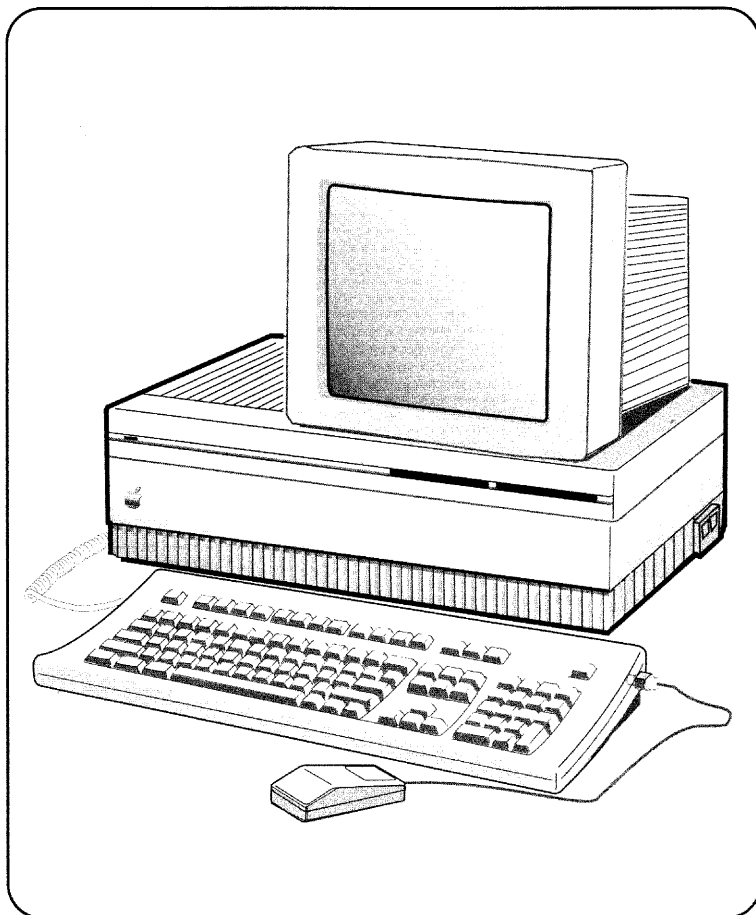




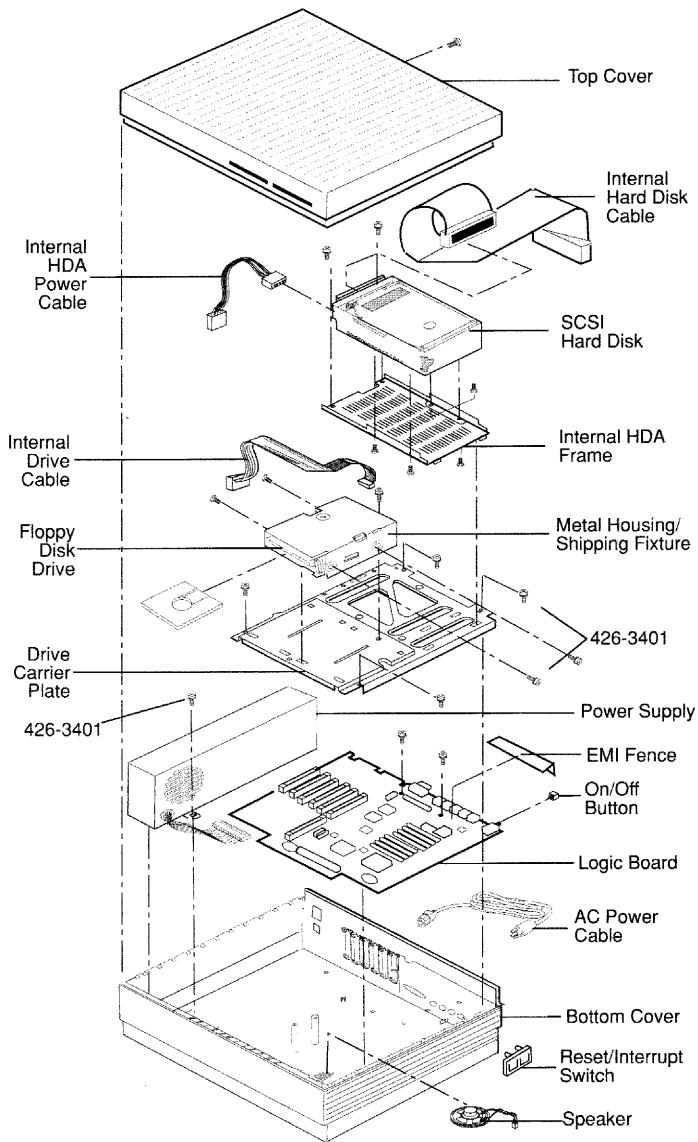
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Macintosh II, IIx, and IIcx

