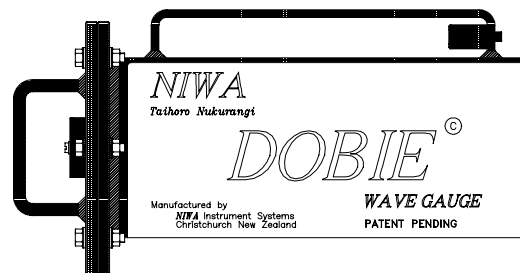




# DOBIE

## Wave Gauge



## Operator's Manual

Version 4.1

June 2001  
DOBIE, NZ Patent Application No. 328902  
NIWA - National Institute of Water & Atmospheric  
Research Ltd  
Manufactured by NIWA Instrument Systems  
Christchurch, New Zealand

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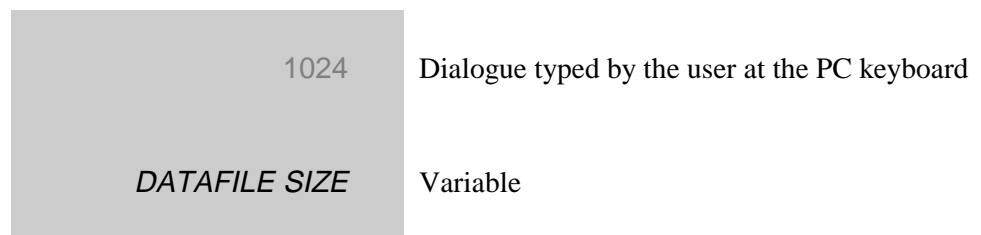
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# CONVENTIONS

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# HOW TO CONTACT US

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Address**

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**Email**

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**Telephone & Fax**

Telephone: +64-3-343-7890  
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# SETUP

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## 1. SETUP OF SOFTWARE ON PC – WINDOWS 95

- Insert Setup Disk #1 in the floppy disk drive.
- Click the Start button.
- Click Run.
- In the dialog box, type the drive letter for the floppy drive, followed by a colon (:), and the word “setup”, and then press return.
  - ⇒ For example: a:setup [RETURN]
- Follow the instructions.

## 2. SETUP OF SOFTWARE ON PC – WINDOWS 3.x

- Create the DOBIE program group

### **Note added 20 December, 2000**

**The software provided for communicating with DOBIE (the “terminal emulator”, which is named Flashrx) will no longer run on PCs that are running Windows 3.x or DOS.**

However, you can still communicate with DOBIE in Windows 3.x and DOS operating environments by installing and using Onset Computer Corporation’s terminal emulator programme TxTools. You can obtain TxTools, complete with installation instructions (simple copy-to-disk installation), by downloading the Instrument Software Upgrade kit from the DOBIE website. TxTools functions nearly identically to Flashrx.

*Download the Instrument Software Upgrade kit from:  
[http://www.niwa.cri.nz/instrument\\_systems/dobienotes/documentation.html](http://www.niwa.cri.nz/instrument_systems/dobienotes/documentation.html)*

⇒ In Program Manager double click on the Main program group

- ⇒ Open Windows Setup
- ⇒ Click on Options/Set Up Applications
- ⇒ Select Ask You to Specify an Application and choose OK
- ⇒ Enter c:\dobie\flashrx.exe in the Applications Path and Filename box
- ⇒ Under Add to Program Group select DOBIE
- ⇒ Click OK
- ⇒ Close Windows Setup
- ⇒ Close the Main window

**Note added 20 December, 2000**

**The software provided for communicating with DOBIE (the “terminal emulator”, which is named Flashrx) will no longer run on PCs that are running Windows 3.x or DOS.**

However, you can still communicate with DOBIE in Windows 3.x and DOS operating environments by installing and using Onset Computer Corporation’s terminal emulator programme TxTools. You can obtain TxTools, complete with installation instructions (simple copy-to-disk installation), by downloading the Instrument Software Upgrade kit from the DOBIE website. TxTools functions nearly identically to Flashrx.

*Download the Instrument Software Upgrade kit from:  
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- ⇒ Close the Main window
- ⇒ Click on the MS-DOS Prompt icon in the DOBIE window
- ⇒ Click on File/Properties
- ⇒ Type DOBIE Data Processor in the Description box
- ⇒ Type c:\dobie in the Working Directory box
- ⇒ Close the DOBIE window

# COMMUNICATIONS CONFIGURATION

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Set the PC serial port settings to 9600 baud, 8 data bits, no parity, 1 stop bit, no handshake.

- 1. Windows 95 – Click on Start. Point to Settings. Click on Control Panel. Click on System. Choose Device Manager. Click on Ports. Click on Communications Port. Choose Port Settings. Select Bits per second, 9600; Data bits, 8; Parity, none; Stop bits, 1; Flow control, none.
- 2. Windows 3.x – In Program Manager, double click the Main program group, double click Control Panel. Double click Ports. Click COM1: or COM2:. Select Baud Rate, 9600; Data bits, 8; Parity, none; Stop bits, 1; Flow control, None.

Invoke the DOBIE Wave Gauge terminal emulator by:

- 1. Windows 95 – Click on Start. Point to Programs. Point to Dobie. Click on DOBIE Wave Gauge.
- 2. Windows 3.x – In Program Manager, double click the DOBIE program group, then double click on DOBIE Wave Gauge.

Pull down the Commands menu and select Setup Port. Set the correct port. Set baud rate to 9600. The remainder of the protocol setup is fixed (data bits, 8; stop bits, 1; handshake, none; parity, none). Plug the 9-pin “D” connector into the PC serial port. Unscrew the comms port cover on the DOBIE endcap and plug in the 3.5-mm stereo jack. See the next section for how to proceed.

## Tip



Ensure that the port number selected in the DOBIE terminal emulator corresponds to the number of the serial port actually being used on the PC.



# COMMUNICATIONS

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DOBIE comprises hardware and software. It is important to understand how the two work together in order to effectively operate DOBIE. This discussion is intended to provide an overview of how DOBIE works, which is followed by specific instructions on how to communicate with DOBIE.

The DOBIE hardware consists of a microprocessor (Onset Computer Corporation's Model 8 Tattletale – the “TT8”) interfaced to a pressure sensor and connected to a power supply. The software is a program – the "DOBIE control program" – that runs on the TT8. The DOBIE control program switches the pressure sensor on and off, takes pressure readings, does the various wave calculations, stores the data in TT8 nonvolatile flashcard memory and liaises with the user when setting up logging sessions and downloading data.

To communicate with DOBIE, the user runs the DOBIE Wave Gauge terminal emulator program on his/her PC and then plugs one end of the DOBIE comms cable into the serial port on his/her PC and the other end into the DOBIE comms port.

(Onset Computer Corporation produce the terminal emulator program TxTools for communicating with the TT8. Some users, if they have access to this program, may like to use TxTools to communicate with DOBIE.)

Invoke the DOBIE Wave Gauge terminal emulator by:

- 1. Windows 95 – Click on Start. Point to Programs. Point to Dobie. Click on DOBIE Wave Gauge.
- 2. Windows 3.x – In Program Manager, double click the DOBIE program group, then double click on DOBIE Wave Gauge.

