HP 8590B/8592B Spectrum Analyzer
Quick Reference Guide

HEWLETT PACKARD

Manual Part Number: 5958-7096
Microfiche Part Number: 5958-7097
Printed in the USA December 1989

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1212 Valley House Drive, Rohnert Park, CA 94928-4999

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. Appendixes 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 LVL. 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.

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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 COUPLE, 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.

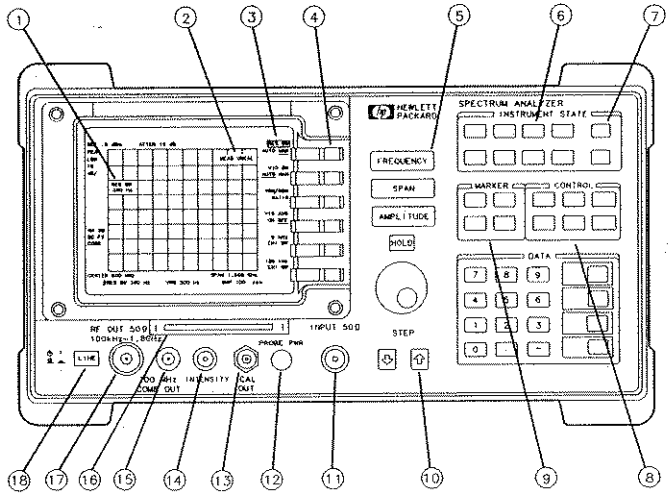


Figure 1-1. Front-Panel Overview

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 PRNT PLT` 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 (29 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 003 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 1-2 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.

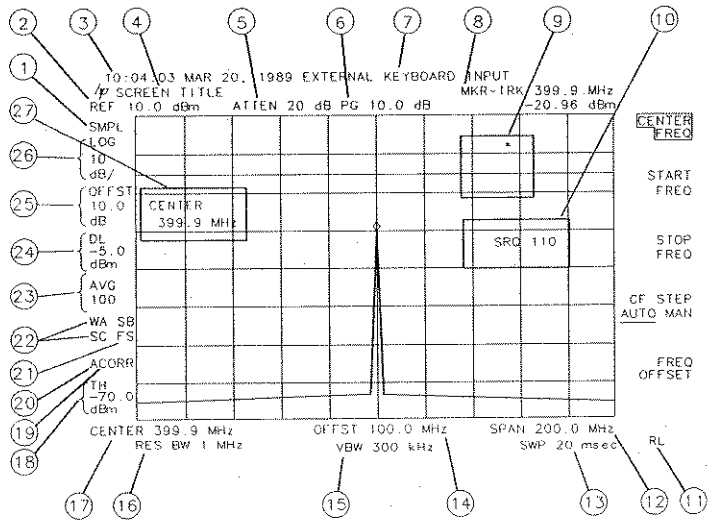


Figure 1-2. Screen Annotation

In Figure 1-2, index number 21 refers to the trigger and sweep modes of the analyzer. The first letter ("F") indicates the analyzer is in 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 ("S").

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

Table 1-1. Screen Annotation

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

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

Trace Mode	Trigger Mode	Sweep Mode
W = clear-write (traces A/B/C)	F = free run	C = continuous
M = maximum hold (traces A/B)	L = line	S = single sweep
V = view (traces A/B/C)	V = video	
S = store-blank (traces A/B/C)	E = external	
M = minimum hold (trace C)		

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 12.38 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.

