■ NewLife-1™ ■

Memory/SCSI Upgrade

Installation Manual

NEWBRIDGE

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MICROSYSTEMS

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Before You Start!

Please read this manual before you install the NewLife board. It provides important safety procedures and it describes the recommended installation steps.

☞ **This symbol is used in the margin to indicate important items**

NewLife products

The NewLife™ series of upgrade products from Newbridge Microsystems are designed specifically for the classic Macintosh™ family of computers. NewLife upgrades are easy to use and install, and they support the entire range of Macintosh computers — from the 128K Macintosh up to the Macintosh II family.

Features and benefits

- NewLife upgrades are installed using a "CPU clip" on the Macintosh 68000 CPU. This is a simple, non-invasive method of attachment.

- A CPU "pin mount" is also included. This option is only recommended for installation by qualified technicians.

- NewLife upgrades feature a flexible memory expansion structure using SIMM technology. This allows you to use any combination of 256KB and 1MB SIMMs to provide from 512KB to 4MB of memory in 512KB increments.

Part 1

Prepare your workplace

Static electricity can severely damage your Macintosh or NewLife upgrade.
To avoid damage caused by static, take the following precautions:

- Place a properly grounded antistatic mat on your workbench.
- Wear a conductive wrist strap connected to the mat.

Tools you will need

- 12-inch T-15 Torx screwdriver or equivalent
- regular flat-bladed screwdriver (for the Killy clip only)
- Macintosh case opening tool or equivalent

Safety Precaution — Unplug the Macintosh
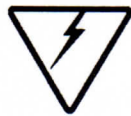
> # SHOCK HAZARD!
> **NOTE:**
> **This equipment should only be installed by a qualified technician.**

Make sure that the Macintosh is disconnected from AC power.
Working within the Macintosh computer requires skill and expertise to prevent electrical discharge and shock, *even when the Macintosh has been disconnected from its power source.*

Serious injury or death may result from improper handling of the interior components of the Macintosh.

DO NOT attempt this installation unless you are completely familiar with the methods for preventing electrical discharge and shock.

Safety Precaution — Discharge the CRT

WARNING: For information on discharging the CRT and checking power supply voltages, refer to the Macintosh Technical Procedure manuals.

CAUTION: To prevent damage when you discharge the CRT

- use a CRT discharge tool as shown in Figure 1
- discharge the CRT anode to the ground lug
- NEVER discharge to the chassis
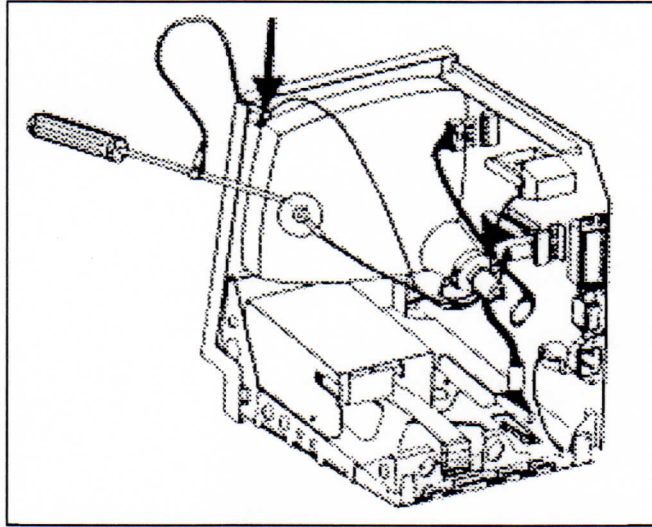
Figure 1 : Discharging the CRT

Part 2

Orienting the NewLife board

Figure 2 is a simplified top view of the NewLife board. It shows the relative locations of the SIMM sockets, the configuration jumpers, and the SCSI connector.

This diagram does not show all of the components on the board — it is supplied to help you orient the board.

Figure 2 : Top view of the NewLife board— simplified diagram

Five easy steps

You install the NewLife board in five easy steps:

1) Set the configuration jumpers.
2) Install the memory.
3) Attach the NewLife board to the Macintosh motherboard.
4) Adjust the Macintosh power supply, if necessary.
5) Attach the SCSI cable.

