New CR9000X features improved CPU

100 kHz measurements processed faster

The next generation CR9000, the CR9000X, will be available first quarter, 2004. The CR9000X will be based around the new CR9032 CPU module. Increased clock speed and 128 Mbytes of internal SDRAM result in improved performance. Our preliminary tests show a reduction of processing time up to 25 times in some applications as compared to the previous CPU. True to Campbell Scientific's tradition of supporting our hardware that is still in the field, existing CR9000 systems can be upgraded to the CR9000X simply by purchasing the new CR9032 CPU module. All CR9000 modules, except the CR9080 (which is no longer required), will be supported by the CR9000X.

In addition to the faster processor speed and increased SDRAM, the CR9032 CPU Module offers a built-in PC card slot that accepts Type I, II, or III memory cards. The memory cards augment internal memory and eliminate the need for a CR9080 PAM Module in a CR9000X system. This frees up a slot in the CR9000X chassis, effectively expanding the maximum channel count of the system.

The new CPU has built-in RS-232 and 10baseT/100baseT ports. Expensive communication interfaces (PLA100, TL925, NL105) are no longer necessary, while communication speed between the CR9000X and PC are enhanced. The new CPU card also includes a 9-pin port for DSP4 communication and SDM connector for SDM devices such as the SDM-CAN and SDM-SIO4.

Modules

The new CR9058E 60 V Isolated Analog Input Module with RTD provides ten isolated differential input channels. Each channel has its own 24 bit A/D converter providing input isolation up to ±60 V. This allows customers to measure a signal (resolution to 2 microvolts) riding on a larger voltage potential. Examples are the high side of current shunts, or temperature

See CR9000X on Page 6
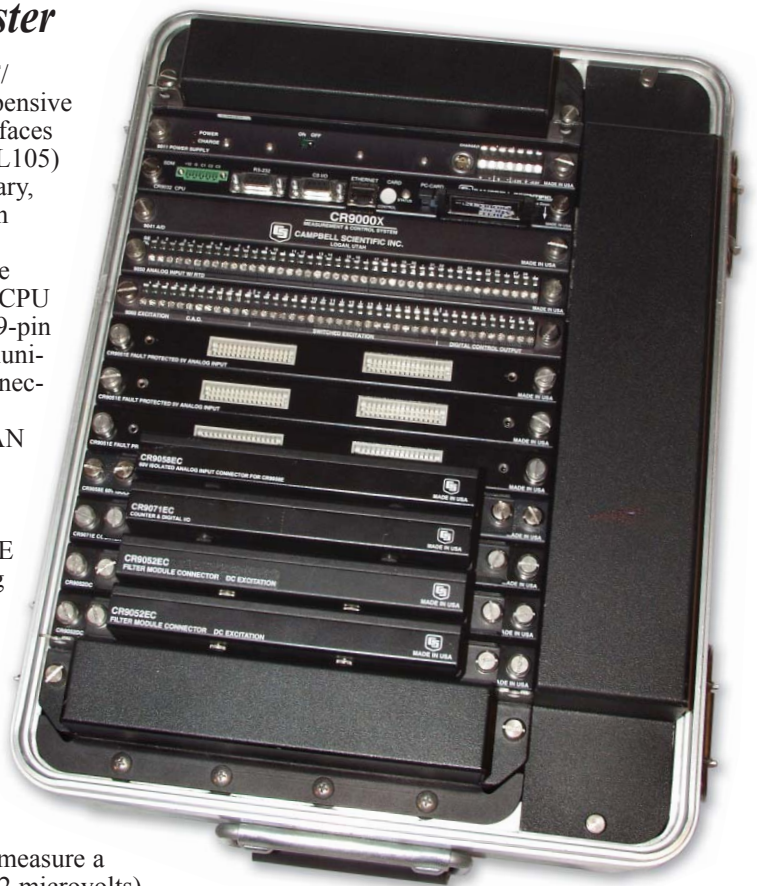
Existing CR9000 systems can be upgraded to the CR9000X simply by purchasing the new CR9032 CPU module.

