UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

GSDIG:
a program to determine latitude/longitude locations using a microcomputer (IBM PC or compatible) and digitizer.

By

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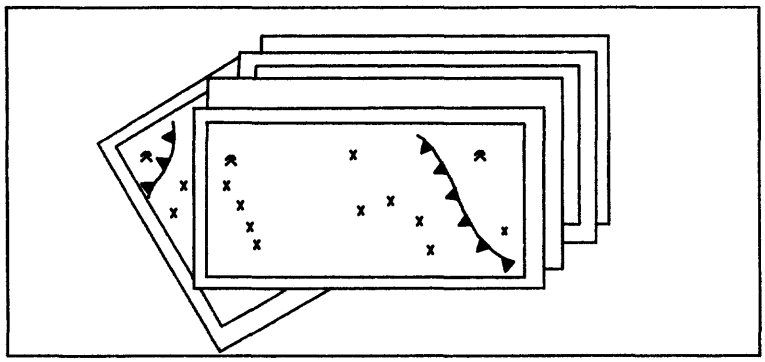

Open-File Report
88-014A

Open File Report 88-014A Documentation (Paper Copy)
Open File Report 88-014B Program Disk (One Disk)

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- If sites on maps in the conterminous US belonging to one of the four common quadrangle map series (7.5 by 7.5 minute maps, 15 by 15 minute maps, 30 minute by 1 degree maps, or 1 degree by 2 degree maps) are to be digitized, only the latitude-longitude of the northwest corner of the map must be entered. The computer will generate the latitude/longitude values for the three other corners required by the program. Projection files are not required for these maps. The Universal Transverse Mercator will be used by default.

- Sites can be digitized from other maps, if they use one of the supported map projections (UTM, Transverse Mercator, Lambert Conformal Conic, Albers Equal Area, and Mercator), and from any quadrant of the earth. For these maps projection files, and the latitude-longitude coordinates of four points (corners) must be entered. Three sample projection files are included on the release disk.

HARDWARE REQUIREMENTS

The program requires an IBM PC (or compatible) with 256K of core memory, an 8087 co-processor chip, a graphics adapter card (either CGA or EGA (not Hercules), a serial communications adapter, and digitizer that interfaces with the computer through an RS232C serial port, transmits X,Y coordinate pairs in an ASCII string, and has a keypad with at least 12 keys that send different ASCII characters .

Information to assist interconnection and installation is given in Appendix 1. Additional information is contained in the manuals supplied with equipment.

SOFTWARE REQUIREMENTS

The minimum software requirements for utilizing the program are PC/DOS (or MS/DOS) Version 2.1 or higher, the release diskette and a word processor capable of producing ASCII files. The release disk contains the following files:

GSDIG.BAS	Source code, GSDIG program
GSDIG.EXE	Executable program, GSDIG
CONFIG.DIG	Configuration file, digitizer
CONFIG.SCR	Configuration file, Screen
DIGGSM.BAS	Source code DIGGSM program
DIGGSM.EXE	Executable program DIGGSM
LCC105.PRJ	Lambert Conformal Conic projection file
ALB100.PRJ	Albers Equal Area projection file
UTM105.PRJ	Universal Transverse Mercator proj. file

The program was developed using the MicroSoft QuickBASIC Compiler Version 2.0, and 87BASIC so that the Math co-processor chip can be used.

INSTALLATION OF SOFTWARE

For floppy disk systems The contents of the release diskette should be copied to a backup disk before using.

For hard disk systems The contents of the release diskette should be copied to the appropriate subdirectory on the hard disk

Short cut for users of GSMAP Version 4.0

Copy GSDIG.EXE, and use the CONFIG files that you are already using with GSMAP Version 4.0

GSDIG

Files Required

Operation of GSDIG requires three files: GSDIG.EXE, CONFIG.SCR, and CONFIG.DIG. In the sequence listed, these are the executable program file, and the configuration files to accommodate differences in graphics adapters and monitors, and digitizers. For certain maps a user created projection file will be required. This file is described in Appendix 1.

