icon
Tool	Tools	Icon Editor icon
Project	Projects	Icon for a Notepad note
Garbage	A drawer that cannot be moved to another drawer	Trashcan icon

When you open the Icon Editor, the Icon Editor icon is loaded into all nine frames. Because the Icon Editor icon represents a tool, you must load another icon if you want to replace an icon of another type.

There are three steps to saving an icon:

1. Select the frame containing the icon.

2. Choose Save Data from the Disk menu. In the requester that appears, select the gadget immediately below the words "Enter Icon Name (.info Will Be Added)" and then enter the AmigaDOS description for the file or directory whose icon you want to replace. This description can be either:

   - the complete AmigaDOS file or directory description

- an abbreviated description that specifies the relationship of the file or directory to the directory in which the Icon Editor resides. For example, you can replace the icon for the Trashcan by entering either:

```
df0:Trashcan
```

```
/Trashcan
```

After you select the gadget, characters you type appear to the left of the Text Cursor (the marker that appears in the gadget when you select it). To move the cursor, use the left and right cursor keys.

There may already be text in the gadget when you select it. You can delete characters at and to the right of the Text Cursor by pressing the DEL key. Press the Backspace key to delete characters to the left of the Text Cursor.

There are shortcuts you can use to change what appears in the gadget and to move the Text Cursor:

- Press the Amiga key and Q key at the same time to get back what was in the gadget before you selected it.

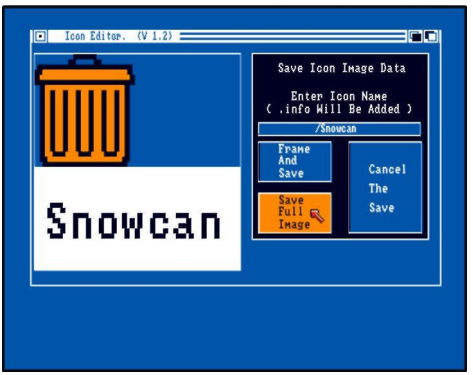
- Press the Amiga key and the X key at the same time to erase what appears in the gadget.

- Press the Shift key and the left cursor key at the same time to move the Text Cursor to the leftmost character in the gadget.

- Press the Shift key and the right cursor key at the same time to move the Text Cursor to the right of the rightmost character in the gadget.

3. When you've finished entering the file description, there are two ways to save the icon:

- If you want the icon to include the entire image that's in the frame, select Save Full Image.



- If you want the icon to include only a part of the image that's in the frame, select Frame and Save. Next, "frame" within a rectangle the part of the magnified view you want to include in the icon: point to a place in the magnified view where you want the top left corner of the rectangle, then click the Selection button. Move the mouse to change the size of the rectangle. When you've framed within the rectangle the part the image you want, click the Selection button a second time to save the icon. (If you change your mind about saving the icon after you've selected the top left corner, move the Pointer outside the magnified view and click a mouse button.)

If you decide not to save an icon after you've chosen Save Data, select Cancel the Save in the requester.

When you look on the Workbench for an icon you've saved, remember that it doesn't replace the previous icon until the next time you open the drawer that contains it.

Stopping the Icon Editor

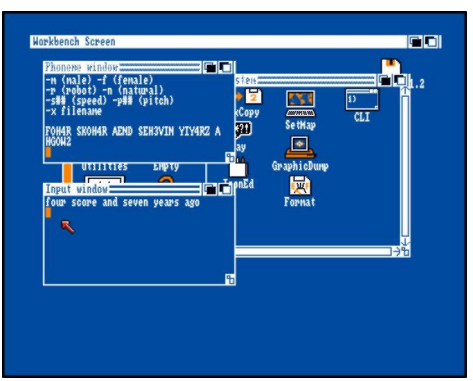
When you are finished using the Icon Editor, close it by selecting the Close Gadget in the upper left corner of the Icon Editor window.

The Say Speech Synthesizer

Say lets you type in English words and sentences which the Amiga then "says" using its audio capabilities. To use the feature, open the System drawer and double-click on the Say icon. Two new windows will open. One is labeled Phoneme window and the other is labeled Input window. You can use the standard Amiga window manipulation techniques to move or change the size of both the Phoneme and Input windows.

Activate the Input window by moving the pointer into it and clicking with the mouse. Now type the words or sentences you want the Amiga to "speak" and press the Return key. You will hear the Amiga repeat those words.

If you type long lines or sentences, don't press Return when you reach the right edge of the input window. The text automatically wraps around to the next line. (Don't worry if the line is broken in the middle of a word.) After you type in your words and press Return, text appears in the Phoneme window just before the Amiga speaks. This display is a phonetic interpretation of your words (that is, it is an interpretation of the sounds necessary to speak the words). Say translates what you type into sounds using a phonetic alphabet and phonetic rules. This translation is printed in the Phoneme window.



To use and enjoy Say, you don't need to learn all the rules of phonetics. However, since phonetic spelling is based on how words *sound* rather than how they are conventionally spelled, you should think in terms of sounds used in pronunciation rather than spelling. At the same time watch how Say spells different words (or sounds) in the phoneme window. A good dictionary will be helpful for looking up the pronunciation of words you are uncertain about.

You can change the voice, pitch and speed of your Amiga's speech by choosing different options in the phoneme window. You have a choice of male, female, robot or natural voice. Select the voice you want by typing the appropriate code below the phoneme window and pressing the Return key:

m	for male voice
f	for female voice
r	for robot voice
n	for natural voice

When you change the voice, you must also change the pitch for it to have an effect.

To change the pitch of the voice, in the phoneme window type p followed by a number from 65 through 320 and press the Return key. The higher the number you type, the higher the voice's pitch will be.

To change the speed of the voice, in the phoneme window type s followed by a number of 40 through 400. The higher the number you type, the faster the voice speaks.

To close Say, just move the pointer into the Input window, activate the window by clicking the Selection button and then press the Return key without typing any words first.

Graphic Dump

The Graphic Dump lets you print entire screen images, including menus and icons, just as they appear on your monitor.

To use Graphic Dump, open the System drawer and double-click on the Graphic Dump icon. After a delay of approximately 10 seconds, the entire screen image that is foremost on the monitor is "dumped" to the printer. You must have a

graphics printer connected to your Amiga, which has been properly selected in Preferences. Printer settings on Preferences are completely explained in Chapter 6.

The 10-second delay allows you time to move images on the screen, open menus, or move the current Workbench screen to the back to let another screen image be printed.

SetMap

There are several different keyboards available for the Amiga. SetMap allows you to select the correct "key map" for the keyboard you wish to use. The key map is a list that tells the Amiga the right character to print for each key on a keyboard.

The SetMap tool is in the system drawer on the Workbench. To use SetMap, open the system drawer and do the following:

1. Select the SetMap icon, choose Info from the Workbench menu, and select the Add gadget.
2. Select the String Gadget between the Add Gadget and the words Tool Types and type "KEYMAP=" followed by the name of a new key map. The key maps available are:

   d for German keyboards
   e for Spanish keyboards
   f for French keyboards
   gb for British keyboards
   i for Italian keyboards
   is for Icelandic keyboards
   s for Swedish keyboards
   usa for standard United States keyboards
   usa0 This is the key map provided with the 1.1 release of the Amiga system software. Some programs may require this keymap to function properly.
   usa2 for Dvorak keyboards

   When you have finished entering the name of the key map, press the Return key.

3. Select the Save Gadget and when the Workbench reappears, point to the SetMap icon and double-click the Selection button.

Note: Not all of the keyboards listed above and shown on the pages following are currently manufactured. It is also possible that other key maps may become available. Consult your Amiga dealer for information about availability. Each keymap has a set of alternate characters. The alternate character set includes special symbols and diacritical marks used in each language. To enter an alternate character, hold down the Alt key while pressing another key on the keyboard. Included among the alternate characters in the new key maps are "dead" keys. These keys allow you to add accents and other diacritical marks to selected characters. When you press a "dead" key, the cursor does not advance; thus, the diacritical mark and the next character you type appear in the same position. Not all characters can be combined with "dead" keys.

NoFastMem

Some software programs do not run properly with non-chip RAM (extra memory) added to the computer. The non-chip RAM is added when you install the A501 Memory Expansion Cartridge (it may already be installed when you purchase your Amiga 500; see Chapter 8 for more details on the A501). If you run a program which looks incomplete (like screen images are missing) or appears distorted, run the NoFastMem utility and retry the program. NoFastMem (located in the System drawer on your Workbench disk) forces the Amiga to allocate all programs to the chip RAM (the basic built-in Amiga memory), allowing those programs to run properly. Most programs will work fine without using NoFastMem.

Select the NoFastMem icon, and watch the memory meter. When the amount of available memory drops, the program has been executed. If you don't have non-chip RAM (i.e., you don't have the A501 Memory Expansion cartridge), this program will have no effect.

The NoFastMem icon works like a toggle; to reinstall the non-chip RAM (to increase the memory), select the NoFastMem icon again. Another way to reinstall the external memory is to reset Workbench.

There are many similar useful programs on the Amiga Extras disk, that was included with your computer. Check the README file on the Extras disk for details on using those programs.

Chapter 6

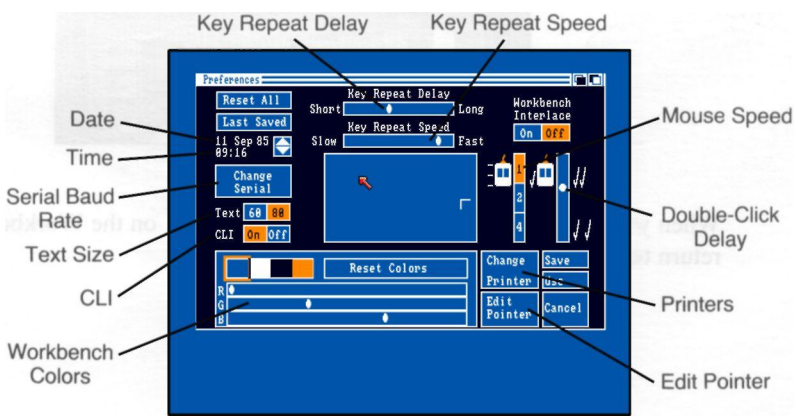
Using Preferences

This chapter explains how to "personalize" your Amiga by changing the settings in Preferences, including selections for:

- printers and related details
- key and mouse speeds
- editing and designing the Workbench pointer

Preferences

Preferences is a tool that lets you see and change many of the settings of your Amiga. These are the settings you can change with Preferences:

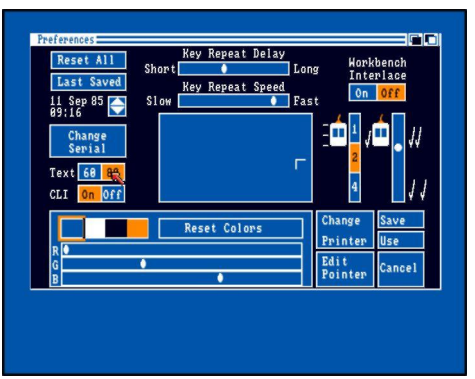


Using the Preferences Tool

With the *Preferences* tool, you can make a number of changes to your Amiga. In this tutorial, you'll learn how to start using Preferences, how to use Preferences to make the correct monitor setting, and what to do when you're finished using Preferences. The rest of the chapter explains each of the Preferences option in detail.

Double-click on the Workbench disk icon, then double-click on the Preferences icon. A window for Preferences appears.

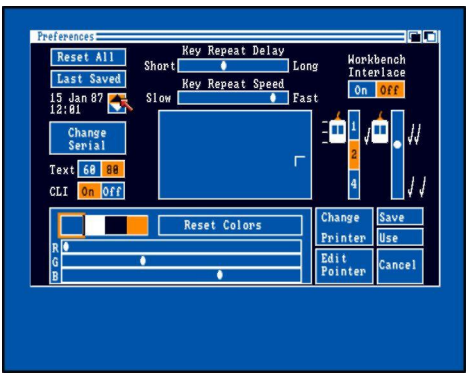
Tools use windows to display information and to accept information from you. The Preferences window shows you the current settings for Preferences and lets you change them. At the left of the Preferences window, you set the number of *characters* (letters, numbers, and symbols) to appear on each line of the display. To the right of the word Text are two *gadgets*, one marked 60 and the other marked 80. If you're using an Amiga Monitor or another RGB monitor, select 80. If you have an NTSC monitor or television attached to your Amiga, select 60. The gadget for the option you choose is highlighted in a different color; the unchosen option remains the background color.



When you're done, select Save to save your choices on the Workbench disk and return to the Workbench.

Date and Time

To change the date or time, first select the digit you want to change by pointing to it, then clicking the Selection button. With a digit selected, you can:



- select the up arrow to increase the selected digit by one
- select the down arrow to decrease the selected digit by one

The leftmost digits of the date are the day of the month, the middle digits are the number of the month, and the rightmost digits are the last two digits of the year. The time is shown using a 24-hour clock.

Note that if any of the numbers is as large as it can be, increasing it increases the value for the next larger interval of time. For example, if the value for the hours is 11 and the value for the minutes is 59, increasing the digit 9 for the minutes leaves you at 12:00. Conversely, decreasing a value that is as small as it can be decreases the value for the next smaller interval of time.

Key Repeat Speed

To make keys on the keyboard repeat more quickly when you hold down a key, drag the arrow on the slider labeled Key Repeat Speed to the right. To slow down the rate at which keys repeat, drag the arrow to the left.

Key Repeat Delay

When you hold down a key that repeats, there is a delay before the key begins repeating. To increase this delay, drag the arrow on the slider labeled Key Repeat Delay to the right. To decrease the delay, drag the arrow to the left.

Warning: Be aware that it is possible to set the key repeat too fast, since the display takes a finite amount of time to update.

Mouse Speed

The three settings for *mouse speed* let you change how far the Pointer moves when you move the mouse. The settings 1,2, and 4 are the number of inches you move the mouse to move the Pointer roughly a third of the way across the display. The larger the number, the more room you need for the mouse.

Double-Click Delay

You use the *Double-Click Slider* to set the maximum length of time between the two clicks of a double-click. Drag the arrow down to increase the maximum length of time. Drag the arrow up to decrease the maximum time.

Text Size

To make the best use of your monitor, you can choose the size of the characters that appear on the display. Most NTSC monitors and televisions can show 60 characters clearly on each line of the display, while RGB monitors can display 80 characters clearly. If you have an NTSC monitor or television connected to the Amiga, select the gadget labeled 60 to the right of the word Text. If you have an RGB monitor connected to the Amiga, select the gadget labeled 80.

CLI

In addition to the Workbench, the Amiga includes another user interface, the Command Line Interface (CLI). To make an icon for the CLI appear in the System drawer on the Workbench, select the ON gadget immediately to the right of "CLI" on the Preferences screen, then select the Save gadget to save the new setting. If the system drawer is already open when you leave Preferences, you must close it and reopen it to make the icon appear. To learn about the CLI, see Chapter 7.

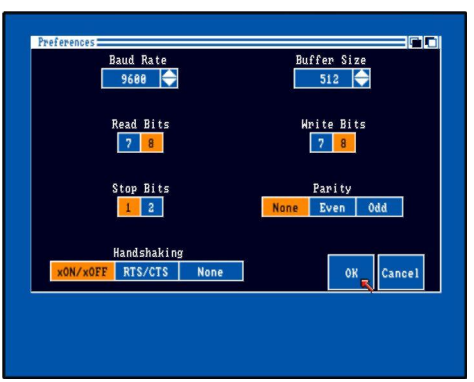
Display Centering

To center the image on a video display, move the Pointer into the corner of the symbol that appears in the *Display Centering Gadget,* hold down the Selection button, then move the mouse to change the position of the image.

Serial Connector

If you have a peripheral hooked up to the serial connector of your Amiga, you can change various parameters, such as the rate at which information is transferred through the connector. To do this, select the gadget labeled Change Serial. A new window appears, which contains the gadgets you need to change the settings for serial communication to meet the requirements of your particular application or peripheral.

The serial settings are:



- **Baud Rate.** This is the number of bits transferred through the serial connector each second. The current rate is shown immediately below the words Baud Rate. To change the Baud Rate, select either the Up or Down arrow to the right of the rate.

- **Buffer Size.** The Serial buffer is an area of memory set aside for serial communication. Its size is shown immediately below the words Buffer Size, To change it, select either the Up or Down arrow to the right of the size.

- **Read Bits.** This is the number of bits expected for each character received through the serial connector. You can select either 7 or 8 bits.

- **Write Bits.** This is the number of bits that are sent through the serial connector for each character. As with the Read Bits, the setting is either 7 or 8 bits.

- **Stop Bits.** Stop bits are bits added to the end of a character that mark where it ends. You can select either 1 or 2. This is the number of bits added to each character sent through the serial connector and the number expected at the end of each character that is read.

- **Parity.** Parity is a method for reducing transmission errors. Select Even to specify even parity, Odd for odd parity, or None for no parity checking.

- **Handshaking.** This setting lets you specify one of two methods to control the flow of information through the serial connector. You can select xON/xOFF, RTS/CTS, or none if you do not need either method.

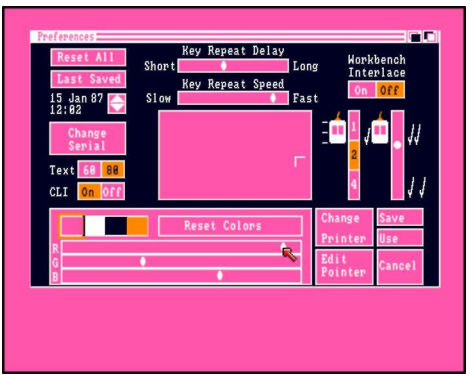
When you're through changing these settings, select OK to confirm your selections or Cancel to cancel them. Selecting either OK or Cancel returns you to the Preferences window.

Workbench Colors

With Preferences, you can change any of the four colors displayed by the Workbench. Start by selecting the color you want to change from the four colors

shown. Below these colors are three sliders labeled R, G, and B. These letters stand for red, green, and blue, the colors that the Amiga combines to create the colors it displays.

To modify the color you've selected, you change the amount of red, green, and blue in the color by dragging the arrows along the sliders.



Try dragging the arrows in the sliders and watch how the color changes. With a bit of practice, you'll be able to get the colors you want.

To get back the colors you had before you opened Preferences, select the gadget labeled Reset Colors. (To get back the original Workbench colors—the ones displayed when you inserted the original Workbench disk that came with the Amiga—select the Reset All gadget described below.)

Interlace

To change the display to *interlace* mode, change this setting (which is in the upper right corner of the screen) to On and then save the setting by selecting the Save gadget. **Then reset the Amiga to activate the new display.** This doubles the number of horizontal lines that make up the Workbench screen.

On many monitors, the colors in an interlaced screen may appear to flicker. You can often minimize this effect by changing the screen colors. Experiment to find the colors that work best on your monitor. Alternatively, "high-persistence" monitors are now available which greatly reduce the flicker. These monitors can be valuable in applications that require interlace screens. Consult your Amiga dealer for more details.

Editing the Pointer

You can use the Preferences tool to modify the Pointer. The following instructions tell you how.

The Pointer Editing Window

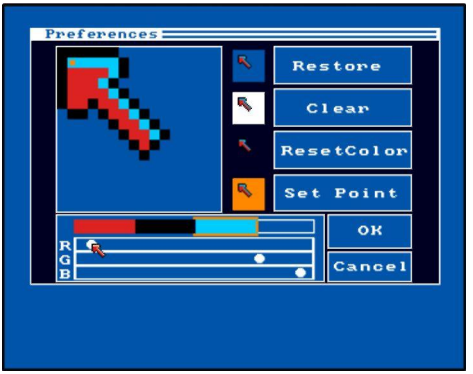
When the Preferences screen appears, select the Edit Pointer Gadget near the lower right-hand corner of the screen. In a moment, a window appears. In this window—the *Pointer Editing Window*—a magnified image of the Pointer appears at the upper left.

It is this magnified image that you modify to change the Pointer.

To the right of the magnified view are copies of the Pointer that appear against each of the four Workbench colors; these copies let you judge how the Pointer will look against the colors on the Workbench.

Changing the Colors

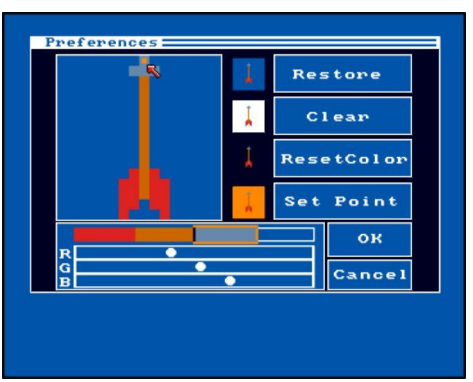
These colors can be different from those used for the Workbench. You can modify the three colors to the left in the same way you modify the Workbench colors: by changing the R, G, and B values for each.



The rightmost "color" is not a color at all: any parts of the Pointer you draw with it are transparent. When you move the Pointer, colors on the Workbench behind any transparent parts of the Pointer show through. If you modify the Pointer colors then want to get back the last colors that were saved, select the ResetColor Gadget.

Changing the Pointer

To modify the Pointer, select one of the colors or transparent, point to a place in the magnified view where you want a pixel of that color, then click the Selection button.

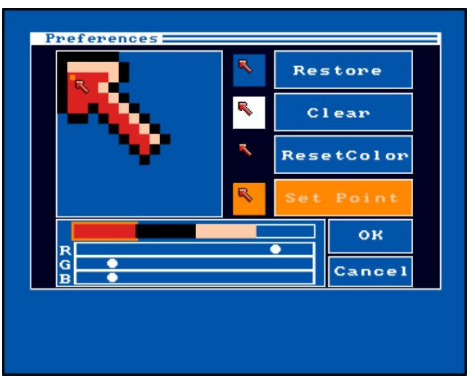


If you want to start from scratch, select Clear to make all the pixels transparent. (If, after you make changes, you'd rather have the old Pointer back, select Restore.)

Changing the Point

Every Pointer has a single pixel called the *point.* To point to something on the display, position the Pointer so that this pixel is over it.

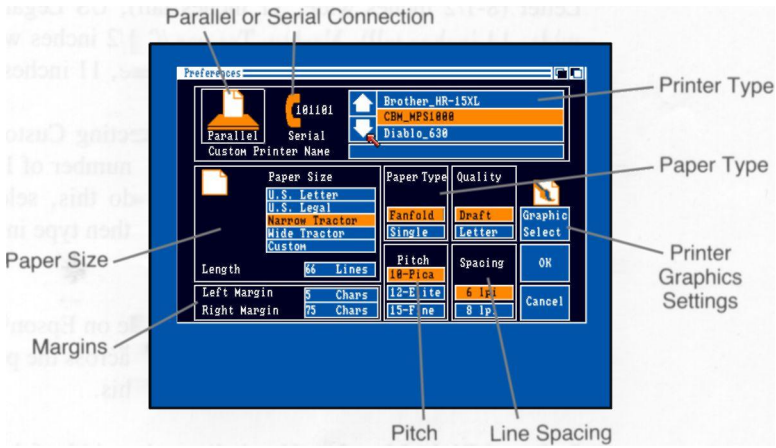
In the magnified view of the Pointer, the point is indicated by a smaller square within one of the pixels. To change the Pointer's point, select Set Point, point to the pixel in the magnified view you want as the point, then click the Selection button.



When you're done and are happy with the Pointer you've created, select OK. You can select Save from the Preferences screen when you're using the new Pointer to save the new Pointer on your Workbench disk so it appears when you boot up Workbench instead of the arrow pointer. To get back to the main Preferences screen without changing the previous Pointer, select Cancel.

Printers

If you've attached a printer to the Amiga, you need to tell the Amiga the type of printer you've attached. You do this by selecting Change Printer. When you do, the *Change Printer Screen* appears:



In this screen, you can select:

- Printer Type. The names of printers supported by the Amiga appear in the upper right of the screen. To indicate the printer you're using, select either the up arrow or down arrow until the the name of your printer is highlighted.

  Makers of other printers may provide a file on disk that allows you to use their printers with the Amiga. If the instructions for your printer state that you are to indicate a printer file, select Custom from the list of printers. Next, select the gadget immediately to the right of the words Custom Printer Name. Finally, type in the name of the file indicated in the instructions.

  If you want to attach a printer that is not supported by the Amiga and you do not have a file for it, select Custom from the list of printers, then enter Generic in the Custom Printer Name gadget. For many printers, this will allow you to print plain text, but not graphics or extra type styles such as italics.

- **Parallel or Serial Connection.** If your printer is attached to the parallel connector on the Amiga, select the gadget labeled Parallel at the upper left of the screen. If it's attached to the serial connector, select the gadget labeled Serial.

- **Paper Size.** There are four preset sizes you can select from: US Letter (8-1/2 inches wide, 11 inches tall), US Legal (8-1/2 inches wide, 14 inches tall), Narrow Tractor (9-1/2 inches wide, 11 inches tall), and Wide Tractor (14-7/8 inches wide, 11 inches tall).

  You can use other sizes of paper by selecting Custom. When you select Custom, you must also specify the number of lines that fit on the size of the paper you're using. To do this, select the gadget labeled Length just below the paper sizes, then type in the number of lines.

  Sometimes when printing in graphics mode on Epson® and other dot matrix printers, narrow blank lines appear across the printout. Selecting Custom for paper size may eliminate this.

- **Left and Right Margins.** You indicate the width of these margins by specifying numbers of characters from the left-hand edge of the paper. To specify the width of the left margin, select the gadget to the right of the words Left Margin, then type in the width, in characters, of the left margin. To specify the width of the right margin, select the gadget to the right of the words Right Margin, then type in the width, in characters, for the distance from the left-hand edge of the paper to where the right margin begins.

- **Paper Type.** Select Fanfold if you're using continuous- feed paper. Select Single if you're printing on individual sheets.

- **Quality.** For faster but lower-quality printing, select Draft. For higher-quality printing, select Letter.

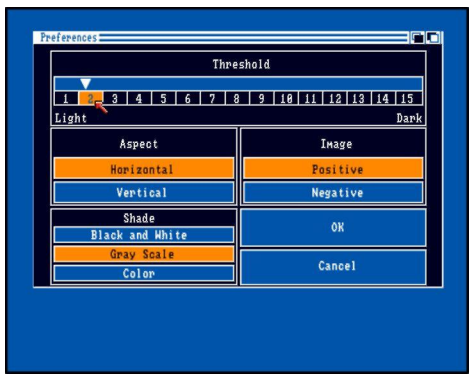
- **Pitch.** You use this to select the size of the characters that are printed. You can select from among 10 pitch ("pica"), 12 pitch ("elite"), and 15 pitch ("fine").

- **Spacing.** This lets you select how closely lines are printed on the page. Select either 6 or 8 lines per inch ("lpi").

Note: Many tools use the Length, Spacing, Left Margin, and Right Margin settings rather than the Paper Size setting to determine how large an image to print. For these tools, check to see whether what you print will fit on the paper by using the following formulas: Length ÷ Spacing must be smaller than the length of the paper, in inches; ((Right Margin Setting - Left Margin Setting) + 1) ÷ Pitch Setting must be smaller than the width of the paper, in inches.

There is an additional gadget in this screen labeled Graphic Select.

Selecting this gadget opens the *Printer Graphics screen:*



You use this screen to select different ways to print images:

- Shade lets you select color printing, gray-scale printing (where colors are represented by different shades of gray), or black-and-white printing (where some colors are printed as pure black, and others as pure white.) Whether a color is printed as black or white is determined by the *threshold value* described below.

