TOPCON

# Pocket-3D


# Reference Manual

TOPCON
POSITIONING SYSTEMS

# Pocket-3D
# Reference Manual

Part Number 7010-0628
Rev F

ECO #2959

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# Preface

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# Manual Conventions

This manual uses the following conventions:

| Example | Explanation |
|---|---|
| **File ▸ Exit** | Tap/press the **File** menu and tap/press **Exit**. |
| **Enter** | Tap or press the button or key labeled **Enter**. |
| ***Topo*** | Indicates the name of a dialog box or screen. |
| *Notes* | Indicates a field on a dialog box or screen, or a tab within a dialog box or screen. |

| | |
|---|---|
| TIP | Supplementary information that can help you configure, maintain, or set up a system. |
| NOTICE | Supplementary information that can have an affect on system operation, system performance, measurements, or personal safety. |
| CAUTION | Notification that an action has the potential to adversely affect system operation, system performance, data integrity, or personal health. |

| | |
|---|---|
| WARNING | Notification that an action *will* result in system damage, loss of data, loss of warranty, or personal injury. |
| DANGER | Under no circumstances should this action be performed. |

# Notes:

# What's New with Pocket-3D

The following list briefly describes new features and functions for the latest version of Pocket-3D.

- ⇨ On the Setup menu, there is a new Units format for metric stationing: 1+000.000.
- ⇨ On the Setup menu for total stations, an unknown point can be added to the list of available setup options when using total stations.
- ⇨ On the Data menu, points can be exported based on the layer. See "Import/Export" on page 3-8 for more information.
- ⇨ On the Data menu, the Calc Wizard offers two new options:
  - Inverse between three points. See "Inverse Between Three Points" on page 3-72 for more information.
  - Distance from two end points. See "Distance From Two End Pts" on page 3-76 for more information.
- ⇨ A Slope stakeout function has been added to the Survey menu. See "Side Slopes" on page 4-34 for more information.
  - To stake out points on a slope.
  - To stake out points on a cross-section slope.

# Notes:

# Introduction and Display Screen

Pocket-3D is surveying and jobsite design software used to build job files, check cuts and fills, layout points, and survey all or part of a jobsite. This software comes on a CD and is ready to install on a hand-held controller—such as, a Topcon FC-100™ (Figure 1-1), a TDS Recon™, or an hp iPAQ™—and is only available as part of the 3DMC Bundle from Topcon™ dealers.


**Figure 1-1. Pocket-3D on Controller (Topcon's FC-100)**

# Main Screen

The Pocket-3D main window (Figure 1-2) has the following components:

- Main Window – displays a graphical representation of the design surface and machine. The display varies according to the selected file and display options.
- Toolbar – provides icons for frequently used functions. See “Toolbar” on page 1-4 for more information.
- Menu bar – contains pop-up menus for the various functions available in Pocket-3D. The following chapters describe each menu in detail.

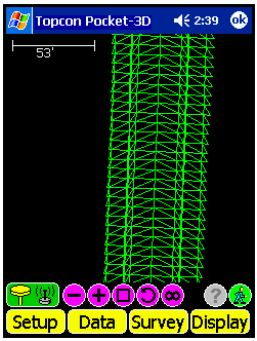



**Figure 1-2. Pocket-3D Main Screen**

The pop-up menu on the main screen (Figure 1-3 on page 1-3) contains frequently accessed functions, and information about selected data. To display the pop-up menu, rest the controller’s stylus on the point, station, or polyline for at least one (1) second.

The pop-up menu options depend on the type of file open and the information selected.

- Design – displays the design elevation for the selected point or station.
- Sta – displays the identifier of the station closest to the point where the stylus was tapped
- Clear selection – de-selects the selected entities (the same functions as the **Data ▸ Clear selection** menu option).

- Hide layers – hides the layer in which the selected entities reside. Navigate to the entity's ***Layers*** dialog to show the layer.
- Use polyline as ref.line – uses the selected polyline as a reference line during a stake-out.
- Use alignment as ref.line – uses the selected alignment as a reference line during a stake-out.
- Edit point – edits the selected point.
- Stake-out point – stakes out the selected point.
- Delete points – deletes the selected point.
- Calcs – performs common polyline calculations.
  - Create points: creates points from the selected polyline.
  - Create alignment: creates an alignment from the selected polyline.
  - Area: displays the area of a selected, closed polyline.
- Delete – deletes the selected polyline.
  - Entire polylines: deletes the entire polyline.
  - Last segment: deletes only the last segment of a multi-segment polyline. For closed polylines, the line between the start and end point/vertex of the polyline will be deleted; for open polylines (not closed), the last point/vertex and its associated line will be deleted.
- Properties – displays the ***properties*** dialog box for the selected entity.

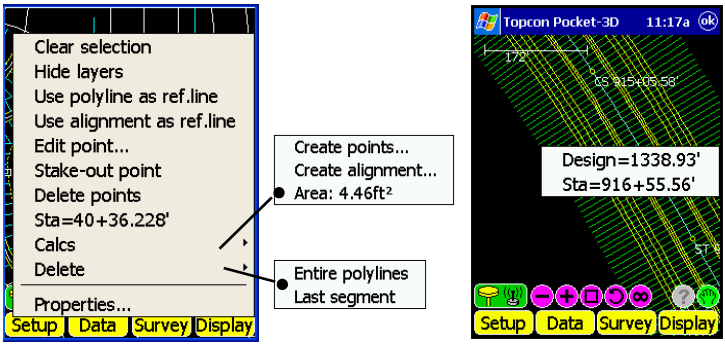



**Figure 1-3. Pop-up Menu Options**

# Toolbar

The toolbar (Figure 1-4) contains icons for frequently used functions.

**Figure 1-4. Pocket-3D Toolbar – GPS Example**

Table 1-1 lists and describes the available icons.

**Table 1-1. Pocket-3D Toolbar Icons**

| Icon | Description |
|---|---|
| GPS Status  LPS Status  mmGPS Status  Total Station Status  | GPS, LPS, mmGPS, total station status – displays symbols for the type of control application used on the jobsite, as well as the connection status (red for unconnected, green for connected, and orange for low precisions in GPS applications).<br>• In GPS control applications, press this icon to display GPS information. See “GPS Status Button” on page 1-6 for details.<br>• In LPS control applications, press this icon to display LPS information. See “LPS Status Button” on page 1-10 for details.<br>• In mmGPS control applications, press this icon to display GPS information. See “GPS Status Button” on page 1-6 for details.<br>• In total station applications, press this icon to display total station information. See “Total Station Status Button” on page 1-12 for details. |
|  | Zoom out – decreases the magnification of the design view each time you tap this button. The zooming pivot is the center of the screen. |
|  | Zoom in – increases the magnification of the design view each time you tap this button. The zooming pivot is the center of the screen. |
|  | Zoom window – increases the magnification of a design area when drawing a box around the selected area. |
|  | Zoom previous – displays the previous design view. |
|  | Zoom extents – displays the extent of the design view/area. |
|  | Info – displays information for selected points/polylines and a dialog box to save the information as a text file. |

**Table 1-1. Pocket-3D Toolbar Icons (Continued)**

| Icon | Description |
|---|---|
| Auto-pan<br>  <br>Selection window<br>  <br>Selection polygon<br>  <br>Pan<br>  | Click to rotate through the four button options:<br>• Auto-pan – tracks the user's current position in the field and displays the position as a cross symbol in the middle of the screen. Available only in GPS connection.<br>• Selection window – selects points/polylines on the screen when drawing a box around them.<br>• Selection polygon – selects point/polylines on the screen when drawing a polygon around them.<br>• Pan – moves the design view around when pressing down on the screen and dragging. |

# GPS Status Button

While in GPS or mmGPS control, to view GPS/mmGPS information, change mask angle or reset a receiver, press the **GPS status** button on the toolbar. The ***GPS status*** dialog box displays (Figure 1-5).

The color of the button and state of the hardware symbol indicates the status of the system.

- Background color – green means the entire system is communicating with Pocket-3D; red means all or some part of the system is not communicating with Pocket-3D; orange means precisions are low.
- Hardware symbol state – if the symbol is crossed out, the corresponding sensor/receiver is not available. If the radio link is between 3 and 10 seconds old, the radio icon will flash (bad or weak signal); after 10 seconds, it will be crossed out (unavailable signal).

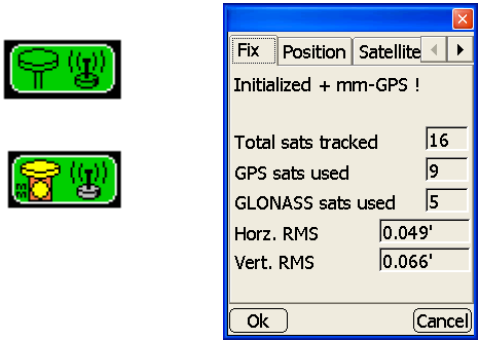



**Figure 1-5. GPS/mmGPS Status Buttons and Dialog Box**

## Fix Tab

The *Fix* tab displays the following information (Figure 1-5):

- Whether or not the GPS+ antenna is initialized.
- Total sats tracked – the total (GPS and GLONASS) number of satellites being tracked.
- GPS sats used and GLONASS sats used – the number of GPS and GLONASS satellites being tracked.

- Horz. RMS and Vert. RMS – an estimation of the positioning quality computed from a valid satellite status (RMS = Root Mean Square).

## Position Tab

The *Position* tab displays the following information (Figure 1-6):

- The latitude, longitude, and height of the GPS+ receiver.
- The Northing, Easting, and Elevation of the GPS+ receiver.
- The Distance from the Rover receiver to the Base.

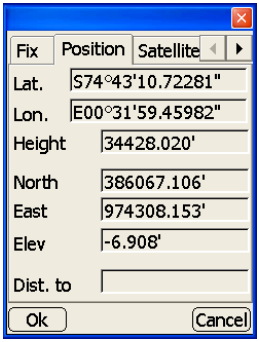



**Figure 1-6. Position Tab**

## Satellites Tab

The *Satellites* tab displays the following information (Figure 1-7 on page 1-8):

- Satellite plot – displays used and unused satellites, and the current mask angle.
  - Blue dots: GPS satellites
  - Red-with-cross dots: GLONASS satellites
  - Black dots: unused satellites
  - Red mask circle: satellites inside will be used for positioning
- Mask – enters and sets the mask angle for the job.

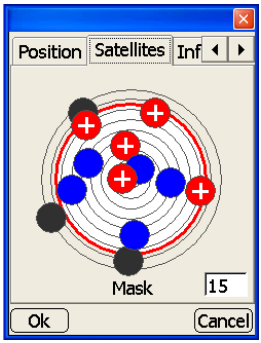



**Figure 1-7. Satellites Tab**

## Info Tab

The *Info* tab displays the following information (Figure 1-8):

- Identification information, firmware revision, and radio link information (type, latency, and quality) for the receiver.
- Reset receiver – press to clear all data and reset all settings stored for the receiver.
- Reset RTK – press to reset RTK ambiguities.

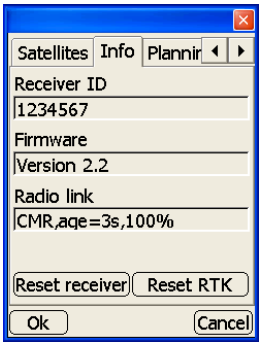



**Figure 1-8. Info Tab**

## Planning Tab

The *Planning* tab displays hourly PDOP information (Figure 1-9).

- Next – displays PDOP values for the next day.
- Previous – displays PDOP values for the previous day.

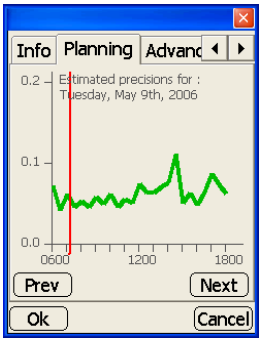



**Figure 1-9. Planning Tab**

## Advanced Tab

The *Advanced* tab has the following settings for GPS receivers (Figure 1-10).

- Use multipath reduction – enables/disable using the option to reduce multiple reflections from nearby objects.
- Use GLONASS satellites – enables/disables using GLONASS satellites for positioning.

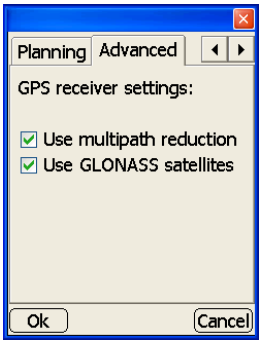



**Figure 1-10. Advanced Tab**

# LPS Status Button

While in LPS control, to view LPS information, change search area or change track sensitivity and speed, press the **LPS status** button on the toolbar. The ***LPS status*** dialog box displays (Figure 1-11).

The color of the button and state of the hardware symbol indicates the status of the system.

- Background color – green means the entire system is communicating with Pocket-3D; red means all or some part of the system is not communicating with Pocket-3D.
- Hardware symbol state – if the symbol is crossed out, the corresponding sensor/receiver is not available.

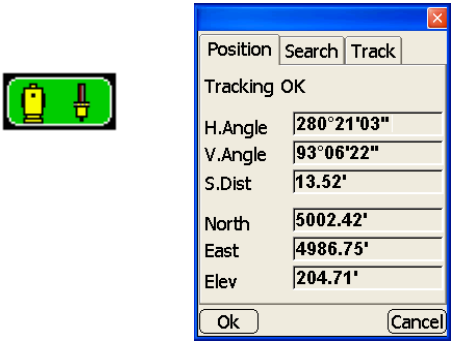



**Figure 1-11. LPS Status Button and Dialog Box**

## Position Tab

The *Position* tab displays the following information (Figure 1-11):

- Whether or not the GRT tracks the LPS sensor.
- The horizontal and vertical angle to the LPS sensor.
- The slope distance to the LPS sensor.
- The Northing, Easting, and Elevation of the LPS sensor.

## Search Tab

The *Search* tab displays the following information (Figure 1-12):

- Search wait (secs) – sets the wait time in seconds until the GRT starts to search for the LPS sensor.
- Set search area at GRT – when enabled, sets the search area at the GRT instead of setting it remotely.
- Left, Right, Up, and Down – establishes the desired horizontal and vertical angles that outline the search area for the jobsite.
- Press the **Obs** buttons to observe the left/right/up/down angles instead of entering them manually.
- Obs – measures user-defined horizontal and vertical angle limits of the jobsite.

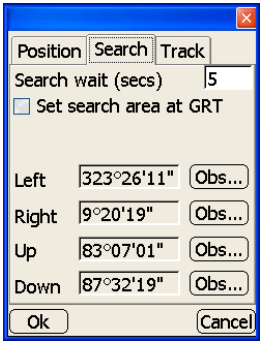



**Figure 1-12. Search Tab**

### Track Tab

The *Track* tab displays the following information (Figure 1-13):

- Track sensitivity – sets the desired track sensitivity for the GRT; either low, medium, or high.
- Track speed – sets the desired tracking speed for the GRT; either slow, medium, or fast.

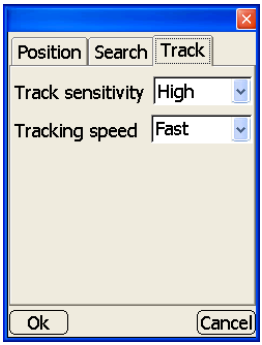



**Figure 1-13. Track Tab**

## Total Station Status Button

While in total station control, to view total station information, change search area or change track sensitivity and speed, press the **Total Station status** button on the toolbar. The ***Total Station status*** dialog box displays (Figure 1-14 on page 1-13).

The color of the button and state of the hardware symbol indicates the status of the system.

- Background color – green means the entire system is communicating with Pocket-3D; red means all or some part of the system is not communicating with Pocket-3D.
- Hardware symbol state – if the symbol is crossed out, the corresponding sensor/receiver is not available. For non-robotic total stations, the prism symbol will remain crossed out.

The instrument selected during equipment setup determines the tabs that display.

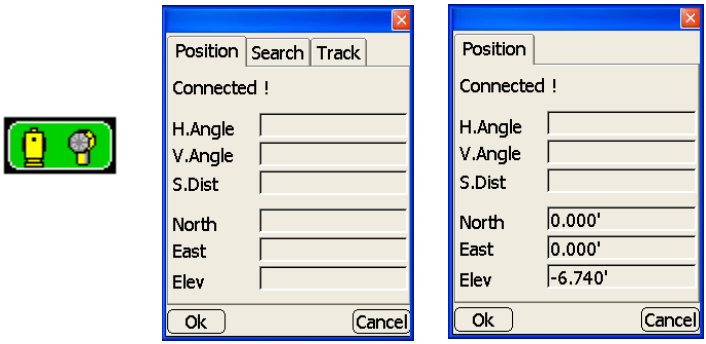



**Figure 1-14. Total Station Status Dialog Box**

## Position Tab

The *Position* tab displays the following information (Figure 1-14):

- Whether or not the total station is connected or tracks the prism.
- The horizontal and vertical angle from the total station to the prism.
- The slope distance from the total station to the prism.
- The Northing, Easting, and Elevation of the prism.

## Search Tab

The *Search* tab displays the following information (Figure 1-15) depending on the total station used and the sensor type:

- Search wait (secs) – sets the wait time in seconds until the total station starts to search for the prism.
- Pattern – selects the pattern for tracking the prism.
- Search area left and right of prism – when enabled, sets the search area at the total station for tracking the prism.
- Above and below prism – enter the angle above and below the prism in which to search.

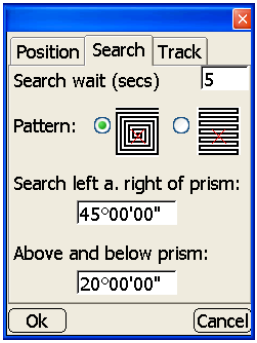



**Figure 1-15. Search Tab for Total Station**

## Track Tab

The *Track* tab displays the following information depending on the total station used and the sensor type. See Figure 1-13 on page 1-12 for an example.

- Track sensitivity – sets the desired track sensitivity for the total station; either low, medium, or high.
- Track speed – sets the desired tracking speed for the total station; either slow, medium, or fast.

# Menu Bar

The menu bar provides access to the Pocket-3D configuration, setup, display, and other jobsite functions (Figure 1-16). For details on the menus, see the following:

- “Setup Menu” on page 2-1
- “Data Menu” on page 3-1
- “Survey Menu” on page 4-1
- “Control Menu” on page 5-1
- “Display Menu” on page 6-1

**GPS, mmGPS, and Total Station Menu Bar**


**LPS Menu Bar**


**Figure 1-16. Pocket-3D Menu Bars**

# Notes:

# Setup Menu

Depending on the application (GPS, mmGPS, LPS, or total station), the Setup menu contains different options for configuring system components.

## GPS Applications

In GPS applications, the Setup menu (Figure 2-1) has the following menu items. Some menu items depend on the type of equipment configured (machine or rover).

- Equipment
- Radios
- Antenna
- Base Station
- Units
- Exit


**Figure 2-1. Setup Menu for GPS Applications**

# Equipment

The Equipment menu creates and edits equipment configuration files. Equipment configuration files contain information specific to the equipment; such as, machine type, receiver type and location, dimensions of the cutting edge, offset lengths depending on the position of the receiver, and radio configuration.

NOTICE

Equipment setup is used for Rover setups, not Base station setups.

To access available equipment configuration files, tap **Setup ▸ Equipment** (Figure 2-2).


**Figure 2-2. Setup ▸ Equipment**

From the ***Equipment configurations*** dialog box (Figure 2-3 on page 2-3), equipment configuration files can be created within Pocket-3D and transferred to the machine Control Box to be used for machine configuration. (A machine configuration file must be created before grading.) Refer to the *System Five-3D Reference Manual* for more information on the Control Box.

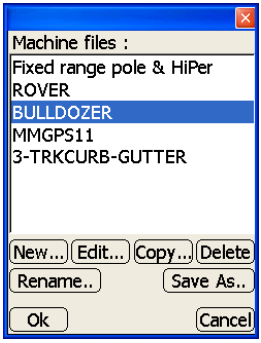



**Figure 2-3. Equipment Configurations Dialog Box**

Once equipment configuration files are created and stored in the internal memory, they can be selected and adjusted at the beginning of the job, depending on the receiver's setup.

On the ***Equipment configurations*** dialog box, press **New** to display the ***Configuration name/type*** dialog box (Figure 2-4 on page 2-4) and create an Equipment Configuration file. Enter the following information and press **Next**. Some selections depend on purchased options for Pocket-3D.

- Configuration name – type a name for the Equipment Configuration.
- Machine type – select Range pole, Bulldozer, Motor grader, or 3-track curb & gutter. The screens display different settings depending on the machine type selection.
- Sensor – select the type of sensor used on the machine; either GPS antenna or Prism, or LS-2000 for 3-track curb & gutter.
- Location – select the sensor's location; Top of pole for Range pole, Middle for Bulldozer and 3-track curb & gutter, or Left/ Right for Motor grader.
- Units – select the unit of measure. Note: these units do not relate to job units.

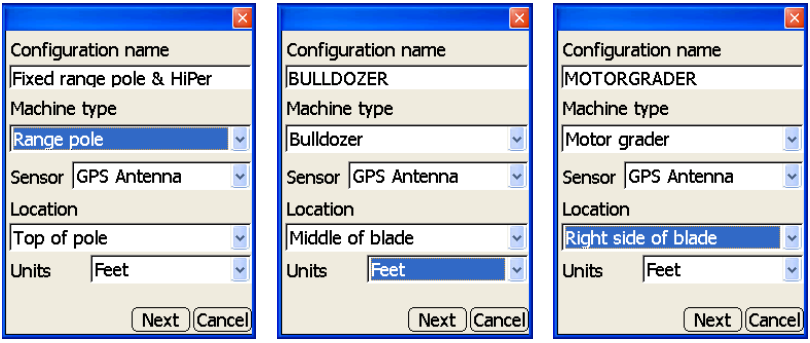



**Figure 2-4. Configuration Name/Type**

On the ***antenna information*** dialog box, enter the following information using the same units of measure entered in the previous step and press **Next**. These settings have a corresponding *Image* tab to illustrate the setup.

**For range poles,** enter the following antenna information (Figure 2-5):

- Antenna type – select the type of antenna.
- Antenna height – enter the antenna height of the GPS+ antenna from antenna measurement point to pole tip.
- Measured to – enter where on the GPS+ antenna the antenna height was measured.
- Connection (Pocket-3D) – select the communication port used between controller and instrument.

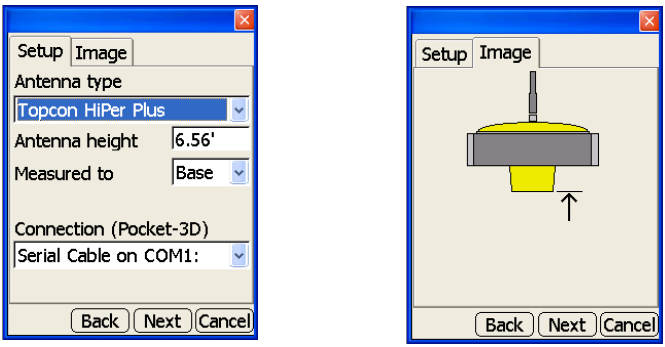



**Figure 2-5. Range Pole Antenna Setup Information**

**For dozers and motor graders,** enter the following antenna information (Figure 2-6):

- Above blade – enter the height of the antenna from the cutting edge to the rim or base.
- In from edge – enter the distance of the blade's edge to the right of the antenna.
- Behind edge – enter the distance of the antenna behind the blade's edge.
- Width of blade – enter the width of the blade.
- Antenna type – select the type of antenna.

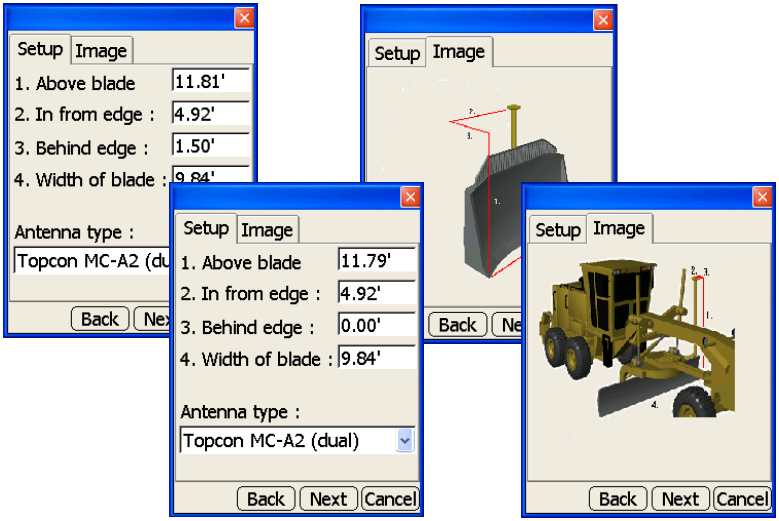



**Figure 2-6. Dozer and Grader Antenna Setup Information**

On the ***Max GPS Errors*** dialog box (Figure 2-7), enter the following maximum GPS error information for point measurements for dozers and motor graders. Then press **Next**.

- Roving – enter the maximum allowable horizontal and vertical RMS (root mean square) errors for moving measurements.
- Point Measurement – enter the maximum allowable horizontal and vertical RMS (root mean square) errors for static point measurements.

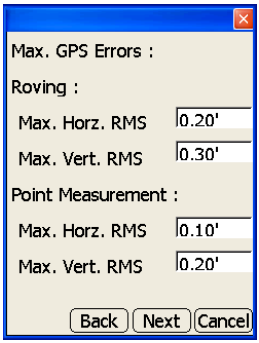



**Figure 2-7. Dozer and Grader Antenna GPS Error Information**

On the ***radio setup*** dialog box (Figure 2-8 on page 2-7), set the following parameters and press **Next**:

- Radio type – the type of radio.
- Connected – the port used for radio connection.
- Baud rate – the speed of communication rate between the radio unit and the GPS+ receiver.
- Format – current GPS+ systems are capable of either CMR or RTCM corrections.

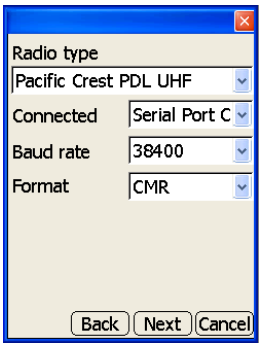



**Figure 2-8. Radio Setup**

On the ***machine switches*** dialog box (Figure 2-9), select the type of reverse switch used on the machine for going in reverse.

NOTICE

This setting is only applicable to mining machines. Do not change this setting for non-mining applications.

- No reverse switch – (default) the machine has no reverse switch.
- Serial reverse switch – the machine uses a serial reverse switch; also select the COM port to which the switch is connected.
- I2C reverse switch – the machine uses an I2C reverse switch.

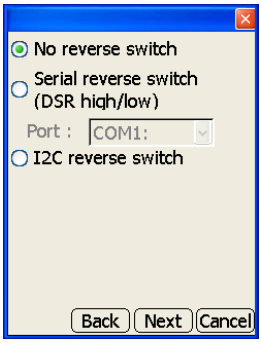



**Figure 2-9. Machine Switches Dialog Box**

On the ***Machine configuration complete*** dialog box (Figure 2-10), press **Finish** to save the configuration file.

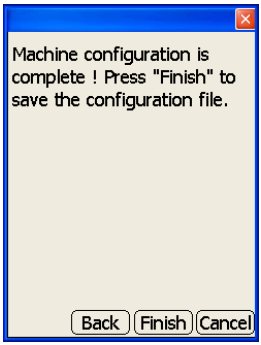



**Figure 2-10. Machine Configuration Complete Dialog Box**

# Radios

To configure radio settings, tap **Setup ▸ Radios** (Figure 2-11).


**Figure 2-11. Setup ▸ Radio**

On the ***radio setup*** dialog box, set the following parameters and press **Ok** (Figure 2-12 on page 2-9):

- Radio type – the type of radio.
- Port – the port used for radio connection.
- Baud rate – the speed of communication rate between the radio unit and the GPS+ receiver.
- Format – current GPS+ systems are capable of either CMR or RTCM corrections.

- Configure – changes the radio channel. Press **Configure** to display the ***channel configuration*** dialog box (Figure 2-12). Select the desired channel and the corresponding Frequency displays. Press **Set** to apply the radio channel parameters.

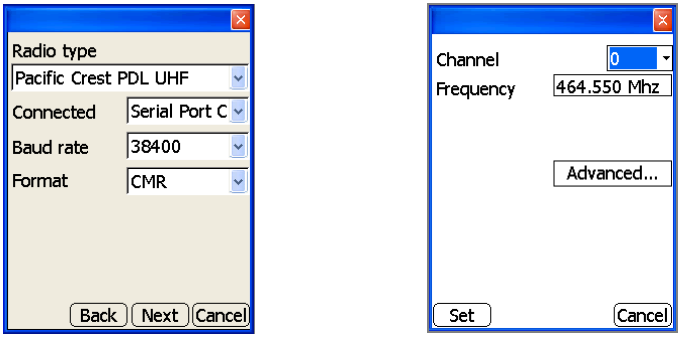



**Figure 2-12. Radio Setup and Channel Configuration Dialog Boxes**

# Antenna

To edit/view antenna measurements, tap **Setup ▸ Antenna** (Figure 2-13).


**Figure 2-13. Setup ▸ Antenna**

On the ***antenna setup*** dialog box, set the following parameters and press **Ok** (Figure 2-14 on page 2-10):

- Antenna type – select the type of antenna.
- Antenna height – enter the antenna height of the GPS+ antenna.
- Measured to – enter where on the GPS+ antenna the antenna height was measured.

- Units – select the unit of measure.

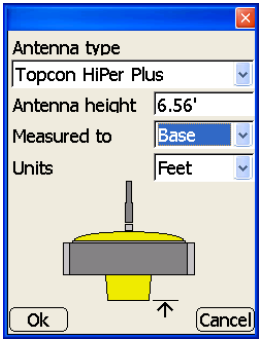



**Figure 2-14. Antenna Setup**

# Base Station

To set Base Station information, tap **Setup ▸ Base Station** (Figure 2-15).

> **NOTE** If the Base station menu item is unavailable, disconnect from the GPS receiver (Survey ▸ Disconnect from GPS).


**Figure 2-15. Setup ▸ Base Station**

On the ***base station configuration*** dialog box (Figure 2-16 on page 2-11), set the following parameters and press **Next**:

- Control point – select the appropriate control point for the base position from the *control point* drop-down list.

- Connection (Pocket-3D) – select the connection to the receiver.

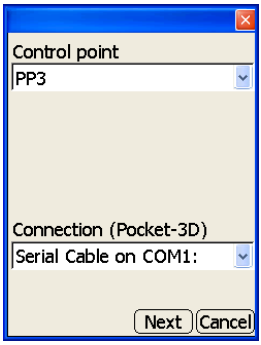



**Figure 2-16. Base Station Configuration**

On the ***antenna setup*** dialog box (Figure 2-17), set the following parameters and press **Ok**:

- Antenna type – select the type of antenna.
- Antenna height – enter the antenna height of the GPS+ antenna.
- Measured to – enter where on the GPS+ antenna the antenna height was measured.
- Units – select either meters, feet, inches, or centimeters.

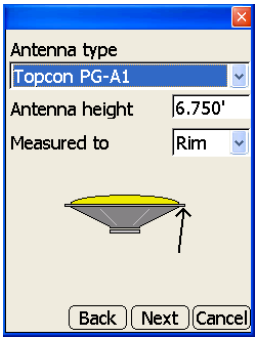
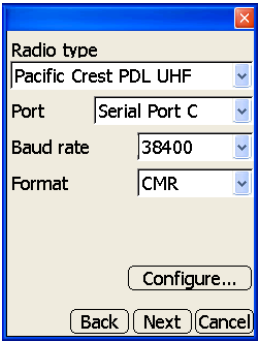



**Figure 2-17. Antenna Setup – Base Station**

On the ***radio setup*** dialog box, set the following parameters (Figure 2-18):

- Radio type – the type of radio.
- Port – the port used for radio connection.
- Baud rate – the speed of communication rate between the radio unit and the GPS+ receiver.
- Format – current GPS+ systems are capable of either CMR or RTCM corrections.
- Configure – changes the radio channel. Press **Configure** to display the ***channel configuration*** dialog box (Figure 2-18). Select the desired channel and the corresponding Frequency displays. Press **Set** to apply the radio channel parameters.
- Press **Next** to display the GPS receiver settings dialog box.



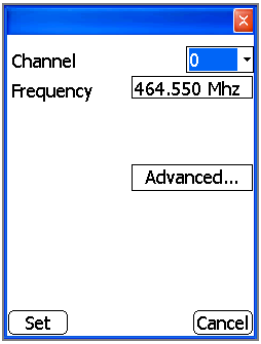




**Figure 2-18. Radio Setup and Channel Configuration Dialog Boxes**

On the ***GPS receiver settings*** dialog box (Figure 2-19 on page 2-13) do the following and press **Finish** to connect to the GPS receiver.

- Use co-op tracking – allows higher efficiency of multipath reduction. This option is only valid for a base station receiver (non-moving).
- Use multipath reduction – reduces multiple reflections from nearby objects.
- Use GLONASS satellites – these satellites will not be included in the position calculations and will not display on the satellite plot if disabled.

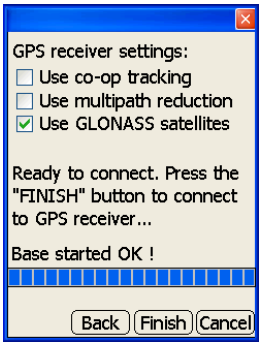



**Figure 2-19. Select GPS Receiver Settings**

# Units

To set project units, tap **Setup ▸ Units** (Figure 2-20).


**Figure 2-20. Setup ▸ Units**

On the ***units*** dialog box (Figure 2-21 on page 2-14), select the desired units for each item from the drop-down lists. Press **Ok** to continue; Pocket-3D saves the entered units.

The units can be changed at any time; Pocket-3D automatically saves the changes.

- Distances – select either Meters, US Survey feet, International feet, or Feet + Inches.

  If using Feet+Inches, all values will show as 1'11"1/2 where 12 inches equal 1 foot and any value smaller than an inch will show as a fraction of an inch.

- Decimal Places – select either 0, 1, 2, 3, or 4 decimal places.
- Angles – select either DD°MM’SS”, NDD°MM’SS”E, Gons, or DD.DDDD°.
- Areas – select either Square meters, Square feet, Acres, or Hectares.
- Volumes – select either Cubic meters or Cubic yards.
- Coords – select either North-East-Elev, East-North-Elev, or X-Y-Z.
- Stations – select either 100.000, 1+00.000, 10+0.000, or 1+000.000.
- Grades – select either Percent (%), Run : Rise, or Rise : Run.

