

A custom survey point code library has been developed to standardize point codes used during field survey and to help automate the process of importing survey data into Civil 3D. The table on the following page lists the field code numeric prefixes and codes that are included in the point code library. For Civil 3D to recognize the survey codes correctly, it is important to include the numeric prefix in the point code.

Reserved Point numbers

Point numbers in the range 9000 – 9999 are reserved for stakeout points.

Point numbers in the range 10000 – 11999 are reserved for as-built survey shots.

Survey Controllers

The point code library can also be uploaded into a data collector. Use the files listed below for the controller that you are using. These files are located on the Minnesota CADD Drawings section on the Minnesota Home Page, in the Minnesota Civil 3D Point codes zip file.

TSCx Controllers

NRCS MN.fcl can be uploaded into the TSCx controllers via TGO and ActiveSync.

Another option is to connect to the controllers using ActiveSync, clicking the “Explore” button in ActiveSync, and copying the following two files into the **Trimble Data** folder on the controller.

NRCS MN.fal, and **NRCS MN.MCD**

Recon Controllers

For Recon Controllers, the upload the file **NRCS MN.txt**

NRCS MN Field Code Library

01	TBM	Temporary Benchmark	Control/Ground Shots
02	BM	Permanent Benchmark	
03	IP	Instrument Point	
04	TP	Turning Point	
05	RP	Reference Point	
06	PPIN	Property Pin or Marker	
07	EPIN	Easement Pin or Marker	
08	GS	Ground Shot	
09	TH	Soil Boring (Test Hole)	

Structures	10	BLD	Building	20	FX	Fence	Boundary Shots
	11	BLDC	Building Corner	21	FC	Fence Corner	
	12	CON	Concrete	22	FJ	Fence Junction	
	13	CONC	Concrete Corner	23	FE	Fence End	
	14	BIT	Bituminous Pavement	24	FG	Fence Gate	
	15	CLDAM	Centerline of Dam	25	PL	Property Line	
	16	EDAM	Top Edge of Dam	26	EL	Easement Line	
	17	WELL	Well	27	ROW	Right-of-Way Line	
	18	WALL	Retaining Wall	28	EFLD	Edge of Field	
19	STRUC	Other Structure	29	EWET	Edge of Wetland		

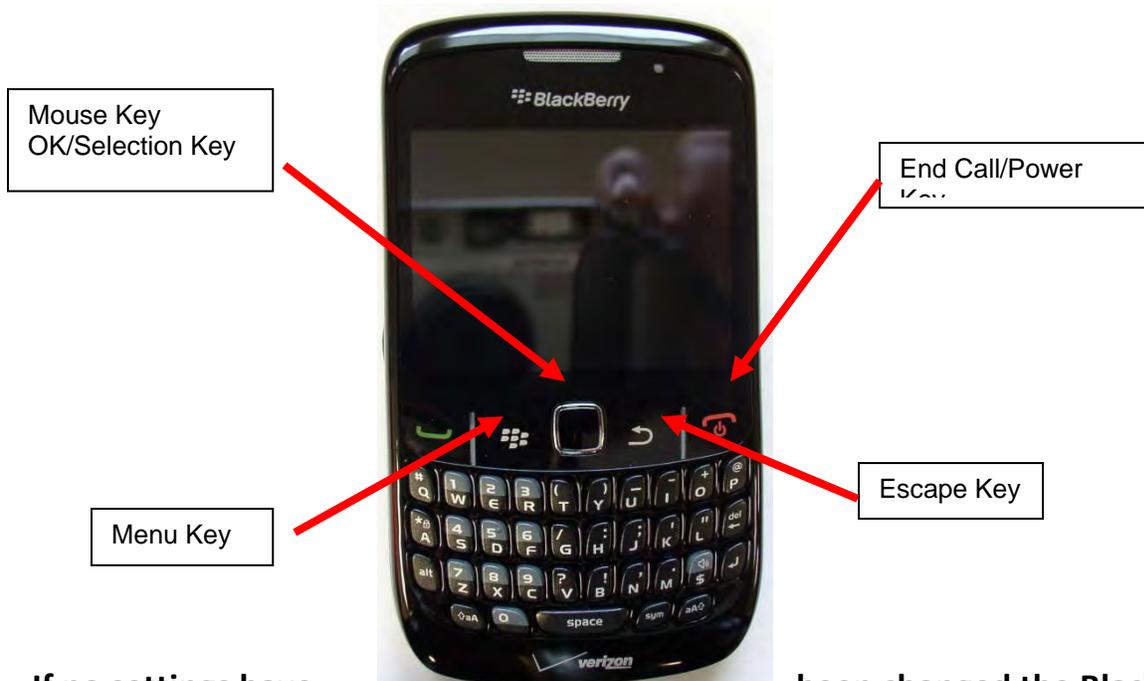
Water Features	30	CLW	Centerline of Watercourse	40	CLR	Centerline of Road	Roads
	31	CLDRAW	Centerline of Draw	41	ER	Edge of Road	
	32	CLDITCH	Centerline of Ditch	42	CLFR	Centerline of Field Road	
	33	EBL	Edge of Bottom LDS	43	EFR	Edge of Field Road	
	34	EBR	Edge of Bottom RDS	44	CLD	Centerline of Driveway	
	35	BNKL	Bank LDS	45	ED	Edge of Driveway	
	36	BNKR	Bank RDS	46	RD	Road Ditch Centerline	
	37	WL	Water Line (Edge)	47	FLDA	Field Approach	
	38	GSWET	Ground Shot in Water	48	CLRR	Centerline of Railroad	
39	H2O	Water Surface Elevation	49	ERR	Edge of Railroad		

Pipes/Culverts	50	RCPINV	Reinforced Concrete Pipe Invert	60	CC	Cropping Change	Vegetation
	51	RCPTOP	Reinforced Concrete Pipe Top	61	VC	Vegetation Change	
	52	CMPINV	Corrugated Metal Pipe Invert	62	EWOOD	Edge of Woods	
	53	CMPTOP	Corrugated Metal Pipe Top	63	TREEL	Tree Line	
	54	PVC	PVC Pipe	64	CTREE	Coniferous Tree	
	55	HDPE	HDPE Pipe	65	DTREE	Deciduous Tree	
	56	APRON	Pipe Apron	66	SHRUB	Shrub	
	57	INTAKE	Tile Intake	67	BRUSH	Brush	
	58	OUTLET	Tile Outlet	68	ROCK	Rock or Rock Pile	
59	TILEFL	Tile Flowline	69				

Utilities	70	PP	Power Pole	80	WD	Watershed Divide	Terrain
	71	PLO	Overhead Power Line	81	SB	Slope Break	
	72	PLB	Buried Power Line	82	TS	Top of Slope	
	73	TEL	Telephone Line	83	BS	Bottom of Slope	
	74	GAS	Gas Line	84	LS	Low Spot	
	75	WATER	Water Line (Pipe)	85	HS	High Spot	
	76	FIBER	Fiber Optic Line				
	77	UTIL	Other Utility Line				
	78	PED	Pedestal (phone, electric, etc.)				
79	GW	Guy Wire					

VRS Blackberry Startup Procedures

- Turn on cell phone by holding down the End Call/Power Key. If the phone does not turn on the battery is most likely dead.

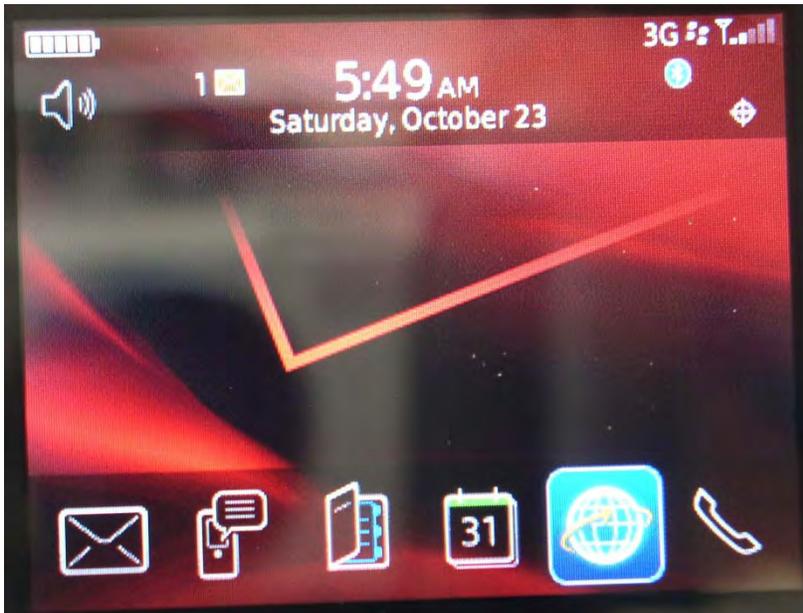


If no settings have been changed the Blackberry should now be ready for VRS use.

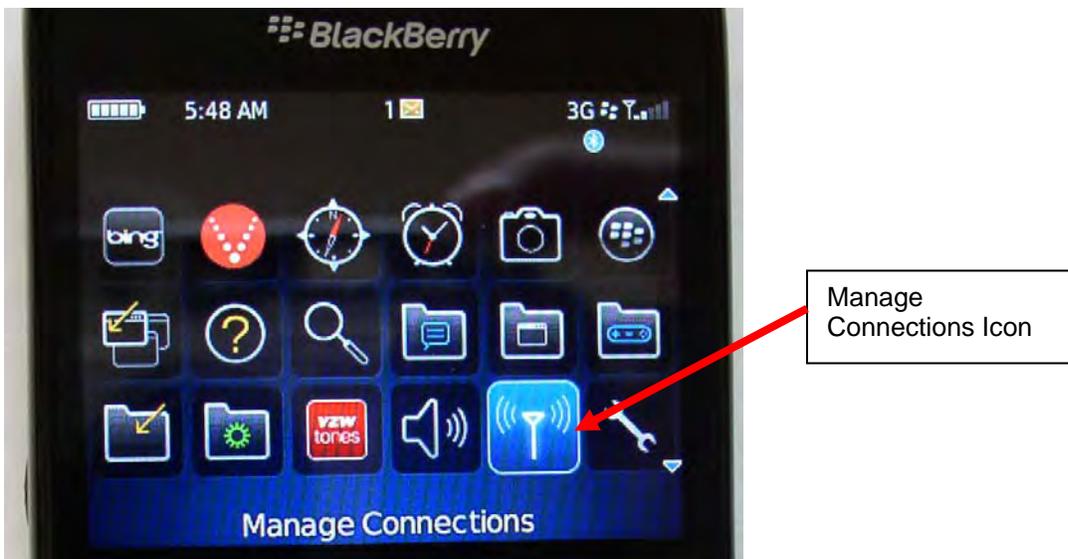
been changed the Blackberry

Checking Bluetooth settings.

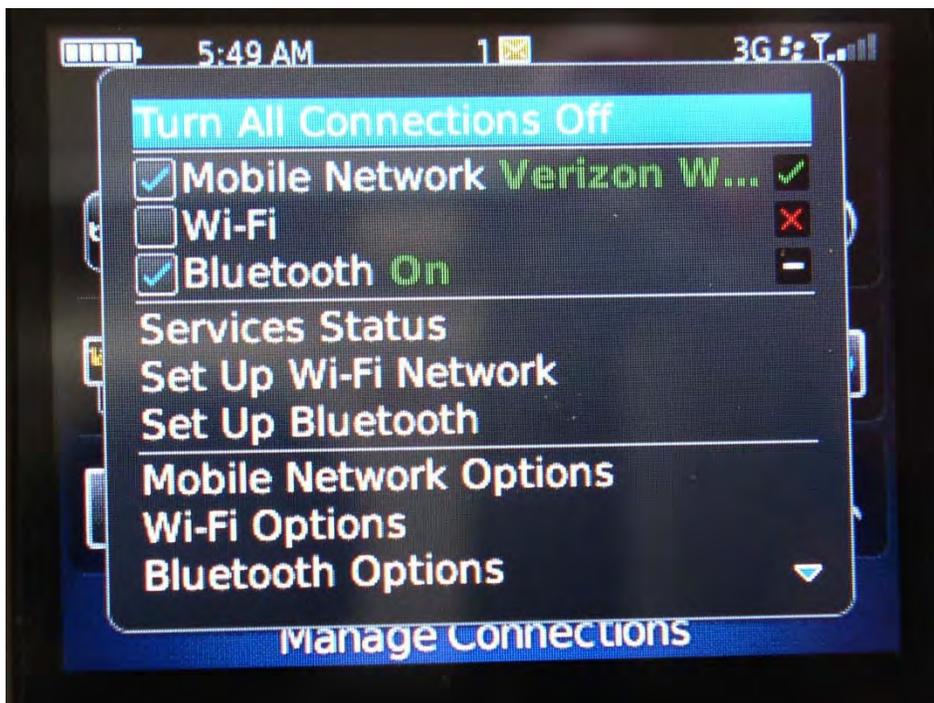
- When the Blackberry is turned on the main menu should appear as shown below.



- Press the Menu Key and the screen similar to the one below should appear. Use the mouse key to scroll to the bottom of the menu page and the screen should look identical to that shown below. Using the mouse key, scroll the selection box over the Manage Connections Icon and press down on the mouse key to select it.



- Selecting the Manage Connections Icon should bring up the dialog box shown below. For VRS use the Mobile Network and Bluetooth boxes both need to be checked. The Blackberry is now ready for VRS use.



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VRS TSC2 Startup Procedures



New Job Setup

Turn on the TSC2 by pressing the green power button. If the controller has undergone a Hard Shutdown it may take a few moments to reboot. If Trimble Access does not open automatically, open it either through the start menu or by pressing the Trimble Button. When Access has opened the main Access screen should appear as shown below.



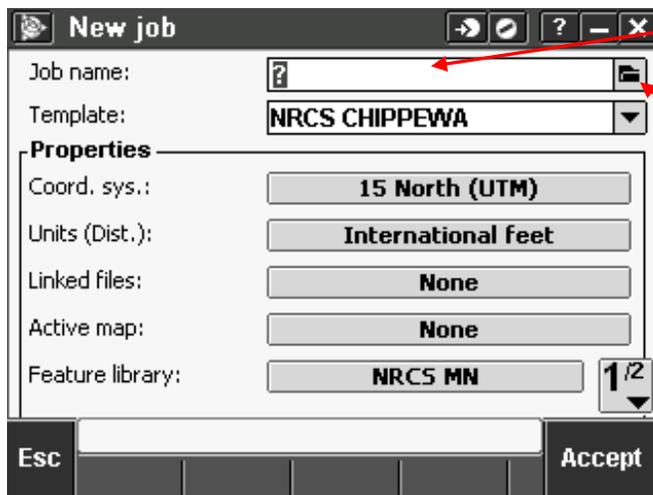
To begin surveying, press the **General Survey** icon on the Main Access Screen



To begin a new job, press the **Jobs** icon on the General Survey Screen.

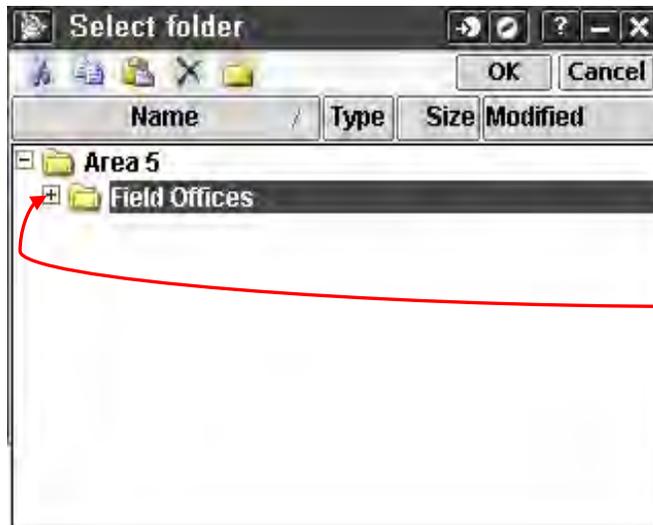


Press **New Job** from the Jobs Menu

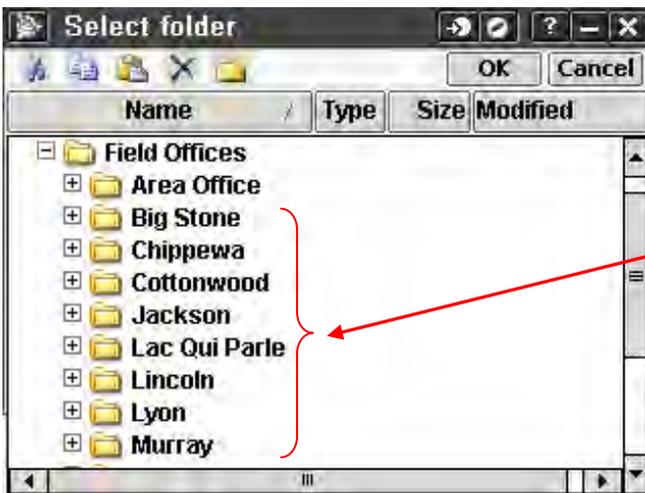


Enter a job name in the Job name entry field.

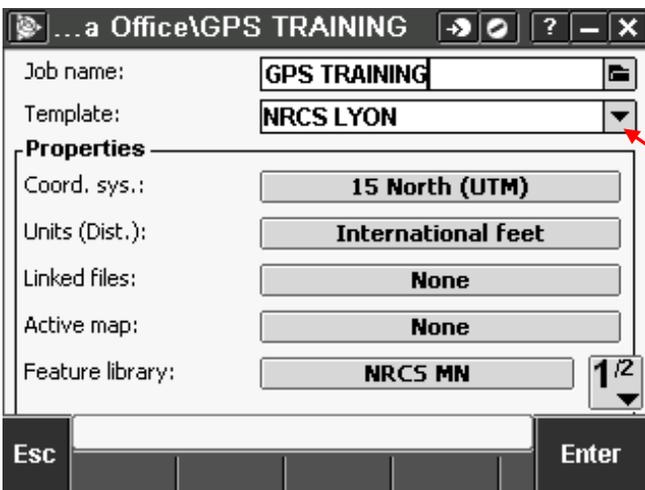
Click the folder icon at the right end of the Job name entry field.



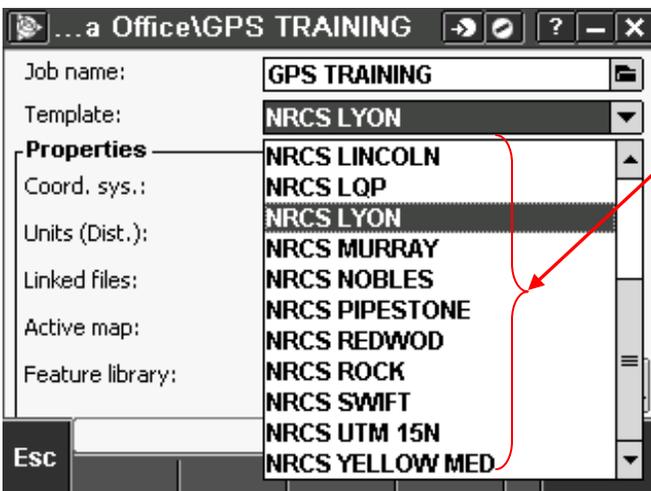
Click the plus sign next to the Field Offices folder to show a list of all Area 5 counties.



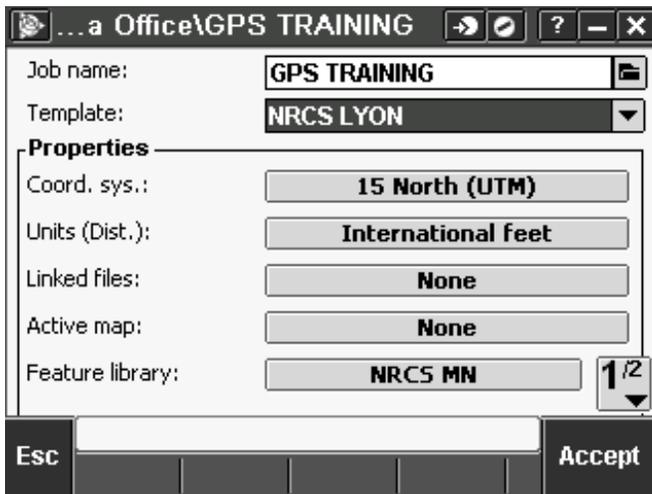
Click on the appropriate county folder and you will be taken back to the New job screen



Click on the drop down arrow located on the right side of the Template box



Click on the appropriate template for the county in which you will be surveying.



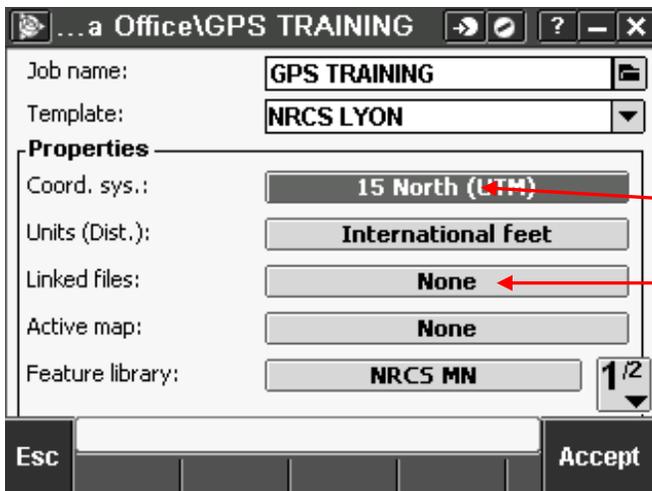
The screenshot shows a software window titled "...a Office\GPS TRAINING". It contains the following fields and values:

- Job name: GPS TRAINING
- Template: NRCS LYON
- Properties section:
 - Coord. sys.: 15 North (UTM)
 - Units (Dist.): International feet
 - Linked files: None
 - Active map: None
 - Feature library: NRCS MN

At the bottom of the window, there are "Esc" and "Accept" buttons.

The chosen template should populate the remaining fields with the required information.

- **Before leaving the New job screens:**
You need to enter a project height. The project height entered should be within 20' of the average ground elevation of the area to be surveyed. The average ground elevation can be sufficiently estimated with the use of a USGS topographic map of the survey area.

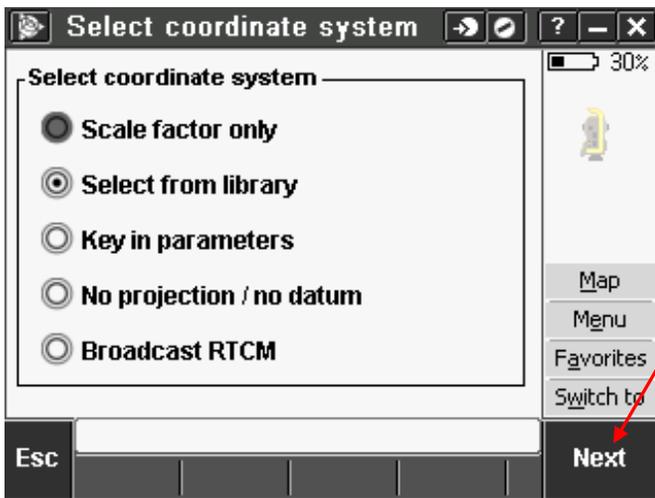


This screenshot is identical to the one above, but with two red arrows pointing to the "15 North (UTM)" field in the "Coord. sys.:" row and the "None" field in the "Linked files:" row.

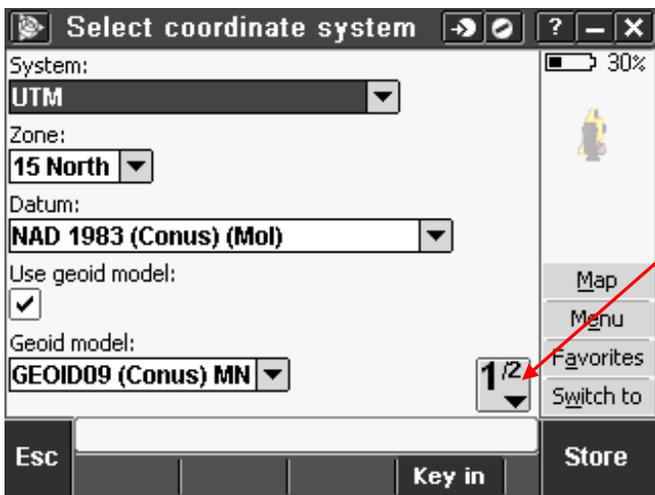
To enter the project height:

Click in the Coordinate System field.

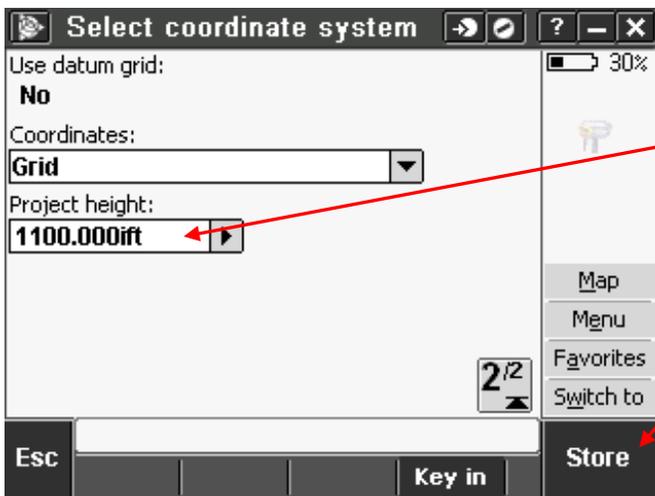
Ensure linked files is set to **None** when beginning a new job you.



Click Next.



Click the 1 of 2 button.



Enter the estimated average ground elevation for the survey area.

Click Store.

The screenshot shows a software dialog box titled "...a Office\GPS TRAINING". It contains the following fields and options:

- Job name:
- Template:
- Properties**
- Coord. sys.:
- Units (Dist.):
- Linked files:
- Active map:
- Feature library:

At the bottom of the dialog box are two buttons: "Esc" on the left and "Accept" on the right.

Click accept.

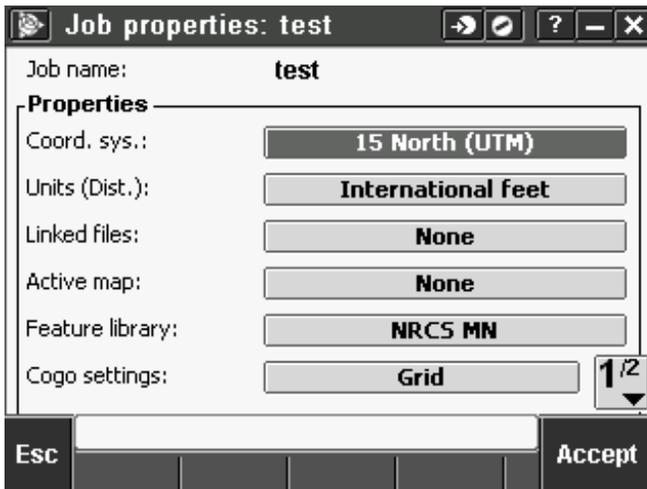
Your job setup is now complete.

Editing Job Properties

- If a job has already been setup the job properties settings can be modified by selecting Properties of current job from the Jobs menu.



Click Properties of Job

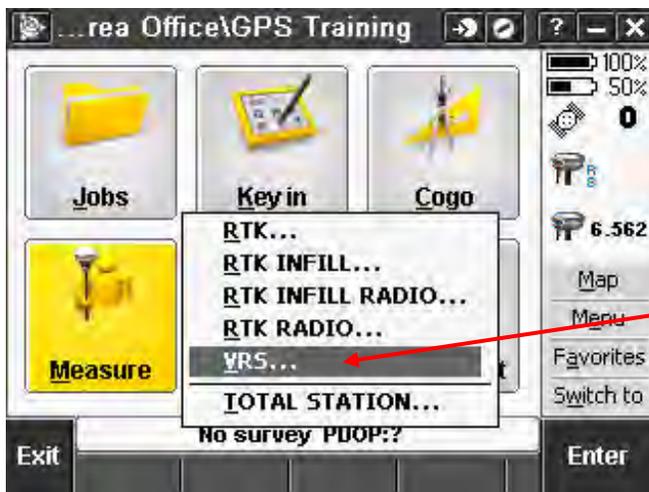


The job properties may be edited in this window.