- Aspect lets you select whether to print normally or "sideways" on the page. Select Horizontal to print "normally," so that what appears on the top of the display appears along the top edge of the printer paper. Select Vertical to print what appears on the top of the display along the side of the printer paper.

- Image lets you print an image as it appears on the display (by selecting Positive) or "reversed" (by selecting Negative). This setting affects only black-and-white and gray scale printing.

- Threshold, for black-and-white printing, lets you determine which colors are printed as white, and which as black. You change the Threshold setting by dragging the arrow in the slider below the label Threshold. When the setting for Image is Positive and the Threshold setting is 2, only the darkest color on the display is printed as black, while the rest is white. Increasing the value of the Threshold setting causes more colors to be printed as black. As you increase the setting, the lighter colors are printed as black.

  When the setting for Image is Negative, the higher the Threshold setting, the lighter are the colors that are printed as black.

Note that not all these choices apply to all printers. For example, letter-quality printers that use a "daisy wheel" printhead can only produce one quality of printing. To find out what selections apply to your printer, see the documentation provided with the printer.

When you're done making selections for your printer, select OK to confirm your selections or Cancel to cancel them. Selecting either OK or Cancel returns you to the Change Printer Screen.

More information is available on printers in Chapter 8, "Adding to the Amiga," and Appendix D.

Getting Back Preferences

If you'd like to get back the Preferences settings that came with the original Workbench disk, select Reset All. If you'd like to get back the last Preferences settings you saved, select Last Saved.

Using and Saving Preferences

When you're done with Preferences, select one of the gadgets at the lower right of the window. Select Save if you want your settings to take effect now and each time you start up the Workbench with the Workbench disk you're currently using. Selecting Save saves your settings on the Workbench disk. Select Use if

you want your settings to take effect now, but you don't want to save the settings on the Workbench disk for future use. If you change the settings, then decide you don't want them to take effect, select Cancel.

Because each Workbench disk keeps its own Preferences settings, different people can save their own settings on separate Workbench disks. To get back your settings, just set up the Workbench using the disk on which you've saved them.

Workbench 1.2
CLI
Copy
Setup
Format

Chapter 7

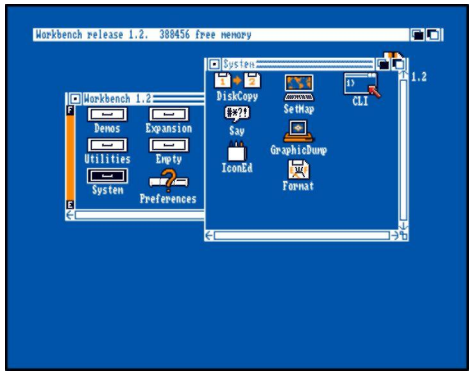
AmigaDOS and the CLI

You don't always have to use the Amiga by clicking the mouse on icons and menus. You can communicate directly with AmigaDOS by opening a CLI window. CLI stands for command line interface. The CLI allows you to directly issue commands to perform disk operations and file manipulations using the AmigaDOS by typing commands at the keyboard, which appear in the CLI window. The mouse is not used with CLI.

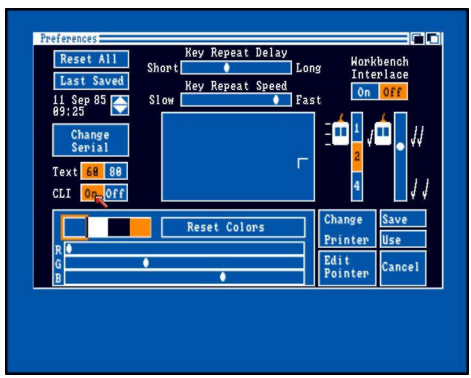
Accessing CLI

To access CLI, the gadget for CLI in Preferences must be set to on.

Your Workbench disk may already have CLI set on, and you need only open its icon. Open the System drawer. If CLI is set to on, there will be an icon for it in this drawer; if there is no CLI icon, you will have to turn on CLI using Preferences.



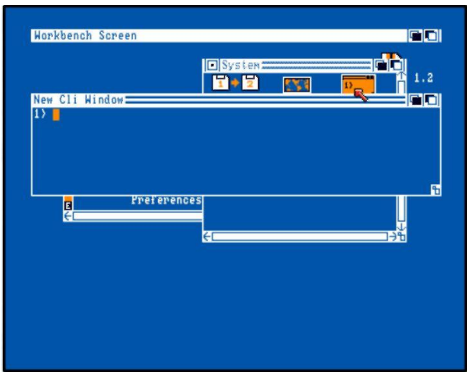
To turn on CLI, double-click on the Preferences icon from the Workbench screen. On the Preferences screen, go to the CLI window and click the pointer in the ON gadget.



Save the Preferences settings and return to the Workbench screen.

Reset the computer (press the CTRL, Commodore and Amiga keys simultaneously), and reboot the Workbench disk.

This time, select the System drawer, and you'll see an icon for CLI. Double-click on this CLI icon. A new window is opened, titled the NewCLI Window.



There is a prompt, with a number followed by >, at which you can enter commands. The number identifies the number CLI window set up (you can have multiple CLI windows at one time). Once you have saved Preferences with CLI set on, you can open the CLI window from the System drawer without having to reset Preferences again.

Commonly Used CLI Commands

Since this manual serves merely as an introduction to the Amiga, rather than present CLI as a volume in this chapter, we'll just review some frequently used AmigaDOS commands in typical applications. Reading this won't make you a programmer, but it will give you a feel for using AmigaDOS with the CLI. More in-depth CLI information and reference material may be found in the *AmigaDOS User's Manual*, from Bantam Books.

The commands summarized in this chapter can be used to perform the following tasks:

- Copying a disk (DISKCOPY)
- Formatting a new disk (FORMAT)
- Relabeling a disk (RELABEL)
- Looking at a disk's directory (DIR)
- Viewing the files in a directory (LIST)
- Protecting a file from deletion (PROTECT)
- Getting information about a file system (INFO)
- Changing the current directory (CD)
- Setting the date and time (DATE)
- Typing a text file to the screen (TYPE)
- Renaming a file (RENAME)
- Deleting a file (DELETE)
- Copying files on a single disk system (COPY)
- Copying files on a dual disk system (COPY)
- Creating a new directory (MAKEDIR)
- Redirecting the output of a command (>)
- Using the RAM disk
- Changing the Startup-Sequence
- Setting the Real Time Clock (SETCLOCK)
- Opening a new CLI window (NEWCLI)
- Closing an existing CLI window (ENDCLI)

We suggest you read and try each of these items in sequence. Each command leaves the Amiga in a known state, so the command which immediately follows will work exactly as shown.

Before you begin this section, be sure you have two blank double-sided diskettes, along with your Workbench disk. Write-protect your master diskette, and write-enable the blank disk before you begin (by sliding the write-protect notches, as explained in Chapter 2). Most of the commands reviewed in this chapter assume that you have a single disk drive system. However, for convenience of those with more than one disk drive, the two disk version of the command is occasionally given.

Commands you give AmigaDOS are shown indented from the left margin.

After typing each command, press the Return key to return control to AmigaDOS. Although the commands are all shown in capital letters, it is mainly to help you distinguish them from the rest of the text.

AmigaDOS accepts the commands in both upper and lower case.

In the sections which follow, the notations "df0:" and "drive 0" refer to the disk drive built into the Amiga. "df1:" is the first external 3.5" disk drive.

Copying a Disk

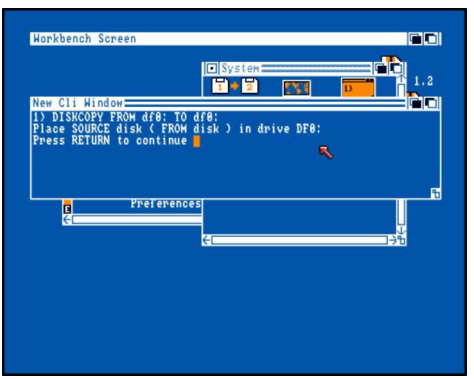
You can use this sequence to backup your Workbench master disk, or any other disk.

For a one disk system, type:

```
DISKCOPY FROM df0: TO df0:
```

For a two disk system, type:

```
DISKCOPY FROM df0: TO df1:
```



Follow the instructions as they appear. For a single drive system, you are prompted to insert the master disk (the disk you are copying information from—the FROM disk). Then, as the copying progresses, AmigaDOS asks you to insert the copy (the disk you are backing up information onto—the TO disk), swapping master and copy in and out until all of the diskette has been duplicated.

For a two disk system, you'll be told to put the master disk into drive df0: (the built-in disk drive) and the copy disk into df1: (the first extension disk drive).

Remove your master disk (Workbench) and put it in a safe place. Leave the copy write-enabled so you can write on it. Insert the copy you just made into the built-in drive and reboot your system from the copy.

After the reboot, re-enter CLI mode again, by double-clicking on icons for Workbench, the System drawer, and CLI.

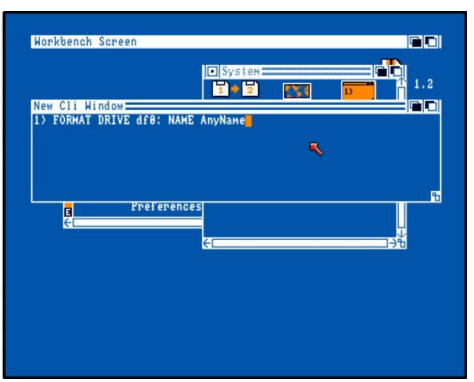
From this point on, any mention of your Workbench disk (such as making sure you have your Workbench disk in drive 0 to try a command) will refer to the copy of Workbench you've just created. This way, any difficulties will only alter a back-up disk, while your master Workbench disk is safe and available to make more copies, should that be necessary.

Formatting a Disk

To try this command, your disk copy of Workbench should be in drive 0, and you should have a blank disk available.

Sometimes, rather than copy a disk, you may want to prepare a data disk for your system. You can't just use a blank disk; it has to be *formatted* first. Once it's formatted, the disk is usable, to copy selected files to as a data disk, for example. To format a blank disk, you use the FORMAT command:

```
FORMAT DRIVE df0: NAME AnyName
```



Follow the instructions given by the computer. You can format disks in either drive (the drive built into your Amiga, df0:) or an external drive.

Wait for the disk activity light to go off (after the formatting is completed), and remove the freshly formatted disk. Reinsert your Workbench disk. The formatted disk can now be used to hold data files.

Relabeling a Disk

Insert your copy of Workbench into drive 0 to try this command.

If, after either copying or formatting a disk, you want to change the volume name, use the RELABEL command; for example, to change the name of the disk we just formatted from AnyName to MyDisk, type:

```
RELABEL AnyName: MyDisk
```

In this example, we've referred to the disk we just formatted by its volume name. You are asked to insert volume AnyName into any disk drive so that RELABEL can relabel it.

After this command is completed, remove the disk and reinsert your Workbench disk. The "AnyName" disk you removed now has the new name.

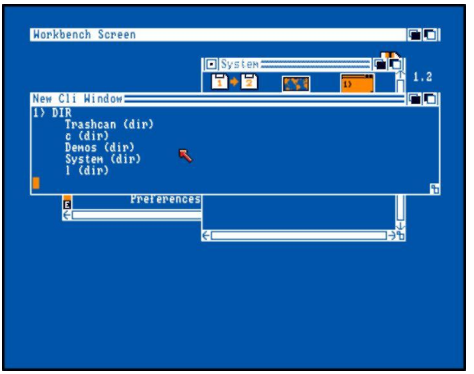
Looking at a Directory

To try this command, your Workbench disk should be in drive 0.

To look at the contents of a disk, issue the command:

```
DIR
```

This form lists the contents of your current directory.



You can list the contents of a different directory by specifying the pathname for that directory. The AmigaDOS filing system organizes directories in a structure. The main directory, the one we just saw the contents of with the DIR command, is known as the **root** directory.

The root directory can contain files or subdirectories, which can contain files or additional directories. This will be explained further a little later on. A pathname identifies the "path" for AmigaDOS to find a certain directory or file, according to the structure of the filing system.

The command:

```
DIR df0:c
```

lists the contents of the c(dir) on drive **0.** Directories are equivalent to the system drawers you see when the Workbench is visible.

You can look at the directory of a different disk unit (if you have one) by specifying its name:

```
DIR df1:
```

lists the contents of a disk inserted in disk unit **1** (the first external drive attached).

You can even look at the directory of a disk which isn't currently in the drive, by specifying its volume name. For example, the contents of the freshly formatted disk we relabeled can be displayed by the following command:

```
DIR MyDisk:
```

AmigaDOS asks you to insert that disk into the drive to allow DIR to read it and report the contents of the directory. Don't do it yet, though, because there are no files present on that disk right now for DIR to read. We'll add some files soon.

Using the LIST Command

Try this command with your Workbench disk in drive 0.

The DIR command tells you the names of the files in your directory.

The LIST command takes it one step further, providing additional information about those files. Type the command:

```
LIST
```

or

```
LIST df0:
```

AmigaDOS provides information about all the files in the current directory, including how large the file is, whether it can be deleted, whether it's a file or directory, and the date and time of its creation.

If you specify the name of a directory with LIST, it lists information about the files within that directory:

```
LIST c
```

The "rwed" in the listing refers to protection flags, standing for read, write, execute and delete. When each flag is set (using the PROTECT command), a file is supposed to be readable, writable, executable or deleteable.

The PROTECT command can protect a file from being deleted accidentally.

Try typing the command:

```
DATE > myfile
PROTECT myfile
LIST myfile
```

You will see that the protect flags have been set to "—". Now, if you try:

```
DELETE myfile
```

AmigaDOS responds:

```
Not Deleted - file is protected from deletion
```

To re-enable deletion of the file, type:

```
PROTECT myfile d
```

or

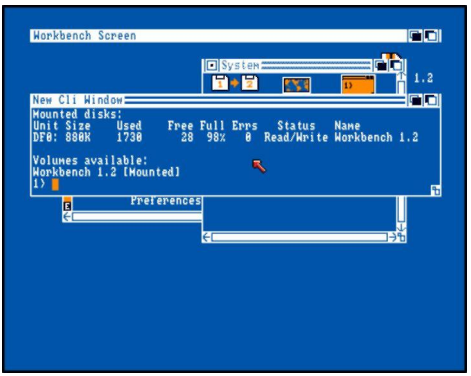
```
PROTECT myfile rwed
```

Getting Information About the File System

With your Workbench copy in drive 0, type the command:

```
INFO
```

This tells you how much space is used and how much space is available on your disks, whether they are read-only or read-write, and the name of the volume.



Changing the Directory

Up until now, we've only considered the "root" level of the diskette directory. An empty disk contains one directory, the root directory.

If you create a file on an empty disk, then that file appears in the root directory. However, directories can also contain further directories (sub-directories). Each directory may contain files, further directories, or both. Any filename is unique within its own directory, meaning that a filename can be repeated in different directories. For example, the file "program" can exist in directory A, and be completely different from the file "program" in directory B.

This filing structure ensures that two people sharing a disk can name their files as they see fit without having to worry about overwriting any other files on the disk, as long as they keep their own directory.

You can also use the filing structure to organize different types of files in different directories on the disk.

To see the directory level at which you are currently positioned in your directory tree, use the command:

CD

To change to a different current directory, you tell the system which directory is to be the current one. For example, when you did a DIR command on df0:, you saw an entry for c(dir). If you want that directory to become the current one, you issue the command:

```
CD C
```

Now when you issue the command DIR, it shows the contents of this level of the filing system. The command CD alone shows you the name of your current directory. You go up to the root directory by specifying:

```
CD :
```

to go up to the root level on the current volume (if you refer to your diskettes by volume name)—make sure you leave a space before the colon—, or

```
CD df0:
```

to go to the root volume on the built-in disk drive.

To move up one level in the directory structure (to go from a subdirectory toward the root directory), enter:

```
CD \
```

Later in this chapter, you'll see how to create new directories with the MAKEDIR command.

Setting the Date and Time

You can set the AmigaDOS clock by using the DATE command. Enter the date in the format DD-MMM-YY (two digits for date, three letters for month, and two digits for year). Enter the time in the format HH:MM:SS, with seconds being optional. Try an example of setting the clock:

```
DATE 12:00:00 01-apr-87
```

If you just enter DATE with no additional information, the current values for date and time are returned.

Now the system clock counts up from this time and date. Load the clock tool from Workbench now to check the new time setting. Remember to click in the CLI window to activate it after you remove the clock by clicking on its quit gadget.

Redirecting the Output of a Command

To try this command, insert your Workbench disk into drive 0.

Normally, the output of all commands goes to the screen. You can change where the system puts the output by using the redirect command, >. We've already used this command, to redirect the date ouput into a file to demonstrate the PROTECT command.

The > symbol tells AmigaDOS to send the output toward the output file name. Here's an example:

```
DATE > datefile
```

(Make sure you leave one space before and after the > symbol when you type this command.)

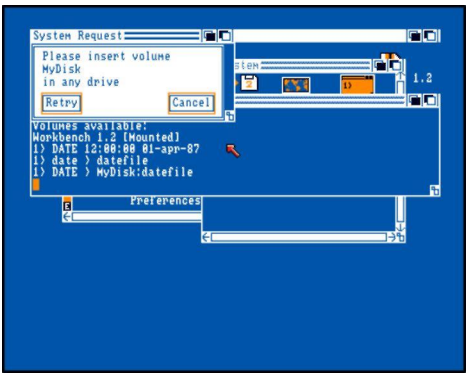
Execute this command, so you can use the datefile in the next example.

This command creates (or overwrites, if the file already exists) a file named "datefile" in your current directory.

Or, just to have something on the disk you formatted and named MyDisk, type the following:

```
DATE > MyDisk:datefile
```

AmigaDOS prompts you to insert the volume by that name (MyDisk).



Once the activity light goes out, remove MyDisk and reinsert your Workbench disk. Now issue the command:

```
DIR MyDisk:
```

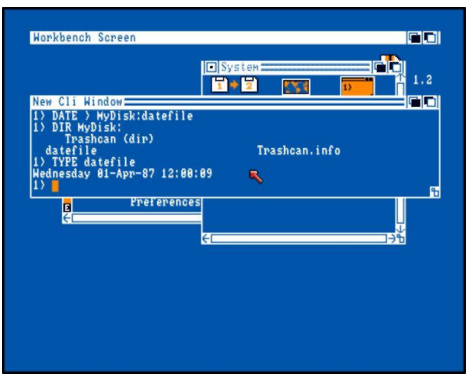
You're again prompted to insert this other disk into any drive. AmigaDOS lists the directory of this disk, which now contains a file named "datefile." Replace your Workbench disk in the drive.

Typing a Textfile to the Screen

You can see what's in a textfile by entering the command TYPE, followed by the name of the file you want to view. For example, to see what's contained in the file we just created, type the following:

```
TYPE datefile
```

which displays whatever you have in the file.



If you wish to verify that your other diskette also has the datefile contents on it, you can issue the command:

```
TYPE MyDisk:datefile
```

Remember to change back to your Workbench diskette after you try this.

Changing the Name of a File

You can change the name of a file by using the RENAME command. To change the name of a file, you must specify the file you are renaming, and the new name you want to give that file. To change the name of datefile to today, type either:

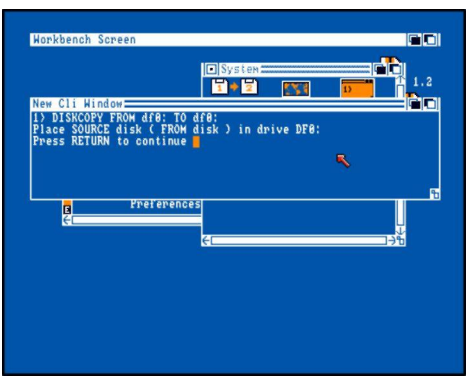
```
RENAME FROM datefile TO today
```

or

```
RENAME datefile today
```

Use TYPE to check that the new name refers to the same file contents as you had seen previously:

```
TYPE today
```



Notice that the alternate form of the command doesn't require you to use FROM and TO, but still executes the command the same way.

Most of the AmigaDOS commands have an alternate form. In this chapter, the longer form has been used primarily to introduce you to what the command does.

Deleting Files

To try this command, place your Workbench disk in drive 0.

You may be working on several versions of a program or textfile, and wish to delete earlier versions of that file, or want to get rid of files you don't need anymore. The DELETE command lets you erase files and gives the space back to AmigaDOS.

NOTE: If you delete files, it is not possible to retrieve them. Be certain that you really want to delete them.

Here is a sample command sequence, which creates a file using the redirection command (>), types it to the screen to see that the file is really there, then deletes the file.

```
DIR > stuff
TYPE stuff
DELETE stuff
TYPE stuff
```

To the final command in the above sequence, AmigaDOS responds:

```
Can't Open stuff
```

indicating that the file named stuff can't be found, because you deleted it.

Copying Files

You can copy files with one disk drive or two. On a single disk system, it's a little more complex.

To copy single files, you must copy certain files from your system disk (Workbench) into the system memory. This is called using the RAM: device, often known as a RAM disk.

You copy certain files to the RAM disk, change your directory to the RAM disk, then copy from the RAM disk onto the destination disk. Here is a sample sequence:

```
COPY df0:c/CD RAM:
COPY df0:c/COPY RAM:
CD RAM:
```

Insert the source data disk into the drive. For this example, we'll copy something from the Workbench disk, which is already in the drive.

Issue the command:

```
COPY df0:c/EXECUTE RAM:EXECUTE
```

Remove the source disk, and insert the destination disk into the drive.

Issue the command:

```
COPY RAM:EXECUTE df0:EXECUTE
```

Remove the destination disk, and insert your Workbench disk into the drive again. Issue the command:

```
CD df0:
```

and you are back where you started. The only other command you may want to perform is:

```
DELETE RAM:CD RAM:COPY RAM:EXECUTE
```

which returns the RAM disk memory to the system for other uses.

Copying files using two drives is much less complicated:

```
COPY FROM df0:sourcepath TO df1:destinationpath
```

or

```
COPY df0:sourcepath df1:destinationpath
```

Creating a New Directory

You can create a new directory (or new drawer) in whatever current directory you are working in with the MAKEDIR command:

MAKEDIR **newdrawer**

Now, **if** you issue the DIR command, you'll see there is an entry for:

newdrawer (dir)

The RENAME command can also be used to move a file from one directory (drawer) to another on the same disk:

MAKEDIR **newdrawer**

RENAME FROM **today** TO **newdrawer/today**

moves the file from the current directory into the newdrawer you have created. To see that it's really been moved, issue the command:

DIR

and it isn't there. Then issue the command:

DIR **newdrawer**

and AmigaDOS looks in the newdrawer, and shows you that the file named "today" is there.

Is My File Somewhere on This Disk?

To try this command, your copy of Workbench should be in drive 0.

Sometimes you'll want to look at everything on the disk, instead of one directory at a time. You can use the DIR command with one of its options:

```
DIR OPT A
```

which lists all directories and sub-directories on the disk.

To get a closer look at it, you might redirect the output to a file:

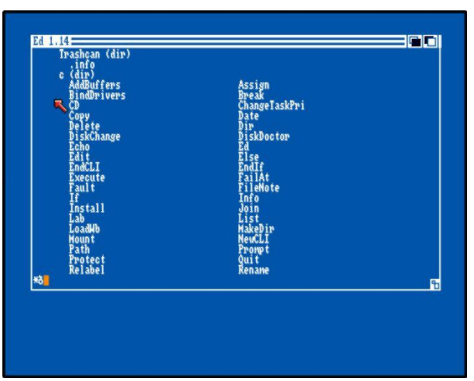
```
DIR >MyDiskDir OPT A
```

Notice that the redirect-the-output character came before the list of options for the DIR command.

Now, if you wish, you could TYPE the file MyDiskDir. Touch the space bar to pause the listing and press the Return key to resume the listing, or you can use the AmigaDOS screen editor (ED) to view the file.

Let's use ED:

```
ED MyDiskDir
```



Use the cursor keys to move up and down in the file.

Use the key combination ESC then T, followed by Return to move to the top of the file.

Use the key combination ESC then B, followed by Return to move to the bottom of the file.

Use the key combination ESC then M then a number, followed by Return to move to a specific line number within the file.

Use the key combination ESC then Q, followed by Return to quit, or ESC then X followed by Return to write any changes to the file back into the original file name.

Appendix B contains a listing of all the ED screen editing commands.

Using the RAM Disk

The RAM disk is a special storage area, which you can "turn on" to hold programs, tools, and other forms of information temporarily. RAM stands for Random Access Memory, which is memory that you can both read information from and write information to, while the computer is operating. The RAM disk is used just like a disk in a disk drive; you can load things from and save things to the RAM disk. The advantage of a RAM disk is speed—it's much faster than accessing a disk from the disk drive.

One way to activate the RAM disk is by issuing the command:

```
DIR RAM:
```

Remember to include the **colon** after RAM when you type in the command.

The disk drive light goes on when you press Return to issue the command. When the light goes out, drag or resize the CLI window to reveal the upper right corner of the Workbench screen, where the disk icons usually appear.

Notice there's a new icon there, for the RAM Disk. Open the RAM disk icon as you would open the Workbench disk icon.

A window comes up for the RAM disk. There's nothing in the window, since you haven't put anything there—yet. Notice that the window for the RAM disk comes up exactly where the Workbench window is. Drag the RAM disk window so you can get the icons in the Workbench window.

Now drag Notepad (or the tool of your choice) into the RAM disk window. The tool is duplicated and the icon is reproduced in the RAM disk.

Now open the tool from the RAM disk window. Notice how quickly the tool is loaded and ready to use.

If you want to use CLI (rather than Workbench) to access the tool in RAM, remember to specify RAM: in the pathname, or you will end up using the original version of the tool rather than the copy in the RAM disk.

The RAM disk is as large as it needs to be; the more tools and information you place in it, the larger it gets. However, try not to put more than you will actually use in the RAM disk, since the memory for the RAM disk is taken from the system, and the loss of memory available to the system slows down the Amiga's operation. Basically, the larger the RAM disk, the less memory there is for running things.

To delete anything from the RAM disk, use the CLI command DELETE. For example,

```
DELETE RAM:Notepad
```

and

```
DELETE RAM:Notepad.info
```

will remove Notepad from the RAM disk.

The RAM disk stays activated until the Amiga is turned off or reset.

Changing the Startup-Sequence

When you power up or reset the Amiga, CLI issues a series of commands to set up the screen. This is known as the Startup-Sequence. If you feel comfortable using CLI, you can change the Startup-Sequence to suit your needs. For example, you might find it convenient if the Amiga started up with the RAM disk already activated, and perhaps a tool loaded into RAM.

Note: If you change the Startup-Sequence, make sure you are changing a copy of Workbench, and not the original Workbench disk. This operation is not recommended for someone who does not really understand using CLI.

From the CLI window, issue the command:

```
ED s/Startup-Sequence
```

This loads the Startup-Sequence for the screen editor. The commands for using the screen editor are listed in Appendix B. Any changes you make to the Startup-Sequence are carried out each time the Amiga is booted up. So, to create a RAM disk automatically when the Amiga boots up, type:

```
DIR RAM:
```

after the `echo "Use Preferences tool to set date"` line.

To add a tool, use the CLI copy command to create that particular tool and assign it to the RAM disk.

