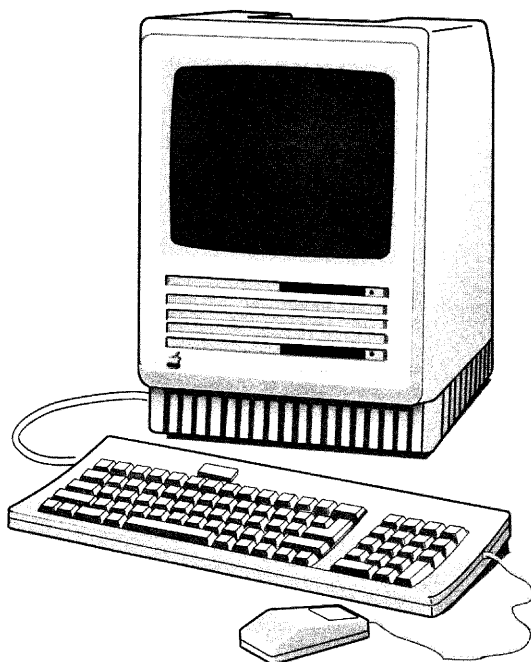


Macintosh SE and Macintosh SE/30

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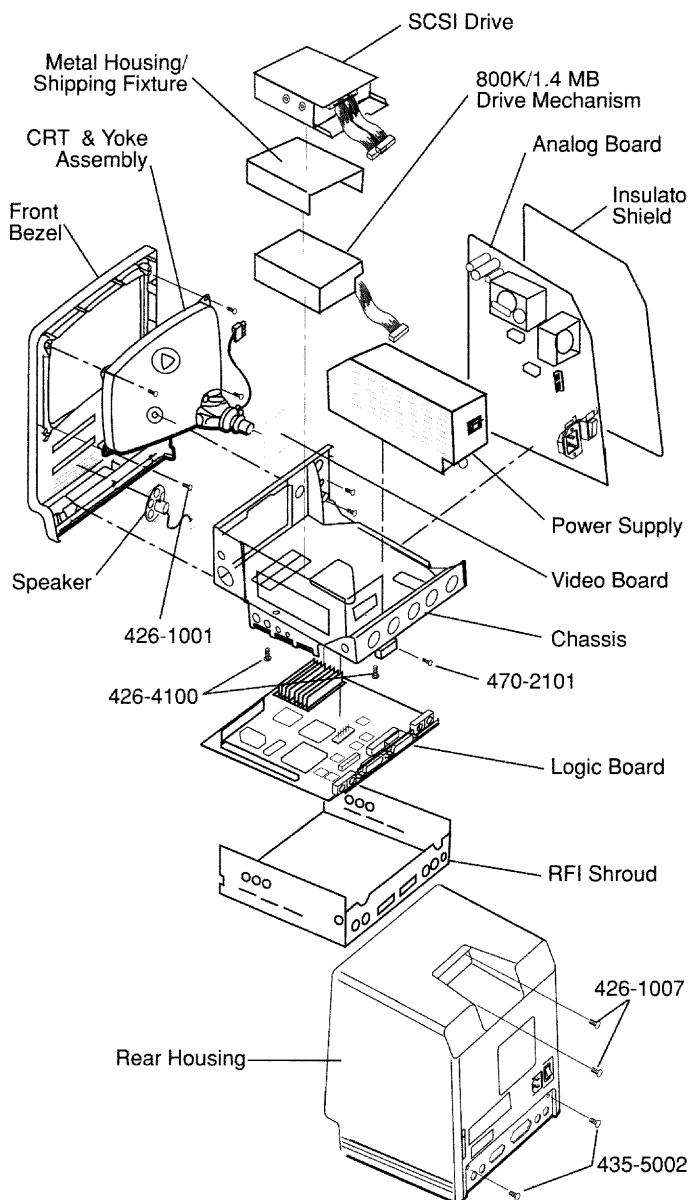
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Macintosh SE and Macintosh SE/30

