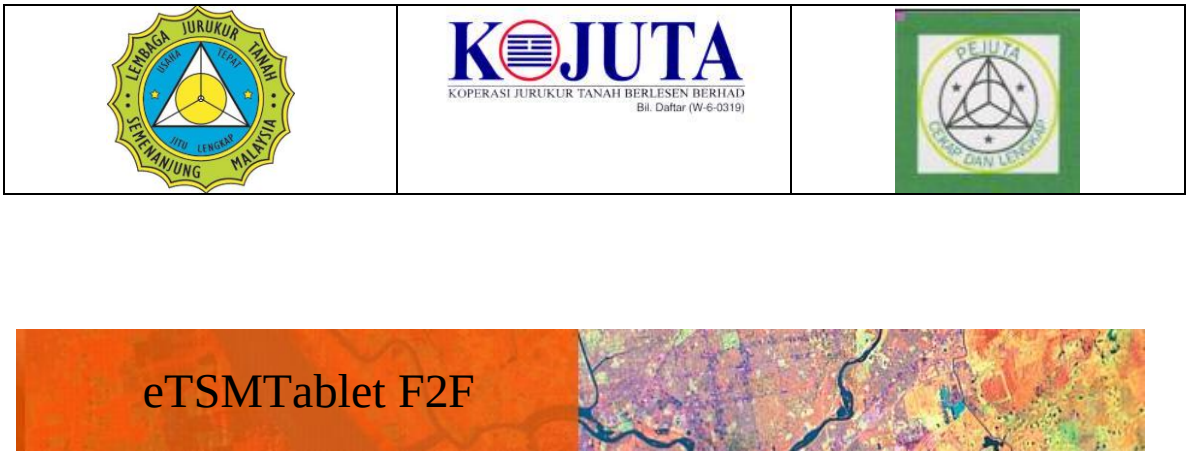
FIELD-TO-FINISH
TRAINING COURSE

USER MANUAL
TITLE SURVEY MODULE (eTSMTablet)
Version 3.05.02



Last Update: 4 July 2022

eTSMTablet - USER GUIDE

This manual provides information on how to use the eTSMTablet Survey Software. Procedures and functionalities of the eTSMTablet Survey Software is included with the help of graphic layouts. A simple tutorial session to guide the user through the process will be provided.

1. Introduction to Field-to-Finish System 1

1.1. Hardware & Software Configuration 1

1.2. Top Level Diagram 1 2

1.3. Processing Steps 3

2. Getting Ready to Use eTSMTablet 4

2.1. Bluetooth and Cable Setting 5

2.1.1. Pairing a New Bluetooth Device 5

2.1.2. Establishing a Bluetooth Connection ..... **Error! Bookmark not defined.**

2.1.3. Bluetooth Troubleshooting ..... **Error! Bookmark not defined.**

2.1.4. Cable Setting 9

2.2. Getting Started with eTSMTablet 9

2.2.1. Method 1 9

2.2.2. Method 2 9

2.2.3. Method 3 9

2.3. Understanding eTSMTablet Interface 10

2.4. Menu Bar 10

2.4.1. Job Menu 10

2.4.2. Survey Menu 11

2.4.3. Define Menu 11

2.4.4. Computation Menu 12

2.4.5. Record Menu 12

2.4.6. View Menu 13

2.4.7. Display Menu 13

2.4.8. Window Menu 14

2.4.9. Layer Menu 14

2.4.10. Geo Menu 14

2.4.11. Line Menu 15

2.4.12. Report Menu 15

2.4.13. Import Menu 15

2.4.14. Export Menu 16

2.4.15. GPS Menu 16

2.5. GPS Setting (Lower Accuracy, Not for CRM) 17

2.5.1. Background 17

2.5.2. Check Com Port 17

2.5.3. GPS Capture 19

2.5.4. Basemap 19

3. Working with Jobs 21

3.1. Start New Job 21

3.2. Open Existing Job 21

3.3. Save Job 22

3.4. Backup Job 23

3.5. Fill in Job Info 23

3.6. eTSMTablet Work Flow 26

3.6.1. eTSMTablet – Processing Steps 26

4. Field Data Preparation 27

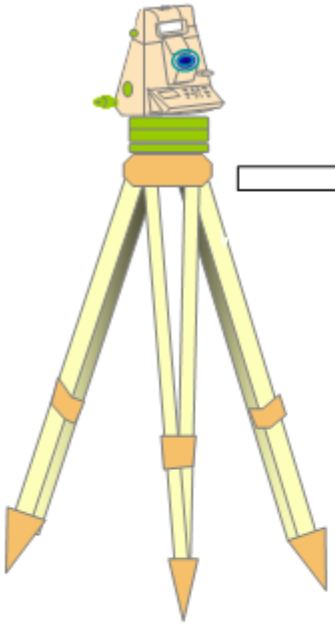
4.1. PO Data 27

4.1.1. Read PDUK Data / POB File 27
4.1.2. Enter PO Line Value 29
4.1.3. Compile Line 30
4.2. SKL (Precomp) Data 31
4.2.1. Import SKL ASCII 31
4.2.2. Enter SKL Line Value 32
5. Field Data Capture 33
5.1. Solar Observation 33
5.2. Differential Field Test 37
5.3. Semakan Harian 39
5.4. Datum 41
5.5. Traverse 43
5.6. Online 45
5.7. Bearing Close 48
5.8. Close Statement 50
5.9. Check Angle & Distance 52
5.10. Check Angle 54
5.11. Check Distance 55
5.12. Offset Measurement 57
5.13. TT Mark 59
5.14. Patty Wall 60
5.15. View Field Book 62
6. In Field Computation 63
6.1. Define Menu 63
6.1.1. Define Coordinate 63
6.1.2. Define Traverse 65
6.1.2.1. Manual Way 65
6.1.3. Define Block 66
6.1.3.1. Manual Way 66
6.1.3.2. Graphically Way 68
6.1.3.3. Auto Define (with SKL ASCII) 69
6.1.4. Define Lot 69
6.1.4.1. Manual Way 69
6.1.4.2. Graphically Way 70
6.1.5. Define Direct Line 71
6.1.5.1. Manual Way 71
6.1.5.2. Graphically Way 72
6.1.6. Define Connection Line 72
6.1.6.1. Manual Way 73
6.1.6.2. Graphically Way 73
6.1.7. Match PO/New or SKL/New 74
6.1.7.1. Manual Way 74
6.1.7.2. Graphically Way 75
6.1.8. Stn Remark 75
6.1.9. Edit Station ID 76
6.2. M & C Correction 77
6.2.1. C Correction 77
6.2.2. M Correction 77
6.2.3. Clear Correction 78
6.2.3.1. Clear Correction 78
6.2.3.2. Clear All Correction 78
6.2.3.3. Clear All Correction (back to RAW) 78
6.3. Survey Computation 79

6.4. Base Computation and Refixation 79
6.4.1. Base Refixation 80
6.4.2. Setting Out 82
6.5. Secant 83
6.6. Missing Line by Bearing and Distance 85
6.7. Missing Line by Coordinate 86
6.8. Convert Coordinate (Cassini ←→ WGS84) 87
7. View Menu 88
7.1. Query and Delete Records 88
7.1.1. Delete by Query Line 88
7.1.2. Delete by View Lines 88
7.1.3. Undelete Record 89
7.2. Query Bearing Distance by 2 Points 89
7.3. Pick Object Info 91
8. Reporting and Export JUPEM ASCII 92
8.1. Reporting 92
8.1.1. Field Note (Field Book) 92
8.1.2. Solar Report 93
8.1.3. Jilid Kiraan (JK) 93
8.1.4. Survey Computation Report 93
8.1.5. Print Observed Line 95
8.1.6. Print PO Lines 96
8.1.7. Print GPS Points 96
8.1.8. View *.doc, *.PDF, *.htm Report 96
8.2. Export JUPEM ASCII 97
8.2.1. Troubleshot – PO Line Info not Complete 97
8.3. Export CPSWin 98
8.3.1. Export CPSWin32 ..... **Error! Bookmark not defined.**
8.3.2. Export CPSWinF2F Ver7 ..... **Error! Bookmark not defined.**
8.4. Export Graphic / Field Diagram 100
9. Utilities and Display Menu 102
9.1. EDM Test 102
9.1.1. Create *.abs 104
9.1.2. Survey Steps 105
9.1.3. Generate EDM Report 107
9.2. Diary 108
9.2.1. Add Record 108
9.2.2. Delete Record 109
9.2.3. Search Record 109
9.3. Claim 110
9.3.1. Add Record 110
9.3.2. Delete Record 111
9.3.3. Modify Record 111
9.4. Check Roll 112
9.4.1. Add Record 112
9.4.2. Delete Record 112
9.4.3. Modify Record 113
9.5. Workspace 113
10. Attachment 115
10.1. eTSMTablet Job Folder Structure 115

1. Introduction to Field-to-Finish System

1.1. Hardware & Software Configuration



TOTAL STATION

Total Station : Cable/ Bluetooth wireless

FIELD COMMUNICATOR + TELEGPS

Operating system windows CE/ XP
Rugged PDA with Bluetooth wireless / cable
Tablet PC with Bluetooth wireless/ cable

LICENSED LAND SURVEYOR
EXISTING OFFICE PC

Title Survey Module :

1. cadastral data capturing
2. solar observation
3. comparison of "PO" and "NEW"
4. Compute Base
5. Refixation
6. lot entry
7. area comparison (surveyed lot vs precomp lot)
8. display of lot and traverse layer
9. Least Square Adjustment

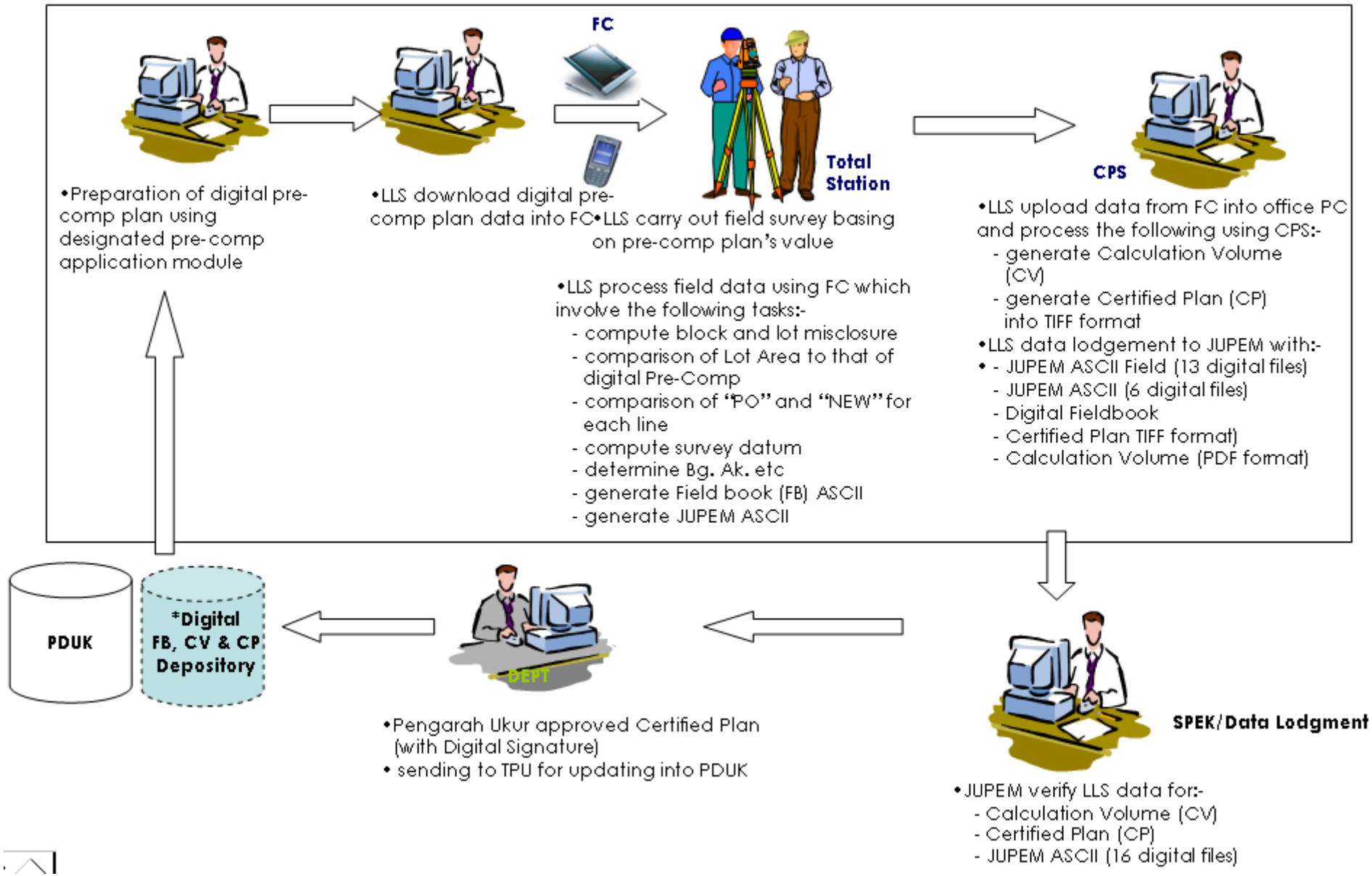
-Attendance
-Field diary
-Conversion module
1. Digital Field book ASCII
2. Jupem ASCII 13 digital files
3. WGS84-CASSINI Module

-Locality Plan Module
-Base Map
-GPS Locality Tracking
-Digital Signature

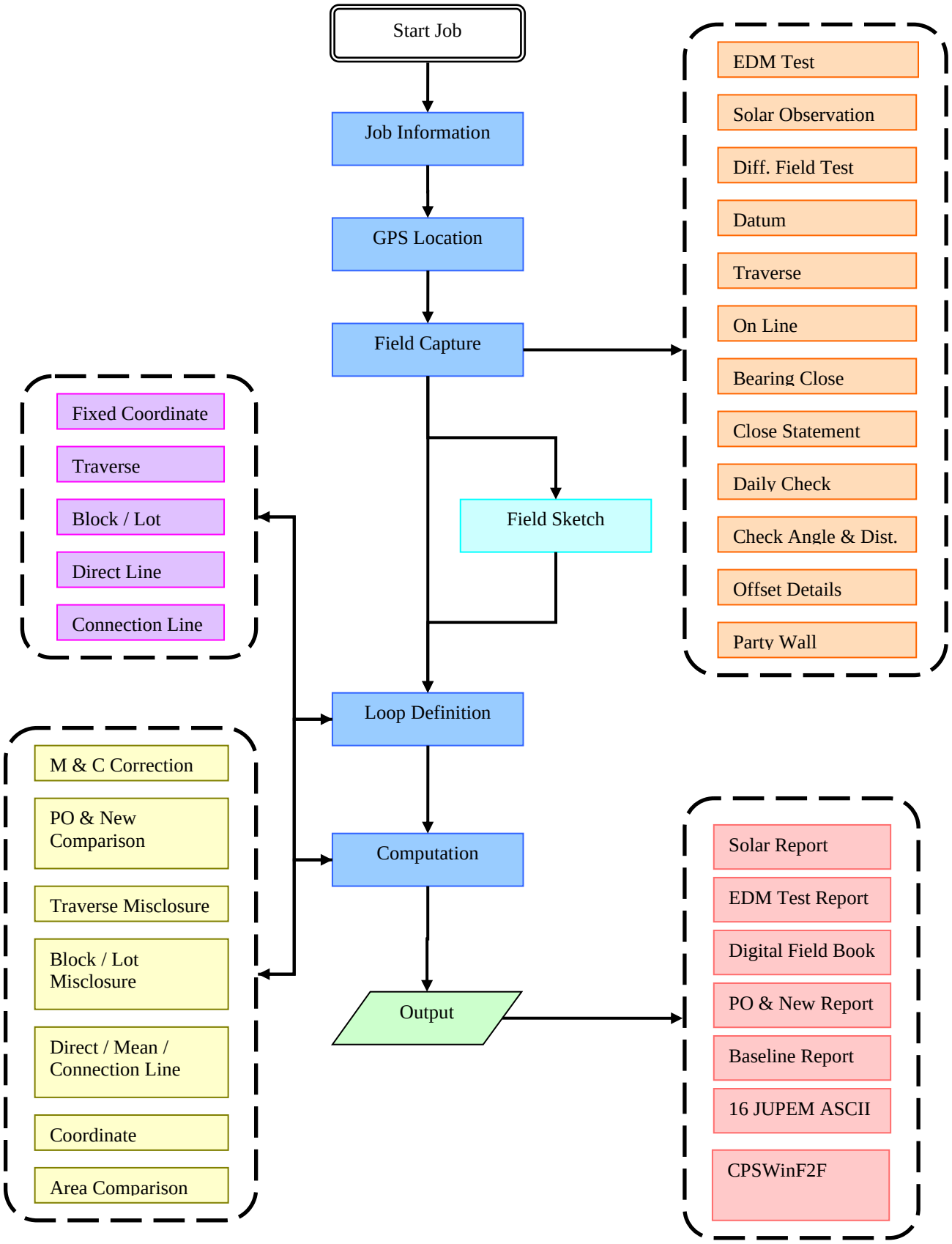
-Conversion module
1. Field book ASCII
2. JUPEM ASCII
3. Conversion to PDF/TIFF format

-Digital Signature

1.2. Top Level Diagram 1



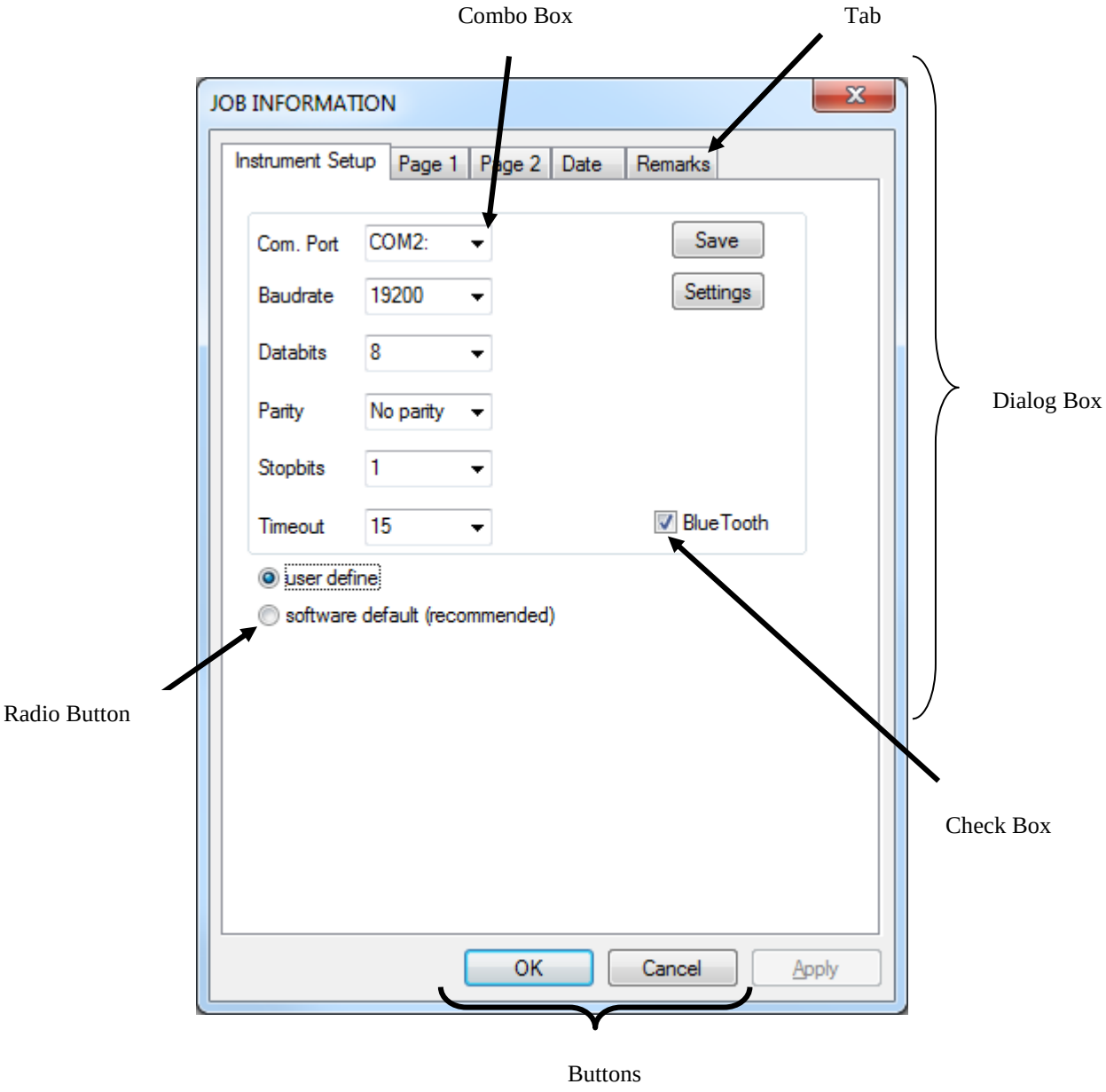
1.3. Processing Steps



2. Getting Ready to Use eTSMTablet

Conventions Used in This Manual

Note Notes explain interesting or important points that can help you understand concepts and techniques. It also acted as a warning for user, which require user to pay careful attention.



2.1. Bluetooth and Cable Setting

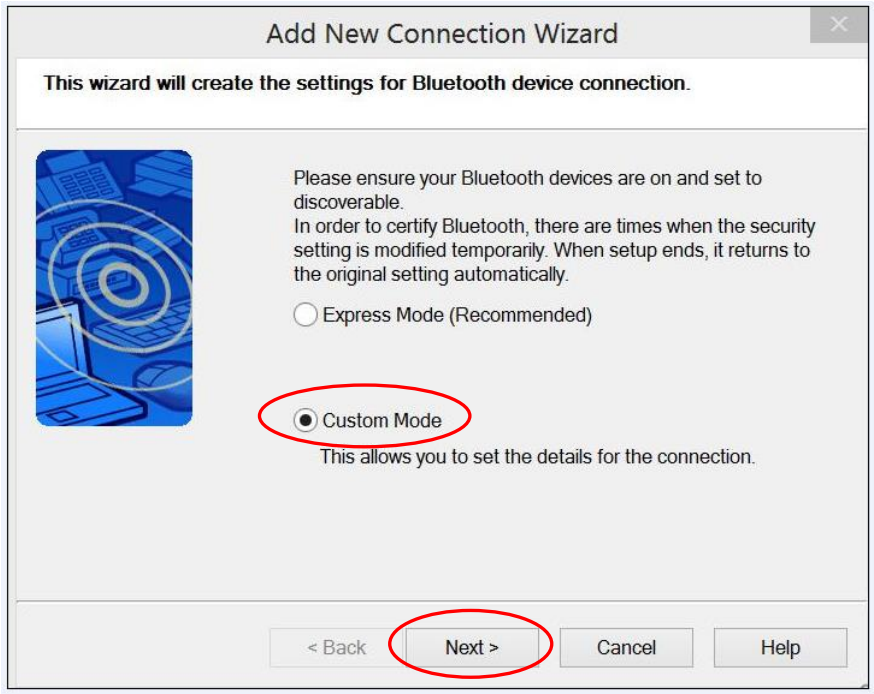
Bluetooth and cable setting is depends on the hardware device. Different device (Tablet) will have different settings.

2.1.1. Pairing a New Bluetooth Device

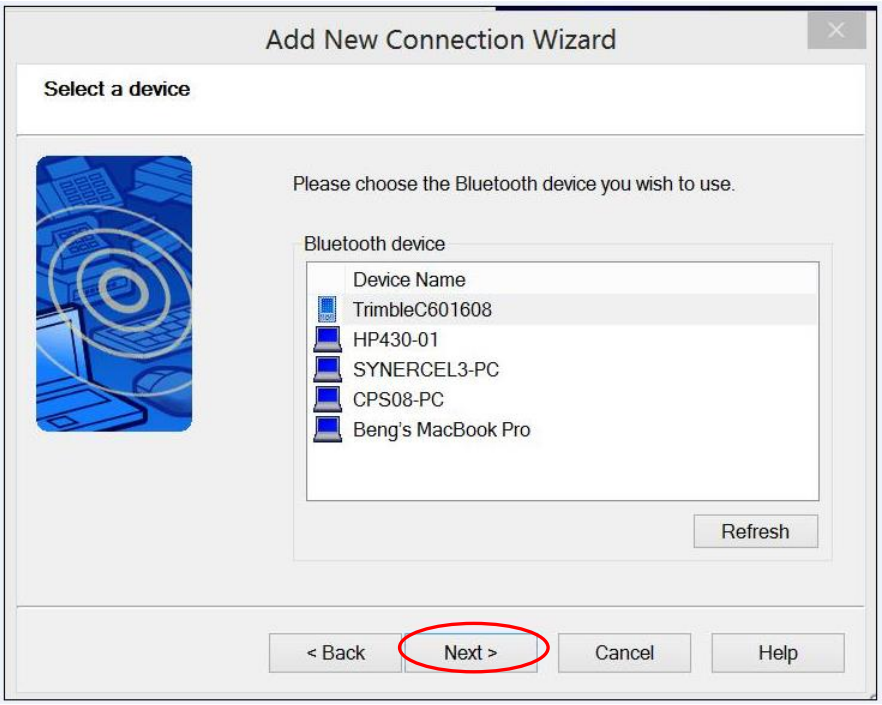
This setting is referring to Panasonic Tough Pad with Window 8 Professional. Before you start using a Bluetooth device, you need to pair up your Bluetooth devices. Pairing the devices allow you to avoid entering access information each time a connection is attempted. Paired devices share a unique link key, which they exchange each time they connect.

1) Make sure both the Tablet and Total Station ON for the Bluetooth. To start initiating your Bluetooth pairing, look for the **Bluetooth Setting**. Click on **New Connection**.

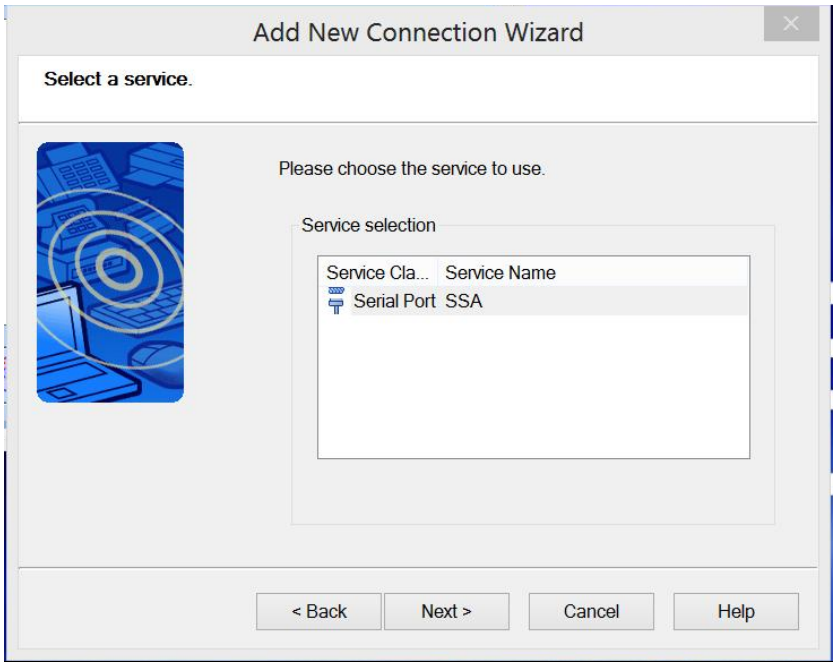
2) Select Custom Mode and click **Next**.



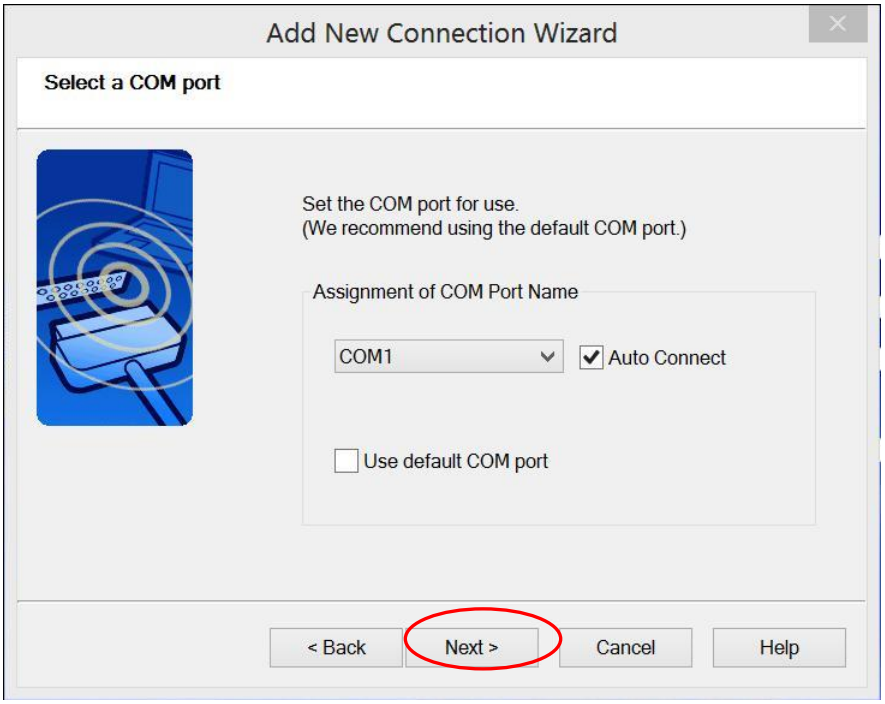
3) Click **Refresh** button if you cannot find your Total Station in the list. Highlight the correct Device Name and then click **Next** to continue.



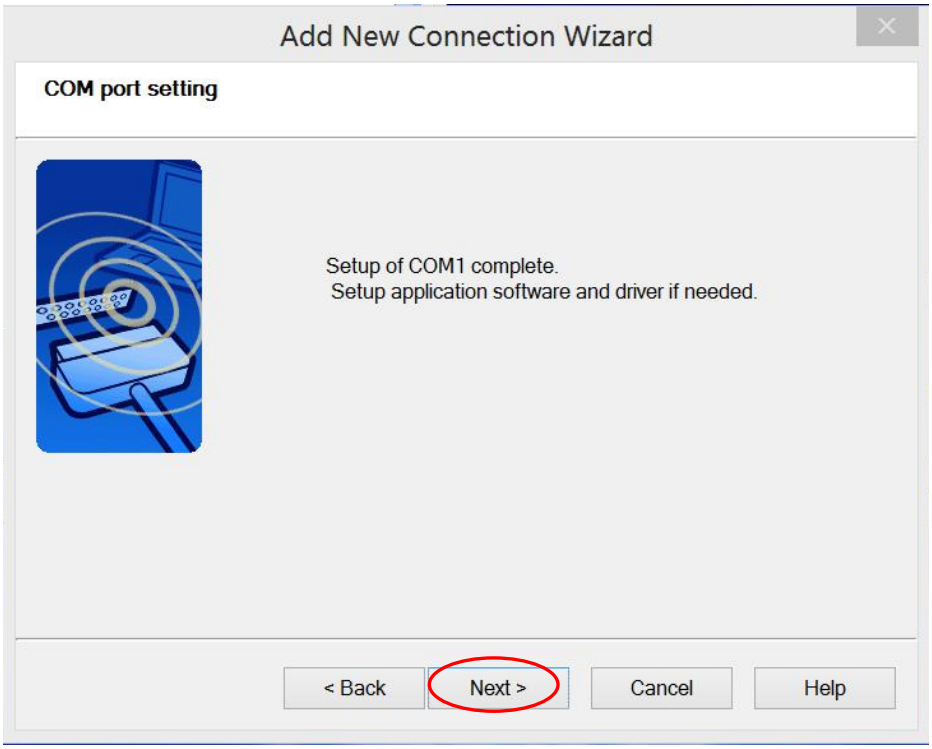
4) Highlight **Serial Port** and click **Next**.



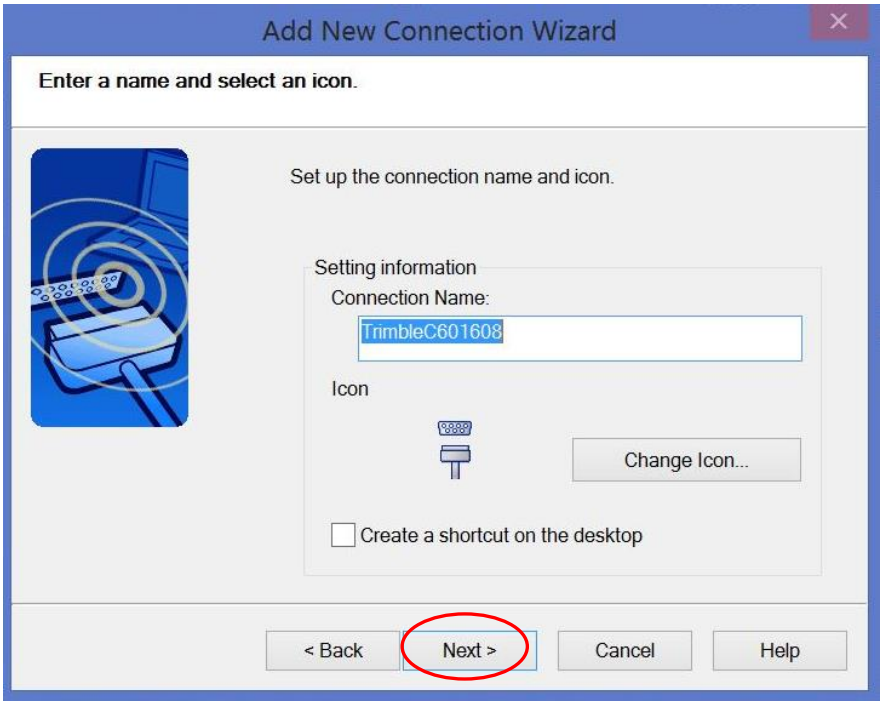
5) Uncheck the "**Use Default COM port**", then chose the available COM Port between **1~9** then click on **Next** button.



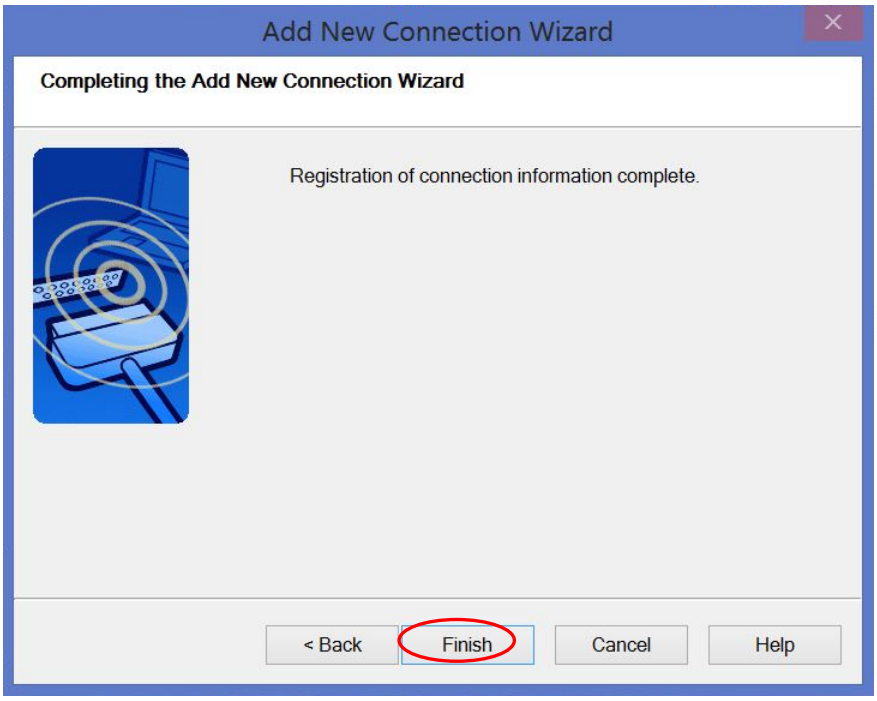
6) Click Next to complete the COM Port setup.



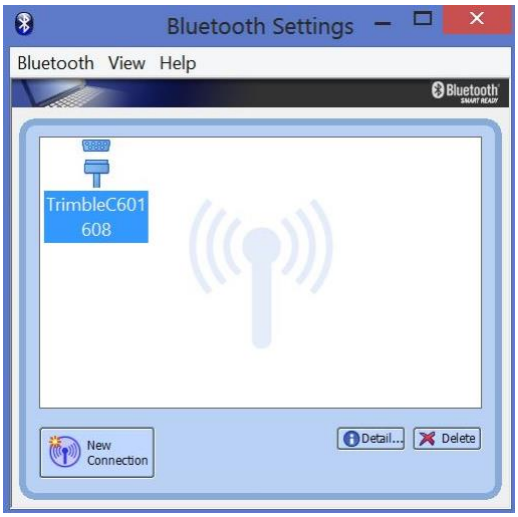
7) Click **Next**.

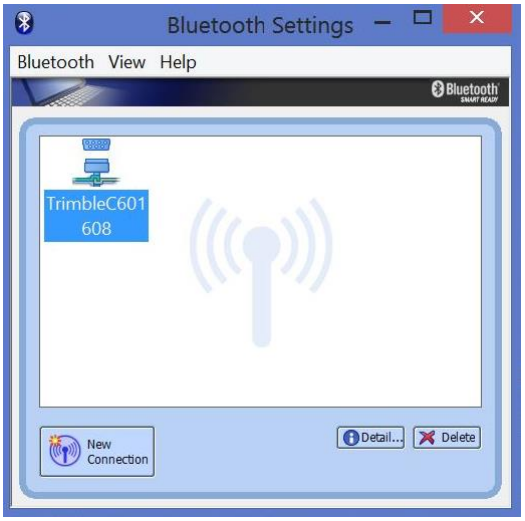


8) Done.



9) Then, in the Bluetooth Settings dialog will appear the Device (Total Station).





2.1.2. Cable Setting

If you are using ATEN Serial Cable to connect from your tablet pc to instrument, please make sure the driver is installed.

After connecting the cable, please check the Comport for ATEN cable follow **Part 2.5.2: Comport**. Then proceed to **Part 3.5: Fill in Job Info**.

All the setting will be same as the figure above but just in the page of **Instrument Setup**, uncheck the **Bluetooth** option.

2.2. Getting Started with eTSMTablet

There is variety of methods to start our eTSMTablet software. Below are some of the methods

2.2.1. Method 1

Double click the <**eTSMTablet**> icon in order to execute the program. An icon as shown in below is available in the window desktop.

2.2.2. Method 2

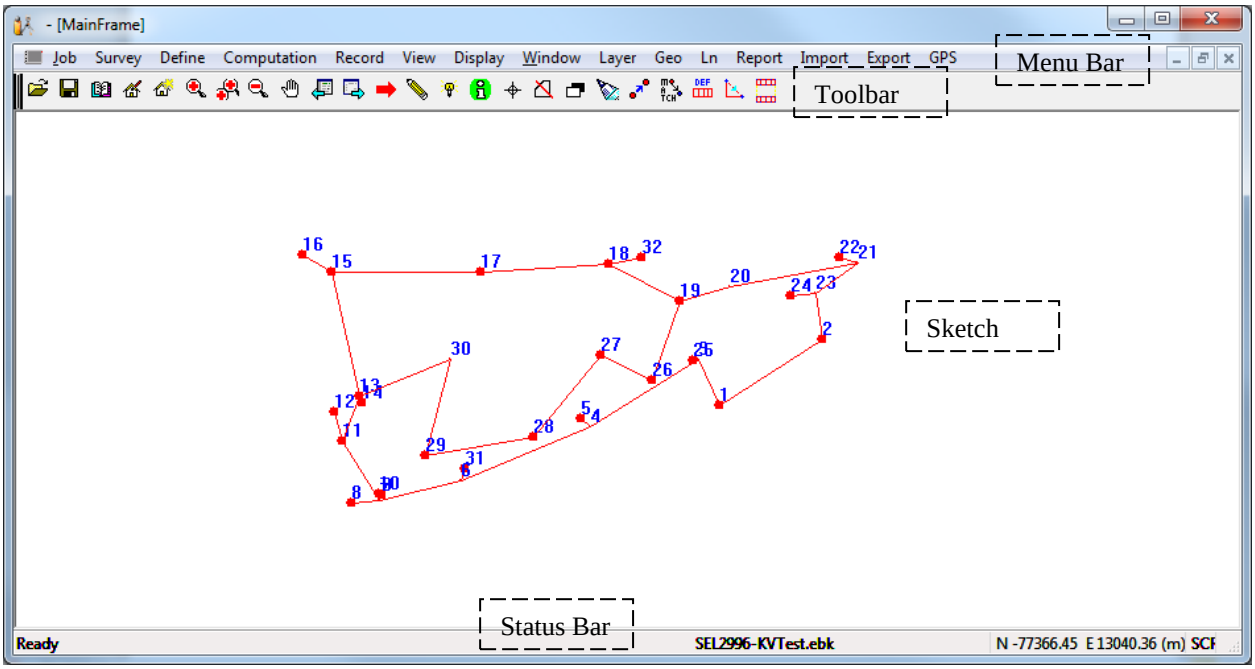
If the eTSMTablet is not visible on your desktop, you can also launch it by navigate to the **Start > All Program > eTSMTablet > eTSMTablet** similar as below.

2.2.3. Method 3

You can also launch **eTSMTablet** by using your window explorer and navigate to the program file in the following directory (C:\CPSTablet\eTSMTablet.exe):-

2.3. Understanding eTSMTablet Interface

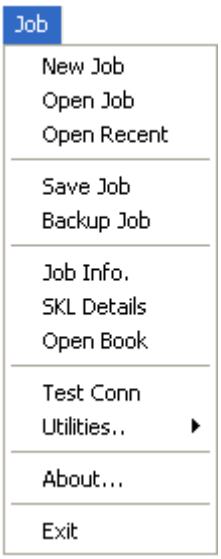
When you first start eTSMTablet, the initial screen contains the menu bar at the top, the status bar at the bottom.



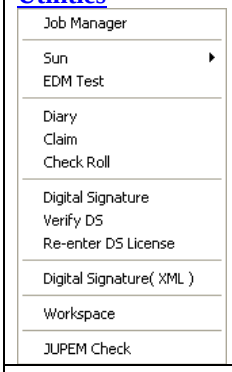
2.4. Menu Bar

2.4.1. Job Menu

– Contains the entire menu item regarding to new job, open job, job info and other utilities. Please refer to **Part 3: Working with Jobs**

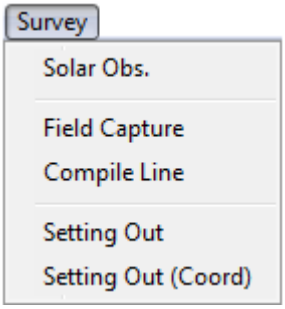


New Job	To create a new job file for database storage
Open Job	To open an existing job file for database storage
Open Recent	To open last use recent file.
Save Job	To write/save current job into file.
Backup Job	To backup an existing job. The backup job will have the same job name but appended with "_1" at the end. I.e. If the job name is Job.ebk , the backup job name will be Job_1.ebk. User can input their own backup filename.
Job Info.	To enter or edit the job information for the job
SKL Details	To view imported SKL job details. i.e *Negeri, Daerah, SKL No., PUNO.*
Open Book	To open existing book index for recording survey measurement. Book is default to "1" if they aren't any other book numbers.
Test Conn	To test the connection between Tablet PC and instrument.

Utilities 	Submenu functions to perform extra/misc. configuration. Include utilities such as *Sun Almanac, EDM Test, Differential Field Test, Diary, Communication settings, etc.*
About	View current version of eTSMTablet.
Exit	To close and exit from eTSMTablet program.

2.4.2. Survey Menu

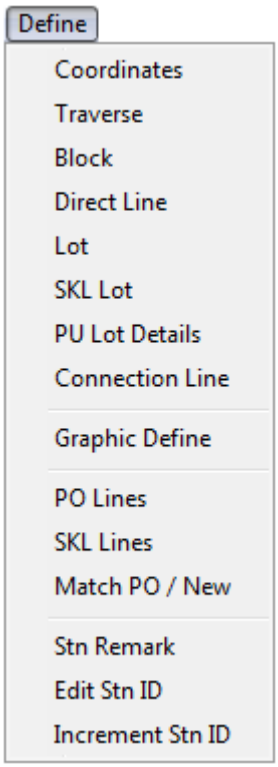
– Contains the entire menu item regarding to field data capture. Please refer to **Part 5: Field Data Capture**



Solar Obs.	To perform SOLAR OBSERVATION measurement
Field Capture	Generic data capture interface. Used for all measured data recording I.e. Datum, Traverse, Produce Line, Online, etc.
Compilation Line	To key in the Compile Line information.
Setting Out (Locate Mark)	To perform calculation and computation between two marks included with tools to locate marks and set out.
Setting Out (Coordinate)	To perform calculation and computation between two marks using Coordinate method

2.4.3. Define Menu

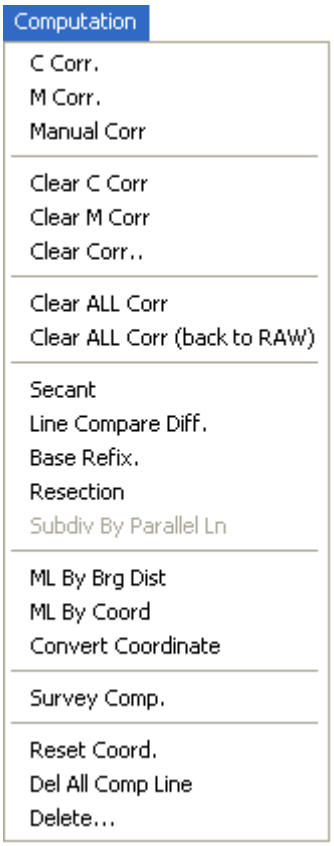
– Contains the entire menu item regarding to define coordinate / traverse / block / lot and etc. Please refer to **Part 6: In Field Computation**



Coordinates	To view and define fixed coordinates.
Traverse	To perform traverse definitions.
Block	To perform block definitions
Direct Line	To perform direct line definitions
Lot	To perform lot definitions.
SKL Lot	To view defined imported SKL Lots
PU Lot Details	To view defined imported PU ASCII Lots
Connection Line	To perform connection line definitions
Graphic Define	To graphically define Traverse and Lot by graphic picking.
PO Lines	To view and edit existing PO Lines.
SKL Line	To view and edit existing SKL Lines.
Match PO/New	To match (transpose) and view existing matches between PO and new stations.
Stn Remark	To enter station remarks i.e. “TLH”, “TP Ke…”, etc.
Edit Stn ID	Edit station ID overall
Increment Stn ID	Increment station ID

2.4.4. Computation Menu

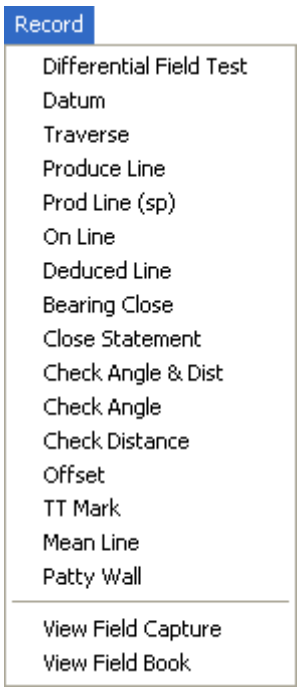
– Contains the entire menu item regarding to survey computation, M and C correction, etc. Please refer to **Part 6: In Field Computation**



C Corr.	To perform Closure Correction.
M Corr.	To perform Meridian Correction.
Manual Corr	Manually apply for Closure or Meridian Correction by user.
Clear C Corr	To clear C Correction only.
Clear M Corr	To clear M Correction only.
Clear Corr..	To clear corrections accordingly starting from particular record.
Clear ALL Corr	To Clear ALL applied corrections.
Clean ALL Corr (back to RAW)	To clear ALL applied corrections and adjusted back bearing to raw data.
Secant	To perform computation of bearing and distance of a secant line for a road reserve survey.
Line Compare Diff.	To calculate differences between PO and New line.
Base Refix.	To perform refixation computation.
Resection	To perform resection computation.
ML By Brg Dist	To compute missing line by bearing distance.
ML By Coord.	To compute missing line by coordinates.
Convert Coordinate	Convert from Cassini Coordinate to WGS84 or vise-versa.
Survey Comp.	To perform basic Survey Computation: (compute Traverse, compute Direct Line, compute Connection Line, compute Mean Line, compute Lot, compute Base, compute SKL Lot, compute coordinates).
Reset Coord.	Reset all non fixed station coordinates.
Del All Comp Line	Remove all computed lines i.e. direct line, missing line.
Delete… Remove All PO Line Remove All Missing Line Remove SKL Line Remove Dead Stn Remove PU Lot	Selection of delete functions: - Remove All PO Line - Remove All Missing Line - Remove SKL Line - Remove Dead Stations (un-link stations). - Remove PU Lot

2.4.5. Record Menu

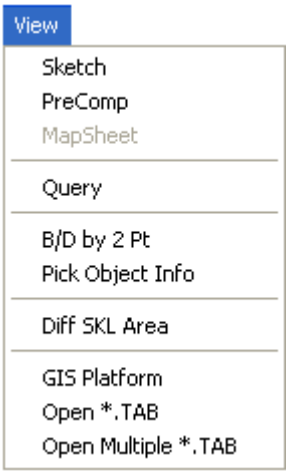
– Contains the entire menu item regarding to field capture record. Please refer to **Part 5: Field Data Capture**



Differential Field Test	To view measured *Differential Field Test* records.
Datum	To view measured *Datum* records.
Traverse	To view measured *Traverse* records.
Produce Line	Disable
Prod Line (sp)	Disable
Online	To view measured *Online* records.
Deduced Line	Disable
Bearing Close	To view measured *Bearing Close* records.
Close Statement	To view *Close Statement* records.
Check Angle & Dist	To view measured *Check Angle and Distance* records.
Check Angle	To view measured *Check Angle* records.
Check Distance	To view measured *Check Distance* records.
Offset	To view measured *Offset* records.
TT Mark	To view *TT Mark* records.
Mean Line	To view *Mean Line* records.
Patty Wall	To view *Patty Wall* records.
View Field Capture	To view all measured records in sequence. ***Next*** and ***previous*** button is used to browse between pages
View Field Book	To view real time auto generated field book.

2.4.6. View Menu

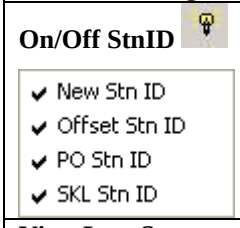
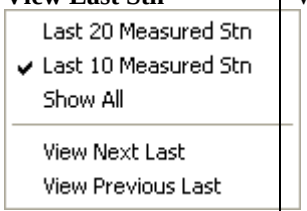
– Contains the entire menu item regarding to view sketch, query line, etc. Please refer to **Part 5: Field Data Capture**



Sketch	To view field sketch of work measurement.
Precomp	To open/view a precomp layer and perform in field basic precomp functions.
Query	To view and query existing lines with their bearing and distances.
B/D by 2 Pt	Function to compute bearing and distance by 2 points using graphical pick.
Pick Object Info	Show object information for the line or point you click
Diff SKL Area	To view graphically the comparison between SKL and new lots. Lots which area has 5% difference from SKL lots will be highlighted. (Note: Lot should be defined and SKL Lot must be computed first).
Field Diagram	To generate field diagram and print.
Delete Field Diagram	Delete field diagram layer.
GIS Platform	To switch to GIS platform.
Open *.TAB	To open *.TAB files and display (under GIS platform).
Open Multiple *.TAB	To open multiple *.TAB files and display (Under GIS platform).

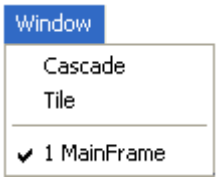
2.4.7. Display Menu

– Contains the entire menu item regarding to graphic display on screen. You can on/off the station id here.

Show All	Show the whole sketch in its original size
Zoom By 2 Point	Zoom in to sketch according to 2 point extent picked by user.
Zoom In	Zoom in.
Zoom Out	Zoom out
Set View Extent	Set view extent for graphic preview
Pan	To pan and navigate around the sketch
Pan Left	Pan the screen to the left.
Pan Right	Pan the screen to the right.
Pan Up	Pan the screen up.
Pan Down	Pan the screen down.
Find Stn	Zoom in to a station specified by user
Toolbar	Toggle SHOW/HIDE display toolbar.
On/Off Lot No.	Toggle ON/OFF lot ID display on sketch
Black/White Bg.	Toggle BLACK/WHITE background for sketch.
On/Off StnID 	Toggle ON/OFF station ID display on sketch
View Last Stn 	View last used 20 or 10 station

2.4.8. Window Menu

– Contains the entire menu item regarding to windows. There have option to cascade or tile the windows.



Cascade	Rearranges all open windows so they overlap in a cascade
Tile	Tiles all open windows
Existing Windows	Selectable window names for user to activate. Current window name will have a check beside it.

2.4.9. Layer Menu

– Contains all the menu item regarding to layer for graphics.

Open Layer	Open layer for graphic.
Add Sheet	Add a plan sheet into the sketch.
Save Sheet	Save the plan sheet.
Edit Sheet	Select and edit scale/format of existing plan sheet on the sketch.
Move	Move a selected plan sheet.
Delete Sheet	Delete a selected plan sheet.
Delete All Sheet	Delete all plan sheets.
Field Diagram Transfer	Transfer the plan sheet out which can later be view in *Layer->Plans*.
Field Diagram Transfer All	Transfer the entire plan sheet.
View Plan Rect	To select and view the transferred plans created by the user.
Export Layer (DXF)	Export current graphic layer out into *.DXF format.

Note: user need to view the sketch in real coordinate only can enable Layer menu

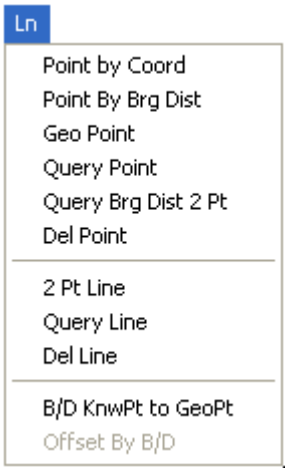
2.4.10. Geo Menu

– Contains the entire menu item regarding to pre comp layer.

