

**A4000**  
**G-FORCE**  
**040 40**



USER'S GUIDE









# **A4000 G-Force 040**

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**High Performance  
Accelerator  
for Amiga  
A4000s and A3000s**



# User's Guide

A4000 G-Force 040

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### FCC Class "B" Radio Frequency Emissions Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- \* Reorient or relocate the receiving antenna.
- \* Increase the separation between the equipment and receiver.
- \* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

**CAUTION: Only equipment with shield-grounded cables (computer input-output devices, terminals, printers, etc.), certified to comply with Class B limits, can be attached to this device. Operation with non-certified equipment may result in communications interference.**

Your house AC wall receptacle must be a three-pronged type (*AC ground*). If not, contact an electrician to install the proper receptacle. If a multi-connector box is used to connect the computer and peripherals to AC, the ground must be common to all units.

If necessary, contact your dealer or an experienced radio-TV technician for additional suggestions. You may find the following FCC booklet helpful: *"How to Identify and resolve radio-TV interference problems."* The booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock no. 004-000-00345-5.





## 1. Introduction

Thank you for purchasing the highest performance accelerator enhancement available for the Amiga A4000. This product brings the latest in processor technology and component integration together in a surprisingly small, but extremely powerful—and expandable—package.

Due to differences in form factor and the arrangement of connectors on the motherboard, certain of the A4000 G-Force 040's expansion options will not be available to A3000 users. However, A3000 owners purchasing this product will be able to preserve their investment should they move up to an A4000 at some later date.

## Features

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### Processor

- Motorola MC68040 processor @ 40 MHz clock speed provides at least 500% speed improvement over your existing A4000 (*and as much as 1,000% in the case of 25 MHz '030 systems*).

### FAST RAM

- Onboard FAST RAM storage up to 32 MB. Uses GVP SIMM32 for high-speed direct memory access (*DMA*).



- Support for Normal and Page Mode RAM accesses, allowing your software to achieve maximum efficiency in all computing environments.
- Supports Burst Mode read and write access to onboard FAST RAM.
- Optional RAM expansion module holds up to 96 MB additional FAST RAM, for a total of 128 MB!

### Expansion

- A4000 G-Force 040 has a multi-pin local bus expansion connector providing direct memory access (*DMA*) to the processor and onboard RAM, avoiding Zorro III bus bottlenecks.
- Optional SCSI-II Fast DMA hard drive controller module connects to A4000 G-Force 040 DMA expansion bus.
- Additional expansion options will be announced throughout calendar year 1994.



## 2. Installation

This chapter describes how to install the A4000 G-Force 040 into your Amiga A4000, how to install the support software and test the hardware for successful operation. Owners of Amiga A3000s should follow the procedures described below, taking into account the differences in layout between A4000 and A3000 motherboards.

Owners of both A4000 and A3000 computers are advised to review the relevant portions of the User's Guide that came with your computer. If any procedure described here is at variance with your User's Guide, follow the Commodore procedure, instead.

2

### Configuration

For most users, the A4000 G-Force 040 is purchased in ready-to-install condition. Unless one of the following conditions applies to you, skip directly to the *Hardware Installation* section of this chapter.

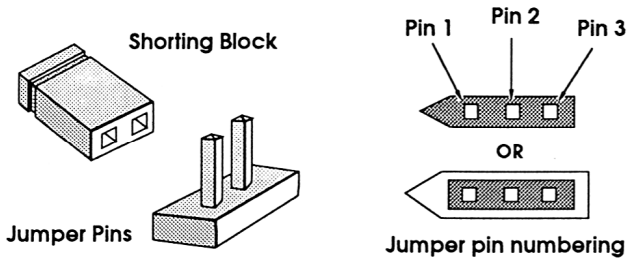
- Adding RAM
- Adding DMA Expansion Bus Option
- Installing in Amiga with CPU on the motherboard. This applies to most A3000s and may apply, in the future, to some additional Amiga models (*including tower models*).

If any of these conditions applies, perform the following configuration procedures as appropriate.

### Configuration Jumpers

The A4000 G-Force 040 board contains two- and three-pin components called jumpers. Jumpers act as switches to enable or disable various options. Placing a shorting block across one pair of jumper pins completes a circuit, enabling the corresponding option. In the case of a three-pin jumper, placing a shorting block on pins 1 & 2 enables one condition, while moving the shorting block to pins 2 & 3 enables a complementary condition.

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**Figure 2.1 – Typical jumper and numbering scheme.**

The following sections will discuss configuring the A4000 G-Force 040 to handle a number of different hardware situations. Some of these configuration procedures will involve changing jumper settings.

