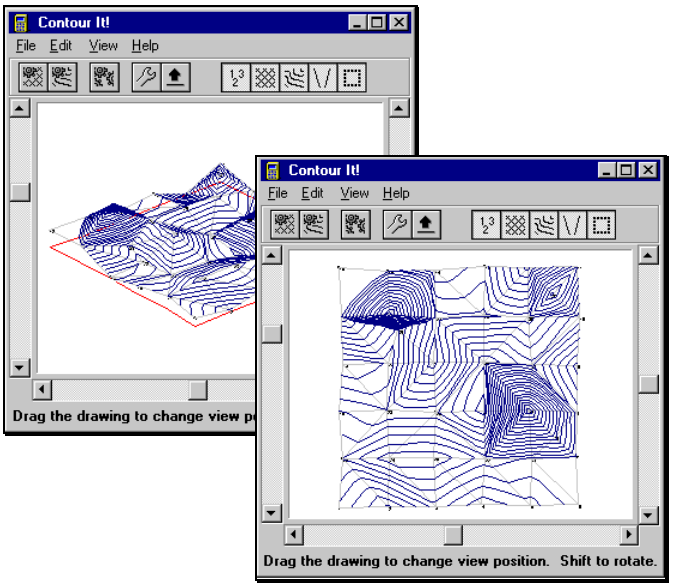
Contour It!

Contouring and Volumes for "Sight" Survey



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Section 1
The Basics

1.01 Introduction

Contour It! is a Windows based program that provides you with a simple method for generating maps, digital terrain models, and for computing the volume between two surfaces. The program is designed to run inside **"Sight" Survey Professional** (our Windows based COGO and CAD software - if you don't have it, you should!), but it will also run as a stand-alone program. (See Section 6.)

Contour It! contains several menus and provides numerous monitor prompts and screens to guide you. You will be capable of running *Contour It!* without the aid of the manual in a very short time. ***This short learning curve will be demonstrated to you if you take the time to run the example problems in Section 3.***

Your ability to use *Contour It!* to its fullest potential depends upon your understanding of its principals. So with that in mind, begin by reviewing some basic terminology relevant to *Contour It!*.

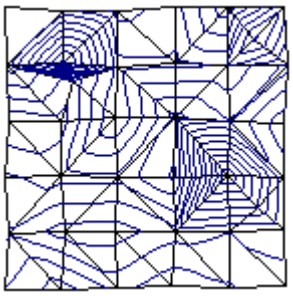
1.02 What is a Contour?

con'tours (kon'to͝orz)*n.* **1.** a line joining points of equal elevation on a surface. **2.** the representation of such a line on a map. **3.** a travel agency for felons. (Con Tours - get it? Only one page into the manual and you're already wondering what you got yourself into.)

You guessed it… We know you know what a contour is, or you wouldn't have purchased the program. We were just searching for something to say to get us started.

Contour It! will produce contour and surface maps containing just contour lines, just triangles, or both contour lines and triangles. You may also include labels, point numbers, breaklines and a

border. Two examples of contour maps are shown below. The example on the left shows contours and triangles, while the example on the right shows only contours. Label, breakline and border display are not illustrated here.



Contour Line Rules

Contour maps are only as accurate and complete as the data you provide in your point file. To assure the integrity of the data, *Contour It!* checks your data as it loads. There are a few rules you must abide by:

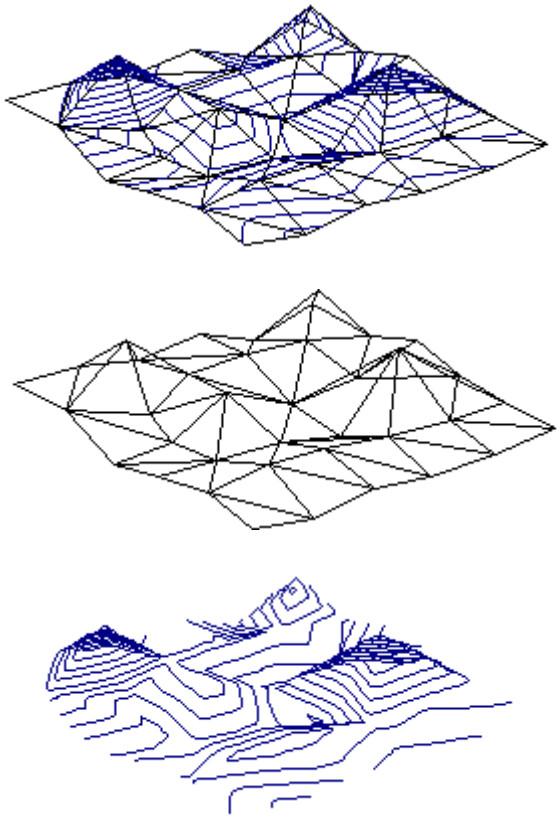
1. You must have at least three points in a contour point file.
2. You cannot have any duplicate points in a contour point file. This includes points having a different point number but identical Northings and Eastings.
3. Incomplete points (those missing a Northing, Easting, or Elevation) are ignored.
4. Point numbers must be numeric. Alpha-numeric point numbers are not allowed in *Contour It!*

1.03 What is a Digital Terrain Model (DTM)?

A **digital terrain model**, or DTM, is a 3-D representation of your contour data. A DTM will typically include some type of grid to assist you in viewing the surface.

In *Contour It!*, the DTM normally consists of the contour lines and/or triangulation grid. Border, breakline, and label display is optional. Shown on the next page are three DTM examples. The first example shows a DTM consisting of contours and triangles.

The second example shows a DTM consisting of triangles only. The third example shows a DTM consisting of contours only.



Like contours, a DTM is only as accurate as the data you provide. This includes not only complete field data, but triangulation, border, and breakline data as well.

1.04 What is a Border?

A **border** consists of line segments connecting the outermost points in the contour point group. Every contour map must have a border, although the border does not need to be visible on the map.

Specifying a Border

When passing points from "Sight" Survey to *Contour It!*, you are given the opportunity to enter a border. To specify a border, simply type in the point numbers of the border (perimeter) points. You may also select the border points visually by using "Sight" Survey's **Get String** (**GS**) command. An example of how to do this is shown in **Computing a Volume**, beginning on page 38.

Border Rules

1. If you do not enter a border, *Contour It!* will attempt to provide one for you. You may edit this border with the **Edit** ➪ **Border** routine as discussed on page 60.
2. Border lines can never cross each other.
3. Breaklines may never cross a border line.

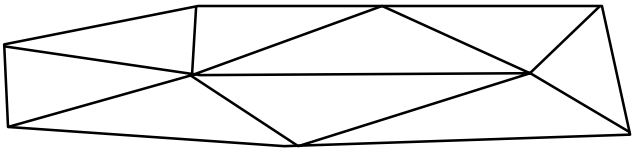
1.05 What is Triangulation?

Triangulation is the basic technique used by *Contour It!* for surface modeling. "Surface model" refers to *Contour It's* representation of the actual surface resulting from the data points that are input.

When *Contour It!* triangulates a set of coordinates, it builds the strongest set of triangles for that data. Since the strongest triangles are equilateral triangles, *Contour It!* tries to make all triangles as nearly equilateral as possible, using the coordinates given.

Triangulation is simply the process by which *Contour It!* defines between which points linear interpolation is appropriate for determining contour lines.

The illustration below represents several data points that have been triangulated.



Notice that the lines connecting the points form triangles, and hence the name triangulation. These lines are very important because they represent a relationship between data points. Imagine

two points on a surface, connected by a string. If the surface does not get in the way, the string will be a straight line between the points. The elevation of the string is that of the data points at each end and changes linearly between the points (along the string). The lines on the previous illustration are exactly like the imaginary string. Each line represents a linear change in elevation between the two points it connects.

The triangles formed are individual planes. When pieced together, they represent the surface and form the "surface model".

Contour It! tries to form the "strongest" set of triangles, given the existing data. This means that long, narrow triangles are avoided whenever geometrically possible. By maintaining triangles as nearly equilateral (sides the same length) as possible, *Contour It!* represents elevation changes over the shortest distance, thus yielding a better surface model.

The most important advantage of triangulation is that the elevation of each original data point is preserved in the surface model. Both research and experience have proven this to be one of the most accurate methods of surface modeling.

Another advantage of triangulation is that the data points describing the surface may be randomly spaced or grid spaced, allowing more information to be gathered where necessary, and less information where not needed.

☞ REMEMBER

The only data Contour It! has available to build an accurate surface model is the data you provide it. Contour It! cannot make assumptions from data it does not have!

If Triangulation Fails

There are some situations that occur where the triangulation technique can fail to accurately describe the surface. Most of these situations are a result of insufficient data or improper placement of survey shots. Others situations are simply beyond the capabilities of triangulation. However, very few situations exist in the real world that are beyond the capabilities of triangulation to model.

The two primary situations that *Contour It's* triangulation can not model are:

1. Exact vertical walls
2. Cliffs and overhangs

ⓘ NOTE

If walls are displaced from vertical by even 0.001 feet from the top to the bottom, the surface can be modeled. However, the resulting surface model may be difficult to work with.

Any other situations that occur can usually be handled in *Contour It!* by using breaklines.

1.06 What are Breaklines?

A **breakline** is a line segment connecting any two points. Breaklines have the ability to modify the surface model by locally adjusting the triangulation. By changing the triangles, the relationship between data points is changed. This produces a different surface model and thus different contours.

Breaklines are helpful for defining objects such as building slabs, and retaining walls, grade lines, roadbeds, ditches, canals, etc.

Breaklines permit:

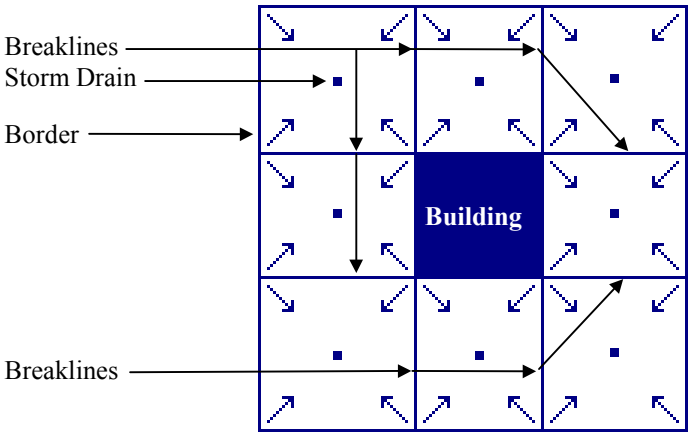
1. Post processing to alter portions of the triangulation thus generating a more accurate surface model;

2. Control of the triangulation by specifying lines which triangle sides cannot cross. Their use allows preservation of significant terrain features even though the lack of sufficient data may favor a different triangulation;

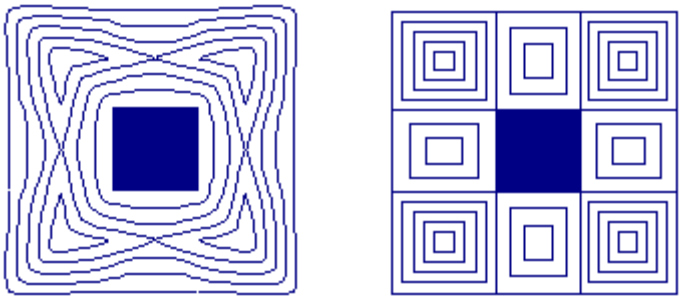
3. Definition of ditches, roadways, terraces, etc. with a minimum of field data.

Parking Lot Example

The drawings below show one example of how a contour map is affected by breaklines. In the first drawing, you see a building (shown as a dark square) in the center of the parking lot. The parking lot is divided into eight drainage areas, the center of each being a storm drain. These drainage areas are defined by lines of constant elevation radiating out from each corner of the building. These lines will serve as our breaklines.

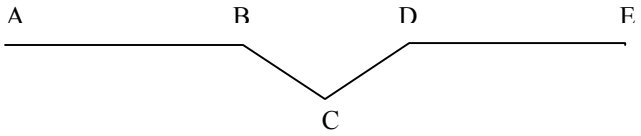


Now we'll contour the data. The example on the left illustrates the incorrect contours that are generated when no breaklines are used to construct the contour map. In the example on the right, the breaklines have been included and we have correctly contoured the drainage areas.

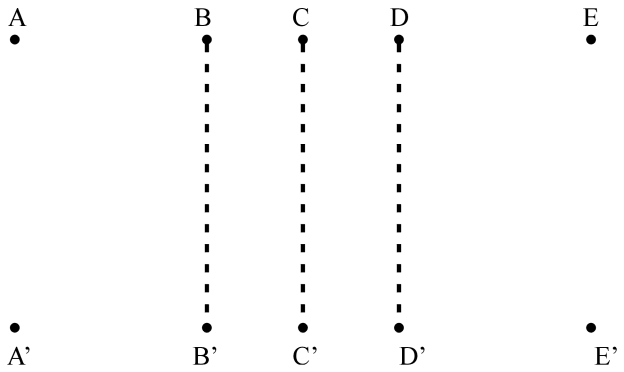


Ditch Example

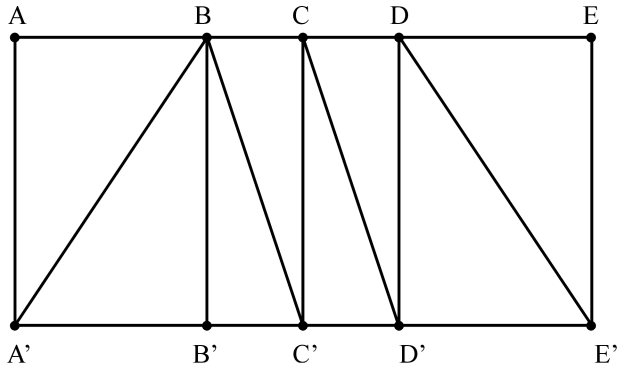
Sometimes the optimal triangulation results in the joining of three points which actually should not be triangulated together. The best example is across or around a ditch. Consider the following cross section of a ditch.



Note that points B and D are on the banks of the ditch and point C is at the bottom of the ditch. Shown below is a top view of the ditch. All lines (A-A', B-B', etc. are straight lines).

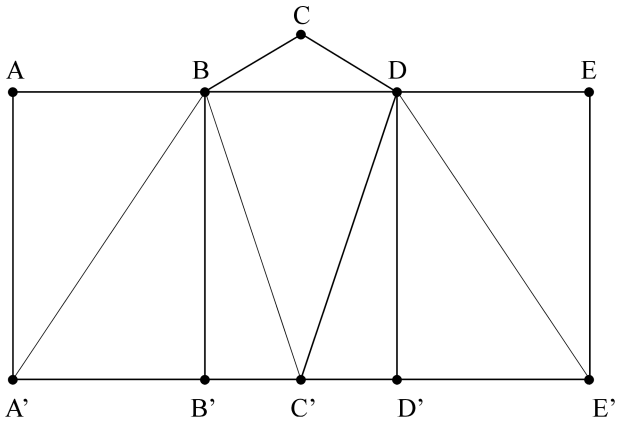


The dashed lines above represent the banks and bottom of the ditch. If the points shown were triangulated, the result would be:

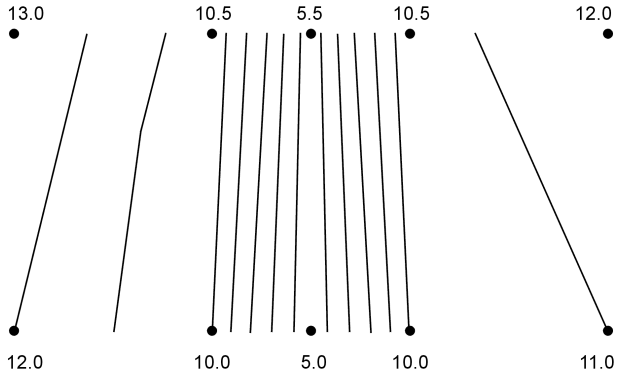


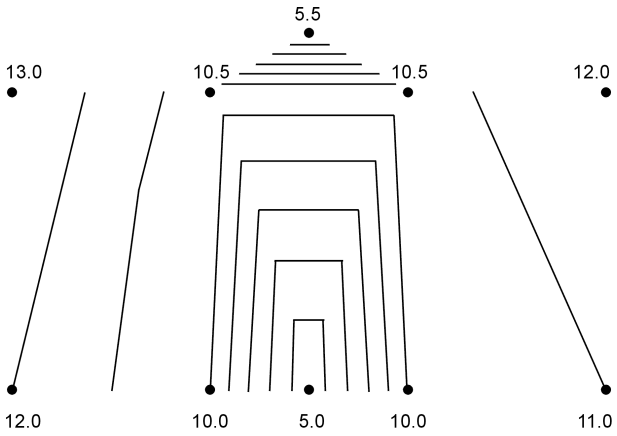
This is a valid triangulation, so no further changes in the surface model would be needed. However, if the points were surveyed in

the following manner and then triangulated, the results would look like this: (Note that ABCDE is not a perfectly straight line.)

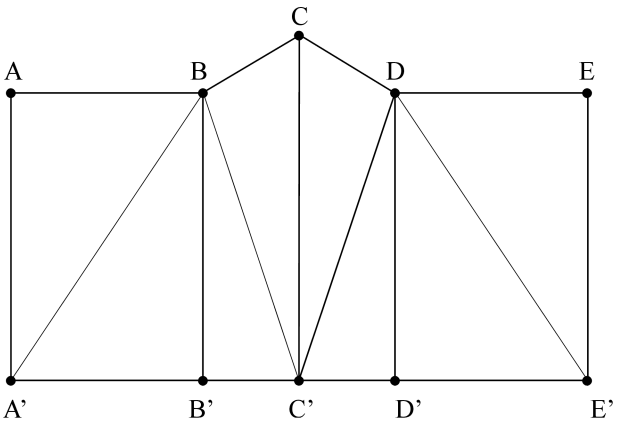


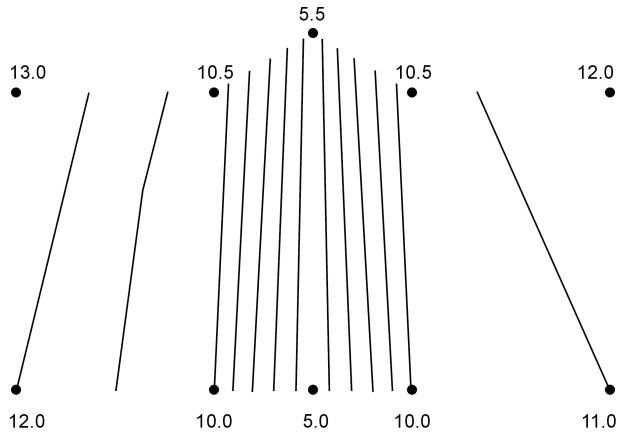
As you can see, points B and D become the side of a triangle BCD, causing *Contour It!* to assume the surface is linear between them. Shown in the next two illustrations are the contour maps of the first "good" surface model, and the second "bad" surface model, listing the elevations at each point.





One way to solve the problem is to instruct *Contour It!* NOT to triangulate across a user-defined line (a breakline). For example, if you were to define a breakline between points C and C', then *Contour It!* would check to see if any side of a triangle crosses that breakline. If a side does cross the breakline, *Contour It!* redefines the triangulation so no triangle side crosses the breakline. After adjusting for the breakline, the following triangulation and contour map would result.

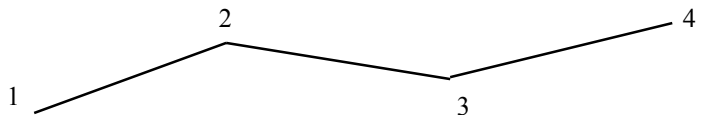




Specifying Breaklines

When passing points from "Sight" Survey to *Contour It!*, you are given the opportunity to enter breaklines. To specify a breakline, simply type in the point numbers of the beginning and ending points, separating the points with a comma. You may also select breakline points visually by using "Sight" Survey's **Get String** (**GS**) command. An example of how to do this is shown in Section 3.03, **Computing a Volume**, beginning on page 38.

Sometimes you might have a breakline that changes direction a few times. For example, imagine a three-segment breakline snaking from point 1 to 2 to 3 to 4.



Technically, a breakline is only one segment long. To specify a multi-segment line, you must include each segment in the breakline string. In this case, an entry of 1,2,3,4 would result in two breaklines: from 1 to 2; and from 3 to 4. Each breakline must be represented by a pair of points. To properly enter this three segment breakline, type 1,2,2,3,3,4.

Breakline Rules

1. Each breakline is always defined by two points.
2. A breakline cannot cross a border.
3. A breakline cannot cross another breakline.
4. A breakline cannot cross a data point.

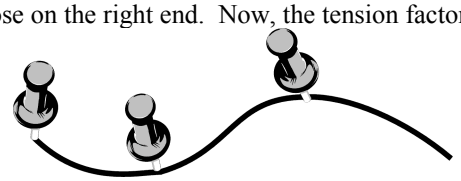
☞ REMEMBER

Breaklines can be created either before of after triangulating the data file. It is often better to create breaklines after the initial triangulation to avoid creating unnecessary breaklines.

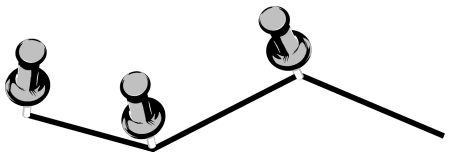
1.07 What is a Tension Factor?

The **tension factor** controls the **smoothing** function in *Contour It!* The range for the tension factor is zero to 10. The higher the tension factor, the sharper the corners are drawn.

