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An installation guide to the PC-based time-series data-management and plotting program BOB

by

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Introduction

BOB is a command-driven FORTRAN program for cleaning, plotting, and comparing time-series data from low-data-rate sensors (sampling intervals greater than or equal to one minute). It is not meant to be a complete graphics package providing publication quality graphs. It will however provide quick and easy access to large sets of time-series data (some in excess of 50,000 data points/year collected over a period of years) and produce plots containing all the essential information. The data from various parameters (tilt, strain, chemistry, earthquake counts, etc.) can be compared with previous time periods and each other. With a real-time telemetry system capable of updating data files every 10 minutes, BOB provides the environment to monitor the sensors virtually in real-time. The information made available by BOB, along with that provided by a real-time seismic data-acquisition and analysis system allows near-real-time monitoring of most currently-accepted predictors of volcanic eruptions.

BOB's minimum system requirements:

IBM PC XT or compatible
640 Kbytes on board RAM
10 Mbytes hard disk
DOS 3.2 or greater
Geograf graphics utilities, Geocomp Corp., Concord, MA
QDOS II or similar software package for moving files, creating directories, word processing, etc., Gazelle Systems, Provo, UT.
Math coprocessor

If the user wishes to set up BOB using a low-data-rate telemetry system (Murray, 1988) and a real-time seismic amplitude system (Murray and Endo, 1989) that automatically transfers data to the computer, the following minimum system is recommended:

IBM PC AT or compatible
DOS 3.2 or 3.3
2 Mbytes on-board RAM - LIM 4.0 compatible
10 Mbytes hard disk
Desqview multitasking software, Quarterdeck Office Systems, Santa Monica, Ca.
GWBASIC or other BASIC interperter
Geograf graphics utilities, Geocomp Corp., Concord, MA.
QDOSII or similar software package for moving files, creating directories, word processing, etc., Gazelle Systems, Provo, UT.
Math coprocessor

Of course, an 80386 machine would even be better. With it you would want to get Desqview 386.

BOB was compiled and linked using Microsoft FORTRAN ver. 4.1. The program STORE.EXE that automatically stores data from the real-time telemetry and seismic-amplitude system was compiled and linked using Microsoft QuickBASIC 4.5 and Microsoft FORTRAN 4.1. The Geograf FORTRAN graphics library and the Geograf graphics utilities provide the graphics drivers.

BOB's time-series limits:

Time resolution - 1 minute
Minimum plot period - 1 day
Maximum plot period - 10's of years
Maximum number of data points that can be plotted - limited by disk space

This guide is for installing BOB. Use of BOB is described in Murray (1990).

Installation Instructions

BOB comes on two 5 1/4", 1.2M installation diskettes. To install BOB put the diskette labeled BOB1 into the A drive. Then type:

A:
INSTALL

The BOB installation program will ask some questions about the destination drive. Answer them and INSTALL will proceed to install BOB, its support programs, source code, and an example data base for Mount St. Helens. Figure 1 displays the directory structure.

Install can also be used to update an older version of BOB. Install will NOT overwrite BOBDIRS.LST nor VOLCANOS.LST if they are already present.

Installing the graphics drivers

After BOB has been installed, you will need to edit the file \BOB\GRAPH_BR.LST to indicate the ports that your monitor and printer use. The file contains the instructions for doing this. The file contains a port for a plotter also, but this option is not currently supported. If you wish to direct output to a plotter, designate the plotter's port in place of the printer' port.

Use the Geograf graphics utilities to install the graphics drivers for your specific setup. Put the utilities diskette into drive A. Then type:

