# Alienware X51 Service Manual



# Notes, cautions, and warnings



**NOTE:** A NOTE indicates important information that helps you make better use of your computer.



CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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# Before working inside your computer



**NOTE:** The images in this document may differ from your computer depending on the configuration you ordered.

## Before you begin

- 1 Save and close all open files and exit all open applications.
- 2 Shut down your computer.
  - Windows 10: Click or tap Start → **OPOWER** → Shut down.
  - Windows 8.1: On the Start screen, click or tap the power icon ♥→
    Shut down.
  - **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
- **3** Disconnect your computer and all attached devices from their electrical outlets.
- **4** Disconnect all cables such as telephone cables, network cables and so on, from your computer.
- **5** Disconnect all attached devices and peripherals, such as keyboard, mouse, monitor, and so on, from your computer.
- **6** Remove any media card and optical disc from your computer, if applicable.
- 7 After the computer is unplugged, press and hold the power button for 5 seconds to ground the system board.

## Safety instructions

Use the following safety guidelines to protect your computer from potential damage and ensure your personal safety.



WARNING: Before working inside your computer, read the safety information that shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory\_compliance.



WARNING: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.



CAUTION: To avoid damaging the computer, ensure that the work surface is flat and clean.



CAUTION: To avoid damaging the components and cards. handle them by their edges and avoid touching pins and contacts.



CAUTION: You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that shipped with the product or at www.dell.com/regulatory\_compliance.



↑ CAUTION: Before touching anything inside your computer. ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.



CAUTION: When you disconnect a cable, pull on its connector or on its pull tab, not on the cable itself. Some cables have connectors with locking tabs or thumb-screws that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending any connector pins. When connecting cables, ensure that the ports and connectors are correctly oriented and aligned.



CAUTION: Press and eject any installed card from the mediacard reader.

#### Recommended tools

The procedures in this document may require the following tools:

- Philips screwdriver
- Flat-head screwdriver

Plastic scribe

# After working inside your computer

## Λ

CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.

- 1 Replace all screws and ensure that no stray screws remain inside your computer.
- **2** Connect any external devices, peripherals, and cables you removed before working on your computer.
- **3** Replace any media cards, discs, and any other parts that you removed before working on your computer.
- **4** Connect your computer and all attached devices to their electrical outlets.
- **5** Turn on your computer.

## **Technical overview**



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## Inside View Of Your Computer



- 1 processor cooling assembly
- 2 memory modules

3 riser cage

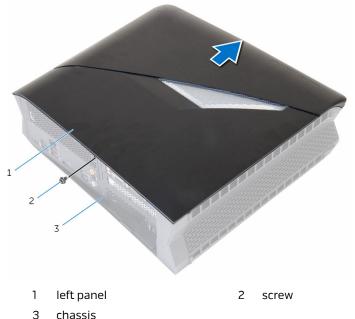
# Removing the side panel



WARNING: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in <u>Before working inside your computer</u>. After working inside your computer, follow the instructions in <u>After working inside your computer</u>. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory\_compliance.

#### **Procedure**

- 1 Place the computer on its side with the left panel facing up.
- 2 Remove the screw that secures the left panel to the chassis.
- **3** Release the left panel by sliding it towards the front of the computer.



- 3 CHassis
- **4** Turn the left panel over and disconnect the lighting cable as shown.

#### **5** Lift the left panel off the chassis.



- 1 left panel
- 3 chassis

2 lighting cable

## Replacing the side panel



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#### **Procedure**

- 1 Connect the lighting cable to the left panel.
- 2 Align the tabs on the left panel with the slots on the chassis and slide it toward the back of the computer.
- **3** Replace the screw that secures the left panel to the chassis.

# Removing the processor cooling-assembly



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## **Prerequisites**



**NOTE:** You will hear a low bubbling sound when the computer is turned on. The sound is standard for all computers with liquid cooling units and stops after a few minutes of computer use. The bubbling sound is due to the air that resides in the liquid cooling assembly. When the temperature of the liquid rises, it expands and the air bubbles in the tube are dislodged. Alienware X51 being a compact desktop computer, initially the sound may be more audible as compared to the liquid cooling units in other larger desktops. The liquid cooling unit dissipates these sounds after few minutes of use.

