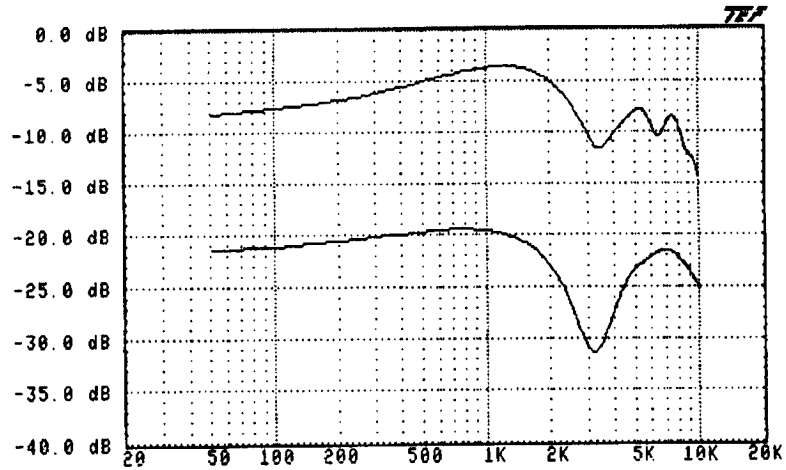


TECHRON®



TEF GRAPH

Software Manual

For Use With TEF System Analyzers

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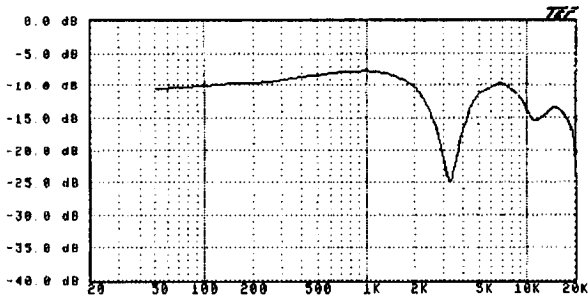
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SECTION 1: INTRODUCTION TO GRAPH

GRAPH is a supplementary TEF program that provides a range of easy-to-use display tools for presentation of frequency and phase response data. GRAPH capabilities include:



- Clearly annotated scales;
- Standard ISO frequency response displays with 25 dB per decade scaling;
- Curve differencing, curve shifting, and normalization;
- Arbitrary scales including frequency scales expanded beyond the scope of the data or compressed to expose only a few data points or a very limited dB range;
- Display of phase as well as frequency response data;
- Curve smoothing with constant absolute and percentage bandwidth capabilities;
- Large printouts; and
- A custom report generator and text editor.

With the aid of GRAPH, you can produce presentation graphics for use in magazine articles, sales brochures, audio/visuals, or other applications where TEF response data needs to be communicated clearly and effectively.

1.1 GRAPH as TEF Software

GRAPH runs only in conjunction with TEF 2.0 software, and you enter GRAPH directly from a TDS measurement by typing the character "{". Since GRAPH can only be run as a supplement to TEF operations, this manual makes no effort to cover basic TEF material.

1.2 Unpacking

GRAPH software contains the following items:

- User's manual
- 790k Distribution disk

1.3. What you need to know

This manual assumes your familiarity with (1) the operating system and utilities that came with your TEF analyzer, (2) the TEF 2.0 software, and (3) acoustics and sound system design. Before operating GRAPH software, you must know how to perform the following tasks:

- Copy files from disk to disk
- Create a working disk with operating system
- Connect your printer, microphone, amplifier and speaker to the TEF.

1.4. Equipment You Need

In addition to TEF 2.0 software you will need the following equipment:

- Microphone
- Five wire to three wire microphone adaptor
- Power amplifier
- Speaker
- Formatted disks to store data

1.5. Back Up the Distribution Disk

Before going any further in the GRAPH program, take time to backup your distribution disk. The procedure for backup is as follows:

1. Label a blank formatted disk as "GRAPH working disk"
2. Copy all files from the GRAPH distribution disk onto the GRAPH working disk.
3. Copy the operating system onto the GRAPH working disk
4. Store the original GRAPH distribution disk in a safe place.

1.6. Installing GRAPH

The GRAPH disk contains both GRAPH and the standard TEF 2.0 program. To protect your master disk, make a copy immediately and save the original distribution disk as a backup.

If you have any custom features installed in your operating system (such as provision for a special printer) you will have to transfer these features to the GRAPH disk. Please refer to the TEF System Operator's Manual for instructions on generating or copying operating systems.

At some later time, you may wish to install GRAPH on another version of TEF such as an update.

1. Copy the file "GRAPH.COM" from the distribution disk to a working disk with TEF 2.0 software.
2. Copy the file "GRAPH.000" from the distribution disk to a working disk with TEF 2.0 software.
3. Remove the distribution disk and put in a safe place.
4. Rename the file "GRAPH.COM" on the working disk to either "TDS1.COM" or "TDS2.COM".

1.7. About This Manual

The rest of this manual contains sections to help you quickly start using GRAPH.

Introduction, Section 1: Introduction to GRAPH, backing up disks, installing GRAPH on other disks.

GRAPH Setup, Section 2: Setting up to run GRAPH. How to select TEF curves for display.

Running GRAPH, Section 3: Command keys for display and print options.

Discussion of GRAPH, Section 4: Tips and cautions to assist you in using GRAPH.

Custom Reports, Section 5: Printing codes to include in reports and how to modify report formats.

Text Editor, Section 6: How to use the text editor to write report formats.

Sample Reports, Section 7: Examples of report formats.

1.8. Customer Support

All Techron software is backed by a customer support system. If you need assistance beyond that provided in the manual, follow these steps:

- Try to duplicate the problem, keystroke by keystroke, to see exactly what was done.
- Have the date and version number of software (displayed on the screen immediately after startup) available.
- Have the date and version number of the manual available (found on "Effective Pages" usually page "a").
- Be at the TEF analyzer and call customer support.