SC-USB: Direct communication between logger, USB port

Our new SC-USB interface allows direct communication between your Campbell Scientific datalogger and a computer equipped with a USB port. Optically isolated, the SC-USB allows multiple devices to be connected in parallel; an SC32B RS-232 Interface is not required. The SC-USB is capable of transferring data at up to 1 Mbit/second.

The drivers support Windows® 98, 2000 and XP operating systems. The SC-USB is shipped with a CD containing suitable drivers and a set-up/programming utility.

Some interactions, such as a PC-to-storage module connection, require the 17394 USB-to-serial port converter and a Campbell Scientific interface.

Message from the President

Strategic product direction: a balanced approach

By Paul Campbell

An ongoing challenge is to manage the introduction and definition of new products. We must address customers' needs and take advantage of new technology, while providing continuity of product direction and a reasonable length of service so that existing technology is not prematurely abandoned. It is a process of trade-offs with numerous inputs to consider. Before evaluating the present and projecting into the future, let's consider the history of some Campbell Scientific datalogger models.

We introduced our CR5 digital recorder in 1976. The first CR5s involved extensive use of Complimentary Metal Oxide Semiconductor (CMOS) logic organized in the circuits of various modules. The modules measured different sensors with data outputs at fixed intervals as selected by electromechanical switches on the panels. CMOS was necessary for low power operation, with the benefit of portability in our dataloggers. When a CMOS microprocessor became available, a module was added to the CR5 (1978) to take advantage of the new technology. Some of the first tasks assigned to the microprocessor were computing wind vectors and capturing wind gust information.

The CR21 Micrologger used a microprocessor as its foundation for programmability. It was programmed to accept inputs from different sensors, display measured values, and allow the user to set up input and output tables with a time interval corresponding to each table.

Introduced in 1979 and manufactured until 1988, the CR21 established the basic datalogger functions built around a microprocessor.

The CR7, 21X, and CR10 dataloggers, introduced in the 1980s, had operating system architectures built around a microprocessor more capable than the CR21's microprocessor. Users were able to take advantage of a structured programming language built into the operating system to perform fairly complex measurement and control tasks.

In the 1990s our products incorporated new technology to expand memory and support greater processing speed. More recently, technology development has given us the ability to offer sophisticated digital signal processing in our CR9000 datalogger.

As hardware technology has advanced, so has the software. The CR5 was set up by plugging modules together (each module specific to a type of sensor) and entering a time interval into an electromechanical switch. Today, setup information is entered into a program on a PC and then transmitted to the datalogger. This setup information includes sensor types, measurement intervals (which may vary from sensor to sensor), intermediate processing, output intervals and conditions, communication paths, and even PC settings.

Many of our dataloggers that were manufactured over 10 years ago are in use today. During a time of rapid technology change, this is made possible through our efforts to maintain some reasonable backward compatibility as we move forward. Again, this is a matter of trade-offs. Newer models of dataloggers such as the CR9000, CR5000, and CR200 are programmed using CRBasic instead of Edlog. Still a structured language, CRBasic is easier to learn and remember for the occasional user because of its similarity to other BASIC computer languages. Future datalogger models will use the architecture of the CR9000, CR5000, and CR200 as a platform in a similar way that the CR7 architecture is now used in the CR10X, CR23X, and CR510.

To extend the useful life of our products and allow datalogger networks to expand, we have invested in the development of network communications software and peripherals that support several different models. For example, a CR23X and CR5000 can be used in the same LoggerNet network with similar communication peripherals. A CR205 can be networked to a CR10X with an RF400 local radio link. The RF400 and CR205 are new products with the most recent RF communications technology, while the CR10X has been available since 1996.

In planning our product strategy, we strive to balance the considerations of backward compatibility with potential improvements offered through advances in technology. I hope that this balanced approach gives you a long product life with your investment in Campbell Scientific equipment while keeping you current with the advances of technology.

