Introduction

This guide provides a quick reference for experienced spectrum analyzer users. Chapter 1 summarizes the front-panel features, how to make a basic measurement, and how to perform the self-calibration routines. Chapter 2 contains brief descriptions of the analyzer functions. Chapter 3 contains the remote programming codes. Appendices A, B, C, and D contain helpful charts and tables.

For additional instrument information, consult the HP 8590B/8592B Spectrum Analyzer Installation, Verification, and Operation Manual or the HP 8590 Series Spectrum Analyzer Programming Manual.

Guide Terms and Conventions

The six keys along the right side of the display are called softkeys. Their labels are displayed on the screen. The softkeys appear in shaded boxes in this guide, for example, REF LEVEL. Pressing the labeled keys on the front panel changes the softkey labels or initiates functions. The front-panel keys appear in unshaded boxes, for example, [FREQUENCY].

Caution

The input of the analyzer can be damaged easily. When using a line impedance stabilization network (LISN) device with the analyzer, disconnect the analyzer from the LISN device before changing the switch position on, or voltage to, the LISN device.

Contents

1. Getting Acquainted with the Analyzer
   Front-Panel Features ........................................ 1-1
   Screen Annotation ........................................... 1-4
   Making a Basic Measurement ................................ 1-6
   Performing Self-Calibration Routines ....................... 1-11
   Warm-Up Time ............................................... 1-11
   Self-Calibration Routine Problems ......................... 1-12
   Performing the Tracking Generator Self-Calibration Routine
     (Option 010 or 011 only) ................................ 1-12

2. Analyzer Functions

3. HP 8590B/8592B Programming Commands
   Introduction .................................................. 3-1
   How to Use This Chapter .................................... 3-1
   Notation Conventions ....................................... 3-2
   Syntax Conventions ......................................... 3-2
   Functional Index ............................................ 3-5
   Programming Codes .......................................... 3-18
   Characters and Secondary Keywords (Reserved Words) Summary 3-52

A. Analyzer Error Messages

B. AM, FM, and Pulsed RF Reference Charts
   Amplitude Modulation ...................................... B-1
C. Programming Command to Key
D. Locating a Softkey

Index

HP 8596B/8592B Spectrum Analyzer Mode Menus

Figures

1. Front-Panel Overview ........................................... 1-2
2. Screen Annotation ............................................. 1-4
3. Center Frequency Set to 300 MHz on HP 8596B ......... 1-7
4. Center Frequency Set to 300 MHz on HP 8592B ......... 1-8
5. Frequency Span Reduced to 20 MHz ......................... 1-9
6. Setting the Amplitude ......................................... 1-10
7. Marker Reads Out Frequency and Amplitude .............. B-2
8. Percent Modulation ............................................ B-4
9. Bessel Null Graph ............................................... B-5
10. Loss in Sensitivity (Pulsed RF versus CW) ............. B-5
11. RES BW Setting for Pulsed RF Computed from t,B = 0.1 . B-6

Tables

1. Screen Annotation ............................................. 1-5
2. Screen Annotation for Trace, Trigger, and Sweep Modes 1-5
3. HP 8596B/8592B Programming Command to Key .......... C-1
4. HP 8596B/8592B Softkey Locations ......................... D-1
Getting Acquainted with the Analyzer

This chapter provides an introduction to the analyzer's front-panel features, and screen annotation, the procedure for making a basic measurement with the spectrum analyzer, and the self-calibration routines.

Front-Panel Features

The following section provides a brief description of front-panel features.

Refer to Figure 1-1.

1. **Active function block** is the space on the screen that indicates the active function. Most functions appearing in this block can be changed with the knob, step keys, or number/units keypad.

2. **Message block** is the space on the screen where MEAS UNCAL and the asterisk (*) appear. If one or more functions are manually set (uncoupled), and the amplitude or frequency becomes uncalibrated, MEAS UNCAL appears. (Use AUTO COUPE, AUTO ALL to recouple functions.) The asterisk indicates that a function is in progress.

3. **Softkey labels** are the annotation on the screen next to the unlabeled keys. Most of the labeled keys on the analyzer's front panel (also called front-panel keys) access menus of related softkeys.

4. **Softkeys** are the unlabeled keys next to the screen.

5. **FREQUENCY**, **SPAN**, and **AMPLITUDE** are the three large dark-gray keys that activate the primary analyzer functions and access menus of related functions.
6. **INSTRUMENT STATE** functions affect the state of the entire spectrum analyzer. Self-calibration routines and special function menus are accessed with these keys. The green **Preset** key resets the entire analyzer state and can be used as a "panic" button when you wish to return to a known state.

7. **Copy** key prints or plots screen data. (This requires Option 021 or 023.) Use **CONFIG**, **PLOT CONFIG** or **PRINT CONFIG**, and **COPY DEV PRINT PLOT** before using the **Copy** function.

8. **CONTROL** functions access menus that allow you to adjust the resolution bandwidth, adjust the sweep time, store and manipulate trace data, and control the instrument display.

9. **MARKER** functions control the markers, read out frequencies and amplitudes along the spectrum-analyzer trace, automatically locate the signals of highest amplitude, and keep a signal at the marker position in the center of the screen.

10. **DATA keys**, **STEP keys** and **knob** allow you to change the numeric value of an active function. **HOLD** deactivates an active function.

11. **INPUT 50Ω** is the signal input for the spectrum analyzer. (INPUT 75Ω is the signal input for an Option 001 analyzer.)

**Caution**  Excessive signal input will damage the analyzer input attenuator and the input mixer. The maximum power that the spectrum analyzer can tolerate appears on the front panel.

12. **PROBE PWR** provides the power for an active probe and other accessories.

13. **CAL OUT** provides a calibration signal of 300 MHz at −20 dBm (20 dBmV for Option 001 or 011).

14. **INTENSITY** changes the brightness of the screen display.

15. **100 MHz COMB OUT** supplies a 100 MHz signal with harmonics up to 22 GHz for use as a reference signal (for the HP 8592B only).

16. **Memory card reader** reads from or writes to a memory card. (Option 010 only.)

17. **RF OUT 50Ω** supplies 100 kHz to 1.8 GHz at the output for the built-in tracking generator (available with Option 010 for the HP 8590B only). (RF OUT 75Ω is the tracking generator output for Option 011.)

18. **LINE** turns the instrument on or off and performs an instrument check.
Screen Annotation

Figure 1-1 shows annotation as it appears on the screen of the analyzer. Table 1-1 lists the features of the front panel numerically and refers to the features in Figure 1-2.

10-02-74 \text{ MAT.} 20 \text{ 1969 EXTERNAL KEYS.} \text{ INPUT} \text{ (25 \text{ kHz})} \text{ (500 \text{ MHz})} \text{ (500 \text{ mw})} \text{ (25 \text{ kHz})}

Center Freq: 350 \text{ kHz}

Figure 1-2. Screen Annotation

In Figure 1-2, index number 21 refers to the trigger and sweep modes of the analyzer. The first letter ("T") indicates the analyzer is in a free-run trigger mode. The second letter ("S") indicates the analyzer is in single sweep mode.

Index number 22 refers to the trace modes of the analyzer. The first letter ("W") indicates the analyzer is in clear-write mode. The second letter is "A", representing trace A. The next two letters ("SB") indicate the store-blank mode ("S") for trace B ("B"). The trace mode annotation for trace C is displayed under the trace mode annotation of trace A. In Figure 1-2, the trace C trace mode is "SC", indicating trace C ("C") is in the store-blank mode ("SB").

Table 1-2 shows the different screen annotation codes for trace, trigger, and sweep modes.

<table>
<thead>
<tr>
<th>Index</th>
<th>Feature</th>
<th>Index</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>detector mode</td>
<td>14</td>
<td>frequency offset</td>
</tr>
<tr>
<td>2</td>
<td>reference level</td>
<td>15</td>
<td>video bandwidth</td>
</tr>
<tr>
<td>3</td>
<td>time/date display</td>
<td>16</td>
<td>resolution bandwidth</td>
</tr>
<tr>
<td>4</td>
<td>screen title</td>
<td>17</td>
<td>center frequency or start frequency</td>
</tr>
<tr>
<td>5</td>
<td>RF attenuation</td>
<td>18</td>
<td>threshold</td>
</tr>
<tr>
<td>6</td>
<td>preamplifier gain</td>
<td>19</td>
<td>correction factors on</td>
</tr>
<tr>
<td>7</td>
<td>external keyboard entry</td>
<td>20</td>
<td>amplitude correction factors on</td>
</tr>
<tr>
<td>8</td>
<td>marker/signal track readout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>measurement-unbiased function-in-progress messages</td>
<td>21</td>
<td>trigger</td>
</tr>
<tr>
<td>10</td>
<td>service request</td>
<td>22</td>
<td>trace mode</td>
</tr>
<tr>
<td>11</td>
<td>remote operation</td>
<td>23</td>
<td>video average</td>
</tr>
<tr>
<td>12</td>
<td>frequency span or stop frequency</td>
<td>24</td>
<td>display line</td>
</tr>
<tr>
<td>13</td>
<td>sweep time</td>
<td>25</td>
<td>amplitude offset</td>
</tr>
<tr>
<td>14</td>
<td>frequency offset</td>
<td>26</td>
<td>amplitude scale</td>
</tr>
<tr>
<td>15</td>
<td>video bandwidth</td>
<td>27</td>
<td>active function block</td>
</tr>
<tr>
<td>16</td>
<td>resolution bandwidth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>center frequency or start frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>threshold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>correction factors on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>amplitude correction factors on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>trigger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>trace mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>video average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>display line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>amplitude offset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>amplitude scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>active function block</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1-2. Screen Annotation for Trace, Trigger, and Sweep Modes

<table>
<thead>
<tr>
<th>Trace Mode</th>
<th>Trigger Mode</th>
<th>Sweep Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>free run</td>
<td>C = continuous</td>
</tr>
<tr>
<td>M</td>
<td>maximum hold</td>
<td>S = single sweep</td>
</tr>
<tr>
<td>V</td>
<td>view</td>
<td>E = external</td>
</tr>
<tr>
<td>S</td>
<td>store-blank</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>minimum hold</td>
<td></td>
</tr>
</tbody>
</table>
Making a Basic Measurement

Basic measurements simply involve tuning the instrument to place a signal on the screen, then measuring the frequency and amplitude of the signal.

Caution

Do not exceed the maximum input power. For the HP 8590B, the maximum input power is +30 dBm (1 watt) continuous, 25 V dc with ≥10 dB attenuation. For the HP 8592B, the maximum input power is +30 dBm (1 watt) continuous, 0 V dc. Use input attenuation of ≥10 dB in bands 1 through 4.

Let's begin using the spectrum analyzer by measuring an input signal. Since the 300 MHz calibration signal (CAL OUT) is readily available, we will use it as our input signal.

First, turn the instrument on (if it is already on, press the green PRESET key).

Connect the CAL OUT to the analyzer INPUT 50Ω connector on the front panel using an appropriate BNC cable with a BNC-to-Type-N adapter.

Option 001 only: Use a 75Ω cable to connect CAL OUT to the INPUT 75Ω connector.

Option 026 only: Connect the SMA (m) to SMA (m) cable to the analyzer input with APC-3.5 mm connector. Connect the cable to CAL OUT with the BNC-to-SMA adapter.

Then follow these steps:

1. Set the center frequency.
   
   Press [FREQUENCY]. CENTER appears on the left side of the screen, indicating that the center frequency function is active. The CENTER FREQ softkey label appears in inverse video to indicate that center frequency is the active function. The space on the screen where CENTER 900 MHz appears for the HP 8590B (or CENTER 1.23 GHz appears if you have an HP 8592B) is called the active function block. Functions appearing in this block are active: their values can be changed with the knob, step keys, or number/units keypad. Set the center frequency to 300 MHz with the DATA keys by pressing 300 [MHz]. The knob and step keys can also be used to set the center frequency.

Figure 1-3. Center Frequency Set to 300 MHz on HP 8590B

Figure 1-4. Center Frequency Set to 300 MHz on HP 8592B

1-6 Getting Acquainted with the Analyzer
2. Set the span.

Press [SPAN]. SPAN is now displayed in the active function block, and the SPAN softkey label appears in inverse video to indicate it is the active function. Reduce the span to 20 MHz by pressing the down key, (F3), or 20 MHz.

![Figure 1-6. Frequency Span Reduced to 20 MHz](image)

3. Set the amplitude.

When the peak of a signal does not appear on the screen, it may be necessary to adjust the amplitude level on the screen. Press [AMPLITUDE]. The message REF LEVEL, 0 dBm appears in the active function block, and the REF LVL softkey label appears in inverse video to indicate it is the active function. The reference level is the top gridline line on the display and is set to 0.0 dBm. Changing the value of the reference level changes the amplitude level of the top gridline line.

4. Activate the marker.

You can place a diamond-shaped marker on the signal peak to find the signal's frequency and amplitude.

To activate a marker, press [MARK] (located in the MARKER section of the front panel). The MARKER NORMAL softkey label appears in inverse video to show it is the active function. Turn the knob to place the marker at the signal peak.

You can also use [PEAK SEARCH], which automatically places a marker at the highest point on the trace.
Readouts of marker amplitude and frequency appear in the active function block and in the upper-right corner of the display. Look at the marker readout to determine the amplitude of the signal.

![Diagram of marker readout and settings](image)

**Figure 1-7. Marker Reads Out Frequency and Amplitude**

Many measurements require only these four steps. To return the instrument to its initial power-on state, press [RESET].

---

**Performing Self-Calibration Routines**

The self-calibration routines add offsets, called correction factors, to internal circuitry. The addition of the correction factors is required to meet frequency and amplitude specifications.

**Warm-Up Time**

To meet spectrum analyzer specifications, allow 2 hours at a constant temperature within the operating temperature range and a 30 minute warm-up before attempting to make any calibrated measurements. Be sure to calibrate the analyzer only after the analyzer is stable.

The spectrum analyzer frequency and amplitude self-calibration routines are accessed by [CAL FREQ & AMPTD] in the [CAL] menu.

To self-calibrate the instrument, connect CAL OUT to the INPUT 50Ω connector, using an appropriate cable. *Option 001 only.* Use a 75Ω cable to connect CAL OUT to the INPUT 75Ω connector.

Press the following analyzer keys: [CAL], [CAL FREQ & AMPTD]. The frequency and amplitude self-calibration routines take approximately 9 minutes to finish, at which time the correction factors will be stored in working RAM. To store this data in the area of analyzer memory that is saved when the analyzer is turned off, press [CAL STORE].

The frequency and amplitude self-calibration functions can be done separately by using [CAL FREQ] or [CAL AMPTD] instead of [CAL FREQ & AMPTD].

**Note**

- If [CAL FREQ] and [CAL AMPTD] self-calibration routines are used, the [CAL FREQ] routine should always be performed before the [CAL AMPTD] routine.

  Interrupting the [CAL AMPTD], [CAL FREQ], or [CAL FREQ & AMPTD] self-calibration routines may result in corrupt data stored in RAM. (If this occurs, rerun the [CAL FREQ & AMPTD] routine.)

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1-10 Getting Acquainted with the Analyzer
When the correction factors are added to internal circuitry, CORR (corrected) appears on the left side of the screen.

Self-Calibration Routine Problems
If the correction data has been corrupted or is obviously inaccurate, use CAL VERIFY to retrieve the correction data that has previously been saved. If the retrieved correction data is corrupt, the following procedure can be used to set the correction data back to predetermined values:


2. Perform the CAL FREQ and CAL AMPTD routines, or the CAL FREQ & AMP TD routine. Be sure CAL OUT is connected to the analyzer input.

Note
Using DEFAULT CAL DATA may cause the self-calibration routine to fail (the frequency span error may interfere with the analyzer routine that locates the 300 MHz calibration signal). If this occurs, press [FREQUENCY] -37 Hz before performing the CAL FREQ routine, or the CAL FREQ & AMP TD routine.

If the self-calibration routines cannot be performed, see Chapter 8 in the HP 8590B/8592B Spectrum Analyzer Installation, Verification, and Operation Manual.

Performing the Tracking Generator Self-Calibration Routine (Option 010 or 011 only)
To meet the tracking generator specifications, allow the analyzer to warm up for 30 minutes after being turned on before attempting to make any calibrated measurements. Be sure to calibrate the analyzer and the tracking generator only after the analyzer has met operating temperature conditions.

Note
Since the CAL TRK GEN routine uses the absolute amplitude level of the analyzer, the analyzer amplitude should be calibrated prior to using CAL TRK GEN.
Analyzer Functions

This section lists the HP 8590B and HP 8592B functions in alphabetical order. Next to each key is a brief description of its operation. For more detailed descriptions, refer to Chapter 7 in the HP 8590B/8592B Spectrum Analyzer Installation, Verification, and Operation Manual. All softkeys are shown in the menu diagram inside the rear cover of this guide. The functions accessed by SERVICE DIAG and SERVICE CAL are not included in this listing.

1. AM determines the percentage of amplitude modulation. The function finds the amplitude difference between the two highest peaks on the screen and computes the percent modulation for the calculated dB difference. (See Figure B-1 for the AM percentage chart.)

2-2.9 Hz BAND 0 locks onto harmonic band 0. Harmonic band 0 is unpreselected and restricts the frequency range from 0 Hz to 2.9 GHz. (HP 8592B only.)

2.75-6.4 BAND 1 locks onto harmonic band 1. Harmonic band 1 is preselected and restricts the frequency range from 2.75 GHz to 6.4 GHz. (HP 8592B only.)

2. 4 dB POINTS finds the bandwidth of the signal at the 3 dB power level.

3rd 0 dB MEAS finds the third order product and measures the frequency and amplitude differences relative to the fundamental signal.

5. 6-12.8 BAND 2 locks onto harmonic band 2. Harmonic band 2 is preselected and restricts the frequency range from 6.0 GHz to 12.8 GHz. (HP 8592B only.)

6. 8 dB POINTS finds the bandwidth of the signal at the 6 dB power level.
2.1
2 kHz resolution bandwidth at the 500 Hz power level for EMI measurements.

19-4-19 BAND 3 locks onto harmonic band 3. Harmonic band 3 is preselected and restricts the frequency range from 12.4 GHz to 19.4 GHz. (HP 8590B only.)

19-4-22 BAND 4 locks onto harmonic band 4. Harmonic band 4 is preselected and restricts the frequency range from 19.1 GHz to 22.0 GHz. (HP 8590B only.)

604 PWR BU computes the power of all signal responses and returns the bandwidth under which 90% of total power is found.

520 kHz BAND 2 selects the 520 kHz resolution bandwidth at the 6 dB power level for EMI measurements.

