

AMTPLT
DOCUMENTATION

ZONGE Data Processing
Frequency Domain log(FREQ) Plot Program
version 7.1x

Mykle Raymond
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Zonge Engineering & Research Organization, Inc.
3322 East Fort Lowell Road, Tucson, AZ 85716 USA
Tel:(520) 327-5501 Fax:(520) 325-1588 Email:zonge@zonge.com

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AMTPLT Program Documentation

OVERVIEW

AMTPLT generates plots of Frequency Domain data, using $\log(\text{FREQ})$ versus linear or logarithmic axes for MAGNITUDE or PHASE values.

INPUT FILES

AMTPLT expects to read an averaged data file (.AVG-file) and optionally a Mode file (.MDE-file). The program can also read plot data (.Z-files) generated by a variety of ZONGE data processing programs. .AVG-files may be created by any of the Zonge DATPRO, frequency-domain, averaging programs.

An optional Mode file includes entries that modify mode values defined by Zonge DATPRO programs. A mode name is specified for several program variables that a user may modify. Each line in a mode file includes the program name, mode name, and value. An appendix to this manual summarizes the use of mode variables and includes a description of each mode defined by AMTPLT. Global modes are recognized, but variables specific to AMTPLT are not available as modes at this time. Plot limits may be changed when the "PLOT PARAMETERS" screen is displayed.

OUTPUT FILES

The log file (.LOG-file) includes much of the information that was displayed to the user while running AMTPLT. It is useful when reviewing the operation of the program.

Plots of Resistivity, E- or H-field Magnitude versus $\log(\text{Frequency})$, and plots of Impedance Phase, E- or H-field Phase versus $\log(\text{Frequency})$ are available. Error bars may be included. Magnitude data use log scaling by default, and Phase values use linear scaling by default. They may be displayed on the computer screen while being created. All plots are written to plot files (.Xnn-files), and may be printed on paper by using a utility program such as FPLOTT to rasterize the plot commands.

AMTPLT Usage

The GENERAL DATA PROCESSING DOCUMENTATION includes many details that are common to data processing programs.

Start the averaging program by typing "AMTPLT" <RETURN>. Respond to the prompt with the name of the data file. An .AVG-file is assumed by default, unless a different extension is included. Specify a .Z-file by responding with the complete filename. Command line execution also allows the user to type "AMTPLT" followed by the data filename and <RETURN> to automatically load the data file.

Several variable parameters called "MODES" influence the operation of AMTPLT. An appendix to this manual summarizes the use of mode variables and includes a description of each mode defined by AMTPLT.

PLOT OPTIONS

AMTPLT will offer a choice of plots or titles, dependent upon input file format.

.AVG-files consist of columns of data, including magnitude and phase data of various kinds, and possibly data describing the variation in raw data block values. The user may specify a column of data to be plotted, scaling, component, and whether to include error bars using variation data.

Optional .Z-files provide data from a wide variety of sources. AMTPLT assumes the X-coordinate represents station number, and the Y-coordinate represents LogBase2 plus 9 for frequency. The type of data is not determined by AMTPLT: the user is expected to select the title that is most appropriate, so that a useable Y-axis label is provided, and that Y-axis scaling is logarithmic for magnitude and linear for phase data.

HEMAVG .AVG-files provide a choice of magnitude or phase plots for each component, and magnitude ratios and phase differences between component pairs.

PLOT REQUEST ENTRIES

Enter a combination of the following entries on one line, at the "Choice:" prompt:

- > Line number of defaults, from the summary list:
 Included: scaling, data column name, errbar column name (if any)
- > Scaling, log or linear (log for names with MAG or RES, else linear)
- > Data Column Name
- > ErrBar Column Name
- > Specific Component (default: all components)
 At this prompt, AMTPLT has read only the column labels.
 The available components are not known until data is read.
- > Second Component (default: none) [2ND COMPONENT NOT YET FUNCTIONAL]
 Linear data: plot first component minus second component.
 Log data: plot first component divided by second component.
 The default plot title should be modified to suit.

SAMPLE PLOT OPTIONS

The list of options displayed for .AVG-file data is dependent upon AMTPLT recognizing the names of data columns. The following are examples of plot options are usually offered by AMTPLT, for several different .AVG-files. Typical plot requests are also included.

CSAMT Example AMTAVG .AVG-file

```
1:   log EMAG           %EMAG
2: linear EPHZ         SEPHZ
3:   log HMAG          %HMAG
4: linear HPHZ         SHPHZ
5:   log RESISTIVITY  %RHO
6: linear PHASE        SPHZ
```

```
Choice: 5
Selected: Log(RESISTIVITY) ErrBars(%RHO) AllComponents.
Selected: "APPARENT RESISTIVITY, ohm-m"
```

```
Choice: emag eyhx exhy
Selected: Log(EMAG) Components(EyHx/ExHy)
Selected: "ELECTRIC FIELD, nVolt/(M amp)"
```

RPIP and CR Example RPAVG and CRAVG .AVG-file

```
1:   log RESISTIVITY  %RHO
2: linear PHASE        SPHZ
```

```
Choice: 2
Selected: Linear(PHASE) ErrBars(SPHZ) AllComponents.
Selected: "PHASE ANGLE, radians"
```

```
Choice: res
Selected: Log(RESISTIVITY) AllComponents.
Selected: "APPARENT RESISTIVITY, ohm-m"
```

Harmonic Example HEMAVG .AVG-file

```
1:   log MAGNITUDE    %MAG
2: linear PHASE        SPHZ
```

```
Choice: mag hx hz
Selected: Log(MAGNITUDE) Components(Hx/Hz)
Selected: "MAGNITUDE, uVolt"
```

```
Choice: phase hx hz
Selected: Linear(PHASE) Components(Hx-Hz)
Selected: "PHASE ANGLE, radians"
```

```
Choice: 2 ex
Selected: Linear(PHASE) ErrBars(SPHZ) Component(Ex)
Selected: "PHASE ANGLE, radians"
```

.Z-file Example

(NOTE: The user is expected to provide suitable titles, when plot parameters are displayed.)

```
[===== Data and Title Selection =====]
Qu: QUIT program
Sk: SKIP this data set
Rh: Frequency -vs- Apparent Resistivity      ( log-log )
Em: Frequency -vs- E field magnitude         ( log-log )
EP: Frequency -vs- E field phase             ( log-linear )
Hm: Frequency -vs- H field magnitude         ( log-log )
HP: Frequency -vs- H field phase            ( log-linear )
Ip: Frequency -vs- (E-H) impedance phase     ( log-linear )
```

PARAMETER CHANGES

(NOTE: These procedures apply when plot parameters are displayed.)

Values that may be changed by the user are hi-lighted, and include the name of the value, and equals symbol, and the value itself, as "NAME= value".

To change a value: type the Name of the value, "=", then the Value.

Example: "XMIN= .1" or "TEXT1= Sample Title".

DATA is set to the data component selected for plotting.

TEXT1 is set from the mode CLIENT value (the client name).

TEXT2 is set from the mode JOBNUMB and JOBLINE values.

SCALE specifies the length of one decade along both axes.

Raw data plot limits are not hi-lighted. They are displayed above the "data min" and "data max" labels for both X and Y. Initial values for plot limits are set from raw data limits.

Some changes affect other values, as follows:

XMIN changes XMAX. XMAX changes SCALE and YMAX.

YMIN changes YMAX. If log(Y) used, YMAX changes SCALE and XMAX.

SCALE changes XMAX. If log(Y) used, YMAX will be changed.

AMTPLT ERROR MESSAGES

If errors or inconsistencies arise within the program, AMTPLT may type a "NOTE" or an "ERROR" message. A "NOTE" message usually indicates some irregularity in the data file that is not fatal to program operation. Depending on the severity of the problem, an "ERROR" message may allow the program to continue to run or cause it to interrupt and wait for a response to a prompt to continue, restart the program, or to end. These messages are also included in a .LOG-file, which provides documentation of the program operation, which is especially useful when running several programs automatically from a batch file.

AMTPLT Sample Run

Input files: SAMCSAM.AVG SAMCSAM.MDE
 Output files: SAMCSAM.LOG SAMCSAM.Xnn log and plot files

***** Bold text: user input and comments *****

C:\ > **AMTPLT SAMCSAM** Start program, specify data file

ZONGE ENGINEERING: 3322 E. Fort Lowell, Tucson AZ 85716, USA
 AMTPLT 7.12: .AVG-file Plot Program, log(f) vs log(mag)
 MS-DOS version implemented 20 September, 1993

[===== Plot data from .AVG- or .Z-files =====]

MODE COMPANY =Zonge Engineering ***** entries read from .MDE-file *****

MODE AUTO = Yes

AMTPLT 7.12, Processed: 31 Jan 94

File used: "SAMCSAM.AVG" ***** filename used *****

Reading header in "SAMCSAM.AVG" . . .

MODE ASPACE = 183.0m ***** data file summary *****
 Data: 9 Stations, 94 Lines, 90 Points

***** .AVG-file plot menu: *****

[===== Data Column Summary =====]

- Q: QUIT program
- S: SKIP this data file
- H: Display HELP text
- E: Display Examples
- 1: log EMAG %EMAG
- 2: linear EPHZ SEPHZ
- 3: log HMAG %HMAG
- 4: linear HPHZ SHPHZ
- 5: log RESISTIVITY %RHO
- 6: linear PHASE SPHZ

Choice: 5 ***** Select Rho plots *****

Selected: Log(RESISTIVITY) ErrBars(%RHO) AllComponents.
 Selected: "APPARENT RESISTIVITY, ohm-m"

Reading input file "SAMCSAM.AVG" . . .

MODE ASPACE = 183.0m
 Data: 9 Stations, 94 Lines, 90 Points

***** screen clears *****

AMTPLT Sample Run (continued)

PLOT parameters: DATA= APPARENT RESISTIVITY, ohm-m

```

+-----+-----+
| TEXT1= Sample Data                                     | YMAX= 14.48K |
| TEXT2= Job: 91000   Line: 1                           | plot max    |
| PDEV= BOTH : Show, write plot (f,s,B)                 | M           |
| GRID= YES : INCLUDE grid lines (Y,n)                 | A           |
| SCALE= 6.011cm : Decade length, log(X)                | G           |
|                                                         | N           |
|                                                         | I           |
|                                                         | T           |
|                                                         | U           |
|                                                         | D           |
|                                                         | E           |
+-----+-----+
| FREQUENCY (Hz)                                       | YMIN= 10.00 |
|                                                         | plot min    |
+-----+-----+

```

```

XMIN= 4.000      16.00      8192.      XMAX= 65.54K
plot minimum    data min    data max    plot maximum

```

VALUE CHANGE [name= value] : <RETURN>
 Type "HELP" or "NAME= value". Type <RETURN> to continue with program.

