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CD-Rom digital archive files of 1993 survey data for
Nome, Circle, Nyac, & Valdez Creek mining districts

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\$150.00

ARCHIVE DATA EXTRACTION

A Program to Extract
Data from Digital
Binary Archives

DIGHEM
I*POWER

Quality and Service in Airborne Geophysics

Geological Insight Through Imaging

INTRODUCTION

Summary

The Archive Data Extraction program (*ARCEX*) is supplied to users of Dighem/I*POWER CD-ROM-based digital profile archives to provide an easy and versatile tool for the extraction of the user's survey data.

ARCEX and the accompanying digital archive(s) were developed in response to the modern needs of explorationists: to be able to handle large data sets efficiently on a PC. When compared to a (non-seismic) ground geophysical program, an airborne survey will generate a much larger volume of data, kilometre-for-kilometre. This poses a problem for the modern explorationist who wishes to manipulate the data further using an in-house PC-based geophysical processing system. Operations, which appeared speedy when processing a ground data set, rapidly slow to crawl when confronted with the volume of data generated by even a small airborne survey.

The main culprit in these systems is the use of *non-indexed, ASCII* files to store the data. *Non-indexed* means that if you wish to process a given group of lines, the program must start searching for these lines, which may be at the end of the database, record-by-record from the beginning until it encounters them. An indexed database will avoid this unproductive time of scanning the database by going straight to the lines you requested. *ASCII* data means that each field must be converted by the program from the representation understood by humans to an internal (binary) representation that can be manipulated directly by the computer. This process is extremely time-consuming.

The Archive DataBase (ADB) format used by *ARCEX* is indexed and binary. While it cannot be used directly by your processing software, it can be used in conjunction with *ARCEX* to extract the required channels of data from the lines and/or areas selected by you for processing, thus avoiding unnecessary scanning and conversions and, ultimately, allowing faster processing.

What You Should Know

ARCEX makes use of the WIMP (Windows Icon Mouse Pointer) interface popularized by Microsoft Windows. To operate *ARCEX*, therefore, a knowledge of this style of interface would be useful. Detailed descriptions of operations will be included, however, should you be unfamiliar with this type of environment.

About This Manual

This manual is organized into the following major sections:

Introduction	Introduces you to <i>ARCEX</i> and its goals.
Installation	Tells you how to install <i>ARCEX</i> and includes system requirements.
Starting and Exiting	Shows you how to begin a session in <i>ARCEX</i> , and how to end a session.
Using <i>ARCEX</i>	Leads you through the process of opening an Archive Database, selecting lines and channels for extraction, and windowing data sets.

Conventions Used In This Manual

Several typographical and notational conventions are followed in this manual to denote commands, user input, etc. These are summarized below:

Text entry, including commands entered at system (*e.g.*, DOS) prompts, and text entered in dialog boxes:

DISKCOPY A: A:

ARCEX controls, including menus, buttons:

Open Database...

File paths and/or names mentioned in text:

d:\archive\exec\arcex.exe

INSTALLATION

This section tells you how to install *ARCEX*.

Programs And Files Supplied

All programs and support files are located in directory *exec*. The documentation, including this document (*arcex.wri*), which is in Microsoft Write format, and an plain text version (*arcex.doc*), is located in *exec\doc*.

Three versions of the *ARCEX* program are supplied:

arcex.exe DOS text and graphics modes.
warcex.exe Windows 3.x.
oarcex.exe OS/2.

They are referred to generically as *ARCEX*, as the operation of each of the programs is virtually identical across all of the supported operating systems.

In addition to these files, the following files are also present:

arc_res.znc Resource file used by the executables.
arcex.ico Icon for use in the Windows and OS/2
arcexpm.ico environments.

System Requirements

The absolute minimum requirements for use of *ARCEX* is an 80286-based (PC compatible) computer running DOS 3.3 or later, 550K available RAM, and a mouse or other pointing device. This will allow you to run *arcex.exe* in text mode.