The DOBIE terminal emulator opens a "window" through which commands typed on the PC keyboard are relayed to DOBIE over the comms cable, and DOBIE responses are sent back to the PC for display on the screen. The DOBIE control program announces its presence by asking questions of the user during setup, or by printing informative progress messages as data logging proceeds. Questions and messages are sent to the terminal window via the comms cable for display, and the user types into the terminal window to communicate with DOBIE.

When power is disconnected from DOBIE the date and time are lost, but all other sampling parameters (e.g., interval between bursts, sampling interval, points per burst) are maintained. Data stored on the flashcard are **not** lost.

DOBIE is always in one of three states:

- monitor mode. DOBIE shows that it is in monitor mode by displaying in the terminal window the prompt TOM8>. DOBIE is "comatose".
- TxBASIC mode. DOBIE shows that it is in TxBASIC mode by displaying in the terminal window the prompt TxB#. DOBIE is "semi-conscious".
- running the DOBIE control program. DOBIE is "alive".

The starting point for conversing with DOBIE is always the OPENING SCREEN which is presented to the terminal window by the DOBIE control program. At the OPENING SCREEN, the user may prepare to set up and initiate a logging session, check the time and battery voltage, display the current pressure and prepare to download data.

To display the OPENING SCREEN:

- From monitor mode (comatose). Disconnect and reconnect the power supply (in disconnecting the power supply the date and time are lost but sampling parameters and any data on the flashcard are **not** lost).

## Tip

It is good practice to disconnect the power for 6 seconds before reconnecting. This ensures DOBIE's microprocessor is thoroughly reset.

The DOBIE control program will launch. If the terminal emulator baud rate is (correctly) set at 9600, you will see the message

```
[9600] Press return to continue...
```

and a bunch of gobbledygook. Press return and DOBIE will proceed through its series of internal checks before finally displaying the OPENING SCREEN. If the terminal baud rate is set at anything other than 9600 you will see the message

```
[38400] Change baud to 9600 now and press return to continue...
```

and a bunch of gobbledygook (the number in square brackets is the baud rate that the terminal emulator is currently set at). Change the baud rate to 9600 by pulling down Commands/Setup port. DOBIE will proceed through its series of internal checks before finally displaying the OPENING SCREEN.

- From TxBASIC mode (semi-conscious). Type ALT-B or pull down the Commands menu and select Boot Eprom (the date and time are **not** lost, sampling parameters and any data on the flashcard are **not** lost). If the terminal emulator baud rate is (correctly) set at 9600, you will see the message

```
[9600] Press return to continue...
```

and a bunch of gobbledygook. Press return and DOBIE will proceed through its series of internal checks before finally displaying the OPENING SCREEN. If the terminal baud rate is set at anything other than 9600 you will see the message

[38400] Change baud to 9600 now and press return to continue...

and a bunch of gobbledygook (the number in square brackets is the baud rate that the terminal emulator is currently set at). Change the baud rate to 9600 by pulling down Commands/Setup port. DOBIE will proceed through its series of internal checks before finally displaying the OPENING SCREEN.

- From within the DOBIE control program (alive). Type CTRL-C and the DOBIE control program (which is already running) will return to the OPENING SCREEN.

DOBIE prints messages and prompts to the comms port regardless of whether anybody is there to actually see them. Thus, when the DOBIE control program is running and a logging session is in progress the informative progress messages are always sent to the comms port. The user can eavesdrop on the DOBIE at any time by connecting the comms between the PC and DOBIE and running the DOBIE Wave Gauge terminal emulator to open the terminal window. DOBIE is fairly verbose; with the DOBIE control program running and after comms connection you will not have to wait more than 60 s to see a message of some kind, unless of course it is waiting for input from the user.

**Given that background, here then is the series of actions you should take after connecting the comms in order to get DOBIE's attention...**

(1) Simply wait for a minute or two. If DOBIE is alive and running, you will see a message of some kind. Once you see a message you can be sure that the comms is operating correctly. You can then type CTRL-C and DOBIE will respond by displaying the OPENING SCREEN (but see the next tip). Time and date and all data are intact. Proceed to download data or initiate new logging session.

**Tip**



DOBIE will always respond immediately to a CTRL-C **unless** it is “hibernating” (1) between bursts or (2) after logging has finished (all bursts have been collected). DOBIE wakes up from hibernation every 55 seconds, and spends the next 5 seconds looking for a CTRL-C. DOBIE prints a message at the start of the 5-s watching period that it is awake and looking for an interrupt. If it doesn't see one then it repeats the cycle by going back into hibernation for the next 55 seconds, and so on. You can still send a CTRL-C during the 55-s hibernation period but you must depress the keys for at least 10 s for it to be recognised. By waiting a minute or two after hooking up the comms you will see whether DOBIE is in a hibernation cycle and DOBIE will tell you when to press CTRL-C.

(2) Type return...

- If DOBIE is in monitor mode (comatose) the TOM8> prompt will be displayed. This will not happen very often. Refer to instructions above for getting to the OPENING SCREEN from here.

- If DOBIE is in TxBASIC mode (unconscious) the TxB# prompt will be displayed. If DOBIE comes up unconscious it is probably because that is how you last left it (most likely after downloading data). Refer to instructions above for getting to the OPENING SCREEN from here.
- If the DOBIE control program is running and DOBIE is waiting for input (e.g., at a menu prompt) the menu will simply be redisplayed. Type CTRL-C to return to the OPENING SCREEN or carry on from where you are.

(3) As a last ditch attempt to get DOBIE's attention, type CTRL-C. If nothing happens then test the comms as follows.

- With the terminal window open, plug the comms cable into the PC. Using a paperclip, short between the tip and middle contacts (TXD and RXD) of the stereo-jack. If the cable and software are working correctly then characters typed on the keyboard will be echoed in the terminal window. If this does not work then remove the comms cable and short pins 2 and 3 (TXD and RXD) on the PC serial port and type a few characters. If the characters are echoed in the terminal window then the DOBIE comms cable is defective and needs replacing. If the characters are not echoed then there is a problem with the PC serial port.

If, after testing the comms and returning to step (1) you end up here again, then check the battery voltage. Replace if necessary (see Power Management) and start again.

## **1. OVERVIEW OF TASKS**

DOBIE measures pressure. What is subsequently done by DOBIE with the pressure measurements depends on which “task” the user has selected. Tasks include:

- storing burst time series of pressure;
- calculating and storing burst-averaged pressure;
- calculating wave statistics (including height, period, spectral width, orbital speed) from pressure and storing the results;
- calculating and storing power spectrum of “hydrostatic depth”.

Further options are provided by the POST-EXPERIMENT DATA PROCESSOR for converting pressure measurements to water depth and wave statistics. Refer to the DOBIE Technical Notes series ([http://www.niwa.cri.nz/instrument\\_systems/dobie.html](http://www.niwa.cri.nz/instrument_systems/dobie.html)) for full details on how DOBIE processes pressure data and how to interpret the results.

## **2. POST-EXPERIMENT DATA PROCESSOR**

After termination of a logging session and data download, the PEDP can be used to “polish” the dataset. The PEDP can:

- format data in preparation for reading into a spreadsheet or graphics program;
- apply small corrections for variations in atmospheric pressure and water density;
- repeat wave calculations with variations in sensor noise level;
- repeat calculations with revised or neglected “real-world” quality checks;
- apply different smoothing procedure to spectra;

and so on.

