

SETTING UP-Setting up your Macintosh Centris 610 involves these steps:

- Plugging in the computer
- Connecting a monitor
- Connecting the mouse and keyboard
- Connecting other devices
- Turning the computer on

Plugging in the Computer

Plug in the Macintosh before connecting anything to it. The plug grounds the computer and protects it from electrical damage while you are setting up.

1. Plug the socket end of the power cord into the recessed power plug (marked with the symbol) on the back of the computer.
2. Plug the other end of the power cord into a three-hole grounded outlet or power strip.

!! WARNING: This equipment is intended to be electrically grounded. Your Macintosh Centris 610 is equipped with a three-wire grounding plug -- a plug that has a third (grounding) pin. This plug will fit only a grounded AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug! !!

If the computer starts up: If you hear a tone, the computer has started up and you need to turn it off before proceeding. Press and release the power switch on the front panel to turn the computer off. To protect both yourself and the computer from electrical hazards, the computer should remain turned off until you are finished connecting its parts.

Installing an Expansion Card

If you purchased an expansion card for your Macintosh

Centris 610, see "Installing Expansion Cards," page 24, for instructions on installing it. If you don't have an expansion card, go on to the next section, "Connecting a Monitor."

Connecting a Monitor

Your computer provides built-in video support for most Apple monitors, including the

following:

- Macintosh 12" Monochrome Display
- Macintosh 12" RGB Display
- AppleColor High-Resolution RGB Monitor (13")
- Macintosh Color Display (14")
- Macintosh Portrait Display (15")
- Macintosh 16" Color Display
- Apple Two-Page Monochrome Monitor (21")
- Macintosh 21" Color Display

With the appropriate adapter cable, you can also use

- VGA monitors (640 pixels by 480 pixels only)
- SVGA monitors (800 pixels by 600 pixels only)

Other Apple and non-Apple monitors are also supported. See your authorized Apple dealer for details. (If you are connecting a different monitor, see the instructions in its manual.)

Follow these steps to connect your monitor:

1. Place the monitor on top of or next to the computer.

If you have a monitor that is larger than 16 inches, such as a two-page display, place it next to the computer.

2. If necessary, attach the monitor power cord to the monitor.

On some monitors, the cord is already attached.

3. Plug in the monitor power cord.

You can plug the monitor into your computer or a grounded electrical outlet. (The Macintosh 12" RGB Display must be plugged into an electrical outlet.)

4. If necessary, attach one end of the video cable to the monitor.

Both ends of the cable are the same. On some monitors, the cable is already attached.

5. Attach the other end of the video cable to the video port on the back panel of the computer, or to the video card, and tighten the thumbscrews.

If you installed a video expansion card, plug the cable into the external connector on the card, not into the video port.

Connecting the Mouse and Keyboard

You have a choice of several keyboards for your Macintosh. They are all connected the same way.

1. Plug the mouse cable into the port on either side of the keyboard.

Most right-handed people prefer to use the mouse with their right hand; most left-handed people prefer to use their left hand. Plug the mouse into the port on the side you prefer.

The plug and the port are both marked with an Apple Desktop Bus (ADB) icon. Align the icons before you insert the plug. (The positions of the port and icon on your keyboard may differ slightly from those pictured.)

2. Plug one end of the keyboard cable (both ends are the same) into the other ADB port on the keyboard.

For example, if you plugged in the mouse cable on the right, plug in the keyboard cable on the left.

3. Plug the other end of the keyboard cable into either of the ADB ports on the back of the computer.

The ports are marked with the same ADB icon.

Connecting other Devices

If you are new to the Macintosh: You might want to get a little experience using your computer before attaching peripheral devices. You can go on with the rest of this book and come back to this section.

If you bought a printer, a modem, or other equipment to use with your Macintosh, turn now to the manual that came with the equipment for instructions on connecting it.

To connect your computer to a network, consult your network administrator, the LocalTalk documentation that you purchased with your computer, or the owner's guide that came with your network system. Also see "High-Speed Networking" on

page 34.

The Macintosh Centris 610 has internal storage capability for up to three drives, including a floppy disk drive, a CD-ROM drive, and an internal hard disk drive (several capacities available). See your Apple dealer for details on configuring your Macintosh Centris 610.