Brg At Stn	To create a geometrical line with a given bearing at a known station
Brg At Point	To create a geometrical line with a given bearing at a point or intersect of geometrical line
Two Intersects	To create a geometrical line between two geometrical points
Fix On Line	To create a geometrical line on a selected line.
Parallel Line	To create a geometrical line parallel to an existing geometrical line
Offset Intersects	To create a geometrical line with a given distance from a geometrical point
Center, Radius	To create a geometrical arc by defining its center with a given radius
Del WorkLine	Deletes a geometry line
Del ALL WorkLn	Deletes ALL geometry lines
Show	Shows geometrical line.
Hide	Hides geometrical line
Precomp Text	Toggle ON/OFF precomp text
Generate Ext	To recalculate and regenerate the display extent of the precomp layer.
Read Geometry	Imports a digital copy of a precomp file previously created.
Save Geometry	Exports out a digital copy of a precomp file.

2.4.11. Line Menu

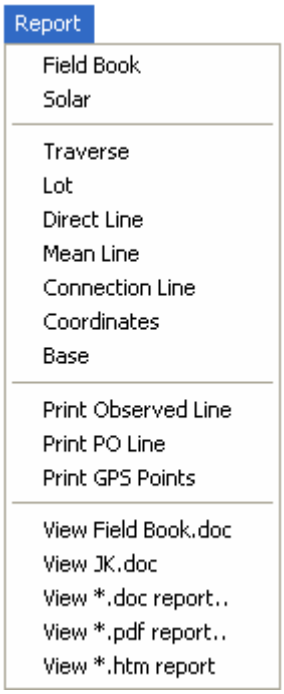
– Contains the entire menu item regarding to precomp layer.



Point By Coord	Create a point with a given Northing and Easting coordinates.
Point By Brg Dist	Create a point with a given Bearing & Distance from an existing point.
Geo Point	Create a point at the intersection of geometrical line or arcs.
Query Point	To query a point for Northing and Easting coordinates.
Query Brg Dist 2 Pt	To query the bearing and distance of a line by two point graphical pick.
Del Point	To delete a point
2 Pt Line	Create two-point line by selecting two existing points
Query Line	To query bearing and distance of a line.
Del Line	To delete a line
B/D KnwPt toGeoPt	To query the bearing and distance by graphical pick. From a known point (station) to a geometry point.

2.4.12. Report Menu

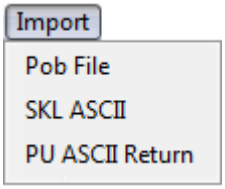
– Contains the entire menu item regarding to computation report. Please refer to **Part 8: Reporting and Export JUPEM ASCII**



Fld Note	To organise and output survey measurement recorded into Field Note format similar to conventional field book style. (eTSMTablet is able to output field note into *.txt , *.doc and *.PDF format)
Solar	To organise and output sun observation report. (eTSMTablet is able to output solar report into *.txt , *.doc and *.PDF format)
Traverse	View Traverse computation report after survey computation.
Lot	View Lot computation report after survey computation
Direct Line	View Direct Line computation report after survey computation
Mean Line	View Mean Line computation report after survey computation
Connection Line	View Connection Line computation report after survey computation
Coordinates	View coordinates computation report after survey computation
Base	View Base computation report after survey computation
Print Observed Line	To output summary report of surveyed line with timestamp.
Print PO Line	To output PO Lines report
Print GPS Points	To output GPS Points report
View Fld Note	To view generated field book in *.doc format.
View JK	To view generated JK in *.doc format.
View *.doc report	Function to open a report in *.doc format.
View *.PDF report	Function to open a report in *.PDF format.
View *.htm report	Function to open a report in *.htm format.

2.4.13. Import Menu

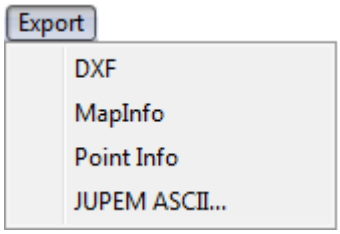
– Contains the entire menu item regarding to POB and SKL ASCII. Please refer to **Part 4: Field Data Preparation**



Read POB File	To read and import POB exchange files.
SKL ASCII	To import downloaded SKL data.
PU ASCII Return	To read and import PU ASCII for Ares Comparison

2.4.14. Export Menu

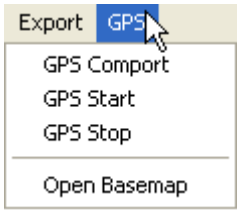
– Contains the entire menu item regarding to export file. Please refer to **Part 8: Reporting and Export JUPEM ASCII**



Export DXF	To export observations into DXF format. File can be open using AutoCAD or other supported software.
Export MapInfo	To export Lot and Lot boundary information that to be read by MapInfo software. There will be four files generated, lot.mid and lot.mif containing lot information, and lot_ln.mid with lot_ln.mif containing lot information.
Export Point Info	To organize and output station coordinates information to filename point info
Export POB	To create and output a POB data exchange file of current survey measurement.
Export TRPS	To export points and line information into SDR format. Generated file will have the extension *.sdr.
Export to CPSWinF2F	To export whole job to be read under CPSWinF2F ver7. Generated file will have the extension *.cps.
Export JUPEM ASCII…	To export JUPEM ASCII data exchange files.

2.4.15. GPS Menu (for locate point only, not for CRM)

– Contains the entire menu item regarding to capturing GPS point.



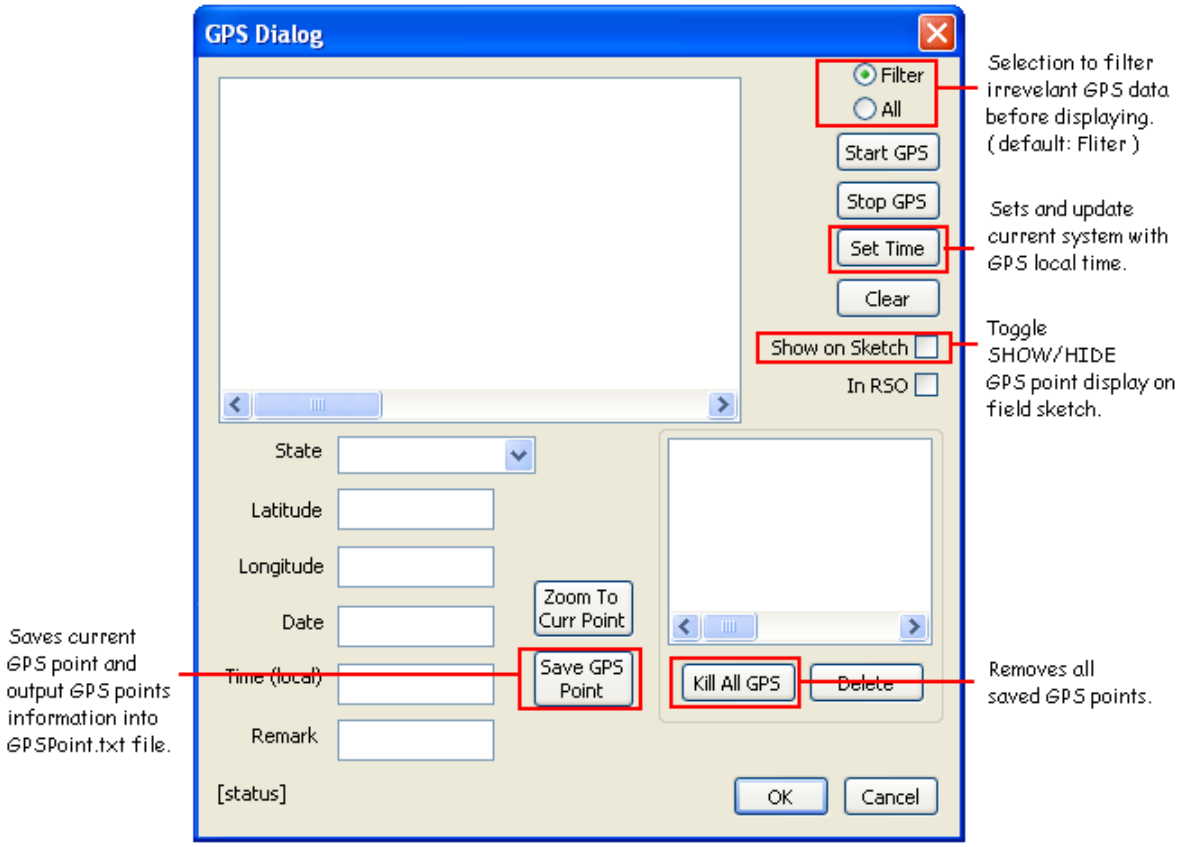
GPS Comport	GPS Comport Selection.
GPS Start	Activate GPS.
GPS Stop	Deactivate GPS.
GPS Basemap	Open Basemap

2.5. GPS Setting (Lower Accuracy, Not for CRM)

In this part we will get the user familiar with the GPS capturing icons and examine how to do GPS point capturing method. In this part, we will working with jobs using **GPS** menu.

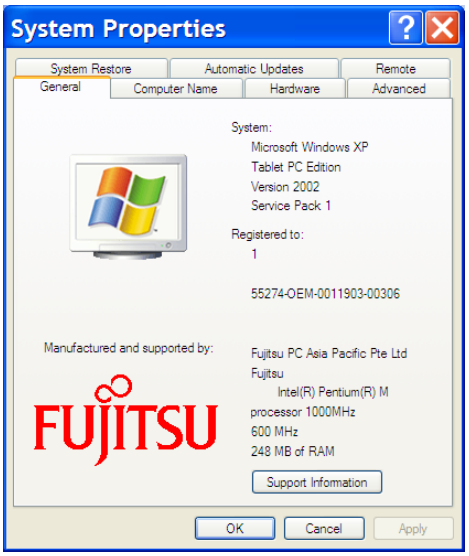
Note: User needs to open a new / existing job before proceed. To open/create job, refer to **Part 3: Working with Job**.

2.5.1. Background

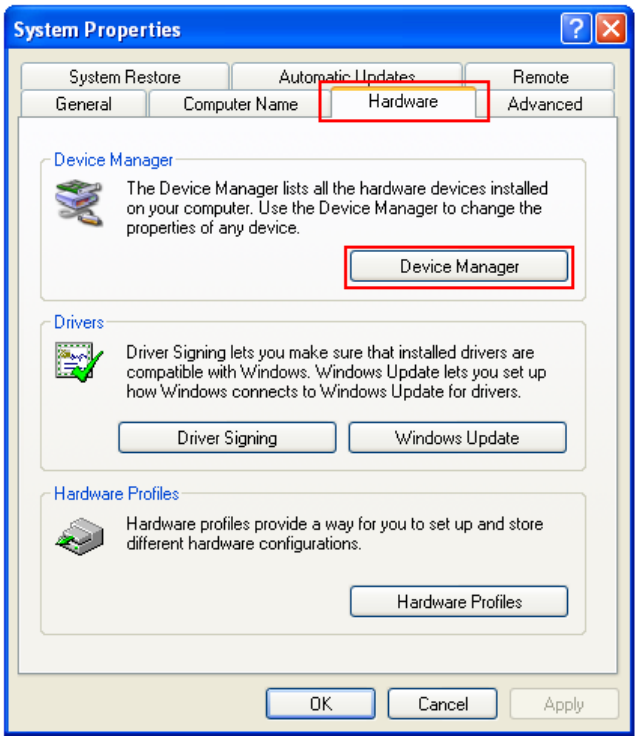


2.5.2. Check Com Port

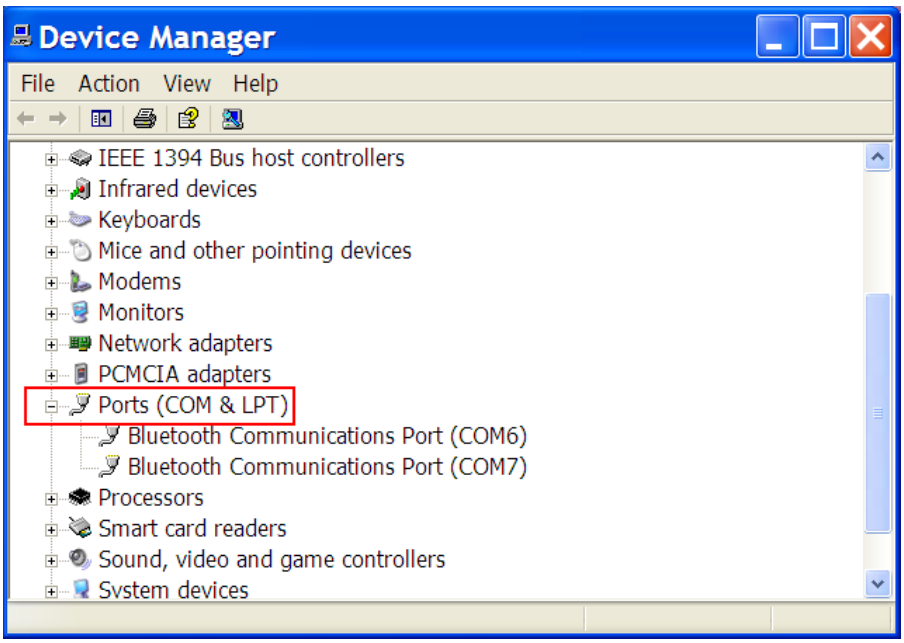
1. To **know what com port** that the system assigns for your GPS card, just **right click** the **My Computer icon** and choose **properties**. Then the system properties dialog will appear.



2. Then select the **Hardware** page on the top of the dialog. You will see the screen will change, then click on the **Device Manager** button.

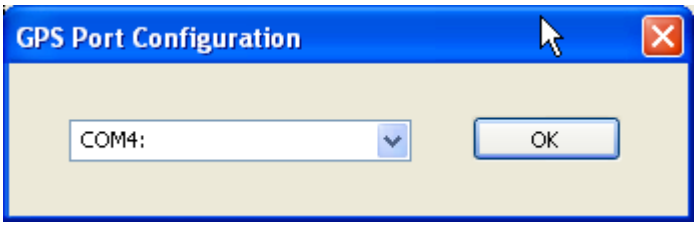


3. The list of the device component that is available in the system will appear. The GPS card Com Port number will appear in the **Port (COM & LPT)** component

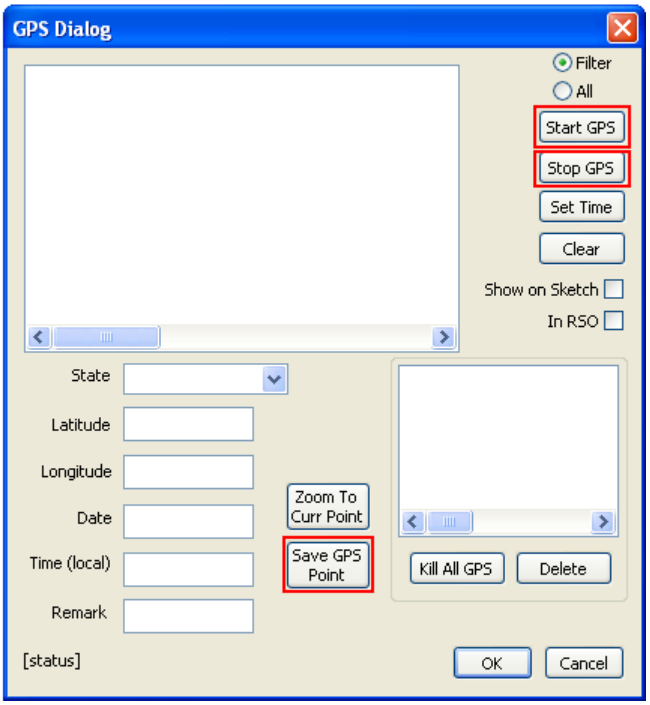


2.5.3. GPS Capture

1. Navigate to **GPS** menu > **GPS Comport**, set the GPS card comport that user plug in. You can check the Com port by the method above (**Part 2.5.2**).



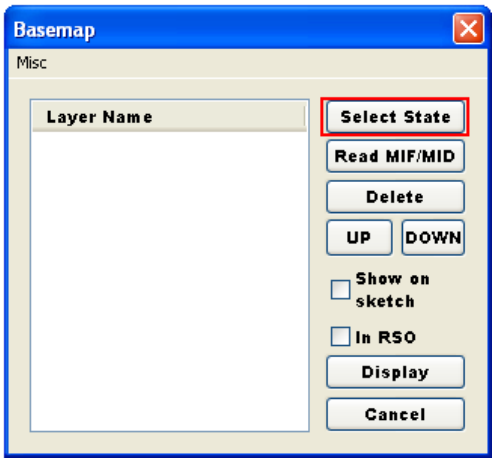
2. Navigate to **GPS** menu > **GPS Start**, the GPS dialog will appear similar as below. Click the **Start GPS** button and the GPS signal will be retrieve.

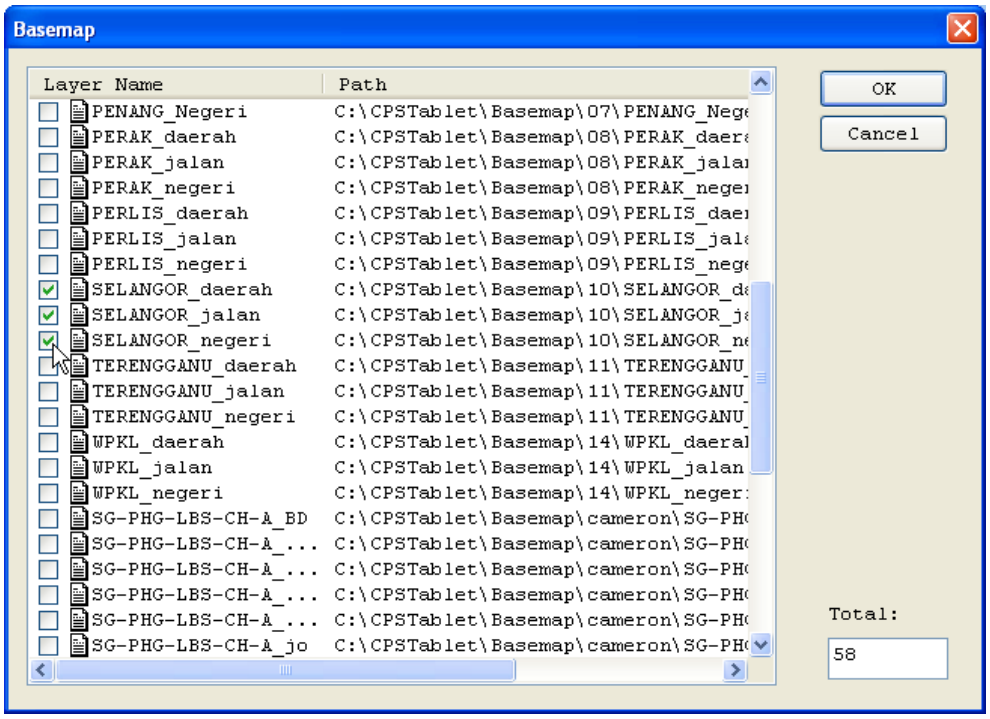


3. Select the state that user is currently in. Once the GPS signal is available, to save a GPS point, click the **Save GPS Point** button.
4. When all needed point is captured, stop the GPS by clicking the **Stop GPS** button and exit the dialog by clicking **OK** button

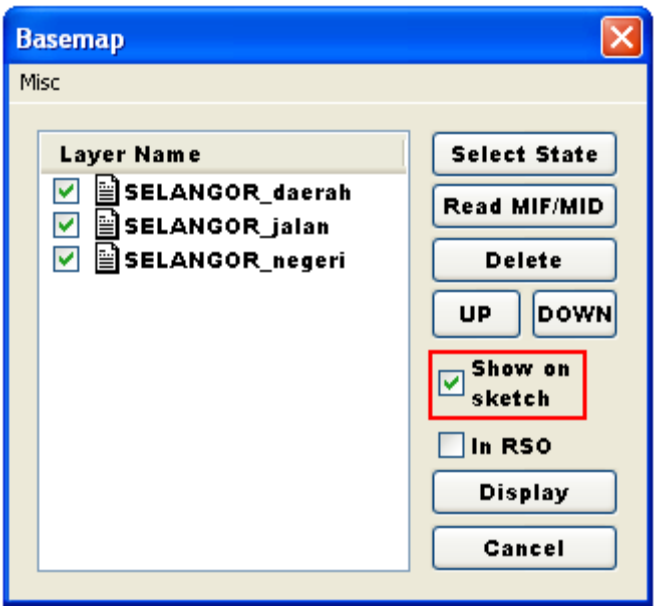
2.5.4. Basemap

1. To open a basemap, navigate to **GPS** menu > **Open Basemap**. Then the screen below appears.
2. Click on the **Select State** button to select the state basemap. After select the basemap then click **OK** button





3. To show it on screen, check the basemap on the list and also tick the **Show on sketch** check box.



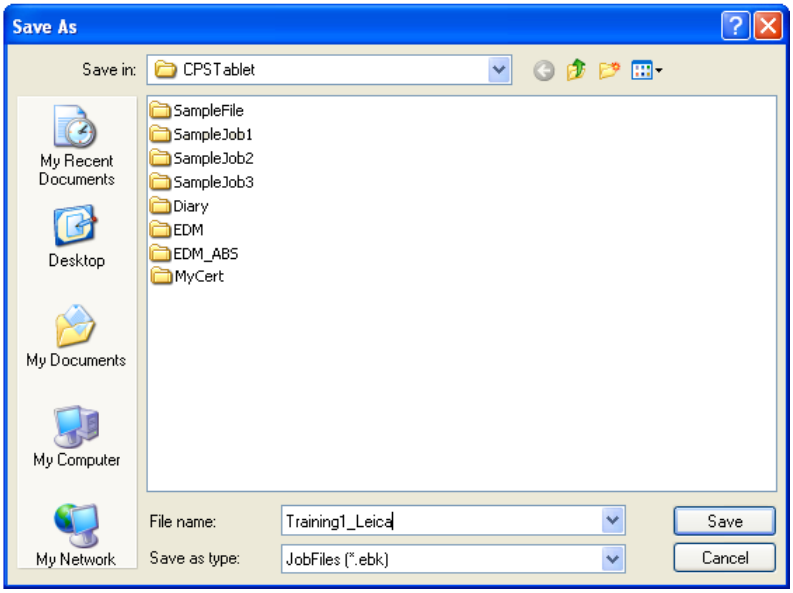
3. Working with Jobs

In this part, we will discuss the menu item from 2.4.1. So, in this part 3, we will working with jobs using Job menu.

3.1. Start New Job

In this part, we will show you the steps to create a new job before you start doing your survey.

1. Before any survey observation will be done, you need to open a new job. Navigate to **Job** menu > **New Job**.
2. A **Save As Dialog** will appear if you click the **New Job**.

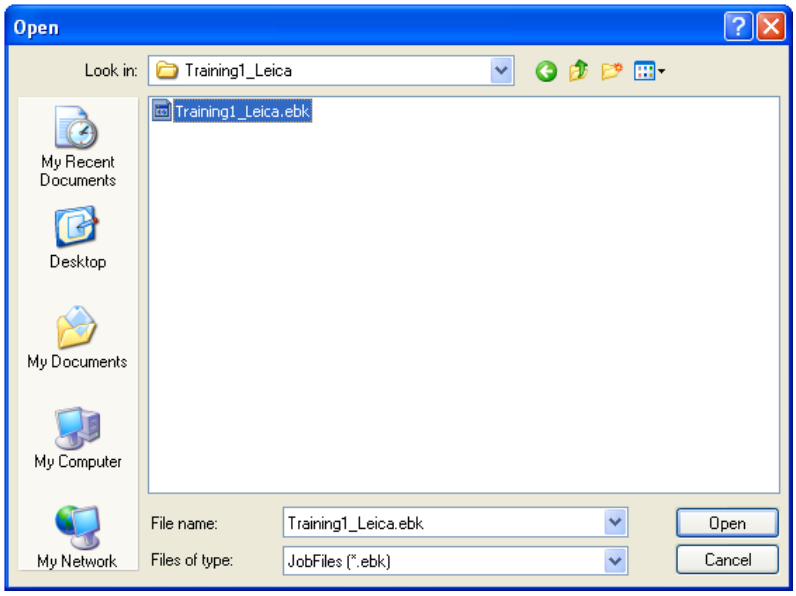


3. Please type in the job file name and indicate which directory you want to store the file in. Normally, job file will be save in C:\cpstablet\(job_name).The type of job is saved in **.ebk** format. So next time if you want to open this job, just choose *.ebk file.

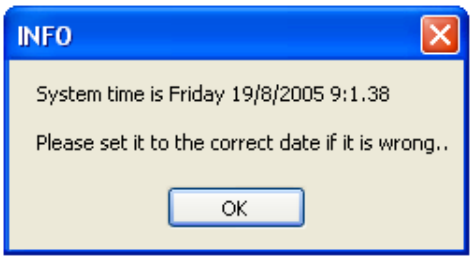
3.2. Open Existing Job

In this part, we will show you the steps to open an existing job before you start doing your survey.

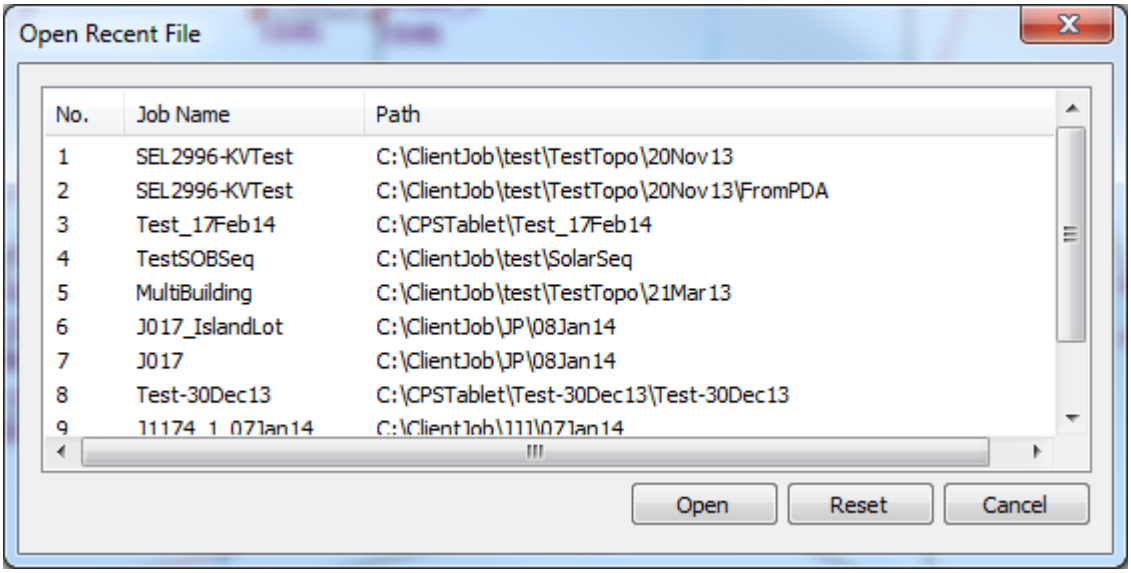
1. Before any survey observation will be done, you need to open an existing job if the file is created. Navigate to **Job** menu > **Open Job**.
2. An **Open Dialog** will appear if you click the **Open Job**.



3. Please indicate the directory and file name where you save the job. Click the job name and click **Open** button.
4. **Info Dialog** below will be displayed. If the system time is incorrect, please set to the correct time.



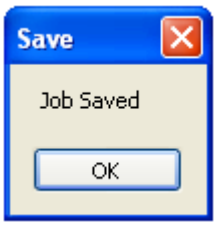
5. User also can direct open recent file by clicking **Job > Open Recent**.



3.3. Save Job

In this part, we will show you the steps to save a job.

1. Navigate to **Job** menu > **Save Job**.
2. A **Save Dialog** as below will appear indicate the job is saved.

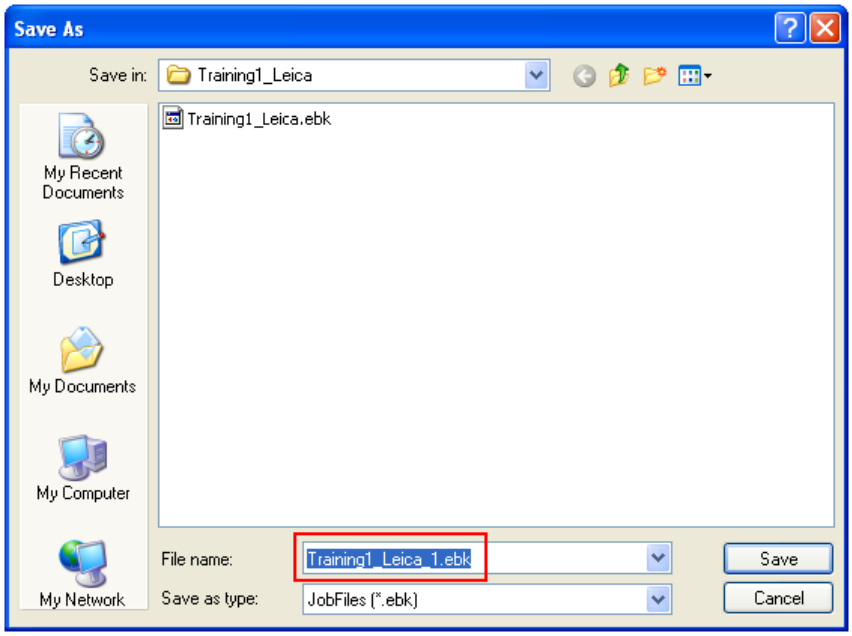


3. You also can click **Save icon** from the icon below.

3.4. Backup Job

In this part, we will show you the steps to backup a job.

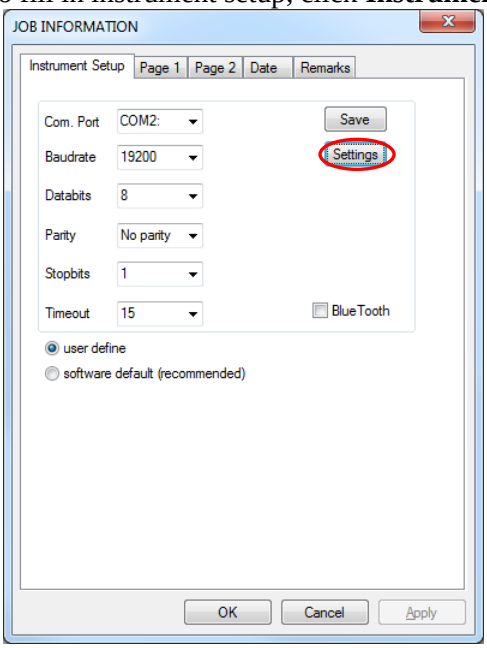
1. Navigate to **Job** menu > **Backup Job**.
2. A **Save As Dialog** will appear if you click the **Backup Job**.
3. The file name will automatically rename to **Job1_1.ebk**. You also can rename it if you like. The backup file will be saved in **same** folder with your job.



3.5. Fill in Job Info

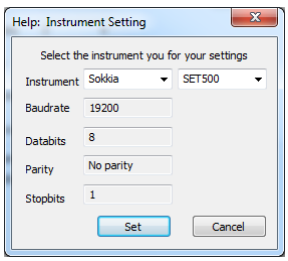
In this part, we will show you the steps how to fill in the job information for the current job.

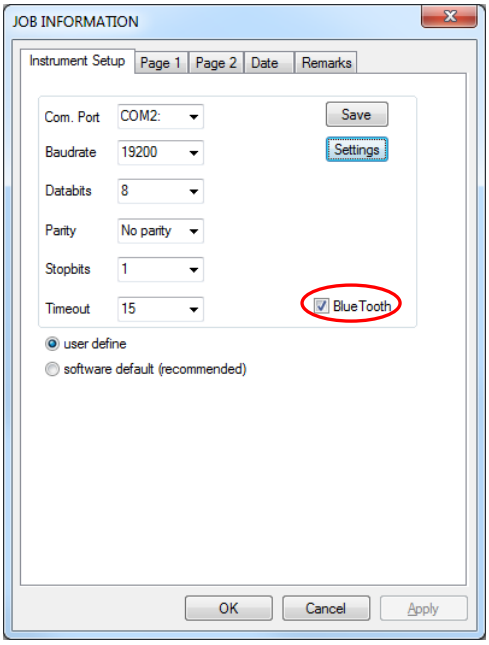
1. Before filling in the job information, please open a job. Navigate to **Job** menu > **Job Info**.
2. A **Job Information Dialog** will appear. There have 5 tab bars in this dialog which is **Instrument Setup**, **Page 1**, **Page 2**, **Tarikh** and **Remark**.
3. To fill in instrument setup, click **Instrument Setup Tab.**



1. To set communication settings between TabletPC and total station. A set of default values will already be assigned automatically according to instrument type selected by user previously on Job Info.

2. To change the instrument setting, click on the **Setting button**, a **Help: Instrument Setting** dialog will pop up. Chose for the correct instrument that you using, the setting value will automatically retrieved. Then, click **Set**.

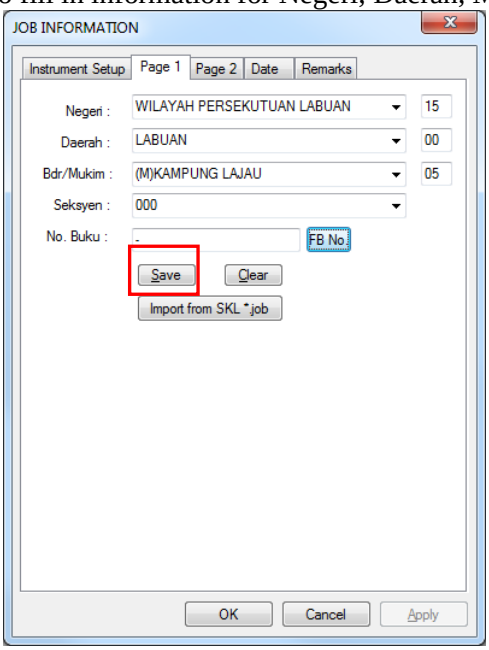




3. To enable **Bluetooth** connectivity, select **user define** radio button. Set the **Com Port** that was assigned by the Bluetooth manager (or Cable Comp Port) during installation of Bluetooth hardware/software.

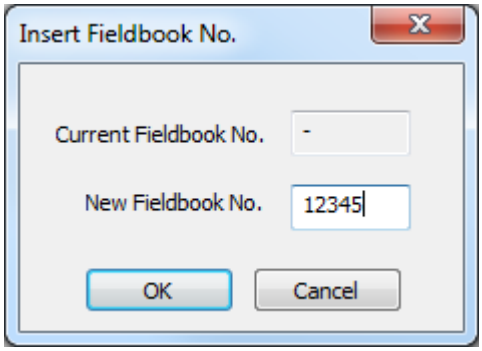
4. **Tick** on **Blue Tooth** if using, then, **Save** and **exit**.

4. To fill in information for Negeri, Daerah, Mukim, please click **Page 1 Tab**.

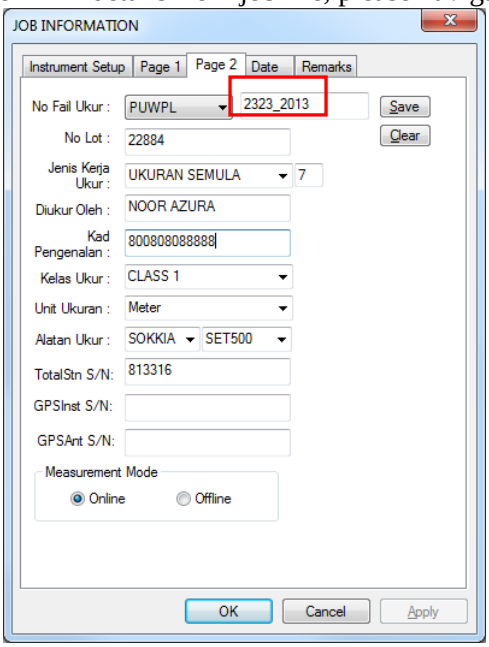


Key in the **Job Information** on **Page1** according to the job. After all job information is entered in, just click the **Save** button. User can click **FB No** button

to edit existing field book number (if have). Dialog below will show out.

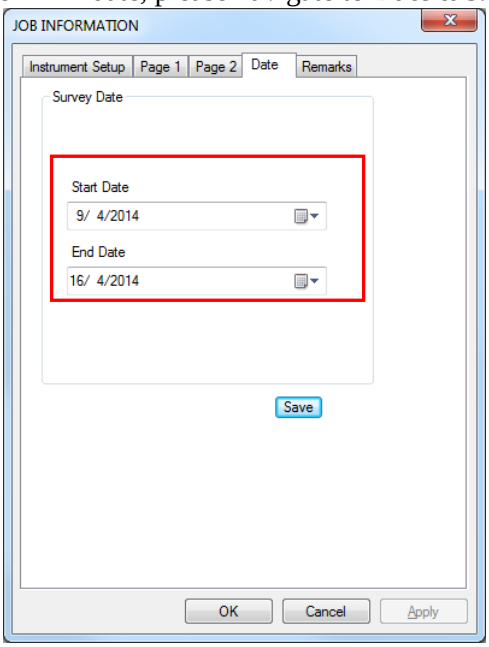


5. To fill in details from job file, please navigate to **Page 2 tab.**



On **Page 2,** key in according to the job. Then click **Save button**.

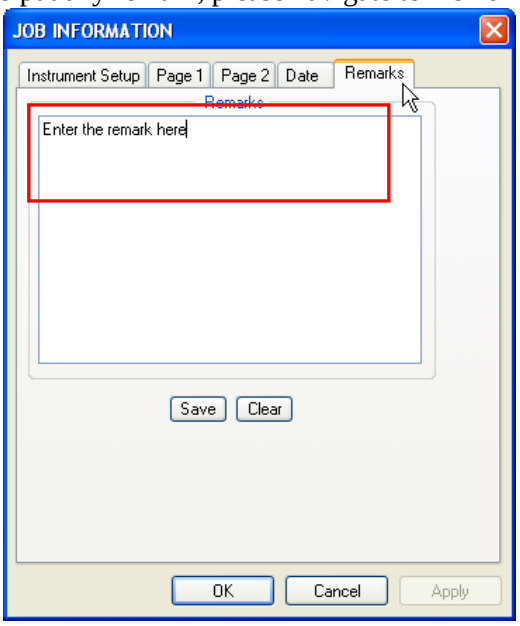
6. To fill in date, please navigate to **Date tab**.



On the **Date tab,** user needs to select the **starting** date of the job and the **ending** date of the job. Click the **Save** button.

Note: **End Date** will auto update to last date surveyed line date.

7. To put any remark, please navigate to **Remarks tab**.



On the **Remark tab,** you can key in any remark for the job. Click the **save** button

3.6. eTSMTablet Work Flow

In this part, we will let you know the eTSMTablet - Processing Steps and work flow for eTSMTablet. You can make a as a quick note to do your job.

3.6.1. eTSMTablet – Processing Steps

You can refer **F2F Work Flow – Work Breakdown Diagram** on **pg. 1-4** to get a whole idea for whole the process while looking for this Processing Steps.

Item	Task	Menu
1	Prepare SKL ASCII/ POB (Part 4: Field Data Preparation)	Define > PO Line
2	Create new job (Part 3: Working with Jobs)	Job > New Job / Open Job / backup job Job > Utilities > EDM Test Job > Job Info.
3	Import POB/SKL ASCII (Part 4: Field Data Preparation)	Import > POB / SKL ASCII View > Sketch
4	Field Data Capture (Part 5: Field Data Capture)	GPS > GPS Start Survey > Solar Survey > Field capture Computation > Base Refix Record > View Field Book Record > View Field capture
5	Define Route (Part 6: In Field Computation)	Define > Coordinate/ Trav / D Line / Block / Lot Graphic Define
6	Survey Computation (Part 6: In Field Computation)	Computation > Survey Comp Computation > M Corr / C Corr
7	Survey Report (Part 8: Reporting and Export JUPEM ASCII)	Report > Field Note / Solar / Trav
8	JUPEM ASCII (16 files) Cpswin32 job file (Part 8: Reporting and Export JUPEM ASCII)	Export > JUPEM ASCII Export > cpswin32

4. Field Data Preparation

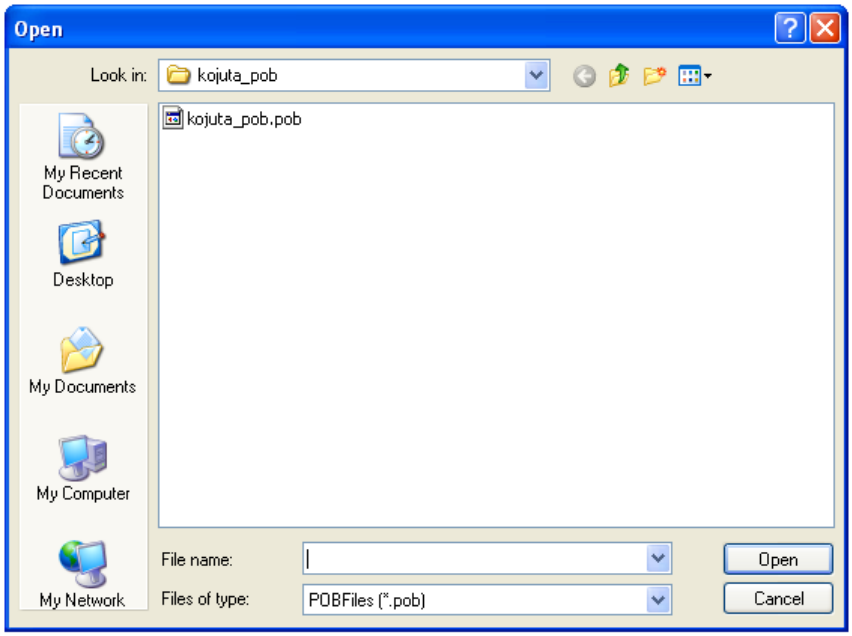
In this part, we will discuss the menu item from 2.4.13: Import menu and 2.4.3: Define menu. So, in this part 4, we will working with jobs using Read Pob File and Import SKL ASCII menu item in Import menu. This part also includes PO Lines menu item in Define menu.

4.1. PO Data

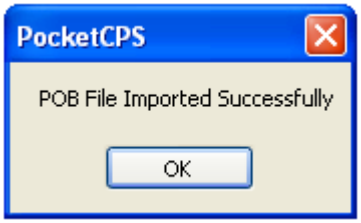
4.1.1. Read PDUK Data / POB File

In this part, we will show you the steps to read / import PDUK Data / POB file.

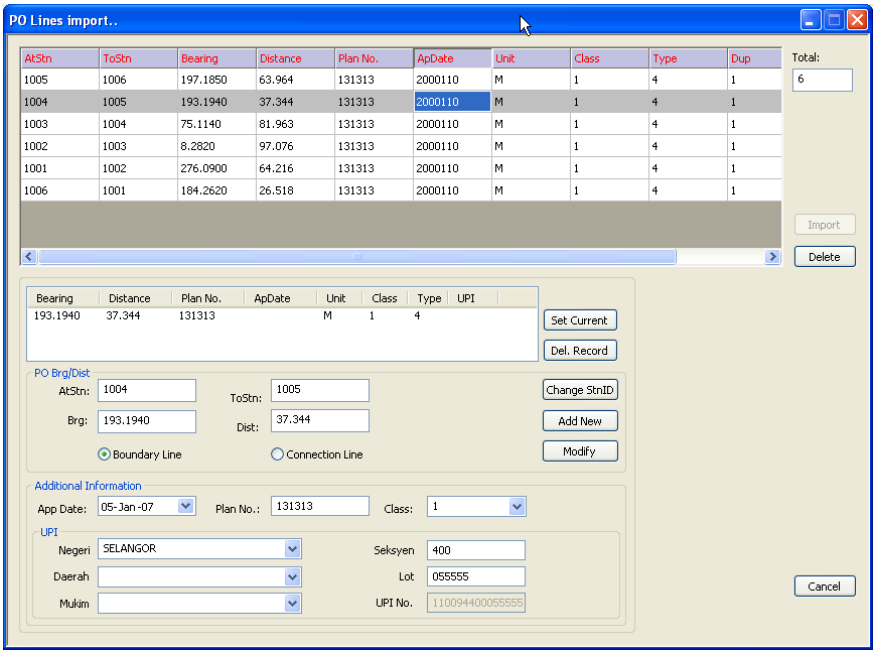
1. Navigate to **Import** menu > **Read Pob File**.
2. An **Open Dialog** will pop up as below. Click the file with extension *.pob from the folder you save your POB file. In this case, POB file is kojuta_pob.pob. Then click **Open** button.



3. A dialog show 'POB file imported successfully' will show up as follow. Then click **OK** button.

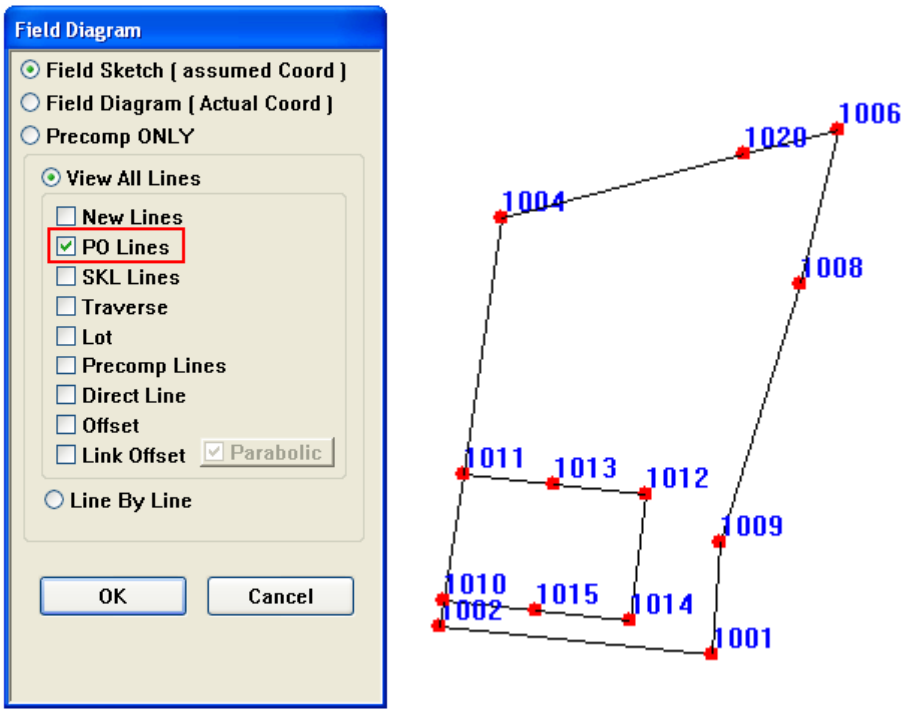


4. To view the record for imported POB file, please navigate to **Define** menu > **PO Lines**. A **PO Lines Import Dialog** will be showed as follow.



5. You also can enter the POB data from CP if you don't have POB file. Please proceed to Part 4.3: Enter PO Lines.

6. You also can check the imported POB file by sketch. Please navigate to **View** menu > **Sketch**. **Field Diagram dialog** will pop up as follow. Click the check box for **PO Lines** then press **OK** button. If u already fixes a coordinate for the PO Lines, check on the second check box on the top, **Field Diagram (Actual Coord)**.

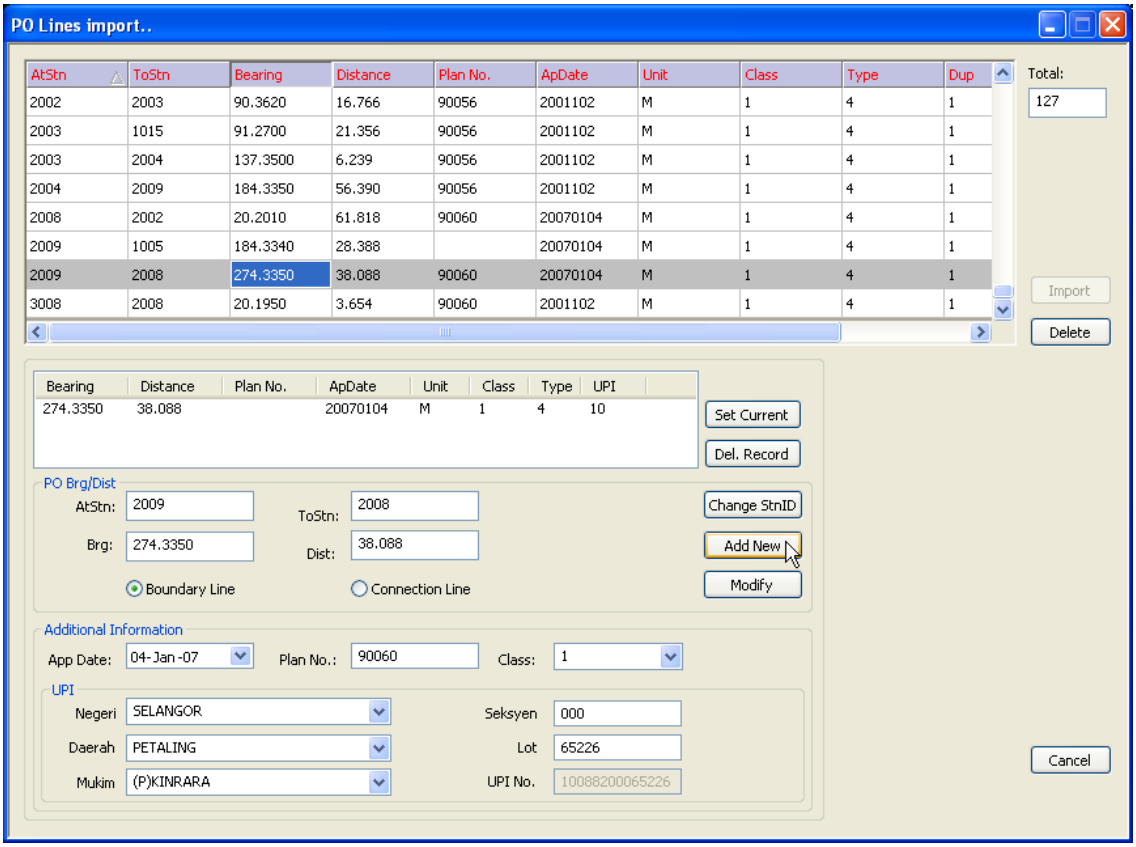


7. Graphic for POB file will be showed as above.

4.1.2. Enter PO Line Value

In this part, we will show you the steps to key in PO Line value.

1. Navigate to **Define** menu > **PO Lines**.
2. A **PO Lines Import** dialog will pop up as following.

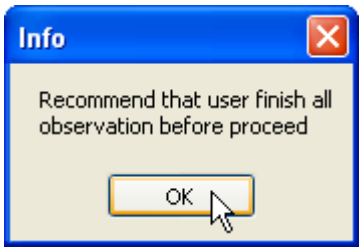


3. Fill in the information here and click **Add New** button. If you want to delete the record, choose from the list then press **Del. Record** button.
4. If you have few records for the same line, you can set the current one with **Set Current** buttons.
5. If you wish to modify the bearing and distance for certain line, click the line you want to modify and click **Modify** button.
6. Precaution:
   i. All the information like At Station, To Station, Bearing, Distance, Plan No, Class, Approval Date and UPI also must fill in, cannot be blank.
   ii. Plan No: just need to key in the numeric number but not include the “PA”.
   iii. Class: follow the old CP’s class.
   iv. Approval Date: must be from the latest CP.
   v. UPI: for the lot number, cannot be blank. If dun have lot number, just key in as “999”

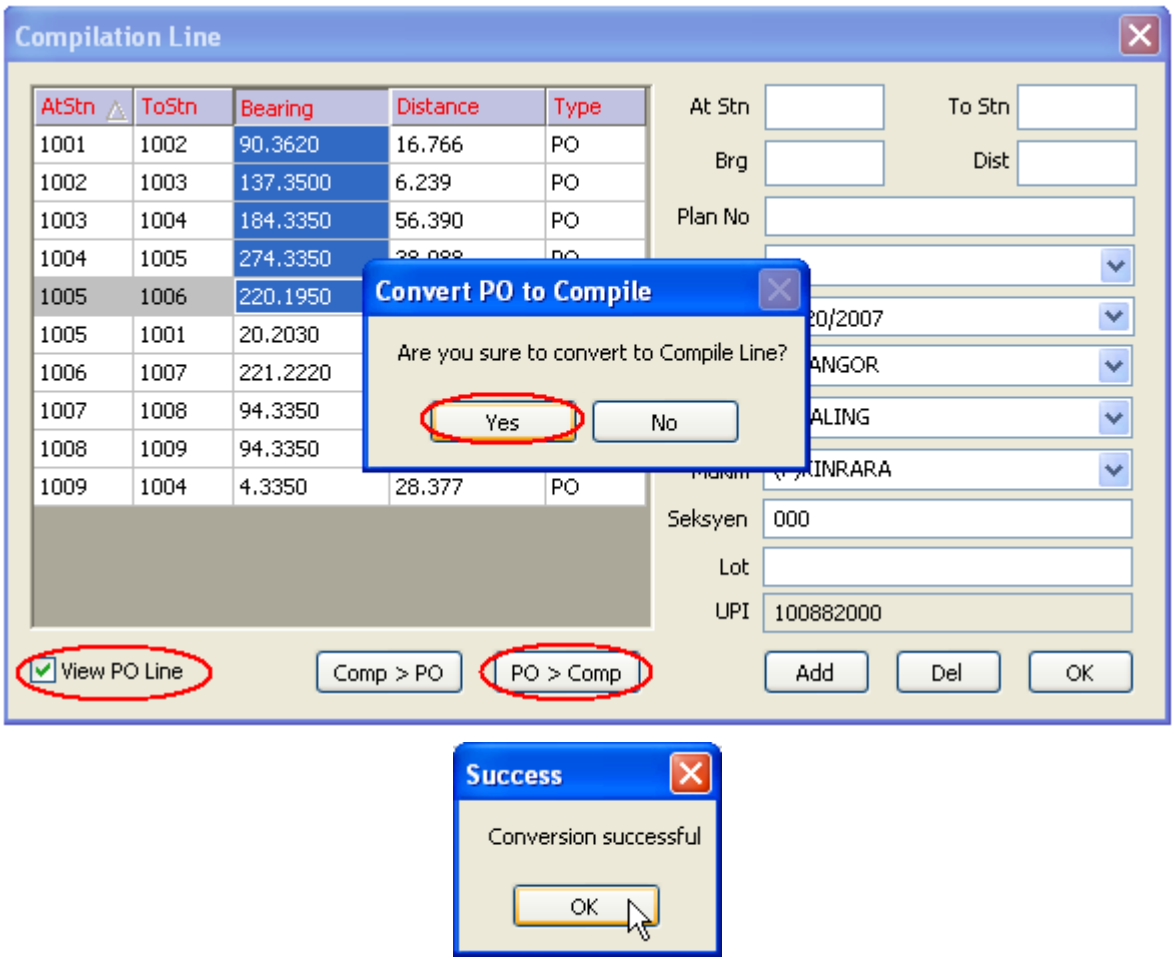
4.1.3. Compile Line

Compilation lines are used for the “minimum survey” or “baki lot” that you did not survey but just compile from the old CP. It will just only need for the final bearing and distance.

