

Ashtech Z-Xtreme RTK / TDS Ranger - Survey Pro CE Version 3.5.3 - Sales Support Document

RTK Demo - TDS Mapping Plane with known WGS84/NAD83 – State Plane Coordinates & Geoid Model

Pre-load all the project's NAD83 control point's coordinates, create and transfer the necessary Geoid model over to the Ranger.

Setup RTK Base Station on known WGS84 / NAD83 Control Point
Measure the HI of the RTK Base Station.

On the TDS Ranger, start the TDS Survey Pro CE software by double-tapping on the Survey Pro icon, or from the **Start | Programs | Survey Pro** menu...

The TDS Survey Pro CE logo / splash screen will be displayed...

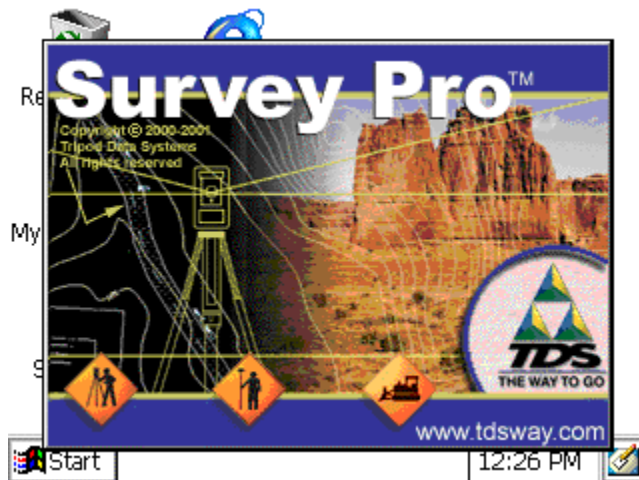


Figure 1

After a few seconds, the Logo / Splash screen will close automatically.

To manually close the Logo / Splash screen, simply tap anywhere on the screen.

The next screen...

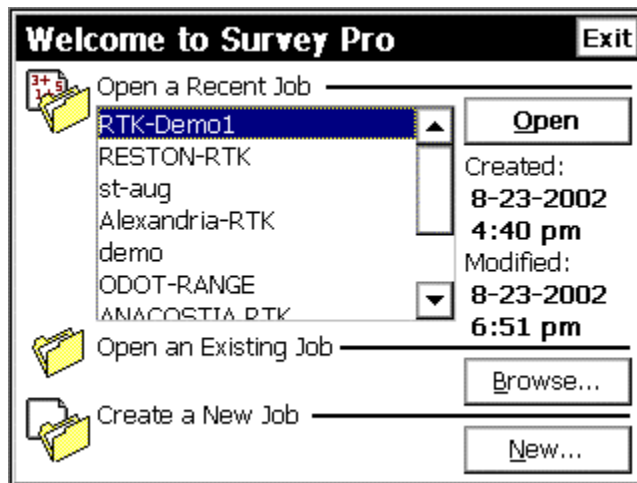


Figure 2

The Welcome to Survey Pro dialog menu...

Select the “**Create a New Job**” menu, tap the **New...** button,

The next screen...

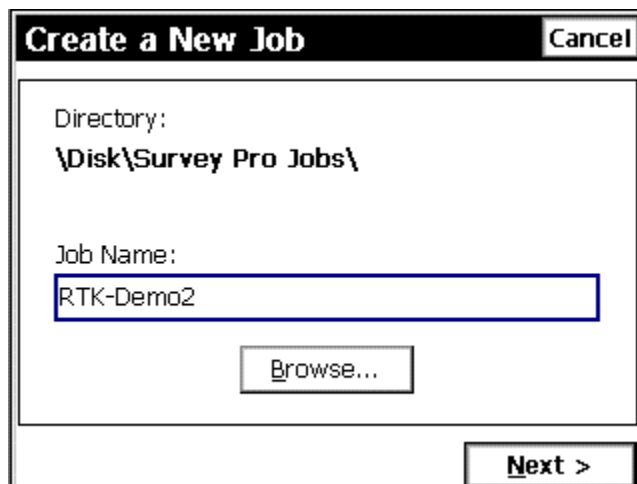
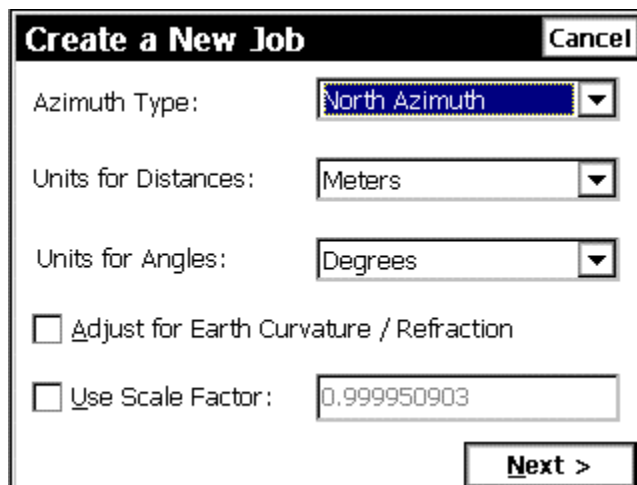


Figure 3

Input a name for the New Job: **RTK-Demo2**

Next, Tap the **Next >** button...

The next screen...



Create a New Job Cancel

Azimuth Type: North Azimuth

Units for Distances: Meters

Units for Angles: Degrees

☐ Adjust for Earth Curvature / Refraction

☐ Use Scale Factor: 0.999950903

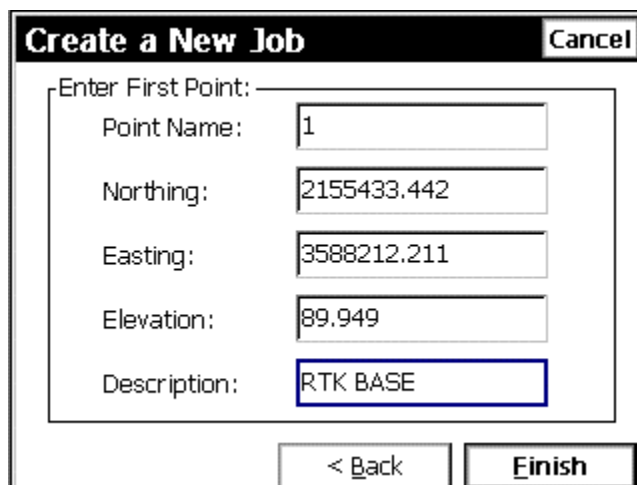
Next >

Figure 4

Select the Options as shown above

Next, tap the **Next >** button...

The next screen...



Create a New Job Cancel

Enter First Point:

Point Name: 1

Northing: 2155433.442

Easting: 3588212.211

Elevation: 89.949

Description: RTK BASE

< Back Finish

Figure 5

Enter the RTK Base points known NAD83 State Plane Coordinates,
Next , Tap the **Finish** button...

To add additional points select,

[2] **Job** – [B] **Edit Points** menu; then select **Insert...**

From the Survey Pro CE main menu,

Tap on [2] **Job** – [A] **Settings** menu...

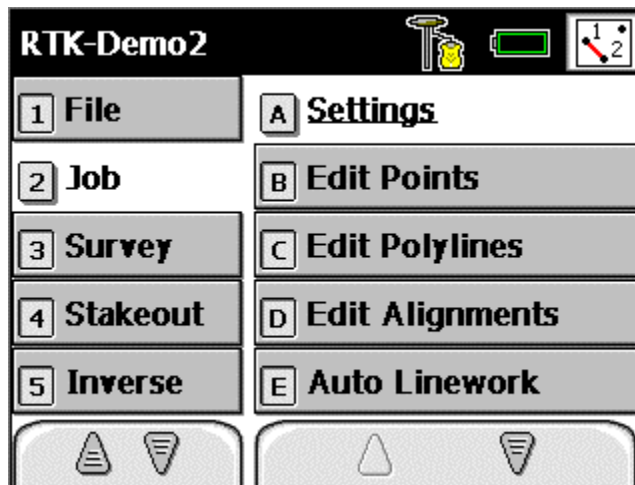


Figure 6

The next screen...

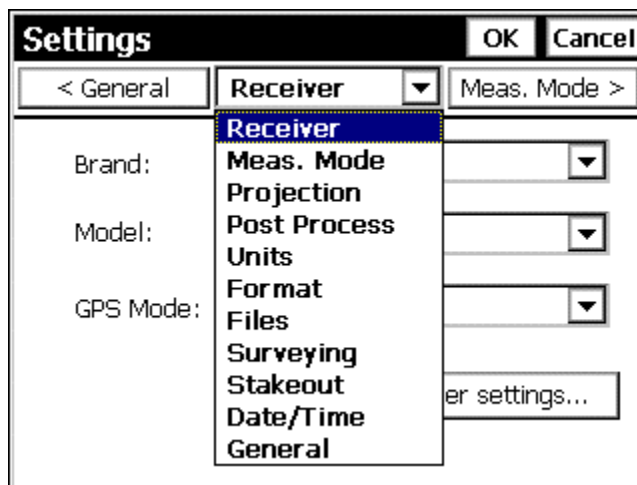


Figure 7

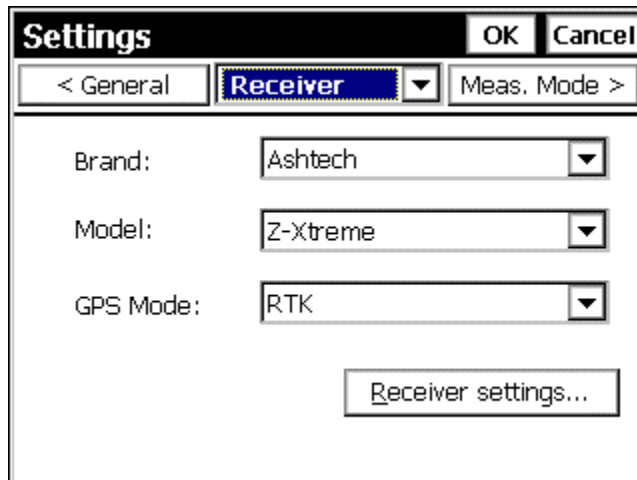
In the **Settings** menu, Tap on the center Pull-Down menu...

This is the Primary Settings Pull-Down menu for the Survey Pro CE software.

The basic flow-chart of the Settings menu, work your way down through the menu, Top to bottom...

Tap on the Down-Arrow, select **Receiver...**

The next screen...



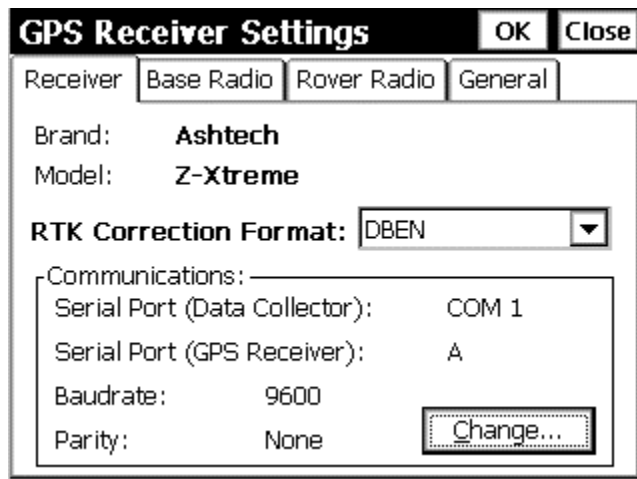
The screenshot shows a 'Settings' dialog box with 'OK' and 'Cancel' buttons at the top right. Below the title bar, there are three tabs: '< General', 'Receiver' (which is highlighted in blue), and 'Meas. Mode >'. The main area contains three dropdown menus: 'Brand:' set to 'Ashtech', 'Model:' set to 'Z-Xtreme', and 'GPS Mode:' set to 'RTK'. At the bottom right, there is a button labeled 'Receiver settings...'.

Figure 8

Select the Options as shown above:

Next, Tap on the **Receiver settings...** button,

The next screen...



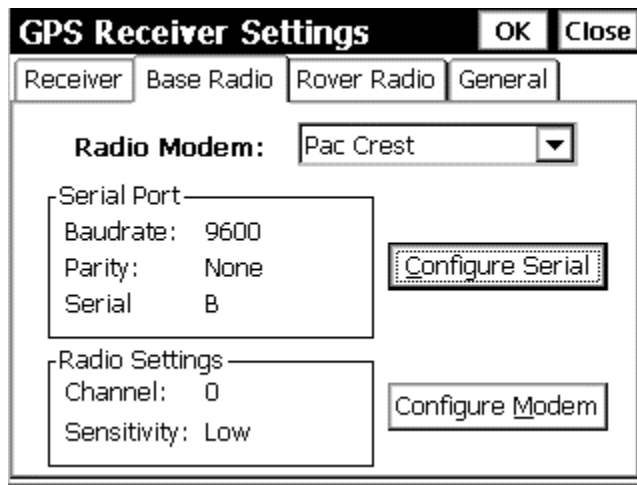
The screenshot shows a 'GPS Receiver Settings' dialog box with 'OK' and 'Close' buttons at the top right. It has four tabs: 'Receiver' (selected), 'Base Radio', 'Rover Radio', and 'General'. Under the 'Receiver' tab, the 'Brand:' is 'Ashtech' and the 'Model:' is 'Z-Xtreme'. Below these, 'RTK Correction Format:' is set to 'DBEN' in a dropdown menu. A 'Communications:' section is expanded, showing 'Serial Port (Data Collector):' as 'COM 1', 'Serial Port (GPS Receiver):' as 'A', 'Baudrate:' as '9600', and 'Parity:' as 'None'. A 'Change...' button is located next to the Parity setting.

