



Maintenance and Service Guide

HP VR Backpack G2 PC

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Product notice

This maintenance guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Go to <http://www.microsoft.com> for details.

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Safety warning notice


 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by applicable safety standards.

Table of contents

1 Product description	1
2 Product features	3
Standard configuration features	3
Top components	3
Right (side) components	4
Bottom	4
3 Illustrated parts catalog	5
Computer major components	5
Miscellaneous parts	7
4 Removal and replacement procedures preliminary requirements	9
Tools required	9
Service considerations	9
Plastic parts	9
Cables and connectors	9
Drive handling	10
Workstation guidelines	10
Electrostatic discharge information	10
Generating static electricity	11
Preventing electrostatic damage to equipment	11
Personal grounding methods and equipment	12
Grounding the work area	12
Recommended materials and equipment	12
Packaging and transporting guidelines	13
5 Removal and replacement procedures	14
Component replacement procedures	14
Preparation for disassembly	14
Top cover	14
Fans	16
Solid state drive	18
Memory modules	19
WLAN antenna	21
WLAN module	22

RTC battery	23
Battery	24
Heat sink	26
Power button board	27
Battery connector and cable assembly	29
System board	30
Power connector (DC-out) for VR headset	33
Power connector (DC-in) and cable	35

6 Interpreting system validation diagnostic front panel LEDs and audible codes 36

7 Computer Setup (BIOS) and TPM 38

Using Computer Setup	38
Starting Computer Setup	38
Navigating and selecting in Computer Setup	38
Restoring factory settings in Computer Setup	38
Updating the BIOS	39
Determining the BIOS version	39
Downloading a BIOS update	39
Changing the boot order using the f9 prompt	40
TPM BIOS settings (select products only)	40

8 Using HP PC Hardware Diagnostics (UEFI) 41

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device	41
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9 Backing up, restoring, and recovering 43

Creating recovery media and backups	43
Using HP Recovery media (select products only)	43
Using Windows tools	44
Using the HP Cloud Recovery Download Tool (select products only)	45
Restore and recovery	45
Recovering using HP Recovery Manager	45
What you need to know before you get started	45
Using the HP Recovery partition (select products only)	46
Using HP Recovery media to recover	47
Changing the computer boot order	47
Removing the HP Recovery partition (select products only)	47

10 Specifications 48

11 Power cord set requirements	49
General requirements	49
Japanese power cord requirements	49
Country-specific requirements	50
12 Statement of memory volatility	51
Nonvolatile memory usage	53
Questions and answers	55
13 Recycling	57
Index	58

1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	HP VR Backpack G2 PC
Processor	8th-generation Intel® Core™ i7-8850H, 2.6 GHz, turbo up to 4.3 GHz, 6 cores, 9 MB SmartCache, L3, 45 W; Intel UHD Graphics 630
Chipset	Intel CNL QM370
Graphics	NVIDIA® GeForce® RTX 2080 N18E-G3 Graphic Controller
Memory	Two memory module slots DDR4-2666 dual channel support Supports up to 32 GB of system RAM in the following configurations: <ul style="list-style-type: none">• 32 GB• 16 GB
Primary storage	Solid-state drives (M.2, PCIe, NVMe, 2280, TLC) 1 TB 512 GB 256 GB
Audio	DTS Headphone X
Ethernet	Integrated 10/100/1000 NIC (Intel I219LM (VPro) GbE PCIe)
Wireless networking	Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth® 4.2 Intel 9260 802.11ac 2 × 2 + Bluetooth 5.0 (non-vPro) Compatible with Miracast® devices
Ports	USB 3.1 Type-A (4) USB 3.1 Type-C (Thunderbolt), power delivery 15 W Mini DisplayPort™ 1.3 (2) RJ-45 (network) connector Audio-out (headphone)/audio-in (microphone) combo jack Power input connector Docking connector
Power requirements	Battery 4 cell, 36 Wh AC adapter 330 W Smart PFC, non-slim barrel, 7.4 mm straight

Table 1-1 Product components and their descriptions (continued)

Category	Description
	180 W Smart PFC, non-slim barrel, 7.4 mm straight
	Power cord
	1.5 m (C13)
Operating system	Windows® 10 Pro 64

2 Product features

Standard configuration features

Features may vary depending on the model. For support assistance and to learn more about the hardware and software installed on the computer model, run the HP Support Assistant utility.



Top components



Table 2-1 Identifying the top panel components

Item	Component
(1)	Power button and light
(2)	Power connector for headset
(3)	USB 3.1 Type-A ports (2)
(4)	Mini DisplayPort
(5)	Mini DisplayPort
(6)	USB Type-C port
(7)	Audio out (headphone)/Audio-in (microphone) combo jack

Right (side) components



Table 2-2 Identifying the right panel components

Item	Component
(1)	RJ-45 (network) jack
(2)	USB 3.1 Type-A ports (2)
(3)	Vent

Bottom

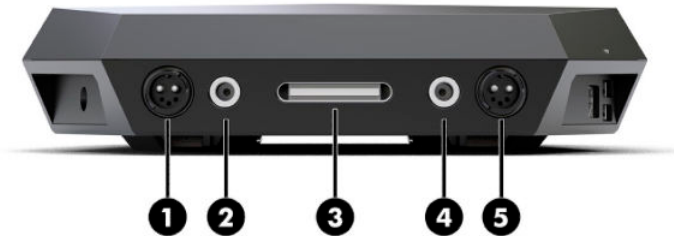


Table 2-3 Identifying the bottom components

Item	Component
(1)	Left battery connector
(2)	Left alignment pin connector
(3)	Docking connector
(4)	Right alignment pin connector
(5)	Right battery connector

3 Illustrated parts catalog

Computer major components

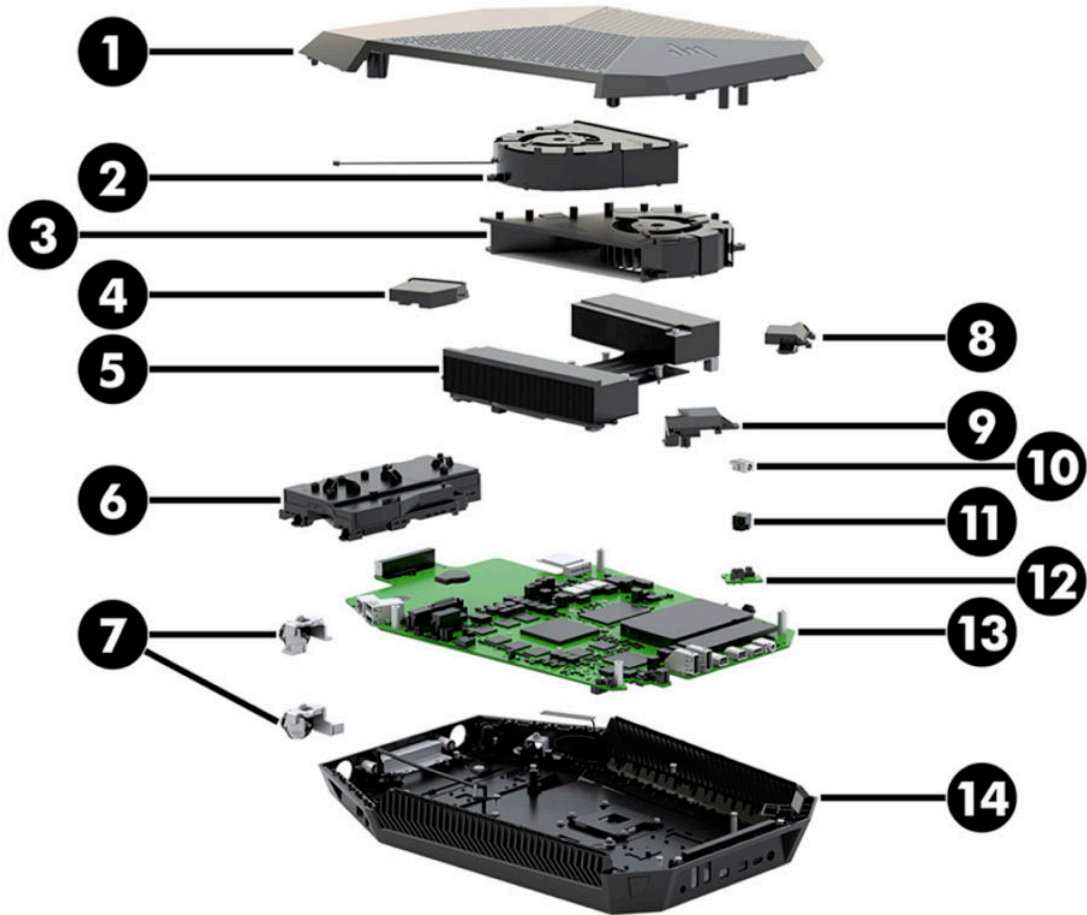


Table 3-1 Identifying computer major components and their part numbers

Item	Component	Spare part number
(1)	Front cover	L62394-001
(2)	Graphics fan (included in fan kit)	L05349-001
(3)	Memory fan (included in fan kit)	L05349-001
(4)	WLAN antenna (includes gasket)	L62404-001
(5)	Heat sink	L62397-001
(6)	Battery	
	8 cell, 73 Wh	L65631-001
	4 cell, 36 Wh	L41691-005

