



**CAMPBELL
SCIENTIFIC**
Australia, Pty Ltd

Issue 28
Mar - May
2010

ONLINE



Loggernet Database Software

Solar Schools - Townsville State High

CSA Touches Base in South East Asia

CRBasic Editor Syntax Highlighting

Making a Custom Data Logger Webpage

Avoiding Loggernet and Device Conflicts

www.campbellsci.com.au
16 Somer Street Hyde Park QLD 4812
tel +61 7 4772 0444 fax +61 7 4772 0555

A Busy Start to the Year

It's been a busy beginning to the year with Simon and Steve taking off to Asia to touch base with our distributors while Gavin and Jeeva hosted a full capacity training course on the Gold Coast in February. Dave Boadle attended the Ozflux eddy covariance training and information week at Creswick around the same time and Simon has only just returned from a week's training with HydroTas in, you guessed it, Hobart.

The rest of the year has Steve and Dave travelling to Borneo, exhibiting and attending at the Asia 2010 conference in Kuching - Sarawak, a team attending and exhibiting at the Clean Energy Conference in Adelaide, Irrigation 2010 in Sydney, Enviro 2010 in Melbourne, back to Sydney for Ecogen 2010 and then, to finish off the year, the Australian Hydrographers Association Conference in WA. We look forward to seeing you at one or many of these events throughout 2010. More information is available by clicking the links below.

| Tradeshow / Conference | Location | Dates | Venue |
|--|------------------|-----------------|--|
| Asia 2010 | Sarawak Malaysia | March 29-30 | Borneo Convention Centre Kuching |
| <i>International Conference & Exhibition on Water Resources and Renewable Energy Development in Asia</i> | | | |
| Clean Energy Conference | Adelaide | May 3 - 5 | Adelaide Convention Centre |
| <i>2010 National Clean Energy Conference & Exhibition</i> | | | |
| Irrigation 2010 | Sydney | June 8 - 10 | Sydney Convention and Exhibition Centre |
| <i>Irrigation Australia 2010 Trade Fair</i> | | | |
| Enviro 2010 | Melbourne | July 21 - 23 | Melbourne Convention & Exhibition Centre |
| <i>Enviro 2010 Conference & Exhibition - Solutions for a Sustainable Future</i> | | | |
| Ecogen 2010 | Sydney | September 5 - 8 | Sydney Convention and Exhibition Centre |
| <i>Ecogen 2010 - The Power to Deliver ~ Uniting the Clean Energy Industry</i> | | | |
| AHA 2010 | Perth | October 19 - 21 | Burswood Entertainment Complex Perth |
| <i>Australian Hydrographers Association Conference 2010</i> | | | |

Ozflux - Creswick Campus

The Practical Side of Managing an Eddy Covariance Station by Dave Boadle

First week of February, the Ozflux group ran a training and information course at the Creswick campus of Melbourne University aimed at the practical side of managing an Eddy Covariance flux station. The first day was dedicated to basic boundary layer micro-meteorology theory and the soil-plant-atmosphere continuum. Subjects covered included fluxes of water, carbon and energy in these systems. Some of the ancillary measurements covered included leaf area index, allometry and sapflow and their importance to the whole energy balance was outlined.



Figure 2: Lindsay Hutley explaining some of the finer points of flux stations



Figure 1 A well guyed flux tower

The next day was more in the eddy covariance theme. Firstly basic eddy flux theory was covered with essential concepts such as atmospheric structure, stability and turbulence covered along with airflow in complex terrain and nocturnal fluxes, followed by instrumentation. The Campbell Scientific equipment, the CR3000 in particular, was well praised for its reliability and low power use. Many people asked about the new CS150 combined 3D anemometer and Infrared gas analyser.

Wednesday gave us the opportunity to see a new flux station functioning in the Wombat State Forest close-by to Creswick. This site not only had a functioning Campbell's eddy covariance system but also a soil gas exchange monitoring system. The safety aspect was emphasized in this part of the course, after which the participants returned for some practical exercises in data handling and gapfilling.

The week was informative and extremely useful for potential flux system managers and support people. Many thanks to the Ozflux community for the opportunity to attain some of their vast store of knowledge and experience.

new faces

Last year saw CSA lose three of our top sales and technical support people. Jason Gunders left to start his own business, Gavin Shaw has moved to our R&D department, and Corinne Malot had a second child and is now going to spend some time being a full-time mum.

