C H A P T E R

3

Importing Spatial Data

Overview

SAS/GIS software organizes its spatial database in SAS data sets and SAS catalog entries. Spatial data may be available from some vendors in this native SAS/GIS format, but any spatial data that are not in this form must be imported before they can be used with SAS/GIS software. SAS/GIS software provides interactive facilities for importing spatial data from the following formats:

☐ Uncompressed ARC/INFO transport files (E00)

   Produced by ARC/INFO software from Environmental Systems Research Institute, Inc. (ESRI)

☐ Digital Line Graph files (DLG)

   From the U.S. Geological Survey and commercial data vendors

☐ Drawing Interchange File (DXF)

   Produced by a variety of mapping and CAD software packages

□ Dynamap files

From Geographic Data Technology, Inc. (GDT)

□ SAS/GRAPH map data sets

Provided with SAS/GRAPH software

□ Topologically Integrated Geographic Encoding and Referencing files (TIGER)

From the U.S. Census Bureau and commercial data vendors

□ MapInfo files (MIF and MID)

From MapInfo Corporation.

SAS/GIS software also supports a generic format to accommodate other sources of spatial data for which no explicit importing facility is provided. You can use SAS DATA steps to translate your spatial data into the generic format and then use SAS/GIS software to complete the process of importing it into a SAS/GIS spatial database. See "Importing Generic Spatial Data" on page 33 for more information on the generic import types.

The GIS Spatial Data Importing Window

The GIS Spatial Data Importing window provides an interactive facility for importing spatial data from other formats into SAS/GIS spatial databases. Use the GIS Spatial Data Importing window to specify the type of spatial data to import. To open the GIS Spatial Data Importing window, select:

| File | ► | Import... |

from the GIS Map window's menu bar, or select **Import...** from the map pop-up menu when no map is displayed.

Display 3.1 on page 24 shows the GIS Spatial Data Importing window.

Display 3.1 GIS Spatial Data Importing window
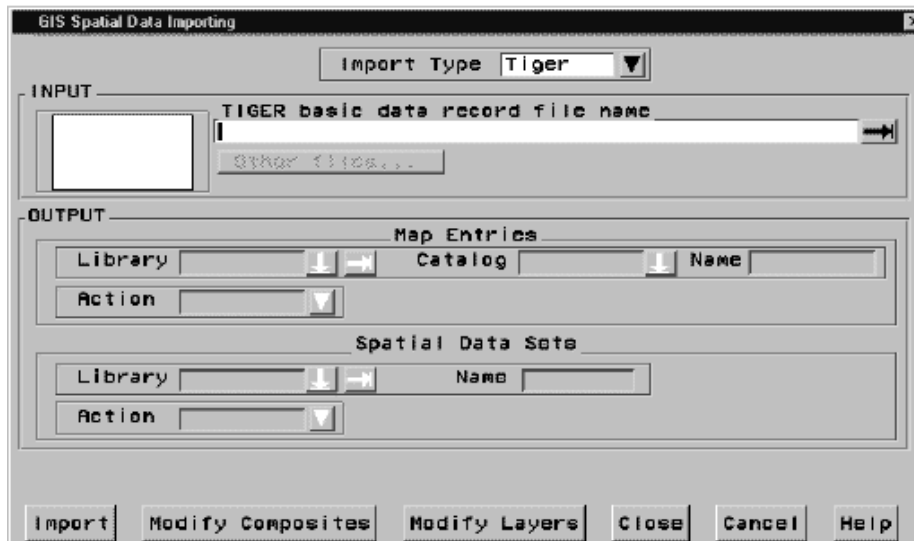
Elements of the Importing Window

The GIS Spatial Data Importing window is divided into the following areas:

□ Import Type

□ Input

□ Output

□ Command Buttons

The Import Type Area

Use the `Import Type` field to specify the type of data you want to import. Click on the pull-down control to the right of the `Import Type` field to display a list of available data types. Select a data type from this list to display it in the field.

The Input Area

Use the Input area of the window to specify the location of the spatial data files that you want to import. Additional information about each type of data is presented later in this chapter.

The Input area contains three elements:

□ A list box, which can contain the names of variables you can select as ID variables or LAYER variables. ID variables apply only to SASGRAPH and GENPOLY import types. LAYER variables apply only to GENLINE and GENPOINT import types.

□ A filename field, which displays the name of the spatial data file. You can either enter the name in the field or use the pull-out control to display the Open window and select the file.

Note: If you are selecting an import for an external file, the pull-out menu opens the Open window. However, if the import type is SAS/GRAPH or generic (SAS data set), the Select a Member window appears so you can select a SAS data set. △

□ An ⬚Other Files...⬚ button, which allows you to select other files that are associated with the main spatial data file.

Note: The ⬚Other Files...⬚ button applies to the TIGER, MAPINFO, and DYNAMAP import types. Other data types may not have any additional spatial data files. △

The Output Area

The Output area of the window contains the following two sections:

`Map Entries`
Specify the storage location of the spatial database in this area.

The `Library` field contains the name of the libref that you want to contain the catalog and its entries. You can type the name of an existing libref in the field, use the pull-down menu to select an existing libref, or use the pull-out menu to assign a new libref.

