

Survey Database Manager

User's Guide

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Introduction

The Survey Database Manager (SDBM) provides a single accessible location where you can store, on your computer, all your GPS (Global Positioning System) observations. It also provides a place to save known, existing control stations and information about each control.

Although it was initially designed as a stand-alone software package, it is fully compatible with the other modules in the WinPrism software product family and gives you the ability to work back and forth seamlessly between the various program modules. For example, you can process baseline vectors, manipulate data and carry them from the processing software into the database, out of the database into the adjustment packages.

SDBM provides a total, integrated environment in which you can complete your project. It is the manager of the database, the center of the whole body of surveying information, safe-guarding the integrity of all data that is incorporated into it.

Project Management and This Manual

This manual is for the GPS project surveyor who is an important member of each GPS project. It provides instructions for running the Survey Database Manager software to work with a project that uses GP+GLONASS satellite measurements.

Basically, your job consists of determining the best strategy to integrate measurements with existing controls. SDBM provides all the tools necessary to enter the sites of interest, create a database of multiple sites, display sites to an ever increasing detailed level, and produce astute reports.

If you need to do a survey in a certain location, you can execute SDBM, query your database and find if there is existing control in that area. This lets you do a survey to requested specifications, for example, to horizontal control specifications.

SDBM is the only program which lets you enter distances measured with EDMs, angles measured with a theodolite, a vast array of survey data. With SDBM, you can import data from NGS, WinPrism, Fillnet, GEOLAB, and COLUMBUS. SDBM also gives you the ability to export your information in a wide array of formats and to do conversions. You can edit information associated with a station; for example, if you find a point has been upgraded or disturbed, it's an easy matter to change its quality order. In addition, you can get a full report on the information for a given station, sending the information to the printer or a file.

Using the SDBM Program

The SDBM software may be purchased as an option in the WinPrism package. The WinPrism package has the design goal of providing an easy-to-use and consistent method of executing the various associated modules. Each module is fully compatible with the others and is designed so that only rudimentary computer knowledge is required. If you know little more than how to turn on your PC, you will find that you can readily become proficient with this software.

We've employed the following conventions in the software to make it easier for you to get up to speed quickly and work back and forth easily between programs due to the consistency shared by the individual functions: making selections with the pointer, entering text, scrolling through panels, using the special buttons, searching along a panel, tagging points and vectors, interrupting a function, and exiting from one module to the next higher level of the software.

Making a Selection

Whenever the pointer tracks over an option box that can be invoked or an entry that can be selected, the area will be highlighted. To make a selection, drag the mouse so that the pointer tracks to the desired area and click the left mouse button. Many items reflect a check mark next to them once they have been selected.

To select a series of items, hold the mouse button down and drag the pointer so it tracks over several items. Once they are selected, should you change your mind, use the same gesture (hold the button and drag the pointer) to de-select them.

You can also select a series of items presented in a panel. To do this, hold the mouse's left button down and move the pointer to the double down-arrow or double up-arrow to select a "page" at a time. (When you click on these panel arrows and do not hold the button down, you simply scroll through the items; see "Scrolling Through Panels" on page 3.)

Entering Text

There are several entry fields into which you can type information. To make a field active, move the pointer to it and click the left mouse button. (You can also move the pointer by using the arrow keys.) Typically, an entry field is a blue rectangle into which you can enter information. If there is no rectangle, you cannot affect the information in that field from the current screen.

A L-shaped cursor will appear. It signals data-entry mode. As you type each character from the keyboard, you are entering it into the left most character position. Any character to its right is shifted right one position.

When you have as much as you want in the field, press <ENTER> or click the mouse's left button on another field. The cursor will go to that field. In addition, when a field becomes full, the cursor automatically jumps to the next field.

The arrow keys can be used to move the cursor from field to field. You can also move the pointer to a field and click a mouse button to "jump" the cursor to that field.

The <TAB> key moves the cursor to a field on the same line. <BACKSPACE>, <HOME>, <END>, , and <INS> retain their usual DOS functionality.

Scrolling Through Panels

When a panel of records (points or vectors), files, or projects is displayed (Figure 1.1), next to it is a vertical bar with arrows in it. You can click on the ↑ to go through the list line-by-line. Click on the double down-arrow (⇓) to go through the list a "page" at a time. (The ↓ and double up-arrow (⇑) display the list in the opposite direction.)

A beep indicates that you have reached the end of a list. You cannot page-down or scroll further.



Figure 1.1: List of Points with Scroll Arrows

Special Buttons

The small button at the top right corner of panels (such as the POINTS/VECTORS panel), switches the display between full descriptor and 4-character site id (Figure 1.2).

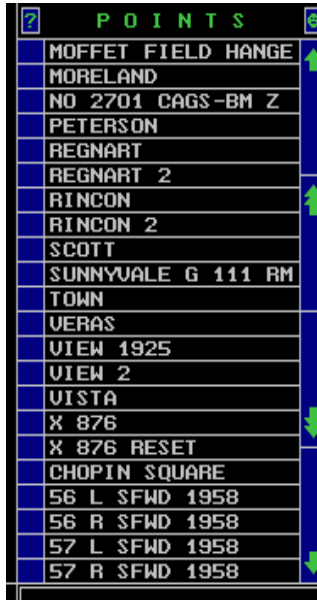


Figure 1.2: List of Points

The small button at the top left corner of panels (such as the POINTS/VECTORS panel), the question mark (?), lets you search for items on the list. When you click on it, a query box opens (Figure 1.3).



Figure 1.3: Query Dialog Box

Table 1.1 describes the buttons of the Query dialog box.

Table 1.1: Query Dialog Box Buttons

Button	Description
SEARCH	Opposite STRING, type in a site id or descriptor to search for, then click on the SEARCH button. You can use the DOS wildcard characters, * (any string) and ? (any single character), in your search. Successful searches report FOUND!
NEXT	Searches for the next occurrence of the specified string, starting after the last found item on the POINTS/VECTORS panel, no matter whether it is visible (being displayed) or not. When it comes to the end of the file, the search stops. Click on FORWARD to search down the list or on BACKWARD to search up the list.
EXIT	Returns you to the SEARCH submenu.

Tagging Points and Vectors

Tagging points and vectors gives you the opportunity to carry objects of interest from one option to another. You can tag both points and vectors; tagging is done in the Export, Project Manager, Report, and View options.

Except in Project Manager where there are two panels, the process is straightforward. For example, in the View option, click on a point and then click on the TAG button. To retain the tagged items within Project Manager, start by going to the Project Manager option first and choosing the current project as the SOURCE project. Items that are tagged in one option and processed in another are sometimes said to be globally tagged. Items that have been tagged in one option can be untagged in another.

When you tag a series of items, you create a sequential list of the items that exists outside the project itself. It is kept in temporary memory and, if you take no special action to save it, it is removed when you exit the software.

There are some restrictions which remove the tagging. For example, if you change projects or the contents of projects, the records are no longer tagged. In the Edit option, if you add or remove a record, the records become untagged because you have changed the order of the records in the project's temporary index module.

Note that, in the Report option, the OBJECTS OF INTEREST that can be specified for choosing the records will not effect previously tagged records. Records that have been tagged show a green check mark on a blue ground. Records which have also been filtered through OBJECTS OF INTEREST have a red background instead of blue.

The usual procedure for tagging is to go to the View option because you can see your data graphically. Later operations would be done in the Export, Report, or Project Manager options, as required by your processing needs.

Halting a Function

The <ESC> key can be pressed when you wish to halt a operation such as loading a file or processing data.

Exiting

When you are ready to exit the SDBM program (from any screen), move the pointer to the EXIT button and click on it.

This returns you to the next higher level of the software.

Using This Manual

Chapter 2 is designed to give you a quick start with the software.

Chapter 3 is a reference chapter that describes each feature of the SDBM program and offers some suggestions for using it.

Getting Started

If you are eager to get started, begin by stepping through this chapter. It takes you from setup through creating to loading a project and will give you an idea of what the Survey Data-base Manager program is all about. In the following sections, you'll learn how to:

- Start the SDBM program.
- Run Setup to initialize SDBM for your configuration.
- Run the Project Manager to create a project.
- And finally, load some data into the project that you've created. This is done with the Import function.

Starting SDBM

After you have installed WinPrism as described in the Introduction to WinPrism manual, you can run the SDBM module in the following ways:

1. Start WinPrism as described in the Getting Started chapter to the Introduction to WinPrism manual.
2. Click on the SDBM button.

OR

1. To run as a stand-alone application, click the Windows START button on the Task Bar and select SDBM under the Programs/Prism for Windows pop-up menu.

SDBM's Main Menu

After starting SDBM, the main menu opens (Figure 2.1).



Figure 2.1: SDBM Main Menu

There are several areas on the screen:

- Top title bar (unchanging)
- Window and Options Grid
- Menu area
- Panel of projects

The Survey Database Manager's Options Grid and the screens for each option are displayed in the window. To select an option, move the pointer to the area you want to select or change. Whenever the pointer tracks over an option that can be invoked, that box will be highlighted.

The area below the window is labeled MAIN MENU. This title changes to reflect which option you have summoned: SETUP, PROJECT MANAGER, IMPORT, etc. On the MAIN MENU, for example, this area contains date, operator name, and the EXIT button.

The date defaults to the current computer system date. If you choose, you can overwrite it. Entering an operator name is optional.

Note that if an option box or button is a color that is less intense than the others on

that screen, that option is not enabled. For example, on the Import screen, the SNAP button is pale and reflects the fact that it is not yet available. Its functionality will be offered in the next software release.

Initial Setup via the Setup Option

The first time that you run SDBM, you must initialize it, that is, you must tell it where to find the files it will work with and where to put those it creates. You must also identify the type of printer you have attached to your system.



1. Click the SETUP icon.

When you move the pointer to the Setup icon, notice that it becomes highlighted. When an icon is highlighted, you can invoke it.

2. The Survey Database window opens (Figure 2.2) where you specify necessary initial parameters such as file locations and type of printer. The directories you see depend on the contents of the current directory.

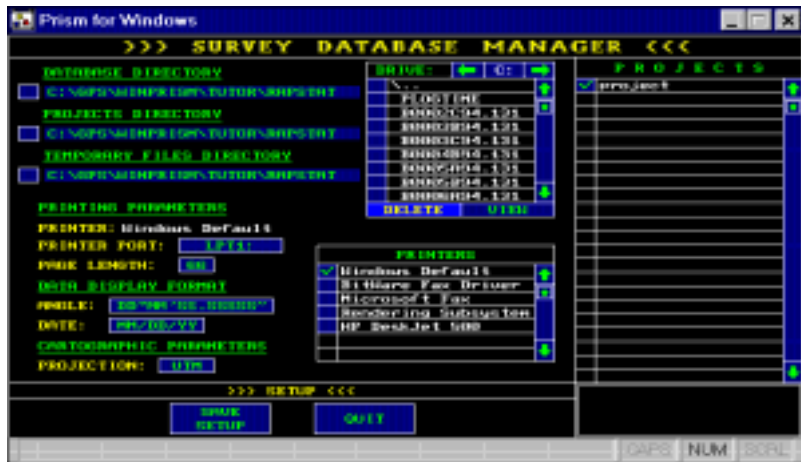


Figure 2.2: Setup Window

You need to initialize the Survey Database Manager the first time you use it. Skip the initialization step in subsequent sessions. (However if you do

change something like the type of printer or location of the database, it may be necessary to run Setup again later.)

3. On the Setup screen, start by specifying the locations of the files: the database itself, the project files, and the temporary files.



The program and project files may be kept in the same directory.

Specifying Directories

The Setup display lets you select a displayed directory, which saves you from having to type it in. The following method is used during the initial setup to specify the location of files. It is also used elsewhere in the software. Note that you cannot create a new directory with this function. You can only choose from existing directories and subdirectories.

1. Specify the database directory.

For the sake of example in this tutorial, assume that you have the following directories on drive D:

```
-- SURVEY.MGR ----- SDB
|
|               +- COLUMBUS
|               +- FILLNET
|               +- GEOLAB
|               +- GPPS
|               +- NGS
+- RANGER ----- RAWDATA
|               +- ADJUSTMENTS
+- WINDOWS ----- SYSTEM ----- MTXFONTs
|               |               +- GENI
|               +- TEMP
|               +- ALMANAC ----- ALD
|               +- ALO
+- QPRO ----- FONTS
+- DOS ----- UTIL
```

Assume that you wish to specify D:\SURVEY.MGR\SDB as the database directory. Pass the pointer through the bar under DATABASE

DIRECTORY in the upper left of the Setup screen and click on it (Figure 2.3).

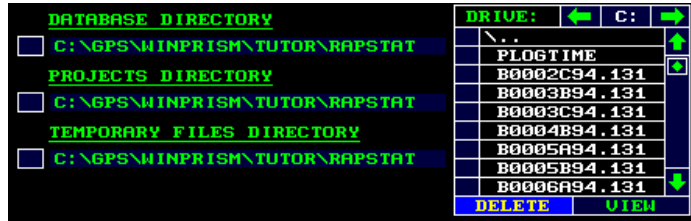


Figure 2.3: Database Directory

In response, SDBM highlights the box on the left and puts a check mark in it. This indicates that it is active. That is, when you choose a drive and directory, it will be assigned here.

If you need to change the drive, move the pointer to the drive submenu area. Move the pointer to the left or right arrow and click until the desired drive is displayed (shown as D: in Figure 2.4).

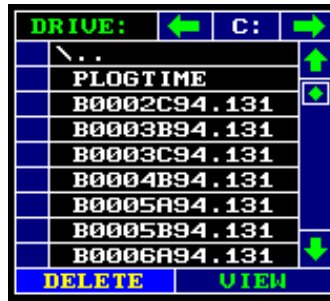


Figure 2.4: Drive Letter

When you click on the left pointing arrow, it goes to a drive with a letter earlier in the alphabet. If you want to indicate a drive with a letter later in the alphabet, click on the right pointing arrow. When the desired drive is displayed, release the mouse button.

You'll see a list of directories and, below them, the files that reside in the current directory. That is, when a directory is highlighted, SDBM displays any files and subdirectories it finds in that directory. To look further down into a directory tree, click on its name. In response, SDBM will display its subdirectories. It also displays its name in the bar with a check mark.

If you have more than 5 subdirectories or files at a given level, you can scroll through the list by moving the pointer to the ↑ (up-arrow box) or the manipulate the data you have entered; use any of SDBM's ↓ (down-arrow box) and clicking on it. SDBM will display files correspondingly higher or lower in the list (Figure 2.5).

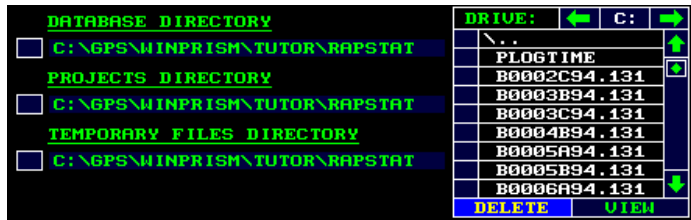


Figure 2.5: Drive List

To move up a tree, click on the \. designator. This selects the parent directory and displays the subdirectories and files at that level.

2. Continue to work your way down the tree until the directory that you desire is displayed. Click on it to specify it.

It is strongly recommended that you not specify a removable drive (i.e., a floppy). When used with a floppy, SDBM runs very slowly. In addition, it is very likely that you will not have enough space because in general the database files are relatively large.

3. Follow the same procedure to specify the directory for the project files and temporary files.

Specifying the Printer

Under the PRINTERS heading on the Setup screen, you'll see a list of several differ-

ent printers which are supported by SDBM (Figure 2.6).



Figure 2.6: Printers

1. Select the one corresponding to the one you have connected to your computer.
The other options on the Setup screen are covered in the reference section. Before you leave the Setup screen, it is necessary to save the specifications you have made.
2. Save a configuration by clicking SAVE SETUP (Figure 2.7).



Figure 2.7: Save Setup Button

The current specifications are saved and are automatically invoked when you execute the program next time for this database in this directory.