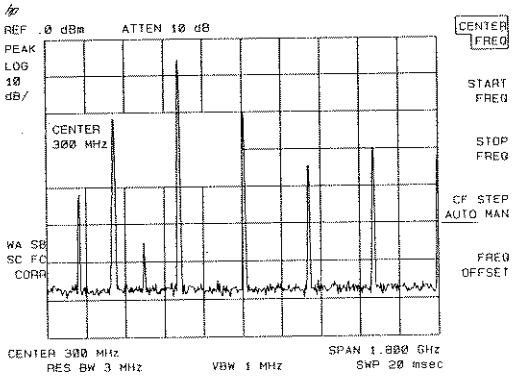


Figure 1-3. Center Frequency Set to 300 MHz on HP 8590B

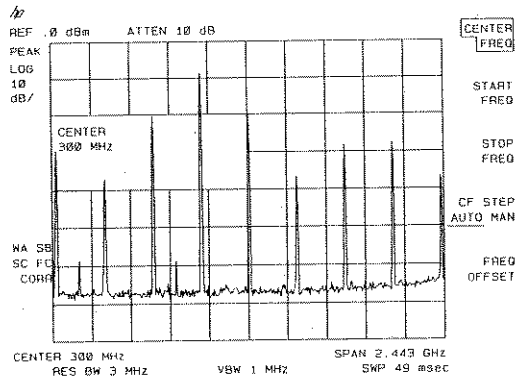


Figure 1-4. Center Frequency Set to 300 MHz on HP 8592B

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, (▼), or 20 (MHz).

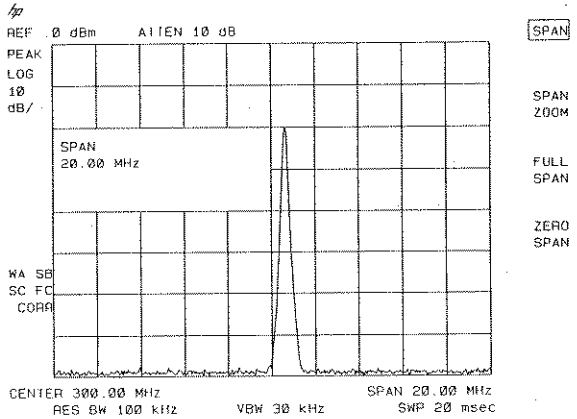


Figure 1-5. Frequency Span Reduced to 20 MHz

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 graticule 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 graticule line.

If desired, use the reference level function to place the signal peak on the screen using the knob, step keys, or number/units keypad.

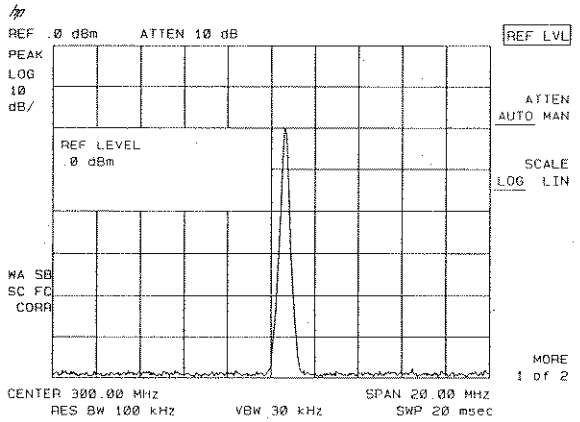


Figure 1-6. Setting the Amplitude

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 (MKR) (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.

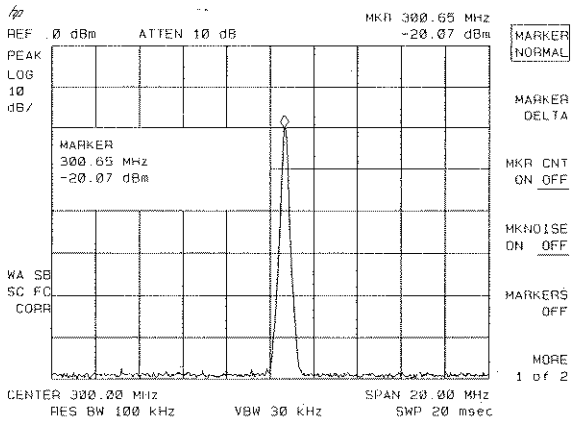


Figure 1-7. Marker Reads Out Frequency and Amplitude

Many measurements require only these four steps. To return the instrument to its initial power-on state, press (PRESET).

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.)

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 FETCH to retrieve the correction data that has previously been saved. If the fetched correction data is corrupt, the following procedure can be used to set the correction data back to predetermined values:

1. Press (FREQUENCY), −37 (Hz), (CAL), MORE 1 of 3, MORE 2 of 3, DEFAULT CAL DATA.
2. Perform the CAL FREQ and CAL AMPTD routines, or the CAL FREQ & AMPTD 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 & AMPTD 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.