Customer support for Techron hardware and software can be reached by dialing:

(219) 294-8300 VOICE

(219) 294-8329 FAX

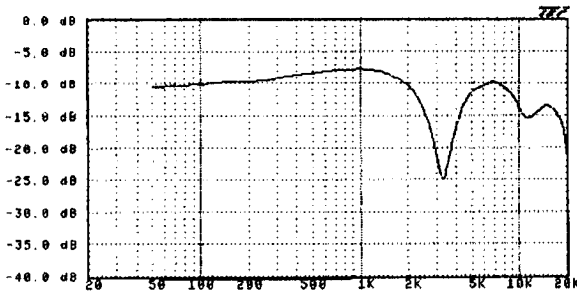
The Techron customer support department takes calls from 8:00 A.M. to 5:00 P.M. Eastern Standard Time. Before 8:00 or after 5:00, you may leave a recorded message or send a message via FAX.

SECTION 2: GRAPH SETUP

2.1. Starting GRAPH

You enter the GRAPH routine by typing the character “{” when viewing a TDS response curve.

NOTE: This instruction presumes that you have not changed the GRAPH installation from the factory default label of TDS1.COM. If you have changed the GRAPH location to TDS2.COM, bring up GRAPH by typing “}”.



Single Curve

2.2 Selecting GRAPH Data

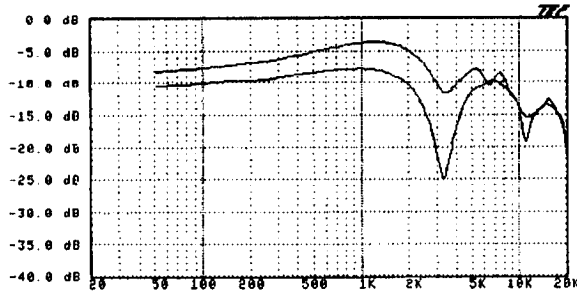
GRAPH can work with either one or two sets of data, called Curve 1 and Curve 2. Both are standard TDS frequency response (EFC) curves that are generated by standard TEF software and stored internally in the TEF analyzer.

2.2.1 GRAPH with Single Curves

Curve 1 is the data last taken or last shown under TDS before you entered GRAPH with “{”. For GRAPH work with a single set of data (i.e., Curve 1 only), the data displayed is identical to the TDS data last viewed in the standard TEF 2.0 software.

2.2.2 GRAPH with Two Curves

Curve 2 is an optional set of data that can be brought into GRAPH for comparing with or differencing against Curve 1. If you wish to manipulate two sets of data, you need to make sure that you have selected the proper reference for Curve 2.



Two Curves

To ensure proper labeling of the two data sets, you should select Curve 2 as the reference curve while in the TDS difference mode. Use the following sequence of TDS entries after you have enabled the single sweep display. If the job you are displaying contains 3D data, you will be asked to specify the single curve of the 32 you wish to display:

“Show which single 3D sweep” of 32 (0-31)?

The curve number you enter here will become GRAPH Curve 1.

If, however, you are in single-sweep mode where there is no 3D data, Curve 1 of GRAPH automatically becomes Curve 32 of the active TEF job. In either case, the following prompt will be displayed:

“Should the difference of two TDS’s be displayed?”

Type “Y” to enter difference mode.

“Type using this format: Filename.TDS”

“The desired filename is? (\ to abort)”

Enter the full description of the curve you wish to designate as Curve 2 (i.e., "JOB03-20.TDS" to select sweep number 20 of Job 3.)

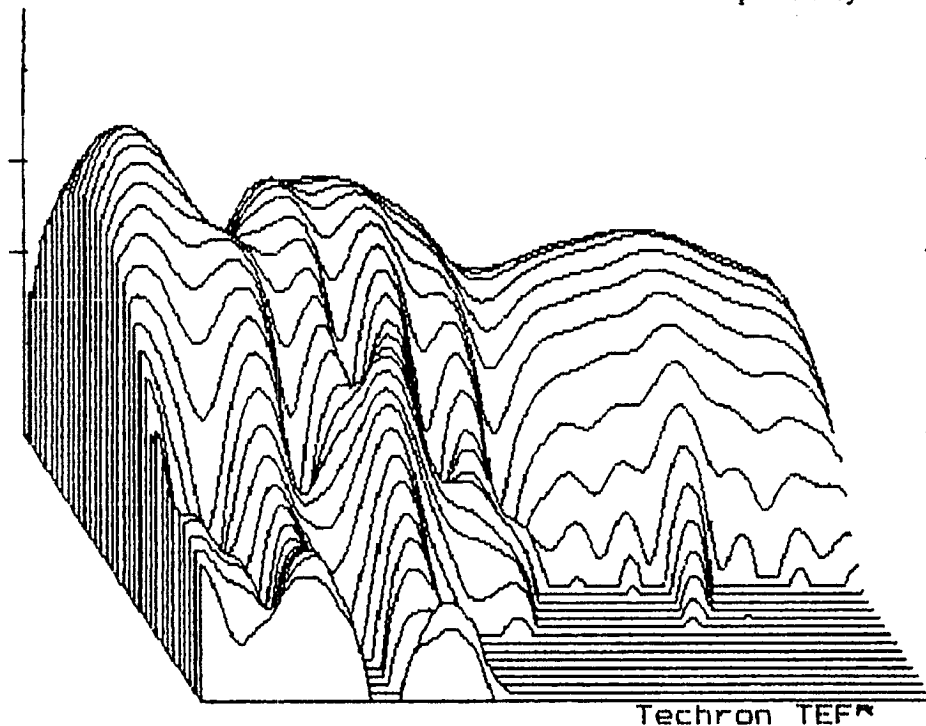
You can also select Curve 2 in the quick difference mode, but either way, you must identify Curve 2 before you enter GRAPH.

NOTE: If you intend to enter GRAPH with Curve 1 only and do not specify Curve 2, there will likely be some odd data carried into GRAPH as Curve 2. As long as you stay with single curve manipulation, the data imbedded as Curve 2 will not disturb your displays.

2.3 GRAPH Manual Examples

To help demonstrate GRAPH, we have selected two Curves from the typical TEF 3-D display shown below. In the GRAPH examples, sweep 25 is Curve 1 and sweep 20 is Curve 2.

