OptiPlex 7090 Micro Form Factor

Technical Guidebook

Regulatory Model: D14U
Regulatory Type: D14U004/D14U005
May 2021
Rev. A00

Notes, cautions, and warnings

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

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.

Contents

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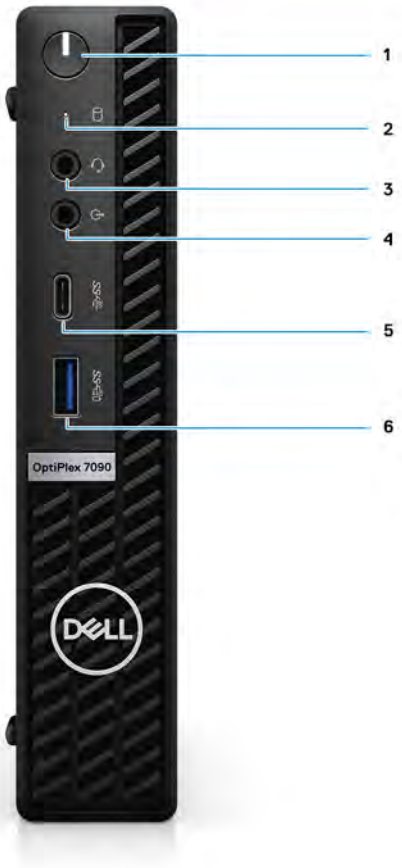
Views

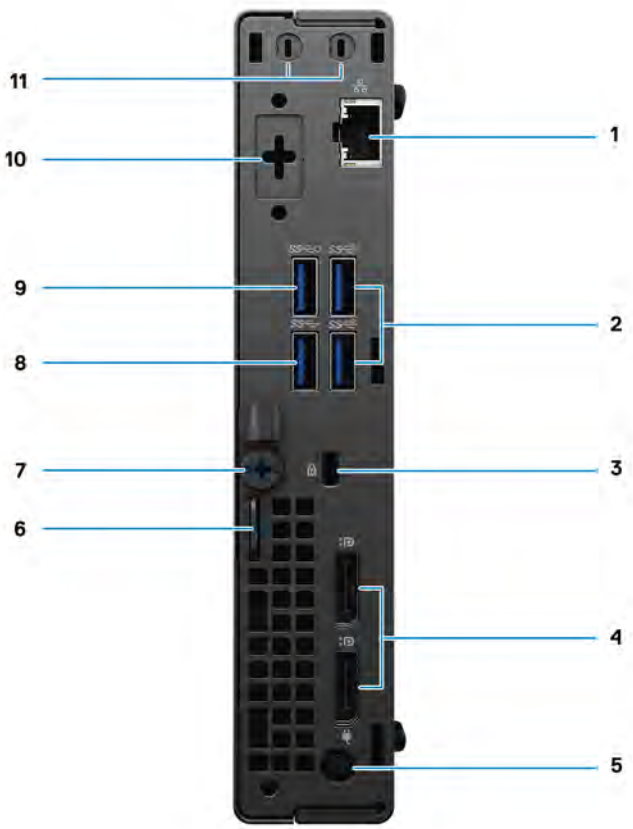
Front



1. Power button with diagnostic LED
2. Hard-disk activity light
3. Universal audio jack port
4. Re-tasking Line-in/Line out audio port
5. USB 3.2 Gen 2x2 capable Type-C port
6. USB 3.2 Gen 2 port with PowerShare

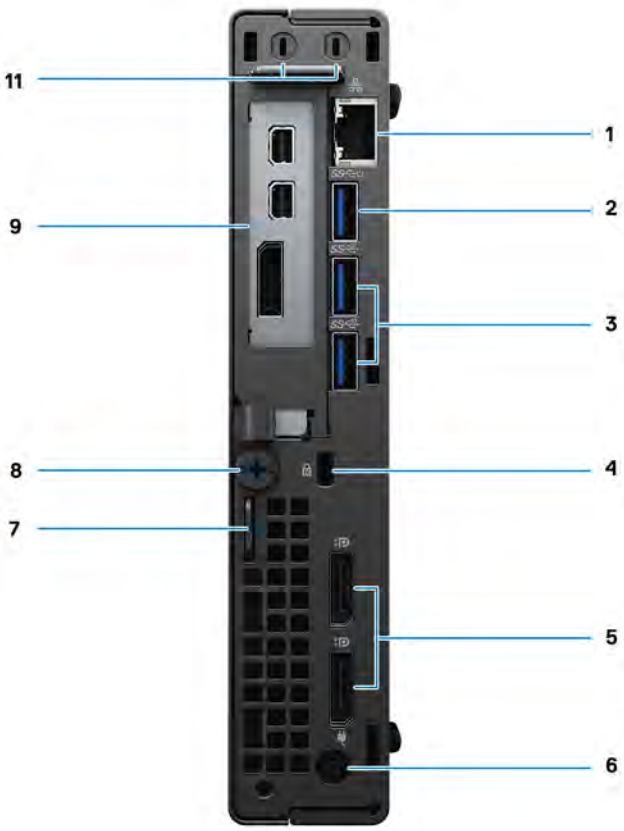
Back

Integrated



1. RJ45 Ethernet port
2. Two USB 3.2 Gen 2 Type-A ports
3. Kensignton cable-lock slot
4. DisplayPort 1.4
5. Power connector port
6. Padlock loop
7. Thumbscrew
8. USB 3.2 Gen 1 Type-A port
9. USB 3.2 Gen 1 Type-A port with Smart Power on
10. Serial/Video port with Serial port/PS2 port/VGA port/DisplayPort 1.4 port/HDMI 2.0 port/USB 3.2 Gen2 Type-C port with DP Alt-mode (optional)
11. External antenna connector

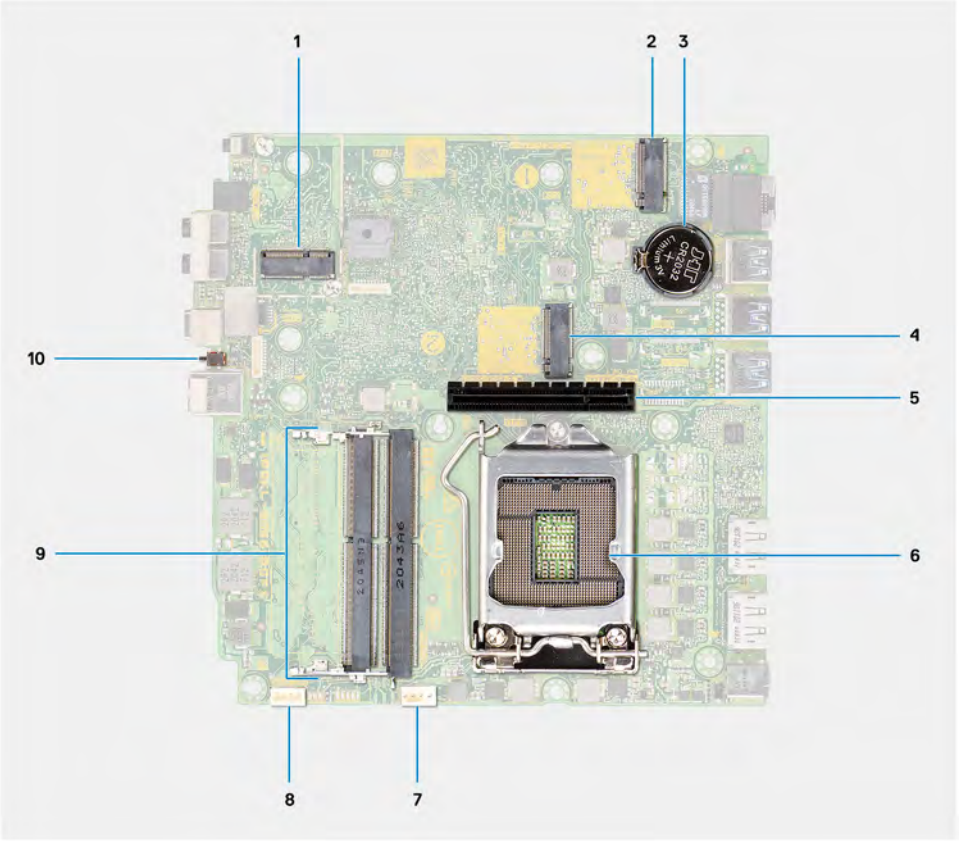
Discrete



1. RJ45 Ethernet port
2. USB 3.2 Gen 1 Type-A port with Smart Power on
3. Two USB 3.2 Gen 2 Type-A ports
4. Kensignton cable-lock slot
5. DisplayPort 1.4
6. Power connector port
7. Padlock loop
8. Thumbscrew
9. AMD Radeon RX 640 with two mini DisplayPort (mDP) ports and DisplayPort 1.4
10. External antenna connector

