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LOGBOX

datahog2

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2.0 OVERVIEW.

2.1 GENERAL

The SDL 5000 series of DataHog 2s comprise an electronically advanced datalogging system integrated with one or more high quality sensors, plus the connection of external sensors. (Some models though only allow for the external connection of sensors).

A layout of the board showing positions of the controls is shown in the fig at the end of this booklet.

The logger is centred on a high performance new generation 8 bit microprocessor (μ p). This has the ability to perform all the mathematical and logging tasks and then close down to conserve power.

Depending on the model there are one or more analogue to digital converters which render the signals from the sensor into a digital form that can be handled by the microprocessor. These have a resolution of 15 bits which means that analogue signals such as light, which vary over several decades, can be properly handled and give adequate resolution of measurement over the required range.

Many versions of the DataHog 2 are available, with different combinations of voltage, current and digital inputs. A block diagram of the hardware for the units to which this manual refers is shown in the fig. at the end of this section, together with a pinout of the connectors fitted in section 4.3.

This manual covers all models, and so will include sections that are not applicable to individual units.

Please check those parts of the manual that apply to your model and type of your unit and ignore inapplicable sections.

In normal logging mode the μ p will be 'woken up' by the clock at regular intervals (every 10 seconds in most models). The μ p will keep track of real time by counting the number of times it is woken up and storing the time in the RAM while the μ p is asleep!

Once woken up, the microprocessor will perform the tasks required of it (depending on the logging mode previously selected) and then when these are complete will return to 'sleep' to conserve power.

The microprocessor can communicate with the user's host computer via its built in RS232 interface, and can be controlled by instructions sent via this. It also gives some feedback to the user via the audio transducer built in.

Immediately before the μ p closes down to 'sleep' mode, if there is a plug connected to the 8 pin RS 232 socket, then it will 'listen' for a command from the user for a period of about 1 second. During this time, preceded by an audible 'beep', any numeric character sent to the DataHog 2 will cause it to enter terminal (or Main Menu) mode.

The unit is located in a polycarbonate housing, which is sealed to IP 65. The sockets, when mated to a matching plug or blanking unit are also weatherproof to IP65.

2.2 POWER.

Power is usually supplied by internal 'C' cell batteries. Both mains power and solar cell supplies are also available.

If power is supplied by the 'C' cells, these will give about four to six months of operation. Special circuitry detects low batteries and terminates logging if results are liable to be inaccurate due to low voltage supply. (Fresh batteries will have a voltage of 9 volts, logging will stop around 6 volts.)

When fitting new batteries the circuitry must be reset by pressing the PSU reset and Reset buttons (see diagram of boards and controls).

Instructions on the Mains Hog mains PSU & Solar Hog solar cell PSU are in a separate section.

Note that Main Menu mode consumes 15-20 mA, and internal batteries give about 2 weeks life if used continuously. Bear this in mind when setting up the logger with your computer - **fit new batteries if a long logging period is required.** In logging mode the DataHog 2 will consume 3mA on average, which will give a battery life of around 14 weeks. These figures depend largely on the sampling and logging intervals chosen.

Remember also, that operation below 0°C will almost halve these times since alkaline cells will give only about half their capacity at low temperatures.

If you need very long logging periods, please consider one of the alternative power options - Solar Hog, Mains Hog and Battery Hog - see the sections 8, 9 or 10.

2.3 MEMORY.

The units all have solid state, battery backed Random Access Memory.(RAM). This stores all the logged data and also calibration factors etc. The on-board lithium cell should provide back-up power for approximately ten years. Because of this memory back-up, data is retained when the main batteries are flat or disconnected for replacement, but no logging is possible from this back-up power.

It should be noted though that it is good practice to offload data from the unit before the main batteries are exhausted if at all possible.

Depending on the model of 5000 series, the RAM may hold up to 11,001 records of data and time, in 121,020 bytes. The amount of spare memory can be checked in Options 1 then 5 from the Main Menu. The following table gives a useful guide to the number of bytes used per channel and records available at different logging intervals:

TABLE OF MEMORY SIZE AND USAGE

The memory of your DataHog 2 is split between a few locations required for housekeeping and the bulk of the storage capacity which is devoted to data storage. The data is stored in a format that is constant. Basically the data from each channel that has been gathered at one time is stored together with the date and time at which the data was obtained. Thus the channel data (from 1 to 8 channels) plus the time is a set number of records. Clearly the fewer the number of channels in use, the greater the number of records available for storage. The table below shows the maximum number of records for different numbers of channels in use and illustrates the time before memory is full at different logging intervals.

Channels	Bytes per record	Records available	Logging	Interval		
			1 min.	10 min	30 min	2 hrs
1	11	11,001	7.6 days	10.9 wks	32.7 wks	2.5 yrs
2	15	8,068	5.6 days	8.0 wks	24.0 wks	1.8 yrs
3	19	6,369	4.4 days	6.3 wks	18.9 wks	1.5 yrs
4	23	5,261	3.6 days	5.2 wks	15.6 wks	1.2 yrs
5	27	4,482	3.1 days	4.4 wks	13.3 wks	1.0 yrs
6	31	3,903	2.7 days	3.8 wks	11.6 wks	46 wks
7	35	3,457	2.4 days	3.4 wks	10.2 wks	41wks
8	39	3,103	2.1 days	3.0 wks	9.2 wks	37 wks

2.4 CHANNELS

There are two 'types' of channels with DataHog 2s, hardware channels and software channels. The former is the electronic hardware that is fitted to your DataHog 2. The hardware that you have will be shown in the front of this manual in the "Hardware Configuration Certificate". There are potentially 54 hardware channels, though only a total of 11 can ever be in any one DataHog 2. Channels can be used for a variety of inputs as is shown on your certificate, e.g.. voltage, current, digital, etc. The electronic components will be different in each case according to which input type that channel has been dedicated to. The RH% channel will only (if fitted) be used with an integral RH% sensor.

The connections for external sensors to the hardware channels will be marked on the Hardware Configuration Certificate. The connections and calibration for those sensors that require it, will be covered in subsequent sections of the manual. See sections 4 & 5. Listed below are the number and types of available hardware channels. It will be seen that there are apparently a few hardware channels 'missing'. These are used internally only.

N.B. Although this list gives details of all the hardware channels that are possible on the DataHog 2, it is certain that not all will be connected or available on a given logger.

2.4.1 Voltage Input Channels

Note that these are grouped in threes. In reality each is a differential amplifier (that is an amplifier which measures the voltage difference between both its inputs) but which has been arranged so that each of its inputs may be used as a separate channel. Usually only one or two of these channels will be fitted on

a DataHog, though the full list is shown below.