TDRSDK Software Development Kit available

TDRSDK Software Development Kit allows software developers to create custom applications for the TDR100 Time Domain Reflectometer. The kit consists of a DLL (Dynamically Linked Library) file that gives developers access to the entire TDR100 command set to customize and simplify the user-interface for the TDR100. RS-232 serial communications with the TDR100 is supported at 9.6, 19.2, or 57.6 kbps. The TDR100COM.DLL runs on Windows® 95, 98, NT, 2000 or XP. Supported languages are C++, Pascal, and Visual Basic®. Code written using Visual Basic in Microsoft Excel allows access to all Excel functions and graphing. Simple example programs are provided in each of the supported languages.

Airlink's Redwing CDMA added to list of cellular choices

The cellular modems offered in our price lists include AirLink's CDPD and CDMA; we no longer offer an analog cellular telephone package. The AirLink Redwing CDMA is a full-duplex digital cellular modem. Communication between your computer's modem and the Redwing CDMA uses a Verizon Wireless CDMA network and the public switched telephone network.

Data is transmitted at rates up to 14.4 kbps (three times that of the COM100) and is billed based on airtime. The Redwing CDMA has a typical current drain of 120 mA at 12 volts while transmitting or receiving and 20 mA during a dormant connection (idle for 10 to 20 seconds).

The Redwing CDMA is a full duplex digital cellular modem.

Prior to purchase, contact your local cellular provider to verify that CDMA coverage is available for your datalogger site and will be available for the duration of your project. Use with other CDMA providers may be possible; contact Campbell Scientific for details.

Price lists for 2004 are now available

Our US and International price lists for 2004 are available, effective 1 January 2004. You can receive our price lists via email, fax, or by contacting one of our applications engineers. Many prices did not change. However, for the first time in several years, some of our datalogger prices have increased.

Price changes are primarily due to changes in the manufacturing process and cost of parts. Our price lists will periodically incorporate new products. To review changes, visit www.campbellsci.com/new.html

RTMCRT, Baler now standalone clients for LoggerNet Server

Real Time Monitoring and Control Software (RTMC) is included in our LoggerNet Software Support Package. RTMC consists of two components: Developer and Run-Time. RTMC Developer is used to create simple or sophisticated graphical data displays. RTMCRT displays the forms created with the RTMC Developer. We also offer RTMCRT as a standalone client application for the LoggerNet Server.

As LoggerNet collects data from the dataloggers, the displays in RTMCRT are automatically updated. LoggerNet can run on one PC while additional licensed copies of RTMCRT installed on remotely connected PCs display data or provide datalogger control as enabled by the RTMC form.

Baler, a new LoggerNet client, extracts data from the LoggerNet Server Cache and creates a data file on your remote PC. This enables multiple users (with PCs running Baler) to access the LoggerNet Server and individually create data files from the server cache.

RTMCRT and Baler join other standalone client software, including RTDM, the DataFiler in LoggerNetData, CSI OPC Server, and RTMC Web Server to take advantage of the distributed data capability in the server that is the core of LoggerNet.

Campbell Scientific Brazil sees growth

Business is going well for our Brazilian affiliates. Campbell Scientific do Brazil (CSB) has been an affiliate of Campbell Scientific since 1999. To support an influx of new customers, CSB has improved their internet access, hired several new employees, and moved into a new three-story building. The new building provides more office space, conference rooms, and training rooms. Also, a satellite office in Northern Brazil has been added to support the numerous customers in that region.

CAMPBELL SCIENTIFIC BRAZIL
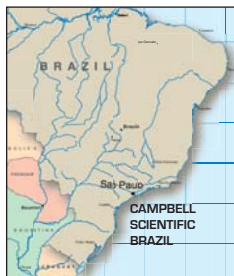
This three-story building located in Sao Paulo serves as the new home to Campbell Scientific do Brazil. A satellite office in Northern Brazil has also been opened to better serve customers.

SC-IRDA: Get the data, leave the enclosure shut

Infrared interface supports communication between Palm-based PDAs and dataloggers

The SC-IRDA Infrared Communications Interface supports communication between a Palm OS-based PDA and a Campbell Scientific datalogger. The SC-IRDA facilitates data transfer without having to open the enclosure door.