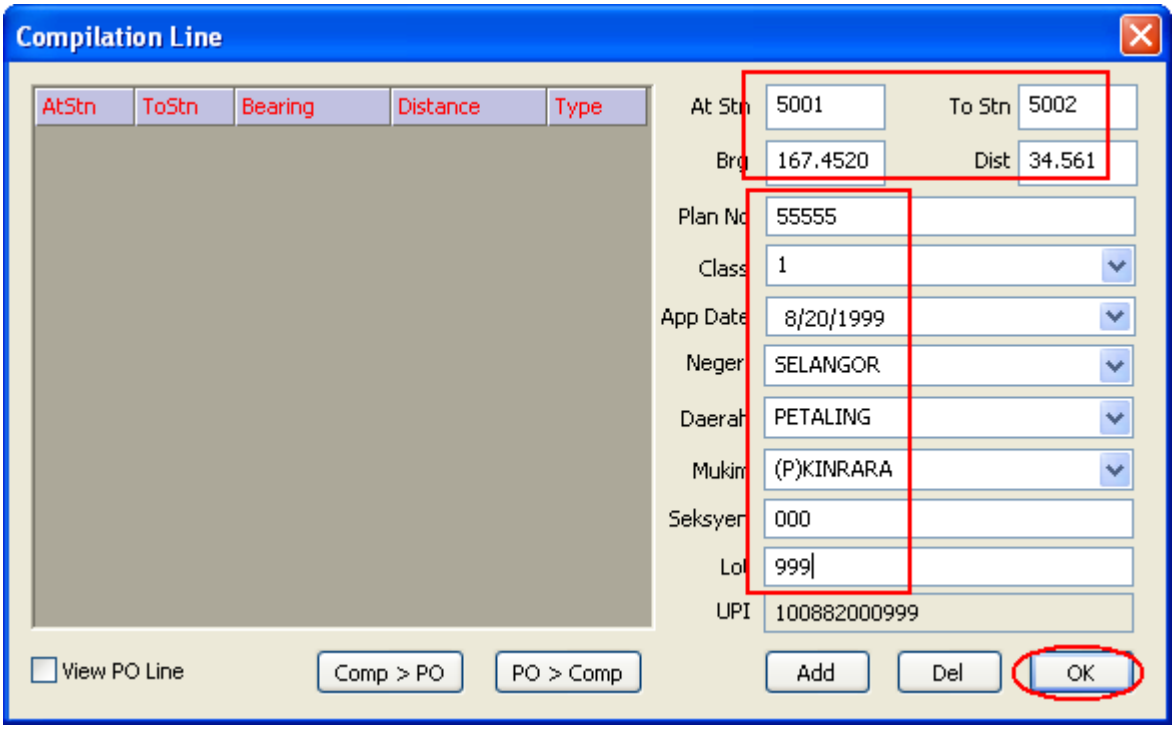
1. Click to **Survey > Compile Line**. Will have a dialog pop up to warn you to finish all the observation data only precede to this compile line function.



2. If you already key in the PO lines and want convert it to be compile line, you may just tick on the **View PO Line** check box, then highlight the PO lines that want to be converted and click **PO > Comp**. then, click **Yes** for the **Convert PO to Compile** dialog. Click **OK** for the **Success** dialog.



3. If you have not key in any PO line to be converted, you may also key in manually for the compilation line. Key in the **At Stn, To Stn, Brg** and **Dist**, and also the information for the compile line. After that click on **OK** button to add in the line.

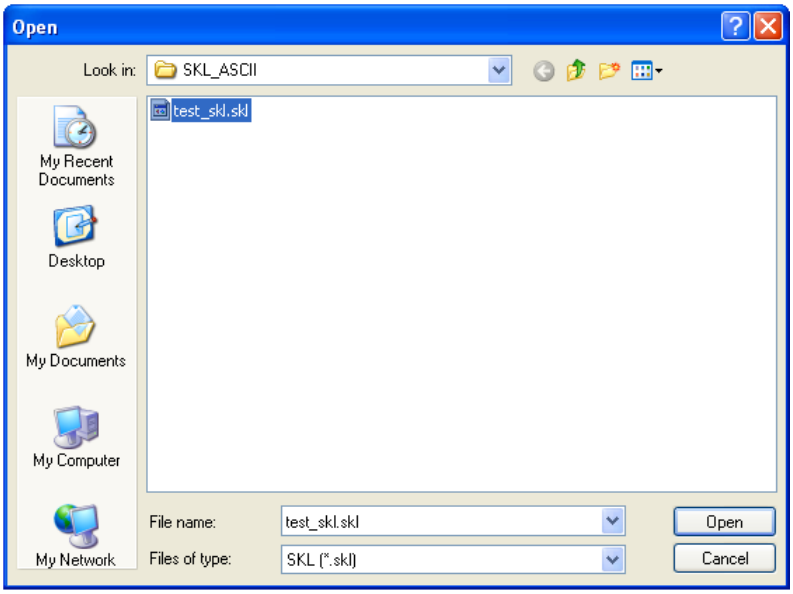


4.2. SKL (Precomp) Data

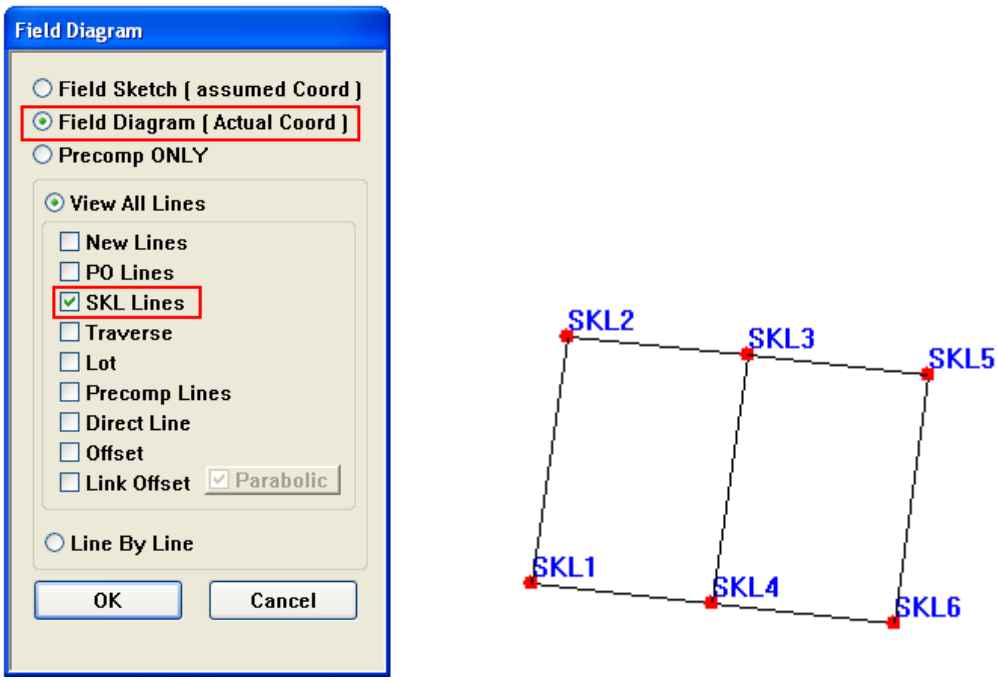
4.2.1. Import SKL ASCII

In this part, we will show you the steps to import SKL ASCII file.

1. Navigate to **Import** menu > **Import SKL ASCII**.
2. An **Open Dialog** will pop up as below. Click the file with extension *.skl from the folder you save your SKL ASCII file. In this case, SKL ASCII file is test_skl.skl. Then click **Open** button.



3. You can check the imported SKL ASCII file by sketch. Please navigate to **View** menu > **Sketch**. **Field Diagram dialog** will pop up as follow. Click the **Field Diagram (Actual Coordinate)** radio button. Then click the check box for **SKL Lines** then press **OK** button.

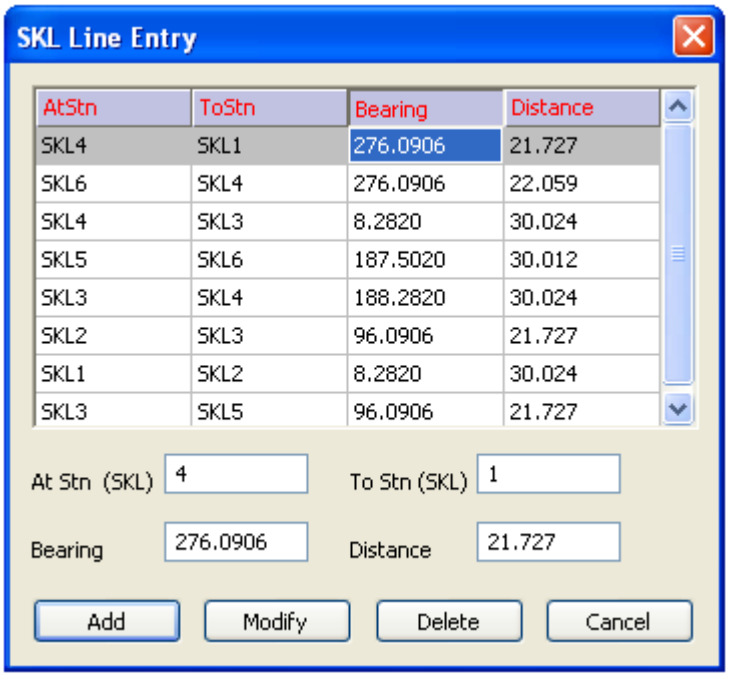


4. Graphic for SKL ASCII file will be showed as above.

4.2.2. Enter SKL Line Value

In this part, we will show you the steps to key in SKL Line value.

1. Navigate to **Define** menu > **SKL Lines**.
2. A **SKL Line Entry** dialog will pop up as following.



3. Key in the information: **At Stn (SKL), To Stn (SKL)**, **Bearing** and **Distance**. Then, click **Add** button to add in the record.
4. You can also **Modify** or **Delete** the SKL record.

5. Field Data Capture

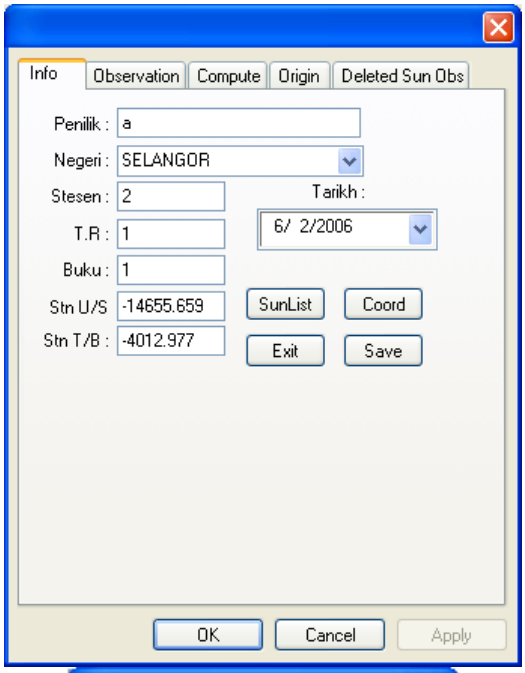
In this part, we will discuss the menu item from 2.4.2: Survey menu and 2.4.5: Record menu. So, in this part 5, we will work with jobs using all the menu items in Survey menu and Record menu.

5.1. Solar Observation

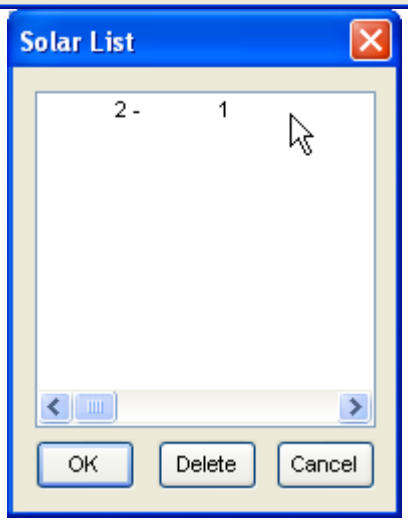
In this part, we will show you the steps to get familiar with the solar observation buttons and examine how to do solar observation.

Note: User needs to open a new / existing job before proceed. To open/create job, refer to **Part 3: Working with Job**.

a) Info Tab

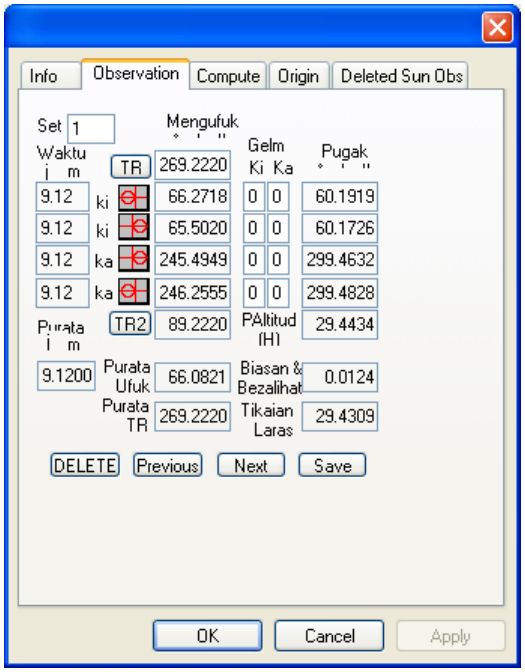


Penilik	Observer's name
Negeri	Select the suitable State from the combo box. Malaysia's state can be view by pressing the down arrow at the side of the combo box.
Stesen	Sit Station ID
T.R.	Reference Station ID
Buku	Book number. Default to "1".
Stn U/S	User input of Stesen U/S coordinates or from GPS generated file.
Stn T/B	User input of Stesen T/B coordinates or from GPS generated file.
Tarikh	Date of current day is automatically retrieved. User can select the date from combo box to change.



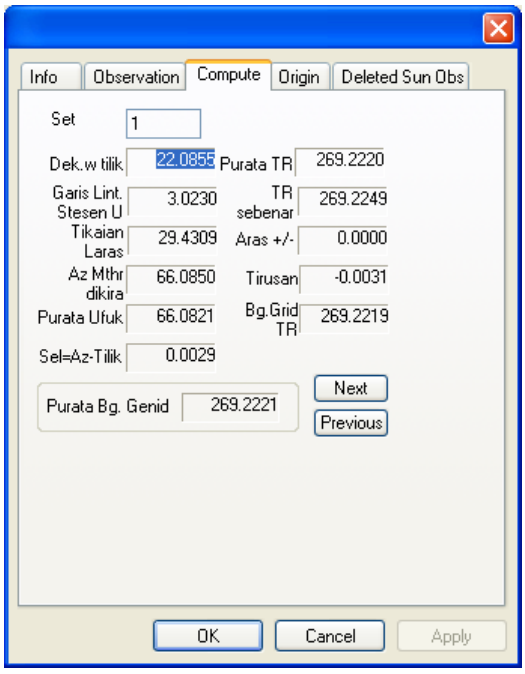
SunList	To open and retrieve previous sun observation data.
Coord	To view fixed/computed coordinates and select a station coordinates to use as Stn U/S and Stn T/B. Refer to **Part 6.2.1**.
Save	Set save index to save Solar Observation to database.
Exit	Quit Solar Observation.

b) Observation Tab



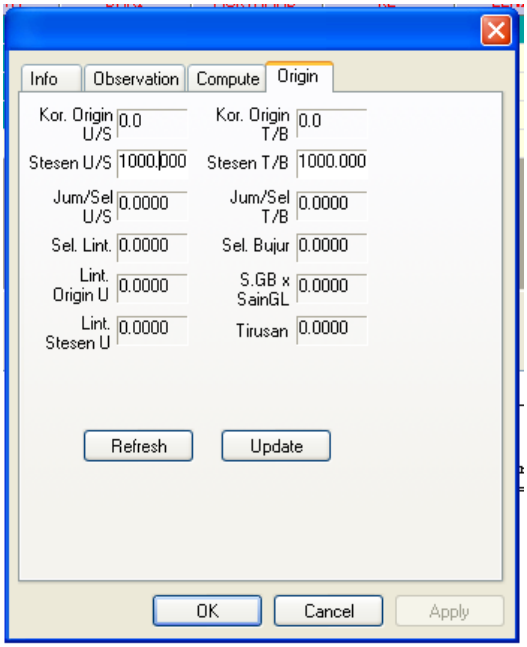
Set	Current set of solar observation.
TR	To set Reference Bearing (face left) in DDD.MMSS format (User editable).
ki	To measure Right Tangent To Sun (Face Left) horizontal and vertical angles in DDD.MMSS format. Observation time in HH.MMSS format.
ki	To measure Left Tangent To Sun (Face Left) horizontal and vertical angles in DDD.MMSS format. Observation time in HH.MMSS format.
ka	To measure Left Tangent To Sun (Face Right) horizontal and vertical angles in DDD.MMSS format. Observation time in HH.MMSS format.
ka	To measure Right Tangent To Sun (Face Right) horizontal and vertical angles in DDD.MMSS format. Observation time in HH.MMSS format.
TR2	Measure Reference Bearing (face right)in DDD.MMSS format.
P. Ke Mth	*Purata Mengufuk*
P. Ke TR	*Purata T.R*
P. Tinjah	*Purata Altitud*
Bias	*Bias dan bezalihat*
Tikaian Laras	*Altitud di laras*
Gelm.	*Gelembung*
DELETE	Delete current solar observation form.
Previous	View previous Solar Observation form.
Next	Save and instantiate the next Solar Observation form.
Save	Save Solar Observation form.

c) Compute Tab



Set	Current set of solar computation.
Dek.w Tilik	*Sudutistiwa pada waktu Penilikan*
G. Lintang	*Garis Lintang Stesen U*
Tinj. Laras	*Altitud di laras*
Az. Mh Kira	*Azimut matahari yang dikira*
Az. Mh Prt.	*Purata mengufuk*
Sel = Az - Tilik	*Beza Azimut*
TR	*Tanda Rujuk Sebenar (Purata TR + Az – Purata Ke Matahari)*
Bg. Genid TR	Bearing grid TR
Purata Bg. Genid	*Purata Bearing grid ke Tanda Rujuk (mean of all set)*
Next	View next Solar Computation form.
Previous	View previous Solar Computation form.

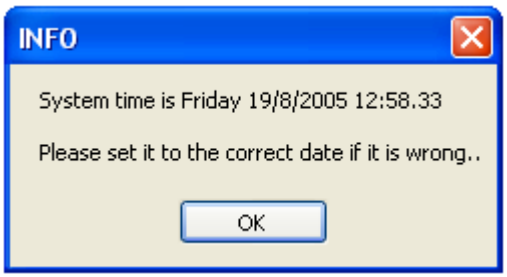
d) Origin Tab



Stesen U/S	User input of Stesen U/S.
Stesen T/B	User input of Stesen T/B.
Refresh	View/refresh origin output after solar sets and computation has been done.
Update	Accept user's input and store into database.

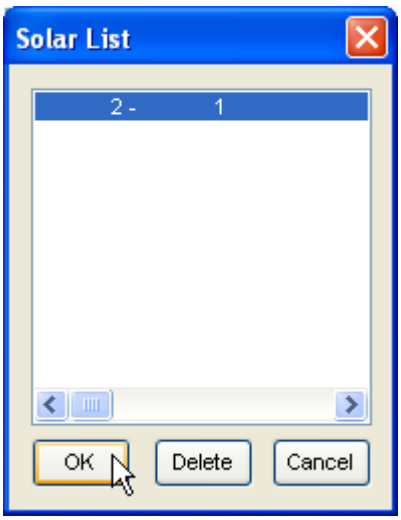
Survey Steps

1. Go to **Surv** Menu > **Solar Obs**. Menu.
2. The application will prompt a message dialog asking that user need to check the system date and the system time will correct with the local date and time

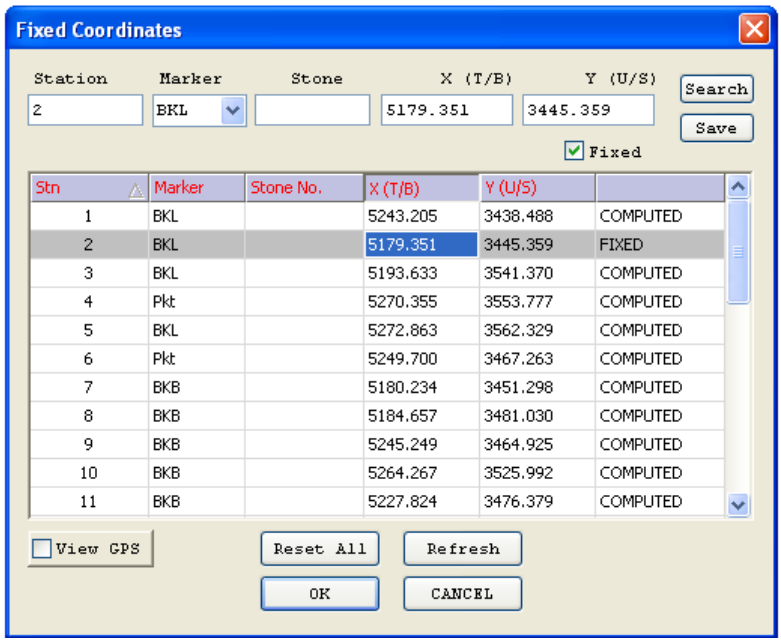


3. The **Query Dialog** will prompt out asking user want to get coordinate value from 3rd party GPS software. Just click **No** button.

4. If you have existing sun observation and you wish to continue the observation, click **SunList** button. You will get **Solar List** dialog as following. Click the '2-1' then click **OK** button to open. You can delete existing solar list use **Delete** button.



5. If you don't have existing solar observation for the line, clicks **Cancel** button go back to observation. Key in all the information in the **Info Page**. If you wish to get the coordinate for station, click **Coord** button and you will get **Fixed Coordinate** dialog as you highlight the station that you want.

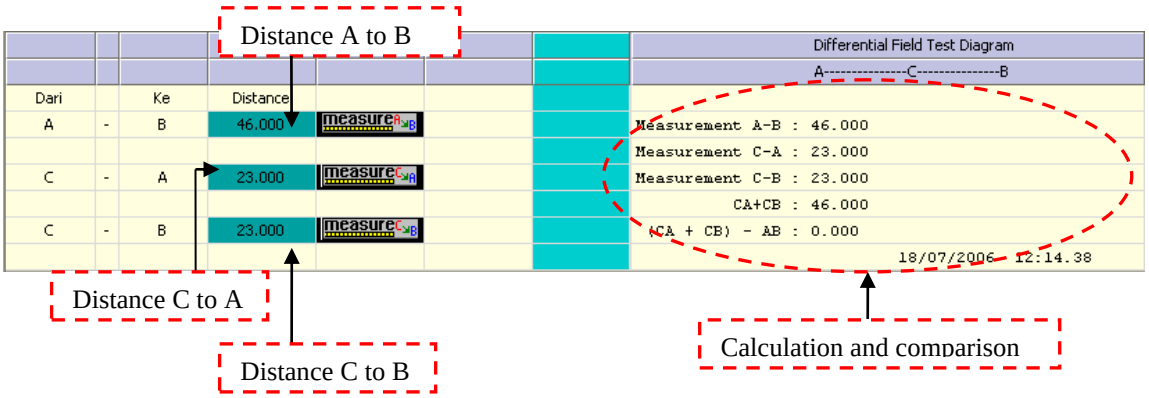


6. Click your station number and click **OK** button. You will return to **Info** page. Click **Save** button to save this page after filling in all information.
7. Go to **Observation page**, and you will see the page similar as below
8. Point theodolite to "To Station" and click the **TR** button (face left).
9. Then point theodolite to the sun and do observation for ki ,ki , ka , ka by clicking each button for each type of observation
10. Point theodolite to "To Station" and click the **TR2** button (face right).
11. Click the **Save** button.
12. Repeat the above steps from step 7 to step 11 for Set 2.
13. If you want to delete bad observation, click **DELETE** button.
14. Navigate to **Compute page** to see the computation.
15. Click the **Next** button or **Previous** button to see the set of computation.

16. Navigate to **Origin page** to see the origin.
17. After finishing solar observation, we can do our M correction for our traverse. To do computation for M correction, please proceed to next part, **Part 6: In-Field Computation – 6.2: M & C Correction**.
18. You also will notice that there have sun list when you want to do datum. For further details, please proceed to **5.4: Datum**.
19. To print out the report, please precede to **Part 8.1.2 Solar Report**.

5.2. Differential Field Test

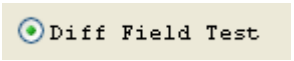
In this part, we will show you the steps to get familiar with the Differential Field Test buttons and examine how to do Differential Field Test. The numbering of the DFT, will automatically change to 9000 series when you save the data.



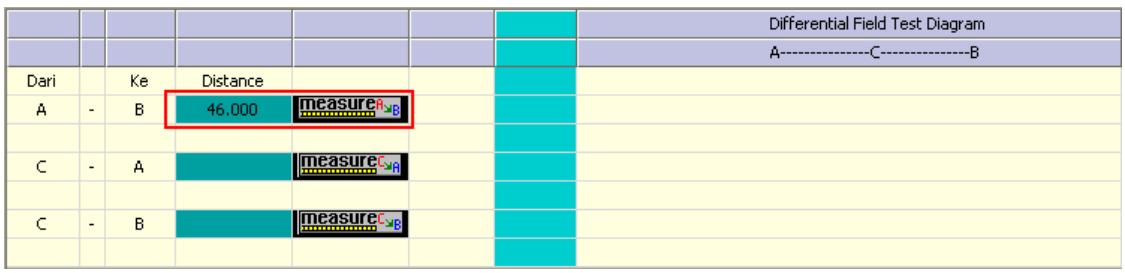
measure A-B	**Measure A-B button**. Measures distance from A to B
measure C-A	**Measure C-A button**. Measures distance from C to A
measure C-B	**Measure C-B button**. Measures distance from C to B
	Reduce button. Reduces the measurement to produce mean, reduction and final value.
	Save button. Set save index to save measurement to database
	Delete button. Deletes the record (applicable during view record mode).

Survey Steps

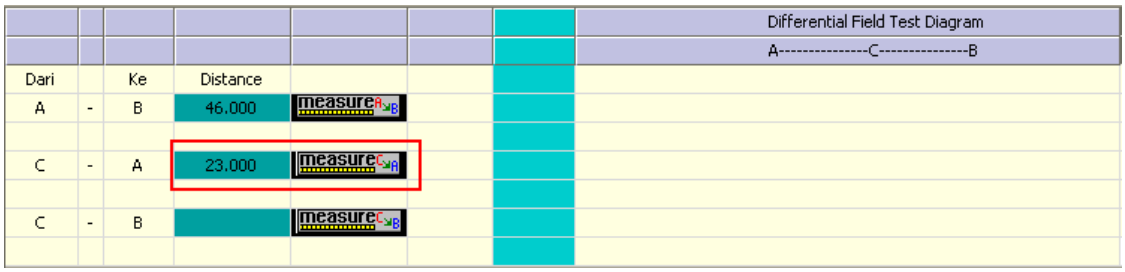
1. Navigate to **Survey > Field Capture**. On the field capture window, select **Differential Field Test** by selecting the Differential field test radio button located at the right side of the window screen



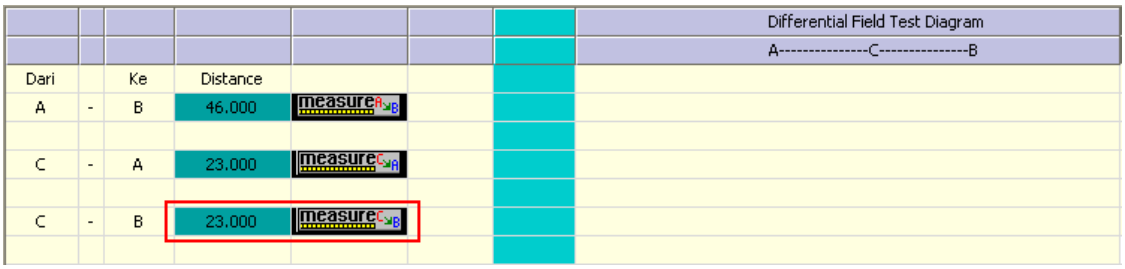
2. Sight theodolite to station "A". Sight to station "B" and click the measure **A-B** button (face left).



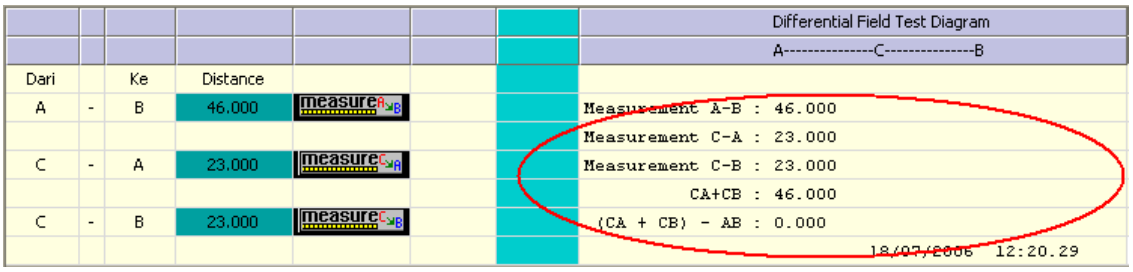
3. Sight theodolite to station “C”. Sight to station “A” and click the measure **C-A** button (face left).



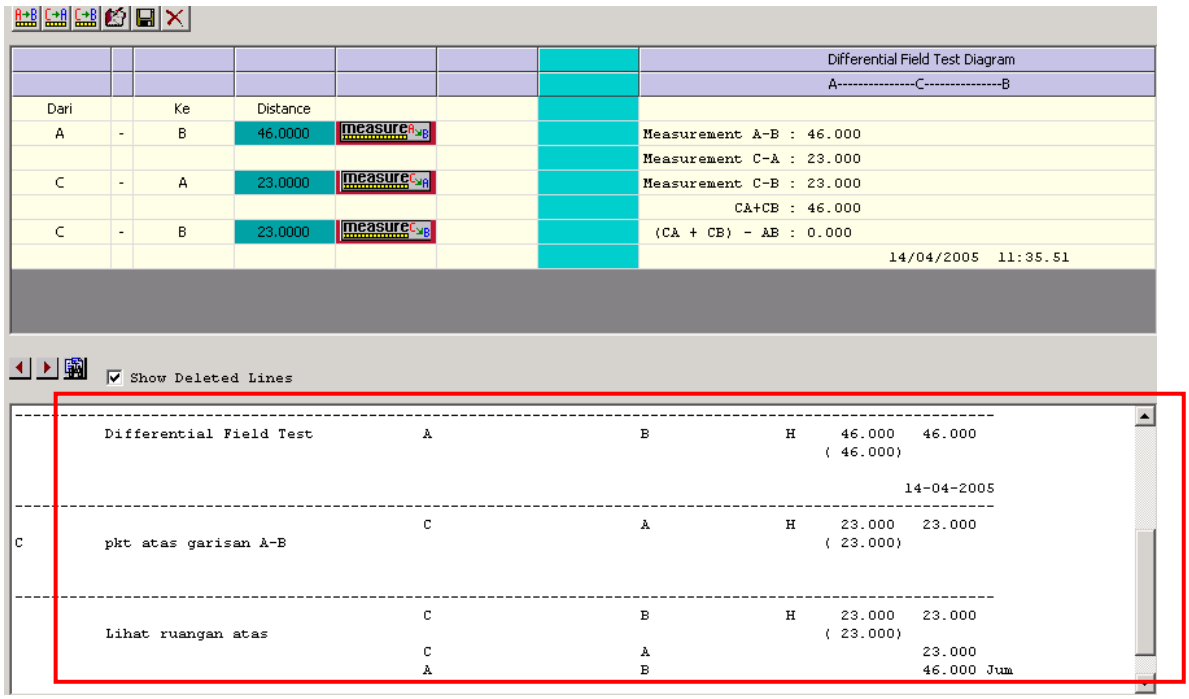
4. From the station “C”, sight to station “B” and click the measure **C-B** button (face left).



5. After all the measurement required was measured, click on the **Reduce** button to reduce the measurement to produce mean, reduction and final value

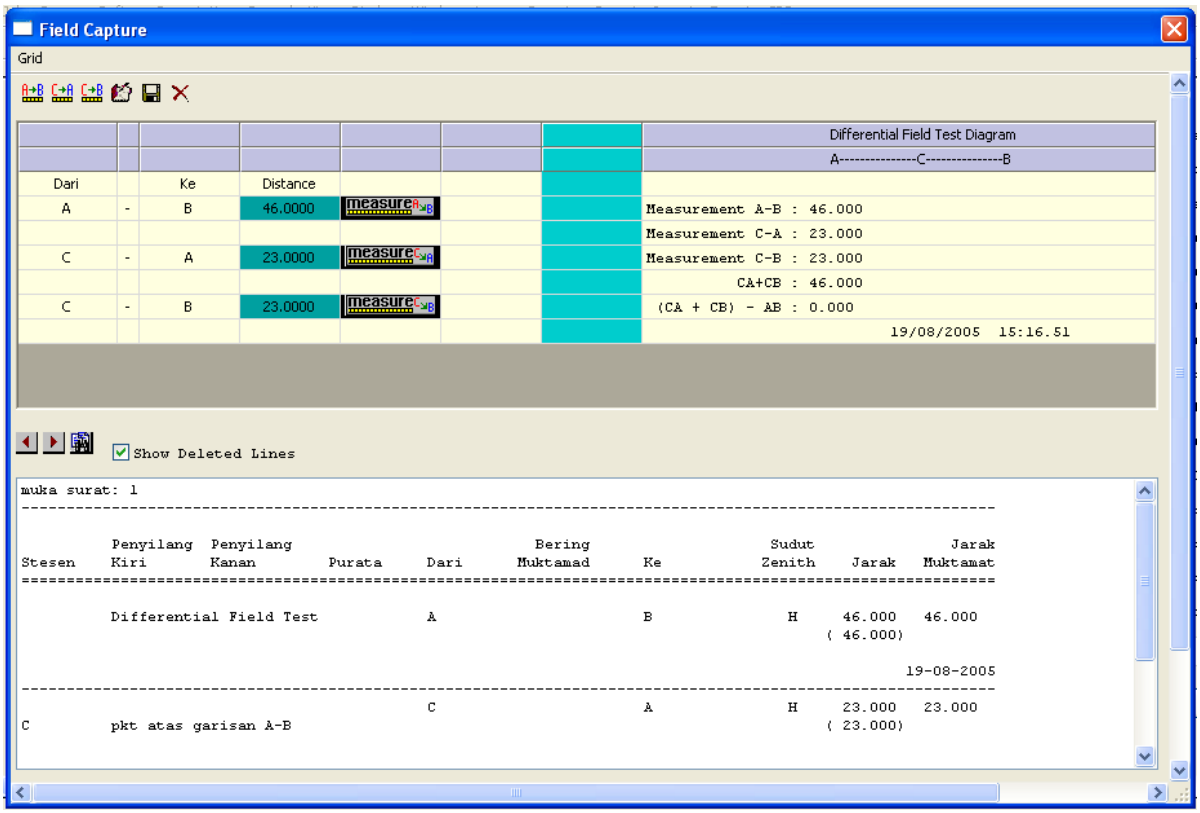


6. Finally click the **Save** button to save your Differential Field Test record. Once you saved the record, you will able to see that the record is booked into the field book. This DFT record will always place on the top of the field book.



Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

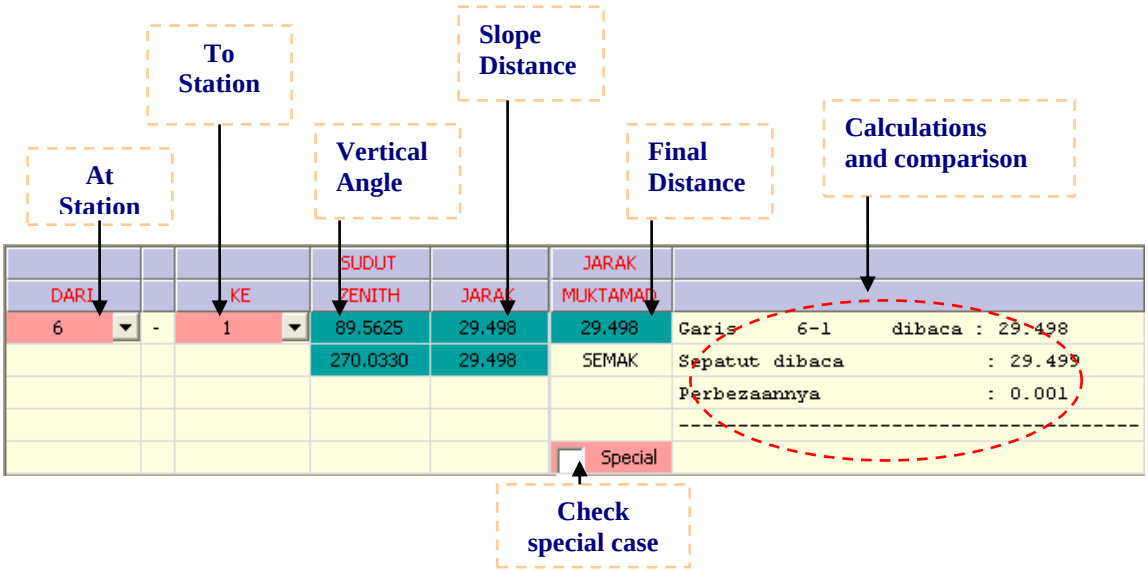
7. You can view your record using **Record** menu. Please click **Record** menu > **Differential Field Test**. **Field Capture Dialog** will be displayed as follow.



8. If you wish to delete the record, please click **Delete** button.

5.3. Semakan Harian

In this part, we will show you the steps to get familiar with the **Semakan Harian** buttons and examine how to do Semakan Harian.

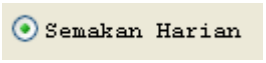


	Measure button. Measures Face Left the first time and Face Right for the second time
	Reduce button. Reduces the measurement to produce mean, reduction and final value. Comparism between computed and true line distances will be shown.

	Save button. Set save index to save measurement to database.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used.

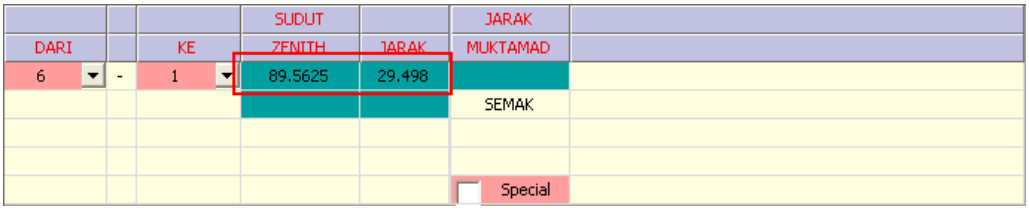
Survey Steps

1. On the field capture window, select **Semakan Harian** observation by selecting the **Semakan Harian** radio button located at the right side of the window screen.

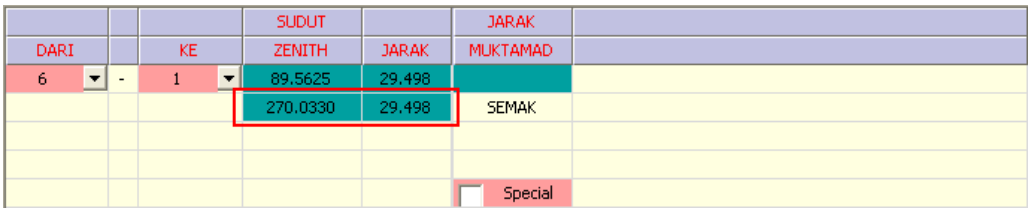


2. User select the "**At station ID**" and the "**To station ID**" from the provided combo box.

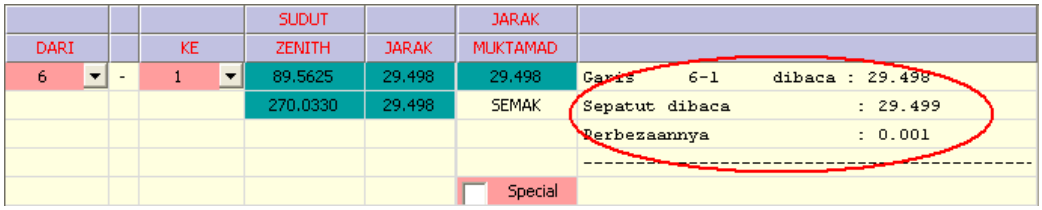
3. After all the information is enter in, sight to the "**forward station**" and click the **measure** button to measure the bearing distance for your face left. The bearing and distance value will be retrieved automatically.



4. Sight to the "**forward station**" and click the **measure** button again to measure the bearing distance for your face right. The bearing and distance value will be retrieved automatically.



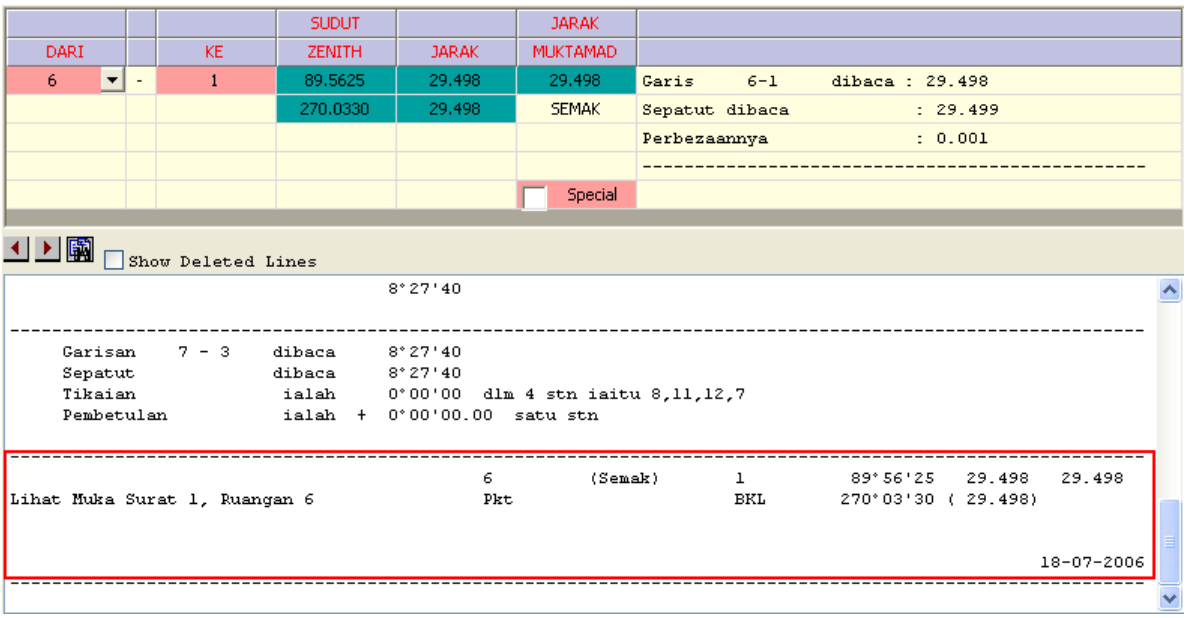
5. Click on the **reduce** button to reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line bearing and distance will be shown.



6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

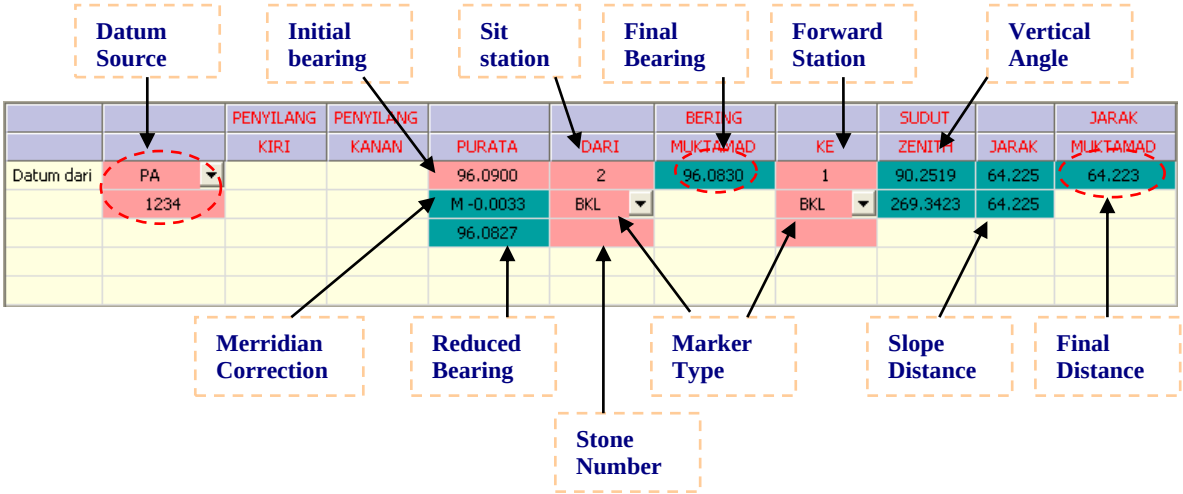
7. You can view your record using **Record** menu. Semakan Harian same with Check Distance, so please click **Record** menu > **Check Distance**. Field Capture Dialog will be displayed as follow.



8. If you wish to delete the record, please click button.

5.4. Datum

In this part, we will show you the steps to get familiar with the Datum buttons and examine how to do Datum.

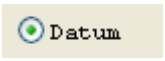


	Measure button. Measures Face Left the first time and Face Right for the second time
	Reduce button. Reduces the measurement to produce mean, reduction and final value.
	Save button. Set save index to save measurement to database
	Measure All button. Measures both face left and face right measurements transiting automatically. Applicable to motorized instruments with auto targeting system only.
	Sketch button. To view sketch.
	PO Line button. Get Datum From Exiting PO.
	Sun Bearings button. Get sun list from **Part 5.1: Sun Observation**.

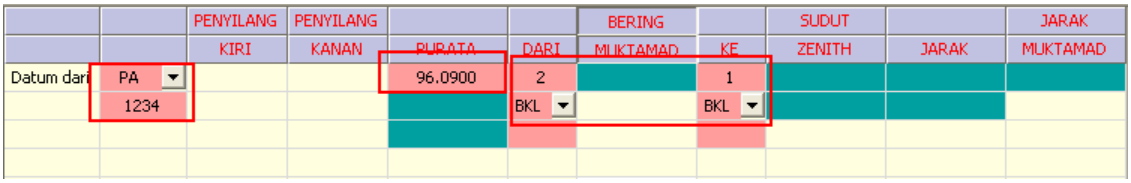
	Remark button. Put the remark.

Survey Steps

1. On the field capture window, select **Datum** observation by selecting the **Datum** radio button located at the right side of the window screen.

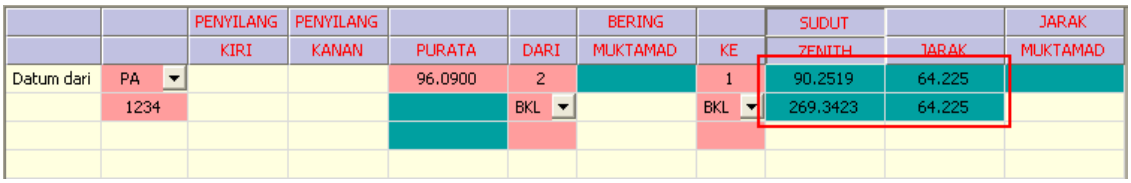


2. Select the type of Datum, then key in the initial start bearing, "**Sit Station ID**, "**To Station ID**" and select or manually key in your marker type.



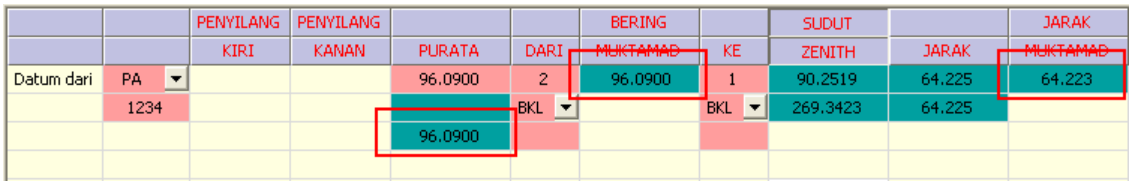
Note: If the is any stone number for a particular station ID; you may enter in the particular stone number directly the red colour field under the marker type.

3. After all the information is keyed in, click the **measure** button to measure the bearing and the distance for your face left. The measurement value will be retrieved automatically. Then continue measure the bearing and the distance for your face right.



Note: For step 3 and step 4, once you click the **measure** button the screen below will appear indicating that measurement is in progress. If the screen below does not appear, you need to click the measure button again to start your measurement.

4. After all the measurement required was measured, click on the **reduce** button to reduce the measurement to produce mean, reduction and final value



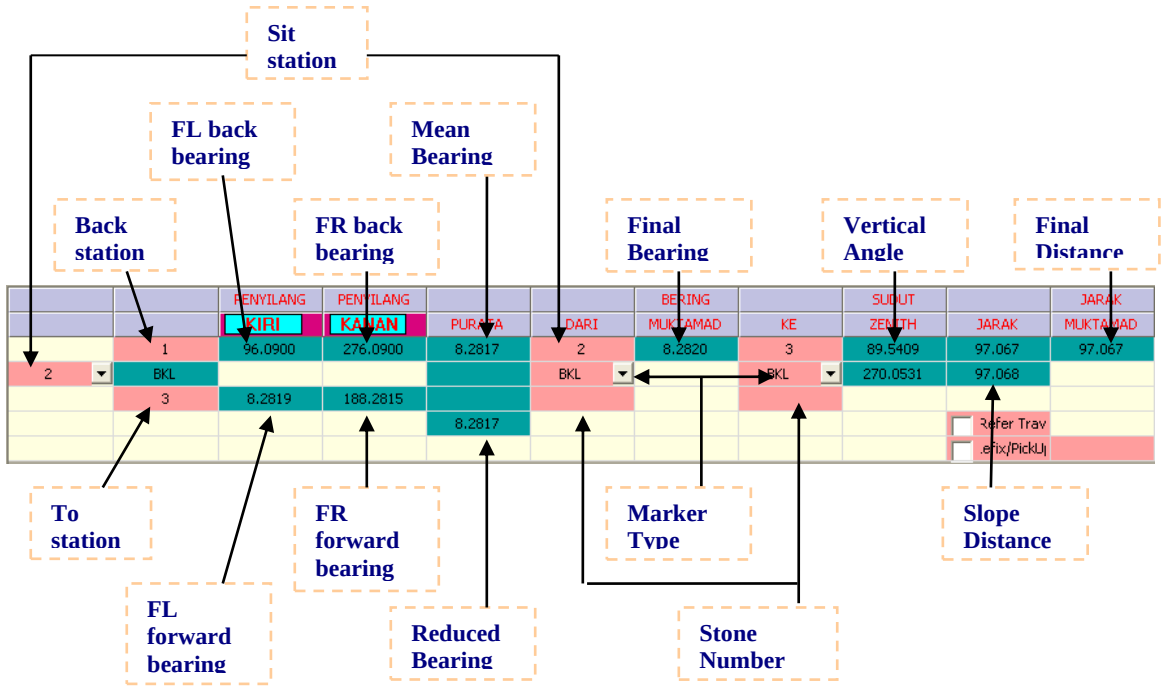
5. Finally click the **save** button to save your datum record. Once you saved the record, you will able to see that the record is booked into the field book.

Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save

6. You can view your record using **Record** menu. Please click **Record** menu > **Datum**.

5.5. Traverse

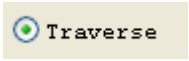
In this part, we will show you the steps to get familiar with the **Semakan Harian** buttons and examine how to do Semakan Harian.



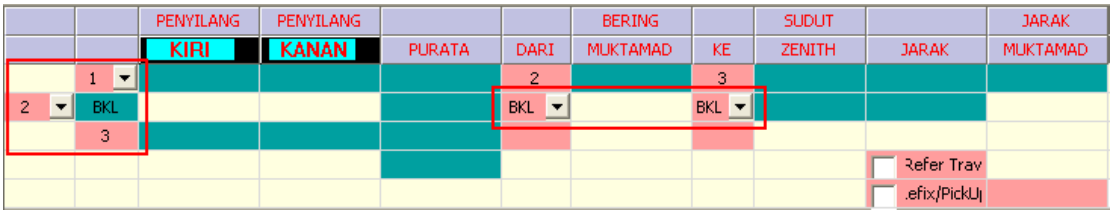
	Measure button. Measures Face Left the first time and Face Right for the second time
	Reduce button. Reduces the measurement to produce mean, reduction and final value.
	Save button. Set save index to save measurement to database.
	Measure All button. Measures both face left and face right measurements transiting automatically. Applicapable to motorized instruments with auto targeting system only.
	Remeasure Horizontal bearing.
	Remeasure Face Left (Horizontal Bearing, Vertical Angle, Slope Distance)
	Remeasure Face Right (Horizontal Bearing, Vertical Angle, Slope Distance).
	Sketch button. To view sketch.
	Enter height button. Enter height details.
	Edit Station ID button. Update/Edit station IDs.
	Remeasure Trav Dist. Remeasure Distance.
	Remark button. Put the remark for observation.
	Last 20 Station button. View the last 20 station number that being used.
	Station Remark button. Put the remark for station.

