TRIUMPH-LS
Readme First

Main: Icons on the top show the status of Ethernet, WiFi, UHF, GSM, Bluetooth, Satellites, Interference, Setup, Audio and Battery (Remaining battery time in hours and minutes). Click them to view their details and configure them.

In **Tags and Codes** create and manage unlimited number of Codes and Tags in the data base of this unit. In each Setup profile you can assign 25 of them to the Setup Favorite Screen for quick access in the field.Note that Favorite Codes and Tags are saved with the Setup profiles and can be recalled with the saved Setup profile.

More details on Pages, Codes, and Tags are available on other screens and user guide that came with this unit.

Click **Time/Date** on the bottom of the screen to set your local time zone.

or (and + and - buttons) take you to the Secondary Main screen.

Use the **Screen** hardware button to select the brightness that you like.

Screen Descriptions

Sunlight Visibility

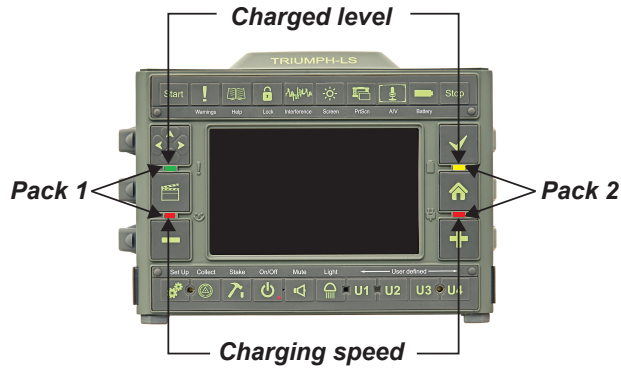
Previous page ← ***in Help screens*** → ***Next page***

Charging Batteries

Lithium Ion batteries should not and cannot be charged when their temperature is above 40° C (104° F). They also charge faster when they are cool. We recommend that you turn off the unit when you charge batteries. With about 24 hours of battery working time, you will get enough spare time to turn off your unit for faster charging. The unit can charge when on, but it may charge more slowly due to higher temperature when the ambient temperature is above 25° C (77° F) and the internally generated heat when the unit is on.

When the unit is off the four LED's in front panel show the status of charging. The two on the left are for one internal pack and the two on the right for the other internal pack.

For each battery, the top LED shows the charged level and the bottom LED shows the speed of charging.



The top LED:

- Green: Battery is fully or almost fully charged.
- Yellow: Battery is half charged
- Red: Battery is almost empty

The bottom LED:

- Green: Battery is fully charged and charging has stopped.
- Yellow: Battery is charging at half speed (due to slightly high temperature). If blinking yellow, it indicates that charging has stopped due to temperature above 40° C (104° F). It will resume charging when cooled off.
- Red: Battery is charging at full speed. If blinking red, it indicates that charging has stopped due to high temperature (this may rarely happen due to fast temperature rise. Blinking yellow should happen earlier.) It will resume charging when cooled off.

Recovery procedure

In rare cases the J-Field or the Operating System may get damaged. In such cases, the system must be restored manually. Please see the recovery procedure in the info section of TRIUMPH-LS at **www.javad.com**.

The J-Field Approach

J-Field has been developed from the ground up, evaluating the way a surveyor works and intelligently using technology to give him or her more flexibility in the field, greater technical reliability, and improved efficiency in collection of data. In order to accomplish these goals, Javad GNSS is introducing some new concepts and redefining some old ones. A clear understanding of “Project”, “Page”, “Tag”, and “Code” is essential to benefit from the innovations in J-Field to make “The Ultimate Land Survey Machine” also “The Ultimate Money-Making Machine”. Enjoy!

Project

In J-Field a project is created or opened in either the Collect Screen or the Stake Screen. The project is defined by the project name and coordinate system. Predefined projections (such as UTM and State Plane) are attached to transformations. Therefore, it is important to select a coordinate system that matches the reference frame the control coordinates are based on (such as HARN for a HARN based monument or NAD83 2007 for a CORS based control point).

