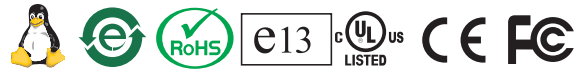# W311/321/341

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

W341

W321

W311

> 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 wall mount installation
> Designed to withstand continuous 5-g vibration and 50-g shocks
> Robust, fanless design

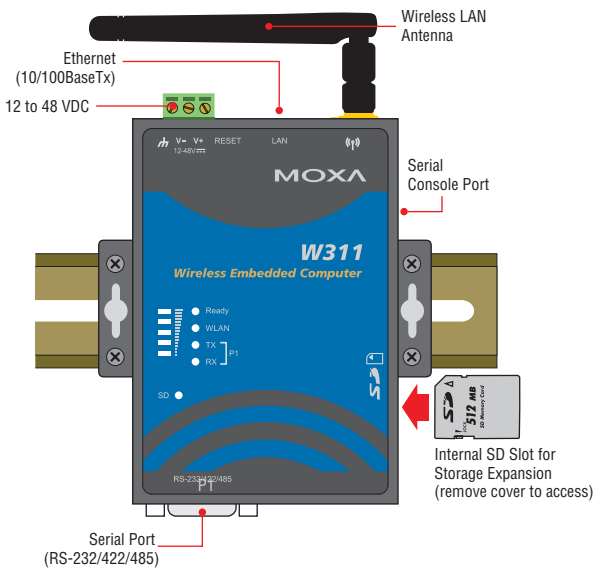## Overview

The W311/321/341 embedded Linux computers feature 1, 2, or 4 software selectable RS-232/422/485 ports, and support the IEEE 802.1a/b/g standards for WLAN connections. In addition, the computers have 1 Ethernet port, and some models come with USB 2.0 hosts and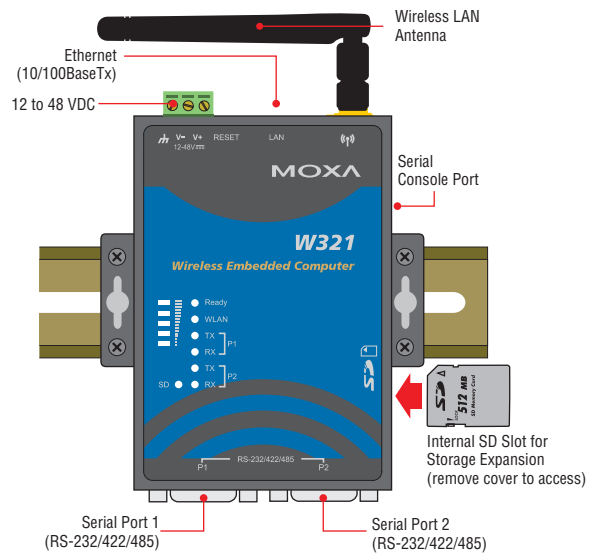 an SD socket for storage expansion. The W311/321/341 computers' Linux OS runs on the MOXA ART 32-bit ARM9 processor that provides a powerful and reliable platform for harsh, industrial environments. You will find these computers ideal for a variety of machine-to-machine applications, including data acquisition, protocol conversion, and remote device control and monitoring.
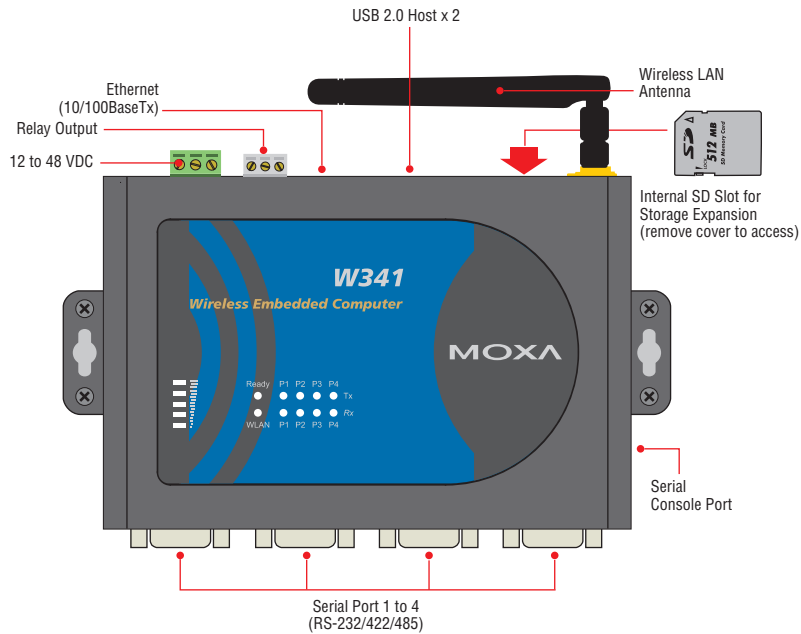
Appearance

W311

Wireless LAN Antenna
Ethernet (10/100BaseTx)
12 to 48 VDC
Serial Console Port

W311
Wireless Embedded Computer

Ready
WLAN
TX
RX
P1
SD

Internal SD Slot for Storage Expansion (remove cover to access)

Serial Port (RS-232/422/485)

W321

Wireless LAN Antenna
Ethernet (10/100BaseTx)
12 to 48 VDC
Serial Console Port

W321
Wireless Embedded Computer

Ready
WLAN
TX
RX   P1
TX
RX   P2
SD

Internal SD Slot for Storage Expansion (remove cover to access)

Serial Port 1 (RS-232/422/485)
Serial Port 2 (RS-232/422/485)

W341

USB 2.0 Host x 2

Ethernet
(10/100BaseTx)

