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Using the Leica TCR407 without the Recon handheld unit

There are a number of reasons why you might use the Leica TCR407 without the Recon handheld. This might include the Recon being unavailable, use of the TCR407 is easier and quicker to learn, and others. Regardless of the reason, here are the instructions for doing so.

Step One: Turn on the station [red button on side of the unit]

Setting up the Station:

- 1) Set-up tripod and place TCR407 onto top plate, use knobs around base of total station to balance. Turn unit on.
- 2) Press the “FNC” (function) button, then Press F1 hotkey to turn on the digital level and laser plummet. If you look closely, you will see a red dot on the ground, this needs to be positioned on the head of the datum/benchmark before proceeding. The unit must also remain level during this process.
- 3) Once TCR407 is leveled and positioned correctly, press the F4 hotkey to exit the present screen.
- 4) Press “ESC” key

You are now ready to use the instrument.

Recording Points

- 1) Create a job file (to store points within)
 - a) Press the “Menu” key.
 - b) Press F4 to access the files section of the instrument’s memory.
 - c) Press F1 to access the Jobs section of the instrument’s memory.
 - d) Press F3 to create a new Job file.
 - e) Press F1 to name the new Job file.
 - f) Use the hotkeys to enter the new Job file’s name (date and sequential #).
 - g) Press the return key when finished entering the Job file’s name.
 - h) Finish creating the Job file by pressing F4 (OK).
 - i) Return to the Menu, press the “ESC” button twice.
- 2) Record points - Surveying
 - a) In the Menu screen, press F1 to go to the programs section of the Menu.
 - b) Select Surveying program by pressing F1
 - c) Check correct Job file is being used – if you just created a new file, it will be automatically selected, but it might not hurt to double-check.
 - d) Select “OK” when correct Job file is selected.

The process of surveying with any instrument requires the user to orient the instrument in space. In other words, you need to tell the TCR where in space it is located, this includes giving it a north direction.

- 3) Setting up the Station
 - a) Press F2 to enter the SET STATION dialogue.
 - b) Always enter the coordinates of the point you are on manually, select F4.
 - c) Press F1 to enter the coordinates (they should always be in the shot book).
 - d) Enter any Point ID and Press F4.
 - e) Measure the instrument height (to the small dot on the side of the TCR407).
 - f) Use the "INPUT" hotkey F1 to enter the instrument's height.
 - g) Press the return key.
 - h) You are finished setting up the station, press F4 "OK".

Now it is time to orient the station in space; there are two methods for doing this – Setting the North Angle Manually or by using the Coordinates of another point.

- 4a) Manual Angle
 - a) Press F1
 - b) Use the telescope to sight on a point directly north of the TCR407.
 - c) Press F1 to set the north azimuth to the current angle. (Hz=0)
 - d) Aim at the prism and press the REC.
 - e) When asked if you want to take an additional measurement, answer NO (F4).
- 4b) Coordinates
 - a) Once again, enter these coordinates manually, press F3.
 - b) Press F1 to input the NEZ coordinates for the backsight.
 - c) After entering the NEZ (remember to press the return button to move between coordinates points), you will need to assign the PtID, set it to 1.

The station is now set-up in space and the user can begin Surveying.

- 5) Surveying – recording points.
 - a) Press F4 to enter the surveying functions.
 - b) Change the PtID to 1 (use the arrow pad to the right of the screen to navigate to this part of the screen).
 - c) You will want to use the third page of the Surveying pages in order to visually check the coordinates being recorded and to document them in the shot log. Press the "Page" button to the right of the screen twice.
 - d) Aim at the Backsight and Press F3 - you should re-measure the Backsight point.
 - e) You can now survey, simply move the rod and prism to points to survey, press F3 and record the points in a shot log along with the descriptions.

[It is too time consuming to enter description codes in the instrument itself because of the clumsy design of Leica instruments without a data logger]

- 6) When finished surveying, turn the instrument off using the power button.



Surveying with Trimble's Survey Pro on the RECON

Before beginning, mount, level, and center the total station about the datum/benchmark point you will be working from. Do this before proceeding to the following instructions.

Both RECON's are set-up to use with both the Leica TCR407 and the Trimble TS305. There is only one difference in using them, and that is discussed below. This section only details how to use the RECON in conjunction with a total station, to transfer files, please see the appropriate section.

- 1) Starting Trimble Survey Pro.
 - a) Use the stylus to press the "Start" button on the RECON screen, a drop-down menu appears, select the Survey Pro icon (it looks like a small, yellow total station). Alternatively, you can click on "Programs" in the drop-down menu and click on "Survey Pro".




The program will automatically require you to select a job or create a new one. For simplicities sake, always start a new file each time you set the total station up.