Page

J-Field's use of Pages is a new concept in land surveying software. J-Field Pages are sub-projects within a project. J-Field supports up to ten Pages in a single project, with each Page being defined by a name (the default is Page 0, Page 1, Page 2...), a coordinate system which includes a transformation and a coordinate system, and unit. The coordinate system of Project is default for the ten pages. A user is free to work entirely in the default opening Page of a new project, Page 0, however there are several advantages to using multiple Pages for some projects. Pages can be used to divide a project into phases. Consider an extensive real-estate development project. A surveyor might initially perform a control survey, a boundary survey, a topographic survey, stakeout utility construction, stakeout road construction, stakeout lots and stakeout buildings. Each of these can be placed within its own Page, and as necessary, the visibility of each Page can be controlled by the user. The points in the topographic phase can be kept within the project, but can be turned off to reduce screen clutter. In this example it is likely that all of the Pages will be in a single coordinate system (such as State Plane).

Because Pages can have different coordinate system definitions within the same project, a user can mix different coordinate systems in the same project. This may be useful if points from different projections and transformations need to be included in a single project. For instance, a user may name his or her main collection Page “Main” and set the coordinate system to State Plane Coordinate System of 1983, NAD83, Kansas North, and because the project is based on HARN control, select the NAD83 to WGS84 (47) / EPSG-USA KS/NAVD 88/SPCS83/Kansas North zone transformation, and select NAVD 88 for the height system and Geoid12A as the geoid. Perhaps some points have been provided in a different projection (such as UTM) or a different transformation (based on NGS CORS). The user could create a new Page called “Given Data” and enter that data in the coordinate system the data was provided in. Internally, all of the coordinates are stored as ITRF2005 coordinates, but are viewed in the coordinate system for their particular Page. Coordinates can be shared between Pages and all coordinates from all Pages can be viewed together or selectively disabled.

Another benefit Pages offers is working with an Unknown coordinate system. A surveyor retracing a boundary using multiple surveys (whether sourced from a plat or a description) could create a Page named “Record Calls” with an unknown coordinate system. The user could also create a primary collection Page named “Survey” with a predefined coordinate system. As the user occupies one of the points from the records, he or she could perform a localization that would place the record calls on the ground. Using the stakeout feature he or she could navigate to another point and once recovered, occupy this point and perform another localization defining the rotation. The user could continue repeating the procedure until all of the record calls are found, refining the localization each time, improving the predicted position of the remaining points. As can be seen, Pages can offer an unprecedented ability to separate data, to work with multiple coordinate systems, and to incorporate data from unknown coordinate systems into a geo-referenced system. Of course, a surveyor can keep all project work in a single Page if he or she desires.

Tags

Tags are used in J-Field to control connections between collected points. Points collected with the same Tag name are connected together by a line or curve (as the user has selected). Points collected with the same Tag name continue to be connected until the user ends the line. Polylines can be ended open or closed back to the first point. Once a Tag is ended, it can be reused for another polyline collected later.

The benefit of using Tags is particularly evident in the J-Field Auto Sequence. By building a list of Tags to be collected, J-Field can automatically switch from one polyline to the next according to the user-defined list. This is particularly beneficial to cross-section data collection. Consider a cross-section of a road that has a ditch on either side. The cross-section sequence would be Left Natural Ground (LNG), Left Top Bank (LTB), Left Ditch Flow Line (LFL), Left Edge of Pavement (LEP), Centerline (CL), Right Edge of Pavement (REP), Right Ditch Flow Line (RFL), Right Top Bank (RTB), Right Natural Ground (RNG). The Auto Sequence would increment from one line to the next based on the Tags (LNG, LTB, LFL...RTB, RNG). Auto Sequence also allows for reversing the sequence once complete (RNG, RTB, RFL...LTB, LNG).

Codes

Codes are used in a unique way within J-Field. Codes are designed by the user and function similarly to layers in AutoCAD. Codes also carry default symbol types and default attributes. The Code “Boundary” might contain a default circle symbol, and the attributes “Type”, “Size”, “ID Cap”. Each point collected with the Code “Boundary” will use the circle symbol by default, and prompt for the attributes Type, Size and ID Cap. Upon Export to dxf (drawing exchange file) from J-Field, Codes can be used to define the layers of the exported polylines. When creating a Tag, you must create its Code first. A Code may belong to several Tags.

