

# V1200 Series

*Arm-based compact rail computers with options for wireless and cellular expansion*



## Features and Benefits

- Arm Cortex-A53 quad-core 1.6 GHz processor
- Slim, compact design with multiple mounting options
- Integrated 5G Sub-6GHz NR module and Wi-Fi 6 module with dual SIM
- Built-in TPM 2.0 module
- Moxa Industrial Linux built-in for long-term Linux support
- Isolated power with 24 to 110 VDC power supply range
- Complies with all EN 50155 mandatory test items<sup>1</sup>
- Compliance with IEC 62443-4-2 Security Level 2 requirements

## Certifications



## Introduction

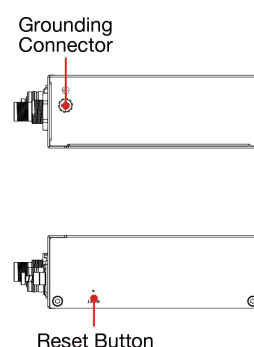
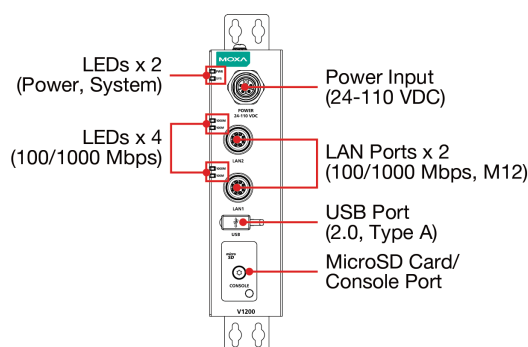
The V1200 computing platform is designed for railway TCMS data-acquisition and train-to-ground applications. The computer comes with dual M12 10/100/1000 Mbps Ethernet ports, built-in 5G and Wi-Fi 6 modules and dual RS-232/422/485 serial ports. The slim, compact design with multiple mounting options reduces installation space and provides flexibility for mounting in various cabinets or onboard locations.

The V1200 comes with Moxa Industrial Linux (MIL) and long-term Linux support and vulnerability patching. A web-based interface is provided for easy configuration of Ethernet and wireless network settings without the need for programming.

The V1200 wireless-enabled models are thoroughly tested in a testing chamber, guaranteeing they meet the EN 50155 mandatory requirements and OT4 operating temperature (-40 to 70°C with cellular and Wi-Fi modules enabled) requirements, making them suitable for wide-temperature applications.

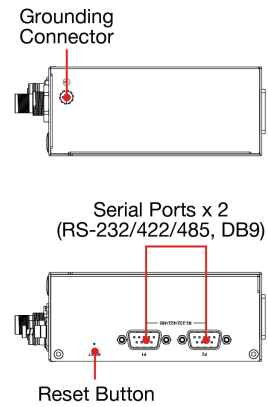
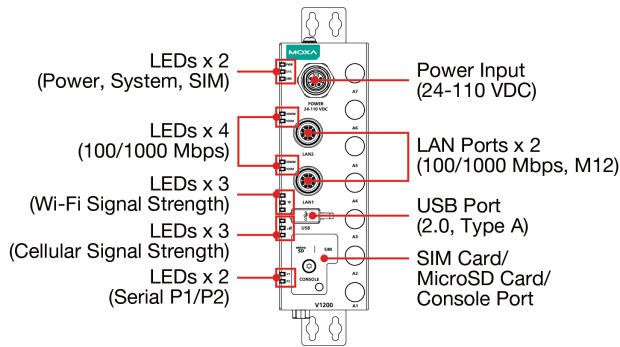
## Appearance