Survey Steps

1. On the field capture window, select **Traverse** observation by selecting the **Traverse** radio button located at the right side of the window screen.

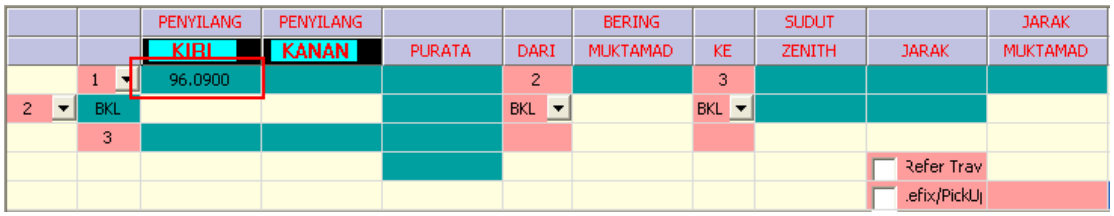


2. Select the "**Sit station ID**", the "**Back station ID**" from the provided combo box and the type in the "**To station ID**". Then select or manually key in your marker type.

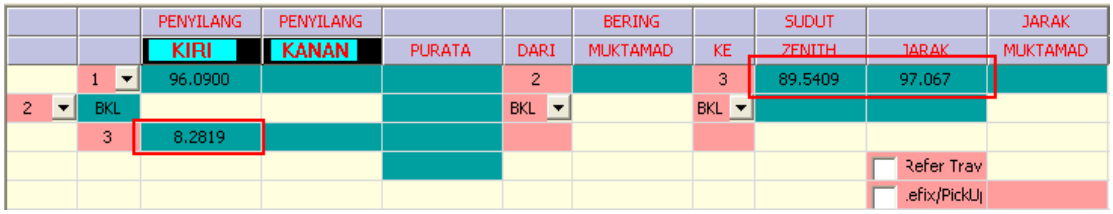


Note: You may enter in the particular stone number directly the red colour field under the marker type if any.

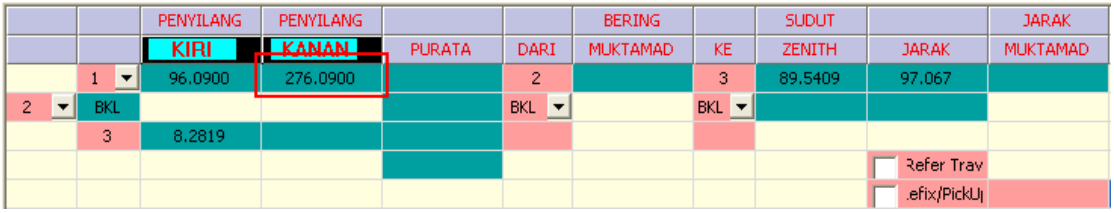
3. After all the information is enter in, sight to the "**Back station**" and click the **kiri** button to set the back bearing for your face left. The bearing value will be retrieved automatically.



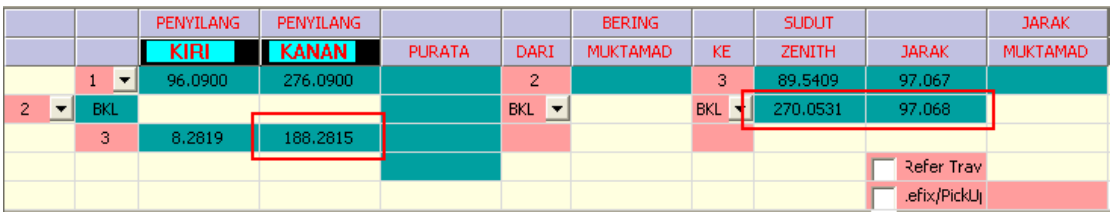
4. Then sight the theodolite to the "forward station" and click the **measure** button to measure the bearing and the distance for your face left. The measurement value will be retrieved automatically.



5. Then sight the theodolite to the "**Back station**" and click the **kanan** button to set the back bearing for your face right. The bearing value will be retrieved automatically.

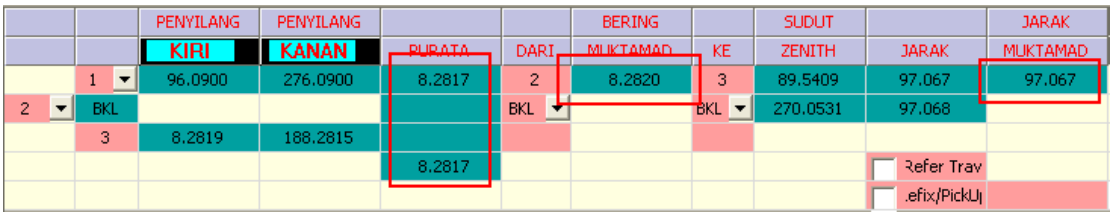


6. Then sight the theodolite to the "**forward station**" and click the **measure** button to measure the bearing and the distance for your face right. The measurement value will be retrieved automatically.



Note: For step 4 and step 6, once you click the **measure** button the screen below will appear indicating that measurement is in progress. If the screen below does not appear, you need to click the measure button again to start your measurement.

7. After all the measurement required was measured, click on the **reduce** button to reduces the measurement to produce mean, reduction and final value.



8. Finally click the **save** button to save your traverse record. Once you saved the record, you will able to see that the record is booked into the field book.

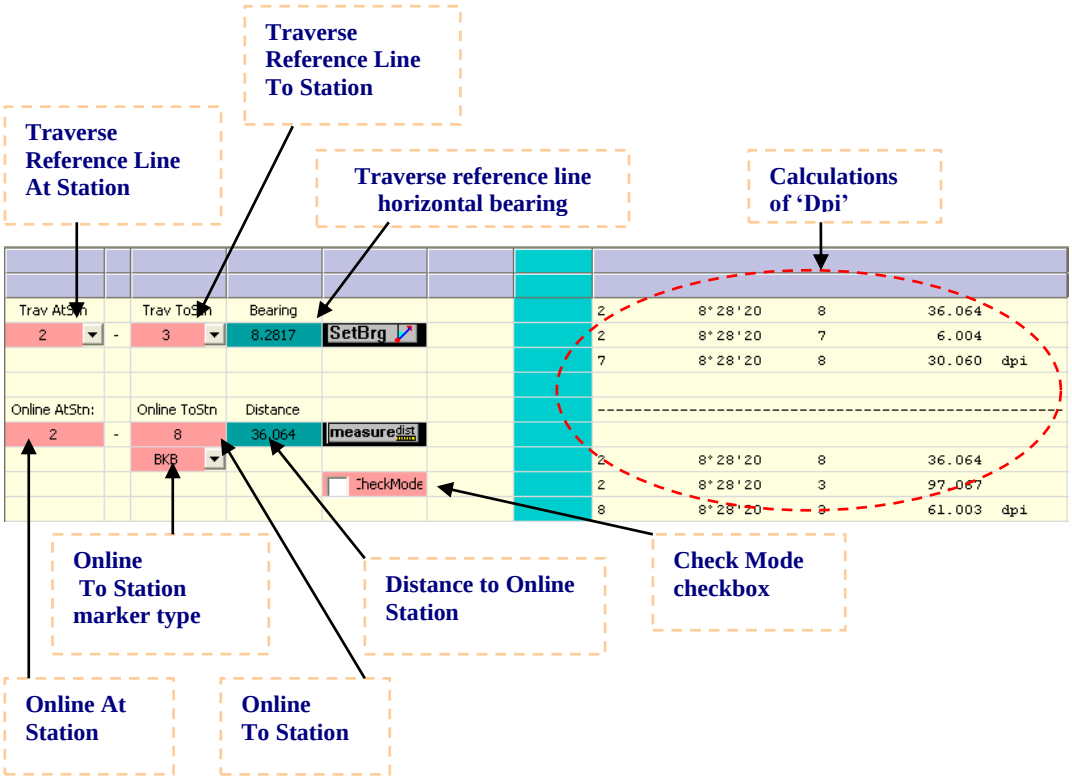
   Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

9. You can view your record using Record menu. Please click **Record** menu >**Traverse**. **Field Capture Dialog** will be displayed as follow.

10. Before you do the close statement, you need to use bearing close function in **Part 5.8: Bearing Close** to do your close bearing before doing close statement in **Part 5.9: Close Statement**.

5.6. Online

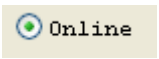
In this part, we will show you the steps to get familiar with the **Online** buttons and examine how to do Online.



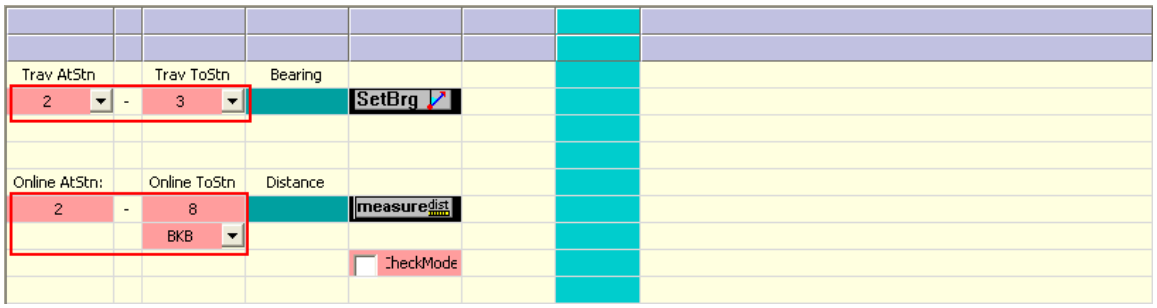
	Set bearing button. Sets traverse line reference bearing to the instrument and displayed.
	Measure Dist only button. Measure distance to online station.
	Reduce button. Reduces the measurement to produce mean, reduction and final value. 'Dpi' will be auto calculated and displayed.
	Save button. Set save index to save measurement to database.
	Sketch button. To view sketch.
	POL Tape button.
	Last 20 Station button. View the last 20 station number that being used.

Survey Steps

1. On the field capture window, select **Online** observation by selecting the **Online** radio button located at the right side of the window screen.

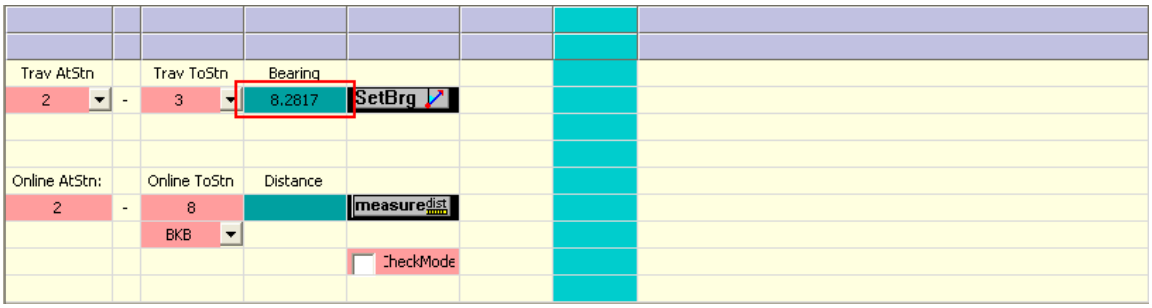


2. Select the "**Traverse Reference Line At Station ID**", the "**Traverse Reference Line To Station ID**" from the provided combo box and the type in the "**Online To Station ID**". Then select or manually key in your marker type.



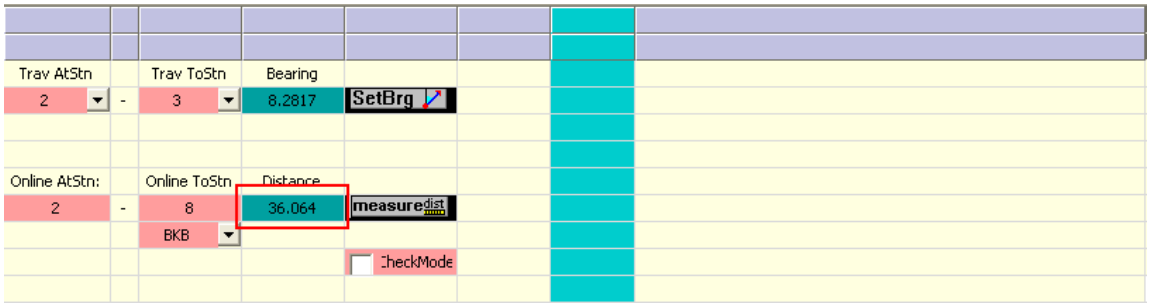
Note: If you are doing online checking, tick the checkbox for check mode

3. Sight the theodolite to "**Traverse Reference Line To Station**" and press **Set Bearing** button to assigned bearing (retrieved from previous measurement) between occupied station and online/reference station.



Note: For online observation, you only need to set the bearing for face left.

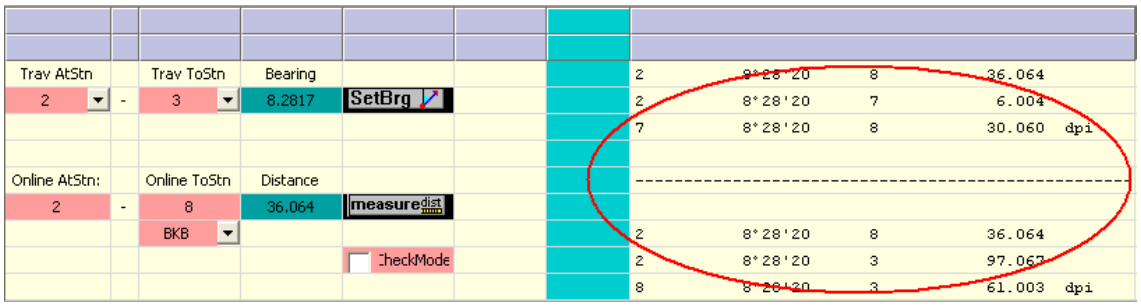
4. Sight the theodolite to "**Online To Station**" and press **Measure** button to measure the distance to online station.



Note: For online observation, you only need to measure the distance for face left.

5. For step 4, once you click the **measure** button the screen below will appear indicating that measurement is in progress. If the screen below does not appear, you need to click the measure button again to start your measurement.

6. After that, press **Reduce** button to produce mean, reduction and final value. 'Dpi' will be auto calculated and displayed.



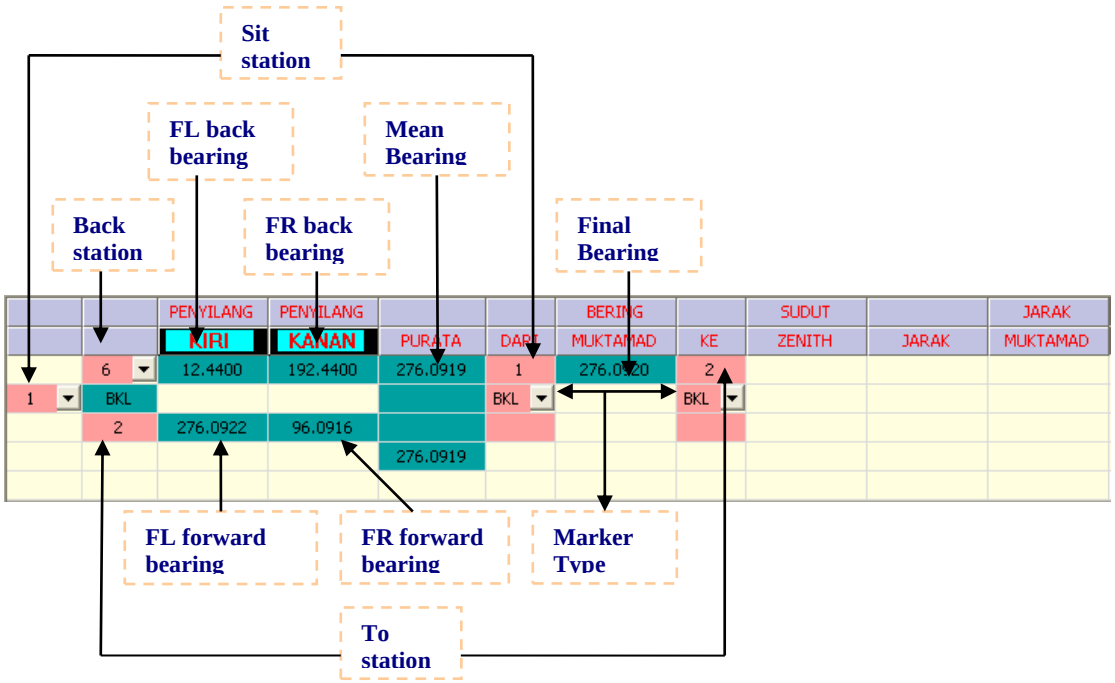
7. Finally click the **save** button to save your online record. Once you saved the record, you will able to see that the record is booked into the field book.

   Note: The measurement that you have measured will only be save once you click the save button.
   If not the measured bearing and distance of that particular record will not be save.

8. You can view your record using Record menu. Please click **Record** menu > **Online**. **Field Capture Dialog** will be displayed as follow.

5.7. Bearing Close

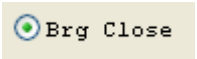
In this part, we will show you the steps to get familiar with the Bearing Close buttons and examine how to do Bearing Close.



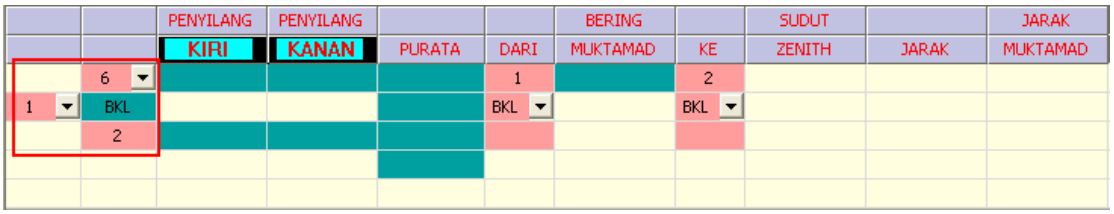
	Measure horizontal bearing button. Measures Face Left the first time and Face Right for the second time
	Reduce button. Reduces the measurement to produce mean, reduction and final value.
	Save button. Set save index to save measurement to database.
	Measure All button. Measures both face left and face right measurements transiting automatically. Applicable to motorized instruments with auto targeting system only.
	Sketch button. To view sketch.
	Delete button. Deletes the record (applicable during view record mode).
	Remark button. Put the remark.
	Last 20 Station button. View the last 20 station number that being used.

Survey Steps

1. On the field capture window, select **Bearing Close** observation by selecting the **Brg Close** radio button located at the right side of the window screen.

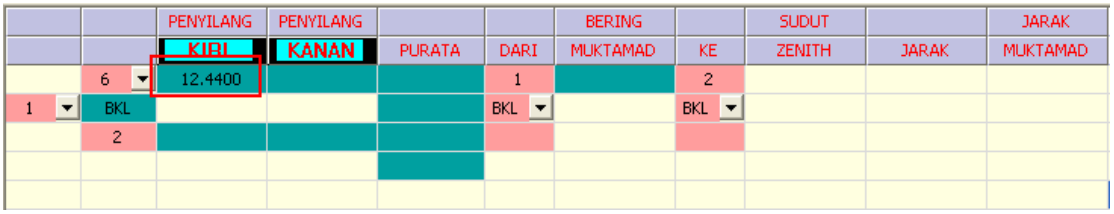


2. Select the "**Sit station ID**", the "**Back station ID**" from the provided combo box and the type in the "**To station ID**". Then select or manually key in your marker type.

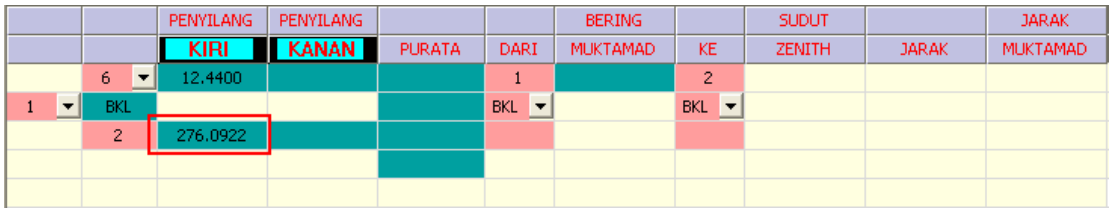


Note: You may enter in the particular stone number directly the red color field under the marker type if any.

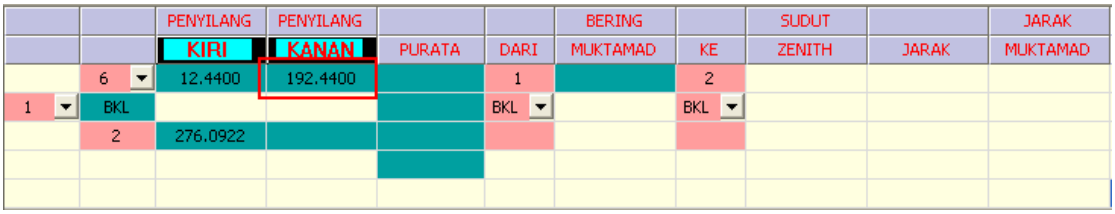
3. After all the information is enter in, sight the theodolite to the "**Back station**" and click the **kiri** button KIRI to set the back bearing for your face left. The bearing value will be retrieved automatically.



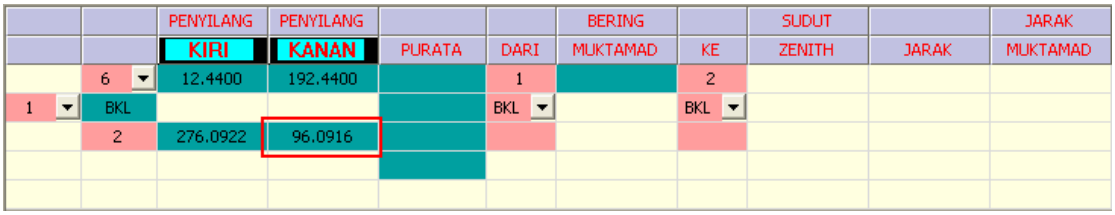
4. Then sight the theodolite to the "**To station**" and click the **measure** button HbrG to measure the bearing and the distance for your face left. The measurement value will be retrieved automatically



5. Then sight the theodolite to the "**Back station**" and click the **kanan** button KANAN to set the back bearing for your face right. The bearing value will be retrieved automatically.

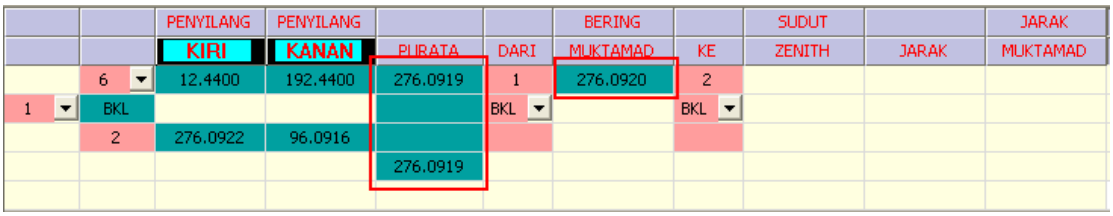


6. Then sight the theodolite to the "**To station**" and click the **measure** button HbrG to measure the bearing and the distance for your face right. The measurement value will be retrieve automatically.



Note: For step 4 and step 6, once you click the **measure** button HbrG the screen below will appear indicating that measurement is in progress. If the screen below does not appear, you need to click the measure button again to start your measurement.

7. After all the measurement required was measured, click on the **reduce** button to reduces the measurement to produce mean, reduction and final value.



8. Finally click the **save** button to save your bearing close record. Once you saved the record, you will able to see that the record is booked into the field book.

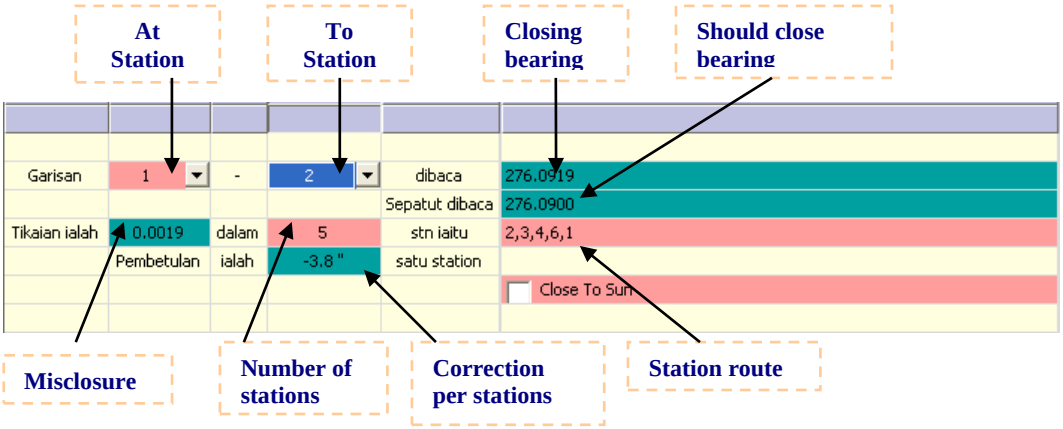
   Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

9. You can view your record using Record menu. Please click **Record** menu >**Bearing Close**. **Field Capture Dialog** will be displayed as follow.

10. After you complete your bearing close, now you can proceed with close statement in **Part 5.9: Close Statement**.

5.8. Close Statement

In this part, we will show you the steps to get familiar with the Close Statement buttons and examine how to do Close Statement.



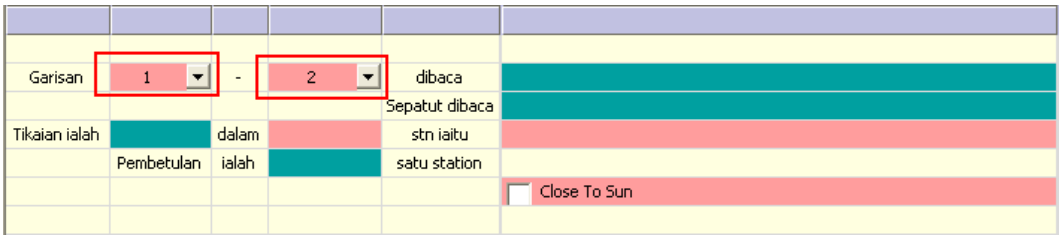
	Reduce button. Reduces the measurement to produce mean, reduction and final value. Close bearing and should close bearing will be automatically retrieved and displayed with the misclosure and correction per stations calculated. If no station route has been entering, user is provided a list of route to select from.
	Save button. Set save index to save measurement to database.
	Sketch button. To view sketch.
	Provides a dialog with all available stations to pick and connect as station route.
	Provides a dialog with all available PO line bearings to select as “Should close bearing”.
	Provides a dialog with all available Sun mean grid bearings to select as “Should close bearing”.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used.

	Graphic Pick Route button. Graphic pick the traverse route by user.
	Remark button. Put the remark for observation.

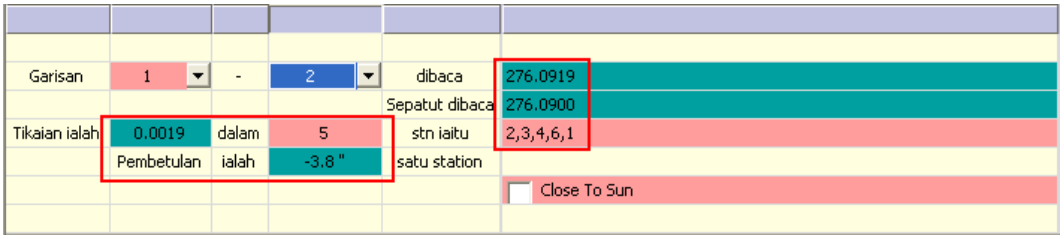
Survey Steps

1. On the field capture window, select **Close Statement** observation by selecting the **Close Statement** radio button located at the right side of the window screen.

2. Select the "**At station ID**" and the "**To station ID**" from the provided combo box.



3. The route and calculation of the correction will be produced.



4. User can also manually key in the station route. Double click the route you want to edit / change. Press Enter and click on the **Reduce** button after change.

5. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

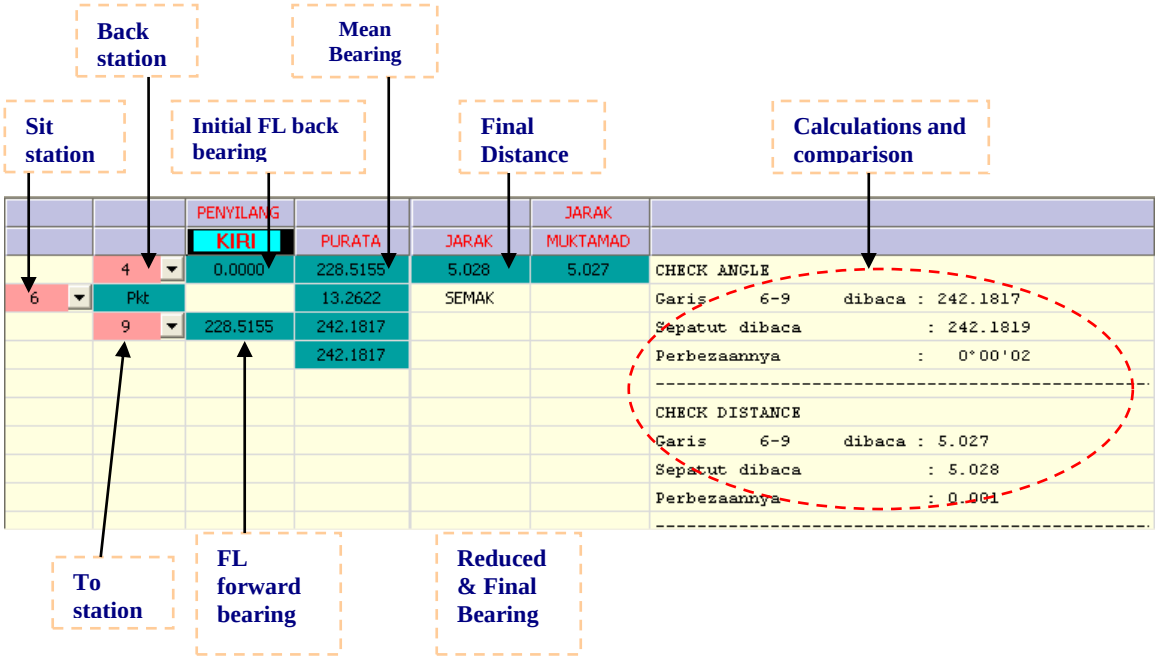
   Note: The measurement that you have measured will only be save once you click the save button.
   If not the measured bearing and distance of that particular record will not be save.

6. You can view your record using **Record** menu. Please click **Record** menu > **Close Statement**. **Field Capture Dialog** will be displayed as follow.

7. After doing the close statement, we need to continue with C correction and misclosure calculation for our job. So, please proceed to next part, **Part 6: In Field Computation**.

5.9. Check Angle & Distance

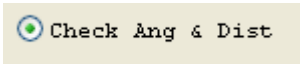
In this part, we will show you the steps to get familiar with the Check Angle & Distance buttons and examine how to do Check Angle & Distance. You can use this function after do refixation or any tasks that require check angle & distance.



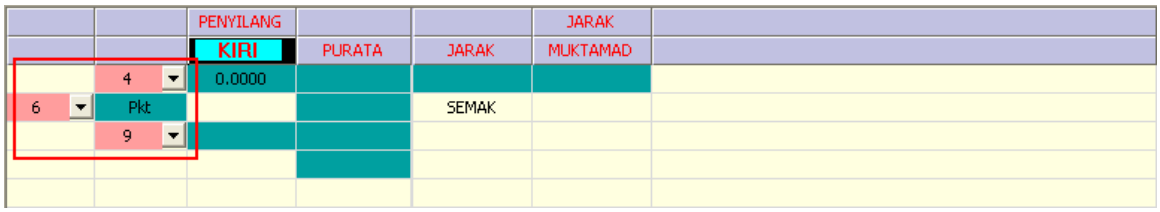
	Measure button. Measures Face Left forward bearing and distance.
	Reduce button. Reduces the measurement to produce mean, reduction and final value. Comparism between computed and true line bearing and distance will be shown.
	Save button. Set save index to save measurement to database.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used.

Survey Steps

1. On the field capture window, select **Check Angle & Distance** observation by selecting the **Check Ang & Dist** radio button located at the right side of the window screen.

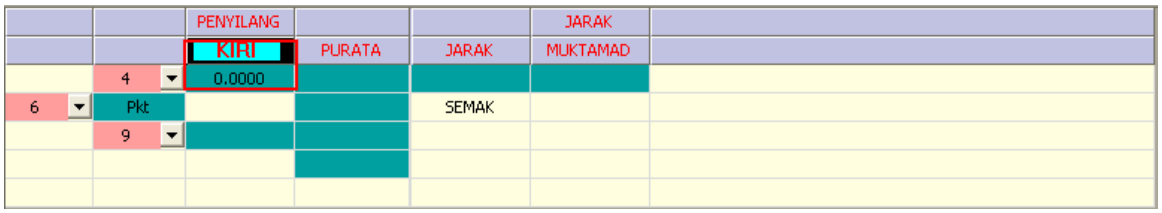


2. Select the "**Sit station ID**", the "**Back station ID**" and the "**To station ID**" from the provided combo box.



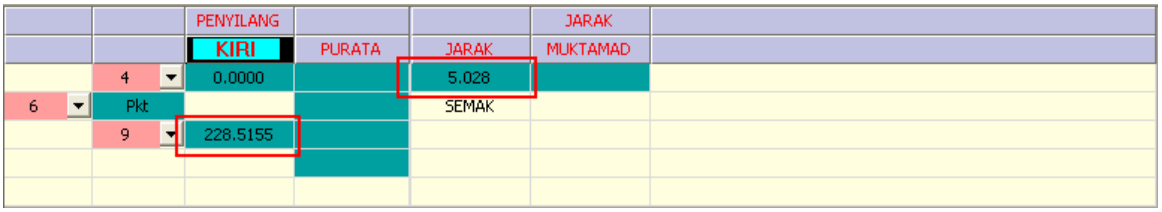
3. After all the information is enter in, sight the theodolite to the "**Back station**" and click the **kiri** button

to set the back bearing for your face left. The bearing value will be retrieved automatically.

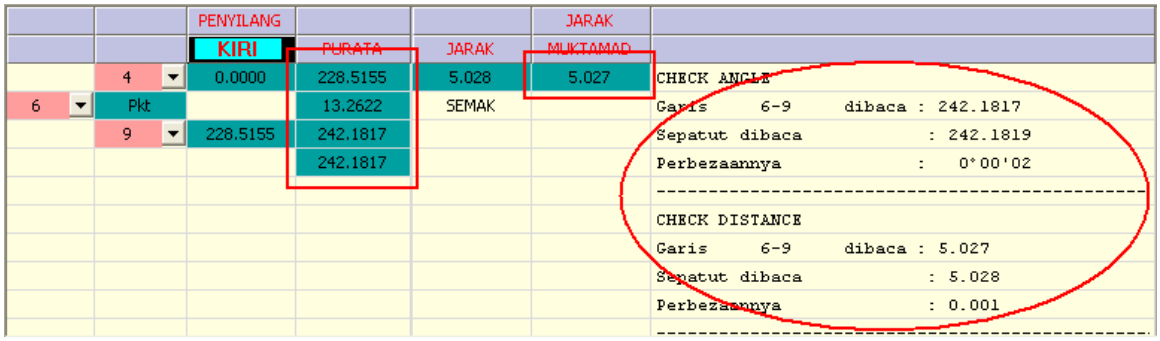


Note: User can also key in the initial face left back bearing.

4. Then sight the theodolite to the "**forward station**" and click the **measure** button to measure the bearing and the distance for your face left. The measurement value will be retrieved automatically.



5. Click on the **reduce** button to reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line bearing and distance will be shown.



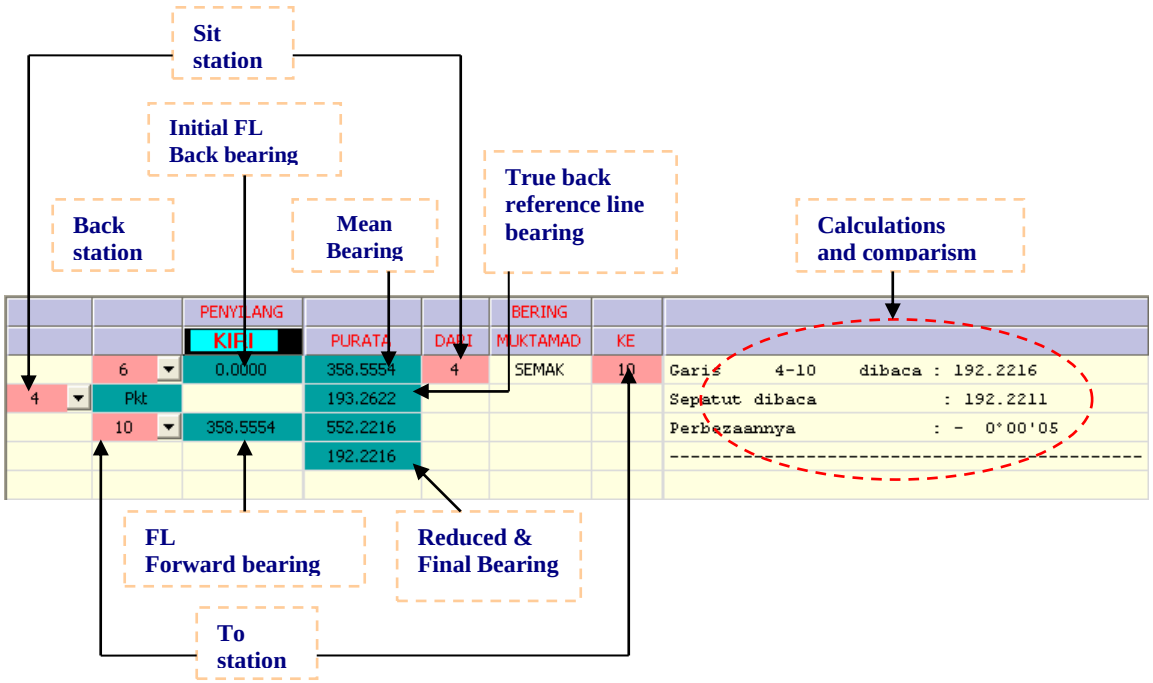
6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

7. You can view your record using **Record** menu. Please click **Record** menu > **Check Angle & Dist**. **Field Capture Dialog** will be displayed as follow.

5.10. Check Angle

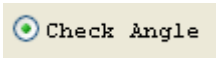
In this part, we will show you the steps to get familiar with the Check Angle buttons and examine how to do Check Angle.



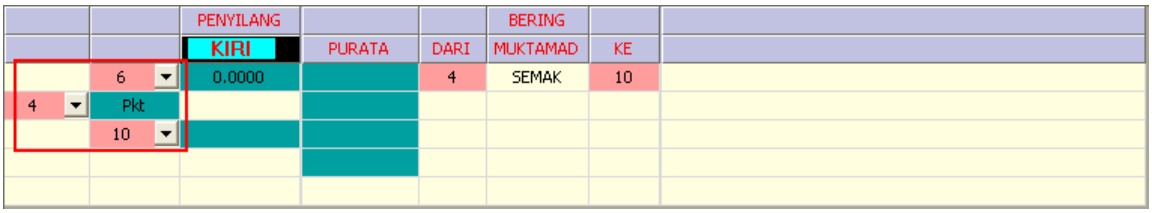
	Measure button. Measures Face Left forward bearing.
	Reduce button. Reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line bearing will be shown.
	Save button. Set save index to save measurement to database.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used

Survey Steps

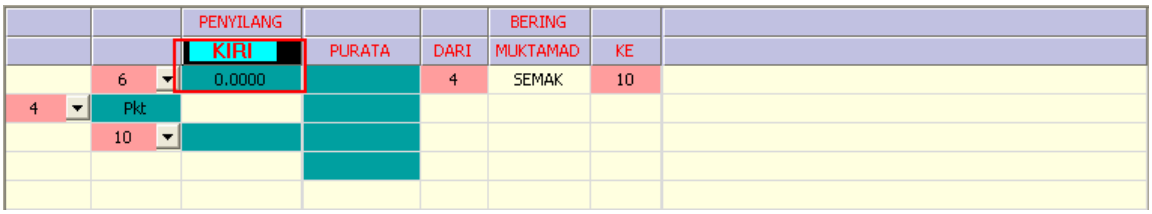
1. On the field capture window, select Check Angle observation by selecting the **Check Angle** radio button located at the right side of the window screen.



2. Select the "**Sit station ID**", the "**Back station ID**" and the "**To station ID**" from the provided combo box.

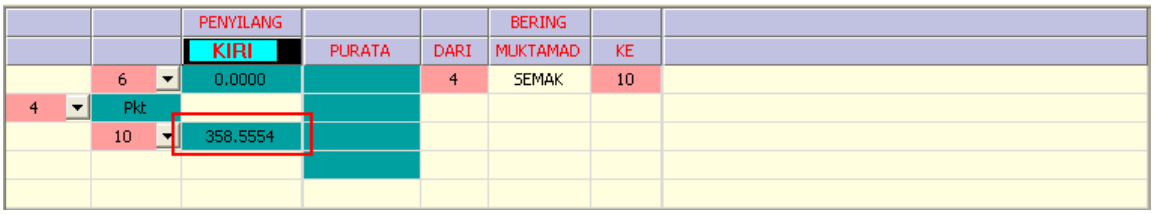


3. After all the information is enter in, sight the theodolite to the "**Back station**" and click the **kiri** button to set the back bearing for your face left. The bearing value will be retrieved automatically.



Note: User can also key in the initial face left back bearing.

4. Then sight the theodolite to the "**To station**" and click the **measure** button to measure the bearing and the distance for your face left. The measurement value will be retrieved automatically.



5. Click on the **reduce** button to reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line bearing and distance will be shown.

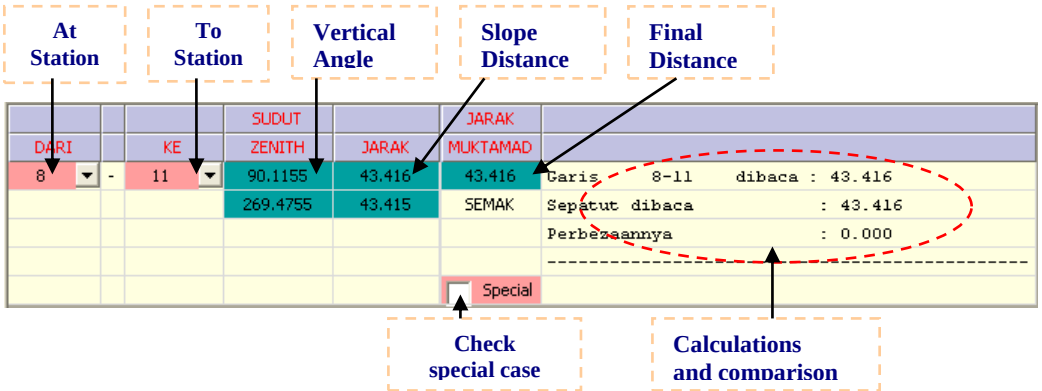
6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

7. You can view your record using **Record** menu. Please click **Record** menu > **Check Angle**. **Field Capture Dialog** will be displayed as follow.

5.11. Check Distance

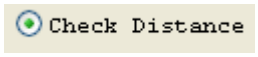
In this part, we will show you the steps to get familiar with the Check Distance buttons and examine how to do Check Distance.



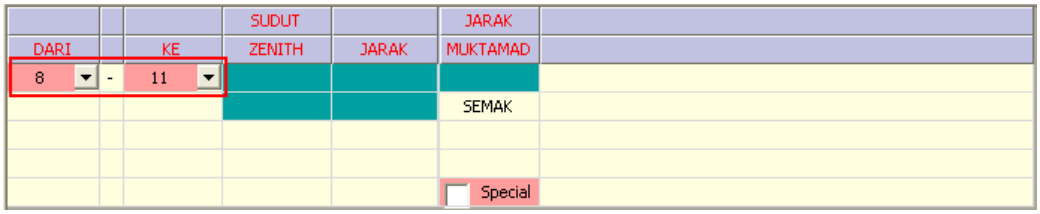
	Measure button. Measures Face Left the first time and Face Right for the second time
	Reduce button. Reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line distances will be shown.
	Save button. Set save index to save measurement to database.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used

Survey Steps

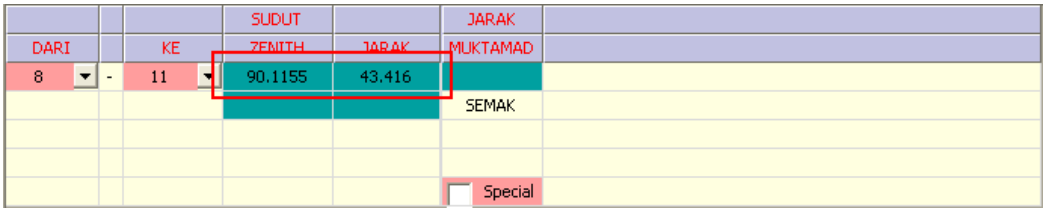
1. On the field capture window, select Check Distance observation by selecting the **Check Distance** radio button located at the right side of the window screen.



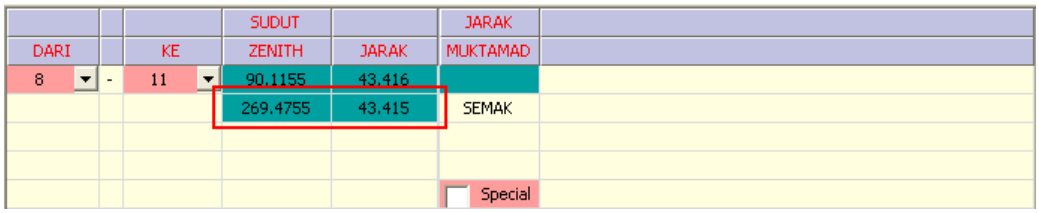
2. Select the "**At station ID"** and the "**To station ID"** from the provided combo box.



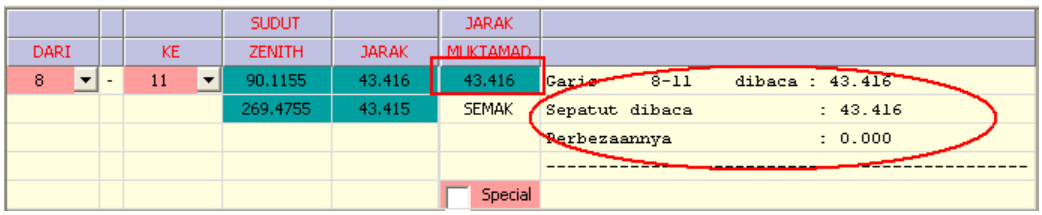
3. After all the information is enter in, sight the theodolite to the "**forward station"** and click the **measure** button to measure the bearing distance for your **face left**. The bearing and distance value will be retrieved automatically.



4. Sight the theodolite to the "**To station"** and click the **measure** button to measure the bearing distance for your **face right**. The bearing and distance value will be retrieved automatically.



5. Click on the **reduce** button to reduces the measurement to produce mean, reduction and final value. Comparison between computed and true line bearing and distance will be shown.



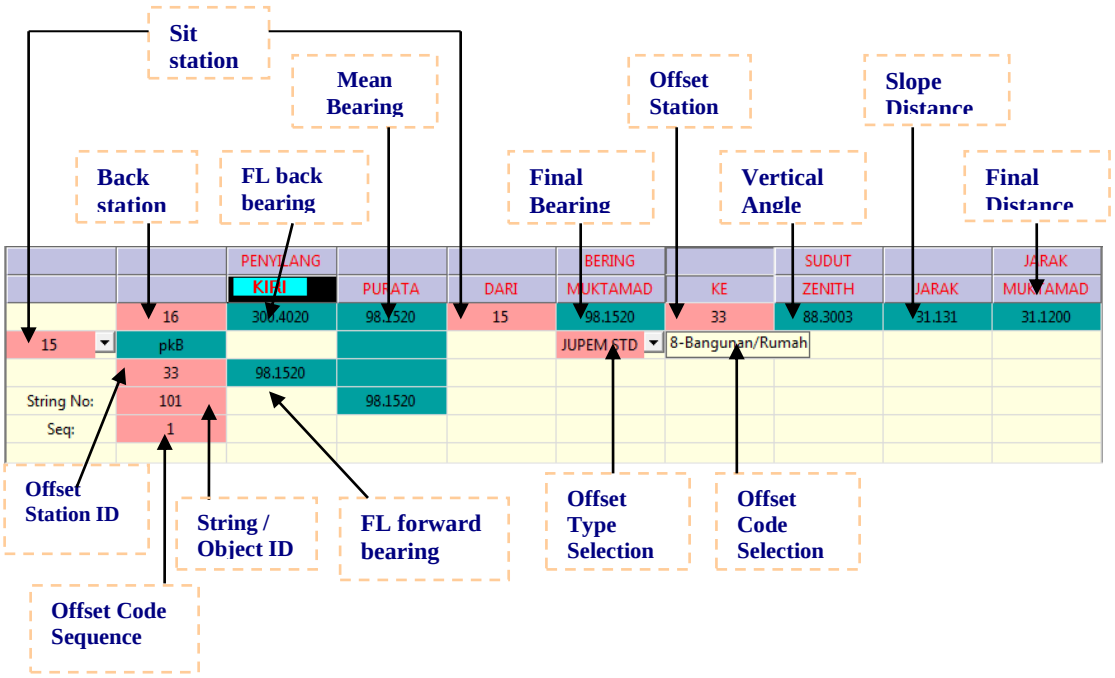
6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

   Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

7. You can view your record using **Record** menu. Please click **Record** menu > **Check Distance**. **Field Capture Dialog** will be displayed as follow.

5.12. Offset Measurement

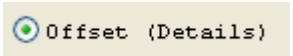
In this part, we will show you the steps to get familiar with the Offset Measurement buttons and examine how to do Offset Measurement.



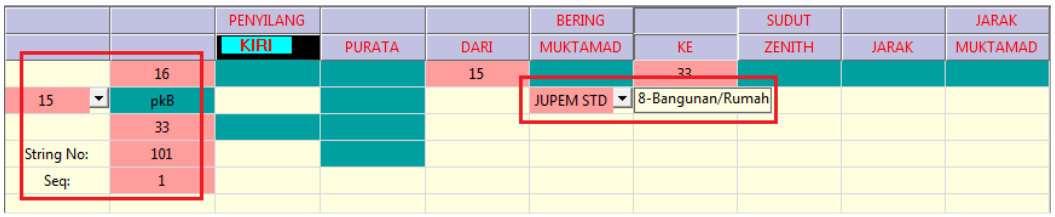
	Set bearing button. Sets back reference line bearing to the instrument and displayed.
	Measure button. Measures Face Left.
	Reduce button. Reduces the measurement to produce mean, reduction and final value
	Save button. Set save index to save measurement to database.
	Sketch button. To view sketch.
	Last 20 Station button. View the last 20 station number that being used

Survey Steps

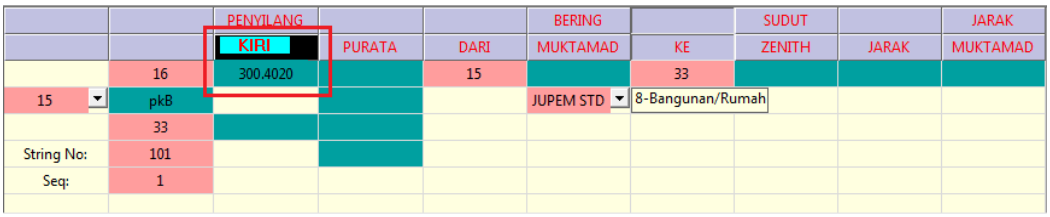
1. On the field capture window, select **Offset** observation by selecting the **Offset radio button** located at the right side of the window screen.



2. Select the "**Sit station ID"** and the "**Back station ID"** from the provided combo box and key in the "**Offset station ID**", following by the **Object ID** and **Sequence** (Seq by automatically). Then select the **offset type** and the **offset code.**

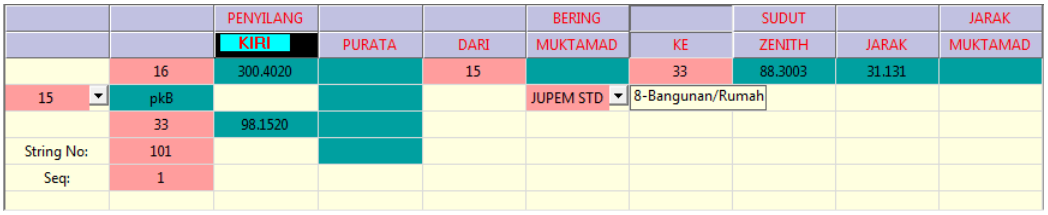


3. After all the information is enter in, sight the theodolite to the "**Back station"** and click the **kiri** button to set the back bearing for your **face left**. The bearing value will be retrieved automatically.

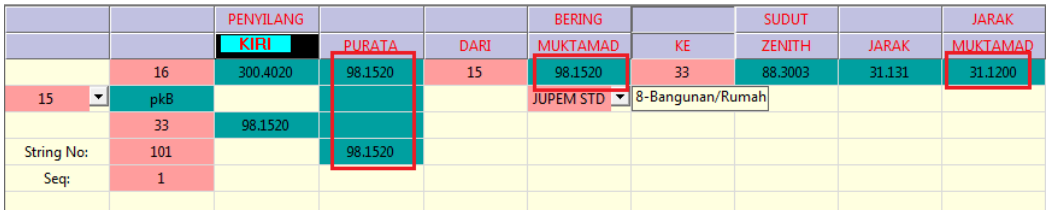


Note: User only needs to set back bearing for face left.