It has been hard on our remaining sales and tech support AE's to carry the workload. We greatly appreciate the wonderful effort put in by Simon Leeds, Dave Boadle, Gavin Feather and Jeeva Prakasan who have been burning the midnight oil trying to keep up. *But help is on the way.*

Geoff Melville joined our ranks in November 2009 and after an intensive training period, is now putting his shoulder to the wheel and gradually supporting his own clients.

Geoff has a Graduate Diploma in Education and a Bachelor of Electrical and Electronic Engineering. With work experience in the hospitality industry in Thredbo, Melbourne, Townsville and Cairns, Geoff also had a stint at secondary school teaching at the Ryan Catholic College in Townsville and the Marist College in Emerald. Geoff came to CSA's attention while working at an electrical wholesalers in Townsville. His recreational activities include acoustic /classical guitar, most sports (especially those involving snow and water), and outdoor sports such as camping, hiking and fishing. Geoff's strong people skills and desire to please the customer will no doubt make him popular with our clients.



Our most recent female AE appointee not only comes highly qualified, but is also a real-life action woman. Having been raised in the UK, **Sue-Ann Watson** has completed a B.SC (Hons) Biology, an M.Sc. in Oceanography and a Ph.D. in Marine Biology.



At various stages throughout her studies, Sue-Ann has worked as an animal keeper at Woburn Safari park, a television researcher for the BBC Natural History Unit and a research assistant for the National Oceanography Centre. Additional exciting expeditions in which Sue-Ann has participated include fieldwork at the Rothera Research Station where

she did Antarctic scuba diving, deep ocean sampling aboard a trawler around the Crozet Islands, and as a volunteer on a six-week conservation project in South-East Sulawesi, Indonesia. Sue Ann is a certified PADI Divemaster, a competition winning snow skier, and also a NQ wildlife carer.

Sue-Ann's British heritage adds to CSA's already eclectic mix of Samoan, Chinese, Zimbabwean, Indian and Australian nationals.

Also joining our AE support / sales team is **Gavin Hewitt**. Gavin studied a dual degree of Bachelor Science and Secondary Education where his studies in science focused primarily on zoological and ecological sciences as well as chemistry.



During his years of study, Gavin was exposed to many different applications of sensors and probes, which sparked his interest in how they work and what they can be used for.

Gavin has a passion for all things science-related as well as for helping people – both essential attributes for a great AE. Outside of work, Gavin is a keen fisherman who also enjoys bushwalking, hiking and water skiing. Prior to joining CSA, Gavin was employed by the Queensland Department of Education as a supply teacher, on call to fill in daily at the many high schools in Townsville.

Gavin believes that his new position at CSA will give him the means to help people match their needs to a product, and in turn to play his part in making a positive difference in the world.

Sue-Ann and Gavin started with CSA on the same day and are undergoing intensive training together. If the first few weeks are any indication, they will both be valuable assets to our sales and support team.

Congratulations are in order to Corinne and Patrick (right) on the birth of Narrah, brother to Elann and very welcome addition to the Malot family. Corinne had been with us at Campbell Scientific for over five years and we wish her all the best in her new role as full-time mother.



case studies

CSA's WeatherHawk Assists in Townsville State High School's Renewable Energies Program.

Townsville State High School (T.S.H.S.) undertook to focus on renewable energy technologies from 2002. The initial phase was the installation of 23 solar panels on the roof of A Block in 2003. These produce electrical energy for the school, and any excess energy is fed into the Ergon Grid.

By November 2006 a stand-alone hybrid Remote Area Power System (RAPS) had been installed at the front of the School and made operational. (See Figure 1). This technology is highly visible, comprising a Solar Array Pyramid capturing the sun's energy, a 6 metre tower supporting a Ropatec Wind Turbine and Generator and a fully automated WeatherHawk wireless weather station. The electrical energy produced from the sun and wind can now power the lighting and appliances use in a nearby classroom.



Figure 1: View of the front of T.S.H.S. featuring the RAPS, Wind Turbine and Generator

After assessing the site and requirements for the Weather station at Townsville State High School, C.S.A. provided a WeatherHawk weather station that was positioned on top of the School's Library roof and attached to a C.S.A. custom-built mast. (See Figure 2). The unit is powered by an Integrated Lead-Acid GelCel Battery, charged by a 5W Solar Panel that is also mounted to the mast. A built-in 922 MHz spread spectrum radio provides wireless communications to the school's IT centre.