CONFIGURATION FILES

CONFIG.SCR

The file CONFIG.SCR provides configuration specifications for the screen (CGA, EGA, with color or monochrome monitor).

Without modification the CONFIG.SCR file supplied on the release disk can be used with CGA adapters with color or monochrome monitors, or with an EGA adapter and monitor with CGA resolution. Modifications to support EGA adapters and monitors with EGA resolution are described in Appendix 1.

CONFIG.DIG

CONFIG.DIG provides configuration specifications to permit use of digitizers using different communication parameters, such as different character strings, baud rates, and serial ports. Without modifications, the file provided on the release disk will work on a GTCO DigiPad Model 5 digitizer connected to COM2 and set for 1200 baud. The contents of the file and modifications that may be made to support other digitizers are described in Appendix 1.

No external projection file is required for the following standard USGS and AMS series of quadrangle maps, **IF the map is in the northwest quadrant of the Earth (N longitude, W Longitude), and the corners used to index the map to the digitizer table are the corners of the map..**

1.	1:24000	7.5 minutes by 7.5 minutes	Polyconic or Lambert Conformal projections.
2.	1:62500	15 minutes by 15 minutes	Polyconic or Lambert Conformal Conic projections.
3.	1:10000	30 minutes by 1 degree	Universal Transverse Mercator projection.
4.	1:250000	1 degree by 2 degrees	Transverse Mercator projection

For other maps an external projection file appropriate for the map is required. This file must be created before starting the GSDIG program, see p. 14-17.

OPERATING GSDIG

Starting the program.

Turn on the digitizer and boot the computer.

GSDIG is started by entering GSDIG at the DOS prompt, with the required files located on the default drive. The monitor will then display a disclaimer screen. Press any key and the program will enter an interactive mode with screen prompts.

File Format:

The screen first provides a listing of the two formats for the output files that can be selected:

```
THERE ARE TWO OUTPUT FORMATS AVAILABLE:

1 - GENERIC
2 - LOTUS STYLE FORMAT

ENTER DESIRED FORMAT (1,2):
```

The generic format, see p. 8, creates a file in which each record, one for each site, contains the site identifier and latitude and longitude for the site. If the generic format is used, and an identifier mask with no prefix, no suffix, and 5 for the maximum number of numeric digits, the file can be taken directly to GSMAP using the program DIGGSM.

The Lotus format, see p.9, creates a file containing the mapname, scale and map series, and coordinates of the northwest and southeast corners of the map used for digitizing. Each site record contains the site identifier, latitude, and longitude, with added characters to facilitate import into Lotus 1,2,3 or other spread sheet programs. Records for each map digitized are separated by the symbol "*".

Entry of a 1 (Generic format), or 2 (Lotus format) brings a prompt to the screen.

Output File Name:

The prompt requests entry of the name of the file to be used for data. Enter the file name with extension (and drive, if other than the default drive).

If the name of an existing file is entered the following prompt will be displayed:

A FILE OF THE SAME NAME ALREADY EXISTS
DO YOU WANT TO APPEND TO IT? (Y/N):

If you enter "Y" digitized data will be added to the end of the pre-existing file. If you answer "N" a new file (with the name that you entered) will be created, and new data put into this file. **WARNING** The old file with the name entered will be written over and its contents lost!

Identifier Mask:

The next three prompts (questions) request entries to create a locality identifier mask: The identifier mask consists of a prefix (up to 10 character), the maximum number of digits (numbers) (up to 10) that will be entered from the digitizer's keypad, and a suffix(up to 10 characters). The prefix and the suffix that the user inputs from the computer keyboard will be combined with each of the site numbers the user will enter from the digitizer keypad during digitizing. For example: prefix = GIS, number of digits=4, suffix=RS would result in sample identifiers of the form GIS0001RS, GIS0002RS, GIS0003RS, etc.

Map name:

The screen will prompt entry of a map name. If commas or other "BASIC" delimiters are used in the map name, the map name should be enclosed within quotation marks ("_") As many as 60 characters can be used in the map name to provide space for comments. The map name will not be entered into the file generated by the GENERIC format, so a simple carriage return can be used as the map name. Entry of "QUIT" at this point returns the system to the DOS prompt.

