

# Online

Campbell Scientific Australia  
Issue 13 - Autumn 2006

## LAST CHANCE TO WIN AN iPod !! Competition Closes 30th June

It's almost time to draw the winner of our CSA Customer Satisfaction Survey, so get your surveys in. You only have until the end of June!

It's so easy to be in the draw - all you have to do is tell us what you think of our products and services! Simply go to <http://www.campbellsci.com.au/surveystart> and , download the form from our website, fill it out (don't forget a name and point of contact so we can contact you if you win) and send it back to us here at [survey@campbellsci.com.au](mailto:survey@campbellsci.com.au). Every entry gets the chance to win an Apple iPod (valued at \$499) with a massive 30Gb memory, 2.5 inch screen and 14 hours playback time - why not take a minute to enter? We have had some great feedback so far and as a result we've already started implementing new processes to ensure we are meeting your needs as best we can. Look out for more changes in the coming months and keep sending in your surveys. Who knows— YOU could be our lucky winner!

**DON'T FORGET COMPETITION CLOSING JUNE 30th -**



### In This Issue

#### 2. Featured Product

Choosing Your Weather station

#### 3. Software & Design

VisualWeather 2.0

Wind Energy Short Cut

#### 4. CSA Tech Talk

Using SDI12 Sensors

#### 5. CSA Station Wiring

Making it Easy for You

Shipping & Delivery Times

#### 6. What's New At CSA

Spotlight On....

## TRAINING UPDATE

### NEW COURSES ANNOUNCED FOR CR1000/CRBasic & CR10X/EdLog

**One off discount price for Townsville training course!**

After the success of our last training course held in Sydney earlier this year- CSA is pleased to announce that we have two new courses scheduled this year for our CR1000 & CR10X data loggers.

As a special treat for our customers, we are offering a one off price for the Townsville course - only \$450.00-exGST. **That is almost a 50% discount on our regular capital city courses - plus you get the added benefit of visiting one of Queensland's best tourist destinations!** Why not stay a few extra days, visit Magnetic Island, dive the Great Barrier Reef and just relax! For more info on Townsville and it's surrounds visit <http://www.townsvilleholidays.info/>

The CR1000 course is suitable for all CRBasic loggers including the CR2xx series, CR3000 and CR5000. The CR10X course is suitable for all EdLog based loggers, such as the CR510 and CR23X.



*Townsville CR1000 training course - the perfect opportunity to combine work & play!*

COURSE	DATE	VENUE	Price	Capacity
CR1000 / CRBasic	11-13th July 2006	Townsville Plaza, Townsville QLD	\$450-ex GST	14
CR10X / EdLog	3rd - 5th October	Vibe Hotel, Inner Sydney, NSW	TBA	16

Whether you're a beginner or slightly more advanced, these courses will provide you with in-depth knowledge of the hardware, software and programming capabilities of your logger - allowing you to use your equipment to it's full potential! All courses operate over three days and are fully catered. To register for training, or for more information please contact Bree in our office or email [bree@campbellsci.com.au](mailto:bree@campbellsci.com.au)

**50% Off Loggernet Software to all training course attendees !**



## FEATURED PRODUCTS

# CHOOSING THE CORRECT WEATHER STATION TO SUIT YOU

*Choosing the correct weather station for your application is not always the easiest of tasks. Accuracy, range of measurement/ sensors, flexibility and cost all play important factors in deciding which type of weather station you install.*

*CSA carries a wide range of weather stations to suit almost any application.*

*Our three main categories are -*



### • PRE-CONFIGURED

Pre-Configured stations are often the simplest and easiest to use, making them ideal for those who do not have extensive knowledge in building and installing weather stations. Our WeatherHawk weather station is quite popular with our home, small business and school customers - and is ideal for those looking for a low cost, turnkey solution to their weather monitoring needs. Where higher accuracy is important we also stock our ET106 weather station. This station allows you to calculate the Evapotranspiration rate of crops as well as measuring the standard sensor range.

Both of our pre-configured stations measure Temperature, Rainfall, Wind Speed & Direction, Barometric pressure, Solar Radiation and Relative Humidity.

### • SEMI-CONFIGURED

CSA carries the MetData1, which is a semi configured station, combining the flexibility of a custom station with the ease of a pre-configured model. Users can choose from a variety of sensors to fit, and install the station quickly and easily.

