

Errata

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HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

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8753B

Firmware Re

HP 8753B Network Analyzer

Firmware Revision Notice

For the HP 86388A Rev 3.0 Firmware Upgrade Kit



HEWLETT
PACKARD

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General Description

About This Firmware Change

Firmware revision 3.00 provides existing HP 8753B instruments with many feature enhancements present in the HP 8753C. This includes all feature improvements; however, it does not include color capability.

One of the more important aspects of this change is that earlier HP 8753Bs are able to share data with revision 3.00 HP 8753Bs, as well as HP 8753Cs. This includes compatibility of disk-stored instrument states and data arrays, as well as HP-IB compatibility.

Summary of Changes

Individual chapters cover specific changes in greater detail, but here is a summary of what changed:

- Data for all markers can be shown on the screen at once.
- A sequence can now pause and present a list of available sequences. The operator may select any sequence from the list and it will run.
- Measurement data arrays may be saved to disk in an ASCII format called CITIfile (Common Instrumentation Transfer and Interchange file). This format allows data arrays to be easily manipulated by computer-based software such as Hewlett-Packard's Microwave Design System, or by software written by the user.
- HP-IB data format "Form 5" has been added. Form 5 is identical to Form 2, but is in reverse-byte order. Form 5 provides data compatibility with Intel 8086, 8088, 80286, or 80386-based computers, such as all PC clones.
- Sweep time auto is now the default sweep time setting. The previous default setting was manual sweep time, set to 100 ms.
- Chop is now the default mode when viewing two channels at once. Alternate mode was the previous default.

New Features

Multiple Marker Data Readouts

Previously, the HP 8753B could only show stimulus and response data for one marker at a time. Now the data for all markers can be displayed simultaneously. Turning **DISP MKRS ON off** on activates multiple marker readouts. Note that marker statistics and marker bandwidth features deactivate DISP MKRS. This is because these features must share the same area on the screen. The HP-IB command DISMON activates multiple marker data readouts, DISMOFF turns them off.

The **DISP MKRS ON off** softkey appears in the Marker Mode Menu, shown in Figure 2-1

