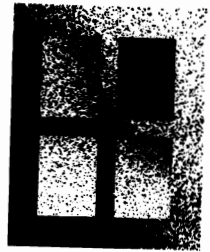




adaptec

SOFTWARE



**MICROSOFT.
WINDOWS™**
Version 3.0 Compatible Product

ASW-1410

**ASPI MS-DOS Manager
with ASPI Disk Module**

Version 3.0

P/N: 472800-01 Rev - B

9210

Preface

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This document provides installation information on Adaptec's Advanced SCSI Programming Interface (ASPI) DOS Manager for Adaptec's bus master line of SCSI host adapters. These host adapters currently include the AHA-1540B/1542B, AHA-1640, and AHA-1740/1744 SCSI host adapters. Also included is the ASPI disk driver ASPIDISK.SYS, and the SCSI hard disk partitioning program AFDISK, with full support for removable media (512 bytes/sector media only).

The DOS versions supported are MS and IBM 3.30, Compaq 3.31, MS or IBM 4.0x, and MS 5.0.

ASPI DOS MANAGER

There are two ASPI DOS Managers included with the ASW-1410, named ASPI4DOS.SYS and ASPIEDOS.SYS. The ASPI4DOS.SYS driver is used on the AHA-1540B/1542B, AHA-1640, and the AHA-1740/1744 (in the standard mode only). The ASPIEDOS.SYS Manager is used on the AHA-1740/1744 when in the enhanced mode.

ASPI4DOS.SYS AND ASPIEDOS.SYS

The DOS operating system uses the ASPI DOS Manager to communicate with the SCSI host adapter and allow access to additional SCSI devices connected to the host adapter. The ASPI DOS Manager is typically installed:

- when more than two hard disk drives are already installed (see section on ASPIDISK.SYS installation)
- to install a SCSI drive that is configured at a SCSI ID other than 0 or 1 (see section on ASPIDISK.SYS installation)
- to install removable media (see section on ASPIDISK.SYS installation)
- when interfacing to ASPI modules, which include modules for SCSI tape (SY-TOS and Sytos Plus), CD-ROM, removable media, printers, plotters, and other SCSI devices

- to support programs that use virtual memory (i.e., MS Windows 3.0, MS Windows 386, Quarterdeck QEMM 386, Qualitas 386MAX)
- to support programs that write large amounts of data directly to video memory (AHA-1540/1542/1640 only)
- to change the host adapter configuration
- to increase performance (ASPI4DOS.SYS only).

These managers fully conform to the Virtual DMA Services (VDS) specification (described in Section Five, "Commonly Asked Questions" of this document).

ASPIDISK.SYS

ASPIDISK.SYS is used to install valid DOS partitions as logical drives with SCSI disk drives that are not installed under the host adapter BIOS. A drive will not be installed under the host adapter BIOS if

- the host adapter BIOS is disabled
- more than two hard disk drives are already installed
- the SCSI ID is something other than 0 or 1 (except for the AHA-1740/1744 in the enhanced mode).

Valid DOS partitions are created with DOS FDISK or Adaptec's AFDISK.EXE.

Removable media hard disks should only be installed with the ASPIDISK.SYS driver, and not with the host adapter BIOS. If the removable media hard disk is installed under the host adapter BIOS, do not change media or unpredictable results may occur and data may be lost! Only media with 512 Bytes/sector is supported.

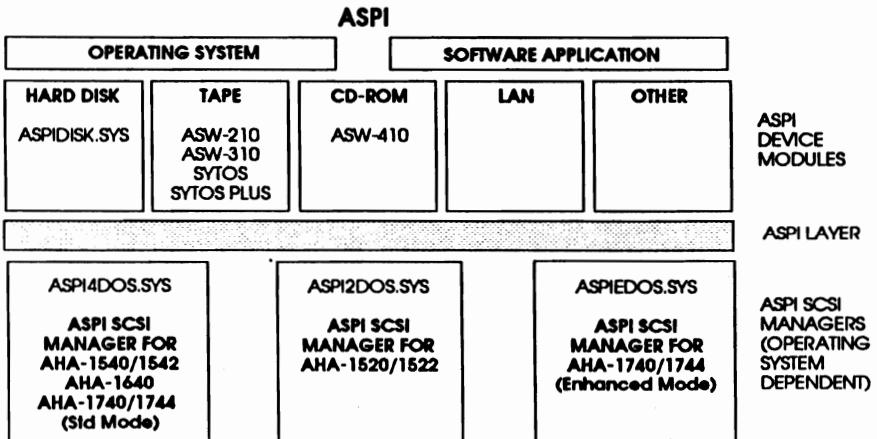
If no AFDISK or DOS partitions are found, the ASPIDISK.SYS driver will not install. However, if a removable media hard disk is found and not installed under the BIOS, a minimum of one logical drive will be reserved.

If only a total of two or less hard drives is in the system (e.g., two standard hard disks, one standard hard disk and one SCSI hard disk, or two SCSI hard disks), ASPIDISK.SYS is not needed. ASPIDISK.SYS can be loaded in the CONFIG.SYS because it will not install and take up memory unless valid partitions are found. Do not be concerned that ASPIDISK.SYS does not load if it is known that no valid partitions exist.

AFDISK.EXE

AFDISK.EXE is an Adaptec SCSI disk partitioning and high-level formatting utility. SCSI disks not installed under the host adapter BIOS must be partitioned with AFDISK. AFDISK will allow you to add or delete a DOS partition, as well as delete a non-DOS partition. AFDISK partitions are installed with the ASPIDISK.SYS driver. AFDISK partitions are completely compatible with DOS partitions (i.e., partitions created with DOS FDISK can later be installed with the ASPIDISK.SYS driver). Also, partitions created by AFDISK can be moved to control of the host adapter BIOS. These partitions will be bootable if previously high-level formatted with the system's files (e.g., using the /s option on DOS FORMAT.COM). The DOS version used must be 3.3 or newer.