The `Catalog` field contains the name of the SAS catalog that you want to contain the spatial database entries. You can type the name of a new catalog to be created, type the name of an existing catalog, or use the pull-down control to select an existing catalog.

The `Name` field contains the name for the GIS map. By default, the `Name` field contains the `name` of the spatial data import type, for example, TIGER, ARC, DXF, and so forth. You can supply your own GIS map name in the `Name` field. This

name also is used for the coverage entry and as the base name of the polygonal index data set by using the first three letters of the name, and then by adding the first five (up to five) letters of the layer name.

The **Action** field lets you select options regarding the catalog entries. The pull-down control to the right of the field contains the following options:

CREATE
   Creates new catalog entries.

REPLACE
   Overwrites existing catalog entries. REPLACE will create new catalog entries if no entries exist for it to overwrite.

UPDATE
   Updates existing catalog entries.

Spatial Data Sets
   Specify the name of the SAS data library in which the chains, nodes, details, and polygonal index data sets are stored along with the base name for the data sets and spatial entry.

   The **Library** field contains the name of the libref that you want to contain the data sets. You can type the name of an existing libref in the field, use the pull-down control to select an existing libref, or use the pull-out control to assign a new libref.

   The **Name** field contains the base name of the data sets. The chains, nodes, and details data set names are formed by adding a C, N, or D, respectively, to this base name. The base name is also used as the name for the spatial entry in the catalog.

   The **Action** field lets you select options regarding the data sets. The pull-down control to the right of the field contains the following options:

CREATE
   Creates new data sets.

REPLACE
   Overwrites existing data sets. REPLACE creates new data sets if no data sets exist for it to overwrite.

APPEND
   Appends to existing data sets.

Command Buttons

The command buttons appear in a row along the lower edge of the GIS Spatial Data Importing window. Use these buttons to perform actions on your data sets, open the SAS/GIS online help, or close the window. The following list describes the different functions of the command buttons:

Import
   Starts the importing process, provided that all required information has been supplied.

Modify Composites
   Opens a window to view and modify the default composites that are created during the import.

Modify Layers
   Opens a window to view and modify the default layer definitions that are created during the import.

Close
   Closes the GIS Spatial Data Importing window and returns to the GIS Map window with the imported map displayed.

Cancel
Closes the GIS Spatial Data Importing window. If a map was imported, it is not displayed in the GIS Map window.

Help
Opens the online Help facility for the GIS Spatial Data Importing window. The Help provides details on the steps for importing the corresponding type of spatial data.

Common Importing Procedures

The following instructions detail the process that is common to importing all accepted types of spatial data. For additional information about preparing and importing specific types of data, see the sections that follow.
To import spatial data:

1 Select
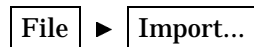
| File | ▶ | Import... |

from the GIS Map window's menu bar or select **Import...** from the map pop-up menu when no map is displayed.

The GIS Spatial Data Importing window appears.

2 Select the type of data to import from the **Import Type** field pull-down control.

3 Select the file to import from the pull-out control to the right of the filename field in the Input area. Or, you can supply the path and filename or SAS data set name in this field.

After you have selected an input file, the OUTPUT fields are filled with the default values. See "The SASHELP.GISIMP Data Set" on page 40 for information about changing the default values.

4 Modify the default composites, if needed. Select Modify Composites and make your changes in the Import window that appears. This step is optional. See "Defining Composites in Imported Data" on page 36 for more information.

Note: The composite definitions in the GIS Import window can have a status of either Keep or Drop. Associations with the Drop status are not included in the SAS/GIS spatial database even though they appear in the variable list in the GIS Import window. △

5 Modify the layers, if needed. Select Modify Layers and make your changes in the Import window that appears. This step is optional. See "Defining Layers in Imported Data" on page 38 for more information.

6 Modify the **Library**, **Catalog**, **Name**, and **Action** field information in the Map Entries area to specify the destination location of the catalog and its entries.

Note: The **Library**, **Catalog**, **Name**, and **Action** fields contain default values that are based on the input file that you selected earlier in this process. You can modify these values or accept the defaults. △

7 Modify the **Library**, **Name**, and **Action** field information in the Spatial Data Sets area to specify the destination location of the spatial data sets.

Note: These fields contain default values based on the input file you selected earlier in the import process. You can modify these values or accept the defaults. △

8 Select the Import button.

Once the import has finished, the following message appears in the window message bar:

```
Import Complete. Close this window to display the map.
```

CAUTION:

Be careful when you are using Modify Composites and Modify Layers , especially when appending new information to an existing map. Modifying the default composites and layers can cause unexpected results or errors. If you are unsure about making modifications, you should keep the default composites and layers as they are during importing. After you import the map, you can view it and review the composites and layers that were created and then use PROC GIS to make modifications later. △

Importing ARC/INFO Data

ARC/INFO software supports several different spatial data formats, but SAS/GIS software can only import spatial data that have been exported from ARC/INFO software in uncompressed transport format (sometimes called E00 files because the transport files have the extension **.e00** by default). If you do not know whether a file is compressed, open the file with a host editor. If you can read text in the file, it is not compressed.

