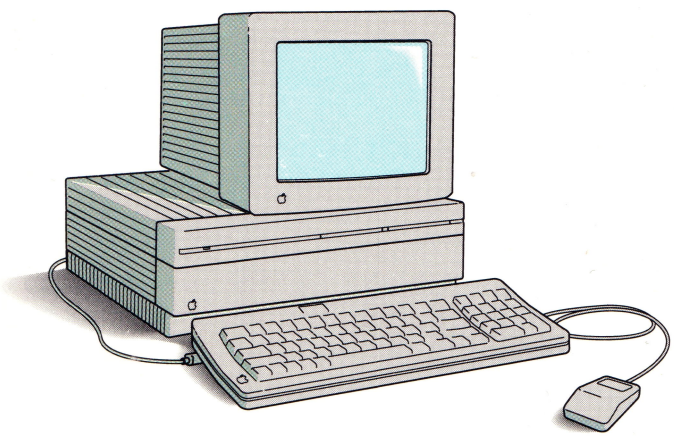
Macintosh™ IIfx Special Options and Technical Information



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Warning

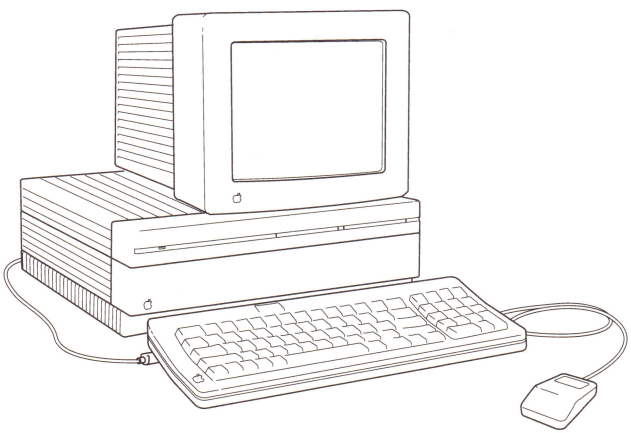
This equipment has been certified to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules. Only peripheral devices (computer input/output devices, terminals, printers, and so on) certified to comply with Class B limits may be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

Δ **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. Δ

Special Options and Technical Information

Your Macintosh™ IIfx is designed to provide maximum performance and expandability. In addition to offering the ease of use and consistency common to all Macintosh computers, the Macintosh IIfx incorporates a variety of custom-designed components that delivers a strikingly increased operation speed.

Advanced features

The Macintosh IIfx offers the highest performance and greatest expandability of any Macintosh. Its advanced features are summarized in this section.

Performance

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

- the Motorola® 68030 microprocessor, running at 40 megahertz (MHz)
- the Motorola 68882 floating-point coprocessor, running at 40 MHz
- a built-in memory cache of 32 kilobytes (K) of static RAM
- seven specially designed application-specific integrated circuits (ASICs) that maximize speed and control of internal processing, memory management, and flow of data to and from peripheral devices
- a minimum of 4 megabytes (MB) of dynamic RAM as main memory
- a quiet, variable-speed cooling fan that increases speed when additional cards are installed in the computer
- optional parity error checking, through a special configuration of memory installed when the computer is manufactured

Expandability

The expansion capabilities of the Macintosh IIfx include

- a choice of several monochrome and color monitors, including a full-page-display monitor and a two-page-display monitor
- six NuBus™ expansion slots, for expansion cards such as the EtherTalk™ and TokenTalk™ cards for connection to specialized networks
- the processor-direct slot, for expansion cards that provide very high levels of performance
- capacity for an internal hard disk drive (80 or 160 MB) and two internal SuperDrive™ floppy disk drives (1.4 MB disk capacity) capable of reading MS-DOS™ disks

Special software considerations

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

Software operation

The advanced features of the Macintosh IIfx may require that some application programs be modified to perform properly on the computer. The programs most likely to be affected are copy-protected programs that use floppy disk–based copy-protection schemes.

If you experience a problem with a program on your Macintosh IIfx, contact your authorized Apple™ dealer or the program supplier to determine whether you need an upgraded version of the program for use with your computer. Apple has provided technical assistance to software developers so that they can modify their programs, if necessary, for use with the Macintosh IIfx.

System software installation

You can use the Macintosh system software and the A/UX™ operating system with your computer, and 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 IIfx.

Macintosh system software

Version 6.0.5 of the Macintosh system software is supplied with your Macintosh IIfx. 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; 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.* This chapter provides several installation options.

