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 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

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❯ 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

-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	6 single-ended or 3 differential (individually configured)
Pulse Counters	8 (P_SW, P_LL, C1, C2, and SE1 to SE4)
Voltage Excitation Terminals	2 (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.
Input Limits	-100 to +2500 mV
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,

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	NTP, Telnet, HTTP(S), FTP(S), SMTP/TLS, POP3/TLS, MQTT
Communication 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	32 mA (@ 12 Vdc with Ethernet link idle)
Active Current Drain, Average	23 mA + 51 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 communication 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
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-CELL200 Option

-NOTE-	*The CR310-CELL200 option is not compatible with a Verizon cellular network.*
Cell Technologies	❭ 2G (GSM/GPRS/EDGE) ❭ 3G (UMTS/HSPA+)
2G Frequency Bands	850, 900, 1800, and 1900 MHz

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3G Frequency Bands	800, 850, 900, 1900, and 2100 MHz
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr310 for Campbell Scientific antennas.)

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
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.* CR310-CELL205 Option No
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	〉 4G (LTE CAT-1) 〉 3G (UMTS/HSPA+)

	〉 2G (GSM/GPRS/EDGE)
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.*
Cell Technologies	〉 4G (LTE CAT-1) 〉 3G (UMTS/HSPA+)
3G Frequency Bands	850 and 2100 MHz
4G Frequency Bands	700, 850, 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-CELL225 Option

-NOTE-	*The CR310-CELL225 option is intended for use in Japan.*
Cell Technologies	4G (LTE CAT-1)
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.

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