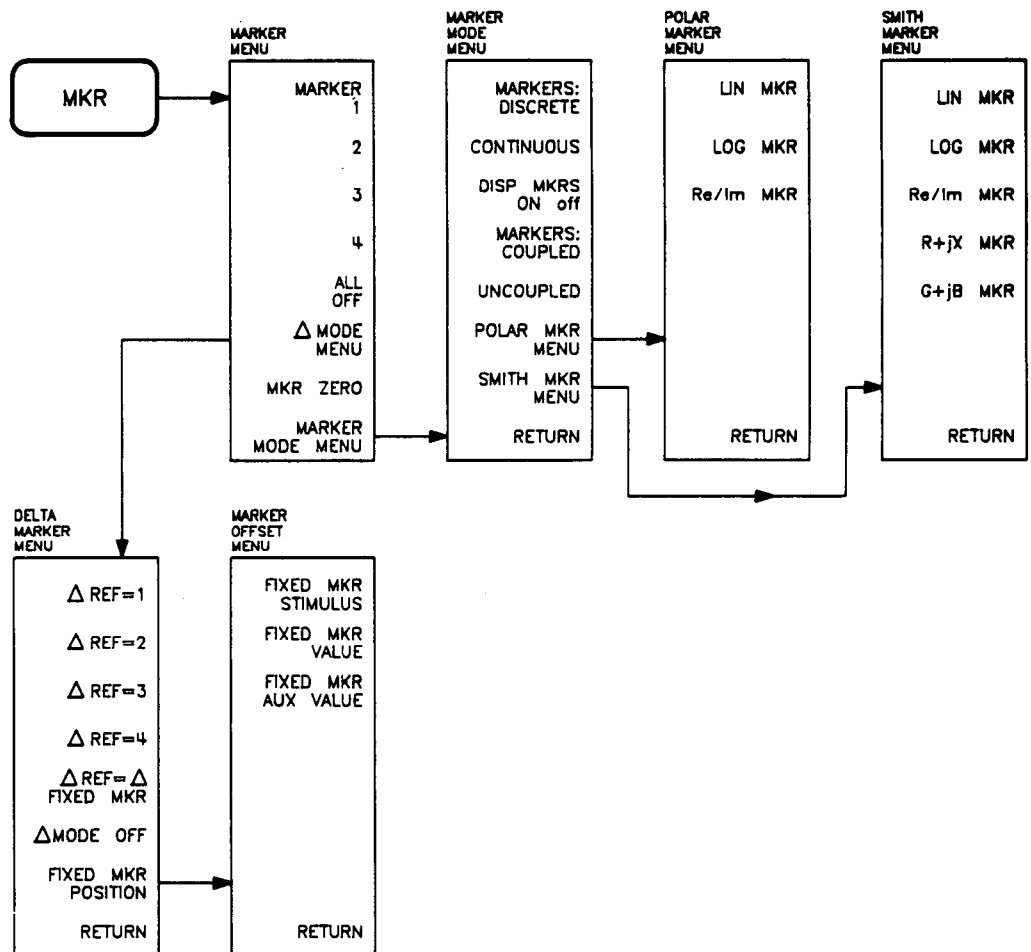


Figure 2-1. Menus Accessed from the **(MKR)** Key

Insertion Loss at Marker 1

In the previous instrument version, the bandwidth search feature displayed the center point, bandwidth, and Q (quality factor). The new version shows all these values plus insertion loss. The value shown is the insertion loss at marker 1. The HP-IB command OUTPMWIL sends these four values to a computer controller.

A New Sequencing Feature

PAUSE TO SELECT (PTOS) has been added to the "Existing-Sequence Selection Menu". This command only functions when placed inside a sequence.

When a running sequence encounters the **PAUSE TO SELECT** command, the following occurs:

- The current sequence is terminated.
- The instrument displays the Existing-Sequence Selection Menu, and allows the user to run any available sequence.

Because **PAUSE TO SELECT** terminates the sequence in which it resides, it should always be the last command. Commands entered after a **PAUSE TO SELECT** will never be performed.

The HP-IB equivalent command is PTOS. Figure 2-2 shows the menu location of the **PAUSE TO SELECT** softkey.