AppleShare and networking software

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

A/UX

If you plan to use A/UX with your Macintosh IIfx, follow the instructions in the *A/UX Installation Guide* to initialize or partition the hard disk in your computer or to install the Macintosh system software.

Special options

Four options help you customize the Macintosh IIfx. They are

- a processor-direct slot
- six NuBus expansion slots
- a programmer's switch (that you install if you choose to use it)
- parity error checking (installed when the computer is manufactured)

Processor-direct slot

The processor-direct slot lets you install high-performance cards that benefit from direct access to the microprocessor.

Cards that use this slot are available only from independent suppliers.

Installing a card in the processor-direct slot

The processor-direct slot is located directly in front of the far-right NuBus expansion slot. Figure 1 shows the processor-direct slot and the six NuBus expansion slots inside the Macintosh IIfx.

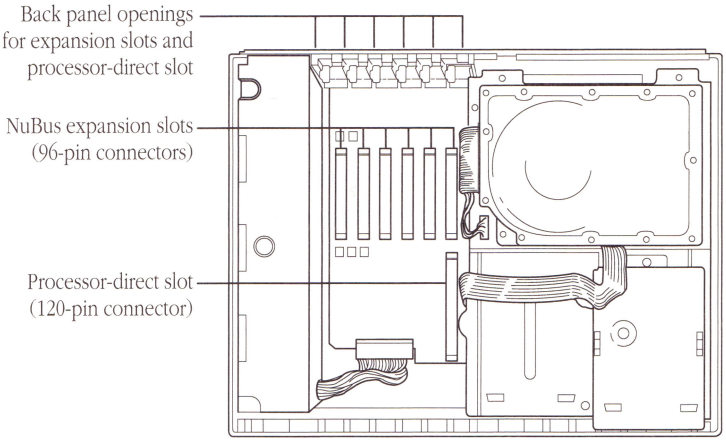


Figure 1 The processor-direct slot and NuBus slots in the Macintosh IIfx

▲ **Warning:** Be certain that any card you install in the processor-direct slot is designed for use with the Macintosh IIfx. Installing a card that is not designed for the Macintosh IIfx could damage the card, the computer, or both.

If you install a card in the processor-direct slot, you cannot use the NuBus slot directly behind the processor-direct slot. ▲

To install a card in the processor-direct slot, follow the procedure described in the documentation for that card. Take care, however, to insert the card in the processor-direct slot; do not try to place it in a NuBus expansion slot. (See Figure 1.)

NuBus expansion slots

The six NuBus expansion slots are designed for a variety of expansion cards. One of these slots is used for the video card to which the monitor of your Macintosh IIfx is connected.

Figure 1 shows the location of the NuBus slots. Use the documentation supplied with the card you plan to install, or follow the instructions in *Setting Up Your Macintosh IIfx* or in Chapter 9 of the *Macintosh Reference* to install a card in one of these slots.

△ Important: If you have installed a card in the processor-direct slot, you cannot use the far-right NuBus slot (immediately behind the processor-direct slot). △

Programmer's switch

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

If you are a program developer, install the programmer's switch only if you're developing stand-alone applications or desk accessories.

The switch has two parts. The front part of the switch is a reset switch. Pressing it is just like turning the power switch off and back on, and carries the same cautions—press it only when using the Finder™ (that is, when you're working on the desktop) with all disks properly ejected.

The back part of the switch is an interrupt switch; press it only if you have debugging software installed.

The switch snaps into place on the right side of the Macintosh IIfx. Figure 2 shows the programmer's switch in place.

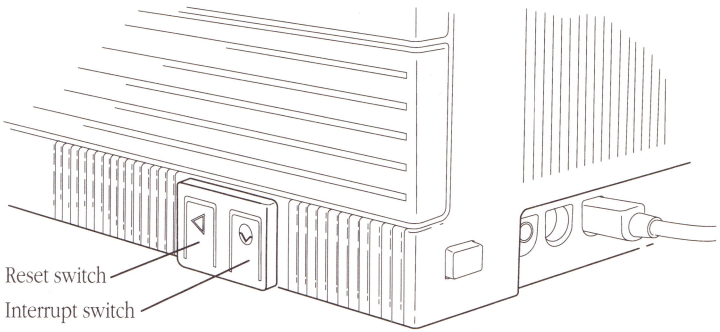


Figure 2 The programmer's switch installed in the Macintosh IIfx

Installing the programmer's switch

Follow these steps to install the switch:

1. **Align the switch so that the rightmost upper pin on the switch fits in the last air vent on the right side of the computer (as the computer is facing you).**
2. **Tip the switch and insert the top pair of pins with the hooks facing up.**
3. **Push up and in on the bottom of the switch. The switch should snap into place.**

Parity error checking

Parity error checking is an option that must be specified when you order the Macintosh IIfx. Contact your authorized Apple dealer or representative to learn more about obtaining this feature.

