# TC501 Mobile Computer

## Rugged mobile computing reimagined for the AI-powered frontline

Empowering your frontline with AI propels productivity, efficiency, customer satisfaction and profitability to exceptional heights. But running AI apps takes the right device. It takes the power to enable ultra-responsive apps. It takes the ability to capture a wealth of data to streamline and automate workflows, and empower workers with a new level of business intelligence—plus the durability to handle whatever the workday brings. Get it all with the TC501. A groundbreaking new processor is the new heart of the TC501, built specifically to enable high performance AI on-device. Zebra's most powerful platform offers the most memory, the most advanced display technology, the fastest wireless networks and the most data capture options in any TC5 device—all in the most rugged TC5 device we've built to date. And develop AI apps in days instead of months with Zebra's Frontline AI Suite. Empower your workers to work smarter every day with the TC501—the mobile computer built for the AI-powered generation.




### Built to power the AI apps of today and tomorrow

**Exceptional processing power for exceptional application performance**
Get the processing power of a workstation with Qualcomm's new Dragonwing™ Q-6690—delivering up to a 300% increase in performance over legacy TC5 Series devices.[1] Easily support the AI applications of today and tomorrow with the integrated, dedicated AI engine. And a major leap in processing efficiency reduces power requirements, preserving battery power.

**Maximum memory**
Class-leading memory supports the most AI data-intensive apps, with up to 12 GB RAM and 256 GB Flash—up to 3x the RAM and 8x Flash compared to legacy TC5s—and a 2 TB MicroSD card slot.

**An advanced display designed for enterprise workers**
The 6-inch high resolution vibrant AMOLED display delivers a superior viewing experience. Brilliant colors, crisp text, and up to an unmatched 1500 NITS of peak brightness provide exceptional readability in any lighting condition. Up to 20% more screen area[2] lets workers see more information at a glance—and the screen is easy to read, even at extreme angles. And Gorilla® Glass Victus—Corning's toughest and only glass drop-tested on concrete-like surfaces—provides maximum protection for this most vulnerable component. The no-wait variable refresh rate improves touch response. And power requirements are reduced up to 40%.[3]

**All the fastest wireless networks**
Get the ultimate in speed, performance and reliability for all your wireless connections—voice, data and peripherals. Enable cellular service anywhere in the world with 5G 3rd Gen Release 17. Support for private 5G, CBRS and simultaneous service on two networks provides complete cellular network flexibility. Wi-Fi 7 delivers lightning fast connections, increased network capacity, and backwards compatibility with the last three Wi-Fi generations. And Bluetooth 6 increases data speeds, range and security, all with reduced power consumption.

**More rugged and more reliable than any other TC5 Series device**
The TC501 can handle 8 ft. (2.4 m) drops—and 9 ft. (2.7 m) drops with the rugged boot. It survives two to four times the number of tumbles compared to other TC5 Series devices. And new thermal shock testing ensures reliable operation for workers who are in and out of environments with dramatic temperature changes, such as postal carriers and field technicians.

**Drive next generation productivity into your frontline with the TC501—the rugged mobile computer built for the AI -powered generation.**
For more information, please visit www.zebra.com/tc501

### More powerful batteries—and new battery features
New apps and advanced features need more power—that's why the TC501 has the most powerful standard and extended batteries in the TC5 Series. Hot swap means no downtime for battery changes. And you can charge batteries from 0 to 70% in 45 minutes with new fast charging options.

### Exceptional AI-enabled audio performance
Advanced AI-based algorithm eliminates feedback when used in proximity to other devices, and background noise to ensure crystal clear voice—whether you're speaking to a customer, a co-worker, a supervisor or a voice-enabled application. And smart amplifiers increase and enhance loudness, without damaging speakers.

### Keep your devices safe with multiple layers of security
Prevent physical hardware attacks with Secure Element and Android Strongbox. Get timely OS updates to stay on top of emerging security threats with Lifeguard™ for Android™ [4]. Enable facial recognition for device access with Identity Guardian[5]. And the built-in Bluetooth BLE beacon works with Device Guardian[5] to locate lost devices—without requiring BLE batteries.

