Alienware X51 Service Manual

Computer Model: Alienware X51 R3 Regulatory Model: D05S Regulatory Type: D05S003



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 $\rightarrow \bigcirc$ Power \rightarrow Shut down.
 - Windows 8.1: On the **Start** screen, click or tap the power icon 0 \rightarrow 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.
- Disconnect all cables such as telephone cables, network cables and so on, 4 from your computer.
- Disconnect all attached devices and peripherals, such as keyboard, mouse, 5 monitor, and so on, from your computer.
- Remove any media card and optical disc from your computer, if applicable. 6
- 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



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 optical-drive assembly
- 3 wireless card

- 2 hard-drive assembly
- 4 memory modules

Removing the side panel

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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.



4 Turn the left panel over and disconnect the lighting cable as shown.

Lift the left panel off the chassis.



3 chassis

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.



5 routing guides

- processor-cooler cable
- 6 screws (2)
- Remove the <u>memory modules</u>. 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.



8 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.



Replacing the processor cooling assembly

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Procedure

- 1 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>.
- 7 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.
- **9** Connect the fan cable and processor-cooler cable to the system board.

Post-requisites

Replace the <u>side panel</u>.

Removing the wireless card

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Prerequisites

Remove the <u>side panel</u>.

Procedure

1 Remove the screws that secure the fan shroud to the processor fan.

2 Lift the fan shroud off the processor fan.



- 3 fan shroud
- **3** Disconnect the antenna cables from the wireless card.
- 4 Remove the screw that secures the wireless card to the system board.

5 Slide the wireless card out of the wireless-card slot.



- 3 system board
- 5 antenna cables (2)
- 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

5 Align the screw holes on the fan shroud with the screw holes on the processor fan.

6 Replace the screws that secure the fan shroud to the processor fan.



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

Post-requisites

Replace the <u>side panel</u>.

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

Removing the optical drive

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Prerequisites

Remove the side panel.

Procedure

- 1 Disconnect the optical-drive data and power cable from the optical drive.
- 2 Remove the screw that secures the drive cage to the chassis.

Slide and lift the drive cage out of the chassis. З



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



Remove the screws that secure the optical drive to the drive cage. 4

5 Slide the optical drive out of the drive cage.



Replacing the optical drive

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Procedure

- 1 Slide the optical drive into the drive cage.
- 2 Align the screw holes on the optical drive with the screw holes on the drive cage.
- **3** Replace the screws that secure the optical drive to the drive cage.
- 4 Slide and place the drive cage into the chassis.
- **5** Connect the optical-drive data and power cable to the optical drive.
- 6 Replace the screw that secures the drive cage to the chassis.

Post-requisites

Replace the <u>side panel</u>.

Removing the memory module

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Prerequisites

- 1 Remove the <u>side panel</u>.
- 2 Follow the procedure from step 1 to step 3 in "<u>Removing the optical drive</u>".

Procedure

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

Remove the memory module from the memory-module slot. 2

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.



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

Replacing the memory module

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Procedure

- U
- **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 memorymodule 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.



Post-requisites

- 1 Follow the procedure from step 4 to step 6 in "<u>Replacing the optical drive</u>".
- 2 Replace the <u>side panel</u>.

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.

Release the riser cage from the tabs on the chassis.



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



- 4 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.
- 6 Lift the hard-drive assembly off the chassis.



- 3 screw
- 7 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.



3 screws (2)

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 <u>side panel</u>.

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.



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



- 1 routing guide
- 3 riser cage

- 2 graphics card
- 4 graphics-card power cables

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



- 3 graphics-card
- 4 riser cage
- **5** Turn around the riser cage and locate the PCI express latch.

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

Post-requisites

Replace the side panel.

Removing the solid-state drive

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.



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 <u>side panel</u>.

Procedure

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

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



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

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



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 <u>side panel</u>.

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.

- 1 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.

Advanced	
Intel(R) Software Guard Extensions	Allows you to enable or disable Intel(R) 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 lpv4 PXE.
Ipv6 PXE Support	Allows you to enable or disable the lpv6 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. Image: Wake Support 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 Frror 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

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 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 boot.
- 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

- 1 If you are booting from a USB device, connect the USB device to a USB port.
- 2 Turn on (or restart) your computer.
- 3 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.

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

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

- 1 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 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:

Self-Help Information	Self-Help Options
Accessing Windows Help	Windows 10/Windows 8.1—In Windows search, type Help and Support, and press Enter.
Learn about Windows	Launch the:
	 Dell Help & Support app (Windows 10/Windows 8.1) Get started app (Windows 10) Help+Tips app (Windows 8.1)
Information about Alienware products and services	www.alienware.com
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	www.youtube.com/ alienwareservices

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.