

Trimble Juno-SB GPS Receiver and TerraSync Software v3.30

Setup Menu

recorded: August, 2009

Hello. This is **Mike Londe**. I'm the Geodesist with the BLM in Wyoming.

The purpose of this session today will be to provide an introduction to users for the **Trimble Juno SB GPS receiver** and an overview of the **TerraSync version 3.30 software** that will be used with these receivers.

About the Juno SB Receiver: The first slide that is up shows the layout of the Juno SB. The Juno SB was chosen for this project in order to maximize, basically, the number of receivers that could be provided for offices and to minimize the IT footprint for the BLM. This receiver, based on testing, is capable of approximately two-meter-type accuracy at the 1-RMS [root mean square] level (i.e., 1 sigma [ranging error]). So for many range and weeds data collection applications, this should be sufficient.

The Juno SB is the second generation of Trimble's receivers, Juno-type receivers, and it has a number of enhancements, most notable of which is the fact that it will support microSD cards in both a standard and high-density format. It also has an intergraded, 3-megapixel, color, digital camera.

Basic Layout: In this screen here, I show the layout, and I want to point out a couple of things that people need to be aware of. In looking at the device itself, the receiver, the power switch is on the left side of the receiver. To turn on the receiver, press and hold it and release. If the receiver doesn't turn on, you need to press and hold the power switch for about five seconds before releasing, then it won't go through its boot up.

This receiver will also support an external GPS antenna that is particular to the Juno, and that port is just above the power switch. The camera switch is lower on the right-hand side of the receiver, as shown in the diagram. One care that people should take

with the camera, when holding it, is not to get a finger or a thumb onto the camera, as it is possible to accidentally switch it on. On the bottom of the receiver, you'll see on the right-hand side of that panel is the AC power supply. On the left-hand side is the mini USB connection that will connect the receiver to the computer for upload and download.

The microSD card, itself, is internal to the receiver. In order to access it, you would need to take the back plate off to expose the battery. And then the port for the microSD card is exposed so that you can insert or take out cards as needed. So this covers the basic layout of the Juno SB.

Now I'm going to bring up a live display of the receiver itself.

Powered On: Okay. This view is of the Juno SB after it's been powered on. From the desktop, itself, the TerraSync software can be started either by clicking in the lower right corner on the Windows "start" key or by coming up to the start banner and clicking on the Windows flag, and that will pull down your start.

If TerraSync has been previously run on the handheld GPS unit, you will have it displayed in the most commonly-used files. If it does not display, your other options would be to go and tap on "programs," and then double-tap on "TerraSync" in order to start it up. After it's used once, it will typically display in the most commonly-used programs. So I want to go ahead and start this up.

Start Up TerraSync: Now we're actually into the Trimble TerraSync program. In this overview, I am not going to show you how to set up and do every configuration or to collect data. This is to provide an overview on where to find information. If you need more detailed descriptions on how to perform a function, there are various documents that are available; one would be to go to the Trimble support website and go to TerraSync, and then download the user guide for version 3.30, or you'll see if your state has training or through the NTC, whether or not training is available.

Trimble TerraSync Software Support: www.trimble.com/terrasync_ts.asp

Trimble's TerraSync program is divided into five (5) main sections:

[Map, Data, Navigation, Status, Setup]

When you start up the program, it will always come up in the section 'Status'.

Whenever you see a black triangle, that indicates a pull-down list. So if I were now to click on this black triangle, opposite 'Status', this pulls up and shows the five major sections.

So you have a '**Map**' display where, when you're collecting data, it will display the features that have been collected and allow you to query them and/or update them. You can also display background - for example, raster imagery or shapefiles in order to provide context to the data that you're collecting.

You have a '**Data**' section where you would actually select the data dictionary for use and collect field data.

There is a '**Navigation**' section that will allow the user to do in-field navigation. You can create, for example, a wave point in the field and then navigate back to it or select a feature for navigation too.

'**Status**', which is the section we're in now, provides information about the receiver and the GPS constellation.

And then the last section that you have is the '**Setup**' section, where you can go in and configure the receiver per operation, in terms of, say, for example, coordinate system and datum, whether or not you want to use a real-time correction source logging rates.

Subsections: Each section is divided into various subsections. For example, in the status section that we are in now, directly underneath it, you'll have a dialog box that says "Skyplot." If you were to access the pull-down menu by Skyplot, this would bring in various subsection screens that one could scroll to. So you have the Skyplot, which, if

the receiver were active, it would display information about the receiver satellite location and signal the noise and strength of constellation. You could also get a text listing of it, information about the receiver, real-time status, and so forth.