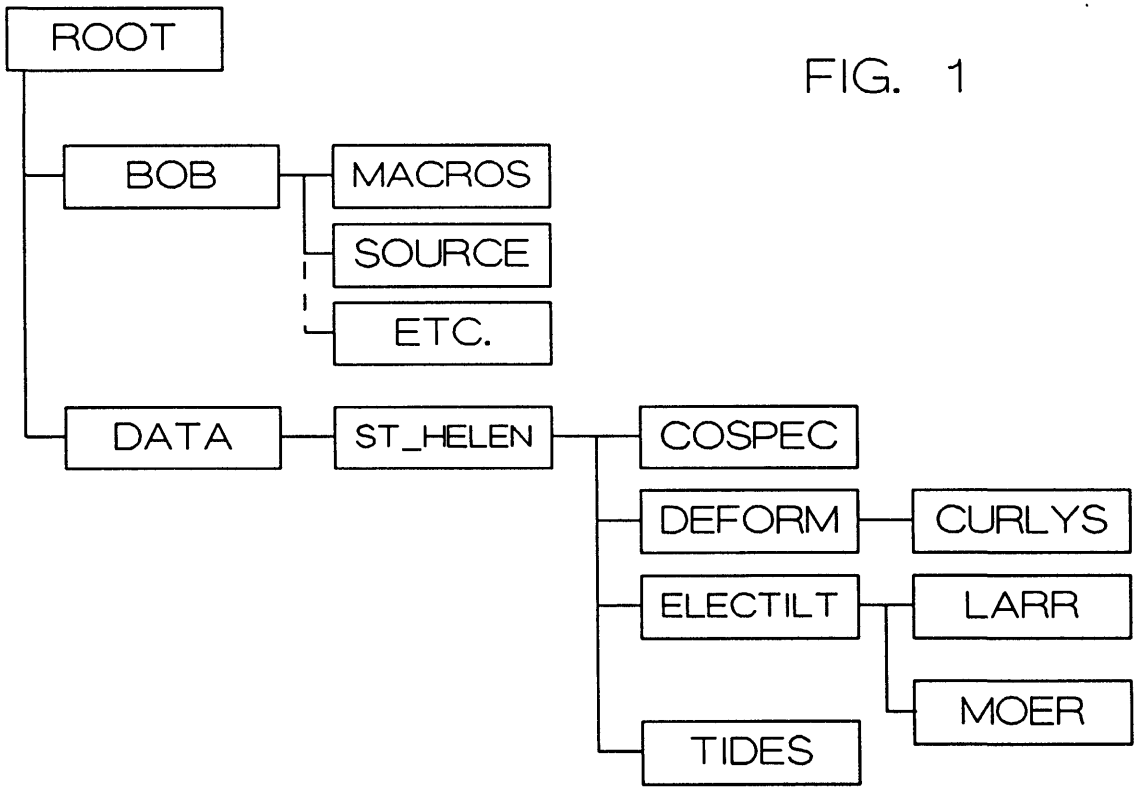
A:
DRIVERS

Follow the instructions as given in the program (or read the Geograf manual).

1) First, select the option to install the drivers for the graphics card you have. If you have a color monitor, it is suggested you enter color 3 (light blue), 6 (gold) or 7 (white) under the column labeled "1" instead of the default 1 (dark blue). Use the TAB key to move to the different columns. When asked where to save the file, it must be saved in the directory BOB on the drive you chose to install BOB. The name of the file should be SCREEN.DRV.

   It may take a little experimentation (especially if you have simply an "EGA" board) to get the correct choice. Unless the specific graphics card in your machine is listed, it is suggested you use a driver from the IBM list. You will need to run BOB and attempt a plot before you know for sure. Just keep trying - one of them will work.

FIG. 1



SAMPLE DIRECTORY LAYOUT

2) Select the printer driver. If you have a plotter as your primary output device, select from the plotter choices. The driver file must be saved in the same directory as BOB. The name of the file should be PRINTER.DRV.

   If your printer/plotter has different resolutions, you may wish to install two drivers in the BOB directory, HI_RES.DRV and LO_RES.DRV, for example. If you are more interested in speed than resolution you would copy LO_RES.DRV to the file PRINTER.DRV. Plots sent to the printer would be printed at the lower resolution but faster than those printed at high resolution. If you desire the higher resolution, copy HI_RES.DRV to PRINTER.DRV. By using the BOB command DOS you can do these copys from BOB, switching between modes without having to exit BOB.

3) Select the driver for the device that will function as your off-line plotting device. BOB will use this driver to create a file containing the plot. Using the FPLOT.EXE program on the Geograf utility diskette, you can then re-create the plot on a different computer. This is typically used if you have access to a laser printer, but it is not attached to the BOB computer. The driver must be stored in the BOB directory under the name LASER.DRV.

4) Copy the fonts desired for the screen and the printer to the BOB directory. The Geograf manual has examples of the different fonts. The recommended fonts are Simplex Roman (SR.FNT) for the screen and Duplex Roman (DR.FNT) for the printer/plotter. Copy these files (or another font if desired) to the BOB directory and rename them FONT.SCN for the screen font and FONT.PRN for the printer font.

At this point, the following files should be in the BOB directory:

Files installed by the BOB installation program

ADD_STID.TXT	Instructions for adding a new station, measurement, or volcano to BOB's data directory.
BOB.EXE	The executable program BOB.
BOBDIRS.LST	The file containing (a) the disk drive to be used for BOB's scratch files and (b) the paths to the various directories containing data.
BOB_EDIT.EXE	The program used to edit direct-access BOB files (its use is discussed later).
BOB_EDIT.FOR	The source code for BOB_EDIT.EXE.
COMMAND.TXT	The file listing all the BOB commands without any explanation. It is accessed by the BOB command COMMANDS.
GRAPH_BR.LST	The file used by BOB to determine the ports used by the printer/plotter and the screen.

PRINTER.TST	An input file for BOB that sends a plot to the printer. It is used to test the printer graphics drivers.
README.TXT	The file listing all the BOB commands and their use. This file is the source of the information displayed while using BOB's HELP command.
SCREEN.TST	An input file for BOB that displays a plot on the screen for about 20 seconds. It is used to test the screen graphics drivers.
VOLCANOS.LST	A file listing the volcano identifiers (ids) used by BOB.

Files installed using the Geograf utilities diskette

FONT.SCN	The font used for screen plotting.
FONT.PRN	The font used by the printer/plotter.
LASER.DRV	The drivers used by BOB to store the plots in a file for later plotting on another device not currently attached to your computer (typically a laser printer). Note that the Geograph utility program FPLOT.EXE must be used to plot the created file, you cannot simply PRINT the file.
PRINTER.DRV	The graphics drivers for the printer/plotter.
SCREEN.DRV	The graphics drivers for screen plotting.