Exploded View



Macintosh SE and Macintosh SE/30

Logic Board Identification

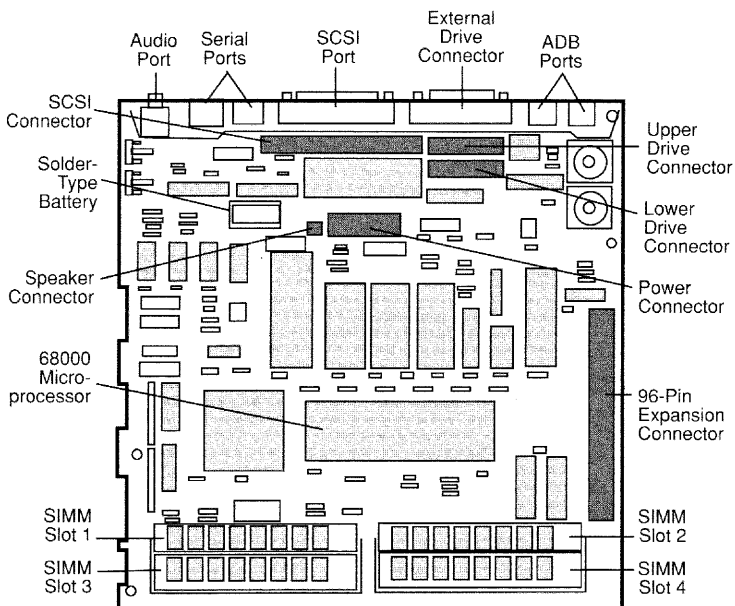


Figure: Macintosh SE Logic Board

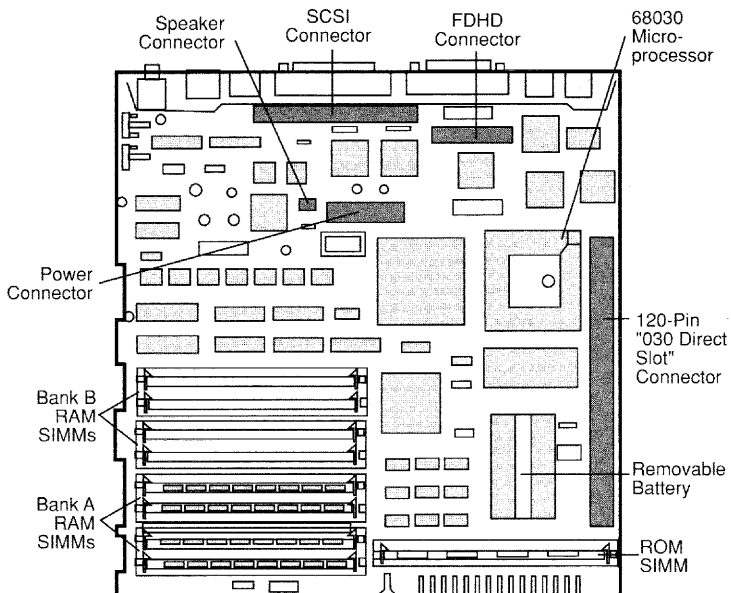


Figure: Macintosh SE/30 Logic Board



Macintosh SE and Macintosh SE/30 Specifications

Macintosh SE Specifications

Microprocessor	MC68000 32-bit internal architecture 7.83 MHz clock frequency
Memory	1 or 2 MB of RAM, expandable to 4 MB 256K of ROM 256 bytes of parameter memory
Video Display	Built-in 9-inch diagonal, high-resolution, 512- by 342-pixel, bit-mapped display
Interfaces	Two Apple Desktop Bus™ (ADB) ports Two RS-232/RS-422 serial ports SCSI interface One DB-19 external disk drive port Macintosh SE internal expansion slot One sound port
Internal Storage	One 1.4 MB, FDHD™ SuperDrive™ (800K drive in older versions of the SE) Optional second FDHD SuperDrive (800K drive in older versions of the SE) Optional internal Hard Disk 20SC, 40SC
Sound	Four-voice sound with 8-bit digital/analog conversion using 22-KHz sampling rate
Clock/Calendar	CMOS custom chip with seven-year battery
Electrical	Line voltage: 90 to 140 VAC; 170 to 270 VAC Frequency: 47 to 63 Hz Maximum power: 100 watts