ASPI4DOS.SYS and ASPIDISK.SYS are written to the Advanced SCSI Programming Interface. This is a modular approach to writing SCSI device drivers. Drivers are written to the ASPI interface instead of to the host adapter hardware. The advantage is that a program need only be written once; if the ASPI Manager for a particular host adapter is loaded, it will work with all ASPI modules.



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The first installation step is to copy the files from the ASW-1410 program diskette to a directory on drive C using the DOS COPY command.

ASPI4DOS.SYS INSTALLATION

The ASPI4DOS.SYS Manager should only be used with the AHA-1540/1542, the AHA-1640, and the AHA-1740/1744 (standard mode only). If the AHA-1740/1744 is in the enhanced mode, the ASPIEDOS.SYS driver should be used, and installation is described in the ASPIEDOS.SYS INSTALLATION section.

In order for the ASPI MS-DOS Manager files to be loaded whenever the system is booted, the CONFIG.SYS file must contain the following DEVICE= command:

DEVICE = [path]ASPI4DOS.SYS [optional switches]

Using any ASCII file editor, add the individual device driver commands to an existing CONFIG.SYS file, or follow the instructions in the MS-DOS Operations Reference Manual to create a new CONFIG.SYS file. The driver should precede the loading of all ASPI modules and any disk caching drivers.

SAMPLE CONFIG.SYS

A sample CONFIG.SYS should look similar to:

```

buffers=20                ;Things like DOS buffers and files can be
files=20                  ;before or after the ASPI Manager
DEVICE=ASPI4DOS.SYS      ;In general, the ASPI Manager should be the
                           ;first in line in the CONFIG.SYS
DEVICE=ASPIDISK.SYS      ;This is an ASPI Module, and should be
                           ;loaded after the ASPI Manager in the
                           ;CONFIG.SYS
DEVICE=HIMEM.SYS         ;Memory managers for Windows and other
                           ;third party software, such as 386MAX and
                           ;QEMM should be loaded after the ASPI
                           ;Manager
DEVICE=SMARTDRV.SYS 2048 512 ;Caching device drivers should be loaded
                           ;after the ASPI Manager

```

When the driver is loaded, the display should look similar to:

```
AHA-1540/1542/1640 ASPI Manager for DOS
Version 3.0
Copyright 1991 Adaptec, Inc.
```

```
Int 13H routed through ASPI manager
ASPI4DOS.SYS Installation Successful
```

If you add the '/D' command line option (i.e., DEVICE = ASPI4DOS.SYS /D), the driver will display configuration information similar to:

```
AHA-1540/1542/1640 ASPI Manager for DOS
Version 3.0
Copyright 1991 Adaptec, Inc.
```

```
Host Adapter #:          0          Host Adapter SCSI ID:  7
I/O Port Address       330          DMA Channel:         5
Interrupt Level:       11          VDS Support Level:   MultiSegRW
```

```
Host Adapter #0 - SCSI ID 0 - LUN 0: QUANTUM P40S 940-40-94xx
Host Adapter #0 - SCSI ID 1 - LUN 0: QUANTUM P105S 910-10-94x
Host Adapter #0 - SCSI ID 4 - LUN 0: SONY    CD-ROM CDU-6XXX
```

```
Int 13H active for drive C: and D:
```

```
Int 13H routed through ASPI manager
ASPI4DOS.SYS Installation Successful
```

COMMAND LINE OPTIONS

The following command line options may be added to the ASPI4DOS.SYS driver to change the parameters of the host adapter:

```
DEVICE= [pathname]ASPI4DOS.SYS [/P<port address>] [/S<slot number>] [/D] [/L] [/W] [/WM] [/V] [/VM] [/X<speed>] [/N <bus on time>] [/F<bus off time>] [/I] [/NORST]
```

*Notes: /S is for the AHA-1640 only
/P <port address>, /X <speed>, /N <bus on time>, /F <bus off time> are for the AHA-1540/1542 and the AHA-1740/1744 (in standard mode) only.*

Use either /W, /WM, or neither, but do not use both

Use either /V, /VM, or neither, but do not use both

- /P <port address>** Sets the port address that the driver uses to communicate with the host adapter. This value is in hex. Valid addresses are:
- 130, 134, 230, 234, 330, 334 (e.g., /P334)
- The AHA-1540/1542 should be jumpered accordingly, or the AHA-1740/1744 should be configured accordingly. The host adapter BIOS should be disabled if a port address other than 330 is used since the BIOS only works at port 330.
- /S<slot number>** Sets the slot number where the driver will find your AHA-1640 host adapter. The valid slot values are:
- 1, 2, 3, 4, 5, 6, 7, 8 (e.g., /S3)
- If this option is not used, the driver will scan the slots starting with slot one and install all of the AHA-1640 that it finds.
- /D** This option will display useful information about the host adapter and attached SCSI devices during boot (see earlier example).
- /L** This option will enable support for SCSI logical units other than zero. The driver can recognize all eight possible SCSI LUNs on each target. If this option is not specified, the driver will only recognize LUN 0 for each SCSI device.
- /W** This option will enable virtual mode buffering. The driver will attempt to allocate a 64K virtual buffer from extended memory; if no extended memory is available, the driver will allocate 64K from main memory. Do not use this option if the /WM switch is used. Virtual mode buffering is required for applications such as Windows 386 v2.x. Virtual mode buffering is not required for MS Windows v.3.0 or later. See section "Software Considerations."