Relay Output

12 to 48 VDC

Wireless LAN
Antenna

Internal SD Slot for
Storage Expansion
(remove cover to access)

Serial
Console Port

Serial Port 1 to 4
(RS-232/422/485)

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
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
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)
ESD 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)
Storage Temperature: -20 to 80°C (-4 to 176°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Anti-vibration: 5 g's @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis
Anti-shock: 50 g's @ IEC-68-2-6, half-sine wave, 30 ms

Power Requirements
Input Voltage:
W311 and W321: 12 to 48 VDC
W341: 12 to 48 VDC
Power Consumption:

W311/321: 4.8 W
• 200 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

Standards and Certifications
Safety: UL 60950-1, EN 60950-1
EMC: EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 55024
Radio: EN 301 489-1/17, EN 301 893, EN 300 328, EN 50392, FCC Part 15, Subpart C/E
Wheeled Vehicles: e-Mark (e13) (W311/321 only)
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
MTBF (mean time between failures):
W311: 501,331 hrs
W321: 367,253 hrs
W341: 284,702 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Software Specifications

Linux
OS: Linux 2.6.9
File System: JFFS2 (for on-board flash)
Internet Protocol Suite: TCP, UDP, IPv4, SNMPv1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, TFTP, PPP, PPPoE
Internet Security: OpenVPN, iptables firewall
Web Server (Apache): Allows you to create and manage Web sites, supporting PHP and XML
Terminal Server (SSH): Provides secure encrypted communications between two un-trusted hosts over an insecure network.
Dial-up Networking: PPP Daemon for Linux allows Unix machines to connect to the internet through dialup lines, using the PPP protocol, as a PPP server or client. Works with 'chat', 'dip', and 'diald', among (many) others. Supports IP, TCP, UDP and (for Linux) IPX (Novell).
Watchdog: Features a software function to trigger system reset in a user specified time interval. (MOXA API provided)

Application Development:
• Moxa API Library (Watchdog timer, Moxa serial I/O control, Moxa DI/DO API)
• GNU C/C++ Cross-Compiler
• GNU C library
• GDB source-level debugging server
Software Protection: Encryption tool for user executable files (based on patented Moxa technology)

Model Name	Serial Ports	LAN Port	WLAN	Cellular	Relay Output	Storage		OS
	RS-232/422/485	10/100 Mbps	802.11a/b/g	GSM/GPRS Quad Band		SD	USB	
W311	1	1	✓	–	–	✓	–	Linux
W321	2	1	✓	–	–	✓	–	Linux
W341	4	1	✓	–	1	✓	2	Linux

Dimensions

Unit: mm (inch)

W311
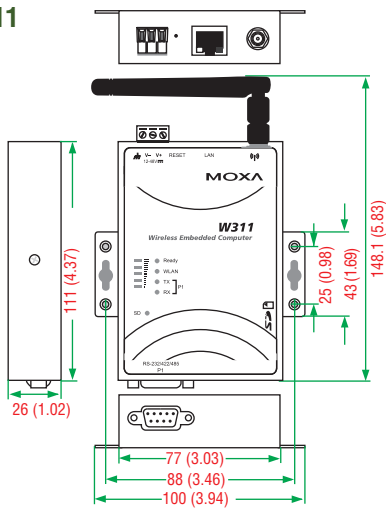
W321
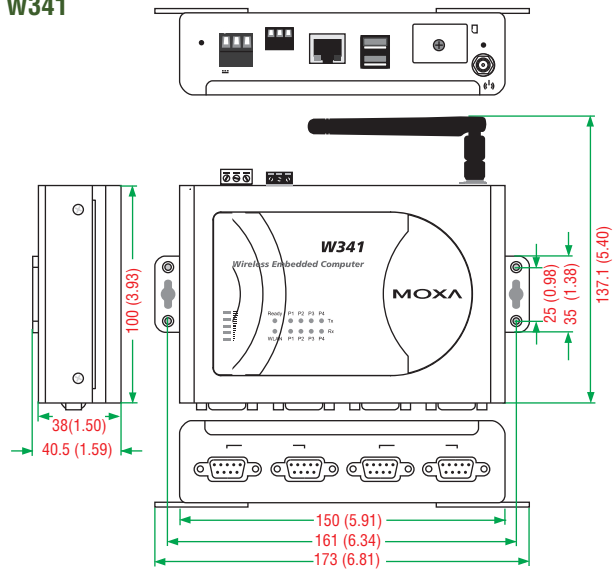
W341
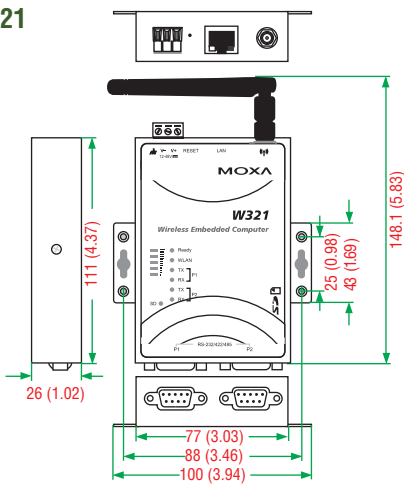
Pin Assignment Male DB9

1 2 3 4 5
6 7 8 9
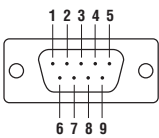
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

Serial Console port

4
3
2
1

PIN	
1	TxD
2	RxD
3	NC
4	GND

⦂ Ordering Information

Available Models

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

Optional Accessories (can be purchased separately)

DK-35A: Mounting kit for 35-mm DIN-Rail

Package Checklist

- 1 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
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card