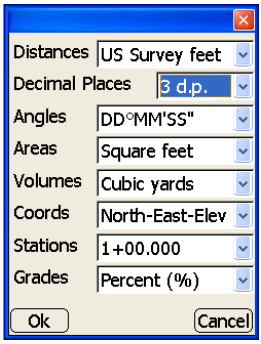



**Figure 2-21. Units**

# Exit

To exit Pocket-3D, tap **Setup ▸ Exit** (Figure 2-22).


**Figure 2-22. Setup ▸ Exit**

# mmGPS Applications

In mmGPS applications, the Setup menu (Figure 2-23) has the following additional menu items. Except for mmGPS setup options, the Setup menu for mmGPS applications is the same as for GPS applications. Other differences are noted below.

- mmGPS transmitters
- mmGPS receiver


**Figure 2-23. Setup Menu for mmGPS Applications**

## Equipment

For further details on the Equipment menu option and setup screens, see “Equipment” on page 2-2. During rover equipment setup for mmGPS applications, an additional screen configures GPS connections; machine setups for mmGPS stay the same.

After setting up the radio during equipment configuration, the ***mmGPS receiver setup*** dialog box displays (Figure 2-24 on page 2-17). Set the following parameters and press **Next**:

- GPS port – select the port used for communication between the receiver and sensor (typically port D).
- Sensitivity – select Auto to automatically control the mmGPS receiver’s detection level of the transmitter’s signal. Select a different setting when working at very short or very long distances, or during inclement weather that can affect laser detection.

- Channels – select the channel to scan for mmGPS connection. The “All” selection will allow the sensor to independently select the transmitter with the smallest error rate[1]. If setting up only one transmitter, but the job has been configured for multiple transmitters, select the individual ID of the transmitter for the sensor to detect.
- Advanced – select advanced mmGPS options.
  - mmGPS aided initialization: select to use the mmGPS signal to assist in initializing the GPS receiver. This option is useful to decrease the initialization time when satellite visibility is limited (for example, tracking only four or five satellites).
  - Calc weighted mmGPS/GPS elevation: select to combine mmGPS elevations and GPS elevations. When selected, this option will force the receiver/sensor to always consider the angle and distance when determining the elevation, then combine the two elevations accordingly. This option works well at large (300m) distances and steep angles.

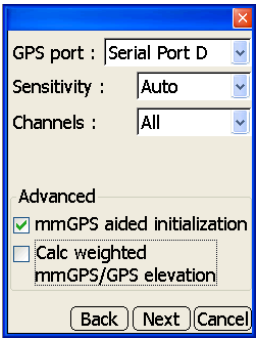



**Figure 2-24. Select mmGPS Information**

1. Note the following exception:
   If using more than one transmitter, and all transmitters have been previously calibrated and initialized, selecting “All” will cause the Pocket-3D program to search for the transmitter with the smallest error rate, even if the physical unit is not set up. In this case, the sensor will not detect the transmitter.

# mmGPS Transmitters

Transmitter calibration data must first be downloaded into Pocket-3D using the *Transmitters* tab (Figure 2-26 on page 2-19). Once this tab contains a list of transmitters, up to four transmitters can be set up on unique channels using the channel tabs (see below). The channel button on the transmitter determines the channel that the transmitter broadcasts on.

To set up transmitter information, tap **Setup ▸ mmGPS transmitters** (Figure 2-25).


**Figure 2-25. Setup ▸ mmGPS Transmitters**

**The Transmitters tab** performs the following (Figure 2-26 on page 2-19):

- **To select a Serial Cable** – select the communication port used between the controller and transmitter; either COM or Bluetooth® comport.
- **To add a transmitter** – tap **Add** and enter a transmitter serial number or other description.
- **To delete a transmitter** – select a transmitter and tap **Delete**.
- **To calibrate the transmitter** – see “TX Calibration” on page 2-20.
- **To load transmitter data for the first time** – tap **Download** to retrieve calibration data from the connected transmitter. The download is complete when the firmware version displays in the *Firmware* column.

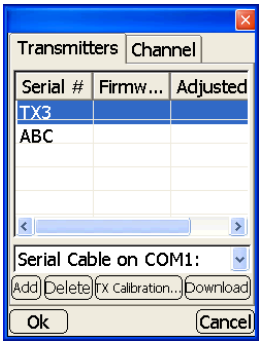



**Figure 2-26. View Transmitters Loaded into Pocket-3D**

**The Channel tab** displays the following transmitter information (Figure 2-27):

- Channel – the channel the transmitter is using.
- Transmitter – the ID of the transmitter.
- ControlPt. – the control point over which the transmitter is set up.
- Height – the height of the transmitter.
- Edit Channel – see “Edit Channel” on page 2-22.

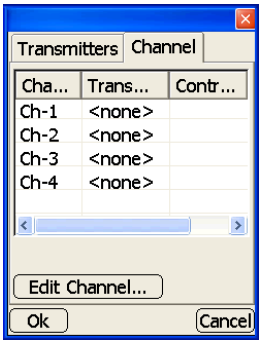



**Figure 2-27. Enter Transmitter Channel Information**

## TX Calibration

The transmitter calibration (adjustment) function fixes errors in incline in the self-leveling mechanism of the transmitter, applying an offset to the transmitter. The transmitter must be in calibration mode for this function and the Rover setup approximately 30 meters (100 feet) away. The height of the sensor must be at an angle less than 1° in relation to the transmitter.

NOTICE

If the sensor experiences excessive movement during any stage of the adjustment, an error message will display. Press Cancel and stabilize the Rover pole. Then press TX calibration again.

To begin a resection, tap **TX Calibration** on the *Transmitters* tab of the ***transmitter setup*** dialog box. If needed, check the setup listed on-screen (Figure 2-28) and tap **OK**.

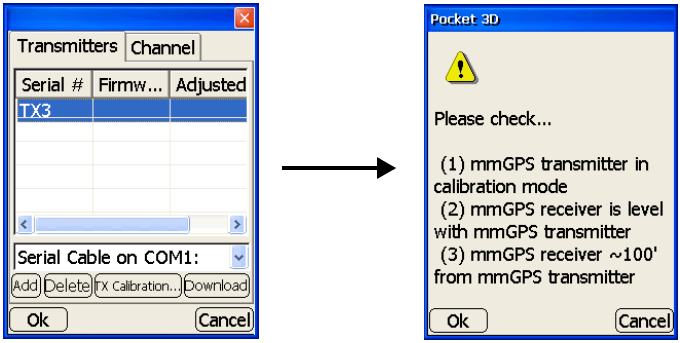



**Figure 2-28. Begin TX Calibration Adjustment**

On the ***transmitter adjustment process*** dialog boxes (Figure 2-29 on page 2-21), follow the instructions on each screen. Press **Next** to continue.

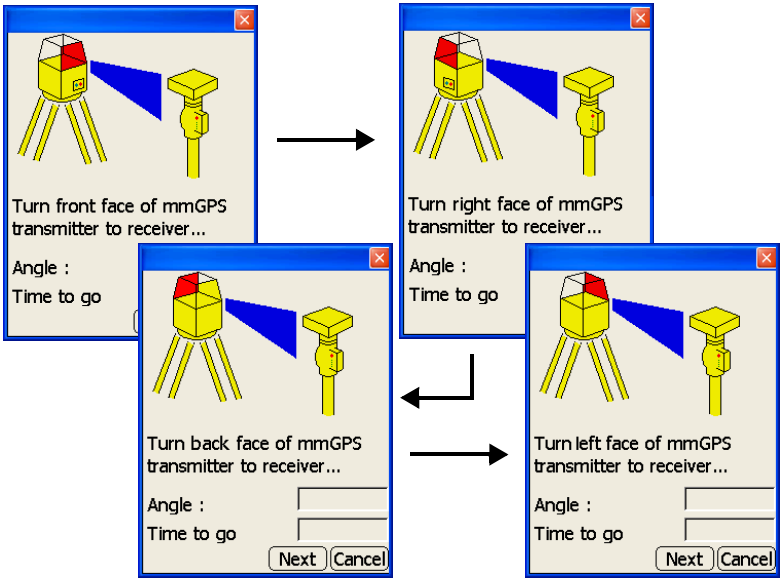



**Figure 2-29. Transmitter Adjustment Process**

When the adjustment completes, the ***Adjustment*** dialog box displays the offsets (Figure 2-30 on page 2-22).

- If both *Axis* measurements are less than 10", no adjustment is needed at the transmitter.
- If either or both *Axis* measurements are more than 10", disconnect from the sensor and connect to the transmitter. Press **Finish** to upload the adjustments to the transmitter. When finished uploading, the transmitter will apply the adjustments and turn off.

TIP

After loading the new self-leveling offset data into the transmitter, re-calibrate to check the system. The transmitter may need to be calibrated a couple of times depending on site conditions.

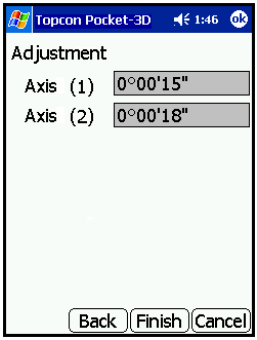



**Figure 2-30. Adjustment Results**

NOTE

This process only applies an offset to the self-leveling mechanism to ensure correct grade. The control point file is not affected.

## Edit Channel

To edit information for the selected transmitter, tap the **Edit Channel** button on the ***Channel*** tab (Figure 2-31 on page 2-23).

On the ***edit channel*** dialog box, edit and select the following parameters and press **Ok** to save (Figure 2-31 on page 2-23).

- Transmitter – select the desired transmitter from the drop-down list.
- Control point – select the control point for the transmitter's position from the drop-down list.
- TX height – enter the height of the transmitter.
- Measured to – select where on the transmitter (Base or Mark/Slant) the height was measured.
- Benchmark check – see "Benchmark Check" on page 2-23.
- Resection – see "Resection" on page 2-24.

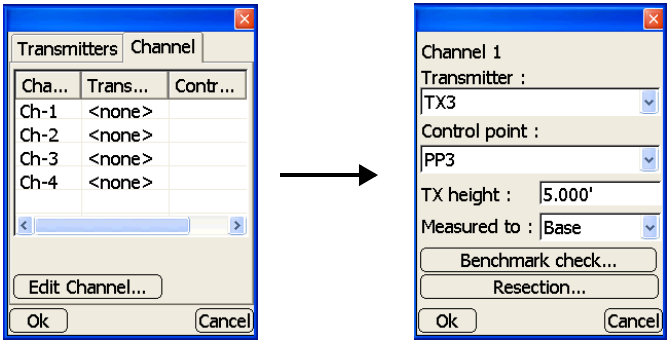



**Figure 2-31. Edit Channel**

## Benchmark Check

This function determines the height of the mmGPS transmitter over a known control point (benchmark) or a point of known elevation.

To take a height measurement of the transmitter, tap **Benchmark check** on the ***channel setup*** dialog box after entering transmitter information (Figure 2-32).

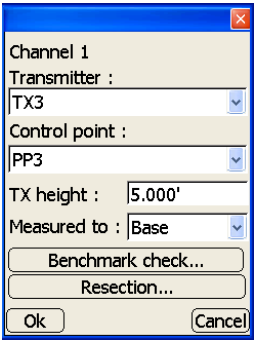



**Figure 2-32. Begin Height Check**

On the ***transmitter height*** dialog box, select one of the following and press **OK** to measure (Figure 2-33). During the measurement, the ***Measuring*** dialog box displays.

- If the transmitter is set up over a known control point, tap the first radio button, then select the control point from the drop-down list.
- If the transmitter is set up over a point with a known elevation tap the second radio button, then enter the elevation of the Rover receiver.

When done, the *Transmitter height* fields display the vertical difference between the height originally specified for the transmitter and the calculated height (Figure 2-33).

- Press **OK** to apply the measured height to the transmitter setup.
- Press **Cancel** to exit without saving the measurement.

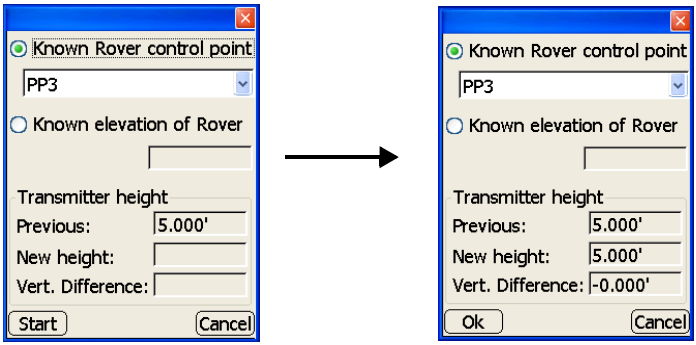



**Figure 2-33. Measure Height of Transmitter**

## Resection

The resection function measures an unknown transmitter location using the rover and three or more points. In general, the results from a resection are adequate for horizontal positioning of the transmitter (an error estimate will also display). Performing a height check and adjustment will fine-tune the calculated elevation.

When performing a resection, use the following guidelines to ensure accurate measurements at the Rover points:

- take measurements at three or more points around the Base transmitter in a balanced, symmetrical pattern (not clustered in one area)
- have the sensor facing towards the transmitter during each measurement
- angle the sensor between 6° higher or lower than the transmitter's beam, not straight on

To begin a resection, tap the **Resection** button on the ***channel setup*** dialog box (Figure 2-34).

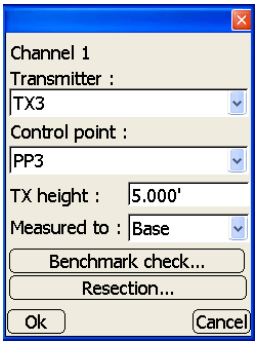



**Figure 2-34. Begin Resection**

On the ***resection*** dialog box, enter the following parameters and press **Measure** (Figure 2-35 on page 2-26). During the measurement, the ***Measuring*** dialog box displays. When done, the *Pts. in calculation* field will increment by one.

- Duration (secs) – enter the duration, in seconds, in which to measure the point.
- H. Precision / V. Precision – enter a horizontal / vertical precision, in the project's units, with which to measure the point.

After three points have been successfully measured, horizontal and vertical errors for the measured point will display (Figure 2-35 on page 2-26). Further measurements should improve the positional error.

To clear the measurements and begin again, press **Reset**.

The point name will be automatically added to the list of control points as “TX-[n] (Resected)”, where “n” is the channel number. Subsequent resections with the same transmitter will overwrite any previous points.

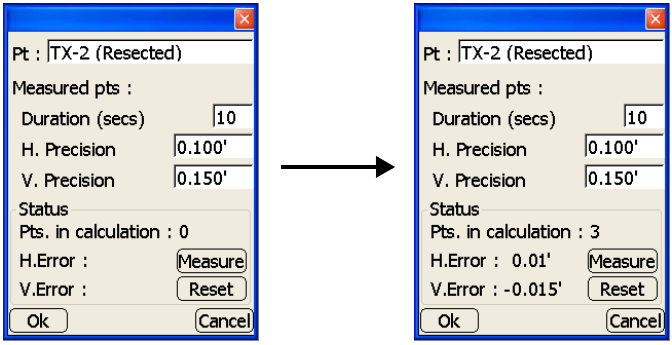



**Figure 2-35. Resection**

# mmGPS Receiver

To set mmGPS receiver information, tap **Setup ▸ mmGPS receiver** (Figure 2-36).


**Figure 2-36. Setup ▸ LazerZone Receiver**

On the ***mmGPS setup*** dialog box, set the following parameters and press **Ok** (Figure 2-37):

- GPS port – select the port used for communication between receiver and sensor (typically port D).
- Sensitivity – select Auto to automatically control the mmGPS receiver's detection level of the transmitter's signal. Select a different setting when working at very short or very long distances, or during inclement weather that can affect laser detection.
- Channels – select the channel to scan for mmGPS connection. See page 2-17 for details.
- Firmware – the firmware version displays after the download of calibration data from the connected transmitter completes.
- Advanced – select advanced mmGPS options.
  - mmGPS aided initialization: select to use the mmGPS signal to assist in initializing the GPS receiver. See page 2-17 for details.
  - Calc weighted mmGPS/GPS elevation: select to combine mmGPS elevations and GPS elevations. See page 2-17 for details.

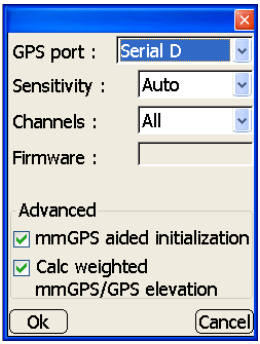



**Figure 2-37. Select mmGPS Receiver Information**

# LPS Applications

In LPS applications, the Setup menu (Figure 2-38) has the following menu items:

- Equipment
- Station Setup
- LS2000 Receiver
- Units
- Exit


**Figure 2-38. Setup Menu for LPS Applications**

## Equipment

The Equipment menu selection creates and edits equipment configuration files. Equipment configuration files contain information specific for the equipment, such as, machine type, receiver type and location, dimensions of the cutting edge, offset lengths depending on the position of the receiver, and radio configuration.

To access available equipment configuration files, tap **Setup ▸ Equipment** (Figure 2-39 on page 2-29).


**Figure 2-39. Setup ▸ Equipment**

From the ***Equipment configurations*** dialog box (Figure 2-40), equipment configuration files can be created within Pocket-3D and transferred to the machine Control Box to be used for machine configuration. (A machine configuration file must be created before grading.) Refer to the *System Five-3D Reference Manual* for more information on the control box.

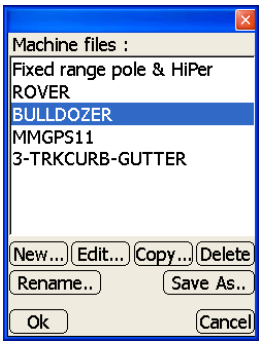



**Figure 2-40. Equipment Configurations Dialog Box**

Once equipment configuration files are created and stored in the internal memory, they can be selected and adjusted at the beginning of the job, depending on the setup of the sensor.

Press **New** to display the ***configuration name/type*** dialog box (Figure 2-41) and create an Equipment Configuration file. Enter the following information and press **Next**. Some selections depend on the purchased options for Pocket-3D.

- Configuration name – type a name for the Equipment Configuration.
- Machine type – select either Range pole, Bulldozer, Motor grader, or 3-track curb & gutter. The screens display different settings depending on the machine type selection.
- Sensor – select the type of sensor used on the machine; either LS-2000 receiver or prism.
- Location – select the sensor's location; either Top of pole for Range pole, Middle for Bulldozer and 3-track curb & gutter, Left/ Right for Motor grader.
- Units –select the unit of measure. Note: These units do not relate to job units.

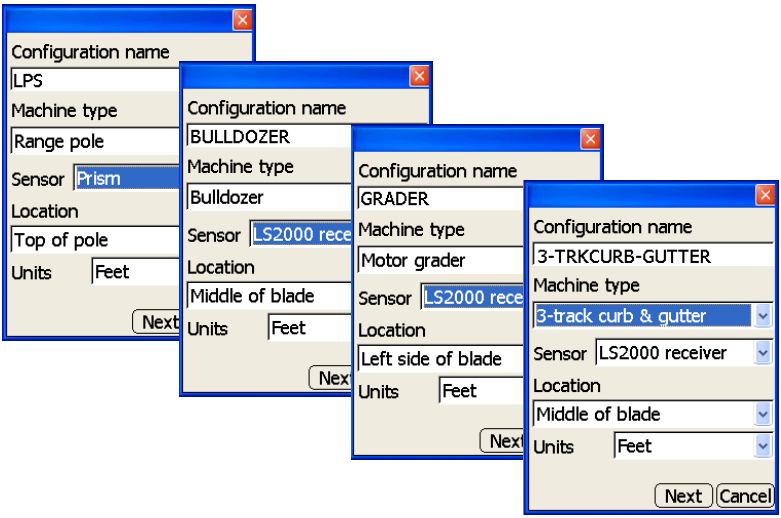



**Figure 2-41. Configuration Name/Type**

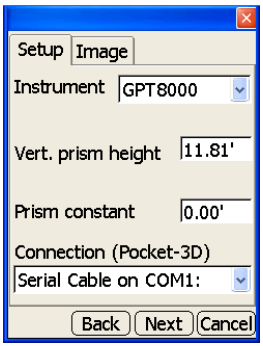
## Sensor and Machine Setup Information

On the ***sensor information*** dialog box, enter the following information using the same units of measure entered in the previous step and press **Next**.

> **NOTE** Some of the machine settings have a corresponding *Image* tab to illustrate the setup.

**For the range pole,** on the ***range pole setup*** dialog box, select and enter the following information (Figure 2-42) and press **Next** to continue:

- Instrument – select the total station being used (GPT-8000).
- Vert. prism height – enter the vertical height of the prism.
- Prism constant – enter the prism constant. This constant is dependent on the manufacturer of the prism; usually -30 mm for a single prism and zero for a 360° prism.
- Connection (Pocket-3D) – select the communication port used between the controller and instrument; COM1 or Bluetooth on equipped total stations.



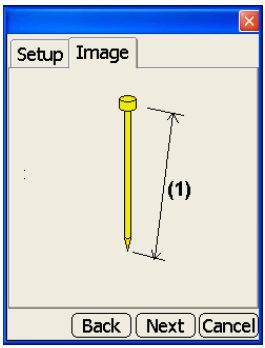




**Figure 2-42. Range Pole Sensor Information**

- On the ***Advanced*** dialog box (Figure 2-73), set the following parameters, and press **Next** to continue:
  - Connect: the means of connection; select either Cable in STD mode, Cable in Ext. Link mode, Radio Modem (Ext. Link), or RC (Ext. Link)
  - Baud rate: select either 1200, 2400, 4800 or 8400
  - Data Bits: select either 7 or 8
  - Stop Bits: select either 1 or 2
  - Parity: select either None, Odd, or Even

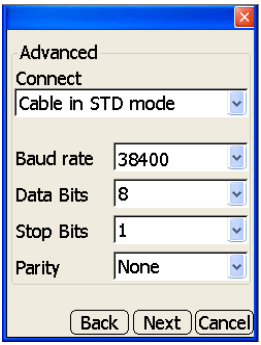



**Figure 2-43. Advanced Dialog Box for the Range Pole**

NOTE

The Advanced dialog box is only available when a prism sensor is selected.

**For dozers and graders,** on the ***blade setup*** dialog box, enter the following measurements (Figure 2-44 on page 2-33) and press **Next**:

- Blade width – enter the width of the blade.
- Height of prisms above cutting edge – enter the distance from the center of the prism to the cutting edge.
- Offset of mast behind cutting edge – enter the distance of the mast behind the cutting edge.
- Offset of mast from right edge – only available for dozers; enter the distance from the mast to the right edge of the blade.

- Offset of mast from edge of blade – only available for motor graders; enter the distance from the mast to the edge of the blade.

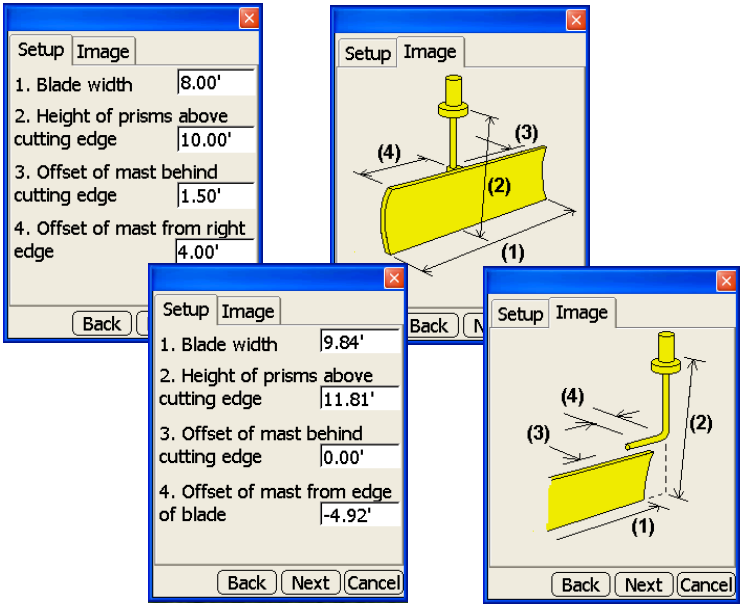



**Figure 2-44. Dozer and Grader Sensor Information**

- On the ***Advanced*** dialog box (Figure 2-45 on page 2-34), set the following parameters, and press **Next** to continue:
  - Connect via: the means of connection; select either Cable in STD mode, Cable in Ext. Link mode, Radio Modem (Ext. Link), or RC (Ext. Link)
  - Baud rate: select either 1200, 2400, 4800, or 9600
  - Data Bits: select either 7 or 8
  - Stop Bits: select either 1 or 2
  - Parity: select either None, Odd, or Even

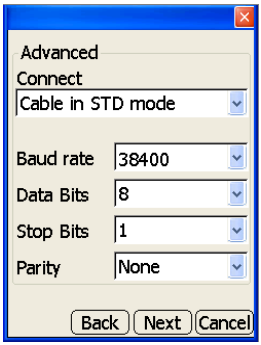



**Figure 2-45. Advanced Dialog Box**

NOTE

The Advanced dialog box is only available when a prism sensor is selected.

**For 3-track curb and gutter machines,** on the ***mold reference point*** dialog box, enter the following measurements (Figure 2-46 on page 2-35) and press **Next**:

- Above – enter the distance from the mold point to the base of the prism.
- Right – enter the distance from the mold point to the base of the receiver pole. When facing forward, this will be to the right of the mold point (the LS2000 is typically placed between the front legs of the machine).
- Ahead – enter the distance from the mold point to the base of the receiver. When facing forward, this will be from the back of the machine.

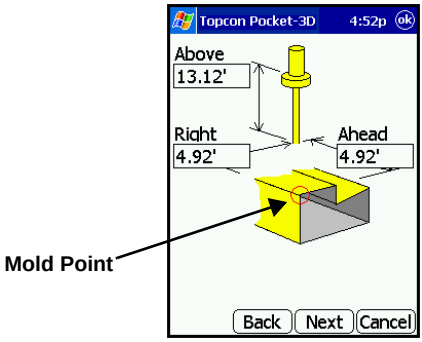



**Figure 2-46. 3-track Curb and Gutter Machine Sensor Information**

**For 3-track curb and gutter machines,** on the ***track distance measurement*** dialog box, enter the following measurements for each track (Figure 2-47) and press **Next**. For control purposes, the LS2000 receiver is typically placed at a forward position on the machine between the front two tracks.

- Ahead – enter the distance to the front from the mold point to the center of the track.
- Right – enter the distance to the right from the mold point to the center of the track.

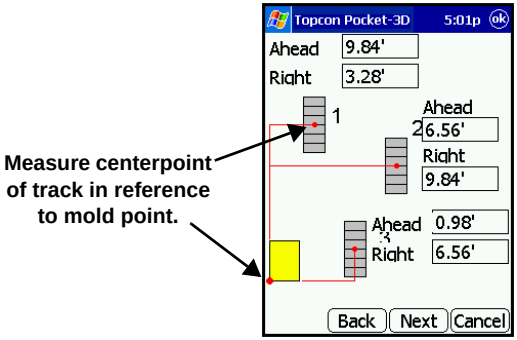



**Figure 2-47. 3-track Curb and Gutter Track Information**

For 3-track curb and gutter machines, the ***Advanced*** dialog box follows if a prism sensor is selected. See Figure 2-45 on page 2-34 for more information. The ***Machine configuration complete*** dialog box (Figure 2-49 on page 2-37) follows the ***Advanced*** dialog box.

## In-cab Display (Dozer and Grader Machines)

On the ***in-cab display*** dialog box (Figure 2-48), enable the following selections, and press **Next**:

- Enable "Machine has 3D display". Leave this disabled if you have no in-cab display. (Only available for dozers and motor graders.)
- Enable one of the following GRT2000 controlled options:
  - by Pocket-3D controller: for the control method (standard selection). (Only available for dozers and motor graders.)
  - remotely via radio link: if your system has special radio equipment for 3D LPS Control, set the correct radio type and baud parameters.

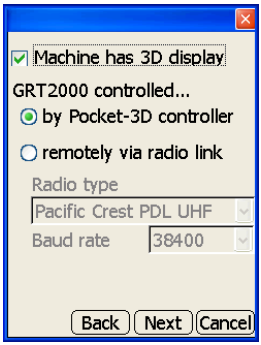



**Figure 2-48. In-Cab Display Dialog Box**

For dozer and grader machines, the ***Machine configuration complete*** dialog box (Figure 2-49 on page 2-37) follows the ***in-cab display*** dialog box.

## Machine Configuration Complete

On the ***Machine configuration complete*** dialog box, press **Finish** to save the configuration file (Figure 2-49).

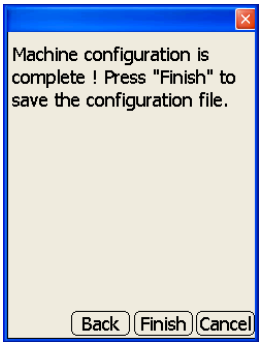



**Figure 2-49. Machine Configuration Complete Dialog Box**

# Station Setup

To orient the GRT2000 on the job site, tap **Setup ▸ Station Setup** (Figure 2-50).


**Figure 2-50. Setup ▸ Station Setup**

On the ***setup method*** dialog box, set the following parameters and press **Next** (Figure 2-51 on page 2-38):

- Setup method – select one of the following:
  - Known station & BS pts: the most common method. Select a station point and a backsight point from the list of control points for the job site.

– Known station & azimuth: select a station point from the list of control points and enter an azimuth value for the orientation.

– New station by resection: add a control point to the resection and take a measurement to each point. Measurements may be a combination of “horizontal angle”, “horizontal and vertical angles”, or “horizontal and vertical angles and slope”. You can use any number of points, but at least three points should be used for an accurate resection. Once computed, add the new, resected point to the control point file.

– Unknown Point: automatically create this point in the database as point 1 with an assumed coordinate system of Northing (5000), Easting (5000), and Elevation (100). A point is created in the database for calculations.

- Instrument height – enter the measured height of the GRT-2000.
- Units – enter the units used to measure the height of the instrument.

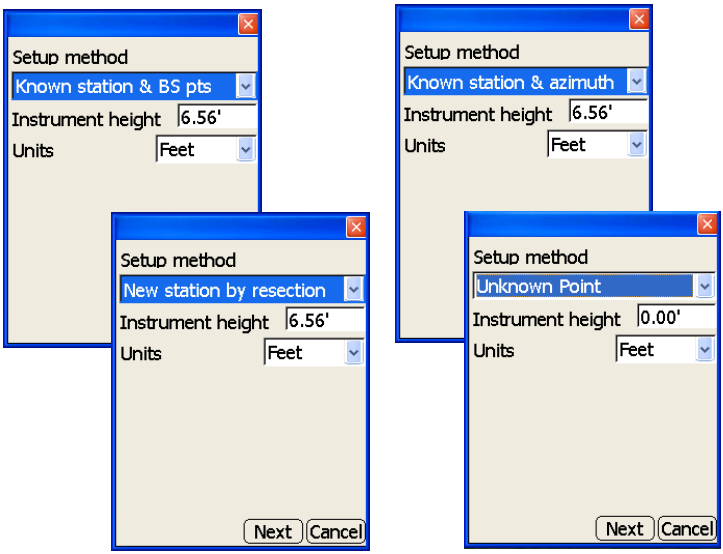



**Figure 2-51. Setup Station**

## Known Station & Backsight Point

On the ***backsight setup*** dialog box, set the following parameters and press **Next** (Figure 2-52).

- Station – select the control point over which the instrument is set.
- Backsight – select the control point used as the backsight.
- Backsight has prism – enable if the backsight has a prism.
- Target height – enter the height of the backsight prism.
- Prism constant – enter the prism constant for the backsight prism.

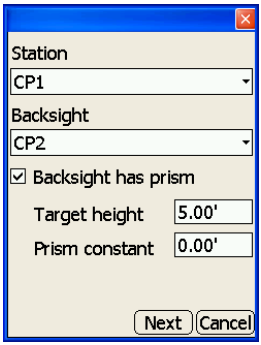



**Figure 2-52. Known Station and Backsight**

**The sight backsight** dialog box (Figure 2-53), sights the backsight. Press **Ok** to continue.


**Figure 2-53. Sight Backsight**

**The Backsight results** dialog box (Figure 2-54), verifies backsight information. Press **Ok** to continue.

- Backsight – displays the current control point being used as the backsight.
- H.Angle – displays the horizontal angle difference.
- V.Angle – displays the vertical angle difference.
- S. Dist – displays the slope distance difference.

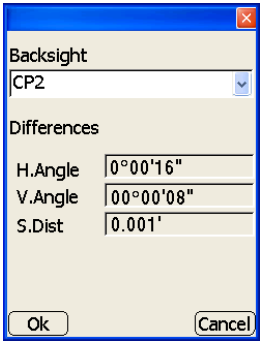



**Figure 2-54. Backsight Results**

**The Station coordinates** dialog box (Figure 2-55), verifies the northing, easting, and elevation coordinates for the station. Press **Finish** when done.

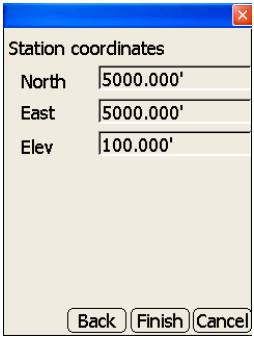



**Figure 2-55. Station Coordinates**

## Known Station & Azimuth

On the ***backsight setup*** dialog box (Figure 2-56), set the following parameters and press **Next**.

- Station – select the control point the instrument is over.
- Backsight azimuth – enter the desired backsight azimuth.

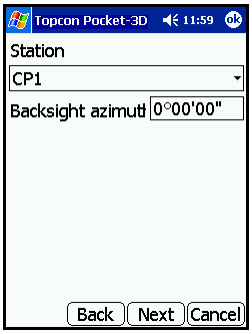



**Figure 2-56. Backsight Setup**

**The sight backsight** dialog box (Figure 2-57), sights the backsight. Press **Ok** to continue.


**Figure 2-57. Sight Backsight**

**The Station coordinates** dialog box (Figure 2-58), verifies the north, east, and elevation coordinates for the station. Press **Finish** when done.

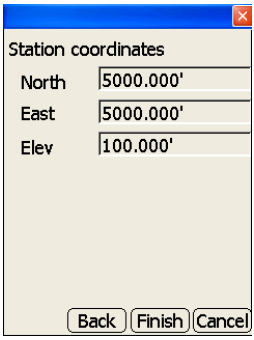



**Figure 2-58. Station Coordinates**

## New Station by Resection

The ***control points*** dialog box displays all points used in the resection (Figure 2-59). After adding the desired number of control points, press **Next** to continue.