Sample identifier mask change:

The screen next prompts to enable a change of sample identifier mask. The user must enter either a Y (yes) or an N (no).

Map type:

Next, the screen displays a listing of the five map types that can be chosen by the user.

1. 24000 7.5 MINUTE
2. 62500 15 MINUTE
3. 100000 30 MIN LAT x 1 DEG LONG
4. 250000 1 DEG LAT x 2 DEG LONG
5. OTHER

If map type 1, 2, 3 or 4 is selected by entering one of these numbers in response to the prompt ENTER TYPE: the screen will prompt for the latitude and longitude of the northwest corner of the map in degrees, minutes, and seconds. Latitude and Longitude are entered in the form DD,MM,SS,DDD,MM,SS; Latitude followed by Longitude, all values separated by commas. DD stands for degrees, MM for minutes, SS for seconds.

If the user chooses map type 5, "OTHER", the screen will prompt for the latitude and longitude of the corners of the map; first the northwest, then the southwest, southeast, and northeast in sequence. After entry of values for these corners, a prompt will request entry of the name of the projection file to be used.

The "OTHER" map type, number 5, must be used for maps from quadrants of the earth other than the northwest quadrant (the quadrant of the earth that contains the conterminous United States),for maps other than the four standard quadrangle series using their corners as the points used for indexing the map to the digitizer, and for maps drawn using the Lambert Conformal Conic, Albers Equal Area, and Mercator projections) . Using the "Other" map type requires that an appropriate projection file be available.

Synchronize digitizer output:

Next the screen will prompt the user to press the 0 (zero) key of the digitizer keypad in order to synchronize output from the digitizer to the computer. The keypad can be anywhere within the active area of the digitizer table. This prompt will repeat until the computer and digitizer are synchronized.

Digitizing

Registering the map corners:

After the synchronizing the computer and digitizer, prompts will ask for entry of the map corners on the digitizer. In sequence the northwest, southwest, southeast, and northeast corners of the map must be indexed by moving the crosshair of the digitizer's cursor to the appropriate corner of the map and pressing the 0 key of the digitizer keypad. The screen will then display an x axis scale and a y axis scale and then prompt the user to continue (Y) or not continue digitizing. if the scales of either the x or y axis differs from the map scale by more than 2%, site localities should not be digitized.

If the user indicates that the X and Y scales are acceptable and the program should continue, by entering Y, the computer screen will display a rectangle. Digitized sites will be shown as points inside this box.

Digitizing site localities:

First, the identifier number is entered using the keypad of the digitizer (the keypad can be located anywhere within the active area of the table). If the site number contains fewer than the maximum number of digits specified when creating the identifier mask, the A key should be tapped to complete the entry of the identifier number. The identifier number will appear at the lower left corner of the screen. If the user enters an incorrect site number, the "E" key can be pressed and the site number can then be reentered. The cross hairs of the cursor should next be positioned precisely at the locality to be digitized, and the 1 (one key) depressed. A high pitched tone will sound, and a dot will appear on the screen corresponding to the location digitized.

Input of site numbers and digitizing of site locations then continues with repetition of prompts as described above until the user wants to either change the sample identification mask or finishes digitizing information on that particular map.

"B" key: Changing the sample locality mask:

To change the sample locality mask, the "B" key on the digitizer keypad is pressed at the point in the digitizing cycle when the system is ready to receive a new locality number. After the "B" key is depressed, prompts on the bottom line of the screen request entry of prefix, maximum number of digits, and suffix from the computer keyboard. After these entries digitizing of points on the same map can continue without reentering information about map corner points or reregistering the map on the digitizer table.

"A" key: Terminating digitizing:

If the user wishes to stop digitizing on the current map, the "A" key on the keypad is pressed at the point in the digitizing cycle when the system is ready to accept a new locality number. The screen will then prompt the user to either enter a new map name or to type the command QUIT to exit the program and return the system to the DOS prompt. If the user wishes to continue digitizing other maps, screen prompts will request entries as described above.

