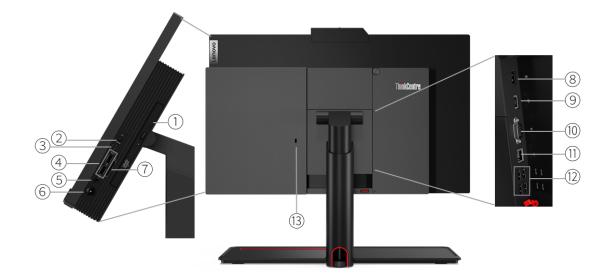
# **OVERVIEW**



1. Optical drive *	8. DisplayPort
2. Microphone mute button	9. Power connector
3. USB-C 3.2 Gen 1	10. Serial *
4. 2x USB 3.2 Gen 2	11. Ethernet (RJ-45)
5. Headphone / microphone combo jack (3.5mm)	12. 4x USB 3.2 Gen 1
6. Power button	13. Kensington Security Slot
7. Card reader *	

Notes:

• Items with \* are only available on selected models

# ThinkCentre M90a

# PERFORMANCE

## **Processor**

#### **Processor Family**

Intel® Celeron®, Intel Pentium®, or 10th Generation Intel Core™ i3 / i5 / i7 / i9 Processor

### Processor\*\*

Processor Name	Cores	Threads	Base Frequency	Max Frequency	Cache	Memory Support	Processor Graphics
Celeron G5900	2	2	3.4GHz	-	2MB	DDR4-2666	Intel UHD Graphics 610
Celeron G5905	2	2	3.5GHz	-	4MB	DDR4-2666	Intel UHD Graphics 610
Celeron G5920	2	2	3.5GHz	-	2MB	DDR4-2666	Intel UHD Graphics 610
Celeron G5925	2	2	3.6GHz	-	4MB	DDR4-2666	Intel UHD Graphics 610
Pentium Gold G6400	2	4	4.0GHz	-	4MB	DDR4-2666	Intel UHD Graphics 610
Pentium Gold G6500	2	4	4.1GHz	-	4MB	DDR4-2666	Intel UHD Graphics 630
Pentium Gold G6600	2	4	4.2GHz	-	4MB	DDR4-2666	Intel UHD Graphics 630
Core i3-10100	4	8	3.6GHz	4.3GHz <sup>[1]</sup>	6MB	DDR4-2666	Intel UHD Graphics 630
Core i3-10300	4	8	3.7GHz	4.4GHz <sup>[2]</sup>	8MB	DDR4-2666	Intel UHD Graphics 630
Core i3-10320	4	8	3.8GHz	4.6GHz <sup>[3]</sup>	8MB	DDR4-2666	Intel UHD Graphics 630
Core i5-10400	6	12	2.9GHz	4.3GHz <sup>[4]</sup>	12MB	DDR4-2666	Intel UHD Graphics 630
Core i5-10500	6	12	3.1GHz	4.5GHz <sup>[5]</sup>	12MB	DDR4-2666	Intel UHD Graphics 630
Core i5-10600	6	12	3.3GHz	4.8GHz <sup>[6]</sup>	12MB	DDR4-2666	Intel UHD Graphics 630
Core i7-10700	8	16	2.9GHz	4.8GHz <sup>[7]</sup>	16MB	DDR4-2933	Intel UHD Graphics 630
Core i9-10900	10	20	2.8GHz	5.2GHz <sup>[8]</sup>	20MB	DDR4-2933	Intel UHD Graphics 630

#### Notes:

[1], [2], [3], [4], [5], [6], [7], [8] Intel Max Turbo frequency will vary depending on application workload and the hardware and software configurations, see

http://www.intel.com/technology/turboboost/ for more information.