Table 3-1 Identifying computer major components and their part numbers (continued)

Item	Component	Spare part number
(7)	Battery connectors and cable assembly	L62406-001
(8)	Rear antenna, right (included in miscellaneous parts kit)	L05775-001
(9)	Rear antenna, left (included in miscellaneous parts kit)	L05775-001
(10)	Power connector (DC in)	L05345-001
(11)	Power connector (DC out) for VR headset	L63398-001
(12)	Power button board	L63399-001
(13)	System board (includes integrated Intel Core i7-8850H processor and thermal grease)	
	For use in models without the Windows operating system	L62393-001
	For use in models with the Windows operating system	L62393-601
(14)	Back cover	L62395-001
*	Memory modules (DDR4-2666)	
	16 GB	937438-855
	8 GB	937236-855
*	Solid-state drive (M.2, PCIe, NVMe, TLC):	
	1 TB	L62399-001
	512 GB	L62401-001
	256 GB	L62400-001

* not illustrated

Miscellaneous parts

Table 3-2 Miscellaneous part descriptions and part numbers

Component	Spare part number
WLAN module	
Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2	924813-855
Intel 9260 802.11ac 2 × 2 + Bluetooth 5.0 (non-vPro)	L64045-005
Cable kit (includes top cover voodoo lighting cable, battery charger cable, backlit protective tape, power board cable, ZVR Backpack cable, fan cable and bracket)	L02927-001
HP ZVR Backpack combination cable	L20517-001
Battery charger	L02934-001
Backpack	L62402-001
Docking station	L62403-001
Mounting plate with clips with battery holders (includes left and right battery holders)	L62408-001
Cable holder	L62624-001
Hardware bracket kit (includes power connector in bracket, power connector out bracket, top I/O bracket, left battery connector bracket, and right battery connector bracket)	L62405-001
Miscellaneous kit (includes right antenna bracket, left antenna bracket, main antenna bracket, and memory cover)	L05775-001
Rubber kit	L05350-001
AC adapter	
330 W, Smart, PFC, non-slim, 7.4 mm	L01032-850
180 W, Smart, PFC, 7.4 mm	L04322-850
Power cord (C13, 1.5 m)	
For use in Argentina	401328-016
For use in Australia	100661-016
For use in Brazil	438723-005
For use in Europe	100614-011
For use in India	403440-003
For use in Israel	398062-007
For use in Italy	121565-016
For use in Japan	653326-003
For use in the People's Republic of China	286496-017
For use in South Africa	187487-008
For use in Switzerland	150304-010
For use in Taiwan	393312-005
For use in Thailand	285052-009

Table 3-2 Miscellaneous part descriptions and part numbers (continued)

Component	Spare part number
For use in the United Kingdom	100613-016
Power cord (C13, 1.83 m)	
For use in Brazil	438723-001
For use in Europe	100614-009
For use in India	403440-001
For use in Israel	398062-001
For use in Italy	109097-008
For use in Japan	653326-001
For use in the People's Republic of China	286496-001
For use in South Africa	187487-005
For use in South Korea	231216-001
For use in Switzerland	150304-008
For use in Taiwan	393312-001
For use in the United Kingdom	100613-008
Power cord (C13, 2.5 m)	
For use in Argentina	401328-001
For use in Australia	100661-001

4 Removal and replacement procedures preliminary requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:


- Phillips P0 screwdriver
- Torx driver (T10)
- Thin, flat and non-conductive prying tool.

 **IMPORTANT:** Use a non-conductive tool. A conductive tool can damage the system board, chassis or components.

- Needle-nosed pliers or socket driver for system board standoffs

Service considerations


The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

 **NOTE:** As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

 **IMPORTANT:** Using excessive force during disassembly and reassembly can damage plastic parts.

Cables and connectors

 **IMPORTANT:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling



IMPORTANT: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing an optical drive, be sure that a disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive or an optical drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) might not appear to be affected at all and can work perfectly throughout a normal cycle. The device might function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.



IMPORTANT: To prevent damage to the device when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

Generating static electricity

Note the following:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

Table 4-1 Static electricity occurrence based on activity and humidity

Event	Relative humidity		
	55%	40%	10%
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs from plastic tube	400 V	700 V	2,000 V
Removing DIPs from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs from Styrofoam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V

Multiple electric components can be packaged together in plastic tubes, trays, or Styrofoam.



NOTE: As little as 700 V can degrade a product.

Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent static electricity damage to electronic components.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.

- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal grounding methods and equipment

Use the following equipment to prevent static electricity damage to electronic components:

- **Wrist straps** are flexible straps with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance between the operator and ground.

Table 4-2 Static shielding protection levels

Static shielding protection levels	
Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the work area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

HP recommends the following materials and equipment to prevent static electricity:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of $1\text{ M}\Omega \pm 10\%$ resistance
- Static-dissipative table or floor mats with hard tie to ground


- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing 1 M Ω \pm 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

5 Removal and replacement procedures

 **IMPORTANT:** Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

IMPORTANT: This computer does not have user-replaceable parts. Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

Component replacement procedures

Preparation for disassembly


See [Preparation for disassembly on page 14](#) for initial safety procedures.

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Top cover

Table 5-1 Top cover description and part number

Description	Spare part number
Top cover	L62394-001

 **IMPORTANT:** The battery is connected to an onboard power connector on the system board. Please exercise caution while removing the top cover, fans and antenna, until the battery is removed.

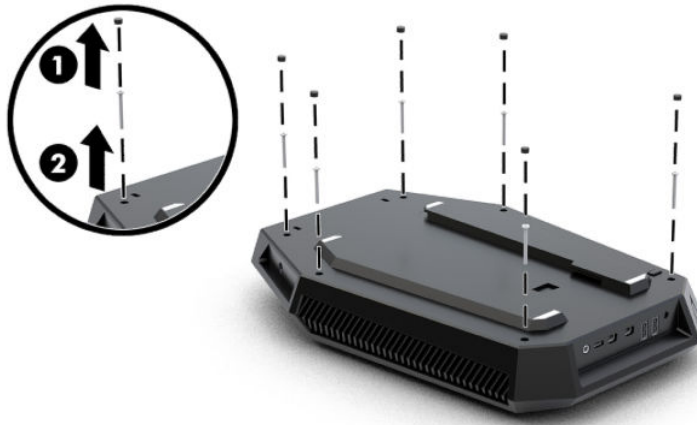
Before removing the top cover, follow these steps:

- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).


Remove the top cover:

1. Remove the six rubber screw covers **(1)**.

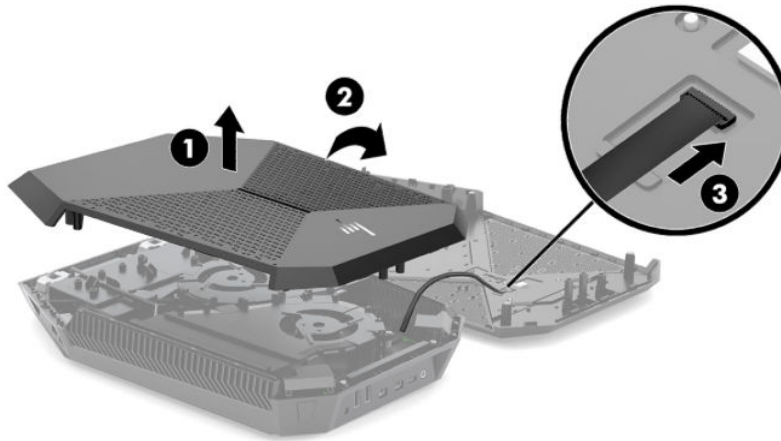
2. Remove the six Phillips M2.0 × 26.0 screws (2) that secure the top cover to the computer.



