

DLG Reader Help

INSTRUCTION MANUAL

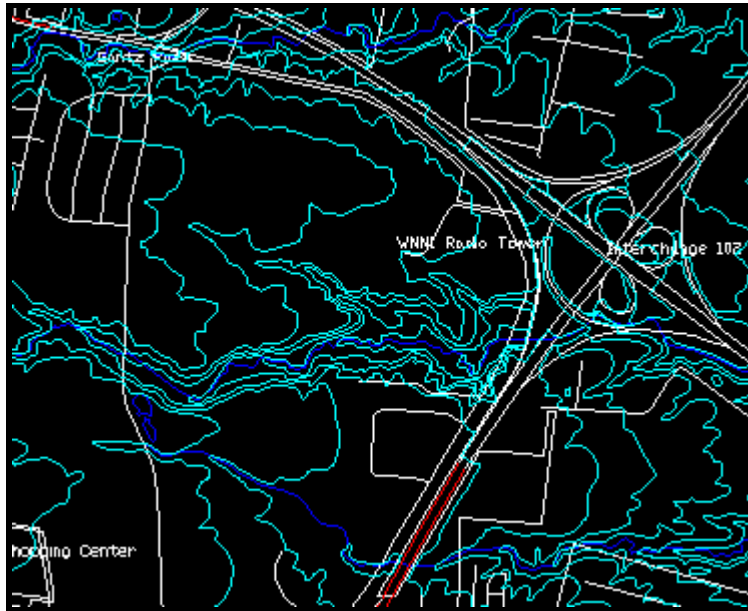


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Product Capabilities

1. Create custom basemaps from 1:100K scale DLGs (freely available over the internet), or purchase 1:24000 scale (7.5' quad sheet) DLGs from the USGS or MidTex Mapping Services.
2. Convert DLGs from their internal coordinate format into the popular coordinate systems: NAD27/NAD83, UTM/State Plane, feet/meters.
3. Easy to use interface makes it a snap to pull data into a new or existing drawing. Coordinate conversion is straight-forward.
4. Import DLGs as single files, or as selected files in a subdirectory. This makes it easy to pull in multiple layers as well as multiple quads.
5. On-line help system.
6. DLG reader will also import names from the Global Names Information System (GNIS) database(s), which are also available over the internet.
7. Contour lines are drawn at proper elevations.
8. Fully configurable layering scheme.
9. Single and double line linetypes.

Software and Hardware Requirements

1. AutoCAD R14 Installed
2. Windows 95 or NT
3. 16MB RAM (more is recommended)
4. 8MB hard-drive space (for program executable and support files)
5. At least 20MB free hard-drive space for DLG files (depending on how many DLGs you plan to pull in at one time) and GNIS files.

Installation procedure

Installation is accomplished by the InstallShield wizard located on the distribution floppy. Installation for the newest version of the DLG Reader for AutoCAD is easy and straight-forward.

To install the program, follow these instructions:

1. If you have more than one installation of AutoCAD, run the copy of AutoCAD that you want the MidTex DLG Reader to install itself into before running the DLG Reader installation program. This is critical, as it sets itself up to run using the "demand loading" mechanism defined by Autodesk with the copy of AutoCAD that was last used.
2. Click on the start button. Select Run from the Start Menu. Type in A:SETUP.
3. Answer the installation questions.
4. After the installation is over, launch AutoCAD. Once you see the Command: prompt, try running the MidTex DLG Reader by typing DLGIN at the Command: prompt. You should see a window pop up allowing you to select directories and files. If you see this, then the software installation is probably OK.
5. If you want to test the installation of the DLG Reader software, import the included demo files into AutoCAD. They will be in the same directory that the software was loaded into.
6. The DLG Reader relies on the AutoCAD "demand load" mechanism which automatically loads an external program when the user issues a command that AutoCAD doesn't recognize. You should not have to load the application by hand. The only situation that may present a problem is if you have more than one copy of AutoCAD loaded, in which case read item 1 above.

A Word About Downloading DLG and GNIS Files

If you are going to download your files from the internet, then you should first know a little about the way the USGS organizes DLG files.

First of all, it is helpful to note that the GNIS files must be downloaded along with the DLGs if you plan to pull in GNIS information. The DLG Reader “remembers” what quad locations have been pulled in, and uses that information to do a search on the GNIS database and pull in data that pertains only to the quad(s) that have been read by the DLG Reader.