Creating a Database

Before you can access the other functions of SDBM, you must have created at least one database file.

1. If you have not created one, a dialog box opens asking if you would like to create one now (Figure 2.8).

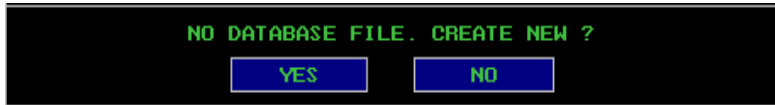


Figure 2.8: Create New Database Dialog Box

2. Click YES.

Specifying YES creates a database file in the directory you identified in the Setup screen.



Unless you create a database file, you will not be able to execute any options from the Survey Database Manager's Options Grid except the Setup option.

Creating a Project with Project Manager

After you have set up SDBM, you need to create a project. At the very least, that means giving it a name that will be used throughout the software and specifying a disk file for it.

1. Invoke the Project Manager option (middle left icon in the Survey Database Manager's Options Grid).

The Project Manager window opens (Figure 2.9).

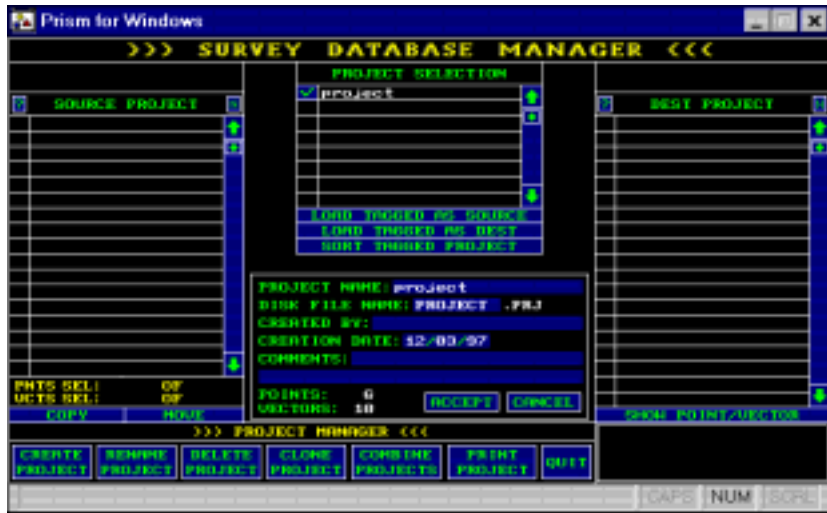


Figure 2.9: Project Manager Window

All fields are empty initially. Name a project in the project information data-entry box in the center and select it in the PROJECT SELECTION panel (top center).

If projects already exist, their names are displayed in the PROJECT SELECTION panel. You would start by selecting one, otherwise you must start by creating a project.

2. Click CREATE PROJECT on the Project Manager toolbar (Figure 2.10).

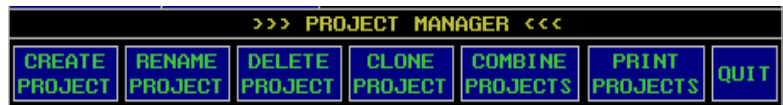


Figure 2.10: Project Manager Toolbar

When you select this function, the Project Information entry box becomes active. Data entry is signalled by the presence of the L-shaped cursor. At the same time, the only buttons remaining enabled on the screen are ACCEPT and CANCEL.

Enter a name for the project and a disk file name; these are required. If you like, enter a creator name, a creation date and any comments you feel inspired to add.



Figure 2.11: Project Information

- Click **ACCEPT** on the Project Manager Toolbar.
This automatically creates a project. The **PROJECT SELECTION** panel (Figure 2.12) lists the project name.

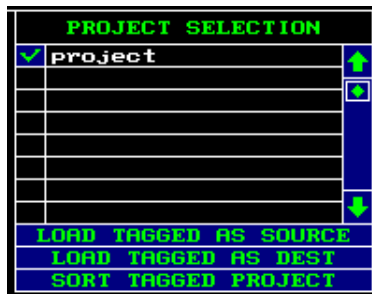


Figure 2.12: Project Selection Panel

The ACCEPT and CANCEL buttons are deactivated and the other buttons are revived.

- Click the QUIT button.
This exits this option and returns to the Survey Database Manager's Options Grid.

After creating a new project, the next step is to go to the Import option and load data into the new project.

Loading Data with the Import Option

After creating a project in SDBM, import the data. Use the Import option to specify the format, identify the files supplying the data, and load files.

1. Click the Import icon.



The Survey Database Manager window opens (Figure 2.13).

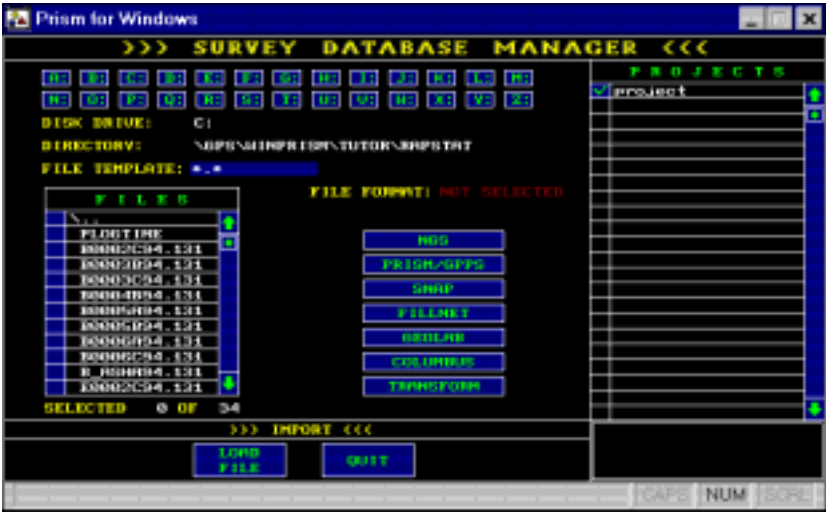


Figure 2.13: Import Window

When only one project exists, the data is automatically associated with that project. If you have more than one project, you need to specify which one you want to process. To specify a project to use, select the project in the PROJECTS panel. (Project selection can be most easily done on the main menu; it can also be done on several lower-level screens such as here or under the Import option.)

The data that you read in must be a compatible format. SDBM currently supports these formats: NGS, PRISM/GPPS, FILLNET, GEOLAB, and COLUMBUS.

2. Click on the format button that matches the data you wish to process, for example, click on the NGS entry under FILE FORMAT.

SDBM reports which one you have selected. The FILE FORMAT field changes from not SELECTED to the format you've chosen.

3. Specify the drive and directory where the imported files reside. Select the drive (Figure 2.14).

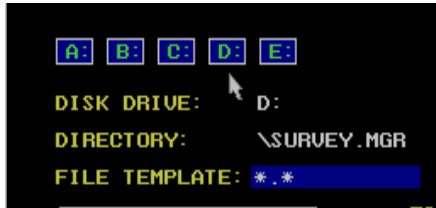


Figure 2.14: Available Disk Drives

4. Select a directory ("Specifying Directories" on page 10). For example, click on \NGS as shown in Figure 2.15.



Figure 2.15: List of Directories

In response, SDBM displays the subdirectories and files (in the specified format) in that directory.

- Click on each file to select it. SDBM puts a checkmark in front of the selected files and lists of the number of files selected, for example, "SELECTED 2 OF 3".



Figure 2.16: List of Selected Files

When the list of files is displayed, use the single arrows (\uparrow or \downarrow) to scroll through the list line-by-line or the double arrows (\Uparrow or \Downarrow) to scroll through the list a page at a time, in this case, eleven files at a time. Hold the mouse button down and drag over several file names to select a series of files.

Once they are selected, should you change your mind, you can use the same gesture (holding the mouse button and dragging the pointer) to de-select them.

- Click the LOAD FILE button to load the selected files to the current project (Figure 2.17).



Figure 2.17: Import Toolbar

SDBM displays information on each file as it loads it (Figure 2.18).

```

FILE FORMAT:  NGS
FILE NAME:    SANJOSE.LST
DATUM:        NAD 1983
RECORDS:      34

```

	<u>FILE</u>	<u>TOTAL</u>
READ	34	1503
ADDED	0	1382
REPLACED	0	0
DUPLICATED	0	87
IGNORED	34	34
BAD	0	0

Figure 2.18: File Information

This information reflects the current file. The number in the TOTAL column updates with each file read in.

If you have a large file and do not want to complete loading it, you can cancel the load by pressing the <ESC> key.

7. After SDBM has completed loading the files, press a mouse button.

Processing files other than NGS has additional procedures. You must specify the SPCS (State Plane Coordinate System) zone to assign to each station in the file. For NGS files, this information is in the file so SDBM does not need to ask you for it. SDBM must obtain this information for each of the other formats. Depending on the file type, SDBM also asks for information such as quality values and type of elevation. See “The Import Option” on page 36 for more information.

8. Click on QUIT to return to the Survey Database Manager's Options Grid.
Now you can post-process the entered data; use any of SDBM's other options: Edit, Export, Query, View and Report.

Reference

This chapter briefly describes the files associated with SDBM, followed by detailed instructions for executing each option of the Survey Database Manager program. A section is devoted to each option on the Options Grid. Where appropriate, processing and design philosophy are described in greater depth.

The Database, Project, and Setup Files

After starting SDBM, it may not allow you execute options (except Setup) until you have created at least one database. When you create a database, SDBM creates one that is composed of four files, described in Table 3.1, located in the directory specified as the database directory.

Table 3.1: Database Files

File	Contents
BASEP.DBD	Stores all points records.
BASEPI.DBD	Index file for accessing BASEP.DBD.
BASEV.DBD	Stores all vector records.
BASEVI.DBD	Index file for accessing BASEV.DBD.

A database can store up to 65,000 vectors and up to 65,000 points. You can also have more than one database. To do this, set up a new directory for each database and whenever you want to access it, indicate that directory under the Setup option.

When a database gets big, it gets unwieldy; for example, searches take more time. We recommend that you consider setting up different databases, each in its own separate directory.

In addition, we recommend that you perform periodic backups of both your databases and your project files. Put them off to tape or floppies as you would any other kind of data file.

Each time you create a project (CREATE PROJECT function of the Project Manager option), SDBM creates a file for that project in the current project directory. It is named in the form xxxxxxxx.PRJ, where xxxxxxxx is a user-supplied name, up to 8 characters long. Each project can contain up to 65,000 records.



The project file does not contain actual points and vectors but rather pointers to point and vector information that is stored in the database file.

Setup files are called AIO_SET.UP and are saved in the current directory (the directory from which you invoke SDBM). They provide information about the configuration file locations (the database itself and the project files), type of printer and other information. Each time you create a new setup, SDBM puts a setup file for it in the current directory. New setup files overwrite existing ones.

The data in these files is accessed via the functions of the Survey Database Manager program. Its top level starts with the Survey Database Manager's Options Grid.

Function Summary

After starting SDBM, the Options Grid is displayed in the window area (Figure 3.1). The nine program options are shown as icons.



Figure 3.1: SDBM Option Grid

Table 3.2 defines the options:

Table 3.2: SDBM Options

Option	Function
IMPORT	Reads in files in various formats such as NGS.
EDIT	Changes existing records, enter new data by hand, and delete records.
EXPORT	Converts data to various formats that are acceptable to other programs.

Table 3.2: SDBM Options (continued)

Option	Function
PROJECT MANAGER	Name projects, specify disk files for them, combine files, sort records, rename projects, lists of your projects.
? QUERY	Retrieves specific records from a project file or from the entire database.
SETUP	Specifies necessary initial parameters such as file locations (the database, the project files, and the temporary files) and type of printer.
REPORT	Writes different vectors and points to a file, to the printer, or to the screen.
VIEW	Displays, in graphical form, the contents of a project, a .QRY file, or database.
TOOLS	This option is unavailable.

To execute an option, move the pointer to the corresponding icon and select it. Each option is covered in the reference section that follows in alphabetic order.

The Edit Option

After loading data into the system, the Edit option allows you change existing records, enter new data by hand, or delete records. Selecting the Edit icon opens the

Edit window (Figure 3.2).

Prism for Windows

>>> SURVEY DATABASE MANAGER <<<

DESCRIPTOR: []

SITE ID: [] PID: []

LAT: [] LAT SIGMA (m): []

LONG: [] LONG SIGMA (m): []

ELLIP: HGT (m): [] HGT SIGMA (m): []

MSL HGT (m): [] ELLIP: []

GEOD HGT (m): [] DATUM: []

QUALITY: [] OPS OBSERVABLE: []

NORTH (m): [] CONVERGENCE: []

EAST (m): [] SCALE FACTOR: []

PROJECTION: UTM 01 ZONE: []

AZM MARK: []

SURVEY DATE: [] SURVEYOR: []

ENTRY DATE: [] AGENCY: []

MODIFY DATE: [] TO-REACH: []

COMMENTS: []

>>> EDIT <<<

☒ POINTS ☐ VECTORS

REPLACE POINT ADD NEW POINT DELETE POINT CLEAR RECORD QUIT

POINTS

0000

0001

0002

0003

0004

0005

0006

0007

0008

0009

0010

Figure 3.2: Edit Window

Verify that the specified the project file supplies the records you wish to work on. To edit data:

1. Indicate the format of the records: point records or vector records.
2. To replace information, select and load a record. Make any changes and click on the REPLACE button.
3. To delete, load a record and click on the DELETE button.
4. To add a new record, clear the edit fields. Enter data and click on the ADD button.

Points and Vectors

SDBM has two kinds of records: point and vector. You can switch between points and vectors and choose which you want to work on. Check POINTS to edit point records, and VECTORS to edit vector records.

For example, if Points mode is selected and you click on COYOTE, SDBM displays the point data of that record.

Points and Vectors Panel

The panel on the right of the window in Figure 3.3 lists all the records in the current project. The title reflects whether points or vectors were selected. To select a record,

click on its entry in that panel.

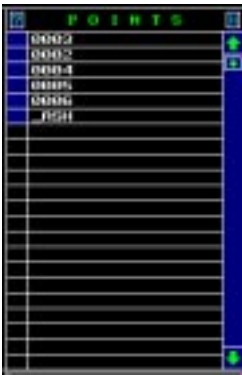


Figure 3.3: Ponits/Vectors Panel

The small button at the top right corner of the panel switches the display between full descriptor and 4-character site id. The small button at the top left corner of the panel, the question mark (?), lets you search for specific records. (See “Special Buttons” on page 4 for more information.)

Edit Buttons (Points)

The Edit buttons (Figure 3.4) are used for operations on point records. Vectors have parallel options and are discussed later in this chapter. Table 3.3 defines the buttons.



Figure 3.4: Edit Buttons

Table 3.3: Edit Buttons

Button	Description
REPLACE POINT	Saves edited information for an existing record. You must load a record before replacing it.
ADD NEW POINT	Add new point to database. Before entering a new point, click CLEAR RECORD. Enter point information, and click ADD NEW POINT. After adding a new point, SDBM displays the confirmation message OPERATION COMPLETED. Press the mouse button to continue.

Table 3.3: Edit Buttons

Button	Description
DELETE POINT	Removes the loaded record from the project file. The record is not deleted from the database, only the project file. If you try to delete a point with associated vectors, SDBM warns you that the vectors is also be deleted and ask if you want to continue.
Clear Record	Returns the Edit Window to the initial stage: no points are loaded and all fields are blank. After selecting this function, only ADD NEW POINT and CLEAR RECORD are enabled.
QUIT	Exits the Edit option and returns to the Survey Database Manager's Options Grid.

About Edit Fields of Point Records

The edit fields fill automatically when you select a record. When a field is flagged N/A, that means a value has not been assigned. If there is no box next to a field, you cannot enter it manually; typically SDBM computes the value and displays it. For example, when you enter position (latitude and longitude) and a proper datum, SDBM computes northing and easting.

The first field, DESCRIPTOR, is 30 characters of alphanumeric information.

