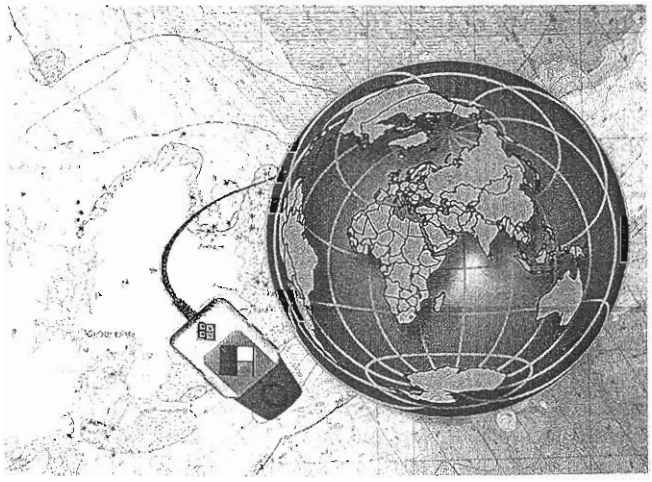
Didger® Getting Started Guide

Your Answer to Digitizing, Coordinate Conversion, and Georeferenced Images



Golden Software, Inc.
809 14th Street, Golden, Colorado 80401-1866, U.S.A.
Phone: 303-279-1021 Fax: 303-279-0909
www.goldensoftware.com

COPYRIGHT NOTICE

Copyright Golden Software, Inc. 2007

The **Didger**® program is furnished under a license agreement. The **Didger** software and getting started guide may be used or copied only in accordance with the terms of the agreement. It is against the law to copy the software or getting started guide on any medium except as specifically allowed in the license agreement. Contents are subject to change without notice.

Didger is a registered trademark of Golden Software, Inc. All other trademarks are the property of their respective owners.

August 2007

Table of Contents

Introduction to Didger 1
What is Digitizing? 1
Usage Examples 2
System Requirements 2
Installation Directions 3
Updating Didger 3
Uninstalling Didger 3
A Note about the Documentation 3
Didger User Interface 4
Changing the Layout 5
Didger Objects 6
Points 6
Polylines 6
Polygons 6
Text 7
Images 7
Digitizing Objects 7
Object Properties 7
Item Properties 7
Data Attributes 8
Symbol Properties 8
Line Properties 8
Fill Properties 8
Label Properties 8
Text Properties 8
Editing Tools 9
Selecting Objects 9
Tolerance Settings and Editing 9
Editing Polylines, Polygons, and Points 9
Reshape 9
Thin and Smooth 10
Resample Polyline 10
Polygon to Polyline 10
Polyline to Polygon 10
Points to Polyline 11
Polyline to Points 11
Connect Polylines 11
Break Polyline 11
Trim Polyline 12
Create Line Intersections 12
Snap All Polyline Segments 12
Snap Undershoot Polylines 13
Trim Overshoot Polylines 13

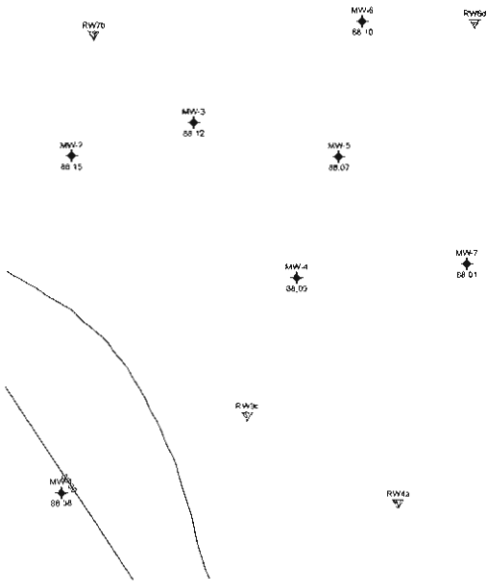
Create Polygons by Locator 13
Create Polygons by IDs 14
Polyline to Polygon with Shared Border 14
Union Polygons 14
Intersect Polygons 14
Difference of Polygons 14
Divide Polygons 15
Convex Hull 15
Create Intersection Points 15
Remove Duplicate Objects 15
Remove Polyline by Length 15
Combine Islands/Lakes 15
Split Islands/Lakes 16
Reverse Direction 16
Image Editing Tools 16
Image Registration and Warping 16
Edge Detection 16
Image Thinning 17
Spatial Filters 17
Sharpen 17
Median Filter 17
Adjust Contrast 17
Adjust Brightness 17
Adjust Saturation 18
Color Reduction 18
Image Erosion and Dilation 18
Convert to Black and White 18
Convert to Grayscale 18
Clip Image 18
Extract Image Region 18
Resize Image 19
Mosaic 19
Change Color Format 19
Modify Image Colors 19
Tutorial 19
Lesson 1 - Starting Didger and Locating the Samples Folder 20
Lesson 2 - Calibrating a Tablet 21
Opening and Printing the Tutorial Map 21
Calibrating a Digitizing Tablet 21
Initial Calibration Settings 22
Create Calibration Points 22
RMS Calibration Settings 23
Calibration Settings 23
Specify Project Limits and Scale 23
Lesson 3 - Calibrating an Image 24
Importing an Image 24

Entering Reference Information 24
Moving the Calibration Points 25
Setting the Options and Finishing the Calibration 26
Lesson 4 - Digitizing Points 27
Tutorial Points 27
Auto Incrementing IDs 27
Selecting Symbols 28
Assigning Labels 29
Digitizing Monitoring Wells 30
Digitizing Recovery Wells 30
Lesson 5 - Digitizing Polylines 31
Creating Multiple Polylines and Setting the Properties 31
Creating Polyline Labels 32
Digitizing Polylines 32
Editing Polygons and Polylines 33
Lesson 6 - Saving and Exporting Data 33
Saving a Didger Project 33
Exporting Data to a File 33
Lesson 7 - Converting Coordinates 35
Lesson 8 - Automatically Digitizing Contours from an Image and Assigning Elevations 37
Opening an Existing Project File 37
Automatically Creating Vector Contour Lines 37
Turning Off the Image Display 38
Assigning Elevations 38
Preprocessing Note 39
Lesson 9 - Creating Layers and Downloading TerraServer Images 40
Opening an Existing Project File 40
Creating a New Layer 40
Downloading Images 41
Moving the Image 41
Getting Help 42
Online Help 42
Context-Sensitive Help 42
Internet 42
Technical Support 43
Contact Information 43
Index 44

Introduction to Didger

Didger® is a digitizing; image registration and warping; and coordinate conversion software. You can digitize maps, aerial photographs, graphs, well logs, or any other data with **Didger**. When working with your project, you can digitize onscreen with your computer's mouse, a digitizing tablet, or even digitize with a GPS unit. Microsoft TerraServer and other images can be modified using **Didger**. You can also use **Didger** to convert coordinates and projections.

Didger provides extensive flexibility in working with your data. **Didger** supports creating multiple layers to help organize your project, warping images (rubber sheeting), georeferencing images, mosaicking georeferenced images, overlaying vector or data files on georeferenced images, adding graticule or grid lines to your project, and associating up to 256 data values or text identifiers to each object. **Didger** also includes comprehensive editing tools for digitized objects and images. Data transformation and coordinate conversion capabilities, in addition to over 25 map projections, easily permit reprojection or recalibration of data. **Didger** also imports and exports data, vector, and raster files in the most popular formats.



*With **Didger**, you can easily digitize objects with a digitizing tablet, mouse, or a GPS unit.*

What is Digitizing?

Digitizing is the process of transferring paper document information, image file information, or GPS data to your computer. This is accomplished with the use of a digitizing tablet, scanner, mouse, or a GPS unit and software such as **Didger**.

By providing the computer with the coordinates necessary to define object locations in relation to other objects, you can create a file of object locations. Object locations are defined by XY coordinates, such as latitude/longitude, UTM (Universal Transverse Mercator), State Plane, or any type of coordinate system. In addition, with **Didger** you can associate text and data with the objects that you digitize.

Usage Examples

People from many different disciplines use **Didger**. The following are a few examples of ways to use **Didger**.

- Digitize contour maps from topographic sheets or hand drawn maps
- Obtain data from graphs, such as well logs, when you do not have the original data
- Digitize sample locations, such as oil and gas wells, and associate them with data
- Digitize boundaries such as township and range lines or property boundaries
- Georeference scanned images, aerial photographs, or satellite images
- Warp images to show their true scaling
- Digitize points, polylines, or polygons from aerial or satellite photographs
- Digitize radiation dose calculations from patient films in the medical industry
- Map archeological sample sites from field maps
- Digitize geological information from paper maps, aerial photos, or hand drawn cross sections
- Digitize road and street maps to obtain route length information
- Digitize wildlife study information such as migratory areas for birds
- Digitize vegetation boundaries, burn areas, and lumbering areas
- Determine the area under a curve of a printed graph
- Resample well log data on regular intervals
- Digitize seismic section lines with shot point locations
- Create **Surfer** base maps
- Merge vector files, georeferenced images, and data files from various data sources into one project

System Requirements

The minimum system requirements for **Didger** are:

- Windows 2000, XP, Vista, or higher
- Video card with 1024x768x16-bit color minimum resolution
- 100 MB hard drive space minimum, 10 GB for advanced image processing
- 512 MB RAM minimum for basic data sets, 1 GB minimum for basic image processing, 2 GB recommended for advanced image processing

GPS units, scanners, and digitizing tablets are optional hardware items that can be used with **Didger**.

Installation Directions

To install **Didger** from a CD:

1. Insert the **Didger** CD into the CD-ROM drive. The install program automatically begins on most computers. If the installation does not begin automatically, double-click on the AUTORUN.EXE file located in the **Didger** CD files.
2. Choose *Install Didger* from the **Didger Auto Setup** dialog to begin the installation.

To install **Didger** from a download:

1. Download **Didger** according to the directions you received.
2. Double-click on the downloaded file to begin the installation process.

You need to have administrator rights to install and run **Didger**. For detailed installation directions see the README.RTF file and check our web site at www.goldensoftware.com.

Updating Didger

To update **Didger**, open the program and select **Help | Check for Update**.

Uninstalling Didger

To uninstall **Didger**, use Add/Remove Programs in Windows 2000 and XP or Programs and Features in Windows Vista.

