

LOGGER MANUAL



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I/WE AGREE TO THE ABOVE TERMS

NAME :

COMPANY :

SIGNATURE :

DATE :

PLEASE SIGN THE ABOVE AND RETURN TO YOUR PLACE OF PURCHASE.

Introduction

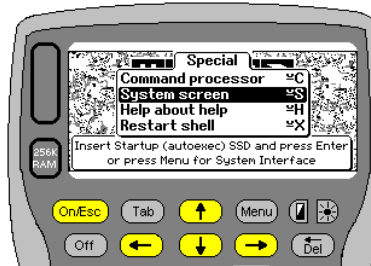
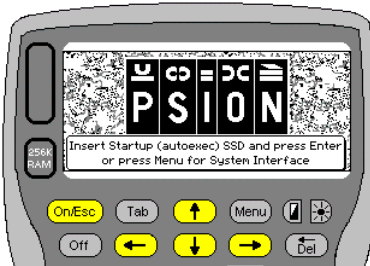
LOGGER has been written to capture basic field survey data in as simple yet efficient format as possible. The program was originally written for the Psion Organiser range of handhelds. The first copies of the program were in operation around about 1989. Since then the Psion Organiser range of handhelds has been replaced with the Psion WorkAbout. **LOGGER** has been improved to now handle engineering work as well

Should you have any problems or queries please feel free to contact me.

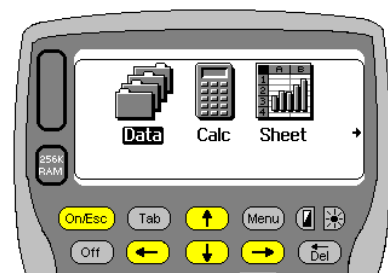
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Website www.logger.co.za

Installing LOGGER on Psion WorkAbout

When the WorkAbout first boots up or new main, and / or backup batteries, are installed, or after a Hard Reset, then the following sequence of screens will appear.



When the LHS screen appears opt for the **System Interface** by pressing **Menu**. This will take you to the RHS screen shown above. Select **System Screen** (arrow down), press Enter,



You will then see the screen to your right. This is the default WorkAbout menu. We now need to install the **LOGGER** software, which comes on a 512K Flash SSD (Solid State Disc) or 1 Mbytes Flash SSD. Typically the SSD is inserted into the top slot (A) of the WorkAbout. The bottom slot (B) is reserved for data storage. For this exercise it is assumed that the **LOGGER** SSD has been inserted into the top slot A.

To install the **LOGGER** icon on the main screen menu used to run **LOGGER** as shown below, follow these steps. Press the **MENU** button on the top line of the WorkAbout. Use the left or right arrow keys to activate the **Apps** tab. Arrow down to **Install** and press **Enter**.



1. Arrow down to **Disk** and use the left/right arrows to change to **A**. Disk **A** is where **LOGGER** would normally be found.
2. Once you have selected the Disk (**A**), Arrow up to **File: Name** and use the left /right arrows until you see **LOGGER.OPA**. Alternatively start typing the word **LOGGER** and once you see **LOGGER.OPA** press **Enter**



You should now see the main screen with **LOGGER** installed as shown opposite. From now on you should never have to install the application again, unless you do a hard reset on the WorkAbout.

The icon represents a shortcut to the program. If you swop the position of the discs at any stage it is possible that **LOGGER** program may not work.

Instrument Communication Parameters

The communication parameters for the various instruments are detailed below. Please refer to your manufacturer's instruction manual for information and details on how to set the following parameters. In some cases the hand shaking and Line terminator settings are not user definable on the instruments. The settings shown here will then be taken as the default.

Please adjust your instrument to the following values.

SOKKIA

Baud Rate	1200
Parity	None
Data Bits	8
Stop Bits	1
Hand Shaking	None
Line Terminator	CR/LF

TOPCON / GOWIN

Baud Rate	1200
Parity	Even
Data Bits	7
Stop Bits	1
Hand Shaking	None
Line Terminator	ETX

On some of the Topcon machines if you hold down F2 while switching on the settings come up. Under these settings you should have

REC A/B set to REC A
 CR/LF should be switched OFF
 ACK MODE can be Standard or Omitted

LEICA Total Stations

Baud Rate	2400
Parity	Even
Data Bits	7
Stop Bits	1
Hand Shaking	None
Line Terminator	CR/LF

LEICA GPS

Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Hand Shaking	None
Line Terminator	EOT or CHR (3)

GEODIMETER

Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Hand Shaking	None

Line Terminator EOT or CHR (3)

To check the comms settings on the Geodimeter instruments do the following.
 Press F78 (function 78). The screen should read COM=1.8.0.9600. Press ENT if correct.
 If not then type in 1.8.0.9600 and ENT

Press F79 and it should display END=3. If so press ENT. If not type in 3 and press ENT

NIKON

Baud Rate	4800
Parity	None
Data Bits	8
Stop Bits	1
Handshaking	None
Line Terminator	CR/LF

ZEISS / TRIMBLE

Baud Rate	1200
Parity	None
Data Bits	8
Stop Bits	1
Handshaking	None
Line Terminator	CR/LF`

Under Setting Interface on the instrument

1. Recording All settings supported
2. Format All recording formats are supported. These include REC500,M5,R4,R5
3. Parity None
4. Baud rate 1200
5. Protocol Can be either REC500 or XON/XOFF
6. Position C 11
7. Position P 16
8. Position I 1

FUJIYAMA

Baud Rate	19200 Models FYTS 5 and 2 and Baud 1200 for Models FYTSO 685 and 682
Parity	None
Data Bits	8
Stop Bits	1
Handshaking	None
Line Terminator	CR/LF

Sometimes these are pre-set on the machine and you cannot change them. Make sure that the instrument is set to distance measuring mode as well. This is done by pressing the 2nd button from the top on the very right hand side of the keyboard.

SOUTH

Baud Rate	1200
Parity	Even
Data Bits	7
Stop Bits	1
Hand Shaking	None
Line Terminator	ETX CR/LF

Sometimes if the Psion is switched on and plugged into the South, before the South instrument is switched on, an error appears on the South screen.

Best is to switch the South on and then plug the Psion into the South Instrument

GEO-ALLEN

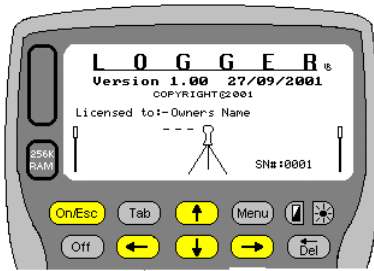
Baud Rate 1200
 Parity Even
 Data Bits 7
 Stop Bits 1
 Hand Shaking None
 Line Terminator ETX CR/LF

On the Geo-Allen you need to set the screen to Meas and select Distance. It will work in Angle and Coordinates but the user will not be able to then check the readings on the instrument against those on LOGGER.

Also for the GEO-ALLEN instrument it is best to set the timeout to 10 seconds and retries to 4. If the instrument responds within the 10 seconds it returns the info, and does not wait the full 10 seconds



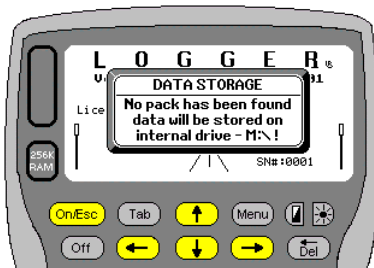
Starting LOGGER



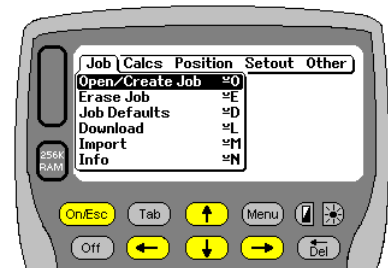
This will be the first screen you see. The version no and date are displayed at the top and also who it is licensed to.

On the bottom right hand side of the screen is the serial number of the package.

To proceed from here press Enter

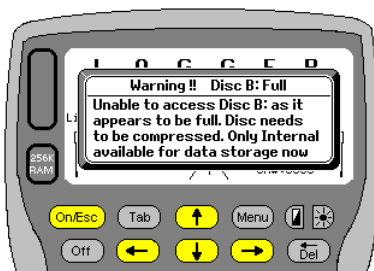


The first thing LOGGER will do is check to see if there is another storage device available in slot B (the bottom one). If it does not find an SSD there then you will get a warning message similar to that shown here on the left.



If this happens LOGGER has no choice other than to store your data in the internal memory of the WorkAbout.

If a storage device is found then LOGGER goes straight to the main menu shown on the right hand side above.

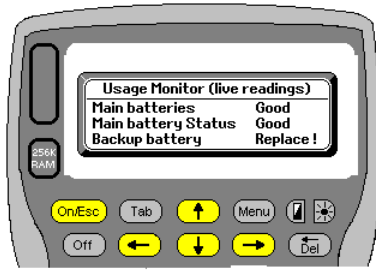


It is possible that your disc B becomes full as well. If you are using a RAM SSD then as files are deleted the memory will be recovered. However the RAM discs are not as stable as the Flash SSD's. On the Flash SSD's, memory is not recovered when data files are deleted. **LOGGER** also creates temporary files and deletes them so eventually the disc will become full. It may appear that you have nothing on the pack, but the deleted info is occupying the space. If a situation like this arises **LOGGER** will present the following screen as a warning and only allow you to store data into the internal memory until the problem is corrected. Use Psion Manager to compress the pack. See the section [Installing](#)

[LOGGER Updates](#) to see how to use Compress

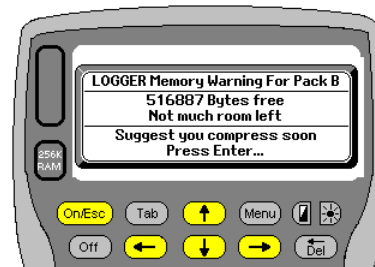
What else does LOGGER do when getting started?

The steps mentioned above are typically what will happen each time **LOGGER** starts up. However there are other checks that **LOGGER** does when starting up and shutting down. One of them is to monitor the Workabout's battery status and also check on free disc space. These operations are conducted in the background and only produce results if a warning to the user needs to be issued. Should a low battery be detected or your discs become full the following screen warnings will appear.

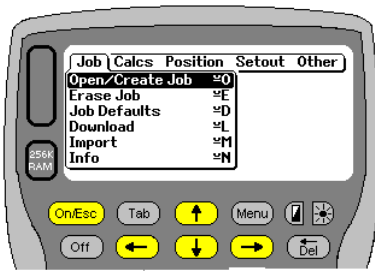


Information provided details the internal backup battery as well as the main battery status. The offending battery will be brought to your attention. It is not imperative that you act immediately. The batteries will last a little longer. The idea is just to give the user advanced warning that he needs to address the situation soon.

The warning screens for memory may also come up. Once the available space gets below 50 000 bytes, messages similar to those displayed below will appear. Again once the memory drops below 25 000 bytes **LOGGER** warns you that your memory is again getting low and below 5 000 bytes **LOGGER** warns you that it is now **"Dangerously Low"**. At this stage it would be advisable to compress the pack and free up space.



Creating a new job



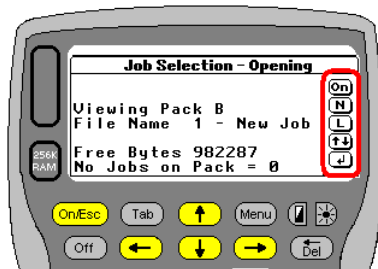
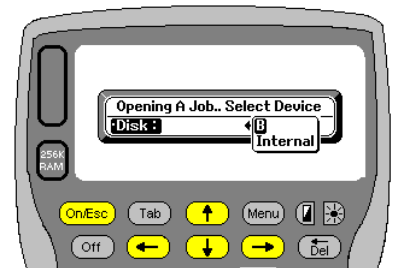
LOGGER files all its jobs in separate folders or directories on the selected device. Typically data can be stored on either disk B (bottom slot) or in the internal memory (M). Remember the program is normally stored on disk A. **You will not be allowed to store data on your program disk.**

To open or create a new job, select the **Job** tab on the LHS of the main menu. Use the up/down arrows to select the “**Open/Create Job**” option and then press Enter.

The shortcut key to this function is Psion+O

Next select which disk, pack or device you want to use.

If you have a disk in slot **B**, **LOGGER** will default to this device. If you wish to store on Internal or M, then pressing **TAB** will offer this disk as an option as well. You could also press the left/right arrows to view what devices are available. Assuming **LOGGER** is installed in **A** and you do not have a disk in slot **B** your only option will be the internal RAM of the WorkAbout. If no device is found in slot B a warning will be given. This basically indicates that your only storage device is M or the internal memory.



The images above reflect examples of the status of jobs on both the B: pack (LHS) and M: or Internal pack (RHS). On the left we see that there are no jobs defined on pack B as yet, **LOGGER** displays the following useful information.

- Which pack you are looking at
- The first job file name, if any are present. Otherwise **New Job** is displayed.
- How much free space you still have on the shown device.
- How many jobs are on the displayed device.

In the above example we see that Pack B has no jobs. Pack M (RHS) has 23 jobs and we are currently ready to load job no 1. A maximum of 200 has been set for the number of jobs at this stage.

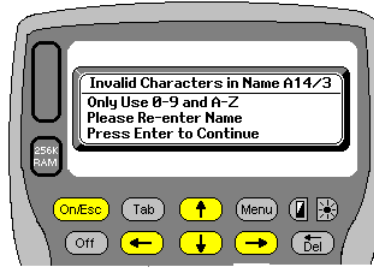
The Hotkeys

There are 6 hotkeys available on the RHS menu. These have been highlighted in **red**.

- On** Press **On/Esc** to go back a menu and re-select the device to load from or store to.
- N** To create a new job press **N**. if there are no jobs on the pack as yet then you can also press **Enter**.
- L** Press L to help look for jobs quickly.
- ↑ ↓** Use the Up/Down arrow keys to scroll through your job list. If you are at the top of the list, press the up arrow to quickly get to the bottom of the list. If you reach the bottom of the list press the down arrow to quickly get to the top of the list. In both instances a loud beep can be heard, just to let you know you have reached the top or bottom of the list.
- ←** Once you have found your job press **Enter**.

Detailed Explanation of the Hotkeys

The Hotkey N



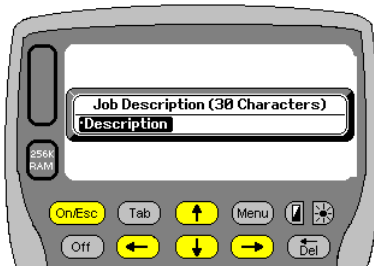
Pressing **N** will start a new job. When starting a new job, you will need to go through the following screens to set up the job parameters and defaults. Enter a file name. The maximum no of characters is 6. This name is used to create the file names that will be used by the project. All names are converted to uppercase values internally and checked.

NB! When entering a file name only use numbers 0-9 or letters A-Z. **LOGGER** checks the file name and if it does not conform to the previous statement a warning message will be displayed, showing the incorrect name entered and allowing you to re-enter a legal name. Above we can see the file name has been entered as A14/3. The “/” is the illegal character.

Examples of correct and in-correct file names are:-

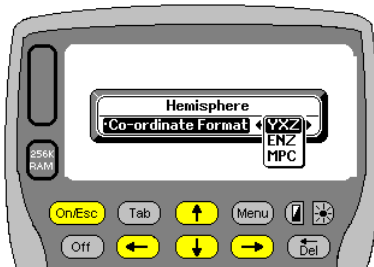
Correct File Name: A1 or CANAL2

Incorrect File Name: RD<a> or any of the following :/?}*&

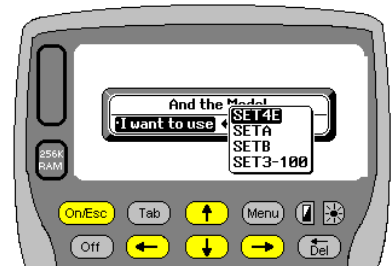
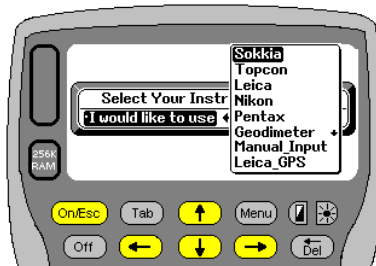


The next option is to enter a job description. The description can be up to 30 characters in length. Once you have entered the description press **Enter**.

Your job description can be changed at a later stage if required. This option can be found under defaults. There you have an option to view and alter certain parameters.



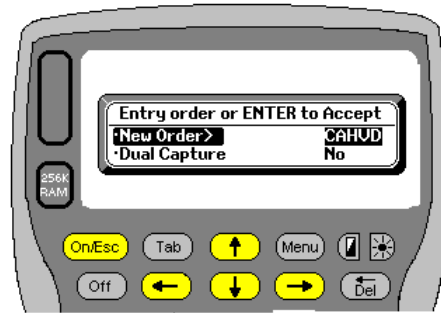
The next option allows you to select which hemisphere you wish to work in. This merely affects the display format for any coordinates shown on screen. You only have three options, **YXZ** (southern) or **ENZ** (northern) and **MPC** for users in Portugal. You can press **TAB** to display the options. The default display is southern hemisphere (**YXZ**). Alternatively press **E**, **Y** or **M** to choose and then press **Enter**. Again this setting can be changed at a later stage.



The next requirement is to choose the instrument you are using. By default Sokkia comes up. Press **TAB** to see a full list of options. Scroll to the one you want and press **Enter**. Once you have chosen the make you need to choose the model. Again press **TAB** or use the arrows to select the model you are using. The example shows the full list of instruments and that the user has finally chosen a Sokkia SET4E. In many cases it does not matter which model you select. Presently for the Topcon, Sokkia and Nikon instruments you may select any model.

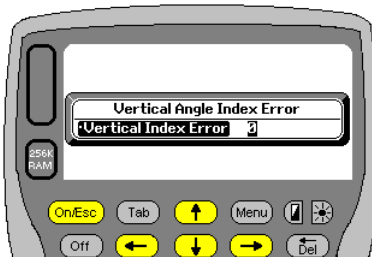
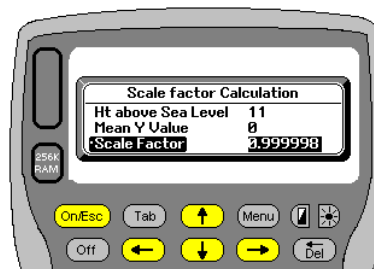
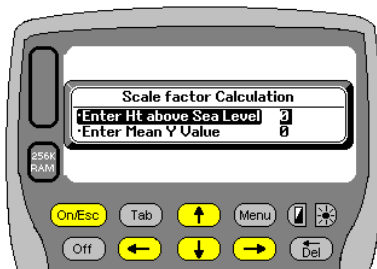
At present the PENTAX (although shown) has not been fully interfaced. There is also a manual input option if required.

Refer to the communication parameters to see what values **LOGGER** is using and make sure your instrument is set to those values. **LOGGER** cannot alter the communication parameters of an instrument. Refer to your instrument manufacturer's manual for instructions on how to alter / set the values.

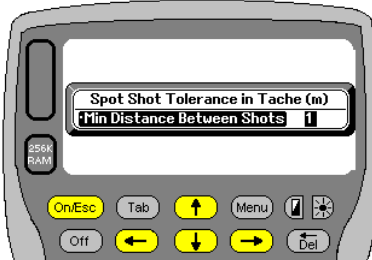


A full list of these settings can be found at the end of this section. This next option is only used during tache data collection, when data is input manually. When entering data manually you can define the order you want to be prompted in. The options are any combination of **Comment**, **Axial**, **Horizontal**, **Vertical**, **Distance**. It is suggested that you always start with the comment as all **Escape** options operate when being prompted for a comment. Axial refers to staff /target / Prism height. **Dual Capture** allows the user to store the reduced YXZ (ENZ) values as well as the raw observations. The reduced data can be downloaded using the Reduced Tache option.

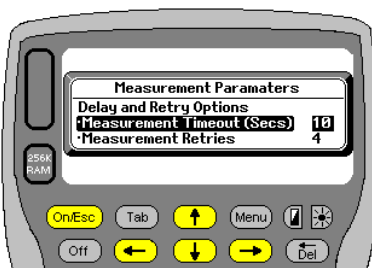
Next enter your height above sea level and mean Y or E value. **LOGGER** will calculate a scale factor using these values. You have the option to override the calculated scale factor if you so wish.



LOGGER gives you the option to enter an index error for your instrument. If you have to enter a value do so now. The default is zero. This value will be applied to all vertical angle measurements. The input is assumed as degrees minutes and seconds. An index error of 12 seconds would be entered as 0.0012.



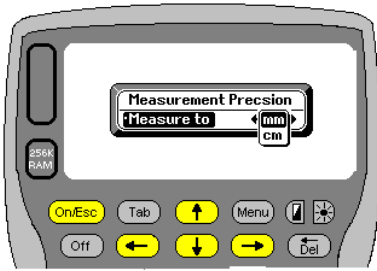
LOGGER will monitor the distance between Tache shots. Enter the value you want to use here. If the distance between the previous and current is less than the entered value a warning will be displayed. This value is also used when placing data. See the sections under Tache and placing / setting out for more details. The default is set to 1m. It can be changed at any stage.



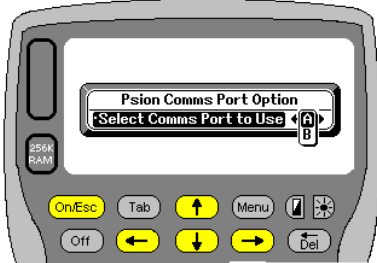
These measurement parameters control the interface between the WorkAbout and the Total Station selected. The measurement timeout is measured in seconds. This value relates to how long **LOGGER** will wait for a response from the total station, once a measurement has been requested. Remember that there is often interference whilst measuring and **LOGGER** attempts to take this into account here.

The measurement retries is the number of times **LOGGER** will attempt to get the information before giving up. In this example **LOGGER** will try up to 4 times to get a successful measurement and wait for a maximum of 10 seconds each time. If a successful data set is returned before the 10 seconds that is fine. Some

instruments measure quicker than others, so make sure that you do not set a timeout value less than the time it takes for your instrument to measure normally. Refer to your instruments handbook for these values.



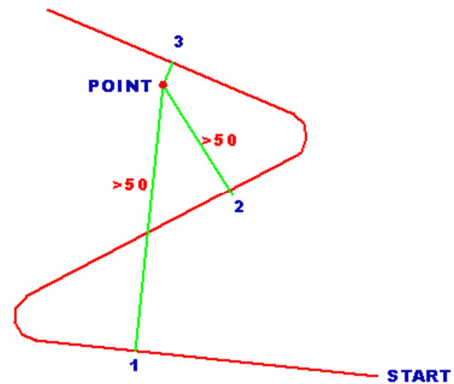
Enter the measurement precision to be used. This generally applies when doing Tache. This value can be changed during data capture. You have 2 options mm or cm.



Select the communications port to be used between the WorkAbout and Total Station. Some WorkAbouts have 2 Comm ports on top. Generally though they only have one and port A is the default selection.

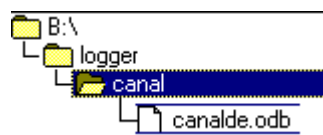
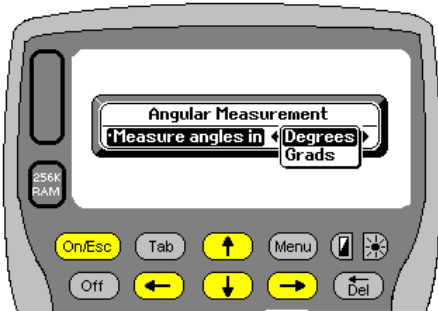


This value is used to define the maximum distance that **LOGGER** must consider, when searching for a point relative to a defined horizontal alignment. When placing batters for example, the user will take a reading and expect **LOGGER** to locate its position. If you have a road that is circular or turns back on itself there could be various solutions. If a solution is found where the offset exceeds the value specified here, **LOGGER** will proceed along the alignment and keep looking for a solution that fits the tolerance specified.



In the example it is clear that there are 3 possible solutions to **POINT**. Options 1 and 2 exceed the 50m tolerance. Solution 3 satisfies the criteria.

The final setting is to work in either Degrees or Grads. At present only the Degrees option is working



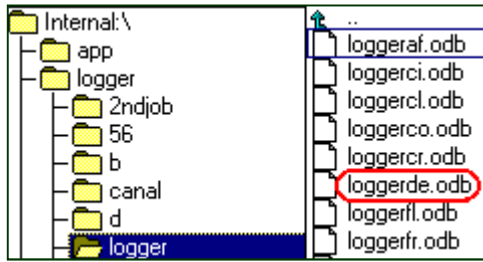
LOGGER automatically creates a folder called Logger on the device to be used for storage. If the folder exists jobs will just be added. When a new job is created, **LOGGER** uses the job name to create a sub-folder. All subsequent data

files for that job will be stored in the job folder. At the moment **LOGGER** has been programmed to cater for up to 200 jobs, providing there is disc space available. This small illustration should help clarify the filing system. In the example we have only one job called CANAL and in the folder is just one file, the defaults file. All this information is on the B pack.

Having the filing system like this makes it very easy to manage your data. It is also then very easy to copy or backup jobs. This can be done very quickly using the program PSiWIN. One can also see at a glance what information you have on what job. There is no reason why these files cannot be copied as is to your PC's hard drive for safety. In the same way they can be copied back to your data packs.

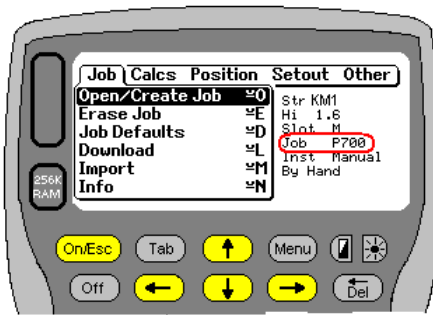
If one had jobs on the internal pack M: you could use PSiWIN to copy them to B: very easily. Simply copy the folder and place it under the Logger folder.

When looking for jobs, **LOGGER** searches for the DE (defaults) file. If that file is found it is assumed that there is a job available.



On the left we can see that there are quite a few files belonging to the job logger. Should the **loggerde.odt** file get deleted for some reason, the rest of the data still remains, and can be accessed again. Simply open the job logger, go to **Job Defaults** and change the defaults. In effect this recreates the file loggerde.odt and you will be able to continue.

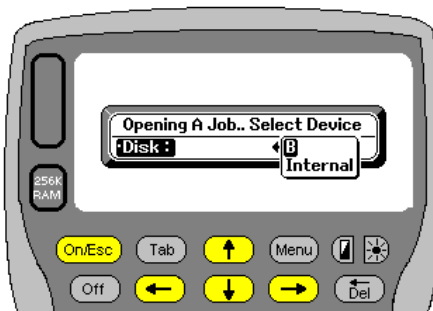
Opening an Existing Job



When **LOGGER** starts up it looks for a file called lj.odb in the internal memory. This file contains info relating to the last job that was worked on. If it is found, **LOGGER** will load and display this data to the user.

For example let's assume you were working on a job called P700 and had finished for the day. **LOGGER** will store the job name and station details into the file called lj.odb in internal memory. When you start again **LOGGER** loads that data and assumes you want to carry on with the last job P700. If this is not the case then you must **OPEN** an existing job or **CREATE** a new one. If you accept the last job you may just have to sort out your setup details.

If you wish to **OPEN** an existing job select Open/Create Job of the Job menu



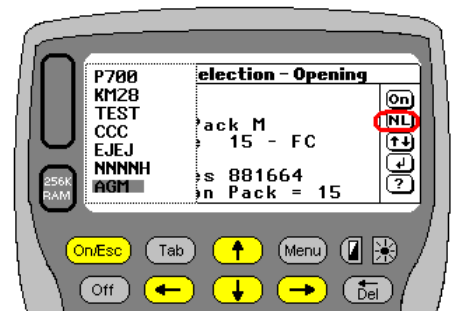
LOGGER will prompt you for the device to open from. Either B or Internal. That is assuming you have a data pack in B. If you have no pack in B you will only be offered Internal as a storage device.

Select accordingly
In this example on the right, pack M (internal) was chosen to load from. **LOGGER** indicates that there

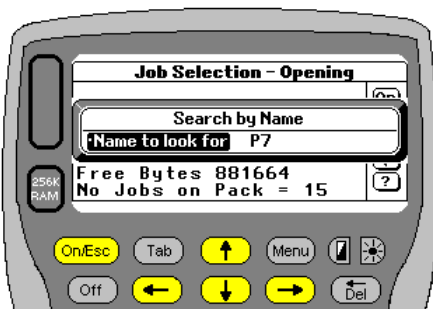
are 15 jobs already on the pack and 881664 bytes free. It also loads the first job ready for selection. At this stage the user can arrow up or down (↑ ↓) to scroll through and find the desired job.



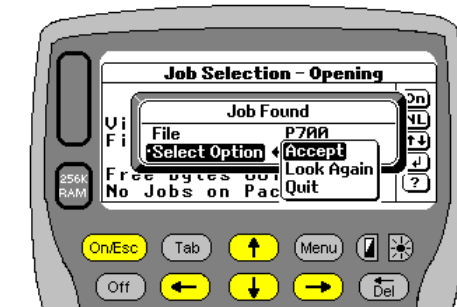
This could be a tedious task if there are a lot of jobs. Alternatively you can press **L** (look). **LOGGER** will open a side window with a list of the current jobs. Again you can scroll up and down this list using the (↑ ↓) keys. Once you have located the job you want press Enter. If you find it difficult to see which job is highlighted for selection, press the contrast button (☰) to darken the flashing selection bar.



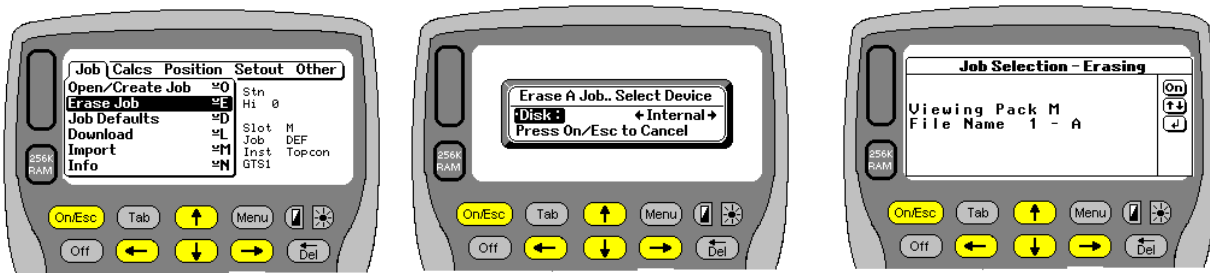
If there are still too many jobs to scroll through you can press **L** again and Look for a specific job. Type in the first few letters of the job and **LOGGER** will locate the job starting with the entered info. In this case the user entered P7 and **LOGGER** located P700.



You have the option to **A**ccept the located job, **L**ook Again or **Q**uit.



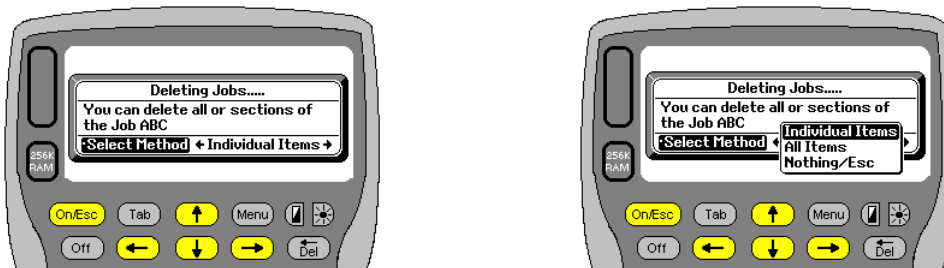
If no match is found then **LOGGER** will display a message to that effect. If you select to look again and no further match is found the same message will appear



Once you have created jobs there will come a time when you wish to delete portions of, or the complete job. Use the **Erase Job** option to achieve this.

Select the device and Job that you want to delete. In this example we have selected on the Internal disk

LOGGER will then display a list of your jobs. Select the job to be used. Here we have selected a job called **A** and it is the first job on the pack.

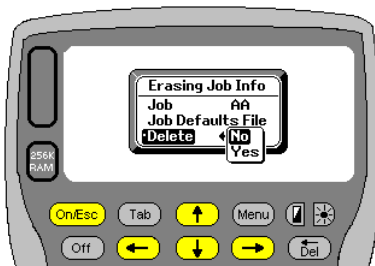


Once you have opted to delete the job you have 3 options. Pressing the TAB button shows them in the drop down menu in the RHS picture above.

Items can be deleted individually, all in one go or not at all. Select the method you wish to use.

Individual Items

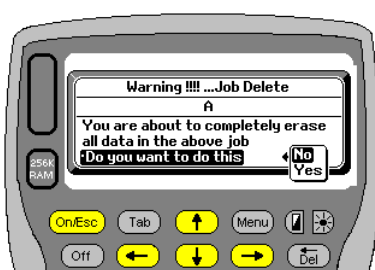
This method gives you full control but can be slow. **LOGGER** generates quite a few files depending on what you have done, and to delete one by one can take time.



Once you have selected your job and are happy **LOGGER** will then display the available files, one by one, that exist for the selected job, and allows you to delete them. By default the prompt is set to **No**, so if you press **Enter** the data will not be deleted. If you press **Esc** at any stage **LOGGER** will bypass all the other files and return straight to the man menu

Here the jobs **Default File** is displayed ready to be deleted. This is always the last file offered for deletion. Once you have been through the whole lot **LOGGER** will return to the main menu.

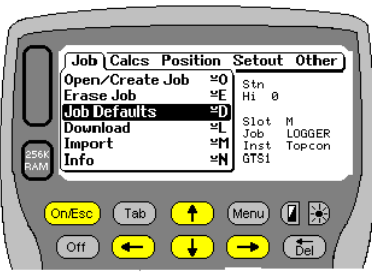
All Items



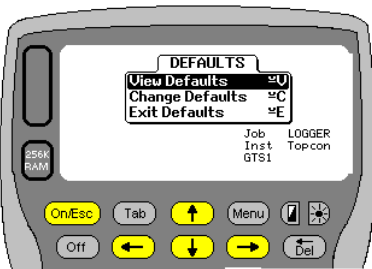
This method deletes all the data files belonging to the job. This includes Pipes and Alignment points that may also have been entered. The default setting is **No**. Press Y or use the arrow keys to select **Yes**.

Warning. There are no second chances once you press **Yes**.

JOB DEFAULTS

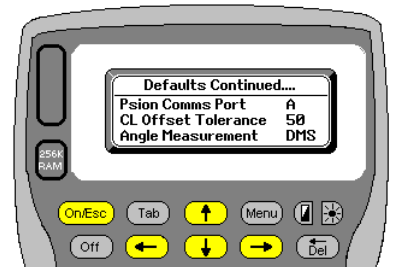
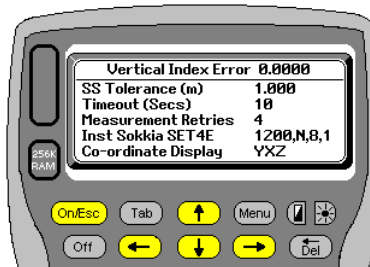
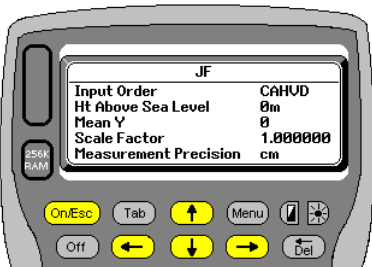


The defaults for any defined job can be viewed and changed at any stage. Reasons for wanting to change may vary. Maybe the user has swopped to another make of Total Station or wants to now enter data manually. Select **Job Defaults** in this instance



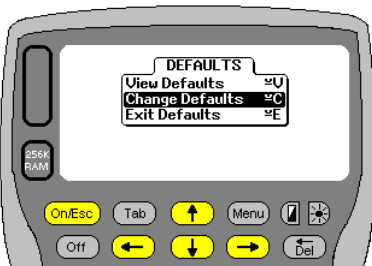
Once you have selected **Job Defaults** you can either **view** the current settings or **change** the current settings. Select the option you wish to use.

Selecting the option to **View Defaults** will display current settings as shown below. Once the first screen has been displayed, press **Enter** to see the second and third screens. All your inputs will be displayed for checking.



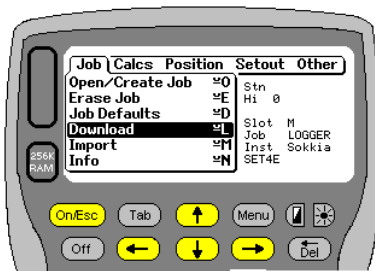
When selecting **Change Defaults** you will be able to alter any of the preset values defined when creating the job.

The screens and prompts that follow are identical to those described in the **Job Creation and Selection** section of this manual. Please refer to that section for further details



Finally you have an option to **Exit** the defaults. Alternatively press **On/Esc** to return to the main menu

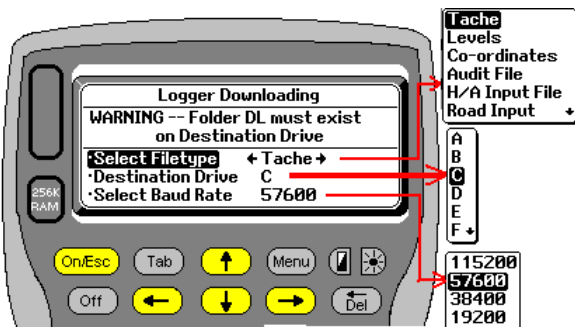
Downloading



Download

Presently all download files are directed to a folder called DL (**DownLoad**) off the root directory on your PC's C: drive. Make sure this folder has been created on the drive you wish to download to. Use Windows Explorer to create the folder if need be.

The Download option is found on the main menu under the job tab. Alternatively press **Psion+L** to start the procedure



By pressing TAB you can select the PC drive you need to download to. Alternatively just press the letter. Generally it will be C. If you wish to download to the internal memory of the Psion use drive M.

The baud rate is user definable as well, between 19200 and 115200

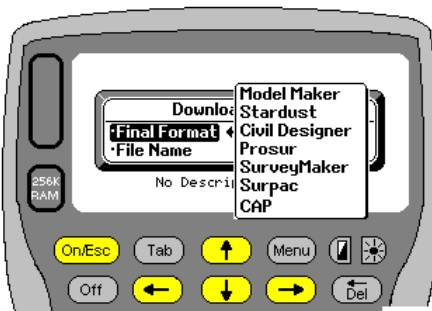
The files that can be downloaded can be selected as well

Select the type of data to be downloaded. You may press the **Tab** button or use the arrow keys to view and select the

various options available. **LOGGER** will prompt to make sure that you have your remote link connected and the download software activated. You can use PsiWin 2.3.3, Psion Manager or the PRC software mentioned above as a communication medium.

Make sure you use a baud rate that is compatible with the software you are using to download with. For example Psion Manager will only work to a maximum of 57600.

Downloading Tache Download



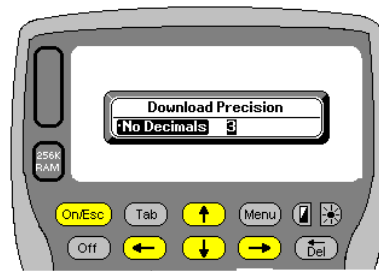
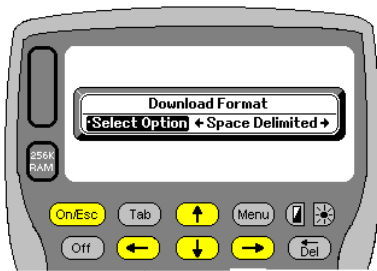
The various formats available are

- | | |
|-------------------|------------------------------|
| 1. Model Maker | Downloads with MMK extension |
| 2. Stardust | Downloads with ODB extension |
| 3. Civil Designer | Downloads with ODB extension |
| 4. Prosur | Downloads with ODB extension |
| 5. Survey Maker | Downloads with MMK extension |
| 6. Surpac | Downloads with TXT extension |
| 7. CAP | Downloads with CAP extension |

Sample Surpac Format

```
//Source  LOGGER Software for Psion WorkAbout issued 29/07/2017
//Job..... A
//Date..... Mon 31 Jul 2017 14:38:22
//
Line  Des.  Obs.  Point      Horizontal      Slope      Vertical      Target      F/B
Num.  Code  Code  Name       Angle           Distance     Angle         Height     Page
-----
00001  00    2    RESECTIO  SET UP STATION                1.5630
00002  00    4    TR123     123.1234                90.0000  0.0000
00003  00    5    A001     123.1456  1234.123    99.1234  1.8550
00004  00    1    B12      SET UP STATION                1.5630
00005  00    5    BB        1.2345    256.225    99.2345  1.5000
00006  00    6             123.1234    11.290    99.4556  0.0000
00007  00    3    KP1     123.1234    11.290    99.4556  1.8000
```

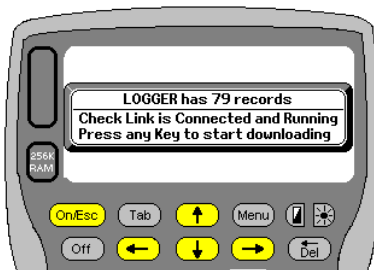
Downloading **Coordinates**



Select the format and no of decimals required.

Presently there are 3 formats:

- | | | |
|--------------------|---|---------------|
| 1. Space Delimited | - Uses spaces to separate columns | Extension YXZ |
| 2. Coma Delimited | - Uses commas to separate columns. Nice for spreadsheets | Extension CSV |
| 3. TAB Delimited | - Uses TAB (CHR\$(9)) as separator. Also used in spreadsheets | Extension CRD |



Once you have selected the format **LOGGER** will display how many records are to be sent.

Make sure your link is running on the PC and it is ready to receive. If you are happy, press Enter on the Psion. **LOGGER** will check for a valid link. This may take a few seconds. Once it establishes the link the download will start.

LOGGER adds SU to the job name so if your job was called **LOGGER** then the downloaded file will be called **LOGGERSU+Ext**. The downloaded file is a plain text file.

LOGGER will count down as the data is transmitted. Once complete you will be informed. Press any key to return to the main menu.



This is an example of a downloaded co-ordinate file space delimited The downloaded file will have an extension **YXZ**.

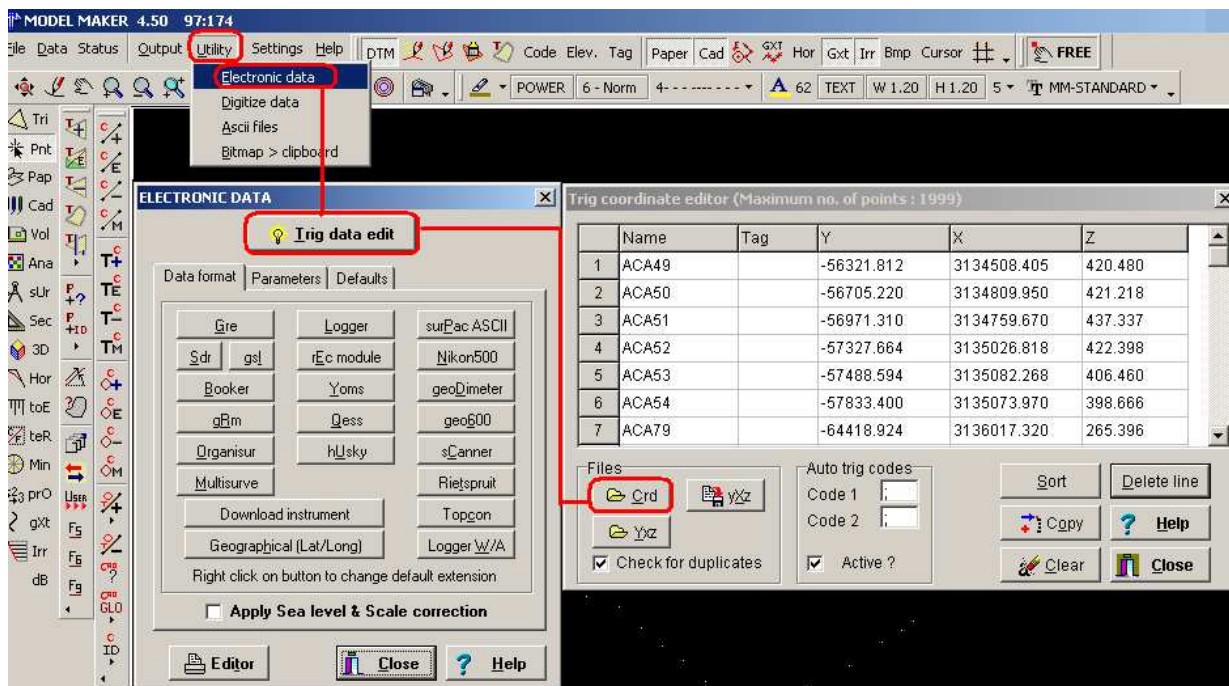
```
//Source LOGGER Software for Psion WorkAbout issued 05/12/2010
//Job..... HILLCR
//Date..... Wed 22 Dec 2010 14:36:26
//
Name                Y Co-Ord                X Co-Ord                Z Co-Ord
=====
1                   320.597                   505.688                   20.000
2                   353.754                   596.649                   15.862
3                   350.142                   566.774                   16.086
4                   346.090                   530.891                   18.044
```

This is an example of a CSV or comma separated values file. The downloaded file will have an extension **CSV**

```
//Job..... P15.....Mon 03 Aug 1998 08:42:38
1,320.597,505.688,20.000
2,353.754,596.649,15.862
3,350.142,566.774,16.086
4,346.090,530.891,18.044
```

And finally an example of a TAB delimited file. The downloaded file will have an extension CRD. LOGGER puts the data out with a CRD extension so that it can be read quickly into Model Maker as a control file when reducing Tache observations.

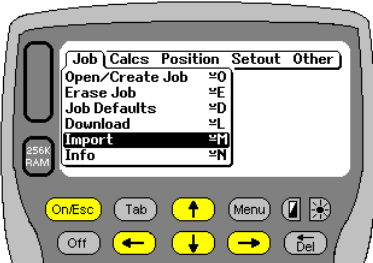
```
//Job..... P15.....Mon 03 Aug 1998 08:46:43
1      320.597      505.688      20.000
2      353.754      596.649      15.862
3      350.142      566.774      16.086
4      346.090      530.891      18.044
```



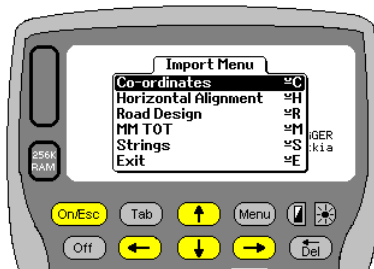
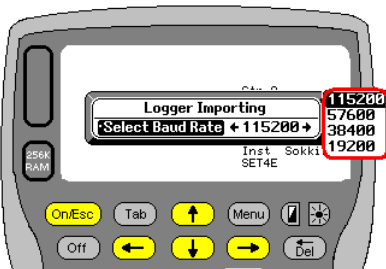
If you wish to read the TAB delimited file directly into Model Maker before starting reductions then the following sketch will show you how to go about it

Importing Data

Before any communications can be done between your PC, and **LOGGER**, on the WorkAbout, the communication channels must be set in place, and activated. See the section on **Installing PRC Download Software** if you are not sure how to activate the comms. If you have PsiWin 1.1 or PsiWin 2.3 running, they can be used as communication channels as well. All 3 are provided on the CD.



The importing section allows the user to upload data from the PC to the WorkAbout and thus save a lot of time entering in data manually. Typically you may want to upload Coordinate files for setting out and Road Design data. The import option is found on the main menu under the Job tab. Alternatively press **M** and the **Enter** or use the arrow keys to navigate to Import and then press **Enter**. Pressing **Psion+M** activates the function immediately.



Once Import has been selected you will need to select the baud rate or import speed you wish to use. Once again make sure that the speed selected is compatible with the import software your are running. Speeds between 19200 and 115200 can be used.

The import menu has 5 import options available. Should you wish to exit at this stage press **E** or scroll to **Exit** and press

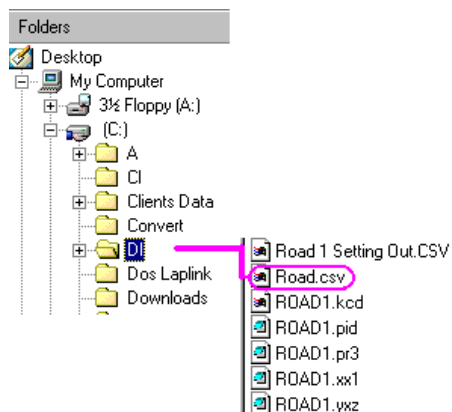
Enter.

Presently **LOGGER** will import the following:-

1. Co-ordinate data.
2. Horizontal Alignment Data from Model Maker. (PID File)
3. Road Design Data from Road Maker. (PR3 File)
4. DTM triangulated network from Model Maker. (TOT File)
5. STRINGS from Model Maker.

Each of these import options will be explained in more detail below. All the options start off at the **Import** menu on the **Job** tab. In all cases a job must be opened before data can be added to it. If one has not already been opened you will be prompted to either open or create one. The steps to follow for this are well detailed under the section **Job Creation and Selection**. Please refer to it if you have not already done so.

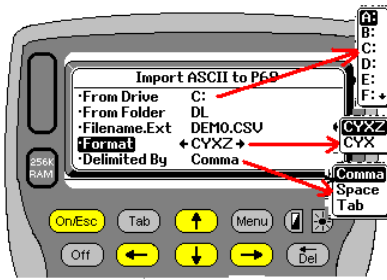
Import Menu – Co-ordinates



As mentioned above, **LOGGER** allows the user to import a variety of data. The most commonly used is probably YXZ or ENZ values and a point descriptor. This falls under the **Co-ordinates** section on the **Import Menu**.

For the purpose of this exercise let us assume that the data file to be loaded is called ROAD.CSV and is stored in the DL folder off the root directory on drive C: of your PC.

This will demonstrate how easy it is to load a file. It should be remembered that the Psion Workabout only recognises 8 character names. Names exceeding 8 characters will be truncated to 8. For example **Township A Phase 1.CSV** will be seen as **Townsh~1.CSV** on the Workabout. It is advisable therefore to keep your file names to 8 or less characters when creating them.



It is assumed at this stage that you have a file on the PC that is ready to be uploaded. Details on how these files can be prepared are covered in a later section. The expected format is CYXZ or CENZ where or CYX or CEN

1. C = Comment. Maximum length is 10 characters at this stage
2. Y = Y Co-ordinate (or E = easting)
3. X = X Co-ordinate (or N = northing)
4. Z = Z value or elevation of point (optional)

LOGGER displays the job name, at the top of the screen, into which the file will be loaded.

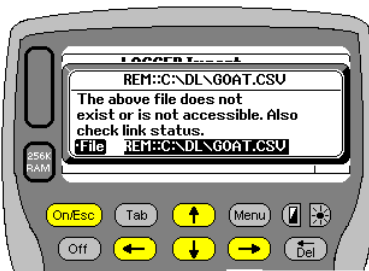
You need to specify the drive from which the data is to be loaded from. (C: in example)

You need to specify the folder from where the data file is to be read from. (DL in example)

You need to specify the file name. The full name including extension must be given. If the file is called GOAT.CSV then type in GOAT.CSV

You must also specify the format to be expected (CYXZ in example)

You then need to specify the delimiter or column separator. This can be Comma, Space or TAB delimited.

