TECHRON®

POST-PROCESSING

Software Manual

For Use With TEF System Analyzers

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SECTION 1: INTRODUCTION TO POST-PROCESSING

TEF Post-processing is a modular software package for secondary processing of TEF TDS Data. TEF Post-processing creates new TDS data files by applying different arithmetic functions to one or more existing data files. Like other TDS data, these new TEF Post-processed files can be viewed and manipulated with various other TEF routines.

As TEF Post-processing will only be used in operations and manipulations that follow conventional TEF measurements, this manual makes no effort to cover basic TEF material. All of the instructions, acoustic theory, and other components of this manual assume an appropriate background in both acoustic measurements and TEF operations.

1.1. Unpacking

TEF Post-processing software contains the following items:

- User's manual
- 790k Distribution disk

1.2. What You Need to Know

This manual assumes you are familiar with basic computer tasks associated with operating a TEF analyzer. Before operating TEF Post-processing, take the time to become comfortable with the following tasks:

- Creating a working disk with an operating system
- Copying files from disk to disk
- Connecting your printer, microphone, amplifier and speaker to the TEF.

1.3. 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

1.4. Back Up the Distribution Disk

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

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

1.5. Features

TEF Post-processing runs within standard TEF software as a post-processor for both 3D and single-sweep TDS data. TEF Post-processing also includes utilities which may be useful in the midst of TEF operations. Section 1.6 describes the 3D functions; single-sweep functions are covered in Section 1.7.

1.6. 3D Functions

You can apply five different functions to 3D TDS data files:

1) Normalization
2) Vector Division
3) Vector Differencing
4) Magnitude Averaging, and
5) Vector Averaging.

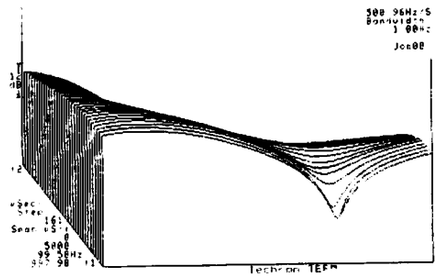
Each of these functions are described in the following sections.

1.6.1. Normalization

In the Normalization function, each curve of a 3D series is divided by a selected individual curve in that 3D set. The result is a 3D data set in which the selected curve appears as a straight line, with the surrounding curves deviating to some degree from the selected curve.

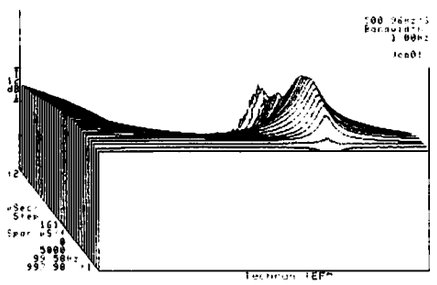
This function is useful when you are interested in seeing to what degree individual curves deviate from a chosen curve, and less interested in the absolute shape of a 3D plot.

In effect, the Normalization function is simply repeated Vector Division of each of the 32 3D curves by one other of those curves.



3D Series 1

3D Series 1 shows a raw 3D of NOTCH FILTER.

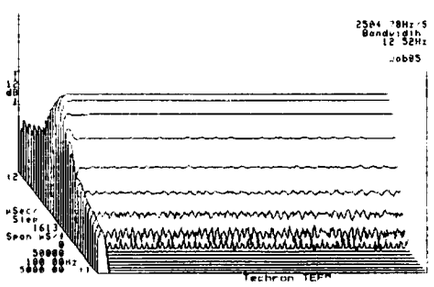


3D Series 2

3D Series 2 shows a post-processed file where all of the curves are normalized to the first curve. Notice that the first curve appears as a straight line. The rise in the middle of 3D Series 2 represents in magnitude how much the relatively flat middle curves of 3D Series 1 vary from the big dip in curve 00 of that Series.

1.6.2. Vector Division

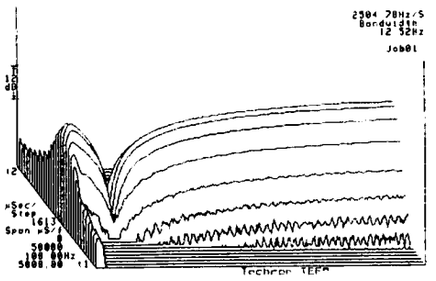
Normalization shows how individual curves vary from a single curve; Vector Division shows the degree to which an entire 3D set varies from another 3D set. The new set created with the Vector Division function does not reflect the absolute shape of the original curve set. Instead, it measures the deviation of one set from another. In arithmetic terms, the Vector Division function divides each curve in a 3D series by the corresponding curve in another 3D series.



3D Series 1

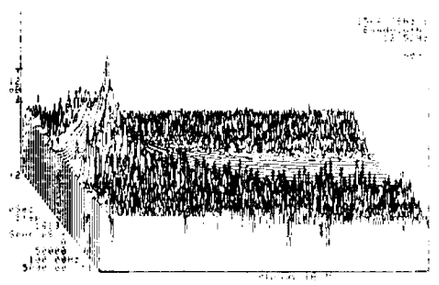
3D Series 1 shows a flat curve delayed in time so that its highest points are in the center of the 3D.

3D Series 2 shows the same input, restricted at the left by a filter network.



3D Series 2

3D Series 3 shows the result of a post-processing vector division. The post-processed curve shown represents the difference in magnitude between 3D Series 1 and 3D Series 2. The lowlying "grassy" areas in the display show instability along the noise floor. The more well-defined areas are the principal areas of interest here, and show the magnitude difference at crucial points between 3D Series 1 and 2.



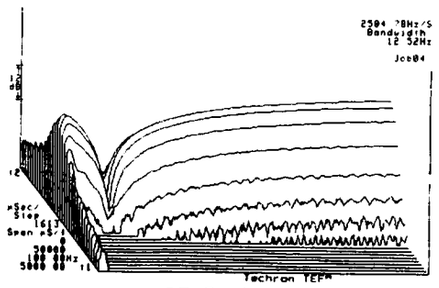
3D Series 3

1.6.3. Vector Differencing

In Vector Differencing, each curve in a selected 3D set is subtracted from the corresponding curve in a different 3D set. The Vector Differencing function creates a new 3D set that is simply the arithmetic difference between one 3D set and another.

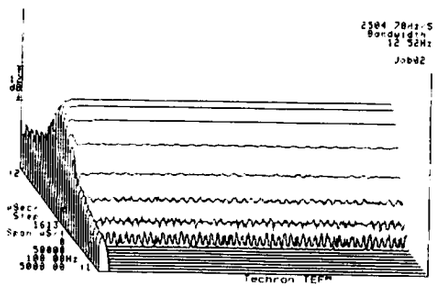
With the Vector Division function, curve A divided by curve B yields curve C. In Vector Differencing, curve A minus curve B results in curve C.

Note that 3D Series 1 and 2 here are similar to those just seen.



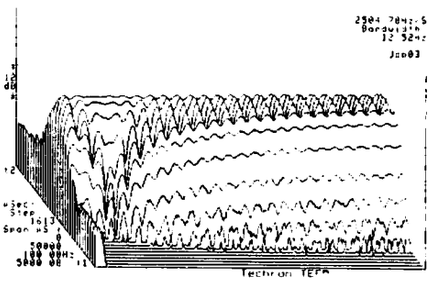
3D Series 1

3D Series 1 is the dip network.



3D Series 2

3D Series 2 is the straight input, delayed somewhat in time.



