

The

A newsletter for the customers of  
Campbell Scientific, Inc.

# CAMPBELLUPDATE

September, 2002

www.campbellsci.com

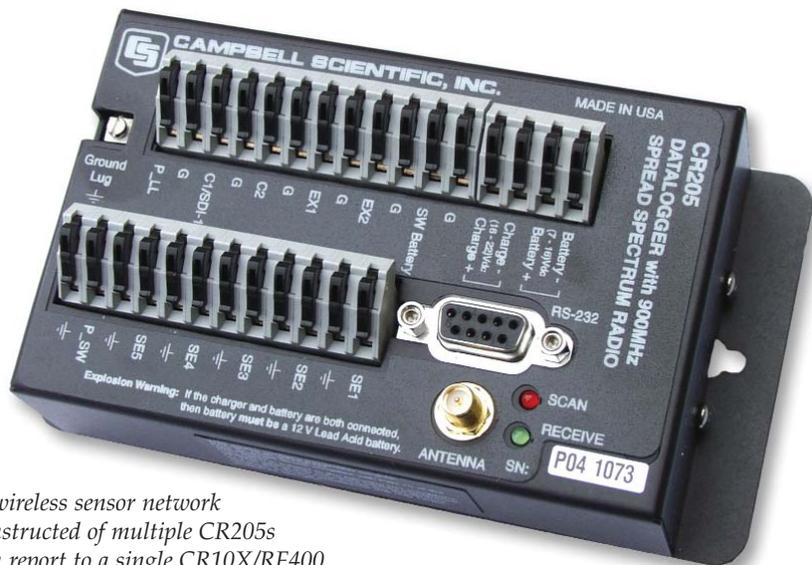
Volume 13, Issue 2

## Need a wireless sensor/datalogger?

### *CR200 series offers distributed measurement in a compact package*

We've developed the CR200-series dataloggers in response to your requests for a small, wireless measurement and control device. You can use these dataloggers to measure sensors, process the results, and transmit data using the built-in spread spectrum radio. Individual units can be used as wireless sensors, independent dataloggers, or as part of a larger datalogger network. The CR200s allow you to deploy a sensor network without installing and maintaining long, expensive cables. Multiple models are available: the CR200 (no radio), the CR205 (910-918 MHz), the CR210 (920-927 MHz) and the CR215 (2.4 GHz).

For measurements, the CR200 series has five single-ended analog inputs, one switch closure pulse input, one low level ac pulse input, two control ports, an SDI-12 port, two excitation channels (2.5 or 5 V), and one switched battery excitation. Input voltage range is 0 to +2500 mV with 0.6 mV resolution. Final Storage memory is 128 kbytes of



*A wireless sensor network  
constructed of multiple CR205s  
can report to a single CR10X/RF400.*

nonvolatile Flash RAM (~32,000 data points). In terms of data storage, the dataloggers are table-based, similar to our CR5000 and CR9000. A battery-backed clock ensures continuous time-keeping. The standard operating temperature range for the CR200 series is -40° to +50°C.

For power, terminals for both battery and charger connections are provided. The dataloggers can use lithium, alkaline, or sealed lead acid batteries or be directly powered using a 16 to 22 Vdc

power supply. A charger for 12 Vdc sealed rechargeable lead acid batteries is built into the logger. The CR200s' quiescent current drain is less than 200  $\mu$ A.

The CR200s' programming language is CRBasic, and CSI Edit or SCWin is used to create programs. For communications, the CR200s use our new PakBus networking protocol, which is a simplified IP protocol. The user interface is a PC that has PakCom (included) or LoggerNet 2.1 installed.