1:100K DLGs (root directory):

`ftp://edcftp.cr.usgs.gov/pub/data/DLG/100K`

GNIS files (download only the state(s) you need):

`ftp://mapping.usgs.gov/pub/gnis` (Yes, use the `ftp://` on the addr.)

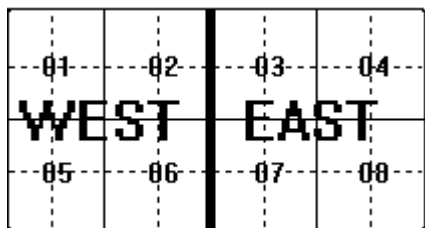
Downloading the proper GNIS files is pretty straight-forward. Simply locate the name of the state or states which you will be working in, and download the appropriate file(s). If you are working in Arkansas, download the file `arkansas.gz`. Once you get the file, you can put it anywhere you want on the hard-drive, but we recommend that you put it in the same directory that the DLG reader has been installed in. To prepare GNIS files for use, unzip using a program that understands GNU zipped files, like WinZip or the command line program `gzip`. Once they are unzipped, rename them, making sure that all GNIS files have the extension `.gni`.

Locating the proper 1:100K DLG files can be a little more tricky, especially if you are looking to find data that overlays a specific 7.5' (1:24000 scale) paper map that you have in hand. To do this, you will have to have the USGS “Index to topographic and other MAP COVERAGE” for each state that you plan to work in. If you do not have the proper indexes, you can obtain them free of charge from the USGS EROS Data Center by calling (605) 594-6151.

Once you have the index, locate the 7.5' quads that you wish to acquire data for. It will be necessary for you to determine where these quads lie in relation to a specific 1:100K map. Depending on what type of index that you have, you will either find the 1:100K maps index in the back (if you have a booklet) or somewhere on the sheet (if you have the fold-out index.) It may take some careful study to make sure of what 1:100K maps you will need to cover a specific area.

You should connect to the USGS FTP site and look around underneath the `/pub/data/DLG/100K/*` directory. You will notice a couple of things:

1. The 1:100K maps are organized in an alphabetical directory structure based on the first letter of each map.
2. The 1:100K quads are further broken up into east and west directories, effectively cutting each quad in half.
3. Each quad is further broken down into sub-quad sections. Each of these 1:100K sub-quad sections actually covers four 7.5' quads exactly. You will see that ultimately the entire 1:100K quad is broken down into files numbered from 01 to 08. The 01 quad will be the upper left-hand sub-quad, and the 08 quad will be the lower right-hand sub-quad. Figure 1 below shows how a single 1:100K quad will be broken into eight parts:



Single 1:100K quad in eight parts. Dashed lines are 7.5' quads

For the sake of example, let us say that you are looking for data in the Mineola, TX 1:100K quad. Let's also assume that you need data for the 02 sub-quad as well as the 03 sub-quad. To find all of the data available for the 02 sub-quad, you would go to the directory `/pub/data/DLG/100K/M/mineola-w_TX`. To find all of the data available for the 03 sub-quad, you would go to the directory `/pub/data/DLG/100K/M/mineola-e_TX`. Notice that the only difference between these two directories is in the final subdirectory. Mineola West is named `mineola-w_TX`, and Mineola East is named `mineola-e_TX`.

The data will be organized further into subdirectories based on available layers. There are five possible subdirectories for data:

Layer Name	Code	Desc
boundaries	BDF	Government land boundaries, large-scale land boundaries
hydrography	HYF	All data pertaining to water features
hypsography	HPF	Contours, also subsea (bathymetric)
public_lands	PLF	Public Land Survey System
transportation		Roads, railroads, power lines, pipelines, etc. To acquire all of the available transportation data, you will have to download three files per sub-quad from this directory
**		
	MTF	Pipelines
	RDF	Roads
	RRF	Railroads

It is important to note that not all of these layers will always be available. The only two that you can normally bank on are the hydrography and transportation layers. When you choose a layer directory, you will be presented (finally!) with the DLG files for this particular quad/layer. It is at this point that it will be necessary to know which sub-quad numbers to download to get the proper maps.