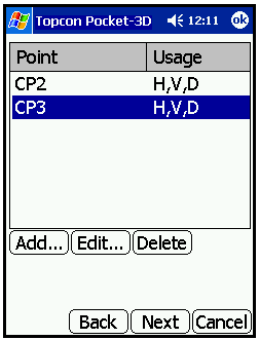



**Figure 2-59. Control Points Dialog Box**

- Add – On the ***control points*** dialog box, press **Add** to add a control point to the resection (Figure 2-60). Enter the desired parameters and take a measurement of the control point, then press **Ok** to save the information. Repeat these steps for each control point.
  - Name: select the control point to be used in the resection.
  - Usage: select how the control point will be used. Either 'horizontal angle', 'horizontal and vertical angles', or 'horizontal and vertical angles and slope'.
  - HT: enter the height of the control point's prism.
  - PC: enter the prism constant for the control point's prism.
  - H.Angle: after pressing the Observe button, displays the horizontal angle to the selected control point.
  - V.Angle: after pressing the Observe button, displays the vertical angle to the selected control point.
  - S. Dist: after pressing the Observe button, displays the slope distance to the selected control point.
  - Observe: press **Observe** to measure the control point.

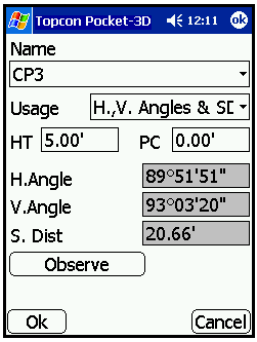



**Figure 2-60. Add Control Point to Resection**

- Edit – On the ***control points*** dialog box, press **Edit** to edit the selected control point. See the "Add" bullet on page 2-43 and Figure 2-58 on page 2-42 for details.
- Delete – On the ***control points*** dialog box, press **Delete** to delete the selected control point.

The program always confirms the deletion of a selected point. Select **Yes** to confirm the deletion.

**The Station coordinates/deviations results** dialog box (Figure 2-61), verifies the station coordinates results. Press **Next** when done.

- Station coordinates
  - North: displays the northing for the new control point.
  - East: displays the easting for the new control point.
  - Elev: displays the elevation for the new control point.
- Standard deviations
  - North: displays the standard deviation for the northing.
  - East: displays the standard deviation for the easting.
  - Elev: displays the standard deviation for the elevation.

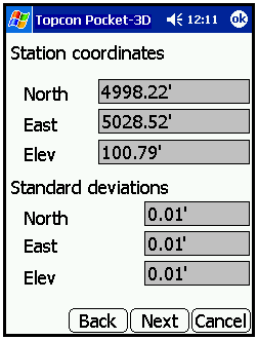



**Figure 2-61. Station Coordinates Results**

**The sight control point** dialog box (Figure 2-62 on page 2-45), sights the target of the control point. Press **Ok** to continue.

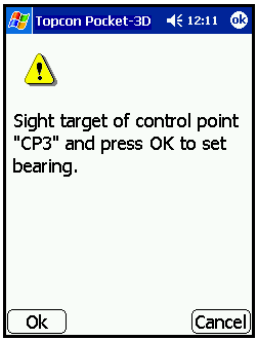



**Figure 2-62. Sight Control Point**

**The new control point** dialog box (Figure 2-63), verifies station coordinates. Enter desired parameters and press **Finish**.

- Station coordinates
  - North: displays the northing for the new control point.
  - East: displays the easting for the new control point.
  - Elev: displays the elevation for the new control point.
- Add this point to list – enable to add the new point to the control point list.
- Name – enter the name of the new control point.

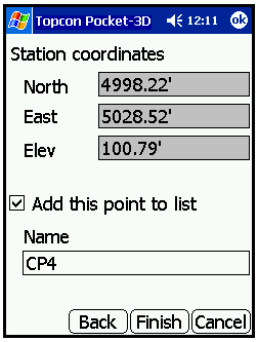



**Figure 2-63. New Control Point**

## Unknown Point

**The Station coordinates** dialog box (Figure 2-64) verifies the northing, easting, and elevation coordinates for the station. Press **Finish** to create the unknown station.

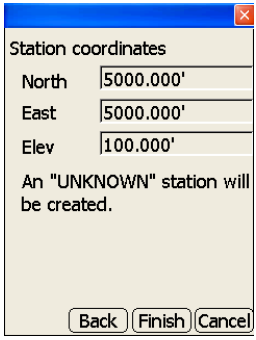



**Figure 2-64. Unknown Points Dialog Box**

# LS2000 Receiver

To set up the LS-2000 receiver, tap **Setup ▸ LS-2000 Receiver** (Figure 2-65).


**Figure 2-65. Setup ▸ LS-2000 Receiver**

**On the receiver setup process** dialog boxes (Figure 2-66 and Figure 2-67 on page 2-48) follow the instructions on each screen. Press **Next** to continue.

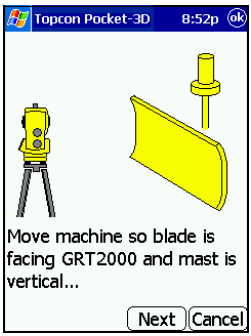
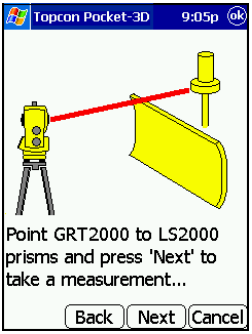



**Figure 2-66. Receiver Setup Process – Step 1**



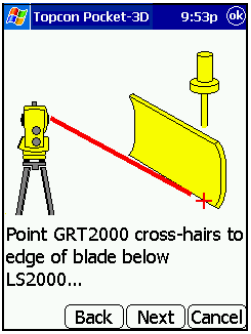




**Figure 2-67. Receiver Setup Process – Step 2 and Step 3**

**On the LS-2000 height** dialog box (Figure 2-68), enter the desired parameters and press **Finish**. Tap the entry box to display the small pop-up keyboard and enter the measured height of the LS2000 receiver, then press **Ok**.

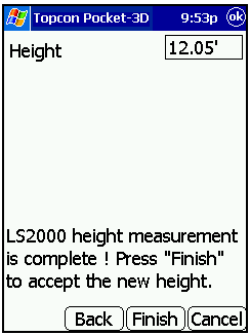



**Figure 2-68. LS-2000 Height Dialog Box**

# Units

To set project units, tap **Setup ▸ Units** (Figure 2-69).


**Figure 2-69. Setup ▸ Units**

On the ***units*** dialog box, select the desired units for each item from the drop-down lists (Figure 2-70 on page 2-50). Press **Ok** to continue; Pocket-3D saves the entered units.

Units can be changed at any time; Pocket-3D automatically saves the changes.

- Distances – select either Meters, US survey feet, International feet, or Feet + Inches (measures to a fraction of an inch).

  If using Feet+Inches, all values will show as 1'11"1/2 where 12 inches equal 1 foot and any value smaller than an inch will show as a fraction of an inch.
- Decimal Places – select either 0, 1, 2, 3, or 4 decimal places.
- Angles – select either DD×MM'SS", NDD×MM'SS"E, Gons, or DD.DDDD×.
- Areas – select either Square meters, Square feet, Acres, or Hectares.
- Volumes – select either Cubic meters or Cubic yards.
- Coords – select either North-East-Elev, East-North-Elev, or X-Y-Z.
- Stations – select either 100.000, 1+00.000,10+0.000, or 1+000.000.

- Grades – select either Percent (%), Run : Rise, or Rise : Run.

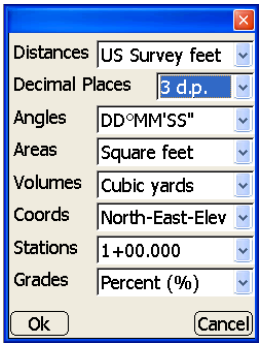



**Figure 2-70. Units**

# Exit

To exit Pocket-3D, tap **Setup ▸ Exit** (Figure 2-71).


**Figure 2-71. Setup ▸ ExiT**

# Total Station Applications

In total station applications, the Setup menu has a Range-pole menu item (Figure 2-72). Except for range pole setup options, the Setup menu for total station applications is the same as for LPS applications. Other differences are noted below.

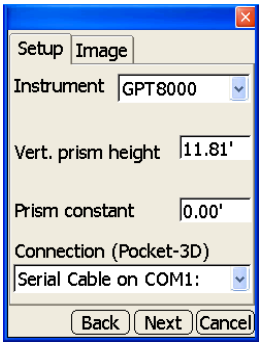

**Figure 2-72. Setup Menu for Total Station Applications**

## Equipment

For further details on the Equipment menu option and setup screens, see “Equipment” on page 2-28.

For the range pole and total station, enter and select the following information during equipment configuration (Figure 2-73 on page 2-52):

- Instrument – select the desired total station (GPT8000).
- Vert. prism height – enter the vertical height of the prism.
- Prism constant – enter the prism constant. This constant is dependent on the manufacturer of the prism; usually -30 mm for a single prism and zero for a 360° prism.
- Connection (Pocket-3D) – select the communication port used between the controller and instrument; COM1 or Bluetooth on equipped total stations.



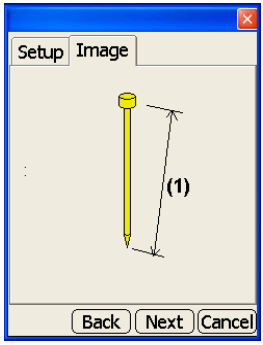




**Figure 2-73. Setup/Image Tabs for Total Station**

On the ***Advanced*** dialog box for prism sensors only, select how you want to connect the total station (Figure 2-74 on page 2-53).

- Cable in STD mode – select to connect the total station via standard cable.
- Cable in Ext. Link mode – select to connect the total station via cable
- Radio Modem (Ext. Link) – select to connect total station via Radio Modem.
- RC (Ext. Link) – select to connect total station via remote control.

NOTE

For a conventional total station, for example GTS 200, you can only connect via Cable in Standard Mode.

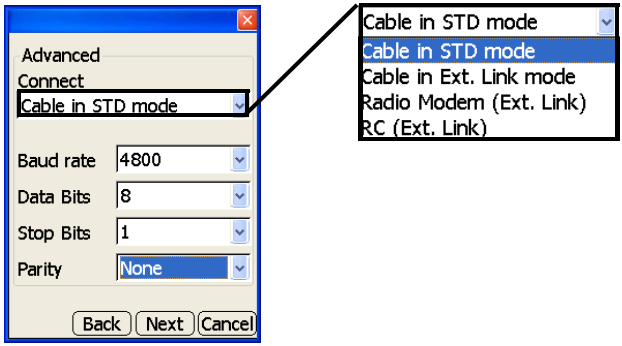



**Figure 2-74. Select Total Station Connection Type**

# Range-pole

To set up the range pole, tap **Setup ▸ Range-pole** (Figure 2-75).

On the ***range pole setup*** dialog box (Figure 2-75), select or enter the following parameters and press **Ok**.

- Units – select the unit of measure. Note: These units do not relate to job units.
- Vert. dist. from prism center to pole tip – enter the measured distances for the prism and the offset.
  - Height of prism: enter the vertical height of the prism.
  - Prism offset: enter the prism offset.

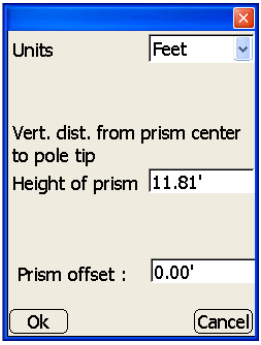



**Figure 2-75. Range Pole Parameters**

# Notes:

# Data Menu

The Data menu (Figure 3-1) has the following menu items:

- Control
- Surface
- Alignment
- Linework
- Points
- Calc Wizard
- Clear Selection


**Figure 3-1. Data Menu**

# Control

Used in both 3D GPS+, Total Station, and 3D LPS applications, the Control menu creates, edits, and deletes Control Point files. Control Point files can also be copied between the Pocket-3D controller and the Control Box using a Flash Card.

Control Point files store ground coordinates and WGS84 values for each point. These values are required to position the Design Surface in the proper location. When beginning a job, the project's survey team locates and measures jobsite control points, called localization. When beginning a job, obtain a list of all control points in and around the jobsite.

Before beginning any 3D project, the operator must obtain or create a new Control Point file. Once stored in the internal memory, select the correct file before starting localization.

## Current File or <none>

Displays the current file loaded as the Control Point file. If no file currently selected, displays "<none>".

To access available Control files or to create a new Control file, tap **Data ▸ Control ▸ [<none> or file name]** (Figure 3-2).


**Figure 3-2. Data ▸ Control Menu ▸ [File Name]**

To change the Control Point file, select it and pick another file from the list and press **Ok** (Figure 3-3). At the verification screen press **Yes** to use this Control Point file for the current project. Control Point Files can be created, copied, or deleted. GPS localization files can also be viewed and saved.

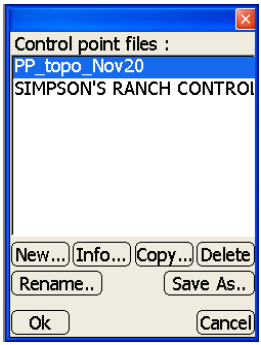



**Figure 3-3. Control Files Dialog Box**

- New – creates a new file by giving it a file name. After naming the file, press **Ok** to save the information (Figure 3-4).

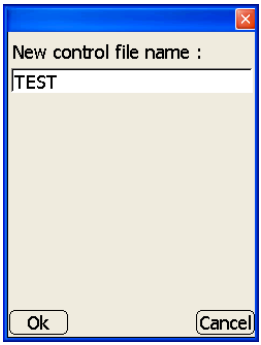



**Figure 3-4. New Control File**

- Info – displays the information on the selected file (Figure 3-5). Press **Save** to save the information as a text file. Enter the name of the new file and press **Ok**.

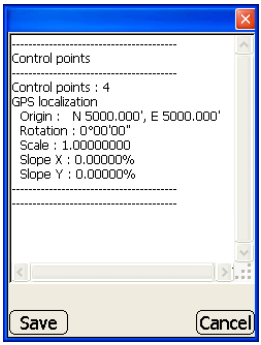



**Figure 3-5. Control Point Information**

- Copy – copies a file either from the Internal memory, Network, or CF (Compact Flash) Card, to the Network or CF Card. The touch screen lists all files available for copying. To copy a file, select a file, then press **Ok** (Figure 3-6).

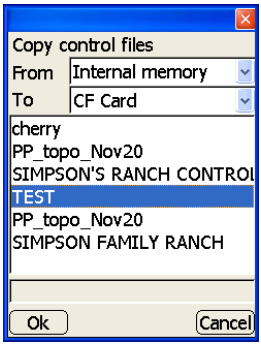



**Figure 3-6. Copy Control Files**

- Delete – removes an existing file from the internal memory. To delete a file, select a file, then press **Delete**.

  The program always reminds the operator to confirm deletion of a selected file. Select **Yes** to confirm the deletion.

- Rename – opens the ***New control file name*** dialog box (Figure 3-4 on page 3-3) for changing the name of the selected file.
- Save As – opens the ***New control file name*** dialog box (Figure 3-4 on page 3-3) for saving the selected file as another file.

# Control Points

To add, edit, delete, or import a control point into the selected Control Point file, tap **Data ▸ Control ▸ Control Points** (Figure 3-7).


**Figure 3-7. Data ▸ Control ▸ Control Points**

The ***control points*** dialog box displays all points within the selected file (Figure 3-8).

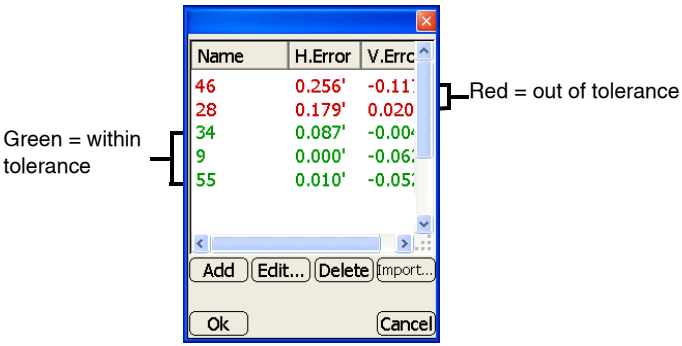



**Figure 3-8. Control Points Dialog Box**

**Add Control Point** On the ***control points*** dialog box, press **Add** to enter a control point and its respective information (Figure 3-9). After entering the control point's information, press **Ok** to save the information.

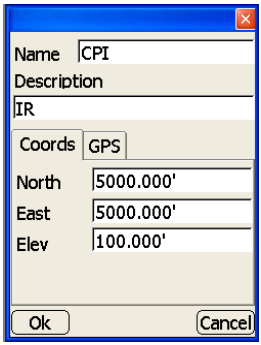



**Figure 3-9. Add Control Point**

- Name – enter in the name of the control point.
- Description – enter in a description (if desired) for the control point.
- Coords tab – displays the Northing, Easting, and Elevation for the control point (Figure 3-9).
- Tap in each *coordinate* entry box to enter the coordinates for Northing (North), Easting (East), and Elevation (Elev).
- GPS tab – displays the Latitude, Longitude, and Height for the control point (Figure 3-10 on page 3-7). Either manually enter the lat/long and height or obtain this information using the GPS+ receiver. Measuring each point is the standard practice for localization.
  - If you have precise *GPS coordinates*, enter the coordinates for Latitude (Lat), Longitude (Lon), and Height (Hgt). Skip this step when measuring points for localization.
  - Use horizontal: used for the purpose of localization. Enable to use the control point as a horizontal control point.
  - Use Vertical: used for the purpose of localization. Enable to use the control point as a vertical control point.

– Measure: used in localization to acquire precise GPS coordinates. Press **Measure** when ready to collect a point; the ***measurement*** dialog box opens and the Rover begins to measure the Control Point.

After a successful measurement, measured GPS coordinates display in the *Lat* (latitude), *Lon* (longitude), and *Hgt* (height) entry boxes. Press **Ok** to save the measurements and return to the ***control points*** dialog box.

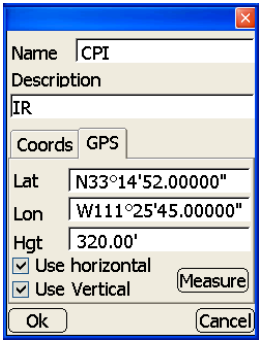



**Figure 3-10. Add Control Points – GPS Tab**

**Edit Control Point** On the ***control points*** dialog box, press **Edit** to edit the selected control point. See “Add Control Point” on page 3-6, Figure 3-9 on page 3-6 and Figure 3-10 for details.

**Delete Control Point** On the ***control points*** dialog box, press **Delete** to delete the selected control point.

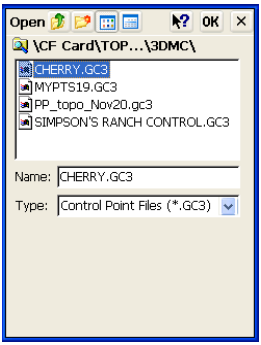
The program always reminds the operator to confirm deletion of a selected file. Select **Yes** to confirm the deletion.

**Import Control Point(s)** On the ***control points*** dialog box, press **Import**.

On the ***file explorer*** dialog box, navigate to and select the point file from which to import points. Control points are imported from a Topcon control point file (*.gc3) (Figure 3-11 on page 3-8).

On the ***control points in file*** dialog box, select the control points to import and tap **Ok**.

- Source filename – displays the location and name of the file from which to import control points. Press the **browse** (“**...**”) button to select a new/different control point file.
- Control point list – lists all points in the selected file. Select the point(s) to import into the current point file and tap **Ok**.



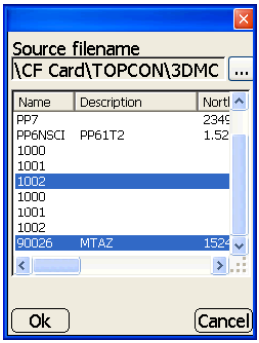




**Figure 3-11. Import Control Point from File Dialog Box and Explorer Dialog Box**

# Import/Export

To import a control file, tap **Data ▸ Control ▸ Import/Export ▸ From text file** (Figure 3-12).

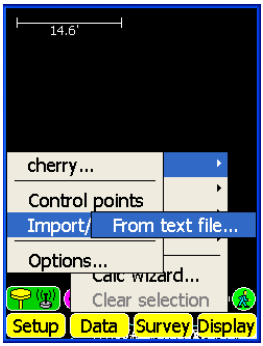



**Figure 3-12. Data ▸ Control ▸ Import/Export ▸ From Text File**

## From Text File

This menu option imports a text file as a control point file.

On the ***conversion*** dialog box (Figure 3-13), select the following options:

- Source text file – press the **browse** ("**...**") button to select the text file to import.
- Conversion format – select the conversion format from the drop-down list. See Figure 3-14 on page 3-10 and "Conversion Formats" on page 3-9 for details on creating formats.

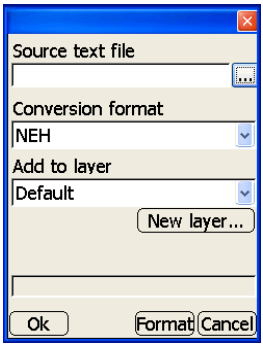



**Figure 3-13. Import From a Text File**

## Conversion Formats

To create, edit, or delete a conversion format, press **Format** on the ***import from text file*** dialog box. The ***Conversion formats*** dialog box displays (Figure 3-15 on page 3-10).

- New – on the ***Conversion formats*** dialog box (Figure 3-14 on page 3-10), press **New** to enter a conversion format.
  - Format name: enter the name of the conversion format.
  - Extension (for example, TXT): enter an extension type. Only enter generic ASCII formats; such as, .txt, .asc, .csv, etc.

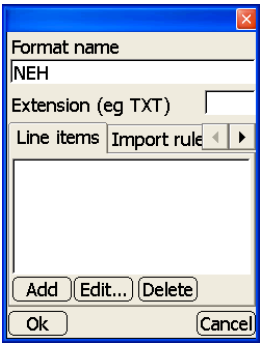



**Figure 3-14. Conversion Format Parameters Dialog Box**

- Edit – on the ***Conversion formats*** dialog box, press **Edit** to edit the selected format. See the "New" bullet above for details on the dialog box that displays.
- Delete – on the ***Conversion formats*** dialog box, press **Delete** to delete the selected format.

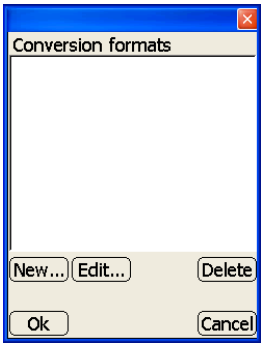



**Figure 3-15. Conversion Formats**

**The Line Items** tab on the ***conversion format parameters*** dialog box adds, edits, or deletes line items for the selected conversion format (Figure 3-17 on page 3-11).

- Add – on the *Line items* tab, press **Add** to add a line item and it's respective information (Figure 3-16 on page 3-11), then press **Ok** to save the information. Repeat this process for each line item.
  - Type: select either Point name, Point description, Point northing, Point easting, Point elevation, Point layer name,

Literal text string, Point WGS84 latitude, Point WGS84 longitude, or Point height.

– Append: select either Trailing comma, Trailing space, Trailing tab, or Nothing.

– Fixed width field: enable to select a fixed width for each field.

– Justified: select Left, Right, or None.

– Width: enter the width of the field.

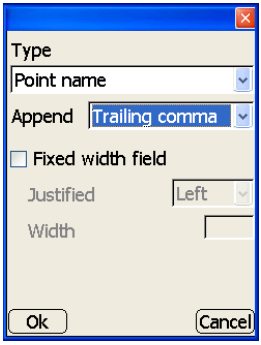



**Figure 3-16. Enter Line Item Information**

- Edit – on the *Line items* tab, press **Edit** to edit the selected line item. See the "Add" bullet above and Figure 3-17 for details on editing the line item.
- Delete – on the *Line items* tab, press **Delete** to delete the selected line item. (Figure 3-17).

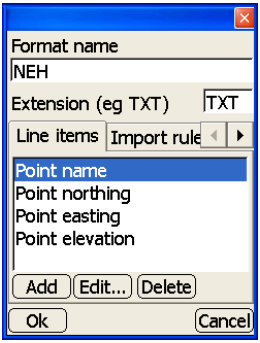
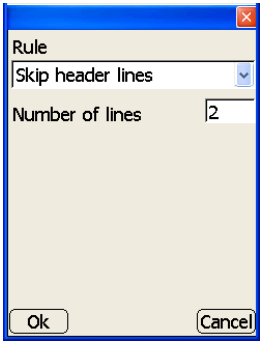



**Figure 3-17. Line Items Tab**

**The Import Rules** tab adds, edits, or deletes import rules for the selected conversion format (Figure 3-19).

- Add – on the *Import rules* tab, press **Add** to add an import rule and it's respective information (Figure 3-18). After entering in all of the import rule's information press **Ok** to save the information.
  - Rule: select either Skip header lines or Skip prefixed lines.
  - Number of lines: enter the desired number of header lines to skip during import.
  - Prefix: enter the prefix of the lines to skip during import.



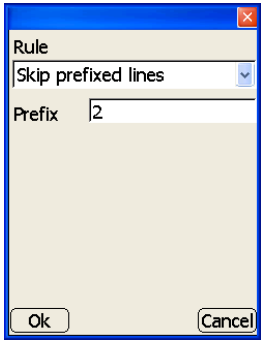




**Figure 3-18. Add Import Rules**

- Edit – on the *Import rules* tab, press **Edit** to edit the selected import rule. See the "Add" bullet and Figure 3-19 for details on editing the import rule.
- Delete – on the *Import rules* tab, press **Delete** to delete the selected import rule.

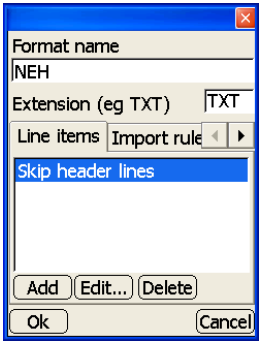



**Figure 3-19. Import Rules Tab**

**The Export rules tab** adds, edits, or deletes export rules for the selected conversion format (Figure 3-21).

- Add – on the *Export rules* tab, press **Add** to add an export rule and it's respective information, then press **Ok** to save the information (Figure 3-20).
  - Rule: select Reassign null pt numbers.
  - Assign pts with NO number starting at: enter the starting number to assign to the points with no point numbers.

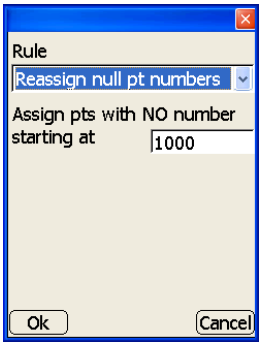



**Figure 3-20. Add Export Rule**

- Edit – on the *Export rules* tab, press **Edit** to edit the selected export rule. See the "Add" bullet on page 3-13 and Figure 3-21 for details on editing the import rule.
- Delete – on the *Export rules* tab, press **Delete** to delete the selected export rule (Figure 3-21).

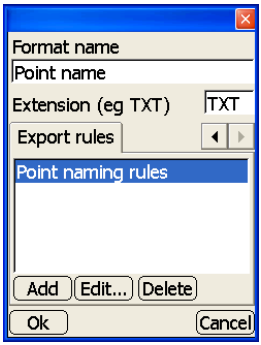



**Figure 3-21. Export Rules Tab**

# Control Point Options

The ***control options*** dialog box displays coordinate selection, projection location, and displays or hides control points, control point names and control point descriptions (Figure 3-22).

Press **Data ▸ Control ▸ Options** to display the ***control options*** dialog box.

**The Coords tab** on the ***control options*** dialog box displays the type of coordinates system to use for jobsite control, and selects the geoid model to use. Press **Ok** when done.

- Use localization – enable to use localization data.
- Use pre-defined projection – enable to use a pre-defined projection. Projection, datum, and elevation information will display.
- Use geoid model – enable to use a geoid model and select the geoid model from the drop-down list.

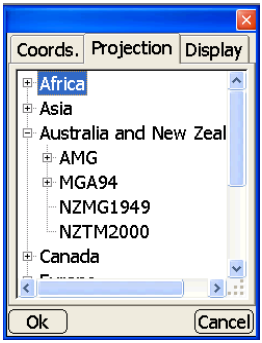



**Figure 3-22. Control Point Options – Coordinate**

**The Projection tab** on the ***control options*** dialog box (Figure 3-23) displays a list of pre-defined projections to use for control. Select the projection for the area in which the jobsite is located.

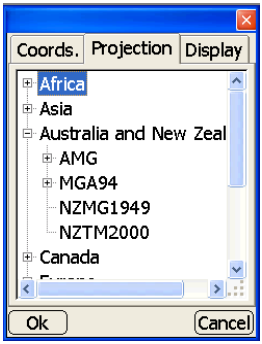



**Figure 3-23. Control Options – Projection**

**The Display tab** on the ***control options*** dialog box displays or hides control points, control point names, and control point descriptions (Figure 3-24).

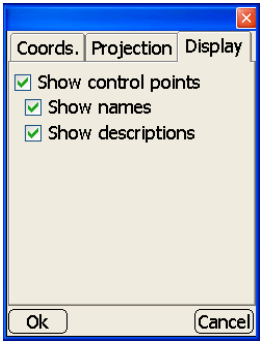



**Figure 3-24. Control Options – Display Options**

# Surface

Used in 3D GPS+, Total Station, and 3D LPS applications, the Surface menu creates, edits, and selects Design Surface files. Design Surface files can also be copied between the Pocket-3D controller and the Control Box using a Flash Card.

Pocket-3D supports the following four types of Design Surface files:

- TIN Surface Model – large, irregularly shaped triangles. See “TIN Surface File” on page 3-18 for more details.
- Road Surface Model – horizontal alignments, vertical profiles, and templates situated (cross-section) along the road. See “Road Surface File” on page 3-20 for more details.
- Plane Surface Model – defined with a continuous compound plane in two directions (mainfall and crossfall). See “Plane Surface File” on page 3-28 for more details.
- Best-fit Model – a dual-slope plane created to balance the cut/fill values across the entire area of interest. See “Best-fit Plane Surface File” on page 3-30 for more details.

## Current File or <none>

Displays the current file loaded as the Surface file. If no file currently selected, displays “<none>”.

To access available Surface files, or to create a new Surface file, tap **Data ▸ Surface ▸ [<none> or file name]** (Figure 3-25).


**Figure 3-25. Data Surface None**

The ***Surfaces*** dialog box displays all surfaces available. To set a Surface file, select it from the list and press **Ok** (Figure 3-26). At the verification screen, press **Yes** to use this Surface file as the current design surface. Surface Files can be created, copied, or deleted.

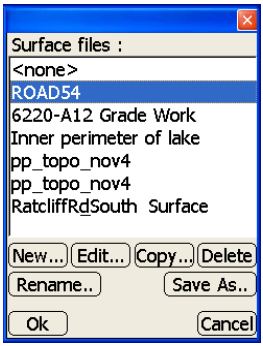



**Figure 3-26. Surfaces Dialog Box**

- New – creates a new surface file. After selecting the type of surface and entering the desired parameters, press **Ok** to save the information. See the following surface type sections for more information.
- Edit – edits the selected file. After selecting the desired file, tap **Edit**. See the following surface type sections for more information.
- Copy – copies a file either from the compact flash card to the internal memory or from the internal memory to a compact flash card. The touch screen lists all files available for copying. To copy a file, select a file, then press **Copy** (Figure 3-27).

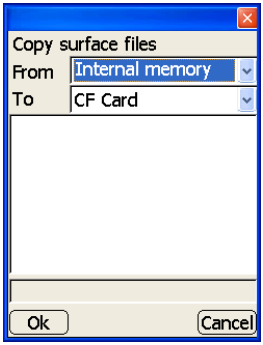



**Figure 3-27. Copy Surface Files**

- Delete – removes an existing file from the internal memory. To delete a file, select a file, then press **Delete**.

  The program always reminds the operator to confirm deletion of a selected file. Select **Yes** to confirm the deletion.
- Rename – opens the ***New surface file name*** dialog box (Figure 3-28) for changing the name of the selected file.
- Save As – opens the ***New surface file name*** dialog box (Figure 3-28) for saving the selected file as another file.

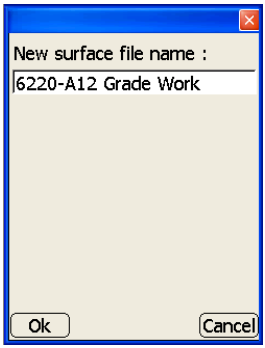



**Figure 3-28. New Surface File Name Dialog Box**

## TIN Surface File

Creates an irregular TIN surface using selected points and linework.

To configure a new TIN surface file, tap **New** on the ***Surfaces*** dialog box, select *TIN surface from pts & line*s on the ***Surface type*** dialog box, and tap **Ok** (Figure 3-29).

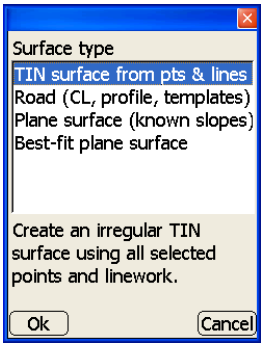



**Figure 3-29. Surface Type Dialog Box – TIN Surface File**

**The preview** dialog box displays the TIN surface created from the selected points and/or lines (Figure 3-30). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

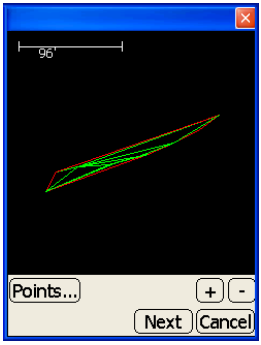



**Figure 3-30. TIN Surface Preview**

**The TIN surface parameters** dialog box sets the following parameters. Press **Finish** (Figure 3-31) when done.

- Name of TIN surface – enter the name of the TIN surface.
- Set as current surface – enable to set the surface as the current surface.

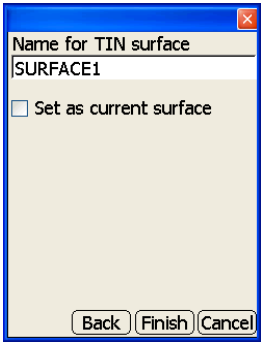



**Figure 3-31. TIN Surface Parameters**

## Road Surface File

This surface type creates a new road surface with known horizontal, vertical, and template design information.

To configure a new Road surface file, tap **New** on the ***Surfaces*** dialog box (see "Surfaces Dialog Box" on page 3-17), select *Road (CL, profile, templates)* on the ***Surface type*** dialog box, and tap **Ok** (Figure 3-32).

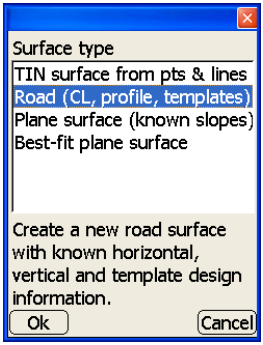



**Figure 3-32. Surface Type Dialog Box – Road Surface File**

**The point of beginning** dialog box (Figure 3-33 on page 3-21) sets the following parameters. Press **Next** when done:

- Alignment name – enter the name of the Alignment.
- Point of beginning – enter the beginning point.
  - North: enter the northing of the beginning point.
  - East: enter the easting of the beginning point.
  - Observe: press **Observe** to measure the northing and easting of the beginning point instead of manually entering in the values.