The second field, the SITE ID, is 4 alphanumeric characters. The SITE ID is the identifier that was entered into the GPS receiver when the data was gathered. If the data was imported from an NGS file, the site id is present in the NGS point format.

The third field, the PID, is 12 characters serving as a station identifier. The last 4 characters are site id. The first 2 characters are latitude in degrees, the next 3 are the degrees longitude, the next 3 reflect the NGS quadrant, in accordance with the NGS

convention, as shown in Figure 3.5.

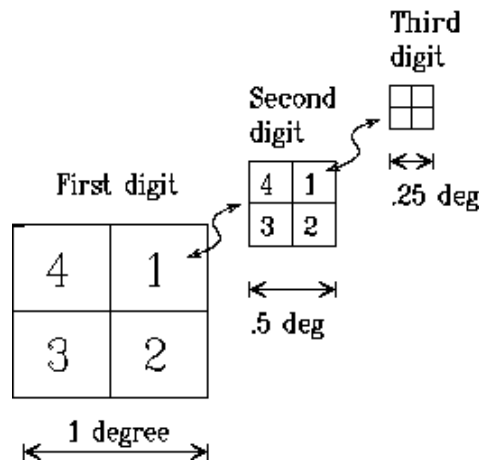


Figure 3.5: NGS Quadrant Information

If you read data from an NGS file, the PID is present. That is, whenever you import a file, the value in this field is set. If you enter a point by hand, you can put anything you like in this field.

The fields that require information are SITE ID, LATITUDE, LONGITUDE, and DATUM. If you do not enter one of these necessary values, an error message such as LATITUDE NOT SET appears. Press any button to continue. Enter the requested data. Many of the fields are familiar to a surveyor. Definitions are included for some that may not be as familiar or for those that are exclusively SDBM's.

Continuing down the left column of edit fields, you'll see next the LATITUDE and LONGITUDE of the point in the format specified in Setup. The ellipsoidal height (ELLIP HGT), the mean sea level elevation (MSL HGT), and the geoidal height (GEOID HGT) are all in meters.

Next to these are the sigma values (also in meters) for the latitude, longitude, and ellipsoidal height (LAT SIGMA, LNG SIGMA, and HGT SIGMA). These values represent the error that was assigned to the position of the point by the adjustment package. For example, when the standard deviation value is 3 cm, the sigma value will be .03.

The ELLIP is the ellipsoid (GRS 1980 in the figure) and the DATUM (NAD 1983 in the figure) that this point is referenced to.

The QUALITY field is a value ranging from AA to 90 which indicates the accuracy

of the station. It is an extended set of the NGS codes. (See Appendix A.)

The GPS OBSERVABLE field can contain Y or N indicating whether or not the site is usable for GPS observations.

The values for NORTHing (in meters), EASTing (in meters), CONVERGENCE (angle between true north and grid north), and SCALE FACTOR, shown in Figure 3.6, are computed based on the selected projection zone.

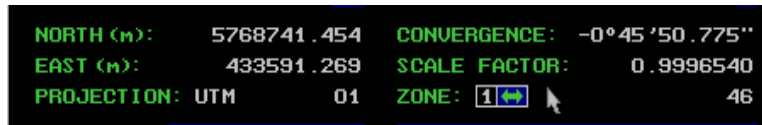


Figure 3.6: Computed Values

Under the Setup option, you specify a map PROJECTION you wish your stations to be represented in. You cannot enter this information here. The choices are the State Plane Coordinate System (SPCS) and Universal Transverse Mercator (UTM).

If you specified UTM there, it is computed and displayed automatically as soon as you enter position. When you enter position, the sense of direction defaults to north and west. When you click on another field, SDBM automatically computes the zone based on the position. Therefore, for UTM, you do not have to specify zone.

For UTM, if a station falls within 15 minutes of a zone boundary, UTM coordinates are computed for the two zones. To toggle between the zones, move the pointer to the arrow in the ZONE box (Figure 3.7).



Figure 3.7: Zone Toggle

For SPCS, zone codes cannot be computed. They must be specified. This can be done while importing or while entering a station manually under the Edit option. With SPCS, it is possible to have 4 zone specifications for a given station. For this reason, you can toggle between four different zones in the ZONE box when SPCS is selected. (For more information, see “The Import Option” on page 36.)

Map projections start from datums. Under the UTM projection, each point is associated with a datum. (NGS format carries that information in the file.) WinPrism is always WGS84. Adjustments can be on one of many datums. When SDBM can not determine the datum from the file, it asks the user to supply it. Some datums allow map projections to be computed. We presently support UTM under 3 datums:

WGS84, NAD83, and NAD27. Others cannot be computed; in this case, SDBM displays N/A (not available). SPCS is on three datums: WGS84, NAD27, and NAD83.

The remaining fields are user-supplied and optional. The AZIMUTH MARK is a field where the azimuth (in degrees, minutes, seconds) to an azimuth mark can be entered along with the name of the azimuth station.

The SURVEY DATE is the date of the survey in the format specified under the Setup option. SURVEYOR can contain the initials of the crew chief that measured the station. For ENTRY DATE, note when the point was entered into the database; this will be updated automatically by the software.

The AGENCY field can contain a 6-character name of the agency that surveyed the point and MODIFY DATE marks when any information was modified for this station to indicate a change. The TO-REACH is the computer file name containing the to-reach or drive-to description for this station. The final field receives COMMENTS (for example, if you modify the station position, put the reason here).

Change an Existing Point

To change a point, start by selecting it; for example, 005 (Figure 3.8).



Figure 3.8: Select Point 005

After selecting a point, SDBM fills the edit fields from the indicated record and enables these buttons: REPLACE POINT, DELETE POINT, CLEAR RECORD, and QUIT. Alter the desired information by overtyping. Wherever there is an entry box, you can edit the data.

When the record is satisfactory, click on REPLACE POINT. SDBM will write the information from the displayed record to disk.

Changing the site id of a point can cause a problem if there are vectors associated with that point. After selecting REPLACE POINT, SDBM checks other points that might be within the ranges with the same site id and if there are vectors associated with that point. When there are vectors associated with that point, it can automatically rename that point in all its associated vectors. (For example, changing point A to B in vector AX generates vector BX; it also stimulates a possible change of AY to BY, AZ to BZ, etc.) Before doing that, it counts the number of occurrences, reports that, and asks for permission (Figure 3.9)

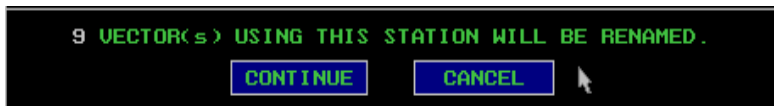


Figure 3.9: Rename Vectors Dialog Box

Selecting CONTINUE authorizes the renaming. To back out of the action, select CANCEL.

Whenever the latitude or longitude of an existing station is modified, an asterisk is placed by the modified field. This indicates to the user that the information has been modified. In addition, the computer updates the MODIFY DATE field.

Edit Menu (Vectors)

When the Vectors check box is checked, the Edit toolbar changes to reflect editing vectors (Figure 3.10). Table 3.4 defines the buttons in the Vector Edit Toolbar.



Figure 3.10: Vector Edit Toolbar

Table 3.4: Vector Edit Toolbar Buttons

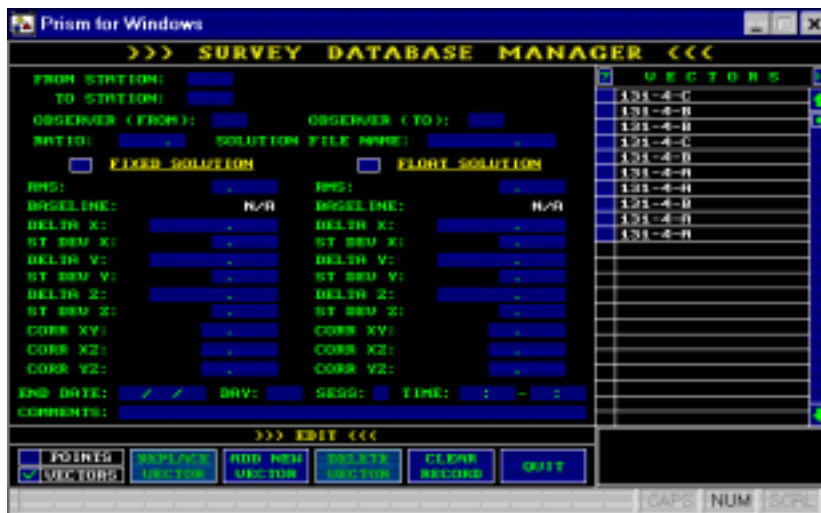
Button	Description
REPLACE VECTOR	Saves edited information for an existing record. You must load a record before replacing it.

Table 3.4: Vector Edit Toolbar Buttons

Button	Description
ADD NEW VECTOR	Add new vector to database. Before entering a new vector, click CLEAR RECORD. To enter a vector, you need to know the names of two points, e.g., 0046 and 0041. Enter their site ids and the other requested information, and click ADD NEW VECTOR. SDBM prompts for any needed information. SDBM searches the database for all stations with the first site id, then searches for all stations with the second site id. If SDBM finds more than one record with the same site id, it asks you to select the specific station to use. After adding a new vector, SDBM displays the confirmation message OPERATION COMPLETED. Press the mouse button to continue.
DELETE VECTOR	Removes the loaded record from the project file. The record is not deleted from the database, only the project file.

About Edit Fields of Vector Records

When you select vector records, SDBM offers a parallel set of functions: REPLACE VECTOR, DELETE VECTOR, and CLEAR RECORD. (ADD NEW VECTOR is disabled.) Although a parallel functionality is offered, the display for the record differs when you are working with vector data (Figure 3.11).

**Figure 3.11:** Edit Vector Information

The first field is the site id of the FROM STATION of the specified vector. The second field is the site id of the TO STATION. These are followed by the initials of the observer at the FROM STATION and the initials of the observer at the TO STA-

TION. The RATIO is the quality indicator provided by the post-processing software. The SOLUTION FILE NAME contains the name of the solution file.

The data is displayed in both columns: fixed and float solutions. FIXED SOLUTION or FLOAT SOLUTION has a checkmark, the solution that was determined to be the best, determined either by the Import routine or specified by the user.

These are the remaining fields for vector records. RMS (root mean square) is the indicator of the error associated with the solution. The DELTA X, DELTA Y, and DELTA Z are the differences between the X component, Y component, and Z component of the FROM STATION and the TO STATION, and their corresponding standard deviations (labeled ST DEV). These are followed by the CORR (correlation matrix) values for XY, XZ, and YZ.

At the bottom of each vector record are the END DATE, DAY, SESSION, TIME, and room for user-supplied COMMENTS.

As with point records, the edit fields are filled automatically when you select a record from the VECTORS panel on the right.

Change a Point in a Vector Record

To change an existing point in a vector record, start by selecting it. Click on it in the VECTORS panel; for example, PALO-0025. After you select it, SDBM fills the edit fields from the indicated record and enables these buttons: REPLACE VECTOR, DELETE VECTOR, CLEAR RECORD, and QUIT. (ADD NEW VECTOR is disabled.)

Type in the new information and click on REPLACE VECTOR to overwrite the "old" vector record. If you are trying to change one of site ids on a vector record, SDBM will go through all existing stations in the database that share that site id and present a list of sites to select from. It computes and displays a new baseline and forces you to

confirm "for sure" that it is the correct one (Figure 3.12).

STATION NAME	LATITUDE	LONGITUDE	BASELINE
0039	37°21'14.06666"N	121°54'25.20313"W	25083.5954

END DATE: 06/06/90 DAY: 157 SESS: A TIME: 22:06 - 00:58

COMMENTS:

>>> EDIT <<<

CHOOSE 'TO' STATION

ACCEPT CANCEL

Figure 3.12: Confirm Vector Edit

When there are several to choose from, it computes and displays the baselines for each one. You'll see them listed on the drop-down screen (Figure 3.13).

STATION NAME	LATITUDE	LONGITUDE	BASELINE
REDWOOD CREEK S I	37°31'22.22441"N	122°42'05.88255"W	9244.0296
GUADALUPE SLOUGH T	37°27'57.28821"N	122°01'22.50707"W	12936.5293
WHITE TANK ON WOOD	37°37'13.12685"N	122°05'26.80212"W	20646.1339
A 496	37°33'17.28366"N	121°56'51.83384"W	22909.0526
0039	37°21'14.06666"N	121°54'25.20313"W	25083.5954
DEMPSEY 2	37°25'23.08582"N	121°53'00.90574"W	25159.8184
OAKLAND RADIO RANG	37°44'36.03410"N	122°43'12.89175"W	33519.3873
BOND	37°46'18.17319"N	122°41'48.98859"W	36430.5617

END DATE: 06/06/90 DAY: 157 SESS: A TIME: 22:06 - 01:00

COMMENTS:

CHOOSE 'TO' STATION

ACCEPT CANCEL

Figure 3.13: Select From Multiple Vectors

When there are several to select from, it is very important that you compare the baseline length on the drop-down entry (25083.5954 in the illustration) with the computed baseline length (25083.6068 in the illustration). The baselines are in ascending order. Look for a value that is "in the ballpark".

Scroll through the list using the arrows on the right bar of the drop-down screen (as opposed to the arrows on the VECTORS panel). Choose the desired station by clicking on it. SDBM puts a checkmark by it. Finally, click on the ACCEPT button (Figure

3.14).



Figure 3.14: Edit Confirmation

If you press REPLACE VECTOR and the station does not exist in the database, SDBM will ask you to create the point first. Go back to POINTS, enter the new point record, and then return to the REPLACE VECTOR procedure.

Selecting Fixed or Float Solution

When adding a new vector manually, if both the fixed and float solutions are present and you do not specify which one to use (clicking on either the FIXED SOLUTION or FLOAT SOLUTION box), SDBM automatically chooses one or the other. When you import vectors, it checks if both fixed and float solutions are available. If they are, it selects one (via the following algorithm) and puts a checkmark next to it in the Edit display. You can change the selection manually by editing the vector, choosing the other solution and replacing the vector.

The explanation of how this determination is made is included here to give you the background information on the processing method.

1. If the RMS from the fixed solution is greater than 0.019 m, SDBM chooses the float solution.
2. If the RMS from the fixed solution is less than or equal to 0.019 m, it again tests the RMS. If the RMS from the fixed solution is greater than 2 times the float RMS, again SDBM chooses the float solution.
3. Otherwise (the RMS of both is the same), it checks to see if there is any difference between the float and fixed components. It check `_X`, `_Y`, and `_Z` from both. If the difference is greater than 10 cm, it chooses the float solution, otherwise it chooses the fixed.

The Export Option

The Export option lets you export your data in a wide array of formats. SNAP/FILL-NET, GEOLAB, and COLUMBUS create input files for each least squares adjustment package. CAD creates an input file for the GPS/CADD option in WinPrism. And the TRANS/MAP button lets you select points from the database and write them to an input file for the transformation and map projection utilities of WinPrism.

Figure 3.15 shows the Export Window.

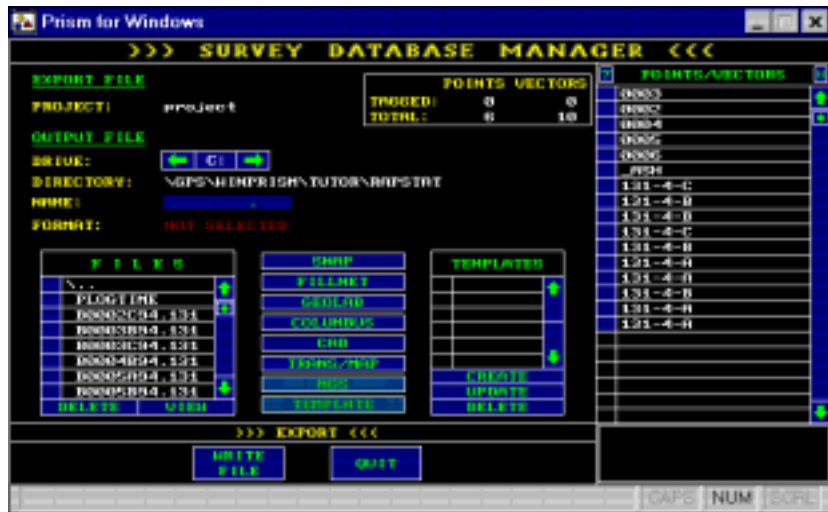


Figure 3.15: Export Window

To export data:

1. First choose the format for the output data.
2. Specify the destination disk file.
3. Choose what records to export.
4. After entering all parameters, click on WRITE FILE.

