

# ZE511 and ZE521 Printer Specifications

Specifications are provided for reference and are based on testing the ZE511 and ZE521 printers using genuine Zebra® supplies. Results may vary in actual application settings or when using other-than-recommended Zebra supplies. Zebra recommends always qualifying any application with thorough testing.

## STANDARD FEATURES

- Print Methods: Thermal transfer and direct thermal printing
- Orientation: right-hand or left-hand
- Quick release, thin film printhead with E3 Element Energy Equalizer for superior print quality
- Printhead element out detection
- 4.3 in. color touch screen with intuitive menu for quick operation and settings
- Rotatable screen
- Industrial all-metal construction
- USB 2.0 high speed
- RS-232 Serial (RS-232C with DB9F connector; Configurable baud rate (2400 – 115,200kB), parity, and data bits. Stop bits at 1 or 2; Software (XON/XOFF), hardware (DTR/DSR or RTS/CTS) communication handshake protocols)
- 10/100 Ethernet
- Bluetooth 4.1
- Dual USB Host
- Applicator Interface
- Adjustable transmissive and reflective media sensors
- Real-time clock
- Print Touch application
- Zebra Designer Essentials: easy label design tool free at [www.zebra.com/zebradesigner](http://www.zebra.com/zebradesigner)
- PDF Direct
- Resident ZPL® and ZPL II® programming languages, selectable through software or front panel



- 512 MB RAM memory (8 MB User Available)
- 512 MB Flash memory (64 MB User Available)
- ENERGY STAR certified

## OPTIONAL FEATURES

### Printheads / Resolution

- Printhead 203 dpi (8 dots / mm)
- Printhead 300 dpi (12 dots / mm)
- Printhead 600 dpi (24 dots / mm)

### Communication

- Parallel (Bi-directional interface)
- Wireless dual radio with 802.11ac Wi-Fi and Bluetooth 4.1
- Applicator interface

### Accessories

- Extend peel bar kit
- User Interface extension and mounting kit

## Fonts

- Asian and other international scalable and smooth bitmapped fonts

## RFID

- UHF field-installable RFID kit for 4 in. or 6 in. print widths
- Supports tags compatible with UHF EPC Gen 2 V2, ISO/IEC 18000-63 and RAIN RFID protocols
- Prints and encodes tags with a minimum pitch of 0.6 in./16 mm
- Adaptive Encoding Technology simplifies RFID setup and eliminates complex RFID placement guidelines
- RFID job monitoring tools track RFID performance
- Globally certified in more than 70 countries for RFID to support multinational deployments
- RFID log records all RFID data with timestamps, ensuring complete traceability
- RFID ZPL commands provide compatibility with existing Zebra RFID printers
- Support for industry standard multi-vendor chip-based serialization (MCS)
- Integrated Zebra RE40 RFID Reader/Encoder

## PRINTER SPECIFICATIONS — ZE511

| Parameter  | 203 dpi<br>(8 dots/mm)   | 300 dpi<br>(12 dots/mm)  | 600 dpi<br>(12 dots/mm)   |
|--|--|--|---|
| <b>Dot Size<br/>(W × L):</b>                                       | 0.0049 in. ×<br>0.0052 in.<br>(0.125 mm ×<br>0.132 mm)                               | 0.0033 in. ×<br>0.0043 in.<br>(0.084 mm ×<br>0.110 mm)                               | 0.0016 in. ×<br>0.0027 in.<br>(0.042 mm ×<br>0.070 mm)                              |
| <b>Maximum<br/>Continuous<br/>Media Print<br/>Length*</b>          | 150 in.<br>(3801 mm)   | 100 in.<br>(2540 mm)   | 50 in.  |
| <b>Maximum<br/>Non-<br/>Continuous<br/>Media Print<br/>Length*</b> | 39 in.<br>(991 mm)   | 39 in. (990mm)   | 32 in.  |
| <b>Maximum<br/>Print Width</b>                                     | 4.1 in.<br>(104 mm)  | 4.1 in.<br>(104 mm)  | 4.1 in.<br>(104 mm)   |
| <b>Programmable<br/>Print Speeds</b>                               | 2.0 in. (50.8<br>mm) through<br>18 in. (457 mm)<br>per second in 1<br>in. increments | 2.0 in. (50.8<br>mm) through<br>14 in. (356 mm)<br>per second in 1<br>in. increments | 2.0 in. (50.8<br>mm) through 6<br>in. (152 mm) per<br>second in 1 in.<br>increments |