3. Insert a thin, flat and non-conductive prying tool into the small gap between the top cover and the computer chassis, and then pry the cases apart.

 **IMPORTANT:** Use a non-conductive tool. A conductive tool can damage the system board, chassis, or components.

4. Lift the top cover (1) and position it upside down next to the computer (2).
5. Disconnect the cable from the board on the bottom of the top cover (3).



Reverse this procedure to replace the top cover.

Fans

Table 5-2 Fan description and part number

Description	Spare part number
Fan kit (includes graphics fan and memory fan)	L05349-001

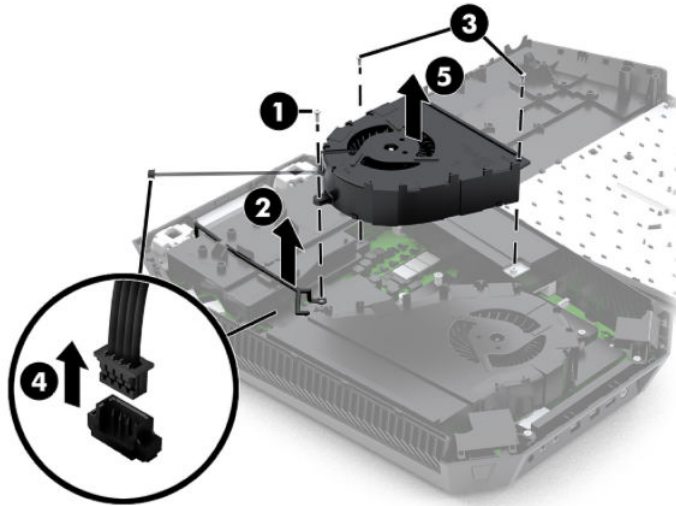
The computer houses two separate fans – one graphics fan and one memory fan.

Before removing the fans, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).

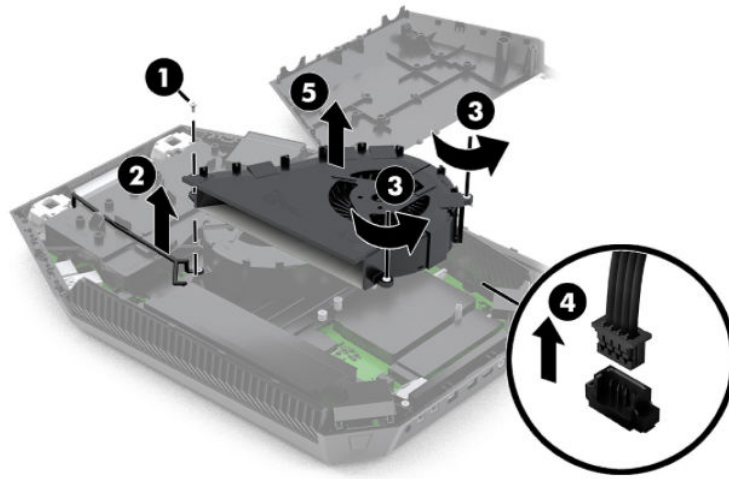
Remove the fans:

1. **Graphics fan:** Remove the Phillips M2.5 × 6.5 screw **(1)**, and then remove the eyelet from the graphics fan **(2)**.
2. Remove the two Phillips M2.5 × 4.5 screws **(3)** that secure the graphics fan to the computer.
3. Disconnect the fan cable from the system board **(4)**, and then remove the graphics fan from the computer **(5)**.



4. **Memory fan:** Remove the Phillips M2.5 × 4.5 screw **(1)**, and then remove the eyelet from the memory fan **(2)**.
5. Loosen the two captive Phillips screws **(3)** that secure the memory fan to the computer.

6. Disconnect the memory fan cable from the system board (4), and then remove the memory fan from the computer (5).



Reverse this procedure to install the fans.

Solid state drive

Table 5-3 Solid-state drive descriptions and part numbers

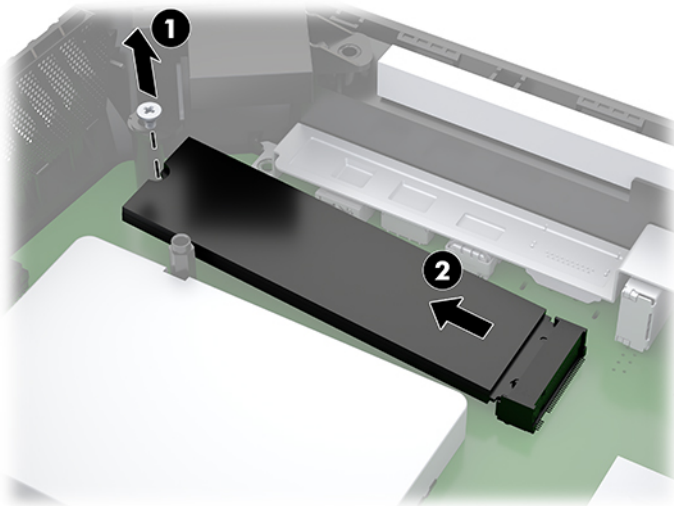
Description	Spare part number
1 TB	L62399-001
512 GB	L62401-001
256 GB	L62400-001

Before removing the solid-state drive, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the memory fan (see [Fans on page 16](#)).

Remove the solid state drive (SSD):

1. Peel back and lift the protective tape from the solid-state drive.
2. Remove the Phillips M2.0 × 3.0 screw **(1)** that secures the solid-state drive, and then pull the solid-state drive out of the socket **(2)**.




Reverse this procedure to install the solid-state drive.

Memory modules

Table 5-4 Memory module descriptions and part numbers

Description	Spare part number
16 GB memory module	937438-855
8 GB memory module	937236-855

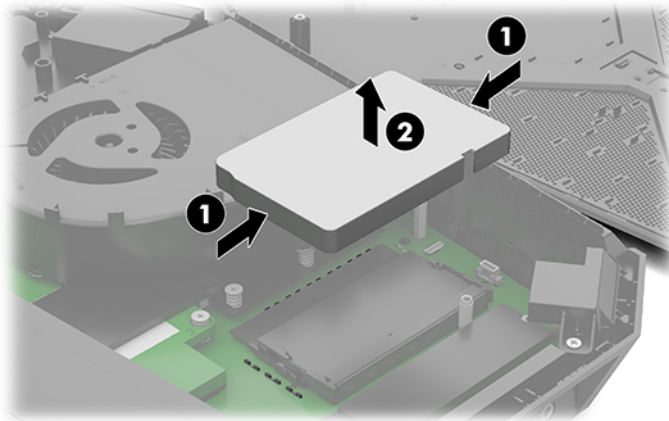
 **NOTE:** It is not necessary to remove the memory module to remove the system board. Remove the memory module only if it needs to be replaced.

Before removing the memory modules, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the memory fan (see [Fans on page 16](#)).


Remove the memory modules:

1. Press in on the sides of the memory module cover **(1)**, and then lift and remove the cover from the computer **(2)**.

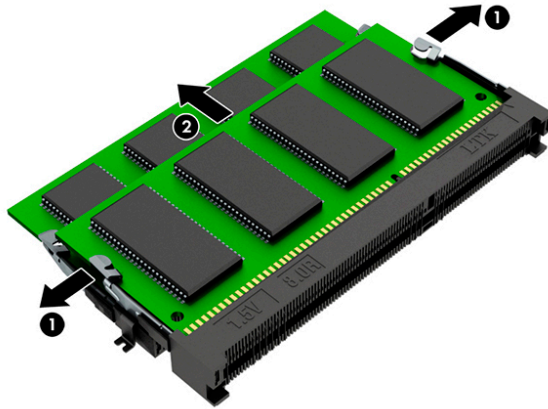


2. Spread the two retention clips outward **(1)** until the memory module tilts up at a 45° angle.


3. Grasp the edge of the memory module (2), and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

 **IMPORTANT:** To prevent damage to a memory module, hold the module by the edges only. Do not touch the components on a memory module.

To protect a memory module after removal, place it in an electrostatic-safe container.



Reverse this procedure to install a memory module.

 **IMPORTANT:** Memory modules are in a stacked configuration. If only one module is installed it must be in the bottom memory socket.