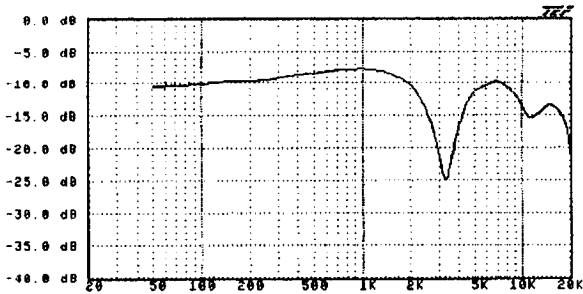
The following section covers GRAPH menus including 22 different display options. Illustrations to the left of the text explain technical points or show features that might not be apparent from either the TEF screen or the text. It's worth repeating that, as GRAPH can only be run as a supplemental TEF module, this manual makes no effort to cover basic TEF material and assumes at least minimal TEF proficiency.



SECTION 3: RUNNING GRAPH

3.1 The First Screen

The initial GRAPH display is the frequency response of Curve 1 on an ISO standard log scale with a horizontal frequency range of 20-20K Hz and a vertical dB scale from 0 down to -40. 25 dB along the vertical scale is the same distance as one decade when the display is dumped to an attached Epson FX series printer.



First Screen

At the end of your session with GRAPH, you can save your last setup as the initial setup for the next time you enter GRAPH. If 25 dB per decade is important to your application, you need to preserve this ratio of 40 dB and 3 decades in your last setup.

3.2 The Graph Menu

The GRAPH menu appears at the top of all data displays and offers five options. (The section references are locations in this manual for information about each option):

- **Graph:** Repaint the GRAPH display. (See Section 3.3)
- **Setup:** Display setup options screen. (See Section 3.4 and Section 4).
- **Quick Setup:** Display a short menu of quick-change setup options. (See Section 3.5)
- **Print:** Print the GRAPH display on the printer. (See Section 3.6)
- **Report:** Generate a formatted report on the printer using the current display. (See Section 5)
- **TDS (TEF):** Return to the TDS response portion of the TEF program.

3.3 Graph Display

Typing "G" repaints the GRAPH display. You will use this option after changing display parameters with the Quick Setup option as explained in Section 3.5.

3.4 Display Options

Typing "S" brings up the Display Option menu with a list of 22 display parameters that are the real working tools of GRAPH.

There are three categories of display options:

Toggles: Ten of the display options are dual choices, either of the "on/off" type (such as option [V] which turns display grid lines on and off) or "either/or" settings (such as the selection of log or linear display with option [A]). Eight of the ten toggles make up the secondary Quick Setup menu.

Graph Scaling: Five of the options are settings to control the horizontal and vertical grids for frequency and dB scales.

Curve Forming: Seven options manipulate the data to present the curves in different formats (such as adding gain or selecting a bandwidth).

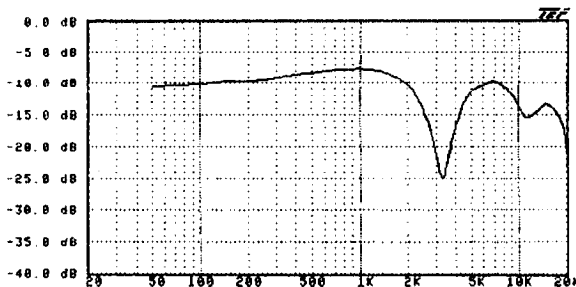
You select display options by typing the key noted next to the option desired. With toggles, the current state is shown as a word in inverse video. Simply typing the appropriate key will change the value for the toggle. With data entry options, the current value is highlighted when the appropriate key is hit. You may either enter a new value or hit <<RETURN>> to keep the present value.

(A)	Toggle Log or Linear	:Log
(B)	Grid Start Frequency	:20.0 Hz
(C)	Grid Stop Frequency	:20000.0 Hz
(D)	Data F1 = 20.0 Hz	Display F1 :20.0 Hz
(E)	Data F2 = 20000.0 Hz	Display F2 :20000.0 Hz
(F)	Toggle Magnitude or Phase	:MAGNITUDE
(G)	Top Of Scale	:0.0 dB
(H)	dB/Division	:5.0 dB
(I)	Total dB Range	:40.0 dB
(J)	Toggle Single or Double Curve Display	:DOUBLE
(K)	Added Gain to Curve 1	:0.0 dB
(L)	Added Gain to Curve 2	:0.0 dB
(M)	Toggle Difference or Absolute	:ABSOLUTE
(N)	Toggle Normalized or Not Normalized	:NORMALIZED
(O)	Toggle Curve 1 Norm. Reference	:CURVE 1
(P)	Toggle Curve 2 Norm. Reference	:CURVE 2
(Q)	Normalization Reference Frequency	:1000.0 Hz
(R)	Toggle Smoothing or Not Smoothing	:SMOOTHING
(S)	Toggle Bandwidth or % Oct. Smooth	:CONSTANT BANDWIDTH
(T)	Constant Bandwidth for Smoothing	:1000.0 Hz
(U)	Toggle View Smoothed or Smoothed/Raw	:SMOOTHED ONLY
(V)	Toggle Grid Lines On or Off	:GRID LINES ON
(X)	Exit to Graph	Command ?

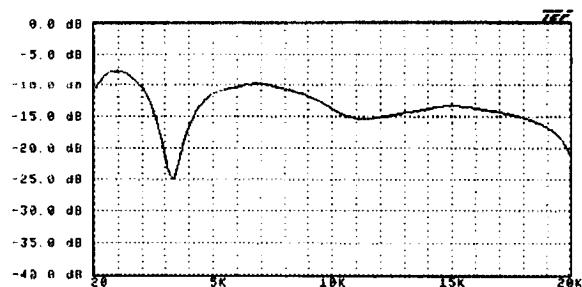
Display Options

3.4.1 [A] Log or Linear Toggle

Both frequency response curves and phase data can be displayed on either a log or linear scale.



