# UC-2100-W Series

**_Preliminary_**

## Arm-based wireless-enabled palm-sized industrial computer with up to 2 serial ports and 2 LAN ports

> Armv7 Cortex-A8 600, 1000 MHz processor
> Up to 2 Industrial CAN 2.0 A/B ports supported
> Up to 2 software-selectable RS-232/422/485 ports supporting all signals
> Mini PCIe socket for Wi-Fi/cellular module (UC-2104)
> Integrated LTE Cat.M1/NB1 (UC-2114/UC-2116)
> Supports TPM v2.0
> Moxa Industrial Linux with 10-year long-term support
> -40 to 75°C wide-temperature model available with hazardous locations certification (UC-2114/UC-2116)

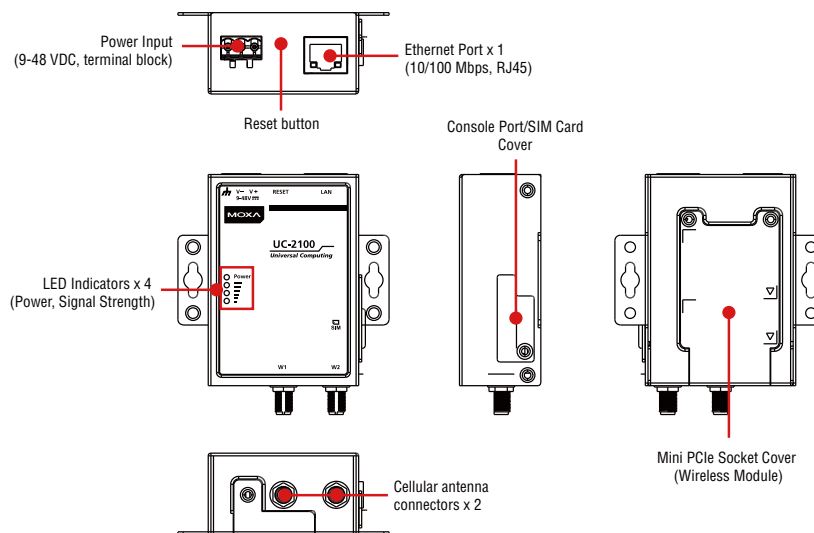Moxa Industrial Linux · RoHS · c(UL)us LISTED · CE · FC

## Introduction

The UC-2100-W Series computing platform is designed for embedded data acquisition and processing applications. The computer comes with up to two software selectable RS-232/422/485 full-signal serial ports and single or dual LAN ports. This palm-sized series of Arm-based computing platforms includes a variety of models for a wide range of interface requirements, such as serial and LAN ports, and wireless connections. The versatile communication capabilities allow users to efficiently adapt the UC-2100-W Series for a variety of complex communications solutions runnning on a compact palm-size computer.
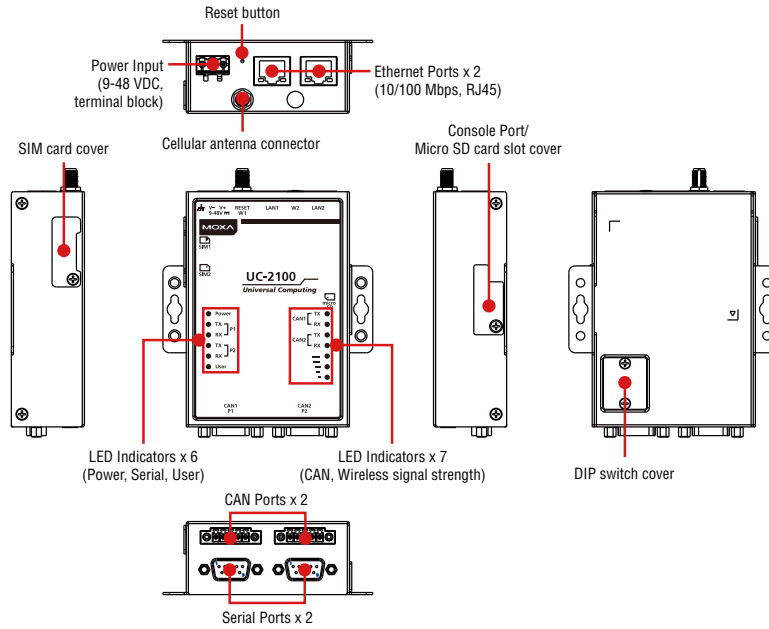
The UC-2100-W Series has a built-in Cortex-A8 Arm-based processor that has been optimized for a variety of industrial solutions. With flexible interface options, this tiny embedded computer is a reliable and secure gateway for data acquisition and processing at field sites and is a useful communication platform for many other large-scale deployments. Models designed for wide-temperature applications are available for extreme environments such as those found in the Oil & Gas industry. Furthermore, all models use Moxa's industrial-grade Linux platform, which provides optimized software features and superior long-term support.

