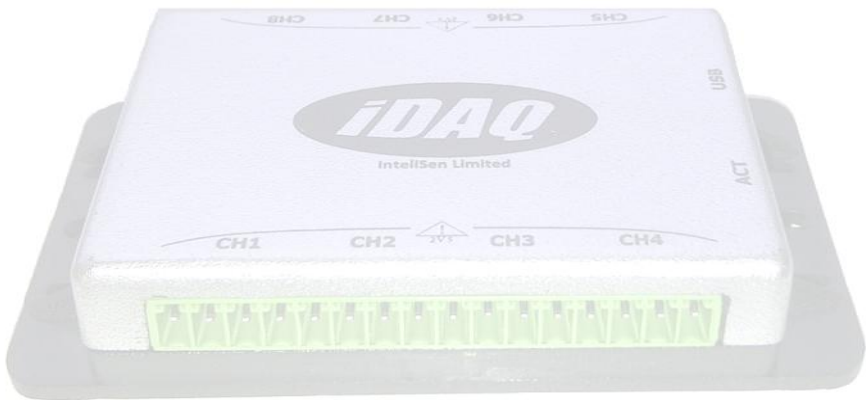


# InteliSen Limited

Electronics & Software Services



**iDAQ™ Data-Logger**

**User's Guide**

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# 1.0 Introduction

## 1.1 Overview

The iDAQ™ range of compact data-loggers offer high resolution, high accuracy readings and can be used to measure a variety of physical parameters (such as voltage, current, resistance, temperature, humidity, etc). Units have both USB and Wi-Fi interfaces, which are ideal for PC based or remote monitoring applications. Each device incorporates a powerful webserver and requires only a browser to function; all units carry 256Kb of internal memory for stand-alone operation and can record data at intervals ranging from 5s to 24hrs.

## 1.2 Safety Notice

**DO NOT exceed the maximum input range.** The unit is designed to measure voltages in the range of  $\pm 2.5V$ ; voltages in excess of this may result in permanent damage to the unit.

**DO NOT use in contact with mains voltages.** The unit is not designed to directly interface with mains voltages. Take great care when measuring near mains equipment.

**DO NOT attempt to repair the unit.** The unit contains no user serviceable parts. Repair or calibration of the unit must be performed by InteliSen Limited.

## 1.3 Package Contents

Your package should contain the following items:

1.	1 x iDAQ™ Data-logger
2.	1 x USB cable
3.	1 x Power supply
4.	8 x 4-Way terminal block
5.	1 x User's guide (CD)

## 2.0 Specifications

### 2.1 UV-0x

	UV-04	UV-08
<b>Input type</b>	General purpose voltage	General purpose voltage
<b>Number of inputs</b>	4	8
<b>Measuring range</b>	±2.5V	±2.5V
<b>Accuracy at 25 °C</b>	0.1%	0.1%
<b>Voltage resolution</b>	10μV	10μV
<b>Converter resolution</b>	22 bits	
<b>Conversion time</b>	72ms per channel	
<b>Internal Memory</b>	256Kb	
<b>Input connectors</b>	3.5mm Screw terminals	
<b>Input impedance</b>	>> 1 MΩ	
<b>Interface</b>	USB 2.0 and Wi-Fi	
<b>Supply</b>	5VDC (100mA)	
<b>Temperature range</b>	0 °C to 70 °C operating -20 °C to +80 °C storage	
<b>Humidity range</b>	20% to 90% RH, non-condensing, operating 5% to 95% RH, non-condensing, storage	
<b>Dimensions</b>	92mm x 51mm x 18.3mm	

