New Life 2™

Memory/SCSI Upgrade with video adapter

for the 128K, 512K, and 512Ke Mac

Installation & Use Manual

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Notes:

- Figures are incomplete, as is figure cross reference
- Figure numbers are incorrect
- photos are missing
- table of contents will be done last
- power supply adjustment is being checked
- video cable attachment still to come

Figure cross reference:

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FCC Notice

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case, the user, at his own expense, will be required to take whatever measures may be necessary to correct the interference.

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Limited Warranty and Disclaimer

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Newbridge Microsystems
603 March Road
Kanata, Ontario, K2K 2M5
(613) 592-5080

Before You Start!

Please read this manual before you install the New Life board.

It provides important safety procedures and

Document Number 768001.MD300.A

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Table of Contents

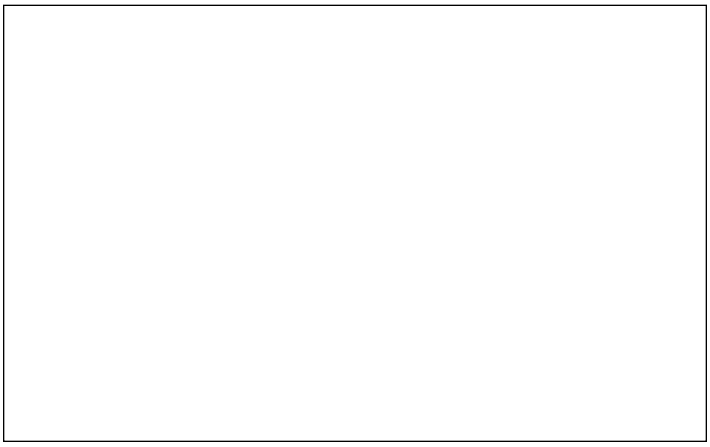

Figure 1 : The New Life 2 upgrade board

Software Installation

Technical Information

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

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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.

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.

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

!

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.

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 4.5MB 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 board. 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.

Preparation and Safety Precautions

Prepare your workplace

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

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
- regular flat-bladed screwdriver
- soft cloth or foam pad

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
- SCSI filter board
- Video cable and connectors

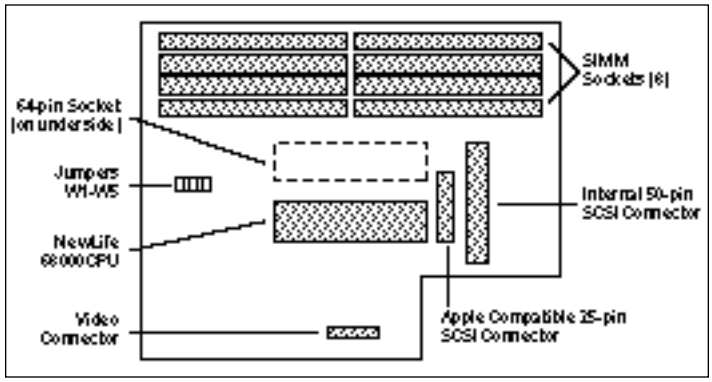


Figure 2 : Simplified top view of NewLife 1

- Self-tapping screw
- One 3.5 inch diskette
- Installation and Use Manual

Understand the hazards

Serious injury or death may result

Step 1:

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

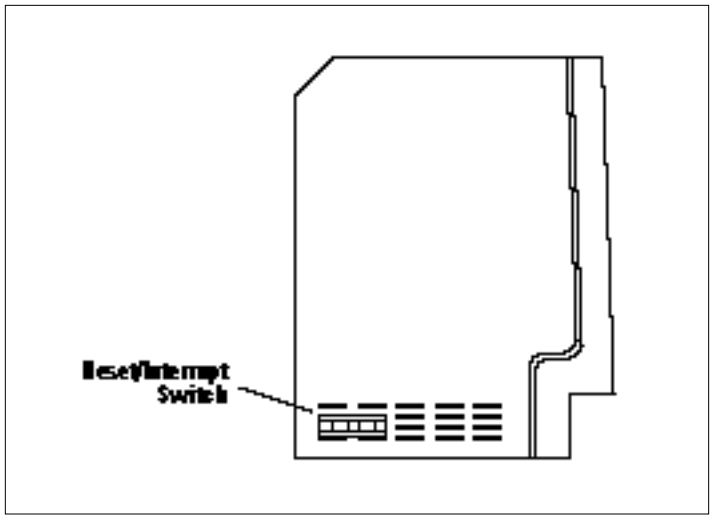


Figure 5 : The reset/interrupt switch

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.***

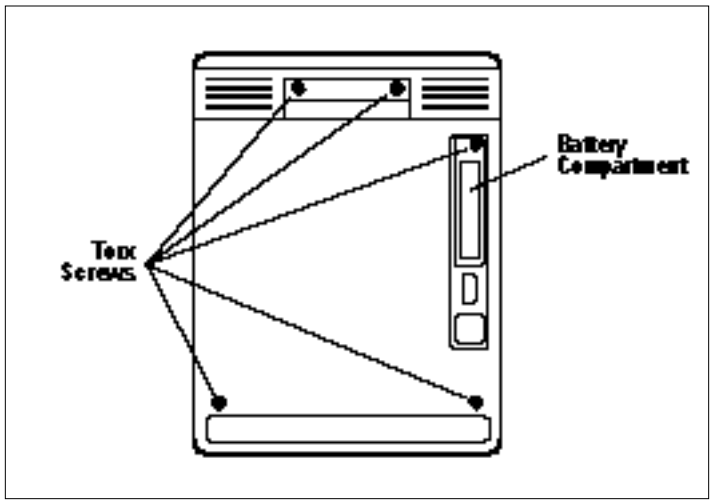


Figure 5 : The back of the Macintosh

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 section 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.***

!

Figure 5 : Discharging the CRT anode

Installing NewLife 2

Orienting NewLife 2

Figure 2 is a simplified top view of NewLife 2. It shows the

Figure 5 : Motherboard connectors

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.

Six easy installation steps

You install NewLife 2 in six easy steps:

1. Open the Macintosh case; remove the motherboard.
2. Set the NewLife 2 configuration jumpers and install the memory.
3. Attach NewLife 2 to the Macintosh motherboard.
4. Replace the Macintosh motherboard and adjust the

Step 2:

6"

power supply, if necessary.

5. Attach the SCSI cable.
6. Attach the video cable and close up the case.

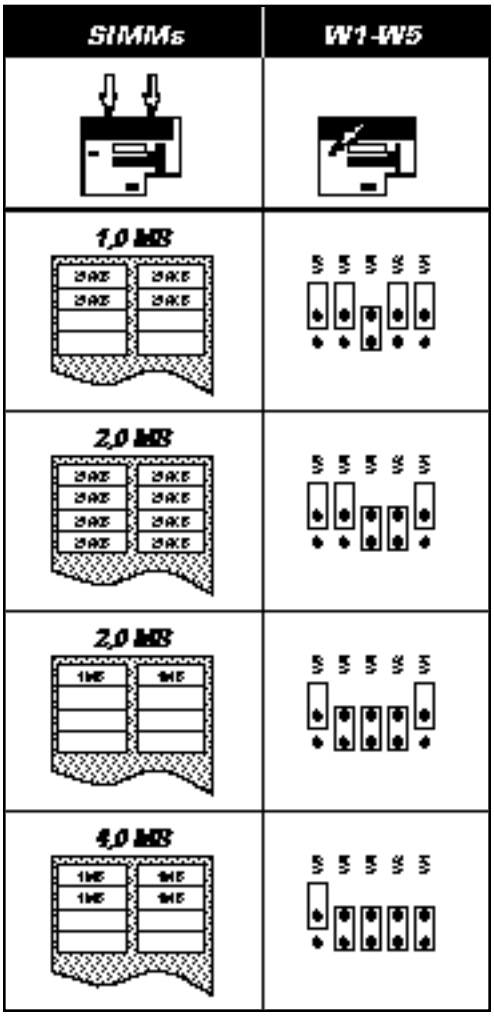
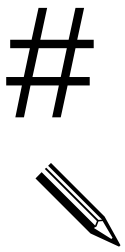


Table 1 : Configuring New Life 2

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.
3. Remove the reset/interrupt switch (if installed) from the side of the case by prying it off with a small flat-blade screwdriver.
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.

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6.

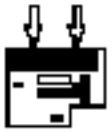
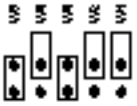
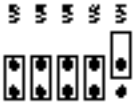
SIMMs	W1-W5
	
	
	
	
	
	

Table 2a : Configuring New Life 2

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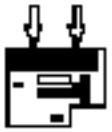
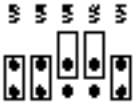
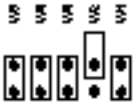
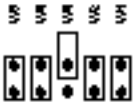
SIMMs	W1-W5
	
	
	
	
	

Table 2b : Configuring New Life 2 for a 512K Mac

Step 3:

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.