### 3. BURST SAMPLING

Regardless of the task, DOBIE samples in bursts, that is, short periods of sampling activity (sampling “bursts”) separated by periods of inactivity.

- The interval between bursts is the period of time that elapses between burst start times, not the time between the end of one burst and start of the next.
- The number of points per burst is just that.
- The sample interval is the time interval between actual samples during a burst.

---

*For example, with a sample interval of 2 s, 128 points per burst and a 60-minute interval between bursts, DOBIE will sample for  $(128 * 2) = 256$  seconds then wait for  $(60*60-256)$  seconds or 55 minutes and 44 seconds before the start of the next burst.*

---

- Samples are NOT spot measurements: DOBIE continuously integrates the pressure when sampling.

---

*Using the above example and denoting the burst start time as  $t = 0$ , the first sample is the average pressure over the time interval  $t = 0$  to  $t = 2$  seconds; it is NOT the instantaneous pressure at time  $t = 0$  or  $t = 2$  or somewhere in between. The next sample is the average pressure over the interval  $t = 2$  to  $t = 4$  seconds, and so on.*

---

## Tip

A typical open-ocean sampling scheme deployed by a waverider is 3 hour interval between bursts, sample interval of 0.5 s and points per burst 2048 (17.067-minutes burst duration). In an estuary, where waves might change significantly over the tidal cycle, a 1-hour interval between bursts might be used.

# OVERVIEW OF MENUS

---

The DOBIE control program displays a series of menus which the user uses to prepare and initiate a logging session.

- The OPENING SCREEN is the starting point. It displays information on software version and calibration parameters.
- The TASK SELECTION MENU is displayed below the OPENING SCREEN. Choose a task to proceed.
  - ⇒ If Task #1 is chosen (Display Pressure, Battery Voltage and Time) the obvious is done and the TASK SELECTION MENU is displayed again.
  - ⇒ If Task #5 is chosen (Exit Program and Download Data) then data are downloaded from the flashcard. After download, DOBIE is left in TxBASIC mode (signified by the TxB# prompt) at which point the DOBIE control program can be relaunched by typing ALT-B (or by pulling down the Commands menu and selecting Boot Eprom).

## Tip

Just as a matter of interest: DOBIE is left in TxBASIC mode after data download – instead of being returned to the OPENING SCREEN – so that the user can access the TT8 operating system. This is the only point at which DOBIE can break out of the control program that is running on the TT8. When in TxBASIC mode, both the TT8 operating system and the DOBIE control program can be upgraded, both of which the user can do (no need to return the unit to the factory). Visit the DOBIE website ([http://www.niwa.cri.nz/instrument\\_systems/dobie.html](http://www.niwa.cri.nz/instrument_systems/dobie.html)) to download a complete upgrade kit that contains the latest software (operating system and control program).

- ⇒ If Task #6 is chosen (Put DOBIE to Sleep), DOBIE is placed in a low-power mode, with date, time and data memory protected. When interrupted by a CTRL-C the OPENING SCREEN is brought up.
- ⇒ Choosing tasks 2, 3 or 4 brings up a SETUP MENU.
- The SETUP MENU gives the user access to sampling parameters, including a sub-menu (the HARDWARE CONTROL OPTIONS) for changing calibration parameters.
  - ⇒ The date and time can be changed at the SETUP MENU.

⇒ Leaving the SETUP MENU by choosing PARAMETER CHOICE COMPLETE initiates data logging.

**Tip**



CTRL-C can be typed at any time and the DOBIE control program will return to the OPENING SCREEN. The date and time, all sampling parameters and any data in memory will **not** be lost.



# OPENING SCREEN

---

**DOBIE A running V20.2 for TxBASIC V4.04**

**Maximum datafile address = 153599**

**\*Y2k OK\***

**\*\*\* DOBIE S/N 2005\*\*\***

**Gain, psi/volts = 19.478**

**Offset, psi = 0.072**

**Sensor intrinsic noise, m = 0.001**

**Battery monitor installed; gain [V/u] = 3.754; offset [V] = 0.124**

**CompactFlash memory card detected (10 Mb)**

**NZ Patent Application No. 328902; (c) 1996/1997/1998/1999/2000**

**NIWA - National Institute of Water & Atmospheric Research**

## *Explanation*



The OPENING SCREEN displays information on the software version, the maximum datafile address, the DOBIE serial number and various calibration parameters. Flashcard memory size is also reported.

## *To Proceed*



The TASK SELECTION MENU is automatically displayed following the OPENING SCREEN.

## *Notes*



- \*Y2k OK\* denotes year 2000 compliance.
- The maximum datafile address refers to RAM memory – not flashcard – and is dynamically determined and therefore may vary slightly with the software version and the DOBIE model. DOBIE uses RAM to temporarily assemble and store data before writing to flashcard.

## 1. TASK SELECTION MENU

1. Display Pressure, Battery Voltage and Time (when return is hit)
2. Time Series
3. Tide Gauge
4. Wave Gauge
5. Exit Program and Download Data to OFFLOAD.DAT
6. Put DOBIE to sleep

Enter task number...

### *Explanation*



- Display pressure, battery voltage and time by typing 1 [RETURN].
- Type 2 [RETURN] to record burst time series of total pressure.
- Type 3 [RETURN] to record burst-averaged total pressure.
- Type 4 [RETURN] to record wave statistics and/or wave spectra.
- Type 5 [RETURN] to download data to the file OFFLOAD.DAT and leave DOBIE in TxBASIC mode.
- Type 6 [RETURN] to put DOBIE into very-low-power-drain sleep mode.

### *To Proceed*



- Choose task 1 and the pressure, battery voltage and time are displayed. Program returns to the TASK SELECTION MENU.
- Choose task 2 and the program goes to the ABBREVIATED SETUP MENU.
- Choose task 3 and the program goes to the ABBREVIATED SETUP MENU.
- Choose task 4 and the program asks you to choose a subtask:

**Enter 0 to store wave statistics or  
1 to store wave statistics plus hydrostatic-depth spectrum...**

Having chosen a subtask, the program then goes to the FULL SETUP MENU.

- Choose task 5 to download data to the file OFFLOAD.DAT. DOBIE is left in TxBASIC mode.
- Choose task 6 and DOBIE goes to sleep.

#### *Notes*



- Having chosen task 1:
  - ⇒ pressure is displayed in pounds per square inch (atmospheric pressure is about 14 psi);
  - ⇒ time corresponds to the instant RETURN was hit.
- DOBIE is left in TxBASIC mode after data download – instead of being returned to the OPENING SCREEN – so that the user can access the TT8 operating system. This is the only point at which DOBIE can break out of the control program that is running on the TT8. When in TxBASIC mode, both the TT8 operating system and the DOBIE control program can be upgraded, both of which the user can do (no need to return the unit to the factory). Visit the DOBIE website ([http://www.niwa.cri.nz/instrument\\_systems/dobie.html](http://www.niwa.cri.nz/instrument_systems/dobie.html)) to download a complete upgrade kit that contains the latest software (operating system and control program).

