DiNi 12 Training

Trimble

How does a Digital Level Work?

A digital level is really no different from an optical level in a lot of ways. A lot of the principals and methods used with optical levels still need to be used and applied with a digital level. Basically what a digital level is; is a digital “camera” that is aligned with the crosshairs of the instrument. When a measurement is needed the user focuses on the rod and then presses measure which then tells the instrument to “snap” a picture of the rod and compares that image with the same rod pattern stored in memory. A rod reading is then calculated and is stored in memory.

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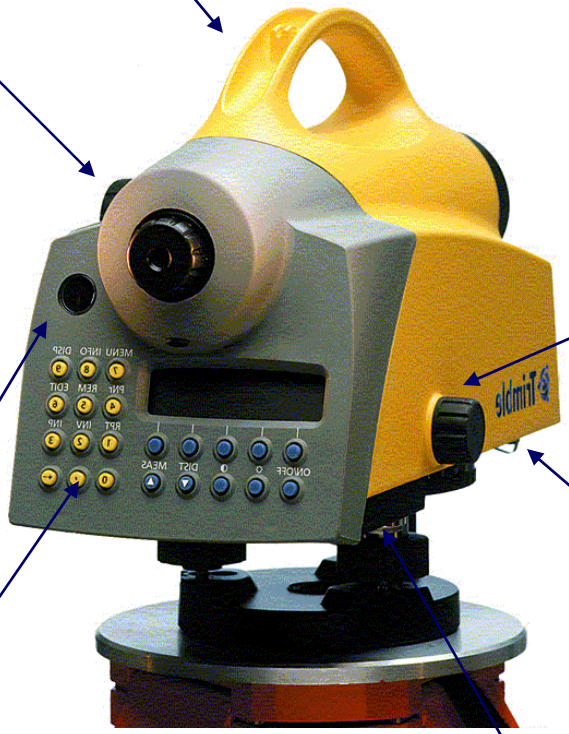
The DiNi 12



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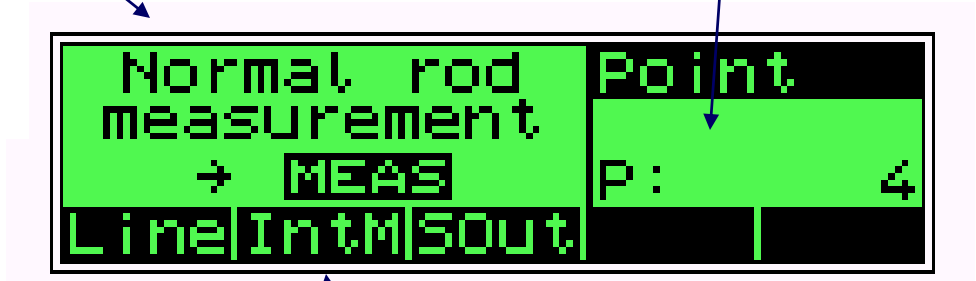
Main Measuring Screen



Displays measured info here

Displays info about the point you are about to measure

Line: Starts a level loop

IntM: Starts a sideshot mode

SOut: Starts a stakeout mode

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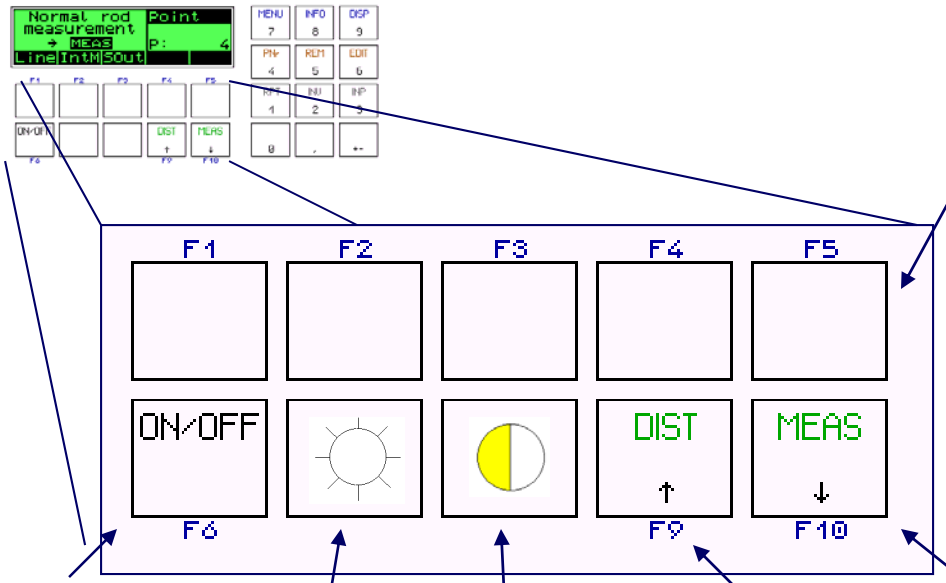
Keyboard and key layout



Function keys: correspond to the function right above them in the display

On / Off button

Backlighting on / off

Contrast adjustment

Dist measurement (no recording)

Full measurement and recording

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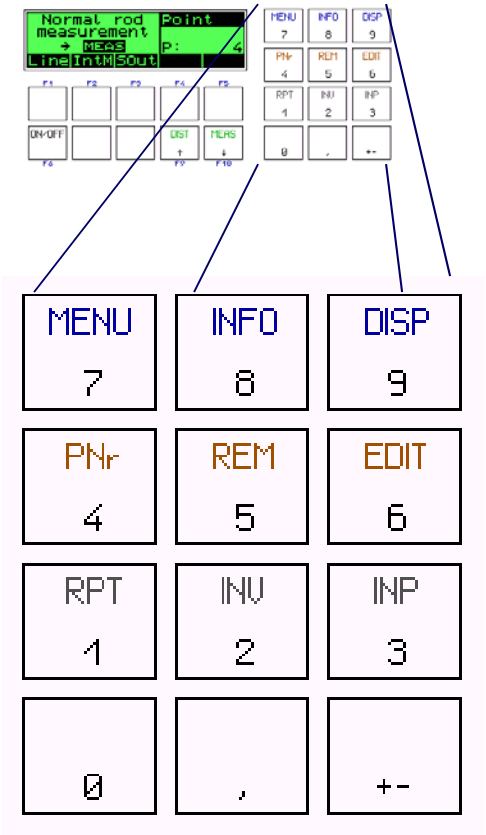
Keyboard and key layout



When in the main measuring Screen the number keys have the following functionality:

1) RPT - Repetition mode
2) INV - Inverted rod setting
3) INP - Manual input of rod reading
4) PNr - Input of point number
5) REM - Input of remark
6) EDIT - Editor function
7) Menu – Instrument settings etc.
8) INFO - General information
9) DISP - Toggles what is displayed

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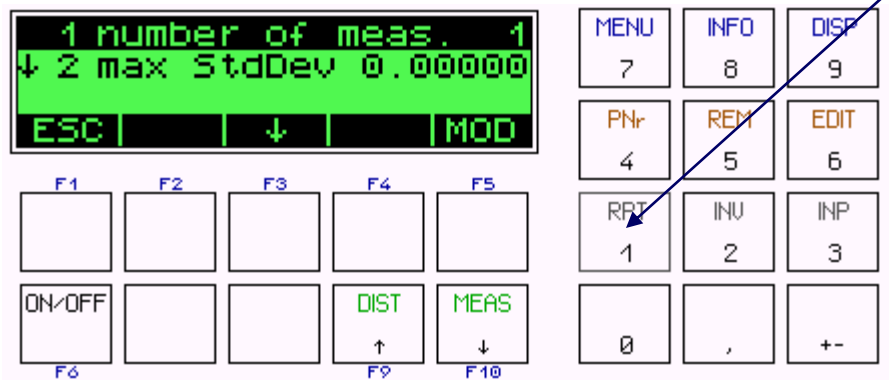
Keyboard – RPT key



RPT (#1 key):

1) Sets the number of measurements to be taken when the Meas button is pressed.

2) Sets the maximum standard deviation allowed for those number of measurements.

If the std dev is met in a majority of measurements the DiNi will discontinue the measurement sequence.