When you now reset the Amiga, there will be a RAM disk icon along with the Workbench disk icon. To remove the RAM disk icon and have the Amiga boot up normally, you need only re-enter the screen editor for the Startup-Sequence and delete the DIR RAM: line (and any other changes that refer to the RAM disk) you added to the Startup-Sequence.

Setting the A501 Real Time Clock

The A501 Memory Expansion Unit increases the amount of memory of the Amiga 500 to 1 Megabyte. In addition, it has a battery backed up Real Time Clock. This clock is different from the Clock tool in Workbench (the system clock). Once set, this clock keeps the actual time continuously, and operates even when the Amiga is off.

You set the time for the Real Time Clock from CLI, using the SetClock command. Typically, you only need to set the time once, using the Save option of this command. You can also load the time from the Real Time Clock into the system clock with the Load option of SetClock. This can be done automatically by changing the Startup-Sequence.

To set the Real Time Clock (assuming you want to set it for February 12th, at 12:18 p.m.), type the following:

```
DATE 12-feb-87 12:18
SETCLOCK OPT SAVE
```

To load the system time from the real time clock (so the system clock has the real time), add the following to the Startup-Sequence:

```
SETCLOCK OPT LOAD
```

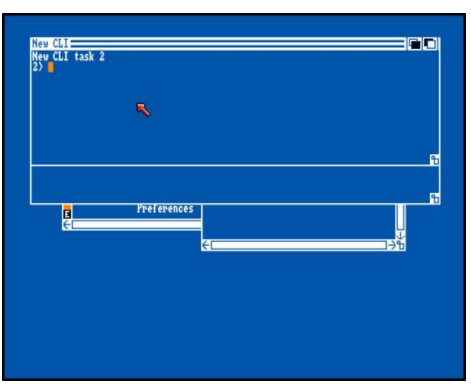
If you do not have the A501 Memory Expansion Unit installed, this command will have no effect.

Creating a New CLI Window

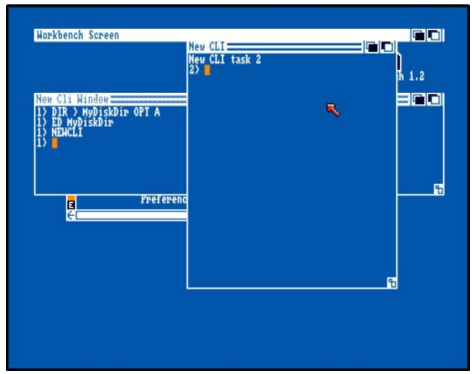
AmigaDOS is multitasking, meaning it can do more than one thing at a time. You can have multiple windows open at once, each having its own current directory and executing its own separate command. You create a new CLI by using the NEWCLI command:

```
NEWCLI
```

This opens a separate window, with a prompt that shows which process it's operating as (i.e., which number window it is). For example, if the first window had a **1>** prompt, then the new CLI window may have a **2>** prompt.



You can move this new window around, make it bigger and smaller and so on.



To issue commands to the new CLI, click within its window to "activate" it. Now anything you type goes to the window you most recently clicked the selection button in. Try the following: Click in window 1, and type:

```
DIR df0:c
```

Quickly click in window 2, and type:

```
INFO
```

Both CLI's will work at the same time to fulfill your requests. This demonstrates the multi-tasking capability of the Amiga. Notice that you aren't limited to only two CLI's, but you are able, if there is available memory, to open several of them.

Closing a CLI

You finish with a CLI and delete its window with the ENDCLI command.

Click the selection (left) button of the mouse in the window for the CLI you wish to close, and type:

```
ENDCLI
```

That's all there is to it.

Changing the Startup Sequence

Closing Comments

The series of command descriptions in this chapter is intended to give you a flavor of the kinds of things you can do with AmigaDOS and how to use the CLI. It is by no means a complete tutorial on either AmigaDOS or CLI. There are many CLI commands which haven't been covered here at all. Appendix B lists the available CLI commands as well as the ED commands and AmigaDOS error messages.

Most of the commands have other "templates" (alternate form in which to enter the commands) and options that haven't been demonstrated here. If you're interested in using CLI more extensively, we highly recommend purchasing *The AmigaDOS Manual* from Bantam Books, for complete tutorial and reference information on AmigaDOS and CLI.

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Picture Brush Mode Effects Font Prefs
Load
Save
Delete
Print
Color Control
Space
Page Size
Show Page
Screen Format
About
Quit
Medium
Value
Low
Value
AMIGA

Chapter 8

Adding to the Amiga

There are many ways you can add to your Amiga. You can make it more powerful by adding memory or an extra disk drive. Tools for business and entertainment let you use your Amiga in new and exciting ways. To print your projects, you can choose from several printers, including color printers. A modem connects your Amiga to the outside world via normal phone lines. Other peripheral add-ons enhance the Amiga picture.

In this chapter, you'll get a quick look at some currently available peripherals. Complete instructions for installing and using these add-ons are included with the peripherals. For more information, and for many peripherals not described here, see your Amiga dealer.

Precautions for Peripherals

When attaching any peripheral, **use only a cable that is specifically designed for the Amiga. Using a cable that is not properly wired for the Amiga may damage the peripheral and/or your Amiga.** You can obtain cables designed for the Amiga from your Amiga dealer.

If you wish to adapt other cables for use with the Amiga, see Appendix A, "Technical Reference," for information about the proper connections.

Before you attach a cable to any of the connectors on the back of the main unit, turn off the Amiga. Attaching a cable when the Amiga is turned on may reset the Amiga.

When using cables to attach any peripherals, including printers, be sure that the cables are shielded. Using unshielded cables can cause interference to radio and television reception. See the statement at the end of Chapter 9 for more information about how to prevent and correct interference.

Adding Memory to the Amiga

With the *Amiga A501 Memory and Clock Expansion Cartridge,* you can easily add an additional 512K of random-access memory to your Amiga, along with a battery backed-up real time clock that keeps track of hours, minutes, seconds, day of the week, month, date and year, even while your Amiga is turned off. The cartridge slides in the bottom of the Amiga and takes only seconds to install. With the additional memory, you can:

- work on more than one program at a time.
- work on larger files in a word processor, spreadsheet or database
- save your favorite commands to a RAM disk, which you can set up automatically when the system is booted.

Adding a Disk Drive to the Amiga

The *Amiga External 3.5 Disk Drive* (Model 1010) is identical in storage capacity and performance to the disk drive built into the Amiga. To attach this drive, you simply plug it into the external disk connector on the back of the Amiga. A second disk drive makes performing many disk operations, such as copying disks, much easier and faster.

The *Amiga External 5-1/4" Disk Drive* (Model 1020) can also be used as an external storage device. Utilities that allow you to use this drive are included on the Amiga Extras disk. It can also be used with the Amiga V1.2 Transformer™ software. (Ask your Amiga dealer for more information about these.)

When using 5-1/4" disks on an Amiga, a system requestor may appear that asks you to insert a disk. Unlike the 3.5" disks, the Amiga cannot detect when you insert a 5-1/4" disk. Once you have inserted the disk, you must enter the AmigaDOS diskchange command, followed by the name of the disk drive, for the Amiga to recognize the disk. (For more details, see the *AmigaDOS Manual* published by Bantam Books.)

Printers for the Amiga

There are many types of printers you can use with an Amiga.

- **Dot Matrix:** Epson® FX-80™ and RX-80™. Apple® ImageWriter™, Commodore MPS 1000™ and MPS 1250™ printers.

  Dot matrix printers can produce both text and monochrome graphics.

- **Daisy Wheel:** Alphacom® Alphapro 101™, Brother® HR15-XL, Diablo® Advantage D25, Diablo 630, and Qume® LetterPro 20™ letter-quality printers.

  These print text of comparable quality to that produced by high-quality typewriters. However, they are slower than most dot matrix printers and cannot print graphics.

- **Color Dot Matrix:** Okimate® 20™ and Epson® JX-80™ and similar color printers. To use the Okimate 20 with the Amiga, you also need an Okidata "Plug 'n Print" cartridge that connects the printer to the parallel port of the Amiga.

  These printers can produce color images from the Amiga, including pictures created with software graphics packages.

- **Color Ink Jet:** Diablo C-150 color printer.

  This type of printer uses advanced ink-jet technology to produce high-quality color images.

- **Okidata Microline™** series printers.

  The models 92 and 192 are available in two versions: a standard version and a version compatible with IBM® dot matrix printers.

  To use the standard version, select Okidata 92 from the list of printer choices in Preferences. To use the IBM compatible version, select CBM MPS 1000 from the list. The Microline 292 can be used with two different personality cards: one that makes it compatible with IBM printers and another that, when used with a different ribbon, lets you print in color. To use the Microline 292 as an IBM compatible printer, select CBM MPS 1000 from the list of printers in Preferences.

  To use the Microline 292 as a color printer, select Epson JX-80 from the list.

- **Laser Printers:** Hewlett-Packard LaserJet™ and LaserJet PLUS™ laser printers.

  These printers can produce high-quality, professional quality print.

  You use the Preferences tool (reviewed in Chapter 6) to tell the Amiga which printer you're using and to change a number of settings that affect printers.

Adding a Modem

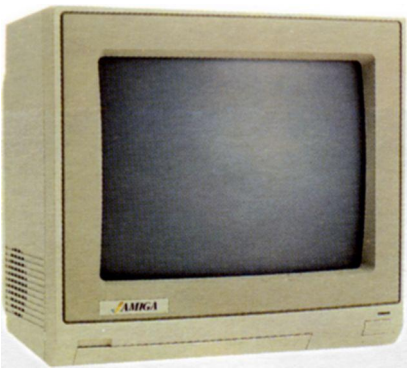
The Amiga 1680 Modem 1200/RS lets you telecommunicate with your Amiga over regular phone lines. The 1680 Modem utilizes the popular Hayes™ protocol to perform data transfers and access information networks.

A modem also gives your Amiga access to public domain software on electronic bulletin boards (BB's) and information services.

The Amiga 1680 Modem 1200/RS supports a standard RS232 interface, which means it can also be used with most other computers which use an RS232 serial port, such as the IBM® PC.

Other Peripherals

There are many other hardware add-ons that can greatly enhance the function of your Amiga. The *Midi Interface,* a cartridge with cable attachment that plugs into the RS232 port of your Amiga, gives the computer the ability to control musical instruments, such as synthesizers, and to digitize sound. The midi interface enables your Amiga to control several instruments at one time, to produce studio-like effects. Some midi interface connectors can connect to parallel ports. Midi interface connectors are available from many sources.



The Amiga can display on RGB monitors, composite monitors, monochrome monitors and even television sets. The monitor you use should depend on your needs for picture display. You can get a modulator/composite video interface that plugs into the Amiga's RGB video port which allows you to connect a Commodore 1702 or comparable composite color monitor or a television.

Still other available Amiga peripherals allow you to digitize the Amiga picture, connect to different networks, or add a graphics tablet.

And the list is still growing! When you're ready to expand your Amiga system, visit your Amiga dealer for the latest in peripherals.

Chapter 9

Caring for the Amiga

Your Amiga needs very little care to keep it working at its best.

Observe the precautions in this chapter to keep your Amiga in top shape.

Amiga Precautions

Keep the Amiga dry. Keep liquids away from the Amiga as you work. An accidental spill can seriously damage the Amiga.

Keep the Amiga out of direct sunlight. If the case gets too hot, the Amiga won't work reliably. Moreover, temperatures above 140 degrees Fahrenheit (60 degrees Celsius) can damage the Amiga's internal components. Keep it cool.

Keep connectors and the ends of cables clean. Food, especially sticky food, is the worst offender. Any substance that adheres to connectors or the ends of cables can prevent a good electrical connection or. worse, damage the connector.

Keep magnets away from the monitor. Although magnets won't damage the monitor, they can distort the video display. In addition to more obvious magnets, beware of magnets in telephones, loudspeakers, and electric motors. (Note that magnets CAN damage information on disks. Be sure to read "Taking Care of Disks" next in this chapter.)

Don't open the case. If your Amiga needs service, bring it to an Amiga dealer or an approved Amiga Service Center. Opening the case will void the warranty on your Amiga.

Use the mouse on a clean surface. The ball on the bottom of the mouse must be clean to work properly. If the mouse behaves erratically, it may need cleaning. The section following disk care tells how to clean your mouse.

Taking Care of Disks

To protect the information on your disks, observe these precautions: **Never remove a disk from a disk drive when the disk drive light is on.** The disk drive light tells you that the Amiga is using a disk. Taking a disk out too soon may ruin the information on the disk.

Keep disks away from magnets. Microdisks, like audio tapes, store information magnetically. Magnets can ruin the information on a disk. In addition to more obvious magnets, beware of magnets in telephones, loudspeakers, and electric motors.

Keep disks dry and away from extreme heat or cold. Microdisks are comfortable at about the same temperatures you are. Don't leave disks in direct sunlight, near heat sources, or in cars parked in the sun.

Don't touch the surface of the disk. A microdisk's metal cover closes automatically whenever you remove the disk from a disk drive. Don't touch the surface of the disk underneath the cover.

Make copies of important disks. The best insurance for the information on a disk is to make a copy of the disk and keep the copy in a safe place. Make a habit of copying an important disk each time you finish working with it.

Store your disks in a clean, dust-free container when not in use. Dust can ruin the information on a disk.

Cleaning the Mouse

To keep the mouse working properly, give it an occasional cleaning.

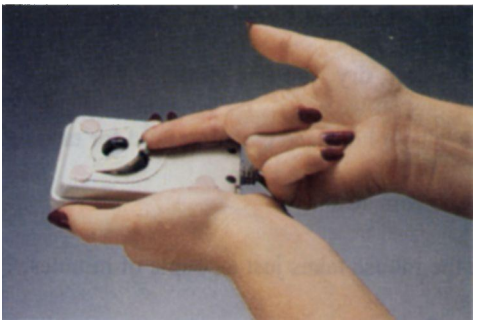
To clean the mouse, you'll need:

- a soft, dry, lint-free cloth
- alcohol or head cleaning fluid for tape recorders
- cotton swabs

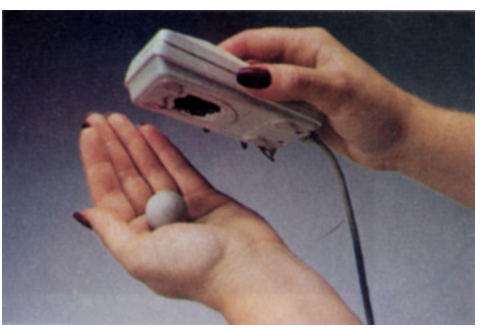
Cleaning the mouse takes just a couple of minutes. Here's how you do it:

Turn the mouse upside down with its cable toward you. Hold the mouse in both hands and put your thumbs under the two arrows on either side of the ball.

With your thumbs, push firmly in the direction of the arrows to open the cover for the mouse ball. With the mouse upside down, lift off the cover with a fingernail:



Put your hand over the opening, turn the mouse upside down, and catch the ball:



In the opening, you'll see three small metal rollers. Moisten a cotton swab with alcohol or head cleaning fluid and gently swab the surface of each roller. Turn each roller as you swab to clean it all the way around.

With the cloth, wipe off the mouse ball. (Don't use any liquid when cleaning the mouse ball.) When you're done, blow gently into the opening to remove any dust, replace the ball, and slide the cover for the ball back into place.

Radio and Television Interference

Your Amiga generates and uses radio frequency energy. If it not installed and used properly, that is, in strict accordance with the instructions in this manual, it may cause interference to radio and television reception. The Amiga has been certified to comply with the limits for a Class B computing device, pursuant to subpart J of Part 15 of the Federal Communication Commission's rules, which are designed to provide reasonable protection against radio and television interference in a residential installation. If you suspect interference, you can test the Amiga by turning it off and on. If the Amiga does cause interference, try the following:

- Reorient the antenna or AC plug on the radio or television.
- Change the relative positions of the Amiga and the radio or television.
- Move the Amiga farther away from the radio or television.
- Plug either the Amiga or the radio or television into a different outlet so that the Amiga and the radio or television are on different circuits.

Use only shield-grounded cables when connecting peripherals (computer input-output devices, terminals, printers, etc.) to the Amiga.

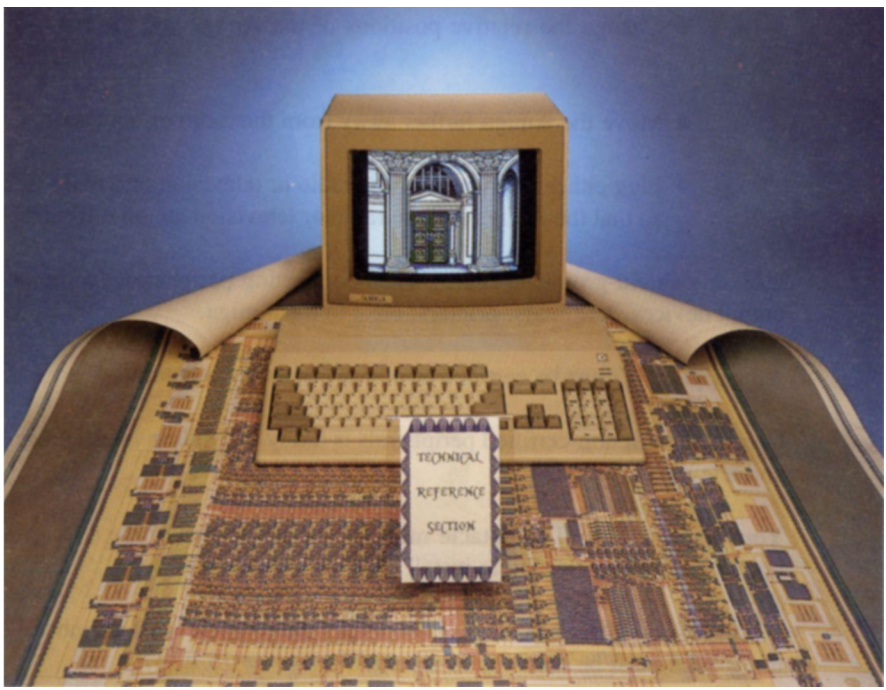
All peripherals must be certified to comply with Class B limits.

Operation with non-certified peripherals is likely to result in interference to radio and television reception.

Your house AC wall receptacle must be a three-pronged type (AC ground). If not, contact an electrician to install the proper receptacle.

If a multi-connector box is used to connect the computer and peripherals to AC, the ground must be common to all units.

If necessary, consult your Amiga dealer or an experienced radio-television technician for additional suggestions. You may find the following FCC booklet helpful: "How to Identify and Resolve Radio-TV Interference Problems." The booklet is available from the U.S. Government Printing Office. Washington, D.C. 20402, stock no. 004-000-00345-4.


TECHNICAL
REFERENCE
SECTION

Appendix A

Technical Reference

In this section, you'll find technical information on the following:

- specifications for the Amiga
- input/output connectors
- block diagrams
- Amiga theory of operations
- custom chip diagrams and features
- Amiga memory map

Amiga Specifications

Central Processor	Motorola MC68000
Memory	512K bytes RAM expandable to 1M
Disks	3-1/2 inch double-sided double-density microdisks with 880K bytes formatted storage capacity per disk
Mouse	Mechanical, .13 mm/count (200 counts per inch)
Interfaces	RS-232 serial interface Centronics®-compatible parallel interface External disk interface Mouse/Game controller interface Additional game controller interface Keyboard interface Two audio outputs for stereo sound Memory cartridge interface Expansion interface
Supported Monitors	Analog RGB, digital RGB, monochrome (composite video), and standard televisions
Power Requirements	99 to 121 volts AC 54 to 66 Hz
Temperature Requirements	For operation: 5 to 40 degrees Centigrade (41 to 104 degrees Fahrenheit) For storage: -40 to 60 degrees Centigrade (-40 to 140 degrees Fahrenheit)
Humidity Requirements	20% to 90% relative humidity, non-condensing

Input/Output Connectors

This section lists pin assignments for several input/output connectors on the Amiga. The information in this section is highly technical and is intended only for those expert in connecting external devices to computers. You do not need this information if you use a cable specifically designed for use with the Amiga and the add-on you want to connect.

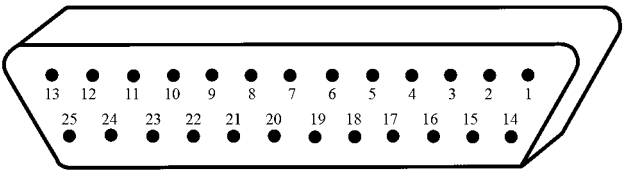
For information about connectors not described in this section, see the *Amiga Hardware Manual.*

If you attach peripherals with cables other than those designed for use with the Amiga, note: **some pins on Amiga connectors provide power outputs and non-standard signals. Attempting to use cables not wired specifically for the Amiga may cause damage to the Amiga or to the equipment you connect.** The descriptions below include specific warnings for each connector. For more information about connecting add-ons, consult your Amiga dealer.

In the descriptions that follow, an asterisk (*) at the end of a signal name indicates a signal that is active low.

Serial Connector

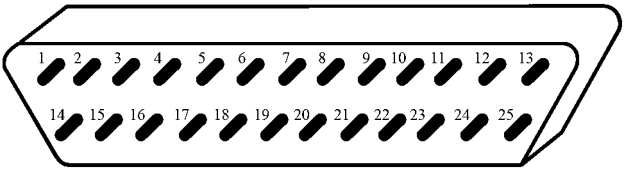
In the following table, the second column from the left gives the Amiga pin assignments. The third and fourth columns from the left give pin assignments for other commonly used connections; the information in these two columns is given for comparison only.



WARNING: Pins 9 and 10 on the Amiga serial connector are used for external power. Connect these pins ONLY if power from them is required by the external device. The table lists the power provided by each of these pins.

Pin	Amiga 500	RS232	HAYES®	Description
1	GND	GND	GND	FRAME GROUND
2	TXD	TXD	TXD	TRANSMIT DATA
3	RXD	RXD	RXD	RECEIVE DATA
4	RTS	RTS		REQUEST TO SEND
5	CTS	CTS	CTS	CLEAR TO SEND
6	DSR	DSR	DSR	DATA SET READY
7	GND	GND	GND	SYSTEM GROUND
8	DCD	DCD	DCD	CARRIER DETECT
9	+ 12V			+ 12 VOLT CARRIER
10	-12V			- 12 VOLT CARRIER
11	AUDO			AUDIO OUT OF AMIGA
12		S.SD	SI	SPEED INDICATE
13		S.CTS		
14		S.TXD		
15		TXC		
16		S.RXD		
17		RXC		
18	AUDI			AUDIO INTO AMIGA
19		S.RTS		
20	DTR	DTR	DTR	DATA TERMINAL READY
21		SQD		
22	RI	RI	RI	RING INDICATOR
23		SS		
24		TXC1		
25				

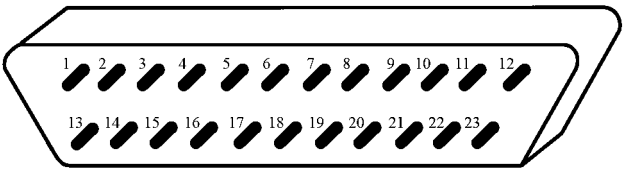
A500 Parallel Connector



WARNING: Pin 14 on the Amiga parallel connector supplies +5 volts of power. Connect this pin ONLY if the power from it is required by the external device. NEVER connect this pin to an output of an external device or to a signal ground. Pins 17-25 are for grounding signals. DO NOT connect these pins directly to a shield ground.

Pin	Name	Description
1	STROBE*	STROBE
2	D0	DATA BIT 0 (Least sign. bit)
3	Dl	DATA BIT 1
4	D2	DATA BIT 2
5	D3	DATA BIT 3
6	D4	DATA BIT 4
7	D5	DATA BIT 5
8	D6	DATA BIT 6
9	D7	DATA BIT 7
10	ACK*	ACKNOWLEDGE
11	BUSY	BUSY
12	POUT	PAPER OUT
13	SEL	SELECT
14	+5V PULLUP	+5 VOLTS POWER (100 mA)
15	NC	NO CONNECTION
16	RESET*	RESET
17	GND	SIGNAL GROUND
18	GND	SIGNAL GROUND
19	GND	SIGNAL GROUND
20	GND	SIGNAL GROUND
21	GND	SIGNAL GROUND
22	GND	SIGNAL GROUND
23	GND	SIGNAL GROUND
24	GND	SIGNAL GROUND
25	GND	SIGNAL GROUND

RGB Monitor Connector

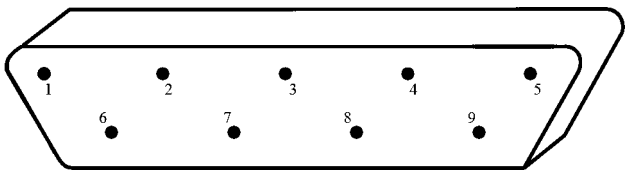


WARNING: Pins 21, 22, and 23 on the RGB monitor connector are used for external power. Connect these pins ONLY if power from them is required by the external device. The table lists the power provided by each of these pins.

Pin	Name	Description
1	XCLK*	EXTERNAL CLOCK
2	XCLKEN*	EXTERNAL CLOCK ENABLE
3	RED	ANALOG RED
4	GREEN	ANALOG GREEN
5	BLUE	ANALOG BLUE
6	DI	DIGITAL INTENSITY
7	DB	DIGITAL BLUE
8	DG	DIGITAL GREEN
9	DR	DIGITAL RED
10	CSYNC*	COMPOSITE SYNC
11	HSYNC*	HORIZONTAL SYNC
12	VSYNC*	VERTICAL SYNC
13	GNDRTN	RETURN FOR XCLKEN*
14	ZD*	ZERO DETECT
15	C1*	CLOCK OUT
16	GND	GROUND
17	GND	GROUND
18	GND	GROUND
19	GND	GROUND
20	GND	GROUND
21	- 12V	- 12 VOLTS POWER (50 mA)
22	+ 12V	+ 12 VOLTS POWER (100 mA)
23	+ 5V	+ 5 VOLTS POWER (100 mA)

Mouse/Game Controller Connectors

There are connectors labeled "JOY1" and "JOY2" on the back of the Amiga 500. If you use a mouse to control the Workbench, you must attach it to connector JOY 1. You can attach joystick controllers to either of the connectors. To use a light pen, you must attach it to connector 1. The following tables describe mouse, game controller, and light pen connections.



WARNING: Pin 7 on each of these connectors supplies +5 volts of power. Connect this pin ONLY if power from it is required by the external device.

