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WHEN MEASUREMENTS MATTER

CR300
Measurement and Control Datalogger

Compact Datalogger
Ideal for small applications

Overview

The CR300 is a multi-purpose, compact, low-cost measurement and control datalogger. This entry level datalogger, 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 CR300 also performs automated on-site or remote decision making for control and M2M communications. The CR300 is ideal for small applications requiring long-term, remote monitoring and control.

Benefits and Features

❯ Setup easily with PC software and USB connectivity

❯ Measure with confidence, analog and digital sensors

❯ Internet ready—Email, FTP, HTTP/Web, TCP

❯ Trust in the Campbell Scientific quality including integral surge and ESD protection

❯ Network wirelessly to another node or Internet gateway with integrated radio option

❯ Communicate from anywhere when using a cellular or satellite peripheral

❯ Save money and space 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

❯ Analyze and control with programmability and multiple general purpose I/O

❯ Notify with event driven communications and physical outputs

General Specifications

❯ **CPU:** ARM Cortex M4, running at 144 MHz

❯ **Internal Memory[a]:** 30 MB flash for data storage, 80 MB flash for CPU drive / programs, 2 MB flash for operating system

❯ **Clock Accuracy:** ±1 min per month

❯ **USB micro B** for direct connection to PC (limited power source during configuration), 2.0 full speed, 12 Mbps

❯ **RS-232** for connecting RS-232 modems or serial sensors

❯ **Battery Terminal Pair (-BAT+)** for regulated 12 V power input or rechargeable 12 V VRLA for UPS mode

❯ **Charge Terminal Pair (-CHG+)** for 16 to 32 V from dc power converter or 12 or 24 V solar panel (10 W)

❯ **Power Consumption @ 12 Vdc:** 1.5 mA (sleep), 5 mA (1 Hz scan with one analog measurement), 23 mA (active processor always on)

[a]*Internal memory is for dataloggers with serial numbers ≥ 2813*

General Specifications Continued

- **One Switched 12 V Terminal (SW12V)** for powering sensors or communication devices, 1100 mA @ 20℃[b]
- **Two Sensor Excitation or Continuous 0.15 to 5 V Terminal (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)

[b] *The 1100 mA voltage output is for dataloggers with serial numbers ≥ 2813*

- **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
- **Best Analog Accuracy:** ±(0.04% of reading ±6 μV), 0° to 40℃
- **Best Effective Resolution:** 0.23 μV (±34 mV range, differential measurement, input reversal, 50/60 Hz f_{N1})
- **Operating Temperature Range:** -40° to +70℃
- **Weight**
  CR300: 242 g (0.53 lb)
  CR300-RF407/RF412/RF422: 249.5 g (0.55 lb)
- **Dimensions:** 14.0 x 7.6 x 5.1 cm (5.5 x 3.0 x 2.0 in)
- **Compliance Information:** View the EU Declaration of Conformity for the CR300, CR300-WIFI, and CR300-RF422 at: www.campbellsci.**eu**/cr300

Terminal Functions
Each terminal may only take on one function.

Analog Input Function	C1	C2	P_SW	P_LL	VX1	VX2	SE1	SE2	SE3	SE4	SE5	SE6	RS-232	SW12	Max
Single Ended Voltage							✓	✓	✓	✓	✓	✓			6
Differential Voltage							H	L	H	L	H	L			3
4 to 20 or 0 to 20 mA							✓	✓							2

Analog Output Function	C1	C2	P_SW	P_LL	VX1	VX2	SE1	SE2	SE3	SE4	SE5	SE6	RS-232	SW12	Max
Switched-Voltage Excitation					✓	✓									2
5 V Source	✓	✓			✓	✓									4
12 V Source														✓	1

Digital I/O Function	C1	C2	P_SW	P_LL	VX1	VX2	SE1	SE2	SE3	SE4	SE5	SE6	RS-232	SW12	Max
RS-232 ± 6 V out													✓		1
RS-232 0-5 V out	Tx	Rx													1
SDI-12	✓	✓													2
Pulse-Width Modulation							✓	✓	✓	✓					4
Timer Input							✓	✓	✓	✓					4
Period Average							✓	✓	✓	✓					4
Interrupt	✓	✓					✓	✓	✓	✓					6
General I/O	✓	✓	✓				✓	✓	✓	✓					7