Tags and Codes provide a very powerful data structure (See page 7). When collecting standalone points, you can also use Tag, Code and other attributes to make your data collection easy in the field and provide versatile documentation.

Javad GNSS geodesists, aided by professional land surveyors, have meticulously programmed the heavy lifting of geodesy into J-Field, resulting in simplified and technically correct software. In order to use it effectively, and for your reference, we explain some terminologies and concepts here.

Ellipsoids
Ellipsoids (Spheroids) are mathematical models of the general shape of the Earth. An ellipsoid is formed by an ellipse rotated about the semi-minor (polar) axis and is defined by semi-minor axis and semi-major axis or semi-minor axis and inverse flattening.

Geoids
Geoids model the local effect of Earth gravity. Geoids are models and improve as gravitational measurements and density of measurements improve. Geoid models are important to land surveyors because these models allow GNSS determined positions to accurately determine orthometric heights related to sea level (such as might be determined by differential leveling) instead of being related to an imaginary shape such as the ellipsoid. Differences in orthometric heights between two points, based on a geoid model, will determine the way in which water will flow between them.

Transformations
Coordinates for a point on the Earth can vary depending on when and how those coordinates were determined. Reference Frames, or Datums, refer to the time and basis of a coordinate system. A transformation is a mathematical process that converts a coordinate related to one datum to another. The geodetic team of Javad GNSS elected to set the J-Field internal database to the ITRF2008 reference frame. This means that any coordinate input as a NAD83_adjustment xx (which is set in the project settings) is transformed internally to ITRF2008. When a position is recalled from the database, the ITRF2008 position is transformed back to a NAD83_adjustment xx position (or whatever coordinate system is set in the project settings). This is why it is important to set the transformation of your project correctly as determined by the published control the user is related to. With the database set to ITRF2008, future adjustments of a reference frame (such as NAD83) can be handled by the software automatically once the new transformation parameters are uploaded to J-Field.

Projections
Projections allow surveyors to visualize flat grid coordinates on the curved surface of the Earth. By projecting points on the ellipsoid onto a grid surface, surveyors can use plane trigonometry with geodetic positions. J-Field is preloaded with projections from around the world and also allows the user to enter his or her own custom, Low Distortion Projection. Furthermore, J-Field can develop a projection through the localization process for coordinates with an unknown coordinate system.

Localization
Localizations in J-Field can accomplish two tasks. By observing points in a defined coordinate system, J-Field can determine the location of the reference station relative to the defined coordinates. In an unknown system (a system of coordinates that are not geo-referenced, such as from a total station survey), J-Field can create a projection from points observed on the ground. In this case, it is important that the reference station coordinates already be related to a known coordinate system.

Auto Naming and Auto sequencing:
Point Names will auto increment based on the Naming Template that is defined for each Tag. When collecting lines and curves, Tags can be changed manually to define a new shape; or can be auto sequenced (automatically switch to another shape) by creating a sequencing scenario and making it active. This feature is helpful in application like collecting cross sections.