# **Operating System**

#### **Operating System**\*\*

- Ubuntu Linux<sup>[1]</sup>
- Windows® 10 Home 64
- Windows 10 Home 64 Single Language
- Windows 10 IoT Enterprise<sup>[2]</sup>
- Windows 10 Pro 64
- Windows 11 DG Windows 10 Pro 64
- Windows 11 Home Single Land
- Windows 11 Home Single Language
  Windows 11 Pro
- Windows 11 Pro
- No operating system

#### Notes:

[1], [2] Special bid only.

# Graphics

## Graphics\*\*

Graphics	Туре	Memory	Connector	Max Resolution	Key Features
Intel UHD graphics 610	Integrated	Shared	1x DP 1.2	4096x2304@60Hz(DP)	DirectX® 12
Intel UHD graphics 630	Integrated	Shared	1x DP 1.2	4096x2304@60Hz(DP)	DirectX 12
AMD Radeon™ 625	Discrete	2GB GDDR5	1x DP 1.2	4096x2304@60Hz(DP)	DirectX 12

# **Monitor Support**

#### **Monitor Support**

Supports up to 2 independent displays via native display and 1 external monitor; supports external monitor via DisplayPort™

# Chipset

### Chipset

Intel Q470 chipset

# Memory

Max Memory<sup>[1]</sup>

Up to 64GB DDR4-2933

#### **Memory Slots**

Two DDR4 DIMM slots, dual-channel capable

#### Memory Type\*\*

- DDR4-2666
- DDR4-2933

Notes:

[1] The max memory is based on the test results with current Lenovo® memory offerings.

# Storage

#### Storage Support<sup>[1]</sup>

Up to three drives, 2x 2.5" HDD + 1x M.2 SSD

- 2.5" HDD up to 2TB each
- M.2 SSD up to 1TB
- Optional Intel Optane™ Memory, M.2

#### Storage Type\*\*\*

Disk Type	Interface	RPM	Security
2.5" SATA HDD	SATA 6Gb/s	5.4K	-
2.5" SATA HDD	SATA 6Gb/s	7.2K	-
M.2 2242 SSD	PCIe® NVMe®, PCIe 3.0 x2	-	-
M.2 2280 SSD	PCIe NVMe, PCIe 3.0 x4	-	-
M.2 2280 SSD	PCIe NVMe, PCIe 3.0 x4	-	Opal
Intel Optane Memory M10	PCIe NVMe, PCIe 3.0 x2	-	-

#### RAID<sup>[2]</sup>

RAID 0/1 support for HDDs

Notes:

[1] The max capacity of each disk type is based on the test results with current Lenovo storage offerings.[2] RAID is not preset by default, user can config RAID 0/1 according to the demand.

# **Removable Storage**

#### **Optical**\*\*

- DVD-ROM, SATA 1.5Gb/s, slim (9.0mm)
- DVD burner (DVD±RW), SATA 1.5Gb/s, slim (9.0mm)
- None

# Card Reader

- 3-in-1 card reader
- No card reader

# Multi-Media

Audio Chip

Lenovo

High Definition (HD) Audio, Realtek® ALC233 codec

#### Speakers

Stereo speakers, 3W x2

#### Microphone

Dual-microphone array

#### Camera\*\*

- FHD 1080p + IR, with ThinkShutter (physical switch on/off), Windows Hello support
- FHD 1080p, with ThinkShutter (physical switch on/off)
- No camera

### **Power Supply**

#### Power Supply\*\*

Power	Туре	Efficiency	Key Features
150W	Adapter	89%	Autosensing
170W	Adapter	89%	Autosensing

# DESIGN

# **Display**

#### Display\*\*[1][2]

Size	Resolution	Touch	Туре	Brightness	Surface	Aspect Ratio	Contrast Ratio	Color Gamut	Refresh Rate	Viewing Angle (L/R/U/D)	Key Features
23.8″	FHD (1920x1080)	None	IPS	250nits	Anti- glare	16:9	1000:1	72% NTSC	60Hz	89°/89°/89°/89°	Borderless design, support low blue light mode
23.8″	FHD (1920x1080)	Multi- touch	IPS	250nits	Anti- glare	16:9	1000:1	72% NTSC	60Hz	89°/89°/89°/89°	Borderless design, support low blue light mode
23.8″	FHD (1920x1080)	None	IPS	350nits	Anti- glare	16:9	1000:1	72% NTSC	60Hz	89°/89°/89°/89°	Borderless design, support low blue light mode, PrivacyGuard

#### Touchscreen

• Advanced In-cell Touch (AIT), supports 10-point touch

Non-touch

#### Notes:

[1] IPS (in-plane switching) technology may refer to IPS, PLS, ADS, AHVA, AAS.

