

RavenXT-Series

Sierra Wireless AirLink Digital Cellular Modems



The RavenXT-series modems are full-duplex devices that transmit data to the local cellular tower. A PC retrieves the data from the cellular tower via the Internet¹. Internet communications provide faster communication rates and eliminate dialing delays and long distance fees.

The following modems are offered:

- **RavenXTV**—Code Division Multiple Access (CDMA) modem configured for Verizon networks
- **RavenXTG**—General Packet Radio Service (GPRS) modem configured for AT&T networks



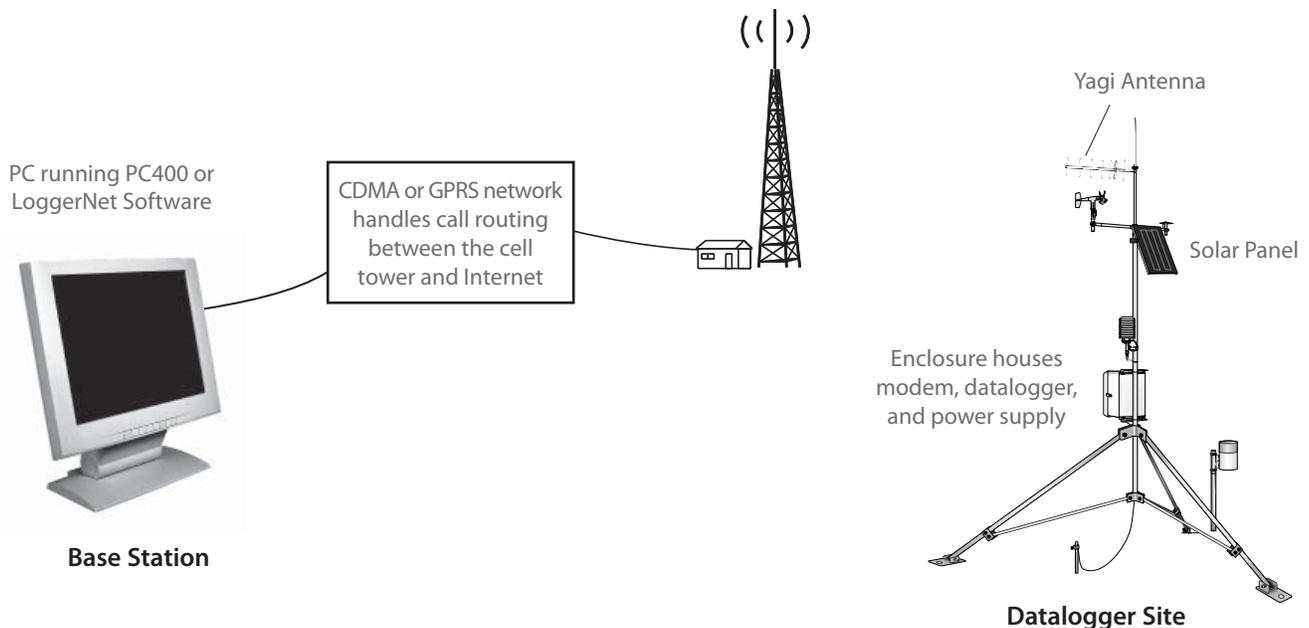
Features

- Eliminates the dialing delays and long distance fees that land-line phone modems experience
- Allows simultaneous communications with multiple dataloggers in the network
- Housed in a rugged aluminum case
- Operates over a wide operating temperature range (see specifications)

Cellular Coverage

Before purchasing a digital cellular modem, ensure that there is a CDMA or GPRS network with coverage at the datalogger site. For the RavenXTV, you'll need to contact Verizon and ask them about coverage. For the RavenXTG, a coverage map is available at: www.wireless.att.com/coverageviewer/

Typical System¹



¹The RavenXTV uses 1xRTT/EVDO to communicate over the Internet. It can also use IS-95 to communicate over standard telephone lines. Contact Campbell Scientific for system requirements if using IS-95.

Establishing Cellular Service

RavenXTV

Call Verizon at 1-888-384-1775 and set up either a static or dynamic IP account. A static IP account eliminates the need for a third party Dynamic Domain Name System (DDNS) such as IP manager. The DDNS translates the domain name to a dynamic IP address so that the modem can be contacted as if it had a static IP address. When setting up the account, you will need the ESN number, which is listed on the modem's label. You will also need to request the *unrestricted IP*. Verizon's *Broadband Plan* is recommended.

