

NewLife 2

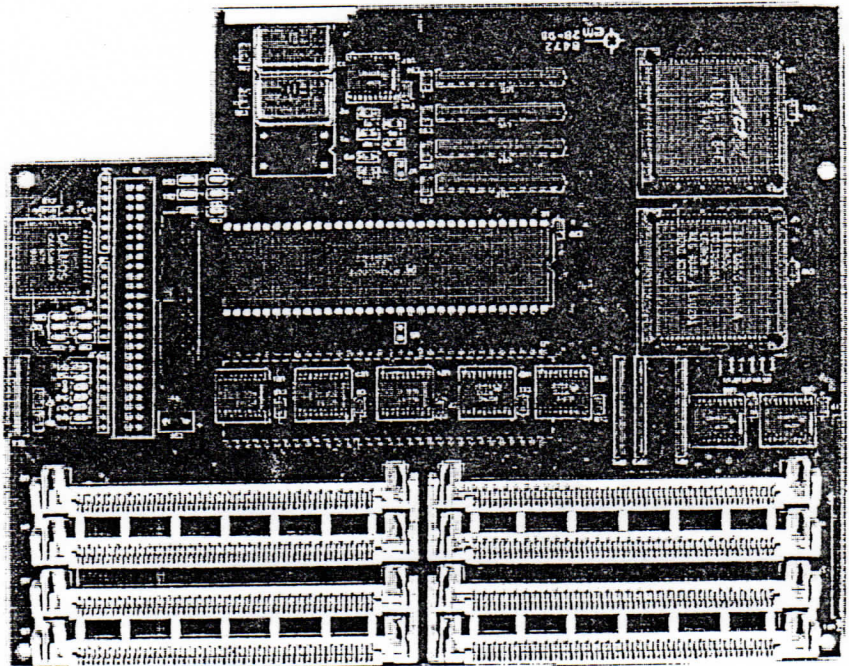
Memory/SCSI upgrade
with video adapter

for

Mac 128K

Mac 512K

Mac 512Ke



User guide and
installation manual

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Table of Contents

part 1	Introduction	
	The NewLife 2 CPU upgrade	2
	NewLife features and benefits	3
	About this manual	3
part 2	Preparation and Safety Precautions	
	Prepare your workplace	4
	Gather the tools you will need	4
	Check the package contents	4
	Understand the hazards	5
	Always unplug the Macintosh	5
	Discharge the CRT anode	5
	Handle the CRT with care	5
part 3	Installing the NewLife 2 board	
	Orienting NewLife 2	6
	Six easy installation steps	6
Step one :	Remove the Macintosh motherboard	6
Step two:	Install NewLife memory	9
	Installing the memory	10
	Upgrading a 128K Macintosh	11
	Upgrading a 512K Macintosh	11
Step three:	Attaching to the Macintosh motherboard	14
	Installing the Killy clip	14
	Installing soldered pin mounts	15
	Attaching the NewLife board	16
Step four	Replacing the motherboard in the Macintosh	16
Step five	Attaching the SCSI cable	18
Step six	Attaching the video cable	19

part 4	Software Installation	
	Installing the NewLife 2 software	20
	Configure video port	21
	Overriding video port selection	22
part 5	Technical Information	
	Troubleshooting	24
	NewLife 2 Technical Specifications	27
	The NewLife product family	29

Before You Start!

Please read this manual
before you install your NewLife board.

It provides important safety procedures
and describes the recommended
installation steps.

The following symbols are used in this manual to indicate
important items:



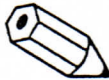
WARNING!

A life-threatening situation. Serious injury or death can result
if the hazard is ignored.



CAUTION!

Static discharge can damage equipment.



NOTE:

Failure to follow instructions can result in equipment damage
or malfunction.

part 1

Introduction

The NewLife 2 system upgrade

Congratulations! We're glad you've chosen to give NewLife™ to your Mac with a Newbridge Microsystems NewLife 2 system upgrade. We're sure you'll be pleased with the improved performance and capabilities of your enhanced Mac.

NewLife 2 is designed specifically for the 128K, 512K and 512Ke Macintoshes. NewLife 2 gives your Mac the computing power of a Mac SE and supports up to 4MB of RAM. NewLife 2 provides a SCSI port for hard disks and other SCSI devices and it allows you to connect a large monochrome monitor to your Mac.