Attaching SCSI devices

If you purchased a hard disk or other SCSI device to use with your Macintosh, follow the instructions in the section "Expanding Your Macintosh System" in your Macintosh User's Guide, as well as the manual that came with the device.

When you are ready to connect a SCSI device, keep in mind the following information about SCSI termination.

!! IMPORTANT: The hard drive on your Macintosh Centris 610 has a built-in SCSI bus terminator. Therefore, you need to make sure that the last SCSI device in the chain has a terminator and that no other external SCSI device has a terminator. If your service provider installs any SCSI devices inside the computer, be sure that the service provider removes all terminators from those devices. **!!**

!! WARNING: To avoid damage to your equipment, Apple Computer recommends that only an authorized Apple dealer or service provider perform upgrades or repairs to this product. If you attempt to perform upgrades or repairs yourself, any damage you may cause to your equipment will not be covered by the limited warranty on your equipment. Contact your authorized Apple dealer or service provider for information about this or any other warranty question. **!!**

Turning the Computer On

To turn on the computer for the first time, follow these steps:

1. Turn on your monitor.

On some Apple monitors, the power switch is on the front; on others, it's on the back. It's usually marked with this icon:

The monitor must be turned on separately each time you turn on the computer.

2. Turn on the computer by pressing the on/off switch on the front panel.

You hear a tone from the computer as it starts up.

3. Check to see what's on your screen.

- If you see the Macintosh desktop, as shown here, your software is already set up correctly. Skip now to the section called "Health-Related Information About Computer Use," on page 9.

- If you see a blinking question mark, you need to install system software on the computer's hard disk. (System software is a set of programs the computer uses to start itself up.)

See "Setting Up Your Macintosh System" in your Macintosh User's Guide for instructions on installing system software. If your computer has an internal

CD-ROM drive, you should also follow the setup and installation instructions in the book that describes the CD-ROM drive.

!! IMPORTANT: When installing system software, be sure to use the Install Me First disk you received with your computer. Check the label of the Install Me First disk to make sure it is for the Macintosh Centris 610. !!

- If you see anything else on your screen, or nothing at all, see the next section, "Problems Starting Up?."

Problems Starting Up?

If you don't see anything on the screen, check these items to see if you can identify the problem:

- Is the computer plugged into a power source? If it is plugged into a power strip, is the power strip turned on?

- Is the computer turned on? If you aren't sure, press the on/off switch (marked with the symbol I) on the front panel.

- Is the keyboard cable connected correctly?

- Is the monitor power cord plugged in?

- Is the monitor turned on? (Check the power-on light on the front of the monitor.)

- Is the monitor's video cable attached firmly to both the monitor and the computer?

- Is the brightness control (marked with the symbol) on the monitor adjusted correctly?

Health-Related Information About Computer Use

Muscle soreness, eye fatigue, and other discomforts and injuries sometimes associated with using computers can occur from performing any number of activities.

In fact, misuse of the same muscles during multiple activities can create a problem that might not otherwise exist. For example, if you engage in nonwork activities that involve repetitive stress on the wrist -- such as bicycling -- and also use your computer's keyboard improperly, you may increase your likelihood of developing wrist problems. Some individuals are at greater risk of developing these problems because of their health, physiology, lifestyle, and general exposure to stress. Work organization and conditions, such as workstation setup and lighting, also play a part in your overall health and comfort. Preventing health problems is a multifaceted task that requires careful attention to the way you use your body every hour of every day.

The most common health effects associated with using a computer are musculoskeletal discomfort and eye fatigue. We'll discuss each area of concern below. For information about electric and magnetic emissions, look in the reference material that comes with your computer.

Musculoskeletal discomfort

As with any activity that involves sitting for long periods of time, using a computer can make your muscles sore and stiff. To minimize these effects, set up your work environment carefully, using the guidelines that follow, and take frequent breaks to rest tired muscles. To make working with your computer more comfortable, allow enough space in your work area so that you can change position frequently and maintain a relaxed posture.

Another type of musculoskeletal concern is repetitive stress injuries (RSIs), also known as cumulative trauma disorders (CTDs). These problems can occur when a certain muscle or tendon is repeatedly overused and forced into an unnatural position. The exact causes of RSIs are not totally understood, but in addition to awkward posture, such factors as the amount of repetition, the force used in the activity, the individual's physiology, workplace stress level, and lifestyle may affect the likelihood of experiencing an RSI.