To import spatial data in uncompressed ARC/INFO format by using the GIS Spatial Data Importing window:

1 Select ARC using the Import Type pull-down control.

The title of the filename field in the Input area changes to **ARC/INFO Coverage export filename**.

2 Specify the path to the desired ARC/INFO file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then by selecting the file from that window.

By default, SAS/GIS expects ARC/INFO files to have an extension of **.e00**.

SAS/GIS allocates the SAS fileref ARCIN to the import path that you specified in the filename field. If you allocate the fileref ARCIN to the desired file before you begin the import process, the filename and path appears in the filename field automatically.

3 Modify the destination information for the catalog and the spatial data sets, if needed.

4 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

5 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing DLG Data

To import spatial data in Digital Line Graph (DLG) format by using the GIS Spatial Data Importing window:

1 Select DLG by using the Import Type pull-down control.

The title of the filename field in the Input area changes to `Digital Line Graph filename`.

2 Specify the path to the desired DLG file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then selecting the file from that window. SAS/GIS software checks whether the DLG file type is Standard or Optional and processes the types accordingly.

SAS/GIS allocates the SAS fileref DLGIN to the import path that you specified in the filename field. If you allocate the fileref DLGIN to the desired file before beginning the import process, the filename and path appear in the filename field automatically.

3 Modify the destination information for the catalog and the spatial data sets, if needed.

4 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information. No more than one layer of each type can be created from a DLG file. The fields for any layer types that cannot be created are grayed.

5 Select | Import | to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing DXF Data

To import spatial data in Drawing Interchange File (DXF) format by using the GIS Spatial Data Importing window:

1 Select DXF by using the Import Type pull-down control.

The title of the filename field in the Input area changes to `DXF filename`.

2 Specify the path to the desired DXF file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then by selecting the file from that window.

SAS/GIS allocates the SAS fileref DXFIN to the import path that you specified in the filename field. If you allocate the fileref DXFIN to the desired file before beginning the import process, the filename and path appear in the filename field automatically.

3 Modify the destination information for the catalog and the spatial data sets, if needed.

4 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

5 Select | Import | to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing Dynamap Data

To import spatial data in Dynamap format by using the GIS Spatial Data Importing window:

1 Select Dynamap by using the Import Type pull-down control.

   The title of the filename field in the Input area changes to `Dynamap basic data record filename`.

2 Specify the path to the desired Dynamap basic data record file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then by selecting the file from that window. The basic data record file is a Type 1 Dynamap file, and it contains a record for each line segment in the file. This file is required.

   SAS/GIS software allocates the SAS fileref GDT1 to the import path that you specified in the filename field. If you allocate the fileref GDT1 to the desired file before beginning the import process, the filename and path appear in the filename field automatically.

3 Select Other Files...

   A window appears and displays filename fields for the remainder of the Dynamap files that are needed. If the files are in the same directory as the basic data record file, the path is specified automatically. Specify the following files:

   Shape coordinate points
   Provides additional coordinates that describe the shape of each line segment, for example, a curve in the road. These coordinates are SAS/GIS detail points. This file is a Type 2 Dynamap file and has a corresponding fileref of GDT2. This file is required.

   Index to alternate feature names
   If a line segment has more than one feature name, for example, Main St. and State Highway 1010, the names are in this file. This file is a Type 4 Dynamap file and has a corresponding fileref of GDT4. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox.

   Feature name list
   Provides a list of all unique feature names. This file is a Type 5 Dynamap file and has a corresponding fileref of GDT5. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox.

   Additional address and ZIP code data
   Provides additional address range information if the address information cannot be presented as a single address range. This file is a Type 6 Dynamap file and has a corresponding fileref of GDT6. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox.

   Select OK when you have specified the paths for the Dynamap files to return to the GIS Spatial Data Importing window.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing MapInfo Data

To import spatial data in MapInfo (MIF and MID) format by using the GIS Spatial Data Importing window:

1 Select Mapinfo by using the Import Type pull-down control.

The title of the filename field in the Input area changes to **MAPINFO MIF filename**.

2 Specify the path to the desired MapInfo MIF file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then by selecting the file from that window. The MIF file has an extension of **.mif** and contains graphic objects.

SAS/GIS allocates the SAS fileref MIF to the import path that you specified in the filename field. If you allocate the fileref MIF to the desired file before beginning the import process, the filename and path appear in the filename field automatically.

3 Select Other Files… , and then enter or select the path for the MapInfo MID file in the window that appears. If the MID file is in the same directory as the MIF file, SAS/GIS software automatically sets the path to the MID file. The MID file has an extension of **.mid** and contains tabular data. SAS/GIS allocates the SAS fileref MID to the import path that you specified in the filename field. If you allocate the fileref MID to the desired file before beginning the import process, the filename and path appears in the filename field automatically.

Select OK when you have specified the path for the MID file to return to the GIS Spatial Data Importing window.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing SAS/GRAPH Map Data Sets

To import spatial data in SAS/GRAPH format by using the GIS Spatial Data Importing window:

1 Select SASGRAPH using the Import Type pull-down control.

The title of the filename field in the Input area changes to **SAS/GRAPH data set**.

2 Specify the library and data set name of the desired SAS/GRAPH data, either by typing the data set name in the data set name field or by using the pull-out control to display a Select A Member window, and then by selecting the data set from that window.

