

The Rejuvenator  
*by Expert Services*

# Installation Manual

Designed by:  
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## Warranty

Expert Services warrants registered boards for a period of 90 days from the date of purchase unless the board is installed by Expert Services in which case the registered board will be warranted for a period of 1 year. If, during that time, the board fails for reasons which, in the opinion of Expert Services, are not the result of accidental or intentional abuse, the board will be repaired or replaced free of charge and in a timely fashion.

If the board fails for reasons other than abuse outside of the warranty period, the board will be repaired for a flat fee of \$95.00. This does not apply to replacement of the custom chips, which will be billed at their current price.

If the board fails for reasons of abuse at any time, the factory will charge a nonrefundable fee of \$40.00 to inspect the board and generate an estimate for repairs. The customer may then elect to have the board repaired for the estimated price or returned to them at no additional charge.

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## 1.0 Introduction

Thank you for purchasing the A1000 Rejuvenator, the compatibility upgrade for the Amiga A1000. With this kit you will modernize the A1000 to the level enjoyed by the latest A500s and A2000s. It provides:

- a battery-backed clock,
- an A2000 video slot subset,
- one meg of additional RAM to be used as new Chip RAM,
- the new 1 Meg ECS Agnus,
- and an A500/A2000-compatible 1.3/2.0 ROM socket.

As long as Commodore supports the A500 and A2000 in their current form, this upgrade kit will enable the A1000 owner to stay compatible. It will even use the ECS Denise when it is available.

## 1.1 Technical Abilities

The Rejuvenator requires the complete disassembly of your A1000. In addition:

- You should be familiar with technical electronic terms and be able to locate components by their silkscreen identifications.
- You should have the tools to perform electronic work on static sensitive equipment.

If you are not sure that you can do the job, please contact the company from which you bought the Rejuvenator and ask for a list of companies qualified to perform this installation.

Be advised that if you somehow still have a warranty on your A1000, installing this product WILL void your warranty!

## 1.2 Things needed for Installation

The tools required for this installation include:

- a 3/8" slotted screwdriver
- a #1 Phillips screwdriver
- long nose pliers
- small diagonal cutters
- a static wrist strap and working pad
- a hair dryer
- lubricant such as WD-40
- optionally, a grounded tip soldering iron.
- a Kickstart disk is also required for testing.

## 1.3 Parts Supplied

- 1 A1000 Rejuvenator Circuit Board with Agnus

Extras

- 8 256Kx4 80-120 nanosecond CMOS DRAMs (installed and tested).
- 1.3 Kickstart ROM with Toggle switch assembly (installed and tested).

## 1.4 Static Handling Precautions

### CAUTION

*Proper static handling precautions must be taken! Improper handling procedures may destroy your A1000 or the Rejuvenator!*

The A1000 Rejuvenator and the internal circuit boards of the A1000 are sensitive to static electricity and proper precautions should be used when handling either. This includes using a properly grounded wrist strap and a grounded static protection pad. ANY ATTEMPT AT ASSEMBLING THE A1000 Rejuvenator WITHOUT USING THESE ITEMS VOIDS YOUR WARRANTY AND IS PERFORMED AT YOUR OWN RISK. Dayton Logic Design, Expert Services and their representatives do not assume any liability for any Rejuvenator or A1000 damaged through improper installation or installation techniques!

## 1.5 Glossary

This section will attempt to explain several terms commonly used throughout this document:

**Motherboard** - This is the main large printed circuit board in the A1000.

**Daughterboard** - This is the small printed circuit board that sits atop the motherboard. On the A1000, the Daughterboard contains the Kickstart WCS RAM.

**Kickstart** - This is the name of the ROMable portion of the Amiga operating system.

**WCS** - Write Control Store. This is a write-protectable RAM that, once loaded, acts in lieu of a ROM. The A1000 uses a 256K WCS to allow changes to be made to the operating system without having to take the machine apart and change ROMs. The early Amiga operating systems had a lot of incompatibilities between versions.

**Rejuvenator** - A replacement daughterboard that moves the custom chips to a daughterboard on the Amiga A1000 computer, adds the capability to use the “fatter Agnus” chip and the Extended Chip Set (ECS), adds one megabyte of new chip ram, and allows the old motherboard chip RAM to be used as Fast RAM or Kickstart WCS.

## 2.0 A1000 Disassembly

The A1000 Rejuvenator installation requires complete disassembly of the A1000 to remove the

A1000 motherboard.

First, make sure all peripherals are removed, as well as removing the AC power cord from the A1000. You **MUST** remove the power cord or face possible injury or damage to your Amiga!

Next, remove the 256K chip RAM expansion board from the front of the A1000 (Figure 1). This is accomplished by simultaneously pressing the top and bottom of the cover at the exact middle and gently pulling the cover off. The RAM board is secured by two Phillips screws. Carefully loosen the screws and pull the RAM expansion off the computer.

Now turn the A1000 over. There are five Phillips screws hidden in deep wells (holes) as shown in Figure 1. Remove these and put the screws (and all others removed during this disassembly) in a container so they will not get lost. Turn the A1000 right side up. Using a small standard (flat) bladed screwdriver, pry the upper lid retaining tabs loose. Carefully remove the lid and place it out of the way.

You will see the RF shield covering much of the inside (Figure 2). It will take some work to remove, as it was meant to keep RF radiation inside the Amiga. There are three screws on the power supply; one on the disk drive; and eight at the back, on each side of each I/O connector (Disk, RGB video, Parallel and Serial Ports). Finally, there are two screws in the front, one on each side of the connector where the front panel expansion RAM plugs on.

At this point, all that holds the RF shield on are two twist tabs (Figure 2). Use a pair of long nose pliers to straighten them out. Try to remove the RF shield, taking care to look for binding. Do not pull excessively, as you can easily warp the shield.