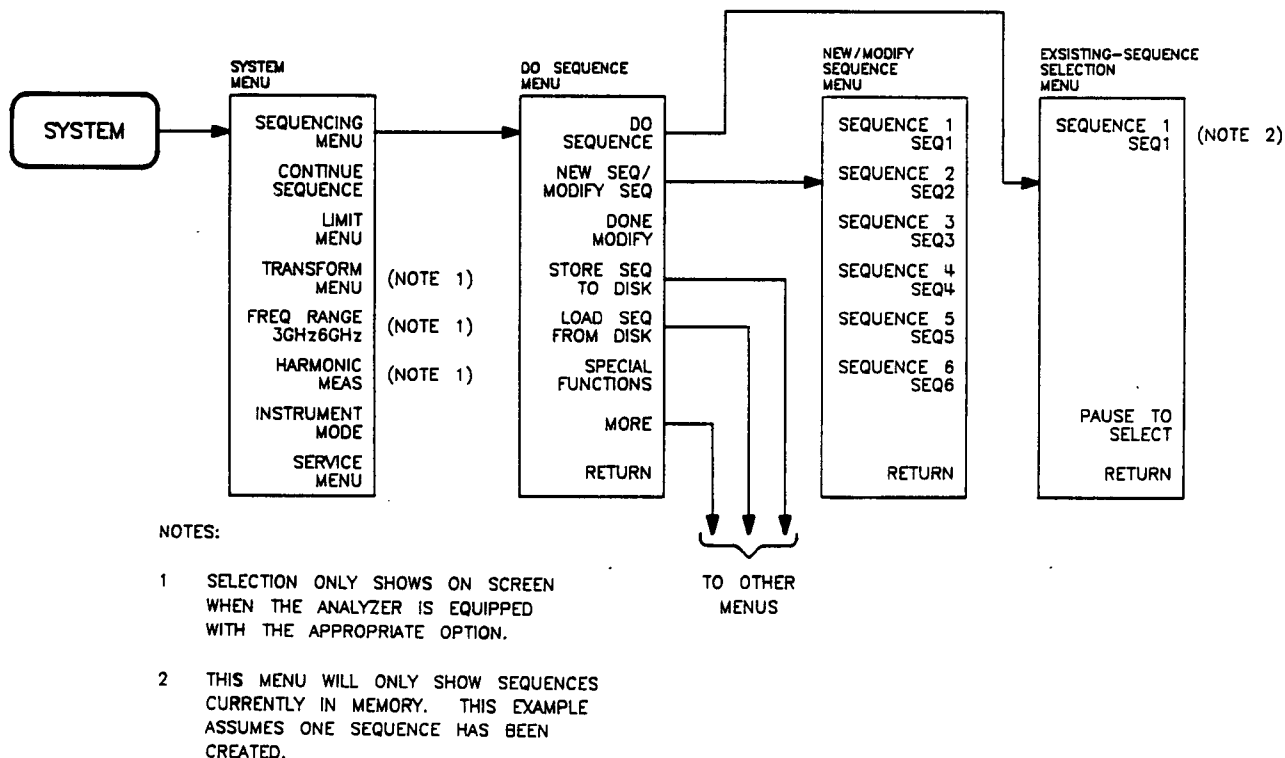


Figure 2-2. Basic Sequencing Menus

Example of Use

Several types of devices are tested on a single instrument, and much of the initial instrument setup is the same. In this example, several sequences have been created. The first sequence sets up all common measurement parameters, and the rest of the sequences test specific types of devices.

For Example:

SEQUENCE 1 SETUP - Performs initial (common) measurement setup.

SEQUENCE 2 FILTER - Measures a filter.

SEQUENCE 3 SAW - Measures a SAW device.

SEQUENCE 4 ATTEN - Measures an attenuator.

When creating the first sequence, perform the initial measurement setup commands and press **SYSTEM SEQUENCING MENU**
DO SEQUENCE PAUSE TO SELECT DONE MODIFY.

When the operator runs the **SETUP** sequence, the common measurement commands are performed and then displays the Existing-Sequence Selection Menu.

Pressing the softkey next to **SEQUENCE 2 FILTER** runs that particular sequence. You do not have to choose one of the displayed sequences: any other instrument keys or softkeys can be pressed instead.

ASCII Data File Format (CITIfile)

All HP 8753Bs allow you to save the instrument state, measurement data arrays, and user-created graphics to disk. Previously, all information was saved in binary format. Binary is a very compact way of storing data, and is recommended when archiving large amounts of production test data. But binary format is very difficult to manipulate or modify.

Now data can be stored in ASCII format. ASCII data, when viewed on a computer, appears in easy-to-read alpha-numeric format. This makes ASCII format very useful when you want to use the data with your own BASIC programs. The ASCII data files follow the CITIfile protocol. CITIfile is a standard file format which is used by the Hewlett-Packard Microwave Design System (MDS). (The ASCII files created by this instrument can be used directly by MDS.)

Each "CITIfile" begins with an informative *package title*. The title includes the model number of the instrument and the type of measurement made. This title is followed by the actual data. An appendix at the end of this document provides more details on CITIfile.

With CITIfile ASCII format activated, selected data arrays, calibration data, and trace memory data are stored to disk in ASCII format. In addition, sweep type and number of points are shown in the CITIfile. The instrument state (the learn string) is still stored in binary format for later use by the instrument.