*** **

The PLOT PARAMETER display can be used to modify various parameters in a manner identical to MODE changes. At the VALUE CHANGE prompt, type the variable name, equals character, and value, then <RETURN>. The display will be updated with the change, in addition to any other change that was needed to provide a uniform relationship between X- and Y-axis scales.

*** **

*** screen clears ***

PLOT SELECTIONS: (There are 9 stations in this set.)
 Select groups of stations for each plot, then "C"ontinue.

- "A" = select all stations for one plot.
- N>0 = select all stations, N stations per plot.
- "U" = select only stations to be specified by user.
- "C" = continue with program: prepare specified plots.
- "Q" = skip this data set, do not do plots with this data.
- ^Z = back up to the "PLOT parameters" screen.

```

Plot # 1, Option [A] : <RETURN>          *** all stns, one plot ***
Plot # 1 will include all 9 stations.
Plot # 2, Option [C] : <RETURN>          *** plot specified stns ***

```

*** plot(s) are generated (and displayed on screen when selected) ***

AMTPLT Sample Run (continued)

Reading header in "SAMCSAM.AVG" . . .
 MODE ASPACE = 183.0m

[===== Data Column Summary =====]

- Q: QUIT program
- S: SKIP this data file
- H: Display HELP text
- E: Display Examples
- 1: log EMAG %EMAG
- 2: linear EPHZ SEPHZ
- 3: log HMAG %HMAG
- 4: linear HPHZ SHPHZ
- 5: log RESISTIVITY %RHO
- 6: linear PHASE SPHZ

Choice: **phase** *** Select phase plots ***

Selected: Linear(PHASE) AllComponents.
 Selected: "PHASE ANGLE, radians"

Reading input file "SAMCSAM.AVG" . . .
 MODE ASPACE = 183.0m
 Data: 9 Stations, 94 Lines, 90 Points

*** screen clears ***

PLOT parameters: DATA= PHASE ANGLE, radians

```

+-----+-----+-----+-----+-----+-----+
| TEXT1= Sample Data                                     | M | YMAX= 1.100 |
| TEXT2= Job: 91000 Line: 1                             | A | plot max   |
| PDEV= BOTH : Show, write plot (f,s,B)                | G | 1.000     |
| GRID= YES : INCLUDE grid lines (Y,n)                  | N | data max  |
| SCALE= 6.011cm : Decade length, log(X)                | I | 35.80m   |
|               [& log(Y)]                               | T | data min  |
|               [D]                                       | U |          |
|               [E]                                       | D |          |
|-----+-----+-----+-----+-----+-----+
|               [E]                                       | E | YMIN= 0.000 |
|               [E]                                       | E | plot min   |
|-----+-----+-----+-----+-----+-----+
| XMIN= 4.000      16.00      8192.      XMAX= 65.54K |
| plot minimum    data min    data max    plot maximum |
    
```

VALUE CHANGE [name= value] : **YMAX= 1.1** *** change max phase ***
 VALUE CHANGE [name= value] : **<RETURN>**

*** screen clears ***

AMTPLT Sample Run (continued)

PLOT SELECTIONS: (There are 9 stations in this set.)
Select groups of stations for each plot, then "C"ontinue.

- "A" = select all stations for one plot.
- N>0 = select all stations, N stations per plot.
- "U" = select only stations to be specified by user.

- "C" = continue with program: prepare specified plots.
- "S" = skip this data set, do not do plots with this data.
- ^Z = back up to the "PLOT parameters" screen.

```
Plot # 1, Option [A] : <RETURN>          *** all stns, one plot ***  
  
Plot # 1 will include all 9 stations.  
Plot # 2, Option [C] : <RETURN>          *** plot specified stns ***  
  
*** plot(s) are generated (and displayed on screen when selected) ***
```

Reading header in "SAMCSAM.AVG" . . .
MODE ASPACE = 183.0m

[===== Data Column Summary =====]

- Q: QUIT program
- S: SKIP this data file
- H: Display HELP text
- E: Display Examples
- 1: log EMAG %EMAG
- 2: linear EPHZ SEPHZ
- 3: log HMAG %HMAG
- 4: linear HPHZ SHPHZ
- 5: log RESISTIVITY %RHO
- 6: linear PHASE SPHZ

Choice: Q *** no more plots ***

Selected: "QUIT program"

Files ready for rasterizing:
SAMCSAM.X01 thru SAMCSAM.X02

Log file "SAMCSAM.LOG" closed.
Thank You !

C:\ >

Appendix A ... MODE VARIABLES

Control of various aspects of many data processing programs is provided by names called "Modes". Each name refers to a specific program function. For example, the Mode name "AUTO" refers to the automatic mode of program operation, which the user may enable.

Mode changes are recognized when prompted by a program, when read from a Mode file, or when included in an input data file.

MODE PROMPTS, Manual entry

The first prompt after a data filename is requested is commonly a mode prompt. In the following example, user requests are in BOLD type, and the results are typical responses.

(Type MENU for assistance with MODEs.)

MODE Change [name?, name= value] : MENU

PROCESSING MODE MENU: Review and changing of mode values.
 Change value: type "NAME= value", where NAME is the variable name, followed by "=", then the value to be assigned to the variable called NAME.
 Description : type "NAME?" for description of value.
 This menu : type "MENU", or "M", to list this menu.
 List globals: type "GLOBL" or "G", to list global mode values.
 List values : type "LOCAL" or "L", to list local mode values.
 Version info: type "VRSN", or "V", for program version info.
 Back up : type <CTRL><Z> to back up in program.
 All done : type <RETURN>.

MODE Change [name?, name= value] : LIST

PROCESSING MODE LIST: (Type MENU for assistance)

CONTROL MODES	AutoRun	LowFreq	InitGain	GridOrgX	GridOrgY
mode names	AUTO	FMIN	(not yet)	GORX	GORY
mode values	YES	1/16 Hz	NONE	NONE	NONE

MODE Change [name?, name= value] : AUTO?

AUTO mode will automatically delete existing output files (if any), not prompt for MODE changes (if AUTO= YES is included in the .MDE-file, and exit when completed. Plots will be done as specified by entries in the .MDE-file (MODE PLOT and VIEW).
 Enter: AUTO= No, or Yes.

MODE Change [name?, name= value] : AUTO= yes

MODE Change [name?, name= value] : <RETURN>

(the program continues ...)

Display a definition of any Mode by typing the variable name and a question mark (as shown for Mode AUTO). Each program manual includes an appendix of mode definitions defined by that program.

Change the value of a Mode by typing the variable name, an equals sign, and a valid value. Press <RETURN> to indicate that the program should continue.

MODE CHANGE PRIORITIES

Mode changes may be manually entered, added to mode files or to input data files. Mode statements in files include the program name (optional), the Mode name, and the Mode value. Include a dollar sign (\$) in the first column, a colon (:) after the program name (if any), and an equal sign after the Mode name such as:

\$ ZPLOT: AUTO= yes

Modes will NOT be changed unless they are from a source with the same or higher priority as the entry to be replaced:

- 1: default mode values
- 2: Mode lines in input data files
- 3: Mode lines in Mode files (global or local)
- 4: Mode changes made at a MODE prompt

LOCAL MODE FILES

The program will read a Mode file (if it exists) with the same name as the data file and an extension of ".MDE" (like LINE10.MDE). Specify a different Mode file from the DOS prompt, by entering the program name, data file name, then Mode file name. Include the filename extension if not the same as the default. For example:

<u>Start ZPLOT by:</u>	<u>ZPLOT looks for files named:</u>
C:> ZPLOT LINE10	LINE10.Z LINE10.MDE
C:> ZPLOT LINE10 PROJECT	LINE10.Z PROJECT.MDE
C:> ZPLOT LINE10.ZZ PROJECT.MOD	LINE10.ZZ PROJECT.MOD

GLOBAL MODE FILES

Frequently used Mode statements may be included in a file named "DATPRO.MDE" and located in any subdirectory included on your PATH. Or, the environment variable DATMDE may specify any Mode file located anywhere on your computer. One of these files will be used automatically by the program, in addition to any local mode file. Your MS-DOS manuals describe environment variables and PATH.

DATA FILE MODE STATEMENTS

Mode statements may be included in an input data file (near the top of the file). Some programs will include Mode statements in output data files, for use by subsequent programs.

AMTPLT MODE LIST
(v 7.1x)

NOTE: GLOBAL modes are defined in AMTPLT, LOCAL modes are not.

COMPANY

Company name (40 chr max)

Values: COMPANY= Name of survey company
Default: COMPANY= (blank)

STNLOW

Low station number, plot limit

Values: STNLOW= X-axis low station limit.
Default: STNLOW= NONE

CLIENT

Client name (40 chr max)

Values: CLIENT= Company requesting the survey
Default: CLIENT= (blank)

STNHIGH

High station number, plot limit

Values: STNHIGH= X-axis high station limit.
Default: STNHIGH= NONE

PROJECT

Project name (40 chr max)

Values: PROJECT= Name of the survey project.
Default: PROJECT= (blank)

STNDELTA

Station number increment, plot scale

Values: STNDELTA= X-axis station increment.
Default: STNDELTA= 1.0

JOBNUMBER

Company job number (10 chr max)

Values: JOBNUMBER= Survey Job Number.
Default: JOBNUMBER= (blank)

LBLFRST

Low station number, axis label

Values: LBLFRST= X-axis low station label.
Default: LBLFRST= mode STNLOW value.

JOBDATE

Survey date (10 chr max)

Values: JOBDATE= Date of Survey.
Default: JOBDATE= (blank)

LBLDELTA

Station number increment, axis label

Values: LBLDELTA= X-axis station label increment.
Default: LBLDELTA= 1.0

JOBLINE

Survey line number (10 chr max)

Values: JOBLINE= Survey Line Number.
Default: JOBLINE= (blank)

FRQLO

Low frequency, plot limit

Values: FRQLO= None, or low frequency limit, Hz.
Default: FRQLO= NONE

BRGLINE

Line forward bearing (10 chr max)

Values: BRGLINE= Line Bearing, to high stn.
Default: BRGLINE= (blank)

FRQHI

High frequency, plot limit

Values: FRQHI= None, or high frequency limit, Hz.
Default: FRQHI= NONE

BRGBACK

Line back bearing (10 chr max)

Values: BRGBACK= Back Bearing, to low stn.
Default: BRGBACK= (blank)

TXLEN

CSAMT Transmitter length (10 chr max)

Values: TXLEN= CSAMT Transmitter Length
Default: TXLEN= (blank)

TXBRG

CSAMT Transmitter bearing (10 chr max)

Values: TXBRG= CSAMT Transmitter Bearing

Default: TXBRG= (blank)

TXDIS

CSAMT Transmitter distance from survey line (10 chr max)

Values: TXDIS= Distance from Rx Line to Tx

Default: TXDIS= (blank)

TXCX

CSAMT Transmitter center, X-coordinate
If units in feet or meters are not included, mode UNITS will be used.

