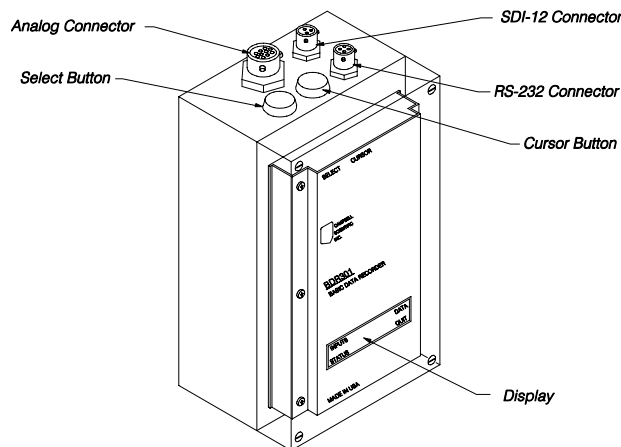


# The BDR301—A Basic Data Recorder For Hydrology

## Features:

- SDI-12 intelligent sensor interface
- Rugged, sealed enclosure with sealed circular connectors
- Autoranging analog input with 5 digit resolution
- Prompted parameter entry for programming
- RS232 interface for programming and data retrieval
- Data storage for 30,000 values
- Low quiescent power drain
- 32 character alpha-numeric display
- Operating temperature range of -35° to +55°C
- Small size—8.5" x 4.7" x 3.6", under 4 lbs.
- Low cost
- 3 year warranty



The BDR301's analog connector accommodates four single-ended or two differential analog inputs, an excitation channel, a digital control port, and two pulse count channels.

## Description

The BDR301 Basic Data Recorder is a rugged, low cost system for installations requiring measurement and data acquisition from a limited number of sensors. Its packaging is optimized for use in remote, harsh environments. Compatible sensors are:

- SDI-12 intelligent sensors
- Thermistors
- Platinum resistance thermometers
- Strain gage type load cells or pressure transducers
- Switches in tipping bucket rain gages or anemometers
- Volt or millivolt outputs from other analog sensors
- Potentiometers

The BDR301 is typically used in the following applications:

- Stage recorder
- Well draw-down tests
- Water quality
- Precipitation recorder

A 32-character alphanumeric display is activated by two buttons allowing the user to examine input values, stored data, or any of several status indicators. Inputs and status values are labeled with names and units. Stored data is labeled with date, time, input label, and processing used (e.g. Sample, Avg., Max., Min., etc.).

A user terminal (e.g., laptop computer) connects to the RS-232 interface for program entry, editing, or data retrieval. Programming is accomplished by entering labels and parameters into input and data storage program tables. A set of single character commands are used to enter the programming mode, set the clock, retrieve status information, or retrieve stored data.

## Pricing

BDR301 Basic Data Recorder	\$1120.00
Analog Mating Connector	20.00
SDI-12 Mating Connector	16.00
RS-232 Mating Connector	16.00
SC325 BDR to 25 pin RS232 cable (6 ft.)	70.00
SC309 BDR to 9 pin RS232 cable (6 ft.)	70.00

# BDR301 Specifications

The following electrical specifications are valid for temperature range of -35° to +55°C, unless stated otherwise.

## ANALOG INPUTS

**Number of Channels:** 2 differential or 4 single-ended (each differential channel can be configured as 2 single-ended channels).

**Measurement Types:** Single-ended and differential voltage, ratiometric half-bridge and full-bridge.

**Accuracy:** Single-ended or differential voltage:  $\pm 0.05\%$  of full scale. Ratiometric bridge measurements: 0.02% of full scale.

