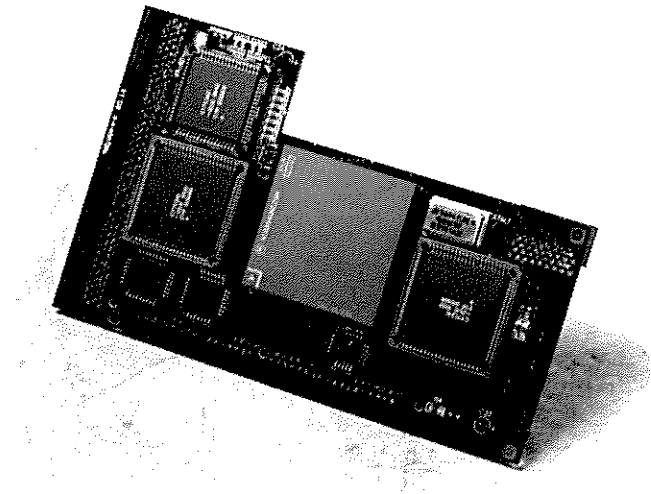




POWER COMPUTING

## FALCON 040/060

*accelerator, RAM-expansion and Fast-SCSI-II  
hard-disk controller*



for the Amiga 1200 computer

**USER'S MANUAL**

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## 1. What you should have:

The box should contain the following things:

- the Falcon board
- a 35mm screw
- 2 stick-on pads
- a 15mm spacer
- a cooling fan

If something is missing in your box, please contact your dealer.

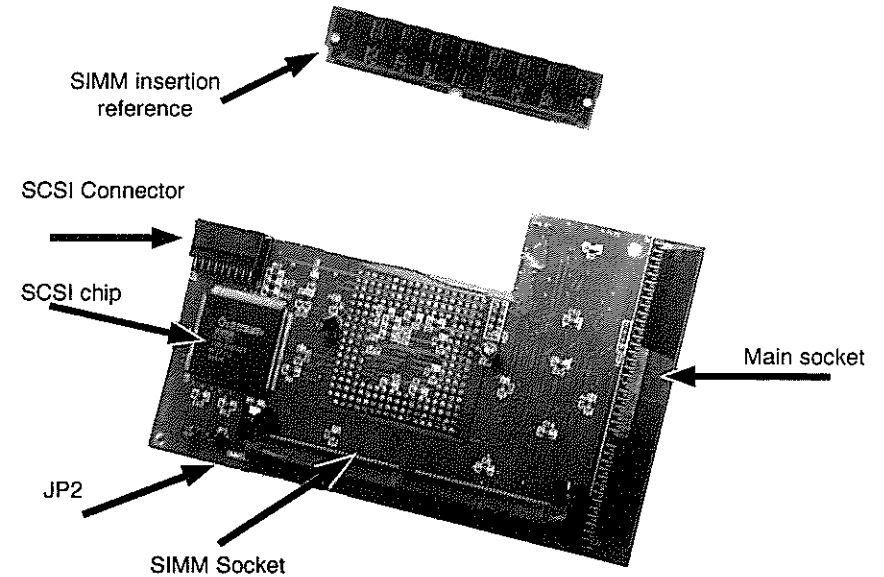
## 2. Memory installation:

The FALCON board accepts a 72-pin, 32-bit SIMM of 70ns or faster. The following sizes are permitted:

- 1 Mb x 32 = 4 Mb
- 2 Mb x 32 = 8 Mb
- 4 Mb x 32 = 16 Mb
- 8 Mb x 32 = 32 Mb
- 16 Mb x 32 = 64 Mb (not yet available)
- 32 Mb x 32 = 128 Mb (not yet available)

The SIMM of your choice can simply be installed by pressing it gently into the socket until it clicks in place. Take care not to force it: if the SIMM doesn't fit in easily it may be inserted upside down!

Now the installation of the memory is finished. Since the board automatically configures the memory, no jumpers need to be set!