    If the project is not localized when creating a new road surface, the Observe button will be disabled. Localize the project to measure the point.
- Start station – enter the value for the starting station of the alignment.
- Station interval – enter the value of the station interval of the alignment.

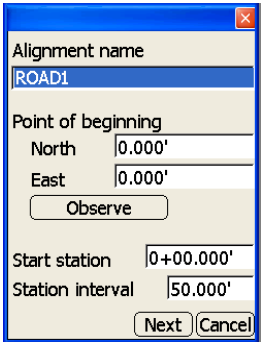
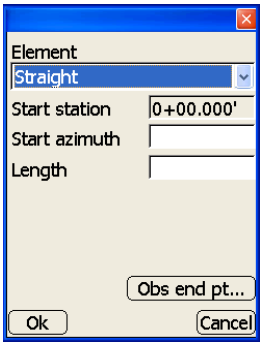



**Figure 3-33. Point of Beginning Dialog Box**

**The centerline elements** dialog box, creates, edits, or deletes alignment elements. After creating station elements, press **Next** to continue (Figure 3-35 on page 3-22).

- Add – on the ***centerline elements*** dialog box, press **Add** to enter a new centerline element (Figure 3-34 on page 3-22).
  - Element: select the type of element; either Straight, Curve PC-PT, Spiral TS-SC, or Spiral SC-ST.
  - Start station: the starting station displays at the interval set for each element.
  - Start azimuth: enter the starting azimuth. This box is only available for the first element.
  - Length: enter the length of the element.
  - Obs end pt: press to measure the ending point of the straight element only, instead of manually entering in the values.
  - Radius (in): enter the inner radius of the curve or spiral element.
  - Radius (out): enter the outer radius of the spiral element.
  - Curves to the: select the direction, either right or left, in which the curve or spiral element curves.



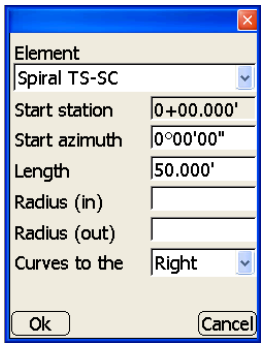




**Figure 3-34. Centerline Elements Parameters Dialog Box**

- Insert – on the ***centerline element*** dialog box, press **Insert** to add an element above the selected element. All following elements will be shifted by the length of the inserted element. See the "Add" bullet on page 3-21 for details on inserting an element.
- Edit – on the ***centerline elements*** dialog box, press **Edit** to edit the selected element. See the "Add" bullet on page 3-21 for details on editing an element.
- Delete – on the ***centerline elements*** dialog box, press **Delete** to delete the selected element.

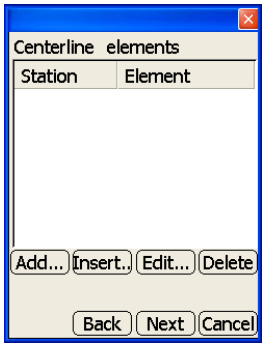
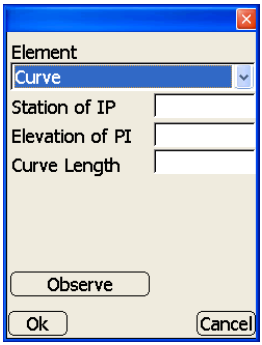



**Figure 3-35. Centerline Elements Dialog Box**

**The vertical profile** dialog box creates, edits, or deletes alignment elements. After creating vertical profiles, press **Next** to continue (Figure 3-37 on page 3-24).

- Add – on the ***vertical profile*** dialog box, press **Add** to enter an element and its respective information, then press Ok to save the information (Figure 3-36).
  - Element: select the type of element; either Curve or Point.
  - Station: enter the station number.
  - Elevation: enter the elevation of the element.
  - Observe: press **Observe** to measure the element, instead of manually entering in the values.
  - Station of IP: enter the station number for the IP (PI).
  - Elevation of PI: enter the elevation for the PI.
  - Curve Length: enter the length of the curve.



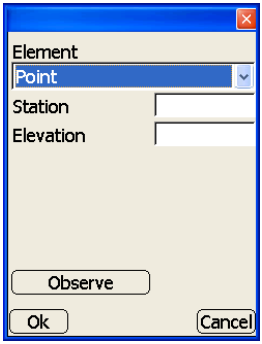




**Figure 3-36. Vertical Profile Elements Dialog Box**

- Insert – on the ***vertical profile*** dialog box, press **Insert** to add an element above the selected element. All following elements will be shifted by the length of the inserted element. See the “Add” bullet on page 3-23 for details on inserting an element.
- Edit – on the ***vertical profile*** dialog box, press **Edit** to edit the selected element. See the “Add” bullet on page 3-23 for details on editing an element.
- Delete – on the ***vertical profile*** dialog box, press **Delete** to delete the selected element.

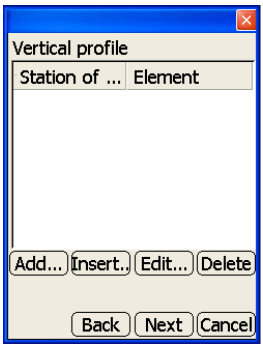



**Figure 3-37. Vertical Profile Dialog Box**

**The Template definitions** dialog box creates, edits, or deletes templates. After creating, editing, or deleting templates, press **Next** to continue (Figure 3-38).

- Add – on the ***Template definitions*** dialog box, press **Add** to enter new template elements, then press **Ok** to save the information (Figure 3-39 on page 3-25). See below for details.
- Edit – on the ***Template definitions*** dialog box, press **Edit** to edit the selected template. See the "Add" bullet for details.
- Delete – on the ***Template definition***s dialog box, press **Delete** to delete the selected template.

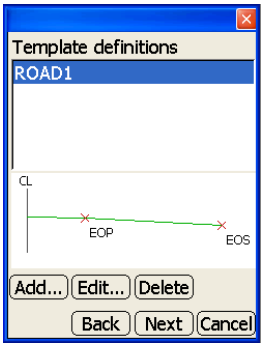



**Figure 3-38. Template Definitions Dialog Box**

On the ***add templates*** dialog box, press **Add** to enter a template and its respective information, then press **Ok** to save.

- Template name – enter in the name of the Template.
- Template elements – on the ***Template elements*** dialog box, template elements can be created, edited, or deleted. After creating template elements press **Ok** to continue (Figure 3-40 on page 3-26).
- Add – On the ***template elements*** dialog box, press **Add** to enter a template element and it's respective information, then press **Ok** to save the information.
- Edit – on the ***template elements*** dialog box, press **Edit** to edit the selected element. See the "Add" bullet for details.
- Delete – on the ***template elements*** dialog box, press **Delete** to delete the selected element.

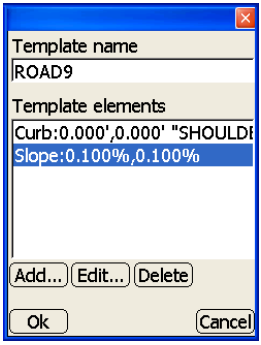



**Figure 3-39. Template Elements Dialog Box**

On the ***add template elements*** dialog box, templates can be created, edited, or deleted. After creating, editing, or deleting templates, press **Next** to continue (Figure 3-40 on page 3-26).

- Element type – select the type of element; either Offset from CL, Grade, H.Dist & V.Dist, Named feature, Curb, or Side slope.
- Feature name – enter the feature name of the element.
- Offset from CL – enter the offset from the centerline. Note: The first template created will always have zero for the offset.

- H.Dist – enter the horizontal distance of the element. For curbs, this can be zero, or less than zero.
- V.Dist – enter the vertical distance of the element. For curbs, this can be zero, or less than zero.
- Grade – enter the grade of the element.
- Curb grade – enter the curb grade of the element.
- Ditch width – enter the ditch width of the element.
- Cut slope – enter the cut slope of the element.
- Fill slope – enter the fill slope of the element.

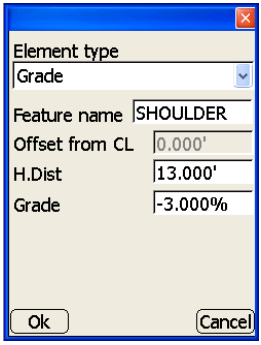



**Figure 3-40. Add Template Elements Dialog Box (Example)**

If only one template has been created, to apply the template to the entire length of the alignment, choose the side(s) of the centerline to which to apply the template, then press **Ok**. Otherwise, press **Cancel** to continue with other operations (Figure 3-41 on page 3-27).

Use the *Apply* drop-down list to select the application for the alignment; either Left of centerline, Right of centerline, or Left and right of CL.

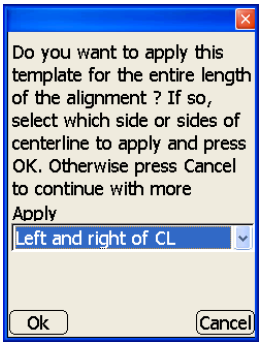



**Figure 3-41. Apply Template to Alignment Dialog Box**

**The Template applications** dialog box creates, edits, and deletes template applications. After creating template applications, press **Next** to continue (Figure 3-43 on page 3-28).

- Add – on the ***Template applications*** dialog box, press **Add** to enter a template application and it's respective information, then press **Ok** to save the information (Figure 3-42).
  - Template: select the template to apply to the alignment.
  - Side of CL: select the position of the template with respect to the centerline; either Left, Right, or Left/Right.
  - Station: enter the beginning station for this template.

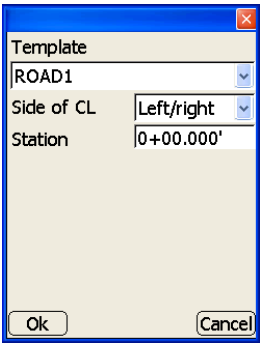



**Figure 3-42. Add Template Applications Dialog Box**

- Edit – on the ***Template applications*** dialog box, press **Edit** to edit the selected template application. See the "Add" bullet for details on editing the application.

- Delete – on the ***Template applications*** dialog box, press **Delete** to delete the selected template application.

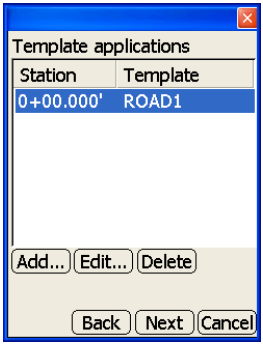



**Figure 3-43. Template Applications Dialog Box**

**On the Alignment completion** dialog box, press **Finish** to save the information (Figure 3-44).

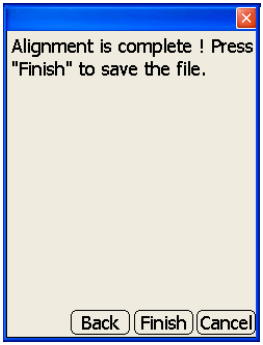



**Figure 3-44. Alignment Completion Dialog Box**

## Plane Surface File

This surface type creates a planar surface with a point of known elevation and known main-fall/cross-fall slopes.

To configure a new plane surface file, tap **New** on the ***Surfaces*** dialog box, select *Plane surface (known slopes)* on the ***Surface type*** dialog box, and tap **Ok** (Figure 3-45 on page 3-29).

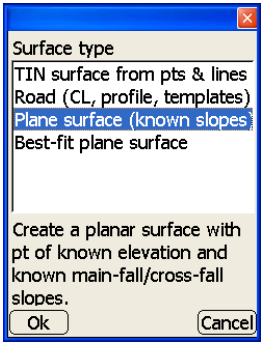



**Figure 3-45. Surface Type Dialog Box – Plane Surface**

**On the plane surface** dialog box, enter or select the following information, and press **Ok** (Figure 3-46 on page 3-30).

- Name – enter the name of the plane surface.
- Point on surface – if connected to an instrument, press **Measure** to measure the point; otherwise, manually enter the northing, easting, and elevation for the point.
- Main-fall – enter the main-fall of the surface.
- Main-fall slope – enter the main-fall slope of the surface.
- Main-fall A/B buttons – to automatically calculate the main-fall direction and slope, position the Rover over point A and press **A**. Then position the Rover over point B and press **B**. Otherwise, manually enter the main-fall direction and slope. Note that the A->B line should be located along the main-fall direction.

  If the project is not localized when creating a plane surface, the main-fall A/B buttons will be disabled. Localize the project before measuring the point.
- Orientation – enter the orientation of the mainfall.
- Slope – enter a grid interval for the mainfall and crossfall for the sloping plane surface.
- Grid interval – enter a grid interval for the mainfall and for the crossfall.

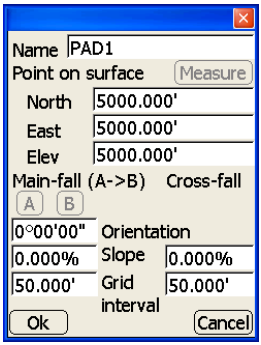



**Figure 3-46. Planar Surface Dialog Box**

## Best-fit Plane Surface File

This surface type creates a planar surface using best-fit calculation through all selected points.

To configure a new plane surface file, tap **New** on the ***Surfaces*** dialog box, select *Best-fit plane surface* on the ***Surface type*** dialog box, and tap **Ok** (Figure 3-47).

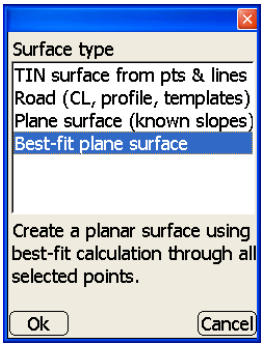



**Figure 3-47. Surfaces Type Dialog Box – Best-fit Plane Surface**

The ***preview*** dialog box displays the Planar Surface created from the selected points and/or lines (Figure 3-48 on page 3-31). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

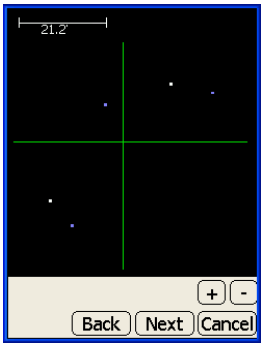



**Figure 3-48. Best-fit Plane Surface Preview**

**On the best-fit plane surface** dialog box, enter or select the following information, and press **Finish** (Figure 3-49).

- Name of Plane surface – enter the name of the Plane surface.
- Grid interval – enter the grid interval.
- Grid orientation – enter the grid orientation.
- Slope east – enter the slope to the east of the surface.
- Slope north – enter the slope to the north of the surface.
- Set as a current surface – enable to set the surface as the current surface.

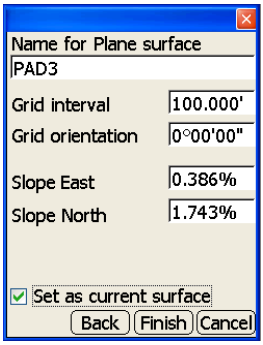



**Figure 3-49. Best-fit Plane Surface Parameters**

# Compare Surface

This menu selection calculates the difference in volume between any two overlapping surfaces. Use the Calc Wizard to create an existing surface in the field (see “Calc Wizard” on page 3-70 for more details). This surface can then be used to compare with a proposed design surface or a different existing surface, calculating a volume between the two surfaces.

To compare two existing surfaces, tap **Data ▸ Surface ▸ Compare surface** (Figure 3-50).


**Figure 3-50. Data ▸ Surface ▸ Compare Surface**

**On the compare surfaces** dialog box, select the over-lapping surfaces to be compared, then press **Next** (Figure 3-51 on page 3-33).

- Design Surface – select a surface from the drop-down list.
- Existing Surface – select the surface to compare from the drop-down list. Remember to choose two over-lapping surfaces.

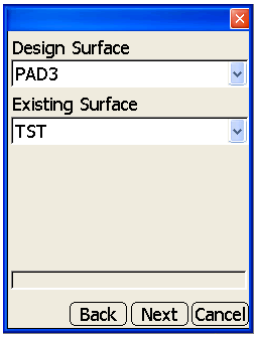



**Figure 3-51. Compare Surfaces**

The ***preview*** dialog box displays the elevation differences between the two surfaces (Figure 3-52). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Finish** to continue.

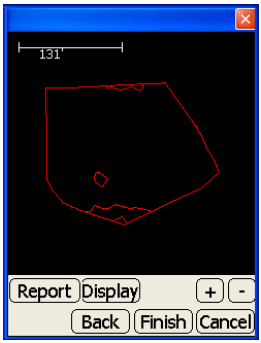


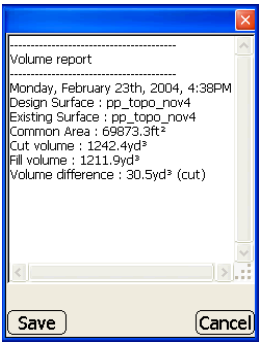

**Figure 3-52. Compare Surface Preview Dialog Box**

**Press Report** to display the ***Volume*** results dialog box. The report screen displays the following results (Figure 3-53 on page 3-34): Date, Name of Design Surface, Name of Existing Surface, Common Area, Cut volume, Fill volume, and Volume difference.

To save the information:

1. Press **Save** on the ***Volume report*** dialog box.
2. Enter the name of the text file.

3. Select a folder and location in which to store the text file.
4. Press **Ok**.



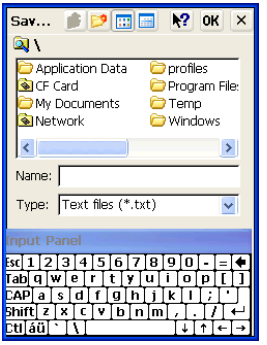




**Figure 3-53. Compare Surface Report**

**Press Display** to select the desired parameters for the surface display (Figure 3-54), then press **Ok**.

- Show contours – enable to display the contour lines at a set interval on the surface.
- Show solid colors – enable to display solid colors at a set interval on the surface.
- Interval – enter the desired contour interval.
- Show grid of cut/fills – enable to display a grid of cut/fills on the surface.

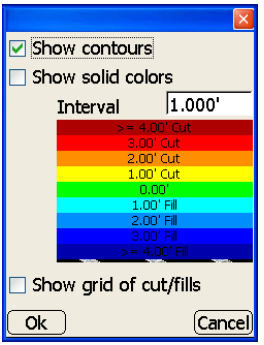



**Figure 3-54. Surface Display Parameters**

# Surface Options

To change the view options of the selected surface, tap **Data ▸ Surface ▸ Options** (Figure 3-55).


**Figure 3-55. Data ▸ Surface ▸ Options**

On the ***Options*** dialog box (Figure 3-56 on page 3-36), select the desired options for the selected surface, then press **Ok**. The selected surface type affects the available options.

- TIN Surface Model
  - Show triangles: enable to display the triangles on the selected surface. Use the color button to set a color for the triangles.
  - Show boundaries: enable to display the boundaries on the selected surface.Use the color button to set a color for the boundaries.
  - Show contours: enable to display the contours on the selected surface. Use the color button to set a color for the contours.
  - Interval: enter the interval desired for the contours.
- Road Surface Model
  - Show feature lines: enable to display the feature lines on the surface. Use the color button to set a color for the feature lines.
  - Use the color button to set a color for the center lines.
  - Show transition pts: enable to display the transition points on the surface.

– Show station lines: enable to display the station lines at a set interval on the surface. Use the color button to set a color for the station lines.

– Interval: enter the desired interval for station points.

- Plane Surface Model
  – Display grid-lines: enable to display the grid-lines at a set interval on the surface.
  – Grid interval: enter the desired grid interval.
  – Orientation: enter the desired orientation.
- Best-fit Model
  – Display grid-lines: enable to display the grid-lines at a set interval on the surface.
  – Grid interval: enter the grid interval for the mainfall.
  – Grid interval (crossfall) – enter the grid interval for the crossfall.
  – Orientation: enter the desired orientation for the mainfall.

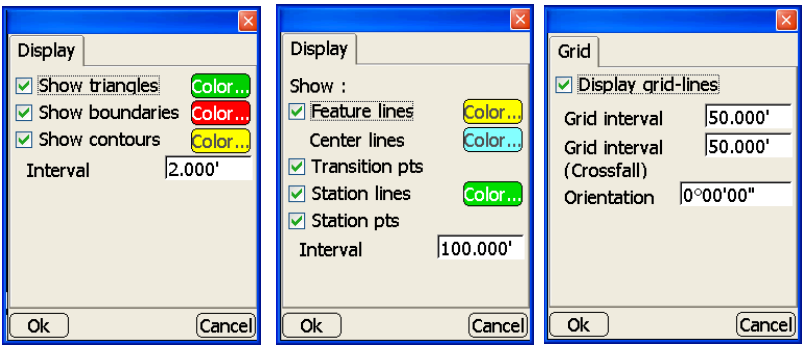



**Figure 3-56. Options Dialog Boxes**

# Alignment

Used in 3D GPS+, Total Station, and 3D LPS applications to create, edit, and select Alignment files. Alignment files can also be copied between the Pocket-3D controller and the Control Box using a Flash Card.

Alignment files contain the following three elements:

- Horizontal alignments – layout and direction of the road (or X and Y information).
- Vertical profiles – elevations (or Z) for the selected horizontal alignment.
- Cross-section templates – details of the road design.

## Current File or <none>

Displays the currently loaded Alignment file. If no file is currently selected, displays “<none>”.

To access available Alignment files or to create a new Alignment file, tap **Data ▸ Alignment ▸ [<none> or file name]** (Figure 3-57).


**Figure 3-57. Data ▸ Alignment ▸ [File Name]**

The ***Alignments*** dialog box lists all available Alignment files. To change the currently loaded Alignment file, select another file from the list and press **Ok** (Figure 3-58 on page 3-38). At the verification, screen press **Yes** to use this Alignment file for the current project. Alignment files can be created, edited, copied, or deleted.

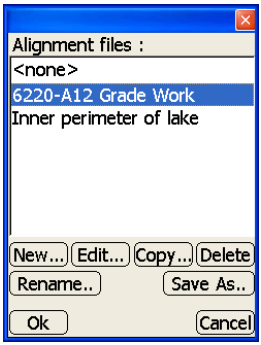



**Figure 3-58. Select Alignment File Dialog Box**

## New

Press **New** to create a new file. On the ***point of beginning*** dialog box (Figure 3-59 on page 3-39), enter the following parameters and press **Next**.

- Alignment name – enter the name of the Alignment.
- Point of beginning:
  - North: enter the northing of the beginning point.
  - East: enter the easting of the beginning point.
  - Observe: measures the northing and easting of the beginning point, instead of manually entering the values.
- Start station – enter the value for the starting station of the alignment.
- Station interval – enter the value of the station interval of the alignment.

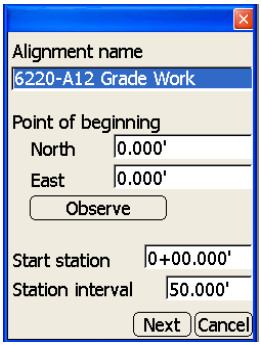



**Figure 3-59. Point of Beginning**

**The centerline elements** dialog box creates, edits, or deletes alignment elements. After creating station elements, press **Next** to continue (Figure 3-60 on page 3-40).

- Add – on the ***centerline elements*** dialog box, press **Add** to enter an element and its respective information, then press **Ok** to save the information (Figure 3-61 on page 3-40).
  - Element: select the type of element; either Straight, Curve PC-PT, Spiral TS-SC, or Spiral SC-ST.
  - Start station: the starting station displays at the interval set for each element.
  - Start azimuth: enter the starting azimuth. This box is only available for the first element.
  - Length: enter the length of the element.
  - Obs end pt: press **Obs end pt** to measure the ending point of the straight element only, instead of manually entering in the values.
  - Radius (start): enter the inner radius of the curve or spiral element.
  - Radius (end): enter the outer radius of the spiral element.
  - Curves to the: select the direction, either right or left, in which the element curves.

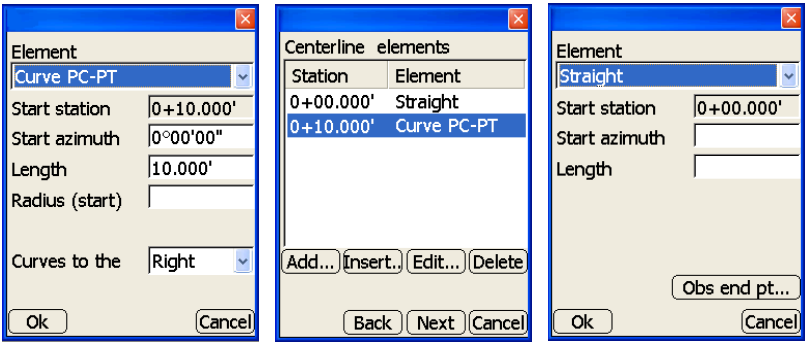



**Figure 3-60. Centerline Element Parameters**

- Insert – on the ***centerline elements*** dialog box, press **Insert** to add an element above the selected element. All following elements will be shifted by the length of the inserted element. See the "Add" bullet on page 3-39 for details on inserting an element.
- Edit – on the ***centerline elements*** dialog box, press **Edit** to edit the selected element. See the "Add" bullet on page 3-39 for details on editing an element.
- Delete – on the ***centerline elements*** dialog box, press **Delete** to delete the selected element.

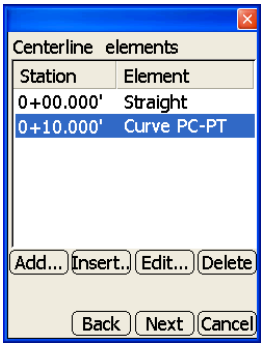



**Figure 3-61. Centerline Elements Dialog Box**

**The Vertical profile** dialog box creates, edits, or deletes alignment elements. After creating vertical profiles, press **Next** to continue (Figure 3-63 on page 3-42).

- Add – on the ***Vertical profile*** dialog box, press **Add** to enter an element and its respective information, then press **Ok** to save the information (Figure 3-62).
  - Element: select the type of element; either Point or Curve.
  - Station: enter the station number.
  - Elevation: enter the elevation of the element.
  - Observe: press **Observe** to measure the element instead of manually entering the values.
  - Station of IP: enter the station number for the IP.
  - Elevation of PI: enter the elevation for the PI.
  - Curve Length: enter the length of the curve.

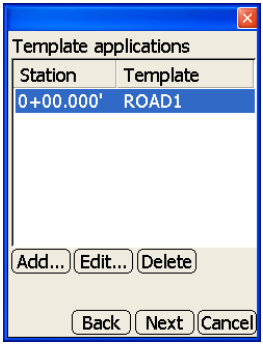



**Figure 3-62. Vertical Profile Parameters**

- Insert – on the ***Vertical profile*** dialog box, press **Insert** to add an element above the selected element. All following elements will be shifted by the length of the inserted element. See the "Add" bullet on page 3-41 for details on inserting an element.
- Edit – on the ***Vertical profile*** dialog box, press **Edit** to edit the selected element. See the "Add" bullet above and Figure 3-63 on page 3-42 for details on editing the element.
- Delete – on the ***Vertical Profile*** dialog box, press **Delete** to delete the selected element.

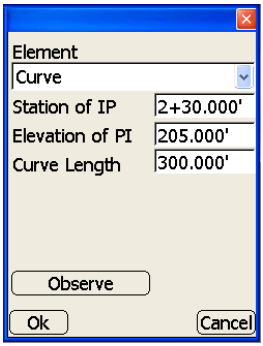



**Figure 3-63. Vertical Profile Dialog Box**

**The Template definitions** dialog box creates, edits, or deletes templates. After creating templates, press **Next** to continue (Figure 3-64).

- Add – on the ***Template definitions*** dialog box, press **Add** to enter a template and its respective information, then press **Ok** to save the information. Follow the same process as seen on page 3-24.
- Edit – on the ***Template definitions*** dialog box, press **Edit** to edit the selected template. Follow the same process as seen on page 3-24.
- Delete – on the ***Template definitions*** dialog box, press **Delete** to delete the selected template.

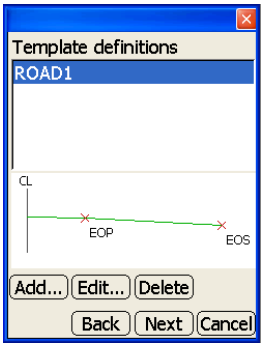



**Figure 3-64. Template Definitions Dialog Box**

If only one template has been added, to apply the template to the entire length of the alignment, choose the side(s) of the centerline to which to apply the template, then press **Ok**. Otherwise, press **Cancel** to continue with other operations (Figure 3-65).

Use the *Apply* drop-down list to select the application for the alignment; either Left of centerline, Right of centerline, or Left and right of CL.

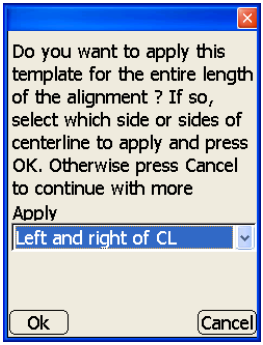



**Figure 3-65. Apply Template to Alignment**

**The *Template applications*** dialog box creates, edits, or deletes template applications. After creating template applications press **Next** to continue (Figure 3-66 on page 3-44).

- Add – on the ***Template applications*** dialog box, press **Add** to enter a template application and it's respective information, then press **Ok** to save the information. Follow the same process as seen on page 3-27.
- Edit – on the ***Template applications*** dialog box, press **Edit** to edit the selected template application. Follow the same process as seen on page 3-27.
- Delete – on the ***Template applications*** dialog box, press **Delete** to delete the selected template application.

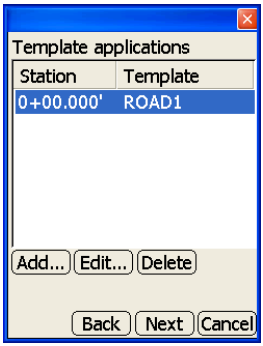



**Figure 3-66. Template Applications Dialog Box**

On the ***Alignment complete*** dialog box, press **Finish** to save the information (Figure 3-67).

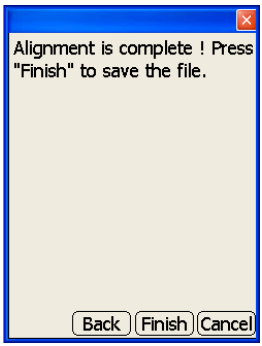



**Figure 3-67. Press Finish**

## Edit

To edit an alignment file, select the desired file, then press **Edit**. Follow the same process as for a new alignment file (see “New” on page 3-38).

## Copy

The Copy button copies a file from either the compact flash card to the internal memory or from the internal memory to the compact flash card. The touch screen display lists all files available for copying.

To copy a file, select the desired file, then press **Copy**.

## Delete

The Delete button removes an existing file from the internal memory. The touch screen lists all files available for deletion.

To delete a file, select the desired file, then press **Delete**.

The program always confirms the deletion of a selected file. Select **Yes** to confirm the deletion.

## Rename

The Rename button changes the name of an existing file. The touch screen lists all files available to rename.

To rename a file, select the desired file, then press **Rename**. Enter a new name for the file on the ***New alignment file name*** dialog box (Figure 3-68).

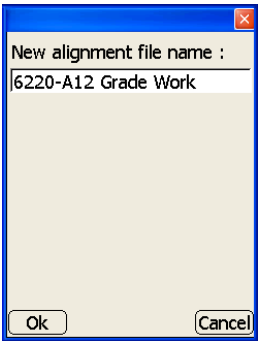



**Figure 3-68. New Alignment File Name Dialog Box**

## Save As

Saves the selected file as a new file. The touch screen lists all files available to save.

To save a file as a new file, select the desired file, then press **Save As**. Enter a new name for the file on the ***New alignment file name*** dialog box (Figure 3-68).

# Options

To change the view options of the selected alignment, tap **Data ▸ Alignment ▸ Options** (Figure 3-69).

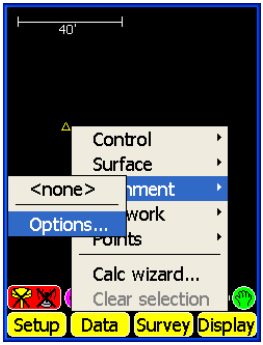



**Figure 3-69. Data ▸ Alignment ▸ Options**

On the ***Options*** dialog box (Figure 3-70), select the desired options for the alignment, then press **Ok**.

- Show feature lines – enable to display feature lines.
- Show transition pts – enable to display transition points.
- Show station lines – enable to display station lines.
- Interval – enter the interval desired for the station lines.
- Color buttons – tap to set a color for feature/center/station lines.

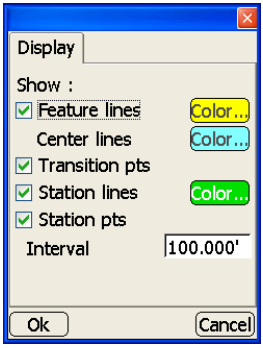



**Figure 3-70. Options**

# Linework

Used in 3D GPS+, Total Station, and 3D LPS applications, the Linework menu creates, edits, and deletes Linework files. Linework files can also be copied between the Pocket-3D and the Control Box using a Flash Card.

Linework files contain layers comprised of polylines identified with different names and colors. The linework represents features or objects on the project, such as building pads, curbs and sidewalks, top and toe of slopes, or the boundary of the project.

If a linework file imported from 3D-Office to Pocket-3D contains text, that text displays on the main screen as well.

## Current File or <none>

Displays the currently loaded Linework file. If no file is currently loaded, displays “<none>”.

To access available Linework files or to create a new Linework file, tap **Data ▸ Linework ▸ [<none> or file name]** (Figure 3-71).


**Figure 3-71. Data ▸ Linework ▸ [<none> or file name]**

The ***Linework files*** dialog box shows the current file loaded and any other available files (Figure 3-72). To change the Linework file, select it and pick another file from the list, then press **Ok**. At the verification screen, tap **Yes** to use this Linework file for the current project. Linework files can be created, copied, or deleted.

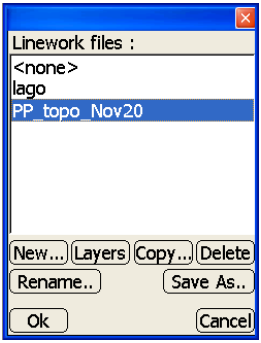



**Figure 3-72. Select Linework File**

- New – enter a name for the linework file. After naming the file, press **Ok** to save the information (Figure 3-73).