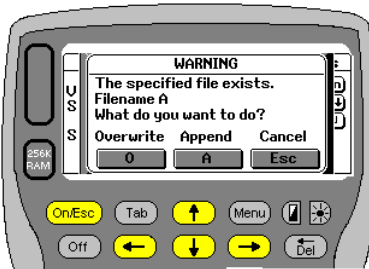


If the file cannot be located then the following warning window will appear. Carefully check the file name. Here the display reads REM::C:\DL\GOAT.CSV. The REM::C: refers to the remote C: drive.

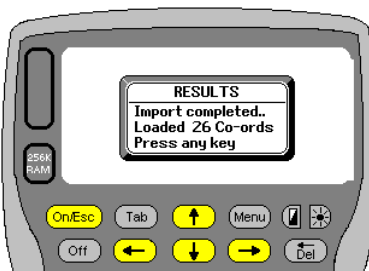
The folder is DL

The file name is GOAT.CSV

If you are sure that this is all correct then make sure that the link is connected and working.



It is possible that you already have data loaded. **LOGGER** checks and if so **LOGGER** then displays a warning message if the coordinate file exists. At this stage it does not tell you how many coordinates are in the Psion file. You have the option to **Overwrite** any existing data, **Append** (add to) the existing file, or **Cancel** (**Escape**) from the routine. If you choose to overwrite then the existing file will be cleared and a new one created and loaded. If you **Append** the incoming data will be added to the existing onboard file. If you **Escape** the operation will be aborted and return to the import menu.



While busy importing a counter will be seen as the data is loaded.

Once the data is loaded you will be informed how many points were imported.

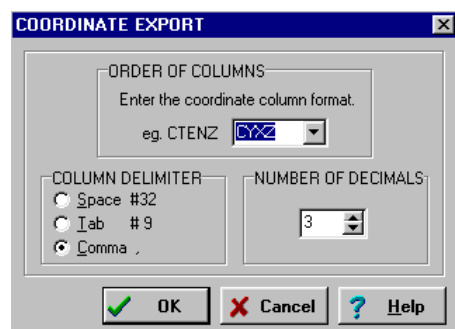
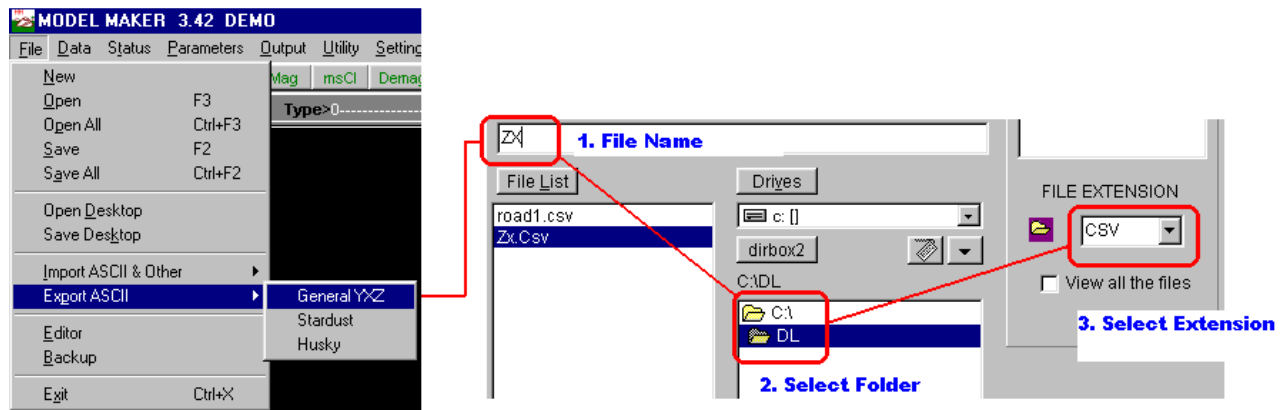
The final stored file will be stored as the Jobname+SU. In this instance GOATSU.ODB

Press Enter to return to the import menu.

While importing **LOGGER** checks the validity of the data. If an error is detected on a line and it cannot be read a beep will be heard. That line of data will be skipped.

Creating Data files for Importing Co-ordinates

For users who have Model Maker Software here are the steps to follow to create a file ready for **LOGGER** to read.



To create a TAB delimited file select the **ODB** extension under file Extension (3 above). Once the above is set you can define the data order, field delimiter and no of decimals as laid out here. Use the drop down box to display other formats eg CENZ or simply type the order in. Press OK and the file will be saved.

Sample Data Structures

Comma

Most packages these days will allow users to define the output format. **LOGGER** requires the YXZ or ENZ and descriptors to be in a set format. This format is fairly standard and is as follows.

Descriptor , Y , X , Z for the Southern Hemisphere.
 Descriptor , E , N , Z for the Northern Hemisphere.

Descriptor , Y , X for the Southern Hemisphere.
 Descriptor , E , N for the Northern Hemisphere.

The Z can be omitted if required. **LOGGER** will set the Z to zero by default if not selected.

If you chose Comma then you must use a comma as the field separator. The descriptor or code used to describe the point can be up to 10 characters in length. A typical example of a data set follows.

Data Description – Pipe Layout info

A1,500.000,500.000,20.000
 A2,533.157,590.961,15.862
 A3,529.545,561.086,16.086
 A4,525.493,525.203,18.044
 A5,508.608,501.770,19.154
 A6,479.117,500.399,18.922

In the above set, note that the first line is a description of the data that follows.
 Note that **LOGGER** will automatically **ignore** the first line when importing co-ordinate ASCII files.

WARNING

Do not leave any fields blank.
 Leaving a field out could cause **LOGGER** to generate an error message indicating that the either the cables or equipment are not working, or the file structure is incorrect.

This is an example of a badly formatted file that will cause errors.

GPS8,7401.758,10152.501,391.042	1 st Line will be ignored	
MT1,6728.857,10582.41,	Line ends with “,”	Not allowed
MT2,7274.858,10745.516,		
MT4,8227.89,9418.892,		
PYLON,7372.788,9414.739,447.343	1 st correctly formatted line.	

In the above example the first line of information will be lost.
 Lines 2 to 4 have no Z value and the lines end with a comma

Tab

This format is exactly the same as for comma. The only difference is that the field separator is a TAB character or CHR\$(9). This is sometimes the default output format from some spreadsheets. It is also the default format used by the old Psion Organisers, and has been retained as many users are familiar with this structure.

Acceptable file formats without Z's would be

Beacons

```
317/1,16154.690,3311153.500
317/2,16162.430,3311176.210
317/3,16185.350,3311243.410
317/4,16191.410,3311261.170
```

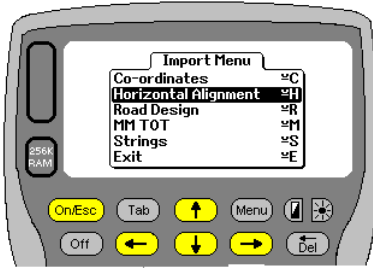
And with Z's

Beacons

```
317/1,16154.690,3311153.500,193.020
317/2,16162.430,3311176.210,192.000
317/3,16185.350,3311243.410,190.680
317/4,16191.410,3311261.170,190.150
```

Import Menu

Horizontal Alignment

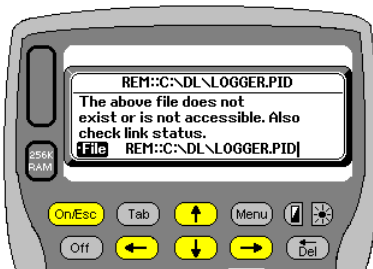


This routine will import a straight ASCII text file that defines a road horizontal alignment. The format used is the same as that used by Model Maker, Road Maker, and Pipe Maker. The file can be set up in any text editor as well. An explanation of the format can be found at the end of this section.



You need to specify the drive from which the data is to be loaded from. You need to specify the folder from where the data file is to be read from. You need to specify the file name. The full name including extension must be given. If the file is called **LOGGER.PID** then type in **LOGGER.PID**. You then need to specify the format. This can be Comma, Space or TAB delimited.

It should be remembered that the Psion Workabout only recognises 8 character names. Names exceeding 8 characters will be truncated to 8. For example **Township A Phase 1.CSV** will be seen as **Townsh~1.CSV** on the Workabout. It is advisable therefore to keep your file names to 8 or less characters when creating them.



If the file cannot be located then the following warning window will appear. Carefully check the file name.

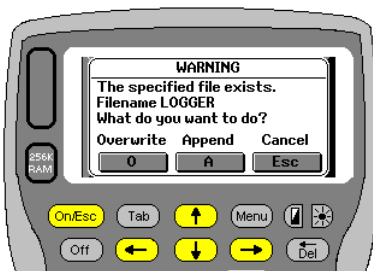
Here the display reads **REM::C:\DL\LOGGER.PID**.

The **REM::C:** refers to the remote C: drive.

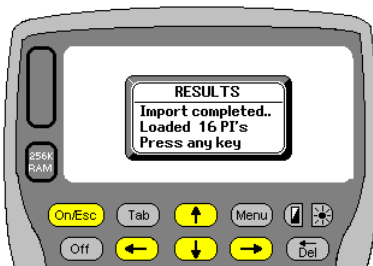
The folder is **DL**

The file name is **LOGGER.PID**

If you are sure that this is all correct then make sure that the link is connected and working



It is possible that you already have data loaded. **LOGGER** checks and if so **LOGGER** then displays a warning message if the alignment file exists. You have the option to **Overwrite** any existing data, **Append** (add to) the existing file, or **Cancel** (**Escape**) from the routine. If you choose to overwrite then the existing file will be cleared and a new one created and loaded. If you **Append** the incoming data will be added to the existing onboard file. If you **Escape** the operation will be aborted and return to the import menu.



While busy importing a counter will be seen as the data is loaded.

Once the data is loaded you will be informed how many points were imported. The final stored file will be saved as the Jobname+HA.

In this instance **LOGGERHA.ODB**

Press Enter to continue. **LOGGER** takes the user straight to the Horizontal Alignment menu where the data can be viewed and checked if need be. If you just press **Esc** **LOGGER** will pre-calculate the data, check for any overlaps, display the final end coordinates and chainage value as a check and then return to the main import menu.

Format of Horizontal Alignment File

When importing a horizontal Alignment file, **LOGGER** is expecting a specific format. Deviations from this may result in errors while loading. The way the user achieves this format is up to them. Many users have Model Maker, Road Maker or Pipe Maker and either of these packages will produce a legitimate file format.

The file starts with a header line. [**LOGGER**]. This being the job description. It may be a maximum of 30 characters. The next line has the starting chainage value [**0.000**] as a single number.

The lines following contain the curve data

A typical line of data contains the PI (point of intersection) name [**PI1**] followed by the **Y and X (E&N)** values followed by the curve radius [**30.000**] and transition lengths [**in and out**]. At present **LOGGER** is set up to handle 200 curves.

The columns need not line up as long as there are spaces commas or TABS as separators.

There must be a PI name at the start of each line

Negative chainages are allowed.

Long/Short chainages are also catered for and should be defined at the end of the PID file as shown

This is an example of a typical PID file.

LOGGER

0.000

PI1	85036.10615	38074.25901	0.00000	0.00000	0.00000
PI2	84969.89264	38022.21211	30.00000	0.00000	0.00000
PI3	84867.95464	38024.36790	40.00000	0.00000	0.00000
PI4	84827.91857	38051.16127	50.00000	0.00000	0.00000
PI5	84803.89692	38110.90741	60.00000	0.00000	0.00000
PI6	84838.38954	38158.33476	30.00000	0.00000	0.00000
PI7	84946.48694	38157.71882	100.00000	0.00000	0.00000
PI8	85000.38165	38122.91823	30.00000	0.00000	0.00000
PI9	84985.90707	38069.63946	30.00000	0.00000	0.00000
PI10	84919.38560	38048.38954	38.00000	0.00000	0.00000
PI11	84853.17209	38065.32788	28.00000	0.00000	0.00000
PI12	84853.48006	38119.53057	20.00000	0.00000	0.00000
PI13	84920.92545	38139.24063	15.00000	0.00000	0.00000
PI14	84965.27310	38105.97989	16.00000	0.00000	0.00000
PI15	84946.79491	38076.41479	10.00000	0.00000	0.00000
PI16	84910.76244	38092.73719	0.00000	0.00000	0.00000
{SHORT}					
28250.000	28260.000	12.310			
37280.000	37300.000	20.680			
64780.000	64790.000	8.530			

The Long/Short Chain equations above should be read as follows:

28250.000 28260.000 12.310 Chainage 28250 to 28260 is actually 12.310m and NOT 10.000m

INTRODUCTION TO ROAD DESIGN

This introductory part is **VERY IMPORTANT**. Please read it. It attempts to explain the limitations that may exist when importing a Road Maker PR3 file. Basically it is also telling you to **CAREFULLY CHECK YOUR INPUT BEFORE SETTING OUT**.

This routine will allow **LOGGER** users to quickly upload a road design from a Road Maker PR3 design file. The PR3 file is a straight ASCII file in a fixed format. It contains all the design parameters for the road. Not all of the information is relevant to **LOGGER** but whatever data is, can be quickly uploaded. It saves having to punch all the input parameters. The PR3 file does not have to be made in Road Maker. The user can use any text editor to create the ASCII file, but it must conform to the standards used by Road Maker. If not it is possible that errors may occur when trying to import the file into **LOGGER**.

The information that **LOGGER** extracts from the PR3 file is as follows:-

1. Vertical Alignment.
2. Road Width definition for left and right hand side of the road.
3. Road Crossfalls for left and right hand side of the road.
4. Kerb Heights for left and right hand side of the road.
5. Kerb Heights for left and right hand side of the road.
6. Shoulder widths for left and right hand side of the road.
7. Shoulder crossfalls for left and right hand side of the road.
8. Up to 3 drain widths for left and right hand side of the road.
9. Up to 3 drain slopes for left and right hand side of the road.
10. Batter slopes in cut and fill for left and right hand side of the road.
11. Centre Line offsets.
12. Grade Line offsets.
13. Vertical offsets.

It must be stressed at this stage that the import routine should just be considered an aid to taking on the road design data quickly. It is not necessarily 100% correct. Road Maker is a fully fledged roads design package that works with ground line cross sections as well. It is therefore capable of making design decisions based on certain input criteria. **LOGGER** does not make any design decisions. It is there as an aid to help surveyors quickly compute and setout what was intended. As such the input needs to be checked after uploading to make sure that that is what the design engineer intended to be setout. It is quite possible that two different engineers can achieve the same end design result, but input the data into Road Maker differently.

The vertical alignment should be fine. There is really no need to check and clarify that input. It is not based on any height criteria within Road Maker. The same applies to Vertical offsets as well.

All the rest of the design input can be defined in Road Maker to change according to certain height restrictions and these items need to be checked and verified.

Road Maker allows users to specify conditions in low fills and high fills as well as shallow cuts and deep cuts. **LOGGER** only reads in the values for shallow cut and low fill. In Road Maker a user could set up his definition table for shoulders to read something like this.

	Peg Distance	Shallow Cut	Deep Cut	Low Fill	High Fill
1	0.00	0.00	0.00	0.00	1.00
2	500	0.00	0.00	0.00	1.00

In this instance **LOGGER** will read this as no shoulders. The design engineer has specified shoulders only in a high fill situation. Elsewhere in Road Maker he would have specified that anything higher than say 0.800m is to be considered a high fill. Only then will Road Maker show a shoulder. This sort of decision making could be undertaken by **LOGGER** but it is not really practical and as such has not been implemented.

Likewise for drains. Typically Road Maker only puts in drains in a cut situation. A user definition for drains in Road Maker may look something like this. Starting with the first drain width definition.

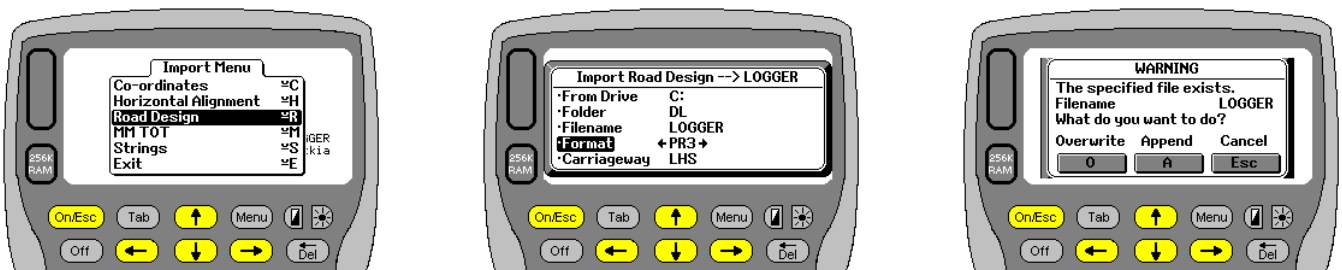
	Peg Distance	Shallow Cut	Deep Cut
1	0.00	1.00	2.00
2	500	1.00	2.00
3	520	0.00	2.00
3	800	0.00	2.00

Here **LOGGER** is only going to read the shallow cut condition. **LOGGER** is also going to assume that there is a drain starting off 1.00m wide between chainages 0 and 500. **LOGGER** will accumulate the drain information to determine the batter or shoulder break point position. This will result in the road being setout too wide in some instances.

However this may not be the actual case in field. It is possible that only the section between 200 and 300 is actually in cut. Road Maker will apply this correctly. The design engineer could have also set values for deep cuts and this could result in drains being required between chn 520 and 800, but only if the criteria are met. To try and make these sort of decisions on site is once again not practical. Remember also, that Road Maker can also force drains through certain sections, even when in fill.

In a case like this the user needs to ascertain the exact run limits for the various features and amend the input tables accordingly. To make life easier **LOGGER** has an option under download, which prints out all the input parameters as they will be applied. The best thing to do is check through this list, in conjunction with the site drawings, before proceeding with any setting out.

Importing Road Design (Road Maker PR3 file)



The import sequence is very simple.

1. Select the Road Design option from the Import Menu
2. In the Import Road Design Menu specify the following
 - a. The drive where the data is located and to be loaded from.
 - b. The folder where the data file is to be loaded from
 - c. The file name to be loaded. The extension PR3 is assumed and need not be entered.
 - d. The file format. Typically PR3. the other option is RAL. An RAL file may contain all the road design data, including cross sections (XX1) Road design details (PR3) and horizontal alignment details (PID)
3. Select which carriageway to be loaded. By default **LOGGER** reads the LHS carriageway. In all Road Maker jobs if there is only one carriageway defined then it will be the left hand side carriageway.

LOGGER will check that the link has been established. If there is already data relating to the road you will be warned and have the option of overwriting Appending or Escaping. Appending does not really make sense so should not be used.

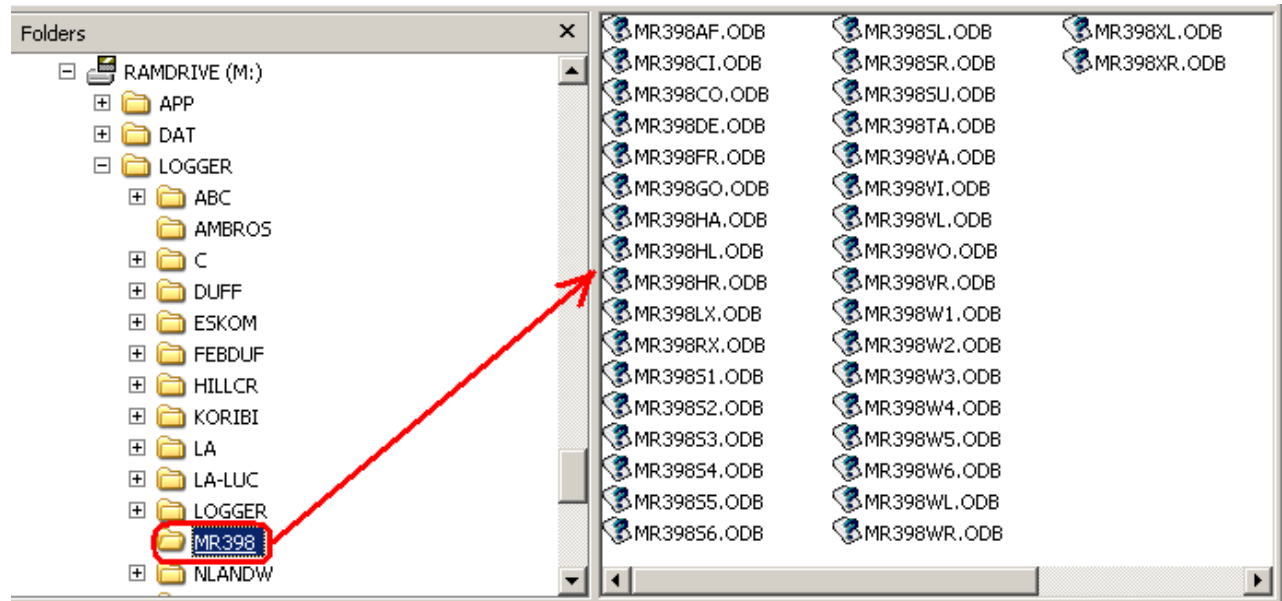
LOGGER will then start to read the PR3 file and extract the relevant information. These components have been listed at the start of this section. As each section is read **LOGGER** updates the screen and keeps the user informed of what sections are being read and how much data has been found for each section.

When the import process is complete **LOGGER** takes the user straight to the vertical alignment menu. This gives the user a chance to check the input. If you do not wish to view and check the data press Esc. **LOGGER** quickly processes the data and checks for any overlaps and stores the critical info for use later on.

When importing a PR3 file number of data files will be created. The number created depends on what information **LOGGER** found. If certain components were not defined (maybe kerbs) then there is obviously no need to create empty files.

All the created files are stored in the main job folder. If the job was called MR398 then a whole lot of files starting with MR398 will be found in the main MR398 job folder. The MR398 job folder would be a sub folder of **LOGGER**.

The image below shows what the filing structure would look like. Notice that all the jobs have separate folders created off the main LOGGER folder.



Here is a list of all the possible road files that could be created, as well as others that maybe on disc, and what they contain.

File Name **Description of Contents**

Road Files LHS

MR398WL.ODB	Road widths LHS
MR398XL.ODB	Road crossfalls LHS
MR398HL.ODB	Kerb width LHS
MR398VL.ODB	Kerb height LHS
MR398SL.ODB	Shoulder width LHS
MR398LX.ODB	Shoulder slope LHS
MR398W1.ODB	Drain width 1 LHS
MR398W2.ODB	Drain width 2 LHS
MR398W3.ODB	Drain width 3 LHS
MR398S1.ODB	Drain slope 1 LHS
MR398S2.ODB	Drain slope 2 LHS
MR398S3.ODB	Drain slope 3 LHS
MR398HL.ODB	Horizontal shift LHS (appendage width)
MR398VL.ODB	Vertical shift LHS (appendage height)
MR398FL.ODB	Batter details Fill LHS
MR398CL.ODB	Batter details Cut LHS

Road Files Centre line

MR398HA.ODB	Road Horizontal Alignment input file
MR398CI.ODB	Road Horizontal Alignment Processed file.
MR398CO.ODB	Road Centre Line Offsets
MR398VA.ODB	Road Vertical alignment input file
MR398VI.ODB	Road Vertical alignment processed file
MR398VO.ODB	Road Vertical Alignment offsets
MR398GO.ODB	Road Gradeline Offsets

Road Files RHS

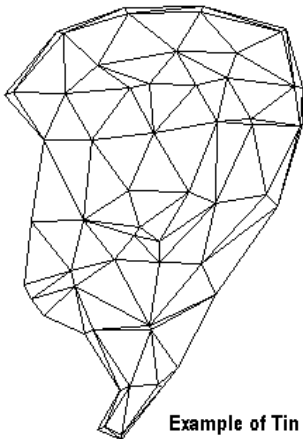
MR398WR.ODB	Road widths RHS
MR398XR.ODB	Road crossfalls RHS
MR398VR.ODB	Kerb height RHS
MR398HR.ODB	Kerb width RHS
MR398SR.ODB	Shoulder width RHS
MR398RX.ODB	Shoulder slope RHS
MR398W4.ODB	Drain width 1 RHS
MR398W5.ODB	Drain width 2 RHS
MR398W6.ODB	Drain width 3 RHS

MR398S4.ODB	Drain slope 1 RHS
MR398S5.ODB	Drain Slope 2 RHS
MR398S6.ODB	Drain slope 3 RHS
MR398HR.ODB	Horizontal shift RHS (appendage width)
MR398VR.ODB	Vertical shift RHS (appendage height)
MR398FR.ODB	Batter details Fill RHS
MR398CR.ODB	Batter details Cut RHS
MR398TC.ODB	Tolerance Check Level Defaults file

Other files

MR398DE.ODB	Defaults file
MR398SU.ODB	Coordinate file (YXZ or ENZ)
MR398TA.ODB	Tache observations
MR398RT.ODB	Reduced Tache or YXZ coordinate file
MR398FB.ODB	Field Book File
MR398TM.ODB	Triangle Model file
MR398TT.ODB	Triangle Network file
MR398EC.ODB	Elevation Checks File
MR398LE.ODB	Levelling File

INTRODUCTION TO DTM

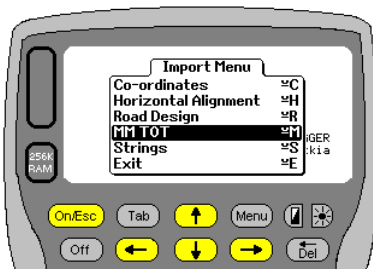


Example of Tin Model

This routine will allow you to import a TIN (Triangulated Irregular Network) or DTM (Digital Terrain Model) produced and saved by Model Maker. The file is a straight text file and can be read with any text editor. The layout and format is specific. It is basically broken into 2 parts. The top section contains all the point coordinate values, and the bottom section contains the triangulation network. It is not a format that can be easily entered and created other than in Model Maker. An example file is show at the end of this section.

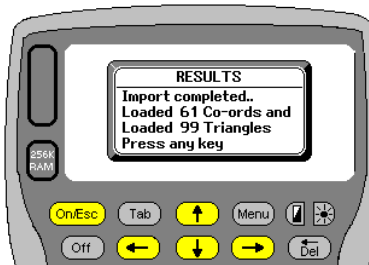
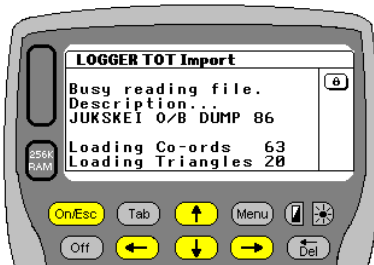
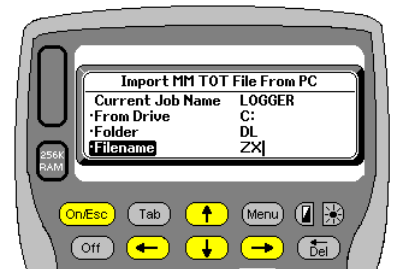
The idea of using a TIN model allows the user to take random shots anywhere on the model. **LOGGER** will locate which triangle it falls in and compute the required elevation at that point. The point can then be setout with a specific travel if need be. The routine is ideal for large sports fields or areas hard to define with a road alignment.

The Import Procedure



Select the MM TOT option from the Import Menu. You can do this by pressing M and then Enter or Psion+M

Next enter the drive from which the TOT file is to be loaded from. By default **LOGGER** sets this to C: Enter the folder form which the data file is to be loaded. Finally enter the file name to be loaded. **LOGGER** automatically adds the extension TOT.

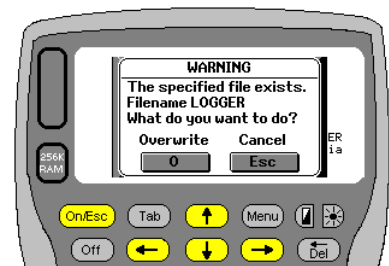


All being well **LOGGER** will start reading the file. Firstly the point values will be read and then the associated triangle network. **LOGGER** displays the job name of the network. A counter for the number of points and triangles being loaded will also be displayed, so the user can watch the progress. On completion a results screen details the total number of points and triangles located and loaded. **Enter** returns to the main import menu.

Problems that may occur



The file you specify cannot be found. **LOGGER** will display this screen. Carefully check that you have everything entered correctly. There are 3 items that make up the file name. The drive, the folder and finally the actual file name. Note REM::C: refers to the Remote or PC's C: drive If all the above are correct make sure the link is working.



The other problem is that the file already exists. If so you can either **Overwrite** or **Esc** and try loading into another job

Example data file structure

The format is:-

Header Line with job description.

Thereafter Point Tag, Point Name, Y, X, Z (E N Z)

Thereafter header line TRIANGLE

Thereafter triangulation network

JUKSKEI O/B DUMP 86

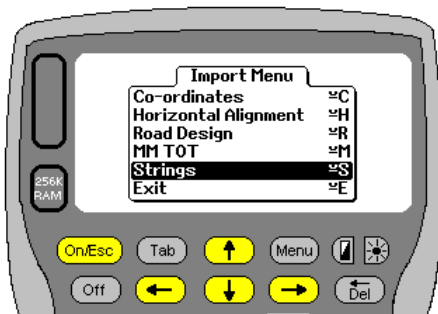
1	1	500.00000	500.00000	20.00000
TAG	T	533.15723	590.96149	15.86232
TAG	T	498.92612	610.74951	14.79770
2	2	535.03003	583.88000	16.00000
TAG	B	555.99988	590.16016	2.13608
TAG	B	552.53961	596.65082	2.02562

TRIANGLE

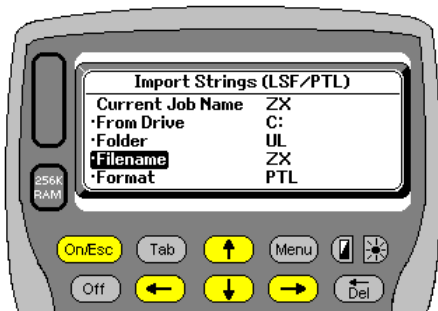
0	20	2	7	2	10	-1
0	11	2	20	17	1	8
.	0	17	14	13	4	23
0	16	14	17	15	3	-1
-	0	19	18	13	-1	22
4	0	3	8	11	18	17
						20

STRINGS

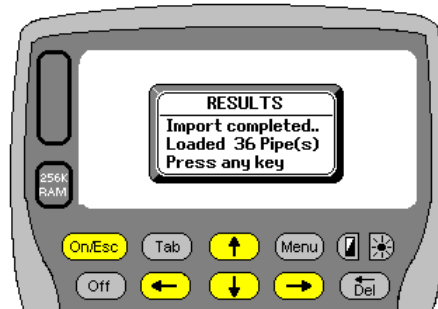
Import Menu - Strings



This routine will import a straight ASCII text file. The file is a fixed format file, typically used to define a Pipe Network. The file is produced automatically from Model Maker. The file can be set up in any text editor as well. An explanation of the format can be found at the end of this section. Alternatively a **PTL** file created in either Pipe Maker or Model Maker can be read in a lot easier
To get started select the Strings option off the Import menu.



You need to specify the drive from which the data is to be loaded from. You need to specify the folder from where the data file is to be read from. You need to specify the file name. **LOGGER** assumes the extension PTL - Pipe Maker **T**o Logger. The other option is a LSF file - Logger **S**trings **F**ile. It should be remembered that the Psion Workabout only recognises 8 character names. Names exceeding 8 characters will be truncated to 8. For example **Township A Phase 1.PTL** will be seen as **Townsh~1.PTL** on the Workabout. It is advisable therefore to keep your file names to 8 or less characters when creating them.



While **LOGGER** is busy with the translation and importation of the file, the user will be kept informed of the progress. **LOGGER** displays the Pipe No or String being read as well as the Pipe or String name. A node counter Indicates how many nodes have been found along the string as well. On completion the user is updated on the total no of Strings loaded. Press Enter to return to the main import menu.

Uses

Typically the importation of Strings would be used for Pipelines. **LOGGER** allows users to enter Pipelines and set them out. Often in Township work there are a lot of services and entering or taking on this data can be a time consuming exercise. With the use of Strings and the import option offered this becomes a simple process.

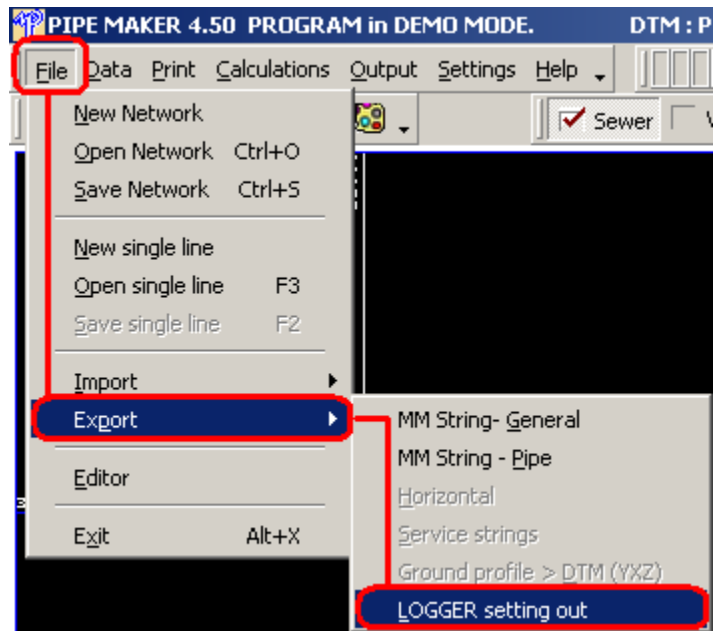
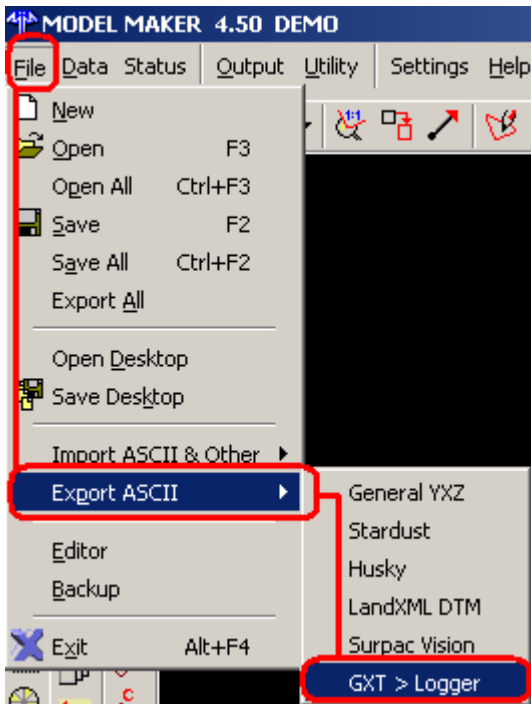
The image on the right gives an example of just such a layout

The user can use his imagination as to the uses for this feature



Creating PTL Files

The quickest and easiest ways of producing a PTL file from either Pipe Maker or Model Maker are detailed below. Note these options are only available from Version 4.50 of both Model Maker and Pipe Maker. Note these PTL files are binary files and cannot be edited.



Sample Data Structure LSF ASCII File

The example below shows a typical Strings report produce by Model Maker. This feature is extremely useful and **LOGGER** makes full use of the report to load the data as quickly and easily as possible. The report below is only part of a huge sewer network that needs to be setout. The take on time would normally be hours.

A few notes on the file format.

LOGGER ignores the first 6 lines of data.

Each Line type must be specified, either as General or Pipe.

A General String has the format Name Y X Z

A Pipe String has the format Name Y X Z Z.

The data can only be separated by spaces at this stage. The exact number of spaces is not critical.

All nodes must have a name. The name can be up to 12 Characters long. If longer Logger automatically trims to 12.

The Pipe Name can be a maximum of 20 characters.

At present up to 250 pipes can be defined and loaded.

Report of identified strings

File : Inanada Township Sewer Layout.kcs

Date : 3/5/2004

	Y	X	Elevation	(Invert)

Layer :	LINE352			
Name :	line352			
Type :	General			
	352/1	16465.670	3311566.020	206.470
	352/2	16463.060	3311595.900	203.540
	352/3	16457.970	3311654.330	195.570
	352/4	16453.070	3311710.470	186.810
	352/5	16435.040	3311787.870	177.820
	352/6	16429.390	3311812.110	172.870
	352/7	16385.440	3311849.140	166.010
	352/8	16348.710	3311880.070	153.920
	352/9	16328.060	3311897.460	147.390
	352/10	16311.120	3311911.730	141.782
	352/11	16292.914	3311911.705	141.648
Totals				

Layer :	LINE370			
Name :	line370			
Type :	General			
	370/1	16292.914	3311894.637	146.724
	352/11	16292.914	3311911.705	141.648
Totals				

Layer :	SEWER			
Name :	LINE 27			
Type :	Pipe			
	MH1	-18120.494	3272085.040	23.234(23.000)
	MH2	-17799.375	3271130.090	22.500(22.500)
	MH3	-18485.401	3270038.720	22.000(21.900)
	MH4	-18967.078	3269361.490	21.000(21.000)
Totals				

Number of strings by type:

General :2

Alignment :0

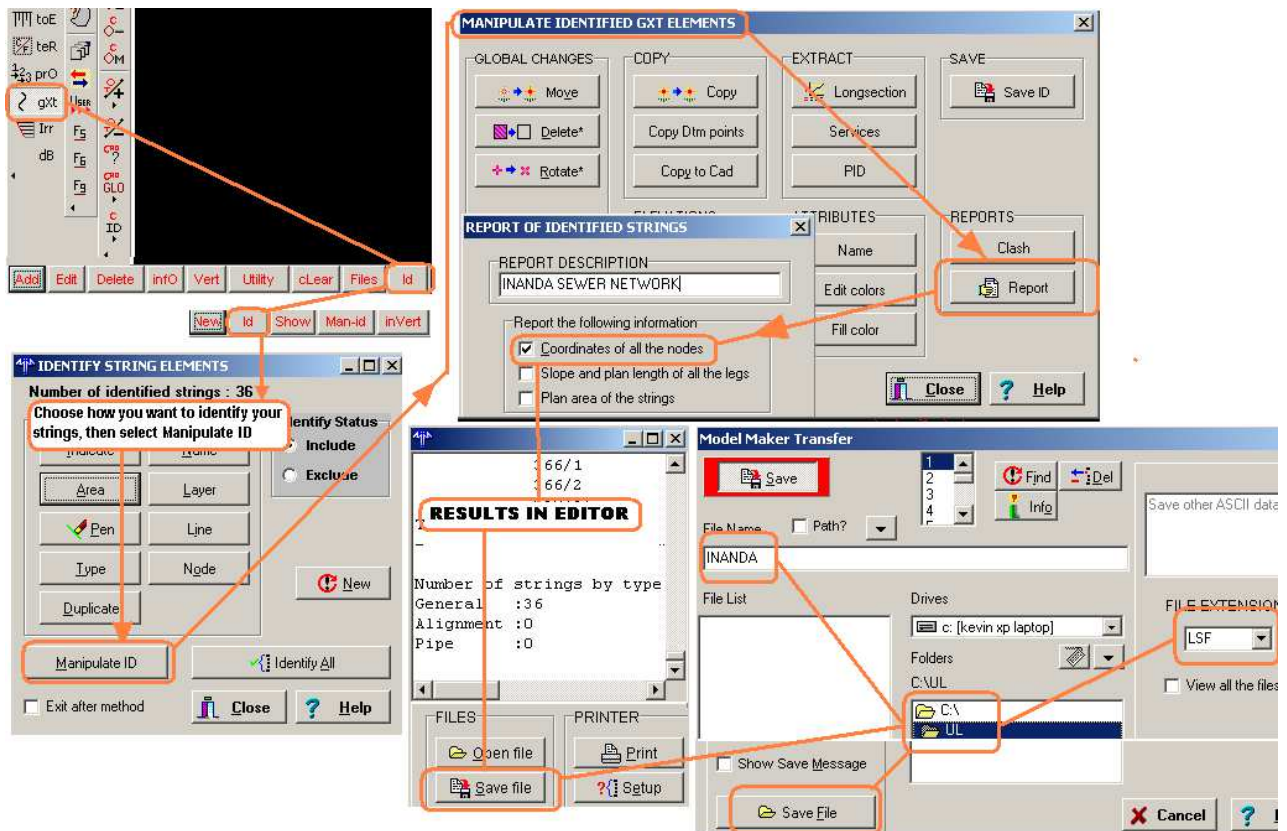
Pipe :1

As mentioned above this table can be created in any text editor or via Model Maker. Here are the steps required to produce an LSF equivalent report from Model Maker. The various screens have been cut out and merged into one.

The steps are as follows.

1. Select Strings (GXT off the LHS menu)
2. Select Id and Id again. Then identify the strings by whatever method.
3. Select Manipulate ID
4. Select Report
5. Enter a report description and check just the “Coordinates of all the nodes” option.
6. The data will be printed to the editor
7. Select Save File at the bottom of the editor
8. Select the file extension. If it does not exist just type in LSF
9. Select a file name and folder
10. Finally select Save File.

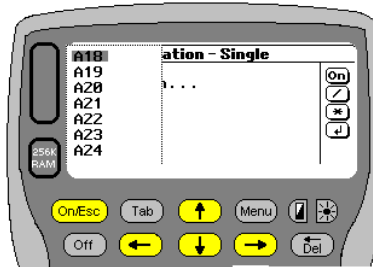
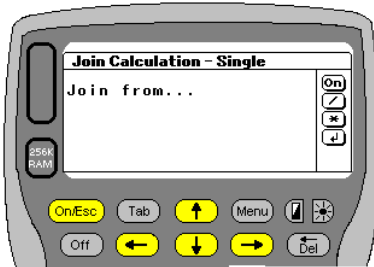
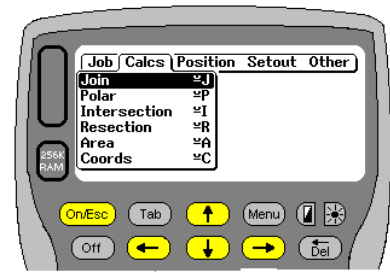
Remember to keep the file name to 8 characters or less. Preferably save it directly to the folder from where you will upload to the Psion.



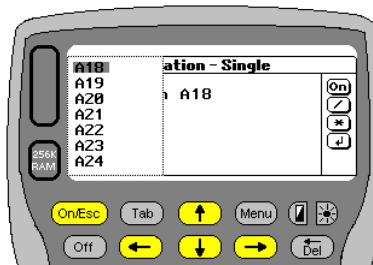
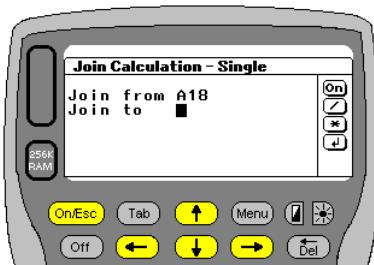
Calculations

Join

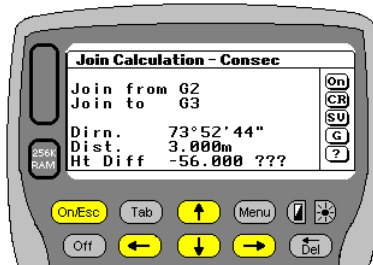
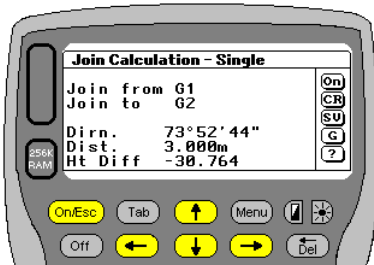
Allows for standard Join calculations. This option can be found on the main menu under the Calcs tab. Alternatively press **Psion+J** to activate this function. You will be prompted for the two points to be used for the calculation.



If the point name is known type it in. If not just press **Enter** and **LOGGER** will display a list of point names down the left hand side of the screen. You can scroll through the list. Press **Enter** to select the point.



Once the first point has been selected you need to enter the second one. The same procedure can be used. Remember that the * button can be used to change coordinate files. Joins can thus be done between points in different jobs and also on different packs.

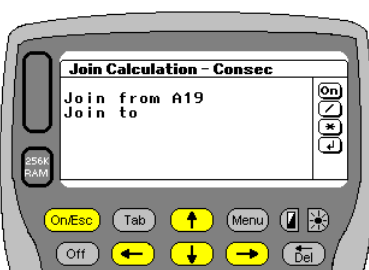


After the two co-ordinates have been entered **LOGGER** will display the distance, direction and height difference. If any of the Z values are zero the height difference will be followed by???

On completion of the initial join, 7 options are available. These are assigned to the following hotkeys

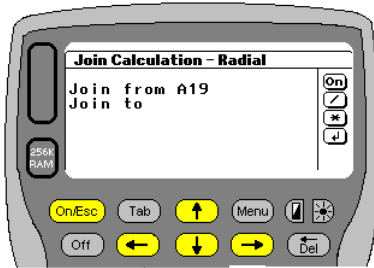
- ON Press ON/Esc to exit the routine
- C Press C to do consecutive joins
- R Press R to do radial joins
- S Press S to do single joins
- V Press V to view the coordinates used in the calc as well as additional slope information
- G Press G to just get grade information between the 2 points. Information will only be displayed if both points have Z values not equal to zero
- ? Press ? to get help. **LOGGER** displays a list of active hotkeys and what they offer

Consecutive Joins



Press **C** to do consecutive joins. **LOGGER** will hold the starting point as the last entered point. If the original join was between A1 and A19 for example, then A19 will now become the start point. You need only enter the new end point.

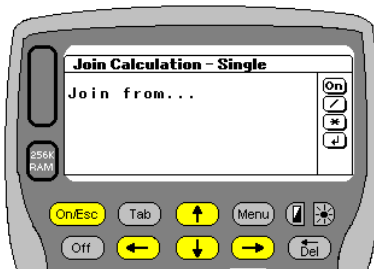
LOGGER displays which join option is active on the header line. In this case Consecutive



Radial Joins

Press **R** to do radial joins. **LOGGER** will hold the starting point as the last entered point. If the original join was between A1 and A19 for example, then A1 will remain the start point. You need only enter the new end point.

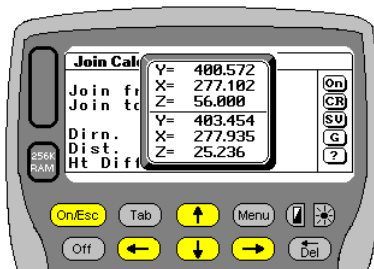
Again **LOGGER** displays which join option is active on the header line. In this case Radial



Single Joins

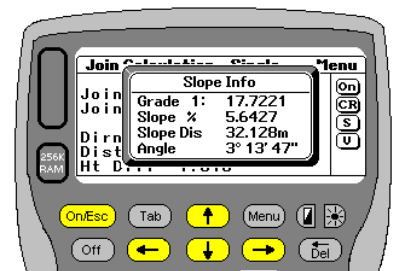
Press **S** to do single joins. **LOGGER** requires that you enter both start and end points again.

Again **LOGGER** displays which join option is active on the header line. In this case Single



View

You can also View additional info by pressing **V** once the join is calculated. This will display the YXZ or ENZ for the start and end points as a check. If the heights for the points are available then the Grade, Slope, Slope distance and angle between the 2 points will be given as well. If the Z is zero then this info



will not be displayed.

Grades

If you just press **G** only the slope info and grades will be displayed.

If you cannot remember these keys then press the **?** button. This will allow a more detailed selection process.

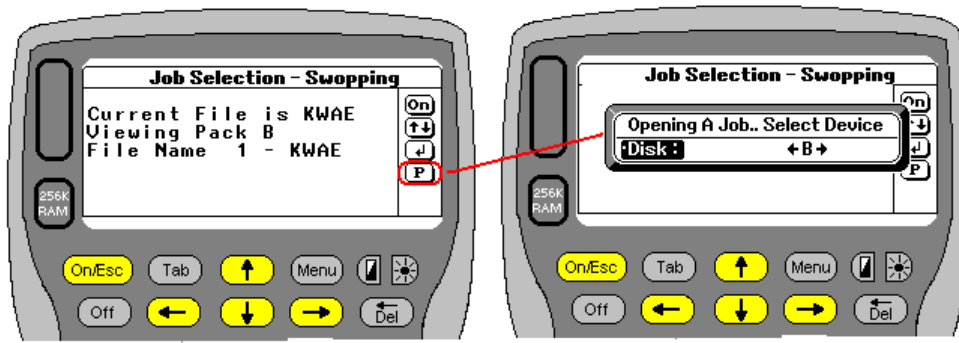
To Exit from the routine press **On/Off**.

LOGGER allows users to do joins between points in different jobs. So it is possible to do a join from a point in Job A, swop to Job B and select a point from Job B's coordinate database. If you wish to swop jobs press the "*" key when you see the prompts "Join from..." or Join to"

Important to Note

Another thing to remember is that when doing Joins, if the point is not found then once the co-ordinates are entered, they will be stored into the co-ordinate file.

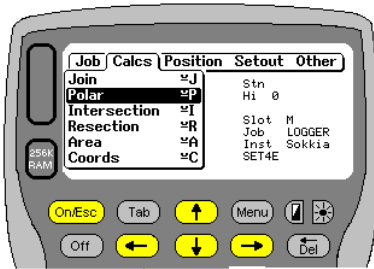
If you want to do joins between points and do not want to store the points values simply press "." (decimal point) when prompted for the name. **LOGGER** will ask for the co-ordinates but will not store them



Remember that users can swap between Jobs by pressing *. When you press * you will get a screen similar to this.

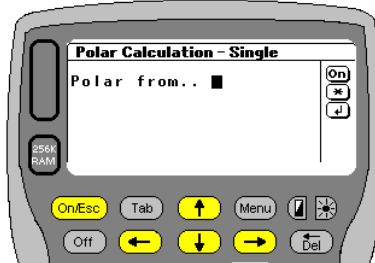
- ❖ Pressing the up/down arrows allows you to scroll through the jobs.
- ❖ Pressing Enter selects the job.
- ❖ Pressing P allows the user to change between packs if required.

If P is selected then the RHS screen prompts the user to select a new device.

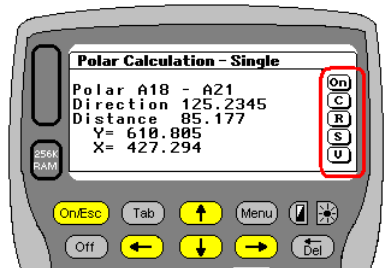
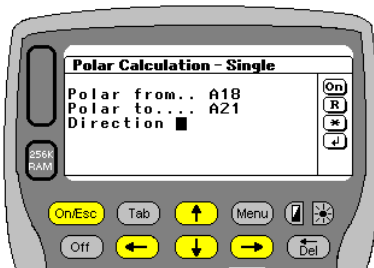


Polar

Allows for standard Polar calculations. This option can be found on the main menu under the Calcs tab. Alternatively press **Psion+P** to activate this function

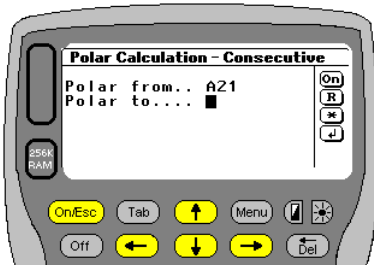


Enter the name of the start point. If you wish to use the name of an existing point in your coordinate database press **TAB** and on the left side a list of point names will be displayed. Remember you can also swop to other coordinate files by pressing “*”.

