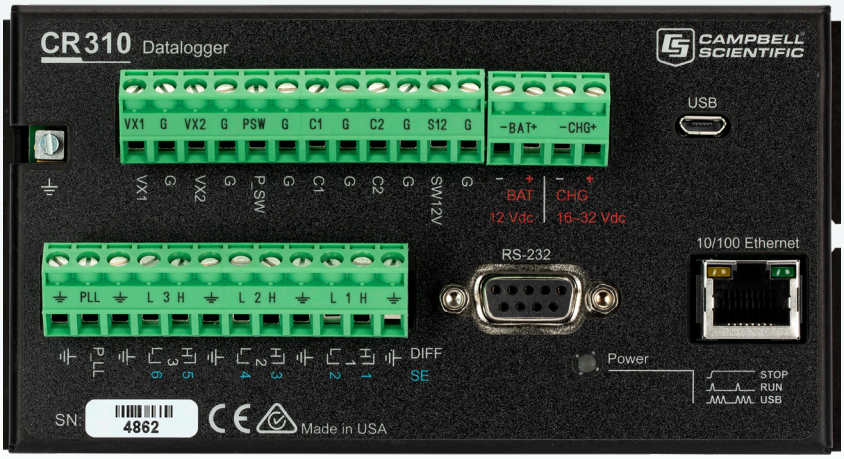
CR310

Measurement and Control Datalogger

Compact Data Logger with Ethernet

Ideal for small applications



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 concentrates and makes data available over varied networks, with delivery 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 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 CR1000Xe 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 communications
- 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 communications protocols
- 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 communications 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: six single-ended or three 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 communications Tx/Rx pair

Specifications

-NOTE-	*Additional specifications are listed in the CR300-Series Specifications Sheet.*
Operating Temperature Range	▪ -40° to +70°C (standard) ▪ Non-condensing environment
Maximum Scan Rate	10 Hz
Case Material	Powder-coated aluminum
Analog Inputs	Six single-ended or three differential (individually configured)
Pulse Counters	8 (P_SW, P_LL, C1, C2, and SE1–SE4)
Voltage Excitation Terminals	2 (VX1, VX2)
Communications Ports	▪ USB Micro B ▪ RS-232 ▪ 10/100 Ethernet RJ45
Switched 12 Volt	1 terminal
Digital I/O	7 terminals (C1, C2, P_SW, and SE1–SE4) configurable for digital input and output. Includes status high/low, pulse width modulation, external interrupt, and communications functions. Exception: The SE4 terminal doesn't do external interrupt.
Input Limits	-100 to +2500 mV

Specifications

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
Charge Terminal Characteristics (CHG+ and CHG-)	▪ Input from power converter or solar panel ▪ ES1 PS2 energy sources only (Energy Source Class 1 [ES1] and Power Source Class 2 [PS2], as defined in Clauses 5 and 7 of IEC/AS/NZS 62368-1:2022) ▪ 16 to 32 Vdc ▪ Hold current limit 1.6 A @ 20°C
Battery Terminal Characteristics (BAT+ and BAT-)	▪ Input from external battery, 7 Ah lead-acid typical ▪ Voltage input 12 Vdc only ▪ Hold current limit 1.6 A @ 20°C
Internal Lithium Battery	▪ 3 V coin cell CR2032X for battery-backed clock ▪ 6-year life with no external power source
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, NTP, Telnet, HTTP(S), FTP(S), SMTP/TLS, POP3/TLS
Communications Protocols	PakBus, Modbus, DNP3, SDI-12, TCP, UDP, and others
CPU Drive/Programs	80 MB serial flash
Data Storage	30 MB serial flash
Idle Current Drain, Average	10 mA (@ 12 Vdc with Ethernet link idle)
Active Current Drain, Average	56 mA (@ 12 Vdc with Ethernet link active, processor always on)
Dimensions	16.26 x 7.62 x 5.68 cm (6.4 x 3.0 x 2.2 in.)
Weight	288 to 306 g (0.64 to 0.68 lb) depending on communications option selected

CR310-RF407 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	902 to 928 MHz (US, Canada)
RF Data Rate	200 kbps
Receive Sensitivity	-101 dBm
Antenna Connector	RPSMA (external antenna required; see www.campbellsci.com/order/rf407 for Campbell Scientific antennas)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR310-RF412 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	915 to 928 MHz (Australia, New Zealand)
RF Data Rate	200 kbps

Specifications

CR310-RF412 Option (continued)

Receive Sensitivity	-101 dBm
Antenna Connector	RPSMA (external antenna required; see www.campbellsci.com/order/rf412 for Campbell Scientific antennas)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR310-RF422 Option

Radio Type	868 MHz SRD 860 with Listen Before Talk (LBT) and Automatic Frequency Agility (AFA)
Output Power	2 to 25 mW (user-selectable)
Frequency	863 to 870 MHz (European Union)
RF Data Rate	10 kbps
Receive Sensitivity	-106 dBm
Antenna Connector	(External antenna required; see www.campbellsci.com/order/rf422 for Campbell Scientific antennas)
Idle Current Drain, Average	9.5 mA
Active Current Drain, Average	20 mA

CR310-RF427 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	▪ 902 to 907.5 MHz ▪ 915 to 928 MHz (Brazil)
RF Data Rate	200 kbps
Receive Sensitivity	-101 dBm
Antenna Connector	RPSMA (External antenna required)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR310-WIFI Option

Operational Modes	Client or Access Point
Operating Frequency	2.4 GHz, 20 MHz bandwidth
Antenna Connector	Reverse Polarity SMA (RPSMA)
Antenna	pn 16005 unity gain (0 dBd), 1/2 wave whip, omnidirectional with articulating knuckle joint for vertical or horizontal orientation
Transmit Power	7 to 18 dBm (5 to 63 mW)

CR310-CELL205 Option

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

Specifications

CR310-CELL205 Option (continued)

Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas)
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	4G (LTE CAT-1)
4G Frequency Bands	700, 850, 1700, 1900, 2100
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas)
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	▪ 2G (GSM/GPRS/EDGE) ▪ 3G (UMTS/HSPA+) ▪ 4G (LTE CAT-1)
2G Frequency Bands	900 and 1800 MHz
3G Frequency Bands	850, 900, and 2100 MHz
4G Frequency Bands	800, 850, 900, 1800, 2100, and 2600 MHz
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V

CR310-CELL220 Option

-NOTE-	***The CR310-CELL220 option is intended for use in Australia and New Zealand.***
Cell Technologies	▪ 3G (UMTS/HSPA+) ▪ 4G (LTE CAT-1)
3G Frequency Bands	▪ 850 and 2100 MHz (EC-21AUT) ▪ 850, 900, 1900, and 2100 MHz (EC-21AU)
4G Frequency Bands	▪ 700, 850, 1800, 2100, and 2600 MHz (EC-21AUT) ▪ 700, 900, 1700, 1800, 1900, 2100, and 2600 MHz (EC-21AU)
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas)
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.***
Cell Technologies	4G (LTE CAT-1)

Specifications

CR310-CELL225 Option (continued)

4G Frequency Bands	800 (lower), 800 (upper), 850+, 900, 1800, and 2100 MHz
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V