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 an unmatched 1500 nits of brightness provide exceptional readability in any lighting condition. Up to 20% more screen area[2] allows workers to see more information at a glance—and the screen is easy to read, even at extreme angles. And Gorilla® Glass Victus[3]—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%.[4]

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.

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 audio eliminates acoustic echoes and suppresses more background noises 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™ [5]. Enable facial recognition for device access with Identity Guardian[6]. And the built-in Bluetooth BLE beacon works with Device Guardian[6] 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 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 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 and SR500 scanners are designed for moderate to intense scanning, with high motion tolerance for easy barcode capture on the move. The SR560 offers an improved 2D barcode finder for fast and accurate barcode capture, while the SR500 captures barcodes in all lighting conditions—including bright sunlight.

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 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; 1500 NITS; 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); Qi compatible 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 octa-core processor; up to 2.9 GHz (SKU specific)
Operating System	Android; for supported Android versions, visit: www.zebra.com/android-versions
Memory	8 GB LPDDR 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 140-2 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 2000 3.3 ft. (1.0 m) tumbles with rugged boot
Drop Specifications	**Exceeds MIL-STD-810H:** 6 ft. (1.83 m) to concrete at -4°F to +122°F (-20°C to +50°C) 8 ft. (2.44 m) to concrete @ room temperature **With rugged boot:** 7 ft. (2.13 m) to concrete at -4°F to +122°F (-20°C to +50°C) 9 ft. (2.74 m) to concrete @ room temperature
Electrostatic Discharge (ESD)	+/- 20 kV air discharge; +/- 8 kV direct discharge; +/- 10 kV indirect discharge
Interactive Sensor Technology (IST)	
Light sensor: automatically adjusts display brightness Motion sensor: 3-axis gyroscope, 3-axis accelerometer Magnetometer: eCompass automatically detects direction and orientation Pressure sensor/barometer: WWAN SKU only 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 autofocus with 0.6 µm pixel: Phase Detection Auto-focus (PDAF); flash LED generates balanced white light; supports Torch mode + HDR Optional 50 MP with 1 µm pixel: Quad Phase Detection Auto-focus (QPD AF)
Front Camera	8 MP; fixed focus
Ultra-wide Rear Camera	13 MP autofocus; 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 Read Range 2 compliant; Host Card Emulation, Contactless Payment Support, 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 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 Tri-band (2.4 GHz, 5 GHz, 6 GHz), 2x2 MU-MIMO Wi-Fi CERTIFIED 7™ MLO (Simultaneous Transmit and Receive MLMR) in Dual-band modes: 2.4+5+6, 5+5+6, 5+6, 5+5, 2.4+5, 2.4+6 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 **5 GHz:** 802.11a/n/ac/ax/be—20 MHz, 40 MHz, 80 MHz, 160 MHz—up to 2882 Mbps **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; **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, 149, 153, 157, 161, 165; **Channel 1-233** (5925-7125 MHz); **Channel Bandwidth:** 20, 40, 80, 160, 320 MHz 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

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
Multimedia	Wi-Fi Multimedia™ (WMM) and WMM-PS; TSPEC
Radio Frequency Band	**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; **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; **4x4 DL MIMO**[7]: 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 Gold 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. Corning Gorilla Glass Victus 2
4. 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
5. Requires a valid Zebra OneCare support contract
6. Requires the purchase of a license
7. 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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