### • CUSTOM BUILT

Where the pre and semi configured stations are not suitable, CSA's technical department can design a complete custom weather station for you. By designing a station, you choose the components that suit both your specification requirements, your budget and your application, ensuring that you get the right equipment for the job. There are a number of different factors to consider when choosing the components of your custom weather station.

#### 1. TOWER TYPE

Firstly, you must decide where you are planning to install the weather station and what type of tower you'll need - commonly we supply tripods, masts or stands. Take into account the stability of the ground, the required measurement height and whether you want a permanent or transferable station. Tripods are generally staked into the ground whereas stands and masts are suited to permanent applications as they are concreted.

#### 2. Power Supply

Consider where the station will be located and how it will be powered. Mains power with a battery back-up is suggested for all applications that have access to mains power. But for remote deployment and unattended stations either battery or solar power options are available.

#### 3. Data Logger

As the logger is such an integral part of the system, and there are many different models - it is important that you choose the right logger for you. It is also important to consider future applica-



tions, as a larger logger may be more cost effective down the track.

Things to consider when choosing your logger -

- The number and type of channels available on the logger. This will impact the number and type of sensors that can be used.
- Memory Size - how much data do you plan to store
- Speed - what speed to you require the measurements to be taken?

Our technical team also provide special programming where required such as - alarming, ModBus & PakBus systems, interfacing with PLC's etc. We also provide a range of extensions and interfaces, allowing you to extend the capabilities of your logger.

### 4. SENSORS

Sensors need to be chosen depending on their specifications - each brand and range offers different accuracy ranges, starting thresholds, outputs and quality. The two main outputs available are analogue (0-5v etc) and digital (SDI12, RS232 etc) We carry a huge range of sensors for almost every type of environmental or industry application - for our complete range, go to

<http://www.campbellsci.com.au/sensors>

### ENCLOSURES, MOUNTS & DISPLAYS

Mounts and enclosures are chosen based on the size, type and amount of equipment in the station. Displays and keypads are also available for in-field program changes and data viewing.

### 6. TELEMETRY & SOFTWARE

Depending on the size and complexity of logger you choose - you will need some type of software package to retrieve the data from the logger. Our technicians will help guide you to the one that best suits your needs (check out our page 3 write up on Virtual-Weather). For transmitting the data to a PC there are many telemetry options available. These include direct connection via either straight cable or short haul modem, wireless connection through either spread spectrum, UHF or VHF radio, landline connection using a telephone modem, satellite or digital cell phone on either the GSM or CDMA networks.



With so many things to consider when choosing a station, it's best not to do it alone - call one of our technical team today, and discuss your weather monitoring options!

### CMP3 PYRANOMETER REPLACES THE CM3

The CMP3 Pyranometer, manufactured by Kipp & Zonen, replaces the CM3 Pyranometer. The CMP3 is an ISO second class pyranometer that measures solar radiation with a high quality blackened thermopile protected by a dome. The blackened thermopile provides a flat spectral response for the 310 - 2800 nm spectral range, which allows you to use the CMP3 under plant canopies or lamps, when the sky is cloudy and for reflected radiation measurements. The CMP3 features a white snap-on sun shield that reduces the sensor's temperature. A bubble level and three adjusting screws are provided for levelling the sensor. A low cost albedometer can be produced by mounting two CMP3's back to back. For more information visit

<http://www.campbellsci.com.au/cmp3>



## SOFTWARE and DESIGN

### VISUAL WEATHER 2.0

#### Added Ease and Flexibility

Until now, VisualWeather was limited to Campbell Scientific's MetData 1 and ET106 preconfigured stations. However with the new release of VisualWeather v2.0 you can interface with almost any of our custom weather stations!

VisualWeather is an ideal package for those with weather stations - supporting program generation, real time data monitoring, automated data collection, and report generation. An EZSetup Wizard guides you through the necessary steps of configuring the weather station. To communicate with your station, VisualWeather supports direct connect, telephone, TCP/IP, spread spectrum radios, VHF/UHF radios, and multi-drop communications devices. Other features added to the latest version include:

- Support for barometers
- Heat index reports and two custom reports with selectable start and end dates
- Your choice of Penman-Monteith, standardised tall crop methods for calculating evapotranspiration
- The ability to link different crop coefficients to different crop stages for estimating crop water

- Improved real time display needs

#### Custom Weather Stations

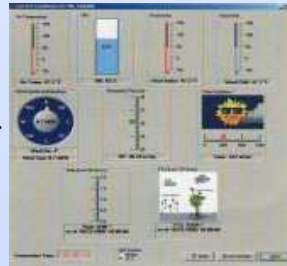
We've included our Short Cut program generator with VisualWeather. You can use Short Cut to generate the program and wiring diagram for your custom station. You can then use VisualWeather to send the program to the weather station and map the data fields used for report generation and real time displays.