To run *arcex.exe* in DOS graphics mode, a VGA (SuperVGA is preferred) graphics card and display is required in addition to the above.

If you wish to work in the Microsoft Windows environment, you should have:

- 80286-based or better PC-compatible computer.
- MS Windows 3.x running in Standard or 386 Enhanced mode.
- 4MB RAM.
- (Super)VGA graphics card and display.
- DOS 3.3 or later.
- Mouse or other pointing device.

If you wish to work under IBM OS/2 2.x, you should have:

- 80386-based or better PC-compatible computer.
- IBM OS/2 2.x.
- 8MB RAM.
- (Super)VGA graphics card and display.
- Mouse or other pointing device.

In addition to the requirements listed above, a math co-processor is strongly recommended. Also, as Dighem/I*POWER is routinely delivering data on CD-ROM, a CD-ROM reader is recommended.

Backing Up your *ARCEX* Disk

Carefully read the *ARCEX* license agreement appended to this manual. Use of this program means that you have accepted the terms of that agreement.

If *ARCEX* has been supplied to you on floppy disk, it is strongly recommended that you make a copy for archival purposes as a precaution against subsequent damage to the distribution media. This is less of a concern if *ARCEX* was supplied on CD-ROM in conjunction with your data, as CD-ROMs are less prone to deterioration.

Installing *ARCEX*

Installation of *ARCEX* is not a requirement but an option. In most cases, *ARCEX* will be run directly from the CD-ROM it shares with your survey data.

The most obvious case where installation is required, is when you have received an upgrade on floppy disk that supercedes the version originally supplied with your data. To install in a DOS system, follow the steps below (if this is a first time installation, begin at 1, otherwise start at 2):

- 1) Create a new directory on your hard drive, *e.g.*,
MD ARCEX
- 2) Copy the contents of the distribution disk, *e.g.*, if disk is located in drive A:
COPY A:\EXEC*.* ARCEX
COPY A:\EXEC\DOC*.* ARCEX
- 3) Edit your *autoexec.bat* file and add *c:\arcex* to your PATH statement.

If you wish to add *warcex.exe* to the Windows Program Manager, so that you can activate it from an icon, carry on with the following steps:

- 4) Open up the group window in which you wish to place the *ARCEX* icon (see the Windows documentation if you wish to create a new group).
- 5) Select File/New from the Program Manager, a dialog box titled *New Program Object* will appear.
- 6) Select the Program Item radiobutton, followed by OK. Another dialog box titled *Program Item Properties* will appear.
- 7) In the Description edit box, enter:
Archive Data Extraction
- 8) In the Command Line edit box, enter:
C:\ARCEX\WARCEX.EXE
- 9) Press the Change Icon... button. An information dialog box will appear. Select OK to clear. Another dialog box titled *Change Icon* will appear.
- 10) Press the Browse... button. A file dialog titled *Browse* will appear. Use this to locate and select the *arcex.ico* file located in *c:\arcex*.

11) The icon should then appear in the lower left corner of the *Program Item Properties* dialog box.

12) Press **OK** to accept the settings. The dialog will disappear and the new *ARCEX* program item will appear in the group window. "Double-clicking" this icon will cause the *warcex.exe* program to run.

To install *oarcex.exe* under OS/2 Version 2.x, you must be operating in OS/2, initially from an OS/2, not DOS, command line.

1) Create a new directory on your hard drive, *e.g.*,
MD ARCEX

2) Copy the contents of the distribution disk, *e.g.*, if disk is located in drive A:

```
COPY A:\EXEC\*.* ARCEX
COPY A:\EXEC\DOC\*.* ARCEX
```

3) Edit your *config.sys* file and add *c:\arceX* to your PATH statement.

If you wish to run *oarcex.exe* from Presentation Manager, carry on with the following steps (you must be in the Presentation Manager environment):

4) Open the folder you wish to place *ARCEX* into.

5) Open the **Template** folder.

6) Using the right mouse button, drag a copy of the **Program** template to the destination folder. The **Program - Settings** dialog will appear at the end of the drag operation.