Connectors 1 and 2: Mouse Connections

Pin	Name	Description
1	MOUSE V	MOUSE VERTICAL
2	MOUSE H	MOUSE HORIZONTAL
3	MOUSE VQ	VERTICAL QUADRATURE
4	MOUSE HQ	HORIZONTAL QUADRATURE
5	MOUSE BUTTON 2	MOUSE BUTTON 2
6	MOUSE BUTTON 1	MOUSE BUTTON 1
7	+ 5V	+ 5 VOLTS POWER (100 mA)
8	GND	GROUND
9	MOUSE BUTTON 3	MOUSE BUTTON 3

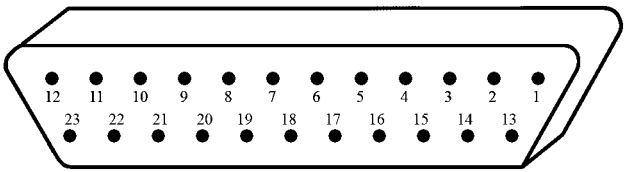
Connectors 1 and 2: Game Controller

Pin	Name	Description
1	FORWARD*	CONTROLLER FORWARD
2	BACK*	CONTROLLER BACK
3	LEFT*	CONTROLLER LEFT
4	RIGHT*	CONTROLLER RIGHT
5	POTX	HORIZONTAL POTENTIOMETER
6	FIRE*	CONTROLLER FIRE
7	+ 5V	+ 5 VOLTS POWER (100 mA)
8	GND	GROUND
9	POT Y	VERTICAL POTENTIOMETER

Connector 2: Light Pen Connection

Pin	Name	Description
1		
2		
3		
4		
5	LIGHT PEN PRESS	LIGHT PEN TOUCHED TO SCREEN
6	LIGHT PEN*	CAPTURE BEAM POSITION
7	+ 5V	+ 5 VOLTS POWER (100 mA)
8	GND	GROUND
9		

External Disk Connector

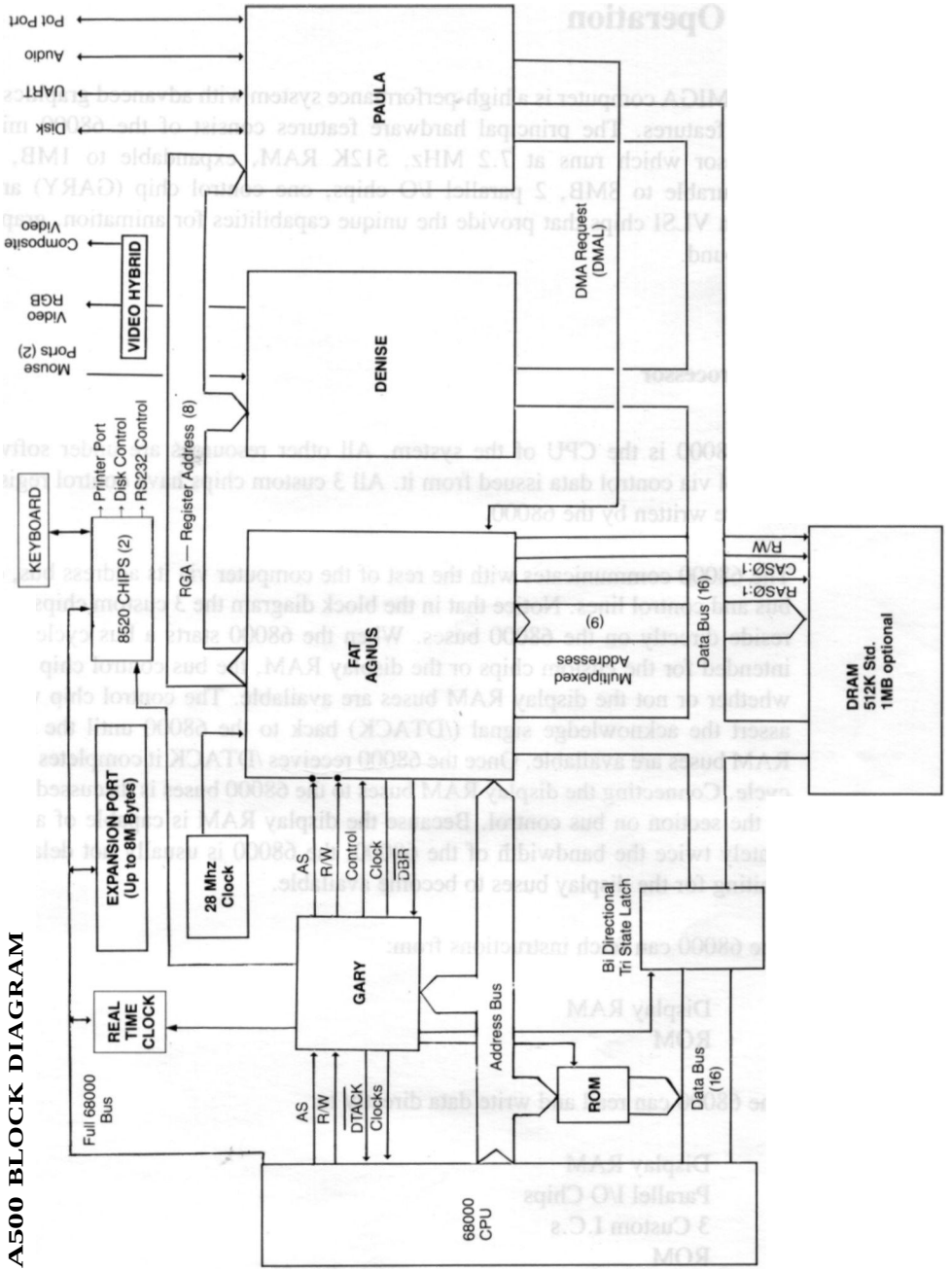


Pin	Name	Description
1	/RDY	Disk Ready—Active Low
2	/DKRD	Disk Ready Data—Active Low
3-7	GND	Ground
8	/MTRXD	Disk Motor Control—Active Low
9	/SEL2B	Select Drive 2—Active Low
10	/DRESB	Disk RESET—Active Low
11	/CHNG	Disk has been Removed from Drive—Latched Low
12	+ 5	5 VDC Supply
13	/SIDEB	Select Disk Side—0 = Upper 1 = Lower
14	/WPRO	Disk is Write Protected—Active Low
15	/TKO	Drive Head Position over Track 0—Active Low
16	/DKWE	Disk Write Enable—Active Low
17	/DKWD	Disk Write Data—Active Low
18	/STEPB	Step the Head—Pulse, First Low then High
19	DIRB	Select Head Direction—0 = Inner 1 = Outer
20	/SEL3B	Select Drive 3—Active Low
21	/SEL1B	Select Drive 1—Active Low
22	/INDEX	Disk Index Pulse—Active Low
23	+ 12	12 VDC Supply

86-Pin Connector

Pin	Name	Pin	Name
1	gnd	44	IPL2*
2	gnd	45	A16
3	gnd	46	BERR*
4	gnd	47	A17
5	+5	48	VPA*
6	+5	49	gnd
7	exp	50	E
8 - 12		51	VMA*
9	exp	52	A18
10	+ 12	53	RES*
11	exp	54	A19
12	CONFIG*	55	HLT*
13	gnd	56	A20
14	C3*	57	A22
15	CDAC	58	A21
16	C1*	59	A23
17	OVR*	60	BR*
18	XRDY	61	gnd
19	INT2*	62	BGACK*
20	PALOPE*	63	PD15
21	A5	64	BG*
22	INT6*	65	PD14
23	A6	66	DTACK*
24	A4	67	PD13
25	gnd	68	PRW*
26	A3	69	PD12
27	A2	70	LDS*
28	A7	71	PD11
29	A1	72	UDS*
30	A8	73	gnd
31	FC0	74	AS*
32	A9	75	PD0
33	FC1	76	PD10
34	A10	77	PD1
35	FC2	78	PD9
36	A11	79	PD2
37	gnd	80	PD8
38	A12	81	PD3
39	A13	82	PD7
40	IPL0*	83	PD4
41	A14	84	PD6
42	IPL1*	85	gnd
43	A15	86	PD5

A500 BLOCK DIAGRAM



Theory of Operation

The AMIGA computer is a high-performance system with advanced graphics and audio features. The principal hardware features consist of the 68000 microprocessor which runs at 7.2 MHz, 512K RAM, expandable to 1MB, and configurable to 8MB, 2 parallel I/O chips, one control chip (GARY) and 3 custom VLSI chips that provide the unique capabilities for animation, graphics and sound.

68000 Microprocessor

The 68000 is the CPU of the system. All other resources are under software control via control data issued from it. All 3 custom chips have control registers that are written by the 68000.

The 68000 communicates with the rest of the computer via its address bus, data bus and control lines. Notice that in the block diagram the 3 custom chips do not reside directly on the 68000 buses. When the 68000 starts a bus cycle that is intended for the custom chips or the display RAM, the bus control chip detects whether or not the display RAM buses are available. The control chip will not assert the acknowledge signal (/DTACK) back to the 68000 until the display RAM buses are available. Once the 68000 receives /DTACK it completes the bus cycle. Connecting the display RAM buses to the 68000 buses is discussed further in the section on bus control. Because the display RAM is capable of approximately twice the bandwidth of the 68000, the 68000 is usually not delayed by waiting for the display buses to become available.

The 68000 can fetch instructions from:

Display RAM
ROM

The 68000 can read and write data directly to:

Display RAM
Parallel I/O Chips
3 Custom I.C.s
ROM

The 68000 transmits data and control to and from the peripherals via the parallel I/O and the 3 custom chips.

/M is the processor clock to the 68000. C1, C3 and CDAC are used to clock the custom chips and determine the timing of signals to the memory arrays.

ROM

The ROM contains the kernel and DOS routines; it is 128K x 16.

Parallel I/O

The 2 multipurpose 8520 I/O chips provide the following:

I/O to and from the parallel port connector
Control lines to and from the joystick/mouse ports
A control line to the front panel LED
Internal control lines
Keyboard control lines, clock and data
Serial port control lines
Floppy disk interface control lines
Internal timers

These 2 chips reside on the 68000 buses and are read and written by the 68000.

Clocks Generator

The entire computer board is run synchronous to the 3.579545 MHz color clock. This is accomplished by generating a number of submultiple frequencies from the master 28.63636 MHz NTSC (or 28.37516 MHz for PAL) crystal oscillator. All clocks are generated by the Fat Agnus custom chip. The following are the primary clocks:

C1 3.579545 MHz color clock
C3 C2 shifted 45 degrees later
7M C1 XORed with C3 = 7.15909 MHz
CDAC 7M shifted 90 degrees later

The 3 Custom Chips

The 3 custom chips provide very fast manipulation of graphics and audio data in the display RAM. All the major functions in the chips are DMA driven; that is, streams of data are moved between the custom chips and display RAM under DMA control. These streams of data are acted upon by the custom chips. Fat Agnus, custom chip #1, contains 25 dedicated purpose DMA counters.

The 3 chips have control registers which are usually loaded by the 68000. However, Fat Agnus also has the capability of loading control registers in the other 2 custom chips. When Fat Agnus performs a bus cycle, it outputs a code on the Register Address Bus telling the other 2 chips the nature of the bus cycle. This is necessary because many of the bus cycles provide data to or from the other 2 chips, thus they must cooperate appropriately.

In addition to manipulating data in the display RAM, the custom chips output streams of data to the video output circuits and audio output circuits, and they move data to and from the floppy disks and serial port.

Note that the display RAM buses can be completely isolated from the 68000 buses by Fat Agnus and Data Bus drivers. Thus, Fat Agnus can be performing a bus cycle on the display buses simultaneously with the 68000 performing a bus cycle on its buses. This parallelism increases throughout.

Bus Control, Address/Data MUX, Address Driver

The bus control logic resides in the control chip (GARY) and Fat Agnus. They provide 3 major functions, they:

Synchronize the 68000 to the current phase of C1
Arbitrate between the 68000 and Fat Agnus for the display buses
Generate DRAM timing for the video RAM bus drivers appropriate to the current cycle

Synchronizing the 68000 to C1 is straightforward, since the 68000 is clocked by 7M which is twice the frequency and synchronous to C1. If the 68000 starts a bus cycle in the wrong phase of C1, the bus control chip merely delays /DTACK long enough so that the 68000 will complete the bus cycle in the desired phase relationship to C1. This phase relationship is necessary because the custom chips and the display RAM are clocked by C1.

Arbitration is very simple. Fat Agnus tells the bus control prior to taking the display RAM buses by asserting an input to the control chip (GARY) called /DBR. Whenever Fat Agnus has the display buses and the 68000 wants them, the 68000 is held off by not giving it /DTACK. In this state the 68000 has no effect on the display buses until the bus controller enables the bus drivers.

Fat Agnus generates the DRAM timings and does all address multiplexing. If the 68000 is running a video memory cycle, its addresses are routed through Fat Agnus onto the multiplexed address lines. If the custom chips are running a memory cycle the addresses are routed to the multiplexed address lines from internal address register.

Display RAM

The display RAM is a 512K read/write memory that resides on the RAM address and RAM data buses. It is expandable to 1M bytes by the addition of the RAM expansion module. It is implemented using standard 256K x 1 dynamic RAMs, refreshed by Fat Agnus.

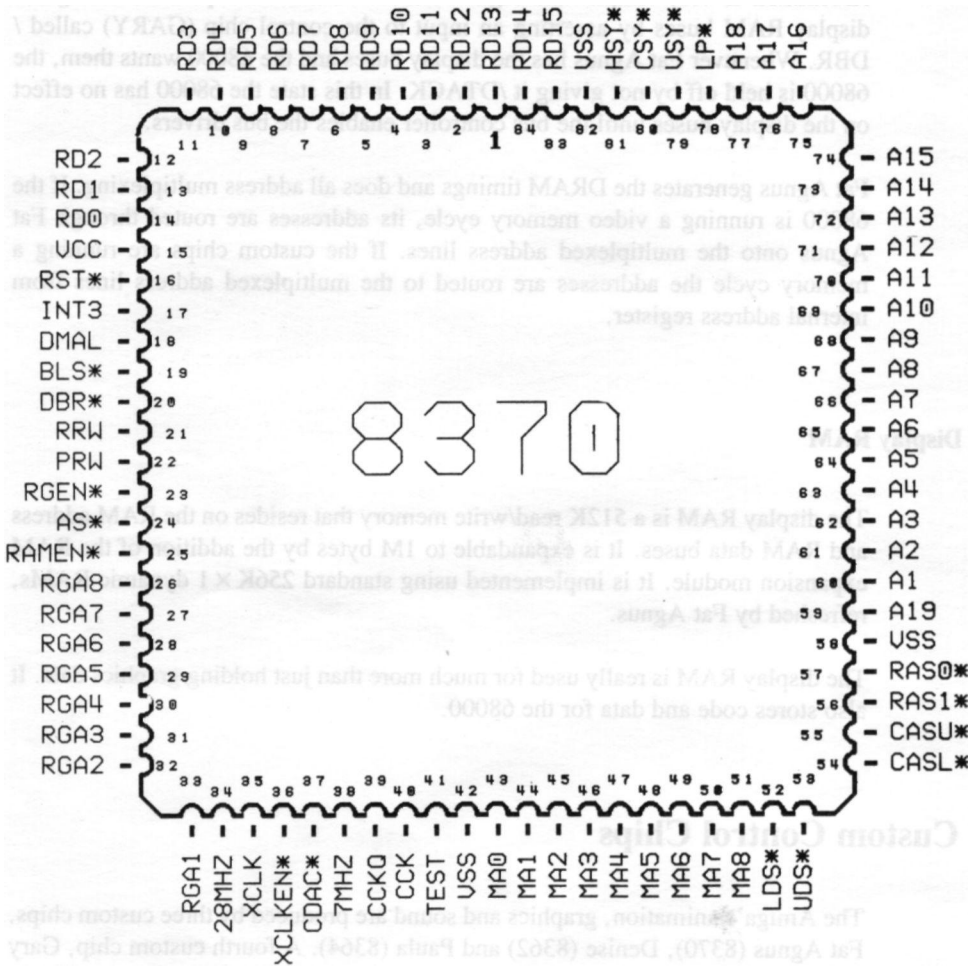
The display RAM is really used for much more than just holding graphics data. It also stores code and data for the 68000.

Custom Control Chips

The Amiga's animation, graphics and sound are produced by three custom chips. Fat Agnus (8370), Denise (8362) and Paula (8364). A fourth custom chip, Gary serves as the control chip. The following pages include pin diagrams, feature lists, and block diagrams for these chips.

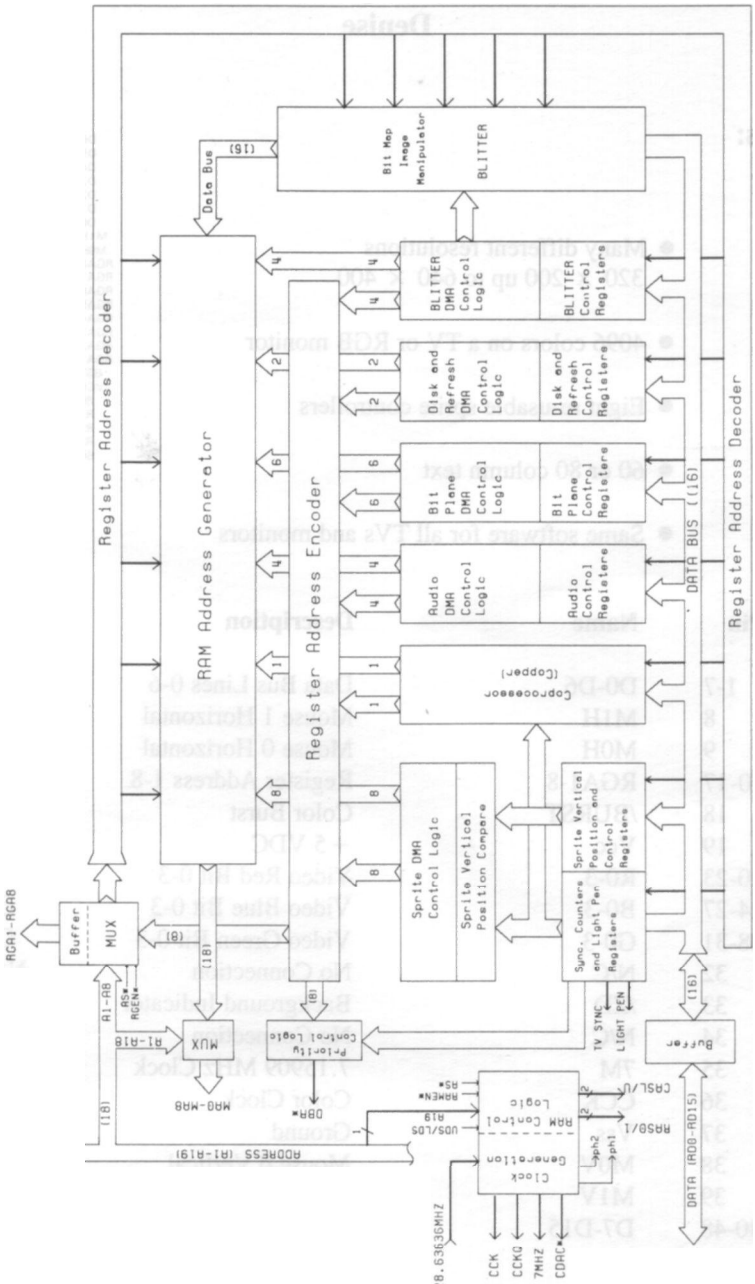
Custom Animation Chip

Fat Agnus



Features:

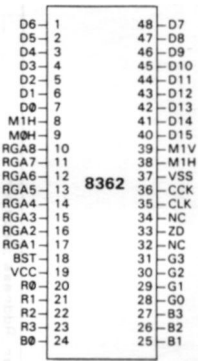
- Bit Blitter—Uses hardware to move display data—Allows high speed animation—Frees the CPU for other concurrent tasks
- Display Synchronized Coprocessor
- Controls 25 DMA Channels—Allows the disk and sound to operate with minimal CPU intervention
- Generates all system clocks from the 28 Mhz oscillator
- Generates all control signals for the video RAM and expansion RAM card
- Provides the address to the video and expansion RAM multiplexing



Fat Agnus Block Diagram

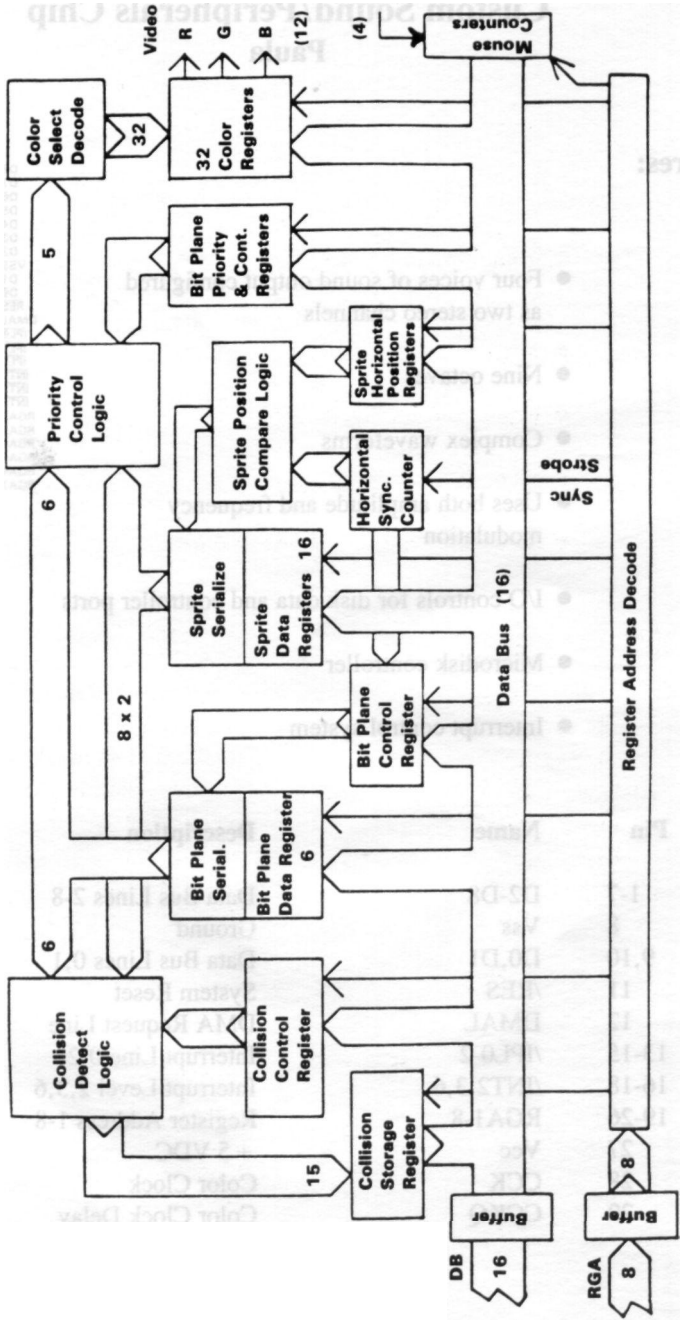
Custom Graphics Chip
Denise

Features:



- Many different resolutions
  320 x 200 up to 640 x 400
- 4096 colors on a TV or RGB monitor
- Eight re-usable sprite controllers
- 60 or 80 column text
- Same software for all TVs and monitors

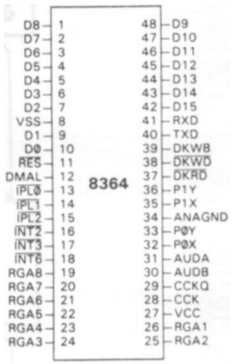
Pin	Name	Description	Type
1-7	D0-D6	Data Bus Lines 0-6	I/O
8	M1H	Mouse 1 Horizontal	I
9	M0H	Mouse 0 Horizontal	I
10-17	RGA1-8	Register Address 1-8	I
18	/BURST	Color Burst	O
19	Vcc	+ 5 VDC	I
20-23	R0-3	Video Red Bit 0-3	O
24-27	B0-3	Video Blue Bit 0-3	O
28-31	G0-3	Video Green Bit 0-3	O
32	N/C	No Connection	N/C
33	/ZD	Background Indicator	O
34	N/C	No Connection	N/C
35	7M	7.15909 MHz Clock	I
36	CCK	Color Clock	I
37	Vss	Ground	I
38	M0V	Mouse 0 Vertical	I
39	M1V	Mouse 1 Vertical	I
40-48	D7-D15	Data Bus Lines 7-15	I/O



Denise Block Diagram

Custom Sound/Peripherals Chip
Paula

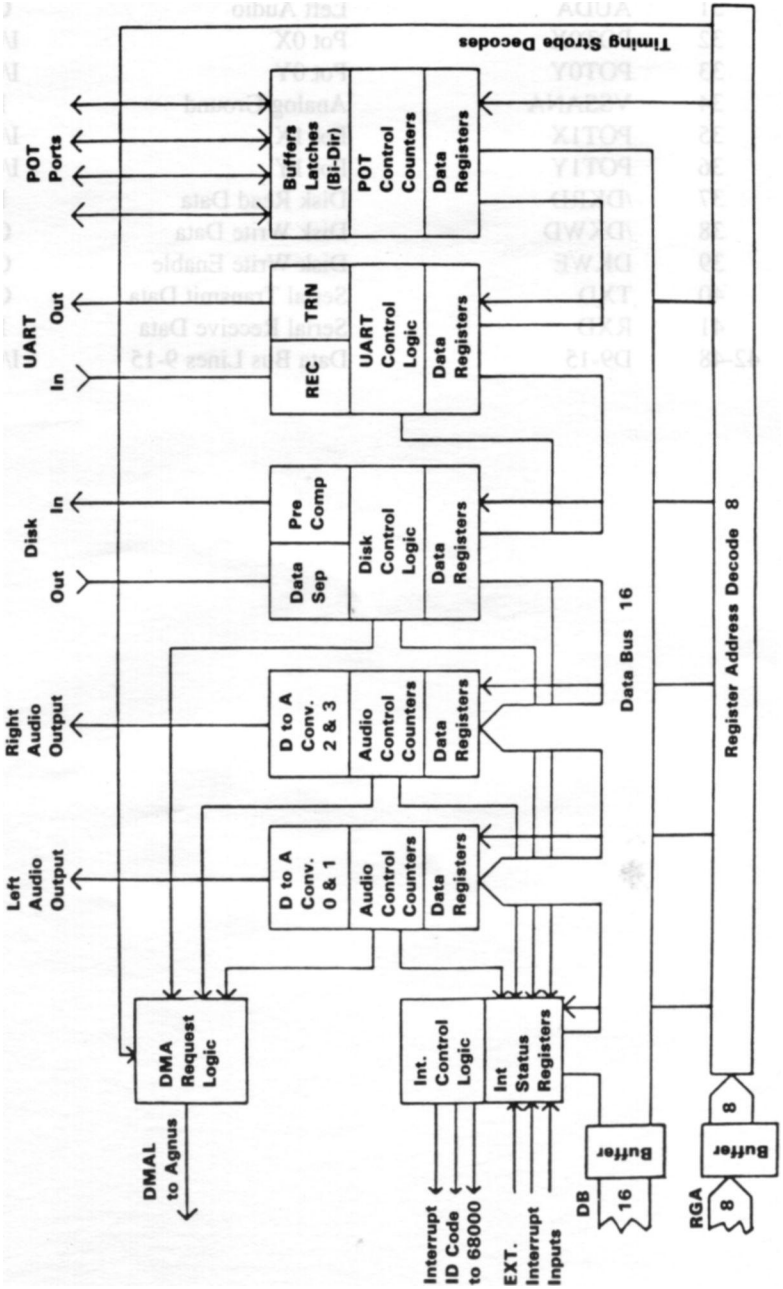
Features:



- Four voices of sound output configured as two stereo channels
- Nine octaves
- Complex waveforms
- Uses both amplitude and frequency modulation
- I/O controls for disk data and controller ports
- Microdisk controller
- Interrupt control system

Pin	Name	Description	Type
1-7	D2-D8	Data Bus Lines 2-8	I/O
8	Vss	Ground	I
9,10	D0,D1	Data Bus Lines 0,1	I/O
11	/RES	System Reset	I
12	DMAL	DMA Request Line	O
13-15	/IPL0-2	Interrupt Line 0-2	O
16-18	/INT2,3,6	Interrupt Level 2,3,6	I
19-26	RGA1-8	Register Address 1-8	I
27	Vcc	+5 VDC	I
28	CCK	Color Clock	I
29	CCKQ	Color Clock Delay	I