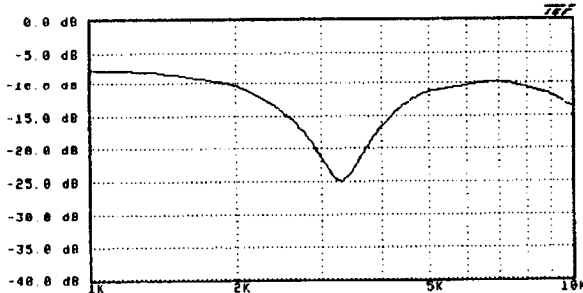
Log Scale



Linear Scale

3.4.2 [B] Grid Start Frequency

The start frequency of the display grid can be set independent of the data (see [D] below). You cannot, however, set the grid start frequency lower than 0.1 Hz or higher than either the grid stop frequency or the data display F2 (See [E]).



**Grid Start: 1K
Grid Stop: 10K**

3.4.3 [C] Grid Stop Frequency

The stop frequency of the display grid is also independent of the data, but you cannot set the grid stop frequency lower than the grid start frequency or the data display F1.

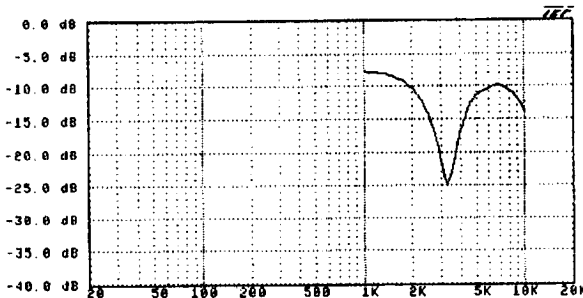
Note: Setting the grid start and stop frequencies within a small range of the data acts as a “zoom lens” on that portion of the data. This allows better inspection of such features as peaks or dips.

3.4.4 [D] Data Display F1

This is the start frequency of the displayed data that can be set higher than the actual data F1. The value for data display F1 must be set within the range of actual data F1 as a minimum to data display F2 as a maximum.

3.4.5 [E] Data Display F2

This is the stop frequency of the displayed data that can be set lower than the actual data F2 such that the upper end of the curve doesn't show.



**Data Display F1: 1K
Data Display F2: 10K**

Note: If the data displays F1 and F2 are “outside” the limits of the graph, the data curve will be plotted from the first valid data point inside the graph. An exception occurs here when the actual F1 is zero (or less) and the first point plotted is the first valid data point. In this case, a line is drawn from this first data point to the left of the graph to indicate that the sweep actually starts from zero.

3.4.6 [F] Magnitude or Phase Toggle

You can display either the frequency response (magnitude) or phase response of the data. If you toggle “Phase”, several display options - including the following three dB settings - become irrelevant and are removed from the display menu.

3.4.7 [G] Top of Scale

This option selects a dB value at the top of the scale of the current display.

3.4.8 [H] dB / Division

This option positions horizontal dotted lines at the selected intervals. (This setting is related to options selected in [G] above and [I] below.)

3.4.9 [I] Total dB Range

This option selects the total dB range of data display.

Note: Depending on the total dB Range of the graph, the single pixels which make up the vertical lines which mark off frequency also divide the graph horizontally as follows:

Range	dB/pixel
5, 10 dB	0.1
15-70 dB	1.0
75-120 dB	2.0

In order for these pixel divisions to be accurate, the total dB Range must be evenly divisible by 5. If the range is not evenly divisible by 5, these single pixel markings are meaningless.

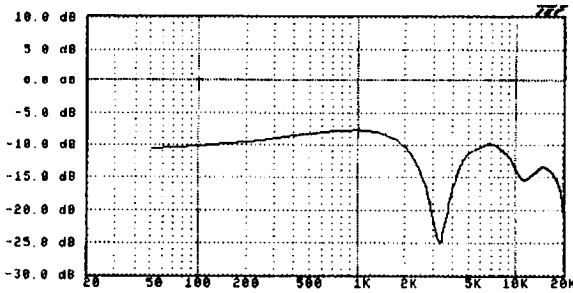
3.4.10 [J] Single or Double Curve Display Toggle

Curve 1 is always displayed if its gain is in the range of the graph (see [K] below). Curve 2 may also be displayed by toggling this "Double" mode. Curve 2 can be displayed alone in the frequency response mode by increasing the gain (see [K] below) of Curve 1 so that it is outside the range of the graph.

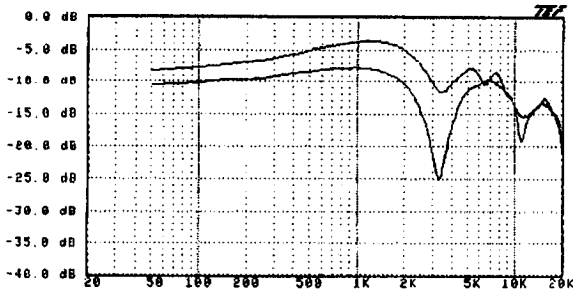
3.4.11 [K] Added Gain to Curve 1

3.4.12 [L] Added Gain to Curve 2

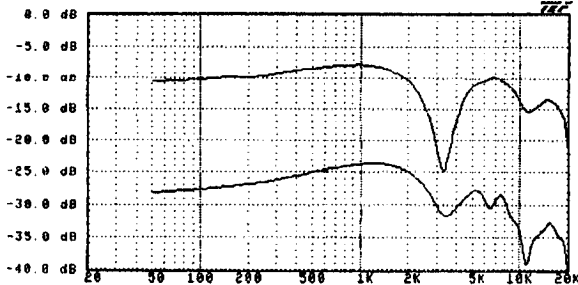
In a frequency display, you can add a specified amount of positive or negative gain (in dB) independently to Curves 1 and 2.



