#### PSREF Product Specifications Reference

# **OVERVIEW**



| 8. Microphone mute button                     |
|---|
| 9. PC / monitor mode switch                   |
| 10. 3x USB-A (USB 10Gbps)                     |
| 11. Card reader *                             |
| 12. Headphone / microphone combo jack (3.5mm) |
| 13. Power button                              |
|   |
|   |

Notes:

• Items with \* are only available on selected models

# ThinkCentre M90a Gen 5

# PERFORMANCE

## Processor

### **Processor Family**

### 13th / 14th Generation Intel® Core™ i3 / i5 / i7 Processor

## Processor\*\*

| Processor<br>Name | Cores                        | Threads                          | Base Frequency                    | Max Frequency   | Cache                      | Processor<br>Graphics      |
|-------------------|------------------------------|----------------------------------|-----------------------------------|---|----------------------------|----------------------------|
| Core i3-<br>13100 | 4 (4 P-core + 0<br>E-core)   |                                  |                                   | 12MB  | Intel® UHD<br>Graphics 730 |                            |
| Core i5-<br>13400 | 10 (6 P-core +<br>4 E-core)  | (16) $(16)$ $(27)$ $(27)$ $(27)$ |                                   | P-core 4.6GHz / E-core 3.3GHz                             | 20MB                       | Intel® UHD<br>Graphics 730 |
| Core i5-<br>13500 | 14 (6 P-core +<br>8 E-core)  | 20                               | P-core 2.5GHz / E-<br>core 1.8GHz | P-core 4.8GHz / E-core 3.5GHz                             | 24MB                       | Intel® UHD<br>Graphics 770 |
| Core i7-<br>13700 | 16 (8 P-core +<br>8 E-core)  | 24                               | P-core 2.1GHz / E-<br>core 1.5GHz | Max Turbo up to 5.2GHz / P-core<br>5.1GHz / E-core 4.1GHz | 30MB                       | Intel® UHD<br>Graphics 770 |
| Core i3-<br>14100 | 4 (4 P-core + 0<br>E-core)   | 8                                | P-core 3.5GHz                     | P-core 4.7GHz   | 12MB                       | Intel® UHD<br>Graphics 730 |
| Core i5-<br>14400 | 10 (6 P-core +<br>4 E-core)  | 16                               | P-core 2.5GHz / E-<br>core 1.8GHz | P-core 4.7GHz / E-core 3.5GHz                             | 20MB                       | Intel® UHD<br>Graphics 730 |
| Core i5-<br>14500 | 14 (6 P-core +<br>8 E-core)  | 20                               | P-core 2.6GHz / E-<br>core 1.9GHz | P-core 5.0GHz / E-core 3.7GHz                             | 24MB                       | Intel® UHD<br>Graphics 770 |
| Core i7-<br>14700 | 20 (8 P-core +<br>12 E-core) | 28                               | P-core 2.1GHz / E-<br>core 1.5GHz | Max Turbo up to 5.4GHz / P-core<br>5.3GHz / E-core 4.2GHz | 33MB                       | Intel® UHD<br>Graphics 770 |

# **Operating System**

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

- Windows® 11 Pro
- Windows® 11 Home
- Windows® 11 Home Single Language
- Windows® 11 DG Windows® 10 Pro 64
- No preload operating system

# Graphics

### Graphics\*\*

| Graphics                               | Туре       | Memory       | Max Resolution                               | Connector                                   | Key<br>Features |
|--|------------|--------------|--|---|-----------------|
| Intel® UHD graphics<br>730             | Integrated | Shared       | 4096x2160@60Hz(HDMI®),<br>4096x2160@60Hz(DP) | 1x HDMI <sup>®</sup> 2.1 TMDS, 1x<br>DP 1.4 | DirectX® 12     |
| Intel <sup>®</sup> UHD graphics<br>770 | Integrated | Shared       | 4096x2160@60Hz(HDMI®),<br>4096x2160@60Hz(DP) | 1x HDMI <sup>®</sup> 2.1 TMDS, 1x<br>DP 1.4 | DirectX® 12     |
| NVIDIA <sup>®</sup> GeForce<br>MX570A  | Discrete   | 4GB<br>GDDR6 | 4096x2160@60Hz(HDMI®),<br>4096x2160@60Hz(DP) | 1x HDMI <sup>®</sup> 2.1 TMDS, 1x<br>DP 1.4 | DirectX® 12     |