## 2.2 AD-08

	Voltage Inputs	Pulse Inputs
<b>Input type</b>	General Purpose Voltage	Voltage-Free Pulse Input
<b>Number of inputs</b>	4	4
<b>Measuring range</b>	$\pm 2.5V$	0 to $2^{24}$ (upto 1KHz)
<b>Accuracy at 25 °C</b>	0.1%	N/A
<b>Input Resolution</b>	10 $\mu$ V	N/A
<b>Converter resolution</b>	22 bits	
<b>Conversion time</b>	72ms per channel	
<b>Internal Memory</b>	256Kb	
<b>Input connectors</b>	3.5mm Screw terminals	
<b>Input impedance</b>	$\gg 1 M\Omega$	
<b>Interface</b>	USB 2.0 and Wi-Fi	
<b>Supply</b>	5VDC (100mA)	
<b>Temperature range</b>	0 °C to 70 °C operating -20 °C to +80 °C storage	
<b>Humidity range</b>	20% to 90% RH, non-condensing, operating 5% to 95% RH, non-condensing, storage	
<b>Dimensions</b>	92mm x 51mm x 18.3mm	

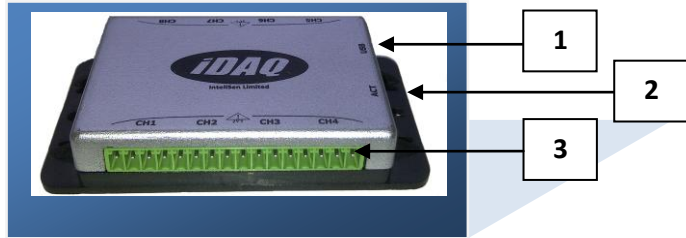
## 2.3 CU-0x

	<b>CU-04</b>	<b>CU-08</b>
<b>Input type</b>	4-20mA	
<b>Number of inputs</b>	4	8
<b>Measuring range</b>	±1A	
<b>Accuracy at 25 °C</b>	1%	
<b>Input Resolution</b>	10μA	
<b>Converter resolution</b>	22 bits	
<b>Conversion time</b>	72ms per channel	
<b>Internal Memory</b>	256Kb	
<b>Input connectors</b>	3.5mm Screw terminals	
<b>Input impedance</b>	>> 1 MΩ	
<b>Interface</b>	USB 2.0 and Wi-Fi	
<b>Supply</b>	5VDC (100mA)	
<b>Temperature range</b>	0 °C to 70 °C operating -20 °C to +80 °C storage	
<b>Humidity range</b>	20% to 90% RH, non-condensing, operating 5% to 95% RH, non-condensing, storage	
<b>Dimensions</b>	92mm x 51mm x 18.3mm	

## 2.4 PT-0x

	<b>PT-04</b>	<b>PT-08</b>
<b>Input type</b>	PT100 Temperature Sensor	
<b>Number of inputs</b>	4	8
<b>Measuring range</b>	-200°C to +800°C	
<b>Accuracy at 25 °C</b>	0.01°C	
<b>Temperature resolution</b>	0.001°C	
<b>Converter resolution</b>	22 bits	
<b>Conversion time</b>	100ms per channel	
<b>Internal Memory</b>	256Kb	
<b>Input connectors</b>	3.5mm Screw terminals	
<b>Input impedance</b>	>> 1 MΩ	
<b>Interface</b>	USB 2.0 and Wi-Fi	
<b>Supply</b>	5VDC (100mA)	
<b>Temperature range</b>	0 °C to 70 °C operating -20 °C to +80 °C storage	
<b>Humidity range</b>	20% to 90% RH, non-condensing, operating 5% to 95% RH, non-condensing, storage	
<b>Dimensions</b>	92mm x 51mm x 18.3mm	

### 3.0 Unit Overview



**Figure.1 – iDAQ™ Data-Logger**

1. USB 2.0 Compatible interface / 5V, 100mA Power supply input (Mini Type-B)
2. LED Indicator

Pattern	Meaning
Flashing (1s)	Unit running
Steady	Unit stopped
Off	No power or critical failure