This completes the installation of BOB and its example data files.

Testing the graphics drivers

To test the screen drivers, get into the BOB directory and enter the following command at the DOS prompt:

BOB < SCREEN.TST

If everything is correct, a plot of data should appear on the screen for about 20 seconds.

To test the printer drivers, enter the command:

BOB < PRINTER.TST

at the DOS prompt. If everything is correct, a plot of tide data should be sent to the printer.

If nothing appears on the screen or only gibberish on the printer, the problem is either in the drivers (SCREEN.DRV or PRINTER.DRV) or in the port allocation (GRAPH_BR.LST). If no plot is attempted, only text with the message FILE NOT FOUND embedded in it, then BOB cannot find the example data file. Either something happened in the install procedure for BOB or the files have been erased. Try running INSTALL again.

The Directory Layout

Figure 1 shows the directory layout as created by the BOB install program. The directory \BOB contains the executable program BOB and all the attendant files necessary for its operation. Subdirectories under \BOB contain programs for changing file formats, menus, source code, and other files and programs used in conjunction with BOB. Where applicable, a README file in the subdirectory tells what the various programs do and how to use them.

The directory \DATA contains the data files used for the examples in the BOB user's guide (Murray 1990) (under the subdirectory \ST_HELEN). It also is to be used as a guide for setting up the data file organization for other volcanoes. The tree mimics how BOB defines a specific measurement, i.e. BOB first looks for the specific volcano (St. Helens), then a specific station (Moe Rock tiltmeter for example) and finally the specific data file for the measurement (the file TEMP87.DAT in \DATA\ST_HELEN\ELECTILT\MOER). If you were to install another tiltmeter at Mount St. Helens, you would place its data files in a new subdirectory under \ELECTILT. If you wanted to add another volcano, it would be named as a new subdirectory under \DATA.

Note that the data organization outlined here does not have to be followed since BOB can access data files anywhere on the computer provided the path is defined in BOBDIRS.LST. This method is recommended though, as it provides a clear "visual" path to the data and is easily expandable as more stations and volcanoes are added.

Data File Types

BOB recognizes two types of data files. One type is a large, direct access, binary file for data that is gathered at regular intervals such as tiltmeter information telemetered to an observatory every ten minutes. These are referred to as BOB files. The other type is a sequential access ASCII file for data gathered at irregular intervals such as aperiodic gas measurements. These are referred to as to as ASCII sequential files (or sequential files). It is only while accessing the files that BOB notes the difference between the two. Once the data is read into BOB, it is treated the same.

