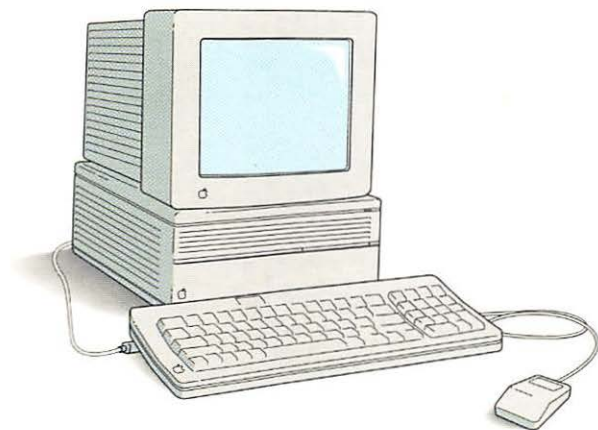




# Macintosh<sup>®</sup> IIfx Special Options and Technical Information



## Warning

This equipment has been certified to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules. Only peripheral devices (computer input/output devices, terminals, printers, and so on) certified to comply with Class B limits may be attached to this computer.

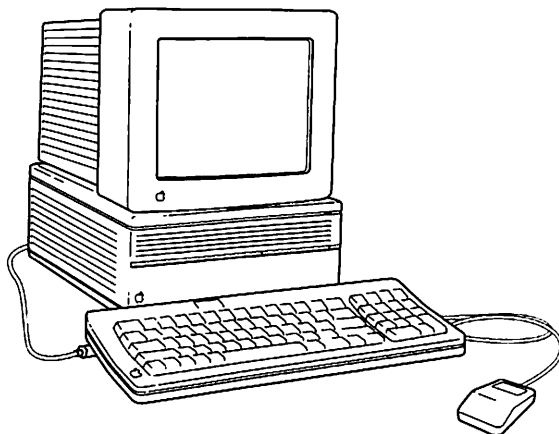
Operation with noncertified peripheral devices is likely to result in interference to radio and television reception.

**DOC Class B Compliance** This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

**Observation des normes—Classe B** Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe B prescrites dans les règlements sur le brouillage radioélectrique édictés par le Ministère des Communications du Canada.



# Macintosh® IIfx Special Options and Technical Information



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## Radio and television interference

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with Apple’s instructions—it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation.

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or one of the peripheral devices.

If your computer system does cause interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit from the television or radio. (That is, make certain the computer and the television or radio are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with a coaxial cable lead-in between the antenna and the television.

If necessary, consult your authorized Apple dealer or an experienced radio/television technician for additional suggestions.

You may find helpful the following booklet, prepared by the Federal Communications Commission: “How to Identify and Resolve Radio-TV Interference Problems” (stock number 004-000-00345-4). This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

⚠ **Important:** This product was tested for FCC compliance under conditions that included the use of shielded cables and connectors between system components. It is important that you use shielded cables and connectors to reduce the possibility of causing interference to radios, television sets, and other electronic devices. For Apple peripheral devices, you can obtain the proper shielded cables from your authorized Apple dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

# Special Options and Technical Information

The Macintosh® IIfx computer embodies the same “user-friendly” philosophy as the original Macintosh, while providing an open architecture, faster performance, more memory, more sophisticated system software—all in a versatile, compact design.



## Performance

These features provide state-of-the-art performance in your Macintosh IIci:

- the full 32-bit Motorola® 68030 microprocessor, running at 25.0 megahertz (MHz)
- the built-in Paged Memory Management Unit (PMMU)
- burst-mode RAM access
- the Motorola 68882 floating-point math coprocessor, running at 25.0 MHz
- a minimum of 1 megabyte (MB) of dynamic RAM as main memory
- built-in video support for both monochrome and color monitors
- a SuperDrive™ 1.4 MB high-density floppy disk drive, capable of reading MS-DOS® disks

## Expandability

The expansion capabilities of the Macintosh IIci include

- three NuBus™ expansion slots, for expansion cards such as the EtherTalk® and TokenTalk® cards for connection to specialized networks
- a cache connector, for a high-speed memory cache card
- optional internal hard disk drive (several capacities are available)

## Software considerations

Before you begin using your Macintosh IIci, it's a good idea to be familiar with the information in this section of the guide.

### System software installation

You can use the Macintosh system software and the A/UX® operating system with your computer; you can also install the resources needed for networking and communication products that use the AppleTalk® network system.