- Turn on GPS receiver, TSC2, and Blackberry.



Press Measure



Press VRS



If this message remains on the screen for longer than 30 seconds, the controller is not connecting with the receiver.

Press Cancel then proceed through the Bluetooth Settings Setup section found below.



If this message is displayed, the controller is not connecting to the internet. This indicates a problem with the Blackberry settings or the Access Internet setup.

First check the Blackberry settings by proceeding through the Checking Bluetooth Settings section of the Blackberry Setup Tab located in the Area 5 GPS manual.

If the error message still persists proceed through the Internet Setup section below.

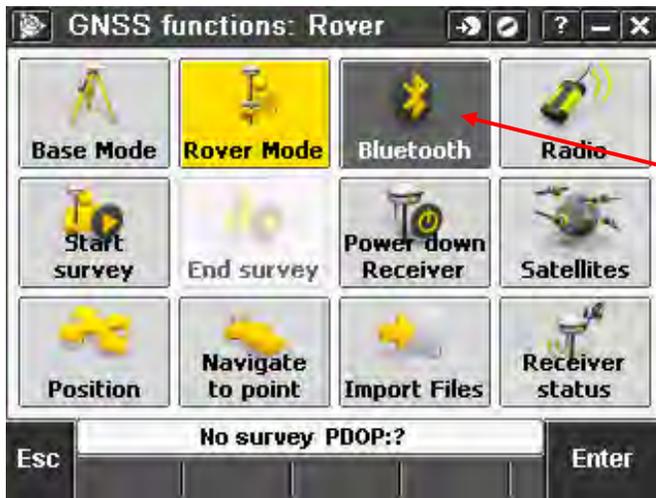
Bluetooth Settings Setup



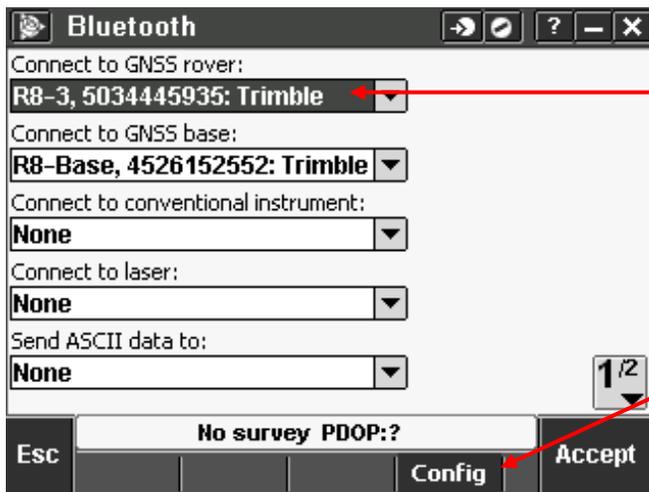
Press Instrument



Press GNSS Functions



Press Bluetooth



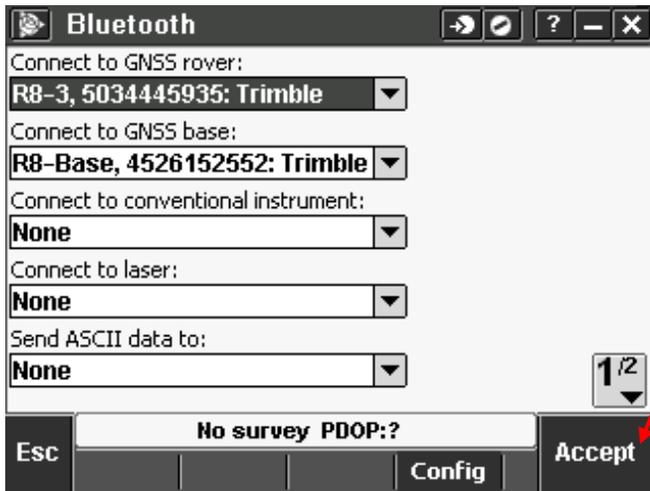
Ensure the Connect to GNSS rover box is set to the correct R8.

Example: If you are using TSC2 #3, the correct R8 would be R8-3.

Click Config



Ensure the Turn on Bluetooth box is checked. Then Click OK.

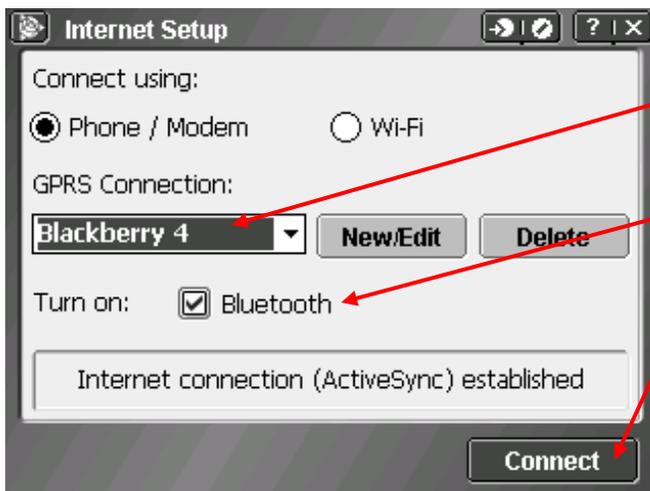


Click Accept. The Bluetooth setup is now complete.

Internet Setup



Click Internet Setup



Ensure the GPRS Connection: is set to the appropriate Blackberry.

Ensure the Bluetooth box is checked

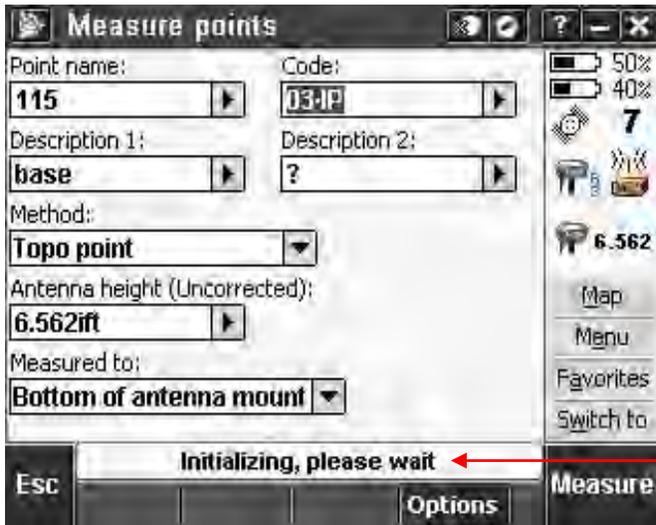
Click Connect. The connection process may take a few seconds. If the connection is successful the box at the bottom should read: Internet Connection (Blackberry 4) established.

Initialization Procedures

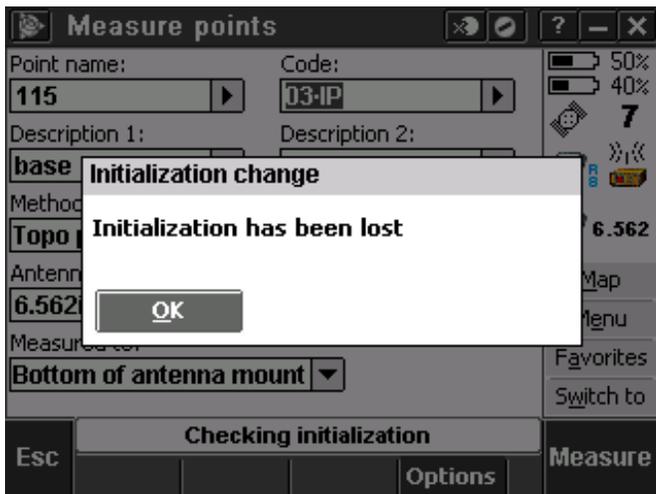
On The Fly Initialization

On the fly initialization occurs automatically once a survey is started.

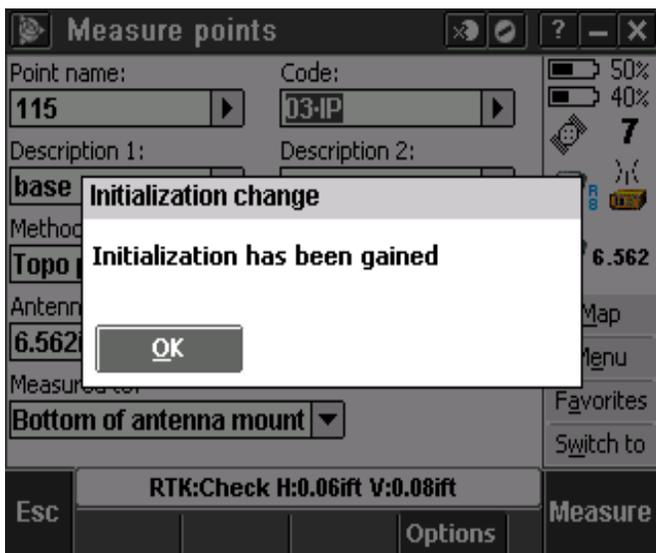
It is best **to move around** while the GPS is performing an OTF Initialization. This eliminates possible errors due to multipath signals.



This message is displayed at the bottom of the screen during on the fly initialization.



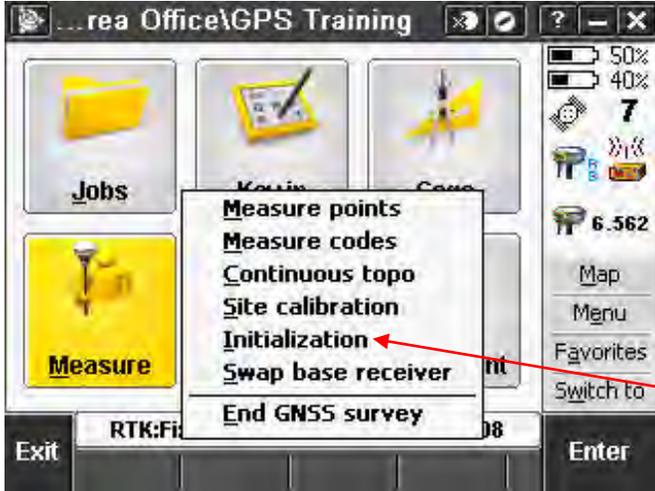
This warning message will appear if initialization is lost and you will not be able to collect survey shots.



Survey shots cannot be taken again until initialization has been regained.

Known Point Initialization

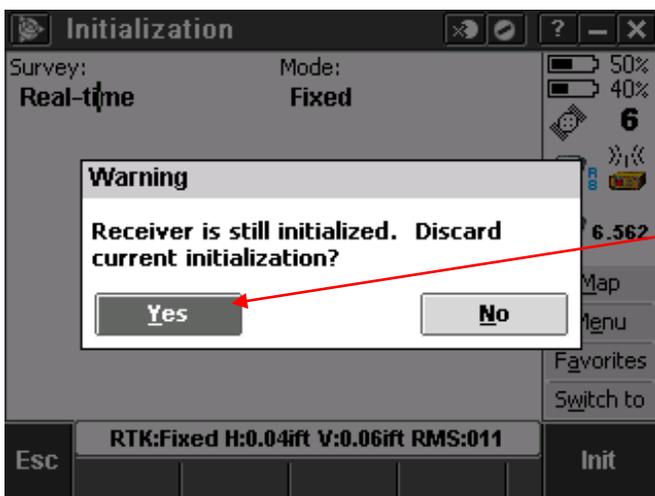
- Know point initialization guarantees better accuracies and is a more robust initialization. Meaning that the initialization will not be lost as easily when entering weak signal areas such as beneath trees or next to buildings.
- A know point initialization is performed while occupying a point which has been previously collected in the job.



Enter the **Measure** menu and press Initializations.

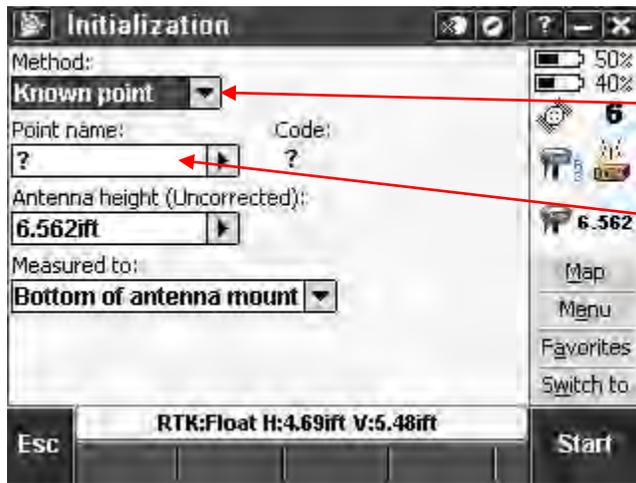


Press Init



Press Yes.

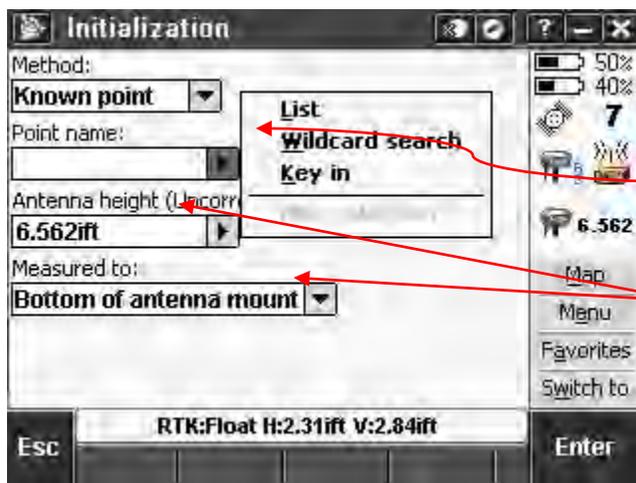
Initialization can also be discarded by simply turning the receiver upside down.



In the Init screen

Set the method to Known Point.

Enter a point name for a point which has previously been collected in this survey.



If you do not know the desired point name you look through the points List or use a Wildcard Search to find the point. Both of these options can be accessed through the drop down arrow.

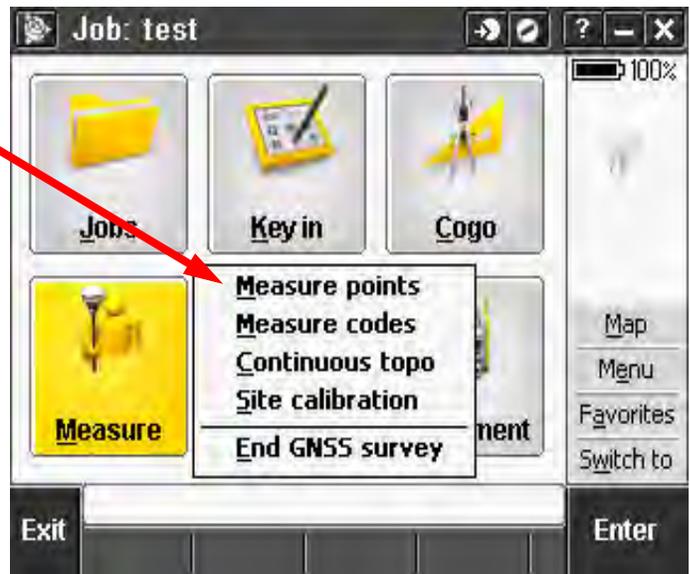
Ensure the Antenna height and Measure to settings are correct.

Press Start to begin the initialization

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Measure Points Procedures

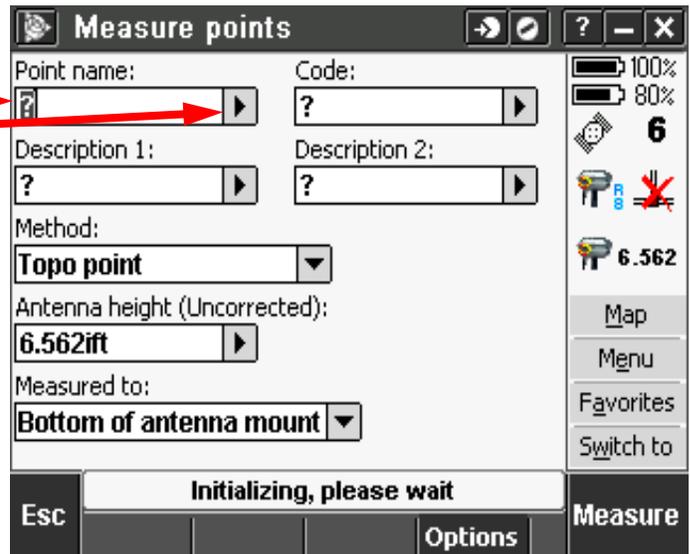
1. Choose Measure points



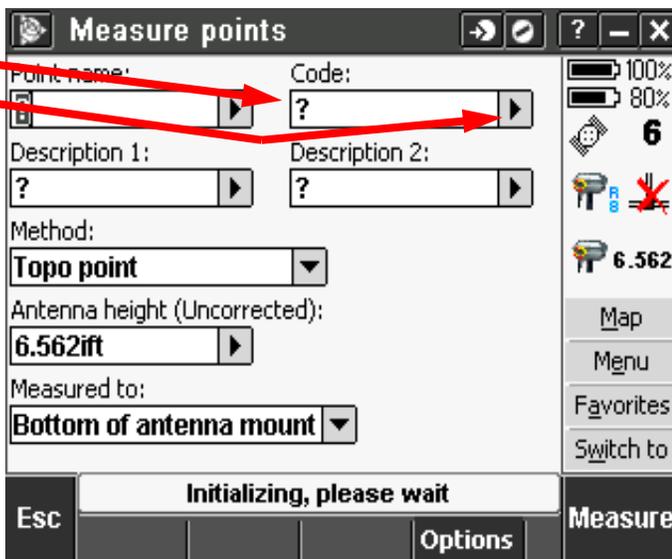
2. Enter Point name:

or click on > to view the dropdown.

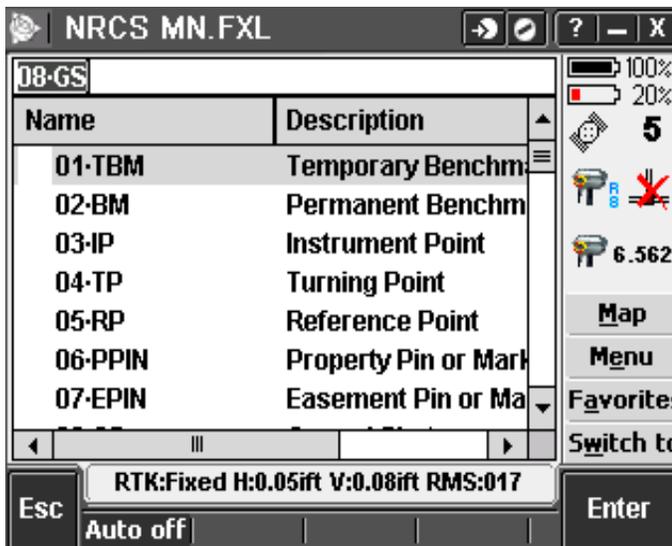
Point name is a number, it is useful to reserve 1 to 99 for control points. Start with 100 for all the other shots, you may desire to set up a numerical system to readily distinguish different Codes eg; 1000 – 1999 for watershed divide, 2000 – 2999 for centerline of draw, 3000 – 9999 for ground shots and so forth.



3. Enter Code:
or click on >
to view the dropdown.
Code is a description of the shot you are taking, descriptions have been selected and are to be used for ALL SURVEYS.



For more information on the Minnesota field code library, refer to Quick Reference Guide *100.0 Minnesota Standard Survey Point Codes*.



NRCS MN Field Code Library

01	TBM	Temporary Benchmark
02	BM	Permanent Benchmark
03	IP	Instrument Point
04	TP	Turning Point
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Control/Ground Shots

Structures	10	BLD	Building
	11	BLDC	Building Corner
	12	CON	Concrete
	13	CONC	Concrete Corner
	14	BIT	Bituminous Pavement
	15	CLDAM	Centerline of Dam
	16	EDAM	Top Edge of Dam
	17	WELL	Well
	18	WALL	Retaining Wall
	19	STRUC	Other Structure

20	FX	Fence
21	FC	Fence Corner
22	FJ	Fence Junction
23	FE	Fence End
24	FG	Fence Gate
25	PL	Property Line
26	EL	Easement Line
27	ROW	Right-of-Way Line
28	EFLD	Edge of Field
29	EWET	Edge of Wetland

Boundary Shots

Water Features	30	CLW	Centerline of Watercourse
	31	CLDRAW	Centerline of Draw
	32	CLDITCH	Centerline of Ditch
	33	EBL	Edge of Bottom LDS
	34	EBR	Edge of Bottom RDS
	35	BNKL	Bank LDS
	36	BNKR	Bank RDS
	37	WL	Water Line (Edge)
	38	GSWET	Ground Shot in Water
	39	H2O	Water Surface Elevation

40	CLR	Centerline of Road
41	ER	Edge of Road
42	CLFR	Centerline of Field Road
43	EFR	Edge of Field Road
44	CLD	Centerline of Driveway
45	ED	Edge of Driveway
46	RD	Road Ditch Centerline
47	FLDA	Field Approach
48	CLRR	Centerline of Railroad
49	ERR	Edge of Railroad

Roads

Pipes/Culverts	50	RCPINV	Reinforced Concrete Pipe Invert
	51	RCPTOP	Reinforced Concrete Pipe Top
	52	CMPINV	Corrugated Metal Pipe Invert
	53	CMPTOP	Corrugated Metal Pipe Top
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	55	HDPE	HDPE Pipe
	56	APRON	Pipe Apron
	57	INTAKE	Tile Intake
	58	OUTLET	Tile Outlet
	59	TILEFL	Tile Flowline

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61	VC	Vegetation Change
62	EWOOD	Edge of Woods
63	TREEL	Tree Line
64	CTREE	Coniferous Tree
65	DTREE	Deciduous Tree
66	SHRUB	Shrub
67	BRUSH	Brush
68	ROCK	Rock or Rock Pile
69		

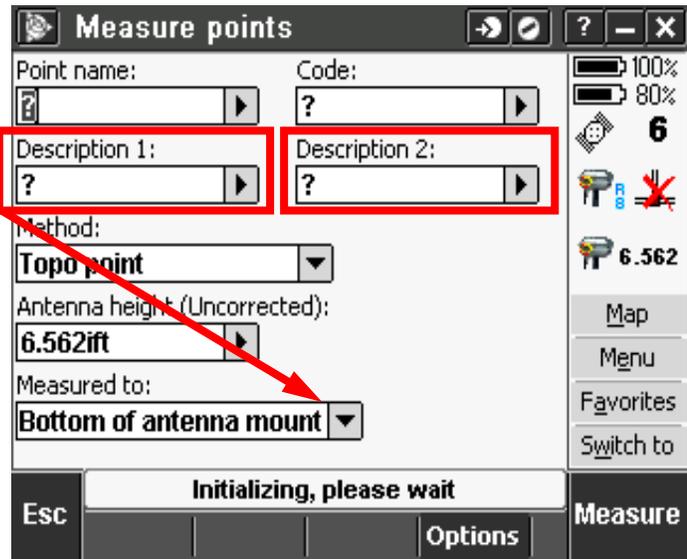
Vegetation

Utilities	70	PP	Power Pole
	71	PLO	Overhead Power Line
	72	PLB	Buried Power Line
	73	TEL	Telephone Line
	74	GAS	Gas Line
	75	WATER	Water Line (Pipe)
	76	FIBER	Fiber Optic Line
	77	UTIL	Other Utility Line
	78	PED	Pedestal (phone, electric, etc.)
	79	GW	Guv Wire

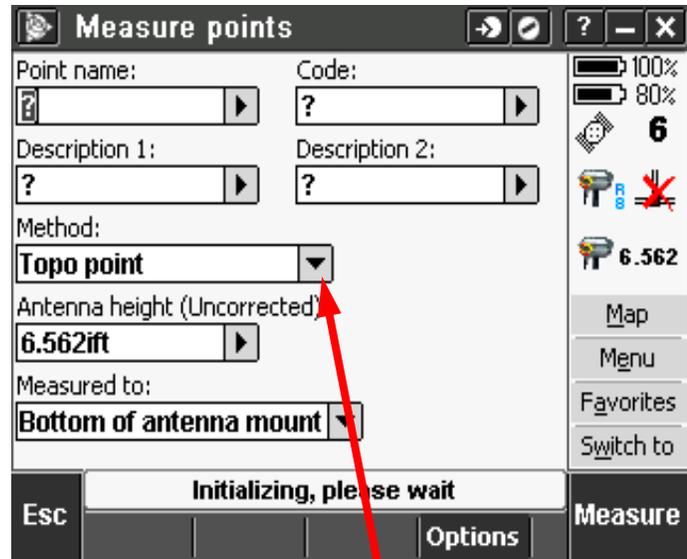
80	WD	Watershed Divide
81	SB	Slope Break
82	TS	Top of Slope
83	BS	Bottom of Slope
84	LS	Low Spot
85	HS	High Spot

Terrain

4. Description 1 & 2 further defines the point or shot you are taking. An example for surveying a terrace would be Ground Shot would be used as the Code, Terrace 1 for description 1, 1+00 for description 2, when taking the next shot of the terrace you need only change description 2 to 2+00 or whatever station you are shooting.

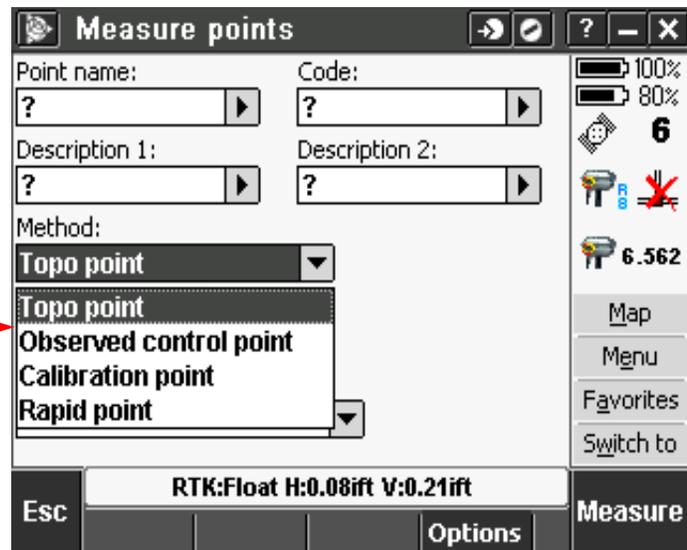


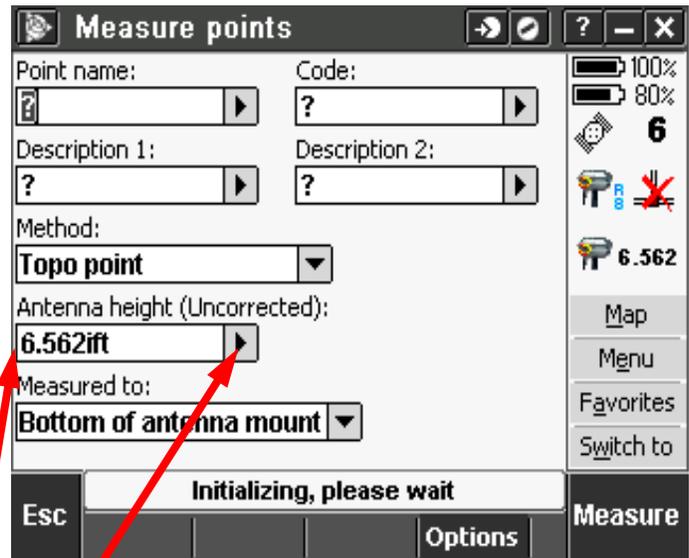
5. You have an option of four **Methods** to choose from
- Topo Point may be selected for taking shots other then control points.
 - Observed Control Point is to be used for control points to include; Temporary Benchmark, Permanent Benchmark, Instrument Point, Reference Point, Property Pin or Marker, and Easement Pin or Marker.
 - Calibration Point Is to be used for site calibration.
 - Rapid Point may be selected for taking shots other then control points.