RSIs did not suddenly arise when computers were invented; tennis elbow and writer's cramp, for example, are two RSIs that have been with us for a long time. Although less common than other RSIs, one serious RSI discussed more often today is a wrist problem called carpal tunnel syndrome, which may be aggravated by improper use of computer keyboards. This nerve disorder results from excessive pressure on the median nerve as it passes through the wrist to the hand.

This section offers advice on setting up your work area to enhance your comfort while you use your computer. Since the effects of repetitive movements associated with using a computer can be compounded by those of other work and leisure activities to produce or aggravate physical problems, proper use of your computer system must be considered as just one element of a healthy lifestyle.

No one, of course, can guarantee that you won't have problems even when you follow

the most expert advice on using computer equipment. You should always check with a qualified health specialist if muscle, joint, or eye problems occur.

Eye fatigue

Eye fatigue can occur whenever the eyes are focused on a nearby object for a long time. This problem occurs because the eye muscles must work harder to view an object that's closer than about 20 feet (6 meters). Improper lighting can hasten the development of eye fatigue. Although eye fatigue is annoying, there's no evidence that it leads to permanent damage.

Whenever you're engaged in an activity that involves close-up work -- such as reading a magazine, doing craft work, or using a computer -- be sure to have sufficient glare-free lighting and give your eyes frequent rest breaks by looking up and focusing on distant objects. Remember to have your eyes examined regularly.

To prevent discomfort and eye fatigue:

- Arrange your work space so that the furniture is properly adjusted for you and doesn't contribute to an awkward working posture.
- Take frequent short breaks to give your muscles and eyes a chance to rest.

Arranging your office

Here are some guidelines for adjusting the furniture in your office to accommodate your physical size and shape.

- An adjustable chair that provides firm, comfortable support is best. Adjust the height of the chair so your thighs are horizontal and your feet flat on the floor.

The back of the chair should support your lower back (lumbar region). Follow the manufacturer's instructions for adjusting the backrest to fit your body properly.

- When you use the computer keyboard, your shoulders should be relaxed. Your upper arm and forearm should form an approximate right angle, with your wrist and hand in roughly a straight line.

You may have to raise your chair so your forearms and hands are at the proper angle to the keyboard. If this makes it impossible to rest your feet flat on the floor, you can use a footrest with adjustable height and tilt to make up for any gap between the floor and your feet. Or you may lower the desktop to eliminate the need for a footrest. Another option is to use a desk with a keyboard tray that's lower than the regular work surface.

- If you use a mouse, position the mouse at the same height as your keyboard. Allow

adequate space to use the mouse comfortably.

- Arrange the monitor so the top of the screen is slightly below your eye level when you're sitting at the keyboard. The best distance from your eyes to the screen is up to you, although most people seem to prefer 18 to 28 inches (45 to 70 cm).
- Position the monitor to minimize glare and reflections on the screen from overhead lights and windows. You may want to use a tiltable monitor stand. The stand lets you set the monitor at the best angle for viewing, helping to reduce or eliminate glare from lighting sources you can't move.

Avoiding fatigue

- Change your seated position, stand up, or stretch whenever you start to feel tired. Frequent short breaks are helpful in reducing fatigue.
- Use a light touch when typing or using a mouse and keep your hands and fingers relaxed.
- Some computer users may develop discomfort in their hands, wrists, or arms after intensive work without breaks. If you begin to develop chronic pain or discomfort in your hands, wrists, or arms, consult a qualified health specialist.
- Allow adequate workspace so that you can use your keyboard and mouse comfortably. Place papers or other items so you can view them easily while using your computer. A document stand may make reading papers more comfortable.
- Eye muscles must work harder to focus on nearby objects. Occasionally focus your eyes on a distant object, and blink often while you work.
- Clean your screen regularly. Keeping the screen clean helps reduce unwanted reflections.

What's Next?

Your computer comes with a variety of training and reference materials. Depending on your computer experience and the way you use your computer, you may use all, some, or none of them.

If you know the Macintosh

First, you should see "Your Computer at a Glance" and "Technical Information" later in this book for details about special features of the Macintosh Centris 610. Then, if you are an experienced Macintosh user, you can start on your own work. If you have questions as you work, refer to the Macintosh User's Guide.

