

memory

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Chapter 1

memory

1.1 Memory-Device

Memory-Device - Exec device driver for direct memory access - ↔
Written by Marius Gröger.

This software requires AmigaOS 2.0 (V37) or higher.

WARNING: THIS SOFTWARE SHOULD ONLY BE INSTALLED AND USED BY EXPERIENCED
USERS. IT IS A LICENSE TO CRASH THE SYSTEM.

Description

Why You need it!

Features

All in one glance

Requirements

What you need

Installation

What's needed to be done

Example with VMM

How to use it with VMM

Bugs

Known Bugs

History

What's been done already

Copyright / Author

Legal stuff, credits, my addresses

1.2 Memory-Device - Description

Description

What is memory.device?

This special device simulates a trackdisk compliant block device in any region of memory. Unlike the RAM DISK (which is in fact not even a device) or the ramdrive.device, memory.device allows the exact definition of the memory to use for data storage.

The purpose memory.device has been developed for is to use it on systems quipped with different RAM chips or local memory busses. In conjunction with VMM or similar virtual memory packages, a memory region with slower RAM chips may be used as swap area. This idea originates from the z2ram device which has been written for Linux/68k/Amiga.

I tried to use the MEM-handler before writing memory.device, but it seems the VMM actually needs an underlying Exec device, even if using a plain page file. I believe nobody has ever been struck by this because probably nobody ever tried to swap to RAM:pagefile :-)

Other applications with memory.device are conceivable, ranging from whitty, over funny to perverted. Use it on your own risk.

The memory.device is in fact a very small driver, and writing this documentation was really a harder task. The good side of this is that the device operates at a very high speed. For example, the device's read and write functions are hardly more than a simple call to Exec's fast memory copy routine. All other typical device functions are simply stubs to pretend a correctly operating, writable trackdisk device.

1.3 Memory-Device - Features

Features

- Very fast raw memory access
- Compatible with trackdisk's command set
- ~Distributed as Freeware, complete source code is supplied

1.4 Memory-Device - Requirements

Requirements

- AmigaOS Release 2.04 or better
- ~VMM if you want to use memory.device for swapping

1.5 Memory-Device - Installation

Installation

1. Copy the file `memory.device` to the system devices directory `DEVS:`
2. Copy the AmigaDOS Driver Descriptor `MEMORY` to `DEVS:DOSDrivers/`
3. This step should be performed with maximum attention. Any mistake will in 99% of all cases lead to an unpleasant system shutdown.

Edit the AmigaDOS Driver Descriptor to match your needs. It is not important how you organize the geometry of the device, only the `SectorSize` should not be too odd. Probably it's best to stick with a value of 512 bytes. Choose the values to match the following equations:

$$\text{LowCyl} \times \text{Surfaces} \times \text{SectorsPerTrack} \times \text{SectorSize} == \text{Starting-Address} \leftarrow$$

$$\text{SectorsPerTrack} + \text{HighCyl} \times \text{Surfaces} \times \text{SectorsPerTrack} \times \text{SectorSize} == \text{Ending-Address} \leftarrow$$

This leads to:

$$\text{LowCyl} := \text{Starting-Address} / (\text{Surfaces} \times \text{SectorsPerTrack} \times \text{SectorSize}) \leftarrow$$

$$\text{HighCyl} := (\text{Ending-Address} - \text{SectorsPerTrack}) / (\text{Surfaces} \times \text{SectorsPerTrack} \times \text{SectorSize}) \leftarrow$$

When dealing with RAM addresses, take care of not to confuse Hexadecimal and decimal addresses.

4. Depending on your application the most tricky bit might be the task of convincing the operations system (namely `exec.library` or `expansion.library`) not to configure a certain memory region to be used. For instance, a GVP Series II RAM expansion needs to be configured by `expansion.library`, otherwise the RAM won't even appear on the bus.

However, once configured by expansion, any RAM will also be added to Exec's memory lists. There are several tools available on Aminet which seem to deal with RAM expansion boards.