Figure 9

Select the Options as shown above:

Next, Tap on the Base Radio tab...

The next screen...



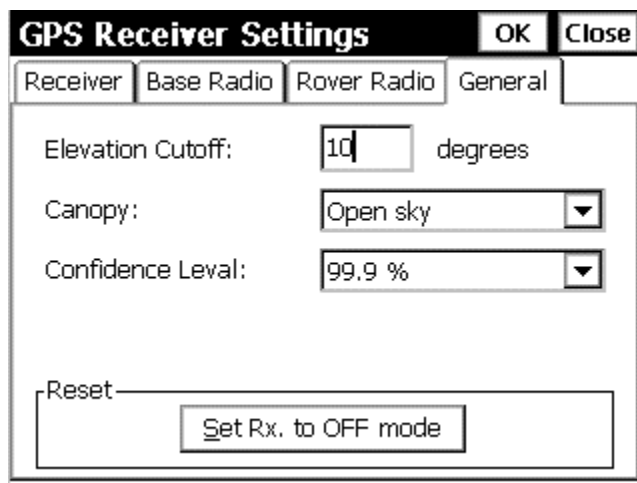
The screenshot shows the 'GPS Receiver Settings' dialog box with the 'Base Radio' tab selected. The 'Radio Modem' is set to 'Pac Crest'. Under 'Serial Port', the Baudrate is 9600, Parity is None, and Serial is B. There is a 'Configure Serial' button. Under 'Radio Settings', the Channel is 0 and Sensitivity is Low. There is a 'Configure Modem' button. The dialog has 'OK' and 'Close' buttons at the top right.

Figure 10

Select the Options as shown above:

Next, Tap on the General Tab...

The next screen...



The screenshot shows the 'GPS Receiver Settings' dialog box with the 'General' tab selected. The 'Elevation Cutoff' is set to 10 degrees. The 'Canopy' is set to 'Open sky'. The 'Confidence Level' is set to 99.9 %. There is a 'Reset' button and a 'Set Rx. to OFF mode' button. The dialog has 'OK' and 'Close' buttons at the top right.

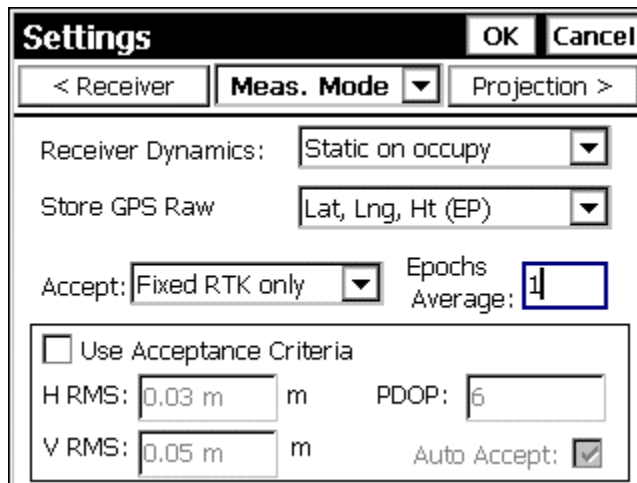
Figure 11

Select the Options as shown above:

When finished verifying the GPS Receiver Settings – Tap **OK...**
This will return you to the **Settings** Menu...

Next, Tap on the Center Pull-Down menu, select **Measure Mode...**

The next screen...



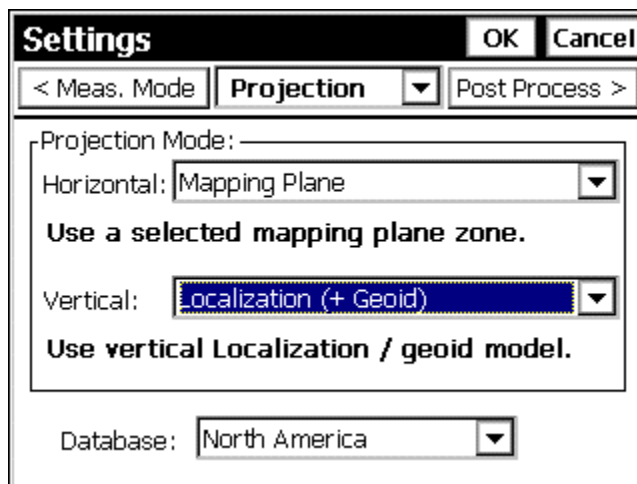
The screenshot shows the 'Settings' dialog box with the 'Meas. Mode' tab selected. The 'Receiver Dynamics' dropdown is set to 'Static on occupy'. The 'Store GPS Raw' dropdown is set to 'Lat, Lng, Ht (EP)'. The 'Accept:' dropdown is set to 'Fixed RTK only', and the 'Epochs Average' is set to '1'. There is an unchecked checkbox for 'Use Acceptance Criteria'. Below this, 'H RMS' is set to '0.03 m' and 'V RMS' is set to '0.05 m'. The 'PDOP' is set to '6'. The 'Auto Accept' checkbox is checked. The 'OK' and 'Cancel' buttons are at the top right.

Figure 12

Select the Options as shown above:

Next, Tap on the Center Pull-Down menu, select **Projection...**

The next screen...



The screenshot shows the 'Settings' dialog box with the 'Projection' tab selected. The 'Projection Mode' dropdown is set to 'Mapping Plane'. Below this, there is a section titled 'Use a selected mapping plane zone.' with a 'Vertical:' dropdown set to 'Localization (+ Geoid)'. Below this, there is a section titled 'Use vertical Localization / geoid model.' with a 'Database:' dropdown set to 'North America'. The 'OK' and 'Cancel' buttons are at the top right.

Figure 13

Select the Options as shown above:

After selecting the Projection “Mapping Plane”, in the **Job | Settings** menu, for the demo, Tap **OK**, this will return you to the Survey Pro CE Main menu...

Next, Tap on the [3] **Survey - [F] Projection** menu

Select the actual parameters for the Mapping Plane...

The next screen...

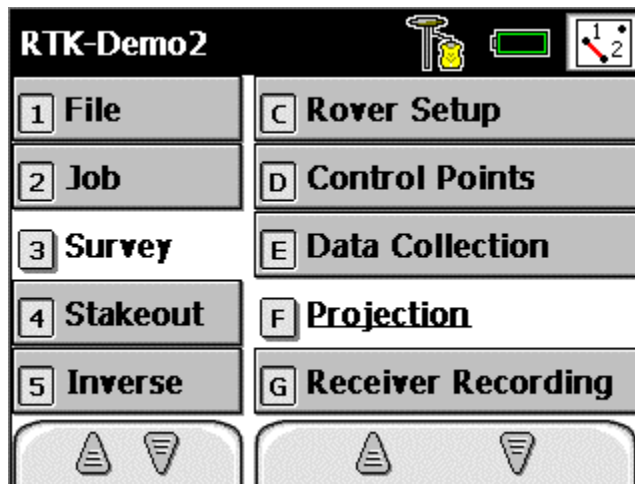


Figure 14

The next screen...

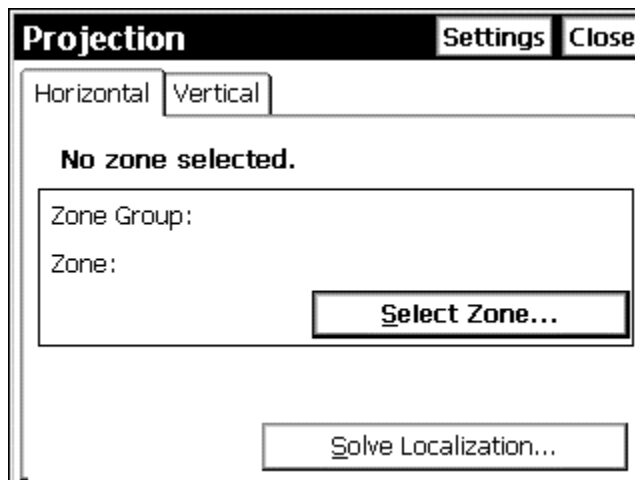
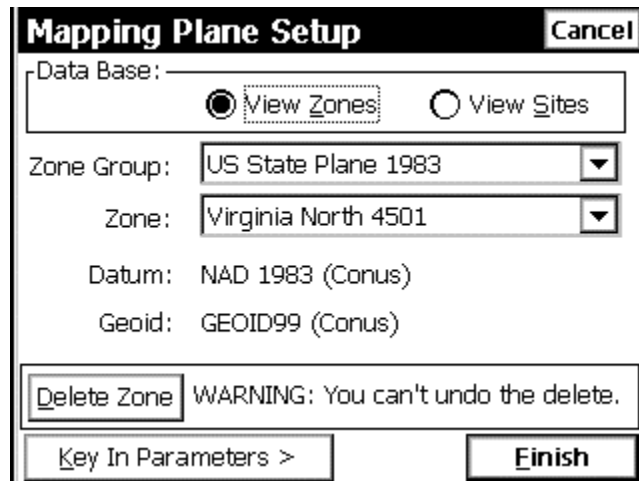


Figure 15

Initially, the Projection will report **No zone selected.**, to establish the Mapping Plane, from the Horizontal Tab, Tap on the **Select Zone...** button,

The next screen...



The image shows a 'Mapping Plane Setup' dialog box with a 'Cancel' button in the top right. It contains a 'Data Base:' section with two radio buttons: 'View Zones' (selected) and 'View Sites'. Below this are two dropdown menus: 'Zone Group' set to 'US State Plane 1983' and 'Zone' set to 'Virginia North 4501'. Further down, it displays 'Datum: NAD 1983 (Conus)' and 'Geoid: GEOID99 (Conus)'. At the bottom, there is a 'Delete Zone' button followed by a warning message: 'WARNING: You can't undo the delete.' Below the warning are two buttons: 'Key In Parameters >' and 'Finish'.

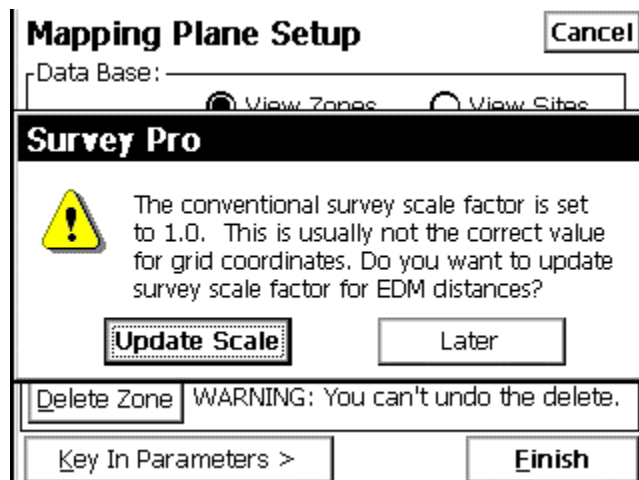
Figure 16

In this example, the RTK Demo will utilize Zone Group: **US State Plane 1983**
Zone: **Virginia North 4501**, Datum: **NAD 1983 (Conus)**, Geoid: **Geoid99 (Conus)**.

Select the appropriate **Zone Group & Zone** for your demo.

When the **Mapping Plane Setup's** have been selected,
Tap on the **Finish** button.

The next screen...



The image shows the same 'Mapping Plane Setup' dialog box as in Figure 16, but with an additional section titled 'Survey Pro'. This section contains a yellow warning triangle icon and the text: 'The conventional survey scale factor is set to 1.0. This is usually not the correct value for grid coordinates. Do you want to update survey scale factor for EDM distances?'. Below this text are two buttons: 'Update Scale' and 'Later'. The rest of the dialog box, including the 'Data Base' section, dropdown menus, datum/geoid information, warning message, and bottom buttons, remains the same.

Figure 17

Tap the **Update Scale** button...

The selected Projection parameters are displayed,
Next, Tap on the **Vertical** tab...

The next screen...

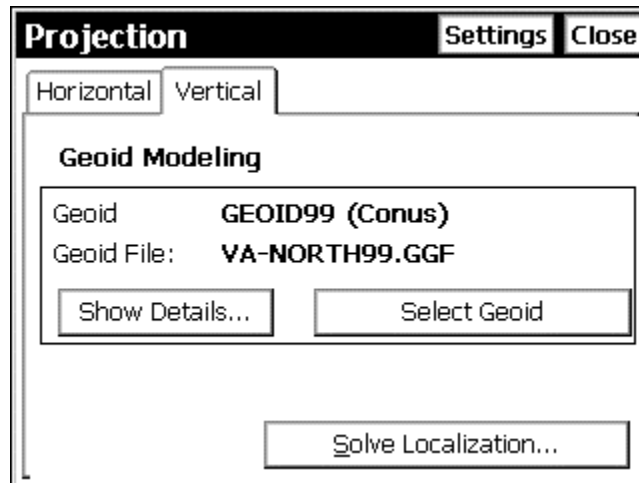


Figure 18

Tap on the **Select Geoid...** button
Select the Geoid Model: **VA-North99.GGF**

The TDS Survey Link software supports creation of a Geoid Sub-Grid suitable for use in the field with the Ranger data collector. The Geoid model data can be computed in Geoid96, EGM96 or the newest Geoid Model – Geoid 99.

