

Installation Guide for the Broadcom Windows Storage Drivers: Mpi2Ses (MiniPort)

NOTE: The installation guide applies to all the Windows OS (x86 and x64) including server and client edition unless specifically stated otherwise.

This file describes the features and use of the Avago Fusion-MPT SAS (Serial

Attached SCSI) Gen3.5 device drivers for the Windows Operating system environments. It is divided into the following sections:

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1.0 Introduction for Windows

Windows is an operating system designed to run on Intel architecture (x86, 32-bit) and Extended-64 (x64, AMD64/EM64T) processors and Arm64 processors using current technology. It provides a graphical user interface environment incorporating many high-level features. Note that Windows Server is only supported on x64 processors. Refer to the Microsoft Windows documentation for details.

An I/O manager handles I/O requests in Windows. To address a peripheral, the I/O manager goes through the appropriate drivers. Windows provides class drivers for hard disk, optical, CD-ROM, printer, and scanner peripherals. Other class drivers, provided by peripheral manufacturers, may be added to support new devices. Tape device support is built into the operating system itself and does not require a class driver.

Microsoft provides the port driver and Broadcom provides the miniport drivers, which is called Mpi2Ses.SYS. This driver completes the path to the Broadcom controller or processor with an optional SAS BIOS.

This miniport driver uses the Microsoft StorPort port driver (rather than the Microsoft ScsiPort driver in earlier versions of Windows). The StorPort driver has architectural enhancements that provide performance improvements on large server systems with many storage adapters. This miniport driver is designed to take advantage of these enhancements for improved performance.

A new Storport driver feature for Windows 8/2012 and above OS is Extended SRB (Storage Request Block). This new type of request is very extensible and allows for better performance and additional new features in future versions of Windows. The Mpi2Ses miniport driver supports Extended SRB.

1.1 Features

The Mpi2Ses.SYS miniport driver supports these features:

- Supports End-to-End Data Protection (EEDP)
- Supports 12Gb SAS expanders/devices and SATA devices
- Supports PCI-Express bus protocols
- Supports MSI/MSI-X
- Supports Broadcom MPT common software interface
- Supports multiple host adapters
- Supports multiple Logical Unit Numbers (LUNs)
- Supports Scatter-Gather
- Supports SCSI pass-through functionality
- Supports disk array configurations with no LUN 0
- Supports disk array configurations with non-contiguous LUNs
- Supports Storport Interrupt Redirection performance enhancements
- Auto request sense
- Maximum block size support: 1 Mbyte (32-bit), 2 Mbyte (64-bit)
- Supports Storport Extended SRB (Storage Request Block)
- Supports Tri-mode (SAS,SATA,Nvme)

1.2 Broadcom Devices Supported

The miniport driver names are listed below, along with their supported devices and associated host adapters: Mpi2Ses.sys

- SAS9400
- Avago PCI Fusion-MPT SAS3.5
- Avago Adapter, Ventura - StorPort
- Avago Adapter, Crusader - StorPort

- Avago Adapter, Harpoon - StorPort
- Avago Adapter, Tomcat - StorPort
- Avago Adapter, Marlin - StorPort
- Avago Adapter, Mercator - StorPort
- Avago Adapter, Marut - StorPort
- Avago Adapter, Aero/Sea - StorPort

1.3 Description

The Mpi2Ses.SYS driver meets the Microsoft specification for miniport drivers. These drivers allow connection of SAS devices including disk drives, CD/DVD-ROMs, and tape drives for PCI-Express based machines. To support a different SAS device type, the Windows architecture requires that a class driver for that type of device be present (usually supplied by Microsoft, or possibly by the peripheral manufacturer). No changes to the Broadcom drivers are required. The driver supports only Windows 10 and above and all subsequent Service Packs. A Windows application passes SCSI commands directly to the SAS Protocol devices by using the SCSI pass-through facility. This facility allows applications to directly control and access devices by filling in a data structure and calling into the port or class driver. Refer to the Microsoft Windows documentation for more details.

2.0 Installing the Mpi2Ses.SYS Driver

This procedure installs the Mpi2Ses.SYS driver onto a new or existing Windows operating system. Depending upon the media used to distribute Broadcom drivers (web or CD-ROM) and the type of adapter, you will create a driver install package on some type of accessible media. This can be a diskette, CD or DVD, or USB flash drive. The driver install package can also be placed on a hard disk for driver upgrades only. Copy the files listed in this section to a folder on the desired media as shown below. You will use this driver package during the installation process.

Mpi2Ses.inf, Mpi2Ses.sys, Mpi2Ses.cat

Note: Windows drivers must be either Release signed (by Avago /Broadcom) or WHQL logo signed (by Microsoft Windows Hardware Quality Labs) to be installed. Any modifications to any of the above files will invalidate the digital signature of the package and the OS will not install the driver.