With NewLife 2 you can run applications that require more memory or need a larger screen, and you can use fast SCSI hard disks to quickly access large amounts of data. NewLife 2 gives a new life to your old Mac and lets you stay productive in a rapidly changing software environment.

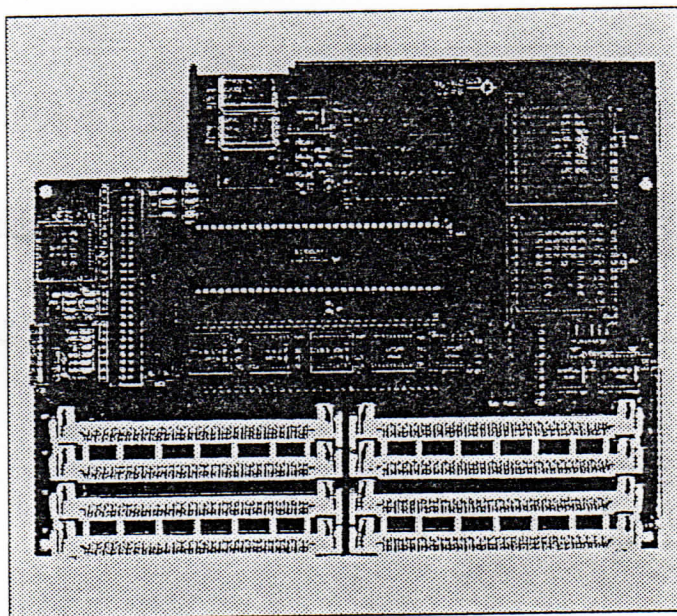


Figure 1: The NewLife 2 upgrade board

NewLife 2 features and benefits

- NewLife 2 is installed using a “CPU clip” on the Macintosh 68000 CPU. This is a simple, non-invasive method of attachment.
- NewLife 2 features 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.
- NewLife 2 uses the motherboard memory on a Mac 512K or 512Ke to provide a total of up to 4MB of RAM.
- NewLife 2 lets you connect a large monochrome screen to your Mac. It has a flexible video adapter with a standard PC-compatible connector and software configurable screen sizes.
- NewLife 2 gives you the performance you need to run powerful programs like MacDraw, Illustrator, Freehand, Excel, Wingz, Word, WordPerfect, Quark XPress, and PageMaker.

About this manual



This manual gives you step by step instructions to install, configure and use NewLife 2.

Some of the steps are potentially life-threatening to you, and hazardous to your Mac. We recommend that you have the installation done by your dealer's qualified service technician.

If you wish to install NewLife 2 yourself, *read the safety precautions in Part 2.*

Part 3 of this manual contains the actual installation steps for the NewLife 2. Part 4 describes the installation and configuration of the video controller CDEV software.

If you follow the steps carefully, you shouldn't have any problems with your NewLife board but just in case you do, Part 5 contains some useful hints to get you back on track.

part 2

Preparation and Safety Precautions

Prepare your workplace

Static electricity can severely damage your Macintosh or the NewLife 2 board.

To prevent static damage, take the following precautions:



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

Gather the tools you will need

- CRT discharge tool
- Macintosh case opening tool or equivalent (also known as the pull-apart tool)
- 12-inch T-15 Torx screwdriver or equivalent
- Safety goggles
- Utility knife for the NewLife 2 SCSI installation
- Regular flat-bladed screwdriver
- Phillips screwdriver for SCSI installation
- Soft cloth or foam pad
- Soldering iron and solder (for pin mount only)
- Digital voltmeter (for power supply adjustment)
- Antistatic wrist strap
- Cotton swabs and alcohol

Check the package contents

- NewLife 2 board
- Pin kit
- Killy clip with installation sheet
- Replacement battery cover loosely attached to the DB-25 SCSI connector with 2 screws
- Internal SCSI cable
- Video cable and connectors
- Self-tapping screw
- One 3.5 inch diskette
- User Guide & Installation Manual (this book)

Understand the hazards



WARNING!

Macintosh computers contain high voltages and a high vacuum picture tube. Both can cause serious personal injury and property damage. This equipment should only be installed by a qualified technician.

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.*

Always unplug the Macintosh

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.

Discharge the CRT anode



The CRT anode can have extremely high voltages present (12,000 volts). Follow the steps specified in the Macintosh Technical Procedures manual to discharge the CRT anode. For your convenience, we have summarized the basic instructions in Part 3. Consult the original Macintosh documentation for all of the details.