WLAN antenna

Table 5-5 WLAN antenna description and part number

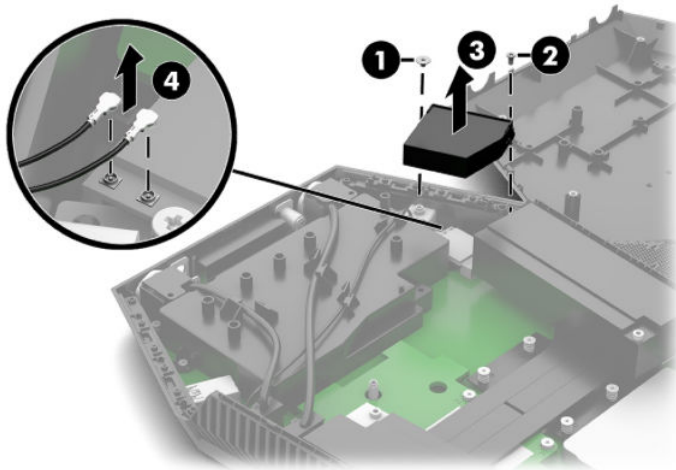
Description	Spare part number
WLAN antenna kit (includes gasket)	L62404-001

Before removing the WLAN antenna, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).

Remove the WLAN antenna:

1. Remove Phillips M2.0 × 3.0 screw **(1)** and the Phillips M2.5 × 4.0 screw **(2)** that secures the antenna to the computer.
2. Lift the WLAN antenna enough to access the WLAN module underneath **(3)**, and then disconnect the antenna cables from the WLAN module **(4)**.




Reverse this procedure to install the WLAN antenna.

WLAN module

Table 5-6 WLAN module description and part number

Description	Spare part number
Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2	924813-855
Intel 9260 802.11ac 2 × 2 + Bluetooth 5.0 (non-vPro)	L64045-005

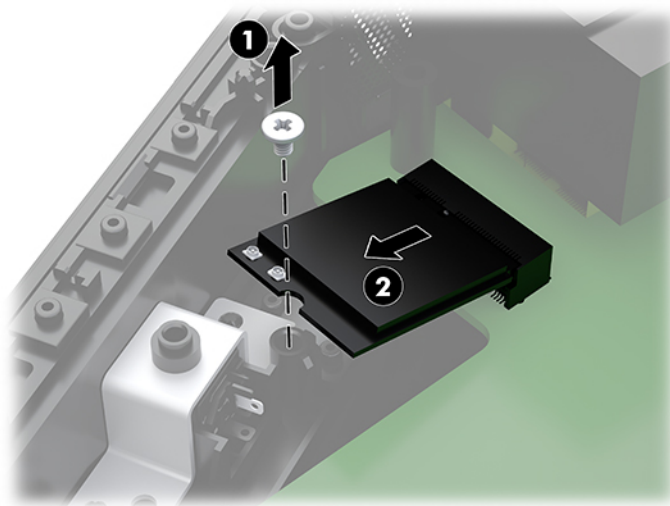
 **IMPORTANT:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).

Remove the WLAN module:

- ▲ Remove the Phillips M2.0 × 3.0 screw **(1)**, and then pull the module out of the socket **(2)**.



Reverse this procedure to install the WLAN module.

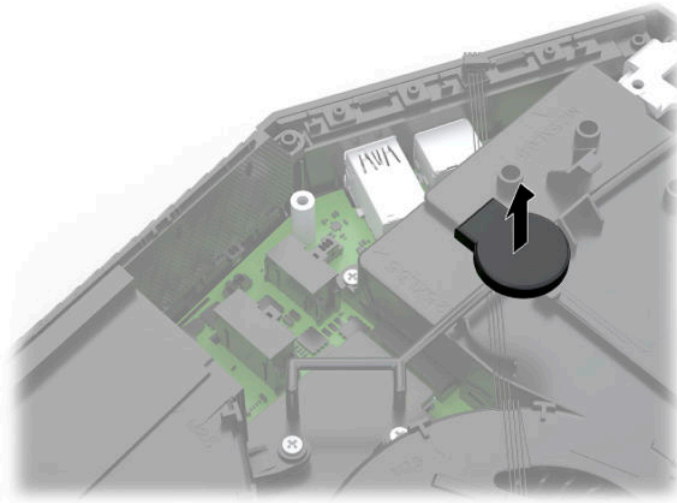
RTC battery

Before removing the RTC battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).

Remove the RTC battery:

- ▲ Disconnect the RTC battery from the system board, and then lift the battery off the main system battery.



Reverse this procedure to install the RTC battery.

Battery

Table 5-7 Battery descriptions and part numbers

Description	Spare part number
Battery, 8 cell, 73 Wh	L65631-001
Battery, 4 cell, 36 Wh	L41691-005

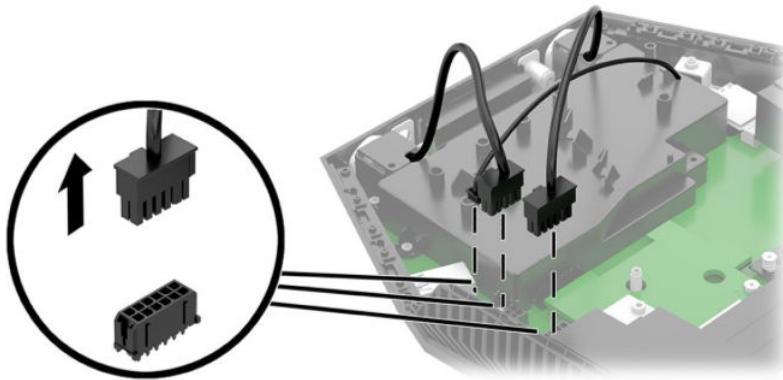
Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the graphics fan (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Disconnect the RTC battery from the system board (see [RTC battery on page 23](#)).

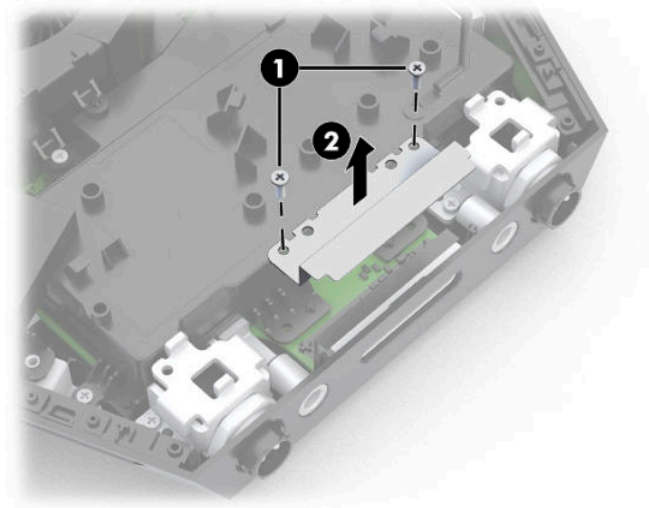
Remove the battery:

1. Disconnect the three cables from the system board that route over the top of the battery, and then remove the cables from atop the battery.

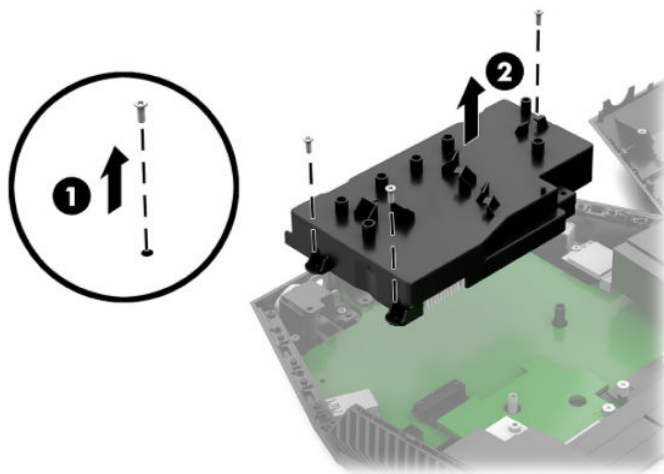
 **NOTE:** The battery has cable routing features designed into the top for easy placement of the battery cables when replacing the battery.



2. Remove the two Phillips M2.5 × 6.5 screws (1) that secure the battery bracket. Then lift the bracket out of the computer (2).



3. Remove the three remaining Phillips M2.0 × 3.0 screws that secure the battery (1), and then remove the battery from the computer (2).



