

# W311/321/341

*RISC-based embedded Linux computers with WLAN, LAN, and 1, 2, or 4 serial ports*



- > MOXA ART ARM9 32-bit 192 MHz processor running Linux 2.6
- > 32 or 64 MB RAM, and 16 MB flash disk on board
- > 802.11a/b/g WLAN with repeater function
- > WEP, WPA, and WPA2 encryption
- > 10/100 Mbps Ethernet for network redundancy
- > Relay output for external alarm connection (W341 only)
- > SD socket for storage expansion
- > DIN-rail or wallmount installation
- > Designed to withstand 5 g's of continuous vibration and 50-g shocks
- > Robust, fan-less design



The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

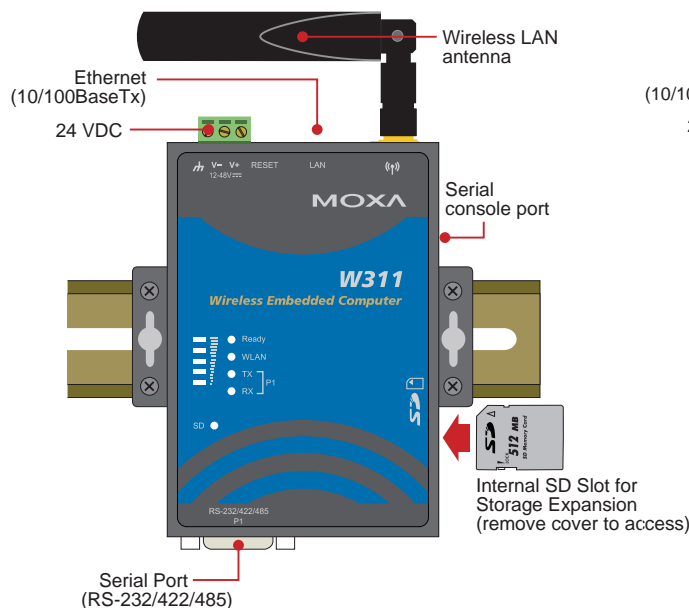
## Overview

The W311/321/341 embedded Linux computers feature 1, 2, or 4 software selectable RS-232/422/485 ports, and support the IEEE 802.11a/b/g standards for WLAN connections. In addition, the computers have 1 Ethernet port, and some models come with USB 2.0 hosts and an SD socket for storage expansion. The W311/321/341

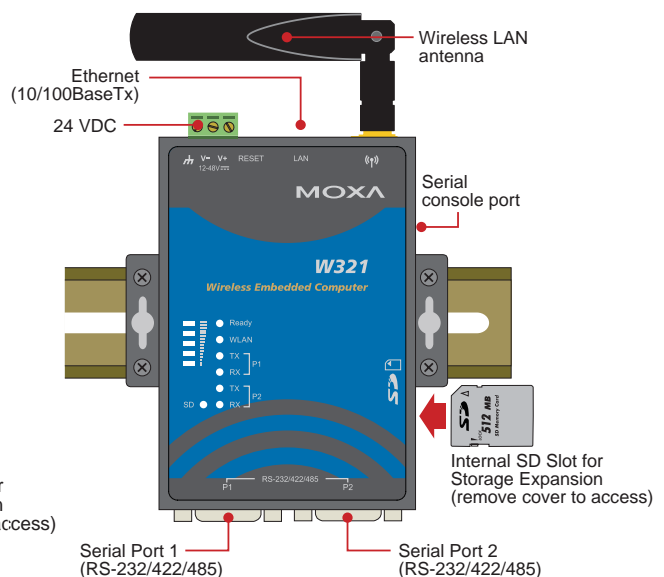
computers' Linux OS runs on the MOXA ART 32-bit ARM9 processor that provides a powerful and reliable platform for harsh, industrial environments. You will find these computers ideal for a variety of machine-to-machine applications, including data acquisition, protocol conversion, and remote device control and monitoring.

