

OWL2pe Menu Manual

...turnkey data logging

system overview	2
data cable wiring	3
Information header	4
OWL2pe command menu	5
view real time readings	6
offload data file	7
memory capacity and days of deployment	8
parameter sub-menu	9
calibration sub-menu	10
technical info, programming, and firmware upgrades	11
Install & configure hyperterminal	12
step by step data offload	13
troubleshooting notes	15
USB flash drive (vDrive) interface	16

OWL2pe system operation, overview:

Thank you for choosing the EME Systems OWL2pe data logger. A companion manual describes the setup of the hardware. This document deals mostly with the connection of your data logger to a computer and with the acquisition of data using the turnkey data logging firmware provided with your system. This can be either a generic demo program, or a custom application for a specific set of sensors and circumstances.

The system may have been shipped in operation, with its battery connected, and you will be able to offload data that shows the temperature experienced by the system while it was in transit. In some situations, the system will not be shipped in operation, however, all you have to do to collect initial data will be to connect or install a battery or power source, and leave it to run for a period of time. It will automatically enter its data logging mode.

When you connect a PC running Hyperterminal, using a standard straight-through modem cable, the OWL menu will appear on the screen. (Please see instructions later in this manual on how to find and configure Hyperterminal program on the PC.) From that menu you will have options to view real time readings from the on-board temperature sensor, the system battery voltage and from other sensors included with your system, and to offload accumulated data, to set the clock, and to enter operational parameters.

If you are using a Mac or a Linux system, or a Palm, please contact EME Systems for instructions. There are similar terminal programs that serve the same purpose available for those operating systems.

If you do not enter a command at the menu screen within one minute, the OWL2pe will fall automatically into its operational mode, where it logs data. When it falls into the logging mode, you will see the word "logging..." appear on the PC terminal screen. In order to wake the OWL2pe, from Hyperterminal click on the Disconnect and then the Call icons. (or use the equivalent commands on the Hyperterminal Call menu).

Data is by default logged at 1 hour intervals, or at an interval you selected at the time of ordering. You can change these parameters, using the "P" option from the OWL main menu. (See command summary later in this manual)

In most systems there is an LED indicator visible on the OWL2pe circuit board or on the outside of its enclosure. It will turn on either red or green at the start, and subsequently, when the OWL2pe falls into logging mode, it will flash red or green briefly once every 10 seconds. Green indicates that the battery is in good condition, while red indicates that the battery is low.

If you do not see the full menu on the screen, or if it all seems to pile up on one line, type "F" (upper case). If the lines of the menu are double spaced, type "f" (lower case). This toggles the linefeed setting, and the OWL2pe remembers your preference.

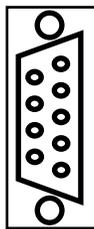
The OWL2pe is may be powered by a 6 or 12 volt Pb-acid sealed battery, or by a set of 4 AA or AAA cels, or by an AC power adapter or solar panel, or other power sources capable of delivering at least 5.5 volts. The power source is determined by the application at the time you order your system. If the battery is a Pb-acid rechargeable type, it will be kept charged by an AC power adapter or a solar panel. The OWL2pe includes a charge regulator on board, which can be configured for either a 6 volt or 12 volt battery.

You may also need to attach some of your sensors to the OWL2pe to bring it into operation. Please refer to the hardware manual and/or the cover letter for details of these connections.

Data cable:

Facing the DB9 or EN35F connector mounted on the OWL2pe or on its enclosure you will need a cable to connect from your PC to the OWL2pe. This will usually be either 1) a “straight-through modem” cable, with a DB9 connector on each end, male to female, or 2) the same with a special Switchcraft circular weatherproof C5 connector on one end in place of the DB9M. OWL2pe units that are mounted in weatherproof NEMA enclosures have the circular weatherproof connector accessible on the outside panel. Cables are available from EME Systems.