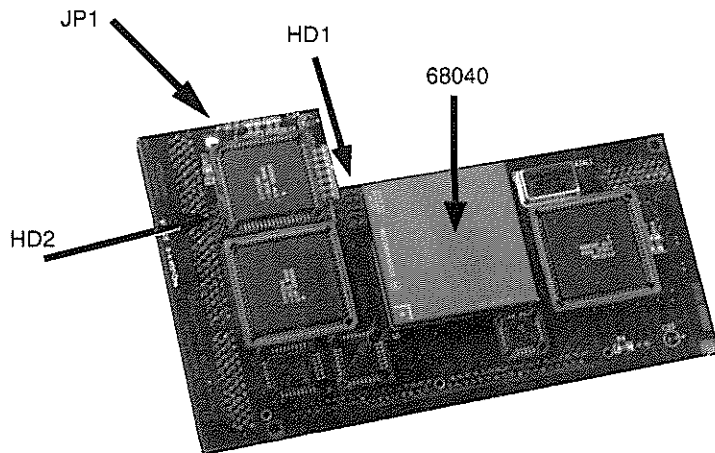


### 3. Jumper settings:

Normally the jumpers are already correctly set, so you only need to check them. These are the jumpers on the board, also see figure below:

- JP1: this is the connector for the cooling fan
- JP2: this jumper has no function and should remain unset
- HD1: these five jumpers should be set when using a 68040 processor, they provide the processor's power
- HD2: these pins are only for use with a 68060 processor, never put jumpers on these since it will destroy your computer!

If your card has a 68060 installed, you should have received a supplementary manual which will show you the configuration differences between the two processors.



### 4. Installing the FALCON board into the A1200:

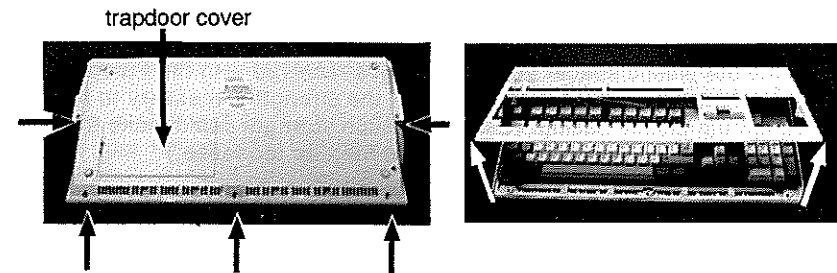
These instructions will cover the main steps necessary to fit the Falcon inside your Amiga 1200.

To install the Falcon can be a bit difficult. If you have no experience at all in how to connect an expansion board inside your 1200, ask someone more experienced to help you.

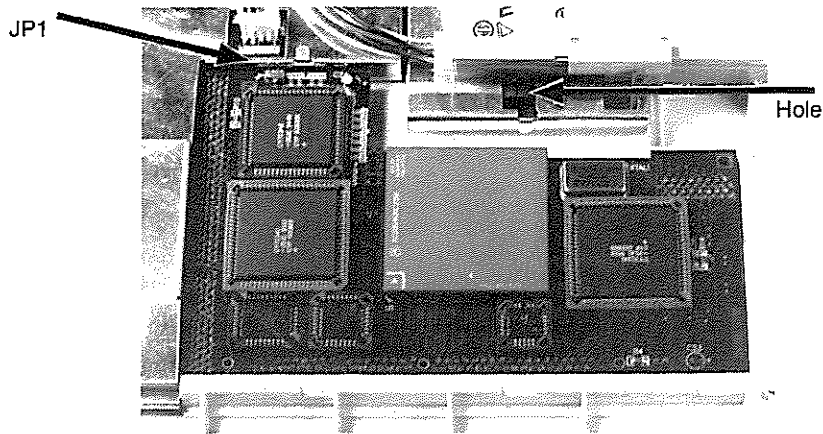
You could find some help through your local Amiga User Club, for example.

A last word of warning. Never touch the Falcon chips. When you need to handle it, do it by touching its borders. Static electricity can damage the Falcon and your 1200.

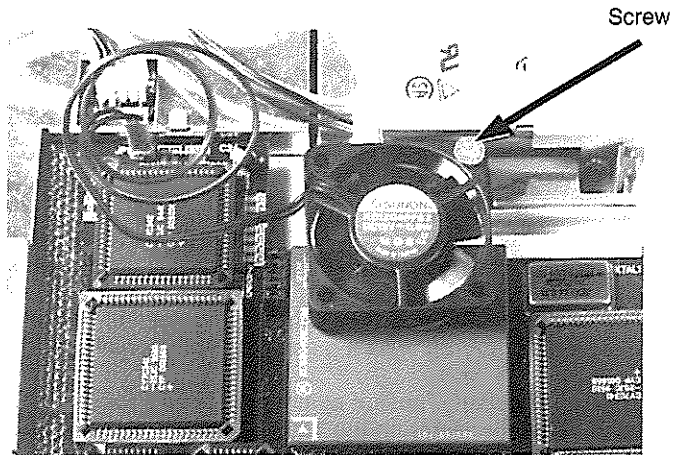
- 4.1 Disconnect all the cables of the A1200 and turn it upside down. Remove the trapdoor cover. Open the cabinet by removing the screws, as shown in the photograph, (this voids your warranty!). Carefully remove the upper part of the cabinet, and disconnect the connector for the power and the drive leds.