1. To calibrate the tracking generator, connect the tracking generator output (RF OUT 50Ω) to the analyzer input connector, using an appropriate cable.
2. Press the following analyzer keys: (CAL), MORE 1 of 3, MORE 2 of 3, CAL TRK GEN. TG SIGNAL NOT FOUND will be displayed if the tracking generator output is not connected to the analyzer input.
3. To save this data in the area of analyzer memory that is saved when the analyzer is turned off, press CAL STORE.

2

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.

`% 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.)

`0-2.9 Gz 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.)

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

`3rd ORD MEAS` finds the third-order product and measures the frequency and amplitude differences relative to the fundamental signal.

`6.0-12.8 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 dB POINTS` finds the bandwidth of the signal at the 6 dB power level.

9 kHz EMI BW selects the 9 kHz resolution bandwidth at the 6 dB power level for EMI measurements.

12.4-19. 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 8592B only.)

19.1-22 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 8592B only.)

99% PWR BW computes the power of all signal responses and returns the bandwidth under which 99% of total power is found.

120 kHz EMI BW selects the 120 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 -> A 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.

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

ALL DLP -> 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.

AMPLTUD COR FACT saves or recalls amplitude correction factors from analyzer memory or the memory card. The memory card reader is available with Option 003.

AMPTD UNITS accesses that change amplitude units: dBm, dBmV, dBuV, Volts, Watts.

ANALYZER ADDRESS allows you to change the analyzer's HP-IB address. (Option 021 only.)

ANNOTATN ON OFF turns the screen annotation on and off. However, softkey annotation remains on-screen.

ATTEN AUTO MAN sets the input attenuation in 10 dB increments.

AUTO ALL automatically couples all functions that can be auto-coupled: resolution bandwidth, video bandwidth, attenuation, sweep time, center-frequency step, video bandwidth, and video-bandwidth/resolution-bandwidth ratio.

(AUTO COUPLE) accesses the auto-couple menu.

AUX CONN CONTROL accesses the softkey menu that controls the input and outputs of the auxiliary interface connector.

(AUX CTRL) accesses the softkey menu for control of the auxiliary interface connector, and, for the HP 8592B, the comb generator.

B & W PRINTER allows you to specify a black and white print using COPY DEV PRNT PLT, (COPY). (Option 021 or 023 only.)

BAND LOCK accesses the harmonic band menu. (HP 8592B only.)

BAUD RATE allows you to change the baud rate. (Option 023 only.)

B -> C moves trace B into trace C.

B <- -> C exchanges trace B and trace C.

B-DL -> B subtracts the display line from trace B and places the result into trace B.

BLANK A stops taking amplitude data for trace A and makes trace A invisible.

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.)

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

(BW) 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 CONFIG accesses the softkey menu that catalogs, formats, or erases a memory card. (Option 003 only.)

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

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

CARD -> 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 ALL 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 AMP CORR catalogs the amplitude correction factor files on the memory card. (Option 003 only.)

CATALOG CARD accesses the softkey menus 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 INTRNL accesses a menu with the cataloging functions for analyzer memory.

CATALOG LMT LINE catalogs the limit-line files on the memory card. (Option 003 only.)

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. (Option 003 only.)

CATALOG TRACES catalogs all of the saved traces from the memory card. (Option 003 only.)

CATALOG VARIABLS 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 MAN activates the step size for the center frequency function.

CHANGE 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.

CHANGE 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.

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

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

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

CNTL 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 PRNT PLT to choose between a printer or a plotter output. (Option 021 or 023 only.)

COPY DEV PRNT 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 HORZ 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.)

DATEMODE MDY 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.

dBmV changes the amplitude units to dBmV for the current amplitude scale.

dBuV changes the amplitude units to dBμV 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 SAMPL PK 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 CNTL 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 LIMIT LINES. 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/DELT 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 UPR 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.)

FREE 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.

