



TRACY

Software Manual

Version 1.0


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PREFACE

Thank you for purchasing this JAVAD GNSS product. The materials available in this software manual (the “Manual”) have been prepared by JAVAD GNSS for owners of JAVAD GNSS products. It is designed to assist owners with the operating of the Tracy Software and its use is subject to these terms and conditions (the “Terms and Conditions”).

Note: Please read these Terms and Conditions carefully.

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USE – JAVAD GNSS products are designed to be used by a professional. The user is expected to have a good knowledge and understanding of the user and safety instructions before operating, inspecting or adjusting. Always wear the required protectors (safety shoes, helmet, etc.) when operating the receiver.

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About this Manual

This guide explains how to install, set up, and use the Tracy software. For best performance of this software, please read all of the instructions carefully. They were especially designed to help you correctly install and operate this program. This guide assumes that you are familiar with GPS and also have some knowledge of working with JAVAD GNSS receivers.

Symbols and Typographic Conventions

This guide uses the following text conventions:

Example	Description.
<i>Port</i>	Titles of dialog windows/boxes, names of menu options.

Screen Captures

This guide includes sample screen captures. Your actual screen can look slightly different from the sample screen due to the receiver you have connected, operating system used and settings you have specified. This is normal and not a cause for concern.

Technical Support

Occasionally, Tracy users encounter problems during installation or use of the program. Should you have any problems with Tracy Software, please contact JAVAD GNSS Support (support@javad.com).

Preface

Technical Support
Screen Captures

TRACY SOFTWARE

1.1. Tracy purposes and functions

Tracy is a Windows CE application for survey in differential modes and field control navigation receivers developed and manufactured by the JAVAD GNSS company.

The most current version of Tracy provides the following functions:

- Connects a Controller to a JAVAD GNSS receiver via Bluetooth or the serial port.
- Configure JAVAD GNSS receivers to work in differential mode getting corrections with
 - UHF radio,
 - GSM radio,
 - NTRIP/RCV servers via Internet with receiver GPRS.
- Collect (survey) points into receiver job file and/or to receiver memory file.
- Organize data with job files.
- Stakeout design points.
- Work in state grid systems and in local systems.
- Export and import data to/from different file formats.
- Keeps track status of receiver and all its components.

For operation it is recommended to use JAVAD Victor, an ultra-rugged Windows Mobile controller with an ample amount of processing power and memory for most field applications.

1.2. Setting up Tracy

1.2.1. Controller and System requirements

- Controller JAVAD Victor for Windows CE;
- About 20MB free memory for software installation and 16 MB for operation.

1.2.2. Installing Tracy

To perform the installation, use Microsoft ActiveSync on a computer with any supporting Windows operating system and a connection between the computer and the controller receiving the software download. Distribution of the Tracy or Windows CE application is performed by `Tracy_pcsetup.exe` file.

Establishing connection between PC and controller

For PC with Microsoft Vista operation system:

To establish connection between the PC and the handheld device receiving the software download, start *Windows Mobile Device Center* (WMDC) application. If you have not WMDC, install it downloading it free from the Microsoft® website: <http://www.microsoft.com/windowsmobile/devicecenter.mspx>

For PC with Microsoft Windows operation system:

To establish connection between the PC and the handheld device receiving the software download, start Microsoft ActiveSync application. If you have not WMDC install it downloading it free from the Microsoft® website: <http://www.microsoft.com/download/activesync>.

After the installation is over, ActiveSync is ready to be run.

Follow the next steps to install Tracy:

1. Turn on controller and make sure, that the COM-port #1 is used for PC connection.
2. Connect controller and PC with appropriate cable for data synchronization. Plug in the cable to the handheld socket at its bottom and other end of the cable to a serial port on your computer or to an USB port on your computer. USB connection is much faster that's why it's recommended to use USB connection. The serial port connection is required only if you computer doesn't have USB port.
3. At the PC, activate MS ActiveSync and click on File and Get Connected. The software will start searching for any device connected to USB and serial communication ports.

4. MS ActiveSync Software starts finding connected device. Failing this select *Get Connected* from *File* menu item and try to connect. Check also PC connection parameters in *Connection Settings* window of *File* menu item, select *Allow USB connection* with this desktop computer check box and click *Ok* button.
5. A message “Connecting To: USB Device” appears on your handheld screen. Soon after connection the message disappears and you can see connection icon in bottom of your handheld screen.
6. If the connection has been a success, the PC-side of ActiveSync will turn green and you will be prompted to make partnerships with your device. Choose *Yes* radio button to make partnership controller to PC. click *Next* button. Check off all check marks at the next dialog to synchronize nothing.
7. Press *Next* to finalize the partnership.

Note: This step will request only once, at next connections your PC will recognize your controller automatically.

8. The step has to finish with connection of your PC to your controller via USB cable and ActiveSync has to show green circle at task bar as indicator.
9. Now you are ready to install Tracy onto your controller. You can download the executable from the downloads page of the JAVAD GNSS website. Run the executable `Tracy_pcsetup.exe` on your PC (after it has been connected to your device) and wait

while all the required files are being copied to the device's memory (main memory or CF Card) (Figure 1-1).

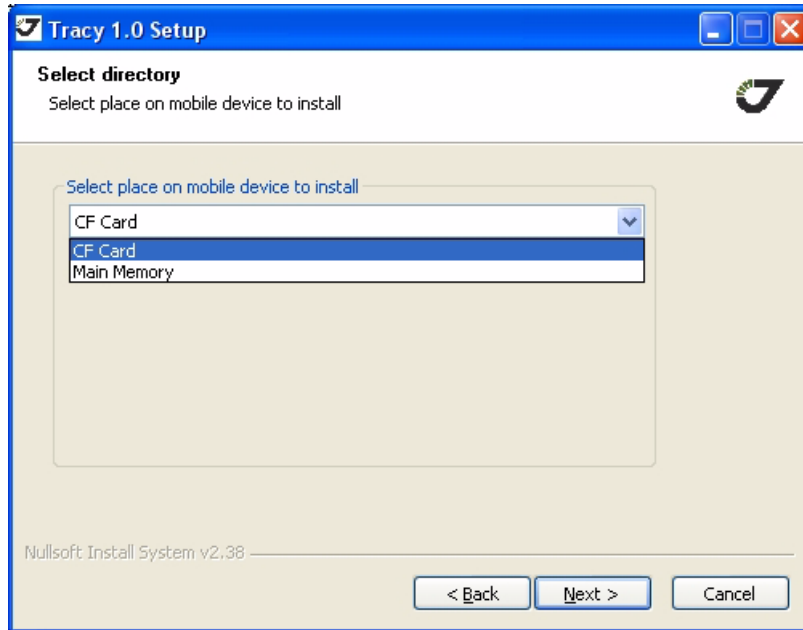


Figure 1-1. Tracy Setup window

To continue installation click *Next*, to abort click *Cancel*.

10. Choose components you want to install and click *Install* (Figure 1-2):

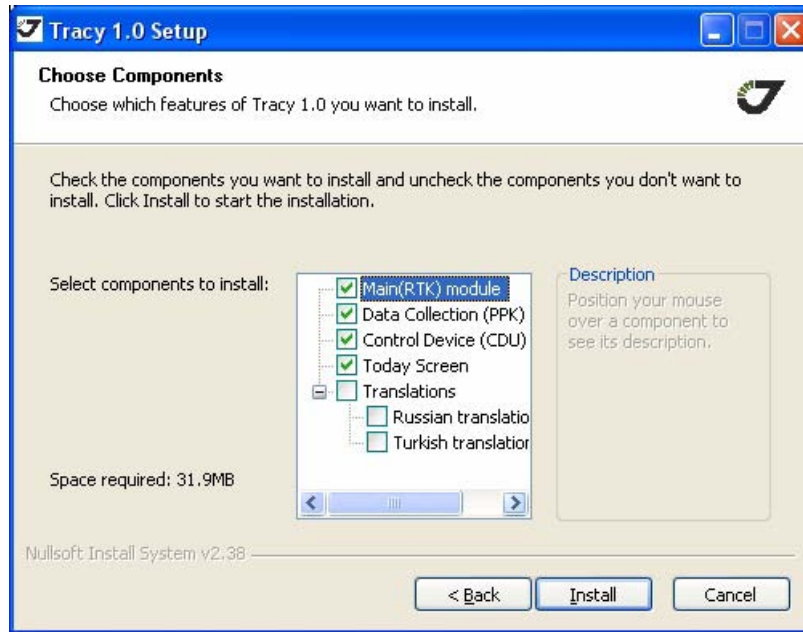


Figure 1-2. Choose device

11. Tracy Software icon(s) appears on the controller's screen. To start Tracy, double click on the corresponding icon.

1.2.3. Uninstalling Tracy

To uninstall Tracy connect your mobile device to your PC and select Uninstall item from Tracy group of Program Files at your PC (or just delete Tracy_RTK, Tracy_CDU and Tracy_PPK folders manually at your mobile device. Your data remain in "Tracy_RTK Data", "Tracy_PPK Data", "Tracy_CDU Data".

1.3. Getting Started

1.3.1. Starting and Registering

Tracy has special start screen (Figure 1-3), that allows user to select the application needed for current survey mode: Control Device (CDU), RTK Survey (RTK), or Post-processing Survey (PPK). Click the appropriate item to start the application.



Figure 1-3. Today Screen

When first starting Tracy software one needs to register the product. Type the corresponding registration code provided with the installation and click the *Register* button (Figure 1-4). To run the program in Demo mode, click the *Demo Mode* button.