See the Technical Support Notes on how to create a Geoid Sub-Grid using TDS Survey Link software.

When the Job's Horizontal and Vertical Projections selections have been made,
Tap on the **CLOSE** button, this will return you to the Survey Pro CE main menu,

At this stage of the demo, the TDS Ranger needs to be connected to the Base RTK receiver. Both of the GPS receivers should be powered ON and tracking satellites. The PDL Base Radio should also be powered ON.

Measure the GPS Antenna Heights for the RTK Base GPS Antenna and the RTK Rover GPS antenna.

Next, Tap on the [3] Survey – [A] GPS Status Menu

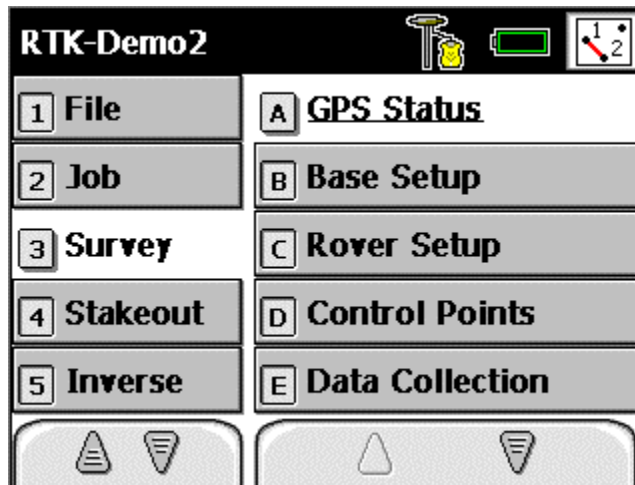


Figure 19

The next screen...

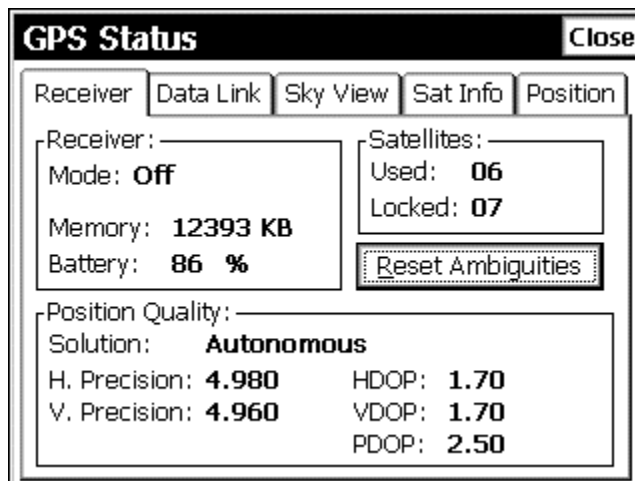


Figure 20

The GPS Status screen confirms you have established communications between the TDS Ranger and the RTK base Receiver.

Notice the Receiver Mode: **Off**, this indicates the GPS receiver is still in STATIC mode, configure the GPS Receiver for RTK Base mode.

Note the Receiver is already tracking and using 6 Satellites.

Next, Tap on the Sky View tab...

The next screen...

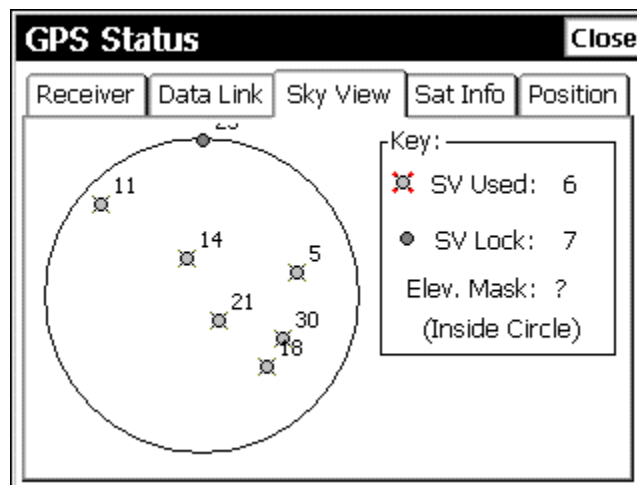


Figure 21

Next, Tap on the **CLOSE** button,

This will return you to the Survey Pro CE main menu...

Next, Select tap on the [3] **Survey** – [B] **Base Setup** menu...

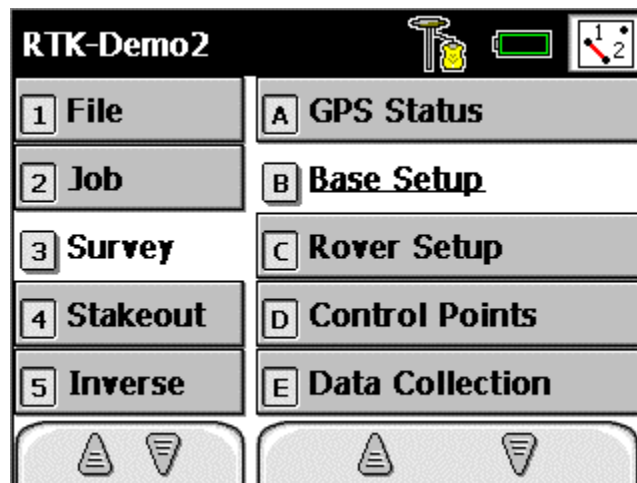


Figure 22

The next screen...

Current GPS Base Settings Close

Base Point:

Base Status: **Base is not set:**

Base Latitude:

Base Longitude:

Base Height:

Antenna

Setup ... Close

Figure 23

Tap on the **Setup ...** button,

The next screen...

Base Setup Settings Cancel

+ Base Point: [Map Icon] [Dropdown Arrow Icon]

Choose from list...

Choose from map...

Create new point...

Show point details...

Zoom to point...

Last antenna for this receiver

Antenna: Geodetic IV -GP:(P

Measured To: Bottom of mo

Measured: 2.051308 m

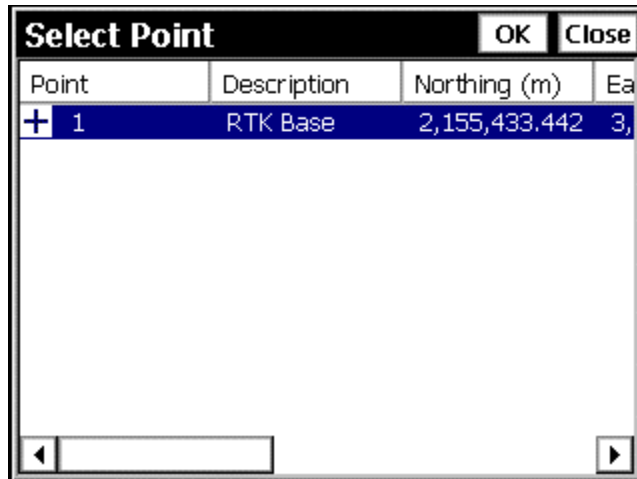
Offset: 0.059

Next >

Figure 25

Tap on the Down-Arrow and select – **Choose from list...**

The next screen...



The 'Select Point' dialog box features a title bar with 'OK' and 'Close' buttons. It contains a table with four columns: 'Point', 'Description', 'Northing (m)', and 'Ea'. The first row is highlighted in blue and contains the values: '1', 'RTK Base', '2,155,433.442', and '3,'. Below the table is a large empty rectangular area. At the bottom left is a left-pointing arrow, and at the bottom right is a right-pointing arrow.

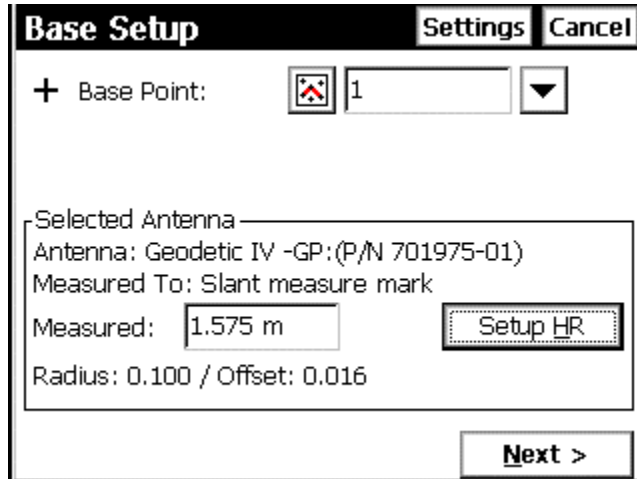
Point	Description	Northing (m)	Ea
1	RTK Base	2,155,433.442	3,

Figure 26

Tap/Select Point 1, RTK Base with the known SPC83 Northing, Easting and Elevation.

Next, Tap the **OK** button...

The next screen...

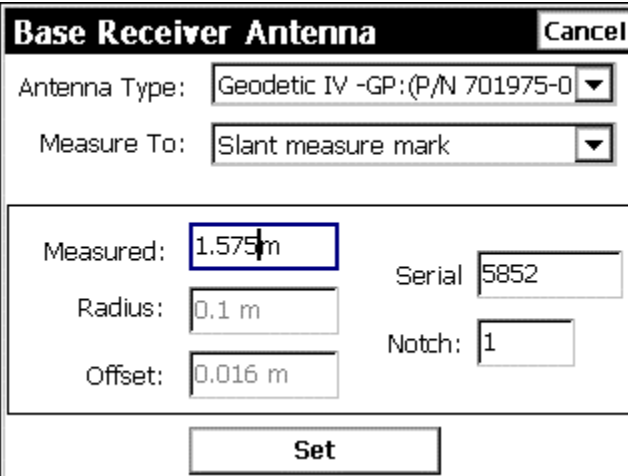


The 'Base Setup' dialog box has a title bar with 'Settings' and 'Cancel' buttons. It includes a 'Base Point' section with a red crosshair icon, a text box containing '1', and a dropdown arrow. Below this is a 'Selected Antenna' section enclosed in a box, containing the text: 'Antenna: Geodetic IV -GP:(P/N 701975-01)', 'Measured To: Slant measure mark', 'Measured: 1.575 m', and 'Radius: 0.100 / Offset: 0.016'. A 'Setup HR' button is located to the right of the 'Measured' value. At the bottom right of the dialog is a 'Next >' button.

Figure 27

Tap on the **Setup HR** button...

The next screen...



The 'Base Receiver Antenna' dialog box contains the following fields and controls:

- Antenna Type:** A dropdown menu showing 'Geodetic IV -GP:(P/N 701975-0)'.
- Measure To:** A dropdown menu showing 'Slant measure mark'.
- Measured:** A text input field containing '1.575m'.
- Radius:** A text input field containing '0.1 m'.
- Offset:** A text input field containing '0.016 m'.
- Serial:** A text input field containing '5852'.
- Notch:** A text input field containing '1'.
- Buttons:** 'Cancel' (top right), 'Set' (bottom center).

Figure 28

Select the Options as shown above:

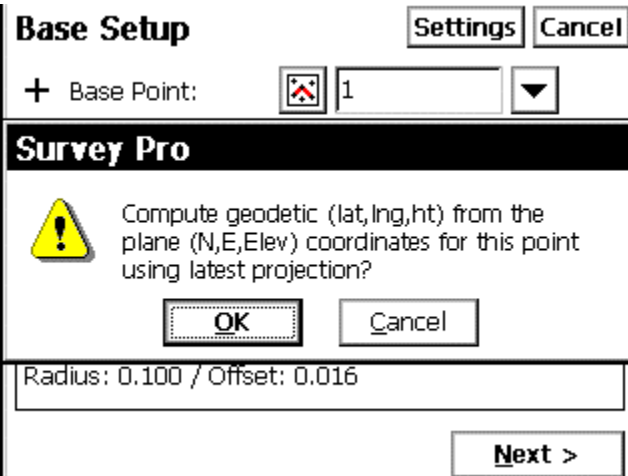
The Antenna Type: **Geodetic IV -GP: (P/N 701975-01)**. The *-GP* = No Ground plane. In this example, The RTK Base GPS Antenna is mounted to a wooden tripod/Tribrach. The HI Flag = **Slant measure mark**. Enter the Slant HI, measured to TGP (Top of Ground Plane), Units = Meters.

Measured HI = 1.575 m

Serial Number for the GPS Antenna = 5851

When finished with the data entry, Tap **Set...**

The next screen...