[2] PrivacyGaurd is only available for MT 11JX.

## **Input Device**

#### Keyboard\*\*

- Lenovo Calliope Keyboard (USB connector), black
- Lenovo Calliope Wireless Keyboard (2.4GHz via USB receiver), black
- Lenovo Traditional Keyboard (USB connector), black
- No keyboard

#### Mouse\*\*

- Lenovo Calliope Mouse (USB connector), black
- Lenovo Calliope Wireless Mouse (2.4GHz via USB receiver), black

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- Lenovo Fingerprint Mouse (USB connector), Windows Hello support, black (EOL on Jan, 2023)
- No mouse

# Mechanical

#### Buttons

- Microphone mute button
- Power button
- PrivacyGuard on/off button (PrivacyGuard models only)

### Form Factor

#### AIO (23.8 inches)

#### Dimensions (WxDxH)<sup>[1]</sup>

Models	Dimensions
Models (with UltraFlex IV stand, with ODD, without PrivacyGuard, with camera)	Lowest in flat mode: 541 x 312.8 x 227.4 mm (21.3 x 12.3 x 9.0 inches) Highest in vertical mode: 541 x 232.7 x 467.7 mm (21.3 x 9.2 x 18.4 inches)
Models (with UltraFlex IV stand, without ODD, without PrivacyGuard, with camera)	Lowest in flat mode: 541 x 312.8 x 227.4 mm (21.3 x 12.3 x 9.0 inches) Highest in vertical mode: 541 x 232.7 x 467.7 mm (21.3 x 9.2 x 18.4 inches)
Models (with full function monitor stand, with ODD, with PrivacyGuard, with camera)	541 x 200 x 414.2-494.2 mm (21.3 x 7.9 x 16.3-19.5 inches)
Models (with full function monitor stand, with ODD, without PrivacyGuard, with camera)	541 x 200 x 414.2-494.2 mm (21.3 x 7.9 x 16.3-19.5 inches)
Models (with full function monitor stand, without ODD, with PrivacyGuard, with camera)	541 x 200 x 414.2-494.2 mm (21.3 x 7.9 x 16.3-19.5 inches)
Models (with full function monitor stand, without ODD, without PrivacyGuard, with camera)	541 x 200 x 414.2-494.2 mm (21.3 x 7.9 x 16.3-19.5 inches)
Models (without stand, without ODD, without PrivacyGuard, with camera)	541 x 46 x 340.5 mm (21.3 x 1.8 x 13.4 inches)
Models (without stand, without ODD, with PrivacyGuard, with camera)	541 x 49.5 x 340.5 mm (21.3 x 1.9 x 13.4 inches)
Models (without stand, with ODD, without PrivacyGuard, with camera)	541 x 57.8 x 340.5 mm (21.3 x 2.3 x 13.4 inches)
Models (without stand, with ODD, with PrivacyGuard, with camera)	541 x 61.3 x 340.5 mm (21.3 x 2.4 x 13.4 inches)