4. Sight the theodolite to the "**Offset station"** and click the **measure** button to measure the bearing and distance for **face left**. The bearing and distance value will be retrieved automatically.



5. Click on the **reduce** button to reduces the measurement to produce mean, reduction and final value.



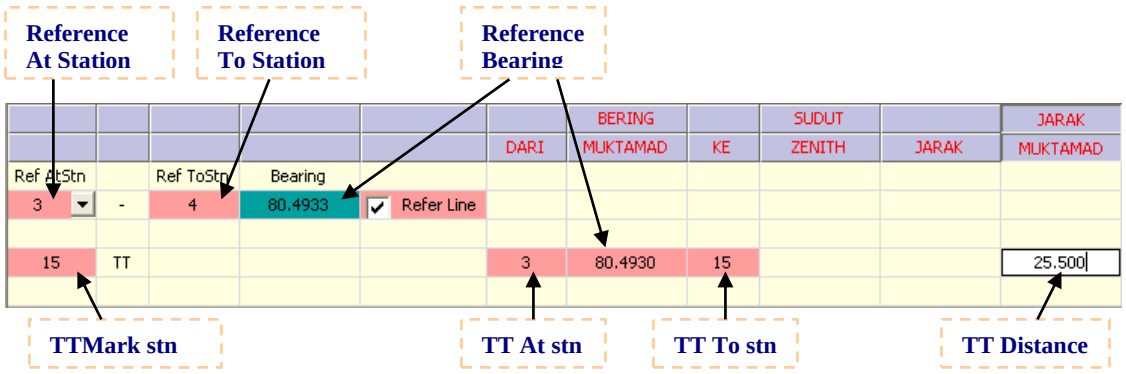
6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

   Note: The measurement that you have measured will only be save once you click the save button.
   If not the measured bearing and distance of that particular record will not be save.

7. You can view your record using **Record** menu. Please click **Record** menu > **Offset**. **Field Capture Dialog** will be displayed.

5.13. TT Mark

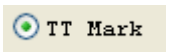
In this part, we will show you the steps to get familiar with the TT Mark Measurement buttons and examine how to do TT Mark Measurement.



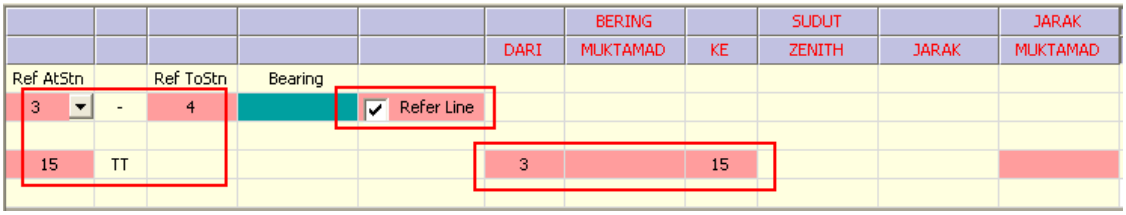
	Set bearing button. Sets back reference line bearing to the instrument and displayed.
	Save button. Set save index to save measurement to database.

Survey Steps

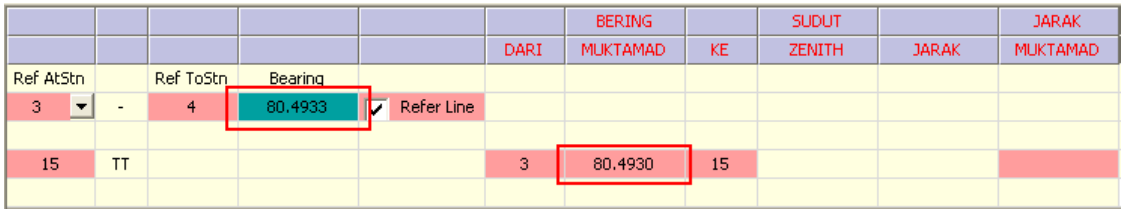
1. On the field capture window, select **TT Mark** observation by selecting the **TT Mark** radio button located at the right side of the window screen.



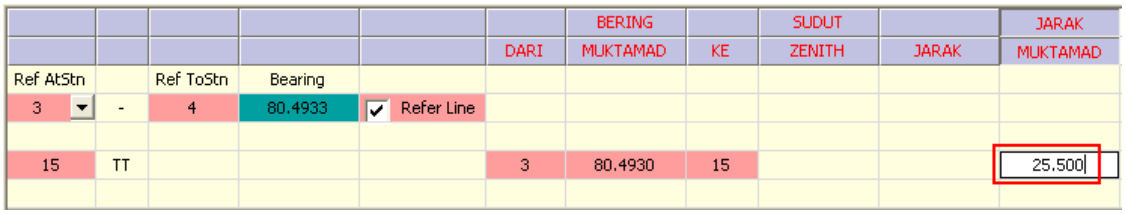
2. Tick or un-tick the **Refer line** checkbox to specify if the is any reference line bearing. If there is a reference line, enter in the **At Stn**, **To Stn**, **TT At stn**, **TT To stn** (**TTMark stn**). Else just enter in the TT Mark



3. Click the **set bearing button** if there is a reference bearing, else enter in the TT Mark bearing then click **set bearing button**



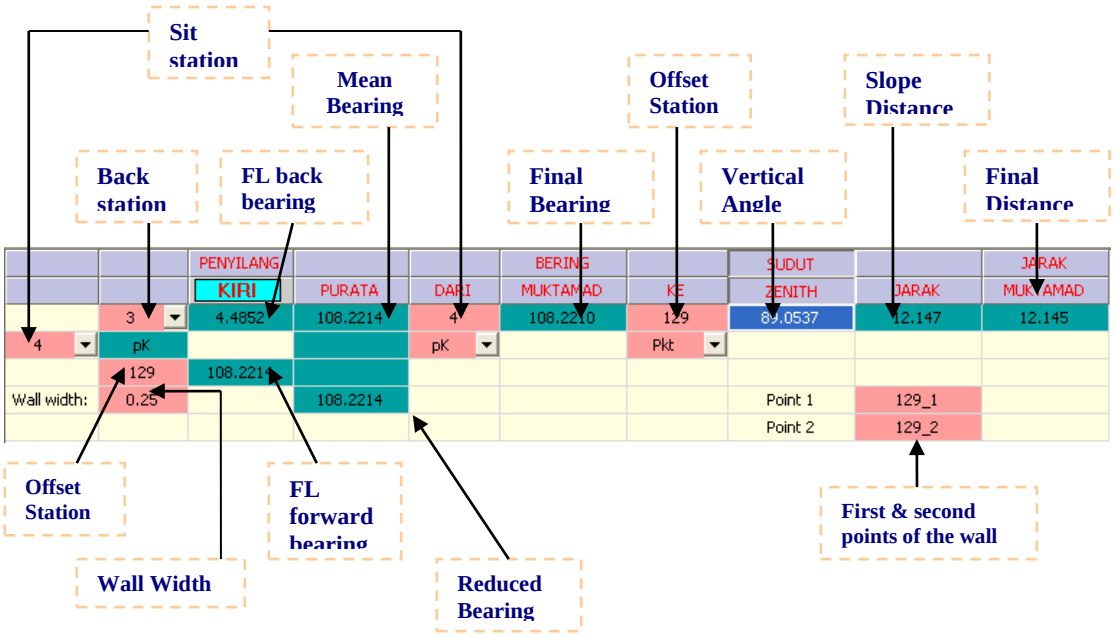
4. Enter in the distance in the final distance edit box. Then Click the **save button**



Note: The measurement that you have measured will only be save once you click the save button. If not the measured bearing and distance of that particular record will not be save.

5.14. Patty Wall

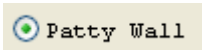
In this part, we will show you the steps to get familiar with the Patty Wall buttons and examine how to do Patty Wall.



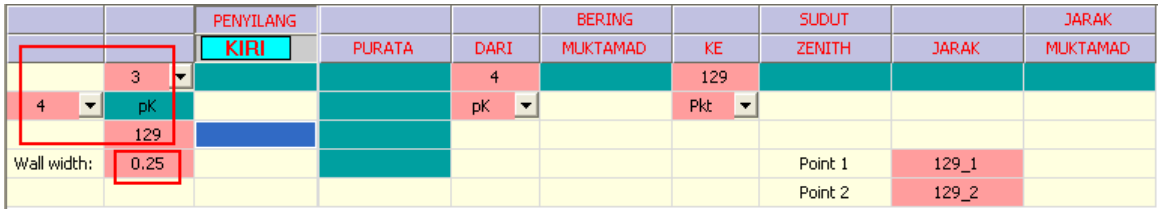
	Set bearing button. Sets back reference line bearing to the instrument and displayed.
	Measure button. Measures Face Left.
	Reduce button. Reduces the measurement to produce mean, reduction and final value
	Save button. Set save index to save measurement to database.
	Delete button. Deletes the record (applicable during view record mode).
	Last 20 Station button. View the last 20 station number that being used

Survey Steps

1. On the field capture window, selecting the **Patty Wall button** located at the right side of the window screen.



2. Select the "**Sit station ID"** and the "**Back station ID"** from the provided combo box and key in the "**Offset station ID**". **Select** offset station type as **Pkt** and key in the **wall width** that you measure manually.



3. After all the information is enter in, sight the theodolite to the "**Back station"** and click the **kiri** button to set the back bearing for your **face left**. The bearing value will be retrieved automatically.

		PENYILANG			BERING		SUDUT		JARAK
		KIRI	PURATA	DARI	MUKTAMAD	KE	ZENITH	JARAK	MUKTAMAD
	3	4.4852		4		129			
4	pK			pK		Pkt			
	129								
Wall width:	0.25						Point 1	129_1	
							Point 2	129_2	

Note: User only needs to set back bearing for face left.

4. Sight the theodolite to the "**Offset station"** and click the **measure** button to measure the bearing and distance for **face left**. The bearing and distance value will be retrieved automatically.

5. Then, click on the **reduce** button to reduces the measurement to produce mean, reduction and final value.

		PENYILANG			BERING		SUDUT		JARAK
		KIRI	PURATA	DARI	MUKTAMAD	KE	ZENITH	JARAK	MUKTAMAD
	3	4.4852	108.2214	4	108.2210	129	91.1343	12.148	12.145
4	pK			pK		Pkt			
	129	108.2214							
Wall width:	0.25		108.2214				Point 1	129_1	
							Point 2	129_2	

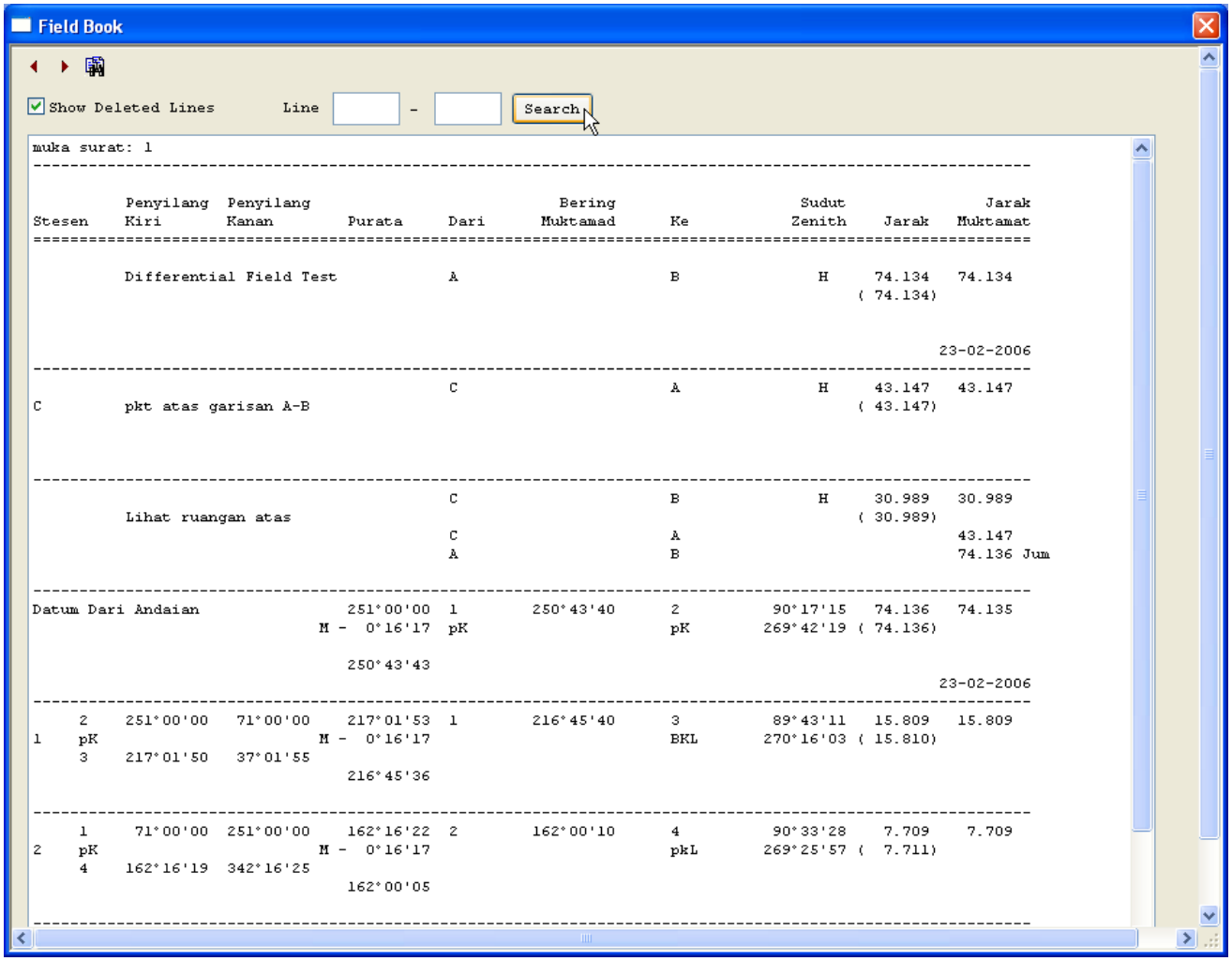
6. Finally click the **save** button to save you record. Once you saved the record, you will able to see that the record is booked into the field book.

Note: The measurement that you have measured will only be save once you click the save button.
If not the measured bearing and distance of that particular record will not be save.

5.15. View Field Book

In this part, we will show you the steps to view the field book after do any field data capture.

1. Navigate to **Record** menu > **View Field Book**.
2. A **Field Book dialog** will be displayed as below. You can view the field data for the job you have done here.




```
muka surat: 1
------------------------------------------------------------------------------------------------------------------
                                                                                                                  
          Penyilang  Penyilang                          Bering                  Sudut                 Jarak
Stesen    Kiri       Kanan        Purata     Dari      Muktamad      Ke          Zenith    Jarak   Muktamat
==================================================================================================================

          Differential Field Test            A                     B              H     74.134   74.134
                                                                                        ( 74.134)


                                                                                                    23-02-2006
------------------------------------------------------------------------------------------------------------------
                                             C                     A              H     43.147   43.147
C         pkt atas garisan A-B                                                        ( 43.147)



------------------------------------------------------------------------------------------------------------------
                                             C                     B              H     30.989   30.989
          Lihat ruangan atas                                                        ( 30.989)
                                             C                     A                           43.147
                                             A                     B                           74.136 Jum

------------------------------------------------------------------------------------------------------------------
Datum Dari Andaian                 251°00'00  1        250°43'40      2          90°17'15   74.136   74.135
                                M -  0°16'17  pK                      pK         269°42'19 ( 74.136)
                                   250°43'43
                                                                                                    23-02-2006
------------------------------------------------------------------------------------------------------------------
     2    251°00'00   71°00'00    217°01'53  1        216°45'40      3          89°43'11   15.809   15.809
1    pK                       M -  0°16'17                         BKL        270°16'03 ( 15.810)
     3    217°01'50   37°01'55
                                   216°45'36

------------------------------------------------------------------------------------------------------------------
     1     71°00'00  251°00'00    162°16'22  2        162°00'10      4          90°33'28    7.709    7.709
2    pK                       M -  0°16'17                         pkL        269°25'57 (  7.711)
     4    162°16'19  342°16'25
                                   162°00'05

------------------------------------------------------------------------------------------------------------------
```

3. User can tick the checkbox for **Show Deleted Line** to show or hide the deleted line.
4. User also can search the record for certain measurement by click the **Search button** by entering the station number.

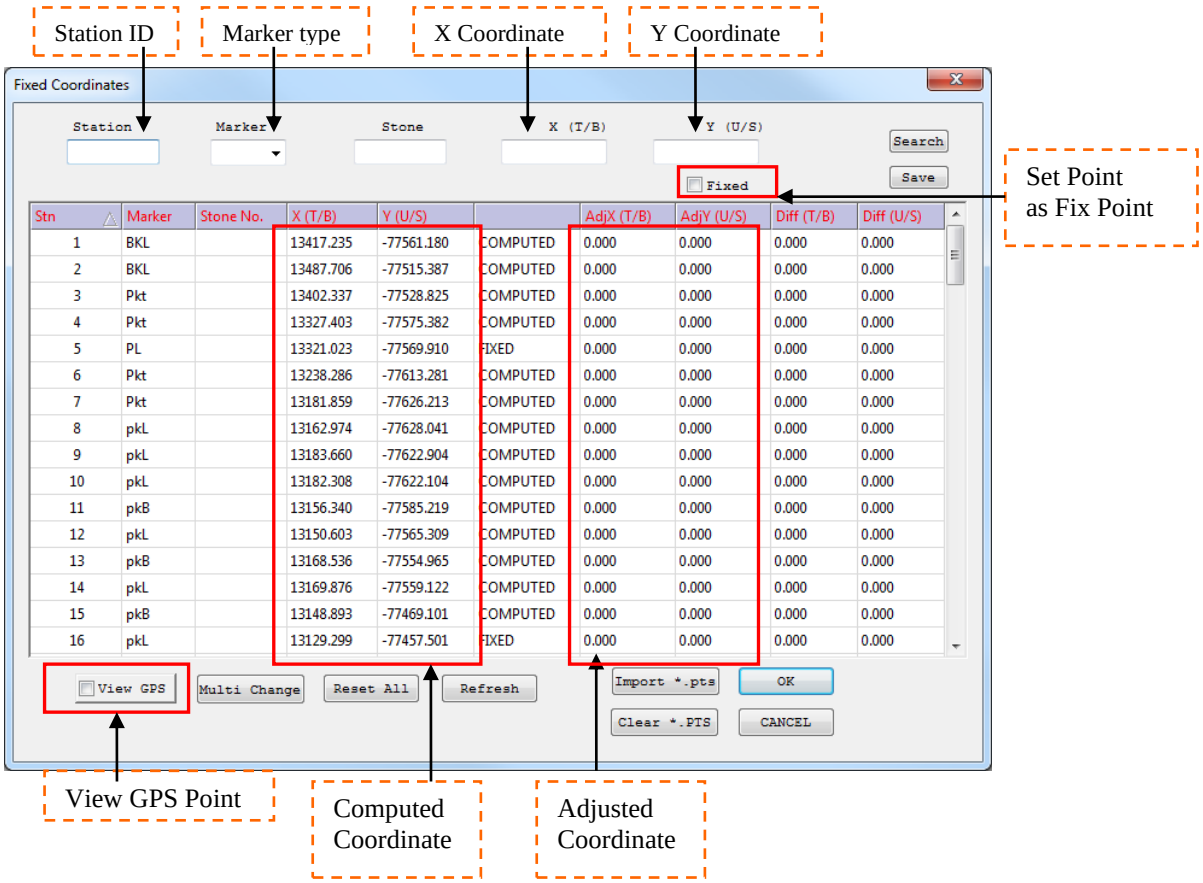
6. In Field Computation

In this part, we will discuss the menu item from 2.4.3: Define menu and 2.4.4: Computation menu. So, in this part 6, we will do in filed computation using the menu items in Define menu and Computation menu.

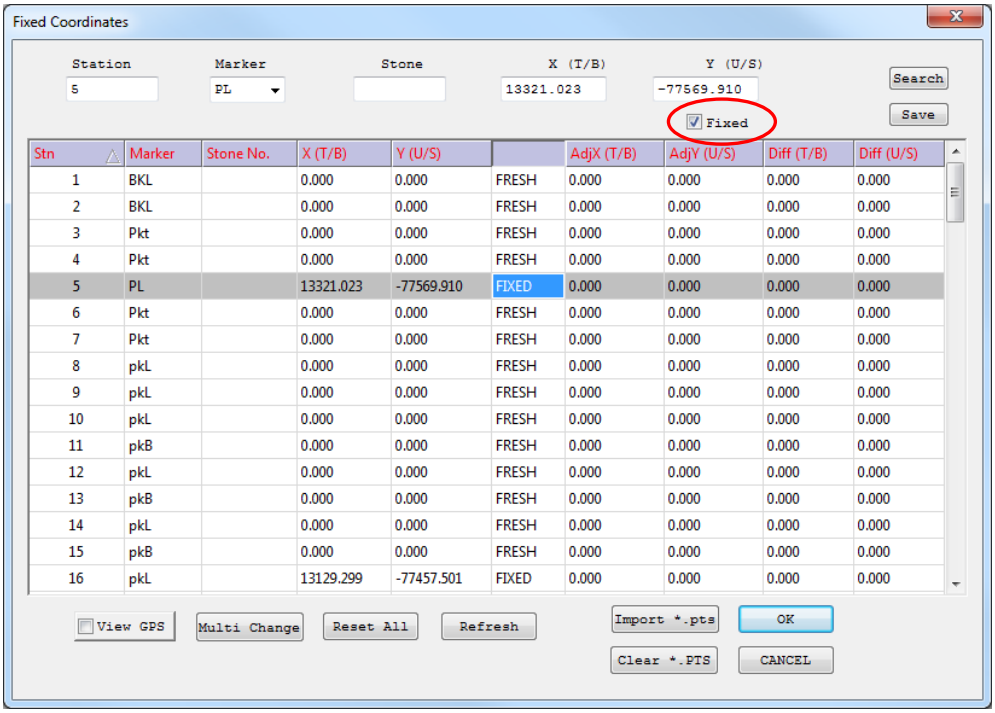
6.1. Define Menu

In this part, we will show you the steps how to do definination for coordinate, traverse, block and lot after completing survey capture in **Part 5: Field Data Capture**.

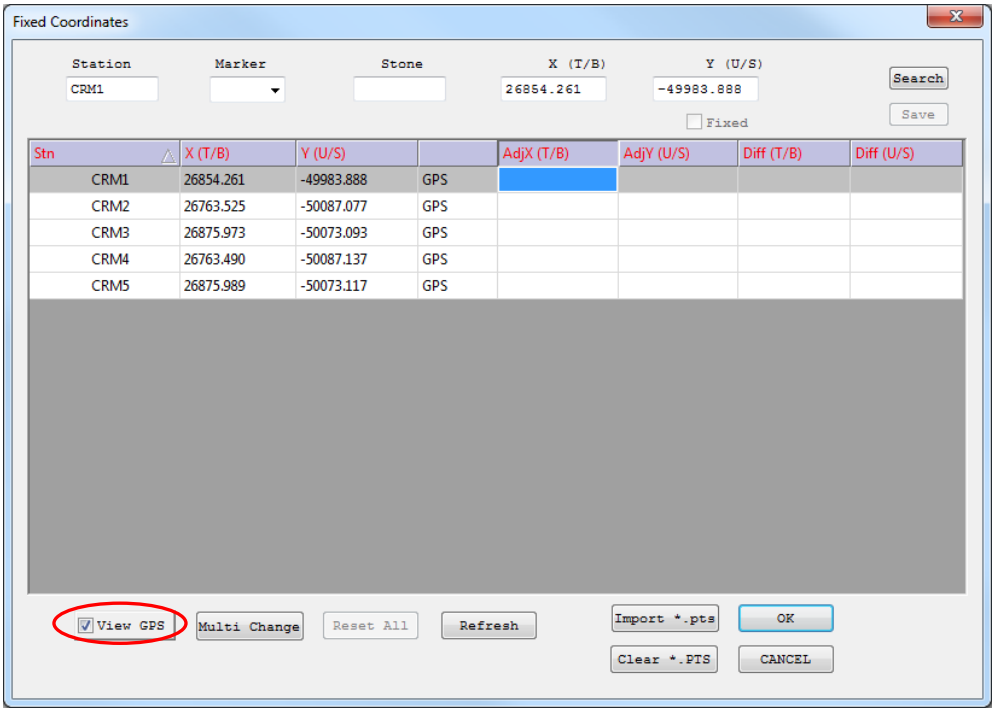
6.1.1. Define Coordinate



1. Click **Define** menu > **Coordinates**.
2. Select the station ID that you want to set as fix point. You can also select the GPS point as a fix point. Then remember to tick the **Fixed** check box.

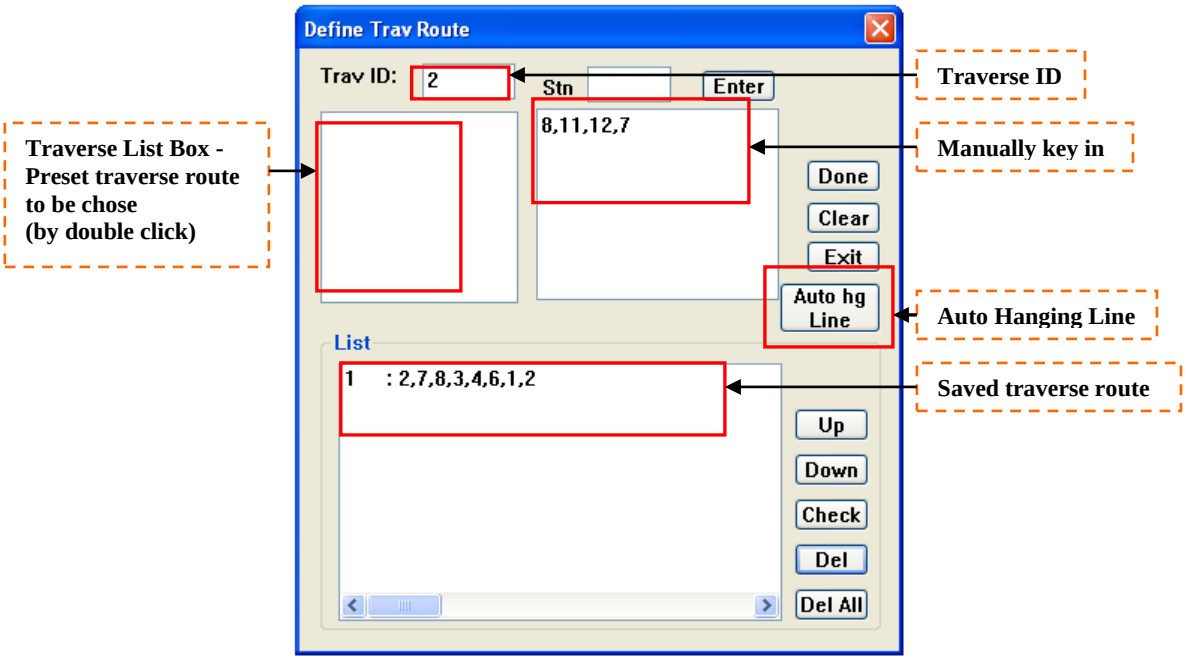


3. If you have GPS Points, please click **View GPS** and the dialog below will show up.



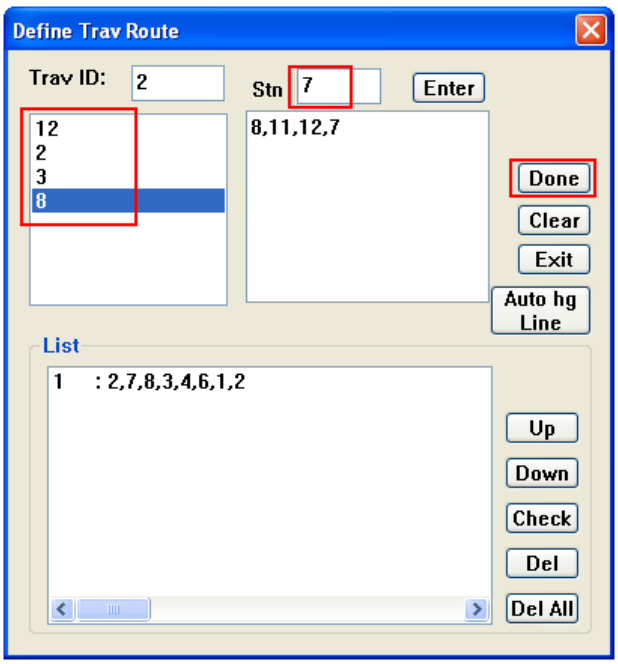
4. Click the **Save** button to save the fixed coordinate.

6.1.2. Define Traverse



6.1.2.1. Manual Way

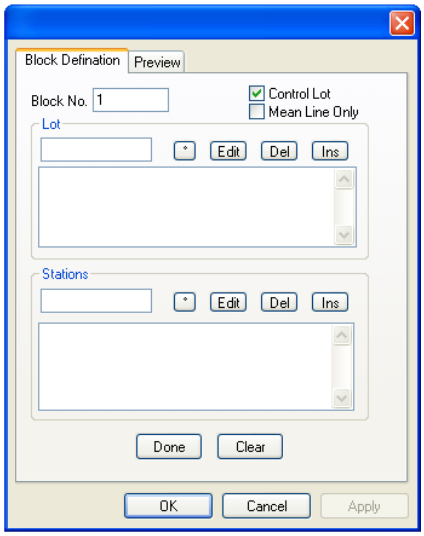
1. Click **Define** Menu > **Traverse**.
2. Key in the **Trav ID** or use the default ID, key in **Stn** edit box and click **Enter** button. Then, select the **traverse route** that is in the list box, you can select by double clicking the route.
3. If traverse route you want does not appear in list box, you can manually key in the traverse route in the **Stn** edit box and click **Enter** button for each station ID.



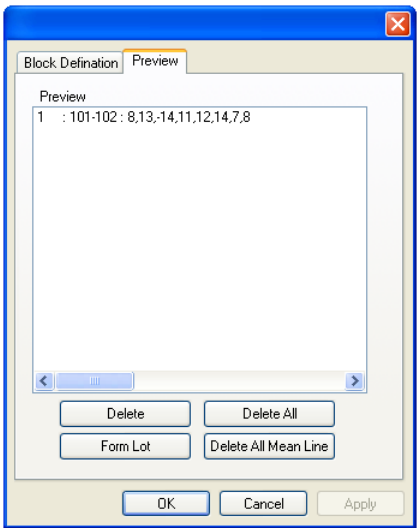
Note: Make sure there is a unique Trav ID in the Trav ID field

4. Click on **Done** button to accept the Traverse definition.
5. Click **Auto hg Line** to auto retrieve the hanging line.
6. Can use the **Up** and **Down** button to change the sequence of the traverse list if needed.
7. Click on the **Exit** button when finish.

6.1.3. Define Block

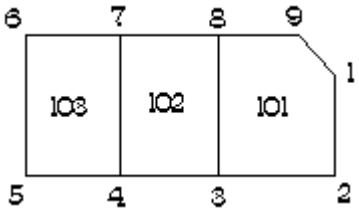


Block No.	Block ID. Integer value is input.
Lot	Lot number located in the block. Integer value is input. Comma is used to separate each lot ID.
Stations	Displays the current block route definition. "-"symbol is used to denote each common boundary or turning line in the block.
Control Lot	To determine definition is a control lot. (default: checked)
Mean Line Only	To use already computed mean line as part of definition. (Default: unchecked).
Done	Accepts and save current block route definition.
Clear	Clear current block route definition.



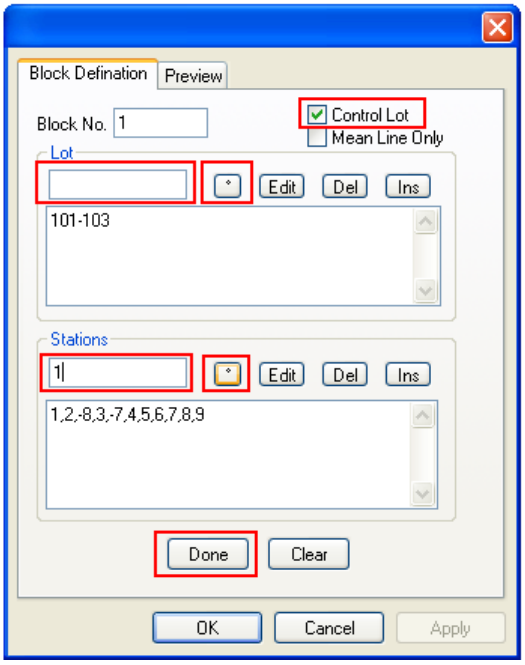
Delete	Delete selected block definition
Delete All	Delete ALL block definitions.
Form Lot	To form and create lot definitions using defined block definitions.
Delete All Mean Line	Delete ALL created mean line.

6.1.3.1. Manual Way

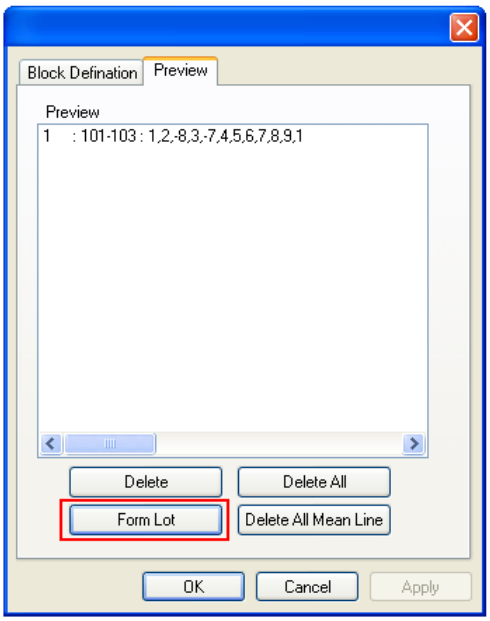


1. Click **Define** menu > **Block**.
2. A **Block Definition** dialog box will be displayed. Make sure the **Control Lot** is check.
3. Key in the **Block No.** or using default id and type in the **Lot** ids to form the block. Press button to key in the lot id. Key in the station ids in the **Stations** list box and press button.

4. Negative sign (e.g. -8) means it is a mean line for two lots. Enter the entire station id that will form the block (lots). To complete the block, need to key in again the same id (number) as the first station. Click the **Done** button when you finished define the first block.



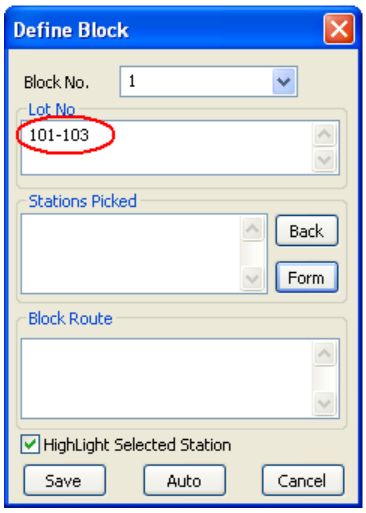
5. You can view the **Preview** page to see the defined block. Click the **Form Lot** button to automatically form the lot.



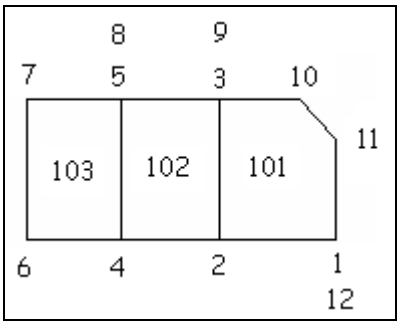
6. You can view the defined lot in next part, **Part 6.1.4 Define Lot**.

6.1.3.2. Graphically Way

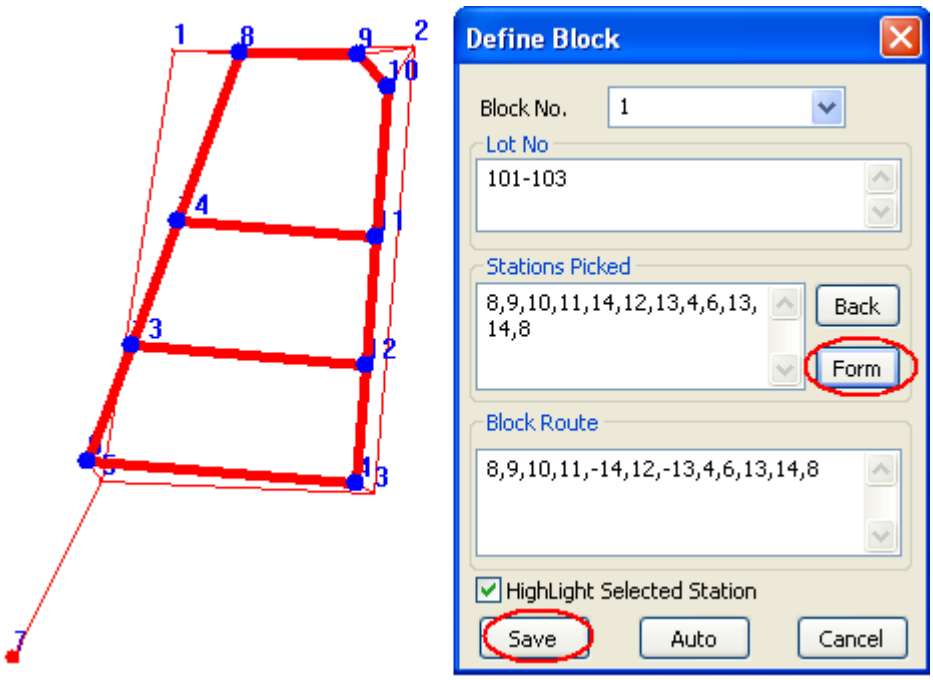
1. Click on the **Define Block** icon.
2. Key in the **Lot number**. Then pick the point on the graphic.



3. To pick the point, should follow the sequence. Need to include the mean line just like manual define block.
4. The below figure shows the sequence to pick the station of a block. The alphabet is mean to the sequence but not station number.



5. After pick all the points of the block, click **Form** button to form the lots according to the Block Route.



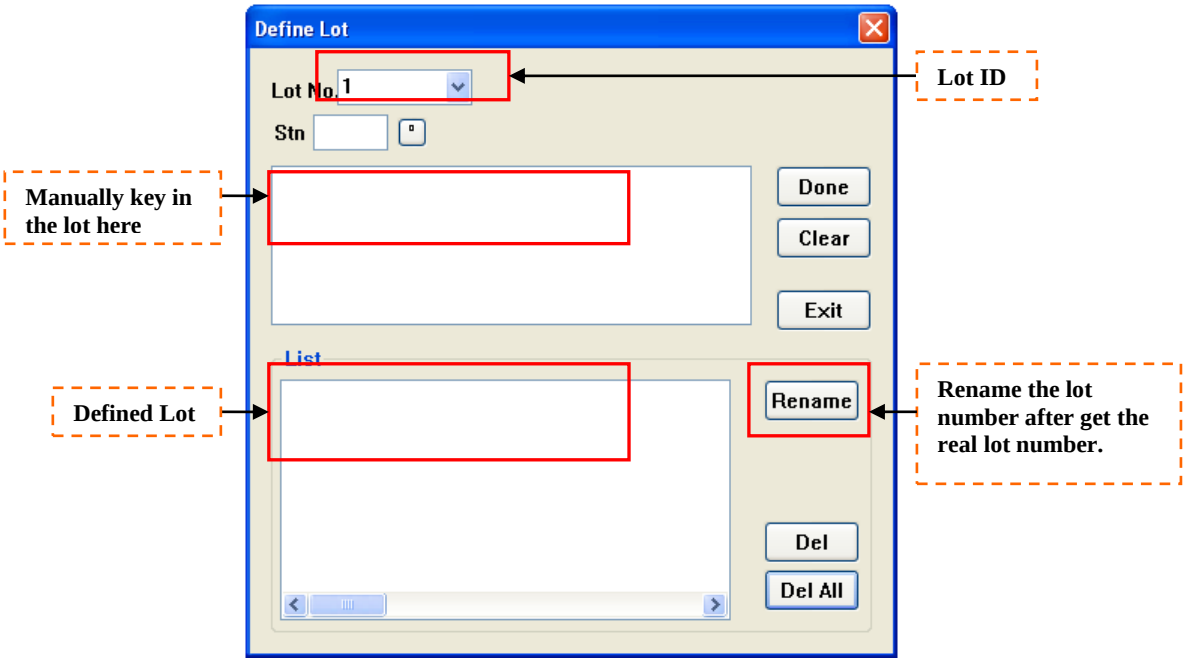
6. Finally click **Save** button to save the block and lots definition.

6.1.3.3. Auto Define (with SKL ASCII)

If you have and being import the SKL ASCII (generated from CPSWinF2F), you may use the auto define block button to define it.

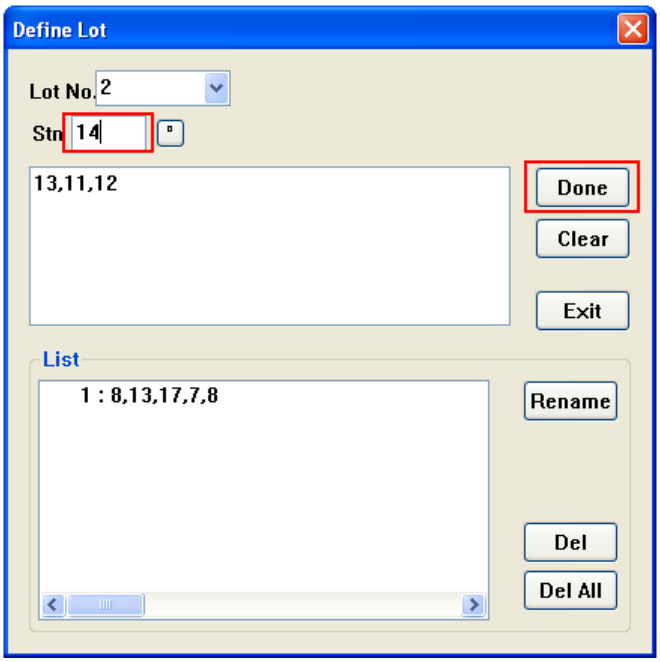
1. Click on the **Define Block** icon.
2. Key in the **Block Number** and the correct **Lot number**.
3. Click on **Auto** button, the lots will auto form up. Check whether correctly form up; If yes, click on **Save** button.

6.1.4. Define Lot



6.1.4.1. Manual Way

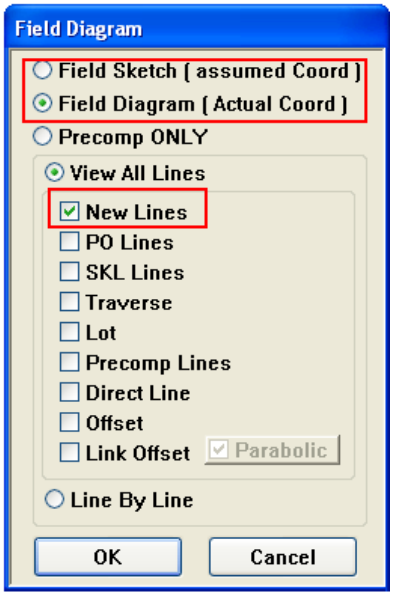
1. Click **Define** Menu > **Lot**.
2. Enter all the station ID that will form the lot. Separate each station ID with a comma. Select **Done** button to accept the Lot definition. The lot will be showed in **List** box.



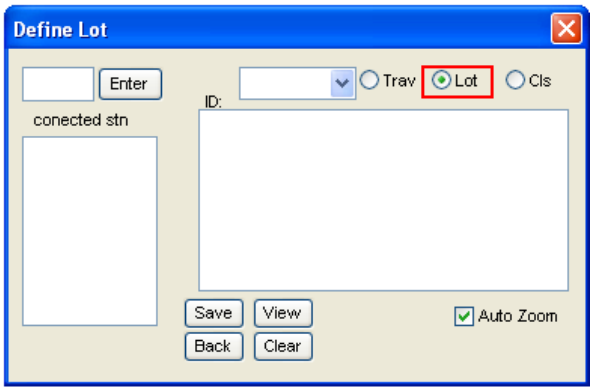
Note: Make sure there is a unique Lot No. in the Lot No. field

6.1.4.2. Graphically Way

1. Navigate the mouse to **View** menu > **Sketch**. Then a **Field Diagram dialog** as below will appear.
2. To show the sketch, user need to choose either the sketch is using assumed coordinate or actual coordinate or precomp. Then user also can choose the type of line to appear on the sketch by ticking the types of line require. Finally click **OK** button.

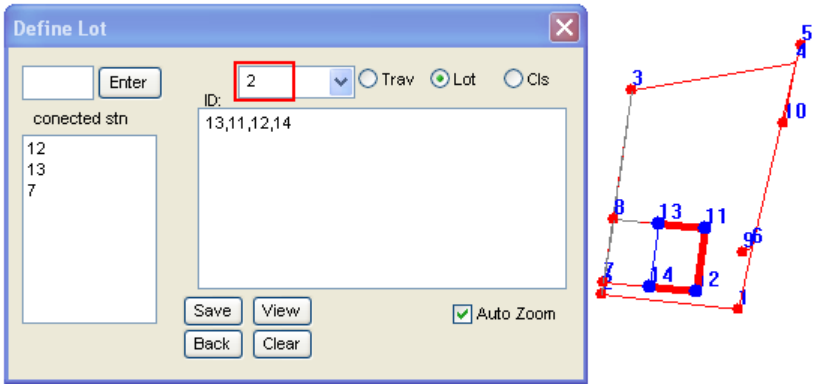


3. Once the sketch appears, user can start to define the lot. Click the **Graphical Define** button or click **Define** menu > **Graphic Define**. The **Define Lot** dialog box below appears.



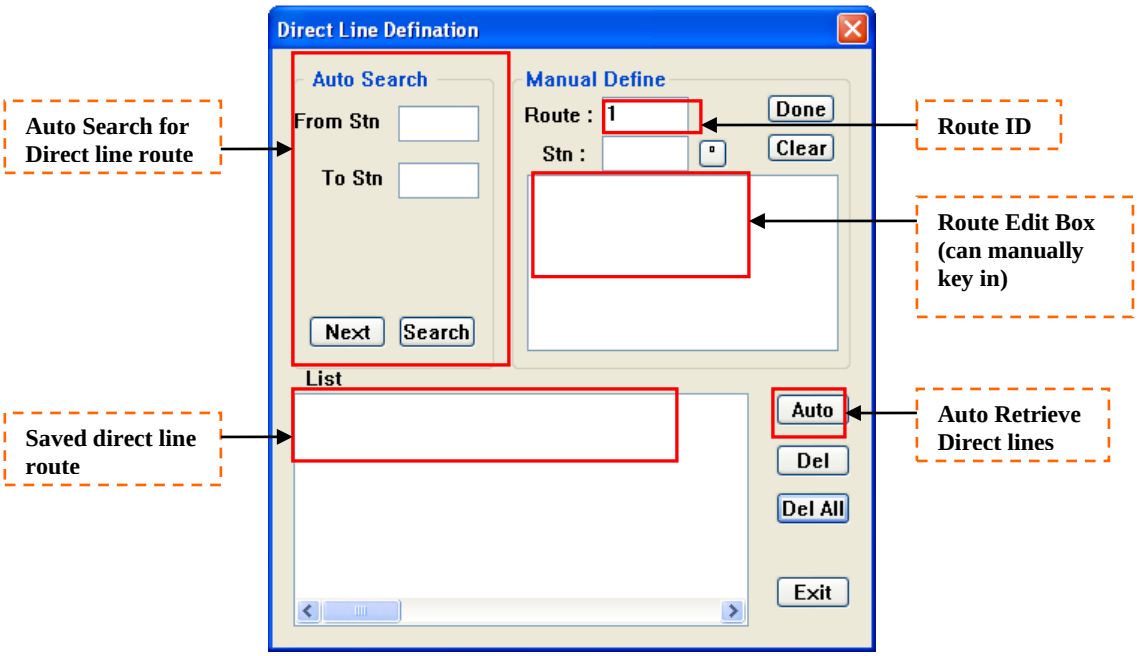
Note: when you are defining lot, please make sure that you have selected the **Lot** radio button before proceed.

4. Enter in the Lot **ID** at the ID combo box and select the station ID for the starting point of the traverse. Then continue to pick the station of the traverse route until it form a loop.



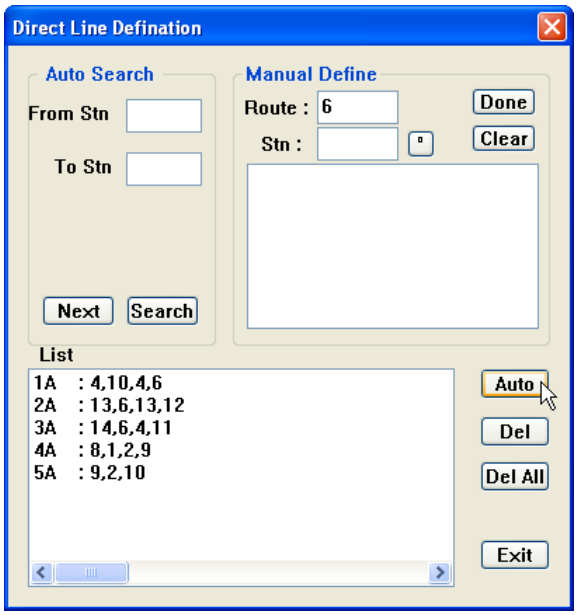
5. Then click the **save** button to save.

6.1.5. Define Direct Line



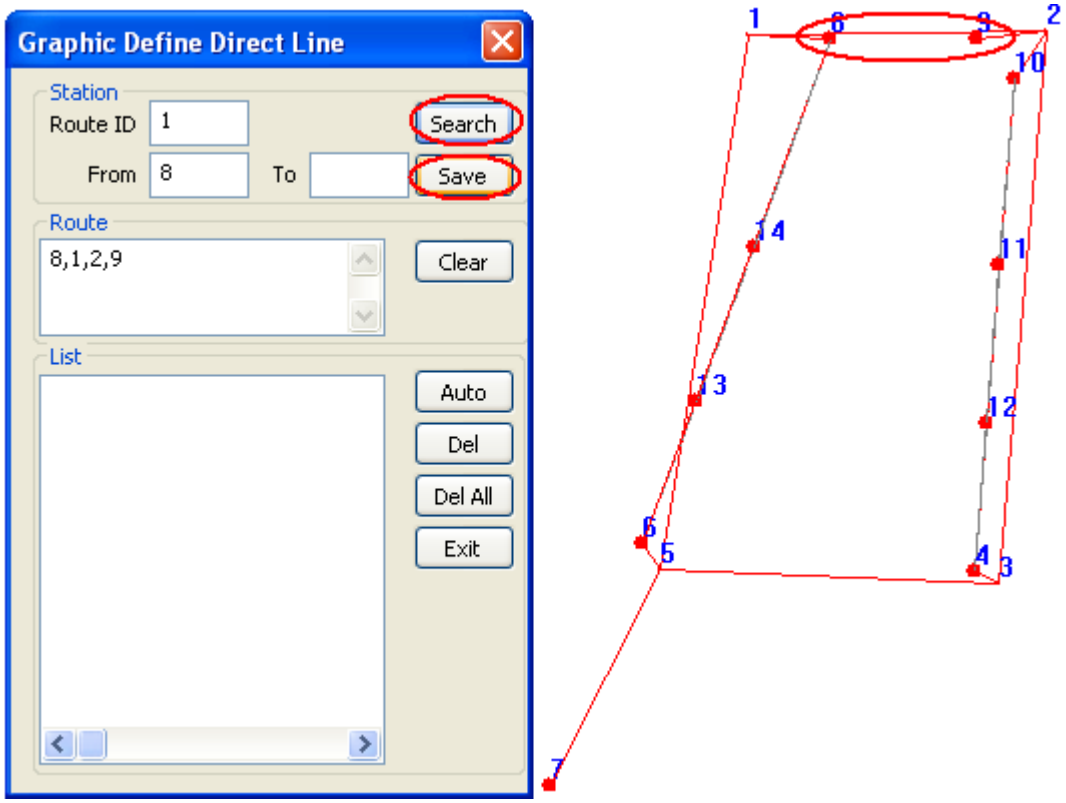
6.1.5.1. Manual Way

1. Click **Computation > Define** Menu > **Direct Line**.
2. Enter the **From** and **To** station in the **Auto Search** column. Then click **Search** button. The Route Edit Box will show out the direct line route. Click **Done** to save it.
3. You can just manually key in all the station with comma for the route.
4. Or you also can click on the **Auto** button to retrieve all the direct lines (but must already define blok / lot).

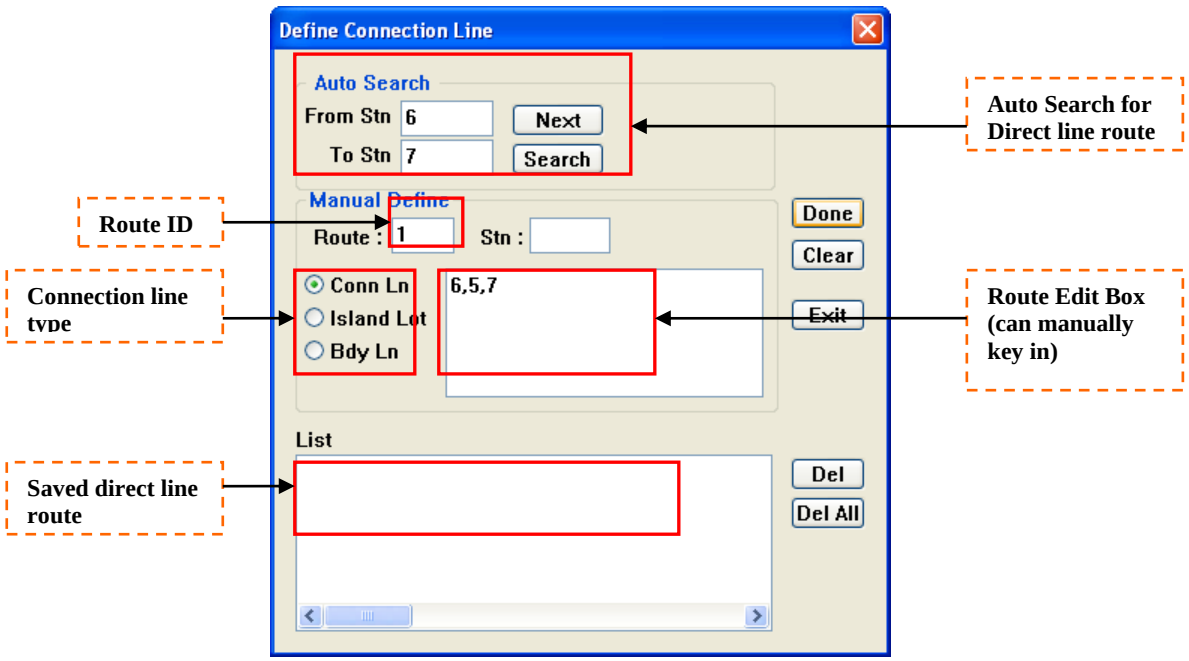


6.1.5.2. Graphically Way

1. Click on the define Direct Line icon, use the mouse to click on the graphic to create the direct line, e.g. Station 8 and Station 9.
2. Then, click **Search** button to search for the route and then click **Save** button to save the direct line in **Graphic Define Direct Line** dialog.