Handle the CRT with care



The CRT contains a high vacuum — if it is cracked or broken, it can violently implode causing serious injury. Handle the CRT with care. Always wear safety glasses when the case is open.

part 3

Installing NewLife 2

Orienting NewLife 2

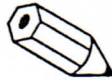


Figure 2 is a simplified top view of NewLife 2. It shows the relative locations of the SIMM sockets, the configuration jumpers, and the SCSI connector.

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

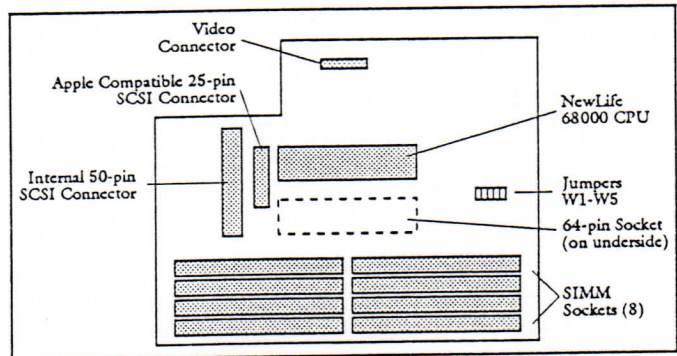


Figure 2: Simplified top view of NewLife 2

Six easy installation steps

You install NewLife 2 in six easy steps:

- Step one: Open the Macintosh case, remove the motherboard;
- Step two Set the NewLife 2 configuration jumpers and install the memory;
- Step three Attach NewLife 2 to the Macintosh motherboard;
- Step four Replace the Macintosh motherboard and adjust the power supply, if necessary;
- Step five Attach the SCSI cable;
- Step six Attach the video cable and close up the case.

Step one: Remove the Macintosh motherboard

To open the Macintosh case:

1. Turn off the power and disconnect the AC power cord from the source and from the back of the computer.
2. Disconnect the mouse and all other external cables from the back of the computer. Disconnect the keyboard.

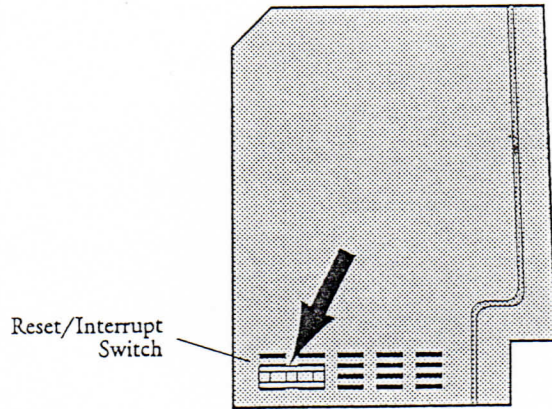


Figure 3 : The reset/interrupt switch

3. Remove the reset/interrupt switch (if installed) from the side of the case by prying it off with a small flat-blade screwdriver (as illustrated in Figure 3).
4. Remove the battery compartment cover from the back of the case.
5. To avoid scratching the bezel, place the computer face down on a soft cloth or foam pad.
6. Use a Torx screwdriver to remove the five screws from the back of the Mac. Note that one of the screws is inside the battery compartment.

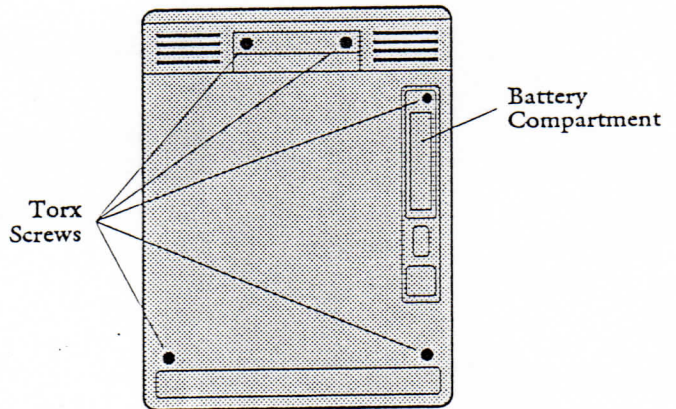


Figure 4 : The back of the Macintosh

7. Use the pull-apart tool to gently pry the cover loose. Carefully lift up the cover and set it aside. *The CRT picture tube is now exposed – be careful!*
8. Stand the Macintosh back up in its normal position.