#### Weight<sup>[2]</sup>

Models	Weight
Models (without stand, without ODD, without PrivacyGuard, with camera)	Around 5.25 kg (11.6 lbs)
Models (without stand, with ODD, without PrivacyGuard, with camera)	Around 5.57 kg (12.3 lbs)
Models (without stand, without ODD, with PrivacyGuard, with camera)	Around 6.13 kg (13.5 lbs)
Models (without stand, with ODD, with PrivacyGuard, with camera)	Around 6.45 kg (14.2 lbs)
Models (with full function monitor stand, without ODD, without PrivacyGuard, with camera)	Around 7.51 kg (16.6 lbs)
Models (with full function monitor stand, with ODD, without PrivacyGuard, with camera)	Around 7.84 kg (17.3 lbs)
Models (with UltraFlex IV stand, without ODD, without PrivacyGuard, with camera)	Around 8.26 kg (18.2 lbs)
Models (with full function monitor stand, without ODD, with PrivacyGuard, with camera)	Around 8.39 kg (18.5 lbs)
Models (with UltraFlex IV stand, with ODD, without PrivacyGuard, with camera)	Around 8.58 kg (18.9 lbs)
Models (with full function monitor stand, with ODD, with PrivacyGuard, with camera)	Around 8.71 kg (19.2 lbs)

#### Case Color

# Black

Bays

• 2x 2.5" disk bay (2nd 2.5" HDD occupies ODD bay)

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• 1x slim ODD bay

#### **Expansion Slots**

Two M.2 slots (one for WLAN, one for SSD)

#### EOU

Toolless cover and stand assembly / removal

#### Stand\*\*

- UltraFlex IV stand, supports -5° to +70° tilt, up to 164mm lift (flat mode) / up to 115mm lift (vertical mode)
- Full function monitor stand, supports -5° to +30° tilt, up to 80mm lift
- No stand

#### Mounting

Supports VESA mount 100mm

#### Notes:

[1] The system dimensions may vary depending on configurations.

[2] The system weight is approximate and based on results in Lenovo lab, which varies depending on the source of component, variance of the distribution of each component, and manufacturing process. It may not be the exact weight for each specific model.

# CONNECTIVITY

## **Network**<sup>[1]</sup>

#### **Onboard Ethernet**

Gigabit Ethernet, Intel Ethernet Connection I219-LM, 1x RJ-45, supports Wake-on-LAN

#### **Optional Ethernet**

No optional Ethernet

#### WLAN + Bluetooth®\*\*

- Realtek RTL8822CE, 802.11ac Dual Band 2x2 Wi-Fi® + Bluetooth 5.0, M.2 card
- Intel Wireless-AC 9560, 802.11ac Dual Band 2x2 Wi-Fi + Bluetooth 5.1, M.2 card
- Intel Wi-Fi 6 AX201, 802.11ax 2x2 Wi-Fi + Bluetooth 5.1, Intel vPro® technology support, M.2 Card<sup>[2]</sup>
- No WLAN and Bluetooth

#### Notes:

[1] This system does not support Power Over Ethernet (PoE). If the system is used in a PoE environment, then a Network Isolator is required to prevent possible damage to the system, PoE equipment, or both.

[2] Bluetooth 5.2 is hardware ready but may run at a lower version due to OS limitations.

## Ports<sup>[1]</sup>

#### Rear Ports

- 4x USB 3.2 Gen 1 (one supports Smart Power On)
- 1x DisplayPort
- 1x Ethernet (RJ-45)

# **Optional Rear Ports**

## 1x serial

#### **Right Ports**

- 1x USB-C<sup>®</sup> 3.2 Gen 1 (5V/3A charging)
- 2x USB 3.2 Gen 2
- 1x headphone / microphone combo jack (3.5mm)

## **Optional Right Ports**

1x card reader

#### Notes:

<sup>[1]</sup> The transfer speed of following ports will vary and, depending on many factors, such as the processing speed of the host device, file attributes and other factors related to system configuration and your operating environment, will be slower than theoretical speed. USB 2.0: 480 Mbit/s;

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USB 3.2 Gen 1 (SuperSpeed USB 5Gbps, formerly USB 3.0 / USB 3.1 Gen 1): 5 Gbit/s; USB 3.2 Gen 2 (SuperSpeed USB 10Gbps, formerly USB 3.1 Gen 2): 10 Gbit/s; USB4® 20Gbps / USB 3.2 Gen 2x2 (SuperSpeed USB 20Gbps): 20 Gbit/s; USB4 40Gbps (USB 40Gbps): 40 Gbit/s; Thunderbolt™ 3/4: 40 Gbit/s.