## Appearance

### UC-2104



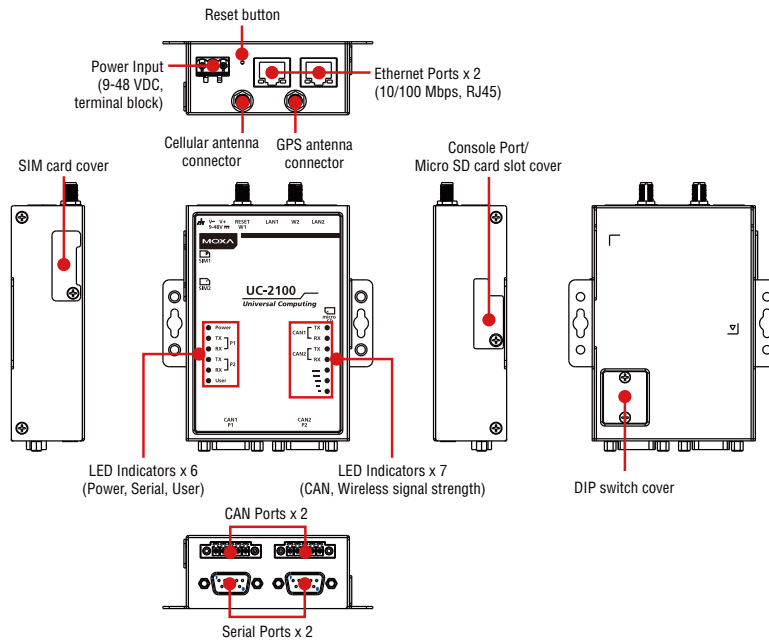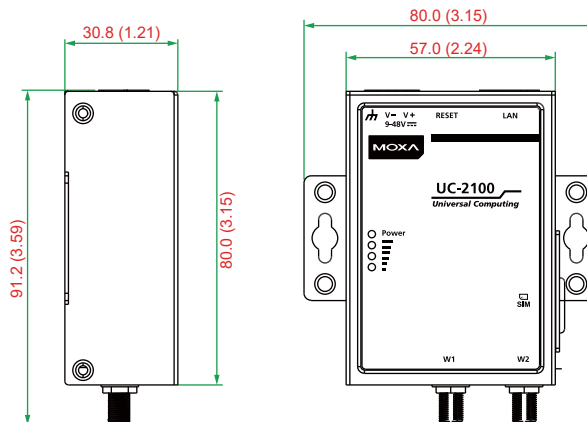Power Input
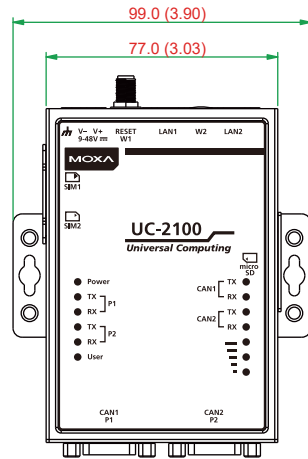(9-48 VDC, terminal block)

Ethernet Port x 1
(10/100 Mbps, RJ45)

Reset button

Console Port/SIM Card Cover

LED Indicators x 4
(Power, Signal Strength)