Values: TXCX=

X-coordinate of center of Tx dipole. (10 chr max)

Default: TXCX= (blank)

TXCY

CSAMT Transmitter center, Y-coordinate
If units in feet or meters are not included, mode UNITS will be used.

Values: TXCY=

Y-coordinate of center of Tx dipole. (10 chr max)

Default: TXCY= (blank)

RX2TX

CSAMT Receiver to Transmitter direction

Values: RX2TX=

Direction from Rx Line to Tx (10 chr max)

Default: RX2TX= (blank)

RXBRG

Receive dipole bearing, usually same as survey line orientation

Values: RXBRG=

Receiver Dipole Bearing (10 chr max)

Default: RXBRG= (blank)

COMWIRE

Communications wire type, used for decalibration of GDP-12 data

Values: COMWIRE=

NONE, 1WHITE, 2WHITE, or BLACK.

Default: COMWIRE= NONE

PLTREV

Plot X-axis reverse selection

Values: PLTREV= No, or Yes.

Default: PLTREV= NO

UNITS

Units for listed values, such as A-Spacing. Feet or meters.

Values: UNITS= Feet or Meters.

Default: UNITS= Meters

Appendix B ... SAMPLE FILES

Sample .LOG-file

AMTPLT 7.12, Processed: 31 Jan 94

File used: "SAMCSAM.AVG"

GLOBAL MODE LIST:

```

=====
+-----+-----+-----+-----+-----+
| COMPANY                                | JOBNUMB | TXLEN |
| Zonge Engineering                      | 91000   |       |
| CLIENT                                 | JOBDATE | TXBRG |
| ZONGE ENGINEERING                     | Jan 91  | 5000 ft |
| PROJECT                                | JOBLINE | TXDIS |
| Sample Data                            | 1       | N 90 E |
+-----+-----+-----+-----+-----+
| BRGBACK | RXBRG | BRGLINE | FRQLO | RX2TX |
| S 90 W  | N 90 E | N 90 E  | 1/8 Hz | 3.5 mi |
| STNLO   | STNDEL | STNHI   | FRQHI | TXCX  |
| 0.0     | 6.0    | 48.0    | NONE  | North |
| LBLFRST | LBLDEL | PLTREV  | UNITS | TXCY  |
| STNLO   | 6.0    | NO      | METERS|       |
+-----+-----+-----+-----+-----+

```

```

=====
Selected: Log(RESISTIVITY) ErrBars(%RHO) AllComponents.
Selected: "APPARENT RESISTIVITY, ohm-m"

```

Data: 9 Stations, 94 Lines, 90 Points

```

Sample Data
Job: 91000 Line: 1
APPARENT RESISTIVITY, ohm-m
Working with 90 data points for 9 stations (max 10 freqs).

```

```

Plotting # 1 of 1 . . .
Plotting Station "0.0" data . . .
Plotting Station "6.0" data . . .
Plotting Station "12.0" data . . .
Plotting Station "18.0" data . . .
Plotting Station "24.0" data . . .
Plotting Station "30.0" data . . .
Plotting Station "36.0" data . . .
Plotting Station "42.0" data . . .
Plotting Station "48.0" data . . .

```

```

=====
Selected: Linear(PHASE) AllComponents.
Selected: "PHASE ANGLE, radians"

```

Data: 9 Stations, 94 Lines, 90 Points

```

Sample Data
Job: 91000 Line: 1
PHASE ANGLE, radians
Working with 90 data points for 9 stations (max 10 freqs).

```

```

Plotting # 1 of 1 . . .
Plotting Station "0.0" data . . .
Plotting Station "6.0" data . . .
Plotting Station "12.0" data . . .
Plotting Station "18.0" data . . .
Plotting Station "24.0" data . . .
Plotting Station "30.0" data . . .
Plotting Station "36.0" data . . .
Plotting Station "42.0" data . . .
Plotting Station "48.0" data . . .

```

```

=====
Selected: "QUIT program"

```

Files ready for rasterizing: SAMCSAM.X01 thru SAMCSAM.X02

Log file "SAMCSAM.LOG" closed.

GDP DATA PROCESSING MANUAL

Sample .AVG-file (CSAMT Averaged Data File)