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

GRAT ON OFF turns the screen graticule on and off.

INPUT Z 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.

INTRNL 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.

INTRNL -> 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.

INTRNL -> 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 (MEAS/USER). When accessed by (SAVE) or (RECALL), LIMIT LINES stores or recalls the current limit-line table(s) 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 ON 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 CATALOG REGISTER, trace or state register data can be loaded into analyzer memory.

(LOCAL) control of the front panel is obtained by pressing (CONFIG) if the analyzer has been placed in remote mode by a controller.

MAN TRK 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 AMPTD 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 LVL changes the analyzer settings so that the amplitude at the active marker becomes the reference level.

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 MXR 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.

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

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

(MKR) accesses the basic marker functions softkey menu and activates the marker.

(MKR ->) accesses the softkey menus for the transfer of marker information directly into other functions.

MKR Δ -> 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.

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

(MODE) accesses the spectrum analyzer mode and other modes of operation, and PRESET SPECTRUM.

NEW LIMIT clears the limit-line 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.

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

NORMLIZE POSITION turns on the display line.

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

PAINTJET PRINTER allows you to select a color print (with an HP PaintJet printer) using COPY DEV PRNT PLT, (COPY). (Option 021 or 023 only.)

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

PEAK MENU 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_LOC_ allows you to select the location of a plotter output. (This key appears only if two or four plots per page are selected using PLTS/PG 1 2 4.) (Option 021 or 023 only.)

PLTS/PG 1 2 4 allows you to choose a full-page, half-page, or quarter-page plot. (Option 021 or 023 only.)

POINT 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. (PRESET) 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. PRESET 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 CONFIG 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.)

PRT MENU 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.

PWR 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 recalls 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 BW AUTO MAN allows you to select the analyzer's 3 dB power level IF bandwidth manually or automatically recouple it.

RPG 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.

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

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

SELECT AMPLITUD allows you to enter the amplitude value for the displayed (upper or lower) limit-line segment.

SELECT DLT 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.

SERVICE 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.

(SGL 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 SHOW. Press EXIT SHOW 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 offsets 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 STP SIZE sets the step size of the source-power level, source-power offset, and power-sweep range functions. (Option 010 or 011 only.)

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

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

STATE -> INTRNL saves the analyzer state in analyzer memory.

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

STUVWX 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 CONT SGL selects between continuous-sweep mode or single-sweep mode. Use (SGL SWP) to trigger a sweep in single-sweep mode.

SWP CPLG SR SA 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.)

SWP TIME AUTO MAN allows you to change the sweep time manually or automatically recouple it.

THRESHLD ON OFF sets the lower boundary of the active trace. The threshold line "clips" signals that would otherwise appear below the line.

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

TIMEDATE ON 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 -> INTRNL saves the analyzer trace, limit-line table(s), or amplitude correction factors in analyzer memory.

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

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

(TRIG) accesses the softkey menu for selection of the sweep mode and trigger mode.

USER MENU(S) accesses menu 1, which is available for user-defined functions.

VBW/RBW RATIO allows the selection of the ratio between the video and resolution bandwidths.

VID AVG ON OFF 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.

VID BW AUTO MAN allows you to change the analyzer's post-detection filter manually or automatically recouple it. VID BW AUTO MAN auto-couples VBW/RBW 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 MIN 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 _ # SPC CLEAR 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.

3

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.
_	Indicates 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><c> indicates that <a> can be replaced by the series of elements <b><c> in any statement where <a> occurs).

Syntax Conventions

<A-block data field>::=

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

<A-block data format>::=

#A<length><command list>.

<character>::=

Sp!"#%&'()+,-/0123456789:;ABCDEFGHIJKL
MNOPQRSTUVWXYZ[\]?-'abcdefghijklmnopqrstuvwxyz

<character string>::=

list of characters.

<command list>::=

any spectrum analyzer command or list of commands separated by semicolons.

<CR>::=

carriage return.

<data byte>::=

8-bit byte containing numeric or character data.

<delimiter>::=

!|"|$|%|&|'|/|:|=|@

<destination>::=

TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined variable>|<trace range>.