Export Parameter Panels

Table 3.5 outlines the panels in the Export Window.

Table 3.5: Export Panel Descriptions

Panel	Description
FORMAT	After selecting a format, SDBM displays your choice under FORMAT: and automatically tags an extension on the file name field (NAME:). The extension corresponds with the format you have specified. For SNAP/FILLNET, it supplies .PRT; for GEOLAB, .JOB; and for CAD, .PTS. For COLUMBUS and TRANS/MAP, it does not supply an extension; you can put in any extension that is meaningful. By choosing the format first, you can see the extension that the output file ought to have.
OUTPUT FILE	Select the directory that you want the output file to go to; this is described on page 21, Specifying Directories. To enter a file name, click on the NAME box to make it active and type in the file name and extension and press <ENTER>.

Table 3.5: Export Panel Descriptions

Panel	Description
POINTS/VECTORS	<p>Depending on your choice, the appropriate heading is displayed on the panel on the right, and the appropriate records are displayed within it. If adjusted data (such as SNAP/FILLNET, COLUMBUS, or GEOLAB) was chosen, you'll see vectors and the heading will say VECTORS. When the vectors of interest have both fixed and float solutions available, only the tagged solutions will be exported. If CAD or TRANS/MAP was selected, you'll see only points and the heading will say POINTS.</p> <p>Select the records you want to export from the POINTS/VECTORS panel. SDBM displays in the window (top center) how many are available and how many have been selected (tagged).</p> <p>Any records tagged in other options will appear tagged here and if tagged here will follow through to other options such as Report and View.</p>

Export Toolbar

The EXPORT toolbar (Figure 3.16) has two buttons:

- WRITE FILE to export the specified records in the indicated format, putting the converted data into the output file. When the operation is complete, to continue, press a mouse button.
- QUIT to exits from the Export option and returns to the Survey Data-base Manager's Options Grid.



Figure 3.16: Export Toolbar

The Import Option

The Import option gives you the ability to import your data in a wide array of formats and to transform position information. These formats are currently supported by SDBM: NGS, WinPrism/GPPS, FILLNET, SNAP, GEOLAB, COLUMBUS, and TRANSFORM. SDBM can import files from the hard disk or floppy disk.

Figure 3.17 shows the Import window.

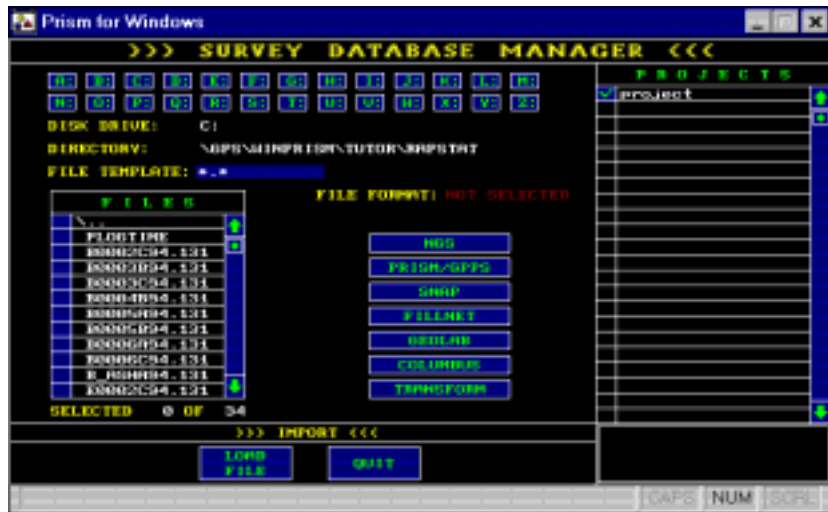


Figure 3.17: Import Window

To import data:

1. First specify the destination project file.
2. Indicate the format of the input data.
3. Choose the files to import.
4. After all parameters are entered, click on LOAD FILE.

The NGS function lets you read in control point information obtained from NGS.

The WinPrism/GPPS function reads in unadjusted baseline vectors from the WinPrism and GPPS processing software; it uses the algorithm described in “Handling Unadjusted Points” on page 43.

The FILLNET, GEOLAB, and COLUMBUS buttons let you import into the database adjusted station positions coming from these three least squares adjustment packages, using the algorithm described “Handling Adjusted Points” on page 45.

The TRANSFORM function button is used to import transformed position information that was output from WinPrism's transformation module, also using the algorithm described in “Handling Adjusted Points” on page 45.

Import Parameter Panels

PROJECTS

When you have only one project, the data goes automatically to that one. If you have more than one project, you need to specify which one you want to add to. To do this, select it from the PROJECTS list on the right.

FILE FORMAT

When you select a format, SDBM displays your choice under FILE FORMAT: and automatically creates a mask for the file name template field (FILE TEMPLATE:). The mask corresponds to the format you have specified, for example, for FILLNET, it supplies .FOP. (If you like, you can change the mask; click on FILE TEMPLATE and type in a new mask). By choosing the format first, you can readily see what input files you ought to have and which files match it.

INPUT FILE

Select the drive and directory as described on page 21, Specifying Directories. SDBM displays the files that match the file template. To select input files, click on their file names in the list of existing files.

When a list of files is displayed, you can click on the ↑ to go through the list line-by-line. You can click on the double down-arrow to go through the list a "page" at a time, in this case, 11 at a time. (The ↑ and double up-arrow ↑ go through the list in the opposite direction.) Click on one file, or hold the mouse button down and drag over several file names or over the down-arrows to select a series of files. Once they are selected, should you change your mind, you can use the same gesture to de-select them.

If the files you want match a different template, click on the FILE TEMPLATE field. When you see the L-shaped cursor, type in the desired mask (for example, O*.*).

LOAD FILE

After specifying the project (or accepting the default), the file, and the format, click on the LOAD FILE button. In response, SDBM loads each selected file into memory and display information on it during the load operation. If you have a large file and decide that you do not want to complete loading it, you can cancel by pressing <ESC>.

The Load Information dialog box (Figure 3.18) shows how many records were read from the file and its format. The information in the FILE column always reflects the current file: how many records were successfully READ, how many were ADDED to the database as new points or vectors, how many records were updated with new information (REPLACED), how many records are DUPLICATES (an NGS record that came in with a blank site id; and the position was the same as the previous

record), how many records came in with duplicate site ids that were IGNORED, and how many records were unreadable (BAD).

The TOTAL column reflects all files read in. When the operation is complete, SDBM will pause to let you digest the report. To go on, you will be prompted to press a mouse button.

FILE FORMAT: NGS		
FILE NAME: SANJOSE.LST		
DATUM: NAD 1983		
RECORDS: 34		
	<u>FILE</u>	<u>TOTAL</u>
READ	34	1503
ADDED	0	1382
REPLACED	0	0
DUPLICATED	0	87
IGNORED	34	34
BAD	0	0

Figure 3.18: Load Information Dialog Box

When importing an adjustment file from FILLNET, GEOLAB, or COLUMBUS, SDBM reads the ellipsoid from the file. Since the database supports more than one datum, when it cannot determine which datum is the appropriate one, SDBM prompts for a datum (Figure 3.19).

ADJUSTMENT PERFORMED ON THE CLARKE 1866 ELLIPSOID. SELECT APPROPRIATE DATUM.

Figure 3.19: Select Datum Dialog Box

Select the appropriate datum from the DATUMS panel in the center of the Import option’s window. SDBM displays your selection in the list of file information.

SPCS ’27 ZONE

SPCS ’83 ZONE

Files other than NGS require that you specify the SPCS zone to be assigned to each station in the file. (NGS files carry this information in the file.) A dialog box appears

(Figure 3.20).

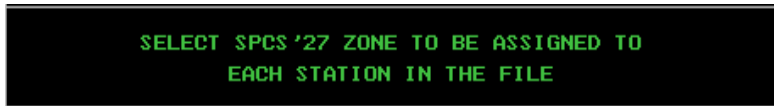


Figure 3.20: Select SPCS Dialog Box

SDBM displays the appropriate pop-up screen (Figure 3.21), either SPCS'83 ZONES or SPCS'27 ZONES. Scroll through it and select the zone for the current record. (All the NAD27 and NAD83 State-Plane Coordinate zone codes are in Appendix A.) If you don't know the SPCS zone or if the point is outside the United States, select NOT ASSIGNED (the top entry). Whatever you select will be displayed in the file information.

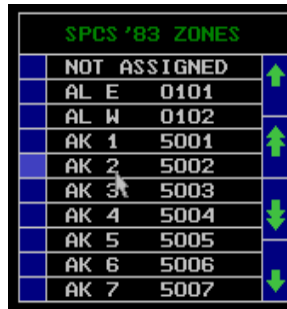


Figure 3.21: SPCS '83 Zones Dialog Box

QUALITY

For all data formats except NGS and WinPrism/GPPS, SDBM asks you to specify data quality. (In NGS files, the quality value is carried along in the file; for unadjusted points such as WinPrism/GPPS, SDBM automatically assigns to the points a quality of 60.)

When the Request for Quality dialog box (Figure 3.22) opens for each station, scroll through the list and click on the appropriate value, for example, 4TH ORDER. What-

ever you select is displayed in the file information.

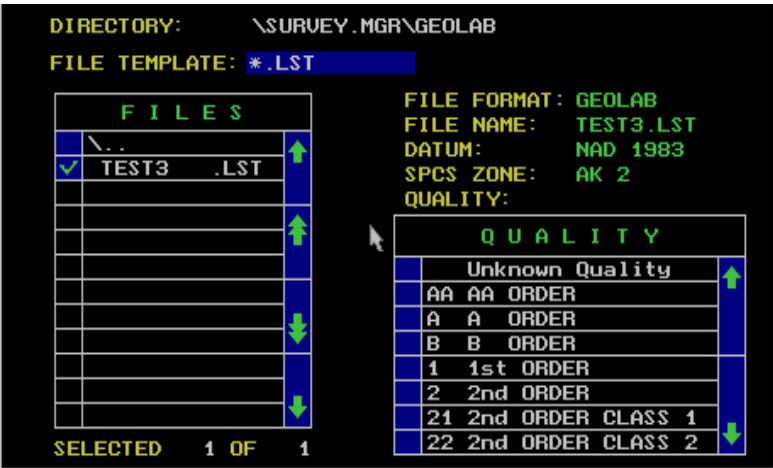


Figure 3.22: Request for Quality Dialog Box

If you don't know the quality for a station, it is tempting to select UNKNOWN QUALITY (the top entry). However it is better in this situation to make a conservative choice rather than blindly picking "unknown".

Assume that SDBM is trying to read in a record that has the same site id as a record already in the database and that its location is within 2 meters of the first. The incoming record is an adjusted station with an unknown quality. The existing record is a station in an O-file from WinPrism and has a better quality. SDBM will keep the O-file solution rather than the adjusted solution. Therefore it is better to assign a conservative quality (such as 4th order) to an adjusted solution than to assign it an unknown quality. Adjusted solutions are almost always better than unadjusted solutions.

ELEVATION TYPE

The Elevation Type dialog box (Figure 3.23) asks if the elevation should be read from the adjustment ellipsoid or mean sea level. Select the appropriate option.

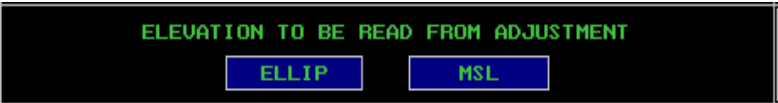


Figure 3.23: Elevation Type Dialog Box

Confirm whether or not to replace existing elevations if the stations already exist in the database.

Routine Processing

When importing files, SDBM reads in records according to predefined algorithms. The explanation of how Import works internally is included here so that when something unexpected happens during the processing, you will have the background to begin to understand why it happened.

The Survey Database Manager works with two ranges in an attempt to make determinations about incoming data. What is call the big range retains the same value for all types of imported data. The small range (r) varies depending on the type of data that is being read. It has these values:

- For NGS points, r is 2 meters.
- For unadjusted points (points from WinPrism's O-files), r is 25 meters.
- For adjusted points (points processed through GEOLAB, COLUMBUS, FILLNET, SNAP), r is 900 meters.

A big range (R) is defined as 2 kilometers. The definition of a big range is the same for all imported data.

Two points having the same site id cannot exist within 2 kilometers of each other within a single database.

When the software encounters a new point that is within the small range of a point already in the database, it assumes that it is very likely to be the same point. In this case, it gives you the opportunity to replace the point. (You can also rename the "new" point and add it or you can ignore the "new" point.)

When the software encounters a point that is within the big range but beyond the small range of a point with the same name already in the database, it assumes that it is a different point and must be renamed or it must be ignored. The soft-ware gives you the opportunity to rename or ignore it.

There is an exception to this that applies to vectors. When a vector point falls between the small range and the big range, in addition to renaming and ignoring, you are given the opportunity to attach the vector to an existing point.

As SDBM reads in records, it goes through this procedure:

1. It reads in the incoming point.
2. Depending on whether it is an NGS point, an unadjusted point, or an adjusted point, it uses the appropriate processing. (An unadjusted point is from a WinPrism/GPPS O-file and is associated with a vector.)

Handling NGS Records

If it is an NGS point, SDBM uses an r of 2 meters. It checks the database for a point with the same site id.

1. If such a point does not exist, it adds the new point.
2. When the software encounters a point with the same site ID (already in the database), it computes the distance (d) between the two points.
 - a. When $d > R$, it adds the new point. (It's too far away to be the same point.)
 - b. When $d \leq r$, other decisions are made based on quality.
 - i. When the quality of the new point is worse, it ignores the new point.
 - ii. When the quality of the new point is the same or better, it asks whether to REPLACE, RENAME, IGNORE, or AUTO ALL which lets SDBM automatically rename points. (The new point is so close, it may be the same point.)
 - iii. In the special case when $d = 0$, if quality is better, the old point replaces the new one. (It's the same point, so it updates the quality.) In any other case (quality worse or equal), the new point is ignored.
 - c. When $r < d \leq R$, it asks whether to RENAME, IGNORE, or AUTO ALL. (It's too far away to be the same point. And since it's somewhat close, we need to either give it new name or discard it.)

Handling Unadjusted Points

Whenever you want to import baseline vector data, the processing involves checking both stations that comprise the vector to insure that they follow all the rules for addition into the database.

When importing a baseline vector, SDBM uses a small range r of 25 meters for each point at the ends of the vector. It deals first with one point of the vector, checking the database for a point with the same site id.

1. If it does not exist, it adds the new point.
2. When the software encounters a point with the same site id already in the database, it handles it like an NGS point (see above) but with a small range r of 25 meters and a few added options. (Differences are shown in *italics*.)
 - a. When $d > R$, it adds the new point. (It's too far away to be the same point.)
 - b. When $d \leq r$, different decisions are made based on quality.

- i. When the quality of the new point is worse, it is ignored. This does not mean the vector is ignored. The vector is simply attached to the existing station.
- ii. When the quality of the new point is the same or better, it asks whether to REPLACE, RENAME, IGNORE, or AUTO ALL which lets SDBM automatically rename points. (The new point is so close, it may be the same point.) Be aware that if the IGNORE option is chosen, not only the point is ignored but also the entire vector.
- iii. In the special case when $d = 0$, if quality is better, the old point replaces the new one. (It's the same point, so it updates the quality.) In any other case (quality worse or equal), the new point is ignored.
- c. When $r < d \leq R$, the program asks whether you want to ATTACH, RENAME, IGNORE, or AUTO ALL. (It's too far away to be the same point. And since it's somewhat close, we need to either give it new name or discard it.) AUTO ALL automatically renames conflicting stations. ATTACH will attach the vector to the existing station. IGNORE will ignore both point and vector.
- 3. Once you have identified a specific point during import, if the same point "reappears" during the same input session, the action taken on the original station (RENAME, REPLACE, etc.) will be taken on each occurrence of the station. This is not true for IGNORE.

