

Recording of Seismic Data with a2d

Hardware checks

- Run Cleaning Tapes in tape drives.
- Make sure that the streamer input data line to the SUN is disconnected.
- Plug streamer input data line to the oscilloscope. Make sure streamer signal has no more than 5 volts peak to peak. You can decrease voltage by adjusting the decibels on the amplifier (coarse is upper knob, fine is lower). Every increase of 20db is a multiplication factor of 10 (e.g. 1mv x 40db = 100mv).
- Connect the streamer input data line into the patch box that goes into the SUN. Position #1. Then make sure the trigger is plugged in the patch box.

Set-up for a2d

Insert 4mm (dat) into /dev/rmt/1 and 8mm (exabyte) into /dev/rmt/0 into Ross (or Hess) external tape drives.

```
ross% underway  
ross% underway
```

Log in to Ross (or Hess) on the Underway account.
Wait for openwindows to start.

```
ross% su root  
pswd = manager
```

su = switch user to root directory.

Look at the GPS time in WinFrog and compare the SUN time to the clock time. Change time if necessary. SUN time should be within one second of WinFrog time. To check/change time do as follows:

```
# date
```

to check time

```
Wed Apr 4 05:34:00 GMT 2001
```

SUN responds with date/time. Most of the time, the SUN clock is inaccurate so must reset time to match WinFrog time (displayed in WinFrog vehicle window). To do this, type the date command again, but this time, give it the time you want to set.

```
# date 040405352001
```

Make it something like 1 min ahead. Then, just as the time on WinFrog changes to match the time you have on the SUN, hit return to execute the command and synchronize SUN with WinFrog.

```
Wed Apr 4 05:35:00 GMT 2001
```

```
# exit
```

Be sure to exit from root directory before proceeding.

```
ross% cd segydata
```

Get into the /segydata directory.

/export/home/underway/segydata

ross% **ls**

187/	core	navlist	tfile100272010957
a2dtotape	logfile	shotfile	wf2mgd77.log
checktape.out	mgd77.hdr	tapetoa2d	

ross% **rm core**

rm: remove core (y/n)? y

If there are any “core” files, delete them. They are system crashes.

ross% **rm tf***

rm: remove tfile100272010957(y/n)?y

If there are any tfiles (where***** is the Julian date and time), determine if they contain real data or not. If real, rename the files if not, delete the files.

Make sure the contents of the “logfile” and “shotfile” are empty when starting the survey. If the file contains real data, rename (mv) it. If the files do not contain real data, delete them (rm). Recreate (touch) the logfile and shotfile.

ross% **head logfile**

to view the contents at the beginning of the file
/export/home/underway/segydata/tfile100237214405
/export/home/underway/segydata/tfile100256021706
/export/home/underway/segydata/tfile100272010559, etc.

to view the contents at the beginning of the file

ross% **rm logfile**

rm: remove logfile (y/n)? y

to delete logfile

ross% **touch logfile**

to recreate logfile

ross% **more logfile**

to view contents of logfile. It should be empty.

ross% **head shotfile**

2000 237 21 45 01 000 shot 1 1
2000 237 21 45 16 000 shot 2 1
2000 237 21 45 32 000 shot 3 1
2000 237 21 45 47 000 shot 4 1 etc.

to view the contents at the beginning of the file

ross% **rm shotfile**

rm: remove shotfile (y/n)? y

to delete shotfile

ross% **touch shotfile**

to recreate logfile

ross% **more shotfile**

to view contents of shotfile. It should be empty.

Start Seismic Data Acquisition

ross% **starta2d**

This starts the a2d data acquisition and display program as well as the “segy2tap” program which copies finished tfiles to the 4mm and 8mm external tape drives.

A window with a white screen on the left and a blue bar on right will open. The next page is a guide to setting up the seismic data acquisition parameters in a2d.

