SD Quads™
for
Windows®
NetBooks, Laptops, & PC's

Installation and User Guide

Real-time GPS Positioning
On USGS Topographic Maps
with Auto-Stitch™ Technology

- **SD Card installation instructions for SD Quads**
- **Setting up your *Bluetooth*® GPS receiver**

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- **SD Card installation instructions for SD Quads**
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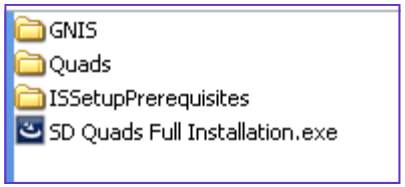
SD Quads™ Installation Instructions (SD Card)

The enclosed SD Card contains installation files for SD Quads software, as well as all of the digital topographic maps for your State (or multiple states, if applicable). The topographic maps are in the 'Quads' folder on the card. Another folder included on the SD Card is 'GNIS'. The GNIS folder contains GNIS database files (1 or more) for your state package.

Prosurv SD Quads is available on SDHC cards only. The HC stands for High Capacity. In order to use the SDHC card, be sure your laptop, NetBook, or PC supports the use of these cards (specifically, SDHC). If your computer only supports SD (non-HC) cards, then adapters, such as the SanDisk MicroMate™ (trademark SanDisk) USB-SDHC adapter can be used in order to support the SDHC SD Quads card.

Installing SD Quads on Windows® Computers



1. Insert the SD Quads Card into the SDHC slot of your computer.
2. Browse to the drive containing the SD Quads card.
3. Double-click the 'SD Quads Full Installation.exe' file to start the installation.
4. Follow the on-screen instructions.
5. Once SD Quads has been installed, run the program.

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Setting up your GPS Receiver

SD Quads requires the use of a GPS receiver in order to track maps as you hike or drive. There are many GPS receivers available today. To work with SD Quads, you simply need a GPS receiver that sends data through a serial port. You do not need a GPS receiver that has a display or screen.

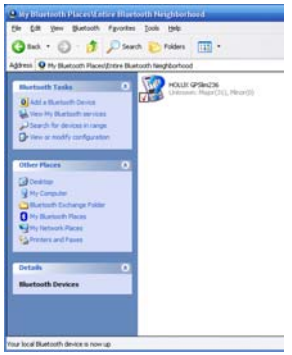
There are two major types of GPS receivers: ***Bluetooth®*** or USB. A Bluetooth GPS receiver is nice because it is wireless--you can set it on your dashboard and it will communicate with SD Quads on your laptop or netbook. However, in order to communicate with the ***Bluetooth® GPS receiver, you will need a Bluetooth®-enabled laptop, netbook, or PC.***

Using a *Bluetooth*® GPS Receiver

Using the Bluetooth software on your PC, you will need to "discover" and then "pair" the GPS receiver with your computer. See the screen captures, below:

In this example, click on "View Devices in Range". Your Bluetooth software may be different.

Double-click the Holux (or similar) GPS device.

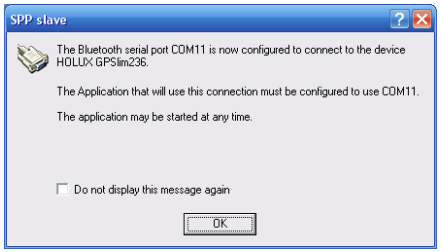


Double-click the “SPP slave” device.

At this time, you may need to establish a “pairing” of the device. This ensures a secure connection to your GPS receiver. Many manufacturer’s require a password code (usually 4 characters) to complete the pairing.

Pair the device by entering the password code provided by the manufacturer. Please refer to the GPS manufacturer’s instructions for further information.

Once the device has been paired with the computer, you will need to setup the services for the device. In this case, the service that you need to setup is a “virtual com port”, also known as a virtual serial port.



Note the serial port number that has been created for the device.

In this case, the device can be used by using serial port #11 (COM 11).

You are now ready to begin using your GPS receiver with SD Quads!

- GPS Latitude
- GPS Longitude
- Recorded Date
- Recorded Time
- Recorded OA Date
- Waypoint Type
- Waypoint Symbol
- User Image Location (Path to your Picture)
- User Image On
- Waypoint Symbol Tag

Appendix A

SD Quads Trail Files contain the following Waypoint Data (some data may not currently be in use by SD Quads):

- Point #
- Northing (Image Zone)
- Easting (Image Zone)
- Elevation (GPS)
- SPC Zone (Job Zone)
- User Text
- Quad Name
- Slice
- X
- Y
- Offset X
- Offset Y
- Font Name
- Font Size
- Font Color
- Font Bold
- Font Italic
- Font Underline
- Font Strikeout
- User Layer
- Color Red
- Color Green
- Color Blue
- Is Visible
- Feature Code
- Attribute 1
- Attribute 2
- Attribute 3
- Attribute 4
- Attribute 5
- Click Northing (Job Zone)
- Click Easting (Job Zone)

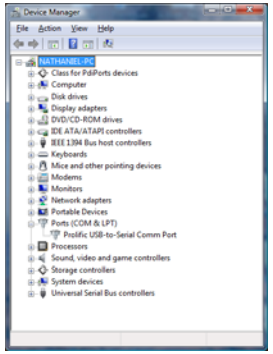
Using a *USB* GPS Receiver

Be sure to install the GPS manufacturer's device drivers before plugging in your USB GPS receiver.

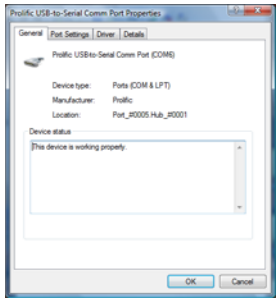
After installing the device drivers and plugging in the USB GPS, you will need to find out which serial port the GPS unit is using. To do this, open up the Device Manager on your PC. Look for the "Ports" listing in Device Manager, and then see which port is used as a serial port for your USB GPS receiver.

On Windows Vista® computers, to find the Device Manager, simply go to Start and type in the words "device manager" in the search box. On Windows XP computers, you can right-click My Computer, select Properties, select the Hardware Tab and then click on Device Manager.

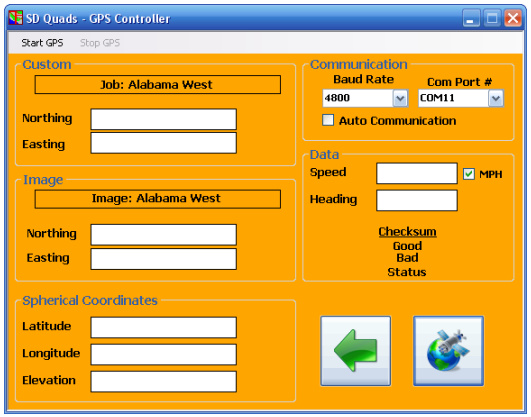
On you're in the Device Manager, look for "Ports". You should see a port for your USB GPS receiver.



Most times, the port number will be shown in the description of the Port. However, sometimes, you will need to right-click the port and look at it's properties to determine the serial port number.



Notes about the Serial Port and Auto Communication



SD Quads has Auto-Communication capability. However, rather than forcing the program to search through many different serial ports for a GPS communication stream, it is actually better and faster to select the available COM port from the drop down list, and UNCHECK the auto-communication box.

So, if you know the COM port that your GPS receiver is using (see the previous section if you need to find out how to look for the port number), simply select the port # from the drop down list, and you'll be ready to go! Also, be sure to set the appropriate BAUD RATE for the GPS device. Most GPS devices operate at a BAUD RATE of 4800, but some are 9600 or even higher. Lower BAUD rates tend to have less communication errors.

Important note: SD Quads only discovers the port numbers in the drop down list when the program is started up. So if you plug in or connect to your GPS receiver after starting SD Quads, then the port # may not appear in the drop-down list. If this happens, simply exit SD Quads, then re-start the program so that it can discover the new, valid, port number.

The Prosurv Imaging Buttons

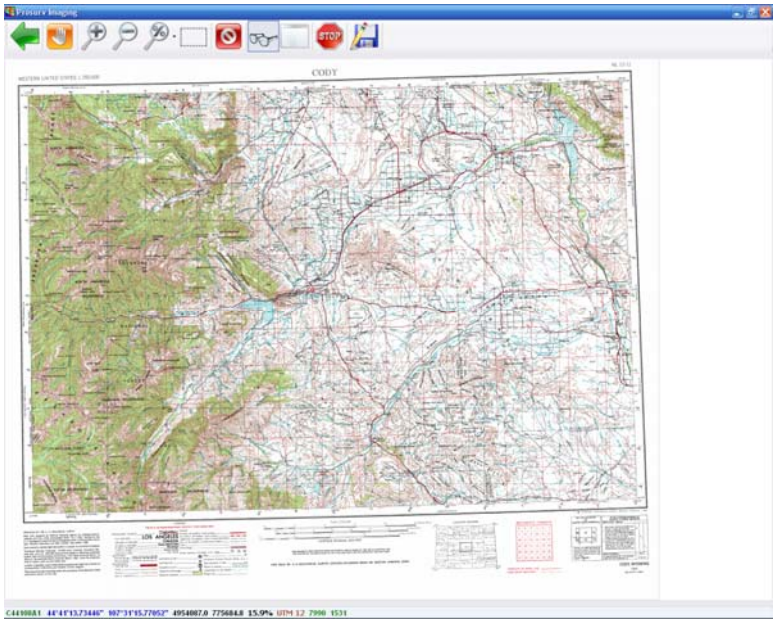
The Prosurv Imaging buttons, from left to right are:

- Back to SD Quads
- Pan around the map
- Zoom + (allows zooming by clicking each time)
- Zoom -
- Zoom %
- Zoom Window (select an area to zoom into)
- Cancel mouse tools (zoom/pan)
- Anti-alias On/Off - When Anti-alias is on, the map will look sharper and show more detailed when the zoom is less than 100%. Anti-alias also slows down zooming, so you should turn off Anti-alias until you're done zooming, then turn it back on. Zoom %'s over 100% are unaffected by the Anti-alias button.
- Zoom to fit in your Window
- Stop GPS - With GPS running in the background, everything in this screen will be slower. You can Stop the GPS (and hence, speed up this screen) by clicking the Stop GPS button. Once you exit this screen (using the green back arrow), GPS will be automatically re-started.
- Save the Map as a Geo-referenced .tif file. This feature actually allows you to save the entire map as a .tif image, complete with a .tfw World file! Note that the image becomes the original USGS digital topographic map (complete with collar information), just as if you had purchased the map from the USGS!