## Fuel your AI apps with a world of data

### Capture exceptional details with a 50 MP camera
A new super-high resolution 50 MP autofocus rear camera offers up to four times the resolution of legacy TC5 models, capturing better information and richer input for AI apps.

### New ultra-wide angle camera option for new use cases
An optional ultra-wide angle 13 MP auto focus rear camera option paves the way for new vision-based applications that require a wider view.

### AI-driven camera app for first-time every time great photos
Zebra's intuitive Enterprise AI Camera app ensures only quality images are captured by prompting users to clean the lens when it is dirty or retake a blurry image. In addition, faces can be automatically blurred when needed and a timestamp can be watermarked on images to verify on time deliveries.

### Three new best-in-class scanner options
The premium advanced long-range AC670 scanner captures barcodes and high-resolution color photos up to 100 ft. (30 m) away, opening up a world of new use cases to streamline workflows. The SR560 (red laser cross-hair aimer/white illumination) and SR500 (yellow LED aimer/red illumination) are designed for moderate to intense scanning. Both scanners offer an improved 2D barcode finder for fast and accurate barcode capture in all lighting conditions—including bright sunlight, plus high motion tolerance for easy barcode capture on the move.

### Built-in efficiency with built-in RFID
Integrated short-range UHF RFID in every model enables users to capture over 200 tags a second up to 6.5 ft. (2 m) away, making it easy to locate specific items, take inventory and more—without the need to purchase and manage RFID sleds or standalone readers.

### Support the world of contactless transactions
Support for all major wallets and the latest wallet passes enables simple tap-to-transact payment and non-payment transactions.

### Turn printed text into instant digital data
On-device Optical Character Recognition (OCR) solutions include tailored configurations for license plates, VINs, TINs, and more, while flexible tools enable the scan of single words or entire lines on any document to support virtually any industry and use case.

### Always available accurate real-time location data
Triple band GNSS improves accuracy, availability, and the reliability of real-time navigation and locationing data through connectivity to more satellites—ideal for workers in remote areas and emergency responders.

### Capture fast and accurate 3D data with Time-of-Flight sensor
Collect accurate depth, distance, presence/absence and volume 3D data in any lighting. Enable parcel and pallet dimensioning to optimize space and capacity in trucks and in warehouses with Zebra Dimensioning Mobile Parcel; track assets, and more.

## Improve frontline productivity with Zebra-only solutions

### Powerful Zebra DNA tools—the Zebra difference
Easily set up, secure, manage and optimize Zebra devices over the entire device lifecycle with many no-cost pre-loaded tools.

### Zebra ready-to-use solutions
Easily enable secure device access, push-to-talk communications over Wi-Fi and cellular networks, and automated task management. And create a fully-featured mobile-driven wireless workstation on demand, reducing the need to purchase and manage workstations.