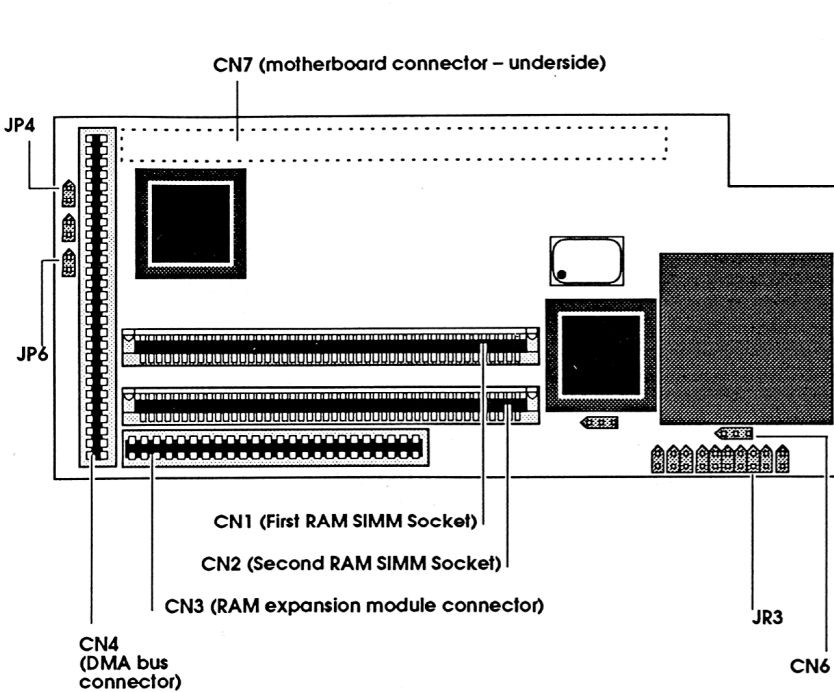
## Memory Expansion

The A4000 G-Force 040 contains two SIMM sockets capable of holding either 4MB or 16MB SIMMs. SIMMs of different capacities may *not* be mixed. An optional 100 pin connector on the A4000 G-Force 040 board can also receive a RAM expansion daughterboard equipped with 6 additional sockets. In all, a total of 128MB of memory may be added.



## Adding RAM

The A4000 G-Force 040 accepts two different sizes of expansion RAM: 4- and 16-MegaByte Single Inline Memory Modules (SIMMs). Both are available in GVP-SIMM32 form factor.

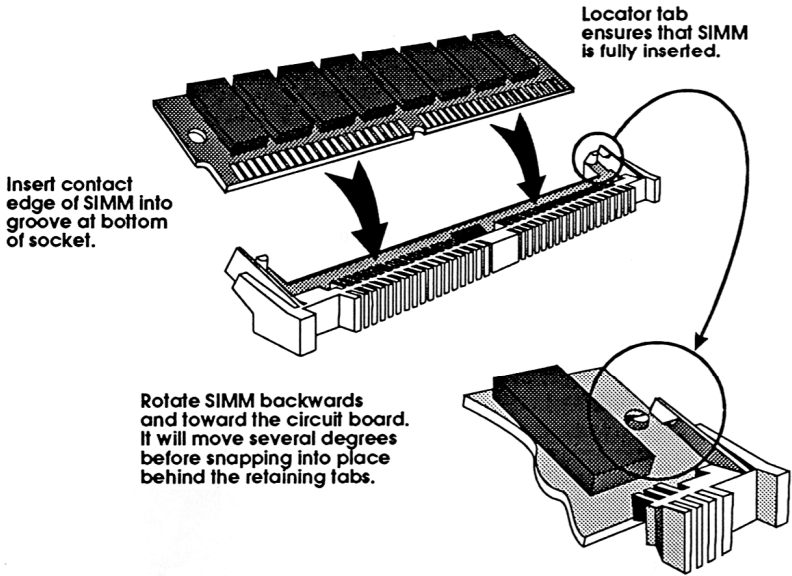


*Figure 2.2 - A4000 G-Force 040 board layout.*

Figure 2.2 indicates the location of the two expansion RAM sockets (CN1 & CN2). The following procedure describes installing a typical SIMM.

### SIMM Installation

2



*Figure 2.3 – SIMM Installation.*

A SIMM consists of individual memory chips mounted on a small circuit board. All of the connection points for the memory chips are arranged along one edge of the SIMM board and mate with the contacts of the SIMM socket on the A4000 G-Force 040 board.

SIMMs are designed to fit into SIMM sockets in only one way. They fit in easily and lock into place behind the retaining tabs.