Exploded View



Macintosh II, IIx, and IIcx

Logic Board Identification

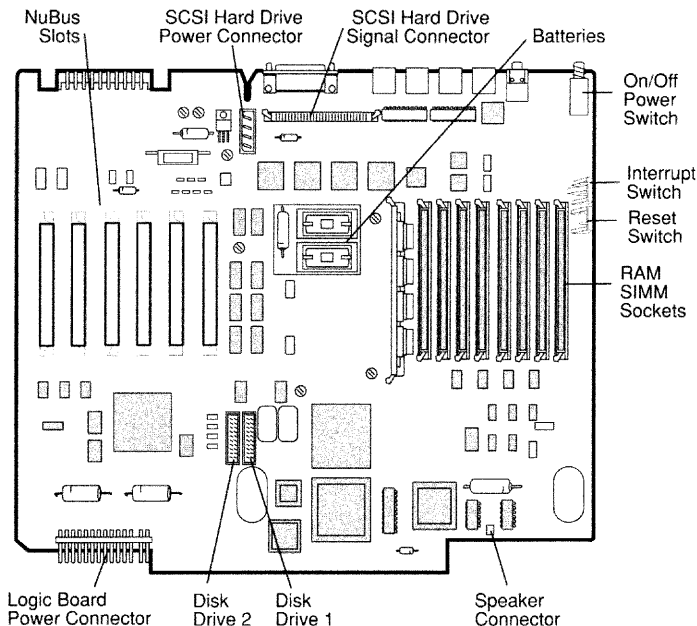


Figure: Macintosh II and IIx Logic Board

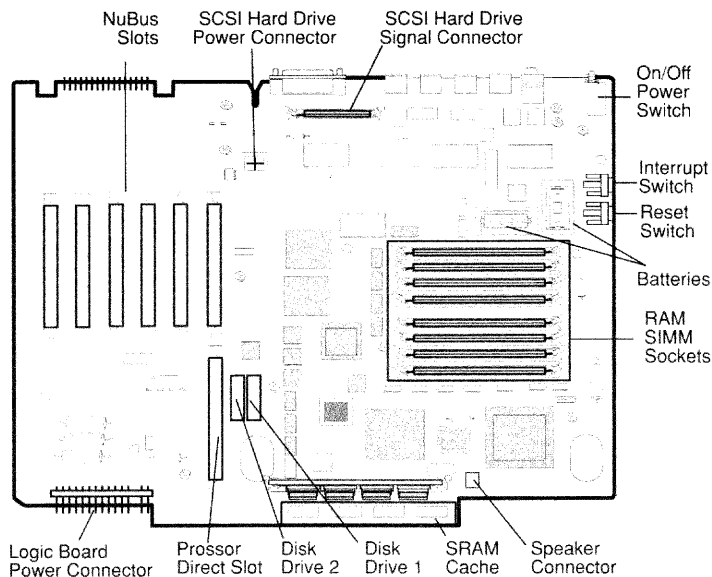


Figure: Macintosh IIcx Logic Board



Macintosh II, IIx, and IIfx

Specifications

Macintosh II Specifications	
Microprocessor	MC68020, 32-bit internal architecture 15.6672 MHz clock speed
Coprocessor	MC68881 floating-point unit (FPU)
Memory	1 MB, expandable to 8 MB (120 ns or faster SIMMs) 256K ROM standard Optional 68851 paged memory management unit (PMMU)
Monitors	Apple High-Resolution Monochrome AppleColor™ High-Resolution RGB Apple Macintosh Portrait Display Apple Two-Page Monochrome
Interfaces	Two RS-232/RS-422 ports SCSI interface (50-pin internal connector and DB-25 external connector) Two Apple Desktop Bus (ADB) ports Six NuBus™ internal slots supporting full 32-bit address and data buses One stereo sound port
Internal Storage	Built-in 3.5-inch, 800K disk drive Optional second 3.5-inch, 800K disk drive 1.4 MB, Apple FDHD SuperDrive upgrade Optional internal Hard Disk 20SC, 40SC, 80SC, 160SC
Sound	Apple custom digital sound chip (ASC), including four-voice wave-table synthesis, stereo sampling generator
Electrical	Line voltage: 90 to 140 volts; 170 to 270 volts, automatically configured Frequency: 48 to 62 Hz Maximum power: 220 watts, not including monitor power

Macintosh II, IIx, and IIx

Specifications



Macintosh IIx Specifications

Microprocessor	MC68030, 32-bit internal architecture 15.6672 MHz clock speed 256 byte instruction and data caches Built-in paged memory management unit (PMMU)
Coprocessor	MC68882 floating-point unit (FPU) 15.6672 MHz clock speed
Memory	1 MB, expandable to 8 MB (100 ns or faster SIMMs) 256K ROM standard
Monitors	Apple High-Resolution Monochrome AppleColor High-Resolution RGB Apple Macintosh Portrait Display Apple Two-Page Monochrome
Interfaces	Two RS-232/RS-422 serial ports SCSI interface (50-pin internal connector and DB-25 external connector) Two Apple Desktop Bus (ADB) ports Six NuBus internal slots supporting full 32-bit address and data buses One stereo sound port