- First dot location measured from media edge 0.093 in. ±0.035 in. (2.4 mm ±0.89 mm)
- Distance from mounting side of mainframe to media edge: 0.914 in. (23.2 mm)
- Media registration tolerance: \*\*
  - Vertical = < ±0.040 in. (±1.0 mm)
  - On concurrent labels in. “Applicator” mode
  - Horizontal = < ±0.040 in. (±1.0 mm)

\*Maximum label lengths are affected by option selections and firmware overhead.

\*\* Media registration and minimum label length are affected by media type and width, ribbon type, and print speed. Performance improves as these factors are optimized. Zebra recommends always qualifying any application with thorough testing.

## PRINTER SPECIFICATIONS — ZE521

| Parameter  | 203 dpi<br>(8 dots/mm)  | 300 dpi<br>(12 dots/mm)   |
|--|---|---|
| <b>Dot Size<br/>(W × L):</b>                               | 0.0049 in. × 0.0052 in.<br>(0.125 mm × 0.132 mm)                                  | 0.0033 in. × 0.0043 in.<br>(0.084 mm × 0.110 mm)                                  |
| <b>Maximum<br/>Continuous<br/>Media Print<br/>Length*</b>  | 150 in. (3801 mm)   | 100 in. (2540 mm)   |
| <b>Maximum Non-<br/>Continuous Media<br/>Print Length*</b> | 39 in. (990 mm)   | 39 in. (990 mm)   |
| <b>Maximum Print<br/>Width</b>                             | 6.6 in. (168 mm)  | 6.6 in. (168 mm)  |
| <b>Programmable<br/>Print Speeds</b>                       | 2.0 in. (50.8 mm)<br>through 14 in. (356 mm)<br>per second in 1 in.<br>increments | 2.0 in. (50.8 mm)<br>through 12 in. (305 mm)<br>per second in 1 in.<br>increments |

- First dot location measured from media edge 0.093 in. ±0.035 in. (2.4 mm ±0.89 mm)
- Distance from mounting side of mainframe to media edge: 0.914 in. (23.2 mm)
- Media registration tolerance: \*\*
  - Vertical = < ±0.040 in. (±1.0 mm)
  - On concurrent labels in “Applicator” mode
  - Horizontal = < ±0.040 in. (±1.0 mm)

\*Maximum label lengths are affected by option selections and firmware overhead.

\*\* Media registration and minimum label length are affected by media type and width, ribbon type, and print speed. Performance improves as these factors are optimized. Zebra recommends always qualifying any application with thorough testing.

## MEDIA SPECIFICATIONS — ZE511 AND ZE521

- Media type: continuous, die-cut, or black mark
- Media Unwind Force:
  - In Peel Mode (with liner drawn by the peel roller): Applicator media supply steady state tension must be uniform and not exceed 2.0 lbs. Start/Stop tension transients must not exceed 4.0 lbs.
  - In Tear Mode (media feed without peeling): Media tension must not exceed 350g (.75 lb)
- Media Rewind Force
  - In Peel Mode (with liner drawn by the peel roller): Applicator media take-up pull tension must be uniform between 1 – 4 lbs.
- Transmissive (gap) sensing standards:
  - Inter label gap: 0.08 in. – 0.16 in. (2 – 4 mm, preferably 3 mm)
  - Sensing notch: 0.25 in. W (6 mm) x 0.12 in. L (3 mm)
  - Sensing hole: 0.125 in. (3 mm) diameter
- Reflective (black mark) sensing standards:
  - Black mark length (parallel to inside media edge): 0.12 in. – 0.43 in. (3 – 11 mm)
  - Black mark width (perpendicular to inside media edge): 0.43 in. (> 11 mm)
  - Black mark location: within 0.040 in. (1 mm) of inside media edge
  - Black mark density: > 1.0 Optical Density Units (ODU)
  - Maximum media density: 0.5 ODU