Hardware Channel Number	Function and Description
0	Single ended Voltage Input, gain = 1, 10,100, or 1000
1	Single ended Voltage Input, gain = 1, 10,100, or 1000
2	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 2 uses the connections of channels 0 and 1)	
3	Single ended Voltage Input, gain = 1, 10,100, or 1000
4	Single ended Voltage Input, gain = 1, 10,100, or 1000
5	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 5 uses the connections of channels 3 and 4)	
6	Single ended Voltage Input, gain = 1, 10,100, or 1000
7	Single ended Voltage Input, gain = 1, 10,100, or 1000
8	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 8 uses the connections of channels 6 and 7)	
9	Single ended Voltage Input, gain = 1, 10,100, or 1000
10	Single ended Voltage Input, gain = 1, 10,100, or 1000
11	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 11 uses the connections of channels 9 and 10)	
12	Single ended Voltage Input, gain = 1, 10,100, or 1000
13	Single ended Voltage Input, gain = 1, 10,100, or 1000
14	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 14 uses the connections of channels 12 and 13)	
15	Single ended Voltage Input, gain = 1, 10,100, or 1000
16	Single ended Voltage Input, gain = 1, 10,100, or 1000
17	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 17 uses the connections of channels 15 and 16)	
18	Single ended Voltage Input, gain = 1, 10,100, or 1000
19	Single ended Voltage Input, gain = 1, 10,100, or 1000
20	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 20 uses the connections of channels 18 and 19)	
21	Single ended Voltage Input, gain = 1, 10,100, or 1000
22	Single ended Voltage Input, gain = 1, 10,100, or 1000
23	Differential Voltage Input, gain = 1, 10,100, or 1000
(note that channel 23 uses the connections of channels 21 and 22)	

2.4.2 Current Input Channels

Note that each of these is a separate input to a current amplifier which can have any of eight different feedback resistors. The effect of these resistors is to set the scaling of the channel. The full scale of the DataHog 2 is reached when 2.000 volts is applied to the Analogue to Digital converter by this current amplifier. The ratio of current in to voltage out (to the A/D converter) is set by this feedback resistor. It's precise value is given in the configuration certificate for each DataHog 2. The ratio of current in to voltage out is given by the following:-

Current in for F/S voltage out (2.000) = 2.0000 volts / feedback resistor value (Megohms)

The individual resistors fitted are very stable in value, but each has a slightly different value. See the configuration certificate for the actual values fitted, but nominal values for each 'current gain' setting (resistor value Megohms / F/S input currents) are as follows:-

- | | | | |
|-------------------|------------------|----------------|------------------|
| 0) 0.005M / 400uA | 1) 0.01M / 200 A | 2) 0.05M/ 40uA | 3) 0.1M / 20uA |
| 4) 0.5M / 4uA | 5) 1.0M/ 2uA | 6) 5.0M/ 0.4uA | 7) 10.0M / 0.2Ua |

Again, only one or two of these are usually fitted, but the full list is as follows:-

Hardware Channels Number	Function and Description
25	Current Input - 'current gain' settable as above, 0) to 7)
26	Current Input - 'current gain' settable as above, 0) to 7)
27	Current Input - 'current gain' settable as above, 0) to 7)
28	Current Input - 'current gain' settable as above, 0) to 7)
29	Current Input - 'current gain' settable as above, 0) to 7)
30	Current Input - 'current gain' settable as above, 0) to 7)
31	Current Input - 'current gain' settable as above, 0) to 7)
32	Current Input - 'current gain' settable as above, 0) to 7)
33	Current Input - 'current gain' settable as above, 0) to 7)
34	Current Input - 'current gain' settable as above, 0) to 7)
35	Current Input - 'current gain' settable as above, 0) to 7)
36	Current Input - 'current gain' settable as above, 0) to 7)
37	Current Input - 'current gain' settable as above, 0) to 7)
38	Current Input - 'current gain' settable as above, 0) to 7)
39	Current Input - 'current gain' settable as above, 0) to 7)
40	Current Input - 'current gain' settable as above, 0) to 7)

N.B. a) Current channel inputs are intended for use with Skye Instruments light sensors and so show a positive reading for a negative current input with respect to ground. If these channels are used with a sensor giving a positive current output with respect to ground, then the DataHog will show a negative current.
 b) Current sourcing sensors that can apply greater than 2 volts to these inputs when they are not active, may cause errors on other channels.

2.4.3 Internal Temperature Channel

This is fitted only as an integral air temperature sensor, or as the 12th thermistor channel where 12 thermistor channels are required. If it is fitted, it may be addressed as channel 45, and will give an output as per a standard thermistor channel

Hardware Channel Number	Function and Description
45	Thermistor only channel. Scale as a thermistor (10K)

2.4.4 Digital Input Channels

Low speed inputs. These accept switch closure inputs or 5volt pulse inputs. The maximum counting rate is 300 pulses per second.

N.B. Digital channels may only be ascribed to one software channel.

Hardware Channel Number	Function and Description
48	Counting channel. Max count = 65535 before rollover
49	Counting channel. Max count = 65535 before rollover
50	Counting channel. Max count = 65535 before rollover
51	Counting channel. Max count = 65535 before rollover
52	Counting channel. Max count = 65535 before rollover
53	Counting channel. Max count = 65535 before rollover

Note that with a sampling time of 1 hour, the maximum count rate is approximately 18 per second if a rollover is to be avoided with a sensor such as windspeed, sample times should be kept below 10 mins to avoid rollover.

2.4.5 Internal Relative Humidity Channel

This hardware is simply addressed as hardware channel 54. As for all other hardware channels it may be ascribed to any or all of the 25 software channels.

Hardware Channel Number	Function and Description
54	'Built in' Relative Humidity Channel.

2.4.6 Software channels

The second type of channel or rather use of the word 'channel' is the software channel. This simply refers to the way that the software has been configured to look at the hardware. For example, if a hardware channel is fitted to the DataHog 2 it may be treated and read from the software as software channel 0 - 24 depending on how the software is configured. Many DataHog 2s use a preset configuration option, but all can be individually configured to use available hardware channels as the user desires.

e.g. more than one software channel can read from a single hardware channel, this is especially useful if each software channel is set with a different gain for readings over a wide range.

NOTE - each digital hardware channel should not have more than one software channel assigned to them, as once they have been 'read' by the first software channel the counter is returned to zero.

2.4.7 Relay output channels

These channels can be fitted at the time of ordering your DataHog 2. Up to 4 relay outputs are available, which can be assigned to any software channel. More than one can be assigned to a single software channel if a 'window' threshold is required.

The relay contacts are gold plated for low level relay switching and hence are for light duty, low inrush switching only. They are not suitable for direct mains connection, inductive loads or loads over 0.5 amps. Slave relays should be used if these ratings are to be exceeded. The built-in relays have a very low contact resistance, and are suitable for dry switching circuits.

2.5 CALIBRATION.

Calibration of the sensor depends on the model in question, some units, for example with curve matched thermistor temperature sensors, will not need specific calibration, this being set at the time of manufacture. Others with external light sensors, or RH probes can be easily calibrated in software.

Sections later in this manual give specific details for calibration of the various channel and sensor options.

Please note that this manual contains the instructions for all models and options. Please ignore those that do not apply to your specific unit.