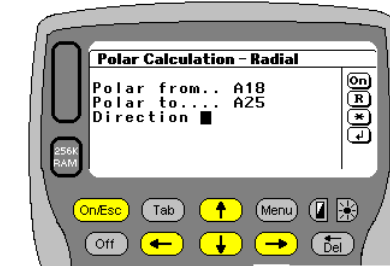
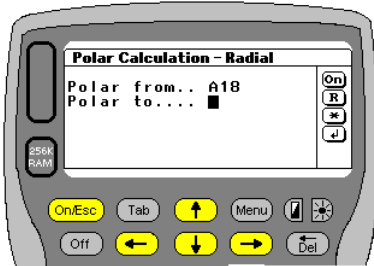


Next enter the name of the point to be calculated along with the direction and distance. **LOGGER** will display the new YX or EN values. No Z is calculated.

At this stage you have a few options and the following hotkeys are available.

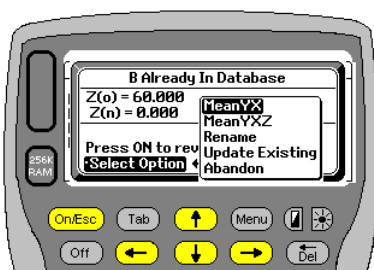


Press **C** to do consecutive polars. The last point A21 in this case, will be held as the base for the next polar calc.



Press **R** to do radial polars. The base point A10, in this case, will be held constant and all subsequent points will be calculated from A10

Press **S** to do a single polar. The start point will have to be redefined each time. Press **V** to view the base points coordinates.



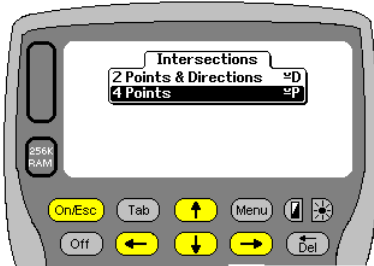
After doing any polar calculation, if **LOGGER** finds that the newly calculated point exists in the coordinate database, **LOGGER** will display the old and the new coordinates along with the differences. You then have a few options to choose from.

You can then either

1. **Mean YX**
2. **Mean YXZ**
3. **Rename**
4. **Update Existing**
5. **Abandon the values will be presented.**

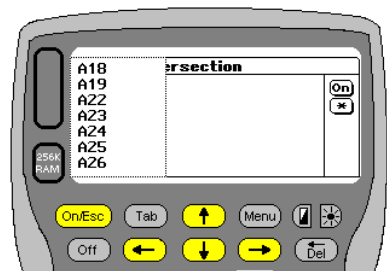
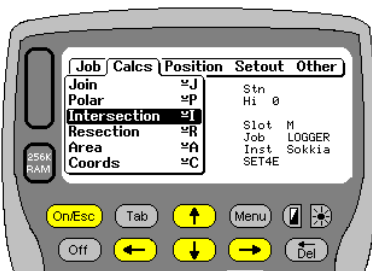
Intersection

There are 2 options available here.

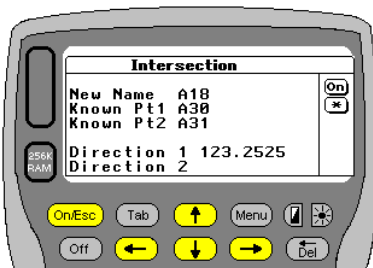
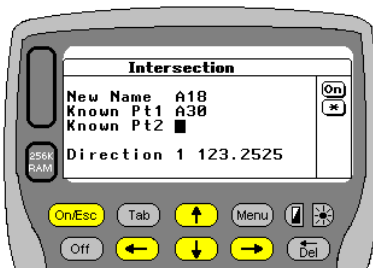


Standard Option (2 points & Directions)

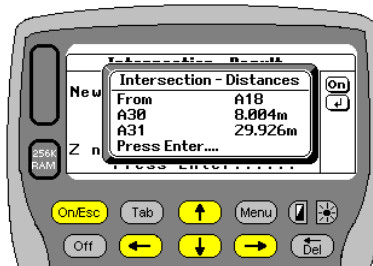
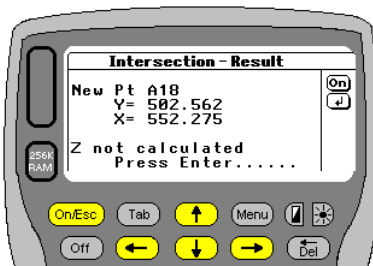
This is a standard 2 point intersection. This option can be found under the Calcs tab on the main menu. Press **Psion+I** to activate or arrow to the item and press Enter



Enter the name of the new point to be calculated. Pressing **ENTER** with no name entered, will give you a selection of points to choose from.



Now enter the names and bearings from the 2 know points. You will be prompted for a name followed by direction from that point.



Once both names and directions have been entered. **LOGGER** will calculate the new YX or EN but not the Z. Press Enter and **LOGGER** will display the join distances from the new point to the fixed points.

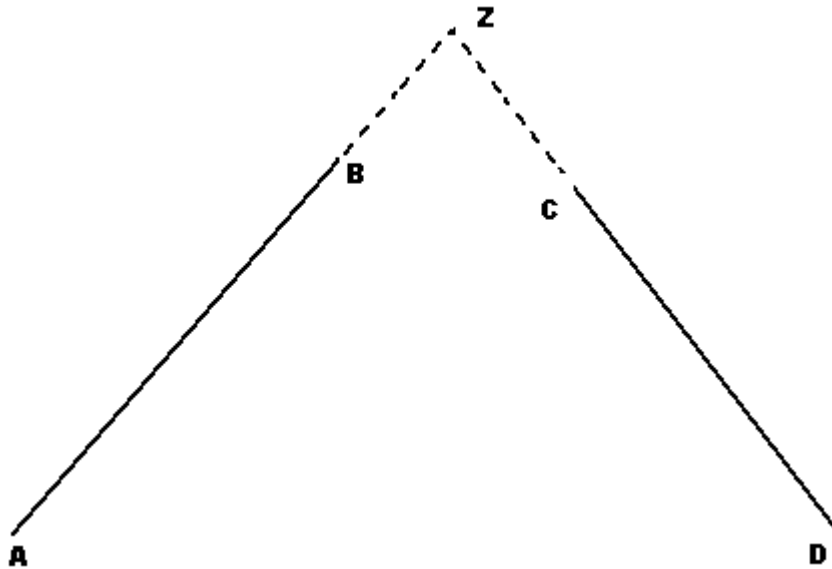
The values will be stored into the current co-ordinate file.

The Second Option

This option will pick up the direction from a join between the points and use it to calculate the intersection point. You will be prompted for the new points name first. In this case Z. Then enter known point 1 (A) followed by known point 2 (B). **LOGGER** calculates the direction A-B. Then enter known points 3 and 4 (D and C). Again **LOGGER** calculates the join direction. Then using A and D and the direction A-B and C-D **LOGGER** computes the required point Z. No Z value is computed.

As above **LOGGER** will display the final value for Z and the distances from the 2 start points. In this case ZA and ZD.

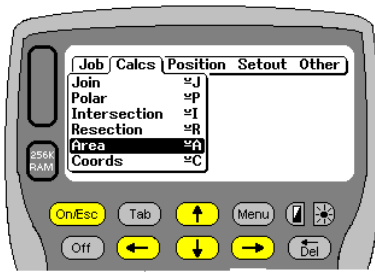
The same answer for Z will be arrived at by entering the points in the order B-A and then C-D. The final distances returned from Z will then be to ZB and ZC

Resection

This can be done under the Position menu.

Area

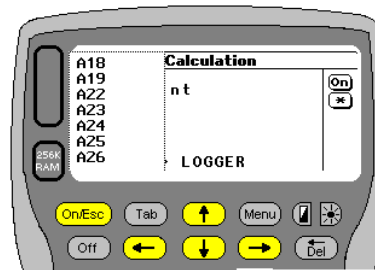
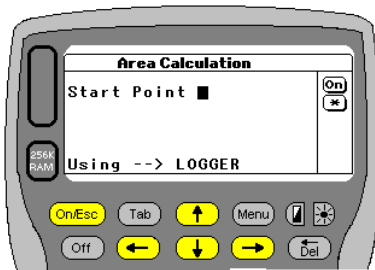
LOGGER allows the user to calculate areas as well. This can be done using coordinates from the current data file, by swopping between files and/or typing in values as you go along.



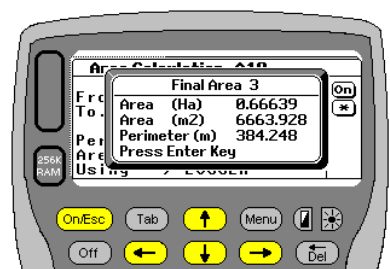
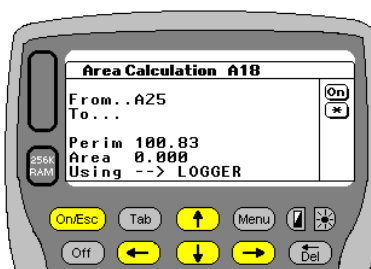
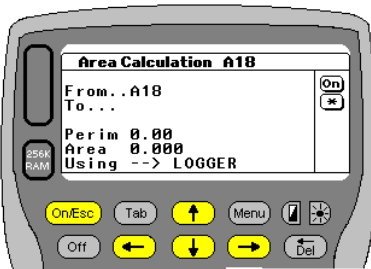
To access the **AREA** menu, arrow across to the **Calcs** menu, and down to Area.

Alternatively press **Psion +A** to take you straight there.

The active co-ordinate database is displayed on the bottom left hand side of the screen. In the example below the current file is called **LOGGER**. Start entering the point names. If you do not know the name then press Enter and a list of items in the current database will be displayed. You can scroll down and select the point required. If an unknown point name is entered you will be prompted for its values. At any stage you can press "*" to change to another coordinate file.

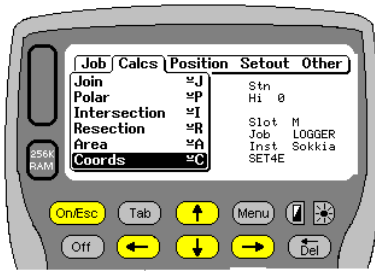


Once the first point has been selected **LOGGER** saves the name on the top line of the screen. (A10 in this example). You will then be prompted for subsequent points. Once 2 points have been entered **LOGGER** will update the perimeter value each time. Once 3 points are entered the area will also be updated. To compute the final area, enter the start point again. Remember the start points name is always displayed at the top of the screen for you. Alternatively to complete the area calc you can press Esc.



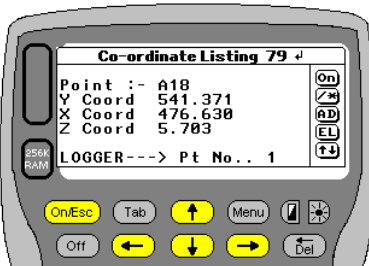
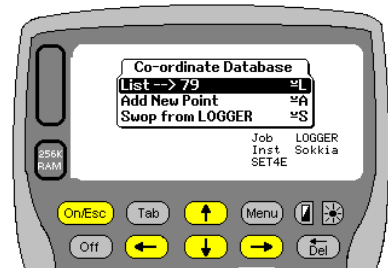
Once the figure is closed **LOGGER** will display the area in Ha and square meters as well as the perimeter length in meters.

Co ordinate Database



The co-ordinate file can be view and edited. Each Job has its own co-ordinate file. The file contains the Name YXZ or ENZ or MPC values for each point. The file can be used by any job at any time as well. This flexibility allows users to easily access information from other jobs without having to shut down their existing job or file and re-open a new job. Coordinate names can be up to 12 characters long.

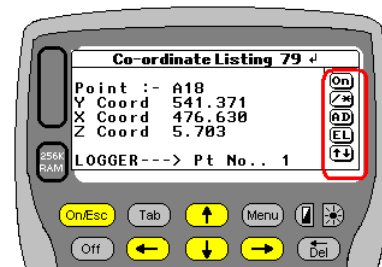
Once this option is selected **LOGGER** will display how many points are in the current active database. It will allow you to swop between databases and also enter new co-ordinates. Options available at he start are listed on the right. Pressing Enter on the List option or (**Psion+L**) will open the database and display the first co-ordinate



The top line of the display shows how many points are in the file. Thereafter the points name or description, as well as its co-ordinate values are displayed. At the bottom of the screen you will see the file name presently being viewed, as well as the current point number.

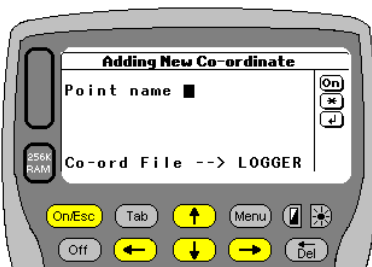
Various options are available and on the RHS menu are the hotkeys that can be activated. The options are as follows:-

- Enter** ← Pressing Enter will move to the next point.
- On** Press On/Esc to escape to the menu.
- /** Press / to see a popup list of names on the LHS and allow you to scroll up or down through the list.
- *** Press * to swop to another co-ordinate file.
- A** Press A if you wish to add a new point.
- D** Press D or the Del key if you wish to delete the current point.
- E** Press E if you wish to edit or change any of the current values.
- L** Press L if you wish to Look or search for a point by name.
- ↑ ↓** Use the up and down arrows to scroll through the file item by item.
- ←** Press the left arrow to jump to the start of the file at any stage
- Use the right arrow to jump to the end of the file at any stage



Here is a more in depth, step-by-step explanation, of what each key has to offer.

Adding a Point



By pressing “**A**” you are able to Add a new co-ordinate to the database. The screen prompt as displayed to the left will appear. Enter the points name or description. Remember **LOGGER** allows a maximum of 12 alphanumeric characters. These can also be a combination of upper and lowercase letters. Once 12 characters have been entered a beep will be heard, indicating that your limit has been reached. At the bottom of the screen you will see the file name into which the point will be stored. At this stage the following hotkeys are active. Once data has been entered you can press ON to clear the input or escape the function.

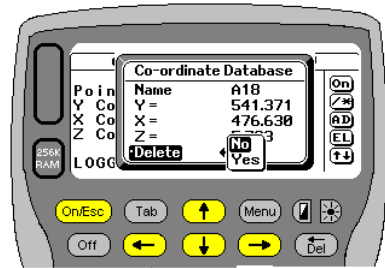
Press * to swop to another co-ordinate file

Enter ← Pressing Enter, if no name has been entered, pulls up a list. And the up down arrows can be used to scroll through the list to the next point. While the list is displayed on the LHS of the screen you can also press **L** to look for a coordinate within the list.

If a new point is entered **LOGGER** will search the database to see if it already exists. If it does you will be presented with the current points info and will be able to edit it. Use the up and down arrows to move to the relative field to be changed. You can either press Enter to accept the data or Esc to return to the menu.

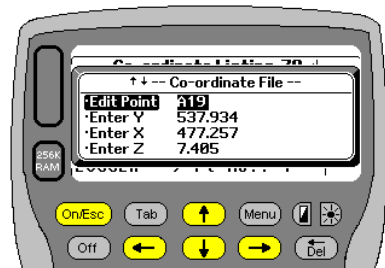
Deleting a Point.

To delete a specific point press **D** or **Del** once the point has been located. One can use **L** to look for a point and display it prior to deleting. Once you elect to delete the point **LOGGER** will display the screen on the right and you must then confirm whether or not to delete the point. By default the delete option is set to No.



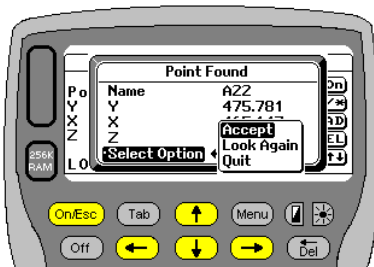
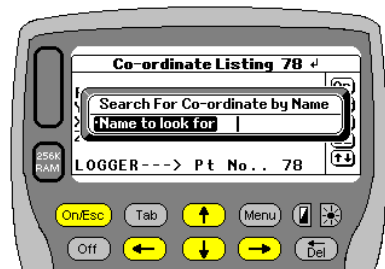
Editing a Point.

Pressing “**E**” will allow you to **Edit** the displayed co-ordinate. The point's current values will be displayed and you can use the up and down arrows to scroll to the field or value to be changed. Press Enter to save the changed values. Press **Esc** if you do not wish to change any values.



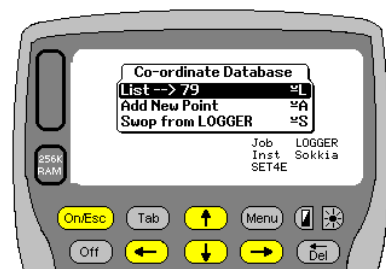
Look for a point.

By pressing “**L**” you can **Look** or **Search** for a co-ordinate within the current database. Enter the name of part of the name and **LOGGER** will search and come up with the first available match. You then have the choice of accepting the point found, looking for another similar match or aborting the search.



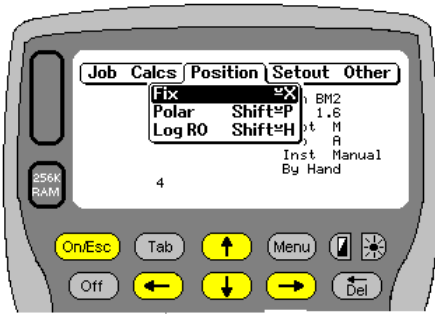
Swapping Coordinate Database Files

LOGGER allows users to make use of any other jobs coordinate file without having to actually load and use the job. While in the Coordinate database routine press * to swop to another job or on the main coordinate database menu select the last option on the menu as shown to the right. **LOGGER** also shows you which coordinate database is currently active. Here it is called **LOGGER**



Positional Fixes

Fix

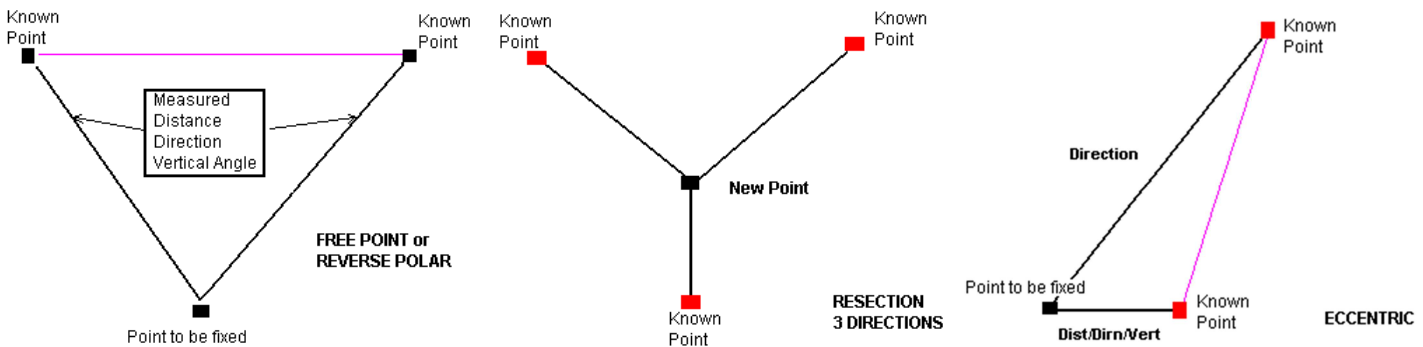


Generally speaking most packages offer the user 3 different options to fix oneself. Typically these are:-

1. Resection
2. Reverse Polar or Freepoint
3. Eccentric.
4. Known Point

These are used to fix the user in YX (EN) and then heights can be calculated as well. **LOGGER** has done away with this style of fixing, and has attempted to make fixing oneself as simple, easy and flexible as possible. **LOGGER** will allow the user to take any observations in any order and once there is enough information to calculate a fix, **LOGGER** will do so automatically.

Users do not have to specify what type of fix is to be done. Lets first assume that the point where you are setup at is **NOT** fixed.



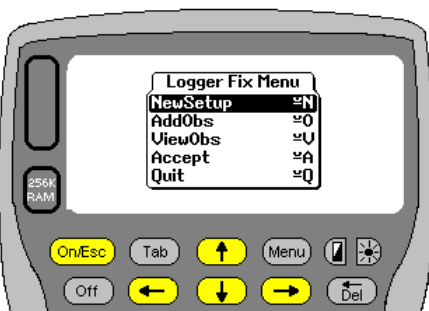
Once **LOGGER** has either:-

- 2 distances and 2 directions, it will calculate the station using a **Reverse Polar or Freepoint**.
- 3 directions (Horizontal Angles) it can calculate the station using a **Resection**.
- Distance and another distance and direction, it will calculate the station using an **Eccentric**.
-

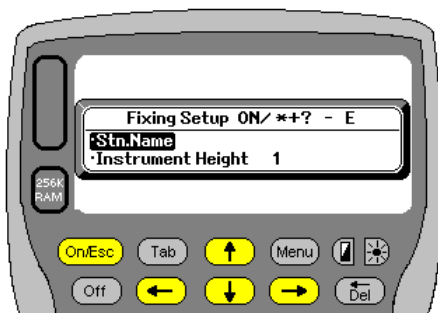
If verticals are also taken during the data collection operation heights will be calculated as well. All YX (EN) calculations are adjusted using least squares and the heights are adjusted using weighted means.

- To activate FIX arrow across to the Position TAB. Locate Fix and press Enter.
- Press X and then Enter.
- Alternatively press **U** +X and Fix will start automatically.

Using Fix (Setup at Unknown Point)

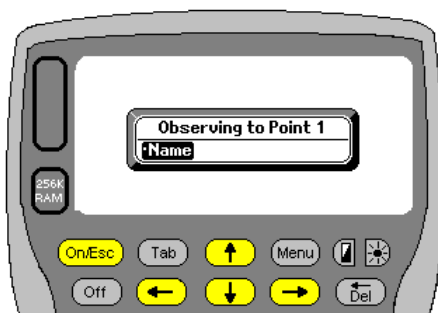


Left is the main Fix menu. Start by selecting **NewSetup**. You need to then enter the name of the new station, or if it's an existing point then the known points name. Various options and hotkeys are available when being prompted for the name. It should be noted that the user can swop from Electronic to manual mode after **FIX** has been started.

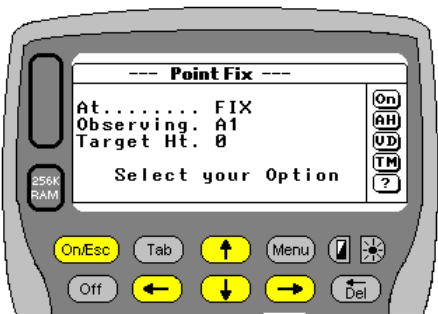


The screen display opposite is requesting a Stn name. The **E** indicates that the users input will be electronic as opposed to manual. Enter your station or setup name. The following hotkeys are active.

- ON** Press ON to escape and return to the previous screen
- /** Press / or Enter to select from a drop down list of names in the current co-ordinate file
- *** Press * to swop between co-ordinate files, and choose a point from another job.
- +** Press + to swop between manual and Electronic mode. If you are in manual mode an M will appear.
- ?** Press ? to get a list and explanation of the hotkeys available.



For this exercise we will assume the points name to be FIX, and that the point to be fixed is a new point and XYZ values need to be calculated. Once you have entered the setup points name (above), you need to start observing to other know points. **LOGGER** prompts you for the name of the 1st known point. As always the / Enter and * keys will respond as detailed above. At this stage you cannot change between manual and electronic mode, so make sure you are in the correct mode before starting the observations. If you are in the incorrect mode you can still change at the next input screen.

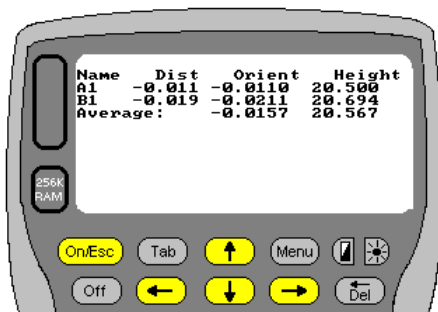
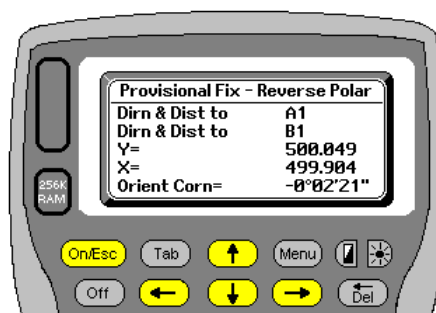


Assume that the first point we observe is called A1. Remember that if A1 is not found in the current coordinate database you will be prompted for its XYZ (ENZ) values. The screen opposite will appear and we are now ready to record our observations from Fix to A1. The following hotkeys are available down the right hand side menu.

- On** Press ON to Esc
- A** Press A to take ALL readings (Horiz, Vert & Distance)
- H** Press H to take only a horizontal angle
- V** Press V to only take Vertical Angle
- D** Press D to only take a Distance (and Vertical)
- T** Press T to change Target height
- M** Press M to swop to manual input

? Press ? for list of hotkeys and their functions.

When you are ready press the required hotkey. **LOGGER** will take the readings requested and proceed to prompt for observations to known point no 2. Follow the same steps. Let's assume for now that we are doing a Freepoint fix. A (ALL) will have been pressed and both sets of observations have been taken. **LOGGER** will then have enough information to calculate a provisional co-ordinate for FIX. (2 distances /directions and verticals)



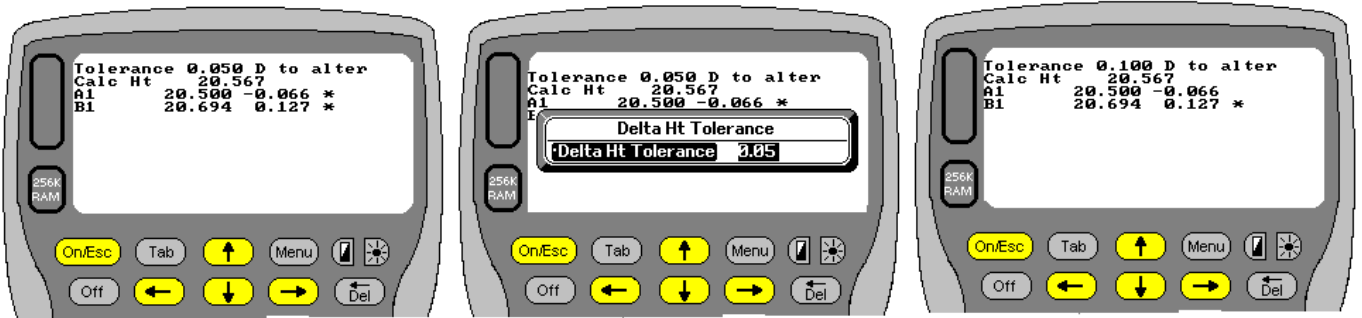
LOGGER will display the provisional YX (EN) of the newly fixed point as well as an orientation correction. Press Enter to continue. **LOGGER** will then compute the residuals on the distance and display these to you. This gives an indication of how good your fix is. With a Freepoint fix **LOGGER** will automatically apply a least squares adjustment as there is already a spare observation/distance. The corrected orientation correction is displayed as well as the height of the newly fixed point, as calculated from the known points. In this case Fix heighted from A1 yields 20.500 and from B1 20.694. A weighted mean is calculated to be 20.567. Press Enter to continue. **LOGGER** returns to the main fix menu.



At this stage **LOGGER** will allow you to display the distance results to either 3 or 4 decimal places. On the left the answer is 0.000 but on the right it is actually 0.0002. For ultra precise work this may make a difference to you. To swop between 3 and 4 decimal point display simply press the decimal point.



Because your heights are important **LOGGER** displays the calculated height and also gives the residuals with the control used. By default a tolerance of 50mm is used. Anything that exceeds that difference will be flagged for your attention. A beep will be heard as the screen prints the results. The bottom left screen below shows the calculated height and warns that both values exceed the allowable of 50mm and are flagged with a *. The default of 50mm can be altered at this stage by pressing D (middle screen below). Once a revised value has been entered the results will be recalculated as shown bottom left.



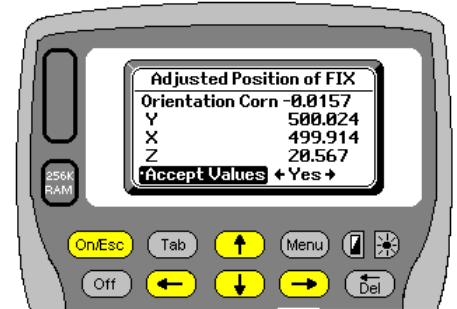
Once the above has been checked and you are happy press Enter. You will be taken back to the main menu



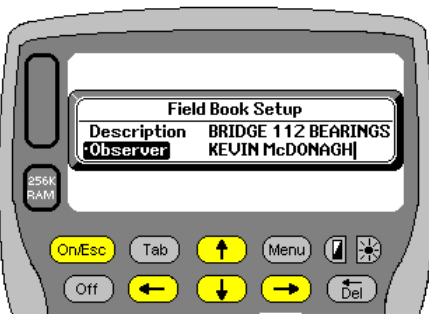
At this stage you can use the **AddObs** option to take additional readings and strengthen or check the fix. These observations can be used to improve either, or both, the horizontal and vertical fix. You can use **ViewObs** to scroll through and see what readings are being used. They can be edited manually. You can also **Accept** the result and continue. Alternatively you could **Quit**.

Lets complete the exercise and Accept the observations and result. Arrow down to **Accept** and press Enter, or press **A** and then Enter.

Once accepted **LOGGER** displays the final results for the newly fixed point, and offers the user a chance to finally accept the answer. If you



select **Yes** **LOGGER** will orientate your instrument, by reading the current horizontal angle, adding the correction angle, and resetting the circle by the required amount. You do not need to point to any of the control points to orientate your instrument. **LOGGER** will also upload whatever information can be accepted by your instrument. Typically this will include the new points name, YXZ (ENZ) values and the instrument and target heights.

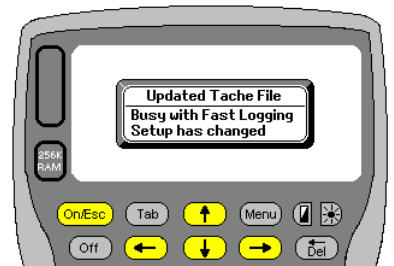


By default **LOGGER** will store all your observations into a field book. You will be requested to give a description for the current job as well as the name of the observer. Its up to you to enter the info or not. All the fixing data and results will be written to the field book. The field book can be downloaded into a straight text file from the Download menu.

Below is also an example of what your field book would look like.

Note!!

If you are busy doing tache and have previously exited using the **Fast**



Logging option the following message will also appear. See section under tache- fast Logging for more details

```
//Source LOGGER Software for Psion WorkAbout issued 05/12/2010
//Job..... HILLCR
//Date..... Wed 22 Dec 2010 14:36:26
FIELD BOOK
Job Description... BRIDGE 112 BEARINGS
Setup at FIX      Y= 500.024      X= 499.914      Z= 20.567
Instrument Ht 1.000      Scale Factor 1.000000
Date and Time..... Tue 18 Oct 2005 14:02:10      Observer KEVIN McDONAGH
```

Point	Horz Ang	Vert Ang	Slope Dist	Red Dist	Target Ht	Y	X	Z
=====	=====	=====	=====	=====	=====	=====	=====	=====

A1	356.2400	87.3640	70.850	70.788	1.360	495.556	570.550	23.094
B1	95.1900	93.4840	135.750	135.450	1.180	634.880	487.450	11.495
C	-0.0205 Correction Applied					500.024	499.914	20.567

Attached to the end of the printout above will also be the columns below.

Dist	Direction	Height	Ht Resid
-0.011	-0.0110	20.500	0.066
-0.019	-0.0211	20.694	-0.127

The height is the calculated height for the new point from the control point. So C's Ht calculated from A1=20.500 and from B1=20.694. The weighted mean is 20.567. The difference between the mean and actual is the residual (0.066 at A1) and (-0.127 at B1). Above we see quite big differences in the elevation calculation.

All the observations from Fix to the known points are recorded, as well as the YXZ (ENZ) of the known points. The correction angle is applied to the total station and all the horizontal observations shown are now the **CORRECTED** angles. In the example above 95.1900 has already had -13.2341 added to it. The actual field observation would have been 108.4241

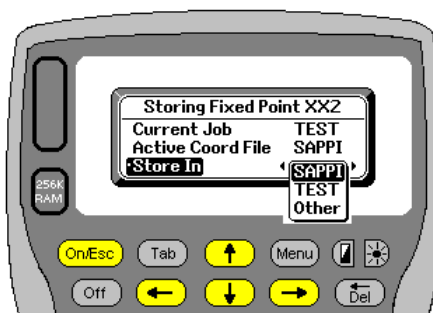
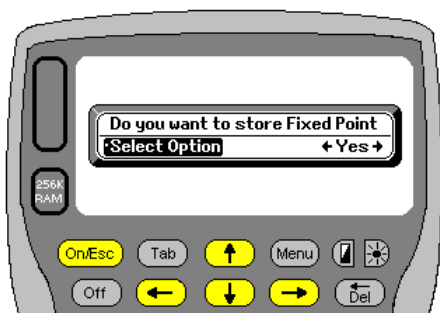


LOGGER then offers you the option to store the point.

LOGGER first checks to see if the current jobs coordinate file is being used or another coordinate file. If the current active coordinate file is that of the current job then **LOGGER** will display the screen to the left. **LOGGER** defaults to your current. You can however use the arrow keys to move up or down

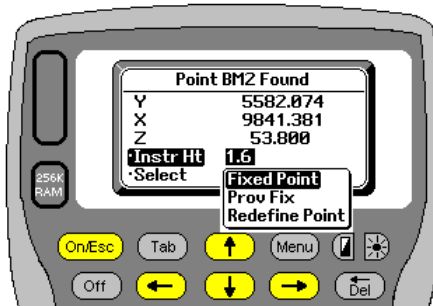
through the job list and store into any other job should you so wish. If you press **On/Esc** at this stage the coordinate will not be stored.

In the above example SAPPI was the current job and coordinates from the SAPPI coordinate file were used to fix the station XX1.



If the current jobs coordinate file differs from that used to fix the point, then you will get the following storing option coming up. This time the user opened a job called TEST but used coordinates from a file called SAPPI to fix XX2. **LOGGER** will default to storing into the SAPPI file. Remember you can press **TAB** or the arrow keys to select the other job (TEST) or to select a completely different job as shown in the example above.

Using Fix (Setup at Known Point)



The logic is basically the same. Select NewSetup and enter the station's name. **LOGGER** will check to see if the point exists in the coordinate file. If so you will be shown the points YX (EN) and Z values. You will have the chance to alter the Instr Height. **LOGGER** will display "Fixed Point". Other options are available and will be discussed later. If you accept the point as being fixed all you really need do now is orientate yourself. **LOGGER** will prompt for the next points name (the point you wish to orient

onto). As when fixing you can select what type of observation you want to take. If you just take a horizontal then an orientation correction will be calculated and displayed. A second observation should be taken. If you want to only use one observation you can ON/ESC. **LOGGER** will warn that the setup is unchecked and orient your instrument, and upload all available data that the instrument can accept.

If Verticals and distances are taken **LOGGER** will compute the "shifts" both horizontally and vertically. This is a useful check to see that the control point has not moved. If you elected "FIXED" at the start, then the values will not be adjusted.

If a known point is found and the "**Prov Fix**" option is selected, then any observations taken will be used to adjust the coordinate values of the known point.

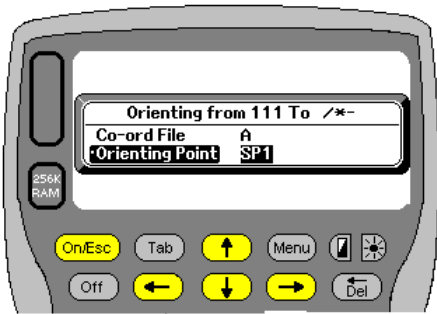
If the "**Redefine Point**" option is selected then the user has a chance to choose another point

Using FIX in Manual mode.

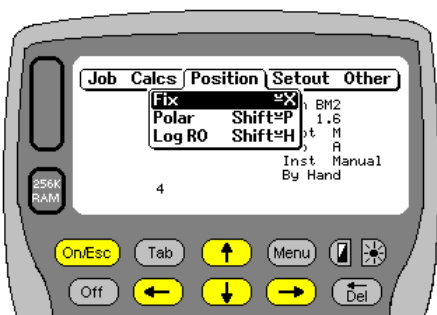
The same logic as above applies. The only difference is that you will be prompted to enter the Horizontal, Vertical and Distance readings. If a reading is to be ignored enter 0. For example if you were doing a resection the vertical angle and distance could all be entered as 0 (zero).

You will be prompted for Horizontal Angle then Vertical Angle, followed by distance and target height. If at any stage during the input you wish to escape, press **ON/ESC** and **LOGGER** will revert to the previous input field. Again once enough observations are available for a provisional calculation, **LOGGER** will do the calculation and display results as above.

Once the point is calculated and accepted you will be prompted to orient onto a known point. An orienting join will be calculated and you will have to manually set your instrument to that direction. You will be prompted again as a check. If you are happy press **ON/ESC** to exit. As above you will be prompted for fieldbook input.



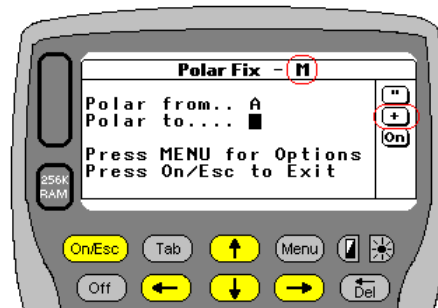
Polar



LOGGER will calculate new XYZ or ENZ values for you. Data can be entered manually or electronically. This polar routine only does radial polars.

If you have not yet setup at a point you will be prompted for the station data.

Then enter the name of the point to be fixed. Once again if you wish to overwrite and exiting point in your file, and do not know its name, you can press Enter and a drop down list of all

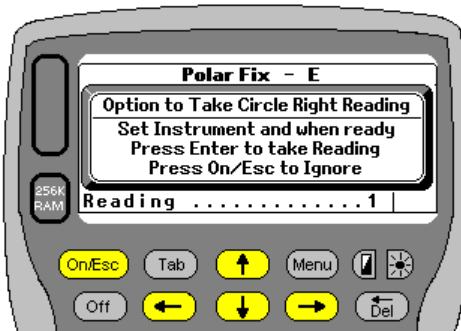
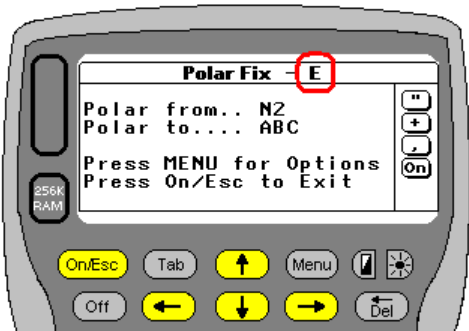


the names will appear on the left. Alternatively you can swap to another coordinate file and do the same by pressing *

The **M** next to Polar Fix at the top of the screen indicates to the user that **LOGGER** is in Manual mode. Press + to swap between manual and electronic modes

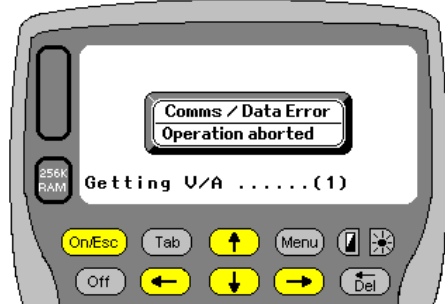
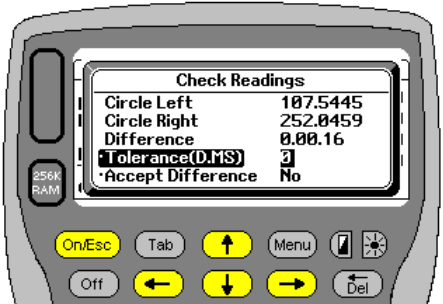
To swap between co-ordinate files press "*"

To view the starting points co-ordinates press " (inverted comma or shift+2)



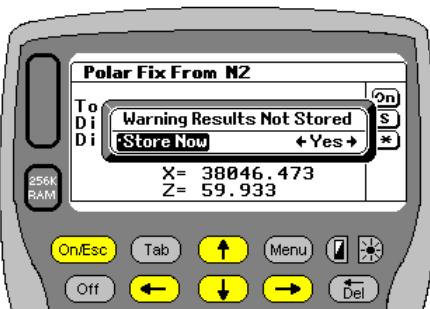
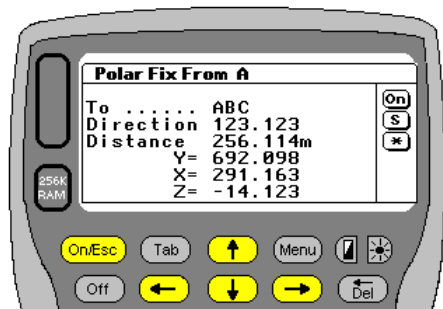
If in electronic mode **LOGGER** will trigger and extract horizontal, vertical and distance readings from the instrument automatically. You then have the option of taking another vertical angle Circle Right. Transit the instrument and re-sight if you wish to take a reading. If not press Escape. If you do not transit and take a reading,

LOGGER realizes that you only want one vertical and uses the first reading.



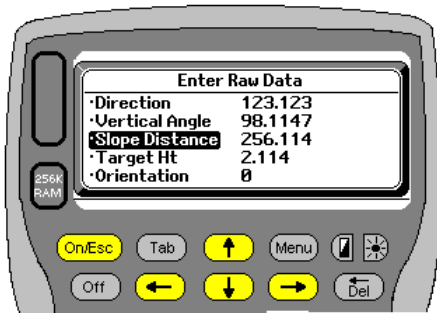
If you do take a second vertical then **LOGGER** displays the two for you initially. It gives the difference between them and allows you to set a tolerance. Initially it is set to zero. If the difference falls within tolerance you do not get the option to check the readings. Instead **LOGGER** proceeds and displays the values that will be used to calculate the polar. Circle Left and Circle Right readings are meaned. If you change

the **Vertical Angle Tolerance** it will remain set until **LOGGER** is shut down and a new session started. If you are not happy with the difference and select **No** **LOGGER** will display an error message screen (above right) and then take you back to the start of the Polar Fix routine



Finally you get given the calculated co-ordinates. Press **S** if you wish to store the data. If you just press Enter or Escape **LOGGER** warns you that the data is not saved and gives you a second chance to save.

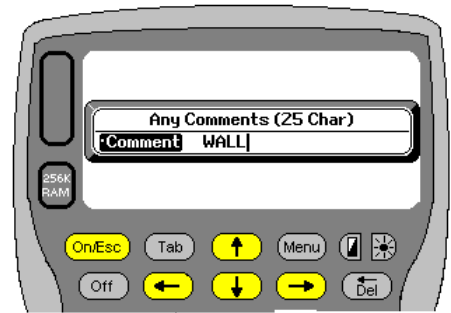
If you wish to save into another job press "*" and choose the job where you want the new point to be stored.



If in manual mode you will need to enter the distance, direction and vertical angle. **LOGGER** also allows you to add an orientation correction when in manual mode. If you have taken a whole lot of unoriented field observations, they can be calculated manually with a correction applied automatically to the Horizontal angle. **LOGGER** calculates the polar and displays the final values as above. To save the data press **S**. To swop between co-ordinate files press “**”

All polar data is automatically saved to the fieldbook. The user is given a chance to enter a 25 character comment before saving the information.

Below is an example of what can be found in the fieldbook

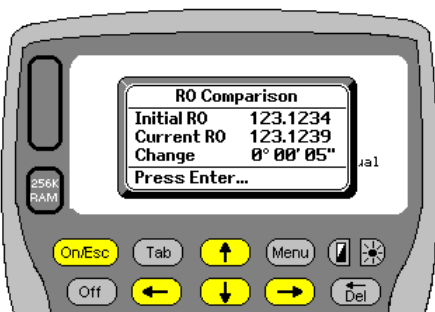


Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments	Y	X	Z
T2	200.1529	91.5419	6.031	6.028	1.557	WALL	651.712	957.291	131.853

Log RO



Also in the Position menu is an option to take an RO reading at any stage. The user will be prompted for the RO name. Then you need to turn your instrument to the RO to be sighted. If it is in electronic mode press Enter and **LOGGER** will read the horizontal angle off the total station and store it. If you are in manual mode (as shown above) you will need to enter the observation manually.

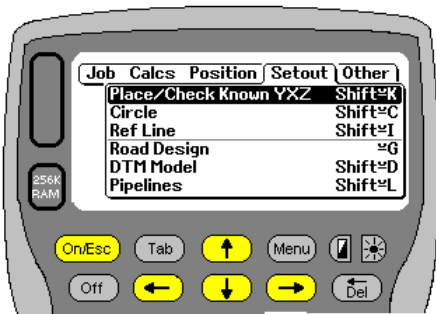


The first time an RO is taken **LOGGER** records and holds onto the reading, and logs it in the fieldbook as **RO Set**. Thereafter when an RO is taken **LOGGER** will compare the new RO to the initial RO and display the difference. This information is also written to the field book and logged as **RO Check**. The time the RO was taken is also recorded.

An example of the output is displayed below

Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments
A1	123.1234			16:56:39		RO Set
B12	205.5310	91.1430	42.058	42.048	1.600	1.6 HT CHCK PLCD BCN
B11	164.0320	85.1210	64.314	64.089	2.000	CHCK PLCD BCN
NKN3	161.0450	84.5330	77.998	77.688	2.500	WP
A1	123.1234	123.1239	+0.00.05	16:56:51		RO Check

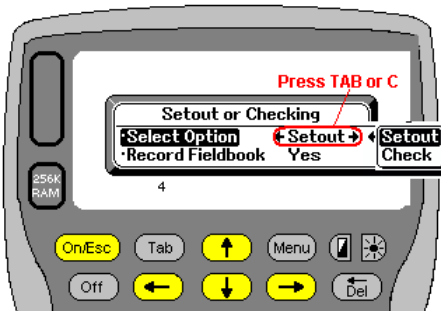
SETTING OUT



Place/Check Known XYZ or Known ENZ

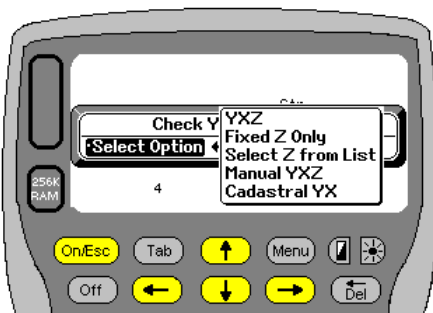
This routine will allow users to setout points or check placed points. The routine is found on the main menu under the **Setout** tab. **LOGGER** assumes that you are already setup at a known point. If not you will be prompted to do so

Once selected choose whether you want to use the setout or check option. You can press **S** or **C** or arrow to the required option and then press **Enter**
 Pressing tab will display the drop down box and allow you to choose as well.
 Then arrow down. Select whether or not you want the data recorded to your fieldbook. Options are Yes or No.

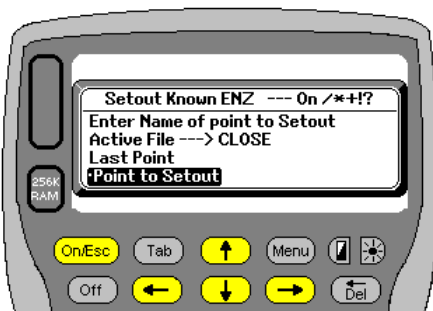


If you select Yes then you will be asked to enter a description heading to be stored in the field book. Example is shown above on RHS (BERG RIVER). Thereafter the screen below will follow

If you select No the screen below will follow.



If Setout is selected then there are 4 other options available.
XYZ Will setout the XYZ of the point selected.
Fixed Z Only Will only setout Z. Typically a contour line
Select Z from List Will select only the Z from a point in database
Manual XYZ User has to type in the XYZ values required.
Cadastral YX No Z will be used



Setout Known XYZ
 This Option allows you to place points with know XYZ or ENZ values from your setup station. **LOGGER** will prompt you for the point to be placed. Remember that if you press **Enter** with no name entered, **LOGGER** will provide a popup screen on the left and allow you to scroll through your current coordinate file.
 The screen displays the active co-ordinate file
 Press **On/Esc** to exit the routine

Press / to list coordinates in file
 Press * to swop between different co ordinate files.
 Press + to swop between Manual and Electronic modes
 Press ! to find closest point (Shift+1)
 Press ? for help

Once the point name is entered **LOGGER** will compute the placing join. The name of the point being placed (NRB201 in this case) can be seen on the top line.

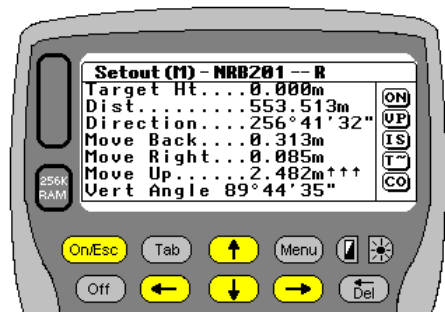
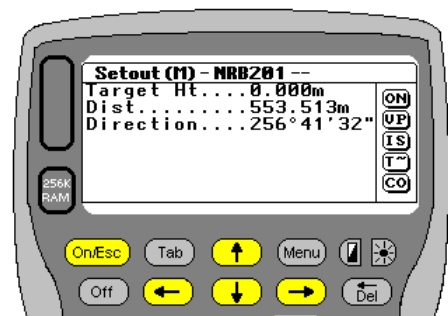
The mode (either **E**lectronic or **M**anual) is also displayed. (Electronic in this case)

In the lower RHS screen **LOGGER** shows placing point no 10 in **M**anual mode and the **R** indicates that a reading has already been taken and you are now ready to **R**ecord to your field book if you choose to.

Hotkeys

Once again various hotkeys are now available. The two screens to the right show the start and end of the setup routine. The keys available from these screens are as follows:-

- On/Esc Exit to previous screen
- V View Station coords
- C Check coords of setout point
- D Displays Dy Dx difference for you
- P Alter measurement precision.
- I Get additional grade info
- S Begin setting out
- T Change target heights
- ~ Alter measurement timeouts
- O Check chn and offset of point if relevant
- R Record to fieldbook if relevant
- L Relative movement from last point
- J Do orienting join
- U Upload data to instruments if applicable
- B Set boning height
- + Swop between manual and electronic modes
- : Alter placing accuracy check
- M Show measured values if applicable
- X Show Profile info if applicable
- H Store Horizontal RO reading
- Q Start quick tache
- ↑ ↓ Scroll Target heights
- ! Check for closest point in file



A more in depth explanation of each hotkey follows

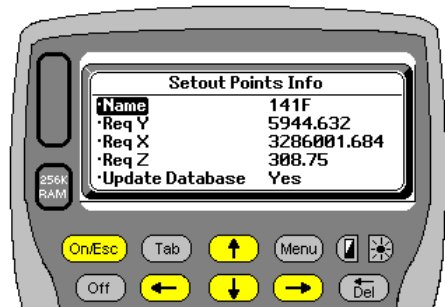
Hotkey V

Pressing V will show the user the co-ordinate values of the setup station. Can be very useful if you suspect that the placing info given to you by **LOGGER** seems incorrect. At least this way you can check the values without having to exit to the co-ordinate file and search for the point



Hotkey C

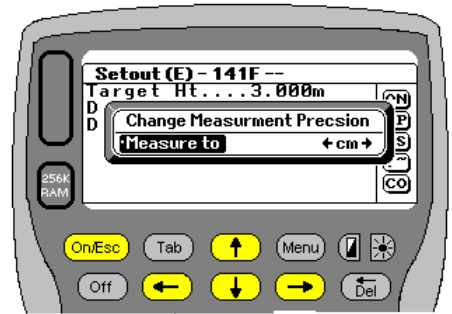
Pressing C will display the co-ordinate values of the point being set out. At this stage you also have the opportunity to alter any of the fields and update the co-ordinate database. It is possible that values have been pre-loaded in the office and when you get to site the plans have



changed and the values need changing. Often its only discovered when actually setting out so instead of having to exit to access and correct the database it can be done here very easily.