## CAUTION

***From this point on, proper static handling precautions must be taken! Improper handling procedures may destroy your A1000 or the Rejuvenator!***

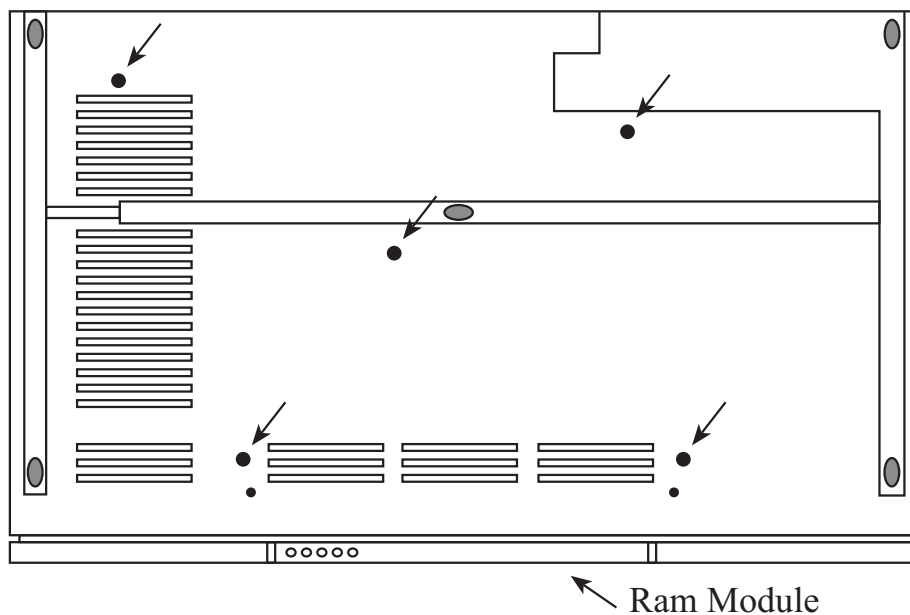


Figure 1  
Screw Holes and Ram Module

The front bezel of the case (The section with the LEDs and disk drive opening) must be removed next. From the bottom side of the machine, remove the two flat head screws. The front bezel can be wiggled back and forth and removed. Don't pull too far as travel is limited by the LED cabling. Remove the power LED at the bezel by pressing down on the retaining flange at the underside of the LED and pulling gently on the cable.

Next, you have to remove the disk drive. There are four slotted brass couplers used to hold the drive to the case. Use a wide standard (flat blade) screw driver to remove the couplers. There are also four Phillips head screws, two on each side of the disk drive, which must be removed.

Before removing the disk drive, remove the cable going from the disk drive to the LED in the front bezel. Due to differing drives used by CBM, the easiest place to remove the cable is where the LED is held onto the case. In most cases, the LED will pull out of the front case after you loosen a catch. Remove the ribbon cable and the green ground strap from the motherboard; leave the other ends attached to the disk drive. Remove the four conductor disk drive power cable from the motherboard, at 'J13.' At this point, the disk drive may be removed. Note the orientation of all cables for reassembly.

Now you have to remove the Kickstart daughterboard. Just remove three retaining screws (Figure 3) and pull the board free. It may take some pressure to get the board to come loose.

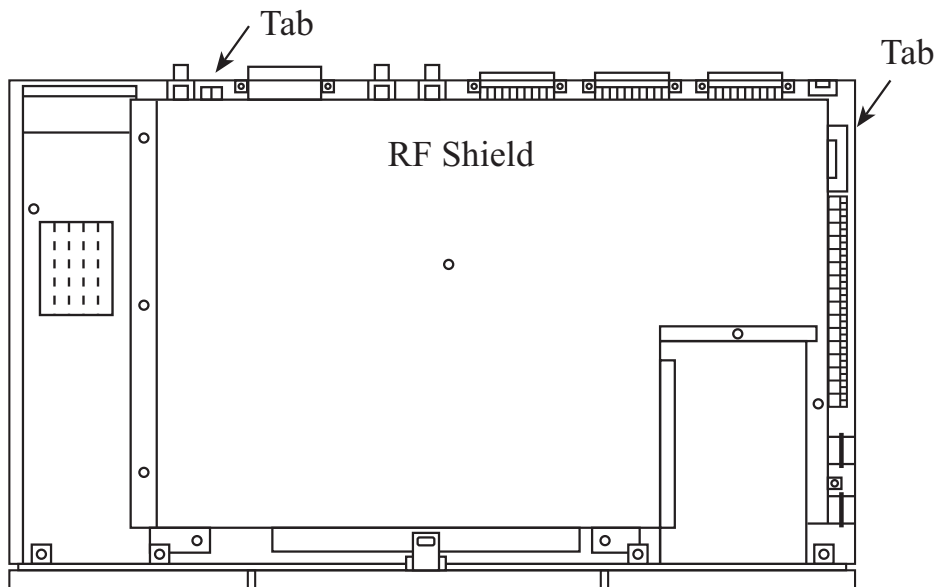


Figure 2  
RF Shield and Twist Tabs

Unplug the multiconductor power cable from the motherboard. It is marked 'J14', and is located behind the daughterboard, near the disk drive power cable, and leads to the power supply. Note that it is keyed such that it locks when plugged in properly. You may have to pry on the lock (flange) to remove the cable.

Now you are ready to remove the motherboard. There will be two screws that hold the power supply, and two that are underneath the disk drive. There are two screws in the middle; one on each side of the front panel plug in RAM connector.

The motherboard should be free. If not, locate the screw(s) holding it in place and remove. The joystick ports may catch on the case holes; just pry (widen) that side of the case open and angle the board out.

Remove the RF shield on the bottom side of the printed circuit board by twisting the tabs to align them with the slots in the motherboard. Then remove the three posts that hold up the old Kickstart Daughterboard. They are held on by three screws on the bottom side of the motherboard,

## 2.1 A1000 Rejuvenator Installation

*Note! you should already be using a grounded wrist strap and pad.*

*Persons having performed the piggyback modification to their A1000 motherboard RAM must read Appendix B first before proceeding.*

Remove the Rejuvenator from its packaging. Check the parts against the list in section 1.3.

First, bend over the transistors marked “R” and “B” (Q1 and Q3 respectively, located on the motherboard) towards the I/O connectors. This assures adequate clearance for the transistors.