The summaries that follow should help you locate the specific information you need to prepare the software for your Macintosh IIci.

#### Macintosh system software

Version 6.0.5 of the Macintosh system software is supplied with your Macintosh IIci. It consists of a *System Tools* disk, a *Printing Tools* disk, and two *Utilities* disks.

If your computer has an Apple® internal hard disk, the Macintosh system software may already have been installed. (You can verify this by turning on the computer. If system software has been installed, you'll see the "happy Macintosh" icon, then the desktop will appear on the screen, with icons for the hard disk and the Trash.)

If you need to install the system software, use the instructions in Chapter 2 of the *Macintosh Reference*. That chapter provides several installation options.

AppleShare and networking software

The *Network Products Installer* disk is provided with your Macintosh IIci. Consult the booklet *Installing Apple Network Products* (provided with the disk) for instructions for installing network products.

## A/UX

If you plan to use A/UX with your Macintosh IIci, be sure to consult the *A/UX Installation Guide* before initializing or partitioning the hard disk in your computer, or before installing the Macintosh system software. (You'll need A/UX version 1.1.1 or later.)

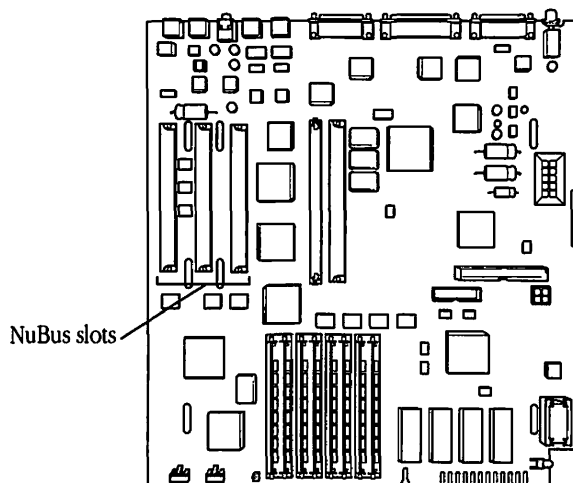
## Special features

The Macintosh IIci provides a number of special features:

- three NuBus expansion slots
- a cache connector
- built-in video
- a programmer's switch (that you install if you choose to use it)
- a locking power switch
- parity error checking (optional)

## NuBus expansion slots

The three NuBus expansion slots are designed for a variety of expansion cards. Figure 1 shows the location of the NuBus slots.



**Figure 1** The NuBus expansion slots

Use the documentation supplied with the card you plan to install, or follow the instructions in *Setting Up Your Macintosh IIcx* or in Chapter 9 of the *Macintosh Reference* to install a card in one of these slots.

- ❖ *Note:* If you plan to install the programmer's switch, do so before installing any NuBus cards. See the section "Programmer's Switch" for instructions. ❖

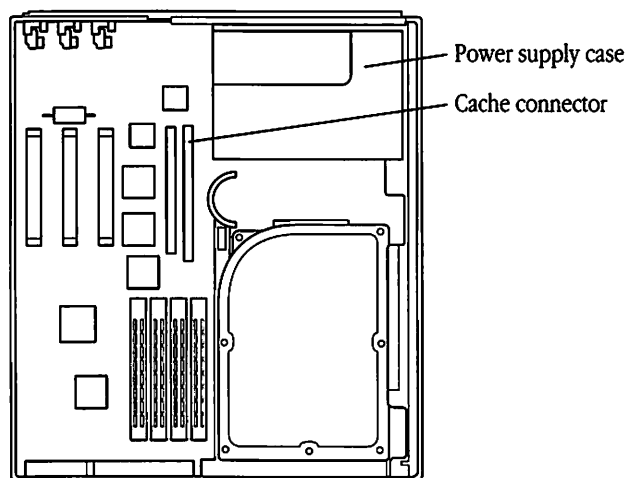
**Cache connector** The cache connector is located on the computer's main logic board. Installing a high-speed memory cache card provides a 20 to 30 percent improvement in overall system performance.

To install a cache card, follow these steps:

1. Turn off the computer, but leave the power cord plugged into its grounded outlet.
2. Remove the lid from the computer.

The booklet *Setting Up Your Macintosh IIci* provides instructions for removing the lid.

3. Touch the power supply case inside the computer to discharge any static electricity that might be on your clothes or body.
4. Locate the cache connector.