<display units>::=

within screen or graticule coordinates. Screen coordinates are (Xmin,Ymin)=(−40,−22), (Xmax,Ymax)=(471,233). Graticule coordinates are (Xmin,Ymin)=(0,0), (Xmax,Ymax)=(400,200).

<EOI>::=

end or identify.

<I-block data field>::=

#I<command list>END; (use when the length of the command list is not known).

<key label>::=

One to eight characters per label line. Use the (|) symbol or blank spaces to separate into two softkey label lines.

<key number>::=

Integer from 1 to 6, 601 to 1200| <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 variable>|<predefined function>|<trace range>|<number>.

<source1>::=

TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined variable>|<predefined function>|<trace range>|<number>.

<source2>::=

TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined 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.
AUNITS	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.
RESETRL	Resets the reference level to instrument preset value.
PP*	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.

AUXILARY CONTROL (AUX CTRL)

CNTLA	Turns control line A on or off.
CNTLB	Turns control line B on or off.
CNTLC	Turns control line C on or off.
CNTLD	Turns control line D on or off.
CNTLI	Returns the status of control line I.
COMB*	Turns comb generator on or off.
MEASURE†	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).
SRCALC†	Selects internal or external leveling for the tracking generator.

SRCNORM	Subtracts trace B from trace A, adds the display line, and sends the result to trace A.
SRCPOFS†	Offsets the source power level.
SRCPSTP†	Selects the source-power step size.
SRCPSWP†	Selects sweep range of source output.
SRCPWR†	Selects the source power level.
SRCTK†	Adjusts tracking of source output with spectrum-analyzer sweep.
SRCTKPK†	Adjusts tracking of source output with analyzer sweep.
SWPCPL†	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.
VAVG	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.
CRTHPOS	Specifies the CRT horizontal position.
CRTVPOS	Specifies the CRT vertical position.

COMMAND TRIGGER

ONCYCLE	Performs command list periodically.
ONDELAY	Performs command list once after a time period.
ONEOS	Performs command list on end of every sweep.
ONMKR	Performs command list at the marker.
ONSRQ	Performs command list on every service request.
ONSWP	Performs command list at beginning of every 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.*
PREFX	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.
PREFX	Specifies the prefix.
TH	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	Returns learn string.
OUTPUT	Controls the HP-IB in order to send data.
RELHPIB	Releases HP-IB control.
TA	Controls trace A output.
TB	Controls trace B output.
TDF	Selects trace data output format.
TRA	Controls trace data input or output.
TRB	Controls trace data input or output.
TRC	Controls trace data input or output.

LIMIT LINES

LIMIDEL	Deletes all segments in the limit-line table and presets limit-line settings.
LIMIFAIL	Returns a "0" if the measurement sweep passes.
LIMILINE	Outputs the current limit-line table definitions.
LIMIMIRROR	Reflects the limit-line about the amplitude axis at the largest frequency.
LIMIMODE	Selects type of limit-line table format—upper, lower, upper and lower, or mid/delta.
LIMIREL	Specifies the current limit-lines as fixed or relative.
LIMISEG	Adds new segments to the current limit-line in the upper limit-line or the lower limit-line.
LIMITEST	Compares the active trace data with the current limit-line.
SEGDEL	Deletes the specified segment from the limit-line table(s).
SENTER	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.
MKPK	Moves active marker to maximum signal detected.
MKPX	Specifies minimum excursion for peak identification.
MKREAD	Selects type of marker readout to be displayed.
MKRL	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.
MKTRACK	Turns signal track on or off.
MKTYPE	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.
CTA	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.

MPY	Multiplies two operands.
MXM	Finds the maximum of two operands.
PDA	Finds the probability distribution of the amplitude.
PDF	Finds the probability distribution of frequency.
RMS	Finds the root mean square.
SQR	Finds the square root.
STDEV	Finds the standard deviation.
SUB	Subtracts one operand from another.
VARIANCE	Finds amplitude variance of operand.