Remove the side panel.

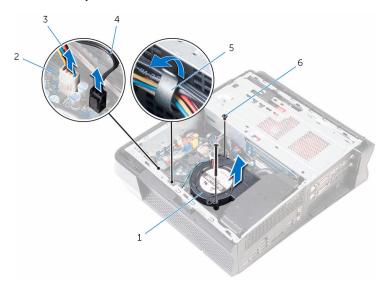
#### **Procedure**

- 1 Remove the fan cable and processor-cooler cable from the routing guide on the chassis.
- **2** Disconnect the fan cable and processor-cooler cable from the system board.
- **3** Remove the screws that secure fan to the processor cooling assembly.

Lift the fan off the processor cooling assembly. 4



NOTE: Note the orientation of the fan so that you can replace it correctly.



- 1 fan
- 3 fan cable
- 5 routing guides

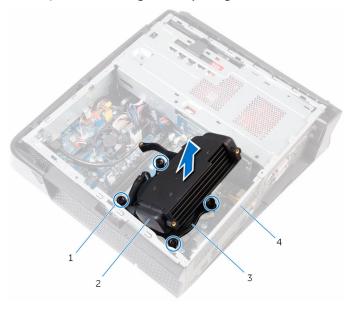
- 2 system board
- 4 processor-cooler cable
- 6 screws (2)
- Remove the memory modules. 5
- 6 Remove the screws that secure the radiator to the chassis.

7 Slide the radiator towards the front of the computer and release it from the chassis.



Lift the radiator and hold it as shown in the image below to remove the thumbscrews that secure the processor cooler to the system board.

**9** Lift the processor cooling assembly along with the cables off the chassis.



- 1 thumbscrews (4)
- 3 processor cooler

- 2 radiator
- 4 chassis

# Replacing the processor cooling assembly



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#### **Procedure**

- Place the processor cooler over the processor on the system board.
- 2 Align the screw holes on the processor cooler with the screw holes on the system board.
- 3 Replace the thumbscrews that secure the processor cooler to the system board.
- 4 Align and place the radiator on the processor cooler and slide towards the back of the computer.
- 5 Replace the screws that secure the radiator to the chassis..
- 6 Replace the <u>memory modules</u>.
- Align and place the fan on the processor cooling assembly.
- 8 Route the fan cable and processor-cooler cable through the routing guide on the chassis.
- Connect the fan cable and processor-cooler cable to the system board.

## Post-requisites

Replace the side panel.

## Removing the wireless card



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## **Prerequisites**

- 1 Remove the <u>side panel</u>.
- 2 Remove the <u>processor cooling-assembly</u>.

#### **Procedure**

- 1 Disconnect the antenna cables from the wireless card.
- **2** Remove the screw that secures the wireless card to the system board.

#### **3** Slide the wireless card out of the wireless-card slot.



- 1 wireless-card slot
- 3 system board
- 5 antenna cables (2)

- 2 wireless card
- 4 screw

## Replacing the wireless card



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#### **Procedure**



CAUTION: To avoid damage to the wireless card, do not place any cables under it.

- 1 Align the notch on the wireless card with the tab on the wireless-card slot.
- 2 Slide the wireless card into the wireless-card slot.
- **3** Replace the screw that secures the wireless card to the system board.

#### **4** Connect the antenna cables to the wireless card.

The following table provides the antenna-cable color scheme for the wireless card supported by your computer.

Connectors on the wireless card	Antenna-cable color
Main (white triangle)	White
Auxiliary (black triangle)	Black



- 1 tab
- 3 wireless-card slot
- 5 screw
- 7 system board

- 2 notch
- 4 wireless card
- 6 antenna cables (2)

# **Post-requisites**

- 1 Replace the <u>processor cooling-assembly</u>.
- 2 Replace the side panel.

# Removing the memory module



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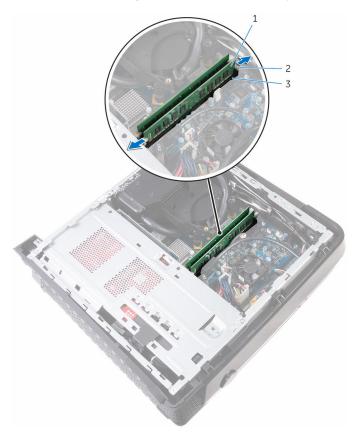
## **Prerequisites**

Remove the side panel.