If you're new to the Macintosh

If you are new to computers or to the Macintosh, begin by reviewing the training provided with your Macintosh:

- the Macintosh Basics tour in the next section, "Learning the Basics"
- Part I, "Learning Macintosh," in your Macintosh User's Guide

First take the training provided in the Macintosh Basics tour and then work through the "Learning Macintosh" section to learn other skills.

LEARNING THE BASICS

1. Use your hand to slide the mouse along the table.

Hold the mouse as shown, cable pointing away from you. Slide it so that it stays in contact with the table. Don't press the mouse button. Watch the arrow on your screen to see if it moves when you move the mouse.

2. Notice that the arrow on the screen moves in the same direction that you move the mouse.

If the arrow doesn't move on the screen, make sure the cable connecting the mouse to the keyboard is secure and that your mouse is positioned as shown in the picture. (Turn off the computer by pressing the power switch before checking the cable. Disconnecting the cable while your computer is on could damage your equipment.)

3. Use the mouse to move the arrow over the picture labeled "Macintosh HD."

The Macintosh Basics tour is installed on your computer's hard disk.

Make sure the tip of the arrow is inside the rectangle and not over the text.

4. Being careful not to move the mouse, click the mouse button twice in a row.

Now your screen should look like this:

If your screen does not look like this, try step 4 again, paying attention to the following:

- Make sure the tip of the arrow touches the picture, not the words beneath it.
- Be sure to press the mouse button twice.
- Try pressing twice more quickly -- but don't move the mouse while you press.

5. Move the mouse to place the tip of the arrow inside the picture of a folder labeled "Macintosh Basics."

6. Being careful not to move the mouse, click the mouse button twice in a row.

Now your screen should look like the picture in the next step.

7. Move the mouse to place the tip of the arrow inside the picture of a man labeled "Macintosh Basics."

8. Click the mouse button twice to start the tour.

Click twice. The tour begins in a few moments with the following screen:

9. Now follow the instructions on the screen and work through Macintosh Basics.

When you have completed Macintosh Basics, continue with "Turning the Computer Off." To continue your training, see the step-by-step tutorial, called "Learning Macintosh," in the Macintosh User's Guide.

Turning the Computer Off

If you plan to continue learning about how to use your Macintosh or if you plan to continue working, don't turn off your computer yet. When you are ready to stop working, follow these steps:

1. Use the mouse to choose the Shut Down command from the Special menu.

Choosing Shut Down readies the hard disk for a fast restart next time you turn on the computer. It also prompts you to save your work on a disk, if you haven't already done so, before turning the power off.

***!*! WARNING:** If you switch off the computer before choosing Shut Down, you will lose any work you haven't previously saved onto a disk. You also risk permanently losing open documents. ***!*!**

2. When a message appears telling you it is safe to switch off your computer, press the on/off switches on the front of the computer and the monitor.

Remember, you need to turn off both the computer and the monitor.

To turn on the computer again, just press the on/off switches on the front of the computer and the monitor, as you've already done in setting it up.

Important Safety Instructions

For your own safety and that of your equipment, always take the following precautions.

Disconnect the power plug (by pulling the plug, not the cord) if any of the following conditions exists:

- the power cord or plug becomes frayed or otherwise damaged
- you spill something into the case
- your Macintosh is exposed to rain or any other excess moisture
- your Macintosh has been dropped or the case has been otherwise damaged
- you suspect that your Macintosh needs service or repair
- you want to clean the case (use only the recommended procedure described next)

Be sure that you always do the following:

- Keep your Macintosh away from sources of liquids, such as wash basins, bathtubs, shower stalls, and so on.
- Protect your Macintosh from dampness or wet weather, such as rain, snow, and so on.
- Read all the installation instructions carefully before you plug your Macintosh into a wall socket.
- Keep these instructions handy for reference by you and others.
- Follow all instructions and warnings dealing with your system.

!! WARNING: Electrical equipment may be hazardous if misused. Operation of this product or similar products must always be supervised by an adult. Do not allow children access to the interior of any electrical product and do not permit them to handle any cables. **!!**

To clean the case, do the following:

1. Disconnect the power plug. (Pull the plug, not the cord.)
2. Wipe the surfaces lightly with a clean, soft cloth dampened with water.