3 Select the variables in the input data set that you want to use as ID variables by selecting them in the **ID Vars** field. ID variables are variables whose values uniquely identify unit areas in the map. Typical ID variables in SAS/GRAPH maps are COUNTRY, ID, STATE, and COUNTY. A separate layer is created for

each ID variable. The ID variables must be selected in hierarchical order. For example, if the data set contains both STATE and COUNTY variables, then STATE must be selected before COUNTY.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select $\boxed{\text{Import}}$ to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing TIGER Data

To import spatial data in Topologically Integrated Geographic Encoding and Referencing (TIGER) format using the GIS Spatial Data Importing window:

1 Select Tiger by using the Import Type pull-down control.

The title of the filename field in the Input area changes to **TIGER basic data record filename**.

2 Specify the path to the desired TIGER basic data record file, either by typing the path in the filename field or by using the pull-out control to display an Open window, and then by choosing the file from that window.

Each TIGER map consists of a set of files with names of the form TGR*ssccc*.F*vn*, where

ss	is the two-digit FIPS code for the state.
ccc	is the three-digit FIPS code for the county.
	Note: Refer to the documentation that accompanies the TIGER data for a directory of the FIPS codes for each state and county. △
v	identifies the TIGER version number.
n	identifies the TIGER record type. The basic data record is Type 1.

SAS/GIS allocates the SAS fileref TIGER1 to the import path that you specified in the filename field. If you allocate the fileref TIGER1 to the desired file before beginning the import process, the filename and path appear in the filename field automatically.

3 Select $\boxed{\text{Other Files...}}$, and then type or select the path for the other TIGER data files in the window that appears. If the files are in the same directory as the basic data record file, SAS/GIS software automatically sets the path to the other files. Specify the following files:

Shape coordinate points
  Provides additional coordinates that describe the shape of each line segment, for example, a curve in the road. These coordinates are SAS/GIS detail points. This file is required and is selected by default. This file is a Type 2 TIGER file. SAS/GIS allocates the SAS fileref TIGER2 to this path.

Index to alternate feature names
>If a line segment has more than one feature name, for example, Main St. and State Highway 1010, the names are in this file. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox. This file is a Type 4 TIGER file. SAS/GIS allocates the SAS fileref TIGER4 to this path.

Feature name list
>Provides a list of all unique feature names. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox. This file is a Type 5 TIGER file. SAS/GIS allocates the SAS fileref TIGER5 to this path.

Additional address and ZIP code data
>Provides additional address range information if the address information cannot be presented as a single address range. This file is optional and is not selected by default. To read in the data from this file, select the Read On/Off checkbox. SAS/GIS allocates the SAS fileref TIGER6 to this path.

Select OK when you have specified the paths for the TIGER files to return to the GIS Spatial Data Importing window.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

Note: By default, the following composites are assigned Drop status and will not appear in the imported data:

AIR

ANC

IADDR

RECTYP

SIDECODE

SOURCE

△

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing Generic Spatial Data

SAS/GIS software provides facilities for creating spatial databases from SAS data sets that contains the following types of generic spatial data:

point   - **GENPOINT** - consists of discrete points

line   - **GENLINE** - consists of discrete line segments

polygon   - **GENPOLY** - consists of areas that are enclosed by polylines.

You can use the following import methods if your data are in a format other than the specific import types that were discussed earlier.

Importing Generic Point (GENPOINT) Data

To import a SAS data set that contains point data by using the GIS Spatial Data Importing window:

1 Select Genpoint by using the Import Type pull-down control.

The title of the filename field in the Input area changes to **SAS/GIS Generic Point data set**.

2 Specify the desired SAS data set, either by typing the location in the data set field or by using the pull-out control to display the Select a Member window, and then by selecting the data set from that window.

The point data set must contain at least the following variables:

X   east-west coordinate of the point

Y   north-south coordinate of the point

ID   identifier value for the point.

> *Note:*   Each observation in the data set must have a unique value for the ID variable. △

The data set can also contain other variables, for example, variable to define characteristics of the points.

3 Select the variable in the input data set that you want to use as an ID variable by selecting it in the **ID Vars** field. SAS/GIS software performs a frequency analysis on the values of the specified variable in the point data set and creates a point layer for each unique value of the specified variable. If you specify more than 16 layers, only the first 16 are added to the map. If you do not specify a layer variable, the resulting map will have a single point layer with the same name as the original point data set.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing Generic Line (GENLINE) Data

To import a SAS data set that contains line data by using the GIS Spatial Data Importing window:

1 Select Genline using the Import Type pull-down control.

The title of the filename field in the Input area changes to **SAS/GIS Generic Line data set**.

2 Specify the desired SAS data set, either by typing the location in the data set field or by using the pull-out control to display the Select a Member window, and then by selecting the data set from that window.

The line data set must contain at least the following variables:

X   east-west coordinate of a point on the line

Y   north-south coordinate of a point on the line

ID   identifier value for the line

>   *Note:*   Each line in the data set must have a unique ID value, and all observations for the points on each line must have the same value for the ID variable. △

The data set can also contain other variables, for example, variables to define characteristics of the lines.