A Note about the Documentation

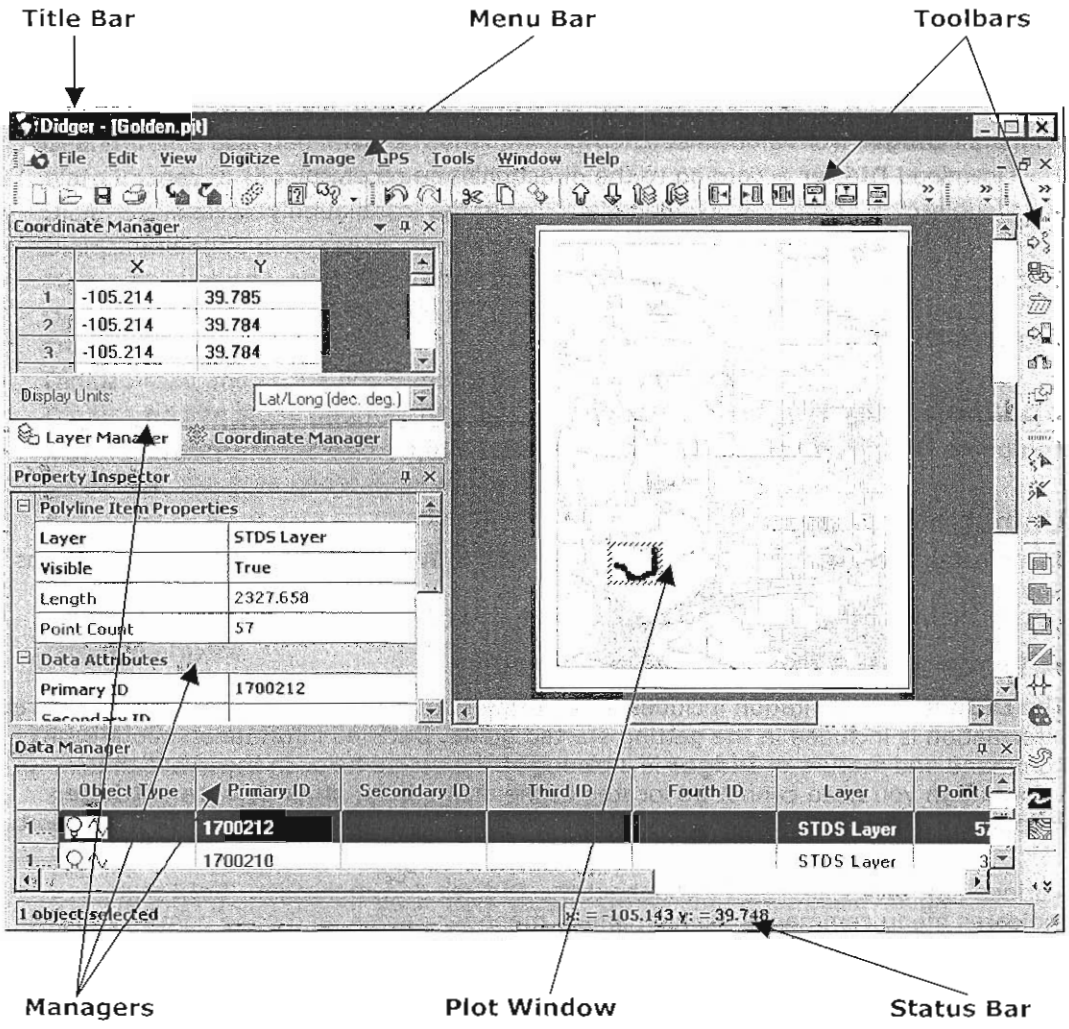
The **Didger** documentation includes this getting started guide and online help. General information is included in the getting started guide. Detailed information about each command and feature of **Didger** is included in the online help. In the event the information you need cannot be located in the online help, other sources of **Didger** help include our support forum, online training videos, web site, and technical support.

Various font styles are used throughout the **Didger** documentation. **Bold** text indicates menu commands, dialog names, manager names, and page names. *Italic* text indicates items within a dialog or manager such as group names, options, section names, and field names. For example, the **Save As** dialog contains a *Save as type* list. Bold and italic text may occasionally be used for emphasis.

In addition, menu commands appear as **File | New**. This means, "click on the **File** menu at the top of the **Didger** window, then click on **New** within the **File** menu list." The first word is always the menu name, followed by the commands within the menu list.

Didger User Interface

The **Didger** user interface consists of the title bar, menu bar, toolbars, plot window, managers, and status bar.



*The **Didger** user interface includes several toolbars and managers.*

The following table summarizes the function of each component of the **Didger** layout.

Component Name	Component Function
Title Bar	The title bar lists the program name plus the saved file name, if any.
Toolbars	The toolbars contain buttons that are usually shortcuts to menu commands. Move the cursor over each button to display a ToolTip describing the command.
Menu Bar	The menu bar contains the commands used to run **Didger**.
Status Bar	The status bar shows information about the activity in **Didger**. The status bar is divided into three sections. The left section displays the number of selected objects or a brief description of menu commands under the cursor. The middle section shows the cursor coordinates. The right section displays the current layer name (not shown in the previous graphic).
Plot Window	The plot window contains the objects.
Managers	There are four managers in **Didger**: the **Data Manager**, **Property Inspector**, **Layer Manager**, and **Coordinate Manager**. ▪ The **Data Manager** displays information about the objects in the current project such as object type, visibility, IDs, layer, point count, perimeter length, area, and polygon direction. ▪ The **Property Inspector** allows you to edit the properties of a selected object. ▪ The **Layer Manager** controls all aspects of layers, such as the addition and removal of layers. ▪ The **Coordinate Manager** contains the vertex coordinates of a selected object. Refer to the online help for detailed information on each of the managers.

Changing the Layout

The toolbars, managers, and menu bar display in a docked view by default; however, they can also be displayed as floating windows. The visibility, size, and position of each item may also be changed. Refer to the *Changing the Layout* topic in the online help for more information on layout options.

Didger Objects

You can transfer paper document information, image file information, or GPS data into a digital format usable by other computer applications with **Didger**. In **Didger**, you can digitize points, polylines, polygons, circles, rectangles, spline polylines, spline polygons, wrapped polylines, and text from your source documents and associate information such as numeric data with each digitized object. This information can then be exported for use in other programs. You can digitize with a digitizing tablet, a GPS, or with your computer's mouse.

Didger objects are represented in your project using special properties, such as fill patterns and color. You can control the properties through the **Property Inspector** for each object you create.

This is a point with a label.

Points

Points are isolated locations that indicate objects such as well locations, sample locations, benchmarks, and so on. In **Didger**, polygon markers are a special type of point. Post maps, created by importing a data file, also consist of points.

Polylines

Polylines indicate objects such as roads, streams, and contours. A polyline consists of one or more line segments joined end to end. Polylines, unlike polygons, are not closed. The beginning and ending points of a polyline are called nodes, and the intermediate ends to each line segment are called vertices. Polyline nodes are displayed as green (beginning) and red (ending) boxes when the *Show Line Nodes* box is checked in **File | Project Settings | Tolerance Settings**. Polylines are also called curves or lines. In **Didger**, spline polylines and wrapped polylines are special types of polylines.

This is a polyline showing the line nodes.

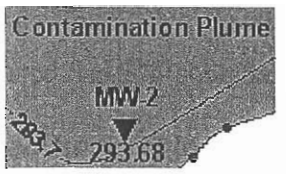
Polygons

Polygons are closed shapes used to represent boundaries such as county or state outlines. Polygon perimeters are defined by a series of straight-line segments joined end to end. A polygon contains at least three line segments, and the beginning of the first line segment is joined to the end of the final line segment to achieve closure. Vertices define the end of each straight-line segment along a polygon. In **Didger**, rectangles, circles, and spline polygons are special types of polygons.

This is an example of a polygon.

Text

Text is not associated with other objects and is created for display purposes only. Text objects are not generally used for analysis. The information stored for text includes a text string, the location at which it is displayed, and formatting (color, font, size, etc.).



Text, such as Contamination Plume *in the example above, can be added to any location in the project.*

Images

Raster images, such as a [.JPG] or [.TIF], are displayed as an array of dots or pixels and contain information on every pixel. The resolution of an image changes when the image is resized or stretched.

Digitizing Objects

In general, to digitize an object you select the object type from the **Digitize** menu or click on a button in the toolbar. Once the object type is selected, use the **Property Inspector** to set options such as line color, symbol type, and IDs. Click with the mouse or digitizing puck to create the object. Note that the object properties can also be changed after the object is digitized. The tutorial contains detailed steps on digitizing objects.

Object Properties

Each object contains properties. These properties are viewed, set, and edited through the **Property Inspector**. Refer to the *Property Inspector* topic in the online help for details on using the **Property Inspector**. When a change is made in the **Property Inspector** before digitizing the object, it becomes the default property until the property is changed again.

Item Properties

In the **Property Inspector**, the *Item Properties* section varies depending on the object type. The possible item properties include *Layer*, *Visible*, *Length*, *Area*, *Point Count*, *Direction*, *Image Width*, *Image Height*, *Color Format*, *Geo-Referenced*, *Clipped Image*, and *File Name*.

Most of these properties are read-only. The *Layer* lists the current layer on which the object exists. The object can be moved to another layer, if other layers exist, by clicking on the current layer name and selecting a new layer from the list. The *Visible* property can be changed between visible (*True*) and invisible (*False*).

Data Attributes

The *Data Attributes* section in the **Property Inspector** includes the object IDs. By default, each object can have a *Primary ID*, *Secondary ID*, *Third ID*, and *Fourth ID*. Additional IDs can be added through **File | Data Attributes**.

Symbol Properties

Use the options in the **Property Inspector's** *Symbol Properties* section to choose the type of marker you want to use to represent points. You can change the *Symbol*, *Symbol Set*, *Color*, and *Size* in the *Symbol Properties* section. **Didger** includes several symbol sets for common types of digitizing projects.

Line Properties

Line properties are available in polylines, polygons, rectangles, circles, spline polylines, spline polygons, and wrapped polylines. In the **Property Inspector's** *Line Properties* section, you can change the line *Style*, *Color*, and *Width* for all objects listed above. Polylines, spline polylines, and wrapped polylines contain the arrowhead options *Start Style*, *End Style*, and *Scale*. In addition, you can create custom line styles. Refer to the online help topic, *Custom Line Style*, for additional information on creating custom line styles.

Fill Properties

Fill properties are available in polygons, rectangles, circles, and spline polygons. The **Property Inspector's** *Fill Properties* section contains the pattern (*Pattern*), colors (*Foreground/Background*), transparency (*Mode*), vector and picture pattern scale (*Scale*), and image fill method (*Cover Areas by*). You can create custom fill patterns in addition to the several fill patterns that are included with **Didger**. Refer to the *Custom Fill Pattern* topic in the online help for information on creating custom fill patterns.

Label Properties

In the **Property Inspector**, use the options in the *Label Properties* section to add, position, and format labels. Click *<Click here to modify the labels>* next to *Modify Labels* to open these options.

Text Properties

Use the options in the **Property Inspector's** *Text Properties* section to create and format text. Note that you can add subscripts, superscripts, date/time, and set up formulas with the **Text Editor**. Click *<Click here to modify the text>* next to *Modify Text* to open the text formatting options.

Editing Tools

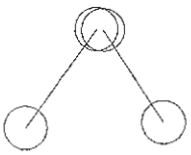
Didger provides many tools for modifying objects, including images. Many advanced editing operations help refine newly created objects.

Selecting Objects

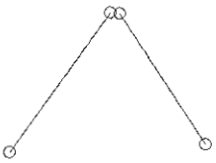
Most tools are available for selected objects. Usually, you can just click on the object in the plot window to select it. However, there are several methods of selecting objects in **Didger**, including selecting objects based on queries. Refer to the *Selecting Objects* topic in the online help for detailed information on selecting objects.

Tolerance Settings and Editing

Tolerance settings play an important role with some editing tools, particularly the *Snap Tolerance*. Tolerance settings are located at **File | Project Settings | Tolerance Settings**.



The Snap Tolerance *is set through* ***File | Project Settings | Tolerance Settings****. The* Snap Tolerance *can be shown as circles at the ends of the polylines. The circle display is controlled through* Show Snap Tolerance Circles.



Since the end nodes are not within the overlapping portion of the snap tolerance circles, these polylines would not snap together using ***Snap All Polyline Segments****.*

Editing Polylines, Polygons, and Points

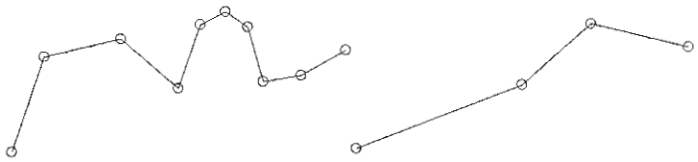
Once a polyline, polygon, circle, rectangle, spline polyline, spline polygon, or wrapped polyline is digitized, it can be edited with one of several commands in the **Tools** menu. The following sections contain brief descriptions of the editing tools. For more detail, refer to the online help.

Reshape

The **Tools | Reshape** command or the button lets you move, add, and delete vertices within a selected polyline, polygon, circle, rectangle, spline polyline, spline polygon, or wrapped polyline. This command is available only when a single object is selected. Note that an object can also be reshaped by selecting it and then editing the vertex coordinates in the **Coordinate Manager**.

Thin and Smooth

The **Tools | Thin and Smooth** command or the button provides four methods to remove unnecessary vertices or smooth out jagged sections in selected objects.

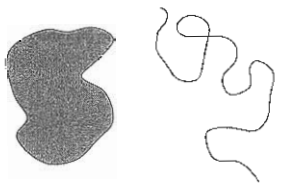


The original polyline is on the left. The polyline smoothed with Vertex Averaging *(Average Rate = 3) is shown on the right.*

Resample Polyline

The **Tools | Resample Polyline** command allows resampling along either the X or Y axis of a selected polyline, spline polyline, or wrapped polyline. The project must be calibrated with Cartesian coordinates to use this command. **Resample Polyline** is designed specifically for well log resampling to create a data value at specified depth increments.