Prosurv Imaging

SD Quads also includes a powerful Prosurv Imaging package. You can activate Prosurv Imaging at any time by first clicking on the Prosurv Imaging icon (shown left).

Then, whenever you click anywhere on the currently stitched map, the location of your click is computed. That location is then translated into the full map name and the entire map is re-stitched into it's original form and displayed in a new window!



The Prosurv Imaging window showing the entire re-stitched 1:250,000 map.

Your communication settings are stored on your computer automatically, so you should only have to do this once.

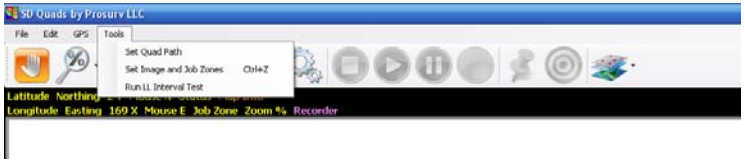
You are now ready to begin using SD Quads!

Using SD Quads the First Time

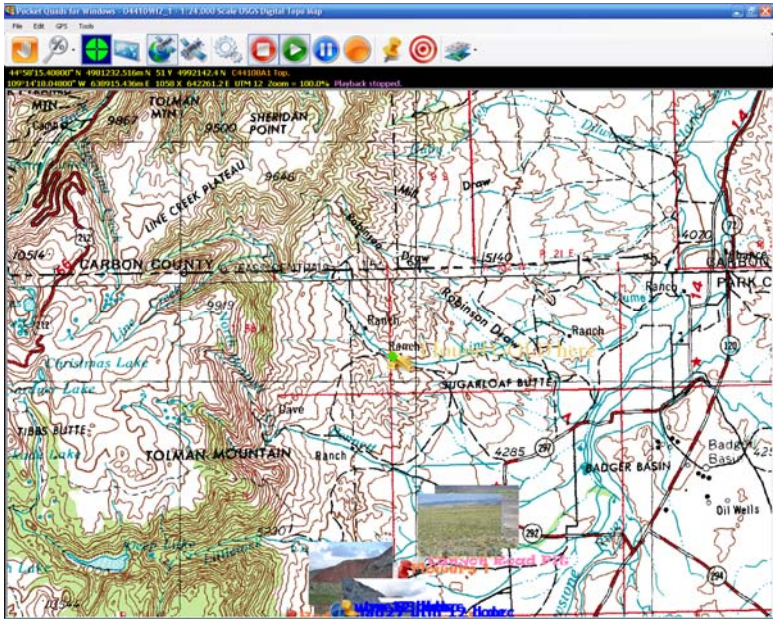
Now that you've properly setup your GPS receiver, you are ready to begin using SD Quads. There are a few steps that you should take the very first time you use the program. An outline of the steps is shown below, followed by detailed, step by step instructions:

1. **Set the Quad Path.** This is the path to where all the topographic maps are located. So if you've installed the SD Quads SDHC card into, say, drive K:, then the correct path to the quads will be K:\Quads.
2. **Set the Job Zone.** SD Quads is very easy to use, but also very powerful. It includes the ability to work in coordinate systems different than the default coordinate systems of the images or maps themselves. Typically, all maps are based on UTM (Universal Transverse Mercator), and are NAD83 (North American Datum). However, for those familiar with their own State's coordinate systems, the program allows you to select a different coordinate zone to work in, such as Wyoming West Central State Plane Coordinates. For those unfamiliar with (or if you simply don't care or need to know about) zones, you should simply check the "Auto Job Zone" box and forget about zones.
3. **Create a New Quads Trail File**. Simply go to the main menu and select New Trail File from the File menu.
4. Be sure that you've setup your **GPS communication** properly, by going to the GPS→GPS Data window. In this screen, set the appropriate Baud rate and Serial Port number as outlined in the previous section. To ensure fast and easy communication with your GPS device, set these manually, rather than relying on the Auto Communication (in other words, try to avoid using Auto-communication, even though it's there).

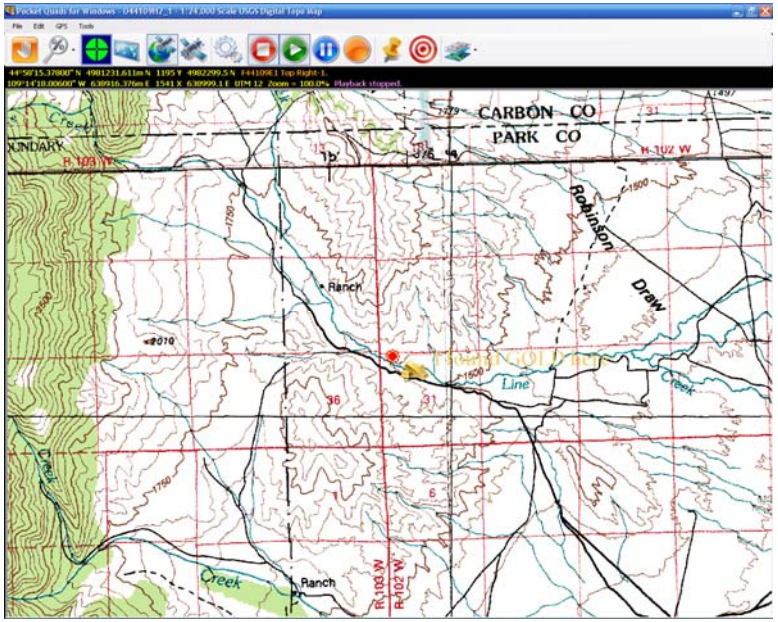
Step 1: Setting the Quad Path



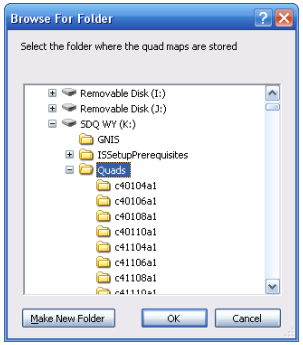
Go to Tools→Set Quad Path.



1:250,000 Scale Map



1:100,000 Scale Map

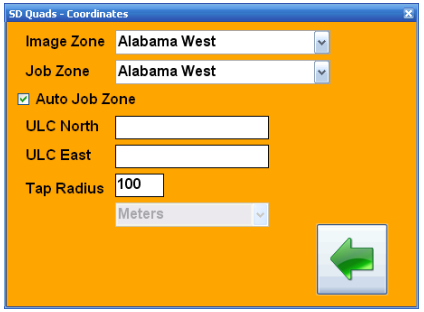


Browse to the Folder called "Quads" that's located on your SDHC SD Quads card, and click OK.

SD Quads will now know where to search for every topo map that's included on the card.

Step 2: Setting the Job Zone

If you don't know or don't care about UTM or State Plane Coordinate Zones, then simply check the Auto Job Zone box.



Whenever a map is loaded, the correct zone for that map is calculated. With SD Quads, all image zones will always be UTM NAD83. This allows SD Quads to compute coordinates for the correct zone. These rectangular coordinates (aka Northings and Eastings) are grid-based, as opposed to Latitude and Longitude which are spherical or polar in nature.

Again, you don't need to know anything about zones--and in that case, you can simply check the Auto Job Zone box and be done with it. By checking the Auto Job Zone box, the job zone will always match the image zone, automatically.

However, if you're a land surveyor, or if for any reason you'd like to work in a job

zone that's different than the image zone, then you should uncheck the Auto Job Zone box and select the Job Zone from the Job Zone drop down list.

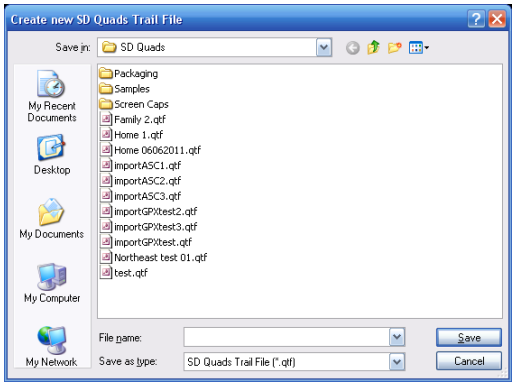
If you are working in a different Job Zone than the Image Zone (which is automatically set when an image is loaded), keep in mind that the Job Zone setting is stored with the individual trail file that you're working with. In other words, you will want to set the Job Zone each time you create a new trail file.