### Media Specifications – ZE511

- Media width (label and liner): 0.625 in. (16 mm) to 4.5 in. (114 mm)
- Minimum label length:
  - Applicator mode, backfeed on: 0.50 in. (12.7 mm)
  - Applicator mode, backfeed off: 0.25 in. (6.4 mm)
  - Stream mode: 0.25 in. (6.4 mm)
  - Rewind mode: 0.25 in. (6.4 mm) “loose loop”
  - Tear-off mode, backfeed on: 0.50 in. (12.7 mm)
  - Tear-off mode, backfeed off: 0.25 in. (6.4 mm)
  - Media thickness (label and liner): 0.0053" (0.135 mm) to 0.010 in. (0.254 mm)
- Media thickness (label and liner): 0.0053 in. (0.135 mm) to 0.010 in. (0.254 mm)

### Media Specifications – ZE521

- Media width (label and liner): 3.0 in. (76 mm) to 7.1 in. (180 mm)
- Minimum label length:
  - Applicator mode, backfeed on: 3.0 in. (76.2 mm)
  - Applicator mode, backfeed off: 1.0 in. (25.4 mm)
  - Rewind mode: 1.0 in. (25.4 mm) “loose loop”
  - Tear-off mode, backfeed on: 3.0 in. (76.2 mm)
  - Tear-off mode, backfeed off: 1.0 in. (25.4 mm)
- Media thickness (label and liner): 0.003 in. (0.076 mm) to 0.012 in. (0.305 mm)

### RIBBON SPECIFICATIONS – ZE511 AND ZE521

- Maximum Length: 1970 ft. (600 m)
- Maximum ribbon roll size: 4.0 in. (101.6 mm) O.D on a 1.0 in. (25.4 mm) I.D. core
- Ribbon wound coated-side out

### Ribbon Specifications – ZE511

- Ribbon width: 1.0 in. (25 mm) to 4.2 in. (107 mm)

### Ribbon Specifications – ZE521

- Ribbon width: 3.0 in. (76 mm) to 7.1 in. (180 mm)

### PROGRAMMING LANGUAGE

ZPL and ZPL II — Universal language for Zebra printers. Simplifies label formatting and enables format compatibility with existing systems that run Zebra printers.

- 16 resident expandable ZPL II bitmap and two resident scalable ZPL fonts
- Unicode for multi-language printing
- Connect and control Zebra barcode printers via the printer’s Web interface using a common Web browser
- Network connected printers provide alerts via any email-enabled, wired, or wireless device to minimize downtime
- Communicates in printable ASCII characters
- Downloadable objects include graphics, scalable and bitmap fonts, label templates and formats
- Adjustable print cache
- Data compression
- Automatic memory allocation for format while printing
- Automatic serialization of fields
- Format inversion (white on black)
- Mirror-image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Slew command
- Programmable label quantities with print, pause, cut control

## ZPL Barcode Symbologies and Specification

- Barcode modulus “X” dimension:
  - Picket fence (non-rotated) orientation:
    - 203 dpi = 4.9 mil to 49 mil
    - 300 dpi = 3.3 mil to 33 mil
  - Ladder (rotated) orientation:
    - 203 dpi = 4.9 mil to 49 mil
    - 300 dpi = 3.9 mil to 39 mil
- Barcode Ratios — 2:1, 7:3, 5:2 and 3:1
- Linear Barcodes: Code 11, Code 39, Code 93, Code 128 with subsets A / B / C and UCC Case Codes, ISBT-128, UPC-A, UPC-E, EAN-8, EAN-13, UPC and EAN 2- or 5-digit extensions, Plessey, PostnetStandard 2-of-5, Industrial 2-of-5, Interleaved 2-of-5, Logmars, MSICodabar and Planet Code
- 2D Barcodes: Codablock, PDF417, Code 49, Data Matrix, MaxiCode, QR Code, TLC 39, MicroPDF, RSS-14 (and composite), Aztec