Acquisition Parameters Set-Up

A2D SEISMIC PACKAGE

Set-up Parameters for DEVICE (upper right blue panel)

CHANNELS = 1
GAIN = 1 (don't change this)
MAX = 4
TRIGGER = EXT (WinFrog providing external trigger)
SAMPLE INTERVAL = 1000 (1 millisecond or samples 1000 times/sec)
Or, 500 (0.5 milliseconds = 2000 times/sec or 2 kHz)
SHOT INTERVAL = can't modify
RECORD(ING) LENGTH = number of seconds recording a shot; set this to the maximum water depth in the survey area plus 1 sec (750m). Want to be sure that penetrate 1 second into bottom.
RECORDING DELAY = number of seconds to wait after the outgoing pulse, prior to start of recording; in deep water, may have to set delay so don't record upper water column.
LINE NUMBER = name the survey line number the same as what you plan to name it in WinFrog. After you enter this number, double click in the blue background of the upper screen. If a2d doesn't like any of the entries, it will display an error message in the white screen.

Set-up Parameters for DISPLAY (lower right blue panel)

TRACES ON SCREEN = 100 is ok (Dennis likes ~20)
DISPLAY LENGTH = start with same number as "RECORD(ING) LENGTH" (above). If the data looks OK, try changing it to 2 secs to filter out top 2 secs (1500m) of water.
Note: To look at the quality of the "d-wave", set DISPLAY LENGTH to 0.
START TIME = usually 0
SELECT TRACES = 1
 click on number 1
 click on set in "Select Traces" area
 click on "set" just to right of "Start Time"

Set-up Parameters for Secondary DISPLAY Screen

Double click in blue background anywhere in the DISPLAY screen

AMPLITUDE = 3
HEADER = set to hr:mm for hours and minutes.
NO FILES = 0; this tells you how many data files are on the disk that have not been written to tape. If set is correct, then there should be zero data files on the disk.
DAT = should say "ready" if 4mm tape drive is loaded and not write protected.
EXABYTE = should say "ready" if 8mm tape drive is loaded and not write protected.

Start-up

Before hitting the START button at the top of the blue panel, make sure event logging is off in WinFrog. Then, after hitting the START button, start a new Event (survey line) and install the trigger device in WinFrog (see WinFrog set-up, next section).

DEVICE

CHANNELS
 GAIN
 MAX
 TRIGGER

SAMPLE INTERVAL

SHOT INTERVAL

RECORD(ING) LENGTH

RECORDING DELAY

LINE NUMBER

DISPLAY

TRACES ON SCREEN

DISPLAY LENGTH

START TIME

SELECT TRACES

1	7	13	19
2	8	14	20
3	9	15	21
4	10	16	22
5	11	17	23
6	12	18	24

NOTE:

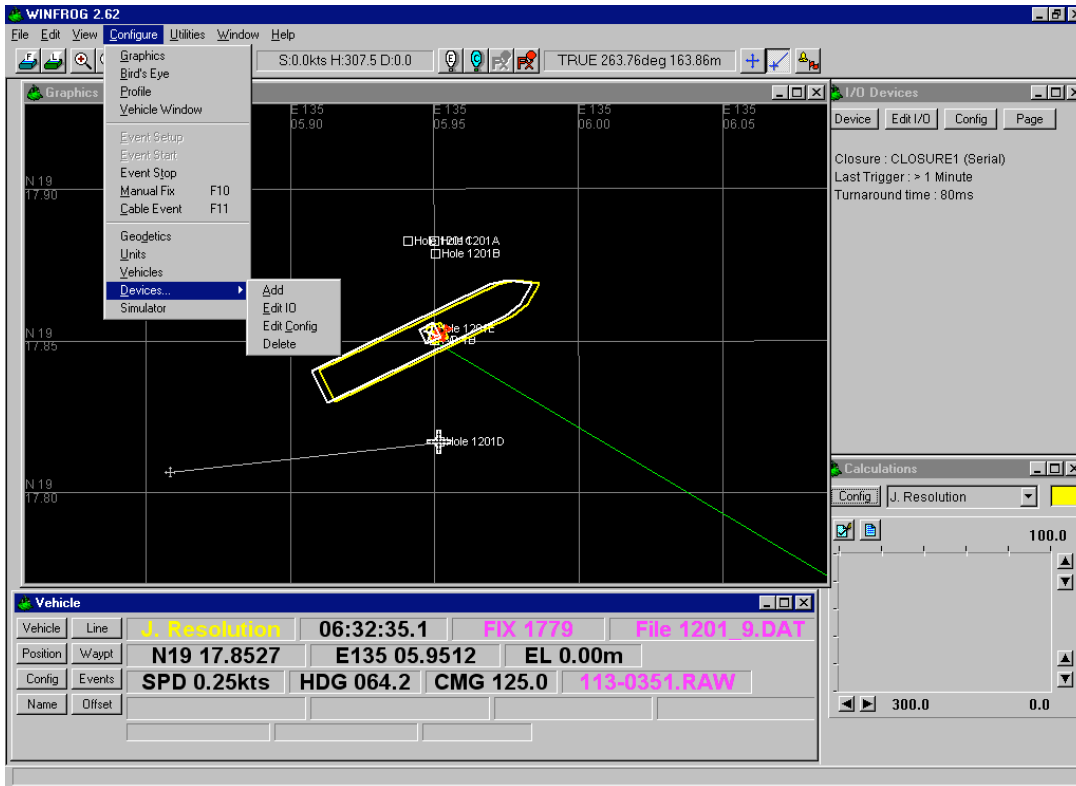
SOUND IN WATER TRAVELS AT 1500m/sec therefore, two way travel time is 750m/sec.
 WATER GUN FIRING RATE = 12 sec (usually)

