



GREAT VALLEY PRODUCTS INC.

IMPACT A2000-SCSI controllers

A500-HD SCSI Subsystem

**Installation and User's
Guide.**

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1. Introduction.

The Great Valley Products (GVP) IMPACT product line offers a wide range of high performance add-on peripheral products for the Commodore Amiga computer systems. This booklet serves as the User Guide and Installation manual for the following products in the IMPACT product line:

- **IMPACT A2000-1/X.** Combination AUTOBOOT SCSI controller and up to 1MB FAST RAM Expansion board for the Amiga A2000. The "X" suffix denotes the amount of FAST RAM (in MB) actually installed at the factory.
- **IMPACT A2000-2/X.** Combination AUTOBOOT SCSI controller and up to 2MB FAST RAM Expansion board for the Amiga A2000. The "X" suffix denotes the amount of FAST RAM (in MB) actually installed at the factory.
- **IMPACT A2000-HC/XX.** The AUTOBOOT SCSI controller board for the Amiga A2000 which allows a 3.5" Hard Disk Drive to be mounted directly (flush) on the controller board itself. This is the "HardDisk-on-a-Card" product (sometimes referred to as a "HardCard"). The "XX" suffix denotes the formatted capacity of the hard disk directly mounted on the controller board, at the factory.
- **IMPACT A500-HD/XX.** Hard Disk and SCSI controller add-on subsystem for the Amiga A500. This sub-system also allows an optional internal AUTOBOOT/FAST RAM expansion module to be added. The "XX" suffix denotes the formatted capacity of the hard disk installed internally in the subsystem.
- **IMPACT A500-2/X.** The optional AUTOBOOT/FAST RAM expansion module which can be installed in the IMPACT A500-HD/XX product. This provides up to 2MB of FAST RAM expansion as well as the AUTOBOOT capability for users who have upgraded their A500 kickstart ROM to V1.3 or later. The "X" suffix denotes the amount of FAST RAM (in MB) actually installed at the factory.

A key feature of all the GVP IMPACT SCSI controller products is their AUTOBOOT capability. This feature together with the Commodore V1.3 Kickstart ROM (expected to be released in the second half of 1988) will allow the Amiga A500/A2000 to be booted directly from the hard disk WITHOUT the need for a floppy disk workbench. Note that to use this feature, your Amiga computer must be fitted with the Commodore V1.3 Kickstart ROM and the two GVP AUTOBOOT EPROM chips must be installed in the particular IMPACT SCSI controller you are using. The AUTOBOOT EPROMs are an option which will be available from GVP not later than October 1988. If you send in your warranty registration card, you will be notified as soon as this option becomes available.

The FAST RAM capability (on all the GVP IMPACT products that have this) provides a zero wait-state, FAST RAM expansion. When installed, the FAST RAM is automatically AUTO-CONFIGured into the AmigaDOS available memory list.

All the IMPACT products covered in this manual provide the same high performance SCSI (Small Computer Systems Interface) controller function. In this capacity the GVP IMPACT controller functions as a high performance "SCSI Host Adapter". The high performance is achieved through the use of an onboard dedicated STATIC RAM buffer which allows fast DMA (Direct memory access) data transfers between the controller and any SCSI peripherals. Up to SEVEN SCSI peripherals can be supported by these products. Each peripheral connected on the SCSI bus, must have its own unique SCSI "ID" number allowing it to be uniquely recognized and selected by the SCSI controller hardware and software. If two SCSI peripherals are connected which have the same SCSI "ID", then contention will occur and the system will not function at all. So BE CAREFUL to select the correct SCSI ID.

All the GVP IMPACT SCSI Controllers provide two separate SCSI connectors, namely the 50-pin internal SCSI connector and the 25-pin external SCSI connector. Each one of these is intended for a different purpose. The internal 50-pin connector (near the rear of the board) is intended for connecting SCSI peripherals which are mounted internally in the A2000 case or A500 add-on subsystem case, e.g: an internally mounted hard disk drive. The external 25-pin "D" connector is externally accessible. This connector is intended for connecting external SCSI peripherals, which have their own power supply and case. This external connector is electrically compatible with the Macintosh Plus.

In order to use a hard disk, a hard disk drive with a SCSI interface must be connected to the GVP IMPACT SCSI controller. In the case of the A2000-HC/XX and the A500-HD/XX, this is generally done at the factory (unless the "XX" suffix is shown as "0"). The controller then acts as the "link" between the SCSI hard disk drive and the Amiga Computer system. Great Valley Products supplies hard disks in various sizes for this purpose. We recommend that you purchase your hard disk from us as it allows you to benefit from a single supplier warranty which offers obvious advantages if any problems should occur during the first year of usage of our products.

The following Hard Disk Drives have been specifically tested to work with the IMPACT SCSI RAM controller. Note that all hard disk capacities are shown in FORMATTED capacity (i.e. the size of the hard disk which can be used by AmigaDOS).

- Conner Peripherals CP340 (3.5", 40MB) and CP3100 (3.5", 100MB)
- Miniscribe 8425S (3.5", 20MB) and 8051S (3.5", 40MB)
- Rodime 652B (3.5", 20MB), 3057S (3.5", 45MB) and 3085S (3.5", 70MB), 3120S (3.5", 100MB)

- Rodime 5125 (5.25", 100MB)
- Seagate ST251N (5.25", 40MB), ST277N (5.25", 62MB)
- Seagate ST125N (3.5", 20MB), ST138N (3.5", 30MB) and ST157N (3.5", 46MB)
- Quantum Prodrive 40S (3.5", 40MB), Prodrive 80S (3.5", 80MB)

All of the above Hard Disk Drives, EXCEPT the Miniscribe 8425S and Rodime 652B, have an AUTO-PARK feature which automatically parks the Read/Write heads in a special shipping zone when power is turned off. We strongly recommend that only hard disk drives with an AUTO-PARK feature be used with our controllers.

The rest of this guide explains in detail how to install the different GVP IMPACT Controllers and internally mounted hard disk drive (where applicable).

WARNING:

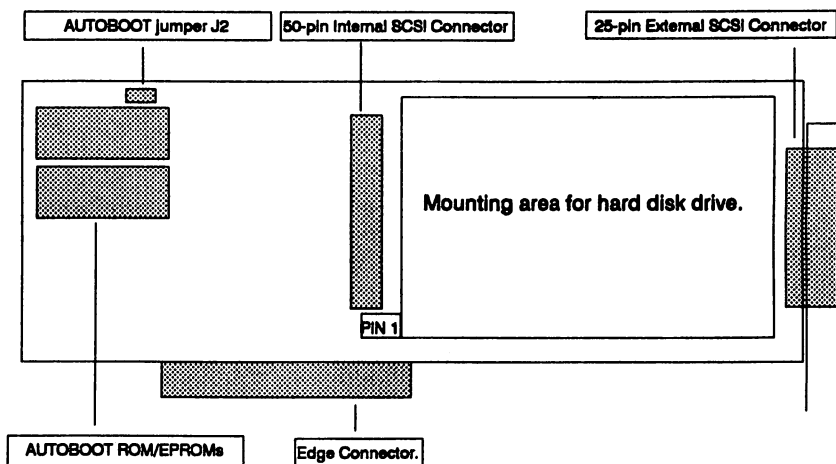
NEVER switch off or reboot your Amiga computer immediately after hard disk activity has occurred. Wait at least 15 seconds AFTER the last command has completed before switching off or rebooting your Amiga. The reason for this is the fact that the Amiga's AmigaDOS operating system may still be updating critical data structures on the hard disk, from its own internal buffers, even after it appears that all commands may have been completed. This AmigaDOS requirement is also the same reason why floppy disks should never be ejected before the red light goes off on the floppy disk drive, even though all commands may appear to have been completed. This is an inherent constraint caused by the multi-tasking filesystem implementation of AmigaDOS.

If this WARNING is NOT adhered to, ALL DATA and files on the hard disk MAY BE LOST!! In some cases it will be necessary to reformat and re-initialize the hard disk. This is an inherent AmigaDOS problem and is not caused by the GVP IMPACT SCSI controller.

2. Installing the IMPACT A2000-HC/XX into the A2000.

This chapter describes the physical installation of the IMPACT A2000-HC/XX into your Amiga A2000 system. The IMPACT A2000-HC/XX is the "Hard Disk On a Card" (sometimes referred to as a HardCard) product.

The diagram below shows the layout of the main components on the IMPACT A2000-HC/XX SCSI controller board.



WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation.