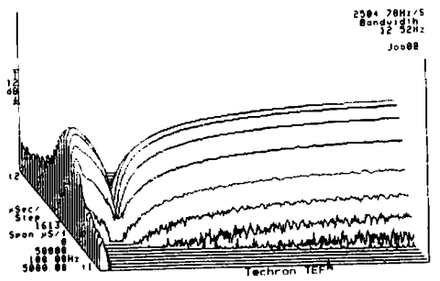
3D Series 3

3D Series 3 is the "sum" of these two. That is both signals were fed into the TEF at the same time by way of an audio mixer. This is the result.

3D Series 3 corresponds in general to input which is the "sum" of two or more effects. One of these effects is the direct signal. Other effects may be reflections or some other type of interference. Theoretically, if we can isolate either the direct signal or its accompanying effect, we can subtract that factor from the "sum" with the result being the "missing" factor.

Here, we assume that 3D Series 2 is interference. So we should be able to subtract 3D Series 2 from 3D Series 3 and come up with a result that is like 3D Series 1.

3D Series 4 is the post-processing result of subtracting 3D Series 2 from 3D Series 3. As we expected, this result is very similar to 3D Series 1.



3D Series 4

1.6.4. Magnitude Averaging

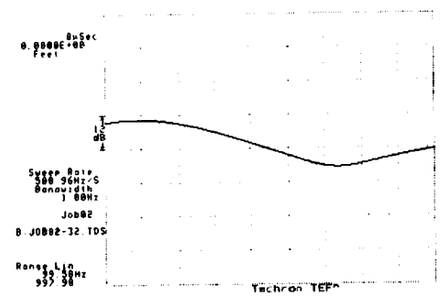
The three functions described above produce new sets of

3D curves. The Magnitude Averaging and Vector Averaging functions produce a single-sweep TDS curve instead of a 3D series.

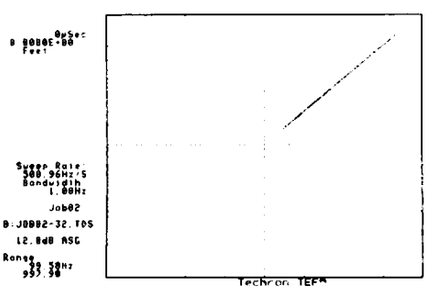
From a selected group of curves from one or more jobs, the Magnitude Averaging function calculates a single curve that is an arithmetic average or mean of the group.

The Magnitude Averaging function disregards the actual phase of the selected curves and reports the phase of the single-sweep TDS curve as 45 degrees. This conversion is useful in situations where the phase wrap of several curves would make a Vector Average unsuitable.

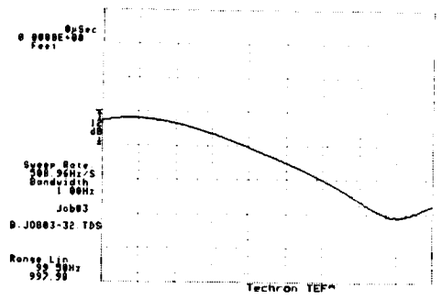
Curve 1 is the post-processed magnitude average of the first 6 curves if the NOTCH FILTER 3D series encountered in our discussion of Normalization. The Nyquist plot, Curve 2, here shows that phase is set to 45 degrees and plays no part in the average result.



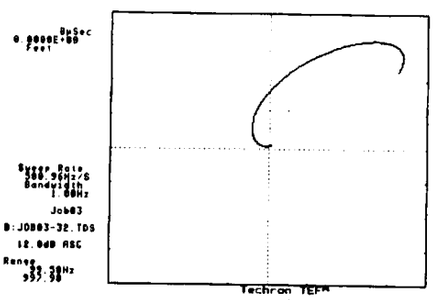
Curve 1



Curve 2



Curve 1



Curve 2

1.6.5. Vector Averaging

The Vector Average function performs the same manipulation as Magnitude Averaging, but instead of converting phase to 45 degrees, returns the average of both magnitude and phase. This function is useful in situations where the phase is well-behaved.

This curve is the post-processed vector average of the first 6 curves of the NOTCH FILTER 3D Series encountered in the discussion of Normalization. The Nyquist here shows that an average phase as well as an average magnitude is taken into account. Because the phase is not the same in all 6 curves, there is a difference in the result of the Magnitude vs. Frequency response as seen here as opposed to the Magnitude average viewed previously.

1.7. Single-Sweep Functions

The four single-sweep functions are similar to the 3Dfunctions described above and include:

1) Vector Division
2) Vector Differencing
3) Magnitude Averaging, and
4) Vector Averaging.

1.7.1. Vector Division

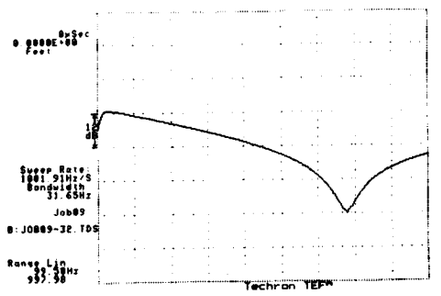
The single-sweep Vector Division function creates a new TDS single-sweep curve by dividing one TDS curve by another. You may choose any of the single-sweep curves or any single curve from a 3D set for division. The curve that results from Vector Division is a measure of the deviation of one curve from another.

1.7.2. Vector Differencing

The Vector Differencing function creates a new single-sweep curve which is the measure of the vector difference between two curves.

The following series gives examples of single-sweep vector division and differencing and illustrates their use in the solution of a problem.

Curve 1 is the result of a dip network attached between the output and input of the TEF.

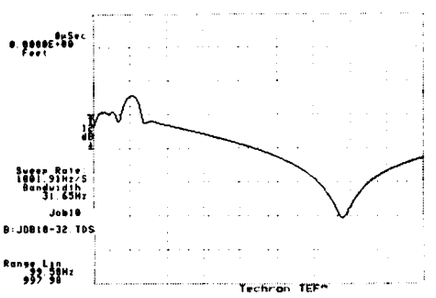


Curve 1

Curve 2 is the result of that same direct signal and an interfering signal. The result of the interference is the "bump" on the left of the curve.

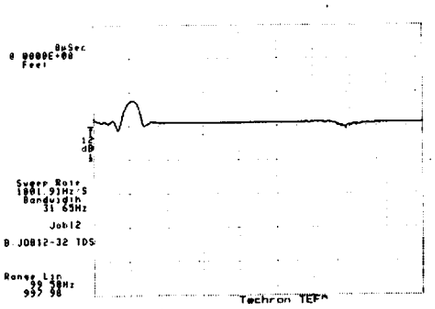
Suppose we are interested in the nature of the interfering signal itself. We can use post-processing to perform a vector division of Curve 2 by Curve 1.

This gives us Curve 3.

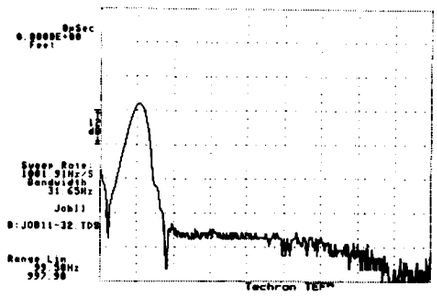


Curve 2

Curve 3 tells us more about the effect of the interference on the magnitude that it does about the interference itself. It shows that the magnitude difference of the bump is in the area of 8 to 9 dB.

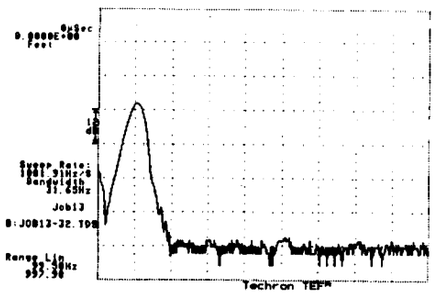


Curve 3



Curve 4

Using post-processing vector differencing, we subtract Curve 1 from Curve 2. The result is Curve 4. Curve 4 suggests that Curve 1, with its bump, is the result of a sum of effects including the direct signal (Curve 1) and some interference resembling Curve 4, which looks like a 200 Hz tone.