- 2) Creating a new Job file
 - a) Use the stylus to click on "New..."
 - b) Press the stylus in the "Job Name:" box to activate the keyboard, name the file.
 - c) Click "Next"
 - d) These settings should be self-explanatory and previously set.
 - e) Enter the occupy point coordinates.
 - f) Click "Finish"

The screen now changes to display the various menu options in the upper half – the menu functions in the lower half, and scroll keys in the bottom right. The File, Job, and Survey menu keys will be used, none other.

- 3) Make sure the correct instrument is selected.
 - a) Click on the small total station at the bottom of the screen and click on the appropriate instrument. [The TCR407 is the Leica. The TS305 is the Trimble.]

Continue setting up the instrument – two options, use a north sight to set the north angle or use two known coordinates to orient the station in space.

-  This is the OK button. This button will complete the task of the current screen once the appropriate data is entered.
-  This is the Close button and is used to close the current screen
-  This is the Cancel button. This will close the current screen before the routine is finished.

- 4a) Orienting the Total Station using a North Point
- a) Click on the “Survey” menu button in the top half of the screen.
 - b) Click on “Backsight Setup” in the lower half of the screen.
 - c) Click the drop-down menu for Occupy Point, select “Choose from List”
 - d) Click on Point 1 and click on the OK button (see above).
 - e) Enter the instrument height in the HI: box (measure from the ground to the cross-hairs or depression on the total station representing the height of the laser).
 - f) Enter the rod height in the HR: box (read from prism rod).
 - g) Enter backsight direction in BS Direction: box (set to zero if using a north sight).
 - h) Click the “Solve” button. [hint: follow the red buttons]
 - i) Click “Send Circle” – this tells the total station to set its internal compass to zero.
 - j) Click “By Angle”
 - k) Click the OK button.

You can now start surveying, move to step 5.

- 4b) Orienting the Total Station using two known points.
- While the station occupy point has been set, you must first tell the machine the second point before proceeding.
- a) Click the “Job” menu button in the top half of the screen.
 - b) Click “Edit Points”
 - c) Click the “Insert” button.
 - d) Enter the following:
 - Point Name: 2
 - Description: What point is this (Datum B, Temp Benchmark, etc.)
 - Layer: Points
 - e) Click on “Location” button
 - f) Enter the coordinates and press the ok button.
 - g) Don’t be startled by the shutter sound.
 - h) Click the close button (green circle with a “x” inside it).
 - i) Click on the “Survey” menu button in the top half of the screen.
 - j) Click on “Backsight Setup” in the lower half of the screen.
 - k) Click the drop-down menu for Occupy Point, select “Choose from List”
 - l) Click on Point 1 and click on the OK button (see above).
 - m) Enter the instrument height in the HI: box (measure from the ground to the cross-hairs or depression on the total station representing the height of the laser).
 - n) Enter the rod height in the HR: box (read from prism rod).
 - o) Click on “BS Direction:” button to toggle to “BS Point”.
 - p) Click drop-down menu and select “Choose from List”.
 - q) Highlight point 2 and click ok (green circle with checkmark).
 - r) Click the “Solve” button. [hint: follow the red buttons]
 - s) Click “Send Circle” – this tells the total station to set its internal compass to zero.
 - t) Click “By Direction”
 - u) Click the OK button.

The user can now start surveying. The first step is to check that your backsight is correct, this insures that you have set up the instrument correctly. So, as you begin surveying as described below, make your first shot (point two or three – the RECON automatically numbers points sequentially) the backsight.

- 5) Surveying – recording points
 - a) Click on the “Survey” menu button.
 - b) Click on “Traverse/Sideshot” in the bottom half of the screen.
 - c) In the “Description:” box, use the stylus to activate the box and enter a description for the point.
 - d) Click “Side Shot”
 - e) Click the ok button (green circle with checkmark).You have now recorded the point. You can move on to the next point.

When you are finished surveying, click the ok button and click on the “File” menu button. Then, in the bottom half of the screen, click on the P-T scroll buttons to activate new functions, and click “Exit”. Click “Yes” to finally exit.