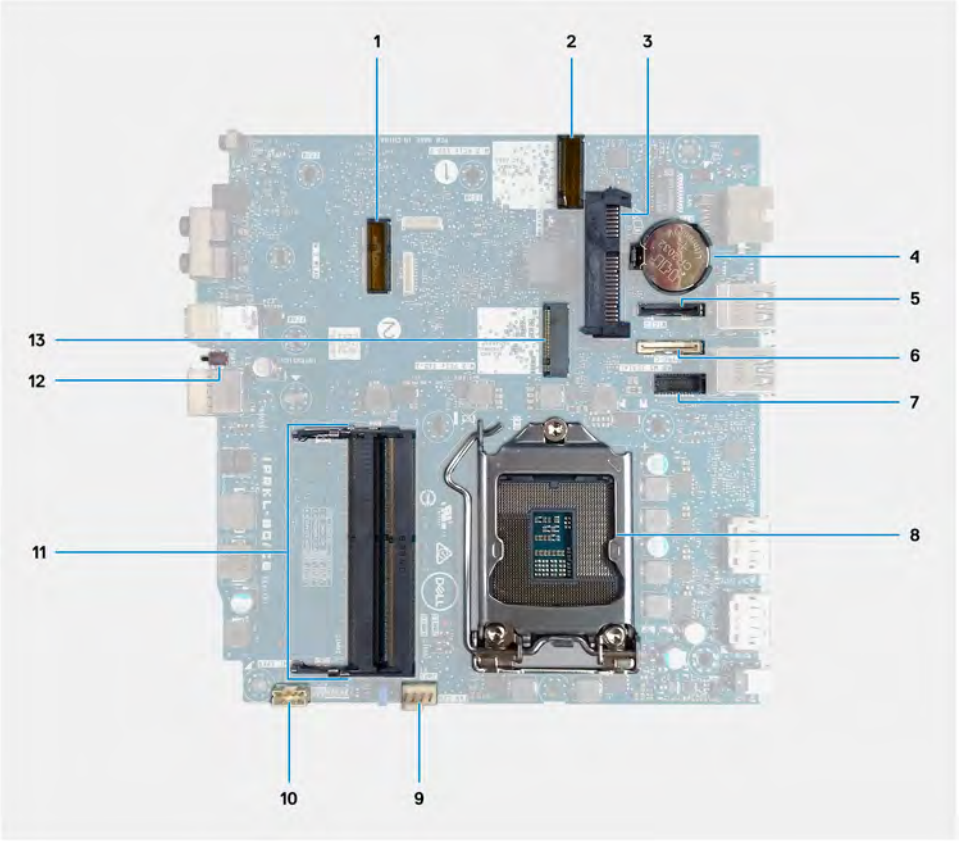
System board layout

Discrete system board



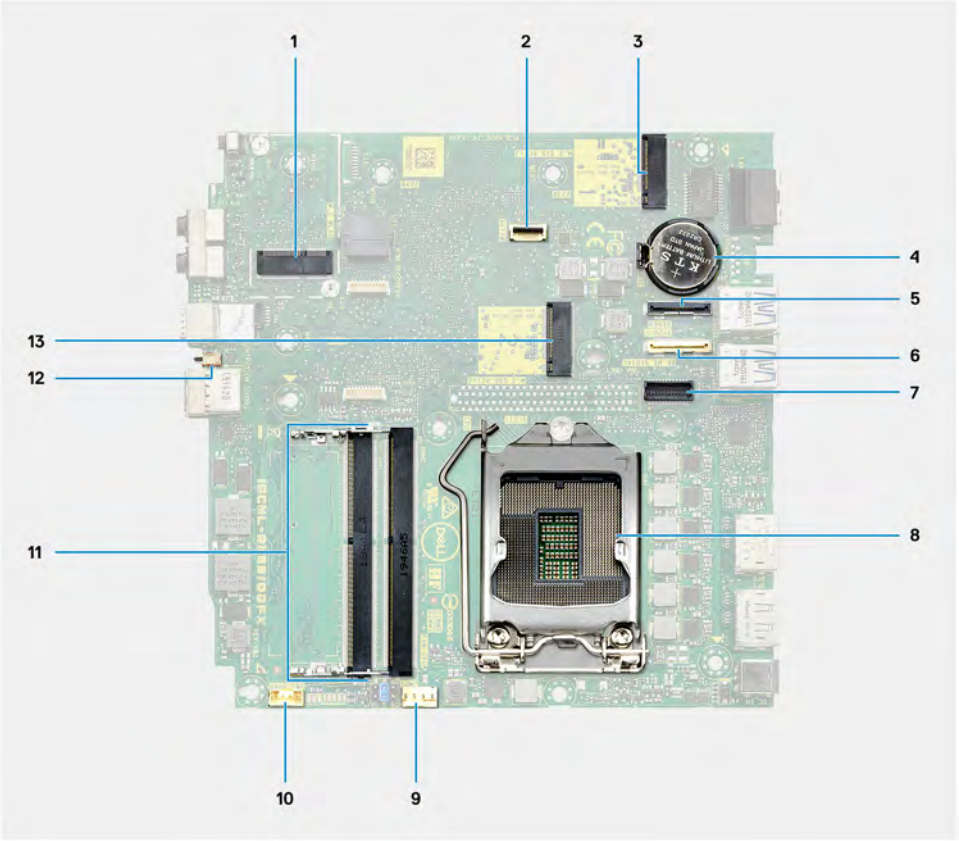
1. M.2 WLAN connector
2. M.2 SSD PCIe connector
3. Coin-cell battery
4. M.2 SSD PCIe connector
5. Riser card connector
6. Processor socket
7. Memory slots
8. Intrusion switch

35 W system board



1. M.2 WLAN card connector
2. M.2 SSD PCIe connector
3. 2.5-inch hard-drive connector
4. Coin-cell battery
5. Optional video connector (VGA Port/DisplayPort 1.4 Port/HDMI 2.0b Port)
6. Optional connector (USB 3.2 Gen 2 Type-C Port)
7. Optional Keyboard and mouse serial port connector
8. Processor socket
9. CPU Fan connector
10. Internal speaker connector
11. Memory modules
12. M.2 SSD PCIe connector

65 W system board



1. M.2 WLAN card connector
2. 2.5-inch hard-drive connector
3. M.2 SSD PCIe connector
4. Coin-cell battery
5. Optional video connector (VGA Port/DisplayPort 1.4 Port/HDMI 2.0b Port)
6. Optional connector (USB 3.2 Gen 2 Type-C Port)
7. Optional Keyboard and mouse serial port connector
8. Processor socket
9. CPU Fan connector
10. Internal speaker connector
11. Memory modules
12. Intrusion switch
13. M.2 SSD PCIe connector

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Specifications of OptiPlex 7090 Micro Form Factor

Dimensions and weight

The following table lists the height, width, depth, and weight of your OptiPlex 7090 Micro Form Factor.

Table 1. Dimensions and weight

Description	Values
Height:	
Front height	182 mm (7.16 in.)
Rear height	182 mm (7.16 in.)
Width	178.50 mm (7.02 in.)
Depth	36 mm (1.41 in.)
Weight **NOTE:** The weight of your computer depends on the configuration ordered and manufacturing variability.	• Minimum: 1.30 kg (2.87 lbs) • Maximum: 1.38 kg (3.05 lbs)

Processor

The following table lists the details of the processors that are supported by your OptiPlex 7090 Micro Form Factor .

NOTE: Processor numbers are not a measure of performance. Processor availability subject to change and may vary by region/country.

Table 2. Processor

Processor type	Processor wattage	Processor core count	Processor thread count	Processor speed	Processor cache	Integrated graphics
10th Generation Intel Core i3-10105T	65 W	4	8	3.0 GHz to 3.9 GHzz	6 MB	Intel UHD Graphics 630
10th Generation Intel Core i3-10105	65 W	4	8	3.7 GHz to 4.4 GHz	6 MB	Intel UHD Graphics 630
10th Generation Intel Core i3-10305T	35 W	4	8	3.0 GHz to 4.0 GHz	8 MB	Intel UHD Graphics 630
10th Generation Intel Core i3-10305	65 W	4	8	3.8 GHz to 4.5 GHz	8 MB	Intel UHD Graphics 630

Table 2. Processor (continued)

Processor type	Processor wattage	Processor core count	Processor thread count	Processor speed	Processor cache	Integrated graphics
10th Generation Intel Core i5-10505	65 W	6	12	3.2 GHz to 4.6 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10400T	35 W	6	12	2.0 GHz to 3.6 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10400	65 W	6	12	2.9 GHz to 4.3 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10500T	35 W	6	12	2.3 GHz to 3.8 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10500	65 W	6	12	3.1 GHz to 4.5 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10600T	35 W	6	12	2.4 GHz to 4.0 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i5-10600	65 W	6	12	3.3 GHz to 4.8 GHz	12 MB	Intel UHD Graphics 630
10th Generation Intel Core i7-10700T	35 W	8	16	2.0 GHz to 4.5 GHz	16 MB	Intel UHD Graphics 630
10th Generation Intel Core i7-10700	65 W	8	16	2.9 GHz to 4.8 GHz	16 MB	Intel UHD Graphics 630
10th Generation Intel Core i9-10900T	35 W	10	20	1.9 GHz to 4.6 GHz	20 MB	Intel UHD Graphics 630
10th Generation Intel Core i9-10900	65 W	10	20	2.8 GHz to 5.2 GHz	20 MB	Intel UHD Graphics 630
11th Generation Intel Core i5-11400T	35 W	6	12	1.3 GHz to 3.7 GHz	12 MB	Intel UHD Graphics 730
11th Generation Intel Core i5-11400	65 W	6	12	2.6 GHz to 4.4 GHz	12 MB	Intel UHD Graphics 730
11th Generation Intel Core i5-11500T	35 W	6	12	1.5 GHz to 3.9 GHz	12 MB	Intel UHD Graphics 750
11th Generation Intel Core i5-11500	65 W	6	12	2.7 GHz to 4.6 GHz	12 MB	Intel UHD Graphics 750
11th Generation Intel Core i5-11600T	35 W	6	12	1.7 GHz to 4.1 GHz	12 MB	Intel UHD Graphics 750
11th Generation Intel Core i5-11600	65 W	6	12	2.8 GHz to 4.8 GHz	12 MB	Intel UHD Graphics 750