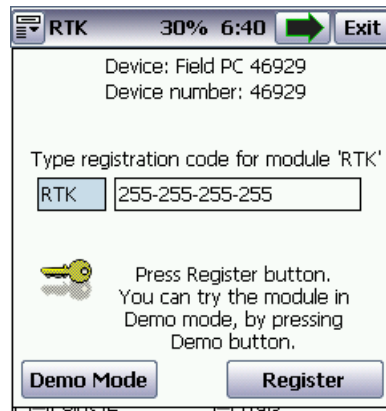


Figure 1-4. Registration

1.3.2. Communication parameters

Tracy tries to connect to recent connected receiver automatically. For the first time or/and if the connection between the controller and device is not established, check the communication parameters.



Click the  *Config* button and open the *Connect* tab (Figure 1-5):




Figure 1-5. Connection tab

See “Connection Tab” on page 73 for detailed description.

1.3.3. Closing Tracy



To disconnect from the receiver, click the JAVAD GNSS label  .

To quit Tracy, click *Exit* button top-right corner or select the *Exit* menu item from top-left corner button  .

If the receiver has not been disconnected by the time the program is turning off, the connection will be automatically broken before Tracy is closed.

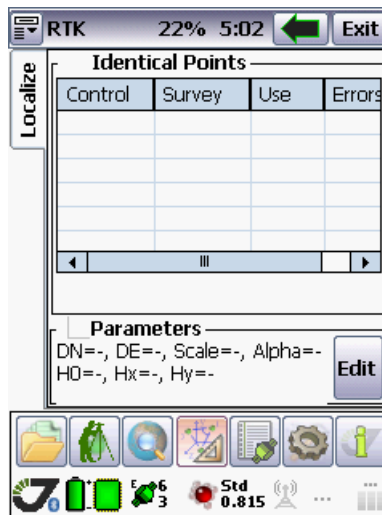
Note: It is recommended to close the connection with the receiver and close Tracy prior to switching the receiver OFF and disconnecting the cable.

1.4. Lite and extended view

The Tracy Software has two view mode: lite and extended. The mode can be switched with the top-left corner button  menu, or with the View button  (Figure 1-6).



Lite view



Extended view

Figure 1-6. Lite and Extended view

LITE VIEW

This chapter guides you through a basic real-time kinematic (RTK) field survey using the Tracy RTK Lite view. The lite view is designed for simple and easy survey. For advanced users and tasks extended view is assigned.

2.1. Main window

When the user start the Tracy RTK it opens the lite view main widow (Figure 2-1):



Figure 2-1. Lite view main window

Tracy RTK tries to connect to recent receiver automatically. If the connection between the controller and device is not established, check the communication parameters: click the connection button (Figure 2-3).



Figure 2-2. Connection menu

- Select the *Serial port (COM1)* for RS232 connection, or
- *Search Bluetooth Receiver...* for establishing Bluetooth connection.

When connection is established the main window looks like in Figure 2-3:



Figure 2-3. Connection parameters menu

After start survey select the receiver mode, click the middle button:






- If *Standalone* mode is selected receiver turns off radio communication, doesn't use corrections and doesn't produce differential solutions. You have to collect information to receiver file and make post-processing to produce precise coordinates in the mode. About surveying in this mode see "Standalone mode" on page 26.

- *RTK Base* mode means the receiver is set up to transmit differential correction via radio. Base station is a receiver set up on a known location and intended to transmit data for rover receivers running in differential mode. About surveying in this mode see “RTK Base” on page 28.
- *RTK Rover* mode means the receiver is set up to receive differential correction from a RTK base receiver via radio or Internet NTRIP. Rover receiver produces precise position each time even at its moving. With rover receiver you can collect these solutions to job files and to receiver memory. About surveying in this mode see “RTK Rover” on page 32.

To start survey click the *Record* button.

Status of receiver is shown with the following symbols:

When the parameter is normal it displays with green symbol. Otherwise (battery is discharged, not enough memory for data saving, etc.) it will be yellow, then red.

	<p>Battery status</p>
	<p>Satellites status: GPS - number of GPS satellites GLNS - number of GLONASS satellites The letter I means the Internal antenna is used The letter E means the External antenna is used</p>
	<p>Solution type and precision RMS values of the horizontal coordinates Dilution of Precision (PDOP)</p>


2.2. Standalone mode

In this mode (the screen is depicted in Figure 2-1 on page 23) the user can survey points and trajectory and record the data into receiver and/or controller memory. To start surveying click the Record button, the menu appears (Figure 2-4):



Figure 2-4. Record parameters menu

- By clicking *Start Record* menu item receiver start to record logfile. After clicking the *Start Record* button changes its name to *Stop Record*. To set the logfile name type it under button.
- 1, 2, 3, 5, 10, 15 sec is the logfile record rate.

To survey point click the *Point* button  ; with the neighbor button set the logging time (Figure 2-5):

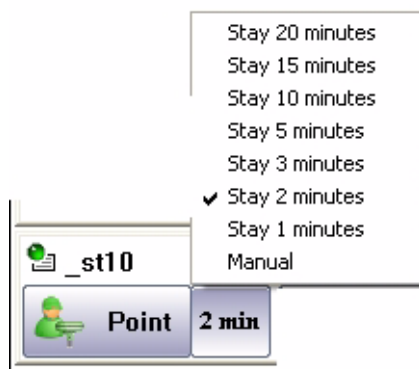


Figure 2-5. Logging time setup

When the point survey starts the progress bar appears (Figure 2-6):



Figure 2-6. Point surveying in progress

To start surveying a new point click the *Point* button.

To survey trajectory click the *Trajectory* button . When the trajectory survey starts the progress bar appears (Figure 2-7):



Figure 2-7. Trajectory surveying in progress

To stop file recording click the record button and click *Stop Record* menu item.

2.3. RTK Base

This mode allows the user to use the receiver as base, i.e. allows the user to set receiver to transmit differential corrections via radio modem. To set up the base receiver navigate through three tabs at the bottom of window (Figure 2-8):



Figure 2-8. RTK Base mode screen

2.3.1. Base coordinates Tab

In this tab (Figure 2-9) the user can set the antenna height and type of measuring antenna height, coordinate source and base position.

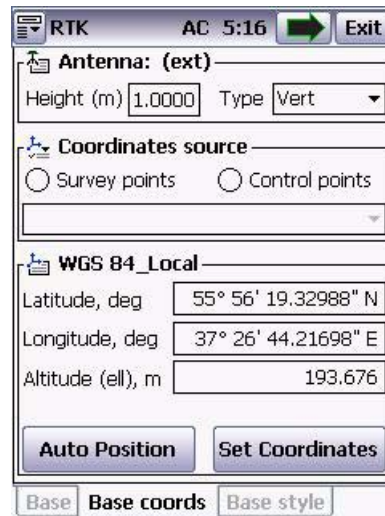


Figure 2-9. Base coordinates tab

Key in the antenna height and select the type of antenna height measuring.

Select the coordinates source with the radio buttons, and choose the surveyed point from the drop-down list box(Figure 2-10):

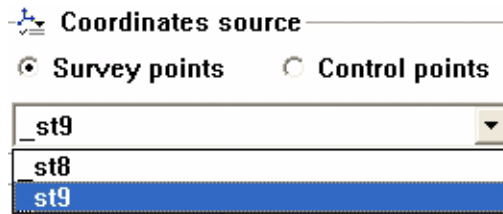


Figure 2-10. Coordinates source

Working with local coordinates only, define the Base point by pressing the *Auto Position* button (the coordinates of the current point will appear) or type in the coordinates of the base location (*Set coordinates* button).

For correct work of base RTK Base receiver should have its precise position in WGS84 coordinate system. Using Tracy the base position can be set in any coordinate system (Tracy will recompute the coordinate to WGS84 coordinates). You can type the position coordinates manually or select them from a control point or from previously surveyed point.

Locate the base station where there is a clear and uninterrupted view of the sky, for example on top of a hill or building. You should be able to see the sky all around at an elevation angle of 15° above the horizon.

The WGS-84 coordinates for the base station should be known. Every 10 m error in these coordinates can cause an error of 1 ppm in the length of the RTK baseline. Define the coordinates in one of the following ways (the most accurate methods are listed first):

- Key in published WGS-84 coordinates (Figure 2-11).



Figure 2-11. Coordinates Input

- Key in WGS-84 coordinates derived from a previous control survey.
- Key in known grid coordinates, if a projection and datum transformation are known.
- Key in local geodetic coordinates, if a datum transformation is known.
- Record GNSS data at the base station over a number of hours. Use the JAVAD GNSS Justin software to postprocessing the data as a point position. This yields approximate WGS-84 coordinates. Key in or upload these WGS-84 coordinates to the Tracy.

Also it is possible to set an autonomous receiver position as a base position, and using localization on rover side to attach the data to a state system. (The user has to survey some control points and attach them with real control point coordinates in localization to make localization parameters to recomputed rover coordinates.)

Use the *Auto position* button to obtain the current approximate (autonomous) position calculated by the receiver. This position can be in error by up to 100 m, so you should perform a calibration to reduce the effect of this process.

2.3.2. Base style Tab

In this tab (Figure 2-12) the user can set the receiver style, selecting it from the drop-down list box.

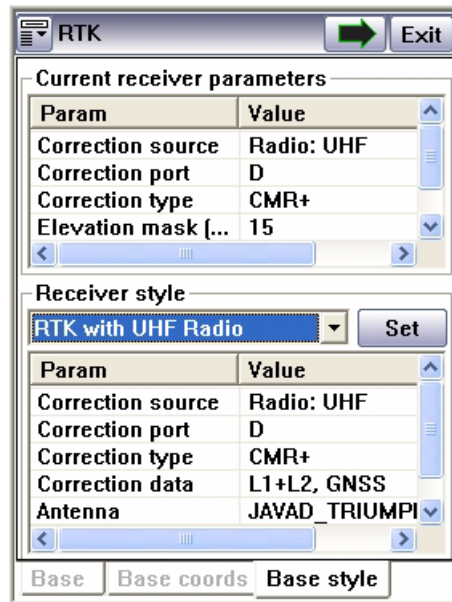


Figure 2-12. Base style tab



Figure 2-13. Receiver style drop-down list box

To add and/or edit the receiver style it is necessary to switch to extended mode. See detailed information about styles in “Receiver Tab” on page 75 and “Receiver style wizard” on page 76.