Hotkey M

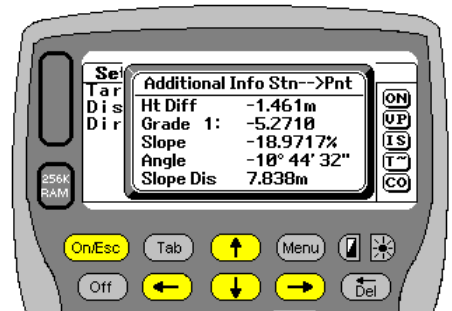
Enter the measurement precision to be used. This generally applies when doing tache. This value can be changed during data capture. You have 2 options mm or cm.



Hotkey I

Press I to get additional information between the setup station and point being setout. **LOGGER** gives:-

1. The height difference
2. The grade as a 1:
3. The slope as a percentage
4. The slope as an angle
5. The slope distance

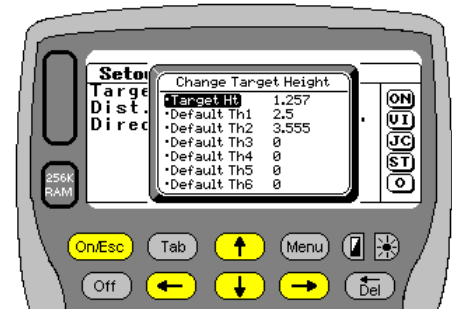


Hotkey S

Press S or Enter to start setting out. In Manual mode you will be prompted for the Distance as well as the Horizontal and vertical angles and also the target height. In electronic mode this info will be got from the instrument. Remember to check your target heights.

Hotkey T

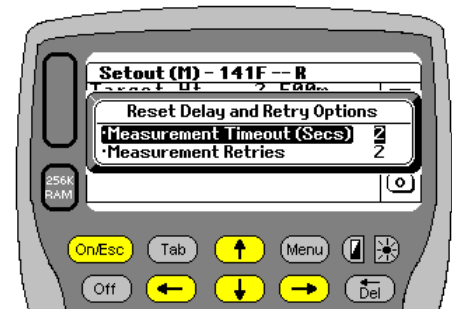
Press T and **LOGGER** will allow you to change your target height. Up to 6 different target heights can be assigned. In this case the current value of 1.257 will be returned but heights 2.5 and 3.555 will be remembered. Once you exit. **LOGGER** will return using 1.257. Thereafter to change target heights simply press the **↑** **↓** to scroll the heights. In this case pressing **↓** will change the value to 2.5 and again to 3.555. If zero is used as a preset height scrolling to it will be ignored. If you need to use a value of zero enter 0.0001. Using **↑** will have the same effect. This method is extremely fast to use when setting out and saves a lot of time and possible errors.



Hotkey ~

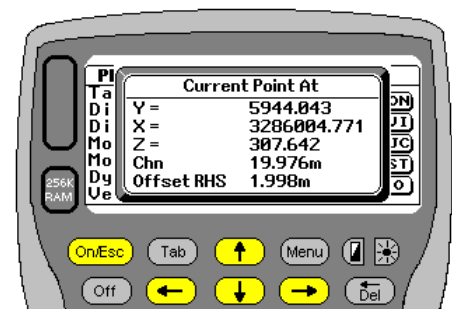
Press ~ (Psion+4 bottom leftkey+4). This allows the user to alter the timeout settings without having to go back to the defaults menu.

A more detailed explanation of these functions is giving under the section job setup.



Hotkey O

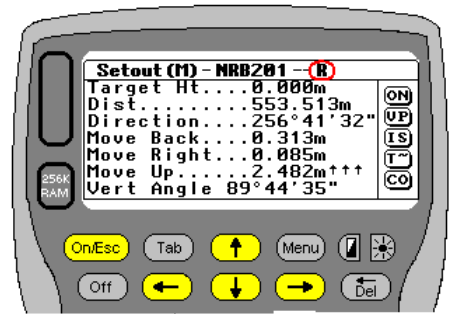
Pressing O will give you the current Chn and Offset of the point if you are using reference line. In this case a reference line has been defined and the user wanted to set out Chn 20 and offset 2. If for some reason you are unable to get to the point you may well want to know where it actually is in relation to your line. Here we see it is actually at 19.976 and offset 1.998.



Obviously if you are not setting out using reference line then the chainage and offset will always be zero.

Hotkey R

Only when the **R** appears in the setout screen will the hotkey be active. At this stage there is sensible data to record to the field book. Pressing **R** will write the relevant info depending on what setting out operation you are doing (Cadastral, Batters, Profiles, Coords)

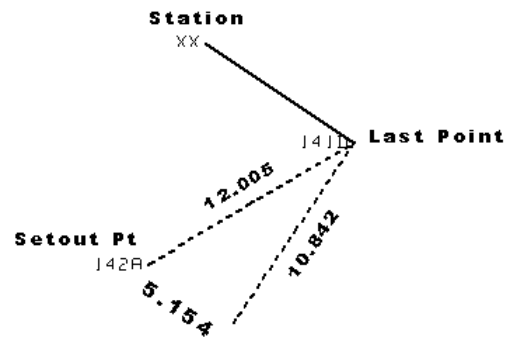
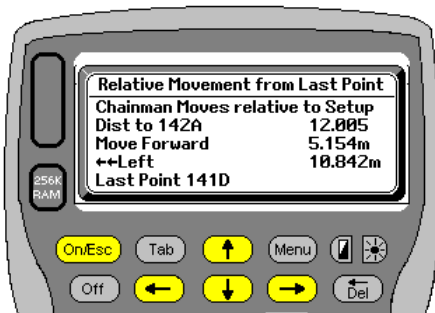


Hotkey L

Pressing **L** will allow the operator to tell the chainman how far to move, to get to the next point, relative to where he and the instrument currently are.

In this case the instrument is at Station XX. The chainman is at Last Point 141D. He is required to now go to Setout Pt 142A.

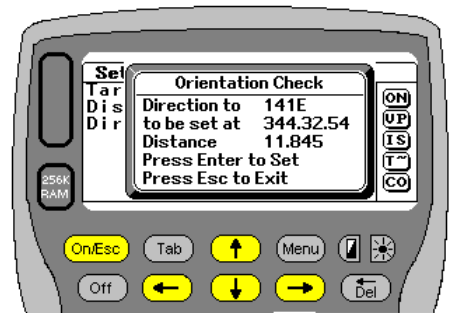
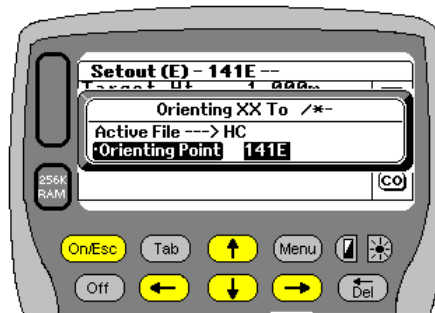
So the chainman needs to look towards the instrument and move 10.842m left and forward 5.154m. Useful for giving field assistances some idea of where to move to next when setting out.



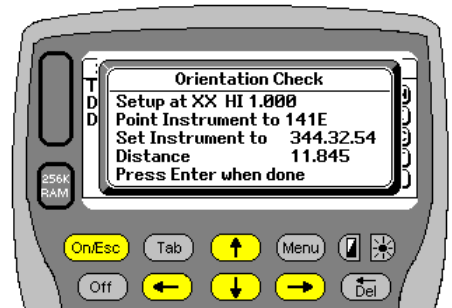
Hotkey J

While busy if you suspect that your orientation has slipped, you can press **H** to check your RO. If you wish to reset your instrument back into orientation it can be done by pressing **J** (Join).

LOGGER will prompt for a point to orientate onto (141E in this example). Press Enter to accept the point. **LOGGER** then calculates the correct join direction to be set on the instrument. (344.3254 and the distance) as shown above. All you need do now is point your instrument to your selected reference point (141E) and press Enter. **LOGGER** will reset the circle to the required direction and you can carry on as normal.



If you are working in manual mode the screen display will be slightly different. As shown on the right. Because you are in manual mode you will have to point the instrument to the selected point and then set your circle manually.



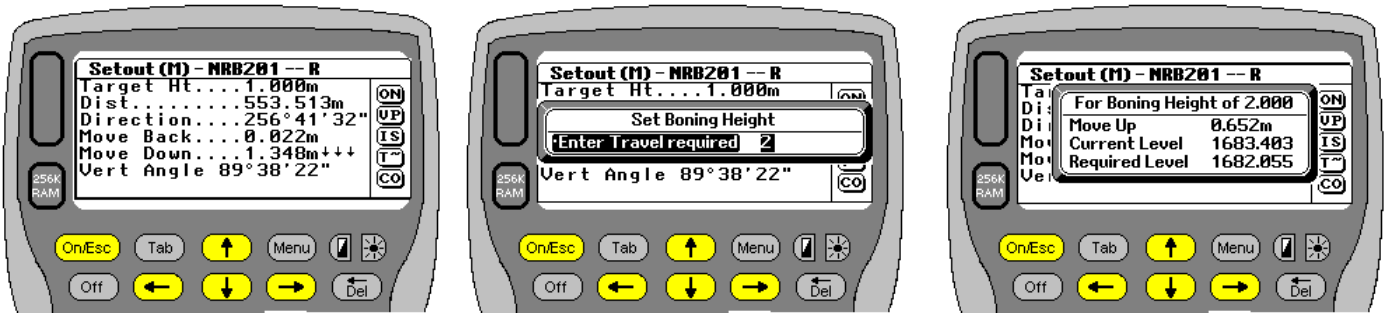
Hotkey U

LOGGER will upload the setting out coordinates to the instrument if it is capable of receiving the data. At this stage with Leica that are able to accept the command to reset the screens, they can be turned until the horizontal circle reads zero and then the vertical angle also adjusted until it also reads zero, can press **U** at this stage. **LOGGER** sends the required

setting out data to the instrument, and the Leica uses its own on board software to set the screens up so that the delta angles are shown. Refer to the Leica manuals for more details on the use of his feature. For other instruments like Sokkia, and Geodimeter the YXZ (ENZ) of the point will be sent to the instrument along with the target height. One then needs to activate the Setout function on the Sokkia to proceed.

Hotkey B

This option has been put in to save on a little bit of mental arithmetic. Once you have taken a reading to the point to be setout, **LOGGER** displays how far you still have to move either backwards or forwards and also how much up or down you have to go. Here we see that you need to measure down 1.348m to get to the required level. If however you wished to put a profile pole in that was 2.000m above final level all you need do is press B (Boning).



LOGGER will show the above screens. You will be asked to enter the travel or boning height required (2m in this case). **LOGGER** will then tell you that for a boning height of 2m you will be required to move up 0.652m. It will also display the current and required levels.

Hotkey +

Pressing the + key will allow the user to swap between manual and electronic modes. The mode you are in can be seen on the screen as is shown here. **LOGGER** will either display M or E indicating manual or electronic modes. In manual mode the user will have to punch in all the observations. In electronic mode **LOGGER** triggers the instrument and gets the readings automatically.



Hotkey :

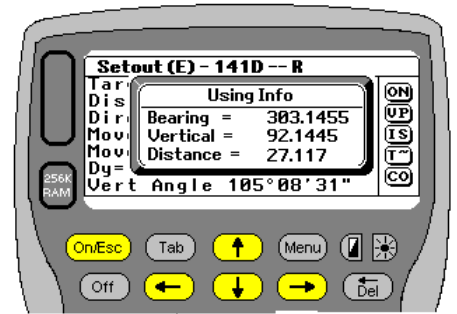
Press : (shift+*) to activate this option. The : represents 2 shots very close together. The user can set a tolerance check as a safety measure. When placing if the join distance from the currently measured point to the required point exceeds the tolerance check a warning to the user will sounded. As can be seen in the example the user has set a tolerance check of 1m but is currently 1.074m out. To change your tolerance press : and enter a new value.



It should be remembered that you could have set out the right distance, but be off line without realizing it. This simple check keeps track of such eventualities.

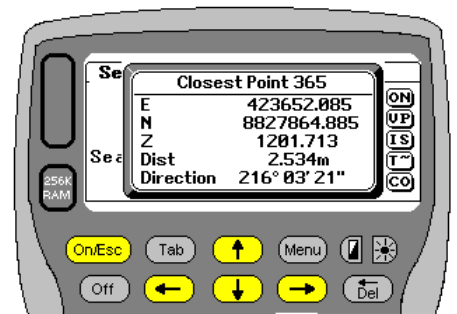
Hotkey M

Pressing M will display the last used measurements. This option has just been added so that should there be a query or concern about the observations either entered or taken you can recall and check them. **LOGGER** will display the following screen for you.



Hotkey !

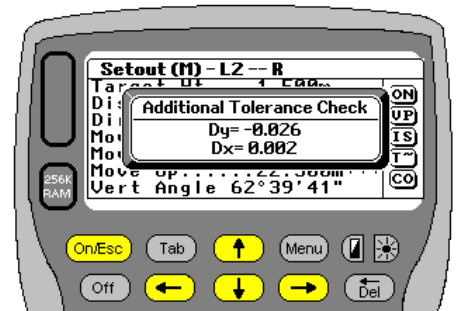
If you press **!** (Shift+1) **LOGGER** will immediately search for the point closest to where you are. If you have not yet selected a point to set out then **LOGGER** will search for a point closest to your setup station. If you have taken a shot to some selected point then **LOGGER** will find the point closest to your current target position.



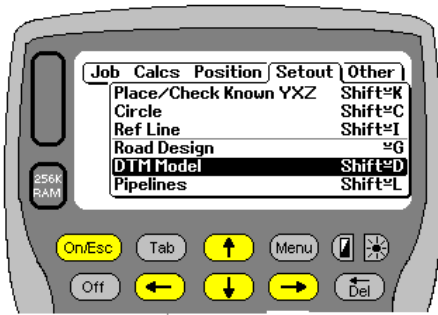
To be able to find the closest point **LOGGER** needs a reference to work from. So if you are trying to find the closest point to where you are, the easiest thing to do is select to setout any arbitrary point from your database. Ignore the setting out info and just take a reading to your target. Ignore the misclosure info. Now **LOGGER** has a point to work from and will be able to calculate the closest point to your last reading. Once that has been done **LOGGER** will display the point found. Pressing enter will take you back to the screen requesting which point needs to be setout and the closest points name will be there.

Hotkey D

Pressing D will display the shift in the Y and X Axis for you. It is possible that you are at exactly the right distance with regards to placing the point but slightly off in direction. **LOGGER** will display the shift as Dy= and Dx=. Basically it's the difference in Y and X values between the theoretically required point and the actual position. Once you have viewed the info press any key to get back to the setout screen.

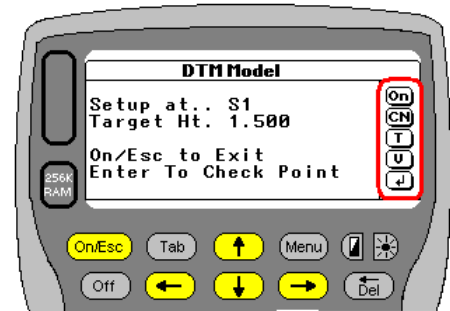


DTM Model

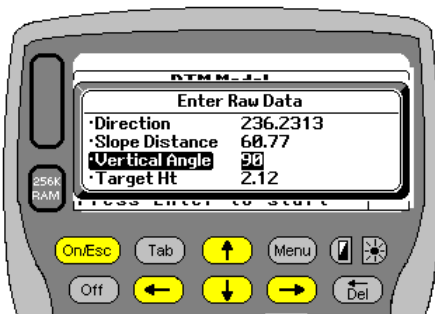


LOGGER is able to load a triangle model directly from Model Maker. The data must be saved as a TOT file and read in under the **Import** menu. This routine is very useful for setting out irregular areas. Sports fields and platforms are typical examples.

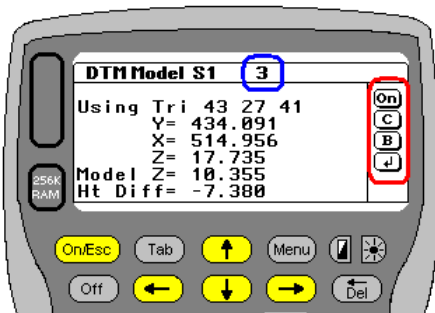
Once again you must be setup at a known point and the setup data entered. Assuming you are setup, **LOGGER** will display the station name where you are setup as well as the target height. If you are not setup, you will be prompted to do so. Various hotkeys are now available



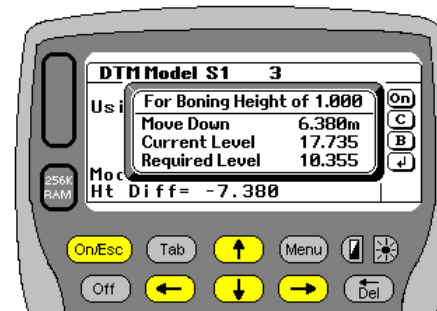
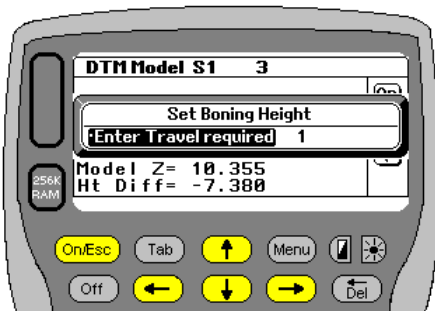
- Press **On/Esc** to exit the routine.
- Press **C** to get a list of the co-ordinates in the network. See below.
- Press **N** to get a listing of the triangle network. See below
- Press **T** to alter the target height. See below
- Press **V** to display the setup stations values (YXZ / ENZ)
- Press **Enter** to capture input data and compute values for the point being set out.



Lets first discuss the actual setting out operation. Press Enter and **LOGGER** will prompt for data input if in manual mode as shown here, or collect it automatically if you are working electronically. Once the data is entered or captured **LOGGER** will polar in the point.



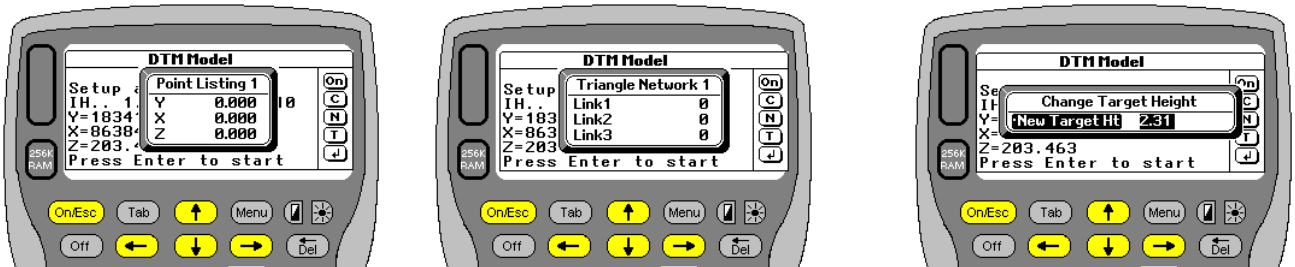
LOGGER will then locate the polarized point on the model. The screen will display the Station name (S1) and the point number being place (3) in this case. **LOGGER** will search the network and locate the triangle in which the point falls. It will compute the theoretical height, shown here as Model Z, for the point and display the height difference for the user. The process is a little slow at this stage, searching through just over 3 triangles per second. It is therefore suggested that you try and keep your model sizes down to a minimum. Should you wish to add a travel or boning height to the setout level press **B**.

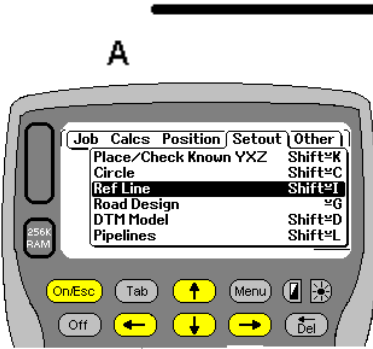


You will be prompted for the height required and **LOGGER** will calculate the height difference (up or down) required to be measured on the placed pole. Press Enter to get back to the previous screen

2. Press **N** to get a listing of the network links. This displays which points are being used to form the triangle surface.
3. Press **T** if you wish to alter the target height.
4. Press **On/Esc** to exit the routine.

Example screens are shown below.

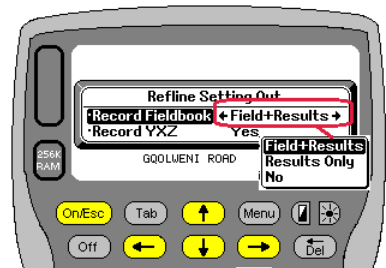
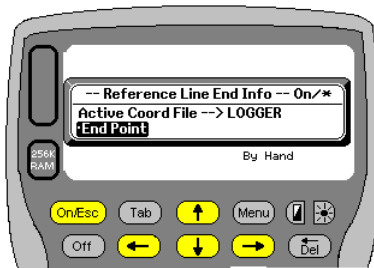
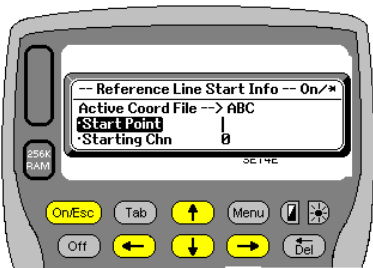




Reference Line

This option will allow the user to place points anywhere along a set reference line. Any two points define the reference line. The illustration above shows just such a line from A to B. This line could define a setting out grid line on a building site for example.

Points can be calculated beyond the limits of the line as well. One can also check the chainage and offset of a co-ordinate in relation to the reference line. Select **Ref Line** from the **Setout** menu to start the routine.



LOGGER requires the two terminals to be defined. Enter the start point's name. If you wish to select a point from the coordinate database but cannot remember its name just press **Enter**. This allows the user to scroll through the current database. Pressing * will allow you to change coordinate files as well. A starting chainage or value can also be entered. The value can be positive or negative. Press **On/Esc** to exit at this stage

The end or terminal of the reference line then needs to be defined. Pressing Enter allows the user to scroll through the current database. Pressing * will allow you to change coordinate files as well. Pressing **On/Esc** at this stage will take you to the previous screen.

Once the terminals are defined you have the option of recording the data that follows to your fieldbook. There are 3 options:-

- Field +Results. Then all field input (angles+Distance) and output (YXZ +Chn &O/S etc) is printed.
- Results Then only the final results(YXZ +Chn & O/S) are printed
- No No field book is printed.

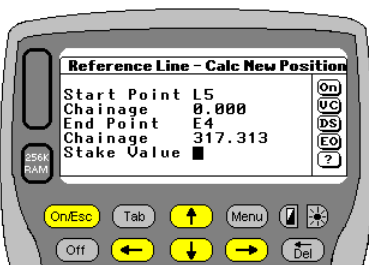
If you select **Field+Results** or **Results** than just the fieldbook headings are written to the fieldbook at this stage. If you select **No**, it is still possible to record the results to the fieldbook but there will be no initial headings to describe the data columns. See the end of this section for examples of the fieldbook output.

XE "**Reference Line:Record YXZ**"

You also have the option to "**Record YXZ**". If **YES** is selected then **LOGGER** will also store just the placed data info as comment YZX/ENZ in a separate file so that it can easily be downloaded and loaded into software for plotting, without having to extract it from the fieldbook. This saves a lot of time.

The YXZ data is stored in a file ending in RT (Reduced Tache) and downloads with a YXZ ext. Sample is shown below

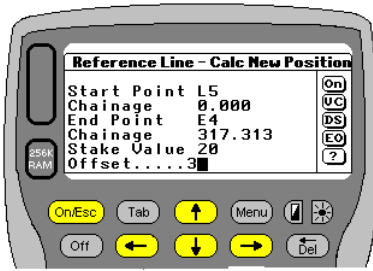
```
//Source LOGGER Software for Psion WorkAbout issued 22/01/2013
//Job..... GQ
//Date..... Fri 01 Feb 2013 10:48:34
//
Target Ht Name Y Co-Ord X Co-Ord Z Co-Ord
=====
1.000 Refline D -68424.872 2651571.900 1075.355
2.000 Refline D -68424.612 2651572.873 1074.181
```



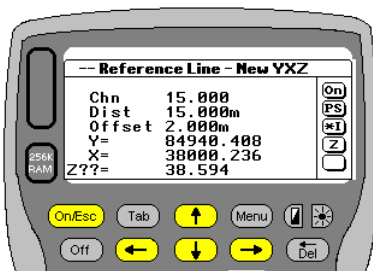
Once the terminals have been defined **LOGGER** computes the distance and direction between the 2 points. The start and end point names as well as their chainages will be displayed. You will be prompted for a stake value and an offset. Once a stake value is entered **LOGGER** will compute its coordinates. If the value falls before or after the defined limits **LOGGER** will extrapolate values. In the example above, values less than zero or greater than 317.313 can be entered.

Enter the stake value required

There are also various hotkeys available now. See Additional Features at the end of this section



Next you will be prompted to enter an offset. By default the input field is left blank. If the user presses Enter an offset of zero is then assumed. If any offset other than zero is required enter it now. Offsets to the left must be entered as -3 (minus 3). Positive offsets are assumed to be to the right.



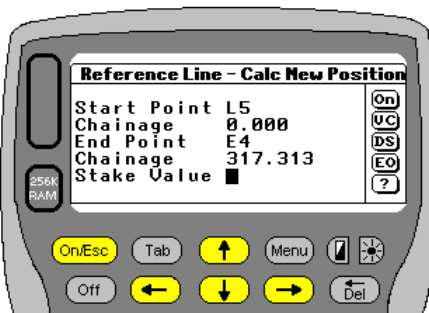
Once the offset is entered the point's coordinates will be calculated. **LOGGER** displays the following:-

1. The Chn to be setout.
2. The distance from the start. In this case the start was also Chn zero. If it were -5 then the distance from the start would reflect as 20m
3. The offset.
4. The Y & X (N & E) values
5. The Z value. If the point is offset then the Z reflects as Z??. The Z is calculated along the line between the terminals. Extrapolated if need be. To set out or place the point press P or Enter.



You will be presented with the standard setout menu. All the options and hotkeys, from now on, are detailed and explained under **Setout Known YXZ**.

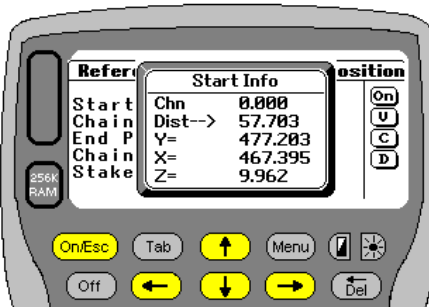
Additional Features



The preceding explanation is a quick guide to using the reference line option. However there are a lot more features available and these will be explained now.

Once the start and end points have been entered and you are prompted for the stake value there are 12 hotkeys that now become available.

On Standard Escape feature. Will return you to the start menu where you will be prompted to re-enter the start point.



Press **V** and **Enter** when prompted for the Stake Value. This will activate the 3 screens above. On the first screen **LOGGER** displays the following:-

1. The starting Chainage
2. The join distance between the terminals (plan distance)
3. The YXZ (NEZ) of the start point.

Press **Enter**

On the second screen **LOGGER** then displays the end points info End Chn YXZ (ENZ).

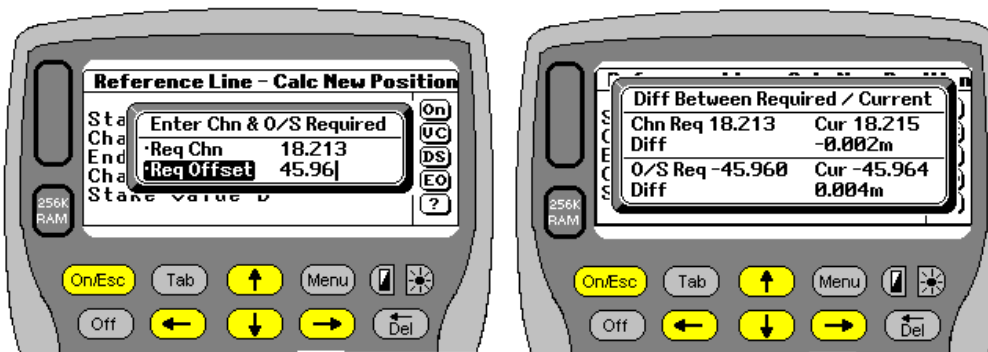
Press **Enter**

Finally on the third screen **LOGGER** displays the following:-

1. The grade between the 2 points expressed as a 1: value
2. The slope between the 2 points expressed as a percentage value
3. The slope distance
4. The angle in Degrees Minutes and Seconds.

If both Z values are zero then the above information cannot be calculated and therefore will not be displayed. Press **Enter** to return to the input menu.

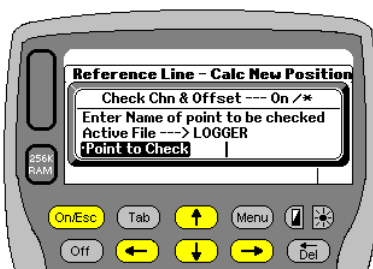
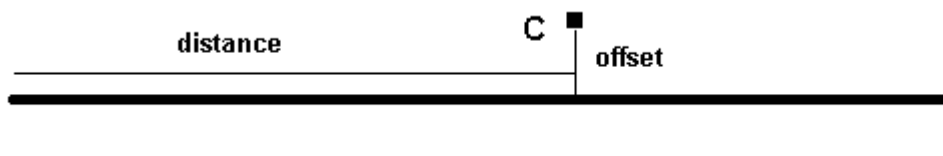
Hotkey A



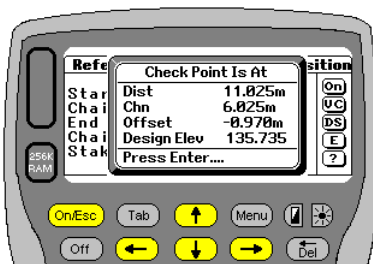
Press **A** to Enter your required Chn & O/S. Useful when trying to setout shutter CL's or bolts when you looking for specific values and you are using the Determine option. Saves having to do any mental arithmetic and avoids errors. Once you have taken your readings and **LOGGER** has calculated

the current Chn and Offset you can select the Display Diffs option. Refer to explanation further on.

Hotkey C



Press **C** and **Enter** when prompted for the Stake Value. **LOGGER** will prompt you for the name of a point to check. This routine is intended to allow the user to select a point from the co-ordinate database, and calculate the chainage, offset and Z of the point. If the point name you enter cannot be found **LOGGER** allows you to enter the YXZ values.

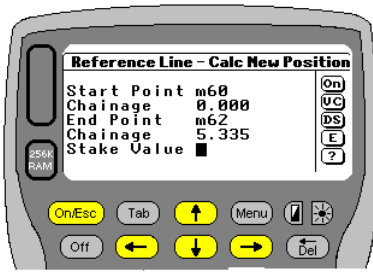


Once the point has been entered **LOGGER** displays the following:-

1. Distance from the start of the line
2. Chainage
3. Offset
4. Elevation of the point. The elevation is calculated along the centre line between the 2 terminals.

Pressing **Enter** will again prompt the user for another point to check. Press **On/Esc** to exit this section of the routine.

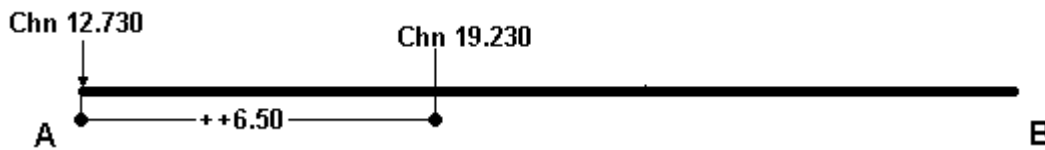
Hotkeys S and E



When prompted for the Stake Value the user can press **S** or **E** as well. **LOGGER** will then calculate the setout values for the Start or End of the line without you having to type in the actual chainage. This is very useful if the start and end values are not nice round easy values to enter. An offset from the start and end can also be entered.

Significance of ++ and -- (plus plus and minus minus)

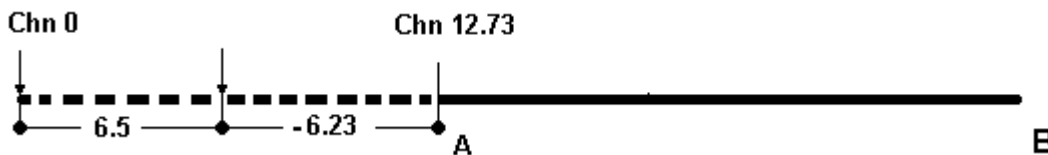
LOGGER also checks the sign of the Stake value when it is entered. If you enter ++6.5 or --6.5 for example, **LOGGER** will add or subtract that value to / from the start chainage. This can be very useful when the starting chainage is not zero, or a nice round easy number.



If your start chainage was 12.730 and you entered ++6.5 for the Stake value then the resulting chainage would read 19.230 on screen and the Distance along the line would be 6.500m. **LOGGER** checks the first 2 characters of the input. If it sees “++” it assumes that the user wants to add 6.5m to the start chainage as above. You should think of it like this. The first + indicates that the following + amount must be added. The first – indicates that the following – amount must be subtracted. **LOGGER** will reject an input of +-6.5 or -+6.5 for example.

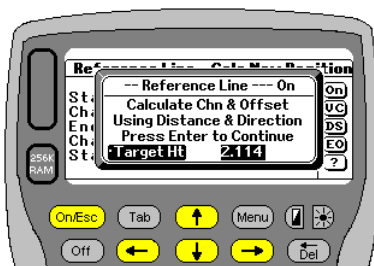
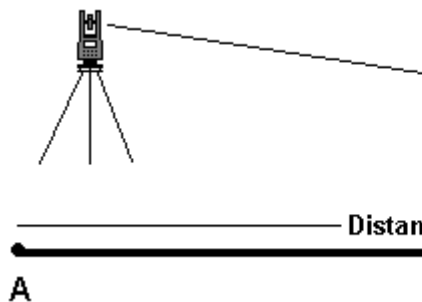
This convention has been adopted because it is possible to have a reference line starting with a negative value for example -100. If that was the case then entering -6 for the stake value, became confusing. Was **LOGGER** to subtract 6 from the start, and set out -106 or actually setout -6

If it sees “--” it assumes that the users wants to subtract 6.5m from the start chainage. The resulting chainage would then be (12.73-6.5) =6.23. The distance along the line would then be -6.50m (backwards) from the start.

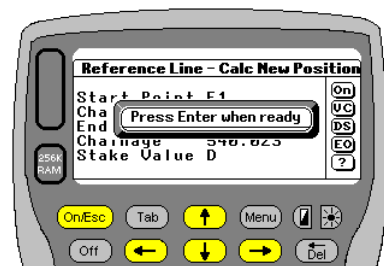


Looking at the example above and taking the same line, and assuming a starting Chainage of 12.73. This means that the theoretical chainage zero is to the left (dotted section) If you enter +6.5 or 6.5 **LOGGER** assumes that as an exact chainage. Your screen would read Chn 6.5 and Dist -6.230. The -6.23 would be the distance backwards along the line, from the start

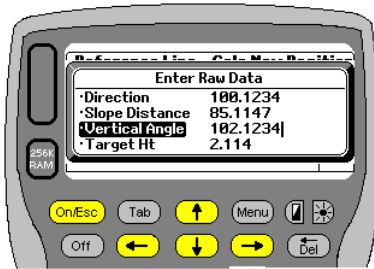
Hotkey D



Entering **D** for the Stake value will allow you to Determine the chainage,



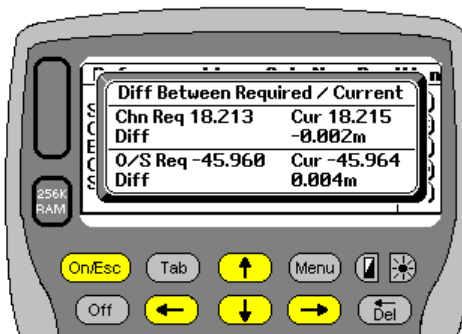
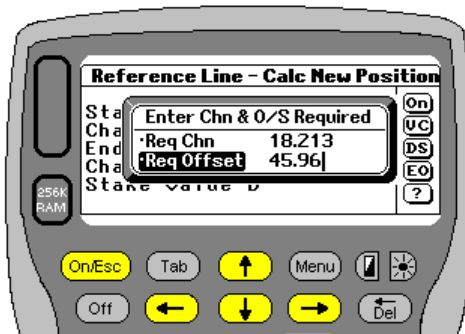
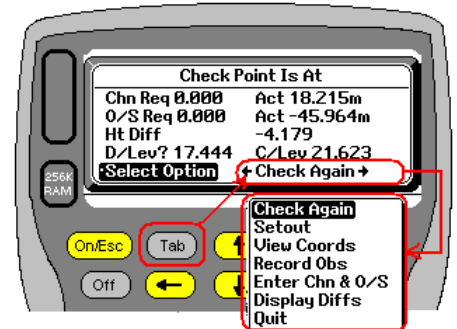
offset and centerline Z value of point in field. The screen will describe the action being taken and give you the chance to alter your target height. Once you press Enter **LOGGER** will display the following prompt "Press Enter when ready"



If you are working in Electronic mode then **LOGGER** will trigger your instrument and return the distance and direction. If in manual mode you will have to enter the data required as shown on the left. A polar will be calculated and the current chainage and offset displayed. **LOGGER** will display the Ht Diff (15.614) and the design (20.000) and Calculated (4.386) levels

At this stage there are various options available again. Press TAB to view a drop down list or use the left/right arrows to scroll between them.

- Check Again. Will just repeat the above exercise
- Setout. Allows you to set the calculated point out.
- View Coords Will display the XYZ (ENZ) of the checked point
- Record Obs Writes out the observations and results to the fieldbook
- Enter Chn & O/S Allows the user to enter the desired Chn & Offset. Useful when trying to setout shutter CL's or bolts when you looking for specific values and you are using the Determine option. Saves having to do any mental arithmetic and avoids errors.
- Display Diffs This option displays the differences between the required values for the chn and/or Offset and the current values.
- Quit Exits the process.



These screens to the left display what the user will see when selecting to enter the required Chn and O/S as well as the differences.

Here is an example of results saved to the fieldbook. The printout below really needs to be printed landscape, and has been condensed here. This is an example of field and Results

```

Job Description... ALL
Reference Line
Start 55200 Y= -95791.657 X= 3618256.232 Z= 413.561
End 55100 Y= -95789.759 X= 3618356.219 Z= 412.635 Dist 100.005m Dirn 1.05.14

Point | Direction | Vertical | Slope Dist | Red Dist | HO | Comments | Y (P) | X (P) | Z (P) | Z (D) | Dz | Required Chn & O/S | Actual Chn & O/S
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
25 | 354.1501 | 90.0114 | 25.190 | 25.190 | 0.900 | RL ALL | -95794.181 | 3618281.295 | 413.329 | 413.652 | 0.323 | 25.000m -3.000m | 25.011m 2.999m
    
```

The above lines have been split up below to give a better indication of what is in the field book above.

Job Description... ALL													
Reference Line													
Start 55200 Y= -95791.657 X= 3618256.232 Z= 413.561													
End 55100 Y= -95789.759 X= 3618356.219 Z= 412.635 Dist 100.005m Dirn 1.05.14													
Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments							
25	354.1501	90.0114	25.190	25.190	0.900	RL ALL							
Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S	Actual Chn & O/S							
-95794.181	3618281.295	413.329	413.652	0.323	25.000m -3.000m	25.011m 2.999m							

The first line shows the job Description. **ALL**
 Next indicates that the **Reference Line** function was used.

Then **LOGGER** displays the start and end coordinates, as well as the join distance and direction for the reference line used. This information is vital if you want to keep good field and office records, and should be a very clear record for quality control purposes.

Under Point **LOGGER** prints the chainage that was to be setout (25)
 Next comes the observed **direction, Vertical Angle, slope distance and reduced distance and target height.**
 The **RL (Reference Line)** is inserted automatically and if the user entered a comment when prompted to do so while placing this will be shown as well. **(ALL)**

Next we have the **XYZ (ENZ)** coordinate values of the placed point.

Z (D) refers to the design Z value required.

Dz is the height difference between Design and placed point.

Next **LOGGER** displays the required **Chn and Offset** of the placed point.
 Finally **LOGGER** displays the actual **Chn and Offset** that was set out

If only the Results Fiedlbook option is selected then the printout will be very similar. Only difference being that all the field observations are not shown. See sample below

```
Job Description... Not Defined
Reference Line
Start 55200 Y= -95791.657 X= 3618256.232 Z= 413.561
End 55100 Y= -95789.759 X= 3618356.219 Z= 412.635 Dist 100.005m Dirn 1.05.14
```

Comments	Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S	Actual Chn & O/S
RL LEFT	-95794.183	3618281.315	413.329	413.632	0.302	25.000m -3.000m	25.031m -3.001m
RL RIGHT	-95788.188	3618281.184	413.329	413.573	0.244	25.000m 3.000m	25.013m 2.995m

Here is an example of what the fieldbook looks like if the Determine option is used.

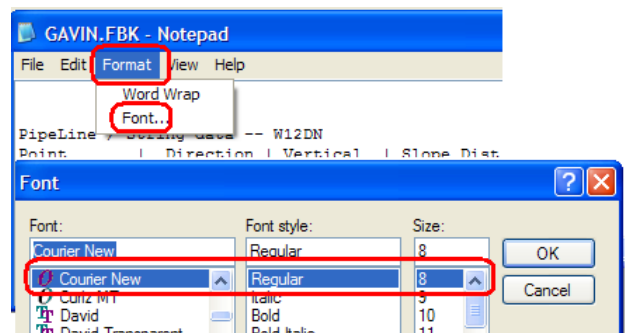
```
Job Description... FILES
Reference Line
Start 55200 Y= -95791.657 X= 3618256.232 Z= 413.561
End 55100 Y= -95789.759 X= 3618356.219 Z= 412.635 Dist 100.005m Dirn 1.05.14
```

Comments	Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S	Actual Chn & O/S
Point Determined	-95794.180	3618281.295	413.646	413.329	-0.317	25.011m -2.999m	

Under comment we are told that the **point was determined** and its **XYZ (ENZ)** values are recorded.
 The Z(D) value is the Z value of the point between the two terminals, perpendicular to the Determined point.
 The DZ is the difference between the two
 Finally you get the **chainage and offset** of the determined point. In this case there required Chn and Offset is the actual Chn and offset so the last column is left blank.

The results in the fieldbook are best viewed in Notepad.
 You may have to adjust the font size. Use Courier New Font and try size 8. Make sure Word Wrap is also unchecked (off)

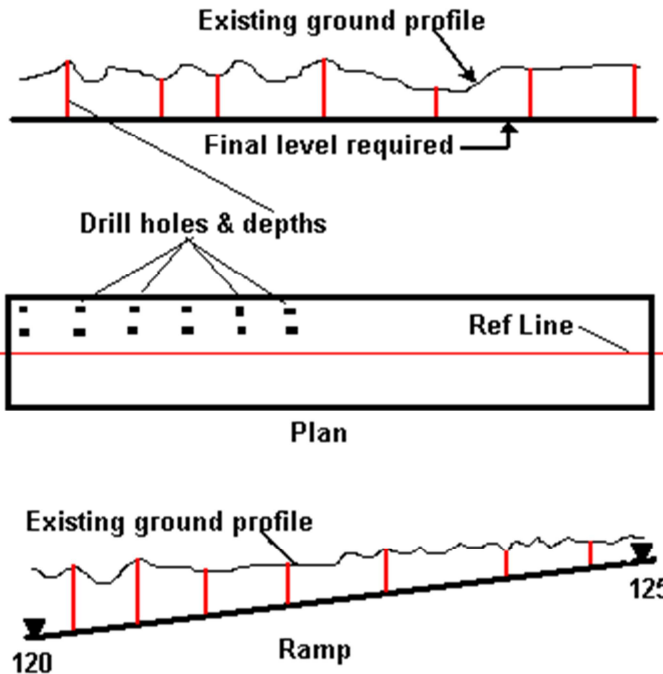
All the data is neatly formatted so it can be read into a spreadsheet or imported into 3rd party software for plotting purposes.



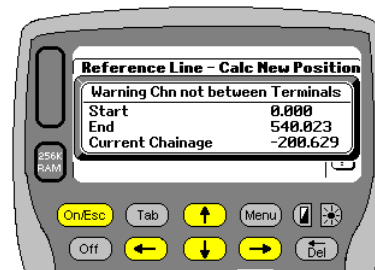
Again another example where only the results are stored would be formatted and look like the example below. You will see in this example that there on two lines of data. One is formatted to 3 decimals and the other to 4. Remember pressing "." (decimal point) in response to chainage will allow you to change the number of decimals to be displayed. This will reflect on both the screen and printouts.

Start B Y= 84797.662 X= 38127.730 Z= 55.295
 End A Y= 85000.406 X= 38123.067 Z= 59.079 Dist 202.798m Dirn 91.19.03

Comments	Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S	Actual Chn & O/S
Point Determined	84970.401	38130.571	59.897	58.516	-1.381	172.629m -6.812m	
Point Determined	84970.4013	38130.5708	59.8969	58.5163	-1.3806	172.6287m -6.8120m	



The **Determine** option can be very useful. A good example is when blasting patterns have to be staked out. The surveyor needs to supply the drillers with a drilling grid and depths to be drilled. The drill pattern can be to a flat surface or on a ramp. By defining a simple reference line in the area concerned, the surveyor can take readings at more or less the drill spacings. **LOGGER** will compute the chn and offset, but more importantly the elevation of the ground as well as the design and display the height difference. In this case the drill depth. Using **Record** the data can be logged to the field book and plotted back in the office if need be. Fieldwork is optimized and office time drastically reduced as well.

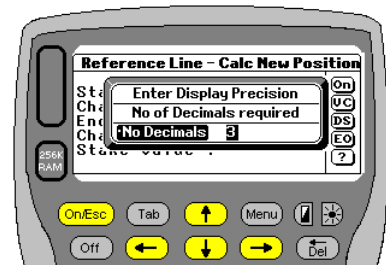


If the located point falls before the start or after the end of the line, **LOGGER** issues a warning stating that the point does not fall between the terminals. **LOGGER** will give the terminal start and end values as well as the value

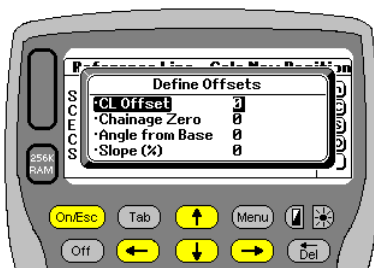
located. Press Enter and **LOGGER** will still display the Chn and offset as well as the height.

Hotkey ‘.’ Decimal Point

Press . in response to Chn and you can change the number of decimals displayed. These will be carried through to the screen displays as well as printouts



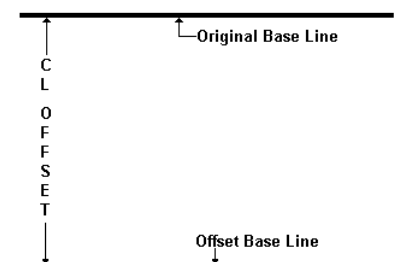
Hotkey O



LOGGER allows the user to define an offset line and distance as well as rotation relative to the existing defined line. Pressing O and Enter, when prompted for the Stake Value, will allow the user to alter these values to suite.

There are 4 values that can be defined.

1. The Center Line offset
2. Chainage Zero
3. Angle from Base
4. Crossfall as a percentage



Center Line Offset

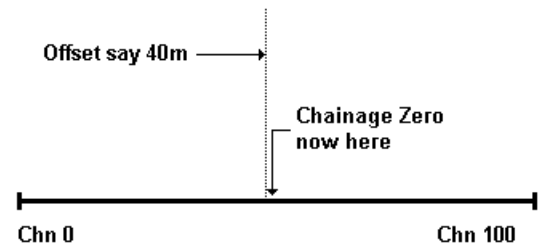
This basically allows the user to define a line parallel to the existing Reference Line. The value can be either positive (to the right) or negative (to the left).

LOGGER will now automatically add or subtract this distance to / from the normal calculations. This feature is ideal if you are setting out data on a series of grid lines. You need only define the initial grid base line and then use the offset option to move to another grid line.

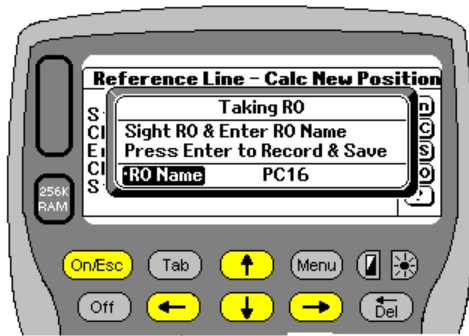
Chainage Zero

This feature works basically the same as the Centre Line Offset. But it allows the user to move his starting chainage to any point along the line. This is also ideal for grid line setting out. The advantage is that you do not have to keep track of awkward offset distances.

Both the Centerline Offset and Chainage offset can be set to work at the same time.



Hotkey L



Press L to log and RO at any stage while working with the reference line. If one is doing precise work it is good practice to log an RO and monitor it. This information is written to the field book automatically.

See the section on Logging RO for more info and samples of printouts

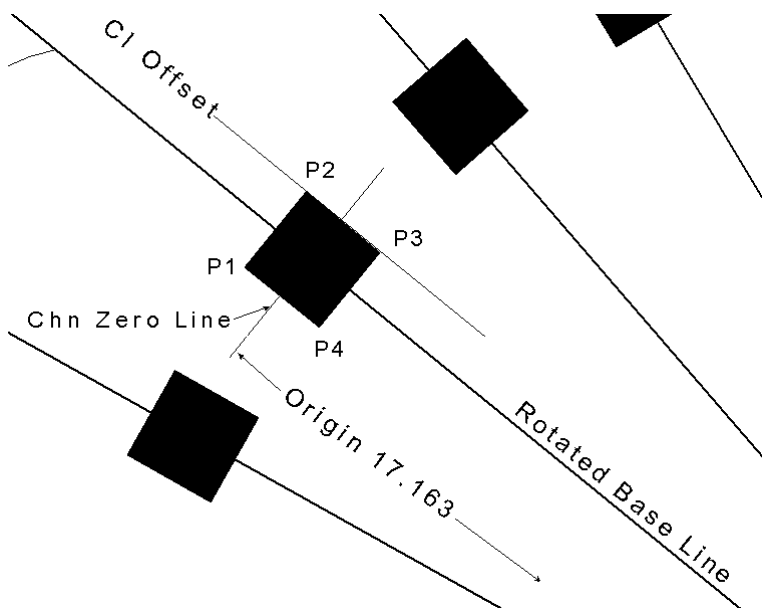
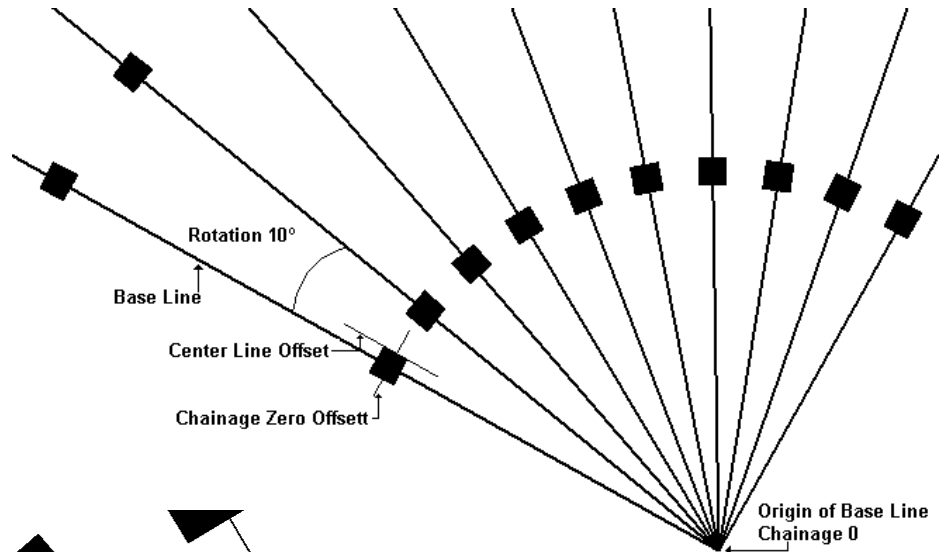
Hotkey B

Batters can also be setout along a Reference Line. To activate the batter option press B. The function is basically the same as the DETERMINE option. The only difference is that the user is prompted for Cut/Fill slopes. A detailed explanation of this can be found under the Pipelines/Strings section of this manual.

