

Adaptec Ultra320 Family Manager Set

README for The Linux Operating System

1. Supported Hardware

The following Adaptec SCSI Host Adapters are supported by this driver set.

| Ultra320 ASIC | Description |
|---------------|---|
| AIC-7901A | Single Channel 64-bit PCI-X 133MHz to Ultra320 SCSI ASIC |
| AIC-7901B | Single Channel 64-bit PCI-X 133MHz to Ultra320 SCSI ASIC with Retained Training |
| AIC-7902A4 | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI ASIC |
| AIC-7902B | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI ASIC with Retained Training |

| Ultra320 Adapters | Description | ASIC |
|----------------------------|--|--------------|
| Adaptec SCSI Card 39320 | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (one external 68-pin, two internal 68-pin) | 7902A4/7902B |
| Adaptec SCSI Card 39320A | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (one external 68-pin, two internal 68-pin) | 7902B |
| Adaptec SCSI Card 39320D | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (two external VHDC and one internal 68-pin) | 7902A4 |
| Adaptec SCSI Card 39320D | Dual Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (two external VHDC and one internal 68-pin) based on the AIC-7902B ASIC | 7902A4 |
| Adaptec SCSI Card 29320 | Single Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (one external 68-pin, two internal 68-pin, one internal 50-pin) | 7901A |
| Adaptec SCSI Card 29320A | Single Channel 64-bit PCI-X 133MHz to Ultra320 SCSI Card (one external 68-pin, two internal 68-pin, one internal 50-pin) | 7901B |
| Adaptec SCSI Card 29320LP | Single Channel 64-bit Low Profile PCI-X 133MHz to Ultra320 SCSI Card (One external VHDC, one internal 68-pin) | 7901A |
| Adaptec SCSI Card 29320ALP | Single Channel 64-bit Low Profile PCI-X 133MHz to Ultra320 SCSI Card (One external VHDC, one internal 68-pin) | 7901B |

2. Version History

- 3.0 (December 1st, 2005)
 - Updated driver to use SCSI transport class infrastructure
 - Upported sequencer and core fixes from adaptec released version 2.0.15 of the driver.
- 1.3.11 (July 11, 2003)
 - Fix several deadlock issues.
 - Add 29320ALP and 39320B Id's.
- 1.3.10 (June 3rd, 2003)
 - Align the SCB_TAG field on a 16byte boundary. This avoids SCB corruption on some PCI-33 busses.
 - Correct non-zero luns on Rev B. hardware.
 - Update for change in 2.5.X SCSI proc FS interface.
 - When negotiation async via an 8bit WDTR message, send an SDTR with an offset of 0 to be sure the target knows we are async. This works around a firmware defect in the Quantum Atlas 10K.
 - Implement controller suspend and resume.
 - Clear PCI error state during driver attach so that we don't disable memory mapped I/O due to a stray write by some other driver probe that occurred before we claimed the controller.
- 1.3.9 (May 22nd, 2003)
 - Fix compiler errors.
 - Remove S/G splitting for segments that cross a 4GB boundary. This is guaranteed not to happen in Linux.
 - Add support for scsi_report_device_reset() found in 2.5.X kernels.
 - Add 7901B support.