For example, SDBM checks point A of vector AB, as shown in Figure 3.24. Later when SDBM encounters point A of vector AC, AD, AE, AF, AG, it simply accepts that point. That is, SDBM uses the existing point.

It loops back to deal with the second point of the vector.

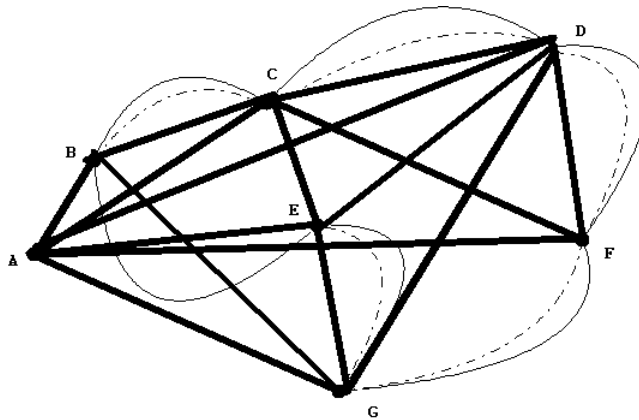


Figure 3.24: Example Vectors

Handling Adjusted Points

Assume you had stations of poor quality and you processed it through an adjustment package in order to improve their quality. When you bring it back into the database and try to overwrite the old station positions, the database needs to know if each point already exists to determine how importing these adjusted stations should be handled.

If it is an adjusted point, SDBM uses a small range r of 900 meters. (Adjusted data comes from GEOLAB, COLUMBUS, FILL-NET and similar adjustment packages.) It starts by asking if all stations exist in the database.

This indicates to SDBM that there should be an existing point within 900 meters to update. (An assumption has been made that a point when adjusted will not move farther than 900 m from its unadjusted location.)

1. When you answer NO, it handles it just as an NGS point (see above) and uses a small range r of 2 meters. This indicates that these are all new points, not necessarily adjusted.
2. When you answer YES and the new point is within the small range and has better quality than the original point, it automatically replaces it. (You are saying that you know the points are already in the database and you are improving their position.)

Adjusted vectors can not be imported.

Exception Handling

When you import files, SDBM reads in the ordinary records; it puts the exceptions at the end, exceptions to the procedure described in Routine Processing, page 68. For each problem, it displays the exception window and an error message reflecting the range limit that was encountered (Figure 3.25). Table 3.6 outlines the response buttons.

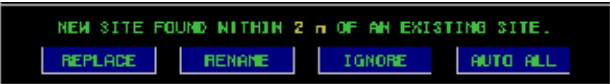


Figure 3.25: New Site Error Message

Table 3.6: New Site Error Message Response Buttons

Button	Description
REPLACE	Asks SDBM to overwrite the existing station information with new station information.
RENAME	SDBM displays a data-entry submenu where you can provide a new site id for the exception record. After you type in the new site id, click on ADD to go on. (Otherwise click on CANCEL.) SDBM checks the "new" name, and if there is no other record with that name, adds it.
IGNORE	Asks SDBM to throw the exception record (the "new" site) away. It does not add a new point.
AUTO ALL	If SDBM encounters a record that should be renamed for any reason, it automatically generates a site id for it using these codes: %001-%999, then %AAA-%ZZZ.

The Project Manager Option

This option lets you create a project. You specify a disk file for it and give it a name that is used throughout the software. The Project Manager option also lets you combine projects, sort records, rename projects, and get a list of your projects from the printer.

After clicking the Project Manager option (middle left icon in the Survey Database

Manager's Options Grid), the Project Manager window opens (Figure 3.26).

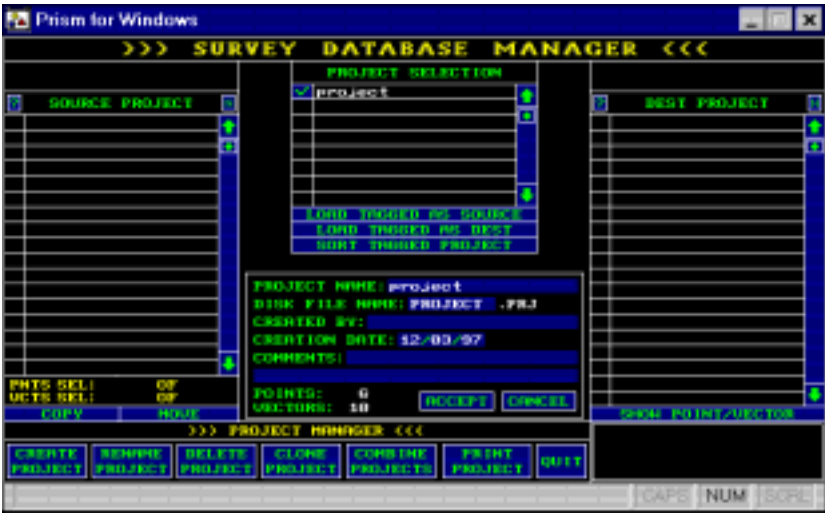


Figure 3.26: Project Manager Window

The small button at the top right corners of the SOURCE PROJECT and DEST PROJECT panels switches the display between full descriptor and 4-character site id.

The small button at the top left corners of the SOURCE PROJECT and DEST PROJECT panels, the question mark (?), lets you do a search for specific records.

Project Selection Panel

In the PROJECT SELECTION panel, SDBM lists the projects found in the directory. To select a project, click on it; SDBM puts a checkmark in front of it and it becomes tagged.

LOAD TAGGED AS DEST

displays the contents of the selected project in the panel on the right.

LOAD TAGGED AS SOURCE

displays the contents of the selected project in the panel on the left.

SORT TAGGED PROJECT

sorts the sites of the specified (tagged) project file in ascending ASCII order (A to Z, preceded by the numbers). Sorting a project may take some time. Remember the <ESC> key can be pressed when you wish to halt the operation.

COPY/MOVE Buttons

Several functions (copy, move, and combine) need to work with two project files. The file providing records is identified as the "SOURCE PROJECT" and is loaded into the panel on the left. The file that receives the records is identified as the "DEST PROJECT" and is loaded into the panel on the right. The procedure for working with two files is:

1. In the PROJECT SELECTION panel, click on the project supplying the records. SDBM puts a checkmark by it.
2. Click on LOAD TAGGED AS SOURCE. In response, SDBM displays the records of that project in the left panel.
3. In the PROJECT SELECTION panel, click on the project file that will be the destination for the records. SDBM puts a checkmark by it.
4. Click on LOAD TAGGED AS DEST. In response, SDBM displays the records of that project in the right panel.
5. In the SOURCE PROJECT panel, click on all records you want copied or moved. SDBM puts a check in front of each one and, at the bottom, indicates how many points and vectors you have selected (Figure 3.27). In this example, 2 points of a total of 46 points and 2 vectors of a total of 8 vectors

in the source project WARSAW-DATA have been selected to be moved or copied.



Figure 3.27: Selected Files to Move or Copy

- Click on the appropriate button at the bottom of the SOURCE PROJECT panel: either COPY or MOVE. SDBM performs the requested operation and adds them to the DEST PROJECT column.

To operate on records that were tagged in other options (View, Report, Export), invoke the Project Manager and start by loading the selected project as the source project.

SHOW POINT/VECTOR Button

displays the contents of a single, selected record. First, in the PROJECT SELECION panel (top center), tag the project that will supply the record. Click on LOAD TAGGED AS DEST. In response, SDBM displays the records of that project in the right panel.

Identify the record that you want displayed. In the DEST PROJECT panel, click on the desired record. SDBM puts a checkmark in front of it. At the bottom, click on the

The Project Information dialog box (Figure 3.30) becomes active. Note that at the same time, the only buttons remaining enabled on the screen are ACCEPT and CANCEL.

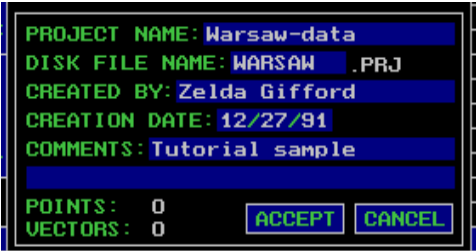


Figure 3.30: Project Information Dialog Box

You can enter up to 18 characters as the new project name and up to 8 characters for the file name. Comply with DOS file-naming conventions. The .PRJ extension is automatically supplied. Project name and disk file name are required; the remaining fields are optional.

If you omit the CREATED BY name, SDBM uses the operator name you entered at the bottom of the main menu. In the same way, if you omit the CREATION DATE, it uses the one you entered at the bottom of the main menu.

The quantities in POINTS and VECTORS reflect the current project and get updated when a project is loaded.

If the information is okay, click on ACCEPT; otherwise click on CANCEL. When you accept the information, SDBM creates a new project and displays its name in the PROJECT SELECTION panel. The ACCEPT and CANCEL buttons are deactivated and the other buttons are revived.

RENAME PROJECT

You can give a new name to a project file by first indicating the project you wish to rename. Click on its name in the PROJECT SELECTION panel.

Then move the pointer to the RENAME PROJECT function and select it. In response, SDBM activates the project information entry box. You can enter a duplicate project name; however, you cannot enter a duplicate disk file name. Click on ACCEPT to go on.

DELETE PROJECT

erases the tagged project from your directory. To tag it, click on its name in the PROJECTION SELECTION panel. SDBM will first ask for confirmation: "DO YOU

REALLY WANT TO DELETE PROJECT?" Click on YES or NO to go on.

This deletes only the project. All points and vectors associated with the project remain in the database.

CLONE PROJECT

makes a copy of the tagged project in the current directory. To tag it, click on its name in the PROJECTION SELECTION panel. When you select CLONE PROJECT, the fields of the project information entry box are cleared. Enter a new project name, disk file name, etc. When you click on ACCEPT, SDBM creates a new project, copying all the records from the tagged project file, and adds the new one to the PROJECT SELECTION panel.

COMBINE PROJECTS

appends the contents of the first tagged file to the second. With this function, you can append one project to another or to a new project file.

The procedure for combining projects is:

1. In the PROJECT SELECTION panel (top center), click on the project that will supply the records.
2. Click on LOAD TAGGED AS SOURCE. In response, SDBM displays the CC records of that project in the left panel.
3. In the PROJECT SELECTION panel, click on the project file that will be the destination for the records.
4. Click on LOAD TAGGED AS DEST. In response, SDBM displays the records of that project in the right panel.
5. In the PROJECT MANAGER menu, click on the COMBINE PROJECTS button.

SDBM then asks whether to combine into a new file or into the destination file (Figure 3.31).



Figure 3.31: Choose Resulting Project Dialog Box

When you click on DEST PRJ, the files are combined immediately. Clicking on NEW PRJ takes you to a screen like CREATE PRO-JECT where you enter file and project information. To back out of this function, select the CANCEL button.

PRINT PROJECTS

prints a brief summary of all projects in the current directory. A typical listing will resemble:

```
SURVEY POINT AND VECTOR DATA BASE
DATA BASE DIRECTORY:      D:\SURVEY.MGR\SDB
PROJECTS DIRECTORY:       D:\SURVEY.MGR\SDB
NUMBER OF PROJECTS:       4
-----
NO  PROJ NAME  DATE  PTS  VECS  FILENAME  CREATOR
4   cloned-    01/23/92  7    1    CLONEDL.PRJ  Kit Carson
    ltl-
    project
2   gpps-test  01/16/92  23    6    GPPS-NEW.PRJ Andrzej Sanojca
3   little-project 01/23/92  58    24  SMALLISH.PRJ W.Kosmalski
1   Warsaw-data  01/07/92 1391 10  WARSAW.PRJ  Zelda Gifford
-----
```

QUIT

exits from the Project Manager option and returns to the Survey Database Manager's Options Grid.

The Query Option

The Query option lets you retrieve specific records from a project file or the entire database file. On the right, SDBM lists the project files you have specified; it also indicates the entire database on the first line. You can do searches through the entire database or through individual projects. When you select this icon, the Query window

opens (Figure 3.32).

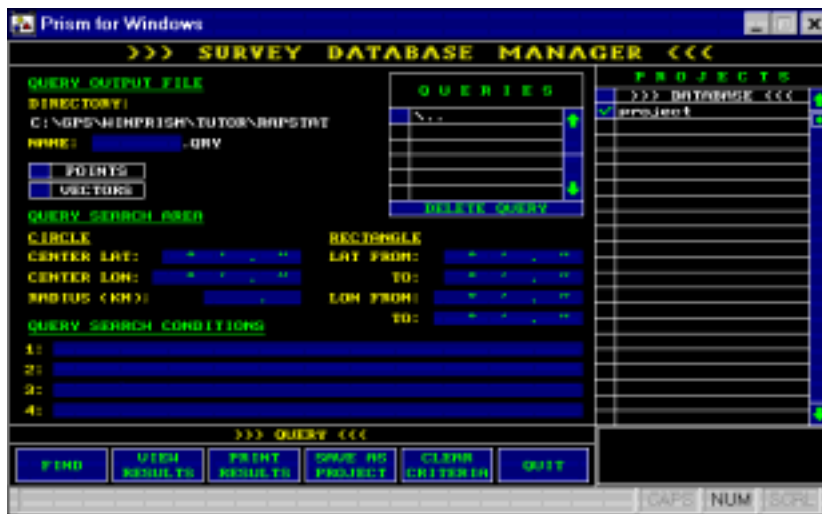


Figure 3.32: Query Window

The procedure for doing a query is:

1. Specify searching the entire database or a project.
2. Specify a name for the query output file, that is, provide a name that will be given to the file that will contain your search criteria.
3. Set the conditions of the search.
4. Press the FIND button to initiate the search.

Query Parameter Panels

PROJECTS

lets you specify whether to search the entire database or specific projects to find matches for the criteria you have entered. Click on >>>DATABASE<<< or the

named project (Figure 3.33).



Figure 3.33: Projects Panel

QUERY OUTPUT FILE

Put the pointer on the file NAME field and click on it (Figure 3.34). When you see the L-shaped cursor, type in a file name. Comply with the DOS file-naming conventions.

SDBM displays all existing files that have the .QRY extension in the QUERIES panel. If the file you want already exists, instead of typing in its name, simply select it. SDBM puts a checkmark in front of the query-file name and displays it in the file NAME field, under the QUERY-OUTPUT FILE title.

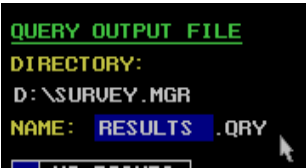


Figure 3.34: Query Name Field

Query Criteria

Three groups of conditions that can be set: POINTS/VECTORS, query-search area, and syntactical conditions.

POINTS/VECTORS

You can specify that SDBM include all records that are point records, or include all records that are vector records and the records for the points at the ends of vectors. If you don't select either, you can't query and if you select both, all records are eligible for query.

If you have specified only vectors and SDBM encounters a vector with both stations meeting all criteria, both the vector record and the point records describing each station will be sent to the .QRY file. That is, even though you have excluded all points, in this special situation, you will see point records.

QUERY SEARCH AREA

By limiting the area of the search, you are asking the program to return only those sites within a given geographic area. You can specify a circle or a rectangle; enter lat/lon information into one and leave the other blank (Figure 3.35).