OUTPUT FILE

The program, GSDIG, generates an ASCII character file. The name of the file is supplied by the user.

Generic format

Each line of the file contains the locality identifier, latitude, and longitude for a site. in the format below. The underlined characters in the example below include the prefix, site number, and suffix

GIS00023PS38 32 53.188N104 57 16.486W

If No prefix, suffix, and a maximum of 5 digits are specified, the resulting file has the exact format required for entry into GS MRDS, and for use by the DIGGSM program. Using DIGGSM it can be used to generate a GSMAP data base so that the data can be plotted. The GSDIG file contains a series of records like the one below.

00023S38 32 53.188N104 57 16.486W

Lotus Format

The first line of the file is the map name supplied by the user from the computer keyboard, enclosed within quotation marks.

eg. "Map number one"

The second line records the type of map in quotes.

eg. " 7 1/2 MINUTE"

The next line provides the latitude-longitude coordinates of the northwest and southeast corners of the map within quotation marks.

eg. "38 0 0 108 0 0 37 52 30 107 52 30"

Succeeding lines of the file contain information about the site identification number and the latitude-longitude of the site. The first entry on each line is a quoted asterisk, the next is the site identification number combined with the user supplied prefix and suffix, enclosed within quotation marks. These are followed by the latitude and longitude of the site.

One line is used for each site.

```
eg.     "*" "GIS001EX"  37 57 24.474  107 54 54.877
        "*" "GIS013EX"  37 56 13.839  107 54 32.430
        "*" "KRG035TX"  37 53 53.492  107 54 6.8263
```

The final record (line in the file) for each map is a quoted asterisk.

"*"

If sites from several maps were digitized in the same session, similar records for each map and site will be created.

This format was chosen to provide easy import directly into a spread sheet program such as Lotus 1-2-3. The data can then be sorted, modified, and put into a file in a format usable by the GSPOST program to draw a sample location map, and one where this data can be combined with other row-column data for analysis and plotting.

A file in the format required by the GSPOST program (see documentation for this program) can easily be created from GSDIG files in either format by using using a word processing program.

APPENDIX 1

HARDWARE INSTALLATION PROCEDURE

This section deals with the physical installation of the digitizer, its connection to the computer, and verification of correct installation.

The digitizer must be connected to a serial port; there must be a match between the port connections, the communications parameters and the settings in the CONFIG.DIG file.

DIGITIZER

The digitizer must have the following characteristics:
- Transmit data to the computer using RS232C communications protocol
- Send information in the form of ASCII characters followed by a carriage return. When a key is depressed on the keypad of the digitizer, the digitizer must send three pieces of information as a part of the string; a character representing the key depressed, the X coordinate, and the Y coordinate. This string must not contain commas or quotation marks.
- It must have a multi-button cursor keypad with the 10 numeric keys and four other non-numeric keys that can be assigned to program functions.
- It should have a resolution of 0.001 inches.

Digitizer installation

1. Connect the cable from the digitizer to one of the serial communication adapters (ports); note whether the port is COM1 or COM2; we use COM 2.

2. Set the digitizer switches for the communications speed you want to operate; we have found 1200 baud to be satisfactory.

3. Set digitizer switches for parity; generally you will have a choice of the following:

S - SPACE: Parity bit always transmitted and received as a space (0 bit)
N -NONE; No transmit parity, No receive parity checking
O - ODD: Odd transmit parity, odd receive parity checking
E -EVEN: Even transmit parity, even receive parity checking
M -Mark: Parity bit always transmitted and received as a mark (1 bit); we use N (None)

4. Set the number of databits per character on the digitizer switches. The choice is generally 7 or 8. We generally use 8.

5. Set the number of stopbits on the digitizer switches. The choice is 1 or 2; we use 1.

6. Set the digitizer switches to transmit a carriage return only; set switches to NOT transmit a line feed.

The following BASIC (BASICA) program can be used to check transmission between the digitizer and computer. It may require modification to reflect the values set in previous steps. It is set up using the values we normally use. Modifications normally are on line 10; refer to the BASIC manual supplied with your computer for a description of the OPEN COMn: command.

```
10 OPEN "COM2:1200,N,8,1" FOR INPUT AS #1
20 PRINT "HIT KEYS ON DIGITIZER KEYPAD ONE AT A TIME"
30 LINE INPUT #1, DSTRING$
40 PRINT DSTRING$
50 GOTO 30
60 END
```

If the above program does not run, check switch settings and/or cable connections, and retry the program. If it still does not work, check the digitizer manual, and seek assistance.