Macintosh SE and Macintosh SE/30

Specifications



Macintosh SE/30 Specifications

Microprocessor	MC68030 32-bit internal architecture 15.667 MHz clock frequency Built-in paged memory management unit (PMMU) 256 byte instruction and data caches
Coprocessor	MC68882 floating-point unit
Memory	1 or 4 MB of RAM, expandable to 8 MB 256K of ROM 256 bytes of user-settable parameter memory
Video Display	Built-in 9-inch diagonal, high-resolution, 512- by 342-pixel, bit-mapped display Color QuickDraw™ in ROM provides support for grayscale and color video cards installed in the 030 direct slot
Interfaces	Two Apple Desktop Bus (ADB) ports Two RS-232/RS-422 serial ports SCSI interface 030 direct slot supporting full 32-bit address and data lines through 120-pin Euro-DIN connector Stereo sound port for external audio amplifier One DB-19 external disk drive port
Internal Storage	One 1.4 MB, FDHD SuperDrive Optional internal Hard Disk 40SC, 80SC
Sound	Apple sound chip including four-voice, wave-table synthesis and stereo sampling generator Mixed stereo monophonic sound output through internal speaker
Clock/Calendar	CMOS custom chip with long-life battery
Electrical	Line voltage: 120 to 240 VAC, RMS automatically configured Frequency: 48 to 62 Hz, single phase Maximum power: 75 watts



Macintosh SE and Macintosh SE/30

Parts List

800K Mechanism, Apple 3.5 Drive	661-0345
1.4 MB Mechanism, Apple 3.5 Drive	661-0474
Disk Drive Parts	
Back Plate, Drive 2	805-0914
Cable, 3.5 Internal Drive (red or yellow stripe)	590-0188
Cable, 3.5 Internal Drive (yellow stripe)	590-0437
Metal Housing/Shipping Fixture	805-5050
Packing Disk, 2-sided (for transporting)	003-0003
Screw, M 3.5 x .6 x 8, PNCR Rec	462-4100
Screw, M 3 x 6, with two washers	462-3401
Service Packaging, 800K/1.4 MB Drive	602-0210
Analog Board, Macintosh SE & SE/30	661-0371
Brightness Knob	865-0047
Fan Kit	076-0311
Fastener, Snap-in Plastic	830-0240
Insulator, Analog Board	725-0020
Lower Ground Clip	805-0576
Screw, M 3 x 5 x 10 PNCR	416-1310
Screw, M 3 x .5 x 6	462-3100
Screw, M 2.9 x 10	470-2101
Washer, Lock, Internal Tooth	860-0282
Cable, Power AC	590-0380
Chassis, Macintosh SE and SE/30	805-0938
Bracket, Macintosh SE and SE/30	805-0939
Screw, M 2.9 x 10	470-2101
CRT and Yoke Assembly	076-0103
Ferrite Bead, Clamp-on	159-0061
Screw, Tap, M 4.22 x 1.41 x 16, Pan, Torx, Zinc (CRT & Chassis)	426-1001
Extended Keyboard	661-0384
Extended Keyboard, French	F661-0384
Extended Keyboard, Fr Canadian	C661-0384
Extended Keyboard, German	D661-0384
Extended Keyboard, Italian	T661-0384
Extended Keyboard, Spanish	E661-0384
Extended Keyboard Parts	
Alps Locking Keypswitch	970-1263
Bottom Case	815-1019
Key Cap Set	658-7010
Keyboard Cable, 1 meter	590-0361
Keypswitch Set (of 10), ADB Keyboard	076-0209
Top Case	815-1018
Front Bezel with Speaker, Slot Cover, Macintosh SE (800K)	810-0399
Front Bezel with Speaker, Slot Cover, Macintosh SE (FDHD)	810-0422
Front Bezel with Speaker, Macintosh SE/30 (800K)	630-5499
Logo Plate Label, Macintosh SE & SE/30	825-1256
Slot Cover Bezel, Macintosh SE	630-5330
Slot Cover Retainer, Macintosh SE	805-0908
Speaker	600-0393
HDA, 20 MB, Internal 3.5 SCSI	661-0373
HDA, 40 MB, Internal 3.5 SCSI	661-0464
HDA, 80 MB, Internal 3.5 SCSI	661-0600
Cable, HDA I/O	590-0211
Cable, HDA LED (red)	590-0237