## Appearance

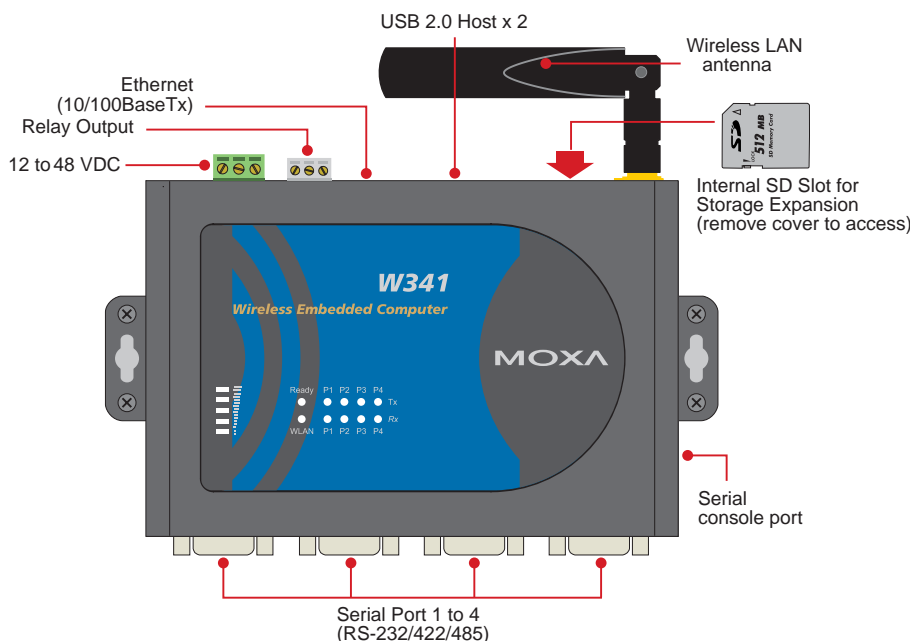
### W311



### W321



## W341



## Hardware Specifications

### Computer

**CPU:** MOXA ART ARM9 32-bit 192 MHz

**OS (pre-installed):** Embedded Linux with MMU support

**DRAM:**

W311/321: 32 MB

W341: 64 MB

**Flash:** 16 MB

**USB:** (W341 only) USB 2.0 compliant hosts x 2, type A connector, supports system boot up

**Relay Output:** (W341 only)

- Form C, SPDT x 1
- Normal Switching Capacity: 2 A @ 30 VDC
- Switching Power: 60 W max.
- Switching Voltage: 220 VDC max.
- Switching Current: 2 A max.
- Operating Time: 4 ms @ 20°C
- Initial Contact Resistance: 100 milli-ohm max.

**Storage Expansion:** SD slot

### Ethernet Interface

**LAN:** 1 auto-sensing 10/100 Mbps port (RJ45)

**Magnetic Isolation Protection:** 1.5 KV built-in

### WLAN Interface

**Standard Compliance:** 802.11a/b/g

**Radio Frequency Type:** DSSS, CCK, OFDM

**Media Access Protocol:** CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)

**Tx Power (typical):**

- 5.15-5.35 GHz: 14 dBm @ 6 Mbps, 14 dBm @ 54 Mbps
- 5.725-5.825 GHz: 14 dBm @ 6 Mbps, 13 dBm @ 54 Mbps
- 2.412-2.483 GHz (802.11g): 17 dBm @ 6 Mbps, 15 dBm @ 54 Mbps
- 2.412-2.472 GHz (802.11b): 18 dBm @ 1-11 Mbps

**Rx Sensitivity (typical):**

- 5.15-5.35 GHz: 6 Mbps @ -82 dBm, 54 Mbps @ -67 dBm
- 5.47-5.725 GHz: 6 Mbps @ -82 dBm, 54 Mbps @ -67 dBm
- 5.725-5.825 GHz: 6 Mbps @ -80 dBm, 54 Mbps @ -69 dBm
- 2.412-2.472 GHz (802.11g): 6 Mbps @ -84 dBm, 54 Mbps @ -69 dBm
- 2.412-2.472 GHz (802.11b): 11 Mbps @ -82 dBm, 1 Mbps @ -90 dBm