WinFrog Set-up

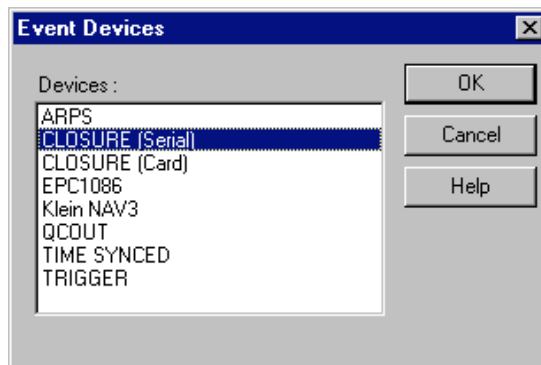
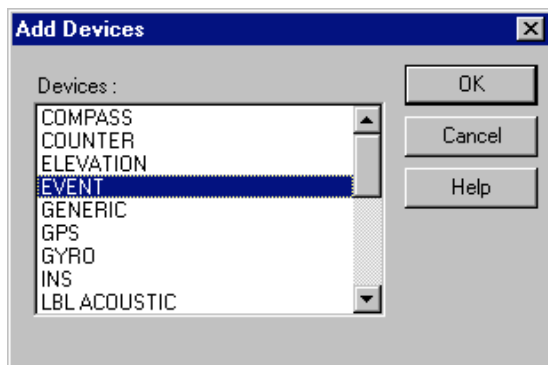
Adding the Trigger

After clicking the START button in a2d, you must set-up the trigger in WinFrog. To do this the trigger device “CLOSURE” is added to the device list. Then a new Event is started for the seismic line. The steps are as follows:

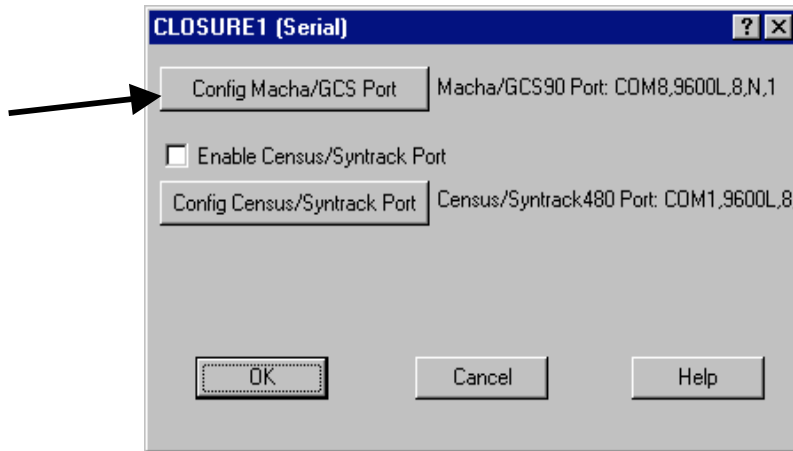
From the upper menu bar select Configure>Devices>Add.