7) Enter the path and filename in the **Path and file name** edit box, *e.g.*,

```
D:\ARCEX\OARCEX.EXE
```

8) "Click" on the **General** tab.

9) In the **Title** text box, enter:

```
Archive Data Extraction
```

10) To set the icon, "click" on the Find... button. A dialog titled **Find** will appear.

11) In the Folder edit box, enter the pathname to the directory containing the programs, *etc.*, for example:

D:\ARCEX

12) "Click" on the **Search just this folder** radiobutton, followed by the Find button. This will bring up a dialog showing all the available icons contained in that directory.

13) "Click" on the icon labelled **ARCEXPM.ICO**, then select OK. An updated image of the icon should appear in the dialog.

14) Close the **Program - Settings** dialog box. The program should be correctly installed in the Presentation Manager.

STARTING & EXITING

This chapter tells you how to begin and end a session in *ARCEX*. If you have not backed up your *ARCEX* disk or installed *ARCEX* on your system, please read the preceding sections to determine if you need to do so.

Starting ARCEX

The techniques for starting *ARCEX* depend upon the environment you are working in. The following sections summarize starting procedures for the DOS, Windows and OS/2 environments:

DOS

To run the DOS version of *ARCEX*:

1) Change the current directory to the directory containing the file *arcex.exe*. This is achieved by entering:

D: (D is the drive containing that file)
CD <dir> (<dir> is the directory containing that file)

Note: D and <dir> should be replaced with the appropriate drive and directory names.

2) As the DOS version of *ARCEX* can be run in either text mode or graphics mode, there are two alternatives to start the program:

ARCEX (graphics mode)
ARCEX /TEXT (text mode)

Windows

To run the Windows version of *ARCEX* from the DOS prompt:

1) Change the current directory to the directory containing the file *warcex.exe*. This is achieved by entering:

D: (D is the drive containing that file)
CD <dir> (<dir> is the directory containing that file)

Note: D and <dir> should be replaced with the appropriate drive and directory names.

2) Now you are in the directory containing *warcex.exe*. Type:

WIN WARCEX

This will start an *ARCEX* session under Windows.

ARCEX may be run from the Windows Program Manager in two ways:

1) Select File/Run... from the Program Manager. A dialog titled *Run* will appear. Enter:

D:<filepath>WARCEX.EXE

in the Command Line edit box, then select OK. *ARCEX* will then start up.

2) If the steps outlined in the extended Windows installation were completed, then *ARCEX* may be started by opening the group window containing the *ARCEX* icon, and then "double clicking" the *ARCEX* icon.

OS/2

The OS/2 version of *ARCEX* may be started in two ways: from the command line, or by activating it from the Presentation Manager.

To start *ARCEX* from the command line:

1) Obtain an OS/2 command line window from the Presentation Manager.

2) Change the current directory to the directory containing the file *oarcex.exe*. This is achieved by entering:

D: (D is the drive containing that file)

CD <dir> (<dir> is the directory containing that file)

Note: D and <dir> should be replaced with the appropriate drive and directory names.

3) Now you are in the directory containing *oarcex.exe*. Type:

OARCEX

This will start an *ARCEX* session under OS/2.

To start ARCEX from Presentation Manager:

- 1) If the steps outlined in the extended OS/2 installation were completed, then open the folder containing the *ARCEX* icon.
- 2) "Double click" the *ARCEX* icon. This will start an *ARCEX* session under OS/2.

Exiting from *ARCEX*

To exit from *ARCEX*, you may either:

- 1) "Double-click" the System menu box in the upper-left corner of the main window, or
- 2) "Click" the System menu box in the upper-left corner of the main window and choose Close from its menu, or
- 3) Select Exit from the *ARCEX* menu bar.

USING ARCEX

Once you have started *ARCEX* in one of the ways described in the earlier section "Starting & Exiting", you are presented with the main *ARCEX* window (see figure 1).