#### Preconfigured Weather Stations

For a preconfigured weather station, VisualWeather generates a program based on information you provide

about the sensors and sends the program straight to your weather station.

For more information on VisualWeather 2.0 please contact us on [info@campbellsci.com.au](mailto:info@campbellsci.com.au)



### SHORT CUT TO WIND ENERGY STUDIES

Campbell Scientific have created a new software program which will speed up the set-up of wind masts for site surveys.

The Wind Prospector program is an enhancement of the Short-Cut program generator widely used by Campbell users in other applications. This version has been tailored to the needs of wind energy users and will simplify and standardise data logging program writing for Wind Prospecting applications. In particular it exploits the flexibility of the CR1000, which can accommodate up to ten pulse inputs on a single logger.

The program can be downloaded by clicking <http://tinyurl.com/zjsfm> and will be up on our website shortly. Selecting the Wind Prospector as a logger (in reality the CR1000) allows you to create a tailored wind prospecting program for your chosen sensors, including - Vector, NRG, RisØe and Thies. Industry standard scan rates and data



storage periods are automatically assigned and the user is offered the choice of saving industry recognised parameters including gust, maxima, averages, standard deviations and vector averaged wind directions. The program then generates three files including an SCWin (Short Cut for Windows) file, and used to create identical programs; a .CR1 file which can be uploaded to your system datalogger; and a .DEF file, which produces a wiring diagram for your sensors. This product will greatly assist engineers in building their own wind prospecting systems.

### NEW Operating Systems Available for Download!

One of the major benefits of our dataloggers is that as new features and communication protocols are developed, older loggers can be easily upgraded by simply downloading the latest firmware revision. These updated revisions include improvements in operation, performance and efficiency for existing revisions, as well as the addition of new features.

The most recent revisions of our standard operating systems (including PakBus operating systems) can be found at our website for free download. Go to -

<http://www.campbellsci.com.au/downloads>

and scroll down to Data Logger Operating Systems. The following are available -

#### CR1000

- CR1000 OS Rev8

#### CR10X

- CR10X Std 1.19
- CR10X PakBus 1.10
- CR10X Table 1.5

#### CR23X

- CR23X Std 1.19
- CR23X PakBus 1.10
- CR23X Table 1.15

#### CR200 Series

- CR200 series OS v04

#### CR510

- CR510 Std 1.15
- CR510 PakBus 1.10
- CR510 Table 1.16

#### CR5000

- CR5000 OS v2.0

These operating systems can be downloaded to the logger using our Device Configuration Software, which is also available free of charge from the download page of our website. The Downloads page contains a number of downloadable programs and patches for existing software packages. Check it out regularly to ensure that you are using the current version of all your products!

### SDI-12 Sensors with Campbell Scientific Data Loggers

As technology develops in the instrumentation field, more and more sensor manufacturers are utilising "smart" interfaces as sensor outputs.

There are many "smart" sensor interfaces available and SDI-12 is a protocol becoming more and more popular due to the number of advantages that it offers.

SDI-12 (Serial Data Interface at 1200 baud) is not a new protocol. It was developed a number of years ago and there has been at least 3 different revisions of the standard. All the details of SDI-12 can be found at [www.sdi-12.org](http://www.sdi-12.org)

### How is SDI-12 different from Analogue sensor Outputs?

Analogue sensors sense a parameter and provide an electrical output to represent the value of the parameter within a certain range. This electrical signal is then measured by the data logger and scaled into units relating to the measured parameter.

SDI-12 sensors have a microprocessor on board which performs all the measurements of the parameter(s) in question. The data logger then polls the sensor for the information it has measured, and this data is transmitted back to the data logger for logging, control or further processing tasks. The data logger performs no measurement in this procedure, it merely stores the data that is passed to it by the sensor.

SDI-12 sensors have an SDI-12 address which can be configured. Sensors with different addresses can exist together on a single communications wire connected to a single recorder (data logger).