- /WM** This option has the same function as the **/W** option except that this will always allocate the 64K virtual buffer from main memory. Do not use the **/W** switch and the **/WM** switch at the same time. Use the **/WM** switch if the **/W** switch does not work, or if no extended memory is available.
- /V** This option will enable video buffering. The driver will attempt to allocate a 64K video buffer from extended memory; if no extended memory is available, the driver will allocate 64K from main memory. Do not use this option if the **/VM** switch is used. Video buffering is required for applications or programs that write large amounts of data directly to video memory. This switch is only required if using an AHA-1540/1542A. If used in conjunction with **/W** or **/WM**, only a single 64K buffer will be allocated.
- /VM** This option has the same function as the **/V** option except that this will always allocate the 64K video buffer from main memory. Do not use the **/V** switch and the **/VM** switch at the same time. Use the **/VM** switch if the **/V** switch does not work or no extended memory is available. If used in conjunction with **/W** or **/WM**, only a single 64K buffer will be allocated.

ADVANCED COMMAND LINE OPTIONS

- /X<speed>** This option sets the AT Bus Master transfer speed of the AHA 1540/1542 and AHA-1740/1744 (standard mode) host adapter only. This option overrides the host adapter jumpers. If this option is not used, the speed will be determined by the jumpers or programmed settings of the host adapter. Normally the host adapter is configured for 5.7 MBytes/second. The hex value is what is sent directly to the host adapter during a "Set Transfer Speed" (Opcode=9) command.

Five values are predefined:

- 00 – 5.0 MB/sec (i.e., /X00)
- 01 – 6.7 MB/sec
- 02 – 8.0 MB/sec
- 03 – 10.0 MB/sec
- 04 – 5.7 MB/sec

WARNING: AT BUS MASTER TRANSFER SPEEDS OF GREATER THAN 5.7 MBYTES/SECOND ARE NOT SUPPORTED IN ALL AT SYSTEMS. INCREASING THE TRANSFER SPEED TO A SPEED GREATER THAN THE AT CAN HANDLE MAY CAUSE A HANG CONDITION.

A VALUE OF FF (E.G., /XFF) WILL SET THE HOST ADAPTER TO THE SLOWEST AND MOST COMPATIBLE TRANSFER SPEED OF 3.3 MBYTES/SECOND.

- /N<bus on time>** This option sets the BUS ON time for the AHA-1540/1542 host adapter only. Valid BUS ON times are between 02 and 15 usecs. The default time is 11 μ secs (i.e., /N11). The value is in decimal.
- /F<bus off time>** This option sets the BUS OFF time for the AHA-1540/1542 host adapter only. Valid BUS OFF times are between 01 and 64 μ secs. The default time is 4 μ secs (i.e., /F4). The value is in decimal.
- /I** This option will disable the loading of the embedded INT 13 module. When specified, INT 13 calls are routed through the host adapter BIOS instead of the INT 13 code in ASPI4DOS.SYS (only for SCSI disks installed with the host adapter BIOS). This option is for debugging purposes and should normally not be used.

/NORST

This option will cause the driver to not issue a hard reset to the host adapter during initialization only if the BIOS is disabled. If the BIOS is enabled, no hard reset is ever issued by the driver because the BIOS resets the board during its initialization phase. If not specified with the BIOS disabled, all devices on the SCSI bus will be reset.

ASPIEDOS.SYS INSTALLATION

ASPIEDOS.SYS is only used with the AHA-1740/1744 in enhanced mode.

In order for the ASPI MS-DOS Manager files to be loaded whenever the system is booted, the CONFIG.SYS file must contain the following **DEVICE=** command:

DEVICE = [path] ASPIEDOS.SYS [optional switches]

Using any ASCII file editor, add the individual device driver commands to an existing CONFIG.SYS file, or follow the instructions in the MS-DOS Operations Reference Manual to create a new CONFIG.SYS file. The driver should precede the loading of all ASPI modules.

When the driver is loaded, the display should look similar to:

```
-----  
AHA-1740/1744 (enhanced mode) ASPI Manager for DOS  
Version 1.0  
Copyright 1991 Adaptec, Inc.
```

```
ASPIEDOS.SYS Installation Successful  
-----
```

COMMAND LINE OPTIONS

The following command line options may be added to the ASPIEDOS.SYS driver to change the parameters of the host adapter:

DEVICE= [pthname]ASPIEDOS.SYS [/S<slot number>] [/D] [/L]

- /S<slot number>** Sets the slot number where the driver will find your AHA-1740/1744 host adapters. The valid slot values are:
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 (e.g., /S3)
- If this option is not used, the driver will scan the slots starting with slot one and install all the AHA-1740/1744 host adapters that it finds.
- /D** This option will display useful information about the host adapter and attached SCSI devices during boot.
- /L** This option will enable support for SCSI logical units other than zero. The driver can recognize all eight possible SCSI LUNs on each target. If this option is not specified, the driver will only recognize LUN 0 for each SCSI device.

ASPIDISK.SYS INSTALLATION

In order for the ASPIDISK.SYS driver to recognize logical drives partitioned with AFDISK, the CONFIG.SYS file must contain the following DEVICE= command:

```
DEVICE = [path] ASPI4DOS.SYS [optional switches]
DEVICE = [path] ASPIDISK.SYS [optional switches]
or
DEVICE = [path] ASPIEDOS.SYS [optional switches]
DEVICE = [path] ASPIDISK.SYS [optional switches]
```

Note: The ASPIDISK.SYS driver must be loaded after the ASPI4DOS.SYS or ASPIEDOS.SYS drivers for proper operation.