Reference ruler line 1

-----1-----2-----3-----4-----5-----6-----7-----8-----9-----0-----1-----2-----

```

\ AMTAVG 7.01: "SAMCSAM.FLD", Dated 91-01-01, Processed 01 Dec 92
$ ASPACE= 183.0m
skp Station Freq Comp Amps Emag Ephz Hmag Hphz Resistivity Phase %Emag sEphz %Hmag sHphz %Rho sPhz
\=====
2 0.0 8192 ExHy 4.5 1.1731e+3 1491.0 3.5150e-1 722.7 2.7195e+2 768.3 0.4 3.1 1.4 14.7 1.7 16.6
2 0.0 4096 ExHy 8. 8.5835e+2 2087.0 3.9003e-1 1244.7 2.3648e+2 842.4 0.4 3.1 0.9 7.1 1.4 12.9
2 0.0 2048 ExHy 15. 6.7279e+2 2450.4 4.4613e-1 1557.8 2.2209e+2 892.6 1.1 11.3 1.2 1.6 0.1 1.1
2 0.0 1024 ExHy 22. 5.4680e+2 2809.1 5.4905e-1 1884.1 1.9377e+2 925.0 1.0 6.0 1.2 7.5 0.4 3.5
2 0.0 512 ExHy 27. 4.3143e+2 3087.0 6.6498e-1 2170.8 1.6442e+2 916.3 0.0 1.4 0.1 0.6 0.2 1.8
2 0.0 256 ExHy 29. 3.6102e+2 -3065.5 8.6567e-1 2361.3 1.3588e+2 856.3 0.0 0.3 0.2 2.1 0.2 1.9
2 0.0 128 ExHy 30. 3.1513e+2 -3056.5 1.1202e+0 2473.8 1.2365e+2 752.8 0.1 0.6 0.3 3.3 0.3 2.8
2 0.0 64 ExHy 30. 2.9184e+2 -3073.0 1.3978e+0 2519.9 1.3621e+2 690.3 0.2 4.8 0.5 4.2 0.2 2.0
2 0.0 32 ExHy 30. 2.3443e+2 3015.3 1.8517e+0 2488.9 1.0018e+2 526.4 0.5 2.1 0.5 4.3 0.2 1.4
2 0.0 16 ExHy 30. 3.4135e+2 2697.3 2.7474e+0 2616.3 1.9295e+2 81.0 0.5 4.3 0.5 4.9 0.1 1.2
2 6.0 8192 ExHy 4.5 1.2513e+3 -2111.5 3.6216e-1 -3036.5 2.9142e+2 925.0 1.0 12.0 1.3 12.8 2.4 19.8
2 6.0 4096 ExHy 8. 8.5772e+2 -1267.2 3.8044e-1 -2183.9 2.4819e+2 916.7 0.2 3.0 0.7 8.3 1.2 12.0
2 6.0 2048 ExHy 15. 6.4934e+2 -785.8 4.2923e-1 -1762.4 2.2349e+2 976.6 0.1 1.1 0.4 4.3 0.5 3.2
2 6.0 1024 ExHy 22. 5.0469e+2 -373.3 5.2905e-1 -1355.6 1.7775e+2 982.3 0.1 0.4 0.1 1.7 0.2 2.0
2 6.0 512 ExHy 27. 3.9387e+2 -73.8 6.4048e-1 -1031.4 1.4772e+2 957.5 0.0 1.5 0.1 0.9 0.2 2.7
2 6.0 256 ExHy 29. 3.2680e+2 68.6 8.3859e-1 -819.4 1.1865e+2 887.9 0.1 0.4 0.1 0.9 0.3 2.8
2 6.0 128 ExHy 30. 2.8114e+2 92.6 1.0776e+0 -709.6 1.0635e+2 802.3 0.0 0.3 0.0 0.3 0.1 0.5
2 6.0 64 ExHy 30. 2.6778e+2 87.0 1.4003e+0 -635.9 1.1428e+2 722.9 0.1 1.1 0.3 2.5 0.2 2.2
2 6.0 32 ExHy 30. 2.0597e+2 -8.5 1.8163e+0 -679.5 8.0377e+1 671.0 0.1 1.4 0.2 1.7 0.2 1.9
2 6.0 16 ExHy 30. 2.6405e+2 -442.2 2.6760e+0 -546.5 1.2170e+2 104.2 0.3 4.6 0.2 2.2 0.5 1.2
2 12.0 8192 ExHy 4.5 1.5175e+3 -3128.3 3.5544e-1 2424.6 4.4503e+2 730.3 0.6 13.9 2.4 25.7 3.7 36.7
2 12.0 4096 ExHy 8. 1.0776e+3 -1818.9 3.5323e-1 -2617.0 4.5444e+2 798.1 0.2 3.8 0.5 5.3 1.0 9.6
2 12.0 2048 ExHy 15. 8.4220e+2 -1080.0 4.0646e-1 -2001.8 4.1928e+2 921.8 0.1 1.0 0.2 1.4 0.3 2.5
2 12.0 1024 ExHy 22. 6.6369e+2 -532.1 4.9443e-1 -1481.4 3.5192e+2 949.3 0.0 0.3 0.0 1.8 0.2 1.7
2 12.0 512 ExHy 27. 5.2781e+2 -170.1 6.0843e-1 -1104.1 2.9397e+2 933.9 0.1 2.0 0.3 1.8 0.3 2.4
2 12.0 256 ExHy 29. 4.4406e+2 -7.6 8.0176e-1 -861.5 2.3966e+2 854.0 0.1 0.2 0.1 0.9 0.1 0.9
2 12.0 128 ExHy 29. 3.9475e+2 18.2 1.0473e+0 -721.9 2.2197e+2 740.1 0.1 1.4 0.3 2.5 0.4 3.7
2 12.0 64 ExHy 30. 3.8188e+2 24.0 1.3362e+0 -646.9 2.5524e+2 670.8 0.1 1.2 0.3 2.5 0.5 5.0
2 12.0 32 ExHy 30. 3.0221e+2 -146.5 1.7584e+0 -676.9 1.8461e+2 530.4 0.3 5.0 0.2 2.3 0.2 3.4
2 12.0 16 ExHy 30. 4.4644e+2 -491.6 2.6151e+0 -548.9 3.6431e+2 57.3 0.1 1.3 0.2 2.1 0.4 1.9
2 18.0 8192 ExHy 4.5 1.6965e+3 2432.0 3.1821e-1 1483.5 6.9396e+2 948.4 1.8 18.0 2.8 24.0 4.8 46.8
2 18.0 4096 ExHy 8. 1.1682e+3 -2162.8 3.4951e-1 -3086.2 5.4546e+2 923.4 1.6 17.2 0.3 20.6 0.5 5.7
2 18.0 2048 ExHy 15. 8.8357e+2 -1238.2 4.0162e-1 -2206.4 4.7266e+2 968.2 0.0 1.0 0.6 6.4 0.4 5.4
2 18.0 1024 ExHy 22. 6.8430e+2 -614.6 4.8870e-1 -1614.7 3.8294e+2 1000.1 0.0 0.4 0.4 0.8 0.7 6.2
2 18.0 512 ExHy 26. 5.3223e+2 -192.5 5.9619e-1 -1180.4 3.1131e+2 987.9 0.2 0.7 0.1 1.5 0.2 2.6
2 18.0 256 ExHy 28. 4.3459e+2 -1.5 7.7973e-1 -904.0 2.4270e+2 902.4 0.0 0.6 0.1 1.3 0.1 1.4
2 18.0 128 ExHy 28. 3.8217e+2 43.6 1.0276e+0 -747.1 2.1611e+2 790.8 0.5 2.6 0.7 6.5 0.3 3.0
2 18.0 64 ExHy 30. 3.6596e+2 60.4 1.2974e+0 -649.7 2.4861e+2 710.1 0.7 10.4 0.9 10.4 0.6 5.7
2 18.0 32 ExHy 30. 2.7788e+2 -38.6 1.7036e+0 -690.5 1.6629e+2 651.9 0.2 5.4 0.4 4.2 0.2 2.0
2 18.0 16 ExHy 30. 3.7603e+2 -491.6 2.5579e+0 -558.1 2.7013e+2 66.5 0.3 1.8 0.3 2.2 0.0 0.4
2 24.0 8192 ExHy 4. 2.0018e+3 1453.4 2.8862e-1 672.6 1.1744e+3 780.8 0.5 6.7 3.1 31.1 3.7 36.6
2 24.0 4096 ExHy 8. 1.4450e+3 -2661.4 3.3326e-1 2765.7 9.1792e+2 856.0 0.5 4.2 1.2 13.7 2.2 22.2
2 24.0 2048 ExHy 15. 1.1192e+3 -1485.7 3.7744e-1 -2406.8 8.5868e+2 921.1 0.2 1.1 0.4 4.3 0.6 6.3
2 24.0 1024 ExHy 22. 8.6714e+2 -712.8 4.4784e-1 -1683.9 7.3225e+2 971.2 0.0 0.2 0.1 3.4 0.3 3.8
2 24.0 512 ExHy 26. 6.6926e+2 -240.2 5.4469e-1 -1212.4 5.8973e+2 972.2 0.0 0.1 0.2 1.9 0.3 3.4
2 24.0 256 ExHy 28. 5.1201e+2 -28.6 6.6927e-1 -921.4 4.5725e+2 892.8 0.0 0.2 0.2 2.4 0.5 4.7
2 24.0 128 ExHy 28. 4.9467e+2 26.6 9.7175e-1 -771.2 4.0490e+2 797.8 0.0 0.8 0.2 1.6 0.3 3.0
2 24.0 64 ExHy 28. 5.0064e+2 42.6 1.3067e+0 -657.9 4.5872e+2 700.5 0.5 2.5 0.3 2.8 1.0 9.8
2 24.0 32 ExHy 28. 3.7409e+2 -33.2 1.6845e+0 -676.6 3.0825e+2 643.4 0.3 4.1 0.4 4.5 0.2 2.0
2 24.0 16 ExHy 28. 5.1261e+2 -515.1 2.5315e+0 -562.5 5.1254e+2 47.4 0.2 2.1 0.2 2.1 0.1 1.4
2 30.0 8192 ExHy 4.5 1.0969e+3 -1667.4 2.9457e-1 -2325.8 3.3851e+2 658.4 1.9 15.6 6.9 69.6 11.6 108.7
2 30.0 4096 ExHy 8. 7.8682e+2 -1051.9 2.9363e-1 -1843.0 3.5059e+2 791.1 0.1 0.8 0.7 8.2 1.2 11.6
2 30.0 2048 ExHy 15. 6.1638e+2 -662.2 3.2983e-1 -1574.8 3.4105e+2 912.7 0.1 0.8 0.7 10.1 1.8 16.8
2 30.0 1024 ExHy 22. 4.7630e+2 -287.8 3.9858e-1 -1263.9 2.7891e+2 976.0 0.1 0.5 0.2 5.8 0.5 5.5
2 30.0 512 ExHy 28. 3.6720e+2 -16.6 4.7574e-1 -1008.9 2.3272e+2 992.4 0.2 1.4 0.3 4.1 0.3 3.7
2 30.0 256 ExHy 30. 3.0297e+2 93.6 6.4638e-1 -821.1 1.7164e+2 914.7 0.1 0.9 0.1 1.5 0.3 2.9
2 30.0 128 ExHy 30. 2.6245e+2 97.7 8.5108e-1 -715.2 1.4859e+2 812.9 0.2 0.8 0.3 2.6 0.3 2.8
2 30.0 64 ExHy 30. 2.5341e+2 83.7 1.0888e+0 -632.8 1.6928e+2 716.5 0.1 1.7 0.7 6.1 0.6 5.9
2 30.0 32 ExHy 30. 1.8666e+2 38.9 1.3951e+0 -653.1 1.1188e+2 691.9 0.3 1.1 0.7 6.5 0.7 7.9
2 30.0 16 ExHy 30. 2.4393e+2 -518.6 2.0950e+0 -565.6 1.6947e+2 47.0 0.4 3.7 0.6 5.0 0.5 2.5

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continued ...

GDP DATA PROCESSING MANUAL

Sample .AVG-file (CSAMT second page)

Reference ruler line																
	1	2	3	4	5	6	7	8	9	0	1	2	3	4		
2	36.0	8192	ExHy	4.5	1.3909e+3	-1630.5	2.9845e-1	-2231.7	5.3027e+2	601.2	0.8	11.3	5.5	55.1	9.0	82.0
2	36.0	4096	ExHy	8.	9.9495e+2	-1050.9	2.8522e-1	-1824.2	5.9415e+2	773.2	0.1	0.7	0.9	7.3	1.5	15.3
2	36.0	2048	ExHy	15.	7.8571e+2	-666.0	3.2131e-1	-1533.9	5.8395e+2	867.9	0.0	0.4	0.6	5.8	1.1	11.6
2	36.0	1024	ExHy	22.	6.0881e+2	-289.9	3.8106e-1	-1231.6	4.9855e+2	941.8	0.0	0.6	0.5	5.2	0.6	7.2
2	36.0	512	ExHy	27.	4.6744e+2	-17.8	4.5015e-1	-990.5	4.2120e+2	972.7	0.1	0.6	0.2	2.6	0.5	4.0
2	36.0	256	ExHy	29.	3.8347e+2	91.5	6.0522e-1	-811.7	3.1365e+2	903.2	0.1	0.3	0.3	2.7	0.5	4.6
2	36.0	128	ExHy	30.	3.3563e+2	98.6	8.1093e-1	-701.4	2.6766e+2	800.0	0.1	2.1	0.3	2.3	0.5	5.1
2	36.0	64	ExHy	30.	3.2922e+2	81.2	1.0407e+0	-624.5	3.1273e+2	705.6	0.8	4.6	0.9	9.4	1.6	15.7
2	36.0	32	ExHy	30.	2.4422e+2	51.8	1.3326e+0	-636.9	2.0992e+2	688.7	0.7	3.2	0.5	4.4	0.4	4.5
2	36.0	16	ExHy	30.	3.0535e+2	-528.8	1.9452e+0	-564.6	3.0804e+2	35.8	0.3	1.7	0.4	2.4	0.2	1.1
2	42.0	8192	ExHy	4.5	1.2131e+3	-471.6	2.7422e-1	-1113.9	4.7775e+2	642.3	1.1	13.6	5.0	56.3	7.8	81.0
2	42.0	4096	ExHy	8.	9.0781e+2	-488.6	2.8341e-1	-1179.7	5.0099e+2	691.1	0.1	0.8	1.7	27.3	2.6	27.9
2	42.0	2048	ExHy	15.	7.2021e+2	-405.1	3.0157e-1	-1169.1	5.5699e+2	764.0	0.0	0.5	0.4	5.5	0.7	7.0