The IMPACT A2000-HC/XX controller card is generally shipped with a hard disk drive already mounted on the controller card. This factory mounting of the hard disk itself takes care of the following:

- SCSI ID of the Hard Disk Drive has been set to ZERO.
- The SCSI bus terminating resistor packs have been removed from the hard disk drive. This means that terminating resistors **MUST** be installed on the last SCSI peripheral installed, if additional SCSI devices are attached to the IMPACT A2000-

HC/XX SCSI controller. See the chapter on "Installing additional SCSI devices".

- A special LED cable has been installed on the hard disk drive which can be used to drive the "Hard Disk" LED (green light) on the front panel of your A2000.
- A short 50-pin ribbon cable has been installed to connect the hard disk drive to the SCSI bus of the IMPACT A2000-HC/XX controller board.
- The power connector on the IMPACT A2000-HC/XX board has been connected to the hard disk drive. This means that the drive will be powered directly from by the IMPACT controller board itself. No further power is required.

The remainder of this chapter assumes that all the above have been done, i.e. you have purchased an IMPACT A2000-HC/XX with a factory installed hard disk drive. The following simple steps should now be followed to install your IMPACT A2000-HC/XX into your A2000 system.

WARNING:

Unplug the Amiga A2000 before removing its top cover to install the IMPACT A2000-HC/XX. Installing the "Hard Card" with the power on could cause possible injury to yourself and damage the equipment. Great Valley Products will not be responsible for any damages caused by improper installation of the IMPACT A2000-HC/XX. Such improper installation will void all warranties both on the A2000 itself and on the IMPACT A2000-HC/XX.

Step 1: Disconnect the power cord and any peripheral cables from the back of the Amiga A2000.

All cables or other objects attached to the back of the Amiga A2000 should be disconnected. Make a note on exactly how everything was connected so that you will be able to reconnect these cables when you have completed the installation.

Step 2: Disconnect the mouse and the keyboard (and any other cables connected there) from the front of the Amiga A2000.

Again make a note of exactly what gets connected to what so that you can reconnect it when you have completed the installation.

Step 3: Remove the five screws which hold the Amiga A2000's top cover and remove top cover.

There are two screws on each side (at the bottom of each side) of the Amiga A2000 and one screw on the back which hold the top cover in place. The screw at the back is positioned dead center at the top. Put the five screws and washers aside so that they won't get lost! Be careful in removing the top cover, make sure no wires are caught under the metal tab to which the center screw in the back was attached.

Step 4: The IMPACT A2000-HC/XX can be installed in any one of the five 100-pin Amiga expansion slots. However, it should preferably be installed in the end slot closest to the power supply, so that only a single expansion slot is used as the hard disk drive will hang over unused space inside the Amiga A2000. Decide which slot you want to use and remove the screw that holds the blank metal bracket which covers up the slot you want to use, at the back of the A2000.

Note: Keep the screw as it will be used to secure the IMPACT A2000-HC/XX at a later stage.

Step 5: If the two GVP AUTOBOOT EPROMS are installed on the IMPACT A2000-HC/XX and your A2000 still has the V1.2 Kickstart ROM, then the AUTOBOOT Jumper J2 (see diagram at the beginning of this chapter) must be removed, as no AUTOBOOTing is possible with the V1.2 kickstart ROM.

Step 6: Install the IMPACT A2000-HC/XX "Hard Card" in the slot you selected. Be careful to ensure that the front of the controller board correctly slides in the plastic guide attached to the inside of the front of the Amiga A2000 case. Apply slight pressure to push the controller board firmly into the slot (connector) on the Amiga A2000 motherboard. Make sure it goes all the way down and that the metal bracket connected to the rear of the IMPACT A2000-HC/XX controller board correctly sits on the ledge at the back of the A2000 case.

Step 7: Using the screw that held down the blank metal bracket (from step 4 above), fasten the rear bracket of the IMPACT A2000-HC/XX controller board to the Amiga A2000 case.

Step 8: Next the Amiga A2000 "Hard Disk" LED (green light on A2000 front panel) must be connected. This LED will show when the hard disk drive is being accessed by the A2000.

Look inside the A2000 case and track down the wires coming from the "Hard Disk" LED on the front panel. You will notice a 3 pin connector on the end of this cable (which should not be

connected to anything). Route the wire in a neat way and connect this connector to the twisted red and black cable which has been connected to the hard disk itself at the GVP factory. The LED cable connected to the hard disk itself will only have a TWO pin connector. Make sure that you connect the A2000 LED wire connector in such a way that the two pins with wires (one pin has no wire connected to it) match up with the two pins of the hard disk drive LED connector. NOTE also that the two wires of each cable (i.e. the A2000 LED cable and the Hard Disk LED cable) are color coded. It is essential that the two cables be connected RED-RED and BLACK-BLACK, otherwise the "Hard Disk" LED (green light) on the A2000 will not light up when the hard disk is being used.

Step 9: Replace the top cover on your Amiga A2000 and re-install the five screws to hold it securely in place. Reconnect all the peripherals and then reconnect the power cord.

You have now completed the hardware installation of your IMPACT A2000-HC/XX and now you are ready to initialize the hard disk and start the software installation.

WARNING:

Your AMIGA 2000 system should NEVER be shipped WITH the IMPACT A2000-HC/XX installed. Before shipping your A2000 system anywhere (e.g. by mail, UPS or FEDEX, etc.) ALWAYS REMOVE THE IMPACT A2000-HC/XX controller. The reason for this is that the single metal mounting bracket on the IMPACT A2000-HC/XX will not be strong enough to hold the IMPACT A2000-HC/XX in place during the typical manhandling which will occur during shipping (e.g. the unit could be dropped on its side or even upside down). Serious damage can occur to both the A2000 motherboard as well as the hard disk if this advice is not followed.

3. Installing the IMPACT A500-HD/XX on the A500.

This chapter describes the physical installation of the IMPACT A500-HD/XX on the Amiga A500.

WARNING:

The IMPACT A500-HD/XX has a built-in hard disk drive. Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the A500-HD/XX unit to any shock or other hazard during installation.

Installing the IMPACT A500-HD/XX is VERY simple! Proceed as follows:

Step 1: Unplug the Amiga A500 before installing the IMPACT A500-SCSI/RAM controller and hard disk. Installing the Hard Disk with the power on could cause damage both to the A500 and the IMPACT A500-HD/XX. Great Valley Products will not be responsible for any damages caused by improper installation of the IMPACT A500-HD/XX subsystem. Such improper installation will void all warranties both on the A500 itself and on the IMPACT A500-HD/XX subsystem.

Step 2: The A500-HD/XX subsystem plugs directly into the Amiga expansion connector located on the lower left hand side of the A500. This expansion connector (on the A500) is covered with a protective plastic cover (about 5.5" long). This cover must first be removed from the A500 case so that the A500 motherboard expansion connector is exposed. The IMPACT A500-HD/XX subsystem can then be directly plugged onto this connector.

Make sure the connector on the IMPACT A500-HD/XX subsystem is pushed all the way into the mating connector on the A500 motherboard. THIS IS VERY IMPORTANT. Once connected, the A500 and the IMPACT A500-HD/XX system should NOT be moved as a single unit. If you must move the system, disconnect the A500 from the IMPACT A500-HD/XX unit, move them separately and reconnect them when you have decided on a final workplace.

Step 3: The IMPACT A500-HD/XX unit uses its own power supply which is supplied with the unit. Connect this power supply to the power connector at the back of the unit.

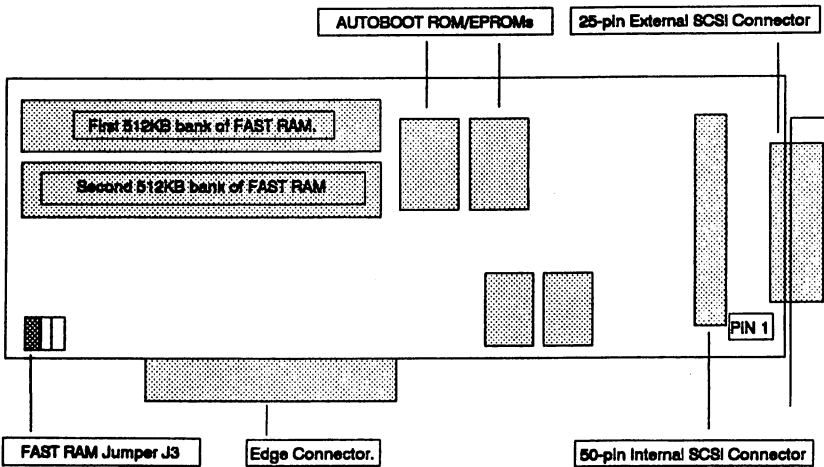
Step 4: Now connect the AC power cords of BOTH THE A500 IT-SELF AND THE the IMPACT A500-HD/XX power supply to a multi-outlet POWER STRIP WITH AN ON/OFF POWER SWITCH. These type of power strips are easily obtained at your local Radio Shack or Sears store. It is ESSENTIAL to use this method of powering the A500 and the IMPACT A500-HD/XX system as this allows both units to be switched on and off simultaneously with a single power switch. The ON/OFF switch on the multi-outlet power strip will therefore act as the ONLY on/off switch needed for the complete system as a whole (you could also plug you monitor into the same power strip).

