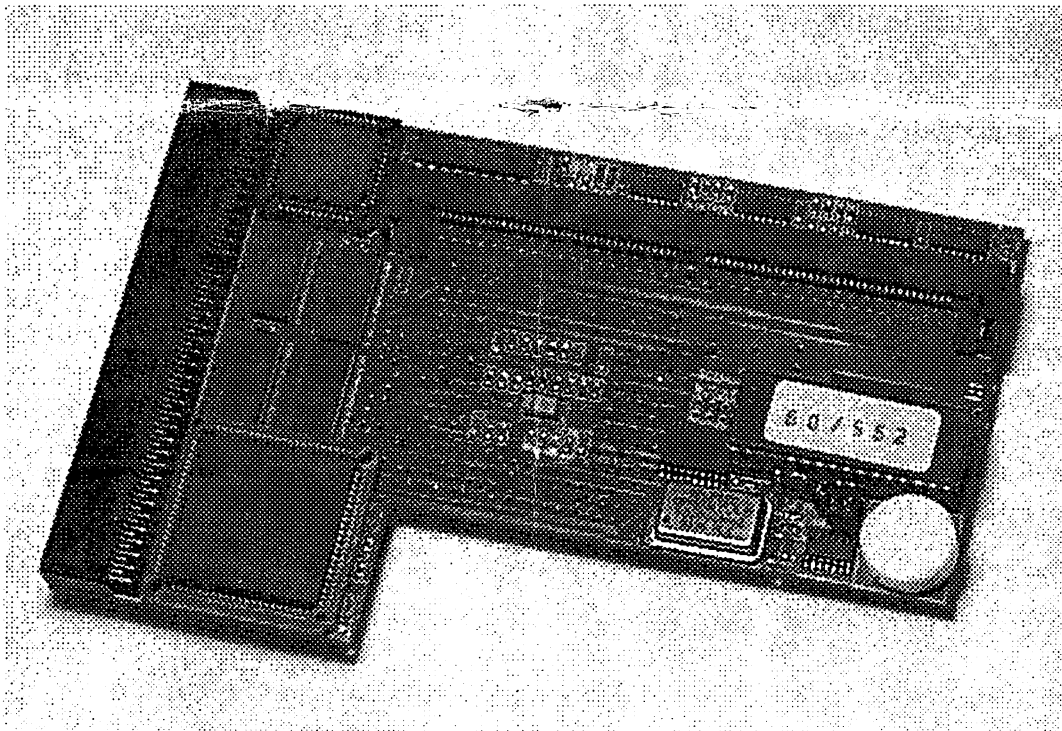

APOLLO
1240
1260
TURBO

68040 / 68060 accelerator
for the *Amiga 1200*



User's Guide

V1.0

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1. Preface

Dear Customer,

thank you for purchasing the Apollo 1240/1260 board. Your Amiga 1200 is now one of the most powerful Amiga computers ever conceived. Please read these important instructions before you put your Apollo 1240/1260 board into operation.

2. What is included

- ⇒ Apollo 1240/1260 accelerator board
- ⇒ This manual
- ⇒ Disk with 68060-Software (Apollo 1260 Turbo only)

3. Apollo 1240/1260 Turbo technical data

- High-End accelerator board for the Amiga 1200 computer
- 68040 processor with FPU and MMU, running at 25, 33 or 40mhz or
68060 processor with FPU and MMU, running at 50 or 66mhz
- upto 32MB FastRAM, with burst-mode capability, autoconfiguring
- optional upto 64MB FastRAM (with 2nd SIMM-socket, when installed in a tower-case)
- Extremely fast memory design, upto 60MByte/sec. transfer rates into local FastRAM
- Upgrade option for an SCSI 2-Controller
- Socket for PS/2 SIM-modules with 1, 2, 4, 8, 16 or 32MB
- Asynchronous design for full compatibility

4. Installation of the Apollo 1240/1260 Turbo board

PLEASE NOTE! The *68040.library* must be installed in the *LIBS:* directory of your boot partition for the Apollo 1240 board to operate properly.