A look at directory `/pub/data/DLG/100K/M/mineola-w_TX` reveals the following layers:

```
hydrography
hypsography
transportation
```

If we choose the directory `/pub/data/DLG/100K/M/mineola-w_TX/transportation` we will see the following list of files:

```
TY1.MTF01.opt.gz  TY1.RDF01.opt.gz  TY1.RRF01.opt.gz
TY1.MTF02.opt.gz  TY1.RDF02.opt.gz  TY1.RRF02.opt.gz
TY1.MTF05.opt.gz  TY1.RDF05.opt.gz  TY1.RRF05.opt.gz
TY1.MTF06.opt.gz  TY1.RDF06.opt.gz  TY1.RRF06.opt.gz
```

Instead of trying to understand the entire naming convention, concentrate on what makes the names different. Notice the numbering. That corresponds to the Figure 1 above. Since we are looking at the directory of the West half, we expect to see 01, 02, 05, and 06, which is obviously the case. In addition to that, notice that within this directory are the files for pipelines (files with MTF in their title), roads (RDF) and railroads (RRF). You would then download whatever files are needed for your project, use gunzip (or gzip -d) to extract the DLG files from each download, then rename them each with a .DLG extension. WinZip will also unzip .gz files, but it will still be up to you to make sure that the files are renamed with a .DLG extension.

Command Overview

Commands that you can type from the command prompt are as follows:

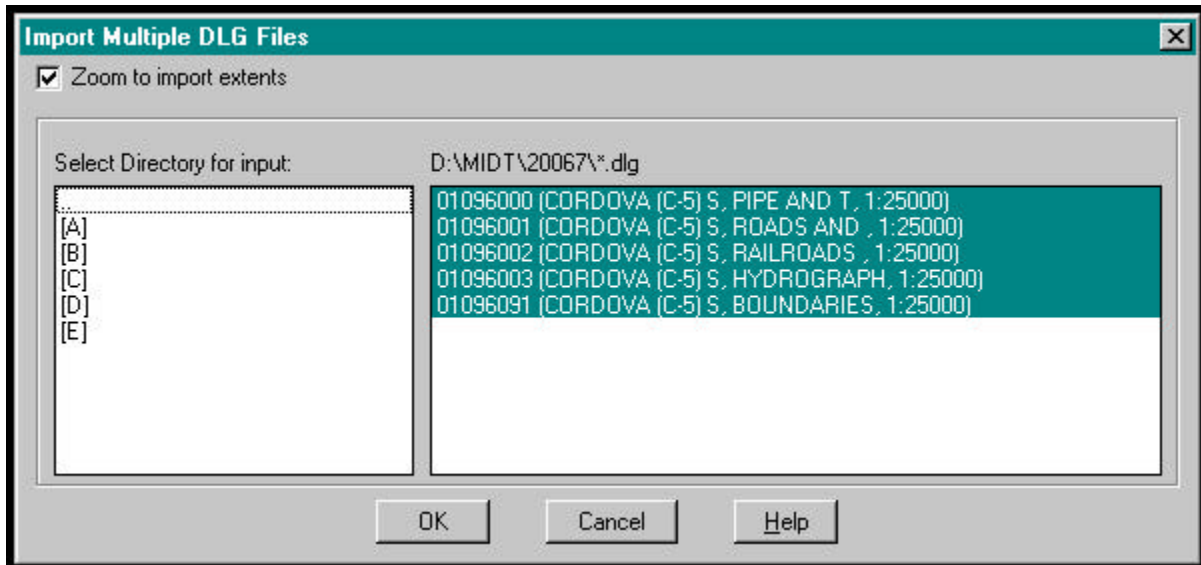
DLGIN

GNISIN

DLGHELP

Using DLGIN

When you first type the command DLGIN at the AutoCAD Command: prompt, you will see the following dialog box:



Import Multiple DLGs In Current Directory

This uses a custom dialog box that allows you to choose which DLGs that you want to load from a list of all DLGs in the current directory. Since you will normally be pulling in quite a few files to comprise one map, it makes sense to build the dialog box for multiple import in mind. (Even one quad can have up to ten layers that comprise the quad!)

Notice that the program automatically searches the entire directory for DLG files, and highlights each one. Thus, it assumes that you want to pull in all DLGs in the current directory. If there are some that you wish not to be included, simply un-highlight that file's entry (with CTRL + left mouse button), and it will not be imported. Also notice that the filename, mapname, layer indication, and scale of source data is all displayed. The different options will be discussed below:

Zoom to import extents

Under normal circumstances you will want to leave this check box checked. It instructs the reader to zoom the AutoCAD drawing to the extents of the selected maps. This allows you to watch the DLG Reader import the maps as they are written to the drawing database.