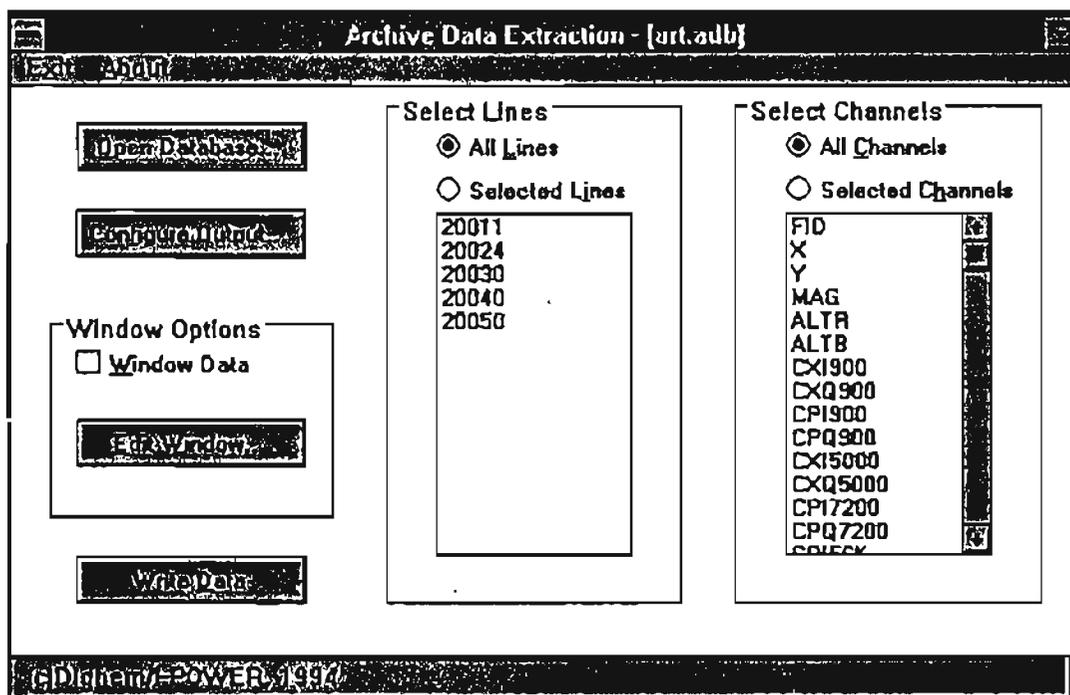


Figure 1. ARCEX Main Window.

The main window contains many elements that will be familiar to users that have had even a brief acquaintance with a GUI (Graphical User Interface) front-end.

Title Bar. This is located at the top of the window. Upon startup and whenever there is no archive database currently open, it will appear with the text *Archive Data Extraction* centred in it. Once an archive database is opened, the title will be modified such that the name of the current file is appended, in brackets and separated by a hyphen, to the original text (see figure 1).

Menu Bar. Located below the title bar, the menu bar provides two rudimentary operations: Exit and About. "Clicking" once on the Exit menu item will cause you to exit unconditionally from the program. Likewise, "clicking" once on the About button will bring up a dialog

box containing version and company information. Selecting OK on this dialog will remove it from the screen.

Client Area. This forms the body of the window and the focus of the archive data extraction operation. As can be seen in figure 1, it is composed of a number of buttons and listboxes. The buttons are used to activate various options, while the listboxes display information concerning the archive data and allow you to select from them.

Status Line. This is located at the bottom of the window. Its prime function is to display the progress of the archive extraction once the process has begun. It is there largely to reassure users that the program is still 'alive' during lengthy extractions.

System Menu. The system menu is accessed by "clicking" on the button in the top-left corner of the window. Accessing this menu allows you to Restore (if in a minimized state), Minimize (if in an open state), Move and Close the window.

Minimize Button. This is located in the upper right corner of the window. If selected, it will cause the window to shrink to an iconic state.

Overview

The general process of archive data extraction can be divided into three steps:

- 1) Opening the database.
- 2) Selecting the data to be extracted.
- 3) Writing the selected data to a file.