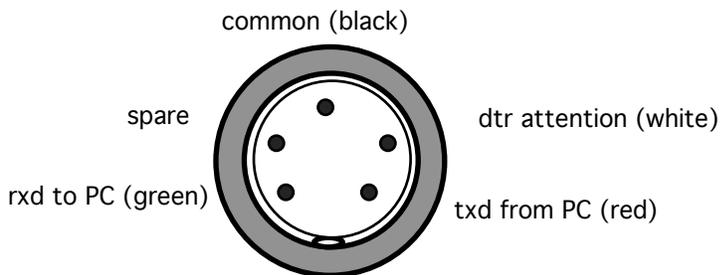
In order to wake up the OWL, the PC must toggle the “DTR” line. In Hyperterminal, this is done by using the “disconnect” then the “call” options on the “Call” menu, or the icon bar or keyboard equivalents. Use a direct connection at 9600 baud, 8 data bits, no parity, one stop bit.



DB9S

- 5-common (black)
- 4-dtr attention (white)
- 3-txd from PC (red)
- 2-rxd to PC (green)

EN3P5F



OWL2pe information display header:

When the OWL2pe is powered up or when it is reset from the keyboard, or after the execution of a command, it displays the following information screen. This display may include customized options. For example, some systems will include the sunrise and sunset times, or sensor accumulations, or additional menu options,

```
2005/02/17 22:06:10 www.owlogic.com OWL2pe SN:01400704
demo.a.001 lg=60 min bvols:11.4 degC:21 logged:1477/28672
(L)og (V)iew (Z)oom (O)ffload (N)ewRun (C)lock (P)arams (fF)eed
>
```

- date and time, default format YYYY/MM/DD HH:MM:SS
The time and date are set by the user by selecting the Clock option
The clock will update correctly for leap years but not for savings time.
It is up to the user to set local time
- our web site, www.owlogic.com. Visit for tutorials and contact information.
- serial number of this OWL2pe data logger core. (This one, 011400704)

- program name . program version number . station location ID
This can be a demo, or a custom turnkey or “starting point” program
The version designation is bumped up or modified to mark successive or special versions.
The program name and version number are fixed when the program is loaded
The station location ID can be set by the user on the Parameters menu
- logging interval in minutes
This can be set by the user on the Parameters menu
from 1 minute to 240 minutes, best as a unit that divides 1440 (# of minutes per day)
- Current battery voltage reading in volts. (11.4)
The correct value depends on the battery type and the state of charge.
5.5 to 7 for a 6 volt Pb-acid, 10 to 14 for a 12 volt Pb-acid, 5.5
OWL2pe can operate from 5.5 to 15 volts DC.
- degrees Celsius from temperature sensor on the OWL2pe core (21)
- Number of data records logged, in example, 1477 out of 59392 possible.
See later in manual the formula for determining the number possible
- Menu of options (see next page)
- prompt “>” waiting for response, single letter to be entered by the user.
If the user does not enter a command within one minute, the word “logging” will appear
as the logger drops into its low power mode, reading sensors and logging at the
chosen interval.

OWL2pe menu commands, summary:

The menu that appears supports the following options...

- O: Offload all logged data up to end of file
 - C: Clock: set time, date and logging interval.
 - Yr: set the hour, 00-99
 - Mo: month 01-12
 - Dy: day 01-31
 - Hr: hour 00-23
 - Mn: minute 00-59 two digits for each prompt
 - V: View/scan current values at 10 second intervals (configure parameter)
 - Z: Zoom, view current readings at ~2 second intervals
 - L: Logging mode, low power, no display on terminal screen
 - N: New run, starts new data file.
 - F: Toggle line feed setting, "F" for extra line feed, "f" for no extra line feed
Use if text piles up on one screen line, or if text is double spaced.
 - \$: Offload previous data file, useful to recover old data after selecting N for new
 - !: Exclamation point, wipes data memory clean, no recovery
 - D: Dump, technical information about memory allocation, for troubleshooting.
 - P: Parameters--This brings up a submenu that lets you enter certain constants and calibration factors. Here are your options:
 - X: back up to main menu
 - 1) logging interval: time in minutes between logged records.
 - This can be any value from 1 to 240 minutes.
 - A value of 0 causes logging to take place at the scan interval, see next item
 - A value of 255 causes logging to be inhibited (screen display continues)
 - 2) scan interval, default 10 seconds between samples for averaging and display
longer intervals conserve battery power, the activity LED flashes at this rate.
 - 3) station ID: this appears on the main menu for your use
The OWL serial number can also be used for station identification
 - 4) low battery threshold, value below which indicator is red instead of green
 - 5) power delay, time to allow sensors to warm up after power comes on
 - 6...) additional options, application specific
 - C) bring up more choices for calibration constants:
 - 1) Correction in units of 0.1 degree Celsius for logger temperature sensor
 - 2...) other calibration constants that are system specific, for example
 - orientation of wind direction arm
 - calibration constants for temperature sensor
 - multiplier for light level sensor
 - X) back up to previous menu
- There may be additional options for some systems, to support particular sensors or hardware such as the vDrive, flash drive interface.