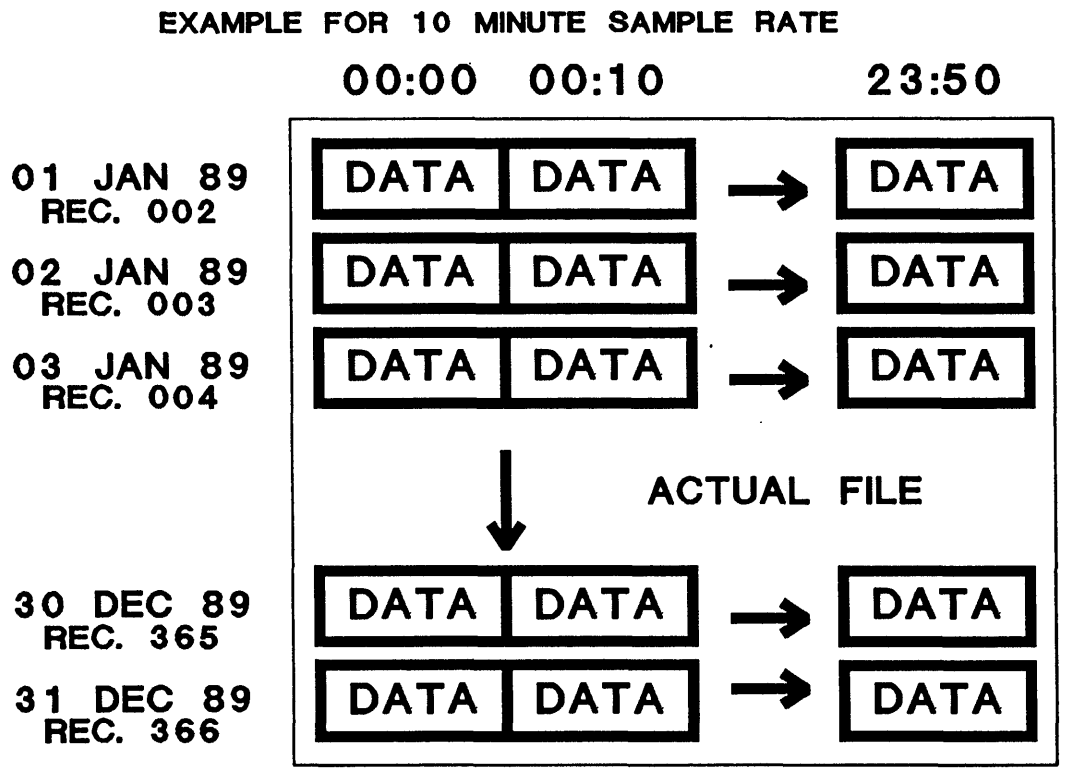
BOB Files

The BOB files are essentially large arrays, each holding a year of data for a particular measurement. The files consist of 366 records (367 for a leap year); one per day except for the initial record which contains the number of bytes in each record. Dividing the number of bytes in each record by four gives the number of data points for each day (the data is stored in REAL*4 format or four bytes per data point). The remaining records contain the data. The data for Jan 01 would be in record 2, that for Dec 31 in record 366, unless it was a leap year in which case it would be in record 367 (figure 2). As the records are directly accessible, access to data at the end of the file takes no longer than that at the beginning of the file. All BOB data file names have the format MEASyr.DAT or MEASyr.CLN where MEAS is the four character measurement identifier, yr is the two character year designation, and .DAT or .CLN are suffixes indicating a raw data file and a cleaned data file, respectively. For example, raw temperature data for 1989 would be stored in a BOB file named TEMP89.DAT. An examples of BOB files are in the directory \DATA\ST_HELEN\ELECTILT\LARR.

Fixing the interval between succeding data points in the file eliminates the need for any time tags. A datum's position in the record indicates its time. For instance, if the file is set for 24 data points/day, the initial datum in a record would be time-tagged at 00:00, the second datum would be for 01:00, etc., and the 24'th would be for 23:00. If no data was collected for a particular time, the missing data value of -998.0 would be inserted in the appropriate spot.

BOB files are created with the program NEWFILE (located in \BOB\SUPPORT). NEWFILE prompts you for the measurement id, year, number of data points/day and if it is to be a .CLN or .DAT file. NEWFILE then creates the file for the entire year's worth

FIG. 2 - DIRECT ACCESS DATA FILES



of data, filling it with all -998s to indicate missing data. The -998s are replaced with valid data values as data is collected and stored in the file. Programs in \BOB\GET_DATA and \BOB\SUPPORT\FILE_CON are used to insert data into BOB files.

ASCII Sequential Files

The ASCII sequential files consist of columns of data with the time of the measurements at the beginning of each line. The time must be in European date format: 2 digit day of the month, 3 character month, 2 digit year, 2 digit hour, and 2 digit minute. Since they are in ASCII format, the user can edit them with the QDOS editor. Word processors may also be used so long as the file is stored in ASCII format. Figure 3 shows an example of a sequential file. Note that as with the BOB files, -998.0 indicates no data.

Since the ASCII sequential files can contain data for more than one measurement (multiple columns of data), BOB requires a map to determine which measurement is in which column. A file named BOB_QPLO.TXT located in the same directory as the data file has this information. Every directory containing a sequential file MUST have a BOB_QPLO.TXT file in it for BOB to properly read the data. BOB_QPLO.TXT contains the full BOB designation for the specific measurement (volcano, station id, measurement id as shown in figure 4), the name of the file the data is in, and the FORTRAN format statement necessary to read the data (figure 5).

The format statement indicates how to read the date and time (I2,1X,A3,1X,(3I2,1X) in figure 4). It then skips to the proper column for the data (48X for the measurement SO2_) and then gives the format to read the data (F4.0). Note that the data must be read as a REAL number, even if it is always an integer. By skipping over different amounts, the different columns of measurements can be specified.

Examples of BOB_QPLO.TXT and sequential data files are given in the directories \DATA\ST_HELEN\COSPEC and \DATA\ST_HELEN\DEFORM\CURLYS.

Converting Files to Different Formats

In the directory BOB\SUPPORT\FILE_CON are BASIC and FORTRAN programs to convert data from one file format to another. Also included are programs to convert back and forth to SAS format. SAS format is exactly the same format as the sequential files except that the month is stored as an integer and the date is in month-day-year format instead of day-month-year format.

FIG. 3 - SAMPLE ASCII DATA FILE

DATE	TIME	DATA 1	DATA 2
01 JAN 89	08:10	+1.233	-456.7
07 JAN 89	13:30	+1.238	-998.0
12 FEB 89	10:42	+1.238	-998.0
12 FEB 89	14:13	+1.235	-455.9
21 FEB 89	12:05	+1.235	-460.0