Internal Storage	Built-in 1.4 MB, FDHD SuperDrive Optional second FDHD SuperDrive Optional internal Hard Disk 40SC, 80SC, 160SC
Sound	Apple custom digital sound chip (ASC) provides 8-bit stereo sampling at 44.1 KHz and includes four-voice wave-table synthesis
Electrical	Line voltage: 100-240 VAC, automatically configured Frequency: 48 to 62 Hz Max power: 220 watts, not including monitor power



Macintosh II, IIx, and IIx

Specifications

Macintosh IIx Specifications

Microprocessor	MC68030, 32-bit internal architecture 40 MHz clock speed Built-in paged memory management unit (PMMU) Two 256 byte instruction and data caches
Coprocessor	MC68882 floating-point unit (FPU) 40 MHz clock speed
Static RAM Cache	Built-in zero-wait-state 32K static RAM cache memory architecture
Memory	4 MB of RAM, expandable to 8 MB 80 ns, fast-page mode, 64-pin SIMMs
Parity Support	Installation of optional parity generating chip and parity DRAM (9-chip, 60-ns SIMM) provides parity error detection
Memory Subsystem	Supports overlapping reads from cache/ROM and writes to DRAM
Input/Output Processor Chips	SWIM chip manages the floppy disk drive(s) SCC chip manages the Apple Desktop Bus and serial ports
SCSI/DMA Controller	Standard cell implementation of 53C80 SCSI chip and DMA control logic (the SCSI/DMA chip manages the SCSI bus)
Interfaces	Two RS-232/RS-422 serial ports SCSI interface with direct memory access for faster transfers and compatibility with faster peripherals Processor direct slot (PDS) provides high-speed, 32-bit access to the system bus Six NuBus internal slots supporting full 32-bit address and data buses Two Apple Desktop Bus (ADB) ports Stereo sound jack
Internal Storage	Two 1.4 MB, FDHD SuperDrives Internal Hard Disk 40SC, 80SC, 160SC
Sound	Apple custom digital sound chip (ASC)
Electrical	Line voltage: 100 to 240 VAC Frequency: 48 to 62 Hz Maximum power: 230 watts, not including monitor power