!! WARNING: If you have a problem with your computer and nothing presented in the

manuals that came with the computer solves the problem, take the computer to your authorized Apple dealer or service provider. If you attempt to repair the computer yourself, any damage you may cause to your computer will not be covered by the limited warranty on your computer. Contact your authorized Apple dealer or service provider for additional information about this or any other warranty question. !!

TECHNICAL INFORMATION

The following pages contain technical information about your Macintosh computer:

- Expanding your Macintosh
- Installing expansion cards
- Using a RAM disk for temporary storage
- High-speed networking
- Reset and interrupt switches
- Attaching a security lock
- Specifications

Expanding Your Macintosh

Your Macintosh computer was designed to grow with your needs. You can add new capabilities or improve its performance as you wish. Like all Macintosh computers, it allows you to plug a number of external devices into its ports. In addition, it allows you or your dealer to install a number of enhancements within the case that houses the computer.

Your dealer can install the following:

- additional dynamic RAM (DRAM), up to a total of 68 MB, to increase the amount of memory your Macintosh can use for running application programs
- additional video RAM (VRAM), up to a total of 1 MB, to increase the numbers of grays or colors your monitor can display
- an internal 5.25-inch device (if one isn't already installed), such as a CD-ROM player or a removable hard disk

You can install one of the following yourself:

- a 7-inch NuBus card, such as a specialized video card or internal modem
- a processor-direct slot card, for faster performance

Choosing the right components

As explained in the next two sections, you must make sure each component you add is compatible with your computer and does not exceed its maximum power allowance.

Compatibility

In general, your dealer or the manufacturer of a component should be able to tell you which components are compatible with your Macintosh. However, you might find these points useful:

- The Macintosh Centris 610 requires a NuBus card that does not exceed 7 inches in length and consumes no more than 10 watts of power.
- Your Macintosh Centris 610 uses 72-pin, 80-nanosecond (ns) RAM Single Inline Memory Modules (SIMMs). Your computer's SIMMs should be fast-paged mode 80 ns RAM access time or faster. SIMMs from older Macintosh computers are not compatible. For more detailed information, see "RAM Configurations" on page 39.

Power allowances

The Macintosh Centris 610 meets Apple's NuBus power specifications. Check the information that came with your expansion card to make sure the card does not exceed these specifications.

For more detailed information, see "Expansion Cards and Devices" on page 40.

!! IMPORTANT: All NuBus expansion cards must conform to FCC Class B and CSA requirements.!!

Installing Expansion Cards

You may have purchased a NuBus card or a processor-direct slot card that provides additional video, networking, or some other capability to your Macintosh Centris 610. The Macintosh Centris 610 has a single expansion slot that accepts an adapter for either a NuBus or a processor-direct slot card. To install either kind of card, you must also install the appropriate adapter.

To install an expansion card and adapter card, follow the instructions in this section.

!! WARNING: To avoid damaging your computer and expansion card, do not attempt to install any expansion card without first checking the documentation for that card. If

the documentation specifies that an authorized Apple dealer or service provider should install the card (usually because the installation requires special training or tools), be sure to have your Apple dealer or service provider do the installation. If you attempt to install the card yourself, any damage you may cause to the computer or card will not be covered by the limited warranty on your computer. If the card is not an Apple-labeled product, then check with an authorized Apple dealer to see if you can install it yourself. !!

Opening the computer

1. Turn off the computer.

Make sure the computer is plugged in but turned off.

2. Remove the lid from the computer.

- Pull up on the two latches at the rear corners of the case.

- Tilt the cover, and slide it toward the front panel. Then lift the cover off.

3. Touch the metal part of the power supply case inside the computer to discharge any static electricity that might be on your clothes or body.

Always do this before you touch any parts or install any components inside the computer.

!! IMPORTANT: The expansion card and adapter you are installing in your computer are electrically sensitive. To avoid problems, observe two precautions:

- Discharge static electricity by touching the power supply case, as just described, before working with expansion or adapter cards.

- Handle the cards by their edges. Do not touch the connectors. !!

Now turn to the section that describes the installation process for your particular type of card.

- If you are installing a NuBus card, follow the instructions in the next section, "Installing a NuBus Card."

- If you are installing a processor-direct slot card, see the section called "Installing a Processor-Direct Slot Card" on page 32.

Installing a NuBus card

1. Remove the cover from the access port on the back panel of your computer and set

it aside.

Use your thumb to push out the access port cover.