## 2a. SETUP MENU - ABBREVIATED

1. Current date (D/M/Y)... nn/nn/nn
2. Current time (H/M/S)... nn/nn/nn
3. Start time (H/M) (0/0 for immediate)... nn/nn
4. Sample interval (s)... n.n
5. Points per burst (power of 2)... nnn
6. Interval between bursts (min)... nn
7. Total number of bursts... nnn

Power endurance, assuming 18 Ahr/80% availability = nnn days  
Maximum possible bursts = nnn

12. ACCESS HARDWARE-CONTROL OPTIONS...  
13. PARAMETER CHOICE COMPLETE...  
Enter number...

### *Explanation*



- Current date and time are displayed (corresponding to instant RETURN was hit to reach this menu – time is not continuously updated on the menu display).
- Current settings for the sampling parameters are displayed.
- Power endurance, corresponding to the selected task and the current settings for the sampling parameters and assuming an 18 Ahr supply with 80% availability, is displayed, in days.
- Maximum possible bursts for the selected task and the current sampling-parameter settings is displayed.

### *To Proceed*



- Type 1 [RETURN] to change the date.

- Type 2 [RETURN] to change the time. The new time takes effect the instant RETURN is hit.
- Type 3 [RETURN] to change the start time. Start time of 0 hours signifies immediate start.
- Type 4 [RETURN] to change the sample interval.
  - ⇒ The minimum sample interval is 0.1 s.
  - ⇒ Maximum sample interval is 5.0 s.
  - ⇒ The sample-interval resolution is 0.1 s, i.e. an entry of 0.25 s will be rounded down to 0.2 s.
- Type 5 [RETURN] to change the number of points per burst.
  - ⇒ Points per burst must be power of 2.
  - ⇒ The minimum points per burst is 128 and the maximum is 2048.
- Type 6 [RETURN] to change the interval between bursts.
  - ⇒ The minimum interval between bursts is approximately the sample interval multiplied by the points per burst, plus 5 minutes. The interval between bursts will be changed to this minimum value if the interval entered is too small. A warning is displayed.
- Type 7 [RETURN] to change the total number of bursts. DOBIE will go into very-low-power-drain sleep mode once the total number of bursts has been collected during the logging session.
  - ⇒ If the total number of bursts requested exceeds the maximum possible number of bursts then the number of bursts is reset to the maximum. A warning is displayed.
- Type 12 [RETURN] to access the HARDWARE SETUP MENU.
- Type 13 [RETURN] to initiate the logging session. DOBIE will report as follows. Respond as instructed:

**Task 2, time series.**

**You have programmed DOBIE to stop after 63 bursts and the interval between bursts is 30 minutes.**

**\*\*DOBIE will therefore stop logging and go to sleep after 1.31 days\*\***

**Enter I [return] now to initialise memory card prior to logging or CTRL-C to abort...**

You must type I [RETURN] to proceed. Any other response, or typing CTRL-C, will send you back to the OPENING SCREEN.

**During initialisation of the flash memory card all data on the card are erased. (This is the only way data can be erased from the card.)**

Occasionally the initialisation fails, in which case you are sent back to the OPENING SCREEN. In that case, simply try again by choosing your task and proceeding. Initialisation never fails two times in a row!

Having initialised the memory card, DOBIE will report

**Enter L [return] now to start logging or CTRL-C to return to opening screen and task selection...**

Typing L [RETURN] initiates display of a time countdown to the start of the first burst.

*Notes*



- CTRL-C can be hit at any time to return to the OPENING SCREEN.
- Warnings will be displayed at the top of the screen.

## 2b. SETUP MENU - FULL

1. Current date (D/M/Y)... nn/nn/nn
2. Current time (H/M/S)... nn/nn/nn
3. Start time (H/M) (0/0 for immediate)... nn/nn
4. Sample interval (s)... n.n
5. Points per burst (power of 2)... nnn
6. Interval between bursts (min)... nn
7. Total number of bursts... nnn
8. Sensor elevation above bed (m)... n.n
9. Number of spectral estimates to merge... nn
10. Maximum allowable wave period (s)... nn
11. Minimum allowable wave period (s)... n.n

Power endurance, assuming 18 Ahr/80% availability = nnn days  
Maximum possible bursts = nnn

12. ACCESS HARDWARE-CONTROL OPTIONS...
  13. PARAMETER CHOICE COMPLETE...
- Enter number...

### *Explanation*



- Current date and time are displayed (corresponding to instant RETURN was hit to reach this menu – time is not continuously updated on this menu display).
- Current settings for the sampling parameters are displayed.
- Power endurance, corresponding to the selected task and the current settings for the sampling parameters and assuming an 18 Ahr supply with 80% availability, is displayed, in days.
- Maximum possible bursts for the selected task and the current sampling-parameter settings is displayed.
- If task 4/1 has been selected (wave statistics plus hydrostatic-depth spectrum), the number of spectral estimates that will be recorded will also be displayed.

*To Proceed*



See SETUP MENU - ABBREVIATED for explanation of choices 1 to 7.

- Type 8 [RETURN] to change the DOBIE elevation above the bed.  
⇒ Elevation above the bed must be greater than or equal to 0 metres.

## Tip

The elevation above the bed only needs to be accurate within a few tens of centimetres. The PEDP offers an opportunity to correct the elevation above the bed.

Type 9 [RETURN] to change the number of spectral estimates to merge; the merge must be greater than or equal to one.

## Tip

All wave statistics are estimated from the raw pressure spectrum, so this parameter has no effect on the wave statistics. If you are storing the spectrum then a rule of thumb is to set the merge to the number of points per burst divided by 8.

- ⇒ This parameter controls the smoothing of the spectrum; the greater the merge, the smoother the spectrum. The smoothing is accomplished at the expense of loss of resolution of the spectrum. See task 4 (below) for a description of how the merge affects spectrum resolution. The tradeoff for the loss of resolution is an increase in the number of spectra that can be stored by DOBIE.
- Type 10 [RETURN] to change the maximum allowable wave period. For gravity waves, this should be about 30 seconds.
- Type 11 [RETURN] to change the minimum allowable wave period. For gravity waves, this should be about 1 second.  
⇒ Do not set the minimum allowable wave period below 0.8 s. The sensor noise usually has a characteristic period of less than about 0.8 s, thus setting this limit at 0.8 s can help DOBIE distinguish between real waves and sensor noise.
- Type 12 [RETURN] to access the HARDWARE SETUP MENU.
- Type 13 [RETURN] to initiate the logging session. DOBIE will report as follows. Respond as instructed:

### **Task 4/0, wave gauge – store wave stats.**

**You have programmed DOBIE to stop after 63 bursts and the interval between bursts is 30 minutes.**

**\*\*DOBIE will therefore stop logging and go to sleep after 1.31 days\*\***

**Enter I [return] now to initialise memory card prior to logging or CTRL-C to abort...**

You must type I [RETURN] to proceed. Any other response, or typing CTRL-C, will send you back to the OPENING SCREEN.



**During initialisation of the flash memory card all data on the card are erased. (This is the only way data can be erased from the card.)**

Occasionally the initialisation fails, in which case you are sent back to the OPENING SCREEN. In that case, simply try again by choosing your task and proceeding. Initialisation never fails two times in a row!

Having initialised the memory card, DOBIE will report

**Enter L [return] now to start logging or CTRL-C to return to opening screen and task selection...**

Typing L [RETURN] initiates display of a time countdown to the start of the first burst.

*Notes*



- CTRL-C can be hit at any time to return to the OPENING SCREEN.
- Warnings will be displayed at the top of the screen.