## PROCEDURE:

- 1) Orient the SIMM as shown in *Figure 2.3*.
- 2) Insert the edge of the SIMM with the silver contacts into the corresponding groove in the SIMM socket.
- 3) Rotate the SIMM backwards until the retaining tabs at each end of the socket snap into place.
- 4) Jumper **JR3** tells the G-Force board what size SIMMs are used. If you have installed 16MB SIMMs, place a shorting block onto jumper **JR3**. Otherwise, leave **JR3** in its default, **OPEN**, condition.

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## RAM Expansion Daughterboard

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If you purchase the RAM Expansion daughterboard option, there may be additional memory configuration conditions. Refer to the documentation accompanying that product for further information. Otherwise, RAM SIMMs are installed into the sockets on the daughterboard using the same procedure just described.

### Adding DMA Expansion Bus Option

Refer to *Figure 2.2* for the location of Connector **CN4**. This is the DMA Expansion Bus. GVP presently has plans to produce a number of high-performance devices that will connect to this bus. Refer to the documentation included with the DMA Expansion product for specific installation procedures or configuration instructions.

NOTE

>>>

Due to differences in internal layout, A3000 users may not be able to add DMA Expansion peripherals.

### Installing in Amigas with a CPU on the Motherboard

If your Amiga (*A3000 or others*) has its native CPU mounted directly on the motherboard, you must make an additional configuration change to the A4000 G-Force 040.

Locate jumper **JP4** on the A4000 G-Force 040. Its default condition, **OPEN**, tells the G-Force board that it is the only CPU present in the system.

If your Amiga has a CPU on the motherboard, place a shorting block on **JP4**. This tells the G-Force board to disable the native CPU at boot time and assume control of the computer.

## Hardware Installation

With the A4000 G-Force 040 properly configured, you may proceed to install the accelerator in your Amiga. As mentioned, this chapter describes how to install the A4000 G-Force 040 into an Amiga A4000 only. A3000 owners must refer to their Commodore A3000 User's Guide or adapt the following procedure to suit their machine.

### What you need



You will need a medium-sized cross-point screwdriver to disassemble the Amiga's case and drive bay assembly.

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### Procedure

- 1) Follow the procedure described in your Amiga A4000 User's manual for removing the computer's top cover and plastic face plate.

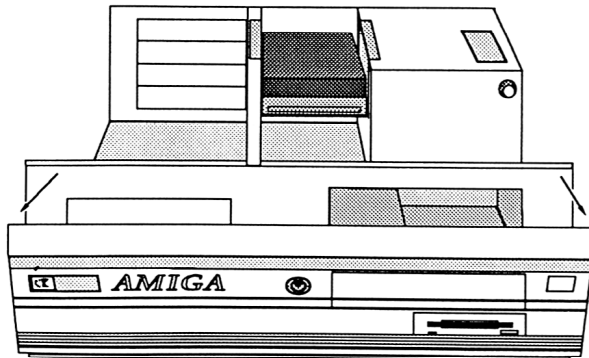
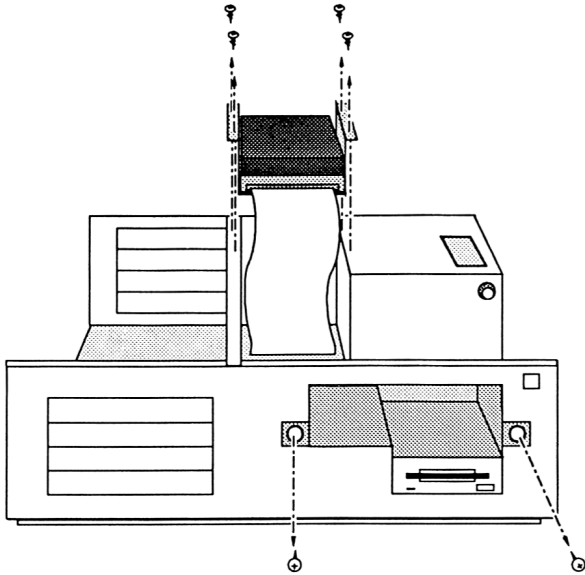
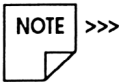


Figure 2.5 – Remove A4000 face plate.



**Figure 2.5 – Remove internal hard drive mount and drive bay screws.**

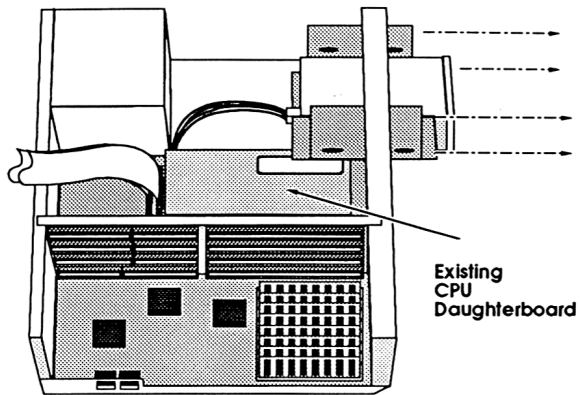
- 2) Remove four screws securing the internal hard drive mount to the power supply and Zorro III expansion daughterboard. Lift the hard drive mount up and away (see Figure 2.5).