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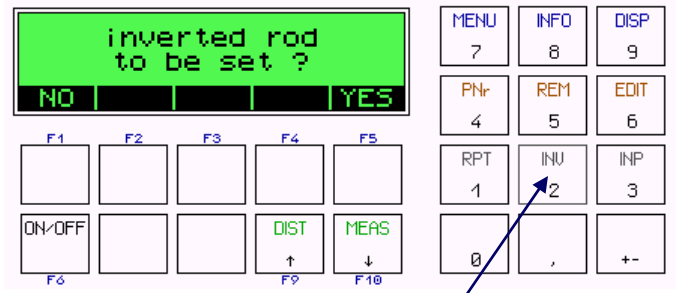
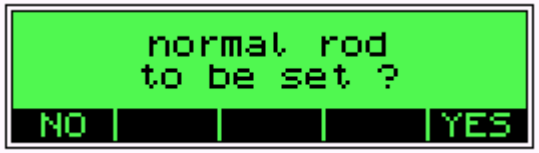
Keyboard – INV key



Notice the display after setting to inv mode or normal mode !



INV (#2 key):

Sets the instrument so the rod person can turn the rod upside down and get a Z value for the “top” of the rod.

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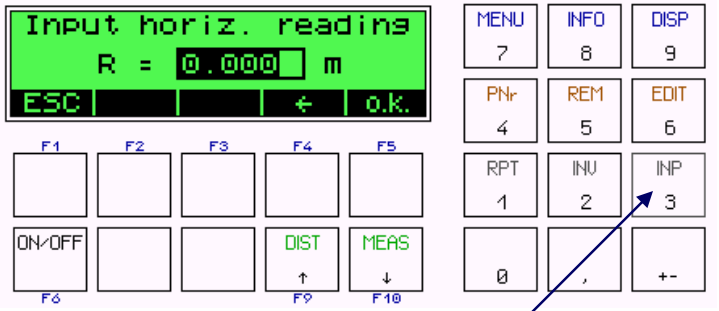
Keyboard – INP key



INP (#3 key):

Allows for manual input of data.
the rod-person turns the rod around
and the instrument person takes a manual reading;
inputs the values they read on the rod, estimates a distance,
and then the instrument records that info to the memory like a normal measurement with a “manual input” note attached.

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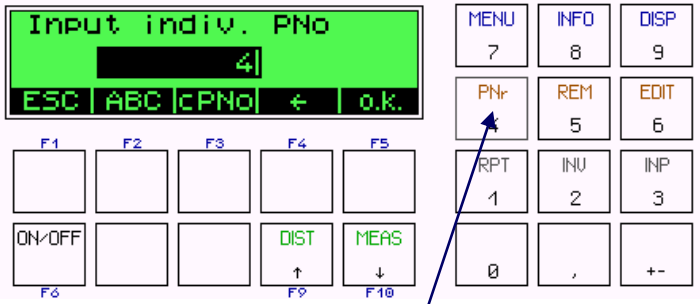
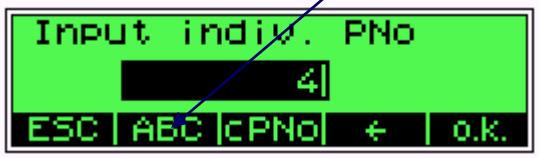
Keyboard – PNr key



Notice that you can enter alphanumeric point numbers



PNr (#4 key):

Allows for input of point numbers.

There are 2 kinds; cPNo & iPNo.

cPNo: Current point number sets the point number and will increment from there.

iPNo: Sets the point number for the individual measurement and goes back to the old incrementing sequence.

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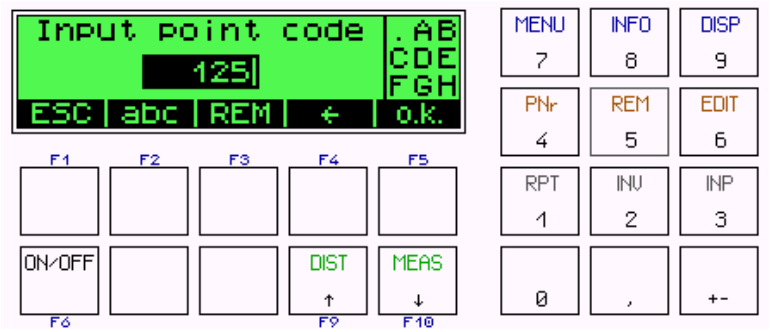
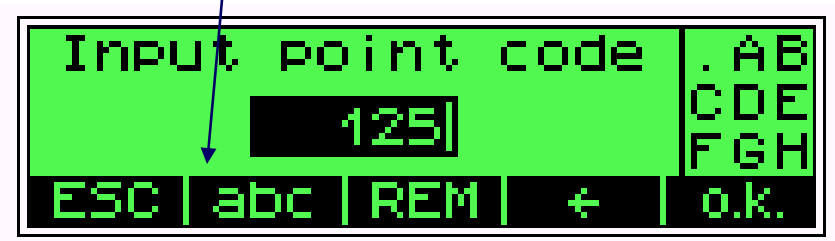
Keyboard REM key



You can enter alphanumeric codes



You can also enter a longer remark or comment

REM (#5 key):

Allows the user to input a code associated with the point being measured.

Remember: Once a code is entered it stays until taken out !!!!

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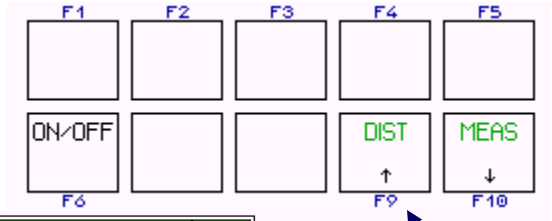
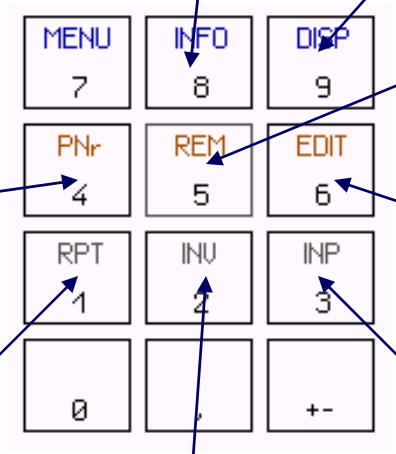
Alphanumeric Input

Toggles between letters and numbers





A key

B key

C key

D key

E key

F key

G key

H key

Scrolls through the different letters and symbols

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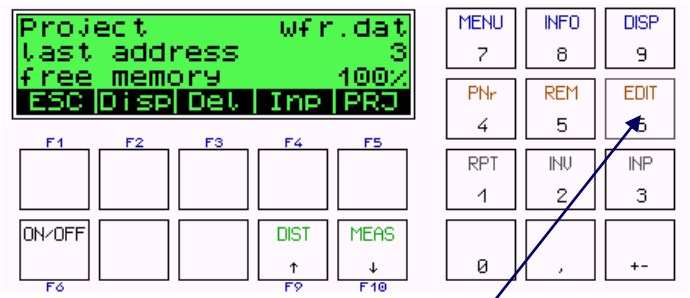
Keyboard – EDIT key



EDIT (#6 key):

A simple editor function.

Esc: Takes you out of this screen

Disp: Will display what information is in an address line.

Del: Deletes information from the memory

Inp: Allows for input into the memory

PRJ: The project key (see next page)

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PRJ – Project setup

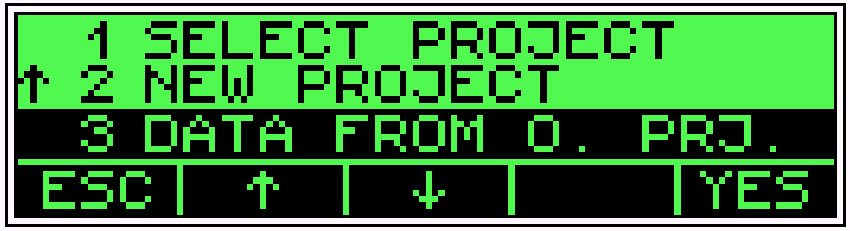
1) Use arrows to highlight new project

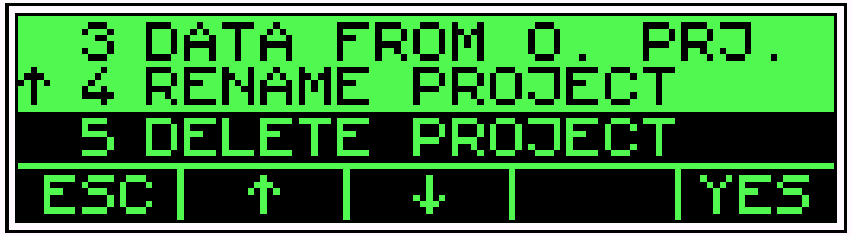
2) You can either input a project name

3) Create a directory and then input a project name

OR

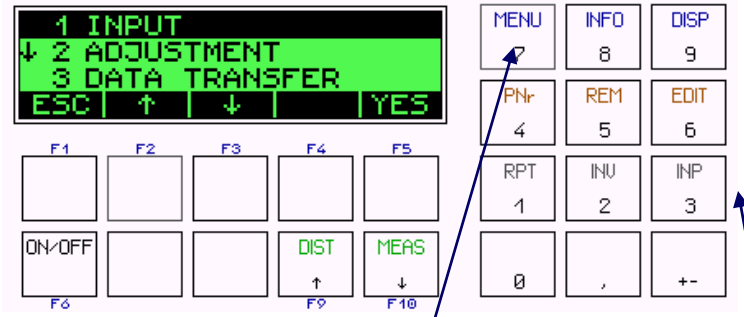
Options in the Project menu:





Trimble

Keyboard – MENU key



MENU (#7 key):

Instrument settings and functions. See the next set of pages for detailed explanation of the menu items.