- Simplify handling of the packetized lun Rev A workaround.
- Correct and simplify handling of the ignore wide residue message. The previous code would fail to report a residual if the transaction data length was even and we received an IWR message.
- 1.3.8 (April 29th, 2003)
 - Fix types accessed via the command line interface code.
 - Perform a few firmware optimizations.
 - Fix "Unexpected PKT busfree" errors.
 - Use a sequencer interrupt to notify the host of commands with bad status. We defer the notification until there are no outstanding selections to ensure that the host is interrupted for as short a time as possible.
 - Remove pre-2.2.X support.
 - Add support for new 2.5.X interrupt API.
 - Correct big-endian architecture support.
- 1.3.7 (April 16th, 2003)
 - Use `del_timer_sync()` to ensure that no timeouts are pending during controller shutdown.
 - For pre-2.5.X kernels, carefully adjust our segment list size to avoid SCSI malloc pool fragmentation.
 - Cleanup channel display in our `/proc` output.
 - Workaround duplicate device entries in the mid-layer device list during add-single-device.
- 1.3.6 (March 28th, 2003)
 - Correct a double free in the Domain Validation code.
 - Correct a reference to free'd memory during controller shutdown.
 - Reset the bus on an SE->LVD change. This is required to reset our transceivers.
- 1.3.5 (March 24th, 2003)
 - Fix a few register window mode bugs.
 - Include read streaming in the PPR flags we display in diagnostics as well as `/proc`.
 - Add PCI hot plug support for 2.5.X kernels.
 - Correct default precompensation value for RevA hardware.
 - Fix Domain Validation thread shutdown.
 - Add a firmware workaround to make the LED blink brighter during packetized operations on the H2A4.
 - Correct `/proc` display of user read streaming settings.
 - Simplify driver locking by releasing the `io_request_lock` upon driver entry from the mid-layer.
 - Cleanup command line parsing and move much of this code to `aiclib`.
- 1.3.4 (February 28th, 2003)
 - Correct a race condition in our error recovery handler.
 - Allow Test Unit Ready commands to take a full 5 seconds during Domain Validation.
- 1.3.2 (February 19th, 2003)
 - Correct a Rev B. regression due to the GEM318 compatibility fix included in 1.3.1.
- 1.3.1 (February 11th, 2003)
 - Add support for the 39320A.
 - Improve recovery for certain PCI-X errors.
 - Fix handling of LQ/DATA/LQ/DATA for the same write transaction that can occur without intervening training.
 - Correct compatibility issues with the GEM318 enclosure services device.
 - Correct data corruption issue that occurred under high tag depth write loads.
 - Adapt to a change in the 2.5.X `daemonize()` API.
 - Correct a "Missing case in `ahd_handle_scsiint`" panic.
- 1.3.0 (January 21st, 2003)
 - Full regression testing for all U320 products completed.
 - Added abort and target/lun reset error recovery handler and interrupt coalescing.
- 1.2.0 (November 14th, 2002)
 - Added support for Domain Validation
 - Add support for the Hewlett-Packard version of the 39320D and AIC-7902 adapters.

Support for previous adapters has not been fully tested and should only be used at the customer's own risk.
- 1.1.1 (September 24th, 2002)
 - Added support for the Linux 2.5.X kernel series
- 1.1.0 (September 17th, 2002)
 - Added support for four additional SCSI products: ASC-39320, ASC-29320, ASC-29320LP, AIC-7901.

- 1.0.0 (May 30th, 2002)
 - Initial driver release.
- 2.1. Software/Hardware Features
 - Support for the SPI-4 "Ultra320" standard: - 320MB/s transfer rates - Packetized SCSI Protocol at 160MB/s and 320MB/s - Quick Arbitration Selection (QAS) - Retained Training Information (Rev B. ASIC only)
 - Interrupt Coalescing
 - Initiator Mode (target mode not currently supported)
 - Support for the PCI-X standard up to 133MHz
 - Support for the PCI v2.2 standard
 - Domain Validation
- 2.2. Operating System Support:
 - Redhat Linux 7.2, 7.3, 8.0, Advanced Server 2.1
 - SuSE Linux 7.3, 8.0, 8.1, Enterprise Server 7
 - only Intel and AMD x86 supported at this time
 - >4GB memory configurations supported.

Refer to the User's Guide for more details on this.

3. Command Line Options

Warning

ALTERING OR ADDING THESE DRIVER PARAMETERS INCORRECTLY CAN RENDER YOUR SYSTEM INOPERABLE. USE THEM WITH CAUTION.