### V1202-CT-T Model

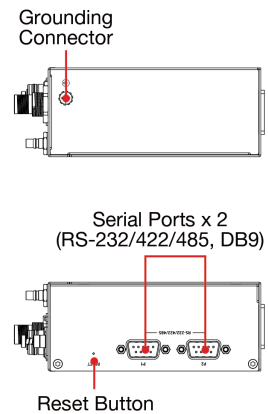
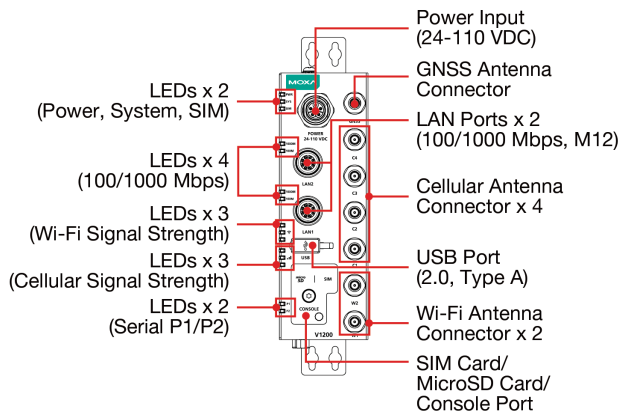


1. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: [www.moxa.com/doc/specs/EN\\_50155\\_Compliance.pdf](http://www.moxa.com/doc/specs/EN_50155_Compliance.pdf)

## V1222-CT-T Model



## V1222-W-CT-T Model



## Specifications

### Computer

|                       |  |
|-----------------------|--|
| CPU                   | Arm Cortex-A53 quad-core 1.6 GHz   |
| DRAM                  | 4 GB LPDDR4  |
| Supported OS          | Moxa Industrial Linux 3 (Debian 11, kernel 5.10), 2031 EOL<br>See <a href="http://www.moxa.com/MIL">www.moxa.com/MIL</a> |
| Storage Pre-installed | 16 GB eMMC   |
| Expansion Slots       | microSD socket x 1   |

### Computer Interface

|                            |   |
|----------------------------|---|
| Ethernet Ports             | Auto-sensing 10/100/1000 Mbps ports (M12 X-coded) x 2   |
| Serial Ports               | V1222-CT-T, V1222-W-CT-T:<br>RS-232/422/485 ports x 2 (software-selectable, DB9 male connector) |
| USB 2.0                    | USB 2.0 hosts x 1, type-A connectors  |
| Wi-Fi Antenna Connector    | V1222-CT-T, V1222-W-CT-T: QMA x 2   |
| Cellular Antenna Connector | V1222-CT-T, V1222-W-CT-T: QMA x 4   |
| GPS Antenna Connector      | V1222-CT-T, V1222-W-CT-T: QMA x 1   |
| Console Port               | 3-pin header output (115200, n, 8, 1)   |
| Expansion Slots            | M.2 E-key slot x1 (for Wi-Fi 6)<br>M.2 B-key slot x1 (for 5G)                                   |

|                |  |
|----------------|--|
|                | mPCIe slot x1 (for LTE)<br><br>Note: 5G and LTE cannot be operated at the same time. |
| SIM Format     | V1222-CT-T, V1222-W-CT-T: Nano   |
| Number of SIMs | V1222-CT-T: 2 for 5G or 2 for LTE<br>V1222-W-CT-T: 2 for 5G                          |
| Buttons        | Reset button   |
| TPM            | TPM v2.0   |

#### Serial Interface

|              |   |
|--------------|---|
| No. of Ports | V1222-CT-T, V1222-W-CT-T: 2   |
| Baudrate     | 50 bps to 921.60 kbps   |
| Data Bits    | 5, 6, 7, 8  |
| Stop Bits    | 1, 1.5, 2   |
| Parity       | None, Even, Odd, Space, Mark  |
| Flow Control | RTS/CTS, XON/XOFF<br>ADDC (automatic data direction control) for RS-485<br>RTS Toggle (RS-232 only) |
| Isolation    | N/A   |

#### Serial Signals

|           |  |
|-----------|--|
| RS-232    | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| RS-422    | Tx+, Tx-, Rx+, Rx-, GND                |
| RS-485-2w | Data+, Data-, GND                      |
| RS-485-4w | Tx+, Tx-, Rx+, Rx-, GND                |