Using CITIfile ASCII Format

The instrument default setting is binary format. ASCII format must be explicitly turned on. The **ASCII** softkey is located in the Disk Menu, shown in Figure 2-3. To activate the ASCII format, press **SAVE** **STORE TO DISK** **DEFINE STORE MORE ASCII**. The HP-IB equivalent of this command is SAVUASCI.

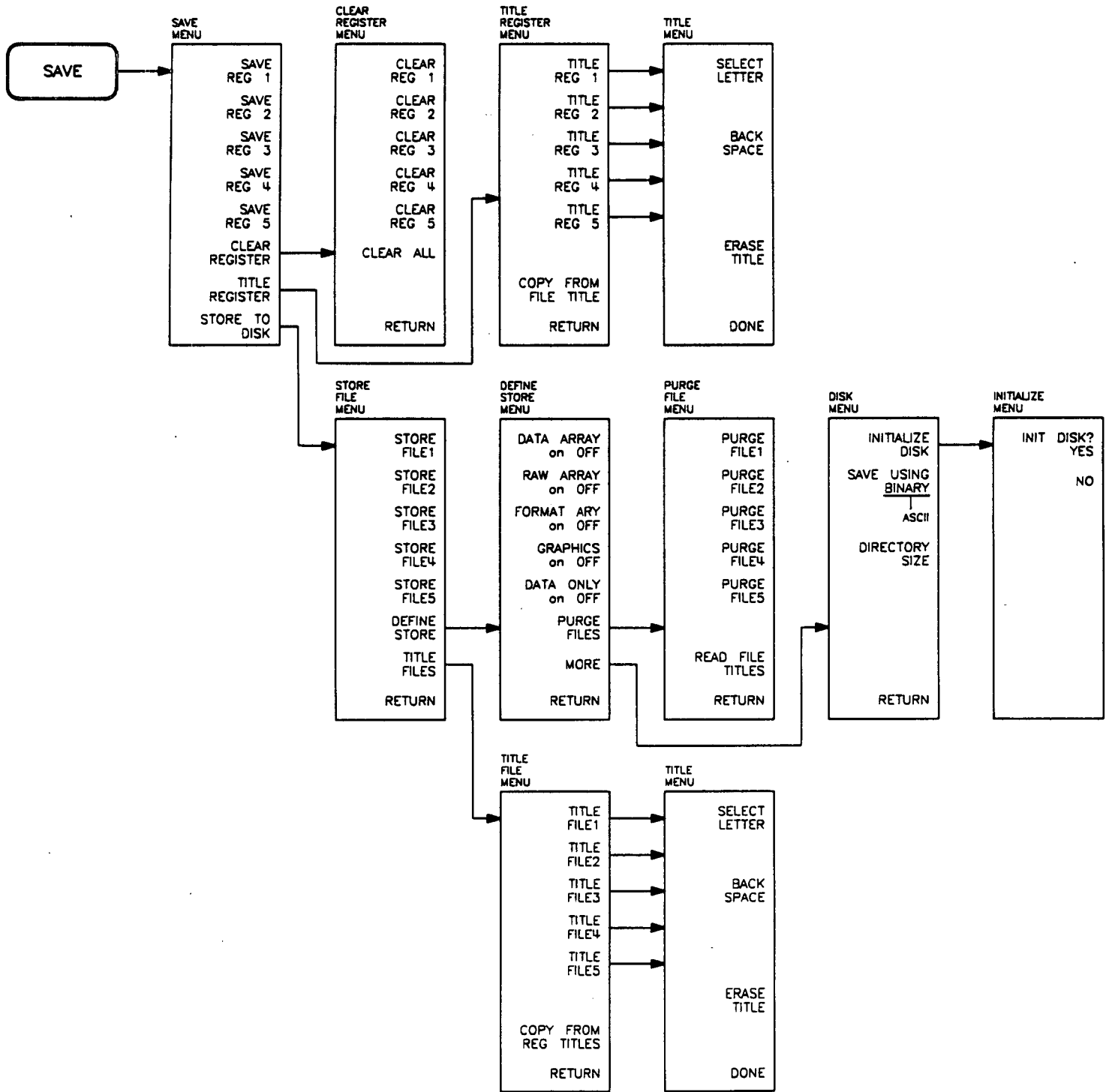


Figure 2-3. Menus Accessed by the **SAVE** key

Form 5 HP-IB Data Output Format

Form 5 is an HP-IB data format. The FORM X (HP-IB) command tells the analyzer what data format to use when outputting or receiving data arrays (to or from a computer). It does not affect data saved to disk, and does not affect query commands. See the *HP-IB Introductory Programming Guide* for more information.

Form 5 data is usable by any computer which uses the Intel 8086, 8088, 80286, or 80386 microprocessor. This includes all PC DOS-compatible computers. Form 5 is a binary floating-point single precision (32 bit) IEEE format.

Form 5 is similar to Form 2, but has reversed data bytes. Form 2 is usable by any computer using the Motorola 68000 microprocessor.

New Default Settings

Automatic Sweep Time Mode

The HP 8753B has two sweep time modes, manual and automatic. These modes are described under "MENU Key" in chapter 3 of the "HP 8753B Operating and Programming Reference."

Automatic sweep time mode is now the default instrument setting. The previous default setting was manual sweep time, set to 100 ms. This change was made so the instrument can make the fastest measurements possible without user intervention.

Chop Mode

The default display mode for viewing two channels simultaneously is now chop mode. Previously, alternate sweep mode was the default mode. This change was made so the instrument can make the fastest measurements possible without user intervention. Chop mode is twice as fast as alternate mode.

Disk Data Compatibility

Three types of data can be saved to a disk:

- The instrument state.
- Data arrays (binary or CITIfile).
- User graphics.

With regard to data storage, the HP 8753B revision 3.00 and the HP 8753C are identical, and can share all types of data. These two instruments are subsequently referred to as “new generation” instruments.