WARNING!



The following procedure is dangerous, a serious shock hazard exists!

To discharge the CRT anode:

1. Remove your grounding wrist strap, if you have it on. Remove any jewelry you are wearing. Put on your safety goggles.
2. Attach the alligator clip of the CRT discharge tool to the metal part of the ground lug exactly as shown in Figure 5; *Do not clip onto the chassis.*
3. Put one hand behind your back or in your pocket. Grasp the insulated handle of the CRT discharge tool with your free hand. Hold the CRT discharge tool against the side of the CRT and insert it under the anode cap, until it touches the anode ring. A crackle or spark may be generated.
4. Remove the CRT discharge tool from under the anode cap. You may wish to repeat step three, to be sure the CRT is discharged.
5. Remove the alligator clip from the ground lug.

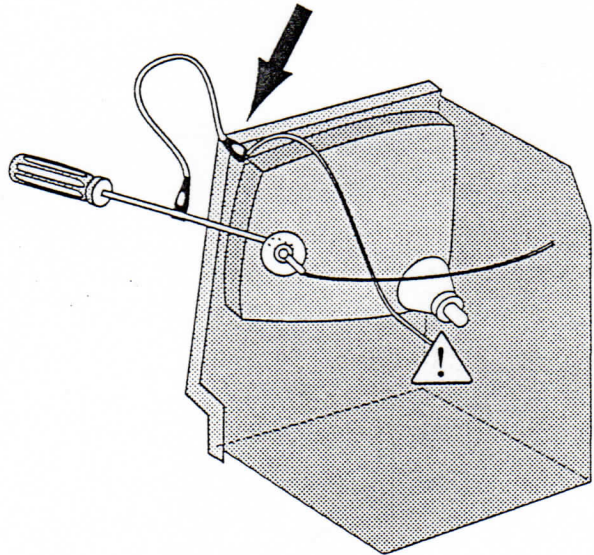


Figure 5 : Discharging the CRT anode



To remove the Macintosh motherboard:

1. To prevent static damage to your Mac or NewLife 2, put on your antistatic wrist strap and perform this operation on your antistatic mat.
2. Locate the motherboard. It is on the bottom side of the Mac. You must detach the connectors from the motherboard before it will slide out of the case.

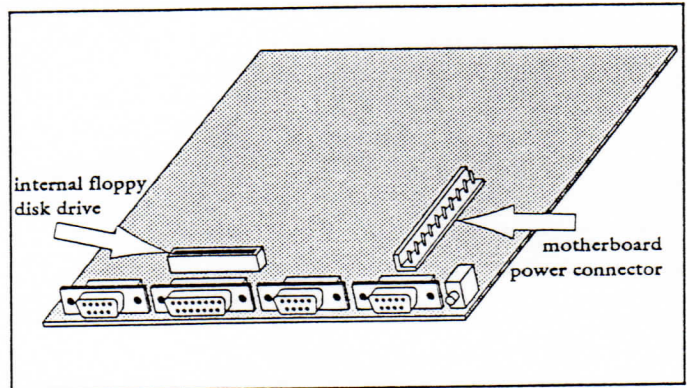
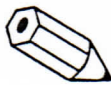


Figure 6 : Motherboard connectors

3. To unplug the power/video connector, grasp the wire bundle and gently pull it away from the board. Care must be taken as the connection may release suddenly causing your hand to strike the CRT neck, breaking the vacuum seal.
4. To unplug the internal floppy drive connector, grasp the ribbon cable assembly cable and gently pull it out of the socket on the board.
5. Lay the Mac face down (on your foam pad) and slide the motherboard up and out of the case.
6. Put the Mac aside in a safe location, and place the motherboard on your antistatic mat.



If you are adding NewLife to an unenhanced Mac 128K or Mac 512K, you must install an Apple 128KB ROM kit upgrade first. The Mac 512Ke already has the 128KB ROMs installed.

Step two Install and configure NewLife memory

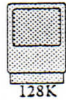
The NewLife board accommodates up to 4MB of RAM with combinations of 1MB SIMMs and 256KB SIMMs. You must set jumpers W1-W5 to indicate the type and amount of memory you are installing on the NewLife 2 board.