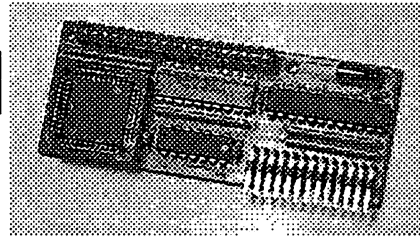
PLEASE NOTE! When installing the Apollo 1260 board, the prior installation of the 68060 software is mandatory due to the incompatibility of the *68040.library* with the 68060 processor. Omitting this procedure can cause the system to hang during the boot process. Therefore install the 68060 software with the *680-install* tool from the Apollo disk before inserting the Apollo 1260 board.

- Firstly switch off your Amiga 1200 and disconnect any connected cables.
- Turn the computer over and remove the expansion cover.
- Carefully insert the Apollo 1240/1260 Turbo board. When inserted, the processor will face inside the Amiga 1200, the SIMM-socket and the other components will face outside.
- Close the trap door again.
- Turn your Amiga 1200 back to its normal position and connect the cables again.
- The installation process is now completed.

4.1 Installation of the SCSI module

PLEASE NOTE! You must open your Amiga 1200 to install the SCSI module. The warranty of your Amiga 1200 may be voided.

Please refer to the SCSI module's manual on how to install the module.



The SCSI module

5. Memory requirements

- ⇒ Upto 32 MB can be fitted on your Apollo 1240/1260 Turbo board
- ⇒ Standard PS/2 SIM-modules (72 positions) that meet the following requirements are suitable:

- Modules with **FastPageMode**
- Modules with parity (x36-modules) or without parity (x32-modules) are suitable and can be used simultaneously
- Access time of 70ns or less
- Suitable modules sizes:
 - ◆ 1MB (256K*32 or 256K*36)
 - ◆ 8MB (2M*32 or 2M*36)
 - ◆ 2MB (512K*32 or 512K*36)
 - ◆ 16MB (4M*32 or 4M*36)
 - ◆ 4MB (1M*32 or 1M*36)
 - ◆ 32MB (8M*32 or 8M*36)

6. Jumper functions

Jumper	function open	function closed
RAM	RAM on the Apollo board off	on
SCSI	Autoboot of the SCSI controller off	on
060	68040 CPU installed	68060 CPU installed

If you change either of the switches, you will need to perform a reset for the switch to take effect. If no SCSI-module is installed, the SCSI jumper has no function.

6.1 The Jumper RAM

PLEASE NOTE: An accelerator board is only capable of high performance if FastRAM is fitted. If FastRAM is disabled, only a minimal increase in performance will be obtained.

6.2 The Jumper SCSI

The SCSI controller's autoboot function should be switched of, if no, or no autobootable, SCSI device is connected. If the autoboot function is enabled, the operation system will wait upto 30 seconds to detect any slow but bootable SCSI devices. SCSI devices can still be used with autoboot function disabled. Obviously they will not boot, but it prevents the 30 second delay occurring before booting will occur from a non SCSI device.

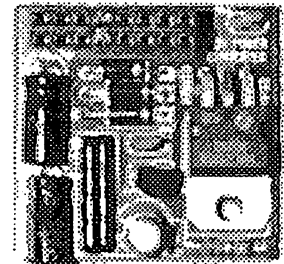
6.3 The Jumper CLK

The 68040 processor has to be supplied with the double external clock frequency. A 68040RC40 (40MHz) CPU is operated with an 80mhz crystal oscillator.

The 68060 processor (with 50MHz) is operated with ist external bus frequency.

The CLK jumper is used to adjust the corresponding clock distribution as following:

Jumper CLK (settings):	
68040-CPU installed:	position *040
68060-CPU (50MHz) installed:	position *060
68060-CPU (66MHz) installed:	position *040



The Power Converter

6.4 The Power Converter (Apollo 1260 Turbo only)

This module is only necessary for the Apollo 1260 board, because the 68060 processor is operated with 3.3 volts. The 68040 processor on the Apollo 1240 board is supplied with the normal system voltage of 5 volts.