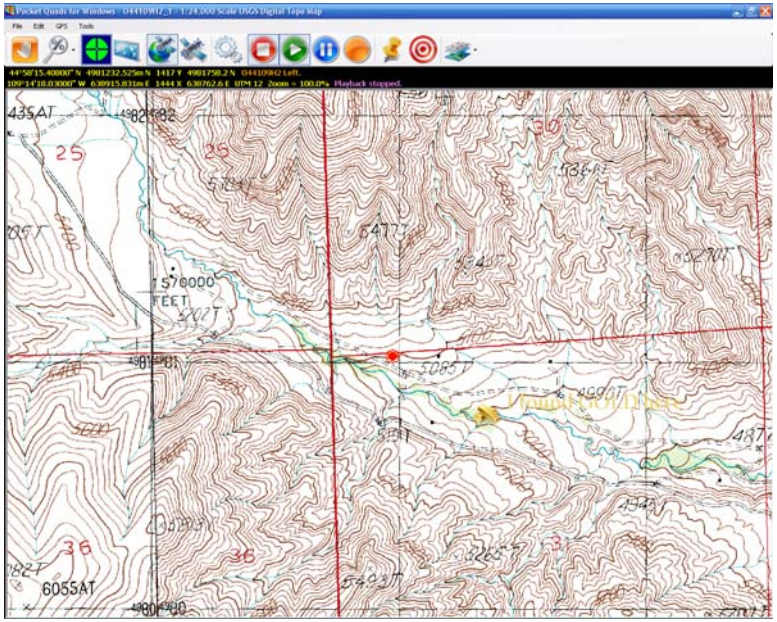
Once again, if you don't care about Job Zones, just leave the Auto Job Zone box checked. This setting (the Auto Job Zone check box) is remembered on your computer and is not job or trail-file specific.

Step 3: Creating a new SD Quads Trail File (*.qtf)

Many functions in SD Quads require that a trail file is currently open. While you don't need to have a trail file open in order to connect to your GPS receiver and see topo maps in action, it is recommended that you always have a trail file open when using SD Quads. This will ensure that all functions will work as expected.

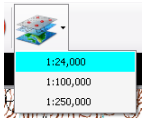
To create a trail file, go to File-->New Trail File. Enter a file name and click Save.





1:24,000 Scale Map

Changing the Map Scale (on the Fly!)



You can change the scale of the map you're looking at, on the fly!

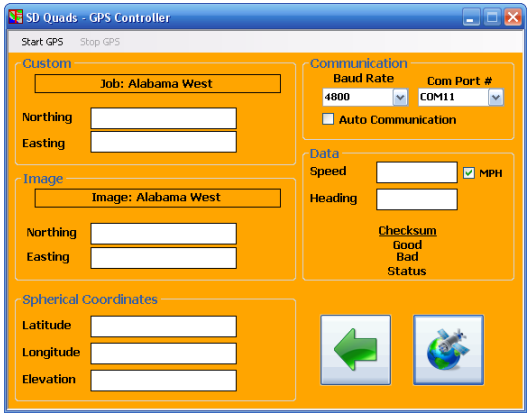
Simply select a different scale, and voila! The new map is shown.

Also, by clicking on the current map scale, you will force SD Quads to reload the map, thus erasing any errant distance clicks and other non-Waypoint objects that have been drawn on the map. So in this sense, it can serve as a "refresh".

Note that all Waypoints and Pictures will be shown, no matter the scale, as long as their location falls within the boundaries of the currently stitched map!

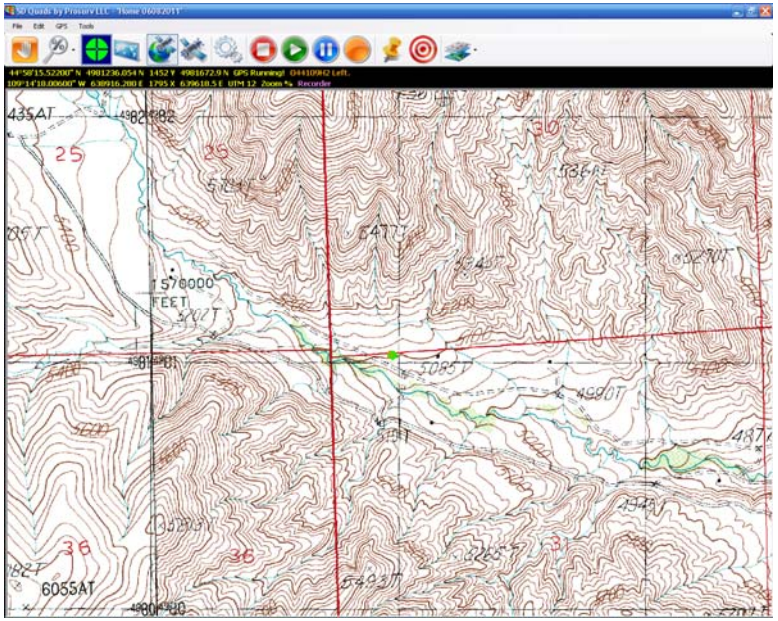
Step 4: Setting up proper GPS Communication

1. On the Main Menu, go to GPS→GPS Data.
2. Uncheck the Auto Communication check box to setup the communication manually.
3. Select the Baud Rate and COM port that matches your GPS receiver.
4. Click the "Back" (left Arrow) button to close the screen.

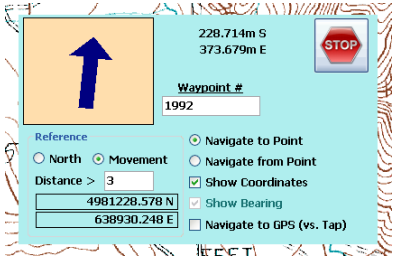


On the Main toolbar, click the GPS On/Off icon, as shown above. SD Quads will attempt to communicate with your GPS device. Once the communication is successful, SD Quads will check to make sure that the GPS signals are good enough for a "fix" on your position. When the location is "fixed", SD Quads will load a topo map based on the current GPS position. SD Quads' Auto-Stitch technology automatically stitches together up to 4 different topographic maps, thus ensuring that you always have enough

map area surrounding your current position so that your position stays centered in the screen!



Note the above example. SD Quads has stitched together two 1:24,000 scale topographic maps, automatically, and centered them on your position.



←Navigating to a point, by referencing movement.

The movement "sensor" is based on going a certain distance. You can set the distance at which SD Quads will compute the direction (of the arrow) to the Waypoint. By default, the distance is set to 3m. So, every 3m, SD Quads will re-calculate the direction to the Waypoint.

You can switch from navigating to the point, to navigating *from* the point. This will reverse the navigation arrow. This is good for knowing how far you've gone from a Waypoint (such as camp), and the direction from camp to your current position.

Also, you can select to show Bearing & Distance or Azimuth & Distance by changing the selections of the radio buttons and check boxes.

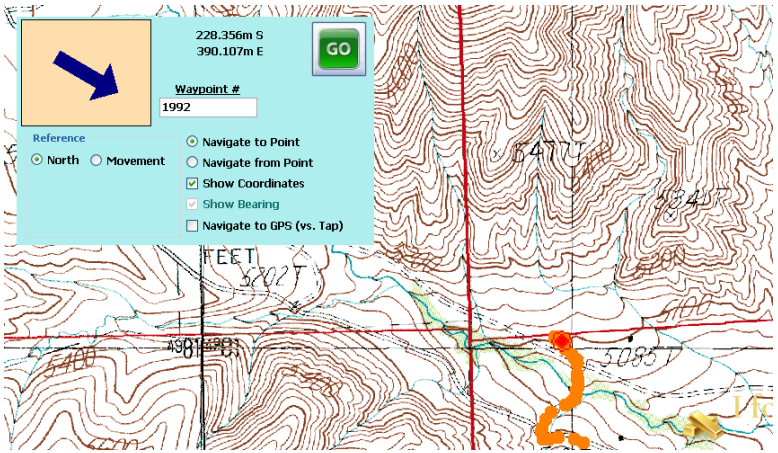
And finally, when a Waypoint is stored, the clicked location as well as the current GPS location are stored with the Waypoint. So when navigating, you have the choice of navigating to the clicked location, or, the actual GPS location that existed when the Waypoint was stored.

Note that in the above example, the Waypoint is 228.714m South and 373.679m East of your current location.

Click the Target button again to toggle the screen OFF.

Navigate to a Point

Click the Target button to begin point navigation.



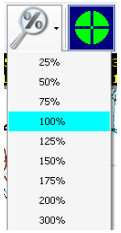
We just created a new "clicked" Waypoint, with Gold Bars as it's symbol. We can easily navigate to the point, as long as we know the Waypoint #. The edit screen showed us that the Waypoint # is 1992. Simply type in the Waypoint # and press the Go button.