Select Directory for Input

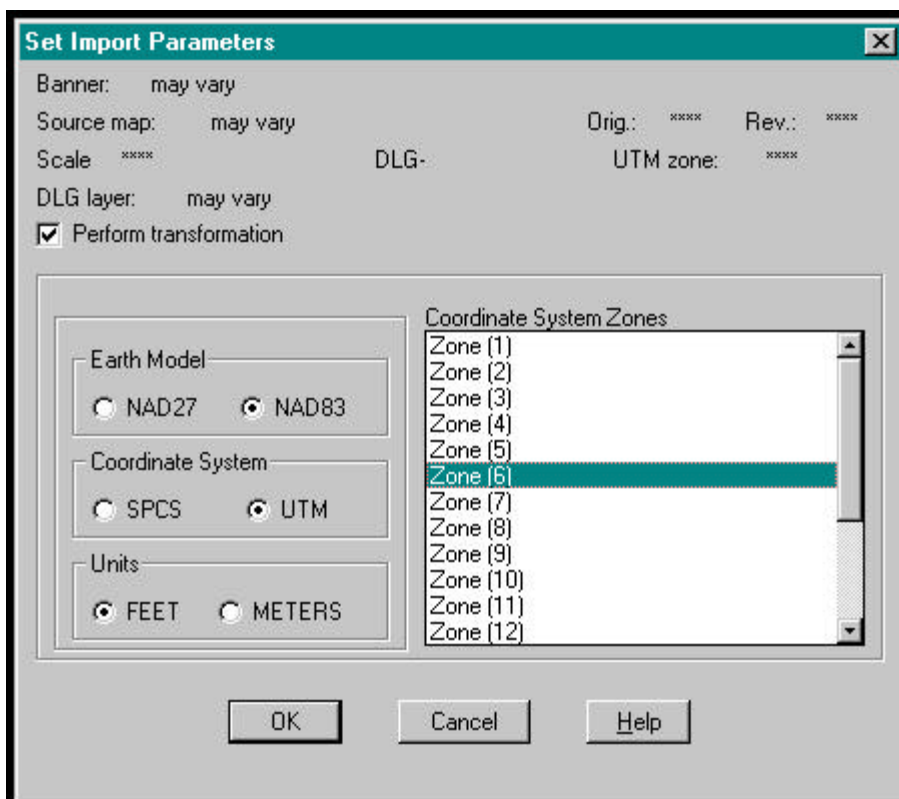
This is a typical directory list box that allows you to navigate any of the drives and directories that are currently available to the local system. This includes all "special" drives as well, like CD-ROMS, Jaz drives, network drives, etc.

File List Box

The list box to the right of the directory list box allows you to select/un-select specific files in the currently selected directory. An attempt has been made to display extra information for each file so that you can more intelligently decide which files you need and which ones you do not. Notice that the USGS map name, layer name, and scale are included in this information. To select or un-select a particular file, move the pointer to the filename, hold down the CTRL key and press the left mouse button.

Setting the Projection Parameters

You will be given the opportunity to set the input map projection parameters. The dialog will look like this:



As you can see, it allows you to set the Earth Model, Coordinate System, Units, and Zone. If you do not check the Perform Transformation check box, then the DLG will be pulled in with its default coordinate system, which is UTM, NAD27, meters. The zone will be displayed in the Set Import Parameters dialog box.

The Finished Product

Once you hit OK to the Set Import Parameters dialog box, the DLG reader will begin the import process. If you are importing multiple DLGs, then you should see the import in action. If you cannot see it, wait until the Command: prompt reappears, and type zoom (Enter), then e (Enter) to zoom to the extents of the drawing. You should see a map somewhere in the drawing.