2.6 SOFTWARE.

As previously mentioned, the units are designed for low power operation, and this is at least in part achieved by switching off as much of the circuitry for as long as possible. This means, amongst other parts of the unit, the RS232 interface (which has a high current requirement), and hence the communication channel with you, the user, is switched off for most of the time. However the software has been arranged so that in most modes there is a period of 'listening' on the RS 232 to see if you wish to 'talk' to the unit.

This period is generally immediately after the microprocessor has done the tasks required of it during each 'wake up' period (every ten seconds in most models). In most cases a message is sent from the DataHog 2 via RS232 requesting a response. An audible beep generally precedes the second or so that the unit spends listening.

The DataHog 2 will only spend this extra time with the RS 232 interface switched on if it 'thinks' that there is someone likely to want to 'talk' to it. The microprocessor monitors the 'plug detect' line - pin 6 socket 1 - and if this is shorted to ground, as by a suitably wired datalead connected to the RS232 input, then it

will 'listen'.

N.B. If for any reason a connection lead is used without the 'plug detect' pin connected to ground, then, although in most modes some data will be sent FROM the 5000 series DataHog 2, it will not respond to characters sent from the host computer TO the DataHog 2.

During the listening period if any numeric character is sent to the unit at the correct baud rate it will immediately stop what it is doing and enter 'terminal mode'. The unit will then send a 'menu' to the host with various options, depending on the model. Many are common to all models, others are specific to certain types. All are listed in subsequent sections. Please ignore those that do not apply to the unit you have. Options that are not applicable to a particular unit will be found to be inoperative when selected from the menu in terminal mode.

The baud rate for current software versions is 9600 Baud. Other details are 8 data bits, stop bits, no parity, and xon/xoff flow control.

3.0 OPERATION

3.1. INITIAL SET UP

Link the DataHog 2 unit to the user's host computer by connecting the supplied cable to the RS232 serial port.

See the connection lead and pinout diagram at the end of this section of the booklet.

Insert floppy disk containing your communications programme and start up.

See separate section on the communications software supplied.

When shipped the unit is usually logging and so that when a datalead is connected the RS232 socket a message is sent to the host computer with instructions for 'waking up' the DataHog 2. Every 10 seconds the logger will emit a 'beep' and send a message to press any numeric key to 'wake up' the DataHog 2. This numeric key must be sent within one second of hearing the 'beep' and the message appearing in order to enter Main Menu mode.

3.1.1 Firmware overview

By firmware, the programme that is running in the DataHog 2 is meant. This programme is stored in a 'ROM' (Non-volatile Read Only Memory) chip. The version may be checked from Option 2 in Main Menu mode.

The DataHog 2, as previously mentioned, is designed to save power when possible, and thus will 'sleep' for long periods compared to the time it spends working.

Essentially, it has two modes of operation which are referred to as logging mode and main menu mode. These can be seen on the Software Flow Diagram.

3.1.2. Logging mode overview

In logging mode the operation is cyclic. The DataHog 2 is 'woken' after approx. 8 seconds by the clock, it will collect and store data from channels according to the various settings made by the user in Main Menu mode. These are detailed in section 3.2. Having completed its tasks, the DataHog 2 will check if a plug is connected to its RS232 port. If not, it will go back to 'sleep', and the cycle repeats. If it finds a plug (plug detect pin shorted to ground - see section 4.1) then it will send a message 'beep' audibly and spend a second listening to see if someone wishes to 'wake it up'.

'Listening' is a strange term, but the DataHog 2 is simply monitoring its RS232 input for any numeric character sent by a computer connected to it.

As soon as the DataHog 2 receives such a character (assuming it arrives within the one second listening period) the DataHog 2 will leave logging mode and enter the Main Menu mode. If the character arrives too late, then the DataHog 2 will simply close down for 8 seconds and listen again about a second later.

3.1.3 Main menu mode overview

Main Menu Mode is entered when a character is received as described above. The DataHog 2 transmits a menu of the various functions and setup choices it has to offer. These are described further in section 3.2. In essence, each option will either display status, offload data, configure and calibrate the logger, etc, returning the user to the main menu when the individual task is completed.

Main Menu mode can only normally be left and logging mode re-entered by sending an escape character to the DataHog 2

When it is awake or in Main Menu mode, the current consumption of the DataHog 2 is 20 - 45 mA, depending on model. When asleep it is approx. 0.2 to 0.4 mA - 100 times less current! N.B. With a windspeed channel fitted consumption is about 1.2 mA. Be warned, Main Menu Mode gobbles current. Do not go away and leave your Hog 'hanging' .!

3.2 MAIN MENU MODE OPTIONS.

Terminal mode is entered from function mode by pressing an numeric key on the host PC during the 'listening' period of the DataHog 2. A menu of options is displayed as below and may be selected from by sending the character indicated to the DataHog 2.

SKYE INSTRUMENTS LTD. DATAHOG2 SERIES

**SEND CHARACTER SHOWN TO SELECT ITEM
<ESC> RETURNS TO LOGGING**

- MAIN MENU -

- 0) DISPLAY READINGS FROM ALL ACTIVE CHANNELS**
- 1) DISPLAY CURRENT SETUP**
- 2) DISPLAY SOFTWARE VERSION**
- 3) OFFLOAD 24HOUR DATA SUMMARY**
- 4) OFFLOAD DATA**
- 5) RESET MEMORY**
- 6) SET CLOCK**
- 7) SET DATAFILE I/D, PLUS MEM OVERWRITE & TIMED LOGGING MODES**
- 8) SET CHANNEL SAMPLE & LOG INTERVALS**
- 9) SET AX+B CALIBRATION FACTORS**
 - A) SET CHANNEL CONFIGUR'NS**
 - B) SET INT'NL RH% SENSOR CALIB'N**
 - C) SET ALARM RELAY(S)**
 - D) SET CHANNELS FOR NONZERO / THRESHOLD LOG MODES**
 - E) ENTER 'LOG ON DEMAND' MODE**

In general upper case characters are expected. <Escape> will cancel almost all operations before changes take effect!

Not all of these options apply to all models of the DataHog 2 family and consequently, those functions that do not apply to a particular unit will be found to be inoperative. Selecting such an inappropriate option will simply redisplay the main menu, or an explanatory message.

Such options as may be found to be inoperative would be Relative Humidity channel calibration in models with no RH channel fitted, although if the user overrides the channel setup by wrong settings using Option A, then it is possible for the DataHog 2 to attempt to take readings from non-existent inputs.

3.2.1 Option 0 - Display readings from all active channels

This menu option will display instantaneous readings from all **active** channels each time the space bar is pressed on the host P.C., whatever logging intervals, thresholds or time modes have been set. Storage of readings does not occur when using this Option. See Section 3.2.15 for the Log on Demand mode, if logging is required. ESC cancels this mode and returns to the Main menu.

NOTE - beware of irregular instantaneous readings from certain sensors which depend on a timed reading, e.g. windspeed, this will give metres per time interval of the space bar press in this mode.