The base receiver is set up and starts sending corrections. The middle button at the main window (*Base* tab) looks like this:



To start data logging from the base into receiver memory click the *Record* button. See more detailed description on page 26.

2.4. RTK Rover

When is the RTK Rover mode selected the screen looks like in Figure 2-14:



Figure 2-14. RTK Rover screen

To survey the point click the *Point* button. Set the additional parameters clicking the neighbor button (Figure 2-15):

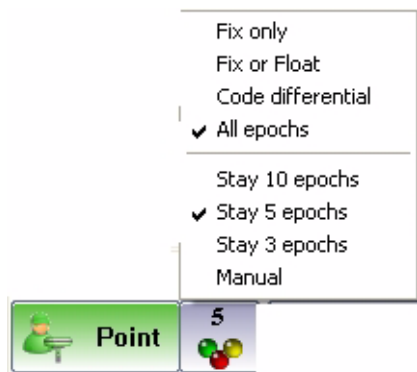


Figure 2-15. Point survey parameters

- Determination of acceptable epochs' features: solution type
- Logging time

To survey the trajectory click the *Trajectory* button. Set the additional parameters clicking the neighbor button (Figure 2-16):

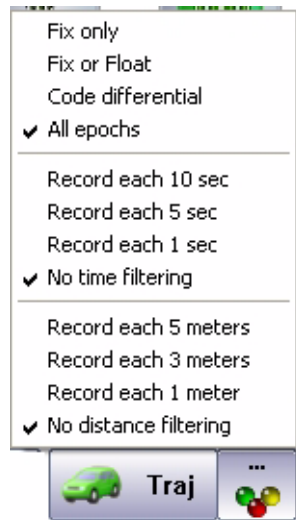


Figure 2-16. Trajectory survey parameters

- Determination of acceptable epochs' features: solution type
- Logging time
- Record interval

2.4.1. Rover style Tab

In this tab the user can set the receiver style, selecting it from the drop-down list box (Figure 2-17)

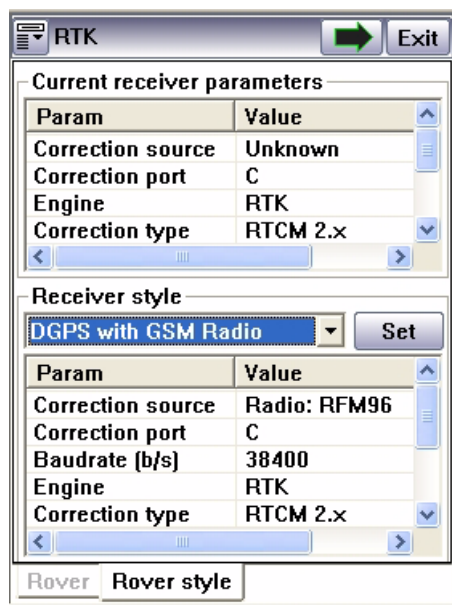


Figure 2-17. Rover style tab

Select the desired rover receiver style from the list (Figure 2-18):



Figure 2-18. Receiver style drop-down list box

To add and/or edit the receiver style it is necessary to switch to extended mode. See detailed information about styles in “Receiver Tab” on page 75 and “Receiver style wizard” on page 76.

To start data logging click the record button. Click the *Point* button to survey points, *Trajectory* button to survey trajectory. To turn off rover mode, select *Standalone* mode.

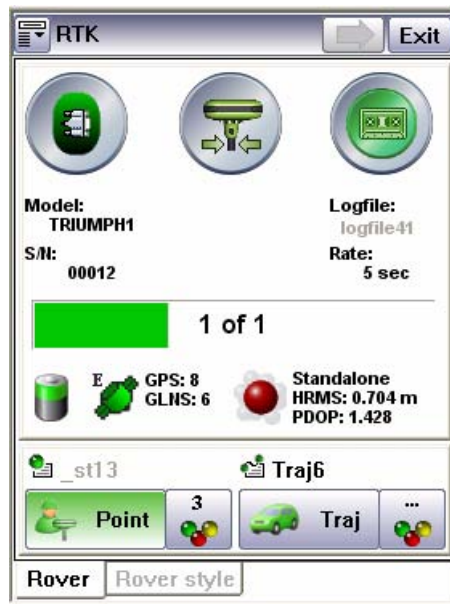



Figure 2-19. Data is logging



JOB PARAMETERS BUTTON

The  Job parameters button opens the window with three tabs: *Job*, *CS*, *Catalog*.

3.1. Job Tab

After Tracy RTK start, choose the job for operation: any existing job or a new job (Figure 3-1).

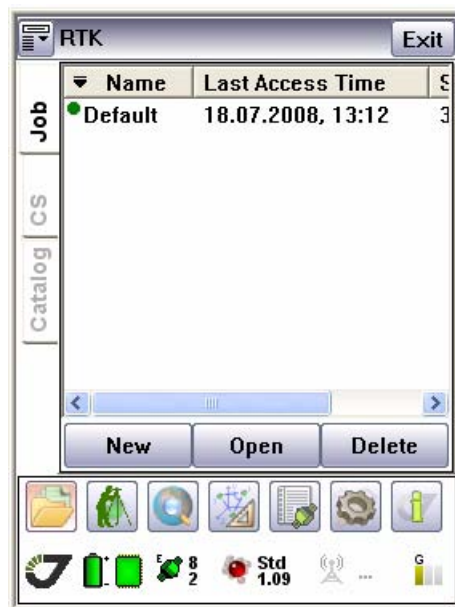


Figure 3-1. Job tab

All data related to one survey, project or single survey day are organized at controller in single place and called the Job. Job file includes surveyed points and trajectories, points to be staked out, user and local coordinate system parameters, attributes and so on.

Some information such equipment configuration styles, predefined coordinate systems, antennas parameters and other can be used by any job and is job-independent.

To create a new document, press a *New* button. In the Create new job screen select the type of a new job to be created (Figure 3-2):



Figure 3-2. New job screen

Select the job *Name*, add the corresponding information in the *Info* edit boxes and press the *Create* button. The new job will be created and activated. The previous open job (if it was) will be saved and closed.

To open the previous job highlight it from the list and click the *Open* button.

3.2. CS Tab

Select Coordinate System in the *CS (Coordinate System)* tab (Figure 3-3).

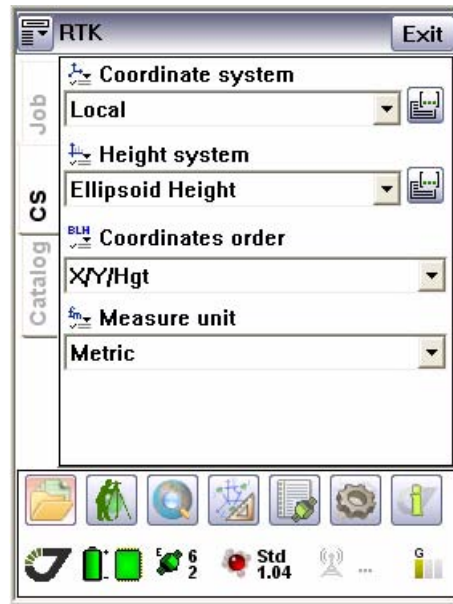


Figure 3-3. CS tab

Choose the type of Coordinate System and the coordinate system. Specify the height system, coordinates order and measure unit. You may select from a list of frequently used, previously selected coordinate systems.

3.3. Catalog Tab

In the *Catalog* tab (Figure 3-4) the user can create catalog of control points.

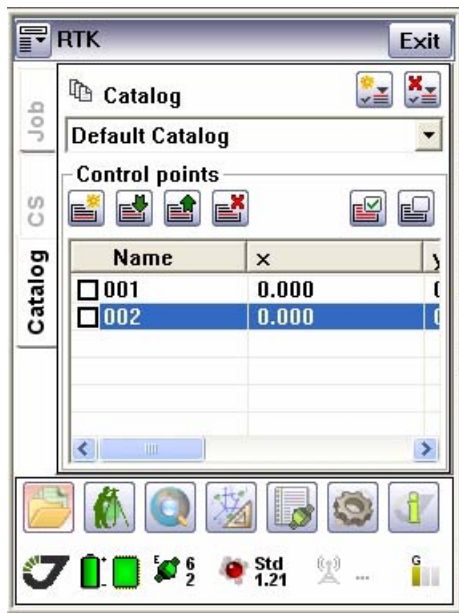








Figure 3-4. Catalog tab

Catalogs allow the user to share control points between jobs without typing them each time after a new job creation (or without importing them from a file). To operate with the control points use the following buttons:

	Add new point with the <i>Add new point wizard</i>
	Edit the point with the <i>Add new point wizard</i>
	Delete the point
	Import and Export of selected point
	Select/Deselect all points at once

To create new catalog click the  (*Create new catalog*) button. The *New catalog* screen appears:

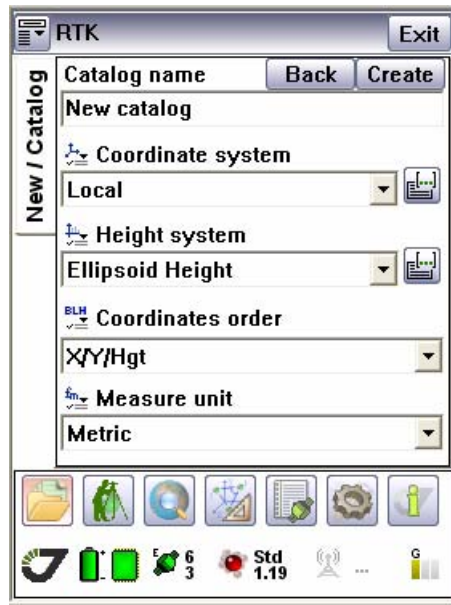


Figure 3-5. New catalog screen

Specify the catalog name, coordinate system, height system parameters, coordinates order and measure unit.