For the GTCO Digi-Pad series of digitizers, connect a null-modem cable from the computer serial port (COM2:) to port J5 on the digitizer (cable diagram is shown in the User's Manual, Appendix on RS232 interfacing, Fig. 1, DTE-to-DTE cabling. The following switch settings are used.

	1	2	3	4	5	6	7	8	
S1	1	1	1	0	0	0	0	1	1 = ON
S2	1	1	1	0	1	0	0	0	0 = OFF
S3	0	1	1	0	1	0	0	0	

Parameters in the example below apply to GTCO digitizer. Annotations are not a part of the file

```
"COM2: 1200,N, 8, 1"  |          Port, baud rate, see OPEN COM, instruction
 1,1                  | Position, # characters sent when a key is depressed
2, 5, .001            |           Start position, field length X coordinate
8, 5, .001            |Start position, field length Y coordinate,resolution
14                    |                                Length character string
0,0                   | The final 14 lines contain the character sent by the
1,1                   | digitizer, a comma, and the label on the key of the
2,2                   | digitizer keypad
3,3                   |
4,4                   |
5,5                   |
6,6                   |
7,7                   |
8,8                   |
9,9                   |
:,A                   |
;,B                   |
=,D                   |
>,E                   |
```

No blank lines are allowed at the beginning or end of the file

Without comments the file is as below.

```
"COM2: 1200,N, 8, 1"
 1,1
2, 5, .001
8, 5, .001
14
1,1
2,2
3,3
4,4
5,5
6,6
7,7
8,8
9,9
:,A
;,B
=,D
>,E
```

This file is the same as the CONFIG.DIG file used in GSMAP and GSDRAW Version 4.

SCREEN and GRAPHICS ADAPTER

GSDIG supports CGA and EGA monitors. It does **NOT** support Hercules or Hercules compatible graphics adapters.

CONFIG.SCR

For CGA adapter with color or CGA monochrome monitor, CONFIG.SCR file contains one line

"CGAC"

For EGA adapter with EGA color or monochrome monitor, CONFIG.SCR contains one line.

"EGAC"

No blank lines are allowed at the beginning or end of the file

The CONFIG.SCR files used for GSMAP and GSDRAW Version 4.0 can be used with the GSDIG program. Although the GSDIG CONFIG.SCR files will work with GSMAP/GSDRAW Version 4, changes will be necessary for EGA adapters and monitors so that GSMAP can fully utilize the resolution and colors of the EGA system.

MAP PROJECTIONS

Using Map type 5 "other", GSDIG can be used with maps drawn using the Lambert Conformal Conic (one or two parallels), UTM (Universal Transverse Mercator), Transverse Mercator, Albers Equal Area, and Mercator projections. These projections are specified by user-created ASCII files external to the program.

Information on map projections used by the U.S. Geological Survey is contained in USGS Bulletin 1532 (Snyder, 1982).

The map projections used for USGS maps are designated on each map.

7 1/2 and 15 minute quadrangles

Lambert Conformal Conic and Polyconic projections are used for detailed quadrangle maps. Although there are mathematical differences between these projections, the Lambert Conformal Conic (two parallels) can used for 7 1/2 and 15 minute quadrangles in the lower 48 states, whether designated as Lambert Conformal Conic or as Polyconic. The UTM projection can also be used. Differences between projections for the 700-800 mm diagonals of a single quadrangle can be expected to be between about 0.001 and 0.05 mm (Snyder, 1982, p. 127).

1^{o} X 2^{o} Sheets

The 1 X 2 degree 1:250,000 sheets of the Army Map Service series are Transverse Mercator projections. For GSDIG, use the UTM projection, and specify the meridian central to the map rather than using the UTM principal meridian for the zone containing the map.