**Figure 2** The cache connector

## **5. Insert the card into the cache connector.**

Hold the card along the top edge. Align the card over the cache connector, and push down firmly on the card until it is fully seated.

**Built-in video** The Macintosh IIci comes with video support built in directly on the main logic board. You can change the amount of memory that the Macintosh IIci reserves for built-in video. By decreasing the amount of RAM reserved for video, you increase the amount of RAM available to run applications software, but limit the number of colors or grays you can display. Conversely, by increasing the amount of RAM reserved for video, you increase the number of colors or grays you can display, but limit the amount of RAM available for applications.

You allocate memory for built-in video by using an option on the Monitors Control Panel. Follow these steps to change the amount of RAM reserved for built-in video:

### **1. Choose Control Panel from the Apple menu.**

The Control Panel appears and presents a column of icons on the left side of the Control Panel.

## 2. Select the Monitors icon.

You may need to scroll to see the icon.

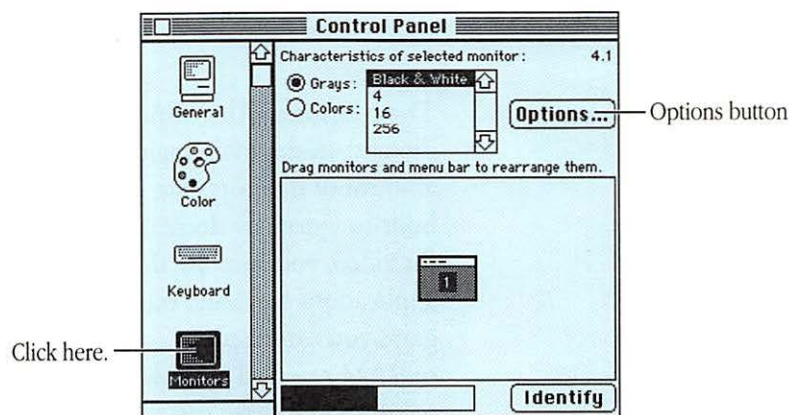


Figure 3 Monitors Control Panel

## 3. Hold down the Option key and click the Options button to see the Monitors Options Panel.

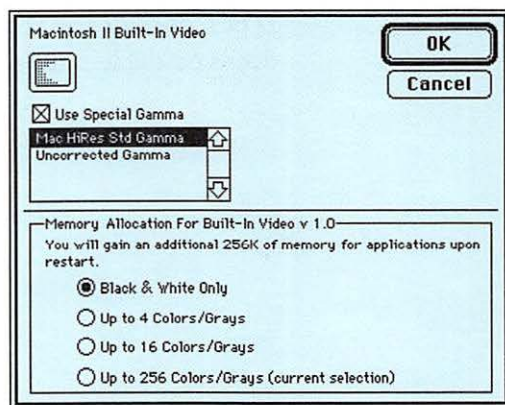


Figure 4 Monitors Options Panel

**4. Select the maximum number of colors or grays for which you want to reserve memory.**

The more colors or grays you select, the more RAM will be reserved for built-in video.

If your system has at least 2 MB of RAM, you can choose 2, 4, 16, or 256. If your system has only 1 MB of RAM, or if your monitor is an Apple Portrait Display, you can choose 2, 4, or 16. If your system has only 1 MB of RAM and your monitor is an Apple Portrait Display, you can choose 2 or 4.

When you choose a number different from the current setting, a message appears telling you how much additional RAM will be reserved for either built-in video or applications.

❖ *Gamma tables:* You can disregard the portion of the Monitors Options Panel that says “Use Special Gamma.” Gamma tables are used to adjust the accuracy of colors on a monitor. ❖

**5. Click OK.**

A confirmation box appears telling you that you have to restart your computer for the changes to take effect.

**6. Click OK.**

You return to the Monitors Control Panel.

**7. Close the Control Panel.**

Click the close box in the upper-left corner of the title bar.



## 8. Restart your computer.

Choose Restart from the Special menu.

As your Macintosh restarts, it reserves the amount of memory you have allocated for built-in video and maintains the setting you just made.

### Programmer's switch

The programmer's switch is for use by programmers. If you aren't developing application programs, don't install the switch. Installing it and using it in the wrong way could cause you to lose information.

The programmer's switch has two parts: the reset switch and the interrupt switch. Pressing the reset switch is just like turning the power switch off and back on; consequently, any work you have not saved will be lost. Press the interrupt switch only if you have debugging software installed.