Angle From Base

This feature allows the user to rotate the base line about its origin. The rotation angle must be defined in Degrees Minutes Seconds (D.MS). The example about shows 25 Deg 14 Min 30 Secs. (25.1430).

The Centre Line offset and the Chainage Zero offset can also be used with a rotation angle. This will allow users to easily set out pile bases or column center's on an arc or circle



Let's look at the example of the left. The user wants to set out positions P1-P4. Assuming the base line has been rotated 10°. The Column center is 17.163m from the origin and P1-P4 are 2.216m either side of the Centre Line and 2.216m either side of the Chn Zero Line.

Using the conventional reference line one would have to first redefine the terminal co-ordinates for the line. When placing P2, you would define the chainage as 19.379 and offset 2.216. All these numbers can get confusing and mistakes are bound to happen.

Using the offset features in **LOGGER** you would define the original base line. Put in a rotation angle of 10° and move Chainage Zero to 17.163. The CI offset could stay set to 0.

When placing P1 you would specify a chn of 2.216 and offset of -2.216.

- When placing P2 you would specify a chn of 2.216 and offset of 2.216
- When placing P3 you would specify a chn of -2.216 and offset of 2.216
- When placing P4 you would specify a chn of -2.216 and offset of -2.216

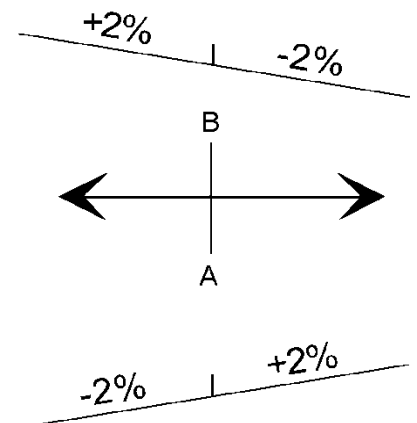
- Alternatively you could specify a Center Line offset of 2.216 when placing P2 and P3.
- When placing P2 you would specify a chainage of 2.216 and offset of zero
- When placing P3 you would specify a chainage of -2.216 and offset of zero

Crossfall

LOGGER also allows the user to define a crossfall relative to the defined reference line. In the example the line A-B is the defined reference line. It could have a slope either to the left or right. If the crossfall is entered in as -2% **LOGGER** will calculate the centerline level and drop offset points to the right by 2%. Likewise points to the left will be raised 2% relative to the centerline.

In similar fashion if the crossfall is entered as +2%, points will rise to the right and drop to the left.

A good example of where this could be used is on a large sloping platform. Using this option there is no need to use the conventional method of defining a typical road scenario. This method is quick and easy. Remember that the line can still be rotated and the normal centerline and chainage offsets applied.



ROAD DESIGN

The Road Design section within **LOGGER** has been written to try and make setting out of road works and related tasks as easy as possible. Taking on data has been made as simple as possible. A direct link to Model Maker ,Road Maker and Civil Designer has also been implemented. This allows the user to import the horizontal alignment (Model Maker PID file) and all the relevant road parameters (Road Maker PR3 file). For Civil Designer **LOGGER** reads the DES files and imports whatever data is currently defined in the DES file

There are 3 basic data take on options. They are:-

1. Horizontal Alignment
2. Vertical Alignment
3. Road Data. This section is also subdivided.

Horizontal Alignment

There are 2 methods of getting data into this section. One is by using the Import option under the Job Menu. The other is to do it manually. That is what will be detailed now.

Once you enter the Horizontal Alignment menu there are 2 options available.

1. View / Edit Pi's
2. Calc & View

View / Edit Pi's

This menu will display how many Pi's (Points of Intersection) are presently loaded (--→ 5), if any. Otherwise zero will be displayed. Lets us assume for now that no data has been loaded.

You will be prompted for a description for the alignment. (max length 30 characters)

Then enter the starting chainage or value for the alignment.

Next let **LOGGER** know what purpose the alignment is t be used for. There are 2 options.

1. Road Alignment – Will require road widths etc to be defined
2. Single Line - Only a vertical alignment needs to be added.

Thereafter you will be prompted to enter the starting PI name and YX or EN values. Again the name can be up to 30 characters in length. Once the first PI has been entered all subsequent input screens require you to input the radius as well. A radius value of zero can be entered if there is a kink in your alignment. Internally **LOGGER** will default a zero radius value to 0.01m.

To exit the input screen either press Enter (all values set to zero) or press On/Esc. **LOGGER** will return to the main input screen showing how many PI's have been entered.

Once you have data you will be allowed to view and edit it. The screen will display the total no of PI's available as well as the current PI number. All the input values will be displayed for checking as well. On the right hand side menu the following hotkeys will be active:-

- On** Press On/Esc to exit the operation.
- D** Press D or **Del** to delete the current curve info. You will be prompted again to delete the data.
- E** Press E to edit the exiting input
- A** Press to add a new PI. This will be added to the end of the list.
- I** Press I to insert a new PI. The new values will be added /inserted before the data displayed on the screen.
- R** Press R if you wish to start from the beginning again and re-enter the whole lot. Your existing data set will be cleared. You will be prompted before **LOGGER** clears the list.
- Enter** Press Enter or the down arrow to proceed to the next curve. You can press the up arrow to go to the previous PI as well.

Calc & View

Once you have data **LOGGER** will allow you to preprocess the info and check the results. Select this option to do that. **LOGGER** will step through curve by curve displaying all the critical info. Press the down arrow or Enter to view the results.

LOGGER will display the BC and EC chainages and values. Press **C** If you wish to see further info. **LOGGER** will display the radius, deflection angle, tangent length, curve length. Once this has been displayed press enter to view the back and front straights as well as the arcs center co-ordinates.

If you exit the main horizontal alignment menu, **LOGGER** will automatically pre process the whole alignment and display the final chainage as a check for you.

Vertical

LOGGER is working with parabolic curves at present.

Much the same as the horizontal alignment. This too can be entered in manually or read in via the import menu.

You have 3 basic options here:

- | | |
|--------------------|---------------------------------------|
| 1. View / Edit | - Allows input and editing |
| 2. Calc & View V/A | - Calculate, view and check the input |
| 3. Elev & Chn | - Calculate elevation at any chainage |

View / Edit

If data has been entered before, then **LOGGER** displays how many PI's are present.

If none are present you will be prompted for input. If data is present you will be able to step through it, check and edit. Let us assume for now no data has been entered.

The first screen prompt will ask for then starting chainage and elevation. Thereafter you will be prompted to enter the VPI (**V**ertical **P**oint of **I**ntersection) chainage, elevation and curve length. The data is checked as it is entered. If curves are found to overlap or chainages do not increase a warning message will be displayed. To exit the input routine press On/Esc or Enter. If **LOGGER** finds all the input fields equal to zero, it assumes you wish to terminate.

You may now view and edit the data. **LOGGER** will display the total number of curves as well as the one currently being displayed. **LOGGER** will display the chainage, elevation, curve length, bvc and evc chainages. Various hotkeys on the right hand side menu are also available.

- On** Press On/Esc to exit the operation.
- D** Press D or **Del** to delete the current curve info. You will be prompted again to delete the data.
- E** Press E to edit the exiting input
- A** Press to add a new PI. This will be added to the end of the list.
- I** Press I to insert a new PI. The new values will be added /inserted before the data displayed on the screen.
- R** Press R if you wish to start from the beginning again and re-enter the whole lot. Your existing data set will be cleared. You will be prompted before **LOGGER** clears the list.
- Enter** Press Enter or the down arrow to proceed to the next curve. You can press the up arrow to go to the previous PI as well.

Calc & View V/A

LOGGER will start off displaying the first chainage, starting elevation and out going grade. Press the down arrow or Enter to move onto the next and subsequent curves.

LOGGER will display the BVC (**B**eginning of **V**ertical **C**urve) and EVC (**E**nd of **V**ertical **C**urve) chainages and their elevations, as well as the K Value for the curve. Press Enter again to see the grades in and out, as

well as the high/low points on the curve as well as its chainage and elevation. Crest and Sag curves will be described as such. If you press ON/Esc while viewing the latter **LOGGER** will stop the operation, compute the data as a check and return to the main menu.

LOGGER will always compute and check the vertical alignment when you exit from the Vertical Alignment menu

Elev & Chn

LOGGER will allow you to enter in any chainage within the bounds of the defined alignment and will compute the elevation for you. If the chainage falls outside the limits a warning message will be displayed.

ROAD DATA

This menu opens up a whole lot of other menu options. It is in this section that **LOGGER** defines the following: -

1. Road Widths.
2. Crossfalls.
3. Edge Shifts.
4. Shoulder Widths.
5. Batter parameters.

Road

Use this menu to define the road widths and how they may vary for both the left and right hand side of the road. The road cross falls must be defined in a similar fashion.

Road Widths LHS

Enter the Chainage and width of the road. As the data is entered a counter will be displayed showing the number of entries thus far. A typical entry sequence for a road that starts off 3m wide and then widens to 5m and returns to 3m would be something like this. Typical example might be a climbing lane.

Chn	Width	
0	3.00	Road starts off 3m wide on LHS
100	3.00	Road stays 3m wide until Chn 100
120	5.00	Road starts to widen and reaches 5m wide at Chn 120
220	5.00	Road stays 5m wide until Chn 220
240	3.00	Road returns to 3m wide at Chn 240
300	3.00	Road remains 3m wide until Chn 300

Such definitions must be setup for both the left and right hand side of the roads. **LOGGER** will do a straight-line linear interpolation in between to calculate the required road widths.

Once you have data entered you will be able to view and edit it. During view and editing the following hotkeys are available on the right hand side menu.

On/Esc	Press On to escape or break out of the viewing process.
R	Press R to re-enter data from scratch.
D	Press D or Del to delete an input
E	Press E to edit the displayed input
I	Press I to insert a set of values prior to the displayed values

Data entry for the RHS road widths as well as cross falls must be done in a similar fashion as detailed above.

Edge Shift

This allows for a horizontal and vertical offset to be defined. The input process is the same as for road widths. The edge shifts can be used to define features such as kerbs or retaining walls. These values will be added to the road profile definition when determining batter positions. Both horizontal and vertical components must be defined. Once data has been entered it can be viewed and edited as with all the other options mentioned above. The hotkeys on the right hand side menu provide the following options.

On/Esc	Press On to escape or break out of the viewing process.
R	Press R to re-enter data from scratch.
D	Press D or Del to delete an input
E	Press E to edit the displayed input
I	Press I to insert a set of values prior to the displayed values

Shoulders

Once again these are to be defined as a set of tables for both the left and right hand side of the roads if applicable. Both the widths and crossfalls need to be entered. Once data has been entered it can be viewed and edited as with all the other options mentioned above.

Note that a shoulder crossfall of 0% will track the road crossfall.

The hotkeys on the right hand side menu provide the following options.

On/Esc	Press On to escape or break out of the viewing process.
R	Press R to re-enter data from scratch.
D	Press D or Del to delete an input
E	Press E to edit the displayed input
I	Press I to insert a set of values prior to the displayed values

Batters

The cut and fill slope parameters for both the left and right hand side of the roads are entered here. **LOGGER** will use these values when calculating batter positions. When defining the slopes **LOGGER** also allows the user to add a further profile feature definition. This is called an Appendage. The appendage can have both a horizontal and vertical offset component. This data is added to the road profile when determining the final batter position. A vertical travel for the batter board can also be input.

Once data has been entered it can be viewed and edited as with all the other options mentioned above. The hotkeys on the right hand side menu provide the following options.

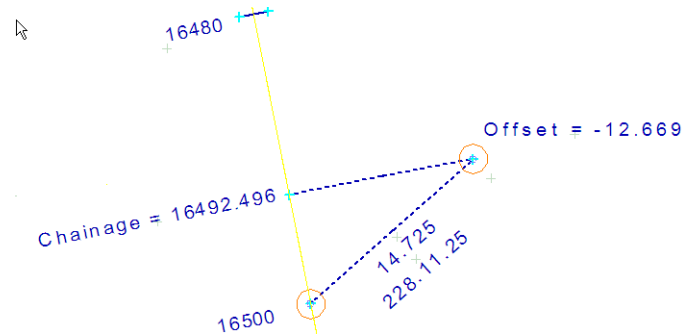
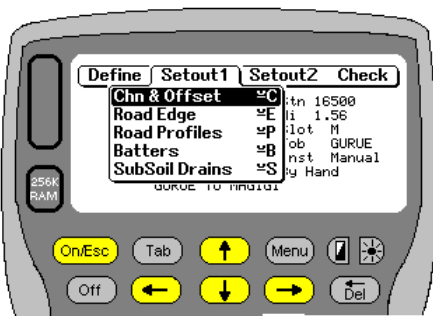
On/Esc	Press On to escape or break out of the viewing process.
R	Press R to re-enter data from scratch.
D	Press D or Del to delete an input
E	Press E to edit the displayed input
I	Press I to insert a set of values prior to the displayed values.

SETOUT

There are 5 options available in this section.

1. Chn & Offset.
2. Road Edge.
3. Road Profiles.
4. Batters.
5. Check Chn & Offset.
- 6.

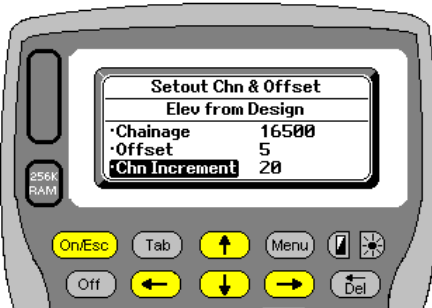
Chn & Offset



This is a simple feature that allows the user to define the chainage and offset to be setout. You must also specify whether the offset is to the left or right of the alignment. **LOGGER** will compute the required coordinates and display the information for you. If you wish to set the point out press Enter. Press Esc to re-enter a new point.



You have the option to store the results of your work to a field Book if required. If you select **YES** you will be prompted for a description. Levels can be calculated from the Design or input manually (User Input). Use the left/right arrows or press TAB to see User Input option

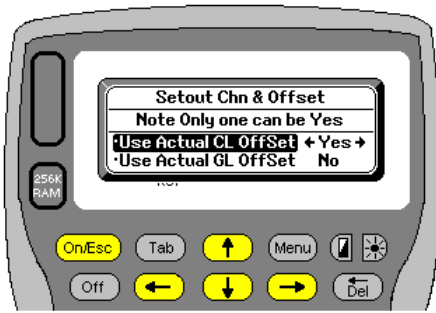


Next step is to define the chainage and offset you require. Offset is measured from the staked centre Line. Enter Chn then offset. Left will be negative. Right positive. The increment required can also be defined. Use up down arrows to enter data into the various fields. Press enter once all data is entered.



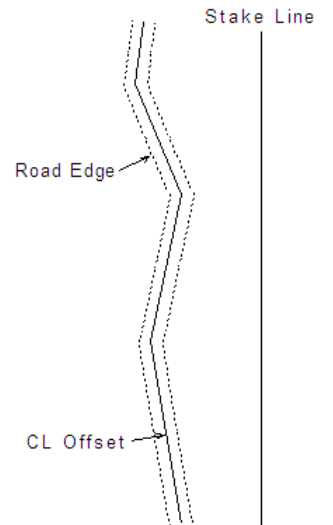
The user can also specify whether or not to setout relative to the Defined Centre Line or Grade Line offset definitions. Typically these definitions are used when doing a dual carriageway job. You can only elect to use one of the two options shown. If both are set to **YES** you

will get an error and be required to reset your options. By default both are switched off (Set to 0).



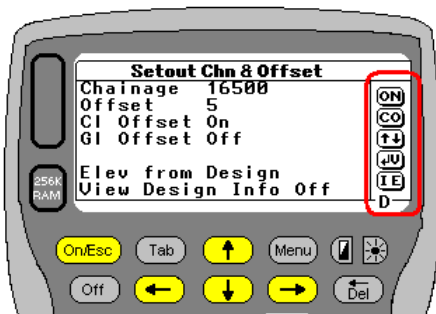
If, as in example shown. The option to **Use Actual CL Offset** is set to yes then **LOGGER** will just automatically add the defined CL offset value to your currently defined offset.

If you have a road definition where the CL Offset is continually varying from the Stake Line then this option is very useful.



To the right is an example. The stake line (Horizontal Alignment) is to the left and the Offset CL is to the left but varies all the time. If one wanted to set out the Offset CL (which is actually the Road Centre Line) you would have to have a list of the different offsets for each Chainage. Maybe they need the CL for Road Marking. If the User elect to set out Chn & Offset and sets offset to 0 and elects to use Actual CL Offset as above, then the road CL will be calculated. If you wanted to setout a constant 3m left or right of that, Whatever Offset you define will be added to the CL Offset value automatically.

The same applies if the GL Offset (Grade Line) is selected.



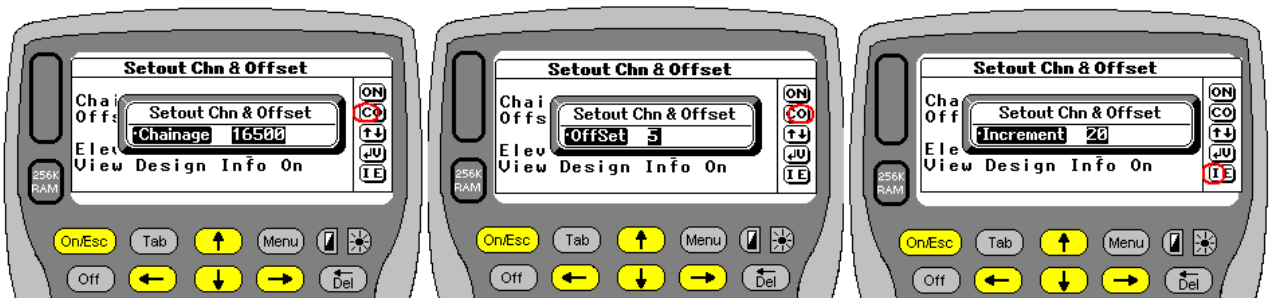
At this stage you are ready to setout chn 16500 at offset 5 (RHS) for example. Again various hot keys are available, but not all visible. Remember you can always press ? to see what options you have.

- ❖ **On/Esc** Takes you back to the 3rd screen above.
- ❖ **C** Will allow you to change Chainage.
- ❖ **O** Will allow you to change Offset.
- ❖ **↑ ↓** Pressing the up/Down arrows will increase / decrease the Chainage.
- ❖ **↵** Pressing Enter will compute the cords ready for setting out.
- ❖ **V** Lets you switch the Design info **ON** and view all relevant detail on the next screen. Presently on screen you will see Design Info is Off.
- ❖ **I** Pressing I lets you change the chainage increment. Values can only be positive.
- ❖ **D** Although not shown is also an active key. Pressing **D** will let you determine where you are. So if you not sure where you are you can start off by entering any chainage and offset and use **D** to establish your location along the alignment.

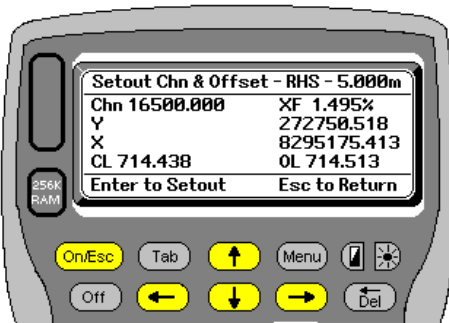
The Hotkeys in more detail.

Hotkeys C O I.

Below you can see the 3 different screens that will appear if you press C O or I.



Hotkey V



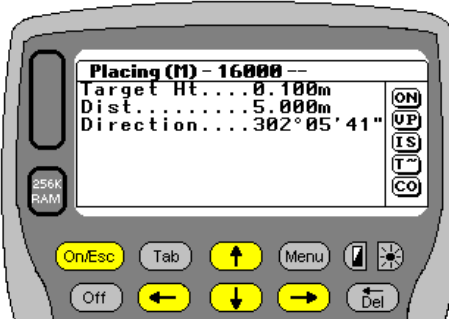
Pressing **V** will display to the users a whole lot of valuable data before going to setout. Can be used for information purposes only or as a check.

Starting at the top **LOGGER** shows the side and offset (RHS 5.000m) in this case Then comes the chainage and crossfall being used. (Chn 16+5000 and 1.495%)

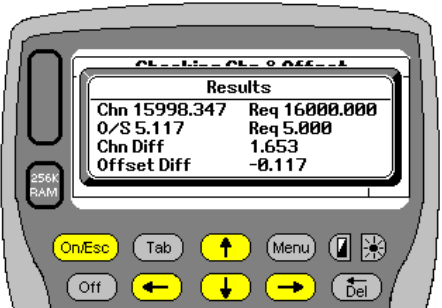
Then you get the actual YX (EN) coordinate values.

Finally at the bottom **LOGGER** gives the **CL** (Centre Line) Level as well as the **OL** (Offset Level).

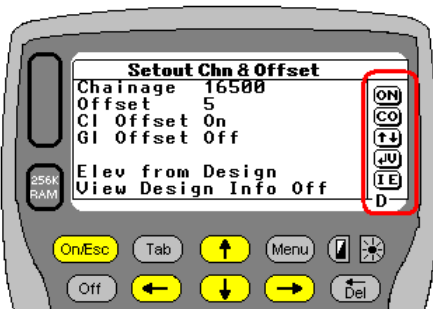
Press **Enter** to proceed to the setout menu or Esc. Pressing Esc will give the user a chance to store the Chainage coordinate values.



Once you have selected your Chn and Offset **LOGGER** computes the setting out data as shown on the left.



Once **LOGGER** has computed the Chn & Offset of the current point, it will be displayed as shown on the left above. If you wish to calc the difference press C and enter the required Chn and Offset as shown in the middle screen above. Once entered **LOGGER** will compute the differences for you as shown on the right above.

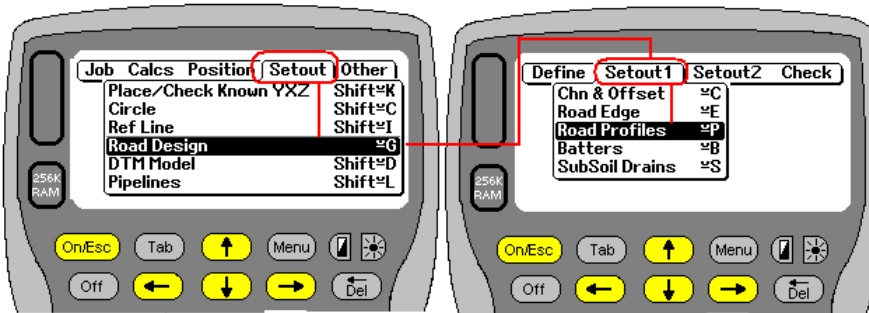


Pressing Enter takes you back to this menu.

Road Edge

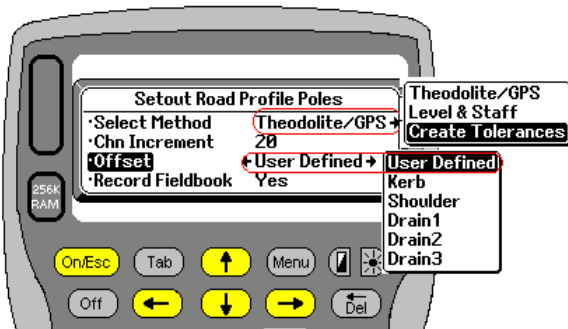
Again a simple routine that computes the co-ordinates for the road edge. All you need to enter is the chainage and whether you want the left or right hand side computed. **LOGGER** will automatically compute for any widenings as defined in the Road width section. Once again **LOGGER** will compute and display the required co-ordinates as well as the current road width, cross fall, centerline and edge elevations.

Road Profiles (Total Station)



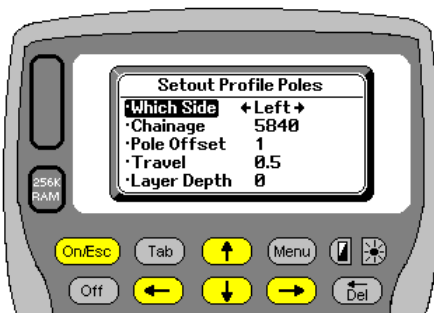
Screens to left indicate how to get to the Profiles Menu. This option will compute the levels for final level poles. **LOGGER** will prompt for a chainage, the pole offset, as well as the travel required. You can also specify a layer depth and the side (left or right) to be set out. **LOGGER** will compute

the required co-ordinates and levels. If the road has a camber both levels will be displayed as well as the height difference to be measured.



This is the first screen you will see. Profiles can be setout either with Total Station or Spirit Level. The user can also elect to define a multiple sets of parameters for Layerworks Checks that will be saved and can be recalled. The user can define the chainage increment as well. This is not automatic but driven by the user. Next the user as the choice of where the offsets must be set out relative too. Use the TAB button to view them all and then select your preference. User Defined sets out relative to the road edge. Finally decide if you want the setting out data recorded in the field book. If so you will be prompted for a description.

Once all this is done press Enter.

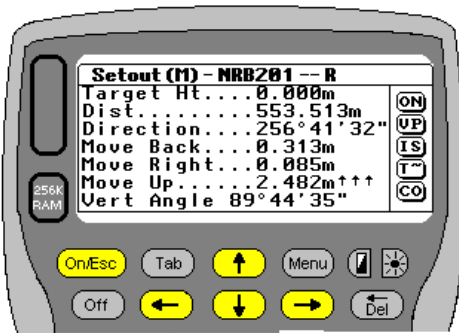


If the data is to be collected electronically then the next screen lets you choose which side is to be setout. Left or Right. This can be easily changed once you start Then the chainage to start from, followed by the offset required. **LOGGER** allows you to also enter a travel and layer thickness if required. Again press Enter to proceed



Once **LOGGER** has the info it requires it will calculate the setting out data for you. 2 possible displays may be presented. The LHS indicates that there is a camber in the road, also indicated at the top of the screen, whereas the RHS indicates that it is a straight cross fall. If the road is cambered pressing X will

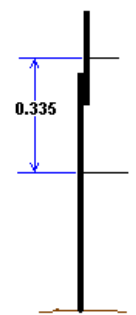
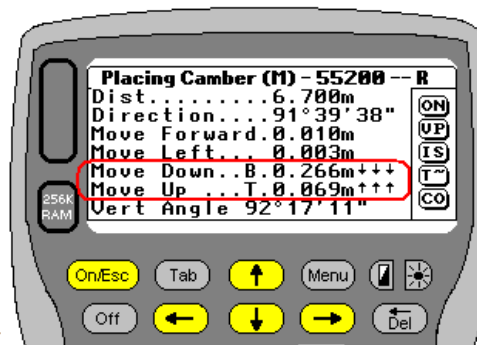
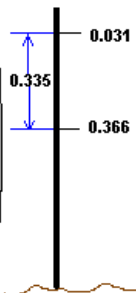
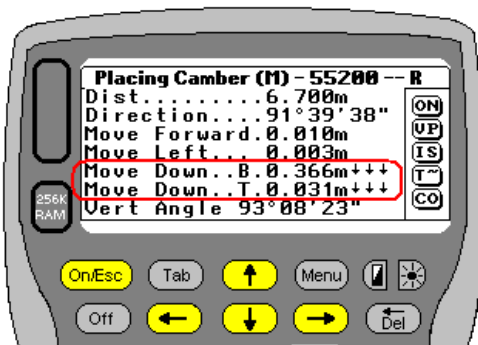
display how much up one needs to measure to get the other nail in. All levels are calculated to the **BOTTOM NAIL** on either side of the road.



All the normal Hotkeys available during setting out are also active. Remember that you can press ? to get a list of all the hotkeys. For a full explanation see the section under "Setting Out Coordinates". Once you are happy with the position press **R** to record (if you are recording) and **LOGGER** will then ask for the next Profile Pole. If you like press Esc to get to the "Placing Profiles Screen" as well.

Below is typical layout of a recorded profile operation that is stored in the **LOGGER** field book. The Y(p) etc are the actual placed coordinates. Top Nail indicates how much up the user needs to measure to get to the top nail if the road has a **camber**. See last line in table below

Point	Required Chn & O/S	Y (p)	X (p)	Z (p)	Req Prof Z	DZ	Travel	Top Nail
PROFILE Pole	11460.000 5.500	76686.078	3367853.761	782.868	782.865	-0.003	1.000	0.000
PROFILE Pole	11460.000 -5.500	76675.262	3367855.846	782.360	782.359	-0.001	1.000	0.000
PROFILE Pole	11480.000 -5.500	76679.105	3367875.501	782.504	782.506	0.002	0.500	0.000
PROFILE Pole	11500.000 -5.500	76682.919	3367895.109	783.107	783.106	-0.001	0.500	0.000
PROFILE Pole	55200.000 -6.700	-95784.950	3618256.035	413.759	413.393	-0.366	0.000	0.335



If the road is cambered then the screens could appear as above. **LOGGER** always calculates to the **BOTTOM NAIL** so on the left the users sees **Move Down..B. 0.366**. This indicates that from the top of the pole (assuming that's where the level was taken) you need to measure down 0.366m to get to the bottom nail and then 0.031m to get to the top nail. In this example the road was 6.7m wide with a 2.5% crossfall so $6.7 \times 2.5\% \times 2 = 0.335$. One can check this by subtracting $0.366 - 0.031 = 0.335$. In both cases the users needs to measure down as indicated by the 3 arrows.

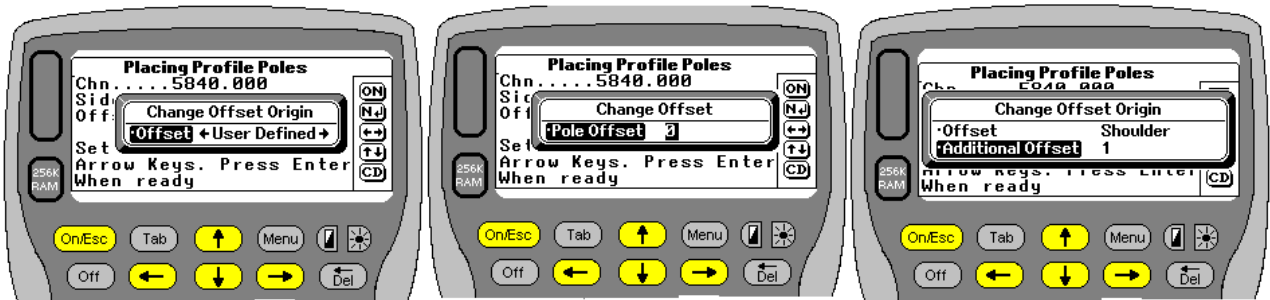
Looking at the screen on the right **LOGGER** indicates that you need to measure down and up. In such a case it is possible that the original profile pole was too short. So one would measure down 0.266m down to get to the bottom nail. Then measure up 0.069m to get to the top (the total difference again is 0.335m). In this case the user would have to join 2 poles to achieve this.



Once your profile is in you now get this screen. It basically shows your last profiles data. At this stage various Hotkeys are available again.

- ❖ **N** gives you're the next chainage (incremented by your preset value)
- ❖ **C** Lets you change to an exact chainage (e.g. 5843.25)
- ❖ **←** Changes to LHS profile
- ❖ **→** Changes to RHS profile
- ❖ **↑ ↓** Will increase or decrease the Chainage by your selected value

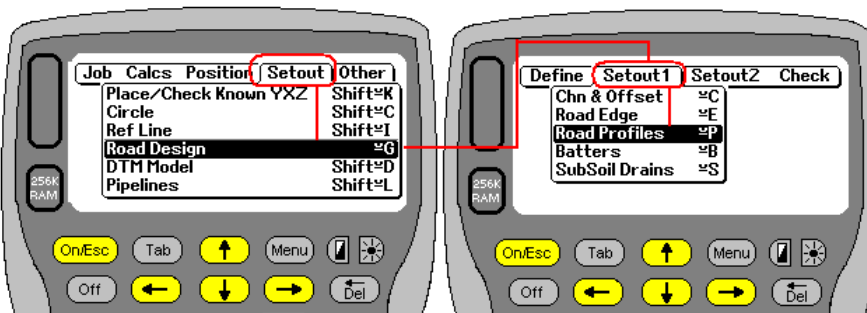
- ❖ **D** lets you determine your Chainage and Offset
- ❖ **I** lets you alter your increment value. Negative values are allowed. The up/down arrows will then work in reverse.
- ❖ **V** lets you view the Road Width and profile distance from the road edge
- ❖ **T** lets you alter your travel
- ❖ **On/Esc** Exit to main Setout 1 menu
- ❖ **O** Allows you to change Offset origin (User Defined, Kerb, Shoulder, Drain1 2 or 3) initially if you have your "Offset Origin" set to "User Defined" you will be presented with the 2 screens on the left below.



If you have your "Offset origin" set to say "Shoulder" then you will be presented with the screen to the right above, which indicates your offset origin and the distance to be measured from there.

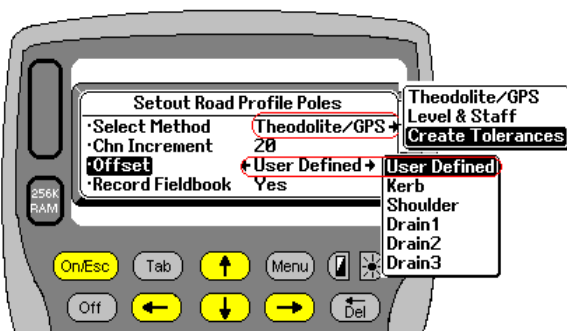
If you are changing your origin from "User Defined" to say "Shoulder" at this stage, you will need to press O again and then set the offset from the shoulder if so required.

Road Profiles (Level)

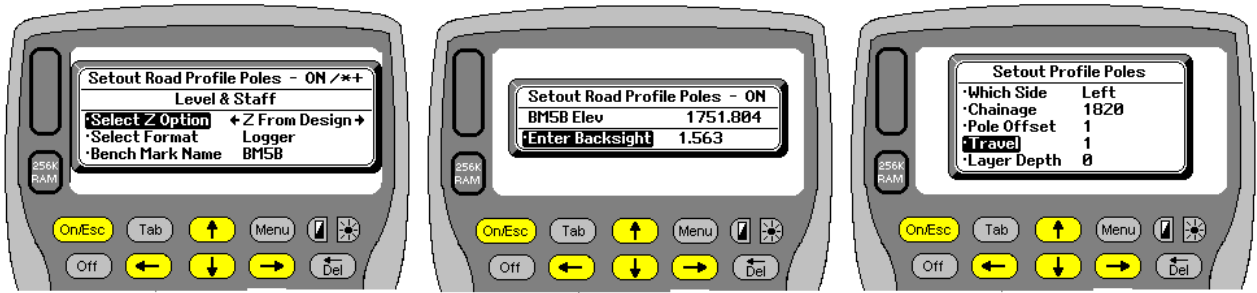


Screens to left indicate how to get to the Profiles Menu. This option will compute the levels for final level poles. **LOGGER** will prompt for a chainage, the pole offset, as well as the travel required. You can also specify a layer depth and the side (left or right) to be set out. **LOGGER** will compute

the required levels. If the road has a camber both levels will be displayed as well as the height difference to be measured.



This is the first screen you will see. Profiles can be setout either with Total Station or Spirit Level. The user can also elect to define a multiple sets of parameters for Layerworks Checks that will be saved and can be recalled. The user can define the chainage increment as well. This is not automatic but driven by the user. Next the user as the choice of where the offsets must be set out relative too. Use the TAB button to view them all and then select your preference. User Defined sets out relative to the road edge. Finally decide if you want the setting out data recorded in the field book. If so you will be prompted for a description. Once all this is done press Enter.



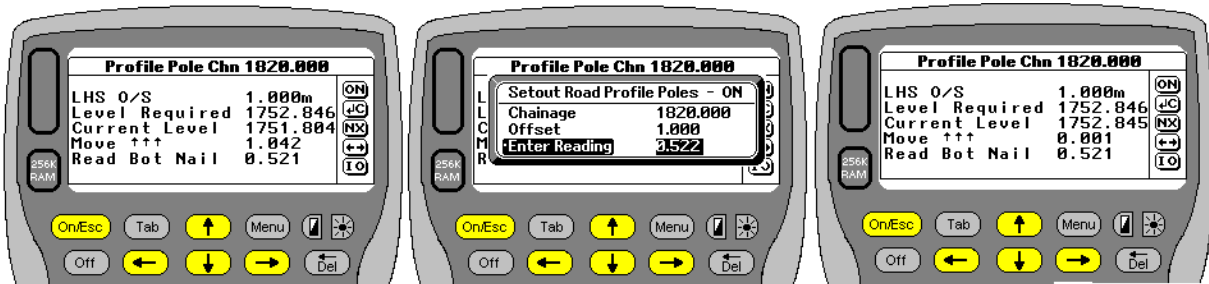
Select the Z from Design option.

Format will be **Logger**. This routine is also used for Layerworks checks and then the user has two options for storing the final output. Either as Logger or Group5. See the section under [Road Design Layerworks Check](#).

Next enter the benchmark you will be using. If not found in the coordinate file **LOGGER** will prompt for the XYZ values.

You will then be required to enter your backsight reading to the benchmark.

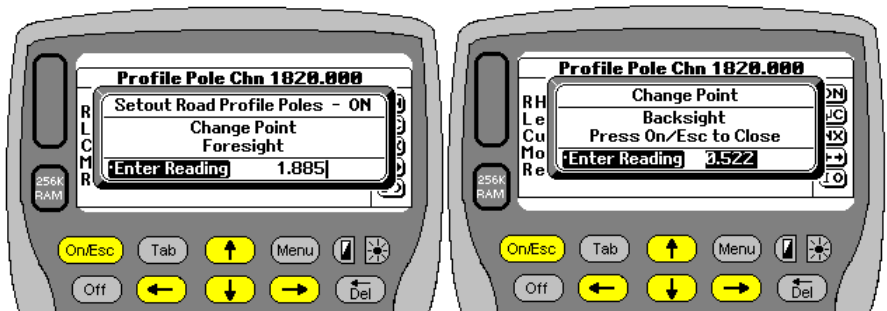
Once that's done **LOGGER** will prompt for the chainage, offset travel and layerworks depth as well as which side is required to be set out. If you enter offset of 1m and its left hand side it is assumed to be -1.



Once the backsight has been entered and chainage selected **LOGGER** will compute the level for the selected profile and display the current level, required level, height difference as well as the reading to be observed on the staff. Initially (you will see that the user needs to move up 1.042m or read 0.521 on the staff. After adjusting and reading again middle window) you will see the final result recalculated.

At this stage there are again various hotkeys available. Press ? to see a list of the keys and their function.

- ❖ **On/Esc** will take you back to the previous menu (Middle Window above)
- ❖ **Enter** also takes you back to the previous menu
- ❖ **C** Lets you create a change point. You will be prompted to enter a foresight reading. **LOGGER** will recalculate the readings and you will come back to the right hand screen above

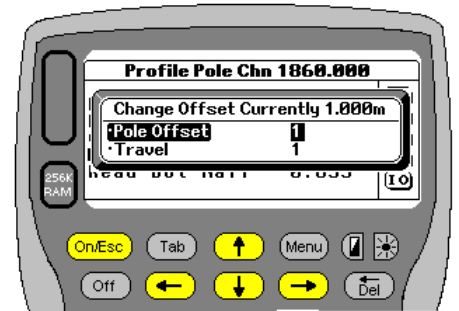


- ❖ Use the **↑ ↓** arrow keys to increase or decrease the chainage value by your selected increment. You will see the chainage value at the top of the screen change.
- ❖ **N** will also take you to the next chainage
- ❖ Use the **← →** arrow keys swap between the left and right hand side profiles.
- ❖ **X** lets you see the current Xfall info and if there is a camber how much to measure up to the top nail. In this case there is no camber . The right hand



screen displays all the critical info being used

- ❖ I lets you alter your increment value. Negative values are allowed. The up/down arrows will then work in reverse.
- ❖ O Allows you to change your offset value as well as the travel.
- ❖ R records the info to the fieldbook if you have selected that option.



To exit the routine one needs to select a change point. You will know that this is a BM. Enter the foresight reading to the benchmark. When prompted for a backsight, Press On/Esc. **LOGGER** will prompt for the benchmark name and then give you a misclosure as a check.. If you have elected to store to the field book you will hear **LOGGER** beeping as it writes the closing info to file.

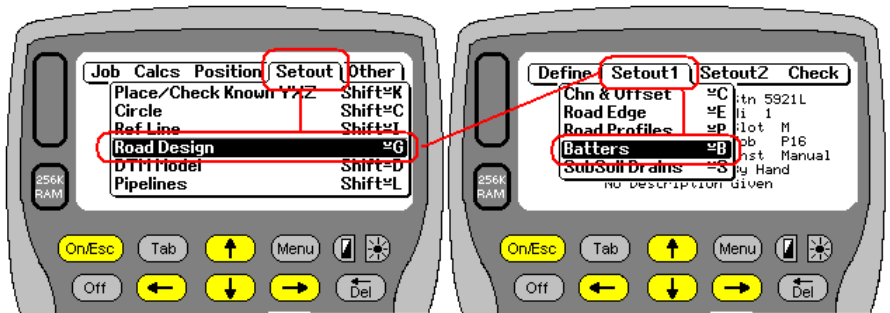
```
Job Description... Not Defined
Profile Poles..... Chn 1820 onwards
Date and Time..... Thu 31 Mar 2010 13:33:53
```

Point	Required Chn & O/S	Z (p)	Req Prof Z	DZ	Travel	Top Nail
PROFILE Pole	1820.000 -8.700	1752.845	1752.846	0.001	1.000	0.000

```
Opening Bench Mark.... BM5B
Bench Mark Elevation.. 1751.804m
Closing Bench Mark.... BM5B
Bench Mark Elevation.. 1751.804m
Field Value..... 1751.803m
Misclosure..... 0.001m
```

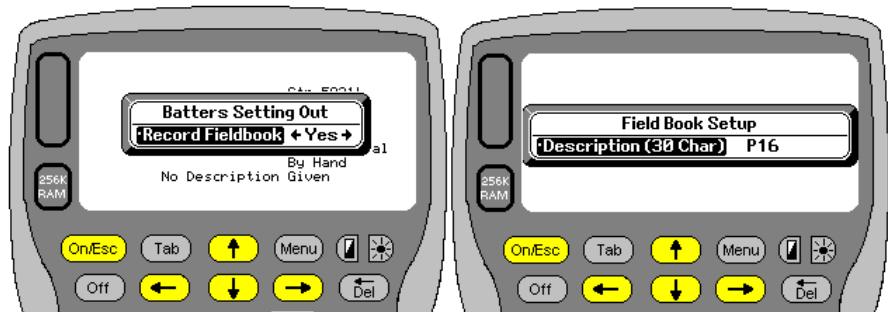
Batters

The Batter menu is located as shown to the right. This function is intended to help compute batter positions anywhere along the defined alignment. From your current setup **LOGGER** will compute the chainage and offset of the polared position. From this data the user will be directed as to where the final batter position should be placed.



LOGGER will first prompt you to select to store or not store a fieldbook. Answering **Yes** will then ask for a description as shown **P16**. Once that's done you will be prompted to take a reading.

If you do not want to store the batter info **LOGGER** will immediately prompt for a reading



Depending if you are in electronic or manual mode the screens will be slightly different. In Electronic mode just press Enter once you have sighted your target. In manual mode you will be prompted for Direction, Vertical Angle and finally Distance. Once **LOGGER** has the direction, distance and vertical angle, it will compute the current chainmans coordinates.



At this stage there are various hotkeys available to you. Some are shown to the right. Remember that pressing ? will display the help menu telling you what each hotkey available does. Here is a listing.

- ❖ F Pressing F will take you to the Fixing routine
- ❖ The Up/Down arrows will scroll your target height automatically. (Not active in Manual Mode)
- ❖ T Will allow you to alter your target height and preset additional values.
- ❖ Z Will allow you to swap jobs.
- ❖ S Allows you to alter your search Radius
- ❖ E Lets you define your starting element.
- ❖ + Allows you to swap between manual and electronic modes.
- ❖ L Lets you start logging tache.

Looking at some of these items in more detail.

Pressing **T** brings up the menu on the left and allows the user to preset up to 6 different target heights. This is very useful because once preset the up/down arrow will automatically choose the next target height. It eliminates punching errors as well. When doing batter for example users often turn the prism upside down on top of the pole. Setting this value as one of the target heights means you can access it quickly and without errors, by using the arrow keys.

Pressing **Z**

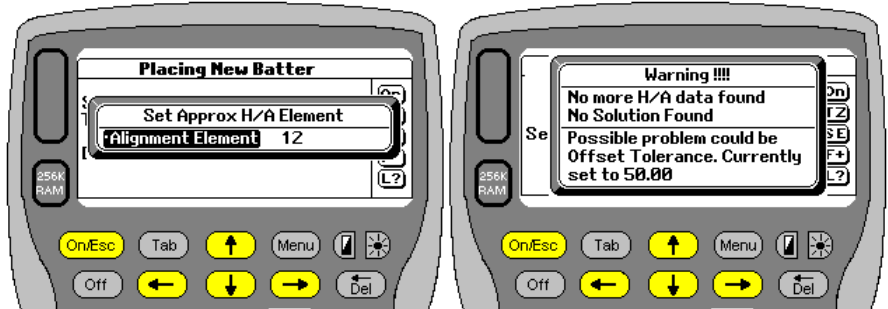
allows the user to swap to another job without having to shut down the current job, open a new file and refix yourself. If for example if you are doing a dual carriageway,



LOGGER will have each carriage way as a separate job. You may be doing batters on both the left and right hand side at the same time. In smaller township type environments where roads intersect or can be seen from your setup up, one just has to press Z to swop to the required road to proceed. You will be prompted exactly the same as when you start off and select a job to work on.

Pressing S

allows the user to change the current search radius. The default is stored when you setup your job and is normally 50m. See the section under 'Creating A Job' for a more detailed explanation. Often if you have a section that may have tight curves, you may want to adjust the search radius. Just saves you having to go all the way back to **your defaults and resetting it there.**

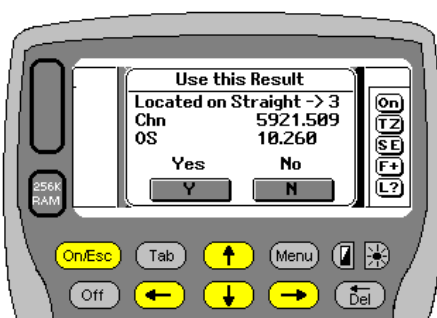


Pressing E

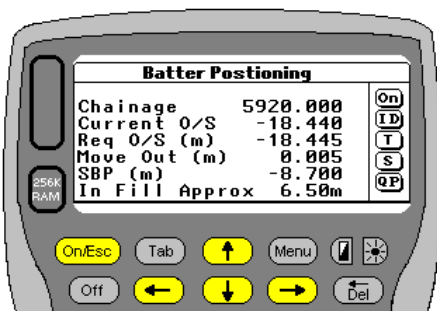
Lets you choose which curve / straight element to start searching from, when trying to locate the batter. If you have a job that is 50Kms long and has 50 curves and straights and you know that you are roughly at element 25,(a straight and a curve are each considered a single element) then you can force **LOGGER** to start searching from there. It saves time. Once **LOGGER** has located itself it remembers where it is, and from then on will always go back 3 elements (curves, straights) and start searching again. This is done just incase the users happens to be working backwards through the job. If you happen to have chosen a starting position beyond where you actually are, **LOGGER** will search to the end of the file and start again form the beginning anyway. If it cannot find a solution then you will get a warning message

Pressing **+** will just swop from manual to electronic mode. A beep will be heard indicating the change has been made. Maybe useful if you are in the office just testing data or you have cable problems in the field.

Pressing **L** will automatically start you Logging tache data. The normal questions associate with tache will appear depending on whether you already have tache logged or not. See the section under Tache for more details. This option is extremely useful for the user. It will allow you to log ground levels or any other detail without having to exit the whole batter routine. If you are logging ground lines, and know you will want to log again further on, when you exit tache select the **FAST LOGGING** option. **LOGGER** will shut your tache file and return to batters. Next time you press **L** **LOGGER** will immediately prompt for a tache shot and bypass all the introductory questions normally associated with starting a tache. This function is available also while setting out and can be useful for doing as built_s on the fly for example.



Once you have triggered the instrument to collect your data or entered manually **LOGGER** calculates the coordinate of your position and will search for a possible solution. **LOGGER** will then display a solution based on the info available and search radius defined. Here we see that it has located us on a straight at Chn 5921.509 and offset 10.26. If you suspect that this is incorrect press **N** and **LOGGER** will carry on searching down the alignment. If you are happy press **Y**. This screen will only appear once. Next time you take a reading **LOGGER** remembers roughly where you were so there is no need to confirm your location each time. Assuming you move back about 1.5m to get to Chn 5920 and out 8m to roughly where the batter would be and take another reading, you would get the following screen.



Once you are happy that you are more or less in the correct position **LOGGER** will calculate where the batter should be placed. In this instance we are only 0.005m short and need to move out slightly.. It also tells you what the **SBP** (Shoulder Break Point) offset is, where the batter is being calculated from, as well

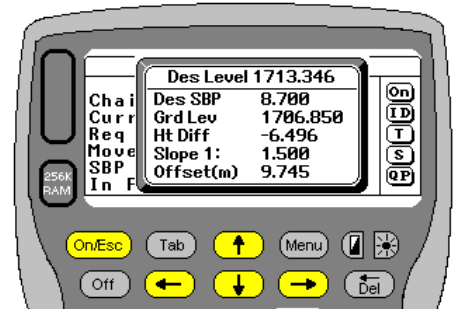


as the approximate height difference is and whether you are in cut or fill.

Again at this stage there are various hotkeys available to the user.