Cable, Internal Power, HDA	590-0505
Frame, HDA, Internal, 3.5 SCSI	805-5066
Service Packaging, 3.5 HDA	602-0164
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
Case Bottom	815-1017
Key Cap Set	658-7011
Keyboard Cable, 1 meter	590-0361
Keyswitch Set (of 10), ADB Keyboard	076-0209
Top Case	815-1016
Logic Board, Macintosh SE (replaced by 661-0526)	661-0369
Logic Board, Macintosh SE (rev., replaced by 661-0526)	661-0490
Logic Board, Macintosh SE 800K (w/o RAM)	661-0526
Lithium Battery (with Leads)	742-0009
Lithium Battery (w/o Leads)	742-0010
IC, ROM, HI	342-0701
IC, ROM, LOW	342-0702
IC, SWIM	344-0062
Resistor, 150 Ohms, .25W, $\pm 5\%$	101-4151
SIMM, 256K, 120 ns	661-0402
SIMM, 1 MB, 120 ns	661-0403
SIMM, DIP, 256K	661-0494
SIMM, DIP, 1 MB	661-0410
Shroud, RFI, Macintosh SE	805-5060
Logic Board, Macintosh SE/30 (replaced by 661-0527)	661-0510
Logic Board, Macintosh SE/30 (w/o RAM)	661-0527
Logic Board, Macintosh SE (FDHD) (w/o RAM)	661-0536
Battery Holder Cover	520-0344
Lithium Battery (w/o Leads)	742-0011
SIMM, 256K, 120 ns	661-0402
SIMM, 1 MB, 120 ns	661-0403
SIMM, DIP, 256K, 120 ns	661-0494
SIMM, DIP, 1 MB, 120 ns	661-0410
Shroud, RFI, Macintosh SE	805-5060
Shroud, RFI, Macintosh SE/30	805-0969
Cable, Logic Board Power Interconnect	590-0392
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 (replacing 661-0338).	661-0479
Mouse Ball (for 661-0479)	815-1135
Retainer, ADB Mouse (for 661-0479)	815-1136
Power Supply, Macintosh SE and SE/30	661-0370
Rear Housing Assembly with Door and Feet	630-5271
Agency Approval Label, Macintosh SE	825-2021



Macintosh SE and Macintosh SE/30 Adjustments & Symptom/Cure Chart

Agency Approval Label, Macintosh SE/30	825-2043
Audio Extension Cable	590-0612
Foot, Platinum	865-0051
Rear Housing Door	815-0986
Reset/Interrupt Switch	815-1008
Screw, Tap, 8-32 x .625, Fill, Torx, Black Zinc Oxide (Main Case)	435-5002
Screw, Tap, M 4.22 x 1.41 x 16, Pan, Torx, Zinc (Main Case)	426-1007
Upper Ground Clip	805-0575
Video Board, Vertical Macintosh SE & SE/30	982-0024

Yoke and Video Adjustments

Although the exact location of the adjustment controls differs slightly, the procedures for performing yoke and video adjustments are the same on the Macintosh SE and SE/30 and on the Macintosh and Macintosh Plus. **Refer to the Macintosh and Macintosh Plus tab for these adjustment procedures.**

Macintosh SE and SE/30 Symptom/Cure Chart

Video Problems	Solutions
Screen is dark; audio and drive operate	1. Turn brightness control clockwise. 2. Check video cable. 3. Replace analog board. 4. Replace video board. 5. Replace logic board. 6. Replace CRT.
Screen is bright and audio is present but no video informaton is visible	1. Replace analog board. 2. Replace video board. 3. Replace logic board.
Screen is completely dark and fan is not running	1. Replace power supply. 2. Replace analog board.
A single vertical/ horizontal line is displayed	1. Replace analog board. 2. Replace video board. 3. Replace logic board. 4. Replace CRT.
Vertical/horizontal bars or stripes are displayed	1. Replace logic board. 2. Replace analog board.
A white dot is displayed in center of screen	1. Check yoke cable. 2. Replace analog board. 3. Replace CRT.



Screen jitters at top left and/or lower right

- Replace analog board.

Peripheral Problems Solutions

Cursor does not move

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

Cursor moves but clicking the mouse button has no effect

1. Replace mouse.
2. Replace logic board.

No response to any key on the keyboard

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

Cannot double-click to open a disk, application, 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 the Apple pull-down menu. Reset mouse controls.
3. If mouse was connected to a keyboard, connect it to a rear ADB port. If mouse works, replace keyboard.
4. If mouse does not work in any ADB port, replace mouse.
5. Replace logic board.

Known-good ImageWriter, or ImageWriter II will not print

1. Make sure the Chooser and Control Panel are set correctly.
2. Replace software with known-good software.
3. Replace printer interface cable.
4. Replace logic board.