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.

Figure 1 : Positioning NewLife on the Mac

WARNING!
THE FOLLOWING PROCEDURE IS DANGEROUS,
A SERIOUS SHOCK HAZARD EXISTS!

To discharge the CRT anode:

1. Remove your grounding wriststrap, 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.
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 3, to be sure the CRT is discharged.
5. Remove the alligator clip from the ground lug.

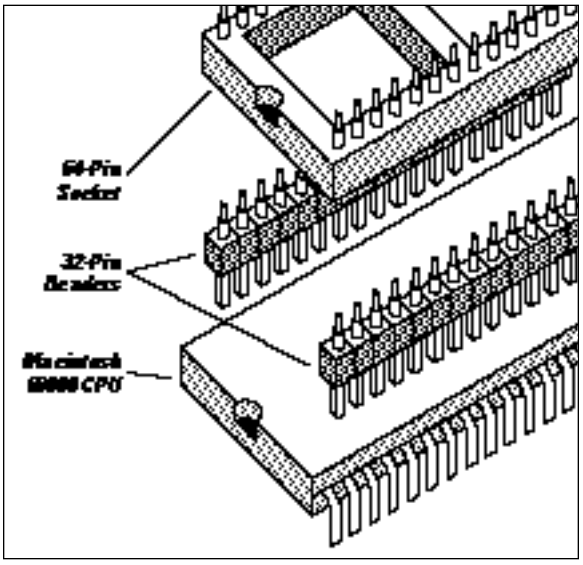


Figure 1 : Exploded view of the pin

To remove the Macintosh motherboard:

1. ***To prevent static damage to your Mac or NewLife 2, put on your antistatic wriststrap and perform this operation on your antistatic mat.***
2. Locate the motherboard. It is on the bottom side of the Mac. Once you remove the connectors from the board, it will slide out of the case.
3. To unplug the power/video connector, grasp the wire bundle and gently pull it away from the board.
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.

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

1

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 center of the board working towards the outer edge.

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.

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

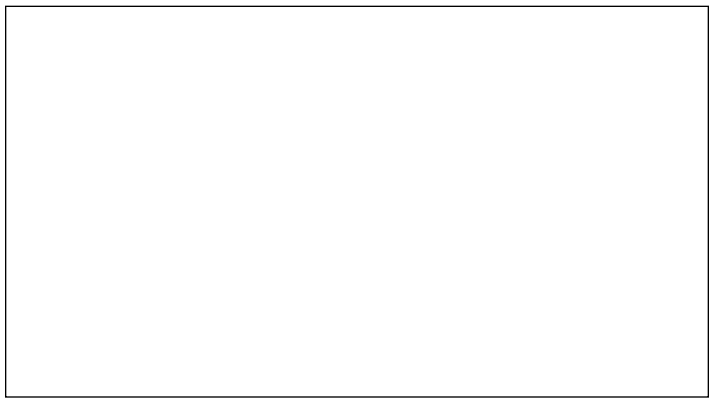

Figure 1 : Power supply plug

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Once you have installed the SIMMs and set the jumpers as shown above, skip to step 3 and continue the installation procedure.

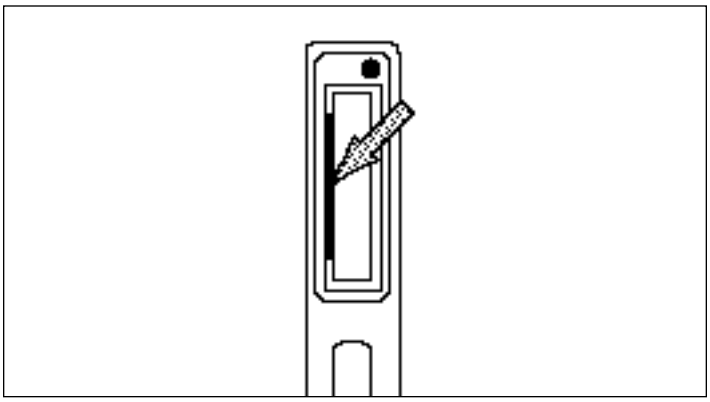

Figure 1 : Remove 1.25 inches of the battery

3

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 recognizes the memory installed on the NewLife board in addition to the 512KB on the Macintosh motherboard. ***However, you must set the configuration jumpers to indicate only the amount of memory on the NewLife board.***

Figure 1 : The internal SCSI cable

The system ignores the 512KB on the Macintosh motherboard in one case — when you install 4.0MB on the NewLife board. In this case, the total memory available is 4.0MB. 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.