This function is not designed to work with polygon-type objects or polylines that loop back on themselves. The polylines should have X or Y values that are ordered and are ascending or descending. If your data are not arranged this way, use the **Tools | Thin and Smooth** command instead.



*Polygons and polylines that loop back on themselves cannot be used with **Resample Polyline**.*

Polygon to Polyline

The **Tools | Change Boundary Type | Polygon to Polyline** command converts selected polygons into polylines by breaking the polygons at the first and last points defined for the polygons. The new polylines use the original polygon IDs and assume the currently defined line properties.

Polyline to Polygon

The **Tools | Change Boundary Type | Polyline to Polygon** command converts selected polylines into polygons by connecting the polyline end nodes with a straight line. The new polygons use the IDs of the original polylines and assume the currently defined line and fill properties.

Points to Polyline

The **Tools | Change Boundary Type | Points to Polyline** command converts selected points into a polyline by connecting the points with a single line. The new polyline inherits the IDs of one point in the selected set and assumes the currently defined line properties.

Polyline to Points

The **Tools | Change Boundary Type | Polyline to Points** command converts selected polylines into points by dissecting the polyline vertices and nodes into a series of points. The new points use the IDs of the original polylines and assume the currently defined symbol properties.

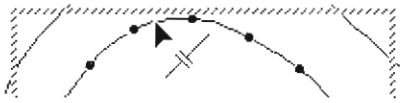
Connect Polylines

The **Tools | Edit Boundaries | Connect Polylines** command joins two or more selected polylines into a single polyline. You must select two or more polylines for this command to be active. Polylines are joined by connecting the two closest nodes. The polylines do not have to be within snap tolerance of each other. The line style, width, and color of the new polyline are set to the default settings. After the polylines are connected, one of the polyline's IDs is applied to the joined polyline.

Connect Polylines *creates one polyline out of several polylines. Three separate polylines were combined into one polyline in the example above.*

Break Polyline

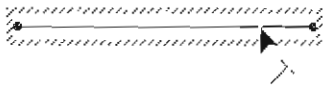
The **Tools | Edit Boundaries | Break Polyline** command or the button cuts a selected polyline anywhere along its length.



Use ***Break Polyline*** *to break a polyline into two segments.*

Trim Polyline

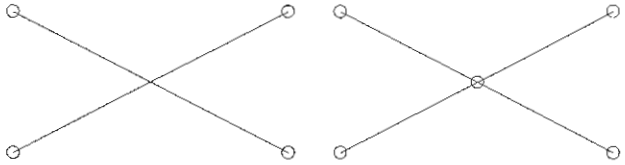
The **Tools | Edit Boundaries | Trim Polyline** command or the button trims a selected polyline's length. **Trim Polyline** cuts away the shortest section between the trim point and the end of the polyline. For example, on a horizontal polyline, if the trim point is closer to the right edge of the polyline, everything to the right of the trim point is trimmed away.



*Since the trim point is closer to the right side of the polyline, everything to the right of the cursor is removed when **Trim Polyline** is selected.*

Create Line Intersections

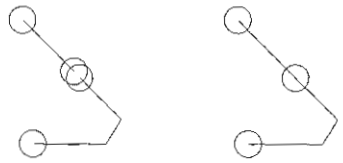
The **Tools | Edit Boundaries | Create Line Intersections** command breaks all existing polylines into their component parts by breaking the line at the polyline intersection. For example, if two polylines cross on a layer, four polyline segments would exist after using this tool.



*Two polylines (left) exist before using **Create Line Intersections** and four polylines (right) exist after using **Create Line Intersections**.*

Snap All Polyline Segments

The **Tools | Edit Boundaries | Snap All Polyline Segments** command automatically joins all existing polylines with nodes that are within the *Snap Tolerance* (see *Tolerance Settings* in the online help) of each other. Polylines are only snapped to other polylines on the same layer. This is different from the **Connect Polylines** command in that you do not choose the polylines to be connected.



*Use **Snap All Polyline Segments** to snap all polylines in a project. The end nodes must be in an overlapping snap tolerance circle.*

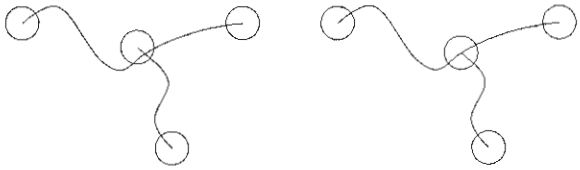
Snap Undershoot Polylines

The **Tools | Edit Boundaries | Snap Undershoot Polylines** command snaps all existing polylines to adjacent polylines that fall within the snap tolerance. The adjacent polyline is broken and the undershoot polyline is snapped to the new point of intersection. Polylines are only snapped to other polylines on the same layer.

*The graphic on the left shows an undershoot. After using **Snap Undershoot Polylines**, the undershoot is connected to the top polyline and the top polyline is broken into two segments.*

Trim Overshoot Polylines

The **Tools | Edit Boundaries | Trim Overshoot Polylines** command determines if two polylines intersect one another and, if true, further examines if one of the end nodes is within the snap tolerance value. If one of the end nodes on a polyline is within the snap tolerance setting, the intersecting polylines are broken at the point of intersection if the polylines are on the same editable layer. The overshoot portion of the polyline is trimmed and removed from the project. The resultant product is three polyline segments. Polylines are only snapped to other polylines on the same layer.



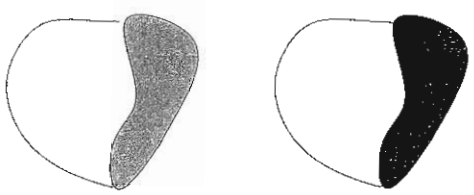
*The graphic on the left shows an overshoot. After using **Trim Overshoot Polylines**, the overshoot is connected to the top polyline and the top polyline is broken into two segments.*

Create Polygons by Locator

The **Tools | Edit Boundaries | Create Polygons by Locator** command creates polygons from polylines. With this tool, you can create polygons that share common borders by only digitizing the shared border (polyline) one time, and using the single border in the creation of both adjacent polygons. **Create Polygons by Locator** does not require that each individual polyline segment be coded with the left or right ID to create the polygon. This command requires that a polygon marker is digitized somewhere within the polygon area to be created.

Create Polygons by IDs

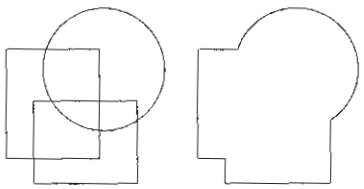
It is usually very difficult to digitize polygons that share common borders and get the borders to match exactly. The **Tools | Edit Boundaries | Create Polygons by IDs** command creates polygons that share common borders by only digitizing the shared border (polyline) one time, assigning "left" and "right" side IDs to the polylines, and using the polylines to create adjacent polygons. Use **File | Data Attributes** to assign the ID left and right sides.



*The **Polyline to Polygon with Shared Border** command changes a polyline into a polygon where one of the borders is shared with an adjacent polyline.*

Polyline to Polygon with Shared Border

The **Tools | Edit Boundaries | Polyline to Polygon with Shared Border** command snaps selected polyline end nodes to a nearby single polygon. The polyline is converted into a polygon and shares the border with the existing polygon.



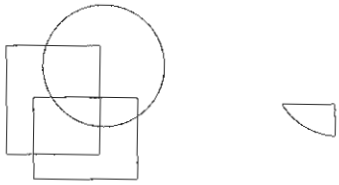
*The **Union Polygons** command traces outside a group of selected polygons (left) and creates one polygon (right).*

Union Polygons

The **Tools | Edit Boundaries | Union Polygons** command or the button traces around the outside of a group of contiguous polygons.

Intersect Polygons

The **Tools | Edit Boundaries | Intersect Polygons** command or the button creates a new polygon from two or more intersecting polygons. The polygon that intersects all selected polygons is created. The original polygons outside of the intersecting portion are removed. A new polygon is not created if a selected boundary does not overlap.



*The **Intersect Polygons** command creates a new polygon out of all selected intersecting polygons.*

Difference of Polygons

The **Tools | Edit Boundaries | Difference of Polygons** command or the button removes the overlapping section of two or more polygons and creates new areas that do not contain overlapping portions of the selected areas.

Divide Polygons

The **Tools | Edit Boundaries | Divide Polygons** command or the button creates two or more polygons from one polygon. Digitize a polyline where you would like to divide the polygon.

Convex Hull

The **Tools | Edit Boundaries | Convex Hull** command or the button creates a new polygon object around a selected set of objects. The new polygon is determined by using the outermost edges along selected objects. Each edge is connected by a straight line to the next edge.

Create Intersection Points

The **Tools | Edit Boundaries | Create Intersection Points** command or the button creates point objects at the intersection of selected objects.

Remove Duplicate Objects

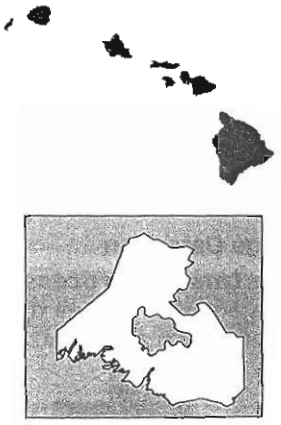
The **Tools | Remove Duplicate Object** command searches all objects in the project for duplicate objects. Any objects that contain identical vertices are removed regardless of the object properties such as line style and IDs.

Remove Polyline by Length

The **Tools | Remove Polyline by Length** command removes any polylines shorter than the specified length. If *Remove Linked Polylines* is checked, polylines that are shorter than the specified length that have been snapped to polylines longer than the specified length are also removed. If *Remove Linked Polylines* is unchecked, the polylines shorter than the specified length are not removed.

Combine Islands/Lakes

The **Tools | Combine Islands/Lakes** command groups all selected polygons into a single complex polygon. One of the original polygons' IDs and properties, such as line color, are assigned to all the islands. You can edit the complex polygon properties through the **Property Inspector**.



Complex polygons can be separate islands as shown for Hawaii (top), or can contain lakes that form holes in the larger polygon (bottom).

Split Islands/Lakes

The **Tools | Split Islands/Lakes** command breaks a selected complex polygon into its component parts. When you use the **Split Islands/Lakes** command each polygon becomes completely independent of the other polygons in the group. The original object's primary ID is assigned to all the new polygons. You can change the new polygons' properties, such as IDs, through the **Property Inspector.**

Reverse Direction

The **Tools | Reverse Direction** command reverses the order of the vertices in selected polygons and polylines. The polygon or polyline appearance does not change. The direction of the polygons is listed as *Reverse* (counterclockwise) and *Forward* (clockwise) in the **Data Manager's** *Direction* column.

This command does not work with complex polygons. To reverse a single polygon of a complex polygon, first use **Tools | Split Islands/Lakes**, reverse the desired polygons with **Tools | Reverse Direction**, and then use **Tools | Combine Islands/Lakes**.

Image Editing Tools

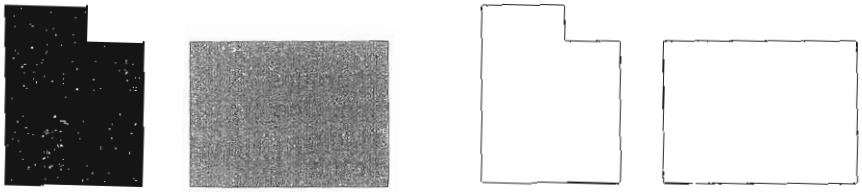
Several tools are available to modify images. Typically, you need to use some of the **Processing Filters** before vectorizing an image with **Image | Vectorize Image.**

Image Registration and Warping

The **Image | Image Registration and Warping** command or the button lets you check the calibration of an image, recalibrate an image, or georeference an un-referenced image.

Edge Detection

The **Image | Processing Filters | Edge Detection** command simplifies the image into a series of lines that outline the edges of the original objects. A few of the spatial filters, such as Laplacian and Sobel can also be used to detect edges.



