



## Wireless Radio Modems

**Models:** X09-009PKC-RA X09-009PKI-RA  
 X09-019PKC-RA X09-019PKI-RA  
 X24-009PKC-RA X24-009PKI-RA  
 X24-019PKC-RA X24-019PKI-RA

### Overview

Stand-alone radio modems were designed to provide end users with an easy-to-install wireless serial communication link. Systems integrators love the functionality provided by the serial connection, power switch, indicator lights, high quality antenna, mounting plates and power source inputs.

The 900 MHz radio modem has the best sensitivity in the industry, making it one of the longest range, low-cost radio modems available to date. The 2.4GHz radio modem can provide high performance and dependable operation for deployment throughout the world.

These radio modems are perfect for applications in automatic meter reading (AMR), supervisory control and data acquisition (SCADA), home automation, security, instrument monitoring and point-of-sale (POS) systems among many others.

These radio modems require no configuration to operate, simply plug-and-communicate. Output serial data from any microcontroller or RS-232 port into the radio modem to send FCC & ETSI approved, frequency hopping spread spectrum data and capture it on all receivers within range on the network. Stand-alone radio modems can also be configured to integrate quickly and seamlessly into any new or existing design.

### Features

- Plug-and-communicate (default mode - no configuration required).
- True peer-to-peer network (no need to configure a "Master" radio).
- Transparent mode supports existing software applications and legacy systems.
- Addressing capabilities provide for point-to-point and point-to-multipoint networks.
- Uses Standard AT commands and/or fast binary commands for simple configuration, changing parameters.
- Retry and acknowledgements of packets provides guaranteed delivery of critical packets in difficult environments.
- Networking features allow up to 7 independent pairs (networks) to operate in close proximity.
- Multiple low power modes including shutdown pin, cyclic sleep and serial port sleep for current consumption as low as 26  $\mu$ A.
- Dip-switchable, RS-232/422/485 protocol and multi-drop bus support
- Host interface baud rates from 1200 to 57600 bps.
- Signal strength register for link quality monitoring and debugging.
- Parity support (None, Even, Odd, Mark, Space)
- Source & destination addressing
- Modbus support
- DCD support
- 9-bit support
- Field upgradeable firmware

International Headquarters:

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## Applications

- Monitoring of remote systems
- Production reporting of active systems
- Home automation and building control
- Supervisory control and data acquisition
- Vehicle management and asset tracking

## Options

- 900 MHz or 2.4GHz license-free ISM bands
- 9,600 bps or 19,200 bps over-the-air data rates
- Commercial (0° to +70°C) or industrial (-40° to +85°C) grades

## Specifications

General	900 MHz	2.4 GHz	
Radio Frequency:	902 – 928 MHz	2.4000 – 2.4835 GHz	
Spreading Spectrum Type:	Frequency hopping transceiver	Frequency hopping transceiver	
Frequency Control:	Direct FM	Direct FM	
Network Topology:	Point-Multipoint and Point-to-Point Multi-Drop Transparent Networking	Point-Multipoint and Point-to-Point Multi-Drop Transparent Networking	
Channel Capacity:	7 hop sequences share 25 frequencies	7 hop sequences share 25 frequencies	
Serial Data Interface:	Switch selectable RS-232/422/485	Switch selectable RS-232/422/485	
I/O Data Rate:	Software selectable 1200-57,600kbps	Software selectable 1200-57,600kbps	
<b>Power Requirements</b>			
Supply Voltage:	7-18 VDC	7-18 VDC	
Transmit Voltage:	200 mA	200 mA	
Receive Current:	70 mA	70 mA	
Power Down Current:	< 1 mA	< 1 mA	
<b>Physical Properties</b>			
Enclosure Type:	Extruded aluminum, black anodized	Extruded aluminum, black anodized	
Enclosure Size:	2.75 x 5.50 x 1.124 in (7.90 x 13.90 x 3.80 cm)	2.75 x 5.50 x 1.124 in (7.90 x 13.90 x 3.80 cm)	
Weight:	7.1 oz (200 g)	7.1 oz (200 g)	
Operating Temperature:	0° to +70°C (commercial) -40° to +85°C (industrial, wide-temperature)	0° to +70°C (commercial) -40° to +85°C (industrial, wide-temperature)	
<b>Antenna</b>			
Type:	½ wave dipole whip	½ wave dipole whip	
Gain:	2.1 dBi	2.1 dBi	
Length:	6.75 in (17.1 cm)	5.25 in (13.3 cm)	
Connector:	Reverse-polarity SMA	Reverse-polarity SMA	
Impedance:	50 Ohms unbalanced	50 Ohms unbalanced	
<b>Certifications</b>			
FCC Part 15.247:	OUR9XSTREAM	OUR24XSTREAM	
Industry Canada:	4214A-9XSTREAM	4214A 12008	
Europe:	n/a	ETSI	
<b>Performance</b>			
Indoor/urban Range*:	Up to 1500 ft. (457m)	Up to 600 ft. (183 m)	
Outdoor LOS Range*:	Up to 7 mi. (11 km) w/dipole Up to 20 mi. (32 km) w/high-gain	Up to 3 mi. (5 km) w/dipole Up to 10 mi. (16 km) w/high-gain	
Serial Data Throughput:	<b>9600 bps</b>	<b>19.2 kbps</b>	<b>9600 bps</b> <b>19.2 kbps</b>
RF Baud Rate:	10,000 bps	20,000 bps	10,000 bps      20,000 bps
Transmit Power Output:	140 mW	(21.5 dBm)	50mW      (17 dBm)
Receiver Sensitivity:	-110 dBm	-107 dBm	-105 dBm      -102 dBm

\*Range is calculated assuming line-of-sight. Actual range will vary based upon specific board integration, antenna selection, and environment.

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**Ordering Information: Model Summary**

<i>Stand-Alone Radio Modem Models:</i>	<b>Operating Frequency:</b>	<b>RF Data Rate:</b>	<b>Temperature Rating:</b>	<b>Interface:</b>
<b>X09-009PKC-RA</b>	915 MHz	9600 baud	0° to 70°C (Commercial)	RS-232/422/485 (DB9 female)
<b>X09-009PKI-RA</b>	915 MHz	9600 baud	-40° to 80°C (Industrial, wide-temp)	RS-232/422/485 (DB9 female)
<b>X09-019PKC-RA</b>	915 MHz	19200 baud	0° to 70°C (Commercial)	RS-232/422/485 (DB9 female)
<b>X09-019PKI-RA</b>	915 MHz	19200 baud	-40° to 80°C (Industrial, wide-temp)	RS-232/422/485 (DB9 female)
<b>X24-009PKC-RA</b>	2.4 GHz	9600 baud	0° to 70°C (Commercial)	RS-232/422/485 (DB9 female)
<b>X24-009PKI-RA</b>	2.4 GHz	9600 baud	-40° to 80°C (Industrial, wide-temp)	RS-232/422/485 (DB9 female)
<b>X24-019PKC-RA</b>	2.4 GHz	19200 baud	0° to 70°C (Commercial)	RS-232/422/485 (DB9 female)
<b>X24-019PKI-RA</b>	2.4 GHz	19200 baud	-40° to 80°C (Industrial, wide-temp)	RS-232/422/485 (DB9 female)

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