Step 1: Setting the configuration jumpers

There are three sets of jumpers used to configure the NewLife board:

- W10–W11 indicate the SIMM mixture
- W1–W6 indicate the amount of memory
- W12–W15 indicate the amount of memory for a 128K Macintosh upgrade

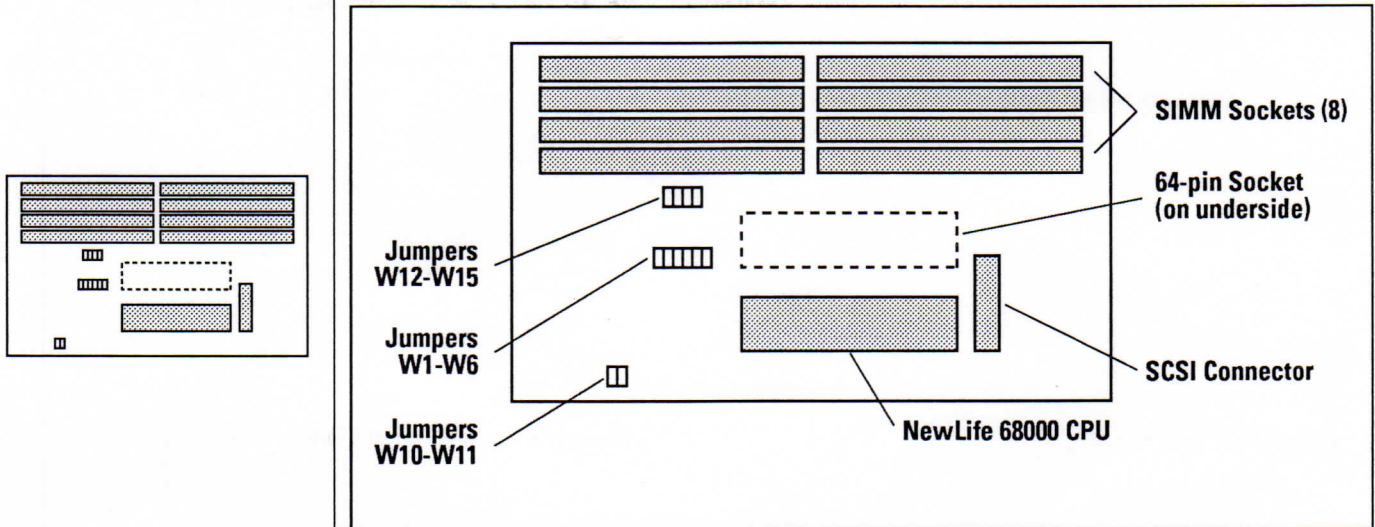The NewLife board accommodates up to 4MB of RAM with combinations of 1MB SIMMs and 256KB SIMMs. You can use eight 256KB SIMMs if you only need 2MB of RAM.

Indicating the SIMM mixture — W10–W11

You can mix 1MB and 256KB SIMMs, but each pair of SIMMs must be the same type. (This is explained in more detail in the memory installation section, below.) To indicate the mixture you have used, set jumpers W10 and W11 as shown in Figure 3.
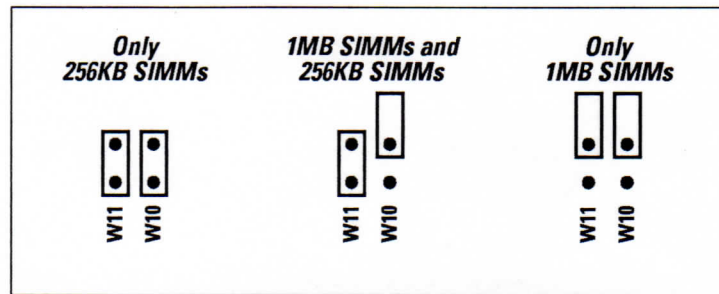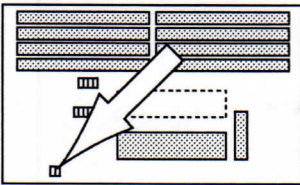
Figure 3 : Indicating the SIMM mixture

512K Macintosh

If you are upgrading a 512K Macintosh, set jumpers W1–W6 as shown in Figure 4 to indicate *the amount of memory you install on the NewLife board*. The total amount of memory will actually be the amount you install on the NewLife board plus 512KB.