# Specifications

| Physical Characteristics | |
|---|---|
| **Dimensions** | L x H x D: 6.42 x 3.07 x 0.61 inches (163.15 x 77.9 x 15.5 mm) |
| **Weight** | 9.63 oz. (273 g) with 5000 mAh battery 10.69 oz. (303g) with 7240 mAh battery |
| **Display** | 6.0 inch color Full High Definition+; 2160x1080; AMOLED; 600 NITS typical, 1000 NITS High Brightness Mode (HBM), 1500 NITS peak; adaptive refresh rate; optically bonded to touch panel; Gorilla Glass Victus |
| **Imager Windows** | Corning® Gorilla® Glass |
| **Touch Panel** | Multi-mode capacitive touch with bare or gloved fingertip input or passive stylus (sold separately); water droplet rejection; fingerprint resistant anti-smudge coating |
| **Power** | Rechargeable Li-Ion, PowerPrecision+ for real-time battery metrics; Standard capacity: 5000 mAh (19.45 Watt hours); Extended capacity: 7240 mAh (28.16 Watt hours); Wireless charge battery: 5000 mAh (19.45 Watt hours); fast charging; Hot Swap capable |
| **Expansion Slot** | User accessible MicroSD card supports up to 2 TB |
| **SIM** | One physical SIM and Dual eSIM |
| **Network Connections** | WLAN Wi-Fi 7, WPAN (Bluetooth 6.0), USB 2.0 (Back I/O—Host Only), USB 3.1 superspeed (Bottom Type C)—Super Speed (Host and Client); WWAN 5G |
| **Notifications** | Audible tone; multi-color LEDs; vibration |
| **Keypad** | On-screen keypad |
| **Voice and Audio** | Stereo speakers; two microphones; audio headset support via USB-C port or Bluetooth wireless headset, BLE Audio 5.3 compatible; VoNR; VoLTE; Cellular Circuit Switch voice; HD voice; VoIP including Fullband (FB) and SWB Audio and PTT support |
| **Buttons** | Programmable buttons: dual dedicated scan buttons, dedicated push-to-talk button, volume up/down buttons |
| **Interface Ports** | USB Type C (USB 3.1); bottom and back IO (USB 2.0) |
| **Performance Characteristics** | |
| **CPU** | Qualcomm® Dragonwing™ Q-6690 processor; up to 2.9 GHz (SKU specific) |
| **Operating System** | Android; for supported Android versions, visit: www.zebra.com/android-versions |
| **Memory** | 8 GB LPDDR5 RAM/128 GB UFS 3.1 Flash; 12 GB LPDDR5 RAM/256 GB UFS 3.1 Flash |
| **Security** | Android Strongbox with Secure Element IC; FIPS 140-3 Validated (ISO 19790) and Common Criteria certified (ISO 15408); Supports Secure Boot and Verified Boot |

| User Environment | |
|---|---|
| **Operating Temp.** | -4°F to +122°F (-20°C to +50°C) |
| **Storage Temp.** | -40°F to +158°F (-40°C to +70°C) |
| **Humidity** | 5%-95% non-condensing |
| **Sealing** | IP68 and IP65 per IEC 60529 standard |
| **Tumble Specification** | 2000 1.6 ft. (0.5 m) tumbles<br>2000 3.3 ft. (1.0 m) tumbles with rugged boot |
| **Drop Specifications** | **Exceeds MIL-STD-810H:**<br>6 ft. (1.83 m) to concrete at -4°F to +122°F (-20°C to +50°C)<br>8 ft. (2.44 m) to concrete @ room temperature<br>**With rugged boot:**<br>7 ft. (2.13 m) to concrete at -4°F to +122°F (-20°C to +50°C)<br>9 ft. (2.74 m) to concrete @ room temperature |
| **Electrostatic Discharge (ESD)** | +/- 15 kV air discharge; +/- 8 kV direct discharge; +/- 8 kV indirect discharge |
| **Interactive Sensor Technology (IST)** | |
| Light sensor: automatically adjusts display brightness<br>Motion sensor: 3-axis gyroscope, 3-axis accelerometer<br>Magnetometer: eCompass automatically detects direction and orientation<br>Pressure sensor/barometer: WWAN SKU only<br>Proximity sensor: Automatically disables the display and touch input when the device is positioned close to the ear | |
| **Data Capture** | |
| **Scanning** | SR500 1D/2D Scan Engine; SR560 1D/2D Scan Engine; AC670 Advanced Range Color 1D/2D Scan Engine |
| **Rear Camera** | 50 MP auto focus with 0.6 µm pixel: Phase Detection Auto Focus (PDAF); flash LED generates balanced white light; supports Torch mode + HDR<br>Optional 50 MP with 1 µm pixel: Quad Phase Detection Auto-focus (QPD AF) |
| **Front Camera** | 8 MP; fixed focus |
| **Ultra-wide Angle Rear Camera** | 13 MP auto focus; Phase Detection Auto-focus (PDAF); 5cm-infinity |
| **Time of Flight (iToF)** | Available on select SKUs |
| **NFC** | NFC ISO 14443 Type A and B; Mifare, FeliCa and ISO 15693 cards, Mifare Desfire EV1, EV2, EV3, NFC Forum tags 2,3,4,5; EMVCo RR2 Contactless Payment Support; Host Card Emulation, VAS (Value Added Services) and Wallet support, Apple ECP1.0 and ECP2.0, Apple VAS and Google Smart Tap certified, VAS Library/SDK |
| **Integrated RFID** | Short range integrated UHF RFID; up to 6.5 ft. (2 m); reads > 200 tags per second; EPC Class 1 Gen2; EPC Gen 2 V2; EU 865-868 MHz and US 902-928 MHz |