There are two basic ways to navigate to a point:

1. Reference North - The arrow's direction will always be based on "up as North". So notice how the gold bars are basically Southeast of our current position.
2. Reference Movement - This can be a little confusing at first, but basically the arrow's direction is based on the direction that you're currently moving. If the point that you're navigating to is straight ahead, then the arrow will point directly UP. If you're moving away from the point, then the arrow will point straight down.

The Main Toolbar

PAN - Click this button to click and drag the map, as desired. Note that clicking the pan button turns off the Center on GPS button (the 3rd button). Simply click the Center on GPS button to "rubber-band" back to your GPS position.



Zoom - Click and select the zoom % from the drop-down menu.

Center on GPS - When clicked ON, the map will center on your GPS position at all times. If new maps are not loading, or if it doesn't seem like SD Quads is following you, it's probably because this button is OFF. Note that clicking some buttons, like the Pan button, automatically turns centering OFF.

Load Complete Quad Map - Click this button to ready SD Quads to automatically load the **entire quad map, including borders, into a brand new window. Once you've turned this function on, then by simply clicking anywhere on a map currently being shown, that map will be re-stitched into it's full size, original USGS topographic map.**

GPS On/Off - Toggles GPS operation. When clicked ON, SD Quads will attempt to communicate with your GPS device. When off, all GPS functionality is shut down.

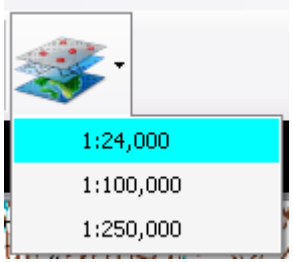
View Satellites - Displays the current satellite positions (graphically).

Options - Accesses the Waypoint font, font color, Bread Crumb trail, and recording points settings.

Timed & Distance Recording functions: Stop, Play, Pause, Record

Place a Waypoint by clicking on the Map

Navigate to a Waypoint



Select a Map Scale - The 1:24,000 scale maps are commonly known as 7.5' Quadrangle maps.

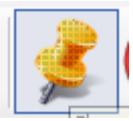
text for the Waypoint (and checking the Attach Image box, if desired), simply click on the map. The location of the Waypoint will be determined by ***where you click!***

Don't worry though! SD Quads will store both the location where you clicked **AND** the current GPS location **WHEN** you clicked! That way, later, when you want to navigate to the point, you can select whether to navigate to the GPS location or the clicked location!

Setting the Waypoint.
Gold may not have been a good color for the font, but no need to worry, as we can always edit the font color, later!

Click the Thumb-tack to make the Waypoint screen go away.

Recording a Waypoint (by Clicking)



Clicking the Thumb-tack icon will display the Waypoint screen. This screen has many features.

First, you will notice a large number of Symbols to choose from. There's even a second screen's worth of more Symbols available for you choose.

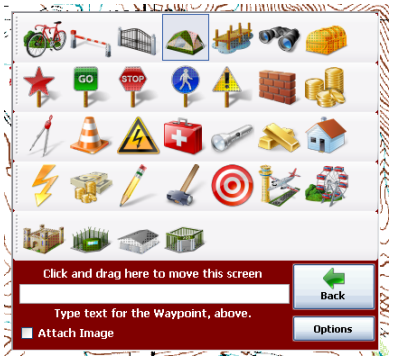
Click the More Icons button to see the second screen of Symbols. Note that you MUST choose a Symbol for the Waypoint.

To set a Waypoint, start by selecting a Symbol. Next, type in some text for the Waypoint. You can even attach an image by checking the "Attach Image" box.

If you will be attaching an image, you will be allowed to browse for the picture after creating the Waypoint.

So, HOW DO I CREATE THE WAYPOINT? Good question!

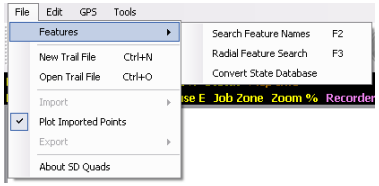
After selecting the symbol and entering



SD Quads Functions

This section will take you through the features and functions found in the Main Menu. Specifically, these are **File**, **Edit**, **GPS**, and **Tools**.

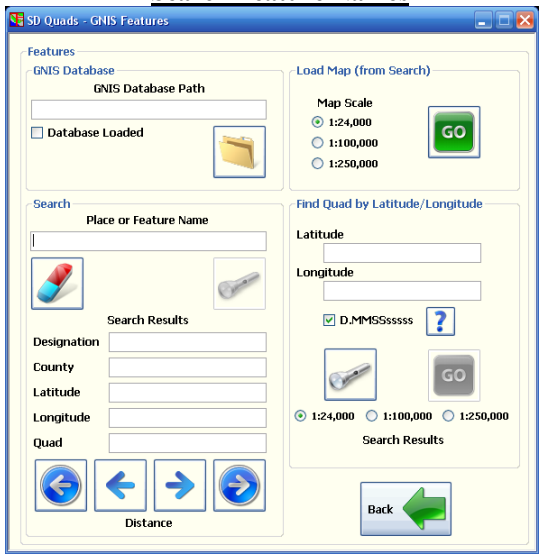
File Menu



The **Features menu** has 3 functions:

1. **Search Feature Names**
2. **Radial Feature Search**
3. **Convert State Database**

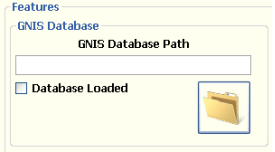
Search Feature Names



What are Features? In SD Quads, Features are a list of items in a database known as the GNIS. GNIS stands for Geographic Names Information System. These databases are maintained by the USGS. Features have designations, or types. A designation could be a geyser, lake, cemetery, basin, etc… Each specific Feature contains information such as it's designation, location (latitude/longitude), and other vital information.

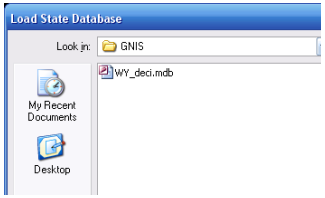
Prosurv SD Quads has converted all of the State GNIS databases from simple text files into searchable databases. Your State SD Quads card comes pre-loaded with the converted GNIS database file for your State.

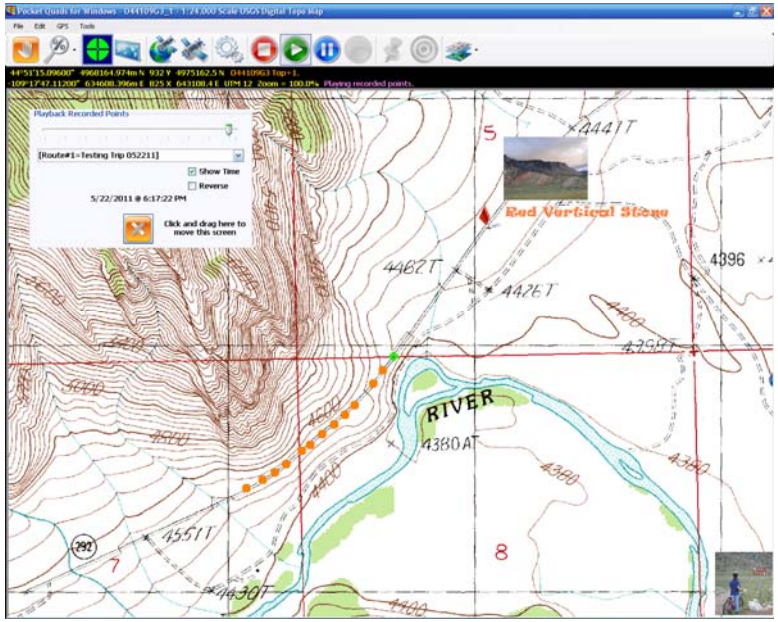
Now that you know what Features are, you may ask "Great, so how do I use them"? We're glad you asked! First, let's load the GNIS database file. Once loaded, SD Quads will always look for the same database in the same place, so you don't have to load it again--it will be done for you automatically.



Loading the GNIS Features database:

1. From the Main screen, hit F2, or click on File→Features→Search Feature Names
2. Click on the Folder and browse for the GNIS file.
3. Typically, the file will be located in the GNIS folder of your SD Quads SDHC card.
4. Double-click the desired file.
5. Note that some SD Quads packages include more than one state. However, only one State database can be opened at a time. Therefore, browse for the State that you need (consistent with the State that you're currently using) and load that State's database file. You can always switch to using a different State database, when needed.

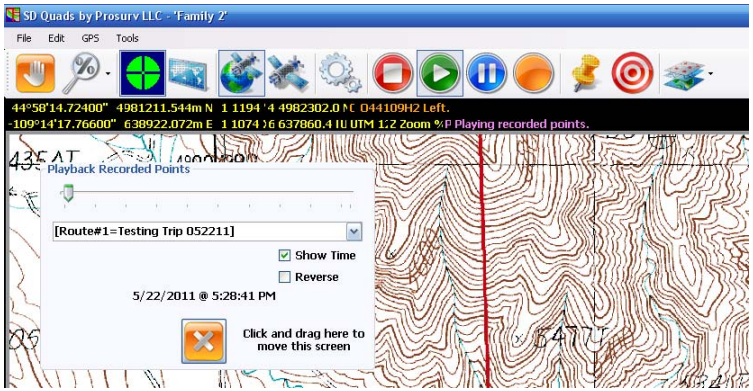




A sample Playback screen shot.