Table 2. Processor (continued)

Processor type	Processor wattage	Processor core count	Processor thread count	Processor speed	Processor cache	Integrated graphics
11th Generation Intel Core i7-11700T	35 W	8	16	1.4 GHz to 4.6 GHz	16 MB	Intel UHD Graphics 750
11th Generation Intel Core i7-11700	65 W	8	16	2.5 GHz to 4.9 GHz	16 MB	Intel UHD Graphics 750
11th Generation Intel Core i9-11900T	35 W	8	16	1.5 GHz to 4.9 GHz	16 MB	Intel UHD Graphics 750
11th Generation Intel Core i9-11900	65 W	8	16	2.5 GHz to 5.2 GHz	16 MB	Intel UHD Graphics 750

Chipset

The following table lists the details of the chipset supported by your OptiPlex 7090 Micro Form Factor

Table 3. Chipset

Description	Option one	Option two
Processors	10th Generation Intel Core i3/i5/i7/i9	11th Generation Intel Core i5/i7/i9
Chipset	Intel Q570	Intel Q570
DRAM bus width	64-bit (for single channel)	64-bit (for single channel)
Flash EPROM	32 MB	32 MB
PCIe bus	Up to Gen 3.0	Up to Gen 3.0

Operating system

Your OptiPlex 7090 Micro Form Factor supports the following operating systems:

- Windows 10 Home, 64-bit
- Windows 10 IoT Enterprise 2019 LTSC (OEM only)
- Windows 10 Pro, 64-bit
- Windows 10 Pro Education, 64-bt
- Kylin Linux Desktop version 10.1 (China only)
- Ubuntu Linux 20.04 LTS, 64-bit
- Windows 10 CMIT Government Edition 64-bit (China only)

Memory

The following table lists the memory specifications of your OptiPlex 7090 Micro Form Factor.

Table 4. Memory specifications

Description	Values
Memory slots	Two DIMM slots
Memory type	DDR4

Table 4. Memory specifications (continued)

Description	Values
Memory speed	2666/2933/3200 MHz
Maximum memory configuration	64 GB
Minimum memory configuration	4 GB
Memory size per slot	4 GB, 8 GB, 16 GB, 32 GB
Memory configurations supported	• 4 GB, 1 x 4 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 8 GB, 1 x 8 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 8 GB, 2 x 4 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 16 GB, 1 x 16 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 16 GB, 2 x 8 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 32 GB, 1 x 32 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 32 GB, 2 x 16 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors • 64 GB, 2 x 32 GB, DDR4, 2666 MHz for 10th Generation Intel Core i5, 2933 MHz for 10th Generation Intel Core i7/i9, 3200 MHz for 11th Generation Intel Core i5/i7/i9 processors

Memory configuration matrix

Table 5. Memory configuration matrix

Configuration	Slot	
	DIMM1	DIMM2
4 GB DDR4	4 GB	
8 GB DDR4	4 GB	4 GB
8 GB DDR4	8 GB	
16 GB DDR4	8 GB	8 GB
16 GB DDR4	16 GB	
32 GB DDR4	16 GB	16 GB

Table 5. Memory configuration matrix (continued)

Configuration	Slot	
	DIMM1	DIMM2
32 GB DDR4	32 GB	
64 GB DDR4	32 GB	32 GB

Intel Optane Memory H10 with Solid State Storage (optional)

Intel Optane Memory technology utilizes 3D XPoint memory technology and functions as a non-volatile storage cache/accelerator and/or storage device depending on the Intel Optane Memory installed in your computer.

Intel Optane Memory H10 with Solid State Storage functions as both a non-volatile storage cache/accelerator (enabling enhanced read/write speeds for hard-drive storage) and a solid-state storage solution. It neither replaces nor adds to the memory (RAM) installed on your computer.

Table 6. Intel Optane Memory H10 with Solid State Storage specifications

Description	Values
Interface	PCIe 3 x4 NVMe • One PCIe 3 x2 for Optane memory • One PCIe 3 x2 for solid-state storage
Connector	M.2
Form factor	2280
Capacity (Intel Optane memory)	Up to 32 GB
Capacity (solid-state storage)	Up to 512 GB

NOTE: Intel Optane Memory H10 with Solid State Storage is supported on computers that meet the following requirements:

- 9th Generation or higher Intel Core i3/i5/i7 processors
- Windows 10 64-bit version or higher (Anniversary Update)
- Intel Rapid Storage Technology driver version 15.9.1.1018 or higher

External ports

Table 7. External ports-Integrated

Description	Values
Network port/slots	**Rear** • One RJ45 Ethernet port • Two knock-out slots for wireless antenna
USB ports	**Front** • One USB 3.2 Gen 2x2 capable Type-C port • One USB 3.2 Gen 2 port with power share **Rear** • One USB 3.2 Gen 1 port • One USB 3.2 Gen 1 port with smart power on • Two USB 3.2 Gen 2 ports
Audio port	**Front**

Table 7. External ports-Integrated (continued)

Description	Values
	• One Universal audio jack • One re-tasking Line out/Line in audio port
Video port/ports	**Rear** • One Serial/Video port with Serial/Serial+PS2 port/VGA port/DisplayPort 1.4 port/HDMI 2.0 Port/USB 3.2 Gen2 Type-C Port with Alt-mode (optional) • Two DisplayPort 1.4 ports
Media-card reader	N/A
Power-adapter port	**Rear** • DC-in power input: 4.5 mm barrel type
Security-cable slot	**Rear** • One Kensington security-cable slot • One padlock loop lock

Table 8. External ports-Discrete

Description	Values
Network	**Rear** • One RJ45 Ethernet port • Two knock-out slots for wireless antenna
USB ports	**Front** • One USB 3.2 Gen 2x2 capable Type-C port • One USB 3.2 Gen 2x2 port with power share **Rear** • One USB 3.2 Gen 1 port with smart power on • Two USB 3.2 Gen 2 ports
Audio port	**Front** • One Universal audio jack • One re-tasking Line out/Line in audio port
Video port/ports	**Rear** • Two mini DisplayPort 1.4 ports • Two DisplayPort 1.4 ports
Media-card reader	N/A
Power-adapter port	**Rear** • DC-in power input: 7.4 mm barrel type
Security-cable slot	**Rear** • One Kensington security-cable slot • One padlock loop lock

Internal slots

The following table lists the internal slots of your OptiPlex 7090 Micro Form Factor.

Table 9. Internal slots

Description	Values
M.2	• One M.2 slot for WiFi and Bluetooth card

Table 9. Internal slots

Description	Values
	• Two M.2 2230/2280 slot for SSD/Intel Optane **NOTE:** To learn more about the features of different types of M.2 cards, see the knowledge base article 000144170 at www.dell.com/support.

Communications

Ethernet

Table 10. Ethernet specifications

Description	Values
Model number	Intel i219-LM
Transfer rate	10/100/1000 Mbps

Wireless module

Table 11. Wireless module specifications

Description	Values		
Model number	Qualcomm QCA61x4a	Qualcomm QCA9377	Intel AX201
Transfer rate	Up to 867 Mbps	Up to 433 Mbps	Up to 2.40 Gbps
Frequency bands supported	2.4 GHz/5 GHz	2.40 GHz/5 GHz	2.4 GHz/5 GHz
Wireless standards	802.11ac	802.11ac	Wi-Fi 6 (WiFi 802.11ax)
Encryption	• 64-bit and 128-bit WEP • 128-bit AES-CCMP • TKIP	• 64-bit and 128-bit WEP • 128-bit AES-CCMP • TKIP	• 64-bit and 128-bit WEP • 128-bit AES-CCMP • TKIP
Bluetooth	5.0	5.0	5.2

Audio

The following table lists the audio specifications of your OptiPlex 7090 Micro Form Factor.

Table 12. Audio specifications

Description	Values
Audio type	4 Channel High Definition Audio
Audio controller	Realtek ALC3246
Internal audio interface	Intel HDA (high-definition audio)
External audio interface	• One Universal Audio Jack (front)

Table 12. Audio specifications (continued)

Description	Values
	• One Line-out audio port with re-tasking to Line-in(rear)

Storage

This section lists the storage options on your OptiPlex 7090 Micro Form Factor.