To get around in a menu:

Press the number key associated with the menu item you wish to access.

OR

Use the arrow keys to scroll and high-light the feature you want and then press the Yes key

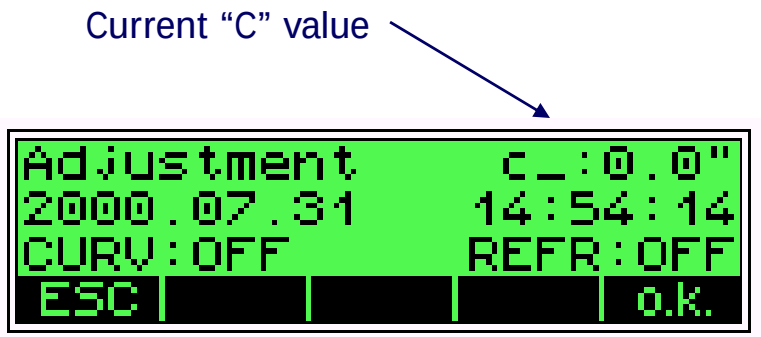
Menu Items - Input

1) Max dist: Sets a QC measure that will alert the user when the specified distance is exceeded.
2) Min sight: Sets the lowest point on the rod that will be accepted for meas.
3) Max diff: Sets the max difference allowed between measurement sets when running a BFFB mode in the line function.
4) Refr coeff: Allows the user to set a value in for the refraction coefficient.
5) Vt offset: Allows the user to put in a value that the instrument will correct the rod reading by
6) Date: Set the date
7) Time: Set the Time

Trimble

Menu Items - Adjustment

The adjustment menu item allows the user to run a “peg test” on the instrument. Various methods are available and the instrument determines a correction value (c_) that will be applied to all measurements. there is no need for mechanical adjustment of the line of sight. The software inside the instrument takes care of the correction for you !



PLEASE REFER TO THE MANUAL (P. 7-1) FOR PROPER RUNNING OF THE ADJUSTMENT PROGRAM.

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Menu Items – Data Transfer

Under data transfer you have the option of setting data transfer to 2 different interfaces. This allows the user to set all of the communication parameters up for each and then picking which one to download to without resetting the comm parameters every time.

1) Interface 1: picks the 1st interface (maybe a PC)
2) Interface 2: picks the 2nd interface (maybe a printer)
3) PC Demo: Allows what is going on in the display of the instrument to be seen on a computer screen.
4) Update / service: This is for the service center to connect and service the instrument.

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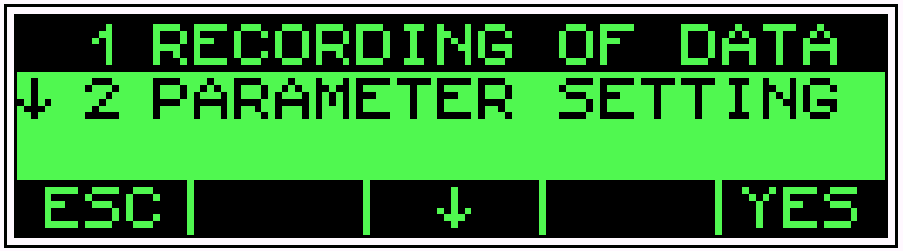
Menu Items – Recording



1) Recording of data

2) Parameter settings: Communication settings that effect the update / service routine. (baud rate, parity etc.)

1) Remote Control: Set-up to record to an external PC.

2) Record: Where or if your recording data

3) Rod Readings: What to record, Measured (RM) Data, or Measured and Computed (RMC) data.

4) Pno Increment: What to increment by

5) Time: Turn the time stamp on or off

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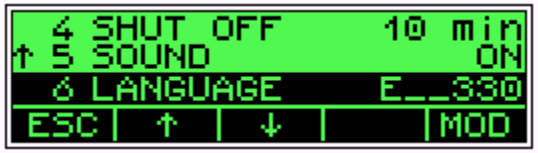
Menu Items – Inst. Settings



Remember the MOD key allows you to change what is highlighted.

1) Height Unit: the units of height to be measured and recorded into memory.
2) Input Unit: Units for the manual input of data.
3) Display resolution: How many decimal places you would like to record out to.
4) Shut Off: Instrument will automatically shut off if not used after 10 minutes.
5) Sound: Turn the sound on or off.
6) Language: Set the language.
7) Date: Set your date format
8) Time: Set your time format

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Menu Items – Line Adj.

Line Adjustment will do a very simple adjustment or balance of your elevations when there is misclosure of a level loop.

After a line adjustment has been done on a level loop that is stored in the memory, the information that is in the file is now adjusted data. Remember to download your raw data before performing a line adjustment.

It is recommended that all adjustments of data be performed by qualified personnel and done in the office

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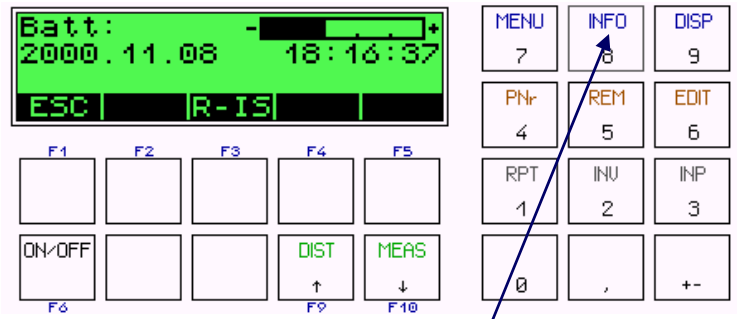
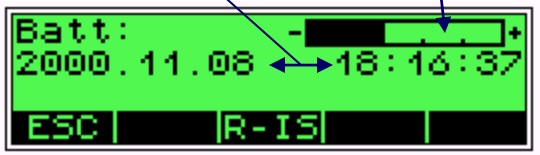
Keyboard – INFO key



Battery level indicator

Date and Time



INFO (#8 key):

Some general information in regards to the level.

Records the current instrument settings to the memory. It is recommended to do this at the start of every project so you have a record of how the instrument is set-up.

TIP: When running a level loop, check here to see if your foresights and backsights are balanced. It keeps a running tally.

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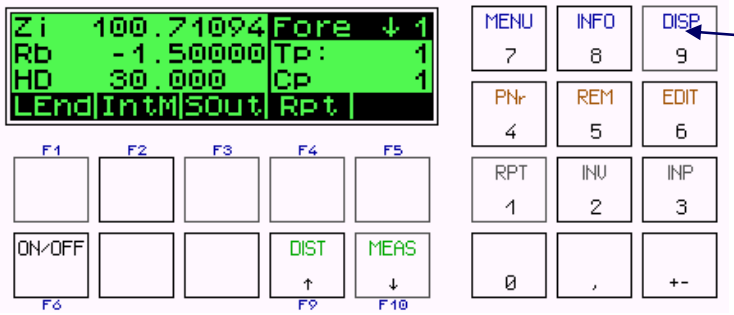
Keyboard – DISP key



DISP (#9 key):

When there is more information than can be displayed in the screen at one time the display key toggles between the different pieces of information.