COMMAND LINE OPTIONS

The following command line option may be added to the ASPIDISK.SYS driver:

- /D** This displays useful information during boot (see the following example).
- /R<# of reserved logical drives>** This determines the number of logical drives that will be reserved for removable media. This command is ignored if the hard disk is the nonremovable type. If not specified, the default number of reserved logical drives is one. Valid values are 1 to 24.

When both the ASPI4DOS.SYS driver and the ASPIDISK.SYS driver are loaded, the display should look similar to:

```
-----
AHA-1540/1542/1640 ASPI Manager for DOS
Version 3.0
Copyright 1991 Adaptec, Inc.

Int 13H routed through ASPI manager
ASPI4DOS.SYS Installation Successful

ASPI Disk Driver for DOS
Version 3.0
Copyright 1991 Adaptec, Inc.

 2 SCSI disk drive(s) handled by ASPIDISK
 5 Logical drive(s) installed
ASPIDISK.SYS Installation Successful
-----
```

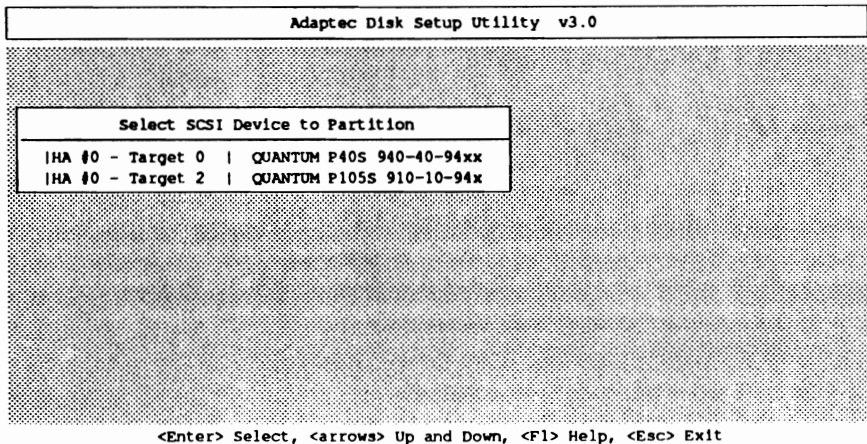

To invoke AFDISK, simply type AFDISK at the DOS prompt. Currently three slash options are available with AFDISK. These are:

`/M` or `/MONO` ;Run AFDISK in black and white mode
`/?` ;Display currently supported / options

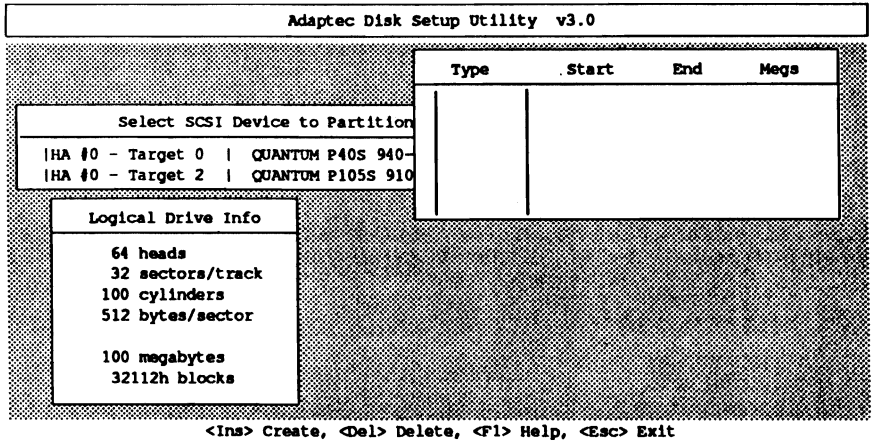
AFDISK may need to run in black and white mode in some laptops, with some monochrome VGA monitors, and other systems that do not properly display AFDISK in color mode.

If `"/M"` is not working correctly, try `"MODE BW80"` before running AFDISK.

The screen will look similar to:



The displayed list shows all installed SCSI disk drives, including removable media devices. The "HA#" field indicates the host adapter number. If running a single host adapter, this number will be zero. The "Target" field indicates the SCSI devices target ID. Select the SCSI disk to partition, and format, and press <Enter>. The screen will look similar to:



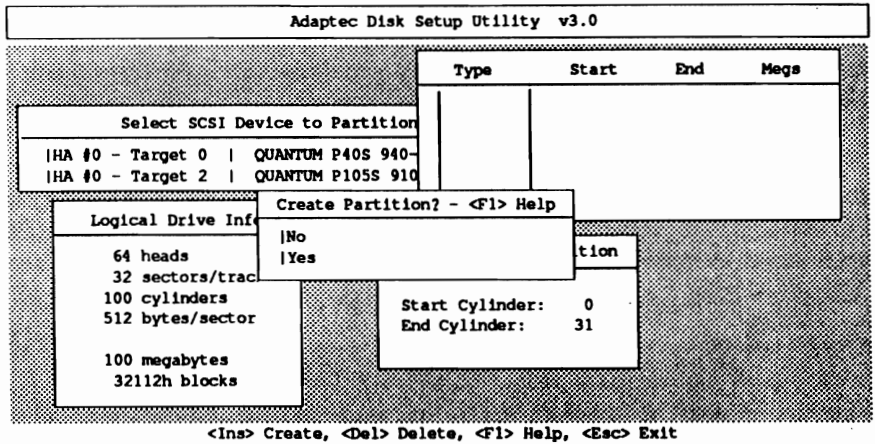
Logical drive information will be displayed in the lower left-hand corner of the screen. Since Adaptec SCSI host adapters use a 64-head/32-spt translation scheme, the number of cylinders will equal the number of megabytes of capacity available. The number of SCSI logical blocks is also displayed.