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)

A ceramic 68000 has a gray or light brown case.

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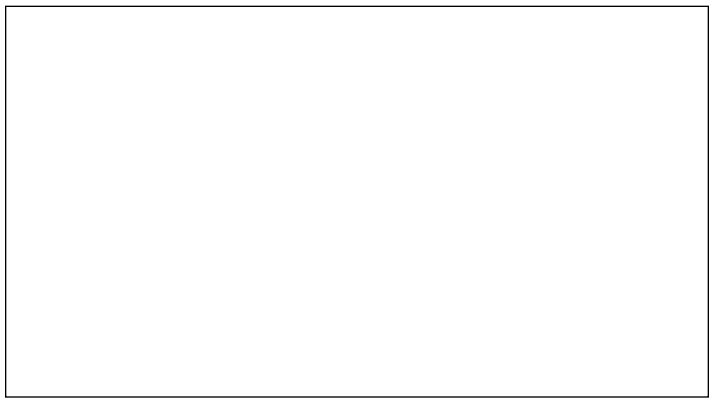

Figure 1 : The video cable

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

Some early versions of the Macintosh have ceramic 68000 CPUs. ***A ceramic 68000 has a gray or light brown case. 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

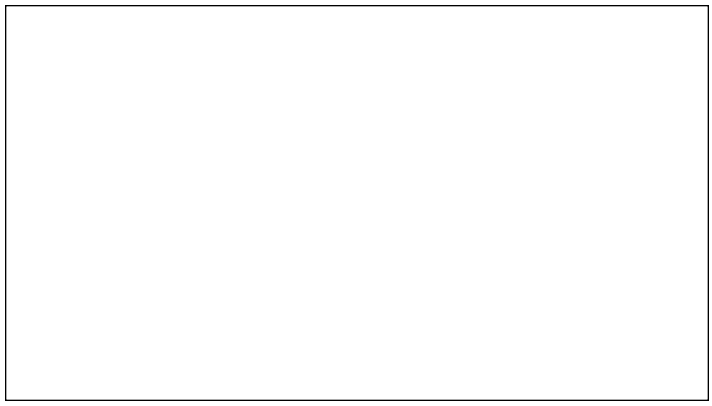

Figure 1 : Files on the master dislette

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.

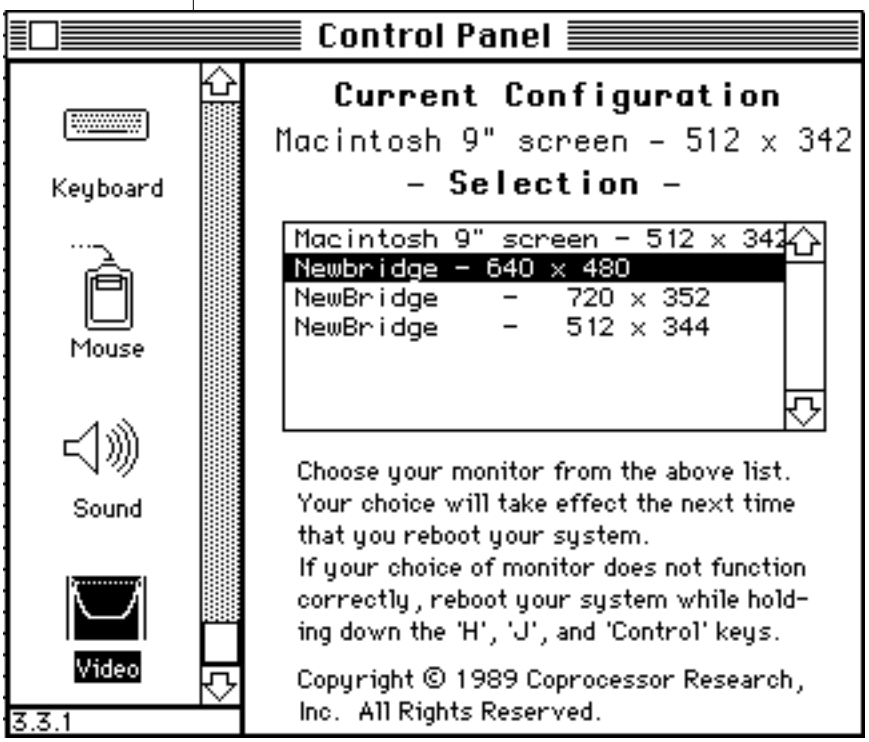

Figure 1 : The video configuration window

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.