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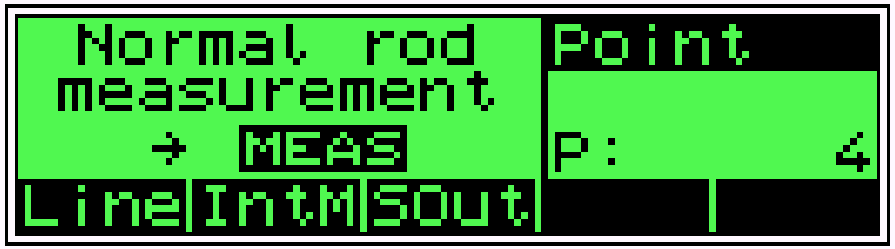
DiNi Functionality



There are 3 main functions of the DiNi digital level:

1) Line – Running a level loop. Keeps track of all of your information and even gives you misclosure at the end of the run if running between 2 known Benchmarks.
2) IntM – Intermediate mode or sideshots. Useful for topo, monitoring or when running a level loop to get a side elevation.
3) SOut – Stakeout of design elevations. Elevations can be entered in when needed or can be recalled from memory.

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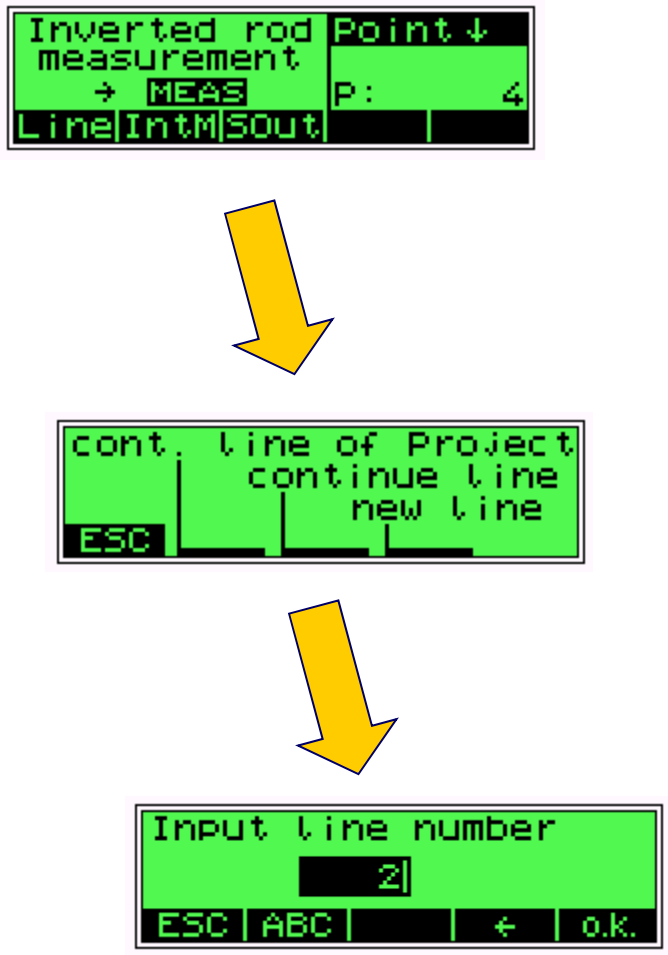
Running a Line



To start a line:

1) Press the key below Line in the screen

2) Press the key below new line

3) Input a line number

A line number is a way to identify a certain level loop within the project. You may have various lines within a project.

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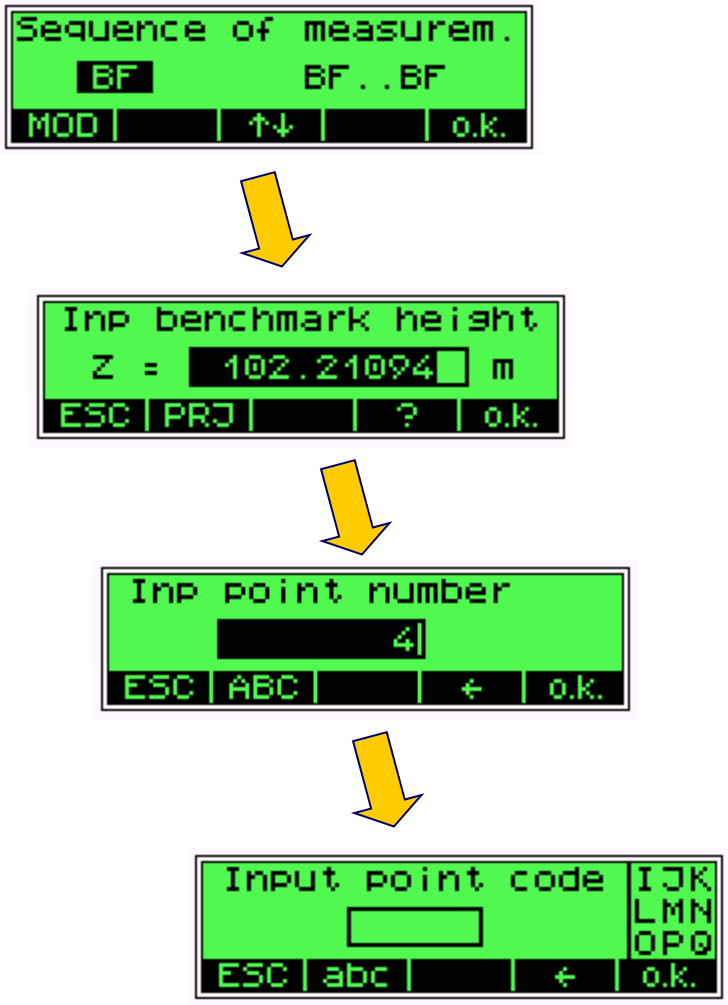
Running a Line



4) Pick the sequence of measurement (BF,BFFB,BBFF,BFBF)

5) Input the Benchmark height.
if you want differences input “0”

6) Assign a point number for the BM

7) Assign a code if you wish.

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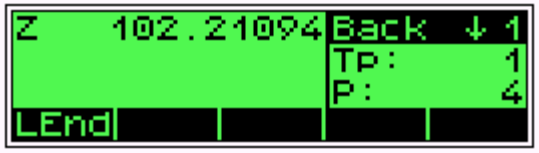
Running a Line

You are now ready to start measuring



Starting BM elevation

Press the Measure button
(remember the one on the side of the instrument)

What are we going to measure next?
Back=Backsight
Fore=Foresight

Rb – rod reading of The backsight

HD – Distance for the measurement

Tp – turning point we are on

Results of the measurement

Cp – Control point or backsight we are turning off of

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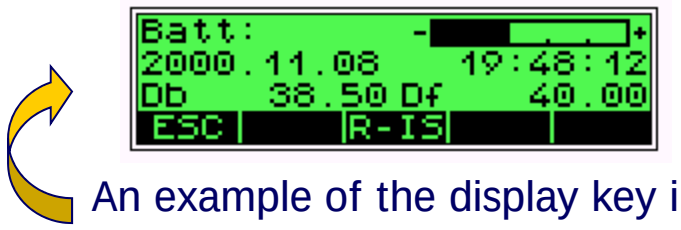
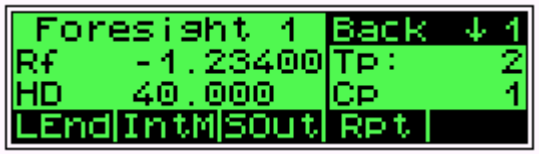
Running & Ending a Line

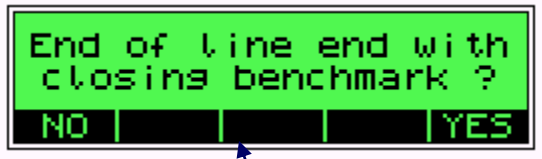


An example of the display key in
The middle of a level loop

After your foresight is taken
you are now ready to move up.
you can turn the level off and when
you move up and turn it on, you will
be right where you left off. Continue
on through the level loop.



When you are done and have measured
the closing BM, you can press the key
below “LEnd” (line end). You need to end
a line after measuring your final shot.



Do you know the elevation of the BM you closed on?

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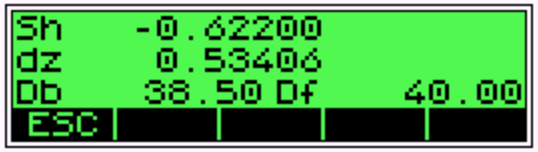
Ending a Line



By answering yes you will get prompted for the following info on the closing BM:

Known Elevation
Point Number
Point Code

We than get some results !