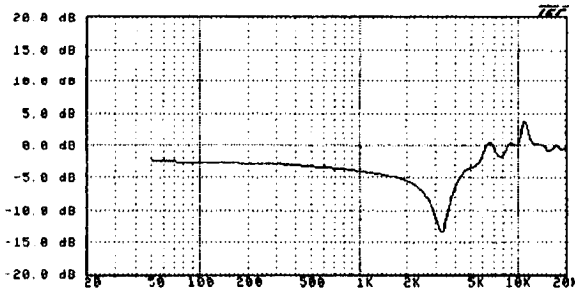
10.0 dB Top of Scale



Double Curve Display



-20 dB Added to Curve 2



Differencing Curve 1 to Curve 2

3.4.13 [M] Difference or Absolute Toggle

Data can either be plotted absolutely or as it differs from another curve. Differencing is always in relation to the other curve (Curve 1 to 2 or 2 to 1). Displaying both curves (1 and 2) while differencing results in symmetry about the 0 line (dB or degrees), so differencing is best displayed in single curve display mode.

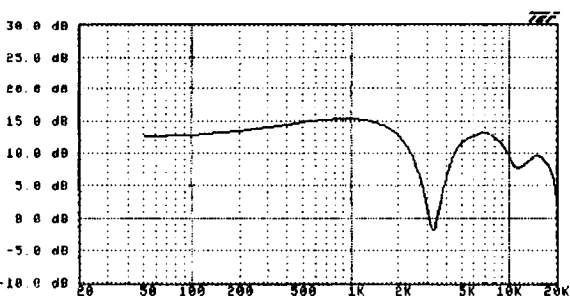
3.4.14 [N] Normalized or Not Normalized Toggle

In GRAPH, normalization is the plotting of magnitude data with reference to the magnitude of a curve at a particular frequency (see [Q] below). All points on the curve are deviations in dB from the magnitude of the specified curve at the chosen frequency. Normalization is performed only while displaying magnitude.

3.4.15 [O] Curve 1 Norm. Reference Toggle

3.4.16 [P] Curve 2 Norm. Reference Toggle

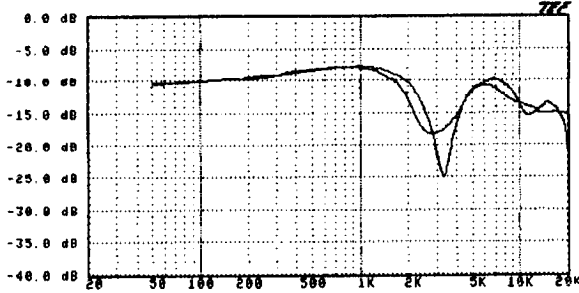
Either Curve 1 or Curve 2 can be displayed as normalized to a data point contained in itself, or to some point in the other curve. That is, all points can be plotted as dB deviations from a selected point on Curve 1 or Curve 2. When plotting Curve 1 with reference to a point in Curve 2, Curve 2 need not be displayed.



Curve 1 Normalized to 3.1K

3.4.17 [Q] Normalization Reference Frequency

This option sets a frequency level between data F1 and data F2, the magnitude of which is considered to be 0 dB. All other displayed points of the curve(s) are then plotted as a deviation from that magnitude. The point used for normalization may be from either Curve 1 or Curve 2 depending on the toggle settings in [O] and [P] above. Also, depending upon the settings for display F1 and display F2, the point used for normalization need not even be displayed.



Curve 1 Smoothed
(Display both Smoothed and Raw Data)

3.4.18 [R] Smoothing or Not Smoothing Toggle

This option smooths the displayed curve(s) according to the functions selected in [S], [T], and [U] below. When "Not Smoothing" is displayed, options [S], [T] and [U] do not appear as selections.

3.4.19 [S] Bandwidth or Percent Octave Smoothing Toggle

This option selects between two different smoothing functions:

Constant Bandwidth smoothing - each data point is calculated as the average of all points within a constant bandwidth, the size of which is selected in option [T] below. The same sized smoothing bandwidth is used over the full frequency range.

Percentage Octave smoothing - each data point is calculated as the average of all points which fall within a specified percentage of an octave. This smoothing function is dependent on the frequency of each data point.

Depending on the value of [S] , option [T] will be displayed as either:

[T] Percentage of Octave Smooth

You can smooth over a fraction of an octave (eg. one-third octave, one-sixth octave, etc.), and when entering an equivalent percentage, simply convert the fraction to a percentage equivalent (eg. $1/3 = 33.3$, $1/6 = 16.7$, etc.).

or

[T] Constant Bandwidth For Smoothing

This option selects the bandwidth over which smoothing is calculated. The input value is converted to the closest value which allows for a single center frequency.

3.4.20 [U] View Smoothed Only or Smoothed/Raw Toggle

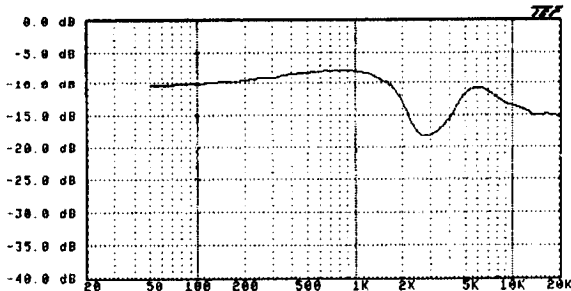
This option allows you to view the raw data along with the smoothed data to see the effect of the smoothing. Note that if you toggle smoothed/raw when both Curves 1 and 2 are displayed, the graph will show four curves.

3.4.21 [V] Grid Lines On or Off Toggle

This option lets you turn horizontal and vertical grid lines on and off.

3.4.22 [X] Exit to Graph

This entry brings back the graph display.



Curve 1 Smoothed
(Display Smooth Only)

3.5 Quick Setup Menu

This main menu item provides eight toggle display choices. These choices can be displayed by typing "Q" at the main menu. The eight are taken from the above full group of 22 display options, and the results of the toggle choices are the same when made from either menu. The Quick Setup menu offers the advantage of seeing the grid at the time you make the toggle change.

3.5.1 Quick Setup Options

Here are the eight components of the Quick Setup menu. The "letter" column provides a cross-reference to the description of display options in the previous section. The "number" column is the sequence of the options on the menu bar as well as the keyboard entry to change the toggle setting.