Please note! Never operate your Apollo 1260 board *without* the Power Converter module.

7. The 68040 processor

7.1 Technical features

- ⇒ 6-Stage Pipeline
- ⇒ MC68882 compatible FPU (with **68040.library** emulation)
- ⇒ 4 Kbyte Instruction Cache and Data Cache
- ⇒ Independent Instruction and Data MMUs

7.2 The **68040.library**

For the board to operate properly, please ensure that

- the **68040.library** resides in the **LIBS**-directory of your boot partition (The **68040.library** is part of the Workbench-Software, supplied together with your Amiga 1200)
- the **setpatch** command is included in your **startup-sequence**.

7.3 The CPU command

With the **CPU** command, that resides in the **C**-directory, the 68040 processor can be configured:

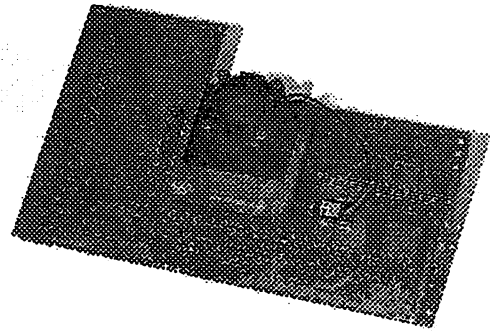
INSTCACHE	Turns the Instruction Cache on
NOINSTCACHE	Turns the Instruction Cache off
DATACACHE	Turns the Data Cache on
NODATACACHE	Turns the Data Cache off
CACHE	Turns both Caches on
NOCACHE	Turns both Caches off

The burst mode is enabled automatically with the corresponding cache activated.

PLEASE NOTE! The FASTROM option (the Kickstart is copied into the FastRAM) isn't possible with the **CPU** command.

For the best performance include the following line in your **startup-sequence**:

CPU CACHE



Apollo 1240 accelerator board

8. The 68060 processor

8.1 Technical features

- ⇒ Harvard architecture with independent fetch and execution pipelines
- ⇒ Superscalar pipeline and dual integer execution units
- ⇒ Branch prediction, 256-entry branch Cache
- ⇒ MC68040/68882 compatible FPU (with **68060.library** emulation)
- ⇒ 8 Kbyte instruction cache and data cache
- ⇒ Four-entry storebuffer
- ⇒ 68040-compatible MMU with dual 64-entry address translation caches

8.2 The **68060.library**

Together with your Apollo 1260 board comes the necessary software for the 68060 processor to operate properly. During the installation process the original **68040.library** (size: 43888 Bytes) - if existing - is deleted and the new libraries **68040.library** (size: 392 Bytes), **68040.library** and **68060.library** are copied into the **LIBS** directory. This is necessary because the Amiga operating system is searching for a library called **68040.library** to configure an 68040/68060 CPU. Due to the incompatibility between the original **68040.library** and the 68060 processor, this library is replaced with an loader that first checks the processor type and then loads the corresponding library into the system.

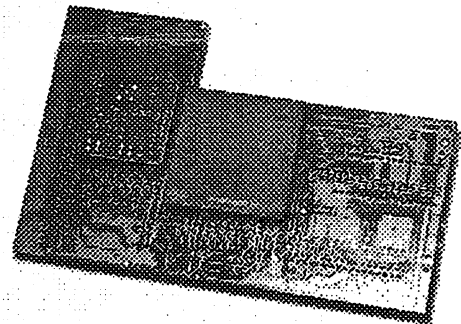
The 060-install tools copies the **CPU60** command into the **C**-directory as well.