## 3. HARDWARE CONTROL OPTIONS

1. ### Gain (psi/volt)... nn.nnn
2. ### Offset (psi)... n.nnn
3. ### Battery monitor gain/offset... n.nnn/n.nnn
4. ### Sensor intrinsic noise level (m)... n.nnn

5. RETURN TO PREVIOUS MENU...  
Enter number...

### *Explanation*



Current settings for hardware-control parameters are displayed.

### *To Proceed*



- Type 1 [RETURN] to change the gain applied by the DOBIE control program to convert volts output by the pressure sensor to pressure in pounds per square inch.

## **Tip**



Download Technical Note 98/2 from the DOBIE webpage for a full explanation of how volts are converted to pressure.

- Type 2 [RETURN] to change the offset applied by DOBIE to convert volts to pressure in pounds per square inch.
- Type 3 [RETURN] to change the gain and offset applied by DOBIE to convert the dimensionless number generated by the TT8 analog-to-digital-converter to power-supply voltage.
- Type 4 [RETURN] to change the intrinsic noise level of the pressure sensor.

## **Tip**



Download Technical Note 99/1 from the DOBIE webpage for a full explanation of sensor noise level.

- Type 5 [RETURN] to return to the previous menu.

*Notes*



- CTRL-C can be hit at any time to return to the SETUP MENU.
- Warnings will be displayed at the top of the screen.

# TASKS

---

## **TASK 1: DISPLAY PRESSURE, BATTERY VOLTAGE AND TIME**

### *Description*



DOBIE displays the current pressure, battery voltage and time.

### *Notes*



- To change the time and/or date, choose task 2, 3 or 4 at the TASK SELECTION MENU and change the time and/or date in the following SETUP MENU.
- Pressure is displayed in pounds per square inch (atmospheric pressure is about 14 psi).
- Time corresponds to the instant RETURN was hit.

# TASKS

---

## TASK 2: TIME SERIES

### *Description*



DOBIE records time series of total pressure.

### *Setup*



The user designs the sampling scheme from the ABBREVIATED SETUP MENU.

### *Data File*



OFFLOAD.DAT is binary format and not directly accessible by the user.

- Process OFFLOAD.DAT using the POST-EXPERIMENT DATA PROCESSOR.

## **Tip**



From time to time, PEDP is enhanced and in so doing the way OFFLOAD.DAT is decoded may be changed. PEDP always reports the details of the output file structure to the user. Download the latest version of PEDP from the DOBIE website. Backwards compatibility is always maintained.

### *Post-Experiment Data Processor*



Use the PEDP to:

- decode OFFLOAD.DAT;
- translate time series of total pressure (psi) into time series of water depth (metres);
- write burst time series of total pressure and water depth to one file per burst.

The user is asked for:

- an atmospheric pressure to subtract from the total pressure;
- a water density (suggestions are given) to improve accuracy of the translation of pressure into water depth;
- DOBIE elevation above the bed.

The DOBIE serial number, software version, sample interval, points per burst and interval between bursts are reported to the screen. The file TIMES.DAT is created, which contains:

DATE//HOUR:MIN:SEC	FILENAME
DATE//HOUR:MIN:SEC	FILENAME
...	...

- *DATE//HOUR:MIN:SEC* is date and time corresponding to burst start time.
- *FILENAME* is the name of the burst datafile starting at *DATE//HOUR:MIN:SEC* and has the form *DOBnnnn.DAT*, where *nnnn* is a number starting at 0000 and incrementing by 1 for each burst..

Each *DOBnnnn.DAT* contains:

SAMPLE NUMBER	TOTAL PRESSURE	WATER DEPTH
SAMPLE NUMBER	TOTAL PRESSURE	WATER DEPTH
...	...	...

- The *TOTAL PRESSURE* corresponding to *SAMPLE NUMBER n* is the average pressure over the interval *DATE//HOUR:MIN:SEC* plus  $[(n-1) * \Delta t]$  seconds to *DATE//HOUR:MIN:SEC* plus  $[n * \Delta t]$  seconds. For example:

---

*Assume the burst started at 10 h and 15 min and the sample interval was 1 s. The first sample in that burst datafile is total pressure/hydrostatic water depth averaged over the interval 10:15:00 to 10:15:01. The second sample is the average from 10:15:01 to 10:15:02, and so on.*

---

- *TOTAL PRESSURE* is in pounds per square inch.
- *WATER DEPTH* is in metres.

**Tip** 

The conversion from pressure to water depth is described in detail in Technical Note 98/3, which can be downloaded from the DOBIE website.

**Tip** 

The number of datapoints in each *DOBnnnn.DAT* is equal to the number of points per burst.

## TASK 3: TIDE GAUGE

### *Description*



DOBIE records mean total pressure.

### *Setup*



The user designs the sampling scheme through the ABBREVIATED SETUP MENU.

### *Data File*



OFFLOAD.DAT contains ASCII data and may be viewed using any text editor. The data therein are not, however, immediately amenable to scrutinization and display. The user should use the PEDP to organise OFFLOAD.DAT into columns ready for opening with a spreadsheet or plotting in a graphics program.

## Tip



From time to time, PEDP is enhanced and in so doing the way OFFLOAD.DAT is decoded may be changed. PEDP always reports the details of the output file structure to the user. Download the latest version of PEDP from the DOBIE website. Backwards compatibility is always maintained.

### *Post-Experiment Data Processor*



Use the PEDP to translate total pressure (psi) into water depth (metres). The user is asked for:

- an atmospheric pressure to subtract from the total pressure
- a water density (suggestions are given) to improve accuracy of the translation of pressure into depth;
- DOBIE elevation above the bed.

The DOBIE serial number, software version, sample interval, points per burst and interval between bursts are reported to the screen.

The PEDP creates the datafile DOBIE.DAT, which contains:

<i>DATE//HOUR:MIN:SEC</i>	<i>BURST NUMBER</i>	<i>MEAN TOTAL PRESSURE</i>	<i>MEAN WATER DEPTH</i>
<i>DATE//HOUR:MIN:SEC</i>	<i>BURST NUMBER</i>	<i>MEAN TOTAL PRESSURE</i>	<i>MEAN WATER DEPTH</i>
...	...	...	...

- *DATE//HOUR:MIN:SEC* is the date and time corresponding to the burst start time.
- *BURST NUMBER* starts at 1 and increments by 1.
- *MEAN TOTAL PRESSURE* is burst-averaged total pressure, units of pounds per square inch.
- *MEAN WATER DEPTH* is burst-averaged water depth in metres.

## Tip



The calculation of mean water depth is described in detail in Technical Note 98/4, which can be downloaded from the DOBIE website.



## TASK 4/0: WAVE GAUGE – WAVE STATISTICS

### *Description*



DOBIE calculates and stores wave statistics.

### *Setup*



The user designs the sampling scheme through the FULL SETUP MENU.

### *Data File*



OFFLOAD.DAT contains ASCII data and may be viewed using any text editor. The data therein are not, however, immediately amenable to scrutinization and display. The user should use the PEDP to organise OFFLOAD.DAT into columns ready for opening with a spreadsheet or plotting in a graphics program.

## **Tip**

From time to time, PEDP is enhanced and in so doing the way OFFLOAD.DAT is decoded may be changed. PEDP always reports the details of the output file structure to the user. Download the latest version of PEDP from the DOBIE website. Backwards compatibility is always maintained.