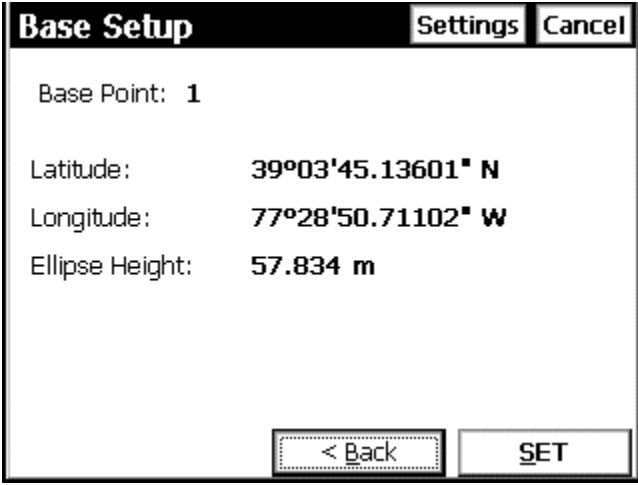
The 'Base Setup' dialog box contains the following fields and controls:

- Buttons:** 'Settings' and 'Cancel' (top right).
- Base Point:** A section with a plus icon, a small map icon, a text input field containing '1', and a dropdown arrow.
- Survey Pro:** A section with a yellow warning triangle icon and the text: 'Compute geodetic (lat,lng,ht) from the plane (N,E,Elev) coordinates for this point using latest projection?'. Below this text are 'OK' and 'Cancel' buttons.
- Radius:** A text input field containing 'Radius: 0.100 / Offset: 0.016'.
- Buttons:** 'Next >' (bottom right).

Figure 29

Tap the **OK** button...

The next screen...



The image shows a 'Base Setup' dialog box with a title bar containing 'Settings' and 'Cancel' buttons. The main area displays the following information:

Base Point:	1
Latitude:	39°03'45.13601" N
Longitude:	77°28'50.71102" W
Ellipse Height:	57.834 m

At the bottom, there are two buttons: '< Back' and 'SET'.

Figure 30

Note the Latitude, Longitude and Ellipsoid Height position. This is the Real-World geodetic WGS84 position. The displayed Geodetic position is derived from the RTK Base point's Northing, Easting and the selected **Survey | Projection** parameters.

Compare the displayed WGS84 position with the Data Sheet, or the known WGS84 position; verify the WGS84 positions match. This is your "In-the-Field" check that the RTK Base station is properly setup. If the WGS84 Positions does not agree, verify the RTK Base Point Number, coordinates and Survey Projection settings.

If the WGS84 position agrees – Tap on the **Set** button.

The next screen...

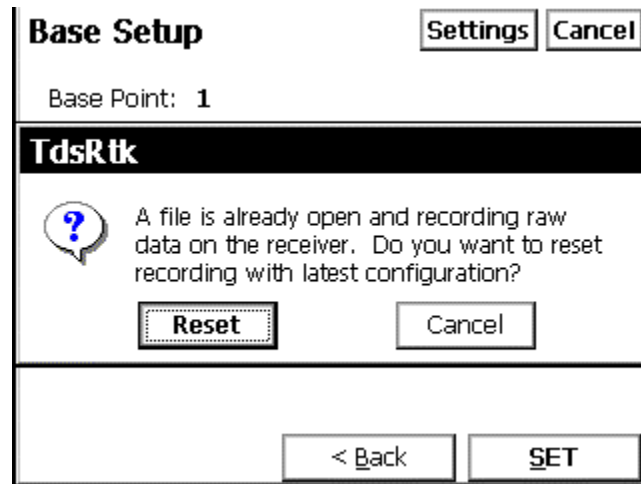


Figure 31

Tap **Reset** button, this function will re-start recording of raw data in the Receiver's PC Card memory, with the latest Post-Processing configurations.

The next screen...

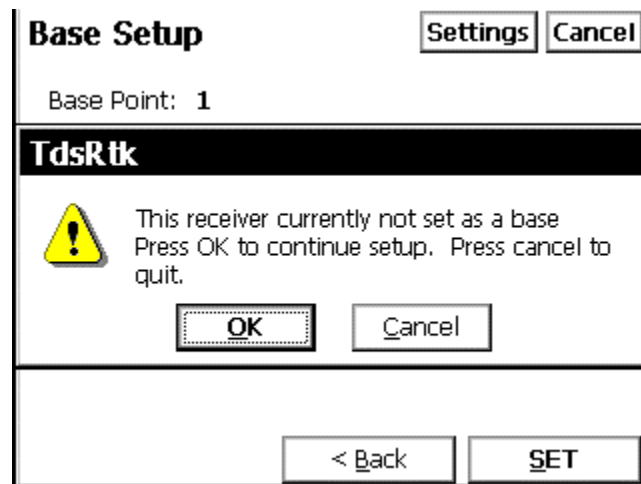


Figure 32

This is the “Trigger” that switches the receiver from STATIC MODE into RTK BASE MODE. The receiver is now configured as a RTK Base, the PDL Base Radio should now begin to Transmit RTK corrections out to the RTK Rover(s)...

The Next screen...

Current GPS Base Station Settings Close

Base Point: 1

Base station location:

Base 39°03'45.13601° N

Base Longitude: 77°28'50.71102° W

Base Height: 57.834 m

Antenna

Measured: 1.545, Radius: 0.100 / Offset: 0.016

Measured to: Slant measure mark

Setup ... Close

Figure 33

This is the known WGS84 position of the RTK Base station,
This is the position and DBEN data the PDL Base radio will broadcast to
the RTK Rover(s). Tap on the **Close** button...

This will return you to the Survey Pro CE main menu...

Select [3] Survey – [A] GPS Status

GPS Status Close

Receiver Data Link Sky View Sat Info Position

Receiver: Mode: **Base**

Memory: 12391 KB

Battery: 86 %

Satellites: Used: 07

Locked: 07

Reset Ambiguities

Position Quality: Solution: **Autonomous**

H. Precision: 3.510 HDOP: 1.20

V. Precision: 5.230 VDOP: 1.70

PDOP: 2.10

Figure 34

From the **GPS Status** | **Receiver** tab, note the Mode: **BASE**...

**Disconnect the TDS Ranger from the RTK Base Receiver,
Connect the TDS Ranger to the RTK Rover Receiver.**

Tap on the [3] Survey – [C] Rover Setup menu

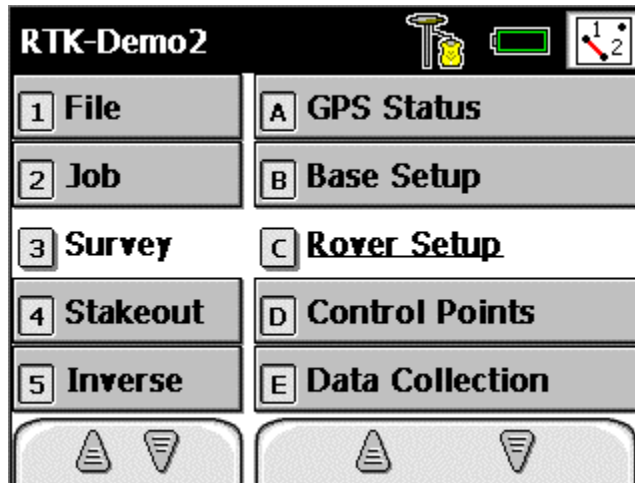


Figure 35

The next screen...

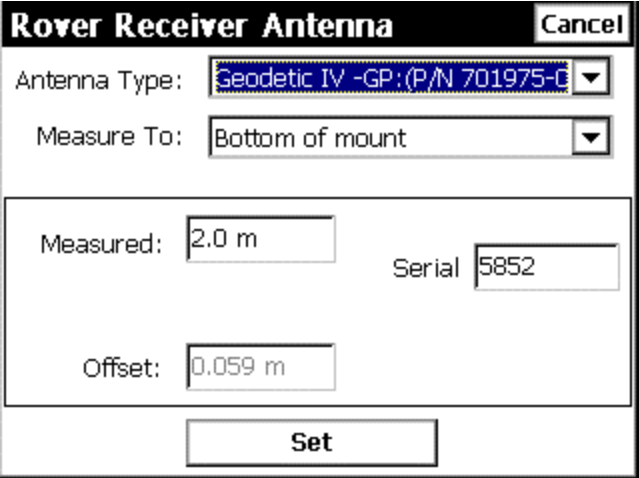
Figure 36

Note the Rover Status: **Rover is not set**, the RTK Rover equipment needs to be configured. Observe the Base point number and WGS84 position, visually confirm this is correct.

DO NOT tap Set Rover yet – Configure the RTK Rover Antenna Parameters first,

Tap **Setup HR**

The next screen...



The screenshot shows the 'Rover Receiver Antenna' configuration screen. It has a title bar with 'Rover Receiver Antenna' and a 'Cancel' button. The 'Antenna Type' is set to 'Geodetic IV -GP: (P/N 701975-01)' and 'Measure To' is 'Bottom of mount'. Below these, 'Measured' is 2.0 m and 'Serial' is 5852. 'Offset' is 0.059 m. A 'Set' button is at the bottom.

Rover Receiver Antenna Cancel	
Antenna Type:	Geodetic IV -GP: (P/N 701975-01)
Measure To:	Bottom of mount
Measured:	2.0 m
Serial	5852
Offset:	0.059 m
Set	

Figure 36

Select the following parameters:

Antenna: **Geodetic IV –GP: (P/N 701975-01**

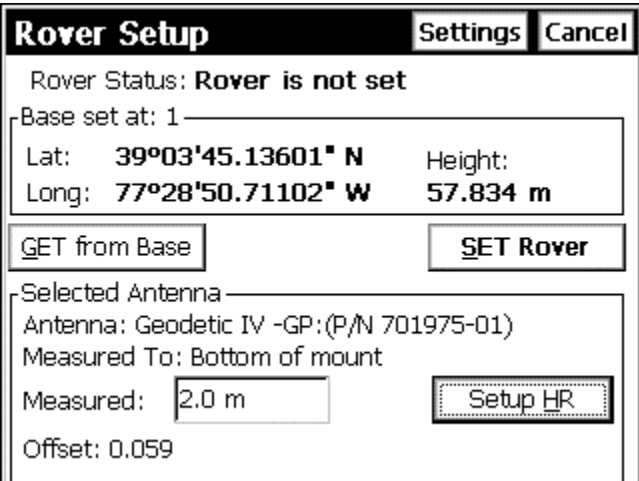
Measure To: **Bottom of Mount**

Measured: **2.000 m**

Serial **5852**

When you have enter the RTK Rover Antenna parameters,
Tap the **Set** button...

The next screen...



The screenshot shows the 'Rover Setup' screen. It has a title bar with 'Rover Setup', 'Settings', and 'Cancel' buttons. 'Rover Status' is 'Rover is not set'. 'Base set at: 1' is shown. Coordinates are Lat: 39°03'45.13601" N, Long: 77°28'50.71102" W, and Height: 57.834 m. There are 'GET from Base' and 'SET Rover' buttons. Below, 'Selected Antenna' shows 'Antenna: Geodetic IV -GP: (P/N 701975-01)', 'Measured To: Bottom of mount', 'Measured: 2.0 m', and 'Offset: 0.059'. A 'Setup HR' button is at the bottom right.

Rover Setup Settings Cancel	
Rover Status: Rover is not set	
Base set at: 1	
Lat: 39°03'45.13601" N	Height: 57.834 m
Long: 77°28'50.71102" W	
GET from Base	SET Rover
Selected Antenna	
Antenna: Geodetic IV -GP: (P/N 701975-01)	
Measured To: Bottom of mount	
Measured: 2.0 m	Setup HR
Offset: 0.059	

Figure 37

When the antenna parameters for the RTK Rover have been determined, Tap on the **SET Rover** button...

The next screen...

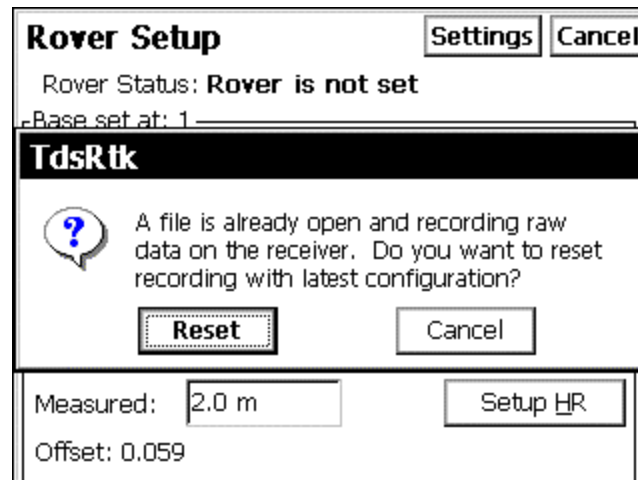


Figure 38

Tap Reset button, this function will open a new file. Recording raw data in the Receiver's PC Card memory, will the latest Post-Processing configurations.

The next screen...