As needed, insert the eight 256Kx4 DRAMS into sockets U6-U13. Insert the chips so the notch or dot representing pin 1 faces away from the sockets for the custom chips. Examine for bent pins. These DRAMS are CMOS and are extra sensitive to static, so be careful!

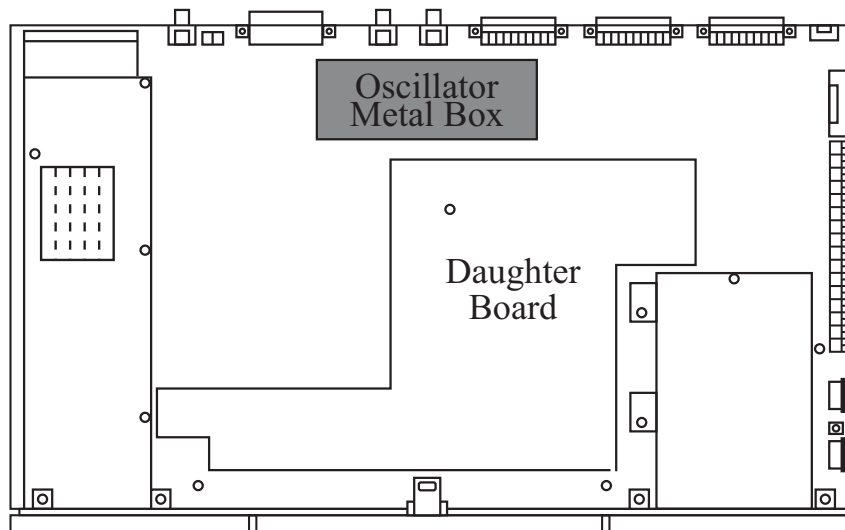


Figure 3  
Daughter Board

Using an IC extraction tool, or carefully using a screwdriver, remove PAULA (8364), DENISE (8362) and AGNUS (8361) from the A1000 motherboard. Plug Paula and Denise into their respective sockets on the Rejuvenator (U20 and U25). Their locations and orientations are clearly marked on the silkscreen. In any case, Paula and Denise will be oriented the same direction as they were on the motherboard, once the Rejuvenator is in place. Agnus should be stored some place safe in case it is needed in the future.



If you are installing your own ROM, it plugs in such that pin 1 is in the opposite direction as the DRAM. On the silkscreen, pin one is located at the pin described as A18 at the ROM socket (U18).

If you are installing your own 1 Meg Agnus, labeled 8372, it fits into the middle of the board in socket (U19). Note that one edge of the chip is beveled and has a dot in the middle of the bevel. This indicates Pin 1. Look at the pins around the chip and see if any are bent. The pins must be straight with one another to fit in a socket. If any are not straight, carefully align them. Place the Agnus in the socket such that the dot lines up with the '1' silkscreened on the board. This would be towards the front of the A1000, once the Rejuvenator is installed,

The process of plugging in Agnus is easy: line the dot up with pin 1 and set the chip on the socket. The little grooves on the socket should separate the pins. You can tell by feel if you are not in perfect alignment. Press the chip in with your thumb.

There is one area that may or may not be an area of difficulty. Because the Rejuvenator fits much further down on the gold pins that formerly went into the Kickstart WCS daughterboard, the plastic spacers that hold the spacing between the gold pins must be pushed all the way to the bottom of the pins, against the plastic separator at the bottom. Several techniques are listed in Appendix D. For some users this may be as easy as pushing them down with your fingers, others may be extremely difficult. If this looks to be too difficult, Expert Services can perform installation for \$40 plus shipping. The warranty is extended to one year if Expert Services performs the installation.

Once the spacers have been pushed down, it is highly recommended to try on the original daughterboard several times to help bring the gold pins into alignment. It is important that all the pins are evenly spaced and perpendicular to the motherboard for the Rejuvenator to fit. Additional information on alignment and installation of the Rejuvenator can be found in appendix E.

Check the machine pins of the bottom of the Rejuvenator to insure they are straight and that each row of pins are perpendicular to the circuit board. If they are not carefully bend them to bring them into alignment.

The Rejuvenator board fits onto the same gold square posts as the original daughterboard as well as, via machine pin adapters, the three custom chip sockets on the motherboard. Place the Rejuvenator into the A1000, attempting to first line up the gold square posts. Start them onto their sockets. Pay special attention to the two pins right behind the front mounting post—they're easy to miss. Use a long screwdriver, if necessary, to move the pins so the adapters fit properly into the custom chip sockets. Carefully place the assembly on a sturdy table and press the adapters into the custom chip sockets. It takes considerable pressure to get all 124 pins to seat the first time. The motherboard is fairly weak; it needs more support while you are inserting the adapters than is supplied by the case. That is another reason why you have to remove the motherboard. Make sure that the capacitors at C92-C95 are straight and do not catch on the notch in the Rejuvenator.

Look at every place where the adapters plug into the custom chip sockets and where the Rejuvenator sockets fit the square gold posts. If anything is misaligned, you must separate the assemblies and try again. This is not fun and once you've got the alignment correct you will not

want to take it apart again without good reason.

The next thing to do is to connect the clip leads to the locations described below. This requires removing the top off the metal box surrounding the oscillator section (figure 3), in the rear middle of the motherboard, and installing two clips to the proper IC pins.

Clip lead “28Mhz” goes to pin 8 of the 74S51 IC located at U9G inside the oscillator section (the area that is inside the perforated metal box). The silkscreen ID happens to be outside the wall of the metal box. Be careful as there are two 74S51 ICs. You want the one closest to the power supply.

Clip lead “RMBCLKS” goes to pin 1 of the 74F74 at location U8G. The clip lead “+12V” goes to the disk drive side of C76. Unfortunately C76 is not identified by the silkscreen. It is the capacitor located between C77 and C75, between the power supply connector (J14) and the disk drive power connector (J13).