A <-> B exchanges the contents of the trace A register with the trace B register and puts traces A and B in view mode.

A -> B ON-OFF subtracts trace B from trace A and places the result in trace A.

ABCDEF accesses the softkey menu for selecting screen title or prefix characters A through F.

ABORT exits the correct to comb routine. (HP 8592B only.)

A -> C moves trace A into trace C.

ALG MTR INT XTAL activates internal (INT) leveling or external (XTAL or MTR) leveling. (Option 010 or 011 only.)

ALL SELS -> CARD saves all the programs in analyzer memory on a memory card using the specified prefix. (Option 003 only.)

AMPLITUDE accesses the amplitude menu and makes the reference level the active function.

AMPLITUDE CCR FACT saves or recalls amplitude correction factors from analyzer memory or the memory card. The memory card reader is available with Option 003.
**BLANK B** stops taking amplitude data for trace B and makes trace B invisible.

**BLANK C** stops taking amplitude data for trace C and makes trace C invisible.

**BLANK CARD** removes all the files from the memory card. (Option 003 only.)

**END LOCK ON/OFF** locks the analyzer on a selected frequency band (local oscillator harmonic number). (HP 8592B only.)

**CAL** accesses the bandwidth control menu and activates the resolution bandwidth function.

**CAL** activates the self-calibration menu.

**Note** Ensure that CAL OUT is connected to the analyzer input before performing CAL FREQ, CAL AMPTD, or CAL FREQ & AMPTD.

**CAL AMPTD** initiates an amplitude self-calibration routine.

**CAL FETCH** retrieves stored correction factors.

**CAL FREQ** initiates a frequency self-calibration routine.

**CAL FREQ & AMPTD** performs both the frequency and amplitude self-calibration routines.

**CAL STORE** allows you to save correction factors in the area of analyzer memory that is accessed when the analyzer is powered up. Correction factors are only stored in the “working” area of memory (not the area of memory that is accessed at power-up) until **CAL STORE** is pressed. Use **CAL FETCH** to retrieve stored correction factors.

**Note** Connect the tracking generator output to the analyzer input before initiating **CAL TRK GEN**.

**CAL TRK GEN** performs absolute amplitude, vernier, and tracking peak self-calibration routines. (Option 010 or 011 only.)

**CAL YTF** generates the best slope and offset adjustment for the YIG-tuned preselector filter for each harmonic band. (HP 8592B only.)

**Note** Connect the COMB OUT to the analyzer input before running **CAL YTF**.

**CARD-CONFSCRIPT** accesses the softkey menu that catalogs, formats, or erases a memory card. (Option 003 only.)

**CARD-SP-DRP** allows you to retrieve a previously saved program from the memory card. (Option 003 only.)

**CARD-SP-STAT** allows you to retrieve a previously saved state from the memory card. (Option 003 only.)

**CARD-SP-TRACE** allows you to retrieve a previously saved trace, limit-line table(s), or amplitude correction factors from the memory card. (Option 003 only.)

**CATALOG-ALC** catalogs all programs and variables loaded into analyzer memory if internal memory is selected. **CATALOG-ALL** catalogs all the programs, traces, states, limit-line files, and amplitude correction factor files saved on the memory card if the memory card is selected. The memory card reader is available with Option 003.

**CATALOG-AM-P-CR** catalogs the amplitude correction factor files on the memory card. (Option 003 only.)

**CATALOG-CARD** accesses the softkey menu for the memory card catalog options. (Option 003 only.)

**CATALOG-DLP** catalogs all of the DLPs (downloadable programs) in analyzer memory or memory card. The memory card reader is available with Option 003.
CATALOG INTENS accesses a menu with the cataloging functions for analyzer memory.

CATALOG LIMIT LINE catalogs the limit line files on the memory card.

CATALOG PREFIX catalogs all of the saved data with the specified prefix.

CATALOG REGISTER displays the status of state and trace registers in analyzer memory.

CATALOG STATES catalogs all of the saved states from the memory card.

CATALOG TRACES catalogs all of the saved traces from the memory card.

CATALOG VARIABLES catalogs all of the variables in analyzer memory.

CENTER FREQ activates the center frequency function to allow the selection of frequency at the center of the screen.

CF STEP AUTO MAX activates the step size for the center frequency function.

CHARGE PREFIX accesses the softkeys to change the prefix for storage and retrieval of states, traces, or programs on the memory card or the variables and programs stored in the analyzer memory. The memory card reader is available with Option 003.

CHARGE TITLE accesses the softkeys that change the screen title.

CLEAR clears the current prefix or screen title.

CLEAR OFFSET clears the frequency offset used during the correct to comb routine. (HP 8592B only.)

CLEAR WRITE A erases any data previously stored in trace A and continuously displays any signals detected during sweeps of the frequency range of the analyzer.

CLEAR WRITE B erases any data previously stored in trace B and continuously displays any signals detected during sweeps of the frequency range of the analyzer.

CLEAR WRITE C erases any data previously stored in trace C and continuously displays any signals detected during sweeps of the frequency range of the analyzer.

CTRL A 0 - 1 sets the auxiliary interface control line A output high or low.

CTRL B 0 - 1 sets the auxiliary interface control line B output high or low.

CTRL C 0 - 1 sets the auxiliary interface control line C output high or low.

CTRL D 0 - 1 sets the auxiliary interface control line D output high or low.

COMB GEN ON OFF turns the comb generator on and off. (HP 8592B only.)

CONFIG accesses the softkey menus for configuring the printer and plotter, setting the time and date, and displaying the options that are installed. If in remote mode, CONFIG places the analyzer in local mode (see LOCAL).

CONF TEST performs a self-test by cycling through the analyzer's major functions.

CONTINUE continues the correct to comb routine. (HP 8592B only.)

COPY initiates a print or plot of the screen data to the graphics printer or plotter addressed with CONFIG and PLOT CONFIG (for a plot), or PRINT CONFIG (for a print). Use COPY DEV PRINT PLT to choose between a printer or a plotter output. (Option 021 or 023 only.)

COPY DEV PRINT PLT allows you to choose between copying to a printer or a plotter. (Option 021 or 023 only.)

CORRECT ON OFF controls the use of some correction factors.

CORRECT TO COMB increases frequency accuracy by using the frequency accuracy of the comb teeth and accesses the correct to comb menu. (HP 8592B only.)
**CRT-HORIZ POSITION** changes the horizontal position of the analyzer's display. (The position is saved in memory when **CAL STORE** is pressed.)

**CRT VERT POSITION** changes the vertical position of the analyzer's display. (The position is saved in memory when **CAL STORE** is pressed.)

**DATE/MOD/DMY** allows you to display the real-time clock's date in month day-year or day-month-year format.

**dBm** changes the amplitude units to dBm for the current amplitude scale.

**dBBV** changes the amplitude units to dBMV for the current amplitude scale.

**DEFAULT CAL DATA** allows you to use predetermined correction data. See “Self-Calibration Routine Problems” in Chapter 1 for more information.

**DEFAULT CONFIG** resets all user configuration settings to their default values.

**DELETE FILE** deletes the selected file from the memory card or analyzer memory. The memory card reader is available with Option 003.

**DELETE SEGMENT** deletes limit-line segment selected by **SELECT SEGMENT**.

**DELTA MEAS** finds and displays the frequency and amplitude differences between the two highest amplitude signals.

**DETECTOR SAMPLE** selects sample or positive peak detection.

**DISPLAY** accesses softkeys that activate the display line and threshold, allow title entry, and control the graticule and screen annotation.

**DISPLAY CTL I** displays the status of auxiliary interface control line I on the analyzer screen.

**DISPOSE USER MEM** purges all programs, states, and traces from the analyzer memory.

**DSP LINE ON OFF** activates an adjustable horizontal line that is used as a visual reference line.

**EDIT DONE** erases the limit-line table from the analyzer's screen and restores the menu accessed by **EDIT LIMIT**. Use **EDIT DONE** when all the limit-line values have been entered.

**EDIT LIMIT** allows you to edit the current limit-line table(s).

**EDIT LOWER** allows you to view or edit the lower limit-line table.

**EDIT MID/DEL** allows you to view or edit the upper and lower limit-line tables by entering a mid-amplitude value and an amplitude deviation.

**EDIT UP/LOW** allows you to view or edit the upper and lower limit-line table.

**EDIT UPPER** allows you to view or edit the upper limit-line table.

**EDIT UP/LWR** allows you to switch between upper and lower limit-line tables.

**EXIT CATALOG** returns the analyzer to the state it was in before the catalog operation.

**EXIT SHOW** blanks the screen annotation left by **SHOW OPTIONS**.

**EXTERNAL** activates the trigger condition that allows the next sweep to start when an external voltage (connected to the EXT TRIG INPUT on the rear panel) passes through approximately 1.5 V, becoming positive. The external trigger signal must be a 0 V to +5 V TTL signal.

**EXT PREAMP** adds a positive or negative preamplifier gain value, which is subtracted from the displayed signal.

**FFT MEAS** transforms zero span data into the frequency domain using a fast Fourier transform.

**FLAT** draws a zero-slope line between the coordinate point of the current segment and the coordinate point of the next segment, producing limit-line values equal in amplitude for all frequencies between the two points. If the amplitude values of the two segments differ, the limit-line "steps" to the value of the second segment.
FORMAT CARD formats a memory card in logical interchange format (LIF).
(Option 003 only.)

FREQ RUN activates the trigger condition that allows the next sweep to start
as soon as possible after the last sweep.

FREQ OFFSET adds an offset value to the frequency readout to account for
pre-analyzer frequency conversions. Offset entries are added to all frequency
readouts including marker, start frequency, and stop frequency.

FREQUENCY activates the center frequency or start frequency functions and
accesses the frequency softkey menu.

FULL SPAN changes the analyzer's frequency span to full span (if possible).
The HP 8592B harmonic band lock keeps the span within the current
harmonic band.

GLOBAL accesses the softkey menu for selecting screen title or prefix
characters G through L.

GRAY ON OFF turns the screen graticule on and off.

INPUT 2 50 75 sets the input impedance for power-to-voltage conversions.
The impedance selected is for computational purposes only, since the actual
impedance is set by internal hardware.

ISTRUE CRD allows you to catalog, save, or retrieve data or programs from
internal memory or memory card. The memory card reader is available with
Option 003.

ISTRUE -> STATE recalls the saved analyzer state from the selected state
register (valid state register numbers are 1 through 9). State register 9
contains a previous state, state register 0 contains the current state.

ISTRUE -> TRACE accesses the softkey menu for recalling a trace into trace
A, trace B, or trace C, recalling limit-line tables, or recalling amplitude
correction factors.

LIMIT LINES accesses the limit-line menus when accessed by \texttt{MEAS TSSER}.
When accessed by \texttt{SAVE} or \texttt{RECALL}, LIMIT LINES stores or recalls
the current limit-line tables in analyzer trace memory or on the memory card.
The memory card reader is available with Option 003.

LIMITS FIX REL selects fixed or relative type of limit lines.

LIMITS OR OFF turns the limit-line testing on or off.

LINE activates the trigger condition that allows the next sweep to start
when the line voltage passes through zero, becoming positive.

LOAD FILE loads the selected file from the memory card (memory card
reader is available with Option 003). When using \texttt{CATALOG REGISTER}, trace
or state register data can be loaded into analyzer memory.

(LOCAL) control of the front panel is obtained by pressing \texttt{CONFID} if the
analyzer has been placed in remote mode by a controller.

MARKER ADJUST allows the user to adjust the frequency of the
tracking generator oscillator manually using the step keys or knob. The
tracking adjustment is tuned to maximize the amplitude of the trace.
(Option 010 or 011 only.)

MARKER AMPID keeps the active marker at a desired amplitude on the screen
once the marker has been positioned. Once activated, the marker remains at
the same amplitude even as the signal frequency is changed. If no signal is
detected at that amplitude, the marker searches for the signal closest to the
amplitude value.

MARKER -> CF changes the analyzer settings so that the frequency at the
marker becomes the center frequency.

MARKER -> CF STEP assigns the value of the active marker to the
center-frequency step-size. If marker delta is active, the step size will be set
to the difference in frequencies of the markers.

MARKER DELTA activates a second marker at the position of the active
marker. The amplitude and frequency of the first marker are fixed, and the
second marker can be manipulated.

MARKER NORMAL activates a single marker at the center frequency on the
active trace.

MARKER -> REF LEVEL changes the analyzer settings so that the amplitude at
the active marker becomes the reference level.

\textbf{Analyzer Functions} 2-11
MARKERS OFF turns off all markers, including signal track. Marker annotation is removed.

MAX HOLD A updates each trace point of trace A with the maximum level detected at each point during successive sweeps.

MAX HOLD B updates each trace point of trace B with the maximum level detected at each point during successive sweeps.

MAX MAX LEVEL lets you change the maximum input mixer level in 10 dB steps.

MEAS USER accesses the softkey menus for special functions and the user menu.

MIN HOLD C updates each trace point of trace C with the minimum level detected at each point during successive sweeps.

MINIMUM MARKER moves the marker to the minimum value detected.

MINIRDS ON OFF reads out the average noise level in reference to a 1 Hz noise power bandwidth at the marker position.

MPause ON OFF stops the analyzer sweep at the marker position for 0.002 to 100 seconds.

NAG accesses the basic marker functions softkey menu and activates the marker.

MARKER accesses the softkey menus for the transfer of marker information directly into other functions.

MARKER SPAN sets the start and stop frequencies to the values of the delta markers. The start and stop frequencies will not be set if the delta marker is off.

MARKER accesses the softkey menu for selecting screen title or prefix characters M through R.

MOUSE accesses the spectrum analyzer mode and other modes of operation, and PRESET SPECTRUM.

NEW LIMIT clears the line-limit table.

NEXT PEAK places the marker on the next highest peak above the threshold.

NEXT PK LEFT moves the marker to the next peak to the left of the current marker above the threshold.

NEXT PK RIGHT moves the marker to the next peak to the right of the current marker above the threshold.

NORMALIZE ON OFF normalizes trace A with the contents of trace B.

NORMALIZE POSITION turns on the display line.

NO USER MENU is displayed if no user-defined keys have been defined for menu 1.

PAINT JET PRINTER allows you to select a color print (with an HP PaintJet printer) using COPY DEV PRINT PLOT. COPY. (Option 021 or 023 only.)

PEAK FICUSON sets the minimum amplitude variation of signals that the marker can identify as a peak.

PEAK MARKER accesses the (PEAK SEARCH) menu.

PEAK SEARCH places a marker on the highest amplitude of a trace, displays the marker's amplitude and frequency, and accesses the peak search softkey menu.

PK-PK MEAS finds and displays the frequency and amplitude differences between the highest and lowest signals.

PLOT CONFIG accesses the following softkey menu to address the plotter and select from plotter options. (Option 021 or 023 only.)

PLOTTER ADDRESS allows you to select the HP IB address of the plotter. (Option 021 or 023 only.)

PLT LOG allows you to select the location of a plotter output.

PLTS/PG 1 2 4 allows you to choose a full-page, half-page, or quarter-page plot. (Option 021 or 023 only.)
PRINT specifies a limit value for the coordinate point and out-of-range values for the rest of the segment.

PRESEL DEFAULT uses the correction factors from the CAL YTF self-calibration routine to provide a swept flatness response without preselector peaking. (HP 8592B only.)

Note Preselector peak operates in the preselected bands (bands 1 to 4) only.

PRESEL PEAK adjusts the preselector to maximize the amplitude at the position of the marker. (HP 8592B only.)

PRESET returns the analyzer to a known state, accesses the softkey menu of available analyzer modes, performs a processor test, but does not affect the correction factors. (PRESST clears both the input and output buffers, turns off amplitude correction factors and limit line testing.

PRESET SPECTRUM allows only the spectrum analyzer mode to be preset; it will not affect the other operating modes. It provides a convenient starting point for most measurements. PRESSET SPECTRUM performs a subset of the functions that PRESET performs. Refer to Chapter 7 of the HP 8590B/8592B Installation, Verification, and Operation Manual for a list of functions that PRESET SPECTRUM performs.

PRINT CONFIDO accesses the softkey menu to address the printer and select from a black and white print or a color print. (A color print requires an HP PaintJet printer.) (Option 021 or 023 only.)

PRINTER ADDRESS allows you to select the HP-IB address of the printer. (Option 021 only.)

PRINTER SETUP resets the printer, sets the lines per page to 60, and skips the page perforations. (Option 021 or 023 only.)

PRMT MNUS ON OFF allows the softkey labels to be printed when doing a print with the COPY key. (Option 021 or 023 only.)

PURGE LIMITS clears the limit-line table.

PVR SWP ON OFF activates (ON) or deactivates (OFF) the power-sweep function, where the output power of the tracking generator is swept over the power-sweep range chosen. (Option 010 or 011 only.)

RECALL accesses the softkey menus that recall data from the analyzer memory or memory card. The memory card reader is available with Option 003.

RECALL LIMIT allows you to recall a limit-line table(s) from the current mass storage device (analyzer memory or memory card). The memory card reader is available with Option 003.

REF LVL changes the value of the reference level.

REF LVL OFFSET adds an offset value to the displayed reference level.

RES BY AUTO MAX allows you to select the analyzer’s 3 dB power level IF bandwidth manually or automatically resoult it.

AP1 TITLE provides lowercase letters, numbers, Greek letters, and punctuation symbols for the screen title. When all characters have been entered, press hold to exit.

SAVE accesses the menu that stores data into the analyzer's memory or memory card. The memory card reader is available with Option 003.

SAVE LIMIT allows you to save the current limit-line table(s) into the current mass storage device (analyzer memory or memory card). The memory card reader is available with Option 003.

SAVE LOCK ON OFF protects the contents of the current state and trace registers from being overwritten. When SAVE LOCK ON OFF is ON, the softkey labels for STATE -> INTRNL and TRACE -> INTRNL change to REM LOCKED.

SCALE LOG LIN sets the vertical scale to log or linear and activates log scale per division.

SELECT AMPLITUDE allows you to enter the amplitude value for the displayed (upper or lower) limit-line segment.
SELECT CLT AMPL. allows you to enter the delta amplitude value. The mid-amplitude value and the delta amplitude value create upper and lower limit-line table entries.

SELECT FREQ. allows you to enter the frequency value for a limit-line segment.

SELECT LWR AMPL. allows you to enter the amplitude value for the lower limit-line segment.

SELECT MID AMPL. allows you to enter the mid-amplitude value. The mid-amplitude value and the delta amplitude value create upper and lower limit-line table entries.

SELECT SEGMENT allows you to create or edit a limit-line segment.