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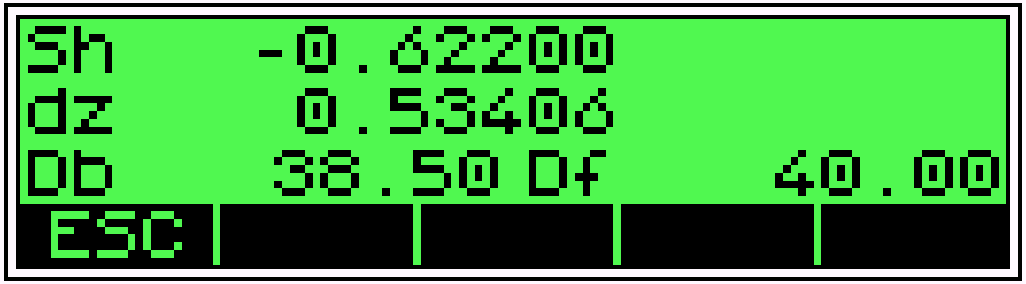
Ending a Line



Sh: The starting and ending elevation difference. If you started on a BM with an elevation of 635 and ended with an elevation of 634, your Sh would be –1.00.

Dz: How well did you close the loop. This compares the measured values for the closing shot compared with the values you entered for vhe closing BM elevation.

Db: Total distances for backsights

Df: Total distances for Foresights

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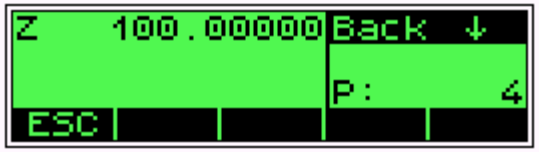
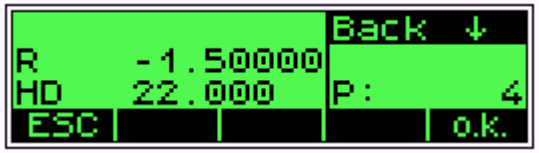
INTM - Sideshots

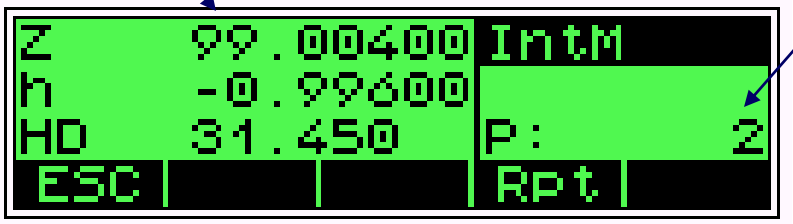




1) Start by pressing the key below IntM
2) Input a BM height
3) Measure the backsight
4) Ok or confirm the measurement is Ok.
5) Start Measuring !

Elev of shot just taken

Point number for next shot



When measuring in IntM, this is the screen you will see after you have taken a shot. Everything is recorded to memory. notice in the upper right hand corner it shows you what mode you are using the DiNi in.

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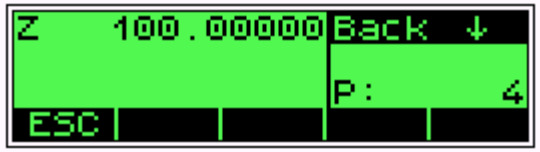
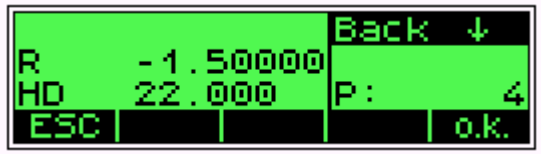
SOut - Stakeout





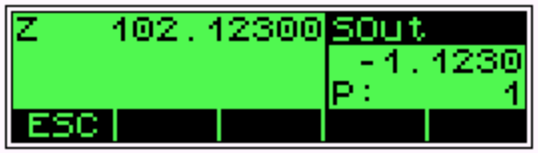
1) Start by pressing the key below SOut

2) Input a BM height

3) Measure the backsight

4) Confirm the measurement is Ok by pressing the key below Ok

SOut - Stakeout



5) The instrument will then ask you for a nominal elevation. This is the design grade for the point you are measuring.

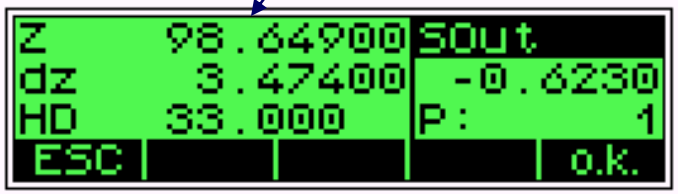
6) Measure the point

7) You now get results !

dz

Cut or fill to design or nominal elevation.
A positive number is a fill and a negative number is a cut

Measured elevation of the point



Mode we are in along with info about the elevation we are setting

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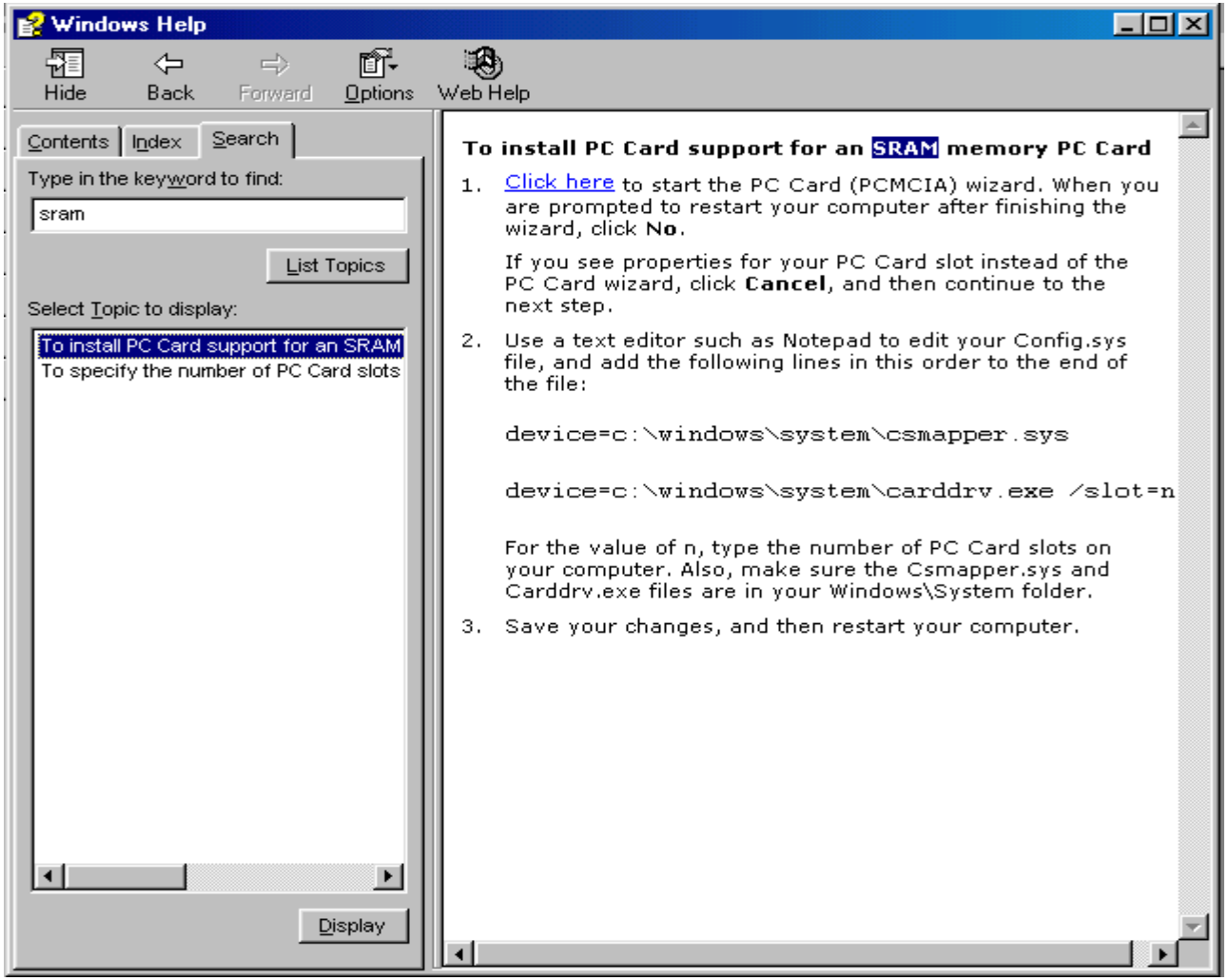
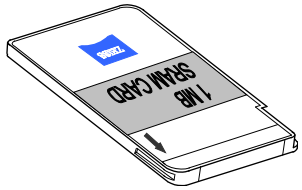
Downloading – PCMCIA





Under Windows Explorer, in the HELP menu, you can find instructions for setting the drivers for SRAM PCMCIA card support. By doing this the card slots in your laptop become the next available drive letters.