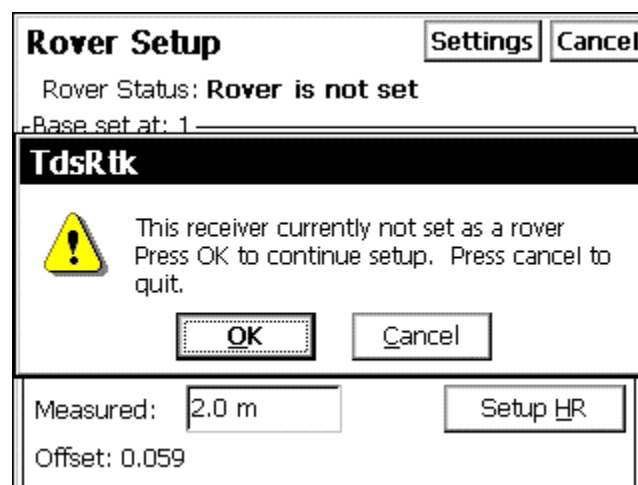


Figure 39

This is the “Trigger” that switches the receiver from STATIC MODE into RTK ROVER MODE. The receiver is now configured as a RTK Rover.

This will return to the Survey Pro CE main menu...

Select [3] Survey – [A] GPS Status

The next screen...

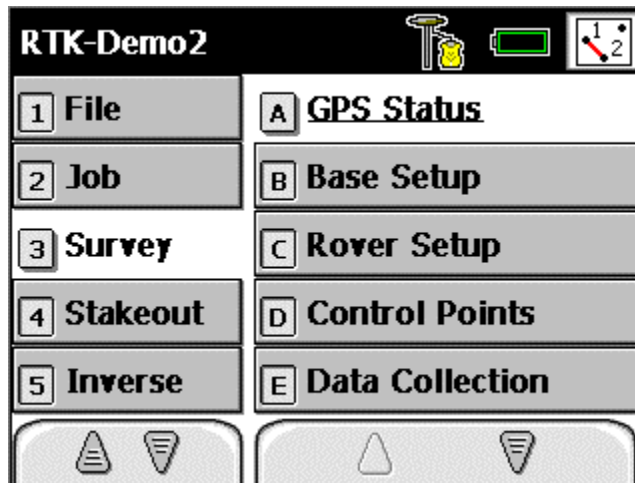


Figure 40

The next screen...

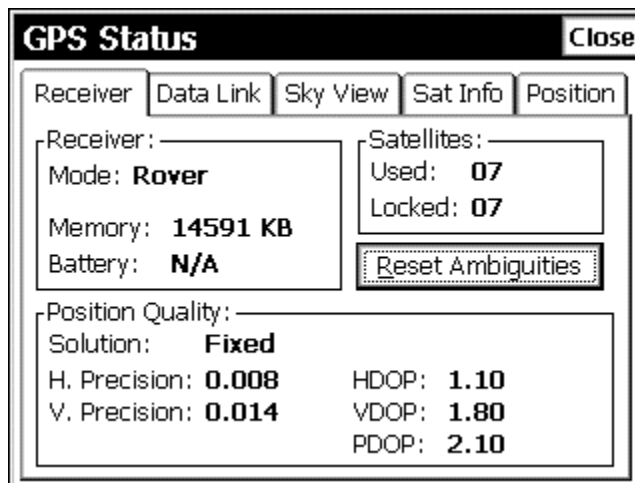


Figure 41

Receiver Tab – note the Receiver mode: **Rover**
Position Quality is **Fixed**, Satellites Used: 7

The next screen...

The screenshot shows the 'GPS Status' window with the 'Data Link' tab selected. The window has a title bar with 'GPS Status' and a 'Close' button. Below the title bar are five tabs: 'Receiver', 'Data Link', 'Sky View', 'Sat Info', and 'Position'. The 'Data Link' tab is active, displaying the following information:

- Receiver Mode: **Rover**
- Radio Reception: **99 %**
- Signal Latency: **0.72 sec.**
- Position Quality: **Fixed**
- H. Precision: **0.008**
- HDOP: **1.10**
- V. Precision: **0.014**
- VDOP: **1.70**
- PDOP: **2.10**

Figure 42

Data Link Tab – this screen display's Radio Reception and Position Quality information.

The next screen...

The screenshot shows the 'GPS Status' window with the 'Post Process' tab selected. The window has a title bar with 'GPS Status' and a 'Close' button. Below the title bar are five tabs: 'Receiver', 'Data Link', 'Post Process', 'Sky View', and 'Position'. The 'Post Process' tab is active, displaying the following information:

- Status: **Recording: no session**
- Recording: **no session**
- Site ID: **????**
- Interval: **5.0 sec**
- Remaining: **No session**
- Free Memory: **14680 KB**
- DOPs: **HDOP: 1.20, VDOP: 2.00**
- Satellites: **Used: 6, Locked: 8**

Figure 42

Post Process Tab – Indicates Status for any post-processing Data recording: SITE ID, Interval, DOPs, Satellites

The next screen...

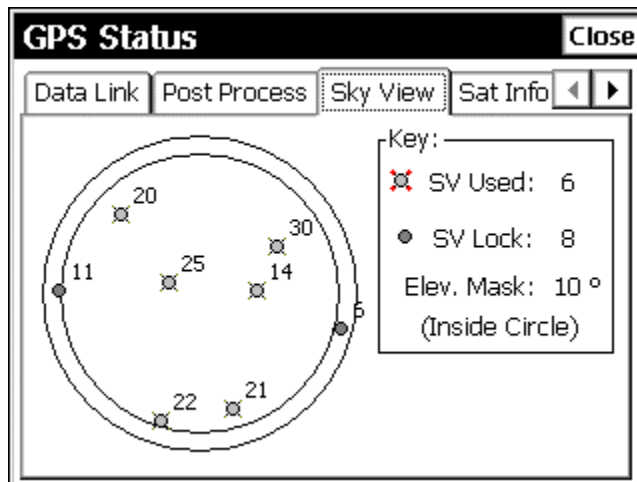


Figure 43

Sky View tab – displays location of satellites relative to Antenna.

The next screen...

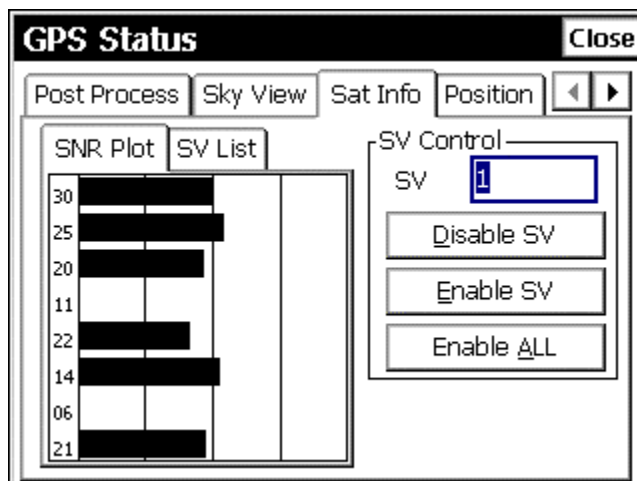


Figure 44

SNR Plot tab – displays SNR (Signal to Noise Ratio) plots.

The next screen...

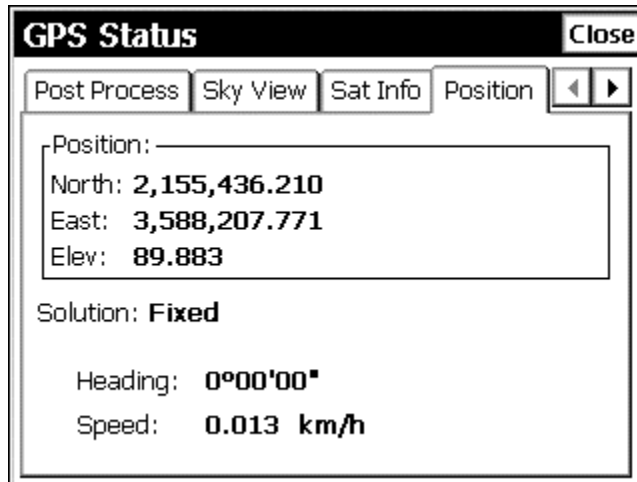


Figure 45

Position tab – displays current Real-Time coordinate and Solution quality, If the Mapping Plane has been Set, coordinates are displayed. If Geodetic Position (Latitude, Longitude, Ellipsoid Ht) are displayed, the Mapping Plane has not been set; return to the **Survey | Projection** menu and define.

The RTK Base and Rover are now configured, continue the demonstration by collecting some Data Collection, then demonstrate the Stake-out functions...

Select [3] Survey – [E] Data Collection

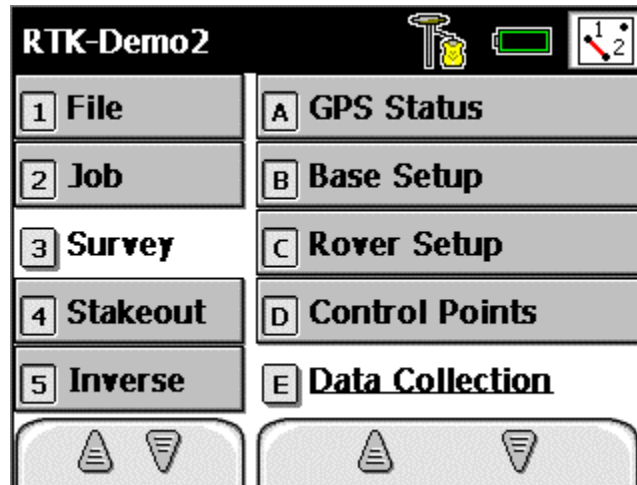


Figure 46

The next screen...

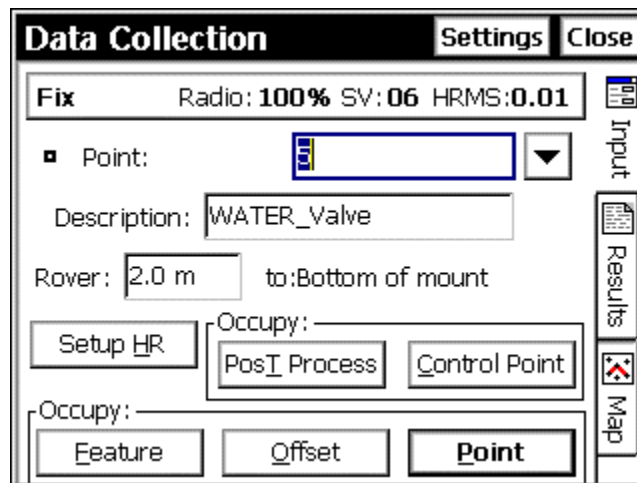


Figure 47

Physically occupy the point of interest, in this example the top surface of a Water Valve lid found in the parking lot. Select the Description for the desired feature, when the RTK Rover pole is plumb and level – Tap on the **Point** button to “Take-the-Shot”.

The next screen...

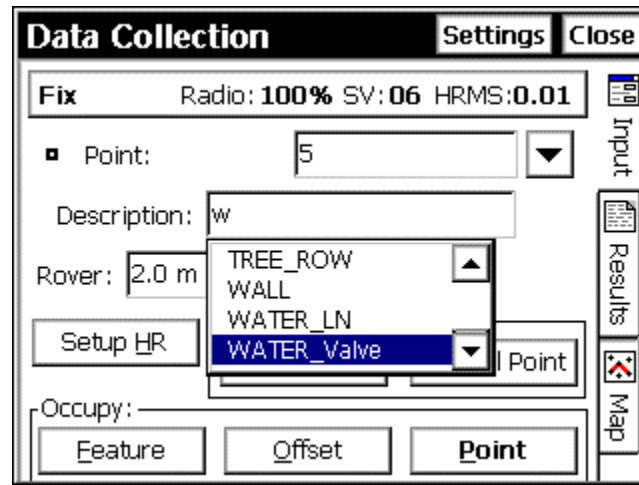


Figure 48

Enter a Description from the Pull-Down Menu, type the first letters of the description. If the user created and copied a descriptor file (Codes.txt), over to the Ranger; a Drop-down menu will automatically appear, exposing the descriptors list. Browse the list and select the topographic code.

To associate a Descriptor file to the Job: **Job | Settings | Files | Description Files:**

Note the Status-Bar in the top portion of the display, The Status-Bar will always indicate the Fix/Float indicator, Radio Reception %, Number of SV's and HRMS.

The next screen...

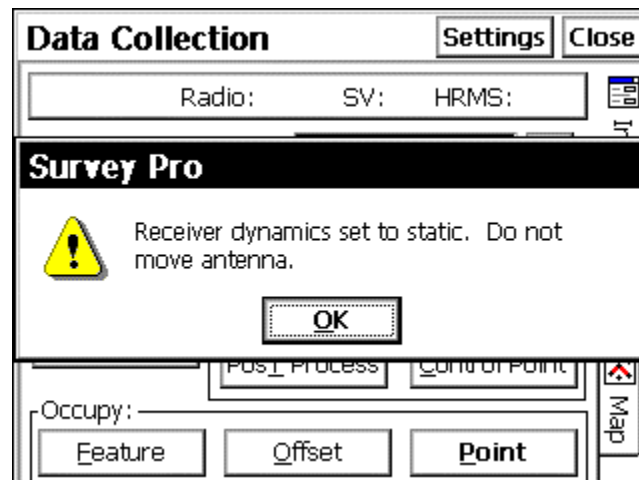


Figure 49

The program warns to user – the Receiver Dynamics are set to Static. This is a reminder: “Do not move antenna”, during the collection process.

The next screen...