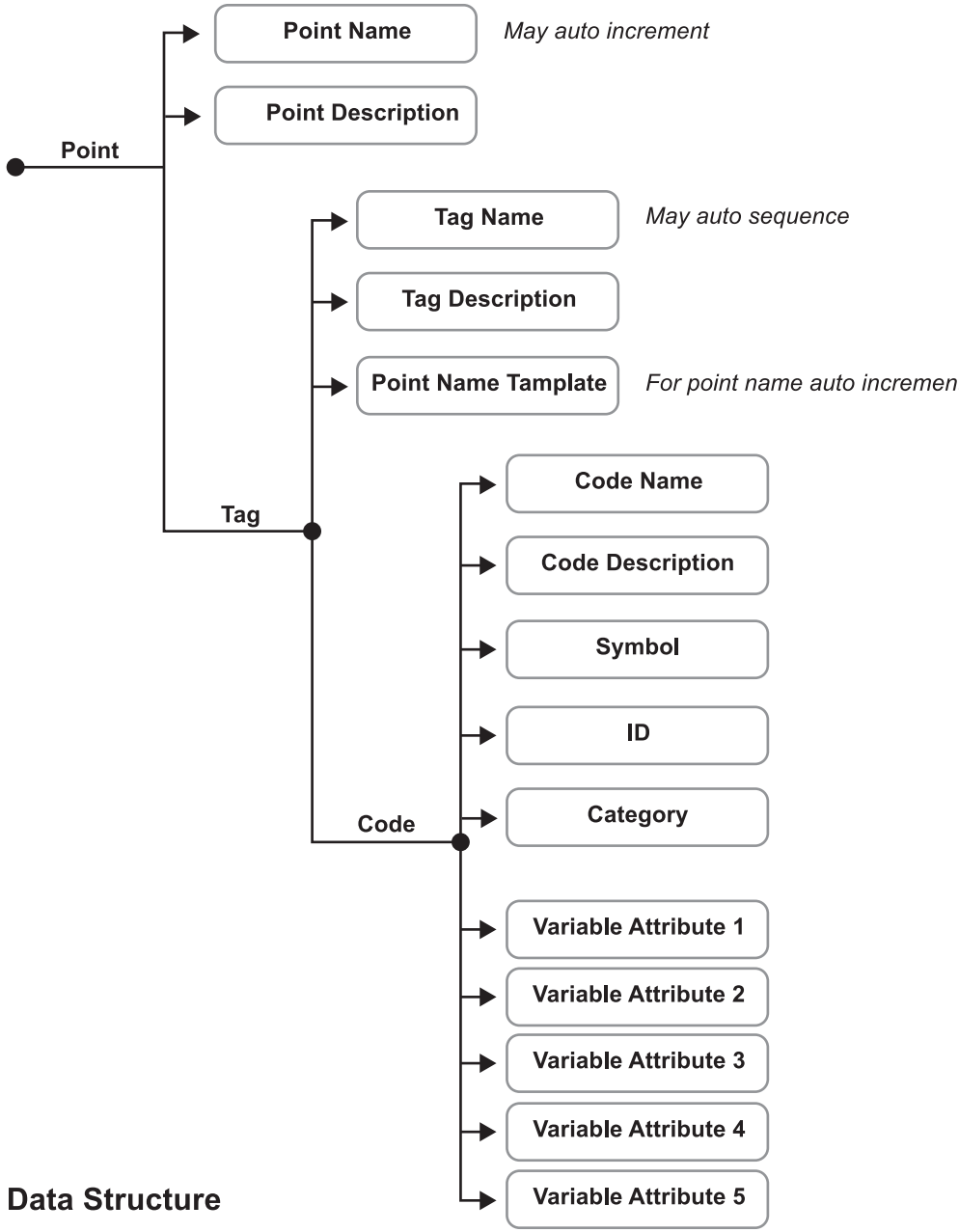
Collect and Stake
The workflow for “Collect” is shown on the Collect screen and its “Help” explanation. For the Stakeout workflow also read the “Stakeout” document.

“Setup” profiles and “Projects”
Parameters related to satellite tracking, mode of operation (Rover, Base, Standalone), communications, favorite Codes and Tag and similar are saved with “Setup” profiles. You can save and recall many “Setup” profiles according to your projects needs. While Reservoir of Codes and Tags are stored as global values, favorite Codes and Tags are saved with Setup profiles. If you recall another Setup profile, you will recall Favorite Codes and Tags with it.
Geometries (points, lines, and curves), their Tags, Codes, attributes , pages and coordinate systems are saved with “Projects”.
Beware of this distinction and use them as it fits your job requirements. In Collect and Stake screens, pay attention to Projects and Setup boxes in Collect and Stake screens to make sure they are selected as you intend. Please refer the charts in next pages to see which items are saved with “Projects” and which items with “Setup” profiles.