Click on dropdown

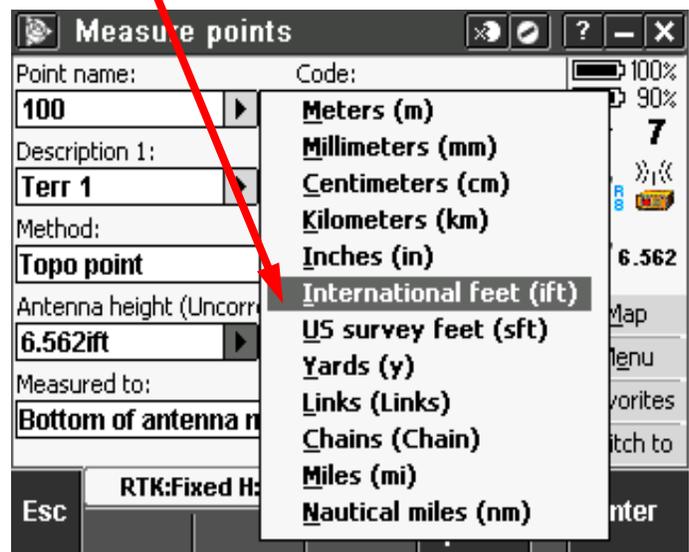
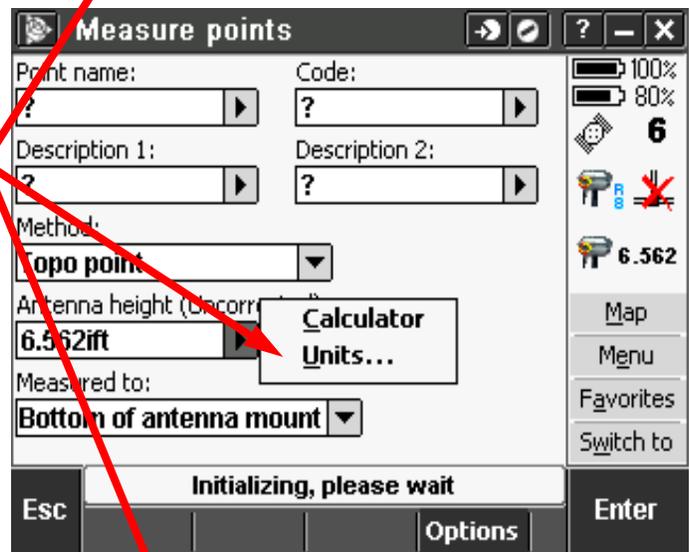
Choose one





6. Enter **Antenna height (Uncorrected):**

After entering the measurement click on the dropdown > and choose the unit of measurement. If rod is completely extended Antenna height is 2 Meters (m) or 6.562 International feet (ift). The antenna height is measured to either the Bottom of the antenna mount (rod height) or the Center of bumper.



7. **Measured to:** is either "Bottom of antenna mount" or "Center of bumper" to change this click on the dropdown and click on the proper choice.

The screenshot shows the 'Measure points' window with the following fields and values:

- Point name: [?]
- Code: [?]
- Description 1: [?]
- Description 2: [?]
- Method: **Topo point**
- Antenna height (Uncorrected): **6.562ft**
- Measured to: **Bottom of antenna mount**

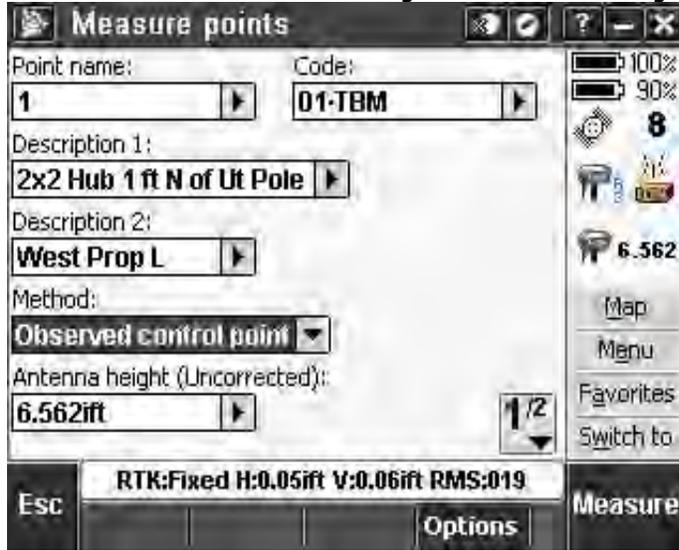
On the right side, there is a battery status indicator (100% and 80%), a signal strength indicator (6), and a distance indicator (6.562). At the bottom, there is a status bar that says 'Initializing, please wait' and buttons for 'Esc', 'Options', and 'Measure'.

The screenshot shows the 'Measure points' window with the 'Measured to' dropdown menu open. The options are:

- Bottom of antenna mount
- Center of bumper
- Antenna Phase Center

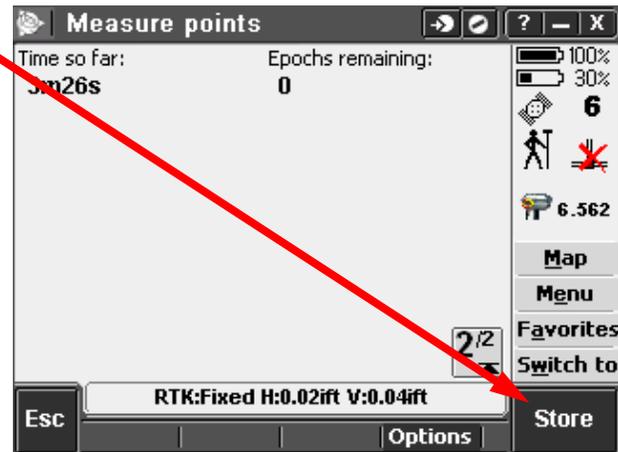
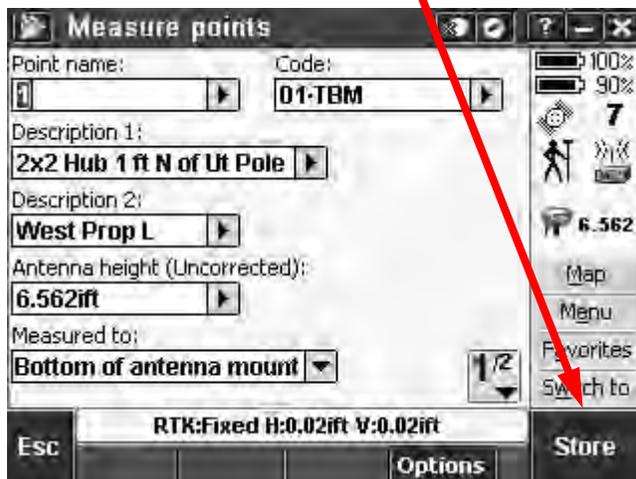
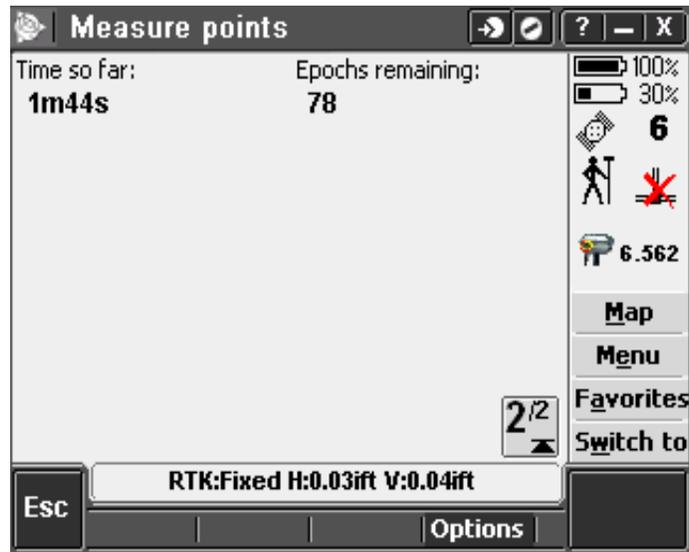
The 'Center of bumper' option is highlighted. The 'Antenna Phase Center' option is partially visible and has a value of 0.13ft RMS:020 next to it. The other fields and values are the same as in the previous screenshot.

Now you are ready to take your shot!



Tap Measure

Page 2 displays the **Time so far:** (amount of time that has elapsed) along with the **Epochs (time) remaining:**. Time for an observed control point is approximate 3 minutes, when the Epochs remaining becomes 0 and the tab displays **Store** tap it and the shot will be stored.



The Store button will activate when the Time to go: reads 0m0s and the horizontal and vertical accuracies are within tolerance.

Note: If the Method was set to Rapid Point the shot will automatically store if the accuracies are within tolerance.

The screenshot shows the 'Measure points' window with the following data:

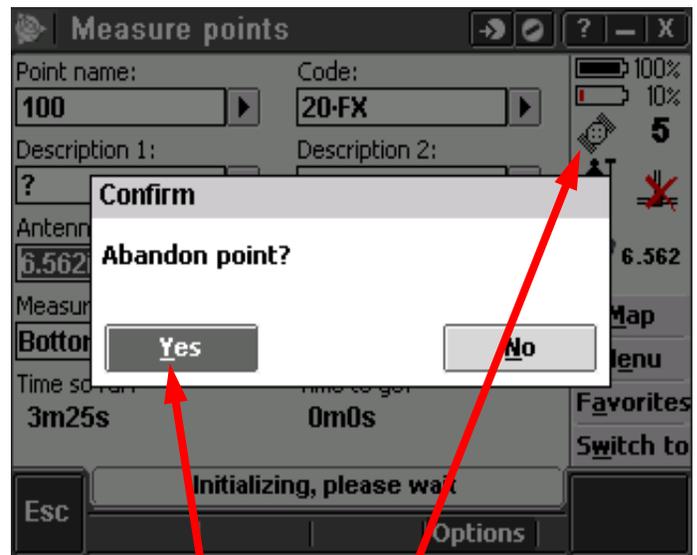
- Point name: 100
- Code: 08-GS
- Description 1: ?
- Description 2: ?
- Antenna height (Uncorrected): 6.562ft
- Measured to: Bottom of antenna mount
- Time so far: 0m7s
- Time to go: 0m0s
- RTK: Fixed H:0.03ft V:0.03ft
- Buttons: Esc, Options, Store
- Right sidebar: 90% battery, 8 satellites, 6.562 antenna height, Map, Menu, Favorites, Switch to

The TSC2 will give this notification as well as a verbal notification when the shot has been successfully stored.

The screenshot shows the 'Measure points' window with the following data:

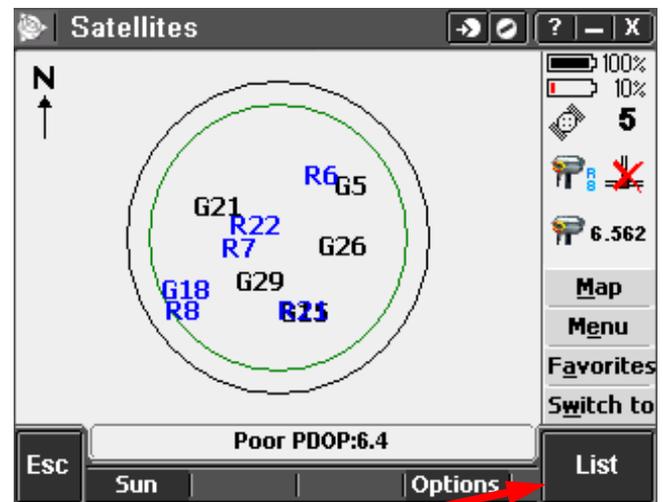
- Point name: 115
- Code: 08-GS
- Description 1: ?
- Description 2: ?
- Antenna height (Uncorrected): 6.562ft
- Measured to: Bottom of antenna mount
- Notification: Observation stored
- Buttons: Esc, Options, Store
- Right sidebar: 90% battery, 9 satellites, 6.562 antenna height, Map, Menu, Favorites, Switch to

This screen will appear if Initialization is lost while you are taking a shot. The most common causes of lost initialization are poor PDOP, high RMS, not enough satellites, satellites too low on the horizon, and excess movement of the GPS receiver.

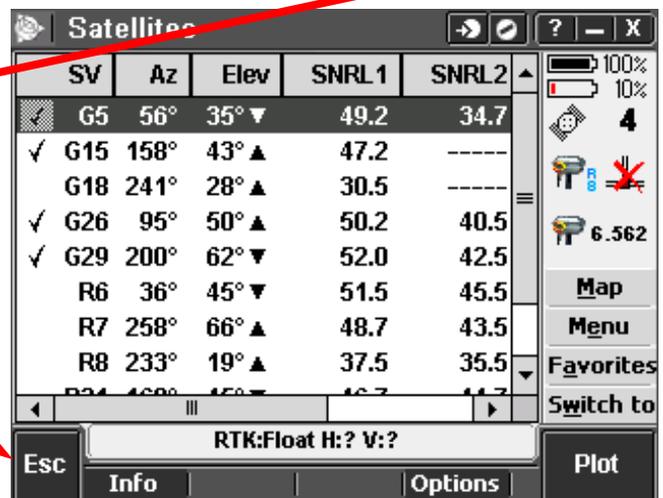


When this screen appears Tap on Yes to abandon the point.

When Initialization is lost frequently check the Satellites by tapping on



This screen show the present location **Plot** of the satellites that are communicating with the GPS unit to view a **List** click on **List** and a chart of the satellite locavion may be viewed. Click on **Esc** tab to return to the previous screen.



When the survey is complete or at the end of the day, closure needs to be done prior to leaving the site. Go to one of the control points you have shot and take a closure shot using “Topo point” method. Compare closure coordinates and elevation to the initial shot.

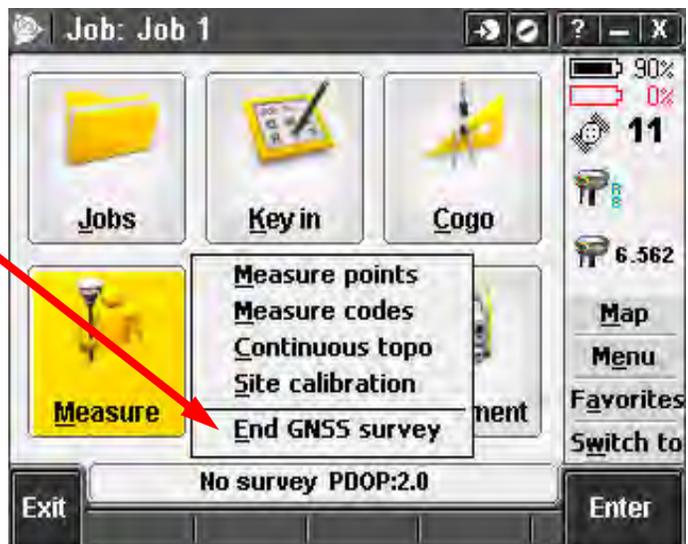
8. To shutdown GPS equipment, tap the Measure tab



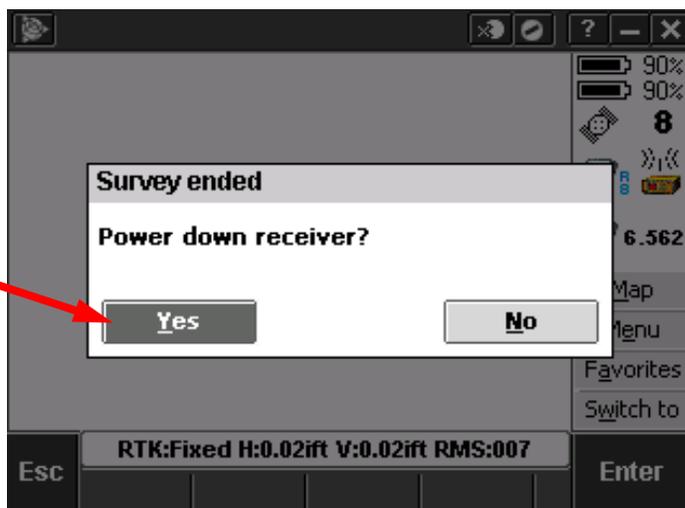
9. Tap on VRS...



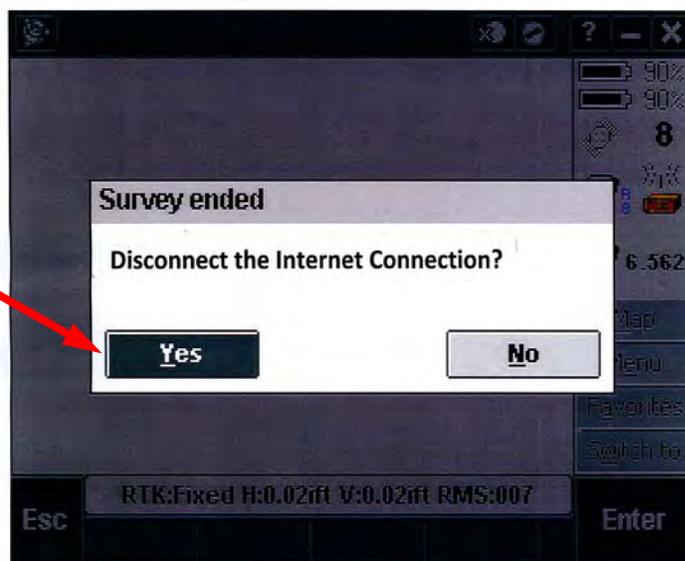
10. Tap on End GNSS survey



11. Click Yes



12. You will also be asked if you would like to Disconnect the Internet Connection. Click yes.



13. Turn controller off by tapping green button

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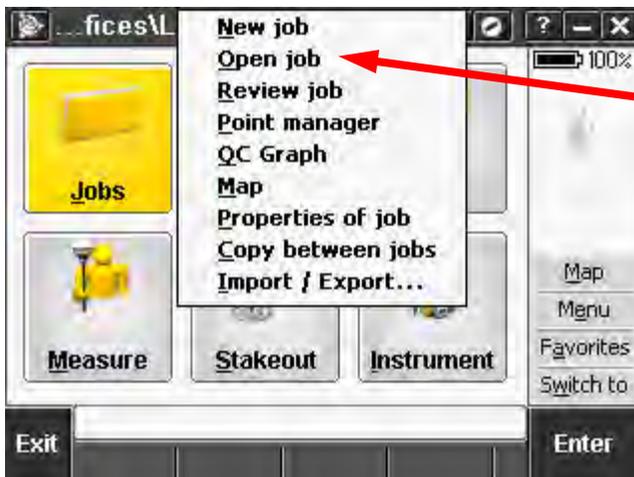
Press green button to wake up controller



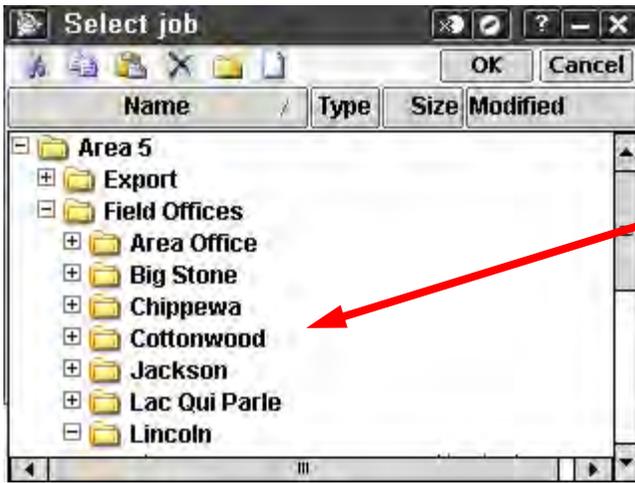
Press **General Survey**



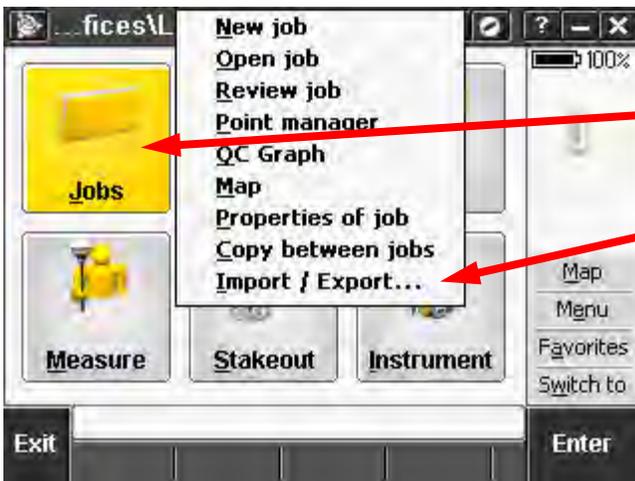
Press **J**obs



Press **O**pen job



Navigate to and open the desired job

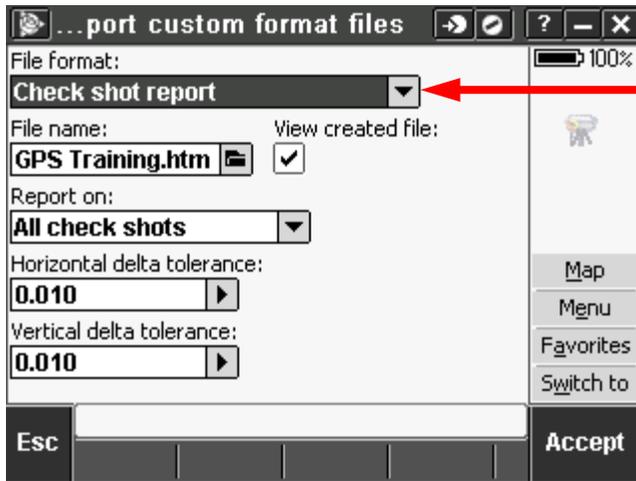


Press **J**o**b**s

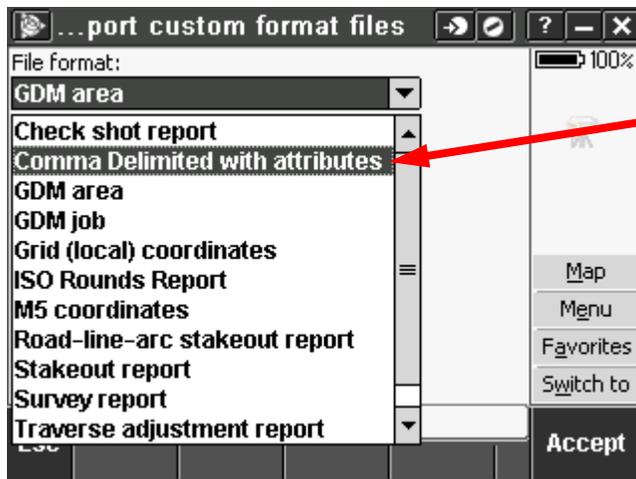
Click on **I**mport / **E**xport...



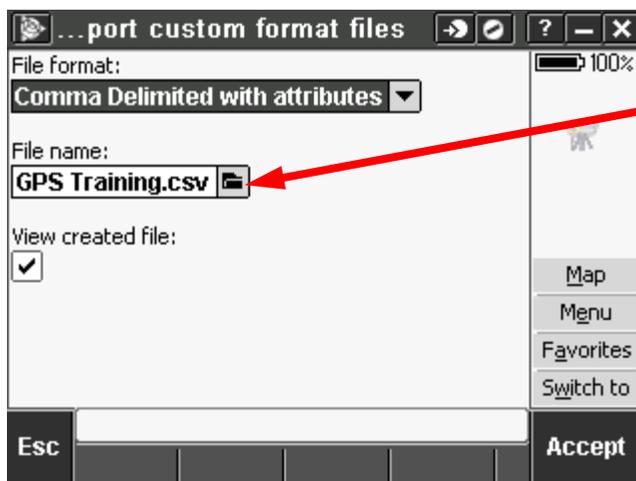
Press **E**xport custom format files



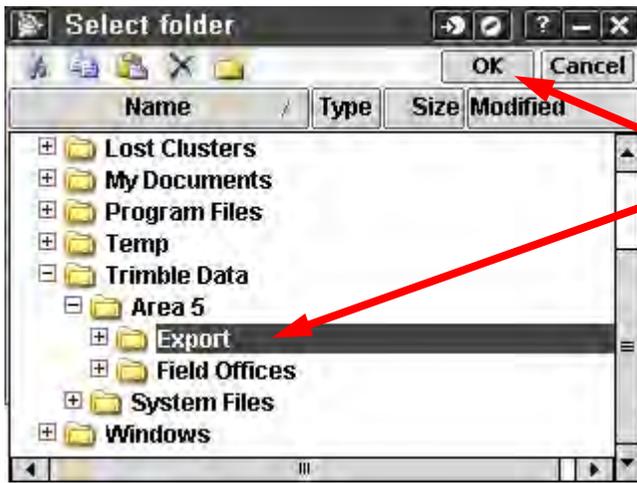
Click on the drop down arrow on the right end of the **File format** field.



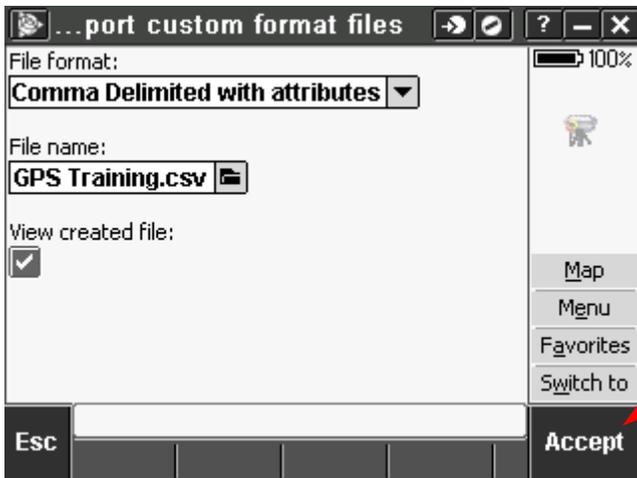
Select **Comma Delimited with attributes** from the dropdown list.



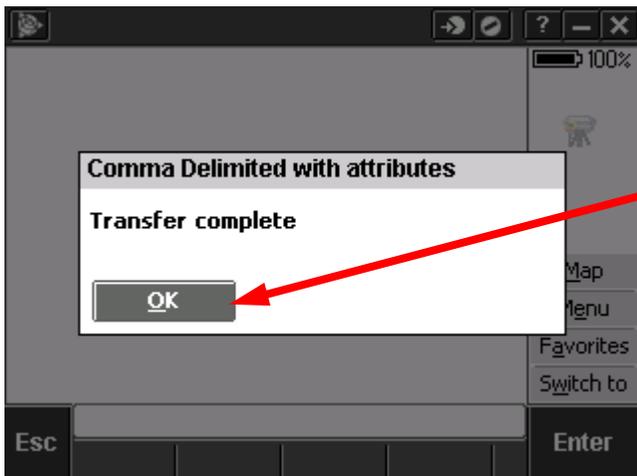
Click on the Folder icon at the right end of the **File name** field.