Steps 2) and 3) may, of course, be repeated more than once for any one database, allowing the user to select and extract many smaller areas for further treatment. These three steps and the operations available to achieve them will be discussed in greater detail in the following sections.

Opening an Archive Database

To access an archive database, you must locate and open the file containing the data. To do so:

1) "Click" on the Open Database... button. This will bring up the file dialog shown in figure 2. Available files are listed in the Filename listbox. The current directory and the directory tree relative to it is displayed in the Directories area.

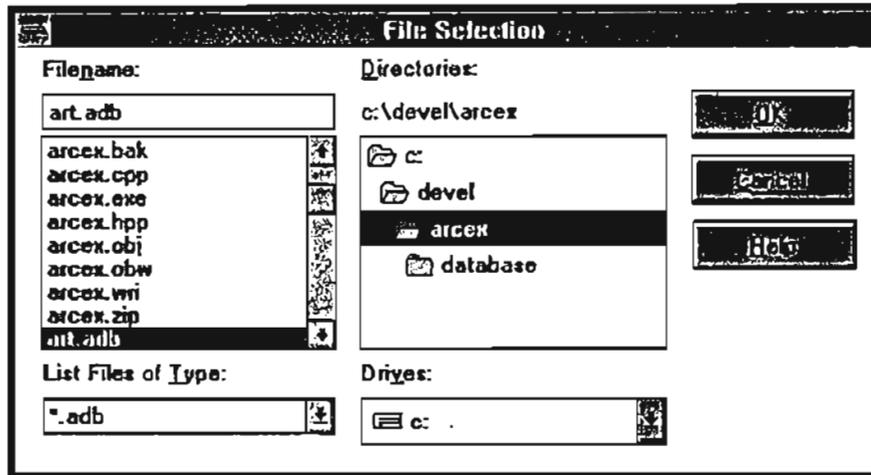


Figure 2. File selection dialog.

2) If the file you want is not on the current disk drive, "click" the down arrow of the combobox labelled Drives. A drop-down list will appear containing the names of all drives recognized by the system (network drives are not supported). "Clicking" on the desired drive will update the contents of the Filename and Directories boxes to reflect the newly selected drive.

3) If the file you want is not in the current directory, you may change to another directory by typing a valid path in the Filename field, or by navigating your way there using the Directories box. For example, if the desired file is in `c:\job1133\data`, "double click" on the top level icon labelled `c:`. This will cause the contents of the Directories box to display all subdirectories of `c:`. Scroll through the list until the directory icon labelled `job1133` is encountered. "Double-click" that to display all the subdirectories of `job1133`. Again scroll through that list until the directory icon labelled `data` is encountered. "Double-clicking" that will display the list of files in the `data` directory in the Filename box, from which you may make your selection.

4) "Double-click" the file you want, or select it and "click" the dialog's OK button.

Once a valid filepath has been selected, *ARCEX* will read the file to extract the line and channel directories and update the title bar with

the name of the file. The line and channel directory information is displayed in the listboxes contained in the areas labelled **Select Lines** and **Select Channels**.

The loading process is extremely quick, and once completed, you will be able to select data for extraction. This aspect will be covered in the next section.

Selecting Data for Extraction

ARCEX offers several methods for data extraction. As the data is logically divided into lines (*e.g.*, 10010, 10020, *etc.*...) and channels (*e.g.*, FID, X, Y, MAG, *etc.*...), the first most obvious place to begin data selection is with these criteria.

Extracting Data by Line

This process is controlled by the **Select Lines** area of the main window (see figure 1). By default, **All Lines** is selected. Should you wish to extract specific lines, first select the radiobutton, **Selected Lines**. Next, scroll through the listbox "clicking" on the line numbers you wish to extract. The process of "clicking" on a line number will cause that number to become highlighted, indicating its selected state. To de-select a line, "click" on it once more. Choosing **Write Data** at this point will cause only those selected lines to be extracted.