Figure 4 : Indicating the memory for a 512K Macintosh

Regardless of the amount of memory, set jumpers W12–W15 as shown in Figure 5 for a 512K Macintosh.
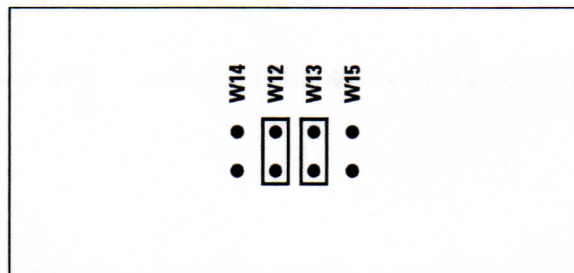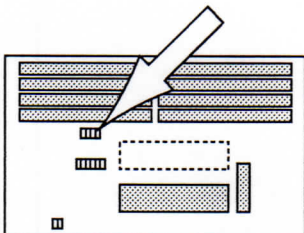
Figure 5 : W12–W15 settings for a 512K Macintosh

128K Macintosh

If you are upgrading a 128K Macintosh, set jumpers W1–W6 as shown in Figure 6 to indicate *the amount of memory you install on the NewLife board.* A 128K Macintosh can only be upgraded to 1MB, 2MB or 4MB of RAM. The system will only recognize the memory installed on the NewLife board.
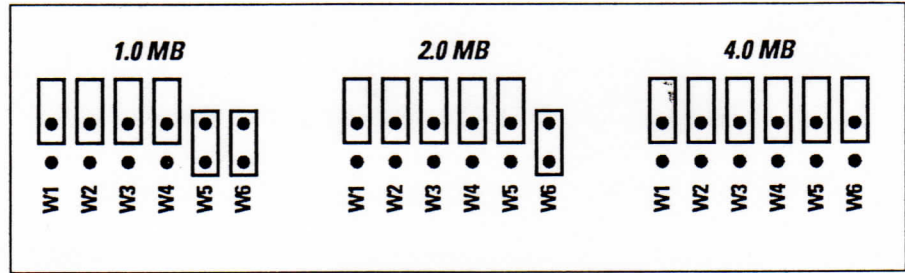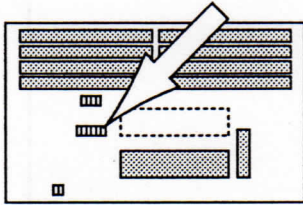
Figure 6 : Indicating the memory for a 128K Macintosh

Set jumpers W12–W15 as shown in Figure 7 for a 128K Macintosh.
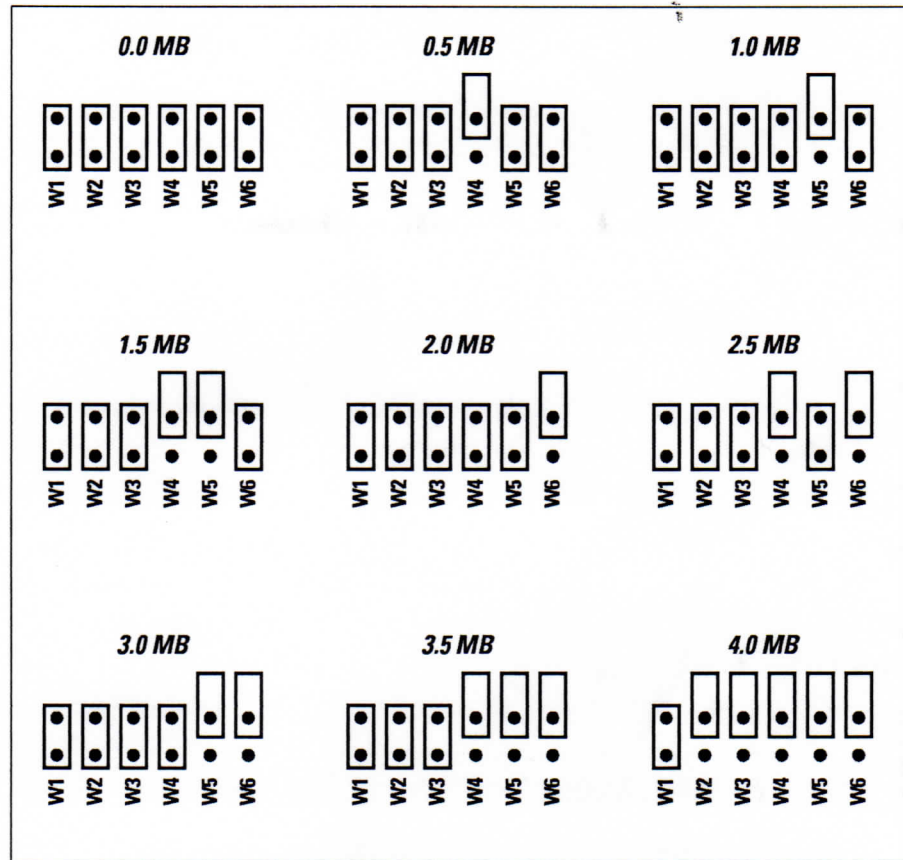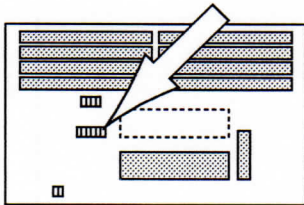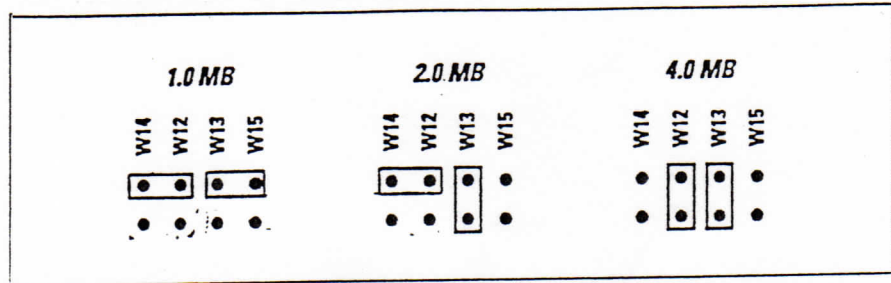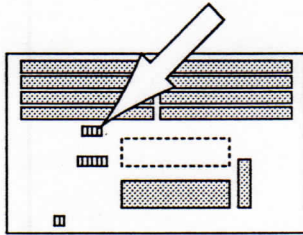