The hardware installation is now completed. You can now proceed with the software installation which will initialize the hard disk.

4. Installing Additional FAST RAM in the IMPACT A2000-1/X SCSI/RAM Controller

The IMPACT A2000-1/X SCSI/RAM controller allows one of two FAST RAM configurations, i.e. ZERO or 1MB. FAST RAM is memory which is used by the Amiga to execute programs, store data, etc. It is different from so-called "CHIP" memory (or video memory) in that it is not affected by the DMA activity of the Amiga co-processor chips (e.g. DENISE and AGNES). The standard 1MB of memory in a stock A2000, is all dedicated to the so-called "CHIP" memory which under heavy graphics load, can slow down the 68000 CPU considerably. Using FAST RAM can considerably speed up certain applications.

The diagram below shows the layout of the IMPACT A2000-1/X controller board. Please take a moment to familiarize yourself with the main components and layout of the board as this will also be useful when reading the chapter on installation of this board into the A2000.



In earlier versions of the IMPACT A2000-1/X it was necessary to have at least 512KB of FAST RAM installed as a ZERO FAST RAM configuration was not supported. Due to the instability of the worldwide DRAM market during 1988 (both in terms of price and availability), a minor design change was made to also support a ZERO "K" FAST RAM configuration. To achieve this it was necessary to sacrifice the 512KB configuration option as the design only allowed TWO different DRAM configurations to be supported. The IMPACT A2000-1/X can

therefore now **ONLY** be used with **ZERO FAST RAM** installed or with the full **1MB FAST RAM** installed.

The board is generally shipped from the factory with **ZERO FAST RAM** installed. This is indicated by the 32 empty DRAM sockets on the board, the presence of a jumper block on jumper "J3" (lower left hand corner) and the presence of a PAL chip in position U74 marked with a **RED** label. An additional PAL chip with a **BLUE** label is shipped with the board for use (in position U74) when **1MB FAST RAM** is to be installed. This blue labeled PAL chip is shipped in a protective plastic holder and should be packed inside the anti-static plastic bag together with the **IMPACT A2000-1/X** board itself.

In order to convert the board from **ZERO FAST RAM** to **1MB of FAST RAM** installed, the following **THREE** steps must be taken:

Step 1: PAL Change for **ZERO** to **1MB FAST RAM** configuration.

To change from a **ZERO FAST RAM** installed to a **1MB FAST RAM** installed configuration, the red labeled PAL chip in position U74 must be replaced with the blue labeled PAL chip provided. This replacement blue labeled PAL chip is shipped with the board in a protective plastic holder. If you are initially using the board with **ZERO RAM** installed, please store this additional PAL in a safe place so you can find it at a later stage when you want to add the **1MB of FAST RAM**.

WARNING:

Please make sure that the blue labeled PAL chip is correctly inserted with the "notch" (or other Pin 1 orientation mark) pointing towards the **TOP EDGE** of the board (i.e. **AWAY** from the edge connector with the gold plated fingers). **DO NOT RELY ON THE ORIENTATION OF THE NUMBERS PRINTED ON THE BLUE LABEL** to provide you with this orientation information. The label may have been stuck onto the chip incorrectly (i.e. upside down!!). The PAL chip can be destroyed if it is inserted incorrectly and the board is powered on.

Step 2: Setting of Jumper J3 for **ZERO** or **1MB RAM** configuration.

In order for the **IMPACT A2000-1/X** board to pass the correct "AutoConfig" information to the **A2000** operating system, the **FAST RAM** jumper J3 must be correctly configured. This jumper is located at the bottom left hand corner of the board (see diagram on previous page). Jumper J3 must be installed when **ZERO FAST RAM** is installed. When the **1MB of FAST RAM** is added (installing of the 32 DRAM chips), Jumper J3 must be removed.

Step 3: Installing the 32 DRAM chips to provide the 1MB of FAST RAM.

There are two important points to bear in mind when installing the 32 DRAM (Dynamic Random Access Memory) chips. First it is essential that the correct type of DRAM chips be used and secondly it is important to ensure that they are correctly installed (orientation).

The specification for the DRAM chips required is:

- **Size of DRAM: 256K**
- **Speed: 150ns or faster (e.g. 120ns or 100ns)**
- **Organization: 256K x 1**
- **Package: DIP**
- **Number required: 32**

Note that there is no advantage (or disadvantage) in using higher speed DRAM chips. The FAST RAM will NOT operate faster if higher speed DRAM chips are used. As long as the DRAMs which are used are rated at 150ns or faster, the FAST RAM will operate flawlessly and at maximum, ZERO WAITSTATE, speed. We recommend STRONGLY that all the DRAMs which are used are all of the SAME speed (i.e. do NOT mix DRAMS of different speed ratings on the same board).

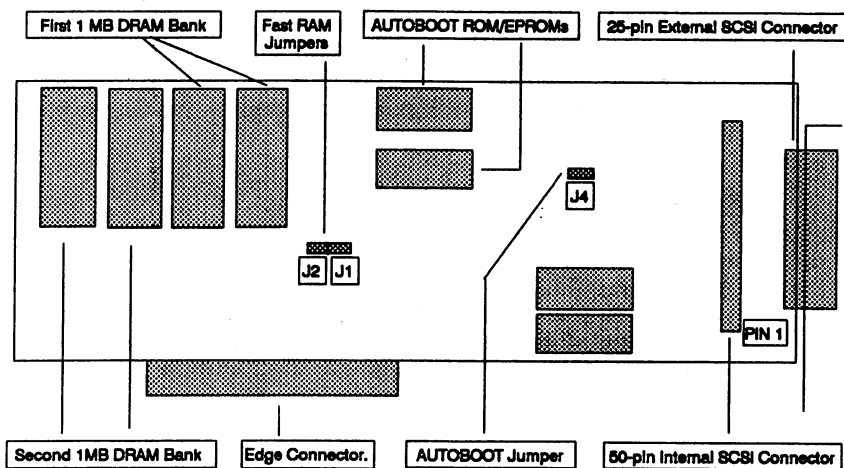
WARNING:

When installing the DRAM chips, make sure they are inserted correctly. They must be inserted facing the same way as the blue labeled PAL chip described above (i.e. the "notch" or other orientation mark on the chips must be facing towards the top edge of the IMPACT A2000-1/0 controller board). Inserting these chips upside down can destroy them when the board is powered on.

5. Installing Additional FAST RAM in the IMPACT A2000-2/X SCSI/RAM Controller

The IMPACT A2000-2/X SCSI/RAM controller allows one of three FAST RAM configurations, i.e. ZERO, 1MB or 2MB. FAST RAM is memory which is used by the Amiga to execute programs, store data, etc. It is different from so-called "CHIP" memory (or video memory) in that it is not affected by the DMA activity of the Amiga co-processor chips (e.g. DENISE and AGNES). The standard 1MB of memory in a stock A2000, is all dedicated to the so-called "CHIP" memory which under heavy graphics load, can slow down the 68000 CPU considerably. Using FAST RAM can considerably speed up certain applications.

The diagram below shows the layout of the IMPACT A2000-2/X controller board. Please take a moment to familiarize yourself with the main components and layout of the board as this will also be useful when reading the chapter on installation of this board into the A2000.



The IMPACT A2000-2/X requires 1MB (1 MegaBit) DRAM chips, which have a 256K x 4 organization. This is **VERY IMPORTANT**, be careful **NOT** to use 1MB DRAMs which are organized as 1MB x 1. The 256K x 4 DRAMs required have 20 pins whereas 1MB x 1 DRAMs have only 18 pins, so the difference is easily recognized. The reason why 256K x 4 DRAMs are used (and not 1MB x 1 DRAMs), is to allow the flexibility of configuring the board with **EITHER** 1MB or 2MB of FAST RAM. As the Amiga uses a 16-bit wide data bus, this flexibility cannot

be achieved when 1MB x 1 DRAMs are used (only ZERO or 2MB could be supported by 1MB x 1 DRAMs).