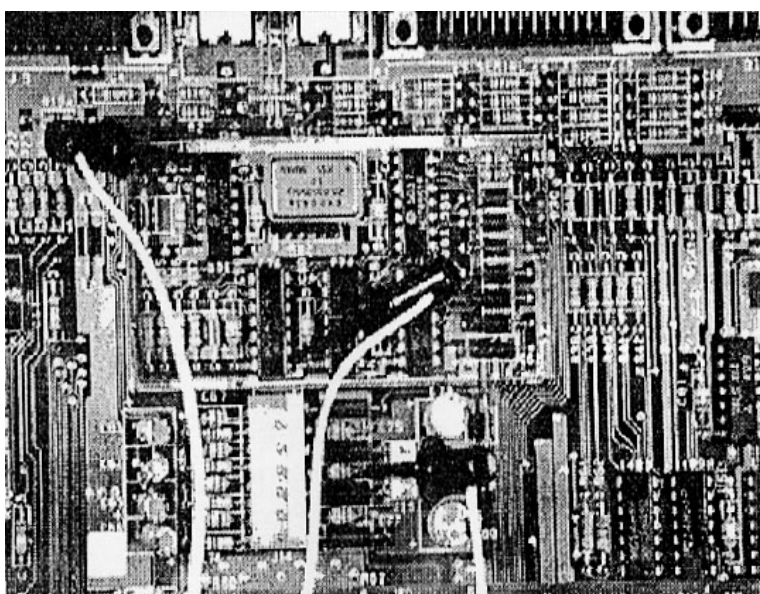
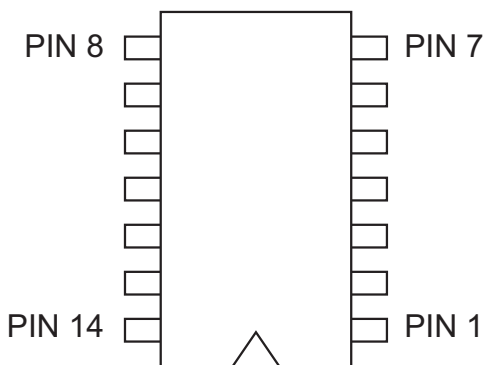


Figure 4  
Clip Leads

## 2.2 Testing

To ensure that your A1000 is working, you should put the motherboard, minus the RF shielding, back into the case (Note: start the sandwich assembly into the power supply area first, angling it such that the power cable rests on on top of the Rejuvenator, not underneath it. Also make sure that the motherboard, in the process of angling it in rests on top of the power supply’s metal retaining flange, not beneath it). Secure the motherboard with one screw. Plug the cable from the power supply back into the motherboard. Mount the disk drive with two of the brass collars and plug the ribbon cable in. Plug in the ground strap also. Make sure the ribbon cable has not started to come off the connector at the back of the disk drive, under the metal cover. Do the same for the disk drive power cable. At this point, with one exception, you are ready to test.

Short the two pins labeled J100 with the supplied shorting block . This forces the Rejuvenator to boot from a Kickstart disk. Plug on your 256K front panel RAM expansion-βyou will need this,

as it becomes the RAM used for storing the Kickstart code. Finally, connect a monitor and keyboard (and mouse if you wish).

Check to make sure that nothing has come loose. Double check all the ICs, the clip leads, the power leads, and the disk drive cables (the Kickstart disk will not be requested, or loaded, if the disk drive is not correctly connected).

Power the monitor and the A1000. It should boot as before: blink the power LED, take 10-15 seconds to check the Kickstart RAM, flash several colors of grey to white, and then request the Kickstart disk. You can put in any Kickstart disk you want. Boot Workbench. You should see more than 500K (usually 800K to 900K). At this point, your A1000 is rejuvenated! (If J101 and J102 are on, then you should see 1.3 to 1.4 Meg!)

If your machine never comes up, it can be one of several faults. Check the power LED to see if it blinks. If so, the Rejuvenator is at least attempting to work.

If the color changes from grey to white, but hangs, then the disk drive is not working. Something is probably wrong in cabling. Recheck and try again.

If the screen stays black, then you have either: a pin bent in an IC; an IC inserted backwards in a socket; one or more misaligned pins from the Rejuvenator to the motherboard; a loose clip lead; or possibly a reversed custom chip. If you have trouble getting a clip-lead to stay, you can solder it.

If the screen comes up robin's egg blue then the Kickstart RAM is faulty or missing. Some third party RAM expansions are not adequately decoupled and fail due to noise. The Kickstart boot sequence performs a significant test of every memory location in the WCS. The RAM may have worked before, but the diagnostic detected a previously unknown problem.

If screen comes up green, check the RAM on the Rejuvenator for a bent pin, reversed IC, or bad Agnus.

If the screen comes up yellow, it means that the front panel RAM expansion is missing when the Kickstart ROM option is selected (This is only included for completeness. In Kickstart RAM (disk) mode, a missing front panel RAM would cause a robin's egg blue screen). Check to make sure that it is well connected to the A1000 motherboard.

Due to an A1000 hardware design conflict with Rejuvenator, which cannot be changed, the motherboard RAM will refresh more than it was originally designed to. The result is that it will use slightly more power than originally designed to. This will not be of concern in most cases.

## 2.3 ROM Option

If you bought the A500/A2000 style Kickstart ROM option, you will have also received a toggle switch with a foot of twisted pair wire. This will fit onto J100 (orientation is not important) and allows you to select between a Kickstart disk or ROM by toggling the switch position and rebooting your Amiga by pressing Ctrl-Amiga-Amiga simultaneously. If you don't use this switch, be sure to remove the jumper at J100 before you reassemble your Amiga. If you don't, the Kickstart in ROM will be disabled.

You may mount this switch anywhere you want, limited only by the path through the RF shield and the length of the wire. A properly sized drill bit will cut the correct size hole. Alternatively, you can use a soldering iron to melt a hole in the plastic of the case. (Recommended at the back of the case, due to looks). This really isn't good for the iron, but it is quick.

Note that you have several options for organizing the 512K motherboard RAM when the ROM is selected (jumper J100 open) via jumpers J101 and J102 according to the following truth table:

J101	J102	Function
ON	ON	C00000H 512K autoconfig
ON	OFF	C00000H 1 Meg autoconfig
OFF	ON	700000H 512K/1 Meg (addmem required)
OFF	OFF	A80000 - B7FFFF 512K/1 Meg (addmem required)

AmigaDos will find and automatically use any memory located at C00000H. It is preferable that the motherboard RAM exist there, as that is the only way to make it autoconfigure.