## OPC eases the exchange of real-time data among PC clients

OPC, originally Object Linking and Embedding for Process Control, is an industry standard. It was created as a collaborative effort between Microsoft and leading suppliers of automation hardware and software. The OPC standard defines methods used to exchange real-time data among PC-based clients, based on Microsoft operating systems. Following

the standard allows client applications to exchange data with servers without using vendor-specific routines. The OPC Foundation manages this non-proprietary standard. According to the OPC Foundation, "OPC will bring the same benefits to industrial hardware and software that standard printer drivers brought to word processing."

PC-OPC allows you to use a graphical display, alarm, HMI, SCADA, custom, or real-time control software package to integrate Campbell Scientific hardware into an existing system.

Campbell Scientific offers its CSI OPC Server as an add-on to LoggerNet.

See OPC on Page 3

## Message from the President

# CSI: Local knowledge and international support

By Paul Campbell

Campbell Scientific has been involved in international sales for most of our corporate history (founded 1974). In 1985, we organized our first international subsidiary, Campbell Scientific Ltd. in the UK, to better serve our European customers. Since that time, other subsidiaries have been organized, and additional business relationships have been established to represent Campbell Scientific's products in many countries. (See world map at [www.campbellsci.com](http://www.campbellsci.com).) This newsletter features applications from our Australian subsidiary, Campbell Scientific Australia Pty. Ltd.



Our philosophy when organizing subsidiaries that bear the Campbell Scientific name has been to maintain some local ownership, typically key people within the subsidiary. Each subsidiary is organized for business activities most important to the local market, with priority on customer service for applications support, equipment repairs, and equipment recalibration.

I am often asked if subsidiaries engage in manufacturing, and most of them do at some level. Each subsidiary engages in system integration work to support their customer base. Some subsidiaries add value to systems by integrating complementary products purchased locally. There are also occasions when a subsidiary may design and manufacture an accessory. For example, Campbell Scientific Australia manufactures the HydroSense display and an enclosure display unit; Campbell Scientific Canada Corp., manufactures a snow depth sensor; and Campbell Scientific Limited manufactures a number of peripherals for mea-

surement, control, and communication. These products are in turn offered through all of our affiliates to customers worldwide.

Customer benefits obtained through our international group of Campbell Scientific companies include:

- Support and service more readily available
- Compatibility of equipment for international markets
- Group awareness of sensors and peripherals used with Campbell Scientific equipment in other countries
- Group awareness of international activities and concerns
- Domestic language support

We at Campbell Scientific remain committed to serving you with an effective combination of local knowledge and international support.

## CSA covers diverse, exotic territory

Situated on the sunny North Queensland coast, Campbell Scientific Australia has provided sales and technical support to its customers since 1993. From its centrally located base in Townsville, CSA covers a diverse and exotic territory including Australia, Fiji, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Brunei, Thailand, and Vietnam. As do our other affiliate companies, Campbell Scientific Australia supports a variety of applications in environmental, water resources, agricultural, and industrial markets. Two of their supported projects, the OzFace study and the preservation of Mawson's Hut (Antarctica), are published as case studies and accompany this newsletter.

Our mates in Oz are also active in product development. Their SDS511 Dual CS I/O Port Adapter is covered in this edition of The Update, their CD294 DataView Display was highlighted in the January, 2002 edition, and their Hydrosense® Handheld Water Content Sensor and Display appeared in our February, 1999 edition. The CR200-series dataloggers, although manufactured in the United States, owe some of their design features to CSA input.



Located in Townsville, Campbell Scientific Australia is active in product development.

Managing Director Steve Bailey says the future of Campbell Scientific looks bright for the Pacific region. "Customers within our territories have to contend with some of the most hostile environmental conditions on Earth—they range from the Antarctic to the Simpson Desert to the tropical jungles of Irian Jaya. The proven reliability of Campbell Scientific products under such extremes is unmatched by any other manufacturer on the market. However, no product can succeed in the market without quality support. CSA has been fortunate in recruiting the highest quality staff and distributors capable of providing exceptional service to the furthest reaches of our territory."