Click *Create* button to create new catalog.


To quit this window click *Back*.

Job Parameters Button

Catalog Tab



SURVEY PARAMETERS BUTTON

Survey Parameters button  opens the window with three tabs: *Survey*, *Start Base* and *Stakeout*.

4.1. Survey Tab

Survey tab (Figure 4-1) allows the user to apply receiver style to the receiver, selecting it from the list (about receiver styles see “Receiver Tab” on page 75):



Figure 4-1. Survey tab

If the *Write to receiver file* check box is selected the logfile will save in the receiver memory. Type in the logfile name in the edit field below.

Survey Parameters Button

Survey Tab

Click the *Start* button to open the next window with surveying parameters. Click *Start* button to setup receiver as rover with selected style settings. If *Apply receiver style* check mark is not selected, no settings will be save in the receiver.

After clicking the *Start* button the next window appears (Figure 4-2 on page 44).

In the type drop-down list box select point to survey a point, or trajectory for trajectory surveying (Figure 4-2):

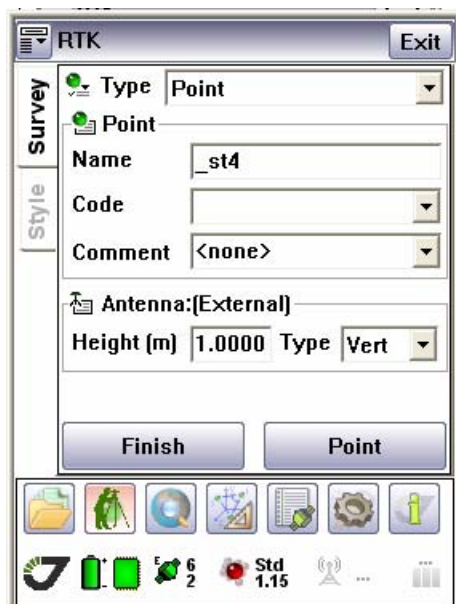


Figure 4-2. Survey tab. Point

- Insert point name in the *Name* field, code and comments.
- Insert the antenna height and type of antenna height measurement.

- Click the *Point* button to start point surveying. New window with the surveying information appears (Figure 4-3):



Figure 4-3. Point surveying

- To finish surveying this point click the *Finish* button.
- Click *Cancel* to stop surveying points.

If the trajectory is selected (Figure 4-4), make the same settings, as described above, and click the *Trajectory* button to start trajectory surveying:

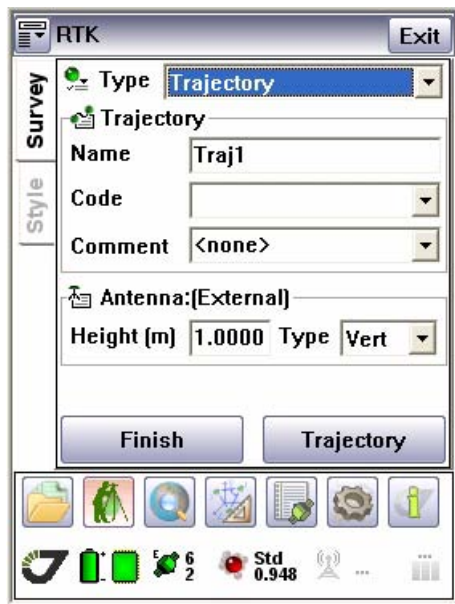


Figure 4-4. Survey tab. Trajectory

- To finish surveying this trajectory click the *Finish* button.
- Click *Cancel* to stop surveying trajectory.

4.2. Start Base Tab

Start Base Tab (Figure 4-5) allows the user to apply receiver as the base, selecting receiver style from the list (about receiver styles see “Receiver Tab” on page 75), and make settings for base receiver:

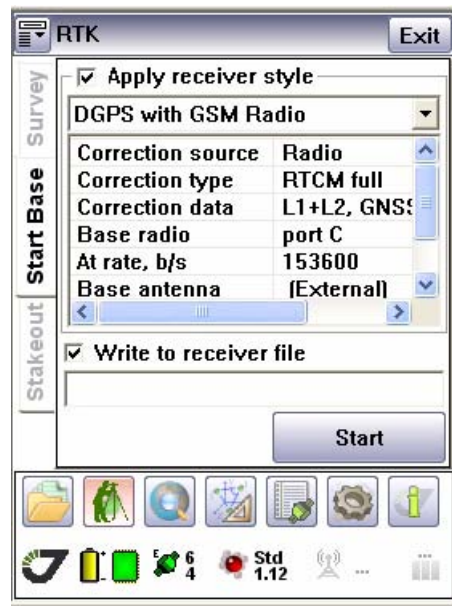



Figure 4-5. Start Base tab

If the *Write to receiver file* check box is selected the logfile will save in the receiver memory. Type in the logfile name in the edit field below.

Click *Start* button to specify the following parameters (Figure 4-6 on page 48):

- Select the point clicking the  and using the map or list of available points.
- Define the Base point as described in “Base coordinates Tab” on page 29.

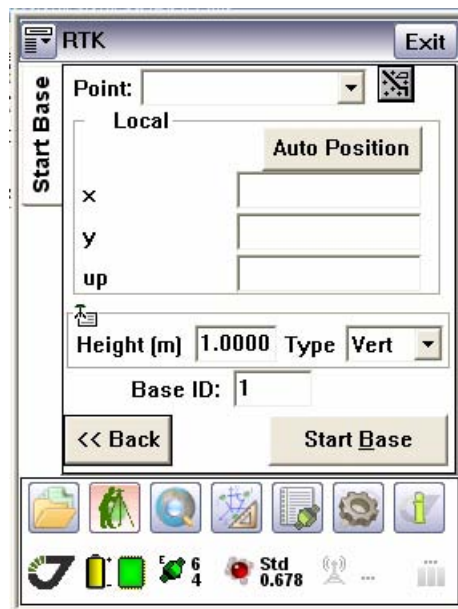


Figure 4-6. Start Base parameters setup

- Measure and insert the antenna height and type of height measuring in the corresponding fields. If the antenna has not been set up yet, click the <<Back button and specify the antenna parameters in the table.

Note: Measuring the height of the antenna is an important step in any survey. There will be serious consequences if it is not measured correctly.

- Set the base ID: you can identify the station ID of the base to avoid picking up inappropriate base corrections from the wrong base receiver.
- After you click the *Start Base* button, the information will be transmitted to the receiver.

4.3. Stakeout Tab

This section shows how to stake out a point. To do this, set up the base receiver (see page 3-5), then use the rover receiver to locate and stake out points. The *Stakeout* tab (Figure 4-7) allows the user to set up and use the rover receiver to locate and stake out points:



Figure 4-7. Stakeout tab

Always use a real-time survey for stakeout operations.



The Stakeout process consists of finding the points close enough to the necessary location.

Click the *Start* button. The following window appears (Figure 4-8):



Figure 4-8. Stakeout tab. Page 2

The top part of the view shows course toward target with arrow directed from the current point to target. The bottom part contains numeric information about distance to target, course towards target, the distance and direction along coordinate axes.

- Select the target point form list, from map or insert the ID manually.
- Choose the reference point or the reference azimuth. Select the order of staking points: by finding the closest to the current one or by incrementing of the point ID onto a known value.
- The coordinates of each next point for stakeout will be set through the *Next Point* button . To stop the process click the *Stop* button .
- To navigate using the arrow in the graphical display screen, move forwards with the TSC1 data collector held in front of you. The arrow points in the direction of the point to be staked out. Walk towards the point. When you are about three meters or 10 feet from the point, the display changes. Two concentric circles (resembling a bull's-eye) show the position of the point, and a cross shows your position.
- Use the information on stakeout screen for finding the target point. Press Save after the location is close enough to the design point. Press the *Next Point* button to proceed with stakeout.

In the *Style* Tab the user can set the parameters of the stakeout: elevation mask, survey conditions (Figure 4-9):

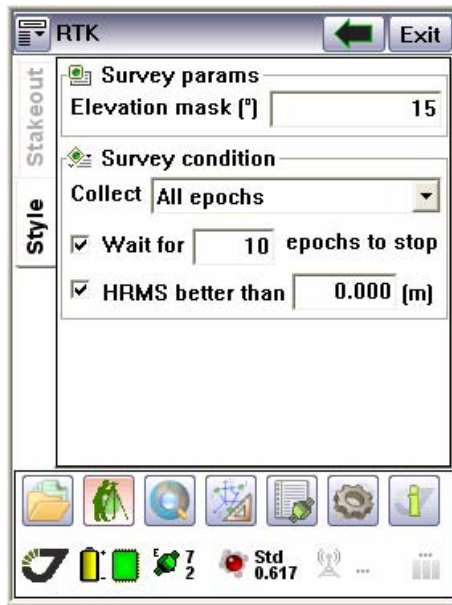


Figure 4-9. Style tab

Survey Parameters Button

Stakeout Tab



DATA BUTTON

The Data button  opens the window with three tabs: *Map*, *Data* and *Pos*.