Reverse this procedure to install the battery.

Heat sink

Table 5-8 Heat sink description and part number

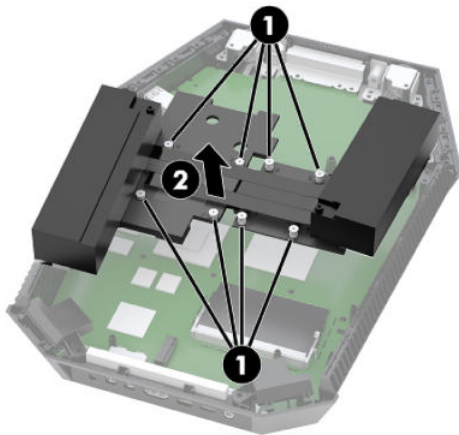
Description	Spare part number
Heat sink	L62397-001

Before removing the heat sink, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the fans (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the heat sink:

1. Loosen eight captive retaining screws according to the numbered order stamped on the heat sink **(1)**.
2. Lift and remove the heat sink **(2)**.



Reverse this procedure to install the heat sink.



NOTE: When installing the heat sink, be sure to examine the areas where the components and the heat sink come into contact to make sure the areas are properly covered by the thermal pads and paste.

Power button board

Table 5-9 Power button board description and part number

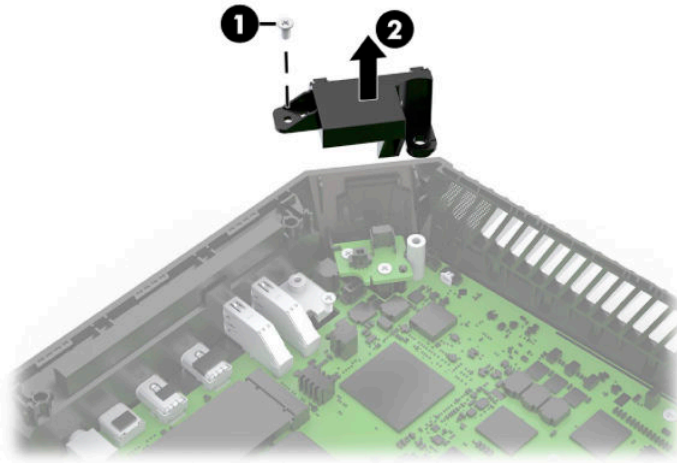
Description	Spare part number
Power button board	L63399-001

Before removing the power button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the graphics fan (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).

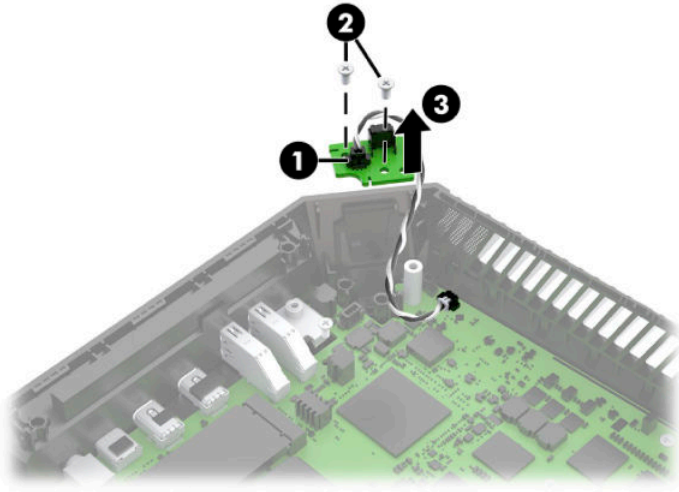
Remove the power button board:

1. Remove the Phillips M2.5 × 4.5 screw **(1)** that secures the power button cover to the computer.
2. Remove the cover from the computer **(2)**.



3. Disconnect the power button board cable from the power button board **(1)**.

4. Remove the two Phillips M2.5 × 4.5 screws (2) that secure the power button board to the computer, and then remove the board from the computer (3).



Reverse this procedure to install the power button board.

Battery connector and cable assembly

Table 5-10 Battery cable kit description and part number

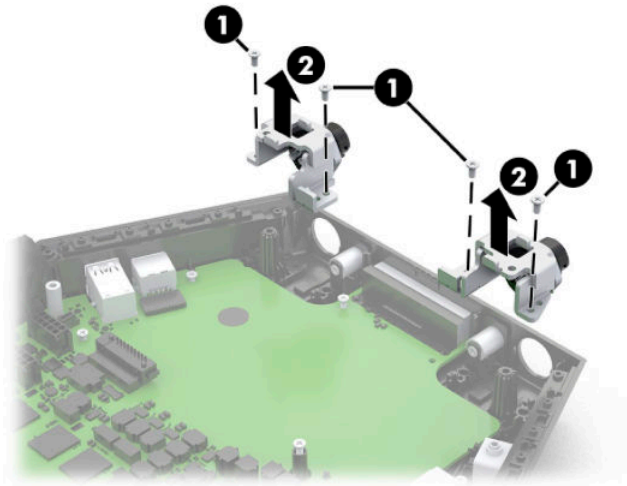
Description	Spare part number
Battery cable kit	L62406-001

Before removing the battery connector and cable assembly, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the graphics fan (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the battery connector and cable assembly:

1. Remove the two Phillips M2.5 × 4.5 screws (**1**) that secure each battery connector to the computer.
2. Remove the connector assembly from the computer (**2**).



Reverse this procedure to install the battery connector and cable assembly.

System board

Table 5-11 System board descriptions and part numbers

Description	Spare part number
System board with Intel Core i7-8850H processor (for use in models without the Windows operating system; includes thermal grease)	L62393-001
System board with Intel Core i7-8850H processor (for use in models with the Windows operating system; includes thermal grease)	L62393-601

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the fans (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Remove the battery (see [Battery on page 24](#)).
6. Remove the heat sink (see [Heat sink on page 26](#)).
7. Remove the battery connector cable and assembly (see [Battery connector and cable assembly on page 29](#)).

Remove the system board:

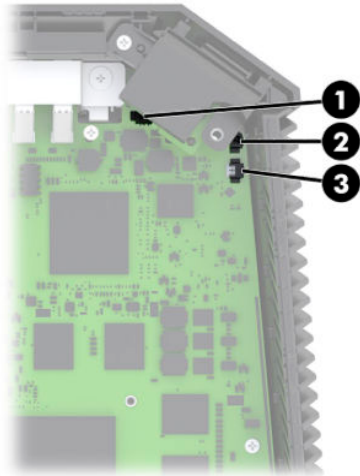
1. If replacing the system board, make sure to remove the following components from the old system board and install on the new system board:
 - Memory module ([Memory modules on page 19](#)).
 - Solid-state drive ([Solid state drive on page 18](#)).
 - WLAN module ([WLAN module on page 22](#))

2. Disconnect the following cables from the system board:

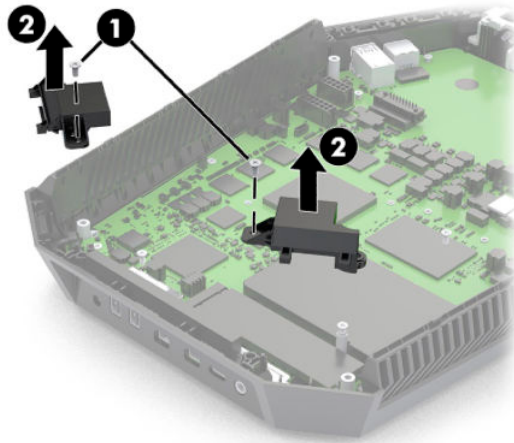
(1) Power connector cable

(2) Power button cable

(3) Power button board cable

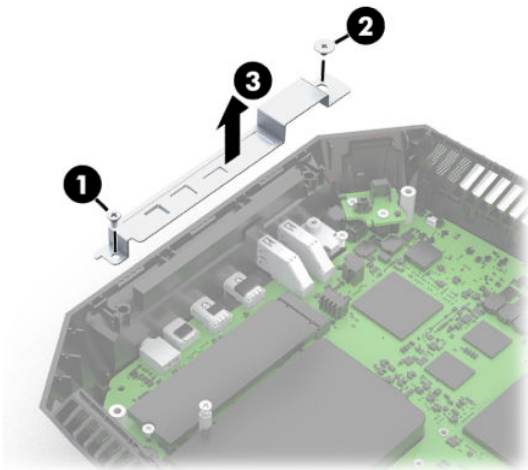


3. Remove the screw that secures each antenna (1), and then move the antennas out the way (2) so that you can access the I/O bracket.