The advantages that SDI-12 sensors offer over standard analogue sensors include:

- Low power requirements - useful for battery powered operation
- The ability to use one data recorder with multiple sensors on a single cable
- The sensors are microprocessor-based and can perform complex calibration algorithms or make internal computations
- Measurement accuracy and resolution is not limited by the recorder's analogue measurement capabilities. This allows cheaper/simpler logger models to be used with the same results as more expensive units.

### Basic Operation of the SDI-12 Measurement Instruction

There are two parts to any SDI-12 system - the sensor, (which will have an SDI-12 address) and the Recorder, (in this case our data logger). By default, most sensors will sit in an idle state to conserve power.

The Recorder initiates the measurement by sending a "Measure" (M) command to the sensor address in question.

The sensor will respond with an amount of time that will be required for the measurement(s) to be made and how many pieces of data will be available when the job is done. The sensor then begins its measurement procedure.

The Recorder then waits for the appropriate amount of time and sends a "Dump" (D) command to the appropriate sensor address in order to retrieve the data.

### Programming the Logger to measure SDI-12 sensors

Depending on the data logger model that is to be used, the programming instruction(s) that are used for SDI-12 sensors vary. What doesn't change is the need to know the following details:

- The SDI-12 sensor address
- How many data values will be returned?
- How long it will take for this data to be returned?

Discovering this information can normally be done by reading the sensor manual, but quite often the sensor needs to have some configuration before use. This may need to be done to set an address or the required units for the output data. It is also important to know how long the sensor will take to return data in order to set the logger execution intervals appropriately. SDI-12 communications can be tested by using the data logger's

Transparent Mode.

The following commands are useful to discover various configuration settings of the SDI-12 sensor:

All SDI-12 commands (except ?!) begin with the SDI-12 address

Command	Meaning	Response Example
?!	What is the sensor's address?	1 (The sensor address)
1I!	Address 1, Identify yourself.	1ECI-1 1.3
1M!	Address 1, Begin Measurement	10053 (3 pieces of data, 5 seconds)
1D0!	Address 1, Dump first line of data	1+12.3+15.2+15.6 (The data)

of the sensor. This table uses Address 1 as an example, but this should be substituted with the correct address of the sensor. The response to these commands will always begin with the sensor's address, followed by the data.

### Accessing Transparent Mode in Various Loggers

Connect the sensor's data line to the logger's Control Port that will be used for SDI-12 communications. CR200 series loggers have a specific port for SDI-12. Other loggers can utilise a selection of the digital control ports. Ensure the sensor is powered from a supply that has a common reference to that of the data logger.

### Edlog Loggers

For Edlog-based loggers (CR10X, CR510, etc), the logger must be executing a program with a P105 (SDI-12 Recorder) Instruction in its table. It is a good idea to use a program that runs the P105 infrequently, to avoid the logger sending any commands to the sensor during the period while it is in Transparent mode. Connect to the logger using a Terminal Emulator and press enter a few times to establish a connection (the \* prompt will be returned).

Type 1X enter (where 1 is the Control Port being used as the Data Line).

Entering SDI-12 will be displayed.

Type SDI-12 commands as required. Commands are executed with "!". Enter is not required.

If a command receives no response or if an invalid command is entered, the logger will exit SDI-12 mode. Use 1X (or equivalent) to access this mode again.

Transparent mode times out after a short period of inactivity.

### CRBasic Loggers

For CRBasic loggers, the logger program is not important but it is a good idea NOT to have SDI12 Recorder Instructions being executed during the period where Transparent mode is being used.

Connect to the logger using a Terminal Emulator and press enter a few times to establish a connection (a CR1000> prompt or CR2xx> Prompt will be displayed).

Type SDI12 followed by Enter. Select the Control Port being used and press enter. Type the SDI-12 commands as required. Commands require the "!" to be included and also require enter to be sent in order for them to be executed.

A message indicating the sensor response or the "SDI12 Fail" will be returned. To exit from Transparent mode, Type ")" followed by enter.

**PUBLISHED A RESEARCH PAPER LATELY?**

**POST IT ON OUR WEBSITE!**

Have you used our gear in any research projects lately? **We want to hear from you.** CSA is inviting you to post your research paper on our website. It's a great way to get your work out to the world, at no cost or hassle to you! We are taking submissions now - so please contact [bree@campbellsci.com.au](mailto:bree@campbellsci.com.au) for more information.