Your computer supports one of the following configurations:

Table 13. Storage Matrix

Storage		1st 2.5-inch hard drive	Single M.2 socket	2nd M.2 2280 socket	1st Bootable Device
2.5-inch hard drive		Y	N	N	2.5-inch hard drive
M.2 solid-state drive		N	Y	N	M.2 solid-state drive
Dual M.2 solid-state drive		N	Y	Y	1st M.2 solid-state drive
M.2 solid-state drive	2.5-inch hard drive/ solid-state drive	N	Y	N	M.2 solid-state drive
M.2 Intel Optane	2.5-inch hard drive	Y	Y	N	2.5-inch hard drive

Table 14. Storage specifications

Storage type	Interface type	Capacity
2.5-inch, 5400 RPM, hard-disk drive	SATA 3.0	Up to 2 TB
2.5-inch, 7200 RPM, hard-disk drive	SATA 3.0	Up to 1 TB
2.5-inch, 7200 RPM, FIPS Self Encrypting Opal 2.0, hard-disk drive	SATA 3.0	Up to 500 GB
M.2 2230 solid-state drive	PCIe 3 Gen x4 NVMe, Class 35	Up to 512 GB
M.2 2280 solid-state drive	PCIe 3 Gen x4 NVMe, Class 40	Up to 2 TB
M.2 2280 solid-state drive	PCIe 4 Gen x4 NVMe, Class 40	Up to 2 TB
M.2 2280 Opal Self-Encrypting solid-state drive	PCIe NVMe Gen3 x4, Class 40	Up to 1 TB

RAID (Redundant Array of Independent Disks)

For optimal performance when configuring drives as a RAID volume, Dell recommends drive models that are identical.

NOTE: RAID is not supported on Intel Optane configurations.

RAID 0 (Striped, Performance) volumes benefit from higher performance when drives are matched because the data is split across multiple drives: any I/O operations with block sizes larger than the stripe size splits the I/O and become constrained by the slowest of the drives. For RAID 0 I/O operations where block sizes are smaller than the stripe size, whichever drive the I/O operation targets determine the performance, which increases variability and results in inconsistent latencies. This variability

is particularly pronounced for write operations, and it can be problematic for applications that are latency sensitive. One such example of this is any application that performs thousands of random writes per second in small block sizes.

RAID 1 (Mirrored, Data Protection) volumes benefit from higher performance when drives are matched because the data is mirrored across multiple drives: all I/O operations must be performed identically to both drives, thus variations in drive performance when the models are different, results in the I/O operations completing only as fast as the slowest drive. While this does not suffer the variable latency issue in small random I/O operations as with RAID 0 across heterogeneous drives, the impact is nonetheless large because the higher performing drive becomes limited in all I/O types. One of the worst examples of constrained performance here is when using unbuffered I/O. To ensure that writes are fully committed to non-volatile regions of the RAID volume, unbuffered I/O bypasses cache (for example by using the Force Unit Access bit in the NVMe protocol) and the I/O operation will not complete until all the drives in the RAID volume have completed the request to commit the data. This kind of IO operation completely negates any advantage of a higher performing drive in the volume.

Care must be taken to match not only the drive vendor, capacity, and class, but also the specific model. Drives from the same vendor, with the same capacity, and even within the same class, can have different performance characteristics for certain types of I/O operations. Thus, matching by model ensures that the RAID volumes are consisted of a homogeneous array of drives that deliver all the benefits of a RAID volume without incurring the additional penalties when one or more drives in the volume are lower performing.

OptiPlex 7090Micro supports RAID with more than one hard drive configuration.

Hard drive preloaded bracket matrix

Table 15. HDD preloaded bracket cable

3.5-inch Caddy/Bracket	No
2.5-inch Caddy/Bracket	No

Power adapter

Table 16. Power adapter specifications

Description		Values		
Type		90 W (35 W CPU)	130 W (35 W CPU)	180 W (65 W CPU and DGFX SKU)
Diameter (connector)		4.5 mm x 2.9 mm	4.5 mm x 2.9 mm	7.4 mm x 5.1 mm
Input voltage		100 VAC—240 VAC	100 VAC—240 VAC	100 VAC—240 VAC
Input frequency		50 Hz—60 Hz	50 Hz—60 Hz	50 Hz—60 Hz
Input current (maximum)		1.50 A	2.50 A	2.34 A
Output current (continuous)		4.62 A	6.70 A	9.23 A
Rated output voltage		19.50 VDC	19.50 VDC	19.50 VDC
Temperature range:				
	Operating	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)
	Storage	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)

GPU—Integrated

The following table lists the specifications of the integrated Graphics Processing Unit (GPU) supported by your OptiPlex 7090 Micro Form Factor.

Table 17. GPU—Integrated

Controller	External display support	Memory size	Processor
Intel UHD Graphics 630	Two DisplayPort 1.4 ports	Shared system memory	10th Generation Intel Core i3/i5/i7/i9
Intel UHD Graphics 730/750	Two DisplayPort 1.4 ports	Shared system memory	11th Generation Intel Core i5/i7/i9

GPU—Discrete

The following table lists the specifications of the discrete Graphics Processing Unit (GPU) supported by your OptiPlex 7090 Micro Form Factor.

Table 18. GPU—Discrete

Controller	External display support	Memory size	Memory type
AMD Radeon RX 640	• One DisplayPort 1.4 • Two mini DisplayPort (mDP) ports	4 GB	GDDR5

Multiple display support matrix

Table 19. Multiple display support matrix

Graphics Card	Radeon RX 640
Memory	4 GB GDDR5
Video Ports on Graphics Card	• 2 x Mini DisplayPorts • 1 x DisplayPort
Max Displays (direct connect)	3
Max Displays (DP multi-stream)	1
Number of displays	3
Supported Resolution	3 x FHD (1920 x 1080)
Total Power	40 W

Hardware Security

Table 20. Hardware Security

One Kensington security-cable slot
One Padlock loop
Chassis intrusion switch
SafeID including Trusted Platform Module (TPM) 2.0

Table 20. Hardware Security (continued)

Smart card keyboard (FIPS)
Microsoft 10 Device Guard and Credential Guard (Enterprise SKU)
Microsoft Windows Bitlocker
Local hard drive data wipe through BIOS (Secure Erase)
Self-encrypting storage drives (Opal, FIPS)
Trusted Platform Module (TPM) 2.0
China TPM
Intel Secure Boot
Intel Authenticate
SafeBIOS: includes Dell Off-host BIOS Verification, BIOS Resilience, BIOS Recovery, and additional BIOS Controls
Physical Security Options: Chassis lock slot support, Chassis Intrusion Switch, Lockable Cable Covers, Supply chain tamper alerts

Environmental

Table 21. Environmental specifications

Feature	OptiPlex 7090 Micro
Recyclable packaging	Yes
BFR/PVC—free chassis	No
MultiPack packaging	Yes (US only) (optional)
Energy-Efficient Power Supply	Standard
ENV0424 compliant	Yes

NOTE: Wood-based fiber packaging contains a minimum of 35% recycled content by total weight of wood-based fiber. Packaging that contains without wood-based fiber can be claimed as Not Applicable.

Energy Star, EPEAT and Trusted Platform Module (TPM)

Table 22. Energy Star, EPEAT and TPM

Features	Specifications
Energy Star 8.0	Compliant configurations available
EPEAT	Gold and Silver compliant configurations available
Trusted Platform Module (TPM) 2.0[1,2]	Integrated on system board
Firmware-TPM (Discrete TPM disabled)	Optional

NOTE:

[1]TPM 2.0 is FIPS 140-2 certified.

[2]TPM is not available in all countries.

Operating and storage environment

This table lists the operating and storage specifications of your OptiPlex 7090 Micro Form Factor.

Airborne contaminant level: G1 as defined by ISA-S71.04-1985

Table 23. Computer environment

Description	Operating	Storage
Temperature range	10 °C–35°C (50 °F–95°F)	-40°C-65°C (-40°F-149°F)
Relative humidity (maximum)	20% to 80% (non-condensing, Max dew point temperature = 26°C)	5% to 95% (non-condensing, Max dew point temperature = 33°C)
Vibration (maximum)*	0.26 GRMS random at 5 Hz to 350 Hz	1.37 GRMS random at 5 Hz to 350 Hz
Shock (maximum)	Bottom half-sine pulse with a change in velocity of 50.8 cm/sec (20 in./sec)	105G half-sine pulse with a change in velocity of 133 cm/sec (52.5 in./sec)
Altitude range	3048 m (10,000 ft)	10,668 m (35,000 ft)

CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.

* Measured using a random vibration spectrum that simulates user environment.

† Measured using a 2 ms half-sine pulse when the hard drive is in use.

3

Engineering specifications

Physical system dimensions

NOTE: System Weight and Shipping Weight is based on a typical configuration and may vary based on PC configuration. A typical configuration includes: integrated graphics, one hard drive, one optical drive.