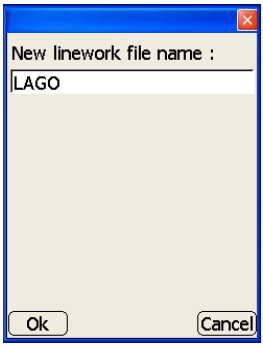



**Figure 3-73. New Linework File**

- Layers – the ***Layers*** dialog box creates, edits, or deletes the layers for the selected linework file, press **Ok** to save the information (Figure 3-74 on page 3-49). To enable the layers, check the box next to the layer to display it on the main screen.

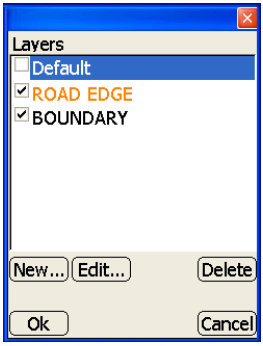



**Figure 3-74. Layers**

– New: on the ***Layers*** dialog box, press **New** to create a layer, then press **Ok** to save the information (Figure 3-75). Enter a layer name and select it's color, then press **Ok** to save.

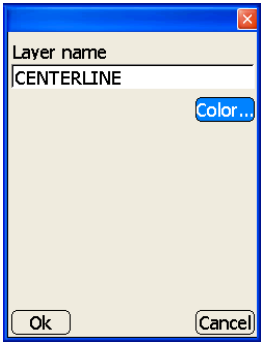



**Figure 3-75. Layers Dialog Box**

– Edit: on the ***Layers*** dialog box press **Edit** to edit the selected layer (Figure 3-74).

– Delete: on the ***Layers*** dialog box, press **Delete** to delete the selected layer (Figure 3-74).

- Rename – opens the ***New linework file name*** dialog box (Figure 3-72 on page 3-48) for changing the name of the selected file.
- Save As – opens the ***New linework file name*** dialog box (Figure 3-72 on page 3-48) for saving the selected file as another file.

- Copy – copies a file from either the compact flash card to the internal memory or from the internal memory to the compact flash card. The touch screen display lists all files available for copying. To copy a file, select a file, then press **Copy** (Figure 3-72 on page 3-48).
- Delete – removes an existing file from the internal memory. To delete a file, select a file, then press **Delete** (Figure 3-72 on page 3-48).

  The program always confirms the deletion of a selected file. Select **Yes** to confirm the deletion.

# Layers

To add, edit, or delete a layer within the current Linework file, tap **Data ▸ Linework ▸ Layers** (Figure 3-76).


**Figure 3-76. Data ▸ Linework ▸ Layers**

The ***Layers*** dialog box displays all layers within the selected file (Figure 3-77 on page 3-51).

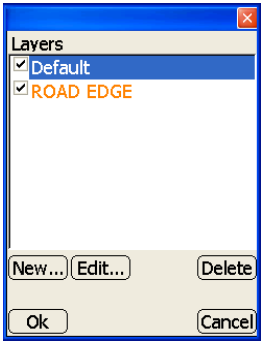



**Figure 3-77. Layers**

- New – on the ***Layers*** dialog box, press **New** to create a layer, then press **Ok** to save the information (Figure 3-78). Enter a layer name and select it's color, then press **Ok** to save.

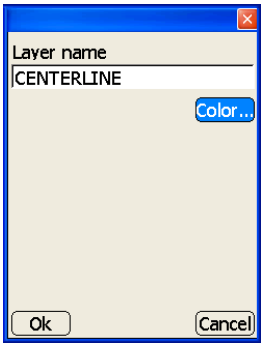



**Figure 3-78. Layers Parameters**

- Edit – on the ***Layers*** dialog box, press **Edit** to edit the selected layer. See the "New" bullet and Figure 3-77 for details on editing the layer.
- Delete – on the ***Layers*** dialog box, press **Delete** to delete the selected layer.

# Points

Used in 3D GPS+, Total Station, and 3D LPS applications, the Points menu creates, edits, and deletes Point files. Point files can also be copied between Pocket-3D and the Control Box using a Flash Card.

Point files contain multiple groups of points, measured with their coordinates, and put together into a layer as with Linework files.

## Current File or <none>

Displays the currently loaded point file. If no file currently selected, displays “<none>”.

To access available Point files or to create a new Point file, tap **Data ▸ Points ▸ [<none> or file name]** (Figure 3-79).

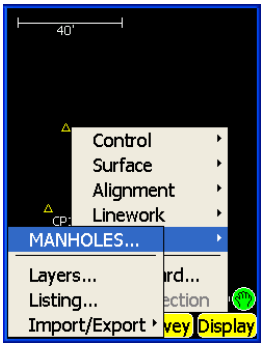



**Figure 3-79. Data ▸ Points ▸ [<none> or file name]**

The ***Points files*** dialog box lists all available point files. To change a Point file, select it from the list and press **Ok** (Figure 3-80 on page 3-53). At the verification screen, press **Yes** to use this Point file for the current project. Point files can be created, copied, or deleted.

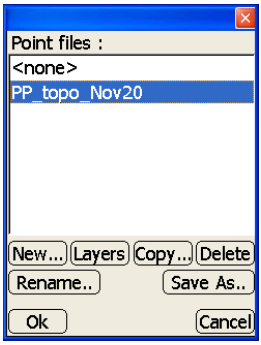



**Figure 3-80. Points Files Dialog Box**

- New – creates a new file in the ***New point file name*** dialog box. After naming the file press **Ok** to save the information (Figure 3-81).

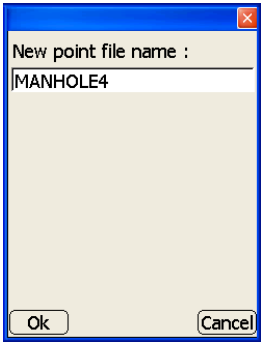



**Figure 3-81. Name New File**

- Layers – use the ***Layers*** dialog box to create, edit, or delete layers for the selected points file; press **Ok** to save the information. To enable the layers, check the box next to the layer so that the layer will be displayed on the main screen (Figure 3-82 on page 3-54).

  See “Layers” on page 3-55 for information on the dialog boxes that display.

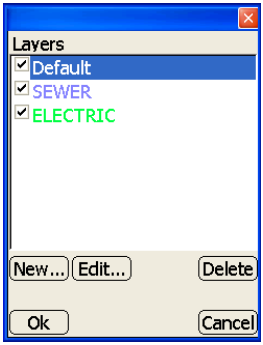



**Figure 3-82. Layers Parameters**

- Rename – opens the ***New point file name*** dialog box (Figure 3-81 on page 3-53) for changing the name of the selected file.
- Save As – opens the ***New point file name*** dialog box (Figure 3-81 on page 3-53) for saving the selected file as another file.
- Copy – copies a file from either the compact flash card to the internal memory or from the internal memory to the compact flash card. The touch screen lists all files available for copying. To copy a file, select it and press **Copy**.
- Delete – removes an existing file from the internal memory. To delete a file, select a file, then press **Delete**.

  The program always confirms deletion of a selected file. Select **Yes** to confirm the deletion.

# Layers

To add, edit, or delete a layer within the selected Points file, tap **Data ▸ Points ▸ Layers** (Figure 3-83).

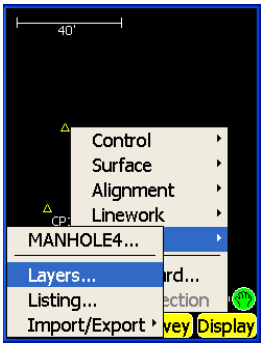



**Figure 3-83. Data ▸ Points ▸ Layers**

The ***Layers*** dialog box displays all layers within the selected file (Figure 3-84).

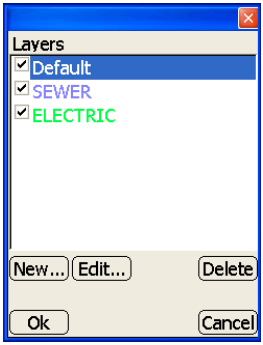



**Figure 3-84. Layer Dialog Box**

- New – on the ***Layers*** dialog box, press **New** to create a layer, then press **Ok** to save the information (Figure 3-85 on page 3-56).
  - Layer name: enter the name of the layer.
  - Show point numbers: enable to display on the main screen point numbers for all points within the layer.
  - Show point descriptions: enable to display on the main screen point descriptions for all points within the layer.

– Show point elevations: enable to display on the main screen point elevations for all points within the layer.

– Symbol: select the type of symbol desired for the Point layer.

– Color: press **Color** and select the desired color for the symbol (if preferred), then press **Ok**.

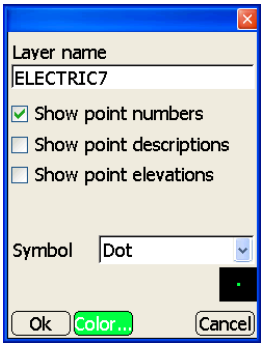



**Figure 3-85. Layers**

- Edit – on the ***Layers*** dialog box, press **Edit** to edit the selected layer. See the "New" bullet on page 3-55 and Figure 3-85 for details on editing the layer.
- Delete – on the ***Layers*** dialog box, press **Delete** to delete the selected layer.

# Listing

To add, edit, or delete a point within the selected Point file, tap **Data ▸ Points ▸ Listing** (Figure 3-86).

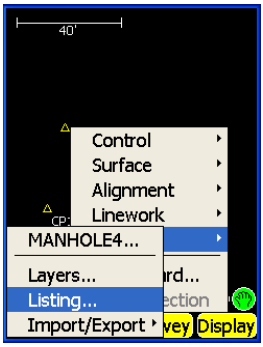



**Figure 3-86. Data ▸ Points ▸ Listing**

The ***points listing*** dialog box displays all points within the selected file (Figure 3-88 on page 3-58).

- Add – on the ***points listing*** dialog box, press **Add** to enter a point and its respective information, then press **Ok** to save the information (Figure 3-87 on page 3-58).
  - Pt. number: enter the point number.
  - Description: enter the point description (if preferred).
  - Layer: stores the point to the selected layer.

– Tap in each coordinate entry box to enter the coordinates for Northing/X (North), Easting/Y (East), and Elevation/Z (Elev).

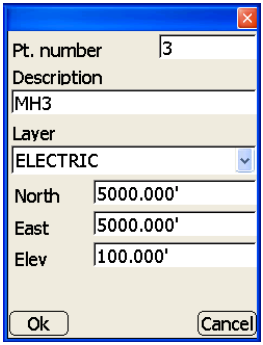



**Figure 3-87. Point Parameters**

- Edit – on the ***points listing*** dialog box, press **Edit** to edit the selected point. See the "Add" bullet on page 3-57 and Figure 3-87 on page 3-58 for details.
- Delete – on the ***points listing*** dialog box, press **Delete** to delete the selected point.
- Import – on the ***points listing*** dialog box, press **Import** to import points from a point file. See "To import points," on page 3-59.

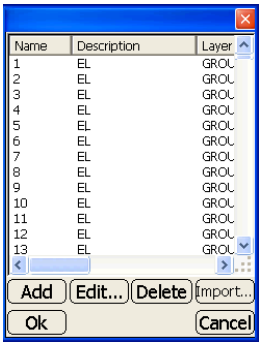



**Figure 3-88. Points Listing Dialog Box**

**To import points,** on the ***points listing*** dialog box, press **Import**.

On the ***file explorer*** dialog box, navigate to and select the point file from which to import points. Points are imported from a Topcon point file (*.pt3) (Figure 3-89).

On the ***points in file*** dialog box, select the points to import and tap **Ok**.

- Source filename – displays the location and name of the file from which to import points. Press the **browse** (“**...**”) button to select a new/different point file.
- Point list – lists all points in the selected file. Select the point(s) to import into the current point file and tap **Ok**.

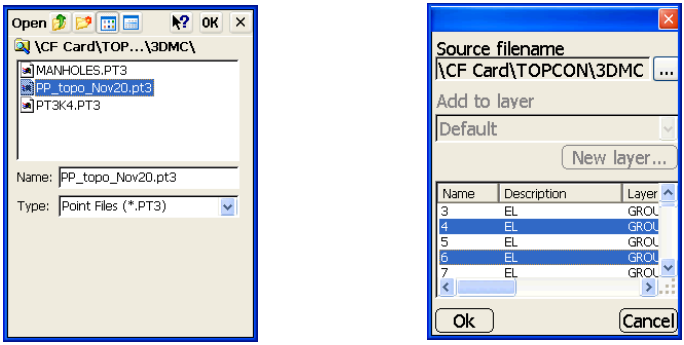



**Figure 3-89. Import Point from File Dialog Box and Explorer Dialog Box**

# Import/Export

To import or export a point file, tap **Data ▸ Points ▸ Import/Export** (Figure 3-90).

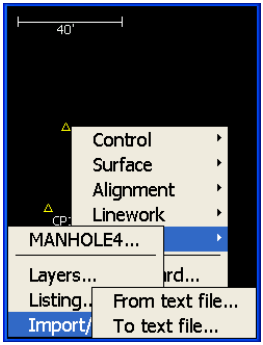



**Figure 3-90. Import/Export**

## From Text File

Enables the user to import a text file as a point file (Figure 3-91 on page 3-61).

- Source text file – press the **browse** ("**…**") button to browse to import the text file and select the text file. The text file will then display in the *Source text file* entry box.
- Conversion format – select the conversion format from the drop-down list. These formats that have been created using the Format button and dialog box (see "Conversion Formats" on page 3-61 for details).
- Add to layer – Select a layer from the drop-down list to add points to an existing layer.
  - New Layer: add points to a new layer; enter a name for the new layer.

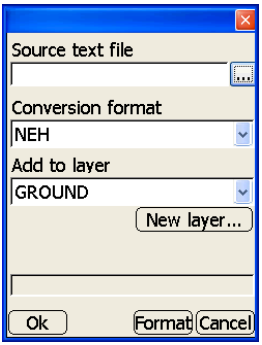



**Figure 3-91. Import From Text File**

## Conversion Formats

To create, edit, or delete a conversion format, press **Format** on the ***import from text file*** dialog box. The ***Conversion formats*** dialog box displays (Figure 3-93 on page 3-62).

- New – on the ***Conversion formats*** dialog box, press **New** to enter a conversion format and it's respective information, then press **Ok** to save the information (Figure 3-92). See the following sections for information on the tabs.
  - Format name: enter the name of the conversion format.
  - Extension (e.g. TXT): enter an extension type. Make sure to only enter generic ASCII formats such as, .txt, .asc, .csv, etc.

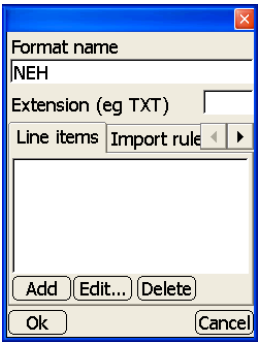



**Figure 3-92. Conversion Format Parameters Dialog Box**

- Edit – on the ***Conversion formats*** dialog box, press **Edit** to edit the selected format. See the "New" bullet on page 3-61 and Figure 3-92 for details.
- Delete – on the ***Conversion formats*** dialog box, press **Delete** to delete the selected format.

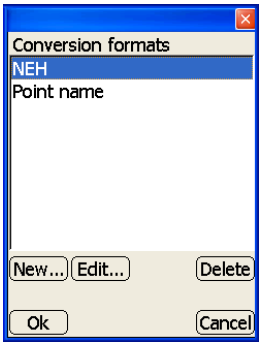



**Figure 3-93. Conversion Formats Dialog Box**

**The Line items tab** on the ***conversion formats parameters*** dialog box adds, edits, or deletes line items for the selected conversion format (Figure 3-95 on page 3-63).

- Add – on the *Line items* tab, press **Add** to add a line item and it's respective information, then press **Ok** to save (Figure 3-94 on page 3-63). Repeat this process for each line item.
  - Type: select either Point name, Point description, Point northing, Point easting, Point elevation, Point layer name, Literal text string, Point WGS84 latitude, Point WGS84 longitude, or Point height.
  - Append: select either Trailing comma, Trailing space, Trailing tab, or Nothing.
  - Fixed width field – enable to select a fixed width for each field.
  - Justified: select Left, Right, or None.
  - Width: enter the width of the field.

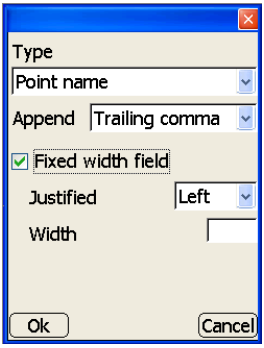



**Figure 3-94. Enter Line Item Information**

- Edit – on the *Line items* tab, press **Edit** to edit the selected line item. See the "Add" bullet on page 3-62 and Figure 3-94 above for details on editing the line item.
- Delete – on the *Line items* tab, press **Delete** to delete the selected line item.

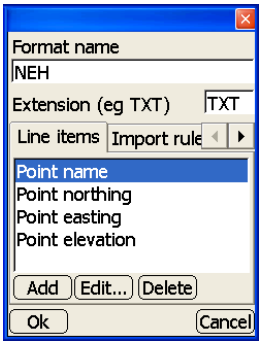


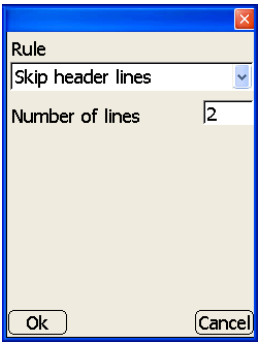

**Figure 3-95. Line Items Tab**

**The Import rules tab** on the *conversion formats parameters* dialog box adds, edits, or deletes import rules for the selected conversion format (Figure 3-97 on page 3-64).

- Add – on the *Import rules* tab, press **Add** to add an import rule and it's respective information, then press **Ok** to save the information (Figure 3-96 on page 3-64).
  - Rule: select either Skip header lines or Skip prefixed lines.

– Number of lines: enter the desired number of header lines to skip during import.

– Prefix: enter the prefix of the lines to skip during import.



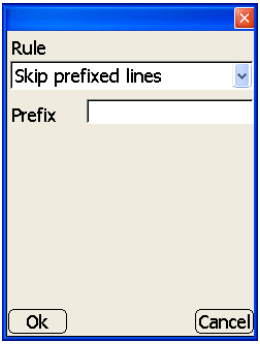




**Figure 3-96. Add Import Rule**

- Edit – on the *Import rules* tab, press **Edit** to edit the selected import rule. See the "Add" bullet and Figure 3-96 for details on editing the import rule.
- Delete – on the *Import rules* tab, press **Delete** to delete the selected import rule.

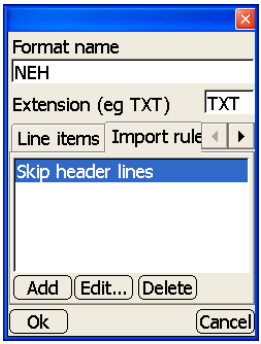



**Figure 3-97. Import Rules Tab**

**The Export rules tab** on the ***conversion formats parameters*** dialog box adds, edit, or deletes export rules for the selected conversion format (Figure 3-99).

- Add – on the *Export rules* tab, press **Add** to add an export rule and it's respective information, then press **Ok** to save the information (Figure 3-98).
  - Rule: select Reassign null pt numbers.
  - Assign pts with NO number starting at: enter the starting number to assign to the points with no point numbers.

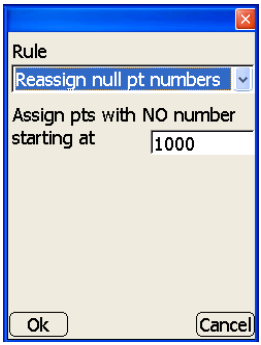



**Figure 3-98. Add Export Rule**

- Edit – on the *Export rules* tab, press **Edit** to edit the selected export rule. See the "Add" bullet and Figure 3-98 for details.
- Delete – on the *Export rules* tab, press **Delete** to delete the selected export rule.

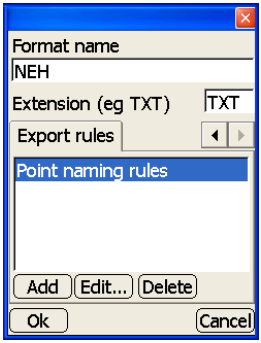



**Figure 3-99. Export Rule Tab**

## To Text File

Exports a point file as a text file (Figure 3-100). Unless otherwise selected, the default folder for exported point files will be the “My Documents” folder on the controller.

- Export all points – enable to export all of the points within the Points file.
- Export selected points only – with the desired points selected, enable to export only those points to a text file.
- Export points by layer – enable to export all of the points within a selected layer.
- Target text file – press the **browse** (“**…**”) button to name the file and select the location of the exported file. Then enter the name of the text file using the keyboard at the bottom of the screen. Choose a folder and location in which to store the text file, then press **Ok**. The text file’s location and name display in the *Target text file* entry box.
- Append to target file – enable to add points onto an existing file.
- Conversion format – select the conversion format from the drop-down list. These formats have been created using the Format button and dialog boxes (see “Conversion Formats” on page 3-67 for details).

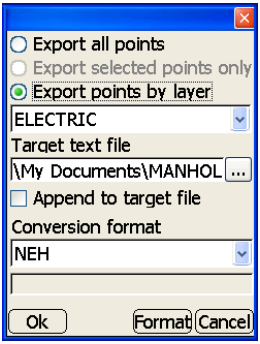



**Figure 3-100. Export To Text File**

## Conversion Formats

To create, edit, or delete a conversion format, press **Format** on the ***export to text file*** dialog box. The ***Conversion formats*** dialog box displays (Figure 3-101). See “Conversion Formats” on page 3-61 for further details on the following parameters and dialog boxes.

- New – press **New** to enter a conversion format and it’s respective information.
- Edit – press **Edit** to edit the selected format.
- Delete – press **Delete** to delete the selected format.

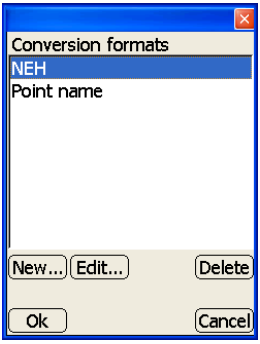



**Figure 3-101. Conversion Formats Dialog Box**

**The Line items tab** on the ***conversion formats parameters*** dialog box adds, edits, or deletes line items for the selected conversion format (Figure 3-102 on page 3-68). See “The Line items tab” on page 3-62 for further details on the following parameters and dialog boxes.

- Add – on the *Line items* tab, press **Add** to add a line item and it’s respective information, then press **Ok** to save the information. Repeat this process this for each line item.
- Edit – on the *Line items* tab, press **Edit** to edit the selected line item.
- Delete – on the *Line items* tab, press **Delete** to delete the selected line item.

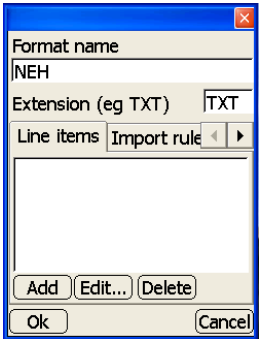



**Figure 3-102. Line Items Tab**

**The Import rules tab** on the *conversion formats parameters* dialog box adds, edits, or deletes import rules for the selected conversion format (Figure 3-103). See "The Import rules tab" on page 3-63 for further details on the following parameters and dialog boxes.

- Add – on the *Import rules* tab, press **Add** to add an import rule and it's respective information, then press **Ok** to save the information.
- Edit – on the *Import rules* tab, press **Edit** to edit the selected import rule.
- Delete – on the *Import rules* tab, press **Delete** to delete the selected import rule.

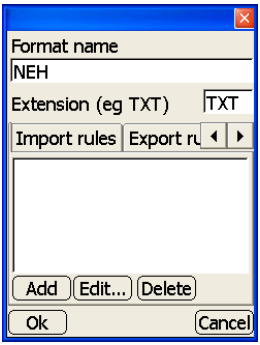



**Figure 3-103. Import Rules Tab**

**The Export rules tab** on the ***conversion formats parameters*** dialog box adds, edits, or deletes export rules for the selected conversion format (Figure 3-104). See “The Export rules tab” on page 3-65 for further details on the following parameters and dialog boxes.

- Add – on the *Export rules* tab, press **Add** to add an export rule and it’s respective information.
- Edit – on the *Export rules* tab, press **Edit** to edit the selected export rule.
- Delete – on the *Export rules* tab, press **Delete** to delete the selected export rule.

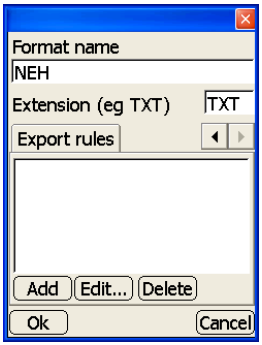



**Figure 3-104. Export Rules Tab**

# Calc Wizard

To perform calculations, tap **Data ▸ Calc Wizard** (Figure 3-105). The following sections describe the types of calculation possible with Pocket-3D.


**Figure 3-105. Calc Wizard**

# Inverse Between Two Points

On the ***Calc Wizard*** dialog box, select *Inverse between two pts* to calculate the inverse of the direction and distance between two points, then press **Next** (Figure 3-106).

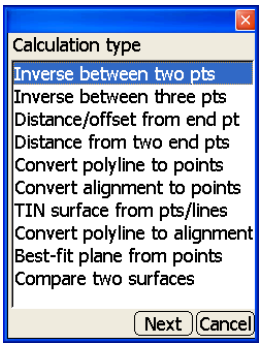



**Figure 3-106. Calc Wizard Dialog Box**

The ***results*** dialog box displays the distance between selected points and the following calculation: Horizontal Distance (Horiz. dist.), Slope Distance (Slope dist.), Azimuth, Gradient, Delta X, Delta Y, and Delta Z (Figure 3-107).

- From Point – press to select the beginning point.
- To Point – press to select the end point.
- Inverse arrows – press to calculate the return (inverse) between the selected points.

Press **Back** to return to the ***Calc Wizard*** dialog box or **Cancel** to return to the main view screen.

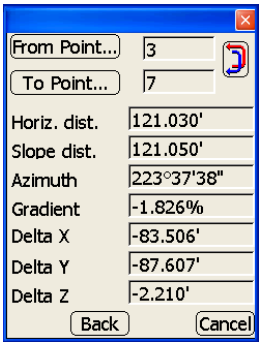



**Figure 3-107. Inverse Between Two Points**

# Inverse Between Three Points

On the ***Calc Wizard*** dialog box, select *Inverse between three pts* to calculate the inverse of the direction and distance between three points, then press **Next** (Figure 3-108 on page 3-72).

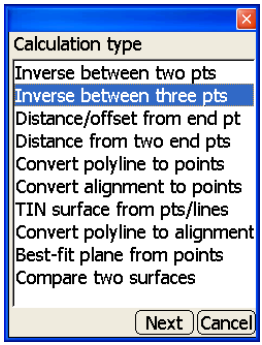



**Figure 3-108. Calc Wizard Dialog Box**

The ***results*** dialog box displays the distance between selected points and another point and the following calculation for Point 1 or Point 2: Horizontal Distance (Horiz. dist), Slope Distance (Slope dist.), and Azimuth (Figure 3-109).

- From Point 1 – press to select the beginning point.
- From Point 2 – press to select the beginning point.
- To Point – press to select the return (inverse) between either Point 1 or Point 2 and the selected point.

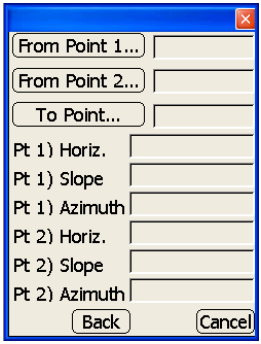



**Figure 3-109. Inverse Between Three Points**

# Distance/Offset From End Pt

On the ***Calc Wizard*** dialog box, select *Distance/offset from end pt*, then press **Next** (Figure 3-110).

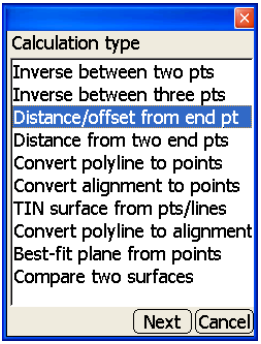



**Figure 3-110. Calc Wizard Dialog Box**

This process creates a point in relation to a baseline created from two points (and only two points) selected on the main screen. When finished, you will be able to stake the new point.

On the ***create point*** dialog box, enter or select the following parameters for the point, then press **Next** (Figure 3-111 on page 3-74).

- Length P1-P2 – displays the length between the two selected points.
- Azimuth P1-P2 – displays the azimuth from point 1 to point 2 (0° being at the top of the screen).
- Distance beyond P2 – enter the distance desired for the offset beyond point 2, then press **Ok**.
- Offset from line P1-P2 – enter the offset distance desired from the line created from point 1 to point 2, then press **Ok**.
- Swap P1-P2 – press **Swap P1-P2** to swap the position of point 1 and point 2.

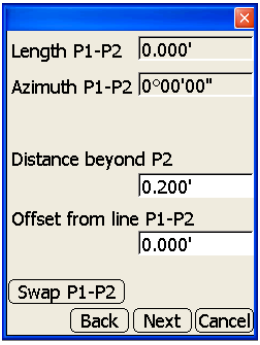



**Figure 3-111. Create Point Dialog Box**

The view screen displays the baseline created from the two points and the newly created point (Figure 3-112). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

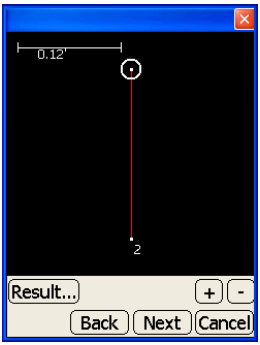



**Figure 3-112. View Screen with Baseline**

**The results** dialog box displays the Northing, Easting, and elevation of the newly created point (Figure 3-113 on page 3-75). Press **Ok** to continue.


**Figure 3-113. Results**

**On the point properties** dialog box (Figure 3-114 on page 3-75), enter the following parameters for the point, then press **Finish**.

- Pt. number – enter the point number.
- Pt. descriptor – enter the point description (if preferred).
- Add to layer – stores the point to the selected layer.
- New layer – creates a new layer to add points to.

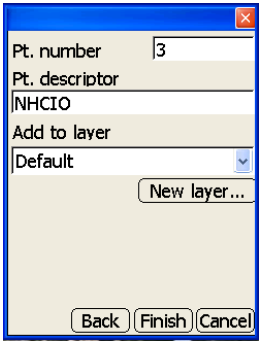



**Figure 3-114. Point Properties**

# Distance From Two End Pts

On the ***Calc Wizard*** dialog box, select *Distance from two end pts* to calculate the distance from two end points, then press **Next** (Figure 3-115).

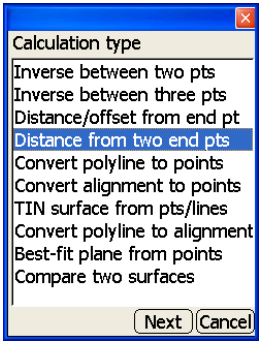



**Figure 3-115. Calc Wizard Dialog Box**

The ***results*** dialog box displays a new point created from the points selected in the *Distance From P1* and *Distance From P2* entry boxes (Figure 3-116 on page 3-77).

- From Point 1 – press to select a point.
- From Point 2 – press to select a point.
- Distance From – enter the intersecting distance from which a new point will be created from Point 1.
- Distance From – enter the intersecting distance from which a new point will be created from Point 2.

Press **Back** to return to the ***Calc Wizard*** dialog box or **Cancel** to return to the main view screen.

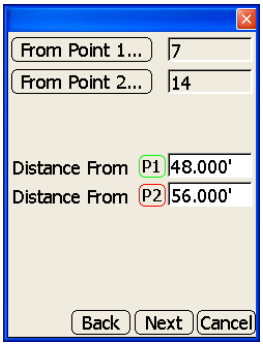
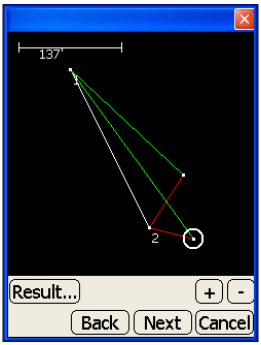



**Figure 3-116. Distance From Two End Points**

The view screen displays the two original points and specified distance between the two points created in the *Distance From* fields (Figure 3-117). Press the **Results** button to display the list of points. Select the point you want to create and press **Ok**. The point that is created displays on the main screen in a circle (Figure 3-117). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.



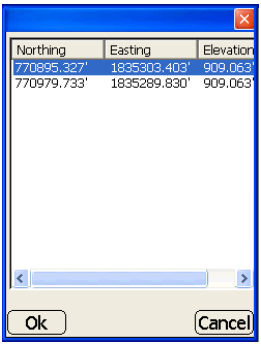




**Figure 3-117. View Screen**

**On the point properties** dialog box (Figure 3-118 on page 3-78), enter the following parameters for the point, then press **Finish** to return to the main screen.

- Pt. number – enter the point number.
- Pt. descriptor – enter a description for the point.

- Add to layer – stores the point to the selected layer.
- New layer – creates a new layer to add points to.

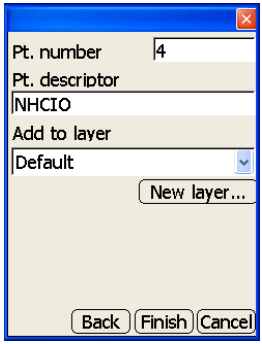



**Figure 3-118. Point Properties**

# Convert Polyline to Points

On the ***Calc Wizard*** dialog box, select *Convert polyline to points*, then press **Next** (Figure 3-119).

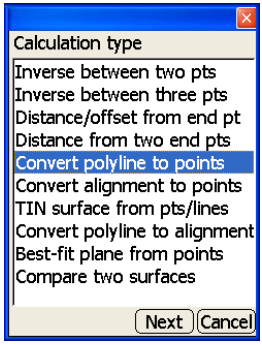



**Figure 3-119. Calc Wizard Dialog Box**

This process creates points at all nodes and vertices of a selected polyline. A points file must be open.

On the ***create points*** dialog box (Figure 3-120 on page 3-79), enter the following parameters for the points, then press **Next**.

- Create pts at vertices – enable to create points at vertices.

- Create pts at interval – enable to create points at an interval along the polyline; enter the value of the desired interval.

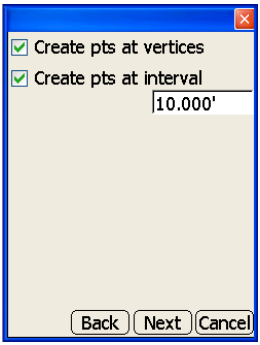



**Figure 3-120. Create Points**

The view screen displays the coordinate points created from the selected polyline (Figure 3-121). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Points** to continue.

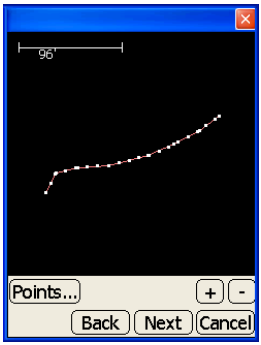



**Figure 3-121. View Screen with Coordinate Points Created from Polyline**

The ***points*** dialog box displays the Northing, Easting, and Elevation of the newly created point(s) (Figure 3-122). Press **Ok**, then press **Next**.