Contents of system software disks

The contents of the four system software disks supplied with your Macintosh IIfx 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 IIfx system software disks

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

(continued)

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

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

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

Technical information

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

Main unit

Processor

- MC68030, 32-bit architecture, 40 MHz clock frequency

Coprocessor

- MC68882 Floating-Point Unit (follows IEEE standards), 40 MHz clock frequency

I/O processors

- Two 6502 processors and 64K static RAM (manage serial ports, the Apple Desktop Bus, and floppy disk drives)

Memory

- 4 MB, expandable to 8 MB (system); additional expansion possible with greater-capacity RAM chips

  or

  4 MB to 8 MB with parity (optional); additional expansion possible with greater-capacity RAM chips

- 32K high-speed static RAM cache
- 512K ROM
- 256 bytes of user-settable parameter memory

Video display

- ROM features built-in 32-Bit QuickDraw
- Support for 24-bit color display using optional NuBus video controller card

Disk drives

- 1.4 MB high-density floppy disk drive (SuperDrive); optional second SuperDrive
- 80 MB or 160 MB internal Apple SCSI hard disk (optional)

Interfaces

- Two Apple Desktop Bus (ADB) ports for keyboard, mouse, and other devices using a low-speed, synchronous serial bus
- Six internal NuBus expansion slots supporting full 32-bit address and data lines
- One internal processor-direct slot 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)
- SCSI interface with direct memory access (for external devices)
- Sound port for external audio amplifier

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

Input

- Line voltage: 100–240 volts AC, RMS automatically configured
- Frequency: 48–62 Hz single phase
- Power: 230 watts maximum, not including monitor power

Output

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

Clock/calendar

- CMOS custom chip with long-life lithium battery

Power

- 132 watts maximum

Current type	Total
+5 volt	18.0 amps
+12 volt	2.5 amps
–12 volt	1.0 amps

Monitor

Options

- RGB monitors of varying sizes and resolutions
- Monochrome monitors of varying sizes and resolutions

Keyboard

Options

- Standard or extended keyboard with ADB connector

Mouse

Included

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

Power requirements

Apple Desktop Bus

- Maximum power draw for all ADB devices: 500 mA
- Mouse draws 80 mA
- Keyboard draws 25–80 mA (depending on model)

Note: Practical total of ADB devices is two daisy-chained to each port.

NuBus

- Types of current available:

  +5 volt

  +12 volt

  –12 volt

- Maximum power draw for all NuBus cards:

Current type	Total
+5 volt	12.0 amps
+12 volt	1.05 amps
–12 volt	0.600 amps

△ 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. △

Size and weight

Weight	Height	Width	Depth
Main unit			
11.8 kg*	140 mm	474 mm	365 mm
26 lb.*	5.5 in.	18.7 in.	14.4 in.
Mouse			
0.17 kg	27.9 mm	53.3 mm	96.5 mm
6 oz.	1.1 in.	2.1 in.	3.8 in.
Keyboard**			
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.

RAM configurations

System memory is supplied on single-in-line memory modules (SIMMs); SIMMs use 64-pin connectors.

△ Important: Memory should be installed only by an authorized Apple representative or service provider. △

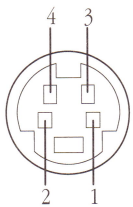
Chips

- 1 Mbit DRAM, 80 ns (8 per SIMM)
- Optional parity SIMM contains 9 RAM chips plus a parity chip

Pin assignments

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

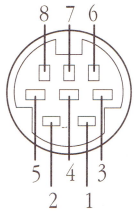
△ Important: The connector type listed for each port indicates the correct *plug* to use with the port illustrated. △



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).

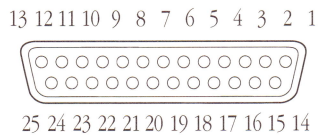


Modem and printer ports

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



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 IIfx. ▲

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 35° C (50° F to 95° 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 IIfx. 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 imagesetter.

Display type is Apple's corporate font, a condensed version of Garamond. Text type is Adobe Garamond. Ornaments are ITC Zapf Dingbats.

PostScript, the LaserWriter page-description language, was developed by Adobe Systems Incorporated.

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