## Markets and Applications

**Retail Associates**
- Price/inventory checks
- Order fulfillment (BOPIS/BOPAC)
- Item locator
- Line busting/Mobile Point of Sale
- Assisted selling
- Task management
- Front of store replenishment
- Price management
- Inventory/cycle counts

**Retail Managers**
- Workforce mgmt
- Planogram mgmt
- Promotion compliance
- Merchandising
- Back of store management

**Field Service Technicians**
- Asset mgmt
- Parts inventory
- Invoicing/Mobile Point of Sale
- Scheduling

**Postal Carriers/ Courier Drivers**
- Proof of delivery/ condition
- Asset mgmt
- Invoicing/Mobile Point of Sale
- Location services

| Wireless PAN | |
|---|---|
| **Bluetooth** | Configurable Class 1 and 2; Bluetooth V6.0 with 2X2 Tx<br>Chipset-enabled secondary BLE beaconing support |
| **Wireless LAN** | |
| **Radio** | IEEE 802.11 be/ax/ac/n/a/g/b/mc/az/d/h/i/r/k/u/v/w<br>Tri-band (2.4 GHz, 5 GHz, 6 GHz), 2x2 MU-MIMO<br>Wi-Fi CERTIFIED 7™<br>MLO (Simultaneous Transmit and Receive MLMR) in Tri-band and Dual-band modes: 2.4+5+6, 5+5+6, 5+6, 5+5, 2.4+5, 2.4+6;<br>Dual Band Simultaneous; High Band Simultaneous; IPv4, IPv6; Wi-Fi Aware |
| **Data Rates** | **2.4 GHz:** 802.11b/g/n/ax/be—20 MHz—up to 344 Mbps<br>**5 GHz:** 802.11a/n/ac/ax/be—20 MHz, 40 MHz, 80 MHz, 160 MHz—up to 2882 Mbps<br>**6 GHz:** 802.11ax/be—20 MHz, 40 MHz, 80 MHz, 160 MHz, 320 MHz—up to 5764 Mbps |
| **Fast Roam** | 802.11r Fast BSS Transition; PMK Caching; Cisco CCKM; OKC |
| **Operating Channels** | **Channel 1-13** (2401-2483 MHz): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13;<br>**Channel 36-165** (5150-5850 MHz): 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144, 149, 153, 157, 161, 165;<br>**Channel 1-233** (5925-7125 MHz);<br>**Channel Bandwidth:** 20, 40, 80, 160, 320 MHz<br>Actual operating channels/frequencies and bandwidths depend on regulatory rules and certification agency. |
| **Security and Encryption** | WPA3 Enterprise 192-bit mode, GCMP-256—EAP-TLS; WPA3 Enterprise, AES-CCMP-128, GCMP-256—EAP-TTLS (PAP, MSCHAP, MSCHAPv2), EAP-TLS, PEAPv0-MSCHAPv2, PEAPv1-EAP-GTC, EAP-PWD; WPA3 Personal (SAE, SAE-EXT), AES CCMP-128, GCMP-256; WPA/WPA2 Enterprise, TKIP and AES-CCMP-128; WPA/WPA2 Personal (PSK), TKIP and AES-CCMP-128; Enhanced Open (OWE), AES-CCMP-128, GCMP-256; WEP 40 bit and 104 bit; WAN only: EAP-SIM, EAP-AKA, EAP-AKA Prime |
| **Certifications** | **Wi-Fi Alliance Certifications:** Wi-Fi CERTIFIED 7; Wi-Fi CERTIFIED 6 (Wi-Fi 6E); Wi-Fi CERTIFIED ac; Wi-Fi CERTIFIED n; WPA2-Personal; WPA2-Enterprise; WPA3-Personal; WPA3-Enterprise (includes 192-bit mode); Protected Management Frames; Wi-Fi Enhanced Open; WMM (Wi-Fi Multimedia); WMM-Power Save WMM-Admission Control; Voice-Enterprise; Wi-Fi Direct; Wi-Fi Agile Multiband; Wi-Fi QoS Management ; Wi-Fi Optimized Connectivity; Passpoint |
| **Multimedia** | Wi-Fi Multimedia™ (WMM) and WMM-PS; TSPEC |