The SC-IRDA conforms to the IRDA low power SIR specification supported by most laptops and Palm PDAs. Its operating temperature range is -40° to 80°C.

The SC-IRDA also supports the SDC protocol (part of the standard operating system in CR510, CR10X and CR23X) allowing the CS I/O port to be shared with modems.

An ice-encrusted enclosure in the Catalan Region of Spain can yield data on-site without opening the enclosure door—if the SC-IRDA is installed.

SC-IRDA also supports the SDC protocol, so the CS I/O port can be shared with modems.

Requirements include PConnect Software (version 2.1 or greater) and a Palm OS-based PDA with Infrared capability. The CR9000 and the CR200-series dataloggers are not supported.

PConnect 3.0 adds support for PakBus

Our latest version of datalogger support software for Palm® devices is PConnect 3.0. PConnect 3.0 adds support for our PakBus dataloggers—the CR10X-PB, CR510-PB, CR23X-PB, and CR200-series dataloggers. To support this, we now provide a PDA-to-datalogger connector and an RS-232 connector with PConnect.

PConnect 3.0 runs on PDAs with Palm-based operating systems 3.3 or greater. It can be used to view measurements, collect data, set the datalogger's clock, and transfer/retrieve datalogger programs. There is also a utility to view the collected data file. When the Palm device is synchronized with a computer, the collected data is transferred and saved in an ASCII comma delimited format.

PConnect 3.0 will be available first quarter, 2004. Users of PConnect version 2.1 or earlier may purchase an upgrade.

The SC105 can also be used as an addressable interface to a serial printer.

GPS16-HVS: Low-cost, compact GPS receiver

The GPS16-HVS Global Positioning Satellite (GPS) receiver has replaced the SV8PLUS on our price lists. The GPS16-HVS is a differential ready (RTCM), WAAS-enabled, 12 channel GPS receiver manufactured by Garmin International Inc. Campbell Scientific configures the receiver to output the NMEA GPGGA string at 1200 baud (default) for direct connection to the CR10X datalogger using direct serial data input through control ports. The receiver can be reconfigured to support higher data collection rates in the CR23X, CR5000, CR9000, or SDM-SIO4 using the 17218 adapter and a computer. The GPVTG and other NMEA output strings can also be enabled to output additional information such as velocity.

The GPS16-HVS comes configured for direct connection to the CR10X, but can be reconfigured to support higher data collection rates.

The GPS16-HVS receiver and antenna are packaged within the same case. The sensor's power and communication cable terminates in an RJ45 connector. Several adapters and cables are available to interface between the sensor cable's RJ45 connector and a PC, SDM-SIO4, or datalogger. See our product literature and manual for details. An optional magnetic mounting base is also available.

SC105 links DCEs to our dataloggers

The SC105 supports communication between a datalogger and an RS-232 DCE device. It can also be used as an addressable interface to a serial printer. The SC105 allows DCE devices such as short haul modems, cellular modems, and spread spectrum radios to communicate with our dataloggers at rates up to 115.2 kbps. The SC105's internal buffering capability ensures no data is lost during transmission and allows each side to operate at different baud rates. Design features include support for concurrent use of the logger's CS I/O port (CSDC), programmable DTR and RTS control, and a current drain of 0.16 mA at standby and 2 to 5 mA while communicating.

New power supplies create more customer options

We have redesigned our power supply products to increase flexibility for our customers. The PS12LA, CH12R, PS512M, and CH512R have been replaced with new modular components, the PS100, CH100, A100, and A105.

Like the PS12LA, the PS100 offers a 12 Vdc, 7 Ahr power supply that can be recharged by solar panel or ac transformer. The CH100 supplants the CH12R in applications where a regulated charging source is needed for a user-supplied battery.

When compared with the PS12LA, the PS100 has a smaller footprint and provides a power switch and LEDs that are accessible without removing the lid. Both the PS100 and CH100 offer additional surge protection and charging levels that are more accurately regulated.

The A100 and A105 adapters connect to either the PS100 or CH100 power supplies. The A100 adds a null modem port; the A105 adapter, a new concept in our product line, increases the number of 12 V and ground terminals.