Number	Letter	"On"	"Off"
1	F	Magnitude	Phase
2	A	Log scale	Linear
3	J	Double	Single Curve
4	M	Difference	Absolute
5	N	Normalized	Not Norm.
6	R	Smoothed	Not Smoothed
7	U	View Smooth	Smooth+Raw
8	V	Grid on	Grid off

3.5.2 Quick Setup Entries

You can enter a new toggle setting either by typing a number key or by one of the function keys F1 through F8. After changing one or more toggle settings, you confirm - or enter - the new setting(s) in any one of three ways:

by typing "B";

by typing "X";

by typing <RETURN>

3.6 PRINT

The print option "P" from the main menu prints the displayed graph. GRAPH commands assume an Epson FX (or compatible) printer. Other types of printers may work, but the prints cannot be guaranteed for correct size. At any time during printing, cancel the command by pressing <ESC>.

3.6.1 Number of Overstrikes

Upon typing "P" for printing, the screen notes the number of overstrikes to be made in one pass. More overstrikes produce a darker print. You change the number of overstrikes by typing "+" or "-" or you can enter a single number with a number key. Enter <RETURN> to proceed.

3.6.2 Standard or Double Size Print

You select between a standard-sized or a double-sized graph by answering the question "Print Double Size? (Y/N)". If you enter "Y", you must then select between two column formats: A) 80 column, or B) 132 column. Choice "A" will produce a large, slightly squashed grid printed landscape. Choice "B" produces a portrait print which is exactly double normal size in both vertical and horizontal directions.

3.7 Report

Main menu option "R" sends a custom formatted report to the printer. The report may include the displayed graph, as well as information from the measurement and/or display. You prepare the report format ahead of time as explained in Section 5.

3.8 Return to TEF TDS

Typing "T" from a display view puts you back in TDS.

The screen asks if you wish to save your GRAPH settings. If you answer Yes, the system stores your display settings in the file "LAST.GPH". When you next enter GRAPH, the system will display the next Curve 1 according to the "LAST.GPH" settings instead of the default values.

Upon returning to TEF, the initial display will match the last GRAPH display (i.e., frequency or phase). The differencing mode will also be retained.

SECTION 4: DISCUSSION

This section offers some tips and cautions to assist you in using GRAPH display tools.

4.1 Gain

Options [K] and [L] add gain to Curves 1 and 2. If you specify more than one curve manipulation, gain will be the last operation performed.

4.2 Normalized Difference

You can combine normalization [N] with differencing [M]. Differencing takes place first. Any gain is added after normalization.

4.3 Smoothing

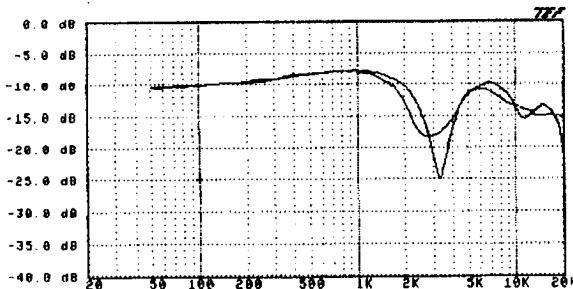
Smoothing is the simple arithmetic mean of dB levels of a number of data points surrounding a focal data point. In GRAPH, this average only includes points in displayed data; that is, data between display data F1 [D] and display data F2 [E] inclusive. It will not include data that may exist but is not displayed, such as points between actual data F1 and display data F1.

4.4 Ends of Curves

Since smoothing averages data on both sides of a focal point, data points that are at curve end points may show peculiar results. To minimize the effect of this occurrence, choose a bandwidth/percentage that is large enough to smooth effectively yet small enough to keep excessive deviation from the end points.

4.5 Smoothing Speed

The time required to calculate curve smoothing is directly proportional to the size of the bandwidth or percentage. With moderately large bandwidths or percentages, there will be a noticeable slowdown in the time taken to draw the curve on the grid.



Curve 1 Smoothed
(Display Both Smoothed and Raw Data)

SECTION 5: CUSTOM REPORTS

5.1 General Information

GRAPH includes routines for efficient reporting of measurement data and display parameters. Through the use of two-character codes that are linked to both TEF and GRAPH memories, you only need to create a framework for a report and GRAPH will automatically insert specified values. As required, you can add comments or other text portions.

5.2 Report Codes

Report codes follow the format “^XX^” where XX is a mnemonic code for a data or display parameter and the enclosing symbols ^ ^ instruct GRAPH to pull information out of memory.

5.3 Sample Report Format

At left below is a sample report format; to the right is an actual report from this format. (In the appendix and on the GRAPH disk, this sample format appears as TEFLIKE.RPT)

```

AT ^LC^
^GR^
Job Number      : ^JN^

Horizontal      : ^F1^ to ^F2^

Receive Delay   : ^T0^
                  ^D0^

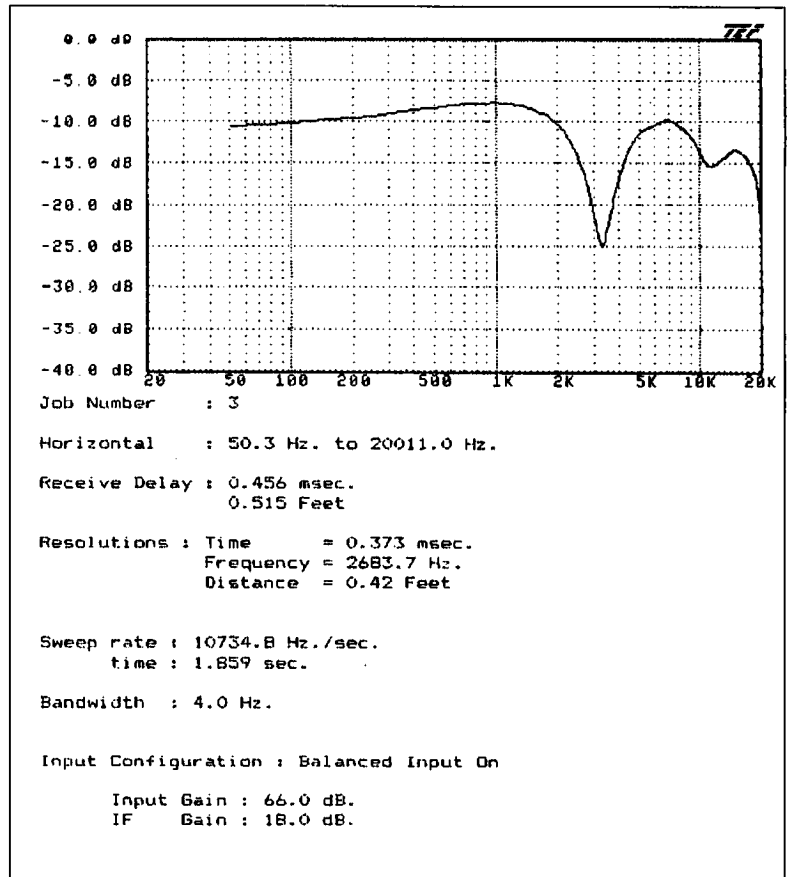
Resolution      : Time      = ^TR^
                  Frequency = ^FR^
                  Distance  = ^DR^

Sweep rate     : ^SR^
                  time      : ^ST^

Bandwidth      : ^BW^

Input Configuration : ^IC
                  Input Gain : ^IN^
                  IF Gain    : ^IF^
^MG^^FF^
    
```