30	AUDB	Right Audio	O
31	AUDA	Left Audio	O
32	POT0X	Pot 0X	I/O
33	POT0Y	Pot 0Y	I/O
34	VSSANA	Analog Ground	I
35	POT 1X	Pot 1X	I/O
36	POT1Y	Pot 1Y	I/O
37	/DKRD	Disk Read Data	I
38	/DKWD	Disk Write Data	O
39	DKWE	Disk Write Enable	O
40	TXD	Serial Transmit Data	O
41	RXD	Serial Receive Data	I
42-48	D9-15	Data Bus Lines 9-15	I/O



Paula Block Diagram

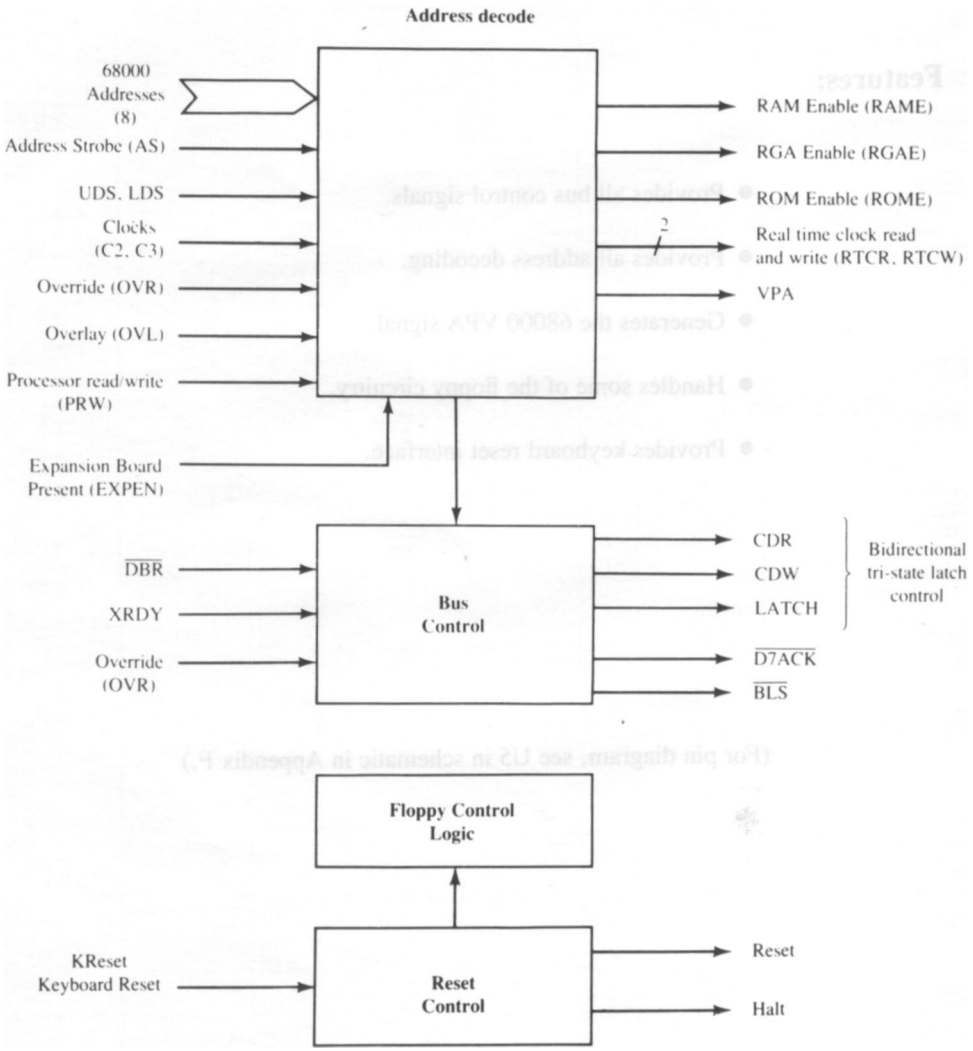
Custom Control Chip
Gary

Features:

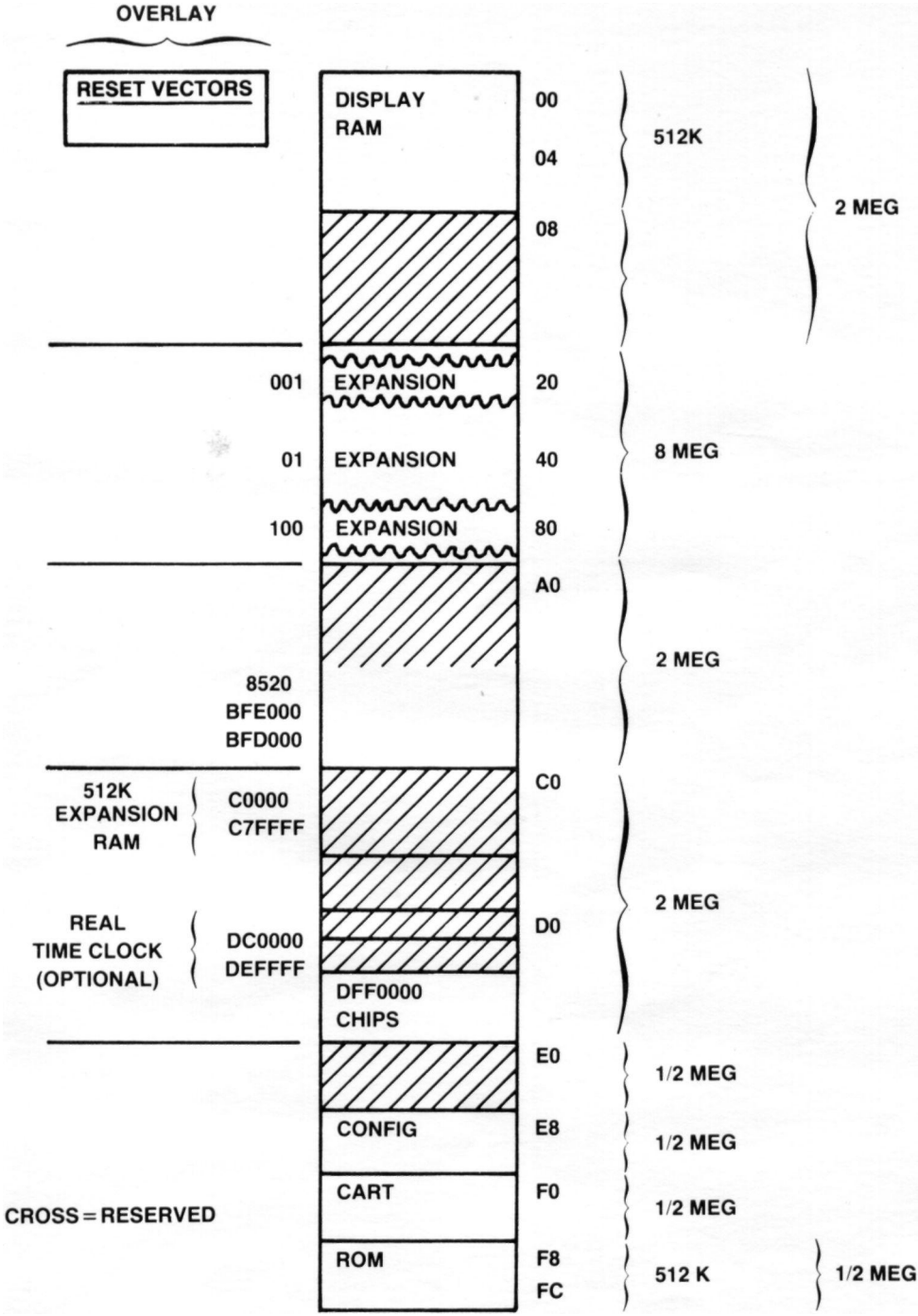
- Provides all bus control signals.
- Provides all address decoding.
- Generates the 68000 VPA signal.
- Handles some of the floppy circuitry.
- Provides keyboard reset interface.

(For pin diagram, see U5 in schematic in Appendix F.)

Gary Block Diagram



Amiga 500 Memory Map



Appendix B

AmigaDOS Information

This appendix includes three tables containing reference information for using AmigaDOS, the Amiga operating system:

- AmigaDOS User's Commands
- Screen Editor (ED) Commands
- AmigaDOS Error Messages

AmigaDOS User's Commands

Each AmigaDOS command is listed and defined. For further information beyond the explanations in Chapter 7, see the *AmigaDOS User's Manual.*

	File Utilities
;	is the comment character.
<	directs command input.
>	directs command output.
COPY	copies one file to another or copies all files from one directory to another.
DELETE	deletes up to 10 files or directories.
DIR	shows filenames in a directory.
ED	enters a screen editor for text files.
EDIT	enters a line-by-line editor.
FILENOTE	attaches a note with a maximum of 80 characters to a specified file.

File Utilities

JOIN	concatenates up to 15 files to form a new file.
LIST	examines and displays detailed information about a file or directory.
MAKEDIR	creates a directory with a specific name.
PROTECT	sets a file's protection status.
RENAME	renames a file or directory.
SEARCH	looks for a specified text string in all the files of a directory.
SORT	sorts simple files.
TYPE	types a file to the screen that you can optionally specify as text or hex.

CLI Control

BREAK	sets attention flags in a given process.
CD	sets a current directory and/or drive.
ENDCLI	ends an interactive CLI process.
NEWCLI	creates a new interactive CLI process.
PROMPT	changes the prompt in the current CLI.
RUN	executes commands as background processes.
STACK	displays or sets the stack size for commands.
STATUS	displays information about the CLI processes currently in existence.
WHY	explains why a previous command failed.

Command Sequence Control

ASK	writes a single string argument and asks the user to respond yes or no.
ECHO	displays the message specified in a command argument.
EXECUTE	executes a file of commands.
FAILAT	fails a command sequence if a program returns an error code greater than or equal to this number.
IF	tests specified actions within a command sequence.
LAB	defines a label (see SKIP).
QUIT	exits from a command sequence with a given error code.
SKIP	jumps forward to LAB in a command sequence.
WAIT	waits for, or until, a specified time.

System and Storage Management

ASSIGN	assigns a logical device name to a filing system directory.
DATE	displays or sets the system date and time.
DISKCOPY	copies the contents of one entire floppy disk to another.

System and Storage Management

FAULT	displays messages corresponding to supplied fault or error codes.
FORMAT	formats and initializes a new floppy disk.
INFO	gives information about the filing system.
INSTALL	makes a formatted disk bootable.
RELABEL	changes the volume name of a disk.
SETCLOCK	controls the battery backed up real time clock.

ED Screen Editor Commands

This is a complete list of all the screen editor commands. The extended commands, which are extended versions of the immediate commands included in this table, may include strings or numbers. Strings (text strings) are denoted by /s/ while /s/t/ indicates two exchange strings. "n" indicates a number. You must press the ESC key to enter extended command mode. In the editor, the directional cursor keys function normally.

Special Key Mappings

Command	**Action**
Backspace	Delete character to left of cursor
DEL	Delete character at cursor
ESC	Enter extended command mode
Return	Split line at cursor and create new line
Tab	Move cursor right to next TAB

Immediate Commands

Command	**Action**
CTRL-A	Insert line
CTRL-B	Delete line
CTRL-D	Scroll text down
CTRL-E	Move to top or bottom of screen
CTRL-F	Flip case
CTRL-G	Repeat last extended command line
CTRL-H	Delete character left of cursor (Backspace)
CTRL-I	Move cursor right to the next tab position
CTRL-M	Return
CTRL-O	Delete word or spaces
CTRL-R	Cursor to end of previous word
CTRL-T	Cursor to start of next word
CTRL-U	Scroll text up
CTRL-V	Verify screen
CTRL-Y	Delete to end of line

Extended Commands

Command	Action
ESC A	Insert line after current line
ESC B	Move to bottom of file
ESC BE	Block end at cursor
ESC BF/s/	Backward find
ESC BS	Block start at cursor
ESC CE	Move cursor to end of line
ESC CL	Move cursor one position left
ESC CR	Move cursor one position right
ESC CS	Move cursor to start of line
ESC D	Delete current line
ESC DB	Delete block
ESC DC	Delete character at cursor
ESC E/s/t/	Exchange "s" into "t"
ESC EQ/s/t/	Exchange but query first
ESC EX	Extend right margin
ESC F/s/	Find string "s"
ESC I/s/	Insert line before current
ESC IB	Insert copy of block
ESC IF/s/	Insert file "s"
ESC J	Join current line with next
ESC LC	Distinguish between upper and lower case in searches
ESC M n	Move line to number "n"
ESC N	Move to start of next line
ESC P	Move to start of previous line
ESC Q	Quit without saving text
ESC RP	Repeat until error
ESC S	Split line at cursor
ESC SA	Save text to file
ESC SB	Show block on screen
ESC SH	Show information
ESC SL n	Set left margin
ESC SR n	Set right margin
ESC ST n	Set tab distance
ESC T	Move to top of file
ESC U	Undo changes on current line
ESC UC	Equate U/C and l/c in searches
ESC WB/s/	Write block to file "s"
ESC X	Exit, writing text into memory

AmigaDOS Error Messages

When error messages appear, they often include *error numbers.* These numbers are generated by the Amiga Disk Operating System (AmigaDOS).

This appendix lists:

- error numbers that are likely to appear when you're using the Workbench
- the AmigaDOS messages that correspond to each error number
- suggestions for what to do when an error occurs

For more information about the meaning of a specific error number and for explanations of error numbers not listed here, see the *AmigaDOS User's Manual.*

ERROR	MESSAGE: SUGGESTION
103	**insufficient free store:** The Amiga needs more memory to perform an operation. Close one or more windows, then try the operation again. In rare cases, you may have to reset the Amiga to reclaim sufficient memory to continue. This error can also occur if you attempt to open a tool that requires more memory than is installed in your Amiga.
121	**file is not an object module:** This error may occur if you try to open a tool that has been damaged. Try making a new copy of the tool from your original disk.
202	**object in use:** Another tool is using the project or tool you want. You may have to wait for the other tool to finish.
203	**object already exists:** You cannot give an object the same name as an existing object. Either give the existing object a different name or delete it so you can reuse its name.

ERROR	MESSAGE: SUGGESTION
204	**directory not found:** A faulty tool may have created an icon for a drawer without creating the actual drawer. Attempt to identify the tool that created the icon, then consult your Amiga dealer.
205	**object not found:** A tool or project that the Amiga needs to locate is not present on the disk. This can happen if (1) you've moved a tool to a different drawer, then tried to open a project created with that tool (2) you've renamed either the System or Utilities drawer on the Workbench disk, then tried to open a project created with a tool that's in the drawer, or (3) the disk containing a tool you need is not in a disk drive.
210	**invalid stream component name:** When renaming a tool, project, drawer, or disk, you have used an invalid character.
213	**disk not validated:** If a disk light was on when you removed a disk or reset the Workbench, the information on the disk that was in that drive may be unusable. This error may also occur if the disk surface has been damaged.
214	**disk write-protected:** You have asked the Amiga to add information to your disk when the protect tab is in the protected position. (See pages 3-2 and 3-3 for information about protect tabs.) Either change the position of the protect tab or use a disk whose protect tab is in the unprotected position.
218	**device not mounted:** This error occurs when a tool needs a disk that is not currently in a disk drive.
221	**disk full:** There is not enough free storage on the disk to do what you have requested. Try emptying the Trashcan (see page 4-10). If this doesn't work, you must either delete objects on the disk or use a different disk.

ERROR	MESSAGE: SUGGESTION
222	**file is protected from deletion:** A tool, project, or drawer cannot be deleted because it is protected. Select the icon for the object, choose Info from the Workbench menu, then change its status to DELETEABLE.
225	**not a DOS disk:** Either the disk has not been formatted or it is a Kickstart disk. Use a different disk, or, if you wish to erase all information currently on the disk, choose Initialize from the Disk menu.
226	**no disk in drive:** A tool expected to find a disk in a disk drive that wasn't there. Insert the disk needed by the tool you're using.

Appendix C

Using the Amiga Keyboard

In the following pages the four sections of the Amiga 500 keyboard and the special keys are described. Then the techniques for using the Amiga without a mouse are outlined. Finally, the keyboard maps (keymaps) for different countries are given.

Layout of the Keyboard

The Amiga 500 keyboard is divided into four sections:

- The **Typewriter Area** (the main keyboard)
- The **Cursor Keypad**
- The **Numeric Keypad**
- The **Function Keys**

When using the keyboard, keep the following points in mind:

- Keys can be program-controlled—that is, their use can be defined by the software being used (e.g., an application program, such as a word processor or spreadsheet). For specific information on the program control of keys, refer to the manual for the particular software program you are using.

- The keys on the keyboard usually repeat for as long as they are held down.

- You cannot interchange the numeral 0 and the upper case letter O, or the numeral 1 and the lower case letter l.

- In some cases several keys may be used together, either simultaneously or in a special sequence.

You can use the keyboard as well as the mouse to move around the screen and select icons, gadgets, etc. In many programs you use the keyboard to enter information. You can use the keys to tell the computer what you want it to do, and to reply to messages or questions the computer displays on the screen, these messages and questions are sometimes called "screen prompts" or simply "prompts".

The Typewriter Area

The typewriter area provides a standard (QWERTY) typewriter keyboard plus additional keys with special uses and capabilities. The special keys include:

ESC

The ESC (Escape) key, located at the top left of the keyboard, is a program-controlled key, often used to expedite leaving or entering a program or a program function at non-routine times.

TAB

The TAB key, located two rows below the ESC key, can be program-controlled to perform tab functions.

RETURN

The RETURN key is the oversize key located on the right side of the typewriter area, in the middle two rows. You use this key to transmit a command or information to the computer.

BACKSPACE

The BACKSPACE is the key farthest right on the top row of the typewriter area. Pressing the BACKSPACE key causes the cursor, and any characters to the right of it, to move to the left. Any characters to the left of the cursor are erased.

DEL

The DELETE is located just to the right of the top row of the typewriter area. Pressing the DEL (Delete) key deletes the character at the cursor position. Any characters to the right of the cursor move to the left.

HELP

The Help key, located to the right of the DELETE key, is a program-controlled key that can be programmed to provide user assistance while a program is being run.

NOTE: The international keyboards have two additional keys, located at the SHIFT key positions.

CTRL

The CTRL (Control) key, located just below the TAB key, is a program-controlled key that is often used with other keys to perform special functions.

CAPS LOCK

The CAPS LOCK key is located next to the CTRL key. When the CAPS LOCK key is first pressed a light on that key is illuminated. The alphabetic characters (A through Z) are displayed in upper case as long as the light is on. However, the upper characters on the numeric row at the top of the typewriter area (!,",# through /) are not affected by the Caps Lock key. To type these characters, you must simultaneously depress one of the Shift keys and the key for the desired character. To release the Caps Lock key, press that key again so that its light goes out.

SHIFT Keys

There are two Shift keys, located on either side of the bottom row of letters (z,x,c, etc.). These keys can perform the same function as the shift keys on a standard typewriter—that is, depressing either Shift key simultaneously with any alphabetic key or with any key on the top row of the typewriter area causes the upper character on that key to be displayed. In addition, the Shift keys are often used with other keys to perform special functions.

ALT Keys

There are two ALT (Alternate) keys, located at the extreme left and right sides of the bottom row of the keyboard. These keys are also often used with other keys to perform special functions.

The Commodore Key

The Commodore key is located on the bottom row of the keyboard, just to the left of the space bar. This key is also used with other keys to perform special functions. Your Amiga 500 may have a left Amiga key in place of the Commodore key.

A

The Amiga key is located on the bottom row of the keyboard, just to the right of the space bar. The Amiga key is also used with other keys to perform special functions.

Note: Simultaneously depressing the CTRL key and the two Amiga keys (or Commodore and Amiga keys, depending on your keyboard) resets the Amiga 500. See Chapter 3 for details.

The Cursor Keypad

The four cursor keys are grouped in a small keypad located on the bottom right side of the keyboard, between the **typewriter area** and the **numeric keypad.** These keys control the movement of the cursor (up, down, left, right) on the screen display. The direction in which each key moves the cursor is indicated by the direction of the arrow displayed on the top of the individual key.

The Numeric Keypad

The Numeric Keypad is located to the far right of the keyboard. The keys are arranged in a calculator layout to facilitate numeric data entry. The numeric and arithmetic symbol keys on the keypad act just like the numeric and arithmetic symbol keys in the typewriter area of the keyboard. You use the ENTER key on the numeric keypad just as you use the RETURN key on the main keyboard—that is, to transmit data and commands to the computer.

The Function Keys

The Function Keys, located at the top of the keyboard and numbered F1 through F10, are program-controlled keys.

Using the Amiga Without a Mouse

On the Amiga, anything you can do with the mouse you can also do from the keyboard:

- move the Pointer
- make selections
- use menus

Moving the Pointer Without a Mouse

To move the Pointer without a mouse, hold down either the Commodore or Amiga key, then, with that key still held down, press a cursor key.

With the Commodore or Amiga key held down, the Pointer moves in the direction of the cursor key you press. The longer you hold down the keys, the faster the Pointer moves. To make the Pointer move even faster, hold down both the SHIFT key along with the other two keys. To stop moving the Pointer, release the cursor key.

Selecting Without a Mouse

To select an icon without using a mouse, first point to the icon, then press both the Commodore key and the left ALT key at the same time.

Anything you do by pressing the Selection button on the mouse you can also do by pressing the Commodore key and the left ALT key at the same time.

Using Menus Without a Mouse

Just as pressing the Commodore key and the left ALT key at the same time is like pressing the Selection button, pressing the Amiga key and the right ALT key at the same time is like pressing the Menu button.

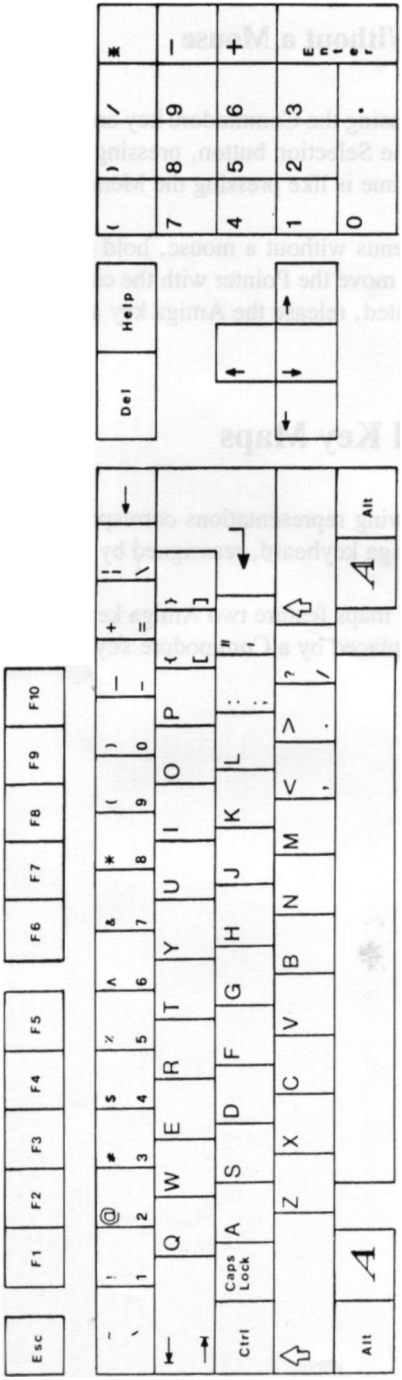
To use menus without a mouse, hold down the Amiga key and right ALT key while you move the Pointer with the cursor keys. When the menu item you want is highlighted, release the Amiga key and right ALT key.

International Key Maps

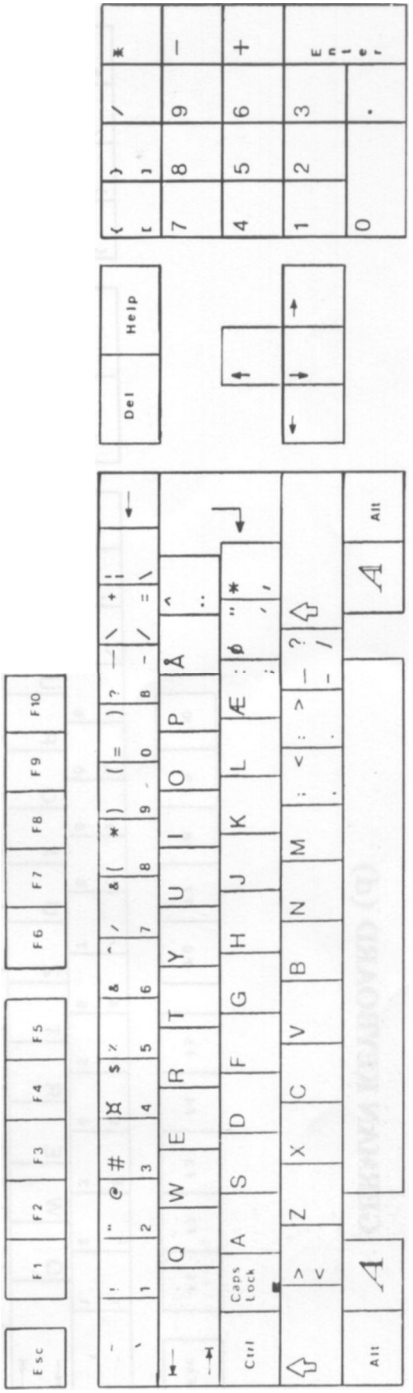
The following representations correspond to the different international versions of the Amiga keyboard, reassigned by the SetMap command.

These key maps feature two Amiga keys. On your keyboard, the left Amiga key may be replaced by a Commodore key.