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.***

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.

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. 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, remove your grounding wriststrap 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 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!***

Symptom	Possible Problem & Suggested Remedy
On powerup, nothing happens or both screens are blank	• 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. • Defective NewLife board. Remove NewLife board, reassemble Mac and restart. If Mac restarts properly, NewLife board may be defective – contact technical support for assistance.
Mac with flashing '?'	• Startup disk is not a system disk, or is defective. Restart with a functioning system disk.
Checkerboard pattern or vertical lines observed on powerup	• Loose Killy clip. Inspect clip for pins which are either too high or too low. Reseat offending pin and remount Killy clip. Verify pin continuity with an ohmmeter. • Bent pin. Remove board and check for bent pins.Straighten bent pins and carefully reseat socket. • Cold solder joint (if CPU pin kit is installed). Remove board and check each pin with an ohmmeter to verify continuity. If a discontinuity is found, carefully resolder the offending pin.
Intermittent Sad Mac or system bomb during operation	• Intermittent connection between Killy clip and Mac CPU. See remedies under 'Checkerboard pattern' symptom. Also

Symptom	Possible Problem & Suggested Remedy
Sad Mac on powerup	• Incorrect SIMM jumper placement on NewLife board. Verify that jumpers W1–W5 have been correctly set for your memory configuration (see Part 3). • Incorrect SIMM placement on NewLife board. Ensure that 256KB and 1MB SIMMs have been placed in the correct sockets as shown in Part 3. Note that the SIMM positions and jumper settings must match. • Defective SIMM module(s). Check the two items above. If Sad Mac still appears on powerup, one or more of the SIMMs is defective. Contact your dealer for replacements.
SCSI peripheral is not recognized or does not mount	• 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. • SCSI filter board incorrectly installed. Install correctly (see Part 3). • Bad connection on internal SCSI cable between NewLife board and battery door connector. Disconnect and reseat cable to ensure a solid connection at each end. If problem persists, contact technical support for assistance.

Table 3b : Troubleshooting chart —part 2

Symptom	Possible Problem & Suggested Remedy
Happy Mac and "Welcome to Macintosh" appear on Mac screen before it blanks, but nothing appears on external monitor	• No power. Plug in and turn on monitor. • Bad connection. Inspect, reseat and tighten video cable connectors. • Defective external video cable. Replace. • Blown fuse in external monitor. Replace. • Invalid monitor configuration selected. Select a valid configuration from the Control Panel and restart system. • Defective or intermittent internal video cable. Call technical support.
Scrambled display, rolling display, garbage on screen or display won't sync	• 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.
Image is skewed on the screen	• Monitor configuration data is incorrect. *This is not user adjustable* — call technical support or your dealer for assistance.
Image is distorted in vertical or horizontal direction	• 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

Table 3c : Troubleshooting chart — part 3

Attach the SCSI cable

The SCSI cable and connector assembly is shipped with the SCSI filter board attached to the SCSI cable, which in turn is loosely attached to the battery door connector.

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 cable 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.

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

Option — attach the internal SCSI cable

If you are mounting a SCSI disk inside the Mac case, attach the internal 50-pin SCSI cable.

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. Use the self-tapping screw to attach the video cable ground lug to the metal frame of the Mac.

You can now close up the Macintosh case.

Software Installation

Install the NewLife 2 software

Before you do anything else, make a working copy of the NewLife 2 master diskette. Put the master diskette away in a safe place and use the working diskette for the remaining procedures.

To install the NewLife 2 software:

1. Insert your NewLife 2 working diskette into the Mac floppy drive. The file named XXXXXXX is a CDEV which controls the NewLife 2 video port.
2. Drag the XXXXXXX file icon from the working diskette into your system folder.
3. When the file copy is complete, restart your Mac.

Configure the NewLife 2 video port

To configure the NewLife 2 video port:

1. Select Control Panel from the menu.
2. Scroll down to the NewLife 2 Video icon. Click on the icon to open the video configuration window as shown in Figure 22.