The settings used for the jumpers depends on the amount of memory you install and the type of Macintosh you are upgrading.

Installing the memory (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. The tables on the following pages show all of the valid SIMM positions.

Because the SIMM sockets are slanted, you must fill them starting at the position furthest from the board edge, but only populating the relevant positions as indicated in Tables 1, 2a and 2b.



SIMMs	W1-W5
<p>1.0 MB</p>	
<p>2.0 MB</p>	
<p>2.0 MB</p>	
<p>4.0 MB</p> <p>*Arrow indicates these SIMMs installed first</p>	

Table 1: Configuring NewLife 2 for a 128K Mac

Upgrading a 128K Macintosh



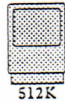
A 128K Macintosh can be upgraded to 1MB, 2MB or 4MB of RAM. Table 1 shows you where to install the SIMMs and how to set the jumpers.

The system only recognizes the memory installed on the NewLife board.

You can configure a 2MB system with either two 1MB SIMMs or with eight 256KB SIMMs.

Once you have installed the SIMMs and set the jumpers as shown (*in Table 1*), skip to step three and continue the installation procedure.

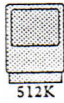
Upgrading a 512K Macintosh



On a 512K Macintosh, you can install from 0.5MB to 4MB of RAM. Table 2 shows you where to install the SIMMs and how to set the jumpers.

The system ignores the 512KB on the Macintosh motherboard in one case – when you install 4.0MB on the NewLife board. In all other cases – when you install 3.5MB or less – the total memory available is the amount you install on the NewLife board *plus* the 512KB on the Macintosh motherboard. Regardless of the amount of memory you install, *set the configuration jumpers to indicate only the amount of memory on the NewLife board.*

You can configure a 2MB system with either two 1MB SIMMs or with eight 256KB SIMMs.



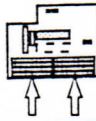

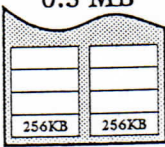
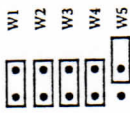
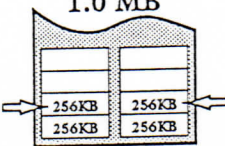
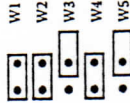
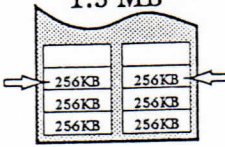
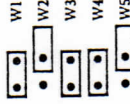
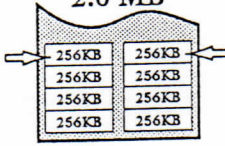
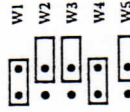
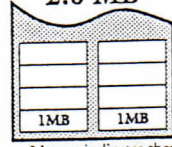
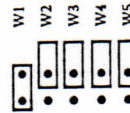
SIMMs	W1-W5
	
<p>0.5 MB</p> 	
<p>1.0 MB</p> 	
<p>1.5 MB</p> 	
<p>2.0 MB</p> 	
<p>2.0 MB</p>  <p>* Arrow indicates these SIMMs installed first</p>	

Table 2a: Configuring NewLife 2 for a 512K Mac



SIMMs	W1-W5
<p>2.5 MB</p>	
<p>3.0 MB</p>	
<p>3.5 MB</p>	
<p>4.0 MB</p> <p>* Arrow indicates these SIMMs installed first</p>	

Table 2b: Configuring NewLife 2 for a 512K Mac

Step three Attaching to the Macintosh motherboard

You install the NewLife board on top of the Macintosh motherboard — as shown in Figure 7. The 64-pin connector on the bottom of the NewLife board attaches to the Macintosh 68000 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)

A ceramic 68000 has a gray or light brown case.

A plastic 68000 has a black case.

The Killy clip will only work with a ceramic device when there is sufficient space underneath for the latches to engage. Typically, these devices have plastic spacers on either end. Remove these plastic spacers with a small flat-bladed screwdriver before applying the Killy clip. Ceramic 68000's without sufficient space must use the soldered pin mount technique.

Using alcohol and cotton swabs, clean each pin on the 68000 CPU before proceeding.

Figure 7: Positioning NewLife 2 on the Mac motherboard

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. A ceramic 68000 has a gray or light brown case.*

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*

DO NOT attempt this procedure unless you are familiar with correct soldering techniques for multilayer boards. You must use a strong soldering iron (we recommend a 40 watt iron) as the 68000 case is an excellent heat sink. Good soldering skills and equipment are required to successfully complete this procedure.