* Note, the \$, ! and D options are hidden, not displayed on screen.

View readings on a PC:

Press the Z or V option to see real time readings from the sensors.
The fields in the real time data display are:

date & time, defaults to YYYY/MM/DD HH:MM format
battery voltage (fully charged battery is ~7 volts, low battery <5.5 volts)
logger internal temperature, degrees Celsius or Fahrenheit
sensor reading #1
...
and so on for additional sensors as ordered and/or programmed.

When you first press the Z or V options, the first line will be a set of headers for the columns to follow, showing the units involved and the connections to channels on the logger.

For example, here is how a data line might appear on screen:

```
dateTime          bvolt    degCi   p01)degCo  _%RH   p8)mph  _max  _avg  a0)degAZ  p9)mmRain
2005/02/01 07:35:40    6.8    21.2    22.5     45.7    0.0    3.7    5.0    237    1.4
```

Fields are tab delimited and records ends with CRLF. On the real time display, the readings can be either present values, taken at the point in time, or they can be filtered or averaged values, or values that are processed in some other way. The real time display can contain several values from one sensor, for example, current, maximum and average windspeed.

The alignment of the columns may depend on your settings for tab stops and margins.

The header, a0)degAZ, is typical of an analog sensor, which is in this case a wind vane attached to analog input a0 on the OWL2pe.

The header, a0)degAZ, is typical of a digital sensor, here a rain gage attached to digital input p9 on the OWL2pe.

A header like this, "p01)degCo _%RH", means that the sensor uses OWL2pe channels p0 and p1, and the values returned are degrees Celsius and % relative humidity, in two data fields. The underscore before %RH means that the humidity is associated with the same sensor as the temperature in the previous column. This sensor is a Sensirion temperature/humidity sensor, the EME RHTX). It is a direct to digital sensor that requires two digital i/o pins.

This one, "p8)mph _max _avg", is a wind speed sensor attached to OWL2pe input p8, and the data fields are a current value at point in time, the maximum over the interval, and the average over the interval.

In turnkey programs, the sensors to be viewed and logged are determined by the PBASIC programming and are not user configurable. Please refer to the technical information section.

Data offload:

Press the “O” option in order to see and offload the accumulated data file.

In order to offload the data that has been logged by the OWL2e and store it as a file on your computer, use the “capture text” option on the “Transfer” menu in Hyperterminal, before selecting the OWL2e “O” command. See the chapter on Hyperterminal, which describes the procedure in detail. Once you have the file, you can choose the “stop capture” option on the PC Hyperterminal menu to close the file. It can be imported directly into Excel™ or other programs for archive and analysis. The capture can also include real time readings from the Z or V commands, and in fact it can include everything that appears on screen. It is highly desirable to archive self documenting files.

The fields in the logged data display are nearly but not always exactly like the fields in the real time display.

date & time, defaults to YYYY/MM/DD HH:MM format
battery voltage, volts (fully charged battery is ~7 volts, low battery <5.5 volts)
logger internal temperature, degrees Celsius
sensor reading #1
...
and so on for additional sensors as ordered.

When you first press the O option, the first line will be a set of headers for the columns to follow, to document the units involved.

For example, here is how a data line will appear:

dateTime	bvolts	degCi	degCo	%RH	_max	_avg	degAZ	mmRain
2005/02/01	6.8	21.2	22.5	45.7	3.7	5.0	237	1.4

Fields are tab delimited and records ends with CRLF. Readings can be either present values, taken at the point in time, or they can be filtered or averaged values, or values that are processed in some other way. The real time display can contain several values from one sensor. For example, the windspeed may have fields for maximum and average value, but the current value field that was present in the real time readings may be absent in the logged data file.