MEASURE/USER (MEAS/USER)

LIMIDEL	Deletes all segments in limit-line table and presets limit-line settings.
LIMIFAIL	Returns a "0" if the measurement sweep passes.
LIMILINE	Outputs the current limit-line table definitions.
LIMIMIRROR	Reflects the limit-line about the amplitude axis at the largest frequency.
LIMIMODE	Selects type of limit-line table format—upper, lower, upper and lower, or mid/delta.
LIMIREL	Specifies the current limit-lines as fixed or relative.
LIMISEG	Adds new segments to the current limit-line in the upper limit-line or the lower limit-line.
LIMITEST	Compares the active trace data with the current limit-line.
PWRBW	Returns power bandwidth of signal.
SEGDEL	Deletes the specified segment from the limit-line table(s).
SENTER	Enters the limit-line data in the upper and lower limit-line tables or the mid/delta table.

MODE

MODE	Returns a "0" if the operating mode is spectrum analysis.

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.
PREFX	Specifies the prefix.
PSTATE	Protects internal state registers.
PURGE	Deletes the file from the current mass storage device.

RCLS	Recalls state from internal state register.
RCLT	Recalls state and trace, limit lines, or amplitude factors from the internal trace register.
SAVES	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.
HN*	Returns the harmonic number (band).
HNLOCK*	Locks the tuning band.
HNUNLK*	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

CONTS	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.
CLRW	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.
TRDEF	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.
TWNDOW	Specifies trace window for FFT.
VAVG	Turns video averaging on or off.
VIEW	Views trace.

TRACE MATH (see also Math)

APB	Adds trace A and trace B and places the result in trace A.
CLRAVG	Restarts video averaging.
COMPRESS	Compresses a trace to the desired length.
CONCAT	Concatenates two traces.
FFT	Calculates fast Fourier transform.
MIRROR	Displays the mirror image of a trace.
PEAKS	Specifies trace peaks.
SMOOTH	Smooths a trace.
SUM	Returns the sum of the amplitudes of the trace elements.
SUMSQR	Returns the sum of the squares of the amplitude of each trace element.
TRMATH	Performs trace math.
XCH	Exchanges traces.

TRIGGER

ONEOS	Performs the command list on end of sweep.
ONSWP	Performs the command list at beginning of sweep.
SNGLS	Selects single-sweep mode.
TM	Specifies trigger mode.
TS	Begins a new sweep.

USER-DEFINED

ABORT	Aborts all user-defined functions.
ACTDEF	Defines an active function.
DISPOSE	Deletes user-defined functions.
ERASE	Performs a DISPOSE ALL.
FUNCDEF	Defines a function.
KEYCLR	Clears softkeys 1 through 6.
KEYCMD	Defines the function and label of a softkey based on a condition and updates label whenever a key is pressed.
KEYDEF	Defines a softkey.
KEYENH	Activates inverse video and underlining of a softkey.
KEYEXC	Executes a softkey.
KEYLBL	Relabels a softkey.

MEM	Returns the amount of memory available.
MENU	Displays the softkey menu.
RETURN	Returns from user-defined function.
SAVEMENU	Saves softkeys 1—6 in the menu specified.
TRDEF	Declares a user-defined trace.
USTATE	Returns/sends user state.
VARDEF	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>;

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|DBM|V|ABSHZ|INTEGER),(<delimiter>(<command list>|<user-defined function>)<delimiter>))|?;

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|DBM|V|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|FOFFSET|INZ|LG|MKA|MKD|MF|MKN|MKPAUSE|MKPX|ML|MODE|NRL|RB|ROFFSET|RL|RLPOS|SAVRCLN|SETDATE|SETTIME|SP|SRCPOFS|SRCPSTP|SRCPSWP|SRCPWR|SRCTK|SS|ST|TH|TIMEDATE|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.

AMB(_(ON|OFF|1|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>.

AMBPL(_(ON|OFF|1|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>.

AMPCOR(_(<frequency>[HZ|KHZ|MHZ|GHZ],<ampli tude>[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|1|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.

AT[_((<number>[DB])|AUTO|UP|DN|EP)|?];

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.