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 under a 64-pin socket as shown in Figure 9. The 64-pin socket is only used as a carrier for the header strips to provide alignment — once you are done, discard the socket.
2. Straddle the header strips and socket assembly over the Macintosh 68000 CPU.

The header strip pins must each slide down the side of one of the 68000s pins. The socket pins must be pointing upwards — away from the board.

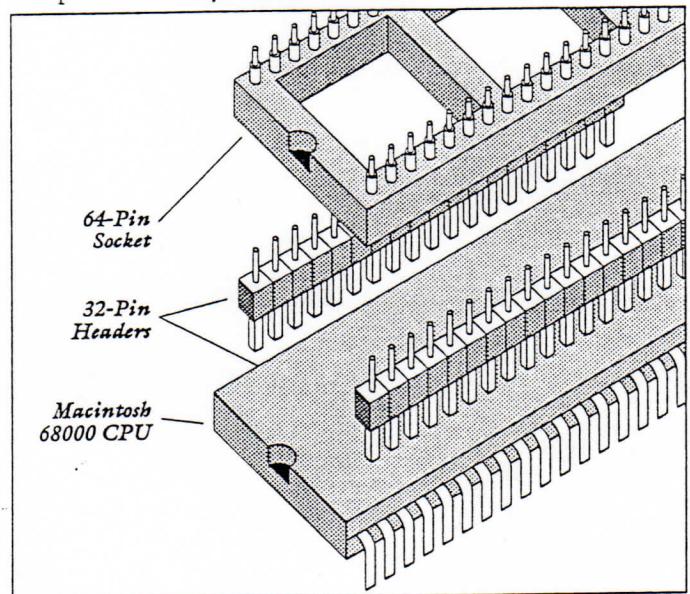
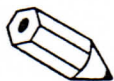


Figure 8 : Exploded view of the pin mount



3. Carefully solder each of the header strip 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 are now attached to the 68000 with their pins pointing upwards. You will connect the NewLife board to these pins.

Attaching the NewLife board

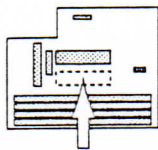
The 64-pin socket on the bottom of the NewLife board connects to the pins on the Killy clip — or to the header strip pins if you used the soldered pin mount procedure.

CAUTION:



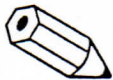
Align all of the pins with their correct socket positions before applying pressure. If the pins and socket are misaligned you can severely damage the board and pins and void your NewLife warranty.

Position the NewLife board above the Macintosh motherboard as shown in Figure 7. *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.

Step four 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 half an 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. Push the motherboard down to seat the rear metal brackets.
3. Re-attach the internal floppy drive ribbon cable and the power/video cable to the motherboard.

Adjust the 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 (*Pin 2*). Locate Pin 6. Insert one of the probes into the top of the connector, so as to connect with the pin.

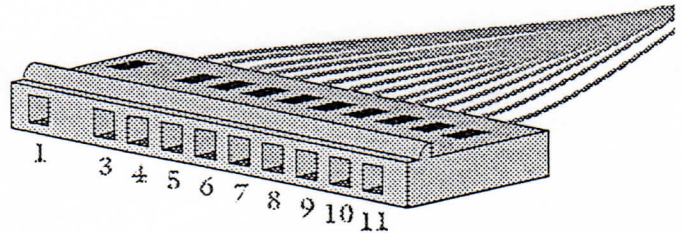


Figure 9: Power supply plug

WARNING!

The following steps are dangerous,
a serious shock hazard exists!

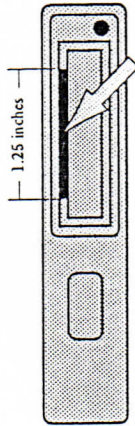
2. Noting the warning above, remove your grounding wrist strap and reconnect the AC power cord to the Macintosh.
Keep your hands away from the machine!
3. Use a high quality digital voltmeter to measure the voltage between pin 6 (*positive supply*) and the chassis (*ground*). If the voltage measures between 4.9 and 5.0 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 4.9 and 5.0 volts. The set screw is clearly labelled on the plastic power supply shield.
5. Disconnect the AC power cord. *Hazardous voltages may still be present even after disconnecting the AC power!*

Step five Attach the SCSI port (optional)

The SCSI cable and connector assembly is shipped loosely attached to the battery door connector. Tighten the connector assembly.