There is also a menu option, \$, that allows you to offload and old file, even after choosing N for new run from the menu. The old data is not erased immediately. This capability only backs up one session. When the N option is selected a second time, the file back two levels is no longer available.

Note that there is a hardware option (vDrive) for storing the data file on a USB flash drive.

Data logging capacity and days of deployment:

The information display screen shows the number of data records logged, for example,

Logged 1477/28672

That is, 1477 out of 28672 possible.

Data is stored in the OWL2pe memory in units of words, each of which is a 16 bit entity. This is a compressed binary format, and it is normally expanded to readable ascii text as it is transmitted to the terminal screen.

The total memory capacity of the OWL2pe is 270336 words, organized into 2048 pages of 132 words per page. Each data record takes a certain number of words. The dateTime occupies 3 words, and the internal battery voltage and internal temperature are stored as one word. Then for the sensor readings there will be a certain number of words, usually one per channel reading. Suppose that there are 5 sensor fields, for a total of 9 words per record.

The OWL2pe always stores a whole number of records on a page. A page holds up to 132 words. In the example, $132/9 = 14.667$, so there will be 14 records stored per page. The total number of records that the OWL2pe can hold on its 2048 pages is then $14 * 2048 = 28672$.

How many days can it be deployed? Calculate the number of records per day. For example, if data is logged once per hour, then there will be 24 records per day, and the logger can be deployed for $28672/24 = 1028$ days. Or, if data is logged every 10 minutes, that is 144 records per day, and the logger can be deployed for $28672/144 = 199$ days.

Data logging commands:

The (L)og command on the menu causes the OWL2pe to enter a mode where it scans the inputs periodically and sleeps in between. Waiting for one minute without pressing any key has the same effect as entering (L). The frequency with which the OWL2pe wakes up to scan is determined by a parameter that can be set on the (P)arams menu.

The (N)ew command causes the OWL2pe to initialize its memory pointers to a place in logging memory on a memory page just past the end of the currently stored data (if any). This effectively creates a new data file. The OWL2pe saves a backup copy of the old pointers, so that it is possible to recover data one session back by using the hidden "\$" command. The hidden "!" command (asks for confirmation) actually erases all the data and sets the pointers to the physical start of the memory on word zero of page zero. It is ordinarily not necessary to use the ! command. The OWL2pe automatically rolls over to reuse memory at the beginning if it happens to fill up to the end. Contact EME Systems if you need the OWL2pe programmed to stop logging completely, preserving the oldest data), if it happens to fill completely.

The hidden (D)ump command displays technical information about the OWL2pe memory allocation and shows the contents of the current memory page in a technical hex format.

Parameters submenu:

The (P)arams option on the OWL2pe menu brings up the paramters menu, which shows the current value of each parameter and a number key to press to edit the value of that parameter. To change the value, the user needs to select the parameter by number, and then enter the new falue, and then press ENTER. The menu is re-displayed and the new value should be seen in the list. Note that the OWL2pe does not support backspace or delete. If you make a mistake, just hit ENTER or reset and try again.

Logging interval is the time in minutes between records logged. This should be a number that divides evenly into 1440 (the number of minutes in a day). The best choices are,

1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240 minutes.

See the previous page for how logging interval interacts with record length to determine the maximum length of deployment. Setting the log interval to zero causes data to be logged at the scan interval, which is a period of seconds. Setting the log interval to 255 causes data logging to be inhibited, but screen display and possibly data capture by an external PC continues.

Scan interval is the number of seconds between scans of the channels. If averages and filtering of the data is in progress, then normally one sample will be entered into the accumulation at each scan. If an event gage such as a rain gage is attached, it is checked at this interval. The screen display for the (V)iew menu option is updated at this same rate. Making this interval long can extend the system battery life, but it decreases the number of samples in the averages reported. The indicator LED flashe at this rate. If the logging interval is set to zero, data is logged at this rate too.

The station ID appears on the information header after the program name and version. This station ID is for convenience only. It is useful where there is more than one OWL station.