## ZPL Font Specifications

- Fonts A, B, C, D, E, F, G, H and GS are expandable up to 10 times, height and width independently. However, fonts E and H (OCR-A and OCR-B) are not considered “in-spec” when expanded.
- The scalable smooth font O (CG Triumvirate™ Bold Condensed\*) is expandable on a dot-by-dot basis, height and width independent, while maintaining smooth edges. Maximum character size depends on available memory.
- IBM Code Page 850 international character sets are available in the fonts A, B, C, D, E, F, G and O through software control
- Code Page 1250, 1252, 1253, 1254, 1255 Support with font O

\* Contains UFST® from Agfa Monotype Corporation

## Font Matrices: 203 DPI (8 Dots / mm) Printheads

| Font        | Matrix H x W     | Matrix Inter-Character Gap | Type†  | H x W (in.) | Characters Per (in.) | H x W (mm)  | Characters Per (mm) |
|-------------|------------------|----------------------------|--------|-------------|----------------------|-------------|---------------------|
| <b>A</b>    | 9 x 5            | 1                          | U-L-D  | .044 x .029 | 33.90                | 1.13 x 0.75 | 1.33                |
| <b>B</b>    | 11 x 7           | 2                          | U      | .054 x .044 | 22.60                | 1.38 x 1.13 | 0.89                |
| <b>C, D</b> | 18 x 10          | 2                          | U-L-D  | .088 x .059 | 16.95                | 2.25 x 1.50 | 0.67                |
| <b>E</b>    | 41 x 20          | 6                          | OCR-B  | .138 x .098 | 10.17                | 3.50 x 2.50 | 0.40                |
| <b>F</b>    | 26 x 13          | 3                          | U-L-D  | .128 x .079 | 12.71                | 3.25 x 2.00 | 0.50                |
| <b>G</b>    | 60 x 40          | 8                          | U-L-D  | .295 x .236 | 4.24                 | 7.50 x 6.00 | 0.17                |
| <b>H</b>    | 30 x 19          | 9                          | OCR-A  | .103 x .093 | 10.71                | 2.63 x 2.38 | 0.42                |
| <b>GS</b>   | 24 x 24          | 0                          | SYMBOL | .118 x .118 | 8.48                 | 3.00 x 3.00 | 0.33                |
| <b>P</b>    | 20 x 18          | N/A                        | U-L-D  | .098 x .089 | N/A                  | 2.49 x 2.26 | N/A                 |
| <b>Q</b>    | 28 x 24          | N/A                        | U-L-D  | .138 x .118 | N/A                  | 3.51 x 2.99 | N/A                 |
| <b>R</b>    | 35 x 31          | N/A                        | U-L-D  | .172 x .153 | N/A                  | 4.37 x 3.89 | N/A                 |
| <b>S</b>    | 40 x 35          | N/A                        | U-L-D  | .197 x .172 | N/A                  | 5.00 x 4.37 | N/A                 |
| <b>T</b>    | 48 x 42          | N/A                        | U-L-D  | .236 x .207 | N/A                  | 5.99 x 5.26 | N/A                 |
| <b>U</b>    | 59 x 53          | N/A                        | U-L-D  | .290 x .261 | N/A                  | 7.37 x 6.63 | N/A                 |
| <b>V</b>    | 80 x 71          | N/A                        | U-L-D  | .394 x .349 | N/A                  | 10.0 x 8.86 | N/A                 |
| <b>Ø</b>    | Default: 15 x 12 |                            | U-L-D  | Scalable    |                      |             |                     |