**Transmission Rate:** 54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps)

- 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11b: 1, 2, 5.5, 11 Mbps

**Transmission Distance:** Up to 100 meters (@ 11 Mbps in open areas)

**Antenna Connector:** Reverse SMA

**Antenna:** External 2 dbi dipole antenna

**Wireless Security:** WEP: 64-bit/128-bit, WPA, WPA2 data encryption

**WLAN Modes:** Ad-hoc (802.11b/g), Infrastructure

### Serial Interface

**Serial Standards:** 1, 2, or 4 RS-232/422/485 ports, software-selectable (DB9 male)

**EDS Protection:** 15 KV ESD protection for all signals

**Console Port:** RS-232 interface (TxD, RxD, GND), with 4-pin pin header output

### Serial Communication Parameters

**Data Bits:** 5, 6, 7, 8

**Stop Bits:** 1, 1.5, 2

**Parity:** None, Even, Odd, Space, Mark

**Flow Control:** RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485

**Baudrate:** 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

## Serial Signals

**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

**RS-422:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-2w:** Data+, Data-, GND

## LEDs

**System:** Ready, SD

**LAN:** 10M/Link, 100M/Link (on connector)

**WLAN:** Enable, Signal Strength

**Serial:** TxD, RxD

## Switches and Buttons

**Reset Button:** Supports “Reset to Factory Default”

## Physical Characteristics

**Housing:** Aluminum (1 mm)

**Weight:**

W311: 170 g

W321: 185 g

W341: 390 g

**Dimensions:** (without ears or antenna)

W311/W321: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)

W341: 150 x 100 x 38 mm (5.91 x 3.94 x 1.50 in)

**Mounting:** DIN-rail (requires optional DK-35A DIN-rail kit), wall

## Environmental Limits

**Operating Temperature:** -10 to 60°C (14 to 140°F)

**Operating Humidity:** 5 to 95% RH

**Storage Temperature:** -20 to 80°C (-4 to 176°F)

**Anti-Vibration:** 5g @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis

**Anti-Shock:** 50g @ IEC-68-2-6, half-sine wave, 30 ms

## Power Requirements

**Input Voltage:** 12 to 48 VDC

**Power Consumption:**

W311/321: 4.8 W

- 400 mA @ 24 VDC

- 400 mA @ 12 VDC

W341:

With no load on USB ports: 7.2 W

- 300 mA @ 24 VDC

- 600 mA @ 12 VDC

With full load on USB ports: 14.4 W

- 600 mA @ 24 VDC

- 1200 mA @ 12 VDC

## Regulatory Approvals

**EMC:** CE (ETSI EN 301 489-1/-17, ETSI EN 301 893, ETSI EN 300 328, EN50392), FCC Part 15C & Part 15E

**Safety:** UL/cUL (UL60950-1), T V (EN60950-1)

**Green Product:** RoHS, CRoHS, WEEE

## Reliability

**Alert Tools:** Built-in buzzer and RTC (real-time clock) with battery backup

**Automatic Reboot Trigger:** Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

## Warranty

**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

## Software Specifications

### Linux

**Kernel Version:** 2.6.9

**Boot Loader:** Redboot

**Protocol Stack:** TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE

**File System:** JFFS2 (on-board flash)

**System Utilities:** bash, busybox, tinylogin, telnet, ftp, scp

**telnetd:** Telnet Server daemon

**ftpd:** FTP server daemon

**sshd:** Secure shell server

**Apache:** Web server daemon, supporting PHP and XML

**openvpn:** Virtual private network service manager

**iptables:** Firewall service manager

**pppd:** dial in/out over serial port daemon & PPPoE

**snmpd:** snmpd agent daemon

**inetd:** TCP server manager program

**Application Development Environment:**

- MOXA Linux API Library

- Linux Tool Chain: Gcc, Glibc, GDB

- BINEncryptor: Encryption tool for binary files, based on “Moxa Intellectual Protection Technology” (Patented)