The low battery threshold is the battery voltage below which indictor is red instead of green. In some systems the low battery condition may bring about other actions, such as shutdown of power hungry peripheral equipment. The OWL2pe itself can operate from power supplies from 5.3 to 18 volts DC. The Vx switched power supply output from the OWL2pe requires may require a voltage greater than 5.3 volts for proper operation. For example, when the Vx supply is set to deliver 10.0 volts, the input voltage would have to be greater than 10.5 volts to maintain that output level. This factor should be entered in the low battery parameter as a signal to the operator. The battery voltage is always recorded in the data log file, as an aid to troubleshooting.

The power delay allows a warmup time for sensors, between the time the Vx power turns on, and the reading taken from the sensors powered from Vx. Some sensors, such as EME TF temperature sensors required practically no warmup time. .1 second is sufficient for most such as the EME LWET leaf wetness probe to acquire a steady value. Some such as ultrasonic depth gages may require much longer, as much as 30 seconds. These may benefit from custom programming.

Additional parameters may be included with custom programming.

Calibration factors -- see next page.

Calibration factors submenu:

Calibration factors are usually linear conversion constants to carry out a transformation of the form,

$$Y = a X + b.$$

The OWL2pe will usually have these numbers tailored for the demands of each particular sensor, rather than as a general formula.

Examples:

Offset for the internal OWL2pe temperature sensor. This sensor measure Celsius from -50 degrees to +85 degrees, and its accuracy is +/- 3 degrees Celsius. The primary error is an offset. The calibration factor is an offset in units of 0.1 degrees Celsius that will be added to correct the raw reading. For example, if correct temperature is 20 degrees Celsius, and the raw sensor reading is 21.5 degrees Celsius, the correction factor entered here should be -15, in units of tenths of a degree. This number is an integer, positive or negative. The sensor is located on the OWL2pe circuit board. Depending on the operation, this sensor may be several degrees above the ambient temperature.

EME TF temperature sensors come with a calibration tag, showing an offset in units of 0.1 degree Fahrenheit. This value (integer, positive or negative) will be added to the raw temperature reading. The calibration screen asks for this value in units of 0.1 degree.

LI-COR light sensors come with a calibration multiplier printed on a calibration certificate and also printed on a label attached to the sensor cable. This multiplier converts from microamps to units of light intensity. Follow the instructions that came with your OWL2pe system to enter the multiplier on the calibration screen.

Wind vanes from Davis Instruments use a potentiometer to monitor wind direction. The OWL2pe monitors the resistance or the voltage coming from the potentiometer, and converts it to wind azimuth. The vane as installed may come out at the wrong angle. The reading from the standard vane is correct only when the mounting arm points directly south (180 degrees). Enter the actual orientation of the mounting arm.

When necessary discuss with EME Systems the necessity of a calibration constant for each sensor.

Technical details and firmware upgrades::

Please refer to the OWL2pe technical manual for information about the inner operation of the data logger and the firmware. Please see <http://www.emesystems.com/OWL2pepr.htm>

If you have the vDrive option, the OWL2pe technical manual may be found on the accompanying USB flash drive.

The options that appear on the Parameters menu and the data that is displayed and logged are determined by programming the BASIC Stamp microcontroller that lies at the heart of the OWL2pe. It is programmed in the PBASIC language, using the enhancements that are available on the OWL2pe module. Only a few of the options can be changed by the user of the equipment. It is set up to be turnkey, to perform a specific task. If a different complement of sensors is needed, or different actins, the program must be modified to accommodate them. The language is very flexible, and this flexibility is one of the strengths of the OWL2pe.

Please contact EME Systems if you would like us to consider changes you may need.

Or, you may like to learn more about the capabilities and make changes yourself. There are many application notes available on the EME Systems web site, and on the Parallax web site. The Parallax BASIC Stamp is a micro-controller that offers great support for both beginning and advanced users.

<http://www.emesystems.com>
<http://www.parallax.com>

Once you have an modified program, It is quite easy to load it into the OWL2pe. This can be done even at a field site with the same cable that is used for offloading data and configuring the OWL2pe. It can be done using a standalone updater program that does not require any programming knowledge, and we even have a programming module that allows people to upgrade the firmware with the push of a button on a small module, the "Stache".