2. Remove the NuBus card and the adapter card assembly from their static-proof bags.

The adapter card assembly consists of an adapter card attached to a metal bracket. You can safely touch any part of the assembly except the connectors on the card.

3. Attach the NuBus card to the adapter card assembly.

- Rest the adapter card on the edge of a flat surface, such as your desk, with the metal bracket pointing up.

- Slide the NuBus card into the bracket. The pin on the bracket should line up with the hole on the metal end of the card.

- Press gently on the cards to push the connectors together.

When the cards are attached correctly, the pin fits into the hole and the guide fits into the slot, as shown in the illustration.

4. Locate the expansion slot on the main logic board.

The expansion slot is at the far left edge of the logic board as you face the front of the computer.

5. Insert the connector on the adapter card into the expansion slot.

- Line up the connector with the slot. Then press down gently but firmly on the adapter card until the connector is fully inserted.

- Make sure that the tab on the side of the card assembly slides into the slot on the side of the case, as shown.

6. Attach the thumbscrews.

Position the bracket against the access port while inserting and tightening the thumbscrews.

The thumbscrews anchor the bracket in place and secure the NuBus card in the access port.

7. Replace the cover on the computer.

- Lower the front end of the cover and slide it toward the back.
- Engage the ribs on the bottom case with the slots in the cover.
- Press down on the latches to snap them into place.

Installing a processor-direct slot card

1. Remove the processor-direct slot card and adapter from their static-proof bags.
2. Locate the expansion slot on the main logic board.

The expansion slot is at the far left edge of the logic board as you face the front of the computer.

3. Follow the manufacturer's instructions to install the processor-direct slot card and adapter.
4. Replace the cover on the computer.

- Lower the front end of the cover and slide it toward the back.
- Engage the ribs on the bottom case with the slots in the cover.
- Press down on the latches to snap them into place.

Using a RAM Disk for Temporary Storage

For improved performance, you may want to set aside part of your random-access memory (RAM) to use as a temporary hard disk. Using a RAM disk improves performance because the computer can get data from a RAM disk much faster than from a hard disk or floppy disk.

You use a RAM disk exactly as you would use a hard disk or floppy disk, except that you save your work onto another disk before you shut down the computer.

To set up a RAM disk:

1. Choose Control Panels from the Apple (K) menu.
2. Open the Memory control panel.
3. Turn on the RAM disk.

Remember that the more RAM you allot as a RAM disk, the less you will have available for running application programs.

!! WARNING: If you use a RAM disk, be sure to save your work onto another disk before turning off your computer so that you won't lose your data. **!!**

High-Speed Networking

If your Macintosh Centris 610 came with built-in Apple Ethernet, you can connect your computer to high-speed Ethernet networks. With the appropriate Apple Ethernet Media Adapter (or other compatible media adapter), you can connect your Macintosh to an existing Ethernet network using thin coax, 10BASE-T twisted pair, thick coax, or other standard cables. (See your authorized Apple dealer for more information on Apple Ethernet Media Adapters for your Macintosh Centris 610.)

To use built-in Ethernet, you need to change the network connection in the Network control panel. See the section "Selecting a Network Connection" in your Macintosh User's Guide for information on how to change the network connection.

!! IMPORTANT: The built-in Ethernet capabilities of your Macintosh Centris 610 allow you to connect to any standard Ethernet network. The Macintosh Centris 610 supports EtherTalk Phase 2 (AppleTalk Phase 2 protocols for Ethernet networks) and TCP/IP (via MacTCP). Non-Apple products are also available that you can use to communicate over Ethernet using other protocols. The Macintosh Centris 610 does not support EtherTalk Phase 1 (AppleTalk Phase 1 protocols for Ethernet networks). **!!**

Reset and Interrupt Switches

Your Macintosh computer has interrupt and reset switches built into the back panel of the computer. (They are shown in the section "Your Computer at a Glance," on page 20.)

The interrupt feature is for programmers, and is meant to be used only if you have installed debugging software. Debugging software is available from APDA (the Apple Programmers and Developers Association). See the Macintosh User's Guide for more information about APDA and about using the interrupt and reset switches.

!! WARNING: Because using the reset function restarts the computer, you will lose any work that you have not saved on a disk. **!!**

Attaching a Security Lock

You may attach a security lock to your Macintosh Centris 610. Look on the back panel for the built-in port for the lock. See your Apple dealer for security lock devices that work with your Macintosh.