**Device Drivers:**

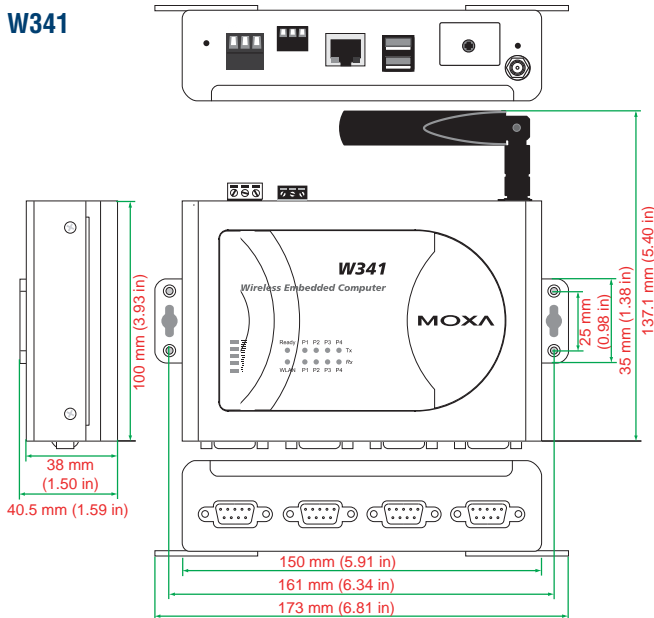
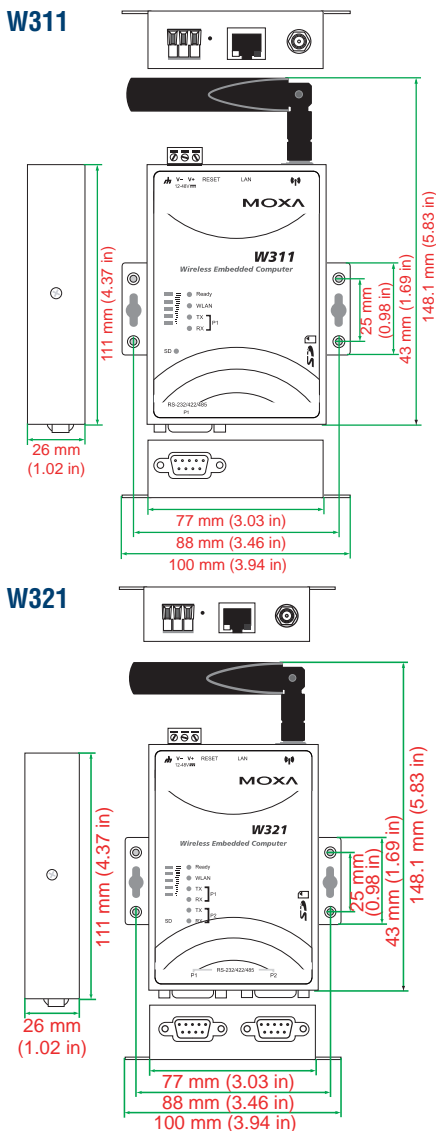
- W311/W321: UART, RTC, Buzzer, SD Card

- W341: UART, RTC, Buzzer, SD Card, USB (supports USB flash disk), Watchdog Timer, DO

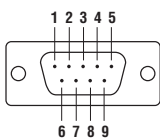
**Software Encryption Lock:**

BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

Dimensions

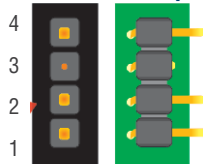


Pin Assignment  
Male DB9



PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	-
2	RxD	TxD+(B)	-
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-

Serial Console port



PIN	
1	TxD
2	RxD
3	NC
4	GND



Ordering Information

Available Models

- W311-LX:** Mini RISC-based wireless Linux computer with WLAN, 1 serial port, LAN, and SD
- W321-LX:** Mini RISC-based wireless Linux computer with WLAN, 2 serial ports, LAN, and SD
- W341-LX:** RISC-based wireless Linux computer with WLAN, 4 serial ports, LAN, SD, USB, and relay output

Package Checklist

- W311 or W321 or W341 computer
- Wall mounting kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adaptor (including terminal block to power jack converter)
- WLAN Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card