# **Monitor Support**

### **Monitor Support**

Supports up to 3 independent displays via native display and 2 external monitor; supports external monitors via DisplayPort<sup>™</sup> and HDMI<sup>®</sup>; work as standalone monitor via HDMI<sup>®</sup> (HDMI<sup>®</sup> in / out combo)

# Chipset

### Chipset

Intel<sup>®</sup> Q670 chipset

# Memory

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

- Models with Core i3/i5: Up to 64GB DDR5-4800
- Models with Core i7: Up to 64GB DDR5-5200

### Memory Slots

Two DDR5 SO-DIMM slots, dual-channel capable

### Memory Type\*\*

- DDR5-4800<sup>[2]</sup>
- DDR5-5200<sup>[3]</sup>
- DDR5-5600

### **Memory Protection**

Non-ECC

Notes:

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

[2] Installed memory is actually DDR5-5600 but may run as DDR5-4800 depending on the memory support capability of Intel<sup>®</sup>.

[3] Installed memory is actually DDR5-5600 but may run as DDR5-5200 depending on the memory support capability of Intel<sup>®</sup>.

## Storage

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

- Models with Intel<sup>®</sup> UHD graphics:
  - Up to two drives, 2x M.2 SSD
  - M.2 SSD up to 2TB each
- Models with NVIDIA® GeForce MX570A: Up to one drives, 1x M.2 SSD
  - M.2 SSD up to 2TB each

### Storage Type

| Disk Type    | Interface                 | Security |
|--------------|---------------------------|----------|
| M.2 2280 SSD | PCIe® NVMe®, PCIe® 4.0 x4 | Opal 2.0 |

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

- RAID 0/1 support for SSDs
- No support

Notes:

[1] The max capacity of each disk type is based on the test results with current Lenovo<sup>®</sup> storage offerings.[2] Only available for models with integrated graphics

# **Removable Storage**

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

- DVD-ROM, SATA connector, slim (9.0mm)
- DVD burner (DVD±RW), SATA connector, slim (9.0mm)
- None

## Card Reader

- 3-in-1 card reader (SD, SDHC, SDXC)
- No card reader

# Multi-Media

# Audio Chip

High Definition (HD) Audio, Realtek® ALC233NL-VB2-CG codec

## Speakers

Stereo speakers, 3W x2, Dolby Atmos®

## Microphone

- Dual-microphone array
- No microphone

### Camera\*\*

- 5.0-megapixel, IR + RGB hybrid, with ThinkShutter (physical switch on/off) and Human Presence Detection (Radar Sensor), ±20° view angle adjustable, Windows<sup>®</sup> Hello support
- 5.0-megapixel, IR + RGB hybrid, with ThinkShutter (physical switch on/off), ±20° view angle adjustable, Windows<sup>®</sup> Hello support
- 5.0-megapixel, with ThinkShutter (physical switch on/off)
- No camera

# **Power Supply**

## Power Supply\*\*

| Power | Туре  | Efficiency | Key Features         |
|-------|-------|------------|----------------------|
| 180W  | Fixed | 90%        | 100V - 240V, 50-60Hz |
| 230W  | Fixed | 92%        | 100V - 240V, 50-60Hz |

# DESIGN

# Display

### Display\*\*[1]

| Size  | Resolution         | Touch           | Туре | Brightness | Surface        | Aspect<br>Ratio | Contrast<br>Ratio | Color<br>Gamut | Refresh<br>Rate | Viewing<br>Angle<br>(L/R/U/D) | Key Features   |
|-------|--------------------|-----------------|------|------------|----------------|-----------------|-------------------|----------------|-----------------|-------------------------------|--|
| 23.8" | FHD<br>(1920x1080) | None            | IPS  | 250nits    | Anti-<br>glare | 16:9            | 1300:1            | 99%<br>sRGB    | 60Hz            | 89° / 89° /<br>89° / 89°      | 14ms response<br>Time, borderless<br>design, TÜV<br>Rheinland® Low<br>Blue Light<br>(Hardware<br>Solution), TÜV<br>Rheinland® Flicker<br>Free, Eyesafe®<br>Certified 2.0 |
| 23.8" | FHD<br>(1920x1080) | Multi-<br>touch | IPS  | 250nits    | Anti-<br>glare | 16:9            | 1000:1            | 72%<br>NTSC    | 60Hz            | 89° / 89° /<br>89° / 89°      | 14ms response<br>Time, borderless<br>design, TÜV<br>Rheinland® Low<br>Blue Light<br>(Sotware<br>Solution), TÜV<br>Rheinland® Flicker<br>Free                             |