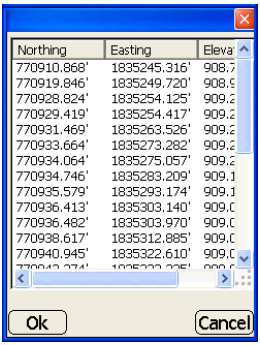



**Figure 3-122. Points**

**On the point properties** dialog box (Figure 3-123), enter the following parameters for the points, then press **Finish**.

- Pt. number – enter the point number.
- Pt. descriptor – enter the point description (if preferred).
- Add to layer – stores the point to the selected layer.
- New Layer – open the layer name dialog box for creating a new layer in which to store points (see page 3-51 for more information).

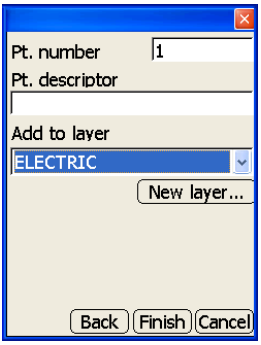



**Figure 3-123. Point Properties**

# Convert Alignment to Points

On the ***Calc Wizard*** dialog box, select *Convert alignment to points*, then press **Next** (Figure 3-124).

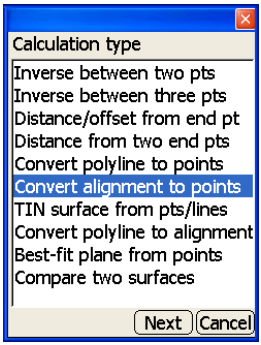



**Figure 3-124. Calc Wizard Dialog Box**

This process creates coordinate points at all nodes and vertices of a selected alignment. A points file must be open and an alignment selected from the list of user-created RD3 files.

On the ***create points*** dialog box (Figure 3-125 on page 3-82), enter the following parameters for the points, then press **Next**.

- Alignment – choose an alignment to be converted to points from the drop-down menu.
- Start station – the start station of the selected alignment (created using Data ▸ Alignment). To select a different start station, enter the desired start station.
- End station – the end station of the selected alignment (created using Data ▸ Alignment). To select a different end station, enter the desired end station.
- Station interval – the station interval of the selected alignment (created using Data ▸ Alignment). To select a different station interval, enter the desired station interval.
- Feature – choose the feature to be converted from the drop-down list.
- Extra H.Offset – enter a horizontal offset for the alignment (if preferred).

- Extra V.Offset – enter a vertical offset for the alignment (if preferred).

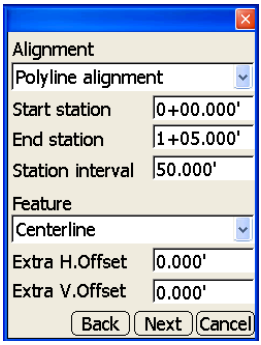



**Figure 3-125. Create Points Dialog Box**

The preview screen will display the coordinate points created from the selected alignment (Figure 3-126). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

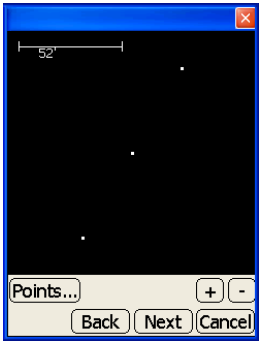



**Figure 3-126. Convert Alignment to Points Preview**

**The points** dialog box displays the Northing, Easting, and Elevation of the newly created point(s) (Figure 3-127 on page 3-83). Press **Ok** to continue.

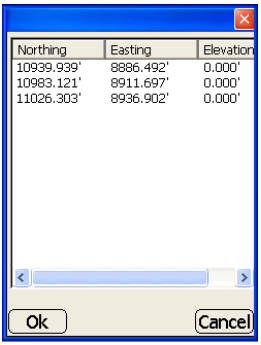



**Figure 3-127. Converted Points**

**On the point properties** dialog box (Figure 3-128), enter the following parameters for the points, then press **Finish**.

- Pt. number – enter the point number.
- Pt. descriptor – enter the point description (if preferred).
- Add to layer – stores the point to the selected layer.
- New Layer – open the layer name dialog box for creating a new layer in which to store points (see page 3-51 for more information).

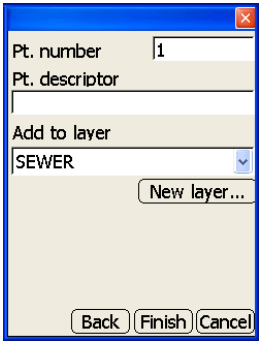



**Figure 3-128. Point Properties**

# TIN Surface from Pts/Lines

On the ***Calc Wizard*** dialog box, select *TIN surface from pts/lines*, then press **Next** (Figure 3-129).

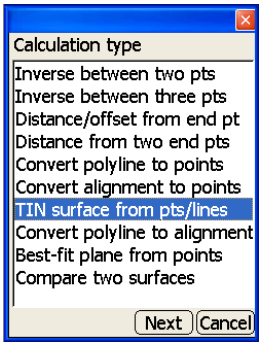



**Figure 3-129. Calc Wizard Dialog Box**

This process creates a TN3 file from selected points and/or lines on the main screen.

The view screen will display the TIN surface created from the selected points and/or lines (Figure 3-130). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

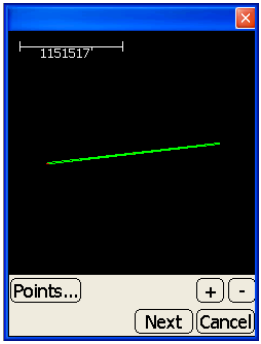



**Figure 3-130. View Screen for TIN Surface**

**On the surface properties** dialog box, enter the following parameters for the surface, then press **Finish** (Figure 3-131).

- Name for TIN surface – enter in a name for the TIN surface.
- Set as current surface – enable to set the surface as the current surface.

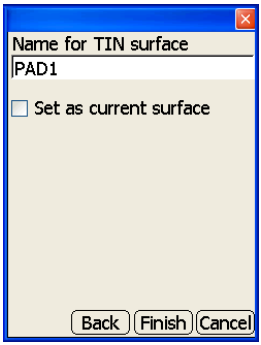



**Figure 3-131. Surface Properties Dialog Box**

# Convert Polyline to Alignment

On the ***Calc Wizard*** dialog box, select *Convert polyline to alignment*, then press **Next** (Figure 3-132).

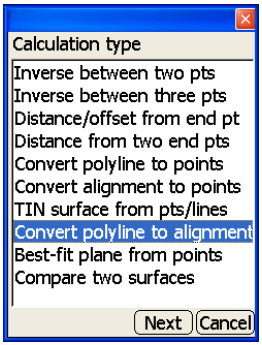



**Figure 3-132. Calc Wizard Dialog Box**

This process creates an RD3 file from a polyline selected on the main screen.

The view screen will display the alignment created from the selected polyline (Figure 3-133). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

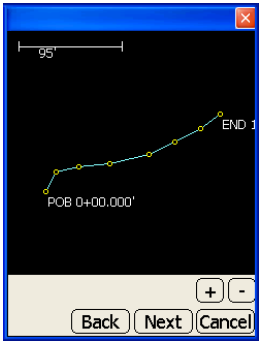



**Figure 3-133. View Screen for Polyline to Alignment Conversion**

**On the alignment properties** dialog box (Figure 3-134), enter the following parameters for the alignment, then press **Finish**:

- Name for alignment – enter a name for the alignment.
- Set as current alignment – enable to set the alignment as the current alignment.

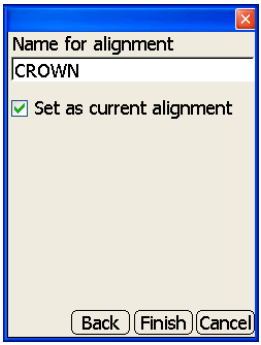



**Figure 3-134. Alignment Properties Dialog Box**

# Best-fit Plane from Points

On the ***Calc Wizard*** dialog box, select *Best-fit plane from points*, then press **Next** (Figure 3-135).

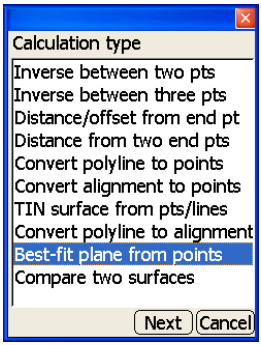



**Figure 3-135. Calc Wizard Dialog Box**

This process creates a dual-slope plane to balance the cut/fill values across the entire area of interest.

The view screen will display the dual-slope plane created from the selected polyline (Figure 3-136). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Next** to continue.

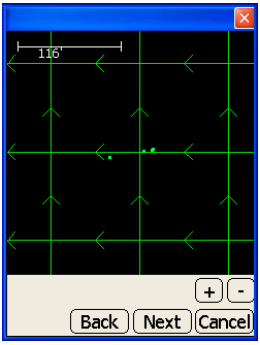



**Figure 3-136. View Screen for Polyline to Alignment Conversion**

**On the Plane surface** dialog box, enter the following parameters for the Plane surface, the press **Finish** (Figure 3-137):

- Name for Plane surface – enter a name for the Plane surface.
- Grid interval – enter the grid interval.
- Grid orientation – enter the grid orientation.
- Slope east – enter the slope to the east.
- Slope north – enter the slope to the north.
- Set as current surface – enable to set the surface as the current surface.

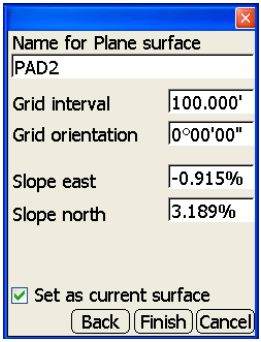



**Figure 3-137. Plane Surface Properties Dialog Box**

# Compare Two Surfaces

On the ***Calc Wizard*** dialog box, select *Compare two surfaces*, then press **Next** (Figure 3-138).

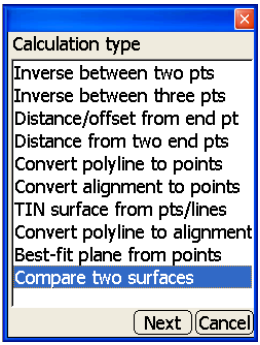



**Figure 3-138. Calc Wizard Dialog Box**

This process compares two surfaces.

On the ***compare surfaces*** dialog box, select the surfaces to be compared, then press **Next** (Figure 3-139).

- Design Surface – choose a surface from the drop-down list.
- Existing Surface – choose a surface from the drop-down list. Remember to choose two over-lapping surfaces.

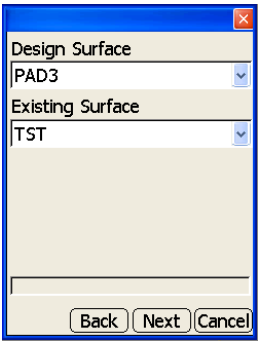



**Figure 3-139. Compare Surface Parameters**

The view screen displays the surface created from the comparison of the two selected surfaces (Figure 3-140). Press the **+/-** buttons to zoom in or out on the image, or press down on the screen and drag the image around. Press **Finish** to continue.

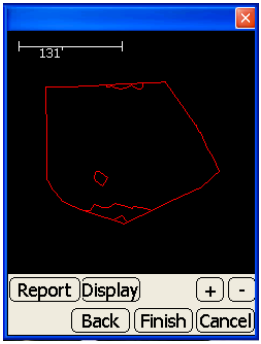



**Figure 3-140. View Screen for Comparing Two Surfaces**

**The report** dialog box displays the following results: Date, Name of Design Surface, Name of Existing Surface, Common Area, Cut Volume, Fill Volume, and Volume difference (Figure 3-141).

Press **Save** to save this information. Enter a name for the text file using the keyboard at the bottom of the screen. Select a folder and location in which to store the text file, then press **Ok**.

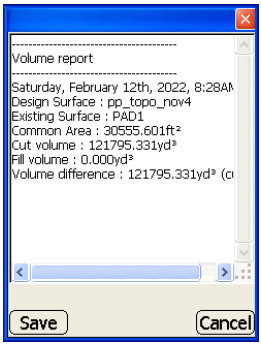



**Figure 3-141. Report**

**On the display surface** dialog box, select the desired parameters for the surface display (Figure 3-142), then press **Ok**.

- Show contours – enable to display the contour lines at a set interval on the surface.
- Show solid colors – enable to display solid colors at a set interval on the surface.
- Interval – enter the desired contour interval.
- Show grid of cut/fills – enable to display a grid of cuts/fills on the surface.

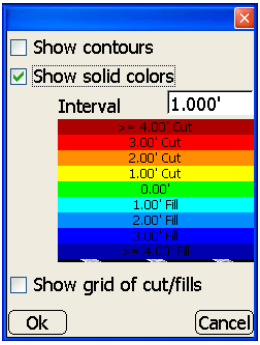



**Figure 3-142. Surface Display**

# Clear Selection

To deselect any selected data (points or line), tap **Data ▸ Clear selection** (Figure 3-143).


**Figure 3-143. Clear Selected Features**

# Survey Menu

Depending on the application (GPS or Total Station), the Survey menu contains different options for surveying and staking out points.

## GPS Survey Applications

For GPS applications, the Survey menu (Figure 4-1) has the following menu items:

- Connect to GPS/Disconnect from GPS
- Measure pts
- Auto-topo/Stop auto-topo
- Stake-out

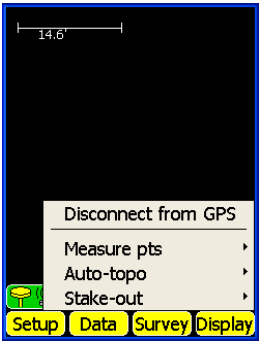



**Figure 4-1. Survey Menu**

# Connect to GPS/Disconnect from GPS

To enable or disable the connection with a GPS+ system, tap **Survey ▸ Connect to GPS/Disconnect from GPS** (Figure 4-2).


**Figure 4-2. Connect to GPS/Disconnect from GPS**

# Measure Pts

The Measure pts menu collects points, control points (mmGPS transmitter locations), points with offsets, a reference line, and polylines in the field.

## Topo-shot

To collect a topo-shot, tap **Survey ▸ Measure pts ▸ Topo-shot** (Figure 4-3 on page 4-3).

On the ***Topo-shot*** tab, select the desired parameters for the topo-shot point, then press **Ok** (Figure 4-3 on page 4-3).

- Pt. number – enter the point number.
- Pt. descriptor – enter the point description (if preferred).
- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New Layer*** dialog box in which to create a new layer to save points to.

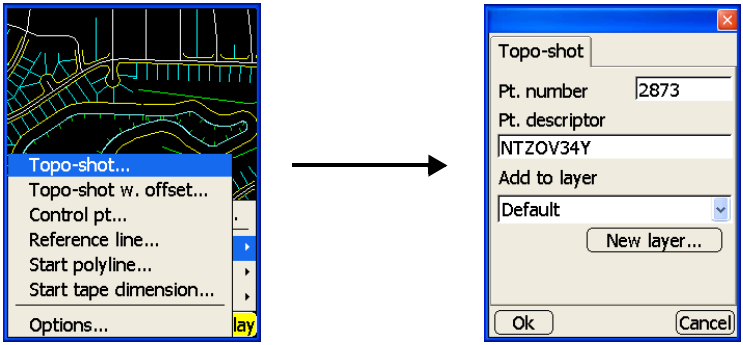



**Figure 4-3. Measure Topo-shot**

## Topo-shot With Offset

To collect a topo-shot with offset, tap **Survey ▸ Measure pts ▸ Topo-shot w. offset**.

Enter the desired topo-shot parameters. For details on the ***Topo-shot*** tab, see "Topo-shot" on page 4-2.

On the ***Offset*** tab, enter actual location where the collected shot is located, then press **Ok** (Figure 4-4).

- measurement 2) – enter an offset value above or below the collected shot. Select the location of this measurement (above or below).

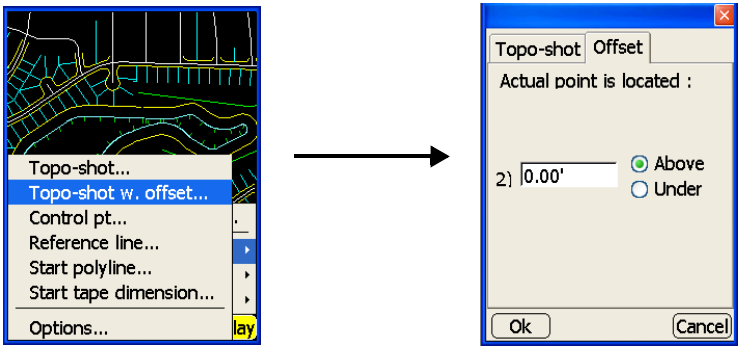



**Figure 4-4. Measure Topo-shot with Offset**

## Control Point

To measure a point that can be used as a mmGPS transmitter location point, tap **Survey ▸ Measure pts ▸ Control pt**.

> **NOTICE** The measure control points option is used to add mmGPS transmitter location points. Do not use for extending localization.

On the ***control pt*** dialog box, enter the following information (Figure 4-5):

- Name – enter a name for the control point.
- Description – enter the point description (if preferred).

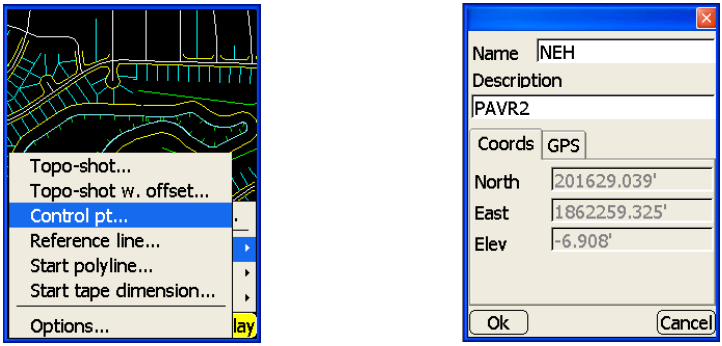



**Figure 4-5. Survey ▸ Measure pts ▸ Control pt**

## Reference Line

When measuring a reference line, first select a polyline, alignment, or points. Then press and hold the selection on the main screen and select “Use points as ref. line” on the pop-up menu.

To measure a reference line, tap **Survey ▸ Measure pts ▸ Reference line**.

On the ***taped distance*** dialog box, select the desired parameters for the taped distance (reference line) (Figure 4-6 on page 4-5), then press **Save**.

- Pt. number – enter the point number.
- Pt. descriptor – enter the point description (if preferred).

- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New layer*** dialog box in which to create a new layer to save the points to.
- Taped (measured) – measure a taped distance using the following parameters:
  - Distance: enter the distance by which to log points on the pop-up keyboard.
  - Offset: enter an offset value from the reference line on the pop-up keyboard.
  - Vertical: enter a vertical distance from the reference line on the pop-up keyboard.

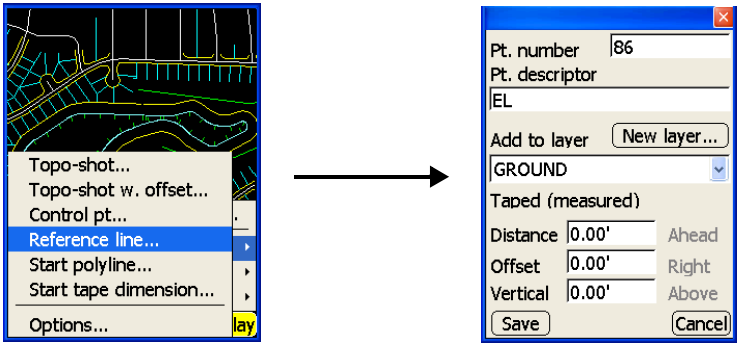



**Figure 4-6. Measure Reference Line**

## Start Polyline

To collect points along a polyline, tap **Survey ▸ Measure pts ▸ Start polyline** (Figure 4-7).

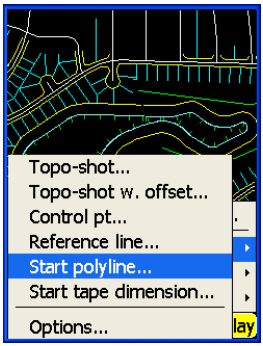
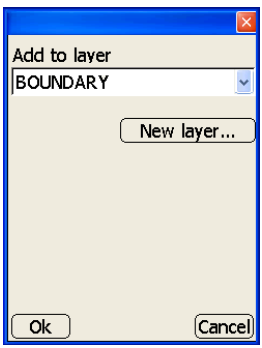



**Figure 4-7. Survey ▸ Measure pts ▸ Start polyline**

On the ***start polyline*** dialog box, select a layer from the *Add to layer* drop-down list or press **New layer** to create a layer in which to store measured points. Then press **Ok** (Figure 4-8).



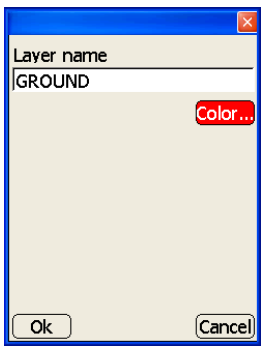




**Figure 4-8. Select Layer or Add New Layer**

## Next Polyline Pt

To collect the next point along a polyline, tap **Survey ▸ Measure pts ▸ Next polyline pt** (Figure 4-9).

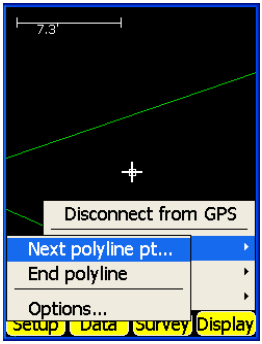



**Figure 4-9. Survey ▸ Measure pts ▸ Next polyline pt**

## End Polyline

To end the polyline, tap **Survey ▸ Measure pts ▸ End polyline** (Figure 4-10).

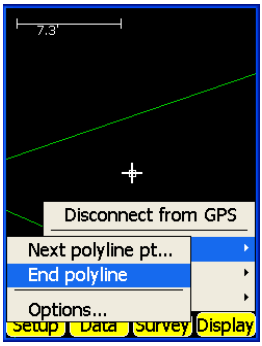



**Figure 4-10. End Polyline**

## Start Tape Dimension

To measure lines perpendicular or at angles to each other, tap **Survey ▸ Measure pts ▸ Start tape dimension** (Figure 4-11).

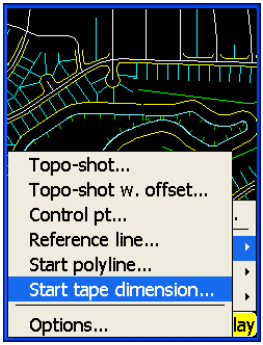



**Figure 4-11. Survey ▸ Measure Pts. ▸ Start Tape Dimension**

On the ***start tape dimension*** dialog box, enter or select the following information, and press **Ok** (Figure 4-13 on page 4-10).

- Pt. layer – select a layer name from the drop-down list.
- New layer – tap to add a new point layer. After entering a new layer name and selecting the following layer parameters, press **Ok** to save the information (Figure 4-12 on page 4-9).
  - Layer name: enter the layer's name.
  - Show point numbers: enable to display on the main screen a point number for all points within the layer.
  - Show point descriptions: enable to display point descriptions on the main screen for all points within the layer.
  - Show point elevations: enable to display point elevations on the main screen for all points within the layer.
  - Symbol: select the type of symbol to display points within a layer.
  - Color: tap to select the symbol's color, then press **Ok**.

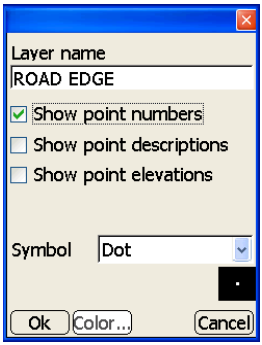



**Figure 4-12. New Layer Parameters**

- Polyline layer – select a polyline layer from the drop-down list.
- New layer – tap to add a new polyline layer. After entering a new layer name and selecting the layer's color, press **Ok** to save the information.
  - Layer name: enter a new polyline layer on the pop-up keyboard.
  - Color: press **Color** and select the desired color for the layer (if preferred).
- From Point – select the beginning of the tape measurement at a known point on the ***points listing*** dialog box.
- To Point – select the end of the tape measurement at a known point on the ***points listing*** dialog box.
- Inverse arrows – press to swap between the From Point and To Point fields on the ***points listing*** dialog box.
- Use selection on screen – enable to use the points already selected on the main screen.
- Start polyline – use the tape dimension measurement to also create a polyline.

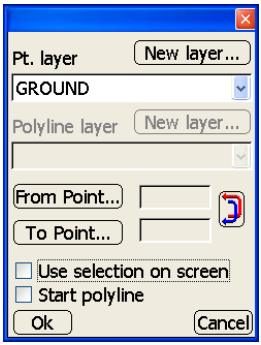


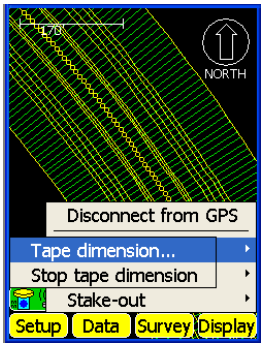

**Figure 4-13. Start Tape Dimension Dialog Box**

## Tape Dimension

To enter parameters for the tape dimension, tap **Survey ▸ Measure pts ▸ Tape dimension** (Figure 4-14 on page 4-11).

**On the Tape tab,** enter the following information and press **Ok** (Figure 4-14 on page 4-11).

- Pt. number – change or enter the point number.
- Pt. descriptor – change or enter the point description.
- Taped dimension – enter the dimension that will be used to create the new line/point.
  - Length: enter the length of the taped dimension.
  - Right/Left: tap to toggle the entered tape dimension length either to the right or left of the last reference point.
- Use ENTER to tape dim – enable the ENTER key to start the measurement on each taped dimension.
- End polyline – enable to end the polyline.



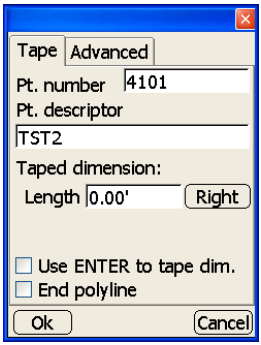




**Figure 4-14. Tape Dimension Parameters**

**On the Advanced tab,** select and enter the following information and press **Ok** (Figure 4-15 on page 4-12).

- Distance – enable to enter a distance/offset that makes the next point 90° from the last point.
  - Right/Left: tap to toggle the entered tape dimension either to the right or left of the last reference point.
  - Offset: enter the offset either Ahead or Behind the last reference point.
  - Ahead/Behind: tap to toggle the entered offset distance either ahead or behind of the last reference point.
- Angle – enable to enter an angle (other than 90°) and length for the next point. A negative distance will make the angle direct towards the left; a positive distance will make the angle direct towards the right.
  - Length: the length of the tape dimension to the next point.
- Vertical – enter the vertical distance.
  - Above/Below: tap to toggle the entered vertical distance either above or below the last reference point.
- Use ENTER to tape dim. – enable the ENTER key (on the controller's casing below the display screen) to start the measurement on each taped dimension.
- End polyline – enable to end the polyline.

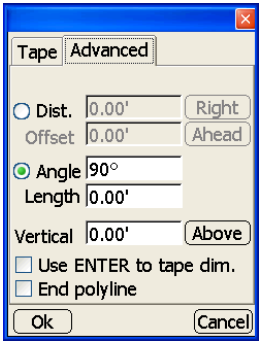



**Figure 4-15. Advanced Tab**

## Stop Tape Dimension

To stop the tape dimension, tap **Survey ▸ Measure pts ▸ Stop tape dimension**.

## Options

To view or change options for topo-shot or control point measurements, tap **Survey ▸ Measure pts ▸ Options** (Figure 4-16).

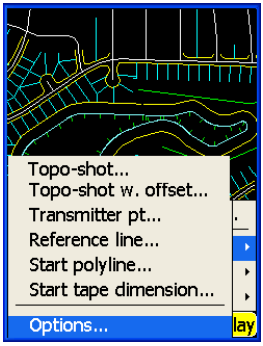



**Figure 4-16. Survey ▸ Measure pts ▸ Options**

**On the Topo-shot options tab,** select the desired options for topo-shot measurements, then press **Ok** (Figure 4-17).

- Prompt for pt. details – enable to prompt for point details every time a topo-shot is measured.
  - Before: enable this option to prompt for point details before the topo-shot is measured.
  - After: enable this option to prompt for point details after the topo-shot is measured.
- Minimum requirements – the following options define the minimum requirements for each topo-shot measured.
  - Duration (secs): enter the minimum time in secon45ds desired for each topo-shot.
  - H. Precision: enter the minimum GPS+ horizontal precision desired for each topo-shot.
  - V. Precision: enter the minimum GPS+ vertical precision desired for each topo-shot.
- Press ENTER to measure – enable to use the Enter key on the controller's casing (below the display screen) to start the measurement on each topo-shot.
- Require Initial.+mmGPS – allows for only mmGPS+ initialized measurements. If the solution is initialized only (rather than mmGPS initialized), the shot will not be accepted.

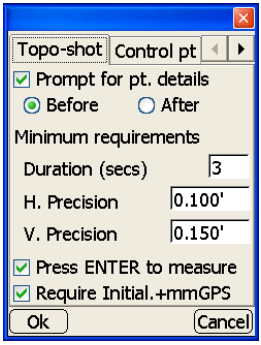



**Figure 4-17. Topo-shot Options**

**On the Control pt options tab,** select the minimum requirements for control point measurements, then press **Ok** (Figure 4-18).

- Duration (secs) – enter the minimum time in seconds desired for each control point measurement.
- H. Precision – enter the minimum horizontal precision desired for each control point measurement.
- V. Precision – enter the minimum vertical precision desired for each control point measurement.

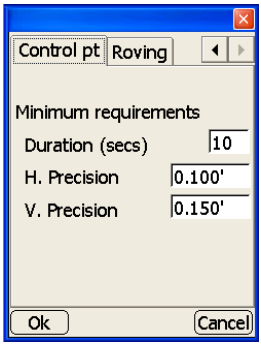



**Figure 4-18. Control Point Options**

**On the Roving options tab,** enter a roving accuracy limit for the horizontal and vertical RMS value, then press **Ok** (Figure 4-19 on page 4-15).

- H. Precision – enter a limit for the horizontal RMS value.
- V. Precision – enter a limit for the vertical RMS value.

If these values are exceeded, the GPS/mmGPS sensor button will turn orange and flash. Also, no measurement will be taken in auto topo mode if the entered values are over the limit.

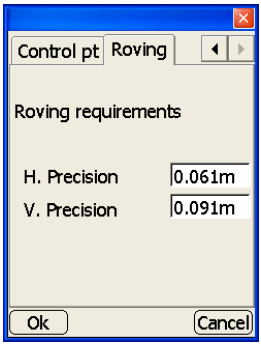



**Figure 4-19. Roving Tab Options**

# Auto-topo/Stop Auto-topo

Used in 3D GPS+ applications, the Auto-topo/Stop auto-topo feature in Pocket-3D performs “on the fly” topographic surveys of an entire project, or any portion thereof.

## By Distance

To measure points at a set distance, tap **Survey ▸ Auto-topo ▸ By distance** (Figure 4-20).

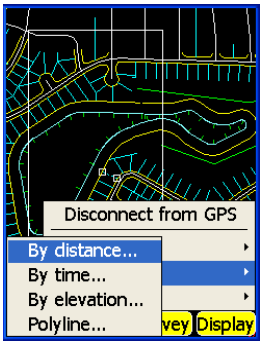



**Figure 4-20. Survey ▸ Auto-topo ▸ By distance**

On the ***by distance*** dialog box, select the desired parameters, then press **Ok** (Figure 4-21 on page 4-16).

- Min. distance – enter the minimum distance by which to log points.

- Check dist to last point – enable to make sure the desired elevation is traveled before the next measurement is taken. With this option enabled, measurements can be less than or greater than the desired distance.
- Check dist to all points – enable to make sure that no measurements within the jobsite are closer to each other than the desired elevation.
- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New layer*** dialog box in which to create a new layer to save points to.
- Assign pt. numbers – enable to assign point numbers to measured points.
- Starting from – enter the starting point number for the auto-topo points.
- Pt. descriptor – enter the point description (if preferred).

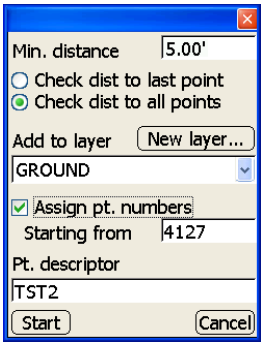



**Figure 4-21. By Distance**

## By Time

To measure points at a constant time interval, tap **Survey ▸ Auto-topo ▸ By time** (Figure 4-22).

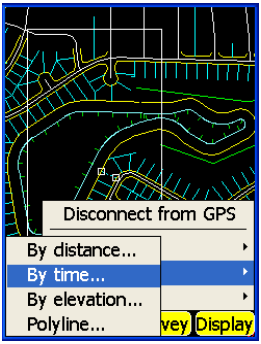



**Figure 4-22. Survey ▸ Auto-topo ▸ By time**

On the ***by time*** dialog box, select the desired parameters, then press **Ok** (Figure 4-23 on page 4-18).

- Time interval (secs) – enter the time interval for logging points.
- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New layer*** dialog box in which to create a new layer to save points to.
- Assign pt. numbers – enable to assign point numbers to measured points.
- Starting from – enter the starting point number for the auto-topo points.
- Pt. descriptor – enter the point description (if preferred).

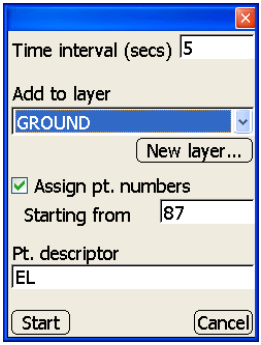



**Figure 4-23. By Time**

## By Elevation

To measure points at a set elevation, tap **Survey ▸ Auto-topo ▸ By elevation** (Figure 4-24).

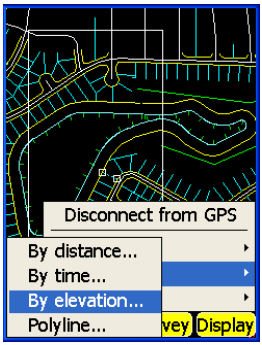



**Figure 4-24. Survey ▸ Auto-topo ▸ By Elevation**

On the ***by elevation*** dialog box, select the desired parameters, then press **Start** (Figure 4-25 on page 4-19).

- Min. elevation diff. – enter the minimum difference in elevation by which to log points.
- Check elev. to last point – enable to make sure the desired elevation is reached before the next measurement is taken. With this option enabled, measurements can be lower than or higher than the entered elevation difference.

