SECTION C-2: FLORIDA TRIMBLE® 5600 SERIES TOTAL STATION WITH TRIMBLE® TSC2 DATA COLLECTOR

The use of the Trimble® 5600 total station and the Trimble® TSC2 data collector can greatly improve the efficiency of collecting and processing survey data. Survey data can be electronically recorded and stored for downloading to a computer for processing. The survey data must be collected in a manner that is compatible with the software used for processing the data.

The following set of procedures describes how to survey with the Trimble ®5600 Total Station and the Trimble® TSC2 Data Collector. The following document only explains features that a NRCS field office will typically use when surveying. This procedure details the user on how to setup the data collector, Trimble® 5600 Total Station, and conduct a field survey. Please see Figures 1 and 2 for illustrations of the total station and the data collector.

Figure 1: Trimble 5600 Series Total Station	**Figure 2:** Trimble TSC2 Data Collector

A. INITIAL SETUP OF SURVEY STYLE IN TCS 2 DATA COLLECTOR FOR THE TRIMBLE® 5600 SURVEY EQUPMENT

NOTE: Once survey style is established it *will not* need to be reestablished unless the Trimble® TSC2 data collector memory is erased or the user is supplied with a new Trimble® TSC2 data collector. The survey style may be setup in the office.
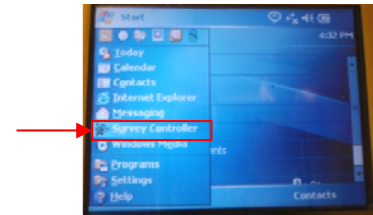
1. Turn on TSC2 data collector by pushing the green button ( ) on the lower left hand corner of the keypad.

2. From Windows Mobile Desktop main menu, select the **"Survey Controller"** icon. See Figure 3.

   Figure 3: "Survey Controller" icon.

3. From the six icons select **"Configuration"** > **"Survey styles"**.

4. *5600&3600* is the pre-defined survey style for the Trimble 5600 Series.

   a. If the survey style exists, ensure it is highlighted and select **"Esc."** Proceed to Section B

   b. If this survey style is not already in the drop list, follow Steps 5 – 13 to create the survey style.

5. At the bottom of the screen there will be three small buttons, select **"New"**.

6. Name the new survey style (e.g. **Trimble 5600**)

7. Select "**Conventional"** from the **style type** dropdown menu.

8. Select **"Accept"** > **"Instrument"**.

9. Fill out the resulting "Instrument" screen with the following parameters (see Figure 5):

   a. Manufacturer: "**Trimble"**

   b. Model: "**5600/3600"**

   c. Baud rate: "**9600"**

   d. Parity: "**None"**

   e. Measurement mode: "**STD"**

f. Averaged observations: **"10"**

g. Auto F1/F2: **box left blank**

h. Measure dist on face 2: **box checked**

i. Autolock off for offsets: **box checked**

j. Select $1^{/2}$ icon

k. Set backsight: "**Azimuth"**

l. Servo auto turn: **"HA & VA"**

m. Edit instrument precisions: **box left blank**

n. Centering error: **0.0000sft**

o. Offset & Stakeout directions: **"Automatic"**

p. Select **"Enter"** > **"Accept"**

Figure 5: Instrument Configuration Settings
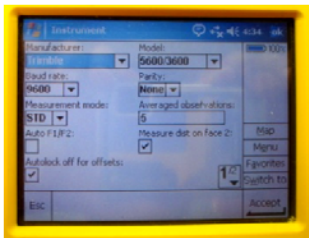
10. From the *new survey style* menu, select **"Topo point"**.

11. Set the following parameters on the instrument screen (see Figure 6):

    a. Measure display: **HA VA SD**

    b. Auto point step size: **1**

    c. View before storage: **box checked**

    d. Select **"Accept"**.

Figure 6: Topo point settings
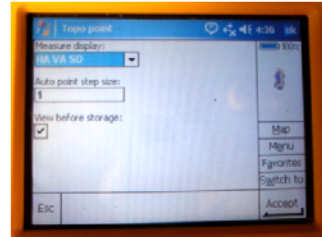
12. Select **"Store"** on the bottom of the screen. The survey style is now established.