#### **Procedure**

1 Using your fingertips, press the securing clips at each end of the memory-module slot until the memory module pops up.

- 2 Remove the memory module from the memory-module slot.
  - \( \sum \text{CAUTION: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



- 1 memory module
- 3 memory-module slot
- 2 securing clips (2)

# Replacing the memory module



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#### **Procedure**



**NOTE:** Alienware X51 R3 supports only DDR4 memory modules. If you are adding additional memory modules or upgrading the memory modules, ensure to use DDR4 UDIMMs.

1 Align the notch on the memory module with the tab on the memory-module slot.

- 2 Insert the memory module into the memory-module slot and press the memory module down until it clicks into place.
  - **NOTE:** If you do not hear the click, remove the memory module and reinstall it.



- 1 memory module
- 3 memory-module slot
- 5 notch

- 2 securing clips (2)
- 4 tab

## Post-requisites

Replace the side panel.

## Removing the hard drive



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CAUTION: Hard drives are fragile. Exercise care when handling the hard drive.



CAUTION: To avoid data loss, do not remove the hard drive while the computer is in sleep or on state.

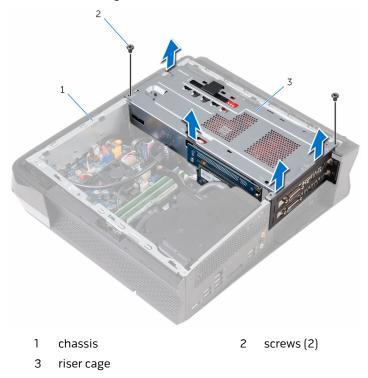
## **Prerequisites**

Remove the side panel.

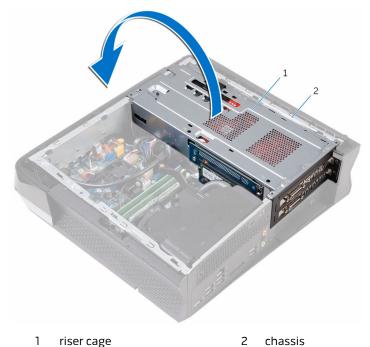
#### **Procedure**

1 Remove the screws that secure the riser cage to the chassis.

#### 2 Release the riser cage from the tabs on the chassis.

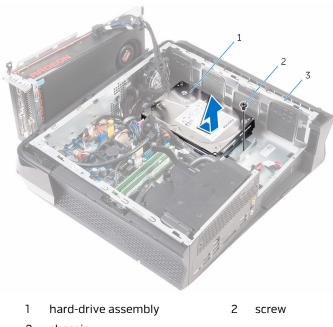


Lift the riser cage from the chassis and place it towards the front-side of the computer.



- Remove the screw that secures the hard-drive assembly to the chassis.
- 5 Slide the hard-drive assembly toward the inside of the computer to disconnect the power cable and the data cable from the hard drive.

Lift the hard-drive assembly off the chassis. 6



- chassis 3
- Remove the screws that secure the hard-drive bracket to the hard-drive assembly.

#### 8 Slide the hard drive out of the hard-drive bracket.



- 1 hard drive
- 3 screws (2)

2 hard-drive bracket

# Replacing the hard drive



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CAUTION: Hard drives are fragile. Exercise care when handling the hard drive.

#### **Procedure**

- 1 Slide the hard drive into the hard-drive bracket.
- 2 Align the screw holes on the hard drive with the screw holes on the harddrive bracket.
- **3** Replace the screws that secure the hard-drive bracket to the hard drive.
- 4 Slide and place the hard-drive assembly into the chassis to connect the power cable and the data cable to the hard drive .
- **5** Replace the screw that secures the hard-drive assembly to the chassis.
- 6 Align and place the rise cage on the chassis.
- 7 Replace the screws that secure the riser cage to the chassis.

## Post-requisites

Replace the side panel.