Figure 7 : W12–W15 settings for a 128K Macintosh

Step 2: | Installing the memory (SIMMs)

After you have set the configuration jumpers, you can install the SIMMs.

☞ *You must always install SIMMs in pairs, one in the left row of sockets and one in the right row of sockets. Each pair must be the same type — 1MB or 256KB.* Figure 8 shows the SIMM positions for configurations from 0.5MB to 4.0MB of RAM.

Because the SIMM sockets are slanted, you must fill them starting at the center of the board working towards the outer edge.

Figure 8: SIMM positions

0.5 MB

256KB	256KB

1.0 MB

256KB	256KB
256KB	256KB

1.5 MB

256KB	256KB
256KB	256KB
256KB	256KB

2.0 MB

256KB	256KB
256KB	256KB
256KB	256KB
256KB	256KB

2.0 MB

1MB	1MB

2.5 MB

1MB	1MB
256KB	256KB

3.0 MB

1MB	1MB
256KB	256KB
256KB	256KB

3.5 MB

1MB	1MB
256KB	256KB
256KB	256KB
256KB	256KB

4.0 MB

1MB	1MB
1MB	1MB
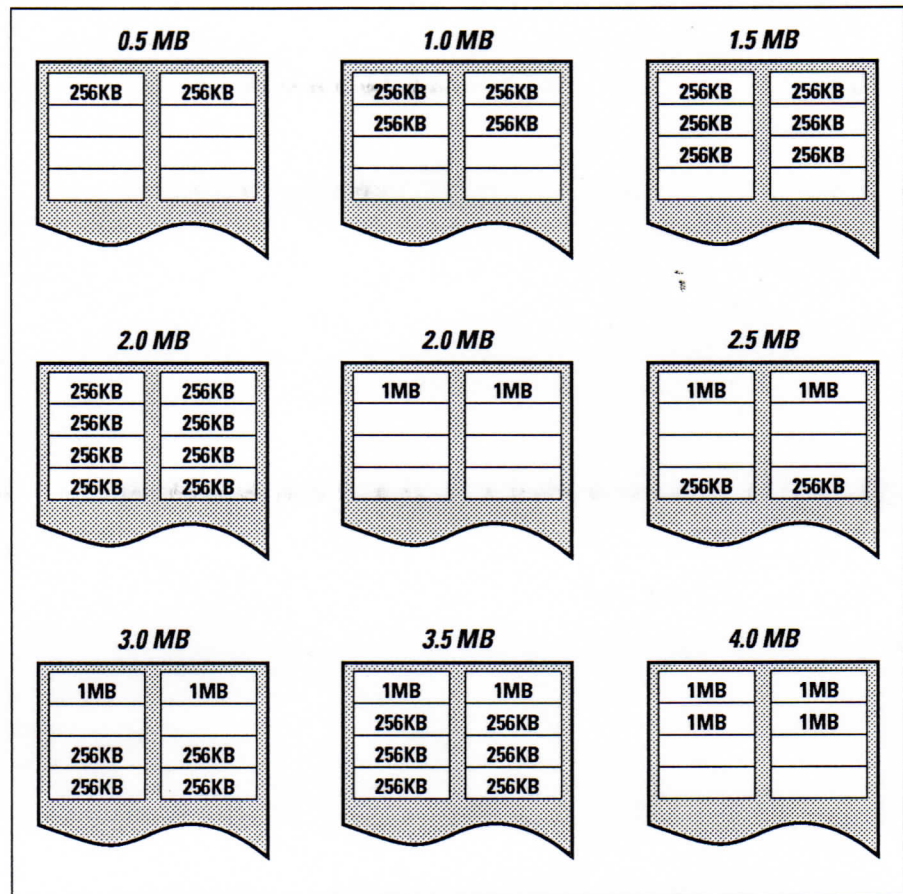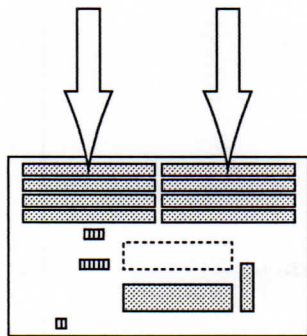
Step 3: Attaching to the Macintosh motherboard

You install the NewLife board on top of the Macintosh motherboard — as shown in Figure 10. The 64-pin connector on the bottom of the NewLife board attaches to the Macintosh 68000 CPU. To allow proper electrical and mechanical connection, you must first extend the pins of the Macintosh CPU. This is done in one of two ways:

1) with a "Killy clip"

2) with soldered pin mounts (required for a ceramic 68000 CPU)