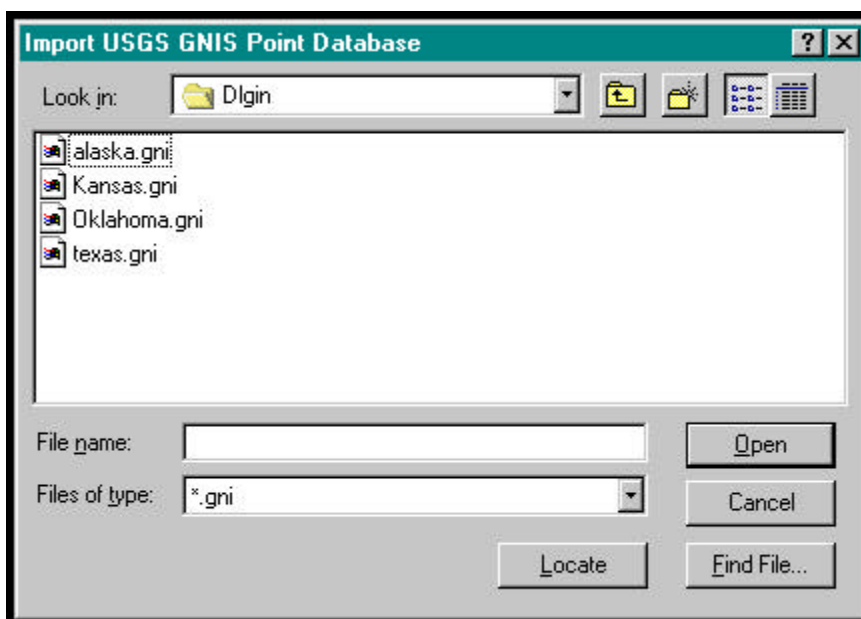
Using GNISIN

Successful use of the GNISIN command depends on having the GNIS file(s) for the state(s) that you are working in before starting the DLGIN procedure. In other words, when you download DLG files, make sure that you also download GNIS files as well. The DLGIN command “remembers” what quad locations have been imported. This is so that when the user runs GNISIN, it will know which tags to search for, and which tags to ignore. A couple of key reminders:

- Always download GNIS files along with DLG files.
- If you are going to pull in GNIS information, do it right after importing DLG files. Don’t even exit AutoCAD, or the program will “forget” what has been pulled in.

Currently GNISIN only works with the state format GNIS files. It will not work with the concise file, nor will it work with the populated_places file. Make sure that you have the file named for the state that you are working in (like texas.gz) Though it is not necessary to place these files in any specific sub-directory on your hard-drive, we suggest that you place them in the same directory that holds the DLG reader software. This can help you keep track of what states you have downloaded and which ones you may need to download for a specific project. Make sure that your GNIS files have the extension .GNI.

When you type the command GNISIN, you should see the following dialog box:



(Please note that you may have to specify the proper directory before you can load the GNIS files.) Once you hit OK on one of these files, the import/search will begin. Since these files can be very large, the search can take a while to perform. Please wait. After it is finished, you should notice tags distributed about the map.

Using DLGHELP

Issuing the command DLGHELP at the Command: prompt will pull up an index of topics that are covered in the DLG Reader help system. It would be good to peruse this, especially for the first time. You will also notice that the help system is “context-sensitive”, that is to say, if you get in trouble, there will be a HELP button which you can press that will bring up help specific to the subject at hand.

Altering the Layering Scheme

The layering scheme is fully configurable through the ATT_LYR.INI file, found in the program’s install directory. This file contains comments to make it easy to edit. It will be helpful to take a look at it while reading this text. You may even find that you can make small changes without needing to read this text.

Understanding the DLG’s Major-Minor Attribute System

All DLG files live up to their names: they are simple digital line graphs. No text annotation is found within them. They do, however, tell you what types of lines that you are dealing with, through the use of major and minor attribute codes. Each code is 4 numbers long, meaning they could theoretically range from 0000-9999. The first code is the major code, and serves to delineate the line into one of several major groups. The major group codes are as follows:

0020	Hypsography
0050	Hydrography
0070	Vegetative Surface Cover
0080	Nonvegetative Features
0090	Boundaries
0150	Survey Control and Markers
0170	Transportation: Roads, and Trails
0180	Transportation: Railroads
0190	Transportation: Pipelines, Transmission Lines, Miscellaneous Transportation Features.
0200	Manmade Features
0300	U.S. Public Land Survey System (PLSS)

The minor group codes are too numerous to mention. If you really want to fine tune the file to that extent, it will be necessary to obtain the Data Users Guide from the USGS, titled “Digital Line Graphs From 1:24000-Scale Maps”. (Look in Section VII. FTP Sites And Pertinent Phone Numbers.)

Editing the ATT_LYR.INI File

If you want to make specific layer changes, you will need to edit the ATT_LYR.INI file found in the program’s install directory. You should only edit this file in a strict ASCII text editor. Word processors will not normally be the best choice for this. Use something like the DOS Edit program. This file will be placed in the same directory as the DLG Reader program files.

The first couple of lines in the ATT_LYR.INI file should look something like this:
; This is file att_lyr.ini.

-1, -1, 7, 0, usgs_homeless_entities ; this is special layer. Return this
; layer name if an attribute is not found.