2	42.0	1024	ExHy	22.	5.7228e+2	-168.0	3.5195e-1	-1043.0	5.1641e+2	875.0	0.1	0.5	0.3	4.9	0.7	6.2
2	42.0	512	ExHy	26.	4.3890e+2	-3105.9	4.3269e-1	2257.2	4.0192e+2	920.1	0.1	1.3	0.2	1.6	0.5	5.4
2	42.0	256	ExHy	28.	3.6474e+2	1683.6	5.6368e-1	818.6	3.2712e+2	865.0	0.0	0.0	0.2	1.5	0.2	1.5
2	42.0	128	ExHy	30.	3.1866e+2	894.9	7.3635e-1	95.9	2.9263e+2	799.0	0.3	3.3	0.4	3.6	0.4	4.1
2	42.0	64	ExHy	30.	3.1227e+2	487.3	9.6601e-1	-190.5	3.2655e+2	677.8	0.2	2.7	0.8	5.9	1.5	13.4
2	42.0	32	ExHy	30.	2.3070e+2	-2818.6	1.1810e+0	2707.2	2.3848e+2	757.4	0.6	4.9	0.7	5.2	0.3	3.2
2	42.0	16	ExHy	30.	2.6395e+2	1149.3	1.7723e+0	1094.5	2.7727e+2	54.8	0.3	2.8	0.4	4.9	0.7	5.5
2	48.0	8192	ExHy	4.5	8.1509e+2	-470.8	2.9521e-1	-974.0	1.8612e+2	503.2	0.7	5.7	2.8	24.9	5.0	41.1
2	48.0	4096	ExHy	8.	6.2295e+2	-489.1	2.7569e-1	-1151.4	2.4931e+2	662.3	0.1	1.2	1.8	13.5	3.7	36.4
2	48.0	2048	ExHy	15.	4.9481e+2	-406.5	3.0274e-1	-1180.2	2.6087e+2	773.7	0.0	0.3	0.3	1.8	0.6	5.8
2	48.0	1024	ExHy	22.	3.9242e+2	-164.2	3.5530e-1	-1044.9	2.3827e+2	880.7	0.0	0.5	0.4	4.5	0.4	4.1
2	48.0	512	ExHy	26.	3.0773e+2	-3095.5	4.3108e-1	2245.6	1.9907e+2	942.1	0.2	4.0	0.2	1.8	0.2	2.1
2	48.0	256	ExHy	28.	2.4759e+2	1695.9	5.5445e-1	806.7	1.5579e+2	889.2	0.0	1.3	0.1	0.8	0.1	1.3
2	48.0	128	ExHy	30.	2.1577e+2	911.0	7.3018e-1	91.2	1.3645e+2	819.8	0.4	4.6	0.2	6.8	0.5	5.0
2	48.0	64	ExHy	30.	2.1024e+2	508.5	9.5573e-1	-205.0	1.5121e+2	713.5	0.4	3.2	0.2	0.6	0.5	4.7
2	48.0	32	ExHy	30.	1.5808e+2	-2717.0	1.1366e+0	2711.9	1.2090e+2	854.3	0.1	1.7	0.1	1.4	0.3	3.0
2	48.0	16	ExHy	30.	1.4876e+2	1194.8	1.6987e+0	1068.3	9.5852e+1	126.5	0.3	2.8	0.3	3.2	0.0	0.7

*** end-of-file ***

GDP DATA PROCESSING MANUAL

Sample .AVG-file (NSAMT Averaged Data File)

Reference ruler line 1 >
 -----1-----2-----3-----4-----5-----6-----7-----8-----9-----0----->

\ NSAVG 1.02: "SAMAMT.FLD", Dated 92-06-16, Processed 01 Dec 92

\$ ASPACE= 200.0m

skp	Station	Freq	Comp	Emag	Hmag1	Hmag2	RHO1	RHO2	RHOA	Phase1	Phase2
2	9.0	896	ExHy	1.0834e+3	2.7027e+0	0.0000e+0	3.0869e+1	3.6073e+1	3.3471e+1	*	807.2
2	9.0	640	ExHy	9.6063e+2	2.7076e+0	0.0000e+0	3.4442e+1	3.9255e+1	3.6849e+1	*	849.5
2	9.0	448	ExHy	6.0642e+2	2.2041e+0	0.0000e+0	3.2607e+1	3.4077e+1	3.3342e+1	*	873.6
2	9.0	320	ExHy	6.4349e+2	2.7309e+0	0.0000e+0	3.2627e+1	3.5632e+1	3.4130e+1	*	877.4
2	9.0	224	ExHy	6.0800e+2	3.0315e+0	0.0000e+0	3.5401e+1	3.6749e+1	3.6075e+1	*	906.0
2	9.0	160	ExHy	3.4158e+2	2.2177e+0	0.0000e+0	2.8638e+1	3.0312e+1	2.9475e+1	*	931.8
2	9.0	112	ExHy	5.5977e+2	4.4097e+0	0.0000e+0	2.8687e+1	2.9364e+1	2.9026e+1	*	952.2
2	9.0	80	ExHy	3.6818e+2	3.5942e+0	0.0000e+0	2.6002e+1	2.6844e+1	2.6423e+1	*	950.7
2	9.0	56	ExHy	3.4890e+2	4.1809e+0	0.0000e+0	2.2244e+1	2.7281e+1	2.4762e+1	*	915.7
2	9.0	40	ExHy	1.9262e+2	2.8893e+0	0.0000e+0	2.1371e+1	2.2640e+1	2.2005e+1	*	942.6
2	9.0	28	ExHy	2.0028e+2	3.7781e+0	0.0000e+0	1.9430e+1	2.0049e+1	1.9739e+1	*	906.3
2	9.0	20	ExHy	1.2696e+2	2.9728e+0	0.0000e+0	1.7678e+1	1.8454e+1	1.8066e+1	*	873.3
2	9.0	14	ExHy	1.1006e+2	3.0145e+0	0.0000e+0	1.7313e+1	2.1489e+1	1.9401e+1	*	726.0
2	9.0	10	ExHy	7.1923e+1	2.4038e+0	0.0000e+0	1.6968e+1	2.0819e+1	1.8893e+1	*	665.7
2	9.0	7	ExHy	7.1707e+1	2.9014e+0	0.0000e+0	1.5782e+1	2.0114e+1	1.7948e+1	*	660.6
2	9.0	5	ExHy	4.4583e+1	2.1473e+0	0.0000e+0	1.5667e+1	1.9395e+1	1.7531e+1	*	677.3
2	9.0	3.5	ExHy	5.9773e+1	2.9068e+0	0.0000e+0	2.1501e+1	2.6782e+1	2.4141e+1	*	698.0
2	9.0	2.5	ExHy	4.6220e+1	2.4572e+0	0.0000e+0	2.4228e+1	3.3463e+1	2.8846e+1	*	722.4
2	9.0	1.75	ExHy	6.0993e+1	3.3649e+0	0.0000e+0	2.6137e+1	5.8983e+1	4.2560e+1	*	752.8
2	9.0	1.25	ExHy	4.7471e+1	3.1784e+0	0.0000e+0	2.8031e+1	4.7740e+1	3.7885e+1	*	947.6
2	9.0	.875	ExHy	4.6194e+1	3.8484e+0	0.0000e+0	1.8227e+1	6.6190e+1	4.2208e+1	*	849.9
2	9.0	896	EyHx	7.2488e+2	1.7745e+0	0.0000e+0	2.9111e+1	4.1078e+1	3.5095e+1	*	797.2
2	9.0	640	EyHx	1.0810e+3	2.9565e+0	0.0000e+0	4.0120e+1	4.3202e+1	4.1661e+1	*	825.4
2	9.0	448	EyHx	1.7999e+3	5.8964e+0	0.0000e+0	4.1157e+1	4.1827e+1	4.1492e+1	*	838.5
2	9.0	320	EyHx	1.9322e+3	7.4448e+0	0.0000e+0	4.1424e+1	4.2358e+1	4.1891e+1	*	874.3
2	9.0	224	EyHx	1.4780e+3	6.9748e+0	0.0000e+0	4.0014e+1	4.0368e+1	4.0191e+1	*	911.4
2	9.0	160	EyHx	1.0503e+3	6.2890e+0	0.0000e+0	3.4548e+1	3.5195e+1	3.4871e+1	*	937.4
2	9.0	112	EyHx	1.5332e+3	1.1146e+1	0.0000e+0	3.3899e+1	3.4378e+1	3.4139e+1	*	935.8
2	9.0	80	EyHx	9.4014e+2	8.3650e+0	0.0000e+0	2.9149e+1	3.3325e+1	3.1237e+1	*	943.7
2	9.0	56	EyHx	1.2254e+3	1.4346e+1	0.0000e+0	1.7037e+1	4.3973e+1	3.0505e+1	*	852.2
2	9.0	40	EyHx	4.4640e+2	6.2551e+0	0.0000e+0	2.4146e+1	2.5809e+1	2.4977e+1	*	930.3
2	9.0	28	EyHx	3.2596e+2	5.8985e+0	0.0000e+0	2.1027e+1	2.2543e+1	2.1785e+1	*	934.0
2	9.0	20	EyHx	1.8256e+2	4.2161e+0	0.0000e+0	1.8372e+1	1.9830e+1	1.9101e+1	*	874.3
2	9.0	14	EyHx	2.2278e+2	6.4082e+0	0.0000e+0	1.6695e+1	1.7758e+1	1.7227e+1	*	801.2
2	9.0	10	EyHx	1.2354e+2	4.3730e+0	0.0000e+0	1.5206e+1	1.7426e+1	1.6316e+1	*	691.7
2	9.0	7	EyHx	1.7231e+2	6.7166e+0	0.0000e+0	1.7137e+1	2.1098e+1	1.9118e+1	*	577.1
2	9.0	5	EyHx	1.2714e+2	5.7996e+0	0.0000e+0	1.7084e+1	2.1662e+1	1.9373e+1	*	385.5
2	9.0	3.5	EyHx	1.5217e+2	6.9028e+0	0.0000e+0	2.3223e+1	3.5004e+1	2.9114e+1	*	264.6
2	9.0	2.5	EyHx	1.4037e+2	6.1503e+0	0.0000e+0	3.6801e+1	5.0572e+1	4.3687e+1	*	275.2
2	9.0	1.75	EyHx	2.0270e+2	8.8640e+0	0.0000e+0	4.2950e+1	9.5927e+1	6.9438e+1	*	257.1
2	9.0	1.25	EyHx	1.9541e+2	8.7846e+0	0.0000e+0	6.3619e+1	1.0063e+2	8.2122e+1	*	241.7
2	9.0	.875	EyHx	2.2724e+2	1.1726e+1	0.0000e+0	6.7449e+1	1.1606e+2	9.1753e+1	*	268.2
2	9.0	.625	EyHx	1.8580e+2	1.0657e+1	0.0000e+0	7.2140e+1	1.4633e+2	1.0923e+2	*	298.9

continued ...

Sample .AVG-file (NSAMT second section)

< 1 1 1 1 1 1
 <+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6

%Emag	%Hmag1	%Hmag2	%RHO1	%RHO2	%RHOA	sPHZ1	sPHZ2
133.1	130.1	0.0	22.9	13.2	16.4	0.1	81.8
147.5	145.9	0.0	22.1	15.8	17.9	0.1	63.3
33.8	30.7	0.0	13.1	11.3	12.1	0.0	44.2
39.3	36.0	0.0	13.8	9.8	11.5	0.0	60.3
44.3	44.1	0.0	6.9	8.4	7.5	0.0	24.8
23.1	21.0	0.0	7.5	7.1	7.2	0.0	39.4
58.5	59.5	0.0	8.9	8.8	8.9	0.0	19.4
53.6	54.0	0.0	7.0	7.4	7.1	0.0	22.6
29.7	21.5	0.0	23.6	20.8	21.0	0.1	86.5
33.1	28.0	0.0	12.4	14.1	13.1	0.0	61.6
39.1	36.1	0.0	10.6	14.0	12.3	0.0	66.0
28.0	24.7	0.0	6.4	12.6	9.5	0.0	60.1
23.1	18.8	0.0	16.1	38.2	27.1	0.1	99.2
21.2	21.5	0.0	31.7	46.7	39.7	0.1	78.1
21.6	21.9	0.0	16.7	20.2	16.0	0.1	68.8
23.2	20.7	0.0	20.8	16.2	17.5	0.1	48.3
37.2	31.0	0.0	18.2	23.0	20.2	0.1	84.7
29.1	25.6	0.0	17.2	21.2	19.1	0.0	66.0
17.6	15.6	0.0	39.9	23.4	23.4	0.1	227.9
18.0	14.3	0.0	26.3	28.9	27.5	0.0	176.5
14.7	15.9	0.0	42.4	33.8	35.6	0.0	38.9
86.1	79.2	0.0	34.7	16.7	19.5	0.2	115.5
71.9	71.4	0.0	9.9	8.7	8.6	0.0	59.5
43.0	42.9	0.0	5.2	4.7	4.9	0.0	18.9
38.5	37.4	0.0	5.4	4.9	5.1	0.0	30.3
24.6	25.1	0.0	3.0	3.1	3.1	0.0	13.1
35.6	35.5	0.0	5.4	5.4	5.4	0.0	21.4
39.3	40.0	0.0	6.6	7.0	6.8	0.0	19.7
45.1	43.0	0.0	13.2	11.3	10.7	0.1	49.5
7.5	12.1	0.0	31.8	42.7	39.6	0.0	167.8
53.9	52.1	0.0	16.5	18.6	17.5	0.0	87.6
29.2	28.3	0.0	7.2	6.5	6.2	0.0	42.3
31.3	32.5	0.0	9.8	9.8	9.6	0.0	44.0
19.2	17.6	0.0	8.2	8.2	6.7	0.0	64.5
23.3	23.7	0.0	19.4	21.6	20.0	0.0	56.9
30.3	32.1	0.0	14.7	11.9	12.2	0.1	59.9
24.5	22.9	0.0	14.8	15.9	14.7	0.0	87.6
27.7	24.2	0.0	28.0	27.2	24.4	0.1	82.5
25.2	24.9	0.0	26.1	31.0	28.7	0.0	169.2
24.9	23.7	0.0	33.5	52.3	44.0	0.1	141.7
23.8	21.3	0.0	23.8	18.8	19.3	0.1	116.8
25.5	23.0	0.0	29.0	28.5	25.0	0.1	146.3
24.3	21.6	0.0	31.4	36.5	30.8	0.1	173.5

*** end-of-file ***

GDP DATA PROCESSING MANUAL

Sample .AVG-file (HARMONIC second page)