#### Cellular Interface

|                 |  |
|-----------------|--|
| 5G NR Bands     | 5G NSA and SA bands:<br>n1 (2100 MHz), n2 (1900 MHz), n3 (1800 MHz), n5 (850 MHz), n7 (2600 MHz), n8 (900 MHz), n20 (800 MHz), n25 (1900 MHz), n28 (700 MHz), n30 (2300 MHz), n38 (2600 MHz), n41 (2500 MHz), n48 (3600 MHz), n66 (1700 MHz), n71 (600 MHz), n75 (1500 MHz), n77 (3700 MHz), n78 (3500 MHz), n79 (4500 MHz)  |
| LTE Bands       | B1 (2100 MHz), B2 (1900 MHz), B3 (1800 MHz), B4 (1700 MHz), B5 (850 MHz), B7 (2600 MHz), B8 (900 MHz), B12 (700 MHz), B13 (700 MHz), B14 (700 MHz), B17 (700 MHz), B18 (800 MHz), B19 (800 MHz), B20 (800 MHz), B25 (1900 MHz), B26 (850 MHz), B28 (700 MHz), B29 (700 MHz), B30 (2300 MHz), B32 (1500 MHz), B34 (2000 MHz), B38 (2600 MHz), B39 (1900 MHz), B40 (2300 MHz), B41 (2500 MHz), B42 (3500 MHz), B43 (3600 MHz), B46 (5200 MHz), B48 (3600 MHz), B66 (1700 MHz), B71 (600 MHz) |
| UMTS/HSPA Bands | B1 (2100 MHz)<br>B2 (1900 MHz)<br>B4 (1700 MHz)<br>B5 (850 MHz)<br>B6 (850 MHz)<br>B8 (900 MHz)<br>B19 (800 MHz)   |

## GPS Interface

|                          |   |
|--------------------------|---|
| Frequency Range          | Wide-band GNSS: 1559 to 1606 MHz (recommended)<br>GPS: BW NB GPS 2.046 MHz (centered at 1575.42 MHz)<br>GLONASS: BW 8.3 MHz approx. (1597.05 to 1606 MHz)<br>BeiDou: 4.092 MHz BW (1559.05 to 1563.14 MHz)<br>Galileo: 4.092 MHz BW (centered at 1575.42 MHz) |
| Antenna Types Supported  | Active antenna (default)<br>Passive antenna   |
| Time to First Fix (TTFF) | Hot start: 1 s<br>Warm start: 27 s<br>Cold start: 28 s  |
| Sensitivity              | Cold starts: -146 dBm<br>Tracking: -161 dBm<br>Acquisition: -148 dBm  |
| Update Rate              | Minimum 1 Hz  |

## WLAN Interface

|                |                                    |
|----------------|------------------------------------|
| WLAN Standards | 802.11a/b/g/n/ac/ax                |
| Frequency Band | 2.4 GHz / 6 GHz<br>2.4 GHz / 5 GHz |

## LED Indicators

|                          |  |
|--------------------------|--|
| System                   | Power x 1<br>System x 1<br>SIM card indicator x 1              |
| LAN                      | 2 ports, 1 per port (10/100/1000 Mbps)                         |
| Serial                   | V1222-CT-T, V1222-W-CT-T:<br>1 LED per port for 2 serial ports |
| Wireless Signal Strength | Cellular x 3<br>Wi-Fi x 3                                      |

## Power Parameters

|                             |   |
|-----------------------------|---|
| No. of Power Inputs         | 1   |
| Input Voltage               | 24 to 110 VDC   |
| Input Current               | V1202-CT-T: 0.4 A @ 24 VDC, 0.1A @ 110 VDC<br>V1222-W-CT-T: 0.48 A @ 24 VDC, 0.105A @ 110 VDC   |
| Power Consumption           | V1202-CT-T: 7.4 W at 95% CPU loading<br>V1222-W-CT-T: 13 W (with 5G & Wi-Fi) at 95% CPU loading |
| Power Connector             | M12 K-code power connector  |
| Reverse Polarity Protection | Supported   |

## Reliability

|                          |                                |
|--------------------------|--------------------------------|
| Automatic Reboot Trigger | External RTC (real-time clock) |
| Alert Tools              | External WDT (watchdog timer)  |

## Physical Characteristics

|           |               |
|-----------|---------------|
| Housing   | Metal<br>SECC |
| IP Rating | IP40          |