Compass and Levels
Calibrate the compass and levels periodically. When calibrating the levels, the unit only needs to be held within 5 degrees of level; the internal three-axis accelerometer calibration software will take care of the rest. Levels are temperature dependent, and should therefore be calibrated at the temperature of the environment the unit will be used in.
Electronic compass works only in magnetically uniform environment. Move any electronic compass around your computer, for example, and its direction may change by 180 degrees. Calibrate compass in the area that you are going to use. Make sure that your environment is uniform enough for using electronic compass. Move around and see if its reading changes substantially.

Compass does have tilt compensation, but it is better to hold the unit level when using compass to remove the need for compensation.

CAUTION: Electronic compass works in uniform electromagnetic environments only. Try the one in your phone and move it around in your office. It changes by 180 degrees when you pass the power supply of your computer, or your office phone. Rely on compass in uniform electromagnetic environment and calibrate it there. This is nothing unique to TRIUMPH-LS. Try many other types. Mechanical compass are also somewhat sensitive. Move them around and see.



Data Structure

Setup Parameters	How to set
Online help: User manual at your fingertips.	"Help" hardware button
Update software directly via Internet in your unit.	Support
Operation Mode: Rover, Base, standalone	Setup/Wizard
Record Raw GNSS data (for post processing)?	Setup/Wizard
Use GPS, GLONASS, Galileo, BeiDou, QZSS, SBAS	Setup/Advanced/GNSS
Set Elevation Mask	Setup/Advanced/GNSS
Employ GNSS In-Band Interference Protection?	Setup/Advanced/GNSS
Collection Duration (Manual or Timed)	Setup/Advanced/GNSS/Duration
Delay to start (after clicking start)	Setup/Advanced/GNSS/Duration
Select communication device and its parameters	Icons on the home top.
Extend the range of UHF by using external antenna	UHF icon
Antenna type, parameters and Height	Setup/Advanced/Antenna
Units	Setup/Advanced/Units
Automatic Photo and voice recording (for documentation)	Setup/Advanced/Photo&Voice
Monitor Interference in all GNSS Bands	"Interference" hardware button
Monitor interference in UHF bands	UHF icon of the Home screen
Take screen shots and interference screens	"PrtScn" Hardware button
Send Interference and screen shots to FTP sites	Interference/Settings
Receiver Details (Name, Organization, etc)	H2/System/Receiver details
Set your Favorite Tags and Codes for quick access in the field	Setup/Tags & Codes. Home
Lift& Tilt (don't look. Don't touch) Lift & Tilt and survey	Setup/Wizard
Auto-Sequence in applications like cross section	Collect/3.Tag
Visual Stakeout. Turn on Camera to see the stake point	Stake/Next/Guide/Camera
Enter measurement tolerances for CoGo accuracy calculations	CoGo/Tolerances

See Ground/Grid distances and angles in CoGo solutions	Most CoGo screens
Use camera to measure angles	Collect/Next/Full Screen/Camera
Forgot Project name? Use calendar view to open it	Collect/Project. Or H2/Calendar.
Lock Touch pad and keys for inadvertent changes when moving	H2/Locks
24-hour battery. Removable & Hot Swappable are old concepts	"Battery" hardware button
Automatic (Code-less) curve and line collection.	Collect/Next/Point,Line,Curve
View/listen, delete, import, export files	Files
Manage and select Coordinate Systems	Coord. Sys.
Manage and view Points, Stakes, Polylines and Trajectories	Points
Setup a TRIUMPH-1 or TRIUMPH-2 with this unit	H2/Setup Remote
Select time zone to show local time	H2/Timing.
Calibrate compass and level	H2/Compass Level
See software and hardware versions	H2/System/Versions
Auto Repeat (re-start another point automatically)?	Setup/Advanced/GNSS/Duration
Save and Recall unlimited number of Setting profiles	Setup
Localize (create local coordinate system)	Localize
What items to show on Collect and Stake scree	8 white boxes around the map
See the status of the 6 RTK engines	Collect/Next /Top box
Details on Stakeout	Refer to Stakeout user manual
Enter Antenna Height	Collect/Antenna Height
Search, Review and edit points. Add a point	Collect/Review
Turn on/off the Flash light on the bottom	"Light" hardware button
Force unit to shut down (in frozen)	Hold " On/Off" button for 15 Sec.
Change display theme for indoor and outdoor	"Display" hardware button