Suppose you have a string loosely draped around some push pins, as shown in the illustration below. The string is anchored at the left end, loose on the right end. Now, the tension factor is zero.



Now grab the loose end and slowly pull it to the right. As you pull, you'll notice the curve of the string begins to flatten out, and continues to do so until the corners at the push pins are sharp. When you cannot pull the string any more (without removing the push pins) you have achieved a tension factor of 10.



A tension factor of zero allows more curving of the line, while a tension factor of 10 results in no noticeable line smoothing. Any value between zero and 10 may be used. The value does not need

to be a whole number. In general practice, values from zero to 5 are most commonly used. See **Edit Contour Setup** on page 70 for more information on **Tension Factors** and **Segments per Curve**.

1.08 What is a Bitmap?

A bitmap is a picture made up of dots. This type of picture is also known as a raster graphic, as opposed to a vector graphic (such as a CAD drawing) which is made up of lines.

Raster or bitmap graphics are simply pictures, nothing more, nothing less. You can enlarge them, shrink them, and rotate them, but they can get pretty ugly if you do. You can save them to a file and import them into other programs. You can print them on your printer. But, no matter what you do to them you cannot move a line or isolate a point or do anything you can do with a vector graphic.

With *Contour It!* alone, you can save your contour map or DTM in a bitmap image. This is often helpful when you want to include a graphic as part of a report, but virtually worthless if you want to manipulate your map inside a COGO/CAD program. Sadly, if you are running *Contour It!* as a stand-alone program, saving your map as a bitmap is all you can do. But don't despair. Using *Contour It!* with **"Sight" Survey Professional** allows you the freedom of choice! Once your map is back in "Sight" Survey Professional (note the word "Professional" here folks, the plain "Sight" Survey version won't work with *Contour It!*) you can save it as a TrueCAD drawing file, an AutoCAD 12 drawing file, a DXF file, and yes…even as a lowly bitmap. What versatility! *Remember now, that's* ***"Sight" Survey Professional****. If you don't have it, call us at 1-800-777-7978 or 1-218-773-8917 and buy it!*

1.09 The Reference Manual

This *Contour It!* manual is designed to provide information in a clear, convenient format. As you page through the manual sections you will notice that the program's monitor prompts and the names of the routines are shown in **Bold Style Helvetica** letters. All prompts are followed by detailed instructions for each needed

response. In cases where the manual indicates a specific response, the response is printed in **`Bold Style Courier`** letters.

The **Reference Manual** is organized by sections and includes:

Section 1 **Basics**	This section includes a general introduction and discussion of basic contouring elements. It also includes sections on response terminology and using the pull-down menus.
Section 2 **Setup**	Contains installation and setup information for this program.
Section 3 **Examples**	Contains two example problems: 1. Constructing a basic contour map; and 2. Calculating a volume. Breaklines are also discussed in the second example.
Section 4 **Menus**	Contains information regarding *Contour It's* menu structure, including complete discussions of each menu item.
Section 5 **Buttons**	Contains information on *Contour It's* tool bar buttons, including complete discussions of each right and left-click function.
Section 6 **Stand-Alone**	Contains information on running *Contour It!* as a stand-alone program.
Section 7 **Trouble?**	Contains troubleshooting information and error messages.
Section 7 **Help**	Contains info you need in the event that you find it necessary to call Simplicity Systems for technical support. Our support hours are listed in this section, as are the numbers for contacting us by phone, fax, or E-mail. But be warned… If our support technicians discover that you haven't read the manual, they will use a large wooden ruler across your knuckles.
Index	Contains a comprehensive listing of routines and terms, and where they can be found within this manual.

ⓘ NOTE

The display illustrations shown throughout this manual may differ slightly from your actual displays. Screen captures for the manual were made while running Windows 95.

1.10 Response Terminology

Throughout this manual, you will see a variety of instructions for answering all of the various types of prompts. Some prompts will require a **YES** or **NO** answer, while others will be accompanied by instructions to **ENTER** your response. Still others will contain instructions for you to **PRESS** a key (either on the keyboard or with your mouse) in response to a given prompt. In an effort to simplify your operation of this program, the following guidelines shall apply to all of the prompt responses for all *Contour It!* routines.

Enter vs. Press or Type

When you encounter an instruction which requires you to **Enter** data, the program expects you to press ↵Enter after the data has been typed. When you encounter the word **Press** or **Type**, the program is indicating that it is expecting you to respond with a single key press, or a series of key presses. In these cases, do not press ↵Enter after your response.

Mouse Clicks

Since *Contour It!* is a Windows program, you can expect to see a number of references to your mouse. It used to be possible to say "click" or "right-click" your mouse button and everyone knew that "click" meant the main mouse button, located directly under your index finger on your right hand. Now that a mouse can come with left hand configurations or software for configuring a right-hand mouse as left handed, "click" takes on a slightly altered meaning, no longer referring to the left button, but simply the main mouse button, still located under your index finger. (Unless you are using a right handed mouse configuration with your left hand.)

☞ REMEMBER

When you are asked to click your mouse, click once on the main mouse button, located under your index finger. Right-click means to click once on the secondary mouse button. "Double-click" simply means two clicks in rapid succession.

Keyboard Responses

In this manual you will occasionally see K E Y C A P responses which indicate that you should press the key or keys shown. When you see keycaps shown in combination (but not with an ↵Enter key) such as Alt E, press the first key and hold it down while pressing the second key.

In most cases, pull-down menu items may also be selected from the keyboard. This type of selection will be depicted in some form of this manner: Alt F, O or Alt F, I, D. To respond to this type of entry, press the first key and hold it down while pressing the second key, then release the keys and press the next key (or keys) in succession. ***DO NOT press the , key.***

When a combination includes an ↵Enter key, such as E ↵Enter, press and release the keys shown in succession.

Even though the key presses and responses within this manual may be shown in capital letters, lower case data entry is acceptable.

Button Responses

You will also see graphic representations of Windows response buttons, such as Accept. Activate a response button in one of two ways: either by clicking your mouse on the button, or (in this example) by pressing Alt A, ↵Enter, where the letter following the Alt key corresponds to the underlined letter on the button.

Accessing Menus

Menus are accessed using the keyboard or your mouse. To access any of the menus, either click on the menu name or press (for example) Alt F, where the letter following the Alt key corresponds to the underlined letter on the menu name. In this case, the **File** menu would have been opened.

Once a menu has been opened and you are presented with a list of routines, simply click on a routine or press the letter corresponding to the underlined letter in the routine name.

An arrow ( ) on the right end of a menu item indicates the presence of a sub-menu. Selecting that item or simply using your mouse to move the highlight bar over the item opens the sub-menu. Select items from any sub-menu in the same manner as you would select an item from a main menu.

Depicting Menus in the Manual

In this manual, menus and sub-menus are depicted in the following manner: **Menu Sub-menu 1 Sub-menu 2**.

The manual uses the symbol to indicate items in a menu structure. For example, the function **Edit Drawing Entities Contours** is on the **Drawing Entities** sub-menu of the **Edit** menu. To get to this function you select the **Edit** menu (with your mouse or by pressing Alt E), then the **Drawing Entities** item (with your mouse or by pressing D). Finally you would select the **Contours** item (with your mouse or by pressing C).

1.11 Read Me Files

Quite often, software manufacturers will place a file on their disk(s) which contains information regarding software version updates and features not described in the manual. These files are typically named **ReadMe.Txt**, **ReadMe.Doc** or just **Read.Me**. It's a good idea to always directory your software to determine if the disk contains a "**Read Me**" file.

The easiest way to read a "**Read Me**" file is to load the file into the **Notepad** or **Write** program in Windows 3.1, or into the **Wordpad** program in Windows 95. From any of these programs, you can scroll through "**Read Me**" files or print them to have a paper copy.

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Section 2
Setup

2.01 Minimum System Configuration

To function effectively, *Contour It!* must run on a computer incorporating a DX 386, DX 486, Pentium (or better) CPU.

Required Items:

1. Windows 3.1, 3.11, WFW 3.11, or Windows 95;
2. 8 Mb of RAM;
3. One 3½" high-density floppy drive;
4. A hard drive with at least 5 Mb of free space;
5. A VGA (or higher resolution) display adapter;
6. A mouse, or compatible point device.

Optional Hardware:

7. A math coprocessor, if you are using an SX style CPU;
8. A dot matrix or laser printer;
9. A plotter.

Optional Software:

10. "Sight" Survey Professional *(If you don't have it, buy it! Call 1-800-777-7978 or 1-218-773-8917 now. Operators are standing by! Just another shameless plug!)*

2.02 Do You Need A Site License

Your purchase of *Contour It!* is nothing more than a license to run the *Contour It!* program on a single computer. You may need an additional site license if you plan to:

- ❒ Install *Contour It!* on more than one computer at your place of business;
- ❒ Install *Contour It!* on a home computer;
- ❒ Install *Contour It!* on a field computer;

- ❒ Install *Contour It!* on a network computer or server;
- ❒ Have *Contour It!* available at temporary field office sites within your company.

The best rule to follow is: ***If there is any probability that a single copy of Contour It! will be running on more than one computer at a time, an additional site license is required!***

The "Transportable " License

Realizing that you may not always perform your job entirely in the office, the *Contour It!* license is a "**Transportable**" license which allows you to copy *Contour It!* to your home computer and use it there for no additional fee, provided that *Contour It!* is used in accordance with the copyright. In other words, you may use *Contour It!* under the "Transportable" license only when you are certain that no other licensed copies of *Contour It!* are running at the same time.

If the *Contour It!* license was originally purchased by a Company, and the Company has multiple owners, the license extends to one owner only. The Company must purchase site licenses in order for additional owners and/or their employees to have a legal copy of *Contour It!* on their home computers. The purchasing Company retains ownership of ALL licenses of the programs.

The "Transportable" license may also be used to allow *Contour It!* to be loaded on a portable field computer instead of, *or in addition to*, a single home computer, *if the user can guarantee that only a single copy of Contour It! is running at a time.*

Multiple Office Installations

The *Contour It!* license covers only a single site, i.e. building or address. ***If you have multiple locations, each location is expected to purchase their first license at full cost,*** with subsequent purchases for each location in accordance with the established site licensing fees.

Network Installations

If *Contour It!* is loaded on a *network* computer, either a server or a node, a site license may be needed. If the network administrator limits access to *Contour It!* to a single user at any one time, a site license is not needed. However, if *Contour It!* is available to more than one networked computer at a time, at least one additional site license is required. The number of site licenses required is based

on the number of computers likely to be using the program *concurrently*, not necessarily the total number of computers on the network.

Site Licensing Fees

A site license granting you permission to make an additional copy of this software and manual is available at approximately ***50% of the full version price***, ***per computer licensed***. An extra manual and disks may be purchased from Simplicity Systems at an additional cost. Prices are subject to change without notice. Call for verification.

2.03 Installation

Contour It! may only be installed to a hard disk containing at least 5 Mb of free space. To install *Contour It!*, you must begin by loading Microsoft Windows. To simplify the installation instructions, we will assume that you are logged to drive **C:\>** and your floppy disk is drive **A:\>**.

Step 1. Place the *Contour It!* disk into your floppy drive.

For Windows 3.1x users, use your mouse to select **File** ➔ **Run** (or press Alt F, R) and type **A:SETUP** ↵Enter.

For Windows 95 users, use your mouse to select **Start** ➔ **Run** (or press Alt S, R) and type **A:SETUP** ↵Enter.

Step 2. Follow the installation instructions that appear on your display. We strongly recommend that you accept the default directory structure, (but not necessarily the disk drive), presented in the installation program. ***NOTE: If you have "Sight" Survey, Contour It! must be installed to the same drive and directory containing "Sight" Survey.***

Step 3. After the installation is complete, store the original *Contour It!* disk in a safe place.

Step 4. After you've finished the installation procedure, your computer will automatically place a *Contour It!* item into your Simplicity Systems program group.

2.04 Product Registration

Product registration is part of the installation process. You will be asked to provide or verify your name, company name, address and telephone number. This information, or at least portions of it, must be provided or the registration program will fail. The information provided is used in two places. Your name and/or company name will automatically appear on your job printouts, but more importantly, the information entered is used to prepare your product registration form for you. Once you have entered and/or verified your data, click on Accept, or press Alt A. You will be asked if your data is correct. If it is, click Yes, otherwise click No.

At this point, we strongly suggest that you print the registration form, sign it, fold it, stamp it and mail it in. It's a quick and simple task that you are urged to complete.

Product registration is important for many reasons. It provides us with updated information so that we can contact you with upgrade information, etc. ***But perhaps most important is that we will not provide support for unregistered software***.

2.05 Un-Installing *Contour It!*

Contour It! may be easily un-installed from your computer by clicking on the **Un-install Contour It** icon in the Simplicity program group.

If, for some unfathomable reason, you do un-install *Contour It!* and return it for a refund, remember…

We know where you live!

Section 3
Test Drive

3.01 The Pitch

"Hey there! How ya do'in? Thanks for droppin' by Fast, I mean Honest Eddie's new car and software emporium."

"I see you've set your sights on that sleek *"Contour It!"* model from Simplicity Systems. A superb choice, if I do say so myself. Why, this little beauty comes in a wide range of colors, and is loaded with so many features it'll make your eyeballs spin!"

"And fast? Whoa, let me tell ya! This little baby can do 0 to 200 points in a few seconds or less. And it has a virtually unlimited top end! Curves, hills, flat plains, you name it. *Contour It!* can handle 'em all."

"But hey, don't just take my word for it, which incidentally is good as gold. You gotta jump behind the wheel and take it for spin. Ready? Have fun!"

3.02 Your First Test Drive

We'll start in "Sight" Survey with a project containing coordinates and we will create contour lines based on those coordinates. Along the way we'll learn how to change contour settings, as well as how to create a bitmap that can be placed into virtually any windows program. The whole process should only take about 5 or 10 minutes. Then, starting with Section 3.03, we'll show you how to use *Contour It!* to calculate a volume between two surfaces.

In order to use *Contour It!* we need to have some coordinates to work with. The following steps will take you through loading a project into "Sight" Survey and getting *Contour It!* running.

Start It Up

Begin by starting your "Sight" Survey program. If you are already familiar with "Sight" Survey procedures, skip ahead to the **Fill'er Up** sub-heading and continue from there.

You can start "Sight" Survey in a wide variety of ways, just as you can for any Windows program. This manual will touch only on the most common startup method for both Windows 3.1 and Windows 95.

Buy It Today!

Running *Contour It!* as a Stand-Alone Program

If you do not have a copy of "Sight" Survey Professional, you need to follow some different instructions. The following text on opening "Sight" Survey is irrelevant to you, but the examples are not. We will be splicing in special instructions for you to follow, with occasional references to topics included in **Section 6: Stand-Alone**. Look for instructions marked by the ***No "Sight" Survey*** icon as shown to the left. For startup instructions, please turn to page 89.

Windows 3.1

Mouse Method: Double-click on the Simplicity Systems program group. When the group window opens, double-click on the **"Sight" Survey** icon ( ).

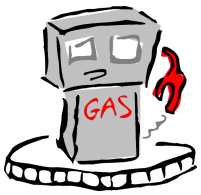
Keyboard Method: Press Alt F,R to open the **File** ➔ **Run** dialog window. Type **`C:\SightSrv\SightSrv`** into the filename box and press ↵Enter. (If necessary, change the drive letter and directory name to match your installation.)

Windows 95

Start **Button Method:** Click on the Windows 95 Start button. Point to **Programs**. After a moment, the program list appears. Point to **Simplicity Systems**. After a moment, the Simplicity Systems program group list appears. Point to **"Sight" Survey** and click your mouse once.

Keyboard Method: Press Alt S, R to open the **Start ➔ Run** dialog window. Type **C:\SightSrv\SightSrv** into the filename box and press ↵Enter or click OK. (If necessary, change the drive letter and directory name to match your installation.)

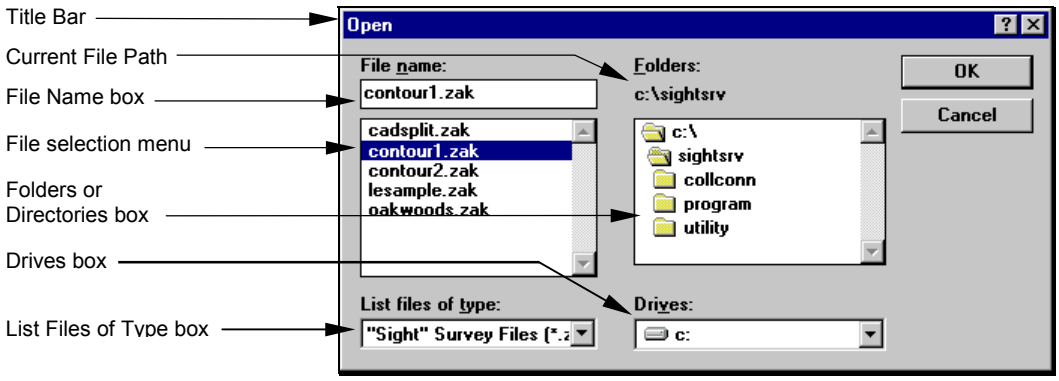
Fill'er Up



To complete this test drive we need some "gas," or data. Select the menu item **File ➔ Open** or press Alt F, O to open the **Filename Dialog Box**. If you are familiar with procedures for opening a data file, select the file **Contour1.zak**. (Open **Original.xyz** if you are running *Contour It!* as a stand-alone program.) This file was installed with the *Contour It!* module if you selected the complete install. If you selected the compact install option, you might want to rerun the installation program and select complete installation. Now skip to the **Check Your Route** sub-heading and continue from there.

Filename Dialog Box

The **Filename Dialog Box** is used to select the data file to be loaded. A typical filename dialog box is shown below for reference. Key areas of the dialog box are identified.



☛ REMEMBER

The sample screens were captured in Windows 95. Your screens may vary slightly, depending upon your version of Windows.

Opening a File

Anytime a **File** ➪ **Open** command is issued, you will be presented with a filename dialog box. To open a file:

1. If the file you want to open is on a different drive, select the drive you want from the **Drives** box.
2. In the **Folders** (or **Directories)** box, choose the directory you want to open. (Double-click the directory, or press the ▲ or ▼ arrows to select the directory, and then press Enter.)
3. Windows displays the names of all files in that directory that are of the type selected in the **List files of type** box. To display a different type of file, select the type you want from the **List files of type** box.
4. From the list of files, select the file you want to open.
5. Click OK.

At this point, we want to open the data file **Contour1.zak**. (Open **Original.xyz** if you are running *Contour It!* as a stand-alone program.) This file was installed with the *Contour It!* module if you selected the typical installation. The file should appear in the file selection menu portion of the filename dialog box. If it doesn't appear, you probably selected the compact installation option. You might want to rerun the installation program at this time selecting a typical installation.

After the project is loaded, we are ready to start creating contours.

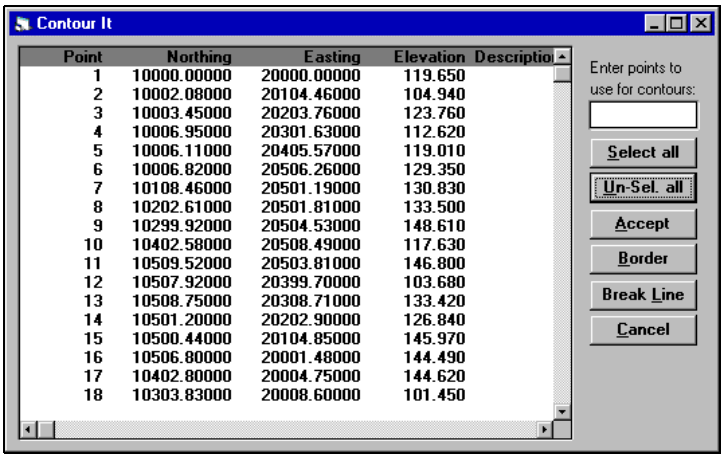
Buy It Today!

Running *Contour It!* as a Stand-Alone Program

Continue at the ***Contour It!*** screen on page 29.

Check Your Route

Select the menu item **Add-Ins** ➪ **Make Contours** or press Alt I, M. Selecting this option tells "Sight" Survey that we want to create some contours. "Sight" Survey responds by setting up the **Contour It** point selection window to allow you to select what points should be used for creating the contour lines.



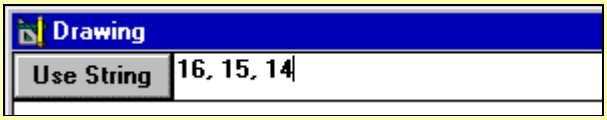
To select all of the points in the file, simply click once on the Select all button. To clear your selections, click the Un-Sel. all button. To select individual points at random, click your mouse on the desired points. Selected points will be highlighted.
For this example, click Select all.

ESTABLISHING BREAKLINES AND BORDERS UNDER NORMAL USE

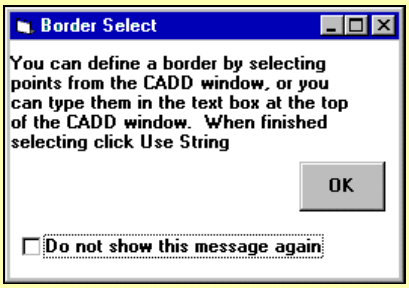
Under normal use, you would probably want to define a border and breaklines before clicking Accept to begin the contour calculations. In order to illustrate the automatic bordering feature, we are not defining a border and breaklines at this time. However, here is how you do it:

To begin, you may want to issue a **Point Plot** (`PP`) command in Sight Survey to show your points on the monitor.