Curve 5

Curve 5 is a measurement of the interference in isolation. It verifies our hunch above, and is in fact the result of a 200 Hz sine wave. In the absence of an ability to view Curve 5, the single-sweep vector differencing function would have, in this case, allowed us to isolate this curve without a measurement.

1.7.3. Magnitude Averaging

The Magnitude Averaging and Vector Averaging functions only operate on single-sweep curves. That is, only curve number 32 in any job can be used as an element in an average. Any number of these curves may be averaged to yield a new TDS curve or you may specify all the curves to be averaged at once.

In the same manner as the 3D function, single-sweep Magnitude Averaging sets the phase to 45 degrees.

1.7.4. Vector Averaging

The single-sweep Vector Averaging function is similar to the 3D function in that it takes into account the individual polarity measurements.

1.8. Utilities

There are two utilities available under TEF Post-processing:

1) A description file inquiry utility, and
2) A disk reset facility.

1.8.1. Description File Inquiry Utility

The description file inquiry utility allows immediate access to information from the .DSC file of any job on the data disk. Identification information including name of measurement, name of operator, date, etc. is displayed and you are given the option to display parameter information which is otherwise found in the TDS and ETC menus. You may also list all of the files on the disk which are related to a particular job number (e.g. all .TDS, .ETC and .DSC files).

Likewise, you may list the first page of any comments which may be in the file.

1.8.2. Disk Reset Facility

The disk reset facility allows you to swap TEF data disks during a measurement session. With other TEF programs, swapping data disks in the course of gathering information results in an operating system error. This facility of TEF Post-processing prevents such an error.

SECTION 2: RUNNING THE TEF POST-PROCESSING SYSTEM

This section describes how to gain access to the TEF Post-processing program as well as the use of the movement and operation keys.

TEF Post-processing is designed to run within the standard TEF software. It acts as an enhancement of the capabilities of the standard software rather than as an external program.

2.1 Access to TEF Post-processing

TEF Post-processing takes advantage of "hooks" that reside in the TEF code, making it possible to run external programs that can return to their point of origin. These hooks run programs with reserved names. These reserved names include: TDS1.COM, TDS2.COM, ETC1.COM and ETC2.COM.

2.2. TEF Post-processing Files

TEF Post-processing exists on the distribution disk both as TEFPost.COM and TDS2.COM. TDS2.COM is the copy which actually runs; TEFPost.COM exists as a backup copy of the program.

2.3 Running TEF Post-processing

To execute TDS2.COM (TEF Post-processing):

1) Run TEF to the stage of the TEF Main Menu.
2) Move to TDSMENU, by either showing a job or actually setting up for a measurement.
3) At the TDSMENU, press the "}" character on the keyboard. This loads TDS2.COM (as noted, TDS2.COM is a copy of TEFPost.COM).

You are now in TEF Post-processing. When you exit back to TEF, you will return to the TEF main menu. This allows you to see the data just created.

NOTE: While this method will gain access to TEF Post-processing on the distribution disk, you can use either TDS1.COM, TDS2.COM, ETC1.COM, or ETC2.COM as a copy of TEF Post-processing.

The command keys to run these files are:

TDS1.COM - from TDSMENU or TDS, press "{".
TDS2.COM - from TDSMENU or TDS, press "}".
ETC1.COM - from ETCMENU or ETC, press "{".
ETC2.COM - from ETCMENU or ETC, press "}".

See Section 4: "Installing TEF Post-processing on a new TEF disk."

2.4 TEF Post-processing Windows

TEF Post-processing operates with screen "windows" that show the operations currently in progress, the options available, and the status of the program at any given point.

The top window displays the operation currently in progress and/or the options currently available. Window overlays make it easy to tell what past operations or options have led to the current state of the program.

TEF Post-processing windows also display the jobs on the data disk which are available for a given function. All options, including choice of job number, file name, etc. are shown. You only need to select from options presented.

2.4.1 Highlighted Option

Options are always shown in windows with one option highlighted. Moving the cursor through the options will highlight individual choices for selection. Pressing the <RETURN> key selects the highlighted option.

2.4.2. Movement Keys.

You may choose from two different sets of keys to control movement:

The first set includes the letter keys E,S,D, and X.

E - movement up
S - movement left (up at beginning of a line)
D - movement right (down at the end of a line)
X - movement down

This set of movement keys may be used in either upper or lower case letters. In addition, you may use the "control" versions of these keys as well (e.g. ^E, ^S, ^D, ^X).

The second set of movement keys are the 8,4,6, and 2 on the numeric keypad:

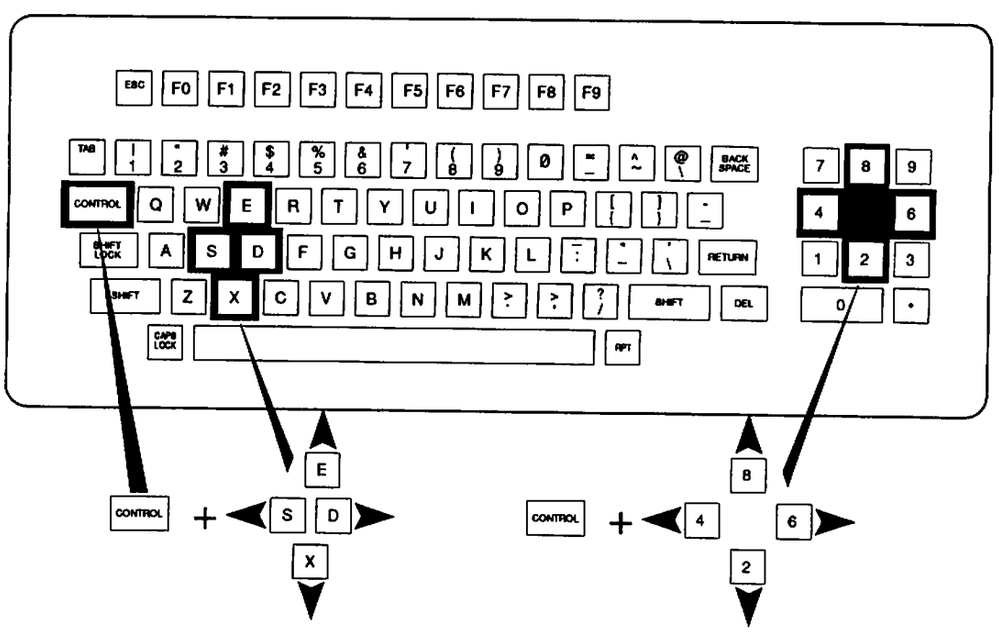
8 - movement up
4 - movement left (up at beginning of a line)
6 - movement right (down at the end of a line)
2 - movement down

2.5. Operation Commands

After you have moved the highlight to the desired option, you select that option by pressing the <RETURN> key.

The <ESC> key acts as an "exit" key, exiting to the previous level of the program. The current process or selection of options is removed. As might be expected, pressing <ESC> also eliminates one or more levels of windows.

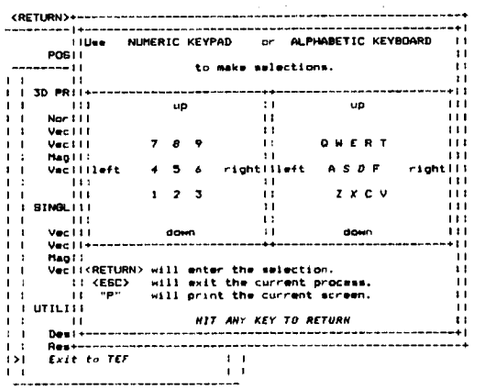
Pressing <ESC> at the TEF Post-processing main menu level will return you to the Main Menu level of the standard TEF software.



