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

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

- Ethernet (10/100BaseT)
- 12 to 48 VDC
- Wireless LAN Antenna
- Serial Port (RS-232/422/485)
- Serial Console Port
- Internal SD Slot for Storage Expansion (remove cover to access)

W321

- Ethernet (10/100BaseT)
- 12 to 48 VDC
- Wireless LAN Antenna
- Serial Port 1 (RS-232/422/485)
- Serial Port 2 (RS-232/422/485)
- Serial Console Port
- Internal SD Slot for Storage Expansion (remove cover to access)
**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  
• 5.47-5.725 GHz: 14 dBm @ 6 Mbps, 14 dBm @ 54 Mbps  
• 5.725-5.825 GHz: 14 dBm @ 6 Mbps, 14 dBm @ 54 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)
Embedded Computing Solutions

Serial Signals
RS-232:TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422:Tx+, Rx-, Rx+, GND
RS-485-4w:Tx+, Tx-, Rx+, 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

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

Power Requirements
Input Voltage:
W311 and W321: 12 to 24 VDC
W341: 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

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

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

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
File System: JFFS2 (on-board flash)
System Utilities: bash, busynx, tinynlog, 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: snmp 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)
**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

**Ordering Information**

- **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

- **Pin Assignment**
  - **Male DB9**
    - 1: DCD
    - 2: RxD
    - 3: TxD
    - 4: DTR
    - 5: GND
    - 6: DSR
    - 7: RTS
    - 8: CTS

- **Serial Console port**
  - 1: RsD
  - 2: RxD
  - 3: NC
  - 4: GND

- **Dimensions**
  - **W311**: 100 mm (3.94 in) x 77 mm (3.03 in) x 25 mm (0.98 in)
  - **W321**: 148.1 mm (5.83 in) x 111 mm (4.37 in) x 26 mm (1.02 in)
  - **W341**: 173 mm (6.81 in) x 150 mm (5.91 in) x 38 mm (1.50 in)