The programmer's switch snaps into place on the inside of the Macintosh IIci. Follow these steps to install the switch:

1. **Turn off the computer, but leave the power cord plugged into its grounded outlet.**
2. **Remove the lid from the computer.**

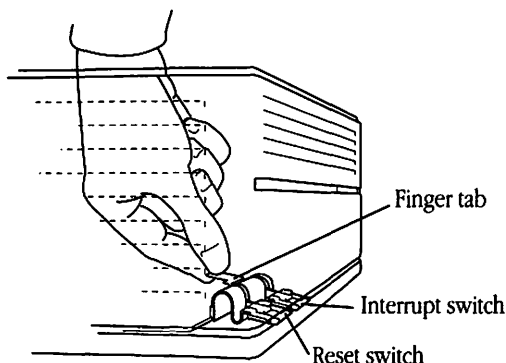
The booklet *Setting Up Your Macintosh IIci* provides instructions for removing the lid.

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

Figure 2, earlier in this booklet, shows the power supply case.

4. Facing the front of the computer, look inside and insert the two buttons into the two small, rectangular openings in the left front of the computer's case. (You may need to remove any NuBus cards installed in your computer.)

Hold the finger tab and slide the two buttons into the holes.



**Figure 5** Inserting the programmer's switch

5. With the two buttons inserted into the openings, push forward on the switch and press down firmly but gently on the finger tab.

As you press on the tab, the switch snaps into place.

6. Replace the lid on the computer (after reinstalling any NuBus cards you removed).

To remove the switch, push in on the rear of the switch and lift it up.

## The locking power switch

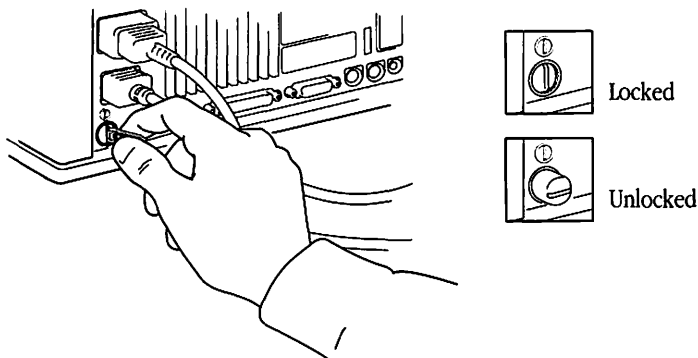
The power switch on the Macintosh IIci can be locked in the *on* position. This feature is provided primarily for specialized applications, such as when the computer is used as a file server. With the switch locked in the *on* position, and with appropriate software, the system restarts automatically if power to the computer is interrupted.

### Locking the switch

Follow these steps to lock the switch in the *on* position:

1. **With the computer turned off, insert a paper clip into the notch in the power switch.**
2. **Press the power switch in and turn it 90° clockwise.**

The switch is locked when it is recessed and the notch is in a *vertical* position.



**Figure 6** Locking the power switch

3. **Remove the paper clip from the notch in the power switch.**

## Unlocking the switch

Take the following steps to unlock the power switch.

- ▲ **Warning:** Following this procedure will shut off the computer. Before unlocking the power switch, save any documents and quit any applications you have open. ▲

1. Insert a paper clip into the notch in the power switch.
2. Press the power switch in and turn it 90° counterclockwise.

The switch is unlocked when it pops out and the notch is in a *horizontal* position.

3. Remove the paper clip from the notch in the power switch.

## Parity error checking

The Macintosh IIci can be ordered with an optional feature known as parity. Parity is a method of detecting memory errors by using an extra bit with each byte stored in RAM. The extra bit is used to detect whenever the value read is not the same as the value stored. When the system detects a parity error, a dialog box appears telling you to restart your computer. If your Macintosh IIci has parity error checking, it has an additional chip included on the computer's logic board specifically designed to perform parity generation and checking.

## Contents of system software disks

The contents of the four system software disks supplied with your Macintosh IIci are listed in the table that follows. Some files are included on more than one disk.

For complete instructions for installing the system software, see Chapter 2 of the *Macintosh Reference*.

