Overview

The CR310 is a multi-purpose, compact, low-cost measurement and control data logger that includes an integrated 10/100 Ethernet port and removable terminal connectors. This entry-level data logger, with its rich instruction set, can measure most hydrological, meteorological, environmental, and industrial sensors. It will concentrate data, making it available over varied networks and deliver it using your preferred protocol. The CR310 also performs automated on-site or remote decision making for control and M2M communications. The CR310 is ideal for small applications requiring long-term, remote monitoring and control.

The primary differences between the CR300 and CR310 are that the CR310 offers removable connectors and a 10/100 Ethernet connection.

The CR310 has multiple radio options that are suitable for different regions:

- CR310-RF407: US and Canada
- CR310-RF412: Australia and New Zealand
- CR310-RF422: Europe
- CR310-RF427: Brazil

Note: Campbell Scientific does not recommend the CR310 for use as a PakBus router in networks with more than 50 devices. Large arrays or string variables may also reach memory limits. For such applications, a CR1000X Measurement and Control Datalogger is recommended.

Benefits and Features

- Set up easily with PC software and USB connectivity
- Measure with confidence analog and digital sensors
- Internet ready—email, FTP, HTTP/web, TCP—with required add-ons
- Trust in the Campbell Scientific quality, including integral surge and ESD protection
- Save money and space using the integrated Ethernet port
- Network wirelessly to another node or Internet gateway with integrated radio option

- CR310-WIFI ideal for short-range, wireless IP communication
- Wiring made easy through removable terminal block
- Communicate from anywhere when using cellular or satellite peripheral
- Charge batteries using the integrated 12 V battery solar charge regulator
- Measure smart sensors using RS-232 or SDI-12
- Connect with PakBus, Modbus, DNP3, GOES, and other standard communication protocols

For comprehensive details, visit: www.campbellsci.com/cr310
Analyze and control with programmability and multiple general purpose I/O

Notify with event-driven communications and physical outputs

Detailed Description

Terminal Descriptions

- One switched 12 V terminal (SW12V) for powering sensors or communication devices, 1100 mA @ 20°C
- Two sensor excitation or continuous 0.15 to 5 V terminals (VX1, VX2) for sensor excitation or output control
- Six multipurpose analog input terminals (SE1 - SE6)
  - Analog functions (SE1 - SE6)
    - Analog inputs: 6 single-ended or 3 differential inputs with -100 to +2500 mV and ±34 mV ranges 24 bit ADC
    - 4 to 20 mA or 0 to 20 mA inputs (SE1, SE2 only)
- Digital I/O functions (SE1 - SE4) consist of 3.3 V logic levels for:
  - High frequency counter (35 kHz)
  - Pulse width modulation
  - Interrupts and timer input
  - Period average (200 kHz, amplitude dependent)

- Two Pulse Counting Terminals (P_SW, P_LL)
  - P_SW
    - Switch closure (150 Hz)
    - High frequency counter (35 kHz)
  - P_LL
    - Low level ac (20 kHz)
    - High frequency counter (20 kHz)

- Two Control Terminals (C1, C2): C terminals are software configurable for digital functions
  - Digital I/O functions consist of 5 V output and 3.3 V input logic levels for:
    - SDI-12
    - High frequency counter (3 kHz)
    - Switch closure (150 Hz)
    - General status/control
    - Voltage source 5 V: 10 mA @ 3.5 V
    - Interrupts
    - Serial asynchronous communication Tx/Rx pair