3. Input channels

#### 3.1 Connector Pin-outs

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	Ch1				Ch2				Ch3				Ch4		



17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Ch5			Ch6				Ch7			Ch8					

### 3.2 Pin Definitions

Pin	UV-04/08	AD-08	CU-04/08	PT-04/08	Pin	UV-08	AD-08	CU-08	PT-08
1	X	X	X	IO1+	17	X	X	X	IO5+
2	AN1+	DIG1+	AN1+	AN1+	18	CH5+	AN1+	CH5+	AN5+
3	AN1-	DIG1-	AN1-	AN1-	19	CH5-	AN1-	CH5-	AN5-
4	X	X	X	IO1-	20	X	X	X	IO5-
5	X	X	X	IO2+	21	X	X	X	IO6+
6	AN2+	DIG2+	AN2+	AN2+	22	CH6+	AN2+	CH6+	AN6+
7	AN2-	DIG2-	AN2-	AN2-	23	CH6-	AN2-	CH6-	AN6-
8	X	X	X	IO2-	24	X	X	X	IO6-
9	X	X	X	IO3+	25	X	X	X	IO7+
10	AN3+	DIG3+	AN3+	AN3+	26	CH7+	AN3+	CH7+	AN7+
11	AN3-	DIG3-	AN3-	AN3-	27	CH7-	AN3-	CH7-	AN7-
12	X	X	X	IO3-	28	X	X	X	IO7-
13	X	X	X	IO4+	29	X	X	X	IO8+
14	AN4+	DIG4+	AN4+	AN4+	30	CH8+	AN4+	CH8+	AN8+
15	AN4-	DIG4-	AN4-	AN4-	31	CH8-	AN4-	CH8-	AN8-
16	X	X	X	IO4-	32	X	X	X	IO8-

## 4.0 Making a Connection

To connect to the unit you must first ensure that it is switched on (plugged in) and in wireless range of your PC/Laptop/Mobile/Portable device. A Wi-Fi scan must be performed (this varies according to the operating system used) and a manual connection has to be made. Figure.2 below gives an example.



*Figure.2 –Scan for iDAQ™*

Once a connection has been made, it will be possible for the user to access the built-in web server and start to utilise the unit. This is achieved by launching a web browser and entering the default IP address of **http://192.168.0.10**. You will then be prompted for a user name and password; the default settings are as follows:

### 4.1 Default Settings

#### Administrator access

---

User Name:	Administrator
Password:	Admin <b>NB: This is the default but it can be changed – see section on console interface.</b>

### **Guest access**

User Name:	Guest
Password:	Guest

**NB: User names and passwords are case sensitive and are limited to 32 characters. Guest login allows restricted access to web-server features and can be useful for sharing data.**

**NB: Administrator passwords can be reset using the console interface – see the section on console interface.**

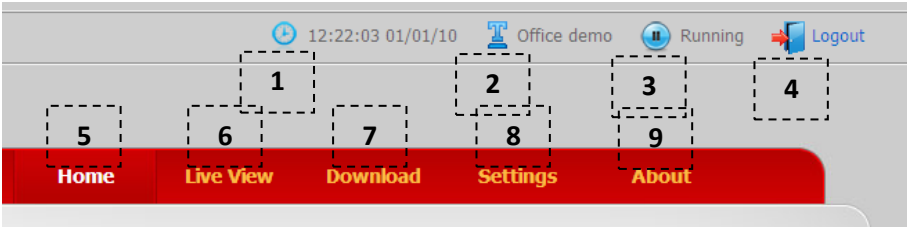
**Default IP Address:** 192.168.0.10

**Subnet Mask:** 255.255.255.0

**Default Gateway:** 192.168.0.1

## **5.0 Web Browser Interface**

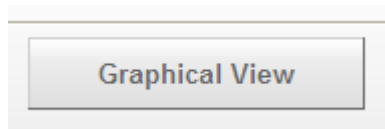
### **5.1 Toolbar and Menu**



**Figure.3 – Toolbar and Navigation Menu**

The toolbar and navigation menu allows you to quickly setup the unit and manoeuvre your way through the rest of the site. The functions are as follows:

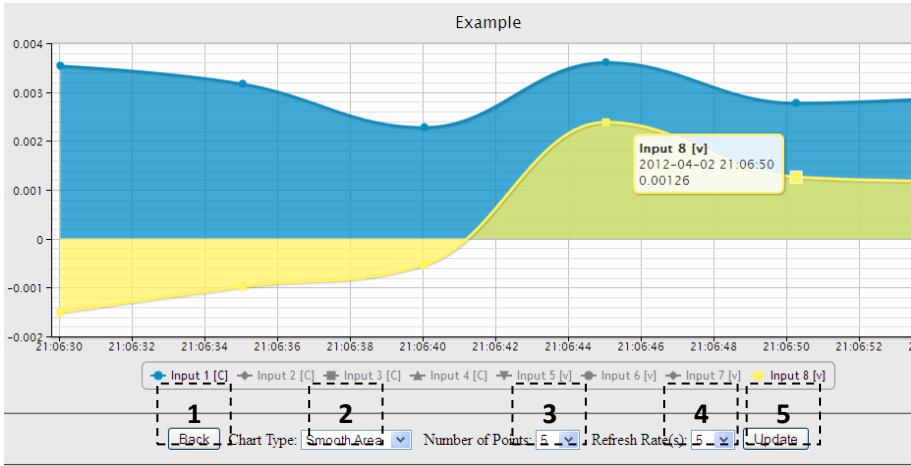
1. This button is used to synchronise the onboard clock/calendar with the PC/Laptop/Mobile/Portable devices clock/calendar.
2. This button is used to set the unit ID to a unique identifier. Unit IDs are restricted to 32 characters and the following characters are disallowed: '<>/';#~@!'”`~`
3. This button is used to start/stop the unit recording data. When stopped, real-Time data will still be displayed but not stored for later retrieval.
4. This button is used to log off from the unit.
5. This button is used to return to the home page.
6. This button displays live readings in numerical or graphical format (by pressing the “Graphical View” button – see figure below).



**Figure.4 Enter Graphical View**

## 5.1.1 Graphical Interface

The graphical interface allows the data to be displayed in various graphical formats and can be easily control by the toolbar below the trace (see figure.5 below).



*Figure.5 Example Graphical View*

The graphical toolbar controls are as follows:

1. Return to previous page.
2. Sets the chart type:
  - Basic Line
  - Smooth Line
  - Basic Area
  - Smooth Area
  - Scatter Graph
3. Sets the number of points to display.

- 
4. Sets the refresh rate (s).
  5. Sends the chart settings to the web server.

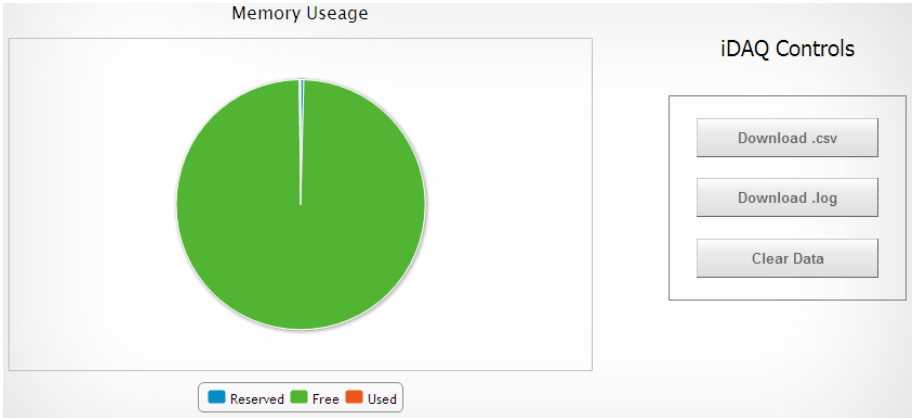
### 5.1.2 Real-Time Channel Status

The channel status is indicated by the symbol next to a corresponding channel. There is also a status indicator on the homepage to alert you to any problems. These indicators show:

Status	Description
Green	Channel is healthy.
Yellow	Channel is currently healthy but has at some point been operating outside of its limit.
Red	Channel is current operating outside of its limit – if this condition persists permanent damage may occur.