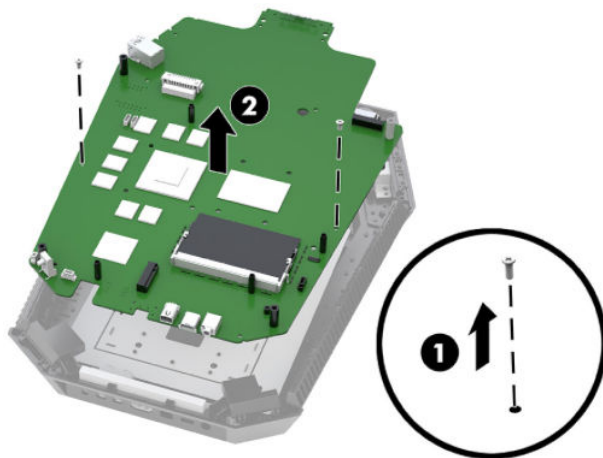


4. Remove the Phillips M2.5 × 3.0 screw (1) and the Phillips M2.5 × 4.5 screw (2) that secures the I/O bracket to the computer.

5. Lift the I/O bracket out of the computer (3).



6. Remove the two Phillips M2.5 × 4.5 screws (1) that secure the system board to the computer.
7. Lift the system board out of the computer (2).



Reverse this procedure to install the system board.

Power connector (DC-out) for VR headset

Table 5-12 DC-out power connector

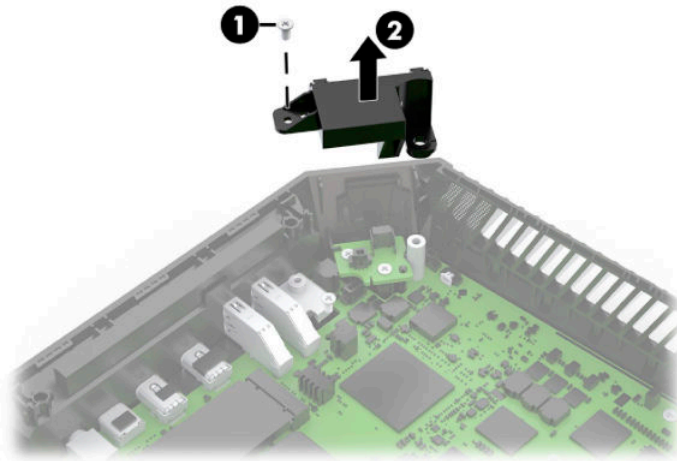
Description	Spare part number
DC-out power connector	L63398-001

Before removing the DC-out power connector, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the graphics fan (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Remove the battery (see [Battery on page 24](#)).
6. Remove the heat sink (see [Heat sink on page 26](#)).
7. Remove the WLAN module (see [WLAN module on page 22](#)).
8. Remove the system board (see [System board on page 30](#)).

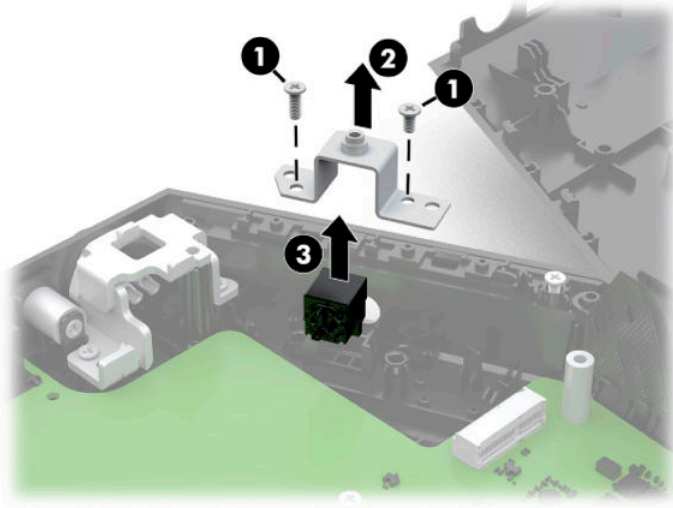
Remove the DC-out power connector:

1. Remove the Phillips M2.5 × 4.5 screw **(1)** that secures the power button cover to the computer.
2. Remove the cover from the computer **(2)**.



3. Remove the two Phillips M2.5 × 4.5 screws **(1)** that secure the power connector bracket to the computer.
4. Remove the bracket from the computer **(2)**.

5. Pull the power connector away from the side of the computer to remove it **(3)**.



Reverse this procedure to install the DC-out power connector.

Power connector (DC-in) and cable

Table 5-13 Power connector description and part number

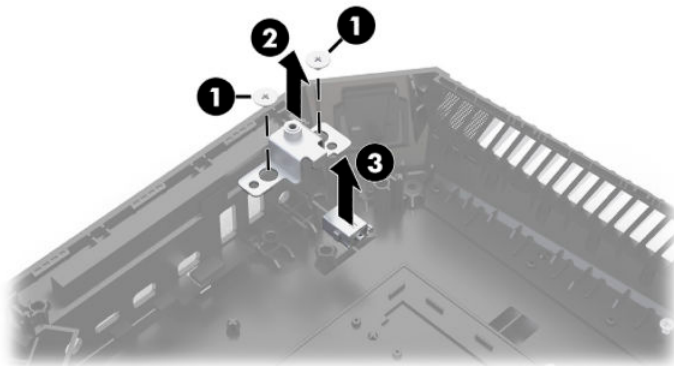
Description	Spare part number
Power connector and cable	L05345-001

Before removing the power connector and cable, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 14](#)).
2. Remove the top cover (see [Top cover on page 14](#)).
3. Remove the graphics fan (see [Fans on page 16](#)).
4. Remove the WLAN antenna (see [WLAN antenna on page 21](#)).
5. Remove the battery (see [Battery on page 24](#)).
6. Remove the heat sink (see [Heat sink on page 26](#)).
7. Remove the WLAN module (see [WLAN module on page 22](#)).
8. Remove the system board (see [System board on page 30](#)).

Remove the power connector and cable:

1. Remove the two Phillips M2.5 × 4.5 screws **(1)** that secure the power connector bracket to the computer.
2. Remove the bracket from the computer **(2)**.
3. Pull the power connector away from the side of the computer to remove it **(3)**.



Reverse this procedure to install the power connector and cable.

6 Interpreting system validation diagnostic front panel LEDs and audible codes

During the system validation phase that occurs at system startup, the BIOS validates the functionality of the following subsystems and conditions:

- AC adapter
- System board power
- Processor failure
- BIOS corruption
- Memory failure
- Graphics failure
- System board failure
- BIOS authentication failure

If an error is detected, specific patterns of long and short blinks, accompanied by long and short beeps (where applicable) are used to identify the error. These patterns will make up a two part code:

- Major – the category of the error
- Minor – the specific error within the category


 **NOTE:** Single beep/blink codes are not used.

Table 6-1 Interpreting blink codes

Number of long beeps/blinks	Error category
1	Not used
2	BIOS
3	Hardware
4	Thermal
5	System board

Patterns of blink/beep codes are determined by using the following parameters:

- 1 second pause occurs after the last major blink.
- 2 second pause occurs after the last minor blink.
- Beep error code sequences occur for the first 5 iterations of the pattern and then stop.
- Blink error code sequences continue until the computer is unplugged or the power button is pressed.

 **NOTE:** Not all diagnostic lights and audible codes are available on all models.

The red LED blinks to represent the major error category (long blinks). The white LED blinks to represent the minor error category (short blinks). For example, **3.5** indicates 3 long red blinks and 5 short white blinks to communicate the processor is not detected.

Table 6-2 Interpreting blink codes

Component tested	Major/minor code	Error condition
Battery	1.2	System battery discharge is switching from the external battery to the internal battery.
BIOS	2.2	The main area (DXE) of BIOS has become corrupted and there is no recovery binary image available
Hardware	3.2	The embedded controller has timed out waiting for BIOS to return from memory initialization
	3.3	The embedded controller has timed out waiting for BIOS to return from graphics initialization
	3.4	The system board displays a power failure (crowbar)*
Thermal	4.2	A processor over temperature condition has been detected.*
	4.3	An ambient temperature over temperature condition has been detected.
	4.4	An dGPU over temperature condition has been detected.
System board	5.3	The embedded controller has timed out waiting for the BIOS
	5.4	The embedded controller has timed out waiting for BIOS to return from system board initialization, i.e., end of POST.

