ZT421 Industrial Printer

Specifications are provided for reference and are based on testing the ZT421 printer 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

Printing

- Thermal transfer and direct thermal printing
- Thin film printhead with E3™ Element Energy™ Equalizer for superior print quality
- 203 dpi print resolution (8 dots/mm)
- Print speeds per second up to 12 in. (305 mm/second)

Communication

- 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: Supports networks internally integrated option that enables the use of Webview and Alert features
- Bluetooth® 4.1
- Dual USB Host

Media Support

- Dual media sensors—transmissive and reflective
- 3 in. media supply hanger
- Auto calibration—printer calibrates when printer is turned on or when printhead is closed

Programming Languages

- Resident ZPL®, ZPL II® and EPL™ programming languages, selectable through software or front panel
- XML-enabled Printing—allows XML communications for barcode label printing eliminating license fees and printer server hardware while lowering customization and programming costs

Operation

- 4.3 in. color touch display with intuitive menu for quick operation and settings management
- Bi-colored status LEDs for quick printer status
- ARM Cortex A7 processor
- 256 MB RAM memory (8 MB User Available)
- 512 MB Flash memory (64 MB User Available)
- Print Touch application
- Link-OS®-enabled
- Auto-switching 100-240V power supply
- ENERGY STAR® qualified
- Printhead element out detection

Design

- Easy, side-loading metal print mechanism
- Door and print mechanism activated lights to light supplies path
- Tool-less printhead and platen replacement
- Metal media cover with enlarged clear viewing window
- Robust-gold user touch points indicating key adjustments
- Bi-fold media door decreasing overall operating space by 35%

Optional Features

Printheads/Resolution

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

Communication

- Parallel (Bi-directional interface)
- Wireless dual radio with 802.11ax Wi-Fi and Bluetooth 5.3
- Wireless dual radio with 802.11ac Wi-Fi and Bluetooth 4.2
- 10/100 Ethernet
- Applicator interface

Media Handling

- **Rewind**—Internally rewinds a full roll of printed labels on 3 in. core, or peels and rewinds liner (factory installed only)
- **Peel**—Front-mount, passive-peel option
- **Cutter**—Front-mount guillotine cutter and catch tray, operates under software control cutting labels individually, or in strips (not compatible with rewind and peel options)

Fonts

Asian and other international scalable and smooth bitmapped fonts.

Power Cords

US, Europe/UK, Israel, China, Japan, Australia, Argentina, Brazil and Taiwan

RFID

- Fully integrated UHF EPC Gen 2 V2.1/ISO 18000-63 RFID Reader/Encoder
- 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

ZKDU Keyboard Display Unit

Enter variable data and retrieve stored forms for standalone applications (requires null modem adapter with DB9 serial cable).

ZBI 2.0™

Field installed via activation file.

Programming Language

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

- **Fonts**—16 resident expandable ZPL II bitmap and two resident scalable ZPL fonts
- **Unicode**—For multi-language printing
- **Web View**—Connect and control Zebra barcode printers via the printer's Web interface using a common Web browser
- **Alert**—Printers equipped with network connected printers provide alerts via any email-enabled, wired, or wireless device to minimize downtime

Zebra DNA™ for Printers

The ZT421 is powered by Link-OS, Zebra's robust printer operating system, and Zebra DNA for Printers, a set of tools and applications designed to optimize your printers' performance over its entire lifecycle. The result is a superior printing experience through better performance, simplified remote anageability and easier integration.

Please visit www.zebra.com/zebradna for more information.

Media Specifications

- Media Types: Continuous, die-cut, notch, black-mark
- Maximum Non-continuous Label Length: 39 in. (991 mm)
- Media Web Width (Label and Liner):
  - 2.00 in. (51 mm) to 7.0 in. (178 mm) Tear/Cutter
  - 2.00 in. (51 mm) to 6.75 in. (171 mm) Peel/Rewind
- Minimum Label Length:
  - Tear-off mode: 0.5 in. (12.7 mm)
  - Peel mode: 0.5 in. (12.7 mm)
  - Rewind mode: 0.5 in. (12.7 mm)
  - Cutter: 1.00 in. (25.4 mm)
- Media Thickness (Label and Liner):
  - 0.0023 in. (0.058 mm) to 0.010 in. (0.25 mm)
- Maximum Media Roll Dimensions:
  - 8.0 in. (203 mm) O.D. on a 3 in. (76 mm) I.D. core

Ribbon Specifications

- Ribbon Width: 2.00 in. (51 mm) to 6.85 in./174 mm
- Maximum Ribbon Length: 1476 ft. (450 m)
- Maximum Ribbon Roll Size: 450 m: 3.2 in. (81.3 mm) O.D. on a 1.0 in. (25.4 mm) I.D. core
- Ribbon Wound Ink-side Out

Printing Specifications

Parameter	203 dpi (8 dots/mm)	300 dpi (12 dots/mm)
Dot Size (W × L):	.0049 in. × .0049 in. (0.125 mm × 0.125 mm)	.0033 in. × .0039 in. (0.084 mm × 0.099 mm)
Maximum Continuous Media Print Length	102 in. (2591 mm)	45 in. (1143 mm)
Maximum Print Width	6.6 in. (168 mm)	6.6 in. (168 mm)
Programmable Print Speeds	2.4 in. through 12 in. (61 mm–305 mm) in 1 in. increments	2.4 in. through 10 in. (61 mm–254 mm) in 1 in. increments

- First Dot Location: Measured from inside media backing edge: 0.10 in. ±.04" (2.5 mm, not to exceed -0.5 mm +1.0 mm)
- Media Registration Tolerance:
  - Vertical = less than ±0.039" (±1.0 mm) on non-continuous media
  - Horizontal = less than±0.039" (±1.0 mm) within a roll of media