The WeatherHawk weather station measures Air Temperature, Relative Humidity, Barometric Pressure, Solar Radiation, Rainfall, Wind Speed and Wind Direction. The data collected is transmitted via the built-in radio to a PC, which uses the Virtual Weather software package designed specifically for the WeatherHawk to display this information on the school's website. (See Figure 3.)

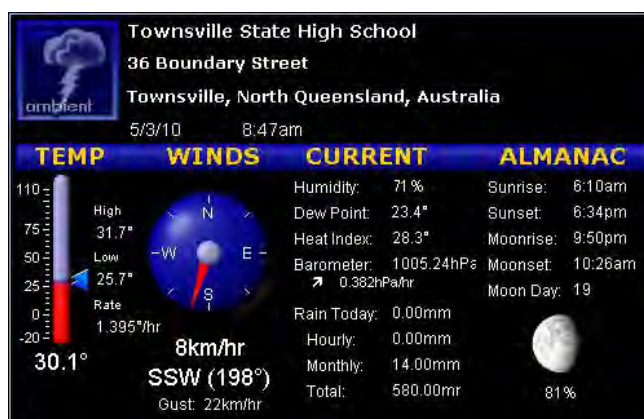
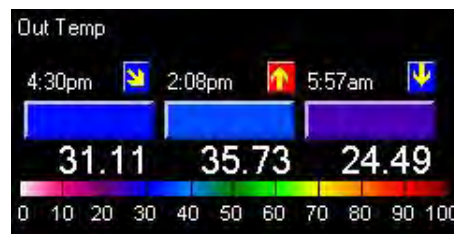


Figure 2: T.S.H.S. WeatherHawk mounted on the Library Roof.

This simple, easy to install software application enables the T.S.H.S. WeatherHawk weather station to monitor, archive, manage and display the weather sensor measurements, and post the weather station data as images on the school

website. It is also capable of automatically exporting data from the school's computer to several weather service websites by registering with them as a data contributor. Registration with those third party weather service sites is typically at no cost and allows the user to obtain a forecast for their location on the respective weather service website using an internet browser.

Figure 3: Screen Shots taken directly from TSHS Website.



WeatherHawk data is automatically formatted for transmission to the GLOBE program. GLOBE is an international exchange of weather knowledge that brings together the children of more than one hundred countries.

The WeatherHawk fully automated weather station provides a vital addition to Townsville State High School's Renewable Energies Program and is available with a variety of options from Campbell Scientific Australia.

National Solar Schools Program

The National Solar Schools Program will help Australian schools take practical action to tackle climate change by offering grants of up to \$50 000 (GST exclusive) to install solar power systems, rainwater tanks and a range of renewable energy and energy efficiency measures. Schools will be able to improve their energy and water efficiency as well as reduce their ongoing energy costs. In particular, for schools with a mains power supply, surplus electricity generated by solar power systems on weekends and during school holidays may be able to be sold back to the electricity grid for extra electricity and greenhouse savings.

For more information contact:

National Solar Schools Team
Department of the Environment, Water, Heritage and the Arts
GPO Box 787 Canberra ACT 2601
Phone: 1800 703 831
Email: nationalsolarschools@environment.gov.au
Website: www.environment.gov.au/nationalsolarschools

out and about

CSA Touches Base with South East Asian Distributors & Clients

In late January, Simon and Steve embarked on a marketing trip to visit CSA's distributors in Thailand, Vietnam and Malaysia. The main reason of the visit was for Simon to conduct a three day training course in each country for the distributors and their key clients while Steve discussed marketing issues with the principals. With a total of 12 days for the trip, it was going to be a whirlwind tour.

The guys flew from Townsville to Bangkok on Sunday, arriving at their hotel around 8PM. The Bangkok training course commenced on Monday with a total of eight participants from our Thai distributor (STS Instruments Company and STS Green Co Ltd), together with some clients from EGAT. The venue was the beautiful old Elizabeth Hotel in Bangkok and the lunchtime buffet complete with karaoke was a new experience for Simon and Steve.