13. When returned to the list of Survey Styles, ensure the newly created survey style is selected.

14. Select **"Esc"** > **"Exit"** to return to the main menu.

B. INITIAL TSC2 DATA COLLECTOR JOB SETUP (Perform for **each** job. May be **performed in the office**)

1. Select "⊕ **Survey Controller"** from the main menu.

2. Open **"Files"** > **"New Job"**.

3. Fill out the resulting screen as follows:

    a. Give name: Enter the name of the job (property and date)

    b. Under the "Properties" table, set the following options:

        •   Coordinate system: Click the box next to "Coordinate System to bring up a pop-up window. Select **"Scale Factor Only"** > **"Next"**

        •   Set the scale factor to **"0.999600000"** then click **"Store"**

        •   Units: **"US Survey Feet"**

        •   Linked Files: **"None"**

        •   Active Map: **"None"**

        •   Feature Library: *local office feature library*

NOTE: The feature table can be loaded onto the data collector in the office. Statewide feature table can be obtained from the Area Engineer or from the SO Engineering Section.

- Cogo Settings: **"Ground"**

- Use all the default settings for page 2.

c. Tap **"Enter"** > **"Accept"**.

NOTE: Use a surveyor's field book to make necessary notes to the field conditions such as time, project, crew members, temperature, and weather, etc.

C. INITIAL SURVEY EQUIPMENT SETUP

1. Set control point (#1) and set a second control point (#2) due north if possible. Distance between the two control points can vary.

    Figure 7: Side view of total station showing asterick.
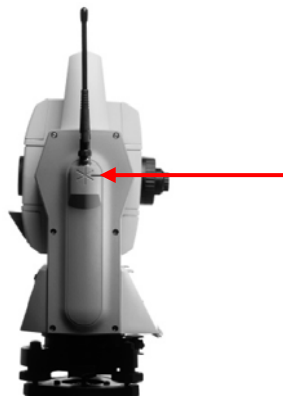
2. Set instrument over control point #1 and level it. Measure instrument height and record it in field book.

    Instrument height is measured from the control point to the asterisk mark (*) on the side of the instrument. See Figure 7.

3. Set rod with a prism on control point #2 by using a bi-pole holding the rod. Record the rod/prism height in field book**.**

D. SETTING UP FOR COLLECTING FIELD SURVEY DATA

1. Remove gray Geodimeter CU unit and attach yellow face plate. See Figure 8

    Figure 8: Remove Geodimeter CU unit
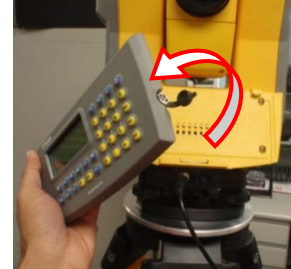
2. Slide 5600 battery onto battery adapter. See Figure 9.

    Figure 9: 5600 battery and adapter

3. **Connect** the appropriate wire from the battery adapter to the total station hook up. The total station should automatically power-up. See figure 10.

    Figure 10: Battery connection to Total Station

4. **Connect** a second wire from the adapter to the bottom of the TrimbleTSC2 Data Collector. See figure 11.

    Figure 11: Battery connection to TSC2 Data Collector

5. A leveling window will appear on the TSC2. Once the instrument is level, select **"Accept"**.

6. Instrument will automatically compensate.

7. A screen asking to confirm corrections will be displayed. Select **"Accept".**

8. Make sure the desired job opened. If correct job is selected proceed to Step 9, if not:

   a. Select **"Files"**

   b. Select **"Open job"**, or **"New job"** if you do not have a previously created job (see Section B of this procedure).

   c. Select the desired job, the names will be listed at the top of the screen.

9. Select **"Survey"** > **"5600 & 3600"** > **"Station setup"**.

   a. **"Accept"** corrections

   b. Give point name (ex. 1 or a)

   c. Code: CP for control point.

   d. Enter the instrument height.

   e. Northing: **5000**

   f. Easting: **5000**

   g. Enter the elevation.