## Removing the graphics card



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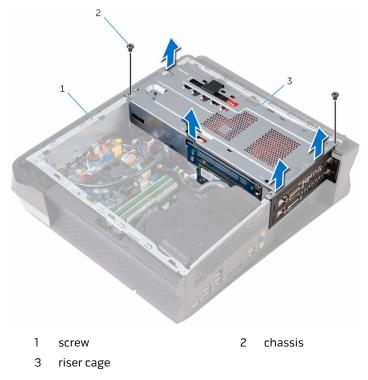
## **Prerequisites**

Remove the side panel.

#### **Procedure**

1 Remove the screws that secure the riser cage to the chassis.

2 Release the riser cage from the tabs on the chassis.



Press the tab and disconnect the graphics-card power cables from the graphics-card assembly.

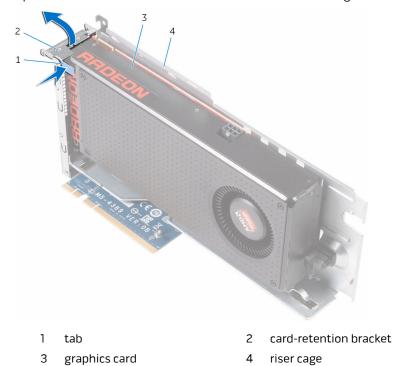
**4** Lift the riser cage from the chassis and remove the graphics-card power cables from the routing guide on the riser cage.



- 1 graphics-card power cables
- 3 riser cage
- 5 tab

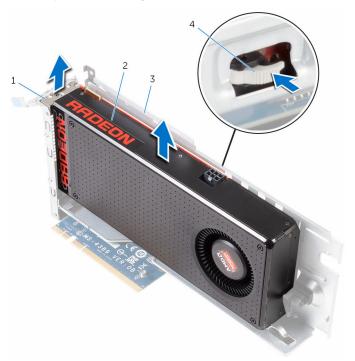
- 2 routing guide
- 4 graphics card

Open and release the card-retention bracket from the riser cage.



Turn around the riser cage and locate the PCI express latch.

**7** Press down the PCI x16 express card latch and lift the graphics-card assembly off the riser cage.



- 1 card-retention bracket
- 3 riser cage

- 2 graphics-card assembly
- 4 PCI express latch

# Replacing the graphics card



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#### **Procedure**

- 1 Align the graphics-card assembly with the slot on the riser cage.
- 2 Place the graphics-card assembly in the slot and press down firmly. Ensure that the graphics-card assembly is seated in the slot.
- **3** Rotate the card retention bracket towards the riser cage until it snaps into place.
- **4** Route the graphics-card power cables through the routing guide on the riser cage.
- **5** Connect the graphics-card power cables to the graphics-card assembly.
- **6** Align and press down the riser cage until the riser card slides into the risercard slot on the chassis.
- 7 Replace the screws that secure the riser cage to the chassis.

## Post-requisites

Replace the side panel.

# Removing the solid-state drive



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CAUTION: Solid-state drives are fragile. Exercise care when handling the hard drive.



CAUTION: To avoid data loss, do not remove the solid-state drive while the computer is in sleep or on state.

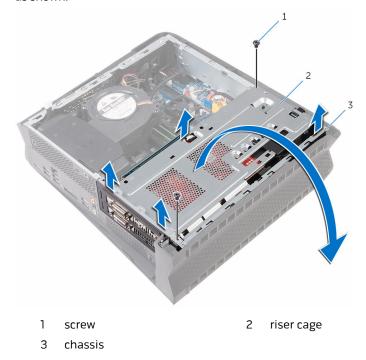
## **Prerequisites**

Remove the side panel.

#### **Procedure**

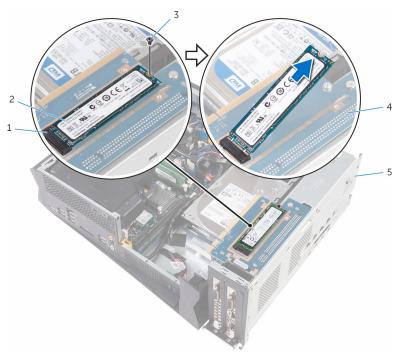
- 1 Remove the screws that secure the riser cage to the chassis.
- 2 Release the riser cage from the tabs on the chassis

Lift the riser cage from the chassis and place it on the side of the computer as shown.