- 4.2 Remove the keyboard. The membrane should be long enough to position the keyboard upside down behind the computer casing.
- 4.3 The space for the Falcon should now be exposed. Lift the computer and insert the Falcon through the trapdoor. Be careful to slide it against the side guides. If the Falcon is inserted correctly it should lie horizontally, with the big socket correctly oriented towards the Amiga 1200 expansion connector.
- 4.4 Do not force it! If the card doesn't lie properly, something has gone wrong. Try again using the photographs as a guidance, where possible.
- 4.5 If the card is lying properly, push it against the connector on the side of the Amiga 1200. The connector on the 1200 should enter inside the Falcon's socket of about 1 centimetre.
- 4.6 The card should be properly positioned, occupying all the space available inside the 1200. The SCSI connector on the top right corner of the Falcon should keep it completely firm.



- 4.7 It is now time to connect the cooling fan. Please check the photograph. If the fan is properly positioned, it should be aligned with a hole in the computer motherboard underneath. Insert the screw in the fan hole, (top right); and then into the plastic spacer you should have received with the Falcon pack. Screw into the motherboard by using just the strength necessary to self-tap it through the plastic casing. (Using too much strength could make the hole too wide and the screw and the fan would then be too loose.)

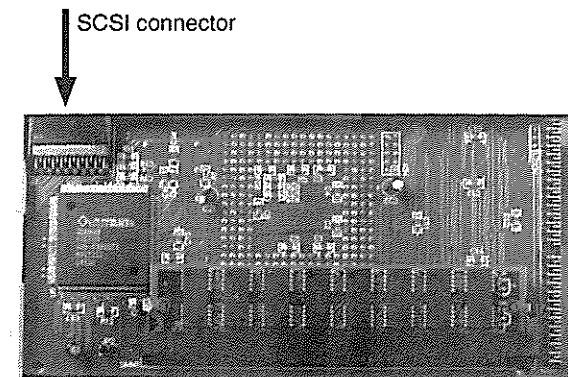


- 4.8 Connect the cooling fan to JP1 (for the correct polarity, the red wire should be near the big connector of the A1200).

- 4.9 If you are brave enough you can test if the Falcon has been fitted properly, straight away. Re-position the keyboard, connect the power supply, plug in monitor and mouse connectors and turn on the computer. If it starts as usual..., well, you can really say that you did it. Otherwise turn it off immediately and go through the procedure again.  
Please be sure that the cooling fan is functioning; if it is not, the heat build-up in the computer could damage your FALCON board.

- 4.10 Once your computer is happily working with its Falcon inside, disconnect once again all external cables. Put back the top lead of the keyboard cabinet. Remember to hook up the power and drive leds' cable. (You may need to move the keyboard in order to access the connector on the motherboard). Reverse the opening procedure. The back just closes with a bit of pressure. (You should hear a sound when the proper position is reached, and the back of the computer should look firmly closed). Turn your Amiga upside down and screw the five screws back again. Stick the two small stick-on pads you received with your Falcon pack on top of the two already existing (front pads of your Amiga). This way the SIMM underneath the Falcon will have enough ventilation. Do not attempt to close the trapdoor cover.

- 4.11 That's it. Connect all the external cables and enjoy the little power monster that your Amiga 1200 has now become, courtesy of Power Computing's Falcon.



(trapdoor view)

### 5. Software installation and testing:

The only software that the FALCON needs in order to run at its best is the 68040 library; but you don't need to install it because it is an integral part of Workbench 3.0 and 3.1. You will find it in the Libs directory on your hard disk, or on the floppy Install, from the Amiga Operating System set.. The 68040 library is not needed to run the FALCON, it only gives some extra speed (10-15%). So if you want to play games from diskette or CD-ROM you will still get a massive performance boost with the FALCON!

To check if the memory is there just click the left mouse button while pointing at the Workbench screen/window. Now you will see the amount of memory in your computer. The FastMem is the amount of memory on the FALCON board. There are many programs in the public domain that will run tests on the memory, but you really have to know what you are doing (memory address, correct memory size and width). One way to test the memory is to fill it up by copying the contents of your harddisk into it with a program like DiskMaster or DirOpus. If the computer crashes before the message, "RAM disk full", appears, then the memory is likely to be alright.