SELECT TYPE accesses the softkey menu for selecting the type of line—a flat line (FLAT), a sloped line (SLOPE), or a point (POINT).

SELECT UPR AMPL. allows you to enter the amplitude value for the upper limit-line segment.

SERVICES CAL accesses several service calibration functions (which are not listed in this guide). The service calibration functions are designed for service use only. Descriptions of the service functions are available in the service documentation. You can order the service documentation, HP 8590B Option 915 or HP 8592B Option 915, through your HP Sales and Service office.

SERVICE DIAG accesses several service diagnostic functions (which are not listed in this guide). The service diagnostic functions designed for service use only. Descriptions of the service diagnostic functions are available in the service documentation. You can order the service documentation, HP 8590B Option 915 or HP 8592B Option 915, through your HP Sales and Service office.

SET DATE sets the date of the analyzer's real-time clock.

SET TIME sets the time of the analyzer's real-time clock.

SINGLE SWP activates the single-sweep mode and sets up a sweep for the next trigger.

SHOW OPTIONS displays the installed options. Pressing SHOW OPTIONS changes the softkey label to EXIT SHOWN. Press EXIT SHOWN to clear the screen of the SHOW OPTIONS annotation.

SIGNAL TRACK moves the signal with an active marker to the center of the screen and fixes the signal peak there.

SLOPE draws a straight line between the coordinate point of the current segment and the coordinate point of the next segment, producing limit-line values for all frequencies between the two points.

SPAN activates the span function.

SPAN activates the span function and accesses the span softkey menu.

SPAN ZOOM activates the signal tracking function if there is an on-screen marker present. If a marker is not present, SPAN ZOOM places a marker on the highest signal peak and then activates signal tracking. Any subsequent changes to the span occur with the signal tracked to center screen.

SPECTRUM ANALYZER sets the analyzer to the spectrum analyzer operating mode and accesses a softkey function, PRESET SPECTRUM.

SRC PWR OFFSET sets the displayed power of the source (SRC), the tracking generator. (Option 010 or 011 only.)

SRC PWR ON OFF activates (ON) or deactivates (OFF) the output power of the source (SRC), the tracking generator. (Option 010 or 011 only.)

SRC PWR STEP SIZE sets the step size of the source-power level, source-power offset, and power-sweep range functions. (Option 010 or 011 only.)

START FREQUENCY sets the frequency at the left-hand side of the graticule.

STATE T1 CARD saves the analyzer state on the memory card using the specified prefix. (Option 003 only.)

STATE T1 TRBL saves the analyzer state in analyzer memory.

STOP FREQUENCY sets the frequency at the right-hand side of the graticule.

Analyzer Functions 2-16
ACQUIRE accesses the softkey menu for selecting screen title or prefix characters S through X.

Sweep accesses the sweep time menu and activates the sweep time function.

Sweep Control selects between continuous-sweep mode or single-sweep mode. Use (ACQUIRE) to trigger a sweep in single-sweep mode.

SR-3 selects stimulus-response (SR) or spectrum-analyzer (SA) auto-coupled sweep time. In stimulus-response mode, auto-coupled sweep times are usually much faster for swept-response measurements. (Option 010 or 011 only.)

Sweep Time Auto-Man allows you to change the sweep time manually or automatically recouple it.

Thresholds sets the lower boundary of the active trace. The threshold line “clips” signals that would otherwise appear below the line.

Sweep Data accesses the softkey menu that sets and displays the real-time clock.

Sweep Data Off allows you to turn the display of the real-time clock on or off.

Trace accesses the softkey menus that allow you to store and manipulate trace information.

Trace A allows you to recall previously saved trace data into trace A or save trace data from trace A.

Trace A B C allows you to select functions for trace A, trace B, or trace C.

Trace B allows you to recall previously saved trace data into trace B or save trace data from trace B.

Trace C allows you to recall previously saved trace data into trace C or save trace data from trace C.

Trace Card saves the analyzer trace, limit-line table(s), or amplitude correction factors on the memory card using the specified prefix. (Option 003 only.)

Trace LIMIT saves the analyzer trace, limit-line table(s), or amplitude correction factors in analyzer memory.

Trace Gen displays softkey menus for use with a built-in tracking generator. (Option 010 or 011 only.)

Tracking Data activates a routine which automatically adjusts the tracking adjustment to obtain the peak response of the tracking generator. (Option 010 or 011 only.)

Tape accesses the softkey menu for selection of the sweep mode and trigger mode.

User Menu accesses menu 1, which is available for user-defined functions.

VBR/REP Ratio allows the selection of the ratio between the video and resolution bandwidths.

Video Averaging initiates a digital averaging routine that averages displayed signals and noise. It does not affect the sweep time, bandwidth, or other analog characteristics of the analyzer.

Video B/W Auto-Man allows you to change the analyzer’s post-detection filter manually or automatically recouple it. Video B/W Auto-Man, auto-couples VBR/REP Ratio also.

Video activates the trigger condition that allows the next sweep to start if the detected RF envelope voltage rises to a level set by the display line.

View A holds the amplitude data in the trace A register so that the trace A register will not be updated as the analyzer sweeps. If trace A is deactivated with BLANK A, the stored data can be retrieved with VIEW A.

Clear Write A and MAX HOLD A overwrite the stored data.

View B is the same as VIEW A, except that trace B is used.

Clear Write B and MAX HOLD B overwrite the stored data.

View C is the same as VIEW A, except that trace C is used.

Clear Write C and MAX HOLD C overwrite the stored data.
VOLTS changes the amplitude units to volts for the current amplitude scale.

WATTS changes the amplitude units to watts for the current amplitude scale.

Y.Z., SRC, CLR, accesses the softkey menu for selecting the characters Y, Z, underscore ( _ ), #, space, or for clearing the current prefix or screen title.

ZERO SPAN sets the analyzer's frequency span to zero.

### HP 8590B/8592B Programming Commands

#### Introduction

The following pages are a compilation of all current programming commands for the HP 8590B and the HP 8592B spectrum analyzers. More information on each command can be found in the HP 8590 Series Spectrum Analyzer Programming Manual.

#### How to Use This Chapter

This chapter is intended for use by the experienced spectrum analyzer programmer.

To find a programming code that performs a particular function, refer to the "Functional Index," which groups the commands according to similar function. Once the desired command is found, refer to the alphabetical listing of the programming codes for further keyword definition and syntax information.

For further information on syntax, refer to "Notation Conventions," "Syntax Conventions," and "Characters and Secondary Keywords (Reserved Words) Summary."
Notation Conventions

The following symbols and type styles found in this guide denote the following:

**BOLD TYPE** All characters appearing in bold type are key words and must appear exactly as shown.

**CAPITAL LETTERS** All characters that are capital letters are secondary keywords and appear within the keyword syntax. They must appear exactly as shown, and their meanings can be found in "Characters and Secondary Keywords (Reserved Words) Summary."

< > Characters appearing in angular brackets are considered to be elements of the language being defined. Their meanings can be found in the section "Syntax Conventions" unless otherwise specified with the keyword definition.

[] Square brackets indicate that whatever occurs within the brackets is optional.

| "or": Indicates a choice of exactly one element from a list (for example, <a> | <b> indicates <a> or <b> but not both).

() Parentheses are used to clarify which elements are to be chosen from.

| Indicated that a space must be placed at the indicated location (for example, A. <a> indicates there must be a space between the keyword A and the element <a>.

:= "Is defined as" (for example, <a> := <b> indicates that <a> can be replaced by the series of elements <b> in any statement where <a> occurs).

Syntax Conventions

<A-block data format>:=

#A<length><command list> (use when the length of the command list is known).

3-2 HP 8590B/8592B Programming Commands
<key label>::=
    One to eight characters per label line. Use the ($) symbol or blank spaces to separate into two subkey label lines.
<key number>::=
    Integer from 1 to 6,601 to 12000 <trace element>|<predefined function>|<predefined variable>|<user-defined variable>.
<label>::=
    A string two to eleven characters long that is defined by the FUNCDEF command. Choice of characters is A through Z and the underscore (_). The underscore should be used as the second character of the label. Omitting the underscore, or using the underscore in other than the second character in a label, is not recommended.
<length>::=
    two 8 bit bytes specifying the length of the command list.
<LF>::=
    line feed.
<number>::=
    Integer number or real number.
<numeric data format>::=
    <number>|<CR>|<LF>|<EOI>.
<source>::=
    TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined function>|<trace range>|<number>.
<source1>::=
    TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined function>|<trace range>|<number>.
<source2>::=
    TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined function>|<trace range>|<number>.

<string data field>::=
    <delimiter><command list><delimiter>.
<trace destination>::=
    TRA|TRB|TRC|<user-defined trace>|<trace range>.
<trace element>::=
    Any element (point) of trace A, trace B, trace C, or user-defined trace. Trace A, trace B, trace C can have 1 to 401 elements; a user-defined trace can have 1 to 2047 elements.
<trace range>::=
    Any segment of trace A, trace B, trace C, or user-defined trace.
<trace source>::=
    TRA|TRB|TRC|<user-defined trace>|<trace range>.
$user-defined function>::=
    A string two to eleven characters long defined in the FUNCDEF or ACTDEF declaration.
$user-defined trace>::=
    A string two to eleven characters long defined in the TRDEF statement. A user-defined trace can have 1 to 2047 elements.
$user-defined variable>::=
    A string two to eleven characters long defined in the VARDEF or ACTDEF declaration.
**Functional Index**

**AMPLITUDE**
- **AMPCOR** Applies amplitude corrections at specified frequencies.
- **AT** Specifies input attenuation.
- **AUNIT** Specifies amplitude units for input, output, and display.
- **INZ** Specifies input impedance.
- **LG** Selects log scale.
- **LN** Selects linear scale.
- **ML** Specifies mixer level.
- **NRL** Sets the normalized trace data with respect to the display line.
- **RESET** Resets the reference level to instrument preset value.
- **FP** Performs a preselector peak.
- **RL** Specifies reference level.
- **ROFFSET** Specifies reference level offset.

* For HP 8592B only.

**AUTO COUPLING**
- **AUTO** Recouples active function or recouples all functions.

**AUXILIARY CONTROL (AUX CTRL)**
- **CNL** Turns control line A on or off.
- **CNL2** Turns control line B on or off.
- **CNT** Turns control line C on or off.
- **CNTL** Turns control line D on or off.
- **CNTL** Returns the status of control line L.
- **COMB** Turns comb generator on or off.
- **MEASUR** Determines the type of measurement: signal analysis, stimulus response, or signal normalization.
- **NRL** Sets the normalized trace data with respect to the display line.
- **RLPOS** Selects the position of reference level (for normalized displays only).
- **SRC** Selects internal or external leveling for the tracking generator.

**SOURCE (SRT)**
- **SRCNORM** Subtracts trace B from trace A, adds the display line, and sends the result to trace A.
- **SRCPOS** Selects source-power step size.
- **SRCFSWP** Selects sweep range of source output.
- **SRCFWP** Selects the power level.
- **SRT** Adjusts tracking of source output with spectrum-analyzer sweep.
- **SRCV** Adjusts tracking of source output with analyzer sweep.
- **SRCV** Selects a stimulus-response (SR) or spectrum-analyzer (SA) auto-coupled sweep time.

* For HP 8592B only.
† For Option 010 or 011 only.

**BANDWIDTH (BW)**
- **RB** Specifies resolution bandwidth.
- **VAV** Turns video averaging on or off.
- **VB** Specifies video bandwidth.
- **VBR** Specifies coupling ratio of video bandwidth to resolution bandwidth.

**CALIBRATION (CAL)**
- **CAL** Initiates calibration routines.
- **CNF** Performs the confidence test.
- **CORREK** Returns a “1” if the analyzer correction factors are on.
- **CRTPOS** Specifies the CRT horizontal position.
- **CRTVPOS** Specifies the CRT vertical position.

**COMMAND TRIGGER**
- **ONCYCLE** Performs command list periodically.
- **ONDLY** Performs command list once after a time period.
- **OONE** Performs command list on end of each sweep.
- **ORMK** Performs command list at the marker.
- **ORSQ** Performs command list on every service request.
- **ONSWP** Performs command list at beginning of each sweep.
ONTIME

Performs command list at a specific time.

CONFIGURATION (CONFIG)

CAT
Displays directory information from the specified or current
mass storage device.

DATEMODE
Sets the format of the display of the date.

DISPOSE
Deletes user-defined functions.

FORMAT
Formats the memory card.*

PREFIX
Specifies prefix.

SETDATE
Sets the date of the real-time clock.

SETTIME
Sets the time of the real-time clock.

TIMEDATE
Sets the time and date of the real-time clock.

TIMEDSP
Turns the display of the real-time clock on or off.

* Option 003 only.

DISPLAY

ANNOT
Turns annotation on or off.

DL
Specifies display line level.

DSPLY
Writes the value of a variable on the analyzer screen.

GRAT
Turns graticule on or off.

HD
Holds or disables data entry and blanks active function.

MENU
Displays specified menu on the analyzer screen.

PREFIX
Specifies the prefix.

TII
Specifies displayed threshold level.

TITLE
Writes text string to the top line of the analyzer screen.

FREQUENCY

CF
Specifies center frequency.

FA
Specifies start frequency.

FB
Specifies stop frequency.

FOFFSET
Specifies frequency offset.

SS
Specifies center-frequency step size.

GRAPHICS

CLRDSP
Erases user-generated graphics.

DT
Defines label terminator.

GR
Graphs specified y values on the analyzer screen.

LB
Writes label to display.

PA
Moves pen to current position.

PD
Places pen down.

PR
Draws vector from last position (plot relative).

PRINT
Prints screen data.

PU
Lifts pen up.

TEXT
Writes text string to screen at current pen position.

TRGRPH
Graphs compressed trace.

INFORMATION

ACTVF
Returns a "0" if the function is not active.

BIT
Returns the state of a bit.

CLS
Clears the status byte.

HAVE
Returns a "0" if a device or option is not installed.

ID
Returns the HP model number of the analyzer.

MDU
Returns the analyzer's baseline and reference level.

OP
Returns the lower-left and upper-right coordinates of the
analyzer display.

REV
Returns the analyzer's firmware date.

RQS
Provides service request mask bits which are enabled for
service requests.

SER
Returns the serial number of the analyzer.

SRQ
Sets service request.

STB
Queries the status byte.

INPUT/OUTPUT

EE
Enables front-panel number entry.

EK
Enables front-panel knob control.

ENTER
Controls the HP-IB in order to receive data.

EP
Enables parameter entry from front panel.

OA
Returns active function.
OL
OUTPUT
RELHPID
TA
TB
TF
TRA
TRB
TRC

LIMIT LINES

LIMIDEL
DEletes all segments in the limit-line table and resets
limit-line settings.

LIMFAIL
Returns "0" if the measurement sweep passes.

LIMLINE
Outputs the current limit-line table definitions.

LIMMIRROR
Reflects the limit-line about the amplitude axis at the largest
frequency.

LIMMODE
Selects type of limit-line table format—upper, lower, upper and
lower, or mid/delta.

LIMREL
Specifies the current limit lines as fixed or relative.

LIMSEG
Adds new segments to the current limit-line in the upper
or lower limit-line.

LIMITTEST
Compares the active trace data with the current limit-line.

SEGDEL
Deletes the specified segment from the limit-line table(s).

SENDER
Enters the limit-line data in the upper and lower limit-line
tables or the mid/delta table.

MARKER

MA
Returns the value of the active marker.

MDS
Specifies measurement data size as byte or word.

MF
Returns marker frequency.

MKA
Specifies amplitude of the active marker.

MKACT
Specifies active marker: 1, 2, 3, or 4.

MKBW
Specifies marker bandwidth.

MKCF
Moves marker frequency into center frequency.

MKCONT
Continues sweep after MKSTOP.

MKD
Moves delta marker to specified position.

MKF
Specifies frequency of active marker.

MKMIN
Moves active marker to minimum signal detected.

MKN
Moves active marker to specified frequency as frequency type
marker.

MKNOISE
Returns average value at marker, normalized to 1 Hz
bandwidth.

MKOFF
Turns off all markers.

MKP
Places the marker at the given x-axis position.

MKPAUSE
Pauses sweep at marker.

MKPER
Moves active marker to maximum signal detected.

MKPFA
Specifies minimum excursion for peak identification.

MKREAD
Selects type of marker readout to be displayed.

MKSEL
Sets reference level to marker amplitude.

MKSP
Sets span to marker frequency value.

MKSS
Sets to center frequency step-size.

MKSTOP
Stops the sweep at the active marker.

MKTRACE
Assigns marker to trace.

MKTYP
TURNS signal track on or off.

MKTYP
Specifies the marker type.

M4
Turns on marker zoom.

MATH (see also Trace Math)

ABS
Calculates the absolute value of the operands.

ADD
Calculates the sum of the operands.

AVG
Averages two trace operands.

BIT
Returns the state of a bit.

CBA
Converts to absolute units.

CTM
Converts to measurement units.

DIV
Returns the result of the division of two operands.

EXP
Calculates the exponential of an operand.

INT
Calculates integer value of an operand.

LOG
Calculates log of operand.

MEAN
Returns the mean value of a trace.

MIN
Finds the minimum of two operands.

MINPOS
Finds the x-axis position of the minimum trace value.

MOD
Finds the remainder from division.
MEASURE/USER (MEAS/USER)

MPY
- Multiplies two operands.

MMX
- Finds the maximum of two operands.

PDA
- Finds the probability distribution of the amplitude.

PDF
- Finds the probability distribution of frequency.

RMS
- Finds the square root.

SQR
- Finds the square root.

STDEV
- Finds the standard deviation.

SUB
- Subtracts one operand from another.

VARIANCE
- Finds amplitude variance of operand.

OPERATOR ENTRY

EE
- Enables front-panel data number entry.

EK
- Enables front-panel knob control.

EP
- Enters parameter from front panel.

HD
- Holds or disables entry and blanks active function readout.

PLOTTER

PLOT
- Plots screen data to previously addressed plotter.

PRESET

IP
- Performs an instrument preset.

LF
- Performs an instrument preset on the base band (band 0) only.

POWERON
- Selects the state the analyzer when turned on: IP (instrument preset) or last state.

RESETRL
- Resets the reference level to instrument preset value.

PRINTER

PRINT
- Prints screen data to previously addressed printer.

PROGRAM FLOW

ABORT
- Aborts all user-defined functions.

IF
- Forms a conditional construct (IF_THEN_ELSE_ENDIF).

REPEAT
- Forms a looping construct (REPEAT_UNTIL).

RETURN
- Returns from user-defined function.