Within the status menu in all sections, the top line is a status bar that will have various icons indicating what functionality is available. Right now, because the receiver is switched off, the only icon is the battery indicator.

And then in many screens, you'll have various information panes, such as the Skyplot graphic, where it says "GPS is disconnected" here, if the receiver were active and tracking, it would show what your position is.

And then other information would be, for example, GPS settings, your critical settings, such as PDOP, signal-to-noise ratio. So the first section here, status, is basically an information screen.

The next section that we are going to go to will be your Setup.

Set Up Menu: To access Setup, I'll come back, click on the arrow by Status, get my drop-down menu, come down to Setup, click on that, and that, then, switches screens.

In the 'Setup' screen, the 'GPS' tab is how one connects and disconnects from the GPS receiver. So, in this case, where GPS is inactive, if I wanted to actually connect to the receiver, I click on 'GPS'. That will pull up, bring up, an icon of two plugs trying to connect. And when it has the connection, the icon will now change, this satellite icon and where it now shows zero - which I won't track anything because this session is inside - shows the number of satellites that one is tracking at a given time. Because it is zero and blinking, we're not tracking. But one of the things that you'll want to watch for is that when you are tracking four or more satellites that that is not blinking. If a number of satellites is blinking, that's an indication that you have a poor PDOP, so the receiver is tracking but not calculating positions.

The next icon that you see is an indicator that I have **real-time settings** available when I'm actually locked. In this case, the Juno will utilize the WAAS (Wide Area Augmentation System] corrector. And if I were actually locked onto that, I would have a little radio icon with a little airplane sub-icon, indicating that it was locked.

On the far right-hand side, the double-ended arrow will provide a display of the **real-time accuracy** in the system. Typically, for the Juno, you will see values that are centered about five meters. It should be noted that the accuracy available with this receiver is often better than what will be displayed.

In the setup, you have six (6) dialup boxes that one can work through:

Logging Settings	GPS Settings	Real-time Settings
Coordinate System	Units	External Sensors

In real-time settings, to access that for example, double-tap on it. It lets you pull up and indicate whether or not you want to utilize a real-time source. The recommended value for choice one would be Integrated SBAS, where SBAS stands for satellite-based augmentation systems, so that's your WAAS. To see a complete list again, you would click on the black triangle, and that would pull up a list of all augmentations available on the receiver.

It's recommended that if you can track and use SBAS, the WAAS goes, to use it in the field. To save any changes, you would then click on OK, and that will take you back to the previous screen.

GPS Settings: In GPS Settings, with the Juno, your critical settings - and I'm going to scroll back to the top of this screen - are all hard-wired onto the receiver. These cannot be changed. The one thing that is critical, especially if you are using ArcPad and TerraSync on the same receiver, is that your default GPS connect, or serial port, is COM4. If, for some reason, that you cannot make a connection to a receiver, then this would be the first place to come in and check to make sure that people working with the

receivers have not accidentally changed that. So I'm going to click on OK to save that and go back.

Logging Settings: Under Logging Settings, this is where one can make settings that would affect your data collection in the field. In the version 3.30, Trimble has introduced new settings called "Accuracy Settings", where one could set an accuracy that would guide the collection in the field. If your accuracy was better than what was selected, it would log points to the receiver. If it's worse, it would wait. So you can go through and set that up. You also now have the ability to predefine the number of points that are collected for a point feature or a vertex on a line or a polygon feature. So you can go through, and all of these will affect the way the receiver works and operates in the field.

Filename Prefix: One thing that does need to be mentioned is under 'Filename Prefix', if you are using Trimble's default naming convention on a new receiver, all filenames will start with 'R.' However, if you're working on a project or have multiple receivers working on a project, you would want to give each receiver a unique filename prefix because, otherwise, when you would go to "download the receiver to the computer," any common file names would be overwritten. We need to click on OK.

Coordinate System Settings: Coordinate System - by default, GPS records data in latitude, longitudes in the WGS 1984 datum, and in terms of height above ellipsoid. If you were going to be displaying background imagery in the Map section, as will be talking about later, one would need to set the coordinate 'System' and 'Datum' to match, or TerraSync to match, that of the raster imagery.