PLEASE NOTE! When installing the Apollo 1260 board, the prior installation of the 68060-software is mandatory due to the incompatibility of the **68040.library** with the 68060 processor. Omitting this procedure can cause the system to hang during the boot process. Therefore install the 68060-software with the 060-install tool from the Apollo disk before inserting the Apollo 1260 board.

For the 68060 processor to operate properly the following files must be installed:

- the **68060.library** in the **LIBS**-directory of your boot partition
- the new **68040.library** in the **LIBS**-directory of your boot partition
- the **68040.library** in the **LIBS**-directory of your boot partition (not mandatory)
- the **setpatch** command in you **startup-sequence**
- the **CPU60** command in the **C**-directory of your boot partition

Please use the **060-Install** tool of the **Apollo-68060** disk for installation.



Apollo 1260 accelerator board

8.3 The CPU60 command

With the **CPU60** command the 68060 processor can be configured:

C	(CACHE)	Turns all Caches on (INST, DATA, BRANCH)
NC	(NOCACHE)	Turns all Caches off (INST, DATA, BRANCH)
IC	(INSTCACHE)	Turns the Instruction Cache on
NIC	(NOINSTCACHE)	Turns the Instruction Cache off
DC	(DATACACHE)	Turns the Data Cache on
NDC	(NODATACACHE)	Turns the Data Cache off
BC	(BRANCHCACHE)	Turns the Branch Cache on
NBC	(NOBRANCHCACHE)	Turns the Branch Cache off
SB	(STOREBUFFER)	Turns the Storebuffers on
NSB	(NOSTOREBUFFER)	Turns the Storebuffers off
A	(ALLOCATE)	Normal Cache function (INST, DATA)
NA	(NOALLOCATE)	Caches are freed
IA	(INSTALLOCATE)	Normal function of the INST Cache
NIA	(NOINSTALLOCATE)	INST Cache is freed
DA	(DATAALLOCATE)	Normal function of the Data Cache
NDA	(NODATAALLOCATE)	Data Cache is freed
S	(SUPERSCALAR)	CPU in superscalar mode (two Integer Units parallel)
NS	(NOSUPERSCALAR)	second Integer Unit deactivated
F	(FASTROM)	FASTROM option activated (uses 512KB FastRAM)
NF	(NOFASTROM)	FASTROM option deactivated
B	(BEST)	best possible configuration
W	(WORST)	worst possible configuration

To obtain the best performance, include the following into your *startup-sequence* after the *setpatch* command:

CPU60 B

The **CPU60** command without options displays the actual processor status.

8.4 Software incompatible with the 68060 processor

Some programs are incompatible with an 68060 CPU with all options activated. In most of the cases the problems are caused by an activated Branch Cache. If you have problems running a specific program, try to re-run it with the prior execution of a **CPU60 NBC** command in a CLI window. If you still don't have success, try to run the program with the prior execution of **CPU60 W**. If the program still refuses to work properly, contact the manufacturer/distributor of this program for an updated, 68060-fixed version.

- Older revisions of the *PrepareEmul* tool of the ShapeShifter software are incompatible with the 68060. Contact your dealer for an update or use the *rsrvmem* tool instead.

9. Power Requirements

The A1200 power supply is not able to provide sufficient current for an expanded A1200. If the power supply is overloaded, system crashes, loss of data and the defect of the power supply unit can occur.

If your Amiga 1200 is already expanded (hard drive, external floppy drive, etc.), then the accelerator board may overload your power supply. You should consider purchasing a higher output power supply.

PLEASE NOTE! We are not liable for any faults caused by an overload of the power supply !

If you put your accelerator board into operation with the original power supply please watch out for symptoms caused by an overloaded power supply (system crashes, over-heating of the power supply).

10. The CPU cooler of the Apollo 1240 Turbo

The 68040 processor must be operated always with an cooling fan. Never try to remove the fan nor disconnect the cable of the cooling fan. An 68040 processor without appropriate cooling will overheat shortly, causing system crashes and possibly damages to the processor. The 68060 processor doesn't need active cooling because of the less power consuming 3.3volts technology.