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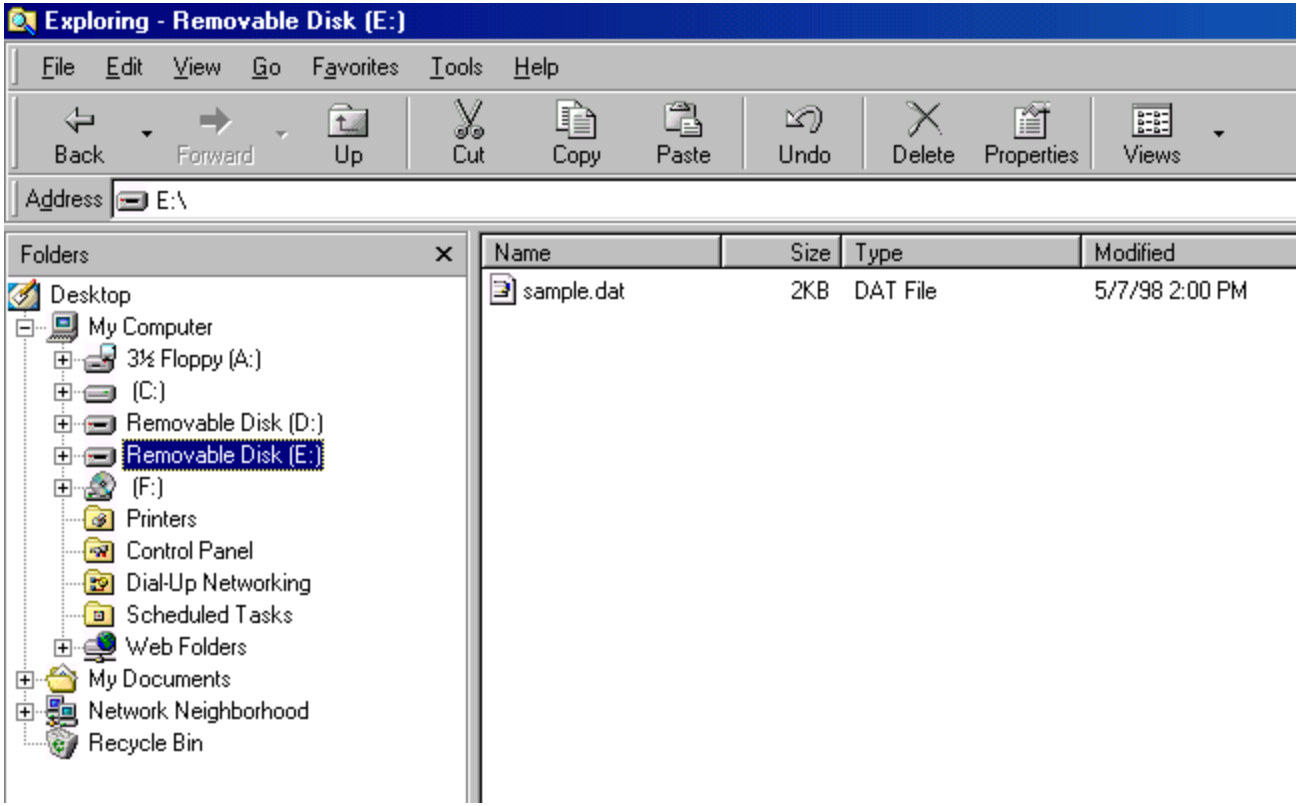
Downloading – PCMCIA

After your computer is set-up for PCMCIA card support, you can now go into Windows Explorer and “click and drag” your file to the proper directory.



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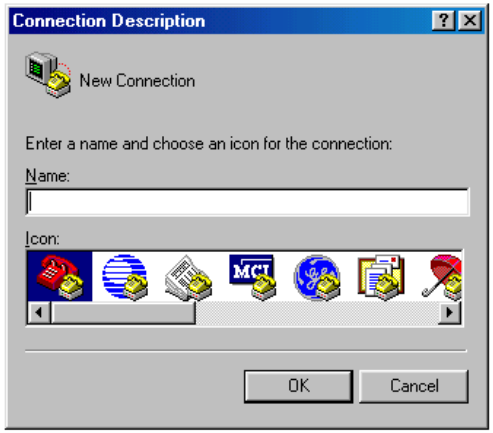
Downloading – RS232

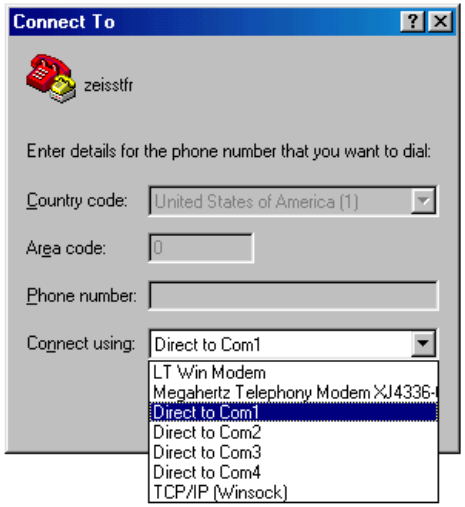
DiNi – HyperTerminal Download Set-up and Procedures:

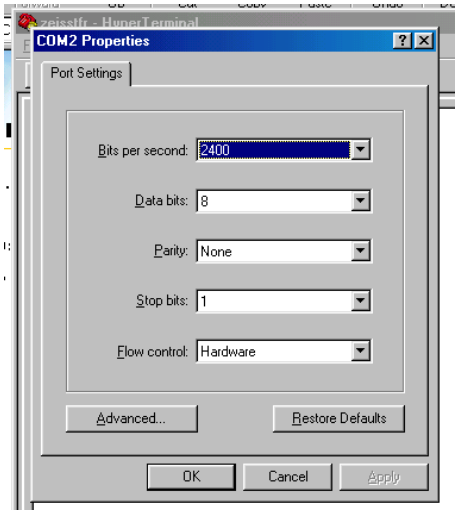
HyperTerminal Settings:

1. Connect using: Com1 (Or whatever COM port you are connecting to via cable)
2. Baud Rate: 9600
3. Data bits: 8
4. Parity: None
5. Stop bits: 1
6. Flow control: Xon-Xoff

Suggestion: It is easiest after you set-up the transfer parameters to create a short cut in your desktop for this process. We also suggest creating a DiNi data directory and transfer always to and from this directory.







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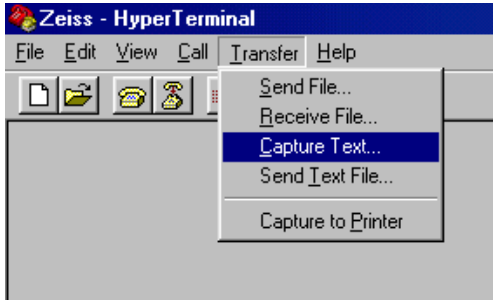
Downloading – RS232

DiNi transfer parameters and procedures:

On the PC:



1. Click on the HyperTerminal or Shortcut icon.
2. To download data select capture text under the transfer menu bar item.
3. Give the file a name with a directory.
4. You are now ready to receive data.

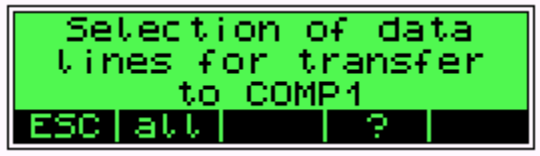
On the Digital Level:

1. Press the Menu key (7)
2. Pick data transfer
3. Pick interface 2 (Interface 1 might be a printer and Interface 2 might be a computer)
4. Pick Dini - Periphery to download to the computer.