Unfortunately, some third party RAM expansions expect to live at C00000H and if you cannot re jumper the RAM expansion to exist elsewhere in the Amiga memory map, you will have to move the motherboard RAM to A0000H (preferred) or 70000H. To get the operating system to use memory at those addresses, the 'addmem' program must be used: B00000-B7FFFF for 512K motherboard RAM and A80000-B7FFFFH for 1 megabyte of piggybacked motherboard RAM. This would have to be done in your startup-sequence, 'addmem' should be the first command in your startup-sequence. This minimizes Chip RAM usage.

Due to the way Kickstart 1.3 and earlier versions work, the users who have performed Chris living's motherboard piggyback upgrade to 1 Meg (in Vol 2 Issue 1 of Amazing Computing) must use the proper settings for J101 and J102 if the RAM is to reside at C00000H. Any other address won't matter because you tell the operating system how much RAM exists with the parameters given to 'addmem'.

The Amiga custom chip registers, nominally located at DFFXXXH, actually mirror (or tile) all the way down to C00000H or the end of C00000H RAM. The Kickstart ROM, at best, behaves erratically when there is a section in CXXXXXH that is not decoded at all. Usually, the result is a yellow screen. This will happen if the 256K front panel expansion is missing. Since there are two memory possibilities—512K, and 1024K (1 Meg)—two of the combinations of jumpers J101 and J102 ensure that there are no undecoded areas to cause a "Yellow" screen error.

## 2.4 Fast Memory When Kickstart Disk Mode is Selected

The Rejuvenator memory map changes somewhat when jumper J100 is closed. 256K of your motherboard RAM is allocated to hold the Kickstart disk data. This means that, at best, only 256K can autoconfigure at C00000H. As with the ROM option, that 256K can be moved to A00000H or 700000H by changing jumpers J101 and J102. In any case, when the Kickstart disk option is selected, the motherboard RAM will always exist simultaneously at F00000H to FFFFFFFH.

Anytime that the motherboard RAM is not decoded at C00000H, the 'addmem' program must be used to tell AmigaDos where to find and use that memory. Internal RAM expansions such as

Spirit, Insider, et. al. will force you to make a decision as to which device must be 'addmem'ed.

A problem exists that allows users with 1 megabyte of piggybacked motherboard RAM to use only 768K of that memory: 256K for Kickstart WCS, and 512K as FAST RAM. 256K of the 1 megabyte of RAM is lost because it is write protected along with the Kickstart WCS RAM. If jumper J101 is installed, then you only need 'addmem' F80000-FBFFFFH as AmigaDos will have found 256K at C00000H. If a RAM expansion forces you to change that 256K at C00000H to somewhere else, then you will have to 'addmem' F00000-F3FFFFH as well.

Alternatively, you can use the Kickstart ROM (remove J100). In that case, there is no need to protect any of the RAM and all 1 Megabyte is available for use. This problem is the result of limitations of the motherboard design and attempting to stuff the board control logic in just four PALS.

The following table shows the memory assignments when J100 is installed:

J101	J102	Function
X	X	F00000H-FFFFFFH WCS 256K/512K Addmem
ON	ON	C00000H-C3FFFFH Autoconfig
ON	OFF	C00000H-C3FFFFH Autoconfig
OFF	ON	700000H-7FFFFFFH Addmem Required
OFF	OFF	A8000H-B7FFFFH Addmem Required

Your motherboard memory will be decoded in at least two areas regardless which settings are used for J101 and J102. To support the Kickstart WCS, your motherboard RAM will appear from F80000H to FFFFFFFH as well as optionally C00000H, A80000H, or 700000H. If you have piggybacked the motherboard RAM for a total of 1 megabyte, the other 512K will exist from F00000H to F7FFFFH. Otherwise, the upper 512K will 'mirror' (or fold) into that area.

## 2.5 Expansion Peripherals

While your A1000 system is working in a limited test mode, it is time to add your peripherals back on to see if there are any conflicts. By peripherals, it is meant third party RAM expansions and hard disk drive controllers, etc. Your standard ports (parallel, serial, etc.) will work as before.

The only electrical conflicts will be in the addressing of RAM expansions as noted above in section 2.3. If you cannot address the third party RAM expansion other than C00000H, then the Rejuvenator must have its address jumpers changed accordingly.

Also if you will be using either a Spirit or Insider memory expansion board you will have to use the clock on the Rejuvenator board because of address conflicts.

The only known physical conflicts are space conflicts with the FRANCES RAM expansion for the LUCAS accelerator, Insider I and Spirit board while simultaneously using the Rejuvenator Video slot. These items all try to occupy some of the same space. The easy solution to this problem is to build your own extension ribbon cable for the video slot (you can purchase an adapter PCB from Expert Services). How you build this is up to you. FCC radiation problems

prevents Dayton Logic Design from solving this problem.

If you think you have electrical contention problems, try using the A00000H setting. You can be sure that no other Amiga expansion device uses that area because it is normally decoded for the two 8520 CIA chips. It was a waste of address space to decode 2 Megabytes of RAM for the CIAs, so the Rejuvenator PALs limit the CIAs to 1024K (B00000-BFFFFFFH) and allow up to 1 megabyte of RAM to be located from A00000-AFFFFFFH.

If the standard motherboard RAM decodes do not satisfy you, Dayton Logic Design or Expert Services can provide alternative SXRF90 address decode PALs to your specifications. There is a special PAL available that lets Michigan Software Insider I owners (or any internal RAM expansions populated to 1 Megabyte or less) make both their motherboard RAM and their Insider RAM Autoconfig at the same time. Contact Expert Services for details.

## 2.6 Battery

The battery will be charged at the time the Rejuvenator is manufactured, but it may become discharged during the time it is on the shelf. The trickle charge circuit may take up to 50 continuous hours to recharge the Nicad battery.