### *Post-Experiment Data Processor*




Use the PEDP to extract the data from OFFLOAD.DAT and organise it into columns ready for opening with a spreadsheet or plotting in a graphics program.


The DOBIE serial number, software version, sample interval, points per burst and interval between bursts are reported to the screen.


For the first look at the data, run the PEDP and choose option 99 (“Do not reprocess data; simply produce DOBIE.DAT”). The PEDP creates the datafile DOBIE.DAT, which contains:

DATE// HOUR:MIN:SEC	BURST NUMBER	QUALITY FLAG	EFLAG	EFLAGR	MEAN WATER DEPTH	STANDARD DEVIATION	MEAN SPEC. PERIOD	SPEC. WIDTH	SIG. ORBITAL SPEED	SIG. WAVE HEIGHT	PENETR.
DATE// HOUR:MIN:SEC	BURST NUMBER	QUALITY FLAG	EFLAG	EFLAGR	MEAN WATER DEPTH	STANDARD DEVIATION	MEAN SPEC. PERIOD	SPEC. WIDTH	SIG. ORBITAL SPEED	SIG. WAVE HEIGHT	PENETR.
...	...	...	...	...	...	...	...	...	...	...	...

- *DATE//HOUR:MIN:SEC* is the date and time corresponding to the burst start time.
- *BURST NUMBER* starts at 1 and increments by 1.
- *QUALITY FLAG* is 0 if the data and calculations passed all checks - see *EFLAG*.
- *EFLAG* is the error flag. It will be 0 if *QUALITY FLAG* is zero. If *QUALITY FLAG* is 1 then *EFLAG* signifies which data or calculation check failed. See below.
- *EFLAGR* will be zero for this first look at the data.
- *MEAN WATER DEPTH* is burst-averaged water depth in metres.
- *STANDARD DEVIATION* is standard deviation of the water depth in metres.
- *MEAN SPECTRAL PERIOD* is the mean spectral period of the waves in seconds.
- *SPECTRAL WIDTH* is the dimensionless width of the spectrum.
- *SIGNIFICANT ORBITAL SPEED* is in metres per second and is the maximum orbital speed at the bed corresponding to the significant wave height and the mean spectral period.
- *SIGNIFICANT WAVE HEIGHT* is the average height of the highest 1/3 waves, in metres.
- *PENETRATION* is the fraction of the total pressure signal that has penetrated down from the surface to the level of the DOBIE.

**Tip**  Wave statistics are described in detail in Technical Note 98/5, which can be downloaded from the DOBIE website.

**Tip**  Technical Note 98/9, which can be downloaded from the DOBIE website, describes extended wave statistics that are calculated by PEDP.

**Tip**  For most users in most circumstances, the PEDP will only need to be run this one time to organise the data into columns ready for opening with a spreadsheet or graphics package. The wave statistics calculated by DOBIE are intended to be conservative, meaning that if a statistic does not seem physically realistic then it is replaced with an invalid data signifier. The cost of this programmed conservativeness might be excessive error flags, which will occur especially when DOBIE is working at the limit of its ability (see below). The advanced user may want to bypass the inbuilt conservatism and minimise the number of error flags. This is the main purpose of running the PEDP more than once. The other purpose, again aimed at the advanced user, is to “tweak” some of the parameter settings to improve the accuracy of the wave statistics.

To reprocess data in order to lower the error count and improve accuracy of the wave statistics, re-run the PEDP choosing a suitable option. The output file DOBIE.DAT will be rewritten. *EFLAGR* will now denote the error code for the reprocessing run. *EFLAG* will not change. Reprocess the data with the PEDP as many times as you like.

#### Interpretation of Error Codes

<i>EFLAG/ EFLAGR</i>	MEANING	TYPE
1	Pressure sensor dead	A
2	Not used	-
3	Not used	-
4	Wild-point tolerance exceeded	A
5	Interpolation to replace wild points in raw pressure time series failed	A
6	Mean spectral period not in range defined by user	B
7	Iteration to solve linear-wave dispersion relationship for wavelength failed	B
8	DOBIE out of water	B
9	Spectrum moment calculation failed	B
10	Exception in QCHECK or WCALC	A
11	Exception in top-level control code	A
12	Intrinsic noise level of sensor exceeded signal level	B
13	Maximum wave steepness exceeded	B
14	Maximum ratio of wave height to water depth exceeded	B

There are two types of error:

- Type A errors occur when quality checks applied to the raw pressure time series fail. All statistics are replaced by invalid data signifiers (“99”) and neither DOBIE nor the PEDP can calculate wave statistics for this burst. This type of error is rare.
- Type B errors occur when calculation of wave statistics fail. *MEAN WATER DEPTH, STANDARD DEVIATION, MEAN SPECTRAL PERIOD* and *SPECTRAL WIDTH* are all valid, but all other statistics are invalid (“99”). The PEDP can attempt recalculation of the remaining wave statistics, if desired.

TYPE	MEANING	ACTION
A	No valid statistics calculated (all are replaced by “99” in data file).	The PEDP cannot do anything for this burst.
B	<i>MEAN, STANDARD DEVIATION, MEAN SPECTRAL PERIOD</i> and <i>SPECTRAL WIDTH</i> are all valid; all other statistics are invalid (“99”).	Attempt calculation of wave statistics for this burst again using the PEDP.

## Tip

Type B errors occur when DOBIE is working at the limit of its ability, for example, measuring very short waves in deep water, where the noise level of the sensor is comparable to the pressure signal generated by the wave train. With DOBIE deployed on an intertidal flat, Type B errors may occur as DOBIE is submerged by and emerges from the water with the rise and fall of the tide. At these times, the precise atmospheric pressure, for instance, may be needed for

DOBIE to accurately estimate water depth and all of the consequent wave statistics. See Technical Note 99/1, which can be downloaded from the DOBIE website, for measuring small waves in lakes and estuaries.

## TASK 4/1: WAVE GAUGE – WAVE STATISTICS PLUS HYDROSTATIC-DEPTH SPECTRUM

### *Description*



DOBIE calculates and stores wave statistics and the power spectrum of hydrostatic depth.

### *Setup*



The user designs the sampling scheme through the FULL SETUP MENU.

### *Data File*



OFFLOAD.DAT is binary format and not directly accessible by the user.

- Process OFFLOAD.DAT using the POST-EXPERIMENT DATA PROCESSOR.

## **Tip**



From time to time, PEDP is enhanced and in so doing the way OFFLOAD.DAT is decoded may be changed. PEDP always reports the details of the output file structure to the user. Download the latest version of PEDP from the DOBIE website. Backwards compatibility is always maintained.

### *Post-Experiment Data Processor*



Use the PEDP to extract the data from OFFLOAD.DAT.

OFFLOAD.DAT contains both wave statistics and spectra. The PEDP asks you to choose which data to extract from OFFLOAD.DAT (i.e. statistics or spectra).

Refer to the previous section (Task 4/0) for description of wave statistics, which are written by the PEDP to the file DOBIE.DAT. The following notes refer only to processing of spectra.

- The DOBIE serial number, software version, sample interval, points per burst and interval between bursts are reported to the screen.

