




# DaniS506 / DaniATAPI / DaniBoot

High-Performance Serial/Parallel  
ATA/ATAPI drivers (and more)

Updates and Outlook

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# What are the »Dani« drivers?


- DaniS506.ADD  
Replacement for IBM1S506
  - DaniATAPI.FLT  
Replacement for IBMIDECD and IBMATAPI
  - DaniBoot.FLT  
Replacement for CD\_BOOT
- 



# DaniS506




# DaniS506 Basics

- S506 is the first »small form factor disk« interface standard
  - The standard is modelled after the registers found in the WD1003 MFM disk controller
  - In the '80s, the controller moved into the disk drive (thus IDE = »Integrated Drives Electronic«), and the physical disk interface became an extension of the ISA bus
  - This interface is known as »ATA«
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# DaniS506 Basics

- The ATA interface became formally standardized by the ANSI T13 committee
  - Over time, a heap of new features was added, the ATA physical interface was decoupled from the system I/O bus, the interface speed increased 30 fold, and increasingly sophisticated CPU offloading schemes were introduced
  - The current ATA/ATAPI standard is version 6
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# DaniS506 Basics

- Eventually, ATA disks became »storage appliances with a funny interface«, running a full-fledged OS inside - just like SCSI disks
  - The evolution of both the ATA host and disk side gave way to implement protocols and command sets beyond ATA - the invention of ATAPI
  - Today, an ATA channel is a bus which »speaks« two languages: ATA and SCSI
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# DaniS506 Basics

- Both ATA/ATAPI and SCSI share the same problems:
  - Parallel interfaces run against the »speed wall« at the physical layer
  - Buses are shared transport channels, the transport capacity has to be split between all attached units
  - Compatibility to first generation hardware eats up large portions of the bandwidth
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# DaniS506 Basics

Parallel ATA is **DEAD!**


(and so is parallel SCSI, too)








# DaniS506 SATA

- The solution to PATA is »serial ATA« (SATA)
  - serial physical signalling -> no speed limit
  - 7 wires instead of 80 wires -> reliable
  - point-to-point only -> defined conditions
  - switched networking -> no bus contention
  - hotplug interface -> no maintenance down time
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# DaniS506 »Ecosystem«

- All but full coverage of the PATA and SATA controller market (w.r.t. OS/2) in a *single* driver:
  - 17 chip manufacturers (all majors)
  - 113 PATA controller chips
  - 26 SATA controller chips
  - plus: OEM variants, chipset variants
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# DaniS506 Chip Support

- The driver supports even »unsupported« (i.e. unknown) chips as long as the controller implementation matches the ANSI T13 committee interface specification
  - The driver autodetects such controllers if the user enables this feature
  - The companion DUMPIDE utility detects the presence of such controllers even without loading the driver.
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# DaniS506 Chip Support

## The driver

- supports both desktop and server machines
  - supports PCI classic, PCI-X and PCI-express
  - supports virtually all currently known or *announced* products
  - supports the maximum performance on all products
  - works around known chip defects where possible
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# DaniS506 Automation Features

- Operation »out of the box« on virtually all machines
  - Autodetection of the ATA channel configuration (f.e. wiring) unless the manufacturer »forgot« to implement means to do so
  - Autoconfiguration of the ATA channel setup (f.e. communication speed) according to the capabilities of the involved components
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# DaniS506 benefits

- A single OS/2 installation image may be deployed on all systems with PATA and/or SATA controllers
  - In virtually all cases the driver defaults to both reliable operation *and* best performance
  - Usually, option flags are required only to address »special« requirements.
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# DaniS506 Convenience Features

- Users may trade communication speed with data transfer reliability
- Users may trade disk access times with disk noise
- Users may trade disk access latency with disk power consumption




# DaniS506 SATA Features

- In addition to the feature set found with PATA units, the driver supports on SATA:
  - PATA-to-SATA bridges
  - device hot-plugging
    - external units
    - swappable disk enclosures
  - full support of SATAPI (if the controller implements this protocol)
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# DaniS506 and RAID

- None of the supported controllers have any RAID support features worth mentioning, even if these controllers are marketed as RAID controllers
  - Their RAID is implemented by software only
  - All of these software RAIDs use vendor specific disk layouts
  - DaniS506 does not implement any of these RAID schemes
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# DaniS506 Status

- Current version is 1.7.0
  - Driver is considered as »production safe«
  - There are no known driver defects
  - The driver applies all known fixes to enable a successful OS/2 boot:
    - VIA PCI arbiter bug
    - AMD/NVidia prefetch bugs
    - NVidia Processor disconnect hang
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# DaniS506 Outlook

- New controller chips are added continuously  
Problem: chip documentation is sparse (at best)
  - The ATA transport layer is currently in rework to support controllers which don't follow the T13 interface standard:
    - AHCI SATA-2 standard (Intel, SiS, ...)
    - Promise PDC203xx/206xx chips
    - Marvell 4/8-port SATA chips
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# DaniS506 Outlook

- The DaniS506 source code is slowly converging with the DaniATAPI source code sharing increasingly larger portions of the code
- Eventually DaniS506 and DaniATAPI will merge into a single driver, possibly named

DaniATA





# ATA RAID Outlook

- There are true hardware RAID controllers with PATA or SATA interfaces available
- Drivers for the well-adopted 3Ware (now AMCC) Escalade 4 to 12 port controllers are in the making - stay tuned!



# DaniATAPI





# DaniATAPI Basics


- Question: What is »ATAPI« ?
- Answer: SCSI in »disguise« !

ATAPI has been invented as means to implement the SCSI command set and protocol suite on the ATA channel, which supports by design - and heritage - a disk-only transport protocol.



# DaniATAPI Device Support


The driver supports basically all ATAPI devices:

- Removable media disks (ZIP, Jazz, etc.)
  - CD/DVD readers and writers
  - Magneto-optical units
  - WORMs
  - Optical phasechangers (PD-units)
  - Combinations of the above in combo units
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# DaniATAPI benefits

- One single driver for all ATAPI device classes
  - Controller-specific workarounds for deviations from the standard controller programming model enable DMA mode operation on most controllers
  - ATAPI devices may be transparently treated like SCSI devices. DaniATAPI has a fully implemented SCSI software interface!
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# DaniATAPI Status

- Current version is 0.3.18
- Driver is considered »production safe«
- There are no known driver defects



# DaniATAPI Outlook

- At present there is no major development planned on the current code basis
  - Wherever possible common source modules are shared with DaniS506
  - Driver is going to be merged with DaniS506 to open the road to future enhancements: better performance, better hotplug support
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# DaniBoot






# DaniBoot Basics

- The OS/2 boot process and the OS/2 driver architecture supports booting off media only, if they become visible to the DASD layer in the first boot stage; but support for ISO9660 or UDF formatted CDs/DVDs becomes available in later stages
  - DaniBoot (and IBM's CD\_BOOT) present a »DASD view« of bootable CDs and DVDs
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# DaniBoot Features

## The driver

- works on systems with more than one CD or DVD unit
  - gives much better performance on most systems
  - supports multiple bootable OS on a single CD or DVD (f.e. OS/2, Windows and Linux)
  - is much easier to use when creating bootable OS/2 CDs
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# DaniBoot Status

- Current version is 1.0.2
- Driver is considered »production safe«
- No known driver defects



# DaniBoot Outlook

- Driver is »stable«
- At present there are no plans for additional features