<http://www.emesystems.com/stache.htm>

Please contact EME Systems if you have any questions about the operation or capabilities of the OWL2pe.

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Using the Hyperterminal program to access the OWL2pe:

If you already have and are familiar with Hyperterminal, skim the following material up to “Step by step data offload”. Please contact EME Systems if you need to connect to a Mac or other computer OS.

Most Windows computers both old and new shipped with Hyperterminal preinstalled. It is also called HTPE (Hyperterminal personal edition. It is usually to be found in the directory at Programs/Accessories/Communications, but the exact location varies from computer to computer, so you may have to invoke the search function to find it for the first time.

The latest free version of Hyperterminal, personal edition, (HTPE) is available FREE from <http://www.hilgraeve.com/hpte/index.html>

This is a more powerful version of the Hyperterminal that ships with most Windows computers. Offloading data from the OWL requires only the most elementary features of the program, and there is no need to purchase their full-featured program, called Hyperaccess, nor to be in a hurry to upgrade from one version of Hyperterminal to the next. We have tested all versions of Hyperterminal from 2.0 to 6.1, and all work fine for the purpose of offloading the data from the OWL2c.

Please follow the instructions that come with Hyperterminal in order to install it. It uses a wizard to assist with the installation, and you can normally chose the easy install and path of least resistance.

Many modern computers have only USB ports, and no built-in RS232 port. In those cases, you can plug in a USB to Serial adapter, which cost around \$30. The ones we recommend are the Keyspan PDA adapter model USA-19HS or the FTDI model US232B as listed at the following URLs:

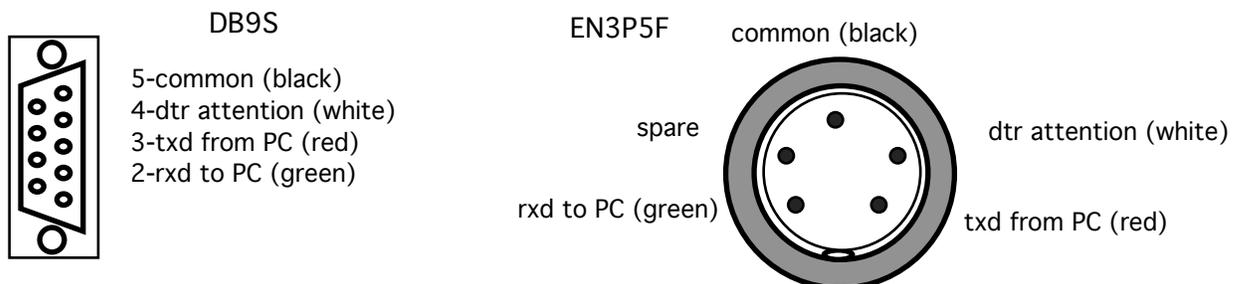
<http://www.keyspan.com/products/usb/usa19hs/>

http://www.parallax.com/detail.asp?product_id=800-00030

Others may work, but we have not tested extensively. The above adapters work for offloading and configuring the OWL2pe, and also for upgrading the OWL2pe firmware. It may turn out very useful for you to be able to do field upgrades of the firmware.

You will need a cable to connect from your PC to the OWL2pe. This will usually be either 1) a “straight-through modem” cable, with a DB9 connector on each end, male to female, or 2) the same with a special Switchcraft circular weatherproof C5 connector on one end in place of the DB9M. OWL2pe units that are mounted in weatherproof NEMA enclosures have the circular weatherproof connector accessible on the outside panel. Cables are available from EME Systems.

facing the connector mounted on the OWL2pe or enclosure



Creating a “new connection”:

When you start Hyperterminal for the first time, it will ask you to create a “new connection”. Alternatively, you can select “New Connection” from the file menu at any time. The “new connection” that you define for the OWL will hold all of the parameters required to connect with the OWL. The program will create an icon on your PC that you can subsequently click to start up the Hyperterminal program with all of those settings intact. You can move that icon or create shortcut on your desktop or task bar for convenience. You will be able to select that connection by name from within the Programs/Communications/Hyperterminal directory.