>>> It should not be necessary to disconnect the ribbon cables from a hard drive installed in the internal mount. Just move the drive and mount aside, taking care to lay the ribbon cable out of the way.

- 3) Remove two screws securing the floppy/hard drive bay to the Amiga's front panel (see Figure 2.5).





**Figure 2.6 – Remove floppy/hard drive bay assembly.**

- 4) Carefully disconnect the floppy drive ribbon cable and power leads, then slide the floppy/hard drive bay assembly out through the hole in the Amiga's front panel (*Figure 2.6*).

## Removing CPU Daughterboard

- 5) You now should have complete access to the Amiga A4000's processor slot. In most cases, a CPU daughterboard will already be in place.
- 6) Taking care to lift straight up from a position along the processor slot edge of the board, remove the CPU daughterboard (*see Figure 2.7*).

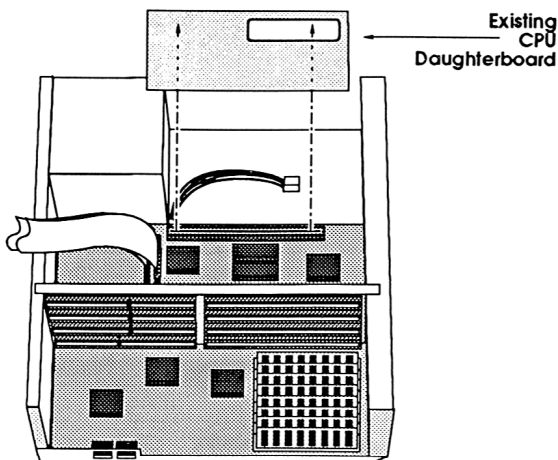
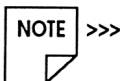


Figure 2.7 - Remove existing CPU daughterboard.

- 2
- 7) With the existing CPU daughterboard removed, examine the A4000's motherboard carefully (refer to Figure 2.8 as necessary).

First, locate the clock crystal U104. This is a bright metal component that looks like a tiny sardine can. This crystal determines the clock rate for the A4000-040 processor. The crystal in U104 should be marked 50.0 MHz. A small number of early A4000s were equipped with 28.0 MHz crystals in this position..

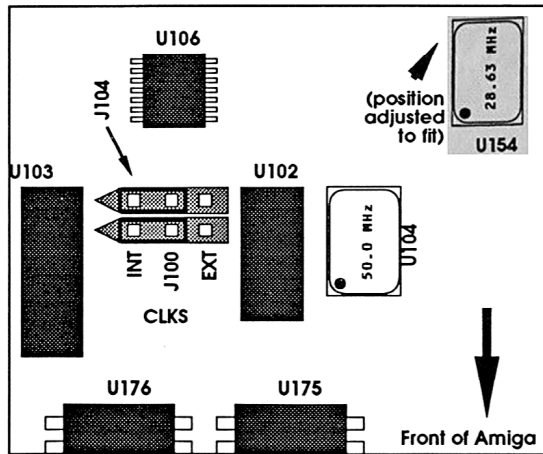


If this crystal is NOT marked 50.0 MHz, it MUST be replaced. Contact your Commodore dealer for replacement crystals.

## Clock Selection

- 8) Next, locate the pair of three-pin jumpers marked **CLKS** (**J100** and **J104**). In most cases, the shorting blocks on these jumpers will be set to the external (**EXT**) position.

You must move both shorting blocks to the internal (**INT**) position before you can complete the A4000-040 installation.



*Figure 2.8 - A4000 motherboard detail.*

**Set shorting blocks to "Int."**

- 9) Locate the A4000 G-Force 040 board as shown in *Figure 2.9* and align the connector on its lower surface with the CPU slot on the Amiga motherboard.
- 10) With the G-Force connector properly aligned, press down until the board is fully seated into the Amiga's CPU slot.

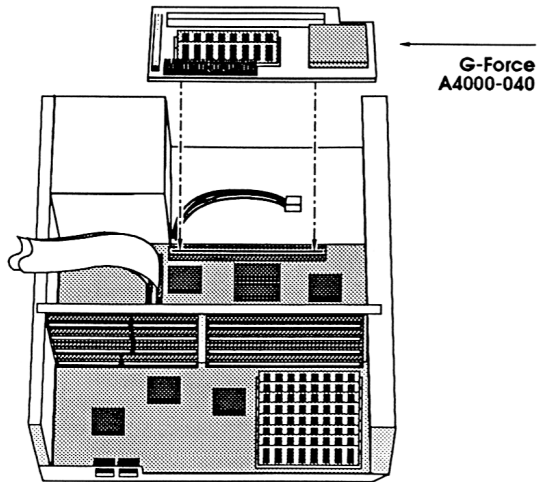


Figure 2.9 – Align A4000 G-Force 040.