For example, if I were going to be displaying data here in Wyoming in, say, UTM's, NAD83, Zone 13, the way to make that change would be to click under 'System', which is for the coordinate system. Again, I would click the black arrow to access the pull-down menu. Bring my slider to the bottom, select UTM's, by clicking on it. The next thing I would need to do is select my 'Zone', and in this case, I want to be in 13 North, so I'd access my pull-down, scroll up or down till I can find 13 North, click on 13 North, and then I would select my datum. In this case, for the example, I'm going to use

NAD1983. So under 'Datum', I click on my black arrow to access, and I'll run my slider down till I find the NAD83s. Now, in this case, there are several realizations of NAD1983, for example, that are available. The correct one to use would be the NAD83 (Conus) CORS96.

'Altitude Reference' does go back to the GPS height above ellipsoid. However, if one wanted an approximate mean sea level, you could click and access, the pull-down list, and access mean sea level, and that has a translation table that's good to approximately ten meters. Once any changes are made, and they want to be locked in, click on OK again. And, again, that takes us back to the main Setup screen.

Units Settings: And then the last tab that we will talk about is Units. So if I click on units, you go into this. Basically, this allows one to set up display units in units that you're used to working with.

For example, in this screen, I'm set up so the three main displays that I would use are, for example, 'Distance Units' are U.S. survey feet. 'Area Units' are set to acres. Velocities 'Velocity Units' are set to miles per hour. If I wanted to use different values for distance, I would come over, click on my pull-down menu arrow, and then that would bring in a drop-down menu, from which I could select the units of measure that I wanted to work with. So if I click, same thing, then, for area units. Velocity units could do the same type thing.

So those are just some of the main screens that you would see in working with the Setup [menu].

GPS Tab: A good practice when working with a GPS receiver is at the end of the day, when you're through working, would be to disconnect the GPS receiver. And that would, again, be done by clicking your 'GPS' tab. The reason for that is if you did not have a chance to charge the receiver overnight, that would help extend the battery life.

On the Juno itself, typical use is eight hours in the field. However, it's recommended

that if you stop or are not data collecting for long periods, do go ahead and close any data files you are collecting and turn off TerraSync and turn off the receiver until you're ready to work again. Do not just turn off the receiver because if you leave TerraSync running and a data file open - then this will be common and you want to get it later - you stand a chance of corrupting your data file and could, possibly, lose all data in it.

Options Tab: There are various 'Options' and subsections that are available in Setup. The most particular ones that you would want to use, 'Disconnect from GPS', would be the same as the GPS tab on the main screen.

The other one is 'Reset GPS receiver'. GPS receivers remember, literally, all satellite information. It is a good practice to - at least once or twice a year, or for myself, I will do it every month or two - to reset the GPS receiver. Because, then, that will wipe out old satellite information and force the receiver to download and update fresh information. To choose one of those options, you would just come down in this drop-down menu and click on the Options subsection that you wanted to exercise.

That is the Setup Menu.

Data Section

The next section that we are going to look at is going to be the **Data** section [screen].

Setup / Data: So from the section [Setup] menu, I will then access the pull-down menu, click on 'Data'. In the default setting, this will bring up the form that will allow you to create a new data file. It is recommended that you create a new data file each day. You could create several data files within a day. However, you can keep appending, as necessary, but Trimble places a seven-day limit, over the number of times that a data file can be opened.

The reason I believe it's a good practice to open a new data file each day, rather than continuing appending, is that experience has shown that the more times a data file is opened on successive days, there is a chance of corrupting the data file. If the data file is corrupted, there is a chance that all the data in it could be lost. So it's just a good practice to, each day, start a new file.

Create New Data File: Now in this "Create New Data File" screen, there are several things that I wish to comment.

First off, under 'File Type' when you're collecting data everything will be a Rover. You have no need to change or access that pull-down. Your only other choice would be to be a base.

The second thing that you have is a choice of where to store your data. Right now, for 'Location', the default value is in the main memory of the receiver. However, if you have a microSD card for increased data storage, by accessing the pull-down menu, you could then have the choice of storing data in the 'Default' memory or storing data, itself, on the 'SD card' [SD-MMC card]. If you have an SD card, I would recommend putting your data on that.

The next thing is "File Name'. And here, you can see where the file prefix is the 'R' that was talked about in the Setup Menu. And then Trimble's default naming structure, for example, is like for here, is R081013A, where the 08 would be MM (the month); 10 is DD (the day), 13 is HH (which stands for hour), and that will be set to either local time, if you defined a time zone for the receiver, or to UTC time. And, then the 'A' is a counter. So, for example, the first file I would open in this hour would have an 'A'. If I were to close the file, open a new one, it would have the same name, but with a counter 'B' and so forth.