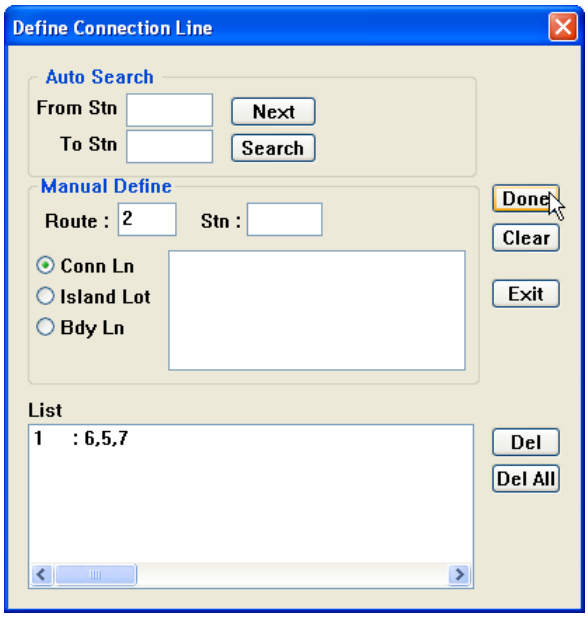


6.1.6. Define Connection Line



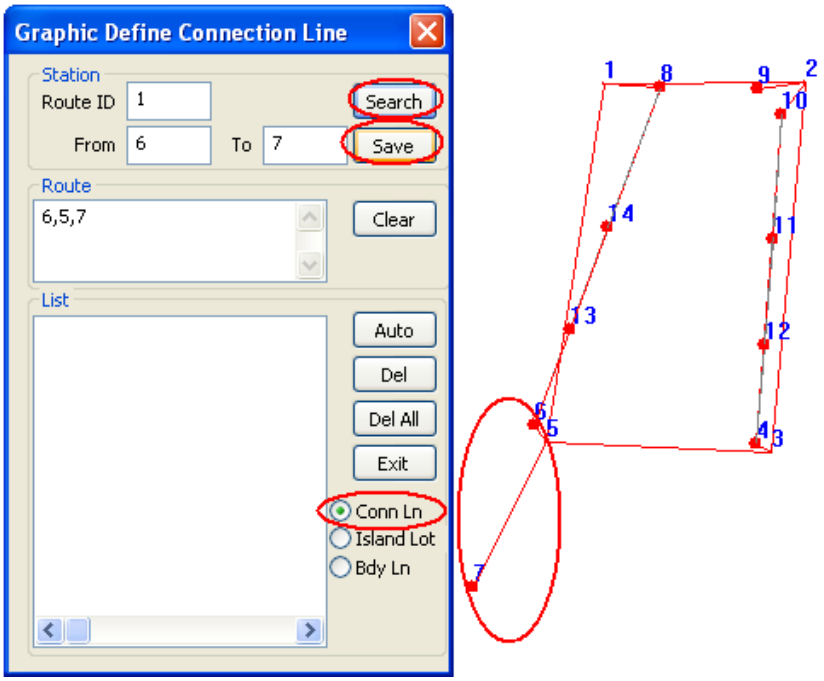
6.1.6.1. Manual Way

1. Click **Computation > Define** Menu > **Connection Line**.
2. Enter the **From** and **To** station in the **Auto Search** column. Then click **Search** button. The Route Edit Box will show out the direct line route.
3. Chose for the connection line type. **Conn Ln** will be shown as “dash line” which is the connection line between lot and lot. **Bdy Ln** will be the solid line.
4. Click **Done** to save it.
5. You can just manually key in all the station with comma for the route.



6.1.6.2. Graphically Way

1. Click on the define connection Line icon, use the mouse to click on the graphic to create the connection line, e.g. Station 6 to Station 7.
2. Then, click **Search** button to search for the route, chose for the connection line type and then click **Save** button to save the connection line in **Graphic Define Connection Line** dialog.

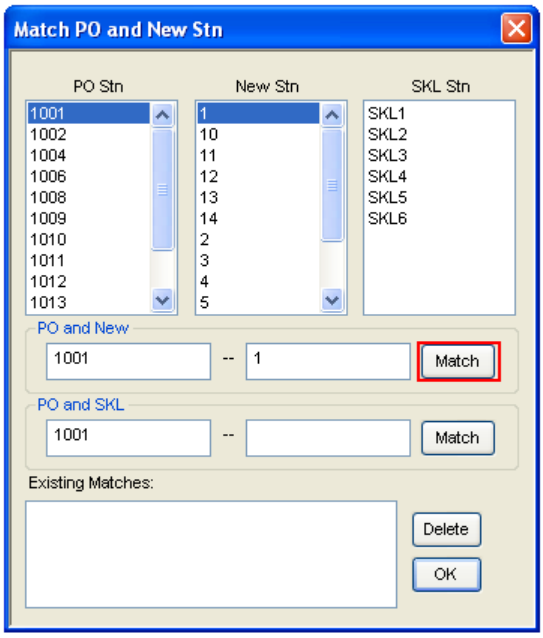


6.1.7. Match PO/New or SKL/New

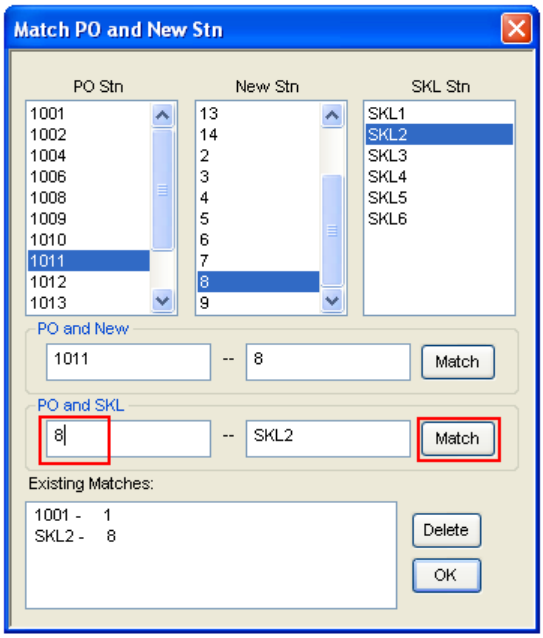
6.1.7.1. Manual Way

This step can be ignored if you done for the Base Refix in **Refixation** function (when you click on the **Adjust & Refix** button, it will automatically match for you).

1. Click **Define** Menu > **Match PO/New**.
2. Select the **PO Stn** ID and the **New Stn** ID from the list which is a common point. Click **match** button to save it.



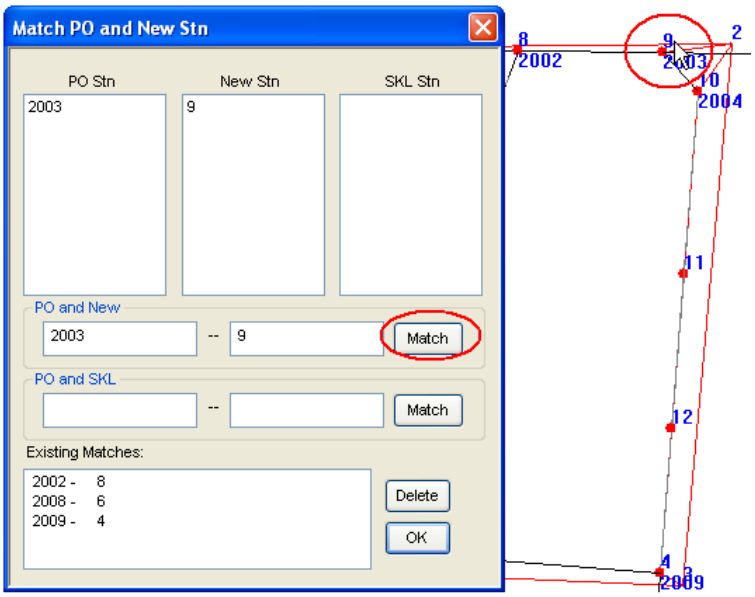
3. Or you can key in the **New Stn** ID in the edit box and match wit the **SKL Stn** ID from the list which is a common point. Click **match** button to save it.



6.1.7.2. Graphically Way

1. Before match the PO and New by graphically, you must on for the PO and New graphic in Actual Coordinate (**Graphic > Sketch**).

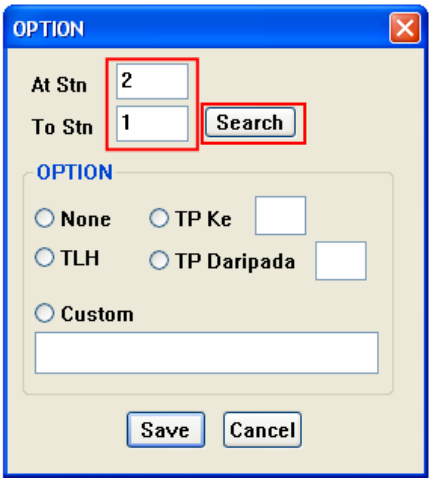
2. Click on the Match PO & New icon, and then select the station that you wish to match. After that, click **Match** in the **Match PO and New Stn** dialog.



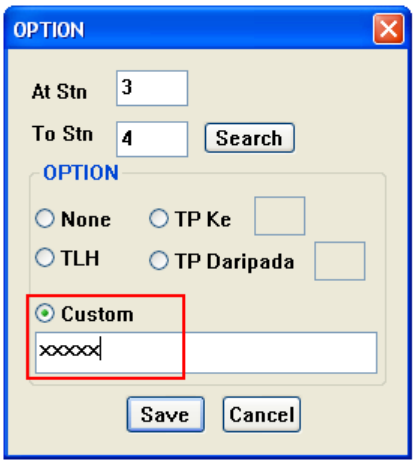
6.1.8. Stn Remark

1. Click **Define** Menu > **Stn Remark**.

2. Enter the **At Stn** ID and **To Stn** ID and click **Search** button

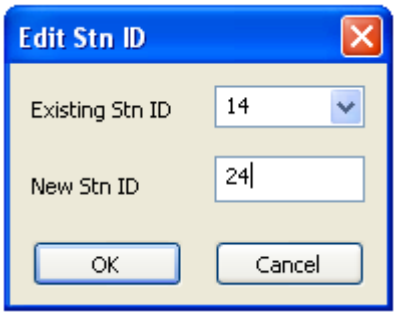


3. Select option you want and enter in the comments to the specific given edit box. Finally click the **save** button to save.



6.1.9. Edit Station ID

1. Click **Define** Menu > **Edit Stn ID**.
2. User can edit the station ID by choosing the station number from combo box then key in the New Station ID. Then click **OK**.

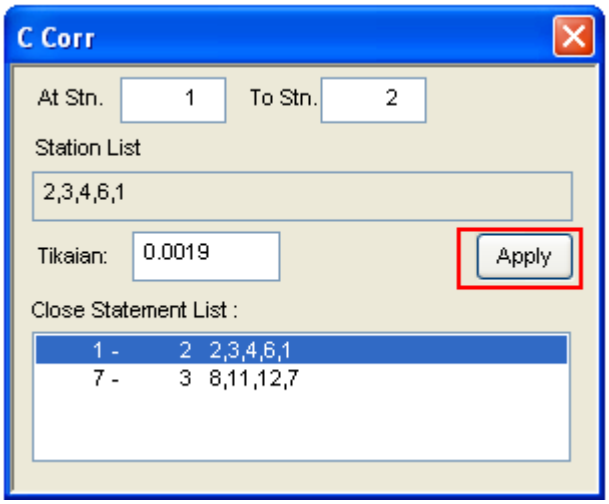


6.2. M & C Correction

In this part, we will show you the steps how to apply the M & C correction after completing survey without do the calculation for the correction. All the calculation will be done automatically and the field book will be automatically adjusted. You need to do Close Statement first before do C correction and do Sun Observation first before do M correction.

6.2.1. C Correction

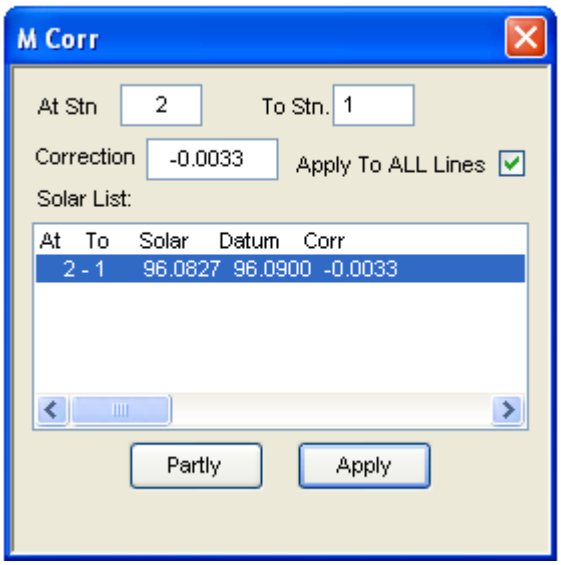
1. Navigate to **Computation** menu > **C Corr**.
2. Select the close statement list that you want to apply the C Correction by just double clicks (highlight) the selected close statement. Then click **Apply** button. So, the C Correction is done.



3. You can view the applied C correction at field book. If you want to view the field book, please refer to **Part 5.16: View Field Book**. In the field book. You will notice that C correction already apply in your field book.

6.2.2. M Correction

1. Navigate to **Computation** menu > **M Corr**.
2. Select the sun list that you did for Sun Observation. Apply the C Correction by just double the Solar List.
3. Change the **At Stn** and **To Stn** if you want to apply the M Correction from different start line. For example, Solar Observation done in line 3-4 but you want to apply the M Correction from the beginning of the survey, then you need to change the **At Stn** and **To Stn** to 2 and 1.
4. Then click **Apply** button. So, the M Correction is done.

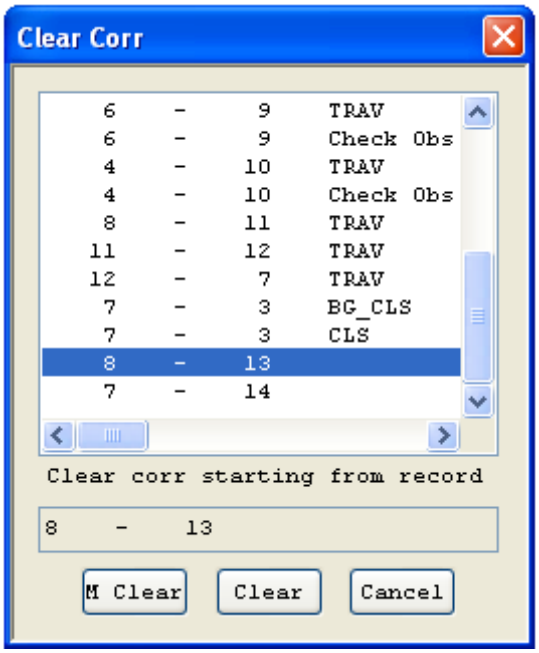


5. You can view the applied M correction at field book. If you want to view the field book, please refer to **Part 5.16: View Field Book**. In the field book. You will notice that M correction already apply in your field book.

6.2.3. Clear Correction

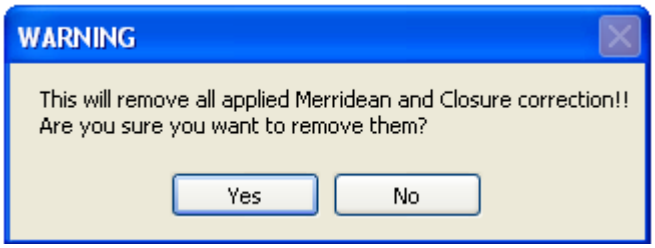
6.2.3.1. Clear Correction

1. Navigate to ~~Computation~~ Correction menu > **Clear Corr**. A **Clear Corr dialog** will be displayed as below.
2. Just click the records where you want to start clearing the correction. Then click **Clear** button or click on **M Clear** button if just only the M Correction want to be clear.



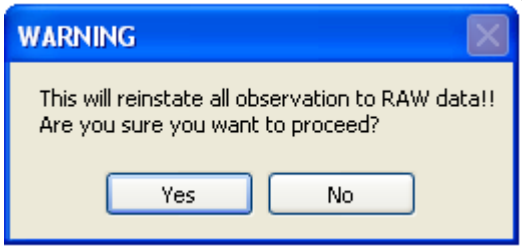
6.2.3.2. Clear All Correction

1. Navigate to **Computation** menu > **Clear All Corr**.
2. A Warning message saying that all C correction and M correction will pop up. Click **Yes** button if you confirm want to remove all, else click **No** button.



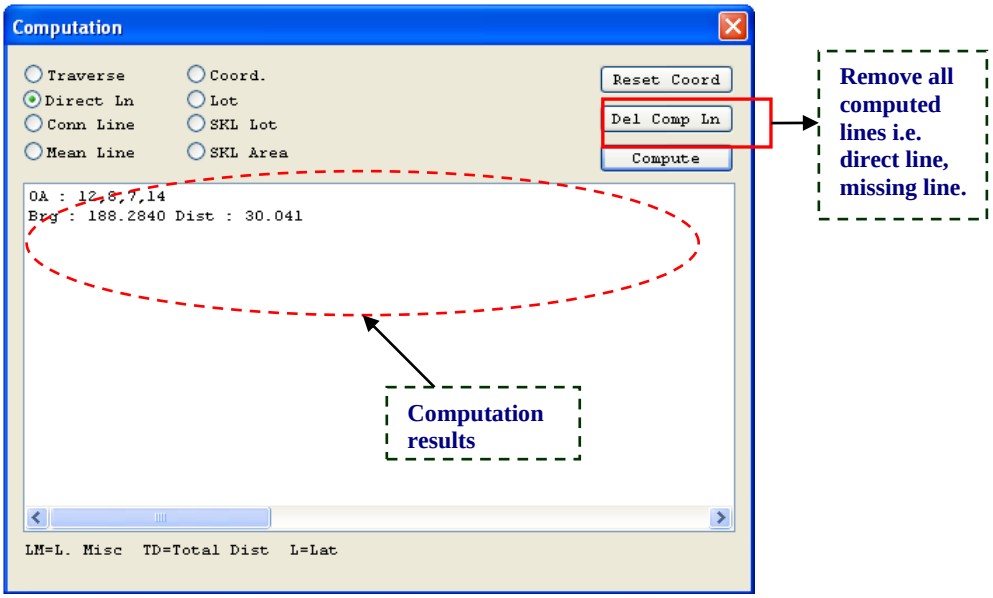
6.2.3.3. Clear All Correction (back to RAW)

1. Navigate to **Computation** menu > **Clear All Corr (back to RAW)**.
2. A Warning message saying that all observation to RAW data. Click **Yes** button if you confirm, else click **No** button.



6.3. Survey Computation

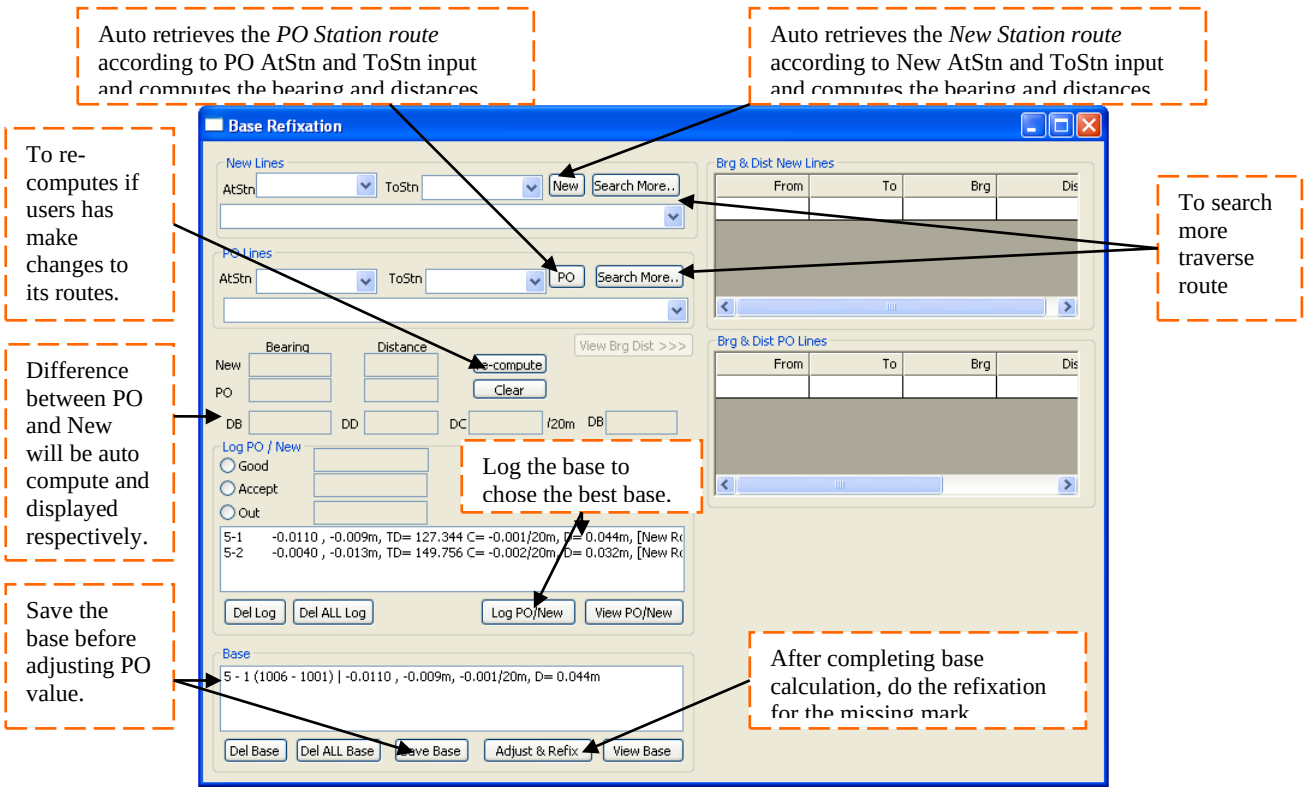
In this part, we will show you the steps how to do **survey computation** after completing survey capture and defining coordinate, traverse, lot and block without do the calculation for the correction. In this part, we will use the **Survey Comp** menu item which already discuss in part **2.4.4 Computation menu**.

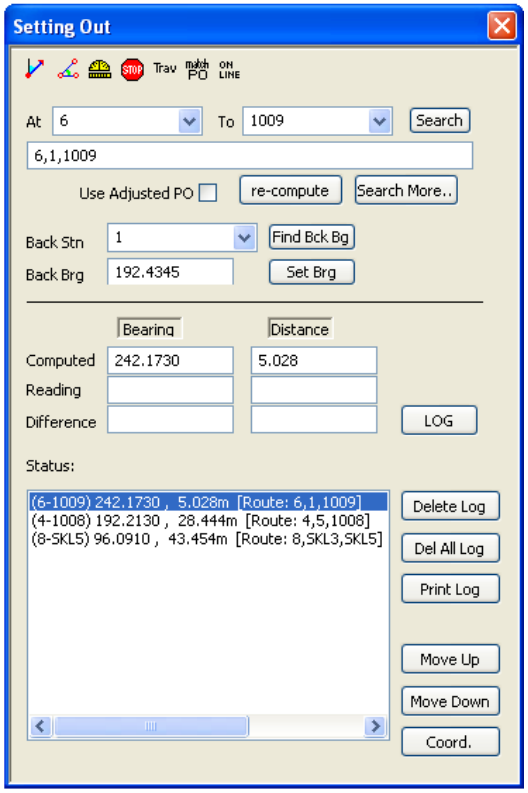


1. Go to **Computation** menu > **Survey Comp**. to do all you computation.
2. Follow the sequence (Traverse → Direct Ln → Coord. → Mean Ln → Lot → Conn Line → SKL Lot → SKL Area) and select the radio button for the type of survey you want to compute. And click on **Compute** button.

6.4. Base Computation and Refixation

In this part, we will show you the steps how to do **base computation.** After calculate the good base, we will do refixation for the missing point. We will using the **Base Refix.** menu item in **2.4.4 Computation menu** and **Setting Out** menu item in **2.2.2 Survey menu**.. This steps is needed for generate JUPEM *.bln file.

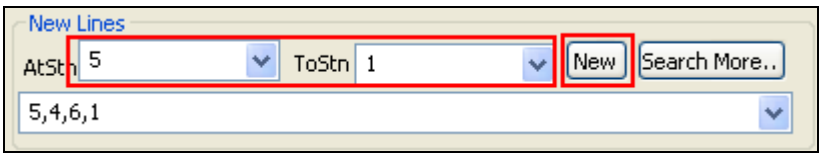




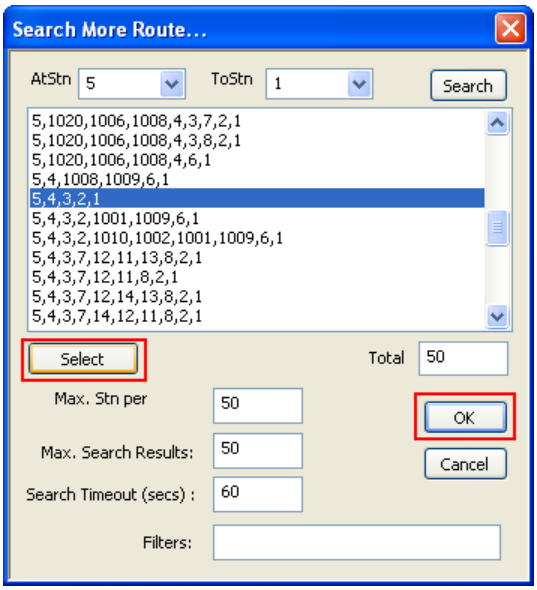
	Set bearing button. Sets back reference line bearing to the instrument and displayed.
	Open bearing button. Measures the horizontal bearing and compared its value with the computed bearing. . Automatically opens to computed bearing value if motorized instruments are being used.
	Measure button. Measures the bearing and distance. Differences between measured and computed value will calculated and displayed.
	Stop button. To stop measuring during tracking mode measurement.
Trav	Jumps to traverse field capture function to perform proper observation after locating the mark.
match PO	Matches (transpose) a station to PO station. Used during locating of PO marks.
Back Brg	Numeric value in DDD.MMSS format. Back Bearing is automatically retrieved and assigned to this field when user selects the Find Bck Bg button. User point to the back station as target and press Set Brg to set the back bearing
Search More..	To search more traverse route
Computed	Displays the value of the computed bearing and distance between sit station and point to locate.
Reading	Displays the measured bearing and distance.
Difference	Calculate and display the bearing and distance differences between computed and measured value
Status:	Shows information and warning messages. I.e. “Mark Found”, “Horiz Brg Out of Position”, “Distance Out”, etc.
LOG	Log the Compute bearing & distance with the route.

6.4.1. Base Refixation

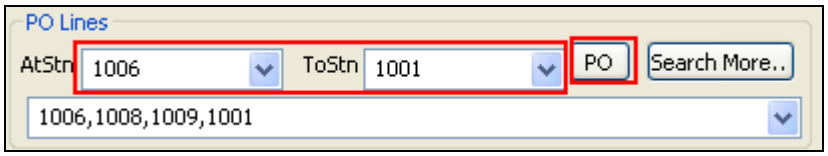
1. Navigate to **Computation** menu > **Base Refix**.
2. Then click the **AtStn** combo box and **ToStn** combo box to choose from which station you want to calculate the base. Then click the **New** button



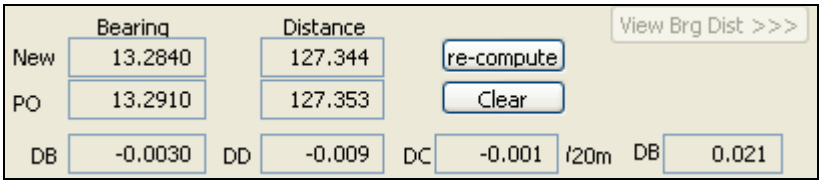
3. If after click on **New** button, you want to change the route, can click on **Search More** button. You can choose the other route for the same line. Then click **Select** and **OK** button.



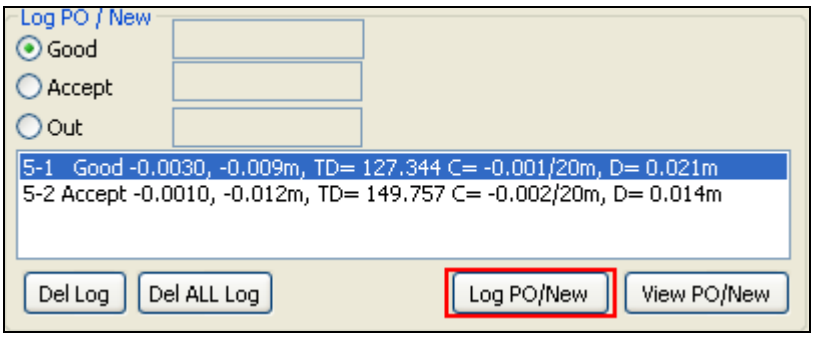
4. Repeat steps 2 and 3 for PO value. Click the **PO** button or **Search More** button to get the result.



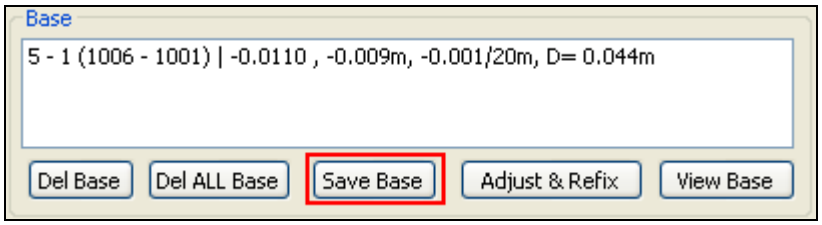
5. After select the PO and New route, the difference between New and PO will be calculated and shown.



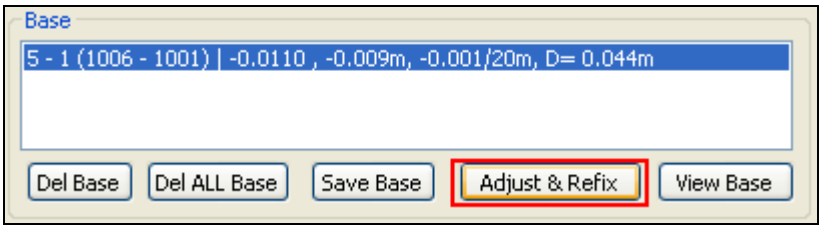
6. Select the status (Good, Accept or Out) and click on **Log PO/New** button to log the route with the status. The logged route will be showed here.



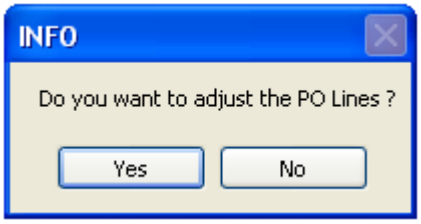
7. After comparing and satisfied with the best base, you can double click the route and click **Save Base** button. The saved route will be shown in the **Base** list box.



8. After save the route, we can continue with base refixation or setting out for missing mark. Highlight the related base and click **Adjust & Refix** button.



9. Click **Yes** if you wan to adjust the PO Lines for refixation; **No** if you do not want o adjust the PO Lines.



10. Click **OK** for the **INFO** dialog.

11. A **Question** dialog will be shown to confirm whether want to Auto Compute the bearing and distance for refixation. Click **Yes** if wish to.

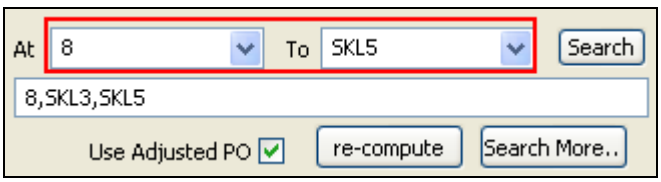
12. Continue with setting out.

6.4.2. Setting Out

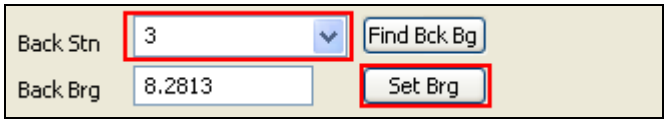
1. You can either continue from part above or click **Survey** > **Setting Out**.

2. Before start to do setting out, we need to match the **PO/New** (if not yet). Please click **Match PO** button. Dialog **Match PO and New Station** will pop up. Match the PO and New or refer to Part 6.1.5. Match PO/New or SKL/New.

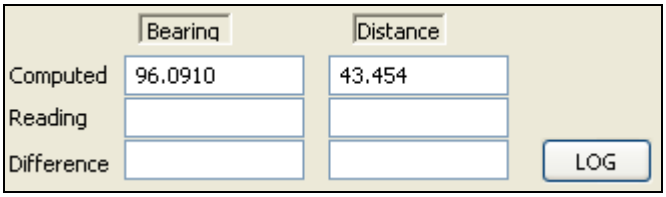
3. After select **At** and **To** station, click on **Search** button and it'll auto retrieve the route and compute its bearing and distance for the direct line. Or click on **Search More** button to get different route.



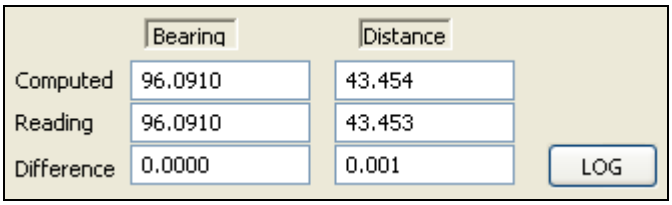
4. Back station will also be automatically retrieved. If you wish to use a different back station, select from the combo box.



5. After select the back station, target (instrument) to your back station as you select and select **Set Brg** Set Brg button to set your orientation.
6. Turn your instrument to the computed bearing.



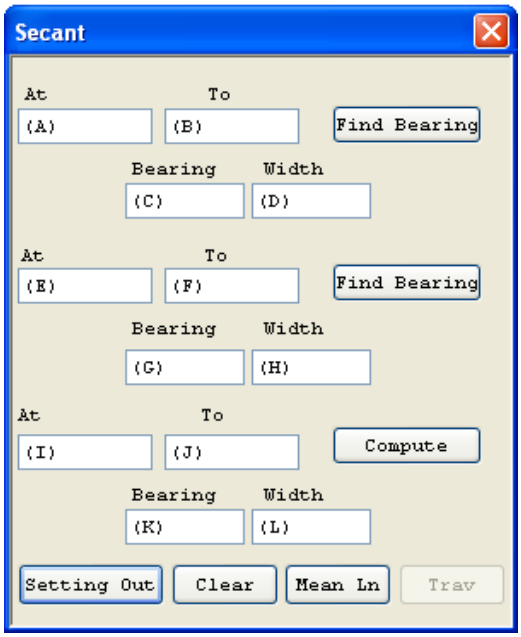
7. Setting your target at an approximate distance as computed, click on icon. This will measure the bearing and distance. The difference between computed and measured line will be also be shown as follow.



8. Repeat measurement until you get a difference of zero value or in between tolerance. By then, you should be able to have located your mark or plant it.
9. This setting out function only use to locate the missing mark. After plant the missing mark, we need to book as traverse use method in **Part 5.5: Traverse**. For the short cut to Field Capture, you can press **Trav** Trav button (go to traverse form).
10. After finishing booking for traverse, please proceed to Check Angle & Distance (Part 5.10: Check Angle & Distance) or Check Angle Only (**Part 5.11: Check Angle**) or Check Distance Only (**Part 5.12: Check Distance**).
11. You also can do computation after completing the job. Please refer to **Part 6: In Field Computation**.

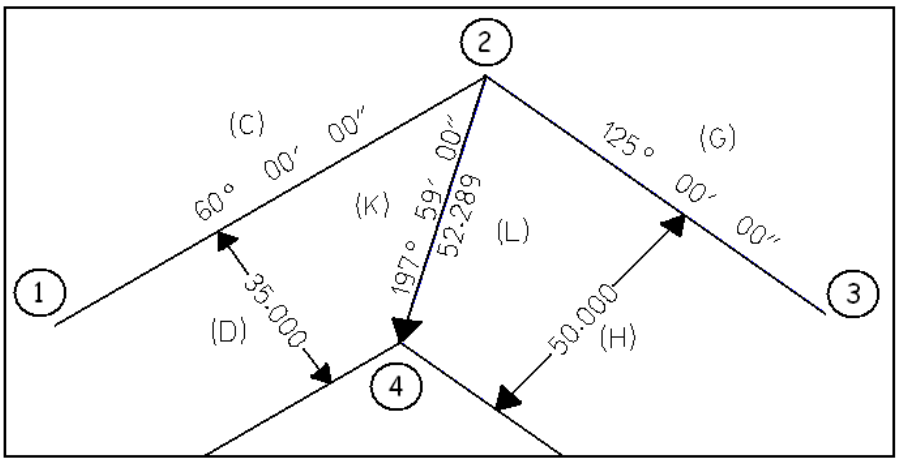
6.5. Secant

In this part, we will show you the steps to get familiar with the Secant buttons and examine how to do Secant.



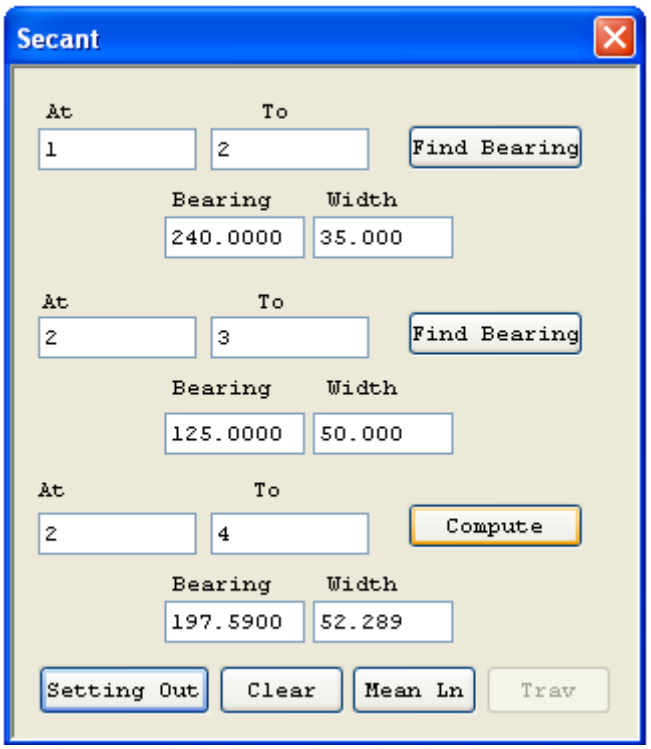
Field (A)	**AtStn ID (side1)**. Integer value is input.
Field (B)	**ToStn ID (side1)**. Integer value is input.
Field (C)	**Bearing (side1)**. Numeric value in DDD.MMSS format is input. If the line has already been defined in previous measurement, user can press Find Bearing to fetch the bearing.
Field (D)	**Width (side1)**. Numeric value is input.
Field (E)	**AtStn ID (side2)**. Integer value is input.
Field (F)	**ToStn ID (side2)**. Integer value is input.
Field (G)	**Bearing (side2)**. Numeric value in DDD.MMSS format is input. If the line has already been defined in previous measurement, user can press Find Bearing to fetch the bearing.
Field (H)	**Width (side2)**. Numeric value is input.
Field (I)	**AtStn ID (secant line)**. Value will be

	automatically assigned when Compute is pressed.
Field (J)	**ToStn ID (secant line)**. Integer value is input.
Field (K)	**Bearing (secant line)**. Value will be automatically assigned when Compute is pressed.
Field (L)	**Width (secant line)**. Value will be automatically assigned when Compute is pressed.
Compute	To Compute the *bearing (Field K)* and *distance (Field L)* of the secant line.
Setting Out	Go to setting out form to plant just computed secant station.
Mean Ln	Jump to Compute Missing Line by Bearing Distance form.



1. For understanding purpose, please refer to the sketch above.
2. Navigate to **Computation** menu > **Secant**.
    a. Enter station ID for **At** and **To** station (**1** and **2)**. Key-in **Bearing** as C (60.0000) and the **Width** (35.000). If line 1 – 2 is an existing data, user can use the **Find Bearing** button to auto retrieve back the bearing.
    b. Enter station ID for **At** and **To** station for another side (**2** and **3**). Key-in **Bearing** as G (135.0000) and the **Width** (50.000). If line 2 – 3 is an existing data, user can use the **Find Bearing** button to auto retrieve back the bearing.
    c. After key in the secant line **At** and **To** station ID (**2** and **4**), click on the **Compute** Compute button to get the bearing and distance.

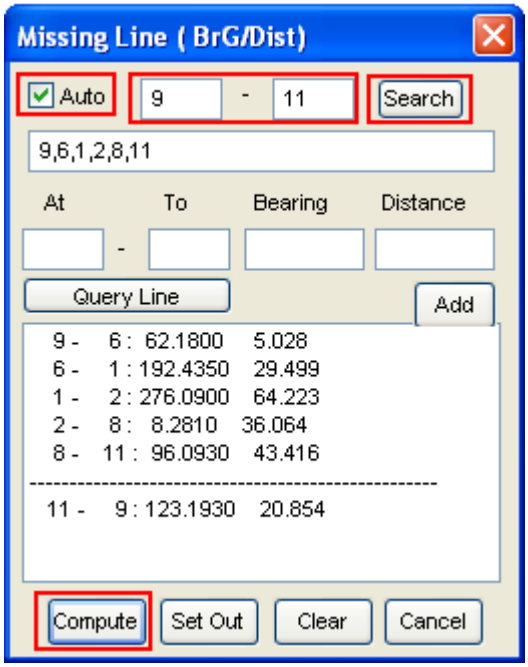
3. In conclusion it should look like the diagram shown below.



4. Then you can click Setting Out button to locate the new mark. Please refer to **6.4.2: Setting Out**.

6.6. Missing Line by Bearing and Distance

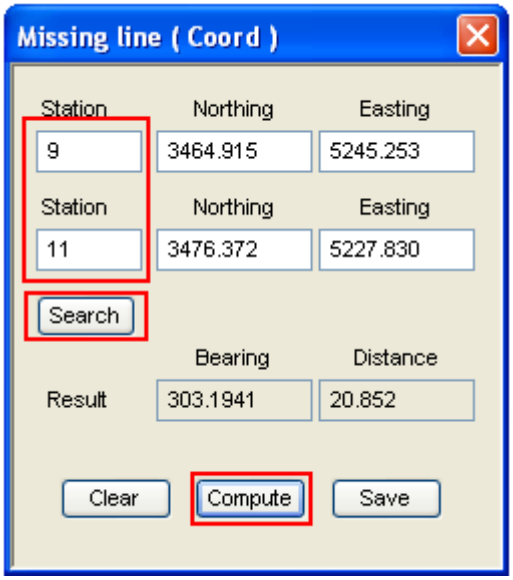
1. Navigate to **Computation** menu > **ML by Brg Dist**.
2. User can use **Auto** search the route or manually define the route to compute the bearing and distance. Enter the At stn and To stn of the line that you want to compute and click **Search** button. After search and get the route, click on **Compute** button to get the bearing and distance of the missing line.



Note: User can manually define the route that you want to use in the route edit box

6.7. Missing Line by Coordinate

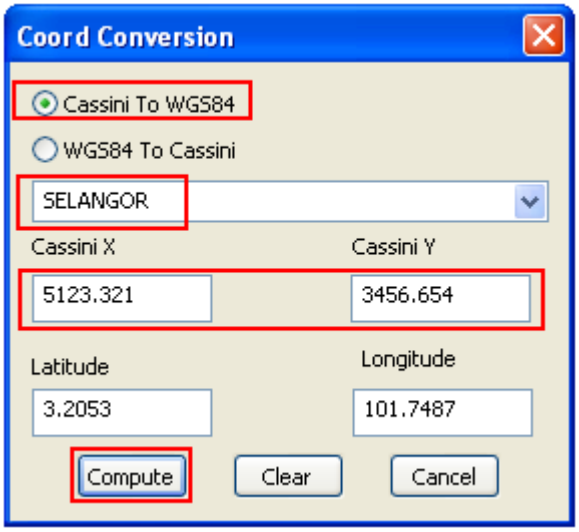
1. Navigate to **Computation** menu > **ML by Coord**.
2. To compute the missing line using coordinate method, first enter in the **At** Stn and **To** Stn then click **Search** button to get the coordinates (only if after compute the coordinates) or can manually key in the coordinates.



3. Finally click the **Compute** button to compute the bearing and distance.

6.8. Convert Coordinate (Cassini ←→ WGS84)

1. Navigate to **Computation** menu > **Convert Coordinate**.
2. To convert the coordinate from Cassini to WGS84, key in the coordinate Cassini (X, Y) and choose the state, then press **Compute** button.



3. To convert the coordinate from WGS84to Cassini, key in the coordinate latitude and longitude and choose the state then press **Compute** button.

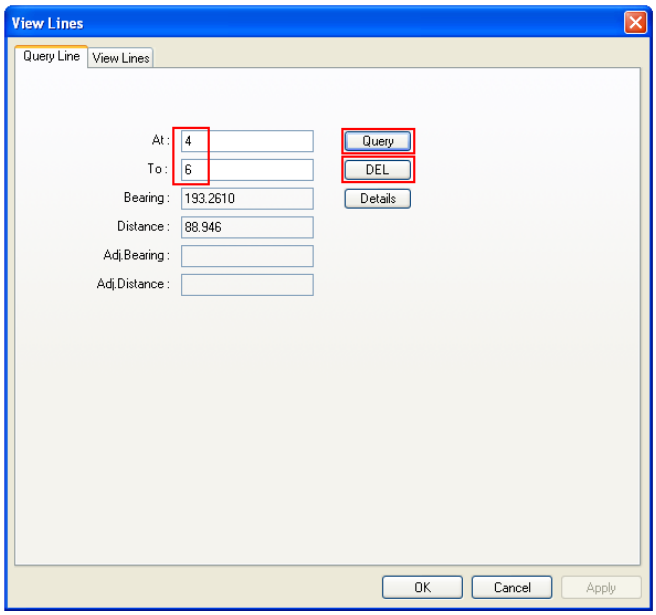
7. View Menu

7.1. Query and Delete Records

In this part, we will show you the steps how to do delete the record for wrong measurements. We will use the Query menu item in 2.4.6 View menu.

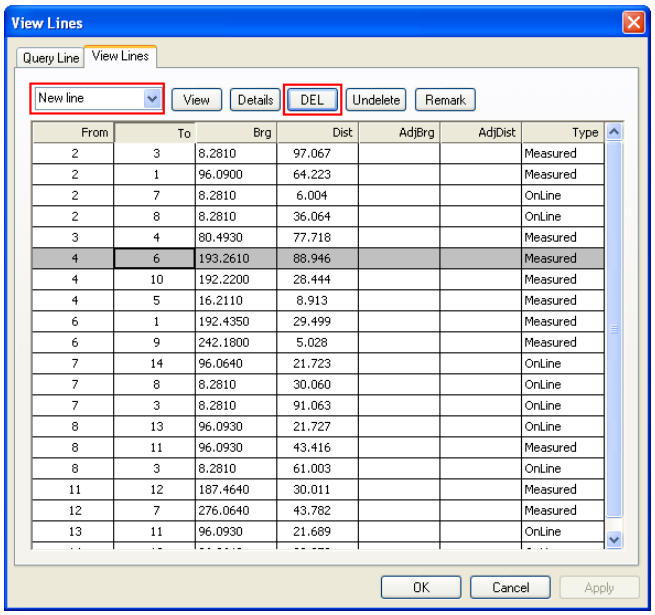
7.1.1. Delete by Query Line

1. To **delete** a saved record, navigate to **View Menu > Query**.
2. Key in the **At** station ID and **To** station ID and click on the **Query** button.
3. If the query line exists, you will see that the bearing and distance of that particular line will appear. If not the query line those not exist. To delete the line, click the **DEL** button.

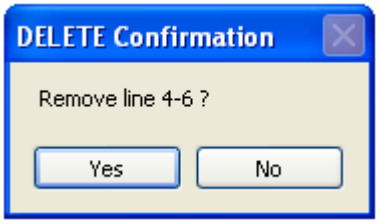


7.1.2. Delete by View Lines

1. To **delete** a saved record, navigate to **View Menu > Query**.
2. Then click the **View Lines** tab locate at the top left corner of the dialog to change to the other page.
3. Select the **Line type** of the top, highlight the line that you want to delete, and click on the **DEL** button.

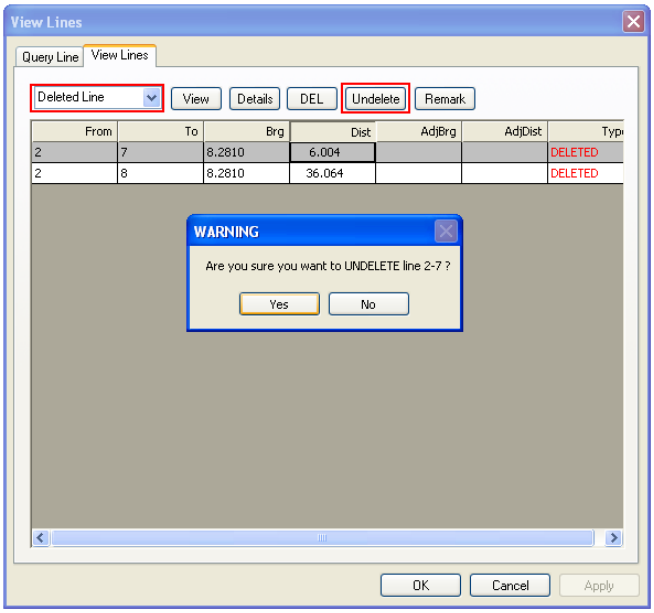


4. An Information or warning dialog will ask to confirm to remove the line. Click **Yes** to delete and **No** to cancel.



7.1.3. Undelete Record

1. To undelete a deleted line, first choose the line type of **Deleted Line**, then choose which line you want to delete, then click **Undelete** button. Click **Yes** for the **WARNING** dialog.

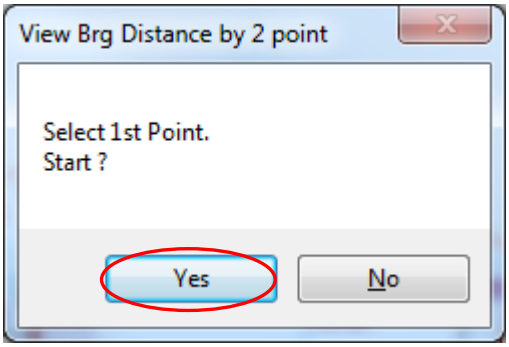


7.2. Query Bearing Distance by 2 Points

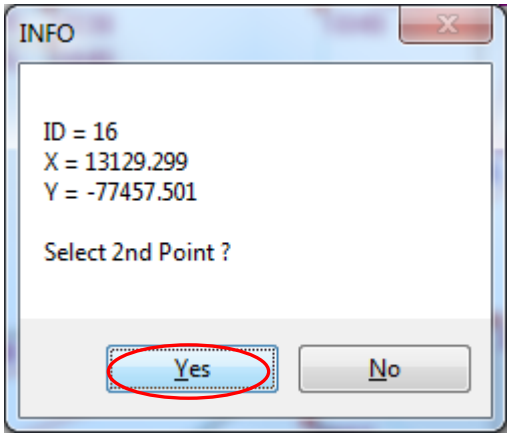
In this part, we will show you the steps how to query bearing distance by 2 points. We will use the **B/D by 2 Pt** menu item in **2.2.6 View menu**.

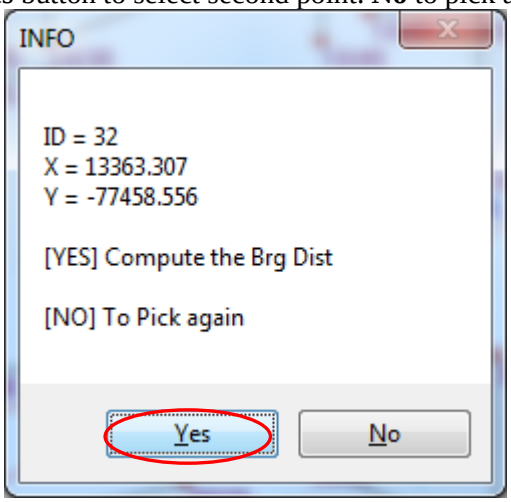
1. Navigate your mouse to **View** menu > **B/D by 2 Pt** or click **Brg Dist by graphical picked 2 point** at toolbar.

2. A **View Brg Distance by 2 point** dialog will show up asking user to select first point. Click **Yes** to select the first station but **No** to cancel.