| Wireless WAN, Data and Voice Communications | |
|---|---|
| **GPS (WWAN SKU only)** | GPS, GLONASS, a-GLONASS, Galileo, Beidou, QZSS, Triple-Band GNSS—concurrent L1/G1/E1/B1; (GPS/QZSS, GLO, GAL, BeiDou) + L5/E5a/BDSB2a (GPS/QZSS, GAL, Beidou)+ I2(GPS+ QZSS L2C), a-GPS; supports XTRA |
| **Radio Frequency Band** | Rel-17, Dual SIM/Dual Standby, Gigabit LTE-A, 5G NR Sub-6 (NSA, SA), LTE/ NR Carrier Aggregation (CA), LTE CA-up to 3DLCA, 2ULCA, NR CA: Up to 3DL, 2UL;<br>**Bands:** 5G FR1: n1/2/3/5/7/8/12/13/14/20/25/26/28/29/30/38/40/41/48/ 53/66/70/71/75/76/77/78/79 4G: B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/29 /30/32/34/38/39/40/41/42/43/48/53/66/68/70/71/106; 3G: B1/2/4/5/6/8/19; 2G (ROW SKU only): 850/900/1800/1900;<br>**4x4 DL MIMO[6]:** 5G FR1: n1/2/3/7/25/30/38/40/41/48/66/70/77/78/79;4G LTE: 1/2/3/4/7/25/30/38/40/41/42/43/48/66/70; **Private Cellular:** B48/53/106/68 |

## Environmental Compliance

RoHS Directive 2011/65/EU; Amendment 2015/863; REACH SVHC 1907/2006; EPEAT Certified; For a complete list of product and materials compliance, please visit: www.zebra.com/environment

## Warranty

Subject to the terms of Zebra's hardware warranty statement, the TC501 is warranted against defects in workmanship and materials for a period of 1 (one) year from the date of shipment. For complete warranty statement, please visit: www.zebra.com/warranty

## Recommended Services

Zebra OneCare™ Essential and Select support services; Zebra Visibility Services—VisibilityIQ™ Foresight; For information on Zebra services, please visit www.zebra.com/services

## Footnotes

1. Based on GeekBench 6 Multi-Thread benchmark scores using real-world tests
2. Compared to TC52, TC57, TC52x, TC57x and TC52ax
3. Reduction in power varies, dependent on numerous factors and features: a) where all pixels require a backlight in LED screens, the black pixels in an AMOLED screen do not require any power; b) the use of Dark Mode and black wallpaper can substantially reduce display power requirements by maximizing the number of black pixels on the screen; c) variable refresh rate
4. Requires a valid Zebra OneCare support contract
5. Requires the purchase of a license
6. Actual support may vary by country/carrier, contact Zebra Tech support for more details

## Zebra DNA

For information on Zebra DNA, visit www.zebra.com/zebra-dna. Zebra DNA features vary by model; a support contract may be required. To learn what solutions are supported, visit: https://developer.zebra.com/zebra-dna

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