

CDMA/1xRTT Digital Cellular Modems

Models Raven100, Raven105

The Raven100 and Raven105 are full-duplex modems that transmit data to the local cellular tower using a Code Division Multiple Access (CDMA) network. The customer's PC typically retrieves the data from the cellular tower via the Internet (1xRTT); Internet communications provide faster communication rates and eliminate dialing delays and long distance fees.

The Raven100 and Raven105 differ in the CDMA network used. The Raven100 uses the Verizon Wireless network, and the Raven105 uses the Alltel network. Both modems are manufactured by AirLink.



Features

- Supports 1xRTT, IS-95B Circuit Switched CDMA, and SMS communication modes allowing data to be retrieved via the Internet or phone system¹
- Eliminates dialing delays when using 1xRTT
- Allows simultaneous communications with multiple dataloggers in the network
- Operates over a wide operating temperature range of -30° to +70°C
- Communicates at rates up to 153.6 kbps
- Gets rid of long distance fees when using 1xRTT
- Housed in a rugged aluminum case

Typical System (1xRTT)

PC running PC400 or
LoggerNet Software



Base Station

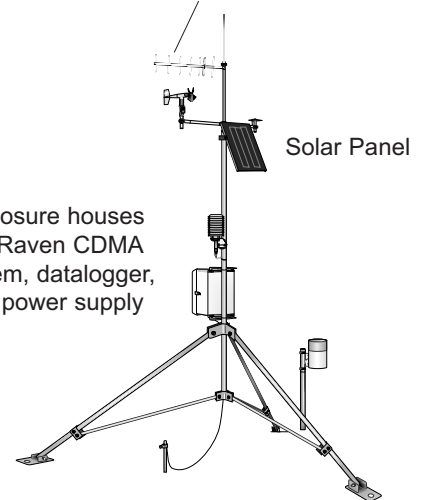
The CDMA network
handles call routing
between the cellular
tower and internet



Yagi Antenna

Solar Panel

Enclosure houses
the Raven CDMA
modem, datalogger,
and power supply



Datalogger Site

¹ Contact Campbell Scientific for system requirements if using IS-95 to communicate over standard telephone lines.

Cellular Coverage/Service Requirements

- CDMA coverage at the datalogger site. For the Raven100, a Verizon coverage map is available at: www.verizonwireless.com/b2c/mobileoptions/nationalaccess/serviceAvailability.jsp. For the Raven105, contact Alltel to ensure that they provide CDMA coverage for your site.
- Contact Verizon (1-888-384-1775) or Alltel and setup an account. When setting up the account, you may need the ESN number, which is listed on the modem's label and the box. To use 1xRTT, you should ask for the following:
 - A plan that supports Internet APN.
 - A static IP account. Although use of a dynamic IP account is possible, Campbell Scientific strongly suggests establishing a static account. To use a dynamic account, a service such as IP Manager is required to translate the dynamic IP address to a domain name so that the Raven100 or Raven105 can be contacted as if it had a static IP address.
 - Both the Mobile Directory Number (MDN) and Mobile Identification Number (MIN). If you do not ask, they may only give you the MDN. You need to know both of these numbers to program your Raven100 or Raven105.



The #18663 null modem cable connects directly to the datalogger's RS-232 port. This cable is the only option available for connecting a Raven100 or Raven105 to a CR200-series datalogger.

Datalogger Site Equipment

- Raven100 or Raven105 Modem—includes a power cable. The following software is used to program the modem:
 - Airlink's SetupWizard—used to activate the modem. It is provided on a CD that is shipped with the modem and is also available, at no charge, from: www.airlink.com
 - Airlink's Wireless Ace 3G Utility—configures the generic parameters of the modem. It is provided on a CD that is shipped with the modem and is also available, at no charge, from: www.airlink.com
 - Campbell Scientific's Raven CDMA Template—used with the Wireless Ace software to configure the modem. This template sets up the Raven serial interface, which is specific to our systems. The Raven CDMA Template is available, at no charge, from: www.campbellsci.com/downloads
- Campbell Scientific Datalogger—all contemporary and many retired dataloggers are compatible.
- Datalogger connection options:
 - The #18663 null modem cable—connects the modem to the datalogger's RS-232 port (not compatible with the CR510, CR10X, or CR7 dataloggers).
 - SC105 interface—connects the modem to the CS I/O port (not compatible with the CR200-series dataloggers).
 - SC932A interface—connects the modem to the CS I/O port (not compatible with the CR200-series dataloggers).

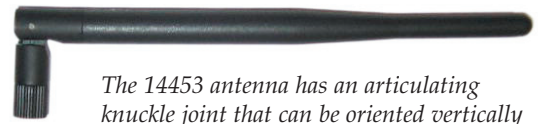


The SC105 interface connects the modem to the datalogger's CS I/O port, and is recommended when using a PAKBus[®] datalogger.