Installing the Killy clip
To install the Killy clip, follow the instructions on the separate sheet enclosed with the NewLife documentation. You *can not* use the Killy clip on a ceramic 68000 CPU.

Once the Killy clip is installed you connect the NewLife board to the pins on top of the clip.

Installing soldered pin mounts — an alternative

Some early versions of the Macintosh have ceramic 68000 CPUs. *The Killy clip does not work with ceramic 68000s.* You must use the soldered pin mount technique.

☞ *DO NOT attempt this procedure unless you are familiar with correct soldering techniques for multilayer boards.* This is a simple procedure for technicians with good soldering skills.

Pin mount soldering procedure:

1) You must solder header strips onto the pins of the Macintosh CPU. Two 32-pin header strips are supplied, mounted in a 64-pin socket. **The header strips have square pins and the socket has round pins.** The 64-pin socket is only used as a carrier for the header strips to simplify the soldering procedure — once you are done, discard the socket.
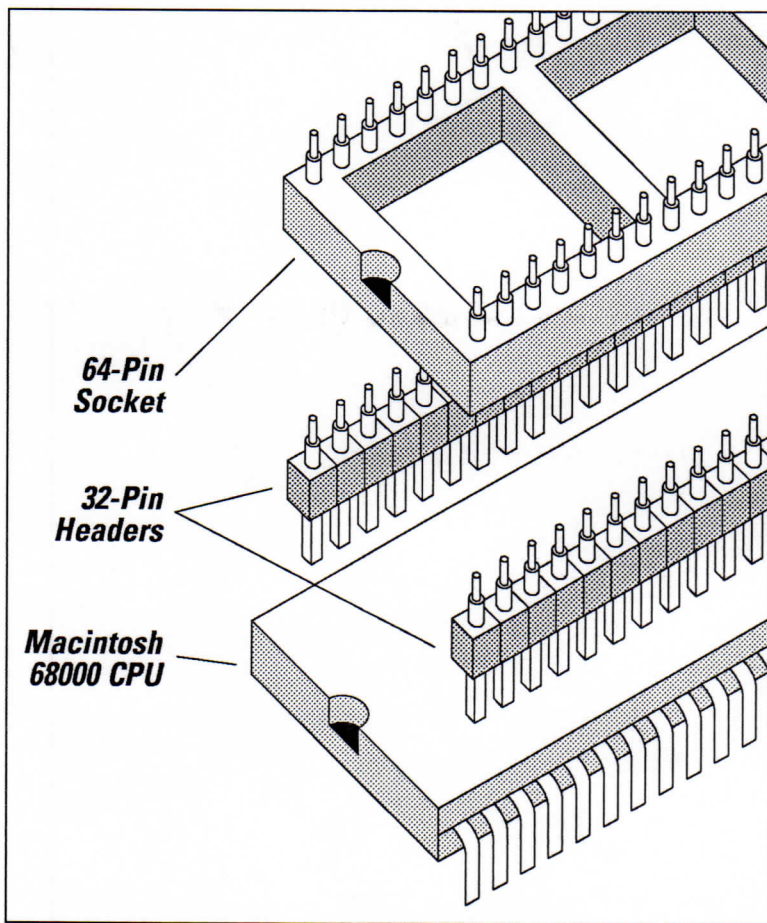
2) Straddle the header strips and socket assembly over the Macintosh 68000 CPU. The header strip **square** pins must each slide down the side of one of the 68000s pins. The **round** pins of the socket must be pointing upwards — away from the board.