The existing partitions on the drive will be displayed on the upper right-hand corner of the screen. Both DOS and non-DOS partitions can be deleted by pressing the <Delete> key and answering "yes" to the prompt. In this example, no partitions exist. To create a partition, press the <Insert> key. The screen will look similar to:

Adaptec Disk Setup Utility v3.0																
Select SCSI Device to Partition HA #0 - Target 0 QUANTUM P40S 940 HA #0 - Target 2 QUANTUM P105S 910		<table border="1"> <thead> <tr> <th>Type</th> <th>Start</th> <th>End</th> <th>Megs</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Type	Start	End	Megs									
Type	Start	End	Megs													
<table border="1"> <thead> <tr> <th>Logical Drive Info</th> </tr> </thead> <tbody> <tr> <td>64 heads</td> </tr> <tr> <td>32 sectors/track</td> </tr> <tr> <td>100 cylinders</td> </tr> <tr> <td>512 bytes/sector</td> </tr> <tr> <td>100 megabytes</td> </tr> <tr> <td>32112h blocks</td> </tr> </tbody> </table>		Logical Drive Info	64 heads	32 sectors/track	100 cylinders	512 bytes/sector	100 megabytes	32112h blocks	<table border="1"> <thead> <tr> <th colspan="2">Create a DOS Partition</th> </tr> </thead> <tbody> <tr> <td>Start Cylinder:</td> <td>0</td> </tr> <tr> <td>End Cylinder:</td> <td>31</td> </tr> </tbody> </table>		Create a DOS Partition		Start Cylinder:	0	End Cylinder:	31
Logical Drive Info																
64 heads																
32 sectors/track																
100 cylinders																
512 bytes/sector																
100 megabytes																
32112h blocks																
Create a DOS Partition																
Start Cylinder:	0															
End Cylinder:	31															
<Ins> Create, Delete, <F1> Help, <Esc> Exit																

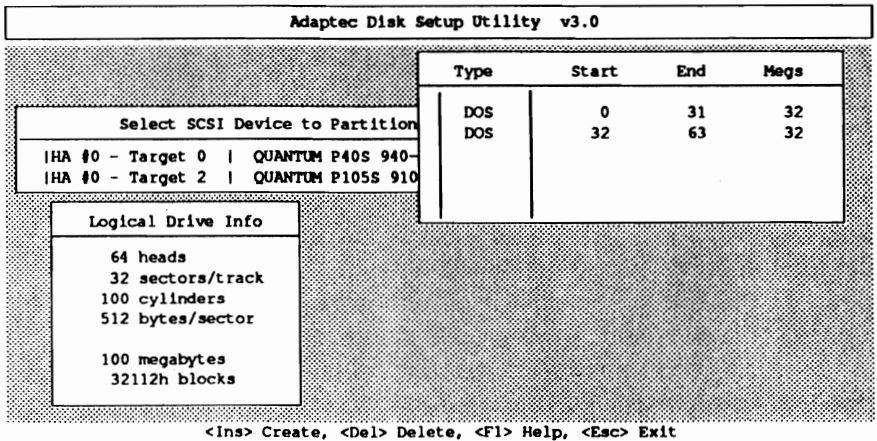
A "Create a DOS Partition" window will appear in the lower right-hand corner of the screen. The "Start Cylinder" and "End Cylinder" will default to the maximum allowed. For DOS 3.30 the limit is 32 megabytes per partition, for COMPAQ DOS 3.31 the limit is 512 megabytes per partition, and for DOS 4.0x and newer the limit is 1 gigabyte per partition. In this example, DOS 3.3 is used so the Start Cylinder is 0 and the End Cylinder is 31. These values can be changed. AFDISK will not allow illegal values to be entered.

When the desired cylinder numbers have been entered, press the <Esc> key. The screen will look similar to:



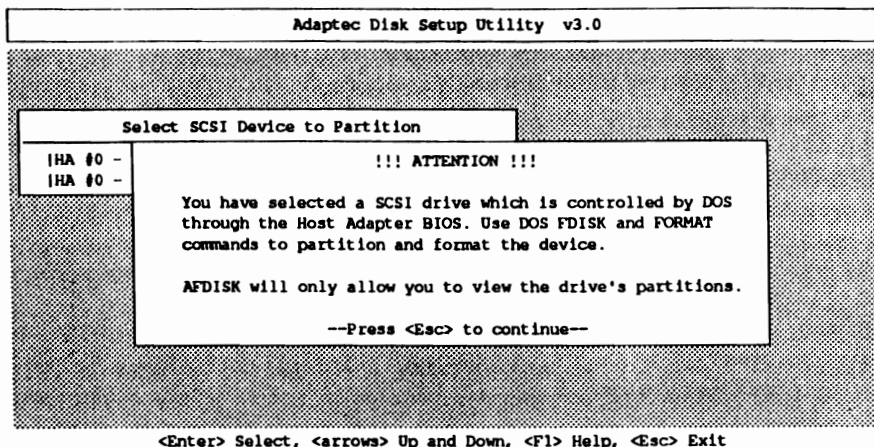
Use the down arrow key to select "Yes" and press the <Enter> key. If additional partitions are desired, hit the <Insert> key and repeat the instructions described above.

After partitions have been created, the partitions will be displayed. In the following example, two 32-megabyte partitions were created.