Specifications

The hardware specifications for the Macintosh Centris 610 are listed below.

Main unit

Processor

- MC680LC040, 32-bit architecture, 20 megahertz (MHz) clock frequency (includes built-in memory-management unit)

Memory

- 4 megabytes (MB) RAM, expandable to 68 MB

- 1 MB read-only memory (ROM)

- 256 bytes of non-volatile parameter memory

Video RAM and monitors

The Macintosh Centris 610 comes with either 512K or 1 MB of video RAM (VRAM) built in.

The following list shows the number of colors or shades of gray your Macintosh Centris 610 can display, depending on how much VRAM is installed. (See your Apple dealer for more information about adding VRAM.)

- Macintosh 12" RGB Display

With 512K of VRAM:

512 x 384 pixels with 1, 2, 4, 8, or 16 bits per pixel
thousands of colors/256 grays

With expansion to 1 MB of VRAM:

512 x 384 pixels with 1,2,4,8, or 16 bits per pixel
thousands of colors/256 grays

- Macintosh 12" Monochrome Display, AppleColor High-Resolution RGB Monitor (13"), and Macintosh Color Display (14")

With 512K of VRAM:

640 x 480 pixels with 1, 2, 4, or 8 bits per pixel
256 colors/grays

With expansion to 1 MB of VRAM:

640 x 480 pixels with 1, 2, 4, 8, or 16 bits per pixel
thousands of colors/256 grays

- Macintosh Portrait Display (15")

With 512K of VRAM:

640 x 870 pixels with 1, 2, or 4 bits per pixel
16 grays

With expansion to 1 MB of VRAM:

640 x 870 pixels with 1, 2, 4, or 8 bits per pixel
256 grays

- Macintosh 16" Color Display

With 512K of VRAM:

832 x 624 pixels with 1, 2, 4, or 8 bits per pixel
256 colors/grays

With expansion to 1 MB of VRAM:

832 x 624 pixels with 1, 2, 4, 8, or 16 bits per pixel
thousands of colors/256 grays

- Apple Two-Page Monochrome Monitor (21")

With 512K of VRAM:

1152 x 870 pixels with 1, 2, or 4 bits per pixel
16 grays

With expansion to 1 MB of VRAM:

1152 x 870 pixels with 1, 2, 4, or 8 bits per pixel
256 grays

- Macintosh 21" Color Display

With 512K of VRAM:

1152 x 870 pixels with 1, 2, or 4 bits per pixel
16 colors/grays

With expansion to 1 MB of VRAM:

1152 x 870 pixels with 1, 2, 4, or 8 bits per pixel
256 colors/grays

- NTSC Monitors

With 512K of VRAM:

Overscan: 640 x 480 pixels with 1, 2, 4, or 8 bits per pixel
Underscan: 512 x 384 pixels with 1, 2, 4, or 8 bits per pixel
256 colors/grays

With expansion to 1 MB VRAM:

Overscan: 640 x 480 pixels with 1, 2, 4, 8, or 16 bits per pixel
Underscan: 512 x 384 pixels with 1, 2, 4, 8, or 16 bits per pixel
thousands of colors/256 grays

- PAL Monitors

With 512K of VRAM:

Overscan: 768 x 576 pixels with 1, 2, 4, or 8 bits per pixel
Underscan: 640 x 480 pixels with 1, 2, 4, or 8 bits per pixel
256 colors/grays

With expansion to 1 MB VRAM:

Overscan: 768 x 576 pixels with 1, 2, 4, 8, or 16 bits per pixel
Underscan: 640 x 480 pixels with 1, 2, 4, 8, or 16 bits per pixel
thousands of colors/256 grays

- VGA Monitors (require a special adapter cable)

With 512K of VRAM:

640 x 480 pixels with 1, 2, 4, or 8 bits per pixel

256 colors/grays

With expansion to 1 MB of VRAM:

640 x 480 pixels with 1, 2, 4, 8, or 16 bits per pixel

thousands of colors/256 grays

- SVGA Monitors (require a special adapter cable)

With 512K of VRAM:

800 x 600 pixels with 1, 2, 4, or 8 bits per pixel

256 colors/grays

With expansion to 1 MB of VRAM:

800 x 600 pixels with 1, 2, 4, 8, or 16 bits per pixel

thousands of colors/256 grays

- Other non-Apple monitors are supported by NuBus video cards. See your authorized Apple dealer for more information.