Edge Detection *outlines the edges of the original objects in images.*

Image Thinning

The **Image | Processing Filters | Image Thinning** command reduces line images down to one pixel width segments. **Image Thinning** is recommended for images that contain line objects rather than complex shapes.

*The **Image Thinning** command reduces lines in an image to one pixel wide.*

Spatial Filters

The **Image | Processing Filters | Spatial Filters** command brings out the spatial details that might be required to digitize objects from an image.

Sharpen

The **Image | Processing Filters | Sharpen** command increases the contrast between adjacent pixels. This tool can aid in restoring fuzzy images to a better-enhanced state. This function enhances the overall contrast of an image.

Median Filter

The **Image | Processing Filters | Median Filter** command removes detail from the image. Median filters are nonlinear filters based on the median brightness value of each input group of pixels. The filter is very good for removing noise and other anomalies from an image.

Adjust Contrast

The **Image | Processing Filters | Adjust Contrast** command adjusts the amount of contrast in the image. Contrast is the difference in brightness between the dark and light components of an image.

Adjust Brightness

The **Image | Processing Filters | Adjust Brightness** command controls the amount of light assigned to the image. One hundred percent fades the image toward white and -100 percent darkens the image toward black.

Adjust Saturation

The **Image | Processing Filters | Adjust Saturation** command adjusts the color saturation of the image. Saturation refers to relative purity or the amount of white light mixed with hue.

Color Reduction

The **Image | Processing Filters | Color Reduction** command reduces the number of colors in an image. This tool is useful for vectorization of true color images.

Image Erosion and Dilation

The **Image | Processing Filters | Image Erosion and Dilation** command eliminates small image object features, such as noise spikes and ragged edges. The effect is to remove single-pixel object anomalies such as small spurs and single pixel noise spikes. As a result, objects are smoothed. This is particularly effective with contour images.

Convert to Black and White

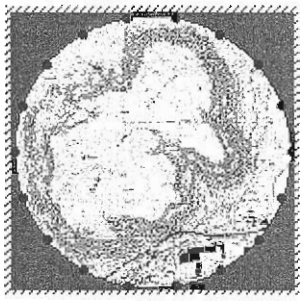
The **Image | Processing Filters | Convert to Black and White** command converts color images to black and white.

Convert to Grayscale

The **Image | Processing Filters | Convert to Grayscale** command or the button converts the image to eight shades of gray.

Clip Image

There are two methods of clipping images with **Image | Clip Image**. You can clip the image based on a polygon and you can remove map collars that may exist with USGS topographic maps.



*This is an image clipped to a circle with **Image | Clip Image | Current Polygon**.*

Extract Image Region

The **Image | Extract Image Region** command or the button extracts a smaller section of an image. When you chose this command, the cursor has a small rectangle next to it. Drag the cursor around the area you would like to keep. Any image georeferencing is retained after the image is extracted.

Resize Image

The **Image | Resize Image** command changes the image size based on pixels, inches, or resolution.

Mosaic

The **Image | Mosaic** command assembles image files from adjacent areas into a seamless single image file.

Change Color Format

The **Image | Change Color Format** command changes the current color depth of an image.

Modify Image Colors

The **Image | Modify Image Colors** command or the button modifies the colors and makes colors transparent in an existing image.

Tutorial

This tutorial is designed to introduce you to some of **Didger's** features. The tutorial teaches the basics of digitizing. You should be able to begin creating your own projects after you have completed the tutorial.

The following is an overview of lessons included in the tutorial.

- *Lesson 1 - Starting Didger and Locating the Samples Folder* shows how to start **Didger**, open a new plot window, and locate the tutorial files.
- *Lesson 2 - Calibrating a Tablet* shows how to calibrate a digitizing tablet.
- *Lesson 3 - Calibrating an Image* shows how to calibrate an image.
- *Lesson 4 - Digitizing Points* shows how to digitize points and set point properties.
- *Lesson 5 - Digitizing Polylines* shows how to digitize polylines.
- *Lesson 6 - Saving and Exporting Data* shows how to save your **Didger** project and export data for use in other programs.
- *Lesson 7 - Converting Coordinates* shows how to modify existing coordinates.
- *Lesson 8 - Automatically Digitizing Contours from an Image and Assigning Elevations* shows how to vectorize an image.
- *Lesson 9 - Creating Layers and Downloading TerraServer Images* shows how to search for and download TerraServer images.

The lessons should be completed in order; however, they do not need to be completed in one session.

In the online help tutorial, each topic contains several links to other topics. Click on the link for an in-depth discussion on the subject. Use the

button to return to the tutorial topic. Use **Help | Tutorial** to open the online help version of the tutorial.

Lesson 1 - Starting Didger and Locating the Samples Folder

To begin a **Didger** session:

1. Click on the Windows Start button.
2. Locate the computer's program list, click on **Golden Software Didger 4**, and then click **Didger 4**.
3. **Didger** starts with a new empty plot window. You are prompted for your serial number the first time you open **Didger**. Your serial number is located on the inside front cover of this getting started guide. The serial number was emailed to you with the download directions if you purchased **Didger** with the download only option.

If you have been working with **Didger**, open a new plot window by clicking **File | New** or click the button. You are prompted to save changes to your existing work before the new plot window opens.

The tutorial uses several files in the Samples folder. The location of the Samples folder depends on the operating system and the type of installation. Find the Samples folder on your computer before beginning the tutorial.

Operating System	Installation	Location
2000 and XP	All Users	C:\Documents and Settings\All Users\Documents\Golden Software\Didger 4\Samples
Vista	All Users	C:\Users\Public\Documents\Golden Software\Didger 4\Samples
2000 and XP	Single User	C:\Documents and Settings\[username]\My Documents\Golden Software\Didger 4\Samples
Vista	Single User	C:\Users\[username]\Documents\Golden Software\Didger 4\Samples

Lesson 2 - Calibrating a Tablet

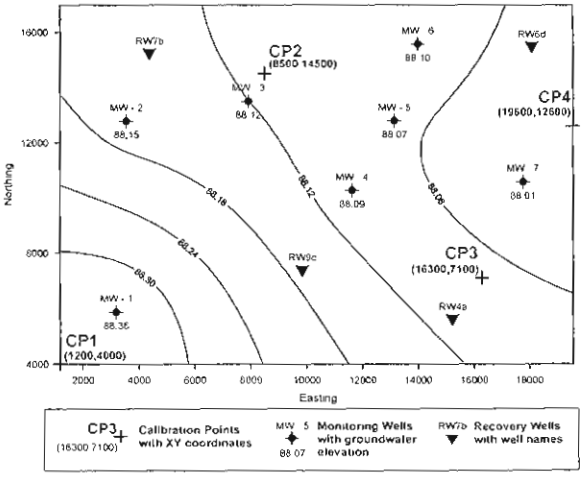
If you own a digitizing tablet, it can be used to transform paper documents into digital documents. A tablet is calibrated to create a relationship between the tablet coordinates and your project coordinates. The first step in calibration is selecting between three and 255 calibration points and determining the map XY coordinates for these calibration points. The calibration points cannot fall into a straight line and should be spread out around the document as much as possible. Four calibration points are selected on the tutorial map and labeled CP1 through CP4.

If you do not have a digitizing tablet, go to *Lesson 3 - Calibrating an Image*.

Opening and Printing the Tutorial Map

To print the tutorial map for tablet calibration and digitizing:

1. Select **File | Import** or click the button.
2. The **Import File** dialog opens. Click TUTORIAL MAP.JPG in **Didger's** Samples folder and then click the *Open* button.
3. Click the *Un-referenced* button in the **Image Registration and Warping** dialog to import the map.
4. Select **File | Print** to print the map. Select *Fit to Page* in the **Print** dialog and then click the *OK* button.
5. After the map is printed, select **File | New** to open a new plot window. Click the *No* button when asked if you want to save changes to the plot.



The tutorial map can be printed for tablet calibration and digitizing.

Calibrating a Digitizing Tablet

Didger uses a series of dialogs to guide you through the tablet calibration process. Before beginning, place the tutorial map on your digitizing tablet so that it cannot easily be moved. Locate the four calibration points +, labeled CP1 through CP4. To begin, select **Digitize | Tablet Calibration**. The calibration process begins with the **Initial Calibration Settings** dialog.

Initial Calibration Settings

The **Initial Calibration Settings** dialog is used to set up the coordinates, axes, and projection of the source document. The settings in this dialog must match the original document settings.

To set the initial calibration settings:

1. In the **Initial Calibration Settings** dialog, select *Cartesian Coordinates* as the *Coordinate Space Type* since we are not using projections in the tutorial.
2. The *X Axis Type* and *Y Axis Type* should both be set to *Linear*.
3. The *Calibration Units* should be set to *<unspecified>*.
4. Click the *Next* button to open the **Create Calibration Points** dialog.

Create Calibration Points

The **Create Calibration Points** dialog is used to enter the coordinates for the calibration points.

To create the calibration points:

1. With the mouse, click in the *Point ID* column in row one and type CP1; the ID for the first calibration point.
2. Click in the *World X* cell with the mouse. Enter the X coordinate for CP1 (1200). Click in the *World Y* cell and enter the Y coordinate for CP1 (4000).
3. Move your puck on the tablet to the CP1 location (cross) in the lower left corner of the map. Click your digitizing button on the puck to enter the *Tablet X* and *Tablet Y* coordinates into the calibration table. Try to be as precise as possible when clicking on the calibration points as your resulting data are only as good as your calibration.
4. Click the *Add Point* button in the **Create Calibration Points** dialog.
5. Repeat these steps until you have entered all four calibration points and coordinates. You should see four red dots in the graphic in the lower right corner of the dialog when you have clicked on all four calibration points. If you make a mistake, you can click the row number and then redigitize the point.

Point ID	World X	World Y
CP1	1200	4000
CP2	8500	14500
CP3	16300	7100
CP4	19600	12600

6. Once you are satisfied with the calibration points, click the *Next* button to open the **RMS Calibration Settings** dialog.

RMS Calibration Settings

The **RMS Calibration Settings** dialog provides you with information about each calibration point and the RMS error value calculated for your calibration points. The coordinate positions of the points in the digitizer's grid referencing system are determined when you digitize calibration points. **Didger** then uses the selected *Georeference Method* to compute the error between the tablet coordinates and the digitized coordinates. This allows **Didger** to orient and scale the project.

For the tutorial example, the RMS value is not critical, but you might want to watch this value closely when you are working on an actual project. For further information on RMS errors, refer to the *RMS Calibration Settings* topic in the online help and the online help book, *RMS Error*. The *RMS Error* book is located in the online help **Contents** page.

To select the georeference method:

1. In the **RMS Calibration Settings** dialog, select *Affine Polynomial* as the *Georeference Method*.
2. Click the *Next* button to open the **Calibration Settings** dialog.

Calibration Settings

The **Calibration Settings** dialog contains options for screen display, digitizing tolerance, and digitizing button options. Note that many of these settings can be set after calibration through **File | Project Settings**.

To set the setting options:

1. In the **Calibration Settings** dialog, set the *Vertex Tolerance* and *Snap Tolerance* to 200.
2. Look at the *Tablet Button Settings* list to make sure you know which button is your *Digitize* button and which button is the *Finish* button on your puck.
3. Click the *Next* button to open the **Specify Project Limits and Scale** dialog.

Specify Project Limits and Scale

The final dialog, **Specify Project Limits and Scale**, is used to set the project extents and scale. Leave all the settings in this box at the defaults. Click the finish button and the calibration points are shown in the plot window. The **Didger** plot window is calibrated.

What to do Next

Go to *Lesson 4 - Digitizing Points* once the map is calibrated. Do not go through the image calibration described in the next lesson at this time. Review *Lesson 3 - Calibrating an Image* later if you need to calibrate images in your work.

Lesson 3 - Calibrating an Image

You need to calibrate an image if you scan paper documents or if you obtain images from other sources and the image is not already georeferenced. (Georeferencing means the file already contains world coordinates and map projections.)

Importing an Image

To import an image:

1. Click **File | Import** or click the button.
2. The **Import File** dialog opens. Click TUTORIAL MAP.JPG in **Didger's** Samples folder.
3. Click the *Open* button to begin the calibration process.