Note: if you subsequently select **All Lines**, the selected lines in the listbox will remain highlighted, but *all* lines will be extracted, not just the highlighted ones.

Extracting Data by Channel

This process is controlled by the **Select Channels** area of the main window (see figure 1). By default, **All Channels** is selected. Should you wish to extract specific channels, first select the radiobutton, **Selected Channels**. Next, scroll through the listbox "clicking" on the channels you wish to extract. The process of "clicking" on a channel label will cause that channel to become highlighted, indicating its selected state. To de-select a channel,

"click" on it once more. Choosing **Write Data** at this point will cause only those selected channels to be extracted.

Note: if you subsequently select **All Channels**, the selected channels in the listbox will remain highlighted, but *all* channels will be extracted, not just the highlighted ones.

These two filter operations may be run together, so that you may extract by both line and channel at the same time. A further filtering process, selection by area ("windowing") may be run in conjunction with the above two options, and is discussed in the following section.

Windowing the Data

The process of windowing data is essentially defining a set of geographic limits to the data set and extracting all data that falls within those limits. This operation is controlled by the **Window Options** area on the main window.

The **Window Options** area contains two controls: a checkbox labelled **Window Data** and a button labelled **Edit Window....** If the **Window Data** checkbox is selected ("checked"), then the data windowing options set by the user (described next) are enabled.

"Clicking" on the **Edit Window** button brings up the dialog box shown in figure 3. This dialog has two main areas: **Coordinate Type** and **Vertices**. The **Coordinate Type** defines the system that the vertices are entered in: selecting **UTM** (the default) implies that the vertices will be in UTM units.

Note: at present it is entirely possible for you to enter the coordinates as UTMs and subsequently change the type to Lat/Longs. This will render the vertices meaningless.

The vertex information is entered and controlled via the **Vertices** area. There are three basic operations offered here: **Adding** new vertices, **Editing** existing vertices and **Deleting** selected vertices.

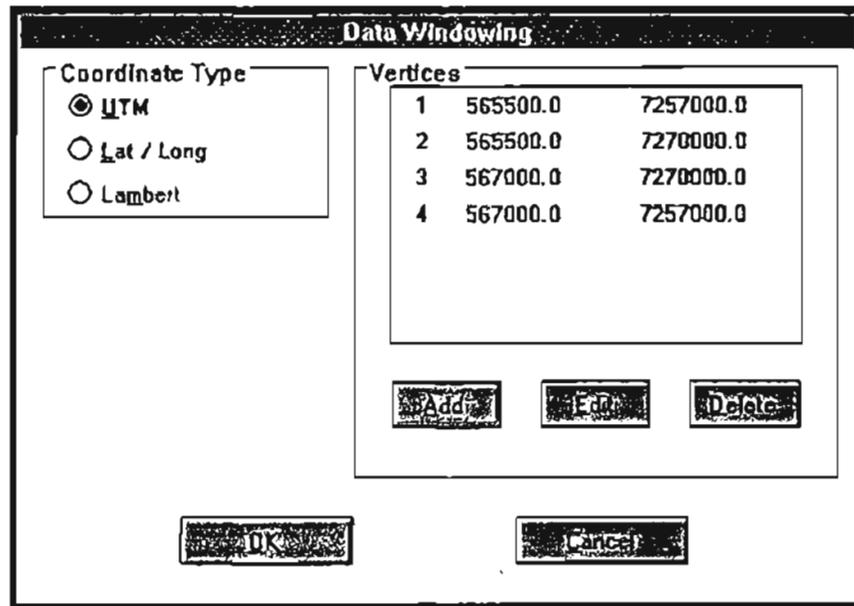


Figure 3. Data Windowing dialog box.