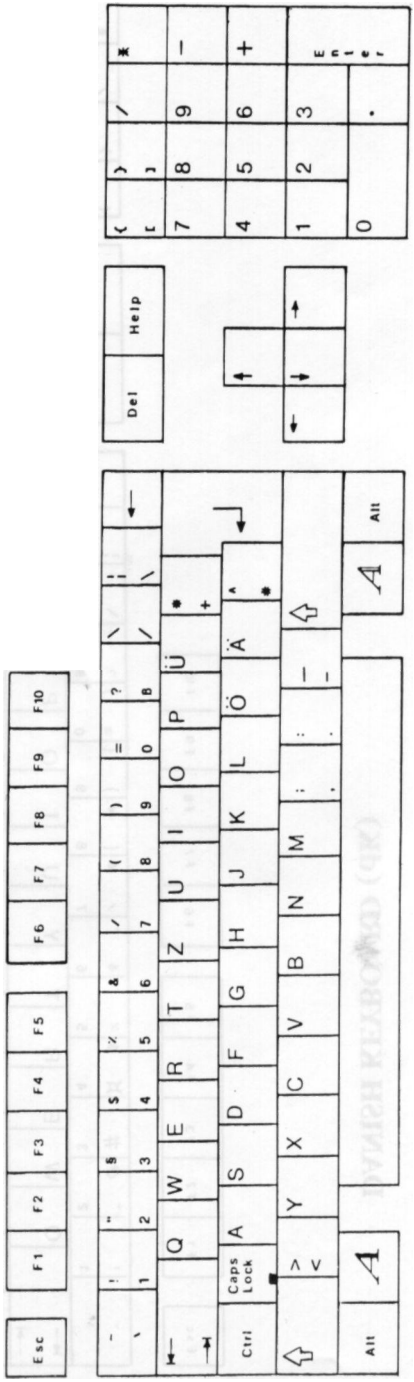
STANDARD U.S. KEYBOARD (usa)



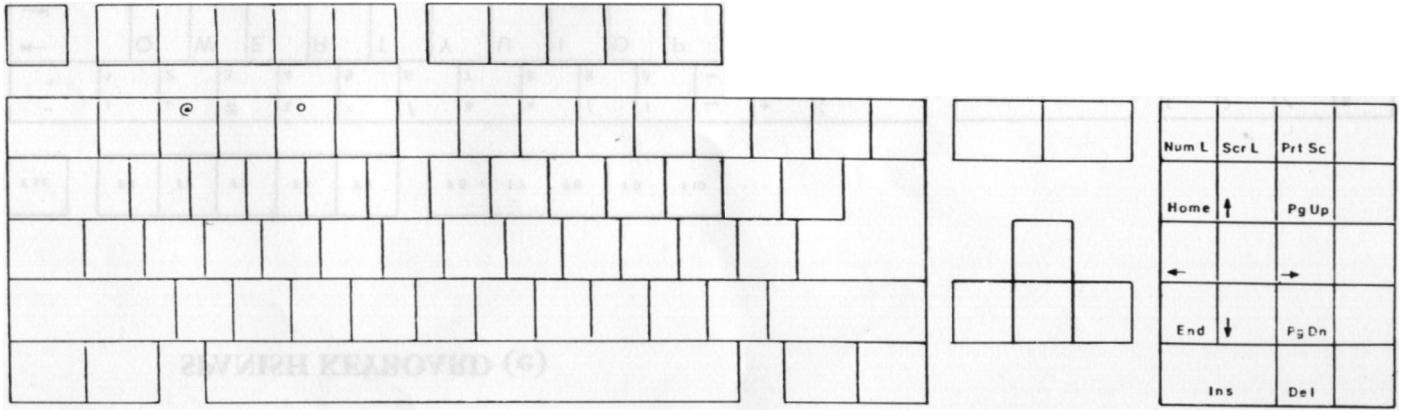
DANISH KEYBOARD (dK)



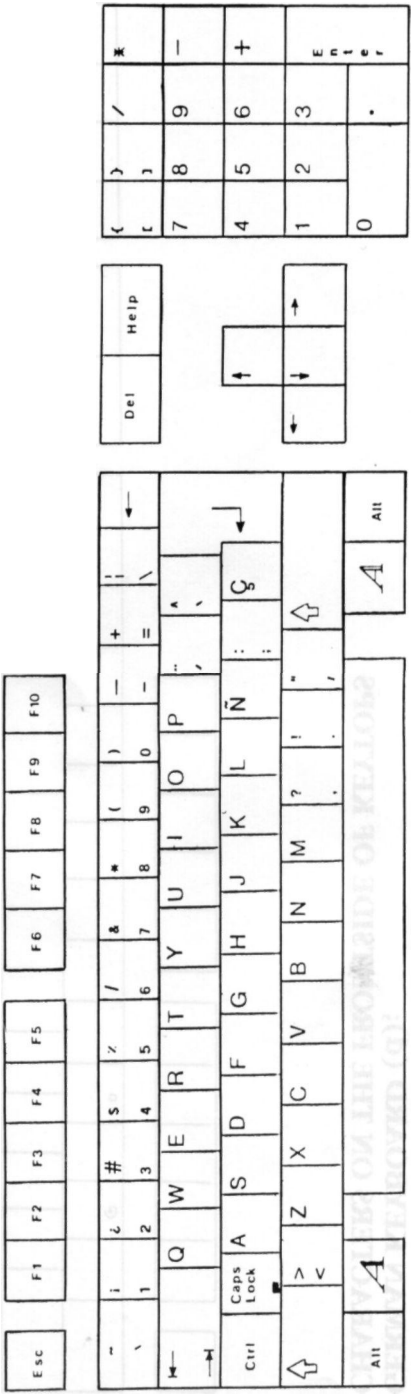
GERMAN KEYBOARD (d)



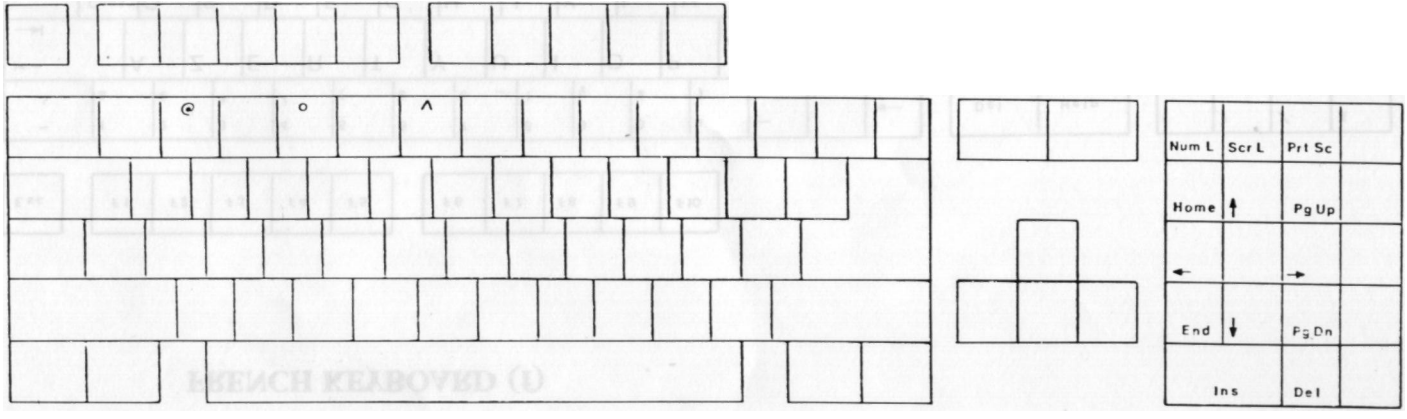
GERMAN KEYBOARD (d);
CHARACTERS ON THE FRONTSIDE OF KEYTOPS



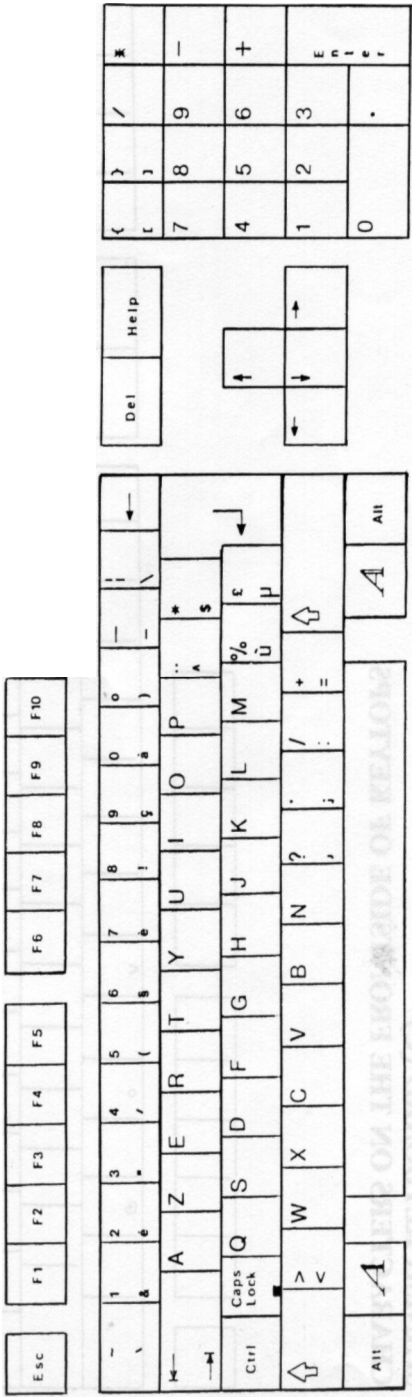
SPANISH KEYBOARD (e)



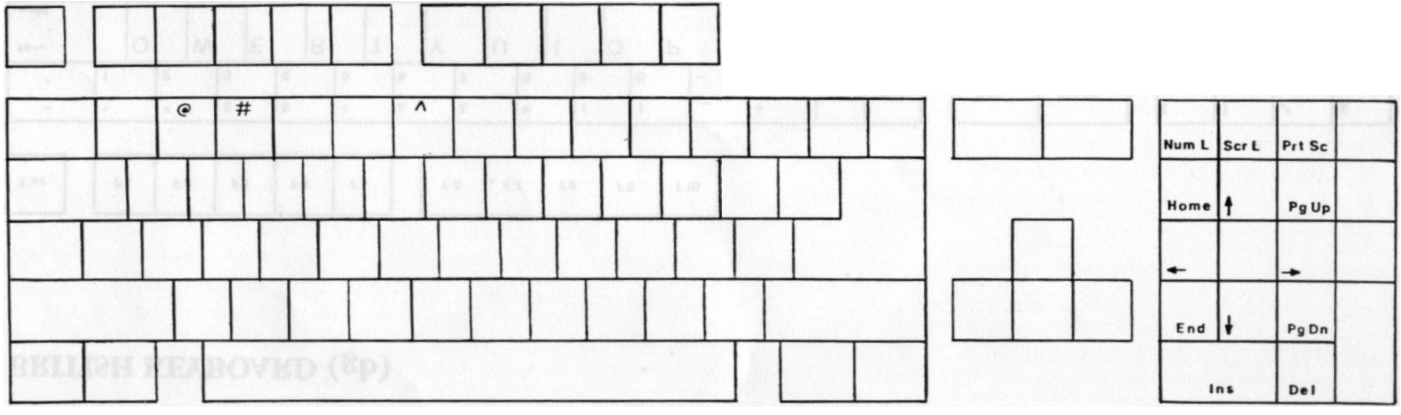
SPANISH KEYBOARD (e)
CHARACTERS ON THE FRONTSIDE OF KEYTOPS



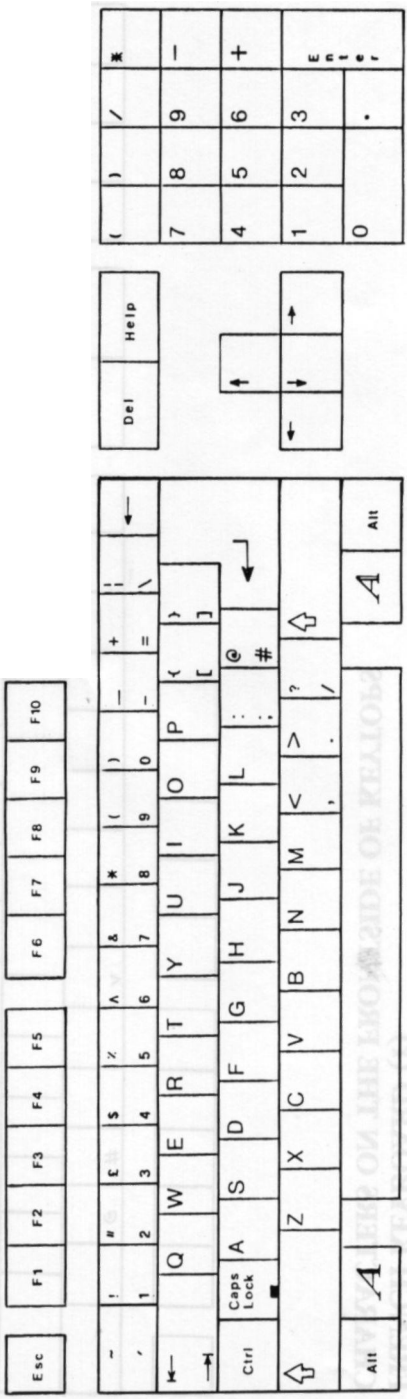
FRENCH KEYBOARD (f)



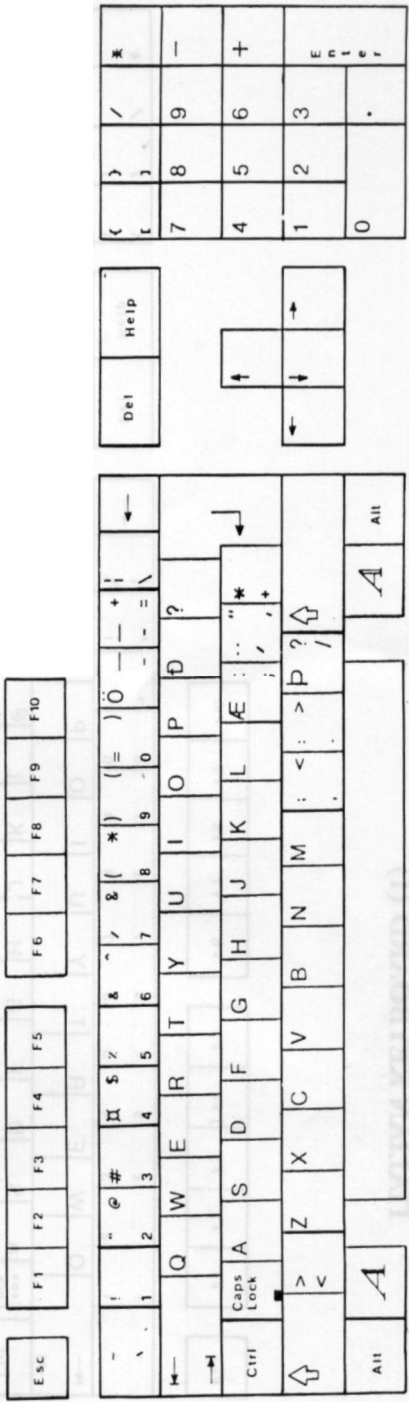
FRENCH KEYBOARD (f)
CHARACTERS ON THE FRONTSIDE OF KEYTOPS



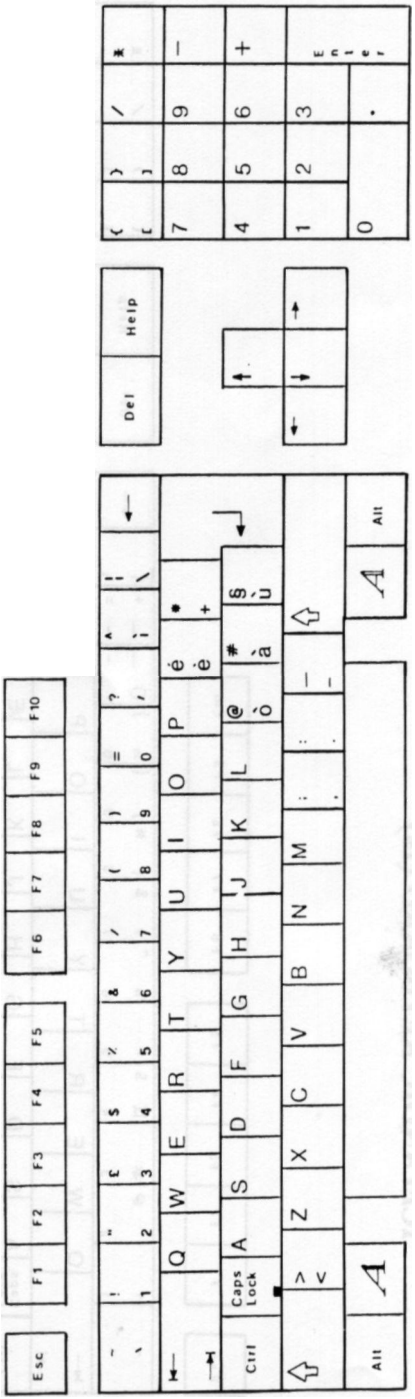
BRITISH KEYBOARD (gb)



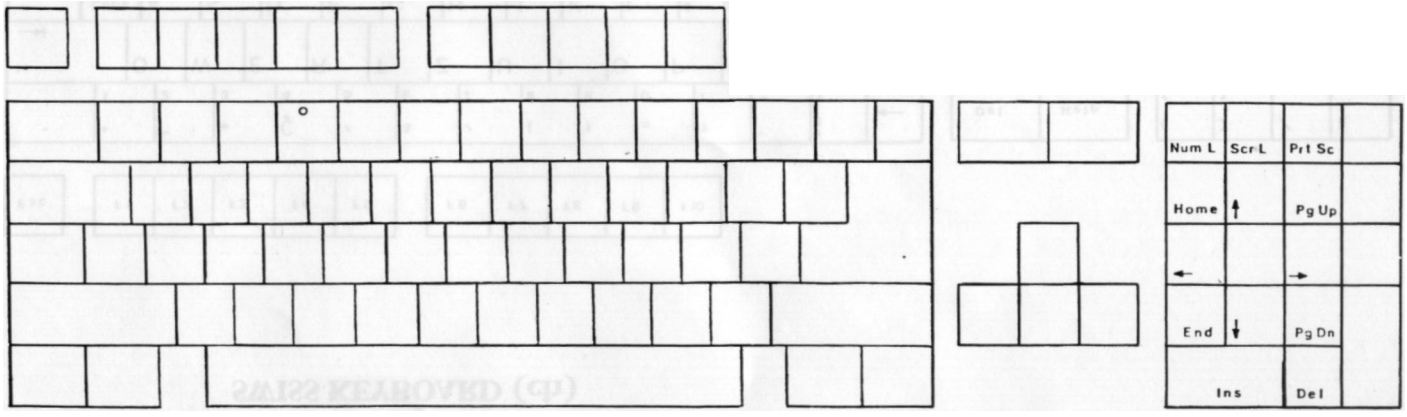
ICELANDIC KEYBOARD (is)



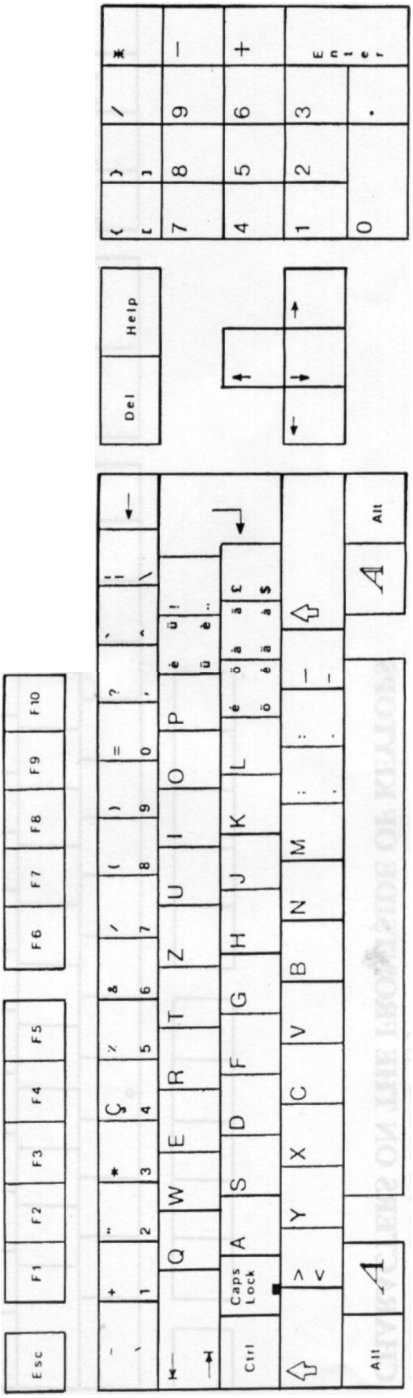
ITALIAN KEYBOARD (i)



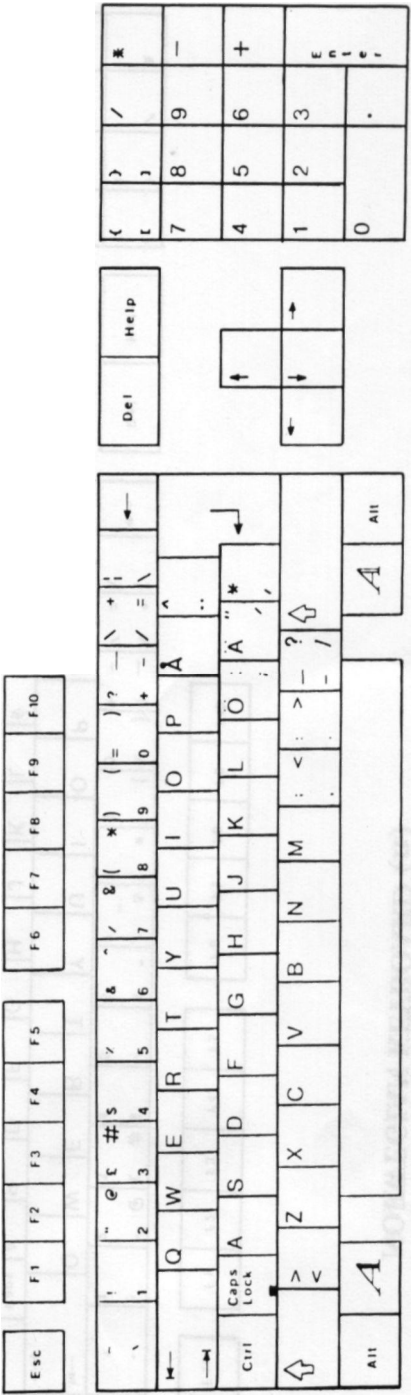
ITALIAN KEYBOARD (i)
CHARACTERS ON THE FRONTSIDE OF KEYTOPS



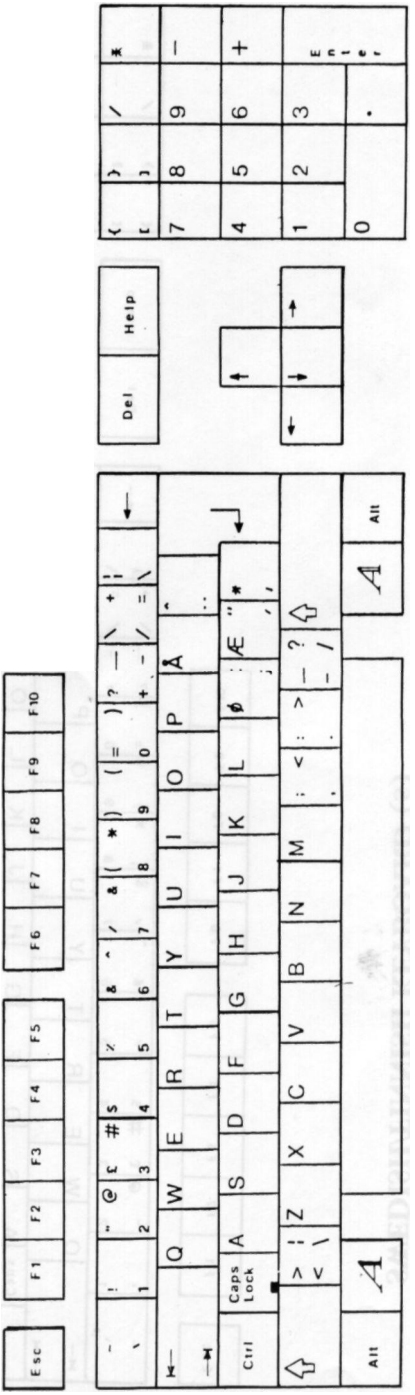
SWISS KEYBOARD (ch)



SWEDISH/FINNISH KEYBOARD (s)



NORWEGIAN KEYBOARD (n)



Appendix D

Printer Escape Codes

There are many types of printers you can use with an Amiga. Most are mentioned in Chapter 8. Your Amiga dealer can advise you about others for both general purpose and specialized applications.

You use the Preferences tool to tell the Amiga which printer you're using and to change a number of settings that affect printers. To learn about Preferences, see Chapter 6.

Printer Escape sequences

The Amiga printer device accepts standard escape sequences that are translated into escape sequences specific to the printer selected in Preferences. When using the printer device or printer handler (PRT), use these standard sequences to implement special printer features.

If the feature is not supported by your printer or driver, the sequence will be ignored.

To send a command to the printer from CLI, follow the steps below.

1. Redirect the keyboard to the printer by typing the following:

   ```
   copy * to prt:
   ```

2. Wait until disk access stops.

3. Type an escape sequence, for example, the NLQ On command:

   ESC [2"z

   What you type will not be echoed on the screen.

4. Hold down the CTRL key and press the backslash (\) key to terminate the keyboard file.

If your printer supports NLQ mode, NLQ will now be on. Any file you COPY or TYPE to prt: will be printed in near letter quality. You can also use the four steps above to create small printer command files. For example, you could replace the prt: in step 1 with ram:NLQon.

Then the four steps will create a file called NLQon in ram:. To turn on NLQ, copy ram: NLQon to prt:.

ANSI X3.64 Style Commands

Note: ESC is the Escape key if you are typing a sequence from the keyboard. In BASIC, it is CHR$(27). In C, \033 can be used.

LABEL	ESCAPE	FEATURE
aRIS	ESCc	reset
aRIN	ESC#1	initialize
aIND	ESCD	line feed
aNEL	ESCE	return linefeed
aRI	ESCM	reverse linefeed
aSGR0	ESC[0m	normal character set
aSGR3	ESC[3m	italics on
aSGR23	ESC[23m	italics off
aSGR4	ESC[4m	underline on
aSGR24	ESC[24m	underline off
aSGR1	ESC[1m	boldface on
aSCR22	ESC[22m	boldface off
aSFC	ESC[30m to ESC[39m	set foreground color
aSBC	ESC[40m to ESC[49m	set background color
aSHORP0	ESC[0w	normal pitch
aSHORP	ESC[2w	elite on
aSHORP1	ESC[1w	elite off

LABEL	ESCAPE	FEATURE
aSH0RP4	ESC[4W	condensed fine on
aSHOPR3	ESC3w	condensed off
aSHORP6	ESC6w	enlarged on
aSHORP5	ESC[5w	enlarged off
aDEN6	ESC[6"z	shadow print on
aDEN5	ESC[5"z	shadow print off
aDEN4	ESC[4"z	doublestrike on
aDEN3	ESC[3"z	doublestrike off
aDEN2	ESC[2"z	NLQ on
aDEN1	ESC[l"z	NLQ off
aSUS2	ESC[2v	superscript on
aSUS1	ESC[lv	superscript off
aSUS4	ESC[4v	subscript on
aSUS3	ESC[3v	subscript off
aSUS0	ESC[0v	normalize the line
aPLU	ESC1	partial line up
aPLD	ESCK	partial line down
aFNT0	ESC(B	US character set
aFNT1	ESC(R	French character set
aFNT2	ESC(K	German character set
aFNT3	ESC(A	UK character set
aFNT4	ESC(E	Danish I character set
aFNT5	ESC(H	Swedish character set
aFNT6	ESC(Y	Italian character set
aFNT7	ESC(Z	Spanish character set
aFNT8	ESC(J	Japanese character set
aFNT9	ESC(6	Norwegian character set
aFNT10	ESC(C	Danish II character set
aPROP2	ESC[2p	proportional spacing on
aPROP1	ESC[lp	proportional spacing off
aPROP0	ESC[0p	proportional spacing clear
aTSS	ESC[n E	set proportional offset
aJFY5	ESC[5 F	auto left justify
aJFY7	ESC[7 F	auto right justify
aJFY6	ESC[6 F	auto full justify
aJFY0	ESC[0 F	auto justify off
aJFY3	ESC[3 F	letter space (justify)
aJFY1	ESC[1 F	word fill (auto center)
aVERP0	ESC[0z	1/8" line spacing
aVERP1	ESC[lz	1/6" line spacing
aSLPP	ESC[nt	set form length n

LABEL	ESCAPE	FEATURE
aPERF	ESC[nq	perf skip n (n > 0)
aPERF0	ESC[0q	perf skip off
aLMS	ESC#9	left margin set
aRMS	ESC#0	right margin set
aTMS	ESC#8	top margin set
aBMS	ESC#2	bottom margin set
aSTBM	ESC[Pn1;Pn2r	top & bottom margins
aSLRM	ESC[Pn1;Pn2s	left and right margins
aCAM	ESC#3	clear margins
aHTS	ESCH	set horizontal tab
aVTS	ESCJ	set vertical tabs
aTBC0	ESC[0g	clear horizontal tab
aTBC3	ESC[3g	clear all horizontal tabs
aTBC1	ESC[1g	clear vertical tab
aTBC4	ESC[4g	clear all vertical tabs
aTBCALL	ESC#4	clear all horizontal and vertical tabs
aTBSALL	ESC#5	set default tabs
aESTEND	ESC[Pn"x	extended commands

Note: Sometimes in graphics mode the Epson and other dot matrix printers print with narrow blank lines across the output. Selecting Custom for Paper size in Preferences may fix this.