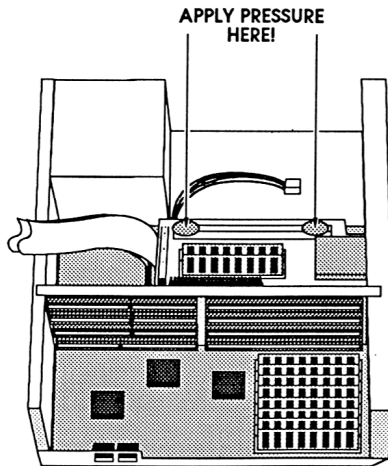


Figure 2.10 – Apply pressure at indicated points ONLY.



&gt;&gt;&gt;

Be careful to apply pressure to the G-Force board **ONLY** at the positions indicated in Figure 2.10! Downward pressure away from these points will cause torque stresses that could damage the connector or other G-Force board components.

- 11) With the A4000 G-Force 040 installed, reassemble your Amiga using the reverse of the procedure just described. Then, proceed to the *Power-Up Test* described below.

**2**

## Power-Up Test

Once you have installed the A4000 G-Force 040 board, it should be ready for use. The accelerator works transparently and you should notice a significant performance increase as soon as you power up your computer.

Take a few moments to carefully observe the computer's behavior the first time you power up following the installation.



&gt;&gt;&gt;

**WARNING:** If the computer does not boot right away; if the power lamp or the hard drive or floppy drive LEDs flash or stay on; power down **IMMEDIATELY** and recheck all your work for shorted or incomplete connections.

Operating your computer with shorted connections can do irreparable harm to the A4000 G-Force 040, the Amiga, or both.

If the computer starts up normally and proceeds through its normal startup-sequence, you may proceed to the next section: *Software Installation*.

### Software Installation

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2

- 1) Start up the Amiga in your accustomed fashion. You must boot from your normal startup System disk for the installation to be successful.
- 2) Insert the supplied *G-Force Install* disk into your Amiga's floppy drive.
- 3) Locate the Install disk's icon on the Workbench screen and double-click to access the disk. In the window that opens, you will see an icon for the software installation program *Install\_G-Force\_040*.
- 4) Double-click the *Install\_G-Force\_040* icon to start the installation procedure. The installation script uses Commodore's standard *Installer* program.

A series of windows will open and prompt you for various pieces of information. Depending on your experience as an Amiga user, you may choose how much control you will have over the installation process:

- Intermediate
- Expert



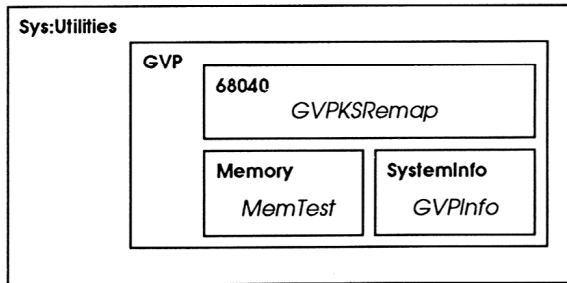
>>> If you select Expert Mode, you can also choose to run the installation script in "Pretend" mode. This will let you verify every stage of the installation process without actually changing the contents of your hard drive.

When you have selected to install the software for real and the installation procedure has run its course, you may proceed to the next chapter.



## 3. Software Reference

Once it has been installed and the Power-Up Test performed, the A4000 G-force 040 should operate smoothly and transparently. The automatic installation script provided on the G-Force Installation disk creates the following directories in your Sys:Utilities drawer:



*Figure 3.1 – G-Force Software Utilities.*

### GVPKSRemap

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The performance of A500, A600, A1000 and A2000 series computers was considerably burdened by relatively slow access to system software encoded in the KickStart ROM chips on the motherboard. Amiga A1200, A3000 and A4000 computers, which have the advantage of a 32-bit wide data bus and full, 32-bit wide access to the KickStart ROMs, do not normally suffer from this limitation.

There is some quantifiable speed increase to be gained, however, by copying the KickStart ROM contents into FAST RAM.

The supplied utility, *GVPKSRemap*, provides the means to copy the KickStart ROM to RAM and, thereby, increase performance. This comes at the expense of 512 kiloBytes of your RAM resources which, thereafter, are not available for programs to use.

When you double-click on the *GVPKSRemap* icon, it attempts to reserve 512 kiloBytes of system RAM and to copy the KickStart ROM contents to that memory. If you copy this icon to your *WBStartup* drawer, it will be run automatically, each time you reset your machine.