- Check elev. to closest point – enable to make sure that no measurements within the jobsite are closer to each other than the entered elevation difference.
- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New layer*** dialog box in which to create a new layer to save points to.
- Assign pt. numbers – enable to assign point numbers to measured points.
- Starting from – enter the starting point number with which to begin measuring auto-topo points.
- Pt. descriptor – enter the point description (if preferred).

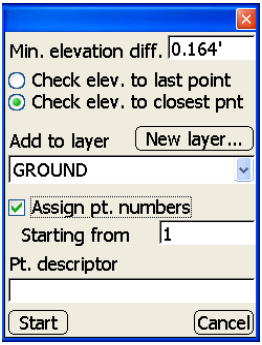



**Figure 4-25. By Elevation**

## Polyline

To measure points at a set distance along a polyline, tap **Survey ▸ Auto-topo ▸ Polyline** (Figure 4-26).

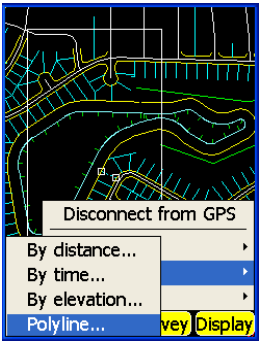



**Figure 4-26. Survey ▸ Auto-topo ▸ Polyline**

On the ***Polyline*** dialog box, select the desired parameters, then press **Ok** (Figure 4-27).

- Min. distance – enter the minimum distance for logging points.
- Add to layer – stores measured points to the selected layer.
- New layer – opens the ***New layer*** dialog box in which to create a new layer to save the polyline to.

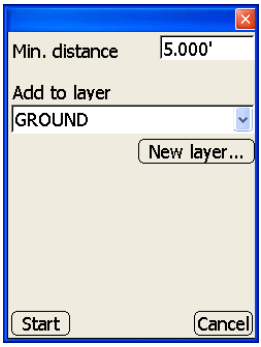



**Figure 4-27. Polyline Dialog Box**

# Stake-out

Used in 3D GPS+ applications to stake-out points using different methods.

## Surface Check

To perform a surface check, tap **Survey ▸ Stake-out ▸ Surface check** (Figure 4-28).

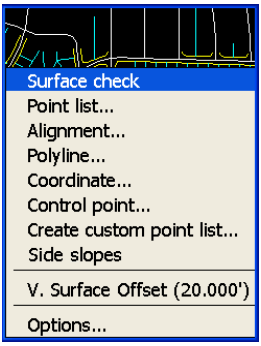



**Figure 4-28. Survey ▸ Stake-out ▸ Surface Check**

The main screen displays the cut/fill information and current elevation (Figure 4-29).

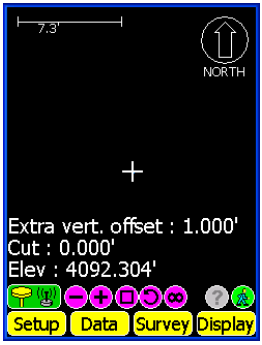



**Figure 4-29. Surface Information**

To measure a stake-out point, tap **Survey ▸ Stake-out ▸ Measure stake** (Figure 4-30).

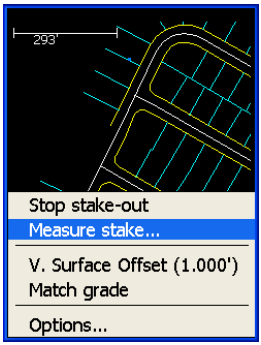



**Figure 4-30. Survey ▸ Stake-out ▸ Measure Stake**

To stop the Surface check function, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-31).

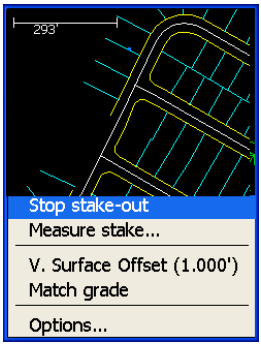



**Figure 4-31. Survey ▸ Stake-out ▸ Stop Stake-out**

See the following sections for details on the other menu selections during a stake-out:

- “Measure Stake” on page 4-37
- “V. Surface Offset” on page 4-48
- “Match Grade” on page 4-23
- “Options” on page 4-49

## Match Grade

To match the grade at the current point during a surface check, tap **Survey ▸ Stake-out ▸ Match grade** (Figure 4-32).


**Figure 4-32. Survey ▸ Stake-out ▸ Match Grade**

## Point List

To stake-out points from the selected point file, tap **Survey ▸ Stake-out ▸ Point list** (Figure 4-33).

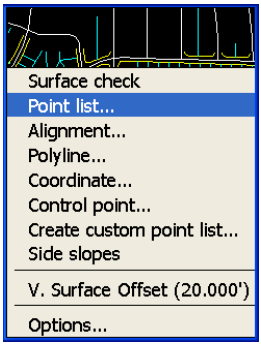



**Figure 4-33. Survey ▸ Stake-out ▸ Point List**

On the ***point list*** dialog box, select the layer and the point for stakeout, then press **Ok** (Figure 4-34).

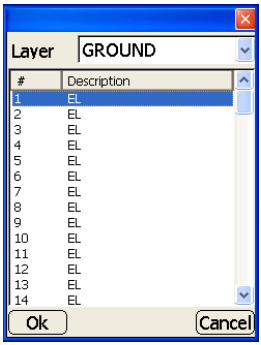



**Figure 4-34. Point List Dialog Box**

If the point to be staked lies outside the screen area, the main screen displays an arrow pointing in the direction of the point (Figure 4-35).

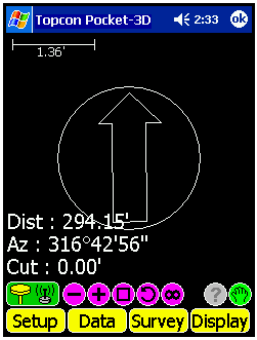



**Figure 4-35. Main Screen Arrow**

See the following sections for details on the other menu selections during a stake-out:

- “Measure Stake” on page 4-37
- “Stake-out Previous Point” on page 4-41
- “Stake-out Next Point” on page 4-42
- “V. Surface Offset” on page 4-48
- “Options” on page 4-49

To stop staking out the selected point, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-36).

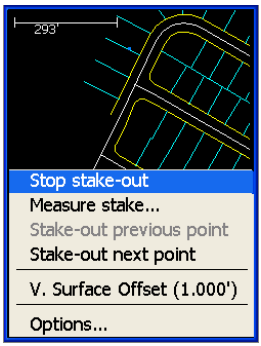



**Figure 4-36. Survey ▸ Stake-out ▸ Stop Stake-out**

## Alignment

To stake-out a station on an alignment, tap **Survey ▸ Stake-out ▸ Alignment** (Figure 4-37).

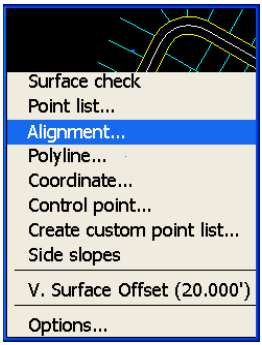



**Figure 4-37. Survey ▸ Stake-out ▸ Alignment**

On the ***alignment stakeout parameters*** dialog box, set the following parameters, then press **Ok** (Figure 4-38 on page 4-26).

- Station/Offset to line – enable to view a live update of the station offset.
- Regular station/transition – enable to select from the following:
  - Transition pts only: select to stake-out transition points.
  - Interval stations only: select to stakeout interval stations.

– Interval: enter a value for the interval between stations.

– Station list: select a station to begin the stake-out at from the drop-down list.

- Random station – enable to manually enter a station number.
- Feature line – select the feature line to be staked from the drop-down list.
- Offset from feature line – enter an offset from the feature line.

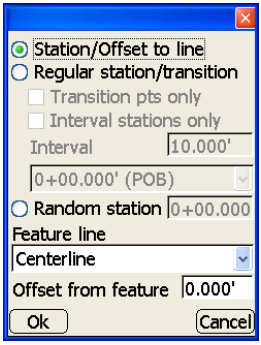



**Figure 4-38. Alignment**

If the point to be staked lies outside the screen area, the main screen displays an arrow pointing in the direction of the station (Figure 4-39).


**Figure 4-39. Main Screen Arrow**

See the following sections for details on the other menu selections during a stake-out:

- “Measure Stake” on page 4-37
- “Stake-out Previous Point” on page 4-41
- “Stake-out Next Point” on page 4-42
- “V. Surface Offset” on page 4-48
- “Options” on page 4-49

To stop the stake-out, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-40).

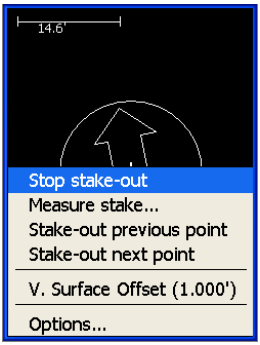



**Figure 4-40. Survey ▸ Stake-out ▸ Stop Stake-out**

## Polyline

To stake out a polyline, tap **Survey ▸ Stake-out ▸ Polyline** (Figure 4-41). See “Alignment” on page 4-25 for details on this dialog box.

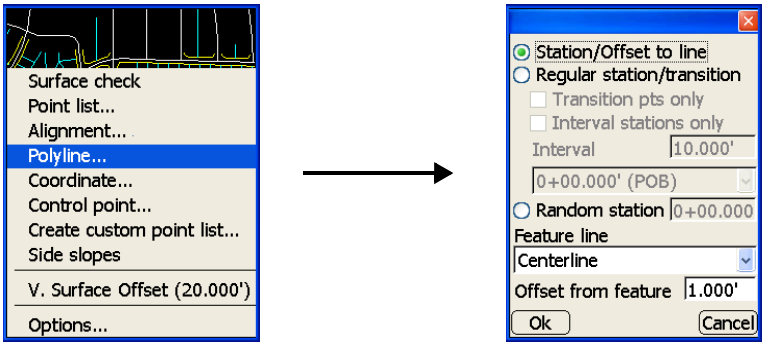



**Figure 4-41. Stake-out a Polyline**

## Coordinate

To stake-out a coordinate, tap **Survey ▸ Stake-out ▸ Coordinate** (Figure 4-42).

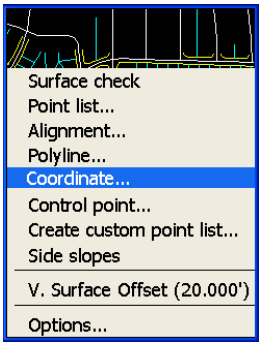



**Figure 4-42. Stake-out a Coordinate**

On the ***coordinate*** dialog box, enter the desired Northing/X, Easting/Y, and Elevation/Z coordinates to stake-out, then press **Ok** (Figure 4-43 on page 4-29).

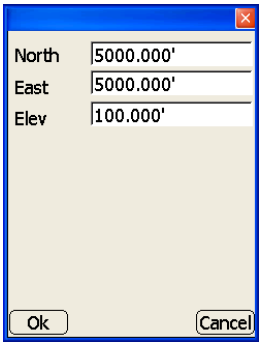



**Figure 4-43. Coordinate Dialog Box**

If the point to be staked lies outside the screen area, the main screen displays an arrow pointing in the direction of the coordinate (Figure 4-44).


**Figure 4-44. Main Screen Arrow**

See the following sections for details on the other menu selections during a stake-out:

- “Measure Stake” on page 4-37
- “V. Surface Offset” on page 4-48
- “Options” on page 4-49

To stop staking out the coordinate, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-45).

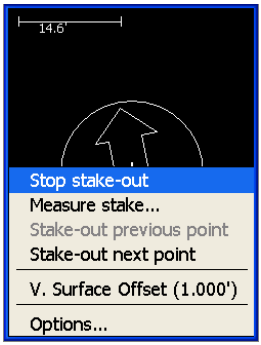



**Figure 4-45. Survey – Stop stake-out**

## Control Point

To stake-out a control point from the selected control point file, tap **Survey ▸ Stake-out ▸ Control Point** (Figure 4-46).

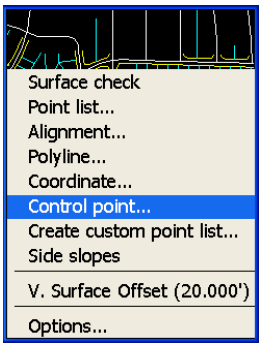



**Figure 4-46. Stake-out a Control Point**

On the ***control point stakeout*** dialog box (Figure 4-47 on page 4-31), select the desired control point for stakeout and press **Ok**.

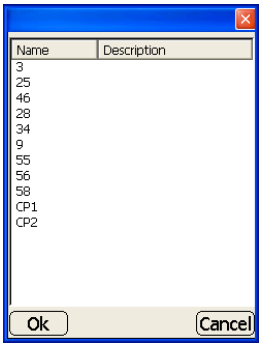



**Figure 4-47. Control Point**

If the point to be staked lies outside the screen area, the main screen displays an arrow pointing in the direction of the control point (Figure 4-48).


**Figure 4-48. Main Screen Arrow**

See the following sections for details on the other menu selections during a stake-out:

- “Measure Stake” on page 4-37
- “Stake-out Previous Point” on page 4-41
- “Stake-out Next Point” on page 4-42
- “V. Surface Offset” on page 4-48
- “Options” on page 4-49

To stop staking out the selected control point, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-49).

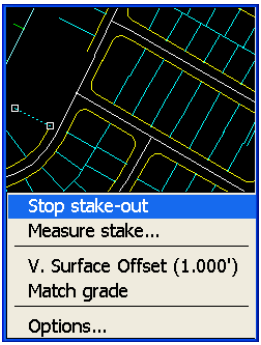
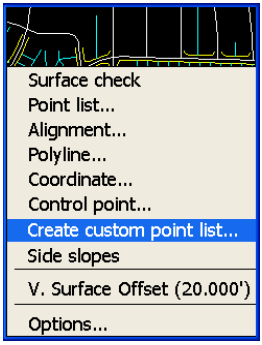



**Figure 4-49. Survey – Stop Stake-out**

## Create/Edit Custom Point List

To create a custom point list, tap **Survey ▸ Stake-out ▸ Create custom point list** (Figure 4-50).

To edit a current custom point list, tap **Survey ▸ Stake-out ▸ Edit custom point list** (Figure 4-50).



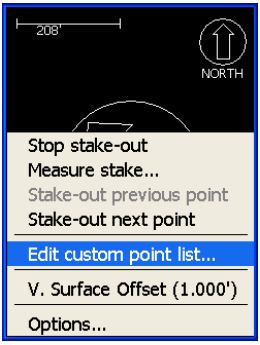




**Figure 4-50. Create Custom Point List**

**On the Available tab,** select points to include in the custom point list (Figure 4-51).

- Type – the type of points to select, either Points or Control pt.
- Point list – displays all points in the active point/control point file.
- Select All – tap to select all points in the list.
- Deselect All – tap to deselect all points in the list.

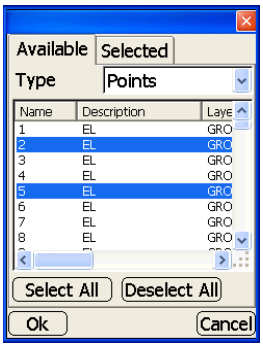



**Figure 4-51. Custom Point List – Available**

The ALT key on the FC100 can be used to make multiple selections.

**On the Selected tab,** view the custom points list created using points selected on the *Available* tab (Figure 4-52 on page 4-34).

- Up arrow button – tap to move the selected point up the list.
- Down arrow button – tap to move the selected point down the list.
- Delete (minus) button – tap to remove the selected point from the custom point list.

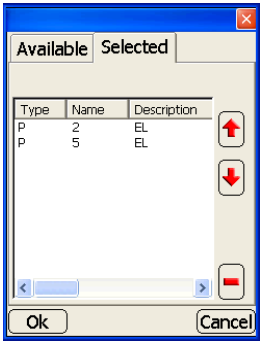



**Figure 4-52. Custom Point List – Selected**

When done, press **Ok** to begin staking out the custom point list.

## Side Slopes

To stake out points on a side slope or a cross-section slope, tap **Survey ▸ Stake-out ▸ Side Slopes** (Figure 4-53).


**Figure 4-53. Stake out Points on a Side Slope**

On the ***Stake-out*** dialog box, enter or select the following information and press **Ok** (Figure 4-54 on page 4-35).

- Running Station – calculates the target point for the current station along the alignment.
- Regular station/transition – displays the target point for regular stations at a user-specified interval and/or at transition points between segments of the alignment:

– Transition pts only: select to only stakeout at transition points.

– Interval stations only: select to only stakeout stations at a user-specified interval.

Deselect both check boxes to stakeout at both Transition pts and Interval stations.

– Interval: enter a value for the interval between stations.

– Road surface list: select the current road surface to begin the stake-out at from the drop-down list.

- Random station – enable to manually enter a station number at which to begin the stakeout.
- Define Cross-section – enable to define cross section slope measurements. The *Xsection* and *Image* tabs activate (Figure 4-54).

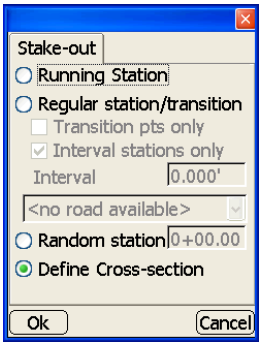



**Figure 4-54. Stake-out Dialog Box**

On the *Xsection* tab, enter the following parameters for the cross-section slope (Figure 4-55 on page 4-36). The corresponding *Image* tab illustrates the measurements described on the *Xsection* tab.

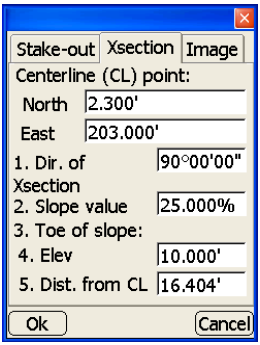
- Centerline (CL) point – the coordinates of the point at the start of the centerline of the cross-section.

  – North: enter the northing parameter.

  – East: enter the easting parameter.

- Dir. of Xsection – enter the direction of the cross section.
- Slope value – enter the percentage of the cross section slope.

- Toe of slope – the point at the beginning of the cross section slope.
  - Elev: enter elevation at the toe of the slope.
  - Dist. from CL: enter the horizontal distance of the Toe of slope point from the Centerline point specified above.



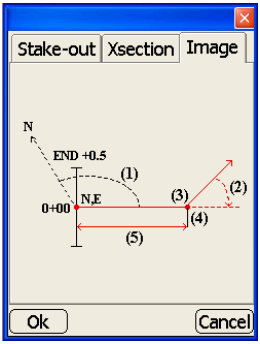




**Figure 4-55. Enter Parameters for Cross-section Slope**

The section view on the main screen displays the cut/fill value from the current elevation to the side-slope and the current station (Figure 4-56).


**Figure 4-56. Side Slopes Screen**

See the following sections for details on other menu selections during a side slope/cross section slope stake-out.

- “Measure Stake 1” on page 4-42
- “Sideslope Options” on page 4-47

- “V. Surface Offset” on page 4-48
- “Options” on page 4-49

To stop the side slope stake-out, tap **Survey ▸ Stake-out ▸ Stop stake-out** (Figure 4-57).


**Figure 4-57. Stop Side Slope Stake-out**

## Measure Stake

The Measure stake menu is available during point list, alignment, or side slope stakeouts. To activate the measure stake menu, tap **Survey ▸ Stake-out ▸ Point list / Alignment / Create custom point list / Side slopes**.

To measure the point or alignment tap **Survey ▸ Stake-out ▸ Measure stake** (Figure 4-58).

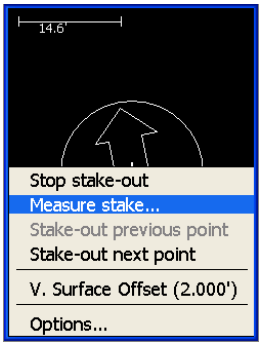



**Figure 4-58. Survey ▸ Stake-out ▸ Measure Stake**

The ***Measuring*** dialog box displays, then the ***results*** screen shows the following information, depending on the stake-out point method (Table 4-1).

**Table 4-1. Results Screen**

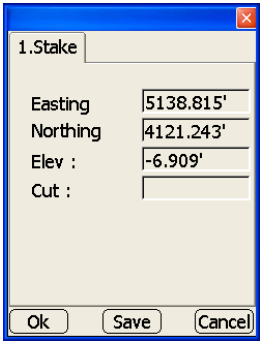
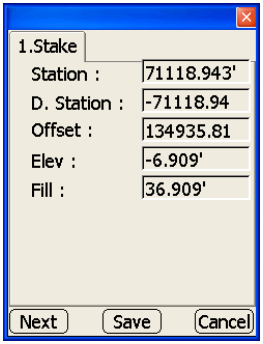
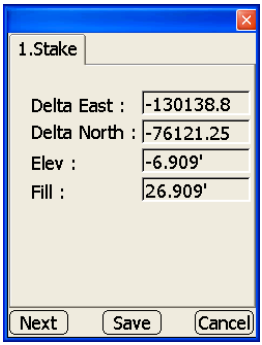
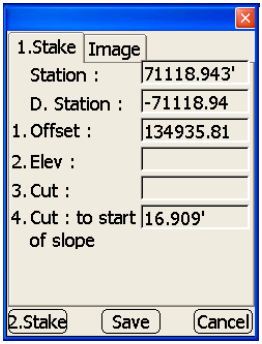
| Stake-out Point Method | Results Screen |
|---|---|
| Surface Check<br>1.Stake<br>• Easting – shows the distance East of the surface being staked.<br>• Northing – shows the distance North of the surface being staked.<br>• Elev – shows the current elevation.<br>• Cut/fill – shows the current cut/fill information.<br>• Ok |  |
| Alignment / Polyline<br>1.Stake<br>• Station – shows the station number.<br>• D. Station – shows the station number for alignment stakeouts.<br>• Offset – shows the offset from the design surface.<br>• Elev – shows the elevation point.<br>• Cut/Fill – shows the cut/fill value in relation to the design surface.<br>• Ok |  |

**Table 4-1. Results Screen (Continued)**

| Stake-out Point Method | Results Screen |
|---|---|
| Coordinates / Control point / Point List / Create control point list<br>1.Stake<br>• Delta East – shows the distance East of the point being staked out.<br>• Delta North – shows the distance North of the point being staked out.<br>• Elev – shows the elevation point.<br>• Cut/Fill – shows the cut or fill value in relation to the design surface.<br>• Ok – returns to the main screen. |  |
| Side Slope / Cross section slope<br>1.Stake<br>• Station – shows the station number.<br>• Offset – shows the elevation point.<br>• Elev – shows the elevation point.<br>• Cut – shows the cut value in relation to the design surface.<br>• Cut to start of slope – shows the cut value at the beginning of the slope<br>• Ok – returns to the main screen. |  |

On the ***results*** screen above, press **Save** to enter or select the following (Figure 4-59):

- Pt. number – enter the point number.
- Description – enter the point description (if preferred).

- Add to Layer – stores measured points to the selected layer.

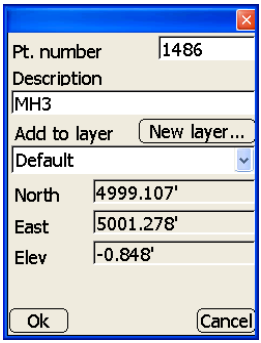



**Figure 4-59. Point and Alignment Screens**

- New Layer – tap to add a new layer to the Point file. After entering the layer's parameters, press **Ok** to save the information (Figure 4-60 on page 4-41).
  - Layer name: enter the layer's name.
  - Show point numbers: enable to display on the main screen a point number for all points within the layer.
  - Show point descriptions: enable to display point descriptions on the main screen for all points within the layer.
  - Show point elevations: enable to display point elevations on the main screen for all points within the layer.
  - Symbol: select the type of symbol to display points within a layer.

– Color: tap to select the symbol's color.

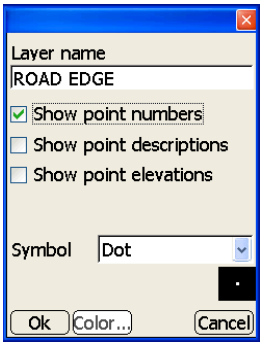



**Figure 4-60. New Layer Parameters**

## Stake-out Previous Point

To activate the Stake-out previous point menu (Figure 4-61), first stake out a point.

To stake out the previous point, tap **Survey ▸ Stake-out ▸ Stake-out previous point**. This menu option is only available for point list and control point stake-outs.

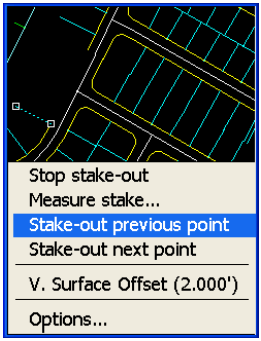



**Figure 4-61. Survey ▸ Stake-out ▸ Stake-out Previous Point'**

## Stake-out Next Point

To stake-out the next point, tap **Survey ▸ Stake-out ▸ Stake-out next point** (Figure 4-62 on page 4-42). This menu option is only available for point list and control point stake-outs.

> **TIP** Press the Enter key on the body of the controller to stake-out the next point (rather than using the menu option).

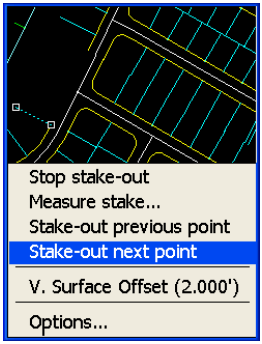



**Figure 4-62. Survey ▸ Stake-out ▸ Stake-out Next Point**

## Measure Stake 1

The Measure stake 1 menu is available during side slope or cross section slope stakeouts only. To activate the Measure Stake 1 menu (Figure 4-63 on page 4-43), first stake out a side slope. See “Side Slopes” on page 4-34, then tap **Survey ▸ Stake-out ▸ Measure stake 1**.

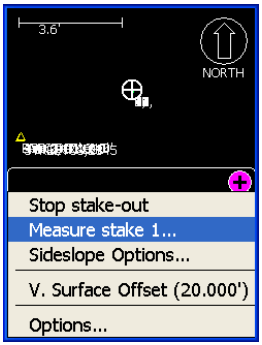
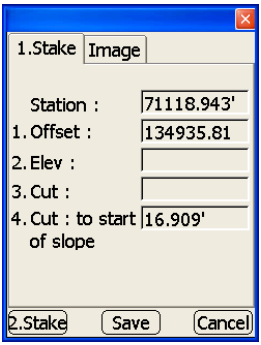



**Figure 4-63. Measure Stake 1 on the Slope**

The ***Measuring*** dialog box displays, followed by the ***results*** screen (Figure 4-64 on page 4-44). The corresponding *Image* tab illustrates the measurements described on the *1.Stake* tab (Figure 4-64 on page 4-44).

The *1.Stake* tab displays the results of the first point (Measure Stake 1) staked out on the side slope.

- Station – displays the station of the first stake.
- Offset – displays the horizontal distance from the centerline point to the first stake.
- Elev – displays the elevation at the top of the first stake.
- Cut/Fill – displays the cut value from the top of the stake to the slope intersecting point. This will always be a cut value if done correctly.
- Cut: to start of slope – displays the cut value from the top of the second stake to the intersecting mark on the first stake.



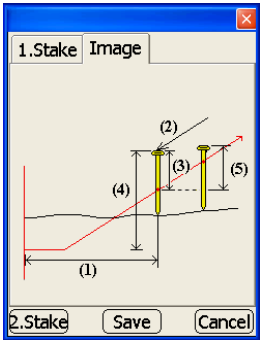




**Figure 4-64. Measure Stake 1 and Image Results Screen**

## Measure Stake 2

The Measure stake 2 menu is available during side slope or cross section slope stakeouts only. To view Measure Stake 2 parameters, press the **2.Stake** button on the ***results*** screen of Measure Stake 1 (Figure 4-64).

Tap **Survey ▸ Stake-out ▸ Measure stake 2** (Figure 4-65) to measure the parameters of Measure Stake 2.

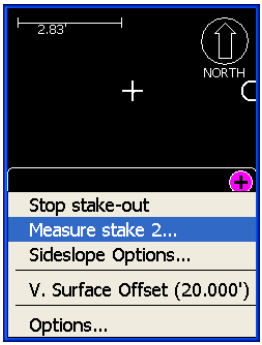



**Figure 4-65. Measure Stake 2 on the Slope**

The ***Measuring*** dialog box displays, followed by the ***results*** screen (Figure 4-66 on page 4-45). The corresponding *Image* tab illustrates the measurements described on the *2.Stake* tab.

The *2.Stake* tab displays the results of the second point (Measure Stake 2) staked out on the side slope.

- Station – shows the station number for Measure Stake 2.
- Offset – displays the horizontal distance from the centerline.
- Elev – displays the elevation at the top of the second stake.
- Cut/Fill – displays the distance from the top of the second stake to the intersecting point along the stake. This will always be a cut value if done correctly.
- Cut: to start of slope – displays the cut value from the top of the second stake to the bottom of the slope.
- Cut: design at 1.stake – displays the cut value from the top of the second stake to the intersecting mark on the first stake.

The *1.Stake* tab shows the same parameters that 1.Stake tab described under “Measure Stake 1” on page 4-42.

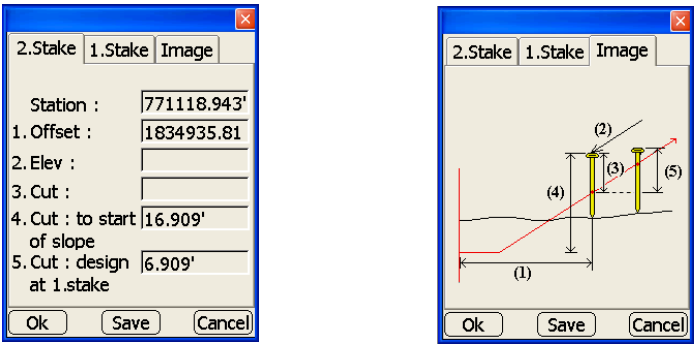



**Figure 4-66. Results Screen for Measure Stake 2**

The section view on the main screen displays station number, vertical location, and horizontal location of the staked out point on the slope (Figure 4-67).

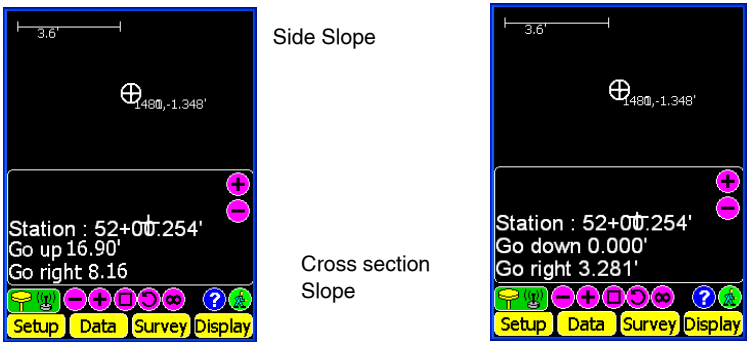



**Figure 4-67. Side Slopes/Cross-section Slopes Section View Screen**

# Stake-out Previous Point

To activate the Stake-out previous point menu, first stake out points on a side slope (see“Side Slopes” on page 4-34).

To stake out the previous point, tap **Survey ▸ Stake-out ▸ Stake-out previous point** (Figure 4-68). This menu option is only available if “Regular station/transition” is selected on the ***Stake-out*** dialog box when staking out points on a side slope. See “Side Slopes” on page 4-34 for more information.

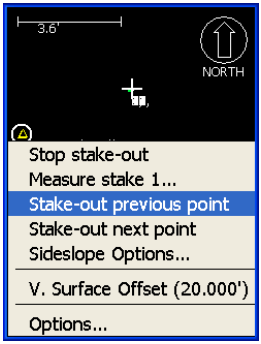



**Figure 4-68. Survey ▸ Stake-out ▸ Stake-out Previous Point**

# Stake-out Next Point

To activate the Stake-out next point menu, first stake out points on a side slope (See “Side Slopes” on page 4-34).

To stake out the next point, tap **Survey ▸ Stake-out ▸ Stake-out next point** (Figure 4-69). This menu option is only available if “Regular station/transition” is selected on the ***Stake-out*** dialog box when staking out points on a side slope. See “Side Slopes” on page 4-34 for more information.

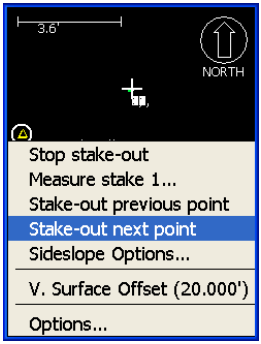



**Figure 4-69. Survey ▸ Stake-out ▸ Stake-out Next Point**

## Sideslope Options

To view or change options for slope or cross-slope stake-out measurements only, tap **Survey ▸ Stake-out ▸ Sideslope Options** (Figure 4-70).

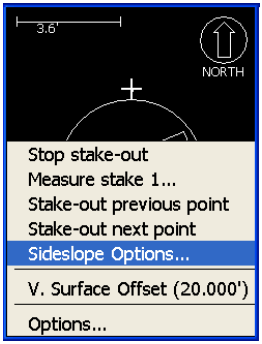



**Figure 4-70. Slope Options for Side/Cross-Section Slopes**

On the ***Slope Options*** dialog box, enter parameters to calculate the target point, then press **Ok** (Figure 4-71).

- Insert 1st Stake at – select either Cut/Fill or Dist from Daylight to calculate the 1st stake's position.
  - 1. Cut/Fill: enter the desired cut value between the slope and the current position.

    The target point will be set at the position where this cut value is the same as that from the slope to the current position.
  - 2. Dist from Daylight: enter a horizontal distance that represents the desired distance from the daylight point to the 1st stake.
- 3. Offset to 2nd stake – enter the desired horizontal distance from Measure Stake 1 to Measure Stake 2.

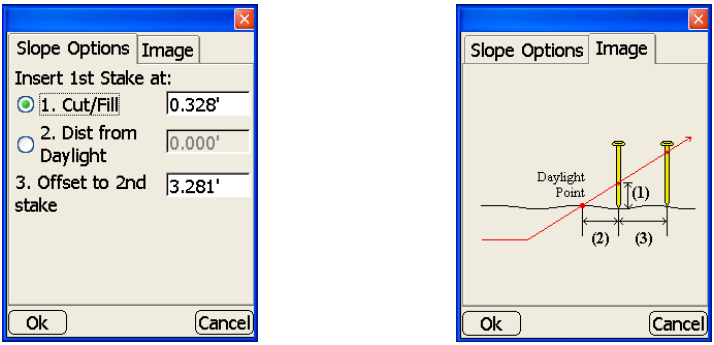



**Figure 4-71. Survey ▸ Stake-out ▸ Slopes ▸ Options**

The *Image* tab illustrates the measurements described on the *Slope Options* tab.