FIG. 04 – BOB FILE DESIGNATION

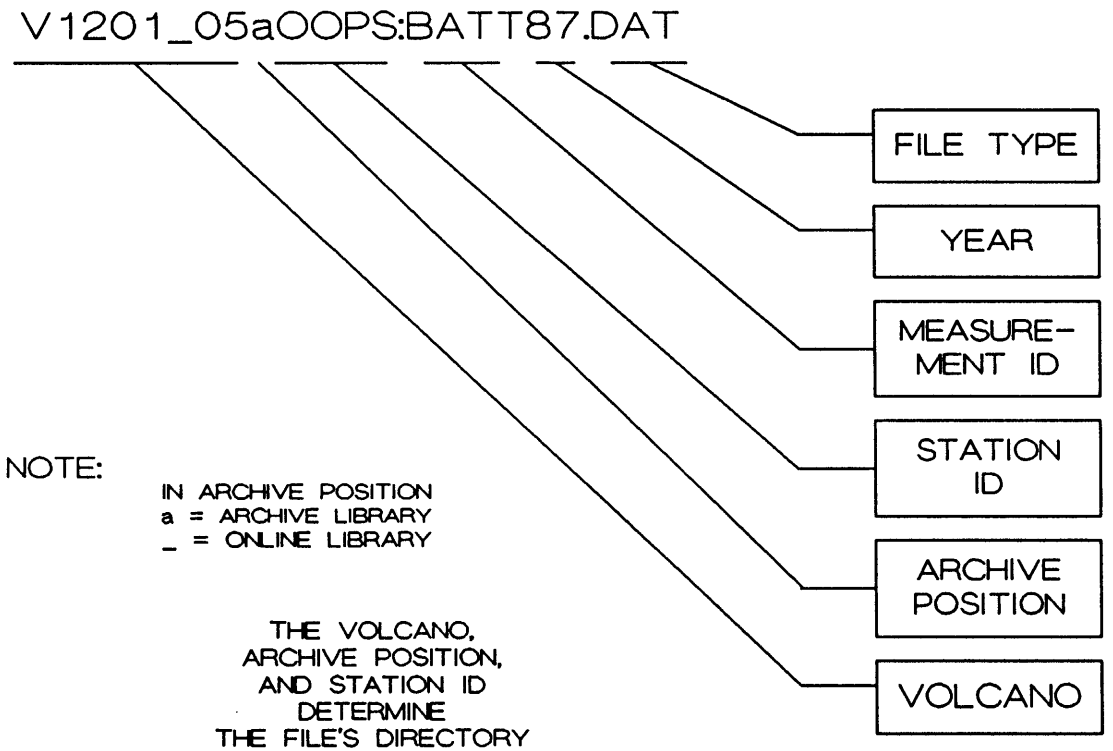


FIG. 5 BOB_QPLO.TXT EXAMPLE

V1201_05_COSP COSPEC/MIRAN MEASUREMENTS, MT. ST. HELENS, WA

BOB FILE/MEASUREMENT DESIGNATION	ACTUAL DATA FILE	FORTRAN FORMAT STATEMENT TO READ PROPER DATA COLUMN
V1201_05_COSP:SO2_.DAT	GASyy.DAT	(I2,1X,A3,1X,3(I2,1X),48X,F4.0)
V1201_05_COSP:WDIR.DAT	GASyy.DAT	(I2,1X,A3,1X,3(I2,1X),F3.0)
V1201_05_COSP:WSPD.DAT	GASyy.DAT	(I2,1X,A3,1X,3(I2,1X),4X,F3.0)
V1201_05_COSP:ASPD.DAT	GASyy.DAT	(I2,1X,A3,1X,3(I2,1X),14X,F3.0)
V1201_05_COSP:ERRB.DAT	GASyy.DAT	(I2,1X,A3,1X,3(I2,1X),53X,F3.0)

THE yy IN THE ACTUAL DATA FILE NAME MEANS TO SUBSTITUTE THE TWO DIGIT YEAR IN THE FILE NAME, I.E. GAS88.DAT, GAS89.DAT, ETC. IF mmm IS IN THE NAME THEN SUBSTITUTE THE THREE CHARACTER MONTH DESIGNATION INTO THE NAME, I.E. GASmmmyy.DAT WOULD HAVE ACTUAL FILE NAMES OF GASNOV88.DAT, GASDEC88.DAT, GASJAN89.DAT ETC. THIS ALLOWS LARGE, CUMBERSOME DATA FILES TO BE BROKEN DOWN INTO MORE MANAGEABLE ONES. ALSO dd CAN BE USED FOR SUBSTITUTING IN THE DAY OF THE MONTH.

Comparison of the File Types

Advantages of BOB files

1) Most efficient utilization of memory.
2) Quick access to data, even at the end of the file.
3) No computations necessary to determine each datum's time.

Disadvantages of BOB files

1) Space for a year of data must be allocated even if data is only collected for one day. This can offset the savings of BOB files efficient utilization of memory. Note that a 10 minute sample interval BOB file occupies 212 Kbytes.
2) Sampling rates cannot be changed as intervals between data points are fixed.

Advantages of ASCII sequential files

1) Editing of the files can be done with the QDOS editor.
2) Intervals between data points are not fixed.
3) Data is entered into the file only when it is collected.
4) Memory efficient when the number of data points is small or the measurements are made at infrequent intervals, once a week for example.

Disadvantages of ASCII sequential files

1) One must read through the entire file to get to the latest data.
2) When reading through the file, each datum's time must be computed to determine if it is in the time period of interest.
3) For large amounts of data, the files become immense.

In summary, use BOB files when dealing with large amounts of data collected at regular intervals such as telemetered tiltmeter readings, computed tidal strains, or hourly earthquake counts. Use sequential ASCII files when dealing with small data sets collected at irregular intervals such as electronic distance measurements, gas, or chemical analyses.

