

MuOmniScsiPatch

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REVISION HISTORY

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Chapter 1

MuOmniScsiPatch

1.1 MuOmniScsiPatch Guide

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MuOmniScsiPatch Guide

Guide Version 1.03 MuOmniScsiPatch Version 40.3

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Thomas Richter

1.3 What's the MMU.library?

All "modern" Amiga computers come with a special hardware component called the "MMU" for short, "Memory Management Unit". The MMU is a very powerful piece of hardware that can be seen as a translator between the CPU that carries out the actual calculation, and the surrounding hardware: Memory and IO devices. Each external access of the CPU is filtered by the MMU, checked whether the memory region is available, write protected, can be hold in the CPU internal cache and more. The MMU can be told to translate the addresses as seen from the CPU to different addresses, hence it can be used to "re-map" parts of the memory without actually touching the memory itself.

A series of programs is available that make use of the MMU: First of all, it's needed by the operating system to tell the CPU not to hold "chip memory", used by the Amiga custom chips, in its cache; second, several tools re-map the Kickstart ROM to faster 32Bit RAM by using the MMU to translate the ROM addresses - as seen from the CPU - to the RAM addresses where the image of the ROM is kept. Third, a number of debugging tools make use of it to detect accesses to physically unavailable memory regions, and hence to find bugs in programs; amongst them is the "Enforcer" by Michael Sinz. Fourth, the MMU can be used to create the illusion of "almost infinite memory", with so-called "virtual memory systems". Last but not least, a number of miscellaneous applications have been found for the MMU as well, for example for display drivers of emulators.

Unfortunately, the Amiga Os does not provide ANY interface to the MMU, everything boils down to hardware hacking and every program hacks the MMU table as it wishes. Needless to say this prevents program A from working nicely together with program B, Enforcer with FastROM or VMM, and other combinations have been impossible up to now.

THIS HAS TO CHANGE! There has to be a documented interface to the MMU that makes accesses transparent, easy and compatible. This is the goal of the "mmu.library". In one word, COMPATIBILITY.

Unfortunately, old programs won't use this library automatically, so things have to be rewritten. The "MuTools" are a collection of programs that take over the job of older applications that hit the hardware directly. The result are programs that operate hardware independent, without any CPU or MMU specific parts, no matter what kind of MMU is available, and programs that nicely co-exist with each other.

I hope other program authors choose to make use of the library in the future and provide powerful tools without the compatibility headache. The MuTools are just a tiny start, more has to follow.

1.4 What's the job of MuOmniScsiPatch?

The MuOmniScsiPatch replaces two internal functions of Ralph Babel's "omniscsi.device" - available as the so called "Guru ROM" - to be MMU aware.

While for the usual Amiga memory layout the physical addresses - as seen from the DMA based SCSI host adapter - are identically to the logical addresses as seen from the CPU, this will be no longer the case if the MMU is used to translate the logical address to a different physical address. It's the aim of this patch to perform the required translation for the omniscsi.device.

For short, if you're using the mmu.library on a system with a "omniscsi" based SCSI host-adapter, it's highly recommended that you install this patch.

Note:

Owners of the following SCSI host adapter solutions are able to upgrade their system to the "omniscsi", and hence will be able to use the mmu.library safely with DMA transfers:

GVP Series-II-SCSI host adapters for the A2000/A3000/A4000 (with or without RAM option), "A2000HC+8" resp. "A2000HC"

GVP Series-II-SCSI host adapter extensions for the A500/A500+ "A500HD-Series-II"

Turbo board "A530 Turbo" for A500/A500+

"Combo '030" turbo board for the A2000.

"G-Force '030" turbo board for the A2000.

"G-Force '040" turbo board for the A2000.

"Fang" SCSI host-adapter for the A1200.

The SCSI host-adapter "A2091" for the A200.

The host-adapter "A590" for the A500.

Besides that these boards can be made MMU aware if a Guru-ROM is installed, the "omniscsi" device is clearly worth its price anyways...

1.5 Installation of MuOmniScsiPatch

First, make sure the "omniscsi.device" is installed in your system and available. Do to so, please open a shell and type
version omniscsi.device

This should either print the version of the omniscsi.device, or an error message like "object not found". It doesn't make sense to install the patch in case the omniscsi isn't available.

If the above test passed, first, install the "mmu.library" if you haven't installed it yet: "CD" into the directory where you unpacked this archive, then copy this library to your LIBS: drawer.

copy mmu.library to LIBS:

Copy the "MuOmniScsiPatch" program to your C: directory:

copy MuTools/MuOmniScsiPatch to C:

The following line should be added to your startup-sequence. It should go somewhere below the "SetPatch" and before the first other tool making use of the mmu.library, or the "LoadWB" command.

MuOmniSCSIPatch

That's it.

1.6 Thank you, folks

Special thanks goes to Ralph Babel for providing the required internal information of the omniscsi.device to make this patch possible.

Besides that, I have to thank Ralph for the very helpful discussion about the internals of the CachePreDMA() and CachePostDMA() functions that implement a similar mechanism for devices using them.

1.7 History

Release 40.1:

This is the first official release. I would call "MuOmniScsiPatch" pretty final because there's not much this program has to do. All the tough tricks are run by the mmu.library anyways. However, the "mmu.library" is still in beta state.

Release 40.2:

Forgot to pass one register an mmu.library function correctly. This register is currently not required anyways, but for good measure, I fixed it.

Release 40.3:

The DMAInitiate() function for V42 does now no longer warn itself in case the requested DMA transfer was illegal. This is now left to this little patch.