- The file `TIMES.DAT` is created, which contains the following information for each burst:
  - ⇒ The burst number.
  - ⇒ The start time (date/hh:mm:ss) of the burst.
  - ⇒ The output file where the spectrum for the burst has been written. The filename has the form `DOBnnnn.DAT` where `nnnn` starts at 1 for burst number 1 and increments by 1 for subsequent bursts.
  - ⇒ The burst-averaged water depth, in metres.
  - ⇒ The value of the quality flag. A value of 0 indicates the data and calculations passed all checks. A value of 1 indicates a check was failed. The error flag (next) denotes which check was failed.
  - ⇒ The value of the error flag. See Task 4/0 for explanation. If the error flag is Type A (see table above) then `DOBnnnn.DAT` is not written. A message is posted in `TIMES.DAT` to that effect.

- Each `DOBnnnn.DAT` contains:

<i>FREQUENCY</i>	<i>PERIOD</i>	<i>SPEC</i>
<i>FREQUENCY</i>	<i>PERIOD</i>	<i>SPEC</i>
...	...	...

- ⇒ *FREQUENCY* is the frequency of the spectral estimate, units of 1/s.
- ⇒ *PERIOD* is the period of the spectral estimate, units s.
- ⇒ *SPEC* is the spectral estimate, which has units of  $\text{m}^2/[1/\text{s}]$ .

**Tip**



Download Technical Note 98/6 from the DOBIE website for a complete explanation of the spectrum. Technical Note 2000/1 has further information.

**Tip**



Run the PEDP as many times as you like to extract statistics and spectra. `OFFLOAD.DAT` is never altered by the PEDP.

# TASKS

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## TASK 5: EXIT PROGRAM AND DOWNLOAD DATA

### *Description*



Data are downloaded and DOBIE is left in TxBASIC mode.

### *To Proceed*



To offload the data from the flashcard into the file OFFLOAD.DAT on your computer, follow the instructions:

**\*\* Should control be lost at any point during the download sequence, power-down/up DOBIE and begin download again \*\***

**DOBIE baud is currently 9600  
Enter DOBIE new baud...**

- Enter a baud rate for data download. You can enter 1200, 4800, 9600, 19200, 38400 or 57600. There is generally no need to download data at less than 9600. Some computers may not like communicating as fast as 57600. Experiment to find a rate that suits your computer. If you lose control at any point, disconnect then reconnect DOBIE batteries to start again. You will not lose data on the flashcard. You may also need to close then re-open the terminal emulator.

When you enter a number, **DOBIE's** baud rate is changed. You now need to change the baud rate of the **terminal emulator program** (FlashRX or TxTools) to match...

**Change FlashRX/TxTools baud to new value now...**  
**1. FlashRX: pull down Commands then Setup Port...**  
**2. TxTools: pull down CommPort then Port-Setup..**

- If you are using FlashRX (the terminal emulator that came with DOBIE) then pull down Commands/Port Setup and select the baud rate to match. If you are using TxTools (Onset Computer Corporation's terminal emulator) then pull

down CommPort/Port Setup and select the baud rate to match.

DOBIE will now begin sending the datafile to your computer. You need to tell the terminal emulator to start accepting the data...

**Initiate data download now...**

- 1. FlashRX: pull down Commands then Offload datafile...**
- 2. TxTools: pull down CommPort then Rcv-file-XMODEM...**

- If you are using FlashRX (the terminal emulator that came with DOBIE) then pull down Commands/Offload datafile. If you are using TxTools (Onset Computer Corporation's terminal emulator) then pull down CommPort/Rcv-file-XMODEM. In both cases name the datafile OFFLOAD.DAT.

When the download is finished, **DOBIE** changes its baud rate back to 9600. You need to change the **terminal emulator** baud rate back to 9600 to match...

**DOBIE baud is about to be changed back to 9600.**

**Change FlashRX/TxTools baud back to 9600 now...**

- 1. FlashRX: pull down Commands then Setup Port...**
- 2. TxTools: pull down CommPort then Port-Setup...**

- If you are using FlashRX (the terminal emulator that came with DOBIE) then pull down Commands/Port Setup and change the baud to 9600. If you are using TxTools (Onset Computer Corporation's terminal emulator) then pull down CommPort/Port Setup and change the baud to 9600.

DOBIE will now exit into TxBASIC mode (TxB# prompt).

- Type ALT-B or pull down the Commands menu and select Boot Eprom to return to the OPENING SCREEN.

**Tip** 

After data download, open another window (File Manager, Explorer, DOS window...) and make a backup copy of OFFLOAD.DAT. Set the attributes to read-only so that it is protected from accidental overwriting.



# TASKS

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## TASK 6: PUT DOBIE TO SLEEP

### *Description*



DOBIE is put into a very-low-power-drain sleep or “hibernation” mode.

### *Explanation*



**THIS IS  
IMPORTANT!**

**When DOBIE is not actually logging data and it is just sitting around – perhaps displaying the OPENING SCREEN or maybe you left it in TxB# mode after data download or maybe you have just installed new batteries and you are carrying DOBIE to a deployment site – then it is using precious battery power. You should never leave DOBIE “idle” with batteries installed – if it is not actually logging data, then put it to sleep using this task!**

In this mode, the clock is kept running while drawing very little power. DOBIE wakes from its hibernation every 55 s and spends the next 5 s looking for a CTRL-C in its input buffer. DOBIE prints a message at the start of the 5-s watching period that it is awake and looking for an interrupt. If it doesn’t see one then it repeats the cycle by going back into hibernation for the next 55 seconds, and so on.

### *To Proceed*



Type CTRL-C during the 5-s watching period and DOBIE will respond immediately by displaying the OPENING SCREEN. You can still send a CTRL-C during the 55-s hibernation period but you must depress the keys for at least 10 s for it to be recognised.

# LED FUNCTIONS

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The single LED inset into the endcap signals to the user DOBIE's current activity. The following table shows how to interpret the LED and what action, if any, is required subsequently.

LED ACTIVITY	INDICATES	ACTION REQUIRED
<i>lit continuously</i>	DOBIE is "idle" (awaiting input from the user, or in TxB# mode)	Program DOBIE and begin logging, or put DOBIE to sleep. You are wasting battery power. See Task 6.
<i>1 flash</i> 5s flash every 30s	DOBIE is counting down to start of logging	Check on your watch that logging start is not overdue
<i>2 flashes</i> 2 x 0.5s flash every 60 s	DOBIE is sleeping between bursts	None
<i>N flashes</i> quick flash every delta-t	DOBIE is sampling ( <i>N</i> is points per burst)	None
<i>1 flash</i> 5s flash every 60s	DOBIE is asleep after all bursts collected or because you put it to sleep (Task 6)	Download data if it is at the end of a logging session

# POST-EXPERIMENT DATA PROCESSOR

---

After termination of a logging session and data download to the file OFFLOAD.DAT, the PEDP can be used to “polish” the dataset.

## Tip



From time to time, PEDP is enhanced and in so doing the way OFFLOAD.DAT is decoded may be changed. PEDP always reports the details of the output file structure to the user. Download the latest version of PEDP from the DOBIE website. Backwards compatibility is always maintained.

To invoke the PEDP:

- 1. Windows 95 – Click on Start. Point to Programs. Point to Dobie. Click on DOBIE Data Processor. When an MS-DOS window opens type PEDP [RETURN] to invoke the PEDP. Type EXIT [RETURN] to close the window when finished or PEDP [RETURN] to run the PEDP again.
- 2. Windows 3.x – In Program Manager, double click the DOBIE group, then double click DOBIE Data Processor. When an MS-DOS window opens type PEDP [RETURN] to invoke the PEDP. Type EXIT [RETURN] to close the window when finished or PEDP [RETURN] to run the PEDP again.