Put a .conf file in the /etc/modprobe.d/ directory and add/edit a line containing `options aic79xx`
`aic79xx=[command[,command...]]` where `command` is one or more of the following:

`verbose`

Definition: enable additional informative messages during driver operation.
Possible Values: This option is a flag
Default Value: disabled

`debug:[value]`

Definition: Enables various levels of debugging information The bit definitions for the debugging mask can be found in `drivers/scsi/aic7xxx/aic79xx.h` under the "Debug" heading.
Possible Values: 0x0000 = no debugging, 0xffff = full debugging
Default Value: 0x0000

`no_reset`

Definition: Do not reset the bus during the initial probe phase
Possible Values: This option is a flag
Default Value: disabled

`extended`

Definition: Force extended translation on the controller
Possible Values: This option is a flag
Default Value: disabled

`periodic_otag`

Definition: Send an ordered tag periodically to prevent tag starvation. Needed for some older devices
Possible Values: This option is a flag
Default Value: disabled

`reverse_scan`

Definition: Probe the scsi bus in reverse order, starting with target 15
Possible Values: This option is a flag
Default Value: disabled

`global_tag_depth`

Definition: Global tag depth for all targets on all busses. This option sets the default tag depth which may be selectively overridden vi the `tag_info` option.
Possible Values: 1 - 253

Default Value: 32

tag_info:{{value[,value...]}[, {value[,value...]} ...]}

Definition: Set the per-target tagged queue depth on a per controller basis. Both controllers and targets may be omitted indicating that they should retain the default tag depth.

Possible Values: 1 - 253

Default Value: 32

Examples:

```
tag_info:{{16,32,32,64,8,8,,32,32,32,32,32,32,32,32}}
```

On Controller 0

- specifies a tag depth of 16 for target 0
- specifies a tag depth of 64 for target 3
- specifies a tag depth of 8 for targets 4 and 5
- leaves target 6 at the default
- specifies a tag depth of 32 for targets 1,2,7-15

All other targets retain the default depth.

```
tag_info:{{},{32,,32}}
```

On Controller 1

- specifies a tag depth of 32 for targets 0 and 2

All other targets retain the default depth.

rd_strm: {rd_strm_bitmask[,rd_strm_bitmask...]}

Definition: Enable read streaming on a per target basis. The rd_strm_bitmask is a 16 bit hex value in which each bit represents a target. Setting the target's bit to '1' enables read streaming for that target. Controllers may be omitted indicating that they should retain the default read streaming setting.

Examples:

```
rd_strm:{0x0041}
```

On Controller 0

- enables read streaming for targets 0 and 6.
- disables read streaming for targets 1-5,7-15.

All other targets retain the default read streaming setting.

```
rd_strm:{0x0023,,0xFFFF}
```

On Controller 0

- enables read streaming for targets 1,2, and 5.
- disables read streaming for targets 3,4,6-15.

On Controller 2

- enables read streaming for all targets.

All other targets retain the default read streaming setting.

Possible Values: 0x0000 - 0xffff

Default Value: 0x0000

dv: {value[,value...]}

Definition: Set Domain Validation Policy on a per-controller basis.
Controllers may be omitted indicating that they should retain the default read streaming setting.

Possible Values:

| | |
|-----|---------------------------------|
| < 0 | Use setting from serial EEPROM. |
| 0 | Disable DV |
| > 0 | Enable DV |

Default Value: DV Serial EEPROM configuration setting.