QUERY SEARCH AREA	
CIRCLE	
CENTER LAT:	37°23'18.00"N
CENTER LON:	122°02'12.00"W
RADIUS (KM):	0.020

RECTANGLE	
LAT FROM:	44°00'00.00"N
TO:	47°00'00.00"N
LON FROM:	118°00'00.00"W
TO:	122°00'00.00"W

Figure 3.35: Query Search Area

Move the pointer to the appropriate field, click on it, and type in the condition statements. If QUERY SEARCH AREA is left blank, all records will be checked against the syntactical conditions.

In order for a vector to be included as a match, both stations that comprise the vector must fall within the specified area.

QUERY SEARCH CONDITIONS

There are four lines where you can enter syntactical conditions. To type in a condition, move the pointer to the line and click; the L-shaped cursor will signal data entry.

If the first condition is met, SDBM tests the second; if the second is met, it tests the third; and if all three are met, it tests the fourth. When all conditions are met, the record is included in the subset of matching records and copied into the .QRY file.

A condition is composed of operands and operators. Each line can contain up to 51 characters; a condition cannot continue to the next line. The rules for combining them and examples in Table 3.7, Table 3.8, and Table 3.9.

Table 3.7: Operands for Points

Operand	Description
DES	Descriptor
SID	Site ID
PID	Point Identification
QUA	Quality
GPS	GPS observable

Table 3.7: Operands for Points

Operand	Description
<i>str</i>	text; must be in quotes. Can contain * and ? (DOS wildcard characters). Equal sign (=) is only valid operator.

Table 3.8: Operands for Vectors

Operand	Description
TDES*	Descriptor of the TO site
FDES*	Descriptor of the FROM site
TSID*	Site ID (in the corresponding point record) of the TO site
FSID*	site id (in the corresponding point record) of the FROM site
TPID*	point identification of the TO site
FPID*	point identification of the FROM site
TQUA*	quality of the TO site.
FQUA*	quality of the FROM site
TOBS	observer at the TO site.
FOBS	observer at the FROM site
TSTN	TO site id in the vector record of the site.
FSTN	FROM site id in the vector record of the site.
DATE	end date. Use proper format with accurate slashes.
SESS	session identifier
ODAY	day of the year of the observation. Only numeric field.
*For the first eight vector operands, SDBM checks the corresponding point records. (For the remaining vector operands, it takes the information strictly from the vector record.)	

Table 3.9: Operators

Operator	Description
=	Equal
<	Less than
>	Greater than
>=	Greater than or equal
<=	Less than or equal
&	Logical AND
	Logical OR
()	Parentheses

Most operands are evaluated alphanumerically; exceptions are date (earlier vs. later) and quality (see Appendix A). SDBM evaluates first the parenthetical expressions;

then, =, <, >, >=, and <=; finally it evaluates & and |.

When operands are compared with the =, <, >, >=, and <= operators, blanks are appended to the shorter so that both operands have the same length. For a comparison involving the QUA operand, leading and trailing blanks are removed from the condition statement (i.e., " 4" and "4 " are reduced to "4" and when compared with the condition statement QUA=" 4" would return TRUE).

Quality can be compared only to itself (QUA=QUA returns TRUE; QUA>QUA and QUA<QUA return FALSE) or to text which is valid quality value.

The following are valid condition statements (spaces around the operators are for readability):

SID = "0071"

SDBM performs an alphanumeric comparison on the value found in the site id field.

SID = DES & QUA=" 4"

SDBM pads SID (4 characters) to equal DES (26 characters) before performing the comparison. When it finds a match, it then tests quality.

(QUA=" 4" | QUA>" 4") & DES = "* BRIDGE *"

SDBM looks for records with quality 4th order or better. When it finds a match, it then tests for the word "bridge" in the descriptor.

(QUA>" 4" & QUA<" 2") | (PID = "22*" & PID = "* ____ *")

SDBM looks for records with quality between 4th order and 2nd order. When it finds a match, it then tests for a PID that starts with a latitude of 22 (and has an unknown site id (four underscores are the convention for unknown)).

Query Toolbar

The Query toolbar (Figure 3.36) has five buttons.

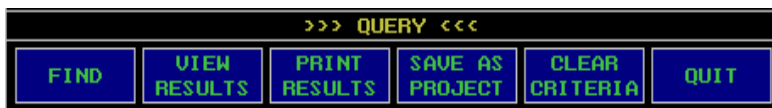
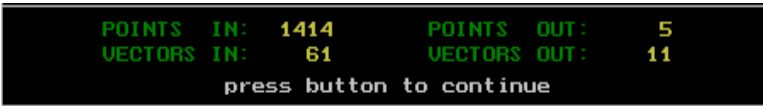


Figure 3.36: Query Toolbar

FIND searches the specified project or database file and displays the records that match the specified criteria (Figure 3.37), putting them in the right side of the display. If some information is missing, you'll see an error message. Supply the missing infor-

mation, press any button, and click on FIND again.



A screenshot of a terminal window with a black background and green text. It displays search results for matched records. The text is arranged in two columns. The left column shows 'POINTS IN: 1414' and 'VECTORS IN: 61'. The right column shows 'POINTS OUT: 5' and 'VECTORS OUT: 11'. At the bottom, it says 'press button to continue'.

Category	Value
POINTS IN	1414
VECTORS IN	61
POINTS OUT	5
VECTORS OUT	11

Figure 3.37: Matched Records

After you press FIND, SDBM reports results of search. POINTS IN/VECTORS IN shows number of points and vectors in project or database you are searching. POINTS OUT/VECTORS OUT reports how many points and vectors met the criteria.

VIEW RESULTS summarizes the number of records that met the criteria.

PRINT RESULTS sends report to printer. Report lists SDBM directories in use, project that was searched and query file, lists specified criteria, and results of query (number of point records that match and number of vector records that match specified criteria). If you have specified a range, it also reports the specified range.

SAVE AS PROJECT saves records matching criteria as project file in your projects directory. PROJECT NAME and DISK FILE NAME required. After satisfactory data entry, click on ACCEPT button. If file already exists, SDBM overwrites the file.

CLEAR CRITERIA erases any criteria that you have specified (POINTS/VETORS, query-search area, and syntactical conditions).

QUIT exits from the Query option and returns to the Survey Database Manager's Options Grid.

The Report Option

Selecting the bottom left icon on the Survey Database Manager's Options Grid, the Report option, gives you the ability to write different vectors and points to a file, to the printer, or to the screen.

When you select this icon, The Report window opens (Figure 3.38).

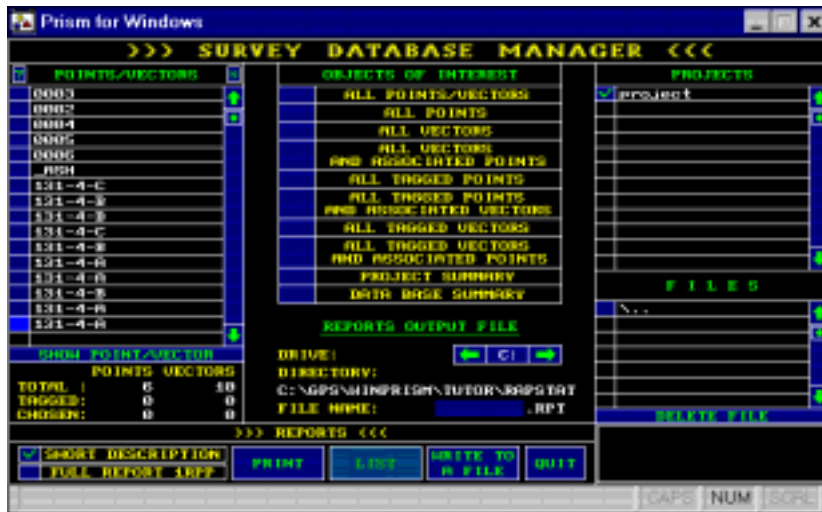


Figure 3.38: Report Window

The procedure for obtaining a report is:

1. Indicate the source of information for the report. This will be a project file.
2. Tag the records (POINTS/VECTORS) to list.
3. Set filters (OBJECTS OF INTEREST) for the listed records.
4. Specify a SHORT DESCRIPTION or FULL REPORT.
5. If the report is going to a file, type in a file name.
6. When all parameters are satisfactory, click on the report type button: PRINT, LIST, or WRITE TO A FILE. (LIST will be available in a future release.)

Report Parameter Panels

PROJECTS

In the PROJECTS panel (Figure 3.39), on the right, SDBM lists all the projects that it finds in the current project directory. To select an item, click on it; SDBM puts a checkmark in front of it and it becomes tagged. If the panel contains more items than can be displayed at one time, you can use the arrows on the right to go through the

list.

PROJECTS	
<input type="checkbox"/>	gpps-test
<input type="checkbox"/>	little-project
<input type="checkbox"/>	new-clone
<input checked="" type="checkbox"/>	Warsaw-data
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

Figure 3.39: Projects Panel

OBJECTS OF INTEREST

The OBJECTS OF INTEREST panel (Figure 3.40), in the middle of the display, contains filters and two summary specifications. Select the filters for the records you wish to list or print.

OBJECTS OF INTEREST	
<input type="checkbox"/>	ALL POINTS/VECTORS
<input type="checkbox"/>	ALL POINTS
<input type="checkbox"/>	ALL VECTORS
<input type="checkbox"/>	ALL VECTORS WITH ASSOCIATED POINTS
<input type="checkbox"/>	ALL TAGGED POINTS
<input checked="" type="checkbox"/>	ALL TAGGED POINTS WITH ASSOCIATED VECTORS
<input checked="" type="checkbox"/>	ALL TAGGED VECTORS
<input type="checkbox"/>	ALL TAGGED VECTORS WITH ASSOCIATED POINTS
<input checked="" type="checkbox"/>	PROJECT SUMMARY
<input checked="" type="checkbox"/>	DATA BASE SUMMARY

Figure 3.40: Objects of Interest Panel

One selection may have an effect on another, perhaps even totally overriding it. For example, if you select ALL POINTS and ALL TAGGED POINTS, the second overrides the first. The checkmark on the first disappears. Whenever a new choice countermands existing selections, the earlier ones are either removed or changed in a relevant way. For example, if you had indicated ALL TAGGED VECTORS WITH

ASSOCIATED POINTS, and then indicate ALL POINTS, it adds a checkmark by ALL POINTS, moves the check from ALL TAGGED POINTS WITH ASSOCIATED VECTORS to ALL TAGGED VECTORS. (This action in no way affects the summary choices.)

When PROJECT SUMMARY in OBJECTS OF INTEREST is selected, SDBM prints a project summary. It gives project name, directory, file, total points, total vectors, creation date, creator, and comments.

When DATA BASE SUMMARY in OBJECTS OF INTEREST is selected, SDBM prints a summary of the data base information: data base directory, total points, total vectors, projects directory, number of projects, and a table with information on each project (name, date, points, vectors, file name, creator).

SHORT DESCRIPTION/FULL REPORT

is a toggle selecting a summary of information or full details. The SHORT DESCRIPTION gives only part of the data of the contents of each point and vector record. There are 5 point records to a page; 5 vector records to a page.

A FULL REPORT details the contents of each point and vector record in the database, starting with a heading that gives project name, directory, and file name.

For FULL REPORT, you can select one record per page (1RPP) or two records per page (2RPP). First make FULL REPORT active by clicking on it (you'll see the checkmark), then click again to toggle the number of records per page. This value remains in effect even if you go to SHORT DESCRIPTION and return later to FULL REPORT. Following are some samples.

Short Report

SURVEY POINT AND VECTOR DATA BASE

SHORT REPORT 03/10/92

PROJECT NAME : kkk
PROJECT DIRECTORY : E:\SDB
PROJECT FILE NAME : KKK2.PRJ

POINT
=====

DESCRIPTOR	: C106	LATITUDE	: 37°28'38.36723"N
SITE ID	: C106	LONGITUDE	: 121°33'21.31983"W
ELLIP HEIGHT	: 1213.398(m)		
MSL HEIGHT	:	GEOID HEIGHT	:
QUALITY	: 4 4th ORDER		
DATUM	: WGS 1984 (1)	PROJECTION	: UTM (01)
NORTHING	: 4148804.789(m)	ZONE	: 10
EASTING	: 627684.243(m)		

VECTOR
=====

FROM STATION	: PALO	DAY	: 157
TO STATION	: C106	SESSION	: A
SOLUTION FILE NAME	: OALO106A.157		
	FLOAT SOLUTION	RATIO	: N/A
BASELINE (m)	: 54170.8899		
DELTA X	: 46552.7687	STANDARD DEVIATION X	: 0.0024
DELTA Y	: -27459.1628	STANDARD DEVIATION Y	: 0.0015
DELTA Z	: 3649.5783	STANDARD DEVIATION Z	: 0.0007

Full Report

SURVEY POINT AND VECTOR DATA BASE
FULL REPORT 03/10/92

PROJECT NAME : kkk
PROJECT DIRECTORY : E:\SDB
PROJECT FILE NAME : KKK2.PRJ

POINT

=====

DESCRIPTOR : C106
SITE ID : C106
PID : 37121311C106
LATITUDE : 37°28'38.36723"N
LATITUDE SIGMA :
LONGITUDE : 121°33'21.31983"W
LONGITUDE SIGMA :
ELLIPSOID HEIGHT : 1213.398(m)
HEIGHT SIGMA :
MSL HEIGHT :
GEOID HEIGHT :
QUALITY : 4 4th ORDER
GPS OBSERVABLE : YES (Y)
DATUM : WGS 1984 (1)
ELLIPSOID : WGS1984
PROJECTION : UTM (01)
ZONE : *10
NORTHING(m) : 4148804.789
EASTING(m) : 627684.243
CONVERGENCE : 0°52'43.545"
SCALE FACTOR : 0.99979997
AZIMUTH MARK :
AZIMUTH :
SURVEY DATE :
ENTRY DATE :
MODIFY DATE :
SURVEYOR :
AGENCY :
TO-REACH FILE :
COMMENTS :

VECTOR

=====

FROM STATION : PALO PALO
TO STATION : C106 C106
OBSERVER (FROM) : MWE
OBSERVER (TO) : DON
END DATE : 06/06/90
DAY : 157
SESSION : A
TIME : 22:06:01:00
SOLUTION FILE NAME : OALO106A.157
RATIO : N/A

FLOAT SOLUTION

=====

RMS : 0.0095
BASELINE (m) : 54170.8899
DELTA X : 46552.7687
STANDARD DEVIATION X : 0.0024
DELTA Y : -27459.1628
STANDARD DEVIATION Y : 0.0015
DELTA Z : 3649.5783
STANDARD DEVIATION Z : 0.0007
CORRECTION XY : -0.7200
CORRECTION XZ : -0.5600
CORRECTION YZ : -0.0300
COMMENTS : _____

POINTS/VECTORS

Once you select an item on the PROJECTS panel, SDBM loads its records into the panel on the left. When the records are displayed, use ↑ to go through the list line-by-line. Use the double down-arrow to go through the list a page at a time, in this case, 17 at a time. To specify a record, click on it. You'll see a check-mark by the records you selected, a green check on a blue ground (Figure 3.41).

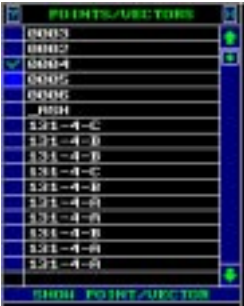


Figure 3.41: Selected Points/Vectors

To select a series of records, hold the mouse button down; then drag over several records or the down-arrows. Once they are selected, should you change your mind, you can use the same gesture to de-select them.

Any records tagged in other options will appear tagged here and if tagged here will follow through to other options such as Export and View.

To indicate records that were tagged, SDBM uses green check-marks on a blue ground. Records which were also filtered through OBJECTS OF INTEREST have a red background instead of blue and will be printed (regardless of what is tagged). It is not enough to tag records to print them or send them to a files; you must also select an OBJECTS OF INTEREST filter.

SDBM displays tallies (Figure 3.42) the total number of points and vectors, how many have been selected (TAGGED), and how many will be printed (CHOSEN).