RECALL or SAVE

CAT
- Displays directory information from the specified or current mass storage device.

LOAD
- Loads data from the memory card.*

MSI
- Defines the mass storage device.

PREFIX
- Specifies the prefix.

PSTATE
- Protects internal state registers.

PURGE
- Deletes the file from the current mass storage device.

* Requires a memory card.
RCLS  Recalls state from internal state register.
RCLT  Recalls state and trace, limit lines, or amplitude factors from the internal trace register.
SAVE  Saves state into internal state register.
SAVET Saves state and trace, limit lines, or amplitude factors in the internal trace register.
SAVRCLF Indicates that a save or recall operation is in progress.
SAVRCLN Appends number to prefix for save and recall operations.
SAVRCLW Specifies what is to be saved or recalled.
STOR  Stores item from instrument to memory card.*

* Option 003 only.

SPAN
FS  Specifies full frequency span.
IN*  Returns the harmonic number (band).
INLOCK* Locks the tuning band.
INUNLK* Unlocks the tuning band.
SP  Specifies frequency span.
SPZOOM Places marker on highest on-screen signal peak, and turns on the signal track function.

* For HP 8592B only.

SWEEP
CONT  Selects continuous-sweep mode.
ST  Specifies sweep time.

SYNCHRONIZATION
DONE  Returns a "1" after preceding commands are begun.
TS  Begins a new sweep.

TRACE
AMB  Subtracts trace B from trace A and places the result in trace A.
AMBPL Subtracts trace B from trace A, adds the display line, and places the result in trace A.
AXB  Exchanges trace A and trace B.
BLANK Blanks trace.
BML  Subtracts display line from trace B, and places the result in trace B.
BTC  Transfers trace B into trace C.
BXC  Exchanges trace B and trace C.
CLR  Clear-writes trace.
DET  Specifies detection mode.
IB  Inputs trace B in binary units.
MINH Updates trace C elements with minimum level detected.
MOV  Moves trace from source to destination.
MXMH Updates trace elements with maximum level detected.
PKPOS Returns maximum value of trace.
TA  Returns trace A data.
TB  Returns trace B data.
TRA  Controls trace data input or output.
TRB  Controls trace data input or output.
TRC  Controls trace data input or output.
TRCMEM Returns the save trace memory capability.
TDEF Declares a user-defined trace.
TRDSP Turns trace display on or off.
TRGRPH Graphs a compressed trace.
TRPRST Returns traces to preset state.
TRSTAT Returns status of traces.
TWINDOW Specifies trace window for FFT.
VAVG Turns video averaging on or off.
VIEW Views trace.
TRACE MATH (see also Math)

APB
CLRAVG
COMPRESS
CONCAT
FFT
MIRROR
PEAKS
SMOOTH
SUM
SUMSQR
TRMATH
XCH

TRIGGER

ONEOS
ORSWP
SNGLS
TM
TS

USER-DEFINED

ABORT
ACTDEF
DISPOSE
ERASE
FUNCDEF
KEYCLR
KEYCMD
KEYDEF
KEYENH
KEYEXE
KEYLBL

Returns the amount of memory available.
Displays the softkey menu.
Returns from user-defined function.
Saves softkeys 1—6 in the menu specified.
Declares a user-defined trace.
Returns/sends user state.
Declares a user-defined variable.
Programming Codes

ABORT;

stops the execution of all user-defined functions and readies the instrument for the next command received.

ABS.<destination>,<source>s;

places the absolute value of the source value(s) in the destination.

ACTDEF.<function name><active function area label><preset value>(STEP)[NONE][HZ][SEC][DB][DBMV][ABSHZ][INTEGER]<definer>(command list)<user-defined function><definer>)];

creates a user-defined active function.

<function name> ::= 2 to 11 ASCII characters representing the function name.

<active function area label> ::= ASCII characters representing the label for the active function area.

<preset value> ::= <number>|<user-defined variable>.

Query response using <name>: <numeric data format>.

Query response using ACTDEF <function name>: ACTDEF <function name>,<active function area label>,<preset value>(STEP)[NONE][HZ][SEC][DB][DBMV][ABSHZ][INTEGER],<A-block data format><CR><LF><EOI>.

ACTVF.<active function>;

returns a "0" if the given function is not active, a "1" if it is active.

<active function> ::= AT[CF][DL][FA][FB][OFFSET][HZ][LG][MK][MKD][MF][MKN][MKPAUSE][MKPX][ML][MODE][NR][RF][OFFSET][RL][RPOS][SAVE][DATE][SET][DATE][TIME][SF][SRC][FOS][SRC][GST][SRC][FSP][SRC][SW][SRC][PWR][SRCT][TS][TH][TIME][DATE][VB][VBR][user-defined active function specified by the ACTDEF command.

ADD.<destination>,<source 1>,<source 2>;

adds the sources and sends the sum to the destination.

AMBR.(ON)(OFF)([0])?;

subtracts trace B from trace A and sends the result to trace A during every sweep of the analyzer.

Query response: (ON)(OFF)<CR><LF><EOI>.

AMPL.(ON)(OFF)([0])?;

subtracts trace B from trace A, adds the display line value to the difference, and sends the result to trace A during every sweep of the analyzer.

Query response: (ON)(OFF)<CR><LF><EOI>.

AMPERR(,[<frequency)][HZ][GHZ][MHZ][GHZ],<amplitude>[DB])(OFF[ON])?;

applies amplitude corrections at specified frequencies. Up to 80 frequency and amplitude pairs may be specified.

<frequency> ::= <number>.

<amplitude> ::= <number>.

Query response: <frequency>,<amplitude><CR><LF><EOI>.

ANNOT.(ON)(OFF)([0])?;

turns the display annotation on or off.

Query response: (ON)(OFF)<CR><LF><EOI>.

APB;

adds trace A to trace B and sends the result to trace A.

ATL((<number>)[DB][AUTO][UP][DOWN])?;

specifies the RF input attenuation. Default unit is dB.

Query response: <numeric data format>.

AUNITS((DBM)[DBMV][DBUV][V][W])?;

specifies the amplitude units for input, output and display for the current amplitude setting (log or linear).

Query response: (DBM)[DBMV][DBUV][V][W]<CR><LF><EOI>.

AUTO;

automatically couples the active functions.
AVERAGE,<destination>,<source>,<ratio>;<

Computes the average value of the source and the destination according
the following algorithm: Average = (\((\text{source} \times \text{destination} + \text{ratio})/\text{ratio}\)

<ratio> := <number>|<user-defined variable>|<predefined variable>|<predefined function>|<trace element>.

AXB;

Exchanges trace A and trace B.

BIT,<destination>,<source>,<bit number>;

Places the state of the bit ("0" or "1") in the destination.

<destination> := <user-defined variable>|<predefined variable>|<trace element>.
<source> := <user-defined variable>|<predefined variable>|<predefined function>|<trace element>|<number>.
<bit number> := <user-defined variable>|<predefined variable>|<predefined function>|<trace element>|<number>.

BLANK,(TRA|TRB|TRC);

Blanks trace A, trace B, or trace C, and stops taking new data into the
specified trace.

BML;

Subtracts the display line from trace B and sends the result to trace B.

BTC;

Transfers trace B to trace C.

BXC;

Exchanges trace B and trace C.

CAL,(ON|OFF)|STORE|FETCH|FREQ|AMP|ALL|TG|YTF|DISP|DUMP|INIT);

Controls the calibration routine.

CAT,[a][d][l][s][t][reg][prefix]*,[INT|CARD];

Returns directory information from the specified or current mass storage
device. The directory information is returned as ASCII string data. The a,
d,l,s, and t parameters denote data types and are used for cataloging the
memory card. The memory card reader is available with Option 003. The
a, d, l, s, and t data types represent the following:

a = amplitude correction factors.
d = downloadable program.
l = limit line table(s).
s = state.
t = trace.

Reg or prefix parameters are used for cataloging analyzer memory. Note
that the data type, reg, and prefix is followed by the asterisk. The asterisk
acts as a wild card. To catalog all of the memory card contents or analyzer
memory, omit the first parameter and use the asterisk. If INT or CARD is
not specified, CAT returns directory information from the current mass
storage device.

CF[,(<number>[Hz|KHz|MHz|GRZ])|UP|DN|EF]|?);

Specifies the center frequency. Default unit is Hz.
Query response: <numeric data format>.

CLR AVG ;

Restarts video averaging.

CLR DSP ;

Erases menu or user-generated graphics.

CLR W,(TRA|TRB|TRC);

Clears the specified trace and enables trace data acquisition.

CLS;

Clears all status bits.

CNF;

Performs the confidence test.

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3-20 HP 8590B/8592B Programming Commands
CNTLA(ON|OFF[1][0])]\);  
Makes the control line A of the auxiliary interface high or low. CNTLA ON sets control line A high, CNTLA OFF sets the control line low.  
Query response: (ON|OFF)<CR><LF><EOI>.

CNTLB(ON|OFF[1][0])]\);  
Makes the control line B of the auxiliary interface high or low. CNTLB ON sets control line B high, CNTLB OFF sets the control line low.  
Query response: (ON|OFF)<CR><LF><EOI>.

CNTLC(ON|OFF[1][0])]\);  
Makes the control line C of the auxiliary interface high or low. CNTLC ON sets control line C high, CNTLC OFF sets the control line low.  
Query response: (ON|OFF)<CR><LF><EOI>.

CNTLD(ON|OFF[1][0])]\);  
Makes the control line D of the auxiliary interface high or low. CNTLD ON sets control line D high, CNTLD OFF sets the control line low.  
Query response: (ON|OFF)<CR><LF><EOI>.

CNTL5;  
Returns a "1" if pin 5 of the auxiliary interface is high, a "0" if the line is low.

COMP {ON|OFF[1][0]};  
Turns the comb generator on or off. (HP 8592B only.)

COMPRESS,\{trace destination\},\{trace source\},\{AVG|NRM|NEG|POSSI|MF|PAVG|PFRPT\};  
Compresses the trace source to fill the trace destination according to the specified compression algorithm.

CONCAT,\{trace destination\},\{source1\},\{source2\};  
Concatenates source 1 and source 2 and sends the new trace array to the destination.

CONTS;  
Selects continuous-sweep mode.

3-22 HP 8890B/8592B Programming Commands
DISPONE.<Coperand>;

Allows the user to free user memory which has been allocated previously for user-defined functions. DISPOE ALL clears all operands.

<Coperand> ::= <user-defined trace> | <user-defined variable> | <user-defined function> | <key number> | ALL | ONCYCLE | ONDELAY | ONEOS | ONMKR | ONSRQ | ONSWP | ONTIME | ONRATH.

<Key number> ::= 1 to 6, 601 to 1200.

DIV.<Cdestination>, <source 1>, <source 2>;

Divides source 1 by source 2 and places the result in the destination.

DL( <number>[DB[DM][AUTO][ON][OFF][UP][DN][EP]]);

Specifies a display line level that is displayed on the CRT. Default unit is dBm.

Query response: <numeric data format>.

DN;

Reduces the active function by the applicable step size.

DONE[O];

Returns a “!” when all commands in a command string entered before DONE have been started.

Query response: 1<CR><LF><EOI>.

DSPLY.<display variable>, <field width>, <decimal places>;

Displays the value of a variable on the analyzer screen.

<display variable> ::= <number> | <user-defined variable>

<field width> ::= <number>

<decimal places> ::= <number>

DT.<character>;

Defines any character as the label terminator. The label terminator is used for the LB command.

EB;

Sends values entered by the operator on the analyzer numeric keypad to the controller.

EK;

Allows data entry with the front-panel knob when the analyzer is under remote control.

ENTER.<HP IB address>, (K[B][W]), <destination>;

Establishes the analyzer as a controller on the HP IB.

<HP IB address> ::= <number> | <user-defined variable> | <predefined variable> | <predefined function> | <trace element>.

K = Free field, ASCII real number format.
B = One byte binary.
W = One word binary (2 bytes).

<trace element> ::= <trace element> | <user-defined variable> | <predefined variable>.

EP;

Sends values entered by the operator on the analyzer number keyboard to the current function.

ERASE;

Clears trace A and trace B, disposes of the contents of the user memory, and resets the internal state registers to the instrument preset state and resets the analyzer.

EXP.<destination>, <source>, <scaling factor>;

The exponentials of the source is placed in the destination. The EXP command is useful for converting log values to linear values.

<scaling factor> ::= <number> | <user-defined variable> | <predefined variable> | <predefined function> | <trace element>.

FA(1, <number>[HZ|KHZ[MHZ][GHZ][UP][DN][EP]]);

Specifies the start frequency. Default unit is Hz.

Query response: <numeric data format>.

FB(1, <number>[HZ|KHZ[MHZ][GHZ][UP][DN][EP]]);

Specifies the stop frequency. Default unit is Hz.

Query response: <numeric data format>.
FFT,<trace destination>,<trace source>,<window>;
Perform a forward fast Fourier transform on the source trace and sends
the results to the destination trace. Before executing FFT, a trace window
must be defined with the TWIN/DO command, for proper formatting.
<trace destination>=TRA[TBB][TRC][user-defined trace];
<trace source>=TRA[TBB][TRC][user-defined trace];
<window>=TRA[TBB][TRC][user-defined trace];

OFFSET,(<number>|[HZ|KHZ|MHZ|GHZ])?;
Specifies the frequency offset for all absolute frequency readouts such as
center frequency. Default unit is Hz.
Query response:<numeric data format>.

FORMAT,<delimiter><volume label><delimiter>;
Formats a memory card in the logical interchange format (LIF). (Option
603 only.)
<volume label>=0 to 6 characters.

FS;
Selects the full frequency span mode of the analyzer.

FUNCDEF,<label>,(<string data field>|<A-block data field>|<I-block data
field>);
Defines a routine consisting of analyzer commands, assigns it a label, and
stores the routine and its label in the user memory.

GR,<number>[,[<number>]];
Graphs the given y coordinate by incrementing the x coordinate by 1. The
number parameter may be repeated.

GRAT,(<ON|OFF|0|1>)?;
Turns the graticule on or off.
Query response: (ON|OFF)<CR><LF><EOI>.

HAVE,(HP1B|RS232|I0|TG|CARD);
Returns a "0" if the specified device is not installed.
HP1B = Option 021.
RS232 = Options 022.
I0 = Option 021 or 023.
TG = Option 010 or 011.
CARD = Memory card reader, Option 003.

HD;
Disables data entry via the analyzer numeric keypad, knobs, or step
keys. The active function readout is blanked, and any active function is
deactivated.

HN[?];
Returns the harmonic number of the analyzer's current tuning. (HP 8592B
only.)
Query response:<numeric data format>.

HNL,(<number>|[ON|OFF|EP])?;
Forces the analyzer to use only the selected harmonic. (HP 8592B only.)
Query response: (ON|OFF)<CR><LF><EOI>.

HNUNLK;
Unlocks the harmonic number. (HP 8592B only.)

IB<entry>;
Provides a method for reading or storing values into trace B.
<entry>=exactly 802, 8-bit binary bytes.

ID[?];
Returns the HP model number of the analyzer.
Query response: <character string><CR><LF><EOI>.  

3-26 HP 8590B/8592B Programming Commands
IF, <operand1> (<GT|LT|EQ|GE|LE> <operand2>), THEN <command list> ELSE <command list> ENDIF;

Compares operand 1 to operand 2. If the condition is true, the command list is executed. Otherwise, commands following the next ELSE or ENDIF statements are executed.

<operand1>::=<number> | <user-defined variable> | <predefined variable> | <predefined function> | <trace element>.
<operand2>::=<number> | <user-defined variable> | <predefined variable> | <trace element>.

INT, <destination>, <source>;

Places the greatest integer which is less than or equal to the source value into the destination.

INZ(<75[50][EF][OA]>)?;

Specifies the value of input impedance expected at the active input port.
Query response: (50|75)<CR><LF><EOI>.

IP;

Performs an instrument preset.

KEYCLR;

Clears softkeys 1 through 6 of menu 1.

KEYCMD, <key number>, <delimiter> <key press command string> <delimiter> <menu label command string> <delimiter>;

Defines the function and label of a softkey based on a condition. The softkey label is updated whenever a key is pressed.

<key press command string>::=<command list>.
<menu label command string>::=<command list>.

KEYDEF, <key number>, <string data field> <user-defined function>, <delimiter> <key label> <delimiter> ?;

Assigns a label and user-defined function to a softkey.
Query response: "A-block data format" "<character string>" "<CR>" "<LF>" "<EOI>".

KEYENL, <key number>, <delimiter> <key label> <delimiter> <inverse video condition> <delimiter> <move enhancement condition> <delimiter>;

Activates part or all of the key label in the inverse video mode, or moves the underline from one section of the label to another.
<inverse video condition>::=<command list>.
<move enhancement condition>::=<command list>.

KEYEXEC, <key number>;

Executes the specified defined key.
<key number>::=<integer value from 1 to 6, or 601 to 1200>.

KEYLBL, <key number>, <delimiter> <key label> <delimiter>;

Renames a key without changing its function.

LB, <character string> <terminator>;

Writes text (label) at the current pen position with alphanumeric characters specified in the character field.
<terminator>::=<character> specified in DT command.

LF;

performs an instrument preset into base band (band 0).

LG, <number>, [DB|DM][|UP|DN][|EF]?

Specifies the vertical graticule divisions as logarithmic units without changing the reference level. Default unit is dB.
Query response: "numeric data format". A query response of zero indicates a linear scale.

LIMIDELI;

Deletes all upper and lower segments in the current limit-line table and presets all limit-line settings.
LIMIFAIL[1];

Returns a "0" if the last measurement sweep is equal to or within the limit-line bounds.
0 indicates the measurement sweep was within the limit-line bounds;
1 indicates the measurement sweep failed the lower limit;
2 indicates the measurement sweep failed the upper limit;
3 indicates the measurement sweep failed both the lower and upper limits.
4 indicates that no test was performed.

LIMILINE[1];

Outputs the current limit-line table definitions.
Query response: LIMDEL;LIMILINE<number of segments>;LIMREL_
<ON><OFF>;<SENTER><frequency>,<upper value>,<lower value>,<SLOPE><FLAT><POINT>;)[LIMHALF;<UPPER><LOWER>];LIMSEG
<frequency>,<amplitude>,<SLOPE><FLAT><POINT>;];LIMTEST_
<ON><OFF>;<CR><LF><EOI>. The number of segments represents the
number of segments in the upper and lower limit-line table.

LIMMIRROR;

Reflects the current definition about the amplitude axis at the largest
frequency in the definition.