## 2.7 Real Time Clock Usage and Speed Adjustment

The clock on the Rejuvenator is an A2000/500 compatible clock. Therefore it can be set using the Workbench 1.3 'SETCLOCK' command. 'SETCLOCK LOAD' will load the current time of the clock chip into the A1000, 'SETCLOCK SAVE' will save the current time of the A1000 into the clock chip.

There is a trim capacitor at C24. To adjust the speed of your real time clock, move the position with a small flat bladed screw driver. Use 'SETCLOCK LOAD' to force the system to read the real time clock and then wait a few minutes and 'SETCLOCK LOAD' again. Check the difference with an independent time source. Adjust until correct.

Note once the time is loaded from the clock, the system 'counts' independently from the real time clock using the 'tick' signal from the power supply. So you must use 'SETCLOCK LOAD' twice to read the beginning and ending time values from the clock.

## 2.8 Reassembly

Take your A1000 apart again (leaving the Rejuvenator on the motherboard, of course). Replace the RF shield on the bottom of the motherboard and put them both back into the A1000 case. Put all motherboard screws back in. It won't be possible to put one screw, located underneath the Rejuvenator, back in. Everything is still secure without that one screw.

Replace the disk drive and its cables (Use the four slotted brass collars to hold it down). Plug the disk drive LED back into the case. Plug the power LED wire back into the motherboard. You might want to recheck to see if everything is still working.

Put the metal RF cover over the oscillator section, taking care not to loosen any clips (enlarging a hole in the lid might be necessary here). Plug in the video slot header, any video slot card, and connect the proper cable and run it out the back. Shielded ribbon is best here. If you use a shielded round cable, you might have to make a hole in the top RF shield to allow it to pass through. You will have to make a hole in the rear of the case for the cable, anyway.

Finally, put the RF shield back on in reverse procedure to taking it off. Put the case's top lid back on and replace the five screws which hold the lid on. Plug the front panel RAM expansion on and secure with the two Phillips screws. Put the RAM expansion's cover on and you are though. Connect the system together and test it again.

## 2.9 Care in Travel

Because the clip leads can come off due to vibrations when transporting a Rejuvenated A1000 in a car or plane, it is highly recommended that they be soldered in place. This requires extreme care as you will be soldering directly to ICs and they can be damaged with exposure to extreme heat for more than a few seconds.

## 3.0 Video Slot Considerations

The Rejuvenator comes prepared to run the flickerFixer in its video slot. Other boards may require additional jumpers to be soldered to pads on the Rejuvenator and clipped to locations on the motherboard. In particular. Analog Red, Green, and Blue would have to be picked up from the motherboard for use with a genlock. These signals and where to pick them up are discussed in Appendix C.

It is usually necessary to remove the metal bracket from a video slot card to get it to fit under the standard RF shield.

## 4.0 Future Compatibility

Your Rejuvenator will accept the new ECS Denise chip. All you need to do is to simply unplug your current Denise and plug in the new ECS Denise. You can get this part from Expert Services. It is also recommended to purchase a new Paula at that time so all your custom chips will be at the same, compatible release level.

The A500-compatible ROM socket is also compatible with a 512K byte ROM, proposed for possible use in future versions of Kickstart. Most A500s and A2000s are wired for this ROM. Right now the 256K ROM mirrors from F80000-FFFFFFFH. A new 512K ROM will just plug in and work with no juniper changes. Even so, you will still be able to use the Kickstart disk option to run older versions of Kickstart!

## 5.0 Acknowledgements

Dayton Logic Design expresses its most heartfelt thanks to the following people and companies:

Ben Williams of Blackbelt Systems for the CAD Program (BoardMaster) used to design the Rejuvenator on the Amiga, for the Amiga

Jim Locker, for use of a A1000 motherboard during an emergency

John Snow for the use of an Insider and a SideCar for compatibility testing

Scott Bennett of Expert Services for his backing of the Rejuvenator project

## Appendix A - Optional Equipment

ROM upgrade Kit - \$49.95 Contains 1.3 Rom, toggle switch, cable and instructions. Allows changing from Kickstart Disk to ROM at will.

*Coming Real Soon from Expert Services:*

A1000/500 Expansion bus buffer kit - \$75. A build-yourself kit containing a bare PCB, edge card connector, and ICs that will buffer your expansion peripherals. Plug this device into the A1000 first and all your peripherals into it. Will fix many 'noise' problems. Includes tips for improving the ground at the expansion connector.

A2K-A1K Keyboard adapter - \$15 Allows A2000 keyboard to be used on A1000.

## Appendix B - Requirements for 1 Meg piggyback upgrade.

The procedure for installing the Rejuvenator will require the following changes to work with A1000s that have been modified for extra memory by piggybacking the motherboard RAM.

The problem is clearance between the underside of the Rejuvenator and the top RAM chip of the piggyback stack. You can test fit the Rejuvenator and see if you have a problem. You probably will.

If so, you have two choices: Remove the piggybacked RAM, or perform modifications to the A1000.

If you want to do the modifications you will have to trim the motherboard posts close to the PCB and tack solder extenders to stubs. This is the easiest, but the effect is to offset the pins by .025". This will cause alignment problems with the Molex connectors, but the extensions can be bent to fit. This causes mechanical stress on the solder joint and may cause it to come apart in the future.



## Appendix C - Video slot signal descriptions

The A1000 Rejuvenator has most of the signals needed to run A2000-style video slot peripherals. Notable exceptions are the pins that contain audio and the parallel port. These were not easily available without ribbon cables and further conflict with internal expansions. There are also 11 signals that are not available on the daughterboard that must be wired to specific locations on the motherboard. Note that the MicroWay flickerFixer and many other video slot peripherals will work with no added jumpers.

It is recommended to test the device without any jumpers, then adding them as needed when the device fails to function. Examination of the pins used on the video slot card will tell which signals will be needed.

All wires will be connected from the labeled pads on the video slot adapter PCB to locations on the motherboard. The following lists where it is best on the motherboard from which to obtain these signals:

(+12V) - Connect to C76, next to J13 (Unlabeled between C75 and C77). Connect to side nearest J13.