3 Select the variable in the input data set that you want to use as an ID variable by selecting it in the **ID Vars** field. SAS/GIS software performs a frequency analysis on the values of the specified variable and creates a line layer for each unique value of the specified variable. If more than 16 layers are created, only the first 16 are added to the map by default. If you do not specify a layer variable, the resulting map will have a single line layer with the same name as the original line data set.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Importing Generic Polygon (GENPOLY) Data

To import a SAS data set that contains polygon data by using the GIS Spatial Data Importing window:

1 Select Genpoly using the Import Type pull-down control.

The title of the filename field in the Input area changes to **SAS/GIS Generic Polygon data set**.

2 Specify the desired SAS data set, either by typing the location in the data set field or by using the pull-out control to display the Select a Member window, and then by selecting the data set from that window.

The polygon data set must contain at least the following variables:

X   east-west coordinate of a point on the polygon boundary

Y   north-south coordinate of a point on the polygon boundary

ID-name(s)   identifier value(s) for the polygonal area.

>   *Note:*   Each polygonal area in the data set should have unique identifier values, and all observations for the points in each area should have the same identifier value. A polygonal area can consist of more than one polygon, in which case the data set should also contain a SEGMENT variable to distinguish the individual polygons. △

Any other variables in the data set will not be included in the spatial database.

3 Select the variables in the input data set that you want to use as ID variables by selecting them in the **ID Vars** field. ID variables are variables whose values uniquely identify unit areas in the map. A separate layer is created for each ID variable. The ID variables must be selected in hierarchical order. For example, if the data set contains both STATE and COUNTY variables, then STATE must be selected before COUNTY.

4 Modify the destination information for the catalog and the spatial data sets, if needed.

5 Modify the default layers and composites, if needed. See "Common Importing Procedures" on page 27 for more information.

6 Select Import to import the data. When the import process is complete, a message is displayed in the window message bar to indicate whether the import was successful. You can proceed with another import or close the window to display the newly imported map.

Defining Composites in Imported Data

As a preliminary step to actually importing your data, the import process identifies all composites that will be created by the import. A composite defines the role that a variable (or variables) play in the spatial data, and how they should be used to represent features on the map. With the exception of the TIGER and DYNAMAP import types, which have a standard set of predefined composites, the composites are based on attributes that are found in the input data. Then, during the import, the composites are actually created. However, you have the opportunity to review the default composites before the import takes place, and you can modify them if you choose.

Once you have filled out the INPUT and OUTPUT sections on the GIS Spatial Data Importing window, you can select Modify Composites (before you select Import). This action will open the Import window as shown in Display 3.2 on page 36.

Display 3.2 Reviewing and Editing Composite Definitions
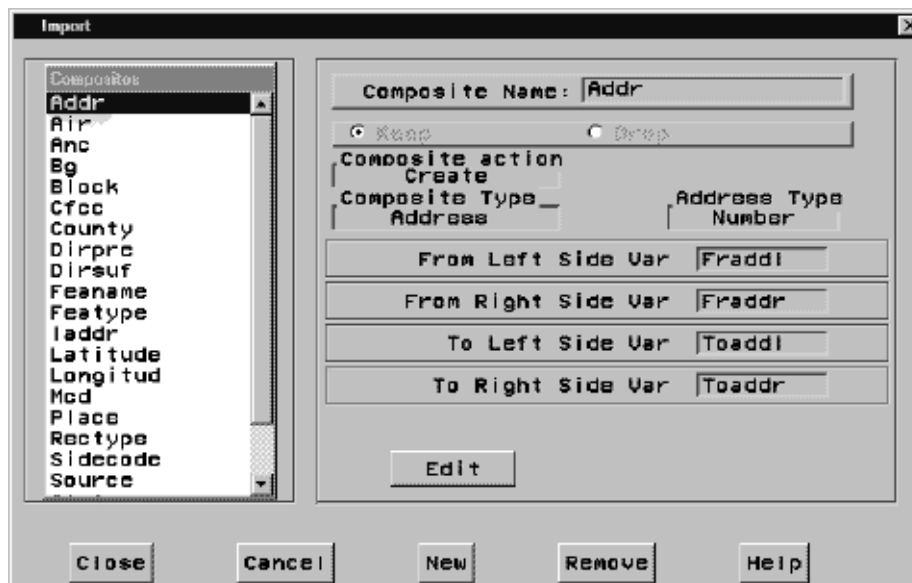
When the window is first displayed, only the Composites list is shown. This list contains all of the composites that will be created for this import, in addition to composites that are found in maps that are being appended to. To review a composite, click on its name in the Composites list box. The other fields in the window are then displayed. The values in these fields are used to define the composite.

To modify the definition of the selected composite, click ⌷Edit⌷ and all the fields will become editable. When you are finished editing, click ⌷Save⌷ if you want to save your changes or ⌷Cancel⌷ if you do not want to save the changes.

Table 3.1 on page 37 describes each of the fields and their uses.