Playing Back Recorded Routes

Hit the Green Playback button to bring up the Playback screen:

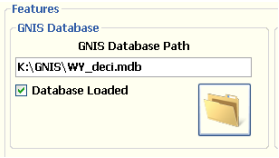


Note the slider on the playback screen. The slider lets you "fast forward" or "reverse" to a different point in time.

Also, you can select which route to playback by clicking on the drop-down route list By un-checking the "Show Time" box, you can view the record # as opposed to the date and time. Further, you can playback the route ***in reverse, if desired!***

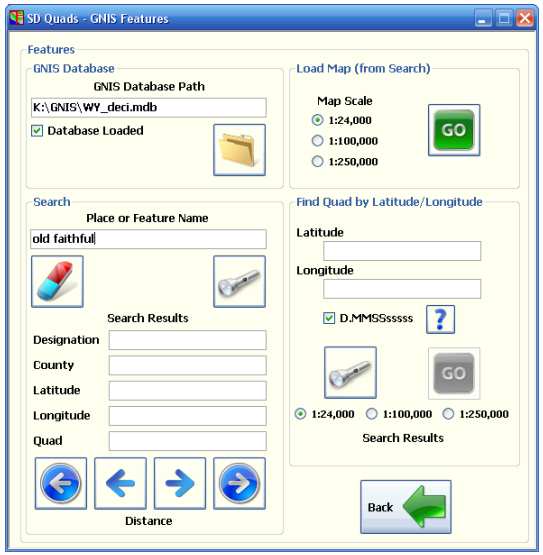
Note that you can move the Playback screen by clicking and dragging where it says "Click and drag here to move this screen".

NOTE: Be sure that GPS is turned OFF when using the Playback features. Otherwise, your screen will "rubber-band" back to the GPS position virtually every second!



You're now ready to use that State's database file!

Using GNIS Features



There are 3 main parts to this screen:

1. The place or feature name search area.
2. The Load Map area.
3. Find Quad by Latitude/Longitude.

Let's say you'd like to see the map that contains Old Faithful. Okay, no problem. Simply type in the words "old faithful" into the Place or Feature Name text box. Then,

click the Flashlight button. SD Quads will search the entire database for all matching features.

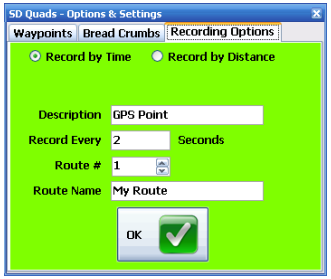
3 features matching "old faithful" have been found! The first is "Old Faithful Geyser".

You can use the First, Back, Next, and Last buttons (blue arrow buttons) to scroll through the matching feature list.

Once you've found the match that you're looking for, you can load the map simply by clicking on the green GO button at the top right of the screen! That's all there is to it!

Hit F2 to go back to the GNIS Features window. There, you can select a different map scale to load. This time, click on 1:100,000 and hit the GO button. The 100,000 scale map is now loaded, instead! Similarly, you can load the 1:250,000 scale map as well.

Remember, if GPS is currently ON and the Center On GPS button is on, then the map will rubber-band back to your current location. So be sure to turn the GPS off, before using this function.



You can record points by time or distance intervals. For example, you can record waypoints every 2 seconds. You may assign a route # and route name to the route.

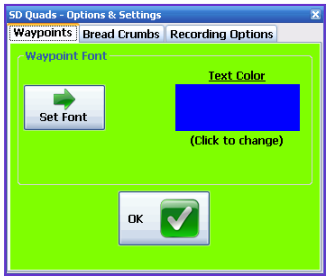
Recording Routes

Hit the Orange Record button to begin recording. Use the settings (in Options and Settings--Recording Options) to determine how the Route Waypoints will be recorded. When recording by distance intervals, SD Quads will check the distance between the last recorded point and your current location. If the distance is greater than the pre-set recording interval, a new Waypoint is stored.

When recording by time intervals, it is recommended that you record at an interval of at least 2 seconds. Recording every 1 second would cause 3600 points to be stored each hour!

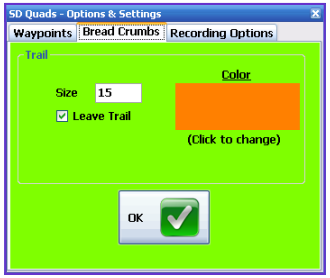
Hit the Pause or Stop buttons to stop the recording of points.

Options



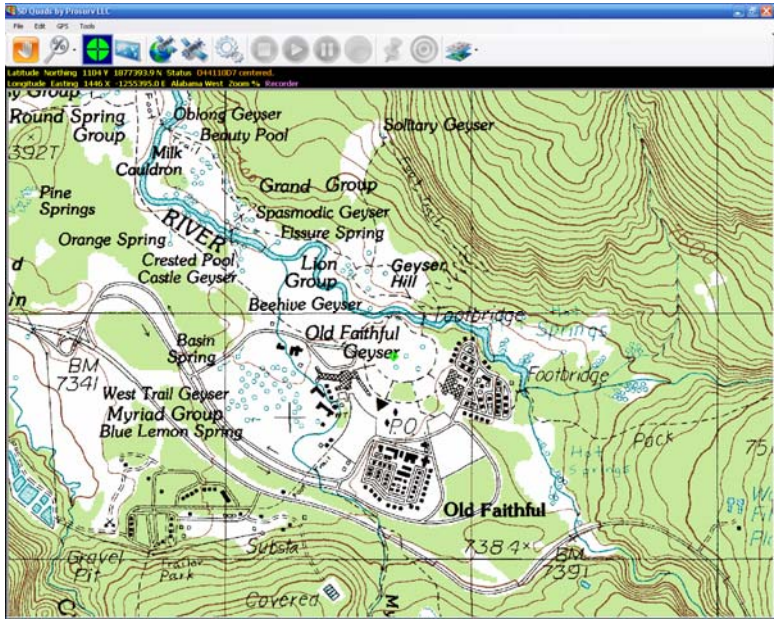
Be sure that you have a trial file open when you access Options!

Click the Waypoints tab to set the font and text color for each Waypoint.

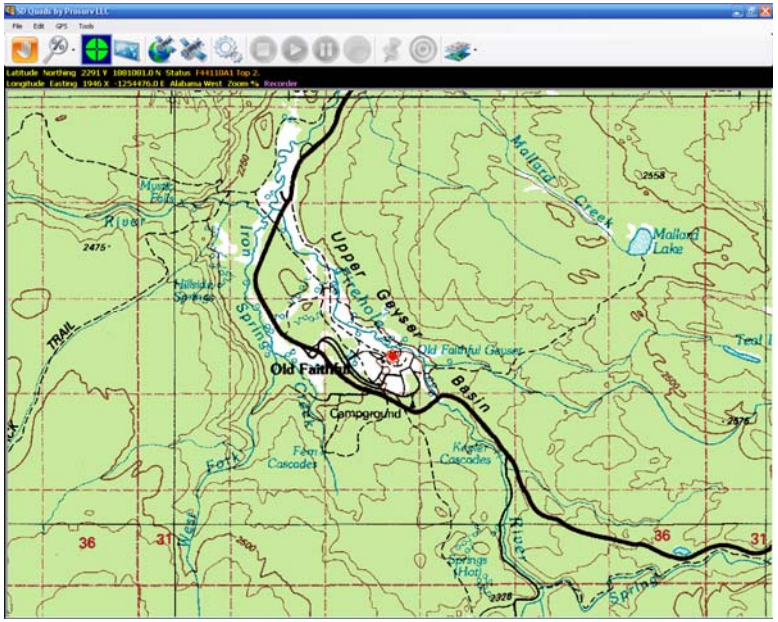


Click the Bread Crumbs tab to set the size and color of bread crumbs that are left behind as you move along the map.

Note that as SD Quads stitches new map pieces together, older bread crumbs will be erased.



The 1:24,000 scale map, loaded using the GNIS database search for "Old Faithful".

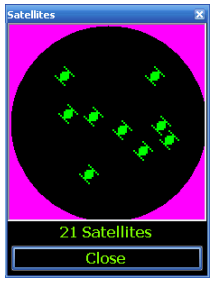


The 1:100,000 scale map, loaded using the GNIS database search for "Old Faithful".

The screen displays the following information:

- Current GPS coordinates (Northings and Eastings) in the Job Zone Datum
- Current GPS coordinates (Northings and Eastings) in the Image Zone Datum
- Current GPS Latitude and Longitude and Elevation
- Communication settings, including Baud Rate, and Com Port #
- Current GPS data such as Speed and Heading.
- Checksum (data verification) information such as good data, bad data, and whether the GPS is On or Off.

Click the Back button to exit this screen. Click on the GPS Satellites button to see a graphical view of the current satellite configuration.