Table 24. System dimensions (Physical)

Feature	Values
Chassis Volume (liters)	1.18
Chassis Weight (lb/kg)	2.82 lb (1.28 kg) (For 35 W) 2.85 lb (1.29 kg) (For 65 W) 3.05 lb (1.38 kg) (For discrete graphics)
Chassis Dimensions (H x W x D)	
Height (in./mm)	7.16 in. (182.00 mm)
Width (in./mm)	7.02 in. (178.50 mm)
Depth (in./mm)	1.42 in. (36.00 mm)
Shipping Weight (lb/kg – includes packaging materials).	7.05 lb (3.20 kg)
Packaging Dimensions (H x W x D)	
Height (in./mm)	19.6 in. (497.84 mm)
Width (in./mm)	9.37 in. (237.99 mm)
Depth (in./mm)	5.24 in. (133.09 mm)

System board connector maximum add-in card allowable dimensions

Table 25. System board connector maximum add-in card allowable dimensions

Feature	Values
PCI x8 connector	1
Voltage	3.3 V/12 V
Height	68.90 mm (2.731 inches)
Length	167.65 mm (6.6 inches)
Maximum wattage	40 W

System board connector maximum allowable dimensions

Table 26. M.2 2230 slot for WiFi card

Voltage	3.3 V
Width	0.86 in. (22.00 mm)
Length	1.18 in. (30.00 mm)
Thickness	0.14 in. (3.65 mm)
Maximum wattage	6.6 W

Table 27. M.2 2280 slot for SSD

Voltage	3.3 V
Width	0.86 in. (22.00 mm)
Length	3.14 in. (80.00 mm)
Thickness	0.15 in. (3.80 mm)
Maximum Wattage	8.25 W

Dust filter specifications

Table 28. Dust filter specifications

Feature	Dust filter specifications
Type	0.008 in. (0.0196 cm)
Mesh count	100.00 in. (39.37 cm)
Weave	PW
Silk diameter	0.002 in. (0.0055 cm)
Open area	61 %
Thickness	0.004 in. (0.01 cm)
Remark	PET

Communications

Intel Ethernet Connection i219-LM

Table 29. Integrated Intel i219-LM Gigabit Ethernet LAN 10/100/1000

Feature	Values
External connector type	RJ45
Supported data rates	10/100/1000 Mbps
Controller Details	
Controller bus architecture	PCI Express base specification revision 1.1

Table 29. Integrated Intel i219-LM Gigabit Ethernet LAN 10/100/1000 (continued)

Feature	Values
Integrated memory	Yes
Data transfer mode	Yes (Bus-Master DMA)
Power consumption (Full operation per data rate connection speed)	542 mW (Max)
Power consumption (Standby operation)	76 mW (Max)
IEEE standards compliance	802.3
Hardware certifications	N/A
Boot ROM support	EEPROM (Located in SPI)
Network Transfer Mode	
Network transfer rate	10 Mb (full/half-duplex)
10BASE-T (full-duplex) 20 Mbps	100 Mb (full/half-duplex)
100BASE-TX (half-duplex) 100 Mbps	1000 Mb (full-duplex)
100BASE-TX (full-duplex) 200 Mbps	
1000BASE-T (full-duplex) 2000 Mbps	
Environmental	
Operating temperature	0 ° C–85° C (32 ° F–185° F)
Operating humidity	20% to 80% (noncondensing)
Operating system driver Support	• Windows 10 (x64) • Ubuntu • Neokylin
Manageability	• Wakeup On LAN • PXE 2.1
Management capabilities alerting	Optional Intel Standard Manageability (must be made at time of purchase).

This term does not connote an actual operating speed of 1 Gb/sec. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Wireless communication

Qualcomm QCA61x4a 802.11ac dual band 2x2 + Bluetooth 5.0

Table 30. Qualcomm QCA61x4a 802.11ac dual band 2x2 + Bluetooth 5.0 specifications

Feature	Values
Host interface	M.2 2230 form factor: • Wi-Fi: PCIe • Bluetooth: USB

Table 30. Qualcomm QCA61x4a 802.11ac dual band 2x2 + Bluetooth 5.0 specifications (continued)

Feature	Values
Network standard	IEEE 802.11a/b/g/n/ac/, MU-MIMO
Wi-Fi alliance certifications	• Wi-Fi Certified a/b/g/n/ac with wave 2 features • WMM • WPA2 • Protected Management Frames • Wi-Fi Direct (For Windows only)
Operating frequency bands	• 2.4 Ghz • 5 Ghz
Data rate	• 2.4 GHz 40M - Up to 300 Mbps • 5 GHz 80M - Up to 867 Mbps
Power consumption	Optimized power modes (sleep states) reduce power consumption during periods of inactivity
Authentication	WPA2 Personal and Enterprise
Authentication protocols	• 802.1X EAP-TLS • EAP-TTLS/MSCHAPv2 • PEAPv0 -MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA)
Encryption	• 64-bit and 128-bit WEP • TKIP • 128-bit AES-CCMP • 256-bit AES-GCMP
Product safety	• UL • C-UL • CB(IEC60950-1)
Government compliance	• FIPS 140-2 • FISMA
Antenna diversity	Supported
Radio On/Off	Supported
Roaming	Support seamless roaming between access points
Wake On wireless	Supported
Wireless display	Native Miracast support by Windows 10
Bluetooth version	Bluetooth 5.0
Bluetooth data rates	Up to 2 Mbps
Bluetooth operating frequency bands	2.4 GHz
Bluetooth profiles supported	Support for Microsoft Inbox Bluetooth profiles in Windows 10
Bluetooth data encryption	128-bit encryption
Bluetooth output power	Power class 1
Temperature	• Operating temperature -10°C to + 65°C (Full performance at shield temperatures up to 85°C) • Storage temperature of -10°C to + 85°C

Table 30. Qualcomm QCA61x4a 802.11ac dual band 2x2 + Bluetooth 5.0 specifications (continued)

Feature	Values
Humidity	Up to 90% RH non-condensing (at temperatures of 25°C to 35°C)

Qualcomm QCA9377 802.11ac dual band 1x1 + Bluetooth 5.0

Table 31. Qualcomm QCA61x4a 802.11ac dual band 1x1 + Bluetooth 5.0 specifications

Feature	Values
Host interface	M.2 2230 form factor: • PCIe • USB
Network standard	IEEE 802.11a/b/g/n/ac/, MU-MIMO
Wi-Fi alliance certifications	• Wi-Fi Certified a/b/g/n/ac with wave 2 features • WMM • WPA2 • Protected Management Frames • Wi-Fi Direct (For Windows only)
Operating frequency bands	• 2.4 Ghz • 5 Ghz
Data rate	• 2.4 GHz 40M - Up to 200 Mbps • 5 GHz 80M - Up to 433 Mbps
Power consumption	Optimized power modes (sleep states) reduce power consumption during periods of inactivity
Authentication	WPA2 Personal and Enterprise
Authentication protocols	• 802.1X EAP-TLS • EAP-TTLS/MSCHAPv2 • PEAPv0 -MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA)
Encryption	• 64-bit and 128-bit WEP • TKIP • 128-bit AES-CCMP • 256-bit AES-GCMP
Product safety	• UL • C-UL • CB(IEC60950-1)
Government compliance	• FIPS 140-2 • FISMA
Antenna diversity	Supported
Radio On/Off	Supported
Roaming	Support seamless roaming between access points
Wake On wireless	Supported
Wireless display	Native Miracast support by Windows 10
Bluetooth version	Bluetooth 5.0

Table 31. Qualcomm QCA61x4a 802.11ac dual band 1x1 + Bluetooth 5.0 specifications (continued)

Feature	Values
Bluetooth data rates	Up to 2 Mbps
Bluetooth operating frequency bands	2.4 GHz
Bluetooth profiles supported	Support for Microsoft Inbox Bluetooth profiles in Windows 10
Bluetooth data encryption	128-bit encryption
Bluetooth output power	Power class 1
Temperature	• Operating temperature -10°C to + 65°C (Full performance at shield temperatures up to 85°C) • Storage temperature of -10°C to + 85°C
Humidity	Up to 90% RH non-condensing (at temperatures of 25°C to 35°C)

Intel Wi-Fi 6 AX201 2x2 (Gig+) + Bluetooth 5.2

Table 32. Intel Wi-Fi 6 AX201 2x2 (Gig+) + Bluetooth 5.2 specifications

Feature	Values
Host interface	M.2 2230 form factor: • Wi-Fi - PCIe • Bluetooth - USB
Network standard	IEEE 802.11a/b/g/n/ac/ax, 160MHz channel use, MU-MIMO
Wi-Fi alliance certifications	• Wi-Fi Certified a/b/g/n/ac with wave 2 features • Designed to be Wi-Fi Certified ax (Wi-Fi 6) • WMM • WMM-PS • WPA • WPA2 • WPS2 • Protected Management Frames • Wi-Fi Direct (For Windows only)
Operating frequency bands	• 2.4 Ghz • 5 Ghz
Data rate	• 2.4 GHz 40M - Up to 574 Mbps • 5 GHz 80M - Up to 1.2 Gbps • 5 GHz 160M - Up to 2.4 Gbps
Power consumption	Optimized power modes (sleep states) reduce power consumption during periods of inactivity
Authentication	• WPA and WPA2 Personal and Enterprise • WPA3 (pending OS support)
Authentication protocols	• 802.1X EAP-TLS • EAP-TTLS/MSCHAPv2 • PEAPv0 -MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA)
Encryption	• 64-bit and 128-bit WEP • TKIP • 128-bit AES-CCMP