Press the <Esc> key to return to the "Select SCSI Device to Partition" screen. Select any other valid SCSI drives to partition.

A drive that was installed with the host adapter BIOS cannot be partitioned with AFDISK. If such a drive is selected, the following screen will appear:



AFDISK will allow the drive's partitions to be displayed, but not altered. Simply press the <Esc> key to continue.

To quit AFDISK, press the <Esc> key and select "yes" when prompted on whether or not to quit. It is necessary to reboot the system in order for the partitions that have just been created to be installed.

On-line help is always available by pressing <F1>.

Some programs that use the virtual mode of the 386 sometimes require a virtual buffer allocated to run correctly with the AHA-1540/1542, the AHA-1640, and the AHA-1740/1744 (standard mode). A virtual buffer can be allocated with the command line switch /W or /WM after the ASPI4DOS.SYS driver. See the table below to determine if a separate buffer is required.

The AHA-1740/1744 (enhanced mode) BIOS fully conforms to the VDS specification (described in Section 5, "Commonly Asked Questions" of this document), and a separate buffer is never required.

<i>Program</i>	<i>Version</i>	<i>Note</i>
MS Windows 286	All	No buffer required
MS Windows 386	2.x	/W or /WM required
MS Windows*	3.0 or newer	No buffer required
DOS	5.0	No buffer required. Driver can be loaded into "high" memory except when booting from a SCSI drive controlled by the host adapter BIOS.
QEMM 386* by Quarterdeck	5.0 or newer	No buffer required. Driver can be loaded into "high" memory except when booting from a SCSI drive controlled by the host adapter BIOS.
QEMM 386 by Quarterdeck	Previous to 5.0	/W should be used. If it is used, at least 64K of extended memory should be left free when QEMM is loaded (i.e., DEVICE = QEMM.SYS EXTMEM = 64). ASPI4DOS.SYS should NOT be loaded into "high" memory.
QRAM* by Quarterdeck	All	No buffer required. Driver can be loaded into "high" memory.
386MAX * by Qualitas	4.08 or newer	No buffer required. Driver can be loaded into "high" memory except when booting from a SCSI drive controlled by the host adapter BIOS.

<i>Program</i>	<i>Version</i>	<i>Note</i>
386MAX by Qualitas	Previous to 4.08	/W should be used. If it is used, at least 64K of extended memory should be left free when 386MAX is loaded (i.e., DEVICE = 386MAX.SYS EXT=64). ASPI4DOS.SYS should NOT be loaded into "high" memory.
MOVE'EM* by Qualitas	All	No buffer required. Driver can be loaded into "high" memory.
Any protected mode Software (No VDS support)	?	/W or /WM required
Any protected mode* Software (VDS support)	?	No buffer required

*This program conforms to the VDS specification (VDS is described in Section Five, "Commonly Asked Questions" of this document.

Note: If problems occur loading ASPI4DOS.SYS into high memory, make sure that ASPI4DOS.SYS is not being loaded into video memory. Consult your user's manual for the particular application.

WINDOWS 3.0

Windows 3.0 has a caching device driver called SMARTDRV.SYS. This driver has a buffering capability built in, similar to the buffering provided by the /W or /WM command line switches on the ASPI4DOS.SYS driver. Since buffering is not required when the ASPI Manager is loaded, buffering by SMARTDRV.SYS can be disabled by adding the following command line switch to SMARTDRV.SYS:

```
device=c:\windows\smartdrv.sys 1024 512 /B-
```

The ASPI4DOS.SYS driver should be loaded before the SMARTDRV.SYS driver in the CONFIG.SYS.

Also, if the host adapter is set to IRQ 14, the following line should be added to the SYSTEM.INI file:

```
Virtual HDIRQ=FALSE
```

The ASPI4DOS.SYS and ASPIEDOS.SYS drivers will support multiple host adapters. Support for multiple host adapters can be achieved by loading one copy of the driver, and specifying the appropriate /Pxxx option (AT) or /S (Micro Channel, EISA) option specifying the port address or slot location. The drivers are capable of chaining themselves onto the ASPI entry point, so the ASPI4DOS.SYS and ASPIEDOS.SYS ASPI managers could be mixed in with ASPI managers for other host adapters as well.

If booting from a SCSI disk drive, then the ASPI Manager that corresponds to the boot host adapter must be loaded before the ASPI Manager for other SCSI host adapters (or if the ASPI Manager is loaded only once, but with / options for multiple host adapters, then the / option for the host adapter with the booting SCSI drive should be specified first).

Examples:

AHA-1540/1542B

If two SCSI host adapters are in the system, an AHA-1540B and an AHA-1520, for example, and the boot SCSI disk drive is attached to the AHA-1540B, then the CONFIG.SYS should look similar to:

```
DEVICE=ASPI4DOS.SYS  
DEVICE=ASPI2DOS.SYS
```

If two AHA-1540B host adapters are in the system, the host adapters should be configured to different port addresses, interrupt channels, and DMA channels. The booting SCSI disk drive should be attached to the host adapter set to port 330h and should have its BIOS enabled, since the host adapter BIOS is required for booting and only works at port 330h. Therefore, the CONFIG.SYS should similar to:

```
DEVICE=ASPI4DOS.SYS /P330 /P334
```

The host adapter at port address 330 will be assigned to HA #0, and the host adapter at port address 334 will be assigned to HA #1. If a command line option is specified that alters the operation of the host adapter (e.g., /N04 to set the bus on time to 4 μ sec), both host adapters will be set to the same value. If a different value is desired for each host adapter, then the driver can be loaded twice, with different command line switches on each:

```
DEVICE - ASPI4DOS.SYS /P330  
DEVICE - ASPI4DOS.SYS /P334 /N4
```

In this example, the bus on time for the host adapter at port 330 would remain at the default of 11 μ sec, while the bus on time for the host adapter at port 334 would be changed to 4 μ secs.