This screen can also be accessed through the Main Menu by going to GPS→GPS Satellites, or by clicking on the GPS Satellites icon:

The GPS Menu

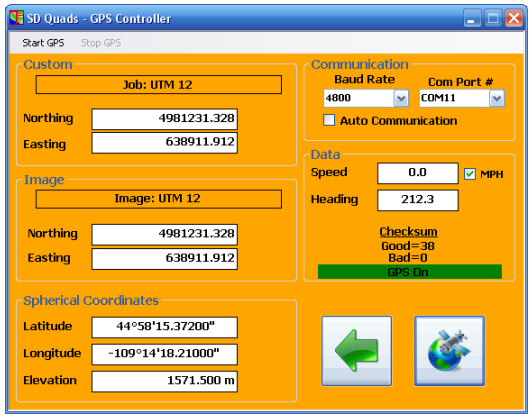
Start GPS

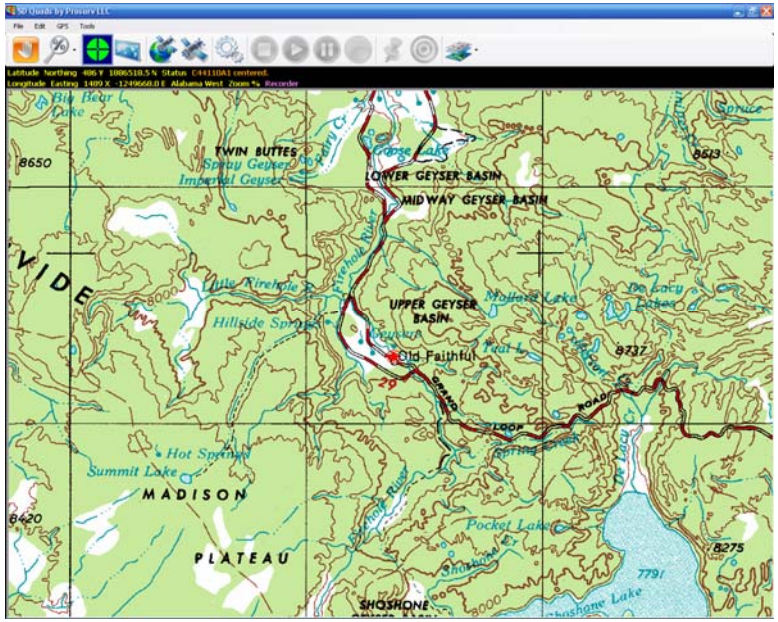
Just one more way to Start and Stop the GPS receiver. On the Main Menu, click GPS→Start GPS to startup the GPS receiver. Once started, the menu will change to "Stop GPS". Click it again to then stop the GPS receiver.

Normally, it's easiest to Start and Stop the GPS receiver by clicking on the GPS On/Off icon, shown here.

GPS Data

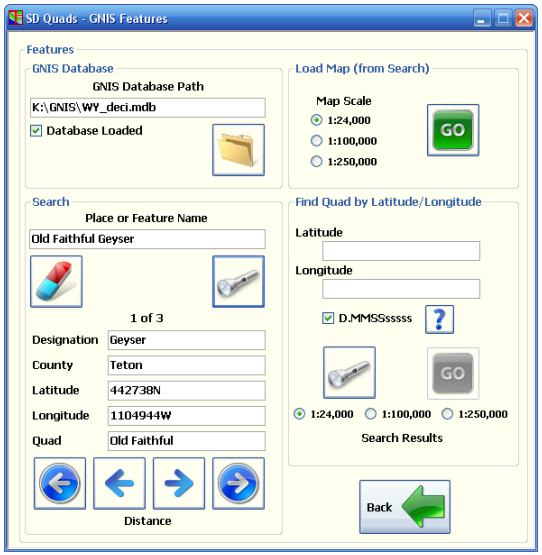
Go to the Main Menu and click on GPS→GPS Data. This will bring up the GPS Data Screen:





The 1:250,000 scale map, loaded using the GNIS database search for "Old Faithful".

Find Quad by Latitude/Longitude



You can also use this screen to load a map simply based on a latitude and longitude.

You may enter the latitude and longitude as DMS (Degrees Minutes and Seconds), or as decimal degrees.

The proper format for DMS entry is D.MMSSssssss. An example of D.MMSSssssss entry is:

45.192511453

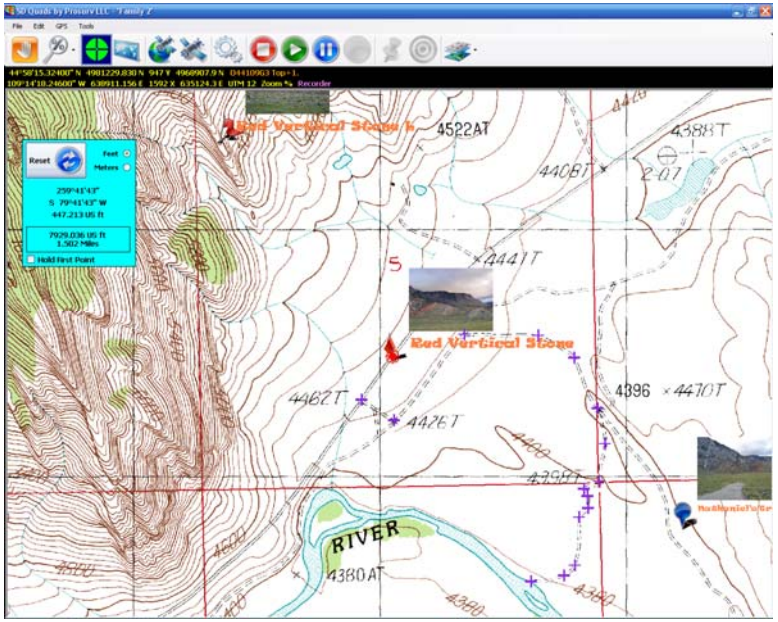
This represents 45 degrees, 19 minutes, 25.11453 seconds. If you have a latitude of say, 45.19251 degrees, you *must* enter zeroes to fill in the spaces after the 1. In other words, you need to enter 45.192510000

There must always be 2 digits for minutes, 2 digits for seconds, and 5 digits for decimal seconds.

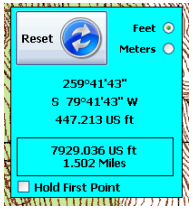
When entering decimal degrees, simply enter them as you would with any calculator. In decimal degrees, the 45.192511453 DMS latitude would be 45.32364292.

If you'd like to see how far it is from one point to many other locations, just check the "Hold first point" box, and click your first location. Then, each subsequent click will calculate the distance from the first, original point, to the new point. Again, you can clear the first point by hitting the Reset button.

You can make the Tap Distance screen go away by clicking on the Edit→Tap Distance again.



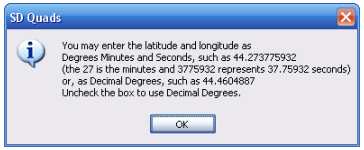
So, just HOW far is it to get to the River?



With SD Quads, it's easy to find out. On the Main Menu, select Edit→Tap Distance. You will see the Distance window overlaid on the map.

Once this screen is activated, every time you click on the map, you will see a violet cross-hair appear where you clicked. Just keep clicking on the desired route, and the distance from the last point to the current point is added to the total accumulated distance. You can see in this example that it would be 1.5 miles to get to the river if you take the off-road trail. You can reset the total distance by clicking the Reset button.

Note that you can hit the Question mark button next to the D.MMSSssss checkbox to see the following help screen:

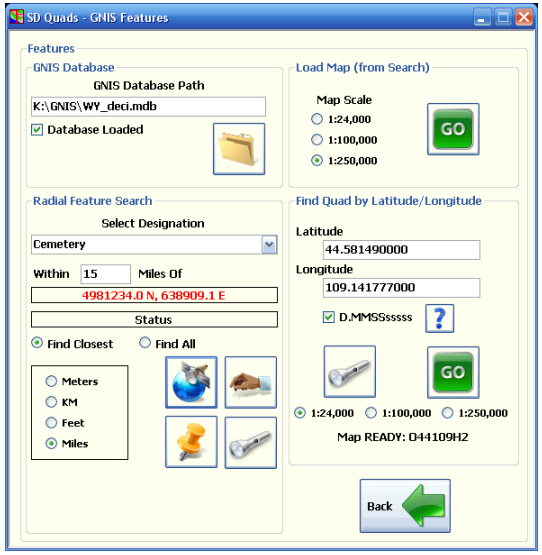


Enter values for latitude/longitude and hit the search button. If a corresponding map is found, the map file name is displayed. You may then hit the GO button (the one below the question mark) to load that map. Of course, you may choose a map scale to load the desired scale map.

Radial Feature Search

In addition to searching for the specific feature name, you can perform radial searches based on designations, instead. From the main menu, hit F3, or select File→Features→Radial Feature Search.

Note the different box labeled "Radial Feature Search".



There are many designations available. Select the desired designation (feature type) from the list.