Mini PCIe Socket Cover
(Wireless Module)

Cellular antenna
connectors x 2

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## UC-2114

Reset button

Power Input
(9-48 VDC,
terminal block)

Ethernet Ports x 2
(10/100 Mbps, RJ45)

Console Port/
Micro SD card slot cover

SIM card cover

Cellular antenna connector

LED Indicators x 6
(Power, Serial, User)

LED Indicators x 7
(CAN, Wireless signal strength)

DIP switch cover

CAN Ports x 2

Serial Ports x 2

## UC-2116

Reset button

Power Input
(9-48 VDC,
terminal block)

Ethernet Ports x 2
(10/100 Mbps, RJ45)

Cellular antenna
connector

GPS antenna
connector

Console Port/
Micro SD card slot cover

SIM card cover

LED Indicators x 6
(Power, Serial, User)

LED Indicators x 7
(CAN, Wireless signal strength)

DIP switch cover

CAN Ports x 2

Serial Ports x 2

## Dimensions

### UC-2104

Unit: mm (inch)

30.8 (1.21)

80.0 (3.15)

57.0 (2.24)

91.2 (3.59)

80.0 (3.15)

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## Dimensions

Unit: mm (inch)

### UC-2114

34.5 (1.36)

111.0 (4.37)    126.0 (4.96)

99.0 (3.90)
77.0 (3.03)

V− V+  RESET  LAN1  W2  LAN2
9-48V ▥  W1

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SIM1

SIM2

UC-2100
*Universal Computing*

micro SD

Power
TX ⌐ P1
RX ⌐
TX ⌐ P2
RX ⌐
User

CAN1 ⌐ TX / RX
CAN2 ⌐ TX / RX

CAN1
P1     CAN2
P2

### UC-2116

34.5 (1.36)

111.0 (4.37)    126.0 (4.96)

99.0 (3.90)
77.0 (3.03)

V− V+  RESET  LAN1  W2  LAN2
9-48V ▥  W1

MOXA

SIM1

SIM2

UC-2100
*Universal Computing*

micro SD

Power
TX ⌐ P1
RX ⌐
TX ⌐ P2
RX ⌐
User

CAN1 ⌐ TX / RX
CAN2 ⌐ TX / RX

CAN1
P1     CAN2
P2
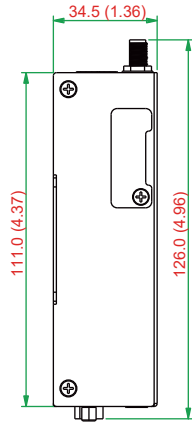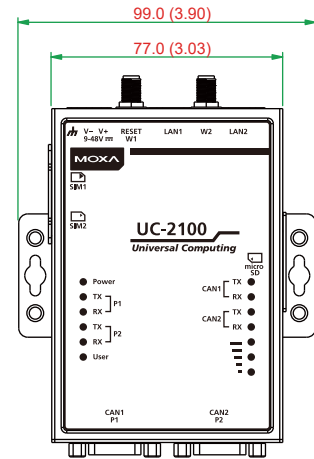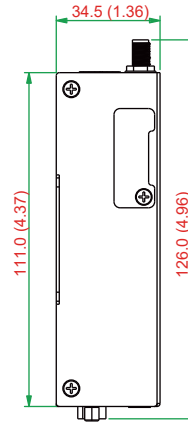
## ⦂ Hardware Specifications

### Computer

**CPU:**
UC-2104: Armv7 Cortex-A8 600 MHz
UC-2114/UC-2116: Armv7 Cortex-A8 1000 MHz
**OS (preinstalled):** Moxa Industrial Linux (Debian 9, Kernel 4.4)
**DRAM:**
UC-2104: 256 MB DDR3 SDRAM
UC-2114/2116: 512 MB DDR3 SDRAM

### Storage

**Built-in:** 8 GB eMMC flash with OS preinstalled
**Storage Expansion:** SDHC/SDXC socket for storage expansion
(UC-2114/2116 only)