* Indicates hardware triggered event; all other events are controlled by the BIOS.

7 Computer Setup (BIOS) and TPM

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

 **NOTE:** Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

- ▲ Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to select the item.
- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
- To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

To exit Computer Setup, choose one of the following methods:

- To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

- To save your changes and exit Computer Setup menus, select **Main**, select **Save Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

Your changes go into effect when the computer restarts.


Restoring factory settings in Computer Setup

 **NOTE:** Restoring defaults will not change the hard drive mode.


To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Start Computer Setup. See [Starting Computer Setup on page 38](#).
2. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

 **NOTE:** On select products, the selections may display **Restore Defaults** instead of **Apply Factory Defaults and Exit**.

Your changes go into effect when the computer restarts.

 **NOTE:** Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named *Readme.txt*, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To decide whether you need to update Computer Setup (BIOS), first determine the BIOS version on your computer.


BIOS version information (also known as *ROM date* and *System BIOS*) can be accessed by pressing **fn+esc** (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup. See [Starting Computer Setup on page 38](#).
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

To check for later BIOS versions, see [Downloading a BIOS update on page 39](#).

Downloading a BIOS update

 **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.


Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. Type `support` in the taskbar search box, and then select the HP Support Assistant app.
– or –
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:

- a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
- b. Follow the on-screen instructions to download your selection to the hard drive.

Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.


 **NOTE:** If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. Type *file* in the taskbar search box, and then select **File Explorer**.
2. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*).

The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.


 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Changing the boot order using the f9 prompt


To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Access the Boot Device Options menu:
 - Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the Boot Device Options menu.
2. Select a boot device, press **enter**, and then follow the on-screen instructions.

TPM BIOS settings (select products only)

 **IMPORTANT:** Before enabling Trusted Platform Module (TPM) functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable. For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. HP will not be responsible for any related liabilities.

TPM provides additional security for your computer. You can modify the TPM settings in Computer Setup (BIOS).

 **NOTE:** If you change the TPM setting to Hidden, TPM is not visible in the operating system.


To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 38](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

8 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

 **NOTE:** To start diagnostics on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached.

To start HP PC Hardware Diagnostics (UEFI), follow these steps:

1. Turn on or restart the computer, and quickly press **esc**.
2. Press **f2**.

The BIOS searches three places for the diagnostic tools, in the following order:


- a. Connected USB drive

 **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see [Downloading HP PC Hardware Diagnostics \(UEFI\) to a USB device on page 41](#).

- b. Hard drive
 - c. BIOS
3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

 **NOTE:** If you need to stop a diagnostic test, press **esc**.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

 **NOTE:** The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are offered.

There are two options to download HP PC Hardware Diagnostics to a USB device.

Download the latest UEFI version

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**.

3. Enter the product name or number.

– or –

Select **Identify now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

Additional BIOS crisis recovery tool

HP provides a BIOS crisis recovery tool through the HP PC Hardware Diagnostics 3-in-1 USB key. This tool can be used by HP authorized service providers to recover systems that have failed due to a corrupted BIOS. For more information about using the 3-in-1 USB key for BIOS crisis recovery, go to <http://www.hp.com/go/techcenter/pcdiags>. Additional information is included in the web-based training offered by HP University. See the modules that cover HP PC Hardware Diagnostics (UEFI).

9 Backing up, restoring, and recovering

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.


- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP Support Assistant app.

▲ Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

– or –

Select the question mark icon in the taskbar.

 **IMPORTANT:** If you will be performing recovery procedures on a tablet, the tablet battery must be at least 70% charged before you start the recovery process.

IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning any recovery process.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see [Using HP Recovery media \(select products only\) on page 43](#). For information on the recovery options that are available using the recovery media, see [Using Windows tools on page 44](#).
- Use Windows tools to create system restore points and create backups of personal information. See [Using Windows tools on page 44](#).

 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

- On select products, use the HP Cloud Recovery Download Tool to create a bootable USB flash drive for your HP recovery media. For more information, see [Using the HP Cloud Recovery Download Tool \(select products only\) on page 45](#).

Using HP Recovery media (select products only)


If possible, check for the presence of the Recovery partition and the Windows partition. Right-click the **Start** button, select **File Explorer**, and then select **This PC**.

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. You can find contact information on the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.
- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be

used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.
- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.
- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your computer from HP. You can find contact information on the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take an hour or more. Do not interrupt the creation process.
- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media using HP recovery manager:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 45](#).

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get Help app.

- ▲ Select the **Start** button, and then select the **Get Help** app.

 **NOTE:** You must be connected to the Internet to access the Get Help app.


Using the HP Cloud Recovery Download Tool (select products only)

To create HP Recovery media using the HP Cloud Recovery Download Tool:


1. Go to <http://www.hp.com/support>.
2. Select **Software and Drivers**, and then follow the on-screen instructions.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

 **IMPORTANT:** Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get Help app.
 - ▲ Select the **Start** button, and then select the **Get Help** app.

 **NOTE:** You must be connected to the Internet to access the Get Help app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.
 - ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.
- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 45](#). If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 43](#).
- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 45](#).
- On select products, if you want to remove the Recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.


For more information, see [Removing the HP Recovery partition \(select products only\) on page 47](#).

Recovering using HP Recovery Manager


HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 43](#).

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

 **IMPORTANT:** Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 43](#).
- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 43](#).
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. You can find contact information from the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.

 **IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

 **NOTE:** Only the options available for your computer display when you start the recovery process.


- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps (select products only).

1. Type `recovery` in the taskbar search box, select **HP Recovery Manager**, and then select **Windows Recovery Environment**.

– or –

For computers or tablets with keyboards attached, press **f11** while the computer boots, or press and hold **f11** as you press the power button.

For tablets without keyboards:

- Turn on or restart the tablet, and then quickly hold down the volume up button; then select **f11**.

– or –

- Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f11**.

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.
2. Insert the HP Recovery media, and then restart the computer.


 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 47](#).

3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection to an optical drive or a USB flash drive.

To change the boot order:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

For computers or tablets with keyboards attached:

- ▲ Turn on or restart the computer or tablet, quickly press **esc**, and then press **f9** for boot options.

For tablets without keyboards:

- ▲ Turn on or restart the tablet, and then quickly hold down the volume up button; then select **f9**.

– or –


Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f9**.

3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

 **IMPORTANT:** After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP Recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see [Using HP Recovery media \(select products only\) on page 43](#).

 **NOTE:** The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

10 Specifications

Table 10-1 Specifications

Item	Value
Dimensions	
Width	232.1 mm (9.1 in)
Depth	317.2 mm (12.5 in)
Height	57.3 mm (2.3 in)
Approximate weight	
Workstation compute module	2.0 kg (4.5 lb)
Complete compute module with harness and external batteries	4.0 kg (8.8 lb)
Power supply (internal battery)	20 minute operation
Max operating power	330 W

11 Power cord set requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage of 100 V ac-120 V ac or 220 V ac-240 V ac. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.


Power cord sets for use in other countries must meet the requirements of the country where you use the computer.

General requirements

The following requirements are applicable to all countries:

1. The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
2. The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 V ac or 250 V ac, as required by each country's power system.
3. The diameter of the wire must be a minimum of 0.75 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

 **WARNING!** Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

Japanese power cord requirements

For use in Japan, use only the power cord received with this product.

 **IMPORTANT:** Do not use the power cord received with this product on any other products.

Country-specific requirements

Additional requirements specific to a country are shown in parentheses and explained below.

Table 11-1 Power cord country-specific requirements

Country	Accrediting Agency	Country	Accrediting Agency
Australia (1)	EANSW	Italy (1)	IMQ
Austria (1)	OVE	Japan (3)	METI
Belgium (1)	CEBC	Norway (1)	NEMKO
Canada (2)	CSA	Sweden (1)	SEMKO
Denmark (1)	DEMKO	Switzerland (1)	SEV
Finland (1)	SETI	United Kingdom (1)	BSI
France (1)	UTE	United States (2)	UL
Germany (1)	VDE		


1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3 conductor. The wall plug must be a 2-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a T mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm² conductor size. Wall plug must be a 2-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

12 Statement of memory volatility

The purpose of this chapter is to provide general information regarding nonvolatile memory in HP Business computers. This chapter also provides general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.