Example:

```
dv: {-1, 0, , 1, 1, 0}
```

- On Controller 0 leave DV at its default setting.
- On Controller 1 disable DV.
- Skip configuration on Controller 2.
- On Controllers 3 and 4 enable DV.
- On Controller 5 disable DV.

seltime:[value]

Definition: Specifies the selection timeout value
Possible Values: 0 = 256ms, 1 = 128ms, 2 = 64ms, 3 = 32ms
Default Value: 0

precomp: {value[,value...]}

Definition: Set IO Cell precompensation value on a per-controller basis. Controllers may be omitted indicating that they should retain the default precompensation setting.
Possible Values: 0 - 7
Default Value: Varies based on chip revision

Examples:

```
precomp: {0x1}
```

On Controller 0 set precompensation to 1.

```
precomp: {1, , 7}
```

- On Controller 0 set precompensation to 1.
- On Controller 2 set precompensation to 8.

slewrates: {value[,value...]}

Definition: Set IO Cell slew rate on a per-controller basis. Controllers may be omitted indicating that they should retain the default slew rate setting.
Possible Values: 0 - 15
Default Value: Varies based on chip revision

Examples:

```
slewrates: {0x1}
```

- On Controller 0 set slew rate to 1.

```
slewrates : {1, , 8}
```

- On Controller 0 set slew rate to 1.
- On Controller 2 set slew rate to 8.

amplitude: {value[,value...]}

Definition: Set IO Cell signal amplitude on a per-controller basis. Controllers may be omitted indicating that they should retain the default read streaming setting.
Possible Values: 1 - 7
Default Value: Varies based on chip revision

Examples:

```
amplitude: {0x1}
```

On Controller 0 set amplitude to 1.

```
amplitude : {1, , 7}
```

- On Controller 0 set amplitude to 1.
- On Controller 2 set amplitude to 7.

Example:

```
options aic79xx aic79xx=verbose,rd_strm:{{0x0041}}
```

enables verbose output in the driver and turns read streaming on for targets 0 and 6 of Controller 0.

4. Additional Notes

4.1. Known/Unresolved or FYI Issues

- Under SuSE Linux Enterprise 7, the driver may fail to operate correctly due to a problem with PCI interrupt routing in the Linux kernel. Please contact SuSE for an updated Linux kernel.

4.2. Third-Party Compatibility Issues

- Adaptec only supports Ultra320 hard drives running the latest firmware available. Please check with your hard drive manufacturer to ensure you have the latest version.

4.3. Operating System or Technology Limitations

- PCI Hot Plug is untested and may cause the operating system to stop responding.
- Luns that are not numbered contiguously starting with 0 might not be automatically probed during system startup. This is a limitation of the OS. Please contact your Linux vendor for instructions on manually probing non-contiguous luns.
- Using the Driver Update Disk version of this package during OS installation under RedHat might result in two versions of this driver being installed into the system module directory. This might cause problems with the /sbin/mkinitrd program and/or other RPM packages that try to install system modules. The best way to correct this once the system is running is to install the latest RPM package version of this driver, available from <http://www.adaptec.com>

5. Adaptec Customer Support

A Technical Support Identification (TSID) Number is required for Adaptec technical support.

- The 12-digit TSID can be found on the white barcode-type label included inside the box with your product. The TSID helps us provide more efficient service by accurately identifying your product and support status.

Support Options

- Search the Adaptec Support Knowledgebase (ASK) at <http://ask.adaptec.com> for articles, troubleshooting tips, and frequently asked questions about your product.
- For support via Email, submit your question to Adaptec's Technical Support Specialists at <http://ask.adaptec.com/>.

North America

- Visit our Web site at <http://www.adaptec.com/>.
- For information about Adaptec's support options, call 408-957-2550, 24 hours a day, 7 days a week.
- To speak with a Technical Support Specialist,
 - For hardware products, call 408-934-7274, Monday to Friday, 3:00 am to 5:00 pm, PDT.
 - For RAID and Fibre Channel products, call 321-207-2000, Monday to Friday, 3:00 am to 5:00 pm, PDT.

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- Visit our web site at <http://www.adaptec.co.jp/>.
- To speak with a Technical Support Specialist, call +81 3 5308 6120, Monday-Friday, 9:00 a.m. to 12:00 p.m., 1:00 p.m. to 6:00 p.m.

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