Analog Red - R25 side closest to rear of A1000

Analog Blue - R23 side closest to rear of A1000

Analog Green - R24 side closest to rear of A1000

!XCLKEN - IC at location U9G pins 2 or 3

Analog CSYNC - no real equivalent; try Digital CSYNC at location U7A pin 2.

XCLK - R27 side closest to rear of A1000

(-12V) - Use -5V, mislabeled. Available at J13 side of the ferrite bead just in front of C77.

Comp. Video - The A1000 Comp. Video is color, the A2000's is monochrome; may or may not work: R9, closest side to rear of A1000.

TBASE - To the J13 side of the ferrite bead between C75 and the wall of the oscillator housing

!LED - to Pins 9 or 10 of the 1488 IC at location U6K.

## Appendix D - General Internal Expansion Information

Now that you've replaced your daughterboard, how do you connect the clip leads from your

internal expansions? This section will detail the new locations.

Generally, there are only two locations that the common internal RAM expansions connect to. These are the !OVR and XRDY signals. When a device calls for connecting to location 'P' on the Kickstart daughterboard, it will translate to the PAL called SBPALN90 at the same relative pin.

Example: The Spirit board has two clip leads, J1 and J2. J2 goes to SBPALN90 pin 8, and J1 goes to SBPALN90 pin 7. The Insider I and II, which only have one clip lead, will go to pin 7.

Note: The rest of the pins of SBPALN90 are not necessarily the same; only pins 1 through 4 and 6 through 9.

## Appendix E - Tips on moving the plastic spacer bar down.

One of the most difficult parts of the Rejuvenator installation is the movement of the spacer on the gold pins from the upper part of the connector to the bottom. The plastic used varies in how tight it fits to the gold posts. First try using the edge of a floppy disk to push the spacers down, if this does not work read on.

Two techniques have been developed for the hard to move spacers. First, heat the spacers by blowing hot air from a hair dryer over the pins until they become loose. Sometimes, that is all that is needed. You should spray on a lubricant, like WD-40, as well.

Reheat each connector before pressing the spacer down. Use a small card, like a credit card but heavier to push the spacer.

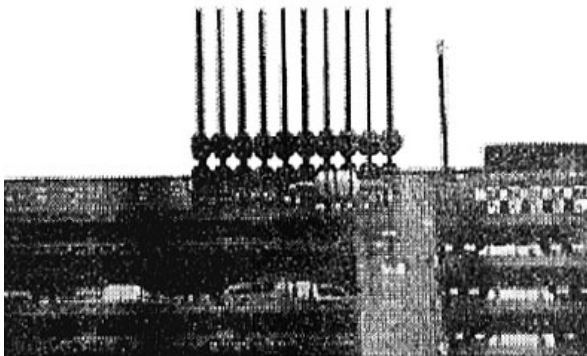


Figure 5  
Posts

When you press the plastic down, do not press so hard as to bend the gold pins. If moderate pressure doesn't work, try the second method:

Use a chisel tipped, wide bladed screw driver. Place the motherboard on a hard, flat surface. Put the screwdriver parallel to the pins on the plastic in the center of the strip of pins (not between the pins!). Angle the screwdriver at 30 to 45 degrees and lightly hit the end of the screwdriver with the palm of your hand. This will move the spacer, but probably only a little bit.

If you hit too hard, then the plastic will bow and pull the pins out of alignment. Using the same technique, hit again at the raised sides and level the plastic spacer out.

Once the plastic has moved, generally you can heat and lubricate and push it down with long nose pliers. If that fails, you will have to use the screwdriver technique to drive the spacer to the bottom. If so, don't be in a hurry, push the spacer down a little bit with each hit, constantly re-heat, and keep the spacer parallel (level) to the motherboard.

Once you have pushed the spacer down, check alignment to see if the posts are evenly spaced and square (perpendicular) with the motherboard and adjust as necessary. Try re-fitting your old Kickstart RAM daughterboard several times to ensure alignment. Once it is reasonably aligned, it is time to attempt the installation of the Rejuvenator.

## Appendix F - Installing the Rejuvenator on the Motherboard

Installation of the Rejuvenator requires that the gold pins be in near perfect alignment. These 124 pins must go through the Rejuvenator circuit board and into the top-mounted Molex connectors. The holes are several times larger than needed, this means that a wider misalignment is tolerable.

It is suggested to orient the motherboard such that the I/O connectors are facing you. Start the Rejuvenator onto the two pin connector at the front of the machine near where the disk drive fits and then carefully set it such that the two sets of pins marked PALEN and CAS on the motherboard are aligned. If they happen to fit, which happens often, keep pressure to prevent them from slipping, but don't press them into the connector (If the board tilts, then the connectors in the middle usually come out; the Rejuvenator must go on evenly). Rotate the board in a circular manner to wiggle any non-aligned pins in.

Once you feel that they are all in, apply pressure to start all the posts into their connectors. The Molex connectors are very tight the first time and may take considerable pressure. However, balance the amount of pressure applied against bending a pin. While still holding the motherboard/Rejuvenator assembly together to prevent slippage, look in between the boards for any pins that are bent or obviously not in alignment. If you have any doubts, continue wiggling the board until you feel it drop into the holes.

By applying pressure, press the pins through the Molex connectors. You will be able to see the gold pins through the connectors once they go on far enough, so you have a visual clue that they all went in OK (The flip-side is that if one isn't visible then it is probably bent real good).

Another problem that can occur is that the pins hit the Molex wrong and it visibly bends (tilts) the Molex instead of going into it as you push on the board. Pull the board up slightly and use a screwdriver between the sandwich to force the pins more into the Molex. Once on, push on the Molex to force it down.

Press the Rejuvenator onto the Molex until the pins are even with the top of the connector.

Now, the only thing left is to ensure that the machine pin adapters on the bottom of the Rejuvenator fit into the Custom chip sockets on the motherboard. Look through the sandwich and see if they are in alignment. If so, place the motherboard on a hard flat surface and press on the Rejuvenator at each adapter and force it into the motherboard sockets. The first time this requires a fair amount of pressure. It fits less tightly each time you unplug and replug it together.