To set a border or breakline: After you have selected the points to contour, but defore you click Accept, click the Border button or the Break Line button. At the top of the **Drawing** window you will see a prompt for a point string.



You may also see a message similar to:

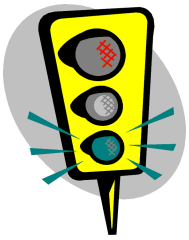


Enter the point numbers of the border or breakline(s) or click on the desired points in the **Drawing** window and then click Use String.

If you are entering breaklines, remember that you must enter beginning and ending points for each segment. For example, a breakline from 1 to 2 to 5 to 7 must be entered as 1,2,2,5,5,7.

When you have finished entering your border and breaklines, click on Accept to begin the contour calculations.

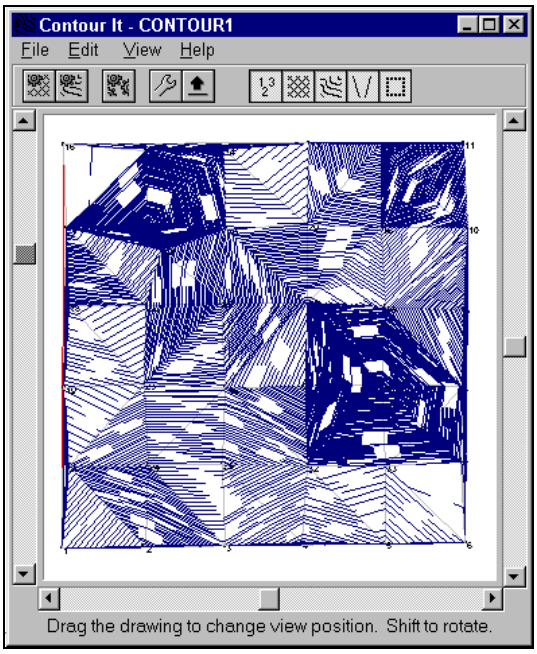
Let's Go!!!



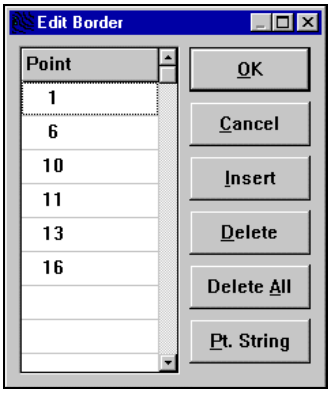
Ready? Here we go. Click on the Accept button to signal "Sight" Survey that all the information it needs has been entered. "Sight" Survey will check to see that the information is valid before creating the contours. Based on the selected points, *Contour It!* automatically generates a **border** and in a moment, the contouring window (shown on the next page) should be visible.

ⓘ NOTE

Any breaks or spaces you may see in the contour lines indicate the placement of elevation labels.



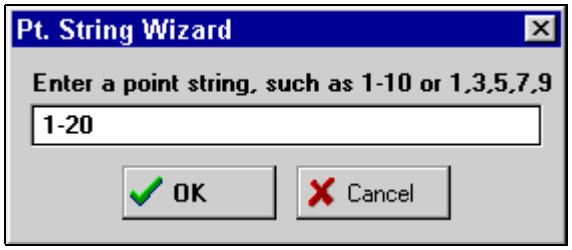
The border automatically defined by *Contour It!* may not be the precise border you want to use. To view (and subsequently edit) the border, select **Edit** ➔**Border** by pressing Alt E, B. The **Edit Border** window will appear.



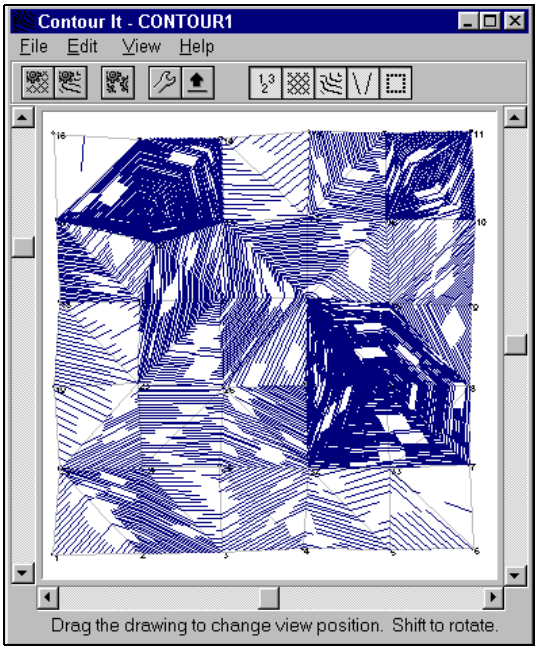
Notice the border points **1**, **6**, **10**, **11**, **13**, and **16**. These points were automatically selected by *Contour It!* as being the outermost points of the data set, and as such were used to define its border.

For this example we want to use a border consisting of points 1-20. First we must erase the border points shown. Click Delete All or press Alt A to delete all of the points.

Now we will insert the new border points. Click in the first open box. Now click the Pt. String button to open the **Pt. String Wizard**.



Type 2-20 Enter and the new border points will be entered. Click OK to recontour the data with the new border.

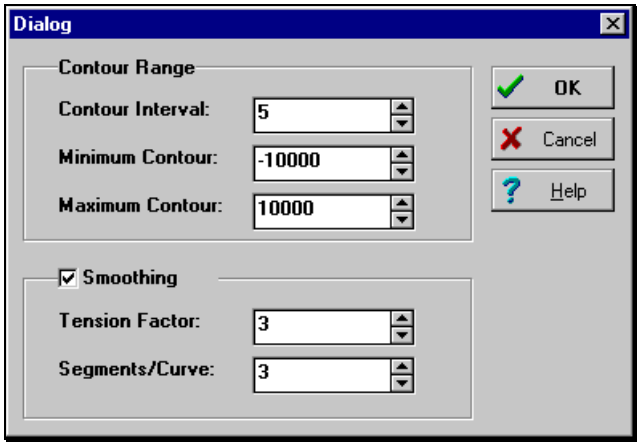


Congratulations, we are almost done. In the *Contour It!* window you can see an image of our project with contour lines created.

The drawing may be kind of ugly if the contour lines are too close together. Also, the contour lines are very straight. It might be more visibly pleasing, though not necessarily more correct, if we remove some of the lines and smooth out the lines that are left.

Adjust Your Controls

Select the menu item **Edit** → **Contour Setup**, or click on the button with a picture that looks like a wrench ( ). This brings up the **contour setup dialog box** where you can change settings for the contour lines, including the contour line interval and smoothing.



Contour Interval

The **Contour Interval** is the elevation difference between contour lines. For example, a setting of 5 causes contour lines to be drawn for every 5 foot (or units) change in elevation. Change the contour interval to **5**. Press Tab to jump to the next entry field.

Minimum Contour

Type in a **Minimum Contour Value**. *Contour It!* will not draw any contour below this level. For this example, just ignore this entry and press Tab to jump to the next entry field.

Maximum Contour

Type in a **Maximum Contour Value**. *Contour It!* will not draw any contour above this level. For this example, just ignore this entry and press Tab to jump to the next entry field.

Smoothing

Click in the box to the left of the word **Smoothing**. This will enable smoothing, which will round your contour lines. Press Tab to jump to the next entry field.

Tension Factor

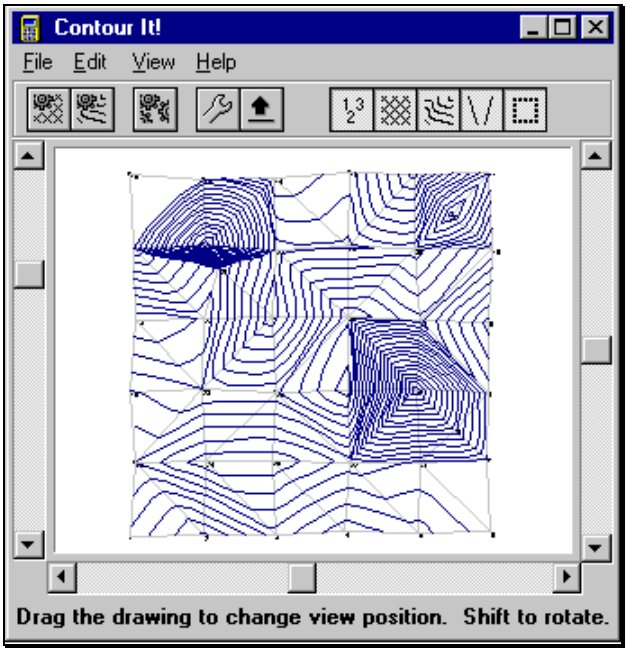
The **Tension Factor** determines the amount of "roundness" of the contour lines. A higher number will cause the contours to appear more round. Set the tension factor to **3**. Press Tab to jump to the next entry field.

Segments per Curve

Contour It! creates smooth contours by breaking the contour line into smaller line segments. For example, a **Segments per Curve** setting of 3 will cause the contour lines between any two data points to be broken into 3 segments. Set the segments per curve to **3**. Press Tab to jump to the next entry field.

Re-Contour the Data

Click the OK button. This will close the contour setup dialog window and redraw the contour map.



You should now see considerably fewer contour lines on the screen. Since we are placing contour lines every five feet instead of every foot, there are 1/5 as many lines. Also, the lines that are left are now slightly rounded giving a more visually appealing drawing.

Turn Off Point Labels

Since our "Sight" Survey drawing already has point numbers on it, we don't want to print a second set of point numbers.

Buy It Today!

Running *Contour It!* as a Stand-Alone Program

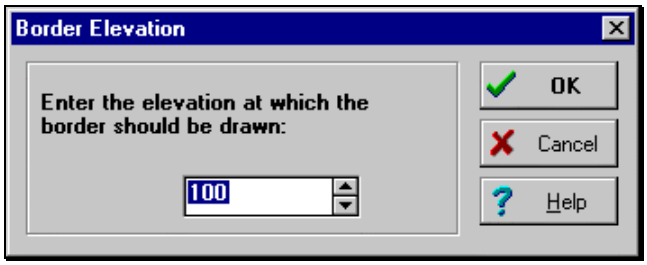
Since you do not have a "Sight" Survey drawing, please skip this step. Continue at the sub-heading **Edit Border Elevation**.

Select **View** ➪ **Points** to remove the check mark next to the word **Points**. If there is not a check mark in front of the word **Points**, omit this step. You may also hide/show the triangulation, border, breaklines, and/or contour lines in the same manner by deselecting/selecting those items from the **View** menu.

The contour lines are now complete. At this point, we could return to "Sight" Survey, but there are a few other features we should explore first. If you don't want to bother with these features right now, continue at **The Joy Ride's Over** on page 37.

Edit Border Elevation

Select **Edit** ➪ **Border Elevation** or click on the **Border Elevation** button ( ). Set the elevation at 100 and click OK.



Rotate Your Drawing

You can rotate your drawing to view it from a different angle. Follow these simple steps to get a different perspective of your data. Try them all to see what happens, but don't get sea-sick with all the rockin' and rollin' going on!

1. Position your mouse near the South (bottom) edge of the drawing.

2. Press and hold the left mouse button down while slowly moving the mouse North (up).

3. While keeping the mouse button pressed, move the mouse East and West (right and left).

4. Hold the Shift key down while moving your mouse to rotate the drawing about an axis normal to the monitor.

5. If you would like to reset the drawing to the original viewing position, select **File** → **Contour** or click on the **Triangulation** button ( ) or **Contour** button ( ) on the toolbar.

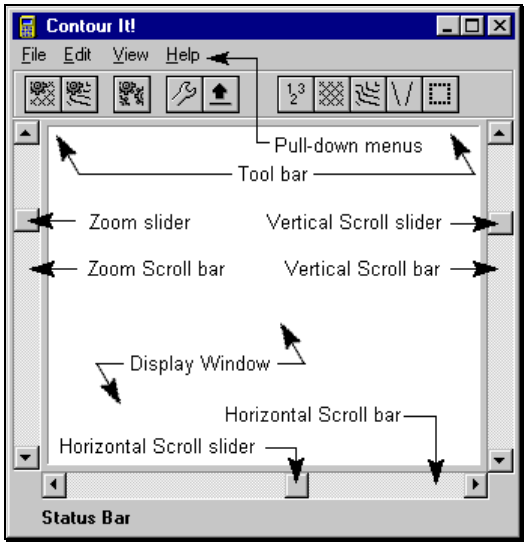
Zoom & Scroll

You can zoom or horizontally and vertically scroll your drawing to view it from a different angle. Follow these simple steps:

To **Zoom** your drawing, click and hold the right mouse button on the **Zoom slider** on the left side of your contouring window. Now move your mouse up and down to zoom in and out.

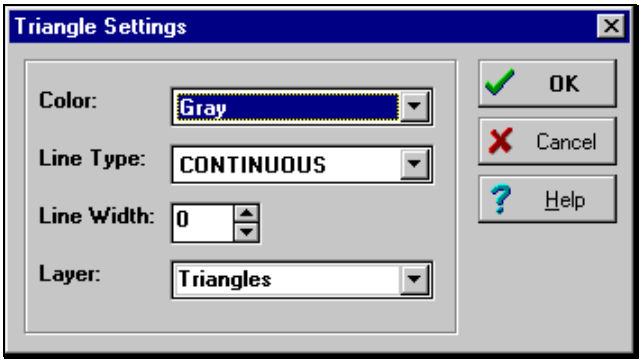
To **Vertically Scroll** your drawing, click and hold the right mouse button on the **Vertical Scroll slider** on the right side of your contouring window. Now move your mouse up and down to scroll up and down.

To **Horizontally Scroll** your drawing, click and hold the right mouse button on the **Horizontal Scroll slider** on the bottom of your contouring window. Now move your mouse right and left to scroll right and left.



Edit Line Properties

Maybe you would like your triangulation lines to be dashed. You can easily do this by selecting **Edit** ➔ **Drawing Entities** ➔ **Triangles** or by clicking the right mouse button on the triangles button ( ) on the toolbar. In the box labeled **Line Type**, click on the down arrow ( ) to expose the choices. (In some instances, you may need to use the slider bar to view additional choices. Point to the slider bar, click and hold the left mouse button, and slide the bar up or down.) Select **Dashed** and click the OK button.



From this settings box you can also change the line color, width, and the layer upon which your triangles will be placed once you return to "Sight" Survey.

In a similar manner, you can change the appearance of the border, the breaklines, and/or the contours.

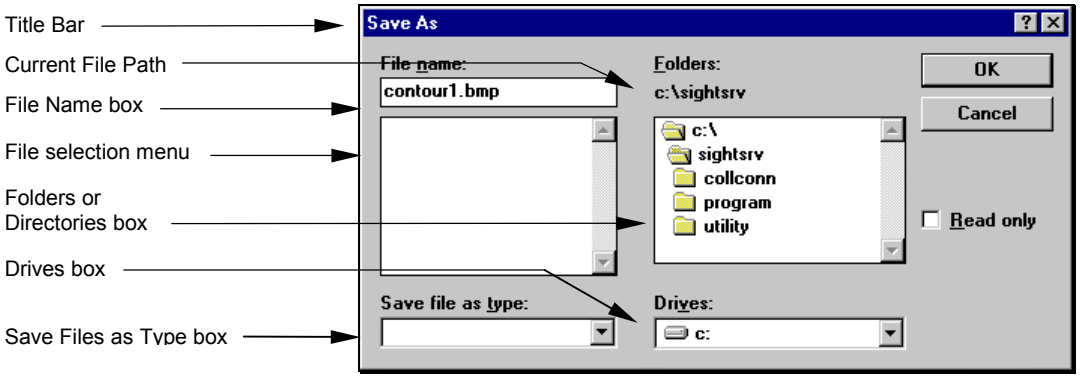
Edit Text Properties

Change text settings by selecting **Edit ➪Drawing Entities ➪ Labels**.

The font style, size, and color may be changed by clicking on the style button. For now, we'll leave these settings unchanged and continue on. The text properties styles are discussed under **Edit ➪Drawing Entities ➪ Labels** on page 62.

Create a Bitmap Image

You can create a bitmap image of your drawing at any time by selecting **File ➪ Export as Bitmap**.



Saving a Bitmap

Anytime a **File ➪ Export as Bitmap** command is issued, you will be presented with a filename dialog box. To save a bitmap file:

1. To place the file you want to save on a different drive, select the drive you want from the **Drives** box.
2. In the **Folders** (or **Directories**) box, choose the directory you want to save the file to. (Double-click the directory, or press the ▲ or ▼ arrows to select the directory, and press ↵Enter.)

3. Windows displays the names of all files in that directory that are of the type selected in the **Save files as type** box. To display a different type of file, select the type you want from the **Save files as type** box.
4. Enter the name of the file you want to save in the **File Name** box, or click on an existing name in the list of files shown in the file selection menu.

> ⓘ **NOTE**
>
> *If you select a name of an existing file, the existing file will not be overwritten unless you confirm your intent to overwrite the file.*

5. Click OK.

At this point, we want to save the file **`Contour1.bmp`**. Enter this name into the **File Name** box and click OK.

The Joy Ride's Over

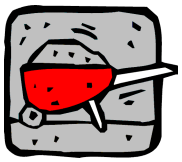
Sadly, your first test drive has come to an end. It's time to close the *Contour It!* window. Select **File** ➔ **Finish** or click on the **Finish** button ( ). The *Contour It!* window will close and the program will terminate.

If you activated *Contour It!* from within "Sight" Survey, you will now be returned to "Sight" Survey, where your contours will be re-drawn in the CAD Output window. From "Sight" Survey you can print, save or modify your drawing using the available "Sight" Survey commands.

If you are running *Contour It!* as a stand-alone program, it will simply terminate.

If you activated *Contour It!* from within "Sight" Survey and you saved your contours as a bitmap, you can now import that bitmap into your drawing by selecting **File** ➔ **Import** ➔ **Bitmap**.

3.03 Computing a Volume



Predictably enough, the first part of this example looks strangely like the road you traveled in the previous example. If you didn't do the first example, you must do it before you can continue.

In "Sight" Survey (or in *Contour It!* if running stand-alone), select the menu item **File** → **Open** or press Alt F, O to open the **Filename Dialog Box**. Open the file **Contour2.zak**. This file was installed with the *Contour It!* module if you selected the complete install. If you selected the compact install option, you might want to rerun the installation program and select complete installation.

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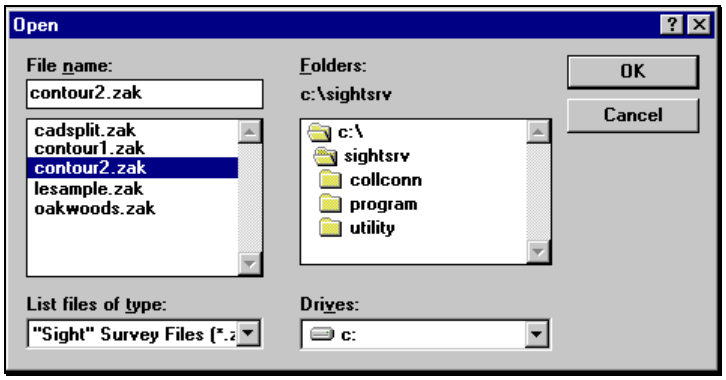
Running *Contour It!* as a Stand-Alone Program

The filename you want to open is **Proposed.xyz**. When the file opens, you will not see a drawing similar to the one on the next page. However, you should use this illustration for reference while completing the breakline editing.

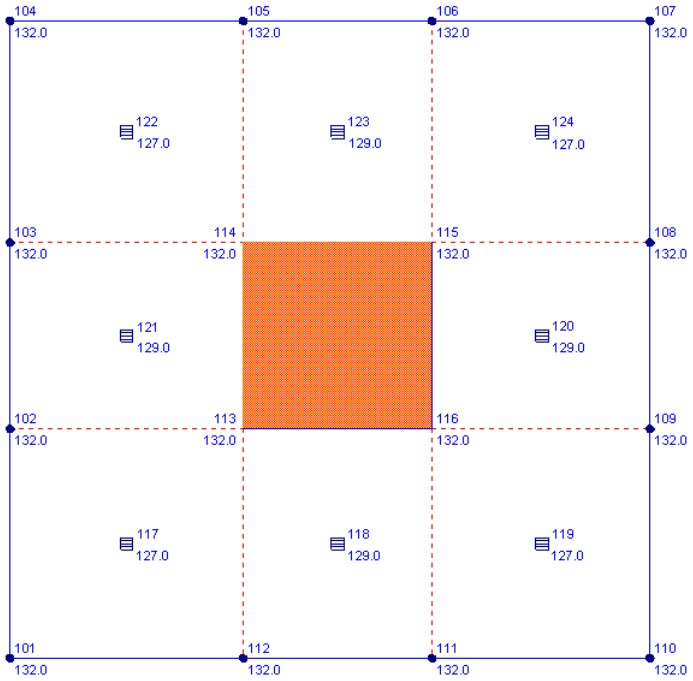


After the project is loaded you should see the "Sight" Survey screen shown on the next page (only the drawing portion is shown here).

The tract shown measures 508' x 506'. The dark square in the middle of the tract represents a building approximately 150' square. The remainder of the tract is to be a parking lot which has been split into eight drainage areas, each centered with a storm

drain. These areas are bounded by the dashed lines. All points and proposed finish elevations are also shown. (Depending upon your drawing window size and your display resolution, you may not be able to read the numbers without zooming the drawing.)