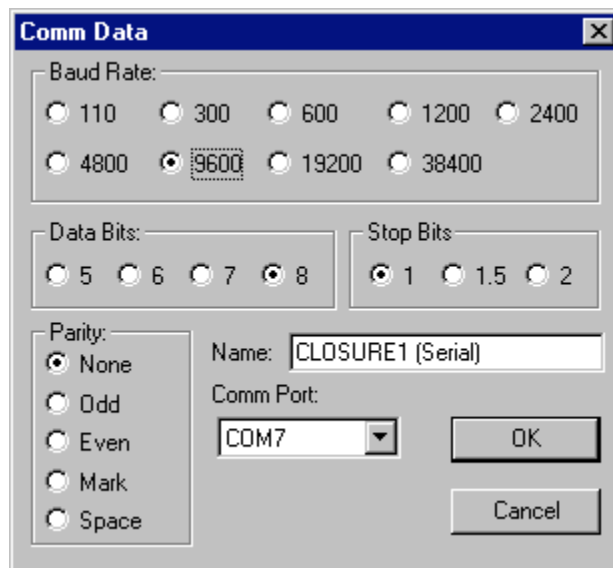
In the Add Devices screen, select Event. The next screen is Event Devices. Select Closure (Serial).



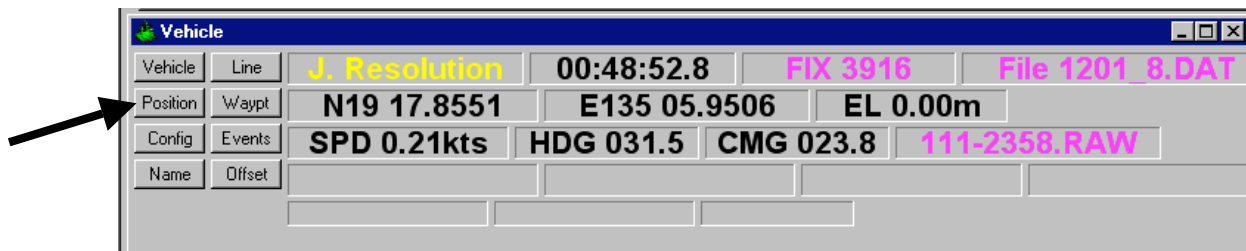
In the Closure1 (Serial) screen, select Config Macha/GCS Port. Click OK.



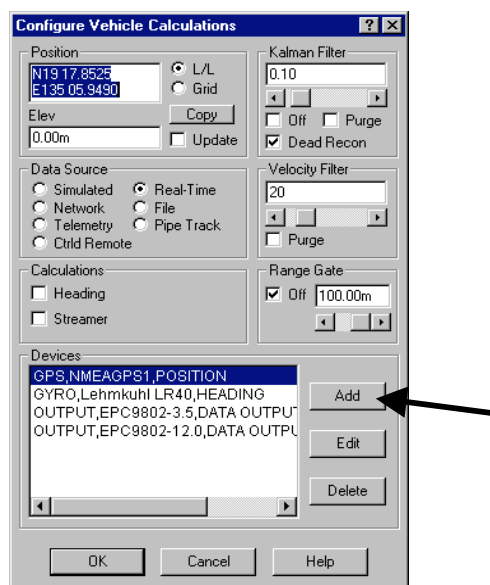
The baud rate is 9600 and the Comm Port is 7.



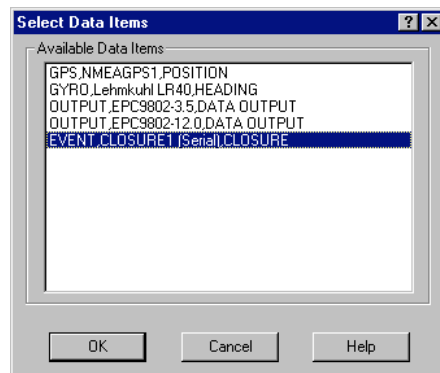
Next, go to the Position button in the Vehicle window.



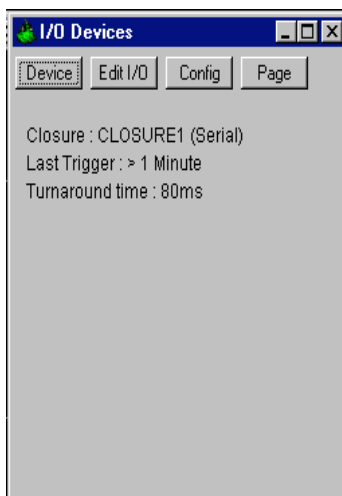
Select Add Device.