LIMMODE[<UPPER><LOWER><UPLOW><DELTA>][1];

Determines if the limit-line entries are treated as upper amplitude
values, lower amplitude values, upper and lower amplitude values, or mid
amplitude and delta values.
Query response: <UPPER><LOWER><UPLOW><DELTA><CR><LF><EOI>.

LIMREL[<ON><OFF>[1][1];

Specifies whether the current limit-lines are fixed or relative.
Query response: <ON><OFF><CR><LF><EOI>.

LIMSEG[<frequency>,<amplitude>,[FLAT]<SLOPE><POINT];

Adds new segments to the current limit-line in the upper limit-line or the
lower limit-line.
Query response: <frequency>::=(number<HZ>[khz][hpz][Ghz])<trace

3-30 HP 8580B/85928 Programming Commands

elment>|<predefined function>|<predefined variable>|<user-defined variable>
<amplitude>::=(number<DB>[dBm])<trace element>|<predefined function>
|<predefined variable>|<user-defined variable>.

LIMTEST[<OFF><ON>[1][1];

Compares the active trace data with the current limit-line data.
Query response: <OFF><ON><CR><LF><EOI>.

LN;

Specifies the vertical graticule divisions as linear units without changing the
reference level.

LOAD.<delimiter><character string><delimiter> [,<destination>];

Loads the data from the memory card. The memory card reader is
available with Option 003. Use TRA, TRB, TRC, <user-defined trace>
when loading trace data. Use LLCMD when loading limit-line data. Use
AMPCOR when loading amplitude correction factors.
<destination>::=TRA|TRB|TRC|<user-defined trace>[LLCMD][AMPCOR].

LOG.<destination>,<source>,<scaling factor>;

Takes the logarithm (base 10) of the source, multiplies the result by the
scaling factor, then stores it in the destination.
<scaling factor>::=<number>|<trace element> |<predefined function>
|<predefined variable>|<user-defined variable>.

MA[1];

Returns the amplitude of the active marker in the current amplitude units
when marker type is of fixed or amplitude type and trace data format
(TDF) is set to return absolute measurement units (P format).

MDS[<BW>][1];

Formats binary measurements by selecting the measurement data size as an
8-bit byte or a two-byte word.
Query response: <BW><CR><LF><EOI>.
MDU[?];
Returns values for the analyzer's baseline and reference level.
Query response: <number>,<number>,<number>,
<number>,<number>,<number>;<number>,<number>,
<number>,<number>,<number>,<number>,<number>,<number>
<CR><LF><EOI>.

MEAN,<trace range>,<user-defined trace>?
Returns the mean value of a trace in measurement units.
Query response: <numeric data format>.

MEASURE,(SA|SR|NRM)?
Determines what kind of measurements the analyzer makes: signal analysis,
stimulus response, or signal normalization.
Query response: (SA|SR|NRM)<CR><LF><EOI>.

MEM?;
Returns the amount of unused analyzer memory available for user programs
and variables.
Query response: <numeric data format>.

MENU,<menu number>?
Displays the selected softkey menu on the analyzer screen. Menu 0 has no
softkeys.
<menu number>::integer value of 1, or 101 to 200.
Query response: <numeric data format>.

MF?
Returns the frequency (or time) of the on-screen active marker.

MIN,<destination>,<source 1>,<source 2>;
Compares the two sources, point by point, and sends the lesser value of
each comparison to the destination.

MINH,TRC;
Updates each trace C element with the minimum level detected.

MINPOS,TRA|TRB|TRC,<user-defined trace>,<trace range>;
Returns a value which is the x-axis position (in <display units>) of the
minimum amplitude value in trace A, trace B, trace C, or user-defined
trace.

MIRROR,<trace destination>,<trace source>;
Moves the mirror image of the source trace into the destination trace.

MKA,(<number>|UP|DP|EP|AUTO)?
Specifies the amplitude of the active marker in the current amplitude units
when marker type is of fixed or amplitude type. When queried, MKA
returns the marker amplitude independent of marker type.
Query response: <numeric data format>.

MKACT,((1|2|3|4))?;
Establishes the active marker. The active marker becomes marker number 1
after the MKACT command.
Query response: (1|2|3|4)<CR><LF><EOI>.

MKBW,<number>;
Returns the bandwidth at the specified power level relative to an on-screen
marker (if present) or the signal peak (if no on-screen marker is present).

MKCF;
Sets the center frequency equal to the marker frequency and moves the
marker to the center of the screen.

MKCONT;
Continues sweeping from the marker after the marker has been stopped.
(See MKSTOP.)

MKD,(<number>|HZ|KHZ|MHZ|GHz)|<UP|DN|EP>?;
Places a second marker the specified frequency from the active marker.
Frequency may be positive or negative. Default unit is Hz.
Query response: <numeric data format>.
MKF!(<number>[Hz|kHz|MHz|GHz]{EP}[UP|DN])?

Specifies the frequency of the active marker. Default unit is Hz.
Query response: <numeric data format>.

MKMIN;

Moves the active marker to the minimum value detected.

MKN!(<number>[Hz|kHz|MHz|GHz]{UP|DN}[EP])?

Activates and moves the marker to the specified frequency.
Query response: <numeric data format>.

MKNOISE{(ON|OFF)[0]}?

Returns the average value of 32 buckets around the marker, compensated
for detection mode, and normalized to a 1 Hz bandwidth.
Query response: (ON|OFF)<CR><LF><EOI>.

MKOFF[ALL];

Turns off the active marker, or all markers (if the ALL parameter is
specified).

MKP!(<number>[trace element][predefined function][predefined
variable][user-defined variable])?

Places the active marker to the given x-coordinate.
Query response: <numeric data format>.

MKPAUSE(.[<number>]SC|MS|US|UP|DN|EP|OA|AUTO) ?

Pauses the sweep at the active marker for the duration of the delay period.
Query response: <numeric data format>.

MKPK!(IH[NH][NR][NL]);

Positions the active marker on signal peaks.

MKPX!(.<number>[DB][UP|DN][EP])?

Specifies the minimum signal excursion for peak identification. Default unit
is dB.
Query response: <numeric data format>.

MKREAD!(<FRQ|PER|SWT|IST|FFT)?)?

Selects the type of active trace information displayed by the analyzer
marker readout.
Query response: (FRQ|PER|SWT|IST|FFT)<CR><LF><EOI>.

MKRL;

Sets reference level to the active marker amplitude.

MKSP;

Sets the start and stop frequencies to the values of the delta markers.

MKSS;

Sets the center-frequency step-size to the marker frequency (or frequency
difference, if delta markers are used).

MKSTOP;

Stops the sweep at the active marker.

MKTRACE!(.<TRA|TRB|TRC)?)?

Moves the active marker to the corresponding position on another trace.
Query response: (TRA|TRB|TRC)<CR><LF><EOI>.

MKTRACK{(ON|OFF)[0]}?

Turns the marker signal track on or off.
Query response: (ON|OFF)<CR><LF><EOI>.

MT TYPE(.[PSN|FIXED|AMP|DELTA])?

Specifies the type of active marker to be used.
Query response: (PSN|FIXED|AMP)<CR><LF><EOI>.

ML(.[<number>][DB|DM][EP][UP|DN])?

Specifies the maximum signal level that is applied to the input mixer for a
signal that is equal to or below the reference level.
Query response: <numeric data format>.

MOD <destination>,<source 1>,<source 2>;

Places the modulo (remainder) of the division of source 1 by source 2 in the
destination.
MODE?

Returns a “0” if the mode of operation is spectrum analysis. A number other that “0” is returned if the operating mode is other than spectrum analysis.
Query response: <numeric data format>.

MOV.<destination>,<source>;

Copies the source into the destination.

MPY.<destination>,<source 1>,<source 2>;

Multiplies the sources, point by point, and sends the result to the destination.

MSI(.CARD[INT])?

Specifies the current mass storage device (memory card or analyzer memory). The memory card reader is available with Option 003.
Query response: (CARD[INT])<CR><LF><EOI>.

MXM.<destination>,<source1>,<source2>;

Compares source 1 and source 2, point by point, and sends the greater value of each comparison to the destination.

MXMH.(TRA|TRB);

Updates the selected trace with the maximum level detected at each frequency (maximum hold).

M4(.<number>[HZ|KHZ|MHZ|GHZ][UP|DN|EP|AUTO])?

Moves the active marker to the specified frequency. Stepping up or down changes the frequency span. Default unit is Hz.
Query response: <numeric data format>.

NRL(.<number>[DB])<EP>?

Sets the normalized trace data with respect to the display line.
Query response: <numeric data format>.

OA;

Returns the active function value.

OL1

Returns the coded instrument state information to the controller in 202 8-bit bytes.

ONCYCLE(.<time value>,<string data field>)?

ONCYCLE periodically executes the string data field or “command string” in the string data field.
<time value>:=<number>|<user-defined variable> in seconds.
Query response: <time value>,<A-block data format>
<CR><LF><EOI>.

ONDLY(.<time value>,<string data field>)?

Executes the string data field after the time value has elapsed.
<time value>:=<number>|<user-defined variable> in seconds.
Query response: <time value>,<A-block data format>
<CR><LF><EOI>. The time value represents the time left until event occurs.

ONEOS(.<string data field>|<A-block data field>|<F-block data field>)?

Executes the contents of the data field after the end of sweep. The string data field should not include the take-sweep command (TS).

ONMKR(.<string data field>)?

Performs the string data field when the sweep reaches the marker position.

ONSQ(.<string data field>)?

Executes the string data field whenever a service request occurs.

ONSWF(.<string data field>|<A-block data field>|<F-block data field>)?

Executes the string data field at the beginning of the sweep. The string data field should not include the take-sweep command (TS).

HP 8590B/8592B Programming Commands
ON TIME,<time value>,<string data field>);  
Executes the string data field at the specified time.

<time value> ::= <number> | <user-defined variable> in YYMMDHHMMSS format.

OP[?];
Returns parameter values P1 and P2, which represent the dimensions of the lower-left and upper-right analyzer display, when the display is to be used as a graphics plotter.

OUTPUT[,<address>,<K|B|RC|KL>,<output data>;  
Establishes the analyzer as a controller on the HP-IB. The data is output according to the specified format options.
<address> ::= <number> | <predefined function> | <predefined variables> | <user-defined variable> | <trace element>.
K = Free field, ASCII real number format.
B = Free field, in a single 8-bit byte.
RC = One byte binary.
KL = One word (2 bytes) binary.

<output data> ::= <predefined function> | <predefined variables> | <user-defined variable> | <trace element> | <A-block data field> | <I-block data field>.

PA[PU|PD].<X coordinate>,<Y coordinate>;
Draws vectors to the specified z and y coordinates. PU and PD determine whether the vector(s) are displayed. The z,y coordinate pairs may be repeated.
<X coordinate> ::= positive integer in <display units>.
<Y coordinate> ::= positive integer in <display units>.

PD;
Instructs the analyzer to plot vectors on the analyzer screen until a PU command is received.

PDA,<trace destination>,<trace source>,<resolution>;
Replaces the destination trace with the amplitude distribution function of the source trace.
<trace destination> ::= TRA|TRB|TRC | <user-defined trace>.
<trace source> ::= TRA|TRB|TRC | <user-defined trace>.
<resolution> ::= <number> | <user-defined variable> | <predefined function> | <trace element>.

PDF,<trace destination>,<trace source>;
Increments an element of the destination trace whenever the corresponding element of the source trace exceeds a threshold. This is useful for constructing a frequency probability density function.
<trace destination> ::= TRA|TRB|TRC | <user-defined trace>.
<trace source> ::= TRA|TRB|TRC | <user-defined trace>.

PEAKS,<trace destination>,<trace source>,<AMP|FRQ>;
Sorts the signal peaks in the source trace by amplitude or frequency and returns the number of peaks found to the controller. It also sends the sorted results to the destination trace.
Query response: <numeric data format>.

PKPOS.(TRA|TRB|TRC | <user-defined trace> | <trace range>);
Returns the z-axis position of the maximum value of the trace.

PLOT,<PIX value>,<PLY value>,<PZ value>,<PZ value>;
Initiates a plotter output of the source data to the remote interface. With the appropriate HP-IB commands, the HP-IB can be configured to route the data to an external plotter.
<PIX value> ::= <PLY value> ::= <number> that represents plotter dependent values that specify the lower-left plotter dimension.
<PZ value> ::= <PZ value> ::= <number> that represents plotter dependent values that specify the upper-right plotter dimension.

POWERON.[(IP|LAST)];
Selects the state of the analyzer when it is turned on: the IP state (same state as an instrument preset command) or last state (the state the analyzer was in when it was turned off).
Query response: (IP|LAST)<CR><LF><EOI>.
PP;
  Peaks the preselector. (HP 8589B only.)

PR.[PF|PD];.<X coordinate>,.<Y coordinate>;
  Specifies a new plot location on the analyzer screen relative to its current
  coordinates. The x, y coordinate pair may be repeated.
  <x coordinate>::= positive integer in <display units>.
  <y coordinate>::= positive integer in <display units>.

PREFIX.<delimiter><prefix><delimiter>;
  Specifies or changes the prefix used in save and recall operations.
  <prefix>::=0 to 6 characters, A through Z and the underscore (the
  underscore cannot be the first character of the prefix)

PRINT[.IB][COLOR[0][1]];
  Initiates a output of the screen data to the remote interface. With
  appropriate HP-IB commands, the HP-IB can be configured to route the
  data to an external printer. PRINT, PRINT0, or PRINT BW outputs the
  screen data in monochromatic format. PRINT1 or PRINT COLOR outputs
  the screen data in color format (with an HP PaintJet printer only).

PSTATE.[ON|OFF][H0];
  This command protects the state registers from being changed.
  Query response: (ON|OFF)<CR><LF><EO1>.

PU;
  Instructs the analyzer not to plot vectors on the analyzer screen until a PD
  is received.

PURGE.<delimiter><filename><delimiter>;
  Deletes the filename from the current mass storage device.
  <filename>::= a valid filename.

PWRBW.<trace source>,.<percentage>?
  Computes the combined power of all signal responses in the source and
  returns the bandwidth which contains the specified percentage of the total
  power. Positions marker at beginning and end of the interval.
  <percentage>::= <number>[<user-defined variable>]<predefined
  variable>|<predefined function>[<trace element>].
  Query response: <numeric data format>.

RR[.<number>[HZ|KHZ|MHz|GHz]][UP|DN|EP][AUTO]?
  Specifies the resolution bandwidth. Default unit is Hz.
  Query response: <numeric data format>.

RCLS.<number>;
  Recalls the previously saved state stored in registers 1 through 9.
  <number>::=1|2|3|4|5|6|7|8|9.

RCLT.<trace destination>,.<trace register>;
  Recalls previously saved trace data and the corresponding instrument state
  when trace data is recalled. Recalls limit-line data or amplitude correction
  factors (but not the trace or state data) when LIMLINE or AMPCOR is used.
  <trace destination>::= TR[AFIB|TRC|LIMLINE|AMPCOR]<user-defined
  name><trace range>.
  <trace register>::= integer from 0 to TRCMEM-1.

RELPHIB;
  Discontinues analyzer control of HP-IB. (Option 021 only.)

REPEAT.<command list> UNTIL.<flow operaand1>,.(GT|LE|EQ|NE)GE|LE|,
  <flow operand2>;
  REPEAT and UNTIL commands form a looping construct.
  <flow operand1>::= <number>[<user-defined variable>]<predefined
  variable>[<trace element>].
  <flow operand2>::= <number>[<user-defined variable>]<predefined
  variable>[<trace element>].

RESETRL;
  Resets the reference level to its instrument preset value.
RETURN;
Stops the operation of a current user-defined command and returns
program operation to the point where the user-defined function was called.

REV[?];
Returns the firmware revision number of the analyzer being used.
Query response: <number><CR><LF><EOI> in YYMMDD format.

RL(<number>[DB][DM][UP][DN][EP]?)?
Specifies the amplitude value of the reference level.
Query response: <numeric data format>.

RLPOS(,(<number>[OA][EP][DN][UP]?)?)?
Selects the position of reference level.
Query response: <numeric data format>.

RMS(TRA|TRB|TRC|<user-defined trace>|<trace range>?)?
Returns the root mean square value of the trace, in measurement units.
Query response: <numeric data format>.

ROFFSET(,(<number>[DB][DM][EP]?)?)?
Offsets all amplitude readouts without affecting the trace.
Query response: <numeric data format>.

RQS(,(<number>?)?)?
Sets a bit mask for service requests.
<number> ::= ASCII decimal number 0 through 63.
Query response: <numeric data format>. (Returns the decimal weighing of
the status bytes bits which are enabled during a service request.)

SAVEMENU,<menu number>;
Saves menu 1 under the menu number given.
<menu number> ::= integer value of 1, or 101 to 200.

SAVES,<state register>;
Saves the current state of the analyzer in the specified state register.
<state register> ::= 1[2][3][4][5][6][7][8].

SAVET.<trace source>,<trace register>;
Saves trace data, limit-line data, or amplitude correction factors in the
selected register.
<trace source>::=TRA|TRB|TRC|LMLINE|AMPCOR|<user-defined
trace>|<trace range>.
<trace register>::=integer from 0 to TRCMEM - 1.

SAVRECF.SAVE|RECALL;
Indicates that a save or recall operation is to be executed.

SAVRCLN.(<register number>[EP]?)?
Appends number to prefix for save and recall operations.
<register number> ::= integer number.

SAVRCLW.(TRA|TRB|TRC|DLP|STATE|LMLINE|AMPCOR);
Specifies the data to be transferred—trace A, trace B, trace C,
downloadable program, state, limit-line values, or amplitude correction
factors.

SEGDEL(,(<segment number>)?)?
Deletes the specified segment from the limit-line table(s).
<segment number> ::= <number> | <user-defined variable>.

SENTER.(<frequency> | <upper or mid value> | <lower or delta
value> | <segment type>);
Enter the limit-line data in the upper and lower limit-line table or the
mid/delta table as chosen by LIMIMODE.
<frequency> ::= <number> | <user-defined variable> | <predefined
variable> | <trace element>
<upper or mid value> ::= <number> | <user-defined variable> | <predefined
variable> | <trace element>
<lower or delta value> ::= <number> | <user-defined variable> | <predefined
variable> | <trace element>
<segment type> ::= SLOPE|FLAT|POINT.

SER[?];
Returns the serial number of the analyzer.
Query response: <numeric data format>.
SETDATE(<date>);<br>
Sets the date of the real-time clock of the analyzer.<br>Query response: <numeric data format> representing YYYYMMDD.

SETTIME(<time>);<br> Sets the time of the real-time clock of the analyzer.<br>Query response: <numeric data format> representing HRMMSS.