11. Warranty disclaimer

All rights reserved. No part of the hardware, software or the manual may be copied without written permission of the manufacturer. In no event will we or any of our dealers be liable to customers or any other person for any damages, including any incidental or consequential damages, expenses, lost profit, lost savings, or any other damages arising out of the use of or inability to use the hardware and software even if we have been advised of the possibility of such damages.

We do not make warranties on the software or hardware, expressed, implied, statutory or in any other provision of this product or communication with customer, and we specifically disclaim any implied warranty of merchantability or fitness for a particular purpose, we do not warrant that the operation of the software by customer will be uninterrupted or error-free.

Our sole liability and the customer's sole remedy is the case of malfunction of the hardware, that was not caused by misuse, unappropriate installation or electrostatic discharges. This warranty is limited to a period of six month, beginning at the date of purchase.

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Supplementary notes for the installation of Eyetech/Apollo accelerators and memory boards for the A1200

Although the installation of a trapdoor-fitting memory board or accelerator is quite straightforward these notes are intended to answer most of the questions asked by Amiga owners who are new to D-I-Y upgrades.

Preparation:

If you are fitting an '060 accelerator first install the software supplied with your board by booting from your hard drive and double-clicking on the installer icon. You may also wish to install the MCP program at this time (which is also on the supplied diskette) which patches the operating system to make significant performance improvements to the day-to-day operation of your A1200. Note however that MCP requires MUI version 3.8 or higher to be installed in order to run the MCP preferences program. Then proceed as follows:

- Disconnect your A1200 from the powersupply, mouse, monitor etc, turn the it upside down and open up the trapdoor cover.
- On many A1200's part of the tinplate shield is incorrectly cut and fouls the main circuit board of trapdoor expansion boards. This can potentially cause short circuits - and hence damage - to the memory board or accelerator. (Note that this applies to all A1200 trapdoor accessories, irrespective of manufacturer.) To eliminate this possibility bend the (approx 10mm) of vertical metal shield which is just below the edge connector (with the A1200 upside down) back under itself (ie away from the trapdoor opening) using a pair of pointed pliers .
- Next fit any required memory SIMMs not already fitted onto the board and configure the jumpers appropriately. If you have not purchased the SIMM from Eyetech ensure that you are able to exchange the SIMM if it does not function properly in the board. (Experience has shown that a small percentage of SIMMs - and different SIMMs for different platforms/CPU's - will not work properly with any given CPU/board combination, whether on PC, Mac or Amiga platforms.). Note that if you do not fit any memory you will need to remove the 'RAM' or 'RAM enable' jumper to avoid the board reporting an error on power-up.
 - You will need to set 1 jumper on the Apollo 1230LC accelerators or 3 jumpers on the memory board to indicate the size of SIMM fitted.
 - On the '040 and '060 accelerators the SIMM size is automatically detected on boot-up. If two SIMM sockets are fitted each SIMM may be of a different size and still be correctly autoconfigured. (Due to space limitations it is only practical to have two SIMM sockets fitted if the A1200 motherboard is to be installed into a tower system - such as the Eyetech EZ-Tower).
 - Note that for *all* '040 & '060 accelerators supplied by Eyetech the 'CLK' jumper should be set on the '040 position - even for the '060/50MHz board. Ignore any instructions to the contrary which are given in the accelerator-specific instruction sheet.
- Slot the board into the trapdoor from underneath. The board needs to be pushed home firmly so that there is a gap of about 10mm (mem boards and '040/'060 accelerators) or 33mm (Apollo 1230LC boards) between the end of the board and the right hand end of the trapdoor aperture.
 - For the memory boards and '040/'060 accelerators you may find it helpful to use a largish flat-bladed screwdriver to gently push the board into position. To do this place the flat blade of the screwdriver between the end of the board opposite the edge connector and the plastic edge of the trapdoor bay, ensure the edge connector is properly lined up, and twist the screwdriver to ease the board into place.
 - For all boards you may find the installation easier if you remove the keyboard unit top cover (by taking out the 5 screws around the edge of the underside of the case), turn the A1200 the right way up and hinge the keyboard back over to behind the A1200. This allows you to access the top of the trapdoor directly allowing you to line up the edge connector more easily.
- Any accelerator board with a CPU cooler fan (mainly '040 models) should be tested for proper fit of the keyboard after installation. This is to ensure that the top of the fan does not touch the back of the A1200 keyboard as follows. (Clearly this does not apply to tower installations).