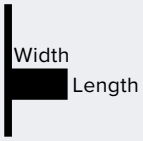
Gap/Notch Sensing Standards

Sensor Adjustment Range: 0.06 in. to 4.31 in. from media inner edge

Parameter	Standard Dimensions	Metric Dimensions
Inter-label Gap	0.079 in. to 0.157 in. preferably 0.118 in.	2 to 4 mm preferably 3 mm
Sensing Notch (W × L)	0.25 in. × 0.12 in.	6 mm × 3 mm
Sensing Hole	0.125 in. diameter	3 mm diameter

Black Mark Sensing Standards

Sensor Adjustment Range: 0.06 in. to 4.31 in. from media inner edge

Parameter	Dimensions
Black Mark Length	0.098 in.–0.453 in. (2.5 mm–11.5 mm)
Black Mark Width 	≥0.37 in. (9.5 mm)

- Black Mark Density: greater than 1.0 Optical Density Units (ODU)
- Maximum Media Density: 0.5 ODU

Eltron Programming Language (EPL2™) (Available on 203 DPI Only)

- Compatible with mainframe, mini, and PC hosts
- Four-position field rotation (0°, 90°, 180°, 270°)
- Variable field support (00 to 99)
- Counter support (up to 10)
- Variable field addition and subtraction
- Status reporting
- Form storage
- Metered print odometer

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, Postnet, Standard 2-of-5, Industrial 2-of-5, Interleaved 2-of-5, Logmars, MSI, Codabar and Planet Code
- 2D Barcodes: Codablock, PDF417, Code 49, Data Matrix, MaxiCode, QR Code, TLC 39, MicroPDF, RSS-14 (and composite), Aztec

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

Font	Matrix		Type†	Character Size			
				Inches		Millimeters	
	H × W	Inter-Character Gap		H × W	Characters Per	H × W	Characters Per
A	9 × 5	1	U-L-D	.044 × .029	33.90	1.13 × 0.75	1.33
B	11 × 7	2	U	.054 × .044	22.60	1.38 × 1.13	0.89
C, D	18 × 10	2	U-L-D	.088 × .059	16.95	2.25 × 1.50	0.67
E	28 × 15	5	OCR-B	.138 × .098	10.17	3.50 × 2.50	0.40
F	26 × 13	3	U-L-D	.128 × .079	12.71	3.25 × 2.00	0.50
G	60 × 40	8	U-L-D	.295 × .236	4.24	7.50 × 6.00	0.17
H	21 × 13	6	OCR-A	.103 × .093	10.71	2.63 × 2.38	0.42
GS	24 × 24	0	SYMBOL	.118 × .118	8.48	3.00 × 3.00	0.33
P	20 × 18	N/A	U-L-D	.098 × .089	N/A	2.49 × 2.26	N/A
Q	28 × 24	N/A	U-L-D	.138 × .118	N/A	3.51 × 2.99	N/A
R	35 × 31	N/A	U-L-D	.172 × .153	N/A	4.37 × 3.89	N/A
S	40 × 35	N/A	U-L-D	.197 × .172	N/A	5.00 × 4.37	N/A
T	48 × 42	N/A	U-L-D	.236 × .207	N/A	5.99 × 5.26	N/A
U	59 × 53	N/A	U-L-D	.290 × .261	N/A	7.37 × 6.63	N/A
V	80 × 71	N/A	U-L-D	.394 × .349	N/A	10.0 × 8.86	N/A
Ø	Default: 15 × 12		U-L-D	Scalable			

† U = Uppercase L = Lowercase D = Descenders

ZPL Printer Fonts

- 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 0 (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 0 through software control
- Code Page 1250, 1252, 1253, 1254, 1255 Support with font 0

*Contains UFST® from Agfa Monotype Corporation

ZPL Programming Language (ZPL/ZPL II)

- Communicates in printable ASCII characters
- Unicode™-compliant
- Compatible with mainframe, mini and PC hosts
- 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
- Status messages to host upon request

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

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

† U = Uppercase L = Lowercase D = Descenders

Environmental Specifications

- Operating Environment:
  - Thermal transfer = 40° to 104°F (5° to 40°C)
  - Thermal direct = 32° to 104°F (0° to 40°C)
  - 20% to 85% non-condensing R.H.
- Storage/Transportation Environment:
  - 40° to 140°F (-40° to 60°C)
  - 5% to 85% non-condensing R.H.

Electrical Specifications

- Power Supply: Auto-detectable (PFC Compliant) 100-240VAC, 50-60Hz
- ENERGY STAR qualified
- Safety and EMC: IEC 62368, Class B, EN 55032, EN 55035, EN 61000-3-2, EN 61000-3-3
- Product Markings: Including, not limited to, cTUVus, CE, FCC, ICES-003(B), VCCI, RCM, NOM, S-Mark, CCC, EAC, BSMI, KCC, SABS, In-Metro, BIS.

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.
- **Print Registration**—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.
- **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.

Physical Specifications

Parameter	ZT421
Height	12.75 in. (324 mm)
Width	13.25 in. (336 mm)
Depth	19.50 in. (495 mm)
Weight	40 lb (18.14 kg)
Shipping Weight	45 lb (20.41 kg)
Parameter	**ZT421 with Full rewind**
Height	16.73 in. (425 mm)
Width	13.31 in. (338 mm)
Depth	19.68 in. (500 mm)
Weight	55.3 lb (25.08 kg)
Shipping Weight	60.3 lb (27.35 kg)

For more information, please visit **www.zebra.com/zt421**

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