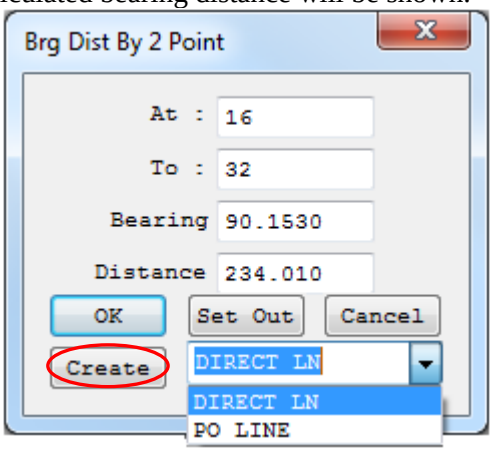


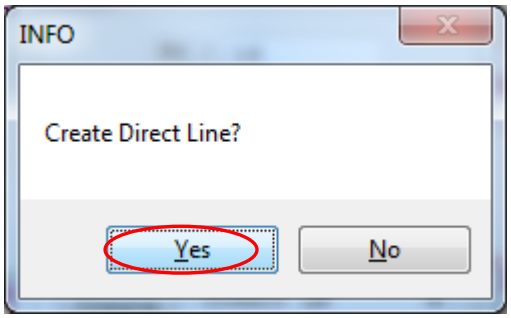
3. Info for selected point is showed as follow and click **Yes** button to select second point. **No** to pick again.



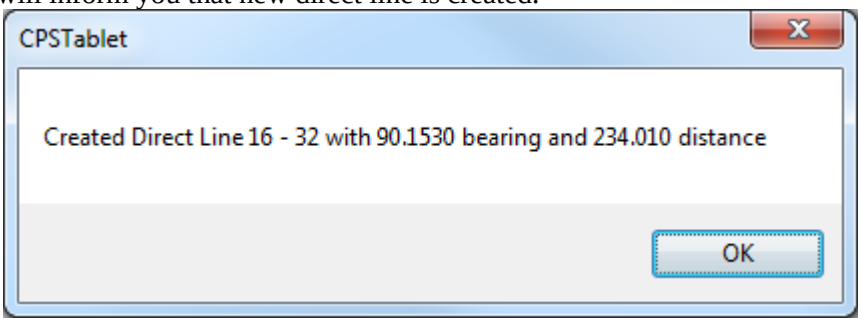


4. The info for second point is showed out. Click **Yes** button if you want to compute the bearing distance from first point to second point. Click **No** button if you want to pick again the second point.
5. The calculated bearing distance will be shown.





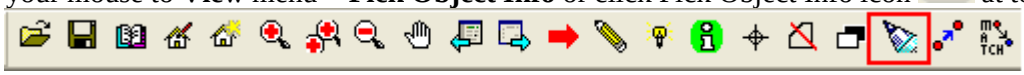
6. If you want to create a direct line between these two points, just click **Create** button. It will ask you whether want to create a direct line.
7. A message box will inform you that new direct line is created.



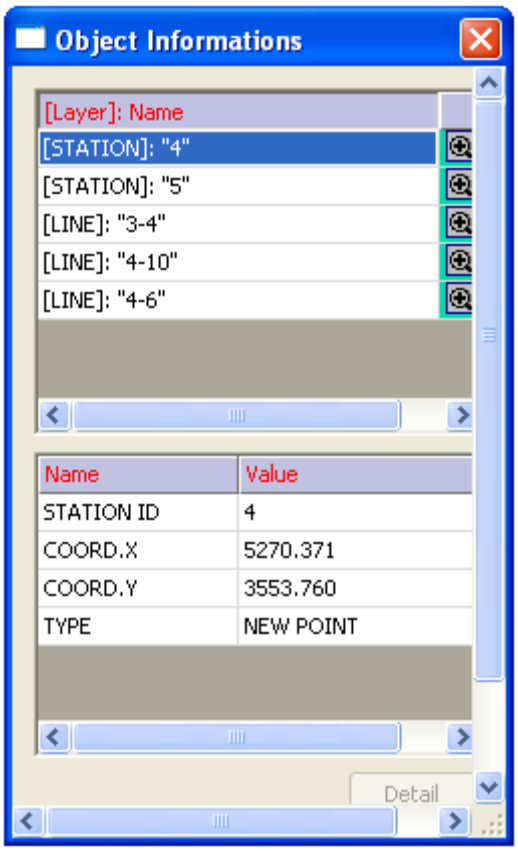
7.3. Pick Object Info

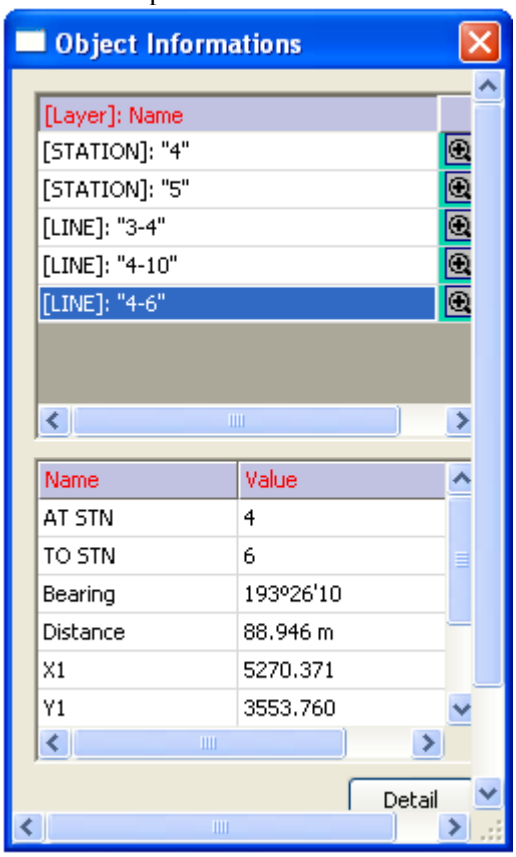
In this part, we will show you the steps how to query object info. We will use the **Pick Object Info** menu item in **2.4.6 View menu**.

1. Navigate your mouse to **View** menu > **Pick Object Info** or click Pick Object Info icon at toolbar



2. Just click on the line or point that you want to know about it info. The **Object Information** dialog will pop up as following. If you click on button, it will zoom to selected point or line.





8. Reporting and Export JUPEM ASCII

In this part, we will discuss the menu item from 2.4.12: Report menu and 2.4.14: Export menu. So, in this part 8, we will do reporting and export JUPEM ASCII file using the menu items in Report menu and Export menu.

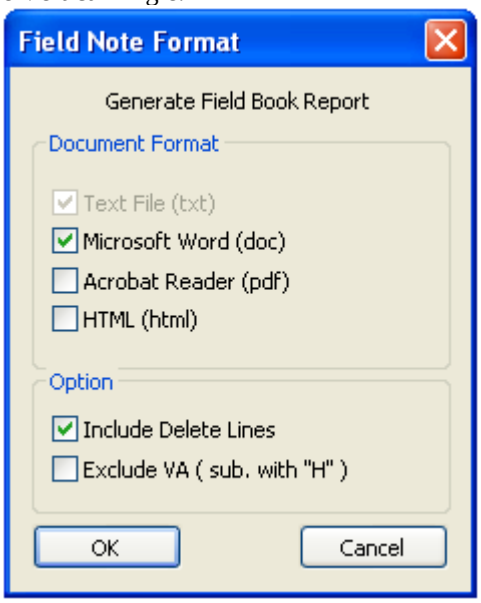
8.1. Reporting

In this part, we will show you the steps how to do **reporting** after completing survey capture in **Part 5: Field Data Capture**. This reporting shows all the details of calculation such as JK for traverse. We will use the **Report** menu item in **2.4.12 Report menu**.

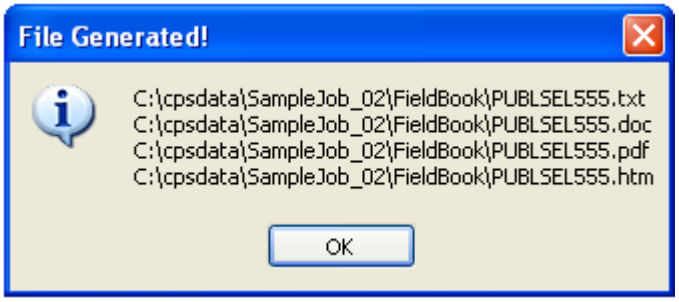
8.1.1. Field Note (Field Book)

To organize and output survey measurement recorded into Field Note format similar to conventional field book style. (eTSMTablet is able to output field note into *.txt, *.doc, *.PDF and html format)

1. Navigate to **Report** menu > **Fld Note**.
2. A **Field Note Format** dialog will be displayed as below. Check the format you wish to generate. You have an option to include the deleted lines and exclude Vertical Angle.



3. A dialog will pop up showing the file is generated to which folder. Files are generated in the **FieldBook** folder in your job file. Just click **OK** button.



4. You can view the generated field book by clicking **Report** menu > **View Fld Note.doc**, then open the particular file.

8.1.2. Solar Report

To organize and output sun observation report (eTSMTablet is able to output solar report into *.txt , *.doc and *.PDF format)

1. Navigate to **Report** menu > **Solar**.
2. Repeat the steps to generate Field Book report as above.

8.1.3. Jilid Kiraan (JK)

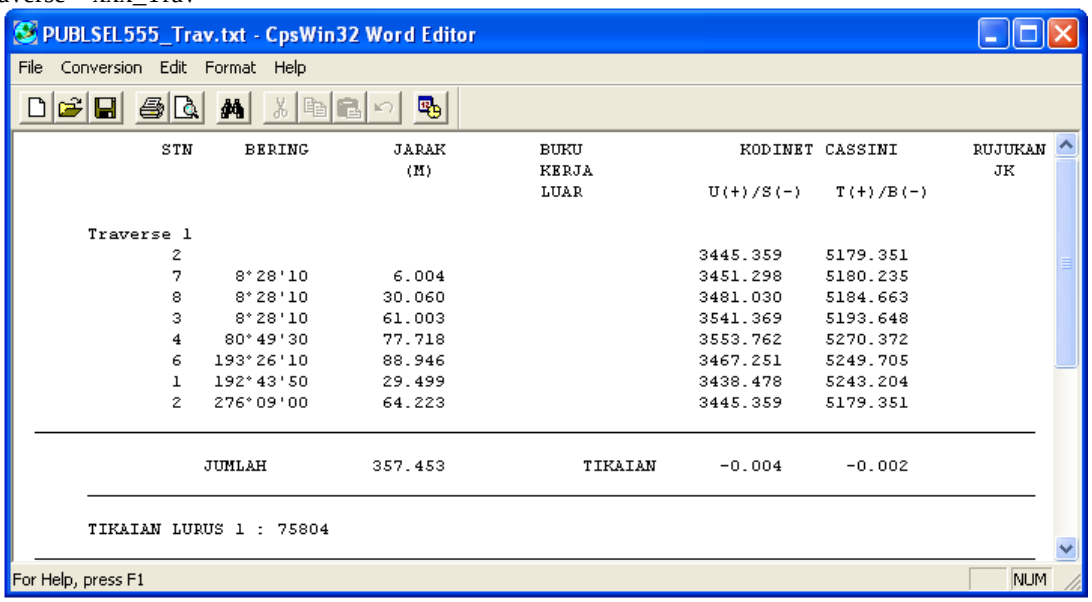
To create and output the JK (Jilid Kiraan) file of current job. (File generated for JK file is mainsht.txt/doc/pdf).

1. Navigate to **Report** menu > **JK**.
2. Repeat the steps to generate Field Book report as above.

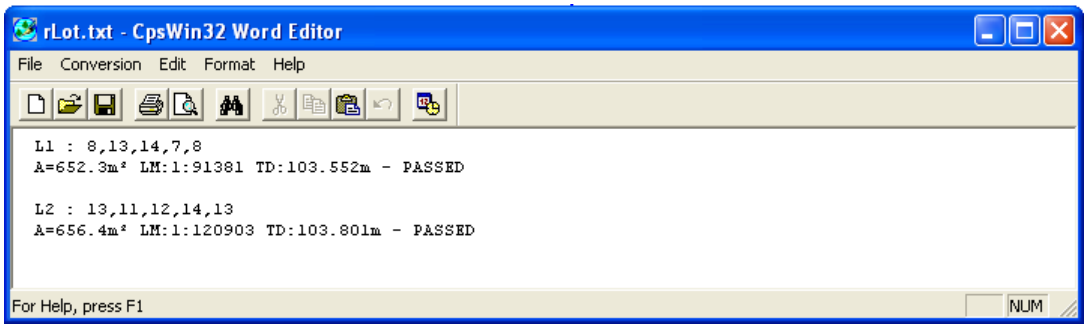
8.1.4. Survey Computation Report

To organize and output survey measurement recorded into Field Note format similar to conventional field book style.(eTSMTablet is able to output field note into *.txt , *.doc and *.PDF format)

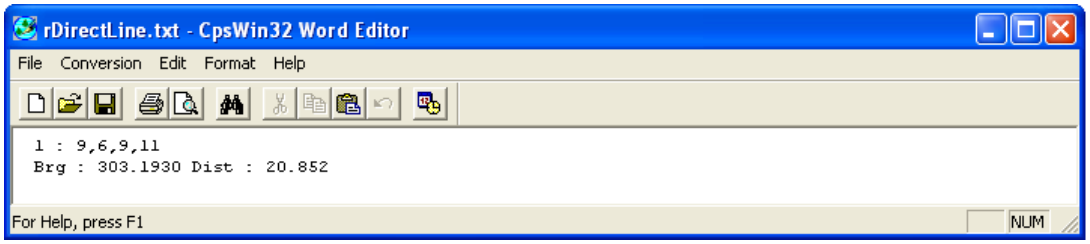
1. Navigate to **Report** menu > **Traverse / Lot / Direct Line / Mean Line / Connection Line / Coordinate / Base**
2. The report is showed up as below.
   a. Traverse – xxx_Trav



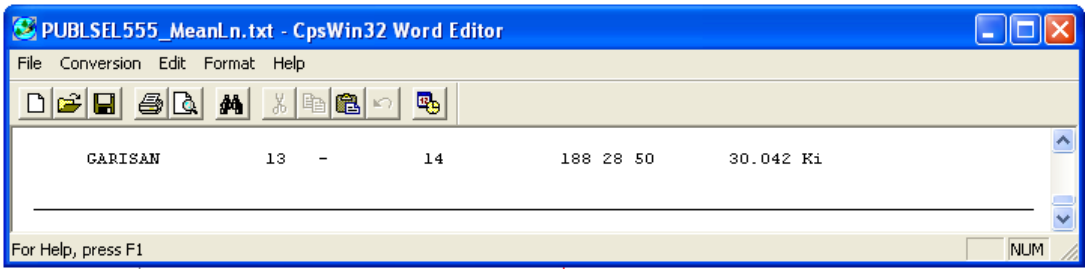
   b. Lot – rLot



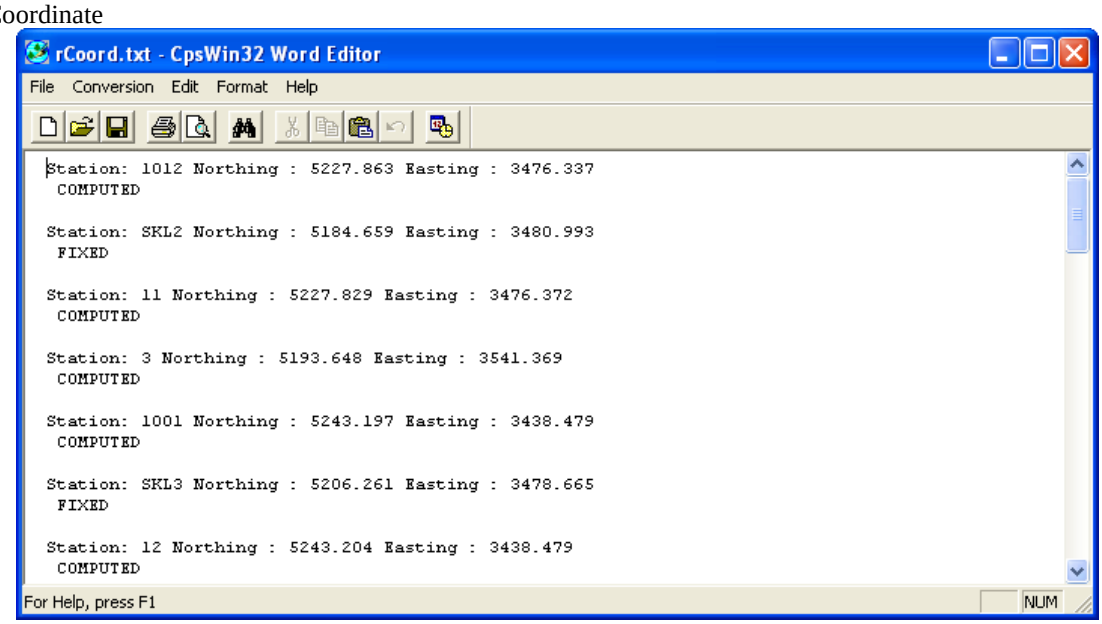
c. Direct Line – rDirectLine



d. Mean Line – rMeanLine



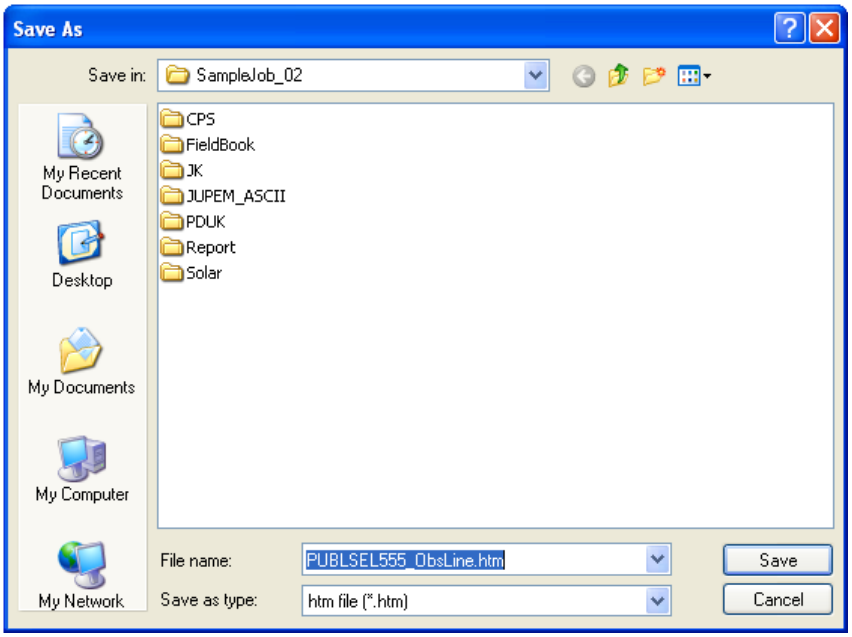
e. Coordinate



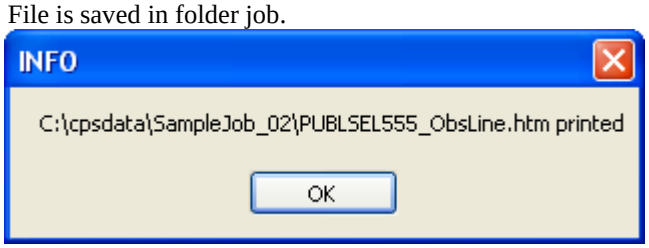
8.1.5. Print Observed Line

To output summary report of surveyed line with timestamp.

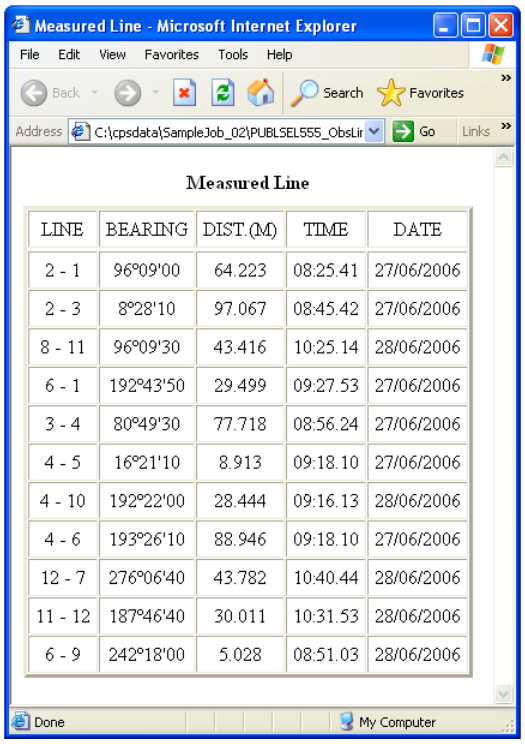
1. Navigate to **Report** menu > **Print Observed Line**.
2. A **Save As** dialog will displayed, type in the filename or use default file name and click **Save** button. File will be save in *.html format.



3. A message box will pop up. File is saved in folder job.



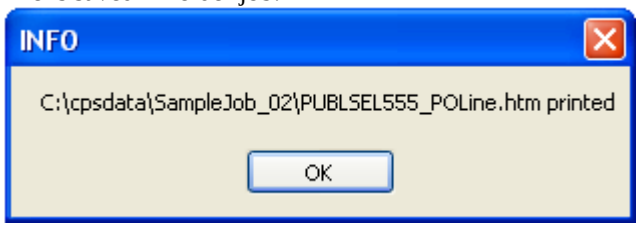
4. Click **OK** and the *html file will be shown.



8.1.6. Print PO Lines

To output PO Lines report

1. Navigate to **Report** menu > **Print PO Lines**.
2. A **Save As** dialog will displayed, type in the filename or use default file name and click **Save** button. File will be save in *.html format.
3. A message box will pop up. File is saved in folder job.

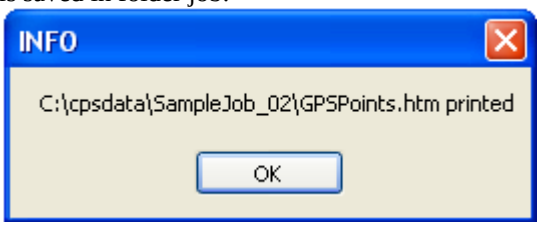


4. Click **OK** and the *html file will be shown.

8.1.7. Print GPS Points

To output GPS Points those have been observed.

1. Navigate to **Report** menu > **Print GPS Points**.
2. A **Save As** dialog will displayed, type in the filename or use default file name and click **Save** button. File will be save in *.html format.
3. A message box will pop up. File is saved in folder job.



4. Click **OK** and the *html file will be shown.

8.1.8. View *.doc, *.PDF, *.htm Report

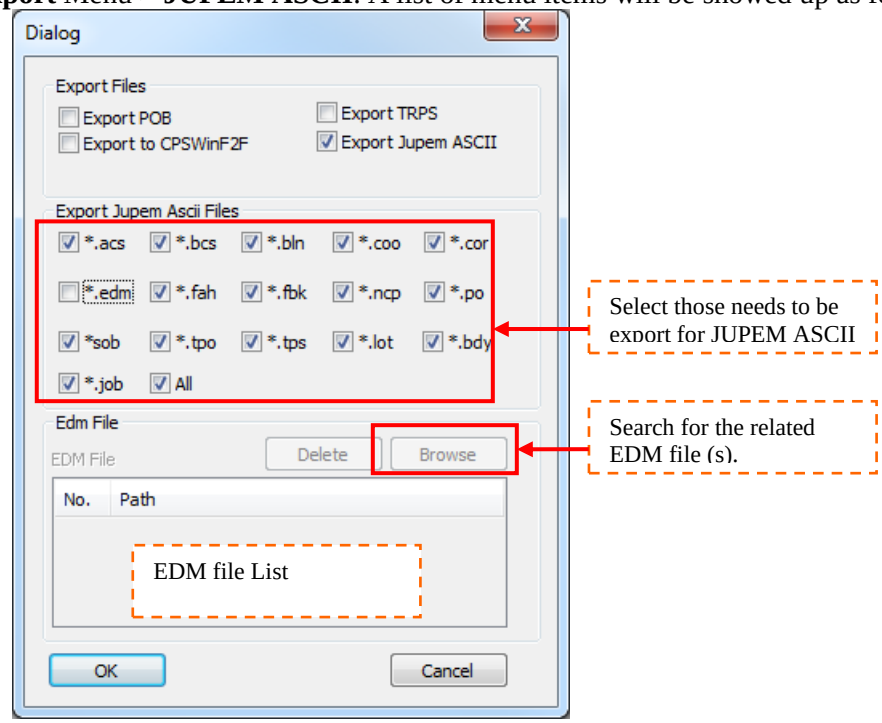
To view all the report in different format such as doc file, PDF file and html file.

1. Navigate to **Report** menu > **View *.doc/ *.PDF/ *.htm Report**.
2. An **Open dialog** with selected extension (*.doc/ *.PDF/ *.htm) will be displayed. Just click which type of file you wish to open and click **Open** button.

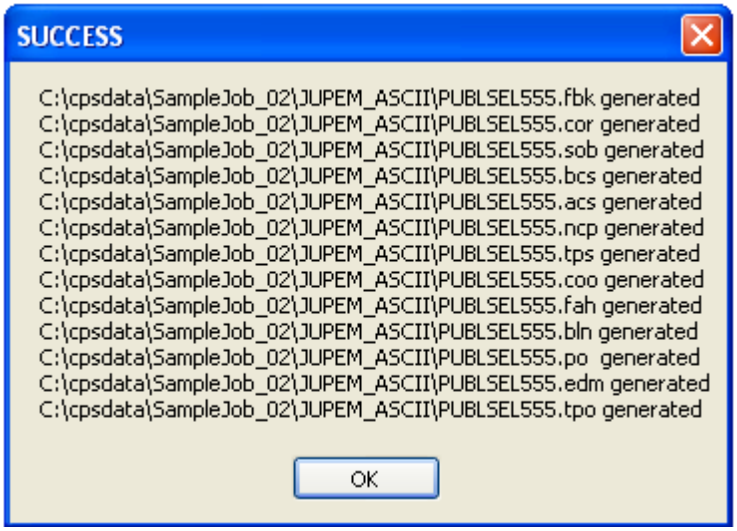
8.2. Export JUPEM ASCII

In this part, we will show you the steps how to export JUPEM ASCII file after This JUPEM ASCII file need to pass up for JUPEM checking. We will use the **Export** menu item in Part **2.4.14: Export menu**.

1. Navigate to **Export** Menu > **JUPEM ASCII**. A list of menu items will be showed up as follow.

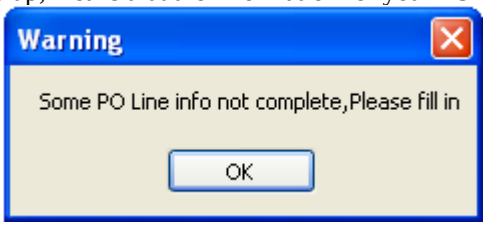


2. Click **OK** for the information dialog that shows the files is exported.



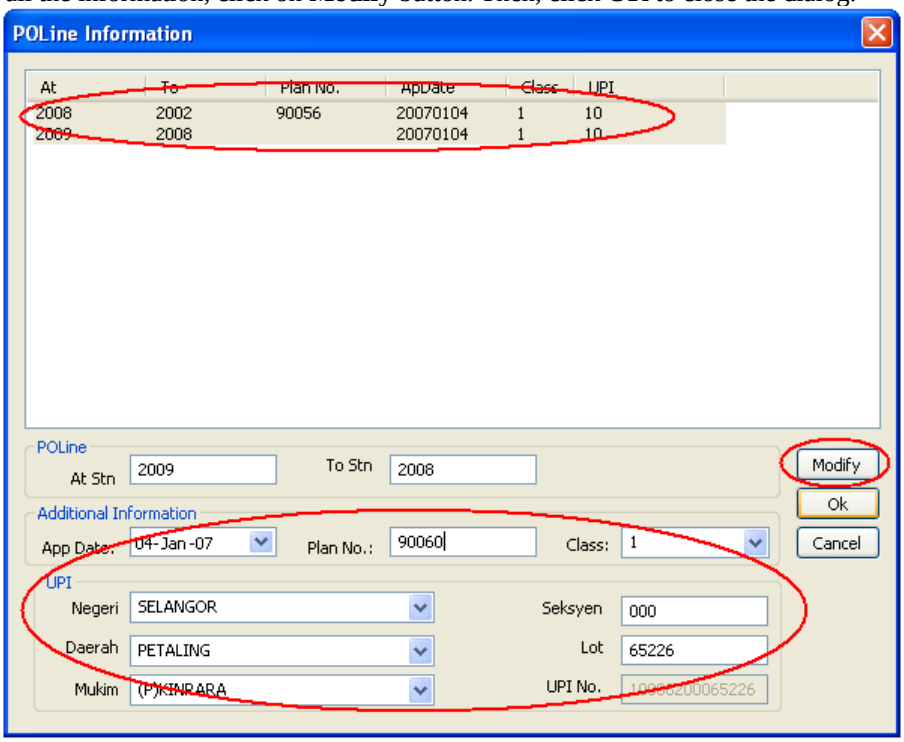
8.2.1. Troubleshot – PO Line Info not Complete

1. If a **Warning** dialog like below pop up, means that the information for your PO lines is not completed.



2. **POLine Information** dialog will be shown. Highlight one or more lines that you wish to edit, select or key in the correct information for the **App Date**, **Plan No**, **Class** and **UPI**.

3. When complete all the information, click on **Modify** button. Then, click **OK** to close the dialog.

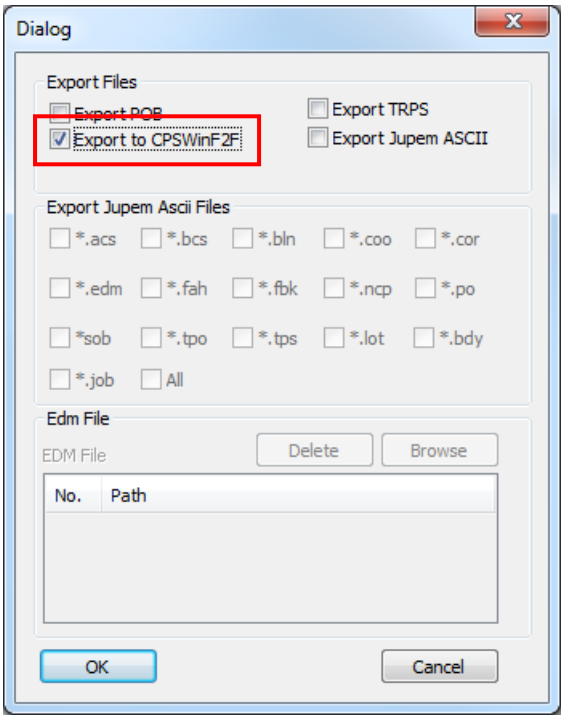


4. Continue to export the ASCII files.

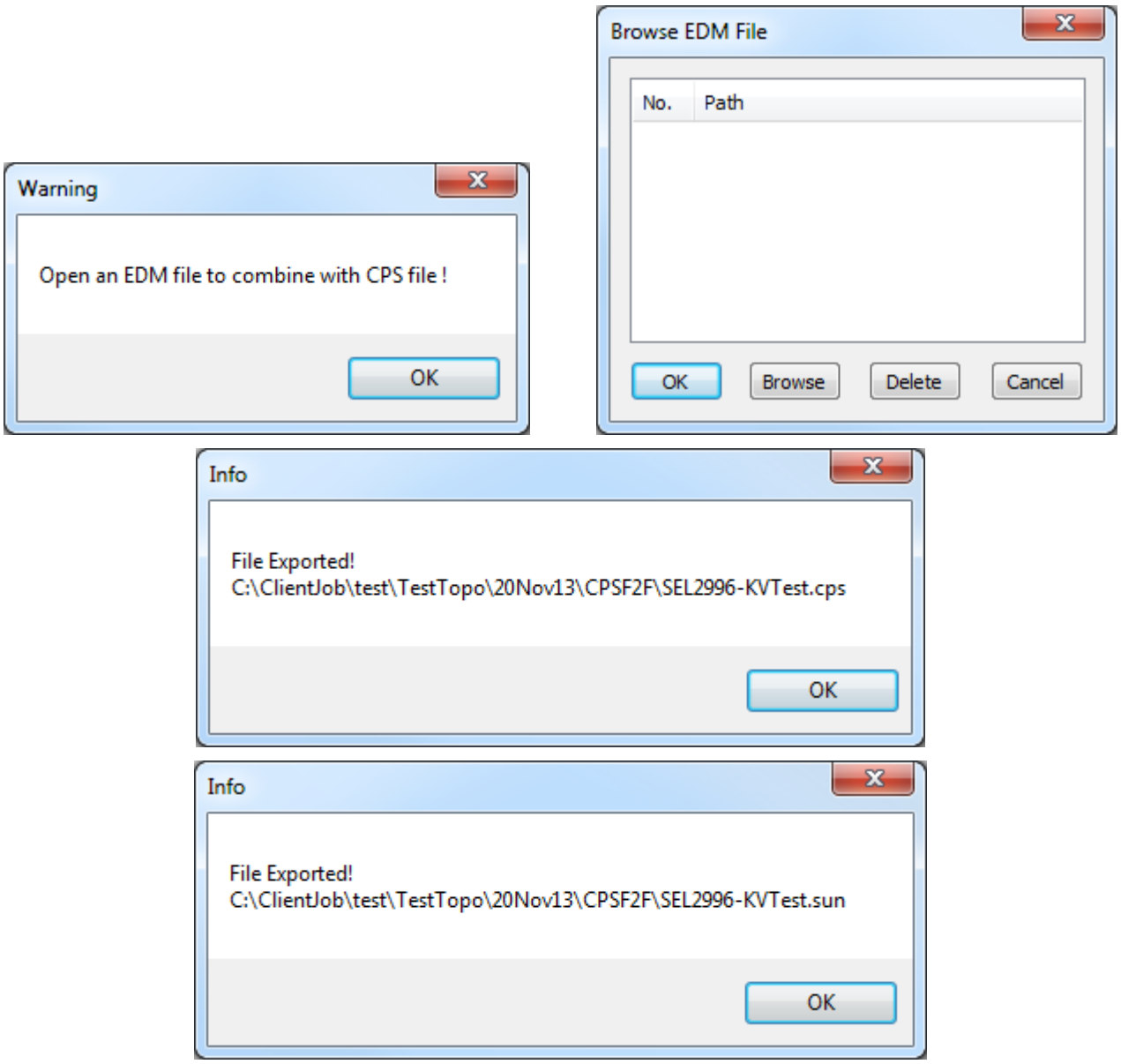
8.3. Export CPSWinF2F

When Export CPSWinF2F, need to enclose the particular EDM file.

1. Navigate to **Export > JUPEM ASCII**. Then, click **OK**.



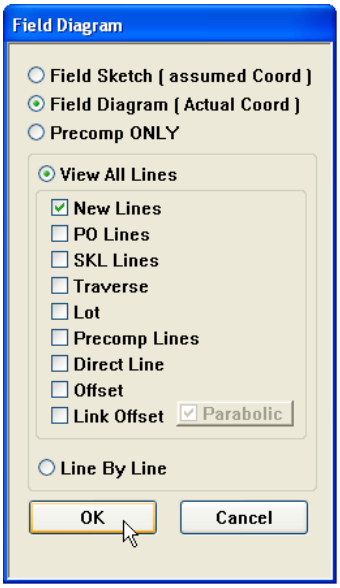
2. For the EDM file, due to EDM test is not done for every beginning job, so please search for your related EDM test file from whatever folder you saved.



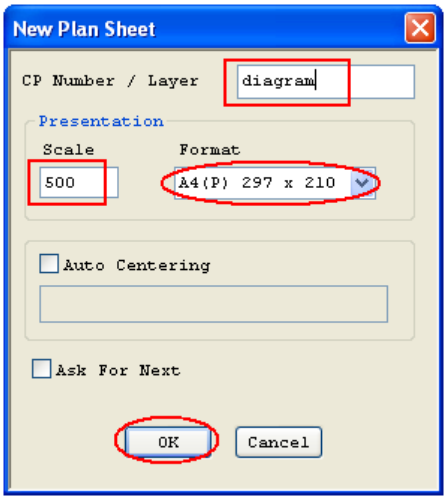
8.4. Export Graphic / Field Diagram

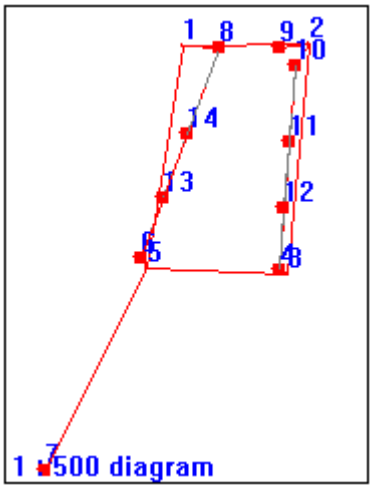
User can export the graphic or field diagram into DXF format to be editing or plot in AutoCAD or other relevant software.

1. Navigate to **View > Sketch** to on New Lines in Field Diagram with Actual Coordinate.

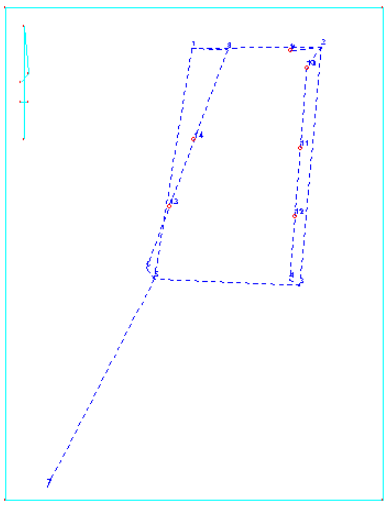


2. Then, go to **Layer > Add Sheet**, key in the layer name, set the scale and chose the format. Then, click **OK** to place the sheet.

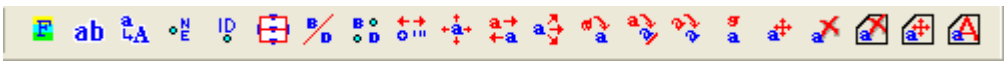




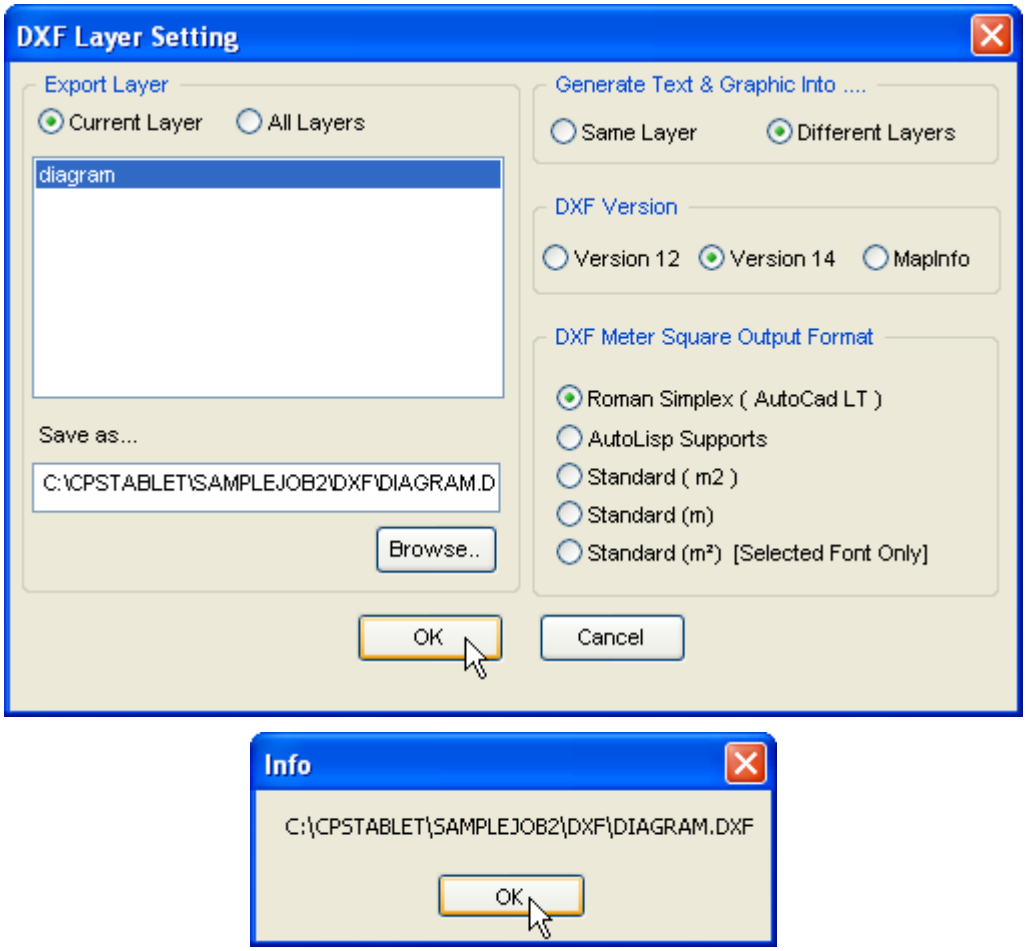
3. After that, go to **Layer > Field Diag. Transfer All** to transfer the entire sheet into a plan layer.



4. Navigate to **Text > Auto Label** to label all the station ID and bearing distance.
5. Use the icon below to edit the text.



6. Last, you may go to **Layers > Export Layer (DXF)**. Chose for the setting and click OK to export.

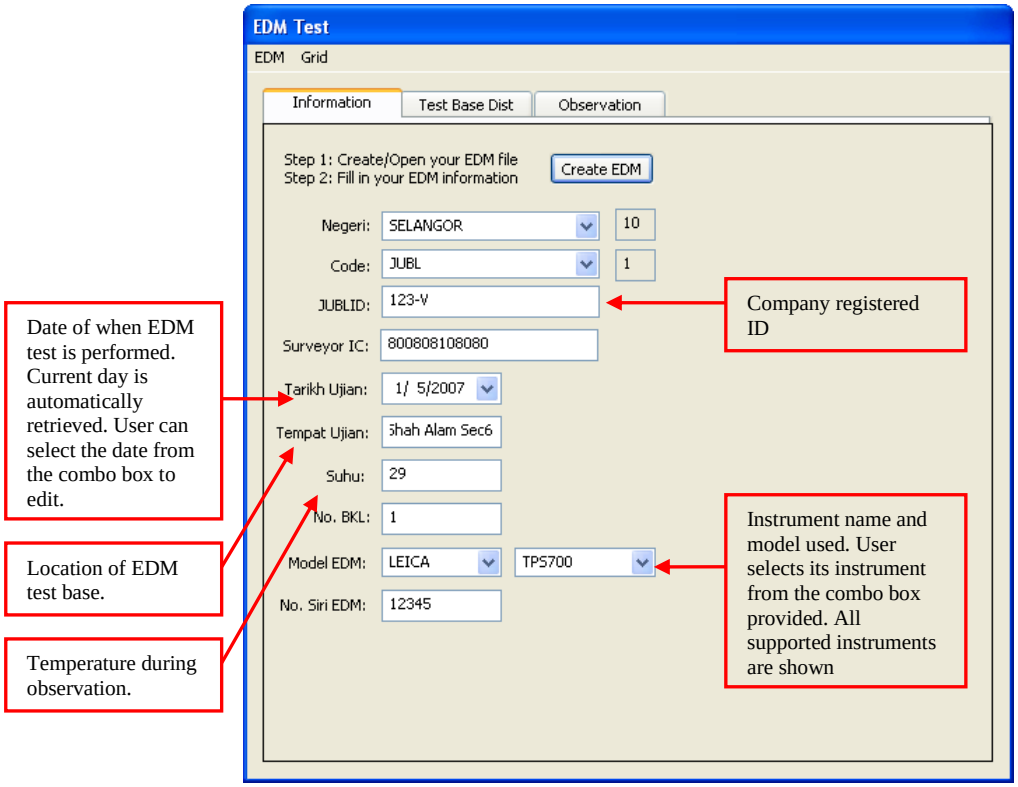


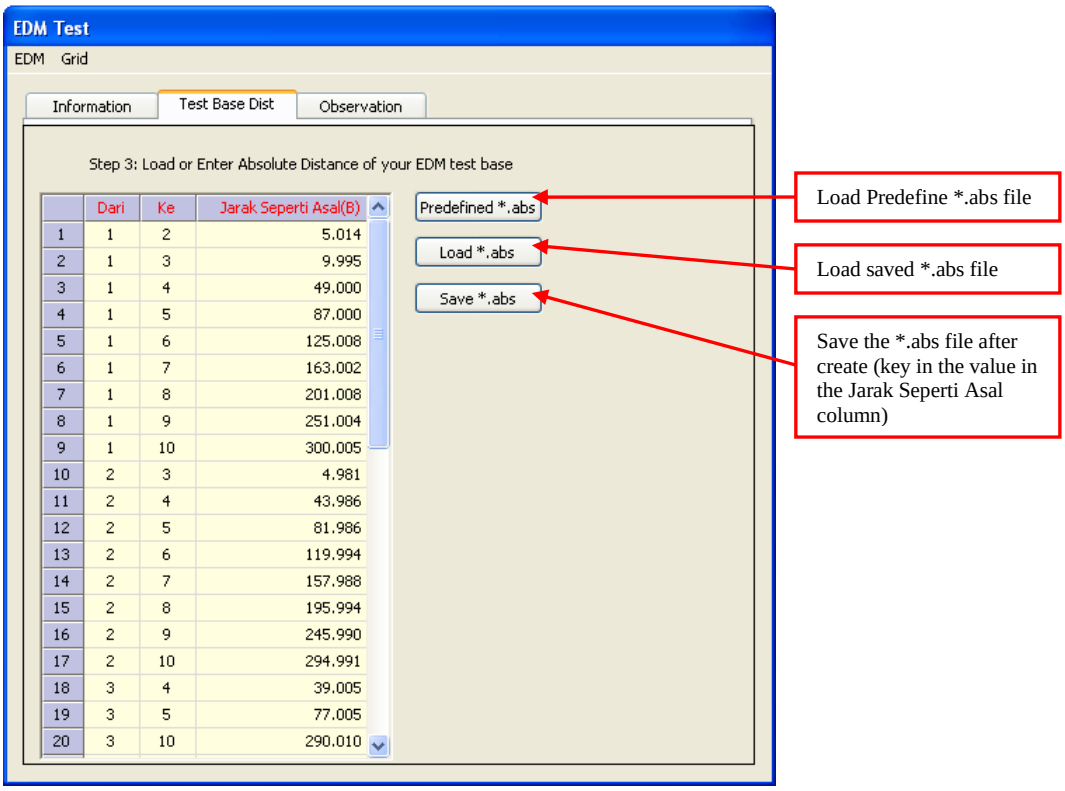
9. Utilities and Display Menu

In this part, we will discuss the menu item from 2.4.1: **Job** menu. So, in this part 8, we will use the menu items in **Utilities** menu.

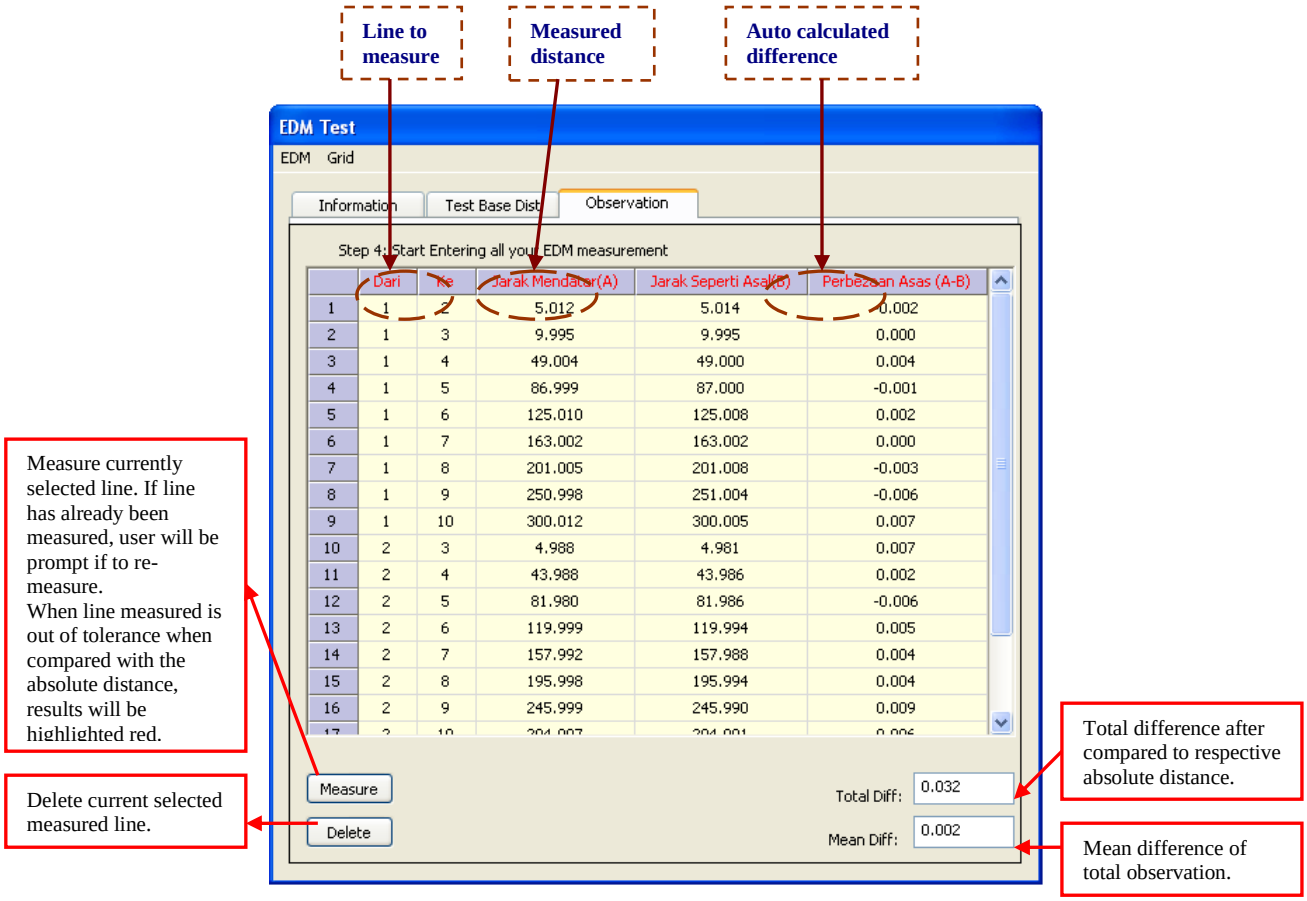
9.1. EDM Test

In this part, we will show you the steps how to do **EDM test** for instrument. We'll show you how to create absolute file for your own state. We will use the **Utilities** menu item in Part 2.4.1: **Job** menu.

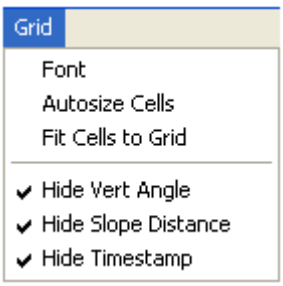




	Dari	Ke	Jarak Seperti Asal(B)
1	1	2	5.014
2	1	3	9.995
3	1	4	49.000
4	1	5	87.000
5	1	6	125.008
6	1	7	163.002
7	1	8	201.008
8	1	9	251.004
9	1	10	300.005
10	2	3	4.981
11	2	4	43.986
12	2	5	81.986
13	2	6	119.994
14	2	7	157.988
15	2	8	195.994
16	2	9	245.990
17	2	10	294.991
18	3	4	39.005
19	3	5	77.005
20	3	10	290.010



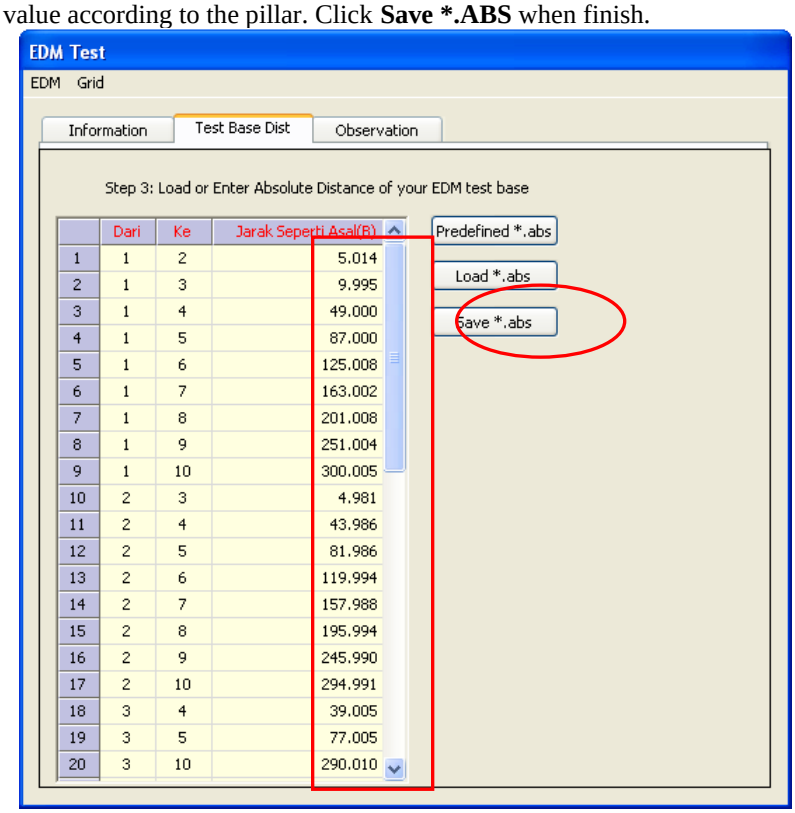
New	To create a new EDM test form.
Open	To open an existing EDM test form
Create *.ABS	Create *.abs (absolute distance) file
Save	Save current EDM test results.
Generate Report	To organise and output EDM test print out. Output will be in HTML format.
Workspace	To set extra/misc. configuration
Exit	Quit EDM Test.



Font	Change font attributes displayed on test form.
Autosize Cells	Auto resize cells to fit characters.
Fit Cells to Grid	Stick test form view to grid display panel.
Hide Vert Angle	Toggle hide/show vertical angle column.
Hide Slope Distance	Toggle hide/show slope distance column.
Hide Timestamp	Toggle hide/show timestamp column for each observation.