Select the **Export** folder and click **OK**

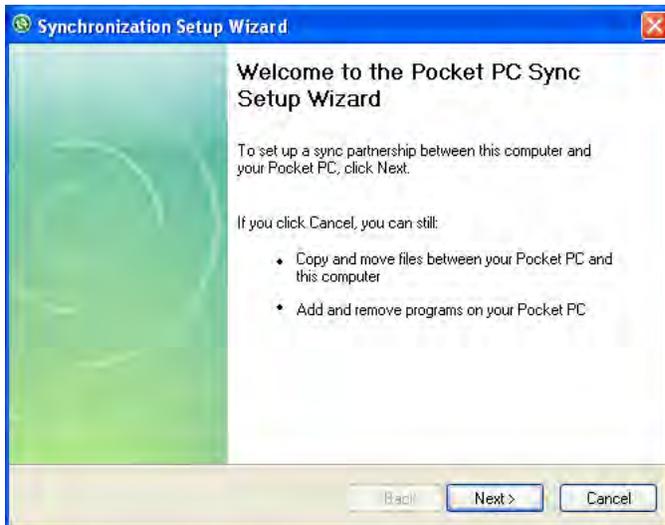


Click **Accept**

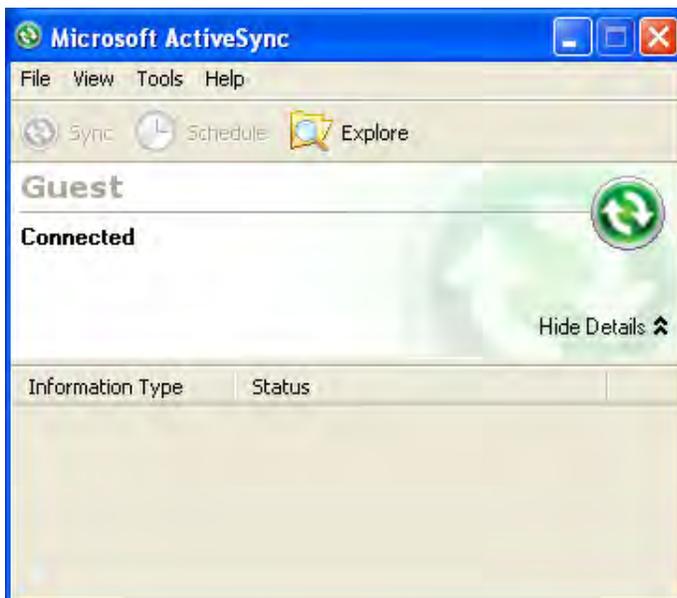


Click **OK**

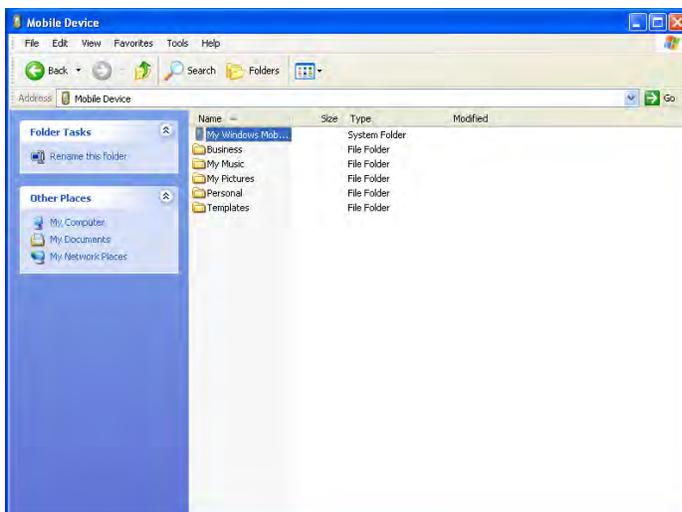
Hook controller up to computer



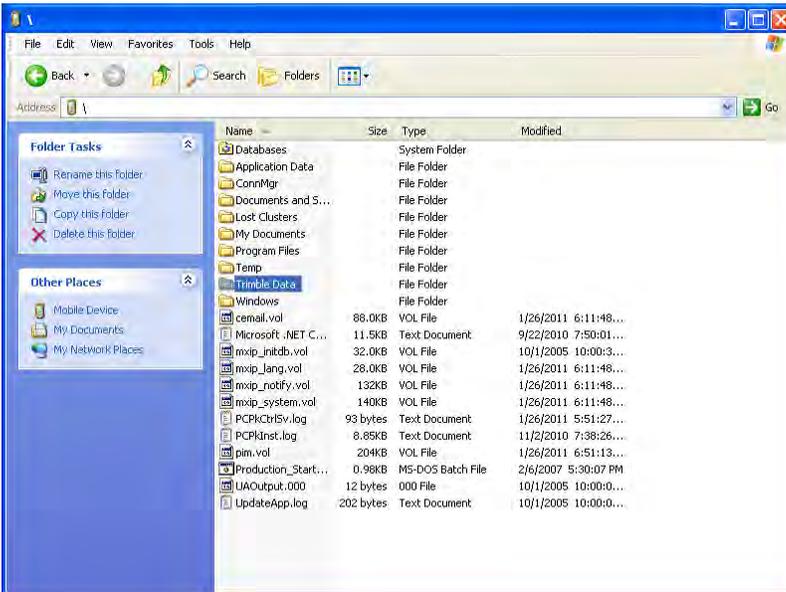
Click **Cancel**



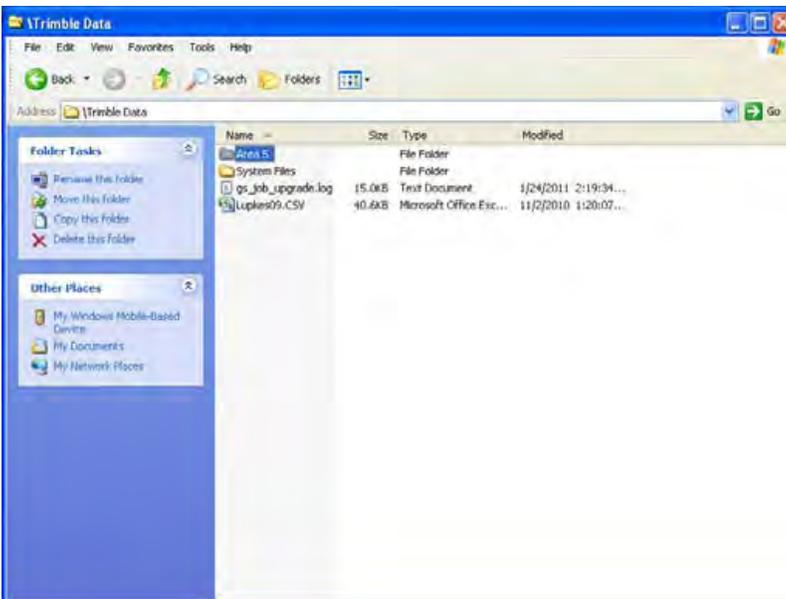
Click **Explore**



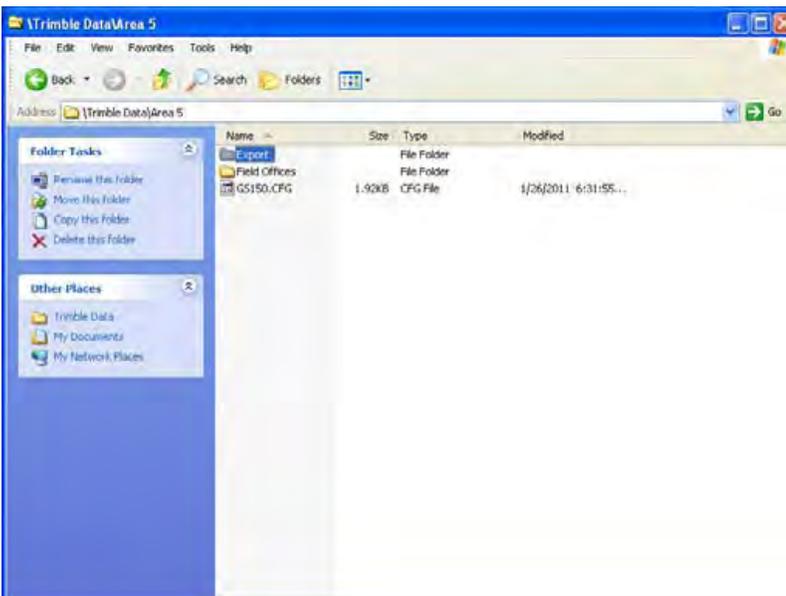
Open **My Windows Mobile-Based Device** folder



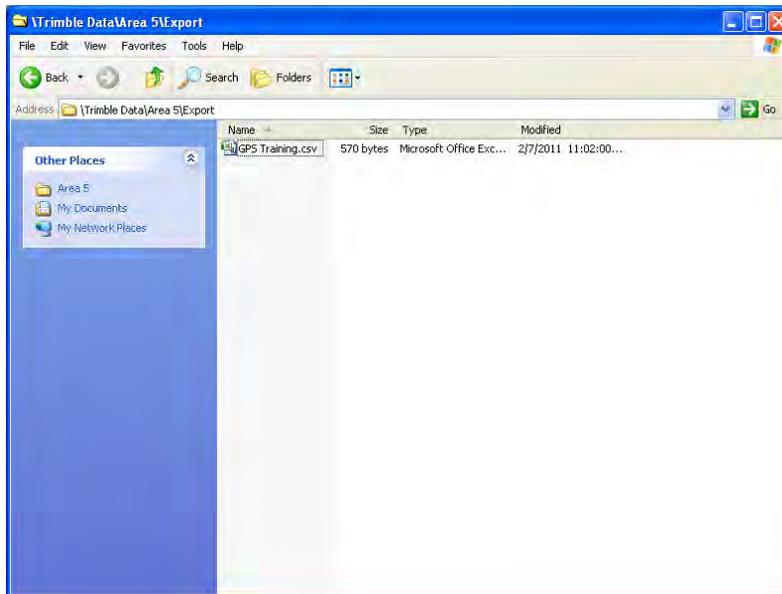
Open **Trimble Data** folder



Open the project folder



Open **Export** folder



Cut and paste project to desired folder on to your PC

Please try to keep the Export folder cleaned out

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Measure Codes Procedures

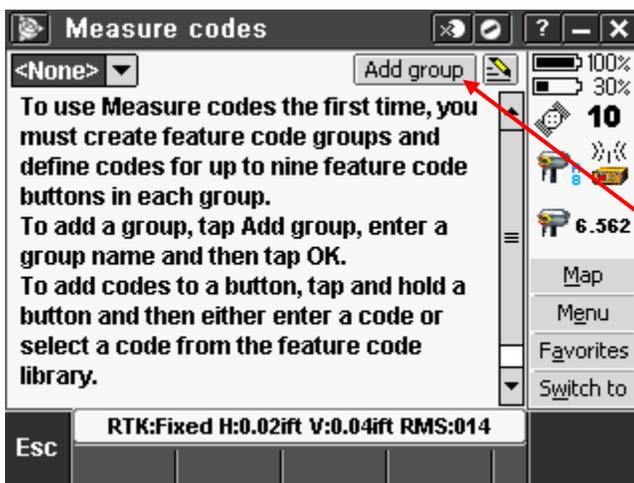
Using measure Codes allows the surveyor to switch between multiple point codes quickly and efficiently.



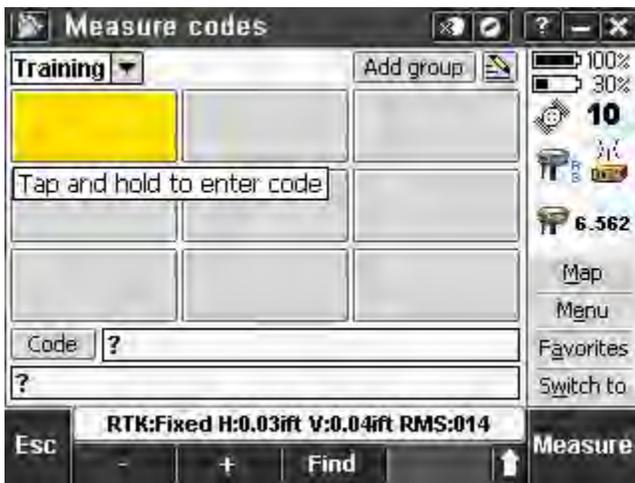
To begin using Measure Codes:
Click Measure



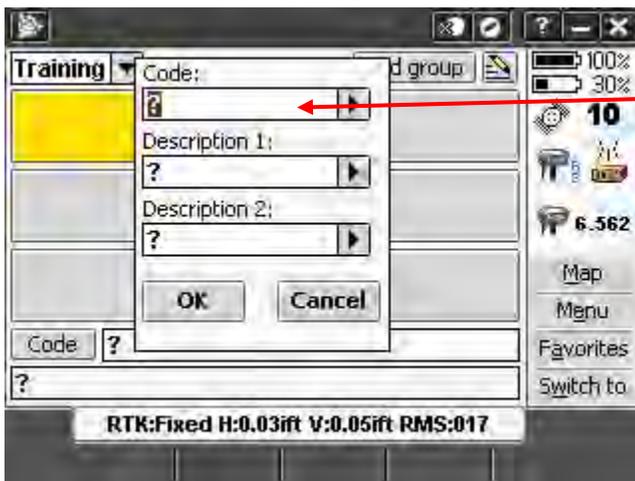
Click Measure codes



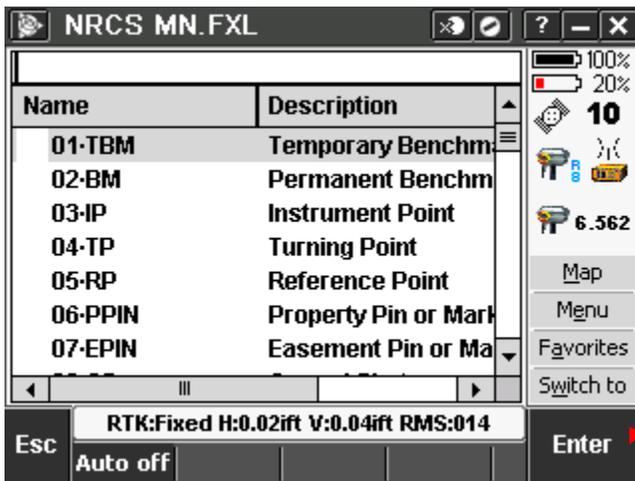
This screen may appear the first time Measure codes is used.
Click Add group and give the group a name.



To assign a code to a box, tap and hold on the desired box.

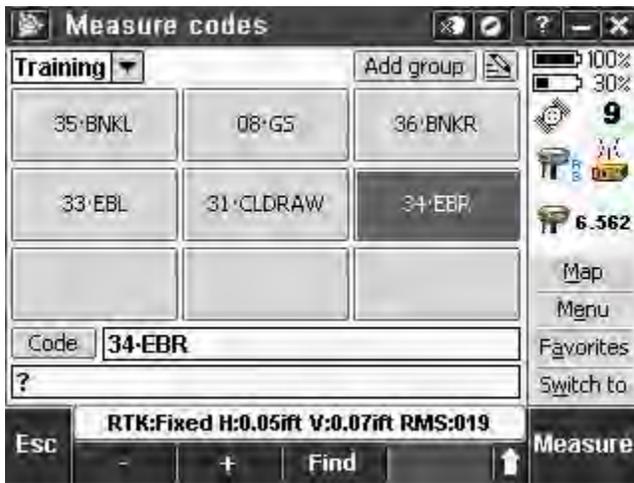


Click in the Code field



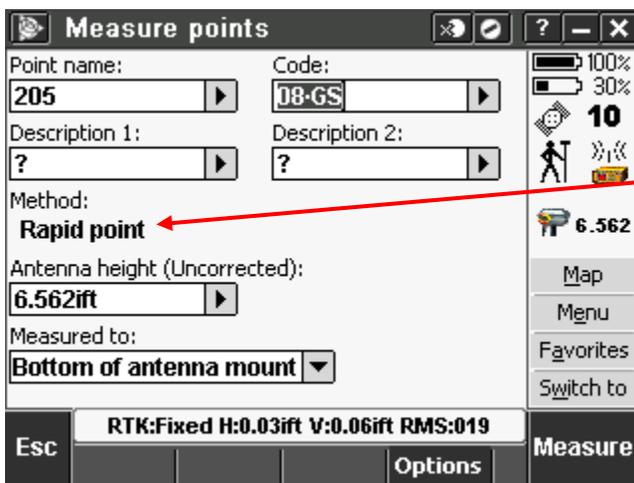
Click on the desired code

Click enter



The code is then assigned to the selected box.

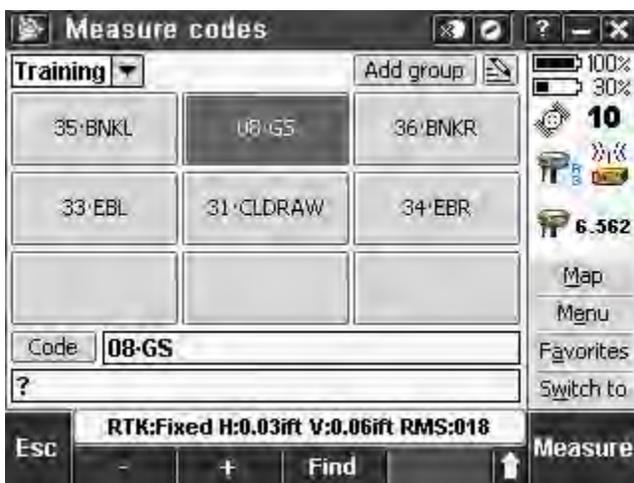
To measure a point, click once on the box with the code you wish to use for the shot.



The measure point screen automatically begins with the selected code.

The method used to collect the point is controlled by the method last used in the Measure Points Screen.

If the method is set to Topo point you will be required to press the Store button to store the shot.

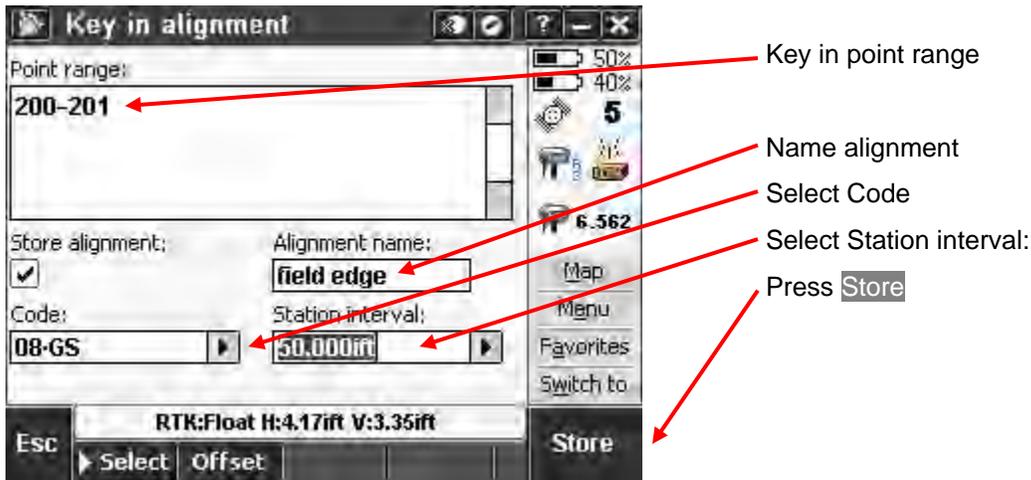
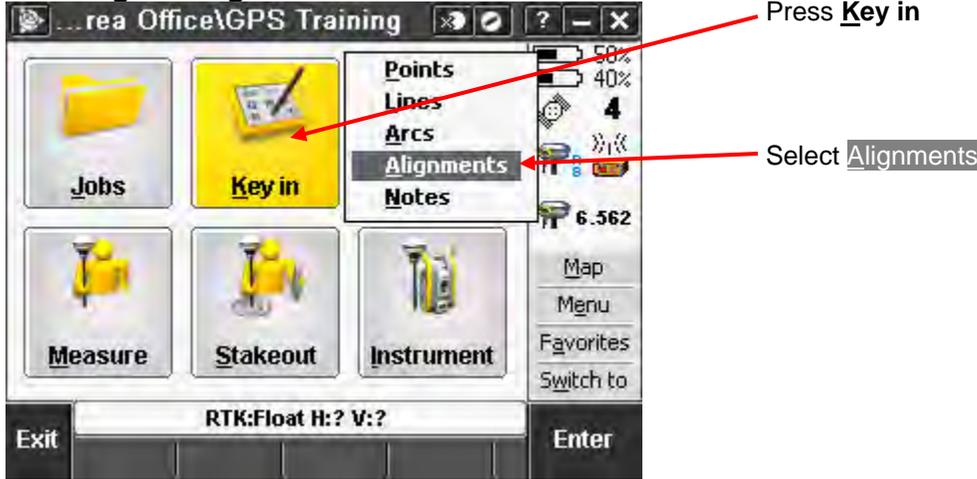


After the shot is stored the Measure Codes Screen will reappear.

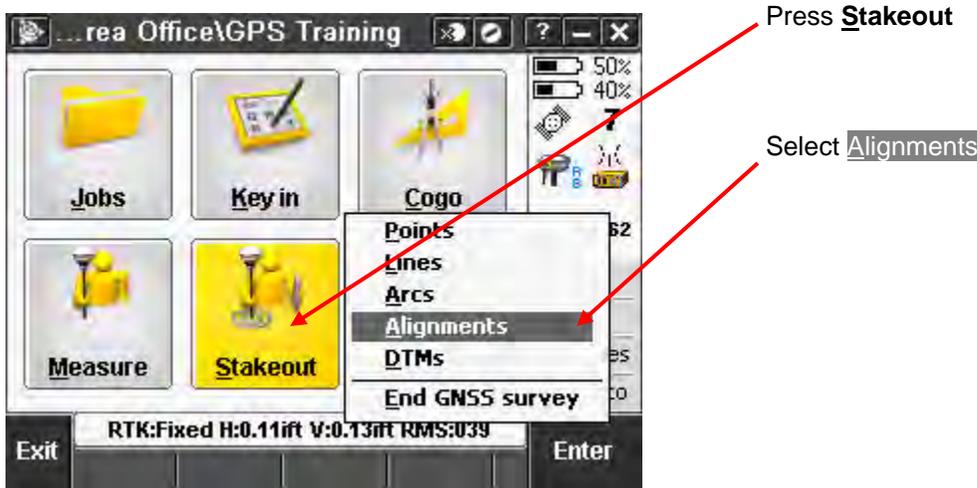
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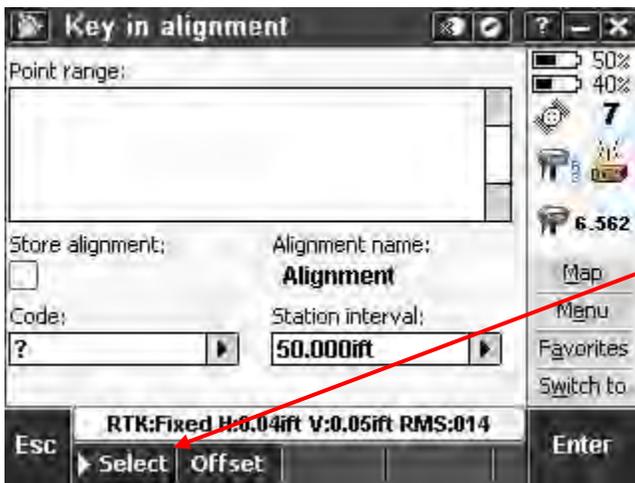
Stakeout Procedures

Creating an Alignment

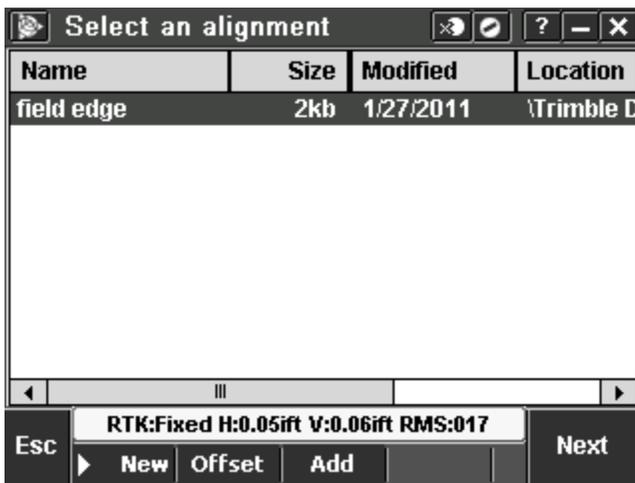


Staking Alignments



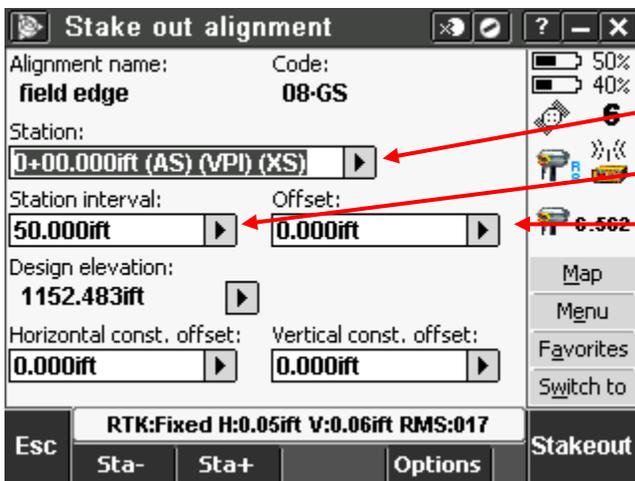


Press **Select**



Select alignment

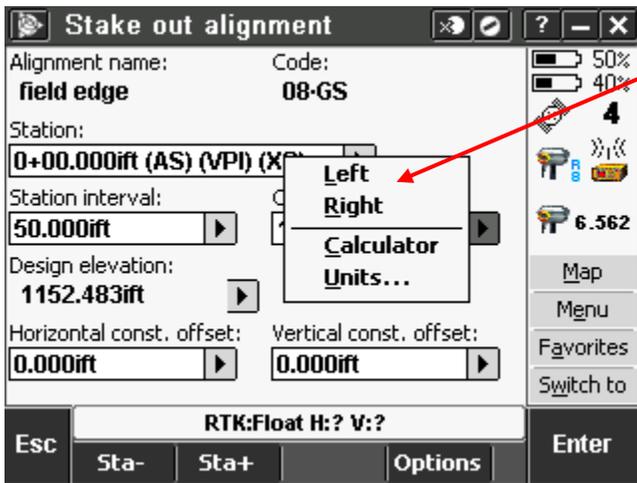
Press **Next**



Select Station to stakeout

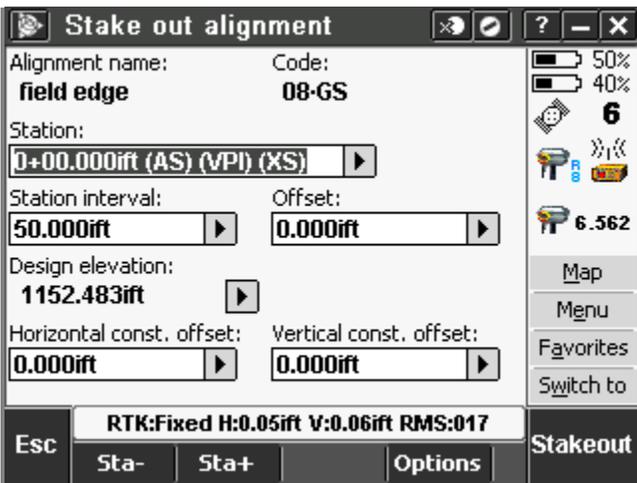
Select Station interval

Enter Offset distance

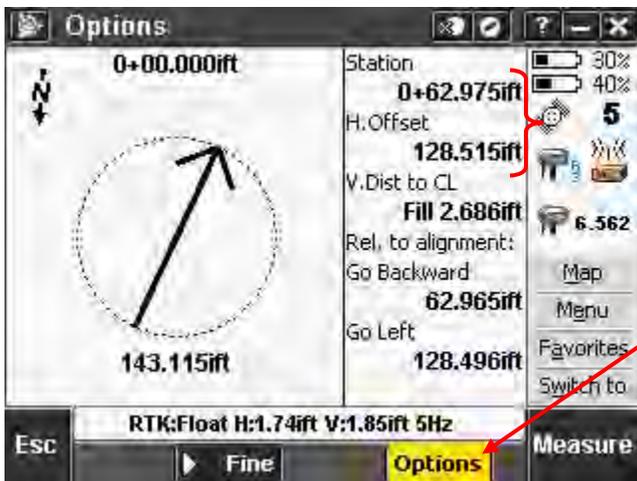


Select Direction to offset

Press Enter

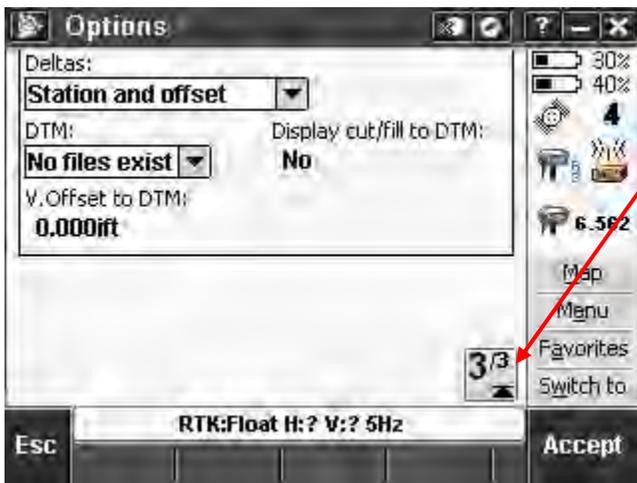


Press Stakeout

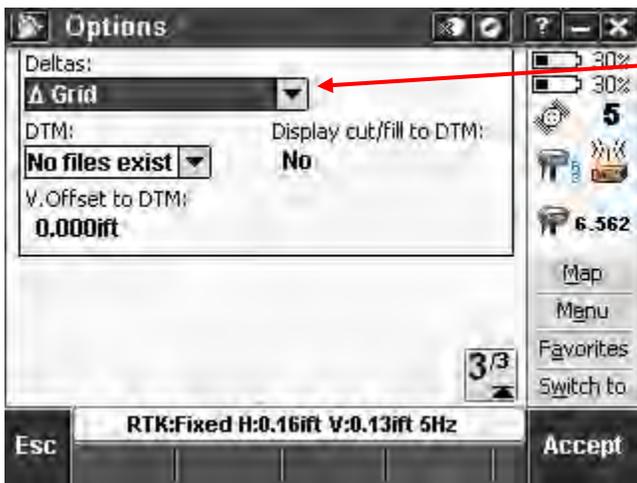


To change the guidance information from Station/H. Offset to Cardinal directions:

Press Options

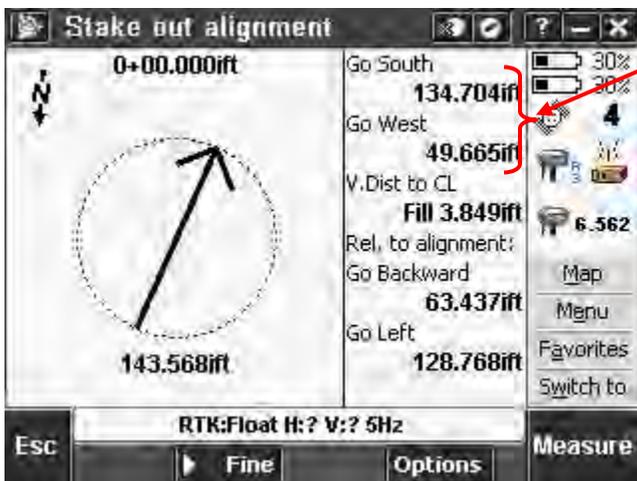


Scroll to page 3



Change Deltas to Grid

Press Accept



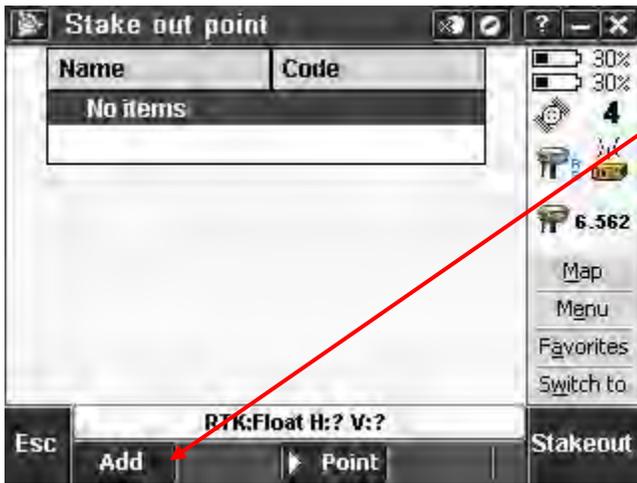
Cardinal direction guidance

Staking Points

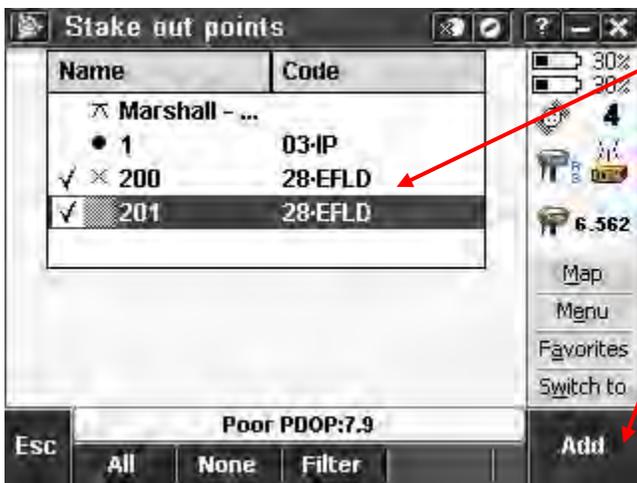


Press **Stakeout**

Select **Points**

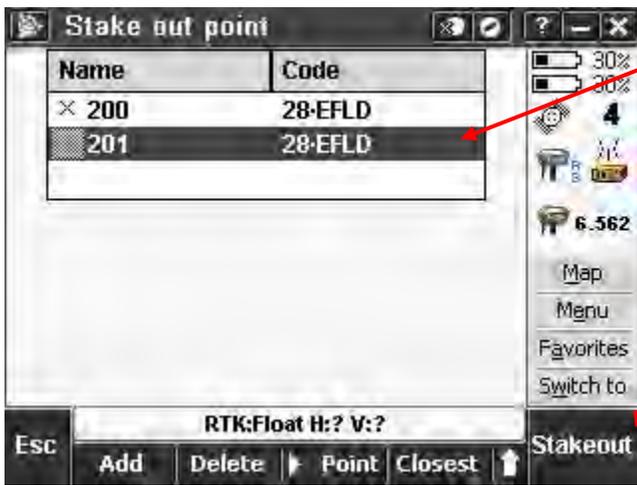


Press **Add**



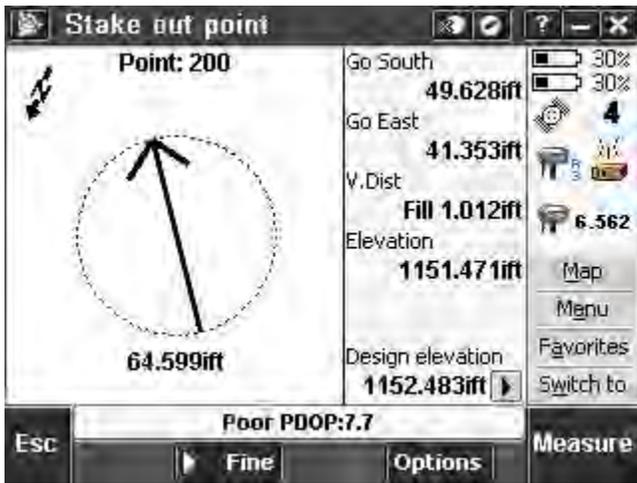
Check the points that you would like to stake

Press **Add**

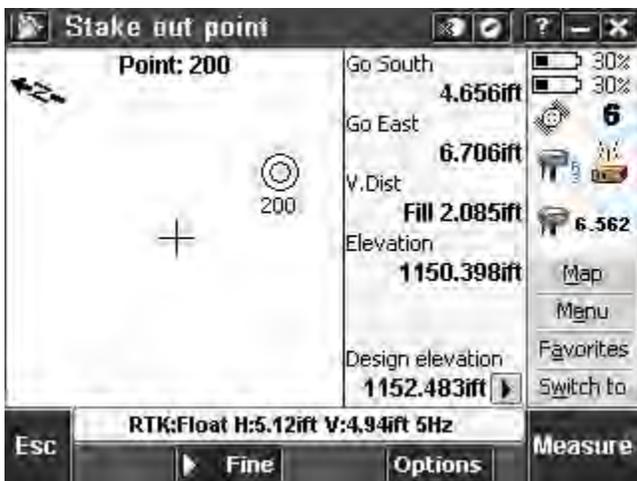


Select desired point

Press Stakeout



Follow guidance to the point



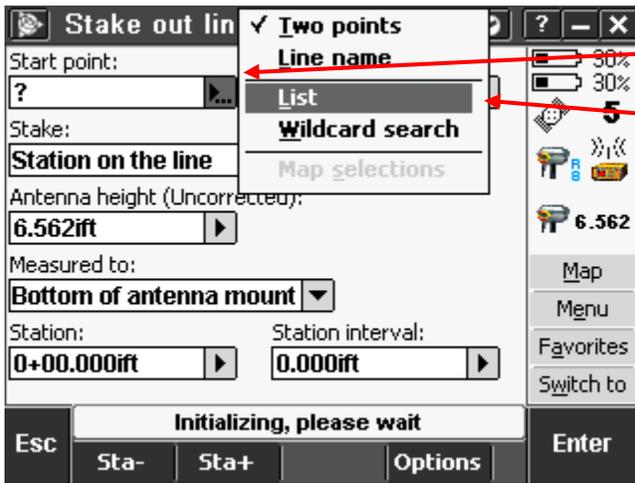
Auto zoomed stakeout point screen

Staking a Line



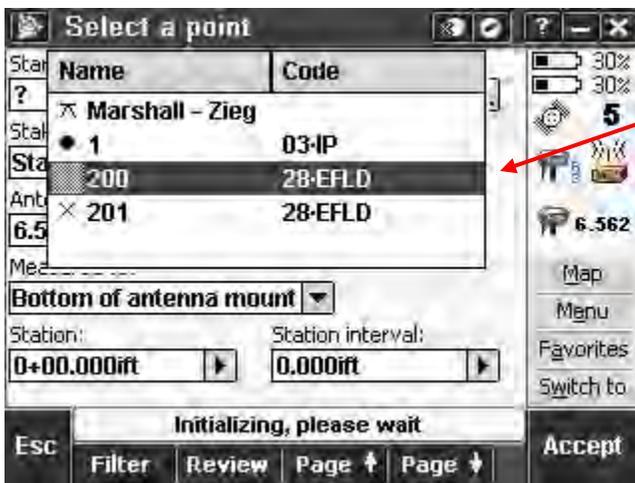
Press **Stakeout**

Select **Line**

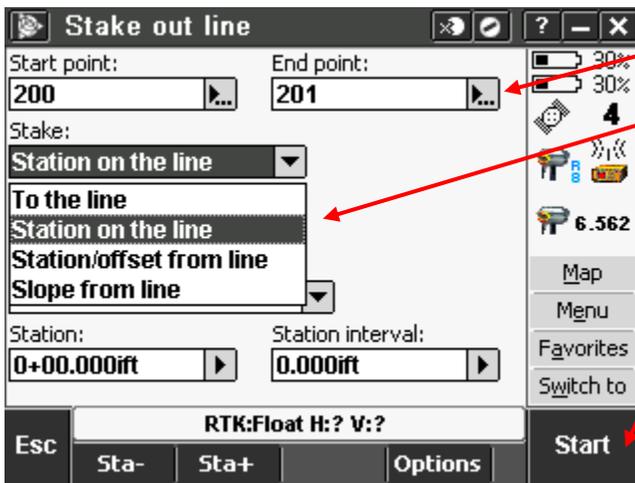


Press Start point: drop down arrow

Select **List**



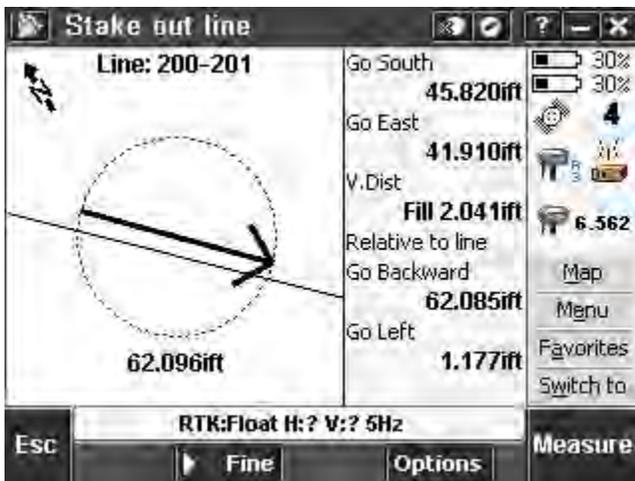
Select point



Repeat previous step for End point

Press Stake: drop down arrow and select desired choice

Press **Start**



Stake out line

Method for Setting Tribrach Over Established Point

By Cal Dunblazier 2-4-11

1. Open Tripod and extend legs
2. Keeping top level, place tripod head approximately over point.
3. Attach tribrach to tripod.
4. Step back and visually line up tripod top with point. Standing between leg "A" and leg "B" helps to visually line things up. Pivot tripod about leg "C" to adjust location.
5. Perform step 4 again standing between leg "B" and "C". Pivot tripod about leg "A".
6. Anchor tripod
7. Locate point using optical plummet, and move optical plummet target over point using tribrach leveling screws. (Remember the 2 and 1 rule with three leveling screws).
8. Check fish eye bubble and rough level by adjusting two legs up and/or down. You will use only two legs and always the same two legs from this point on.
9. When fish eye is rough leveled, check optical plummet, adjust optical plummet target to point if necessary following instructions listed in number 7.
10. Perform step 8 if necessary. Repeat steps 7, 8, and 9 as needed.
11. Perform fine level adjustment of fish eye bubble using tribrach leveling screws.
12. Check optical plummet and if adjustment is needed loosen tribrach and gently slide plummet target over point. This should be a minor amount.



Figure 1 RTK Base

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Getting Started:

- Assemble rover and make sure that you use the note what receiver you are using. You do not need to attach the pencil antenna because your cell from is acting as your antenna. In the controller select **Configuration > Controller > Bluetooth**, the top selection to connect to **GNSS receiver/VX/S Series**, select the proper receiver (Rover 1, Rover 2 or Base), then accept the changes. The unit is receiving corrected xyz data from the MNDOT server.
- Manually turn on power on all equipment.
- **(To create a new job)** In the controller, start a new job by selecting **Files > New Job**, Then enter in your job name. Check to make sure the coordinate system is **"US State Plane 1983, MN North 2201"** and check **"use geoid model"** and select **"GOID03"**
- **(To survey an existing job)** In the controller, **Select Files > Open Job**, then select the job to survey.
- To start the survey select **Survey > RTK_VRS_ "name of phone" > Start Survey**. You should see the that it is connecting with the modem and you will select **CMRx_NAD83(1996)**. When the rover indicates that it is fixed, you are ready to survey.

Troubleshooting:

- If you are having trouble taking a survey point,

Check to make sure you have good satellites by looking in the upper right corner and ensuring you have a minimum of 5. Then check the plot to make sure you have good satellite geometry by clicking the "number" of satellites to show the sky plot. When the controller tells you that there is "poor PDOP" that related to the satellite position and there is not a lot we can do with that other than wait for a better time of the day.

Look in the upper right and you will see a upside down "T", if there is a red line across it that means that the cell phone is not connected to the MNDOT server for some reason. The most common reason will be because there is low signal in the cell phone. You can try to hold the phone higher or take it out of your pocket to get more signal strength. Once you lose connection it may be necessary to reconnect. To do this select **Configuration > Dial Profiles**, highlight **"name of phone"** and select connect on the lower right of the screen. It may take a few minutes to reconnect. If this does not work, end survey and restart the survey.

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This reference guide covers the basic set-up procedures to begin a new survey, continue with an existing survey as well as performing a resection. Please refer to the Quick Reference Guide 118.0 GPS Survey Manual – Method for Setting Tribrach Over Established Point for assistance with the physical set up of the instrument.



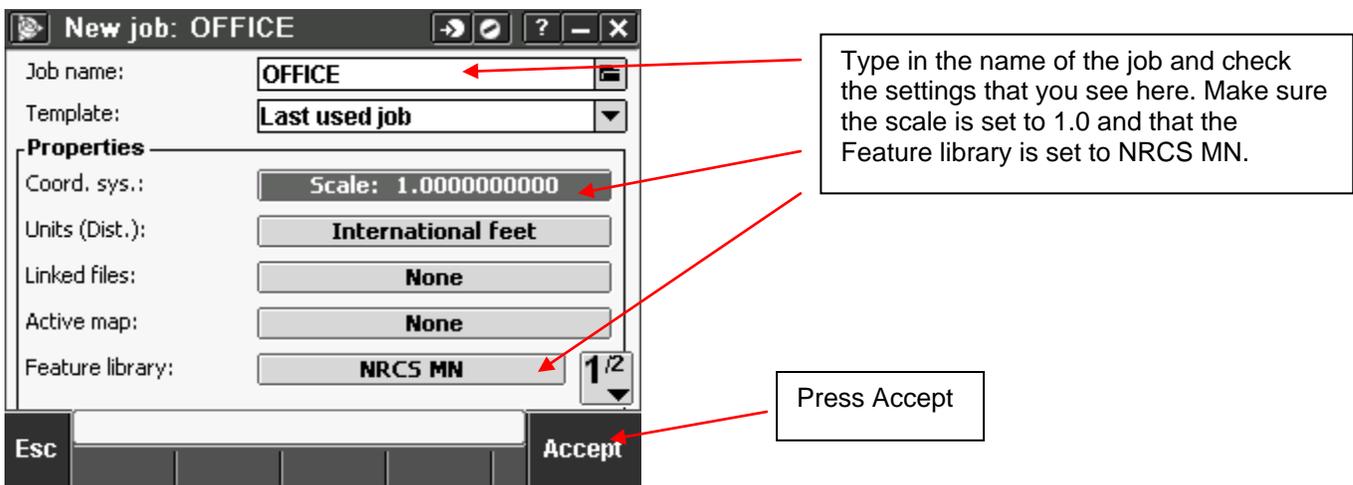
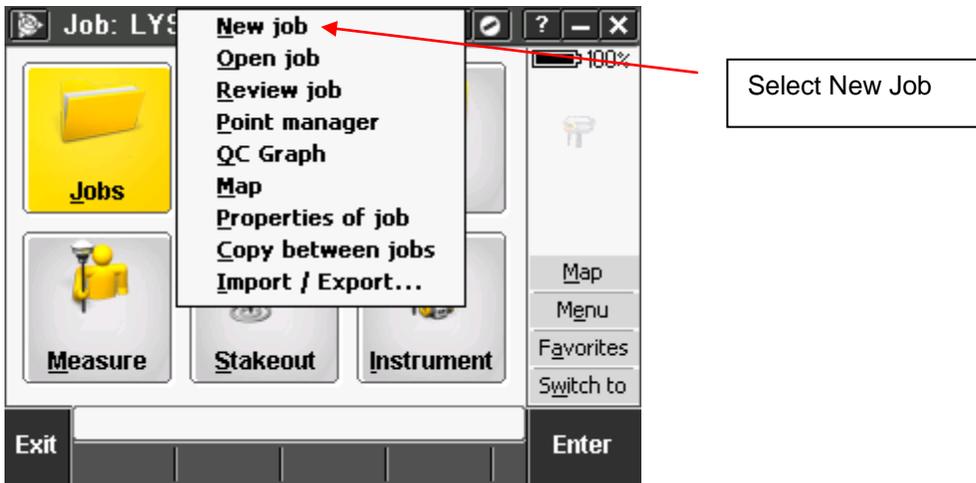
When you are in the main windows screen, press the Trimble Icon button on the keypad to open Access.



Press on the General Survey Module button

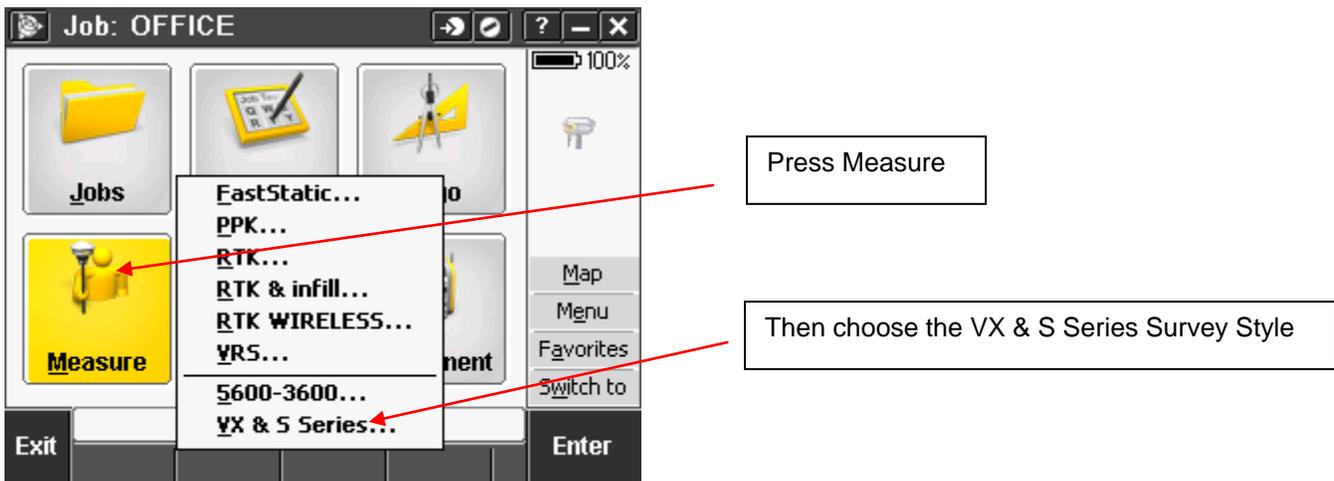


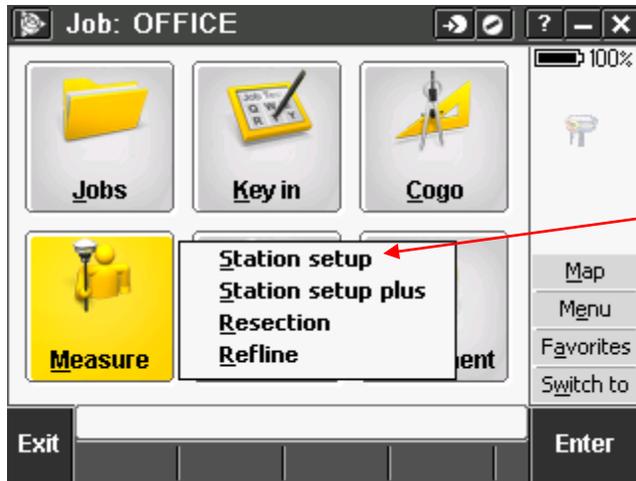
Press Jobs



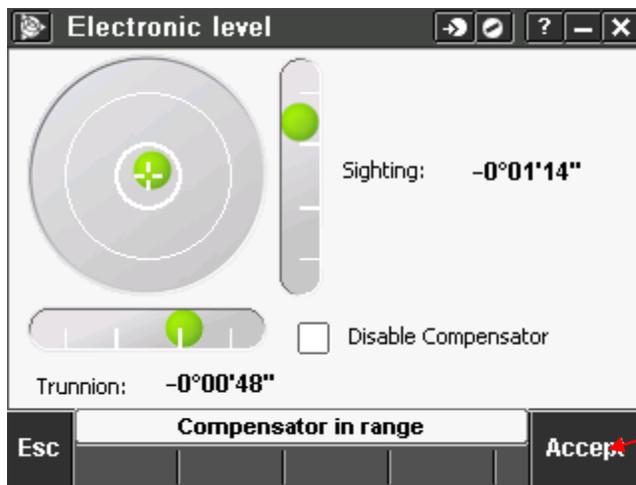
*As long as the template field is set to “**Last used job**” the settings should not change.

--Once the job creation is complete continue on with the survey start up.



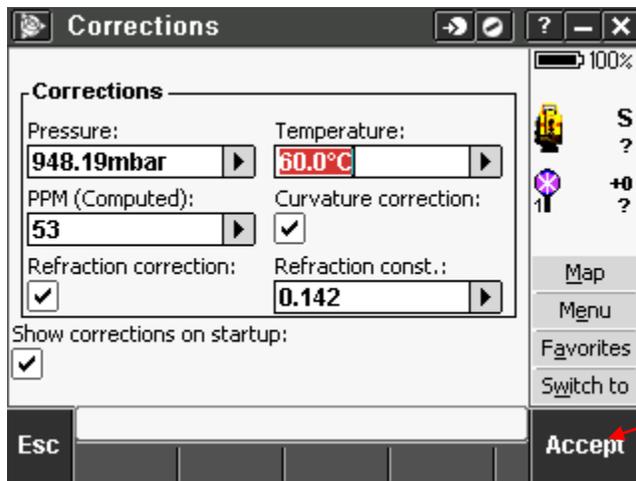


Choose Station Setup



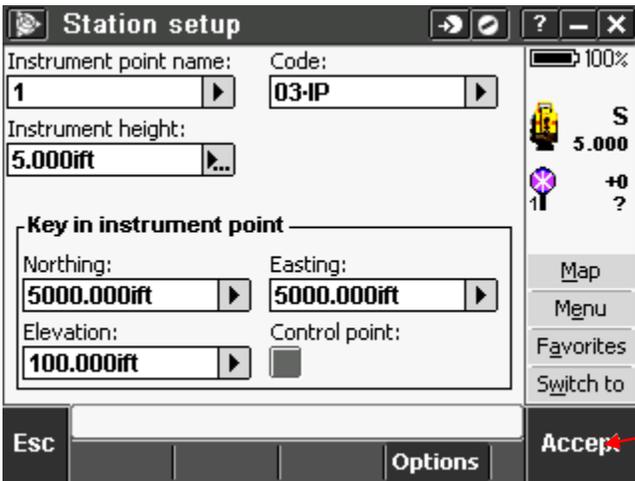
The electronic level will display when the data collector has connected to the total station. If this does not happen you will have to connect the gray wire to the Instrument and Data Collector. Once this has been done your wireless capabilities will be restored.

Press Accept



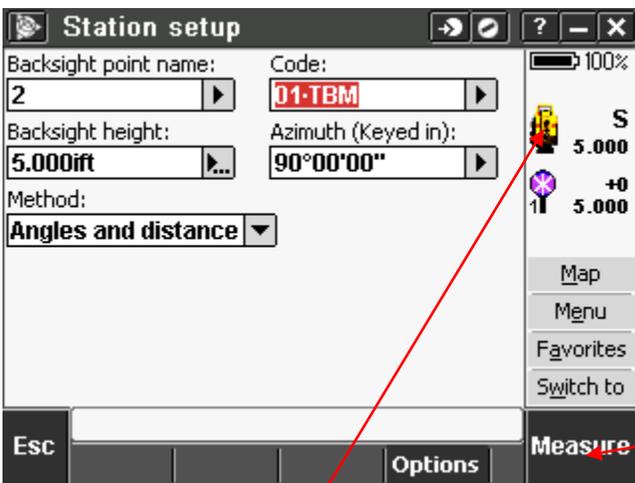
The corrections menu will be displayed. This should not have to be altered either since this is mainly for minute adjustments to accuracy. Check that the constants are the same.

Press Accept



Define the instrument point. The point name is always the number, the code is the description and the height is what you measured up to the X on the side of the instrument.

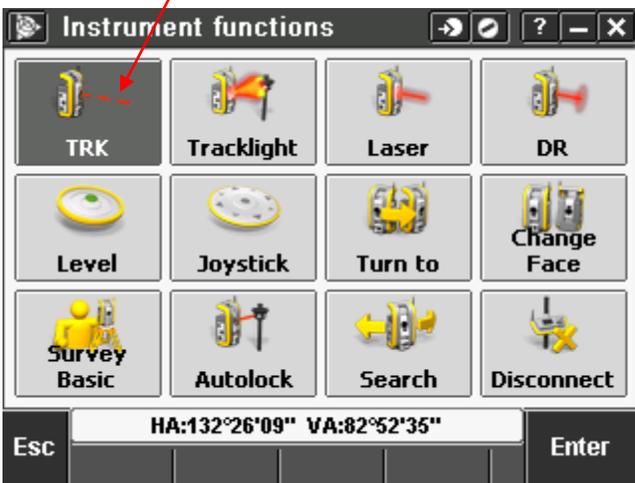
Press Accept



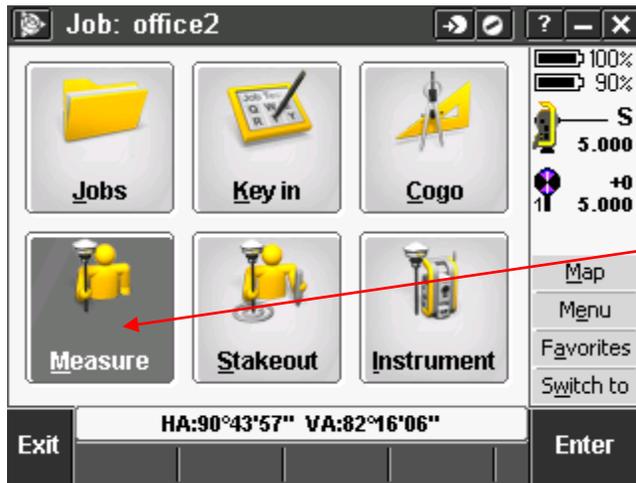
Define the backsight point, the code, a backsight height (rod height), and choose an azimuth. The azimuth is the direction that you are looking from the instrument to the backsight. North is 0° and 360°. South being 180°. This is just an estimate to get the survey close to actual orientation.