5.1. Map Tab

This chapter describes the commands in the map screen available in the pull-down menus or at the command prompt. The map screen is useful for drawing, CoGo, creating points for stakeout, and for the import and export of DXF and shape files. No measurements are taken from the map screen (Figure 5-1)

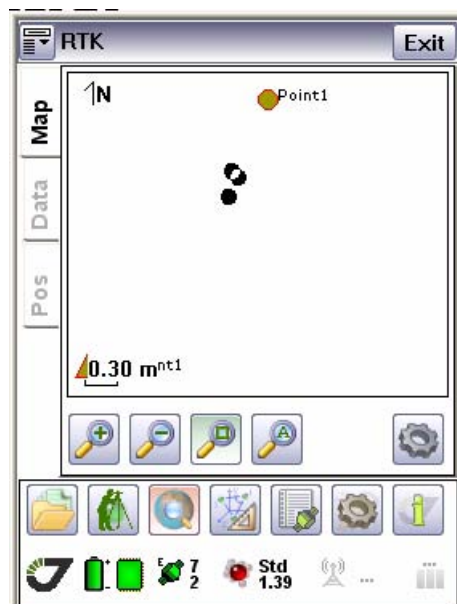








Figure 5-1. Map tab

5.1.1. Map view icons

	Zoom in: Zooms in 25%.
	Zoom out: Zooms out 25%
	Zoom window: Zooms into a rectangular area that you pick on the map screen.
	Zoom window
	Map settings: opens the window with map parameters (Figure 5-2).

The *Map settings* tab opens by clicking the  button. The user can set the color, sign of each point, show or hide the points.

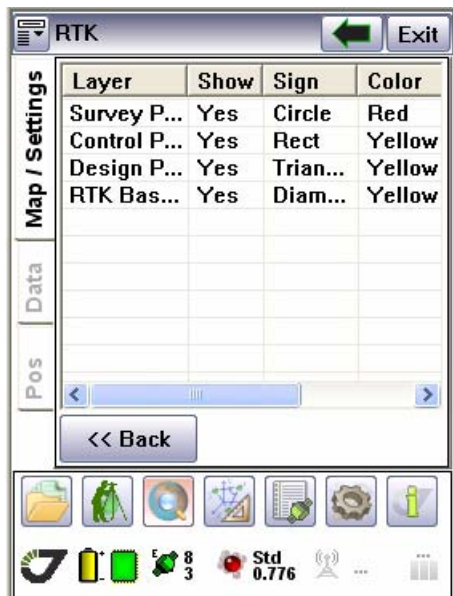


Figure 5-2. Map settings

5.2. Data Tab

The *Data* tab has information about points.

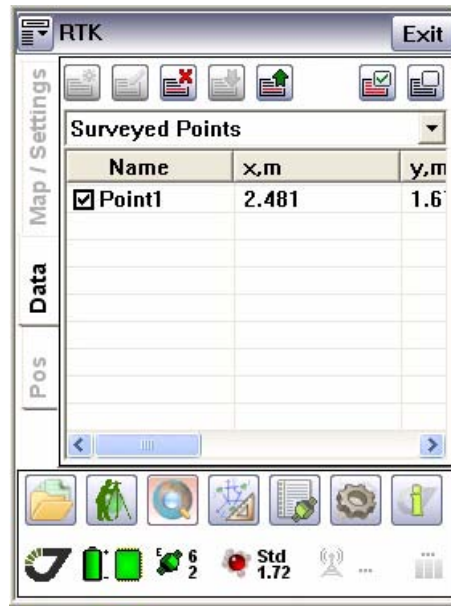


Figure 5-3. Data tab

The points group can be selected in the drop-down list box (Figure 5-4):



Figure 5-4. Points list

Surveyed points

When surveyed points are selected from the *Points* list box, the list of surveyed points will be shown (Figure 5-5):

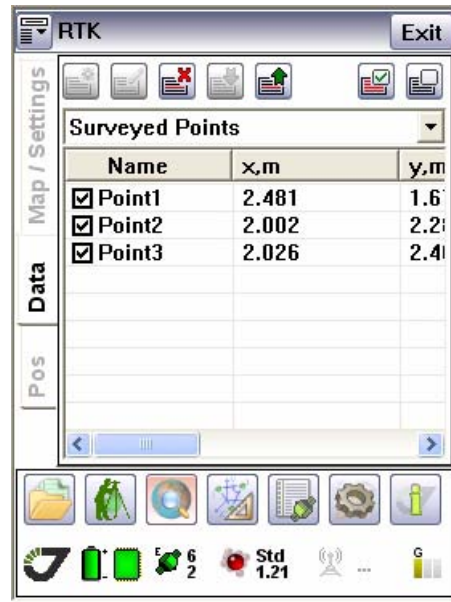


Figure 5-5. Surveyed points

Control points

The Control points screen contains a list of the associated points for the calculation of transformation parameters (Figure 5-6).

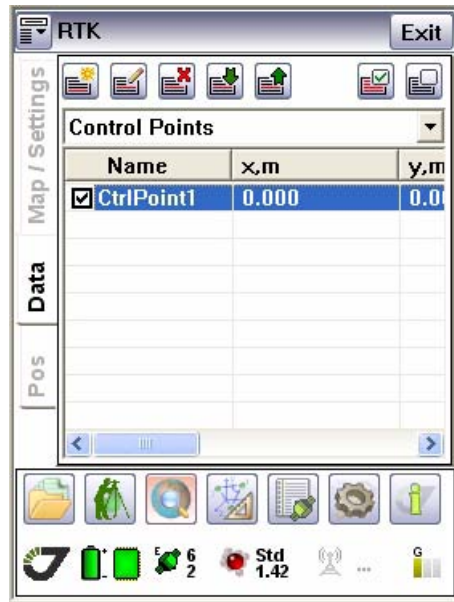



Figure 5-6. Control points

Data Button

Data Tab

Map view icons

When the screen is opened for the first time, it is empty. To add points to the list, click in the cell to edit it (Figure 5-7) or clicking the  (*Add point*) button. See “Add new control point wizard” on page 59 for detailed description.

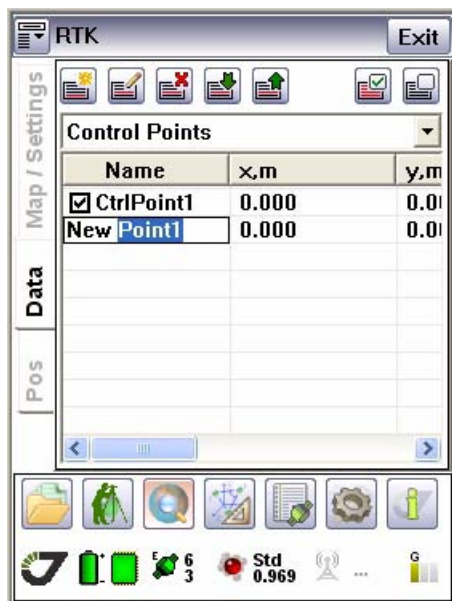







Figure 5-7. New control point

Use the buttons for the following operations:

	Add new point with the <i>Add new point wizard</i>
	Edit the point with the <i>Add new point wizard</i>
	Delete the point
	Import and Export of selected point
	Select/Deselect all points at once






Tracy directly supports reading and writing to CAD/GIS formats:

- ArcGIS .SHP Shape files
- MapInfo .MAP and .TAB file
- MicroStation .DGN files
- AutoCAD .DXF files
- Custom text files

Design points

Design points are the computed points to be staked out on ground. Their positions have been computed or drawn in a CAD/COGO software and imported to Tracy from a file. They are used to put road/metal/etc rods on ground to mark a place.


Use the buttons for the following operations:

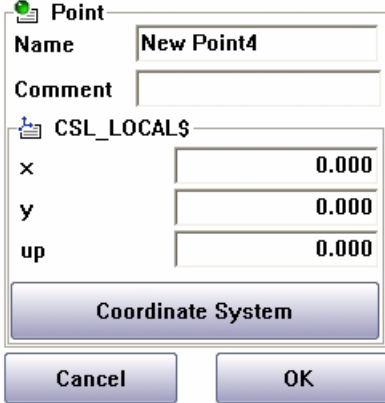
	Add new point with the <i>Add new point wizard</i>
	Edit the point with the <i>Add new point wizard</i>
	Delete the point
	Import and Export of selected point
	Select/Deselect all points at once

RTK Bases

The RTK Bases points are points with RTK Base coordinates. To create new point, edit or delete it use the buttons, described above.

5.2.1. Add new control point wizard

To add new control point click the  *Add point* button. In the first screen specify the new point name and add comment (Figure 5-8):



Point

Name

Comment

Coordinate System: CSL_LOCALS

x

y

up

Coordinate System

Cancel OK

Figure 5-8. Add new point wizard - Point parameters

Data Button

Data Tab

Add new control point wizard

Insert the parameters of the local coordinate system in the *CSL_LOCALS* field.

Specify the coordinate system clicking the *Coordinate System* button. The next screen will be shown (Figure 5-9):

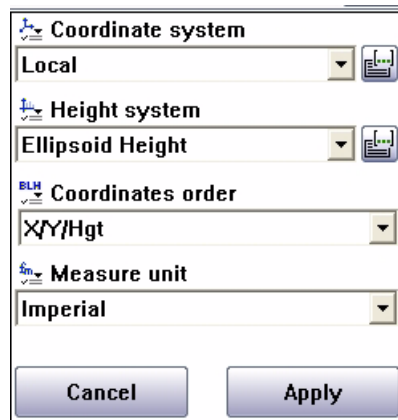


Figure 5-9. Add new point wizard - Coordinate system

Using the  (*Browse*) button specify the coordinate system selecting from the list the desired parameters (Figure 5-10). Click *Apply*.