Table 3.1   Import Window Fields and Buttons for Modifying Composites

Text Fields/Buttons	Type	Use
Composite Name	Text	Allows you to change the composite name.
Keep/Drop	Button	If Drop is selected, all the variables that define the composite are dropped from the spatial data sets; otherwise, they are kept.
Composite Action	Text	This is an noneditable field and notes if the composite will be created or replaced.
Composite Type	Text	This field defines the composite type. Modify this value by clicking the down arrow next to the field and selecting one of the types from the list.
Address Type	Text	This field is visible only for the Address composite type. Modify this value by clicking the down arrow next to the field and selecting one of the types from the list.
SAS variables	Text	The SAS variables that define the composite are listed in separate fields. There may be as many as four of these fields, depending on the composite type. You may either type in these fields, or click the pull-down control next to the field to access the list of available variables. You'll notice, however, that the pull-down controls aren't visible until one of the other composites has been removed. Then, the list will contain the SAS variables that belonged to the composite that was removed.

| Text Fields/Buttons	Type	Use
Polygonal	Checkbox	This checkbox indicates whether polygonal index data set will be created for this composite. This is valid only for Area type composites. Toggling this checkbox hides and displays the **Index DS** (Data Set) field.
Index DS	Text	You may type in the name of the index data set or use the pull-out control to bring up the Select a Member window to select a SAS data set.

The command buttons are used to perform window-wide functions. The ⬚Close⬚ button closes the window and saves all changes that you made. The ⬚Cancel⬚ button closes the window and cancels all changes that you made. The ⬚New⬚ button allows you to define a new composite. The ⬚Remove⬚ button removes the currently selected composite. The ⬚Help⬚ button accesses the Help system.

Defining Layers in Imported Data

In addition to identifying the default composites, a preliminary step of the import is to identify all of the layers that will be created by the import. Each layer represents a set of features on the map and how those features will be displayed. With the exception of the TIGER and DYNAMAP import types, which have a standard set of predefined layer definitions, the layer definitions are based on attributes that are found in the input data. Then, during the import, the layers are actually created. However, you can review the default layer definitions before the import takes place, and you can modify them if you choose.

Before selecting the ⬚Import⬚ button, you have to fill out the INPUT and OUTPUT sections on the GIS Spatial Data Importing window. Then you can select the ⬚Modify Layers⬚ button, which opens the Import window as shown in Display 3.3 on page 38.

Display 3.3   Import Window —Modifying Layers
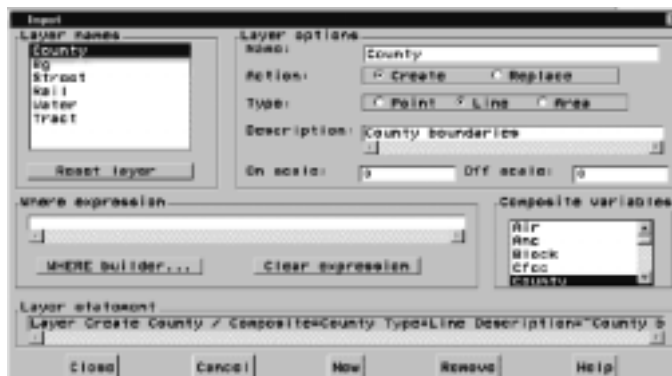
When the window is first displayed, the first layer in the Layer Names list is selected and its definition is displayed in the window. This list contains all of the layers that will be created for this import. To review a layer, click on its name in the Layer Names list box. All of the information in the window will be updated for the selected layer. You can now modify any of the fields. Unlike the Import window for modifying composites, all the fields in the window, except the **Layer Statement** field, are immediately editable, and none are hidden. Table 3.2 on page 39 describes each of the fields and their uses.

Table 3.2   Import Window Fields for Modifying Layers

Text Fields/Buttons	Type	Use
Layer Names	List	Selectable list of layer names.
Reset Layer	Button	This button is used to reset the layer definition to the way it was initially (with the exception of the layer name).
Name	Text	To change the layer name, type another name in this field.
Action	Button	Choices are either CREATE or REPLACE.
Type	Button	Specifies the type of layer to be created or replaced. Choices are POINT, LINE, or AREA. By default, one of these will be selected, but you can change it to either of the others.
Description	Text	A description for the layer.
On/Off Scale	Text	Defines the scale at which to turn the layer on and off. The default is 0.
Where Expression	Text	Specifies the expression to be used to define features for the layer. You can type directly in this field. Invalid expressions are flagged.
Where Builder	Button	Clicking this button brings up the WHERE window, which allows you to build a valid WHERE expression. When the WHERE window is closed, the resulting expression is displayed in the **Where Expression** field.
Clear Expression	Button	Clears the WHERE expression.

Text Fields/Buttons	Type	Use
Composites Variables	List	This list contains all the composites that are defined for this import. Selecting a composite inserts it in the layer statement.
Layer Statement	Text	This is a noneditable text field that displays the layer statement as it will appear when it is sent to the GIS procedure by the import.

The command buttons are used to perform window-wide functions. The Close button closes the window and saves all changes that you made. The Cancel button closes the window and cancels all changes that you made. The New button allows a new layer to be defined. The Remove button removes the currently selected layer. The Help button accesses the Help system.

The SASHELP.GISIMP Data Set

You can manually change the values for the destination location each time you import data. However, you can also set new default values that will be in effect for each subsequent import unless you manually declare specific values for an import. Use caution when changing these values because the import has predefined values in the SASHELP.GISIMP data set that are needed for the import to complete.