Table 32. Intel Wi-Fi 6 AX201 2x2 (Gig+) + Bluetooth 5.2 specifications (continued)

Feature	Values
	• 256-bit AES-GCMP
Product safety	• UL • C-UL • CB(IEC60950-1)
Management capabilities alerting	Support for Intel AMT
Government compliance	• FIPS 140-2 • FISMA
Client utility	Intel PRO/Set Wireless Software v21 and later
Antenna diversity	Supported
Radio On/Off	Supported
Roaming	Support seamless roaming between access points
Wake On wireless	Supported
Wireless display	Native Miracast support by Windows 10
Wireless PAN standard	Dual Mode Bluetooth 5.2, BLE
Bluetooth version	Bluetooth 5.2
Bluetooth data rates	Up to 3 Mbps
Bluetooth operating frequency bands	2.4 GHz
Bluetooth profiles supported	Support for Microsoft Inbox Bluetooth profiles in Windows 10
Bluetooth data encryption	128-bit encryption
Bluetooth output power	Power class 1
Temperature	• Operating temperature 0°C to + 50°C (Full performance at shield temperatures up to 80°C) • Storage temperature of -40°C to +70°C
Humidity	Up to 90% RH non-condensing (at temperatures of 25°C to 35°C)

Graphics options

Intel UHD 630 Graphics

Table 33. Intel UHD 630 Graphics specifications

Intel UHD 630 Graphics	
Bus Type	Integrated
Memory Type	UMA
Graphics Level	10th Generation Intel Core i3/i5: GT2 (UHD)

Table 33. Intel UHD 630 Graphics specifications (continued)

Intel UHD 630 Graphics	
Overlay Planes	Yes
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5
Supports maximum resolution	• DP: 4096 x 2304 @60 Hz, 24 bpp • Option DP: 4096 x 2304 @60 Hz • Option USB type-C Alt mode: 4096 x 2304 @60 Hz • Option VGA: 1920 x 1200 @60 Hz • Option HDMI2.0: 4096 x 2160 @60 Hz
Number of display supported	Up to three displays supported
Multiple Display Support	Two motherboard integrated DP1.4 HBR2 + One video option (VGA/DP1.4 HBR2/HDMI2.0/USB3.2 Gen2 Type-C Alt-mode)
External Connectors	Two MB integrated DP1.4 HBR2 + One video option (VGA/ DP1.4 HBR2/HDMI2.0b/USB3.2 Gen2 Type-C Alt-mode)

Intel UHD Graphics 730

Table 34. Intel UHD Graphics 730 specifications

Intel UHD 730 Graphics	
Bus Type	Integrated
Memory Type	Shared memory
Graphics Level	11th Generation Intel Core i5-11400
Overlay Planes	Yes
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL (4.6)
Supports maximum resolution	• DP: 4096 x 2304 @60 Hz, 24 bpp • Option DP: 4096 x 2304 @60 Hz • Option USB type-C Alt mode: 4096 x 2304 @60 Hz • Option VGA: 1920 x 1200 @60 Hz • Option HDMI2.0: 4096 x 2160 @60 Hz
Number of display supported	Up to three displays supported
Multiple Display Support	Two system-board integrated DP1.4 HBR2 + One video option (VGA/DP1.4 HBR2/HDMI2.0/USB3.2 Gen2x2 type-C Alt-mode)
External connectors	Two system-board integrated DP1.4 HBR2 + One video option (VGA/DP1.4 HBR2/HDMI2.0/USB3.2 Gen2 type-C Alt-mode)

Intel UHD Graphics 750

Table 35. Intel UHD Graphics 750 specifications

Intel UHD 750 Graphics	
Bus Type	Integrated
Memory Type	Shared memory
Graphics Level	11th Generation Intel Core i5/i7/i9

Table 35. Intel UHD Graphics 750 specifications (continued)

Intel UHD 750 Graphics	
Overlay Planes	Yes
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5
Supports maximum resolution	• DP: 4096 x 2304 @60 Hz, 24 bpp • Option DP: 4096 x 2304 @60 Hz • Option USB type-C Alt mode: 4096 x 2304 @60 Hz • Option VGA: 1920 x 1200 @60 Hz • Option HDMI2.0: 4096 x 2160 @60 Hz
Number of display supported	Up to three displays supported
Multiple Display Support	Two system-board integrated DP1.4 HBR2 + One video option (VGA/DP1.4 HBR2/HDMI2.0/USB3.2 Gen2x2 type-C Alt-mode)
External connectors	Two system-board integrated DP1.4 HBR2 + One video option (VGA/DP1.4 HBR2/HDMI2.0/USB3.2 Gen2 type-C Alt-mode)

AMD Radeon RX 640

Table 36. AMD Radeon RX 640 specifications

Feature	Values
GPU frequency	1.2 GHz
DirectX	12
Shader model	5.0
Open CL	2.0
Open GL	4.5
GPU memory interface	128 bit
PCIe bus	PCIe 3.0 x8
Display support	• Two Mini DisplayPorts • One DisplayPort
Graphics memory configuration	4 GB, GDDR5
Graphics memory clock speed	7 Gbps
Active fan sink	4-pin embedded fan controller
Slot number	Single slot
PCB form factor	Low profile
PCB layer	6 layer
PCB solder mask	Green
Bracket form factor	Low profile

Table 36. AMD Radeon RX 640 specifications (continued)

Feature	Values
Maximum resolution	5120 x 2880
Power consumption	50 W
3D mark performance	3DMark 11 (P): 5315

Video port and resolution matrix

Table 37. Video port and resolution matrix

Port type	DP++ 1.4/HDCP 2.3 port (UMA and Discrete Graphics)	HDMI-OUT port—HDMI 1.4b (UMA Graphics)	HDMI-OUT port—HDMI 2.0 (Discrete Graphics)
Maximum resolution—single display	4096 x 2304 @ 60 Hz	4096 x 2160 @ 30 Hz	4096 x 2160 @ 60 Hz
Maximum resolution—dual MST	4096 x 2304 @ 60 Hz, 1400 x 1050 @ 60 Hz or 2880 x 1800 @ 60 Hz, 2880 x 1800 @ 60 Hz	Not applicable	Not applicable
Maximum resolution—triple MST	4096 x 2304 @ 60 Hz, 1360 x 768 @ 60 Hz, 640 x 480 @ 60 Hz or 2304 x 1440 @ 60 Hz, 2304 x 1440 @ 60 Hz, 2304 x 1440 @ 60 Hz	Not applicable	Not applicable

HDD Preloaded bracket and cable matrix

Table 38. HDD Preloaded bracket and cable matrix

Hard drive Preloaded bracket	Available
3.5-inch Caddy/Bracket	No
2.5-inch Caddy/Bracket	No

Supported hard drives

2.5-inch, 1 TB, 5400 RPM, SATA, HDD

Table 39. 2.5-inch, 1 TB, 5400 RPM, SATA, HDD specifications

Capacity	1 TB
Speed	5400 RPM
Height (approximate)	70.10 mm (2.76 in.)
Width (approximate)	70.10 mm (2.76 in.)
Depth (approximate)	100.58 mm (3.96 in.)
Interface	SATA 3.0
Speed (maximum)	Up to 6 Gbps
MTBF	550,000 hours
Logical blocks	976,773,168
Power source	

Table 39. 2.5-inch, 1 TB, 5400 RPM, SATA, HDD specifications (continued)

Power consumption (reference only)	• Idle: 0.7 W • Active: 3.10 W
Environmental operating conditions (non-condensing)	
Temperature range	5°C to 60°C
Relative humidity range	5% to 90%
Op shock	350G @2ms
Environmental non-operating conditions (non-condensing)	
Temperature range	-40°C to 65°C
Relative humidity range	5% to 95%

2.5-inch 2 TB 5400 RPM SATA Hard-Disk Drive

Table 40. 2.5-inch 2 TB 5400 RPM SATA Hard-Disk Drive

Capacity (GB)	2 TB HDD 5400 RPM
Dimensions (W x D x H)	Approximately (2.75 in. x 3.937 in. x 0.276 in.)
Interface type and maximum speed	Up to 6 Gb/s (SATA 3.0)
MTBF	550,000 hours
Logical blocks	3,907,029,168
Power source	
Power consumption (reference only)	Idle 0.7 W, Active 3.10 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	5°C to 60°C
Relative humidity range	5% to 90%
Op shock (@ 2ms)	350 G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 65°C
Relative humidity range	5% to 90%

2.5-inch 500 GB 7200 RPM SATA Hard-Disk Drive

Table 41. 2.5-inch 500 GB 7200 RPM SATA Hard-Disk Drive

Features	Specifications
Capacity (GB)	500 GB HDD 7200 RPM
Dimensions (W x D x H)	2.75 in. x 3.955 in. x 0.276 in.
Interface type and Maximum speed	Up to 6 Gb/s (SATA 3.0)
MTBF	550,000 hours