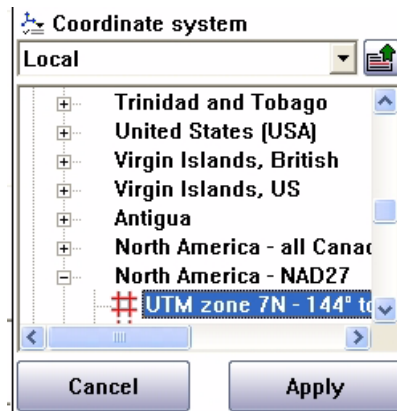



Figure 5-10. Coordinate system selection

Using the  (*Browse*) button specify the height system selecting from the list the desired parameters. Double click to set up.

Set the coordinates order and measure unit using the appropriate list boxes (see Figure 5-9 on page 60). Click *Apply* to apply the specified parameters or *Cancel* to quit this window.

5.3. Pos Tab

In the *Pos* tab (Figure 5-11) is shown the current receiver position in WGS 84 coordinate system and in current coordinate system.

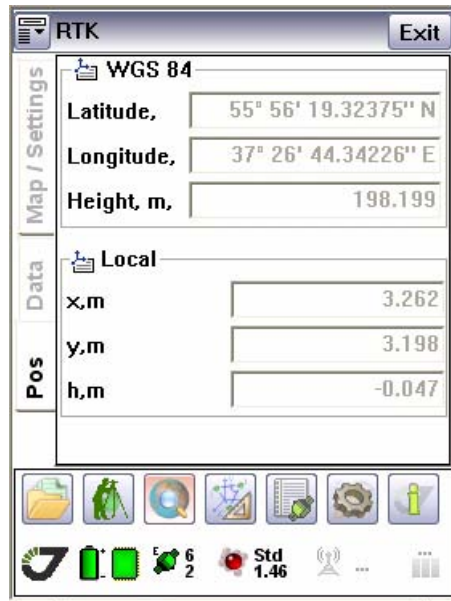


Figure 5-11. Pos tab


Data Button

Pos Tab

Add new control point wizard



STATUS BUTTON

Clicking the *Status* button  opens the window with four tabs (*Corrections*, *Logfiles*, *Sats*, and *SkyPlot*), which show satellites' status and corresponding information.

6.1. SkyPlot Tab

SkyPlot Tab (Figure 6-1) shows graphic representation of the satellite positions in the sky.

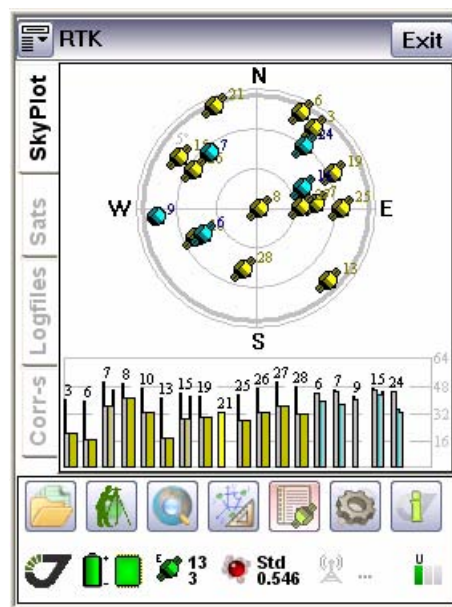


Figure 6-1. SkyPlot tab

Each concentric circle represents the elevation angle above the horizon. The outermost circle corresponds to 0 degrees above the horizon. The center of the sky plot represents 90 degrees above the horizon. The dotted circle shows the elevation mask angle.

A dynamically changing histogram shows the signal-to-noise ratio (C/N0) in the C/A channel. Each vertical bar has a unique color and designates a satellite's PRN (GPS and WAAS) or slot number (GLONASS).

6.2. Sats Tab

Sats Tab (Figure 6-2) shows the basic tracking information (parameters) for the locked satellites. These tracking parameters are described in table below.

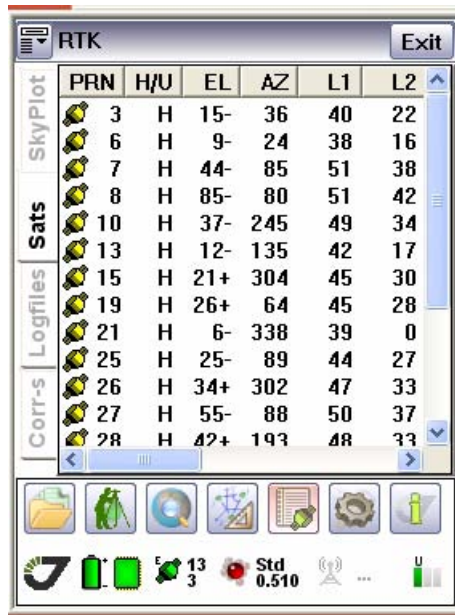


Figure 6-2. Sats tab

Table 6-1. Basic tracking information

Parameter	Description
PRN	GPS SV PRN and GLONASS SV Orbital Slot Number.
H/U	Healthy/Unhealthy
EL	Elevation angle in degrees.
AZ	Azimuth in degrees.
L1	L1 frequency.
L2	L2 frequency.

6.3. Logfiles Tab

If post-processing the data after completing a survey, the data in the receiver’s memory will need to be downloaded to a computer. Downloading and deleting files will also prepare the receiver’s memory for the next survey.

After completing a survey, download data files to a computer for storage, post-processing, or backup. Also, the receiver memory holds a finite amount of files and information, so downloading data prevents files from being lost.

Logfiles Tab (Figure 6-3) allows the user to delete log-files from the receiver memory, or download them onto your computer.

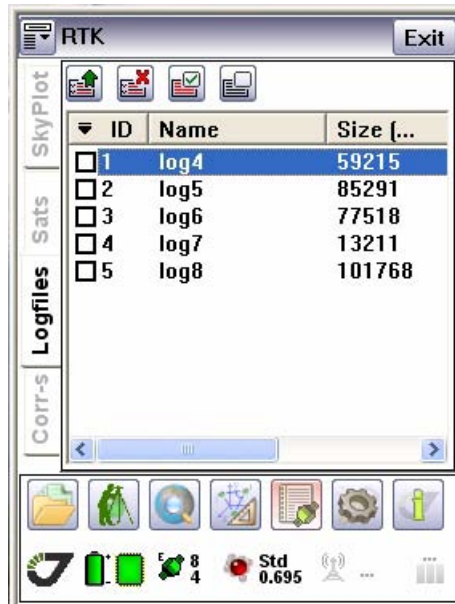







Figure 6-3. Logfiles tab

Before downloading the desired log-file(s) onto your controller, select the folder on controller where you want the file(s) to be stored. Highlight the file(s) that you want to download onto the controller or delete, and click corresponding button:

	download file(s)		select all files
	delete file(s)		deselect all files

Status Button

Logfiles Tab

During the downloading process it will be shown the progress bar (Figure 6-4). To stop the process, click the button ,

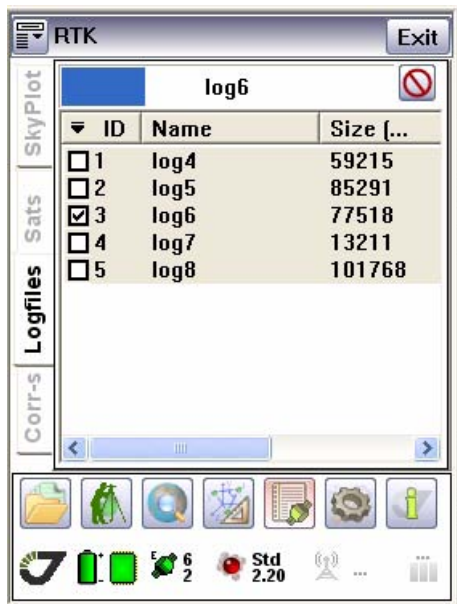


Figure 6-4. Downloading progress


To delete the logfiles select the files and click the  button. A window with the warning appears (Figure 6-5):



Figure 6-5. Delete logfiles confirmation

6.4. Corrections Tab

This tab shows the correction source (Figure 6-6)

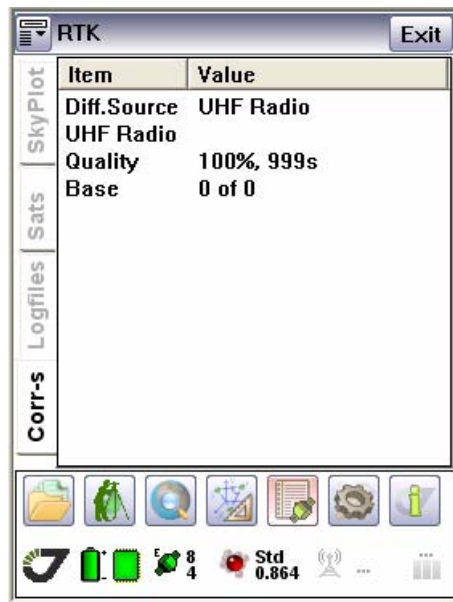


Figure 6-6. Corrections tab



LOCALIZE BUTTON

Clicking this button opens the window with *Localize* Tab.

7.1. Localize Tab

Localization is a method to generate ground level coordinates from GNSS measurements. The principle is simple: the measured GPS coordinates (latitude, longitude, elevation) is projected onto a local stereographic map projection and then transformed into the local coordinate system with a 2-D similarity for plain and heights as separate transformation. The transformation scales, rotates and two shifts the coordinates from the map projection into your local coordinate system. The heights are transformed with 3 more parameters. The localization parameters are calculated from your measurements to control points.

Tracy offers two ways: localization with control points and entering localization parameters.