If you should ever need to recover the reserved RAM, you can edit a Tooltype in the *GVPKSRemap* icon. Refer to your Workbench user's guide for information on how to edit Tooltypes. In this case, you would remove the parentheses ( ) around the `RESTORE` keyword and save the icon file. Now, when you double-click the icon, the program will return KickStart to the ROM chips and restore the RAM for system use.

*GVPKSRemap* can also be used as a shell command:

### Command:

```
GVPKSRemap
```

### Template:

```
GVPKSRemap [RESTORE | QUIET]
```

**RESTORE** – When issued, this optional argument instructs *GVPKSRemap* to reset the system vectors to use the ROM-based KickStart and frees any RAM resources that were reserved by a previous execution of *GVPKSRemap*.

**QUIET** – When issued, this argument suppresses program status messages.

## Examples:

```
GVPKSRemap  
GVPKSRemap QUIET <return>  
GVPKSRemap RESTORE QUIET <return>
```

## MemTest

---



*MemTest* is a Workbench program written specifically to test the RAM SIMMs installed on your A4000 G-force 040 board. You should execute *MemTest* immediately after installing your A4000 G-force 040, to determine that the installed RAM is in proper working order. Double-click the *MemTest* icon to start the program.

When run, *MemTest* performs a series of read and write tests on each block of FAST RAM installed in your system. The results are displayed in a standard CLI window. It then checks CHIP RAM. If all the RAM checks out, you will be informed that the system is OK.

If some memory location fails the test, it will be reported by address. Report this to your GVP dealer. If the faulty memory is G-Force RAM (*it might be on the Amiga's motherboard or bad CHIP RAM*), it will be replaced under warranty.

## GVPInfo

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*GVPInfo* is a Workbench program for displaying various useful information about any and all GVP products you might have installed in your Amiga. This point-and-click program opens a window that lets you examine each of several different facets of your system.

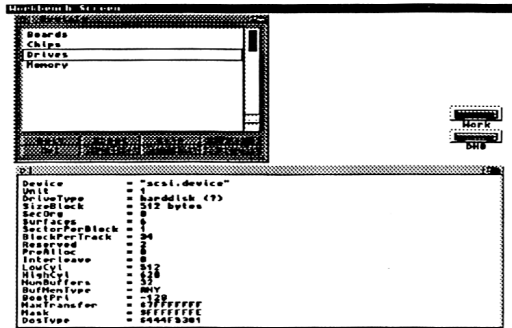


Figure 3.2 – GVPInfo window.

In the main window, you will see listed **Boards**, **Chips**, **Drives** and **Memory**. Clicking twice on any of these items will produce a new window displaying relevant information about the selected items. Each item in the new list can, in turn, be double-clicked, to produce still more information about the selected item.

*GVPInfo* has a special operation that is available only through the CLI or Shell. When issued as:

```
GVPInfo SPEED <return>
```

the *GVPInfo* Chips option will run a performance test on your main processor chips and display the actual clock speed at which they are running. In this case, the speed should be reported as 40 MHz.

NOTE

>>>

The SPEED check should not be performed when other programs are running. Other tasks can steal processor time away from *GVPInfo* and give the appearance that the G-Force A4000 040 is not performing at top speed.

## 4. Troubleshooting

Despite its power, the A4000 G-Force 040 is a very simple device. As long as it is correctly configured and installed, there is not much that can go wrong. The following list describes most conditions that could, potentially, cause problems with the A4000 G-Force 040.

**Problem:**

Following installation, the Amiga will not boot.

**Cause:**

A4000 G-Force 040 is not correctly seated on the Amiga's CPU expansion slot.

**Solution:**

Repeat the Hardware Installation procedure from Chapter 2, being especially careful to check that the accelerator is aligned with, and properly connected to, the Amiga's CPU expansion slot.

or

**Cause:**

A motherboard processor is present and jumper JP4 has not been correctly set. In the case of the 68030-based A4000, there are additional motherboard jumpers that must be set, as well (*see pp. 2.10 – 2.11*).

**Solution:**

Repeat the configuration procedure for motherboard CPU as described in *Chapter 2*.

or

**Cause:**

The clock crystals on the A4000 motherboard are the wrong speed, or the motherboard clock jumpers are incorrectly set.

**Solution:**

Refer to *Chapter 2 – Installation* for information concerning the Amiga A4000 and A3000 motherboard clocks and jumpers. Be sure that these are configured as described in *Chapter 2*. If the crystals are not 50 MHz parts, they *must* be replaced.

or

**Cause:**

One or several A4000 G-Force 040 jumpers are incorrectly set.