SMOOTH(<trace source>,<number of points>);<br> Smooths the specified trace according to the number of points specified for the running average.<br>Query response: <numeric data format> representing HRMMSS.

SNGLS;<br> Selects the single-sweep mode.

SPH(<number>[HZ|KHZ|MHZ|GHZ])<br> Changes the total displayed frequency range symmetrically about the center frequency.<br>Query response: <numeric data format>.

SPZ;<br> Places a marker on the highest on-screen signal (if an on-screen marker is not present), turns on the signal track function, and activates the span function.

SQR.<source>;<br> Computes the square root of the source and sends the result to the destination.

SRCH(<INT[X:Y][MTR]>);<br> Selects internal or external leveling for use with the built-in tracking generator. Use INT for internal leveling, XTAL for external leveling, MTR for external leveling with an HP meter. (Option 010 or 011 only.)<br>Query response: INT[X:Y][MTR]<CR><LF><EOI>.

SRCNORM(<OFF|ON[01]>);<br> Subtracts trace B from trace A, adds the display line value to the difference, and sends the result to trace A during every sweep of the analyzer.<br>Query response: (ON|OFF)<CR><LF><EOI>.

SRCPOFS(<number>[DB][EP][DN][UP]);<br> Offsets the source power level. (Option 010 or 011 only.)<br>Query response: <numeric data format>.

SRCPSSTP(<number>[DB][EP][DN][UP][AUTO]);<br> Selects the source-power step size. (Option 010 or 011 only.)<br>Query response: <numeric data format>.

SRCPSWP(<number>[DB][OA][EP][DN][UP][OFF]);<br> Selects sweep range of source output. (Option 010 or 011 only.)<br>Query response: <numeric data format>.

SRCRWR(<number>[DB][OA][EP][DN][UP][OFF]);<br> Selects the source power level. (Option 010 or 011 only.)<br>Query response: <numeric data format>.

SRCTD(<number>[OA][EP][DN][UP]);<br> Adjusts tracking of source output with spectrum-analyzer sweep. (Option 010 or 011 only.)<br>Query response: <numeric data format>.

SRCSTPK;<br> Automatically adjust tracking of source output with spectrum-analyzer sweep.

SRQ.<number>;<br> Used by an external controller to simulate service requests to the analyzer.<br>Query response: <numeric data format>.

SS(<number>[HZ|KHZ|MHZ|GHZ][UP][DN][EP][AUTO]);<br> Sets the center frequency step size. Default unit is Hz.<br>Query response: <numeric data format>.
STI[, [(<number>][<SC][<MS][<US]][UP][DN][EP][AUTO][)];]
  Specifies the time in which the analyzer sweeps the displayed frequency range.
  Query response: <numeric data format>.

STB;
  Returns the decimal equivalent of the bits set in the status byte.

STDEV_(TRA[TRB][TRC]<user-defined trace> [trace range]);
  Returns the standard deviation of the specified trace amplitude.
  Query response: <numeric data format>.

STOR.<file type>[<delimiter><filename> <delimiter>],<source>;
  Stores an individual function on the memory card. The memory card reader is available with Option 083. Use trace A, trace B, trace C, or user-defined trace when storing trace data. Use LLCMD when storing limit-line values, AMPCOR when storing amplitude correction factors. Use an asterisk as the source when storing downloadable programs. If the source parameter is omitted, an executable copy of the user’s memory is stored on the memory card. If the filename is omitted, a filename is created.
  <file type> ::= ad[0-9]*t. The a, d, l, s, and t parameters represent the data types as follows:
  a = amplitude correction factors.
  d = downloadable program.
  l = limit-line tables.
  s = state.
  t = trace.
  <filename> ::= 1 to 6 characters, specify the file type before the filename.
  <source> ::= TRA[TRB][TRC]<user-defined trace>[<user-defined variable>[<user-defined function>[LLCMD][AMPCOR]*].

SUB.<destination>,<source1>,<source2>;
  Subtracts source 2 from source 1, point by point, and sends the difference to the destination.

SUM_(TRA[TRB][TRC]<user-defined trace> [trace range]);
  Returns the sum of the amplitudes of each trace element in measurement units.
  Query response: <numeric data format>.

SUMSQR_.(TRA[TRB][TRC]<user-defined trace> [trace range]);
  Returns the sum of the squares of the amplitude of each trace element in measurement units.
  Query response: <numeric data format>.

SWPCI.(SA|SR|OA));
  Selects either a stimulus-response (SR) or spectrum analyzer (SA)
  auto-coupled sweep time. (Option 010 or 011 only.)
  Query response: (S|A|SR)<CR><LF><EOI>.

TA;
  Transfers the 401 amplitude values of trace A to the controller.

TB;
  Transfers the 401 amplitude values of trace B to the controller.

TDF_(A|B|M|F));
  Formats trace information for return to the controller.
  TDF A = returns data as an A-block data field.
  TDF B = enables binary format.
  TDF I = returns I-block data field.
  TDF M = returns values in <display units>.
  TDF P = returns absolute measurement units.
  Query response: (A|B|M|F)<CR><LF><EOI>.

TEXT.<delimiter><character string><delimiter>;
  Writes text on the spectrum analyzer screen at the current pen location.

TH_(<number>[DB][DM][UP][DN][EP][AUTO]);
  Clips signal responses below the specified threshold level. Default unit is dBm. Default level is nine major divisions below the reference level.
  Query response: <numeric data format>.
TIMEDATE(.<time date value>);?
Sets the time and date for the analyzer's real-time clock in the
YYMMDDHHMMSS format.
*time date value>::=<number> in the YYMMDDHHMMSS format.
Query response: <number><CR><LF><EOI> in the
YYMMDDHHMMSS format.

TIMEDSP(.<ONOFF>[1][0])?;
Enables the display of the time and date on the analyzer screen.
Query response: (ON)<CR><LF><EOI>.

TITLE.<delimiter><character string><delimiter>;
Allows entry of a screen title.

TM(.<FREE|VID|LINE|EXT>);?
Implements the selected trigger mode.
Query response: (FREE|VID|LINE|EXT)<CR><LF><EOI>.

TRA(.<number>[,<number>]<A-block data field>[,<I-block data field>]?)?
Provides a method for returning or storing trace values.

TRB
Same format and query response as TRA except TRB is used.

TRC
Same format and query response as TRA except TRC is used.

TRCMEM();?
Returns the total number of registers available for SAVET and RCLT.
Query response: <numeric data format>.

TRDEF.<label>(<numeric data format>);
Creates a user-defined trace.
<trace length>::=<user defined variable>[<predefined variable>[<predefined function>]<trace element>]<number>
Query response: <numeric data format>.

TRDSP(.TRA|TRB|TRC).(ON|OFF)[1][0];
Controls the display of trace A, B, or C without clearing the trace
(measurements can still be taken).

TRGRAPH.<address>,<x position>,<y position>,<expanding factor>[<trace source>];
Displays a compressed (see "COMPRESS") trace anywhere on the
spectrum analyzer display. The x and y positions orient the trace positions.
<address>::=integer,
<x position>::=integer in <display units>.
<y position>::=integer in <display units>.
<expanding factor>::=integer from 0 to 100.
<trace source>::=TRA|TRB|TRC.<user-defined trace>.

TRMATH.<string data field>[,<A-block data field>[,<I-block data field>]?)?
Executes the specified trace math or user-operator commands at the end of
a sweep. All analyzer commands except TS are allowed.

TRPRST;
Sets trace operations to their preset values.

TRSTAT;
Returns the status of traces A, B, and C to the controller.
Query response: (CLEAR|WRITE|BLANK|VIEW|MXM|MIN|MAX|A|B|C)
<CR><LF><EOI>.

TS;
Starts and completes one full sweep before the next command is executed.

HP 8590B/8592B Programming Commands
TWDW<trace destination>, UNIFORM|HANNING|FLATTOP;
Formats trace information for fast Fourier analysis (FFT). This user-defined trace should be used as the <window> parameter in the FFT command.
UNIFORM: for FFT of transient signals and random noise. This window has the least frequency uncertainty.
HANNING: offers a compromise between the UNIFORM window and the FLATTOP window.
FLATTOP: for FFT of periodic signals. This window has the least amplitude uncertainty.

UP<number>; 
Increases the value of the active function by the applicable step size.

USTATE<#A<length><character string>>?; 
Transmits information that has been stored in the analyzer by the user.
Query response: <A block data format><CRELFEOI>.

VAR<DEF<label>,<preset value>>; 
Defines a variable name and assigns an initial value to it. If reassigns the initial value to the variable name.
<preset value>:=<trace element>|<predefined function>|<predefined variable>|<user defined variable>|<number>.

VARIANCE<trace source>?; 
Returns the amplitude variable of the selected trace, in measurement units.

VAVG<#<number>,<ON|OFF>>?; 
Turns the video averaging on or off.
<number>:represents the maximum number of sweeps executed for averaging. Default length is 100.
Query response: <numeric data format>.

VBV<#<number>,<KHz|MHz|GHz>|<UP|DN|EP|AUTO>>?; 
Specifies the video bandwidth of the post-detection filter.
Query response: <numeric data format>.
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Amplitude correction factors.</td>
</tr>
<tr>
<td>A</td>
<td>Amp (unit) or A-block data field.</td>
</tr>
<tr>
<td>ABSHZ</td>
<td>Absolute Hz (unit).</td>
</tr>
<tr>
<td>ALL</td>
<td>ALL.</td>
</tr>
<tr>
<td>AMP</td>
<td>Amplitude.</td>
</tr>
<tr>
<td>AMPCOR</td>
<td>Amplitude correction.</td>
</tr>
<tr>
<td>AUTO</td>
<td>Auto-couple.</td>
</tr>
<tr>
<td>AVG</td>
<td>Average.</td>
</tr>
<tr>
<td>B</td>
<td>8-bit byte or binary format.</td>
</tr>
<tr>
<td>BW</td>
<td>Black and white.</td>
</tr>
<tr>
<td>CARD</td>
<td>Memory card.</td>
</tr>
<tr>
<td>COLOR</td>
<td>Color.</td>
</tr>
<tr>
<td>d</td>
<td>downloadable programs.</td>
</tr>
<tr>
<td>DB</td>
<td>Decibel (unit).</td>
</tr>
<tr>
<td>DBM</td>
<td>Absolute decibel milliwatt (unit).</td>
</tr>
<tr>
<td>DBMV</td>
<td>Decibel millivolt (unit).</td>
</tr>
<tr>
<td>DBUV</td>
<td>Decibel microvolt (unit).</td>
</tr>
<tr>
<td>DELTA</td>
<td>Delta.</td>
</tr>
<tr>
<td>DISP</td>
<td>Display.</td>
</tr>
<tr>
<td>DLP</td>
<td>Downloadable program.</td>
</tr>
<tr>
<td>DM</td>
<td>Absolute decibel milliwatt (unit).</td>
</tr>
<tr>
<td>DMY</td>
<td>Day, month, year format.</td>
</tr>
<tr>
<td>DN</td>
<td>Decreases parameter one step size.</td>
</tr>
<tr>
<td>DUMP</td>
<td>Dump.</td>
</tr>
<tr>
<td>EP</td>
<td>Passes program for data entry from front panel.</td>
</tr>
<tr>
<td>EQ</td>
<td>Equal to.</td>
</tr>
<tr>
<td>EXT</td>
<td>External trigger.</td>
</tr>
<tr>
<td>FETCH</td>
<td>Fetch.</td>
</tr>
<tr>
<td>FIXED</td>
<td>Fixed.</td>
</tr>
<tr>
<td>FFT</td>
<td>Fast Fourier transform.</td>
</tr>
<tr>
<td>FLAT</td>
<td>Flat.</td>
</tr>
<tr>
<td>FLATTOP</td>
<td>Flat top filter window.</td>
</tr>
<tr>
<td>FREE</td>
<td>Free run.</td>
</tr>
<tr>
<td>FREQ</td>
<td>Frequency.</td>
</tr>
<tr>
<td>FRQ</td>
<td>Frequency.</td>
</tr>
<tr>
<td>GE</td>
<td>Greater than or equal to.</td>
</tr>
<tr>
<td>GHz</td>
<td>Gigahertz (unit).</td>
</tr>
<tr>
<td>GT</td>
<td>Greater than.</td>
</tr>
<tr>
<td>GZ</td>
<td>Gigahertz (unit).</td>
</tr>
<tr>
<td>HANNING</td>
<td>Hanning filter window.</td>
</tr>
<tr>
<td>HI</td>
<td>Highest.</td>
</tr>
<tr>
<td>HPB</td>
<td>HP-B.</td>
</tr>
<tr>
<td>HZ</td>
<td>Hertz (unit).</td>
</tr>
<tr>
<td>I</td>
<td>I-block data field.</td>
</tr>
<tr>
<td>INIT</td>
<td>Initialize.</td>
</tr>
<tr>
<td>INT</td>
<td>Internal.</td>
</tr>
<tr>
<td>INTEGER</td>
<td>Integer.</td>
</tr>
<tr>
<td>JP</td>
<td>Instrument preset.</td>
</tr>
<tr>
<td>IST</td>
<td>Inverse sweep time.</td>
</tr>
<tr>
<td>K</td>
<td>Free-field ASCII format with no terminator.</td>
</tr>
<tr>
<td>KC</td>
<td>Free-field ASCII format with &quot;CR&quot; and &quot;LF&quot; terminator.</td>
</tr>
<tr>
<td>KHZ</td>
<td>Kilohertz (unit).</td>
</tr>
<tr>
<td>KL</td>
<td>Free-field ASCII format with &quot;CR&quot; and &quot;END&quot; terminator.</td>
</tr>
<tr>
<td>KHZ</td>
<td>Kilohertz (unit).</td>
</tr>
<tr>
<td>L</td>
<td>Limit-line.</td>
</tr>
<tr>
<td>LAST</td>
<td>Last state.</td>
</tr>
<tr>
<td>LE</td>
<td>Less than or equal to.</td>
</tr>
<tr>
<td>LIMILINE</td>
<td>Limit-line.</td>
</tr>
<tr>
<td>LINE</td>
<td>Line trigger.</td>
</tr>
<tr>
<td>LCMD</td>
<td>Limit-line command.</td>
</tr>
<tr>
<td>LOWER</td>
<td>Lower limit-line.</td>
</tr>
<tr>
<td>LT</td>
<td>Less than.</td>
</tr>
<tr>
<td>M</td>
<td>Measurement units.</td>
</tr>
<tr>
<td>MA</td>
<td>Milliamper (unit).</td>
</tr>
<tr>
<td>MDY</td>
<td>Month, day, year format.</td>
</tr>
<tr>
<td>MHZ</td>
<td>Megahertz (unit).</td>
</tr>
<tr>
<td>MS</td>
<td>Millisecond (unit).</td>
</tr>
<tr>
<td>MTR</td>
<td>Meter.</td>
</tr>
<tr>
<td>MV</td>
<td>Millivolts (unit).</td>
</tr>
<tr>
<td>MW</td>
<td>Milliwatts (unit).</td>
</tr>
<tr>
<td>MZ</td>
<td>Megahertz (unit).</td>
</tr>
<tr>
<td>NE</td>
<td>Not equal to.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NE0G</td>
<td>Negative.</td>
</tr>
<tr>
<td>NH</td>
<td>Next highest peak.</td>
</tr>
<tr>
<td>NL</td>
<td>Next peak left.</td>
</tr>
<tr>
<td>NONE</td>
<td>No units.</td>
</tr>
<tr>
<td>NR</td>
<td>Next peak right.</td>
</tr>
<tr>
<td>NRM</td>
<td>Normal.</td>
</tr>
<tr>
<td>OA</td>
<td>Output amplitude.</td>
</tr>
<tr>
<td>OFF</td>
<td>Turn function off.</td>
</tr>
<tr>
<td>ON</td>
<td>Turn function on.</td>
</tr>
<tr>
<td>P</td>
<td>Parameter units.</td>
</tr>
<tr>
<td>PER</td>
<td>Period.</td>
</tr>
<tr>
<td>PKAVG</td>
<td>Peak average.</td>
</tr>
<tr>
<td>PKPIT</td>
<td>Peak pit.</td>
</tr>
<tr>
<td>POINT</td>
<td>Point.</td>
</tr>
<tr>
<td>POS</td>
<td>Positive.</td>
</tr>
<tr>
<td>PSN</td>
<td>Position.</td>
</tr>
<tr>
<td>RECALL</td>
<td>Recall operation.</td>
</tr>
<tr>
<td>RS232</td>
<td>RS-232 interface.</td>
</tr>
<tr>
<td>S</td>
<td>State.</td>
</tr>
<tr>
<td>SA'</td>
<td>Signal analysis.</td>
</tr>
<tr>
<td>SAVE</td>
<td>Save operation.</td>
</tr>
<tr>
<td>SC</td>
<td>Seconds (unit).</td>
</tr>
<tr>
<td>SLOPE</td>
<td>Slope.</td>
</tr>
<tr>
<td>SMP</td>
<td>Sample detection mode.</td>
</tr>
<tr>
<td>SP</td>
<td>Space.</td>
</tr>
<tr>
<td>SR</td>
<td>Stimulus response.</td>
</tr>
<tr>
<td>STATE</td>
<td>State register.</td>
</tr>
<tr>
<td>STEP</td>
<td>Step key ability.</td>
</tr>
<tr>
<td>STORE</td>
<td>Store.</td>
</tr>
<tr>
<td>SWT</td>
<td>Sweep time.</td>
</tr>
<tr>
<td>T</td>
<td>Trace.</td>
</tr>
<tr>
<td>TG</td>
<td>Tracking generator.</td>
</tr>
<tr>
<td>TRA</td>
<td>Trace A.</td>
</tr>
<tr>
<td>TRB</td>
<td>Trace B.</td>
</tr>
<tr>
<td>TRC</td>
<td>Trace C.</td>
</tr>
<tr>
<td>UA</td>
<td>Microamp (unit).</td>
</tr>
<tr>
<td>UNIFORM</td>
<td>Uniform filter window.</td>
</tr>
<tr>
<td>UP</td>
<td>Increases the parameter one step size.</td>
</tr>
<tr>
<td>ULOW</td>
<td>Upper limit.</td>
</tr>
<tr>
<td>UPPER</td>
<td>Upper limit-line.</td>
</tr>
<tr>
<td>US</td>
<td>Microseconds (unit).</td>
</tr>
<tr>
<td>UV</td>
<td>Microvolts (unit).</td>
</tr>
<tr>
<td>UW</td>
<td>Microwatt (unit).</td>
</tr>
<tr>
<td>V</td>
<td>Volts (unit).</td>
</tr>
<tr>
<td>VID</td>
<td>Video trigger.</td>
</tr>
<tr>
<td>W</td>
<td>Watts or Word (for MDS command).</td>
</tr>
<tr>
<td>YTF</td>
<td>YIG-tuned filter.</td>
</tr>
<tr>
<td>XTAL</td>
<td>Crystal.</td>
</tr>
<tr>
<td>*</td>
<td>Asterisk (wildcard).</td>
</tr>
<tr>
<td>;</td>
<td>Semicolon (ASCII code 59).</td>
</tr>
<tr>
<td>0</td>
<td>Comma (ASCII code 44).</td>
</tr>
<tr>
<td>1</td>
<td>Off. Command argument.</td>
</tr>
<tr>
<td>50</td>
<td>On. Command argument.</td>
</tr>
<tr>
<td>75</td>
<td>50Ω.</td>
</tr>
<tr>
<td>?</td>
<td>75Ω.</td>
</tr>
</tbody>
</table>

Returns a query response containing the value or state of the associated parameter. The query response is followed by a carriage-return/line-feed.
Analyzer Error Messages

The analyzer can generate various messages that appear on its screen during operation to indicate a problem.