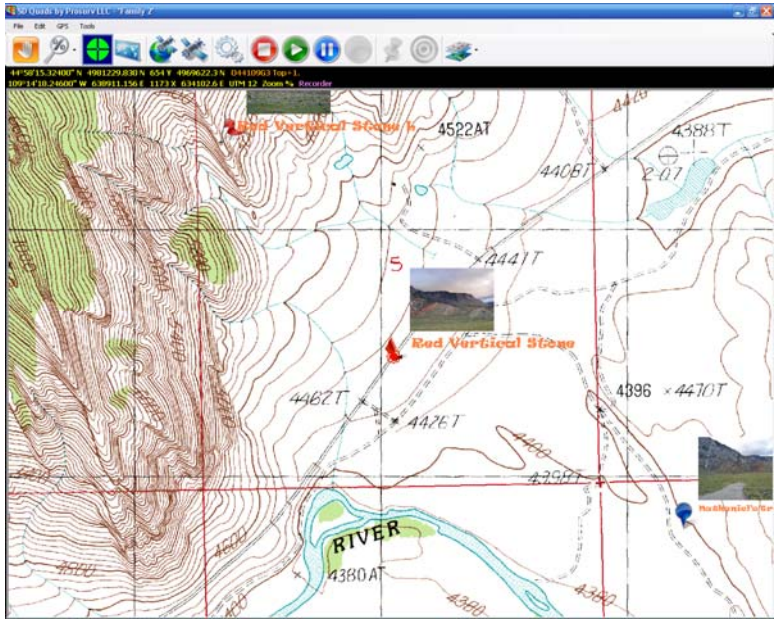
Then, enter the search distance (aka "radial" distance), such as 15 miles as shown in the example. In this case, we're looking for the closest cemetery within 15 miles of our current GPS position.

We now need a "center point" to search from. In other words, we need a point representing the center of a circle whose radius will be 15 miles. This gives us our search area. In this case, we will use our current GPS position as the center of the search circle. To do this, simply click the GPS button, shown here.

Now, click the Flashlight (search) button. SD Quads will search through the entire database, looking for all cemeteries within 15 miles of our current GPS position!

One cemetery was located. It is 9528.9 meters from our current position. If more than 1 was found, you could scroll through and find the desired cemetary.

Now, you can simply load the map by clicking on the GO button in the upper right corner of the screen:



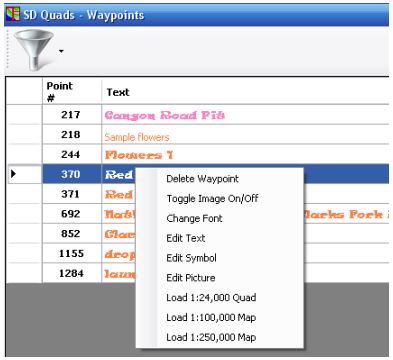
Viewing the map that contains the Waypoint. Way Cool!

Edit Waypoints

The Edit Waypoints screen lets you edit virtually everything about a Waypoint, including changing the picture (i.e. it's path) being shown for the Waypoint!

The **Filter** button allows you to filter which type of Waypoints that the list is currently showing. You can filter by:

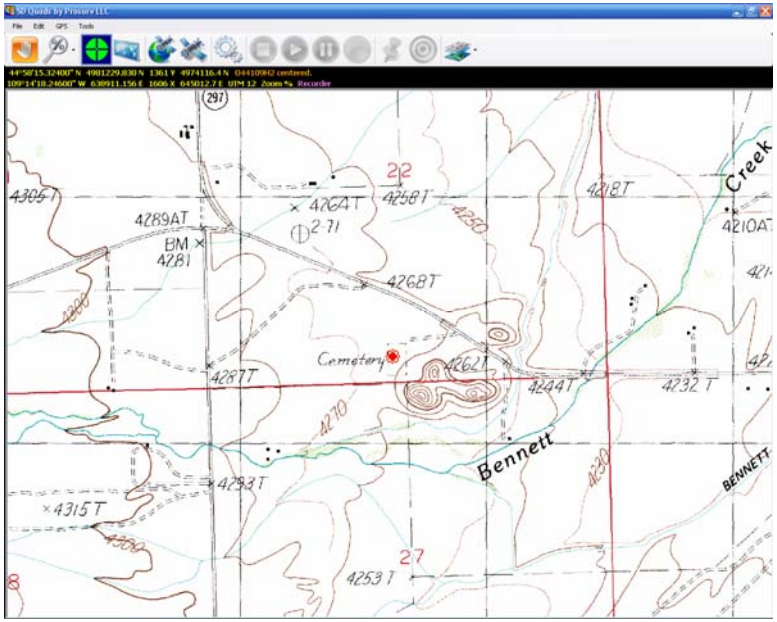
- Clicked Waypoints - Waypoints that you've created by clicking on the map
- Imported Waypoints
- Keyed-In or Hand-Entered Waypoints
- Waypoints that were recorded by Time Intervals (Routes)
- Waypoints that were recorded by Distance Intervals (Routes)
- All Waypoints



Find the Waypoint that you'd like to Edit, then select that row by clicking on the row. Next, Right-Click the row to bring up the editing Menu:

- Delete Waypoint
- Toggle Image On/Off
- Change Font
- Edit Text
- Edit Symbol
- Edit Picture

This menu also lets you load the map that contains the Waypoint (so you can see it). Simply select the scale map desired, and you're now viewing the map & Waypoint!



The Clark Cemetery, found using a GNIS Designation Search (1:24,000 scale map shown)

The **Radial Feature Search** screen offers several options.

You can find the closest feature to the desired position, or you can find all the features within the given radius (distance).

You may indicate the units for the search distance. And you can specify 3 different ways to indicate the center of the search circle, as shown below:

Click to set the center of the search circle as your **current GPS position**. GPS must be On and running to use this method. Remember to turn off the "Center on GPS" function. Otherwise, your map will "rubber-band" back to your current GPS location!

Click the "hand" icon to use the pick-point method. Once you click the hand button, the Feature Search screen will disappear, and you can now click your map to indicate the center of your search circle.

Click the thumb-tack icon to use an existing Waypoint as the center of your search circle. You must have a job (trail file) open to use this function. You will be asked to enter a Waypoint name, which must be the Waypoint # that was assigned to the Waypoint when it was created. If you're unsure about the Waypoint that you need to enter, you can use the Edit→Edit Waypoints menu function to examine your Waypoints. (See the picture, below).

Given;
44.521296400 (D.MMSSssssss) Latitude NAD 27
109.161212144 (D.MMSSssssss) Longitude NAD 27
Results are:
4969777.646 Northing (NAD 27)
636659.290 Easting (NAD 27)
4969987.623 Northing (NAD 83)
636599.471 Easting (NAD 83)

Image Zone = UTM 12
Job Zone = Wyoming West Central State Plane Coordinates (NAD-83)
Given;
485574.138 Northing (stored as Click North)
558851.149 Easting (stored as Click East)
Results are:
44.521277400 Latitude (D.MMSSssssss)
109.161467000 Longitude (D.MMSSssssss)
4969987.623 Northing (stored as GPS North)
636599.471 Easting (stored as GPS East)

NOTES: D.MMSSssssss stands for Degrees, then a decimal point, then two digits for the Minutes, then two digits for the Seconds, then 5 digits for decimal seconds. If the seconds are 39.54985 then you'd type in 3954985 (without the decimal). In reality, all continental US longitudes are negative, so you can enter positive or negative for any longitude in this program.

NORTH/EAST) THAT REPRESENT THE 'JOB ZONE' COORDINATES.

However, if you know something about these coordinate zones, the screen coordinates and waypoint coordinate entry screen can be very powerful tools. For example, in Wyoming, the image zone will normally be UTM 12. But, you can set the job zone to Wyoming West Central (NAD-83) or even NAD27-Wyoming West Central State Plane Coordinates. Or, you could set the job zone to NAD27-UTM 12. Latitudes and Longitudes were different (yes, they were) in 1927 than they are today!

In fact, most USGS topo maps actually still reference the 1927 lat/long datum! Prosurv has converted all of the georeference files to NAD-83 coordinates when it created SD Quads. But there may be times when surveyors (or others) still need to work in NAD-27 coordinates.

In the 'Enter Waypoints' screen, you can enter latitude and longitude, or northings and eastings. If you enter lat and long, the coordinates (northings and eastings) will be computed and stored for you. If you enter the northing and easting, then the lat and long will be computed and stored for you. The latitude and longitude stored will always be 'in' the 'job zone' that you've selected. Similarly, the 'Click Northing' and 'Click Easting' will always be 'in' the 'job zone' as well. However, SD Quads will compute the true NAD-83 based coordinates and store those as 'GPS North' and 'GPS East'.

So, let's use an example:

Image Zone = UTM 12
Job Zone = UTM 12
Given;
44.521277400 Latitude (D.MMSSssssss)
109.161467000 Longitude (D.MMSSssssss)
Results;
4969987.623 Northing636599.471 Easting
Both the Click North, Click East and GPS North, GPS East will be the same.

OR,

Image Zone = UTM 12
Job Zone = NAD-27 UTM 12
So you would be entering coordinates or lat/long in NAD-27 UTM 12 coordinates;

Viewing your waypoints so you can know which waypoint # to enter when you click the thumb-tack icon.

SD Quads Trail Files

An SD Quads Trail File is a database used to store all of your waypoint information and certain settings and options. Creating a Trail File is quick and easy. Just go to File→New Trail File or press Ctrl+N.

You can open an existing Trail File by going to File→Open Trail File, or by pressing Ctrl+O.

Trail files contain lots of information regarding your Waypoints. To edit virtually anything related to your Waypoints, simply go to Edit→Edit Waypoints (Ctrl+E).

You can create Waypoints by hand-entering their location using Ctrl+W (or selecting Edit→Enter Waypoint), or simply by clicking on an existing map after you've turned on the Waypoint screen by clicking the Waypoint Thumb-tack.

For more information about the Trail Files and what is stored with each point, please refer to Appendix A, which details the fields for the waypoints in the database.