3) Carefully solder each of the header strip **square** pins to the Macintosh 68000 CPU. *Remove* any flux residue and check for bad solder joints or solder bridges. *Poor soldering can prevent proper operation of the Macintosh — it may not even boot up.*

4) Remove and discard the 64-pin socket. The two header strips have **round** pins pointing upwards. You will connect the NewLife board to these pins.

64-Pin Socket

32-Pin Headers

Macintosh 68000 CPU

Figure 9 : Exploded view of the pin mount option

Attaching the NewLife board

The 64-pin socket on the bottom of the NewLife board connects to the pins on the Killy clip — or to the header strip round pins if you used the soldered pin mount procedure.

Position the NewLife board above the Macintosh motherboard as shown in Figure 10. *Before you apply any pressure, look between the two boards and make sure all of the pins are aligned with the socket.*

Place the entire assembly on your antistatic mat and apply pressure to the NewLife board — *but only above the socket location.* After the pins are seated in the socket, inspect the assembly to make sure the NewLife board is completely seated and properly aligned.

> **CAUTION:** *Align all of the pins with their correct socket positions before applying pressure. If the pins and socket are misaligned you can severely damage the board and pins.*
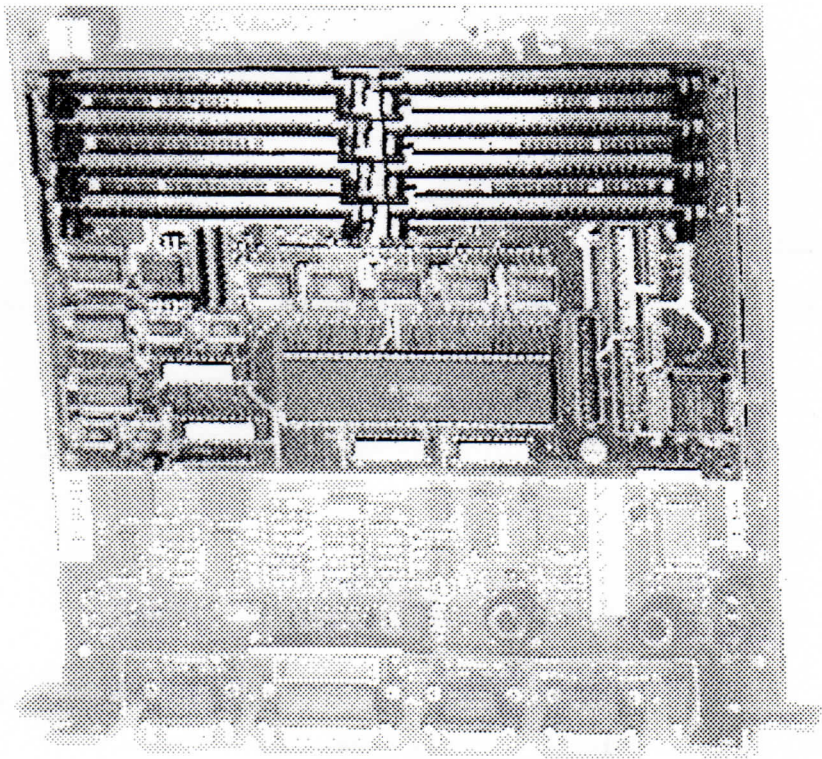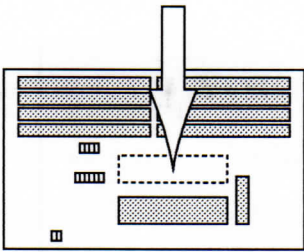