The first dialog will ask you to provide a name for the “new connection”. Call it OWL9600, and choose an icon that pleases you. We often use the picture with a telephone under an umbrella, to suggest a weather logger.

The second dialog will ask you to select a connection method. Go directly to the drop-down menu and select the option “direct to com1:”. Or, if you will be connecting directly to a different com port, please select the appropriate one. If you are using a USB/serial adapter, it will appear in the list once it is plugged in to an available USB port. The other options in this dialog, the area code and so forth, will be unavailable after you select one of the direct to com options. If you plan to connect to the OWL by modem, please see the separate document.

The third dialog will ask for the COMx properties and port settings. Normally you will select the following:

```
bits per second      9600 (unless your OWL is set up for 2400)
data bits            8
parity               none
stop bits            1
flow control         none
```

[The exception to these parameters might be an OWL set up for interrogation via modem, or for operation by wireless or over long cables, at 2400 baud.] Change the settings if necessary and then click okay. The Hyperterminal main screen will now appear.

You can revise the settings at any time by going to the menu, file/properties, and making changes in the dialog box that pops up. There is an additional tab in the dialog box (“settings”), for making changes to the terminal settings. You can change the appearance of the terminal screen to match your tastes. I prefer to leave it at 24 lines, 80 columns, TTY emulation, with the backscroll buffer=0. You can also change the appearance of the screen from the view menu, by choosing a larger font, or by choosing the “snap” option to collapse the window down around the terminal area.

Step by step data offload:

- 1) Connect the cable. (and the null-modem adapter if necessary.) and run Hyperterminal.
- 2) The OWL2c may need to be reset in order to give the menu on the Hyperterminal screen. Do the following from the Hyperterminal main screen:

- choose "disconnect" from the "Call" menu.
 - or type "ALT-C" and then letter "D"
 - or choose the lifted telephone icon
- choose "call" from the "Call" menu.
 - or type "ALT-C" and then letter "C"
 - or choose the telephone icon

Then OWL main menu should appear on the screen. Alternatively, you can disconnect the OWL power, wait a second or two, then reconnect it, and the OWL2pe menu should appear.

The red and then the green indicator light on the OWL2pe should come on and a message should appear on the desktop PC screen. The message shows the current time and date in the OWL2, and the current number of records stored in relation to the total capacity, and a menu of OWL commands. The OWL2C will automatically go back to logging data if you do not enter a command within one minute after pressing the RESET button.

- 3) Start data capture on your desktop PC. In Hyperterminal
 - choose "capture text" from the "Transfer" menu
 - or type ALT-T and then letter "C"

(do not choose "Receive file") A dialog box will appear that allows you to enter a name for the incoming data file, and also a location (path) for it. You can either press enter to go with the path and file suggested, or you can type in an entire path and file name, or you can alter just the file name. Data will be appended to the file that you choose here, or if the file does not exist, it will be created. The next time you start Hyperterminal, this same path and file name will reappear, so that by default new data will be appended to the previous file. If you want to enter just a new file name without changing the path, press the right-arrow key. The cursor will move to the right end of the name, from whence you can backspace and/or left-arrow to modify the existing name. We strongly suggest that you plan out a consistent scheme that will meet your future needs for naming of your data files.

- 4) Press letter O on the PC keyboard. The data contained in the OWL2 will march up the PC screen and will be saved into the file on the PC you just named.

- 5) When the data flow stops and the OWL menu reappears...
 - choose "capture...", sub-option "stop" from the "Transfer" menu
 - or type ALT-T and then letter "C" and then the letter "S".

This will close the data file.

- 6) At this point you may want to check to be sure that the file was in fact transferred correctly. You can open the file with a text editor or with a test viewer like notepad (small files only) or wordpad. Do this to be sure that the file has been captured correctly before you erase the data on the OWL2

- 7) Return to the Hyperterminal screen. If necessary, RESET again to get the attention of the OWL if more than a minute has passed. (type ALT-C "D" and then ALT-C "C").

- 8) Type "N" in order to start a fresh data file on the OWL. The OWL will ask for Yes/No confirmation. If you do start a new file, old data will remain and the new data will be appended onto the end of the old file. When this is confirmed, the menu will reappear and you will see that there is

now zero data in the file.