AHA-1640

The following is the CONFIG.SYS entry for a Micro Channel system with two AHA-1640 host adapters:

```
DEVICE - ASPI4DOS.SYS \S1 \S2
```

In this case, only the host adapters at slots 1 and 2 will be installed.

When using multiple host adapters, be sure to select a different port address, DMA channel, and Interrupt channel for each host adapter. Only one AHA-1540/1542 should have its BIOS enabled; all other host adapter BIOS's should be disabled. Multiple AHA-1740/1744 BIOS can be enabled, if desired. If using multiple AHA-1542 host adapters (the '2' indicates the presence of a floppy controller), you will also need to disable the floppy controllers on all the host adapters except the one used.

When using multiple AHA-1640 host adapters, be sure to select a different port address, arbitration level, and interrupt level for each host adapter. Only one AHA-1640 should have its BIOS enabled; all other host adapter BIOS' should be disabled.

*AHA-1740***Standard Mode:**

When the AHA-1740 is in Standard Mode, the `ASPI4DOS.SYS` driver should be used. Multiple adapters are handled just like multiple AHA-1540 series adapters.

Enhanced Mode:

When the AHA-1740 is in Enhanced Mode, the `ASPIEDOS.SYS` driver should be used. Multiple adapters are handled just like multiple AHA-1640 series host adapters.

The following is the `CONFIG.SYS` entry for an EISA system with two AHA-1740 host adapters in Enhanced Mode:

```
DEVICE = ASPIEDOS.SYS
```

All installed Enhanced Mode AHA-1740 host adapters will be installed. The host adapter in the lowest slot number will be assigned to host adapter #0, the AHA-1740 in the next highest slot will be numbered host adapter #1, etc. If desired, the ASPI Manager can be specified more than once with the slot number specified:

```
DEVICE = ASPIEDOS.SYS \S1    ;will be assigned to host adapter #0  
DEVICE = ASPIEDOS.SYS \S2    ;will be assigned to host adapter #1
```

In this case only the host adapters at slots 1 and 2 will be installed.

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Q. *What is VDS?*

A. VDS stands for virtual DMA Services. It is a standard, developed so that bus master devices can obtain the physical address of software that is running in the protected mode of the 386. It eliminates the need for a separate buffer, thus increasing overall system performance. The ASW-1410 ver 2.0 and newer fully supports the VDS specification. Microsoft Windows 3.0 also supports VDS. See section on "Software Considerations."

Q. *Why should I install the ASPI4DOS.SYS manager if I only have one SCSI hard disk installed, and it is currently installed under the BIOS?*

A. When the manager is loaded, Int 13 calls are rerouted through the driver instead of through the host adapter BIOS. Since the Int 13 code is processed at RAM speed instead of ROM speed, overall system performance is increased.

Q. *What is SCSIHA.SYS and do I still need it?*

A. SCSIHA.SYS is a buffering device driver for the AHA-1540/1542, AHA-1640, and the AHA-1740/1744 (standard mode) that can be obtained from the Adaptec BBS. It is not required when using the ASPI4DOS.SYS driver. SCSIHA.SYS creates a buffer in lower memory that is required when using programs that use the protected mode of the 386, such as Windows 3.0 in the standard and enhanced modes.

Q. *I have both ASPI4DOS.SYS and ASPIDISK.SYS loaded into my CONFIG.SYS. However, I'm getting a message during boot "No SCSI logical drives to support. ASPIDISK.SYS is NOT installed." What is wrong?*

A. ASPIDISK.SYS will only install if compatible partitions are found on SCSI drives that are not installed under the host adapter BIOS. If such partitions are not found, ASPIDISK.SYS will not install. This is normal and is not a problem. ASPI4DOS.SYS will still install normally.

Q. What are the DOS partition limits with my SCSI host adapter?

A. The maximum DOS partition size is determined by the DOS version. The following table can be used to determine the maximum partition size:

<i>DOS Version</i>	<i>Maximum Partition Size</i>
MS or IBM 3.30	32 MBytes/partition
Compaq 3.31	512 MBytes/partition
MS or IBM 4.0 and newer	1 GigaByte/partition
MS or IBM 5.0	1 Gigabyte/partition

Q. How do I install a removable media drive?

A. Removable media is supported by `ASPI4DOS.SYS` (or `ASPIEDOS.SYS`) and `ASPIDISK.SYS`. Use the following guidelines to install removable media:

1. Change the SCSI ID of the removable media drive to 2, 3, 4, 5, or 6. (Consult the drive's manual for instructions.)
2. A low-level format of the media may be necessary. Format Utilities are available on the Adaptec BBS.
3. Boot to DOS, with a `CONFIG.SYS` containing the ASPI Manager.
4. Partition the media with `AFDISK.EXE`.
5. Reboot for partitions to take effect (ensure `CONFIG.SYS` has `ASPI4DOS.SYS`, or `ASPIEDOS.SYS` and `ASPIDISK.SYS` loaded).

Q. Why would I want to decrease the host adapter bus on time?

A. Some tape drives require that the host adapter bus on time be decreased from the default of 11 μ sec to about 4 μ sec for proper operation.

ASPI4DOS.SYS

Invalid entry for '/p' setting

You have entered an invalid '/P' setting on the command line. There are six valid port settings: 334, 330, 234, 230, 134, and 130 (e.g., /P334).