We have arbitrarily set the building elevation and border elevation at 132.0 feet, which was the approximate average elevation of the existing ground. We intend to run the 132.0 elevation away from the building on the dashed lines. Each dashed line will be a constant 132.0 elevation.



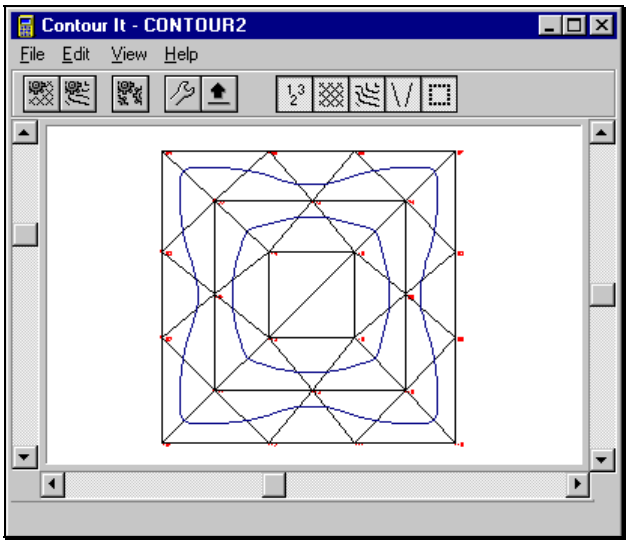
Finally, our soil has no shrink/swell factor so we will try to make our cut and fill volumes as close to equal as we can.

Running *Contour It!* as a Stand-Alone Program

Please skip the next paragraph.

Select the menu item **Add-Ins** ➔ **Make Contours** or press Alt T, M. Selecting this option tells "Sight" Survey that we want to create some contours. Once again, "Sight" Survey responds by setting up the **Contour It** point selection window to allow you to select what points should be used for creating the contour lines.

Click Select all, then click on the Accept button to signal "Sight" Survey that all the information it needs has been entered. "Sight" Survey will check to see that the information is valid before creating the contours. Based on the selected points, ***Contour It*** automatically generates a **border** and in a moment, the contouring window should be visible.



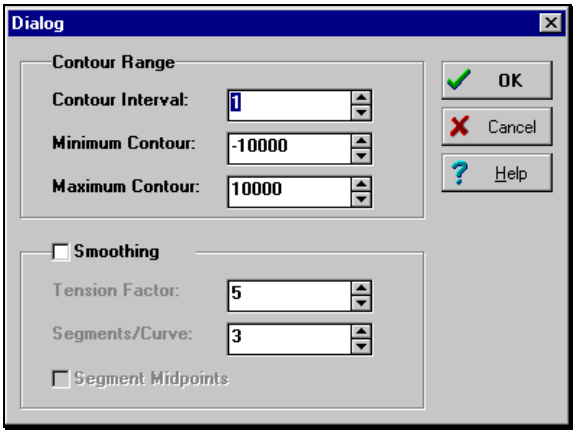
ⓘ NOTE

Contour It! *automatically selected the points 101-112 as a border. This is the correct border for this figure, so we will not need to edit the border as we did in the first example.*

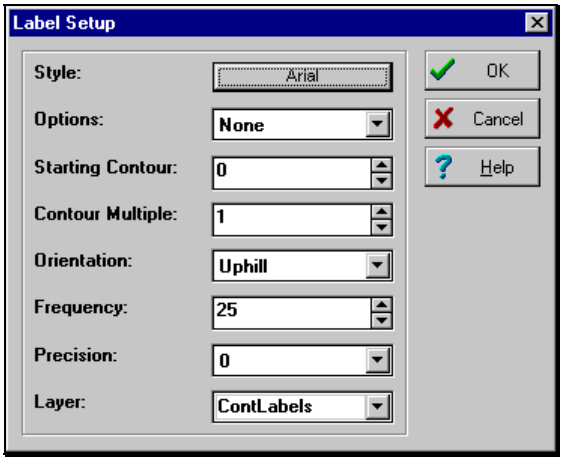
Normally, you might press Alt ↵Enter, K to edit or enter **Breaklines** at this point. However, for this example we don't want to add any breaklines just yet.

Yuck! You are looking at your finish grade contours. Obviously, this does not fit the eight drainage areas we had planned. We must use breaklines to further define these areas. Before we set any breaklines, let's adjust some settings so we get a better picture of what we are looking at.

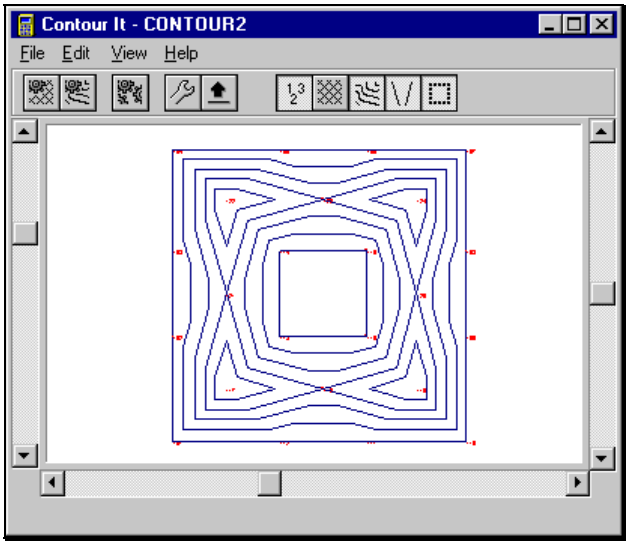
Coming from the first example, our contour interval was set to 5 and we employed smoothing. Given that we have a much smaller change in elevation over this site, we should decrease the contour interval. Click the **Settings** button ( ) to set the contour interval and smoothing options. Set the **Contour Interval** to **1** and un-check the **Smoothing** option. Click OK to re-contour with these settings.



We will also turn off our label options, just to show all contours as continuous lines, with no breaks for labeling. Right-click your mouse on the **Show/Hide Labels** button ( ) and set the **Options** to **None**. Click OK to re-contour with these settings.

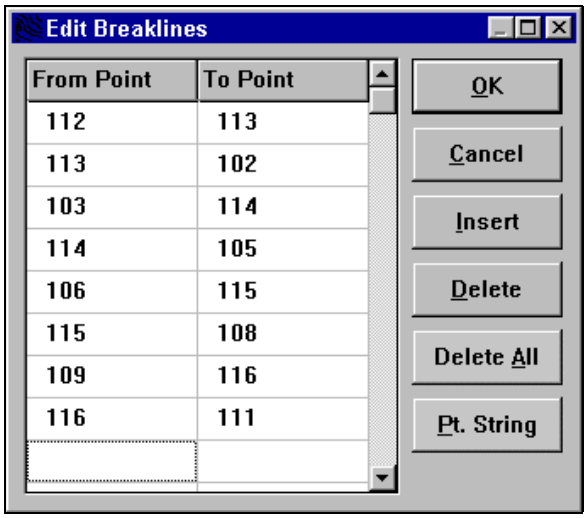


Finally, just to clean up the drawing a little more, we'll turn off the triangle display by clicking on the **Show/Hide Triangles** button ( ).



Since we still do not have our eight drainage areas well defined, it looks like we need to add some breaklines.

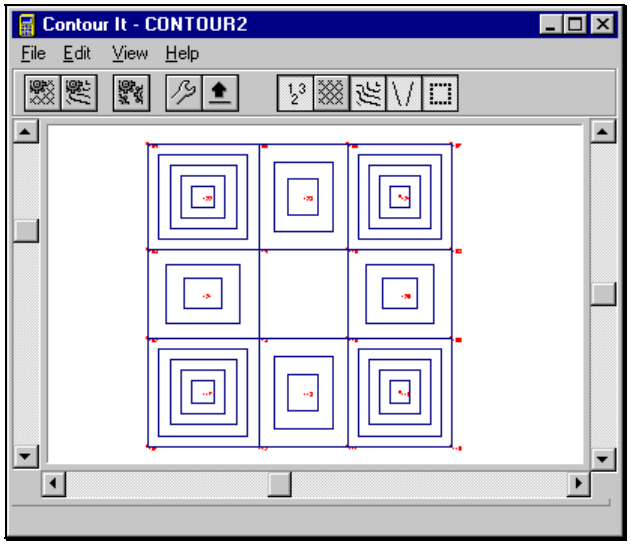
To add breaklines, we will use the **Edit** ➔ **Breaklines** routine. Select **Edit** ➔ **Breaklines** from the menu or by pressing Alt E, K. (Note: When the **Edit Breaklines** window opens, it will be blank.)



You need to add several breaklines at this time. To begin, click your mouse in the empty square in the **From Point** column. Type `112` ↵Enter. The cursor moves to the **To Point** column. Type `113` ↵Enter. You have just added the first breakline, and the cursor should be in the next row in the **From Point** column. In a similar manner, type in these point numbers:

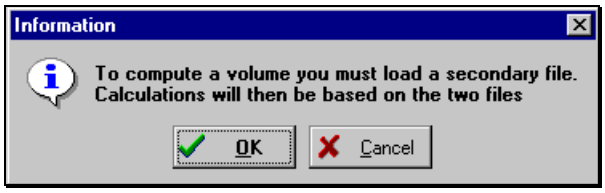
From Point	From Point
`113` ↵Enter	`102` ↵Enter
`103` ↵Enter	`114` ↵Enter
`114` ↵Enter	`105` ↵Enter
`106` ↵Enter	`115` ↵Enter
`115` ↵Enter	`108` ↵Enter
`109` ↵Enter	`116` ↵Enter
`116` ↵Enter	`111` ↵Enter

Now click OK to re-contour the data. When your map appears, click the **Show/Hide Triangles** button (▩).



Doing the Math

We have completed and are satisfied with the final contours so it's time to compute the volume between this surface and our existing surface. Select **File** ➔ **Calculate Volume**.



This message is a reminder that *Contour It!* needs another surface to compare to for volume calculation. This surface must have already been contoured or it will not be a valid surface. We will load the existing surface from the first example. This file was **Contour1.zak**. Click OK to access the **File Open** routine.

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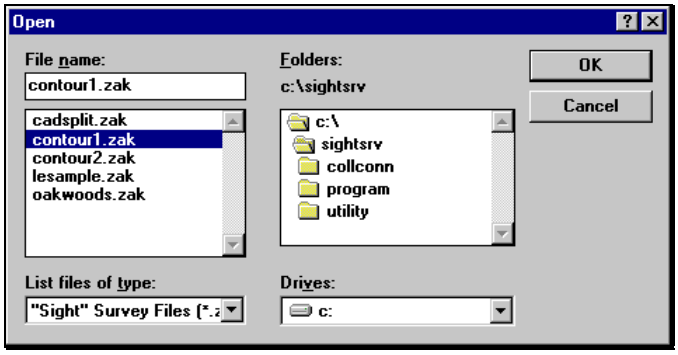
Running *Contour It!* as a Stand-Alone Program

The filename you want to open is **Original.xyz**. Continue at the next ***No "Sight" Survey*** icon on page 46.



Select the file **Contour1.zak** (or **Original.xyz** if running stand-alone) and click OK. At this point, one of two things will happen: 1. The volume between the two surfaces will be calculated; or 2. You will receive this error message:

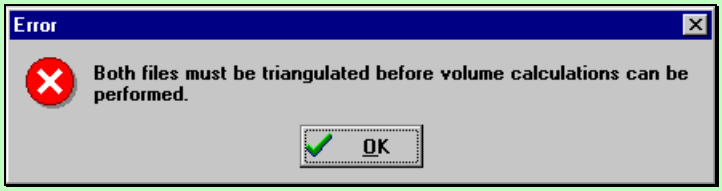
This message indicates that the first file has never been processed by *Contour It!*. It cannot be used until you have triangulated the file. You must:

1. Return to "Sight" Survey and open the file **Contour1.zak**.
2. **Make Contours** on this file.
3. Return to "Sight" Survey and open the file **Contour2.zak**.
4. **Make Contours** on this file.
5. From within *Contour It!*, select **File** ➪ **Calculate Volume**.
6. Select the file **Contour1.zak** and click OK.

Please continue at the **Volume Calculation Results** screen shown on page 46.

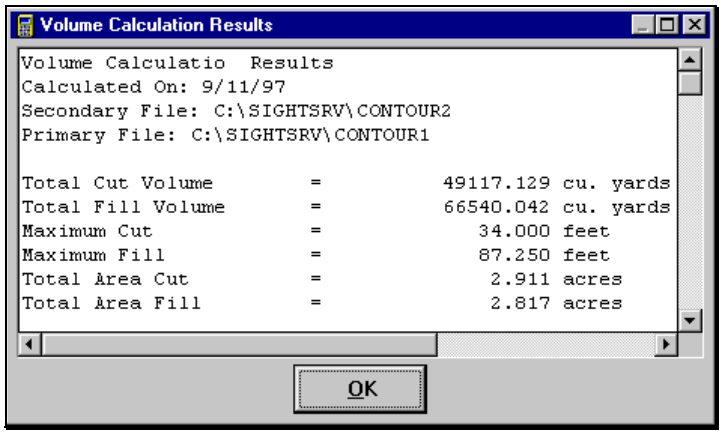
Running *Contour It!* as a Stand-Alone Program

Select the file **Original.xyz** and click OK. At this point, one of two things will happen: 1. The volume between the two surfaces will be calculated; or 2. You will receive this error message:



This message indicates that the first file has never been processed by *Contour It!*. It cannot be used until you have triangulated the file. You must:

1. Use **File** ➔ **Open** to open the file **Original.xyz**.
2. Use **File** ➔ **Open** to open the file **Proposed.xyz**.
3. Select **File** ➔ **Calculate Volume**.
4. Select the file **Original.xyz** and click OK.



The report contains the date and both filenames, the total cut and fill volumes, the points of minimum and maximum cut (including Northing and Easting coordinates), and total area of both cut and fill. You may have to use the horizontal and vertical sliders to see all the data in the window.

If you want, you may click the cursor in the window and add notes to the volume report.

When you click [OK] you are returned to the main *Contour It!* screen. The volume window disappears but is not lost. Before we return to "Sight" Survey, click the **Show/Hide Points** button ( ), the **Show/Hide Triangles** ( )button, the **Show/Hide Breaklines** button ( ), and the **Show/Hide Border** button ( ). This will allow us to bring only the contours into our "Sight" Survey drawing.

Click on the **Finish** button ( ) or select **File** ➔ **Finish** to close *Contour It!* and return to "Sight" Survey where the volume data will be added to your **Text Window** printout.

Adjusting the Volume

In the example above, we measured the following:

Total Cut Volume	=	49117.129 cu. yards
Total Fill Volume	=	66540.042 cu. yards
Maximum Cut	=	34.000 feet
Maximum Fill	=	87.250 feet
Total Area Cut	=	2.911 acres
Total Area Fill	=	2.817 acres

To save time in our example, we used the finish grade as the primary file, and the original ground as the secondary file. This means our volume data is inverted. We could have avoided this problem by triangulating and contouring **Contour2.zak** (or **Proposed.xyz**) before **Contour1.zak** (or **Original.xyz**).

We actually have 66,540 cu. yards of cut and 49,117 cu. yards of fill. The ratio of cut to fill is 1.35:1. We originally stated that we have no shrink/swell factor so we want our cut and fill to be approximately equal.

The difference between cut and fill is 17,423 cu. yards. To balance the volumes, we will need to move approximately one-half of this volume (8712 cu. yards) from cut to fill. In other words, we need to raise our final grade.

But how much do we raise it? We have a total fill area of 2.817 acres, or 122,708.5 sq. feet. 8712 cu. yards equals 235,224 cu.

feet. Dividing this volume by the fill area gives us the change in depth that we need. 235,224 cu.ft. /122,708.5 sq.ft. = 1.92 feet.

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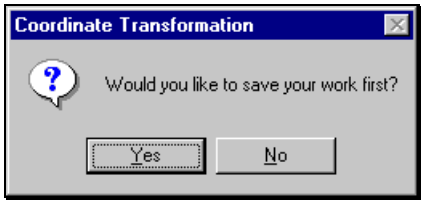
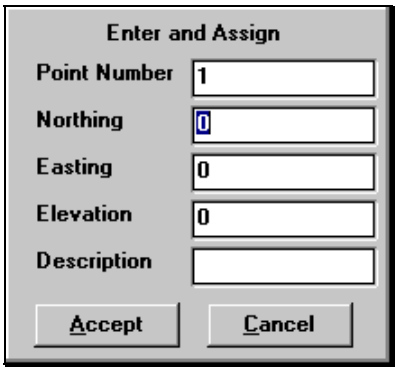
Running *Contour It!* as a Stand-Alone Program

For the remainder of this example, you must either have "Sight" Survey or some other COGO program that has a **Coordinate Transformation** routine. Follow the general procedures below, adjusting for your program. The export your data to an **xyz** file. See **File Structures - Point Files** on page 90 for the **xyz** file format.

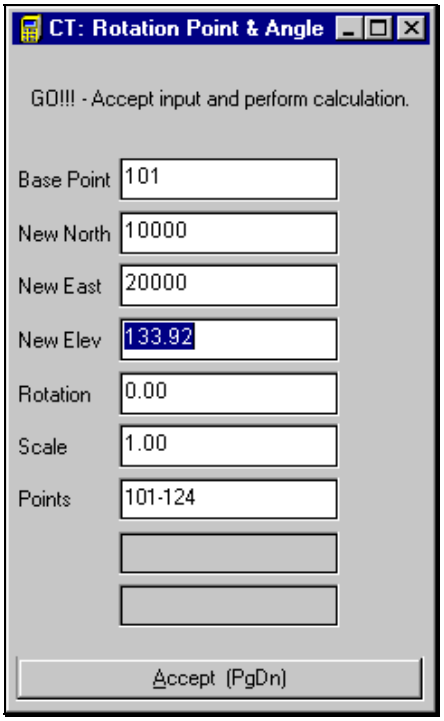
Since we are back in "Sight" Survey, it is easy to adjust our finish grade elevations to raise them by 1.92 feet. Select **Misc** ➪ **Coordinate Transformation** ➪ **Rotation Point and Angle Known**.



Select an option by clicking a button. You don't need to save your work at this time though.

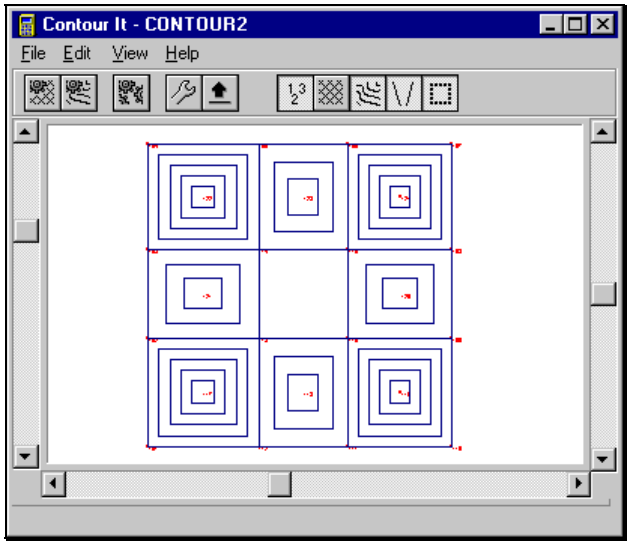


Click Cancel.

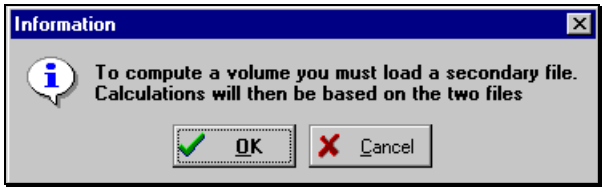


In the **Coordinate Rotation** data entry window, type `101` for a **Base Point**, type `133.92` for a **New Elev**, and type `101-124` for **Points**. Click on Accept (Pg Dn).

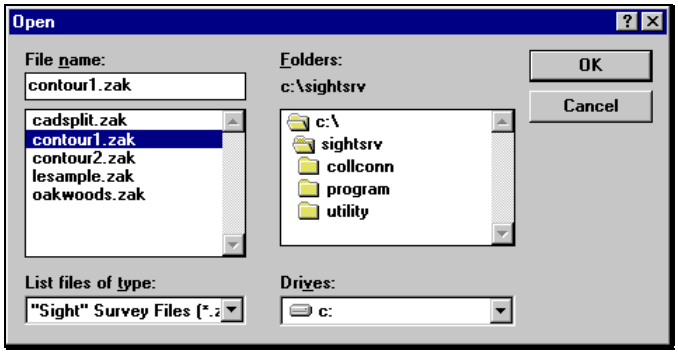
After your coordinates have been translated to the new elevation, select **Add-Ins** ➪ **Make Contours** or type `MC` to return to the **Make Contours** window. The points, border, and breaklines default to your previous settings. Click on Accept (Pg Dn).



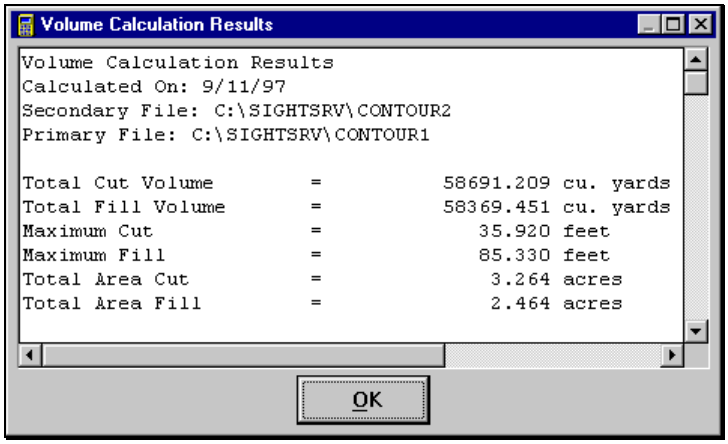
Select **File** ➔ **Calculate Volume**.