Cursor Movement Keys

2.5.1 Printing Screen Contents

"P" (or "p" or ^P) acts as a screen "dump" or print key. The contents of the screen are translated to printable characters and sent to an attached printer. You can print screen contents at any time.



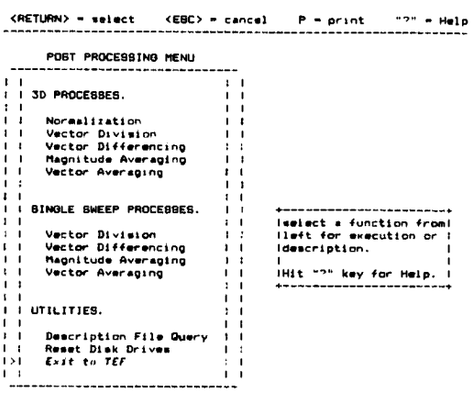
2.5.2 "Help" Command

The help key, "?" (or "/") is available at most points in the program. The help window displays a compressed explanation of the use of the movement and operation keys as detailed above. In addition to the help window, a short help option is displayed at the top of the screen.

SECTION 3: TEF POST-PROCESSING OPERATIONS

This section describes the operating procedures of the TEF Post-processing program with an emphasis on the various menus and sub-operations.

3.1. THE TEF Post-processing Menu

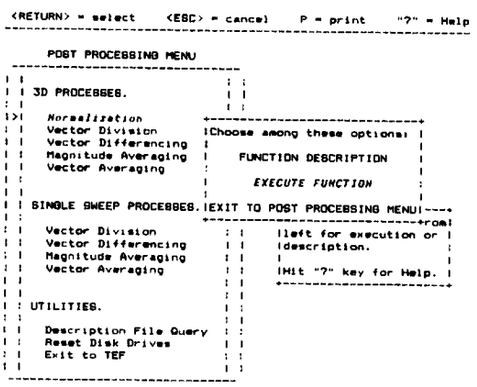


The TEF Post-processing main menu appears when you enter TEF Post-processing from the standard TEF software. From the TEF Post-processing main menu, you branch to the various TEF Post-processing functions The main menu ill return upon completion.

The TEF Post-processing menu has twelve options. When the program is first run, the highlighted option is "Exit to TEF". If you press the <RETURN> key, you will return to the TEF Main Menu.

The other 11 options are described in some detail in Section 3.4. Any option can be selected by highlighting it with the movement keys and pressing <RETURN>.

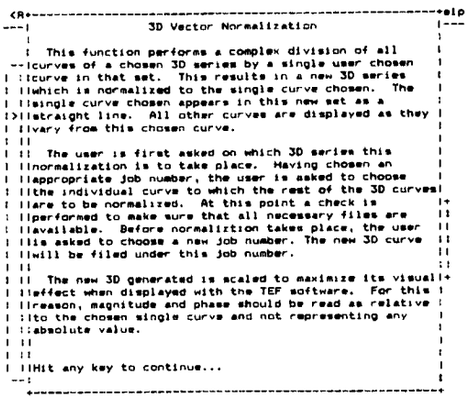
3.2. Interim Menu



After choosing a function and pressing <RETURN>, a small interim menu appears which allows you to:

1) DESCRIBE the function
2) EXECUTE the function
3) EXIT to the TEF Post-processing menu.

The interim menu defaults to option #2, EXECUTE the function. To select either of the other options, use the movement keys, followed by a <RETURN>.



3.2.1. Function Description

This option displays a one page screen briefly describing the action of the function and the steps you need to take to run it. Miscellaneous information about the function may also be shown.

A message appears at the bottom of the page, "Hit any key to continue..." Pressing any key returns you to the interim menu with the EXECUTE option highlighted.

3.2.2. Exit To TEF Post-processing Menu

Before discussing the EXECUTE Function option, note that the third option is EXIT to the TEF Post-processing menu. This function removes the interim menu and places control back at the TEF Post-processing menu level. The same result occurs if you press <ESC>.

3.2.3. Execute Function

The order of execution for particular functions may vary greatly from one to another. Certain operations, however, will remain common.

All operations begin by selecting "EXECUTE FUNCTION" at the interim menu. The interim menu and TEF Post-processing menu windows are then covered and a banner describing the function to be executed is displayed.

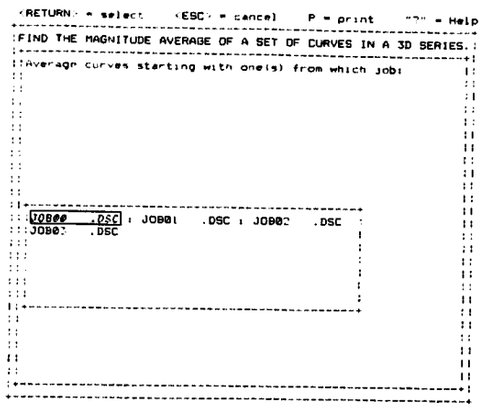
A new window appears where the function will be performed.

3.3. Sub-Operations

The TEF Post-processing program creates new TDS files which are the result of the application of a specific function to one or more TDS curves.

The application of any one function involves the sequential execution of a number of sub-operations. In describing each of these sub-operations and detailing the order in which they are executed, you will have a clear description of the entire program.

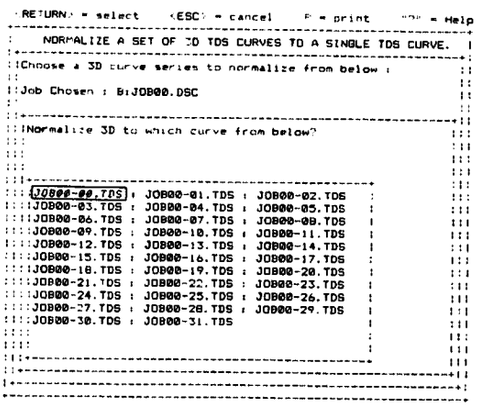
Here are a series of sub-operations which are common in the running of most of the TEF Post-processing functions.



3.3.1. Choose A Job Number

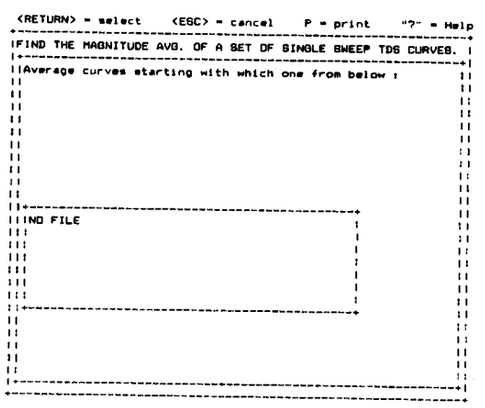
Job numbers that apply to the function being run are displayed in a window in the form "JOBAA.DSC" where AA is the job number. If there are no job numbers on the data disk which apply, the message "NO FILE" will be displayed.

Job numbers are chosen by using the movement keys and <RETURN> (<ESC> exits to the TEF Post-processing menu). If the message "NO FILE" appears in the window, pressing <RETURN> is the same as pressing <ESC>.



3.3.2. Choose A Single Curve

Complete filenames for applicable curves are displayed in a window. Normally, the request for curve selection follows the request for a job number, so the filenames appear "JOBAA-BB.TDS" where AA is the already-chosen job number and BB is the individual curve number. If there are no curves on the disk that apply, the message "NO FILE" appears.