9) If you need to reset the clock on the OWL2, press C and follow the prompts. You will need to enter two characters in response to each prompt, for Year, Month, Day, Hour and Minute. Be sure to check that the time and date are set correctly.

10) Additional commands are described at another point in this manual, that allow you to look at current readings and to test the system operation. If you leave the Capture on in Hyperterminal, everything that appears on the terminal screen will also be captured into the file. That can include the menus, your actions, and real time readings, in addition to the logged data. This can be a good thing, in order to self-document the data file, but you must usually cut out the extraneous data before analyzing it in Excel.

11) When you are finished, press L to put the OWL2 into logging mode. Quit the Hyperterminal program by typing ALT-F "X" or by choosing "eXit" from the file menu. Disconnect the cable if necessary. The LED on the OWL2pe may come back on, but it will automatically return to logging mode in one minute.

Troubleshooting NOTES:

If the OWL2 does not respond to commands, it may have gone to sleep. Press RESET to wake it up. You can generate a RESET from Hyperterminal by typing ALT-C "D" and then ALT-C "C" as above.

If all the text bunches up on one line or nothing at all seems to be happening, press the letter "F" to tell the OWL2c to add line feeds. Or if the data is double-spaced, press "F" to tell the OWL2c not to send line feeds. There is an option in Hyperterminal to add line-feeds, on the file/preferences/settings tab. If Hyperterminal adds line feeds, you will not want the OWL to add them also.

If you find that the OWL does not seem to contain any data, where you would expect to find some, then you can use the OWL "\$" option to read out the contents of the previous data file. □

If the OWL menu appears on screen, but the characters you type at the keyboard do not appear, then check the flow control settings. This is in the properties dialog box below the settings for baud rate etc. Be sure the flow control box says "none" and not "hardware" nor "X-onXoff".

vDrive USB key procedures:

The vDrive logs meteorological data onto a USB flash drive. When you come to the field, you can remove the flash drive and insert it in a standard USB port on your computer, and transfer the data file very quickly to the PC. This is much much faster than offloading the data file from the OWL2pe internal memory.

The data is a plain text file, with tab delimited fields and CRLF delimited records. The file can be directly imported to EXCEL or to other text or analysis programs. The data file also contains a header line, naming the fields. The file may also contain comments you enter.

In order to remove the USB key, wait for the LED on the OWL2pe to blink on and then off. The look at the indicator light on the vDrive itself. If it is dark, then you can safely remove the USB key. If the LED is on or blinking, wait for it to turn off, and then remove the USB key.

When you insert the USB key into the USB port on the PC, its icon should appear on the desktop or listed under "my computer". Or, on a Mac, it will appear on the desktop. Open the disk and find the file, CAPTURE.TXT. This will always be the accumulated data file. Drag the file to an archival location, and rename as needed. A file naming system based on location and date may work for you.

Once copied to archive, drag the file to the trash to erase it. If this step is not taken, new data will be appended to whatever is already in the capture file.

Eject the disk. On windows machines, this is done through the "safely remove hardware" item in the dock. On the Mac it is done by dragging the disk to the trash.

Return the USB flash drive to the OWL2pe. Install it while the vDrive indicator light is dark. One alternative is to keep two flash drives, and swap one in the field with one you carry back to a lab. Most USB flash drives will work, however, it is always a good idea to test a new one first, before counting on it for long term data.

There will be a U)SBkey option on the OWL2pe menu, where it is selected by typing "U". The vDrive will power up, the LED on the vDrive will flash red and then green, and a message and a sub-menu will appear on the terminal screen. Here are the menu options:

- 1) Add a comment at the current position in the card data file. You can enter anything you want here up to the number of characters shown in the prompt and ends when you press RETURN or ENTER. You can enter more lines if you wish by choosing option 1 again.
- 2) View data stored on the vDrive. This allows you to be sure that it recording. Reset to abort. .
- 4) View info about the USBkey, file name and file size.
- 6) Reboot: The vDrive LED will flash and the USB key menu will restart
- 7) Erase the old data file. Asks for confirmation.
- 0) back to th main OWL2pe menu

If we provide a flash disk, it may contain other files and documentation for your system.