Click OK to access the **File Open** routine.



Select the file **Contour1.zak** (or **Original.xyz**) and click OK.



In our recalculated example above, we now measure a cut volume of 58369 cu. yards and a fill volume of 58691 cu. yards, a minor difference of 322 cu. yards. Our cut/fill ratio is 1:1.01, which is acceptable. (Remember, our file order was reversed so our cut and fill values are reversed from the screen above.)

That's it! We're done.

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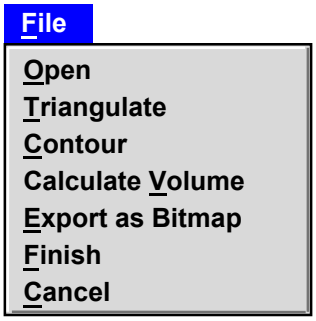
Section 4
Menus

4.01 The File Menu

Shown below are the items in the **File** menu. To select any item on the menu, click your mouse on the desired selection. You may also use your keyboard to select a menu item by pressing Alt plus the underlined letters. For example, select **File** ➔ **Triangulate** by pressing Alt F, T.

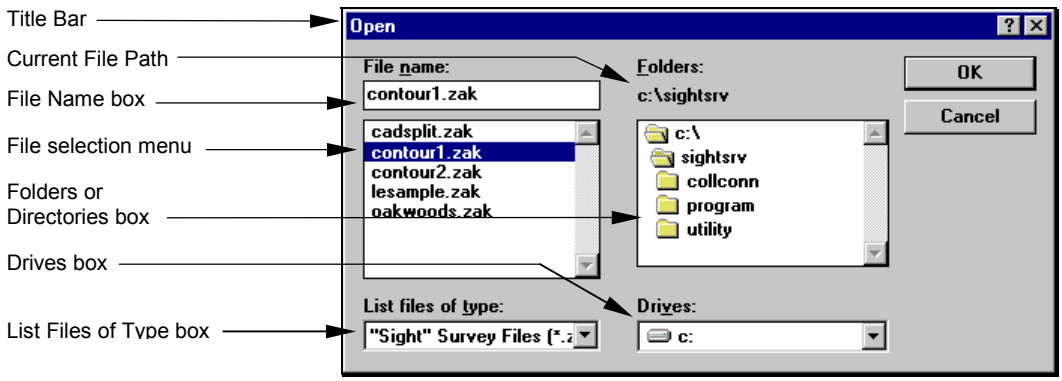


File ➔ Open

Use your mouse or press Alt F, O to select **File** ➔ **Open**.

> ⓘ **NOTE**
>
> *The* **File** ➔ **Open** *icon and menu item will only be active when Contour It! has been started as a stand-alone program. Under normal circumstances, all file handling is controlled by "Sight" Survey.*

The **Filename Dialog Box** is used to select the data file to be loaded. A typical filename dialog box is shown on top of the next page for reference. Key areas of the dialog box are identified. (*The sample screen was captured in Windows 95. Your screens may vary slightly, depending upon your version of Windows.)*



Anytime a **File ➔ Open** command is issued, you will be presented with a filename dialog box. To open a file:

1. If the file you want to open is on a different drive, select the drive you want from the **Drives** box.
2. In the **Folders** (or **Directories)** box, choose the directory you want to open. (Double-click the directory, or press the ▲ or ▼ arrows to select the directory, and then press Enter.)
3. Windows displays the names of all files in that directory that are of the type selected in the **List files of type** box. To display a different type of file, select the type you want from the **List files of type** box.
4. From the list of files, select the file you want to open.
5. Click OK.

File ➔ Triangulate

Use your mouse or press Alt F, T to select **File ➔ Triangulate**. This item forces the triangulation file to be recreated based upon the point coordinates. Triangulation is always handled automatically after loading or editing points, so this routine will rarely be used. One possible use is to quickly reconstruct the contour map after experimenting with various image rotations.

After the triangulation is complete, the contouring routine is automatically called to produce the contour data.

For more information on triangulation, see **What is Triangulation?** on page 4.

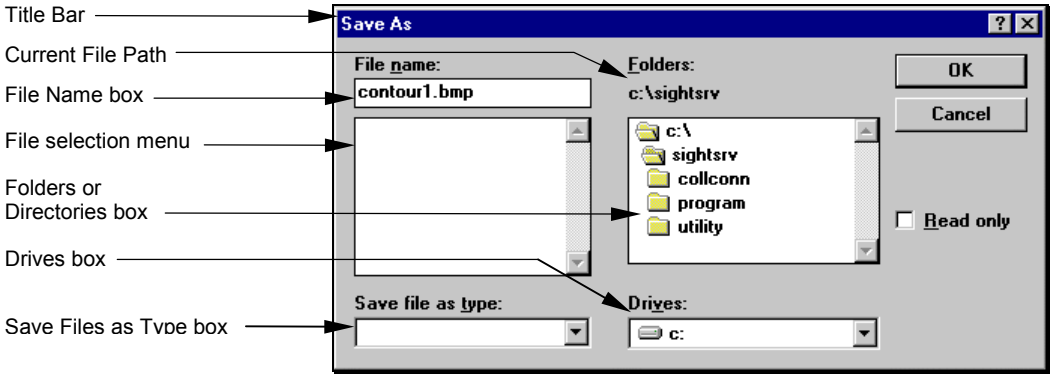
File ➔ Contour

Use your mouse or press Alt F, C to select **File ➔ Contour**. This item forces the contour map to be recreated based upon the triangulation file. Contour generation is always handled automatically after loading or editing points, so this routine will rarely be used. One possible use is to quickly reconstruct the contour map after experimenting with various image rotations.

For more information on contours, see **What is a Contour?** on page 1.

File ➔ Export as Bitmap

Use your mouse or press Alt F, E to select **File ➔ Export as Bitmap**. This selection allows you to create a bitmap image that is exactly the same as the drawing that is currently on the screen. Position (rotate, zoom, etc.) the image to your satisfaction, then use **File ➔ Export as Bitmap** to get a "snapshot" of the drawing to insert into your CAD program, "Sight" Survey, word processor, or any other Windows application that allows bitmap importation.



Anytime a **File ➔ Export as Bitmap** command is issued, you will be presented with a filename dialog box. To save a bitmap file:

1. To place the file you want to save on a different drive, select the drive you want from the **Drives** box.
2. In the **Folders** (or **Directories)** box, choose the directory you want to save the file to. (Double-click the directory, or press the ▲ or ▼ arrows to select the directory, and press ↵Enter.)

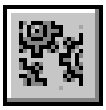
3. Windows displays the names of all files in that directory that are of the type selected in the **Save files as type** box. To display a different type of file, select the type you want from the **Save files as type** box.
4. Enter the name of the file you want to save in the **File Name** box, or click on an existing name in the list of files shown in the file selection menu.

> **ⓘ NOTE**
>
> *If you select a name of an existing file, the existing file will not be overwritten unless you confirm your intent to overwrite the file.*

5. Click OK.

For more information, see **What is a Bitmap?** on page13.

File ➔ Finish



Use your mouse or press Alt F, F to select **File ➔ Finish**. This selection creates the contour macro file, closes the contouring module and returns control to "Sight" Survey. The contour macro file is created based on the settings in the contour setup dialog. Also, the drawing object view entities pertain to the macro file as well, i.e. if borders, breaklines, triangles, or contours are not displayed on the screen they will not be in the macro file.

Once control has been passed back to the main "Sight" Survey module, the macro file will recreate the contour map on your "Sight" Survey drawing.

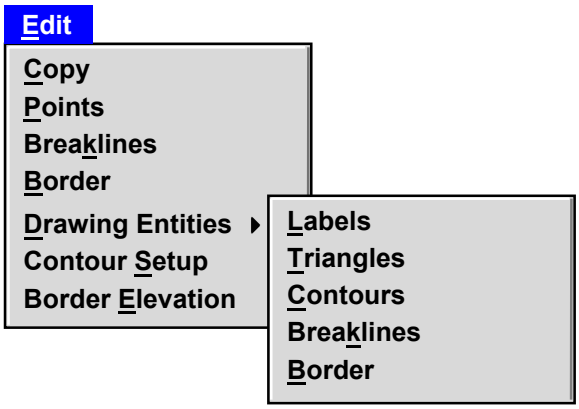
File ➔ Cancel

Use your mouse or press Alt F, C to select **File ➔ Cancel**. This selection cancels the contouring session and return control to "Sight" Survey. No contour map is constructed upon your return to "Sight" Survey.

> **ⓘ NOTE**
>
> *The* **File ➔ Cancel** *icon will only be active when Contour It! has been started as a stand-alone program. The* **File ➔ Cancel** *menu item will always be present.*

4.02 The Edit Menu

Shown below are the items in the **Edit** menu. To select any item on the menu, click your mouse on the desired selection. You may also use your keyboard to select a menu item by pressing Alt plus the underlined letters. For example, select **Edit ➔ Border** by pressing Alt E, B, or select **Edit ➔ Drawing Entities ➔ Triangles** by pressing Alt E, D, T.



Edit ➔ Copy

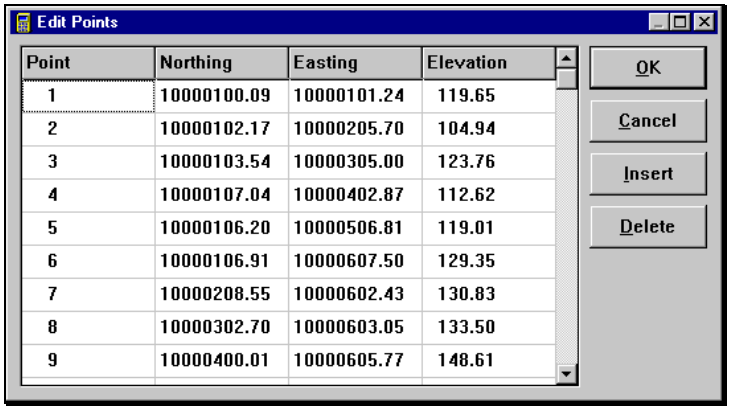
Use your mouse or press Alt E, C to select **Edit ➔ Copy**. This selection creates a copy of the display window in it's current state and put it in the clipboard. From the clipboard, the image may be pasted into many other programs, even into the "Sight" Survey text output window.

Pasting a drawing into another document is normally accomplished using some sort of **Edit ➔ Paste** command. You can often accomplish this task by pressing Shift Insert or Ctrl V.

Edit ➔ Points

Use your mouse or press Alt E, C to select **Edit ➔ Points**. Use this selection to insert, delete, or edit a value in the data file.

To edit a point, position the mouse on the slider button. Click and hold the left mouse button. Move the mouse up or down and release the mouse button when you reach the desired location.

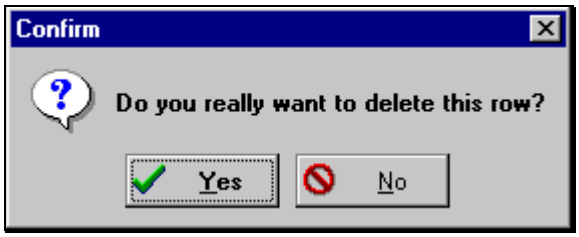


To Insert a point

Click your left mouse button once on the point number that will follow the point you wish to insert (i.e. if you want to insert a point after point 4, click on point 5). A dotted outline will surround the point field. Click Insert or press Alt I. Type in a new **Point number**, **Easting**, **Northing**, and **Elevation**. Use ↵Enter to move between fields. *All columns must contain a value!*

To Delete a point

Click your left mouse button once on the point number that you wish to delete. A dotted outline will surround the point field. Click Delete or press Alt D. Just to be sure, a confirmation window appears.



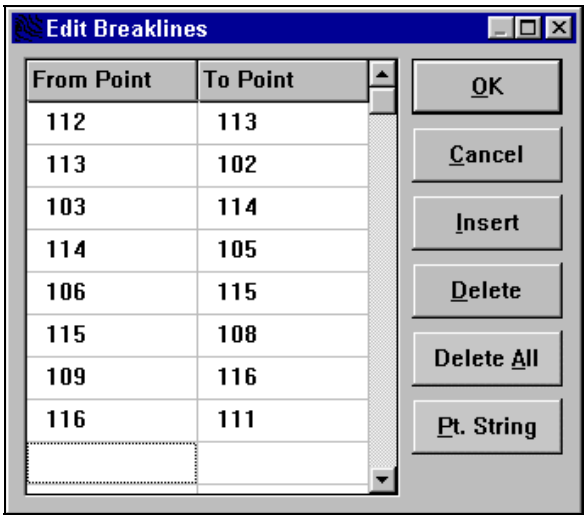
Confirm that you want to delete the point by pressing Y, clicking the button, or by pressing ↵Enter. If you've changed your mind, press N or click the No button.

To EDIT a value

Click your left mouse button once on the data you want to edit. A dotted outline will surround the data field. Once the data is highlighted, you may replace the value by typing a new one.

Edit ➔ Breaklines

Use your mouse or press Alt E, K to select **Edit ➔ Breaklines**. Use this selection to insert, delete, or edit a value in the breaklines file.



To edit a breakline, position the mouse on the slider button. Click and hold the left mouse button. Move the mouse up or down and release the mouse button when you reach the desired location.

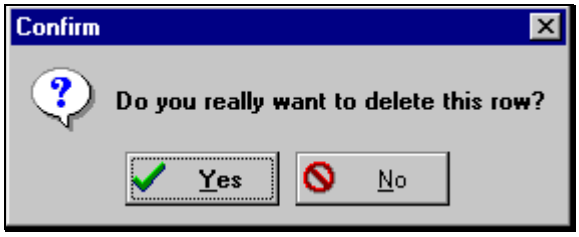
To Insert a Breakline

Click your left mouse button once on the breakline that will follow the breakline you wish to insert (i.e. if you want to insert a breakline after point 4, click on point 5). A dotted outline will surround the point field. Click Insert or press Alt I. Type in new **From Point**, and **To Point** numbers. Use Enter to move between fields. *All columns must contain a value!*

To Delete a Breakline

Click your left mouse button once on the breakline that you wish to delete. A dotted outline will surround the point field. Click Delete or press Alt D. Just to be sure, a confirmation window appears (as shown on the next page).

Confirm that you want to delete the breakline by pressing Y, clicking the button ,or by pressing Enter. If you've changed your mind, press N or click the No button.

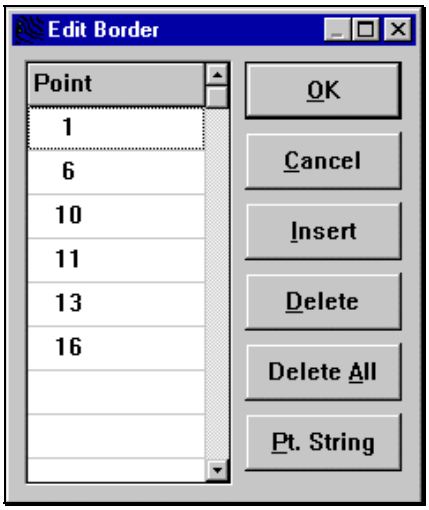


To EDIT a value

Click your left mouse button once on the data you want to edit. A dotted outline will surround the data field. Once the data is highlighted, you may replace the value by typing a new one. For more information on breaklines, see **What is a Breakline?** on page 6.

Edit ➔ Border

Use your mouse or press Alt E, B to select **Edit ➔ Border**. Use this selection to insert, delete, or edit a value in the border file.



To edit the border, position the mouse on the slider button. Click and hold the left mouse button. Move the mouse up or down and release the mouse button when you reach the desired location.

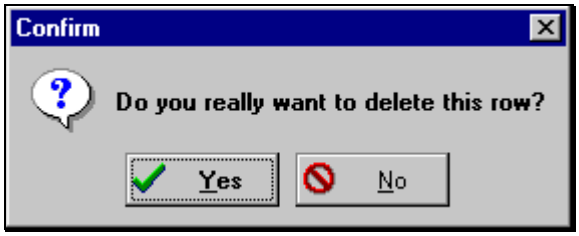
To Insert a point

Click your left mouse button once on the point number that will follow the point you wish to insert (i.e. if you want to insert a point after point 4, click on point 5). A dotted outline will surround the

point field. Click Insert or press Alt I. Type in a new **Point**, number. Use ↵Enter to move between fields.

To Delete a point

Click your left mouse button once on the point number that you wish to delete. A dotted outline will surround the point field. Click Delete or press Alt D. Just to be sure, a confirmation window appears.



Confirm that you want to delete the point by pressing Y, clicking the button ,or by pressing ↵Enter. If you've changed your mind, press N or click the No button.

To EDIT a value

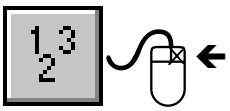
Click your left mouse button once on the data you want to edit. A dotted outline will surround the data field. After a brief pause, click again on the data to highlight it. Once the data is highlighted, you may replace the value by typing a new one. For more information on borders, see **What is a Border?** on page 3.

Edit ➔ Drawing Entities

The **Edit ➔ Drawing Entities** menu allows you to control the look of your final contour map. Through these items you control such properties as **Color**, **Line Type**, **Line Width** (1-thin up to 10-fat), **Label Style**, and **Layer**, the layer name on to which the entities will be placed in "Sight" Survey.

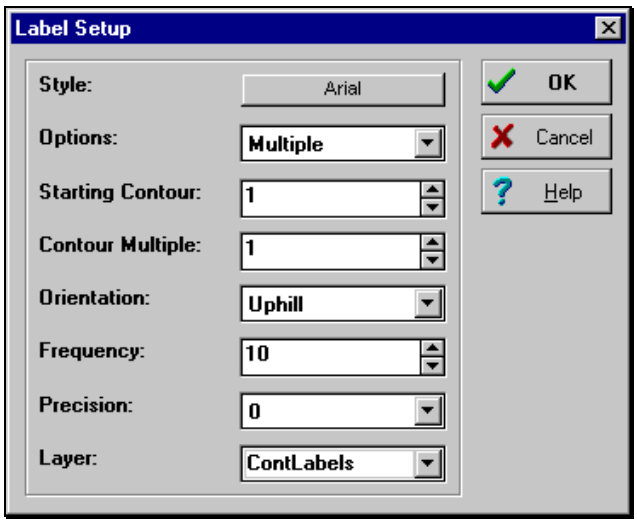
Click on any menu item to select it, or click the **right** mouse button on the appropriate toolbar button.

Edit ➔ Drawing Entities ➔ Labels



Use your mouse to select **Edit ➔ Drawing Entities ➔ Labels** or press Alt E, D, L.

The **Label Setup** dialog box controls all of your label settings. To select any item, simply click on the field, or button (in the case of **Style**), next to the setting you want to modify. Move between fields with your mouse or by pressing Tab and Shift Tab. Since **Style** uses a **Font** dialog box, we will discuss the other items first, while we can make use of the screen illustration below.



Options:

This setting controls how many contour lines are to be labeled. Your choices are:

None	No contour lines are labeled.
All	All contour lines are labeled.
Multiple	Only the "multiple" contour lines are labeled, as specified by the **Contour Multiple** setting.
Non-multiple	Only the "non-multiple" contour lines are labeled, as specified by the **Contour Multiple** setting.

To change the setting, click your mouse on the down arrow (▼) in the entry box, then click again on the desired setting.

Starting Contour: This setting is the elevation of the first contour to be labeled. To change the setting, click your mouse in the entry box and type the desired elevation.

Contour Multiple: This setting establishes the number of contour lines between labeled contour lines. (See **Options** on the previous page.) To change the setting, click your mouse in the entry box and type the desired setting.

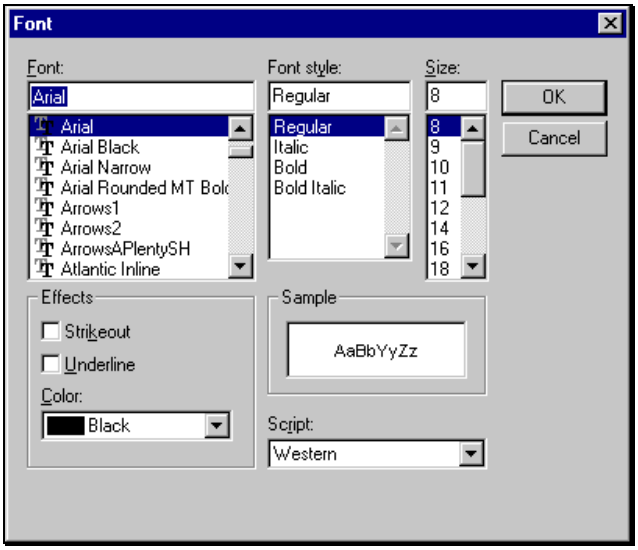
Orientation: This setting controls the direction in which elevation labels are placed on the contour lines. Your choices are **Uphill** and **North**. **Uphill** labels are read with the text pointing uphill. **North** labels are read with the text pointing to the North, or top of the drawing. To change the setting, click your mouse on the down arrow (▼) in the entry box, then click again on the desired setting.

Frequency: This setting controls the frequency of label appearance in the contour lines. This number is actually a percentage of the length of the contour line. In general, the higher the number, the more frequently labels will be placed. This number may range from 1-75, but most common values are between 10 and 20. To change the setting, click your mouse in the entry box and type the desired setting.