3.2.2 Option 1 - Display current setup

This option displays a sub-menu requesting the user to select which items to display, as below:

SELECT THE ITEM REQUIRED

0 - CHANNEL CONFIG'N AND SCALING

1 - SAMPLE AND LOG INTERVALS

2 - LOG MODE AND THRESHOLDS

3 - AX+B SCALING FACTORS

4 - ALARM RELAY SETUP

5 - TIME, BATTERY, MEMORY & TIMED LOG STATUS

6 - RETURN TO MAIN MENU

Option 0 displays each software channel which is active alongside its associated hardware channel, gain, termination and scalecode.

Option 1 displays each software channel which is active with its chosen sampling and storage times.

Option 2 displays each software channel which is active, with its associated scalecode, logging threshold and logging mode.

Option 3 displays each software channel which is active with its full scale value, zero offset count and scalecode.

Option 4 displays each relay output (even if not fitted), which software channel it is assigned to and its threshold setting. (NOTE - logging and alarm thresholds are two completely separate items, do not confuse, see Sections 3.2.13 and 3.2.14). Check your configuration certificate if in doubt as to which is fitted.

Option 5 displays current time and date, current battery voltage, total free data memory, full memory capacity, chosen logging start / stop times and whether timed logging is enabled or disabled, plus chosen memory full option. (Fresh batteries will have a voltage of 9 volts, logging will stop around 6 volts. Memory capacity is given in bytes, please see section 2.3 for conversion to number of records.)

See Appendix 1 for a summary of codes for gains, scalecodes, sample and logging times.

3.2.3 Option 2 - Display software version

This mode displays the version of the current software along with your contact for help or service.

3.2.4 Option 3 - Offload 24 hour data summary

This option will display a summary of data for a chosen 24 hour period, e.g. previous day. You are asked to enter a date and the summary is calculated from midnight to midnight for that day (if records for that date is held in memory), and displayed as maximum, minimum and mean values for each active channel. A total is also given for digital channels - however, this total is given as unscaled (raw count) data, with a maximum display of 999999 before 'rollover'. This is because a total count can potentially be a very large number when scaled into units.

3.2.5 Option 4 - Offload data

This menu option will offload all data stored from the start of memory to the latest record..

If this option is used alone then all the stored data will scroll up on the PC screen without being saved. To save the data your communications program must also be operated.

If using the Skye programs H2COL96.EXE or H2MON96.EXE then press '3' from the Main menu and at the "ANY KEY TO PROCEED" message type press CTRL-S (as instructed at the bottom of the screen).

You will then be asked for a filename in which to save the data - please note that the current directory will be used unless a full path is entered. Enter a filename, e.g.. 'FILENAME' press return and the bottom line on the screen should read "CTRL-S toggles save - to FILENAME". Any characters now appearing on screen will automatically be saved to your chosen filename - including any menus which you may call up! Pressing any key (spacebar is the best option) will cause the stored data to scroll and be saved. When

offload is finished, at the prompt “ANY KEY TO PROCEED” first press CTRL-S to toggle save off (bottom line should now read “SAVE IS OFF”) else you will get the next menu at the end of your datafile! (See Section 6 Communications Software for further details).

Pressing any key will return to the Main menu.

If using other Communications Programmes please consult the manual for that programme.

The data you have saved consists of a stream of data records. A record is the data collected from each active channel at a particular time. The first item in the datapoint is the date and time of the series of readings. This is given in the form: DD:MM:YY:Hrs:Mins:Secs. The data starts with the lowest numbered active channel. A space separates this data from the next active channel/data, until all channel data is sent.

A carriage return and line feed terminates the datapoint.

3.2.6 Option 5 - Reset memory

A routine that will clear all the data in memory leaving it clear for new records. Use with caution! The screen will give full instructions and offer a way out if the user should change his/her mind.

3.2.7 Option 6 - Set clock

This routine allows the user to set the real time. This is rarely necessary as it is initially set at Skye and the logger’s clock is backed by an internal lithium battery.

Full instructions are given on screen. Note that the clock starts when the date is confirmed and entered, so this may be done at the correct time by observing the clock on the screen of the SKYE communications software, which shows your P.C.’s time (H2MON96.EXE or H2COL96.EXE).

3.2.8 Option 7 - Set datafile identifier, plus memory overwrite & timed logging modes

This option displays a sub-menu requesting the user to select which options to set, as below:

SELECT ITEM REQUIRED

- 0 - ENABLE MEMORY OVERWRITE**
- 1 - DISABLE MEMORY OVERWRITE**
- 2 -**
- 3 - SET LOG START / STOP TIME**
- 4 -**
- 5- EDIT DATAFILE IDENTIFIER**
- 6 - RETURN TO MAIN MENU**

Option 0 will enable the DataHog 2’s memory to overwrite in a loop, so that the oldest records are overwritten with the latest data. Your choice is confirmed on the screen.

Option 1 will disable the overwrite option so that the DataHog 2 will stop logging and emit a regular series of beeps when the memory is full. Your choice is confirmed on the screen.

Option 2 is not yet available.

Option 3 allows logger setup if a timed logging period is required, and displays a further submenu as follows:

- 00) - DISABLE LOGGING START / STOP TIME**
- 01) - ENABLE LOGGING START / STOP TIME**
- 02) - ENTER THE LOGGING START TIME**
- 03) - ENTER THE LOGGING STOP TIME**

Option 00 is used if timed logging is not required, or is to be disabled. Confirmation that normal logging mode has been resumed is seen on screen.

Option 01 enables the logger to use the start / stop times entered in Options 02 and 03. Confirmation is

again seen on screen. Ensure that the stop / start times are correct before leaving this submenu.

Option 02 allows the user to enter a date and time when the DataHog 2 will begin its logging sequence.

Option 03 allows the user to enter a date and time when the DataHog 2 will end its logging sequence.

The stop date /time must be later than the start date/time or logging will not occur. Also make sure that Option 01 is used to enable this timed logging mode.

NOTE - The DataHog 2's date and time clock uses the last 2 digits of the year only, e.g. 96 for 1996. So in the year 2000 the DataHog 2's clock will reset to 00, and so a timed logging period beginning in 1999 and ending in 2000 will be ignored.

Option 4 is not yet available.

Option 5 allows the user to enter and edit 12 characters to identify this DataHog 2 logger. These characters will be automatically printed at the head of datafile when data is offloaded. This is particularly useful if the user is collecting data from more than one system. Your 12 characters will be repeated on screen for your confirmation before continuing.

Note - in Skye Graphical / Offload Software packages only the first eight characters of this identifier are used in some filenames the package creates for data storage.

3.2.9 Option 8 - Set channel sample and log intervals

This changes the basic logging mode function of the unit. The user can choose sampling and logging intervals for each individual channel.

The sampling interval is where a reading is taken from the associated channel and stored in temporary memory. At the chosen logging interval the sampled readings will be divided by the number of samples and the single averaged measurement stored in memory with the appropriate time and date. If sample and log times are equal, the averaging process is irrelevant, and readings are stored directly.