Curves are chosen by using the movement keys followed by <RETURN> (<ESC> exits to the TEF Post-processing menu). If the message "NO FILE" appears in the window, pressing <RETURN> is the same as pressing <ESC>.

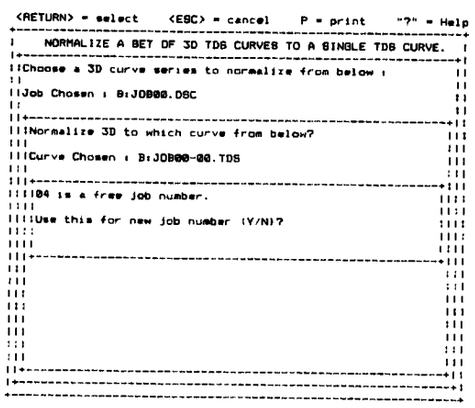
3.3.3. Verify File Existence

In the case of 3D functions, all of the curves 00 - 31 must be on the data disk for each job in the function you are executing. This sub-operation checks to see that this is the case. If one or more files do not exist, the names of the missing files are displayed and the program exits to the TEF Post-processing menu. No action is required for this sub-operation.

3.3.4. Check Start/Stop Frequencies

If you are working with functions on two or more curves, it makes no sense to apply the function if the start and stop frequencies of any two of the curves are different. This sub-operation compares the start and stop frequencies of the files involved. If the frequencies are the same, the program moves to the next phase of operation. If they are different, however, you are informed and given the option to quit or continue the operation on a point by point basis.

3.3.5. Choose A New Job Number



Since TEF Post-processing generates files, each new job must be assigned a job number. This sub-operation searches the data disk and displays the lowest unused job number.

To choose a new number:

A) Determine if the number displayed is the one to be used for the new job.
B) If yes, the displayed number will be used.
C) If not, enter a new job number.
D) The new number will be compared to those already on disk. You will be informed if the input number is currently on the disk. (In this case, cycle back through A).
E) When finished, press <RETURN> and the program will continue. If you wish to abandon the current process, hitting <ESC> returns the program to the TEF Post-processing menu.

3.3.6. Create New .DSC File

Each new file created is accompanied by a .DSC file. This file is created automatically. The .DSC file formed appears as "JOBAA.DSC" where AA is the newly chosen job number. When two or more jobs are used to create a new job (eg. 3D vector division/ subtraction, averaging, etc.) the .DSC file is assigned both TDS and ETC parameters the same as those of the first file chosen.

For example, when doing a 3D vector Division JOB 00 / JOB 01, the TDS and ETC parameters used in the new .DSC file are taken from JOB 00. TEF Post-processing automatically does the naming of the measurement. In our example, the new name would be, "Vector Division: 3D JOB 00 / 3D JOB 01."

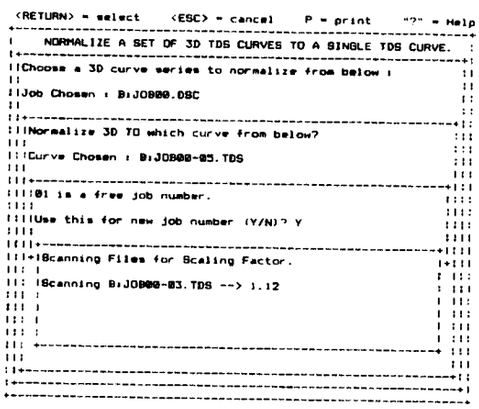
The operator name and the date are taken from the TEF session under which TEF Post-processing is running.

Finally, certain other .DSC parameters may be changed depending on the function applied (see individual function descriptions).

3.3.7. Scan For Scaling Factor

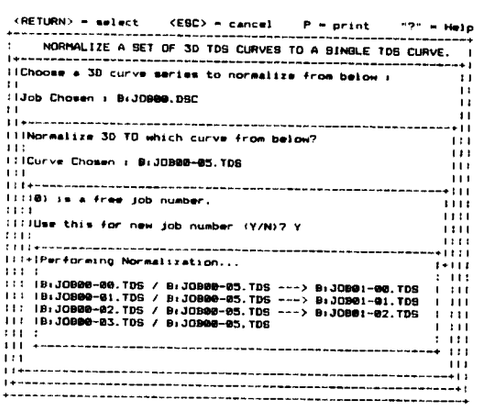
Certain functions such as Vector Division and Vector Differencing apply a scaling factor to the results. This insures that the result can be easily viewed from all TEF display modes.

In order to arrive at this scale factor, the program must make a preliminary pass over the data set to discover the maximum variation and determine an effective scale factor. In 3D functions this requires 32 operations. This is done automatically and may take some time to complete. When complete, TEF Post-processing proceeds to file creation.



3.3.8. Create New TDS Curve Files

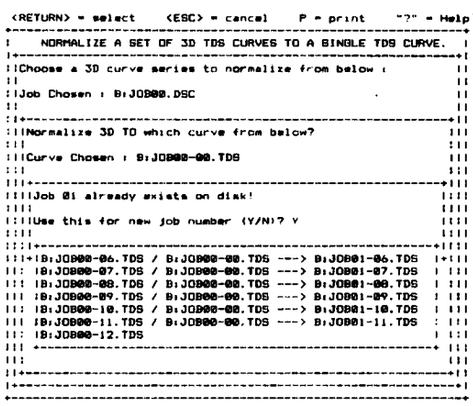
The operation of this function is determined by the information you have already provided. No other action is required. The screen display allows you to track the course of the file generation process. For single-sweep functions this process lasts only seconds, while a full 3D Vector Division takes about 7 minutes.



3.4. Detailed Description Of Individual Functions

You are now ready to trace the actions of the individual functions. In several of the following cases, you will use the sub-operations described above in sequence without repetitions. In other cases, the actions which take place are unique and require individual explanation. In all cases, it is assumed that you have run the program to the point where a descriptive banner is at the top of the screen (see EXECUTE FUNCTION above).

The descriptions below are set in the form of short "programs" which correspond to the actual execution of TEF Post-processing. These "programs" even detail short loops where applicable. Often, both in the operation of TEF Post-processing thus in the descriptions that follow, there is a need to specify JOB and/or curve numbers. In the descriptions which follow, these numbers will be by way of example only and will be noted by phrases such as, "Call number chosen..." or "Call curve chosen..." These phrases will be followed by numbers which should be considered examples only. The actual numbers will be determined by the user in an actual application.



3.4.1. Normalization (3D)

Choose a job number.

Choose a 3D curve to normalize. Call number chosen 00.

Verify file existence.

Choose a single curve.

Normalize job 00 to which single curve in job 00? Call curve chosen JOB00-31.TDS

Choose a new job number.

Call new number 01.

Create new .DSC file

Filename:	JOB01.DSC
Measurement name:	Vector Normalization of JOB 00 to JOB00-31.TDS
User Ref.	Units:Normalized.

Scan for scaling factor.

Create new TDS curve files.

JOB00-00.TDS / JOB00-31.TDS —> JOB01-00.TDS
JOB00-01.TDS / JOB00-31.TDS —> JOB01-01.TDS
JOB00-02.TDS / JOB00-31.TDS —> JOB01-02.TDS

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.
.

JOB00-31.TDS / JOB00-31.TDS —> JOB01-31.TDS

Return to TEF Post-processing menu.

3.4.2. Vector Division (3D)

Choose a job number.

Where JOB X / JOB Y —> JOB Z , choose JOB X. Call number chosen 00.

Where JOB X / JOB Y —> JOB Z , choose JOB Y. Call number chosen 01.

Verify file existence.

Check start/stop frequencies.

Choose a new job number.

Where JOB X / JOB Y —> JOB Z , choose JOB Z. Call number chosen 02.