The SASHELP.GISIMP data set supplies values that you need to import your spatial data. Included in this data set are two variables, DEFMLIB and DEFSLIB, which are used to supply the default values for the Map Entries Library and the Spatial Data Sets Library. To specify different default values:

1 Edit the SASHELP.GISIMP data set (you must have WRITE access to the SASHELP library).

2 Change the values of the DEFMLIB and the DEFSLIB variables.

   a Change the values of the DEFMLIB variable to the that libref you want to use as the default for the map entries.
   b Change the value of the DEFSLIB variable to the libref that you want to use as the default for the spatial data sets.

3 Save the data set.

4 Reinvoke the Import window.

If the specified libref does not exist, an error message is issued, and the name SASUSER is substituted for the libref.

If you do not have WRITE access to the SASHELP library, and you want to change the default values for the DEFMLIB and DEFSLIB, variables copy the SASHELP.GISIMP data set to an allocated library to which you do have WRITE access. Change the values and save the data set as described above. Before you reinvoke the Import window, you must assign the new location of the GISIMP data set to the macro variable **USER_FIL**. For example, if you copy the SASHELP.GISIMP data set to your SASUSER library, submit the following statement:

```
%LET USER_FIL=SASUSER.GISIMP;
```

If you want to use the default values for a particular import without having to modify the SASUSER.GISIMP data set, you can reset the USER_FIL macro variable to the default SASHELP.GISIMP data set. For example:

```
%LET USER_FIL=SASHELP.GISIMP;
```

The import will use the values in the data set that the USER_FIL macro variable points to.

Building Census Tract Maps

Beginning with Version 7, SAS/GIS software includes a facility for building Census Tract maps for counties in the United States from modified TIGER data that are supplied with SAS/GIS software.

To build Census Tract maps, follow these steps:

1 Define the libref GISMAPS to point to the location where the Census Tract map data were installed by your SAS administrator. For PC or UNIX systems, this libname may point to a CD-ROM.

   Note: Your site administrator may have already assigned the libref for you. △

2 Start SAS/GIS, then select

   File ► Build Census Tract Maps...

   to open the Build Census Tract Map window.

3 With the Geography tab selected, select a state in the State list box. When you select a state, the Available Counties list box is updated to list the state's counties. Display 3.4 on page 41 shows the window with the Geography tab selected.

Display 3.4   Build Census Tract Map Window's Geography Tab
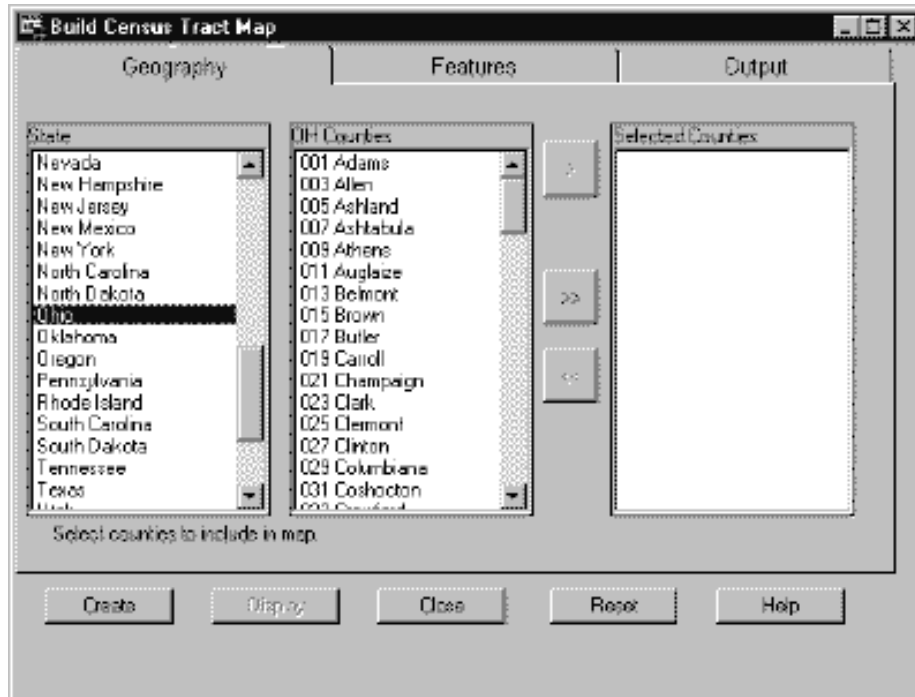
4 To select a county map to build, select the county name in the Available Counties list box and select the right arrow to place the name in the Selected Counties list box.

You can select multiple counties or you can use the right double arrow to select all counties. Note, however, that a large map consisting of several counties requires significant processing time.