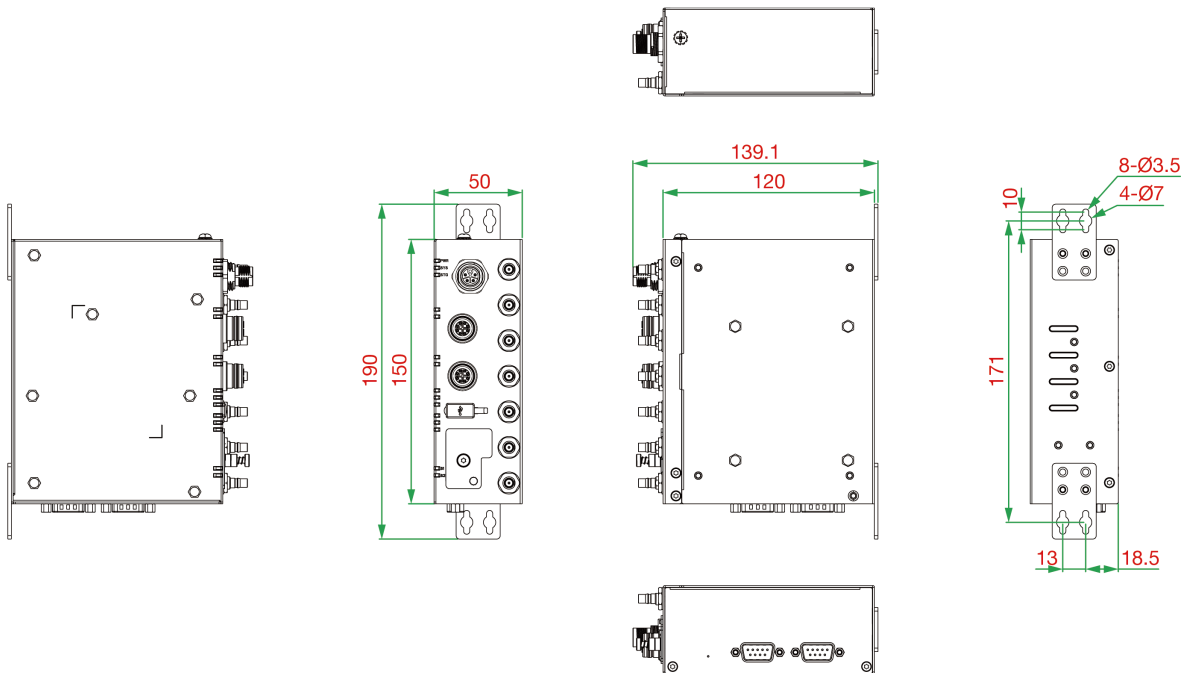
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|--|---|
| Dimensions                             | V1202-CT-T: 150 x 120 x 41 mm<br>V1222-CT-T / V1222-W-CT-T:<br>150 x 120 x 50 mm  |
| Weight                                 | V1202-CT-T: 665g (without mount ears)<br>V1222-W-CT-T : 1000g (without mount ears)  |
| Installation                           | Wall mounting (standard)<br>Desk mounting (with optional kit)<br>DIN-rail mounting (with optional kit)  |
| <b>Environmental Limits</b>            |   |
| Operating Temperature                  | With Cellular and Wi-Fi: -40 to 70°C (-40 to 158°F)   |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F)  |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)   |
| <b>Standards and Certifications</b>    |   |
| EMC                                    | EN 55032/35<br>EN 61000-6-2/-6-4  |
| EMI                                    | CISPR 32, FCC Part 15B Class A  |
| EMS                                    | IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m<br>IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV<br>IEC 61000-4-5 Surge: Power: line-to-line 2 kV, Signal: line-to-ground 2 kV<br>IEC 61000-4-6 CS: 150 kHz to 80 MHz; Signal: 10 V<br>IEC 61000-4-8 PFMF |
| Cellular Standards                     | EN 301 908-1 (WCDMA/LTE)<br>EN 301 489-1/-19 (GPS)<br>EN 301 489-1/-52 (WCDMA/LTE)<br>EN 303 413 (GPS)  |
| WLAN Standards                         | EN 303 687 (6 GHz)<br>EN 301 893 (5 GHz)<br>EN 301 489-1-17<br>EN 300 328 (2.4 GHz)   |
| Radio Frequency                        | FCC<br>RCM<br>CE (RED)<br>UKCA<br>EN 62311  |
| International Approval                 | FCC<br>CE<br>UKCA<br>RCM (V1202-CT-T and V1222-CT-T)<br>BSMI (V1222-CT-T)   |
| Safety                                 | IEC 62368-1<br>UL 62368-1   |
| Railway Fire Protection                | EN 45545-2<br>NFPA130   |
| Railway                                | EN 50155: 2021<br>EN 50121-4  |
| Shock                                  | IEC 60068-2-27<br>IEC 61373<br>EN 50155   |