Macintosh II, IIfx, and IIfx

Parts List



800K Mechanism, Apple 3.5 Drive	661-0345
1.4 MB Mechanism, Apple FDHD SuperDrive	661-0474
800K/1.4 MB Drive Parts	
Cable, 3.5 Internal Drive (red or yellow stripe)	590-0188
Internal Drive Shield, 800K (for transporting)	805-0217
Metal Housing/Shipping Fixture (for transporting)	805-5050
Packing Disk, 2-Sided (for transporting 800K Mechanisms)	003-0003
Screw, M 3 x 6, with two washers	462-3401
Bottom Cover Assembly, Macintosh II	630-5227
Bottom Cover Assembly, Macintosh IIfx	630-5494
Bottom Cover Assembly, Macintosh IIfx	630-5806
Reset/Interrupt Switch	815-6024
Speaker	630-5222
Cable, Power AC, smoke	590-0380
Drive Carrier	805-5062
Extended Keyboard	661-0384
Extended Keyboard, French	F661-0384
Extended Keyboard, French Canadian	C661-0384
Extended Keyboard, German	D661-0384
Extended Keyboard, Italian	T661-0384
Extended Keyboard, Spanish	E661-0384
Extended Keyboard Parts	
Alps Locking Keyswitch	970-1263
Bottom Case	815-1019
Key Cap Set	658-7010
Keyboard Cable, 1 meter	590-0361
Keyswitch Set (of 10), ADB Keyboard	076-0209
Top Case	815-1018
HDA, 20 MB, Internal 3.5 SCSI	661-0373
HDA, 20 MB, Internal 3.5 SCSI, Rev. B	661-0612
HDA, 40 MB, Internal 3.5 SCSI	661-0464
HDA, 80 MB, Internal 3.5 SCSI	661-0600
HDA, 80 MB, Int. 3.5 SCSI with A/UX [®] v.1.1 (replaced by 661-0613)	661-0561
HDA, 80 MB, Internal 3.5 SCSI with A/UX, v.2.0	661-0613
HDA, 40 MB, Internal 5.25 SCSI	661-0391
HDA, 80 MB, Internal 5.25 SCSI	661-0411
HDA, 80 MB, Internal 5.25 SCSI with Apple A/UX, v.1.0	661-0457
HDA, 160 MB, Internal 5.25 SCSI	661-0601
HDA Parts	
Cable, Internal Hard Disk	590-0566
Cable, Internal Hard Disk Power, Macintosh II/IIfx	590-0364
Cable, Internal Hard Disk Power (2 x 2 pin), Macintosh IIfx	590-0512
Frame, HDA, Internal, 3.5	805-5066
Frame, HDA, Internal, 5.25	805-5051
Screws, M 3.5 x .6 x 8, PNCRS Rec	462-4100
ISO Keyboard, French	F661-0454
ISO Keyboard, German	D661-0454
ISO Keyboard, Italian	T661-0454
Keyboard, Regular Apple	661-0383
Keyboard, French Canadian	C661-0383
Keyboard, Spanish	E661-0383
Keyboard Parts	
Alps Locking Keyswitch	970-1263



Macintosh II, IIx, and IIfx

Parts List

Bottom Case	815-1017
Key Cap Set	658-7011
Keyboard Cable, 1 meter	590-0361
Keyboard Cable, 2 meter	590-0152
Keyswitch Set (of 10), ADB Keyboard	076-0209
Top Case	815-1016
Logic Board, Macintosh II (w/o RAM; replaces 661-0374)	661-0528
Battery Holder Board	600-0530
IC, IWM	344S0043
IC, SWIM	344S0062
IC, HMMU	343-0002
IC, PMMU	630-8221
IC, ROM, 512K, Low	342-0642*/342-0108
IC, ROM, 512K, Med Low	342-0641*/342-0107
IC, ROM, 512K, Med Hi	342-0640*/342-0106
IC, ROM, 512K, Hi	342-0639*/342-0105
SIMM, 256K, 120 ns	661-0402
SIMM, DIP, 256K, 120 ns	661-0494
SIMM, 1 MB, 120 ns	661-0403
SIMM, DIP, 1 MB, 120 ns	661-0410
Logic Board, Macintosh IIx (w/o RAM; replaces 661-0463)	661-0529
Battery Holder Board	600-0530
SIMM, 256K, 120 ns	661-0402
SIMM, DIP, 256K, 120 ns	661-0494
SIMM, 1 MB, 120 ns	661-0403
SIMM, DIP, 1 MB, 120 ns	661-0410
Logic Board, Macintosh IIfx (w/o RAM)	661-0522
Battery Holder Cover	520-0344
Internal SCSI Termination Block	590-4515
Internal SCSI Filter	590-4516
SIMM, 1 MB, SOJ, 80 ns, 64 pin	661-0548
Logic Board, Parity, Macintosh IIfx (w/o RAM)	661-0592
Battery Holder Cover	520-0344
SIMM, 1 MB, SOJ, 60 ns, 64 pin, Parity	661-0549
Logic Board Parts	
EMI Fence	805-5070
Lithium Battery (w/o leads; replaces 742-0009)	742-0011
On/Off Button	815-6237
Screws (logic board mounting)	462-4100
Mouse, Apple Desktop Bus	661-0338
Mouse Ball (25.4 mm dia)	699-8001
Mouse Ball (21.9 mm dia)	699-8038
Retainer, ADB Mouse (38 mm dia)	076-0231
Retainer, ADB Mouse (34 mm dia)	815-0816
Mouse, ADB (replaces 661-0338)	661-0479
Mouse Ball (for 661-0479)	815-1135
Retainer, ADB Mouse (for 661-0479)	815-1136
Power Supply, Macintosh II/IIx	661-0375
Power Supply, Macintosh IIfx	661-0542
Top Cover and Latch Assembly	630-5229