Pulse Counting Function	C1	C2	P_SW	P_LL	VX1	VX2	SE1	SE2	SE3	SE4	SE5	SE6	RS-232	SW12	Max
Switch Closure	✓	✓	✓												3
High Frequency	✓	✓	✓	✓			✓	✓	✓	✓					8
Low Level AC				✓											1

CR300-WIFI Specifications

Wireless Local Area Network (WLAN)

❯ **Operational Modes:** Client or Access Point

❯ **Supported Standards:** EEE 802.11 b/g/n, IEEE 802.11d/e/i, 802.1X, WEP, WPA/WPA2-Personal and Enterprise

❯ **Maximum Possible Over-the-Air Data Rates**
  ○ 802.11b: up to 11 Mbps
  ○ 802.11g: up to 54 Mbps
  ○ 802.11n: up to 72 Mbps

❯ **Operating Frequency:** 2.4 GHz, 20 MHz bandwidth

❯ **Antenna Connector:** 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)

❯ **Rx Sensitivity:** -97 dBm

Average Additional Current Contribution @ 12 Vdc

❯ **Client Mode:** 7 mA idle, 70 mA communicating

❯ **Access Point Mode:** 62 mA idle, 65 mA communicating

❯ **Sleep (disabled using IPNetPower() or DevConfig setting):** <0.1 mA

Compliance Information

❯ **United States FCC ID:** XF6-RS9113SB

❯ **Industry Canada (IC):** 8407A-RS9113SB

Note: The user is responsible for emissions if changing the antenna type or increasing the gain.

CR300-RF407, CR300-RF412 Specifications

Frequency Hopping Spread Spectrum Radios (FHSS)

❯ **Transmit**
  ○ Output Power: 5 to 250 mW, user selectable
  ○ Frequency
    ◆ RF407: 902 to 928 MHz (US, Canada)
    ◆ RF412: 915 to 928 MHz (Australia, New Zealand)
  ○ Channel Capacity
    ◆ RF407: Eight 25-channel hop sequences sharing 64 available channels
    ◆ RF412: Eight 25-channel hop sequences sharing 31 available channels
  ○ RF Data Rates: 200 kbps

❯ **Receive Sensitivity:** -101 dBm

❯ **Antenna Connector:** RPSMA (external antenna required; see www.campbellsci.com/order/cr300 for Campbell Scientific antennas)

Average Additional Current Contribution @ 12 Vdc

❯ **Transmit:** 45 mA

❯ **Idle On:** 12 mA

❯ **Idle 0.5 s Power Mode:** 4 mA

❯ **Idle 1 s Power Mode:** 3 mA

❯ **Idle 4 s Power Mode:** 1.5 mA

Compliance Information

❯ **CR300-RF407**
  ○ United States: FCC Part 15.247: MCQ-XB900HP
  ○ Industry Canada (IC): 1846A-XB900HP
  ○ Mexico IF: RCPDIXB15-0672-A2

❯ **CR300-RF412**
  ○ ACMA RCM
  ○ United FCC Part 15.247: MCQ-XB900HP
  ○ Industry Canada (IC): 1846A-XB900HP

CR300-RF422 Specifications

F868 MHz SRD 860 Radio with Listen Before Talk (LBT) and Automatic Frequency Agility (AFA)

❯ **Transmit**
  ○ Output Power: 2 to 25 mW, user selectable
  ○ Frequency: 863 to 870 MHz (European Union)
  ○ Channel Capacity: 30 channels (default), software configurable for meeting local regulations; 10 sequences for reducing interference through channel hop
  ○ RF Data Rates: 10 kbps

❯ **Receive Sensitivity:** -106 dBm

❯ **Antenna Connector:** RPSMA (external antenna required)

Average Additional Current Contribution @ 12 Vdc

❯ **Transmit:** 20 mA

❯ **Idle On:** 9.5 mA

❯ **Idle 0.5 s Power Mode:** 3.5 mA

❯ **Idle 1 s Power Mode:** 2.5 mA

❯ **Idle 4 s Power Mode:** 1.5 mA