Known-good LaserWriter will not print

1. Make sure the Chooser and Control Panel are set correctly.
2. Replace software with known-good software.
3. Refer to the Networks tab in the *Apple Service Technical Procedures*.



Macintosh SE and Macintosh SE/30

Symptom/Cure Chart

Drive Problems

Solutions

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

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

Audio and video are present, but neither internal drive operates (Macintosh SE only)

1. Replace bad disk.
2. Replace logic board.

External drive does not operate

1. Replace bad disk.
2. Be sure external drive is placed on the right side of the Macintosh.
3. Replace external drive.
4. Replace logic board.

Will not eject disk

1. Eject disk manually by pushing an opened paper clip into hole beside drive.
2. Power off system and hold mouse button down while powering back on (to complete eject cycle).
3. Replace disk drive.

Disk ejects; display shows icon with blinking "X"

1. Replace disk with known-good system disk.
2. Replace disk drive.
3. Replace logic board.

Unable to insert disk all the way

1. Eject disk manually by pushing an opened paper clip into hole beside the drive.
2. Power off system and hold mouse button down while powering back on (to complete eject cycle).
3. Replace disk drive.

Internal disk drive runs continuously

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

SCSI Problems

Solutions

Internal or external hard disk will not operate

1. Verify that SCSI loopback card is not attached.
2. Replace hard disk.
3. Replace logic board.
4. Replace hard disk drive cable.



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

1. Check SCSI device switch setting on the external device.
2. Replace terminator on the external device.
3. Verify that terminator is installed on the internal SCSI drive.
4. Replace SCSI device select cable.

Miscellaneous Problems

Solutions

Clicking, chirping or thumping sound

1. Verify analog board cable is connected at J12 on logic board.
2. Replace power supply.
3. Replace analog board.
4. Replace logic board.

Smoke/odor

1. Replace power supply.
2. Replace analog board.

No video, no audio and no drive operation

1. Connect power cord.
2. Turn power on.
3. Replace power cord.
4. Replace power supply.
5. Replace analog board.
6. Replace logic board.

"Sad Macintosh" icon

1. Replace bad floppy disk.
2. Replace SIMM(s) if code matches any of those in SIMM Error Codes chart (see next page).
3. Verify that three-pin jumper on logic board is configured correctly for system RAM (Macintosh SE only).
4. Replace logic board.

"Sad Macintosh" icon and black line are displayed; screeching sound

1. Verify that three-pin jumper on logic board is configured correctly for system RAM (Macintosh SE only).
2. Replace logic board.



Macintosh SE and Macintosh SE/30

Macintosh SE SIMM Error Codes

When the Macintosh SE is powered on, the ROM runs a series of logic board tests. If any of the tests fails, a "Sad Macintosh" icon and a two-row, eight-digit error code is displayed. Error codes indicating SIMM failures are shown in the table below. Identify the SIMM socket number for the type of logic board in the customer's computer and replace the bad SIMM.

Note: Paired XXs in the error codes indicate any number except 0. If the error code is unreadable, press the reset switch and watch carefully—the error code will be displayed briefly. If still unreadable, try replacing SIMMs.

Macintosh SE SIMM Error Codes

Error Code	SIMM # Solder Type ¹	SIMM # Jumper Type ²	Error Code	SIMM # Solder Type ¹	SIMM # Jumper Type ²
0000000E 000000XX	1	3	00000003 0000XX00	2	4
0000000E 00XX00XX	1	3	00000003 XX00XX00	2	4
0000000E XX00XX00	2	4	00000004 000000XX	3	1
0000000E XX00XX00	2	4	00000004 00XX00XX	3	1
00000002 000000XX	1	3	00000004 0000XX00	4	2
00000002 00XX00XX	1	3	00000004 XX00XX00	4	2
00000002 0000XX00	2	4	00000005 000000XX	3	1
00000002 XX00XX00	2	4	00000005 00XX00XX	3	1
00000003 000000XX	1	3	00000005 0000XX00	4	2
00000003 00XX00XX	1	3	00000005 XX00XX00	4	2

¹The Macintosh SE uses both solder-type and jumper-type logic boards. To correctly locate the SIMM socket with the faulty SIMM, first identify the type of logic board in your customer's computer. This column refers to solder-type boards.

² This column refers to Macintosh SE computers with jumper-type logic boards.