RavenXTG

Call AT&T at 1-800-331-0500 and ask for an *unrestricted data account* for a GPRS modem. Either a static IP account or a dynamic IP account needs to be established. After the account has been set up, mobile termination needs to be configured onto the account to make the modem accessible through the Internet. This is done by adding an *I2gold APN*² or *custom APN*³ to the account. A data account with an *I2gold APN* will have a Static IP address.

After establishing service, AT&T will provide a SIMM card for each modem. In some cases, the SIMM card can be picked up at the local AT&T store.

Datalogger Site Equipment

Digital Cellular Modem

The RavenXTV and RavenXTG are configured using the following software:

- **Airlink AceManager software**—activates the modem and configures the generic parameters of the modem.
- **Campbell Scientific's Raven CDMA Template (RavenXTV) or Raven GPRS Template (RavenXTG)**—used with Airlink AceManager software to configure the modem. The template sets up the Raven serial interface, which is specific to Campbell Scientific systems.

The AceManager software, Raven CDMA Template, and Raven GPRS Template are available, at no charge, from: www.campbellsci.com/downloads

Datalogger Connections

All of our contemporary and many of our retired dataloggers are compatible. The datalogger connects with the modem using one of the following devices:

- **18663 Null Modem Cable**—connects the modem directly to the datalogger's RS-232 port. This cable is the only option available for connecting the modem to a CR200(X)-series datalogger.
- **SC105 DCE Interface**—connects the modem to the datalogger's CS I/O port via an SC12 cable. The SC105 is recommended for PakBus® dataloggers when the RS-232 port is unavailable.
- **SC932A DCE Interface**—connects the modem to the datalogger's CS I/O port via an SC12 cable. The SC932A is recommended for mixed-array dataloggers when the RS-232 port is unavailable.



One of the above is required to connect the datalogger to the modem. The best choice for your application depends on the datalogger you are using.

Power Considerations

A power cable shipped 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 regulator, and SP10 solar panel. For help on analyzing your system's power requirements, refer to our Power Supply product brochure or application note.

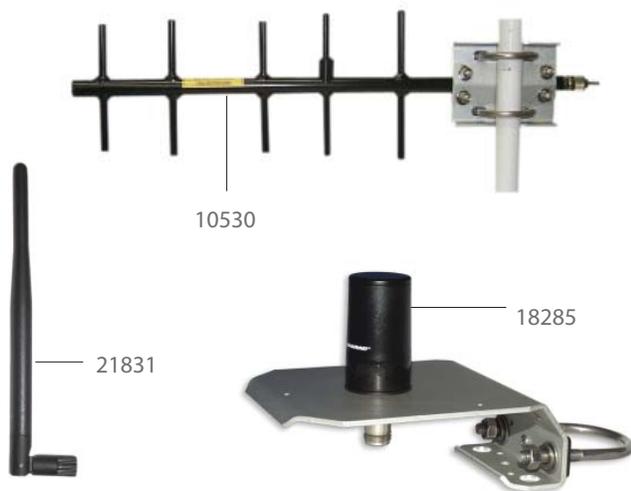
²At one time, feature code G821 was used instead of the I2gold APN. Feature code G821 has been discontinued, and all RavenXTGs need either an I2gold APN or custom APN.

³A custom APN may offer more efficient routing and better security for large cellular phone networks. It will take four to six weeks for AT&T to develop a custom APN and cost about \$250.00.

Antennas

A choice of four antennas is offered for the modems. Contact an Applications Engineer for help in determining the best antenna for your application.

- **21831 0 dBd, ½ Wave Dipole Whip Antenna**—supports the 800 MHz band. It is intended for locations that have strong cellular coverage. This antenna attaches directly to the modem's SMA connector and must reside in an environmental enclosure or building. It has an articulating knuckle joint that can be oriented vertically or at right angles.
- **18285 1 dBd, Omnidirectional Antenna**—covers both the 800 MHz and 1.9 GHz bands. It includes a mounting bracket for attaching the antenna to a crossarm, tripod, tower, or pole. Connection to the modem requires an antenna cable (see right column).
- **20679 800 MHz/0 dBd and 1.9 GHz/3 dBd Omnidirectional Antenna**—includes a mounting bracket for attaching the antenna to a crossarm, tripod, tower, or pole. Connection to the modem requires an antenna cable (see right column).
- **10530 9 dBd, Yagi Antenna**—supports the 800 MHz band and is intended for sites near the edge of the cellular coverage. It includes a bracket for attachment to a mast or pole (outer diameter of up to 1.5" (3.8 cm)). Some sites may require the CM230 mount (see *Adjustable Angle Mounting Kit*). Connection to the modem requires an antenna cable (see right column).