Transferring Files from the Leica TCR 407 to a Computer

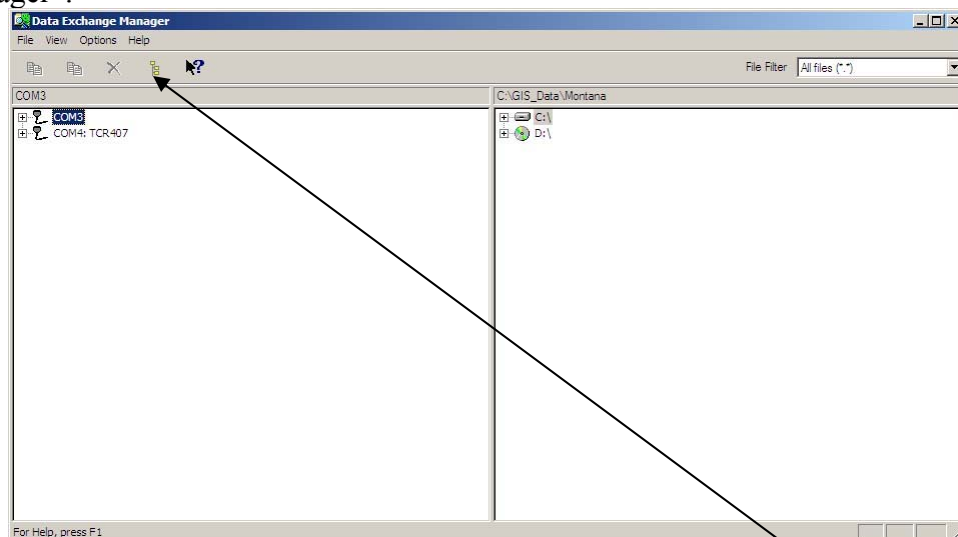
In the case that you use the Leica TCR407 without the Recon data logger, these instructions will show you how to transfer the files to a computer to use with computer mapping software such as ESRI's ArcGIS.

The first step is to install Leica Survey Office (available as a free download online or with the CD provided by Edward Tennant in 2007). Also, you will need to install the USB to Serial adaptor in order to allow the total station to communicate with the computer.

- 1) Turn on the TCR407 total station.
- 2) Connect the serial cable to the port underneath the screen, and the serial cable to the USB to Serial adaptor.



- 3) Start the Leica Survey Office on your computer, and then select “Data Exchange Manager”.



- 4) Connect the cable to a USB port – click the “Update Devices” button.

- 5) Double-click on the COM port that has TCR 407 following it – then double-click on the “Jobs” directory. This will open up more folders, each named for a single job file.
- 6) To transfer the file from the TCR 407, open on the measurements file and drag to a directory on your computer.

You have now transferred a universally-usable file from the total station to your computer. You can send these files to a computer mapping program such as ArcGIS.

Transferring Files from Recon to Computer




These instructions are geared towards using the Total Station data with a GIS software package such as ESRI's ArcGIS. There are other ways to download the data, but other formats (see below) are proprietary and will only work with purchased software packages. The CSV (comma-separated value) format can be imported and utilized by a variety of mapping applications.

- 1) Install Microsoft ActiveSync on your computer (re-start computer if prompted).
- 2) On Recon, start Trimble Survey Pro (it's the little total station icon under Start menu).
- 3) At the "Open a Recent Job" dialogue, open job to be transferred.

You will now be taken to a screen with several options, represented by menu keys in the upper half of the screen and specific functions in the bottom. Also, along the right-hand side of the bottom half are alphabetical numbers that allow you to select various functions.

First, you have to know how many points are in the file.

- a) Click on "Job" button to change the bottom half of the screen.
- b) Click on "Edit Points".
- c) Scroll to the bottom of the list and make a note of the number of records.
- d) Click the green 'x' button at the left-side of the bottom of the screen.

-  This is the OK button. This button will complete the task of the current screen once the appropriate data is entered.
-  This is the Close button and is used to close the current screen
-  This is the Cancel button. This will close the current screen before the routine is finished.

Return to the "File" Menu.

- 4) Under the "File" menu, select the "Export" function.
- 5) In the "Export" menu, click the circle next to "CSV (.CSV) File".
- 6) Click "Next" button.
- 7) Click the "To/From" button.
- 8) Enter the point range from above as thus; 1-## (where ## is the total number of points).
[hint: simply typing in the "Point Range" box will bring up a keypad to use]
- 9) Click anywhere in the screen to remove the keypad, and click on the OK button.
- 10) Click on the "Next" button.
- 11) Click on the "Next" button.
- 12) Click "Finish".

You are about to create the file, note the location, you will need to know this when you get ready to retrieve the files using your computer. The default save location is probably \Built-in Storage\Survey Pro Jobs\.

13) Click the OK button.

You are now ready to connect the Recon to your computer.

Once the unit is connect, a window will open requesting you to select what type of partnership you want, you should ALWAYS select “Guest Partnership”.

14) After selecting “Guest Partnership”, press “Next”.

15) Click the “Explore” button on the Microsoft ActiveSync window.

16) Double-click “My Windows Mobile-Based Device”.

17) Double-click “Built-in Storage”.

18) Double-click “Survey Pro Jobs”.

[hint: if the default save location above was different from these notes, make those changes in the above steps 16 – 18]

There may be many files here, so its important you remember the names of the files you have converted to CSV files. There should be three files with the name

19) Once you’ve selected the files to be transferred, copy them to your computer into whatever directory you’ve created.

You have now transferred a universally-usable file from the total station to your computer. You can send these files to a computer mapping program such as ArcGIS.