SHOW POINT/VECTOR		
	POINTS	VECTORS
TOTAL :	43	27
TAGGED:	1	0
CHOSEN:	43	0

Figure 3.42: Show Point/Vector Dialog Box

SHOW POINT/VECTOR Button

displays the contents of a single, selected record. First, in the PROJECTS panel (right), specify the item that will supply the records. In response, SDBM displays the records it contains in the left panel.

To identify a record that you want displayed, click on the desired record in the POINTS/VECTORS panel. SDBM puts a check in front of it. (If more than one record is selected, only the first is displayed.)

At the bottom of the POINTS/VECTORS panel, click on the SHOW POINT/VECTOR button. SDBM displays the selected record (Figure 3.43).

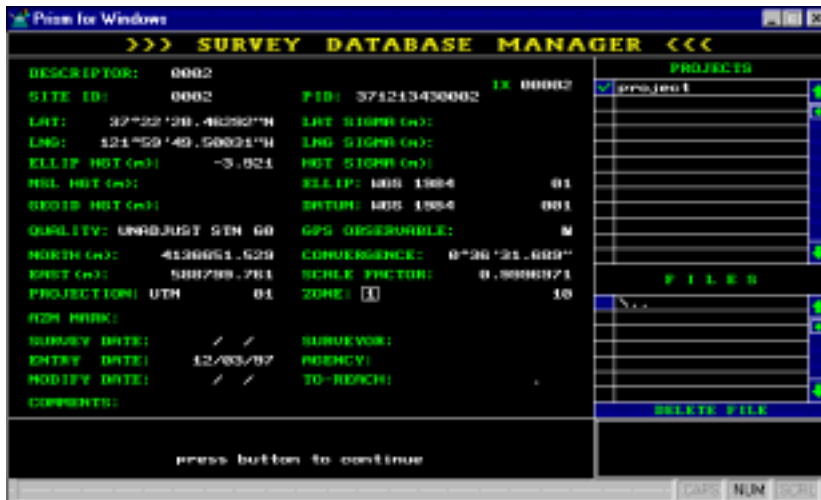


Figure 3.43: Selected Point/Vector Information

To return to other SDBM functions, press a mouse button.

REPORTS OUTPUT FILE

Specify the directory and file as described on page 21. Put the pointer on the FILE NAME field and click on it. When the L-shaped cursor appears, type in a file name. Comply with the DOS file-naming conventions.

SDBM displays all existing files that have the .RPT extension in the FILES panel (Figure 3.44). If the file you want already exists, instead of typing in its name, simply select it. SDBM puts a check-mark in front of the report-file name and displays it in

the FILE NAME field, under the REPORTS OUTPUT FILE title.

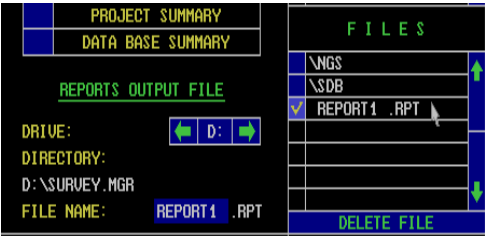


Figure 3.44: Files Panel

DELETE FILE

erases the tagged file from your directory. To tag it, click on its name in the FILES panel. You'll see the question: "DO YOU WANT TO DELETE FILE filename.RPT?" Click on YES or NO to go on.

Report Toolbar

The Report Toolbar (Figure 3.45) has four buttons.



Figure 3.45: Report Toolbar

PRINT sends the indicated items to the printer specified under the Setup option.

LIST This function is unavailable.

WRITE TO A FILE sends the indicated items to the file specified under the REPORTS OUTPUT FILE. If the specified file does not exist, it will be created. If the specified file already exists, SDBM appends the report to it.

QUIT exits from the Report option and returns to the Survey Data-base Manager's Options Grid.

The Setup Option

On the Setup screen, you specify necessary initial parameters such as file locations (the database itself, the project files, and the temporary files) and type of printer. The directories you see depend on the contents of the current directory. (Specifying directories is discussed on p. 21.) Selecting the Setup icon opens the Setup window (Figure 3.46).

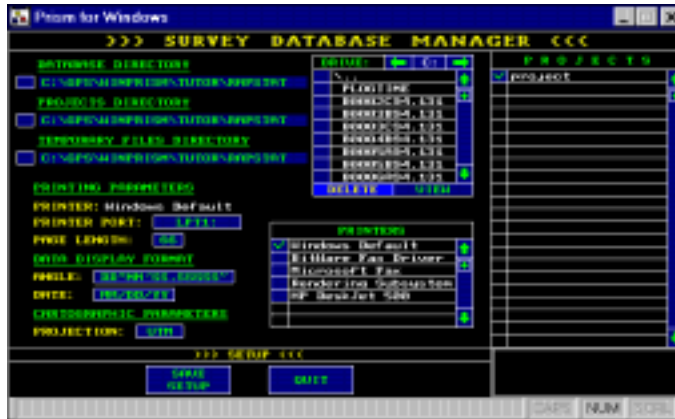


Figure 3.46: Setup Window

You need to initialize the Survey Database Manager the first time you use it and whenever you change something such as the type of printer.

After you've executed the SAVE SETUP command, you'll also see an AIO_SET.UP file in the current directory (the directory from which you invoke SDBM). It provides information about the configuration-file locations (the database itself and the project files), type of printer and other information. Each time you create a new setup, SDBM puts a setup file for it in the current directory. New setup files will overwrite existing ones.

PROJECTS column

When you run SDBM the first time, the PROJECTS column is empty. Later when you run the program and have created projects with a database and have specified the appropriate directory, you'll see project names in this column. They are displayed only when you have specified the correct directory for your database and projects.

Setup Functions

PRINTER PORT specifies the computer port to which your printer is connected. You can choose LPT1 or LPT2. The default is LPT1.

PAGE LENGTH establishes the number of lines per printed page. You can choose 66 or 72. The default is 66.

FORM FEED inserts a formfeed character at the end of printing to clear the print buffer and at the end of each physical page.

ANGLE lets you choose which way to display angles for latitude, longitude and azimuth: in degrees (dd(mm'ss.sssss in integer degrees, integer minutes, seconds) or in decimal to 11 places (ddd.ddddddddddd). Defaults to dd(mm'ss.sssss.

DATE specifies the format for the date. You can choose mm/dd/yy, dd/mm/yy, or yy/mm/dd. The default is mm/dd/yy.

PROJECTION specifies the cartographic projection to use. You can choose UTM (Universal Transverse Mercator) or SPCS (State Plane Coordinate System). The default is UTM.

Setup Toolbar

The Setup toolbar (Figure 3.47) has two buttons.



Figure 3.47: Setup Toolbar

SAVE SETUP lets you save the parameters you have specified on this screen. When the parameters are saved with SDBM, they are invoked automatically whenever you execute the program.

If a setup file already exists, SDBM will ask for confirmation. If you click on **CONTINUE**, the existing configuration file is overwritten. There is no message to report that the old file is being overwritten. If you click on **CANCEL**, SDBM returns to the previous display, letting you quit without saving.

If you do not save the setup, any modifications will be used only during the current session of SDBM and will revert to the previously saved parameters when SDBM is invoked again.

QUIT exits from the Setup option and returns to the Survey Database Manager's

Options Grid.

The Tools Option

The Tools option supports several standard functions. This option is unavailable.

The View Option

The View option displays the contents of a project graphically. When a project is loaded, SDBM automatically provides a grid with appropriately scaled coordinates. The scale is chosen to display the greatest extent of the data. For example, if New York and San Francisco are included in the project, it displays an extent of about 3000 miles. It is proportional in that the number of degrees vertically may differ from the number horizontally but the distance represented per unit (per inch or per centimeter) is the same.

When you select the View icon, the Network window opens (fig).

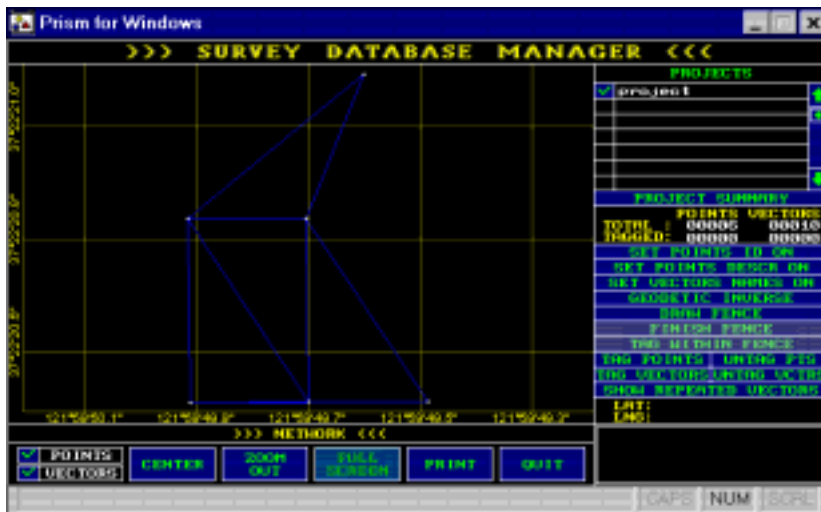


Figure 3.48: Network Window

You can select the project on this screen or, if you have selected it under another function, when you summon this screen, it will already be selected and have a check-mark by it. If necessary, click on the scroll arrows to go down the list.

The LAT/LON box reflects the current position (latitude and longitude) of the pointer relative to the current coordinates. The field goes blank when the pointer is moved out of the window.



Press the mouse's right button to cancel the last operation. This works at all levels throughout the View option.

PROJECT SUMMARY

After a project is selected, loaded, and displayed, when you click on PROJECT SUMMARY, SDBM displays the Project Information dialog box (Figure 3.49). After you read the information, press any button to continue.

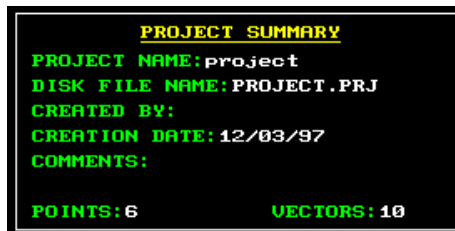


Figure 3.49: Project Information Dialog Box

Zooming In

The procedure for zooming in is:

1. Identify the area you want to look at more closely.
2. Move the pointer to a corner (imagined) of the area of your choice and click on it.
3. Without releasing the mouse button, drag the pointer to the opposite "corner" of the chosen area. This creates a green rectangle based on the two corners.
4. When the area you want to look at is entirely enclosed, release the mouse button.

SDBM zooms in to that area, and update its lat/lon label. If you like, you can zoom in further. If you are not happy with the zoom area, you can return to the previous screen by pressing the mouse's right button.

It is not unusual to be left with a grouping of points that are off center. To make them easier to select or recognize, you can resize them to better fit the entire window by using the CENTER button on the View menu (below).

Displaying Information on a Record

At any time, you can pick up a point or a vector and display information on it. To do this, place the pointer on or near the desired point or vector and press the left mouse button. In response, the point or a vector turns green to indicate that it is the active one. SDBM displays its information in the upper right corner (Figure 3.50).

POINT	
FARALLON IS RADIO COMP	
ID: 0001	QUALITY: 31
LAT: 37°41'57.04351"N	
LNG: 122°59'58.76237"W	
MSL HGT: 6.00 (m)	
MORE INFO	
TAG	DELETE
CANCEL	ACCEPT

Figure 3.50: Point Information

It also presents these additional functions.

MORE INFO displays the full record from the database. This is illustrated under the Edit option. To go on, press any button.

TAG/UNTAG lets you select records in preparation for some additional function, for example, reports, exporting, copying or moving via the Project Manager option. It is a toggle. When you click on a site, then on TAG, the color of the point changes to cyan (light blue-green). A red asterisk also appears at the top of the point information sub-screen. When a vector is tagged, it turns red. (The button changes to UNTAG.)

Any records tagged in other options will appear tagged here and if tagged here will follow through to other options such as Report and Export.

DELETE This function is unavailable.

ACCEPT is connected with the GEODETIC INVERSE option offered on the View Parameter Panel. For geodetic inverse information, you need to pick up two points and ACCEPT each to confirm the point. The order in which you do this does not matter. As soon as you click on GEODETIC INVERSE and ACCEPT two points, SDBM

displays the results (Figure 3.51).

VECTOR	
0039-C106	
DATE: 06/06/90	DAY: 157
SES: A	TIME: 22:01-01:00
DIST: 33989.0705 (m)	
FROM FILE: 0039106A.157	
MORE INFO	
TAG	DELETE
CANCEL	ACCEPT

Figure 3.51: Accepted Vector Results

A similar selection of sub-functions is offered when you select a vector. A vector that is chosen on the graphical display will be displayed in green. The ACCEPT button gives the ends of the vector and the geodetic inverse information that relates to the vector.

If there is more than one point or one vector at the pick up area, when you click on the first, SDBM presents a list of points at that location for you to select from. Choose the desired item from the list (scroll down the list if necessary) and SDBM displays the corresponding record data. Or, if appropriate, click on the CANCEL button to abandon the whole step. The geodetic information remains on the screen until you request another operation.

If you choose the GEODETIC INVERSE function before you ACCEPT two points or a vector, the button's color changes to green indicating that it is active and will display geodetic inverse information as soon as you accept the two points or vector. If you are performing a sequence of ACCEPT actions (more than two points or one vector) with the GEODETIC INVERSE button not activated, the last two accepted points or last accepted vector is valid.

CANCEL halts any action. It also removes the displayed geodetic inverse information from the screen and any accepted points. You can also cancel geodetic information by doing any action that results in changing the field where geodetic inverse information is displayed.

View Parameter Panel

Descriptions of the View parameter panel buttons are grouped by similar function. Whenever a function box is displayed in a duller color than the others, it can not be invoked.

SET VECTORS NAMES ON

Labels are displayed only when there are less than 100 points or less than 50 vectors on the screen (Figure 3.52). It will have no effect if there is too much information on the screen. SDBM will explain the situation in an error message; press a button to continue.

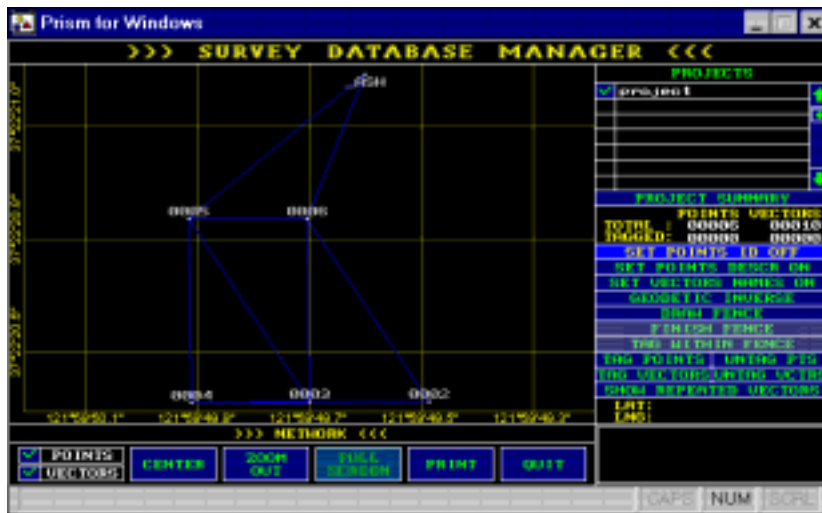


Figure 3.52: Points with Labels

Where possible, the label is placed above the point. If it is too cluttered in that area, it will be placed below the point. Although SDBM tries to avoid it, there are times when

the labels are written over each other.

In a similar way, SET VECTORS NAMES ON labels the vectors. SDBM uses a 5-character identifier where the first 3 digits are the day number, the next is the last digit of the year, followed by the session identifier (Figure 3.53). If you have more than one vector on a line (and you have set vectors names on), SDBM displays the number of vectors that are there in parentheses.