Take the rod to your backsight point and click Measure.

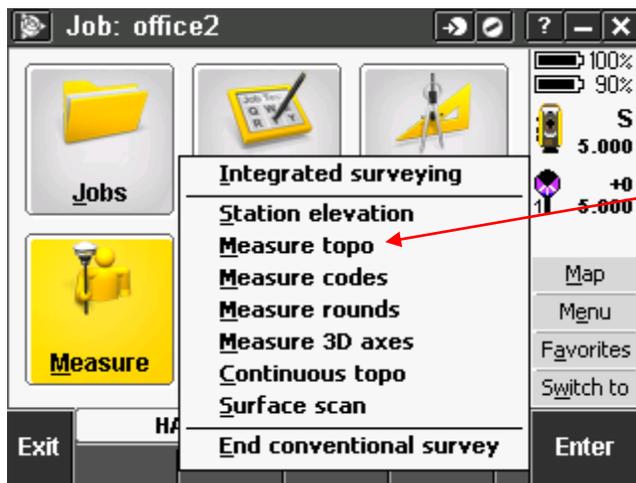
*****Click the total station icon to change the measurement settings. Multiple options are available like TRK which gives you real-time coordinates and elevations that can instantaneously be stored as points.



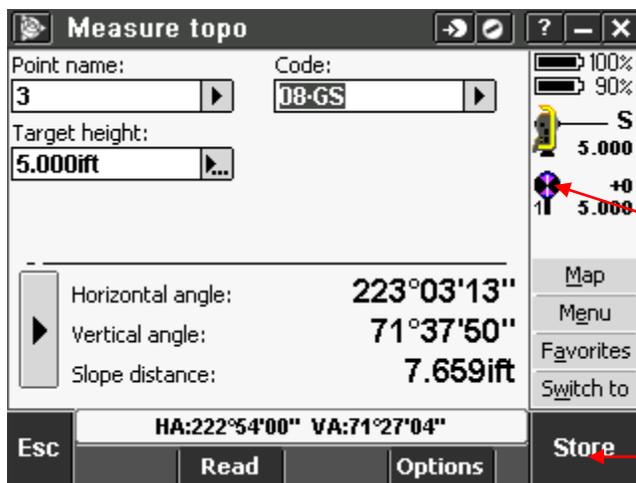
--Once the backsight shot has been stored the data collector will say "Station set-up completed". This indicates that you are now ready to continue with the survey. You will be looking at the "General Survey" screen.



Press Measure



Select Measure topo

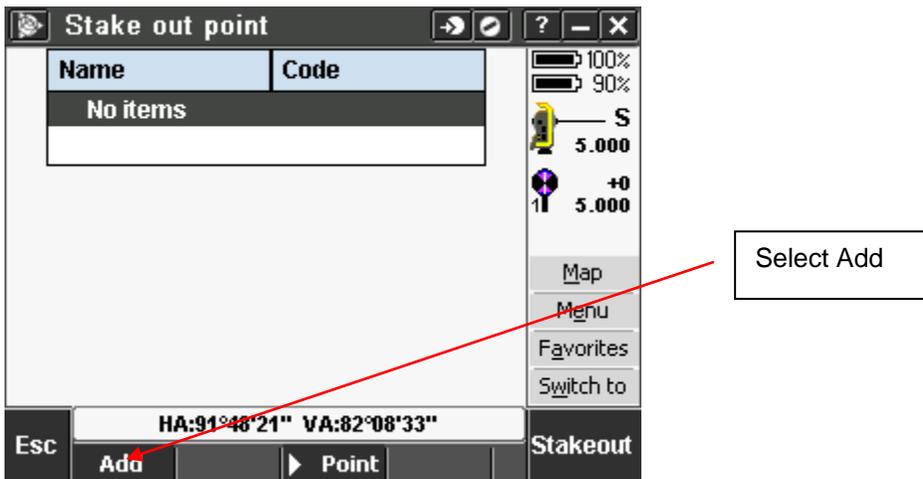
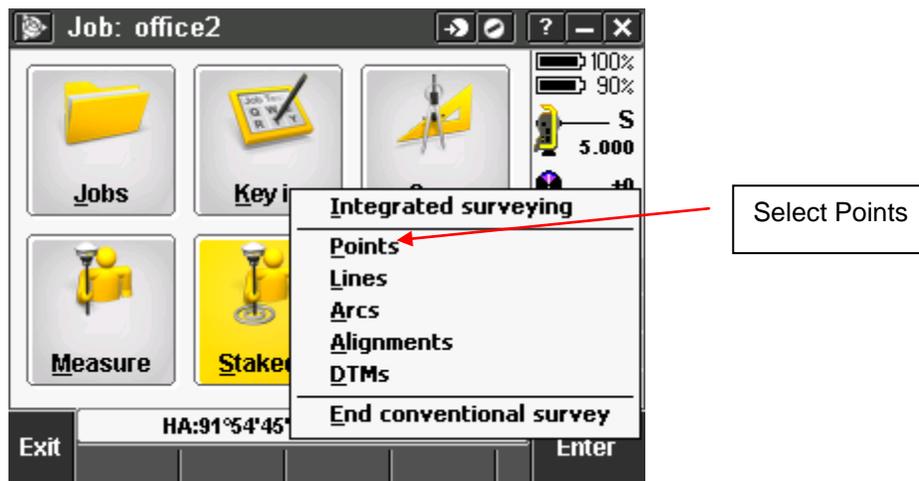
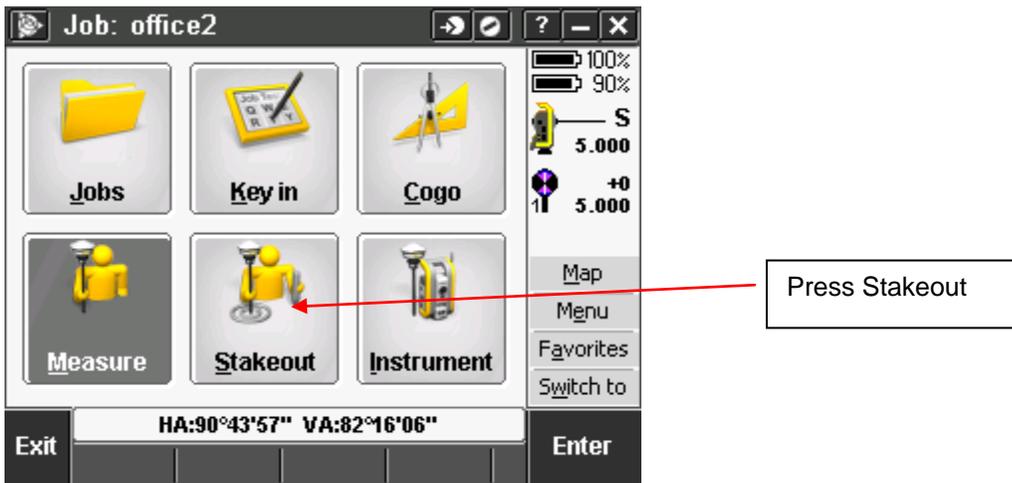


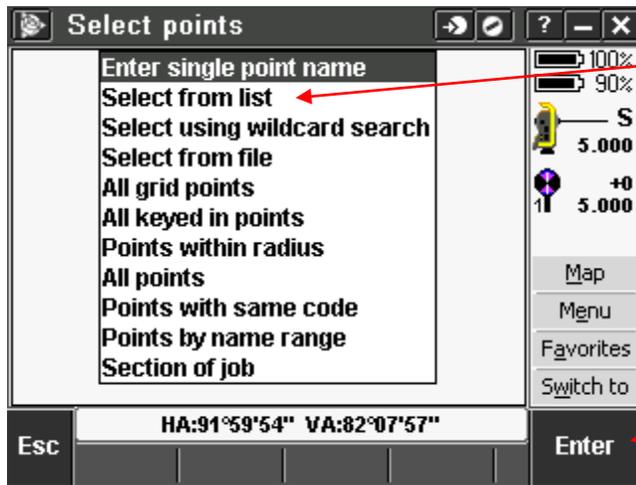
The Measure topo screen is where you will survey all of your points taken in the field. Make sure that you target height is correct for each shot. The rod height can be changed by selecting the Prism symbol.

Prism Symbol

Press Store

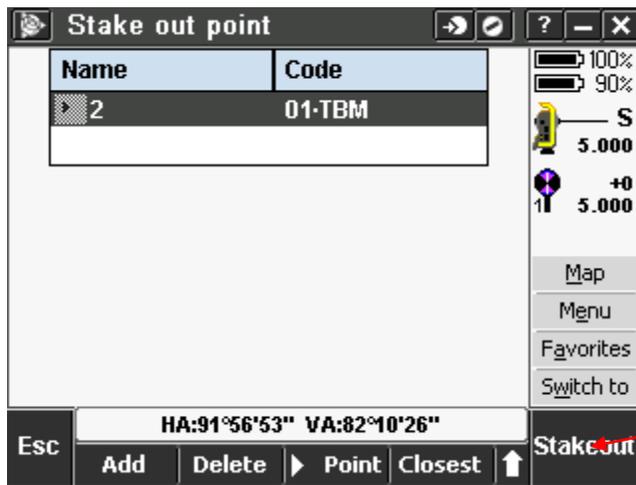
--Exit out of the Measure Topo command and return to the General Survey screen. To do a closing shot on one of the benchmarks that you shot earlier, you can stakeout to that original point. This will display the error that you now have, if any.



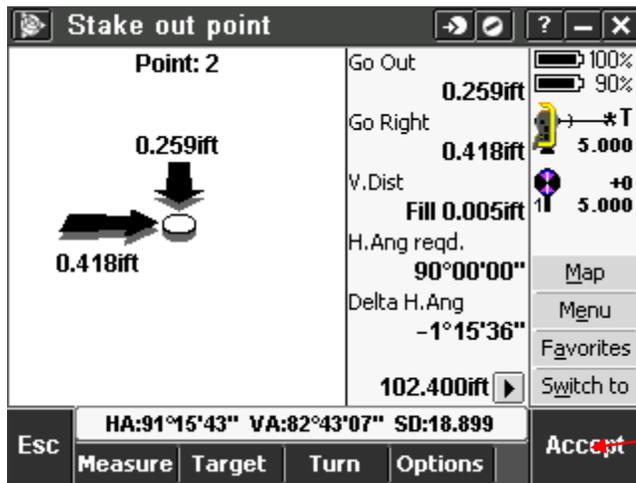


Select the point from the list of points in the data collector and select add to bring it into the stake out list.

Press Enter



Press Stakeout



This screen will give you the error that you have for benchmark closures. The display shows horizontal and vertical precision. The vertical precision is listed under V. Dist and is displayed as a cut or fill.

Press Accept to view the error involved.

These two screens will display the deltas (error) that was shot compared to the first time the point was shot. To page up and down press the circled buttons.

Press Store to accept the shot

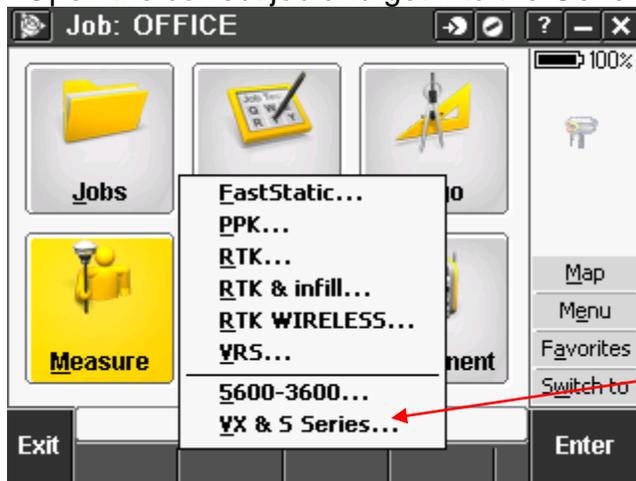
Click Measure on the General Survey Menu and select End conventional survey to end your survey session. **Make sure you use this method rather than just turning off the instrument.**

--To continue with an existing survey you would also need to use the station setup method. The instrument needs to be set and leveled over a point that you have stored in the collector. You would choose this point from the list of points for your first point. The second point is your backsight and is also chosen from the list of points in the collector. **Make sure the instrument and rod heights are correct before you measure the backsight.**

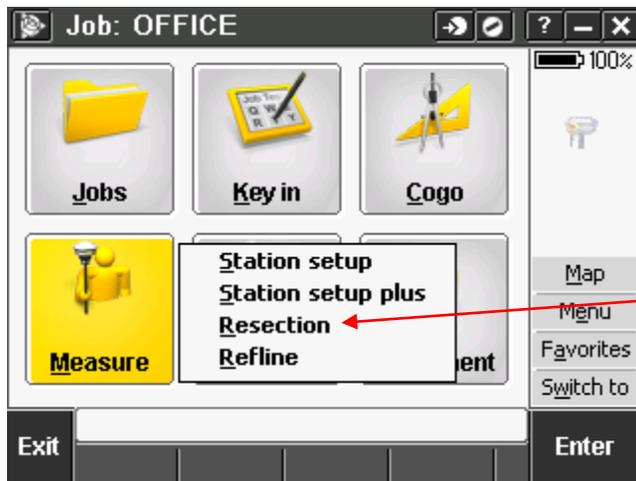
Resection

The following procedure describes the steps involved in performing a resection from two existing points. This method requires two benchmarks that are already stored in the data collector.

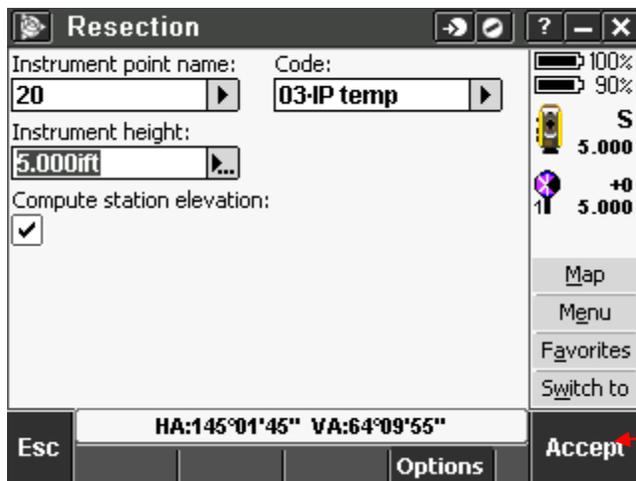
--Open the correct job and get into the General Survey Menu.



Press Measure and select VX & S Series Survey Style

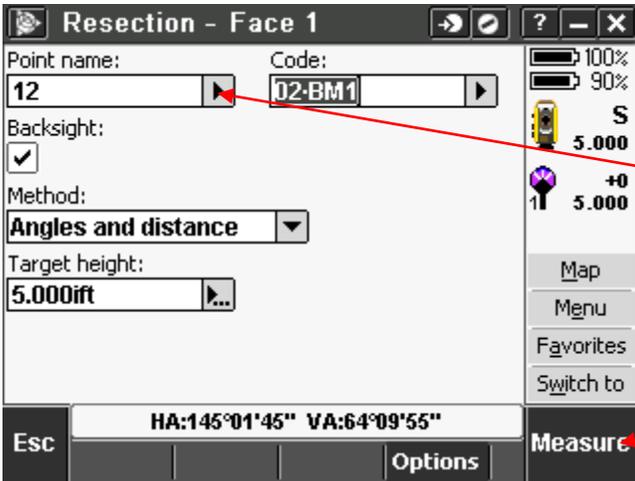


Select Resection



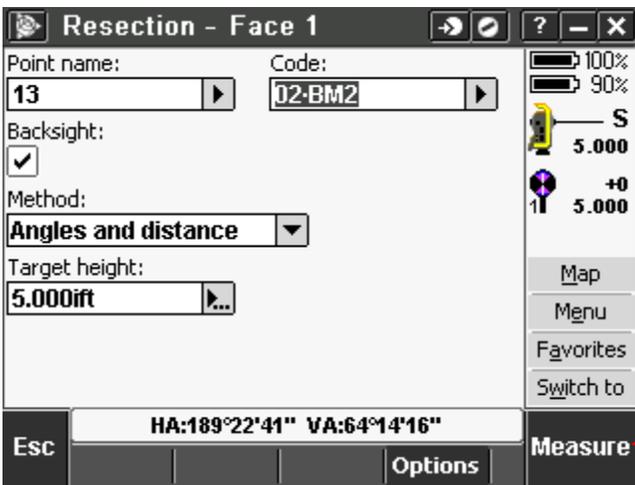
The instrument point name is a new number that has not already been used. You will be creating this point from the angles and distances off of the other points. **Make sure you check Compute station elevation.**

Press Accept to continue



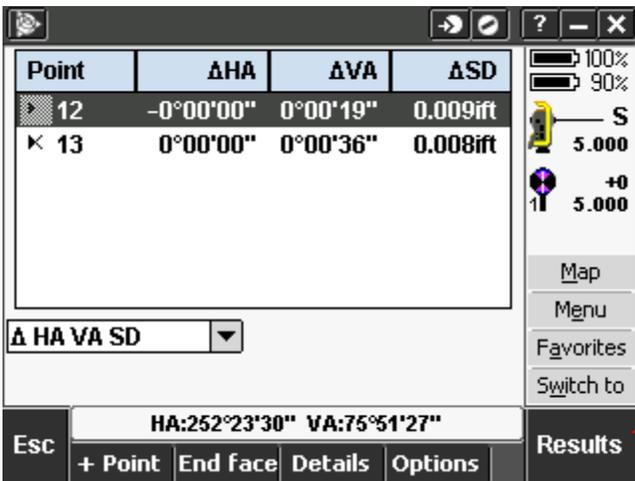
Choose your first point to measure from the list. This option can be accessed from the arrow in the point name field.

Move rod to benchmark and press measure.



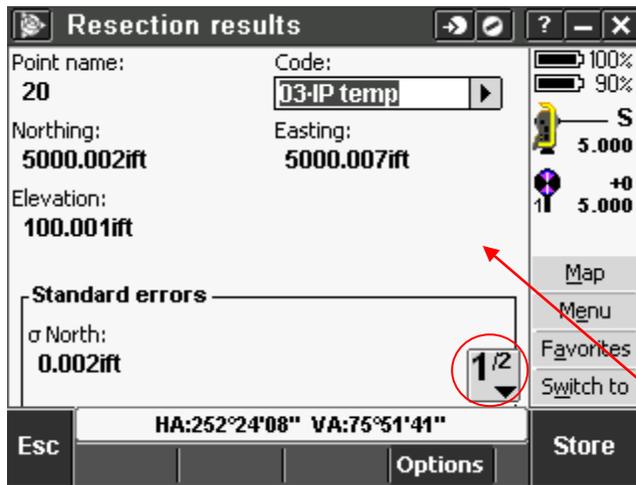
You will see the same screen appear where you will select the second point to measure.

Move rod to next benchmark and press Measure

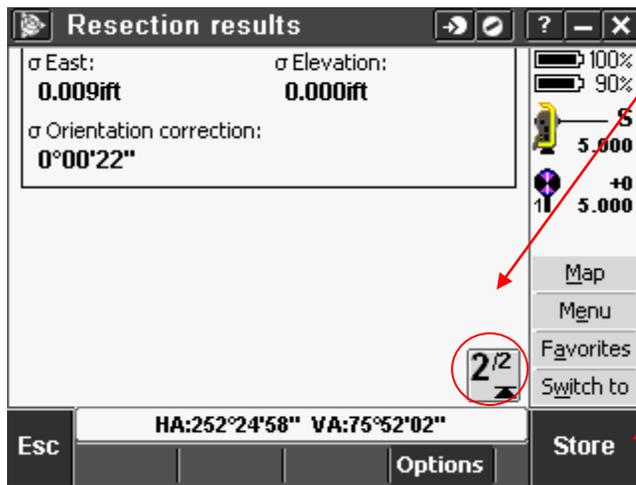


The next screen displays the error involved in both shots. This is used to calculate the new instrument point.

Press Results to see the horizontal and vertical error in feet



These two screens will display the deltas (error) that was shot compared to the first time the point was shot. To page up and down press the circled buttons.

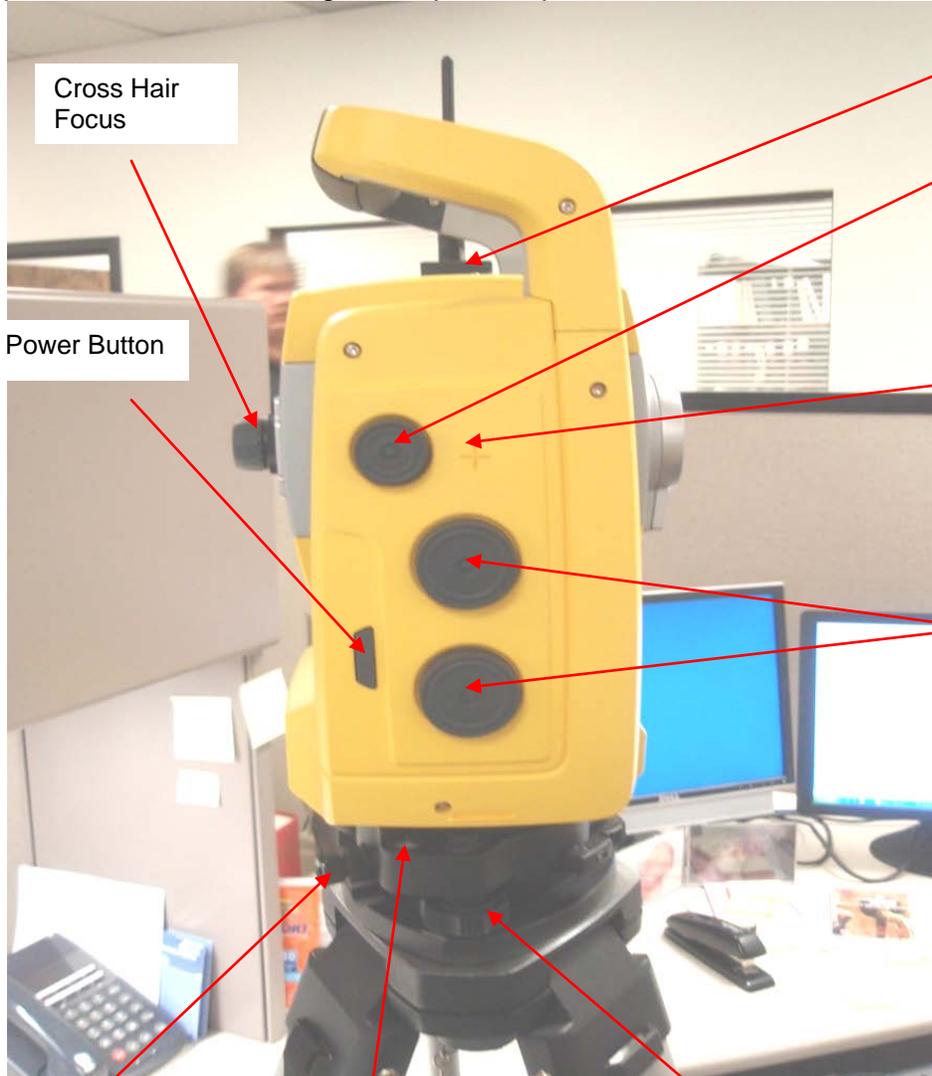


Press Store

--The setup is complete for the resection and now you can continue with the Measure Topo commands.

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This reference guide covers the basic location of the Trimble S3 Total Station controls. The pictures are referencing the important parts to function in the field with the instrument.



Rough Sighting Collimator

Cross Hair Focus

Image focus

Power Button

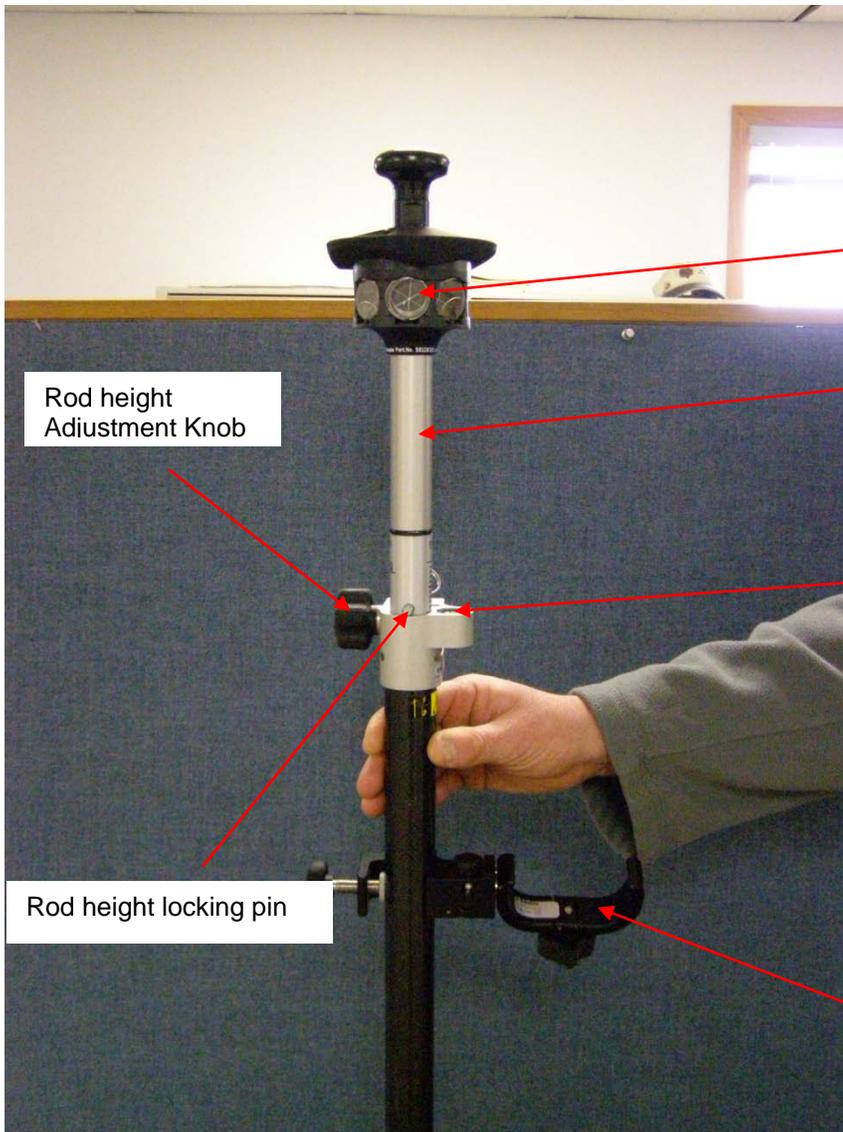
Instrument Height Measuring Mark

Horizontal and Vertical Adjustment

Optical Plummet

Level Bubble

Fine Adjustment Leveling Screws



Reflective Prisms

Prism Extension

** This extension needs to be on the rod with the prism as the rod graduations are calibrated with the extension on the rod.

Level bubble

Data Collector Bracket

Do not over tighten as the collector can be internally damaged*

Rod height Adjustment Knob

Rod height locking pin

Edits to the survey should be done at this time while in Survey Controller on the data collector before creating the csv file. It may be advantageous to create several csv files. Each file can contain different point groups (i.e. survey control, ground, etc.). This may make importing the points into AutoCAD easier by already dividing up the points into groups. When each csv file is imported into AutoCAD, you can then select which point group the contents will go in rather than relying on an AutoCAD template enter them into a default point group.

Creating the csv file

On the data collector in Survey Controller, go to:

1. Files (Icon on main menu) → Import/Export → Export fixed format files
2. Select the File Format: "Comma Delimited (*.CSV, *.TXT)"
3. Enter the File name you want

It should default to the name of the job file you have open with the .csv extension

4. The "... " button lets you pick the folder the csv file will be saved to on the data collector

It should default to a folder called Export under the original folder where the job file is

5. Make these selections for the fields and choose "Accept":

Point name: Field1

Northing: Field2

Easting: Field3

Elevation: Field4

Point code: Field5

6. Select which points from the job that you want included in the csv file

Do this by choosing a filter from the list that appears and select "Enter"

7. Hit "OK" once the transfer is complete

The csv file is now created and saved on the data collector.