#### 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.

# Input Device

### Keyboard\*\*

- Lenovo<sup>®</sup> Calliope Keyboard (USB connector), black
- Lenovo<sup>®</sup> Traditional Keyboard (USB connector), black
- Wireless EOS Keyboard, black
- No keyboard

### Mouse\*\*

- Wireless EOS Mouse, black
- Lenovo® Calliope Mouse (USB connector), black

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• No mouse

## Mechanical

### Buttons

- Microphone mute button
- Monitor / PC mode switch buttonPower button

# Form Factor

AIO (23.8 inches)

### Dimensions (WxDxH)[1]

| Models  | Dimensions  |
|---|---|
| Models (with tilt only stand, without camera)             | 539.6 x 213.38 x 434.39 mm (21.24 x 8.40 x 17.10 inches)  |
| Models (with tilt only stand, with camera)                | 539.6 x 213.38 x 453.39 mm (21.24 x 8.40 x 17.85 inches)  |
| Models (with full function monitor stand, without camera) | 539.6 x 217.31 x 374.15-483.16 mm (21.24 x 8.56 x 14.73-19.02 inches)   |
| Models (with full function monitor stand, with camera)    | 539.6 x 217.31 x 393.66-501.85 mm (21.24 x 8.56 x 15.50-19.76 inches)   |
| Models (without stand, without camera)                    | 539.6 x 49.6 x 352 mm (21.24 x 1.95 x 13.86 inches)   |
| Models (without stand, with camera)                       | 539.6 x 49.6 x 371 mm (21.24 x 1.95 x 14.61 inches)   |
| Models (with UltraFlex V stand, without camera)           | Lowest in flat mode: 539.6 x 341.42 x 219.50 mm (21.24 x 13.44 x 8.64 inches)<br>Highest in vertical mode: 539.6 x 252.60 x 451.51 mm (21.24 x 9.94 x 17.78 inches) |
| Models (with UltraFlex V stand, with camera)              | Lowest in flat mode: 539.6 x 344.19 x 227.54 mm (21.24 x 13.55 x 8.96 inches)<br>Highest in vertical mode: 539.6 x 252.60 x 472.00 mm (21.24 x 9.94 x 18.58 inches) |

### Packaging Dimensions (WxDxH)\*\*

- Models (with UltraFlex V stand): 690 x 545 x 238 mm (27.17 x 21.46 x 9.37 inches)
- Models (with full function monitor stand): 660 x 575 x 228 mm (25.98 x 22.64 x 8.98 inches)
- Models (with tilt only stand): 660 x 550 x 216 mm (25.98 x 21.65 x 8.50 inches)

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

| Models                                    | Weight                    |
|---|---------------------------|
| Models (with UltraFlex V stand)           | Around 7.83 kg (17.3 lbs) |
| Models (with full function monitor stand) | Around 8.13 kg (17.9 lbs) |
| Models (with tilt only stand)             | Around 7.61 kg (16.8 lbs) |
| Models (without stand)                    | Around 5.53 kg (12.2 lbs) |

### Packaging Weight

- Models (with UltraFlex V stand): 2.94 kg (6.5 lbs), packaging only
- Models (with full function monitor stand): 2.96 kg (6.5 lbs), packaging only
- Models (with tilt only stand): 2.73 kg (6.0 lbs), packaging only

## Case Color

### Black

## Bays

- 1x 2.5" disk bay (optional, only available via special bid)
- 1x slim ODD bay

## Expansion Slots

- Models with Intel $^{\rm \tiny 8}$  UHD graphics: Three M.2 slots (one for WLAN, two for SSD)
- Models with NVIDIA  $^{\rm \tiny 8}$  GeForce MX570A: Two M.2 slots (one for WLAN, one for SSD)

### EOU

Toolless cover, stand, motherboard shielding, and memory assembly / removal

### Stand\*\*

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- UltraFlex V stand, supports -5° to +70° tilt, up to 70°±2° lift (up to 179.96mm lift in flat mode / up to 84.37mm lift in vertical mode)
- Full function monitor stand, supports -5° to +20° tilt, left & right 45° swivel, 90° pivot, up to 110mm lift
- Tilt only stand, supports -5° to +20° tilt.
- No stand