### 5.1.3 Download Page

7. This button shows the download data page (see figure.6) and allows you to retrieve saved data (in .csv format). You can also clear recorded data (WARNING: Data is irretrievably lost) and download a diagnostic log file (useful for technical support).

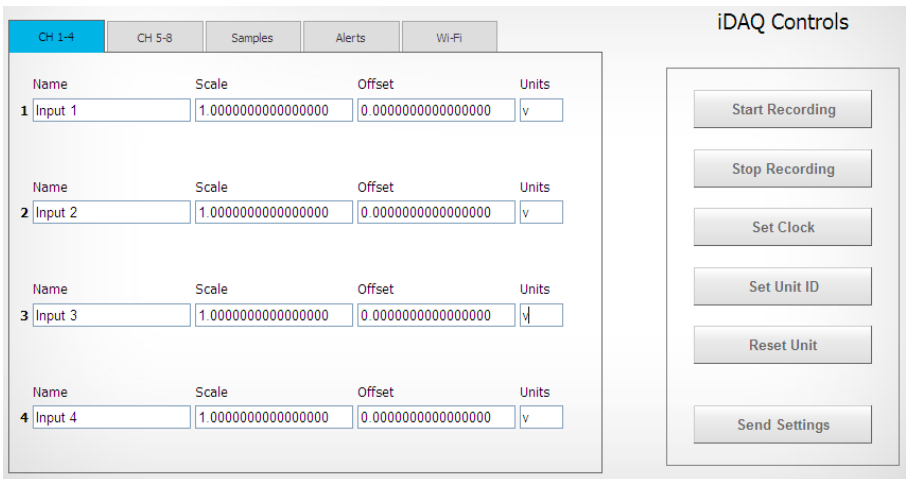


**Figure.6 – Download Page**

## 5.1.4 SettingsPage

- This button shows the system settings page (see figure.7 below). Here you can fully configure the iDAQ and perform unit conversions.

### 5.1.4.1 Channel Setup Tab



**Figure.7 – Channel Setup**

**Example.1** – Assuming that a temperature sensor connected to channel 1 has a 10mV/°C output; to convert the voltage reading given by channel 1 to a temperature, the scale and offset figures would be set to 1.000000 and 100.000000 respectively (i.e.  $0.010V * 100.000000 = 1^{\circ}C$ ).

### 5.1.4.2 Samples Tab

By selecting the “Samples” tab (see figure.8 below), the sampled channels can also be configured, along with sample rates, sample mode and decimal place etc.

The screenshot shows the 'iDAQ Controls' interface with the 'Samples' tab selected. The interface is divided into two main sections: channel configuration and control buttons.

**Channel Configuration:**

- Recorded Channels (Analogue):** A table with columns CH1 through CH8. CH1 and CH2 have checked checkboxes, while CH3 through CH8 have unchecked checkboxes.
- Recorded Channels (Digital):** A table with columns CN1 through CN4. Each column has three rows: a checkbox (all unchecked), a polarity selection '+/-' (all '+/-' selected), and another checkbox (all unchecked).
- Sample Rate (secs):** A dropdown menu set to '5s'.
- Mode:** A dropdown menu set to 'Until Full'.
- Decimal Places:** A dropdown menu set to '5'.
- Estimated Running Time (Days:Hours:Mins):** Three input fields showing '1', '6', and '16' respectively, separated by colons.

**iDAQ Controls Panel:**

- Start Recording
- Stop Recording
- Set Clock
- Set Unit ID
- Reset Unit
- Send Settings

**Figure.8 – Samples Tab**



### 5.1.4.3 Alerts Tab

By selecting the “Alerts” tab (see figure.9 below), the automatic email alerts can be configured. From here, a test message can also be sent to validate the server settings to confirm that they are correct.

**Example.2** – To send an email alert when channel 1 temperature is greater than 22.5°C, the “>” symbol associated with channel 1 must be selected and 22.5°C entered in to the setpoint box.