NOTE: Communication parameters can be set and changed in this screen by picking Set Parameters.

Your parameters should be:

Format - REC_ E
Protoc - Xon/Xoff
Baud - 9600
Parity - none
StopBit - 1
Timeout - 10s
Linefeed - Yes



5. Select the data you wish to transfer (ie: all)
6. Select yes to start transfer.

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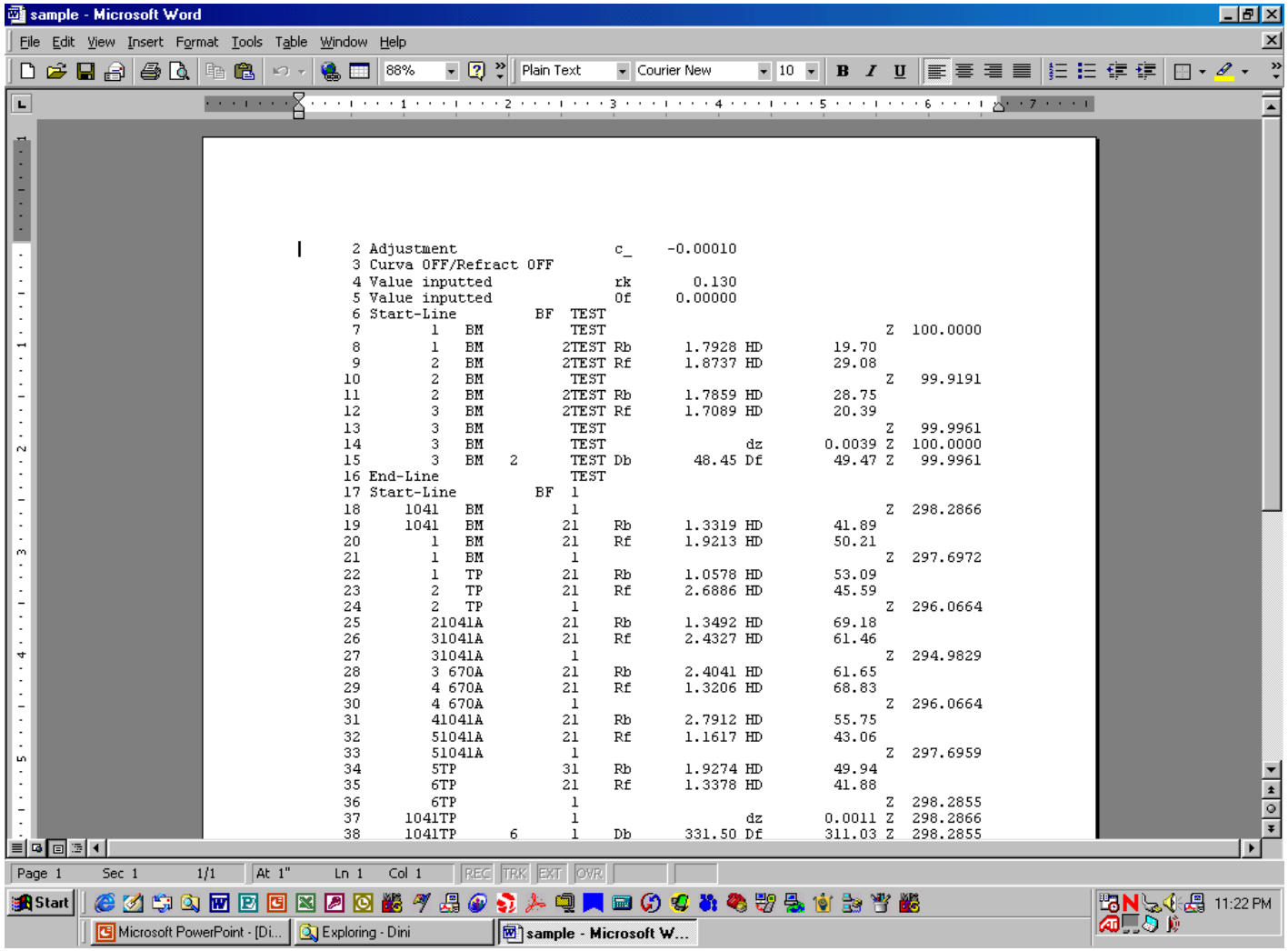
Data File

The file that is recorded in the DiNi is a Text file that can be looked at and edited in any text editor program. There is no need to convert the file format.

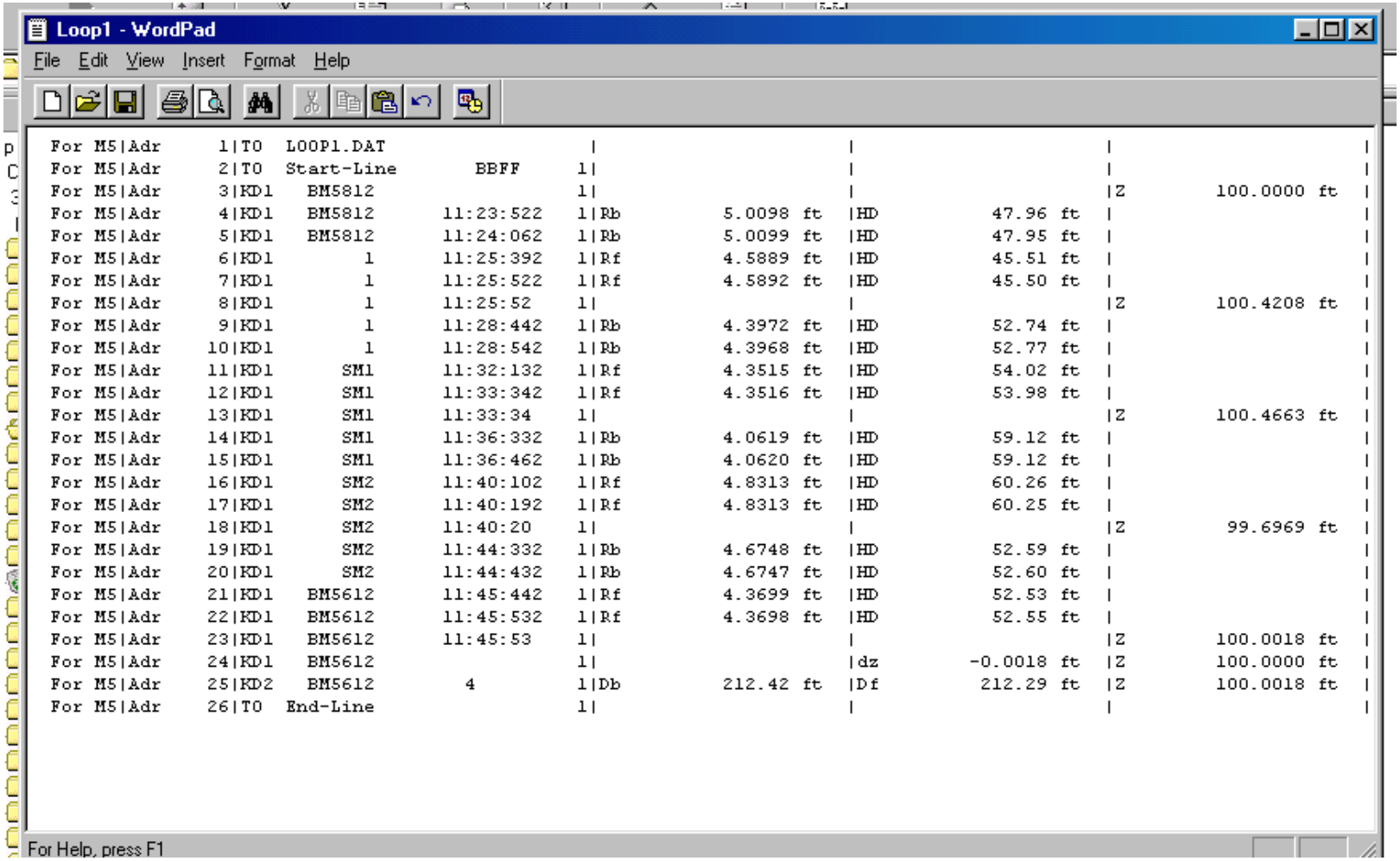
There are 2 different File formats for the DiNi digital level; Rec_E (M5) and Rec500.




```
 2 Adjustment                  c_    -0.00010
 3 Curva OFF/Refract OFF
 4 Value inputted              rk       0.130
 5 Value inputted              0f     0.00000
 6 Start-Line          BF  TEST
 7         1   BM          TEST                                        Z  100.0000
 8         1   BM        2TEST Rb      1.7928 HD        19.70
 9         2   BM        2TEST Rf      1.8737 HD        29.08
10         2   BM         TEST                                       Z   99.9191
11         2   BM        2TEST Rb      1.7859 HD        28.75
12         3   BM        2TEST Rf      1.7089 HD        20.39
13         3   BM         TEST                                       Z   99.9961
14         3   BM         TEST                  dz      0.0039 Z  100.0000
15         3   BM   2     TEST Db       48.45 Df        49.47 Z   99.9961
16 End-Line               TEST
17 Start-Line         BF  1
18      1041   BM          1                                          Z  298.2866
19      1041   BM         21    Rb      1.3319 HD        41.89
20         1   BM         21    Rf      1.9213 HD        50.21
21         1   BM          1                                          Z  297.6972
22         1   TP         21    Rb      1.0578 HD        53.09
23         2   TP         21    Rf      2.6886 HD        45.59
24         2   TP          1                                          Z  296.0664
25         21041A         21    Rb      1.3492 HD        69.18
26         31041A         21    Rf      2.4327 HD        61.46
27         31041A          1                                          Z  294.9829
28         3 670A         21    Rb      2.4041 HD        61.65
29         4 670A         21    Rf      1.3206 HD        68.83
30         4 670A          1                                          Z  296.0664
31         41041A         21    Rb      2.7912 HD        55.75
32         51041A         21    Rf      1.1617 HD        43.06
33         51041A          1                                          Z  297.6959
34         5TP            31    Rb      1.9274 HD        49.94
35         6TP            21    Rf      1.3378 HD        41.88
36         6TP             1                                          Z  298.2855
37      1041TP             1                  dz      0.0011 Z  298.2866
38      1041TP       6     1    Db       331.50 Df       311.03 Z  298.2855
```