Above are antennas used with the RavenXT-series digital cellular modems. The 20679 antenna is not shown.

Antenna Cables/Surge Suppressor



Installations that are susceptible to lightning should use the COAXNTN cable and 19533 surge protector kit.

Typically, a 21847 or COAXSMA-L cable is used with a 18285, 20679, or 10530 antenna. Both of these cables have a type N male connector on the antenna end and an SMA connector on the transceiver end. They differ in their length:

- **21847 Antenna Cable with 12-ft Length**
- **COAXSMA-L Antenna Cable with User-specified Length**—enter cable length, in feet, after the L. Length should not exceed 20 ft (6 m).

Use the following when the modem is in an environment susceptible to lightning or electrostatic buildup:

- **COAXNTN-L antenna cable** with type N male to type N male connectors (requires 19533)—specify length, in feet, after the L. Cable lengths longer than 20 ft will weaken the signal strength.
- **19533 Antenna Surge Protector Kit**—includes one COAXSMA-L1.5 cable. A COAXNTN-L cable is required (see above).

Adjustable Angle Mounting Kit

The CM230 Adjustable Angle Mounting Kit allows the 10530 Yagi antenna to be aimed at the service provider's antenna.

Enclosures and Mounting Bracket

An ENC12/14, ENC14/16, or ENC16/18 environmental enclosure can house the modem, datalogger, and power supply. The modem is secured to the enclosure's backplate via the 14394 Mounting Bracket.

Base Station Requirements

- PC running PC400 or LoggerNet Datalogger Support Software.
- Access to the Internet.

Specifications

| | RavenXTV | RavenXTG |
|--|--|--|
| Technology | CDMA 1xRTT, EVDO Rev. A, CDMA IS-95, dual band | GPRS (MS-12), quad band |
| Bands | Dual band: 800 MHz Cellular, 1900 MHz PCS | Quad band: 850/1900 MHz; 900/1800 MHz |
| Transmit Frequency | 1850 to 1910 MHz and 824 to 849 MHz | 850/1900 MHz: 824 to 849 MHz; 1850 to 1910 MHz 900/1800 MHz: 890 to 915 MHz; 1710 to 1785 MHz |
| Transmit Power | 1.0 W for 1900 MHz; 0.8 W for 850 MHz | 1.0 W for 1900 MHz; 0.8 W for 850 MHz |
| Receiver Frequency | 1930 to 1990 MHz and 869 to 894 MHz | 850/1900 MHz: 869 to 894 MHz; 1930 to 1990 MHz 900/1800 MHz: 935 to 960 MHz; 1805 to 1880 MHz |
| CDMA or GPRS Throughput | up to 80 kbps (CDMA) | up to 70 kbps (GPRS) |
| RS-232 Data Rates | 1200 bps to 115.2 kbps | 1200 bps to 115.2 kbps |
| Serial Interface | RS-232, DB9-F | RS-232, DB9-F |
| Serial Protocols | AT Commands, PPP, SLIP, UDP/IP, TCP/IP | AT Commands, PPP, SLIP, UDP, TCP |
| RF Antenna Connector | 50 Ohm SMA | 50 Ohm SMA |
| Input Current Range | 50 to 250 mA | 40 to 250 mA |
| Typical Current Drain (at 12 Vdc) | 50 mA dormant (idle for 10 to 20 seconds), 120 mA transmit/receive | 50 mA dormant (idle for 10 to 20 seconds), 120 mA transmit/receive |
| Input Voltage Range | 6 to 28 Vdc | 6 to 28 Vdc |
| Operating Temperature Range | -30° to +70°C | -30° to +65°C |
| Operating Humidity Range | 5% to 95% RH non-condensing | 5% to 95% RH non-condensing |
| Status LEDs | Power, Network, Signal, Activity | Power, Network, Signal, Activity |
| Width | 7.6 cm (3 in.) | 7.6 cm (3 in.) |
| Depth | 2.5 cm (1 in.) | 2.5 cm (1 in.) |
| Length | 10 cm (4 in.) | 10 cm (4 in.) |
| Weight | <0.5 kg (<1 lb) | <0.5 kg (<1 lb) |