- remove the keyboard case top as above.
 - unscrew the two self-tapping screws which hold the fan in place on the heatsink which is bonded to the top of the CPU.
 - move the fan towards the floppy disk drive (it may overlap the plastic trapdoor board locating lip) and re-insert the screws, tightening carefully to avoid unbonding the heatsink
 - replace the keyboard and check to make sure it now seats properly. If not, repeat the exercise until it does.
- Reassemble the A1200. If necessary invert it so the trap door is uppermost. Lay the trap door lid upside down on the underside of the A1200 by the front edge of the trap door opening so that it is lined up with the opening in a side-to-side direction. Mark, in pencil, any areas of the plastic upstands on the underside of the trapdoor lid which need trimming because they are obstructed by some of the boards components. Repeat this for the other side of the trap door. Use a pair of side cutting wire cutters (or a Stanley knife -- but BE CAREFUL not to cut yourself) to trim the excess plastic away.

Using your accelerator/memory board.

First of all it is important to realise that it is the close coupling between the A1200/accelerator CPU and the 32-bit memory in the SIMM socket which gives the increased A1200 performance. If you do not have any fast memory installed then you will not see any significant performance increase. If you have purchased the memory board you also have the option of adding a 33 Mhz floating point processor (FPU) which will significantly speed up the execution of certain types of software (notably 3D rendering programs). The Apollo 1230LC is generally supplied with an FPU fitted to the board (but see your invoice to confirm this) and the '040 and '060 accelerators have an FPU capability built in to the CPU itself.

For accelerators with built-in memory management unit (MMU)-it is also possible to put a copy of the Kickstart ROM into the fast memory area (this takes up about 0.5MB of system memory) to speed up system calls which normally get made to the relatively slow Kickstart chip. Details of how to do this are given in the accompanying accelerator instruction sheet. However please get used to using the accelerator 'as-is' before starting such fine tuning operations.

Note that some older programs - particularly those that are not 'OS-legal' and/or otherwise patch the operating system may not work properly with the higher speed processors (which were not generally available when such software was written). In most cases updated and/or alternative versions of this software are commonly available from Aminet or the appropriate commercial developer.

Finally you should be aware that - according to the 'Commodore Hardware Developer Notes' for the A1200 the power supply shipped with the A1200 was only designed to power a basic A1200 with *either* a memory expansion board *or* a small 2.5" hard drive. Adding a higher powered accelerator and/or a larger hard drive is likely to risk overloading your original power supply and this can lead to system instability and 'crashing'. Such accessories also generate more heat (from the extra power that they use) which in some cases means that an internal cooling fan for your A1200 is also a sensible investment. Replacement, uprated power supply units and internal A1200 cooling fans are available from Eyetech. Please ring for further details.

Warranty information

The accelerator/memory board (and any memory modules supplied by Eyetech at the same time) carry a 12 month, return-to-base manufacturers warranty against mechanical or electrical failure. There is a £30 administration, carriage and handling charge made by Eyetech for processing warranty claims on behalf of the manufacturer for failures occurring more than 90 days from date of purchase. Note that the warranty does not cover failure through incorrect handling of the any of the units supplied, damage caused by incorrect use of hard disk management software, damage caused by faulty software or computer viruses, or damage caused by faulty equipment (including power supply units) with which any of the equipment supplied is used in conjunction. All forms of consequential loss are expressly excluded.

Thankyou for purchasing this Amiga product from Eyetech.