Entering Reference Information

After the *Open* button is clicked in the previous steps, the **Image Registration and Warping** dialog appears. The image is calibrated during import using this dialog. To begin, we need to enter the point ID and known coordinate information into the **Image Registration and Warping** dialog.

To enter information:

1. In the **Calibration Points** page at the bottom of the **Image Warping and Registration** dialog, type CP1 into the *Point ID* box for row 1.
2. Click in the row 1 *Reference X* box and type 1200.
3. Click in the row 1 *Reference Y* box and type 4000.
4. Click in the row 2 *Point ID* box and type CP2 into the box.
5. Continue entering the information into the calibration table as it appears below.

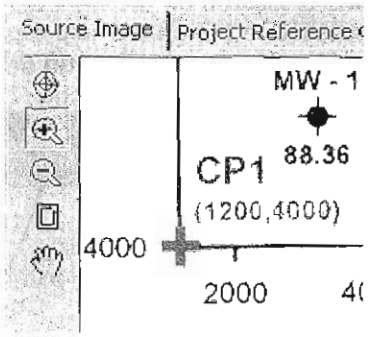
Point ID	Reference X	Reference Y
CP1	1200	4000
CP2	8500	14500
CP3	16300	7100
CP4	19600	12600

Moving the Calibration Points

Once all of the reference information (*Point ID*, *Reference X*, and *Reference Y*) is added, the calibration points need to be moved to the proper locations on the map.

To move the calibration points:

1. Make sure the *Auto Advance Row Position* box is checked.
2. Click on the word "CP1" in the calibration points table at the bottom of the dialog.
3. Click the button at the top of the **Image Registration and Warping** dialog's **Source Image** page.
4. Click a few times on the lower left corner of the map near CP1 to zoom in on the first calibration point.
5. Click the button.
6. Center the cursor over the blue cross and then click. A small red diamond and the number 1 appear in the location. Try to be as precise as possible when clicking on the calibration points (blue crosses), as your resulting data are only as good as your calibration.
7. Click the button to view the whole map and locate CP2.
8. Click the button and then click a few times near the upper center part of the map near the blue words CP2 to magnify the second calibration point.
9. Click the button.
10. Center the cursor over the CP2 blue cross and then click. A small red diamond appears in the location.
11. Calibrate CP3 and CP4 using the steps above. You can zoom in and out to locate the points or use the scroll bars to move the map. If you make a mistake, you can click the calibration point name in the calibration table and then redigitize the point.

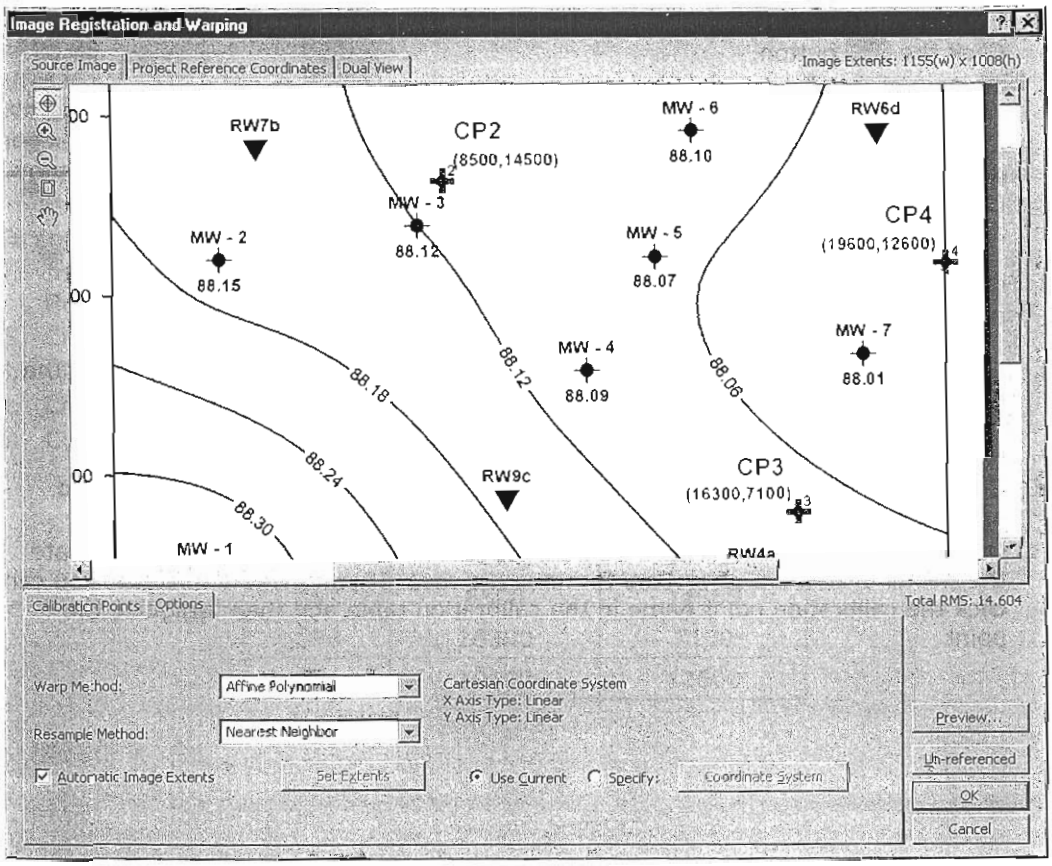


Click on the map two or three times to zoom in on CP1.

Setting the Options and Finishing the Calibration

Click the **Options** page at the bottom of the **Image Registration and Warping** dialog. Typically, you should accept the defaults on the **Options** page unless you are familiar with specific warping or resampling methods or you would like to change the coordinate system for the image. The *Warp Method* should be *Affine Polynomial* and the *Resample Method* should be *Nearest Neighbor*.

For the tutorial example, the *Total RMS* value is not critical, but you might want to watch this value closely when you are working on an actual project. The *Total RMS* value is located on the right side of the dialog above the *Preview* button. RMS is discussed in the online help topic, *RMS Error*. Click the *OK* button in the **Image Registration and Warping** dialog to use the current settings and import the image.



The dialog settings should be similar to the above settings before clicking the OK button.

Lesson 4 - Digitizing Points

The tutorial map contains several points and polylines. After the map is calibrated in *Lesson 2 - Calibrating a Tablet* or *Lesson 3 - Calibrating an Image*, you can begin digitizing.

Tutorial Points

The tutorial map contains many points. In **Didger**, points are represented by symbols. You can specify the symbol type, size, color, and IDs with each point. Any of these IDs or a combination of IDs can be used as a label for the point.

There are two types of points included on the tutorial map. The ✦ symbols represent monitoring wells that are labeled with well names (MW-3) and groundwater elevation values (88.12). The ▼ symbols represent recovery wells labeled with well names (RW7b).

First, let's digitize the monitoring wells ✦. You can associate the well names and the groundwater elevation values with each point as you digitize it. We will use the well names and elevation values as labels on the **Didger** map.

Auto Incrementing IDs

Because the monitoring wells use sequential IDs, we can use the auto increment options.

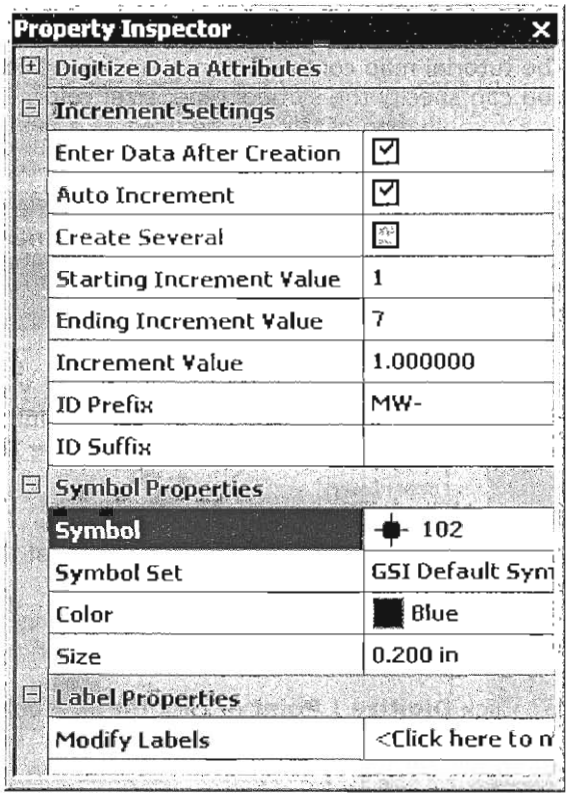
To auto increment:

1. Click **Digitize | Point** or click the button to display the point properties in the **Property Inspector**.
2. In the **Property Inspector**, expand the *Increment Settings* section by clicking the ⊞ adjacent to the name if it is not already open.
3. Click on the *Enter Data After Creation* check box so you can add the groundwater elevation values for each point as it is digitized.
4. Check the *Auto Increment* box.
5. In the *Starting Increment Value* field, highlight the existing number, type 1, and then press ENTER on your keyboard.
6. In the *Ending Increment Value* field, highlight the existing number, type 7, and then press ENTER on your keyboard.
7. The *Increment Value* should already be 1, if not, enter 1 into the *Increment Value* field.
8. In the *ID Prefix* field, type MW- for the label prefix.
9. In the *ID Suffix* field, highlight any existing text and delete it.

Before digitizing points, we will set the symbol properties and label properties so do not click on the map yet.

Selecting Symbols

In the **Property Inspector**, expand the *Symbol Properties* section by clicking on the ⊞ if it is not already expanded. The *Symbol Properties* section contains symbol type, color, and size options.



*You can set the point properties after selecting **Digitize | Point**.*

First, make sure the *Symbol Set* is set to GSI Default Symbols. If the symbol set is not set to GSI Default Symbols, click on the current symbol set name and then click on GSI Default Symbols in the list.

Once the GSI Default Symbols set is selected, choose the monitoring well symbol from the palette:

1. In the **Property Inspector**, click on the current symbol to open the symbol palette.
2. Click on the ✦ symbol to select it.

Next, choose the symbol color:

1. In the **Property Inspector**, click on the existing color next to the word *Color* to open the color palette.
2. Click on the color blue to select it.

Finally, set the symbol size:

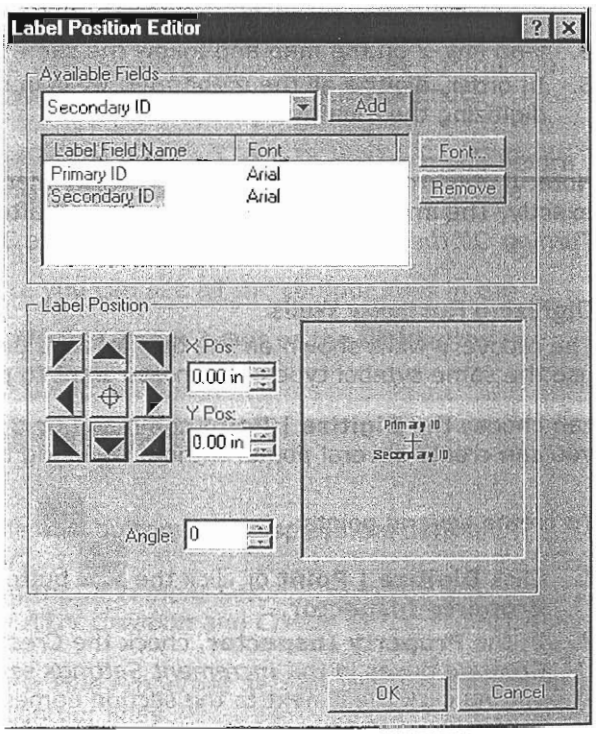
1. In the **Property Inspector**, highlight the contents of the *Size* box.
2. Type 0.200 into the *Size* box and then click the ENTER button on your keyboard.

Assigning Labels

In the **Property Inspector**, expand the *Label Properties* section to add and format point labels.