### Other Peripherals

**TPM:** v2.0 by request (SPI interface)
**SIM:** 2 nano SIM slots

### Ethernet Interface

**LAN:**
UC-2104: 1 auto-sensing 10/100 Mbps port (RJ45)
UC-2114/2116: 2 auto-sensing 10/100 Mbps ports (RJ45)
**Magnetic Isolation Protection:** 1.5 kV built-in

### Cellular Interface (UC-2114/2116 Only)

**Standard:** LTE (FDD) 3GPP Rel.13 compliant
**LTE Band Supported:**
Cat M1/NB1 deployed bands: 2, 3, 4, 5, 8, 12, 13, 20, 28

### GPS Interface (UC-2116 Only)

**Number of Channel:** 72 channels
**Receiver Type:** GPS/QZSS L1 C/A, GLONASS L1 FDMA
**Navigator Update Rate:** Up to 18 Hz
**Position Accuracy:**
GPS: 2.5 m CEP
GLONASS: 4.0 m CEP

### Serial Interface (UC-2114/2116 Only)

**Serial Standards:** 2 RS-232/422/485, software selectable port (DB9)
**Console Port:** RS-232 (TxD, RxD, GND), 4-pin pin header output
(115200, n, 8, 1)

### Serial Communication Parameters

**Data Bits:** 5, 6, 7, 8
**Stop Bits:** 1, 1.5, 2
**Parity:** None, Even, Odd, Space, Mark
**Flow Control:** XON/XOFF, ADDC® (automatic data direction control)
for RS-485
**Baudrate:** 50 bps to 921.6 kbps

### Serial Signals

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

### CAN Interface (UC-2114/2116 only)

**Standards:** 2 CAN port, CAN2.0A/2.0B compliant
**Signals:** CAN_H, CAN_L, CAN_GND, CAN_SHLD, CAN_V+, GND
**Isolation:** 2 kV digital isolation
**Speed:** 10 kbps to 1 Mbps
**Connector Type:** 5-pin Terminal block

### LEDs

**UC-2104:**
System: Power x 1
LAN: LED located on the RJ45 connector, 10M/Link x 1, 100M/Link x 1
Wireless: Signal Strength x 3
**UC-2114/UC-2116:**
System: Power x 1
LAN: LED located on the RJ45 connector
• LAN1: 10M/Link x 1, 100M/Link x 1
• LAN2: 10M/Link x 1, 100M/Link x 1
Serial: TxD x 2, RxD x 2
CAN: TxD x 2, RxD x 2
Wireless: Signal Strength x 3
User Programmable: User x 1

### Switches and Buttons

**Push Button:** Reboot and to reset the device to factory defaults
**Dip Switch:** For configuring the serial port Pull-High/Pull-Low and
termination resistors

## Physical Characteristics
**Housing:** SECC
**Weight:**
UC-2104: 220 g (0.49 lb)
UC-2114/2116: 396 g (0.87 lb)
**Dimensions:**
UC-2104: 57 x 80 x 30.8 mm
UC-2114/2116: 77 x 111 x 34.5 mm
**Mounting:** Wall, DIN rail (with optional kit)

## Environmental Limits
**Operating Temperature:**
UC-2104: -10 to 70°C (14 to 158°F) w/ wireless module
UC-2114/UC-2116: -40 to 75°C (-40 to 167°F)
**Storage Temperature:**
UC-2104: -20 to 70 °C (-4 to 158°F)
UC-2114/UC-2116: -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Anti-Vibration:** 2 Grms @ IEC 60068-2-64, random wave, 5-500 Hz, 1 hr per axis (without any USB devices attached)
**Anti-Shock:** 20 g @ IEC 60068-2-27, half sine wave, 11 ms

## Power Requirements
**Input Voltage:** 9 to 48 VDC (3-pin terminal block, V+, V-, SG)
**Input Current:** 0.45 to 0.084 A
**Power Consumption:** 4 W (max.)