## CSA - STATION WIRING MAKING IT SIMPLE AND EASY FOR YOU

*There are significant advantages to be gained by spending a little extra time and effort in the planning and wiring of your weather station or installation.*

*You'll find by taking these few extra moments when installing your next project, your life will be made a lot easier down the track!*

Or you can take advantage of the pre wiring service we offer and we'll do it all for you!

By keeping your wiring neat and ordered, you'll find the following tasks much easier

- **Fault finding** – Tracing where wires go can be a real problem if you have large numbers of sensors. If wires are clearly identifiable, most faults can be quickly rectified.
  - **Replacing Sensors and equipment** – When equipment / sensors require calibration, the neater the wiring, the easier the removal and replacement process.
  - **Less stress / damage to wires** – This means not only longer equipment life but also less chance of damaging other equipment or in fact introducing a fault when servicing equipment.
- And last but not least,
- **Neat = Professional**

For new customers we recommend they purchase our "pre-wiring" service regardless of the size or complexity. Numerous existing customers have seen the benefits of having their stations pre wired and continue to opt for this service, making each installation much quicker and simpler.

Should you choose to wire your own station, it's a relatively simple and straight forward process. By following these few basic guidelines, you can easily achieve an equally neat and professional result.

- **Layout** – By careful positioning of the logger and its peripherals, wire runs can be kept to a minimum. The less wire in the enclosure the better !
- **Positioning of cables** – Maximise the use of the back plane, and keep as many of the cable runs behind it as possible.
- **Cable ties** – These can be used to hold the cables and wires where you want them.

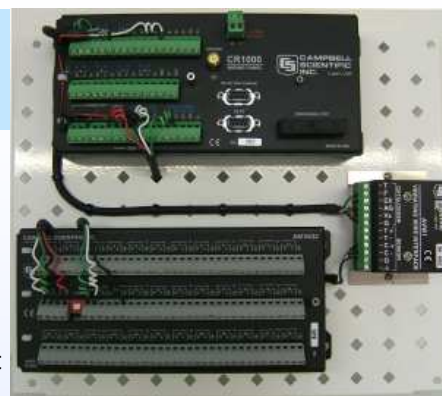
- **Sensors** – When positioning the logging equipment – keep in mind that the sensors cables will need to enter the enclosure, usually through the left hand side. Keeping these neatly tied to the left edge of the back plane helps with the overall neatness.

- **Sensor wires** – Wrap the loose ends around a small screwdriver, creating a curl. This not only keeps the installation neat, it allows for easy identification, removal and replacement. Additionally, it also means that you have "spare" wire just in case you need to rewire the sensor into another channel. It's a good idea to strip and tin all wires that are used on the typical Campbell's Screw terminals. This allows the wires to be used and reused without the threat of small shards of wire becoming loose and causing shorts.
- **Batteries** – as they are probably the most replaced part of any system, it is always a good idea to ensure they can be readily accessed, without disturbing other cables / wires.

One of the most common installation problems seen by our support team is what we call "finger trouble", this refers to the logger program and sensor wiring not matching. In some cases incorrect wiring can cause damage to equipment which can be expensive to rectify.

There's no right or wrong way to wire your station, however the tips mentioned here are generally better to follow than ignore. A few extra minutes spent on planning the installation and subsequent wiring, can save you hundreds of dollars in lost production not to mention frustration or phone support.

Hopefully your next installation will not only look good, but will also be more user-friendly and less prone to unnecessary faults!



*Clean and simple. If you don't have the time or skills, we can do it for you!*

## SHIPPING TIMES - WHY THE WAIT ?

Customer often ask us (and our survey feedback shows) that many people are questioning the length of time it takes to receive their order. In this day and age of technology there must be a quicker way to receive equipment!!

Well, allow us to explain as there are a number of factors that impact on our shipping times.

1. **Lead Time.** CSI has a 30 day lead time on most equipment. Due to the extensive product range that they manufacture, CSI does not carry large volumes of stock, they manufacture to order. While CSA attempts to carry as much high-volume stock as possible, we are regularly caught short with custom cable lengths, large orders and slow-moving items. If CSI does have the equipment in stock it generally can take up to two weeks from placing the order to shipping to Australia.
2. **Freight Times & Costs.** Once leaving the US, it takes a minimum of two weeks to receive an order here at CSA. This usually breaks down to 7-8 days in shipping, 2-3 days in customs and 2-3 days freight from Sydney. We all know that an express post parcel can arrive from the US in 4-5 days. However, our orders usually consist of several large boxes and the only cost-effective method of shipping these is by consolidated air-freight.