To label points:

1. In the **Property Inspector**, click *<Click here to modify the labels>* next to *Modify Labels*.
2. The well names are stored in the primary ID. In the **Label Position Editor** dialog, click on *Primary ID* in the *Available Fields* list and then click the *Add* button.
3. We are going to add groundwater elevation IDs as we digitize points, and these labels will be stored in the secondary ID field. Click the arrow on the *Available Fields* list, click on *Secondary ID*, and then click the *Add* button.
4. Click *Primary ID* in the *Label Field Name* column, and then click the *Font* button.
5. In the **Font Attributes** dialog, choose *Arial* as the *Face* and 10 as the *Points*. Click the *OK* button to return to the **Label Position Editor** dialog.
6. Click *Secondary ID* in the *Label Field Name* column, and then click the *Font* button.
7. In the **Font Attributes** dialog, choose *Arial* as the *Face* and 10 as the *Points*. Click the *OK* button to return to the **Label Position Editor** dialog.
8. The IDs appear in the graphic in the lower right corner of the dialog. By default, the labels are centered over the point. Since we have two labels and a symbol, we need to move the labels around. Click on *Primary ID* in the *Label Field Name* column, and then click the button to move the well name above the symbol. Next, click on *Secondary ID* in the *Label Field Name* column, and then click on the button to move the elevation label below the symbol.
9. Click the *OK* button to set the label properties.



*The **Label Position Editor** dialog is used to add and format the labels.*

Digitizing Monitoring Wells

Once all the properties are set, you can begin digitizing points. Tablet digitizers use the puck to digitize and image digitizers use the mouse. Everyone uses the mouse for dialog actions. If you are digitizing an image and want to zoom in to see the image more closely, press the + key on the numeric keypad. Press the – key to zoom out while digitizing.

To digitize monitoring wells:

1. If you are using a digitizing tablet, move the puck over MW-1 on the tablet and click the digitizing button. If you are digitizing an image, move your mouse so that the cross hair cursor is over MW-1 and click the left mouse button.
2. The **Enter Object Data** dialog appears with the well name automatically included in the *Primary ID* field.
3. Click in the *Secondary ID* field and then type the groundwater elevation value for this point (88.36).
4. Click the *OK* button. The point is drawn in the plot window with the primary ID and secondary ID as labels for the point.
5. Find MW-2 on the map and follow the same procedure.
6. In order, digitize all the monitoring wells in this way. After MW-7, you are done digitizing the monitoring wells.

Note: if you are digitizing with an imported image, the points and labels do not overlay exactly. The image display can be turned off after the digitizing is complete. The *Turning Off the Image Display* section on page 38 covers this in more detail.

Digitizing Recovery Wells

The recovery wells shown on the tutorial map do not use sequential IDs, but they do use the same symbol types. When you want to place several points on the map, you can choose the **Digitize | Point** command or click the button for each point; or you can create several points without selecting the command or tool each time.

To create several points:

1. Click **Digitize | Point** or click the button to display point properties in the **Property Inspector**.
2. In the **Property Inspector**, check the *Create Several* and *Enter Data After Creation* boxes in the *Increment Settings* section. Remember, if you do not see a setting click the ⊞ next to the section names in the **Property Inspector**.
3. In the **Property Inspector**, expand the *Symbol Properties* section to select the symbol type, color, and size for the symbol. Choose the ▼ symbol, select green for the symbol color, and set the *Size* to 0.200.

4. In the **Property Inspector**, click *<Click here to modify the labels>* next to *Modify Labels* in the *Label Properties* section. The labels should still be set from digitizing the monitoring wells.
5. In the **Label Position Editor**, click *Secondary ID* in the *Label Field Name* column, and then click the *Remove* button. Click the *OK* button to set the label properties.
6. Move the puck or mouse over one of the recovery wells (named with RWxx) on the map and click the digitizing button or left mouse button.
7. In the **Enter Object Data** dialog, type the name for the recovery well into the *Primary ID* field and then click the *OK* button.
8. Continue clicking on the recovery well points and entering the primary IDs into the **Enter Object Data** dialog until all four recovery wells are digitized. After the fourth point, press the ESC key on your keyboard or click the button to exit digitize mode.

Lesson 5 - Digitizing Polylines

You can digitize polylines by clicking on points along the line or by tracing along the line. When tracing, a continuous stream of vertices is created as you move the pointer along the polyline. This makes it easy to digitize curved boundaries. The contours in this example are curved lines and are best digitized using the tracing method.

If you are using a digitizing tablet, check to see if the tablet is in stream mode before continuing. Select **File | Project Settings | Digitizing Settings** and make sure *Stream Mode* is checked.

If you are digitizing an image, make sure you can see all the contour lines in the window before beginning. You can click **View | Zoom | Out** or the button to change the view.

Creating Multiple Polylines and Setting the Properties

To set polyline properties:

1. Click **Digitize | Polyline** or click the button. This displays the polyline settings in the **Property Inspector**.
2. In the **Property Inspector**, expand the *Increment Settings* section if it is not already open. Check the *Enter Data After Creation* and *Create Several* boxes if they are not already checked.
3. In the **Property Inspector**, open the *Line Properties* section and then specify any properties you want to use for the contour lines.

Creating Polyline Labels

To set label properties:

1. In the **Property Inspector**, click *<Click here to modify the labels>* next to *Modify Labels* in the *Label Properties* section.
2. In the **Label Position Editor** dialog, click on *Primary ID* in the *Available Fields* list and then click the *Add* button.
3. Click the *Font* button and set the *Face* to *Arial* and *Points* to 10. Click the *OK* button to return to the **Label Position Editor** dialog.
4. In the *Label Position* group, choose the *Position Along Line* option.
5. Set *Label Alignment On* to *On* and set *Label Position Along* to *Middle*.
6. Click the *OK* button to set the label properties.

Digitizing Polylines

To digitize polylines:

1. If you are using a digitizing tablet, move the puck over one end of the 88.30 contour. If you are using an image base map, move the cursor with the mouse over one end of the 88.30 contour. Press and hold the digitize button or left mouse button and move along the contour line to the end. You should see a polyline drawn in the plot window. Note that you can also click points along the line.
2. Press the ENTER key on your keyboard, double-click the left mouse button, or press the finish button on the puck to stop digitizing the line.
3. The **Enter Object Data** dialog is displayed. Click in the *Primary ID* field and type 88.30, the contour level for the line you just digitized.
4. Click the *OK* button in the **Enter Object Data** dialog and then digitize the next contour line on the map. Enter the contour level for this line and continue the procedure until all contour lines are digitized.
5. Press the ESC key on the keyboard after you are done digitizing the last contour line. This ends digitize mode.

Digitizing polylines and polygons takes a bit of practice. If you are not satisfied with the way the object looks as you are digitizing it, you can click the right mouse button to remove the last digitized vertex. If the line is beyond repair, click ESC on your keyboard to cancel digitizing, delete the line, and start over. These commands apply to both tablet digitizing and image digitizing, although you can set a puck button to act like right-clicking the mouse. See the online help for more information on puck button settings.

Editing Polygons and Polylines

If you have traced lines by holding down the puck digitizing button or the left mouse button, the lines are most likely a bit jagged. Several tools are available to help you edit polygons and polylines. Refer to the **Tools** menu and to the associated help topic for more information on these tools. Hint: if you highlight a command and click F1 on your keyboard, the specific topic opens.

If you would like to experiment with a smoothing a line:

1. Select a line by clicking on it. If you are having difficulty selecting a line, refer to the *Selecting Objects* topic in the online help.
2. Select **Tools | Thin and Smooth** or click the button.
3. Select *Vertex Averaging* in the **Line Thinning and Smoothing** dialog and then click the *OK* button. The line should become smoother.

Lesson 6 - Saving and Exporting Data

After you have digitized the points and polylines on the tutorial map, you can save the digitized data in a **Didger** project [.PJT] file or export your data to a file that can be used in other applications.

Saving a Didger Project

Didger project [.PJT] files save all the calibration information, the XY coordinates for digitized objects, the projection, the object properties, and the IDs associated with the objects. Although the [.PJT] files cannot be used in any other applications, these files preserve the **Didger** data so you can recall the file later. This allows you to add additional data, to edit any existing data, or to export the data to a file that can be used in other applications.

To save the tutorial example in a [.PJT] file:

1. Select the **File | Save** command or click the button. Since this is a new **Didger** project, the **Save As** dialog is displayed, allowing you to save the file to any name.
2. Highlight the *File name* field contents, type the name DIDGER TUTORIAL, and then click the *Save* button. The file DIDGER TUTORIAL.PJT is saved and the [.PJT] extension is placed on the file automatically.

Exporting Data to a File

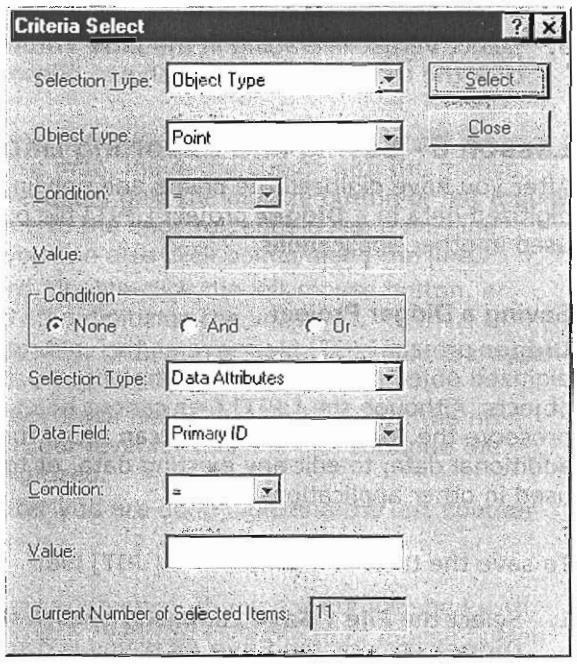
The **File | Export** options allow you to save project information in files that can be used by other programs. For example, you might want to use the digitized points from the tutorial example to produce a contour map in Golden Software's **Surfer**. Each of the monitoring wells digitized in *Lesson 4 - Digitizing Points* had a groundwater

elevation value entered as the secondary ID. With **Export**, you can create a data file of this groundwater elevation information. For further information on the format types, refer to the online help.

For this lesson, let's produce a text file of points. First, we need to select just the points in the file. This is easily accomplished with **Criteria Select**.

To select points only:

1. Select **Edit | Criteria Select**.
2. In the **Criteria Select** dialog, choose *Object Type* from the *Selection Type* list.
3. Select *Point* from the *Object Type* list. Note that the *Object Type* list does not exist until *Object Type* is selected from the *Selection Type* list in step 2.
4. The *Condition* in the middle of the dialog should be set to *None*.
5. Click the *Select* button. This selects the 11 points we have digitized.
6. After the points are selected, click the *Close* button.



The Selection Type *should be* Object Type *and the* Object Type *should be* Point *to select all the points in the file.*

To export the points:

1. Select **File | Export** or click the button.
2. Check the *Selected objects only* box in the **Export** dialog.
3. Select the *DAT - Golden Software Data (*.dat)* format from the *Save as type* field.
4. Type a name into the *File name* field.
5. Click the *Save* button.
6. The **Export Options** dialog appears allowing you to specify the format of the [.DAT] file. Check the *Tabs as separators* and *Quote text* options.
7. Click the *OK* button and the Golden Software Data [.DAT] file is created. This data file can be used in software that accepts ASCII text files.

Lesson 7 - Converting Coordinates

A coordinate conversion adjusts the values of the existing coordinate system and maps them to new values. Examples of situations you would use coordinate conversions include: converting the file coordinates of a [*.DXF] file to latitude/longitude coordinates or converting a site-specific coordinate system to a regional coordinate system.

Didger can perform two types of coordinate conversions, *Math Operation* and *Georeference*. Both methods convert coordinates but require that you know different information about the data. You can select one or the other in the conversion process.

Use *Math Operation* when you want to correct a known offset in the project coordinate system. For example, you can add, subtract, multiply, or divide every X value by 2.

Use *Georeference* when you know the exact coordinates of three or more non-linear points and you want to recalibrate based on those values. This is useful when you want to recalibrate a **Didger** project file that contains either vector data only or both a georeferenced image and vector data. You can select from a list of many transformation functions when converting the coordinates. These methods, as well as the **Coordinate Conversion** dialog are described in detail in the online help.