Steve enjoyed a visit to the STS Green offices in Pathumthani with STS General Manager Mr Chayuth Songaipool and the manager of the Instrumentation Division, Mr Anan Orprayoon. The boys did manage a little sightseeing on two evenings, visiting the Baiyoke Tower and the Sukhumvit night markets. Special thanks to Mr Anan Orprayoon for being an excellent host and for preparing the training venue so well. The training course was completed on Wednesday afternoon and the boys flew to Hanoi that evening.

Simon spent the next three days training six employees from Hymetco together with our good friend Mr Quang from Geotech International. Steve spent the best part of a day with Marshall Silver from Geotech International and assisted Simon with training when he could. A special thanks to Dr Marshall Silver, Mrs Ha Thi Thuan and Mr Nguyen Dinh Ca for some wonderful Vietnamese eating experiences, although snails and dog meat were not amongst our favourites. The traffic in Hanoi was something that has to be seen to be believed. It's amazing to see how such bedlam just works – with no one getting angry or upset. It says a lot for the patience of the Vietnamese people and I'm sure that the Western world could learn a lot from their respect for others. The last day of our Vietnamese training course finished on Saturday lunch time after which everyone met for a celebratory lunch.



Sunday was spent flying to Kuala Lumpur where the guys were booked into the magnificent Sunways Lagoon resort.



Simon again spent the next three days running a training course for staff from the various IEI companies together with key clients from MPOB and MARDI. Our good friend Seeva made sure we were not bored by taking us to see the magnificent Petronas twin towers at night as well as to some excellent local eateries. Many thanks to Seeva, Fadzli and Selva for their generous hospitality and assistance during the visit. A quick flight to Singapore Wednesday night and a meeting the next day with the guys from Greenspan technical Services wrapped up the tour before an overnight flight back to Australia.

Simon did a marathon effort of running three training courses in the space of ten days and the course participants did an equally fantastic job of understanding his Australian accent. We met some wonderful customers and strengthened some long-standing friendships during the visit. The trip was a resounding success in terms of marketing and training and we hope that this will be the start of regular bi-annual marketing trips to the SE Asian region.



CLEAN ENERGY SE ASIA SNAPSHOT

South East Asia boasts a GDP of around \$800 billion with a total population of around 550 million. Hydro, biomass and geo-thermal power, solar and wind are being increasingly considered as renewable energies gain momentum.

Thailand is looking to increase renewable energy usage from 8-12% resulting in total emissions savings of around a million tons of CO2 per year. The Thai Board of Industry is promoting renewable energy investment and has instituted a tax exemption for raw materials used in solar cell production. The estimated Thai environmental technology market is around \$2 billion per year.

Vietnam's rapid growth has created some challenging environmental issues. In response, coastal areas with strong winds will be developed with renewable energy systems, rural areas are implementing solar options and the use of biogas is being encouraged for cooking purposes.

Malaysia has a goal to create world class environmental practices by 2020 and offer attractive import duty exemptions and sales tax breaks. The government also provides a 100% investment tax allowance for RE projects.

new products

LNDB – Loggernet DataBase Software

When it comes to data management and the ability to generate reports or web-based views of data sets, the power of databases is invaluable.

For a long time, users with large monitoring networks have made use of databases to store and manage their most valuable resource – the data.

Getting data from devices in the field into a database has always been a significant task and there are companies who exist with this as their primary business. Until recently, data from Campbell Scientific data loggers had to be imported into databases by using custom-written scripts that moved the data files that had been collected by Loggernet or delivered using some internet protocol such as FTP.

The initial release of LNDB (Loggernet DataBase Software) makes importing data from the Loggernet server into a database a far simpler operation and it means that you don't have to be a whiz kid with a degree in IT to be able to make use of the power of a database for data management.

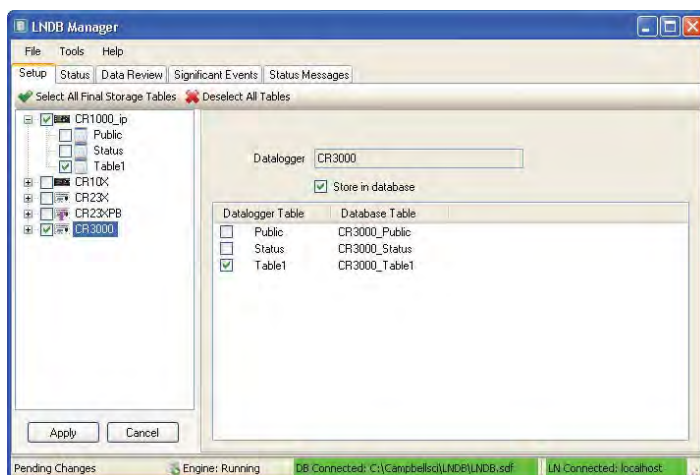
There are two main components in LNDB v1.0: LNDB Manager and LNDB Engine.