To view the file location from the data collector

1. Go to the Windows Start Menu → File Explorer
2. Under the My Device heading, go to the Trimble Data folder
3. Select the folder where the csv file was saved. It will be a folder named "Export"

(Should be under the county name folder where the survey job file is)

Example: Start Menu → File Explorer → My Device → Trimble Data → county → Export → filename.csv

This is the location the csv file was created and exported from the Survey Controller program.

To transfer the new csv file from the data collector to the computer

1. Connect the data collector with the USB cable and open either ActiveSync or Windows Explorer

Select: My Windows Mobile-Based Device

Follow the file path in the example above

Drag or copy the csv file from the data collector location to its new hard drive location

2. The csv file can now be imported in to a CAD program.

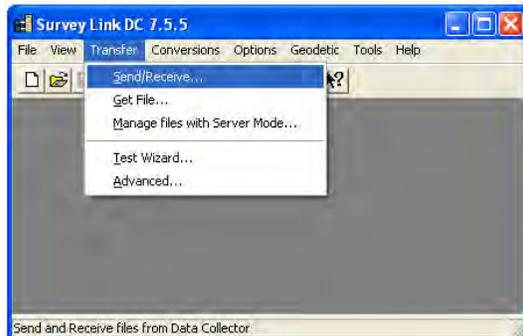
The file can also be opened in Excel for editing. For example, AutoCAD can only accept points with numerical names. If a name such as "BASE" or "BACKSITE" etc. was used in the survey, it will need to be changed to a number before importing the points in AutoCAD. Also, the codes can be edited and breakline coding can be checked for errors before importing to ensure they import correctly.

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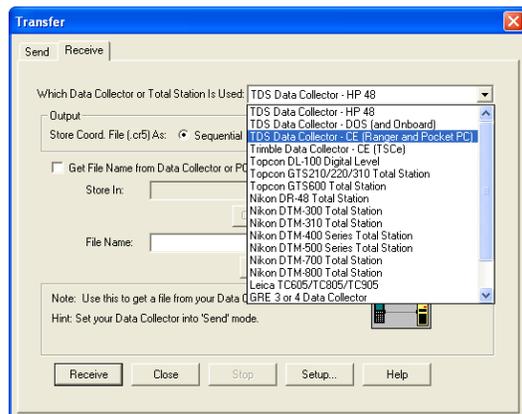
This Quick Reference Guide covers the procedure for downloading survey data from a data collector using the Civil 3D Survey Link.

For more information on creating the folders needed to import the survey data, and setting up the survey database and network in Civil 3D, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.

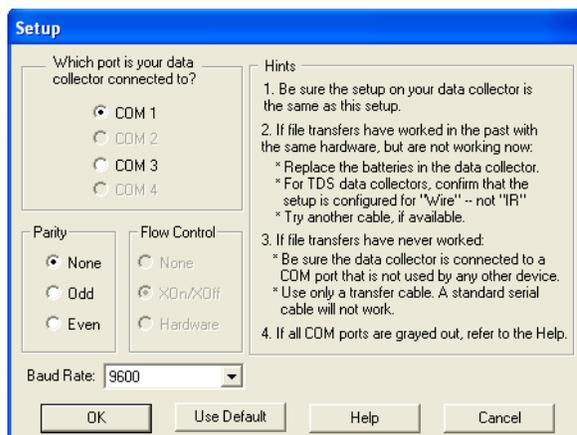
1. Connect your data controller to the computer via ActiveSync.
2. Open the Survey Link by using the *Survey Data Collection Link* command. This is located on the *Create Ground Data* panel on the *Home* ribbon. You will need to click on the down arrow on the lower right hand corner of the panel to expand the list of commands to get to the *Survey Data Collection Link* command.
3. In the Survey Link window, go to the *Transfer* drop-down menu and select *Send/Receive...*



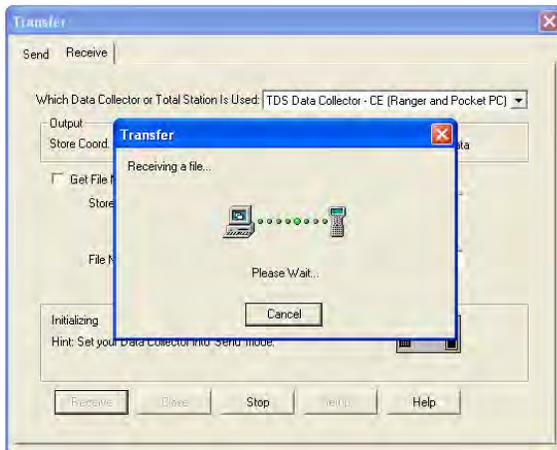
4. Click on the arrow at the right end of the Which Data Collector or Total Station is Used: section and select the data collector you are using. After you have selected your data collector from the list, click on the *Setup...* button at the bottom of the window.



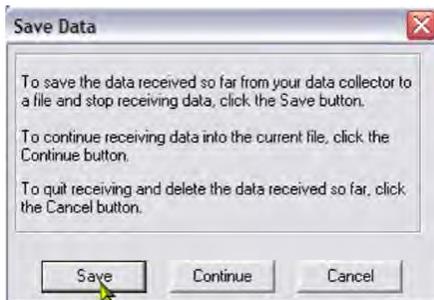
5. Check the settings in the *Setup* window to make sure they match the settings in the data collector. Click on the *OK* button to return to the *Transfer* window.



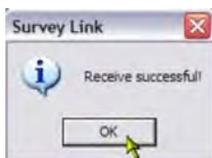
6. In the *Transfer* window, click on the *Choose File...* button. Browse to the folder where you want to save the survey data file and click on the *Save* button in the *Save As* window.
7. After you return to the *Transfer* window, click on the *Receive* button. The data will be transferred from the data collector.



8. When the transfer is complete a window will appear allowing you to save the file.

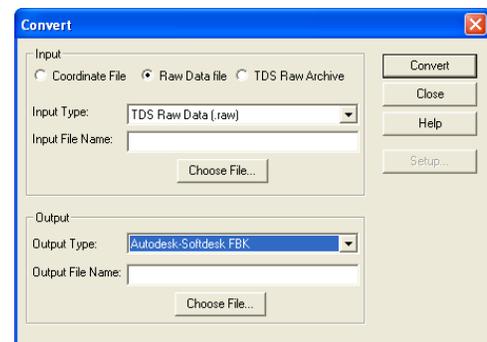


9. You should receive a message letting you know when the data is successfully received. Click on the OK button to continue.



10. Convert the file format of the imported data into the format that you want to save the final data file in.

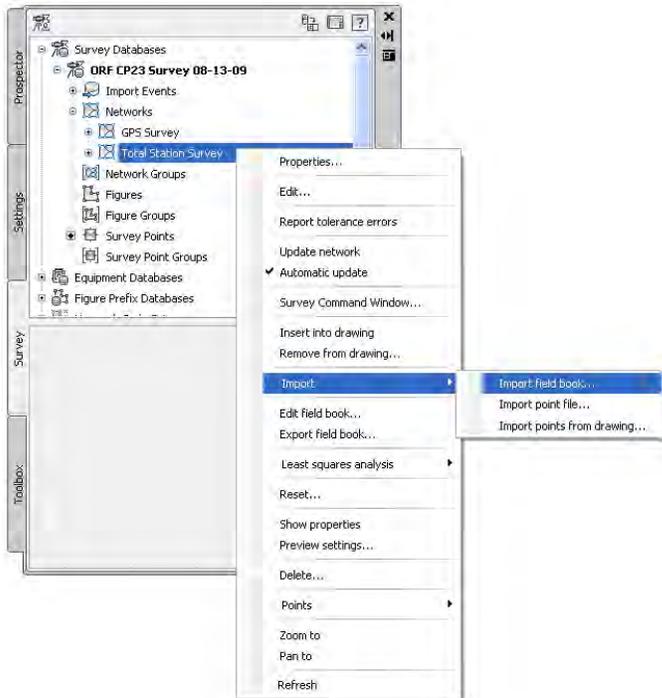
- a. In the Survey Data Link window, click on the *Conversions* drop-down menu and select *Convert File Format*.
- b. In the *Convert* window, click next to *Raw Data file* in the *Input* section. Click on the down arrow next to the *Input Type:* drop-down and select your raw file format from the list.
- c. Click on the *Choose File...* button in the *Input* section and browse to find the file that you created to store your downloaded survey data in Step 6.
- d. In the *Output* section of the *Convert* window, select the type of output file you want to create from the *Output Type:* drop-down menu, then click on the *Choose File...* button and navigate to the folder where you want to save your output file.
- e. Click on the *Convert* button to complete the file conversion process.



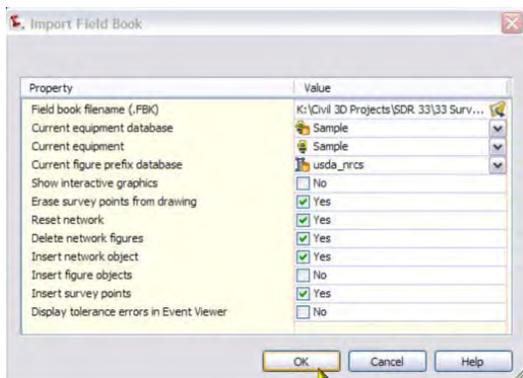
This Quick Reference Guide covers the procedure for importing survey data contained in a field book file into a drawing.

For more information on creating the folders needed to import the survey data, and setting up the survey database and network in Civil 3D, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.

1. Go to the Survey tab in the Toolspace and find the network that you want to import the data into. Right click on the network name, go to the *Import* pull-out menu, and select *Import field book...*



2. Navigate to the field book file containing the survey data you want to import and click on the *Open* button.
3. Check the settings in the *Import Field Book* window and click on the *OK* button to import the data from the field book file.

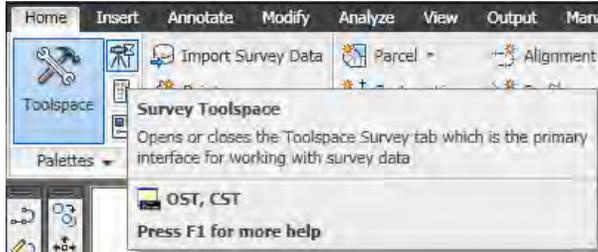


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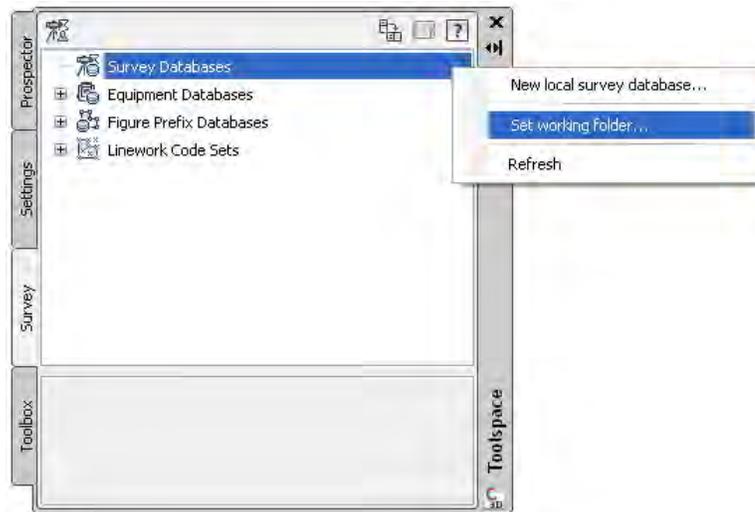
This quick reference guide covers the process of setting up a survey database and network to be used when importing survey data into the software using Trimble Link.

A. Set up the survey database

1. Go to the Survey tab in Toolspace. If the Survey tab does not show up in Toolspace, open it by clicking on the *Survey Toolspace* button on the *Palettes* panel of the *Home* ribbon.



2. On the *Survey* tab in *Toolspace*, right click on *Survey Databases* and select *Set working folder...*

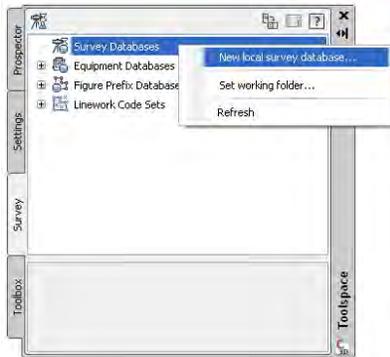


3. Browse to your working folder location, which is where the files for the project you are working on is located, e.g. S:\Service_Center\NRCS\Engineering\Projects\Project Name\
4. Use the *Make New Folder* button and create two sub-folders with the names "Dwgs" and "Survey Data"

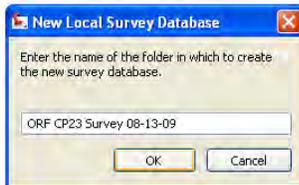


5. Select *Survey Data* as your working folder and click on the *OK* button. A different folder path can be used if desired.

6. Right click on *Survey Databases* and select *New local survey database...*

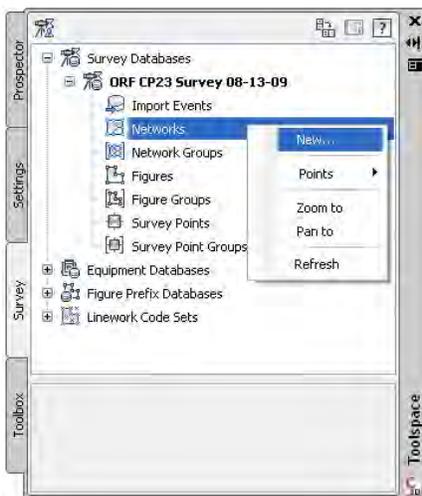


7. Enter a name for the database and click on the *OK* button.



- B. Create networks for GPS survey and for total station survey.

1. Expand the listing under the name of the database you created in step A7 above. Right click on *Networks* and select *New...*

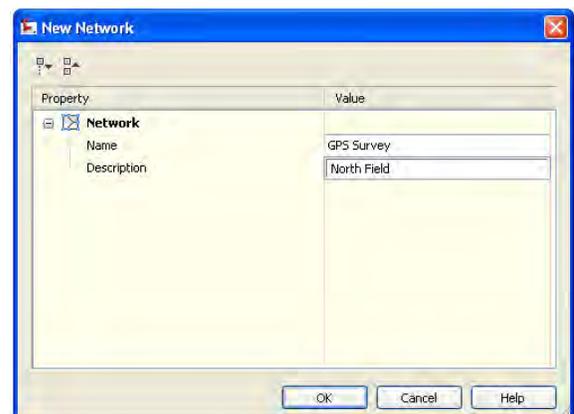


2. The *New Network* window will appear. In the value column, enter the following information:

Next to Name type GPS Survey

Next to Description type North Field

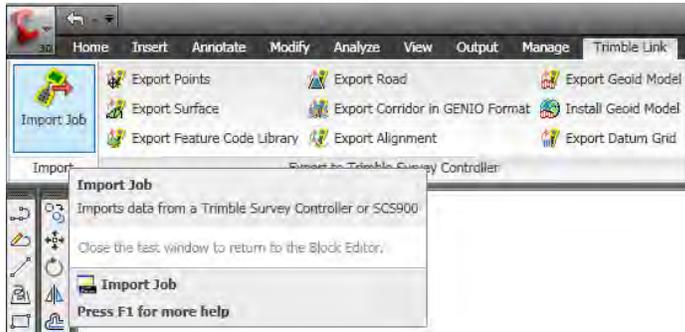
Click on the *OK* button when finished



This quick reference guide covers the procedure for downloading survey data from a GPS survey into Civil 3D through Trimble Link. This example covers the process using a Trimble TSC2 controller.

For more information on creating the folders needed to import the survey data, and setting up the survey database and network in Civil 3D, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.

1. Connect your data controller to the computer via ActiveSync.
2. Select *Import Job* on the *Import* panel of the *Trimble Link* ribbon.

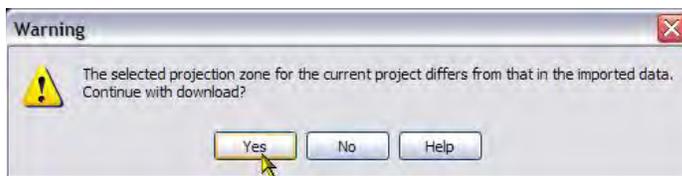


3. If your current drawing has not been saved you will get a warning that you need to save your current drawing. Save it in the drawing folder that you have created to store survey data. Refer to Step A4 in Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.
4. Select the appropriate device you are connecting to

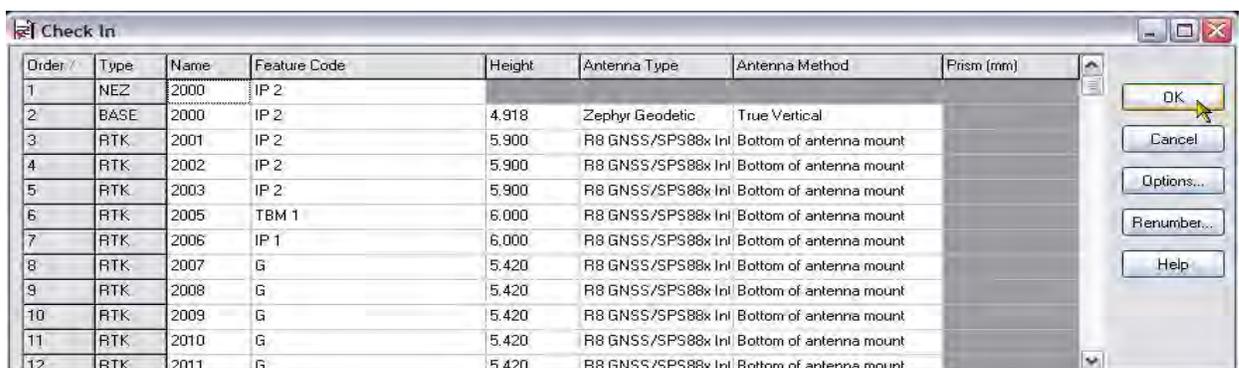
- a. Click *Open*
- b. Navigate to and select the desired job on the controller
- c. Click *Open*



5. A warning may appear regarding the projection zone and/or coordinate system. Click on the *Yes* button.



6. Check In



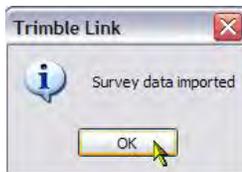
Here you can make corrections to Feature code (Field Code), and or Height (Target height) etc. Antenna Type, and Antenna Method are set in the controller. Click on the *OK* button when editing is completed.

7. Import survey data

- Select a survey database. For more information on setting up a survey database, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.
- Add to an existing survey network. For more information on setting up a survey network, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*. Be sure to uncheck all of these boxes
 - Delete network observations
 - Delete network points
 - Delete network figures
- Click *OK*.



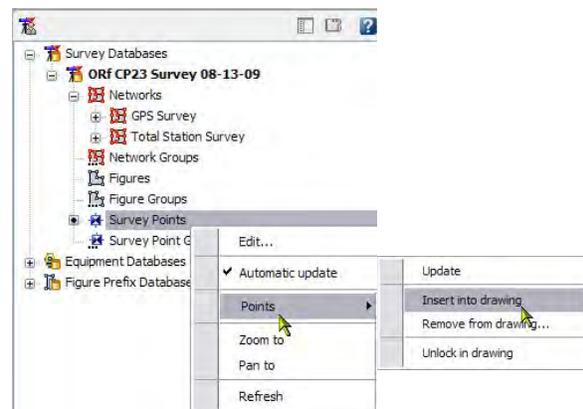
- Watch the status at the lower left corner. This will take some time and CAD may appear to be not functioning or that it is locked up. Be patient.
- Survey data is imported into the drawing when the verification window appears. Click on the *OK* button.



10. Insert the points into the drawing

- Right click on *Survey Points*
- Hover over *Points*
- Select *Insert into drawing*

The points will be inserted into the drawing, but you may need to zoom out to see them.



This quick reference guide covers the procedure for downloading survey data from a total station survey into Civil 3D through Trimble Link. This example covers the process using a Trimble TSC2 controller.

For more information on creating the folders needed to import the survey data, and setting up the survey database and network in Civil 3D, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.

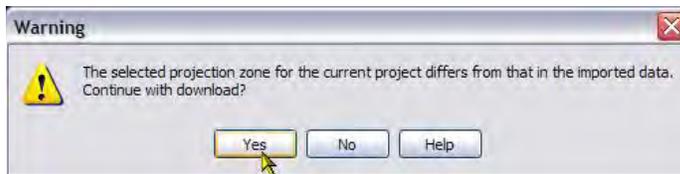
1. Connect your data controller to the computer via ActiveSync.
2. Select *Import Job* on the *Import* panel of the *Trimble Link* ribbon.



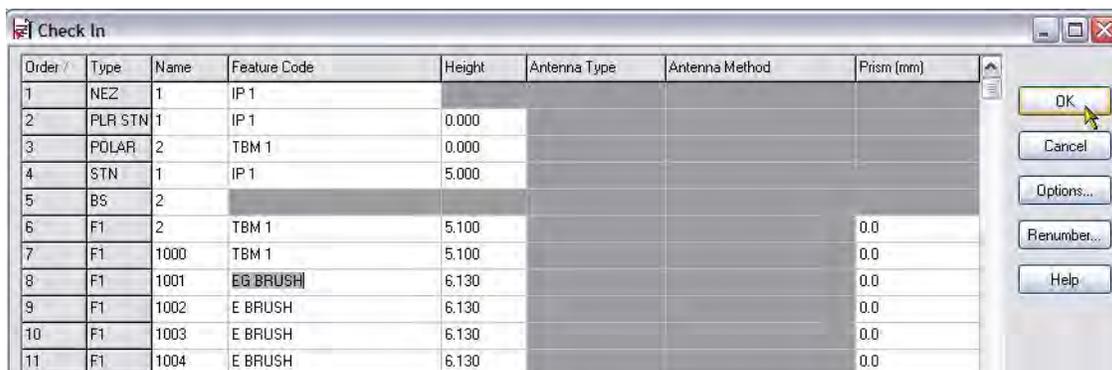
3. If your current drawing has not been saved you will get a warning that you need to save your current drawing. Save it in the drawing folder that you have created to store survey data. Refer to Step A4 in Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.
4. Select the appropriate device you are connecting to
 - a. Click *Open*
 - b. Navigate to and select the desired job on the controller
 - c. Click *Open*



5. A warning may appear regarding the projection zone and/or coordinate system. Click on the *Yes* button.



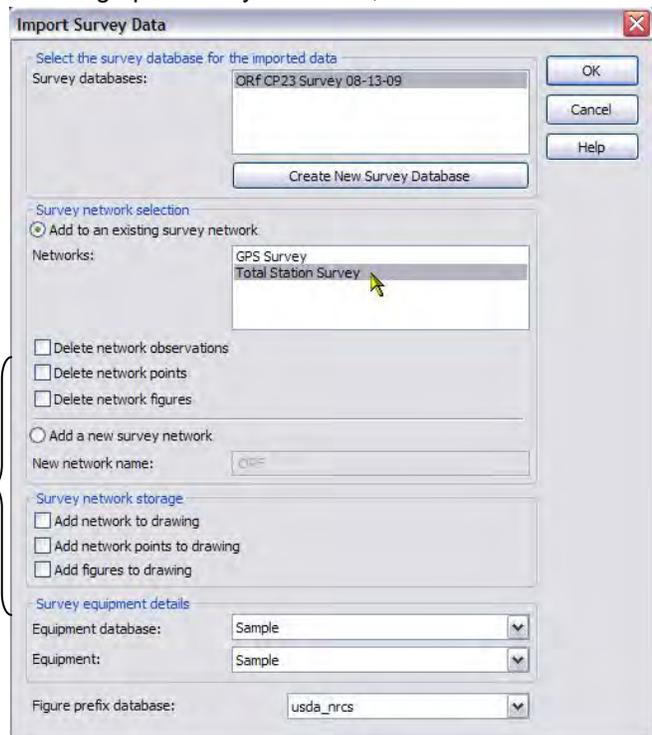
6. Check In



Here you can make corrections to Feature code (Field Code), and or Height (Target height) etc. Antenna Type, and Antenna Method are set in the controller. Click on the *OK* button when editing is completed.

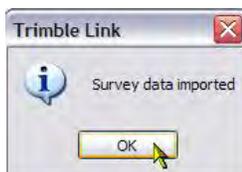
7. Import survey data

- a. Select a survey database. For more information on setting up a survey database, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*.



- b. Add to an existing survey network. For more information on setting up a survey network, refer to Quick Reference Guide *140.0 Trimble Link – Civil 3D Setup*. Be sure to uncheck all of these boxes
- c. Click OK.

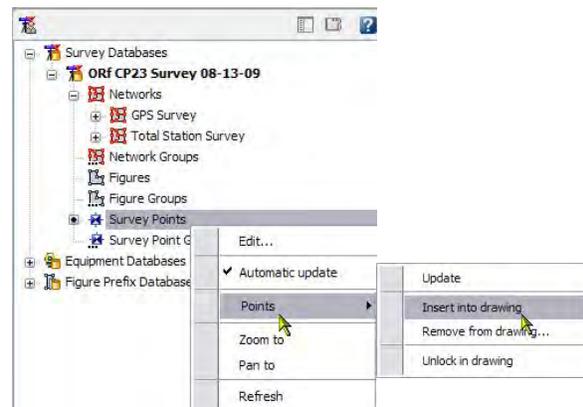
8. Watch the status at the lower left corner. This will take some time and CAD may appear to be not functioning or that it is locked up. Be patient.
9. Survey data is imported into the drawing when the verification window appears. Click on the OK button.



10. Insert the points into the drawing

- a. Right click on *Survey Points*
- b. Hover over *Points*
- c. Select *Insert into drawing*

The points will be inserted into the drawing, but you may need to zoom out to see them.



Corridors and Assemblies

Note: For ease of construction stakeout it's important that the assembly naming convention and corridor surface creation is done properly

Assembly Properties:

Right click the Assembly and select "Properties..."

Point Codes: This is what shows up as the offset in the Data Collector

Link Codes: This is used when creating the surface in the Corridor Properties

Naming conventions here don't affect construction stakeout, but cleans up the drawing

Value Name	Default Input Value	Parameter Reference
Omit Link	No	
Side	Right	
Use Superelevation Slope	None	
Slope	0.00%	
Width	5.000'	<None>
Point Codes	TopEdgeRight	
Link Codes	Embankment	
Version	R2009	

Corridor Properties:

Right click the Corridor and select "Properties..."