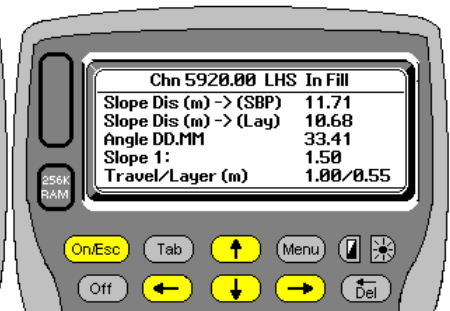
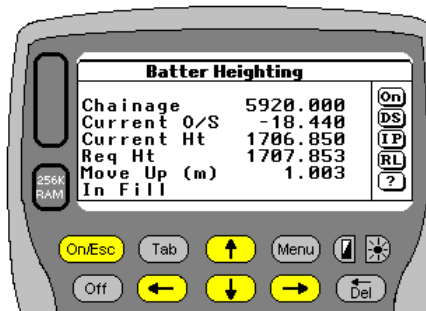
- ❖ **I** Pressing I gives info on your setup Position. Often useful if there is a query on the batter position. First thing to check is that you are in fact setup at the correct position. If displayed is Station Name, Instrument Height, Target Height and Coordinate values.

- ❖ **D** Pressing D displays all the design info used to establish the batter position. **LOGGER** displays the design level used at the SBP. Also the SBP offset from CL. The ground level where your shot was taken, the height difference between ground and design and batter slope to be used. The height difference * the batter slope gives the offset to be moved out from the SBP (9.745m). Pressing Enter will then also display the current Y/X (E/N) of the current position



- ❖ **T** Lets user alter Target Height
- ❖ **S** Lets user Set and check the batter level
- ❖ **P** Lets user move straight to the profile routine. If you are setting out batters and the current position does not warrant a batter (very low fill or shallow cut) then the user can rather set out a profile pole without having to exit the whole batter routine. When you have completed putting in profiles **LOGGER** will revert back to the batter routine.

- ❖ **Q** Quick batters. If you select **Q** **LOGGER** will bypass the option to set a level and just give you the info required. In this case we see that we only needed to move out 0.005m (previous page) this means that the



batter position is basically correct. All that needs to be done now is to set the level. We have selected to have a 1m travel. (***This has been previously defined in the batter parameters***) So **LOGGER** indicates that you basically need to measure up from the ground 1.003m to get to the correct elevation. Pressing Enter again will display your chainage, two slope distances, the first to the SBP and the other to the bottom of the Layerworks, slope angle in Deg & mins for those using an abney level, the slope defined as a 1: and the travel being used as well as the Layerworks thickness defined. Also at this stage there are optional Hotkeys available.



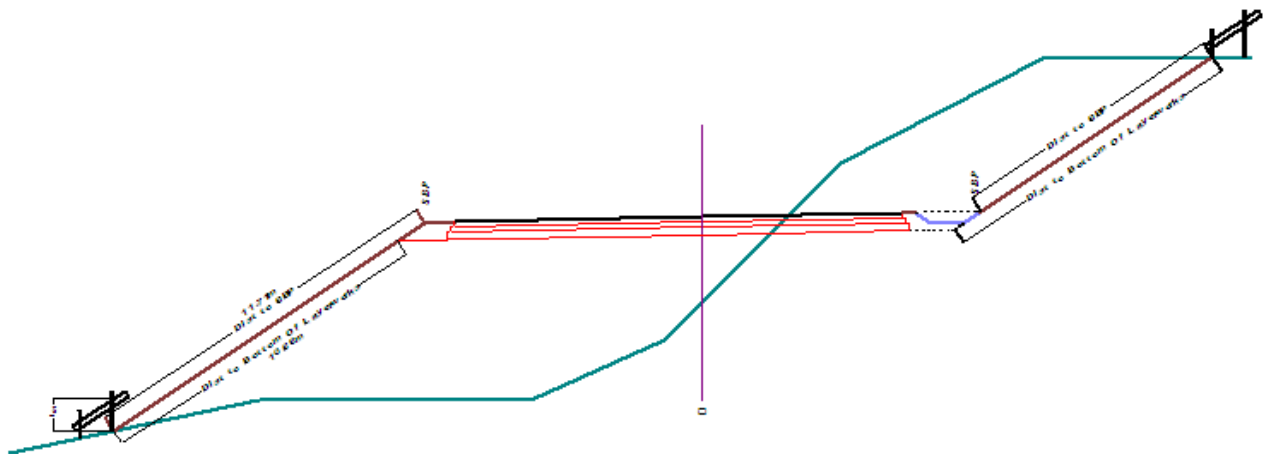
- ❖ **D** Design info as mentioned above.
- ❖ **S** Option to recheck and set level.
- ❖ **I** Batter and slope info as above.
- ❖ **P** Parameters. Allows you to see / edit your batter input parameters.
- ❖ **R** Record all info to field book for record purposes. **LOGGER** will display the data as shown above and write it to the field book. A beep will be heard indicating the info has been stored. Once stored you still have the option to set the level or proceed to the next batter. A sample printout from the field book is shown below. The **Nail** column indicates how far down from the top of the

front pole the user needs to measure down to get the correct batter level. Some users just put the front poles in and height them and leave their assistants to go back later with the printout and measure down and put the batters in. The data is in neat columns so that it can be imported into your software to plot the positions and levels as a check if need be. Batter (F) indicates the batter is in Fill.

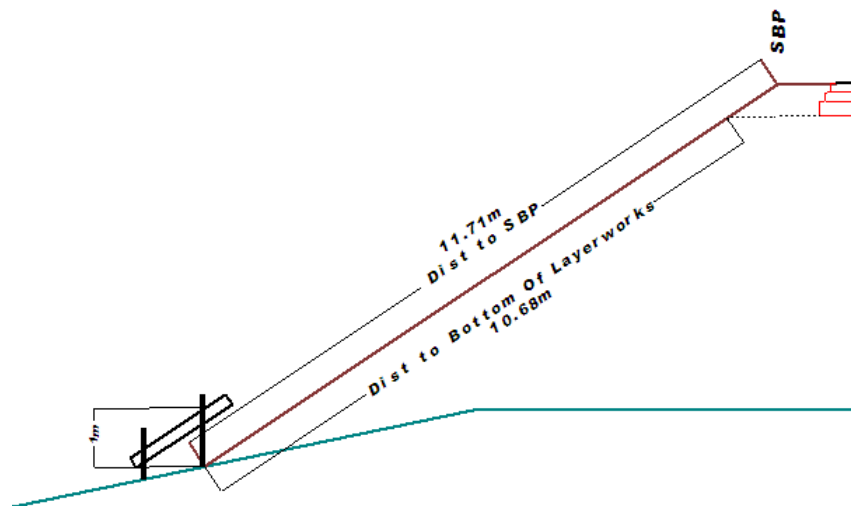
Chainage	Offset	Travel	Nail	1: / Deg	SD (SBP)	SD (B/Lay)	Comment	Y	X	Ground Lev
10944.83	22.673	0.500	0.598	1.50/33.41	9.22m	7.99m	BATTER (F)	7879.358	3293513.920	133.903
10959.23	23.400	0.500	0.497	1.50/33.41	10.09m	8.86m	BATTER (F)	7892.955	3293520.079	133.441
10974.37	23.118	0.500	0.431	1.50/33.41	9.76m	8.52m	BATTER (F)	7906.617	3293527.812	133.693
10989.53	24.286	0.500	0.549	1.50/33.41	11.16m	9.93m	BATTER (F)	7920.832	3293534.620	133.163

- ❖ **L** Start logging tache as mentioned above as well. (Fast Logging)
- ❖ **Enter / Esc** Pressing either of these will first display your batter distances etc (above right) and proceed letting you set out the next batter.

Below is a typical batter situation in cut and fill

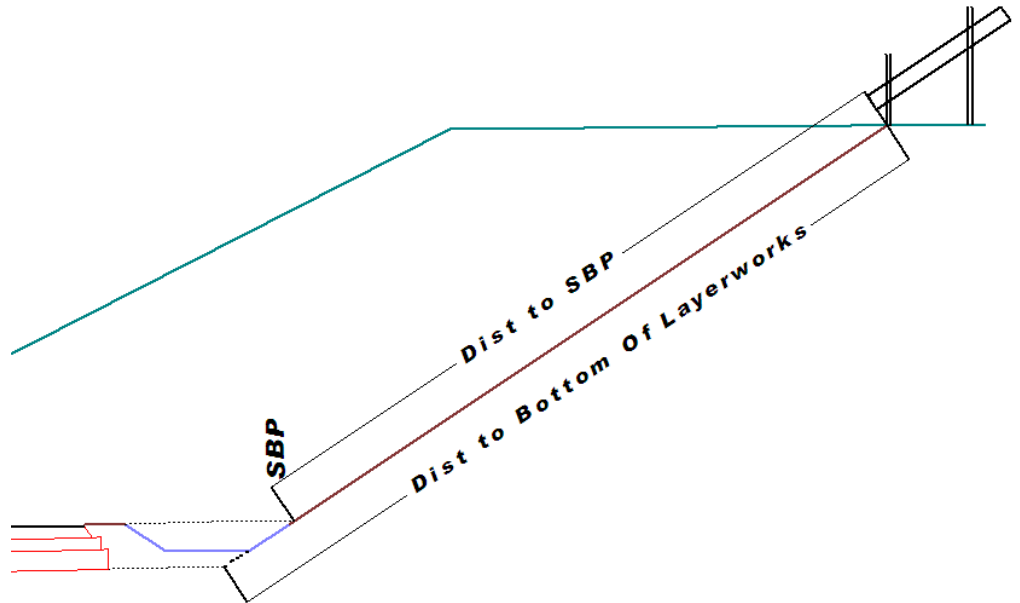


Right is an enlargement of the fill on left hand side. It clearly indicates the two batter slope distances. One can see that the second distance to the bottom of the layers is calculated by intersecting the bottom layer (with its corresponding cross fall) and the batter slope. So even in very steep cross fall situations or varying batter slopes **LOGGER** will always give you the correct slope distances. Generally in fill situations users will use the dist to bottom of Layerworks as the distance to be written on the batter board.



It is recommended that users put in the layerwork thickness and let **LOGGER** do the calcs for you. Some users prefer to use the appendage option and calculate the offset and ht difference that the layer will create. It should be remembered that this will vary if you have steep cross falls and also varying batter slopes.

Here we have a typical cut situation with a drain defined. Again two distances are calculated. It is up to the user which distance they choose to use here. In some instances contractors prefer to cut down to the SBP and then put in Profile poles and box out for the drain and Layerworks to come.

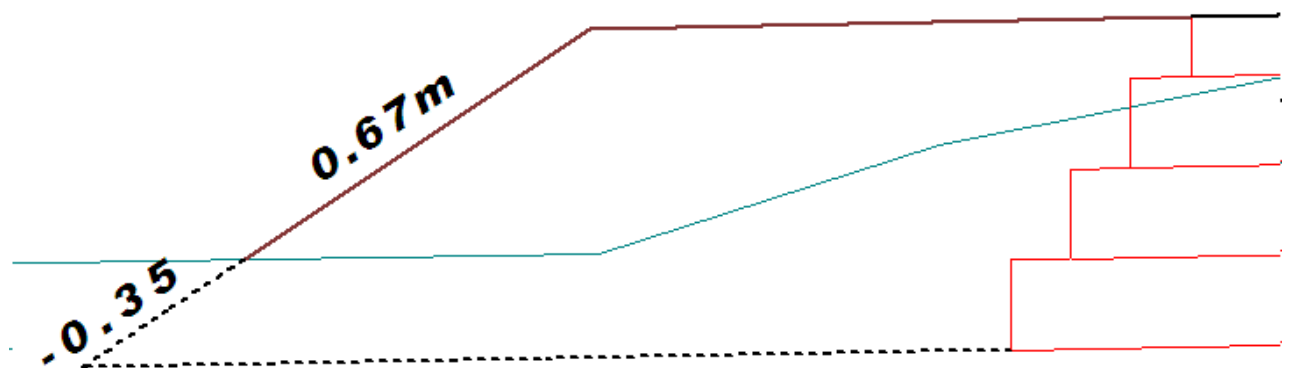


Note

Sometimes you may get a negative batter slope to the Layerworks. The sketch below illustrates what is happening. In such cases you will see that you are almost always in very shallow cuts or fills and a batter is really not needed. A profile would be more appropriate.

Notice in the LHS screen that it indicates a fill of only 0.39m. The final result on the RHS indicates a negative slope of -0.35m too.

The sketch below should explain it better to you. One can clearly see that the Layerworks are in fact going to end up below the ground level and hence the negative value.



Check Chn & Offset

This routine will allow you to take a reading anywhere along an alignment and will report back to you. **LOGGER** will locate and ask you to confirm the chainage and offset. Once you have done this it will display the following:-

Chainage
Offset

Current Elevation
Design Elevation
Height Difference (Design minus Ground)
Location. (Road, Edge Shift, Shoulder, Appendage, Batter)

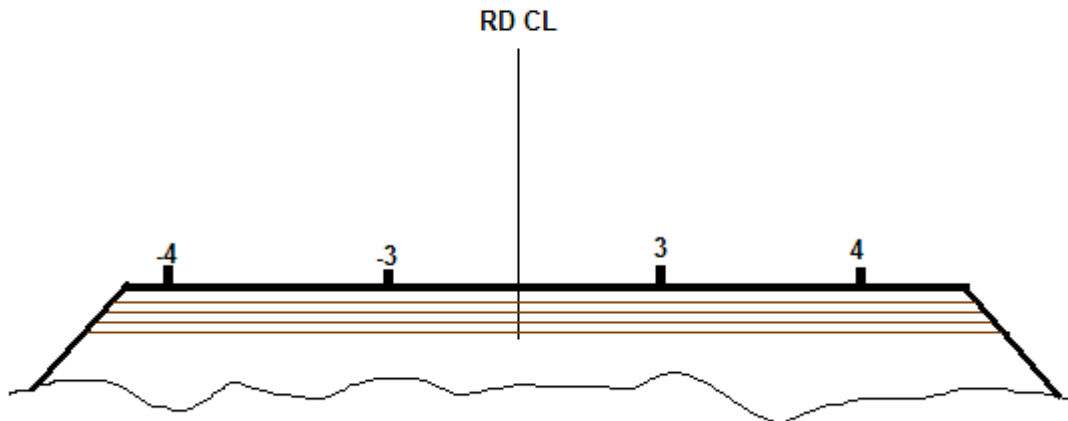
The following hotkeys are available at this stage on the right hand side menu:-

Menu	Pressing menu will give you more info on the keys below. It will also activate the selection at the same time.
On/Esc	Press On to escape or break out of the viewing process.
T	Press T to alter you target height.
R	Press R to record the field data and results to file. This can be printed out later.

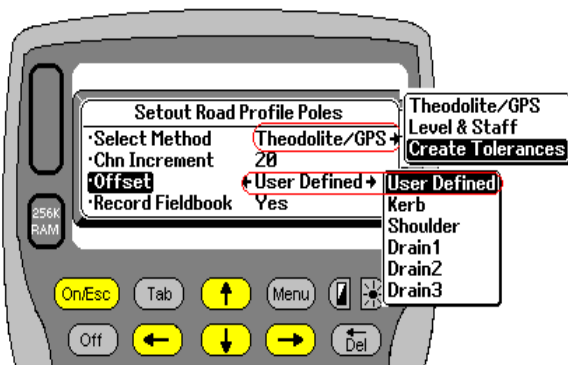
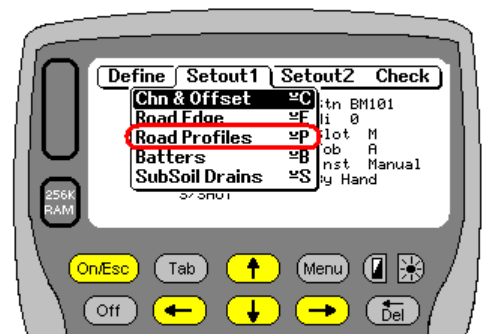
Layer Works Checks – Using Spirit Level.

LOGGER will allow the user to check Road Layer works using a normal spirit level. The user needs to define predetermined offsets. IN the illustration below these are at -4m,-3m,3m, and 4m from Centre line. The offsets must be entered from left to right. However when taking levels in the filed you can work from left to right or right to left. A maximum of 10 offsets can be defined at this stage. The users will be prompted for layer thickness as well as tolerances applicable so that the statistics can be run at the same time. As the date and time are recorded to the file the user should check that they are set correctly

Layerworks Checks - Spirit Levelling



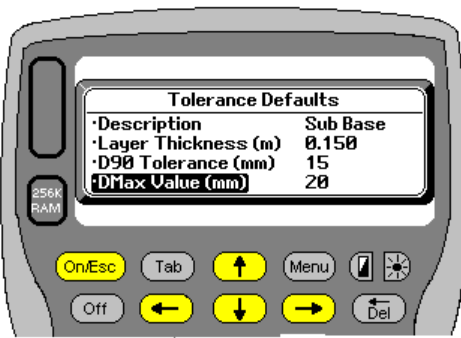
The Option is found under Setout – Road Design – Setout 1 – Road Profiles. (Shortcut from the main menu is Pson+G then P)



Once the Road Profiles option is selected the screen to the left will be displayed. Select **Level & Staff**. Either press **L** (for Level) or press **Tab** for the drop down menu and then select Level & Staff. The user can also elect to define a multiple sets of parameters for Layerworks Checks that will be saved and can be recalled.

Arrow down to alter the chainage increment if you wish. The option **user defined** is not applicable at this stage as you will be prompted later for the defined offsets.

Select whether to store the information to a field book or not. If you select to store to a field book you will be prompted for a description on the next screen. Once happy with the screen input press Enter.



If you elect to **Create Tolerances** a menu similar to this will appear. You can enter the Description and then the relevant values required. Press Enter to save the data. The data will be store in a file starting with your Job Name and have TC added.

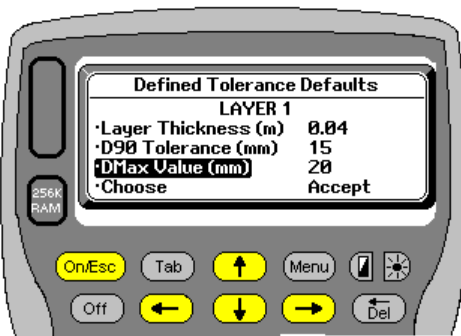
To exit the routine press **On/Esc**

This file cannot be edited or have data deleted. If there are any errors that can be changed at the time the file is read, or alternatively delete the file and make a new one.



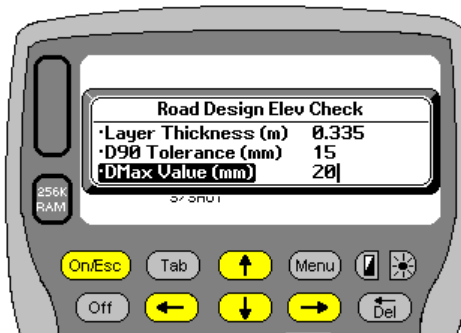
Select Tolerance Check by either pressing T or using the side arrow buttons of pressing menu and selecting from the drop down menu. Then arrow down and enter the name of the bench mark from which you will be starting from. If the field is left blank and you press enter **LOGGER** will give a drop down menu on the left of available points in the current file. If no point is found then you will be prompted for the points details.

Storage Format will generally be Logger. Group 5 was a special option but no longer seems to be used by them



LOGGER will check and see if you have defined Tolerance checks. If so they will be loaded and displayed as shown to the left. You can press Accept or Next to scroll through the file. The data can be edited at this stage and if **Accepted** will be used and displayed in the screen below as a final check Edited data will not be restored into the defaults file.

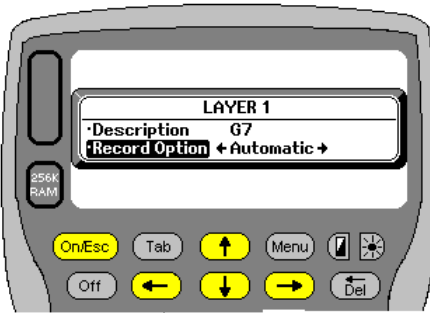
If no tolerance file is found you will be prompted as below to enter data.



If a Tolerance Check file is not found you need to enter the tolerance parameters. **LOGGER** will calculate the final road level at the offsets still to be defined. It will then deduct the **Thickness** to determine the required level. This value is in m.

The **D90 tolerance** (defined in mm) will check to see whether or not the leveled point falls within (15mm in this case) of the design level.

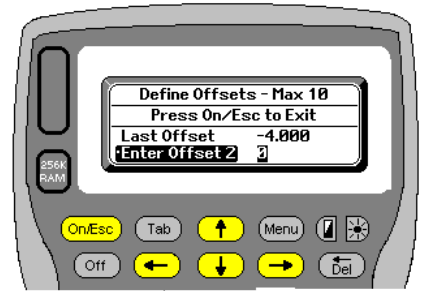
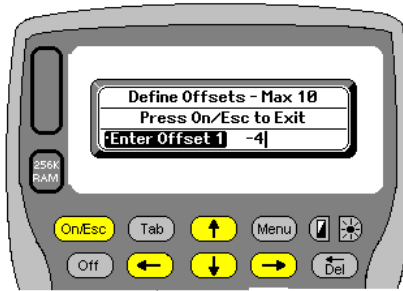
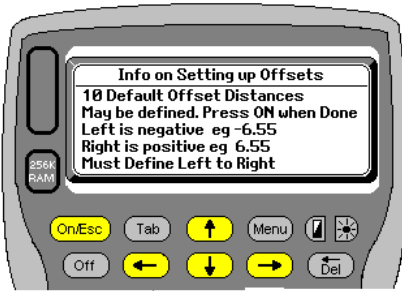
The **DMax Value** marks points that deviate (20mm in this case) from the design level required.



If you elected to **Record to Fieldbook** then you will be prompted for a description. In this case G7 has been used as an example description, and will be printed out on the results sheet.

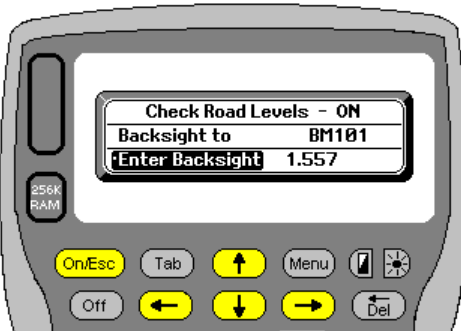
The record options can be done manually or automatically. Once the level results are displayed, if the manual option is selected, the user will have to press R (Record) to save the results to file each time. In Automatic mode once the results are displayed and accepted, they automatically get stored.

If the user selects not to store the results the above left hand side screen will not appear.



As the levels will be taken at predetermined offsets **LOGGER** needs to know what they are. They must be define from left to right and a maximum of 10 can be defined.. In the initial sketch at the start of this section 4 offsets have been selected and they are at -4m,-3m 3m and 4m. The Above LHS screen is just an information screen explaining what needs to be done. Press Enter to proceed to the next (middle screen) step.

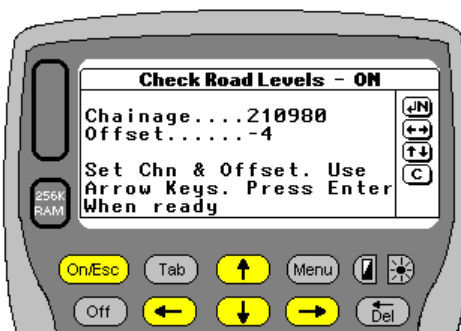
Here you will be prompted for the first offset (-4 in this case). Press Enter once the value has been typed in. Thereafter **LOGGER** (RHS screen) will display the previous offset and request the next offset. Each time the offset number is increased so the users knows how many have been entered. The previous reading is also displayed as well. If you try and enter a value less than the previous reading **LOGGER** will beep and prompt again for a reading. Zero is always displayed as the next value. Type over it with your new value. Once you have entered all the offsets you require press **On/Esc**.



You are now ready to start. Enter the backsight reading to your benchmark. You can escape at this stage but **LOGGER** will take you back to the screen where you are asked if you want to store your results.

Once you have typed in the reading press Enter.

LOGGER requires the chainage you will be starting at. In this example it is 210980.



You are now ready to start the leveling operation. **LOGGER** will display the Chainage you are at (210980), as well as the first offset from the left (-4) as a starting point. At this stage there are various options available to you and these can be found on the hotkeys down the RHS of the screen. For the sake of this exercise let's assume offsets have been defined as -4,-3, 3, 4

Hot Keys

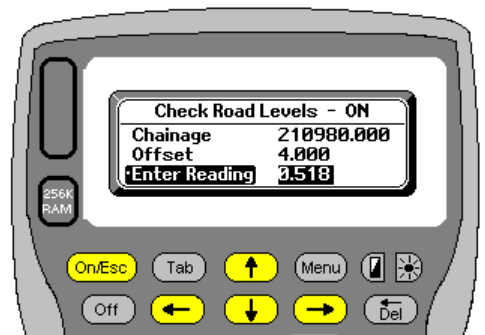
- ↵ Press Enter to Input your reading
- N Press N to Increment to Next Chainage.
- ← Left Arrow will alter offsets. Pressing left arrow now will force **LOGGER** backwards to the end of the list which is 4. A beep will be heard in such instances. If the reading was -3 pressing ← sets it to -4.
- Right arrow will increase the offset. Pressing it now will change the offset to -3. Once it reaches 4 and → is pressed a beep will be heard as it sets itself back to -4.
- ↑ Pressing the up arrow will increase the chainage by the initial increment specified. In this case 20m In both cases if the up or down arrow is pressed **LOGGER** will beep, warning you of a change.
- ↓ Pressing the Down arrow will decrease the chainage by the initial increment specified. Again 20m.
- C Press **C** to enter a change point. See further down on next page.

At this stage of the exercise you will not be able to escape from the routine without taking a foresight onto a bench mark. Since an initial backsight has already been taken it is only logical to now take intermediate sights or a foresight.

Hotkey ↵.

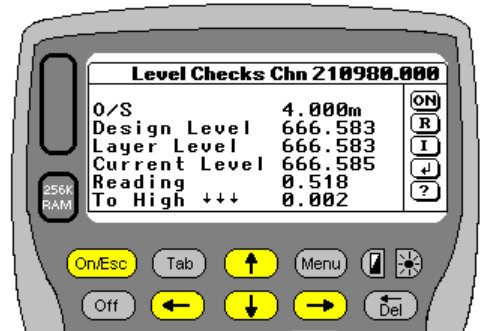
Once Enter is pressed Logger will display the following screen. You can press **On/Esc** to go back to the previous menu if need be. **LOGGER** displays the current chainage and offset as a check for you. All you need do is type in the staff reading (0.518) and press Enter ↵

Once you have entered the reading **LOGGER** will compute the required values



LOGGER will now display

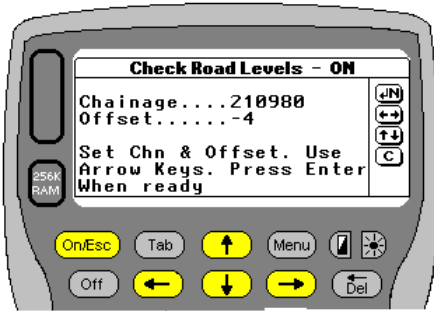
1. Your current Chainage
2. The offset you are observing to
3. The Design level at that chainage and offset.
4. The layer level required for that chainage and offset
5. Your current computed level
6. Your staff reading
7. Difference in elevation between the required level and your actual level. Arrows up or down indicate whether its too high or too low. In this example we are too high by 0.002mm and arrows indicate we need to go down,



At this stage the following Hot keys are operative.

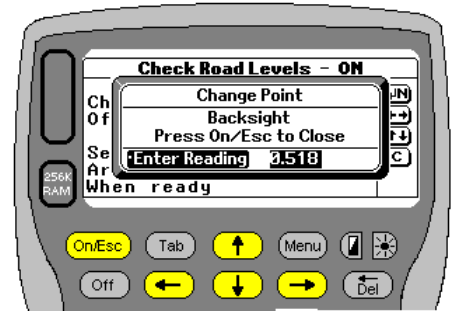
- On/Esc** Press **On/Esc** to go back and re-enter your reading
- R Press **R** to Record the readings to file and proceed with the next check.
- I Press **I** to change the chainage increment so that when the up/down arrows are used the chainages will be adjusted by this new value.
- ↵ Press **Enter** to proceed to the next check. If the automatic store option is switched on the data will also be stored for you and a beep will be heard confirming storage.



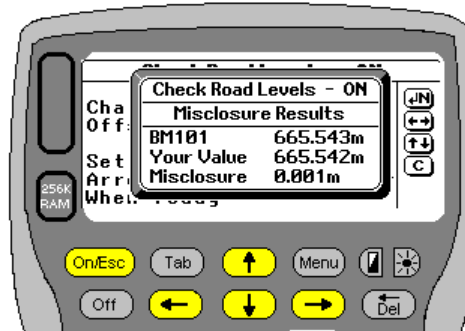


Hotkey C

(LHS Image). Pressing **C** will allow user to observe to a change point. This can be to either move on further down the road or to close the level run. Type in your foresight reading (1.557 middle image) and press **Enter**. At this stage **LOGGER** will prompt for a Backsight. If you are moving on then enter the backsight reading. (0.518 RHS Image) and



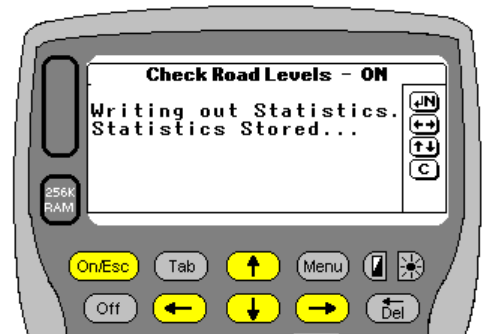
press **Enter**. **LOGGER** will compute a new collimation height and repeat the whole process. You will need to adjust either your chainage and/or offset accordingly. If you have come to the end of your run and wish to close off then press **On/Esc**.

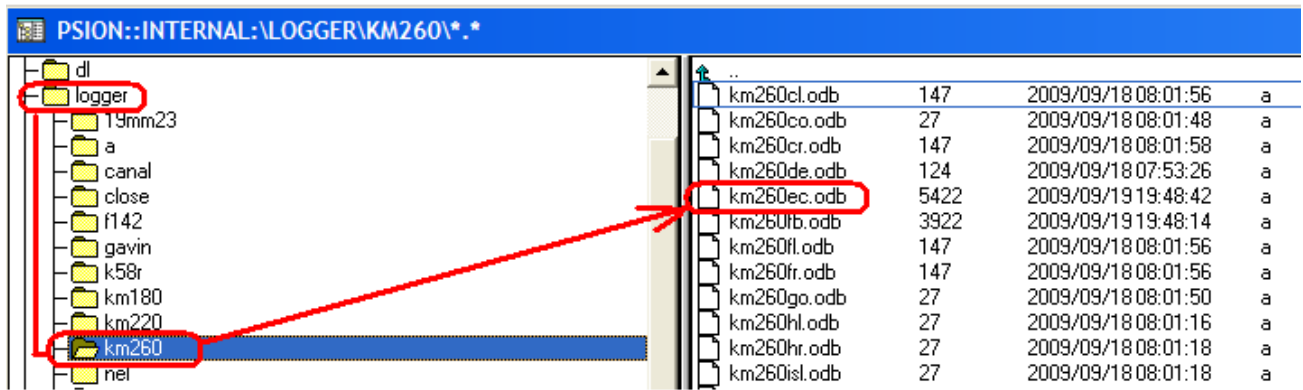


Assuming you wish to close **LOGGER** indicates that the Leveling is now complete and calls for the closing Benchmark name In this example it is BM101 (LHS Image). **LOGGER** then displays the Closing Benchmarks value compared to yours and gives a misclosure. Press **Enter** to exit the procedure.

A screen indicating that the Statistics are being written to file will appear and once done you will be informed that they are all stored and **LOGGER** will return to the main menu.

All the data will have been written to a file called Jobname+EC.odb. Assuming your job was called Km260, then the file will be called Km260ec.odb and will be stored under the **LOGGER/KM260** folder. The file needs to be downloaded using **Download – Check Levels**. Once download it can be deleted as if further checks are done in this same job they will be added to the file.





This is a sample printout of what the results should look like.

```
//Source LOGGER Software for Psion WorkAbout issued 05/09/2009
//Job..... HILLCR
//Date..... Sun 20 Sep 2009 14:36:26
```

```
CHECKING SURFACE ELEVATIONS
Job Description... SUBBASE CHECK
Date and Time.... Sun 20 Sep 2009 11:37
Bench Mark..... BM101
Elevation..... 665.543
Layer Thickness... 0.335m
Travel..... 0.000m
```

STAKE-DIST	OFFSET	SURVEY	DESIGN	DES-SUR	B/S	I/S	F/S
					2.261		
					2.350		2.151
210980.000	-4.000	666.258	666.248	0.010		1.745	
210980.000	-3.000	666.298	666.278	0.020		1.705	^
210980.000	3.000	666.301	666.278	0.023		1.702	^^^
210980.000	4.000	666.255	666.248	0.007		1.748	
210960.000	-4.000	666.561	666.554	0.007		1.442	
210960.000	-3.000	666.598	666.584	0.014		1.405	
210960.000	3.000	666.608	666.584	0.024		1.395	^^^
210960.000	4.000	666.557	666.554	0.003		1.446	
210940.000	-4.000	666.812	666.807	0.005		1.191	
210940.000	-3.000	666.847	666.837	0.010		1.156	
210940.000	3.000	666.853	666.837	0.016		1.150	^
210940.000	4.000	666.817	666.807	0.010		1.186	
210920.000	-4.000	667.033	667.031	0.002		0.970	
210920.000	-3.000	667.045	667.061	-0.016		0.958	^
210920.000	3.000	667.074	667.061	0.013		0.929	
210920.000	4.000	667.044	667.031	0.013		0.959	
210900.000	-4.000	667.265	667.256	0.009		0.738	
210900.000	-3.000	667.283	667.286	-0.003		0.720	
210900.000	3.000	667.294	667.286	0.008		0.709	
210900.000	4.000	667.275	667.256	0.019		0.728	^
					2.230		0.692
210880.000	-4.000	667.496	667.481	0.015		2.045	^
210880.000	-3.000	667.521	667.511	0.010		2.020	
210880.000	3.000	667.520	667.511	0.009		2.021	
210880.000	4.000	667.498	667.481	0.017		2.043	^
210860.000	-4.000	667.723	667.704	0.019		1.818	^
210860.000	-3.000	667.742	667.734	0.008		1.799	
210860.000	3.000	667.711	667.734	-0.023		1.830	^^^
210860.000	4.000	667.680	667.704	-0.024		1.861	^^^
210840.000	-4.000	667.861	667.875	-0.014		1.680	
210840.000	-3.000	667.902	667.905	-0.003		1.639	

LOGGER**Road Design Layerworks Check**

210840.000	3.000	667.899	667.905	-0.006	1.642	
210840.000	4.000	667.888	667.875	0.013	1.653	
						2.067
Closing Bench Mark....	BM1005					
Bench Mark Elevation..	667.474m					
Field Value.....	667.474m					
Misclosure.....	0.000m					

Layer Tolerance Details

H90 =15mm

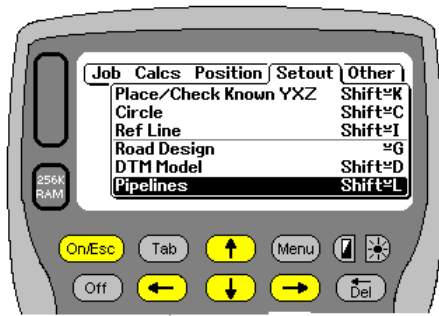
Hmax=20mm

Total Number of Readings Taken 32
Percentage Within H90 Tolerance 65.63%

Readings Between H90 and Hmax ^ 7
Percentage between H90 and Hmax 21.88%

Readings Above Hmax ^^^ 4
Percentage Readings Above Hmax 12.50%

Pipe Line / String Line Setting Out

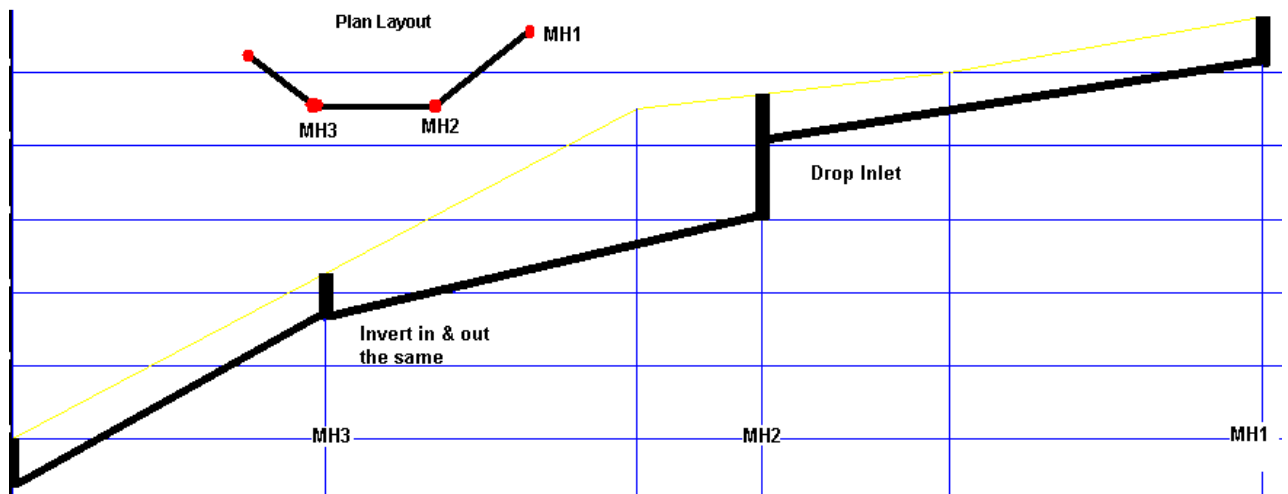


LOGGER allows the user to input up to 250 pipelines or strings and each one of these elements can have up to 400 nodes defined. That equates to 100,000 coordinate values. The user can use these strings to define pipelines, culverts, fence lines, or any continuous feature you care to want to define.

The typical definition of a string of data would be as follows:-

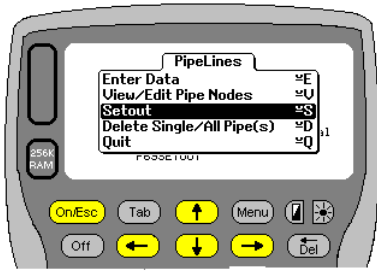
Sewer Line 1
MH1 -18120.494 3272085.040 23.234 23.000
 MH2 -17799.375 3271130.090 22.500 22.500

- Sewer Line 1** represents the string name and can be a maximum of 20 alphanumeric characters.
- MH1** is the first node name and can be a maximum of 12 alphanumeric characters
- 18120.494** the Y or E value
- 3272085.040** the X or N value
- 23.234** the invert level in
- 23.0** the invert level out. If it is not a drop inlet then they will be the same.



A typical Pipe Network layout might look like the image below. This particular network comprises 29 different lines and a total of 172 manholes. This data can be entered manually or imported automatically. The import option is covered under the section "Import Data – Strings" Importing this set of data took just under 1 minute.





On the main setout menu select **Pipelines**. You will then be presented with the following Options.

1. Enter Data
2. View/Edit Pipe Nodes
3. Setout
4. Delete Pipe
5. Quit

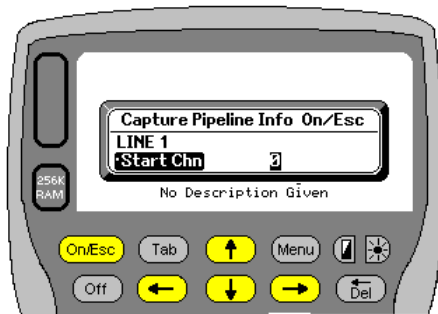
Each of these will now be dealt with.

Enter Data



This option is used for the manual input of information. Remember the data can also be imported automatically. See the section "Import Data – Strings". Each Pipeline/String can have a unique description up to 20 characters in length. Type in the description for this particular Pipeline/String and then press Enter. If no name is enter and you just press Enter, then **LOGGER** will give a default name of "None"

If you wish to bypass and escape press On/Esc to return to the previous menu.



LOGGER displays the pipeline name and prompts for a starting chainage.

Type in the starting chainage and press Enter.

Negative starting values are allowed as well.

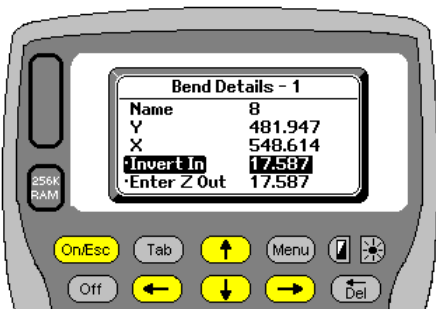
Pressing On/Esc will return to the previous menu.



Now you need to enter the details for each node or bend along the line. **LOGGER** displays the current node number. Remember you can have up to 400 nodes per line.

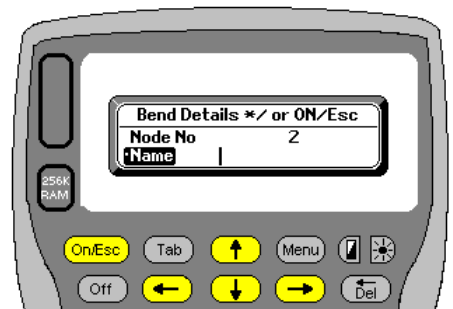
Type in the node name. The name+ can be up to 12 alphanumeric characters.

Points can be selected from the coordinate list if it has been loaded, or from the coordinate list of any other currently stored job. If the name field is blank press Enter to get a drop down list of points to choose from. Press * to swop to another job.



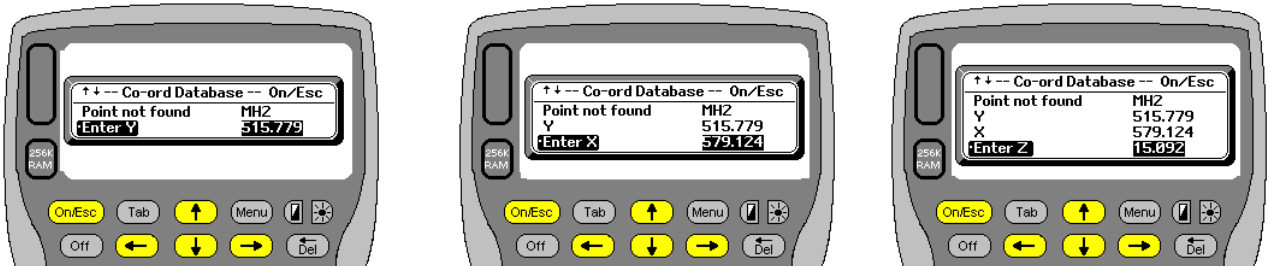
If a known point is used **LOGGER** will then display the current values and stop and allow the user to edit the invert levels.

If the Z out value needs changing arrow down and enter the required value. Press Enter once you are happy. **LOGGER** will keep prompting for the next node



or bend points details. Once you have completed the input for the line press On/Esc. **LOGGER** will return to the main PipeLines menu as shown at the top of the previous page.

If the point name you enter is not found in the current coordinate file **LOGGER** will prompt you to enter the YXZ (ENZ). Then as above you will have the option to enter the Z Out value if applicable.

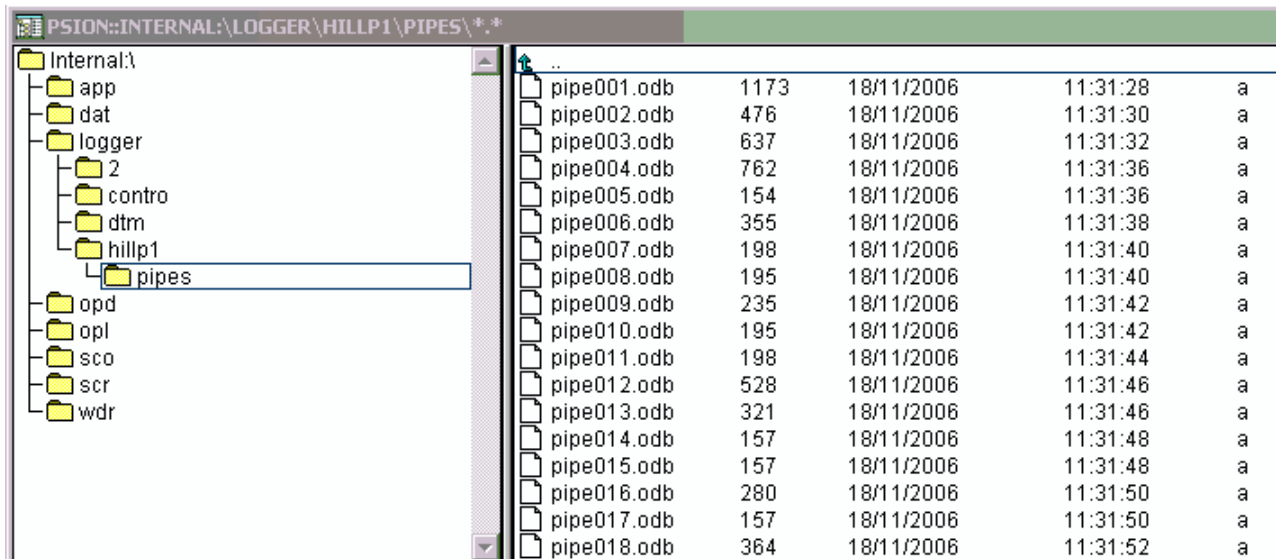


View/Edit Pipe Nodes

Once your data has been loaded, either manually or automatically **LOGGER** gives you the option to view and or edit the information. **LOGGER** files all you pipeline info away neatly and logically so that it is easy to maintain, backup and access. Each job that has pipelines defined will have a separate folder called Pipes. In that folder will be stored each pipelines info. The files are numbered automatically by **LOGGER** and will be called **Pipe001.odb** etc. Below is a typical example of what the filing structure will look like on your Psion.

In this example we have a master **LOGGER** folder with a job called **hillp1**. Within **hillp1** we have a network of pipes stored in a sub-folder **pipes**. Each Pipe or string is numbered **pipe001.odb** all the way through to possibly **pipe200.odb**.

It is clear to see that this filing structure makes it simple to maintain your data.



Now when we want to View/Edit the data **LOGGER** will scan the pipes folder of the current job and build up a list of pipes currently available. This may take a few seconds so please be patient. The reason it has been done like this is because occasions have arisen where users have got into the pipes folder and manually deleted pipe files, either intentionally or not. Being able to quickly rebuild the list thus allows **LOGGER** to give the user access to all the pipes presently stored. While **LOGGER** builds the index list you will see the following screen



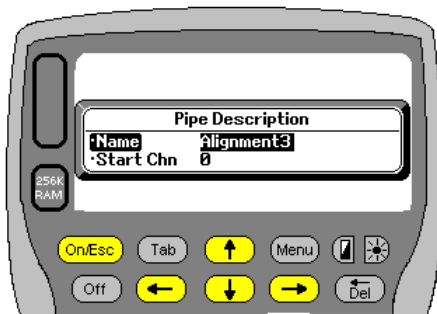
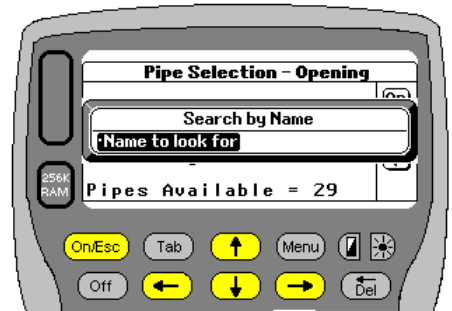
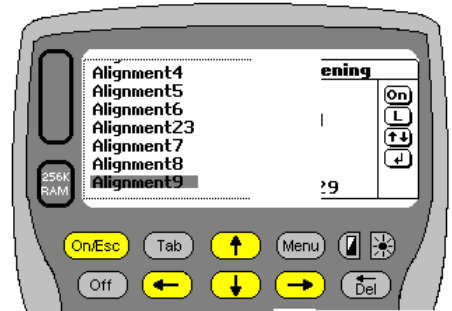
LOGGER will start counting down from 200 and as it locates files will build up a list and inform the user. The image on the left shows that **LOGGER** has so far located 14 alignments and the last one it found was called Alignment13.



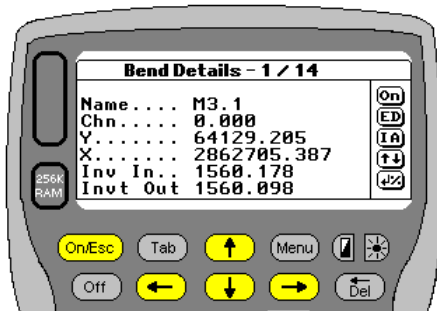
Once the index has been completed **LOGGER** will display the data pack and Job being used. It will set itself ready to the display info for the first located Pipeline and show the name of the located pipeline. In this case it's called **Alignment1**.

LOGGER also tells the user how many pipes have been located in the pipes folder. In this case 29

1. Pressing On/Esc returns to the main pipes menu.
2. Press L to view a names list and scroll and select. If you wish to improve the search, press L again and you can type in the start of the name and **LOGGER** will search the list and display matches. So if you have a lot of pipes and it is possible to name them uniquely then it can aid in searching and locating your file faster.
3. Use the up and down arrows to scroll through the list item by item
4. Press **Enter** to select the current pipeline and view its related info.



Once you have selected your file then **LOGGER** will firstly display the Pipeline/String Name and starting chainage. Either of these can be changed at this stage if you so wish. Just up/down arrow to the item to alter, change it accordingly, and press Enter.



LOGGER

will then run through all the nodes defining the line and present them either for viewing or editing. If you just wish to view then use the keys to scroll through the list or press **Enter**.

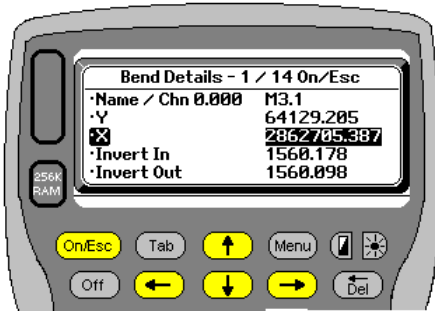
At the top of the screen **LOGGER** displays the current node number you are viewing as well as the total number of nodes on the line. In this case we are viewing node **1** and there are a total of **14** making up the line. Next you will see the nodes name (**M3.1**) followed by its chainage (**0.000**) as well as the **Y&X** or (**E&N**) of the point. Finally you will see the Invert levels

(**Z**) in and out. At this stage there are various hotkey options available.

1. Press On/Esc to exit to the main menu.
2. Press **E** if you wish to **EDIT** the data.
3. Press **D** if you wish to **DELETE** the node.
4. Press **I** if you wish to **INSERT** a node.
5. Press **A** if you wish to **ADD** a node.
6. Use the arrow keys to scroll up or down the list.
7. Use the arrow keys to scroll the start or end of the file.
8. Press **V** to **View** or % (Shift+5) or : (shift+*) to see the grades and slope info on the line.
9. Press **P** to **PLOT** the line
10. Press **ENTER** to scroll to the next node.

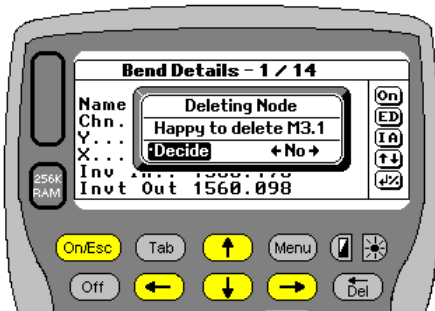
Now to deal with each option in more detail.

On/Esc. Pressing this key will return to the main Pipeline menu.