The screenshot shows the 'Alerts' tab in the iDAQ Controls software. The interface is divided into several sections:

- Server Settings:** Includes fields for Email To (example@example.com), SMTP Server (smtp.example.com), Port (465), Use SSL (checked), User Name (example\_user\_name), and Password (masked with dots). A 'Send Test Message' button is located below these fields.
- Analogue Alerts:** A table for configuring alerts for channels CH1 through CH8. Each row includes a comparison operator (dropdown), a setpoint value (input field), and a unit (dropdown).

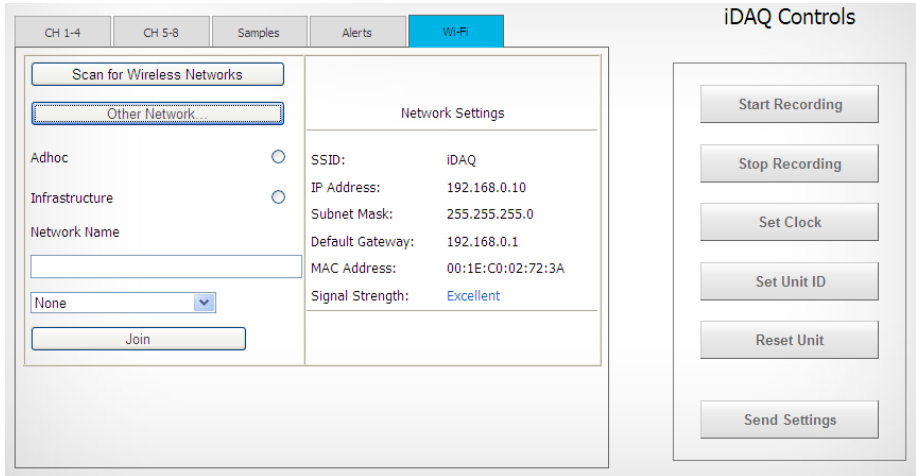
Channel	Operator	Setpoint	Unit
CH1	>	22.5	C
CH2	<	18.0	C
CH3	<	18.0	C
CH4	>	100.0	C
CH5	X	0.0	v
CH6	X	0.0	v
CH7	X	0.0	v
CH8	X	0.0	v
- General Alerts:** A list of system alerts with checkboxes: Input Range Exceeded (checked), Memory Full (unchecked), Daily Summary (checked), and Weekly Summary (unchecked).
- Digital Alerts:** A list of digital events with checkboxes: Digital CH1 Event (unchecked), Digital CH2 Event (unchecked), Digital CH3 Event (unchecked), and Digital CH4 Event (unchecked).

On the right side of the interface, there is a vertical stack of control buttons: Start Recording, Stop Recording, Set Clock, Set Unit ID, Reset Unit, and Send Settings.

**Figure.9 – Alerts Tab**

### 5.1.4.4 Wi-Fi Tab

By selecting the “Wi-Fi” tab (see figure.10 below), the user can search for a wireless network to join or they can input one manually. The unit also provides basic network related parameters to aid connection.



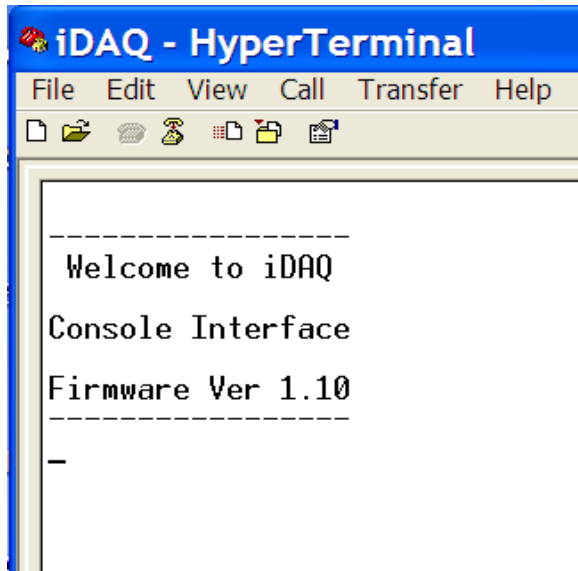
*Figure.10 – Wi-Fi Tab*

**NB: No setting will be sent to the unit until the “Send Settings” button is pressed and a confirmation is received.**

---

## 6.0 Console Interface

The unit can be fully configured using the console interface provided by the USB 2.0 port. To access this interface the user will need to start a third party terminal application (such as Microsoft™ Hyperterminal) and connect to the iDAQ™ emulated COM port. Once a the port has been opened (port settings such as baud-rate are irrelevant), a welcome message will be seen (see figure.11 below)