# Monitor Cable

#### Monitor Cable\*\*\*

- DP to VGA dongle
- DP to dual DP dongle
- DP to DVI-D dongle
- DP to HDMI<sup>®</sup> dongle
- No monitor cable

# **SECURITY & PRIVACY**

## Security

#### **Security Chip**

Discrete TPM 2.0, TCG certified

#### **Physical Locks**

Kensington<sup>®</sup> Security Slot<sup>™</sup>, 3 x 7 mm

#### **Chassis Intrusion Switch**

- Chassis intrusion switch
- No chassis intrusion switch

#### **Fingerprint Reader**

- Touch style fingerprint reader on mouse (EOL on Jan, 2023)
- No fingerprint reader

#### **Other Security**

(Optional) ThinkShutter camera cover

#### **BIOS Security**

- Administrator password
- Power-on password
- Hard disk password
- Boot sequence control
- Boot without keyboard and mouse
- Self-healing BIOS
- Smart USB protection (allows keyboard / mouse only, blocks all storage devices)
- Individual USB port disablement

# MANAGEABILITY

## System Management

#### System Management<sup>[1]</sup>

- Intel vPro with Intel AMT 14<sup>[2]</sup>
- Non-vPro

#### Notes:

Require choosing a vPro-support Wi-Fi adapter to enable vPro function through wireless connection.
 Intel vPro offers a superset of DASH's defined capabilities.

# SERVICE

## **Warranty**<sup>III</sup>

#### Base Warranty\*\*

• 1-year courier or carry-in service

- 1-year limited onsite service
- 3-year limited onsite service
- No base warranty

#### Notes:

[1] The warranty upgrades may be bundled with some models, please check the "Included upgrade" column in the specific model's configurations. For more service extensions, please go to <u>https://smartfind.lenovo.com/</u>. To learn more details of warranty policy, please access <u>https://pcsupport.lenovo.com/warranty</u>.

# **ENVIRONMENTAL**

# **Operating Environment**

#### Temperature

- Operating: 5°C (41°F) to 35°C (95°F)
- Storage: -20°C (-4°F) to 60°C (140°F)

#### Humidity

Operating: 20% to 80%

#### Altitude

- Operating: 0 m (0 ft) to 3048 m (10,000 ft)
- Storage: 0 m (0 ft) to 12192 m (40,000 ft)

# **CERTIFICATIONS**

## **Green Certifications**<sup>III</sup>

#### Green Certifications<sup>[2]</sup>

- (Optional) ENERGY STAR<sup>®</sup> 8.0
- (Optional) EPEAT<sup>™</sup> Silver Registered<sup>[3]</sup>
- ErP Lot 3
- RoHS compliant
- TCO Certified 8.0
- TCO edge

Notes:

[1] The items listed under the "Green Certifications" section may not only refer to certification but also registration or selfdeclaration.

[2] Energy Star 8.0 and EPEAT are only available for MT 11CD/11CE, TCO 8.0 and TCO Edge are not for the models with PrivacyGaurd.

[3] EPEAT is registered where applicable, please see https://www.epeat.net for registration status by country.

## **Other Certifications**

#### **Other Certifications**

- (Optional) TÜV Rheinland® Eye Comfort Certification
- (Optional) TÜV Rheinland Ultra Low Noise
- TÜV Rheinland Low Blue Light

#### **Mil-Spec Test**

MIL-STD-810H military test passed (Low Pressure [Altitude], High Temperature, Low Temperature, Temperature Shock, Humidity, Sand and Dust, Vibration, Shock, Fungus, Solar Radiation)

- Feature with \*\* means that only one offering listed under the feature is configured on selected models.
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Lenovo PSREF Product Specifications Reference











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