Note: Tracy allows attaching control points for horizontal and vertical parameter computations independently. If you have control points selected for both horizontal and vertical parameter computation you can solve both parameters simultaneously. It is possible to select a control point to be used for vertical parameter computation only or for horizontal parameters only.

7.1.1. Localization with control points

1. Select Local coordinate (see “CS Tab” on page 39) system and configure the base and rover receivers (See “RTK Base” on page 28 and “RTK Rover” on page 32).
2. In the *Data* tab (see “Data Tab” on page 55) and select control points in the list of control points. Then enter new control points or import them from a file. (The step can be done in office). Horizontal control points must have a valid (northing, easting) coordinate in the

Localize Button

Localize Tab

Localization with control points

local system. Vertical control points may have a valid horizontal coordinate (although it is not used in the calculation) but must have a valid elevation (Figure 7-1):

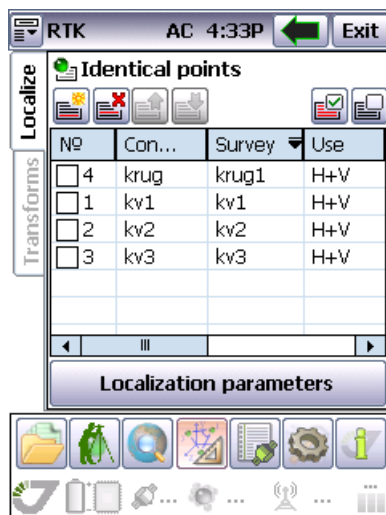



Figure 7-1. Localize tab

3. Set your instrument into the control points and survey them, storing corresponding surveyed points. Collect a minimum of 2 control points to solve horizontal localization. Collect a minimum of 3 vertical control points to solve vertical localization. Tracy also can set scale to 1.0 and rotation to 0 and compute 2 plain offsets and 1 height offset parameter with just one horizontal and vertical control point. So you can start working with just one control point. And then add more and more points into the localization. That will reprocess and justify parameters of the transformation.
4. Switch to *CoGo* tab to localize page.

5. Press  button to add new identical point from control and surveyed points (Figure 7-2).

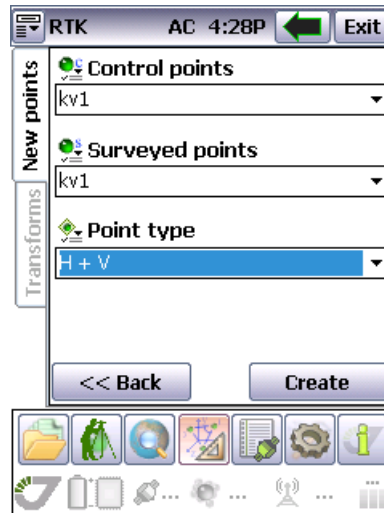


Figure 7-2. New points tab

- Select a control point from list of control point and select a survey point which is identical it from the list of surveyed points.
 - In the last list-box, control points collected will be identified with H only, V only or H+V. Points marked “H only” will be used to compute horizontal parameters of the localization only. Points marked “V only” will be used to compute vertical parameters of the localization only. Points marked “H+V” will be used to compute both horizontal and vertical parameters of the localization.
 - Press *Create* to create the identical point.
6. It is possible to modify the identical point settings by clicking to list and change the settings in drop-down lists - list of control points, list of surveyed points and list of identical point usage.
 7. The last column shows residual for each point. That allows to estimate quality of the fitting your surveyed point to the ground system specified with the control points.

7.1.2. Manual parameters entry

If you already know the scale, rotation and other parameters of your localization you can manually set them. This can be done when you are setting up a second rover on a job site and then you do not have control point information loaded onto the second data collector.

Localize Button

Localize Tab

Manual parameters entry

Click *Localization parameters* button and modify values for all control to correct in follow dialog (Figure 7-3):

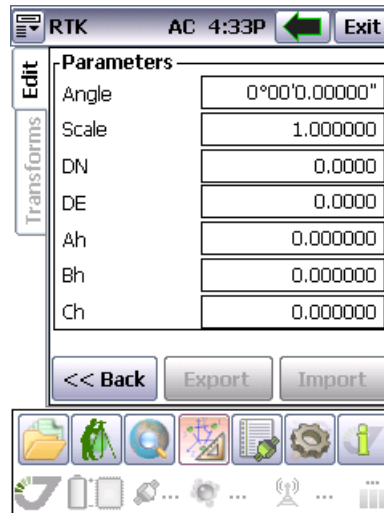



Figure 7-3. Edit Parameters

After finish any of previous step (it doesn't matter were the parameters computed with control points or were entered manually), all coordinates will be shown in the ground local coordinate system.



CONFIG BUTTON

Config button  opens the window with three tabs: *Connection*, *Sounds*, *Receiver*.

8.1. Connection Tab

Connection Tab (Figure 8-1) allows setting controllers port that you want to use for connection with receiver. After port selecting click *Set port* button.



Figure 8-1. Connection tab

Find button allows finding the JAVAD GNSS device with Bluetooth module and adds it in the list. To connect to the desired JAVAD GNSS device, highlight it in the list and click the *Set* button.

The *Delete* button allows the user to delete JAVAD GNSS device with Bluetooth module from the list.

Clicking the *Connect* button to establish connection with receiver.

Note: To set up the JAVAD GNSS Bluetooth module parameters, use the Tracy CDU.

8.2. Sounds Tab

Sounds Tab (Figure 8-2) allows the user to activate/deactivate accompanying sounds and signals.

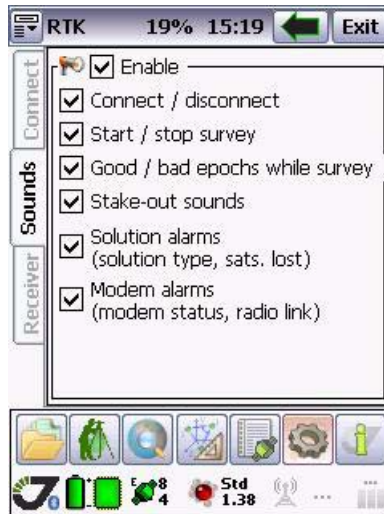


Figure 8-2. Sounds tab

Enable check box activates/deactivates all sounds at once.

8.3. Receiver Tab

Receiver tab (Figure 8-3) allows the user to set the desired receiver style, to create and edit new styles, to delete selected styles from the list.

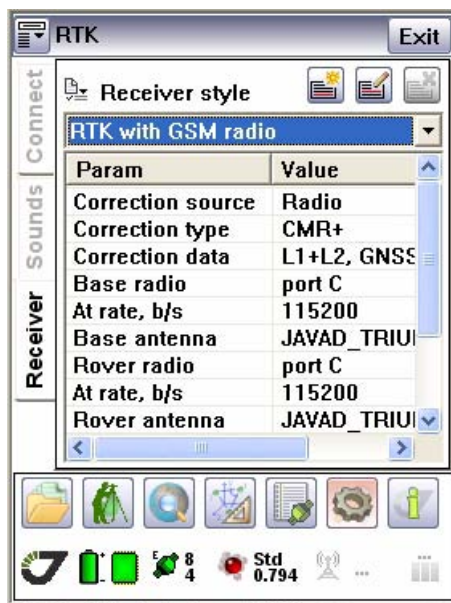


Figure 8-3. Receiver tab

A Receiver style is a set of configurations that apply to one particular type of survey. Each Receiver style provides a template that you can use when you perform a survey of that type. A Receiver style instructs the base and rover receivers to perform compatible types of measurements. It also defines the parameters needed for measuring and storing points.

Receiver style drop-down list box (Figure 8-4) allows the user to select the receiver style

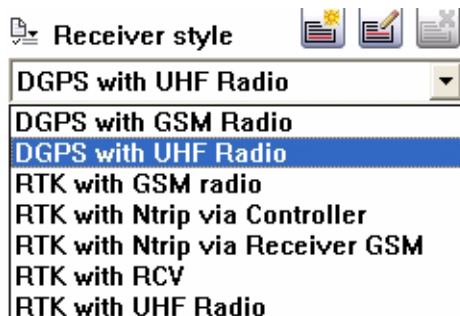




Figure 8-4. Receiver style drop-down list box



- *DGPS with GSM Radio* means the receiver will receive/send differential corrections via GSM module.
- *DGPS with UHF Radio* means the receiver will receive/send differential corrections via UHF Radio.
- *RTK with GSM Radio* means the receiver will receive/send phase corrections via GSM module.
- *RTK with NTRIP via Controller* means the receiver will receive NTRIP phase corrections via controller.
- *RTK with NTRIP via Receiver GSM* means the receiver will receive NTRIP phase corrections via GSM module.
- *RTK with RCV* means the receiver will receive/send phase corrections via receiver.
- *RTK with UHF Radio* means the receiver will receive/send phase corrections via UHF radio.

To create your own receiver style use the  (*Add new receiver style*) button. The receiver style wizard opens. See “Receiver style wizard” on page 76 for detailed wizard description.

To edit the created receiver styles use the  (*Edit receiver style*) button. The receiver wizard opens. Edit the parameters as described in “Receiver style wizard” on page 76.

To delete the receiver style highlight the desired style in the *Receiver style* drop-down list box and click the  (*Delete receiver style*) button.

8.3.1. Receiver style wizard

Click the  (*Add new receiver style*) button or highlight the desired style and click the  (*Edit receiver style*) button to start wizard. To navigate through wizard use the *Next* and *Back* buttons.