You also have the option, if you did not want to use the default naming structure, to also give this a custom name. So instead of using filename, for example, I could call this "Mike's data file". So for filenames, you have the option. You can use the default

structure, or you can give it a custom name.

The last thing for creating a new data file is under data 'Dictionary Name'. Data dictionaries, basically, are the information that define the features that you're going to collect and the attributes that you will collect. When you come in to Data each time, it always defaults back to 'Generic'. However, you can have multiple data dictionaries stored on a receiver.

Data Dictionary List: To access the data dictionary list, you can click on the black triangle to access a pull-down menu. And now you would have a choice. Like here on this SD card, I've got four data dictionaries stored, Generic, Seaview, one that I've been working on myself [9071516a], and then if you're going to be collecting NISMS data, you would probably want to select the one called Weeds.

Create Sub-Section: Once you have set this screen up, by then clicking on 'Create' - that would then come in, ask you, for example, your antenna height, depending on how you were set up. And then it would bring you to your new feature pick list.

Now I'm not going to go through, here, on how to collect data in the field. That's where you should go to the start guide or other training sources.

At the end of a data collection session, to properly close the file, you would click on 'Close'.

Collect Sub-Section: You'll also have various subsections and options that are available. Right now, because we created a new file, we are in the 'Collect' subsection. And Collect - that basically means you are collecting new data. However, to access other subsections, click on the [Collect] pull-down menu. You would have an option, for example, of a new subsection would be Update Features, where one could go in and update feature information for data that has already been collected in this file. So you can toggle back and forth between Collect and Update.

And you can also access a file 'Manager'. For example, that would bring up new 'Options'. Under file Manager, some of the things that could be done is deleting files and/or copying files to new locations.

One of the capabilities of TerraSync is that one could edit an embedded data dictionary or create a new data dictionary - however, that is not advised for the field. It is too easy to make a mistake, and if you make a mistake, you could lose all the data that is in your data file. So as a good practice, it is best not to use those functions.

You also have the ability in the file 'Manager', to read data from an existing shapefile, or when you're finished with data collection, to write data back directly to the shapefile.

So I'm going to go back to Collect Features, and then I'm going to close this option. Close this file. Are you sure? Yes.

Existing File Sub-Section: Now, back in the 'Data' menu, this form is set up in order to create a new file - however, you can also open up existing files.

Choose Existing Data File: To do that, I would access my subsection menu pull-down list. And instead of selecting 'New File', and I would select 'Existing File', and then that would bring up a list of all files stored on the receiver. And then I could pick the file that I wanted to open, re-open that, and then append data to it.

Update File Sub-Section: Now, a thing that one needs to watch when you're opening up an existing file is that, unlike a new data file, where you open up in your existing pick list, in your new feature pick list, when you open an existing file, it will open up in the 'Update' file subsection.

Now one needs to be careful with that because if you actually have positions written into the file, one can accidentally overwrite the data as you collect new data, thinking that you're actually in the New Feature pick list. So you need to be very careful about which subsection that you wish to be in.

So, again, 'Update' is for working with existent features in a file. If I want to collect new data, you need to be in 'Collect Features'.

Options to Open an Existing File or Create a New File: With either opening an existing file or creating a new file, there are various options that can be applied. Just some of the ones that you have or that you would use - would be one could adjust the 'Logging Interval' - beyond what is set up in the data dictionary. You have the ability to select features and 'Repeat' them.

The two most commonly-used ones [Options] are 'Log Now' or 'Log Later'. If Log Now is selected as soon as you open a feature, you will start writing positions to the feature. If you choose 'Log Later', you will open up in a paused mode. That Log Later is a useful tool to use when you're working with lines and polygons, as if you do your attribute entry at, say, the start of a line or at any point while the feature is open. You would probably want to suspend data logging so that you do not get a bird's nest of points.

Again, to properly close a file when you're through with data collection would be click on Close. It will query you - Close this file. Are you sure? Yes or No. If you're sure, click on 'Yes'. Now, I'll go back to my default screen for New file.

So that is your overview of the **Data** screen.

Map Section

From this overview, I'm going to go up to my section menu, access the pull-down list, and then the next section we'll look at will be **Map**.

Setup Menu / Map: So to access that, I'll click on Map. And this brings me over to a new section. In Map, as I stated earlier, this will display features that are being collected in a open data file. I can also display background imagery, such as, for

example, vector data, which would be GPS files, AutoCAD DXF files or ESRI shapefiles. I can also display raster imagery. Raster images have to be in a JPEG, TIF, BMP, or MrSID format.