†U—Uppercase L—Lowercase D—Descenders

Font Matrices: 300 DPI (12 Dots / mm) Printheads

| Font        | Matrix H × W     | Matrix Inter-Character Gap | Type†  | H × W (in.) | Characters Per (in.) | H × W (mm)  | Characters Per (mm) |
|-------------|------------------|----------------------------|--------|-------------|----------------------|-------------|---------------------|
| <b>A</b>    | 9 × 5            | 1                          | U-L-D  | .030 × .020 | 50.00                | 0.76 × 0.51 | 1.97                |
| <b>B</b>    | 11 × 7           | 2                          | U      | .037 × .030 | 33.33                | 0.93 × 0.76 | 1.31                |
| <b>C, D</b> | 18 × 10          | 2                          | U-L-D  | .060 × .040 | 25.00                | 1.53 × 1.02 | 0.98                |
| <b>E</b>    | 41 × 20          | 6                          | OCR-B  | .137 × .087 | 11.54                | 3.47 × 2.20 | 0.45                |
| <b>F</b>    | 26 × 13          | 3                          | U-L-D  | .087 × .053 | 18.75                | 2.20 × 1.36 | 0.74                |
| <b>G</b>    | 60 × 40          | 8                          | U-L-D  | .200 × .160 | 6.25                 | 5.08 × 4.07 | 0.25                |
| <b>H</b>    | 30 × 19          | 9                          | OCR-A  | .100 × .093 | 10.71                | 2.54 × 2.37 | 0.42                |
| <b>GS</b>   | 24 × 24          | 0                          | SYMBOL | .080 × .080 | 12.50                | 2.03 × 2.03 | 0.49                |
| <b>P</b>    | 20 × 18          | N/A                        | U-L-D  | .098 × .089 | N/A                  | 2.49 × 2.26 | N/A                 |
| <b>Q</b>    | 28 × 24          | N/A                        | U-L-D  | .138 × .118 | N/A                  | 3.51 × 2.99 | N/A                 |
| <b>R</b>    | 35 × 31          | N/A                        | U-L-D  | .172 × .153 | N/A                  | 4.37 × 3.89 | N/A                 |
| <b>S</b>    | 40 × 35          | N/A                        | U-L-D  | .197 × .172 | N/A                  | 5.00 × 4.37 | N/A                 |
| <b>T</b>    | 48 × 42          | N/A                        | U-L-D  | .236 × .207 | N/A                  | 5.99 × 5.26 | N/A                 |
| <b>U</b>    | 59 × 53          | N/A                        | U-L-D  | .290 × .261 | N/A                  | 7.37 × 6.63 | N/A                 |
| <b>V</b>    | 80 × 71          | N/A                        | U-L-D  | .394 × .349 | N/A                  | 10.0 × 8.86 | N/A                 |
| <b>Ø</b>    | Default: 15 × 12 |                            | U-L-D  | Scalable    |                      |             |                     |