Specifications

- Operating Temperature Range
  - -40° to +70°C (standard)
  - Non-condensing environment
- Maximum Scan Rate
  - 10 Hz
- Case Material
  - Powder-coated aluminum
- Analog Inputs
  - 6 single-ended or 3 differential (individually configured)
- Pulse Counters
  - 8 (P_SW, P_LL, C1, C2, and SE1 to SE4)
- Voltage Excitation Terminals2 (VX1, VX2)
- Communications Ports
  - 10/100 Ethernet RJ45
  - USB Micro B
  - RS-232
- Switched 12 Volt
  - 1 terminal
- Digital I/O
  - 7 terminals (C1, C2, P_SW, and SE1 to SE4) configurable for digital input and output. Includes status high/low, pulse width modulation, external interrupt, and communication functions. Exception: The SE4 terminal doesn’t do external interrupt.
- Analog Voltage Accuracy
  - Accuracy specifications do not include sensor or measurement noise.
  - ±(0.04% of measurement + offset) at 0° to 40°C
  - ±(0.1% of measurement + offset) at -40° to +70°C
- ADC
  - 24-bit
- Power Requirements
  - 16 to 32 Vdc for charger input (CHG) (Current limited to 0.9 A maximum for power converter or solar panel input.)
- Real-Time Clock Accuracy
  - ±1 min. per month
- Internet Protocols
  - Ethernet, PPP, RNDIS, ICMP/Ping, Auto-IP(APIPA), IPv4, IPv6, UDP, TCP, TLS (v1.2), DNS, DHCP, SLAAC,
<table>
<thead>
<tr>
<th>CR310-RF407 Option</th>
<th>CR310-RF422 Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Type</td>
<td>Frequency Hopping Spread Spectrum (FHSS)</td>
</tr>
<tr>
<td>Output Power</td>
<td>5 to 250 mW (user-selectable)</td>
</tr>
<tr>
<td>Frequency</td>
<td>902 to 928 MHz (US, Canada)</td>
</tr>
<tr>
<td>RF Data Rate</td>
<td>200 kbps</td>
</tr>
<tr>
<td>Receive Sensitivity</td>
<td>-101 dBm</td>
</tr>
<tr>
<td>Antenna Connector</td>
<td>RPSMA (external antenna required; see <a href="http://www.campbellsci.com/order/rf407">www.campbellsci.com/order/rf407</a> for Campbell Scientific antennas)</td>
</tr>
<tr>
<td>Idle Current Drain, Average</td>
<td>12 mA (@ 12 Vdc)</td>
</tr>
<tr>
<td></td>
<td>&lt; 80 mA (@ 12 Vdc)</td>
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<table>
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<tr>
<th>CR310-RF412 Option</th>
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<tbody>
<tr>
<td>Radio Type</td>
</tr>
<tr>
<td>Output Power</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>RF Data Rate</td>
</tr>
<tr>
<td>Receive Sensitivity</td>
</tr>
<tr>
<td>Antenna Connector</td>
</tr>
<tr>
<td>Idle Current Drain, Average</td>
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<tr>
<th>CR310-WIFI Option</th>
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<tbody>
<tr>
<td>Operational Modes</td>
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<tr>
<td>Operating Frequency</td>
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<tr>
<td>Antenna Connector</td>
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<tr>
<td>Antenna</td>
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<tr>
<td>Transmit Power</td>
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<tr>
<th>CR310-CELL200 Option</th>
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<tbody>
<tr>
<td>-NOTE-</td>
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<tr>
<td>Cell Technologies</td>
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<td></td>
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<tr>
<td>2G Frequency Bands</td>
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</table>
### CR310-CELL205 Option

**NOTE:** The CR310-CELL205 option is not compatible with a Verizon cellular network.

<table>
<thead>
<tr>
<th>Antenna Connector</th>
<th>SMA (External antenna required; see <a href="https://www.campbellsci.com/order/cr310">www.campbellsci.com/order/cr310</a> for Campbell Scientific antennas.)</th>
</tr>
</thead>
</table>
| Cell Technologies | 3G (UMTS/HSPA+)  
4G (LTE CAT-1) |
| 3G Frequency Bands | 850, 1700/2100 (AWS), and 1900 |
| 4G Frequency Bands | 700, 850, 1700/2100 (AWS-1), 1900 |

**SIM Interface**

3FF (6 position/contacts)  
Supports SIMs that require 1.8 or 3 V.

### CR310-CELL210 Option

**NOTE:** The CR310-CELL210 option is only compatible with a Verizon cellular network.

| Cell Technologies | No  
4G (LTE CAT-1) |
<table>
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<tbody>
<tr>
<td>4G Frequency Bands</td>
<td>700, 850, 1700, 1900, 2100</td>
</tr>
<tr>
<td>Antenna Connector</td>
<td>SMA (External antenna required; see <a href="https://www.campbellsci.com/order/cr310">www.campbellsci.com/order/cr310</a> for Campbell Scientific antennas.)</td>
</tr>
</tbody>
</table>
| SIM Interface | 3FF (6 position/contacts)  
Supports SIMs that require 1.8 or 3 V. |

### CR310-CELL215 Option

**NOTE:** The CR310-CELL215 option is intended for use in EMEA countries.

| Cell Technologies | 4G (LTE CAT-1)  
3G (UMTS/HSPA+) |

### CR310-CELL220 Option

**NOTE:** The CR310-CELL220 option is intended for use in Australia.

| Cell Technologies | 4G (LTE CAT-1)  
3G (UMTS/HSPA+) |
<table>
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</thead>
<tbody>
<tr>
<td>3G Frequency Bands</td>
<td>850 and 2100 MHz</td>
</tr>
<tr>
<td>4G Frequency Bands</td>
<td>700, 850, 1800, 2100, and 2600 MHz</td>
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<tr>
<td>Antenna Connector</td>
<td>SMA (External antenna required; see <a href="https://www.campbellsci.com/order/cr310">www.campbellsci.com/order/cr310</a> for Campbell Scientific antennas.)</td>
</tr>
</tbody>
</table>
| SIM Interface | 3FF (6 position/contacts)  
Supports SIMs that require 1.8 or 3 V. |

### CR310-CELL225 Option

**NOTE:** The CR310-CELL225 option is intended for use in Japan.

<table>
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<tr>
<th>Antenna Connector</th>
<th>SMA (External antenna required; see <a href="https://www.campbellsci.com/order/cr310">www.campbellsci.com/order/cr310</a> for Campbell Scientific antennas.)</th>
</tr>
</thead>
</table>
| SIM Interface | 3FF (6 position/contacts)  
Supports SIMs that require 1.8 or 3 V. |