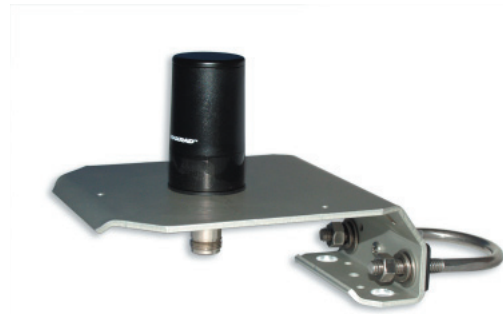


The SC932A interface connects the modem to the datalogger's CS I/O port, and is recommended when using a mixed-array datalogger.

- Mounting Kit—includes mounting hardware for securing the modem to an environmental enclosure.
- Antenna—Campbell Scientific offers the following antennas for use with our cellular modems. Contact an Applications Engineer for help in determining the best antenna for your application.
 - 14453—0 dBd, ½ Wave Dipole Whip Cellular Antenna that supports the 800 MHz band and is intended for locations with strong cellular coverage. The antenna attaches directly to the Raven100 or Raven105 and should reside in an environmental enclosure.
 - 18285—1 dBd, dual-band Omnidirectional Antenna that covers both the 800 MHz and 1.9 GHz bands. The 18285 includes a 10 ft cable for attaching to the modem and a mounting bracket for attaching the antenna to a cross-arm, tripod, tower, or pole.
 - 20679—3 dBd, dual-band Omnidirectional Antenna that covers both the 800 MHz and 1.9 GHz bands. The 20679 includes a 10 ft cable for attaching to the modem and a mounting bracket for attaching the antenna to a cross-arm, tripod, tower, or pole.
 - 14454—9 dBd, Yagi Antenna that supports the 800 MHz band and is intended for sites near the edge of the cellular coverage. The antenna must be aimed at the service providers's antenna. The 14454 includes 10 ft of cable for attaching the antenna to the modem and a bracket for attaching the antenna to a mast or post up to 1.5" (3.8 cm) in diameter. Often the CM230 Adjustable Inclination Mount is used with the 14454.
- CM230 Adjustable Inclination Mount—allows the 14454 Yagi antenna to be aimed at the service provider's antenna.
- Power Supply (see power considerations)
- Environmental Enclosure—an ENC12/14, ENC14/16, or ENC16/18 can house the Raven CDMA modem, datalogger, and power supply.



The 14453 antenna has an articulating knuckle joint that can be oriented vertically or at right angles.



The 18285 antenna is recommended for many of our applications. It is the only cellular antenna offered that supports the 1.9 Ghz band.



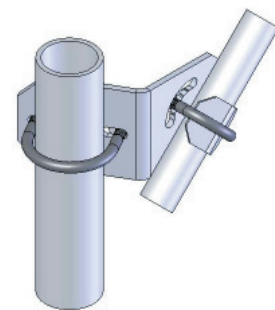
The 14454 Yagi antenna is intended for longer transmission distances.

Base Station Requirements

- PC running PC400 or LoggerNet Datalogger Support Software.
- Access to the Internet when using 1xRTT.

Power Considerations

A power cable included with the modem connects to the datalogger's 12 V or switched 12 V terminal. Connection to the switched 12 V terminal allows the datalogger to switch power to the modem during scheduled transmission intervals, thereby conserving power. When using the switched 12 V terminal, the modem can be powered with a BP12 battery, CH100 charger/regulator, and SP10 solar panel. For help on analyzing your system's power requirements, refer to our Power Supply product literature or application note.



When using the CM230, fix the declination of the antenna by tightening the u-bolt that mounts on the mast. The inclination is then adjusted with the other set of u-bolts and nuts.

Specifications

RF Output:	224 mW (+23.5 dBm)
CDMA Modes Supported:	CDMA2000 1X, IS-95B Circuit Switched CDMA, and SMS
Dual-band Support:	800 MHz cellular, 1.9 GHz PCS bands
Packet Mode (1xRTT) Data Rates:	up to 153.6 kbps (forward channel), 76.8 kbps (reverse channel)
RS-232 Data Rates:	1200 bps to 115.2 kbps
Input Voltage:	10 to 28 Vdc
Input Current:	40 to 200 mA
Typical Current Drain at 12 Vdc:	40 mA dormant connection (idle for 10 to 20 seconds), 200 mA while receiving, ~200 mA during transmission
Operating Temperature Range:	-30° to +70°C (10% duty cycle limit above 60°C)
Operating Humidity:	5% to 95% non-condensing
Serial Protocols:	AT Commands, PPP, SLIP, UDP, TCP
Serial Interface:	RS-232, DB-9F
RF Antenna Connector:	50 Ohm TNC
Status LEDs:	Power, Channel Acquired, Link Status, Network Registration, RSSI, Transmit/Receive, Block Errors
Dimensions:	3"W x 1"D x 5.1"L (5.8"L w/connector) 7.6 W x 2.5 D x 13 L cm (14.7 L cm w/connector)
Weight:	< 1 lb (<0.5 kg)