E Editing

Pressing E with display the following screen and allow the user to alter any of the fields displayed. It clearly shows again which node number is to be edited and the total number of nodes on the line (1/14). If you do not wish to edit or change simply press **On/Esc** and **LOGGER** will return to the previous screen. If you wish to alter something use the **↑ ↓** arrow keys to activate the field. Enter your new data. If more than one field needs to be changed do so before pressing Enter. Once completed press Enter to record the changes.

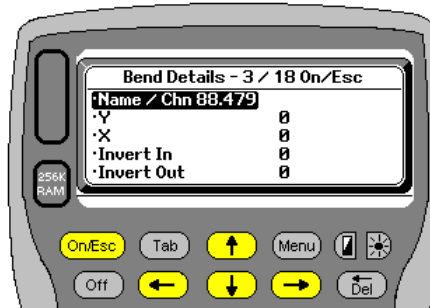
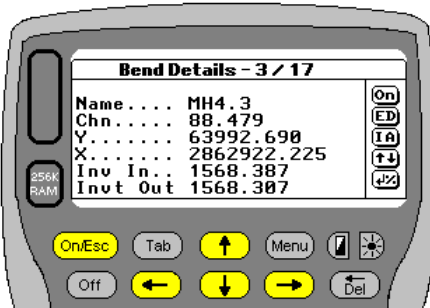


D Delete a Node

To delete the current displayed node press **D**. **LOGGER** will stop and display the node name and request confirmation that the node must be deleted. By default the answer is set to No. Press **Y** or use the side arrow keys to change the response to **Yes** and then **Enter**. If the node is deleted **LOGGER** will return to the start of line and the menu on the previous page that says **Pipe Description**. This is because the chainages will change and the line will need to be recomputed. If you do not want to delete you can press **Enter** when it says **No** or press **On/Esc**. **LOGGER** will return to the previous

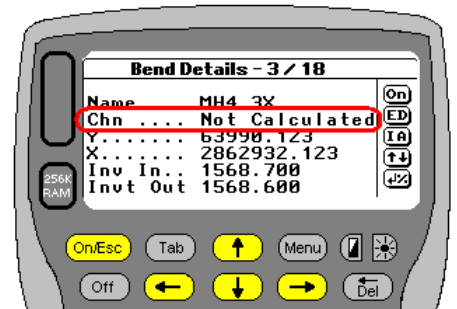
menu.

I Insert a Node



LOGGER allows the user to insert a node as well. This is extremely useful especially if changes are made and you are in the field. The process is simple and illustrated by the 2 screens above. While viewing the node data (left) you can press **I** and **insert** a new node (right). You will notice on the left that **LOGGER** is currently displaying node 3 of 17. Inserting a node will move all the nodes down the list. In this instance node 3 is going to become node 4. Notice too that the counter has been incremented from **3/17** to **3/18**.

LOGGER prompts for a Node name and shows the current Chainage of the new node (**88.479**). Arrow down and enter the new YX and Z values (ENZ's) Once the new node has been inserted **LOGGER** displays the new values in the node viewing screen but you will notice that the chainage is **Not Calculated**. To get the chainages right you will need to scroll to the start of the line and come back down through the nodes.

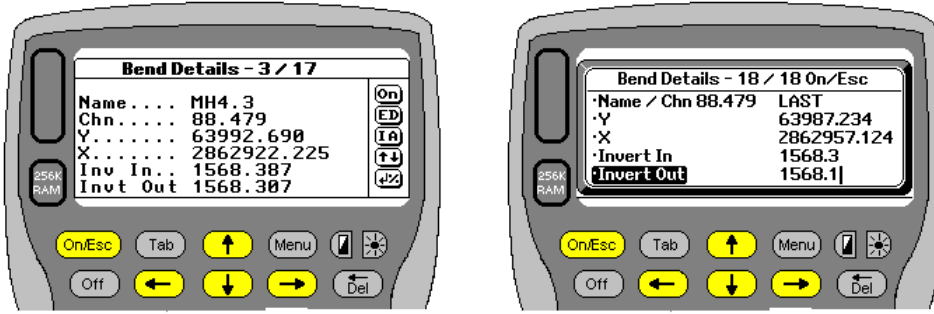


The quickest way to get the chainages recalculated is to:-

1. Use the left arrow (takes you to the first node)
2. Then press up arrow (takes you to the start of the line – its name)
3. Press Enter to select the Pipe Description
4. Scroll through the nodes until you reach the one you want.

A Add a new Node

Basically this is the same as inserting a new node. The only difference is that the node gets added to the end of the list. You will notice that the node counter has changed to 18/18 as the new node is added to the list. Again enter your data the same as you would for inserting, as above. **LOGGER** will display the input and again the chainage will not be calculated until the line is re-run.



The quickest way to get the chainages recalculated is to:-

1. Use the left arrow (takes you to the first node)
2. Then press up arrow (takes you to the start of the line – its name)
3. Press Enter to select the Pipe Description
4. Scroll through the nodes until you reach the one you want.

Node to Node Info

LOGGER can also provide the user with information relating to the grades and slopes between the nodes. The information displayed is from the current node to the next node. To retrieve this info press either:-

1. % (Shift+5)
2. : (Shift+*)
3. Press V to View



P Plot

Logger also gives the user a basic layout plot of the line and will display where the current node is, in relation to the line. To achieve this press P and **LOGGER** will open a small graphic window on the right, draw the line and indicate where the current node is. **LOGGER** will only plot a line if there are 4 or more nodes on the line.

The illustration bellows shows the user currently viewing node 6 of 17's data. Pressing P indicates the position of 6 along the line. This is just meant to be an aid to the user to hopefully pick up any glaring errors.

Once you are finished looking at the plot press Enter to review the coordinates.

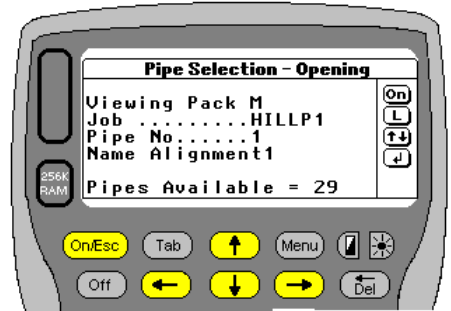
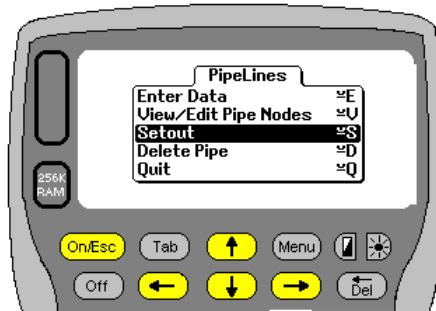


PipeLine / Strings Setting out

Setting out Pipelines or Strings uses basically the same routine as setting out Reference Lines. **LOGGER** is aware that the data to be set out has come from the PipeLine routine so there are additional checks, and other options available.

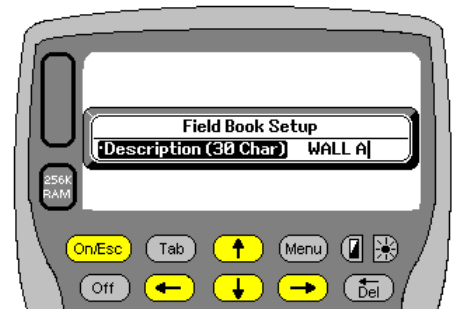
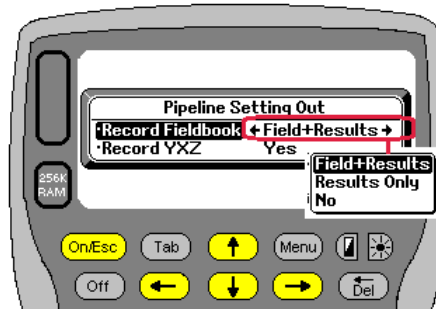
Before any setting out can take place the user first needs to select the Line that is to be used.

Use the Setout option and then select the line that you wish to use for setting out purposes



You have 2 option formats to store your information in the fieldbook. Select the option you would like.

You can use the left/right arrows to scroll through the options or press TAB to see the dropdown menu and select. Once selected **LOGGER** will open the field book with the appropriate headings and also the String name as a reference. Example of the initial header info is displayed below.



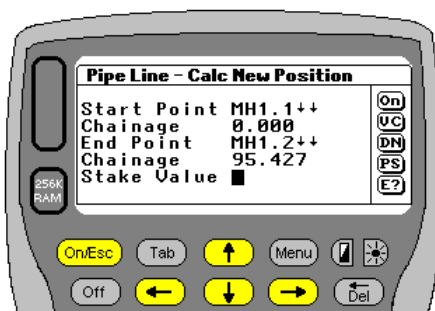
```
Job Description... WALL A
PipeLine / String data -- Alignment1
```

The job being worked on is called **WALL A** and the string being used is called **Alignment1**. Additional headers are also printed but space does not allow them to be displayed at this stage.

You also have the option to **"Record YXZ"**. If YES is selected then **LOGGER** will also store just the placed data info as comment YZX/ENZ in a separate file so that it can easily be downloaded and loaded into software for plotting, without having to extract it from the fieldbook. This saves a lot of time. The YXZ data is stored in a file ending in RT (Reduced Tache) and downloads with a YXZ extension. Sample is shown below

```
//Source LOGGER Software for Psion WorkAbout issued 22/01/2013
//Job..... GQ
//Date..... Fri 01 Feb 2013 10:48:34
//
Target Ht Name          Y Co-Ord      X Co-Ord      Z Co-Ord
-----
1.000 Refline D        -68424.872    2651571.900    1075.355
2.000 Refline D        -68424.612    2651572.873    1074.181
```

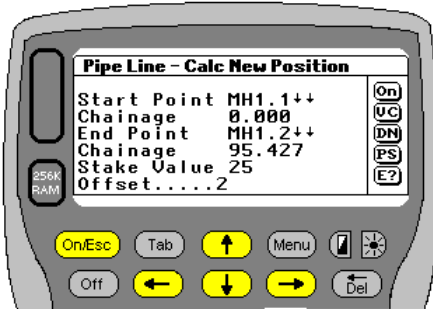
If you select **NO** and elect not to store then you will obviously not be prompted for any info and the following screen will appear



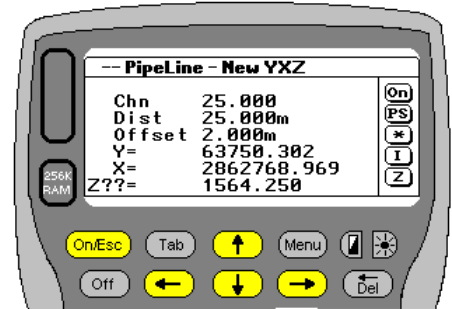
Initially **LOGGER** will display the first 2 nodes on the line. In this example we have MH1.1 and MH1.2. The distance between them is also displayed (95.427m). The user is then requested to enter the stake value that he would like to set out. In this instance any value between 0 and 95.427 would be logical. Also shown on this screen are ++. This indicates that the points have different inlet and outlet Z values. This warning is put there as an aid for the user so that should double profile poles be required the user is made aware of it.

If the levels did not vary then you would just see MH1.1 for example and not MH1.1 ↑↑

Note:- At this stage there are various hotkeys available. A more in depth overview of them is given on the next page. Remember you can press ? to get a list of the hotkeys and their functions



For now let's assume you want to set out a chainage and offset between the initial 2 nodes. Once you have entered the Stake Value you will be prompted for the offset. In this case stake value 25 and offset 2. Offsets to the left will be negative (i.e. -2) and to the right positive (i.e. 2). No need to press +2 for positive offsets



LOGGER then computes the required coordinate values and displays the following:-

1. The Chn to be setout **(25.000)**
2. The distance from the start. In this case the start.
3. The offset. **(2.000)**
4. The Y & X (N & E) values
5. The Z value. If the point is offset then the Z reflects as Z??. The Z is calculated along the line between the terminals.
6. To set out or place the point press P or Enter

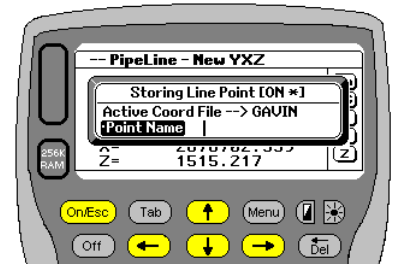
There are various hotkeys available on the right again and they allow you to do the following.

1. Press **On/Esc** to return to the previous menu where you are prompted for Stake Value and Offset

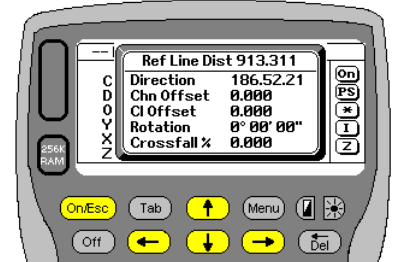


2. Press **P** or **Enter** to proceed and set out the point. **LOGGER** will display Your Target Height, Distance to the point and direction to be observed. Again various hotkeys are available.

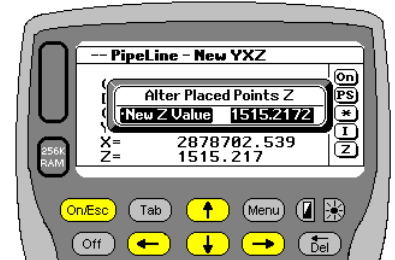
3. Press **S** to **Store** the point. **LOGGER** will display the currently active co-ordinate file name and allow you to enter a name for the stored point to be called. At this stage you can use * to change jobs and store the co-ordinate in another job.
4. Pressing * will also allow you to swap jobs before actually selecting to go and store



5. Press **I** to get additional Info. **LOGGER** will display the join distance between the two terminals **(913.311)** as well as the direction **(186.52.21)**. The other info displayed is really not applicable at this stage. Because the setout information has actually been sent to the REFERENCE LINE utility this information will appear, but can be ignored.



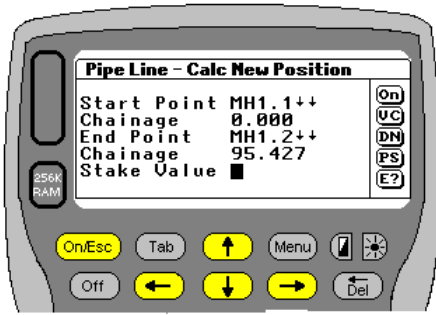
6. Press **Z** to alter the Z value to be set out. **LOGGER** gives the user a chance to alter the Z that has been calculated. Remember **LOGGER** will have calculated the correct Z at the chainage requested, based



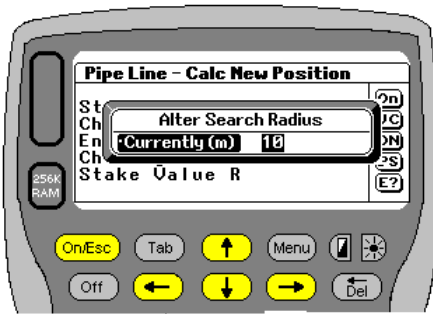
on the grade of the line between to terminals. Altering the Z at this stage is up to you and you need to understand why you would want to do it.

Again this screen is a general display that gets used when setting out co-ordinates from say your co-ordinate file. It is possible that you have uploaded data previously and now when it comes to setting out the drawings have changed and new Z's been given. It is in such instances that one would normally change the Z.

Let's now consider the **Additional hotkey options** that are available on the initial setout screen where the stake value is entered.



1. R Will allow you to enter an new search radius
2. V will let you view the start and end points values
3. C will calculate a know points Chn and offset relative to the terminals
4. D will determine the Chn & offset of a polared point.
5. N will call up the next leg of the line
6. P will recall the previous leg of the line
7. S will setout the start of the segment
8. E will setout the end of the segment
9. O allows the user to change offsets, rotation and slope. Probably not applicable to Pipelines.
10. G will go to a specific node no.
11. B will allow you to set out a batter



Hotkey R

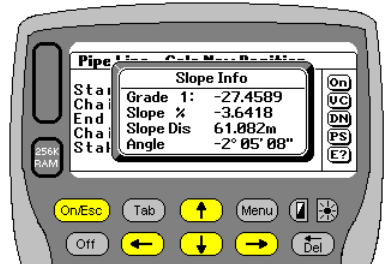
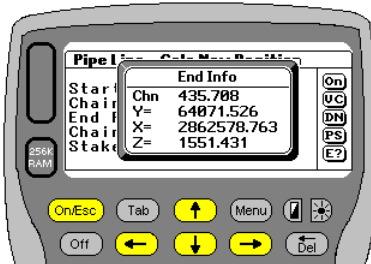
Instead of entering a numeric stake value the above hotkey letters can be entered and the following results will be displayed. For example when prompted for the Stake Value press R and then press Enter.

You can now alter the search radius. The current value will be shown and can be changed. See the section further down for the effect of the search radius.

This is a global variable and the same value is used for road setting out and searching when placing batters. Typically it is set to a default value of 50 when setting up a job.

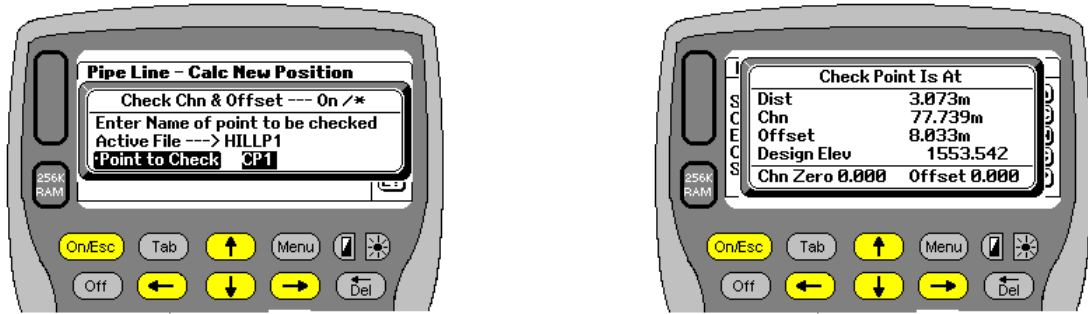
Hotkey V

Pressing V will display the start info. This consists of the starting chainage for the current leg as well as the distance to the end of the current leg. Also shown will be the YXZ (ENZ) of the current starting node of the leg. Once you press **ENTER** you will get the second screen that shows the terminal chainage as well as the terminal's YXZ (ENZ) values. Again press **ENTER** and the final screen will display the slope info as a 1: grade as well as % grade. **LOGGER** also gives you the slope distance in meters and slope angle in degrees minutes and seconds. Press **ENTER** again to return to the menu prompting for Stake Value.

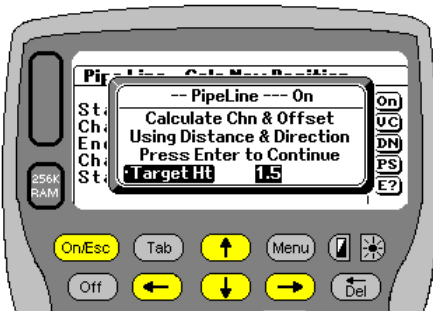
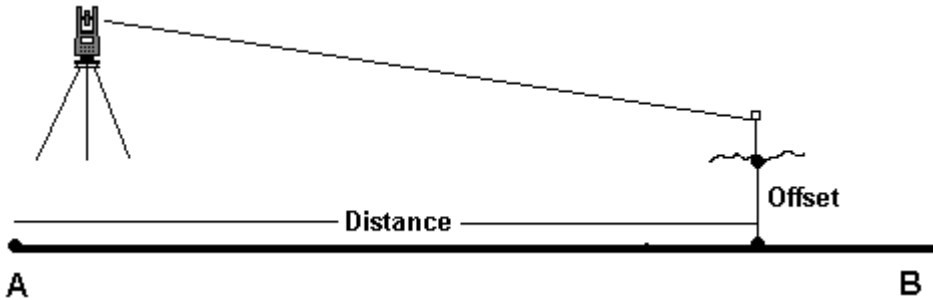


Hotkey C

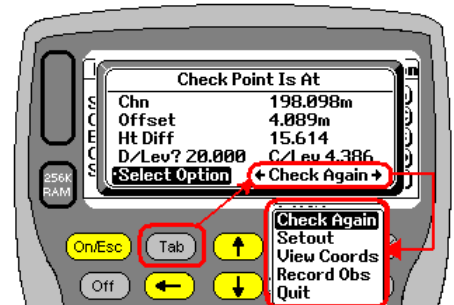
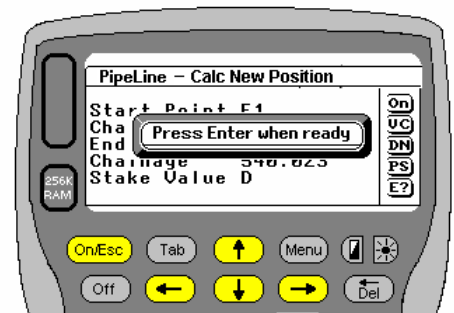
Pressing **C** will allow the user to calculate or check the position of a known point relative to the current line being set out. **LOGGER** will prompt for the point's name. Remember you can swop coordinate files or if the point is not found you will be prompted for its values. **LOGGER** will then compute the distance along the line (from the terminal) and the actual chainage as well as the offset and elevation. Remember you could be between nodes 3 and 4 for example, so the distance and chainage will not be the same. The elevation is calculated along the centre line between the 2 terminals. This option is often useful in the office when you want to know at what chainage and offset a specific point is at. Once the info is displayed press **Enter** or **On/ESC** to return to the setout menu. This option only checks between the current 2 nodes. It does not check along the whole line.



Hotkey D



Entering **D** for the Stake value will allow you to **Determine** the chainage, offset and centerline Z value of the point in field. The screen will describe the action being taken and give you the chance to alter your target height. Once you press **Enter** **LOGGER** will display the following prompt. "Press Enter when ready"

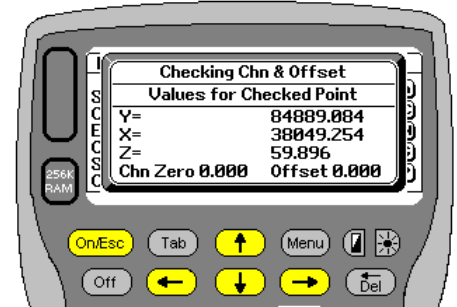


LOGGER

Pipe Lines/ Strings

If you are working in Electronic mode then **LOGGER** will trigger your instrument and return the distance and direction. If in manual mode you will have to enter the data required as shown on the left. A polar will be calculated and the current chainage and offset displayed. **LOGGER** will display the Ht Diff (15.614) between the D/Lev (design Level 20.000) and Calculated (4.386) levels. At this stage there are various options available again. Press TAB to view a drop down list or use the left/right arrows to scroll between them.

1. **Check Again.** Will just repeat the above exercise.
2. **Setout.** Allows you to set the calculated point out.
3. **View Coords** Will display the YXZ (ENZ) of the checked point as shown
In the image on the right
4. **Record** This will write field data and results to the fieldbook
5. **Quit** Exits the process



The printout below really needs to be printed landscape, and has been condensed here.

Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments	Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S
Refline D	338.2914	74.3726	9.537	9.196	0.500	Point Determined	88118.259	2877971.659	1536.208	1536.319	0.111	57.970m 0.244m

The above line has been broken in two below to give a better indication of what is in the field book.

PipeLine / String data -- W12DN

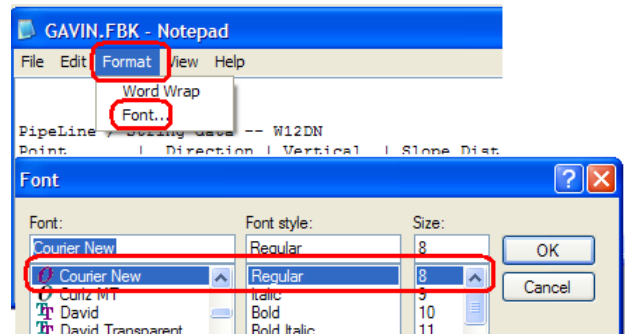
Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments
Refline D	338.2914	74.3726	9.537	9.196	0.500	Point Determined

Starting on the left.. **LOGGER** automatically writes in Refline D, indicating that the DETERMINE option within the Refline line function was used. Next comes the observed **direction, Vertical Angle, slope distance and reduced distance, target height and Comment**. Again the comment is automatically inserted.

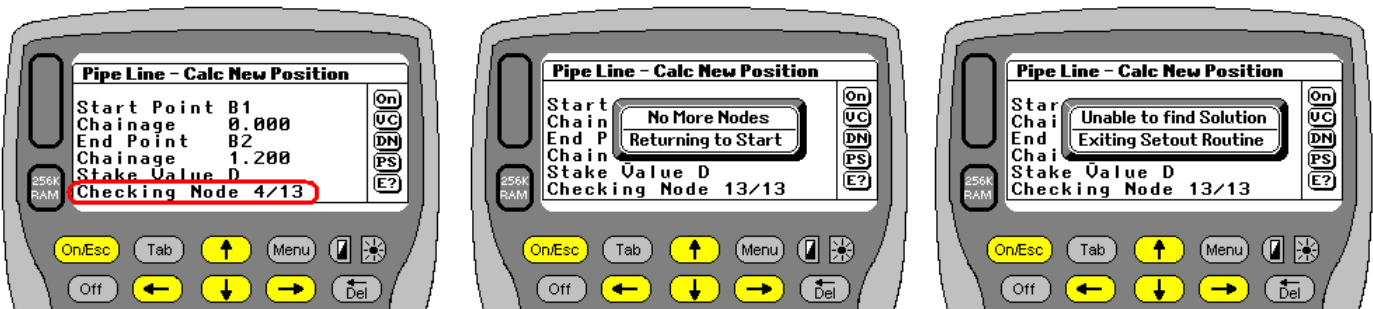
Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S
88118.259	2877971.659	1536.208	1536.319	0.111	57.970m 0.244m

Next we have the **YXZ (ENZ)** coordinate values of the placed/checked position. **Z (D)** refers to the design Z value required. **Dz** is the height difference between Design and placed/checked point. Lastly **LOGGER** displays the **Chn and Offset** of the placed/checked point.

The results in the fieldbook are best viewed in Notepad. Use Courier New Font and size 8. Make sure Word Wrap is also unchecked (off)



All the data is neatly formatted so it can be read into a spreadsheet or imported into 3rd party software for plotting purposes



LOGGER

Pipe Lines/ Strings

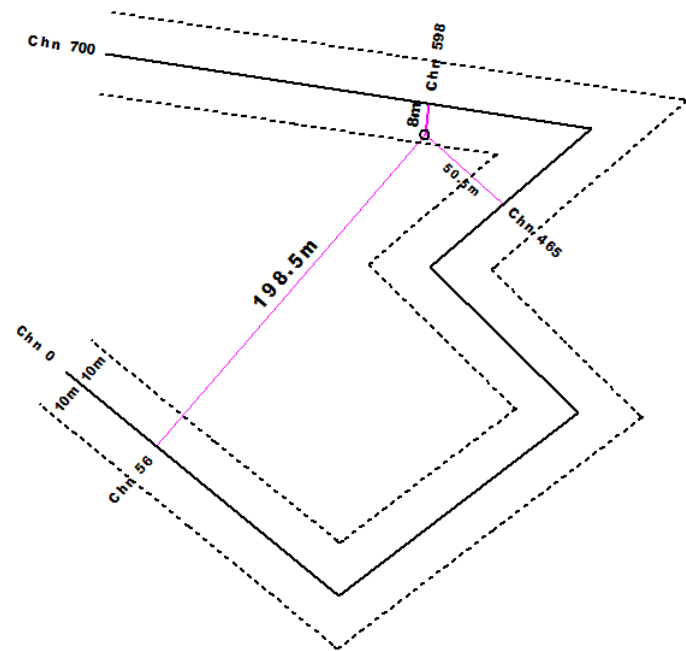
When doing pipelines or strings **LOGGER** will automatically hunt along the string, checking between each set of nodes to locate you. As it does so a beep will be heard as the next leg is loaded and checked. A progress report is displayed on the screen showing which node it is at, and how many there are. In this example it's at node 4 of 13.

Depending on the definition of the line it is possible to get various solutions. If it is more or less straight and heading in one direction there should only be one solution. If the line bends then there is a possibility there could be a few solutions. To better refine the search **LOGGER** checks the offset once a solution is found. If the offset lies within the search Radius or criteria set by the user then the result will be displayed.

In the example on the left the dotted line defines a 10m corridor either side of the center line. You can see that there are 3 possible solutions as well. The first is at Chn56 but the offset is 198.5m. No good.

LOGGER loads the 2^d and 3rd legs. Again a solution is found at Chn 465 but the offset is 50.5m. No good.

LOGGER loads the 5th and final leg and finally at Chn 598 on the last leg the shot falls 8m from CL so is within tolerance.



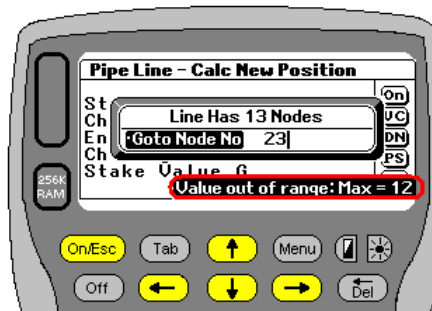
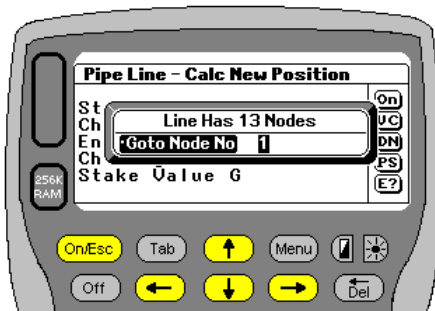
If a solution cannot be found then the middle screen above will appear. Typically this could happen for 2 reasons:

1. The shot does not have a solution
2. You may be on leg 5 of the job (as shown right) and then decide to take a shot that will locate you on leg 2.

What **LOGGER** will do is display the middle message. You press Enter to continue. **LOGGER** will then go back to the start of the run and search again. If it does not find a solution by the time it gets to the end the 2nd time. Then the very right hand message above will appear. **LOGGER** has been unable to locate a solution and will exit back to the main Setout Menu.

Remember that the search tolerance can be set or adjusted at any stage by pressing **R** when prompted for the stake Value

Hotkey G

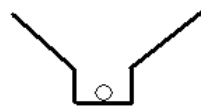
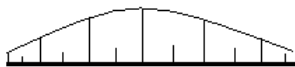
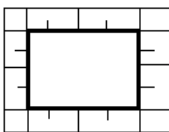


This is a pretty straight forward option. Your string may consist of 100 nodes and instead of pressing **N** 20 times to get to node 20, you can simply press **G** and you will be

prompted for the node number required. **LOGGER** shows the maximum number of nodes (13) here. You will be able to enter any number up to one less than the maximum number of nodes in the string being used. In example above user entered 23 and prompt at the bottom of the screen shows 12 as maximum.

Hotkey B

Batters can also be setout from a String / Pipe Line. Examples of where this can be applied are:-



- Setting out of platforms
- Road widenings where you are just given a single line to widen from
- Pipeline excavations. Often deep trenches need to be battered back first.

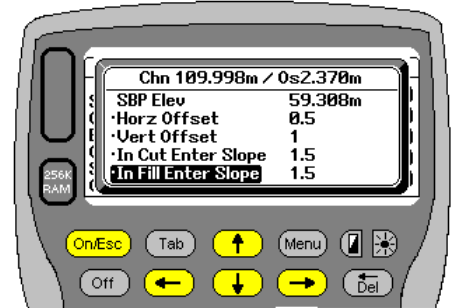
LOGGER

Pipe Lines/ Strings

All of the above can be done using a conventional road setup but the input is a little more tedious and only one road per job can be defined. Using Strings you can have up to 200 definitions per job and setup is simple.

Setting out batters works in exactly the same way as Determine. Instead of pressing D(etermine) use B(atter). **LOGGER** will hunt along the route and locate the leg you are on. The same search criteria as above are used. Once **LOGGER** has located your position you will be presented with the following screen.

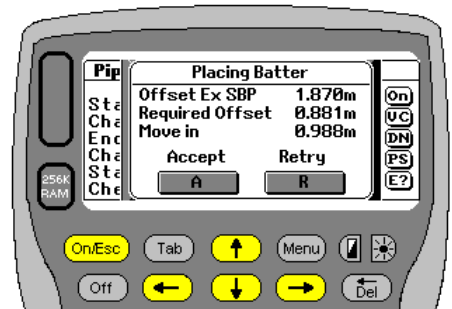
LOGGER will display the current chainage(109.998) and Offset (2.370). It will show you the SBP (Shoulder Break Point) level (59.308). This will be the center line level of the string at Chn 109.998. You can now enter a Horizontal (0.5m) and Vertical (1m) Offset. So in the case of a Pipe as shown above you could offset to the edge of the trench and move up to where you want the new SBP to be. **LOGGER** applies the Vertical Offset to the elevation. (59.308). Enter the slopes required if you are in Cut or Fill. **LOGGER** then computes where the batter board should be placed.



Initially your first attempt maybe incorrect.

- **LOGGER** will display your current Offset from the SBP (1.870m)
- **LOGGER** displays the required offset (0.881m).
- **LOGGER** displays how much to move in or out (0.908m)

In this instance you would **RETRY** and move in 0.908m. Press **R**. Take another reading until your movement in or out is almost zero



Here we see that you only need to move 0.012m to reach the batter. Effectively you are in the right place. Once you press **A**(ccept) **LOGGER** will display

- Final Chn (109.998)
- Slope Dist (1.06m)
- Horz Offset used 0.5m
- Vert Offset used 1.0m

Press enter to continue. A beep will be heard as the results get stored into your fieldbook.



Below is a typical fieldbook printout. Normally it would have to be printed landscape as it's too wide for portrait. They have been split below for easy of reading and explanation.

Job Description... Road Widening
PipeLine / String data -- Bus Bay 1

Point	Direction	Vertical	Slope Dist	Red Dist	HO	Comments
Batter	359.5912	90.0123	0.014	0.014	0.123	Cut SD=1.06m / 1:1.50

The first section above shows the basic field data. Under Point **LOGGER** just shows you were doing a Batter. Under Comments **LOGGER** shows

- The Batter was in Cut.
- The Sloped Distance (SD) is 1.06m
- The Batter slope is 1:1.50

Y (P)	X (P)	Z (P)	Z (D)	Dz	Required Chn & O/S
88124.753	2877988.466	1535.028	1536.646	0.50/1.00	39.953m 0.219m

The second section gives

- Coordinates of the Batter position YXZ (ENZ)
- Z (D) is design level at centre Line (Vertical offset has not been applied)
- Dz shows the Horizontal and Vertical Offsets used (0.50m and 1.00m) displayed to 2 decimals

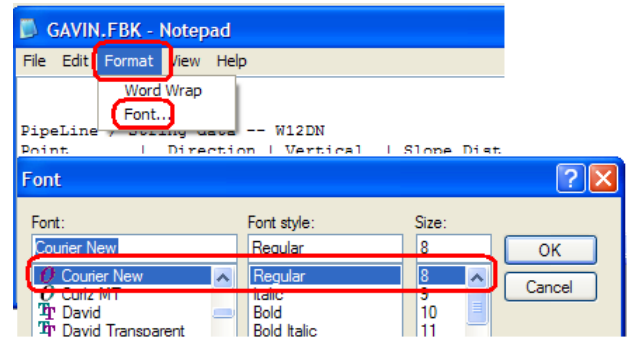
LOGGER

Pipe Lines/ Strings

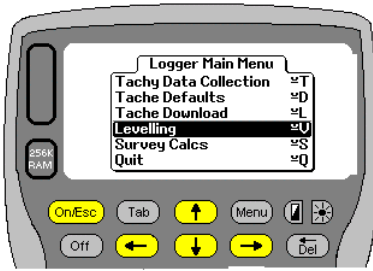
- The chainage the batter was placed at
- The Offset the batter was placed at. That offset is measured from centre line

The results in the fieldbook are best viewed in Notepad. Use Courier New Font and size 8. Make sure Word Wrap is also unchecked (off)

All the data is neatly formatted so it can be read into a spreadsheet or imported into 3rd party software for plotting purposes



Levelling



LOGGER also contains a data capture routine for electronic levels. Presently the Leica NA2000 and NA3000 series have been interfaced.

Getting Started

Follow the same steps as found on page 3. That should bring you to the screen detailed below

Assuming that an SSD was found onto which data can be stored then this is the next screen you will see. This is the main screen from which **LOGGER** operates.

From here you will be able to do the following:-

- Collect Tache data
- Change your tache default settings
- Download tache observations
- Enter the Levelling data capture routine
- Start the survey calcs
- Finally quit the program and return to the main menu.

To start the **Levelling** highlight the relevant menu. Use your up and down arrows to get there or alternatively press **V** and then **Enter**.

For immediate execution press the Psion Key +V together.

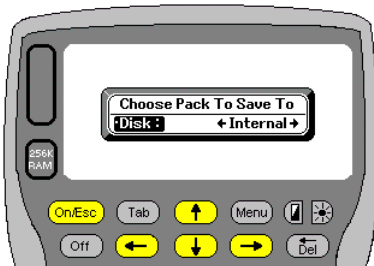
The Psion key is the one on the bottom left hand side of the keypad and has an upside down C and underscore on it.



This will be the next screen you see. From here you can choose to

- Start capturing data
- Download captured data
- Quit and return to the main **LOGGER** menu

To start the capture routine press **Enter** while capture is highlighted. If not highlighted use the arrow keys to get there. Alternatively press **C** and the Enter



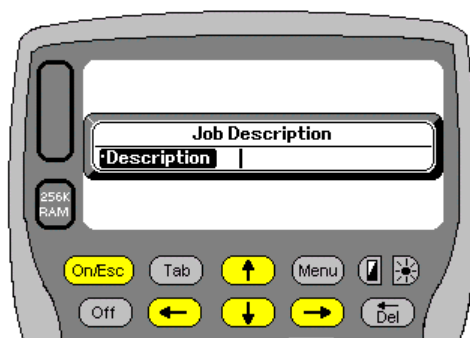
Once you have selected **Capture** then this will be your next choice. Here you can decide where to store your data. Again use the arrow keys to change devices.

Remember that if you choose to store on the internal, then no backup file will be created for you.

Once you have chosen your storage device, **LOGGER** requires a job name. If there are no leveling jobs on the selected device then you will see the screen on the left. If there are existing jobs on the pack then a job name will probably be displayed. At this stage **LOGGER** cannot add to an existing leveling job and a new one must be started each time. If there are existing jobs press **Tab** to view them or the left/right arrows to scroll through. To start a new job scroll down to **New Job** or press **N**. If there are no other jobs starting with the letter N then new Job will appear on the screen. Press **Enter** to continue.



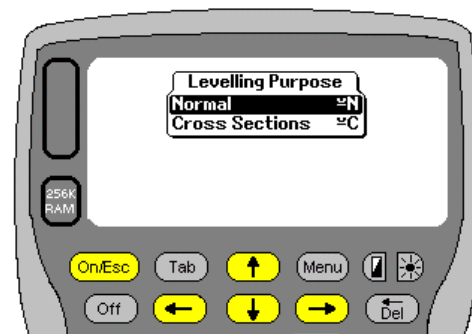
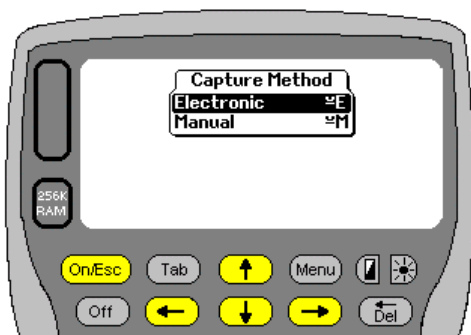
The maximum length for the job name can be 5 characters as **LOGGER** adds LEV to the final name. Names can start with numerics unlike on the previous Psion Organisers. If you type in a name of an existing file or choose an existing file name, you will be warned and asked to choose another name.



Job Description

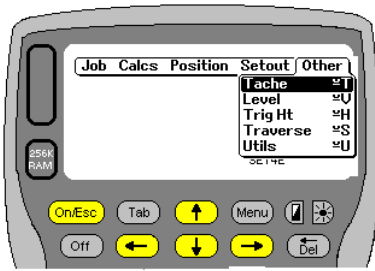
Next thing is to enter a job description. This can be up to 30 characters long. If no name is given and **Enter** is pressed, then **LOGGER** will create its own name of "No Description Given".

Once the description has been entered **LOGGER** needs to know whether data is going to be captured **electronically** or **manually**. Once you have decided there are two other options. The normal method is the traditional B/S I/S F/S with provision for comments as you go. Cross section has been designed specifically for certain construction works where levels are taken at set predefined offsets when checking layerworks. The setup of this is dealt with later. For now we will go the traditional route. The two screens below relate.



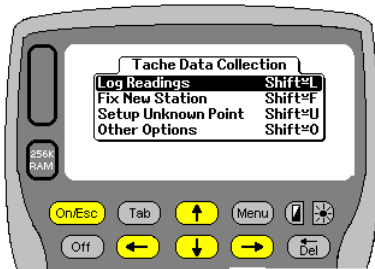
Tache Surveys

Job Selection and Station Setup



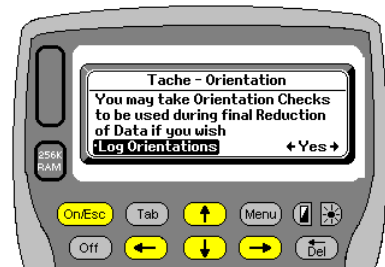
To start the tache data collection process, select **Other** off the main menu. If a job has not yet been created or opened you will be prompted to do so before the data collection process can continue.

Once a job has been created or opened **LOGGER** will check to see if a tache file for that job exists or not. If no previous tache file is found, one will be created on the selected storage device. If one is found then the screen on the right will appear. If you are happy to add to the file press Enter. If you do not want to use the file press **N**, or use the left and right arrows to change the prompt, and then press Enter. If you select to not use the file, **LOGGER** will return to the menu above



Whether or not you are adding to an existing file or starting from scratch you now have the option of fixing yourself or logging data. It is possible that you have already fixed yourself while doing some other operation and have now changed to tache data logging. In that case you can select to start logging immediately. If not Select the **Fix New Station** option. **LOGGER** will take you to the normal fixing menu. If you do not wish to fix yourself you can select **Setup Unknown Point**. This assumes that you will have the co-ordinates for the point when you do get back to the office. Once you have selected your option, you will be taken to the following screen.

This option allows the user to log orientation readings. These readings will be used during the reduction process on the PC back in the office. If you have already set up and taken readings to orient, while fixing yourself, these readings will not be recorded in the tache file. If you elect not to take orientation checks at this stage, you will have no way of checking you tache reductions back in the office. It is advisable to take readings at this stage. It cannot do any harm and is an added check for you when back in the office. The difference is clearly demonstrated in the 2 example field book files that would be downloaded.



This set of data **does** have orientation.

//Source LOGGER Software for Psion WorkAbout issued 05/07/1998

//Job..... CANAL TACHE

//Date..... Mon 03 Aug 1998 08:15:05

//

LH2			Tue 28 Jul 1998 05:44	000.0000	0000.000	01.554	Station Info
TR322	4	066.1045	000.0000	0000.000	00.000		Orientation
TOW10	4	305.2555	000.0000	0000.000	00.000		Orientation
000004	T-CL 5	073.2345	106.1150	0220.480	01.900		Observation
000005	T-CL 5	073.3750	105.4315	0228.270	01.900		
000006	T-CL 5	074.0420	104.2335	0236.220	05.000		
000007	SB 5	075.1315	105.0300	0235.560	01.900		

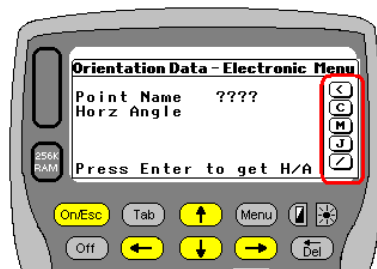
This is the same set of data but does **not** have any orientation logged.

```
//Source LOGGER Software for Psion WorkAbout issued 05/07/2008
//Job..... CANAL TACHE
//Date..... Mon 03 Aug 1998 08:15:05
//
LH2      2      Tue 28 Jul 1998 05:44    000.0000    0000.000    01.554  Station Info
000002 T-CL  5      073.2345    106.1150    0220.480    01.900    Observation
000003 T-CL  5      073.3750    105.4315    0228.270    01.900
000004 T-CL  5      074.0420    104.2335    0236.220    05.000
000005 SB   5      075.1315    105.0300    0235.560    01.900
```

The next thing to do is orient. Depending on whether you are booking manually or using a total station, **LOGGER** will then prompt for orientation data. For now lets assume that the booking method is electronic. The following screen will appear.

Orientation

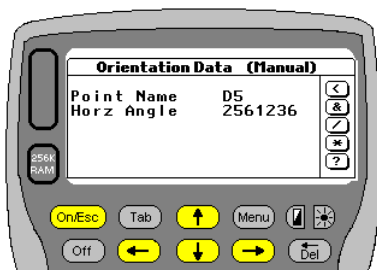
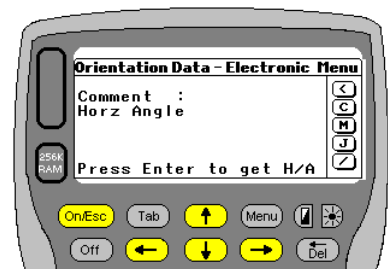
Assuming that you elect to Log Orientations this is the route you would follow and screens you would see. Initially the point name comes up with ????. The idea is to force you to change this name or comment to something more sensible.



There are 6 hotkeys available to you. On the RHS of the screen are 5 of them.

- < Will exit the routine. If you are finished taking readings or do not want to take any at all. (Psion Key+0)
- C Press C to change the comment or point name.
- M Press M to switch into manual mode.
- J Press J to do a join and orient the machine.
- / Press / to see the setup name, Inst Ht and YXZ or ENZ values.
- Menu Press Menu to get an explanation of the keys.

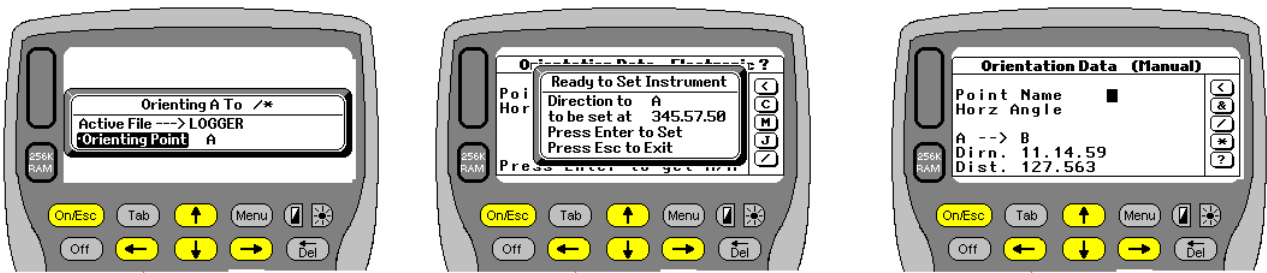
If **C** is pressed then the screen on right will appear. The ???? will disappear. Enter the name of the point you wish to orient onto, and then press **Enter**. The maximum no of characters for the comment is 10. Once Enter is pressed the screen with your comment will be displayed with your new comment. Once you are happy press **Enter** and **LOGGER** will then retrieve the horizontal angle from the Total Station. **LOGGER** will then display the previous comment and current horizontal angle reading. You are free to select another point to orient onto or Escape (<) and start taking field readings. Once the angle has been read **LOGGER** will return and display the value next to Horz. Angle. Repeat this sequence until you have taken all your orienting rays. There is no limit to the number of orientations that me be taken.



Pressing **M** will swop **LOGGER** into manual mode. You will be prompted to enter a point name, and then the horizontal angle to that point must be typed in. **LOGGER** will then prompt for the next orientation. The comment field will be cleared automatically, but the previous horizontal angle reading will be displayed. There are also various hotkeys available in manual mode. They are not immediate execution keys as in electronic mode. When you enter any of these options under comment and press enter, **LOGGER** will take the appropriate action. Here is a list of the keys and what they do.

- < Exits the routine. If you are finished taking readings or do not want to take any at all. (Psion +0)
- & Swop back to electronic mode. (Press Shift + 7)
- / Press / to see the setup name, Inst Ht and YXZ or ENZ values.
- * Press * to do a join and orient the machine.
- ? Press ? to get an explanation of the keys.

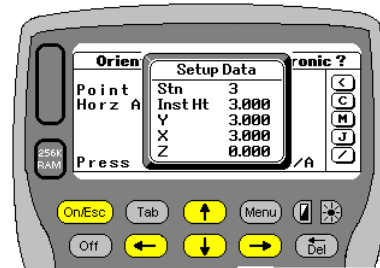
Pressing **J** in electronic mode or ***** in manual mode **LOGGER** will allow you to calculate an orienting join if you wish.



The left hand side screen shows this. **LOGGER** displays which co-ordinate file is active. Select the point you wish to orient onto. **LOGGER** will calculate the join and if you are in electronic mode **LOGGER** will set the circle for you. If you are in manual mode you will have to set the circle yourself. Remember that it does not make sense to use **J** or ***** more than once to reset the circle. Once **J** has been use to set the circle you could use it to check onto other beacons to make sure they have been identified correctly. Remember pressing **Esc** once the join has been calculated will not reset the circle in electronic mode.

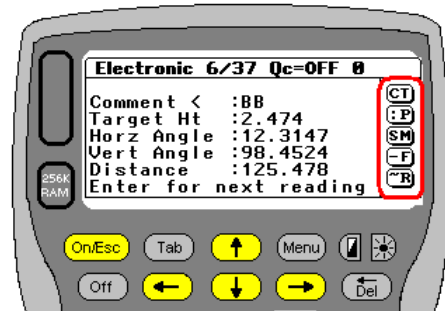
In both modes you can press Esc to exit the orienting join routine. Remember that you can swop to any coordinate file at this stage by pressing ***** Pressing **/** or **Enter**, if the point field is blank, will allow you access to a list of co-ordinates in the current co-ordinate database.

Finally pressing **/** will display the name of the station you are setup at. This is just for information purposes and nothing can be changed. If you a have the wrong station name or details you need to delete the setup and correct your information. At present deleting can only be done when full readings are being taken.



Electronic Data Logging

Once the orientation routine is completed this will be the next screen you will see. On the top line **LOGGER** shows you that it is logging in either manual or electronic mode. Also on the top line is displayed the number of shots taken from the current station (6 in this case) and the total number of shots in the file (37 in this case). The example shows that Quick codes are off (Qc=OFF). The zero next to it indicates the status of the double polar. In this case it is switched off and 0 will be added to the next horizontal angle taken.



Again down the RHS menu are many hotkeys. Only 10 are visible though. A brief explanation follows. A more detailed explanation can be found further on.

- | | | |
|---|--|-----------------------------------|
| C Press C to change the comment or point name. | | |
| T Will allow you change the Target Ht. | | |
| : Alter close shot Tolerance. | | |
| P Alter measurement Precision. | | |
| S Swop to Survey Calcs Menu reading. | | These keys are visible and active |
| M Swops to Manual Mode. | | |
| - (minus) View & Delete previous and other readings. | | |
| F Fix next spot shot. | | |
| ~ Change Timeout and reading retries. | | |
| R Take an RO observation. | | |
| O Take an offset shot. | | |
| W Check your whereabouts or chn and offset relative to loaded horizontal alignment | | |
| B Backup current tache file into Internal Memory | | Keys Invisible but active |
| D Take double readings. Books RAW obs as well as reduced YXZ / ENZ | | |
| H Takes Hidden shot | | |
| / Toggle to switch hidden shot on continuously or off, if already on | | |
| ! Toggles between adding 0 and 180 to the following reading. | | Keys Invisible |

- Q** Activate quick codes
- I** Allows user to alter Prism constant
- X** Enter user comments
- N** Increment Codes. On / Off Toggle
- L** L lets you look at a plot of the coordinates if the dual option is active
- K** Automatically takes a reading for Surpac users and assigns code 3. This flags the reading as shot to a known fixed point
- ?** Get Help on keys

| but active
|
|
|

Once you have set your comment and target height press **Enter**. **LOGGER** will then trigger the total station to start measuring and return the horizontal and vertical angles as well as the slope distance. This data capture cycle can be repeated until the user wants to move to another setup position or end the survey. Press **<** to terminate the current setup.