Create new .DSC file

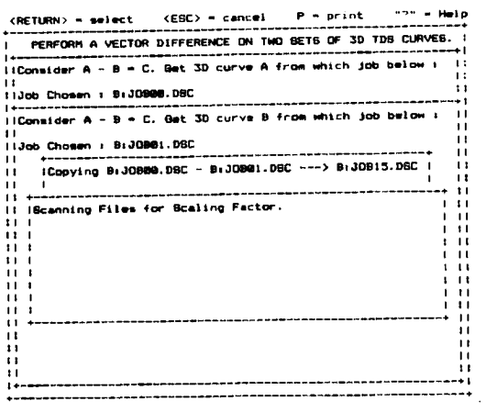
Filename:	JOB02.DSC
Measurement name:	Vector Division: 3D JOB00 / 3D JOB01
User Ref. Units:	Vector Div.
Parameters from:	JOB00.DSC

Scan for scaling factor.

Create new TDS curve files.

JOB00-00.TDS / JOB01-00.TDS —> JOB02-00.TDS
JOB00-01.TDS / JOB01-01.TDS —> JOB02-01.TDS
JOB00-02.TDS / JOB01-02.TDS —> JOB02-02.TDS
JOB00-31.TDS / JOB01-31.TDS —> JOB02-31.TDS

Return to TEF Post-processing menu.



3.4.3. Vector Differencing (3D)

Choose a job number.

Where JOB X - JOB Y —> JOB Z , choose JOB X. Call number chosen 00.

Where JOB X - JOB Y —> JOB Z , choose JOB Y. Call number chosen 01.

Verify file existence.

Check start/stop frequencies.

Choose a new job number.

Where JOB X - JOB Y —> JOB Z , choose JOB Z. Call number chosen 02.

Create new .DSC file

Filename:	JOB02.DSC
Measurement name:	Vector Difference: 3D JOB00 - 3D JOB01
User Ref. Units:	Vector Dif.
Parameters from:	JOB00.DSC

Scan for scaling factor.

Create new TDS curve files.

JOB00-00.TDS - JOB01-00.TDS —> JOB02-00.TDS
JOB00-01.TDS - JOB01-01.TDS —> JOB02-01.TDS
JOB00-02.TDS - JOB01-02.TDS —> JOB02-02.TDS

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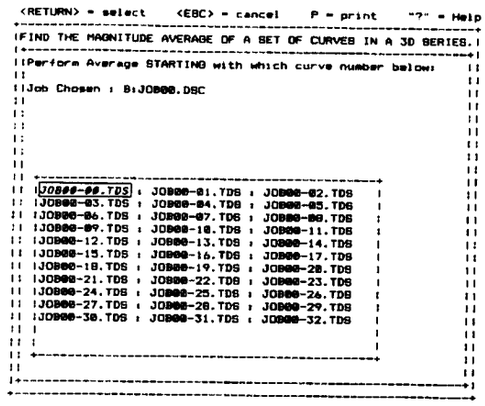
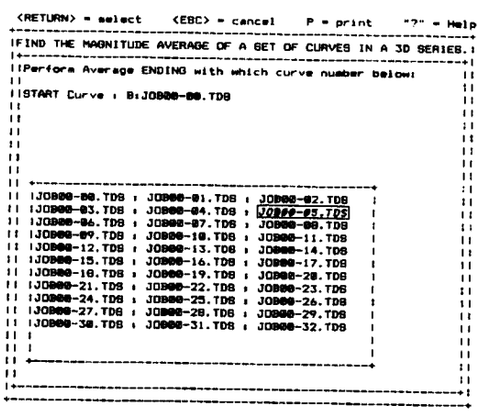
JOB00-31.TDS - JOB01-31.TDS —> JOB02-31.TDS

Return to TEF Post-processing menu.





3.4.4. Magnitude Averaging (3D)

Choose a job number.

Choose a job number which will serve as the "basis" of the

average. This means the averaging of any subsequent job curves will be compared to the start and stop frequencies of this curve. The .DSC information supplied to the new .DSC file will also come from this file. Call the number chosen 00.

Choose a single curve.

3D Magnitude Averaging can average any number of curves from any jobs. In addition, for a single job, you can specify the starting and ending curve number for the curves you wish to average. To do this, choose the curve to START the averaging. Call this curve JOB00-05.TDS.

After specifying the START curve, you must choose the END curve. If you want to choose only one, choose the END curve the same as the START. Call this END curve JOB00-10.TDS.

A Magnitude average is a type of arithmetic mean. The sum of the curves 05 through 10 of JOB 00 is computed and stored in memory. Then a window appears with the question "Average more curves?" If you answer NO, the program skips to FINISH. If YES, the program repeats the LOOP until you exit.

The steps of the LOOP follow:

** LOOP **

Choose a job number.

Choose a job number to average curves with those already specified. Call this job number 01.

Check start/stop frequencies.

Compare start/stop frequencies of JOB 01 with those of JOB 00.

Choose a single curve.

Choose a START curve for averaging in JOB 01.

Choose an END curve for averaging in JOB 01.

Compute the sums of these curves and add to current sums.

The question "Average more curves?" appears. If you answer NO, the program proceeds to FINISH. Otherwise, it will go back to LOOP.

** FINISH **

Choose a new job number.

Call new number 02.

Create new .DSC file

Filename:	JOB02.DSC
Measurement name:	Magnitude Averaging based on: JOB 00
Parameters from:	JOB00.DSC

Create new TDS curve files.

The Magnitude sum of the curves you selected is divided by the total number of curves averaged. The new file created from this averaging is JOB02-32.TDS.

Return to TEF Post-processing menu.

3.4.5. Vector Averaging (3D)

Choose a job number.

Choose a job number which will serve as the "basis" of the

average. This means the averaging of any subsequent job curves will be compared to the start and stop frequencies of this curve. The .DSC information supplied to the new .DSC file will also come from this file. Call the number chosen 00.

Choose a single curve.

3D Vector Averaging can average any number of curves from any jobs. In addition, for a single job, you can specify the starting and ending curve number for the curves you wish to average. To do this, choose the curve to START the averaging. Call this curve JOB00-05.TDS.

After specifying the START curve, you must choose the END curve. If you want to choose only one, choose the END curve the same as the START. Call this END curve JOB00-10.TDS.

A Vector Average is a type of arithmetic mean. The sum of the curves 05 through 10 of JOB 00 is computed and stored in memory. Then a window appears with the question "Average more curves?" If you answer NO, the program skips to FINISH. If YES, the program repeats the LOOP until you exit.

The steps of the LOOP follow:

**** LOOP ****

Choose a job number.
Choose a job number to average curves with those already specified. Call this job number 01.

Check start/stop frequencies.
Compare start/stop frequencies of JOB 01 with those of JOB 00.

Choose a single curve.
Choose a START curve for averaging in JOB 01.

Choose an END curve for averaging in JOB 01.

Compute the sums of these curves and add to current sums.

The question "Average more curves?" appears. If you answer NO, the program proceeds to FINISH. Otherwise, it will go back to LOOP.

**** FINISH ****

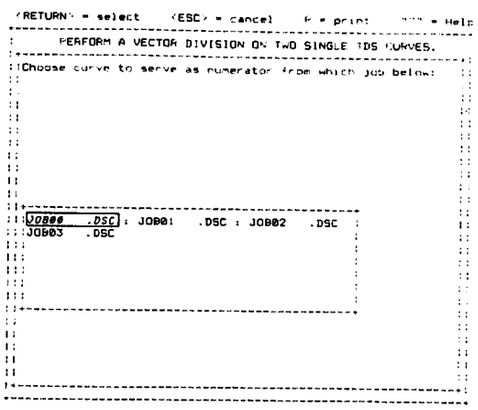
Choose a new job number.
Call new number 02.