There are three types of messages: hardware error messages (H), user-created error messages (U), and informational messages (M).

- Hardware error messages indicate the analyzer hardware is probably broken. Refer to Chapter 8 in the HP 8590B/8592B Installation, Verification, and Operation Manual for more information.
- User-created error messages appear when the analyzer is used incorrectly. They are usually generated during remote operation (entering programming commands using a controller or the external keyboard). See the HP 8590 Series Spectrum Analyzer Programming Manual for more information.
- Informational messages indicate the analyzer's progress within a specific procedure.

The messages are listed in alphabetical order on the following pages; each message is defined, and its type is indicated by an (H), (U), or (M).

ADC-GND FAIL
Indicates a failure in the processor. (H)

ADC-TIME FAIL
Indicates a failure in the processor. (H)

ADC-2V FAIL
Indicates a failure in the processor. (H)

CAL:
During the self-calibration routine, messages may appear on the display indicating the routine is progressing: SWEEP, FREQ, SPAN, AMPTD, 3dB BW, ATTN, LOG AMP, PEAKING, YFP. FREQ UNCAL appears
briefly during CAL FM. This is normal and does not indicate a problem. (M)

CAL: DATA NOT STORED
CAL AMP NEEDED
The correction factors are corrupt and cannot be stored. Perform the CAL AMP NEEDED routine. (U) (H)

CAL: cannot execute CAL AMP
enter: 0 dB PREAMP GAIN
The preamp gain should be set to 0 dB before the CAL AMP routine is performed. The preamp gain is set by using CAL PREAMP. (U) (H)

CAL: FM SPAN SENS FAIL
The analyzer could not set up span sensitivity of the FM coil. (H)

CAL: GAIN FAIL
Indicates the signal amplitude is too low during the CAL AMP routine. (H)

CAL: LOST COMB SIGNAL
Indicates the amplitude of the comb generator signal is insufficient to complete the CAL YTF. Be sure to use a low-loss cable (SMA-to-type N cable) to connect the comb generator output the analyzer input before when using CAL YTF. (U) (H)

CAL: NO YTF IN 8590/1
The CAL YTF programming command is available for the HP 8592B and the HP 8593A only. (U)

CAL: NO YTO AVAILABLE
The CAL YTO programming command is no longer necessary. (U)

CAL: PASSCODE NEEDED
Indicates that the function cannot be accessed without the pass code. (M)

CAL: RES BW AMP FAIL
The relative insertion loss of the resolution bandwidth is incorrect. (H)

CAL SIGNAL NOT FOUND
Indicates the CAL OUT signal cannot be found. Check that the CAL OUT is connected to the analyzer input connector using an appropriate cable. If the CAL OUT signal is connected to the analyzer input but cannot be

found, press (FREQ) -37 GM before performing the CAL PREP or CAL FREQ & AMP. (U) (H)

CAL: SPAN SENS FAIL
The self-calibration span sensitivity routine failed. (H)

CAL: USING DEFAULT DATA
Indicates the calibration data is corrupt and default correction factors are being used. Interruption of the self-calibration routines or an error can cause this problem. (M)

COMB SIGNAL NOT FOUND
The comb signal cannot be found. Check that 100 MHz COMB OUT is connected to the analyzer input. The comb generator is available with the HP 8592B or HP 8593A only. (U) (H)

COMMAND ERROR:
The specified programming command is not recognized by the analyzer. (U)

CONFLICT TABLE OVERFLOW
Indicates that too many two-letter compatible commands have been used. See Table 4-3 in the HP 8590 Series Spectrum Analyzer Programming Manual for information about substituting alternate commands for two-letter compatible commands. (U)

CONF TEST FAIL
Indicates that the confidence test failed. (H)

FAIL:
An error was discovered during the power-up check. The 4-digit by 10-digit code indicates the type of error. Error codes are described in the analyzer Service Manual. (H)

FREQ UNCAL
Indicates a YTO-tuning failure. This may occur when using default correction factors. Performing the CAL FREQ routine may eliminate the failure. The FREQ UNCAL message appears briefly during the CAL FREQ routine or when changing the frequency value with the knob (it does not indicate a problem). (U) (H)
INVALID ACTDEF: . . .
The specified ACTDEF name is not valid. See the ACTDEF programming command. (U)

INVALID AMPCOR: FREQ
For the AMPCOR command, the frequency data must be in increasing order. See the AMPCOR programming command. (U)

INVALID AUNITS: . . .
The amplitude units are not valid. See the AUNITS programming command. (U)

INVALID BLOCK FORMAT: IF STATEMENT
An invalid block format appeared within the IF statement. (U)

INVALID CARD: DIRECTORY
Indicates the memory card has not been formatted. (U)

INVALID CARD: NO CARD
Indicates a memory card has not been inserted. (U)

INVALID CARD
Indicates a card reader is not installed, the memory card is write-protected, the memory card is a read-only card, or a memory card has not been inserted. This message can occur if remote programming commands for the memory card capability are executed with an HP 8590B or HP 8592B without Option 003. (U)

INVALID CARD: TYPE
Indicates a card reader is not installed, the memory card is write-protected, the memory card is a read-only card, or a memory card has not been inserted. This message can occur if remote programming commands for the memory card capability are executed with an HP 8590B or HP 8592B without Option 003. (U)

INVALID CHECKSUM: USTATE
The user-defined state does not follow the expected format. (U)

INVALID COMPARE OPERATOR
An IF/THEN or REPEAT/UNTIL routine is improperly constructed. Specifically, the IF or UNTIL operands are incorrect. (U)

INVALID DETECTOR: . . .
The specified detector is not valid. See the DET programming command. (U)

INVALID ENTER FORMAT
The enter format is not valid. See the appropriate programming command description to determine the correct format. (U)

INVALID FILE: NO ROOM Indicates that there is not enough available space on the memory card to store the data. (U)

INVALID HP-IB ADDRESS/OPERATION
An HP-IB operation was aborted due to an incorrect address or invalid operation. Check that there is only one controller (the analyzer) connected to the printer. (U)

INVALID HP-IB OPERATION REN TRUE
The HP-IB operation is not allowed. (This is usually caused by print/plot when a controller is on the interface bus.) (U)

INVALID ITEM:
Indicates an invalid parameter has been used in a programming command. (U)

INVALID KEYNAME: . . .
The specified key name is not allowed. (The key name may have conflicted with an analyzer programming command.) Use an underscore as the second character in the key name, or avoid beginning the key name with the following pairs of letters: LB, OA, OL, TA, TB, TR, MA, MF, TS, OT, and DR. (U)

INVALID OUTPUT FORMAT
The output format is not valid. See the appropriate programming command description to determine the correct format. (U)

INVALID REGISTER NUMBER
The specified trace register number is invalid. (U)

INVALID REPEAT MEM OVFIL
Memory overflow occurred due to a REPEAT routine. This occurs if the repeat statements are too long. (U)
INVALID REPEAT NEST LEVEL
The nesting level in the REPEAT routine is improperly constructed. This can occur if too many REPEAT routines are nested. (U)

INVALID RS-232 ADDRESS/OPTION
An RS-232 operation was aborted due to an incorrect address or invalid operation. (U)

INVALID SAVREG
Data has not been saved in the specified state or trace register, or the data is corrupt. (U)

INVALID STORE DEST:...
The specified destination field is invalid. (U)

INVALID SYMTAB ENTRY: SYMTAB OVERFLOW
There is a symbol table overflow. This can occur if there are too many user-defined items (functions, variables, key definitions) or downloadable programs in analyzer memory. Use DELETE, DELETE, or DISPOSE USER KEY to delete unnecessary items. This can also occur when the processor board has failed. See the analyzer's Service Manual for more information. (U)

INVALID TRACE:...
The specified trace is invalid. (U)

INVALID TRACE NAME:...
The specified trace name is not allowed. Use an underscore as the second character in the trace name, or avoid beginning the trace name with the following pairs of letters: LB, OA, OL, TA, TB, TR, MA, MF, TS, OT, and DR. (U)

INVALID TRIGGER MODE:...
The specified trigger mode is invalid. See the TM programming command. (U)

INVALID VALUE PARAMETER:...
The specified value parameter is invalid. (U)

INVALID VARDEF:...
The specified variable name is not allowed. Use an underscore as the second character in the variable label, or avoid beginning the variable label with the following pairs of letters: LB, OA, OL, TA, TB, TR, MA, MF, TS, OT, and DR. (U)

INVALID WINDOW TYPE:...
The specified window is invalid. See the TWNDW programming command. (U)

MEAS UNSCAL
The measurement is uncalibrated. Check the sweep time, span, and bandwidth settings. (U)

NO CARD FOUND
Indicates that the memory card is not inserted. (U)

NO COUNTER/LOCK AVAILABLE
The programming command is available for the HP 8591A or the HP 8593A only. (U)

PARAMETER ERROR:...
The specified parameter is not recognized by the analyzer. See the appropriate programming command description to determine the correct parameters. (U)

POS-PK FAIL
Indicates the positive-peak detector has failed. (H)

RES-BW SHAPE FAIL
Indicates the 3 dB bandwidth is not within specifications. (H)

RES-BW NOISE FAIL
Indicates the noise floor level is too high at the indicated bandwidth. (H)

SAMPLE FAIL
Indicates the sample detector has failed. (H)

SOFTKEY OVF/... Softkey nesting exceeds the maximum number of levels. (U)

SRQ...
The specified service request is active. Service requests are a form of informational message and are explained in Appendix B of the HP 8591B/8592B Spectrum Analyzer Installation, Verification, and Operation Manual. (M)

STEP GAIN ATTEN FAIL
Indicates the step gain has failed. (H)
TABLE FULL
Indicates the upper or lower table of limit lines contains the maximum number of entries allowed. Additional entries to the table are ignored. (U)

TG SIGNAL NOT FOUND
Indicates the tracking generator output signal cannot be found. Check that the tracking generator output (RF OUT 50Ω or RF OUT 75Ω) is connected to the analyzer input connector using an appropriate cable. (U)

TG UNINV
Indicates that the source power is set higher or lower than the analyzer can provide (HP 8560B with Option 010 or 011 only).

UNDEF KEY
A softkey referred to is not recognized by the analyzer. (U)

VID-BW FAIL
Indicates the video bandwidth(s) have failed. (H)

---

AM, FM, and Pulsed RF Reference Charts

This appendix contains charts and graphs that are helpful for amplitude modulation, frequency modulation, and pulsed RF measurements.

Amplitude Modulation

Modulation information can easily be determined from the carrier signal and a sideband.

The difference in amplitude between the two signals can be used to determine percent of modulation. Markers read the frequency difference between two signals, which is equal to the modulating frequency. The following table and graph help you to determine amplitude modulation information.

<table>
<thead>
<tr>
<th>% Modulation</th>
<th>Sideband Level Below Carrier (dB)</th>
<th>Sideband Level Below Carrier (dB)</th>
<th>% Modulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45</td>
<td>10</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
<td>30</td>
<td>6.3</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>40</td>
<td>2.0</td>
</tr>
<tr>
<td>30</td>
<td>16.5</td>
<td>50</td>
<td>0.63</td>
</tr>
<tr>
<td>40</td>
<td>14</td>
<td>60</td>
<td>0.3</td>
</tr>
<tr>
<td>50</td>
<td>11</td>
<td>70</td>
<td>0.063</td>
</tr>
<tr>
<td>70</td>
<td>9.1</td>
<td>80</td>
<td>0.02</td>
</tr>
<tr>
<td>80</td>
<td>7.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Figure B-1. Percent Modulation**

**Carrier and First Sideband Charts for Calibrating Deviation**

<table>
<thead>
<tr>
<th>Carrier Band</th>
<th>1st</th>
<th>1st</th>
<th>2nd</th>
<th>2nd</th>
<th>3rd</th>
<th>3rd</th>
<th>4th</th>
<th>4th</th>
<th>5th</th>
<th>5th</th>
<th>6th</th>
<th>6th</th>
<th>7th</th>
<th>7th</th>
<th>8th</th>
<th>8th</th>
<th>9th</th>
<th>9th</th>
<th>10th</th>
</tr>
</thead>
</table>

\* \(i = \text{modulation index}\)
Figure B-2. Bessel Null Graph

ARGUMENT OF THE FUNCTION = t
Bessel functions for the first eight orders

Figure B-3. Loss in Sensitivity (Pulsed RF versus CW)
Programming Command to Key

This appendix lists the programming commands alphabetically. Use the "Key" column to identify the command that is similar to front-panel or softkey function.

<table>
<thead>
<tr>
<th>Command</th>
<th>Name</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABORT</td>
<td>Abort</td>
<td>A-B -&gt; A ON</td>
</tr>
<tr>
<td>ABS</td>
<td>Absolute</td>
<td>NORM</td>
</tr>
<tr>
<td>ACTDEF</td>
<td>Active Function</td>
<td>A NNOT</td>
</tr>
<tr>
<td>ACTVF</td>
<td>Active Function</td>
<td>AMPL</td>
</tr>
<tr>
<td>ADD</td>
<td>Add</td>
<td>AT Tenuation</td>
</tr>
<tr>
<td>AMB</td>
<td>Trace A Minus Trace B</td>
<td>AUTO</td>
</tr>
<tr>
<td>AMBPL</td>
<td>Trace A Minus Trace B Plus Display Line</td>
<td>BLANK</td>
</tr>
<tr>
<td>ANNOT</td>
<td>Annotation</td>
<td>BIT</td>
</tr>
<tr>
<td>APB</td>
<td>Trace A Plus Trace B</td>
<td>EXCH</td>
</tr>
<tr>
<td>AT</td>
<td>Attenuation</td>
<td>EXCH</td>
</tr>
<tr>
<td>AUNITS</td>
<td>Amplitude Units</td>
<td>EXCH</td>
</tr>
<tr>
<td>AUTO</td>
<td>Auto Couple</td>
<td>EXCH</td>
</tr>
<tr>
<td>AVG</td>
<td>Average</td>
<td>EXCH</td>
</tr>
<tr>
<td>AXB</td>
<td>Exchange Trace A and Trace B</td>
<td>EXCH</td>
</tr>
<tr>
<td>BIT</td>
<td>Bit</td>
<td>EXCH</td>
</tr>
<tr>
<td>BLANK</td>
<td>Blank Trace</td>
<td>EXCH</td>
</tr>
<tr>
<td>BML</td>
<td>Trace B Minus Display Line</td>
<td>EXCH</td>
</tr>
<tr>
<td>BTC</td>
<td>Transfer Trace B to Trace C</td>
<td>EXCH</td>
</tr>
<tr>
<td>BXC</td>
<td>Trace B Exchange Trace C</td>
<td>EXCH</td>
</tr>
</tbody>
</table>

Figure B-4. RES BW Setting for Pulsed RF Computed from \( \tau B = 0.1 \)
### Table C.1.

**HP 8590B/8592B Programming Command to Key (continued)**

<table>
<thead>
<tr>
<th>Command</th>
<th>Name</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL</td>
<td>Calibration</td>
<td>CAL calibration functions</td>
</tr>
<tr>
<td>CAT</td>
<td>Catalog</td>
<td>CATALOG CARD</td>
</tr>
<tr>
<td>CF</td>
<td>Center Frequency</td>
<td>CENTER FREQ</td>
</tr>
<tr>
<td>CLR AVG</td>
<td>Clear Average</td>
<td>CLEAR WRITE A</td>
</tr>
<tr>
<td>CL LTD</td>
<td>Clear LTD</td>
<td>CLEAR WRITE B</td>
</tr>
<tr>
<td>CLR NV</td>
<td>Clear NV</td>
<td>CLEAR WRITE C</td>
</tr>
<tr>
<td>CLS</td>
<td>Clear Status Byte</td>
<td></td>
</tr>
<tr>
<td>CNF</td>
<td>Confidence Test</td>
<td>CONFF TEST</td>
</tr>
<tr>
<td>CNTL A</td>
<td>Auxiliary Control Line A</td>
<td>CNTL A.0.1</td>
</tr>
<tr>
<td>CNTL B</td>
<td>Auxiliary Control Line B</td>
<td>CNTL B.0.1</td>
</tr>
<tr>
<td>CN TL C</td>
<td>Auxiliary Control Line C</td>
<td>CNTL C.0.1</td>
</tr>
<tr>
<td>CNTL D</td>
<td>Auxiliary Control Line D</td>
<td>CNTL D.0.1</td>
</tr>
<tr>
<td>CNTL I</td>
<td>Auxiliary Control Line Input</td>
<td>CNTL I</td>
</tr>
<tr>
<td>COMB</td>
<td>Comb</td>
<td>COMB GEN OR OFF</td>
</tr>
<tr>
<td>COMPRESS</td>
<td>Compress</td>
<td></td>
</tr>
<tr>
<td>CON CAT</td>
<td>Concatenate</td>
<td></td>
</tr>
<tr>
<td>CONS</td>
<td>Continuous Sweep</td>
<td>SWEEP. CONT. SOL. (CONT)</td>
</tr>
<tr>
<td>CORRECK</td>
<td>Correction Factors On</td>
<td></td>
</tr>
<tr>
<td>CR H POS</td>
<td>Horizontal Position of CRT</td>
<td>CRT BOX POSITION</td>
</tr>
<tr>
<td>CRT V POS</td>
<td>Vertical Position of CRT</td>
<td>CRT VERT POSITION</td>
</tr>
<tr>
<td>CTA</td>
<td>Convert to Absolute Units</td>
<td></td>
</tr>
<tr>
<td>CTM</td>
<td>Convert to Measurement Units</td>
<td></td>
</tr>
<tr>
<td>D AT E MODE</td>
<td>Date Mode</td>
<td>D AT EMODE, DRY, DRY</td>
</tr>
<tr>
<td>DET</td>
<td>Detection Mode</td>
<td>DETECTOR, DAMP, FR</td>
</tr>
<tr>
<td>DIS POS</td>
<td>Dispose</td>
<td>DISPOSE USER, MEM</td>
</tr>
<tr>
<td>DIV</td>
<td>Divide</td>
<td></td>
</tr>
<tr>
<td>DL</td>
<td>Display Line</td>
<td>DISP LINES ON/OFF</td>
</tr>
<tr>
<td>DONE</td>
<td>Done</td>
<td></td>
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**HP 8590B/8592B Programming Command to Key (continued)**

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C-6 Programming Command to Key  C-7 Programming Command to Key
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**HP 8590B/8592B Programming Command to Key (continued)**

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### C-8 Programming Command to Key
Locating a Softkey

Use this appendix to locate a softkey. For each softkey listed, a corresponding front-panel key is listed. Pressing the front-panel key accesses the menu containing the desired softkey.