Display Imagery: If I'm displaying vector imagery, TerraSync will re-project the vectors on the fly as long as you have correctly identified the coordinate system and datum in the transfer process through Pathfinder Office [software]. It will re-project on the fly. However, raster imagery needs to have the coordinate system and datum for the receiver set to match that of the background image.

A change that is now available in TerraSync is that in previous versions of TerraSync, you could only have one background image of a type available. So you could have a vector file, or you could have a raster file, but you could not have both. However, TerraSync version 3.3 will allow one to open multiple background files. So you could have several raster images open as long as they are all in the same coordinate system and datum. You could also have multiple vector images open.

Now a thing to take care and watch for, though, is because these are handheld systems with limited memory and processing power, you do not want to be trying to open very large files. Generally, a very good practice I have found is to keep a number of files that are open on the order of maybe two to three, or generally, below about 10 to 12 megabytes. Anything more than that, TerraSync will spend a lot of time regenerating the image.

Open Raster File: So now in this 'Map' section, if I had a data file open and collecting data, it would display. I could also open up background imagery. If you'll remember back in the setup, for example, I showed - for the coordinate system, I set that to UTM's, zone 13, NAD83 (Conus) CORS96. To actually open up a raster file, I would come to my 'Layers' subsection, click on the pull-down menu and go to Background Files.

Background Files: It should be noted, in Background Files under 'Location', again, you have the choice of the default, internal memory, or one can go - when you do the

transfer process, store data on the microSD card [SD-MMC card]. In that case, that's what I'll choose here. And that will bring up a list of all imagery that's available in either of those locations. Now in this case, I just have the one. So I'm going to click on Dry Creek - choose it, and then I'll click on OK. And now you have a background, like in this case, aerial photo that you can have displayed to provide context to the GPS data that you are collecting.

Map Features: Other options that one can do in the Map screen is if you had a data file open, you could click on an existent feature and get information about the feature, in terms of the first - in terms of the attributes.

Set Navigation Targets: You also have the ability, under your 'Options' menu, where one can go in, and you can Set Nav Targets, either by selecting a point on the map or by selecting an existent feature from a data file and then navigate within that. You'll also have the ability to Enter Coordinates to create a navigation way point.

So to summarize, the **Map** view allows one to have a view of the data while it's being collected. You can have background imagery to provide context to the data.

Navigation Section

The next section that we are going to take a look at, so I'll access my pull-down menu, will be the **Navigation** section. And this is the section that would be used in order to do in-field navigation.

Setup / Navigation: The default Setup screen that comes up would provide a pointer arrow that shows the relation of how you are moving relative to your navigation target. You also have a set of customizable dialog boxes at the bottom. The default gives you 'Distance' to your target; 'Bearing', which is your most direct azimuth to the target; and 'Heading', which is your instantaneous direction of travel. And then you have a 'Turn', which tells you whether to turn left or right in order to be heading straight.

If you did not want to use these screens, by clicking on - or any of these dialog boxes, the black, pull-down arrow - you can select other subjects or headings that would provide navigation information, such as Cross-Track error, if you're doing a transect, how much Time To Go (TTG), how long it would take you to get to your target, Velocity, and so forth.

Waypoints: A major change in version 3.30 over previous versions of TerraSync is that now, besides just the navigation screen, if you were to go to the [Navigate] subsection, click on here - and then click on 'Waypoints'. This has now brought back the ability to create separate waypoint files and store them on the receiver. So instead of having all of your data stored in a data file, you could actually have a separate waypoint file [Wpt File].

And so, for example, if I were to create one, as an example - and I'll just leave it in my default memory - various Options that I now have would be to create a New waypoint, or I could either give it a name and type in coordinates if they're available. Or now, I could actually 'Create From' my GPS [drop-down] again. We have lost that in previous versions of TerraSync but they have now brought this back.

So once you created your Waypoints or access Waypoints, you could also set your nav targets from a pull-down list here under the Waypoints section or, if you're in Navigate, you could set up the display, or you could go back to your map view to select your targets.

So at this point, I am now going to go back to my **Status** menu, which is the screen where we start, and this completes the overview of the TerraSync software.

Additional Information

Training Options: Again, if you need more detail on how to actually work with and collect the data, you could go to [website]

Trimble's Users' Guide or **Getting Started Guide** for the software

http://www.trimble.com/terrasync_ts.asp?Nav=Collection-30232

Or talk to your **State GPS coordinator** or **GIS coordinator** to find out your various training options.

If one has questions, you could also contact me:

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Thank you

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