Both sampling and logging intervals can be chosen from 10 seconds to 24 hours, in any combination and can be different for each software channel if desired. Beware, as it is possible to choose a sampling time which is equal to or greater than the logging interval. Where logging time is shorter than sampling time, erroneous or zero data may be stored.

Options available are all visible on the screen (of 25 line or more monitors). In the current software version these options are displayed as codes, a summary of options and codes is given below and in Appendix 1.

You will first be asked the software channel you wish to configure, enter channel number 00 to 24. the submenu below will then ask you to choose the sampling time for that channel:

ENTER THE SAMPLING TIME TO USE

ENTER THE NUMBER (01 TO 18) FOR THE PERIOD REQUIRED

01 -	10 - 10 min
02 -	11 - 20 min
03 -	12 - 30 min
04 - 10 sec	13 - 1 hour
05 - 20 sec	14 - 2 hour
06 - 30 sec	15 - 3 hour
07 - 1 min	16 - 4 hour
08 - 2 min	17 - 6 hour
09 - 5 min	18 - 12 hour

Enter the code for the sampling time required. A second, similar submenu will then be displayed showing identical codes for choosing the storage time at which the sampled readings will be averaged and stored.

Enter the code as before.

The routine will now display a summary of your chosen codes for the sampling and storage times. Accept to confirm if correct and return to Main Menu. Repeat the procedure for each channel as necessary. When Main Menu mode is terminated and logging initiated, the DataHog 2 will 'go to sleep' and commence the new logging function mode at the next wake-up period.

When logging parameters such as light measurement or wind speed, where the values change greatly and fast, then averaging many frequently taken samples is the only practical mode. Long storage intervals can be used with short sampling times without losing much data. Spot logging (i.e. choosing identical sampling

and storage intervals) may seriously mis-represent the true data, for example a cloud may cover the sun for just a few seconds in an hour, but if a spot logging interval occurs at this point then the user is not told of the high levels throughout the rest of the hour. Averaged logging avoids this problem.

NOTE - to record total rainfall it is necessary to set identical sample and log times. This will give an accumulative rainfall measurement, otherwise an average or mean measurement would be recorded, and the 'average' value may fall below the storage resolution in some cases.

Spot logging also has use in sampling slowly changing parameters, especially when measurements have to be synchronised with various events, processes or other measurements.

When a datalead is connected to the DataHog 2 and it transmits it 'wake up' message via RS232 every 10 seconds to the PC, it will also transmit sensor readings each time a channel is logged (but not each time a channel is sampled). So if the user requires the DataHog 2 to log as well as transmitting data, simply set the logging interval to the transmitting interval required and link up to the PC. Alternatively use Option E from the Main Menu, Log on Demand mode - see Section 3.2.15. Remember that RS232 communication drains the DataHog 2's internal batteries at a greater rate than remote logging, and an external power supply should be considered for long term operation in this mode.

3.2.10 Option 9 - Set AX+B calibration factors

This routine sets the factors for channels using the 'Ax+B' scaling, e.g. channels for light sensors, anemometers, raingauges etc. Its function is to convert raw data from the sensor into empirical units for ease of use. This option can be applied to each channel individually as appropriate.

On choosing '9' from the Main Menu you are first asked to enter the software channel to configure, choose from channel number 00 to 24. The following submenu is then displayed:

ENTER THE NUMBER FOR UNITS REQUIRED TO GIVE FULL SCALE

Calculate the Full Scale as follows

a) For Voltage Input channels 1 - 23

$$F/S = (\text{SENSOR OUTPUT [Units per mV]} / \text{GAIN}) * 2000$$

b) For Current Input channels 25 - 40

$$F/S = 2.000 / (\text{SENSOR OUTPUT [uA per Unit]} * \text{Feedback Resistor [Megohms]})$$

c) For Digital channels 48 - 53

$$F/S = \text{SENSOR OUTPUT [Units per 19,000 pulses]}$$

Enter 5 digits AND a decimal point

Leading zeros NOT permitted

Calculate the full scale as instructed for the type of channel chosen and enter in the required format above. You will then see a second submenu displayed:

ENTER THE OFFSET COUNT AND THEN ITS SIGN WHEN PROMPTED

The count is calculated as follows

a) For Voltage Input channels 1 - 23

$$\text{Offset count} = \text{SENSOR OFFSET (mV)} * \text{GAIN (1, 10, 100, 1000)} * 9.5$$

b) For Current Input channels 25 - 40

$$\text{Offset count} = \text{sensor offset (uA)} * \text{FEEDBACK RESISTOR (Megohms)} * 9500$$

c) For Digital channels 48 - 53

Offset count usually zero, but may be used as a threshold

ENTER THE OFFSET COUNT REQUIRED (MAX = 9999)

Again, the appropriate zero offset figure should be entered, calculated as instructed. You will then be prompted to enter the sign of the offset (+ or -) and a summary of your entries for that software channel will be displayed for you to accept, reject or redo. Acceptance or Escape will return to the Main Menu, Redo

will restart the option sequence. Repeat the procedure for each channel as necessary. If the offset entered is zero, the sign is irrelevant, but a + or - must be entered in order to move on.

3.2.11 Option A - Set channel configurations

This routine will enable the user to set up each individual software channel to match the sensor it is logging. As the user goes through the process a series of submenus will be displayed giving choices for the type of channel, voltage, current, digital, RH etc, the gain, type of output required etc. Firstly the user will be asked to enter the software channel to be configured from 00-24. The following menu will then be displayed:

ENTER THE HARDWARE CHANNEL TO USE (00 TO 54)

- 0 - 23 - VOLTAGE INPUTS FOR +/-2V TO +/-2mV AS SET BY GAIN:-
- 25 - 40 - CURRENT INPUTS FOR +/-400uA TO +/-2uA AS SET BY GAIN:-
- 45 - INTERNAL TEMPERATURE REFERENCE
- 48 - 53 - DIGITAL COUNT CHANNELS
- 54 - INTERNAL HUMIDITY CHANNEL

SEE YOUR CONFIGURATION CERTIFICATE OR MANUAL

Refer to the Hardware Configuration Certificate at the front of this manual to check which hardware channels have been fitted to your DataHog 2. Enter the hardware channel number 00 to 54. Depending on the type of channel you have chosen to configure, a different series of submenus will be displayed.

VOLTAGE INPUTS 0 - 23

Enter the hardware channel you wish to configure 0 - 23 and you will then be asked to specify the gain to use as below:

ENTER GAIN TO USE SELECT THE VOLTAGE GAIN

- 0 - GAIN*1 +/- 2.0V F/S
- 1 - GAIN*10 +/- 200mV F/S
- 2 - GAIN*100 +/- 20mV F/S
- 3 - GAIN*1000 +/- 2.0mV F/S

Enter the gain appropriate for your voltage output sensor as shown. **NB - do not connect a sensor with a higher output than 4.5 volts, as this may damage your DataHog 2's circuitry.**

You will then be requested to choose the termination suitable for this voltage channel. Termination is only really applicable to differential channels, but must be set for all voltage channels. See the submenu on the following page.