## Standards and Certifications
**Safety:** UL 60950-1, IEC 60950-1, EN 60950-1
**Hazardous Environments\*:** C1D2, IECEx, ATEX
*\*Certification process is underway*
**EMC:** EN 55032/24, RCM, EAC
**EMI:** CISPR 32, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz, 3 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: DC Power: 0.5 kV; Signal: 1 kV
IEC 61000-4-6 CS: 3V
IEC 61000-4-8 PFMF: 1 A/m
**Green Product:** RoHS, CRoHS, WEEE
**RF Regulatory:** FCC, CE RED (EN 301489, EN301908), RCM, IC, PTCRB
**Carrier Approval:** Verizon, AT&T

## Reliability
**Alert Tools:** External RTC (real-time clock)
**Automatic Reboot Trigger:** External WDT (watchdog timer)

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

# Software Specifications

## Linux
**OS:** Moxa Industrial Linux (Debian 9)
**Web Server (Apache):** Allows you to create and manage web sites; supports PHP and XML
**Terminal Server (SSH):** Provides secure encrypted communications between two untrusted hosts over an insecure network
**Kernel:** GNU/Linux 4.4 CIP
**System Shell:** DASH (default), BASH
**Text Editor:** vim, nano
**File System:** JFFS2, NFS, Ext3, Ext4, VFAT, OverlayFS, NTFS
**Internet Protocol Suite:** TCP, UDP, IPv4, IPv6, SNMPv2, v3, ICMP, ARP, HTTP, CHAP,PAP,DHCP, NTP,NFS, SSH, PPP, SFTP, RSYNC, SSL, SCP
**Programming Language Support:** PHP, Perl, Python
**Internet Security Suite:** OpenVPN, Netfilter/iptables, IPsec
**Cryptographic Hardware Accelerators:** AES, SHA, OpenSSL, random generator
**Application Development Software:**
• Toolchain Arm GNUeabihf 6.3
• GNU C/C++ cross-compiler
• GNU C library
• GDB source-level debugging server

**Cellular Networking:**
• WVDIAL: Point-to-Point Protocol dialer that dials a modem and starts pppd to connect to the Internet
• QMI (Qualcomm MSM Interface): Glib-based library for talking to WWAN modems and devices that speak the Qualcomm MSM Interface (QMI) protocol
• Modem Manager
• Cellular Management Utility
• Wi-Fi Management Utility (UC-2104)

## Moxa Industrial Linux
**Long-Term Support:** Moxa Industrial Linux allows users to keep the same kernel version and Debian user space without needing to upgrade the entire system frequently. In addition, subscription services for each major release of Moxa Industrial Linux, throughout its 10-year life-cycle phase, provide security updates and bug fixes
**Robust File system:** The OverlayFS robust file system integrated into Moxa Industrial Linux provides extra protection during firmware upgrades and downgrades.
**Cybersecurity:**
• Moxa Industrial Linux comes with a built-in utility that helps developers implement a cybersecurity protection mechanism based on IEC 62443-4-2 international standards
• Security Update of Existing Software Packages: All software packages installed on the UC-2100 Series can be automatically updated using Debian Linux's Advanced Packaging Tool (APT) server or Moxa's server
**Real COM Mode:** Support NPort's Real COM mode driver to communicate with NPort device servers

# Ordering Information

| Model | CPU | RAM | Storage | Serial | Ethernet | Mini PCIe | Cellular | GPS | Operating Temperature |
|---|---|---|---|---|---|---|---|---|---|
| UC-2104-LX | 600 MHz | 256 MB | 8 GB | – | 1 | 1 | – | – | -10 to 70°C |
| UC-2114-T-LX | 1000 MHz | 512 MB | 8 GB | 2 | 2 | – | NB-IoT/CAT.M1 | – | -40 to 75°C |
| UC-2116-T-LX | 1000 MHz | 512 MB | 8 GB | 2 | 2 | – | NB-IoT/CAT.M1 | Yes | -40 to 75°C |

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## : Optional Accessories (can be purchased separately)