Locating the Data Files

BOB can access data files anywhere on the computer. The file \BOB\BOB_DIRS.LST contains the paths to all the data files and can be updated as new stations are added or old data is archived. Instead of having all the files in a single spot, the user can set up a directory structure for the data that makes for better overall organization (figure 1).

BOB uses three parameters to specify a unique name for each measurement. The first is the volcano identifier. It is recommended that "Volcanoes of the World" (Simkin, 1981) be used to assign this. Second a four character station identifier is used to specify the station. This could be a site name in the case of a tiltmeter (MOE Rock), or a grouping of measurements such as SEISmic in the case of earthquake counts. Finally, a four character measurement identifier is used to specify the precise measurement (or sensor) at that station, such as TEMP or TILT. See figure 4.

When accessing a data file, BOB searches the paths in BOB_DIRS.LST until a match of station and volcano is found. Then BOB will:

1) Look for a BOB file for the specific measurement (as determined by the measurement identifier) in the station's directory.

2) If no BOB file is found, BOB will look for an archival location path in BOB_DIRS.LST (indicated by an 'a' following the volcano identifier in place of the '_' - figure 4) and search for the BOB file there. This allows storing of older data from a station on optical disk or tape while keeping the more recent data on the hard disk.

3) If no BOB file is found in the archival location, then BOB will search for a sequential file containing the measurement's data in the station's primary (non-archival) directory.

4) If no match is found in BOB_QPLO.TXT (or no BOB_QPLO.TXT exists in the directory) BOB will return with a file not found message.

Figure 6 shows the flow chart describing how BOB searches for a data file.

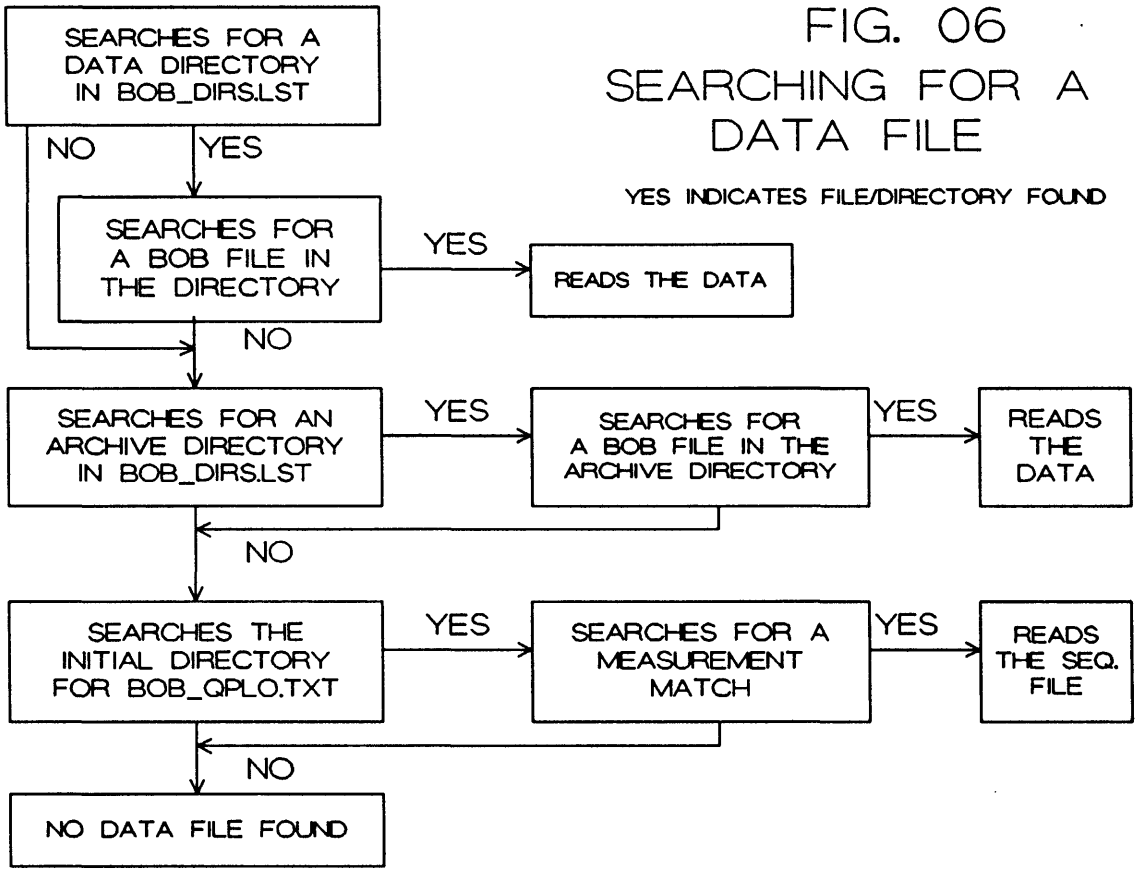


FIG. 06
SEARCHING FOR A DATA FILE

YES INDICATES FILE/DIRECTORY FOUND

Adding New Volcanoes, Stations, and Measurements

Data files in BOB are found by searching down a three layer tree. The first layer is the volcano, the second is the station, and finally the specific measurement for that station (figure 4). For example, the volcano could be Mount St. Helens, the station Moe Rock tiltmeter, and the measurement temperature. The following instructions for adding to the existing network assume knowledge of how to create directories, edit files, copy/rename files, and change directories. In many instances, it is best to copy the example file to the location of the new file and edit in the new file information. This will help prevent making mistakes due to forgetting exactly what the format of the file should be.