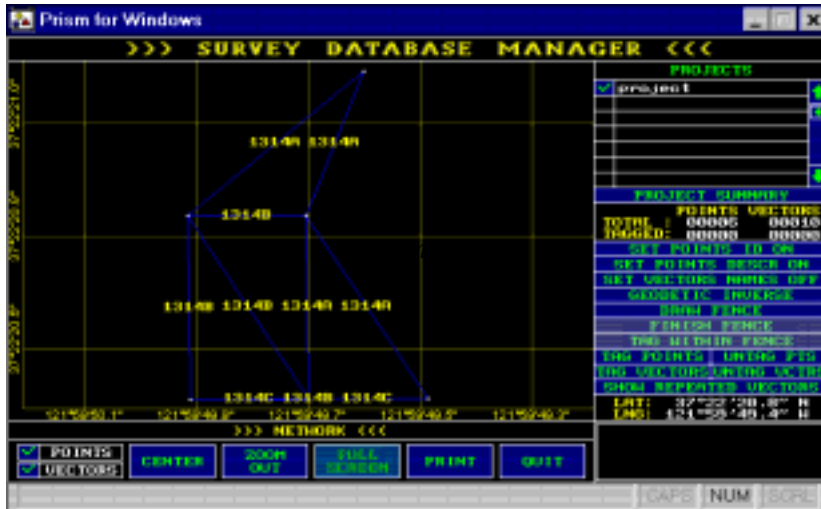


Figure 3.53: Vectors with Labels

You can turn on point ids or descriptors in order to see the names at the ends of the vectors even when you have de-selected points in the points/vectors switch.

To get the geodetic inverse results:

1. Click on a point; it will turn green.
2. Click on the ACCEPT button. The point changes to magenta.
3. Pick up a second point. (SDBM automatically cancels the previous description for you.)
4. Click on the ACCEPT button again. The second point will change to magenta.
5. Click on the GEODETIC INVERSE button.

SHOW REPEATED VECTORS is a toggle. Click on it to make it active. When active

and multiple vectors are encountered, they are displayed in light blue. (Single vectors are displayed in dark blue.) When the function is active, it shows that the OFF function is available.

When it is active, SDBM will display vectors as soon as the number of records displayed in the window drops below the established limit (10,000 vectors).

DRAW FENCE lets you choose several points or vectors as a group by enclosing an area of interest within an irregular shape. The procedure is:

1. Click on DRAW FENCE to activate it.
2. To make the shape, click on several spots in sequence. As you go from spot to spot, SDBM will display a magenta line.
3. To close the shape, you can click on (or near) the first spot a second time or you can select the FINISH FENCE button.

You can connect up to 100 points in creating one fence. If you reach this limit, SDBM will explain the situation in an error message; press a button to continue.

When the DRAW FENCE option is active, all another options (except FINISH FENCE) are disabled. You can cancel DRAW FENCE by pressing the mouse's right button.

TAG WITHIN tags all the points and vectors within the enclosed area (fence) and report on the results in a message such as 108 POINT(S) AND 0 VECTOR(S) TAGGED WITHIN FENCE. Previously tagged points (globally tagged) will be included in the count. Press a button to continue.

TAG ALL POINTS/UNTAG ALL POINTS

TAG ALL VECTORS/UNTAG ALL VECTORS

When points or vectors are tagged, SDBM will display them respectively in cyan and red. The condition is reversible. Untagged points are white and untagged vectors are dark blue. Note that you can tag only what is currently visible on the screen, not necessarily everything in the selected project or database.

View Toolbar

The View Toolbar (Figure 3.54) has five buttons.



Figure 3.54: View Toolbar

POINTS/VECTORS

SDBM has two kinds of records: point and vector. You can switch between points and vectors and choose what kind you want to work on. Specify POINTS when-ever you need to look at point records, VECTORS for vector records. You must specify at least one of them.

The total number of points and/or vectors (depending on your specification) that are currently displayed on the screen will be reported below the PROJECT SUMMARY. When you specify POINTS, no vectors are counted. If you have specified VECTORS only, points which are the ends of vectors are displayed on the screen and included in the point count. This figure reflects those that have been tagged on this screen and those that were globally tagged.

CENTER spreads the points and vectors throughout the window, finding the best fit based on the minimum and maximum latitude and longitude of the records enclosed by the green rectangle.

For example, in Figure 3.55, CENTER was pressed and SDBM displayed 10 vectors and 1386 points with the appropriate vertical (and correspondingly appropriate horizontal) scale.

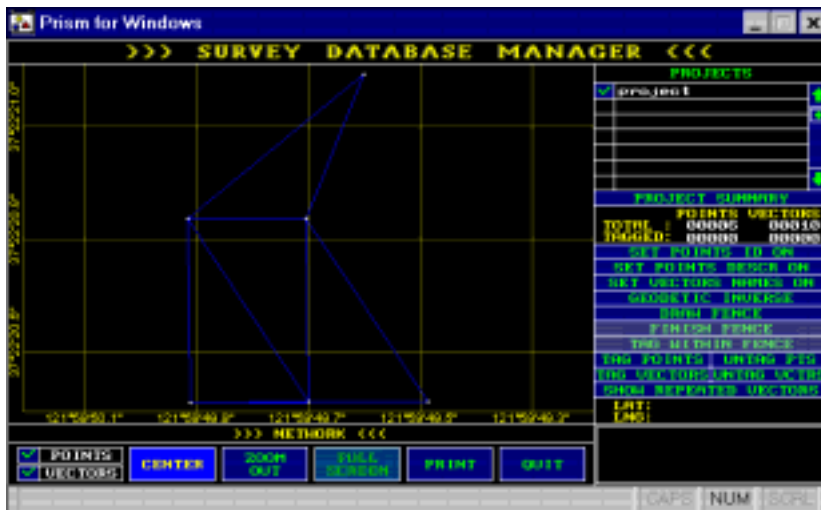


Figure 3.55: Points Displayed with Center Option

ZOOM OUT returns to the top level where the entire project is displayed.

PRINT sends a copy of the entire screen to the printer specified on the Setup option. The panel and menu will drop from full color to black and white during the capture. As with other graphics-intensive operations, the capture may take a while, up to three minutes. After the capture is complete, the color and functionality return.

FULL SCREEN This function is unavailable.

QUIT exits from the View option and returns to the Survey Database Manager's Options Grid.

Reference Tables

The following sections contain important tables that are accessed from a number of screens:

- Datum Table
- Quality Table

The following tables contain important information accessed from a number of screens:

- Datum table
- Quality Table
- NAD27 State-Plane Coordinate Zone Codes
- NAD83 State-Plane Coordinate Zone Codes

The Datum List

Table A.1: Datums

Datum
WGS 1984
NAD 1983
NAD 1927
QORNOQ
HJORSEY 1955
Naparima
Prov South America 1956
Corrego Alegre
Chua Astro
Campo Inchausp
Yacare
European 1950
O.S. Great Britain 1936
Ireland 1965
Tana Obsv 1925
Tokyo
Hu-Tzu-Shan
Luzon
Indonesia 1974

Table A.1: Datums (continued)

Datum
Australian Geo
Geo Datum 1949

The Quality List

Table A.2: Quality Quantifications

Identified	Description
AA	AA order
A	A order
B	B order
1	First order
2	Second order
21	Second order, class 1
22	Second order, class 2
3	Third order
31	Third order, class 1
32	Third order, class 2
4	Fourth order
60	Unadjusted vector
61	Differential code
62	Single point position
70	Scaled position
80	Station Disturbed
90	Station Destroyed

NAD27 State-Plane Coordinate Zone Codes

Table A.3: State-Plane Coordinate Codes

CODE	STATE	ZONE	PROJECTION
0101	Alabama	East	Transverse Mercator
0102	Alabama	West	Transverse Mercator\
0201	Arizona	East	Transverse Mercator
0202	Arizona	Central	Transverse Mercator
0203	Arizona	West	Transverse Mercator
0301	Arkansas	North	Lambert
0302	Arkansas	South	Lambert
0401	California	I	Lambert
0402	California	II	Lambert
0403	California	III	Lambert

Table A.3: State-Plane Coordinate Codes (continued)

CODE	STATE	ZONE	PROJECTION
0404	California	IV	Lambert
0405	California	V	Lambert
0406	California	VI	Lambert
0407	California	VII	Lambert
0501	Colorado	North	Lambert
0502	Colorado	Central	Lambert
0503	Colorado	South	Lambert
0600	Connecticut		Lambert
0700	Delaware		Transverse Mercator
0901	Florida	East	Transverse Mercator
0902	Florida	West	Transverse Mercator
0903	Florida	North	Lambert
1001	Georgia	East	Transverse Mercator
1002	Georgia	West	Transverse Mercator
1101	Idaho	East	Transverse Mercator
1102	Idaho	Central	Transverse Mercator
1103	Idaho	West	Transverse Mercator
1201	Illinois	East	Transverse Mercator
1202	Illinois	West	Transverse Mercator
1301	Indiana	East	Transverse Mercator
1302	Indiana	West	Transverse Mercator
1401	Iowa	North	Lambert
1402	Iowa	South	Lambert
1501	Kansas	North	Lambert
1502	Kansas	South	Lambert
1601	Kentucky	North	Lambert
1602	Kentucky	South	Lambert
1701	Louisiana	North	Lambert
1702	Louisiana	South	Lambert
1703	Louisiana	Offshore	Lambert
1801	Maine	East	Transverse Mercator
1802	Maine	West	Transverse Mercator
1900	Maryland		Lambert
2001	Massachusetts	Mainland	Lambert
2002	Massachusetts	Island	Lambert
2101	Michigan	East	Transverse Mercator

Table A.3: State-Plane Coordinate Codes (continued)

CODE	STATE	ZONE	PROJECTION
2102	Michigan	Central	Transverse Mercator
2103	Michigan	West	Transverse Mercator
2111	Michigan	North	Lambert
2112	Michigan	Central	Lambert
2113	Michigan	South	Lambert
2201	Minnesota	North	Lambert
2202	Minnesota	Central	Lambert
2203	Minnesota	South	Lambert
2301	Mississippi	East	Transverse Mercator
2302	Mississippi	West	Transverse Mercator
2401	Missouri	East	Transverse Mercator
2402	Missouri	Central	Transverse Mercator
2403	Missouri	West	Transverse Mercator
2501	Montana	North	Lambert
2502	Montana	Central	Lambert
2503	Montana	South	Lambert
2601	Nebraska	North	Lambert
2602	Nebraska	South	Lambert
2701	Nevada	East	Transverse Mercator
2702	Nevada	Central	Transverse Mercator
2703	Nevada	West	Transverse Mercator
2800	New Hampshire		Transverse Mercator
2900	New Jersey		Transverse Mercator
3001	New Mexico	East	Transverse Mercator
3002	New Mexico	Central	Transverse Mercator
3003	New Mexico	West	Transverse Mercator
3101	New York	East	Transverse Mercator
3102	New York	Central	Transverse Mercator
3103	New York	West	Transverse Mercator
3104	New York	Long Island	Lambert
3200	North Carolina		Lambert
3301	North Dakota	North	Lambert
3302	North Dakota	South	Lambert
3401	Ohio	North	Lambert
3402	Ohio	South	Lambert
3501	Oklahoma	North	Lambert

Table A.3: State-Plane Coordinate Codes (continued)

CODE	STATE	ZONE	PROJECTION
3502	Oklahoma	South	Lambert
3601	Oregon	North	Lambert
3602	Oregon	South	Lambert
3701	Pennsylvania	North	Lambert
3702	Pennsylvania	South	Lambert
3800	Rhode Island		Transverse Mercator
3901	South Carolina	North	Lambert
3902	South Carolina	South	Lambert
4001	South Dakota	North	Lambert
4002	South Dakota	South	Lambert
4100	Tennessee		Lambert
4201	Texas	North	Lambert
4202	Texas	North Central	Lambert
4203	Texas	Central	Lambert
4204	Texas	South Central	Lambert
4205	Texas	South	Lambert
4301	Utah	North	Lambert
4302	Utah	Central	Lambert
4303	Utah	South	Lambert
4400	Vermont		Transverse Mercator
4501	Virginia	North	Lambert
4502	Virginia	South	Lambert
4601	Washington	North	Lambert
4602	Washington	South	Lambert
4701	West Virginia	North	Lambert
4702	West Virginia	South	Lambert
4801	Wisconsin	North	Lambert
4802	Wisconsin	Central	Lambert
4803	Wisconsin	South	Lambert
4901	Wyoming	East	Transverse Mercator
4902	Wyoming	East Central	Transverse Mercator
4903	Wyoming	West Central	Transverse Mercator
4904	Wyoming	West	Transverse Mercator
5001	Alaska	1	Oblique Mercator
5002	Alaska	2	Transverse Mercator *
5003	Alaska	3	Transverse Mercator *

Table A.3: State-Plane Coordinate Codes (continued)

CODE	STATE	ZONE	PROJECTION
5004	Alaska	4	Transverse Mercator *
5005	Alaska	5	Transverse Mercator *
5006	Alaska	6	Transverse Mercator *
5007	Alaska	7	Transverse Mercator
5008	Alaska	8	Transverse Mercator
5009	Alaska	9	Transverse Mercator
5010	Alaska	10	Lambert
5101	Hawaii	1	Transverse Mercator
5102	Hawaii	2	Transverse Mercator
5103	Hawaii	3	Transverse Mercator
5104	Hawaii	4	Transverse Mercator
5105	Hawaii	5	Transverse Mercator
5201	Puerto Rico & Virgin Islands		Lambert
5202	St. Croix		Lambert
5300	American Samoa		Lambert

* The Alaska zones 2-9 are a special case of Universal Transverse Mercator coordinates. The formulas differ from the other zones listed as Transverse Mercator zones.

NAD83 State-Plane Coordinate Zone Codes

Table A.4: State-Plane Coordinate Zone Codes

SPC	ZONE	CODE	SPC	ZONE	CODE	SPC	ZONE	CODE
AL	E	0101	HI	1	5101	MN	N	2201
	W	0102		2	5102		C	2202
				3	5103		S	2203
AK	1	5001		4	5104			
	2	5002		5	5105	MS	E	2301
	3	5003					W	2302
	4	5004	ID	E	1101			
	5	5005		C	1102	MO	E	2401
	6	5006		W	1103		C	2402
	7	5007					W	2403
	8	5008	IL	E	1201			
	9	5009		W	1202	MT		2500
	10	5010						
			IN	E	1301	NE		2600
AZ	E	0201		W	1302			
	C	0202				NV	E	2701
	W	0203	IA	N	1401		C	2702
				S	1402		W	2703
AR	N	0301						
	S	0302	KS	N	1501	NH		2800
				S	1502			
CA	1	0401				NJ		2900
	2	0402	KY	N	1601			
	3	0403		S	1602	NM	E	3001
	4	0404					C	3002
	5	0405	LA	N	1701		W	3003
	6	0406		S	1702			
				SH	1703	NY	E	3101
CO	N	0501					C	3102
	C	0502	ME	E	1801		W	3103
	S	0503		W	1802		L	3104
Ct		0600	MD		1900	NC		3200
DE		0700	MA	M	2001	ND	N	3301

Table A.4: State-Plane Coordinate Zone Codes (continued)

SPC	ZONE	CODE	SPC	ZONE	CODE	SPC	ZONE	CODE
				I	2002		S	3302
FL	E	0901						
	W	0902	MI	N	2111	OH	N	3401
	N	0903		C	2112		S	3402
				S	2113			
GA	E	1001				OK	N	3501
	W	1002					S	3502
OR	N	3601	TX	N	4201	WV	N	4701
	S	3602		NC	4202		S	4702
				C	4203			
PA	N	3701		SC	4204	WI	N	4801
	S	3702		S	4205		C	4802
							S	4803
RI		3800	UT	N	4301			
				C	4302	WY	E	4901
SC		3900		S	4303	WY	EC	4902
						WY	WC	4903
SD	N	4001	VT		4400	WY	W	4904
	S	4002						
VA	N	4501	VI	PR	5200			
TN		4100		S	4501			
			WA	N	4601	AS	5300	
				S	4602			
						GU	5400	

