W311

RISC-based embedded Linux computers with WLAN, LAN, and 1 serial port

- MOXA ART ARM9 32-bit 192 MHz processor running Linux 2.6
- 32 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
- DIN-rail or wall-mount installation
- Designed to withstand 5 g’s of continuous vibration and 50-g shocks
- Robust, fan-less design

Overview

The W311 is an embedded Linux computer that features 1 software selectable RS-232/422/485 port, and supports the IEEE 802.1a/b/g standards for WLAN connections. In addition, the computer has 1 Ethernet port for wired network communication. The W311’s Linux OS runs on the MOXA ART 32-bit ARM9 processor, and 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

Dimensions

Ethernet (10/100BaseTx)
12 to 48 VDC

Wireless LAN antenna

Serial Port
(RS-232/422/485)

22 mm (0.87 in)

67 mm (2.64 in)

90 mm (3.54 in)

100.4 mm (3.95 in)

25 mm (0.98 in)

43 mm (1.69 in)

78 mm (3.07 in)

409 mm (15.8 in)

25 mm (0.98 in)

409 mm (15.8 in)
Hardware Specifications

**Computer**
- **CPU:** MOXA ART ARM9 32-bit 192 MHz
- **OS (pre-installed):** Embedded Linux with MMU support
- **DRAM:** 32 MB
- **Flash:** 16 MB

**LAN Interface**
- **Ethernet:** Auto-sensing 10/100 Mbps, RJ45 connector
- **Magnetic Isolation Protection:** 1.5 KV built-in

**WLAN Interface**
- **Standard Compliance:** 802.11a/b/g
- **Radio Frequency Type:** DSSS, CCK, OFDM
- **Radio Frequency Band:**
  - 802.11a: 5.15-5.25 GHz, 5.25-5.35 GHz, 5.725-5.825 GHz
  - 802.11b/g: U.S., Europe, Japan products, covering
  - 2.4-2.484 GHz
- **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, 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
  - 802.11n: 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:** RS-232/422/485 (software-selectable)
- **Number of Port:** 1
- **Connector:** DB9 male
- **Serial Line 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 (RS-232/422/485 ports can select non-standard baudrates in this range)

**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:** OS Ready
- **LAN:** 10M/Link, 100M/Link (on connector)
- **WLAN:** Enable, Signal Strength
- **Serial:** TxD, RxD

**Switches and Buttons**
- **Buttons:** Reset button for resetting to factory defaults

**Physical Characteristics**
- **Housing:** Aluminum (1 mm)
- **Weight:** 150 g
- **Dimensions (without ears or antenna):**
  - 67 x 100.4 x 22 mm (2.64 x 3.95 x 0.87 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:** 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:** 12 to 48 VDC
- **Power Consumption:** 400 mA @ 12 VDC, 4.8 watts

**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), TÜV (EN60950-1)
- **Directives:** RoHS, CROHS, WEEE
- **MTBF:** 402,216 hrs

**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
**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, PPoE
- **File System:** JFFS2 (on-board flash)
- **System Utilities:** bash, busybox, tinylogin, telnet, ftp, scp
- **Supporting Services and Daemons:**
  - 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 & PPoE
  - 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:** UART, RTC, Buzzer

**H/W Block Diagram**

**Pin Assignment**

<table>
<thead>
<tr>
<th>PIN</th>
<th>RS-232</th>
<th>RS-422/485-4w</th>
<th>RS-485-2w</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>TxD-(A)</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>RoC</td>
<td>TxD+(B)</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>RxO+(B)</td>
<td>Data+(B)</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>RxO-(A)</td>
<td>Data-(A)</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>–</td>
<td>–</td>
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</tbody>
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**Ordering Information**

**Available Models**

- **W311-LX:** Mini RISC-based wireless Linux computer with WLAN, 1 serial port, and LAN

**Package Checklist**

- W311 computer
- Wall mounting kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PIND89F-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