Import Points (.asc) File

The Import Points (.asc) file function lets you import a list of Waypoints from a "Points" file. An .asc points file is simply a text file with the extension .asc. But it represents a type of file used in the surveying industry.

Typically, these files specify a Point Number, coordinates, and a description of the point. Sometimes, they are referred to as PNEZD files, which stands for Point #, Northing, Easting, Elevation, and Description.

An example of the file would be:
1,496888.33,561458.52,5000.15,Home
2,496893.55,561498.35,5000.88,Well
3,496800.17,561525.89,4995.33,Bridge

The Import Points File function will let you browse for an .asc file. The points found in the .asc file will be imported and stored into your existing Trail File. An auto point numbering system is used during the importing of the points. For example, if you already have 1000 waypoints in your trail file, then the imported points will become 1001, 1002, and 1003.

As mentioned before, SD Quads is a powerful program. It allows you to select and use a Job Zone that is different than the Image Zone. It also stores three sets of coordinates with each Waypoint:

- Spherical or Polar coordinates simply known as Latitude & Longitude
- Rectangular coordinates in the Image Zone (UTM)
- Rectangular coordinates representing the Job Zone

If you're unfamiliar with these Zones, that's okay. You can just ignore them altogether. However, if you'd like to use the power and versatility of Job Zones, then please read on.

When importing points, SD Quads will use the current Job Zone. It will assume that the imported coordinates are coordinates whose datum matches the Job Zone in use. For example, if your trail file is currently using a Job Zone of Wyoming West Central (State Plane Coordinates), then it will be assumed that the coordinates in the imported file are Wyoming West Central coordinates.

Entering Latitude and Longitude

The proper format for DMS entry is D.MMSSssssss. An example of D.MMSSssssss entry is:
45.192511453

This represents 45 degrees, 19 minutes, 25.11453 seconds. If you have a latitude of say, 45.19251 degrees, you *must* enter zeroes to fill in the spaces after the 1. In other words, you need to enter 45.192510000

There must always be 2 digits for minutes, 2 digits for seconds, and 5 digits for decimal seconds.

When entering decimal degrees, simply enter them as you would with any calculator. In decimal degrees, the 45.192511453 DMS latitude would be 45.32364292.

Note that you can hit the Question mark button next to the D.MMSSssssss checkbox to see the following help information:
DOUBLE-CLICK THIS SCREEN TO EXIT HELP!

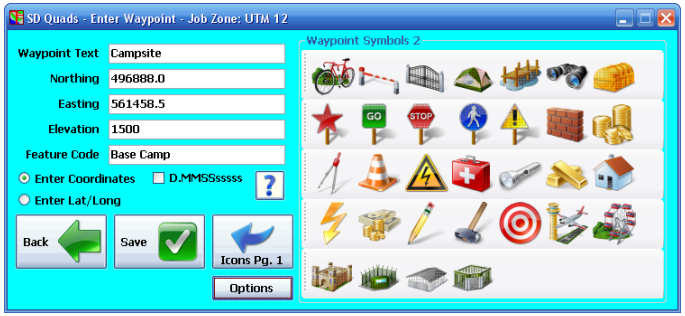
This screen is very powerful (yet easy to use)! It can perform coordinate conversions from Latitude/Longitude to Northings/Eastings and vice versa.

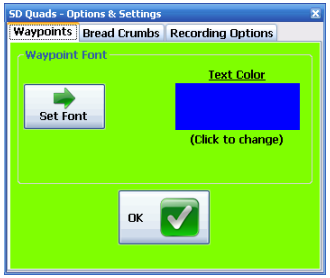
It is important that the 'Image Zone' and 'Job Zone' are properly set up in Tools→Set Image and Job Zones. The easiest way to do this is to let the GPS do it for you. In other words, by turning on the GPS, the Image Zone will be automatically set when a valid topo map is loaded. For example, image zones are normally 'UTM xx', such as 'UTM 12'.

Image zones are always NAD83-based. In other words, they will coincide with WGS 84 coordinates, which are the basis for GPS.

On the other hand, you can set a Job Zone to whatever zone you'd like. Now, if you don't know anything about these zones, simply check the 'Auto Job Zone' checkbox, and the job zone will automatically match the image zone, all the time. Then, your latitudes, longitudes, northings, and eastings will always be in the same UTM zone, and will always match each other.

NOTE: YOU ALWAYS HAND-ENTER THE COORDINATES (LAT/LONG OR





Click the Options button (shown above), to bring up the SD Quads Options & Settings screen. Select the Waypoints Tab to set the font and font color for the Waypoint.

Each Waypoint stores the Font information for it's own point. So you can have 100 Waypoints, each with their own color, font, font size, bold, italic, etc…

Entering a Rectangular Coordinate

It is important that you note that the coordinate being entered will be considered as being in the Job Zone Datum. For example, you've created a trail file and you've selected Wyoming West Central as your Job Zone. This tells SD Quads that you want to work in the Wyoming West Central coordinate system. So SD Quads will assume that the coordinate that you're entering is a Wyoming West Central coordinate.

The coordinate that you entered is then converted to an Image Zone coordinate. In this case, it would be converted to UTM 12 (NAD 83). It is then converted into a corresponding Latitude and Longitude. This allows the point to be plotted on the map, whenever it's location would be within the boundaries of the current map in view.

During the importing process, SD Quads will convert the incoming coordinates into Image Zone datum coordinates. These coordinates are then converted into polar coordinates (latitude & longitude).

Import GPX File

SD Quads can read existing GPX (*.gpx) files. GPX has become a popular format for the exchange of GPS data between different programs. GPX files are an XML-based GPS data file. SD Quads automatically reads routes and Waypoints from GPX files, allowing you to playback the routes and navigate to the Waypoints that were imported from the GPX file.

Export GPX File

SD Quads also has the ability to export your recorded GPS routes and Waypoints as a GPX file. Simply select Export GPX File from the menu. You can select to export all data (waypoints and routes) or, you can export specific routes only. On the main menu, go to File→Export→GPX File and enter a filename to save as.

Export All Data (as .csv)

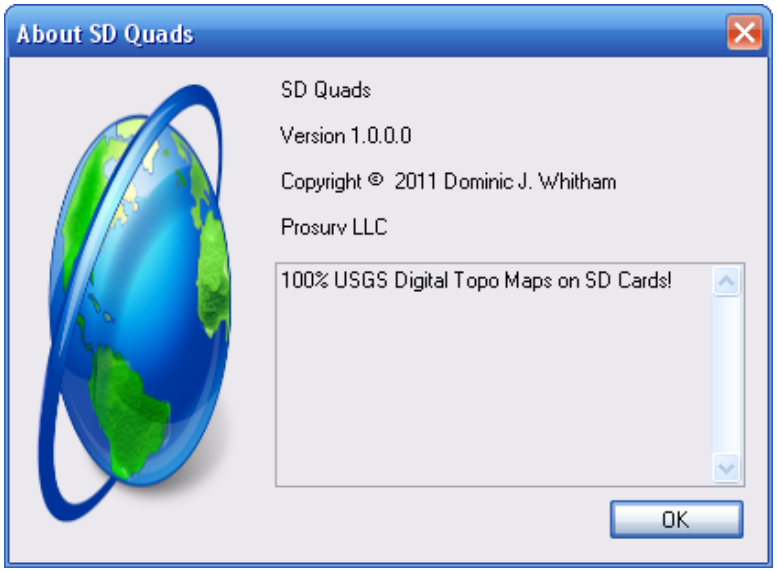
An SD Quads Trail File contains quite a bit of information for each and every Waypoint that is stored. If you'd like to see all of the data that's stored with each point, simply select Export All Data from the File→Export menu. The file is stored as an Excel .csv file, but it can be opened with Notepad as well as Excel. CSV stands for Comma Separated Values, so each field is separated by a comma.

Data exported includes:

- Point #
- Northing (in the Image Zone Datum)
- Easting (in the Image Zone Datum)
- GPS Elevation
- Job Zone
- User-entered text for the Waypoint
- Quad Name
- Click Northing (in the Job Zone Datum)
- Click Easting (in the Job Zone Datum)
- GPS Latitude and Longitude

About SD Quads

This is where you find information about the version being used.



If you have any questions, please call us at 307.645.3319 between the hours of 8 am and 6 pm Mountain Time. Or visit us on the web at http://www.prosurv.com.

The Edit Menu

Enter Waypoint

This menu selection allows you to hand-enter Waypoints. For example, if you know the latitude and longitude or coordinates of a Waypoint, you can enter them and save the point to your SD Quads Trail File.

Before using this function, you should be sure that you have a Trail File open, and that you've connected to your GPS so that a map has been loaded. When a map is loaded, it sets up the Image Zone, which is crucial to proper calculations that are needed when saving the Waypoint.

To activate the Enter Waypoint screen, on the Main Menu go to Edit→Enter Waypoint, or press Ctrl+W.

This screen has many options:

- Enter rectangular coordinates
- Enter Polar coordinates (latitude/longitude) in decimal degrees
- Enter Polar coordinates (latitude/longitude) in Degrees Minutes Seconds as D.MMSSssssss

You must always select a Waypoint Symbol before saving the Waypoint. Click the Icons Pg. 2 button to see more Waypoint Symbols.