Remove the screw that secures the SSD card to the riser card.

#### **5** Slide the SSD card out of the SSD-card slot.



- 1 SSD-card slot
- 3 screw
- 5 riser cage

- 2 SSD card
- 4 riser card

# Replacing the solid-state drive



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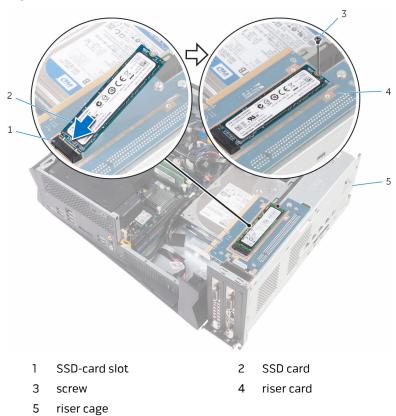


CAUTION: Solid-state drives are fragile. Exercise care when handling the hard drive.

#### **Procedure**

- 1 Align the notch on the SSD card with the tab on the SSD-card slot.
- 2 Slide the SSD card into the SSD-card slot.

**3** Replace the screw that secures the SSD card to the riser card.



- 4 Align and press down the riser cage until the riser card slides into the risercard slot on the chassis.
- **5** Replace the screws that secure the riser cage to the chassis.

## Post-requisites

Replace the side panel.

# BIOS setup program

#### Overview



CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS setup program. Certain changes can make your computer work incorrectly.



NOTE: Before you change BIOS setup program, it is recommended that you write down the BIOS setup program screen information for future reference.

Use BIOS setup program to:

- Get information about the hardware installed in your computer, such as the amount of RAM, the size of the hard drive, and so on.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, enabling or disabling base devices, and so on.

## **Entering System Setup**



**NOTE:** You must connect a keyboard and mouse to access and configure system setup.

- Turn on (or restart) your computer.
- 2 During POST, when the Dell logo is displayed, watch for the F2 prompt to appear and then press F2 immediately.



**NOTE:** The F2 prompt indicates that the keyboard has initialized. This prompt can appear very quickly, so you must watch for it, and then press F2. If you press F2 before the F2 prompt, this keystroke is lost. If you wait too long and the operating system logo appears, continue to wait until you see the operating system's desktop. Then, turn off your computer and try again.

## System Setup Options



**NOTE:** Depending on your computer and its installed devices, the items listed in this section may or may not appear.

Main

System Date Displays the current date in mm/dd/

yyyy format.

System Time Displays the current time in

hh:mm:ss format.

**BIOS Information** 

BIOS Version Displays the BIOS version number.

BIOS Build Date Displays the BIOS release date.

**Product Information** 

Product Name Displays the product name of your

computer.

Set Service Tag Allows you to enter the service tag of

your computer.

Asset Tag Displays the asset tag of your

computer.

**ME Information** 

ME Firmware Version Displays the Management Engine

firmware version of your computer.

EC Information

EC Firmware Version Displays the embedded controller

firmware version of your computer.

Memory Information

Total Memory Displays the total computer

memory.

Memory Available Displays the amount of memory

available on the computer.

Memory Technology Displays the type of memory

technology used.

Memory Speed Displays the memory speed.

**CPU Information** 

Processor String Displays the processor string.

Processor ID Displays the processor identification

code.

#### Main

CPU Speed Displays the speed of the processor.

Cache L2 Displays the processor L2 cache size.

Cache L3 Displays the processor L3 cache size.

#### **Device Information**

SATA ODD Displays the if the drive is present.

Fixed HDD Displays the if the drive is present.

Second HDD Displays the if the drive is present.

mSATA Device Displays the if the mSATA is present.

NVMe Device Displays the if the NVMe is present.

#### Advanced

#### **Advanced BIOS Features**

OptionRom Display Screen Allows you to display or hide OptionRom Information during system POST.

#### **CPU Configuration**

Hyper-Threading Technology Allows you to enable or disable the

HyperThreading in the processor.

XD Bit Capability Allows you to enable the Execute Disable

mode of the processor.

Intel(R) SpeedStep Allows you to enable or disable Intel(R)

SpeedStep Technology.