Precision: This setting controls the number of decimal places used when labeling a contour. You may use 0, 1, 2, or 3 decimal places. To change the setting, click your mouse on the down arrow (▼) in the entry box, then click again on the desired setting.

Layer: This setting controls the drawing layer (in "Sight" Survey) upon which the contour labels are placed. To change the setting, click your mouse on the down arrow (▼) in the entry box, then click again on the desired setting. If you want to use a layer that isn't an offered choice, simply type in the layer name.

Style: This setting controls the font style, including font type, size color, etc. Click your mouse on style button to call up the **Font** window, as shown on the next page. Move between fields by using your mouse or pressing Tab and Shift Tab. A sample box will keep you aware of your current selections. When you are done making changes to your assigned font, click on OK.



Font: Select the desired font by choosing a name from the **Font** selection list. Click and hold the slider button while moving up or down until the desired font is shown in the list area, then click on the font name. All of the fonts available to you under Windows are available in *Contour It!*

Font Style: Select the desired font style by selecting one from the **Font Style** selection list. Click and hold the slider button while moving up or down until the desired font style is shown in the list area, then click on the style name. Not every font has the same available style choices.

Size: Select the desired font point size by choosing one from the **Size** selection list. Click and hold the slider button while moving up or down until the desired size is shown in the list area, then click on it.

Effects: You may choose either **Strikeout** or **Underline** by checking the box adjacent to your choice. To check or un-check a box, simply click your mouse on it.

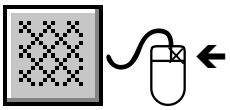
Color: You may choose a font color by clicking on the down arrow ( ) adjacent to the current color. Click and hold the slider button

while moving up or down until the desired font color is shown in the list area, then click on the color name.

Script:

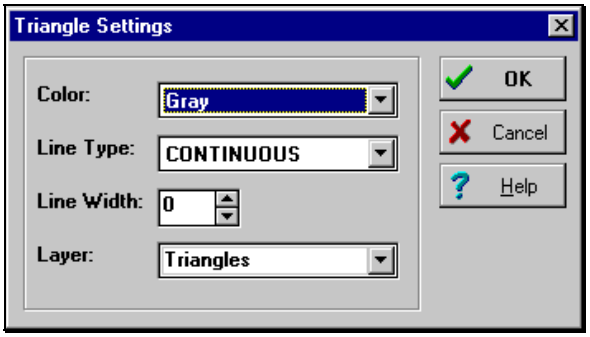
Depending upon your version of Windows, this setting may or may not be available. No matter, you will rarely have any reason to change it from its current setting.

Edit ➪ Drawing Entities ➪ Triangles



Use your mouse to select **Edit ➪ Drawing Entities ➪ Triangles** or press Alt E, D, T. This selection is used to alter the look and the layer placement of the of the triangles on the drawing.

To select any item, simply click on the field, or button next to the setting you want to modify. Move between fields with your mouse or by pressing Tab and Shift Tab. Click the OK button when you are satisfied with the triangle settings.



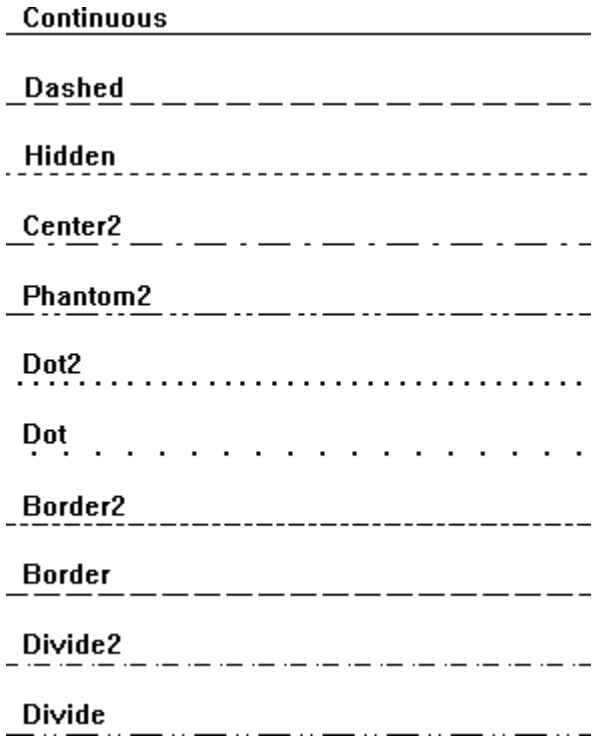
Color:

You may choose a line color by clicking on the down arrow ( ) adjacent to the current color. Click and hold the slider button while moving up or down until the desired font color is shown in the list area, then click on the color name.

Line Type:

You may choose a line type by clicking on the down arrow ( ) adjacent to the current line type name. Click and hold the slider button while moving up or down until the desired line type is shown in the list area, then click on the line type name.

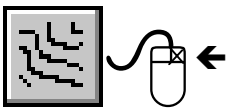
These are the line types available in *Contour It!*:



Line Width: You may choose a line width by clicking on the up or down arrow (▲ or ▼) adjacent to the current line width setting. Use these arrow buttons until the desired line width (1-thin up to 10-fat) is shown in the data field.

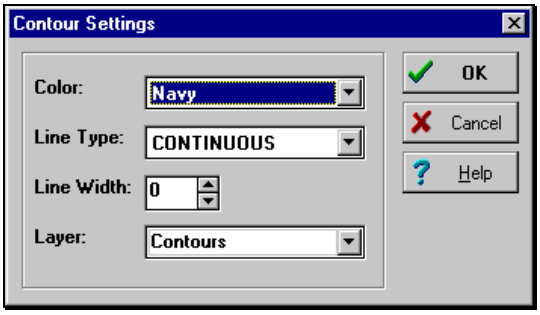
Layer: You may choose the layer name upon which the triangulation lines will be placed in your "Sight" Survey drawing. Choose a layer name by clicking on the down arrow (▼) adjacent to the current layer setting. Click and hold the slider button while moving up or down until the desired layer name is shown in the list area, then click on the name. If you want to use a layer that isn't an offered choice, simply type in the layer name.

Edit ➪ Drawing Entities ➪ Contours



Use your mouse to select **Edit ➪ Drawing Entities ➪ Contours** or press Alt E, D, C. This selection is used to alter the look and the layer placement of the contour lines on the drawing.

To select any item, simply click on the field, or button next to the setting you want to modify. Move between fields with your mouse or by pressing Tab and Shift Tab. Click the OK button when you are satisfied with the contour settings.



Color: You may choose a line color by clicking on the down arrow (▼) adjacent to the current color. Click and hold the slider button while moving up or down until the desired color is shown in the list area, then click on the color name.

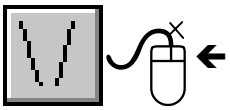
Line Type: You may choose a line type by clicking on the down arrow (▼) adjacent to the current line type name. Click and hold the slider button while moving up or down until the desired line type is shown in the list area, then click on the line type name. The line types available in *Contour It!* are shown on page 66.

Line Width: You may choose a line width by clicking on the up or down arrow (▲ or ▼) adjacent to the current line width setting. Use these arrow buttons until the desired line width (1-thin up to 10-fat) is shown in the data field.

Layer: You may choose the layer name upon which the contour lines will be placed in your "Sight" Survey drawing. Choose a layer name by clicking on the down arrow (▼) adjacent to the current layer setting. Click and hold the slider button while moving up or down until the desired layer name is shown in the list area, then click on

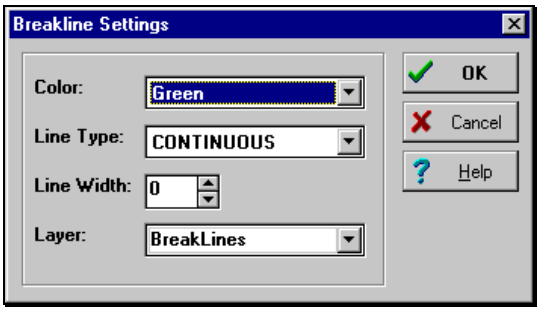
the name. If you want to use a layer that isn't an offered choice, simply type in the layer name.

Edit ➔ Drawing Entities ➔ Breaklines



Use your mouse to select **Edit ➔ Drawing Entities ➔ Breaklines** or press Alt E, D, K. This selection is used to alter the look and the layer placement of the breaklines on the drawing.

To select any item, simply click on the field, or button next to the setting you want to modify. Move between fields with your mouse or by pressing Tab and Shift Tab. Click the OK button when you are satisfied with the breaklines settings.



Color: You may choose a line color by clicking on the down arrow (▼) adjacent to the current color. Click and hold the slider button while moving up or down until the desired color is shown in the list area, then click on the color name.

Line Type: You may choose a line type by clicking on the down arrow (▼) adjacent to the current line type name. Click and hold the slider button while moving up or down until the desired line type is shown in the list area, then click on the line type name.

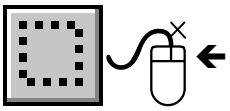
The line types available in *Contour It!* are shown on page 66.

Line Width: You may choose a line width by clicking on the up or down arrow (▲ or ▼) adjacent to the current line width setting. Use these arrow buttons until the desired line width (1-thin up to 10-fat) is shown in the data field.

Layer: You may choose the layer name upon which the breaklines will be placed in your "Sight" Survey drawing. Choose a layer name by

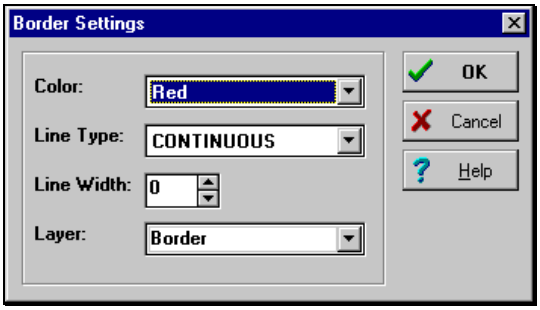
clicking on the down arrow (▼) adjacent to the current layer setting. Click and hold the slider button while moving up or down until the desired layer name is shown in the list area, then click on the name. If you want to use a layer that isn't an offered choice, simply type in the layer name.

Edit ➪ Drawing Entities ➪ Border



Use your mouse to select **Edit ➪ Drawing Entities ➪ Border** or press Alt E, D, B. This selection is used to alter the look and the layer placement of the border on the drawing.

To select any item, simply click on the field, or button next to the setting you want to modify. Move between fields with your mouse or by pressing Tab and Shift Tab. Click the ✔ OK button when you are satisfied with the border settings.



Color: You may choose a line color by clicking on the down arrow (▼) adjacent to the current color. Click and hold the slider button while moving up or down until the desired color is shown in the list area, then click on the color name.

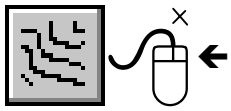
Line Type: You may choose a line type by clicking on the down arrow (▼) adjacent to the current line type name. Click and hold the slider button while moving up or down until the desired line type is shown in the list area, then click on the line type name. The line types available in *Contour It!* are shown on page 66.

Line Width: You may choose a line width by clicking on the up or down arrow (▲ or ▼) adjacent to the current line width setting. Use these arrow buttons until the desired line width (1-thin up to 10-fat) is shown in the data field.

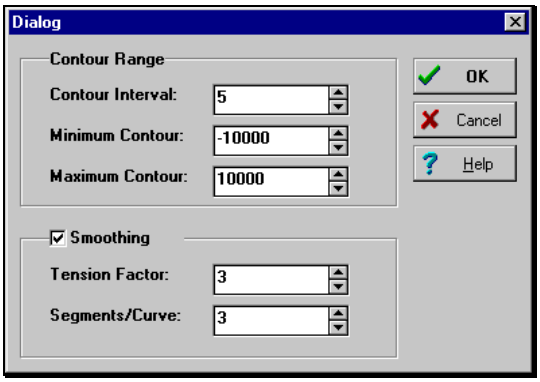
Layer:

You may choose the layer name upon which the border will be placed in your "Sight" Survey drawing. Choose a layer name by clicking on the down arrow (▼) adjacent to the current layer setting. Click and hold the slider button while moving up or down until the desired layer name is shown in the list area, then click on the name. If you want to use a layer that isn't an offered choice, simply type in the layer name.

Edit ➪ Contour Setup



Use your mouse to select **Edit ➪ Contour Setup** or press Alt E, S. This function controls the look of the contours. To change any variable, click on the setting's data entry box and change the data. To activate or deactivate the check box item, simply click on the check box. Move between fields with your mouse or by pressing Tab and Shift Tab. Click the OK button when you are satisfied with the border settings.



Contour Interval

The **Contour Interval** setting establishes the elevation interval between contours. You may choose a new value by clicking on the up or down arrow (▲ or ▼) adjacent to the current setting. Use these arrow buttons until the desired value is shown in the data field. A much quicker way to set the new value is to double click on the current value, and when it is highlighted, type in a new number.

Minimum Contour

The **Minimum Contour** setting establishes the lowest possible contour to be drawn. You may choose a new value by clicking on the up or down arrow (▲ or ▼) adjacent to the current setting. Use these arrow buttons until the desired value is shown in the data

field. A much quicker way to set the new value is to double click on the current value, and when it is highlighted, type in a new number.

Maximum Contour

The **Maximum Contour** setting establishes the highest possible contour to be drawn. You may choose a new value by clicking on the up or down arrow (▲ or ▼) adjacent to the current setting. Use these arrow buttons until the desired value is shown in the data field. A much quicker way to set the new value is to double click on the current value, and when it is highlighted, type in a new number.

Tension Factor

The **Tension Factor** setting controls contour smoothing. The tension factor may range from `0` to `10`. The higher the setting, the sharper the corners will be drawn. A setting of "`0`" produces more curving in the lines, while a setting of "`10`" produces no noticeable line smoothing. Any whole or decimal value may entered, however lower values from `0` to `5` appear to produce the most aesthetically pleasing results.

You may choose a new value by clicking on the up or down arrow (▲ or ▼) adjacent to the current setting. Use these arrow buttons until the desired value is shown in the data field. A much quicker way to set the new value is to double click on the current value, and when it is highlighted, type in a new number.

For more information on tension factors, see **What is a Tension Factor?** on page 12.

Segments/Curve

The **Segments/Curve** setting determines the number of straight line segments used during line smoothing. The higher the number, the smoother the contour line will appear. Any value greater than "`3`" is allowed, but values between "`3`" and "`10`" are recommended. Values over "`15`" may cause CAD transfer files to become extremely large.

You may choose a new value by clicking on the up or down arrow (▲ or ▼) adjacent to the current setting. Use these arrow buttons until the desired value is shown in the data field. A much quicker way to set the new value is to double click on the current value, and when it is highlighted, type in a new number.

☛ CAUTION

Too many segments per curve may cause the contour labels to disappear. When printed, a contour label replaces a line segment in your drawing. If the line segments are too numerous, and therefore too short, your contour labels will be eliminated. For best results, keep the **Segments/Curve** *setting as close to* **3** *as possible.*

Smoothing

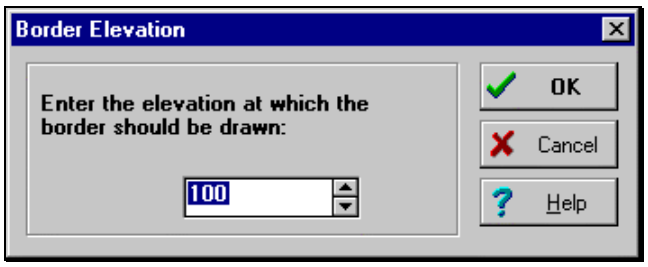
The **Smoothing** check box toggles the contour line smoothing function on and off. If set to "**off**," the settings for **Tension Factor** and **Segments/Curve** are ignored when construction a contour map.

☛ CAUTION

Using contour smoothing is not always desired, especially in proposed contours, or when using breaklines. Smoothing may introduce errors in your contour map for the sake of aesthetics. Too much smoothing may even cause your contour lines to overlap. Your breaklines, typically straight sections, may also end up as curved sections when smoothing is employed. Higher numbers of **Segments/Curve** *will also drastically affect your drawing file size.*

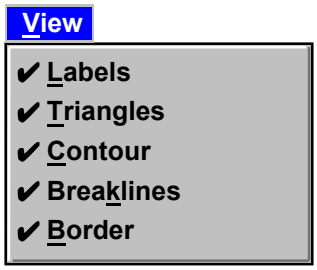
Edit ➔ Border Elevation

Use your mouse to select **Edit ➔ Border Elevation** or press Alt E, E. This function controls the placement of the **Border Elevation** on your contour map. To set the elevation, simply type a new value in place of the value current and click OK. To eliminate the display of the border altogether, simply click on the **Show/Hide Border** button ( ) on the toolbar.



4.03 The View Menu

Shown below are the items in the **View** menu. To select any item on the menu, click your mouse on the desired selection. You may also use your keyboard to select a menu item by pressing Alt plus the underlined letters. For example, select **View** ➔ **Border** by pressing Alt V, B. Any item preceded by a check mark (✔) is active, and only active items will be included in the drawing



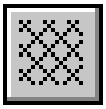
View ➔ Labels

Use your mouse to select **View** ➔ **Labels** or press Alt V, L. This selection toggles the display of all labels **on** and **off**.

Right click your mouse on the **Show/Hide Labels** button to edit settings for label appearance. See **Edit** ➔ **Drawing Entities** ➔ **Labels** on page 62 for information on editing the appearance.

View ➔ Triangles

Use your mouse to select **View** ➔ **Triangles** or press Alt V, T. This selection toggles the display of the triangles **on** and **off**.



Right click your mouse on the **Show/Hide Triangles** button to edit settings for triangle appearance. See **Edit** ➔ **Drawing Entities** ➔ **Triangles** on page 65 for information on editing the appearance.

View ➔ Contours

Use your mouse to select **View** ➔ **Contours** or press Alt V, C. This selection toggles the display of the contours **on** and **off**.

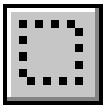
Right click your mouse on the **Show/Hide Contours** button to edit settings for contour appearance. See **Edit** ➔ **Drawing Entities** ➔ **Contours** on page 67 for information on editing the appearance.

View ➔ Breaklines

Use your mouse to select **View ➔ Breaklines** or press Alt V, K. This selection toggles the display of the breaklines **on** and **off**.

Right click your mouse on the **Show/Hide Breaklines** button to edit settings for breakline appearance. See **Edit ➔ Drawing Entities ➔ Breaklines** on page 68 for information on editing the appearance.

View ➔ Border

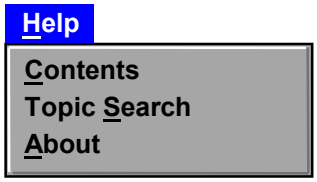


Use your mouse to select **View ➔ Borders** or press Alt V, B. This selection toggles the display of the borders **on** and **off**.

Right click your mouse on the **Show/Hide Borders** button to edit settings for border appearance. See **Edit ➔ Drawing Entities ➔ Border** on page 69 for information on editing the appearance.

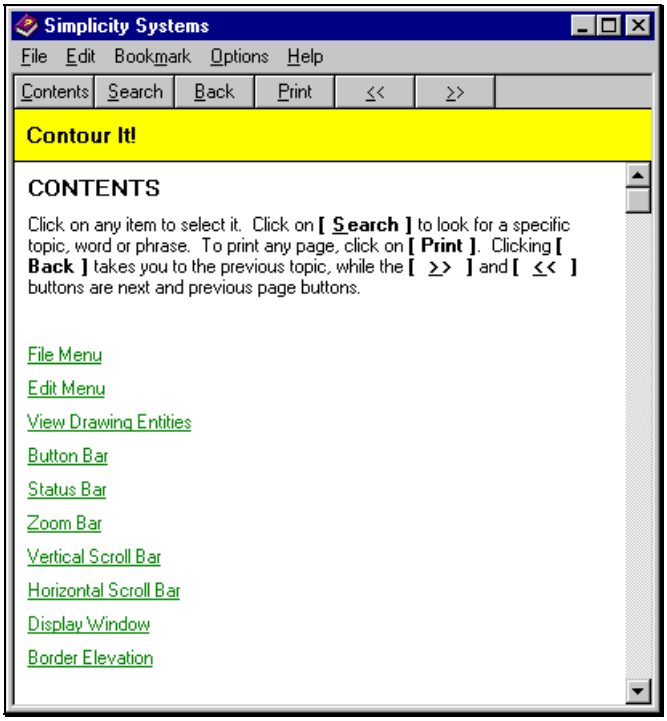
4.04 The Help Menu

Shown below are the items in the **Help** menu. To select any item on the menu, click your mouse on the desired selection. You may also use your keyboard to select a menu item by pressing Alt plus the underlined letters. For example, select **Help ➔ Contents** by pressing Alt H, C.



Help ➔ Contents

Use your mouse to select **Help ➔ Contents** or press Alt H, C. You may also simply press the F1 key. This selection brings up a help window showing the contents of the help file.



Across the top of the help window lies a pull-down menu bar, similar in form and function to the pull-down menus in *Contour It!* The pull-down menus are an integral part of the **Windows Help File System**.

To select any item on a pull-down menu, click your mouse on the desired selection. You may also use your keyboard to select a menu item by pressing Alt plus the underlined letters. For example, select **File** → **Open** by pressing Alt F, O. Some items may be preceded by a check mark (✔) if the item is active.

For the most part, the pull-down menu items are inconsequential to the operation of the *Contour It!* help system. For that reason we will limit the amount of discussion for any particular item to a short synopsis of the function of that item.

In the **Contents** window itself, you will notice some words are written in green, underlined text. These are linked topics. When

you double click your mouse on an underlined word, you will jump to another section which will give you additional information.