Larger Battery Offered for CR200-series Dataloggers

For our CR200-series dataloggers, the 17365 12 Vdc, 7 Ahr rechargeable battery is a larger-capacity power supply option. The 17365 connects directly to the terminal strip of the CR200-series dataloggers. The 17365 does not fit inside the ENC200 enclosure. A mounting base is included for use inside an ENC 10/12, ENC 12/14, or ENC 16/18 enclosure.

The PS100 is a 12 Vdc, 7 Ahr power supply that can be recharged by solar panel or ac transformer.

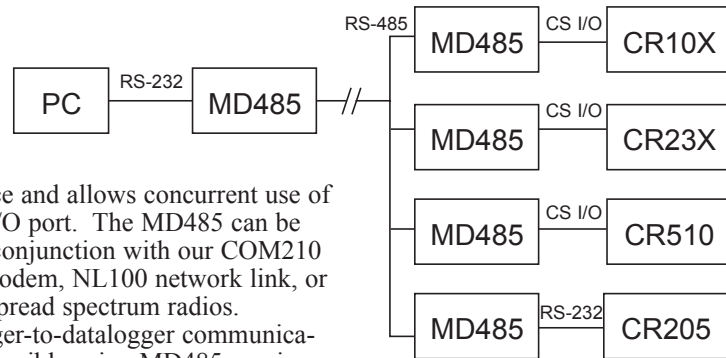# MD485 RS-485 Multidrop Interface: two ports at once

Use it in conjunction with our COM210, NL100 or RF400s

The MD485 RS-485 Multidrop Interface is replacing our MD9 Multidrop Interface. The MD485 is an intelligent RS-485 interface that is configurable to use any two of its three communication ports (RS-485, RS-232 and CS I/O) at a time. The MD485 device's primary function is to provide a connection to an RS-485 network using CS I/O or RS-232 ports. It can also provide an RS-232 connection to a datalogger's CS I/O port (CSDC or ME).
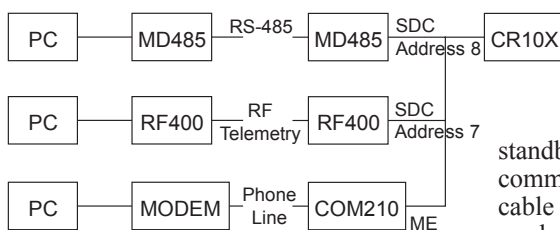
The MD485 is easily configured to handle multiple RS-485 protocols and all CSI communication modes. It can be set up to provide PakBus™ networking, MD9 emulation or transparent communication. PakBus networking incorporates collision
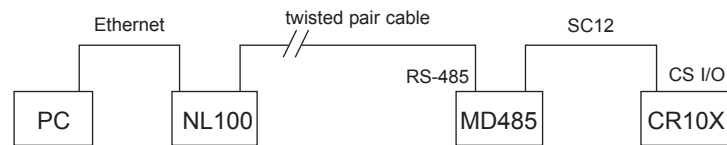
The system above uses an Ethernet link to increase the distance between the PC and datalogger.

avoidance and allows concurrent use of the CS I/O port. The MD485 can be used in conjunction with our COM210 phone modem, NL100 network link, or RF400 spread spectrum radios. Datalogger-to-datalogger communication is possible using MD485s, as is callback from a remote datalogger.

Connection between RS-485 links is made with inexpensive twisted pair cable. The MD485 communicates at 1200 bps to 115.2 kbps. It has a current drain of 1.4 mA in standby mode and 2 to 7 mA when communicating. Up to 4000 feet of cable can be run in an MD485 network.

The system on the left shows multiple communication devices sharing the CS I/O port.
*The system above is a multidrop system.*

Although the MD485s cannot be added to existing MD9 networks, the MD9 and accessories will continue to be available for our customers who have these systems.

CR9000X
Continued from Page 1

measurements of battery posts and alternator brushes. The CR9058E is based on a programmable DSP that implements a fifth-order sync filter. This reduces signal noise, eliminating the need for third-party filter devices.