## Mounting

Supports VESA mount 100mm

### Others

Supports Smart Power On

#### Notes:

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

[2] The system weight is approximate and based on results in Lenovo<sup>®</sup> 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

### **Onboard Ethernet**

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

### **Optional Ethernet**

#### No optional Ethernet

### WLAN + Bluetooth®\*\*

- Realtek® Wi-Fi® 6 RTL8852BE, 802.11ax Dual Band 2x2 Wi-Fi® + Bluetooth® 5.3, M.2 card<sup>[1]</sup>
- Intel<sup>®</sup> Wi-Fi<sup>®</sup> 6 AX201, 802.11ax 2x2 Wi-Fi<sup>®</sup> + Bluetooth<sup>®</sup> 5.2, M.2 Card<sup>[2]</sup>
- Intel<sup>®</sup> Wi-Fi<sup>®</sup> 6E AX211, 802.11ax 2x2 Wi-Fi<sup>®</sup> + Bluetooth<sup>®</sup> 5.3, Intel<sup>®</sup> vPro<sup>®</sup> technology support, M.2 Card<sup>[3]</sup>
- No WLAN and Bluetooth®

### Notes:

- [1], [3] Bluetooth<sup>®</sup> 5.3 requires Windows<sup>®</sup> 11.
- [2] Bluetooth<sup>®</sup> 5.2 requires Windows<sup>®</sup> 11.

### Ports<sup>III</sup>

### **Rear Ports**

- 1x USB-C<sup>®</sup> (USB 10Gbps / USB 3.2 Gen 2), with data transfer and 15W charging
- 3x USB-A (USB 5Gbps / USB 3.2 Gen 1)
- 1x HDMI<sup>®</sup> (HDMI<sup>®</sup> in 1.4 / HDMI<sup>®</sup> out 2.1 TMDS combo port)
- 1x DisplayPort<sup>™</sup> 1.4

### 1x Ethernet (RJ-45)

Optional Rear Ports

1x serial

### **Right Ports**

- 3x USB-A (USB 10Gbps / USB 3.2 Gen 2)
- 1x headphone / microphone combo jack (3.5mm)

### **Optional Right Ports**

1x card reader

#### Notes:

[1] 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;

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;

# **SECURITY & PRIVACY**

# Security

## Security Chip

Discrete TPM 2.0, TCG certified, FIPS 140-2 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

No fingerprint reader

### **Other Security**

- ThinkShutter camera cover (camera models)
- (Optional) Smart Human Presence Detection (Camera with Radar Sensor)

### **BIOS Security**

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

# MANAGEABILITY

# System Management

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

- Intel<sup>®</sup> vPro<sup>®</sup> Enterprise
- Non-vPro®

Notes:

[1] Intel<sup>®</sup> vPro<sup>®</sup> offers a superset of DASH's defined capabilities.

# SERVICE

## Warranty

### Base Warranty\*\*

- 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://support.lenovo.com/warrantylookup/warrantypolicy</u>.

# ACCESSORIES

# **Bundled Accessories**

### Bundled Accessories\*\*\*

- DP to DVI dongle
- DP to Dual DP dongle
- DP to HDMI<sup>®</sup> dongle
- DP to VGA dongle
- HDMI® to DVI dongle
- HDMI<sup>®</sup> to VGA dongle
- None

# **OPERATING REQUIREMENTS**

# **Operating Environment**

### Temperature

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

### **Relative 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**

- (Optional) ENERGY STAR<sup>®</sup> 8.0
- (Optional) EPEAT<sup>™</sup> Gold Registered
- ErP Lot 3
- GREENGUARD®
- RoHS compliant
- TCO Certified 9.0
- TCO edge

### Notes:

[1] The items listed under the "Green Certifications" section may not only refer to certification but also registration or self-declaration. For ESG & regulatory compliance documents, please visit <u>https://compliance.lenovo.com</u>.

# **Other Certifications**

### **Other Certifications**

- (Optional) TÜV Rheinland<sup>®</sup> Low Blue Light (Hardware Solution)
- (Optional) TÜV Rheinland® Low Blue Light (Software Solution)
- (Optional) TÜV Rheinland® Ultra Low Noise
- Eyesafe<sup>®</sup> Certified 2.0
- TÜV Rheinland<sup>®</sup> Flicker Free
  UL Anti-dust

# 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, Contamination by Fluids, Salt Fog)

- Feature with \*\* means that only one option listed under the feature can be configured on selected models. Please refer to the model configuration for specific information.
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