### The CAMPBELLUPDATE

Executive Editor: Bert Tanner

Managing Editor: Jeff Goalen

Assistant Editors and Update Design:

Tracy Weber Davidson

Linda Worlton

Jared Thayne

Contributing Writers:

Steve Bailey, CSA	Jeff Goalen
Roy Brazell	John Halloran
Craig Christensen	Shashi Kalaskar
Rachel Christensen	Tyler Meacham
Betsy Dastrup	David Odd
Tracy W. Davidson	Andrew Sanford, CSL
Bryan Dixon	Lex Shakespear
Ken Gibbons	Linda Worlton

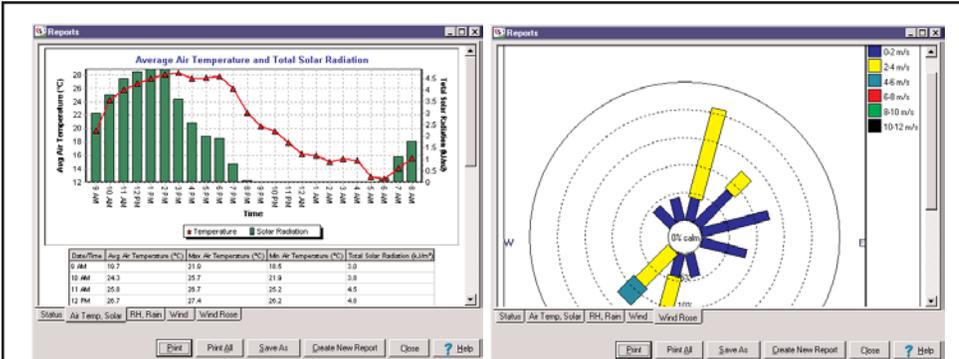
Graphics/Photography:

Hoa Pham Jared Thayne Brian Ulrich

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Data gathered by our preconfigured weather stations can be easily viewed using the tools of VisualWeather.

## VisualWeather™ lets you program a station in minutes

VisualWeather™ is a comprehensive software package that supports our ET106 and MetData1 weather stations. It allows an ET106 or MetData1 Weather Station to be configured in minutes. With VisualWeather, you program the weather station, retrieve data, and create reports simply by selecting options from a list or entering a few parameters; complex program development is not required.

VisualWeather is comprised of five modes—the configuration wizard, active connection, network monitor, report generator, and data export. Their functions are described below:

**Configuration Wizard** — is the heart of VisualWeather. It automatically generates the station's program as you select sensors, scan interval, output interval, and communications path. Direct, short haul, telephone, RF, and phone-to-RF communications are supported.

**Active Connection** — sends the station configuration, synchronizes the station's clock to the computer's clock, collects data on demand, displays real-time weather conditions, and monitors station status. You can specify the length of time the connection stays active.

**Network Monitor** — displays the communications status, battery voltage,

datalogger temperature, air temperature, rainfall, or weather conditions for each station in the network.

**Report Generator** — creates daily (midnight-to-midnight), last 24 hour, weekly, or monthly reports. You choose the report type, time-period, and units (metric and US units supported). Each report includes a header, station image, graph, tabular data, and company logo. You can preview the reports and print them on a user-specified schedule (batch reports).

**Data Export** — exports data to a file for use in a third-party software package, such as MS Excel or MS Access. The data is exported in the comma-separated format with headers.

VisualWeather features on-board equations that calculate:

- Evapotranspiration (ETo) based on the FAO-56 Penman-Monteith equation
- Crop Water Needs
- Growing Degree Days
- Wet Bulb Temperature
- Dew Point
- Chill Hours
- Wind Chill factor

Some calculations require the station's elevation, longitude, and latitude. Once entered, these parameters are saved for future calculations.

## Milestone reached with 100,000th CSI datalogger

We recently marked a milestone with the sale of our 100,000th datalogger. We would like to thank you, our customers, for making this possible.