In this example, we will import a data file and use a math operation to adjust the X values.

To import the data:

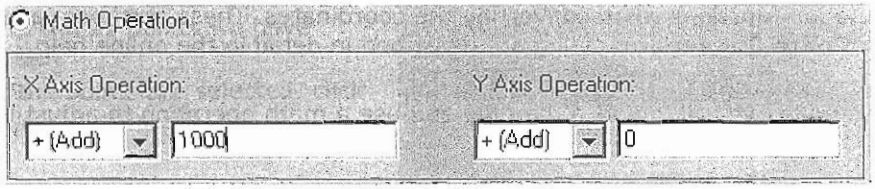
1. Let's start with a new plot window, so click **File | New** or click the button. The existing project was saved in the previous lesson, if not, you will get a message asking if you would like to save the project.
2. Select **File | Import** or click the button.
3. The **Import File** dialog opens. Double-click TUTORIAL-CONV.DAT in **Didger's** Samples folder.
4. In the **Import Data File** dialog, click in the *Field Name from first row* check box.
5. Click in the *Primary ID* box and select *Well Name* from the list.
6. The rest of the defaults are acceptable, so click the *Import* button to import the data as points.
7. You can select symbol properties in the **Define Import Options** dialog if you wish, otherwise, accept the defaults and click the *OK* button to import the data.

Now that the data are imported, let's look at the eastings (X values). Click on the point on the lower left corner of the map. The coordinates are 3237.071, 5882.831 as

seen in the **Coordinate Manager**. The **Coordinate Manager**, by default, appears in the upper left part **Didger**. Click a few points and note the X values. Let's say the X values are offset by 1000 meters. This is something that is corrected easily in **Didger**.

To adjust the X values by 1000 meters:

1. Select **Tools | Coordinate Conversion** or click the button to open the **Coordinate Conversion** dialog.
2. Select *Meters* as the *Input Data Units*.
3. Click the *Destination System* button.
4. In the **Specify Coordinate System** dialog, the *Coordinate Space Type* should be *Cartesian Coordinates*, the *X Axis Type* and *Y Axis Type* should be *Linear*, and the *Calibration Units* should be *Meters*. Click the *OK* button to return to the **Coordinate Conversion** dialog.
5. In the **Coordinate Conversion** dialog, make sure *Math Operation* is selected.
6. In the **Coordinate Conversion** dialog, select *+ (Add)* for the *X Axis Operation* and then enter 1000 into the adjacent box. For the *Y Axis Operation*, enter 0 into the value box since we are not adjusting the northings.



*Add 1000 to the X coordinates and 0 to the Y coordinates in the **Coordinate Conversion** dialog.*

7. Click the *OK* button to adjust the coordinates.

If you click on the point in the lower left corner of the map, you will see that the coordinates are now 4237.071, 5882.831. All of the X values have been adjusted by 1000 meters.

Lesson 8 - Automatically Digitizing Contours from an Image and Assigning Elevations

The **Image | Vectorize Image** command converts a raster image into a vectorized data set of polylines and polygons. In the vectorize image example, we will use an image containing contours and automatically create vector lines of those contours. Once the contour lines are created, we will automatically assign elevations to the polylines.

Opening an Existing Project File

To open a **Didger** project file [.PJT]:

1. Click **File | Open** or click the button.
2. The **Open** dialog appears. Click TUTORIAL-VLINES.PJT in **Didger's** Samples folder.
3. Click the *Open* button to open the contour map image. You do not need to save changes to the coordinate conversion project.

TUTORIAL-VLINES.PJT contains a simple contour map from which we can create vector polylines automatically.

Automatically Creating Vector Contour Lines

To have **Didger** automatically create vector contour lines:

1. Click on the image to select it.
2. Click **Image | Vectorize Image** or click the button to open the **Vectorize Image** dialog.
3. Set the *Edge Detection Method* to *Standard Object Thinning*.
4. *Smooth Lines* should be set to *Minor*.
5. Change the *Min Pixel Length* to 5.
6. Make sure *Auto Generate Polygons* is not checked.
7. Check the *Create results on new layer(s)* if it is not already checked.
8. Click the *OK* button to create the vector polylines from the image.

Turning Off the Image Display

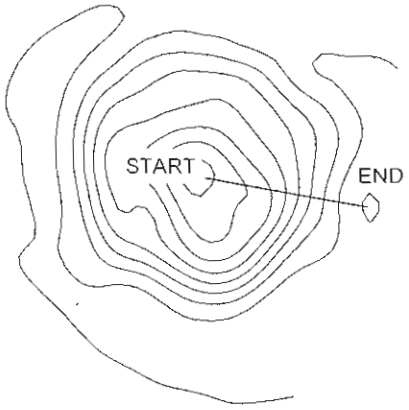
After the vector contour lines are created, you can turn off the image display to see the lines more clearly.

To hide the image display:

1. Open the **Data Manager** if it is not already open by selecting **View | Toolbars/Managers | Data Manager**. The **Data Manager** is open if it has a check mark next to it. The **Data Manager** is typically displayed at the bottom of the **Didger** window.
2. Images are displayed in the **Data Manager** with this symbol: . The image should be at the bottom of the *Object Type* list.
3. The light bulb symbol is yellow, indicating the image is displayed. Click on the light bulb so that it changes to gray. This turns off the image so the vector contour lines can be seen easily.

Assigning Elevations

Typically, contour lines have elevation numbers associated with them in one of the ID fields. Technically, you could select each line and type the ID into the **Property Inspector's** *Data Attributes* section, but this is time consuming when you have many polylines. Instead, you can use **Assign Elevations**.

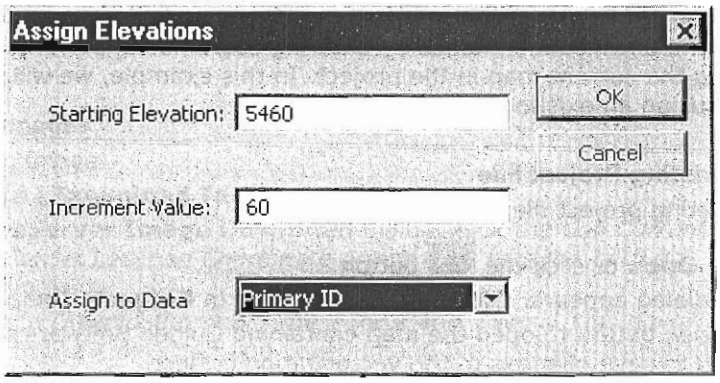


The minimum elevation is at the circle in the center of the map and the maximum elevation is at the right-side circle. Begin the line at the center of the map and end it just inside the right-side circle.

To automatically assign elevations:

1. Select **Edit | Data | Assign Elevations** and a cursor appears.
2. To assign the elevation data, a line must be drawn from the minimum contour polyline to the maximum contour polyline. The minimum elevation is assigned to the first polyline the line crosses and each successive polyline is assigned an increasing elevation based on the specified contour interval. The minimum contour level is located at the center circle of this map and the maximum contour is located at the circle on the right side of the map. Position the cursor just inside the center circle, hold down the mouse button, and drag the cursor to the circle on the right side of the map to draw the line.
3. Release the mouse button and the **Assign Elevations** dialog appears.

4. Type 5460 for the *Starting Elevation*.
5. Type 60 for the *Increment Value*.
6. The *Assign to Data* list contains the fields that can be used for the data. In this case, select *Primary ID*.



Enter the Starting Elevation *and* Increment Value *to assign elevations to all the polylines crossing the line drawn with the* ***Assign Elevations*** *command.*

7. Click the *OK* button and the elevations are entered into the primary ID. You can see all the primary IDs in the **Data Manager**.

Preprocessing Note

The vectorization example above was a simplified example. Typically, you need to use image pre-processing tools before vectorizing. Pre-processing includes the commands in **Image | Processing Filters**. For example, if the pixels are not well defined, you may need to use **Adjust Contrast**, **Adjust Brightness**, etc. If the lines in the image are not well defined or break apart, you may want to use **Image Erosion and Dilation**. Pre-processing and vectorization settings may take some experimentation to achieve the preferred results.

Lesson 9 - Creating Layers and Downloading TerraServer Images

Microsoft TerraServer is a geo-spatial database server containing high-resolution aerial imagery and rasterized topographic maps for the United States provided by the US Geological Survey (USGS). **Didger** lets you download a series of tiles from the USGS web site and then imports them as a single georeferenced image. You can determine the location of the downloaded images by entering coordinates, performing a location search, or using the current map in the project. In this example, we will download aerial imagery using an existing map.

Opening an Existing Project File

To open an existing project file:

1. Click **File | Open** or click the button.
2. The **Open** dialog appears. Click TUTORIAL-TS.PJT in **Didger's** Samples folder.
3. Click the *Open* button to open the map containing Golden Software's location. You do not need to save changes to the vectorization project.

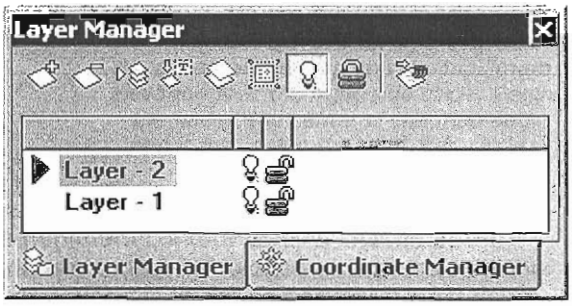
Creating a New Layer

Layers partition a project into one or more overlays and make it easy to organize your project. Layers are like transparencies in that you can see all layers at the same time but they let you isolate objects by placing them on separate layers. There are many layer tools such as locking layers to make them uneditable. Layers are created and edited using the **Layer Manager**. For additional information on layers, refer to the *Layer Manager* topic in the online help file.

We will create a new layer and download the TerraServer image onto the new layer to better organize our project.

To create a new layer:

1. Open the **Layer Manager** if it is not already open by selecting **View | Toolbars/Managers | Layer Manager**. The **Layer Manager** is already open if there is a check mark next to **Layer Manager**.
2. Click on the **Layer Manager** tab near the upper left corner of **Didger** if the **Layer Manager** is not visible. Usually, the **Layer Manager** and **Coordinate Manager** occupy the same location and are toggled by clicking on the tabs.



*Layers are created through the **Layer Manager**.*

3. In the **Layer Manager**, click the button to create a new layer. *Layer - 2* is the new, active layer. The active layer is the layer on which you are currently working. Objects on other layers typically remain unaffected by any changes you make on the active layer. The active layer name is displayed on the right side of the status bar and is indicated by a red triangle in the **Layer Manager** to the left of the layer name.

Downloading Images

To download an image:

1. Click **Image | Download TerraServer Images**.
2. In the **TerraServer Image Download** dialog, click the *Use Current Map* button in the *Select Center Location Coordinate* group. This sets the *Lat/Long* coordinates to the correct location.
3. In the *Tiles to Download* group, type 7 for *X* and 7 for *Y*. This downloads seven image tiles in the X direction and seven image tiles in the Y direction.
4. Select *USGS Urban Area - .25 Meter Per Pixel* from the *Select Type* list.
5. Click the *Download Tiles* button.
6. After the image appears in the preview box, click the *Load* button to load the image tiles into the plot window on Layer - 2.

Moving the Image

Newly created layers are placed on top of existing layers, so this means the image obscures the original map's text and symbol. The image layer can be moved behind the original layer so the text and symbol can be seen on the map.

To move the layer:

1. Click on *Layer - 2* in the **Layer Manager**.
2. Click and hold the left mouse button and drag *Layer - 2* beneath *Layer - 1*.

Getting Help

The getting started guide is a quick way to learn about the basics in **Didger**. There are also other sources of help with **Didger**.

Online Help

Extensive information about **Didger** is located in the online help. To access online help, choose **Help | Help Topics**. You can navigate help using the **Contents**, **Index**, **Search**, and **Favorites** pages in the navigation pane to the left of the topic page.