Appendix E

Amiga Bibliography

This manual is only an introduction to using the Amiga, and only scratches the surface. There's much, much more you can do with your Amiga. Here are some books available from your local bookstore or Amiga dealer that will help you learn how to use your Amiga to its—and your—fullest potential.

This isn't a complete list, since the Amiga library is constantly growing as new books come out. Also, books not specifically about the Amiga may be universal, and thus, applicable for the Amiga. The Amiga books are listed in three categories:

- **Introductory Level,** which includes books about the Amiga hardware and applications for beginners.

- **Advanced Books** are written on a level appropriate for the experienced programmer, and cover topics including programming languages, sound and graphics, and technical hardware details.

- **AmigaDOS Information** features book that explain the Amiga disk operating system and CLI.

Introductory Level

Amiga Applications, Flynn, Compute! Books
The Amiga Handbook, Breuer, Progressive Peripherals and Software
The Amiga System: An Introduction, Donald, Progressive Peripherals and Software
Beginner's Guide to the Amiga, McNeill, Compute! Books
Elementary Amiga BASIC, Regena, Compute! Books
Kids and the Amiga, Carlson, Compute! Books

Advanced Books

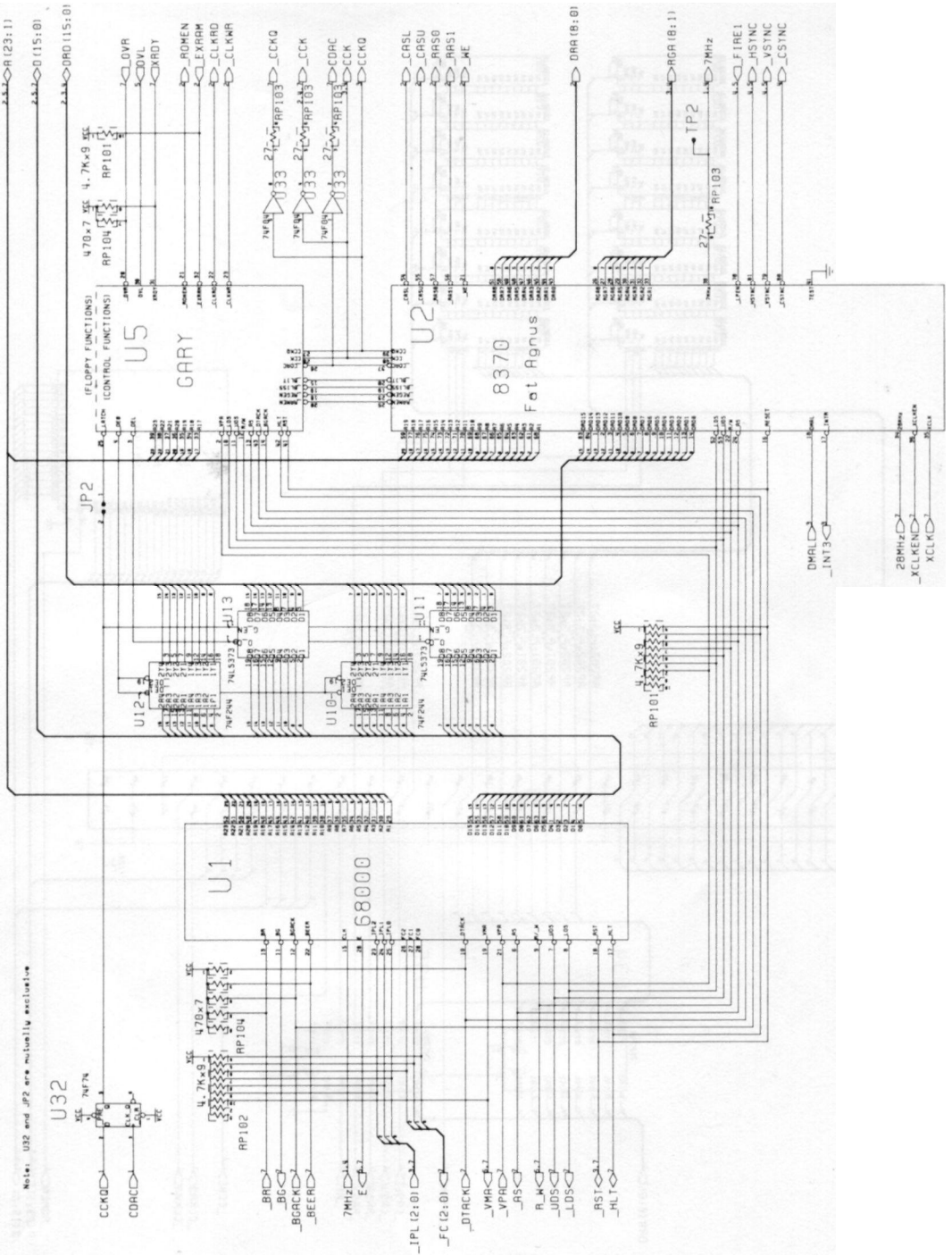
Advanced Amiga BASIC, Halfhill and Brannon, Compute! Books
Amiga Microsoft BASIC Programmer's Guide, Sanders, Scott, Foresman and Co.
Amiga Programmer's Handbook, Mortimore, Sybex Books
Amiga Programming Guide, Knight, Que Corporation
Amiga Programming Guide, Levy, Compute! Books
Amiga Technical Reference Set, Addison Wesley
IFF Technical Notes, CBM Technical Support Group
Inside Amiga Graphics, Leemon, Compute! Books
Inside the Amiga, Berry, SAMS
Music, Sound and Graphics on the Amiga, Boom, Microsoft Press

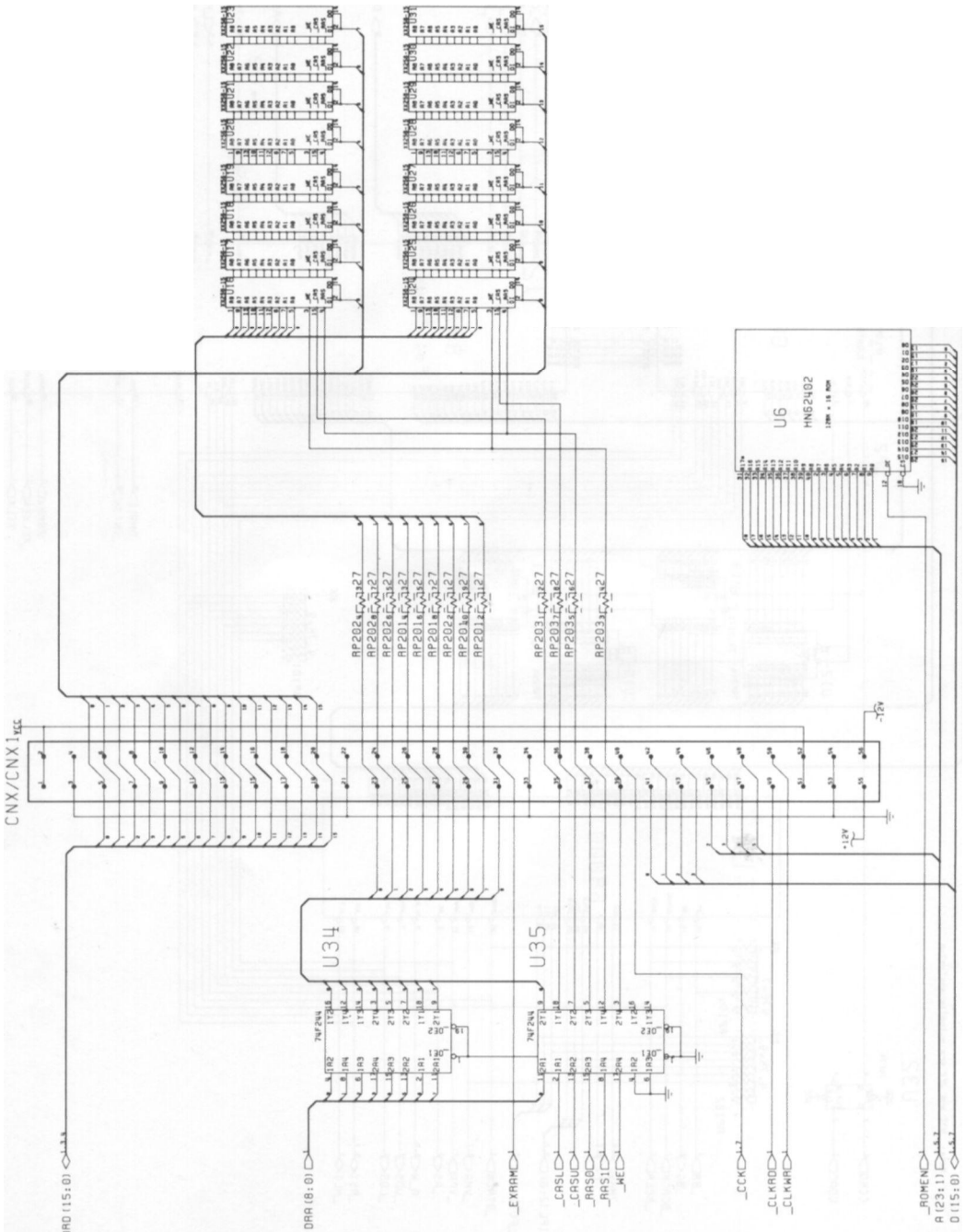
AmigaDOS Information

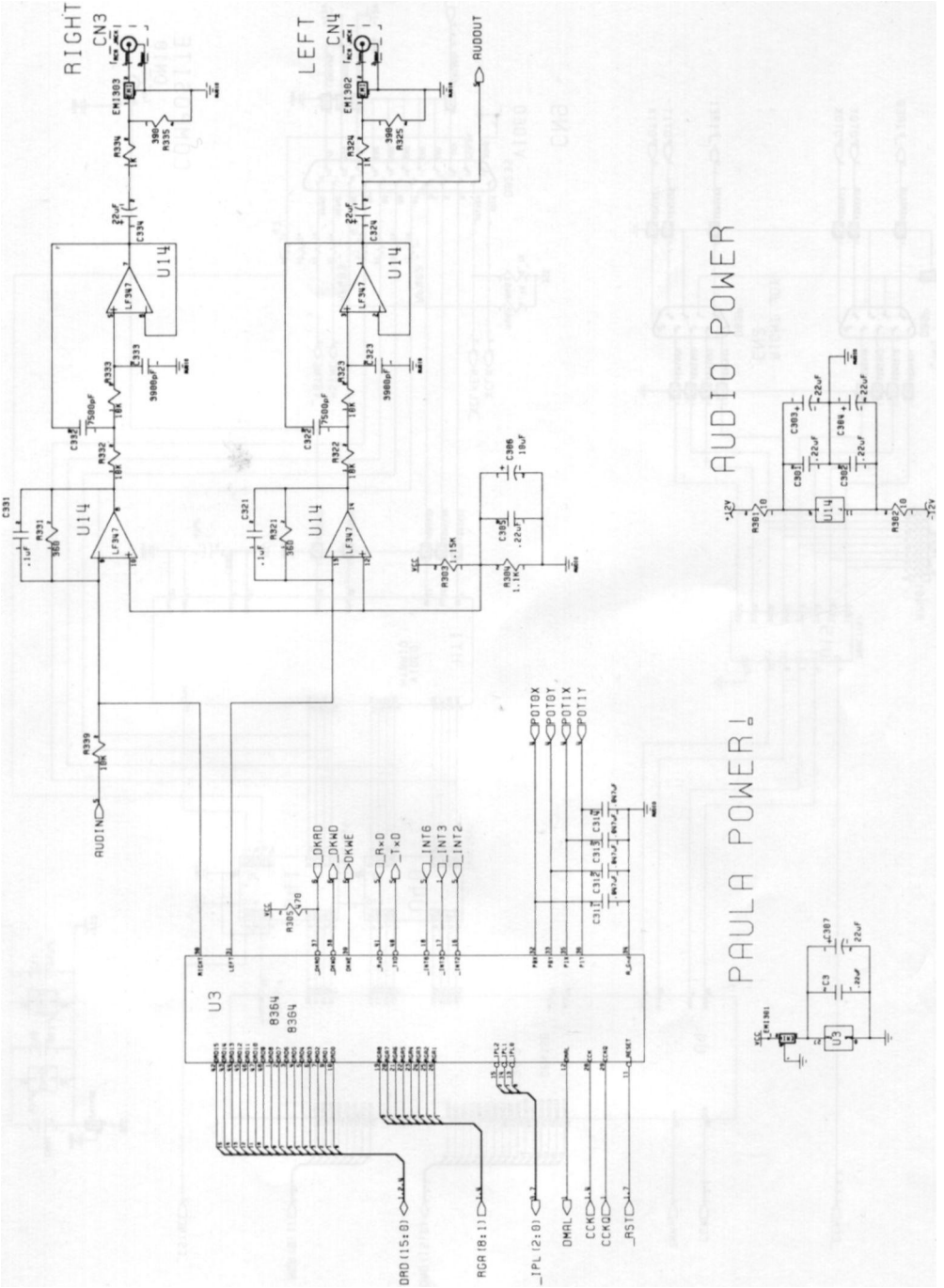
The AmigaDOS Manual, Bantam Computer Books
AmigaDOS Reference Guide, Levitan and Leemon, Compute! Books
Mastering AmigaDOS, Stanton and Pinal, Arrays Inc.

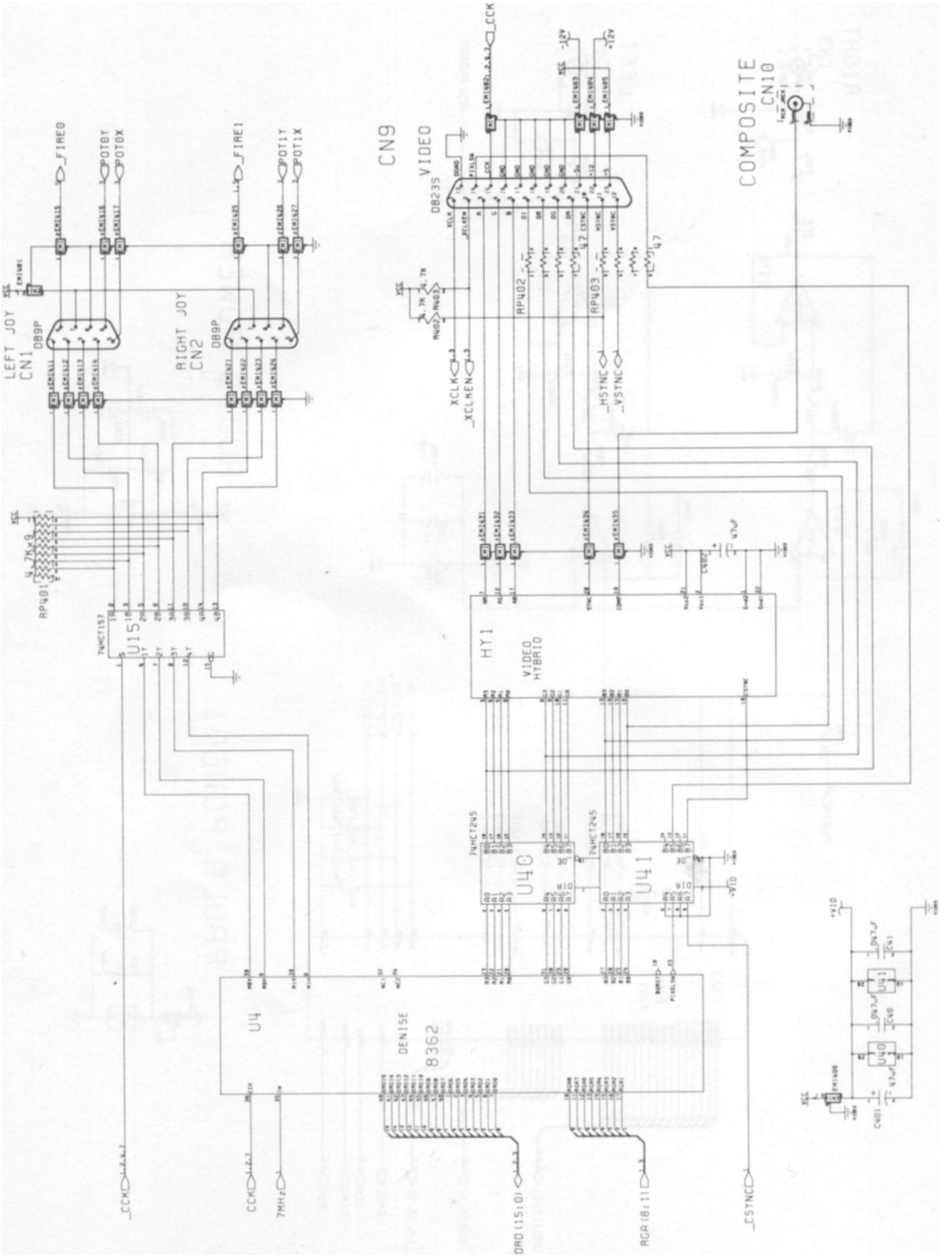
Appendix F

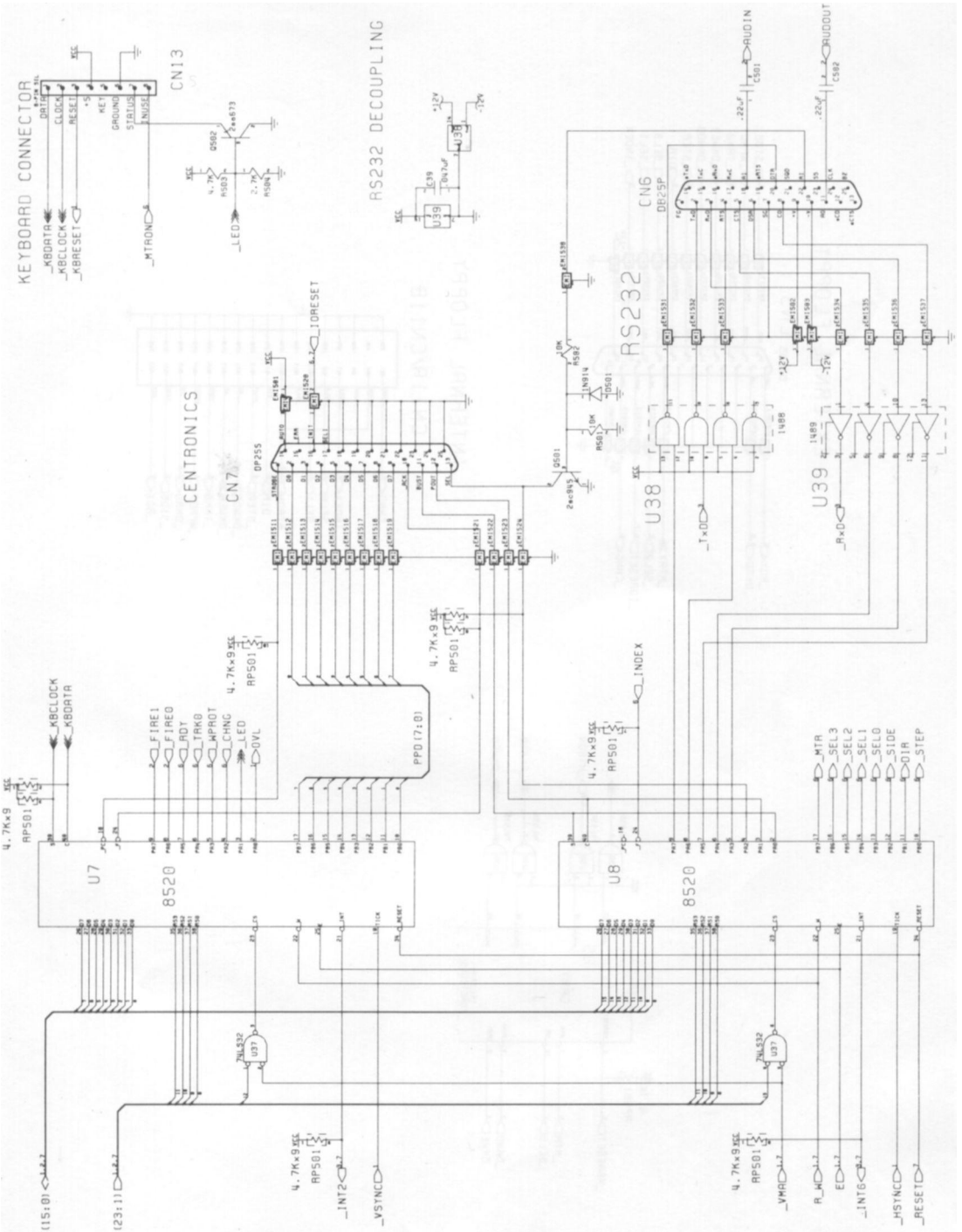
Amiga 500 Schematics

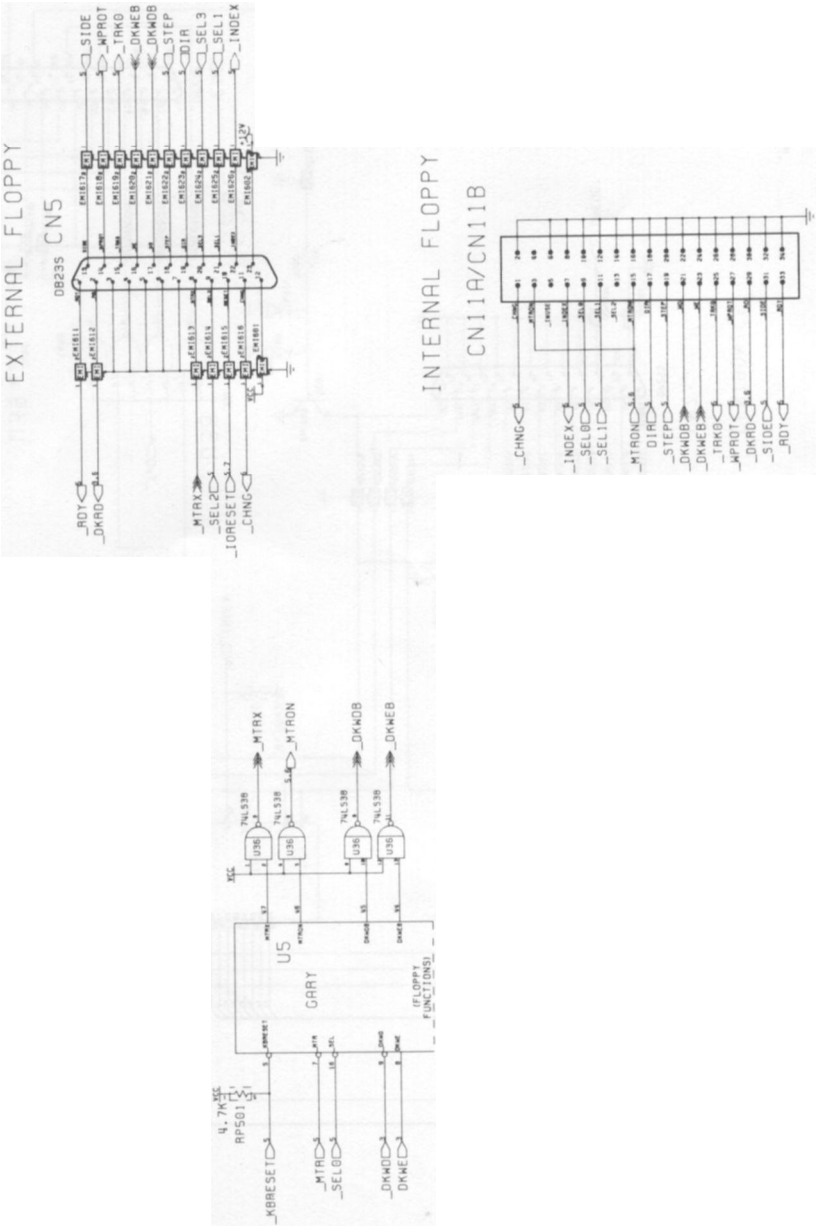

U5
GARY
U2
8370
Fat Agnus
U1
68000
U32
74F74
U12
U10
U13
U11
74F244
74LS373
JP2
TP2
Note: U32 and JP2 are mutually exclusive

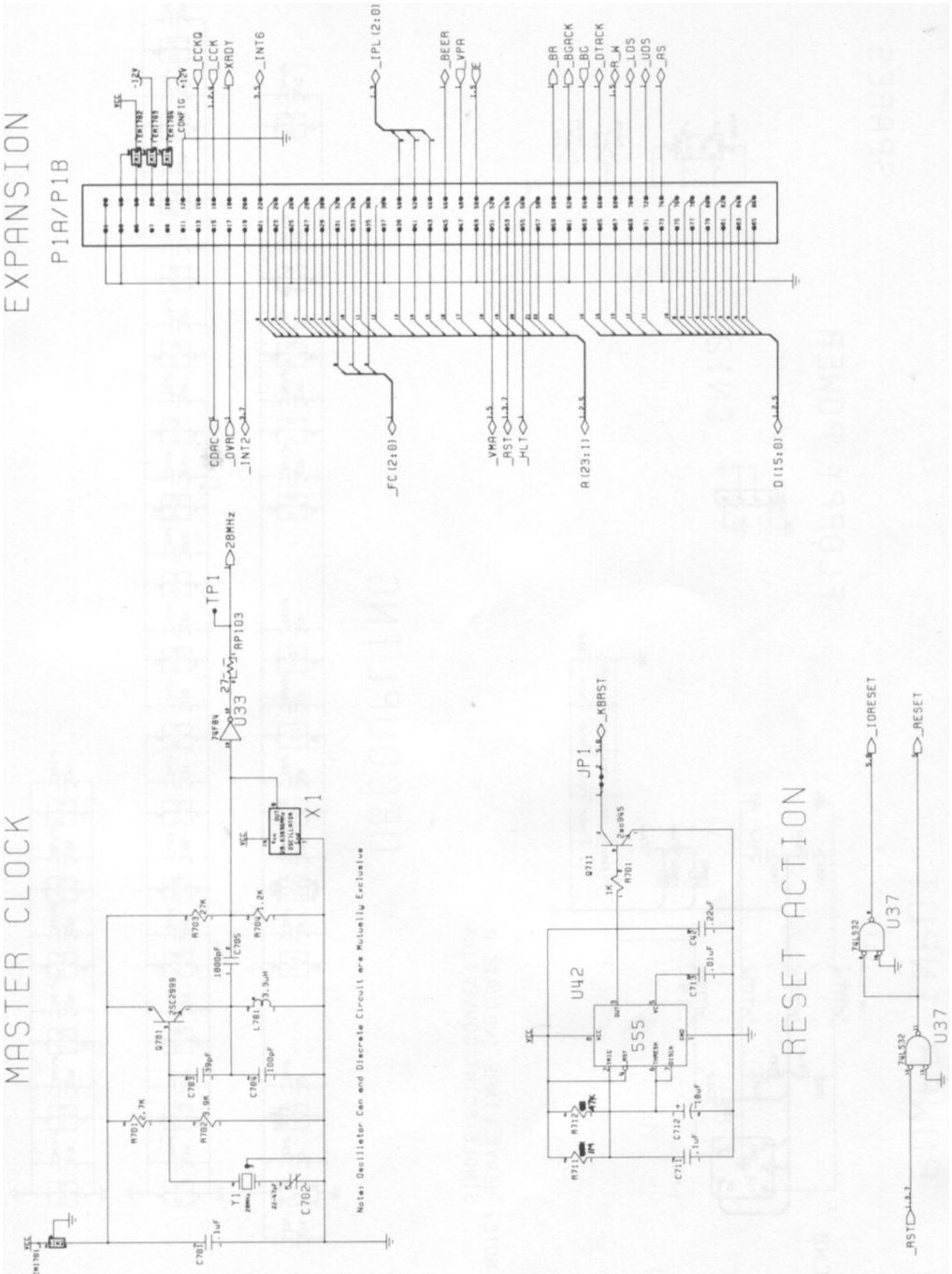

CNX/CNX1
U6
HM62402
U34
U35
74F244
RP202
RP201
RP203
+12V
-12V
DRA(15:0)
DRA(8:0)
_EXRAM
_CASL
_CASU
_RAS0
_RAS1
_WE
_CCK
_CLKRD
_CLKWR
_ROMEN
A(23:1)
D(15:0)