Two logic boards are available for the Macintosh SE. The original logic board uses solder-type resistors to identify system memory configurations; the revised logic board uses a jumper to identify system memory. Also note that memory configurations requiring only two SIMMs use SIMM slots 1 and 2 on the original board, but use slots 3 and 4 on the revised board. The Macintosh SE requires 150-ns (or faster) SIMMs (indicated by the -xx number after the manufacturer's part number).

Upgrade Procedure (Solder-Type Resistors)

1. Clip or install the needed resistor (see the chart and figure below).
2. Install the SIMMs as indicated in the chart below.

RAM	Resistors	SIMMs
1 MB	R35 installed R36 removed	4—256K SIMMs
2 MB	R35 removed R36 installed	2—1 MB SIMMs (slots 1 & 2)
2.5 MB	No resistors	2—1 MB SIMMs (slots 1 & 2) 2—256K SIMMs (slots 3 & 4)
4 MB	No resistors	4—1 MB SIMMs

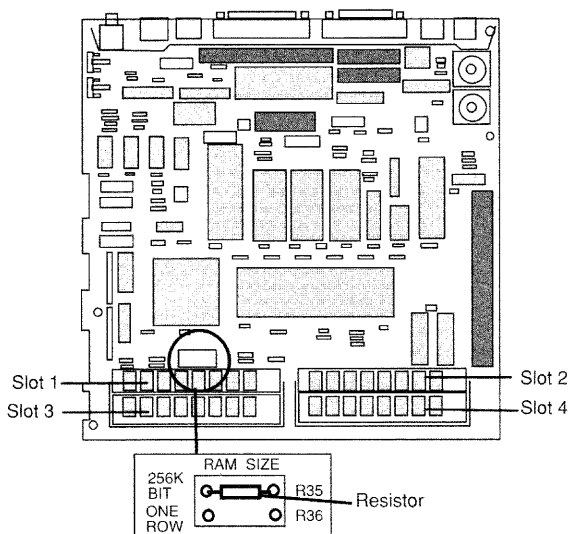


Figure: Macintosh SE Solder-Type Logic Board



Macintosh SE and Macintosh SE/30

Macintosh SE Memory Upgrade

Upgrade Procedure (Jumper-Type Resistors)

1. Move the jumper to the appropriate pins, or remove it altogether (**refer to the chart and figure below**).
2. Install the SIMMs as shown below.

RAM	Jumpers	SIMMs
1 MB		4—256K SIMMs
2 MB		2—1 MB SIMMs (slots 3 & 4)
2.5 MB		2—1 MB SIMMs (slots 3 & 4) 2—256K SIMMs (slots 1 & 2)
4 MB		4—1 MB SIMMs

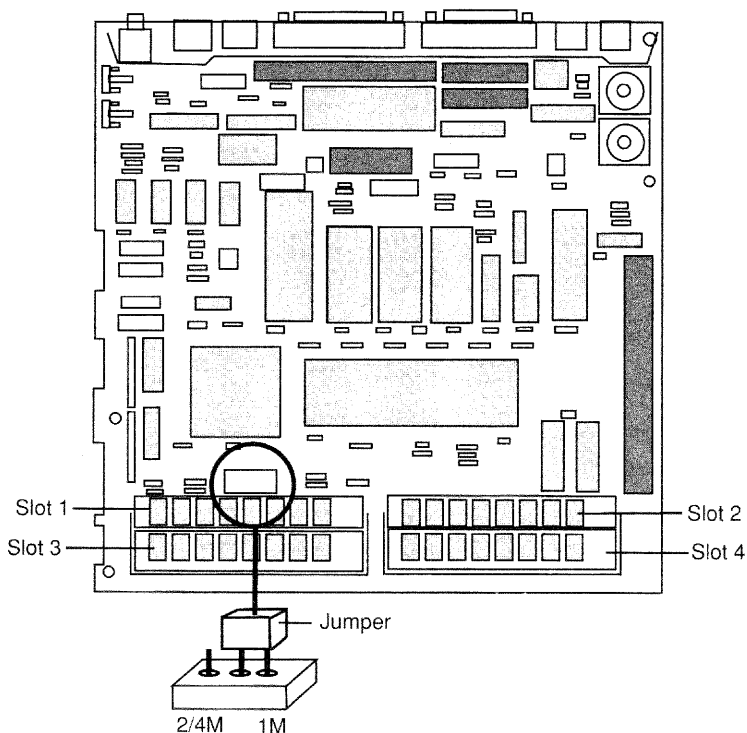


Figure: Macintosh SE Jumper-Type Logic Board

Macintosh SE and Macintosh SE/30

Macintosh SE/30 Memory Upgrade



The Macintosh SE/30 requires 120-ns (or faster) SIMM modules. Using 150-ns SIMMs will cause serious timing problems. Oversized 256K and 1 MB DIP SIMMs should be installed in Bank A only. All SIMMs in each bank must be the same memory size.