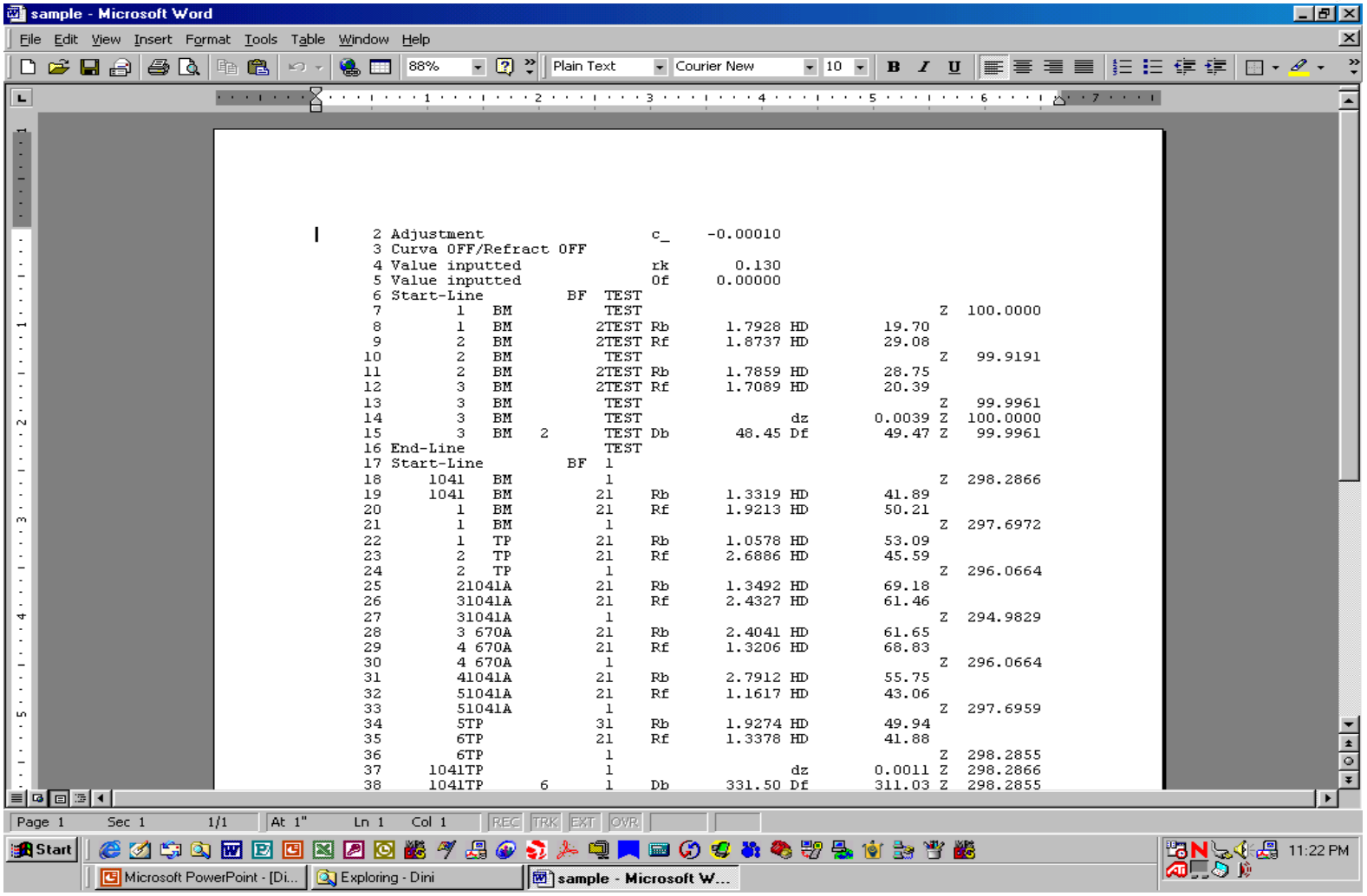
Trimble

Data File – Rec_E



Trimble

Data File – Rec500




```
 2 Adjustment                    c_     -0.00010
 3 Curva OFF/Refract OFF
 4 Value inputted                rk        0.130
 5 Value inputted                0f      0.00000
 6 Start-Line          BF  TEST
 7         1   BM          TEST                                        Z  100.0000
 8         1   BM         2TEST Rb       1.7928 HD         19.70
 9         2   BM         2TEST Rf       1.8737 HD         29.08
10         2   BM          TEST                                       Z   99.9191
11         2   BM         2TEST Rb       1.7859 HD         28.75
12         3   BM         2TEST Rf       1.7089 HD         20.39
13         3   BM          TEST                                       Z   99.9961
14         3   BM          TEST                    dz     0.0039 Z  100.0000
15         3   BM   2      TEST Db        48.45 Df         49.47 Z   99.9961
16 End-Line                TEST
17 Start-Line           BF  1
18      1041   BM          1                                          Z  298.2866
19      1041   BM         21    Rb       1.3319 HD         41.89
20         1   BM         21    Rf       1.9213 HD         50.21
21         1   BM          1                                          Z  297.6972
22         1   TP         21    Rb       1.0578 HD         53.09
23         2   TP         21    Rf       2.6886 HD         45.59
24         2   TP          1                                          Z  296.0664
25         21041A         21    Rb       1.3492 HD         69.18
26         31041A         21    Rf       2.4327 HD         61.46
27         31041A          1                                          Z  294.9829
28         3 670A         21    Rb       2.4041 HD         61.65
29         4 670A         21    Rf       1.3206 HD         68.83
30         4 670A          1                                          Z  296.0664
31         41041A         21    Rb       2.7912 HD         55.75
32         51041A         21    Rf       1.1617 HD         43.06
33         51041A          1                                          Z  297.6959
34         5TP            31    Rb       1.9274 HD         49.94
35         6TP            21    Rf       1.3378 HD         41.88
36         6TP             1                                          Z  298.2855
37      1041TP             1                    dz     0.0011 Z  298.2866
38      1041TP          6  1    Db        331.50 Df        311.03 Z  298.2855
```

General Info

The DiNi needs approx. 30cm of the rod to measure, about 15cm above and below the center crosshair. Remember the rod needs to be in focus and the crosshairs on the surface of the rod.

The battery is NiMh. It will last about 3 working days and recharges in about 1.5 hrs.

The DiNi is a precision instrument and needs to be cared for as such. Routine servicing and calibrating is recommended.

Field calibration of the circular level vial is recommended on a regular basis.

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