Table 41. 2.5-inch 500 GB 7200 RPM SATA Hard-Disk Drive (continued)

Features	Specifications
Logical Blocks	976,773,168
Power Source	
Power Consumption (reference only)	Idle 0.7 W, Active 3.25 W
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5°C to 60°C
Relative Humidity Range	5 to 90%
Op Shock (@2 ms)	350G
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40°C to 65°C
Relative Humidity Range	5 to 95%

2.5-inch 1 TB 7200 RPM SATA Hard-Disk Drive

Table 42. 2.5-inch 1TB 7200 RPM SATA Hard-Disk Drive

Features	Specifications
Capacity (TB)	1 TB HDD 7200 RPM
Dimensions (W x D x H)	2.75 in. x 3.955 in. x 0.276 in.
Interface type and Maximum speed	Up to 6 Gb/s (SATA 3.0)
MTBF	550,000 hours
Logical Blocks	1,953,525,168
Power Source	
Power Consumption (reference only)	Idle 0.7 W, Active 3.25 W
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5°C to 60°C
Relative Humidity Range	5 to 90%
Op Shock (@2 ms)	350G
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40°C to 65°C
Relative Humidity Range	5 to 95%

2.5-inch 500 GB SATA 7200 RPM Opal Self-Encrypting FIPS Hard-Disk Drive

Table 43. 2.5-inch 500 GB SATA 7200 RPM Opal Self-Encrypting FIPS Hard-Disk Drive

Features	Specifications
Capacity (GB)	500 GB HDD 7200 RPM OPAL SED FIPS
Dimensions (inches) (W x D x H)	2.75 x 3.955 x 0.276
Interface type and Maximum speed	Up to 6 Gb/s (SATA 3.0)

Table 43. 2.5-inch 500 GB SATA 7200 RPM Opal Self-Encrypting FIPS Hard-Disk Drive (continued)

Features	Specifications
MTBF	550,000 hours
Logical Blocks	976,773,168
Power Source	
Power Consumption (reference only)	Idle 0.7 W, Active 3.25 W
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5°C to 60°C
Relative Humidity Range	5 to 90%
Op Shock (@2 ms)	350G
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40°C to 65°C
Relative Humidity Range	5 to 95%

M.2 2230, 128 GB, PCIe NVMe Gen3 x4, Class 35 SSD

Table 44. M.2 2230, 128 GB, PCIe NVMe Gen3 x4, Class 35 SSD specifications

Capacity	128 GB
Height (approximate)	2.38 mm (0.09 in.)
Width (approximate)	22.00 mm (0.87 in.)
Depth (approximate)	30.00 mm (1.18 in.)
Interface type	PCIe Gen3
Speed (maximum)	32 Gb/s (up to 4 lanes)
MTBF	1.4M hours
Logical blocks	250,069,680
Power source	
Power consumption (reference only)	• Idle: 5 mW (PS4) • Active: 3.50 W
Environmental operating conditions (non-condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Op shock	1500G
Environmental non-operating conditions (non-condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2230, 256 GB, PCIe NVMe Gen3 x4, Class 35 SSD

Table 45. M.2 2230, 256 GB, PCIe NVMe Gen3 x4, Class 35 SSD specifications

Capacity	256 GB

Table 45. M.2 2230, 256 GB, PCIe NVMe Gen3 x4, Class 35 SSD specifications (continued)

Height (approximate)	2.38 mm (0.09 in.)
Width (approximate)	22.00 mm (0.87 in.)
Depth (approximate)	30.00 mm (1.18 in.)
Interface type	PCIe Gen3
Speed (maximum)	32 Gb/s (up to 4 lanes)
MTBF	1.4M hours
Logical blocks	500,118,192
Power source	
Power consumption (reference only)	• Idle: 5 mW (PS4) • Active: 3.50 W
Environmental operating conditions (non-condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Op shock	1500G
Environmental non-operating conditions (non-condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2230, 512 GB, PCIe NVMe Gen3 x4, Class 35 SSD

Table 46. M.2 2230, 512 GB, PCIe NVMe Gen3 x4, Class 35 SSD specifications

Capacity	512 GB
Height (approximate)	2.38 mm (0.09 in.)
Width (approximate)	22.00 mm (0.87 in.)
Depth (approximate)	30.00 mm (1.18 in.)
Interface type	PCIe Gen3
Speed (maximum)	32 Gb/s (up to 4 lanes)
MTBF	1.4M hours
Logical blocks	1,000,215,216
Power source	
Power consumption (reference only)	• Idle: 5 mW (PS4) • Active: 3.50 W
Environmental operating conditions (non-condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Op shock	1500G
Environmental non-operating conditions (non-condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 256 GB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Table 47. M.2 2280 256 GB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Features	Specifications
Capacity	256 GB
Dimensions	22.00 mm x 80.00 mm x 2.38 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s
MTTF	1.4 M hours
Logical blocks	500,118,192
Power Source	
Power consumption (reference only)	• Idle : 5 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 512 GB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Table 48. M.2 2280 512 GB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Features	Specifications
Capacity	512 GB
Dimensions	22.00 mm x 80.00 mm x 2.38 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s
MTTF	1.4 M hours
Logical blocks	1000,215,216
Power Source	
Power consumption (reference only)	• Idle : 5 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%

Table 48. M.2 2280 512 GB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive (continued)

Features	Specifications
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 1 TB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Table 49. M.2 2280 1 TB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Features	Specifications
Capacity	1 TB
Dimensions	22.00 mm x 80.00 mm x 3.73 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s
MTTF	1.4 M hours
Logical blocks	2000,409,264
Power Source	
Power consumption (reference only)	• Idle : 5 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 2 TB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Table 50. M.2 2280 2 TB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive

Capacity	2 TB
Dimensions	22.00 mm x 80.00 mm x 3.73 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s
MTTF	1.4 M hours

Table 50. M.2 2280 2 TB Gen 3 PCIe x4 NVMe Class 40 Solid-State Drive (continued)

Logical blocks	4000,797,360
Power Source	
Power consumption (reference only)	• Idle : 5 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 2 TB PCIe NVMe Gen 4x4 Class 40 Solid-State Drive

Table 51. M.2 2280 2 TB PCIe NVMe Gen 4x4 Class 40 Solid-State Drive

Capacity	2 TB
Dimensions	22.00 mm x 80.00 mm x 3.73 mm
Interface type and maximum speed	Gen 4x4 PCIe 64 Gb/s
MTTF	1.4 M hours
Logical blocks	4000,797,360
Power Source	
Power consumption (reference only)	• Idle: 5 mW (PS4) • Active: 5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 256 GB Gen 3 PCIe x4 NVMe Opal Self-Encrypting Class 40 Solid-State Drive

Table 52. M.2 2280 256 GB Gen 3 PCIe x4 NVMe Opal Self-Encrypting Class 40 Solid-State Drive

Features	Specifications
Capacity	256 GB
Dimensions	22.00 mm x 80.00 mm x 2.38 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s (Up to 4 lanes)
MTTF	1.4 M hours
Logical blocks	500,118,192
Power Source	
Power consumption (reference only)	• Idle : 5 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C
Relative humidity range	10% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-40°C to 70°C
Relative humidity range	5% to 95%

M.2 2280 512 GB Gen 3 PCIe x4 NVMe Opal Self-Encrypting Class 40 Solid-State Drive

Table 53. M.2 2280 512 GB Gen 3 PCIe x4 NVMe Opal Self-Encrypting Class 40 Solid-State Drive

Features	Specifications
Capacity	512 GB
Dimensions	22.00 mm x 80.00 mm x 2.3 mm
Interface type and maximum speed	Gen 3 PCIe 32 Gb/s
MTTF	1.6 M hours
Logical blocks	1000,215,216
Power Source	
Power consumption (reference only)	• Idle : 10 mW (PS4) • Active : 4.5 W
Environmental Operating Conditions (Non-Condensing)	
Temperature range	0°C to 70°C

Table 53. M.2 2280 512 GB Gen 3 PCIe x4 NVMe Opal Self-Encrypting Class 40 Solid-State Drive (continued)

Features	Specifications
Relative humidity range	5% to 90%
Non-op shock (@0.5 ms)	1500G
Environmental Non-Operating Conditions (Non-Condensing)	
Temperature range	-10°C to 85°C
Relative humidity range	5% to 95%

M.2 2280 512 GB PCIe NVMe Intel Optane memory Solid-State Drive

Table 54. M.2 2280 512 GB PCIe NVMe Intel Optane memory Solid-State Drive

Features	Specifications	
Capacity	512	32
Dimensions	22 mm x 80 mm x 2.3 mm	
Interface type and maximum speed	PCIe Gen3.32 Gb/s	
MTTF	1.6 M hours	
Logical blocks	1,000,215,216	
Power Source		
Power consumption (reference only)	• Idle : 10 mW • Active : 4.5 W	
Environmental Operating Conditions (Non-Condensing)		
Temperature range	0°C to 70°C	
Relative humidity range	5% to 95%	
Non-op shock (@0.5 ms)	1500G	
Environmental Non-Operating Conditions (Non-Condensing)		
Temperature range	-10°C to 85°C	
Relative humidity range	5% to 95%	