State Maps

Recent State (1:500,000) maps have been drawn using Lambert Conformal Conic projections (two parallels)

National Maps

The Albers Equal Area projection is used by the USGS for sectional maps of the 50 States in the National Atlas of 1970, and for most other U.S. maps at scales of 1:2,500,000 and smaller. The Lambert Conformal Conic projection is used for certain national maps. Check your map before digitizing, and read appropriate chapters of Snyder,1982 for details.

Projection parameter files

Line 1

The first line of each projection parameter file is a number that designates the **QUADRANT** of the earth:

1	Northwest	North latitude, West longitude
2	Northeast	North latitude, East longitude
3	Southeast	South latitude, East longitude
4	Southwest	South latitude, West longitude

Line 2

The second line of the file is a number that designates the map projection:

1 Lambert Conformal Conic - 1 standard parallel
2 Lambert Conformal Conic - 2 standard parallels
3 UTM (Universal Transverse Mercator)
4 Albers Equal Area
5 Mercator projection

Line 3

The third line of the file provides the equatorial radius of the Earth in kilometers: for most maps the equatorial radius of Clarke, 1866 is used -- 6378.2064 km.

Line 4

The fourth line of the projection file provides the polar radius of the Earth in kilometers: for most maps the polar radius of Clarke, 1866 is used -- 6356.5838 km.

Line 5

Lambert Conformal Conic - 1 parallel

Enter the Standard Parallel of the map in degrees and decimal degrees.

Lambert Conformal Conic - 2 parallels

Enter the Standard Parallels of the map in degrees and decimal degrees separated by a comma (for the lower "48", 45 and 33 degrees are the standard parallels; see Snyder 1982, p. 101 for other maps).

UTM

Enter the Principal Meridian for the map; this is the line of longitude (a whole number of degrees) that has 3 as a factor but does not have 6 as a factor(eg. 99, 105, etc., not 102) that is closest to the map center.

Albers Equal Area

Enter the standard parallels for the map in degrees and decimal degrees (for the lower "48" use 45.5,29.5; for Alaska use 65,55; for Hawaii use 18,8).

Mercator

No entry.

Line 6

Lambert Conformal Conic - 1 parallel

Enter the central meridian for the map in degrees, minutes, and seconds; normally this is the line of longitude centrally located with respect to the map.

Lambert Conformal Conic - 2 parallels

Enter the central meridian for the map in degrees, minutes and seconds; normally this is the line of longitude centrally located with respect to the map sheet.

UTM

Enter the Scale Factor for the map: the standard scale factor is 0.9996

Albers Equal Area

Enter the meridian central to the map in degrees, minutes, and seconds

Mercator

No entry

Examples of projection parameter files

Lambert Conformal Conic - one parallel

1	Quadrant of Earth ("1" specifies NW)
1	"1" specifies LCC - one parallel
6378.2064	Equatorial radius in km, Clarke, 1866
6356.5838	Polar radius in km, Clarke, 1866
45	Standard parallel for map
105,0,0	Meridian central to map

Lambert Conformal Conic - two parallels

1	Quadrant of Earth ("1" specifies NW)
2	"2" specifies LCC - two standard parallels
6378.2064	Equatorial radius in km, Clarke, 1866
6356.5838	Polar radius in km, Clarke, 1866
45,33	Standard parallels for map
105,0,0	Meridian central to map

Universal Transverse Mercator - UTM

1	Quadrant of Earth ("1" specifies NW)
3	"3" specifies UTM projection
6378.2064	Equatorial radius in km, Clarke, 1866
6356.5838	Polar radius in km, Clarke, 1866
105,0,0	Standard meridian for map
0.9996	Scale factor

A special spherical form of the Transverse Mercator projection was chosen for the 1979, 1:5,000,000 scale map of North America; this map was adopted by the Geological Society of America as the base for publications in the DNAG (Decade of North American Geology) series.