The PEDP will open the file OFFLOAD.DAT, determine what kind of data the file contains, and then await instruction by the user. Follow the prompts on the screen. Here is a summary of the files created by the PEDP:

TASK #	PEDP READS	PEDP CREATES
2	OFFLOAD.DAT	TIMES.DAT, DOBnnnn.DAT
3	OFFLOAD.DAT	DOBIE.DAT
4/0	OFFLOAD.DAT	TIMES.DAT, DOBIE.DAT
4/1	OFFLOAD.DAT	TIMES.DAT and DOBIE.DAT or TIMES.DAT and DOBnnnn.DAT

## Tip



Run the PEDP as many times as you like – OFFLOAD.DAT is never altered by the PEDP.

# DEPLOYMENT

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Before every deployment:

- Both O-ring seats (main case and comms port) and corresponding mating faces should be inspected for damage and cleaned with lint-free cloth. Silicone-based lubricant (e.g., Dow Corning 111) should be applied lightly.
- O-rings should be inspected for damage (small cuts or abrasions) and cleaned. A silicone-based lubricant should be applied sparingly to the O-rings before reinstalling.
- Replace the 8 D-cell batteries (Eveready alkaline No. E95, or equivalent) in the battery compartment. Screw down retaining bar firmly!
- The sacrificial zinc anode should be inspected and replaced if necessary. Never deploy DOBIE without an anode.

## Tip

When closing the housing ensure the O-ring remains in its seat!

The simplest deployment technique is to strap DOBIE to a mooring weight and place the whole assembly on the seabed:


## Tip

DOBIE **must** be electrically isolated from the mooring. This is to ensure that electrolysis cannot take place. DOBIE must not touch any other metals that are used in the mooring. Assuming DOBIE is simply strapped to a mooring weight, isolation could be achieved by inserting a rubber sheet between DOBIE and the mooring block, and also wrapping the strap (if it is metallic) with rubber where it contacts DOBIE. **Be very diligent about this.** If DOBIE is not effectively isolated, the sacrificial anode will be quickly consumed and the chamber will start corroding.


- The mooring weight should be heavy enough to keep DOBIE stable under the largest expected waves.
- Strap DOBIE to the weight so that DOBIE will lie horizontally on the seabed (but see tip below), which will prevent suspended sediment settling on DOBIE

and clogging the pressure-sensor orifice. This arrangement will also allow a diver to view the endcap LEDs without disturbing DOBIE.

- Tie a floating line to DOBIE. Bring the line to either a surface buoy, to mark DOBIE's location, or to a subsurface buoy, which will aid recovery should DOBIE become buried by sediment.

**Tip**  DOBIE can be mounted in any orientation, since pressure is omnidirectional.

- DOBIE can be fixed to a taut wire in mid-water column, with care.
- DOBIE should not be mounted below a heaving buoy.

**Tip**  Download Technical Note 98/1 from the DOBIE website for a full discussion of the factors that bear on choosing deployment depth.

**Under no circumstances deploy deeper than DOBIE's maximum rated depth, beyond which the pressure sensor will be damaged. Refer to your DOBIE specifications.**

# MEMORY MANAGEMENT

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## Tip

From time to time data compression used in data storage is improved. DOBIE computes memory endurance for the current sampling parameters and reports it to the user during setup. The memory endurance thus reported is the best estimate, and reflects the most recent improvements in data compression. Although the example endurances reported below are reasonably accurate and can be used to design experiments, you should refer to the numbers reported by DOBIE during setup for the most accurate estimates.

The following equations can be used to estimate memory endurance, which is the number of bursts that will fill the data memory. *MEM* is the memory size, which is **roughly** 10,000,000 for the 10Mb flashcard; and 40,000,000 for the 40 Mb flashcard (the accurate number for a flashcard is reported when the card is initialised immediately prior to a logging session).

- Task 2 (time series): memory endurance depends on number of points per burst,  $N$ :

$$(MEM - 114) / (10 + 2N)$$

Thus, for  $N = 1024$  for example, the memory will fill after about 4,900 bursts with 10Mb flashcard and 19,500 bursts with 40 Mb flashcard.

- Task 3 (tide gauge): memory endurance is about 525,000 bursts with 10 Mb flashcard and 2,100,000 bursts with 40 Mb flashcard. Memory endurance is independent of sampling parameters.
- Task 4/0 (wave statistics): memory endurance is about 123,000 bursts with 10 Mb flashcard and 492,000 bursts with 40 Mb flashcard. Memory endurance is independent of sampling parameters.
- Task 4/1 (spectrum plus statistics): memory endurance depends on number of spectral estimates,  $N_S$ :

$$[MEM - 22 - (2N_S)] / [32 + (2N_S)]$$

where  $N_S = N / 2M$  and  $M$  is the merge. Thus, for  $N_S = 128$  and with 10 Mb flashcard the endurance is 34,700 bursts and with 40 Mb flashcard the endurance is 139,000 bursts.

DOBIE computes memory endurance for the current sampling parameter settings using the above equations and reports it during setup. DOBIE will halt logging and go to sleep when the data memory is full.

# POWER MANAGEMENT

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## Tip



DOBIE computes power endurance for the current sampling parameters and reports it to the user at the SETUP MENU. The power endurance thus reported reflects changes in hardware and software designed to minimise power drain and implemented from time to time. The number reported by DOBIE is always the best estimate.

DOBIE's power supply is a rack of 8 D-cells (Eveready alkaline No. E95, or equivalent; ~18 Ahr) mounted in the battery compartment. It is important to be able to accurately estimate power endurance. The following discussion is intended for that purpose.

Very roughly, the following currents are drawn:

- 50 mA when sampling or processing data;
- 0.5 mA between bursts or when DOBIE is asleep.

You can use those figures to roughly estimate power endurance given your particular sampling parameters, figuring on about an 18 Ahr main power supply (fresh batteries). Better yet (better because the estimation will be more accurate), let DOBIE do it for you.

DOBIE computes power endurance for the current sampling parameter settings and reports it at the SETUP MENU (FULL or ABBREVIATED).

Here are some example durances:

<i>N</i>	$\Delta t$ (secs)	<i>IBB</i> (min)	<i>E</i> (days)
1024	0.2	30	77
2048	0.1	30	77
2048	0.2	30	43
2048	0.1	60	144

- *E* is endurance, which is the time, in days, to expend 80% of the battery supply (i.e. 14.4 Ahr) when collecting data in burst mode.
- *N* is the number of points per burst.
- $\Delta t$  is the sample interval in seconds.

- *IBB* is the interval between bursts in minutes.

**Data stored on flashcard is not volatile and will not be lost if the power supply is drained. By all means run DOBIE fitted with flashcard data storage until the power supply is totally exhausted!**



# ROUTINE MAINTENANCE

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- Rinse the housing in freshwater after deployment to avoid buildup of salt crystals around the seals and pressure sensor orifice.
- Inspect the pressure sensor orifice screen. If it appears dirty or clogged, remove and wash. Do not touch the black membrane as this will result in permanent damage.
- Remove all batteries before storing DOBIE.
- Renew the sacrificial anode from time to time.