†U—Uppercase L—Lowercase D—Descenders

Font Matrices: 600 DPI (24 dots / mm) Printheads

| Font        | Matrix H × W     | Matrix Inter-Character Gap | Type†  | H × W (in.) | Characters Per (in.) | H × W (mm)  | Characters Per (mm) |
|-------------|------------------|----------------------------|--------|-------------|----------------------|-------------|---------------------|
| <b>A</b>    | 9 × 5            | 1                          | U-L-D  | .030 × .020 | 50.00                | 0.76 × 0.51 | 1.97                |
| <b>B</b>    | 11 × 7           | 2                          | U      | .037 × .030 | 33.33                | 0.93 × 0.76 | 1.31                |
| <b>C, D</b> | 18 × 10          | 2                          | U-L-D  | .060 × .040 | 25.00                | 1.53 × 1.02 | 0.98                |
| <b>E</b>    | 41 × 20          | 6                          | OCR-B  | .137 × .087 | 11.54                | 3.47 × 2.20 | 0.45                |
| <b>F</b>    | 26 × 13          | 3                          | U-L-D  | .087 × .053 | 18.75                | 2.20 × 1.36 | 0.74                |
| <b>G</b>    | 60 × 40          | 8                          | U-L-D  | .200 × .160 | 6.25                 | 5.08 × 4.07 | 0.25                |
| <b>H</b>    | 30 × 19          | 9                          | OCR-A  | .100 × .093 | 10.71                | 2.54 × 2.37 | 0.42                |
| <b>GS</b>   | 24 × 24          | 0                          | SYMBOL | .080 × .080 | 12.50                | 2.03 × 2.03 | 0.49                |
| <b>P</b>    | 20 × 18          | N/A                        | U-L-D  | .098 × .089 | N/A                  | 2.49 × 2.26 | N/A                 |
| <b>Q</b>    | 28 × 24          | N/A                        | U-L-D  | .138 × .118 | N/A                  | 3.51 × 2.99 | N/A                 |
| <b>R</b>    | 35 × 31          | N/A                        | U-L-D  | .172 × .153 | N/A                  | 4.37 × 3.89 | N/A                 |
| <b>S</b>    | 40 × 35          | N/A                        | U-L-D  | .197 × .172 | N/A                  | 5.00 × 4.37 | N/A                 |
| <b>T</b>    | 48 × 42          | N/A                        | U-L-D  | .236 × .207 | N/A                  | 5.99 × 5.26 | N/A                 |
| <b>U</b>    | 59 × 53          | N/A                        | U-L-D  | .290 × .261 | N/A                  | 7.37 × 6.63 | N/A                 |
| <b>V</b>    | 80 × 71          | N/A                        | U-L-D  | .394 × .349 | N/A                  | 10.0 × 8.86 | N/A                 |
| <b>Ø</b>    | Default: 15 × 12 |                            | U-L-D  | Scalable    |                      |             |                     |

†U—Uppercase L—Lowercase D—Descenders

## GENERAL SPECIFICATIONS

- Operating environment:
  - Thermal transfer = 40° to 104°F (5° to 40°C)
  - Direct Thermal = 32° to 104°F (0° to 40°C)
  - 20% to 85% non-condensing Relative Humidity
- Storage/Transportation environment:
  - -40° to 160°F (-40° to 71°C)
  - 5% to 95% non-condensing Relative Humidity
- Electrical Specifications:
  - Power Supply: Universal, auto-detectable (PFC Compliant) 90-264 VAC, 47-63 Hz
  - ENERGY STAR qualified
- Standards approvals:
  - IEC 62368-1; EN 55032, Class A; EN 55035; EN 61000-3-2, 3-3
- Product markings, but not limited to:
  - cTUVus; CE; FCC A; ICES-003; VCCI; RCM; CCC; EAC; S-Mark; KCC; BSMI; India-BIS; In-Metro; Energy Star

|        | ZE511             | ZE521             |
|--------|-------------------|-------------------|
| Height | 11.8 in. (300 mm) | 11.8 in. (300 mm) |
| Width  | 9.6 in. (245 mm)  | 9.6 in. (245 mm)  |
| Depth  | 14.9 in. (379 mm) | 17.2 in. (438 mm) |
| Weight | 34 lb (15.4 kg)   | 38 lb (17.3 kg)   |

## PREVENTATIVE MAINTENANCE

Zebra recommends cleaning the printer on a regular basis using standard Zebra printer parts and cleaning supplies. Consult your “User’s Guide” for further details.

- Cleaning — The exterior is cleaned with a lint-free cloth, and if necessary, a mild detergent solution or desktop cleaner. Interior components (printhead, platen roller, media sensor, peel bar, ribbon and media paths) are cleaned with alcohol or blown air to remove any particles.
- Lubrication — All mechanical parts are self-lubricating and do not require additional lubrication.
- Printhead Replacement — For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra supplies as part of the total solution. Printers are designed to work only with genuine Zebra printheads, thus maximizing safety and print quality.

For more information, visit [www.zebra.com/ze511-ze521](http://www.zebra.com/ze511-ze521)



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