Sample Report Format



Completed Report

The following sections list the codes for three categories of report elements: TDS data, GRAPH data, and page formatting instructions.

5.4 TDS Information Codes

A typical report will make use of many measurement values that come into GRAPH from TDS. Here are the two-character symbols for TDS codes:

- ^MN^** Measurement Name.
- ^OP^** Operator Name.
- ^DT^** Date.
- ^LC^** Location.
- ^JN^** Job Number.
- ^F1^** TDS F1 (Start frequency).
- ^F2^** TDS F2 (Stop frequency).
- ^BW^** TDS Bandwidth.
- ^SR^** TDS Sweep rate.
- ^ST^** Equivalent Sweep Time.
- ^T0^** Receive Delay (in Time).
- ^D0^** Equivalent Distance Units.
- ^OV^** TDS Output Voltage.
- ^IC^** Input Configuration. *
- ^IF^** IF Gain.
- ^VL^** Velocity of Sound.
- ^AM^** Amplitude Units.
- ^DB^** Zero DB Reference.
- ^TR^** Time Resolution.**
- ^FR^** Frequency Resolution.**
- ^DR^** Distance Resolution.**

In addition to the value for each of the above codes, the Report Function will also show the appropriate unit of measure. (See "Completed Report" on previous page.)

*The Input Configuration is as specified in TDSMENU. The report result is formatted in text in one of three forms:

“Balanced Input On”

“Non-inverting Input On”

“Inverting Input On”

**Time, Frequency, and Distance resolution are all values which can be derived from the above Sweep rate and Bandwidth values. They are computed and formatted as follows:

Time Resolution = Bandwidth/Sweep rate (in “msec.”)

Frequency Resolution = Sweep Rate/Bandwidth (in Hz)

Distance Resolution = Speed of Sound multiplied by Time

5.5 GRAPH Display Codes.

These codes relate to the graph itself and are typically independent of the TEF data.

^D1^ Displayed F1 (Start frequency).

^D2^ Displayed F2 (Stop frequency).

^G1^ Gain Added to Curve 1.

^G2^ Gain Added to Curve 2.

^NF^ Normalization Frequency.

^SM^ Smoothing Type (Constant/Percentage).

^SV^ Smoothing Value(Hz or Percent).

5.6 Page Formatting Codes.

Several codes can be imbedded to control the presentation of the report.

^FF^ Form feed.

^B^ Bold on/off.

^MG^ Margin Set/Release.

^GR^ Graph.

This last code refers to the actual placement of the Graph. Without it, the custom report will be printed without the graph.

5.7 Text Input Code

The symbol ^?^ allows entry of one line of text up to 80 characters long.

Example:

In the report file:

“Unit Name : ^?^”

On the screen appears the prompt:

“Unit Name : ?”

At this point, you type:

“My Favorite Microphone.”

The result on the printed report is :

“Unit Name : My Favorite Microphone.”

5.8 Selecting and Creating Report Formats

The menu option “R” brings up the question: “Choose a file to serve as the basis for report.” Below that is a series of file names with the suffix “.RPT”. These are sample files such as “TEFLIKE.RPT” used above as an example. You can use these sample files directly, or make any modifications you might require and save the new format under a different file name (making sure you add the suffix “.RPT”).

Section 7 shows the line-by-line components of three sample report formats included on the GRAPH disk.

SECTION 6: TEXT EDITOR

6.1 General Information

RPTEDIT is a full-screen text editor capable of editing about 400 lines of text. Each line may contain up to 80 characters. This is usually sufficient for editing GRAPH report text files, and may be useful for the creation of other documents.

6.2 RPTEDIT Startup

RPTEDIT is called by typing "RPTEDIT" at the CP/M system prompt. RPTEDIT cannot be called from inside TEF or from any of the GRAPH menus. Before calling RPTEDIT, you must exit the TEF software system by typing "X" at the TEF main menu.

After displaying a brief startup message, you are requested to enter the disk drive designator of the drive where the file you want to edit is found. Choose drive A (left) or B (right) by pressing the letter corresponding to the drive desired. If a <RETURN> key is entered instead, the program will exit to the operating system.

6.2.1 Selecting Text Files

Selecting a drive causes the program to display the directory of that disk. Only GRAPH report files that exist on the chosen disk will be shown in the listing. You are then asked for the name of the text file desired. Only the file name is required as the drive designation has already been entered. If a file name is entered which is not in the directory, a flag designating "new file" appears. When this file is saved, it will be saved under its new file name.

If you discover that the wrong disk is in the drive, the disk can be changed at this point. Entering <RETURN> will repeat the above question concerning the drive desired.