Adding Vertices

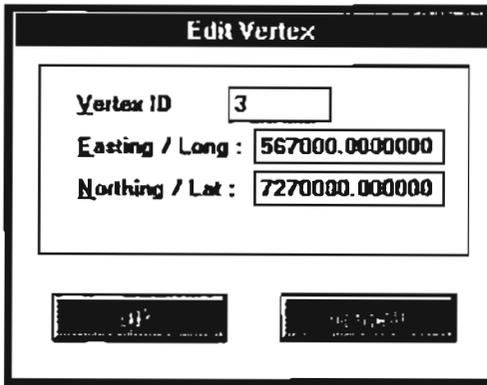
"Clicking" the **A**dd button will bring up the **Add Vertex** dialog (see figure 4, **Edit Vertex** dialog box, which is identical). This dialog has three main controls labelled **V**ertex ID, **E**asting / Long and **N**orthing / Lat.

Vertex ID contains the sequence number of the vertex being added. Its value is assigned by the program and is non-editable. The fields **E**asting / Long and **N**orthing / Lat are for input of the vertex coordinates by the user in the coordinate system selected in **C**oordinate Type above. Once you have entered the desired value for the vertex, "click" the **O**K button to accept the vertex.

Polygons are currently limited to 50 vertices.

Editing Vertices

"Clicking" the **E**dit button will bring up the **Edit Vertex** dialog (see figure 4, **Edit Vertex** dialog box). This dialog has three main controls labelled **V**ertex ID, **E**asting / Long and **N**orthing / Lat.



The image shows a dialog box titled "Edit Vertex". It contains three input fields: "Vertex ID" with the value "3", "Easting / Long" with the value "567000.000000", and "Northing / Lat" with the value "7270000.000000". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

Figure 4. Edit Vertex dialog.

Vertex ID contains the sequence number of the vertex being added. Its value is assigned by the program and is non-editable. The fields Easting / Long and Northing / Lat contain the vertex coordinates, in the coordinate system defined in **Coordinate Type**, for editing by the user. Once you have altered the vertex coordinates, "click" the QK button to accept the new location.

Deleting Vertices

To delete a vertex from the list, use the mouse to highlight the redundant vertex (*i.e.*, scroll to and "click" on the vertex to be deleted), then "click" the Delete button. The highlighted vertex will be removed and the list automatically resequenced.

Note: the vertices should describe a non-complex polygon. That is, you must enter them in the order you would encounter them while walking around the perimeter of the area being windowed. Non-adjacent sides may not intersect. The direction of entry is immaterial, vertices may be entered in either clockwise or anti-clockwise directions. Subsequent additions, edits and/or deletions must preserve this order.

Note: windowing of the data takes place only on those lines you have selected using the Select Lines options described above.

Configuring the Output

ARCEX offers formatting control of the output generated by the extraction process. To access these options, "click" on the button labelled **Configure Output...** located in the main window (see figure 1). This will cause a dialog labelled **Configure Output** to appear (see figure 5).

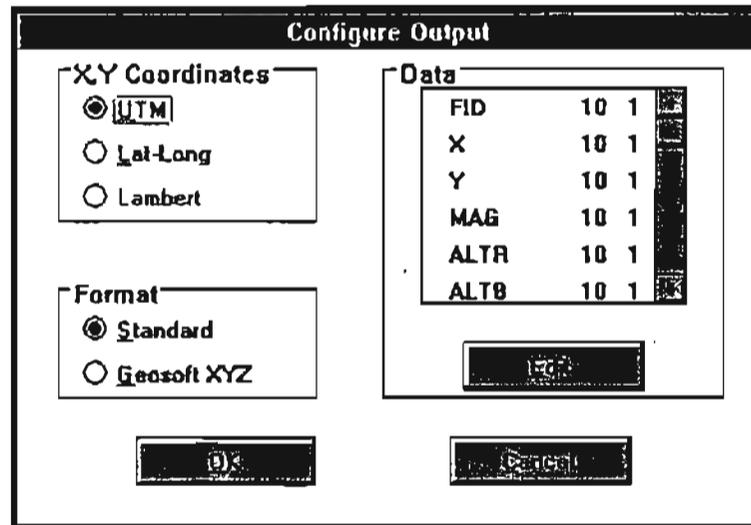


Figure 5. Configure Output dialog.