Instrument State Compatibility

An “instrument state” is a block of data containing:

- All front panel settings (the “learn string”).
- If calibration is on, the instrument state includes error-correction data.
- If trace memory or trace math functions are on, the instrument state includes trace memory data.

HP 8753B revision 2.01 can share all instrument state data with new generation instruments.

If you use an HP 8753B revision 2.01 instrument state file in a new generation instrument, the latter will automatically activate multiple marker readouts. If more than one marker is on, the new generation instrument will display the data for the additional markers and will not be identical to the revision 2.01 HP 8753B screen.

You can transfer the learn string between HP 8753B revision 2.01 and new generation instruments by diskette, but not by computer. So do not attempt to use the OUTPLEAS or INPLEAS (HP-IB) commands between different revision instruments.

Data Array Compatibility

Data arrays are optional when saving to disk. Data arrays can be taken from different stages of instrument data processing evolution. More about this is explained in “HP 8753B Data Processing” in the beginning of the “HP 8753B Operating and Programming Reference”. There are two formats available when saving the data array to disk, binary format and CITIfile ASCII format.

Revision 2.01 HP 8753Bs can only save data arrays to disk in binary format. New generation instruments can save data in either binary or ASCII format. Binary files can be shared between all versions of HP 8753B or 8753C. ASCII files, however, are incompatible with HP 8753B revision 2.01 instruments.

User Graphics Compatibility

User graphics are not compatible between HP 8753Bs and HP 8753Cs because of the differences between the monochrome and color displays. User graphics files will not cause any problems when transferring instrument state or data files, however.

Sequencing Compatibility

Sequences written in a revision 2.01 instrument are 100% compatible with revision 3.00 instruments.