BOB also gives you convenient spots to document where stations are located, how long they lasted, and other information that typically resides in field notebooks, on the backs of envelopes, and/or in somebody's head. **It is highly recommended that you take advantage of these "documentation" files to keep pertinent information quickly accessible.**

Adding a New Volcano

Before adding a new volcano, you must decide where the head directory will reside. The head directory will hold information pertinent to the entire volcano such as eruptive history and names of instrument stations. In figure 1, the volcano headquarters for Mount St. Helens is in the DATA subdirectory \ST_HELEN. Keeping with this convention, to add a new volcano you would:

1) Create a new sub-directory under DATA for the new volcano's head directory.

2) Create a station documentation file and place it in the head directory.

   This station file will list all the 4 character codes for the stations associated with that volcano. Comments should be included as this file will be the main guide for BOB users not familiar with the stations. This file must be named STATIONS.TXT. An example is \DATA\ST_HELENS\STATIONS.TXT.

3) Update \BOB\BOB_DIRS.LST with the path to the volcano's head directory.

   Follow the example of Mount St. Helens already listed in BOB_DIRS.LST. The long number preceded by a V is the volcano designation according to "Volcanoes of the World" (Simkin, 1981). Insert the appropriate pathways to, first, the head directory and then the various stations. Note that the designation for the head directory is a four character station id of "xxxx" (lower-case). It is a good idea to insert comments and such to keep things organized and easy to read.

4) Add the new volcano and its designation to the list in \BOB\VOLCANOS.LST following the examples already there.

Adding a New Station

1) Decide where the station's data files will reside. Use figure 1 as an example of how to set up the data directory tree.

2) Edit the STATIONS.TXT file in the volcano's head directory to include the new station's four character station id and other information.

3) Edit \BOB\BOB_DIRS.LST to include the path to the new station's directory.

   Again follow the directions and examples. Note that the four-character station id must be unique with respect to a specific volcano. Search through the volcano's current stations in BOB_DIRS.LST to make sure that you are not using someone else's.

4) Create a file in the station's directory describing the station and its various measurements.

   This will be the main source of information about the station by BOB users not familiar with it. The file name must be of the format BOB_stid.TXT where stid is the four-character station id. An example is \DATA\ST_HELENS\COSPEC\BOB_COSP.TXT.

5) Decide whether the data will be stored in a BOB file or ASCII sequential file. See the section on Data Files for advice on when to use each type.

6) If the data is to be stored in BOB file format, you must create individual files for each measurement using the program NEWFILE. See the following section on Adding a New Measurement for instructions.

7) If the data for the station is to be in an ASCII sequential file format, the file can be created and data entered using a simple ASCII word processor. The file must adhere to the date/time format as described in the section Data File Types. Next, the file BOB_QPLO.TXT (figure 5) must be created/edited to tell BOB in which file and data fields the measurement's data reside. There can only be one BOB_QPLO.TXT in any one directory. If more than one station's data reside in the same directory, their information will be in a single BOB_QPLO.TXT. Follow the examples given by the files in \DATA\ST_HELENS\COSPEC\ and \DATA\ST_HELEN\DEFORM\CURLY\ and the description given in Data File Types.

Adding a New Measurement

1) For documentation purposes, edit the station's description file (BOB_stid.TXT as desribed in Adding a New Station) for the new measurement and its four-character measurement id.

2) If this is an ASCII sequential file, you must also edit the BOB_QPLO.TXT file to include the new measurement. Do this by following the examples in \DATA\ST_HELENS\COSPEC. The new measurement will typically be just another field in an existing sequential file.

3) If the new measurement is to be stored in BOB file format, copy NEWFILE.EXE (which should be residing in \BOB\SUPPORT) to the directory where the data files will reside.

4) Get into the target directory and run NEWFILE (simply type NEWFILE). Answer the prompts. NEWFILE will create a BOB file for you. Delete NEWFILE.EXE in the target directory to eliminate clutter.

   After making any changes, it is important to confirm BOB can access the file. Run BOB and input the correct volcano, station id, measurement id and an appropriate time period. Try a FILL command. If BOB found the file correctly, it will display either data or -998's indicating BOB found the file but there was not any data for the time period requested. If BOB displays a file not found message you will have to track down the problem.

Desqview and BOB

Desqview is a program that implements a multi-tasking, window environment for MS-DOS based machines. This multi-tasking capability allows you to run a data storage routine in background, while using the computer as you would normally in the foreground. The data files will be automatically updated without having to dedicate the computer to data acquisition. With the system operating properly, people using the computer will not even be aware that the data storage routine is running. To them, the system will appear as any other DOS-based computer, except that the data files are automatically updated.

To Install Desqview

1) The Desqview manual, page 9 describes the installation procedure.