Adjust the height of the pins going through the Molex connector to take any bow or warpage out of the board. Reinspect for bent Molex and machine pin adapter pins.

## Appendix G - Jumper Description

- J100- KickStart Enable/Disable
- J101 - Memory configuration
- J102- Memory configuration
- J103 - 2MEG AGNUS Enable/Disable
- J104 - PAL/NTSC

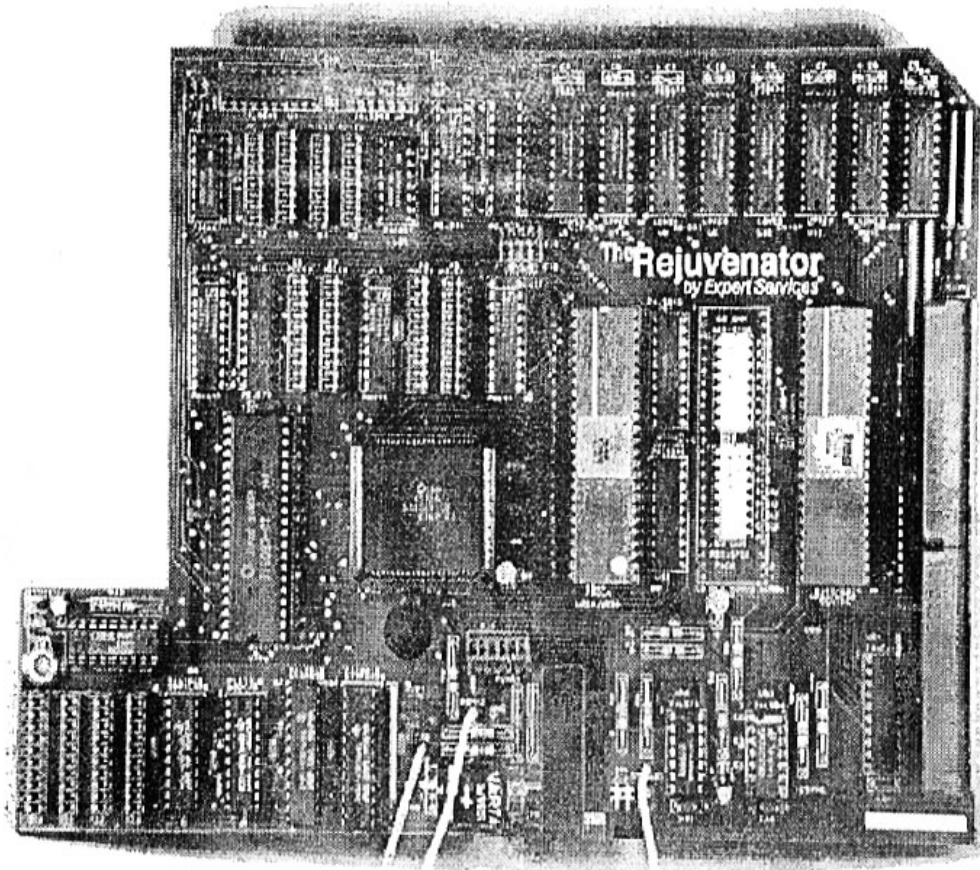


Figure 6  
The Rejuvenator

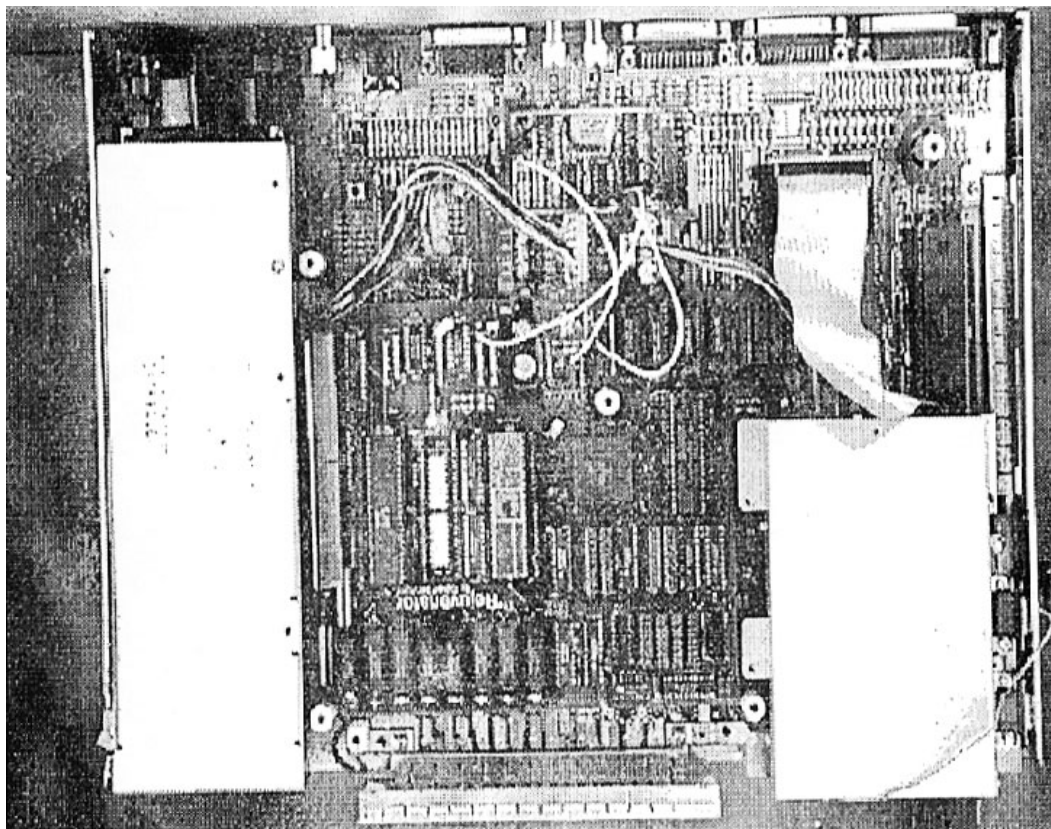


Figure 7  
The Rejuvenator Installed

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