Occupy Data Points Settings Cancel

Local Coordinates:—
Northing: **2,155,430.651**
Easting: **3,588,221.985**
Elevation **90.090**

Solution Quality:—
Solution: **Fixed**
Num. SV: **6**
H. Precision: **0.004**
V. Precision: **0.005**

Epochs:—
8
Count Status
Measuring

Accept **GPS Status**

Figure 50

Live screen displaying Coordinates and Solution Quality during Data collection, typically when you observe a **Fixed Solution** and have desirable Horizontal and Vertical Precisions – tap the **Accept** button.

Occupy Data Points Settings Cancel

Local Coordinates:—
Northing: **2,155,420.151**
Easting: **3,588,216.828**
Elevation **90.090**

Store GPS Point OK

Description: **WATER_Valve**

Feature: **<None>** Attributes...

V. Precision: **0.002**

Accept **GPS Status**

Figure 51

Survey Pro CE allows the user to append the Description if necessary. This Feature can be turned off by the user.

GPS Staking

Note: to perform any Stakeout functions, the Stake-out Point's: Point Number, Northing, Easting, Elevation and Descriptions MUST be Pre-loaded into the Ranger, before any stake out work can be started. Typically, these coordinates are pre-loaded into the Ranger back at the office.

The Customer may have calculated these coordinates with a COGO software, or the coordinates may have been generated from a design, or drawing file.

The coordinates for Control Points and the Design (Stake-Out) points MUST be on the same coordinate system. That is, the points used on the job site for the Control MUST be on the same coordinate system as the Design Points.

Select [4] Stakeout – [A] Stake Points

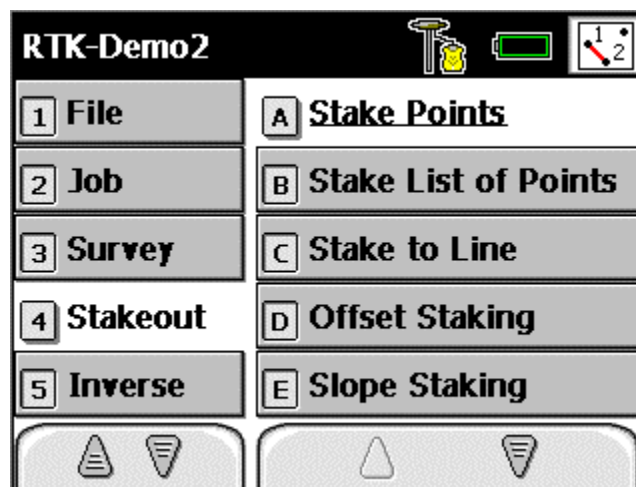


Figure 52

The next screen...

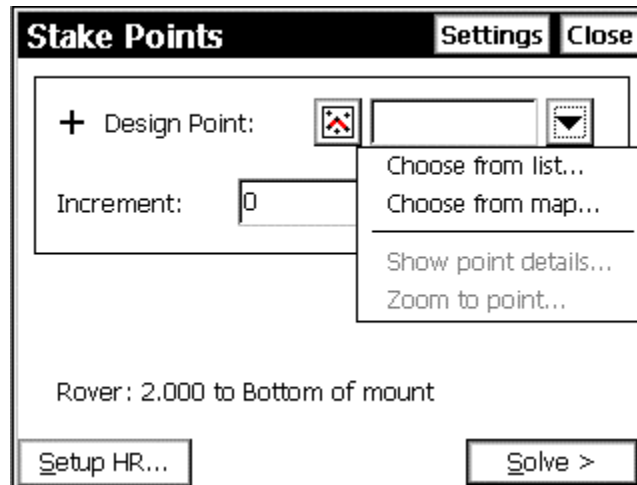


Figure 53

Tap on the Pull-down Arrow, select **Choose from list...**
Select Point Number – 3...

The next screen...

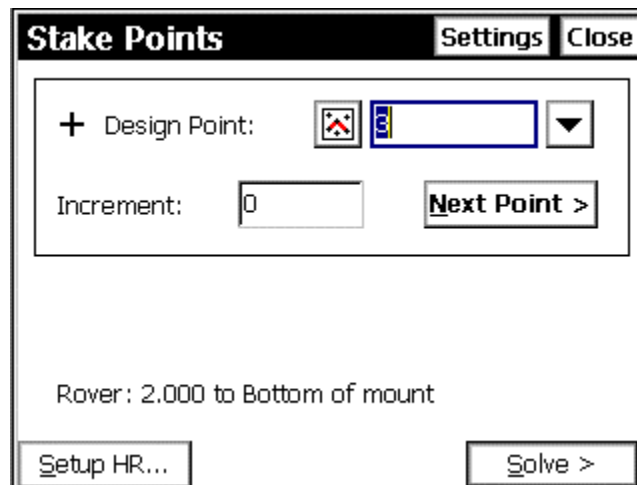
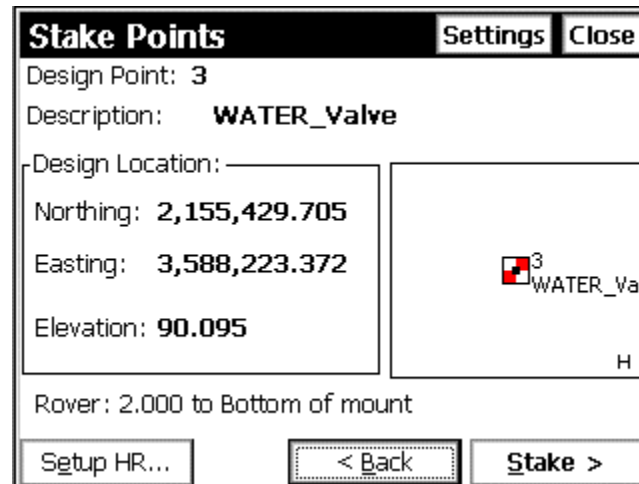


Figure 54

After the Stake Point selection, Tap on the **Solve** button...

The next screen...



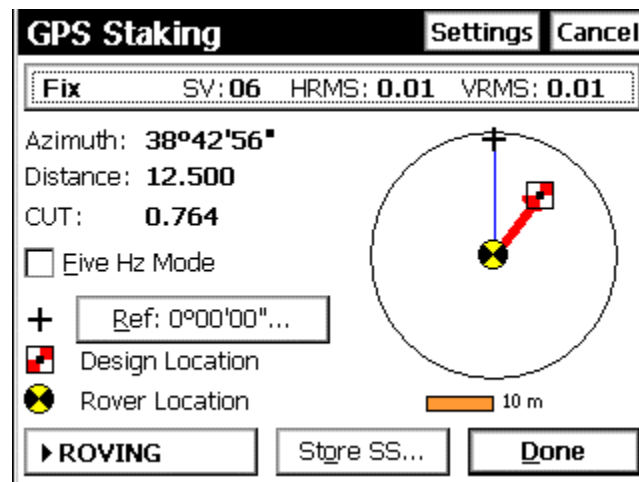
The 'Stake Points' dialog box has a title bar with 'Stake Points', 'Settings', and 'Close' buttons. It contains the following fields: 'Design Point: 3', 'Description: WATER_Valve', 'Design Location:' (with sub-fields for 'Northing: 2,155,429.705', 'Easting: 3,588,223.372', and 'Elevation: 90.095'), and 'Rover: 2.000 to Bottom of mount'. On the right is a small map showing a red crosshair icon labeled '3 WATER_Va' and a point labeled 'H'. At the bottom are three buttons: 'Setup HR...', '< Back', and 'Stake >'.

Figure 55

The selected Points Design Coordinates are displayed,

Next, tap on the **Stake >** button...

The next screen...



The 'GPS Staking' dialog box has a title bar with 'GPS Staking', 'Settings', and 'Cancel' buttons. It displays 'Fix' status and 'SV: 06 HRMS: 0.01 VRMS: 0.01'. Below this are fields for 'Azimuth: 38°42'56"', 'Distance: 12.500', and 'CUT: 0.764'. There is a checkbox for 'Five Hz Mode'. A legend shows a red crosshair for 'Design Location' and a yellow/black circle for 'Rover Location'. A diagram shows a circle with a red line from the center to a red crosshair on the perimeter, with a scale bar for '10 m'. At the bottom are three buttons: '▶ ROVING', 'Store SS...', and 'Done'.

Figure 56

The Azimuth and Distance to the Stake-out point are displayed.

When Staking-out with RTK, it takes a little while to get use to the flow of things... When performing Stake-out with Total stations, the Instrument person back sights a reference point, turns an Angle-Right to direct the Rodman for line, then shoots a distance to determine the distance towards the gun, or distance away from the gun to stake the point's location.

With RTK systems, there are not these types of survey crew deployments. The RTK Base station is typically un-attended, it sits there all by itself. The two-person survey crew is working with the RTK Rover system. One person to carry and operate the RTK Rover system, the second person to carry the wooden stakes, Lath or guard stakes, the sledge hammer and the project's design plans.

To orientate Stakeout directions on the job site with the RTK Rover, Survey Pro CE allows the user to select from two types of orientation on the job site:

Reference Direction: 0° 00' 00000" (Geodetic North), the surveyor can utilize a compass to determine orientation on the job site.

Reference Point: Select any physical point on the job to be used for Orientation.

The next screen...

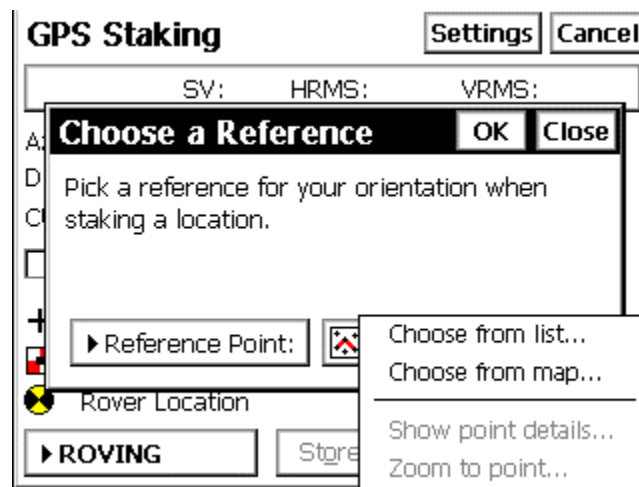


Figure 57

Tap on the **Reference: 0° 00' 0000"** button, the display will Change to **Reference Point:**

The next screen...

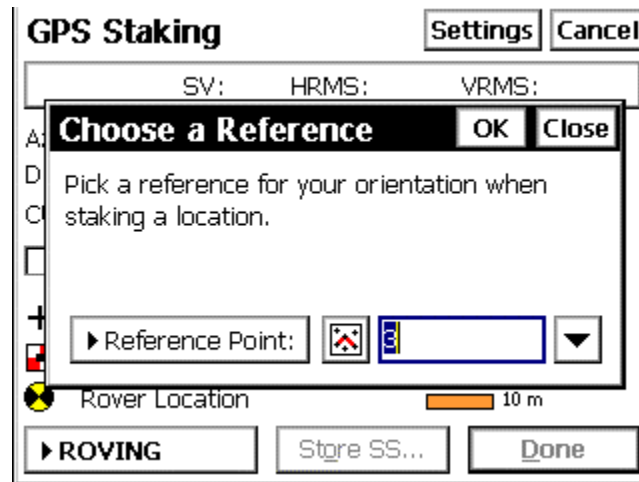


Figure 58

Then tap on the Pull-Down menu and select **Choose from list...**

The next screen...

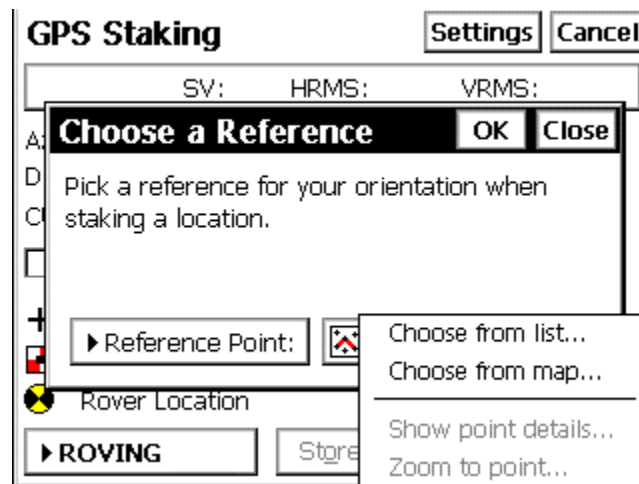


Figure 59

The next screen...

Select Point				OK	Close
Point	Description	Northing (m)	Ea		
1	RTK BASE	2,155,433.442	3,		
2	WATER_LN	2,155,436.003	3,		
3	WATER_Valve	2,155,429.705	3,		
4	WATER_Valve	2,155,430.645	3,		
5	WATER_Valve	2,155,430.651	3,		
6	WATER_Valve	2,155,420.151	3,		
7	WATER_Valve	2,155,419.953	3,		

Figure 60

In this example, Point number 1 (the RTK Base) was selected for the Reference point.

The next screen...

GPS Staking

SettingsCancel

SV:HRMS:VRMS:

Choose a Reference

OKClose

Pick a reference for your orientation when staking a location.