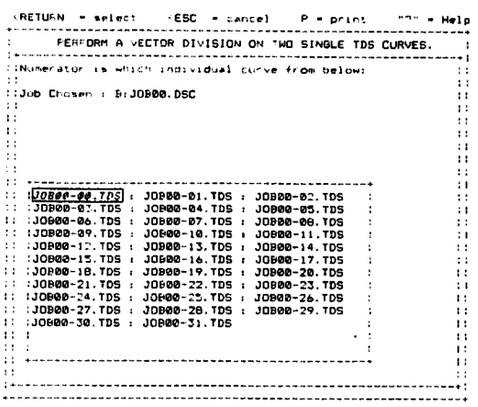
Create new .DSC file

Filename:	JOB02.DSC
Measurement name:	Vector Averaging base on: JOB 00
Parameters from:	JOB00.DSC

Create new TDS curve files.
The vector sum of the curves you selected is divided by the total number of curves averaged. The new file created from this averaging is JOB02-32.TDS.

Return to TEF Post-processing menu.





3.4.6. Vector Division (Single-Sweep)

Choose a job number.

When you wish to divide a curve in JOB X by a curve in JOB Y, (where X may or may not equal Y) choose JOB X. Call the number chosen 00.

Choose a single curve.

When you wish to divide a curve in JOB 00 by a curve in JOB Y, choose a curve in JOB 00. Call this curve JOB00-00.TDS.

Choose a job number.

When you wish to divide a curve in JOB X by a curve in JOB Y, choose JOB Y. Call this number 01.

Choose a single curve.

When you wish to divide a curve in JOB 00 by a curve in JOB 01, choose a curve in JOB 01. Call the curve JOB01-00.TDS.

Check start/stop frequencies.

Choose a new job number.

When you wish JOB00-00.TDS / JOB01-00.TDS to result in a curve in JOB Z, choose JOB Z. Call this number 02.

Create new .DSC file

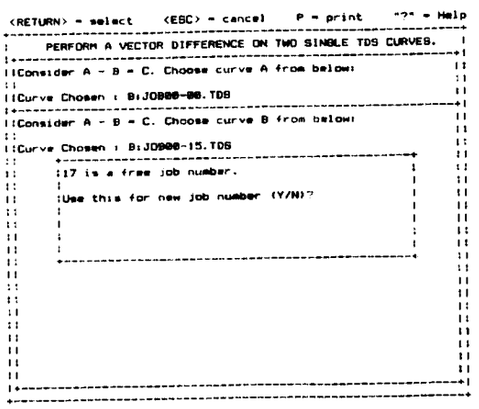
Filename:	JOB02.DSC
Measurement name:	Vector Division: JOB00-00.TDS / JOB01-00.TDS
User Ref. Units:	Vector Div.
Parameters from:	JOB00.DSC

Scan for scaling factor.

Create new TDS curve files.

JOB00-00.TDS / JOB01-00.TDS —> JOB02-32.TDS

Return to TEF Post-processing menu.



3.4.7. Vector Difference (Single-Sweep)

Choose a job number.

When you wish to subtract a curve in JOB Y from a curve in JOB X (X - Y = Z, where X may or may not equal Y) choose JOB X. Call this number 00.

Choose a single curve.

When you wish to subtract a curve in JOB Y from a curve in JOB 00, choose a curve in JOB 00. Call this curve JOB00-00.TDS.

Choose a job number.

When you wish to subtract a curve in JOB Y from a curve in JOB 00, choose JOB Y. Call this number 01.

Choose a single curve.

When you wish to subtract a curve in JOB 01 from a curve in JOB 00, choose a curve in JOB 01. Call the curve JOB01-00.TDS.

Check start/stop frequencies.

Choose a new job number.

When you wish JOB00-00.TDS - JOB01-00.TDS to result in a curve in JOB Z, choose JOB Z. Call this number 02.

Create new .DSC file

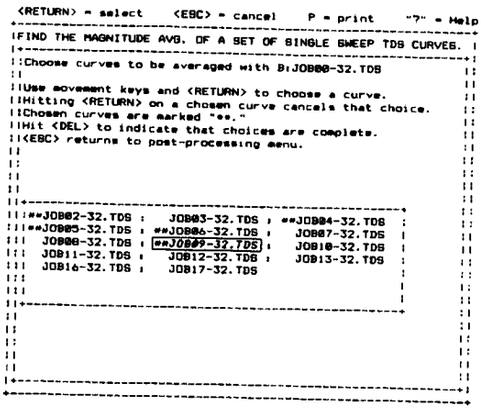
Filename:	JOB02.DSC
Measurement name:	Vector Difference: JOB00-00.TDS - JOB01-00.TDS
User Ref. Units:	Vector Dif.
Parameters from:	JOB00.DSC

Scan for scaling factor.

Create new TDS curve files.

JOB00-00.TDS - JOB01-00.TDS —> JOB02-32.TDS

Return to TEF Post-processing menu.



3.4.8. Magnitude Averaging (Single-Sweep)

Choose single curve.

Since single-sweep Averaging works only on curves of the form, JOBXX-32.TDS, choosing a single-sweep filename automatically chooses the job number XX.

The first filename you choose serves as a "basis" for averaging. Any subsequent job curves will be compared to the start and stop frequencies of this curve. Likewise, the .DSC information supplied to the new file will come from this file.

Once you choose a basic curve (call it 00), you may wish to specify more than one single-sweep file to average. The single file choice is modified to accomplish this.

To choose a single file highlight the single filename and press <RETURN>. Selected filenames are marked with "**" so you may choose others. (This is how you mark multiple curves for averaging). If you wish to cancel a selection you have made, highlight the filename and press <RETURN>. The <RETURN> key acts as a toggle to "tag" and "untag" files which will be averaged along with the basic file. When you have selected all the files you wish, press <DEL>. The "tagged" files will be averaged with the basic curve.

Check start/stop frequencies.

The files you chose above are checked for start and stop frequencies against the basic file. If any of the files have start/stop frequencies different from those of the basic file, you are given an opportunity to abort or to continue.

The selected curves are summed and stored in memory.

Get a new job number.

Call it 02.

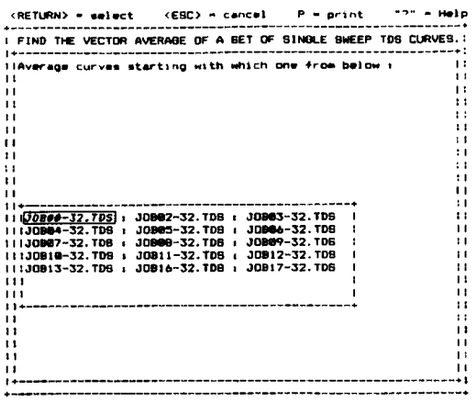
Create new .DSC file

Filename:	JOB02.DSC
Measurement name:	Single-sweep Vector average based on JOB00-32.TDS
Parameters from:	JOB00.DSC

Create new TDS curve files.

The magnitude sum of all the curves you specified is divided by the total number of curves averaged. The new file created from this averaging is JOB02-32.TDS.

Return to TEF Post-processing menu.



3.4.9. Vector Averaging (Single-Sweep)

Choose single curve.

Since single-sweep Averaging works only on curves of the form, JOBXX-32.TDS, choosing a single-sweep filename automatically chooses the job number XX.

The first filename you choose serves as a "basis" for averaging. Any subsequent job curves will be compared to the start and stop frequencies of this curve. Likewise, the .DSC information supplied to the new file will come from this file.