If you see a small image of a paper clip, it indicates that you have annotated the current topic. To read the annotation associated with a paper clip, click on the paper clip. For additional information on annotation, see **Edit ➔ Annotate** on page 76.

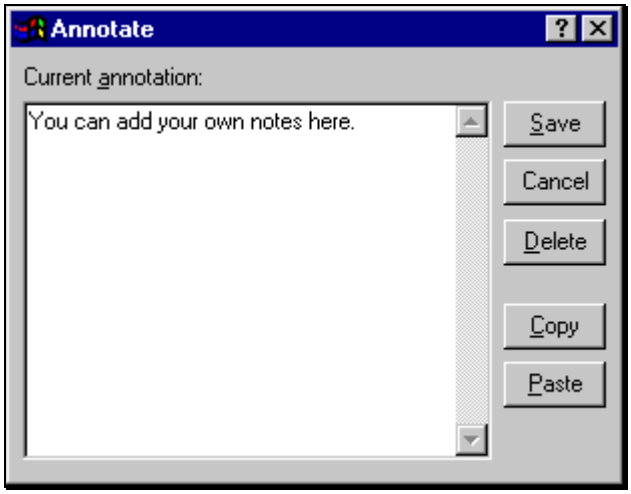
File ➔ Open This selection is used to open a different help file. *Contour It!* does not need this function.

File ➔ Print Topic This selection is used to print the current topic as shown in the main window.

File ➔ Exit This selection is used to exit the help file system.

Edit ➔ Copy This selection is used to copy currently highlighted text to the clipboard. From the clipboard, you can paste the text into another document. To highlight, place the mouse cursor at the beginning of the text. Click and hold the left mouse button while moving the cursor to the end of the desired text. Release the mouse button.

Edit ➔ Annotate This selection allows you to add notes to the help file. To use annotation, position the cursor anywhere on the topic screen you want to annotate. Press Alt E, A to select annotation.



Type your annotation into the window, or click Paste to insert the contents of the clipboard. When you are done, click Save. A small image of a paper clip will appear at your annotation spot. To read the annotation associated with a paper clip, click on the paper clip. Annotation may only be used once on any particular topic screen, but you can add to existing annotation at any time.

Bookmark ➔ Define

This selection allows you to add a bookmark to the help file. *Contour It!* does not need this function. If you wish to use bookmarks, please refer to your Windows manual for instructions.

Options ➔ Keep Help on Top

This selection allows you to control the placement of the help file. Your choices are: **Default** (on top when in use); **On Top** (always on top of the program screens); and **Not On Top**. This should normally be set to **Default**, but **On Top** is useful when you are using help to guide you through a procedure.

Options ➔ Display History Window

This relatively worthless Windows feature shows you a listing of the help files you have recently accessed. Exciting, isn't it?

Options ➔ Font

This selection allows you to control the size of the help file text. Your choices are: **Small**; **Medium**; and **Large**. Be bold and daring, then choose the size you are most comfortable with.

Options ➔ Use System Colors

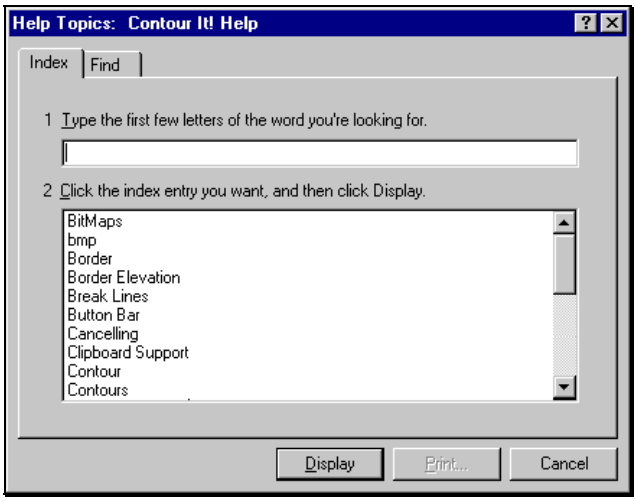
This selection allows you to the preset help system colors to match your system colors. Any color changes only take effect after the current help session has ended and a new one has been started.

Help ➔ Version

This selection displays the current help system version and the name of the help file.

Help Screen Buttons

Below the menus you'll find a button bar containing Contents, Search, Back, Print, << (page back), and >> (page ahead). The functions of each button will be discussed below.

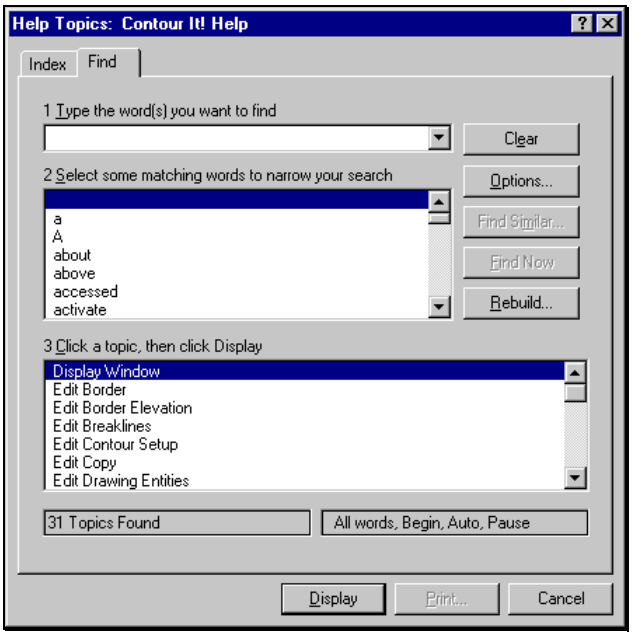


The Contents button brings you back to the contents page from where ever you are in the help file.

The Search button allows you to search the help file for specific phrases, words, etc. When you click this button you call up the search screen.

To find a specific topic, narrow your search by typing in the first few letters of the topic name into the text entry box. In the topic window, you should soon find a list a topics that begin with the letters you just typed. View the topic by double-clicking on it, or click once on the topic and then click Display.

If you are having difficulty locating a topic, you might want to try searching for a specific word. Click on the **Find** tab at the top of the search screen.



To find a specific word, narrow your search by typing in the first few letters of the topic name into the text entry box, or select a word in the word selection window. In the topic window, you should soon find a list a topics that contain the word you just search for. View the topic by double-clicking on it, or click once on the topic and then click Display.

The Back button brings you back to the previously accessed section from where ever you are in the help file.

The Print button prints the current topic using your standard Windows printer control.

The << button brings you back one page from where ever you are in the help file.

The >> button moves you ahead one page from where ever you are in the help file.

Section 5
Buttons

5.01 The Button Bar

Shown below are *Contour It's* **Button Bars**. The first button bar is used when *Contour It!* is run from within "Sight" Survey. The second button bar is used when *Contour It!* is run as a stand-alone program.

The Button Bar mirrors most of the functionality of the menus. Several buttons perform different functions for both the left and right mouse button.

File Open

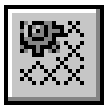
Left click: Opens a new contouring file. See **File ➔ Open** on page 53 for more information.

Right click: No function.

File Cancel

Left click: Cancel contouring and exit the contouring module. See **File ➔ Cancel** on page 56 for more information.

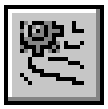
Right click: No function.



File Triangulate

Left click: Triangulates and refreshes the contour map. See **File ➔ Triangulate** on page 54 for more information.

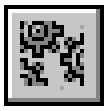
Right click: No function.



File Contour

Left click: Computes and draws the contour map. See **File ➔ Contour** on page 55 for more information.

Right click: Activates the **Contour Setup** dialog window. See **Edit ➔ Contour Setup** on page 70 for more information.



File Finish

Left click: Finishes the contouring session and exits *Contour It!*. See **File ➔ Finish** on page 56 for more information.

Right click: No function.

Edit Contour Setup

Left click: Activates the **Contour Setup** dialog window. See **Edit ➔ Contour Setup** on page 70 for more information.

Right click: No function.

Edit Border Elevation

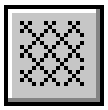
Left click: Activates the **Border Elevation** dialog window. See **Edit ➔ Border Elevation** on page 72 for more information.

Right click: No function.

Show/Hide Points

Left click: Toggles the point number display on and off.

Right click: Allows you to set the properties for point and label display. See **Edit ➔ Drawing Entities ➔ Labels** on page 62 for more information.



Show/Hide Triangles

Left click: Toggles the triangle display on and off.

Right click: Allows you to set the properties for triangle display. See **Edit ➔ Drawing Entities ➔ Triangles** on page 65 for more information.

Show/Hide Contours

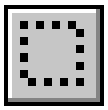
Left click: Toggles the contour display on and off.

Right click: Allows you to set the properties for contour display. See **Edit ➔ Drawing Entities ➔ Contours** on page 67 for more information.

Show/Hide Breaklines

Left click: Toggles the breakline display on and off.

Right click: Allows you to set the properties for breakline display. See **Edit ➔ Drawing Entities ➔ Breaklines** on page 68 for more information.



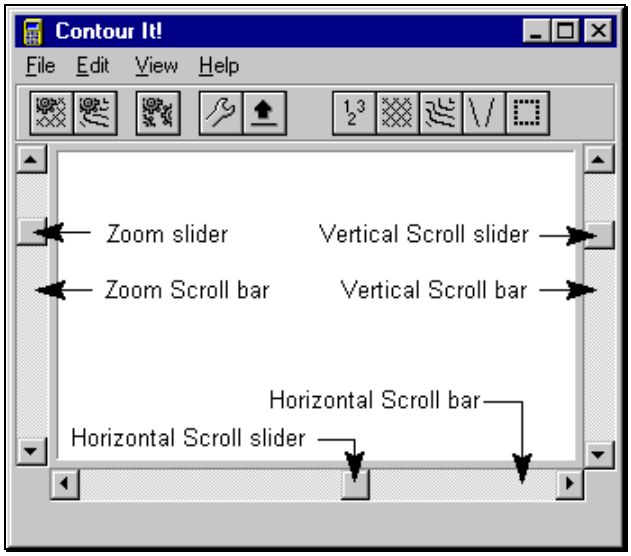
Show/Hide Border

Left click: Toggles the contour display on and off.

Right click: Allows you to set the properties for border display. See **Edit ➔ Drawing Entities ➔ Border** on page 69 for more information.

5.02 Slider Buttons - Zoom & Scroll

Shown below are *Contour It's* horizontal and vertical **Slider Buttons**. These buttons are used to zoom and scroll your contour map or digital terrain model.



Zoom Scroll Bar and Slider

The **Zoom Scroll bar** and **Zoom slider** (located on the left side of the contouring window) control the scale of the drawing on the screen. It therefore changes the scale of an image that is copied or saved as a bitmap, but it has no effect on the image that is in "Sight" Survey. The image returned to "Sight" Survey will always match "Sight" Survey's drawing scale.

There are several ways to zoom the image:

1. Click your left mouse button on the up or down arrow keys (▲ or ▼)above or below the slider bar;

2. Position the mouse on the slider button. Click and hold the left mouse button. Move the mouse up or down and release the mouse button when you reach the desired scale;

3. Position your mouse on the slider button, then click the left mouse button. Position the image using the keyboard's up and down arrow keys (↑ or ↓);

4. Click your mouse above or below the slider button, between the slider button and the arrow key at the end of the scroll bar.

After re-scaling an image you may need to reposition the image using the **Horizontal Scroll Bar** and the **Vertical Scroll Bar**.

Vertical Scroll Bar and Slider

The **Vertical Scroll Bar** (located on the right side of the contouring window) controls the vertical position of the image in the contouring window.

There are several ways to move the image:

1. Click your left mouse button on the up or down arrow keys (▲ or ▼) above or below the slider bar;

2. Position the mouse on the slider button. Click and hold the left mouse button. Move the mouse up or down and release the mouse button when you reach the desired scale;

3. Position your mouse on the slider button, then click the left mouse button. Position the image using the keyboard's up and down arrow keys (↑ or ↓);

4. Click your mouse above or below the slider button, between the slider button and the arrow key at the end of the scroll bar.

Horizontal Scroll Bar and Slider

The **Horizontal Scroll Bar** (located near the bottom of the contouring window) controls the horizontal position of the image in the contouring window.

There are several ways to move the image:

1. Click your left mouse button on the left or right arrow keys (◄ or ►) at either end of the slider bar;

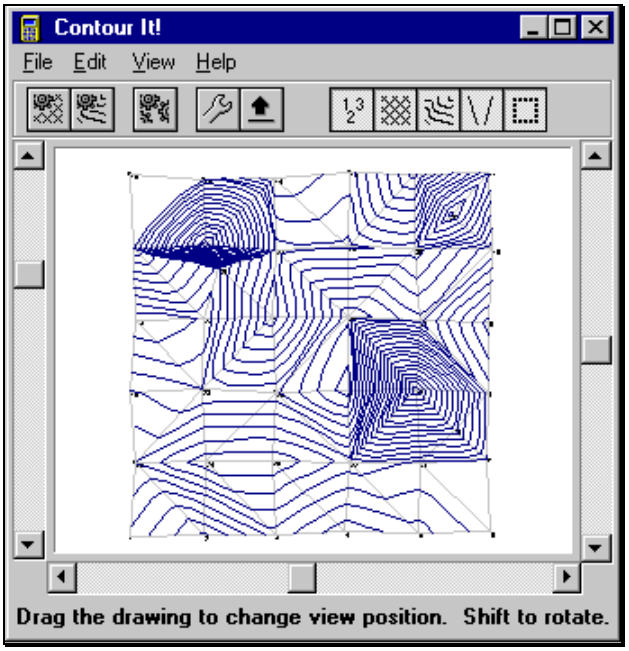
2. Position the mouse on the slider button. Click and hold the left mouse button. Move the mouse left or right and release the mouse button when you reach the desired scale;

3. Position your mouse on the slider button, then click the left mouse button. Position the image using the keyboard's left and right arrow keys (← or →);

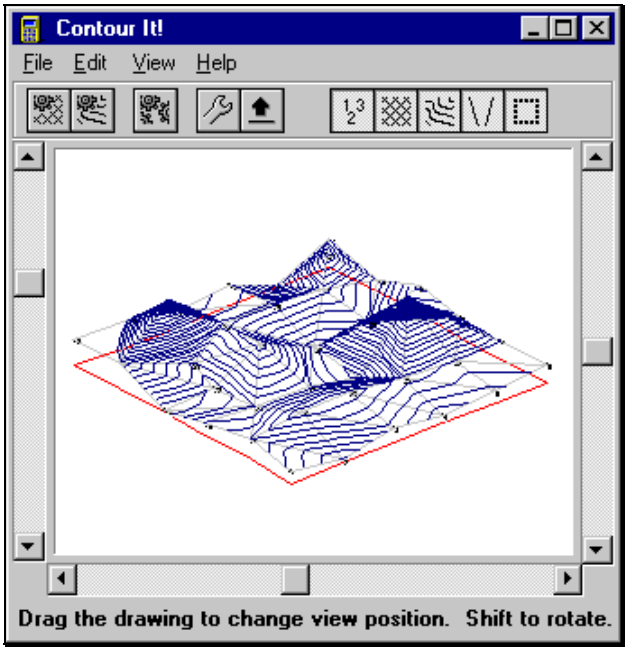
4. Click your mouse above or below the slider button, between the slider button and the arrow key at the end of the scroll bar.

5.03 Mouse Button - Rotate the Drawing

Shown below is the contouring display window. This window contains a preview of the image that will be sent back to "Sight" Survey, or saved. The image in the window below represents an un-rotated display.



To rotate the drawing, click and hold the left mouse button while pointing the mouse at the image. Move the mouse and the image will rotate. Hold the Shift key down while moving your mouse to rotate the drawing about an axis normal to the monitor. If you get the drawing into a unusable position and want to reset it, just click the Contour ( ) or Triangulation ( ) button . A rotated image is shown below.



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Section 6
Stand-Alone

6.01 Startup as a Stand-Alone

In "Sight" Survey Professional, *Contour It!* is located on the **Add-Ins** pull-down menu. Since you are running *Contour It!* as a stand-alone program, you must open the program using a different method.

Windows 3.1

Mouse Method: Double-click on the Simplicity Systems program group. When the group window opens, double-click on the **Contour It!** icon ( ).

Keyboard Method: Press Alt F,R to open the **File** ➔ **Run** dialog window. Type **`C:\SightSrv\Program\Contour`** into the filename box and press Enter. (If necessary, change the drive letter and directory name to match your installation.)

Windows 95

Start **Button Method:** Click on the Windows 95 Start button. Point to **Programs**. After a moment, the program list appears. Point to **Simplicity Systems**. After a moment, the Simplicity Systems program group list appears. Click on the **Contour It!** icon ( ).

Keyboard Method: Press Alt S, R to open the **Start** ➔ **Run** dialog window. Type **`C:\SightSrv\Program\Contour`** into the filename box and press Enter or click OK. (Change the drive letter and directory name to match your installation if necessary.)

If you are running the example problem now, return to the subsection **Fill'er Up** on page 25.

6.02 File Structures

Points

The structure of a point file is:

```
total number of points in file
point Easting Northing elevation
point Easting Northing elevation
```

where each piece of information is separated by a space. The first line of the file indicates the number of points in the file. ***Note that the Easting (or X coordinate) comes before the Northing (or Y coordinate).*** A typical point file would look like this:

```
21
1 20000.000 10000.000 119.650
2 20104.460 10002.080 104.940
3 20203.760 10003.450 123.760
.
.
16 20506.260 10006.820 129.350
.
21 20406.570 10026.130 119.550
```

where **21** (on the first line) is the number of points in the file.

Border

The structure of a border file is:

```
total number of points in file
point
point
```

where each piece of information is separated by a space. The first line of the file indicates the number of points in the file. A typical point file would look like this:

```
4
1
6
2
34
```

where **4** (on the first line) is the number of points in the file.

Breaklines

The structure of a breakline file is:

```
total number of breaklines in file
point point
point point
```

where each piece of information is separated by a space. The first line of the file indicates the number of breaklines in the file. A typical breakline file would look like this:

```
5
10 18
16 15
12 34
34 25
25 41
```

where **5** (on the first line) is total number of breaklines in the file.

6.03 Creating Files

If the COGO program you are using will not let you export points into an ASCII file, you can create your own point file by using a word processing program or text editor. Just be certain to save the file in a **Text Only** (no formatting) type of file.

You can also use your word processor/text editor to construct border and breakline files. Again, be certain to save the file in a **Text Only** (no formatting) type of file.

Another Plug

Of course, you could always call us and order a copy of **"Sight" Survey Professional**. It is a really good COGO & CAD program. But don't take our word, read the review from *"Professional Surveyor"* on page **Error! Bookmark not defined.**.

Our toll-free telephone number is (800) 777-7978. If you are outside the US and Canada, please call (218) 773-8917. You can also order over our web site at **www.simsystems.com**

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Section 7
Trouble?

7.01 Startup & Loading Problems

Contour It! does not appear on the "Sight" Survey Add-Ins menu

Contour It! is located on the **Add-Ins** pull-down menu inside of "Sight" Survey. The actual menu item is **Make Contour Lines (MC).** The **Add-Ins** menu is located between the **Utilities** and **Windows** pull-down menus. If you can't find the **Add-Ins** menu, you should first be sure that you are running the **"Sight" Survey Professional** version, and that your "Sight" Survey serial number is 970812 or greater. You can find both these items shown on the bottom of the **System Information** screen within "Sight" Survey. Enter the routine code **SI** to access this screen.

If you do not have the **Professional** version, or if your serial number is less than 970812, you may wish to call our sales office at 1-800-777-7978 to purchase a "Sight" Survey upgrade. Pricing will vary depending upon the version of "Sight" Survey that you currently own. If you do not wish to purchase the upgrade, you can still use *Contour It!* as a stand-alone program however, you will not be able to use it seamlessly integrated within your "Sight" Survey program.

If you do have the **Professional** version, and your serial number is 970812 or greater, then **Make Contour Lines (MC)** should appear on the **Add-Ins** menu, however, it may appear grayed-out or dimmed. If you are unable to access *Contour It!* because the selection is dimmed, then *Contour It!* was installed to the wrong directory. ***Contour It! must be located in the same directory as your "Sight" Survey Professional program.*** The default name that the installation program uses for this directory is:

Drive:\SightSrv\Program

where **Drive** is replaced by the drive letter where the program is installed.

Running Contour It! Across a Network

If *Contour It!* is being run across a local area network (LAN), it is important that all users have read/write access to the program directory. If users do not have access to this directory, an error will occur when they try to load the program. The most common error to occur under this situation is an **Access Denied** error, but the exact error will vary depending upon your system setup. The user will not be able to run the program until he has access rights to the directory where *Contour It!* is installed. The default name that the installation program uses for this directory is:

Drive:\SightSrv\Program

where **Drive** is replaced by the drive letter where the program is installed.

Illegal Function Call

If *Contour It!* issues an **Illegal Function Call** error when it first attempts to load into memory, it is most likely because an invalid configuration setting exists in the **CONTOUR.INI** initialization file. To correct the situation, simply use the **Windows 3.1 File Manager** or the **Windows 95 Explorer** to delete the initialization file from the *Contour It!* program directory and restart the program. The default name that the installation program uses for the directory containing the initialization file is:

Drive:\SightSrv\Program

where **Drive** is replaced by the drive letter where the program is installed.