Figure 10 : The NewLife board positioned on the Macintosh motherboard

Replacing the motherboard in the Macintosh

When you removed the motherboard, you slid it out of the metal guides towards the back of the Macintosh. *With the NewLife board attached, the assembly is too high to slide back into the Macintosh.*

To replace the motherboard:

1) Place one edge of the motherboard in the metal guides with the keyboard connector toward the front of the computer about 1 inch behind the plastic front cover.

2) Use a flat tool — such as a small screwdriver — to carefully spread the metal guide frame away from the opposite edge of the motherboard. Push the mother board into position and release the metal guide frame. The motherboard should be held securely by the guides.

Step 4: Adjust the Macintosh power supply, if necessary

The Macintosh has an adjustable power supply designed to operate between 4.9 and 5.0 volts. Test and adjust it, if necessary.

Power supply adjustment procedure:

1) A ten-prong plug connects the power supply to the Macintosh motherboard. Pin 1 is separated from the others by a blank space. Locate the solder joints of pins 5 and 6 on the back of the board.

WARNING!
THE FOLLOWING STEPS ARE DANGEROUS,
A SERIOUS SHOCK HAZARD EXISTS!

2) Noting the warning above, reconnect the AC power cord to the Macintosh. *Keep your hands away from the machine!*

3) Use a high quality digital voltmeter to measure the voltage between pin 5 (positive supply) and pin 6 (ground). If the voltage measures between 4.85 and 4.95 volts no adjustment is necessary.

4) If adjustment is required, turn the voltage set screw on the side of the power supply until the voltage measures between 4.85 and 4.95 volts. The set screw is clearly labelled on the plastic power supply shield.

5) Disconnect the AC power cord. *Hazardous voltages still may be present even after disconnecting the AC power!*

Step 5: Attach the SCSI cable
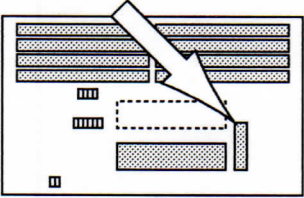
Attach the square black connector on one end of the SCSI ribbon cable to the header on the NewLife board. The cable connector is keyed to prevent improper installation. Pin 1 of the connector is marked with black stripes or red hatching and should face the rear of the chassis.

The cable is designed to run out of the Macintosh battery door. You must remove a small part of the plastic ridge inside the battery compartment to make room for the cable. Use a sharp utility knife to trim away 1.25 inches of the ridge as shown in Figure 11. Make sure to remove any rough edges that could damage the cable.
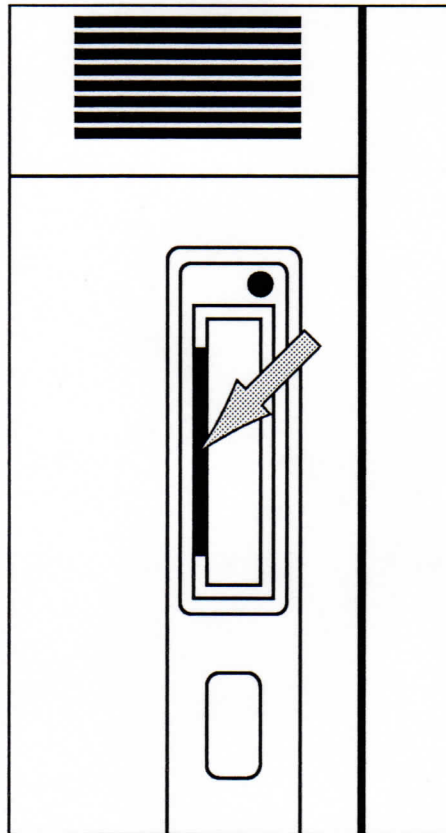
Figure 11 : Remove 1.25 inches of the
battery compartment ridge

Place the 25-pin D connector on top of the battery, laying the cable over the trimmed edge of the battery compartment.