; HYPSOGRAPHY CODES
20, -1, 9, 0, hyp_contour ; -1 is special. If lookup on 20, xxx doesn't reveal
; a code, then hyp_contour will be default layer
; name
<file partially deleted here....>
20, 205, 9, 0, hyp_bathymetric ; bathymetric contour
<file partially deleted here....>
170, 201, 1, 1, trn_primary ; primary route, class 1, symbol undivided

As you can see from first glance, comments are possible (and encouraged!) in order to help you remember what different major-minor code combinations stand for. Let's take a line-by-line approach to discussing the part of the file that we see in the box above.

The first line that we see in the file is:
; This is file att_lyr.ini.

Note that the semi-colon (;) is used as a line comment character. Everything after the semi-colon is considered a comment, for that line only.

The second line is blank. Any number of blank lines can be used. The file is free-format.

The third and fourth lines look like this:

-1, -1, 7, 0, usgs_homeless_entities ; this is special layer. return this
; layer name if an attribute is not found.

All layer entries will consist of five pieces of information: major code, minor code, color code, single/double linetype, and layer name, and must be in that order. Looking back at the line above, we can see that -1 was used for the major code, -1 was used for the minor code, color 7 was used for the color code, 0 was used for single/double linetype, and the string "usgs_homeless_entities" was used for the layer name. This is a special use. This indicates that any information found in the DLG that cannot be placed in a specific layer will be placed in the layer usgs_homeless_entities. This can be helpful when you are modifying the layering scheme. If anything pops up in the usgs_homeless_entities layer, you know that there is something that you missed.

The next couple of lines look like this:

; HYPSOGRAPHY CODES
20, -1, 9, 0, hyp_contour ; -1 is special. If lookup on 20, xxx doesn't reveal
; a code, then hyp_contour will be default layer
; name

The 20, -1, 9, 0, hyp_contour is also another special use of the layering scheme. It indicates that any entity with the major code 20, that is not put into a specific layer, should be put in this layer. In our case, it will be placed in the layer "hyp_contour." This can be helpful when you don't want to get real specific with information.

The last lines in the example show the more conventional approach:

20, 205, 9, 0, hyp_bathymetric ; bathymetric contour
170, 201, 1, 1, trn_primary ; primary route, class 1, symbol undivided

These lines show how to be specific with a given major-minor attribute pair. Major code 20, minor code 205, will be put on the layer hyp_bathymetric, using a color of code 9 (gray) and a single line linetype. Major code 170, minor code 201 will be put on the layer "trn_primary", using a color of code 1 (red) and a double line linetype.

It is suggested that whatever changes you make, always follow the convention of using a three letter code + underscore character as the first part of the layer name. That will make dealing with layers in AutoCAD much easier to manage, especially when there are many layers to manipulate.

FTP Sites And Pertinent Phone Numbers

USGS FTP server, 1:100K files:

ftp://edcftp.cr.usgs.gov/pub/data/DLG/100K/*

USGS FTP server, GNIS files:

ftp://mapping.usgs.gov/pub/gnis/*

Ohio 1:24000 files:

ftp://ftp.geodata.state.oh.us/DLG/24000/Data/*

(Files are organized into subdirectories named after 1:100K topo maps, but the files within those directories are genuine 1:24000 scale maps.)

USGS Eros Data Center: (for ordering DLG data and obtaining indexes to topographic map coverage)

(605) 594-6151, press 0 to avoid annoying recording and expedite talking to a human.

#GNIS stands for Global Names Information System. GNIS files are GIS files with proper names and their latitude-longitude coordinates. The DLG Reader queries these files to pull in proper names for the quads that have been imported during the current session of AutoCAD.

Distorted Transformation

An indication that the transformation that you are attempting is out of range.

Flat grid coordinate systems like UTM and State Plane systems will only work effectively over very specific sections of the earth. If you try to transform DLG data that is in Louisiana using an Arkansas State Plane zone, the results will be overly distorted. The transformation can be performed, but the results most likely will be useless.

If you get this message, it may indicate one of a couple of things:

1. The DLG file that you are trying to import is not where you think it is.
2. You have inadvertently chosen the wrong zone to transform to. Cancel this dialog box and try again.

In some rare cases, you may get this message even though there is no real problem. If you try a couple of things and nothing seems to work, go ahead and ignore the warning messages (nothing bad should happen) and import the data anyway. You will not know if everything is OK, unless you have pre-existing data to compare to.