      Note the elevation difference between bench mark and control point 1.

   h. Control point: **box checked**

   i. Select **"Accept"**.

   j. Name the backsight (ex. 2 or b)

   k. Code CP for control point.

l. Enter the rod height (measured in section C, step 3)

m. Method: **"Angles and Distance"**

n. Azimuth – **"0"** for due north.

   If not due north, put in the degrees to due north.

o. Select **"Enter"**

10. Select **"Measure"** > **"Store"**.

11. TSC2 will announce "station setup completed" upon completion.

12. Select **"Survey"** > **"Measure Topo"**

13. Enter point starting station number.

14. Continue taking shots until a turn is necessary.

E. COLLECTING FIELD SURVEY DATA

The following procedures explain the user how to use the equipment to survey.

1. Move the prism to the desired survey point location.

2. Tap **"Survey"** > **"Measure topo"**.

3. In the "Measure Topo" screen, enter the following information.

   a. Point name: **"1000"**

   b. Code: Use the appropriate alpha or numeric code. Tap **"Enter"**. See Appendix C-A for Florida NRCS numeric and alpha survey codes.

   c. Method: **"Angles and distance"**

   d. Target height: The height of the backsight should be correctly inputted every time the height of the backsight is adjusted.

4. Tap **"Measure" > "Store"**. The equipment will announce "observation stored".

5. Repeat steps 3 and 4 until all the shots have been taken for the given control point. Note

that the point name automatically increases in value after each shot.

6. If a Turn becomes necessary, continue to Section "F" before powering down the data collector.

F. MAKING A TURN

1. Once a turn becomes necessary set a new control point. Make sure control point has adequate vision to get the most out of the turn.

2. Setup a Prism over the new control point.

3. Take a shot. Code it (CP2) for the next control point. Record the number of the shot in field book.

4. Before performing the turn, end the survey by selecting **"Survey"** and then **"End conventional survey"**.

5. Shut down the Trimble 5600 total station and TSC2 data collector. Disconnect the TSC2 and 5600 from the battery adapter.

6. Move to and setup Trimble 5600 over control point #2.

7. Measure and record the height of instrument. Record in field book.

8. Set rod with bi-pod over the previous control point or instrument point. Measure the height of rod and record in field book.

9. Connect the battery to the 5600, allowing it to turn on.

10. Turn and aim towards last CP or the previous instrument point.

11. Reconnect the TSC2 data collector.

12. Go to **"Survey Controller"** > **"Survey"**.

13. Select the Survey Style for the Trimble 5600 total station.

14. Select **"Station Setup"**, the TSC2 will connect to the total station.

15. Enter local corrections and tap **"Accept"**.

16. Enter the instrument information by selecting the arrow next to the **"Instrument point name"** field and selecting the desired point name/code (CP#2).

17. Northing, easting, and elevation will populate. The HA at this time should be set to Zero (0°00'00")

18. Enter the height of instrument (recorded in field book).

19. Select **"Enter"** > **"Accept"**.

20. Enter the Control Point information by selecting the arrow next to the **"Back sight point name"** field and selecting the desired point name/code (CP#1).

21. This will automatically populate the field according to the chosen point.

22. Select **"Enter"**.

23. Select **"Measure"** > **"Store"**.

24. Select the **"Survey"** icon.

25. Select **"Measure Topo"** and change the point name to 2000 side shots.

26. Refer to the backsight if visible.

27. Continue with survey. See Section "G. COLLECTING SURVEY DATA" Steps 3-4.

G. WHEN FINISHED SURVEYING

1. Select **"Esc"** button.

2. Select **"Survey"** > **"End conventional survey"** > **"Exit"**.

3. Shut down TSC2 data collector and Trimble 5600 total station. Disassemble each to the condition needed for transport/storage.

4. For a procedure on how to import the TSC2 job file to your computer for use with AutoCAD refer to Section D, Sub-Section B.