We are developing a new Anti-Alias Filter and Spectrum Analyzer Module based on the existing CR9052 electronics and a new excitation daughter board. The CR9052IEPE provides excitation and signal conditioning for IEPE-type (Integral Electronic Piezo Electric) accelerometers, microphones, and pressure transducers. The CR9052DC offered DC excitation only, although it was designed to accept daughter boards for different excitation options. An existing CR9052DC can be converted to a CR9052IEPE by ordering a conversion kit that includes a cover
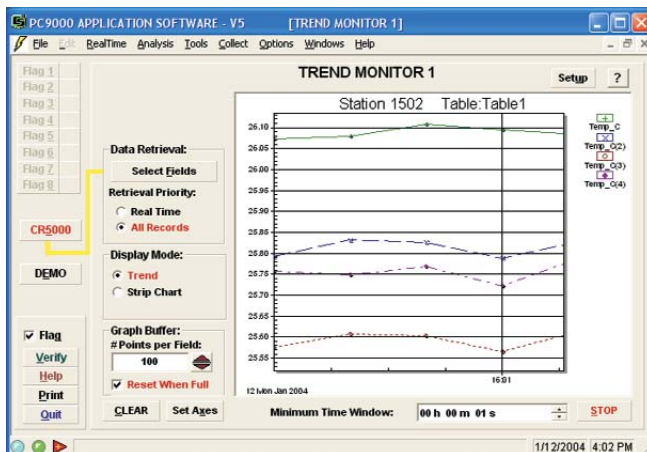
PC9000 is versatile, easy-to-use software. Version 5.0 will support existing CR9000 hardware and the new CR9000X hardware.

fitted with BNC connectors. With the removal of a few screws, the user can swap back and forth between the DC and IEPE excitation boards.

The CR9058E and CR9052IEPE can be used with previously purchased modules in either a CR9000 or CR9000X system. *Please refer to our product literature for specifications on all of our available CR9000 modules.*

Software

PC9000 version 5.0 will support the new CR9000X hardware. PC9000's communications, program generation, and real-time windows have been enhanced. In fact, most real-time windows have updated controls and high-performance graphics.

We offer LoggerNetSDK for customers who need to program a custom interface to our dataloggers. Multiple connections, networking capability, and telecommunications functions are supported in the LoggerNetSDK tool set.

Gill WindSonic: No moving parts make anemometer easy to maintain

The WindSonic, manufactured by Gill Instruments Ltd., is a two-dimensional ultrasonic anemometer for measuring wind speed and direction.

The WindSonic is an alternative to traditional mechanical cup and vane or propeller and vane anemometers. Unlike mechanical anemometers, there are no moving parts to be replaced periodically, minimizing routine maintenance. The minimum detectable wind speed is 0.01 meters per second.

The WindSonic easily interfaces to a Campbell Scientific datalogger through a control port, +12 Vdc, and ground. Current drain is 40 mA continuous. The SDI-12 instruction is used to collect data from the WindSonic; up to 10 WindSonics can be connected to one datalogger control port.

The Gill WindSonic is a two-dimensional ultrasonic anemometer.

CAMPBELL SCIENTIFIC CALENDAR

Date	Event	Location
February		
4-6	Fish Farming Trade Show	Greenville, MS
12-14	Golf Course Superintendents Assoc.	San Diego, CA
24-27	Utah Rural Water Assoc. Conf. & Expo	St. George, UT
26	USCID Workshop/Exhibit	Scottsdale, AZ
March		
1-5	Aquaculture America 2004	Honolulu, HI
8-11	SAE International Expo	Detroit, MI
April		
19-22	Western Snow Conference	Richmond, BC Canada
June		
14-16	International Bridge Conference	Pittsburgh, PA
15-17	Hydrologic Instrumentation and Data	Raleigh, NC
22-25	Air and Waste Management Association	Indianapolis, IN
July		
22-25	Recirculating Aquaculture	Roanoke, VA
26-29	StormCon	Palm Desert, CA
August		
1-6	Ecological Society of America	Portland, OR

visit our web site for additional listings and training class schedules

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