The specification for the DRAM (Dynamic Random Access Memory) chips required is:

- **Size of DRAM: 1MB (1 MegaBit).**
- **Speed: 150ns or faster (e.g. 120ns or 100ns).**
- **Organization: 256K x 4**
- **Package: 20 pin DIP**
- **Number required: 8 (for 1MB) or 16 (for 2MB).**

Note that there is no advantage (or disadvantage) in using higher speed DRAM chips. The FAST RAM will NOT operate faster if higher speed DRAM chips are used. As long as the DRAMs which are used are rated at 150ns or faster, the FAST RAM will operate flawlessly and at maximum, ZERO WAITSTATE, speed. We recommend STRONGLY that all the DRAMs which are used are all of the SAME speed (i.e. do NOT mix DRAMs of different speed ratings on the same board). The two steps required to install 1MB or 2MB of FAST RAM are detailed below.

The A2000-2/X is generally shipped from the factory with ZERO FAST RAM installed. This is indicated by the 16 empty DRAM sockets on the board and the presence of jumpers J1 and J2 (i.e. both must be installed for use with ZERO FAST RAM). In order to convert the board from ZERO to 1MB or from 1MB to 2MB of FAST RAM installed, the following TWO steps must be taken:

Step 1: Installing the DRAM chips to provide the 1MB or 2MB of FAST RAM.

Make sure you obtain the correct specification DRAMs as described above. For upgrading from ZERO to 1MB of FAST RAM, eight DRAM chips are required. These EIGHT DRAM chips must be inserted in the RIGHTMOST eight DRAM sockets on the board. These are the two columns of four headed by chip positions U3 and U1. See A2000-2/X layout diagram above.

When upgrading to 2MB of FAST RAM a total of sixteen DRAM chips are required. All the empty DRAM sockets will be used up in this case.

WARNING:

When installing the DRAM chips, make sure they are inserted correctly. They must be inserted with the "notch" or other PIN 1 orientation mark pointing towards the REAR end of the IMPACT A2000-2/X controller board. The REAR end of the board is the side which has the mounting bracket and the ex-

ternal SCSI connector. Inserting these chips incorrectly can destroy them when the board is powered on.

Step 2: Setting of Jumpers J1 and J2 for 1MB or 2MB FAST RAM configuration.

In order for the A2000-2/X controller to pass the correct "AutoConfig" information to the A2000 AmigaDOS operating system, the jumpers J1 and J2 must be correctly installed to reflect the actual amount of FAST RAM installed on the board. The diagram in the beginning of this chapter indicates where these two jumpers are located on the board itself. Jumpers J1 and J2 must be configured as followed:

For ZERO FAST RAM, Both J1 and J2 must be installed (i.e. shorted).

When 1MB of FAST RAM is installed, ONLY jumper J1 must be installed (i.e. REMOVE jumper J2).

When the full 2MB of FAST RAM is installed, ONLY jumper J2 must be installed (i.e. remove jumper J1).

6. Installing the IMPACT A2000-1/X or the IMPACT-2/X into the A2000.

This chapter describes the hardware installation procedure for the multi-function IMPACT SCSI/RAM controllers. Both the IMPACT A2000-1/X (1MB maximum FAST RAM) and the IMPACT A2000-2/X (2MB maximum FAST RAM) are supplied complete with a flat ribbon cable for connecting to an internally mounted SCSI hard disk drive in your A2000. Should you wish to connect more than one internally mounted hard disk drive, a special "daisy-chain" ribbon cable is required. GVP also supplies these (optional) daisy-chain ribbon cables.

The main components of the IMPACT A2000-2/0 and the IMPACT A2000-1/0 controllers are illustrated in the diagrams at the beginning of the previous two chapters. Look at your controller board and identify the major components shown. You need to know some of the terminology used in the diagrams during the installation. Take note of the position of PIN 1 on the 50-pin Internal SCSI connector.

Also take note of how much FAST RAM is installed, i.e. ZERO, 1MB or 2MB. The FAST RAM jumpers should be correctly installed in the factory. However should you need to change the amount of FAST RAM installed, see one of the previous two chapters on "Installing additional FAST RAM", to check the correct jumper setting. Additional FAST RAM may also have been installed by your GVP dealer.

WARNING:

Unplug the Amiga A2000 before removing its top cover to install the IMPACT A2000-SCSI/RAM controller and hard disk. Installing the Controller and/or the Hard Disk with the power on could cause possible injury to yourself and damage the equipment. Great Valley Products will not be responsible for any damages caused by improper installation of a hard disk or the IMPACT A2000-SCSI/RAM Controller. Such improper installation will void all warranties both on the A2000 itself and on the IMPACT A2000-SCSI/RAM controller.

Step 1: Disconnect the power cord and any peripheral cables from the back of the Amiga A2000.

All cables or other objects attached to the back of the Amiga A2000 must be disconnected. Make a note on exactly how everything was connected so that you will be able to reconnect these cables when you have completed the installation.

Step 2: Disconnect the mouse and the keyboard (and any other cables connected there) from the front of the Amiga A2000.

Again make a note of exactly what gets connected to what so that you can reconnect it when you have completed the installation.

Step 3: Remove the five screws which hold the Amiga A2000's top cover and remove top cover.

There are two screws on each side (at the bottom of each side) of the Amiga A2000 and one screw on the back which hold the top cover in place. The screw at the back is positioned dead center at the top. Put the five screws and washers aside so that they won't get lost! Be careful in removing the top cover, make sure no wires are caught under the metal tab to which the center screw in the back was attached.

Step 4: If you are NOT installing an internally mounted hard disk drive, remove the flat ribbon cable from the IMPACT A2000-SCSI/RAM controller board. In this case the ribbon cable will NOT be used as you will probably want to connect only external SCSI peripherals.

If you want to install an internally mounted hard disk drive (most people would want to do this), make sure that one end of the flat ribbon cable is properly connected to the 50-pin internal SCSI connector on the IMPACT A2000-SCSI/RAM controller. The flat ribbon cable is normally already connected when shipped from the factory. Make sure the connector is properly seated (i.e. pushed all the way in).

Step 5: The IMPACT A2000-SCSI/RAM controller can be installed in any one of the five 100-pin Amiga expansion slots. However, it should preferably be installed in the slot which is as close to the disk drives as possible so that the cable routing is simpler and cleaner (neater). Decide which slot you want to use and remove the screw that holds the blank metal bracket which covers up the slot you want to use, at the back of the A2000.

Note: Keep the screw as it will be used to secure the IMPACT A2000-SCSI/RAM controller.

Step 6 Check the FAST RAM jumpers, to ensure they are correctly installed. If ZERO FAST RAM is installed, jumper J3 must be installed in the case of the IMPACT A2000-1/0. In the case of the IMPACT A2000-2/0, BOTH JUMPERS J1 and J2 must be installed (for ZERO FAST RAM).

Step 7: Install the IMPACT A2000-SCSI/RAM controller in the slot you selected. Be careful to ensure that the front of the controller board correctly slides in the plastic guide attached to the inside of the front of the Amiga A2000 case. Apply slight pressure to push the controller board firmly into the slot (connector) on the Amiga A2000 motherboard. Make sure it goes all the way down and that the metal bracket connected to the rear of the IMPACT A2000-SCSI/RAM controller board correctly sits on the ledge at the back of the A2000 case.

Step 8: Using the screw that held down the blank metal bracket (from step 5 above), fasten the rear bracket of the IMPACT A2000-SCSI/RAM controller to the Amiga A2000 case.

The IMPACT A2000-SCSI/RAM controller is now installed. Now proceed with preparing your SCSI hard disk drive for installation.

7. Preparing a SCSI Hard Disk Drive for the IMPACT A2000-1/X or the IMPACT A2000-2/X.

The Amiga A2000 allows a hard disk drive with a form factor of either 3.5" half-height or 5.25" half-height, to be mounted internally. In this chapter we are assuming that you will be installing a single, internally mounted hard disk drive. For installing more than one hard disk drive, see the chapter on "Installing multiple SCSI devices". Note that if you intend (in the future) to install a Commodore "BridgeCard" (IBM PC/XT or IBM PC/AT emulator) in your A2000, you may want to keep the 5.25" peripheral bay (the larger opening below the standard 3.5" floppy drive) free for accommodating the 5.25" floppy disk drive which is normally used with those Commodore products. In that case your best choice would probably be to use a 3.5" form-factor hard disk drive which will be installed next to the "DF0:" floppy disk drive.

WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation.

The first thing to be prepared on your SCSI hard disk drive is to ensure that the correct physical SCSI ID (Identity) has been set. In the case of installing a single, internally mounted hard disk, the SCSI ID of this hard disk must be set to ZERO. Most SCSI hard disk drives are shipped from the factory with SCSI ID set equal to ZERO, so it is highly probable that no changes will have to be made to the SCSI ID setting. Note however that some drive manufacturers (e.g. QUANTUM) preset their drives to SCSI ID = 7, which is the required SCSI ID for the first hard disk drive in the Apple Macintosh market.

This SCSI "ID" is a hardware identity number which must be set by the person installing the SCSI peripherals to ensure that each device has been preset to a different SCSI ID. SCSI ID numbers are usually set by installing different jumpers (or setting DIP switches) on the SCSI peripheral itself. The IMPACT A2000-SCSI/RAM controller also identifies itself with a SCSI ID to the other SCSI peripherals connected. It has been factory preset to SCSI ID = 7, hence this ID number (7) may not be used by any of the other SCSI peripherals which will be connected to the IMPACT A2000-SCSI/RAM controller.

The installation software provided with your IMPACT A2000-SCSI/RAM controller has been specifically designed for easy installation of a single, SCSI hard disk drive with a SCSI ID = 0. It is good practice to number the first SCSI peripheral as ID = 0. Subsequent

SCSI peripherals, which can be installed later, should then be set to have SCSI ID = 1, 2, ..., 6. Each SCSI peripheral must be given its own unique ID number. The system will not function if this is not done correctly.

In addition it is necessary to ensure that the SCSI bus is properly terminated. When installing a single SCSI hard disk only, this should not be a problem as SCSI hard disks are normally shipped from the factory with the correct SCSI bus TERMINATING RESISTOR PACKS installed. When multiple SCSI peripherals are connected ONLY the LAST ONE in the chain must have these terminator resistor packs installed. As we are installing only one SCSI peripheral here (i.e. the hard disk drive), it is the last one in the chain and hence it MUST have these terminator resistor packs installed to correctly terminate the SCSI bus. These resistor packs are always located very close to the SCSI interface connector of the SCSI hard disk drive.

Step 1: Read the manual which was supplied with the SCSI Hard Disk Drive which you are going to install. Ensure that you familiarize yourself with the way to check (and set, if necessary) the SCSI ID of the drive as well as where the terminating resistor packs are located on the drive. Check also (in the manual) if your SCSI hard disk drive has a LED connector for connecting the Amiga A2000 "hard disk" LED wire. This LED is the green "Hard Disk" light located on the front panel of your A2000 (below the red "power" LED). You will need to know where this connector, on your hard disk drive, is located to power the "Hard Disk" LED on the A2000.

Note that most hard disk drives are in fact shipped from the factory with SCSI ID = 0. Generally SCSI ID = 0 is set by removing all the SCSI ID jumpers from the hard disk drive. Check however that this is also true for the particular drive that you are about to install.

Step 2: Check that the SCSI ID of the hard disk drive is correctly set equal to ZERO. If it is not set correctly, follow the instructions in the hard disk drive manual to change it.

Step 3: Check that the TERMINATING RESISTOR packs on the hard disk drive are installed. If these are not installed (we are assuming that at this stage you are going to connect only a single hard disk drive), you need to install them. If you do not have these resistor packs, purchase them from the organization where you bought the hard disk drive or your local Amiga dealer.

Step 4: At this point familiarize yourself on how to connect the flat ribbon cable to the SCSI interface connector of your hard disk

drive. It should not be connected yet, but it is essential that you know which way the cable must get connected to the drive. Once you have figured this out, make a note of it for later reference when the cable finally gets connected.

WARNING:

The ribbon cable supplied by GVP has **KEYED CONNECTORS** (i.e. they cannot be inserted incorrectly) on each end, which should match the mating **KEYED** connectors on the **IMPACT A2000-SCSI/RAM Controller** and the **SCSI hard disk drive itself**. However if you are using a ribbon cable which was not supplied by GVP or you have a hard disk drive which does not have a keyed connector, it is essential that you ensure that the cable is correctly connected. If this is **NOT DONE** it is **POSSIBLE TO DAMAGE** the **HARD DISK**. It is essential that **PIN 1** (of the 50-pin internal SCSI connector) on the **Impact A2000-SCSI/RAM Controller** and **PIN 1** on the **SCSI Hard Disk drive** are connected together. **PIN 1** on the **IMPACT A2000-SCSI/RAM controller** is located on the lower side of the 50-pin internal SCSI connector (see layout diagrams in earlier two chapters) . Check in the manual which was provided with your hard disk, where **PIN 1** is located on the hard disk. On most SCSI hard disk drives, **PIN 1** is located on the side of the SCSI interface connector which is closest to the power connector of the drive.

You are now ready to proceed with the installation of your hard disk drive into your Amiga A2000.

8. Installing an Internally Mounted Hard Disk Drive in the A2000.

This chapter describes the installation of a single, internally mounted, Hard Disk Drive into the A2000, for connection to either the IMPACT A2000-1/X or the IMPACT A2000-2/X controller boards.

WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation.

To install a hard disk into an Amiga A2000, you will need to have at least a basic mechanical aptitude! Irrespective of how clear we have written this part of the manual, you need to use some common sense to correctly do this installation. If it seems to difficult, or you get stuck, or are unsure on any detail, we suggest you get the installation done by your friendly local Amiga dealer.

Step 1: Prepare your SCSI hard disk drive as instructed in the previous chapter.

Step 2: If you have to install a 5.25" SCSI hard disk drive, go to step Step 3 below. To install a 3.5" SCSI hard disk drive, continue with this step.

Notice the metal plate to which the internal floppy disk drive (DF0:) is attached. Your 3.5" hard disk drive must be mounted on that plate to the left of the floppy disk drive. As is the case of the floppy disk, the screws which will secure the hard disk will be installed from underneath this plate. Now remove this plate by removing the four screws holding it down (two on each side).

Gently lift up the plate and position your hard disk on top of the plate. Install 4 screws from the underside of the plate (in the four mounting slots) and screw down the hard disk. We recommend that you place some spacers (e.g. washers) between the hard disk drive and the A2000 mounting plate to ensure that the components on the hard disk drive PCB do not touch the A2000 mounting plate. Before tightening the screws down, push the hard disk all the way to the back (i.e. so that the screws are moved to the back of the 4 mounting slot holes). This is necessary so that the hard disk will not protrude through the front bezel of the A2000 (as is the case with a floppy drive).

Now put the metal mounting plate (which now has both the floppy disk drive and the hard disk drive securely mounted on it) back and re-install the 4 screws which secure the plate to the A2000 sub-chassis. Don't tighten these 4 screws at this stage, i.e. allow the plate to be moved (these screws are also in slotted holes). Push the plate all the way forward, since you now need to make sure that the face of the floppy disk drive is flush with the face of the A2000.

To do this, replace the A2000 cover (without installing the screws of the cover). If the floppy disk drive is not flush with the face of the machine, gently push it back until it is correctly positioned. Now remove the top cover of the A2000 once again, and tighten the screws holding the metal mounting plate.

Proceed to Step 4.

Step 3: A 5.25" hard disk drive must be installed in the slot underneath the internal floppy disk drive. The hard disk drive must be secured with four screws, two on each side. There are special slotted mounting holes located on the sides of the 5.25" mounting bay, for this purpose. Correctly align the hard disk and install the four screws.

Note that if your 5.25" hard disk has a front bezel which you want to be seen from the front of the Amiga A2000 you must also remove the plastic cover (installed inside the A2000 front panel) which covers the 5.25" peripheral bay of the A2000. You must then correctly align the hard disk by temporarily replacing the A2000 top cover (before tightening the screws securing the hard disk), correctly align the hard disk, remove the top cover again and then tighten the hard disk mounting screws. Another alternative is to simply push the hard disk all the way back (and maybe remove its own plastic front bezel) and connect the A2000 "hard disk" LED as explained below. In this case, you would not remove the plastic cover from the A2000 front panel and the hard disk will not be visible from the front of the A2000. This is the more common installation method.

Step 4: One end of the flat ribbon cable has already been connected to the IMPACT A2000-SCSI/RAM controller board as instructed in the previous chapter. Now connect the other end of this cable to the SCSI interface connector of the hard disk drive.

