APOLLO
1240
1260
TURBO

68040 / 68060 accelerator
for the *Amiga 1200*
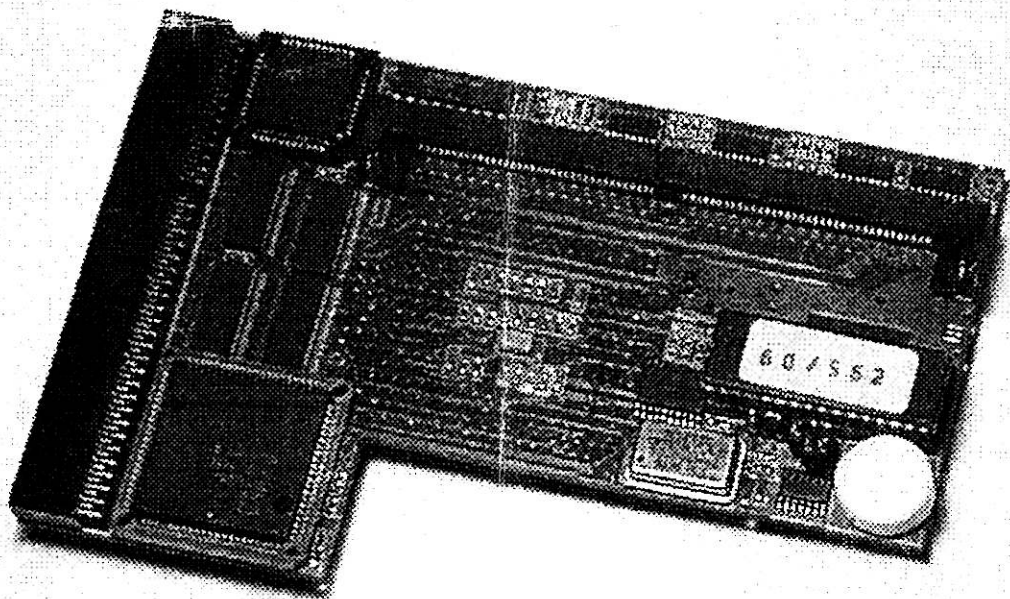
User's Guide

V1.0

Table of Contents

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)
- Extremly 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 **060-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.
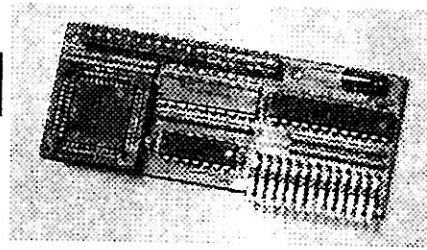
The SCSI module

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 simultaneosly
* 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 occuring before booting will occour 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 exernal 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
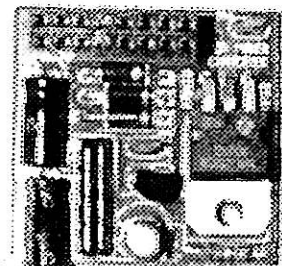
6.4 The **Power Converter** (Apollo 1260 Turbo only)

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.

The Power Converter

Please note! *Never* operate your Apollo 1260 board *with out* 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

Apollo 1240 accelerator board

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**

8. The 68060 processor

8.1 Technical features

⇒ Harvard architecture with independent fetch und execution pipelines
⇒ Superscalar pipeline and dual integer execution units
⇒ Branch predicion, 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

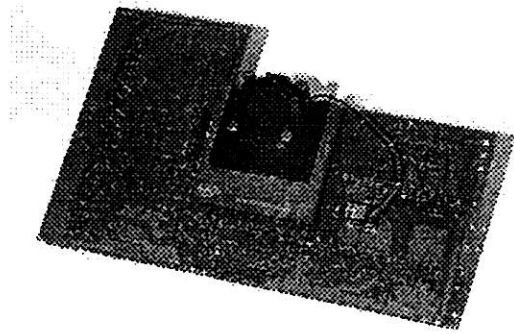*Apollo 1260 accelerator board*

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), **68o4o.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.
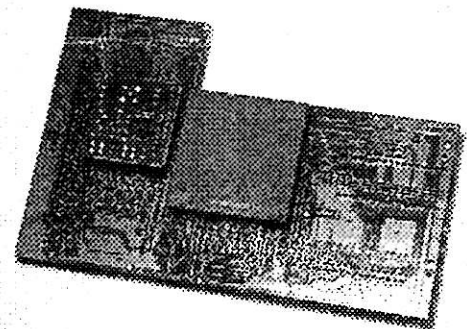
For the 68060 processor to operate properly the following files must be installed:
- the **68060.library** in the **LIBS:**-directory of your boot partition
- the new **68040.library** in the **LIBS:**-directory of your boot partition
- the **68o4o.library** in the **LIBS:**-directory of your boot partition (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.

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 freezed
IA	(INSTALLOCATE)	Normal function of the INST Cache
NIA	(NOINSTALLOCATE)	INST Cache is freezed
DA	(DATAALLOCATE)	Normal function of the Data Cache
NDA	(NODATAALLOCATE)	Data Cache is freezed
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 performace, 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 proir execution of *CPU60 W*. If the program still refuses to work properly, contact the manufacturer/distributor of this program for and 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 symtoms 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 consumpting 3.3volts technology.

11. Warranty disclaimer

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