Context-Sensitive Help

Didger also contains context-sensitive help. Highlight a menu command, window region, or dialog box, press the F1 key and help is displayed for the highlighted item. You may also access context-sensitive help by pressing SHIFT+F1 or clicking on the button. After clicking the button, the pointer appears like this . Simply click the item for which help is required and a help window appears.

In addition, the dialog boxes contain a help button. Click the button in the dialog title bar to obtain help for that dialog.

Internet

There are several Internet help resources.

- Click the *Forums* button in online help to research a **Didger** question or to post a question.
- You can use the **Help | Feedback** commands to send a problem report, suggestion, or information request by email.
- You can search our web page at www.goldensoftware.com or use the **Help | Golden Software on the Web** commands.

Technical Support

Golden Software's technical support is free to registered users of Golden Software products. Our technical support staff is trained to help you find answers to your questions quickly and accurately. We are happy to answer all of your questions about any of our products, both before and after your purchase. We also welcome suggestions for improvements to our software and encourage you to contact us with any ideas you may have for adding new features and capabilities to our programs.

Technical support is available Monday through Friday 8:00 AM to 5:00 PM Mountain Time, excluding major United States holidays. We respond to email and fax technical questions within one business day. When contacting us with your question, have the following information available:

- Your **Didger** serial number (located in the front cover of the getting started guide or in **Help | About Didger**)
- Your **Didger** version number, found in **Help | About Didger**
- The operating system you are using (Windows 2000, XP, Vista, etc.)

If you encounter problems with **Didger**, send an email message to Golden Software using **Help | Feedback | Problem Report** (didgersupport@goldensoftware.com). Report the steps you perform when the problem occurs and include the full text of any error messages that are displayed. You are welcome to attach a [.ZIP] file up to 6 MB containing the [.PJT] file and other files that illustrate the problem. Larger files may be uploaded to our FTP site at ftp://ftp.goldensoftware.ws/incoming/didger/.

Contact Information

Telephone: 303-279-1021
Fax: 303-279-0909
Email: didgersupport@goldensoftware.com
Web: www.goldensoftware.com
Mail: Golden Software, Inc., 809 14th Street, Golden, Colorado 80401-1866, USA

Index

A

add point · 22
adjust brightness · 17
adjust contrast · 17
adjust saturation · 18
area · 7
assign elevations · 38–39
auto increment · 27

B

background color · 8
bitmap · *See* image
bold text · 3
break polyline · 11

C

calibrate tablet · 21
calibration points · 21, 24, 25
calibration settings · 23
calibration units · 22
Cartesian coordinates · 22
change boundary type
  points to polyline · 11
  polygon to polyline · 10
  polyline to points · 11
  polyline to polygon · 10
change color format · 19
check for update · 3
circles · 6
clip image · 18
clipped image · 7
color · 8
color format · 7
color reduction · 18
colors · 19
combine islands/lakes · 15
commands · 3
complex polygon · 15
conditional selection · 34
connect polylines · 11
contact information · 43
context-sensitive help · 42
contours · 31
convert to black and white · 18
convert to grayscale · 18
convex hull · 15
coordinate conversion
  tutorial · 35–36
coordinate manager · 5, 9, 36
cover areas by · 8
create calibration points · 22
create IDs · 8
create intersection points · 15
create labels · 8
create line intersections · 12
create polygons by IDs · 14
create polygons by locator · 13
create several · 30
create text · 8
criteria select · 34
curves · *See* polylines
custom fill patterns · 8
custom line styles · 8

D

data attributes · 8
data manager · 5
date/time · 8
Didger project file · 33
difference of polygons · 14
digitize menu
  point · 27
  polyline · 31
  tablet calibration · 21
digitize multiple points · 30
digitize objects · 7
digitize points · 30
  tutorial · 27–31
digitize polylines · 32

tutorial · 31–33
digitizing definition · 1
digitizing tablet · 2, 21
direction · 7
divide polygons · 15
documentation · 3

E

edge detection · 16
edit boundaries
  break polyline · 11
  connect polylines · 11
  convex hull · 15
  create intersection points · 15
  create line intersections · 12
  create polygons by IDs · 14
  create polygons by locator · 13
  difference of polygons · 14
  divide polygons · 15
  intersect polygons · 14
  polyline to polygon with shared border · 14
  snap all polyline segments · 12
  snap undershoot polylines · 13
  trim overshoot polylines · 13
  trim polyline · 12
  union polygons · 14
edit data attributes · 8
edit fill properties · 8
edit IDs · 8
edit item properties · 7
edit labels · 8
edit line properties · 8
edit menu
  assign elevations · 38–39
  criteria select · 34
edit reference information · 24
edit symbol properties · 8
edit text · 8
editing tools · 9–19
  adjust brightness · 17
  adjust contrast · 17
  adjust saturation · 18
  break polyline · 11
  change color format · 19
  clip image · 18
  color reduction · 18
  combine islands/lakes · 15
  connect polylines · 11
  convert to black and white · 18
  convert to grayscale · 18
  convex hull · 15
  coordinate conversion · 35–36
  create intersection points · 15
  create line intersections · 12
  create polygons by IDs · 14
  create polygons by locator · 13
  difference of polygons · 14
  divide polygons · 15
  edge detection · 16
  extract image region · 18
  image erosion and dilation · 18
  image registration and warping · 16
  image thinning · 17
  intersect polygons · 14
  median filter · 17
  modify image colors · 19
  mosaic · 19
  points to polyline · 11
  polygon to polyline · 10
  polyline to points · 11
  polyline to polygon · 10
  polyline to polygon with shared border · 14
  remove duplicate object · 15
  remove polyline by length · 15
  resample polyline · 10
  reshape · 9
  resize image · 19
  reverse direction · 16
  sharpen · 17
  snap all polyline segments · 12
  snap undershoot polylines · 13
  spatial filters · 17
  split islands/lakes · 16
  thin and smooth · 10
  trim overshoot polylines · 13
  trim polyline · 12
  union polygons · 14
email · 43

end style · 8
ending increment value · 27
enter data after creation · 27, 30
enter object data · 31
export · 33, 34
  tutorial · 33–34
extract image region · 18

F

F1 key · 42
fax number · 43
feedback · 42
file menu
  export · 33
  import · 35
  new · 20
  save · 33
file name · 7
fill method · 8
fill patterns · 8
  custom · 8
fill properties · 8
foreground color · 8
format labels · 8
format text · 8
formulas · 8
forums · 42
fourth ID · 8

G

georeference · 24
geo-referenced · 7
georeferencing method · 23
Golden Software on the web · 42
GPS units · 2

H

hardware requirements · 2
help · 3, 42–43
help button · 42
help file · 42
help menu
  feedback · 42
  Golden Software on the web · 42
  help topics · 42

I

ID prefix · 27
ID suffix · 27
IDs · 8
  sequential · 27
image · 7
  move to back · 41
  vectorize · 37
image calibration
  tutorial · 24–26
image color · 19
image erosion and dilation · 18
image height · 7
image menu
  adjust brightness · 17
  adjust contrast · 17
  adjust saturation · 18
  change color format · 19
  clip image · 18
  color reduction · 18
  convert to black and white · 18
  convert to grayscale · 18
  download TerraServer images · 41
  edge detection · 16
  extract image region · 18
  image erosion and dilation · 18
  image registration and warping · 16
  image thinning · 17
  median filter · 17
  modify image colors · 19
  mosaic · 19
  processing filters · 39
  resize image · 19
  sharpen · 17
  spatial filters · 17
  vectorize image · 16, 37
image pre-processing · 39

image registration and warping · 16, 24
image thinning · 17
image width · 7
import · 35
import data · 35
import image · 24
increment settings · 27
increment value · 27
information request · 42
initial calibration settings · 21
install · 3
Internet help · 42
intersect polygons · 14
italic text · 3
item properties · 7

L

label properties · 8, 29
labels · 29
layer · 7, 40
layer manager · 5, 40
length · 7
line properties · 8
line style · 8
line styles
  custom · 8
linear axis · 22
lines · 31. *See* polylines

M

mailing address · 43
math operation
  tutorial · 35–36
median filter · 17
menu bar · 5
menu commands · 3
mode · 8
modify image colors · 19
monitoring wells · 27
mosaic · 19
move calibration points · 25

N

new plot window · 20

O

object properties · 7–8
objects · 6–7
  selecting · 9
online help · 3, 42

P

paper documents · 21
pattern · 8
pattern scale · 8
pixels · 7
PJT · 33
plot window · 5
  new · 20
point count · 7
point ID · 22, 24
points · 6, 27
polygon markers · 6, 13
polygon to polyline · 10
polygons · 6
polyline to points · 11
polyline to polygon · 10
polyline to polygon with shared border · 14
polylines · 6, 31
  digitize · 32
post maps · 6
prefix · 27
primary ID · 8
problem report · 42, 43
processing filters · 39
  adjust brightness · 17
  adjust contrast · 17
  adjust saturation · 18
  color reduction · 18
  convert to black and white · 18
  convert to grayscale · 18
  edge detection · 16

image erosion and dilation · 18
image thinning · 17
median filter · 17
sharpen · 17
spatial filters · 17
properties · 7–8
property inspector · 5, 7

R

recalibrate · 16
rectangles · 6
reference X · 24
reference Y · 24
remove duplicate object · 15
remove polyline by length · 15
resample method · 26
resample polyline · 10
reshape · 9
resize image · 19
reverse direction · 16
RMS · 26
RMS calibration settings · 23

S

save · 33
tutorial · 33–34
scale · 8
secondary ID · 8
select specific objects · 34
selecting objects · 9
sequential IDs · 27
serial number · 20, 43
sharpen · 17
size · 8
snap all polyline segments · 12
snap tolerance · 9, 23
snap undershoot polylines · 13
spatial filters · 17
specify project limits and Scale · 23
spline polygons · 6
spline polylines · 6
split islands/lakes · 16
start style · 8
starting Didger · 20
starting increment value · 27
status bar · 5
stream mode · 31
style · 8
subscripts · 8
suffix · 27
suggestion · 42
superscripts · 8
support forums · 42
symbol · 8, 27
symbol color · 28
symbol properties · 8, 28
symbol set · 8, 28
symbol size · 28
system requirements · 2

T

tablet · 21
tablet button settings · 23
tablet calibration
tutorial · 21–23
tablet coordinates · 21
tablet X · 22
tablet Y · 22
technical support · 43
telephone number · 43
TerraServer · 40–41
text · 7
text properties · 8
thin and smooth · 10
third ID · 8
title bar · 5
tolerance settings · 9
toolbars · 5
tools menu
break polyline · 11
combine islands/lakes · 15
connect polylines · 11
convex hull · 15
coordinate conversion · 36
create intersection points · 15
create line intersections · 12

create polygons by IDs · 14
create polygons by locator · 13
difference of polygons · 14
divide polygons · 15
intersect polygons · 14
points to polyline · 11
polygon to polyline · 10
polyline to points · 11
polyline to polygon · 10
polyline to polygon with shared border · 14
remove duplicate object · 15
remove polyline by length · 15
resample polyline · 10
reshape · 9
reverse direction · 16
snap all polyline segments · 12
snap undershoot polylines · 13
split islands/lakes · 16
thin and smooth · 10
trim overshoot polylines · 13
trim polyline · 12
union polygons · 14
total RMS · 26
tracing · 31
transparency · 8
trim overshoot polylines · 13
trim polyline · 12
tutorial · 19–41
assign elevations · 38–39
coordinate conversion · 35–36
create layers · 40
digitize multiple points · 30
digitize points · 27–31
digitize polylines · 31–33
export · 34
image calibration · 24–26
labels · 29
online · 20
save · 33–34
starting Didger · 20
tablet calibration · 21–23
TerraServer · 40–41
vectorize image · 37

U

uninstall · 3
union polygons · 14
update Didger · 3
usage examples · 2
user interface · 4

V

vector pattern scale · 8
vectorize image · 16, 37
version number · 43
vertex order · 16
vertex tolerance · 23
view menu
layer manager · 40
visible · 7, 38

W

warp method · 26
warping · 16
web address · 43
width · 8
world X · 22
world Y · 22
wrapped polylines · 6

X

X axis type · 22

Y

Y axis type · 22