Choose option 0 for no input ground return, as default, if in doubt. Option 1 terminates the positive differential input to ground, and Option 2 terminates the negative differential input to ground.

ENTER THE TERMINATION TO USE

SELECT THE TERMINATION. (SELECT '0' AS DEFAULT)

- 0 - NO INPUT GROUND RETURN
- 1 - A+ INPUT HAS GROUND RETURN
- 2 - B- INPUT HAS GROUND RETURN

Enter your choice of termination 0, 1 or 2.

The following menu is displayed requiring the entry of the scalecode to use (this submenu is displayed for all types of hardware channels). The scale code will determine how the data will be handled by the DataHog 2 and how it will be displayed and offloaded.

ENTER THE SCALE CODE TO USE

SELECT THE SCALING REQ'D FOR THIS SOFTWARE CHANNEL

- 0 - RAW DATA COUNT**
- 1 - Ax + B SCALING**
- 2 - THERMISTOR (10K)**
- 3 - INTERNAL RH%**
- 4 - WINDVANE**
- 5 - CHANNEL OFF**
- 6 -**

Enter your chosen scalecode (usually Option 1 - Ax + B for voltage channels), and the software will then display all the choices you have made for this voltage channel. If correct, accept and return to Main Menu. If you have chosen Option 1 - Ax + B, remember to set this scaling in Option 9 - Enter Calibration Factors from the Main Menu, see section 3.2.9 of this manual for more details.

If at any time you wish to switch off a software channel, e.g. to increase logging capacity, choose Option 5 - Channel Off from the Scalecode menu above.

CURRENT INPUTS 25 - 40

Enter the hardware channel you wish to configure 25 - 40 and you will then be asked to specify the gain to use as below:

ENTER THE GAIN TO USE

SELECT THE FULL SCALE CURRENT FEEDBACK RESISTOR

- 0 - 0.005M (400uA)**
- 1 - 0.01M (200uA)**
- 2 - 0.05M (40uA)**
- 3 - 0.1M (20uA)**
- 4 - 0.5M (4.0uA)**
- 5 - 1M (2.0uA)**
- 6 - 5M (400nA)**
- 7 - 10M (200nA)**

The feedback resistors are shown with nominal values in the submenu above, exact figures for the resistors fitted to your DataHog 2 are given on the Hardware Configuration Certificate. Choose the gain suitable for your current output sensor.

Note that the true 'full scale' current is calculated as follows using the values given on the calibration configuration certificate:-

$$\text{Full scale current } (\mu\text{A}) = \frac{2 \text{ (volts)}}{R \text{ (megohms)}} = \frac{2}{0.497} = 4.024$$

The routine will now ask you to enter the scalecode for this software channel. The submenu displayed is identical to the one shown above under the voltage inputs section. Again, enter your chosen scalecode (usually Option 1 - Ax + B for current channels), and the software will display all the choices you have made for this current channel. If correct, accept and return to Main Menu.

If you have chosen Option 1 - Ax + B, remember to set this scaling in Option 9 - Enter Calibration Factors from the Main Menu, see section 3.2.9 of this manual for more details.

If at any time you wish to switch off a software channel, e.g. to increase logging capacity, choose Option 5 - Channel Off from the Scalecode menu.

INTERNAL TEMPERATURE REFERENCE - 45

This hardware channel will be chosen if your DataHog 2 is fitted with an integral air temperature sensor. It

can also be used as a 12th channel of thermistor temperature in some cases.

Enter hardware channel 45. No gain needs to be chosen for this channel so the submenu to choose the scalecode is immediately displayed (see Voltage Inputs section on the previous page).

Choose Option 2 - Thermistor (10K). The software will then display all the choices you have made for this internal temperature reference channel. If correct, accept and return to Main Menu.

If at any time you wish to switch off this software channel, e.g. to increase logging capacity, choose Option 5 - Channel Off from the Scalecode menu.

DIGITAL COUNT CHANNELS 48 - 53

Enter the hardware channel you wish to configure. No gain needs to be set for digital channels so the submenu to choose the scalecode is immediately displayed (see Voltage Inputs section on the previous page).

Choose the scalecode desired (usually Option 0 - Raw data count or Option 1 - Ax + B scaling for digital channels). The software will then display all the choices you have made for this internal temperature reference channel. If correct, accept and return to Main Menu.

If at any time you wish to switch off a software channel, e.g. to increase logging capacity, choose Option 5 - Channel Off from the Scalecode menu.

Note that although more than one software channel may be ascribed to a hardware channel, e.g.. voltage, perhaps with two different gains, if more than one software channel is used with a digital channel, the higher number software channel will return counts accumulated between the first and second scans of the hardware channel.

INTERNAL HUMIDITY CHANNEL - 54

This is only for use if your DataHog 2 has an integral relative humidity sensor fitted. In which case, initial set up will have been done at Skye.

Enter hardware channel 54. No gain needs to be chosen for this channel so the submenu to choose the scalecode is immediately displayed (see Voltage Inputs section on the previous page).

Choose Option 3 - Internal RH%. The software will then display all the choices you have made for this internal temperature reference channel. If correct, accept and return to Main Menu.

If at any time you wish to switch off this software channel, e.g. to increase logging capacity, choose Option 5 - Channel Off from the Scalecode menu.

Remember, when configuring channels yourself, that there must be a suitable hardware channel fitted in your DataHog 2 for the configuration you set. For example, it is no use to configure software channel on say relative humidity , if there is no relative humidity hardware in your DataHog 2. Check the Hardware Configuration Certificate if in doubt.

3.2.12 Option B - Internal RH% sensor calibration

This routine will be found to be inoperative unless the unit has a built in RH sensor. It will allow the user to calibrate the actual RH sensor and also re-enter the calibration data in the event of memory corruption.

DIRECTLY CALIBRATE THE SENSOR WITH REFERENCES

The calibration is done at two different levels of relative humidity. For best accuracy, one should be low - around 1%, the other at about 75% RH. The materials available in Skye's Calibration Kit SKH 1093 will provide these references.

The instructions on screen will lead the user through the process, but essentially the user should allow the RH probe to equilibrate ideally overnight, with an atmosphere of 1% RH (Instructions to obtain this are with the calibration kit) and then a low calibration point is entered. The probe is then equilibrated in an atmosphere of around 75% RH, and a high calibration point entered. Once two calibration points are entered the new scale can be set up and used, again instructions are given on the screen.

These calibration points should be recorded and kept safely should they need to be used again. The original calibration figures at time of manufacture are shown in the Hardware Configuration Certificate at the front

of this manual.

RE-ENTER FACTORS PREVIOUSLY DETERMINED

In the unlikely event that memory is corrupted, then the calibration points for RH models may be re-entered using this routine. Such corruption should not occur, but very occasionally when changing batteries or if something metallic touches the P.C. board, it may do so.

Each calibration point is a humidity percentage and has an associated count. There are two such points, low and high, e.g.. typical values might be:-

high RH = 075.4% count = 12003
low RH = 001.0% count = 08903

These are entered by following the instructions on the screen, high point first (percentage then count) followed by the low point.