AVG_<destination>,<source>, <ratio>;

Computes the average value of the source and the destination according to the following algorithm: Average = [((ratio − 1) × destination + source)]/ratio
<ratio>::=<number>|<user-d efined 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|GHZ])|UP|DN|EP)|?];

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

CLRAVG;

Restarts video averaging.

CLRDSP;

Erases menu or user-generated graphics.

CLRW_(TRA|TRB|TRC);

Clears the specified trace and enables trace data acquisition.

CLS;

Clears all status bits.

CNF;

Performs the confidence test.

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>.

CNTLI;

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

COMB_(ON|OFF|1|0);

Turns the comb generator on or off. (HP 8592B only.)

COMPRESS_<trace destination>,<trace source>,
(AVG|NRM|NEG|POS|SMP|PKAVG|PKPIT);

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.

CORREK[?];

Returns a "1" if the correction factors are on, a "0" if they are off.
Query response: (0|1)<CR><LF><EOI>.

CRTHPOS(_<position>|UP|DN)|?;

Specifies the horizontal position of the analyzer display.
<position>::=integer from 1 to 34.
Query response: <numeric data format>.

CRTVPOS(_<position>|UP|DN)|?;

Specifies the vertical position of the analyzer display.
<position>::=integer from 10 to 58.
Query response: <numeric data format>.

CTA_<destination>,<source>;

Converts the source values from measurement units to the current absolute amplitude units and stores this result in the destination.
<destination>::=<user-defined variable>.
<source>::=<user-defined variable>|<number>|<predefined variable>|<predefined function>.

CTM_<destination>,<source>;

Converts the source values to vertical measurement units and places the result in the destination.
<destination>::=<user-defined variable>.
<source>::=<user-defined variable>|<number>.

DATEMODE(_(MDY|DMY))|?;

Allows the display of the real-time clock to be set in month-day-year format or day-month-year format.
Query response: (MDY|DMY)<CR><LF><EOI>.

DET(_(POS|SMP))|?;

Selects the specified analyzer input detection mode.
Query response: (POS|SMP)<CR><LF><EOI>.

DISPOSE_<operand>;

Allows the user to free user memory which has been allocated previously for user-defined functions. DISPOSE ALL clears all operands.
<operand>::=<user-defined trace>|<user-defined variable>|<user-defined function>|<key number>|ALL |ONCYCLE|ONDELAY|ONEOS|ONMKR |ONSRQ|ONSWP|ONTIME|TRMATH.
<key number>::=1 to 6, 601 to 1200.

DIV_<destination>,<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[?];

Returns a "1" 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.

EE;

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).

<destination>::=<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 presets the analyzer.

EXP_<destination>,<source>, <scaling factor>;

The exponential of the source is placed in the destination. The EXP command is useful is for converting log values to linear values.
<scaling factor>::=<number>|<user-defined variable> |<predefined variable>|<predefined function>| <trace element>.

FA((_{<number>[HZ|KHZ|MHZ|GHZ])|UP|DN|EP))|?;

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

FB((_{<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>;

Performs 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 TWNDOW command, for proper formatting.
<trace destination>::=TRA|TRB|TRC|<user-defined trace>.
<trace source>::=TRA|TRB|TRC|<user-defined trace>.
<window>::=TRA|TRB|TRC|<user-defined trace>.

FOFFSET(_(<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 003 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|1|0))|?;

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

HAVE_(HPIB|RS232|IO|TG|CARD);

Returns a "0" if the specified device is not installed.

HPIB = Option 021.
RS232 = Option 023.
IO = 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>.

HNLOCK(_(<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>.

IF_<operand1>,(GT|LT|EQ|NE|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|EP|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>,<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>.

KEYENH_<key number>,<delimiter><key label><delimiter>,<delimiter><inverse video condition><delimiter>,<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>.

KEYEXC_<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|EP))|?;

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.

LIMIDEL;

Deletes all upper and lower segments in the current limit-line table and presets all limit-line settings.

LIMIFAIL[?];

Returns a "0" if the last measurement sweep is equal to or within the limit-line bounds.
Query response: 0|1|2|3|4<CR><LF><EOI>.