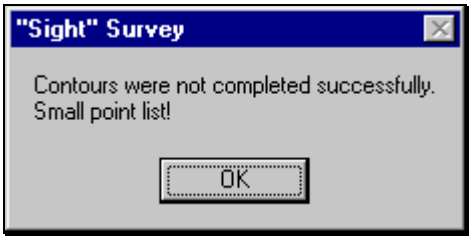
Program Appears to Hang Upon Startup

If *Contour It!* appears to hang or "lock up" when it first loads into memory, it is most likely because an invalid configuration setting exists in the **CONTOUR.INI** initialization file. To correct the situation, simply use the **Windows 3.1 File Manager** or the **Windows 95 Explorer** to delete the initialization file from the *Contour It!* program directory and restart the program. The default name that the installation program uses for the directory containing the initialization file is:

Drive:\SightSrv\Program

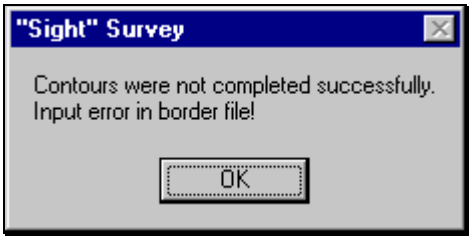
where **Drive** is replaced by the drive letter where the program is installed.

7.02 File Problems



Your point list, i.e. your data file, contains fewer than three points, and therefore is an invalid file. A *Contour It!* file must contain at least three points before triangulation can be completed. Add points to your data file and try again.

Two, or possibly more, duplicate points have been found lurking around in your data file. The offending point numbers are shown so you don't have to hunt them down. Delete the offending points using the **Edit** ➪ **Points** routine as described on page 57.



You have a data error in your border file. Remember, *Contour It!* must have a valid border before it can triangulate and contour data. See **What is a Border** on page 3. Use the **Edit** ➪ **Border** routine described on page 60 to fix your border.

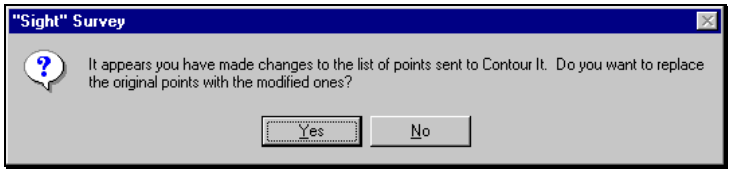
This message indicates that the secondary file has never been processed by *Contour It!*. It cannot be used until you have triangulated the file. You must:

1. In "Sight" Survey, open the secondary file and **Make Contours** on it.
2. Return to "Sight" Survey and open the primary file and **Make Contours** on this file.
3. In *Contour It!*, select **File** ➔ **Calculate Volume** and continue.

Running *Contour It!* as a Stand-Alone Program

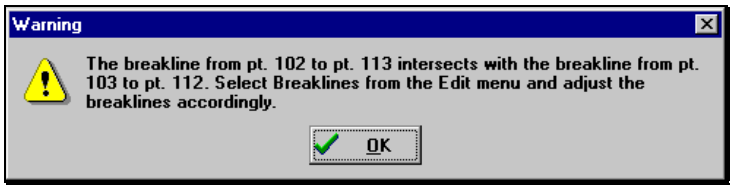
1. Use **File** ➔ **Open** to open the secondary file.
2. Use **File** ➔ **Open** to open the primary file.
3. Select **File** ➔ **Calculate Volume**.
4. Select the secondary file and click OK.

This is a general indicator of bad data in the border or points file. Use the **Edit** routines to check your data. It may be helpful to return to "Sight" Survey and check your data visually.

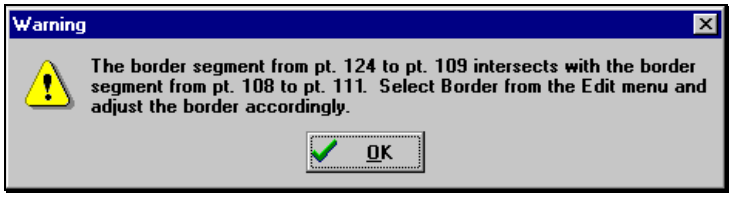


You have used the **Edit ➔ Points** routine to change a point's coordinates or elevation, or perhaps you added or deleted a point. *Contour It!* needs to know if you want to return your changed points to "Sight" Survey and make them a part of the permanent data file.

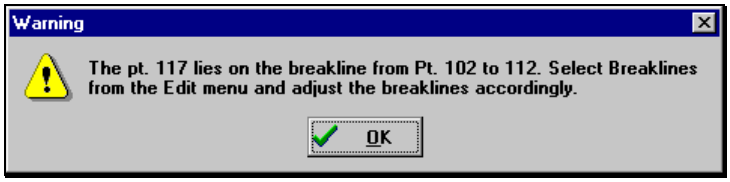
7.03 Breakline & Border Problems



Your breakline file contains crossing breakline(s), a no-no. Use the **Edit ➔ Breaklines** routine to remove the offending breaklines. See **What are Breaklines** on page 6.



Your border file contains crossing border line(s), another no-no. Use the **Edit ➔ Border** routine to remove the offending breaklines. See **What is a Border** on page 3.



Your breakline file contains a breakline(s) that crosses a data point. The only way *Contour It!* allows a data point to touch a breakline is if the data point anchors one end of the breakline. Use the **Edit ➪ Breaklines** routine to modify the offending breakline. See **What are Breaklines** on page 6.

ⓘ NOTE

*You can also run into border trouble that does not generate an error message. See **Section 7.06 - Trouble at the Border** for more information.*

7.04 Volume Problems

Contour It! is only as good as the data you provide. It's the old adage, *"Garbage in…Garbage out"* played out to its fullest extent.

If you are having trouble generating valid volume calculations, the problems often stem from one of four sources:

Incomplete Field Data

The problem of incomplete field notes can be rectified by having a survey crew revisit the site.

Bad Borders

Bad borders may be corrected by editing your border points using the **Edit ➪ Border** routine. You should also review the section **Border Rules** on page 4.

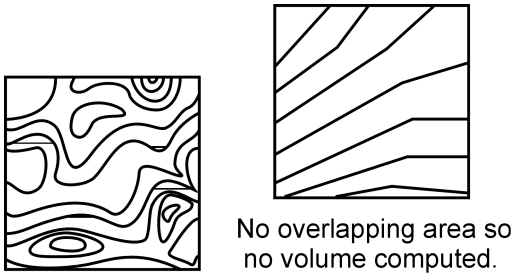
Bad Breaklines

In order to properly triangulate your data, you may need to add breaklines. Review the section **What are Breaklines** on page 6. Use the **Edit ➪ Breaklines** routine to modify the offending breakline.

Non-Overlapping Files

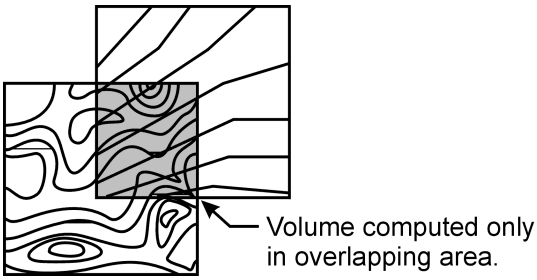
Contour files that do not overlap, or overlap only partially may be your problem. *Contour It!* cannot compute volumes on non-overlapping files.

For example, if the relationship between your two surface maps looked like this:



no volume could be computed because no portions of the files overlapped.

If the relationship between your two surface maps looked like this:



only the volume in the overlapping area would be computed.

If your problem is caused by different coordinate bases, use "Sight" Survey's (or your COGO's) **Coordinate Transformation** routine to translate one file to the same base as the other. Don't forget to re-contour the translated file before computing a volume.

7.05 Label Problems

If you have set up *Contour It!* to include contour labels in your drawing and they do not appear, you may have a problem with the label being too large or too frequent. However, this problem is usually caused by your **Segments/Curve** setting.

Too many segments per curve may cause the contour labels to disappear. When printed, a contour label replaces a line segment in your drawing. If the line segments are too numerous, and therefore too short, your contour labels will be eliminated. For best results, keep the **Segments/Curve** setting as close to **3** as possible.

Adjust the **Segments/Curve** setting by using **Edit** ➔ **Contour Setup** as discussed on page 70.

Adjust the **Font Size** and **Frequency** settings by using **Edit** ➔ **Drawing Entities** ➔ **Labels** as discussed on page 62.

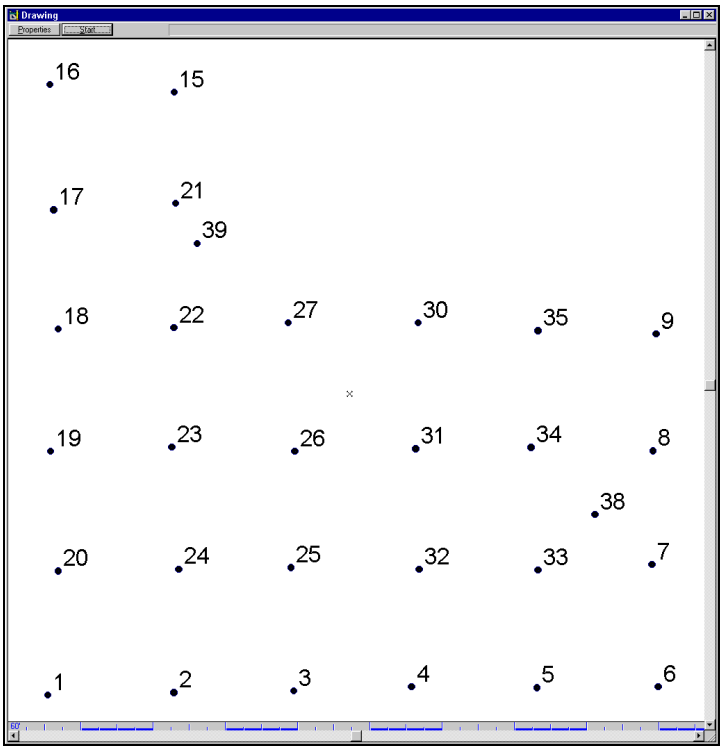
7.06 Trouble at the Border

You've gathered your field data, reduced your notes to COGO points, and imported your data into *Contour It*. But wait... something's wrong! Your triangles are running across your border and are out of control! Arrrgh!!! This stupid program doesn't work!

Well, before you get too stressed out, let's begin by saying the program works just fine. It's doing everything it can to help you get an accurate contour map. But there is one thing it cannot do, and that is what is causing the problem. It doesn't have the benefit of sight. It hasn't seen the lay-of-the-land. And, it cannot read your mind.

You need to help it.

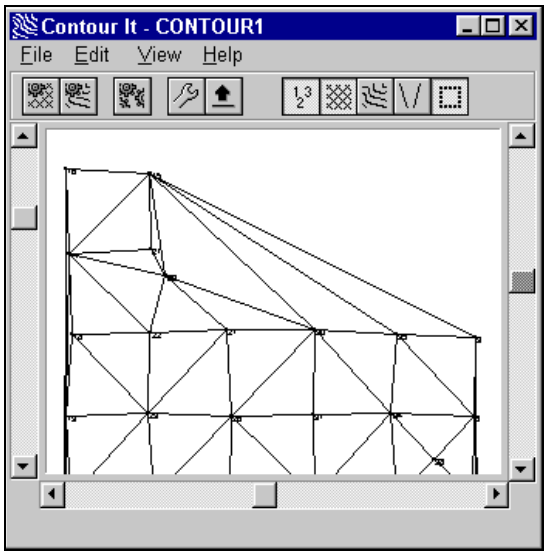
Consider the data set from the file **Contour1.zak**. Suppose we load the data into *"Sight" Survey* and plot the points, excluding points 10-14, 28, 29, 36, and 37. We would have the following plot:



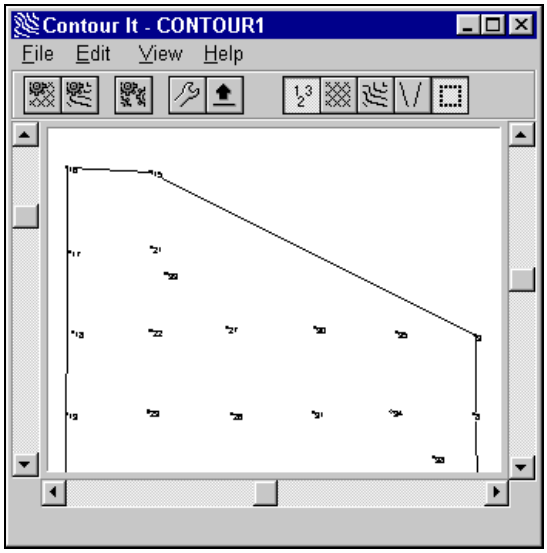
Now we type **MC** to **Make Contour Lines** and we select the points we want to take into *Contour It*. Again, we'll bring in all of the points, except points 10-14, 28, 29, 36, and 37.

Contour It automatically chooses a border, and triangulates and contours the data. If we click on the **Show/Hide Contours** button ( ), we would see the *Contour It* screen at the top of the next page.

Notice how we have triangle lines from point 15 to points 39, 27, 30, 35, and 9. You don't have data for this area, but *Contour It* is attempting to contour the area anyway. Why? Because the automatic bordering procedure calculated a border line stretching from point 9 to point 15. We can see this by clicking on the **Show/Hide Triangles** ( ) button to turn off the triangles and show us only the border. This is shown in the *Contour It* screen at the bottom of the next page.



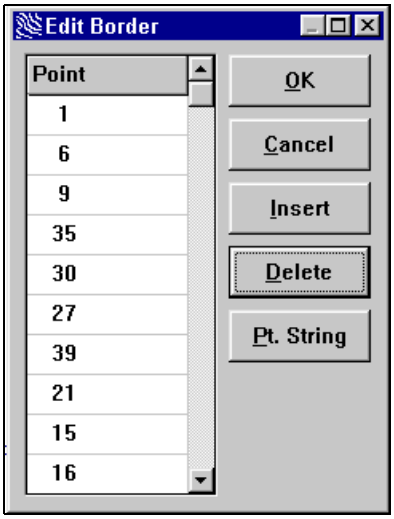
Contour It screen showing triangulation of data.



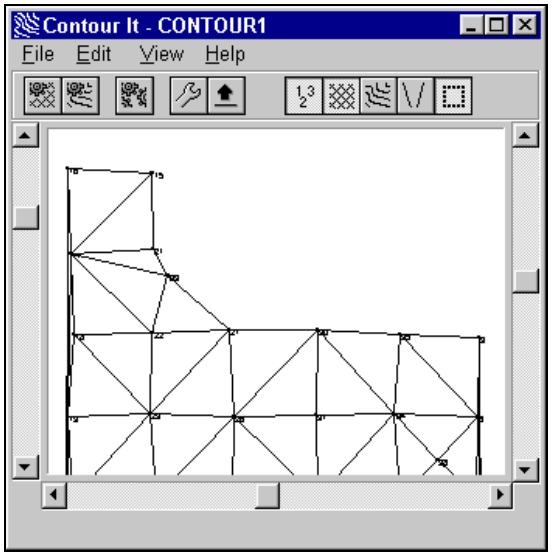
Contour It screen showing automatically generated border.

The triangulation is correct because it falls within the selected border. The solution lies in changing the border. We select **Edit**

Border and insert the necessary points to create the correct border, enumerated in the **Edit Border** window below.



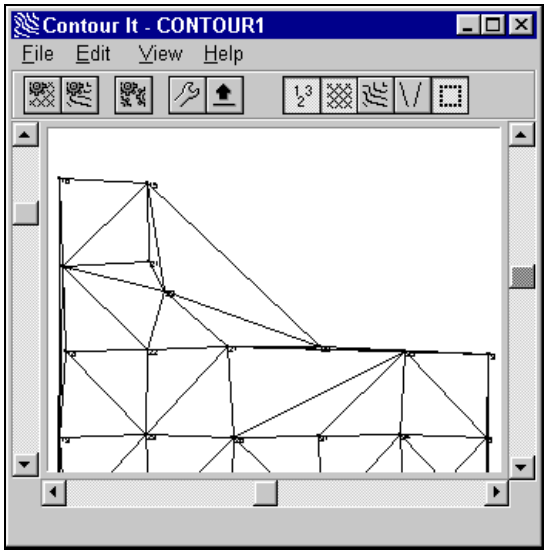
When we click OK, *Contour It* re-triangulates and contours the data. If we click on the **Show/Hide Contours** button ( ), we would see the correct triangulation.



Good Borders Are Critical!

One other situation can cause improper triangulation and thus bad contour generation. This occurs when we have a data point lying outside the border.

Suppose we select **Edit ➪Border** and delete point 30 from the border. Maybe we thought (incorrectly) that point 30 would lie inside a line from point 9 to point 27, and therefore we could omit it from our border list. Our triangulation would look like this,



with triangulation lines stretching from point 30 to points 39 and 15. This is because point 30 actually lies outside a border line from point 9 to point 27 and *Contour It* thinks it can triangulate point 30 to points 9 and 27 without crossing a border line.

☛ VERY IMPORTANT

*It is critical that you do not bring any data points into **Contour It!** unless they lie within the border of what you want to triangulate and contour. To include extraneous data points will always lead to incorrect triangulation. Either use* **Edit ➪Border** *to include the points, or use* **Edit ➪Points** *to delete the data points in question.*

Section 8
Getting Help

8.01 Help!

Simplicity Systems, Inc., provides support free of charge (but ***not*** toll-free) for 90 days from date of purchase, provided the user has returned a signed software registration form.

Experience demonstrates that well over 80% of the support calls we receive could be avoided if the caller would first look in the manual. Many long hours have gone into the preparation of this manual in an effort to provide all of the information necessary to the operation of this program. So please check the manual before you call.

Telephone support is available **ONLY** at the following numbers:

Voice: **1-218-773-7966**
Fax: **1-218-773-3849**
E-mail: support@simsystems.com

Support is also available on our web site at www.simsystems.com

Support hours are 8:00am to 5:00pm (Central time), Monday through Friday, exclusive of holidays. If all incoming support lines are busy, your call will be answered by our answering service and you will be given an option to leave your name and number, or you may wish to simply try your call again later. Call backs on messages left on the answering service will be returned *collect*, in the order they are received with the exception that customers on an **Unlimited Support Plan** will always be given top priority.

If at all possible, please be at your computer when you call for support. This way a support technician will be able to step you through the procedure in question, which will save you the frustration of trying to remember our instructions at a later time. It will also be helpful for the technician to know the exact procedural steps you were following when you encountered the problem.

Raw Data files and **Text Output** printouts are especially helpful for this.

If your question or problem does not require an immediate answer, please write down your problem and mail or fax it to the Simplicity technical support department including printouts, data disks, etc. Include your program serial number, your phone and fax numbers, and the hours/days you may be available. A support technician will solve your problem and provide you with the solution by mail, fax, or telephone.

You are encouraged to become as familiar with the operation of your computer as possible. When helping you, we will often ask you to perform certain functions such as: Copying a disk; Formatting a disk; Checking the contents of a disk, directory or folder; and Copying, Renaming, and Moving files. It is not within the scope of our technical support plans to assist you with, or tutor you on the use of Windows. Therefore, it is to your advantage to be familiar with these commands before you call.

If you are having a problem such as constant input/output (I/O) errors, etc., chances are good that the problem is hardware or media related. Please contact your hardware dealer first.

8.02 Support Plans

The subject of charging a fee for technical support is a controversial subject across the software industry. However, when you compare the initial product cost, it appears that many of the companies that do *not* charge for technical support have actually built a prepaid support charge into the price of their software package. If you are like most people, you don't want to pay for something that you may never use.

At Simplicity, we pride ourselves on dependable, practical, and perhaps best of all, *affordable* software solutions. We have not "built-in" a prepaid support charge into the price of our software. You get a great program with well-written documentation and up to 90 days of free support. We do not charge you "up front" for software support that you may never need.

After the initial period of free support, users who feel they will need additional help are encouraged to subscribe to one of our support plans. A technical support order form was enclosed with the shipment of this program. Please refer to this form for prices and updated information on the following support plans.

ⓘ NOTE

Customers who do not subscribe to a support plan will be automatically transferred to the Basic Service when their 90 days of free support has expired.

One Year Unlimited

The **One Year Unlimited Support Plan** provides ***unlimited, priority*** telephone, fax, and E-mail support on all Simplicity software for one year for $199 for a single user, $279 for multiple users.

Basic Service

The **Basic Service Support Plan** provides non-priority telephone support for all Simplicity software on a ***$45.00 per incident*** basis. This plan is designed for the user who rarely needs support and can use Visa, MasterCard, or American Express for the billing.

8.03 Updates & Upgrades

It is Simplicity's policy to regularly maintain and update our software programs. Occasionally, *Contour It!* may undergo slight changes such as minor enhancements, bug fixes, etc. which we refer to as software ***revisions*** or ***updates***.

These changes may or may not result in a change of the internal version number of this program. For example, the first *revision* or ***update*** of *Contour It!* after its initial release will most likely be referred to as *Contour It! 1.01*. The next revision/update would most likely be *Contour It! 1.02*, etc. These updates are available for a nominal fee.

Much less frequently, this program may undergo *major* changes such as the addition of new routines, etc., which may or may not require the addition of a manual addendum. These changes will always result in the change of the version number. For example,

the first ***upgrade*** of *Contour It!* will most likely be referred to as *Contour It! 2.0*. These upgrades are available for a fee commensurate with the changes that have been made.

Whether you choose to update and/or upgrade this program is strictly optional. Depending on the changes that have been made during each release, you may choose to purchase every update, or you may choose to "skip" any update and purchase the next one when the changes may be more substantial. Either way, the choice is *yours*.

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