The routine can be cancelled by pressing "escape" at any time before the final confirmation request.

3.2.13 Option C - Set alarm relay(s)

This option will only be available for models which have relay outputs fitted at the time of ordering. Up to 4 relays can be fitted to each DataHog 2. These are changeover relays, single pole with all 3 contacts, off, common and on, (contacts 1, 2 and 3 - see chapter 4 for pin connections) available to the user.

Each relay may be assigned to any software channel of the DataHog 2, more than one relay can be assigned to a single channel to give a 'window' threshold if required.

Option C will first ask the user to specify which relay to set, and then which software channel to use as a threshold. The relay threshold must then be entered using the same format as the full scale for that channel - an example is given on screen.

Leading zeros are required and the format must be adhered to. Invalid characters will restart this sequence. Note that sometimes there may be internal rounding of figures due to multiple linearisation tables and the set positions may deviate from the input values by one least significant bit.

Your choices and threshold value is repeated on screen for your confirmation.

NOTE - for humidity, no sign (+ or -) is needed, only one decimal place is required, format is xxx.x (e.g. 099.9). For thermistor channels the format is xxx.xx plus a + or - sign (e.g. +100.00). All other channels must be entered as raw data, e.g. +19000 - however, these are redisplayed for confirmation as scaled values if the channel being configured is set up as AX+B. (See Appendix 5 for a table of wind direction degrees against raw data count for the Vector W200P windvane.)

The relays will switch whenever the channel to which they are assigned is sampled i.e. at each sample time. e.g. if the sample code is set to 30 seconds (code 06) then it will compare the threshold value with the channels reading every 30 seconds and switch accordingly.

When the DataHog 2's other functions are used, e.g. offload in Main Menu mode, the relays will remain in their last set position. They will hold this position until the DataHog 2 reverts to its normal 'sleep / sample / store' mode. As soon as the Main Menu mode is left and the first sample occurs, the relay assigned to the sampled channel will take on its new position, if its threshold or the reading from the channel have altered. To disable switching a relay, assign to an unused channel or set the threshold to a value outside the normal operating range, above or below, depending on the desired contact position.

NOTE - alarm relay thresholds are very different from the logging thresholds described in Section 3.2.14 below and must not be confused.

3.2.14 Option D - Set channels for non zero / threshold log mode

This option allows the user to set up the DataHog 2 for normal logging, logging only if data is not zero, or logging above or below a set threshold. Each software channel can be individually configurable, but only one mode can be set at any one time. On choosing Option D from the Main Menu, you are asked to enter the software channel you wish to set, choose from 00 to 24. The following submenu is then displayed:

CONFIGURE CHANNEL FOR -
00) - NORMAL LOGGING
01) - NON-ZERO LOGGING
02) - LOGGING ABOVE THRESHOLD
03) - LOGGING BELOW THRESHOLD

Option 00 - in normal storage mode, the DataHog 2 will store every measurement at the chosen log intervals. Your choice of normal logging is confirmed on screen.

Option 01 - in non-zero storage mode, a measurement is only stored in memory if it does **not** have a raw data value of zero. This option is a memory saving procedure and prevents the memory being filled up with unnecessary zeros - most applicable to digital channels. Your choice of non-zero logging is confirmed on screen.

NOTE - it is not advised to use the non-zero storage mode option with relative humidity and thermistor temperature channels. The raw data values for these sensors are not zero at 0% and 0°C. Similarly for voltage or current channels as these may have a zero offset. This option is really designed for use with digital channels only, where the absence of a 'count' has a clear meaning and is usually a significant event, e.g.. a tipping bucket raingauge.

Option 02 - this mode can be used to offset readings if wished, data is stored only when readings are above the set threshold. You are asked set this threshold by entering it in the same format as the full scale value for the chosen software channel - an example is given on screen. A + or - sign and leading zeros are required.

Option 03 - this option is similar to Option 02 above, except data is stored only when readings are below the set threshold. You are asked set this threshold by entering it in the same format as the full scale value for the chosen software channel - an example is given on screen. A + or - sign and leading zeros are required.

Your choices and threshold setting are redisplayed for confirmation before returning the Main menu mode.

NOTE - for humidity, no sign (+ or -) is needed, only one decimal place is required, format is xxx.x (e.g. 099.9). For thermistor channels the format is xxx.xx plus a + or - sign (e.g. +100.00). All other channels must be entered as raw data, e.g. +19000 - however, these are redisplayed for confirmation as scaled values if the channel being configured is set up as AX+B.

An exception in this case is setting up logging thresholds for a windvane channel. The same routine is displayed, requesting the threshold value as raw data, i.e. +19000, but the value in degrees (0-359, entered as +00000 to +00359) is expected.

Repeat this procedure for each software channel in turn, as required. All channels are set to normal logging by default before leaving Skye.

NOTE - logging thresholds are very different from the alarm relay thresholds described in Section 3.2.13 above and must not be confused. They are separate values, treated and stored separately by the DataHog. Even if identical values are required for relay and log thresholds on the same channel, each must be individually entered.

3.2.15 Option E - Enter 'Log on Demand' mode

This menu option displays and logs instantaneous readings from all **active** channels each time the space bar is pressed, (or the ASCII character equivalent to the space bar is sent to the DataHog 2) whatever logging intervals, thresholds or time modes have been set. ESC cancels this mode and returns to the Main

menu.

NOTE - beware of irregular instantaneous readings from certain sensors which depend on a timed reading, e.g. windspeed, this will give metres per time interval of the space bar press in this mode.

Note also, with some communications software associated with Windows, two or three erroneous characters will precede the readout of the channel number of the RH% channel. The channel number and value will be correct and these characters should be ignored. They will not appear in the stored data.

3.3 CHANGING THE BATTERY

Loosen the four screws on the underside of the case (they will remain 'captive' in the base) and locate the 6 'C' cell batteries. Ease each out of its compartment using the ribbon provided and carefully clip in fresh replacements. The battery holders have a very stiff, positive hold of the cells, so take care not to bend the contacts (or damage your fingers!). The power supply relay may be heard to click off when the old batteries are disconnected.

Care - make sure that the ribbon is replaced under each battery. This is essential not only for ease of removal next time, but also to ensure no damage to the battery itself from the clip.

When the batteries are properly connected, momentarily press the P.S.U. reset button. The relay should be heard to give a faint 'click'. Press and release the Reset button.

If no click is heard from the relay, and the unit is inoperative, then check the condition of the replacement battery and/or its connections. Replace the logger base and tighten the four screws, the unit is now ready for use.

NB - ENSURE THAT THE LOOSE RIBBON IS KEPT WELL INSIDE THE BASE AND AWAY FROM THE 'O' RING SEAL. DAMAGE TO THIS SEAL OR 'FOREIGN BODIES' IN ITS 'SLOT' MAY ALLOW WATER INGRESS.