### Contents of the Macintosh IIci system software disks

Name of file	Disk	Folder (if applicable)
System	<i>System Tools</i>	System Folder
Finder™	<i>System Tools</i>	System Folder
General	<i>System Tools</i>	System Folder
Clipboard File	<i>System Tools</i>	System Folder
Monitors	<i>System Tools</i>	System Folder
Startup Device	<i>System Tools</i>	System Folder
Installer	<i>System Tools</i>	—
Installer Script	<i>System Tools</i>	—
Apple HD SC Setup	<i>System Tools</i>	—
LaserWriter®	<i>Printing Tools</i>	—
LaserWriter IIsc	<i>Printing Tools</i>	—
Laser Prep	<i>Printing Tools</i>	—
ImageWriter®	<i>Printing Tools</i>	—
AppleTalk ImageWriter	<i>Printing Tools</i>	—
LQ ImageWriter	<i>Printing Tools</i>	—

(continued)

Contents of the Macintosh IIci system software disks (*continued*)

Name of file	Disk	Folder (if applicable)
LQ AppleTalk ImageWriter	<i>Printing Tools</i>	—
PrintMonitor	<i>Printing Tools</i>	—
LaserWriter*	<i>Printing Tools</i>	Apple Color
Laser Prep*	<i>Printing Tools</i>	Apple Color
PrintMonitor*	<i>Printing Tools</i>	Apple Color
32-Bit QuickDraw™*	<i>Printing Tools</i>	Apple Color
Backgrounder	<i>Utilities 1</i>	System Folder
MultiFinder™	<i>Utilities 1</i>	System Folder
DA Handler	<i>Utilities 1</i>	System Folder
AppleShare®	<i>Utilities 1</i>	System Folder
Access Privileges	<i>Utilities 1</i>	System Folder
Responder	<i>Utilities 1</i>	—
Disk First Aid™	<i>Utilities 1</i>	—
TeachText	<i>Utilities 1</i>	—
Color	<i>Utilities 2</i>	System Folder Additions
Keyboard	<i>Utilities 2</i>	System Folder Additions
Mouse	<i>Utilities 2</i>	System Folder Additions

\*Special files for color or gray-scale printing and enhanced color display; for instructions, see “Installing 32-Bit QuickDraw for Enhanced Color Images” in Chapter 2 and “Color or Gray-Scale Printing” in Chapter 4 of the *Macintosh Reference*.

(*continued*)

Contents of the Macintosh IIci system software disks (*continued*)

<b>Name of file</b>	<b>Disk</b>	<b>Folder (if applicable)</b>
Sound	<i>Utilities 2</i>	System Folder Additions
CloseView™	<i>Utilities 2</i>	System Folder Additions
Easy Access	<i>Utilities 2</i>	System Folder Additions
Key Layout	<i>Utilities 2</i>	System Folder Additions
Scrapbook File	<i>Utilities 2</i>	System Folder Additions
Map	<i>Utilities 2</i>	System Folder Additions
Portable	<i>Utilities 2</i>	System Folder Additions
Font/DA Mover	<i>Utilities 2</i>	Font/DA Mover Folder
Fonts	<i>Utilities 2</i>	Font/DA Mover Folder
Desk Accessories	<i>Utilities 2</i>	Font/DA Mover Folder
Apple File Exchange	<i>Utilities 2</i>	Apple File Exchange Folder
DCA-RFT/MacWrite®	<i>Utilities 2</i>	Apple File Exchange Folder
MacroMaker™	<i>Utilities 2</i>	MacroMaker Folder
MacroMaker Help	<i>Utilities 2</i>	MacroMaker Folder
Macros	<i>Utilities 2</i>	MacroMaker Folder

# Technical information

The hardware specifications for your Macintosh IIci are listed below. For complete instructions for setting up and operating your computer, see *Setting Up Your Macintosh IIci*, *Getting Started With Your Macintosh*, and *Macintosh Reference*.

## Main unit

### Processor

- MC68030, 32-bit architecture, 25.0 MHz clock frequency (supports paged memory management)

### Coprocessor

- MC68882 Floating-Point Unit, 25.0 MHz clock frequency (follows IEEE standards)

### Cache connector

- 120-pin memory cache connector, for connecting optional high-speed memory cache card

### Memory

- 1 MB RAM, expandable to 8 MB; additional expansion possible with greater-capacity RAM chips
- 512 KB ROM
- 256 bytes of user-settable parameter memory

### Disk drives

- 1.4 MB high-density floppy disk drive (SuperDrive); optional external unit available
- Internal Apple SCSI hard disk drive
- Optional external Apple SCSI hard disk drives