LNDB Manager is used to select the datalogger tables for which data will be stored in the database. It also provides tools to monitor the LNDB Engine and to review the database data.

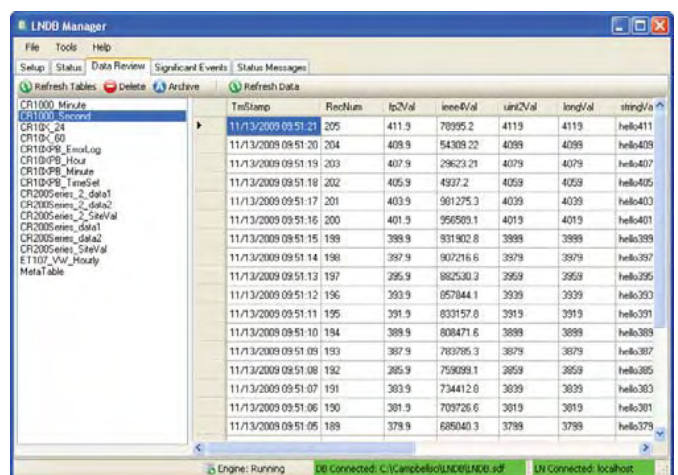
LNDB Engine performs the insertion of data from the Loggernet Server data cache into the database.

LNDB operates as a service under Windows XP, Vista or Windows 7 and has been tested to work successfully with:

- Microsoft® SQL Server® 2005 Express
- Microsoft® SQL Server® 2008 Express
- Microsoft® SQL Server® Compact 3.5
- MySQL 5.0 and 5.1 (with the MySQL 3.51.27 or 5.1.6 ODBC database driver); earlier versions of 5.x ODBC database drivers are not compatible with LNDB.



When a station is highlighted in the left tree, the station setup screen is shown. On the station setup screen, tables can be enabled/disabled for storage.



The Data Review tab shows tables and data from the database. When a table on the left side is selected, the data for the table is shown on the right side.

LNDB is a product that has a number of future developments in the pipeline including an import facility to import data from a data file (not the Loggernet Data cache) into the database, an export facility to generate a data file in one of the standard CS formats from the data in the data base and some CS-based report facilities. As with all CS software, purchasing a version of LNDB entitles you to free upgrades within the same major version number.

[Contact one of the technical sales team](#) for more information and pricing on LNDB.

Making a Custom Web Page

The new generation of dataloggers have the ability to host a web page over an IP connection. This connection can be over a cell phone modem or an ethernet connection using an NL115. By default the datalogger will host a basic web page with links to the historical data stored on the logger and the station status table. This web page can be replaced with a user defined web page in the datalogger programming.

Example Web Page Code

```
Public PTemp, batt_volt
Public Commands As String * 100
Dim i

DataTable (Test,1,-1)
    DataInterval (0,15,Sec,10)
    Minimum (1,batt_volt,FP2,0,False)
    Sample (1,PTemp,FP2)
EndTable

WebPageBegin ("default.html",Commands)
    HTTPOut("<img src='\"cpu/csa_logo.jpg\"' />")
    HTTPOut("<p>Welcome to the CSA datalogger!</p>")
    HTTPOut("<p>Battery Voltage: " + batt_volt + "</p>")
    HTTPOut("<p>Watchdogs: " + Status.WatchdogErrors(1,1) + "</p>")
    HTTPOut("Last ten records from test table:<br/>")
    For i = 1 To 10
        Dim lastrecord_string As String * 256
        GetRecord (lastrecord_string,Test,i)
        HTTPOut(lastrecord_string + "<br/>")
    Next i
WebPageEnd

BeginProg
    Scan (1,Sec,0,0)
        PanelTemp (PTemp,250)
        Battery (batt_volt)
        CallTable Test
    NextScan
EndProg
```