3.4 CARE FOR YOUR DATAHOG 2

Keep the unit clean and away from organic solvents, chemicals etc., especially in the case of integral RH units. When changing the batteries take care not to interfere with the electronics and do not allow the battery connections to touch any of the components.

Do not allow the units to be even partially immersed in water. Keep the connectors either mated with a waterproof plug or cover, when exposed to weather. Protect the inside of the unit from damp, rain etc., when changing the batteries out of doors.

4.0 CONNECTIONS

All DataHog 2s will have at least one miniature socket fitted to them. This is the RS232 port, which will connect the DataHog 2 to your computer. Details of pinout are in section 4.1. The datalead supplied with your DataHog 2 is configured to connect to an IBM PC or compatible. It will also work with many other types of computer - see communication lead diagram Figure 7.

If sensors are not built into the DataHog 2, they will be connected to it by miniature waterproof connectors.

The positions of these sockets is shown on the diagram Figure 1a. As noted, there are locations shown for up to 8 sockets. Most DataHog 2s will have fewer than this. They will be fitted starting from the lowest numbered locations in the diagram. The pinout for various sensor connectors are listed in subsequent sections. The pin numbers referred to are as marked on the socket and plug.

The sensor inputs will be wired internally to an appropriate hardware channel, as will be shown on the configuration certificate.

4.1 RS232 CONNECTOR

The diagram Figure 7 shows the connections for a lead to join the DataHog 2 to a 25 pin standard COM or serial port of an IBM or compatible PC. If a 9 pin or other connector is used at the 'PC' end of the cable, the names (not numbers) of the pins in the new connector will stay the same for any RS232 port.

The function of the pins in the DataHog 2 are as follows:-

1	Tx data	Data leaves the DataHog 2 here
2	Rx data	DataHog 2 reads data on this pin
3	Ground	Earth or common for power supply (P.S.U.) or signal
4	Ext supply +ve	A pin for connecting an external power supply between 8 and 15 volts. As long as this supply is higher than 10 volts there is no need to remove the normal internal battery (N.B. not the RAM backup). It can be left to act as a backup for maintaining full operation when the external supply is interrupted, since no current will be drawn from it as long as the external supply is above 10 volts.
5	P.S.U. Reset	This pin, when shorted <u>momentarily</u> to the ground pin (pin 3), will duplicate the action of the P.S.U. Reset button. This allows full remote operation of the unit. Do <u>not</u> connect permanently, or excess current will be drawn.
6	Plug Detect	This pin when shorted to the ground pin, will allow the microprocessor to know that a plug is connected to the DataHog 2 and hence force the DataHog 2 to 'listen' at regular intervals for user commands. This can be permanently connected to the ground, but the lowest current consumption and hence longest battery life is achieved by removing the communication lead and hence disconnecting this from ground.
7	n/c	
8	n/c	

4.2 LIGHT SENSORS

a) Built in light sensors

These will already be connected to the channel as indicated in the Hardware Configuration Certificate.

b) External light sensor (s)

i) Sockets for single channel light sensors

Pin 1	n/c
Pin 2	n/c
Pin 3	n/c
Pin 4	signal output (negative current) channel input
Pin 5	ground and cable screen

ii) Sockets for dual channel light sensors

Pin 1 n/c
Pin 2 n/c
Pin 3 signal output (negative current) 2nd channel
Pin 4 signal output (negative current) 1st channel
Pin 5 ground (common) and cable screen

iii) Sockets for 4 channel light sensors (SKR 1850 unamplified versions)

Pin 1 n/c
Pin 2 n/c
Pin 3 signal output (negative current) 1st channel
Pin 4 signal output (negative current) 2nd channel
Pin 5 ground (common) and cable screen
Pin 6 signal output (negative current) 3rd channel
Pin 7 signal output (negative current) 4th channel
Pin 8 n/c

4.4 TEMPERATURE SENSORS (THERMISTORS)

Sockets for connection of single thermistors

Pin 1 n/c
Pin 2 thermistor connection (+ve excitation)
Pin 3 n/c
Pin 4 n/c
Pin 5 thermistor connection (ground) and cable screen

4.5 RAINGAUGE

Sockets for connection of a single raingauge (reed switch closure type only).

Pin 1 n/c
Pin 2 raingauge switch connection (positive excitation)
Pin 3 n/c
Pin 4 n/c
Pin 5 raingauge switch connection (ground) and cable screen

4.6 TENSIO METER/AIR PRESSURE/WATER LEVEL SENSORS (DIFFERENTIAL VOLTAGE CHANNELS)

Sockets for connection to a single tensiometer

Pin 1 positive excitation (5.000 volts)
Pin 2 n/c
Pin 3 negative going input
Pin 4 positive going input
Pin 5 ground and screen of cable

4.7 WINDSPEED (ANEMOMETER - type A100R)

Sockets for connection of a single anemometer (reed switch closure type)

Pin 1 n/c
Pin 2 anemometer switch connection (positive excitation)
Pin 3 n/c
Pin 4 n/c
Pin 5 anemometer switch connection, ground and cable screen

4.8 SINGLE ENDED VOLTAGE INPUT CHANNELS

N.B. Be sure that the DataHog 2's channel is specified for the voltage you are intending to connect as an input. Do not use sensors with a voltage output greater than +/- 4.5V as these may damage the DataHog 2's circuitry.

Also no more than 5 mA (10-15mA maximum total over all sockets) may be drawn from the 5 volt supply pin. Offset errors may occur with high ground current and long leads.

Pin 1 5 volt sensor supply +ve
Pin 2 0- maximum input voltage (from sensor or customer's equipment)
Pin 3 n/c
Pin 4 n/c
Pin 5 ground and cable screen

Examples of sensors to use such a socket may be a HOPL (High OutPut Light sensor)

4.9 WIND VANE (RESISTOR TYPE W200P/DH)

Pin 1 n/c
Pin 2 Voltage reference
Pin 3 n/c
Pin 4 wiper of potentiometer
Pin 5 ground

4.10 HIGH VOLTAGE (24 VOLTS) COUNTER

Pin 1 Digital input
Pin 2 n/c
Pin 3 n/c
Pin 4 n/c
Pin 5 Ground

4.11 RELAY OUTPUT

Pin 1 normally off
Pin 2 common } joined when the threshold is above the reading
Pin 3 normally on } joined when the threshold is below the reading

5.0 COMMUNICATIONS PROTOCOL

The DataHog2 logger is supplied with SkyeLynx Standard software for easy communication to set up, operate and download data from memory.

Other software options are also available. SkyeLynx Auto software enables the unattended automatic download of data from memory, either via a hard wired cable link or via a line or cellular modem.

SkyeLynx Deluxe is an integrated communications and data handling program. It allows the logger to be set up, operated and downloaded, and also has powerful graphing and tabulating features, including a windrose.

If you have already got your own favourite communications software it is almost certainly compatible with the SKYE DataHog 2. Before using it though check the baud rate etc., but for current models it is 9600 baud, no parity, 8 data bits, 1 stop bits, and X on / X off flow control.