HP Business computer products that use Intel®-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP, assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.


Following system shutdown and removal of all power sources from an HP Business computer system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. Use the steps below to remove personal data from the computer, including the nonvolatile memory found in Intel-based and AMD-based system boards.


 **NOTE:** If your tablet has a keyboard base, connect to the keyboard base before beginning steps in this chapter.


Current BIOS steps

1. Follow steps (a) through (l) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - b. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes** to load defaults.
The computer will reboot.
 - c. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - d. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - e. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.
 - f. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.

- g.** Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.
 - h.** Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint reader, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.
 - i.** Remove all power and system batteries for at least 24 hours.
- 2.** Complete one of the following:
- Remove and retain the storage drive.
 - or –
 - Clear the drive contents by using a third party utility designed to erase data from an SSD.
 - or –
 - Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:



IMPORTANT: If you clear data using Secure Erase, it cannot be recovered.

- a.** Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b.** Select the **Security** menu and scroll down to the **Utilities** menu.
- c.** Select **Hard Drive Utilities**.
- d.** Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

Nonvolatile memory usage

Table 12-1 Troubleshooting steps for nonvolatile memory usage

Nonvolatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using Computer Setup (BIOS), or by changing the Microsoft® Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KB (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility must be used to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 bytes per memory module, 128 bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MB	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.	NOTE: Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility must be used for writing data to this memory and is available on the HP website; go to http://www.hp.com/support . Select Find your product , and then follow the on-screen instructions.
Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to http://www.hp.com/support . Select Find your product , and then follow the on-screen instructions.)	1.5 MB or 7 MB	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third party data store contents can be populated by a remote management console or local applications that have been registered by an	The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility must be used for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.

Table 12-1 Troubleshooting steps for nonvolatile memory usage (continued)

Nonvolatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
					administrator to have access to the space.	
Bluetooth flash (select products only)	2 Mb	No	Yes	Stores Bluetooth configuration and firmware.	Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility must be used for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.
802.11 WLAN EEPROM	4 Kb to 8 Kb	No	Yes	Stores configuration and calibration data.	802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Webcam (select products only)	64 Kb	No	Yes	Stores webcam configuration and firmware.	Webcam memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KB flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

1. How can the BIOS settings be restored (returned to factory settings)?



IMPORTANT: Restore defaults does not securely erase any data on your hard drive. See question and answer 6 for steps to securely erase data.

Restore defaults does not reset the Custom Secure Boot keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Apply Factory Defaults and Exit**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

2. What is a UEFI BIOS, and how is it different from a legacy BIOS?

The Unified Extensible Firmware Interface (UEFI) BIOS is an industry-standard software interface between the platform firmware and an operating system (OS). It is a replacement for the older BIOS architecture, but supports much of the legacy BIOS functionality.

Like the legacy BIOS, the UEFI BIOS provides an interface to display the system information and configuration settings and to change the configuration of your computer before an OS is loaded. BIOS provides a secure run-time environment that supports a Graphic User Interface (GUI). In this environment, you can use either a pointing device (Touchscreen, TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make menu and configuration selections. The UEFI BIOS also contains basic system diagnostics.

The UEFI BIOS provides functionality beyond that of the legacy BIOS. In addition, the UEFI BIOS works to initialize the computer’s hardware before loading and executing the OS; the run-time environment allows the loading and execution of software programs from storage devices to provide more functionality, such as advanced hardware diagnostics (with the ability to display more detailed system information) and advanced firmware management and recovery software.

HP has provided options in Computer Setup (BIOS) to allow you to run in legacy BIOS, if required by the operating system. Examples of this requirement would be if you upgrade or downgrade the OS.

3. Where does the UEFI BIOS reside?

The UEFI BIOS resides on a flash memory chip. A utility must be used to write to the chip.

4. What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?

The DIMM SPD memory contains information about the memory module, such as size, serial number, data width, speed/timing, voltage, and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a computer. Third-party tools do exist that can write to the EEPROM when the memory module is not installed in a computer. Various third-party tools are available to read SPD memory.

5. What is meant by “Restore the nonvolatile memory found in Intel-based system boards”?

This message relates to clearing the Real Time Clock (RTC) CMOS memory that contains computer configuration data.

6. How can the BIOS security be reset to factory defaults and data erased?

 **IMPORTANT:** Resetting will result in the loss of information.

These steps will not reset Custom Secure Boot Keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Reset Security to Factory Defaults**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

7. How can the Custom Secure Boot Keys be reset?

Secure Boot is a feature to ensure that only authenticated code can start on a platform. If you enabled Secure Boot and created Custom Secure Boot Keys, simply disabling Secure Boot will not clear the keys. You must also select to clear the Custom Secure Boot Keys. Use the same Secure Boot access procedure you used to create the Custom Secure Boot Keys, but make the selection to clear or delete all Secure Boot Keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

13 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at <http://www.hp.com/recycle>.

Index

Symbols/Numerics

`product description
ethernet 1

A

audible codes 36
Audio out/in, location 3
audio, product description 1

B

backups 43
battery
removal and replacement 24
battery connector and cable
assembly
removal and replacement 29
beep codes 36
BIOS
determining version 39
downloading an update 39
updating 39
boot order
changing 47
changing using the f9 prompt
40
bottom components 4

C

cautions
electrostatic discharge 10
chipset, product description 1
components
bottom panel 4
right side 4
top 3
Computer Setup
navigating and selecting 38
restoring factory settings 38
starting 38
computer setup 38
country power cord set
requirements 50

D

DisplayPort, location 3

E

electrostatic discharge (ESD) 10
preventing damage 11
error
codes 36
ethernet
product description 1

F

fans
removal and replacement 16
flashing LEDs 36

G

graphics, product description 1
grounding methods 12
guidelines
packaging 13
transporting 13
workstation 10

H

heat sink
removal and replacement 26
HP PC Hardware Diagnostics (UEFI)
using 41
HP Recovery Manager
correcting boot problems 47
starting 46
HP Recovery media
recovery 47
using 43
HP Recovery partition
recovery 46
removing 47

M

memory
nonvolatile 51
product description 1
volatile 51
memory modules
removal and replacement 19
minimized image recovery 46
minimized image, creating 45

model name 1

N

nonvolatile memory 51

O

operating system, product
description 2
original system recovery 45

P

packaging guidelines 13
ports
product description 1
power button board
removal and replacement 27
power button, location 3
power connector (DC out) for VR
headset
removal and replacement 33
power connector and cable
removal and replacement 35
power connector for headset,
location 3
power cord set requirements
country specific 50
power requirements, product
description 1
power supply 48
primary storage
product description 1
processors, product description 1
product description
audio 1
chipset 1
graphics 1
memory 1
operating system 2
ports 1
power requirements 1
primary storage 1
processors 1
product name 1
wireless networking 1
product name 1

R

- recover
 - options 45
- recovery
 - discs 44, 47
 - HP Recovery Manager 45
 - media 47
 - starting 46
 - supported discs 44
 - system 45
 - USB flash drive 47
 - using HP Recovery media 44
- recovery media
 - creating using HP Recovery Manager 44
 - using 43
- recovery partition
 - removing 47
- removal and replacement
 - battery 24
 - battery connector and cable assembly 29
 - fans 16
 - heat sink 26
 - memory modules 19
 - power button board 27
 - power connector (DC out) – for VR headset 33
 - power connector and cable 35
 - RTC battery 23
 - solid state drive 18
 - system board 30
 - top cover 14
 - WLAN antenna 21
 - WLAN module 22
- removal/replacement
 - procedures 14
- removing personal data from volatile system memory 51
- right components 4
- RTC battery
 - removal and replacement 23

S

- setup utility
 - navigating and selecting 38
 - restoring factory settings 38
- solid state drive
 - removal and replacement 18

- specifications
 - computer 48
- static electricity 11
- supported discs, recovery 44
- system board
 - removal and replacement 30
- system memory, removing personal data from volatile 51
- system recovery 45
- system restore point
 - creating 44
- system restore point, creating 43

T

- top components 3
- top cover
 - removal and replacement 14
- TPM settings 40
- transporting guidelines 13

U

- USB Type-A port, location 3

V

- Vent, location 4
- vent, location 4

W

- Windows
 - system restore point 43, 44
- Windows tools
 - using 44
- wireless networking
 - product description 1
- WLAN antenna
 - removal and replacement 21
- WLAN module
 - removal and replacement 22
- workstation guidelines 10