*Included in the 1.4 FDHD SuperDrive Mechanism Upgrade

Macintosh II, IIfx, and IIfx

Symptom/Cure Chart



System Problems

Solutions

Does not power on, screen is black, fan is not running, and LED is not lit

1. Check cables.
2. Plug monitor directly into wall socket, and verify that monitor has power.
3. Replace power cord.
4. Check batteries.
5. Replace power supply.
6. Replace logic board only.

Clicking, chirping, or thumping sound

1. Replace power supply.
2. Replace logic board only.

System shuts down intermittently

1. Check that air vents on sides and top of main unit are clear. Thermal protection circuitry may shut system down. After 30 to 40 minutes, system should be OK.
2. Replace power cord.
3. Check batteries.
4. Replace power supply.
5. Replace logic board only.

System intermittently crashes or locks up

1. Make sure correct version of system software is being used.
2. Make sure all software is known-good.
3. Replace SIMMs.
4. Replace logic board.
5. Replace power supply.

Screen is black, fan is not running, and LED is not lit

1. Plug monitor directly into wall socket, and verify that monitor has power.
2. Check batteries.
3. Replace power supply.
4. Replace logic board only.

Video Problems

Solutions

Screen is black, audio and drive operate, fan is running, and LED is lit

1. Adjust brightness on monitor.
2. Replace monitor.
3. Replace video cable.
4. Move video card to different slot.
5. Replace video card.
6. Replace SIMMs.
7. Replace logic board.
8. Replace power supply.

Partial or whole screen is bright and audio is present, but no video information is visible

1. Replace monitor.
2. Replace video cable.
3. Move video card to different slot.
4. Replace video card.
5. Replace logic board only.



Macintosh II, IIx, and IIcx

Symptom/Cure Chart

Video Problems (continued)

Solutions

Screen is black, audio and drive do not operate, but fan is running and LED is lit

1. Replace video cable.
2. Move video card to different slot.
3. Replace video card.
4. Replace SIMMs.
5. Replace logic board.
6. Replace power supply.
7. Replace monitor.

Screen is completely dark, fan is not running, and LED is not lit

1. Plug monitor directly into wall socket and verify that monitor has power.
2. Check batteries.
3. Replace power supply.
4. Replace logic board only.

Disk Drive Problems

Solutions

Internal disk drive runs continuously

1. Replace bad disk.
2. Replace internal disk drive cable.
3. Replace internal disk drive.
4. Replace logic board only.

Audio and video are present, but one internal drive does not operate

1. Replace bad disk.
2. Verify that all external SCSI devices are disconnected.
3. Replace internal disk drive cable.
4. Replace internal disk drive.
5. Replace logic board only.
6. Replace power supply.

Audio and video are present, but neither internal drive operates

1. Replace bad disk.
2. Verify that all external SCSI devices are disconnected.
3. Replace power supply.
4. Replace logic board only.

Disk ejects; icon with blinking "X" displays

1. Replace disk with known-good system disk.
2. Replace internal disk drive cable.
3. Replace internal disk drive.
4. Replace logic board only.