Accessories

Table 55. Accessories

Accessories	
Audio	• Dell Pro Stereo Headset - UC350

Table 55. Accessories (continued)

Accessories	
	• Dell Pro Stereo Soundbar - AE515M
Keyboard and Mice	• Dell Pro Wireless Keyboard and Mouse - KM5221W
Cable cover	OptiPlex Micro Cable Cover
Monitors	• Dell 22 Monitor - P2219H • Dell 24 Monitor - P2419H
Stands and Mounts	• Dell Micro All-in-One Stand • Dell Single Monitor Arm • OptiPlex Micro AIO Mount for E Series Monitors • OptiPlex Micro Dual VESA Mount with Adapter Bracket • OptiPlex Micro DVD+/-RW Enclosure • OptiPlex Micro Vertical Stand • OptiPlex Micro VESA Mount with Adapter Bracket

Security

Software security

Table 56. Software security

Security options
McAfee Small Business Security 30 Day Free Trial
McAfee Small Business Security 12-month subscription
McAfee Small Business Security 36 month Subscription
Intel Guard Technologies & Secure Key: Software Guard (SGX), Data Guard (vPro only), Boot Guard, BIOS Guard (Core CPU's only), OS Guard (Core CPU's only) and Secure Key (i5 or greater only)
Intel Runtime BIOS Resilience (Copper Point) with attestation via Nifty Rock + Intel TXT
Support of Absolute Persistent Module BIOS agent v2
OpenXT validation required
SafeGuard and Response, powered by VMware Carbon Black and Secureworks
Next Generation Antivirus (NGAV)
Endpoint Detection and Response (EDR)
Threat Detection and Response (TDR)
Managed Endpoint Detection and Response
Incident Management Retainer
Emergency Incident Response
SafeData

Hardware security

Table 57. Hardware security

Security options
Kensington security-cable slot
Padlock loop
SafeID including Trusted Platform Module (TPM) 2.0
Smart card keyboard (FIPS)
Microsoft 10 Device Guard and Credential Guard (Enterprise SKU)
Microsoft Windows BitLocker
Local hard drive data wipe through BIOS (Secure Erase)
Self-encrypting storage drives (Opal, FIPS)
Trusted Platform Module TPM 2.0
China TPM
Intel Secure Boot
Intel Authenticate
SafeBIOS: includes Dell Off-host BIOS Verification, BIOS Resilience, BIOS Recovery, and additional BIOS Controls
Physical Security Options: Chassis Intrusion Switch, Lockable Cable Cover, Supply chain tamper alerts.

Military specifications

The OptiPlex 7090meets military specifications for the following MIL-STD 810G tests:

Table 58. Micro - Military specifications

Test Category	Test Method	Test Parameters
Non-operating altitude test	Method 500.5 Procedure I	Test specification: • Altitude: 15,000 ft • Temperature: 21°C
Operating altitude test	Method 500.5 Procedure II	Test specification: • Altitude: 15,000 ft • Temperature: 21°C
Non-operating high temperature test	Method 501.5 Procedure I	Test specification: • High temperature cycles, climatic category A1 - Hot dry • Duration: 7 cycles
Non-operating low temperature test	Method 502.5 Procedure I	Test specification: • Temperature: -51°C • Duration: 24 hours
Operating low temperature test	Method 502.5 Procedure II	Test specification: • Temperature: -29°C • Duration: 24 hours
Humidity test	Method 507.5 Procedure I	Induced B3 and nature B3

Table 58. Micro - Military specifications (continued)

Test Category	Test Method	Test Parameters
		• Duration: 15 days exposure Induced B3, Non-operating • Duration: 15 days exposure Nature B3, Operating
Mechanical shock test - I Bench handling	Method 516.6 Procedure VI	Test specification: • The lifted edge of the chassis has been raised 100 mm (4 in.) above the horizontal bench top.
Blowing dust test	Method 510.5 Procedure I	Test specification: • Temperature: 25°C and 60°C • Dust concentration: (10.5±7) g/m³ • Air flow velocity: 8.9 m/s
Operating vibration test	Method 514.6 Procedure I	Refer table 514.6: Category 4 - common carrier
Non-operating vibration test	Method 514.6 Procedure I	Refer table 514.6: Category 24 - General minimum integrity exposure
Mechanical shock test - II operating	NA	Test specification: • Pulse shape: Half-sine • Acceleration: 185 g • Pulse duration: 2 ms • Shock direction: 6 faces (±X, ±Y, ±Z axes) • No. of shock: 1 shock/ face (total 6 shocks)
Mechanical shock test - III non-operating	NA	Test specification: • Pulse shape: Trapezoidal • Acceleration: 30 g • Velocity change: 304 inch/second • Shock direction: 6 faces (±X, ±Y, ±Z axes) • No. of shock: 1 shock/ face (total 6 shocks)
Mechanical shock test - IV Non-operating	NA	Test specification: • Pulse shape: Half-sine • Acceleration: 185 g • Pulse duration: 2 ms • Shock direction: 6 faces (±X, ±Y, ±Z axes) • No. of shock: 1 shock/ face (total 6 shocks)

Acoustic Noise Emission Information

Table 59. Declared Sound Power (LWAd)

Operating Mode	Declared Sound Power(LWAd)
Idle	2.9

Table 59. Declared Sound Power (LWAd) (continued)

Operating Mode	Declared Sound Power(LWAd)
HDD Operating	3.2
ODD Operating	N/A

Table 60. A-Weighted Sound Pressure Level (dB)

Declared Sound Pressure (LpA)				
	Tabletop System		Floor Standing System	
Operating Mode	Operator Position	Bystander Position	Operator Position	Bystander Position
Idle	17.9	16.5	N/A	N/A
HDD Operating	22.5	19.2	N/A	N/A
ODD Operating	N/A	N/A	N/A	N/A

All tests are conducted according to ISO 7779 and declared according to ISO 9296 except CPU Stressed. This test mode is not specified in ISO 7779, but was measured using the same microphone distances and measurement techniques defined for the other reported operating modes.

Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

Chassis enclosure and ventilation requirements

Enclosure ventilation

If your enclosure has doors, they need to be of a type that allows at least 30% airflow through the enclosure (front and back).

Enclosure minimum clearance

Leave a 10.2 cm (4 in.) minimum clearance on all vented sides of the computer to permit the airflow required for proper ventilation.

Recommended enclosure

Do not install your computer in an enclosure that does not allow airflow/dusty environment/temperate over 35ºC. Do not put any objects to directly block air-vent. This restricts the airflow and impacts your computer's performance, possibly causing it to overheat.

Open desk minimum clearance

If your computer is installed in a corner, on a desk, or under a desk, leave at least 5.1 cm (2 in.) clearance from the back of the computer to the wall to permit the airflow required for proper ventilation.

Systems management features

Systems Management—From On-Premises To The Cloud

Dell Client Command Suite—A free toolkit available for download, for all OptiPlex PCs at https://dell.com/command, automates and streamlines systems management tasks, saving time, money, and resources. It consists of the following modules that can be used independently, or with various systems management consoles such as SCCM.

- **Dell Command | Deploy**—Enables easy operating system deployment across all major Operating System (OS) deployment methodologies and provides numerous system-specific drivers that have been extracted and reduced to an Operating System-consumable state.
- **Dell Command I Configure**—A graphical user interface (GUI) admin tool for configuring and deploying hardware settings in a pre-Operating System or post-Operating System environment. It operates seamlessly with SCCM and Airwatch and can be self-integrated into LANDesk and KACE. Command I Configure allows you to remotely automate and configure over 150+ BIOS settings for a personalized user experience.
- **Dell Command I PowerShell Provider**—Can do the same things as Command I Configure, but with a different method. PowerShell is a scripting language that allows customers to create a customized and dynamic configuration process.

- **Dell Command I Monitor**—A Windows Management Instrumentation (WMI) agent that provides IT administrators with an extensive inventory of the hardware and health-state data. IT administrators can also configure hardware remotely by using command line and scripting.
- **Dell Command | Update (end-user tool)**—A factory-installed software and allows IT administrators to individually manage and automatically present, install Dell updates to the BIOS drivers, and software. Command Update eliminates the time-consuming process of update installation.
- **Dell Command I Update Catalog**—Provides searchable metadata that allows the management console to retrieve the latest system-specific updates (driver, firmware, BIOS). The updates are then delivered seamlessly to end-users using the customer's systems management infrastructure that is consuming the catalog (like SCCM).
- **Dell Command | vPro Out of Band console**—Extends hardware management to systems that are offline or have an un-reachable Operating System (Dell exclusive features).
- **Dell Command | Integration Suite for System Center**—Integrates all the key components of the Client Command Suite into Microsoft System Center Configuration Manager 2012 and Current Branch versions.

4

Getting help

Contacting Dell

Prerequisites

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.

About this task

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

Steps

1. Go to **Dell.com/support**.
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.