

## Detailed specifications - ThinkPad T510, T510i, W510

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### Architecture

#### Audio

- High Definition (HD) Audio
- Conexant CX20585 codec
- Volume up, down, and mute buttons
- Dual array microphone
- Mic mute button
- Combo audio/mic jack

#### Keyboard

- Embedded numeric keypad and integrated UltraNav dual-pointing system with wide touch pad below keyboard, Tap Zones, scrolling regions label, multi-touch; and TrackPoint and customized touch pad for the ultimate in pointing flexibility.
- ThinkVantage button, individual speaker volume up, down, and mute buttons, mic mute button
- The keyboard has a Fn key which is a special key and is located in the lower left corner. The Fn key allows the user to instantly activate the following operational features by pressing the Fn key and a designated function key:
  - Standby/Suspend/Hibernation
  - Switching between Display device
  - Multimedia
- Fingerprint reader is integrated into the palm rest of the ThinkPad notebook computer to prevent unauthorized access to your notebook and data
- Spill-resistant
- ThinkLight keyboard light illuminates the keyboard to improve visibility in low-light conditions

#### Memory

- PC3-8500 or PC3-10600 Non-Parity (NP) Double Data Rate Three (DDR3) Technology (\*)
- Dual-channel capable
- Two or four 204-pin SO-DIMM sockets (\*)
- 1GB, 2GB or 4GB memory
- Supports up to 8GB (for T510) or 16GB (for W510) maximum memory

**Note:** \* depending on system models

#### Mouse

- All systems come with the UltraNav dual-pointing system, featuring TrackPoint and customized touch pad for the ultimate in pointing flexibility is a part of the keyboard. The TrackPoint features Press-to-Select, Internet scroll, and magnifying glass for accurate and convenient control.

#### Processor

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- Premiere performance; two spindles
- DMI (Direct Media Interface)
- Hyper-Threading technology
- Available processors are:
  - Intel® Core™ i3 processor i3-330M (2.13 GHz)
    - Integrated DDR3 memory controller (up to 1066MHz), 3MB cache
  - Intel® Core™ i3 processor i3-350M (2.26 GHz)
    - Integrated DDR3 memory controller (up to 1066MHz), 3MB cache
  - Intel® Core™ i5 processor i5-430M (2.26 GHz)
    - Integrated DDR3 memory controller (up to 1066MHz), 3MB cache
  - Intel® Core™ i5 processor i5-520M (2.40 GHz) with dual core
    - Integrated DDR3 memory controller (up to 1066MHz), Intel Turbo Boost, 3MB cache
  - Intel® Core™ i5 processor i5-540M (2.53 GHz) with dual core
    - Integrated DDR3 memory controller (up to 1066MHz), Intel Turbo Boost, 3MB cache
  - Intel® Core™ i7 processor i7-620M (2.66 GHz) with dual core
    - Integrated DDR3 memory controller (up to 1066MHz), Intel Turbo Boost, 4MB cache
  - Intel® Core™ i7 processor i7-720QM (1.60 GHz) with quad-core
    - Integrated DDR3 memory controller (up to 1333MHz), Intel Turbo Boost, 6MB cache
  - Intel® Core™ i7 processor i7-820QM (1.73 GHz) with quad-core
    - Integrated DDR3 memory controller (up to 1333MHz), Intel Turbo Boost, 8MB cache
  - Intel® Core™ i7 processor i7-920XM (2.00 GHz) with quad-core
    - Integrated DDR3 memory controller (up to 1333MHz), Intel Turbo Boost, 8MB cache

## Communications

### Network

- Integrated Mobile Broadband (Gobi 2000 3G with GPS) on selected models
- Intel® Centrino® Wireless-N 1000 on selected models
- ThinkPad 11b/g/n Wireless LAN Mini-PCI Express Adapter II on selected models
- Intel Centrino Advanced-N 6200 on selected models
- Intel Centrino Ultimate-N 6300 on selected models
- Intel Centrino Advanced-N + WiMAX 6250 on selected models
- Bluetooth with Enhanced Data Rate (BDC-2.1)