WARNING:

The ribbon cable supplied by GVP has **KEYED CONNECTORS** (i.e. they cannot be inserted incorrectly) on each end, which should match the mating **KEYED** connectors on the IM-

PACT A2000-SCSI/RAM Controller and the SCSI hard disk drive itself. However if you are using a ribbon cable which was not supplied by GVP or you have a hard disk drive which does not have a keyed connector, it is essential that you ensure that the cable is correctly connected. If this is NOT DONE it is POSSIBLE TO DAMAGE the HARD DISK. It is essential that PIN 1 (of the 50-pin internal SCSI connector) on the Impact A2000-SCSI/RAM Controller and PIN 1 on the SCSI Hard Disk drive are connected together. PIN 1 on the IMPACT A2000-SCSI/RAM controller is located on the lower side of the 50-pin internal SCSI connector (i.e. on the side which is closest to the Amiga A2000 motherboard). Check in the manual which was provided with your hard disk, where PIN 1 is located on the hard disk. On most SCSI hard disk drives, PIN 1 is located on the side of the SCSI interface connector which is closest to the power connector of the drive.

Step 5: The Amiga A2000 "Hard Disk" LED (green light on A2000 front panel) must be connected next. This LED will show when the hard disk drive is being accessed by the A2000. By now you will know exactly where the LED connector is located on your hard disk (see Step 1 in the previous chapter).

Look inside the A2000 case and track down the wires coming from the "Hard Disk" LED on the front panel. You will notice a 3 pin connector on the end of this cable (which should not be connected to anything). Route the wire in a neat way and connect this connector to the LED connector of your hard disk. The hard disk will only have two pins for a LED connector. Make sure that you connect the A2000 LED wire connector in such a way that the two pins with wires (one pin has no wire connected to it) match up with the two pins of the hard disk drive LED connector.

NOTE: *As there are only two wires on the A2000 "Hard Disk" LED cable connector with no keying, it is possible to connect the LED connector the wrong way around (i.e. wrong polarity). This will not cause any damage BUT the LED will not work. Once you start your initial testing you will have to see if the LED works, if not, simply connect the LED cable the other way around (i.e. reverse the polarity).*

Step 6: The final connection to be made to the hard disk is the power cable. You will notice two separate sets of wires coming out of the Amiga A2000 power supply. There should be two free power connectors (these are the large 4-pin plastic connectors), one of which can be used to provide power to your hard disk. Plug any one of these two connectors into the power con-

necter of your hard disk. Make sure you push it all the way down so it is properly seated.

Step 7: Replace the top cover on your Amiga A2000 and re-install the five screws to hold it securely in place. Reconnect all the peripherals and then reconnect the power cord.

You have now completed the hardware installation of your IMPACT A2000-SCSI/RAM Controller and now you are ready to initialize the hard disk and start the software installation.

9. Initializing Hard Disk and Software Installation.

In order to use your hard disk in the Amiga, you need to format and initialize the hard disk into one or more AmigaDOS file system volume(s). To do this you will need to use the GVP Installation Diskette that is included with your IMPACT peripheral.

The GVP Installation diskette is an Amiga Workbench diskette which contains most Workbench files found on the standard Amiga Workbench. In addition this diskette contains the files needed to run and install a hard disk.

The installation procedure is very simple. Once it is started, the hard disk will automatically be formatted and initialized as one or more AmigaDOS file system volumes. Thereafter the complete installation diskette will be copied to the hard disk. After that the system will actually be operating from the hard disk and a "HD Boot" floppy disk will automatically be created (you need to have a blank 3.5" diskette for this). Once the hard disk has been installed, the system will subsequently be booted with this special "HD Boot" diskette. This is necessary with the Amiga V1.2. Kickstart ROM, as V1.2. does not support AUTOBOOTING off a hard disk directly (without first booting from a floppy disk).

Commodore-Amiga has announced that they will be releasing a new V1.3 Kickstart ROM, which will allow direct AUTOBOOTING from a hard disk. This V1.3 AUTOBOOTING feature will ONLY WORK with hard disk controllers which have AUTOBOOTING driver ROM/EPROMs. As you are one of the fortunate people who selected such a controller, you will be able to boot directly off your hard disk as soon as Commodore releases this new V1.3 Kickstart ROM (second half of 1988). Great Valley Products will provide the two AUTOBOOT driver EPROMs which can only be installed on the IMPACT SCSI peripherals when the new V1.3. (or later) Kickstart ROM from Commodore is installed in the A500/A2000 motherboard. These EPROMs CANNOT be installed while your A500/A2000 is equipped with a V1.2. Kickstart ROM. Contact your local Amiga dealer to find out when the new V1.3. Kickstart ROM will be available. The EPROMs from Great Valley Products will be available around the same time.

Hard disks offer large file storage capacity. AmigaDOS allows a hard disk to be split up into different PARTITIONS. Each PARTITION is then treated as a separate AmigaDOS filesystem (just like each floppy disk is a separate AmigaDOS file system). It is good practice to split up your hard disk into more than one partition as each partition is validated and controlled separately by AmigaDOS. This means that if one partition gets corrupted (resulting in possible loss of data), the other partition(s) may still be in good condition, thus minimizing the risk of losing all data on your hard disk in one foul swoop! The GVP Installation procedures allow you to install a single partition on a 20MB hard disk drive

and two 20MB partitions on a 40MB hard disk drive. If you want to change this arrangement, read the chapter on "Changing/Setting Hard Disk Partition Sizes".

The installation procedure will install the first 20MB partition as DH0: and the second 20MB partition as DH1:. These volume/device names can then be used in the same way as DF0:, etc.. Now for the hard disk installation!

WARNING:

Always keep the write protect tab of your GVP Installation diskette, in the "WRITE INHIBIT" position to ensure it is not accidentally erased. Make a copy of the GVP Installation diskette for safekeeping in case the original gets damaged.

Step 1: Make sure there is no floppy disk in DF0:. Switch on your Amiga. When the "Insert Workbench" hand appears on the Amiga monitor, insert the GVP Installation Diskette.

Step 2: Wait for the Amiga to boot and for the WORKBENCH screen to be loaded. When the WORKBENCH screen appears, you will notice a single icon entitled "install.scsi". The ICON itself is identified as the "GVP install" diskette. Double click on this icon.

Step 3: You will now see a number of icons appearing on the screen. One of them is entitled "INSTALL". Double click on this INSTALL icon.

Step 4: Answer all the questions. They are all very simple and self-explanatory. Be patient, it takes a while to format your hard disk and copy all the files from the installation diskette to the hard disk.

Step 5: If you have a 40MB (or greater) hard disk, answer yes to those questions so that the second 20MB partition is installed on your hard disk.

Step 6: Once the hard disk has been initialized, you will be requested to place a blank diskette (or one that can be reformatted and overwritten) in DF0:. This diskette will then automatically be formatted and initialized as your "HD Boot" diskette (required for V1.2 Kickstart ROM only). Make sure you also keep the write protect tab on this diskette set in the "WRITE INHIBIT" position

Step 7: Once the installation is completed, reboot your Amiga (CTL-Amiga-Amiga Keys) with the HD Boot diskette inserted in DF0:. This will automatically boot your Amiga and transfer control to the hard disk.

Step 8: You should now copy any files from your own workbench diskette that you need. In general these are all the printer drivers, the "Amiga EXTRAS" diskette, and any personal files you have created over time. The best way to do this is to use the CLI "copy" command, e.g:

1. Boot the system with the "HD Boot" diskette.
2. Double click on the "DH0" icon.
3. Double click on the "system" drawer icon.
4. Double click on the CLI icon.
5. Insert your own workbench diskette in DF0:
6. Type: copy DF0:devs/printers DH0:devs/printers ALL

This will copy all the printer drivers from your Amiga Workbench to the hard disk.

Now "explore" your hard disk by using CLI commands like "CD", "DIR", etc..... Note that the HD Boot diskette startup-sequence will automatically do all the necessary "assigns" to allow the Hard Disk to be used as the SYSTEM (SYS:) disk.

WARNING:

NEVER switch off or reboot your Amiga computer immediately after hard disk activity has occurred. Wait at least 20 seconds **AFTER** the last command has completed before switching off or rebooting your Amiga. The reason for this is the fact that the Amiga's AmigaDOS operating system may still be updating critical data structures on the hard disk, from its own internal buffers, even after it appears that all commands may have been completed. This AmigaDOS requirement is also the same reason why floppy disks should never be ejected before the red light goes off on the floppy disk drive, even though all commands may appear to have been completed. This is an inherent constraint caused by the multi-tasking nature of AmigaDOS.