|                         |   |
|-------------------------|---|
| Vibration               | IEC 60068-2-64<br>IEC 61373<br>EN 50155   |
| Green Product           | RoHS, CRoHS, WEEE   |
| <b>MTBF</b>             |   |
| Time                    | V1202-CT-T: 2,755,789 hrs<br>V1222-CT-T: 1,430,568 hrs<br>V1222-W-CT-T: 1,324,329 hrs |
| Standards               | Telcordia Standard SR332 Issue 4  |
| <b>Warranty</b>         |   |
| Warranty Period         | 5 years   |
| Details                 | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>                  |
| <b>Package Contents</b> |   |
| Device                  | 1 x V1200 Series computer   |
| Installation Kit        | 1 x wall-mounting kit   |
| Documentation           | 1 x quick installation guide<br>1 x warranty card                                     |

## Dimensions

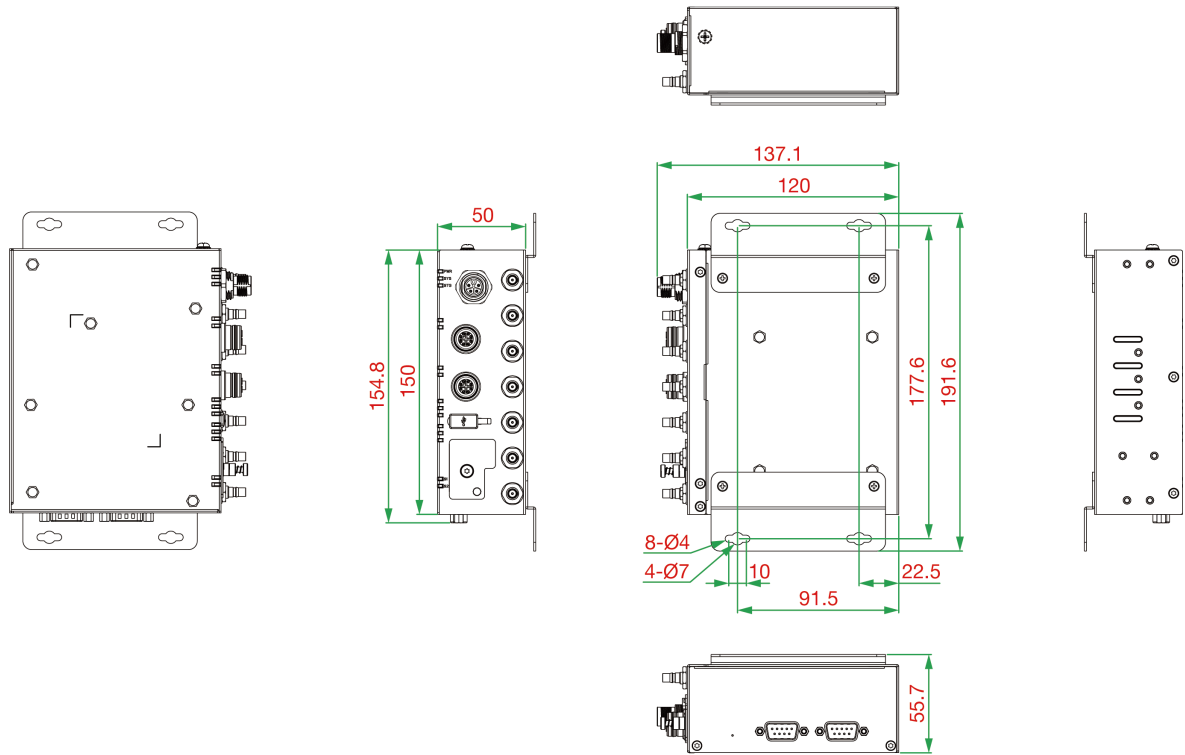
### With Standard Wall Mounting Kit

Unit: mm



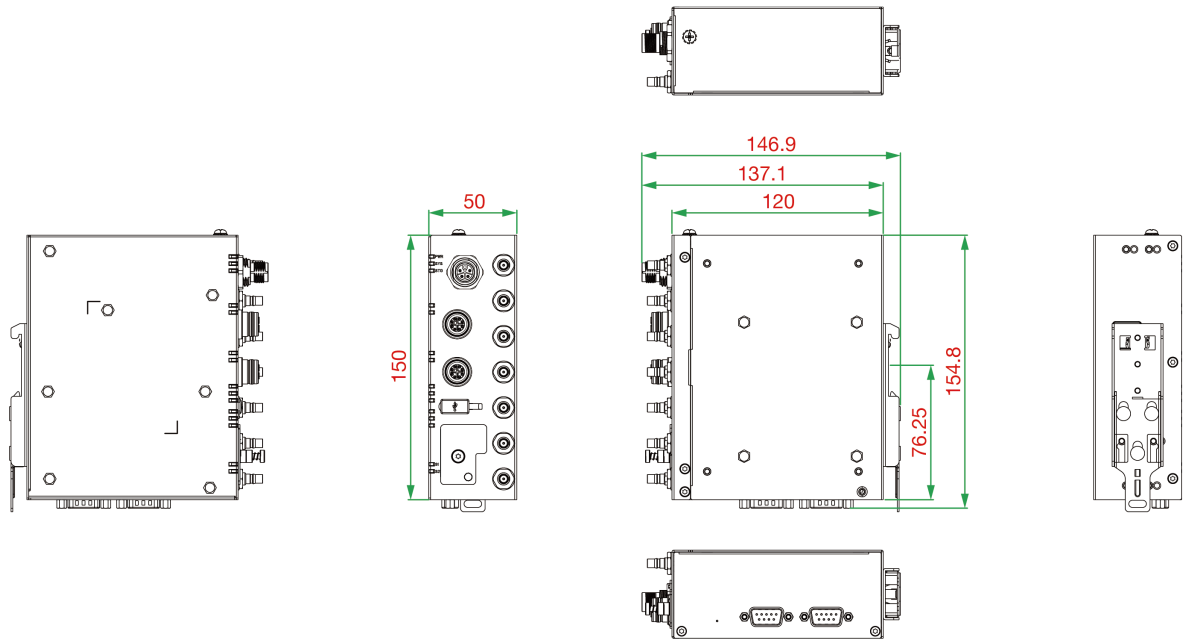
With Optional Desk Mounting Kit

Unit: mm



With Optional Din Rail Mounting Kit

Unit: mm



Ordering Information

| Model Name | CPU                              | eMMC  | LPDDR4 | GbE Ports | Serial Ports | Wireless | Operating Temperature | Conformal Coating |
|------------|----------------------------------|-------|--------|-----------|--------------|----------|-----------------------|-------------------|
| V1202-CT-T | Arm Cortex-A53 quad-core 1.6 GHz | 16 GB | 4 GB   | 2         | N/A          | N/A      | -40 to 70°C           | ✓                 |

Accessories (sold separately)

Cables

|                             |  |
|-----------------------------|--|
| CBL-M12KFF5POPEN-O-150-IP67 | K-coded female M12-to-5-pin open wire power cable, orange, IP67-rated, 1.5 m |
| CBL-M12XMM8P-Y-300-IP67     | X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 3 m           |
| CBL-M12XMM8P-Y-100-IP67     | X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 1 m           |
| CBL-M12XMM8PRJ45-Y-200-IP67 | X-coded male M12-to-RJ45 Ethernet cable, yellow, IP67-rated, 2 m             |

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