One way might for example be to configure the RAM (e.g. by hardware jumpering) not to auto-configure at boot-time. In startup-sequence, an `addmem` command or similar could configure the RAM, and an `AllocAbs()` following right after this could eat the complete new block.

1.6 Memory-Device - Example for VMM usage

An example to use `memory.device` as VMM swap space

Important Note: Before you actually start toying around with VMM, you should have installed the memory.device and found a working method to hide some of your RAM from the system. It is most important that the region of memory you intend to use with memory.device is either completely unconfigured or completely allocated in an Exec-safe manner. It is impossible to describe how to archive this on your system, you simply must have the required knowledge about the Amiga's internal way of memory and expansion handling. See

Installation
for further detail.

The idea of it

Memory.device has been developed to be used as swap space with VMM. This is realised in a similar way as done in Linux/68k/Amiga's z2ram device.

Usually any harddisk partition is driven by some scsi.device which provides for the low-level device functions, namely to read and write blocks of data. The idea is just to pretend the slow RAM portion being a very small harddisk, and VMM won't notice anything.

Now let's get into the details.

System examination

A typical configuration is an A2000 system with a A2630 turbo board providing 4 megs 32bit RAM, and another 4megs on a 16bit RAM expansion (such as a dedicated RAM board, or a SCSI host adapter with a RAM option).

First you should figure out the memory map to avoid sacrificing innocent memory. The memory map of the above configuration looks like this:

```

+-----+-----+---$0000 0000
|   512k Chip RAM   |
+-----+-----+---$0080 0000
| 512k Chip RAM (opt.) |
+-----+-----+---$0100 0000
|   1meg Chip RAM   |
|   (opt.)         |
+-----+-----+---$0200 0000
|                   |
|   4megs of       |
|   fast 32bit RAM |
|                   |
+-----+-----+---$0600 0000 \
|                   |           |
|   4megs of       |           | Should be used
|   slow 16bit RAM |           | for swapping
|                   |           |
+-----+-----+---$0A00 0000 /
|                   |
|   IO and ROM follows |
|                   |
| | | | | | | |

```

2. The DOSDriver entry

The DOSDriver entry ``MEMORY`` must be modified to meet the above considerations. The following values should (at least for calculation simplicity) always be chosen like this:

```
Surfaces := 1
SectorsPerTrack := 1
SectorSize := 512
```

Low- and High-Cylinder will determine the actual RAM area:

```
LowCyl := $600000 / (1 $\times$ 1 $\times$ 512) = 12288
HighCyl := ($A00000-512) / (1 $\times$ 1 $\times$ 512) = 20479
```

Note that both hexadecimal and decimal values are used.

3. VMM configuration

Finally start the VMM configure utility and put VMM in the mode ``Swap to Partition``. Enter ``MEMORY`` in the text-field which controls the partition to be used.

VMM should soon start swapping, since half of your RAM seems to be vanished for your system.

1.7 Memory-Device - Known Bugs

Known Bugs

Currently things seem to work quite well.

If you know bugs, contact
me
.

1.8 Memory-Device - History

Development history of Memory-Device

Release 37.1

..initial release

Technical history of Memory-Device

For more technical details, please refer to the source code. In the header section of each source file, you find the pseudo-keyword \$HISTORY: after which follows the complete revision history of this file.

1.9 Memory-Device - Copyright / Credits / Legal stuff / Contacting

Copyright and author information

Memory-Device is

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Credits

The technical idea behind the memory.device was inspired by the z2ram device written for Linux/68k/Amiga.

I ask everyone who has suggestions to Memory-Device's implementation or even modified versions of Memory-Device to tell me, so that I can incorporate them into the distribution.

Legal stuff

This software is freeware. It is provided as-is and is subject to change; no warranties are made. All use is at your own risk. No liability or responsibility is assumed.

It's strictly forbidden to include this archive in any kind of software collection except Fred Fish's AmigaLibrary, Meeting Pearls CD's, Aminet, Aminet CD's and BBS fileareas.

Contact

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