**Input Range, Integration Time, Resolution:**

Full Scale Range mV	Integration ms	Resolution $\mu V$
-20 to 5000*	up to 16.7	3.1 to 49.5
-20 to + 80	50.0	1.0
-20 to + 120	33.33	1.5
-20 to + 250	16.7	3.1
-30 to + 1000	5.3	10.2
-50 to + 5000	1.08	49.5

\**autoranging*

**Input Noise Voltage:** 1.76  $\mu V$  RMS on -20 to +80 mV range

**Common Mode Range:**  $\pm 5$  volts

**Input Current:** 10 nanoamperes

**Input Resistance:** 6 gigohms

## PULSE COUNTERS

**Number of Channels:** 2

**Input Signal:** Switch closure

	Channel 1	Channel 2
Max input frequency (Hz)	20	150
Min switch closure time ( $\mu s$ )	100	200
Min voltage pulse low time ( $\mu s$ )	100	200
Max debounce filter time (ms)	10	5.5
Max voltage input (V)	5	5
Result	Counts	Frequency

**Note:** Pulse count channel 1 activates the processor on each count requiring 13 mA for 20 ms.

## SDI-12

Compatible with SDI-12 standard version 1.0, October 1988 and 1.1, July 1994.

## ANALOG OUTPUT

**Excitation:** A single excitation output for resistive bridge measurements; switched to 4.0 volts  $\pm 50$  mV during program execution.

**Maximum Output Current:** 35 mA

**Note:** The precise value of the excitation voltage is measured during the BDR301 calibration. Bridge measurements are ratiometric with an accuracy of 0.02% of full scale.

## DIGITAL CONTROL OUTPUT

A single digital control output; enabled according to programmed time or event.

**Output Voltage (no load):**

High, 5 V  $\pm 0.1$  V  
Low,  $< 0.1$  V

**Output Resistance:** 1000 Ohms

## DISPLAY

The LCD display has a useful operating temperature range of 0° to 50°C.

"SELECT" and "CURSOR" buttons allow viewing of:

- Instantaneous measurements
- Stored records
- Datalogger status

## RS-232 PORT

**Format:** ASCII, 8 bit, no parity, 1 start bit, 1 stop bit

**Type:** RS232C

**Baud:** 300, 1200, 9600

**Mode:** Full duplex, asynchronous

## TRANSIENT PROTECTION

All input and output connections to the BDR301 and protected using RC filters and transzorbors or spark gaps.

## POWER

**External Supply:** 9 VDC minimum; 18 VDC maximum

**Internal Supply:** 8 alkaline "C" cells; can be used as the primary source or as backup for an external supply.

**Current Drain:** 200 microamps quiescent; 27 mA active

**Data Loss Protection:** If the external supply drops below 9.0 VDC and the internal batteries drop below 9.8 VDC, the datalogger enters a low power survival state where programming and data are maintained, but program execution stops and communication ceases. Functions return to normal when adequate power is provided.

## PROGRAMMING

**Prompt Programming:** program generation from prompted input.

**Direct Programming:** more flexible instruction set; EDLOG.

**Measurement Internal:** 1 second to 1440 minutes.

**Processing:** Numerical and transcendental operations for algorithm development

**Output Processing:** Sample, average, totalize, maximize, minimize, histogram, wind vector, sample on max or min, standard deviation.

## SELECTED COMPUTER COMMANDS

**Status:** Listing of parameters critical to datalogger operation.

**Data Diagnostics:** Occurrences of run time errors and changes to real time clock are logged.

**Data Retrieval:** Retrieve all data, all since last retrieval, or time window; optional time tag; ASCII format.

**Data Notes:** Up to 1000 alphanumeric characters.

**Display Inputs:** Instantaneous measurements on command for on-site verification and calibration of sensors.

**Adjust Offset:** Enter desired measurement value and offset is calculated automatically.

## PHYSICAL

**Size:** 8.5 x 3.6 x 4.75 inches without mating connectors

**Weight:** 3.7 lbs, including batteries



**CAMPBELL SCIENTIFIC, INC.**

815 W. 1800 N. • Logan, Utah 84321-1784 • (435) 753-2342 • FAX (435) 750-9540  
Offices also located in: Australia • Canada • England • France • South Africa

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