In the reverse case, revision 2.01 instruments understand all 3.00 sequencing commands except PAUSE TO SELECT, DISP MKRS ON or OFF, and ASCII, which are ignored.

CITIfile ASCII File Format

Introduction

This is a short description of the Common Instrumentation Transfer and Interchange File (CITIfile) format used by Hewlett-Packard network analyzers. This format provides a common format for exchanging data between the analyzer, external computer controllers, and the HP Microwave Design System (MDS).

When to Use CITIfile

CITIfile is useful under the following circumstances:

- If you must transfer disk files for use with Hewlett-Packard's MDS system.
- If you use diskettes to transfer data array information to an external computer controller, and wish to manipulate this data.

Description

With CITIfile ASCII format activated, selected data arrays, calibration data, and trace memory data are stored to disk in ASCII format. In addition, sweep type and number of points are shown in the CITIfile. The instrument state (the learn string) is still stored in binary format for later use by the instrument.

CITIfile uses only standard ASCII text format files. ASCII provides a standardized, highly transportable type of file that may be created, examined, and edited using many applications, including HP BASIC. This makes it easy to pass information between hardware and software applications.

A CITIfile disk file is made up of one or more CITIfile packages. Each package begins with the CITIfile keyword, followed by individual lines made up of ASCII characters. Each line is terminated by carriage return/line feed.

Each file is terminated with a standard disk End-of-File (EOF).

CITIfile Package Structure

The typical CITIfile package structure is:

CITIfile title line	<i>Title</i>
Name	
Target device information	
Constant declaration	<i>Header</i>
Independent variable declaration	
Dependent variable declaration	
Independent variable list	
Dependent variable list, or lists	<i>Data List, or Lists</i>

As seen above, a package consists of a header and at least one list of data values. The header consists of the required CITIfile title line and optional information such as file name, instructions and data for the target application. The header also includes required declarations and data lists for the independent variable (usually frequency), and declarations for the dependent variables (the measured data). The remaining part of the file contains values for the dependent variable (the data value at each frequency point).

The following example shows a CITIfile disk file created by storing a data array (corrected data) to disk. To interpret the data, refer to the *HP-IB Quick Reference*. The CITIfile keywords are shown in bold type.

Example Data Array File

CITIfile A.01.00	<i>Package Title</i>
#NA VERSION HP8753B.03.00	
NAME DATA	
VAR FREQ MAG 201	
DATA S[1,1] RI	<i>Header</i>
SEG LIST BEGIN	<i>Independent Variable List</i>
SEG 100000000 1300000000 201	
BEGIN	
8.6303E-1,-8.98651E-1	<i>Dependent Variable Data List</i>
8.5849E-1,3.06091E-1	
-4.96887E-1,7.87323E-1	
.	
.	
-5.65338E-1,-7.05291E-1	
8.94287E-1,-4.255537E-1	
1.77551E-1,8.96606E-1	
END	

In this case the analyzer was operating in the linear sweep mode, from 1 to 1.3 GHz, using 201 data points. The actual data file would contain 201 entries, one for each data point.

Example Program to Read and Print CITIfile

The following is a simple BASIC program to read the contents of a CITIfile generated by the analyzer.

```
10 ALLOCATE Filename$[30], Current_line$[256], Response$[30]
20 PRINTER IS 1
30 LINPUT "Name of File to Read?",Filename$
40 ASSIGN @Diskfile to Filename$
50 ON END @Diskfile GOTO End_of_file
60 PRINT "*** DISK FILE NAME:'"&Filename$&"'***"
70 REPEAT
80 ENTER @Diskfile;Current_line$
90 PRINT Current_line$
100 UNTIL 0=1
110 End_of_file:
120 PRINT "*** END OF FILE ***"
130 END
```

Where to Find More CITIfile Information

For more information concerning CITIfile, contact: Hewlett-Packard Network Measurements Division, 1400 Fountaingrove Parkway, Santa Rosa, CA 95403. Attention Marketing Dept.