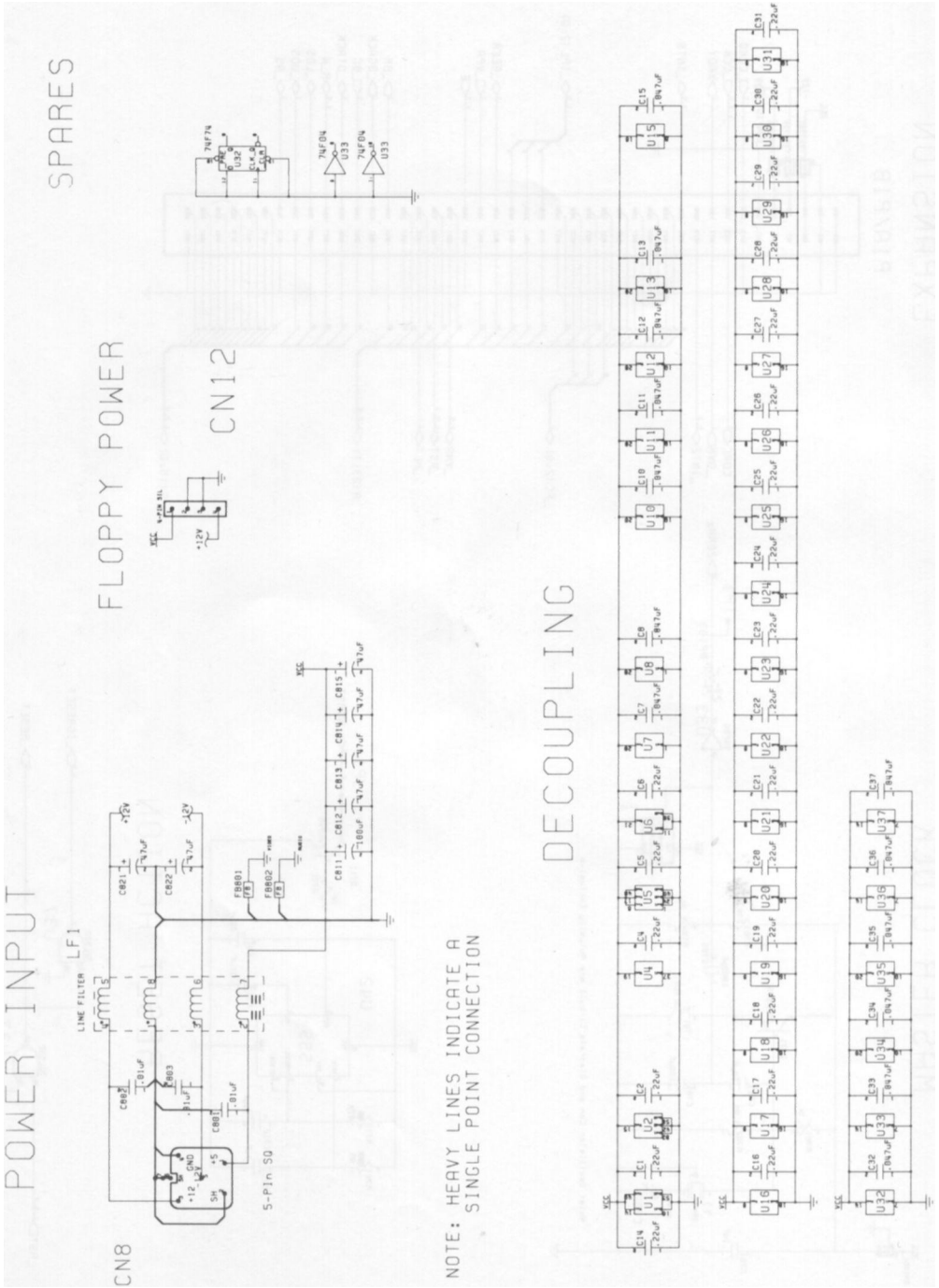

RIGHT
CN3
LEFT
CN4
AUDOUT
U14
LF347
AUDIO POWER
PAULA POWER!
U3
8364
AUDIN
DKRD
DKWD
DKWE
RxD
TxD
INT6
INT3
INT2
POT0X
POT0Y
POT1X
POT1Y
DRD(15:0)
RGA(8:1)
IPL(2:0)
DMAL
CCK
CCKQ
_RST

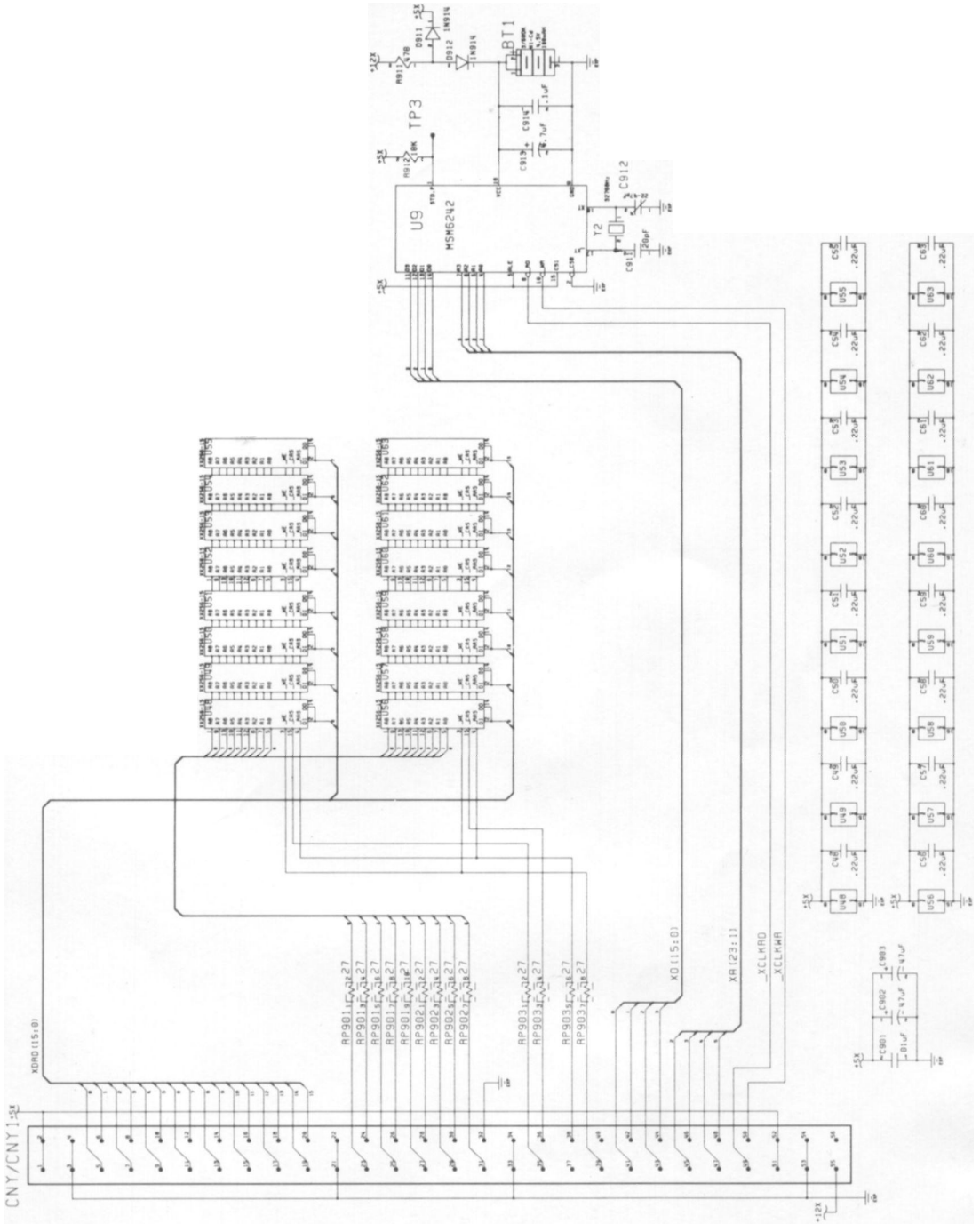

LEFT JOY
CN1
DB9P
RIGHT JOY
CN2
DB9P
CN9
VIDEO
DB23S
COMPOSITE
CN10
RP401
4.7K-8
U15
74HCT157
HY1
VIDEO
HYBRID
U40
74HCT245
U41
74HCT245
U4
DENISE
8362
_FIRE0
POT0Y
POT0X
_FIRE1
POT1Y
POT1X
RP402
RP403
XCLK
_XCLKEN
_HSYNC
_VSYNC
_CCK
CCK
7MHz
DRD(15:0)
RGB(8:1)
_CSYNC


KEYBOARD CONNECTOR
CN13
RS232 DECOUPLING
CENTRONICS
CN7
RS232
CN6
U38
U39
U7
U8
8520
_KBDATA
_KBCLOCK
_KBRESET
_MTRON
_LED
_IORESET
_INDEX
_TxD
_RxD
_AUDIN
_AUDOUT
_MTR
_SEL3
_SEL2
_SEL1
_SEL0
_SIDE
_DIR
_STEP
_INT2
_VSYNC
_VMA
_INT6
_HSYNC
_RESET
D(15:0)
A(23:1)


EXTERNAL FLOPPY
DB23S CN5
INTERNAL FLOPPY
CN11A/CN11B
U5
GARY
74LS30
4.7K
RP501
IFLOPPY FUNCTIONS


EXPANSION
P1A/P1B
MASTER CLOCK
RESET ACTION
Note: Oscillator Can and Discrete Circuit are Mutually Exclusive
U42
555
U37
U33
X1
JP1
TP1
Y1
28MHz
_CCKQ
_CCK
_XRDY
_INT6
_IPL(2:0)
_BEER
_VPA
_BR
_BGACK
_BG
_DTACK
_AW
_LDS
_UDS
_AS
CDAC
_DVA
_INT2
_FC(2:0)
_VMA
_RST
_HLT
A(23:1)
D(15:0)
_KBRST
_IORESET
_RESET
_RST


POWER INPUT
CN8
LF1
LINE FILTER
S-Pin SQ
FLOPPY POWER
CN12
SPARES
DECOUPLING
NOTE: HEAVY LINES INDICATE A
SINGLE POINT CONNECTION


U9
MSM6242
TP3
BT1
T2
C912
CNY/CNY1
XDRD(15:0)
XD(15:0)
XA(23:1)
_XCLKRD
_XCLKWR

Glossary

add-on A printer, game controller, modem, or other external component you use with an Amiga.

alert A message displayed when there is a serious problem with an Amiga.

ALT key One of two **keys** next to the either the **Commodore** or the **Amiga key** at the bottom of the **keyboard.**

Amiga keyboard The **keyboard** similar to a typewriter's attached to an Amiga.

Amiga key The **key** on an **Amiga keyboard** to the right of the **Space Bar.** You use the Amiga key for **menu shortcuts,** or when operating the Amiga without a **mouse.**

Amiga Memory Expansion Cartridge A cartridge you plug into the bottom of the Amiga A500 to add 512K of **memory.**

Amiga Monitor An **RGB monitor** made for use with the Amiga.

AmigaDOS The Amiga disk operating system.

audio connector The **connector** you use when attaching audio equipment with an Amiga.

audio signal The output from one of the two audio **connectors** on the Amiga.

available menu item An **item** in a **menu** that you can **choose.**

Back Gadget A **gadget** you **select** to move a **window** or **screen** behind other windows or screens that overlap it.

baud rate The rate at which information is transferred through the **serial connector.**

cable A set of insulated wires used either to connect the parts of the Amiga or to connect **add-ons** to the Amiga.

choose To pick a **menu item.** You normally choose menu items with the aid of the **Menu button.**

chosen option An **option** that is currently in effect.

CLI The **Command Line Interface,** which opens a window to communicate directly with AmigaDOS, instead of using icons.

click **1.** To **press** and **release** a **mouse button. 2.** The action you perform when you click.

Clipboard A place where parts of a **project** that you **cut** or **copy** are kept.

clipping A part of a **project** that has been **cut** or **copied** and put on the **Clipboard.**

Clock A **tool** that lets you display the time on the **Workbench.**

close **1.** To remove a **window, requester,** or **screen** from the **display. 2.** To put away a **tool** or **project.**

Close Gadget A **gadget** that you **select** to **close** a **window** or **screen.**

Color Palette The set of colors available in a **screen.**

column A set of adjoining **pixels** or characters that form a vertical line on the **video display.**

command A **menu item** that, when you **choose** it, instructs the Amiga to perform a task. *Compare* **option.**

Commodore key The **key** on an **Amiga keyboard** to the left of the **Space Bar.** This is the same as the left Amiga key, and is used for **menu shortcuts,** or when operating the Amiga without a **mouse.**

composite video monitor *See* **NTSC monitor**

connector Any of the places on the outside of the Amiga to which you can attach external equipment.

copy To replicate a **tool, project, drawer,** or **disk.**

cursor key One of four **keys** with an arrow on top at the right of the **keyboard.** You press these keys either to move the **Text Cursor** or, by pressing the **Amiga key** at the same time, to move the **Pointer.**

custom screen A **screen** created by a **tool** for its own use and, optionally, for use by other tools.

cut To remove part of a **project** and place it on the **Clipboard.** *Compare* **erase.**

Demos drawer A **drawer** on the **Workbench disk** in which demonstration **tools** are kept.

destination disk When **copying disks,** the disk that receives the copy. *Compare* **source disk.**

discard To dispose of a **project, tool,** or **drawer** by putting it in the **Trashcan.**

disk A medium for storing and retrieving information.

disk drawer A **drawer** that contains the contents of a **disk.**

disk drive A device for reading information from and saving information on a **disk.**

disk drive light A light on the front of a **disk drive** that shows when the **disk** cannot safely be removed.

disk gauge A indicator at the left of the **window** for a open **disk** that shows how much free storage is available.

display That which appears on a **video monitor** or television.

Display Centering Gadget A **gadget** provided by **Preferences** for centering the image on the **display.**

double click [n.] The action you perform when you quickly **press** and **release** a **mouse button** twice.

double-click [v.] To quickly **press** and **release** a **mouse button** twice.

Double-Click Slider A **gadget** provided by **Preferences** for changing the maximum length of time between the two **clicks** of a **double click.**

drag To move an **icon, gadget, window,** or **screen** by putting the **Pointer** over what you want to move, **holding down** the **Selection button,** and moving the **mouse.**

Drag Bar That portion of a **Title Bar** that contains no **gadgets.** You **drag** the Drag Bar to move a **window** or **screen.**

drawer A place where **tools, projects,** and other drawers are kept.

edit To change the contents of a **project.**

empty To remove from the **Trashcan** any **projects, tools,** or **drawers** you've **discarded.** When you empty the Trashcan, you can no longer get back any of the projects, tools, or drawers that were in it.

erase To remove part of a **project** without putting what you've removed on the **Clipboard.** *Compare* **cut.**

error numbers Numbers that identify **AmigaDOS** errors.

exit gadget A **gadget** in a **requester** that you **select** to **close** the **requester.**

Extended Selection A technique for **selecting** more than one **icon** or **gadget** at a time. To use it, you **select** with the **Shift key** held down.

Extras disk One of three **microdisks** packaged with the Amiga.

feature A noteworthy property of a **tool.**

Front Gadget A **gadget** that you **select** to move a **window** or **screen** to the front of other windows or screens that overlap it.

gadget Any of the facilities provided within a **window, requester,** or **screen,** such as **Scroll Bars, Sizing Gadgets,** and **Close Gadgets,** that you use to change what's being displayed or to communicate with a **tool.**

ghost [adj.] Displayed less distinctly to indicate unavailability.

ghost gadget An **gadget** that is displayed less distinctly to indicate that it is not currently available.

ghost icon An **icon** that is displayed less distinctly to indicate that it is not currently available.

ghost menu item A **menu item** that is displayed less distinctly to indicate that it is not currently available.

highlight To display something in a way that distinguishes it. Normally, something is highlighted to indicate that it is **selected.**

hold down To press a **mouse button** or a **key** on the **keyboard** without **releasing** it.

icon A visual representation of a **tool, project, drawer,** or **disk.**

initialize To prepare a **disk** so that it can be used by an Amiga.

item = menu item

key Any of the switches on a **keyboard.**

Key Repeat Slider A **gadget** provided by **Preferences** for changing the speed at which **keys** on the **keyboard** repeat when you hold them down.

keyboard A set of **keys** used for typing or for giving other information to an Amiga.

keyboard cable The **cable** used to connect the **keyboard** to the **main unit.**

keyboard connector The **connector** on the **main unit** to which you attach the **keyboard cable.**

Kickstart disk A **microdisk** that contains information an Amiga needs to begin operating.

Look Again A **gadget** in **Open Reqesters** that you **select** to update the **Project List.**

main unit The largest component packaged with the Amiga. The main unit contains the central processor and other circuitry, **memory,** the **keyboard** and an internal **disk drive.**

memory Electronic circuits used to store information.

memory meter The indicator in the Title Bar for the Workbench screen that shows the amount of free RAM in bytes.

menu A list of items you can choose from.

Menu Bar A strip at the top of a **screen** that contains **menu titles.** The menu bar for the **selected window** appears when you hold down the **Menu button.**

Menu button The right-hand button on the **mouse.**

menu item One of the choices in a **menu.**

menu shortcut A way of choosing a **menu item** by pressing a **key** on the **keyboard** while holding down the **Commodore** or **Amiga key.**

menu title The name that for a **menu** that appears in the **Menu Bar.**

microdisk A 3 1/2-inch flexible **disk.**

monochrome monitor A type of monitor that displays computer output in one color.

mouse A device you move on a flat surface to move the **Pointer.**

mouse ball The ball on the bottom of the **mouse** that rolls as you move the mouse.

mouse button One of the two buttons on a **mouse.**

mouse speed A option provided by **Preferences** for varying how many inches you must move the **mouse** to move the **Pointer** roughly a third of the way across the **display.**

Multiple Choice A technique for **choosing** more than one **option** at a time. To use it, you **hold down** the **Menu button,** then **click** the **Selection button** with the **Pointer** over the options you want.

Notepad A **tool** provided with the **Workbench** for writing short messages.

NTSC monitor A type of color monitor that can be used with the Amiga.

OK Gadget A **gadget** in a **requester** that you **select** to carry out what you've asked for in the requester.

object A **tool, project, drawer,** or **disk.**

open **1.** To display a **window, requester,** or **screen.**
2. To make a **tool** or **project** available.

Open Requester A **requester** from which you **select** a **project** you want to **open.**

option A **feature** of a **tool** that, once you **choose** it, persists until you choose another, mutually exclusive feature.

palette = color palette

parallel port A **connector** on the back of the Amiga that you use to attach printers and other **add-ons.**

paste To copy the contents of the **Clipboard** into a **project.**

peripheral = add-on

pixel One of the small elements that together make up the **video display.**

pixel color The color of a **pixel** on the **display.**

point To position the tip of the **Pointer** over an object on the **display.**

Pointer The thing that moves on the **display** when you move the **mouse.** You use the Pointer to (1) **select icons** and **gadgets (2) choose menu items.**

Pointer Editing Window The **window** displayed by **Preferences** in which you change the **Pointer.**

pop-up requester A **requester** that you **open** by **double-clicking** the **Menu button.**

port A **connector** for attaching **add-ons** to the Amiga.

Preferences A **tool** that allows you to change various settings of an Amiga, including the time, the **Workbench font,** the speed that keys on the keyboard repeat when you hold them down, and the interval before keys begin repeating.

press To push down a **mouse button** or **key** on a keyboard.

Printer Requester A **requester** provided by **Preferences** that you use to change printer settings.

project A place where information created or used by a **tool** is kept.

An example of a project is a note you write with the **Notepad.**

Project disk A **disk** used to store **projects.**

Project List The list of **projects** you can **open** from an **Open Requester.**

protect To prevent the contents of a **project, tool, drawer,** or **disk** from being changed.

protect tab A plastic tab on a **microdisk** that, when you slide it so that there is a hole through the disk, prevents the information on that disk from being changed.

protected disk A **disk** whose contents cannot be modified.

RAM = random-access memory

RAM disk A storage area which can be used to temporarily hold programs for faster access than loading from disk.

random-access memory **Memory** whose contents can be changed while the computer is operating.

redraw To redisplay what appears in a **screen.**

release To stop **pressing** or **holding down** a **mouse button.**

rename To change the name of a **tool, project, disk, or drawer.**

Repeat Delay Slider A **gadget** provided by **Preferences** for changing how long it takes for a **key** on the **keyboard** to repeat when you hold it down.

requester A rectangular region in a **screen** which you use to give information to a **tool.** When a requester appears, you must select a **gadget** in the requester to **close** the requester before you can do anything else in the **window** in which the requester appears.

reset To **set up** the **Workbench** again after it has begun working.

resolution On a **video display,** the number of **pixels** that can be displayed in the horizontal and vertical directions.

reverse video Displayed using colors opposite those normally used. For example, if letters are normally black on a white background, white letters on a black background are said to be shown in reverse video.

RGB connector The **connector** on the back of the **main unit** that you use to attach an **RGB monitor** to the Amiga.

RGB monitor A **video monitor,** such as the **Amiga Monitor,** that interprets signals for red, green, and blue to create colors.

row A set of adjoining **pixels** that form a horizontal line on the **video display.**

save To copy the contents of a project onto a **disk.**

Say The speech synthesizing program included on **Workbench.**

screen A full-width area of the **video display** with the same **color palette, resolution,** and other attributes.

scroll To move the contents of a **project** within a **window.**

Scroll Arrows Arrows at both ends of a **Scroll Bar.** To move slowly forward through a **project,** put the **Pointer** over the bottom Scroll Arrow and hold down the **Selection button.** To move slowly backward through a project, put the **Pointer** over the top Scroll Arrow and hold down the **Selection button.**

Scroll Bar A **gadget** you use to display different parts of a **project.**

Scroll Box The rectangular area within a **Scroll Bar** that you drag to move rapidly from one part of a **project** or list to another.

SetMap The **Workbench** program that allows you to select an international version of the Amiga **keyboard.**

submenu An additional **menu** that appears to the side of a menu.

submenu title An item in a **menu** that, when you place the **Pointer** over it, causes a **submenu** to appear.

select To pick an **icon, gadget,** or a part of a **project** using the **Selection button.**

Selection button The left-hand button on the **mouse.**

selected option An **option** that is currently in effect.

selected window The **window** that you do work in. Only one window can be selected at a time.

selection shortcut A quick way to **select** something by pressing a **key** on the **keyboard** while holding down the left **Amiga** (Commodore) key.

serial port A **connector** on the back of the Amiga which you use to attach **modems** and other **add-ons.**

set up To start the **Workbench.**

shortcut A quick way, from the **keyboard,** to **(1) choose** a **menu item** (2) **select** an **icon** or **gadget.** See **menu shortcut** and **selection shortcut.**

size To change the dimensions of a **window** or **screen.**

Sizing Gadget A **gadget** you **drag** to change the size of a **window.**

slider A **gadget** you use to pick a value within a range, normally by **dragging** an arrow along a line.

source disk When **copying disks,** the disk that is being copied. *Compare* **destination disk.**

Space Bar The long **key** at the bottom of the **keyboard** that you **press** to enter a blank space.

status A characteristic of a **tool, project, drawer,** or **disk,** such as whether it is deletable or not deletable.

string A set of one or more characters.

String Gadget A **gadget** you use to enter or modify **strings.**

Text Cursor In **projects** containing text, a marker that indicates your position in the project.

timesaver Any technique provided by a tool to save you time. A **shortcut** is one kind of timesaver; another is double-clicking the **Menu button** to get a **pop-up requester.**

Title Bar A strip at the top of a **screen** or **window** that contains the name of the screen or window.

Title Gadget A **gadget** in **Open Requesters** that you use to type in the title of the **project** you want to open.

tool A facility for working with information. For example, the **Graphicraft** tool lets you create and change visual information that takes the form of a **painting.**

Trashcan The place where you put **projects, tools,** and **drawers** to **discard** them.

TV modulator A device used to connect a television set to an Amiga.

TV modulator cable A **cable** you use to connect the **TV modulator** to the **TV switch box.**

TV switch box A device that allows you to connect both an Amiga and an antenna to a television and switch between them.

type The kind an object is **(tool, project, drawer,** or **disk).**

type font A set of letters, numbers, and symbols that are the same **type size** and of the same **typeface.**

type size The size of text.

type style A variation of a **typeface,** such as italic or bold.

typeface A set of letters, numbers, and symbols that share the same design.

unavailable menu item Any **item** in a **menu** that you cannot **choose.** Unavailable menu items are shown as **ghost items.**

video cable The **cable** you use to connect an **RGB monitor** to an Amiga.

video equipment A **video monitor** or television.

video monitor A device for displaying visual information from an Amiga.

Wait Pointer A special shape for the **Pointer** that indicates that you must wait before continuing.

window A rectangular area in a **screen. Tools** use windows to accept and present information.

Workbench A **tool** you use to get and manipulate the facilities of the Amiga. You use the Workbench to **open, close, move,** create, and delete **projects, tools** and **drawers,** to **copy disks,** as well as to perform other operations.

Workbench disk A **disk** that contains the Workbench.

Workbench screen The **screen** used by the **Workbench** and other tools.

working disk A copy of an original disk that came with the Amiga or with a tool.

"Y" adapter An adapter that lets you combine both of the audio signals from an Amiga into a single audio signal. You use this adapter to connect the **Amiga Monitor** to an Amiga.

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