As can be seen, there are three main components to configuring the output the extracted data: **X,Y Coordinates**, **Format** and **Data**. These options will be discussed in the following sections.

Setting X,Y Coordinates

If you require the extracted data in a coordinate system other than the default UTM system, select one of the options offered in **X,Y Coordinates** group. No additional information is required from the user (*e.g.*, zone number or hemisphere in the case of a conversion to latitude and longitude), as this data is contained in the archive database.

Note: if you have selected **Lat-Long** as the X,Y output coordinate system, the format of these fields should be changed to a field width of 12 and 6 decimal places. See "Formatting Data Fields" below.

Setting the Output Format

There are many ASCII output formats currently in use in the industry. *ARCEX* supports two (see the **Format** area): "Standard" and Geosoft XYZ.

The "standard" format, which is enabled by selecting the **Standard** radiobutton, outputs one data record per text line (lines are delimited by Carriage Return / Line Feed character pairs). A data record is composed of the survey line number, the flight number in which that line was flown, followed by the channels selected in the **Select Channels** described above. No header information is placed in the file.

Selecting the **Geosoft XYZ** radiobutton, will cause the data to be output in the Geosoft XYZ format. That is, each survey line added to the extracted data set has a header containing the line number. Subsequent lines contain the channels selected in the **Select Channels** described above.

Formatting Data Fields

The format of individual data fields is set, by default, to a total field width of 10 characters, which would include a decimal point and negative sign if required, and 1 decimal place. This should be sufficient for most channels, but if, for example, the output **X,Y Coordinates** (described above) were set to **Lat-Long**, the default format would be clearly inadequate.

The formats currently in effect for all channels are displayed in the listbox in the **Data** group. The listbox displays the channel (field) name in the first column, the field width in the second column and the number of decimal places in the third column.

To change the format of individual data fields, scroll to and "click" on the field you wish to change. Next "click" the **Edit** button. This will cause the **Edit Channel Output** dialog to appear.

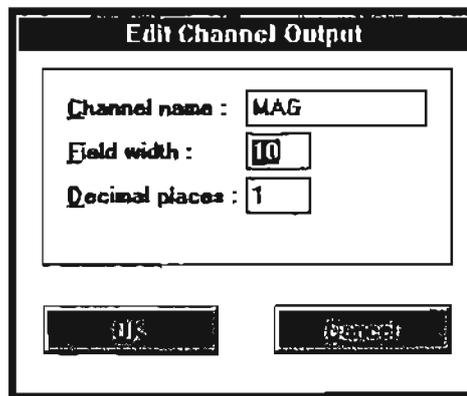


Figure 5. Edit Channel Output dialog.

The desired values for both the width of the data field and the number of decimal places may then be entered in the appropriate edit boxes. To accept and use those values, select **OK**; otherwise "click" on **Cancel** to retain the original values.

Once the form of the output is to your satisfaction, select **OK** to accept and use those settings; otherwise "click" on **Cancel** to retain the original values.

Writing Out the Data

The final stage of the process is, of course, to begin the extraction process and write the data to a disk file. To do this, "click" on the **Write Data** button on the main window (see figure 1). This will bring up a file requestor identical to that used when selecting and opening an archive database (see figure 2).

Using a similar process, locate the directory where you wish to place the extracted data. The name of the output file will have to be entered in the **Filename** edit box, unless you plan to overwrite an existing file in the same directory, in which case you may select that name from the file listbox.

Note: for users of CD-ROMs, it is important to make certain that you do not attempt to open the output file on the CD-ROM itself. This will not harm the CD-ROM if you do, but will almost certainly cause the process to fail as these devices are definitely "read-only" disks.

Once the path and filename have been satisfactorily set, select OK. This will clear the file requestor from the screen and begin the extraction process. While the extraction is in progress, the mouse cursor will be in the form of an hourglass, and the status bar at the bottom of the main window will be updated with the name of each line as it is operated upon. At the end of the extraction, the mouse pointer will revert to its usual arrow form, and the status bar will indicate that the process is complete.