Will not eject disk

1. Switch power off and hold mouse button down while switching power back on.
2. Eject disk manually by pushing opened paper clip into hole beside drive slot.
3. Replace internal disk drive.

MS-DOS drive does not recognize disk formatted on 1.4 MB FDHD SuperDrive

- Reformat disk using MS-DOS™ drive.

Macintosh II, IIx, and IIfx

Symptom/Cure Chart



Attempts to eject disk but doesn't

1. Reinsert disk.
2. Reseat top cover so drive slots line up correctly.
3. Try ejecting disk manually by pushing opened paper clip into hole beside drive slot.
4. Replace internal disk drive.

SCSI Drive Problems

Solutions

Internal hard disk will not operate, LED does not light, drive does not spin-up

1. Replace SCSI signal cable.
2. Replace SCSI power cable.
3. Replace hard disk.
4. Replace logic board only.

Drive does not appear on desktop

- If Macintosh IIfx, there may be SCSI termination problem. **Refer to Macintosh IIfx—SCSI Termination** to verify that computer is properly terminated.

Works with internal or external SCSI device but will not work with both

1. Check SCSI device switch setting on external device. Make sure setting isn't 0 (internal hard drive address) or 7 (CPU address).
2. If Macintosh IIfx, there may be SCSI termination problem. **Refer to Macintosh IIfx—SCSI Termination** to verify that computer is properly terminated.
3. Replace SCSI terminator on external device.
4. Verify that terminator is installed on internal SCSI drive.
5. Refer to *SCSI Hard Disk Drive Technical Procedures* for troubleshooting external drive.

Peripheral Problems

Solutions

Cursor does not move

1. Check mouse connection.
2. Clean mouse, if necessary.
3. If mouse was connected to keyboard, connect it to rear ADB port. If mouse works, replace keyboard.
4. If mouse does not work in any ADB port, replace mouse.
5. Replace logic board only.

Cursor moves but clicking mouse button has no effect

1. Replace mouse.
2. Replace logic board only.

No response to any key on keyboard

1. Check keyboard connection to ADB port.
2. Replace keyboard cable.
3. Replace keyboard.
4. Replace logic board only.



Macintosh II, IIx, and IIfx

Symptom/Cure Chart

Peripheral Problems (continued)

Solutions

Cannot double-click
to open application,
disk, or server

1. Remove any multiple system files on hard disk.
2. Clear parameter RAM. Hold down **<Shift>** **<Option>** **<Command>** keys and select Control Panel from Apple pull-down menu. Reset mouse controls.
3. If mouse was connected to keyboard, connect it to rear ADB port. If mouse works, replace keyboard.
4. If mouse does not work in any ADB port, replace mouse.
5. Replace logic board only.

Known-good
ImageWriter or
ImageWriter II
will not print

1. Make sure correct version of system software is being used.
2. Make sure that Chooser and Control Panel are set correctly.
3. Replace printer interface cable.
4. Replace logic board only.

Known-good
LaserWriter
will not print

1. Make sure correct version of system software is being used.
2. Make sure that Chooser and Control Panel are set correctly.
3. Refer to Networks tab in *Apple Service Technical Procedures*.

Miscellaneous Problems

Solutions

No sound from
speaker

1. Verify that volume setting in Control Panel is set to 1 or above.
2. Replace speaker.
3. Replace logic board only.

HMMU socket
does not allow
PMMU installation

- Replace logic board. Verify that socket is 13 x 13 grid array package and that it contains 132 gold contacts inside socket. (Sockets containing 70 pins do not support PMMU.)

Macintosh II, IIx, and IIx

Memory Upgrades



Macintosh II and IIx Memory Upgrades

The Macintosh II and IIx require 120-ns (or faster) SIMMs. The 150-ns SIMMs will cause serious timing problems. All SIMMs in each bank must be the same size. Mitsubishi 1 MB SIMMs for the Macintosh IIx, which are labeled "For 030 Systems Only," should be used only in systems with 68030 microprocessors.