### Sound generator

- Apple Sound Chip (ASC), including 4-voice wave-table synthesis and stereo sampling generator capable of driving stereo miniphone jack headphones or stereo equipment



## **Interfaces**

- Two Apple Desktop Bus™ (ADB) ports for keyboard, mouse, and other devices using a low-speed, synchronous serial bus
- Video port to support RGB and monochrome monitors of varying sizes and resolutions
- Three internal NuBus expansion slots supporting full 32-bit address and data lines
- Two RS-232/RS-422 serial ports, 230.4 Kbits per second maximum (up to 0.920 Mbit per second if clocked externally)
- External floppy disk drive interface
- SCSI interface
- Sound port for external audio amplifier

## **Input**

- Line voltage: 100–240 volts AC, RMS automatically configured
- Frequency: 50–60 Hz single phase
- Power: 90 watts maximum, not including monitor power

## **Output**

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

## **Power**

- 90 watts maximum

Current type	Total
+5 volt	12.0 amps
+12 volt	1.5 amps
–12 volt	1.0 amp

## **Clock/calendar**

- CMOS custom chip with long-life lithium battery

## Monitor

### Options

- A variety of RGB and monochrome monitors, including Apple High-Resolution Monochrome Monitor, AppleColor High-Resolution RGB Monitor, and Apple Portrait Display

## Keyboard

### Options

- Standard or extended keyboard with ADB connector

## Mouse

### Included

- ADB mouse: mechanical tracking, optical shaft or contact encoding;  $3.94 \pm 0.39$  pulses per mm ( $100 \pm 10$  pulses per inch) of travel

## RAM configurations

RAM in the Macintosh IIci is provided in packages called single in-line memory modules, or SIMMs. (Memory can also be added on cards installed in NuBus expansion slots.) Each SIMM contains dynamic RAM (DRAM) chips on a single circuit board, with electrical “finger” contacts along one edge that plug into the SIMM sockets mounted on the computer’s logic board.

Macintosh IIci computers are supplied with one of several RAM configurations (1 MB, 2 MB, 4 MB, 5 MB, 8 MB, 16 MB, 17 MB, 20 MB, or 32 MB), depending on how many SIMMs are used, the density of the RAM chips that are mounted on the SIMMs, and whether the system has been upgraded.

- △ **Important:** Macintosh IIci SIMMs should be fast-page mode 80 nS RAM access time or faster. Non-fast-page mode or the slower 100 nS, 120 nS, 150 nS SIMMs available for other models of Macintosh computers will not work reliably in a Macintosh IIci. △

## Size and weight

Weight	Height	Width	Depth
<b>Main unit</b>			
6.2 kg*	140 mm	302 mm	365 mm
13 lb. 10 oz.*	5.5 in.	11.9 in.	14.4 in.
<b>Mouse</b>			
0.17 kg	27.9 mm	53.3 mm	96.5 mm
6 oz.	1.1 in.	2.1 in.	3.8 in.
<b>Keyboard**</b>			
1–2 kg	44–60 mm	418–490 mm	142–190 mm
2–4.5 lb.	1.8–2.5 in.	16.5–19.5 in.	5.6–7.5 in.

\*Weight varies with disk drives installed.

\*\*Keyboard size and weight vary with model selected.

## Power requirements

### Apple Desktop Bus

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

*Note:* The practical total of ADB devices is two daisy-chained to each port.

### Cards

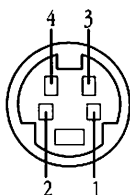
- Maximum power draw for all cards:

	Current type	Total
NuBus	+5 volt	6.0 amps
	+12 volt	0.525 amp
	–12 volt	0.450 amp
Cache connector	+5 volt	1.0 amp

△ **Important:** All NuBus expansion cards must conform to FCC Class B and CSA requirements. Some NuBus cards, as labeled, conform to FCC Class A and CSA requirements. △

Pin assignments      This section presents the pin assignments and functions for all the external connectors on the back panel of the Macintosh IIci.