LOGGER checks all output from the total station. All angles must fall within 360 degrees 60 minutes and 60 seconds. If not an error will be reported and the reading must be taken again.

Vertical angles are only accepted between the ranges 30-150 and 210-330. All the values are returned to the **LOGGER** screen and the user should check these.

Hotkey Explanation

Hotkey C

Use **C** to change the comment or code. Type in your required comment. The comment can be alphanumeric input up to a maximum of 10 characters. The comment can also be blank.

Hotkey D

This option will store a dual set of data. One set will be the normal raw observations and the other set will be reduced coordinates. Some packages do not have reduction facilities and required just Comments/Codes and YXZ or ENZ values. A beep will be heard if **D** is pressed and **YXZ** or **ENZ** will appear on the top right hand side of the screen. Also when storing a double beep will be heard indicating that the raw, and then the reduced values have been stored.

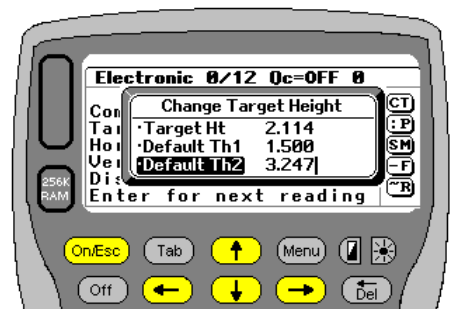
Hotkey L

If the above option has been activated then the user has the option to view a plot of the data. To do this press **L**. Notice that the YXZ option is displayed indicating that reduced data is being stored and so can be viewed. If there is no data to view the relevant warning message will be displayed.



Hotkey T

Press **T** to alter the target height. The allowable range is -99 to +99. **LOGGER** allows the user to define 2 target heights that can be swapped between very quickly. In the example on the right, the current target height is set to 2.114. You can now set the 2 default heights that you would like to swop between as well. In this case they are set to 1.500 and 3.247. When you exit this screen **LOGGER** will default to 2.114. Should you wish to change to one of the defaults simply press the **↑** **↓** up/down arrow. **LOGGER** will then display 1.500 or 3.247



Hotkey <

Press **<** (Psion+0) to end the setup and exit the data logging all together or move to another setup station.

Hotkey :

Press : (Shift+*) to alter the spot shot tolerance. **LOGGER** automatically checks the distance between the last 2 shots. If the last reading is within the specified distance of the previous reading a warning is issued. This is a useful tool. It helps eliminate duplicate shots on a plan or shots that are going to be close. There are instances where shots will be very close. For example the top and bottom of a kerb, or manhole cover and invert levels. **LOGGER** will default to accepting the reading. It is up to the user to reject any reading.

Hotkey P

Press **P** to alter the measurement precision. This can be set to either mm or cm. Sometimes it takes a little longer to measure to mm and the precision is not always needed.

Hotkey S

Press **S** to swop to the **LOGGER** survey menu. From there you will be able to do all the basic survey calculations, setout, view and edit your coordinate data. On termination you will be returned to the tache logging option.

Hotkey M

Press **M** to swop from electronic to manual mode. In manual mode you will have to punch in each of the readings. To return to electronic mode enter **e** for the comment and press **Enter**.

Hotkey -

Press - (minus key) to view the previous and any reading taken thus far. **LOGGER** will display the total number of shots taken so far and allow you to scroll up and down through the readings. Any reading can be deleted by pressing **D** or the **Del** button. Readings cannot be edited. Logger will display station setups and orientations take as well. Caution should be exercised when deleting any of these. Deleting a station will assume that all subsequent readings come from the previous station. Take a look at this sample data.

PR5		2	089.0111	003.0400		1.420
EF8		4	293.2607	000.0000		0.000
003	;EF8	5	293.2608	097.1804	70.059	1.611
004	SS	5	117.2710	076.4304	59.493	1.510
005	SS	5	121.2440	076.0953	57.118	1.510
006	SS	5	127.3254	076.4211	52.988	1.510
F1		2	089.0111	020.3900		0.000
PR6		2	089.0111	022.0100		1.436
0045	SS	5	035.3818	092.3104	5.110	1.505
0046	SS	5	007.2941	097.1024	16.975	2.505
0047	SS	5	154.0214	091.2155	7.682	2.505
0048	SS	5	217.2246	098.3558	10.560	1.500
PR7		2	089.0111	023.2800		1.462
0093	SS	5	042.0633	090.2718	47.383	1.505
0094	SS	5	046.2513	085.3014	48.232	1.505
0095	SS	5	046.0033	088.2044	33.594	1.505
PR1		2	089.0112	004.2900		1.480
00170	P0	5	359.5959	089.1149	340.313	1.505
00171	SS	5	215.3450	109.5805	19.969	1.505
00172	SS	5	214.1057	118.3359	17.779	1.505
00173	SS	5	191.0536	113.4148	20.972	1.505
00174	SS	5	196.5428	105.3612	23.502	1.505
00175	SS	5	192.0318	107.1350	24.499	1.505

The blue readings are setup stations. If station **PR1** were to be deleted then it stands to reason that shots **00170 to 00175** will fall under station **PR7**. In this file it can be seen that there are also 2 stations one after the other. This can happen in the field. If this happens then deleting station **F1** will leave station **PR6** and shots **0045 to 0048** will be reduced from **PR6**.

This editing can be done in the field if you feel confident, otherwise once the data is downloaded, it can be loaded into a simple text editor (Notepad) and corrected. This data is in a fixed format separated by TAB characters. Keep it like that.

Hotkey F

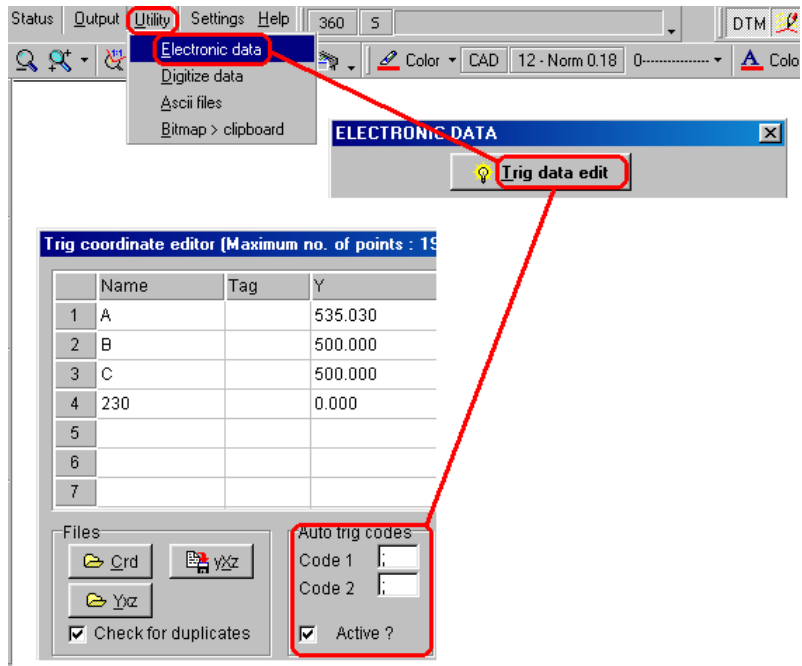
Press **F** to fix the next shot. Once you have your comment and target heights set, pressing **F** instead of **Enter** does 2 things.

Firstly it changes the code (eg **EF8** to **;EF8**) and stores it in the tache file. Have a look at the example above.

Secondly it computes the coordinates for the point and stores them. These coordinates can be used at any time during the survey and you have the option of storing them in any of the available jobs.

Thirdly when reducing your tache readings in a program like Model Maker, one is able to flag certain readings to be used for future sets. In this case **LOGGER** has automatically done it for you by using a semi-colon. If you are using Model Maker and want to make use of this feature make sure you have this option activated. If other software packages support such a feature make sure it is activated.

Here is a flow chart on how to activate the settings for Model Maker. Make sure the **Active** box is checked at the end.



Hotkey K

If **K** is pressed **LOGGER** automatically takes a reading with the current comment and flags it with a 3. When downloading tache into Surpac format this will be recognised and output in the correct format for Surpac to process.

e.g 00025 00 3 KP1 123.1234 11.290 99.4556 1.8000

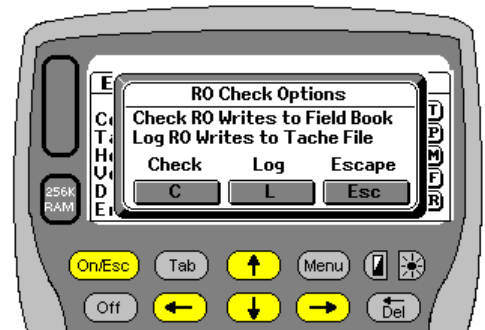
Hotkey ~

Press **~** (Psion+4) to change your timeout and no of times **LOGGER** retries to take a reading. Often there are instances where it is difficult to measure. Leaves interfere with the signal response back to the total station, and a reading fails. **LOGGER** has an option where the user can decide how many times to try and how long to wait between each response. Remember to use a sensible timeout value. If your instrument normally takes 4-5 seconds to take a reading, do not set the timeout value to less than that. If **LOGGER** fails to get a response you will be informed.

Hotkey R

Press **R** to take a check orientation reading at any stage. **LOGGER** gives you two options.

The **Check RO Writes to Field Book** option will allow you to read and compare the RO. The results will be written into the fieldbook file. The procedure is exactly the same as described under the Fix section Log RO



The **Log RO Writes to Tache File** option will log the RO as a normal orientation ray and store the reading into the tache file. The procedure is exactly the same as described under **Orientation** above. The resulting observation would be flagged 4 and look something like this in the tache file where 293.2607 represents the horizontal bearing 293 degrees 26 minutes and 07 seconds.

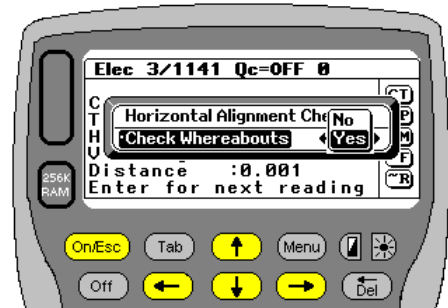
EF8 4 293.2607 000.0000 0.000

Hotkey O

Press **O** if you wish to take an offset shot. An offset shot could be a reading to the middle of a tree for instance. Normally you would take a distance reading alongside the tree trunk and then move the horizontal circle to the middle of the tree to read the horizontal angle. Using this option **LOGGER** will prompt you to measure the distance and then allow you to turn the circle and then measure the horizontal angle. Please note that this button is not displayed on the menu as a hint.

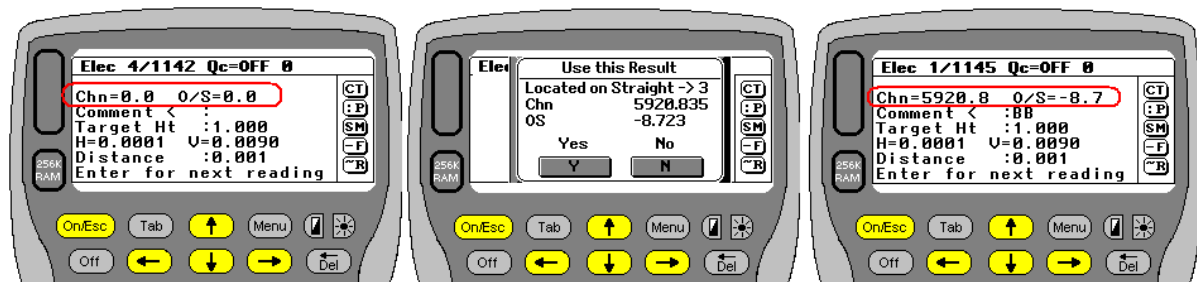
Hotkey W

Press **W** to locate a tache shot in relation to a loaded horizontal alignment. You will be prompted to “**Check Whereabouts**” **Yes/No**. This feature will allow a user to load a horizontal alignment, and as readings are taken **LOGGER** will compute the chainage and offset of the shot. This is extremely useful when one is doing a strip survey and wants to make sure that you cover the area required. As this computation takes a second or 2 you have the option of having the function active or not.



If you select **Yes** the screen layout will change as indicated below left.

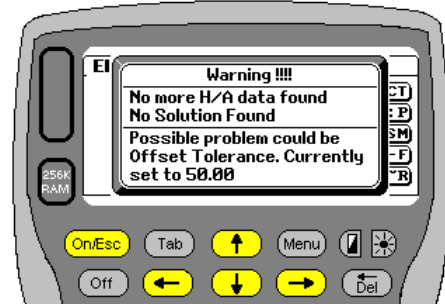
Once the shot has been taken **LOGGER** checks for its location (Below center). If it locates a solution, it is displayed to the user as a check. If you think it is incorrect select no and **LOGGER** will check further along the alignment. The answer is also determined by the search radius (see section under creating a job for additional info). If you are happy with the result **LOGGER** will display the answer as Chn and O/S as well as the field obs. (Bottom right). To deactivate the search merely press **W** and then **No**. When the “Whereabouts” option is activated a double beep will be heard indicating a solution has been found and that the point has been stored.



If initially you decide that the located chn and offset are wrong and select **No**, **LOGGER** will continue searching along the alignment for another solution. If none can be found then the following message will appear.

Note

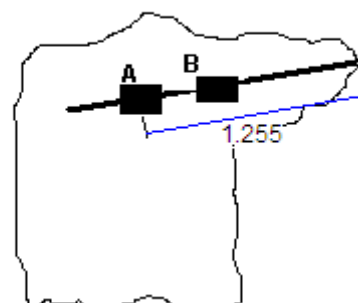
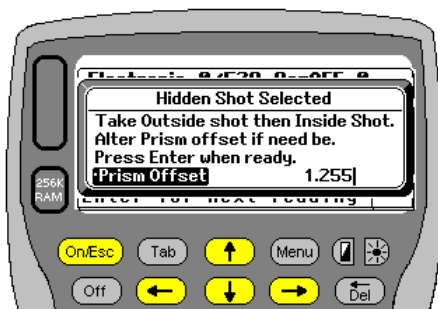
If you have a tight alignment and feel that 50m is to wide it can be change under job defaults.



Hotkey %

Press **%** to add 180 degrees to the next reading. Pressing **%** again sets the value back to zero. This option is used to basically double polar and check shots in field. Some users have requested this option. The idea is to take a reading to a point, and as a check take another reading on circle right. What **LOGGER** will do is then add 180 degrees to the reading. This effectively double polars the shot and acts as a check. On the top line of the screen you will either see 0 or 180 indicating the current value to be added to the following reading. The **%** sign was chosen as it closely resembles 2 shots on top or next to each other.

Hotkey H



Press **H** if you wish to take a hidden shot. Specifically for mining applications.

The user would use a prism pole with 2 prisms. The distance from **A**, (towards **B**) to the end of the pole must be known. (Prism offset). The user would sight prism **A** and then prism **B** and **LOGGER** will compute a coordinate and elevation for the end of the pole. Nowadays users with reflector less instruments would have **A** marked and then can sight anywhere to the right of **A** for the second reading. All results are stored in the **REDUCED TACHE** file. See example below.

Hotkey /

The / (forward slash) has been selected as a hotkey to switch the hidden shot option on or off. The / was selected as it best represents an extension pole. If you are going to be taking **HIDDEN** shots continuously and do not want to press **H** each time, then press



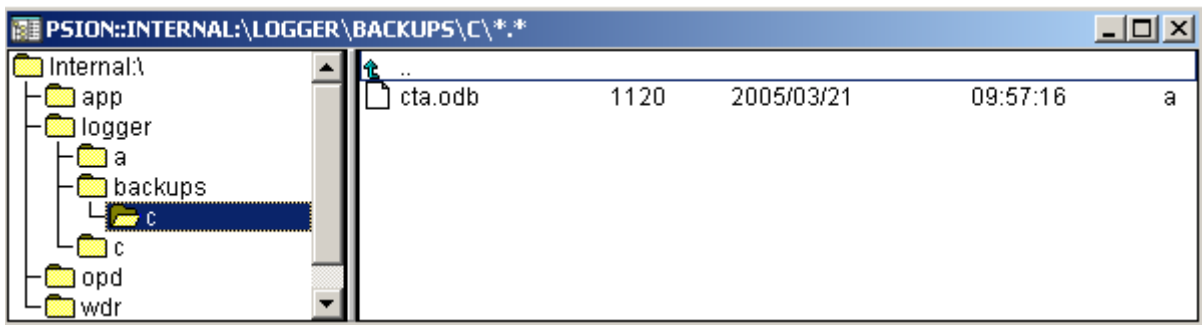
/, a beep will be heard, and **LOGGER** will continuously prompt for a hidden shot. Pressing / again will disable the action. If you have switched the continuous **HIDDEN** shot on option on the screen will indicate this to you by displaying a / on the top line. When off the / will not be there. Above are 2 screen shots showing the /. The one on the left indicates that the hidden shot option is continuously switched on but normal tache is being stored into the tache file and will have to be reduced later. The one to the right again indicates that the **HIDDEN** shot is set to continuous mode but also that all tache (reduced to YXZ) is being stored into the **REDUCED TACHE** file as well.

Below is a sample file format of the reduced tache with normal tache shots as well as **HIDDEN** shots

```
//Source LOGGER Software for Psion WorkAbout issued 05/12/2010
//Job..... GIEL
//Date..... Wed 02 Feb 2011 11:06:54
//
Name          Y Co-Ord      X Co-Ord      Z Co-Ord      Target Ht
=====
Hidden        502.285        569.112        20.743        0.000
Hidden        504.385        564.682        16.924        0.000
Hidden        506.627        568.457        15.474        0.000
BB            495.565        570.714        16.594        0.000 Normal Tache
Hidden        507.138        569.317        15.140        0.000
Hidden        504.385        564.682        16.924        0.000
Hidden        495.574        575.105        16.594        0.000
BB            495.565        570.714        16.594        0.000 Normal Tache
Hidden        495.648        575.104        16.595        0.000
BB            495.648        575.104        16.595        0.000 Normal Tache
```

Hotkey B

Press **B** to force a backup of your current Tache file. **LOGGER** will make an exact duplicate of the current. Tache file in the internal memory of the WorkAbout. This operation is very quick and very useful. A lot of time is spent collecting Tache data and there is nothing worse than losing it or not being able to download or retrieve for some reason or other. The example below should help you visualize what is going on. Once you are happy that your data is safely downloaded the backups should be deleted. **LOGGER** has made it easy as well. All the backups can be deleted in one go but deleting the **BACKUPS** folder if need be. Use Psion Manager to do this, as it is probably the easiest method



Hotkey Q

Press **Q** to activate the quick codes. **LOGGER** allows the user to predefine 10 frequently used codes and 4 target height values. The codes can be assigned to numeric keys 0-9. The function can be activate or inactive. If active the user only has to press the key 0-9 and **LOGGER** will automatically assign the code of that key to the spot shot, and start the measuring procedure. Also to change the preset target heights you need only press the up or down arrows.

When **Q** is pressed the following options are available.

- On** Will exit the routine
- E** Will allow you to edit the key displayed and enter the code to be assigned
- A** Will activate the quick codes option.
- D** Will deactivate the quick codes option.
- Enter** Will scroll down through keys 0-9 and the 4 heights
- ↑ ↓** Will scroll up and down through keys 0-9 and the heights
- ?** Will display help on active keys

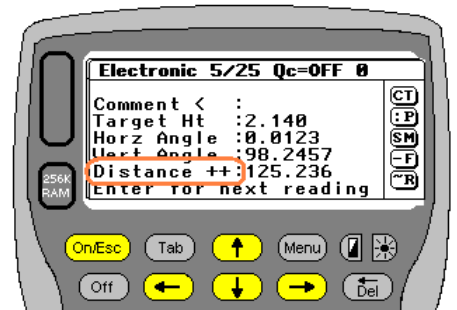
When the quick code option is activated then the keys 0-9 and the up and down arrows become hot keys. This means that they activate as soon as they are pressed. When the quick code option is active, the tache input screen will display Qc=ON on the top line otherwise it will display Qc=OFF

Hotkey Menu

Menu Only when the quick code option is active, will the **Menu** button be active. Pressing **Menu** will display a list of the codes assigned to keys 0-9 as well as the 4 pre-stored target heights. Thus the user has quick access to what he as assigned to which keys.

Hotkey I

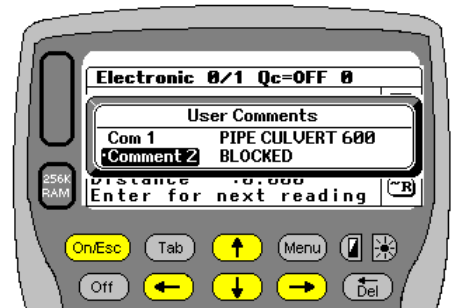
Press **I** to alter the prism constant. By default it is set to zero. At any stage while recording readings the value can be changed. Press **I** and you will be prompted for a new value. Values between -1 and +1 are accepted. While the prism constant is not set to zero the screen will display "Distance ++". If the constant is non zero **LOGGER** will display "Distance ++"



Hotkey X

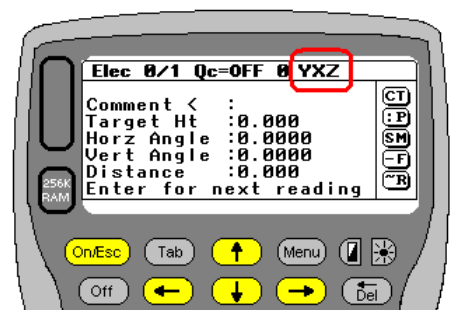
Press **X** to enter in any user notes or explanations you may want later. There is space for 2 comments. The following screen will appear. Enter the text you want under the first comment. Press Enter and then repeat for the second comment if you wish. The info will be stored in the tache file and reflect as show below when downloaded. Up to 20 characters per comment may be entered

```
000506 CH1400 5 062.3453 090.3420 0009.610 01.500
//PIPE CULVERT 600,BLOCKED
000507 ERD 5 075.1134 091.0506 0011.716 01.500
```



Hotkey D

LOGGER can store both the raw observations as well as the reduced data if you wish. By default only the raw data is stored which then has to be downloaded and reduced. If however you do not have any means of reducing the data, **LOGGER** can do it as the readings are taken, and store them. These can then be downloaded as **YXZ/ENZ** values with their relevant codes. To activate the option press **D**. **LOGGER** will beep



indicating that the option is now active. The top line of the screen will now display **YXZ** or **ENZ**. All subsequent readings will be reduced and stored in a separate file. The raw observations will also be stored. To deactivate the option press **D** again. **LOGGER** will beep indicating the function has been turned off.

The co-ordinates that are generated are calculated relative to the current setup. One needs to understand that if you are not correctly setup and oriented then the subsequent co-ordinates will be on a local system.

The data file that the co-ordinates are stored in has RT (Reduced Tache) at the end of the job name. (ie If Job is call Tache then the data file will be called Tachert.odb). The data can be downloaded using the **Download option** in the Job menu.

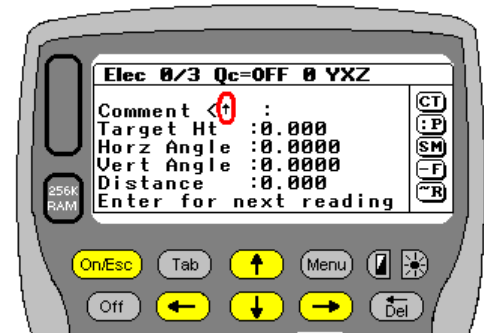
Here is an example of the contents of a downloaded space delimited data file. This format will ready directly into Model Maker using the File – Open - YXZ option.

```
//Source LOGGER Software for Psion WorkAbout issued 19/09/2011
//Job..... EWCOL
//Date..... Sun 25 Dec 2011 15:27:12
//
```

Target Ht	Name	Y Co-Ord	X Co-Ord	Z Co-Ord
1.467	T	412386.300	8831588.582	1410.594
1.467	7BS	412418.630	8831603.316	1401.752
1.467	7BS	412418.630	8831603.315	1401.753
1.467	7TF	412418.621	8831603.344	1410.005
1.467	7TF	412418.621	8831603.344	1410.005
1.467	6B	412413.082	8831601.036	1401.742

Hotkey N

Logger will also allow the user to automatically increment codes. For example if your code starts L1 and the increment option is active the next code will become L2,L3 etc. Any code ending in a numeric can be incremented. To activate this option press **N** when on the main tache data collection screen. When the option is activated a beep will be heard and the screen will display **↑** next to the Comment. To deactivate the option press **N** again.



Hotkey ?

Finally press **?** If you want to know what all the keys do. A brief explanation is given on screen and should be sufficient for the user to understand the function.

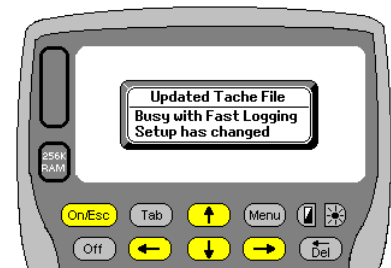
Closing Down or Changing Setup Stations

Once you press < (Psion+0) to terminate the data capture sequence **LOGGER** displays the following screen. It basically confirms which setup is being terminated and informs the user of how many readings were taken at the setup. There are then three options available.

1. By default **LOGGER** displays the option to **QUIT**. Choosing to quit will close the tache data file, and return the user to the main menu.
2. The second option is **Next Stn**. You can either press **N** or use the left/right arrows or TAB to select this option. This will take you right back to the start of the data logging operation. You then have to select the option **Fix New Station** or **Setup Unknown Point** before being able to proceed. If you do not want to, then you can press Esc to return to the main menu.
3. The third option is **Fast Logging** This just shuts the tache file so that it can be used again later. Typically users would choose this option while they are doing setting out work, and want to record tache at the same time. While setting out if the tache option is selected and you quit using **Fast Logging** it takes you back to setting out.. If you again choose to record tache **LOGGER** remembers the file to where recording to and prompts you straight away to start recording. This option is extremely useful and can be used when doing batters, and you want to record ground lines at the same time, or maybe while setting out you wish to pick up as built details.



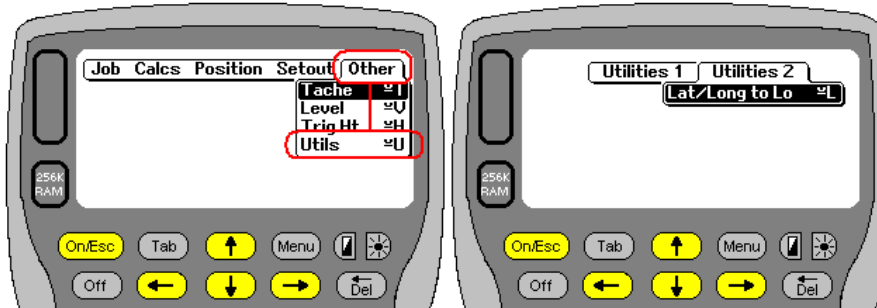
LOGGER remembers if **Fast Logging** is active or not and if by chance you decide to move stations, **LOGGER** will automatically update the Tache file with the new setup, so all subsequent readings are reduced from the correct setup. In such a case a warning/information box as shown on the right will appear. Just press Enter to continue. A beep will be heard to confirm the file has been updated.



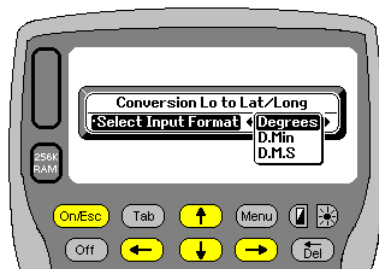
The downloading of your Tache readings is covered in the Download section of the manual. Download is found under the main menu item **Job**

Conversion of Lat / Long to Lo Coord Values

LOGGER will allow users to manually type in Geographical Coordinates (Latitude & Longitude) and convert them to WGS84 Coordinates. Below is a detailed explanation of the process.



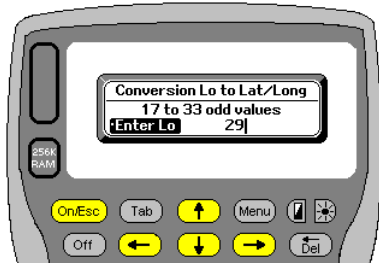
The above option is found on the main menu under "Other - Utils" and then on the Utilities 2 is "Lat/Lon to Lo"



Next select the format that the data will be input in. There are 3 options.

1. Degrees Degrees and decimal degrees
2. D.Min Degrees Minutes and decimal minutes
3. D.M.S Degrees Minutes Seconds and decimal seconds

Select the option that matches the format of your input data. Either use the left/right arrow or press **Tab** to navigate to your choice and press Enter. To Esc to the previous menu press On/Esc



The next option is to select the Lo band that is to be used. **LOGGER** will accept any odd values between 17 and 33 inclusive. Only entries between these values will be accepted. Pressing On/Esc will return you to the main Utilities menu.



Assuming that the D.M.S option was selected the screen prompts would be similar to those shown above. You will first be prompted for the Latitude in Degrees then Minutes and finally seconds. Next would come Longitude in the same format. Finally you would get the result also showing the **LO** band used as a check as well.

Pressing On/Esc on the Latitude input menu will return you to the Lo band selection menu. Pressing On/Esc on the Longitude input menu will return you to the Latitude input menu.

When choosing the **D.M.S** option **LOGGER** requires that you **ONLY** enter integer values for Degrees and Minutes. Although decimals will be accepted it will result in incorrect answers.

If you use **D.Min** then **LOGGER** requires that you **ONLY** enter integer values for Degrees. Again decimals will be accepted, but it will result in incorrect answers.

If you choose just **Degrees** then decimals are acceptable.

If you choose to input data in **Degrees** and decimal degrees you will only be prompted for Degrees. Likewise if you choose **D.Min** you will be prompted for Degrees and Minutes only.



UPDATING LOGGER

Please read this whole section and make sure you understand it before proceeding. If you have any queries please contact me. The process is really quite simple and straight forward and you should familiarize yourself with it.

LOGGER updates are available via the Internet. The current download address is www.LOGGER.co.za

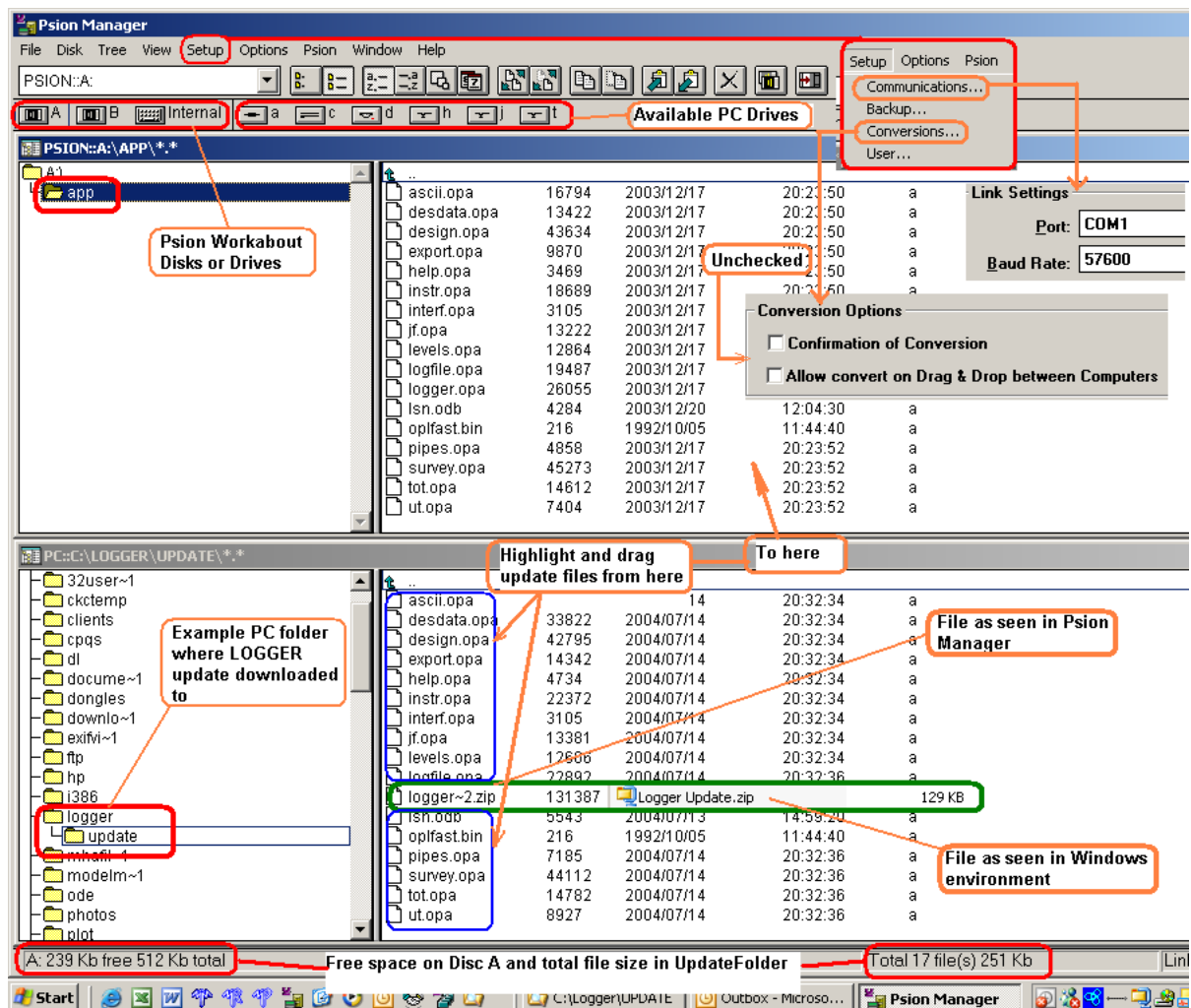
Once on the site download the Logger Update and save it to your hard drive. For the sake of this exercise I have used the folder C:\Logger\Update. Once the file is downloaded, unzip the contents. Again I have used the same folder. You are welcome to download and unzip to any suitable folder of your choice.

Updating your pack or SSD is done outside of **LOGGER** itself. Make sure you exit **LOGGER** and have the main screen present. Press Psion+L (bottom left key+ L). This activates the remote link screen.

Set the following

- Remote link ON
 - Baud rate 57600 (or whatever you ultimately set Psion Manager to)
 - Port A
- Press Enter once complete.

Now make sure the Psion is connected to the PC and activate Psion Manager. The PC and Psion should link and you will be presented with a screen similar to the one below.



A lot of detail has been added to this screen, hopefully for ease of use.

You will know whether or not the PC and Psion have connected and are communicating if you see A B Internal displayed at the top left of the screen.
 If no communication is present select **Setup** and check your communication parameters and port.

The first time you start Psion Manager select **Setup – Conversions** and make sure the conversion options are as above. Both de-activated or unchecked. Psion Manager will remember your settings and next time you use it they should remain unchanged.

Psion Manager is basically a Windows Explorer type interface between the Psion and the PC. It is an extremely useful tool and you should get to know it well. It gives you a quick window to your Psion and allows you to see what's going on on it.

In the above example I have created a folder on the PC called C:\Logger and then a sub folder called Update. The Psion reflects the name as **PC::C:\LOGGER\UPDATE***. The contents of the Update folder can be seen. In the example there is a file called **logger~2.zip**. On the PC the file is actually called **Logger Update.zip**. This is illustrated in the green box above. Psion Manager only allows 8 character names and as such you will only see **logger~2.zip**. This is the original downloaded file. It does not have to reside in the folder. In fact once you have unzipped it, it can be deleted or kept in some other folder just in case.

To update your **LOGGER** simply highlight all the files in the **PC::C:\LOGGER\UPDATE** folder (except the zip file) and drag them to the **APP** folder on disk A. If you have files there already, select to overwrite them all.

A few important things to consider and check before updating.

Before you update your disk, make sure you are going to have enough free space. Psion Manger will tell you how much free disc space there is. Refer to the bottom of the screen. In the above example we have 239Kbytes free on disc A. We can see that we require 251 Kbytes. Clearly we are going to run out of space. One needs to be careful here as Psion Manager is including the size of the zip file as well.

If you find that there is not enough space then the SSD will have to be formatted. All installations after November 2005 require that the program disc be named. All program discs have been allocated unique names or volume numbers. These should be on the label at the back of your program pack which should look something like this. Example below shows Vol number as 20060605

LOGGER
 VERSION 2.02
 19/06/2006
 SN# 208206026/262
 Vol 20060605
 Clients Name

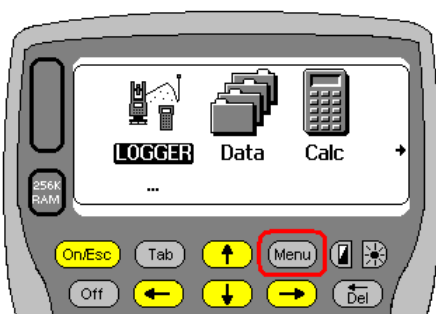
Earlier versions did not reflect the Volume number. If you do not have a Volume number then contact Kevin McDonagh via e-mail to get your unique number. The e-mail address is kevin@logger.co.za

If you have to format your pack it **must** be done on the Psion Workabout and **not** using Psion Manager. Here are the steps to follow.

Warning

Before formatting make sure that you have enough battery power.
 Do not format your program Disk on low batteries. **LOGGER** provides info on your battery status when it starts and ends. If you get a main battery low warning, do not format on these batteries. Change them first. If the formatting process is interrupted, through either user intervention or the Psion running low on battery power, the serial number on the pack will be corrupted and **LOGGER** will not run when loaded.

Do not interrupt the formatting process ether. It only takes a few seconds. Opening the Psion to access either the packs or batteries during formatting will corrupt the pack as well.



Exit **LOGGER** and press Menu. Arrow across to Disk and down to Format disk. Press Enter.
 If the Psion displays Disk Internal change to A.



Then enter unique Volume or number allocated to for this pack. example 20060107 as shown

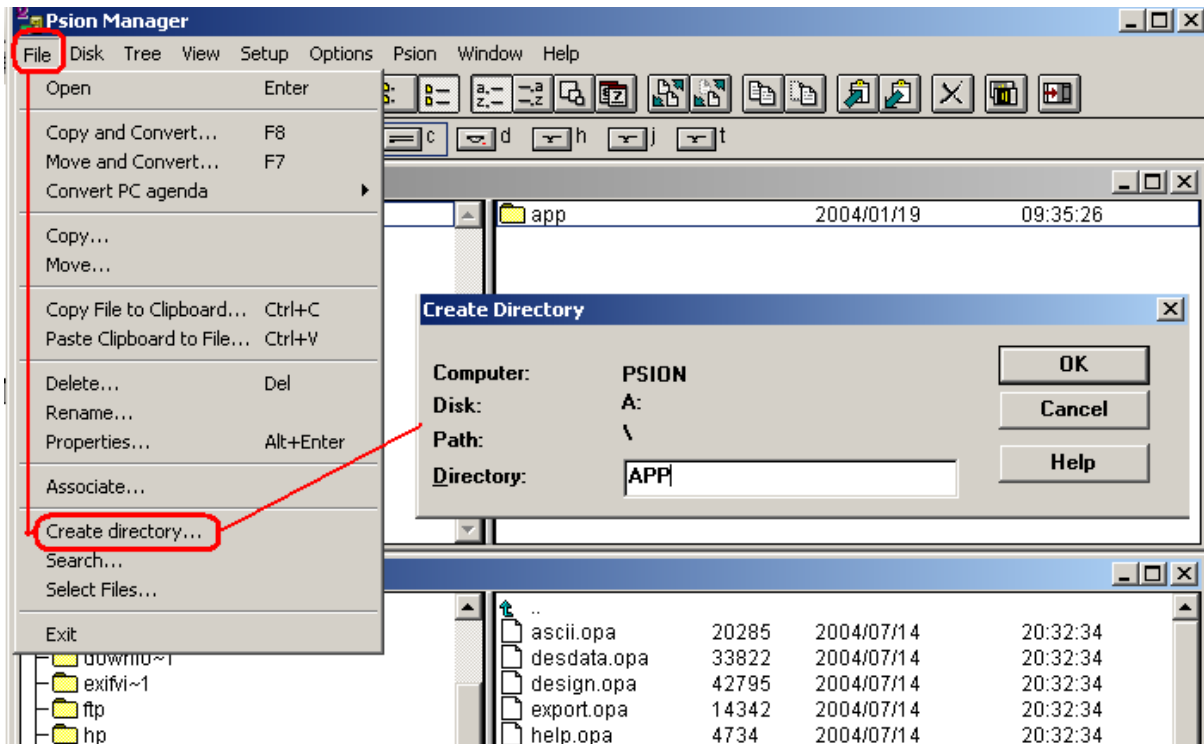


the disk you For

The above are really simple rules and not life threatening. Please observe them.
 If you do not already have Psion Manager running, start it up. Open up a window for Psion disk A. (see below if you are not sure how to do this)

Once the window has been opened you will need to create a folder called **APP**. Short for application. Activate Disk A window by clicking in the window or on the top bar defining the window
 Select **File- Create directory...**

Make sure that you have in fact selected the Psion as your computer and that disk A: is the one you want. Type in the name of the directory (or Folder) to be created. In this case APP.
 Once this has been done you can drag and drop the update files to the APP folder as detailed earlier.



The reason why your disk A will need formatting from time to time is because it is a SSD or Solid State Disc. As data is deleted or overwritten the actual space occupied is not recovered as is the case with RAM disks. So eventually the disk becomes full. In fact in may be full of nothing. The only way around the problem is to format it.

The same goes for your data disk B. Eventually it may become a little slower and full as well. Use Psion Manger to COMPRESS the pack. This function copies all the data off the disk, formats it and

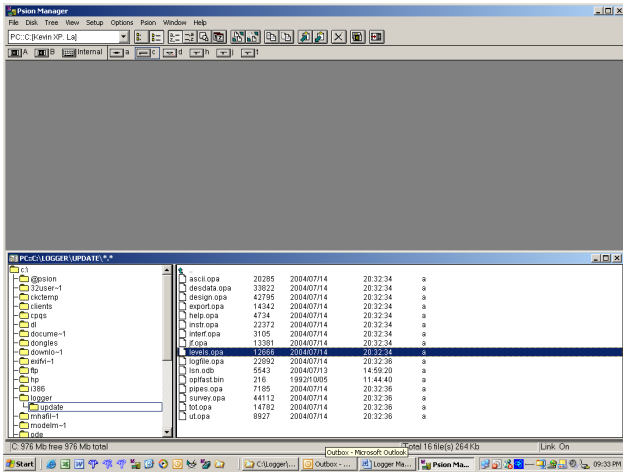
copies it all back again. It will speed up access to files as well. This function is found under **Disk – Compress Flash Disk**

The other really useful option is backup. It is found under **Disk –Backup**. This routine will make a backup copy of all your data onto you PC.

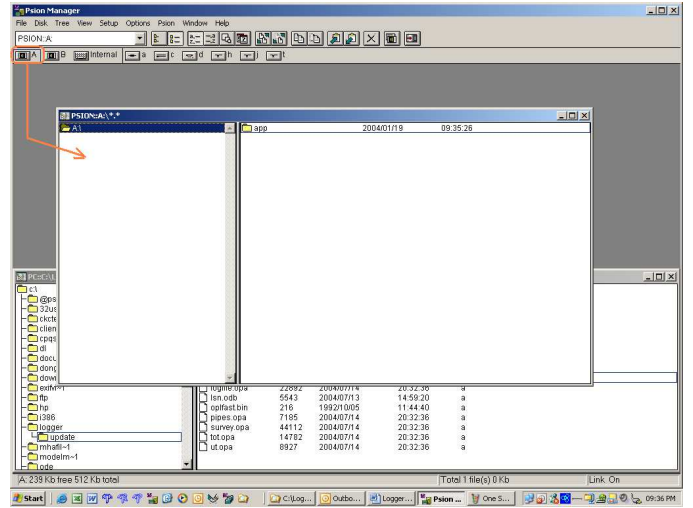
You can restore it using **Disk-Restore**.

For more on these functions read the Help menu supplied with Psion Manager

Alternatively just copy the whole **LOGGER** folder to you PC. Much easier and you can then edit and delete info not required

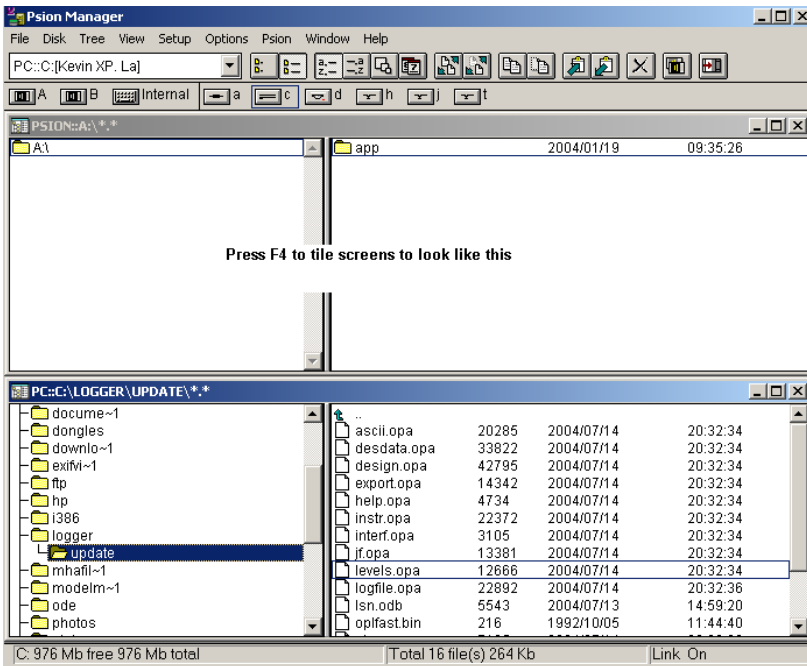


If when Psion Manager starts up you do not see Disk A simply double click on A. By double clicking on either drive A B or Internal you will create a new window for the selected device. You can press F4 to tile the window(s) as displayed below



After double clicking A the screen may appear similar to that on the right.

To rectify the situation press F4 and Psion Manager will tile the screen to look like the image below.



Compressing Data Discs

Flash SSD's (Solid State Discs) do not recover memory when files get deleted. Eventually they will become full. When this happens they need to be formatted. If there is still data on the packs, doing a straight Format will destroy all the data on the disc.

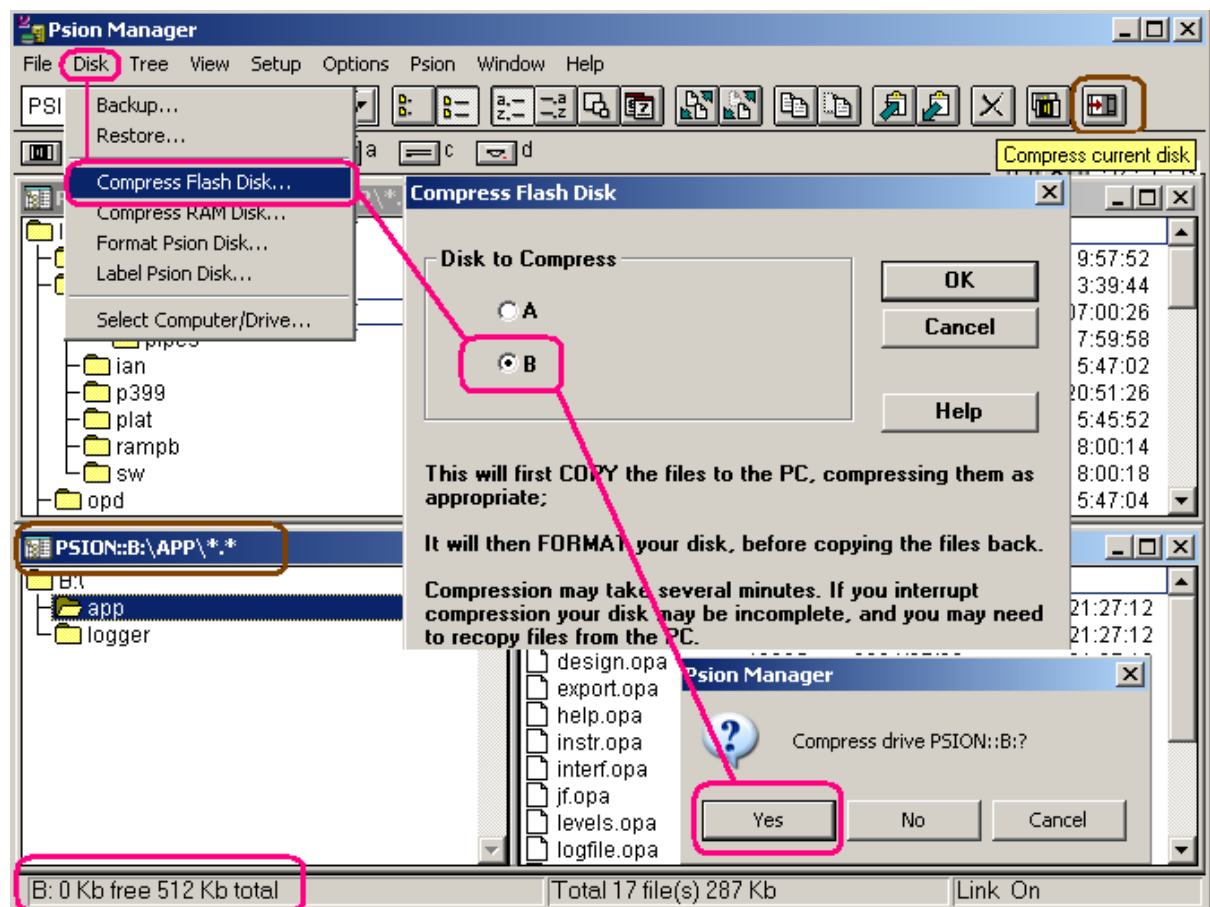
Compress however will copy all the data from the disc onto your hard drive, format the disc and copy back the data. All redundant data will be erased and empty space recovered, It will also speed up access to the disc. It is advisable to compress from time to time. In the image below the bottom right hand side of the screen shows that disc B has zero Kb free. Its ultimate capacity is 512Kb.

There is also a quicker way to getting to activate Compress. Select the Icon on the top right hand side of the screen and compress will then compress the active disc. In the example you will see that Disc B is active. The bar indicating the active disc is blue. To activate a disc simply click anywhere in the window associated with the disc.

Do not run Compress on low batteries. Read more about Compress in the help provided in Psion Manager.

Do not compress Disc A either. That's your program disc and will result in changes to the serial number and Logger may not run.

An easy way to compress is to just drag the whole **LOGGER** folder of disc B onto your hard drive. Clean up what you don't need. Then format Busing the Psion (Menu – disk – Format Disk. Once that's done copy the **LOGGER** folder back off your hard drive onto B. This also has the advantage that it leaves a copy of your data on your hard drive for you.



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