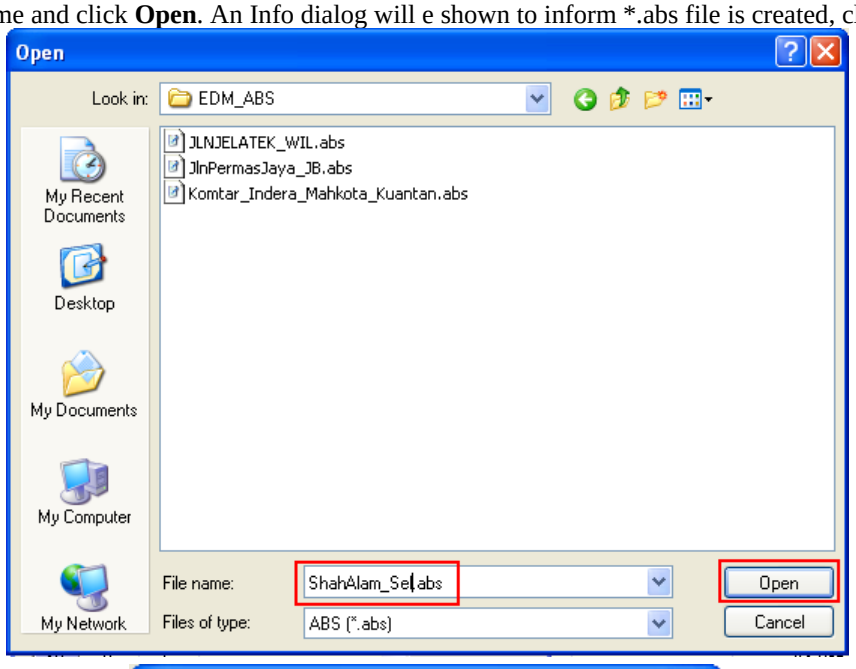
9.1.1. Create *.abs

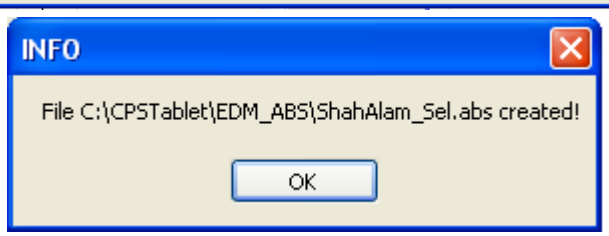
1. Navigate to **Job** menu > **Utilities** > **EDM Test**.
2. After create **EDM file** and keyed in the **information**, go to the **Test Base Dist** to create the *.abs file for the Base Station. If already created the *.abs for the same location already, can just load the *.abs file.
3. Key in the base line value according to the pillar. Click **Save *.ABS** when finish.



	Dari	Ke	Jarak Seperti Asal(B)
1	1	2	5.014
2	1	3	9.995
3	1	4	49.000
4	1	5	87.000
5	1	6	125.008
6	1	7	163.002
7	1	8	201.008
8	1	9	251.004
9	1	10	300.005
10	2	3	4.981
11	2	4	43.986
12	2	5	81.986
13	2	6	119.994
14	2	7	157.988
15	2	8	195.994
16	2	9	245.990
17	2	10	294.991
18	3	4	39.005
19	3	5	77.005
20	3	10	290.010

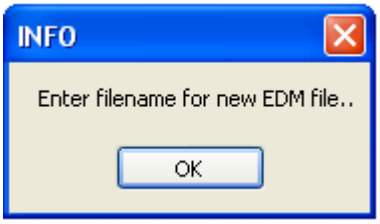
4. Key in the file name and click **Open**. An Info dialog will e shown to inform *.abs file is created, click **OK**.



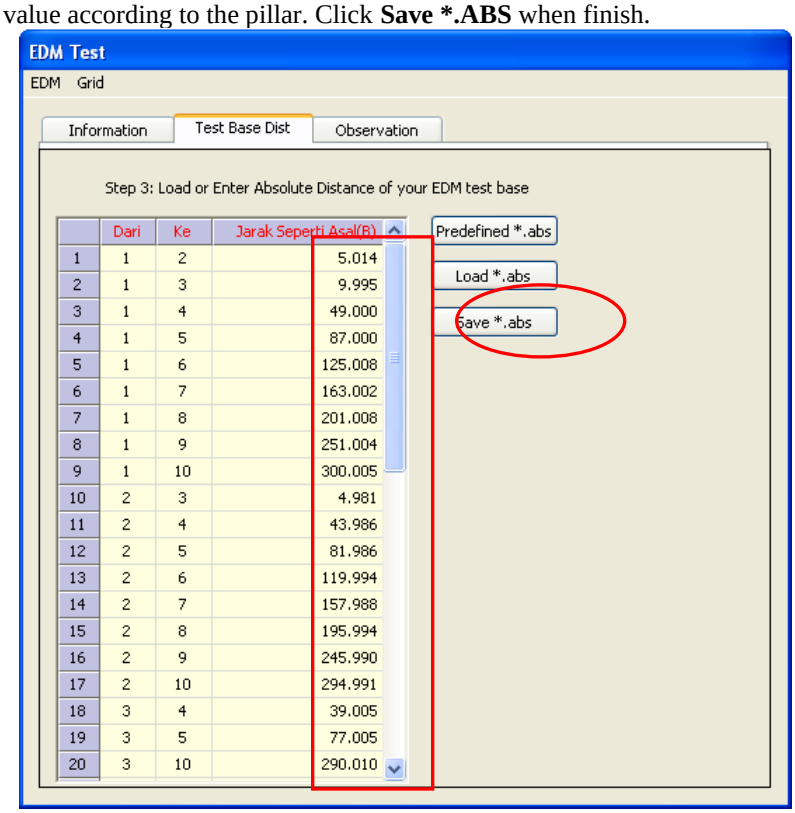


9.1.2. Survey Steps

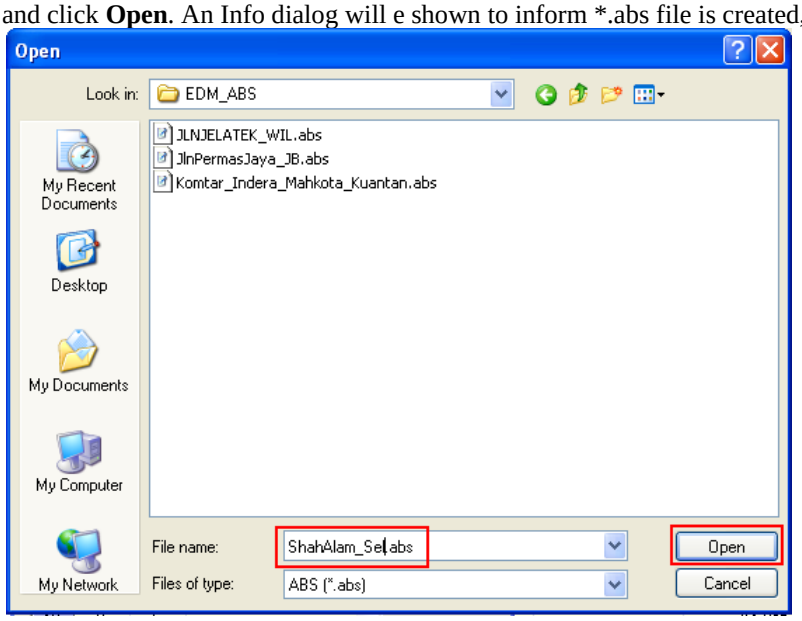
1. Navigate to **Job** menu > **Utilities** > **EDM Test**.
2. After create **EDM file** and keyed in the **information**.

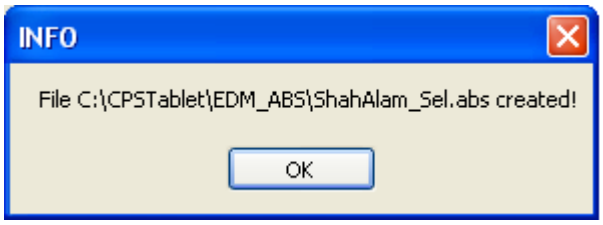


3. Go to the **Test Base Dist** to create the *.abs file for the Base Station. If already created the *.abs for the same location already, can just skip steps 4 and 5, then load the related *.abs file.
4. Key in the base line value according to the pillar. Click **Save *.ABS** when finish.

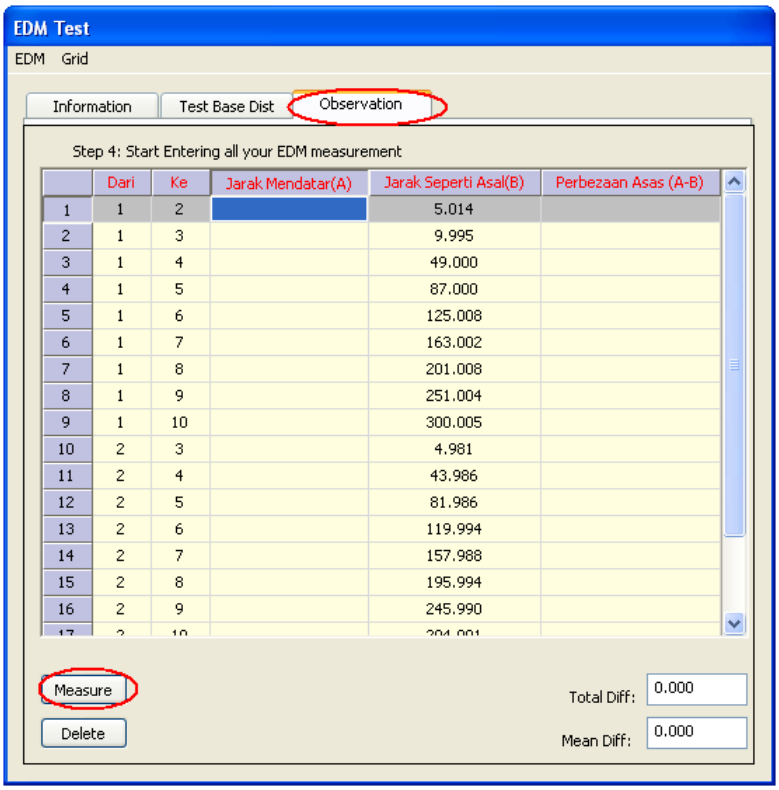


5. Key in the file name and click **Open**. An Info dialog will e shown to inform *.abs file is created, click **OK**.





6. To measure the data, navigate to **Observation** tab bar. Highlight the row that you going to measure and click on the **Measure** Measure button.

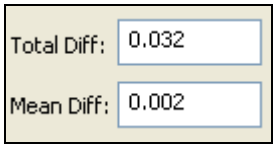


	Dari	Ke	Jarak Mendatar(A)	Jarak Seperti Asal(B)	Perbezaan Asas (A-B)
1	1	2		5.014	
2	1	3		9.995	
3	1	4		49.000	
4	1	5		87.000	
5	1	6		125.008	
6	1	7		163.002	
7	1	8		201.008	
8	1	9		251.004	
9	1	10		300.005	
10	2	3		4.981	
11	2	4		43.986	
12	2	5		81.986	
13	2	6		119.994	
14	2	7		157.988	
15	2	8		195.994	
16	2	9		245.990	

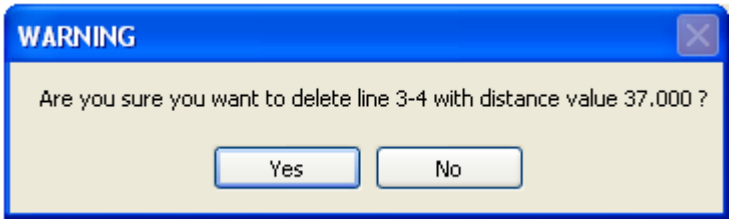
7. After measure, will get the horizontal distance. The differences will be calculated automatically. Repeat the step for other lines.

	Dari	Ke	Jarak Mendatar(A)	Jarak Seperti Asal(B)	Perbezaan Asas (A-B)
1	1	2	5.012	5.014	-0.002
2	1	3	9.995	9.995	0.000
3	1	4	49.004	49.000	0.004
4	1	5	86.999	87.000	-0.001

8. The **Total Different** and **Mean Different** will always show at the bottom right of the **EDM Test** dialog.



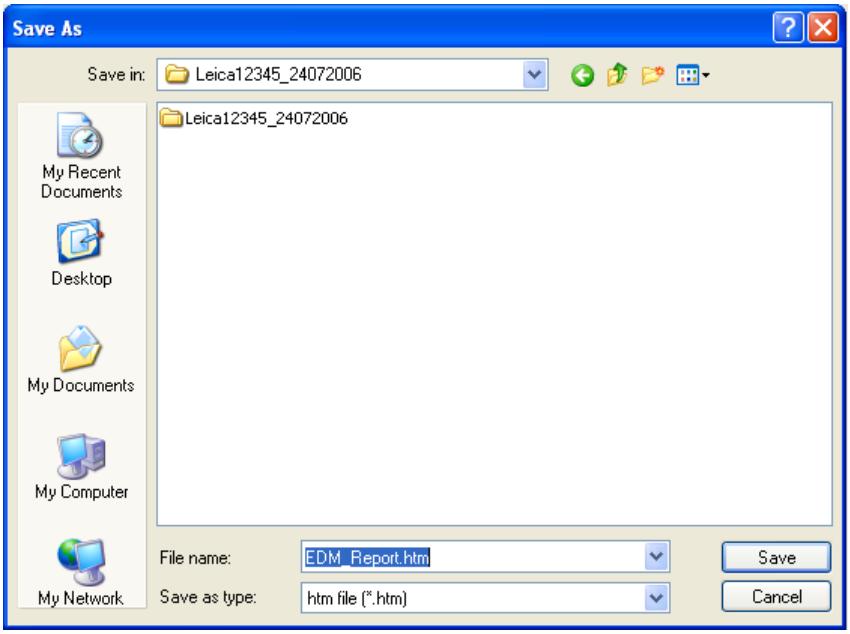
9. If wrongly measured the line and want to delete it, can click on **Delete** Delete button after you highlight the line that you wish to delete. Click **Yes** for the **WARNING** dialog.



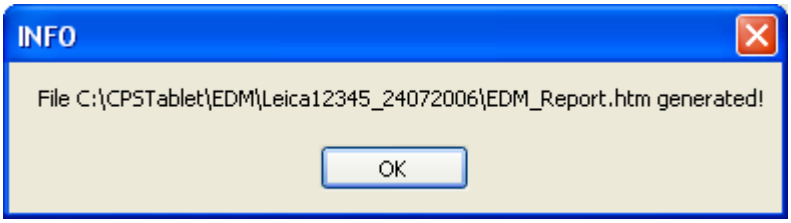
10. After completing your EDM test, go to **EDM** menu > **Save.** Click **OK** to save the data.

9.1.3. Generate EDM Report

1. Navigate to **EDM > Generate Report**. Key in the file name or use the default file name and click **Save** to save it in the same folder of your EDM files.



2. Click **OK** for the INFO dialog.



3. Go to the same directory to open the file if you want to view it.

9.2. Diary

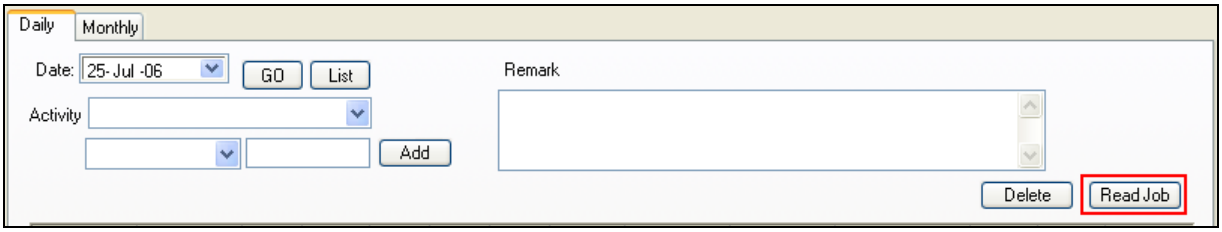
In this part, we will show you the steps how to write **Diary** for your survey job. In this diary, you can write down which activity is done for certain day. We will use the **Diary** menu item in Part 2.4.1: **Job** menu.

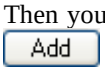
9.2.1. Add Record

1. To use the Field Diary function, navigate your mouse to **Job** menu > **Utilities > Diary.**

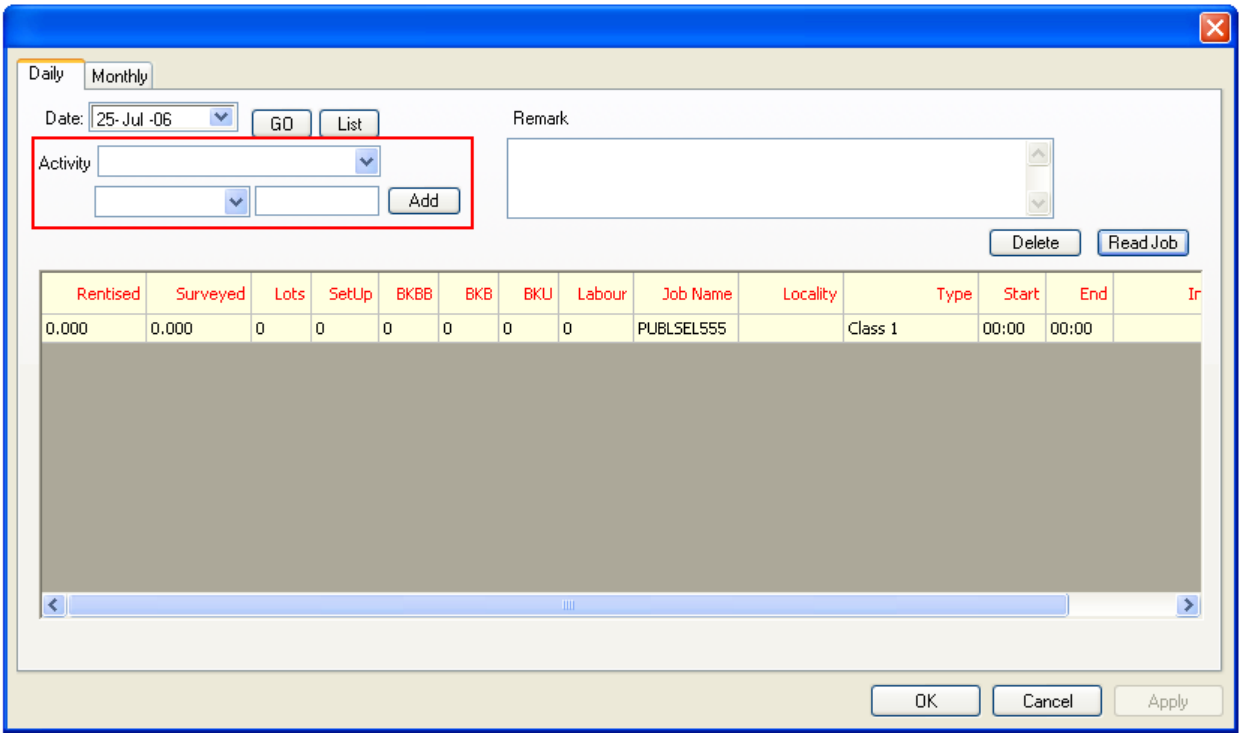
2. First at all, you must import a selected job file that you want to add a diary in by clicking the **Read Job**

button



3. Then you can add in a new record in the database by enter in all the information to the given field and click the **Add** 

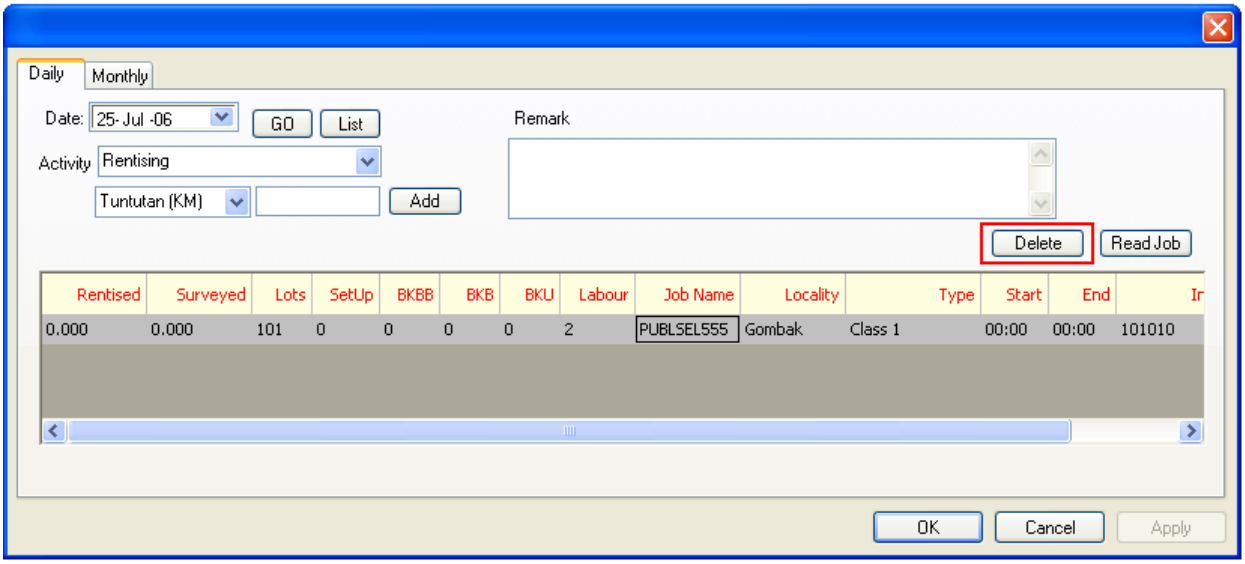
button



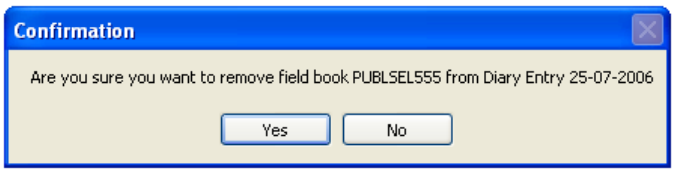
Note: Only selected information can be entering in, others will be automatically calculated by the application such as number of lots, distance's surveyed and etc.

9.2.2. Delete Record

1. To delete a particular record, just highlight the selected record and click the **Delete** button.

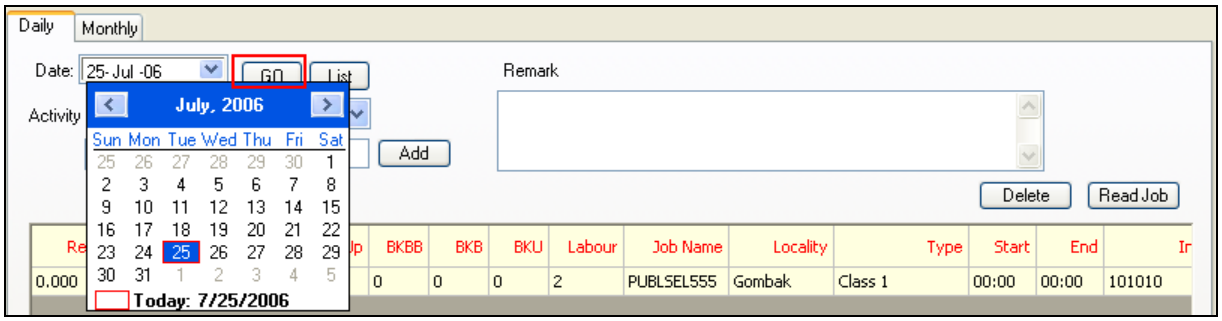


2. Then a **Confirmation** dialog appears. To delete click **Yes** button, else click **No** button



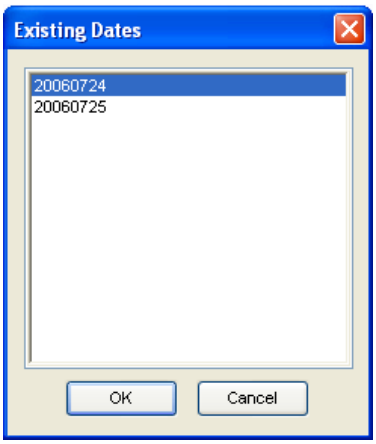
9.2.3. Search Record

1. To **search** a particular record, just **select the particular date** and Click the **Go** button.

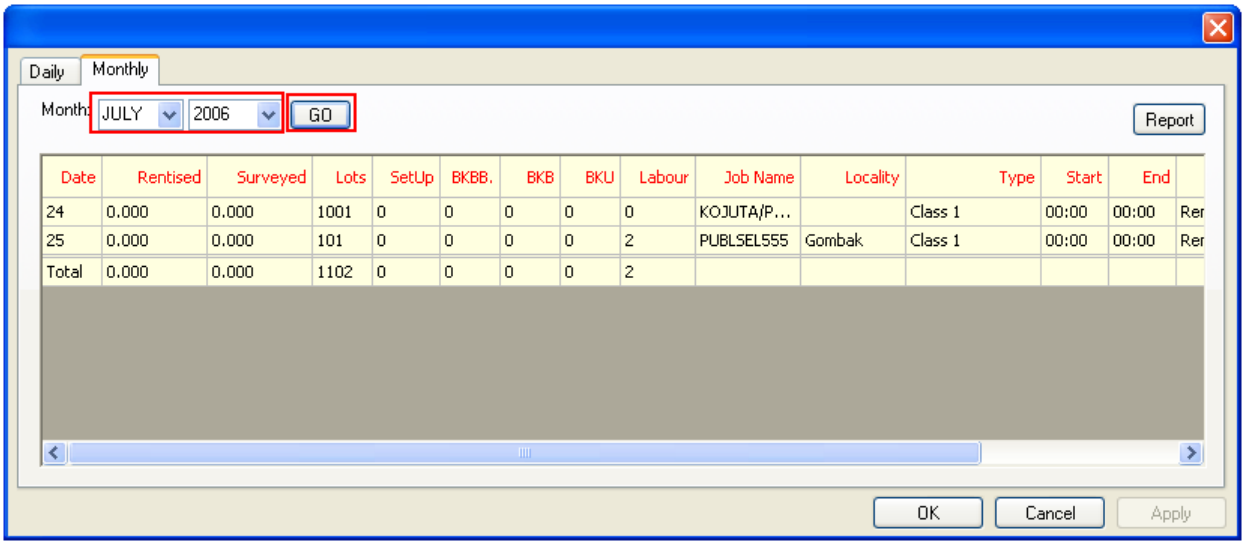


2. Or you can select the particular **date** from a list containing all the existing diary date of the job by clicking the **List**

button. Then the list will appear, just highlight the selected date and click **OK** button.



3. Or you can search all the record in a particular month by selecting the **Monthly** Page located at the left top corner of the diary dialog. Then select the month and the year of the diary and click **Go** button.

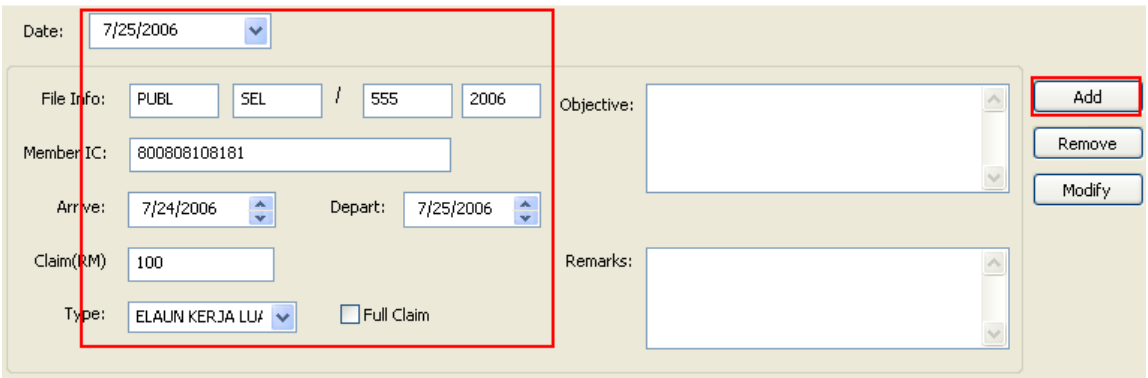


9.3. Claim

In this part, we will show you the steps how to **claim**. In this claim, you can claim for 'bus, dobi, elaun harian' and others. We will use the **Claim** menu item in Part 2.4.1: **Job** menu.

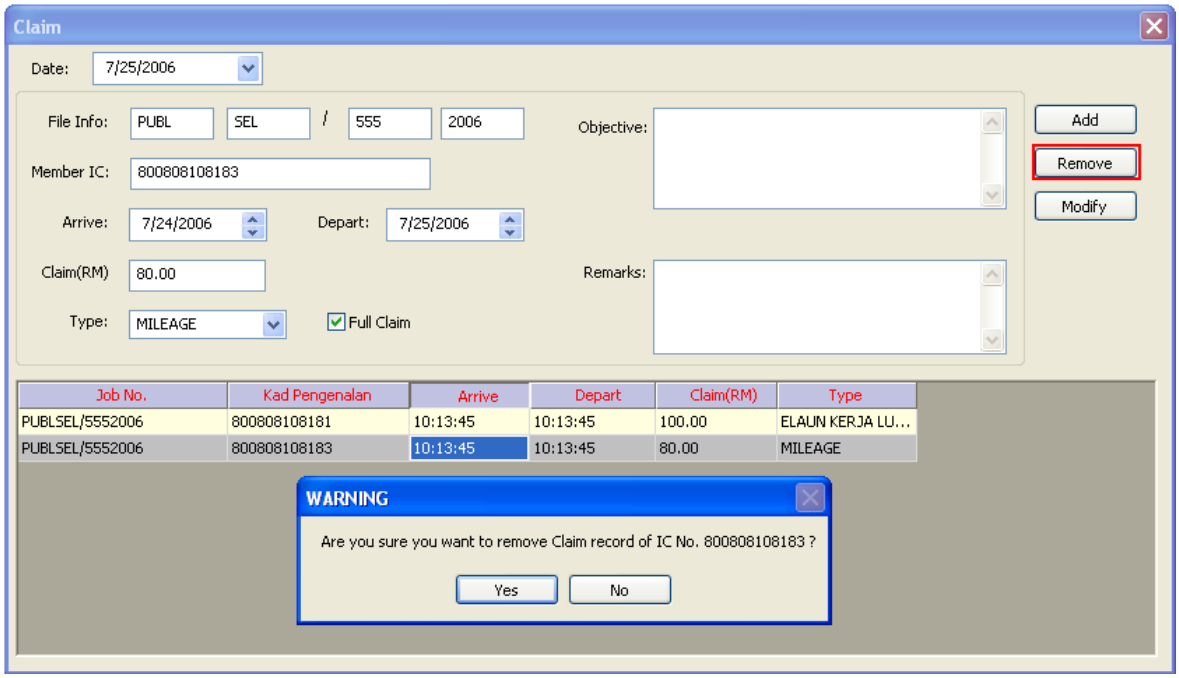
9.3.1. Add Record

1. To use the **Check Roll** function, you just need to navigate your mouse to **Job** menu **> Utilities > Claim**.
2. Then you can add in some records in the database by enter in all the information to the given field then click the **Add** button



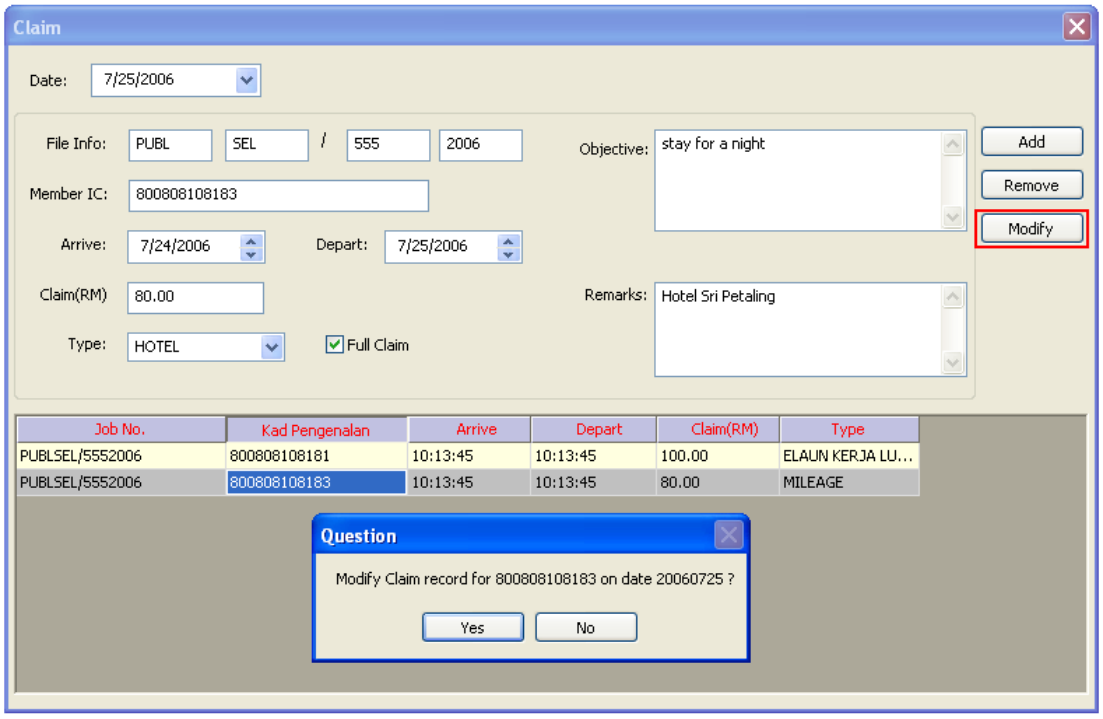
9.3.2. Delete Record

1. To delete a particular record, just highlight the selected claim record and click the **Remove** button. **WARNING** dialog appears. To delete click **Yes** button, else click **No** button



9.3.3. Modify Record

1. To modify a particular record, just select / highlight the particular record to be update and **enter in the new information**. Then click the **Modify** button. Then **Question** dialog appears. To modify click the **Yes** button, else click **No** button

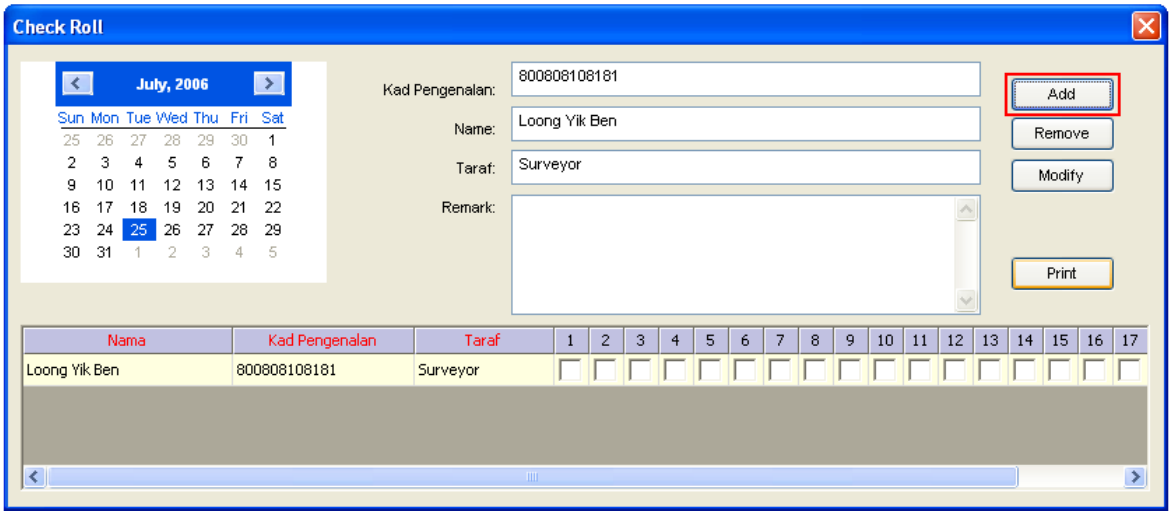


9.4. Check Roll

In this part, we will show you the steps how to do **Check Roll** for your survey team. In this check roll, you can tick the attendance for your survey teams. We will use the **Check Roll** menu item in Part 2.4.1: **Job** menu.

9.4.1. Add Record

1. To use the Check Roll function, you just need to navigate your mouse to **Job** menu **> Utilities > Check Roll**
2. Then you can add in some record in the database by enter in all the information to the given field can click the **Add** button

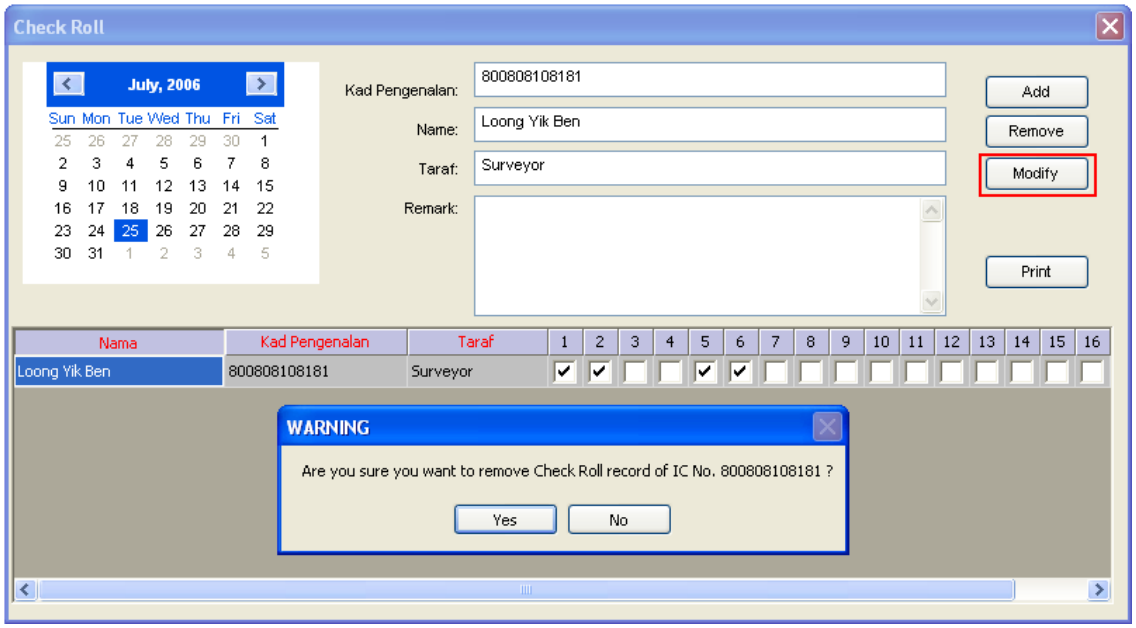


3. To add in the attendance accordingly, just click on the checkbox of the particular date to the selected surveyor.

Note: To select the month, just click on the calendar located at the left top corner of the check roll dialog.

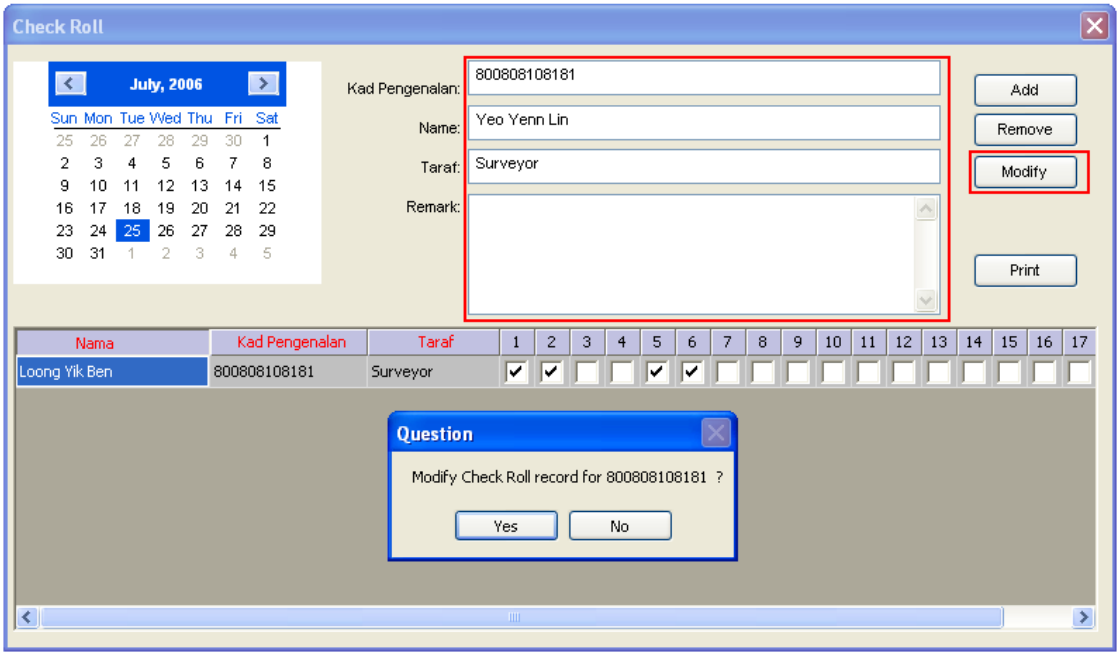
9.4.2. Delete Record

1. To delete a particular record, just highlight the selected surveyor record and click the **Remove** button. Then a **WARNING** dialog appears. To delete click **Yes** button, else click **No** button.



9.4.3. Modify Record

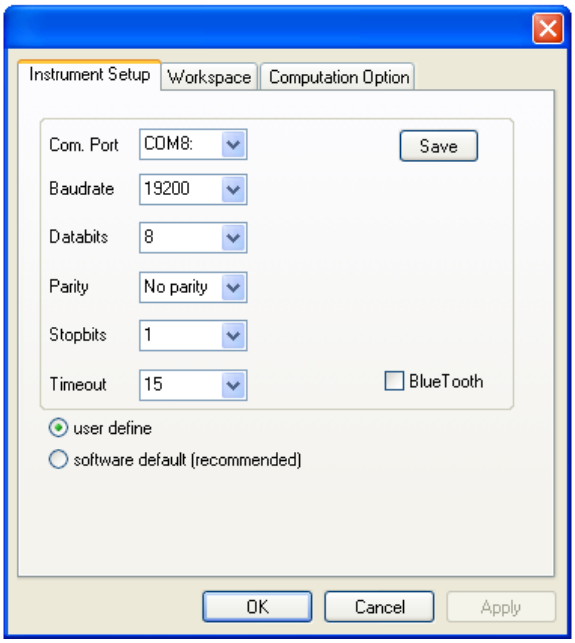
1. To modify a particular record, just select the particular record to be update and enter in the new information. Then click the **Modify** button. Then a **Question** dialog appears. To modify click the **Yes** button, else click **No** button



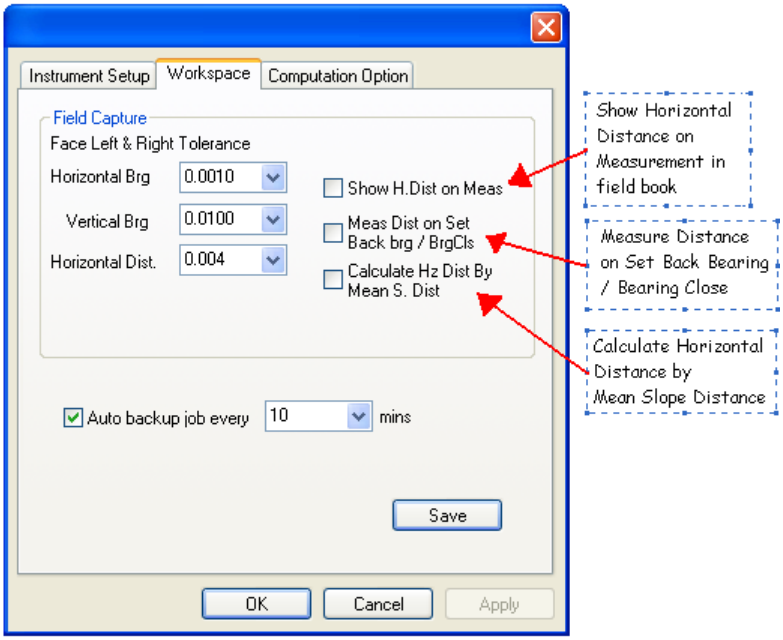
9.5. Workspace

In this part, we will show you the steps how to do setting at **Workspace**. In this workspace, you can do setting for instrument setup and tolerance. We will use the **Workspace** menu item in Part 2.4.1: **Job** menu.

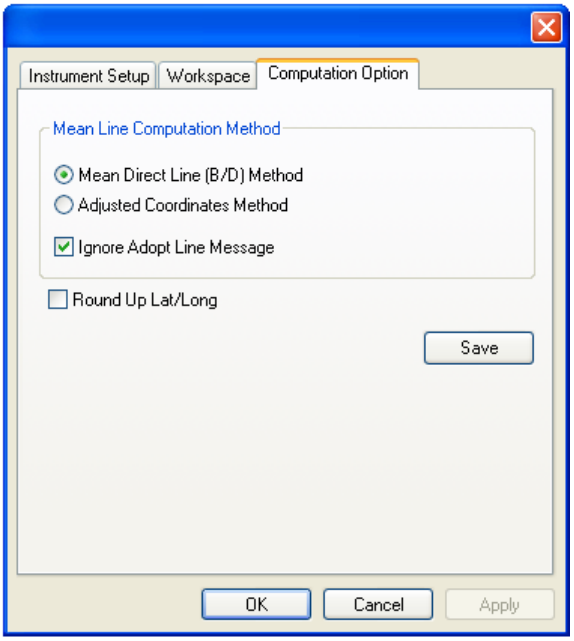
1. Navigate your mouse to **Job** menu > **Utilities** > **Workspace**.
2. Then you can view **Instrument Setup** page and **Workspace** page as following.
3. **Instrument Setup** page in Workspace same as **Instrument Setup** page in Job info. It is used to do setting for instrument comport.



4. **Workspace** page is to set tolerance for measurement. Auto backup job is default to every 10 minutes. The three option of measurement setting also available.
   a. **Show H. Dist on Meas** ➔ View distance in horizontal distance.
   b. **Meas Dist on Set Back brg / BrgCls** ➔ To measure distance for checking. It will give you warning if you sight to wrong back station measured by distance.
   c. **Calculate Hz Dist By Mean S. Dist** ➔ Calculate final distance by the mean of 2 slope distance measurement.



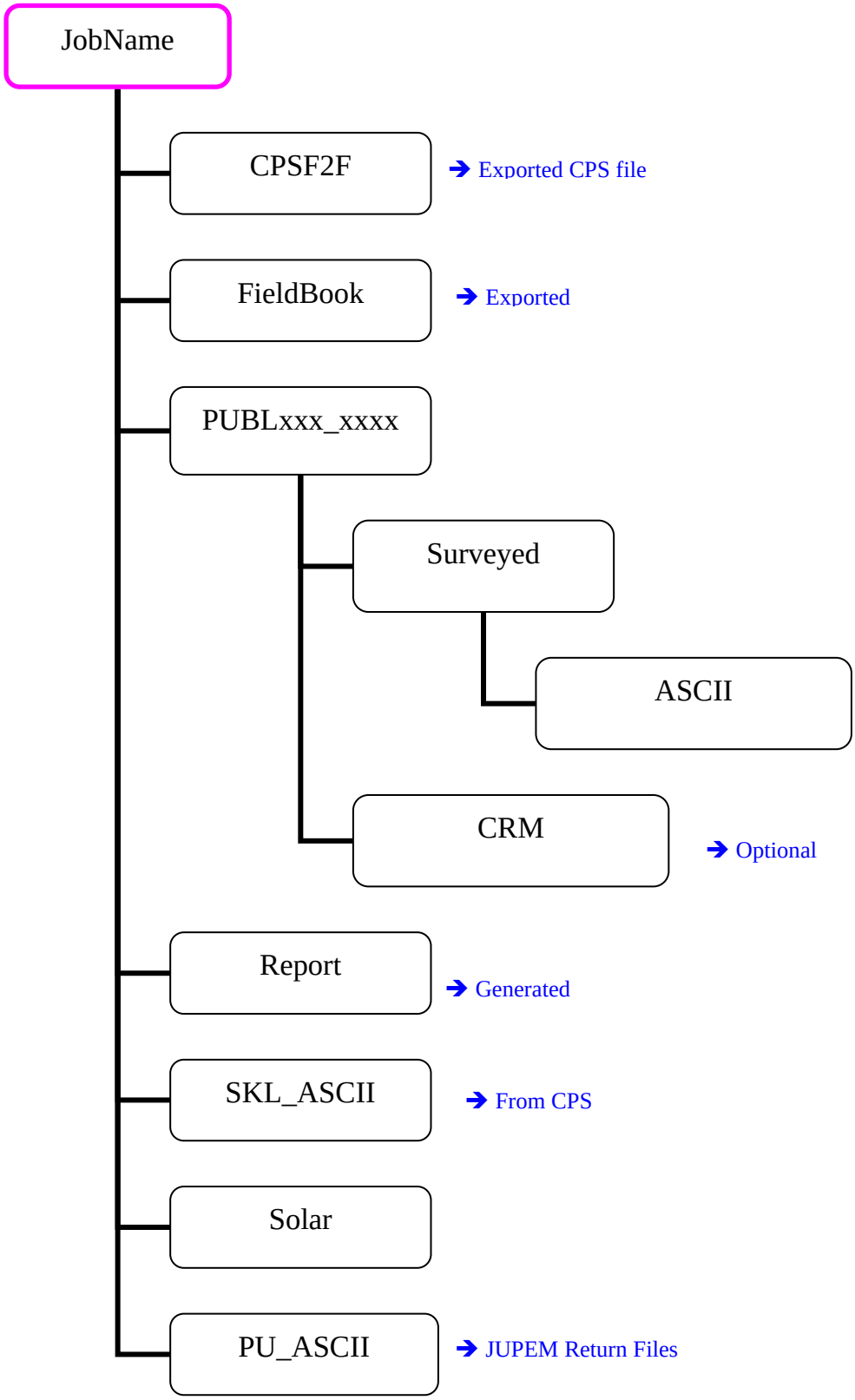
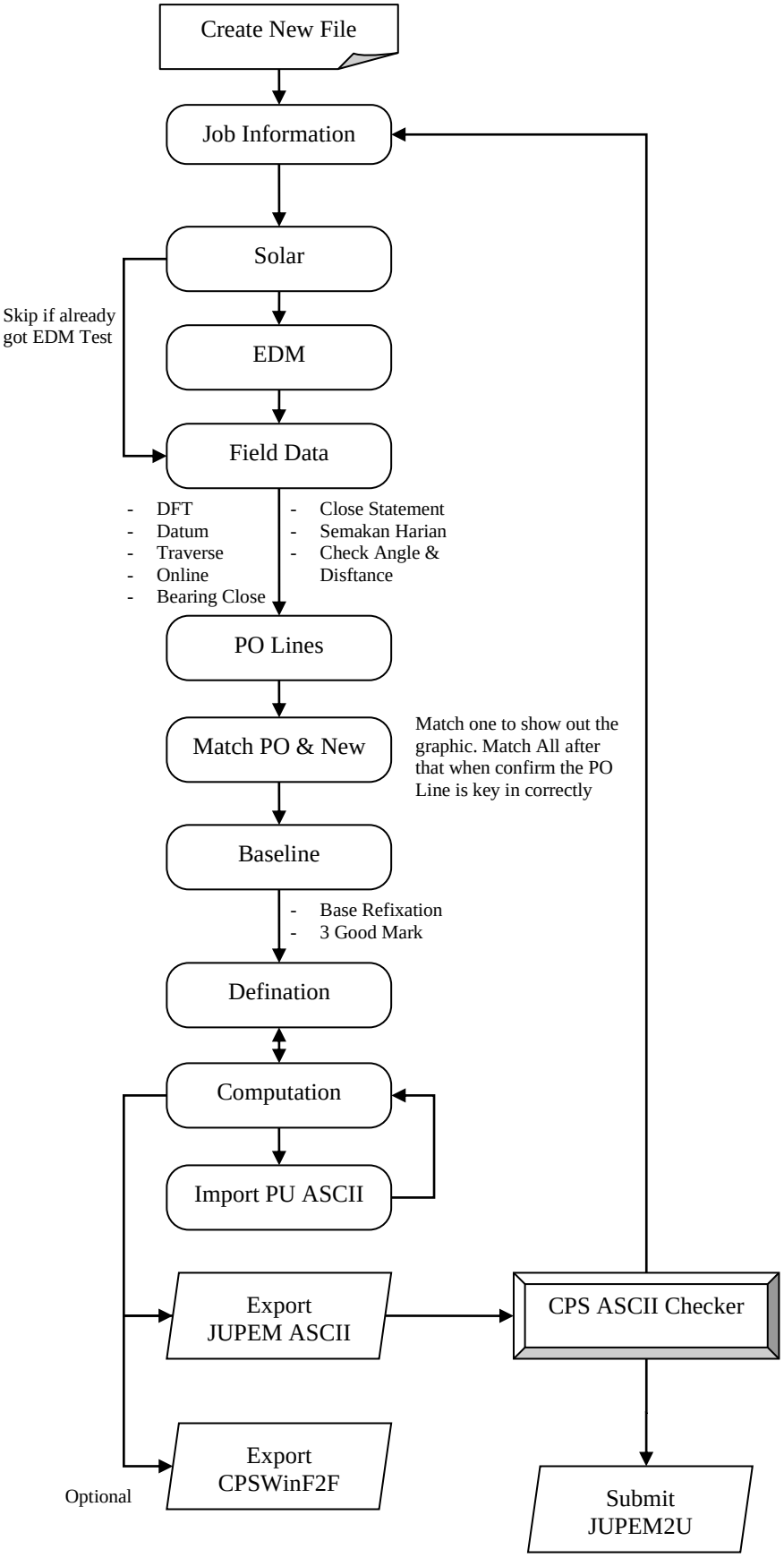
5. **Computation Option** page is to choose the Mean Line Computation Method.



10. Attachment

10.1. eTSMTablet Job Folder Structure

C:\eTSMTablet\<JobName>



10.2. F2F Work Flow