The example code above creates a web page called default.html (this will overwrite the CR1000 default web page) which displays the following on separate lines;

- "" - An html tag has been used to insert a company logo stored on the datalogger CPU drive.
- "<p>Battery Voltage: " + batt_volt + "</p>" - The logger battery voltage has been added onto the end of a paragraph of text (<p></p> tags).
- "<p>Watchdogs: " + Status.WatchdogErrors(1,1) + "</p>" - The number of watchdog errors has also been added on to the end of a paragraph. This time the value has come from the status table (this syntax can be used to access any status table value, refer to Tablename.FieldName in the CRBasic help for more information).
- lastrecord_string + "
" - The last ten records in the Test table are displayed one after the other using a "for loop" to avoid writing ten lines of code. All CRBasic programming functions, such as for and while loops) are available between **WebPageBegin** and **WebPageEnd**. The **GetRecord** instruction pulls data from a specified number of records back from a datatable and creates a string from that data. For example: "2010-02-25 09:31:00",0,11.87,28.14

tech tip cont.

Datalogger Instructions

The following instructions can be used in your datalogger code to change the default web page:

| | |
|-------------------------------------|---|
| WebPageBegin() ... WebPageEnd | These two instructions begin and end a web page section. Multiple sets of instructions can be used to add more than one web page to the datalogger. |
| HTTPOut() | This instruction is used inside a web page section (defined by the instructions above) to output HTML code to the web page. |

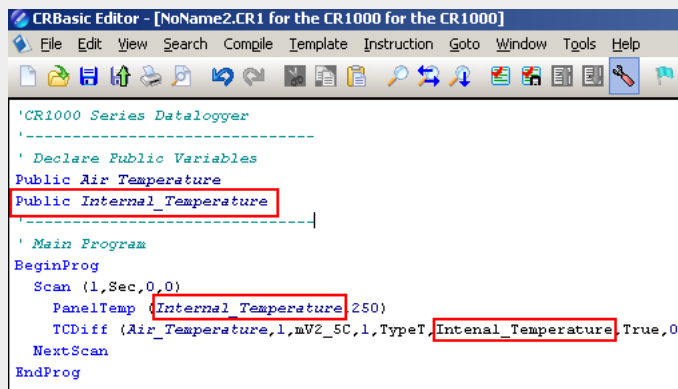
Basic HTML Code

HTML is the programming language of web pages. It is a set of rules for defining how to layout a web page in the same way that CRBasic is a set of rules for how define a dataloggers operation. HTML is organised into many “tags” which can be used to surround areas of text. Below are some good tags to start with, for more information on HTML tags see:

<http://www.w3schools.com/html/>

| | |
|---------------|--|
| <p></p> | Text between these tags forms a paragraph. It will be separated from surrounding text by a line break and spacing. |
| | This tag inserts a line break wherever it is inserted. |
| | This tag inserts a picture into a web page from the specified source location. This location can be a relative path from the html file (the web page) or a absolute path such as http://www.google.com/logo.gif |

Loggernet 4.0 – CRBasic Editor Syntax Highlighting



The CRBasic Editor has always offered syntax highlighting as a way to identify different data types and keywords. The new version of CRBasic editor offers an option to have syntax highlighting to identify variable names declared by the user. In the screenshot below, the variable Internal Temperature is declared and is misspelled in the TCDiff() instruction. The syntax highlighting indicates the variable names in Italics when the spelling matches the declared variable name. The TCDiff instruction (where the variable name is misspelled) is not highlighted in Italics, giving an immediate indication as to the error.

Avoiding Loggernet and Device Configuration Utility Conflicts

Users of Loggernet may have encountered situations where their PC hardware (such as a COM port) remains tied up by the Loggernet server due to particular settings in the Setup screen. In some cases, this causes Device Configuration Utility software to be unable to use that hardware until Loggernet is closed.

Loggernet 4.0 offers the ability for Device Configuration Utility software to communicate as a client to the Loggernet server so that the PC hardware can be shared. When the Device Configuration Utility application is started and an attempt to connect is done, a login is displayed to allow the application to connect to the Loggernet server and control it such that the hardware can be released temporarily.

This allows both applications to work in harmony and avoids frustrating and time-consuming delays when connecting to Campbell Scientific hardware devices.