**NOTE:** If enabled, the processor clock speed and core voltage are adjusted dynamically based on the processor load.

Virtualization Allows you to enable or disable Intel

Virtualization Technology feature for the

processor.

CPU C states Allows you to enable or disable CPU C

states.

Active Processor Cores Allows you to enable or disable multi-core

processor.

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Intel(R) Software Guard Allows you to enable or disable Intel(R)

Extensions Software Guard Extensions.

Allocated memory size Allows you to allocate memory size for

Intel(R) Software Guard Extensions.

**Integrated Devices** 

Front USB Port Allows you to enable or disable the front

USB ports.

Rear USB Port Allows you to enable or disable the rear

USB ports.

HD Audio Allows you to enable or disable the HD

Audio.

Integrated NIC Allows you to enable or disable the

Integrated NIC.

Pxe Option

Launch PXE OpROM Allows you to enable or disable the PXE

OpROM.

UEFI PXE Driver Allows you to enable or disable the UEFI

PXE Driver.

Ipv4 PXE Support Allows you to enable or disable the Ipv4

PXE.

Ipv6 PXE Support Allows you to enable or disable the Ipv6

PXE.

SATA Mode Displays the SATA mode on your

computer.

PCIE GEN3 Allows you to enable or disable the third

generation of PCI express.

**Power Management Setup** 

Intel Ready Mode Technology Allows you to enable or disable the Intel

Ready Mode Technology.

AC Recovery Sets what action the computer takes

when power is restored.

Deep Sleep Control Allows you to define the controls when

Deep Sleep is enabled.

#### Advanced

Wake Up by Integrated LAN

Allows the computer to be powered on by special LAN signals.



**NOTE:** This option is available only when Deep Sleep Control is disabled.

**USB Wake Support** 

Allows you to enable or disable the USB Wake Support.



**NOTE**: This option is available only when Deep Sleep Control is disabled.

#### **Boot**

#### **Boot Configuration**

Bootup Numlock State Allows you to set the status of the

Num Lock key during boot to On or

Off.

Wait For 'F1' If Error Allows you to enable or disable

system to boot if F1 error occurs.

Secure Boot Control Allows you to enable or disable the

secure boot control.

Load Legacy OPROM Allows you to enable or disable the

Legacy Option ROM.

#### Set Boot Priority

Boot List Option Displays the available boot devices.

USB Boot Support Allows you to enable or disable

booting from USB mass storage devices such as external hard drive, optical drive, USB drive, and so on.

1st Boot Displays the first boot device.

Default: Hard disk.

2nd Boot Displays the second boot device.

Default: USB hard disk.

3rd Boot Displays the third boot device.

Default: Internal ODD Devices.

4th Boot Displays the fourth boot device.

Default: USB Floppy Device.

#### **Boot**

5th Boot Displays the fifth boot device.

Default: Onboard NIC Device.

#### OverClocking support for CPU and Memory

<u>U</u>

**NOTE:** This option is available only for Intel K SKU processors.

Memory Frequency Allows you to change Memory

Frequency for OverClocking.

Memory Voltage Allows you to change Memory

Voltage for OverClocking.

Load Level 1 OC setting Allows you to load CPU OverClocking

level 1 profile.

#### Security

Unlock Setup Allows you to unlock setup.

Admin Password Displays whether the admin

password is set.

System Password Displays whether the system

password is set.

Password Change Allows you to set, change, or delete

the admin password. The admin password controls access to the

system setup utility.

HDD Password Status Displays if the hard drive password

is set.

HDD Password Displays the hard drive password.

BIOS Recovery from Hard Drive Allows you to enable or disable BIOS

Recovery from hard drive.

Firmware TPM Displays the firmware TPM.

TPM Security Displays if the TPM security is

enabled or disabled.

Clear TPM Allows you to reset the TPM

security.

Save & Exit					
Save Changes and Reset	Allows you to exit system setup and save your changes.				
Discard Changes and Reset	Allows you to exit system setup and load previous values for all system setup options.				
Restore Defaults	Allows you to load default values for all system setup options.				