Step 1. Corrections source

With radio button switch between Modem (GSM, Radio) and Internet (NTRIP, RCV) source of corrections (Figure 8-5):

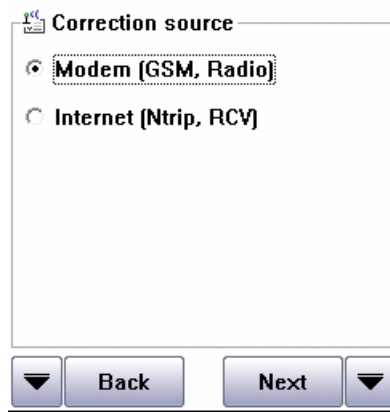


Figure 8-5. Correction source

Step 2. Base modem

Set the parameters of base modem with this screen (Figure 8-6):

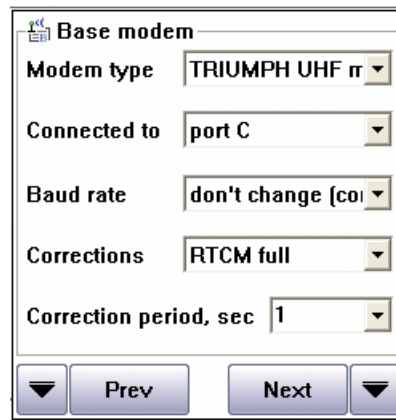


Figure 8-6. Base modem

- Select the modem type from *Modem type* drop down list box.
- Set the port which modem is connected to with the *Connected to* drop-down list box.
- Set the baud rate with the *Baud rate* drop-down list box.

Config button

Receiver Tab
Receiver style wizard

- Select the format of the corrections received from the Base Station from the *Corrections* drop-down list box (Figure 8-7).

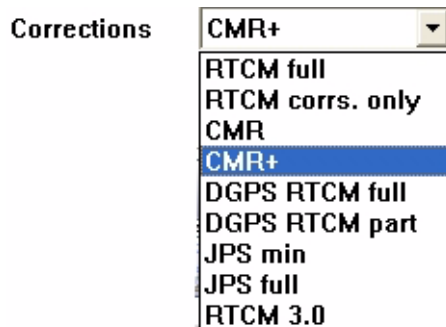


Figure 8-7. Corrections drop-down list box

- Set the correction period in the *Correction period* edit box.

Step 3. Rover modem

Set the parameters of the rover modem with this screen as described in “Step 2. Base modem” on page 77 (Figure 8-8):

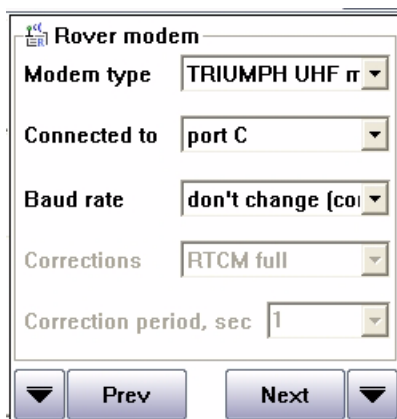


Figure 8-8. Rover modem

Step 4. UHF modem settings

Set the UHF modem parameters: protocol, power and channel (Figure 8-9)

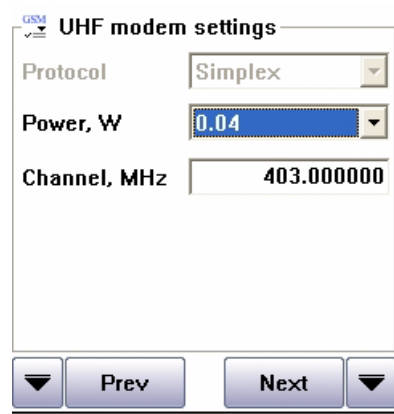


Figure 8-9. UHF modem settings

Step 5. Base antenna


Set the base antenna type from the list of antennas, using the *Base antenna* drop-down list box and  (*Browse*) button (Figure 8-10):



Figure 8-10. Base antenna

Note: Select the correct antenna type. The antenna selected here determines which antenna phase center model the JAVAD GNSS software uses to process height information.

Step 6. Rover antenna


Set the rover antenna type from the list of antennas, using the *Rover antenna* drop-down list box and  (*Browse*) button (Figure 8-11)



Figure 8-11. Rover antenna

Note: Select the correct antenna type. The antenna selected here determines which antenna phase center model the JAVAD GNSS software uses to process height information.

Step 7. Rover settings

This window allows setting the rover parameters (Figure 8-12):



Figure 8-12. Rover settings

- Set the corrections type: RTK or DGPS

- Choose what measurements will be used in RTK mode - only the L1 frequency measurements or dual frequency (L1 and L2) measurements:

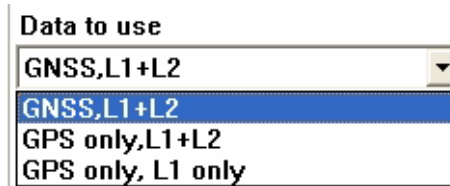


Figure 8-13. Data to use

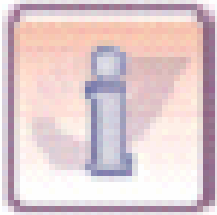
- Select the RTK computation mode: the mode of the base and rover synchronization. It can be one of the following:
 - Extrapolation - The mode that uses extrapolation of measurement corrections in the computation of position. Extrapolated measurement corrections are applied to raw rover measurements. This technique is sometimes described as “asynchronous”.
 - Time Tagged - The mode that uses synchronized measurements from both the base and rover receivers in the computation of differential position solutions. This technique is sometimes described as “synchronous”.

Click the *Finish* button to finish adding/editing the receiver style.


Config button

Receiver Tab

Receiver style wizard



INFO BUTTON

This button  opens the window with information about the receiver, controller, and software. There are four tabs in this window: *About*, *Receiver*, *PDA*, *Job*.

9.1. About Tab

About Tab (Figure 9-1) shows software version information and registration information.



Figure 9-1. About tab

9.2. Receiver Tab

After establishing connection *Receiver Tab* (Figure 9-2) shows information about the receiver (hardware version, firmware version, serial number, memory size, etc.):

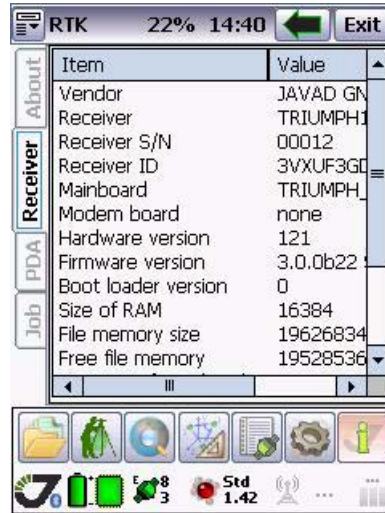


Figure 9-2. Receiver tab

Note: Bear in mind that Receiver ID is not the same as the receiver serial number printed on the receiver's body.

9.3. PDA Tab

PDA Tab (Figure 9-3) shows information about your Personal Digital Assistant, its name, operation system version, memory size, free memory space, etc.;



Figure 9-3. PDA tab

9.4. Job Tab

This tab shows information about your current job (name, path, info, surveyed points, etc.) (Figure 9-4):

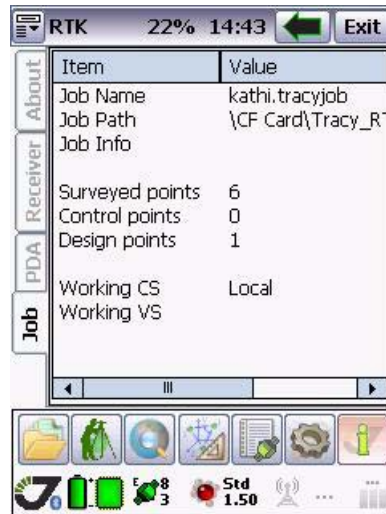












Figure 9-4. Job tab

9.5. Receiver Status

There is connected receiver status displaying at the bottom of window. When the parameter is normal it displays with green symbol. Otherwise (battery is discharged, not enough memory for data saving, etc.) it will be yellow, then red.

	Connection to receiver
	Using Bluetooth for connection this symbol appears
	Battery status
	Free receiver's memory space
	During file recording the red R blinks
	Number of GPS+GLONASS satellites
	Solution type and precision
	Radio link status (data link quality in percent and time (in seconds) elapsed since last message was received)
	Internal GSM/GPRS/NTRIP status
	Internal UHF status

TROUBLESHOOTING

Before contacting JAVAD GNSS Customer support about any problems with the Tracy RTK software, refer to the following list of basic suggestions that may help:

- Go through all external receiver connections carefully and make sure they are not wrong or loose.
- Double-check the cables. Cables became defective more often than the devices do.

10.1. Obtaining Technical Support

If the troubleshooting hints and tips in this User Manual fail to remedy the problem, contact JAVAD GNSS Support: support@javad.com.

Note: To provide you with quick and effective support, provide us with detailed description of the problem.

Typical steps you should take to provide us with this information are as follows:

1. Reveal the exact conditions when the problem occurs.
 - What receiver model and configuration settings do you use?
 - What system/hardware specifications does the computer on which you are running (installing) Tracy RTK have?
 - What symptoms and/or error codes/messages do you see?
 - Does the problem happen regularly or occasionally?
2. Document the problem and create *support request package*.
 - Write an e-mail that contains complete explanation of the problem with answers to the questions from Step 1.
 - Attach the file created in Step 1 to this e-mail.
3. Submit e-mail to Customer Support.
 - Send the e-mail you wrote in Step 2.

Note: Generally, you will receive a response within 24 hours or less, depending on the severity of the problem.

Note: You can also check our online resources for the latest product support information.

10.1.1. Web Site

The JAVAD GNSS website provides current information about our line of products. The support area of the website provides access to frequently asked questions, configuration procedures, manuals, e-mail support, etc.

To access the JAVAD GNSS website home page, use: www.javad.com.



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