If this WARNING is NOT adhered to, ALL DATA and files on the hard disk MAY BE LOST!! In some cases it will be necessary to reformat and re-initialize the hard disk. This is an inherent AmigaDOS problem and is not caused by the IMPACT SCSI controller.

10. Installing Multiple SCSI Devices.

Up to seven SCSI peripherals can be attached to any of the IMPACT SCSI controllers. The main considerations to bear in mind are the following:

SCSI ID:

Each SCSI peripheral must have its own unique SCSI ID. SCSI IDs range from zero to seven. However the IMPACT SCSI Controller itself uses SCSI ID number seven. No other peripheral may therefore use a SCSI ID = 7.

Terminating Resistors:

The END of the SCSI bus **MUST** be correctly terminated with terminating resistors. **ONLY ONE** SCSI peripheral should have these terminating resistor packs installed, this should always be the last peripheral in the daisy-chain. It is **ESSENTIAL** that the terminator resistor packs **BE REMOVED** from **ALL** peripherals other than this last one. If there are both internal and external SCSI peripherals installed, then the external peripherals are considered to be the END of the chain. This means that the terminating resistor packs must be **REMOVED** from all internal SCSI peripherals installed (when one or more external peripherals are connected).

Correct mating of the RIBBON cable.

When connecting more than one internal SCSI peripheral, you need a new flat ribbon cable which has more than one connector. In this case it is essential that you take great care to ensure that the ribbon cable is correctly connected to the SCSI peripherals. The main concern here is the mating of PIN 1 from the IMPACT A2000-SCSI/RAM controller (see diagrams in earlier chapters) to PIN 1 of the SCSI interface connector on the SCSI peripheral which is being installed. **THIS IS VERY IMPORTANT** as you can damage the SCSI peripherals if the connectors are reversed.

AmigaDOS "UNIT Numbers" and SCSI ID relationships.

AmigaDOS requires an entry for each file system volume which must be mounted. In the case of hard disks, each **PARTITION**

needs an entry in the MOUNTLIST file. This file is located in the DEVS directory. One of the parameters required in each MOUNTLIST entry is the "UNIT Number". This identifies the physical unit number on which the file system volume resides. This UNIT Number is always ONE GREATER than the SCSI ID of the peripheral which is to be addressed. SCSI ID = 0, therefore requires a UNIT Number = 1; SCSI ID = 1, requires a UNIT Number = 2; etc..., in the MOUNTLIST entries.

Software installation of additional hard disks.

When additional hard disk are added, they must be formatted and initialized into AmigaDOS volumes and correctly mounted. An entry must be created in the DEVS/MOUNTLIST file for each partition on the hard disk (minimum of one partition per drive!). The DEVS/MOUNTLIST file provided on your GVP installation diskette, provides entries for a second hard disk drive (20MB or 40MB). In the case of a 20MB drive, it has been setup to create a single 20MB partition. For a 40MB drive two 20MB partitions have been setup. The UNIT Number has been set equal to 2 for this second drive (hence the SCSI ID of the second drive must be equal to 1, in order for these entries to be used). The device "ID" for these two partitions has been set to DH2: and DH3: respectively. The device "ID" is also specified in the DEVS/MOUNTLIST file. Assuming you have correctly installed a second hard disk drive with a SCSI ID = 1, issue the following commands to initialize this second hard disk (from a CLI window):

```
SYS:c/mount DH2:  
SYS:system/format DRIVE DH2: NAME DH2  
SYS:c/dir DH2:
```

The above commands will format and initialize the first 20MB partition on the hard disk. Note that you can give the partition any "NAME" (e.g. "JOE'S HD"). This NAME will appear under the icon representing the hard disk partition. Each partition will be represented by its own icon on the workbench screen. If you have a 40MB hard disk (or greater) a second 20MB partition can be formatted and initialized as follows:

```
SYS:c/mount DH3:  
SYS:system/format DRIVE DH3: NAME "JOE'S HD"  
SYS:c/dir DH3:
```

You can now copy any files you want to these partitions. For example to copy the entire contents of your main hard disk (DH0:) partition to the first partition of the second hard disk drive, issue the following command: "copy DH0: DH3: ALL"

Modifying Your Startup-Sequence.

Once you have installed more hard disk partitions, you probably want to mount them automatically when you boot your Amiga. The HD Boot diskette contains a file called S/STARTUP-SEQUENCE, which has been specifically designed to run the system from the hard disk as soon as possible after booting (i.e. it stops using the floppy disk as soon as it can!). As a result this file should NEVER be changed. However this STARTUP-SEQUENCE file automatically executes a script file on hard disk DH0:, called DH0:GVPSCRIPTS/HDSTARTUP-CONTINUE. This is a continuation of the STARTUP-SEQUENCE which is automatically executed at bootup time. If you want to automatically mount your new hard disk partitions at bootup time, you should add the "mount DH2:" and "mount DH3:" commands to THAT file. This can be done by using the MICROEMACS screen editor contained in the TOOLS drawer of the GVP Installation Diskette and DH0:.

11. Changing/Setting Hard Disk PARTITION Sizes.

The file DEVS/MOUNTLIST contains all the information related to the number and size of hard disk partitions. This file is used by the AmigaDOS "MOUNT" command, which in turn passes much of the information to the hard disk driver.

Hard disks consists of sectors, tracks and cylinders. The smallest unit is a sector. A number of sectors make up a track. If a hard disk has more than one physical read/write surface (and heads) then a cylinder contains the number of tracks equal to the number of read/write surfaces. AmigaDOS only supports sector sizes of 512 bytes on hard disk devices.

Although such parameters as "the number of sectors per track" and "number of surfaces" (= number of tracks per cylinder) are sometimes important to understand to achieve optimal performance from a hard disk, these parameters are not critical to know (for non-advanced users!) in the case of SCSI hard disk drives. The reason for this is that in the case of a SCSI hard disk drive, the SCSI interface provides a view of the entire hard disk as simply "X number of blocks". Each block is a 512 byte sector. So, for example, a 20MB hard disk drive (which should have $20 \times 1,024,000 = 20,480,000$ bytes of data storage available), should consist at least of 40,000 "blocks" or sectors (i.e. $20,480,000 / 512$). The AmigaDOS hard disk driver (which is supplied on your GVP Installation diskette), then simply works with block numbers in that range and it has no knowledge of the actual number of tracks, sectors per track, etc.

The entries in the DEVS/MOUNTLIST file, have various parameters which refer to the above concepts. In the DEVS/MOUNTLIST file provided on your GVP Installation Diskette, we have included entries for four hard disk partitions. There are two 20MB partitions allocated to UNIT Number = 1 (maps to hard disk with its SCSI ID = 0) and two 20MB partitions allocated to Unit Number = 2. These latter two entries can therefore be used for a second hard disk.

To create your own customized partition sizes you need to edit the entries in the DEVS/MOUNTLIST file. This can best be done with the MICROEMACS editor which is contained in the TOOLS drawer of DH0: and the GVP Installation diskette.

WARNING:

When editing the DEVS/MOUNTLIST file, make sure you also update the copies of this file on the HD Boot Diskette, the GVP Installation Diskette and the Hard Disk DH0:. If you do not do this you may get problematic inconsistencies which could destroy data in some of your hard disk partitions.

After changing the DEVS/MOUNTLIST file it is generally necessary to re-FORMAT all the partitions on the disk affected. This will destroy all files and data in those partitions. So make backups before you start changing this file.

A typical DEVS/MOUNTLIST entry is shown below:

```
DH2:   Device = scsidev.device
        Unit = 2
        Surfaces = 4
        BlockPerTrack = 16
        Reserved = 2
        LowCyl = 1 ; HighCyl = 611
        Buffers = 30
        BufMemTYpe = 0
```

#

NOTE: Each MOUNTLIST ENTRY must end with the character "#" on a separate line, as shown above.

The actual PARTITION SIZE generated by the above entry is calculated as follows:

$$512 \times \text{Surfaces} \times \text{BlocksPerTrack} \times (\text{HighCyl} - \text{LowCyl} + 1) \\ = 512 \times 4 \times 16 \times (611 - 1 + 1) = 20,021,248 \text{ bytes (approx 20MB).}$$

Note also that there are additional parameters which may be contained in a MOUNTLIST entry, these are optional and have no effect in the case of SCSI hard disk drives. They all default to ZERO. One such parameter is the INTERLEAVE parameter, which is totally unrelated to the real sector interleaving (a major performance factor) of a SCSI hard disk drive. Below is a description of each of the above parameters:

Device = scsidev.device

This identifies the hard disk driver to be used. This driver must be present in the EXPANSION directory of the SYS: device. This driver is unique to every hard disk controller. In the case of the IMPACT SCSI Controllers, the hard disk driver is called "scsidev". It is present in the EXPANSION drawer of the GVP Installation diskette. This driver is automatically loaded by the "BindDrivers" command which is executed in the "S/STARTUP-SEQUENCE" script.