### Boot sequence

This feature allows you to change the sequence of devices that your computer attempts to boot from. If the computer cannot boot from the device you select, it attempts to boot from the next bootable device. You can use this feature to change the:

- Current Boot Sequence change the boot sequence for the current boot, for example, to boot from the optical drive to run Alienware Diagnostics from the Drivers and Utilities disc or to reinstall your operating system using an external media. The previous boot sequence is restored at the next
- Future Boot Sequence change the boot sequence for all future boots, for example, to boot from the primary hard drive.

#### Changing boot sequence for the current boot

- If you are booting from a USB device, connect the USB device to a USB port.
- Turn on (or restart) your computer.
- When **F2 Setup**, **F12 Boot Options** appear in the lower-right corner of the screen, press F12.



**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop. Then, shut down your computer and try again.

The **Boot Options** appears, listing all available boot devices.

On the **Boot Options**, select the device you want to boot from and press

For example, if you are booting to a USB hard drive, highlight **USB Hard Disk** and press Enter.

#### **Boot Options**

Following are the devices that your computer can boot from:

**Floppy** — The computer attempts to boot from the floppy disk drive. If no operating system is on the drive, the computer generates an error message.

**Hard Drive** — The computer attempts to boot from the primary hard drive. If no operating system is on the drive, the computer generates an error message.

**CD/DVD/CD-RW Drive** — The computer attempts to boot from the optical drive. If no disc is in the drive, or if the disc is not bootable, the computer generates an error message.

**USB Storage Device** — Insert the memory device into a USB connector and restart the computer. When **F12 Boot Options** appear in the lower-right corner of the screen, press F12. The BIOS detects the device and adds the USB flash option to the boot menu.



**NOTE:** To boot to a USB device, the device must be bootable. To ensure that your device is bootable, check the device documentation.

**Network** — The computer attempts to boot from the network. If no operating system is found on the network, the computer generates an error message.

#### Changing boot sequence for future boots

- Enter system setup.
   See "Entering System Setup".
- 2 Use the arrow keys to highlight the **Boot** menu option and press Enter to access the menu.
  - **NOTE:** Note your current boot sequence in case you want to restore it
- 3 Navigate to **Set Boot Priority** to configure the boot priority.
- **4** Use the arrow keys to highlight the boot priority and press Enter to display the different devices.
- **5** Select the device and press Enter to set the boot priority.

# Flashing the BIOS



**NOTE:** It is recommended that you connect a keyboard and mouse to flash the BIOS.

You may need to flash (update) the BIOS when an update is available or when you replace the system board. To flash the BIOS:

- 1 Turn on the computer.
- 2 Go to www.dell.com/support.
- **3** If you have your computer's Service Tag, type your computer's Service Tag and click **Submit**.

If you do not have your computer's Service Tag, click **Detect My Product** to allow automatic detection of the Service Tag.



**NOTE:** If the Service Tag cannot be detected automatically, select your product under the product categories.

- 4 Click Get Drivers and Downloads.
- 5 Click View All Drivers.
- 6 In the **Operating System** drop-down, select the operating system installed on your computer.
- 7 Click BIOS.
- 8 Click **Download File** to download the latest version of the BIOS for your computer.
- **9** On the next page, select **Single-file download** and click **Continue**.
- **10** Save the file and once the download is complete, navigate to the folder where you saved the BIOS update file.
- 11 Double-click the BIOS update file icon and follow the instructions on the screen.

## Getting help and contacting **Alienware**

### Self-help resources

You can get information and help on Alienware products and services using these online self-help resources:

Information about Alienware products www.alienware.com and services

Windows 8 1 and Windows 10 Dell Help & Support app



Windows 10 Get started app



Windows 8.1 Help + Tips app



Accessing help in Windows 8, In Windows search, type **Help and** Windows 8.1, and Windows 10 Support, and press Enter.

Accessing help in Windows 7 Click Start → Help and Support.

www.dell.com/support/ Online help for operating system windows

www.dell.com/support/linux

Troubleshooting information, user manuals, setup instructions, product specifications, technical help blogs, drivers, software updates, and so on

www.alienware.com/ gamingservices

Videos providing step-by-step instructions to service your computer alienwareservices

www.youtube.com/

## **Contacting Alienware**

To contact Alienware for sales, technical support, or customer service issues, see **www.alienware.com**.



**NOTE:** Availability varies by country and product, and some services may not be available in your country.



**NOTE:** If you do not have an active internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.