Reference Point:1

Rover Location

10 m

ROVING

Store SS...

Done

Figure 21

After selecting the Reference Point, tap **OK**

The next screen...

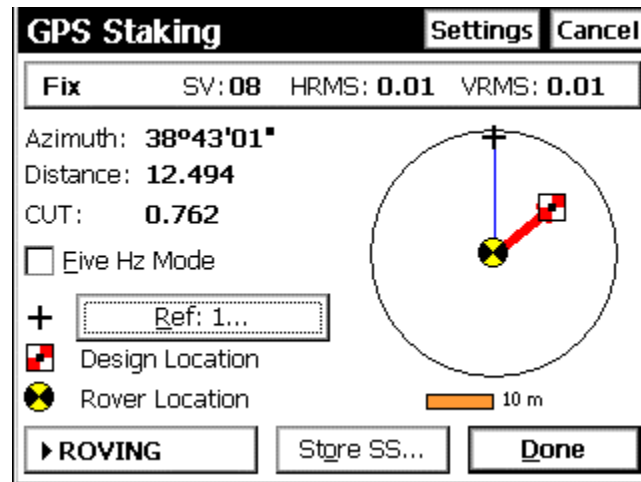


Figure 62

Direction and Distance with visual cues - to the Stakeout Point are presented, with the Reference Point 1, the RTK Base station .

Navigate towards the Design Point, this is live screen. If your Navigating in the right direction – the distance should decrease. If your navigating in the wrong direction, the distance will increase...

The next screen...

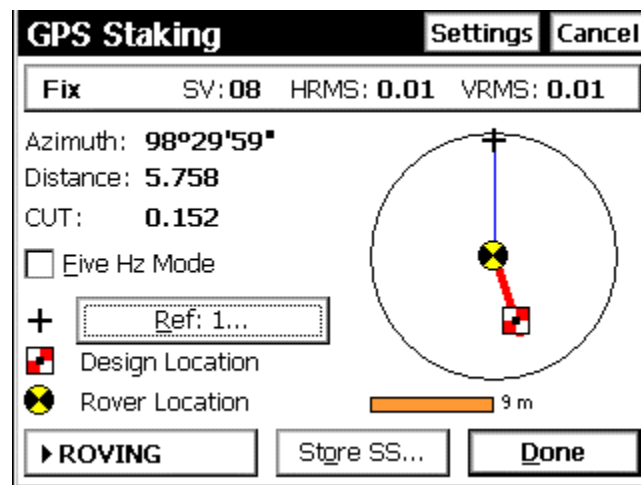


Figure 63

The Distance is decreasing – your getting closer...

The next screen...

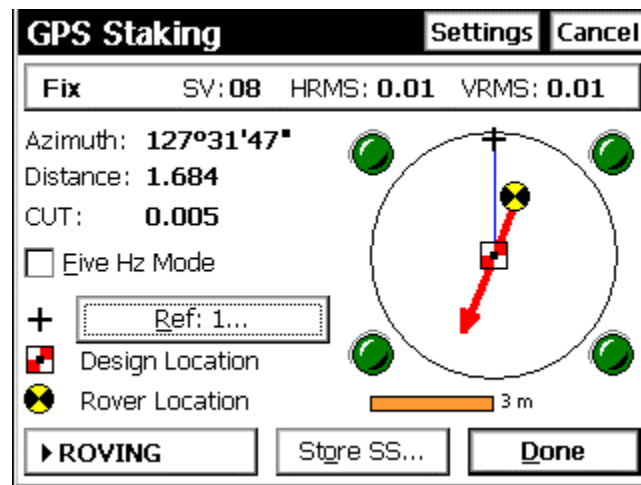


Figure 64

When you get within a meter of the Design Point, The scales of the GPS Staking screen will enlarge, Providing greater detail to stakeout the point...

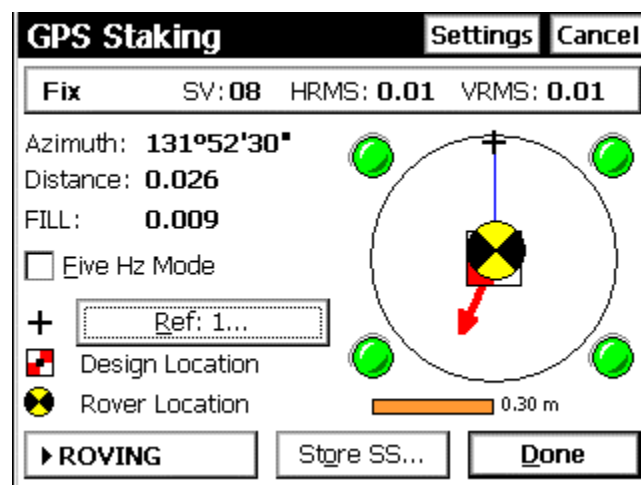


Figure 65

When you get within a few decimeters, the scale is enlarged once again.

When you arrived at the Design Point, Tap **Done**,
The next screen...

Stake Points [Settings] [Close]

Design Elev: **90.095** [Change...]

[Shot...]

Results:

Azimuth: **126°02'19**

Distance: **0.024**

FILL: **0.014**

HR: 2.059

Shot Data:

Northing: **2,155,429.719**

Easting: **3,588,223.352**

Elevation: **90.082**

[Store...]

[GPS Status...] [**< Back**] [Stake **N**ext >]

Figure 66

To accept the “AZ-Built” Shot Data, Tap **Store...**

The next screen...

Stake Points [Settings] [Close]

Design Elev: [] Results: Azimuth: **126°02'19**

Stake Out Point [OK] [Cancel]

Point: **8** ▼

Description: **FLD-3**

Feature: **<None>** [Attributes...]

Elevation: **90.082**

[Store...]

[GPS Status...] [**< Back**] [Stake **N**ext >]

Figure 67

A Description can be appended to the Stake Out Point...

The “**FLD-3**” Description can be used to store the AZ-Built Coordinates, where the FLD-3 = Field coordinate for design 3. This type of description can help locate the Cut/Fill data.

The next screen...

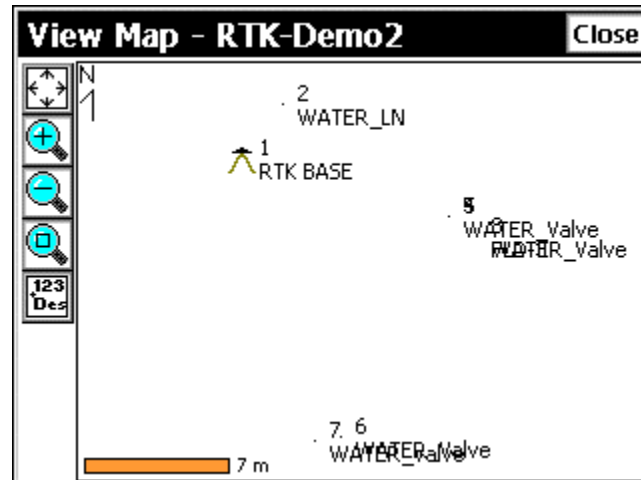


Figure 68

Points in the current job file can be viewed by tapping on the **View Map** icon...

The next screen...

Point Details			Close
Point	2		
Description	WATER_LN		
Feature	None		
Layer	Points		
N	2,155,436.003	m	
E	3,588,214.028	m	
Z	89.934	m	
Lat	39°03'45.21841" N		
Lng	77°28'50.63427" W		
Ht	57.819	m	
Type	Existing Pt.		

Figure 69

Tap on a point in the **View Map** display, the **Point Details** Will be displayed...

Tap **Close** to return to the View Map...

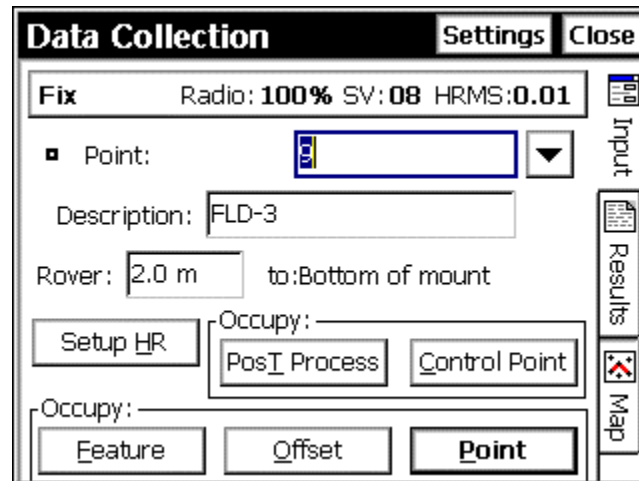
Tap **Close** to return to the Survey Pro CE main menu...

Advanced Data Collection:

Collect continuous data by Time –or- Distance filters:

Select [3] Survey – [E] Data Collection

The next screen...

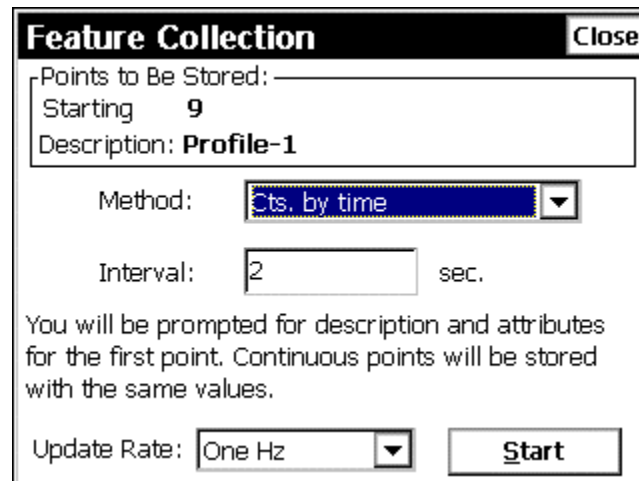


The screenshot shows the 'Data Collection' window with a title bar containing 'Settings' and 'Close' buttons. The main area includes a 'Fix' status bar with 'Radio: 100% SV: 08 HRMS: 0.01'. Below this is a 'Point:' label next to a text input field containing '01'. A 'Description:' label is followed by a text input field containing 'FLD-3'. The 'Rover:' label is next to a text input field containing '2.0 m', followed by the text 'to: Bottom of mount'. There are three buttons: 'Setup HR', 'PosI Process', and 'Control Point'. Below these is an 'Occupy:' label followed by a text input field. At the bottom are three buttons: 'Feature', 'Offset', and 'Point'. On the right side, there is a vertical toolbar with icons for 'Input', 'Results', and 'Map'.

Figure 30

Specify the Description, then Tap Feature...

The next screen...

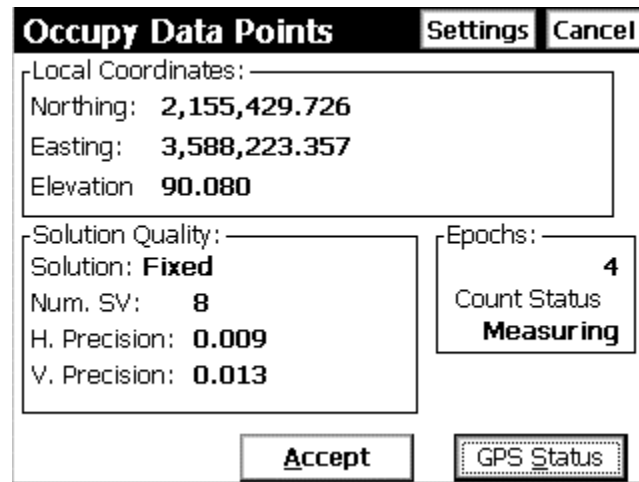


The screenshot shows the 'Feature Collection' window with a title bar containing a 'Close' button. The main area includes a 'Points to Be Stored:' label followed by a text input field containing '9'. Below this is a 'Starting' label followed by a text input field containing '9'. The 'Description:' label is followed by a text input field containing 'Profile-1'. The 'Method:' label is next to a dropdown menu showing 'Cts. by time'. The 'Interval:' label is next to a text input field containing '2', followed by the text 'sec.'. Below this is a paragraph of text: 'You will be prompted for description and attributes for the first point. Continuous points will be stored with the same values.' At the bottom, there is an 'Update Rate:' label next to a dropdown menu showing 'One Hz', and a 'Start' button.

Figure 71

Select Method: Cts. by Time –or- Cts. by Distance,
In this example Cts. by Time / 2 Second Interval has been selected.
When ready to begin, Tap Start...

The next screen...



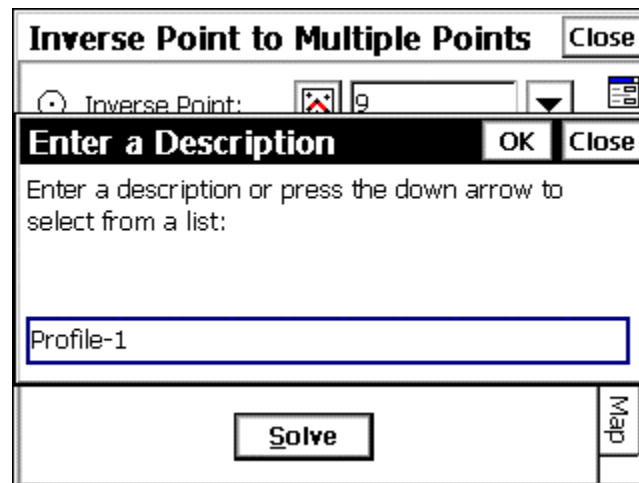
The screenshot shows a software interface titled "Occupancy Data Points" with "Settings" and "Cancel" buttons. It displays local coordinates (Northing: 2,155,429.726; Easting: 3,588,223.357; Elevation: 90.080), solution quality (Fixed), number of satellites (8), and precision values. It also shows 4 epochs and a "Measuring" status. "Accept" and "GPS Status" buttons are at the bottom.