<table>
<thead>
<tr>
<th>Softkey Functions</th>
<th>Front-Panel Key Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>X AM</td>
<td>MEAS/USER</td>
</tr>
<tr>
<td>0-2.90 GHz BAND 0</td>
<td>SPAN</td>
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<tr>
<td>2.70-3.4 GHz BAND 1</td>
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</tr>
<tr>
<td>3 dB POINTS</td>
<td>MEAS/USER</td>
</tr>
<tr>
<td>3rd ODD MEAS</td>
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<tr>
<td>6.0-12.8 BAND 2</td>
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</tr>
<tr>
<td>2 dB POINTS</td>
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<tr>
<td>9 kHz FM T. BW</td>
<td>BW</td>
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<tr>
<td>19.4-10 BAND 3</td>
<td>SPAN</td>
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<td>19.4-22 BAND 4</td>
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<tr>
<td>90% PWK BW</td>
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<td>120 kHz FM T. BW</td>
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<td>A &lt;--&gt; B</td>
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<tr>
<td>A = B = A ON CTR</td>
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<tr>
<td>ABCD EFG</td>
<td>COMP/DISPLAY, or</td>
</tr>
<tr>
<td>A B C D E F G</td>
<td>MEAS/USER</td>
</tr>
<tr>
<td>A&gt;B&gt;C&gt;D&gt;E&gt;F&gt;G</td>
<td>AUX CTRL</td>
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<tr>
<td>A&gt;B&gt;C&gt;D&gt;E&gt;F&gt;G</td>
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Table D-1. HP 8590B/8592B Softkey Locations
Table D-1. HP 8590B/8592B Softkey Locations (continued)

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<tr>
<th>Softkey Functions</th>
<th>Front-Panel Key Access</th>
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<td>ALL CLR -&gt; CLRD</td>
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<td>ATTEN AUTO MAX</td>
<td>AMPLITUDE or AUTO COUPL</td>
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<td>AUTO COUPL</td>
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<td>B = 5 -&gt; C</td>
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<td>BLANK C</td>
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<td>CAL FREQ</td>
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<td>CAL TRK GEN</td>
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<td>CARD CONFIG</td>
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<tr>
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Table D-1. HP 8590B/8592B Softkey Locations (continued)

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D-2 Locating a Softkey

Locating a Softkey D-3
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Table D-1. HP 8590B/8592B Softkey Locations (continued)
### Table D-1. HP 8590B/8592B Softkey Locations (continued)

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<td>MAX MAX LEVEL</td>
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<td>HIRM HOLD &amp;</td>
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### Table D-1. HP 8590B/8592B Softkey Locations (continued)

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<td>SAVE LOCK OFF</td>
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<tr>
<td>SCAL L/G LIM</td>
<td>AMPLITUDE</td>
</tr>
<tr>
<td>SELECT AMPLITUDE</td>
<td>MEAS/USER</td>
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<td>MEAS/USER</td>
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<td>MEAS/USER</td>
</tr>
<tr>
<td>SERVICE CLR</td>
<td>CAL</td>
</tr>
<tr>
<td>SERVICE DIAG</td>
<td>CAL</td>
</tr>
<tr>
<td>SET ATT ERROR</td>
<td>CONFIG</td>
</tr>
<tr>
<td>SET DATE</td>
<td>CONFIG</td>
</tr>
<tr>
<td>SET TIME</td>
<td>CONFIG</td>
</tr>
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<td>SET OPTIONS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>SETUP</td>
<td>MEAS/USER</td>
</tr>
<tr>
<td>SPARK</td>
<td>SPARK</td>
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<td>SPARK ZOOM</td>
<td>SPARK</td>
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<td>SPEAKER ON/OFF</td>
<td>AUX CTRL</td>
</tr>
</tbody>
</table>
Table D-1. HP 8590B/8592B Softkey Locations (continued)

<table>
<thead>
<tr>
<th>Softkey Functions</th>
<th>Front-Panel Key Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECTRUM ANALYZER</td>
<td>MODE or (RESET)</td>
</tr>
<tr>
<td>SRC PWR OFFSET</td>
<td>AUX CTRL</td>
</tr>
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<td>SRC PWR ON/OFF</td>
<td>AUX CTRL</td>
</tr>
<tr>
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<tr>
<td>START FREQ</td>
<td>FREQUENCY</td>
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<tr>
<td>STATE -&gt; CARD</td>
<td>SAVE</td>
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<tr>
<td>STATE -&gt; INTERI</td>
<td>SAVE</td>
</tr>
<tr>
<td>STOP FREQ</td>
<td>FREQUENCY</td>
</tr>
<tr>
<td>STORWX</td>
<td>CONFIG, DISPLAY, or MEASURE</td>
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<tr>
<td>SWEEP CONT. SSL</td>
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<tr>
<td>SWP CPLG.SR. SA</td>
<td>AUX CTRL</td>
</tr>
<tr>
<td>SWP TIME AUTO MAN</td>
<td>AUTO COUPLE or SWEEP</td>
</tr>
<tr>
<td>THRESHOLD ON/OFF</td>
<td>DISPLAY</td>
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<td>CONFIG</td>
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<tr>
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<td>CONFIG</td>
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<tr>
<td>TRACE A</td>
<td>RECALL or SAVE</td>
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<td>TRACE A &amp; C</td>
<td>TRACING</td>
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<td>RECALL or SAVE</td>
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<tr>
<td>TRACE C</td>
<td>RECALL or SAVE</td>
</tr>
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<td>SAVE</td>
</tr>
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<td>TRACE -&gt; INTERI</td>
<td>SAVE</td>
</tr>
<tr>
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<td>AUX CTRL</td>
</tr>
<tr>
<td>TRACKING PEAK</td>
<td>AUX CTRL</td>
</tr>
<tr>
<td>USER MENU(S)</td>
<td>MEASURE/USER</td>
</tr>
<tr>
<td>VIB/RES. RATIO</td>
<td>DUAL</td>
</tr>
<tr>
<td>VIB AVG. ON/OFF</td>
<td>TRACING</td>
</tr>
<tr>
<td>VIB BY AUTO MAN</td>
<td>AUTO COUPLE or DUAL</td>
</tr>
<tr>
<td>VIDEO</td>
<td>TRACING</td>
</tr>
<tr>
<td>VIEW A</td>
<td>TRACING</td>
</tr>
</tbody>
</table>

Locating a Softkey
### Index

<table>
<thead>
<tr>
<th>% AM</th>
<th>2-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
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<tr>
<td>6-2.9 GHz BAND 0</td>
<td>2-1</td>
</tr>
<tr>
<td>2</td>
<td>2.75-6.4 BAND 1</td>
</tr>
<tr>
<td>3</td>
<td>3 dB POINTS</td>
</tr>
<tr>
<td>6</td>
<td>3rd ORD MEAS</td>
</tr>
<tr>
<td>6</td>
<td>6-12.8 BAND 2</td>
</tr>
<tr>
<td>6 dB POINTS</td>
<td>2-1</td>
</tr>
<tr>
<td>9</td>
<td>9 kHz EMI BW</td>
</tr>
<tr>
<td>9 kHz resolution bandwidth</td>
<td>See 9 kHz EMI BW</td>
</tr>
<tr>
<td>12</td>
<td>12 kHz -&gt; 19 kHz BAND 3</td>
</tr>
<tr>
<td>19</td>
<td>19 kHz -&gt; 22 kHz BAND 4</td>
</tr>
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<td>99% PWR BW</td>
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<td>120 kHz EMI BW</td>
</tr>
<tr>
<td>120 kHz resolution bandwidth</td>
<td>See 120 kHz EMI BW</td>
</tr>
<tr>
<td>A -&gt; C</td>
<td>2-2</td>
</tr>
<tr>
<td>A-B -&gt; A ON OFF</td>
<td>2-2</td>
</tr>
<tr>
<td>ABCDEF</td>
<td>2-2</td>
</tr>
<tr>
<td>ABB</td>
<td>2-2</td>
</tr>
<tr>
<td>active function block</td>
<td>1-1</td>
</tr>
<tr>
<td>ALC MUTE INT XTL</td>
<td>2-2</td>
</tr>
<tr>
<td>ALL-DLP -&gt; CARD</td>
<td>2-2</td>
</tr>
<tr>
<td>AMPLITUDE, 1-1, 1-8, 2-9</td>
<td></td>
</tr>
<tr>
<td>amplitude commands</td>
<td>3-6</td>
</tr>
<tr>
<td>amplitude correction factors</td>
<td>See AMPLITUDE COR FACT</td>
</tr>
<tr>
<td>amplitude correction factors</td>
<td>cataloging</td>
</tr>
<tr>
<td>See CATALOG AMP CORR</td>
<td></td>
</tr>
<tr>
<td>amplitude functions</td>
<td>See AMPLITUDE</td>
</tr>
<tr>
<td>amplitude units</td>
<td>3-3</td>
</tr>
<tr>
<td>AMPLITUDE COR FACT</td>
<td>2-2</td>
</tr>
<tr>
<td>AMPTD UNITS</td>
<td>2-3</td>
</tr>
<tr>
<td>ANALYZER ADDRESS</td>
<td>2-3</td>
</tr>
<tr>
<td>annotation</td>
<td>See ANNOTATN ON OFF</td>
</tr>
<tr>
<td>ANNOTATN ON OFF</td>
<td>2-3</td>
</tr>
<tr>
<td>ATEN AUTO MAN</td>
<td>2-3</td>
</tr>
<tr>
<td>attenuation</td>
<td>See ATEN AUTO MAN</td>
</tr>
</tbody>
</table>
MAX HOLD B, 2-12
MAX MXR LEVEL, 2-12
message/user commands, 3-12
MEMORY/USER, 2-12
memory card reader, 1-3
message block, 1-1
MIN HOLD C, 2-12
MINIMUM -> MARKER, 2-12
mixer level, 2-12
MNOISE ON OFF, 2-12
MEPAUSE ON OFF, 2-12
MFR, 1-9, 2-12
MFR. ->, 2-12
MFR -> SPAN, 2-12
MFRQ, 2-12
MODE, 2-12
mode commands, 3-12
N
NEW LIMIT, 2-12
NEXT PK, 2-13
NEXT PK LEFT, 2-13
NEXT PK RIGHT, 2-13
NORMALIZE ON OFF, 2-13
NORMALIZE POSITION, 2-13
notation conventions, 3-2
NO USER MENU, 2-13
O
operator entry commands, 3-13
output power, 2-17
P
PAINT/PRINTER, 2-13
peaks detection. See DETECTOR/SAMPL PK
PEAK EXCURS., 2-13
PEAK MENU, 2-13
PEAK SEARCH, 1-9, 2-13
PK-PK MEAS, 2-13
PLOT CONFIG, 2-13
PLOTTER ADDRESS, 2-13
plotter commands, 3-13
PLT. LOC., 2-13
PLTS/PG 1 2 4, 2-13
POINT, 2-14
preamplifier gain. See EXT PREAMPLER PEAK
PRESEL DEFAULT, 2-14
preset gaging. See PRESEL PEAK
PRESEL PEAK, 2-14
PRESET, 2-14
preset commands, 3-13
PRESET SPECTRUM, 2-14
PRINT CONFIG, 2-14
PRINTER ADDRESS, 2-14
printer commands, 3-13
PRINTER SETUP, 2-14
PROBE PWR, 1-3
program flow commands, 3-13
programming codes, 3-18-51
PRT MENU ON OFF, 2-14
PURGE LIMITS, 2-14
PWR SWP ON OFF, 2-15
R
RECALL, 2-15
RECALL LIMIT, 2-15
recall or save commands, 3-13
reference level, 2-15
reference level offset. See reference level
REF LVL, 2-15
REF LVL OFFSET, 2-15
RES BW AUTO MAN, 2-15
resolution bandwidth, 2-4, 2-15
RF OUT 600, 1-3
RF OUT 750, 1-3
RFG TITLE, 2-15
S
sample detection. See DETECTOR/SAMPL PK
SAVE, 2-15
SAVE LIMIT, 2-15
SAY LOCK ON OFF, 2-15
SCALE LOG LIN, 9-15
screen annotation, 1-4-6
screen graphics. See CRT ON OFF
screen title. See CHANGE TITLE
SELECT AMPLITUDE, 2-16
SELECT DIT AMPL, 2-16
SELECT FREQ, 2-16
SELECT LVL AMPL, 2-16
SELECT MID AMPL, 2-16
SELECT SEGMENT, 2-16
SELECT TYPE, 2-16
SELECT UFR AMPL, 2-16
self-calibration functions, 2-4
self-calibration routine problems, 1-12
self-calibration routines, 1-11-13
SERVICE CAL, 2-1
SERVICE DIAG, 2-1
SET DATE, 2-16
SET TIME, 2-16
SGL SWP, 2-16, 2-18
SHOW OPTIONS, 2-17
SIGNAL TRACK, 2-17
SLOPE, 2-17
softmax label, 1-1
softmax, 1-1
SPAN, 1-1, 1-8, 2-17
SPAN commands, 3-14
SPAN ZOOM, 2-17
SPECTRUM ANALYZER, 2-17
Spectrum analyzer auto-coupled sweep
time. See SWP CPLG SR SA
SRC PWR OFFSET, 2-17
SOURCE ON OFF, 2-17
SRO PWR ON OFF, 2-17
SRO PWR OFFSET, 2-17
START FREQ, 2-17
STATE -> CARD, 2-17
STATE -> INTRNL, 2-17
step keys, 1-3
stimulus response mode. See SWP CPLG SR SA
STOP FREQ, 2-17
STUWX, 2-18
SWEEP, 2-18
sweep commands, 3-14
SWEEP CONT SGL, 2-18
sweep modes, 1-4
sweep time, 2-18 See also SWP TIME
AUTO MAN
SWP CPLG SR SA, 2-18
SWP TIME AUTO MAN, 2-18
synchronization commands, 3-14
syntax conventions, 3-2-5
T
THRESHOLD ON OFF, 2-18
threshold line, 3-18
TIMEDATE, 2-18
TIMEDATE ON OFF, 2-18
title. See CHANGE TITLE
TRACE, 2-18
TRACe A, 2-18
TRACe A B C, 2-18
TRACe B, 2-18
TRACe C, 2-18
TRACe -> CARD, 2-18
trace commands, 3-15
TRACe -> INTRNL, 2-19
trace math commands, 3-16
trace modes, 1-4
TRACk GEN, 2-19
tracking generator, 2-19
frequency adjustment, 2-11
internal/external leveling, 2-2
output, 1-3
output power, 2-17
peak response, 2-19
calibration range, 2-15
power sweep, 2-17
power sweep range, 2-17
self-calibration, 2-3
self-calibration routine, 1-12
source power level step size, 2-17
source power offset, 2-17
warm-up time, 1-12
TRACKING PEAK, 2-19
TRIG, 2-19
trigger commands, 3-16
trigger modes, 1-4
USER defined commands, 3-16
USER MENU(S), 2-19
V
VBW/RBW RATIO, 2-19
VID AVG ON OFF, 2-19
VID BW AUTO MAN, 2-19
VIDEO, 2-19
video averaging, 2-19. See also VID AVG ON OFF
video bandwidth, 2-19. See also VID BW
AUTO MAN
video bandwidth to resolution bandwidth ratio, 2-19
VIEW A, 2-19
VIEW B, 2-19
VIEW C, 2-19
Volts, 2-20
W
warm-up time, 1-11
Watts, 2-20
Y
YZ. SPC CLEAR, 2-20
Z
ZERO SPAN, 2-20
RECALL
- state -> internet
- trace
- trace b
- trace c
- limit lines
- amplitude, corr fact
- menu
- catalog
- all
- catalog, register
- catalog, variables
- catalog, prefix
- more, 1 of 2
- delete, file
- exit, catalog
- menu
- catalog, dlp
- change, prefix
- entry, catalog
- more, 2 of 2
- abedef
- chemin
- stavin
- yzef spec, clear
- more, 1 of 2
- more, 2 of 2

SAVE
- trace a
- trace b
- trace c
- limit lines
- amplitude, corr fact
- menu
- catalog
- all
- catalog, register
- catalog, variables
- catalog, prefix
- more, 1 of 2
- delete, file
- exit, catalog
- menu
- catalog, dlp
- change, prefix
- entry, catalog
- more, 2 of 2
- abedef
- chemin
- stavin
- yzef spec, clear
- more, 1 of 2
- more, 2 of 2

* For saving and recalling data from the memory card. Available with Option 003 only.

For saving and recalling data from analyzer memory.
† Becomes MEM, LOCKED when SAV LOCK is on.
‡ CATALOG, REGISTER becomes LOAD, FILE instead of DELETE, FILE.

HP 8590B/8592B Spectrum Analyzer Mode Menus
**Sweep**

SWP TIME, AUTO MAN
Sweep. CONT SQL

**Trace**

CLEAR, WRITE A
MAX, HOLD A
VIEW, A
BLANK, A
TRACE, A B C
MORE, 1 of 3

VIEW AVG, ON OFF
DETECTOR, SAMPLE PK
NORMALIZE, ON OFF
A-B -> A, ON OFF
B-OL -> B
B-<-> C
A-B -> C
B-<-> C
MORE, 2 of 3

* Change to OFF, HOLD C when trace C is selected.

**Trig**

Sweep, CONT SQL
FREE RUN
VIDEO
LINE
EXTERNAL

---

HP 85908A/8592B Spectrum Analyzer Mode Menus