Disk drives

- Apple SuperDrive 1.4 MB high-density floppy disk drive

- Internal Apple SCSI hard disk drive (13-height, various capacities)

- Optional, internal 5.25-inch, 12-height SCSI drive, such as a CD-ROM player, or internal 3.5-inch SCSI drive

- Up to six drives can be connected via the SCSI port

Sound generator

- Custom sound chip, including stereo sampling generator capable of driving miniature phone jack headphones or audio equipment

Interfaces

- Two Apple Desktop Bus (ADB) ports support a keyboard, mouse, and other devices daisy-chained through a low-speed, synchronous serial bus (maximum of three devices total)

- Video port supports color and monochrome monitors of various sizes and resolutions

- Internal expansion slot supports either a NuBus or processor-direct slot card, with the appropriate adapter

- Two RS-232/RS-422 serial ports, 230.4 Kbit per second maximum (up to 0.920 Mbit per second if clocked externally)
- Optional built-in Apple Ethernet for connecting to high-speed Ethernet networks
- SCSI interface supports a combination of up to seven internal and external SCSI devices
- Sound output port for stereo compact disc audio and stereo computer-generated sound
- Sound input port for monaural sound input

A/C line input

- Line voltage: 100-240 volts AC, RMS single phase, automatically configured
- Frequency: 50-60 Hz
- Power: 86 watts maximum, not including monitor power

A/C line output

- Output receptacle: 100-240 volts AC, RMS (determined by actual input voltage), 5 ampere maximum

DC power

- 86 watts maximum

Current type	Total
+5 volt	11.6 amps
+12 volt	2.5 amps
-12 volt	0.5 amp

Clock/calendar

- CMOS custom chip with long-life lithium battery

Keyboard

- Supports all Apple ADB keyboards

Mouse

- Supports the Apple ADB mouse

Apple microphone (optional)

- The microphone is an electret type, omnidirectional microphone that is powered by the computer. Microphone output voltage is 4 millivolts (mV) peak to peak at normal speaking volume.

RAM configurations

RAM is provided both on the logic board (4 MB) and in packages called Single Inline Memory Modules, or SIMMs.

Your computer can work with any of several RAM configurations, depending on the density of the RAM chips that are mounted on the SIMMs.

!! IMPORTANT: The SIMMs should be fast-paged mode 80-nanosecond (ns) RAM access time or faster. The slower 100 ns, 120 ns, and 150 ns SIMMs available for some other models of Macintosh computers will not work in your model. The Macintosh Centris 610 uses 32-bit wide, 72-pin SIMMs not previously used in Macintosh computers. Consult your authorized Apple dealer or service provider for information and upgrades. **!!**

!! WARNING: To avoid damage to your computer, Apple Computer recommends that only an authorized Apple dealer or service provider install additional RAM. If you attempt to install additional RAM yourself, any damage you may cause to your equipment will not be covered by the limited warranty on your computer. See your authorized Apple dealer or service provider for additional information about this or any other warranty question. **!!**

Power requirements

Apple Desktop Bus

- Maximum power draw for all ADB devices: 500 mA
- Mouse draws up to 80 mA
- Keyboard draws 25-80 mA (varies with keyboard model used)

Note: The two ADB ports can support up to a total of three ADB devices.

!! IMPORTANT: All NuBus expansion cards must conform to FCC Class B and CSA requirements. **!!**

Size and weight

Weight	Height	Width	Depth
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Main unit*

6.4 kg	85 mm	415 mm	397 mm
14 lb.	3.4 in.	16.3 in.	15.6 in.

Mouse

0.10 kg	33 mm	61.7 mm	107.3 mm
4 oz.	1.3 in.	2.4 in.	4.2 in.

* Varies depending on type of hard disk. May be greater if a 5.25-inch device, such as a CD-ROM drive, is installed.

Environment

Operating temperature

- 10 C to 40 C (50 F to 104 F)

Storage temperature

-40 C to 47 C (-40 F to 116.6 F)

Relative humidity

- 5% to 95% (noncondensing)

Altitude

- 0 to 3048 m (0 to 10,000 ft.)