Invalid entry for '/n' setting

You have entered an invalid '/N' setting on the command line. You can only enter number 2-15 (e.g., /N10). This bus on time is entered in decimal. This option is only valid for the AHA-1540/1542.

Invalid entry for '/f' setting

You have entered an invalid '/F' setting on the command line. You can only enter numbers 1-64 (e.g., /F5). This bus off time is entered in decimal. This option is only valid for the AHA-1540/1542 and the AHA-1740/1744 (standard mode).

Invalid entry for '/x' setting

You have entered an invalid '/X' setting on the command line. You should enter a 2-byte hex value (e.g., /X03). This option is only valid for the AHA-1540/1542 and the AHA-1740/1744 (standard mode).

Unable to read configuration from host adapter

The driver failed in its attempt to get the host adapter's configuration settings. This error will only occur with the AHA-1540/1542 or the AHA-1740/1744 (standard mode). Make sure there are no hardware conflicts within your PC, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Unable to set Bus Master transfer rate

The driver failed in its attempt to set the host adapter's Bus Master DMA transfer rate. This error will only occur with the AHA-1540/1542 or the AHA-1740/1744 (standard mode). Make sure there are no hardware conflicts within your system, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Unable to set bus on/off timing

The driver failed in its attempt to set the host adapter's bus-on or bus-off time. This error will only occur with the AHA-1540/1542 or the AHA-1740/1744 (standard mode). Make sure there are no hardware conflicts within your system, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Unable to initialize host adapter mailboxes

The driver failed in its attempt to initialize the host adapter's mailbox base address. Make sure there are no hardware conflicts within your system, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Failed checking for scatter/gather mode

The driver failed in its attempt to determine whether or not your host adapter supports scatter/gather. Make sure there are no hardware conflicts within your system, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Failed to hard reset the host adapter

The driver failed in its attempt to hard reset the host adapter. Make sure there are no hardware conflicts within your system, the host adapter's jumpers are set correctly, and that the host adapter is securely inserted.

Not enough memory available to load driver

This error only occurs with DOS 5.0 and above. This message will only be displayed if the ASPI4DOS.SYS driver is being loaded high ('DEVICEHIGH=') and not enough upper memory is available. Use 'DEVICE =' to load the driver into conventional memory.

Failed scanning for SCSI devices

The driver failed scanning for devices on the SCSI bus. Make sure that the SCSI bus is properly terminated. The SCSI host adapter is a SCSI device that has onboard terminators that should be removed if both the internal and external connectors are used.

Unable to find host adapter in POS registers

No AHA-1640 host adapter was found in your system.

ASPI4DOS.SYS Installation Failed

This error message indicates that the ASPI driver was not loaded. This message will generally be preceded by one of the aforementioned errors.

ASPIEDOS.SYS

Slot #xx AHA-1740/1744 - Not configured for enhanced mode

The ASPIEDOS.SYS driver is intended for the AHA-1740/1744 when configured for enhanced mode. If any AHA-1740/1744s in the system are configured for standard mode, ASPIEDOS.SYS will not load unless the /s switch is specified. The /s switch is used with ASPIEDOS.SYS to indicate the host adapters to be installed (i.e., all configured to enhanced mode).

Slot #xx AHA-1740/1744 is using an old BIOS revision which could cause some unpredictable results. Programs such as ADPIDISK.SYS and AFDISK will not work with this BIOS!!

The AHA-1740/1744 BIOS being used is down rev, and should be replaced.

ASPIDISK.SYS

No SCSI logical drives to support.

This indicates that ASPIDISK has not found any logical drives to support. The driver will not load and take up memory if this message appears. There may be no logical drives to support for several reasons:

1. There are no attached SCSI disk drives.
2. All SCSI disk drives are under control of the host adapter BIOS.
3. The SCSI disk drives have not been partitioned yet.

Error issuing SCSI Inquiry command.

This indicates that ASPIDISK timed out on issuing a SCSI Inquiry command. Check SCSI bus termination, SCSI parity, and cabling. The driver will not load if this message is displayed.

Unable to open ASPI Manager!

This message indicates that there is not ASPI Manager loaded. Ensure that the ASPI Manager is specified before ASPIDISK in the CONFIG.SYS. Check that the ASPI Manager is loading correctly (it will not load if incorrect / options are specified).

Invalid DOS version. DOS must be version 3.21 and above.

ASPIDISK supports DOS versions 3.21 and newer. Versions of DOS older than 3.21 cannot be used. ASPIDISK will not load if this message is displayed.

Command line arguments are incorrect.

Check to ensure that any command line switches (/ options) are specified correctly and as specified in this document. If invalid parameters are used, the driver will not load.

Failed to read, or invalid, boot record.

This message will appear if ASPIDISK was unable to read data from a disk, or if the data read from the disk was invalid. This may occur if the drive has not been partitioned or formatted yet, or is defective. A low-level format of the drive may fix this problem. The driver will continue to load for valid attached devices.

WARNING: Maximum number of DOS logical drives (A: to Z:) reached.

Only 24 logical drive letters are available for hard disk logical drives, whether they are SCSI or standard hard disk drives. If 24 logical drives are exceeded, only a maximum of 24 logical drives (C: to Z:) will be available for hard disk drives.

Unsupported (old-style) ASPI manager found.

ASPIDISK v3.0 must be used with ASPI4DOS.SYS v3.0 or newer. Older ASPI Managers are not supported.

Failed to find any SCSI logical drives to support.

The driver cannot find any logical drives to be handled. The drive that is not controlled by host adapter BIOS may not have been formatted.

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