APOLLO 1240 1260 TURBO

68040 / 68060 accelerator for the Amiga 1200

User’s Guide V1.0
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 86mhz
- 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 60MB/sec. transfer rates into local FastRAM
- Upgrade option for an SCSI 2-Controller
- Socket for PS2 SIMM-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 686-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 competed.
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.

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)
  - 2MB (512K*32 or 512K*36)
  - 4MB (1M*32 or 1M*36)

- 8MB (2M*32 or 2M*36)
- 16MB (4M*32 or 4M*36)
- 32MB (8M*32 or 8M*36)

6. Jumper functions

<table>
<thead>
<tr>
<th>Jumper</th>
<th>function open</th>
<th>function closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>RAM on the Apollo board off</td>
<td>on</td>
</tr>
<tr>
<td>SCSI</td>
<td>Autoboot of the SCSI controller off</td>
<td>on</td>
</tr>
<tr>
<td>060</td>
<td>68640 CPU installed</td>
<td>68660 CPU Installed</td>
</tr>
</tbody>
</table>

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 off, if no, or no autoexecutable, SCSI device is connected.
If the autoboot function is enabled, the operation system will wait up to 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 occuring 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 1st external bus frequency.
The CLK jumper is used to adjust the corresponding clock distribution as following:

<table>
<thead>
<tr>
<th>Jumper CLK (settings):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>68040-CPU installed:</td>
<td>position 040</td>
</tr>
<tr>
<td>68060-CPU (50MHz) installed:</td>
<td>position 060</td>
</tr>
<tr>
<td>68060-CPU (66MHz) installed:</td>
<td>position 040</td>
</tr>
</tbody>
</table>

6.4 The Power Converter (Apollo 1260 Turbo only).

This module is only necessary for the Apollo 1260 board, because the 65060 processor is operated with 3.3 volts. The 65040 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:

<table>
<thead>
<tr>
<th>INSTCACHE</th>
<th>Turns the Instruction Cache on</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOINSTCACHE</td>
<td>Turns the Instruction Cache off</td>
</tr>
<tr>
<td>DATACACHE</td>
<td>Turns the Data Cache on</td>
</tr>
<tr>
<td>NODATACACHE</td>
<td>Turns the Data Cache off</td>
</tr>
<tr>
<td>CACHE</td>
<td>Turns both Caches on</td>
</tr>
<tr>
<td>NOCACHE</td>
<td>Turns both Caches off</td>
</tr>
</tbody>
</table>

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

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)
- 64 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: 43886 Bytes) - if existing - is deleted and the new libraries 68060.library (size: 352 Bytes), 68c40.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 606-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 606-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 606-Install tool of the Apollo-68060 disk for installation.
8.3 The CPU60 command

With the CPU60 command the 68060 processor can be configured:

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

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 and update, 68060-fixed version.

- Older revisions of the PrepareEmu tool of the ShapeShifter software are incompatible with the 68060. Contact your dealer for an update or use the rsrvrnm 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, overheating 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 3.3Volt technology.

11. Warranty disclaimer

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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.

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