2.1 New System Installation

This procedure installs the Mpi2Ses.SYS driver onto a Windows system. Use this procedure when installing Windows 10/2016 onto an unused drive. Windows 10/2016 automatically adds the driver to the registry and copies the driver to the driver storage area.

2.1.1 DVD-ROM Installation

1. Start the Windows installation by booting from the Windows DVD-ROM. The system BIOS must support booting from a DVD-ROM. BIOS settings may need to be changed to allow DVD-ROM booting.

2. Proceed with the installation of Windows when the screen displays "Where do you want to install Windows?" click on the Load Driver icon.
3. Be sure the media with the Mpi2Ses driver install package for the system processor architecture is inserted in the system. Click the Browse button, browse to the location of the driver package, and then click OK.

Note: Current Windows 10/2016 drivers can be downloaded from the Broadcom/Avago Tech

Web site at:

<http://www.avagotech.com/support/download-search>

After you are connected to this web site, Select Product Family, product name, and driver to begin the download.

4. The Broadcom adapter driver name will be displayed, click Next.

Note: When using a Release Signed driver, a Windows Security dialog box may appear, indicating that the publisher of this software is Avago Corporation. Click the Install button to continue installation of the driver. A second Windows Security dialog box may appear, indicating that an Avago/Broadcom system device is being installed. This is to install drivers for Avago storage enclosure processors. Click the Install button to continue installation of the driver.

5. Follow the Microsoft Windows OS installation procedure at this point.

2.2 Existing System Installation

This procedure installs or upgrades the Mpi2Ses.SYS driver onto an existing Windows system.

NOTE: When an Avago/Broadcom SAS Gen3.5 adapter is added to an existing system installation, the new adapter is automatically detected at the next reboot. When the Update Driver Software Wizard appears at boot, continue at step 8 below.

1. Boot Windows and logon as a user that has Administrator privileges.
2. Right-click on a blank area of the Task Bar, then click Task Manager.
3. Click File, then Run New Task.
4. In the Open: box, type devmgmt.msc, then click OK. The Device Manager window will open.
5. Click the arrow to the left of the Storage Controllers line. Find the adapter desired for the driver upgrade and double-click the entry. Click on the Driver tab.
6. Information on the currently installed driver is displayed, and additional driver details can be viewed by clicking the "Driver Details" button.
7. Click on the "Update Driver" button to update the existing driver. The Update Driver Software wizard begins.
8. Click on the "Browse my computer for driver software" selection.

9. Click on the "Let me pick..." selection at the bottom of the window.
10. Click on the "Have Disk" button and type the path to the driver, or click on the Browse button. Select the location for the driver package which matches the processor architecture of the system (x86 or x64). After the path to the driver has been established, click the OK button.
11. Select the driver from the list and click on the Next button.

Note: When using a Release Signed driver, a Windows Security dialog box may appear, indicating that the publisher of this software is Avago Corporation. Click the Install button to continue installation of the driver. A second Windows Security dialog box may appear, indicating that an Avago system device is being installed. This is to install drivers for Avago storage enclosure processors. Click the Install button to continue installation of the driver.

12. The system will load the driver from the Windows driver package media. A message box may display indicating that the target (existing) driver is newer than the source (upgrade) driver.
13. Click No to cancel the driver upgrade at this point. Or Click yes to continue the installation. The system copies the driver to the system disk. For any adapter other than the boot adapter, the updated driver will become active immediately. For the boot adapter, a message displays indicating that you must reboot your system for the new driver to take effect.
14. Click on the Close button to complete the driver upgrade.

2.3 WinPE Installation

WinPE is provided to system OEM's to create a Pre-install Environment image. To use the Mpi2Ses.SYS driver with the Windows based WinPE, perform the steps listed below.

1. Create an Mpi2Ses folder in the winpe_image directory under i386\system32.

For example: `mkdir winpe_image\i386\system32\ Mpi2Ses`

2. Copy the Mpi2Ses driver package to the winpe_image\i386\system32\ Mpi2Ses folder.
3. Edit the winpe_image\i386\System32\Winpeoem.sif to remove the semicolons from the [OemDriverParams] section and add the name of the Mpi2Ses directory to the OemDriverDirs entry.
For example:

[OemDriverParams]

OemDriverRoot = ""

OemDriverDirs = Mpi2Ses

4. You can then use oscdimg to create a bootable .iso image, or follow the WinPE User's Guide to create a bootable USB flash device.

3.0 Troubleshooting

The Mpi2Ses.SYS driver will log error messages to the system error log. For these errors, the system error log EventID will be 11, and the specific error code values will be displayed at offset 0x48. Data should be displayed in words and user can read the error string as well.