```

Reference ruler line
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2 4400. 3600. 4100. 3. 0.375 Hz 1.3 2.8448e-6 -1142.7 1.6160e+0 -3.5410e+0 17.7 234.7
2 4400. 3600. 4100. 3. 0.625 Hz 1.3 2.2956e-6 -1423.9 4.5988e-1 -3.1070e+0 22.9 84.1
2 4400. 3600. 4100. 3. 0.875 Hz 1.3 3.8286e-6 -1624.2 -2.7961e-1 -5.2309e+0 24.8 342.9
2 4400. 3600. 4100. 3. 1.125 Hz 1.3 5.0045e-6 -1703.8 -9.0837e-1 -6.7868e+0 41.7 559.4
2 4400. 3600. 4100. 3. 1. Hz 1.3 3.2784e-6 -1570.3 2.2259e-3 -4.4856e+0 0. 21.2
2 4400. 3600. 4100. 3. 3. Hz 1.3 9.0675e-6 -1550.9 2.4621e-1 -1.2404e+1 5.9 51.5
2 4400. 3600. 4100. 3. 5. Hz 1.3 1.5540e-5 -1571.3 -1.1772e-2 -2.1262e+1 2.9 24.5
2 4400. 3600. 4100. 3. 7. Hz 1.3 2.1400e-5 -1585.8 -4.3783e-1 -2.9277e+1 3.6 15.8
2 4400. 3600. 4100. 3. 9. Hz 1.3 2.9654e-5 -1584.7 -5.6410e-1 -4.0569e+1 3.7 5.9
2 4400. 3600. 4100. 3. 16. Hz 1.3 4.8172e-5 -1675.3 -6.8753e+0 -6.5551e+1 0.7 4.5
2 4400. 3600. 4100. 3. 48. Hz 1.3 1.4858e-4 -1832.1 -5.2518e+1 -1.9639e+2 0.8 2.1
2 4400. 3600. 4100. 3. 80. Hz 1.3 2.5363e-4 -1996.3 -1.4324e+2 -3.1608e+2 0. 6.1
2 4400. 3600. 4100. 3. 112. Hz 1.3 3.5606e-4 -2168.1 -2.7402e+2 -4.0281e+2 0. 0.9
2 4400. 3600. 4100. 3. 144. Hz 1.3 4.6383e-4 -2330.8 -4.3718e+2 -4.6002e+2 0.1 0.2
2 4400. 3600. 4100. 3. 128. Hz 1.3 4.0058e-4 -2485.9 -4.3442e+2 -3.3417e+2 0.2 0.6
2 4400. 3600. 4100. 3. 384. Hz 1.3 1.2621e-3 2046.9 -7.9150e+2 1.5347e+3 0. 0.1
2 4400. 3600. 4100. 3. 640. Hz 1.3 2.1415e-3 323. 2.7785e+3 9.3002e+2 0. 0.3
2 4400. 3600. 4100. 3. 896. Hz 1.3 2.9740e-3 -1407.1 6.6333e+2 -4.0147e+3 0. 0.1
2 4400. 3600. 4100. 3. 1152. Hz 1.3 3.7665e-3 -3139.8 -5.1535e+3 -9.2380e+0 0. 0.
2 4400. 3600. 4100. 3. 1024. Hz 1.3 3.1941e-3 -2289.8 -2.8784e+3 -3.2884e+3 0. 0.1
2 4400. 3600. 4100. 3. 3072. Hz 1.3 7.3959e-3 2523.8 -8.2489e+3 5.8615e+3 0. 0.4
2 4400. 3600. 4100. 3. 5120. Hz 1.3 9.4041e-3 936. 7.6302e+3 1.0360e+4 0.1 0.6
2 4400. 3600. 4100. 3. 7168. Hz 1.3 8.1331e-3 -873.6 7.1449e+3 -8.5312e+3 0.2 1.7
2 4400. 3600. 4100. 3. 9216. Hz 1.3 5.1085e-2 -3100.6 -6.9837e+4 -2.8679e+3 0.1 0.8
2 4200. 3600. 4000. 2. 0. Ex 0. 1.9837e+2 5.7 1.0000e+0 0.0000e+0 0. 0.
2 4200. 3600. 4000. 2. 0.125 Ex 2.9 5.4916e-2 5.5 1.0000e+0 5.5001e-3 0. 0.
2 4200. 3600. 4000. 2. 0.375 Ex 2.9 5.4666e-2 4.8 9.9545e-1 4.7782e-3 0. 0.
2 4200. 3600. 4000. 2. 0.625 Ex 2.9 5.4545e-2 3.7 9.9326e-1 3.6254e-3 0. 0.1
2 4200. 3600. 4000. 2. 0.875 Ex 2.9 5.4469e-2 2.3 9.9188e-1 2.2317e-3 0. 0.1
2 4200. 3600. 4000. 2. 1.125 Ex 2.9 5.4421e-2 0.8 9.9100e-1 7.4325e-4 0. 0.1
2 4200. 3600. 4000. 2. 16. Ex 2.9 5.2271e-2 -1.6 9.5185e-1 -1.5230e-3 0. 0.1
2 4200. 3600. 4000. 2. 48. Ex 2.9 5.2486e-2 8.1 9.5575e-1 7.6939e-3 0. 0.1
2 4200. 3600. 4000. 2. 80. Ex 2.9 5.2600e-2 16. 9.5773e-1 1.5325e-2 0. 0.
2 4200. 3600. 4000. 2. 112. Ex 2.9 5.2581e-2 24. 9.5723e-1 2.2978e-2 0. 0.
2 4200. 3600. 4000. 2. 144. Ex 2.9 5.2488e-2 31.9 9.5532e-1 3.0485e-2 0. 0.
2 4200. 3600. 4000. 2. 128. Ex 2.9 5.1688e-2 25.9 9.4092e-1 2.4375e-2 0. 0.
2 4200. 3600. 4000. 2. 384. Ex 2.9 5.1172e-2 78.5 9.2898e-1 7.3075e-2 0. 0.
2 4200. 3600. 4000. 2. 640. Ex 2.9 5.0590e-2 125.8 9.1397e-1 1.1554e-1 0. 0.1
2 4200. 3600. 4000. 2. 896. Ex 2.9 4.9769e-2 164.5 8.9406e-1 1.4841e-1 0. 0.3
2 4200. 3600. 4000. 2. 1152. Ex 2.9 4.8902e-2 201.9 8.7241e-1 1.7862e-1 0.1 0.6
2 4200. 3600. 4000. 2. 1024. Ex 2.9 4.9902e-2 172.6 8.9521e-1 1.5607e-1 0. 0.
2 4200. 3600. 4000. 2. 3072. Ex 2.9 4.3035e-2 389.1 7.2509e-1 2.9729e-1 0. 0.1
2 4200. 3600. 4000. 2. 5120. Ex 2.9 3.8787e-2 566.1 5.9612e-1 3.7882e-1 0. 0.3
2 4200. 3600. 4000. 2. 7168. Ex 2.9 3.3537e-2 594. 5.0611e-1 3.4177e-1 0. 0.1
2 4200. 3600. 4000. 2. 9216. Ex 2.9 1.4499e-1 860.1 1.7224e+0 2.0011e+0 0.1 0.8
2 4200. 3600. 4000. 2. 0.125 Hx 2.9 1.3771e-6 -156.1 1.0000e+0 -1.5733e-1 85.8 2899.9
2 4200. 3600. 4000. 2. 0.375 Hx 2.9 1.9916e-6 -1181.3 5.5593e-1 -1.3544e+0 25.4 1296.8
2 4200. 3600. 4000. 2. 0.625 Hx 2.9 2.4808e-6 -2080.9 -8.9043e-1 -1.5915e+0 8. 110.3
2 4200. 3600. 4000. 2. 0.875 Hx 2.9 2.0204e-6 -1323.3 3.6378e-1 -1.4400e+0 42.5 908.
2 4200. 3600. 4000. 2. 1.125 Hx 2.9 2.2290e-6 -1782.8 -3.4487e-1 -1.6019e+0 78.6 71.8
2 4200. 3600. 4000. 2. 16. Hx 2.9 2.8290e-5 -1625.9 -1.1464e+0 -2.0765e+1 0. 1.1
2 4200. 3600. 4000. 2. 48. Hx 2.9 8.4548e-5 -1626.1 -3.4324e+0 -6.2058e+1 0.1 1.3
2 4200. 3600. 4000. 2. 80. Hx 2.9 1.4475e-4 -1637.1 -7.0449e+0 -1.0618e+2 0.1 0.8
2 4200. 3600. 4000. 2. 112. Hx 2.9 2.0585e-4 -1650.8 -1.2094e+1 -1.5084e+2 0. 0.7
2 4200. 3600. 4000. 2. 144. Hx 2.9 2.7165e-4 -1667.3 -1.9231e+1 -1.9877e+2 0.1 1.8
2 4200. 3600. 4000. 2. 128. Hx 2.9 2.3398e-4 -1662.8 -1.5794e+1 -1.7128e+2 0. 0.2
2 4200. 3600. 4000. 2. 384. Hx 2.9 8.0741e-4 -1705.9 -7.9947e+1 -5.8814e+2 0. 0.1
2 4200. 3600. 4000. 2. 640. Hx 2.9 1.4990e-3 -1661.1 -9.9322e+1 -1.0975e+3 0. 0.2
2 4200. 3600. 4000. 2. 896. Hx 2.9 2.2521e-3 -1591.8 -3.4688e+1 -1.6552e+3 0. 0.2
2 4200. 3600. 4000. 2. 1152. Hx 2.9 3.0484e-3 -1511.6 1.3269e+2 -2.2370e+3 0. 0.8
2 4200. 3600. 4000. 2. 1024. Hx 2.9 2.6764e-3 -1576.3 -1.0828e+1 -1.9675e+3 0. 0.1
2 4200. 3600. 4000. 2. 3072. Hx 2.9 9.4310e-3 -981.6 3.8529e+3 -5.7638e+3 0. 0.5
2 4200. 3600. 4000. 2. 5120. Hx 2.9 1.5552e-2 -314.7 1.0871e+4 -3.5387e+3 0. 0.3
2 4200. 3600. 4000. 2. 7168. Hx 2.9 2.0544e-2 180.4 1.4857e+4 2.7097e+3 0. 0.1
2 4200. 3600. 4000. 2. 9216. Hx 2.9 7.6258e-2 738.7 4.1447e+4 3.7746e+4 0. 0.
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*** end-of-file ***

```

GDP DATA PROCESSING MANUAL

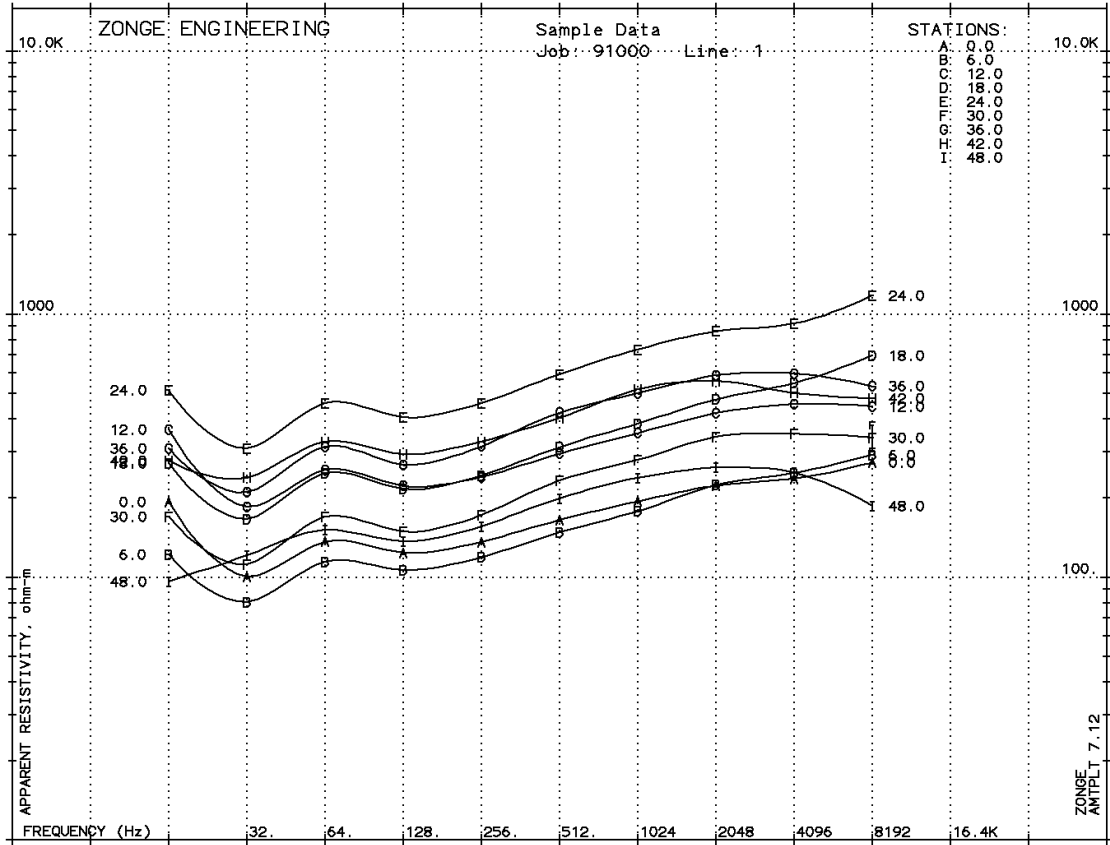
Sample .Z-file