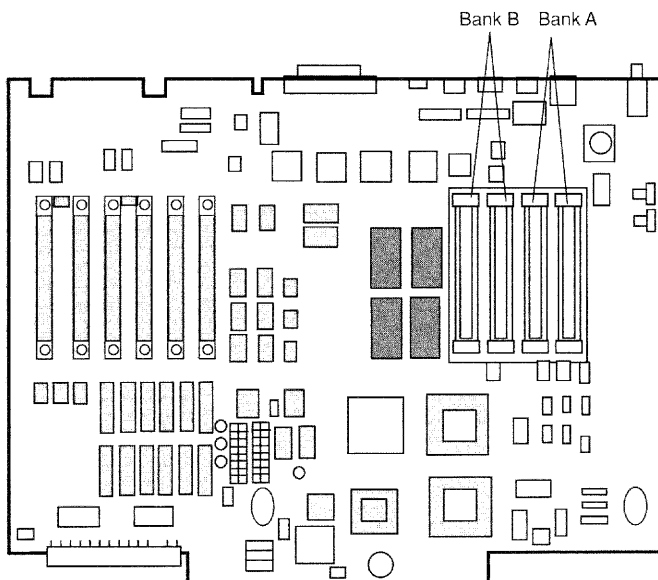


Figure: Macintosh II and IIx Logic Board

Size	Bank A	Bank B
1 MB	4—256K SIMMs	Empty
2 MB	4—256K SIMMs	4—256K SIMMs
4 MB	4—1 MB SIMMs	Empty
5 MB	4—1 MB SIMMs	4—256K SIMMs
8 MB	4—1 MB SIMMs	4—1 MB SIMMs



Macintosh II, IIx, and IIfx

Macintosh II PMMU Upgrade

Macintosh IIfx Memory Upgrade

The Macintosh IIfx requires 80-ns (or faster) SIMMs in systems without the parity checking option, 60-ns (or faster) SIMMs in systems with parity checking. LaserWriter II SIMMs cannot be used in the Macintosh IIfx.

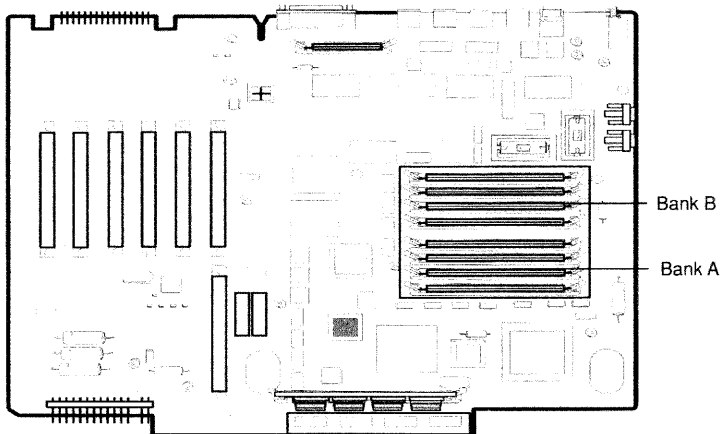


Figure: Macintosh IIfx Logic Board

Size	Bank A	Bank B
4 MB	4 — 1 MB SIMMs	Empty
8 MB	4 — 1 MB SIMMs	4 — 1 MB SIMMs

Macintosh II PMMU Upgrade Procedure

1. Remove the Macintosh II top cover and drive mount.
2. Locate the HMMU chip on the Macintosh II logic board.
3. Using a small flat-blade screwdriver, gently pry up the sides of the chip to remove the HMMU from the socket.
4. Position the PMMU so that the line on its surface is pointing toward the speaker at the lower-right corner of the logic board.
5. Line up the pins in the socket and gently press the PMMU into the socket.
6. Replace the Macintosh II drive mount and top cover.

Macintosh II, IIfx, and IIfx

Macintosh II FDHD SuperDrive Upgrade



The system software must be version 6.0.2 or higher to use the 1.4 MB FDHD SuperDrive. If the software is lower than 6.0, the drive will be recognized as an 800K mechanism.

Upgrade Procedure

1. Place the Macintosh II on the grounded workbench pad and put on your grounding wriststrap.
2. Remove the top cover, video card (and any other cards installed), and the drive mount.
3. Using an IC extractor, remove the four ROMs at locations C13, C12, E13, and E12 on the logic board (**see Figure**).
4. Use the following chart to install the four revised 512K ROMs. The notch at the end of each ROM should face the front of the logic board.