**Solution:**

Refer to *Chapter 5 – Technical Reference* for the correct jumper configuration. Verify that *all* A4000 G-Force 040 jumpers are correctly set according to the jumper table and diagram.

or

**Cause:**

An expansion option (*FAST RAM daughterboard or DMA Expansion Bus option*) is not installed correctly.

**Solution:**

Refer to the documentation that came with the FAST RAM or DMA Expansion product.

**Problem:**

Computer seems to run slowly

**Cause:**

In most cases, the A4000 G-Force 040 will be the only CPU present in your system. Therefore, if it boots at all, it should be running at full speed. If performance still seems poor, it is probably a sign of incorrectly set jumpers.

**Solution:**

Refer to *Chapter 5 – Technical Reference* for the correct jumper configuration. Verify that *all* A4000 G-Force 040 jumpers are correctly set according to the jumper table and diagram.

or

**Cause:**

You did not run *GVPKSRemap*. Even without remapping KickStart, a G-Force accelerated Amiga should run at least twice as fast as a stock A4000. Additional performance can be gained, however, by using *GVPKSRemap* as described in *Chapter 3*.

**Solution:**

Refer to the discussion of *GVPKSRemap* in *Chapter 3* and be sure that the program is correctly run at boot-time.

**Problem:**

A system requester appears with the message:  
“*GVPKSRemap* failed.”

**Cause:**

Insufficient contiguous RAM for KickStart remapping to be successful.

**Solution:**

Run *MemTest* to determine that your RAM resources are OK. Be sure that you are not running any system-unfriendly hacks that attempt to manage memory on their own. Be sure to check both the *WBStartup* drawer and your *s:user-startup* file.

**Problem:**

System crashes unexpectedly and repeatedly.

**Cause:**

Assuming that some individual program or combination of programs is not responsible, the most likely cause of repeated system crashes is faulty RAM.

**Solution:**

Run *MemTest* to determine that your RAM resources are OK. If not, replace faulty RAM with new SIMMs.

**Problem:**

System runs reliably for several hours, but crashes unpredictably when left on for longer periods.

**Cause:**

The A4000 G-Force 040 is overheating. All computer components are subject to failure if they overheat. The A4000 G-Force 040's CPU is no exception.



NOTE

>>> **WARNING:** Repeated overheating of computer components will shorten their service life and may result in catastrophic (and irreparable) failure. Be sure that the A4000 G-Force 040 cooling fan is operating properly!



**Solution:**

Check the heat sink/fan assembly on the A4000 G-Force 040. Be sure that the electrical leads from the fan are properly connected to **CN6** on the G-Force board. With the Amiga's cover removed and power supplied to the computer, verify that the fan is actually working.

If the fan is correctly connected, but does not operate, contact your GVP dealer for a replacement.

**or**

**Cause:**

*68040.library* is not the current revision. The GVP supplied installation script attempts to copy the latest *68040.library* file into your system *libs:* directory. If the older version is protected against writing or deletion, the GVP copy attempt will fail.

**Solution:**

Verify that the file *68040.library* in your *libs:* directory is not protected (*refer to your AmigaDOS user's guide for information on file protection bits*). Then, reinstall the GVP software.



# User's Guide

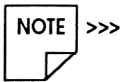
A4000 G-Force 040

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## 5. Technical Reference

### Jumper Reference

The A4000 G-Force 040 contains a number of jumpers for configuring various options. The following diagram and table documents all of these.



**WARNING:** This information is provided as a service to the user community and for reference purposes only. **DO NOT CHANGE JUMPER SETTINGS MARKED AS RESERVED BY GVP.** Doing so could damage your A4000 G-Force 040.

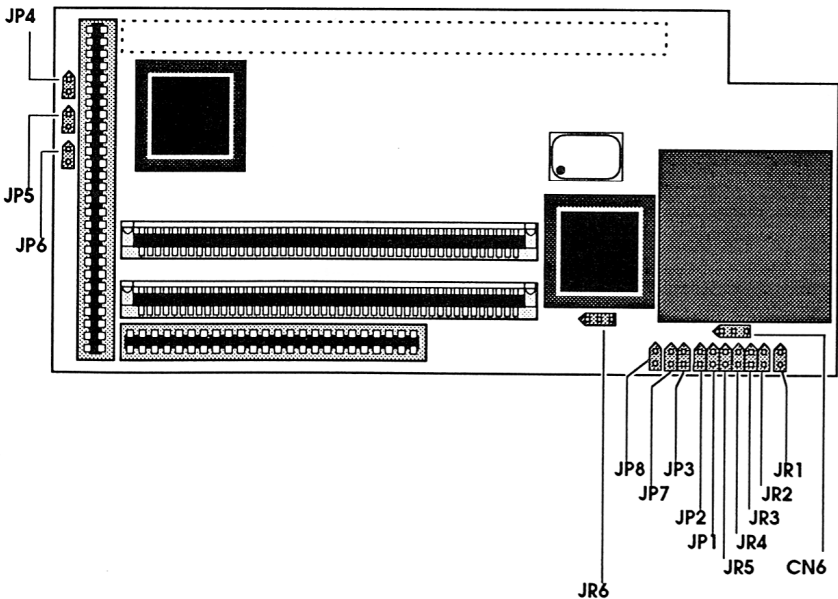


Figure 5.1 – Jumper Locations.