Select Closure.

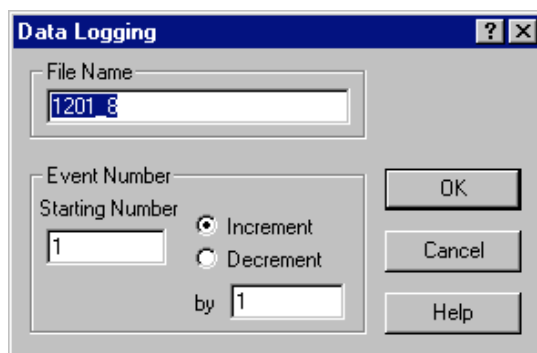


The device will appear in the I/O Devices window in the upper right part of the screen.

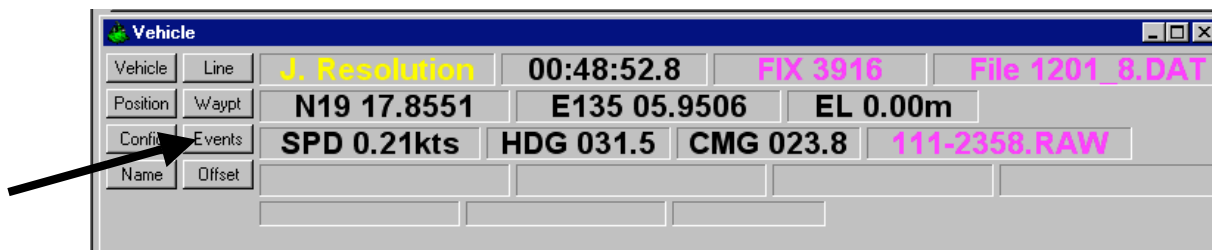


Starting a New Event for the Seismic Survey

Stop current event recording by clicking on the red button at the top of the screen. When the Data Logging screen appears, click cancel.

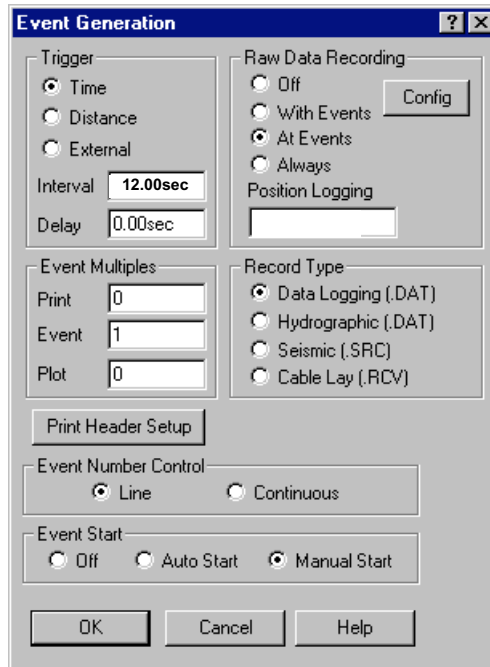


Click on the Events button in the Vehicle window.

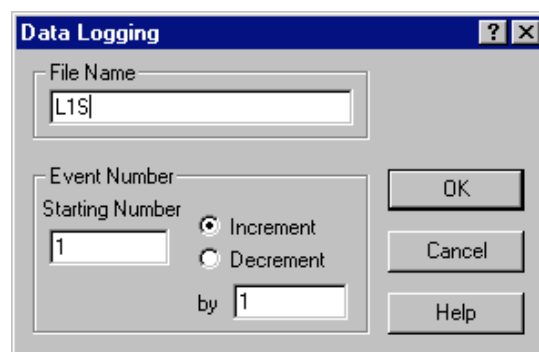


The scientist should tell you what firing interval to use but keep in mind that the interval will depend on water depth. Allow enough time for the sound to travel to and from the seafloor with at least 1 second of seafloor penetration plus add 1 second for computer processing time. The interval is usually 10-12 seconds.

Set the Interval to the appropriate time in seconds (water gun firing rate) and Event Start to manual.



Name the file L1S (e.g. Line 1 Survey). Click green button at top of screen to start the Event.



Once you start Event in WinFrog, data acquisition should begin in a2d as soon as the next trigger signal is received. You'll see the number of files should go to 1.