```

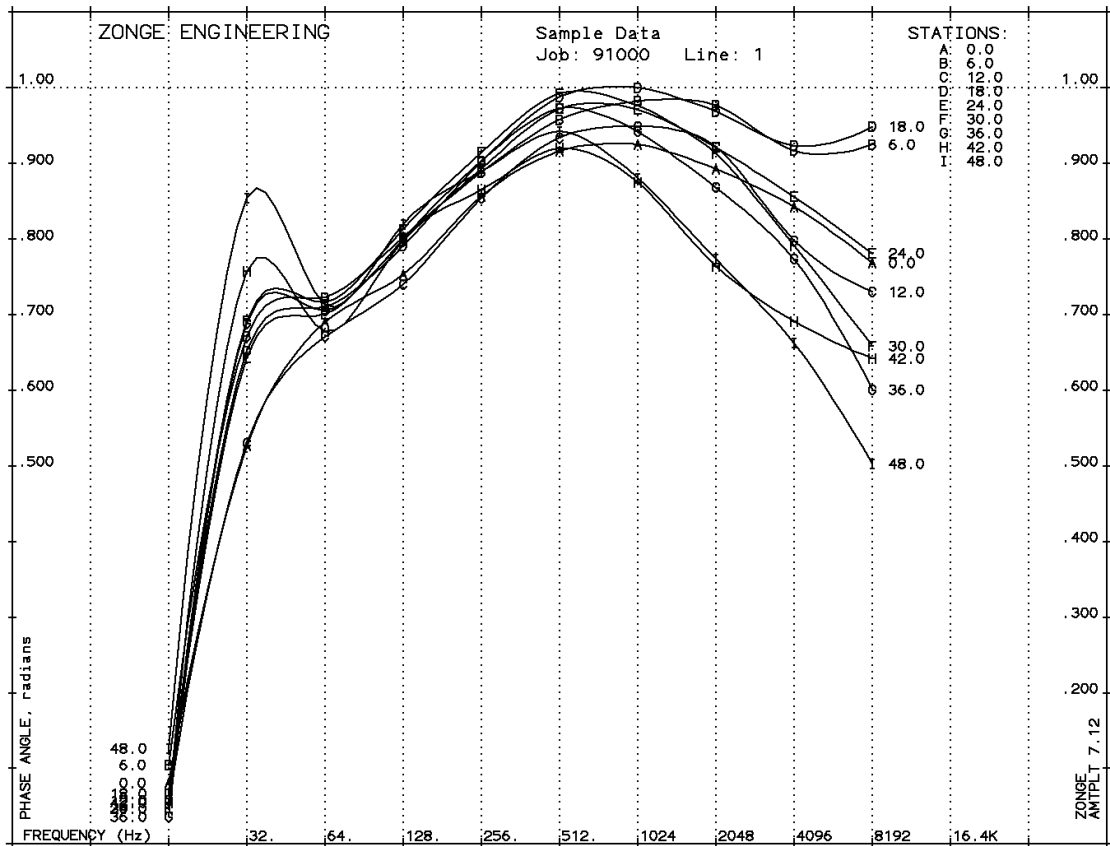
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CAGNIARD RESISTIVITY
values in ohm-meters
IIxxxxxxxxYYYYYYYzzzzzzzzzzz AAA
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2 0.0 21.00 2.365E+02
2 0.0 20.00 2.221E+02
2 0.0 19.00 1.937E+02
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2 0.0 17.00 1.359E+02
2 0.0 16.00 1.237E+02
2 0.0 15.00 1.362E+02
2 0.0 14.00 1.002E+02
2 0.0 13.00 1.930E+02
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2 6.0 21.00 2.482E+02
2 6.0 20.00 2.235E+02
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2 12.0 16.00 2.220E+02
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2 12.0 14.00 1.846E+02
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2 36.0 13.00 3.080E+02
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2 42.0 14.00 2.385E+02
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IMPEDANCE PHASE
values in milliradians
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2 0.0 20.00 8.926E+02
2 0.0 19.00 9.250E+02
2 0.0 18.00 9.163E+02
2 0.0 17.00 8.563E+02
2 0.0 16.00 7.528E+02
2 0.0 15.00 6.903E+02
2 0.0 14.00 5.264E+02
2 0.0 13.00 8.100E+01
2 6.0 22.00 9.250E+02
2 6.0 21.00 9.167E+02
2 6.0 20.00 9.766E+02
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2 6.0 18.00 9.575E+02
2 6.0 17.00 8.879E+02
2 6.0 16.00 8.023E+02
2 6.0 15.00 7.229E+02
2 6.0 14.00 6.710E+02
2 6.0 13.00 1.042E+02
2 12.0 22.00 7.303E+02
2 12.0 21.00 7.981E+02
2 12.0 20.00 9.218E+02
2 12.0 19.00 9.493E+02
2 12.0 18.00 9.339E+02
2 12.0 17.00 8.540E+02
2 12.0 16.00 7.401E+02
2 12.0 15.00 6.708E+02
2 12.0 14.00 5.304E+02
2 12.0 13.00 5.733E+01
9999.00
*** end of file ***

```

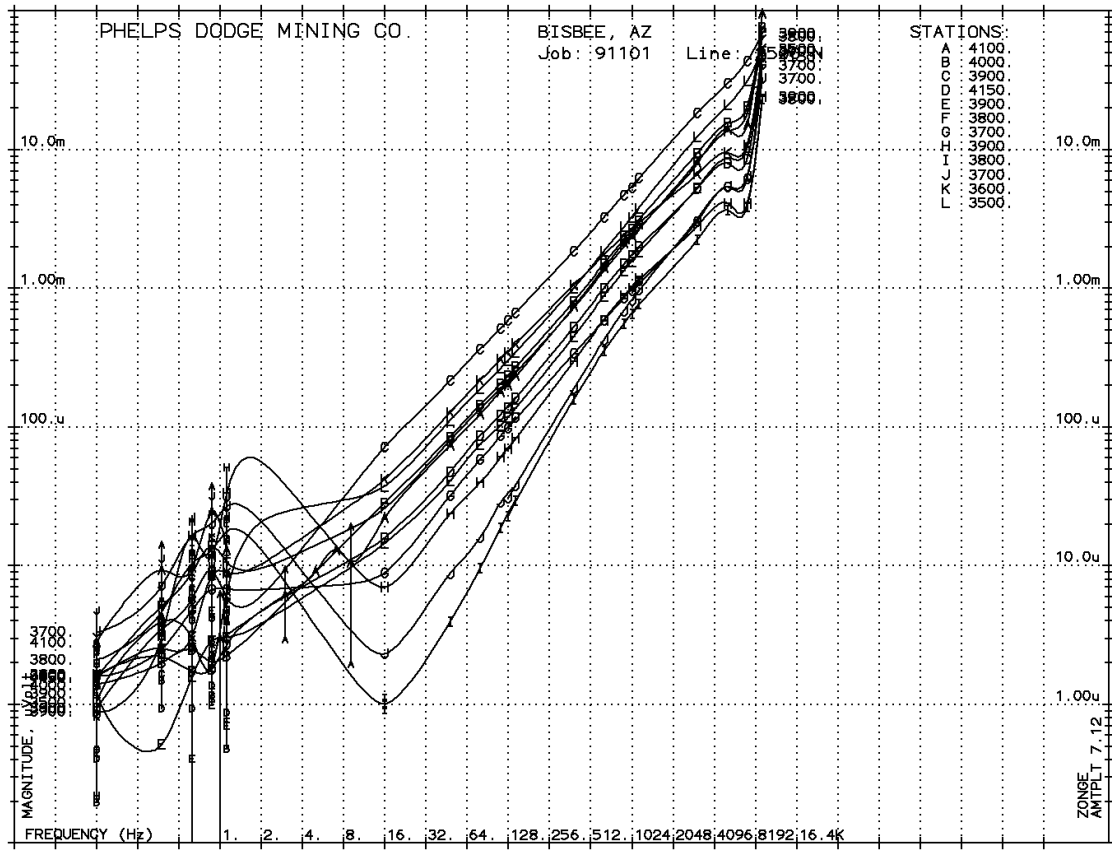
Sample .Xnn-file SAMCSAM.X01



Sample .Xnn-file SAMCSAM.X02



Sample .Xnn-file HARMONIC.X03



Appendix C ... FILE DOCUMENTATION

.AVG-file Format (v1.0) CSAMT Averaged Data File

The .AVG-file is defined by the order of data on each line. The first line is a list of column titles, with at least one space between each title. Lines of data values follow, one value for each title provided, in the same order, with at least one space between values. If no value is available, then an asterix (*) is used. Data may be aligned in columns. Comment lines may occur anywhere in the file, with the characters (/*) or (\) in the first column.