The performance of the board can be tested with programs like SysInfo (version 3.23 and upward) and AIBB (version 6.5 and upward).

### 6. The SCSI-controller connection:

"Onboard" the FALCON is the NCR 720 FastSCSI-II/III controller. This is one of the most advanced SCSI controllers at this moment. To use it you will have to order the SCSI-connector board.

This board will give you a half pitch 50-pin SCSI-connector at the back of your Amiga 1200. The board will be supplied with an additional manual and with SCSI software.

## 7. Trouble shooting:

Problem: the computer doesn't boot up. Or crashes during start-up, or after.  
Possible causes and solutions:

- \* There is no SIMM installed: the FALCON needs at least 4 Mb RAM to function, (See chapter 2; how to install RAM).
- \* The memory SIMM used, is too slow; it should be 70ns or faster. Most 80ns will function, but we can not guarantee it.
- \* The jumpers on HD1 are not set; they should all be set when using a 68040 processor. (See chapter 3).

If you check all these points and find them to be OK, and the computer still doesn't work, you should contact your dealer. There are no user-serviceable parts on the FALCON board. Unauthorized repairs voids your warranty!

Please notice: the 68020, 68030, and even more, the 68040 and 68060 although members of the same Motorola family are not 100% compatible with each other. Some old programs and especially games which don't follow Motorola's and Amiga designers' recommendations may have problems with the Falcon, (as all the Amiga 4000/040 users know). But this is a very little price to pay for such an improvement in performance.

If you are a Lightwave enthusiast cheer up, the rendering times are faster with your Falcon than with an Amiga 4000/040!

## 8. Why is the 68040 better?

Few years ago at Motorola the chip designers decided to improve the 680x0 family.

Before the actual design started, there was a long study whose target was to determine the instructions that a processor uses the most. In the end they decided to optimize the functioning, by reducing the number of clocks needed to perform them. The chip designers decided to eliminate the least used instructions. But in order to keep compatibility with the previous models the eliminated instructions were emulated and built in to the software.

This study brought the 68040 closer to the way a RISC processor works. But it was not the only improvement: wider address and data caches, different addressing techniques, a better management of the way the processor accesses the memory, and so on.

For all these reasons a 68040 running at 25MHz will give better performance in most applications than a 68030 running at double its speed. (For a proper knowledge on the 68040 inner working, read the Motorola 68040 handbook.)

After all the fitting instructions for board-assembly have been carried through the real test will come from using the Falcon. Here is a set of results from comparison tests we have run.

Can you imagine a Falcon equipped with a 68060 running at 50 MHz?

Results of AIBB 6.5 (Copyright LaMonte Koop)

Test	Amiga 1200 68030/6882 40MHz	Amiga1200 Falcon	Amiga 4000/040
EmuTest	0.49	1.17	1.00
Writepixel	0.31	0.67	1.00
Sieve	1.22	1.77	1.00
Dhrystone	0.49	1.00	1.00
Sorf	0.56	1.08	1.00
EllipseTest	0.63	0.90	1.00
Matrix	0.93	1.39	1.00
IMath	0.70	1.01	1.00
MemTest	2.56	3.13	1.00
TGTest	0.70	0.97	1.00
LineTest	0.99	1.01	1.00
Savage	1.35	1.01	1.00
FMath	0.18	1.01	1.00
FMatrix	0.55	1.46	1.00
BeachBall	0.38	0.39	1.00
InstTest	0.88	1.45	1.00
Flops	0.27	1.01	1.00
TranTest	0.91	1.33	1.00
FTrace	0.87	1.02	1.00
CplxTest	0.40	1.01	1.00

As you can see the Falcon behaves better or at least like an Amiga 4000/040 in all categories. The MemTest result is just fantastic! But we were left a bit upset by the BeachBall test (a rendering test), so we decided to call the supervision of the most famous, TV award-winning, 3D package. We tried to get Lightwave to enlighten us... and it did!

A simple rendering of one of the tutorial scenes that come with the software, TextureExamples showed us the evidence!  
On the Amiga 4000/040 Lightwave took 217" (3' 37") to calculate the rendering of the scene where the Falcon took 189" (3' 09").  
The more difficult the scene, the better the performance. And you know how important it is to reduce the working seconds when doing the rendering of a whole animation!