Occupancy Data Points		Settings	Cancel
Local Coordinates:			
Northing:	2,155,429.726		
Easting:	3,588,223.357		
Elevation:	90.080		
Solution Quality:		Epochs:	
Solution:	Fixed	4	
Num. SV:	8	Count Status	
H. Precision:	0.009	Measuring	
V. Precision:	0.013		
Accept		GPS Status	

Figure 72

To start the Continuous Data Collection mode, the user must manually accept the first shot, Tap **A**cept...

The next screen...



The screenshot shows a software interface titled "Inverse Point to Multiple Points" with a "Close" button. It includes an "Inverse Point" field with a value of 9. Below is a sub-screen titled "Enter a Description" with "OK" and "Close" buttons. The sub-screen prompts the user to enter a description or select from a list, with "Profile-1" entered in the text field. A "Solve" button is at the bottom, and a "Map" button is on the right side.

Inverse Point to Multiple Points		Close	
Inverse Point:	9		
Enter a Description		OK	Close
Enter a description or press the down arrow to select from a list:			
Profile-1			
Solve		Map	

Figure 73

An opportunity is provided to append the Description, Tap **O**K, or press Enter on the Ranger keyboard...

Once the initial shot has been Accepted, the continuous Data Collection mode will begin, in this example **Cts. by Time / 2-Second Interval** was selected. If the conditions of the HRMS/VRMS filter are met, the Ranger will beep every 2-seconds, indicating data collection is occurring. Start walking the feature you desire to data collect / map.

The next screen...

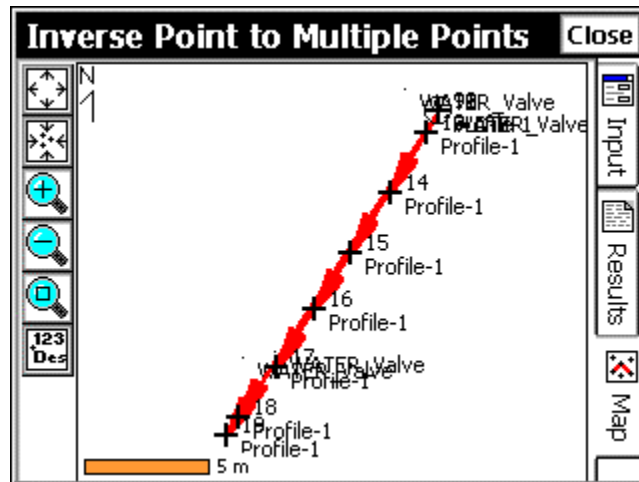


Figure 74

Example of Profile Line collected with the Continuous Data Collection Mode.

To Export coordinates:

Select [1] File – [D] Export Coordinates



Figure 75

The next screen...

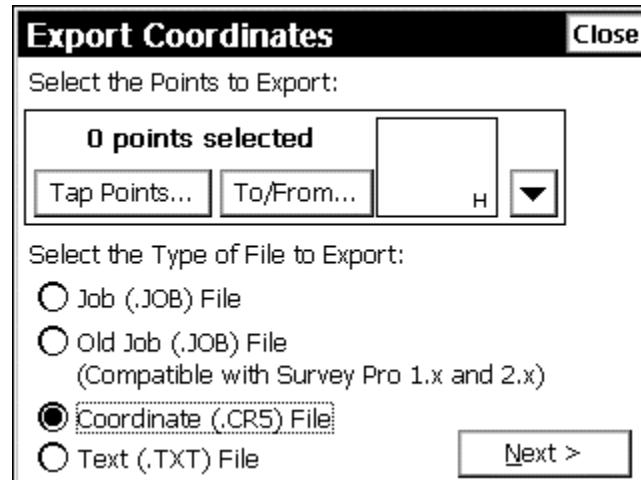


Figure 76

Tap on the Down Arrow...

The next screen...

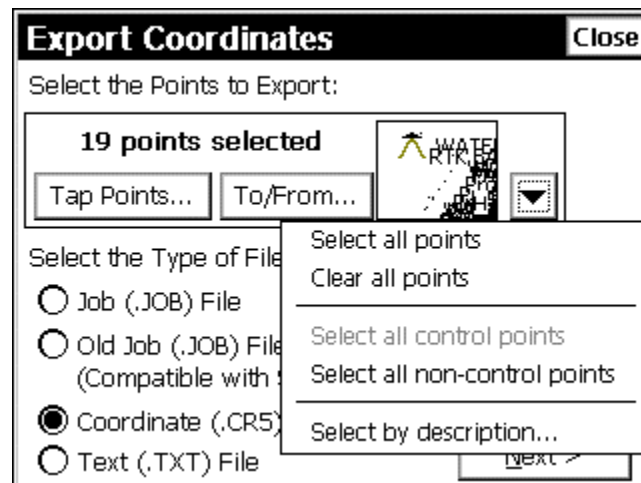


Figure 77

Tap on the **Select all Points** option...

The next screen...

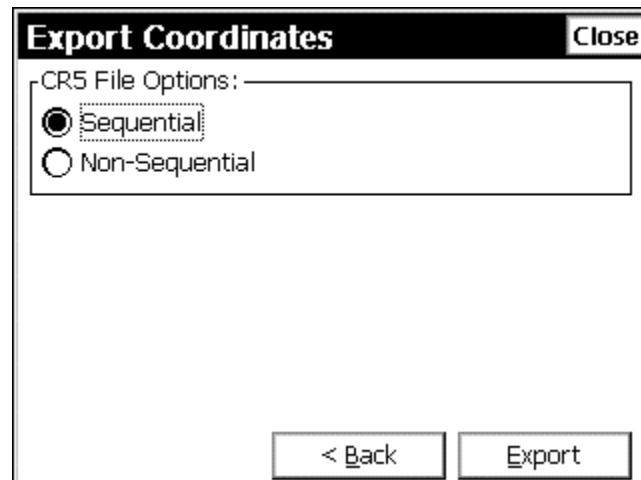


Figure 78

Choose Sequential –or- Non-sequential option...

Tap the **Export** button...

The next screen...

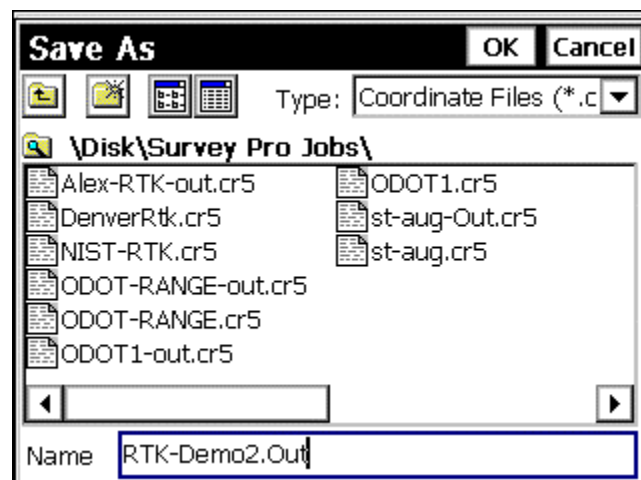


Figure 79

Specify a **Name and File -Type Extension** for the **Export Coordinates...**

Next, Transfer the Coordinates from the Ranger back over to the office Computer,

Select [1] **File** – [F] **Transfer**

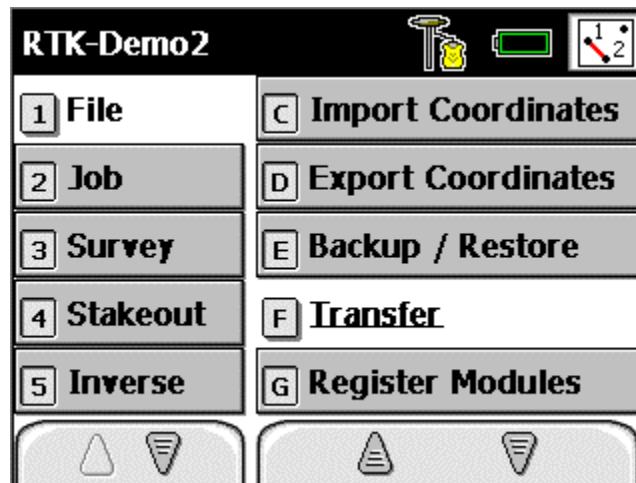


Figure 80

The next screen...

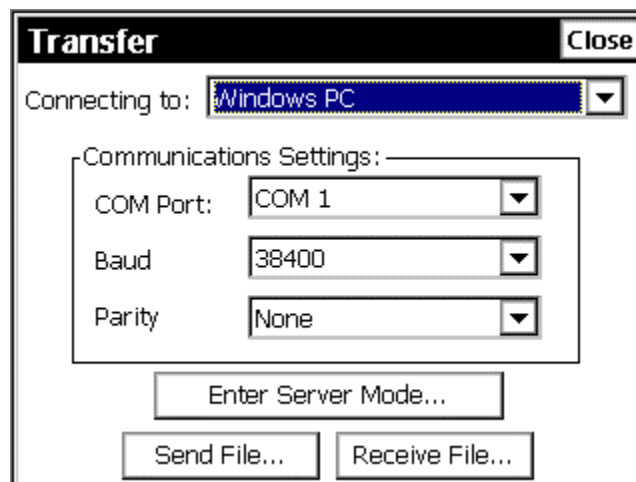


Figure 81

Select the Transfer **Communications Settings**,

Start the TDS Survey Link software on the PC,

Start | Programs | TDS Survey Works | Survey Link...

From the Pull-Down menu → Select **Transfer | Send / Receive...**

Select the **Receive Tab...**

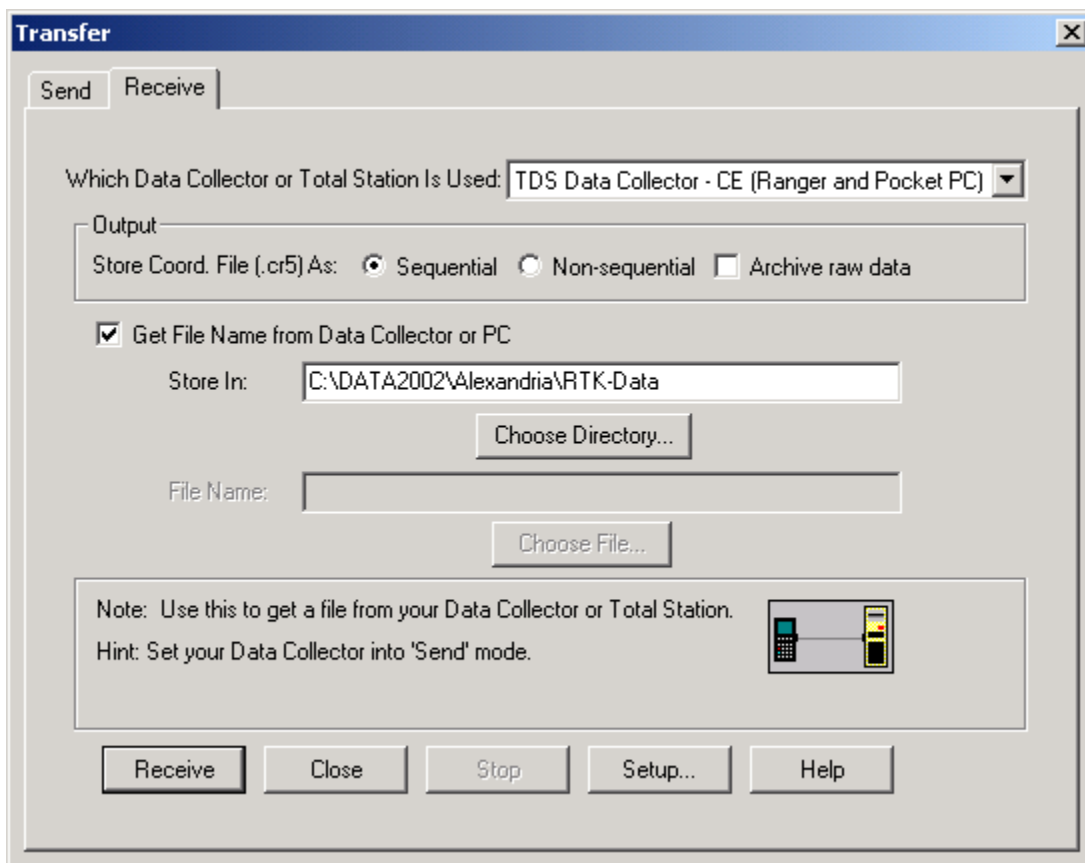


Figure 42

Last Updated by RDL: 9/12/02