Select the Link Code you created under Assembly Properties

Click here to create the Surface

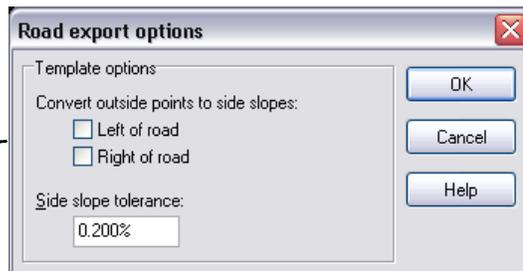
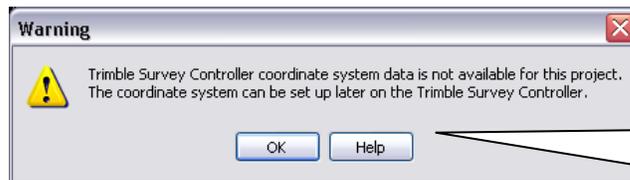
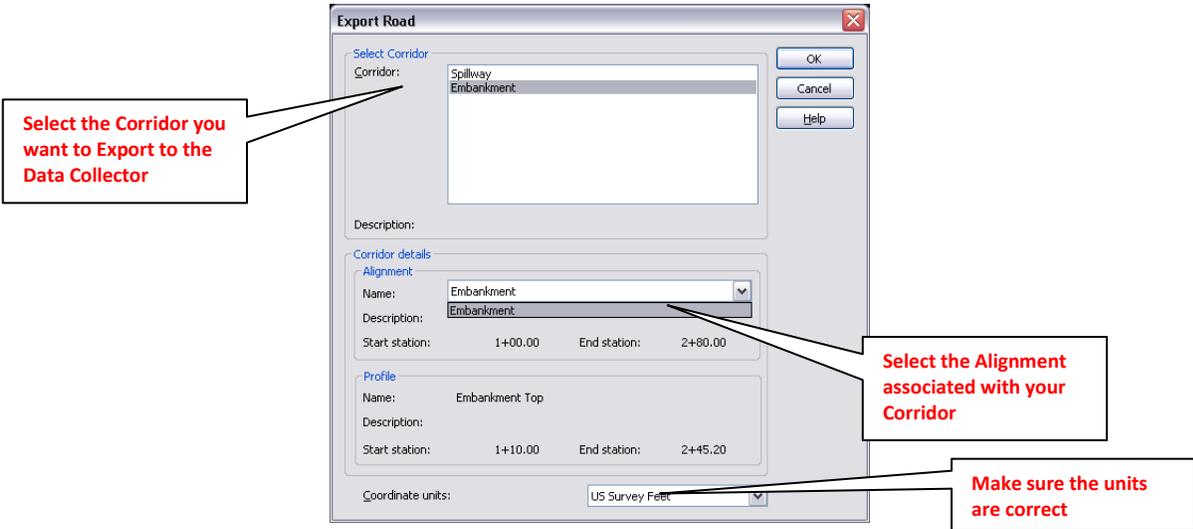
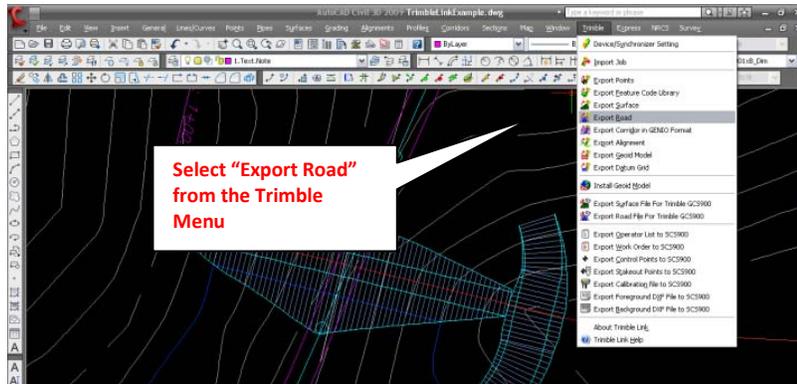
Click here to add the Link Code to your Surface

Name	Surface Style	Render Material	Specify code:
Embankment Surface	Triangles (Yellow)	ByLayer	Embankment
Embankment			Daylight_Fill
			Daylight_Cut

Trimble Link

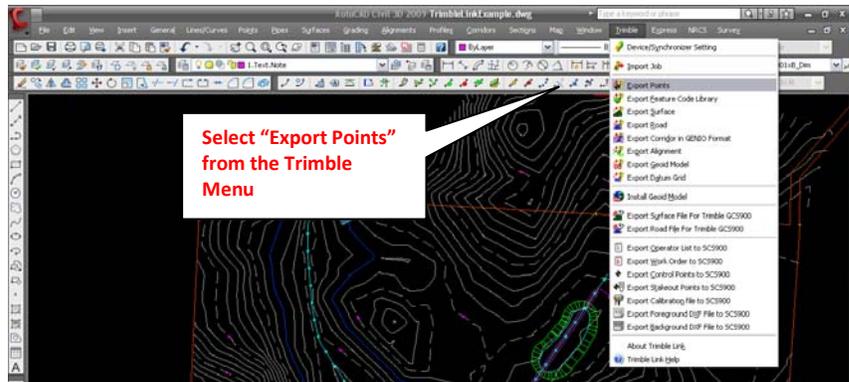
Note: Corridor templates cannot be exported in TGO and must be done using Trimble Link

Exporting Roads (Corridors):

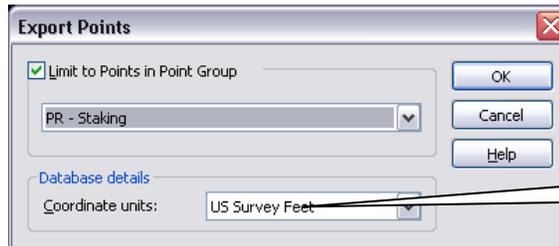


Continue to section "Trimble Access on ActiveSync" at bottom of next page

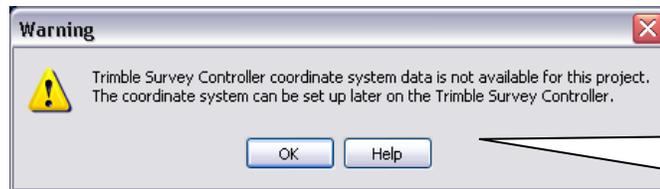
Exporting Points:



Select the Point Group you want to Export to the Data Collector



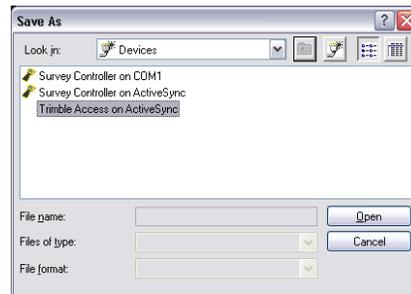
Make sure the units are correct



This warning is normal and tells you the coordinate system will need to be setup under job properties on the Data Collector

Trimble Access on ActiveSync:

After connecting the Data Collector "double click" Trimble Access on ActiveSync



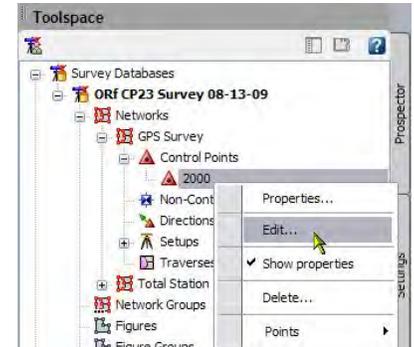
Name the job file or the road file here



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This quick reference guide covers the procedure for correcting GPS coordinates to the OPUS solution

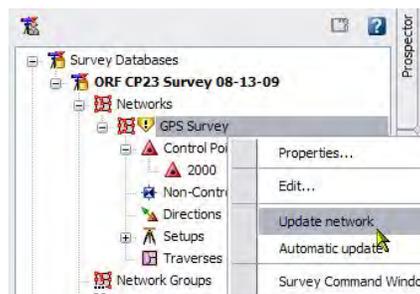
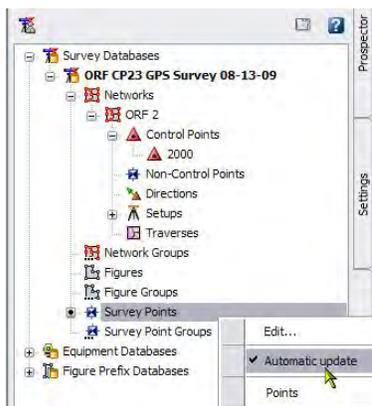
1. Under the survey databases on the *Survey* tab in *Toolspace*, you will see the name of the database that you created (e.g. ORF CP23 GPS Survey 08-13-09)
2. Right click on it and select open survey database if not already open or expanded.
3. Expand the tree by clicking on the (+) next to *Networks*, *GPS Survey* (Network we created during downloading) and *Control Points*.
4. Under *Control Points* select a point number (such as 2000), then right click and select *Edit*. This will open the *Panorama*.
5. With the OPUS report, convert the UTM Coordinates Northing, Easting, and Ortho height to feet.



Enter these values in the Northing, Easting, and Elevation fields for point 2000 by clicking in each field.

Number	Name	Northing	Easting	Elevation	Description	Longitude	Latitude	Semi-Major Axis	Semi-Minor Axis
2000		14324256.2497	1912295.2502	708.791	IP 2	-92.02132419	39.26238024		

6. Click on the  icon in the upper right to save your edit, and then click  to close the panorama.
7. Select *Survey Points* from the database tree. Right click and select *Automatic update* and turn it on. See the figure below and to the left.



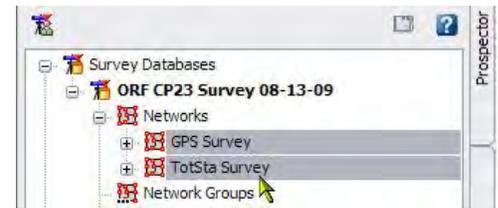
8. Since we have modified the base point, the yellow shield appears indicating we need to update the network. See the figure above and to the right
 - a.) Click on *GPS Survey*
 - b.) Right Click
 - c.) Select *Update network*.

In the lower left corner the status should indicate updating network and survey points.

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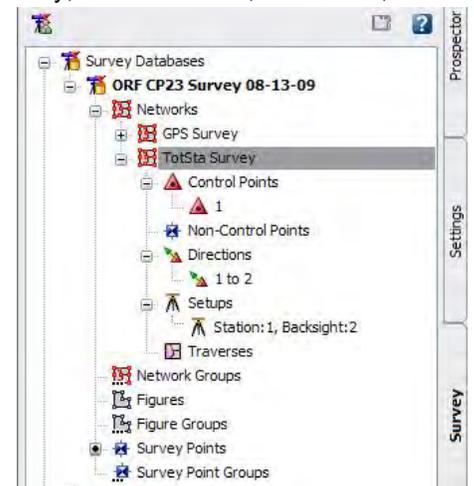
This quick reference guide covers the procedure for adjusting a total station survey performed using assumed coordinates to a survey performed with GPS coordinates.

- Under the survey databases you will see the name of the survey databases that you have created, in this example GPS Survey and Total Station Survey. For more information on creating survey databases, refer to *Quick Reference Guide 140.0 Trimble Link – Civil 3D Setup*.



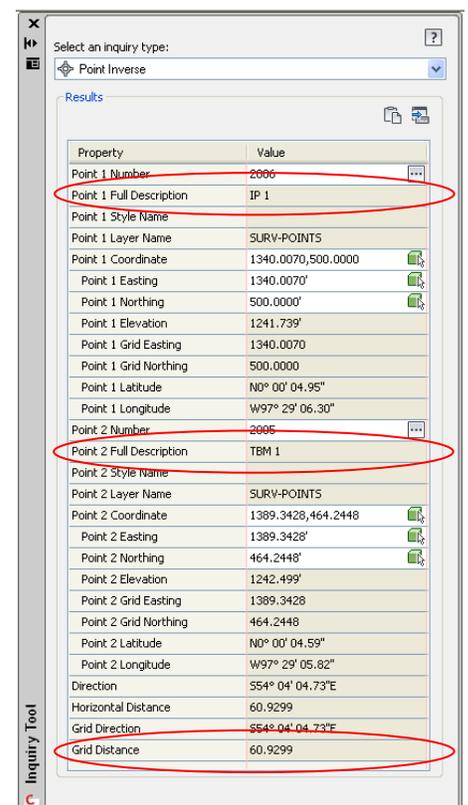
- Expand the tree by clicking the (+) next to Networks, Total Station Survey, Control Points, Directions, and Setups.

In this example, we know that point (1) in the Total station survey equals point (2006) in the GPS survey, and the backsight point (2) in the Total station survey equals point (2005) in the GPS survey.



- We need to find the inverse angle from the GPS survey in order to continue with the adjustment.
 - Select a point in the drawing. A *COGO Point* ribbon should appear at the top of the screen for the point that you selected. On this *COGO Point* ribbon, click on *Inquiry* on the *General Tools* pane.
 - In the *Inquiry Tool* window, click on the down arrow next to *Select an inquiry type:* and select *Point Inverse* from the drop-down menu.
 - For *Point 1 Number* enter 2006. Make note of the northing, easting and elevation of point 2006.
 - For *Point 2 Number* enter 2005. Make note of the northing, easting and elevation of point 2005.
 - Down toward the bottom of the list is the inverse angle between points 2006 and 2005, listed under *Grid Direction*. Make note of this angle.

Now that we have all the information we need to tie the Total Station survey to the GPS survey.



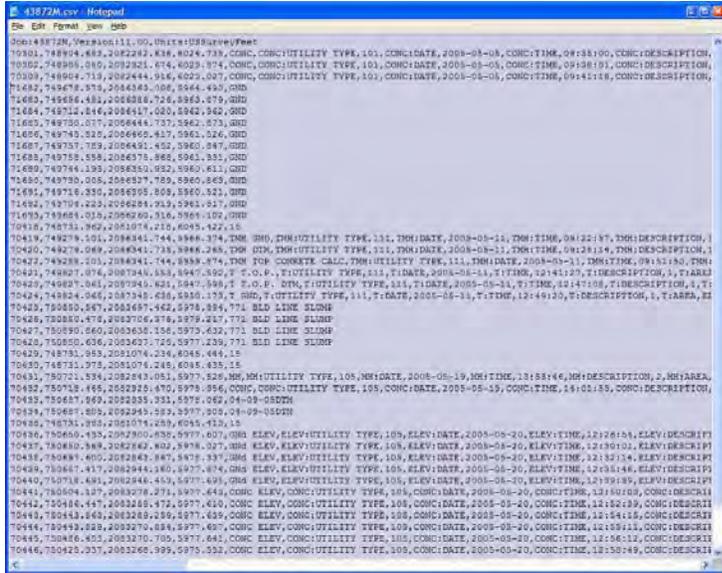
4. Apply the adjustments to the coordinates and rotation to the points in the total station survey.
 - a. Back on the *Survey* tab in *Toolspace*, right click on Point 1 and select *Edit*.
 - b. The Panorama window will open. Enter the Northing, Easting and Elevation values for Point 2006 in the appropriate fields of the table to assign these value to Point 1.
 - c. Click the  icon in the upper right to save your edit, and then click  to close the panorama.
 - d. Back on the *Survey* tab in *Toolspace*, right click on *Directions* and select *New...*
 - e. In the *New Direction* window, make the following changes:
 - From Point → 1
 - To Point → 2
 - Direction → Enter the Grid Distance angle you recorded in Step 3e.
 - Click on the *OK* button
5. Since the base point in the total station survey has been modified, a yellow shield may appear indicating you need to update the network. If this happens, right click on the name of the network and select *Update network*.

Custom Export Style Sheets

Trimble provides a number of style sheets that can be used to generate custom reports from a data collector. Below is a summary of some of the most commonly used reports. For more information on downloading the style sheets from Trimble’s website and loading them on a data collector, refer to Quick Reference Guide 171.0 Trimble Reports – Using Custom Export Style Sheets

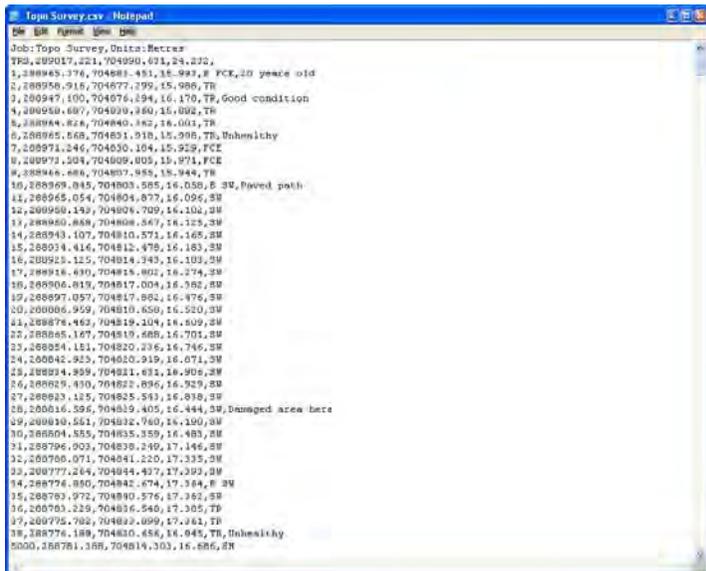
Comma Delimited with Attributes

This report creates a csv text file of the points in the job and includes the point code plus any features and attributes assigned to the points as well as the point name and coordinates. Each attribute value included with a point is preceded by the attribute name (prefixed with the feature name and a colon). If the points have any descriptions assigned to them these will follow the attributes.



Comma Delimited with notes

Creates a csv text file of the points in the job and for each point will include any notes that have been assigned to the point. Any notes entered immediately following a point will also be included with the point. In addition there is an option to output any attributes assigned to points (output in the same manner as for the 'Comma delimited with attributes style sheet). Any point descriptions will also be included. The notes output follows all the other output details.



GPS points report

This style sheet creates a text file report of the points in the job that provides the point name, grid coordinates, point code, horizontal and vertical precisions, PDOP and number of satellites. There is an option to sort the points either numerically or alphabetically.

Point coordinates for job 43872M

Point	North	East	Elev	Code	Hz Prec	Vt Prec	PDOP	Sats
15	748731.983	2081074.246	6045.462	BASE	?	?	?	?
18	749552.630	2086141.580	5969.080	CP 18	?	?	?	?
19	749602.470	2086150.190	5969.550	CP 19	?	?	?	?
26	749315.098	2088637.884	5937.564	CP 26	?	?	?	?
33	749331.821	2088661.578	5937.310	CP33	?	?	?	?
38	754648.838	2080576.743	5996.600	CP 38	?	?	?	?
39	754755.844	2080474.031	5999.870	CP 39	?	?	?	?
47	748839.630	2081315.574	6040.271	CP-47	?	?	?	?
48	748842.980	2081289.567	6041.250	CP-48	?	?	?	?
63	748552.526	2085497.955	5980.371	FSI-CP-63	?	?	?	?
64	748530.383	2085456.460	5981.406	FSI-CP- 64	?	?	?	?
200	750471.841	2080805.319	6039.000	200	?	?	?	?
201	751475.870	2082101.679	6008.000	201	?	?	?	?
202	749491.246	2086607.104	5964.000	202	?	?	?	?
208	749979.394	2088943.907	5936.000	208	?	?	?	?
268	749774.225	2079178.170	6062.571	268	?	?	?	?
302	748923.295	2082077.558	6024.714	BW37-013	?	?	?	?
303	749057.027	2082102.629	6024.667	BX37-016	?	?	?	?
304	748923.295	2082077.558	6024.714	BW37-013	?	?	?	?
431	749770.451	2078053.044	6094.781	431	?	?	?	?
864	751922.345	2079201.475	6055.037	864	?	?	?	?
2129	750471.841	2080805.319	6039.000	200	?	?	?	?
70301	748904.683	2082282.636	6024.735	CONC	0.033	0.058	1.6	8
70302	748905.080	2082321.674	6023.874	CONC	0.020	0.035	1.6	8
70303	748904.713	2082444.916	6023.027	CONC	0.018	0.031	1.5	8
70304	748731.946	2081074.222	6045.449	15	0.019	0.032	2.1	6
70305	748698.622	2084345.192	5991.378	EOR	0.017	0.061	4.4	5
70306	748697.806	2084339.887	5991.697	EOR	0.016	0.058	4.4	5
70307	748676.448	2084296.138	5992.633	EOR	0.013	0.047	4.3	5
70308	748653.412	2084241.321	5994.057	EOR	0.021	0.074	4.3	5
70309	748647.196	2084188.204	5994.545	EOR	0.012	0.043	4.2	5
70310	748642.073	2084136.410	5995.019	EOR	0.014	0.048	4.2	5
70311	748632.878	2084088.120	5996.492	EOR	0.015	0.053	3.4	5
70312	748607.405	2084019.526	5998.451	EOR	0.014	0.048	4.1	5
70313	748629.044	2084036.138	5997.921	EOR	0.018	0.064	4.0	5
70314	748650.379	2084105.346	5995.799	EOR	0.015	0.051	4.0	5
70315	748658.097	2084184.506	5995.003	EOR	0.019	0.066	3.9	5
70316	748663.587	2084228.422	5994.451	EOR	0.023	0.080	3.9	5
70317	748677.345	2084283.279	5993.201	EOR	0.010	0.035	5.4	5
70318	748698.679	2084316.983	5992.106	EOR	0.020	0.069	5.4	5
70319	748728.105	2084367.987	5990.573	EOR	0.013	0.042	3.8	5
70320	748702.259	2084358.727	5990.943	EOR	0.023	0.076	3.8	5
70321	748617.286	2084292.890	5993.607	DIRT PILE	0.013	0.042	5.2	5

Points and notes report

This style sheet is designed to list all the point names in the job, in the order in which they were observed, along with their point code and any notes assigned to points, or included in the job along with the points. This can be a useful report to supply to a CAD operator to assist them in understanding how the surveyed points are to be handled in the CAD system.

Point And Note Details Report

Point Name	Code	Note
PC 3	122	
PC 6	122	
PC 8	122	
PC 105	125	
PC 4	122	
PC 371	123	
GPS E 105	125	
GPS PC 3	122	
GPS PC 4	122	
MARION DR 2	125	
GPS MAR DR	123	
GPS PC 6	122	
GPS PC 8	122	
TBM 01	125	
1	113	CGS
2	117	
3	117	
4	117	WITH WARNER
5	117	
30001	901	WHITE N/B New base station detected Modified 5:14:05 PM 4/4/2006 Old Value 901
30002	901	
30003	D 406J1	
30004	406J1	
30005	406J1	
30006	CLOCK 406J1	
30007	255	40 N/W 15-33 Figure closed Present shaded in drawing Modified 5:33:32 PM 4/4/2006 Old Value 255 40 N/W 15-33
30008	901	
30009	902	ORANGE/WHITE
30010	902	Modified 5:33:10 PM 4/4/2006 Old Value 902 ORANGE/WHITE
30011	902	
30012	902	
30013	902	
30014	902	
30015	902	

Quality Control Report

This style sheet creates a report on the job providing details of the instruments/receivers used, GPS base points used, antenna heights used, points with precisions and PDOP's outside specified tolerances, GPS points without a fixed solution, lists of any points fixed prior to a loss of initialization due to high RMS within 5 minutes of initialization, instrument station setups used, target heights used, check observations taken and a list of duplicate points observed, with deltas from the mean position.

Quality Control Report - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Quality Control Report

Job Name: R0602062
Date: 10-10-2005
Distance Units: Metres
Angle Units: DMS Degrees

Equipment Used

Instrument/Receiver	Serial Number	Model	Firmware Version
Trimble S Series	10008	S6 2" DR 300+	R3.0.41
Unknown (Base)			
R8	4563156890		2.26

Base Points Used

Base Point	Latitude	Longitude	Height	Date/Time
0448	50°05'17.10788"N	8°13'36.09811"E	241.834	2006-02-06 10:28:48

Antenna Heights Used

Measured Height	Reduced Height	Antenna Type	Measurement Method
0.000	0.000	Adv Null Antenna	Antenna Phase Center
2.000	2.065	R8/S800/SPS780 Internal	Unterseite Antenne
2.500	2.565	R8/S800/SPS780 Internal	Unterseite Antenne

Points with PDOP exceeding limit (5.0)

Point Name	PDOP
060206900	5.8

Station Setups

Station Name	Inst. Height	Station Type	East	North	Elevation	Date/Time
060206900	0.000	Station Setup	3429975.571	5559435.828	525.736	2006-02-06 15:14:11
060206901	0.000	Station Setup	3429929.379	5559384.973	525.324	2006-02-07 08:18:44
060206902	0.000	Station Setup	3429944.527	5559354.885	525.631	2006-02-07 10:15:42
060206902	0.000	Station Setup	3429944.527	5559354.885	525.631	2006-02-07 10:55:57
103347	0.000	Station Setup	3429905.944	5559336.396	522.125	2006-02-07 12:06:46
060207800	0.000	Station Setup	3429931.977	5559312.886	522.546	2006-02-07 12:24:55

Targets Used

Done My Computer

Stakeout Report

Creates a generalized stakeout report providing details of the points staked in the job. Tolerances can be specified to allow highlighting of out of tolerance values.

Stakeout Tolerance Report

Job name: 0604051
 Survey Controller version: 11.00
 Creation date: 2005-04-07
 Distance/Coord units: Metres
 Angle units: DMSDegrees
 Stakeout horizontal tolerance: 0.020
 Stakeout vertical tolerance: 0.050
 Tolerance checking/highlighting: Both

Highlighted values exceed stakeout tolerances.

Name	dNorth	dEast	dElev	Code
VEJ300566	0.911	0.261	-0.437	S256
VEJ300567	-0.016	0.009	-0.449	K47
VEJ300568	0.026	-0.029	-0.047	1420C
VEJ300569	0.007	-0.010	-0.002	1430C
VEJ300570	-0.004	0.028	-0.116	1440C
VEJ300571	-0.025	-0.057	0.290	1450C
VEJ300572	0.028	0.005	-0.743	1420V2
VEJ300573	0.029	0.014	-0.520	1420V1
VEJ300574	0.020	0.009	-0.593	1440V1
VEJ300575	0.054	0.032	-0.540	1440V5
VEJ300576	0.053	0.050	-0.689	1450V1

Survey report

This style sheet creates an html report providing details on all the work carried out in a job. This provides a report that can be used to help analyze what has been done in the job.

Survey Report

Pressure: 756.06mmHg | Temperature: 7.0°C | Refraction Const.: -11.2

Instrument Station

Station	0604051	Inst Ht	0.000	Station Type	Helmert Resection	Station SF	1.00000000	SF Std Error	?
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Station Orientation

Inst. Station	0604051	BS Station	7017	Orientation	0°00'00"	Orient. Std Err	0°00'05"
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Point (BS)

Point (BS)	7017	Hz	25°06'33"	Vt	89°44'36"	SD	115.086	Code	047
Std Errors		Hz	0°00'10"	Vt	0°00'10"	SD	0.001		
Target Ht	0.000	Prism Const	0.0mm						

Point (BS)

Point (BS)	7015	Hz	278°16'23"	Vt	89°41'20"	SD	126.416	Code	047
Std Errors		Hz	0°00'10"	Vt	0°00'10"	SD	0.001		
Target Ht	0.000	Prism Const	0.0mm						

Point (BS)

Point (BS)	7032	Hz	97°49'45"	Vt	89°44'01"	SD	175.962	Code	047
Std Errors		Hz	0°00'10"	Vt	0°00'10"	SD	0.001		
Target Ht	0.000	Prism Const	0.0mm						

Point (BS)

Point (BS)	7019	Hz	70°05'48"	Vt	89°51'18"	SD	129.768	Code	047
Std Errors		Hz	0°00'10"	Vt	0°00'10"	SD	0.001		
Target Ht	0.000	Prism Const	0.0mm						

Point

Point	0604051	North	97579.739	East	-183181.227	Elevation	4.352	Code	041 0
-------	---------	-------	-----------	------	-------------	-----------	-------	------	-------

Resection

Resection	0604051	N std err	0.003	E std err	0.003	El std err	0.002
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Station Residuals

Point	7017	dN	-0.002	dE	-0.008	dEI	-0.001
		dHz	0°00'12"	dVt	0°00'01"	dSD	-0.005

Download the Custom Export Style Sheets from the Trimble Website

1. The Custom Export Style Sheets can be found on the Trimble Website <http://www.trimble.com>
 - a. Support and Training → Support A-Z List → T → Trimble Access → Downloads → Custom Export Style Sheets (<http://www.trimble.com/survey/Trimble-Access-IS-support.aspx>)
2. Download the style sheets that you want to use to your computer, and extract the files from the .zip file that is downloaded.
3. Connect your TSC2 to your computer and place the files in the systems file folder
 - a. My Computer → Mobile Device → My Windows Mobile-Based Device → Trimble Data → System File
 - b. Note some of these Style Sheets are already on your TSC2

Create Reports in the Data Collector

1. Start Trimble Access
2. Start General Survey
3. Go to Jobs → Open Job, and open the job you wish to create the report for
4. Go to Jobs → Import/Export → Export custom format files
5. Choose the File Format for the report that you want to create. The file name will be the name of the file you are creating and if you click on the folder to the right of the name you can choose the location of where it will be saved on the TSC2.

If you wish to view the report directly on the TSC2 then you can check the View created file box. → Accept → When transfer is complete click OK
6. Once the report is generated you can browse on your computer to the location you saved the file on your TSC2 and save it to your computer and view the report.

Additional Items:

- Some files will be too large to export directly from your TSC2. You may receive the following error: “Error during Conversion, Error using style sheet to create ASCII File”. Frontier Precision provided the following input about this error:

I have seen this in the past with large job files trying to run reports. There is a lot of information that gets reported in both of these, so even though the job file isn't huge, it still may get hung up on writing the report. A good test would be to export a simple points report or something like that on your TSC2 and see if that goes through without issues. The TSC2's do have anywhere near the processors that a conventional computer does, and it takes a little while for the computer to create it as well. If the reports are critical, they can be run on the computer via Trimble Business Center or by using the ASCII File Generator. The “AFG” should be located in your start menu under the Trimble Office folder, then in Utilities. If you do not have the Trimble ASCII File Generator, it can be downloaded from Trimble's support site. It is pretty straight forward. You browse your computer for the job file, then browse for the style sheet and it creates the report.

- The ASCII File Generator would need to be installed by IT.