Our first datalogger, the CR5, was introduced in 1975 and since then we've introduced 12 others. As many of you can attest, we are proud to report that most of these are still in operation—even many that were manufactured in the early '80s.

## OPC

Continued from Page 1

This allows third-party, OPC-compatible, software packages to access LoggerNet-supported dataloggers to read Final Storage and Table data, as well as read/write to Ports, Flags, Input Locations, and the Public table values. LoggerNet also monitors the data collection process.

Many software and hardware products support OPC. A handful that we have tried are:

- Iconics Genesis
- Intellution IFIX
- National Instruments LabVIEW Data logging and Supervisory Control
- National Instruments Lookout
- Wonderware FactorySuite 2000 with OPCLink
- Rockwell RSVIEW

To "test drive" CSI OPC Server, Campbell Scientific offers an evaluation copy from our Web site. The evaluation software generates random data. It does not retrieve data, so purchasing LoggerNet or CSI hardware is not required. To see the power of CSI OPC server, you need software that uses the data. If you don't own a software package, many vendors offer a free demo or limited use version of their software.

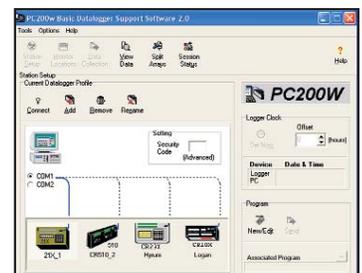
## Next release of PC200W to be available soon

PC200W has undergone a complete rewrite. Under the hood, this new 32-bit version uses the same client-server architecture as our LoggerNet software.

In addition to the tools found in earlier versions, we've enhanced the file viewer and added support for the CR510-TD, CR10T,

CR10X-TD, CR23X-TD and CR5000 table-based datalogger operating systems. As with earlier versions, PC200W is limited to direct connect only.

Now in the final stages of testing, PC200W 2.0 will be available from our Web site when released.



# ViewDAQ: On-screen pages of real-time data

*Eliminate the tedious back-and-forth between design and view modes*

ViewDAQ Real-Time Display Software is designed to build on-screen pages to view real-time data. You can quickly develop a mix of windows (pages) containing virtual instruments, visual alarms, and audible alarms. You have control over the virtual instruments' position, size, colors, orientation, and scale. While a page can be developed in as little as five minutes, fine-tuning complex pages will require more time. Pages can be bound into a book containing one to ten pages. Up to 50 books can be in a library. An individual page can be bound into one book or several books.

ViewDAQ easily accesses a wide variety of ActiveX components. The set-up windows provide instant feedback as changes are made. This eliminates the tedious process of going back and forth between the design and view modes.

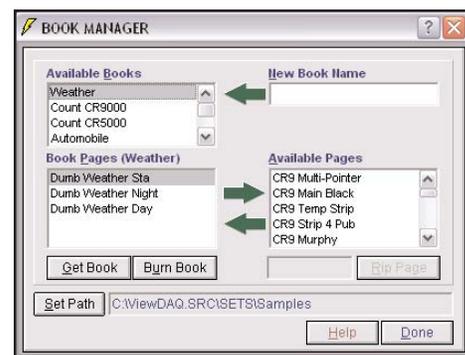
ViewDAQ provides extensive on-line help. Three types of help are available: Mouse-over Help, Context-sensitive Help, and Detailed Help accessed with the Help button.

ViewDAQ has two modes: DLL and OPC. Using the DLL mode, you can connect directly to a Campbell Scientific CR5000 or CR9000. To connect with other Campbell Scientific dataloggers requires table-based operating systems,



LoggerNet, and the CSI OPC Server. Additionally, ViewDAQ can be used as an OPC client and will work with any OPC server that complies with the current standards. A demonstration version of ViewDAQ can be downloaded from [www.campbellsci.com](http://www.campbellsci.com) or is available from our ResourceCD.

