

How to disable PCIe power management in Linux

The optical transceivers used in Adnacom PCI Express over fiber optic expansion systems do not support PCI Express (PCIe) link power management. This guide explains how to disable Active State Power Management (ASPM) in the BIOS/UEFI, prevent Linux from changing that configuration or putting PCIe ports into a low-power state, and disable automatic system sleep

Disable PCIe link power management

1. Disable ASPM in the BIOS/UEFI. Open the computer's firmware settings, disable PCIe ASPM, and save the changes. Setting names vary by computer; consult the system documentation. If no ASPM setting is available, use the alternative parameter in the note after step 2, or contact the computer vendor.

2. Add the kernel parameters. Follow the instructions for your distribution below. Two parameters are required:

- `pcie_aspm=off` prevents Linux from changing the ASPM configuration; it does not clear ASPM settings already enabled by firmware.
- `pcie_port_pm=off` prevents Linux from putting PCIe ports into a low-power device state (D3). A port in D3 puts its link in the L1 low-power state, separately from ASPM. Disabling ASPM alone does not prevent this.

Note: `pcie_aspm=off` also stops Linux from requesting control of native PCIe features from the firmware, so Advanced Error Reporting (AER) and native hot-plug are left to the firmware. If the BIOS/UEFI has no ASPM setting, or if you need AER, use `pcie_aspm.policy=performance` instead of `pcie_aspm=off`. It disables ASPM on the PCIe links that Linux manages, including links where the firmware enabled ASPM. Power management tools such as TLP can change this policy while the system is running; configure them to keep it set to performance. Keep `pcie_port_pm=off` in either case.

3. Disable automatic system sleep. Prevent the computer from entering sleep or hibernation:

```
sudo systemctl mask sleep.target suspend.target
sudo systemctl mask hibernate.target hybrid-sleep.target suspend-then-
hibernate.target
```

This blocks sleep requests from all standard sources, including desktop power settings and the laptop lid. To reverse the change, run the same commands with `unmask` instead of `mask`.

4. Restart the computer. The kernel command-line change takes effect at the next boot. Then complete the checks below.

Add the kernel parameters

Ubuntu and Debian with GRUB

Open the GRUB configuration file in a text editor:

```
sudo nano /etc/default/grub
```

Add `pcie_aspm=off` and `pcie_port_pm=off` inside the quotes in `GRUB_CMDLINE_LINUX_DEFAULT`, preserving all existing parameters. For example:

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet splash pcie_aspm=off pcie_port_pm=off"
```

To apply the parameters to all Linux entries, including recovery entries, use `GRUB_CMDLINE_LINUX` instead. Save the file, exit the editor, and update GRUB:

```
sudo update-grub
```

On some installations, such as cloud images, files in `/etc/default/grub.d/` override `GRUB_CMDLINE_LINUX_DEFAULT`. If the parameters do not appear in `/proc/cmdline` after restarting, check those files.

Arch Linux with GRUB

Edit `/etc/default/grub` as described above, then generate the GRUB configuration:

```
sudo grub-mkconfig -o /boot/grub/grub.cfg
```

Fedora, RHEL and compatible distributions

Add the parameters to all kernel entries:

```
sudo grubby --update-kernel=ALL --args="pcie_aspm=off pcie_port_pm=off"
```

Compatible distributions include CentOS, Rocky Linux and AlmaLinux.

Other bootloaders

Follow the bootloader documentation to add `pcie_aspm=off` and `pcie_port_pm=off` to the Linux kernel command line.

Verify PCIe link power management status

Inspect the kernel boot parameters

Run:

```
cat /proc/cmdline
```

Confirm that `pcie_aspm=off` (or `pcie_aspm.policy=performance`) and `pcie_port_pm=off` appear in the output. This confirms that the parameters were passed to the kernel. It does not confirm that ASPM is disabled on the PCIe links.

Check the PCIe link settings

Run:

```
sudo lspci -vv
```

Identify the PCIe bridges listed as **PLX Technology**. To show only these devices, run `sudo lspci -vv -d 10b5:` instead.

If other PLX devices are installed in the computer, use the **Device Serial Number** to find the bridges that belong to the expansion system. Its last six bytes, in reverse order, form the card serial number. For example, Device Serial Number `00-00-56-34-12-3d-0a-4c` corresponds to card serial number `4C0A3D123456`.

For each of these bridges, and for the root port that the host card is installed in, check that the **LnkCtl** line begins with:

```
LnkCtl: ASPM Disabled
```

To list every device together with its **LnkCtl** line, run:

```
sudo lspci -vv | grep -E '^[0-9a-f]|LnkCtl:'
```

LnkCap describes the supported features; **LnkCtl** shows the configured ASPM setting. If any of these ports reports ASPM L0s or L1 enabled, review the BIOS/UEFI settings or use `pcie_aspm.policy=performance` (see the note after step 2), and repeat the check after restarting.

Check the PCIe port power state

Run:

```
for d in $(lspci -D -d 10b5: | cut -d' ' -f1); do echo "$d $(cat /sys/bus/pci/devices/$d/power/runtime_status)"; done
```

Confirm that each bridge belonging to the expansion system reports **active**. If any bridge reports **suspended**, check that `pcie_port_pm=off` appears in `/proc/cmdline`.

Check the kernel logs

For additional diagnostic information, run:

```
sudo dmesg | grep -i aspm
```

ASPM messages vary by kernel version and configuration. An ASPM-related message, or the absence of one, is not sufficient to confirm the link settings. Use the **LnkCtl** checks above.

Check that sleep is disabled

Run:

```
systemctl is-enabled sleep.target suspend.target hibernate.target hybrid-sleep.target suspend-then-hibernate.target
```

Confirm that the output reads **masked** for each target.

Note: This procedure addresses PCIe ASPM, PCIe port power management, and system sleep. Runtime power management of the devices installed in the expansion system is controlled by their drivers. See the documentation for those devices.