SIZE	BANK A	BANK B
2 MB	4—256K SIMMs	4—256K SIMMs
4 MB	4—1 MB SIMMs	
5 MB	4—1 MB SIMMs	4—256K SIMMs
8 MB	4—1 MB SIMMs	4—1 MB SIMMs

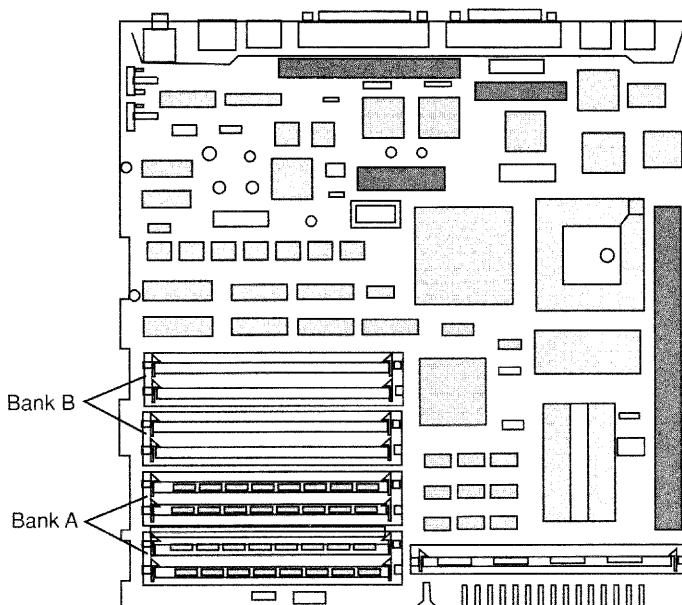


Figure: Macintosh SE/30 Logic Board



Macintosh SE and Macintosh SE/30

Macintosh SE FDHD Upgrade

Using the FDHD SuperDrive in the Macintosh SE requires using System software version 6.0.3 or higher. If the software is lower than 6.0.2, the SuperDrive will be recognized as an 800K mechanism.

Macintosh SE FDHD Upgrade

1. Remove the cover and discharge the CRT.
2. Place the Macintosh SE on the grounded workbench pad and put on your grounding wriststrap.
3. Remove the video board, the SCSI hard disk drive or upper 800K disk drive, the main logic board, and the lower 800K disk drive.
4. Using the IC extractor, remove the IWM chip at location D8 and the two ROM chips at locations D6 and D7 on the main logic board.
5. Install the SWIM chip and the two new ROMs as indicated in the following chart. The notch at the end of the SWIM chip and each ROM should face the front of the logic board (toward the SIMMs).

<u>ROM</u>	<u>P/N</u>	<u>Location</u>
SWIM	344-0062	D8
HI	342-0701	D6
LO	342-0702	D7

6. Install the FDHD SuperDrive in the lower internal drive.
7. Replace the main logic board; the SCSI hard disk, upper 800K disk drive, or second FDHD SuperDrive; the video board; and the cover.
8. Place the appropriate 1.4 MB and 800K labels in the grooves next to the upper and lower disk drive slots on the front bezel of the Macintosh SE.

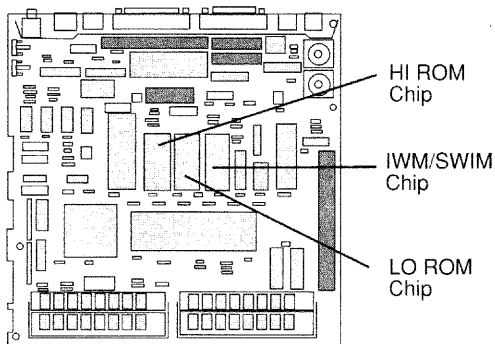


Figure: Macintosh SE Logic Board