Once you choose a basic curve (call it 00), you may wish to specify more than one single-sweep file to average. The single file choice is modified to accomplish this.

To choose a single file highlight the single filename and press <RETURN>. Selected filenames are marked with "**" so you may choose others. (This is how you mark multiple curves for averaging). If you wish to cancel a selection you have made, highlight the filename and press <RETURN>. The <RETURN> key acts as a toggle to "tag" and "untag" files which will be averaged along with the basic file.

When you have selected all the files you wish, press <DEL>. The "tagged" files will be averaged with the basic curve.

Check start/stop frequencies.

The files you chose above are checked for start and stop frequencies against the basic file. If any of the files have start/stop frequencies different from those of the basic file, you are given an opportunity to abort or to continue.

The selected curves are summed and stored in memory.

Get a new job number.

Call it 02.

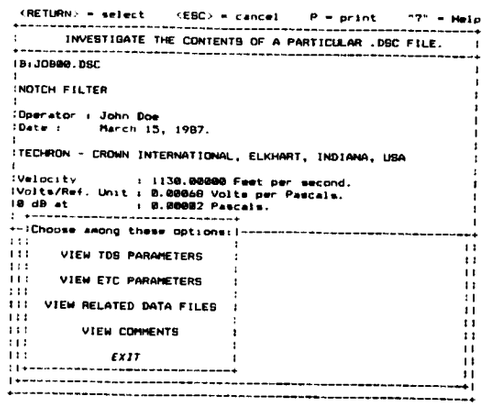
Create new .DSC file

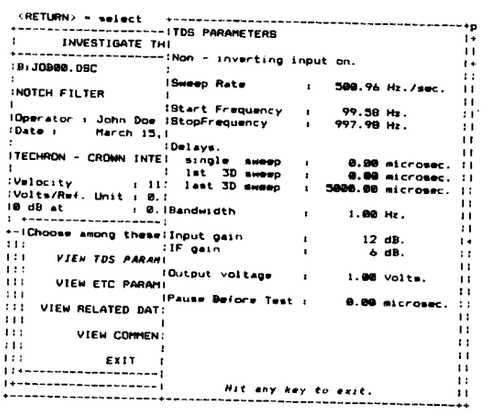
Filename:	JOB02.DSC
Measurement name:	Single-sweep mag. average based on JOB00-32.TDS
Parameters from:	JOB02.DSC

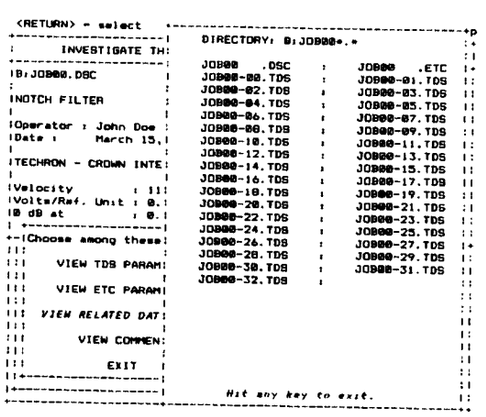
Create new TDS curve files.

The vector sum of all the curves you specified is divided by the total number of curves averaged. The new file created from this averaging is JOB02-32.TDS.

Return to TEF Post-processing menu.







3.4.10. Description File Query

This function allows you to access information from any .DSC file on the data disk.

Specify the .DSC file desired in the same manner data files were selected. That is, highlight the desired .DSC file and press <RETURN>. Pressing <ESC> at this point will return you to the TEF Post-processing menu.

After a .DSC file is selected, a window appears which

displays basic information about the corresponding measurement. Included in this information is the name of the measurement, the operator name, the date of the measurement, the measurement location, and various measurement unit specifications.

A second window appears displaying a set of .DSC query options. To select an option use the movement keys and press <RETURN>.

The options available are:

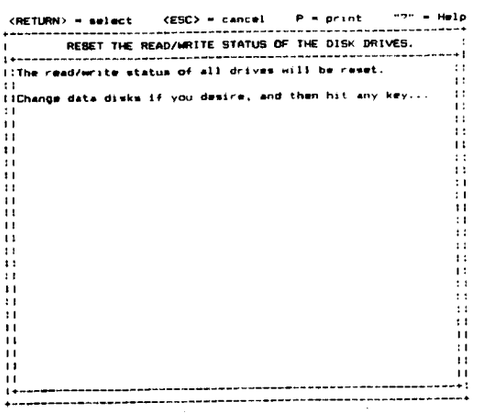
1) Display TDS parameters.
   Certain TDS parameters present in the .DSC file are displayed in a window, including start and stop frequencies, sweep rate, delay specifications and others. Strike any key to return to the options menu.

2) Display ETC parameters.
   This option displays parameters from the ETC side.

3) Display Related Files.
   This function displays which files related to the selected .DSC file are present on the data disk. If, for example, you chose the .DSC file JOB00.DSC, the filenames displayed are the same as would be displayed at the CP/M level if the command "DIR JOB00*.*" was entered. "JOB00.DSC" will be in this group, as might "JOB00-32.TDS," or "JOB00.ETC." In general, any filename which begins "JOB00" is displayed. These filenames are displayed in a window to the right of the screen. Strike any key to return to the options menu.

4) Display Comments.
   Display comments consist roughly of the first page of the entire screen. Strike any key to return to the options menu.

5) Exit.
   Exit is the default option displayed when the options menu first appears. To exit, press <RETURN>. As elsewhere in the TEF Post-processing system, you may also exit by striking <ESC> at any point in the options menu. However, unlike other functions, pressing exit will not return to the TEF Post-processing menu, but will leave you at the level where another .DSC file may be queried. If you wish to return to the TEF Post-processing menu, press <ESC> again.



3.4.11. Reset Disk Drives

This function allows you to change the data disk, even while conducting a measurement session. A message appears informing you that the disks are to be reset. You are requested to place the new disk in the data drive and then press any key. When this is done, a message appears that the drives are being reset and the program returns to the TEF Post-processing menu.

NOTE: No harm can occur from resetting the drives if the data disk is not changed. The drive containing TEF Post-processing should remain the same.

EXIT TO TEF.

Returns the user to the Main Menu in TEF.

SECTION 4: INSTALLING TEF Post-processing ON A NEW TEF DISK

4.1. Installing

TEF Post-processing is designed for execution within the standard TEF software. TEF Post-processing acts as an enhancement of the capabilities of the standard software rather than as an external program. TEF Post-processing comes already installed on the distribution disk. This section explains how to install TEF Post-processing on another TEF disk or on potential future releases of the TEF software.

TEF Post-processing consists of three disk files. They are:

- TEFPost.COM

This is the "main program" of TEF Post-processing.

- TEFPost.000

This file includes the individual functions which make up TEF Post-processing.

- TEFPost.MSG

This file contains the on-line function descriptions which can be viewed from the TEF Post-processing menu.

As indicated, TEFPost.COM is duplicated on the distribution disk under the name TDS2.COM.

To install TEF Post-processing on another TEF disk:

1) copy the above files to the new TEF disk.
   and
2) copy or rename TEFPost.COM to TDS2.COM on the new TEF disk.

Copying can be done with any good copy utility, such as PIP.

NOTE: TDS1.COM, ETC1.COM, ETC2.COM can all be used in place of TDS2.COM, however this changes the commands used to run TEF Post-processing. See "RUNNING TEF Post-processing" above.

4.2. Customer Support

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

- Try to duplicate the problem, keystroke by keystroke, to see exactly what was done.
- Have available the date and version number of software (displayed on the screen immediately after start-up) 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.

Contact customer support for Techron products at one of the following numbers:

(219) 294-8300	VOICE
(219) 294-8329	FAX
(810) 294-2160	TWX

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 on FAX or TWX.