2) Make sure your memory configuration is set up correctly. A minimum of 2 Mbytes of LIM 4.0 memory and a memory manager is needed. The Desqview manual explains about Desqview and expanded memory in its appendix B.

3) Install XDV.COM on your system in place of DV.EXE as listed near the bottom of page 138 in the manual. I am not sure how to "disconnect" part of your conventional memory as also listed on page 138, so it does not seem to be critical.

4) Follow the Desqview tutorial located in chapter 2. It does not take long.

Setting up the automatic storage routine

The program STORE.EXE in BOB's sub-directory GET_DATA is designed to run in background under Desqview and automatically store data coming through COM1:. The README3.TXT in the directory explains its workings and the data format. The following steps describe how to set up the program information file for STORE and how to start it. **IT IS ASSUMED THAT YOU TOOK THE TIME TO GO THROUGH THE DESQVIEW TUTORIAL AS SUGGESTED ABOVE.**

1) Get into Desqview and go to Add a Program (manual page 22).

2) Enter the parameters for the program as shown in figure 7. Change the drive designations if your using a drive other than **D:** for BOB.

3) Go to the advanced window (F1) and enter the parameters as shown in figure 7. Save the changes.

4) Now change the Big Dos program (BD) parameters as shown in figure 8. Save the changes.

5) Start STORE (ST) running in the first window.

6) Start Big DOS (BD) running in the second window. Users of the computer will only see the standard DOS prompts and many times not even realize that they are in the Desqview environment.

You can also set up custom windows for BOB, word processing software, etc. I recommend only doing this after people have become more familiar with Desqview. Initially, its best to leave them in Big Dos and not complicate matters for them.

```
Change a Program

 Program Name.............: STORE

 Keys to Use on Open Menu: ST                          Memory Size (in K): 350

 Program...: D:\BOB\GET_DATA\STORE.EXE

 Parameters:

 Directory.: D:\BOB\GET_DATA

 Options:
                  Writes text directly to screen.......: [N]
                  Displays graphics information........: [N]
                  Virtualize text/graphics (Y,N,T).....: [Y]
                  Uses serial ports (Y,N,1,2)..........: [1]
                  Requires floppy diskette.............: [N]

  Press F1 for advanced options                  Press DY when you are DONE
```

```
Change a Program Advanced Options

 System Memory (in K).......:    0   Maximum Program Memory Size (in K)..:

 Script Buffer Size.........:  1000   Maximum Expanded Memory Size (in K):

 Text Pages: 1  Graphics Pages: 0   Initial Mode:        Interrupts: 00 to FF

 Window Position:
    Maximum Height:  25        Starting Height:          Starting Row...:
    Maximum Width.:  80        Starting Width.:          Starting Column:
                                 Shared Program
 Pathname..:
 Data......:
 Close on exit (Y,N,blank)......: [Y]  Uses its own colors..............: [N]
 Allow Close Window command.....: [Y]  Runs in background (Y,N,blank)...: [Y]
 Uses math coprocessor..........: [Y]  Keyboard conflict (0-4)..........: [0]
 Share CPU when foreground......: [Y]  Share EGA when foreground/zoomed.: [Y]
 Can be swapped out (Y,N,blank).: [N]  Protection level (0-3)..........: [0]

  Press F1 for standard options                  Press DY when you are DONE
```

FIGURE 7

```
I1MMChangeMaMProgramMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:                              Change a Program
:
: Program Name............: Big DOS
:
: Keys to Use on Open Menu: BD                          Memory Size (in K): 400
:DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
: Program...:
:
: Parameters:
:
: Directory.:
:DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
: Options:
:                  Writes text directly to screen.......: [Y]
:                  Displays graphics information........: [Y]
:                  Virtualize text/graphics (Y,N,T).....: [Y]
:                  Uses serial ports (Y,N,1,2)..........: [N]
:                  Requires floppy diskette.............: [N]
:
:  Press F1 for advanced options                     Press DY when you are DONE  :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
```

```
I1MMChangeMaMProgramMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:                       Change a Program Advanced Options
:
: System Memory (in K).......:    0   Maximum Program Memory Size (in K)..: 600
:
: Script Buffer Size.......:  1000   Maximum Expanded Memory Size (in K):  256
:
: Text Pages: 4  Graphics Pages: 2   Initial Mode:        Interrupts: 00 to FF
:DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
: Window Position:
:    Maximum Height:  25       Starting Height:  25       Starting Row...:   0
:    Maximum Width.:  80       Starting Width.:  80       Starting Column:   0
:DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
:                                 Shared Program
: Pathname..:
: Data......:
:DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
: Close on exit (Y,N,blank)......: [ ]  Uses its own colors.............: [Y]
: Allow Close Window command.....: [Y]  Runs in background (Y,N,blank)...: [N]
: Uses math coprocessor..........: [Y]  Keyboard conflict (0-4)..........: [0]
: Share CPU when foreground......: [Y]  Share EGA when foreground/zoomed.: [Y]
: Can be swapped out (Y,N,blank).: [ ]  Protection level (0-3)...........: [0]
:
:  Press F1 for standard options                     Press DY when you are DONE  :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
```

FIGURE 8

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