<u>ROM</u>	<u>P/N</u>	<u>Location</u>
HI	342-0639	C13
MED HI	342-0640	C12
MED LO	342-0641	E13
LO	342-0642	E12

5. Using the IWM/SWIM extractor (**see Special Tools Index in the General Information section**), remove the IWM chip at location I10 on the logic board.
6. Position the SWIM chip over location I10 so that the beveled edge with the dot is facing the white dot on the logic board beside the socket.
7. Line up the pins in the socket and gently press straight down on the SWIM chip until it is seated in the socket.
8. Install the 1.4 MB FDHD SuperDrive onto the drive mount on drive 1 or drive 2.
9. Replace the drive mount, the video card (and any other cards that you removed), and the top cover.
10. Place the 1.4 MB and 800K labels in the appropriate positions on the front of the Macintosh II.

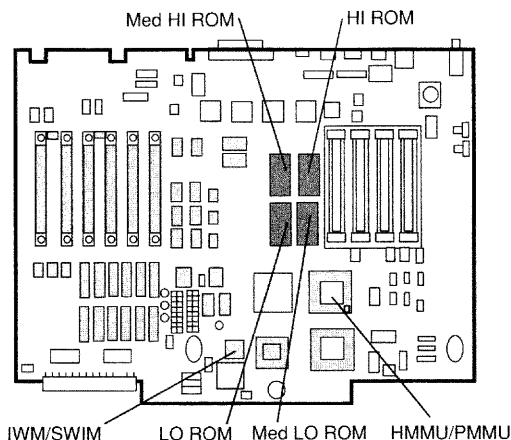


Figure: Macintosh II Logic Board



Macintosh II, IIx, and IIcx

Macintosh IIcx—SCSI Termination

The Macintosh IIcx is able to transfer data to and from SCSI devices much faster than earlier Macintosh computers. This increased data transfer rate has made it necessary to modify the termination characteristics of the SCSI interface. Three new parts are used to implement these SCSI termination changes:

- Apple SCSI Cable Terminator II
- Internal SCSI Termination Block
- Internal SCSI Filter

Apple SCSI Cable Terminator II

SCSI Cable Terminator II must be installed to provide proper termination when one or more external SCSI devices are attached to a Macintosh IIcx. Rules for using and installing Terminator II are the same as those for the original SCSI terminator. To help you tell these devices apart, the plastic on the Terminator II is black, whereas the plastic on the original terminator is blue.



CAUTION: Never connect more than one Cable Terminator II on a SCSI daisy-chain. Connecting more than one terminator can damage the Macintosh IIcx.

Internal SCSI Termination Block

The termination block must be installed to provide internal SCSI termination for systems **without** an internal SCSI hard drive. Apple installs this termination block (and the internal SCSI filter) at the logic board SCSI connector on all Macintosh IIcx systems shipped without internal SCSI drives (**see Figure**). The termination block must be removed when an internal SCSI drive is added to the system.

Internal SCSI Filter

The SCSI filter must be installed to provide the proper termination capacitance for third-party drives and for Apple internal drives shipped before 3/19/90. When a SCSI drive is added to a Macintosh IIcx that had no SCSI drives installed, **the SCSI filter must be removed from the Macintosh IIcx logic board and connected to the drive.**

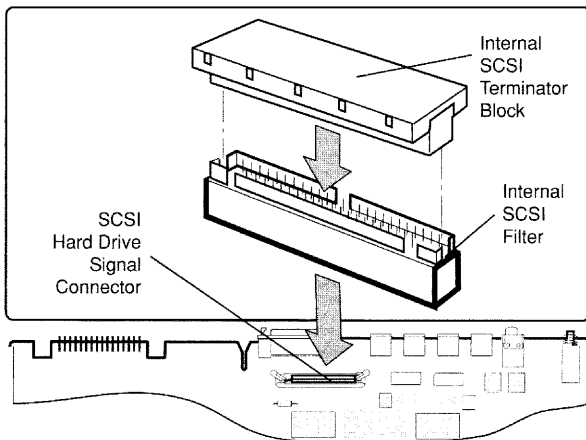


Figure: Macintosh IIcx Without Internal SCSI Drive