## Expansion

### Bays

- One 34-mm ExpressCard slot or 5-in-1 Media Card Reader slot

### External ports

- Three or four USB ports version 2.0 (for T510 systems)
- Two USB ports version 3.0, one Powered USB port version 2.0 (for W510 systems)
- One USB 2.0/eSATA combo port on some models
- External monitor (VGA DB-15, DisplayPort)
- Built-in RJ-45 connectors for LAN connection
- RJ-11 for modem
- IEEE 1394 FireWire 400 (4-pin connector; 1394a-2000 standard)
- Audio ports
  - External stereo speakers or headphone
  - Dual array microphone
  - Combo audio/mic jack

## Operating environment

**Physical specifications****For systems with a 15.6-in HD or HD+ TFT display:**

- Width: 372.8 mm (14.68 in)
- Depth: 245.1 mm (9.65 in)
- Height: 32 to 35.8 mm (1.26 to 1.41 in)
- Configured system weight:
  - 6-cell: starting at 2.57 kg (5.66 lb)
  - 9-cell: starting at 2.72 kg (6.01 lb)

**For systems with a 15.6-in FHD TFT display:**

- Width: 372.8 mm (14.68 in)
- Depth: 245.1 mm (9.65 in)
- Height: 32.8 to 36.6 mm (1.29 to 1.44 in)
- Configured system weight:
  - 6-cell: starting at 2.57 kg (5.66 lb)
  - 9-cell: starting at 2.72 kg (6.01 lb)

**For systems with a 15.6-in FHD MultiTouch display:**

- Width: 372.8 mm (14.68 in)
- Depth: 245.1 mm (9.65 in)
- Height: 34.3 to 39.8 mm (1.35 to 1.57 in)
- Configured system weight:
  - 6-cell: starting at 2.57 kg (5.66 lb)
  - 9-cell: starting at 2.72 kg (6.01 lb)

**Environment:**

- Maximum altitude without pressurization: 3048 m (10,000 ft)
- Temperature
  - At altitudes up to 2438 m (8000 ft)
    - Operating: 5.0°C to 35.0°C (41°F to 95°F)
    - Non-operating: 5.0°C to 43.0°C (41°F to 109°F)
  - At altitudes above 2438 m (8000 ft), below 3048 m (10,000 ft)
    - Operating under the unpressurized condition: 5.0°C to 31.3°C (41°F to 88°F)
- Relative humidity:
  - Operating: 8% to 80%
  - Non-operating: 5% to 95%
- Storage: -20°C ~ 60°C
- Shipping: -20°C ~ 60°C

**Accessories:**

- Battery ([Click here for more information](#))
- AC Adapter ([Click here for more information](#))
- Power cord for AC adapter (weight included with AC adapter)

**Note:** All weight and dimensions are approximate.

**Power**

**AC Adapter**

- AC adapter: This AC-to-DC converter supplies the necessary power to the computer. The AC adapter also charges the battery pack when it is installed in the computer.
- Universal AC adapter: 90 W, 2-pin / 3-pin (Click here for more information) (/documents/migr-61193)
- Universal AC adapter: 65 W, 2-pin / 3-pin (Click here for more information) (/documents/migr-62473)
- ThinkPad and IdeaPad 90W Slim AC/DC Combo Adapter (Click here for more information) (/documents/migr-68305)
- Battery (Click here for more information)

**Battery**

- The battery pack is an internal power source to the computer when the AC adapter is not available. The battery pack is rechargeable and is charged using the AC adapter with the system.
- You can determine how much battery power remains by using the Fuel-Gauge ThinkPad utility program. This displays the percent charge remaining, whether one or two batteries are in the system.
- A 4-, 6- or 9-cell Li-Ion battery pack is shipped with the system.
- Supports optional Slice battery as second battery at bottom.
- Battery life:
  - 6-cell: up to 6.2 hours
  - 9-cell: up to 10.4 hours
  - 9-cell plus Slice battery: up to 20.8 hours

**Notes:**

- Battery life (and recharge times) will vary based on many factors including screen brightness, applications, features, power management, battery conditioning and other customer preferences.

**Security****System**

- Hardware Password Manager (HPM)
- Security Chip
- Security keyhole allows an optional locking device to be installed to provide physical security.
- Fingerprint reader on selected models, offers users a convenient solution, authenticate at system startup and log on to Windows with a swipe of your finger.