Unit = NN

NN is the UNIT number which identifies the physical SCSI device to which the entry applies. It must be one greater than the physical SCSI ID of the SCSI peripheral to which it refers.

Surfaces = NN

This should reflect the number of read/write surfaces which the hard disk has. You should find this information in your hard disk manual. Note however if this parameter is set to a different value the only effect will be that hard disk performance may be slightly affected. This parameter is much more important for non-SCSI hard disk drives. This parameter is used mainly to optimize AmigaDOS file system performance.

BlocksPerTrack = NN

NN should be set to the number of sectors per track of the hard disk. However as in the case of "Surfaces" above, it is not a critical parameter in the case of SCSI hard disk drives. It is used mainly to optimize the AmigaDOS file system performance.

Reserved = 2

This parameter must always be set to 2 for the IMPACT SCSI controllers. It reserves two blocks in the beginning of the partition. Part of these two sectors are used by AmigaDOS to identify the partition as an AmigaDOS file system "volume".

LowCyl = NN

A cylinder is defined as consisting of a number of BLOCKS (= sectors) equal to: "Surfaces x BlocksPerTrack". The LowCyl parameter defines the physical block on the hard disk where the partition will start. The MINIMUM value for this parameter is 1. To calculate the actual SCSI BLOCK NUMBER (on the hard disk) where the partition will start, the following formula can be used:

$$[(\text{LowCyl} - 1) \times \text{Surfaces} \times \text{BlockPerTrack}] + 1.$$

HighCyl = NN

This parameter defines the end of the partition and where it is physically located on the hard disk. The actual SCSI BLOCK

NUMBER (on the hard disk) where the partition will end can be calculated using the following formula:

Last Block of Partition = (HighCyl x Surfaces x BlocksPerTrack)

NOTE: The value assigned to "HighCyl" **MUST BE GREATER THAN OR EQUAL TO** the value assigned to "LowCyl". If the two are equal the partition will consist of only a single cylinder.

When more than one partition is located on the same physical device (i.e. same UNIT number), the "LowCyl" and "HighCyl" values assigned to each partition **MAY NOT OVERLAP**. In the example entry shown above, a second partition on UNIT number 2, **MUST** have a LowCyl (and therefore a HighCyl) value **GREATER THAN 610**.

As an example, if we want to create a 30MB partition, from the beginning of a hard disk and the hard disk has 4 surfaces and 24 sectors/blocks per track, then LowCyl must be set = 1 and HighCyl must = 625 which is derived from: $[(30 \times 1,024,000)/512] / (4 \times 24) = 625$.

For a second partition of 10MB on the same hard disk, LowCyl = 626 (immediately following 30MB partition) and HighCyl must be set = 833 which is derived from: $625 + \{[(10 \times 1,024,000)/512] / (4 \times 24)\} = 833$

Buffers = NN

This defines the number of buffers which the AmigaDOS file system should use as a cache. The higher this number, the better the performance, however these buffers consume memory and hence less memory is available for application programs. A good tradeoff, is a number between 20 and 30. Note also that as the number of (mounted) partitions you define increases, you may want to decrease this number, as NN buffers are reserved for each active mounted partition.

BufMemType = N

This determines the type of memory which the AmigaDOS file system should use for the buffers defined above. A value of 0 means "use first available memory". Other values are: 2 for use "CHIP" memory only and 4 for use FAST memory only.

12. SCSI Hard Disk Error Handling and Correcting.

It is possible for hard disks to develop "bad spots" on a read/write surface. If this happens you will from time to time get a special "System Requester" window which informs you of such errors and asks you to click on "RETRY", "CONTINUE" or "ABORT", depending on the type of error. This "System Requester" window is displayed by the GVP hard disk driver.

The most serious of these types of errors are "read/write" errors. If you find that these errors start occurring regularly, it will be necessary to do a PHYSICAL format of your hard disk. Most SCSI hard disk drives contain so-called "bad block handling" firmware logic. This allows the drive to automatically re-assign any BAD blocks (where it finds a read/write error) to alternate sectors which are specially reserved for this purpose.

The AmigaDOS "FORMAT" command does NOT do a physical formatting of a hard disk drive. It only sets up the necessary data structures on a partition for the AmigaDOS file system. To do a physical format of the complete hard disk a special utility is supplied on the GVP Installation Diskette. This utility can be found in the GVPSCRIPTS directory and is called SFORMAT. SFORMAT does NOT use the entries in the MOUNTLIST file. Instead it requests a SCSI hard disk to completely reformat the entire disk. This will destroy all the files and data on the hard disk. During such a formatting operation, the SCSI firmware logic resident on the hard disk itself, will verify every sector and automatically remove any bad blocks.

After SFORMAT is executed, it will be necessary to re-install and re-initialize the software on the hard disk with the GVP Installation Diskette.

WARNING:

In early versions of SFORMAT shipped by GVP, only SCSI ID = 0 hard disks can be addressed. If a second hard disk drive (i.e. with SCSI ID not set = 0) gives problems, it needs to be temporarily connected as SCSI ID = 0 (with no other drives present) for SFORMAT to be able to do a physical reformat on it.

13. TECHNICAL SPECIFICATIONS.

Specifications:

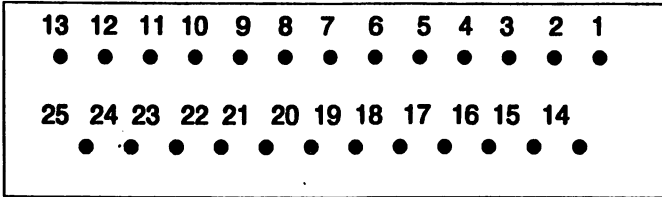
- Combination 1MB, zero-waitstate, FAST RAM controller and ANSI X3T9.2 compatible SCSI controller.
- Supports up to 7 SCSI peripherals.
- High performance DMA data transfer to/from hard disk.
- SCSI data transfer rate up to 2MBytes/sec for asynchronous SCSI peripherals.
- SCSI data transfer rate up to 4MBytes/sec for synchronous SCSI peripherals.
- Amiga A500/A2000 expansion bus host interface.
- Auto-configs both FAST RAM and SCSI Controller.
- Sockets for AUTOBOOT hard disk driver in ROM/EPROM (can only be used with Amiga V1.3, or later, Kickstart ROM). 16-bit wide data path allowing hard disk driver to be directly executed out of these ROM/EPROMs.
- Internal 50-pin SCSI connector.
- External 25-pin (DB25) SCSI connector. Macintosh compatible pinout.
- Power requirements: +5 Volts $\pm 5\%$, 2.2 Amps maximum.
- Ambient temperature: 0° – 55° C
- Relative Humidity: 20% - 80%

Internal SCSI Connector Pinout.

		PIN #	Name
● 50	● 49	50	I/O
● 48	● 47	48	REQ
● 46	● 45	46	C/D
● 44	● 43	44	SEL
● 42	● 41	42	MSG
● 40	● 39	40	RST
● 38	● 37	38	ACK
● 36	● 35	36	BSY
● 34	● 33	34	Ground
● 32	● 31	32	ATN
● 30	● 29	30	Ground
● 28	● 27	28	Ground
● 26	● 25	26	Ground
● 24	● 23	26	Not Used
● 22	● 21	24	Ground
● 20	● 19	22	Ground
● 18	● 17	20	Ground
● 16	● 15	18	DB(P)
● 14	● 13	16	DB(7)
● 12	● 11	14	DB(6)
● 10	● 9	12	DB(5)
● 8	● 7	10	DB(4)
● 6	● 5	8	DB(3)
● 4	● 3	6	DB(2)
● 2	● 1	4	DB(1)
		2	DB(0)

All odd pins, except pin 25, are ground. Pin 25 is not used.

External SCSI Connector Pinout (DB-25 Female)



Pin	Name	Pin	Name
1	REQ -	14	Ground
2	MSG	15	C/D
3	I/O	16	Ground
4	RST	17	ATN
5	ACK	18	Ground
6	BSY	19	SEL
7	Ground	20	DB(P)
8	DB(0)	21	DB(1)
9	Ground	22	DB(2)
10	DB(3)	23	DB(4)
11	DB(5)	24	Ground
12	DB(6)	25	TPWR
13	DB(7)		



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