```

\ AMTAVG 7.01: "SAMCSAM.FLD", Dated 91-01-01, Processed 16 Nov 92
skp Station Freq Comp Amps      Emag      Ephz      Hmag      Hphz  Resistivity  Phase  %Emag  sEphz  %Hmag  sHphz  %Rho  sPhz
\=====
2      0.0  8192  ExHy  4.5  1.1731e+3  1491.0  3.5150e-1  722.7  2.7195e+2  768.3  0.4  3.1  1.4  14.7  1.7  16.6
2      0.0  4096  ExHy  8.   8.5835e+2  2087.0  3.9003e-1  1244.7  2.3648e+2  842.4  0.4  3.1  0.9  7.1  1.4  12.9
2      0.0  2048  ExHy  15.  6.7279e+2  2450.4  4.4613e-1  1557.8  2.2209e+2  892.6  1.1  11.3  1.2  1.6  0.1  1.1
2      0.0  1024  ExHy  22.  5.4680e+2  2809.1  5.4905e-1  1884.1  1.9372e+2  925.0  1.0  6.0  1.2  7.5  0.4  3.5
2      0.0  512   ExHy  27.  4.3143e+2  3087.0  6.6498e-1  2170.8  1.6442e+2  916.3  0.0  1.4  0.1  0.6  0.2  1.8
2      0.0  256   ExHy  29.  3.6102e+2  -3065.5  8.6567e-1  2361.3  1.3588e+2  856.3  0.0  0.3  0.2  2.1  0.2  1.9
2      0.0  128   ExHy  30.  3.1513e+2  -3056.5  1.1202e+0  2473.8  1.2365e+2  752.8  0.1  0.6  0.3  3.3  0.3  2.8
2      0.0  64    ExHy  30.  2.9184e+2  -3073.0  1.3978e+0  2519.9  1.3621e+2  690.3  0.2  4.8  0.5  4.2  0.2  2.0
2      0.0  32    ExHy  30.  2.3443e+2  3015.3  1.8517e+0  2488.9  1.0018e+2  526.4  0.5  2.1  0.5  4.3  0.2  1.4
2      0.0  16    ExHy  30.  3.4135e+2  2697.3  2.7474e+0  2616.3  1.9295e+2  81.0  0.5  4.3  0.5  4.9  0.1  1.2
2      6.0  8192  ExHy  4.5  1.2513e+3  -2111.5  3.6216e-1  -3036.5  2.9142e+2  925.0  1.0  12.0  1.3  12.8  2.4  19.8
2      6.0  4096  ExHy  8.   8.5772e+2  -1267.2  3.8044e-1  -2183.9  2.4819e+2  916.7  0.2  3.0  0.7  8.3  1.2  12.0
2      6.0  2048  ExHy  15.  6.4934e+2  -785.8  4.2923e-1  -1762.4  2.2349e+2  976.6  0.1  1.1  0.4  4.3  0.5  3.2
2      6.0  1024  ExHy  22.  5.0469e+2  -373.3  5.2905e-1  -1355.6  1.7775e+2  982.3  0.1  0.4  0.1  1.7  0.2  2.0
2      6.0  512   ExHy  27.  3.9387e+2  -73.8  6.4048e-1  -1031.4  1.4772e+2  957.5  0.0  1.5  0.1  0.9  0.2  2.7
2      6.0  256   ExHy  29.  3.2680e+2  68.6  8.3859e-1  -819.4  1.1865e+2  887.9  0.1  0.4  0.1  0.9  0.3  2.8
2      6.0  128   ExHy  30.  2.8114e+2  92.6  1.0776e+0  -709.6  1.0635e+2  802.3  0.0  0.3  0.0  0.3  0.1  0.5
2      6.0  64    ExHy  30.  2.6778e+2  87.0  1.4003e+0  -635.9  1.1428e+2  722.9  0.1  1.1  0.3  2.5  0.2  2.2
2      6.0  32    ExHy  30.  2.0597e+2  -8.5  1.8163e+0  -679.5  8.0377e+1  671.0  0.1  1.4  0.2  1.7  0.2  1.9
2      6.0  16    ExHy  30.  2.6405e+2  -442.2  2.6760e+0  -546.5  1.2170e+2  104.2  0.3  4.6  0.2  2.2  0.5  1.2
    
```

Skp skip flag	%Emag Statistical variation of magnitude values from averaged data blocks.
Station Receiver Station location	100 * Standard Deviation / Average Emag (percent)
Freq Frequency at which data was measured (hertz)	sEphz Statistical variation of the data blocks averaged for this data point. Standard Deviation of Ephz values (milliradians)
Comp Components measured	%Hmag Statistical variation of magnitude values from averaged data blocks.
Amps Square-Wave current (amps)	100 * Standard Deviation / Average Hmag (percent)
Emag E-field magnitude (microVolts/(kiloMeter*Amp))	sHphz Statistical variation of the data blocks averaged for this data point. Standard Deviation of Hphz values (milliradians)
Ephz E-field phase (milliRadians)	%Rho Statistical variation of magnitude values from averaged data blocks.
Hmag H-field magnitude (picoTesla/amp) (milliGammas/amp)	100 * Standard Deviation / Average Rho (percent)
Hphz H-field phase (milliRadians)	sPhz Statistical variation of the data blocks averaged for this data point. Standard Deviation of Phase values (milliradians)
Resistivity Cagniard Resistivity (Ohm-Meters)	
Phase Impedance phase = (Ephz - Hphz) (milliRadians)	

9: Header line for the data that follows:

II - Command flag:

- 0 = Skip this line of data.
- 1 = Omit for contouring, but post the bracketed value.
- 2 = Use for contouring and post the value (most common).
- 3 = Label a point or station by plotting a symbol under the X-axis at the X-coordinate.
- 4 = Use for contouring, post the symbol and not the value.
Used for depth plots where values are interpolated for the bottom of the plot to improve the gridding.
- 5 = Use to set plot limits, do not contour or post.
Used for depth plots to set zero depth. Used to provide a margin around the data, as for plan maps.

xxxxxxxx - X-coordinate, usually station coordinate.

yyyyyyyy - Y-coordinate, not used for Flag = 3

zzzzzzzz - Value to be plotted at X-Y for Flags 1, 2, 4.

AAA - For Flag 1 or 2, ZPLOT posts any characters in the AAA column instead of the value in the **zzzzzzzz** column.

For Flag 3, ZPLOT plots a symbol below the X-axis at the x-value, according to an integer in column AAA. A zero or positive integer refers to symbols in TABLE 1 of the PLOT Manual. A negative integer refers to topographic symbols in the CTOPO Manual.

99: **9999.0** - End-Of-Plot indicator.

Transient ElectroMagnetic data append profile plot data. Points at a single time (Y) for one frequency (f) and window (w) are connected from station to station by a profile line.

yyyyyyyy - Time in milliseconds for a particular window.

ffffffff - Frequency at which data was acquired.

www - Window number.

II	xxxxxxxx	yyyyyyyy	zzzzzzzzzzzz	AAA	ffffffff	www
2	100.00	0.121	-9.10488E+02		*32*	Hz W 1
2	100.00	0.243	-1.34988E+03		*32*	Hz W 2
2	100.00	0.364	-3.91872E+02		*32*	Hz W 3