**Password**

- A Power-on password (POP) protects the system from unauthorized use. If a POP is set, the password prompt appears:
  - Each time the system is turned on.
  - When the system is returned to normal operation from suspend mode.
- A Supervisor Password provides a higher level of security than the POP. The Supervisor Password protects the system functions from being used by unauthorized users, and protects the hardware configuration from unauthorized modification. The Supervisor Password prompt appears when the BIOS setup screen is accessed.
- A Hard Drive Password (HDP) protects hard drive data from unauthorized users. Once HDP is set, data on the hard drive cannot be accessed without the correct HDP. Because the HDP is stored in the hard drive, the data remains protected even if the hard drive is removed to another system. The HDP password prompt appears each time the system is turned on.

**Software****Operating system**

- Windows XP Professional (32 bit)
- Windows Vista Business (32 bit)
- Windows 7 Home Basic (32 bit)
- Windows 7 Home Premium (32 bit)
- Windows 7 Home Premium (64 bit)
- Windows 7 Professional (32 bit)
- Windows 7 Professional (64 bit)

**Notes:**

- Previous versions of these operating systems are not supported.
- Operating systems other than those preinstalled on the systems may not provide full-feature functionality.

**Storage**

**Optical drive**

- Ultrabay enhanced DVD/CD-RW combo drive
- Blu-ray combo drive
- Blu-ray burner

**Floppy drive**

- Only available using USB, UltraBay Slim Media, or Docking solution

**Hard drive features**

- Standard 160GB, 250GB, 320GB, and 500GB hard drive sizes.
- 250 GB, 7200 rpm, FDE (Full Disk Encryption)
- 5400 rpm or 7200rpm hard drive speeds.
- Supports one additional hard drive which can be used concurrently to offer expanded storage in the Ultrabay Slim Media Bay.
- Although you can upgrade the hard drive, it is not designed to be removed and reinserted on a regular basis. Repeated and frequent removal, for purposes other than to upgrade for greater capacity, can cause damage to the system. The Ultrabay Slim hard drive adapter is designed to provide this flexibility with a second hard drive in the Ultrabay Slim.
- The Hard Drive Active Protection system protects your hard drive when the shock sensor inside your ThinkPad computer detects a situation that could potentially damage the hard drive.

**Note:** Supported hard disk drives depend on the model.

**Solid state drive features**

- 80GB, 128GB, 160GB, and 256GB MicroSATA solid state drive sizes.
- Fast, reliable, lightweight, and energy-efficient.
- Faster data rates and boot-up times than a 7200 rpm mobile hard disk drive (HDD).
- Very low failure rates.
- Able to withstand harsher environmental and vibration conditions than a mobile HDD.
- Consumes less battery power than a mobile HDD.
- Significantly lighter than a mobile HDD.

**Video****Display**

- 15.6-inch (396mm) HD (1366x768) color, anti-glare, LED backlight LCD
  - 220 nits, 16:9 aspect ratio, 500:1 contrast ratio, 60% Gamut
- 15.6-inch (396mm) HD+ (1600x900) color, anti-glare, LED backlight LCD
  - 220 nits, 16:9 aspect ratio, 500:1 contrast ratio, 60% Gamut
- 15.6-inch (396mm) FHD (1920x1080) color, anti-glare, LED backlight LCD
  - 270 nits, 16:9 aspect ratio, 500:1 contrast ratio, 95% Gamut
- 15.6-inch (396mm) FHD (1920x1080) color, anti-glare, LED backlight, MultiTouch (touchscreen supports two-finger touch)
  - 242 nits, 16:9 aspect ratio, 500:1 contrast ratio, 95% Gamut
- Camera on top of screen, 2.0-megapixel, fixed focus (for some models)
- Colour calibration: huey™PRO Colorimeter by X-Rite® color calibration sensor in palm rest (for some models)

**Graphic Controller**

Video chipsets (switchable graphics):

- Intel HD Graphics in processor - integrated graphics
- 512MB NVIDIA® Quadro® NVS3100M - discrete graphics
- 1GB NVIDIA® Quadro® FX880M - discrete graphics

**Notes:**

- Support for external monitor is through VGA DB-15 connector
- Support for digital monitor via DisplayPort (supports single-link DVI-D via cable 45J7915)
- Supports dual independent display
- Maximum external resolution: 2560x1600 (DisplayPort)@60Hz; 2048x1536 (VGA)@75Hz; 1920x1200@60Hz (single-link DVI-D via cable 45J7915)

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