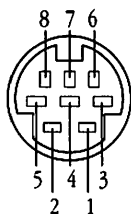
△ **Important:** The connector type listed for each port indicates the correct *plug* to use with the port illustrated. ^



#### Apple Desktop Bus (ADB)

Pin	Signal name	Signal description
1	ADB	Data
2	PWRON	Power on
3	+5v	+5 volts DC
4	GND	Signal ground

- Connector type: 4-pin minicircular
- Total length of all cables not to exceed 16 feet (5 meters)

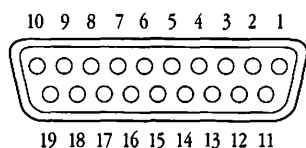


## Modem and printer ports

Pin	Signal name	Signal description
1	HSKo	Handshake out
2	HSKi	Handshake in/external clock
3	TXD-	Transmit data -
4	GND	Signal ground
5	RXD-	Receive data -
6	TXD+	Transmit data +
7	GPi	General purpose input*
8	RXD+	Receive data +

\*Modem port only; can be set in software to be a second external clock.

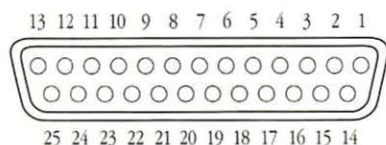
- Connector type: 8-pin minicircular



Disk drive port

Pin	Signal name	Signal description
1	GND	Signal ground
2	GND	Signal ground
3	GND	Signal ground
4	GND	Signal ground
5	-12v	-12 volts DC
6	+5v	+5 volts DC
7	+12v	+12 volts DC
8	+12v	+12 volts DC
9	NC	No connection
10	+5v	Reserved
11	PH0	Register select CA0
12	PH1	Register select CA1
13	PH2	Register select CA2
14	PH3	Register write strobe LSTRB
15	WRREQ/	Write request
16	SEL	Register select line SEL
17	ENBL/	Drive enable
18	RD	Read data
19	WR	Write data

- Connector type: DB-19

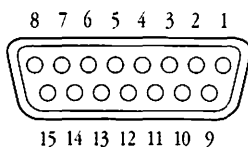


## SCSI port

Pin	Signal name	Signal description
1	REQ/	Request
2	MSG/	Message
3	I/O/	Input/Output
4	RST/	SCSI bus reset
5	ACK/	Acknowledge
6	BSY/	Busy
7	GND	Signal ground
8	DB0/	Data bit 0
9	GND	Signal ground
10	DB3/	Data bit 3
11	DB5/	Data bit 5
12	DB6/	Data bit 6
13	DB7/	Data bit 7
14	GND	Signal ground
15	C/D/	Common/Data
16	GND	Signal ground
17	ATN/	Attention
18	GND	Signal ground
19	SEL/	Select
20	DBP/	Data parity
21	DB1/	Data bit 1
22	DB2/	Data bit 2
23	DB4/	Data bit 4
24	GND	Signal ground
25	TPWR	Terminator power

- Connector type: DB-25
- Total length of all cables not to exceed 20 feet (6 meters)

▲ **Warning:** The SCSI port uses the same type of connector as a standard RS-232, DB-25 serial interface, but it is electrically very different. Do not connect any RS-232 device to this connector. Doing so can result in damage to both the device and the Macintosh IIci. ▲



## Video port

Pin	Signal name	Signal description
1	RED.GND	Red video ground
2	RED.VID	Red video
3	CSYNC/	Composite sync
4	MON.ID1	Monitor ID, bit 1
5	GRN.VID	Green video
6	GRN.GND	Green video ground
7	MON.ID2	Monitor ID, bit 2
8	NC	No connection
9	BLU.VID	Blue video
10	MON.ID3	Monitor ID, bit 3
11	C&VSYNC.GND	Composite & vertical sync ground
12	VSYNC/	Vertical sync
13	BLU.GND	Blue video ground
14	HSYNC.GND	Horizontal sync ground
15	HSYNC/	Horizontal sync
Shell	CHASSIS.GND	Chassis ground

■ Connector type: DB-15





## Audio jack

Pin	Signal name	Signal description
(Sleeve)	GND	Signal ground
(Ring)	RIGHT	1.5 volt peak-to-peak audio signal, right channel
(Tip)	LEFT	1.5 volt peak-to-peak audio signal, left channel

- Connector type: Stereo miniature phone plug
- The internal speaker is disabled when this port is in use.

## 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.)

## Keep this booklet

Be sure to save this booklet with the other manuals that came with your Macintosh IIci. It contains important information about your computer.

## The Apple Publishing System

This Apple® manual was written and edited on a desktop publishing system using Apple Macintosh® computers and Microsoft Word. Line art was created using Adobe Illustrator 88. Pages were composed in QuarkXPress. Proof pages were created on the Apple LaserWriter® printers. Final pages were output directly to separated film on a Linotronic 300.

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