After setting a2d up to acquire seismic data, very little operator intervention is needed until you stop data collection. During the beginning of a line, you will probably want to adjust the display parameters to get the best screen display. This does not affect the acquired data in any way. You should strive to get something that allows you to see the quality of the data as well as satisfy the needs of the scientists who are running the survey. Remember, you are looking at unfiltered data.

Note: To ensure that data is being collected by the Sun, look at the size of the tfile in /segdata. The tfile size should be growing.

Stop Seismic Data Acquisition

After the seismic gear is retrieved (or when you want to stop the seismic acquisition) do the following:

- Click the STOP icon on the upper right blue panel. Wait until STOP turns red (after one more shot).
- Quit a2d and then wait for starta2d to finish.

The following will appear on the screen:

```
Waiting for segy2tap to transfer tfiles to tape...
Ready to kill segy2tap [y/n/abort]? y
Have you write protected the tapes [y/n]? y
```

Running Checktape

To verify that data is on the tape, run “checktape”. Checktape copies header information from the first file to the hard drive. After asking if you write protected the tapes, the program will query:

```
Would you like to run checktape on /dev/rmt/1 [y/n]? y
Output from check tape is in file /export/home/underway/segdata/checktape.out
```

ross% **more checktape.out** to view contents of checktape

```
EBCIDIC Reel Hdr 3200
traces per record      1
samples per trace     8000
samp interval         1000
1      1      1 1 0 0 8000 1000 101 94 5 57 19
2      2      1 1 0 0 8000 1000 101 94 5 57 29
3      3      1 1 0 0 8000 1000 101 94 5 57 39
4      4      1 1 0 0 8000 1000 101 94 5 57 49
5      5      1 1 0 0 8000 1000 101 94 5 57 59
6      6      1 1 0 0 8000 1000 101 94 5 58 9
7      7      1 1 0 0 8000 1000 101 94 5 58 19
8      8      1 1 0 0 8000 1000 101 94 5 58 29
9      9      1 1 0 0 8000 1000 101 94 5 58 39
10     10     1 1 0 0 8000 1000 101 94 5 58 49
11     11     1 1 0 0 8000 1000 101 94 5 58 59...etc.
--More--(27%)
```

Finishing Up a2d

- Remove the tapes by pressing the buttons on the outside of the tape drives. Wait for the tapes to rewind. The doors will open automatically. Take the tapes out and slide the “write protect” buttons over so the tapes can’t be written to. **THIS IS CRITICAL AND SHOULD ALWAYS BE DONE AS SOON AS THE TAPES COME OUT OF THE MACHINES!**
- Label the tapes. Make sure all necessary information is added to the labels on the boxes.
- Rename the shotfile and logfile.

ross% **cp shotfile shotfile.line##** Copy the shotfile for the just finished line to another file name.

ross% **cp logfile logfile.line##** Copy the logfile for the just finished line to another file name.

- Logout from the SUN by moving the mouse arrow to the blue background, press the right mouse button, scroll down and highlight exit and let go of the right mouse button.. Press the ‘exit’ button. This will log you out of Openwindows.

An Additional Note on segy2tap:

Here are the specifics for checking to see that data has been written to tape:

ross% **cd /export/home/underway/segydata**

ross% **ls -lt tfile*** The tfiles are the original seismic data files and are in SEGY data format. Note: SEGY format is a standard format used in the seismic industry. Once they have been written to tape they are removed from the hard disk. The tfiles are written to disk either when they become larger than 10mbytes or when you are in the a2d program and you activate the “change” tape button or if the program is quit.

The program that writes the files to tape is “segy2tap”. When “a2d” is finished with a file, it will remove the write privileges. When a file is active (and therefore, not available to “segy2tap” to be written to tape) the privileges will look something like this:

```
rw-r--r--
```

When the file is finished and ready to be written to disk, the “a2d” program will change the permission to this:

r--r--r--

The next time “segy2tap” checks the /segydata directory for files that are ready to be written to tape it will write all the remaining tfiles that have permissions like r--r--r--.

Before quitting segy2tap, wait until any remaining data files are written to tape.

ross% **ls -lt tfile*** to see if and data files remain
If so, wait.

ross% **ls -lt tfile*** if the file is now gone, you can proceed to “kill
segy2tape”.