### Power Adapters, Power Cords

| Model Name | Package Contents | Description |
|---|---|---|
| PWR-24270-DT-S1 | • 1 x Power adapter | Power adapter for testing and system development indoors under ambient temperature conditions (input: 100 to 240 VAC, 50 to 60 Hz, 1.5 A; output: 24 VDC, 2.7 A, 60 W) |
| PWC-C7US-2B-183 | • 1 x Power cord | 10 A/125 V North American (US) power cord, 183 cm |
| PWC-C7EU-2B-183 | • 1 x Power Cord | 10 A/250 V Continental European (EU) power cord, 183 cm |
| PWC-C7UK-2B-183 | • 1 x Power Cord | 10 A/250 V United Kingdom (UK) power cord, 183 cm |
| PWC-C7AU-2B-183 | • 1 x Power Cord | 2.5 A/250 V Australian (AU) power cord, 183 cm |
| PWC-C7CN-2B-183 | • 1 x Power Cord | 10 A/250 V China (CN) power cord, 183 cm |

### Wireless Packages (UC-2104 Only)

| Model Name | Package Contents | Description |
|---|---|---|
| UC-LTE-CAT1-EU | • 1 x Cellular module<br>• 2 x Mini PCI/e mount screw sets | LTE regions: Asia, Europe<br>Penta-Band LTE: Bands 1, 3, 8, 20, 28 (700, 800, 900, 1800, 2100 MHz), Dual-Band GSM 900 and 1800 MHz |
| UC-LTE-CAT1-AUS | • 1 x Cellular module<br>• 2 x Mini PCI/e mount screw set | LTE regions: Australia, New Zealand<br>Quad-Band LTE: Bands 3, 5, 8, 28 (1800, 850, 900, 700 MHz), Tri-Band UMTS: Bands 1, 5, 8 (WCDMA/FDD 2100, 850, 900 MHz) |
| UC-LTE-CAT4-CN | • 1 x Cellular module<br>• 2 x Mini PCI/e mount screw set | LTE(FDD): B1,B3,B8;<br>LTE(TDD): B39,B40,B41(38), all bands with diversity<br>DC-HSPA+: B1,B9,B5,B8; TDS: B34, B39, all bands with diversity<br>GSM: 1800/900MHz |
| UC-WiFi-USB | • 1 x WiFi module<br>• 2 x Mini PCI/e mount screw set | Operating Frequency:<br>802.11 ac/a/b/g/n ISM Band<br>2.412 GHz to 2.472 GHz, 5.180 MHz to 5.825 MHz<br>(Subject to local regulations)<br>Modulation:<br>802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11a/g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)<br>802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM |

### Antennas and Internal Antenna Cables

| Model Name | Package Contents | Description |
|---|---|---|
| ANT-WDB-ARM-0202 plus ADP | • 1 x WiFi antenna<br>• 1 x SMA adapter | 1.8/1.8 dBi, RP-SMA (male) antenna with 1 SMA adapter |
| ANT-LTE-OSM-03-3m BK | • 1 x LTE antenna | Multi-band antenna that covers 700-2700 MHz. Specially designed for 2G, 3G, and 4G applications. Magnetic mounting is available. |
| ANT-LTE-ASM-04 BK | • 1 x LTE antenna | LTE Stick antenna that covers 704-960/1710-2620 MHz providing omnidirectional radiation with a gain of 4.5 dBi. |
| ANT-LTE-ASM-05 BK | • 1 x LTE antenna | LTE stick antenna that covers 704-960/1710-2620 MHz with a gain of 5 dBi. |
| ANT-LTE-OSM-06-3m BK MIMO | • 1 x LTE antenna | Multi-band antenna that covers 700-2700/2400-2500/5150-5850 MHz frequencies. Screw-fastened mounting and full IP67 waterproofing are available. |
| SMA-Adapter | • 1 x SMA adapter | SMA Adapter for UC-2104 to convert to SMA male connector |

### DIN-Rail Kits

| Model Name | Package Contents | Description |
|---|---|---|
| DK35A | • 2 x Mounting kit | DIN-rail kit with screws |

### Package Checklist

- UC-2100-W embedded computer
- Power jack
- Console cable
- Quick installation guide (printed)
- Warranty card