## V. Surface Offset

To add an extra vertical surface offset to a point or surface file, tap **Survey ▸ Stake-out ▸ V. Surface Offset**. On the small pop-up keyboard, enter the value for the extra vertical offset, then press **Ok** (Figure 4-72 on page 4-49).

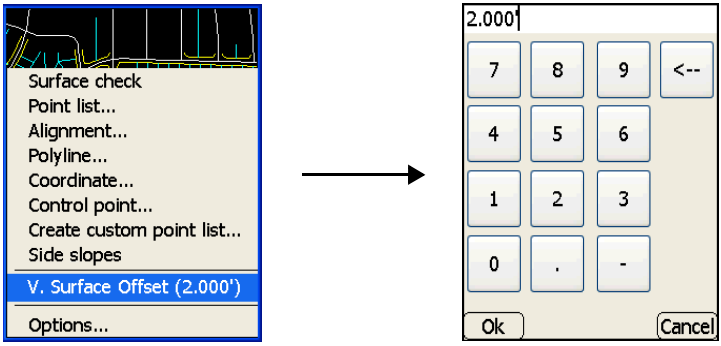



**Figure 4-72. Vertical Surface Offset**

## Options

To view or change options for stake-out measurements, tap **Survey ▸ Stake-out ▸ Options** (Figure 4-73).

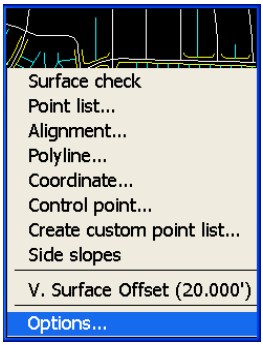



**Figure 4-73. Survey ▸ Stake-out ▸ Options**

On the ***stakeout options*** dialog box, select the desired options for stakeout measurements and audio, then press **Ok** (Figure 4-74 on page 4-50).

- *Measure* tab – sets the way to measure/stake-out points and alignments and the information to display on the main screen during a measurement/stake-out.
  - Press ENTER to measure: enable to use the Enter key (on the controller's casing, below the display screen) to start the measurement on each stakeout point or alignment.

– Enable Auto-Zooming: enable to zoom in so that the target point and the current location of the rover will always be seen on the main screen. If the rover comes closer to the target point, Pocket-3D will automatically zoom in to get a closer look. The scale bar will turn red to signify that Pocket-3D zoomed in or out.

> **TIP** If zoom in or zoom out is selected separately, auto zooming will be disabled for the current target and will be activated again at the next target.

– Show following details: select the desired details to show on the main screen during a stake-out.

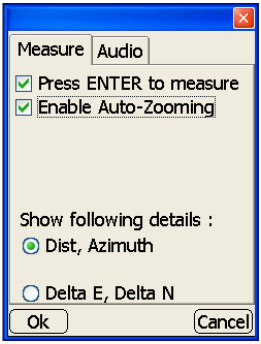
  – Dist, Azimuth: select to show distance and azimuth information during a measurement/stake-out.

  – Delta E, Delta N: select to show east/north information during a measurement/stake-out.

- *Audio* tab – an internal, Pocket-3D voice recites the cut/fill value rounded to the nearest tenth of a foot.

  – Report cut/fills to surface: enable to audibly report the cut/fills to the surface.

  – Time interval (secs): enter the desired time interval in seconds for the voice to recite the cut/fill.



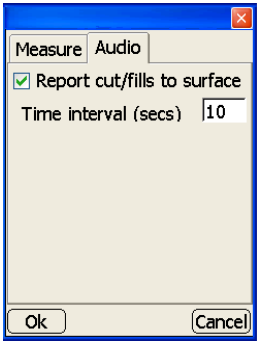




**Figure 4-74. Measure and Audio Option Tabs**

# Total Station Survey Applications

In total station survey applications, the Survey menu (Figure 4-75) has the following additional menu items. Many survey and stakeout functions are the same for GPS and total station applications. The following sections note the differences. The type of instrument configured determines the available menu items.

- Connect/Disconnect
- Start/Stop tracking
- Turn instrument
- Turn face
- Reflectorless
- Measure pts
- Auto-topo/Stop auto-topo
- Stake-out



**Figure 4-75. Survey Menu for Total Station**

# Connect/Disconnect

To enable or disable a connection with a total station, tap **Survey ▸ Connect/Disconnect** (Figure 4-76).

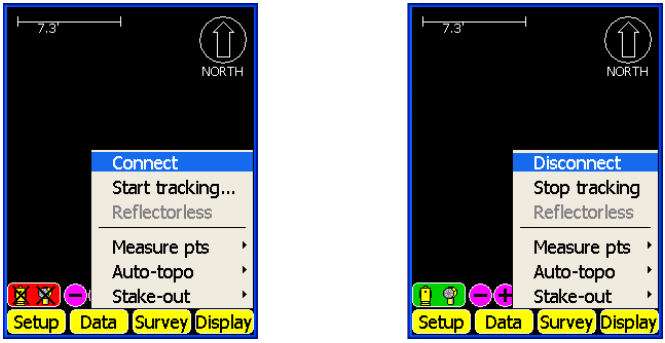



**Figure 4-76. Connect/Disconnect to Total Station**

# Start/Stop Tracking

To start or stop tracking a total station, tap **Survey ▸ Start/Stop tracking** (Figure 4-77).

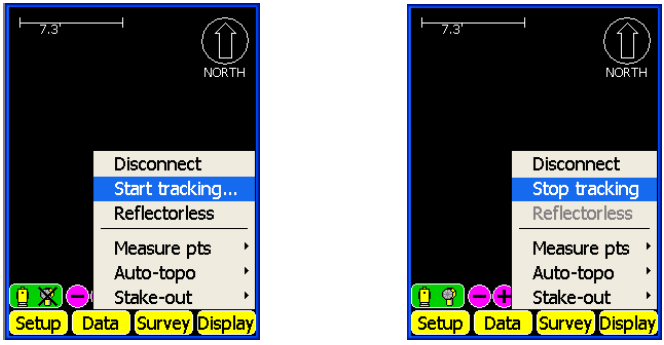



**Figure 4-77. Start/Stop Tracking of Total Station**

# Turn Instrument

To turn an instrument with a total station, tap **Survey ▸ Connect**, then press **Survey ▸ Turn instrument**. The turn **total station** menu displays (Figure 4-78).

Pressing the **Turn face** button will turn the total station 180 degrees while rotating it vertically 180 degrees. This will cause the total station to show the opposite face of the instrument while pointing in the previous direction.

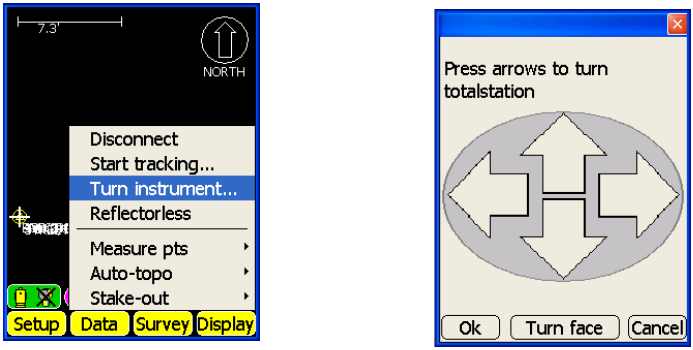



**Figure 4-78. Turn Total Station**

# Turn Face

To display the Turn Face menu option tap **Setup ▸ Equipment**. Follow the instructions for a range-pole setup. See “Total Station Applications” on page 2-51 for more information.


**Figure 4-79. Turn Face**

Select the “RC (Ext. Link)” for Connection type on the ***Advanced*** dialog box (Figure 4-80). See “Equipment” on page 2-51 for more details.

Tap **Survey ▸ Connect**, then press **Survey ▸ Turn face**. Pressing Turn Face returns you to the main screen.‘

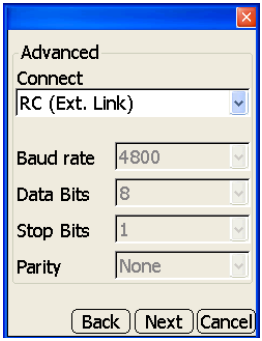



**Figure 4-80. Select Total Station Connection Type**

# Reflectorless

To enable/disable the use of a reflectorless total station, tap **Survey ▸ Reflectorless** (Figure 4-81).

A check mark indicates that a reflectorless total station is being used. In this mode, the Auto-topo menu options are unavailable.

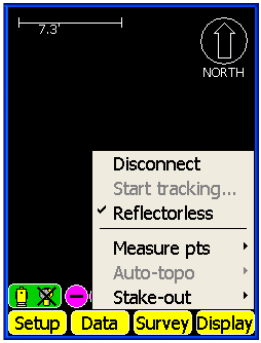



**Figure 4-81. Survey – Reflectorless Menu**

# Measure Pts

The Measure pts menu collects points, points with offsets, a reference line, and polylines in the field. The following sections note only the differences in these menus for total station applications.

For further details on the Measure pts menu options and setup screens, see “Measure Pts” on page 4-55.

## Topo-shot With Offset

To collect a topo-shot with offset, tap **Survey ▸ Measure pts. ▸ Topo-shot w. offset**. See “Topo-shot” on page 4-2 for details on the topo-shot tab.

**On the Offset tab,** enter the actual location where the collected shot was taken, then press **Ok** (Figure 4-82).

- measurement 1) – enter an offset value behind or in front of the collected shot. Select the location of this measurement (behind or in front).
- measurement 2) – enter an offset value above or below the collected shot. Select the location of this measurement (above or below).
- measurement 3) – enter an offset value to the right or left of the collected shot. Select the location of this measurement (right or left).

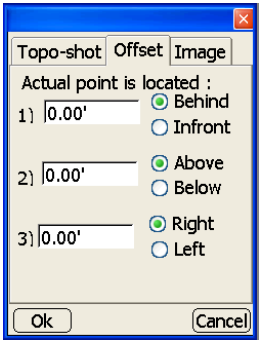



**Figure 4-82. Topo-shot with Offset – Offsets**

**The Image tab** illustrates the measurements described on the *Offset* tab (Figure 4-83).

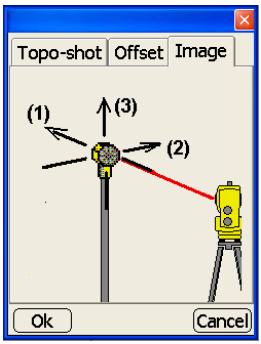



**Figure 4-83. Topo-shot With Offset – Image**

## Options

To view or change options for point measurements with a total station, tap **Survey ▸ Measure pts ▸ Options**.

On the ***Topo-shot options*** tab, select the desired options for topo-shot measurements, then press **Ok** (Figure 4-84 on page 4-57).

- Prompt for pt. details – enable to prompt for point details every time a topo-shot is measured
  - Before: enable this option to prompt for point details before the topo-shot is measured
  - After: enable this option to prompt for point details after the topo-shot is measured
- Add details/offset autom. – automatically adds details/offset information when a topo-shot is measured
- Auto-lock onto prism – automatically locks on to the prism for a measurement
- Press ENTER to measure – enables the Enter key on the controller's casing for measuring each topo-shot
- In tracking measure pt – determines how accurate and fast a measurement will be while the total station is in tracking mode.

– Quick n' dirty: uses the next tracking position update as the location of the measured point. (A little faster.)
– Accurate: records the location of a measured point by averaging a number of measurements. (A little slower.)

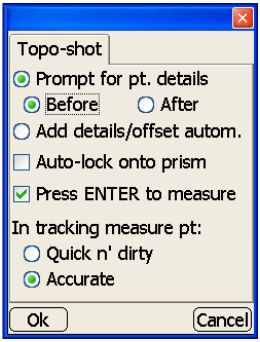



**Figure 4-84. Measure Point Options**

# Stake-out

Used in total station applications to stake-out points using different methods. The following section notes only the differences in these menus for total station applications.

For further details on the Stake-out menu options and setup screens, see "Stake-out" on page 4-21.

## Options

To view or change options for stake-out measurements, tap **Survey ▸ Stake-out ▸ Options**.

On the ***stakeout options*** dialog box, select the desired options for stakeout measurements and audio, then press **Ok** (Figure 4-85 on page 4-59).

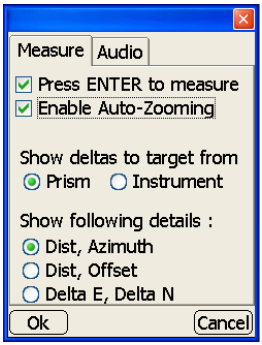
**The Measure tab** sets the way to measure/stake-out points and alignments and the information to display on the main screen during a measurement/stake-out.

- Press ENTER to measure – enable to use the Enter key (on the controller's casing, below the display screen) to start the measurement on each stakeout or alignment.

- Enable Auto-Zooming – enable to zoom in so that the target point and the current location of the rover will always be seen on the screen. If the rover comes closer to the target point, Pocket-3D will automatically zoom in to get a closer look. The scale bar will turn red to indicate that Pocket-3D zoomed in or out.
- Show deltas to target from – select the target from which to show deltas.
  - Prism: shows the deltas from the prism during a measurement.
  - Instrument: shows the deltas from the instrument during a measurement.
- Show following details – select the desired details to show on the main screen during a stake-out.
  - Dist, Azimuth: select to show distance and azimuth information during a measurement/stake-out.
  - Dist, Offset: select to show a distance and offset during a measurement/stake-out.
  - Delta E, Delta N: select to show east/north information during a measurement/stake-out.

**The Audio tab**, select to have an internal, Pocket-3D voice recite the cut/fills value rounded to the nearest tenth of a foot.

- Report cut/fills to surface – enable to audibly report the cuts/fills to the surface.
- Time interval (secs) – enter the desired time interval in seconds for the voice to recite the cut/fill.



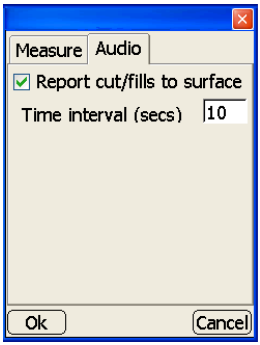




**Figure 4-85. Stake-out Options for Total Station Applications**

# Notes:

# Control Menu

Depending on the machine type in LPS configurations, the Control menu contains different options for different job applications.

## Motor Grader/Dozer Applications

For motor grader/dozer applications, the Control menu (Figure 5-1) has the following menu items:

- Start/Stop LPS control
- Blade control
- V. Surface Offset

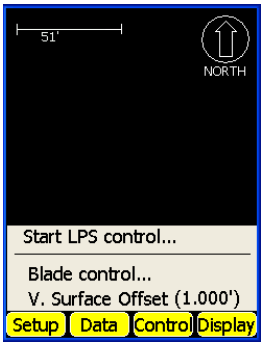



**Figure 5-1. Control Menu for Grader/Dozer Applications**

# Start/Stop LPS Control

To start-stop LPS control, tap **Control ▸ Start/Stop LPS control** (Figure 5-2).


**Figure 5-2. Control ▸ Start/Stop LPS Control**

When starting LPS control, the main screen displays the machine on the design surface, and the current cut or fill and slope (Figure 5-3).

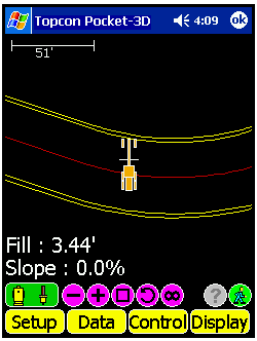



**Figure 5-3. Machine on Design Surface**

# Blade Control

To select the controlling position of the machine's cutting edge, tap **Control ▸ Blade Control** (Figure 5-4). On the ***blade control*** dialog box (Figure 5-4), select the desired method of blade control and press **Ok**.

- Best-fit (whole blade) – looks at the cutting edge and determines where on the Design Surface the greatest amount of the blade resides and controls to that grade and slope.
- Single point on blade – looks only at a selected point on the blade rather than the entire cutting edge for tight grading areas, and controls to that point's grade and slope. This option is useful for tight grading areas, or where the design surface is smaller than the blade.
  - Slider bar: specifies the from left/right location of the point on the blade. While grading, this ensures the blade is positioned so that the point remains on the desired surface.

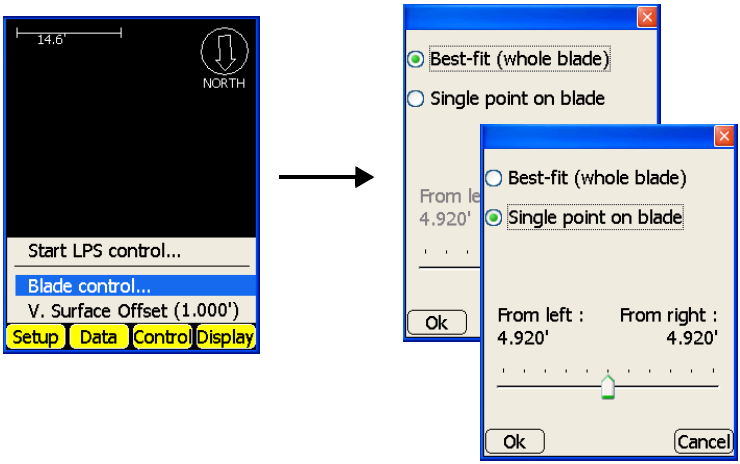



**Figure 5-4. Blade Control**

# V. Surface Offset

To add an extra vertical offset to a surface, tap **Control ▸ V. Surface Offset** (Figure 5-5). Enter a vertical offset value on the small pop-up keyboard and press **Ok**.

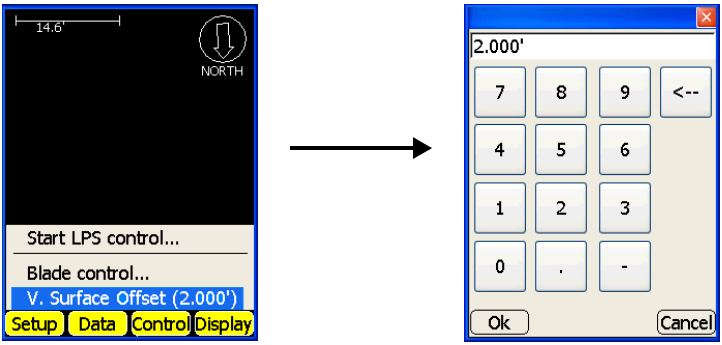



**Figure 5-5. V. Surface Offset**

# 3-Track Curb and Gutter Applications

For 3-track curb and gutter applications, the Control menu (Figure 5-6) has the following menu items:

- Start LPS control
- Direction of travel
- Slope fixed
- Line of interest
- H. Surface Offset
- V. Surface Offset

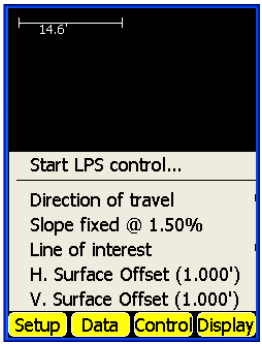



**Figure 5-6. Control Menu**

## Start/Stop LPS Control

See “Start/Stop LPS Control” on page 5-2 for more information on this menu.

# Direction of Travel

To select the direction of travel, tap **Control ▸ Direction of travel** (Figure 5-7).

- Increasing stationing – the machine is traveling in the direction increasing station numbers.
- Decreasing stationing – the machine is traveling in the direction decreasing station numbers.

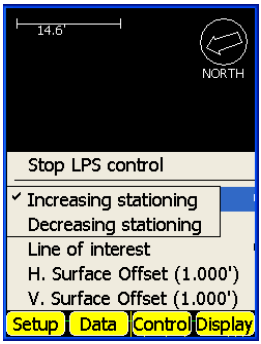



**Figure 5-7. Direction of Travel**

# Line of Interest

To select a line of interest, tap **Control ▸ Line of interest ▸ <desired feature line>** (Figure 5-8). The line of interest menu contains a list of features available in the active alignment file. The selected line will display on the main screen as a reference for grading.

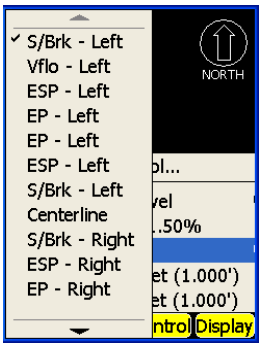



**Figure 5-8. Line of Interest**

# Slope Fixed

To set a fixed value for the angle of the slope, tap **Control ▸ Slope fixed**. Enter a value in the pop-up keyboard for a fixed slope and press **Ok** (Figure 5-9).

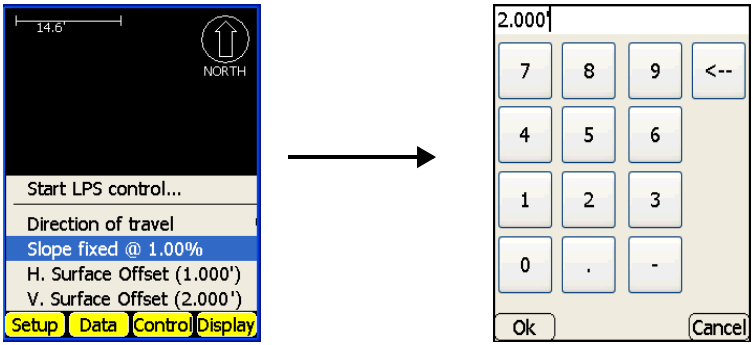



**Figure 5-9. Control ▸ Slope Fixed**

# H. Surface Offset

To add an extra horizontal offset to a surface, tap **Control ▸ H. Surface Offset** (Figure 5-10). Enter a horizontal offset value on the small pop-up keyboard and press **Ok.**

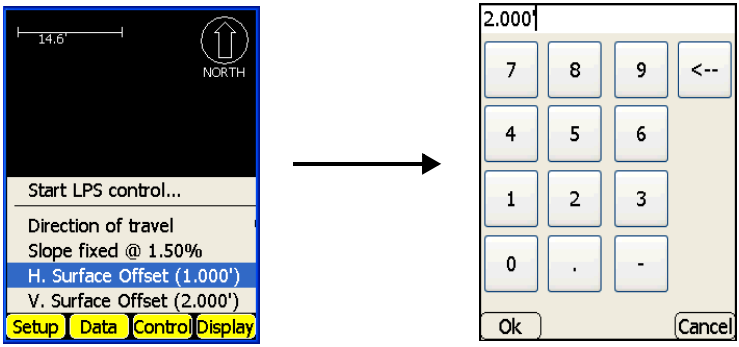



**Figure 5-10. H. Surface Offset**

# V. Surface Offset

To add an extra vertical offset to a surface, tap **Control ▸ V. Surface Offset** (Figure 5-11)**.** Enter a vertical offset value on the small pop-up keyboard and press **Ok**.

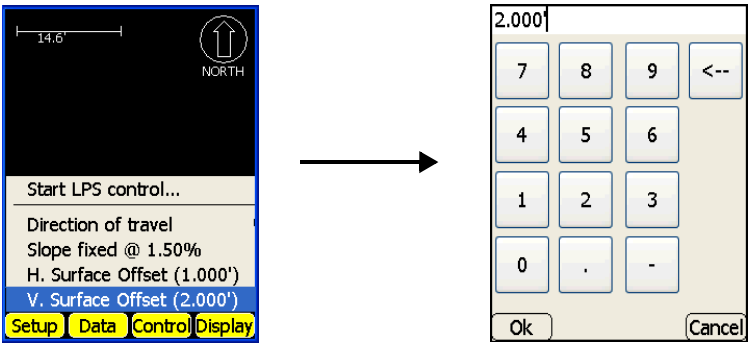



**Figure 5-11. V. Surface Offset**

# Display Menu

The Display menu (Figure 6-1) has the following menu items:

- Zoom
- Cursor
- Show
- Orientation
- Grid lines
- Show section view
- Cut/fill history
- Color selection
- Language selection
- About Pocket-3D

Some menu options depend on the type of file open and the jobsite application.

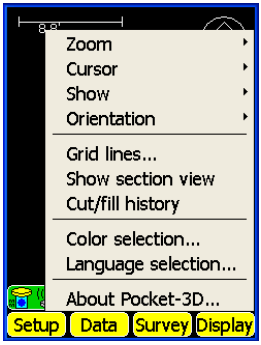



**Figure 6-1. Display Menu – Example**

# Zoom

To choose a zoom function, tap **Display ▸ Zoom** (Figure 6-2).

- Zoom in – magnifies the main screen by 25%.
- Zoom out – magnifies the main screen by -25%.
- Zoom window – zooms to a window drawn on the main screen.
- Zoom extents – displays the extent of the project.
- Zoom prev. – displays the previous view.

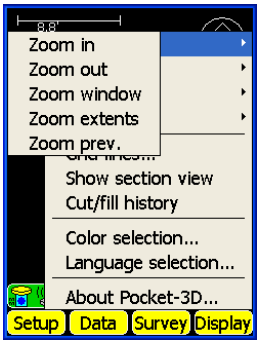



**Figure 6-2. Zoom Options**

# Cursor

To switch the main screen between views, tap **Display ▸ Cursor** (Figure 6-3).

- Pan – moves the main screen around by pressing down on the screen and dragging it.
- Select – selects a point, points, and/or a polyline on the main screen when tapping on them, or drawing a box around them.
- Polygon – selects a point, points, and/or a polyline on the main screen when creating a polygon around them.
  - To draw a polygon, tap once on the screen to start the polygon, then tap as many points around the screen as desired.
  - To close the polygon, tap the last point and drag a line to connect with the first point. When all lines of the polygon turn to thick white lines, lift off the screen.
- Auto pan – available only when GPS or LPS are connected. The view of the screen pans automatically as the user moves around the project site.

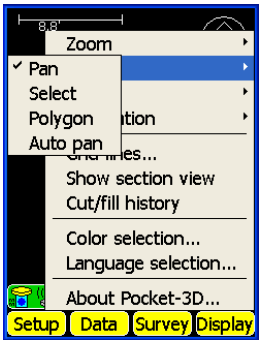



**Figure 6-3. Cursor Options**

# Show

To display main screen reference items, tap **Display ▸ Show** (Figure 6-4).

- Scale bar – shows/hides the scale bar, which shows the current scale of the view on the screen to the jobsite.
- North arrow – shows/hides the north arrow, which points North.
- Reference line – shows/hides the reference line defined (selected to use) for certain measuring functions.

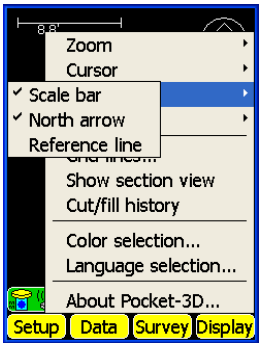



**Figure 6-4. Show Options**

# Orientation

To change the orientation of the arrow while in stake-out mode, tap **Display ▸ Orientation** (Figure 6-5).

- To north – orients the arrow to point north.
- Current direction – orients the arrow to point in the direction of travel.
- Up station – orients the arrow to point up a station along the alignment.
- Down station – orients the arrow to point down a station along the alignment.

Some menu options depend on the type of file open and the jobsite application.

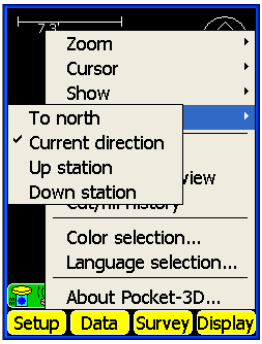



**Figure 6-5. Orientation Options**

# Grid Lines

To view or change the grid-lines display, tap **Display ▸ Grid-lines** (Figure 6-6).

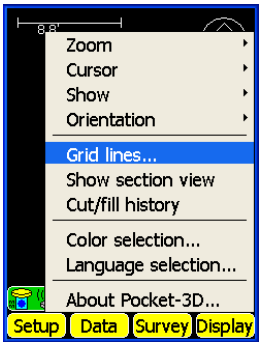



**Figure 6-6. Grid Lines Display**

On the ***Grid-lines*** dialog box (Figure 6-7), select the desired options for grid-lines, then press **Ok**.

- Display grid-lines – enable to display grid-lines.
- Grid interval – enter the desired grid interval for the mainfall.
- Grid interval (Crossfall) – enter the desired grid interval for the crossfall.
- Orientation – enter the desired orientation of the grid-lines.
- Align grid – press to align the grid to the current position chosen for orientation.

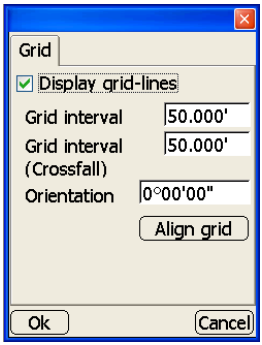



**Figure 6-7. Grid Lines**

# Show Section View

To display the section view of the selected surface file, tap **Display ▸ Show section view** (Figure 6-8).

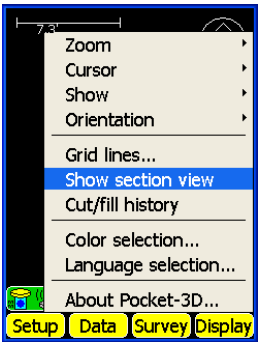



**Figure 6-8. Display Show Section View**

The main screen displays a cross section view of the selected design surface (Figure 6-9). Press the **+/-** buttons to zoom in or out.

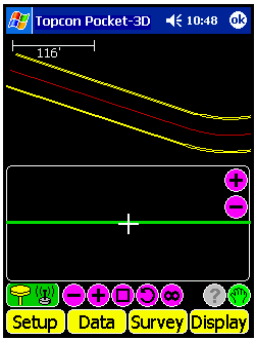



**Figure 6-9. Section View**

# Cut/fill History

For mmGPS applications, Pocket-3D has an option to view the cut/fill history of the loaded project.

To display the cut/fill history, tap **Display ▸ Cut/fill history** (Figure 6-10).

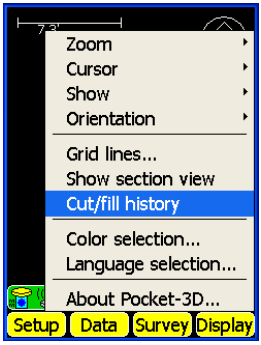



**Figure 6-10. Display  Cut/fill History**

The cut/fill window (Figure 6-11) displays the on-going highs and lows of the project as determined by both laser and GPS readings.

- The red line indicates mmGPS detection.
- The blue line indicates GPS only detection.

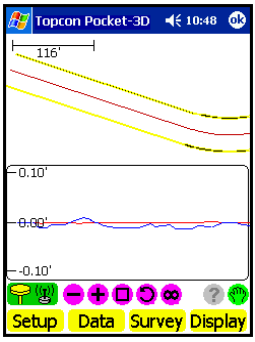



**Figure 6-11. Cut/fill History**

# Color Selection

To change the color of the background for the main screen, tap **Display ▸ Color selection** (Figure 6-12).

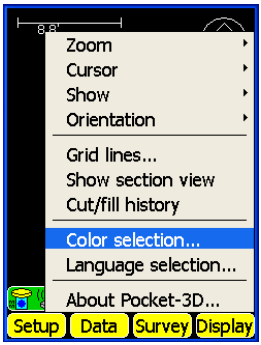



**Figure 6-12. Display  Color Selection**

On the ***color selection*** dialog box, select an appropriate contrasting color and press **Ok** (Figure 6-13).


**Figure 6-13. Select Color**

TIP

You will not see black points, linework, etc., on a black background. Conversely, you will not see white points, linework, etc., on a white background.

# Language Selection

To change the language used in Pocket-3D, tap **Display ▸ Language selection** (Figure 6-14).

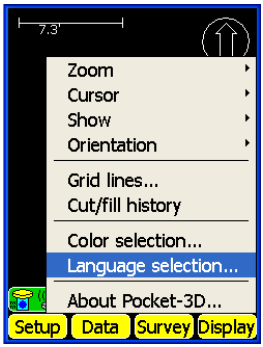



**Figure 6-14. Display  Language Selection**

Select the desired language and press **Ok** (Figure 6-15).

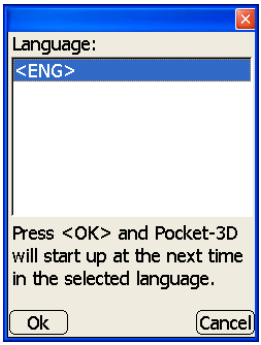



**Figure 6-15. Select Language**

Pocket-3D will start up next time in the selected language.

# About Pocket-3D

To view Pocket-3D information, tap **Display ▸ About Pocket-3D** (Figure 6-16).

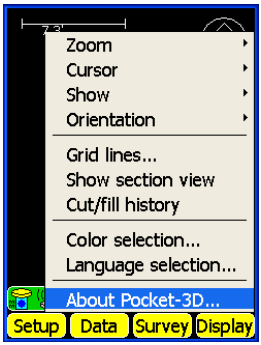



**Figure 6-16. Display About Pocket-3D**

The ***about Pocket-3D*** dialog box displays the following fields (Figure 6-17):

- Version number – version number of software.
- Copyright information – name of publishing company.
- Registered to – name of registered user.
- ID – passcodes/authorization codes needed to operate software.
- Options – press to view a list of available machine and application options.


**Figure 6-17. About Pocket-3D**

# Options

The ***Options*** dialog box displays a list of all available machine and application options for Pocket-3D (Figure 6-18). The yes/no column indicates whether or not the option is enabled/purchased.

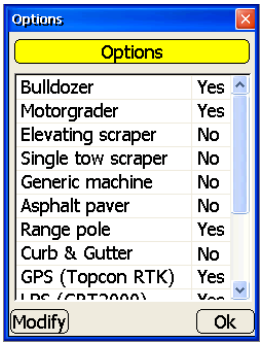



**Figure 6-18. Pocket-3D Options (Example)**

# Modify

On the ***Options*** dialog box, press **Modify** to change/edit registered user and authorized options. The ***Pocket3D*** dialog box displays (Figure 6-19). After entering the following information on the ***Pocket3D*** dialog box, press **Ok**. To activate new/changed codes and options, turn Pocket-3D off, then on.

- Device identification – the device ID to give to a Topcon representative to obtain new authorization codes for the desired applications.
- Registered user name – name software is registered to.
- Authorization code (1) and (2) – enter the first and second codes for the purchased options.

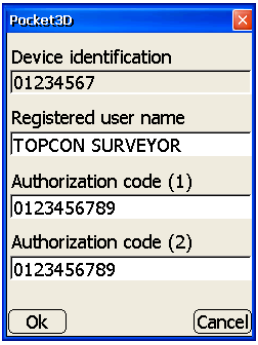



**Figure 6-19. Device and Information Authorization**

# Notes:

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## R



## S

## T



## U



## V



## Z

# Notes:

# Notes:

# Notes:

**Topcon Positioning Systems, Inc.**
7400 National Drive, Livermore, CA 94551
Phone: 800-443-4567
www.topcon.com

ISO 9001:2000
FM 68448

Pocket-3D Reference Manual
P/N: 7010-0628 Rev F 03/07 500