### Jumper Table

Jumper	Definition	Default	Reserved?
JP1	RESERVED	OFF	YES
JP2	RESERVED	ON	YES
JP3	RESERVED	OFF	YES
JP4	<b>Startup Mode</b> ON = Native CPU Installed OFF = Native CPU not Installed	OFF	NO
JP5	RESERVED	OFF	YES
JP6	<b>Accelerator Board Enable</b> ON = Native CPU Enabled OFF = G-Force CPU Enabled	OFF	NO
JP7	<b>A4000 Burst Mode (RESERVED)</b> ON = Burst Mode Enabled* OFF = Burst Mode Disabled	OFF	YES
JP8	RESERVED	OFF	YES
JR1	<b>G-Force RAM Burst Writes</b> ON = Burst Mode Writes Enabled OFF = Burst Mode Writes Disabled	ON	NO
JR2	<b>G-Force RAM Burst Reads</b> ON = Burst Mode Reads Enabled OFF = Burst Mode Reads Disabled	ON	NO
JR3	<b>RAM SIMM Size</b> ON = 16 MB SIMMs installed OFF = 4 MB SIMMs Installed	OFF	NO

*The A4000 G-Force 040 is capable of supporting Burst mode reads of A4000 motherboard RAM. Unfortunately, no Burst Mode capable RAM is currently available for the A4000. This setting is, therefore, reserved by GVP for future use.*



# Technical Reference

<b>Jumper</b>	<b>Definition</b>	<b>Default</b>	<b>Reserved?</b>
JR4	RESERVED	OFF	YES
JR5	RESERVED	OFF	YES
JR6	RESERVED	pins 2 & 3 shorted	YES
CN6	<b>Fan Power Connector</b> three-pin connector <b>WARNING: VOLTAGE SUPPLIED!</b>		



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## A. Service & Support

### General Information

**GVP supports hardware and software products through our network of Authorized Dealers. GVP Authorized Dealers have access to all significant technical information and support.**

If necessary, you can get assistance from GVP's Technical Support department via fax, automated telephone system or mail:

**Fax** (610) 337-9922  
24 hours; fastest response

**Phone** (610) 354-9495  
24 hour automated system:  
Recorded answers to most frequent questions; with instant Fax response.

**Mail** Great Valley Products, Inc.  
657 Clark Ave.  
King of Prussia, PA 19406



### Electronic Assistance

GVP provides a 24 hour Bulletin Board Service (*BBS*) where the latest patches and software updates are maintained. Access is immediate for first-time users. No direct customer support is available online, however. Call (610) 337-5815 (8, N, 1).

### CompuServe Information Service

GVP provides Technical assistance—including direct responses to your questions—as well as more general product information, via **CompuServe (CIS)**.

Type `Go AmigaVendor` at any prompt or send direct EMail to GVP Tech at **72662,51**.

### Reporting Problems

Whether you are reporting problems via FAX or CompuServe, to your dealer or direct to GVP, please take time to prepare your message. If possible, try to determine if the problem is repeatable (*i.e., it occurs under predictable conditions*), and be sure to describe in detail the particular symptoms and the system configuration in use when it happens. If error messages are displayed, copy down the information. It might help pinpoint your problem.

**A**







### Your Configuration

AMIGA MODEL \_\_\_\_\_

Motherboard Revision \_\_\_\_\_ Chipset Version \_\_\_\_\_

Kickstart (ROM) Version \_\_\_\_\_ Workbench Version \_\_\_\_\_

CPU Model \_\_\_\_\_ Clock Speed \_\_\_\_\_

#### Expansion products installed (including competitors' products):

CPU Slot \_\_\_\_\_

Video Slot \_\_\_\_\_

Expansion Slot #1 \_\_\_\_\_

Expansion Slot #2 \_\_\_\_\_

Expansion Slot #3 \_\_\_\_\_

Expansion Slot #4 \_\_\_\_\_

Expansion Slot #5 \_\_\_\_\_

Expansion Slot #6 \_\_\_\_\_

Expansion Slot #7 \_\_\_\_\_

List all hard and floppy drives attached to your system, with Unit ID numbers, manufacturers and capacities, plus any other peripherals:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**A**



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