5 Select the Features tab, as shown in Display 3.5 on page 42.

Display 3.5   Build Census Tract Map Window's Features Tab
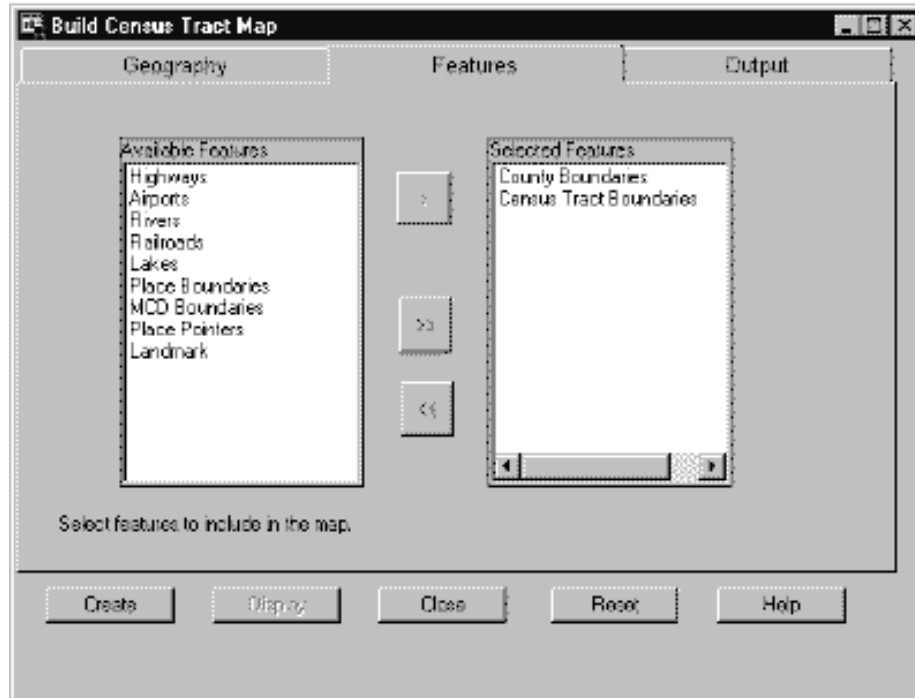
6 Select the features that you want to include in the map in the Available Features list box, and then select the right arrow to place the feature in the Selected Features list box. By default, the only selected features are the County Boundaries and Census Tract Boundaries. Select the right double arrow to place all available features in the Selected Features list.

7 Select the Output tab, as shown in Display 3.6 on page 43.

Display 3.6   Build Census Tract Map Window's Output Tab
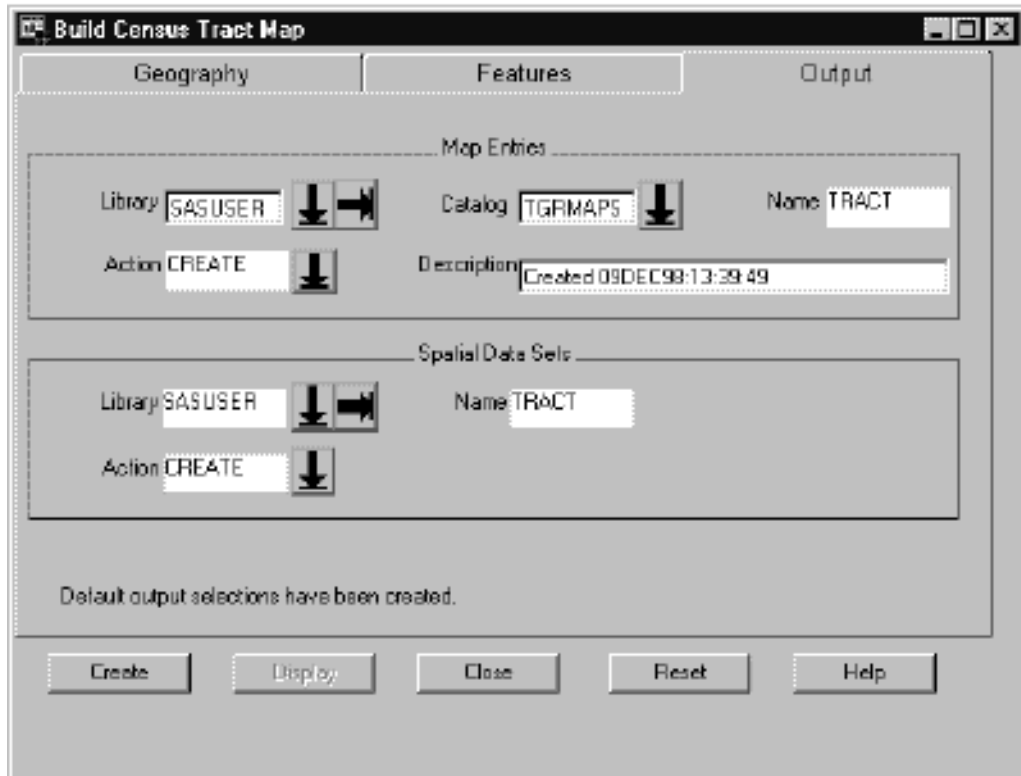
8 Enter the output location for the map entries and spatial data set entries and specify whether you are creating new entries or overwriting existing entries. These fields contain default values, but you can modify them.

9 When you have typed information in all the fields, click on ⬚Create⬚. SAS/GIS builds the selected map and returns a message when it successfully completes.

10 After the data have been imported, click on ⬚Display⬚ to view the map in SAS/GIS.

11 When you have finished building maps, click on ⬚Close⬚ to close the Build Census Tract map window.