*ViewDAQ can display results immediately in a graphic or tabular format that is easy to review.*



## New RTDM acts as client to a LoggerNet server

*Automatically saves screen images for use on Web sites*

Campbell Scientific Ltd (UK) will soon release a 32-bit version of RTDM. Based on the original program, RTDM (2.0) provides a powerful and flexible screen development environment.

The new version acts as a client to a LoggerNet server, which can reside on the same PC or on a remote one. It also reads data from files written by other programs, e.g. PC208W.

When RTDM is acting as a client to the LoggerNet server, any data available via the server can be displayed in real-time. New active controls allow ports,

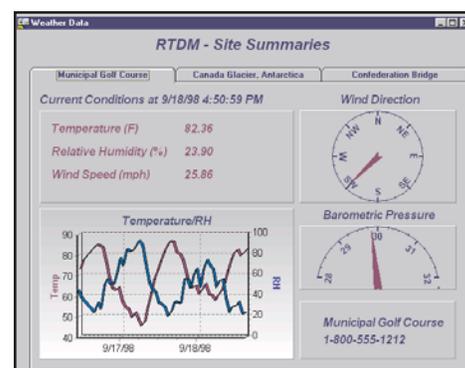
flags, and variables in a remote logger to be changed via your computer.

RTDM retains the ability to automatically save its screen images to disk for use on Web sites. New features include alarms logged to disk and the ability to trigger alarms if data are not being updated in a timely fashion, e.g. due to communications problems. Improved help and diagnostic tools have been added to aid the design process.

To make the transition seamless, RTDM 2.0 automatically converts forms developed with 16-bit versions. A run-time version of the program allows pre-designed forms to run on multiple remote machines at a reduced cost.

Visit [www.campbellsci.co.uk](http://www.campbellsci.co.uk) for the

latest information on RTDM or to download a demo 32-bit version.



*RTDM allows you to design screens to view real-time or archived data retrieved from a datalogger.*

# RTMC graphically displays LoggerNet server data

Real Time Monitoring and Control (RTMC) is a new application included in our LoggerNet 2.0 software package. RTMC is used to graphically display data from the LoggerNet server, set input locations, and toggle ports and flags. A simple yet powerful user-interface allows RTMC to use components such as alarms, sliders, graphs, toggles, tables, and gauges

to design custom multi-tab displays. RTMC's bitmap-based display system provides the tools used to tailor your displays. It can simultaneously display data from any number of dataloggers in the network. RTMC can access statistical data reported by the LoggerNet server, including the current state of your datalogger network and system-critical infor-

mation used to trigger alarms. All of RTMC's functions are available when connected as a client to a server on a remote PC. RTMC also includes a sophisticated real-time mathematical compiler for performing real-time calculations. With its point-and-click interface, RTMC is a simple solution for generating real-time displays.

## Comparing ViewDAQ, RTDM and RTMC

	Design Goal	Data Source	Real-Time Updates	Alarms	Designer Tool Kit	Availability
<b>ViewDAQ</b>	Graphically appealing; fast in direct mode; easy to use	CR5000, CR9000; other table-based dataloggers via OPC Server	Yes	Real-time; Audible; Persistent, requires user acknowledgment; Multi-level alarms possible; Alarm log	Alarms, Compasses, Dials, Dual Compasses, Flag controls, Gauges, Labels, LEDs, Numerics, Potentiometer controls, Sliders, Strip charts, Switch controls, Text boxes, Thermometers	Stand-alone product (demo available)
<b>RTDM</b>	Graphically appealing; flexible; powerful; exports images to Web site	Data files or LoggerNet Server	Yes	Real-time; Audible; Persistent, requires user acknowledgment; Multi-level alarms possible; Alarm log; Launch programs	Alarms, Charts, Dials, Images, Launch buttons, Scatter plots, Set points, Sliders, Snapshots, Tables, Toggles, Web Graphics and Numeric labels, Wind meters	Stand-alone product (demo available); run-time version available for OEM applications
<b>RTMC</b>	Starter software; simple	LoggerNet Server	Yes	Real-time; Audible	Alarms, COM check, Gauges, Graphs, Images, Labels, Numerics, Set point, Sliders, Status boxes, Table display, Time, Toggles	Included in LoggerNet
<b>View</b>	Quick and simple viewer for data files	Data files	No (historic only)	None	(1) Table and (1) Graph	Included in LoggerNet



Existing ADR systems can be replaced with the SSR100.