The cable is designed to run out of the Macintosh battery door. You must remove a small part of the plastic ridge on the battery compartment opening to make room for the cable. Use a sharp utility knife to trim away 1.25 inches of the ridge as shown in Figure 10. Make sure to remove any rough edges that could damage the cable.

Place the 25-pin D connector on top of the battery, laying the cable towards the trimmed edge of the battery compartment. At the back of the Macintosh there is a wire cable which grounds the analog board to the chassis. It is screwed into the chassis directly above the spot marked with the symbol \perp .

Figure 10: Rear case battery door opening

Using a Phillips screwdriver, remove this screw. Feed the loose end of the SCSI ground wire down to the chassis. Replace the screw placing both the SCSI ground and analog board ground together onto the screw and re-attach. Attach the rectangular black connector on the end of the SCSI ribbon cable to the header of the NewLife SCSI board. The cable connector is keyed to prevent improper installation.

SCSI Configuration

The last device in the SCSI chain should be equipped with termination resistors. If the termination resistors are missing, SCSI peripheral behaviour may be unpredictable, or the system may not recognize the peripheral.

There should be only one set of termination resistors in the SCSI chain. More than one set may cause problems. If SCSI problems arise in your system, carefully check for terminating resistors. Refer to the user guides for each SCSI device to determine if the resistors are installed.

Option – attach the internal SCSI cable

If you are mounting a SCSI disk inside the Macintosh case, attach the internal 50-pin SCSI cable. See Figure 11 for the location of pin one. Be careful not to offset the pins when connecting the cable.

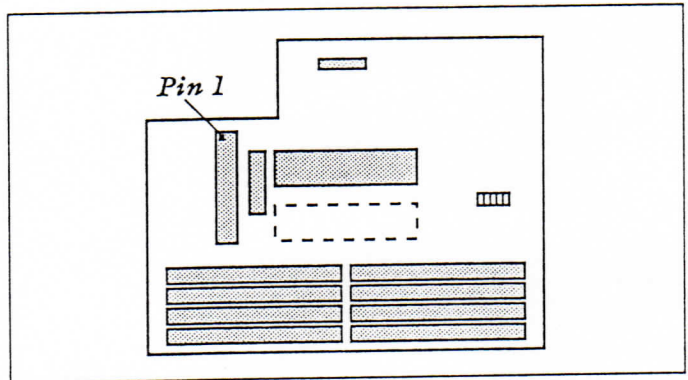


Figure 11 : The internal SCSI cable

Step six Attach the video cable

The video cable and connector assembly is used to attach an external monitor.

To attach the video cable:

1. Locate the security port on the back of the Mac case.
2. Thread the small black connector on the video cable into the security port from the outside of the case.
3. Looking at the back of the Mac, orient the Killy video connector assembly such that the DB-9 connector faces right.
4. Push the Killy video connector assembly into the security port until the internal lugs snap into place. If the assembly does not snap into place you have the DB-9 connector facing the wrong way.
5. Attach the small black connector on the video cable to the NewLife board. Be careful you don't unseat the NewLife 64-pin connector from the motherboard when attaching the video cable.
6. On the chassis near the power harness is the analog board grounding wire. Remove the self-tapping screw which attaches the lug to the chassis. Reattach the video cable ground lug along with the analog board ground to the chassis.

You can now close up the Macintosh case.

Before you call for Technical Support,
please fill in the form on this page.

For technical support call:

1 (800) 267-7231
Monday to Friday,
from 09:00 to 5:00 Eastern Time
Fax: (613) 592-1320

Before you call:

Please fill in the form on this page. You must have the
information available to allow us to provide you with the best
possible service if you call or address an enquiry to our office.

NewLife Problem Report			
name of registered user		name of dealer	
phone and/or fax no.			
NewLife product name		serial no.	
system version no.	finder version no.	multifinder version no.	
applications in which problem occurs			
INTs in use when problem occurs			
description (include screen messages or numbers)			

Troubleshooting Guide

Symptom

On power-up, nothing happens or both screens are blank

Possible Problem and Suggested Remedy

- No power. Plug computer into a live outlet and turn it on.
- Defective Mac. Remove NewLife board, reassemble Mac and restart. If Mac does not restart properly, it is defective – contact your Mac dealer or repair center.