6.2.2 Loading the Text

After a file name has been entered, RPTEDIT attempts to load the text. If the text is much over 400 lines, RPTEDIT reports that the file is too big. Another editor must be used. Fortunately, very few GRAPH report applications will run over 400 lines. If a line in a file is greater than 80 characters, a <RETURN> will be inserted at the 80 character point. If, during an edit, the limits of memory are approached, a warning will be given displaying the number of bytes left. At times, due to the design of the editor, a warning may be given when it is obvious that fewer than 400 lines have been entered. In this case, the file must be re-edited by saving and reloading the same file.

6.3 The Editing Screen

The RPTEDIT screen is divided into two sections. The first section is the editing window where text is examined, entered and edited. The second section is the editing information banner, which aids the user by displaying the status of the edit as well as providing command information.

6.3.1 The Editing Window

The editing window moves automatically to accommodate the current edit. That is, it scrolls both vertically and horizontally as cursor commands dictate. The horizontal limit of RPTEDIT is 80 characters.

6.3.2 The Information Banner

The editing information banner has two forms: the basic form and the help form.

When the editor is first entered, the editing information banner is in its basic form. The basic form of the editing information banner displays the following four pieces of information:

6.3.3 The Activity

This will generally be "editing" although "printing" and "saving" are other possibilities which will appear when these activities are being performed.

6.3.4 The Working File Name

This is the name of the file as it was initially entered including the drive designation. (i.e., B: WORKING.RPT)

6.4 The Insertion Mode

RPTEDIT is always in one of two insertion modes. Insertion", the default mode, allows for the insertion of text in the midst of existing information. The "Overwrite" mode, on the other hand, will write over existing text.

6.5 Help Key

The <ESC> key acts as a toggle switch turning the "help" mode (and information banner) on and off.

The help form of the editing information banner includes a listing of all the special editing keys supported by RPTEDIT. The help form of the editing information banner is enabled by pressing <ESC>.

NOTE that this help form adds to the basic form rather than overwriting it. It also reduces the size of the editing window which is "pushed down" to accommodate the help text.

6.6 The Editing Command Keys

The editing commands form a subset of the commands supported by WordStar (WordStar is a registered trademark of MicroPro, Inc., San Rafael, CA 94903) and are very similar to the editing commands used throughout TEF. The following description will note control characters by the prefix "^", so that control-G (holding down the control key while simultaneously pressing "G") is shown as "^G".

6.6.1 Special Key Functions

The following control-key combinations move the cursor right and left, or up and down:

- ^D** move cursor right one character.
- ^S** move cursor left one character.
- ^E** move cursor up to the previous line.
- ^X** move cursor down to the next line.

Note that these four keys form a diamond pattern on the keyboard.

```
      E
     S       D
      X
```

This makes their functions easier to remember. If a boundary is reached for a particular key (Example: Bottom of file for **^X**), the key will have no effect and will not wrap around.

The following move and scroll control-key combinations are available:

- ^F** move right to the next word.
- ^A** move left to the last word.
- ^R** scroll the screen down one window
(move up the file).
- ^C** scroll the screen up one window
(move down the file).
- ^W** scroll the screen down one line
(expose a higher line).
- ^X** scroll the screen up one line
(expose a lower line).

With **^C** and **^R**, the bottom/top line of the window moves to the top/bottom of the window. The cursor retains its horizontal position.

The following control-key combinations for delete operations are also available.

- ^G** delete character under cursor.
- ^T** delete "word" to the right.
- ^Y** delete line.

"Word" here refers to a group of contiguous non-blank or blank characters such that usually two **^T**'s are required to actually delete a target word and its separating space.

The remaining control-key combinations available are as follows:

DEL, ^H backspace/delete character to left. This is a departure from WordStar, where Backspace and ^H are not destructive.

^I tab right 5 spaces.

^V toggle "Insertion"/"Overwrite" modes.

<RETURN> end this line; go to next.

^N insert end of line, but maintain current position.

^P control character prefix. If next character is control character, accept as such, otherwise do nothing.

^K^D Save and Quit this edit.

^K^S Save, but keep editing at current position.

^K^Q Quit, but do not Save.

^K^P Print text as it exists now (in the editor).

SECTION 7: SAMPLE REPORT FORMATS

Section 5 describes the report routines that provide automatic insertion of setup parameters and measurement values into various report formats. You only need to create a framework based upon one of the sample formats supplied on the program disk. The GRAPH program automatically inserts specified values, complete with labels and units of measure.

See Section 5 for instructions on selecting and using report formats. Listed below are the components of three sample reports:

THREELIN.RPT (allows for insertion of three lines of text)

TEFLIKE.RPT (see page 5-1 for typical application)

EXCESSIV.RPT (provides an extensive list of report parameters)

THREELIN.RPT

^GR^

^?^

^?^

^?^

^L

TEFLIKE.RPT

^MG^MN^

By ^OP^

On ^DT^

At ^LC^

^GR^

Job Number : ^JN^

Horizontal : ^F1^ to ^F2^

Receive Delay : ^T0^

^D0^

Resolutions: Time = ^TR^

Frequency = ^FR^

Distance = ^DR^

Sweep rate: ^SR^

time: ^ST^

Bandwidth: ^BW^

Input Configuration : ^IC^

Input Gain : ^IN^

If Gain : ^IF^

^MG^FF^

^L

EXCESSIV.RPT

^MG^^MN^
 By ^OP^
 On ^DT^
 At ^LC^
 ^GR^
 Job Number : ^JN^
 Data Sweep : ^F1^ to ^F2
 Displayed Portion : ^D1^ to ^D2^
 Normalized to : ^NF^ (if normalization active)
 Display gain added to curve 1 : ^G1^
 Display gain added to curve 2 : ^G2^ (if present)
 Smoothing info (if active) : ^SM^ ^SV^
 Receive Delay : ^T0^
 ^D0^
 Resolutions : Time = ^TR^
 Frequency = ^FR^
 Distance = ^DR^
 Sweep rate : ^SR^
 Sweep time : ^ST^
 Bandwidth : ^BW^
 Input Configuration : ^IC^
 Input Gain : ^IN^
 If Gain : ^IF^
 Output Voltage : ^OV^
 Speed of Sound : ^VL^
 Amplitude Units : ^AM^
 0 dB. at ^DB^
 ^MG^^^
 ^L