## Shaft encoder? Think SSR100

Campbell Scientific's SSR100 is an integrated system that consists of a shaft encoder, a Campbell Scientific datalogger, and a display—all housed in an environmental enclosure. Designed to replace USGS gauging station ADRs, the SSR100 can be used in any application requiring a shaft encoder. The system monitors and records water level and displays the real-time measurements. It is pre-programmed to measure the shaft encoder, an optional tipping bucket rain gauge, and an optional SDI-12 sensor. A High Data Rate GOES satellite transmitter can be added to the system to transmit measurements.

## LoggerNet update on way

LoggerNet 2.1 is scheduled for release this fall. This release incorporates support for our RF400 Spread Spectrum Radio Modem and allows you to communicate with, program, and collect data from the CR200-series dataloggers using the new PakBus communications protocol. Additionally, we've enhanced the toolbar and fixed a few bugs.

We encourage customers with LoggerNet 2.0 to update their version, which will be available from: [www.campbellsci.com/upgrades.html](http://www.campbellsci.com/upgrades.html)

# Faster SC32B replaces the SC32A

The SC32B has replaced the SC32A as our Optically Isolated RS-232 Interface between a datalogger CS I/O port and a computer serial port. The SC32B ships with a 9-pin to 9-pin serial data cable and an SC12 cable. The SC32B supports data transfer rates up to 115 kbps, so you can transfer data at the highest rate possible by your datalogger.



## SDS511: Add multiple devices to a datalogger

Developed by Campbell Scientific Australia, the SDS511 is a dual port adapter. It allows customers to add multiple devices, such as a PDA and a COM210 to one datalogger. Communications are determined on a first-come-first-served basis.

The SDS511 has two ports. One port supports modem enable (ME) devices, the

other supports both synchronous devices for communication (SDC) and ME devices. Compatible SDC devices include the CR10KD keyboard display and COM300 Voice Synthesizer modem. Compatible ME devices include the CD294 DataView Display, PDAs, laptop computer, COM210 phone modem, and our CDPD digital cellular modems.

## CAMPBELL SCIENTIFIC CALENDAR

Date	Event	Location
<b>October</b>		
2-4	Florida Conf. on Water Management	Miami, FL
13-17	American Institute of Hydrology	Portland, OR
23-24	Monitoring, Control & Automation	Denver, CO
23-25	Southwest Assoc. of ALERT Systems	Houston, TX
24-26	Irrigation Association	New Orleans, LA
27-30	Geological Society of America	Denver, CO
<b>November</b>		
10-14	ASA, CSSA, SSSA	Indianapolis, IN
15-16	Northeast Aquaculture Conference & Expo	Warwick, RI
<b>December</b>		
6-10	American Geophysical Union	San Francisco, CA
<b>February</b>		
6-7	Fish Farming Trade Show	Greenville, MS
9-13	American Meteorological Society	Long Beach, CA
13-15	Golf Course Superintendents Association	Atlanta, GA
18-21	Aquaculture America 2003	Louisville, KY
25-28	Utah Rural Water Assn. Conf. & Expo	St. George, UT
<b>March</b>		
3-6	SAE International Expo	Detroit, MI

visit our website for additional listings and training class schedules



**CAMPBELL SCIENTIFIC, INC.**

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

[www.campbellsci.com](http://www.campbellsci.com)