This "DNAG" projection can be achieved by using the projection parameters below:

1	Quadrant of Earth ("1" specifies NW)
3	"3" specifies UTM projection
6371.204	Radius of earth
6371.204	Radius of earth
100,0,0	Meridian central to map
0.926	Scale factor unique to this map

Albers Equal Area projection

1	Quadrant of Earth ("1" specifies NW)
4	"4" specifies Albers Equal Area projection
6378.2064	Equatorial radius in km, Clarke, 1866
6356.5838	Polar radius in km, Clarke, 1866
45.5,29.5	Standard parallels for "Lower 48"
100,0,0	Meridian central to map

Mercator projection

1	Quadrant of Earth ("1" specifies NW
5	"5" specifies the Mercator projection
6378.2064	Equatorial radius in km, Clarke, 1866
6356.5838	Polar radius in km, Clarke, 1866

DIGGSM

Utility program; GSDIG to GSMAP

DIGGSM is a utility program that takes data from one varient of the generic format of the GSDIG output file and creates a GSMAP data base.

The file must have the following format: It is created by GSDIG using the Generic format if NO PREFIX or suffix is used and 5 digits (NO MORE, NO LESS) is specified for the site number.

```
00001 8 37 53.026N 96 00 15.630W
00002 9 30 32.095N 96 11 44.514W
0000338 30 42.178N106 11 43.953W
0001438 38 13.027N110 59 54.550W
0001538 35 21.653N106 21 11.669W
```

In sequence, each record of the ASCII file consists of a 5 digit locality number ("0"s to fill out a number with less than 5 digits) latitude in degrees, minutes, and seconds (DD MM SS.SSSN),a blank space, longitude in degrees, minutes, and seconds (DDD MM SS.SSSW). No alpha characters (letters) can be used in the identifier **NUMBER**

The program is started by entering:
DIGGSM

Screen prompts will call for entry of data for a GSMAP data base that will be created from the GSDIG file.

Prompts	Examples of entries.
ENTER MAP DATA BASE NAME:	**NEWMAP**
ENTER TITLE OF MAP:	**NEWTITLE**
ENTER QUAD # (1=NW,2=NE,3=SE,4=SW):	**1**
ENTER LAT/LON OF NORTHWEST CORNER DD,MM,SS,DDD,MM,SS:	**39,0,0,106,0,0**
ENTER LAT/LON OF SOUTHWEST CORNER DD,MM,SS,DDD,MM,SS:	**38,0,0,106,0,0**
ENTER LAT/LON OF SOUTHEAST CORNER DD,MM,SS,DDD,MM,SS:	**38,0,0,104,0,0**
ENTER LAT/LON OF NORTHEAST CORNER DD,MM,SS,DDD,MM,SS:	**39,0,0,104,0,0**
ENTER INPUT FILENAME:	**PEB.DAT**
ENTER CODE FOR POINTS:	**102**
ANOTHER FILE?(Y/N)	**N**

Notes:

- The format of data entry above follows standard GSMAP practice. Answering "Y" to the "ANOTHER FILE?(Y/N)" query allows additions of data from other data files.

- 100 series CODES should be used for point data. The program will enter the specified CODE, the specified point number as Parameter 1, and a "0" for Parameter 2. Specification of symbols and sizes will then be done as a part of the GSMAP plot procedure. Changes to other line CODES, symbols, or angle of posting can be done on an entry by entry basis, or changed globally, using the GSMAP program

- The format file format required by DIGGSM is same as the format required for entry into the GS MRDS system using the dBASE program UPDATE.

- As the map data base name will be used as the name for the GSMAP files, the DOS conventions for a file name must be followed (including the DOS limit of 8 characters); extensions are supplied by GSDIG.

REFERENCES

Selner, G.I., and Taylor, R.B., 1987, GSDRAW and GSMAP Version 4.0: Prototype programs for the IBM PC or compatible microcomputers to assist compilation and publication of geologic maps and illustrations: U.S. Geological Survey Open-File Reports. Documentation 87-496A, 90 p.,Executable Program disk 87-496B, Source code disk 87-496C, Utility program disks (2), 87-496D. Tutorial, About GSDRAW and GSMAP, 87-496E, 54 p.

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