Symptom

Checkerboard pattern or vertical lines observed on power-up

Possible Problem and Suggested Remedy

- Bent pin. Remove board and check for bent pins. Straighten bent pins and carefully reseal socket.
- Cold solder joint on pin mount. Remove board and check each pin with an ohmmeter to verify continuity. If a discontinuity is found, carefully resolder the offending pin.
- Improperly installed Killy clip. Reseat Killy clip and try again.

Symptom

Wavering vertical lines observed after power-up

Possible Problem and Suggested Remedy

- Power supply is not properly connected. Verify that power supply harness connectors are firmly seated.
- Power supply is not adjusted to correct voltage. Re-adjust power supply output voltage following instructions in Step 4.

Symptom

Intermittent Sad Mac or system bomb during operation or power-up

Possible Problem and Suggested Remedy

- Intermittent connection between NewLife board and Mac CPU. See remedies under "Checkerboard pattern" symptom.
- Incorrect SIMM jumper placement on NewLife board. Verify that jumpers W1–W5 have been correctly set for your memory configuration (see Step 2)
- Incorrect SIMM placement on NewLife board. Ensure that 256KB or 1MB SIMMs have been placed in the correct sockets as shown in Step 2. Note that the SIMM positions and jumper settings must match.
- Defective SIMM module(s). Replace with new set of SIMMs. If problem disappears then one or more of SIMM modules were defective. Contact your dealer for replacements.

- Symptom *Intermittent Sad Mac or system bomb during operation or power-up Con't*
- Possible Problem and Suggested Remedy
- See INIT warning at the beginning of this section.
 - Power supply is not adjusted to correct voltage. Readjust power supply output voltage following the instructions in Step 4.
- Symptom *SCSI peripheral is not recognized or does not mount*
- Possible Problem and Suggested Remedy
- Peripheral software is incorrectly loaded or configured. Reload or reconfigure.
 - SCSI address on peripheral is incorrect. Refer to peripheral user manual for correct SCSI address.
 - Bad connection in SCSI cable between Mac and peripheral. Replace SCSI cable.
 - Bad connection on internal SCSI cable between NewLife board and battery door connector. Disconnect and reseal cable to ensure a solid connection at each end. If problem persists, contact technical support for assistance.
- Symptom *Happy Mac and "Welcome to Macintosh" appear on Mac screen before it blanks, but nothing appears on external monitor*
- Possible Problem and Suggested Remedy
- No power to monitor. Plug in and turn on monitor
 - Invalid monitor configuration selected. Select a valid configuration from the Control Panel and restart system.
 - Bad connection. Inspect and reseal video cable connectors.
 - Defective external video cable. Replace.
 - Blown fuse in external monitor. Replace
 - Defective or intermittent internal video cable. Call technical support.

Symptom *Scrambled display, rolling display, garbage on screen or display won't sync*

Possible Problem and Suggested Remedy

- Invalid monitor configuration selected. Select a valid configuration from the Control Panel and restart system.
- Video cable to external monitor is loose. Inspect, reseat and tighten video cable connectors and try again.

Symptom *Image is skewed on the screen*

Possible Problem and Suggested Remedy

- Monitor configuration data is incorrect. This is not user adjustable – call technical support or your dealer for assistance.

Symptom *Image is distorted in vertical or horizontal direction*

Possible Problem and Suggested Remedy

- Monitor configuration selection is not optimal. Select another configuration from the control Panel and restart system.
- Monitor aspect ratio is incorrect. Adjust horizontal width and/or vertical size of the monitor. Refer to monitor user guide for directions on performing these adjustments, or contact your dealer.

NewLife 2

Technical Specifications

System Requirements

- Mac 128K, Mac 512K or Mac 512Ke
- Mac 128K and 512K require 128KB ROM set (available with 800KB floppy disk drive kit)
- 800KB floppy disk drive recommended

Hardware

- Low power CMOS logic
- CMOS 68HC000 CPU
- CMOS SCSI controller
- CMOS ASIC memory controller
- CMOS ASIC video controller

Power

- Mac internal power supply
- Voltage Required: 5V
- Power Consumption: Max 4.5 Watts with eight 256KB SIMMs

Video Interface

- DB-9 TTL video connector

Software Controls

- Control panel device (CDEV) to select and monitor screen attributes