

Section 14

PLOTTING ROUTINES

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PLOTTING ROUTINES

14.1 INTRODUCTION

The plotting routines for the liquid crystal display perform rudimentary but useful plots of the five types of data which may appear in the data cache. The PLOT function is invoked by pressing **F5** while viewing data in the **FIELDATA** cache. At no other time can the PLOT function be called.

When PLOT is selected by pressing **F5**, a short menu is displayed, indicating the type of plot available. The data display will depend upon the type of data in the block that is being viewed when the **F5** key is pressed. For instance, if the user is viewing TDIP data, the type of plot listed in the menu when **F5** is pressed is:

1. Decay Plot

On the other hand, if the user is viewing CR data and **F5** is pressed, the following menu appears:

1. CP Plot

There are three types of plots for option 1, depending upon the data:

Data Type	Plot Type	
RPIP	CP plot	(complex plane)
TDIP	Decay plot	(Vs/Vp vs. window number)
CR	CP plot	(complex plane)
CSAMT	Log plot	(log apparent resistivity vs. log frequency)
	Phase difference plot	(E-phase minus H-phase)
	Magnitude plot	(either E or H-field)
HACSAMT	Same as CSAMT	
TEM	Decay plot	(volts/amp vs. window number)
	Rho plot	(resistivity vs. depth)
MT/AMT	Log Plot	(log resistivity vs. log frequency)
	Phase Difference plot	(phase vs. log frequency)

For each plot type the user is asked to input a starting block number for the data. This number is the first block in the range of data which is to be used for the requested plot. The user is not asked to enter an ending block since this number is fixed to the block number that was being viewed when the plot option was invoked. The ending block number is the number of the block the user is viewing when he originally presses the **F5** key.

The GDP-32^{II} assumes that there are valid data blocks in the range of blocks requested (excluding header blocks). If there is data within this range of a different type than the type of data in the ending block, the plot program will skip the non-conforming blocks. However, the GDP cannot recognize a block corrupted due to a system failure (e.g. a block partially written), and will generate an error message.

A skip flag has been implemented to plot around corrupted data blocks or blocks of the wrong type. By pressing **F6** an "x" is placed between the data version number and the date in the header for the block being viewed. This flag is recognized by the plot routines and flagged data will be not be included when plotting multiple blocks. Repeated pressing of **F6** will remove and replace the "x".

After selecting a range of data blocks to display, the user is asked which channel to use for the plot. After the user selects a channel, the system checks the blocks in the range requested to make sure that at least one or more blocks (depending upon the data type) have the channel number requested for the plot. If this is not the case, an error message will be displayed (see Section 4. ERROR MESSAGES).

If the user selects **CHANNEL ZERO (ALL CHANNELS)**, the program will plot all the channels for which there is legal data. An error message will be displayed for channels containing insufficient or illegal data.

After the plot window is completely drawn, pressing any key continues program operation. If only one channel is selected and no errors are found, the user is returned to the **FIELDATA** cache. If all channels are selected, data for the next channel is plotted.

Function Key operation is identical to other programs: **ESC** backs up one menu and **F2** exits the DATA mode of operation.

NOTE: To make a screen plot of the data, attach an Epson compatible printer to the parallel port and press **F6**. The plot on the LCD will be printed.

NOTE: The **HELP** key is useful to prompt the user in the different options available in this plot routine.

14.2 SUMMARY OF PLOTS FOR DIFFERENT DATA TYPES

TDIP

Linear Decay Plot
At least one block required
Multiple blocks are averaged
Error bars presented

RPIP

CP (complex plane) Plot
At least two different frequencies required
One data point plotted for each different frequency
Multiple blocks are averaged
No error bars

CR

CP (complex plane) Plot
At least one block required
Five data points (harmonics) plotted for each different frequency
Multiple blocks are averaged
No error bars

CSAMT

Log Resistivity vs. Log Frequency Plot
Linear Phase vs. Log Frequency Plot
Log Magnitude (E or H) vs Log Frequency Plot
At least two different frequencies required
One data point plotted for each different frequency
Multiple blocks are averaged
Error bars presented

TEM

Log Transient Decay vs Time Plot
Log Late-time Resistivity vs Depth Plot
At least one block required
Multiple blocks are averaged
Error bars presented

MT/AMT

Log Resistivity vs. Log Frequency Plot
Linear Phase vs. Log Frequency Plot
At least one band of data required
One data point plotted for each different frequency
Multiple blocks are averaged
Error bars presented

14.3 EXAMPLES OF OPERATION

EXAMPLE 1: The user is viewing TDIP data, block 513. This block has data for three channels. To plot data for this block for all three channels, one channel at a time, the user proceeds as follows:

```
Ending Block:      513
Enter Starting Block:  513
Enter Channel to Use:    0
```

After entering the starting block number and 0 to plot all channels, press **CONTINUE** and data for channel one will be plotted. Press **CONTINUE** and data for channel 2 will be plotted. Press **CONTINUE** again and data for channel 3 will be plotted. Press **CONTINUE** one more time and you are back into data view mode.

EXAMPLE 2: The user is viewing the last 50 blocks of CSAMT data (block 316 through 365). Data for apparent resistivity plot is in channel 1.

```
Ending Block:      365
Enter Starting Block:  316
Enter Channel to use:    1
```

Enter the starting block number and channel number. Then press **CONTINUE** and the log-log data for channel 1 will be plotted. Press **CONTINUE** one more time and you are back in data view mode.

EXAMPLE 3: Suppose in the above example you were gathering CSAMT data in the CSAET mode with six E-fields (channels 1 through 6) and one H-field (channel 7):

```
Ending Block:      365
Enter Starting Block:  316
Enter Channel to use:    0
```

Enter the starting block number and 0 for the channel number. Then press **CONTINUE** and the log-log data for channel 1 will be plotted. Press **CONTINUE** again and channel 2 data will be plotted, etc., until the channel 6 data are plotted. Press **CONTINUE** one more time and the error message "**Insufficient/illegal data**" will be displayed for channel 7 (the H-field data) and then you will be back in the data view mode.

14.4 ERROR MESSAGES

"Error in LOG data"

Negative values for either frequency or resistivity for CSAMT, TDCSMT and AMT only. It is difficult to get a negative frequency value, but the check is there. For TEM we take the absolute value of the decay value.

"Zero range in data"

Applies to all programs. There are at least two data points available, but $\text{maximum_X} - \text{minimum_X} = 0$, or $\text{maximum_Y} - \text{minimum_Y} = 0$.

"Insufficient/illegal data"

Applies to all programs. A minimum of two data points do not exist in the data blocks chosen.

"Data OK"

Applies to all programs. No problems were found with the data.