*Figure.11 – iDAQ™ Console Interface*

Once this message is visible then the unit is ready to receive the following commands:

Command	Comments
set_time	Sets the onboard clock (in 24hr format). Data format:- HH:MM:SS
set_date	Sets the onboard calendar (valid until 2099). Data format:- DD/MM/YY
set_unit_id	Sets the unit ID (up to 32 characters long). Data format: ASCII
set_unit_pw	Sets the unit password for web access (up to 32 characters long).
set_run_state	Sets the state of the sample recorder (0 is stop, 1 is run).
set_mem_rst	Reverts back to factory defaults and clears all data from memory (WARNING: Permanent data and settings loss will occur if this command is used). Command should be followed by the password "iDAQ" (case sensitive).
set_name_n	Sets the channel name of channel n (n = 1 to 8). Followed by name.
set_scale_n	Sets the scale factor of channel n (n = 1 to 8). Followed by scale.
set_offset_n	Sets the offset factor of channel n (n = 1 to 8). Followed by offset.
set_unit_n	Sets the units of channel n (up to 3 characters long). Followed by units.
set_chart_type	Sets the chart type (1: Basic Line, 2: Smooth Line, 3: Basic Area, 4: Smooth Area, 5: Scatter Graph).
set_chart_points	Sets the density of the chart (range 5 – 50 in steps of 5).
set_chart_refresh	Sets the refresh rate of the chart (range 1 – 10 seconds).
set_decimal_place	Sets the number of decimal places (range 1 – 5).
set_config_word	Sets the general configuration word.
	F E D C B A 9 8 7 6 5 4 3 2 1 0
	Alert Alert Alert Alert Record DIG4 Record DIG3 Record DIG2 Record DIG1 Record Ch8 Record Ch7 Record Ch6 Record Ch5 Record Ch4 Record Ch3 Record Ch2 Record Ch1

set_sample_rate	Sets the rate of the sample recorder. Followed by sample rate.
set_sample_mode	Sets the sample mode (0: Until Full, 1: Wrap Around).
set_clr_status	Clears the status flag for channel 1 to 8.
set_email_to	Sets the mailto address for the alerts (up to 64 characters long).
set_email_server	Sets the email server address (up to 64 characters long).
set_email_port	Sets the email SMTP port. Followed by port number.
set_email_user	Sets the email username (of the account to be used – up to 64 characters long).
set_email_pw	Sets the email password (of the account to be used – up to 64 characters long).
set_email_ssl	Sets the email SSL state (0: No SSL, 1: Use SSL).
set_email_test	Sends a test email using the settings provided.
set_alert_con_n	Sets the alert condition for channel n (n = 1 – 8).
set_alert_set_n	Sets the alert set-point for channel n (n = 1 – 8).
set_ip_val_n	Sets the ip address octet n to a value between 1 and 255. This command expects a three digit value e.g. 010 representing 10.
set_subnet_val_n	Sets the subnet mask octet n to a value between 1 and 255. This command expects a three digit value e.g. 010 representing 10.
set_gateway_val_n	Sets the gateway address octet n to a value between 1 and 255. This command expects a three digit value e.g. 010 representing 10.
set_dns_val_n	Sets the DNS server address octet n to a value between 1 and 255. This command expects a three digit value e.g. 010 representing 10.
set_use_dhcp	Enables or disables DHCP (0: Disabled, 1: Enabled). NB: May be overridden by network router.