Once received from the US, it generally takes 2 days to unpack and sort the equipment into their respective orders and reship to the customer via either road or overnight delivery.

While we may not be able to change these factors, we're looking into alternative to decrease our shipping times for a broader range of products, Stay tuned for more information !

## CALLING ALL CASE STUDIES!

*We are looking for Australian case studies to feature on our website!*

Whatever your application or industry, CSA wants to hear from you. We are currently taking case study submissions for our website and newsletter - so if you have an interesting application you would like to see profiled, contact us today on [marketing@campbellsci.com.au](mailto:marketing@campbellsci.com.au) Just include a short description of your application and we'll get in touch with you!!

# WHAT'S HAPPENING AT CSA

## **Campbell Scientific Marketing Conference.**

Approximately every 18 months, CSA attends an International Marketing Conference hosted by CSI for the affiliate companies from around the world. The conference is an excellent opportunity for affiliates to learn about the latest developments at CSI, to demonstrate new techniques and products to each other, and to discuss strategies that will decide the future of Campbell Scientific.

As always, it is invigorating to associate with such an enthusiastic bunch of professionals. Some exciting new products are on the drawing board and forward planning has meant that from concept to finished product, time-to-market is a fraction of what it once was.

The principle secret to the incredible reliability of CS manufactured products is the total control maintained over the manufacturing process. CSI processes include – engineering & PCB design, component sourcing and inventory, population and wave-soldering of PCB's, PCB cleaning & testing, temperature cycling and product testing. CSI has an incredible investment in equipment and staff training just to support such a facility but the benefits speak for themselves. During the marketing conference we were shown the latest additions to the PCB-manufacturing armoury including a Ball Grid Array (BGA) repair station and an X-Ray device for examining products in minute detail. The latter has already proved extremely useful in uncovering previously invisible manufacturing problems



Steve (top right) and the CSI affiliates at the 2006 CSI Marketing Conference in Logan, Utah

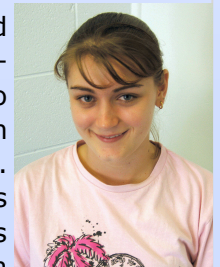
## **CSA Welcomes our New Receptionist**



Belinda's Beer's promotion into Sales and Technical Support has meant that we now have a new receptionist. Soraye Thorne has commenced a Traineeship for Certificate III in Business Administration. Soraye's bubbly personality has made her an instant hit both with customers and her fellow workmates.

Although she is fresh out of High School, Soraye has already completed a Certificate II in Business Administration. Outside work, Soraye is also an accomplished basketball player. At just seventeen, Soraye is a diminutive point guard who has already represented both Townsville and Queensland in representative basketball.

## **And our New Storeperson**



Miranda Kitching has recently started as our new storeperson. Like our receptionist Soraye, Miranda is also fresh out of high school having been raised in the country town of Biloela. Although she has only been with us for just over six weeks, Miranda has already proven that she is more than capable by quickly coming to grips with her complex duties and our extensive product range. Miranda, who has signed on for a Traineeship in Transport & Distribution (Warehousing), enjoys her rugby league. She currently leads Simon's Footy Tipping Competition - well ahead of the more-seasoned veterans.

## Spotlight On... Jason Gunders

This edition's featured employee is a quiet achiever, Application Support Technician **Jason Gunders**.

Jason joined CSA as an Trainee Application Technician just over twelve months ago at a point in time in CS history that could best be described as volatile. This was the transition period between Edlog and CRBasic, Pakbus and Telecommunications Commands, the CR10X and the CR1000. Subsequently, Jason had to learn to program and support two completely different systems in parallel.

Jason's prior work experience in the IT industry had prepared

him well for his new role because despite having no prior data logging experience, he has taken to his new duties like a duck to water.

After an extensive training period, Jason has taken on the responsibility for technical support of some of our more complex customer applications as well as custom programming. He also does a great job of supporting wireless network applications and is heavily involved in assisting Simon with CSA's training courses.

Outside of work, Jason has a wide range of interests. He loves all things mechanical—having

rebuilt several four-wheel drive vehicles, built his own 16 foot aluminium boat, and fabricated trailers, exhaust systems and turbo intercooler plumbing. He also enjoys building computers, working with his Picaxe development kit, dabbling in the share market and mountain bike riding.