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?;

Outputs the current limit-line table definitions.
Query response: LIMIDEL;LIMILINE<number of segments>;LIMIREL_(ON|OFF);(SENTER<frequency>,<upper value>,<lower value>,(SLOPE|FLAT|POINT);)|(LIMIHALF_(UPPER|LOWER);LIMISEG<frequency>,<amplitude>,(SLOPE|FLAT|POINT);)LIMITEST_(ON|OFF);<CR><LF><EOI>. The number of segments represents the number of segments in the upper and lower limit-line table.

LIMIMIRROR;

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

LIMIMODE(_(UPPER|LOWER|UPLOW|DELTA))|?;

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 >.

LIMIREL(_(OFF|ON|0|1))|?;

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

LIMISEG(_<frequency>,<amplitude>,[FLA T|SLOPE| POINT];

Adds new segments to the current limit-line in the upper limit-line or the lower limit-line.
<frequency>::=(number[HZ|KHZ|MHZ|GHZ])|<trace element>|<predefined function>|<predefined variable>|<user-defined variable>.
<amplitude>::=(number[DB|DM])|<trace element>|<predefined function>|<predefined variable>|<user-defined variable>.

LIMITEST(_(OFF|ON|O|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;

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(_(B|W))|?;

Formats binary measurements by selecting the measurement data size as an 8-bit byte or a two-byte word.
Query response: (B|W)<CR><LF><EOI>.

MDU[?];

Returns values for the analyzer's baseline and reference level.
Query response: <number>,<number>,<number>,
<number>,(DBM|DBMV|DBUV|V|W) <CR><LF><EOI>.

MEAN_(TRA|TRB|TRC|<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|DN|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|1|0))|?;

Returns the average value or 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[_(HI|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|1|0))|?;

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

MKTYPE(_(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.

OL;

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>.

ONDELAY(_<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> |<I-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).
Query response: <A-block data format><CR> <LF><EOI>.

ONMKR(_<string data field>)|?;

Performs the string data field when the sweep reaches the marker position.
Query response: <A-block data format><CR> <LF><EOI>.

ONSRQ(_<string data field>)|?;

Executes the string data field whenever a service request occurs.
Query response: <A-block data format><CR><LF><EOI>.

ONSWP(_<string data field>|<A-block data field> |<I-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).
Query response: <A-block data format><CR><LF><EOI>.

ONTIME(_<time value>,<string data field>)|?;

Executes the string data field at the specified time.
<time value>::=<number>|<user-defined variable> in YYMMDDHHMMSS format.
Query response: digits representing YYMMDDHHMMSS, <A-block data format><CR><LF><EOI>.

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.
Query response: −40,−22,471,233<CR><LF><EOI>.

OUTPUT[_<address>,(K|B|KC|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 variable>|<user-defined variable> |<trace element>.

K = Free field, ASCII real number format.
B = Free field, in a single 8-bit byte.
KC = One byte binary.
KL = One word (2 bytes) binary.

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

PA[_PU|PD]_<X coordinate>,<Y coordinate>;

Draws vectors to the specified x and y coordinates. PU and PD determine whether the vector(s) are displayed. The x,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 x-axis position of the maximum value of the trace.

PLOT[_<P1x value>,<P1y value>,<P2x value>,<P2y value>];

Initiates a plotter output of the screen 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.
<P1x value>::=<P1y value>::=<number> that represents plotter dependent values that specify the lower-left plotter dimension.
<P2x value>::=<P2y 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 8592B only.)

PR[(PU|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>.

PREFX_<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[_(BW|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 monochrome format. PRINT1 or PRINT COLOR outputs the screen data in color format (with an HP PaintJet printer only).

PSTATE(_(ON|OFF|1|0))|?;

This command protects the state registers from being changed.
Query response: (ON|OFF)<CR><LF><EOI>.

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>.

RB(_(<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 LIMILINE or AMPCOR is used.
<trace destination>::=TRA|TRB|TRC|LIMILINE|AMPCOR|<user-defined trace>|<trace range>.
<trace register>::=integer from 0 to TRCMEM − 1.

RELHPIB;

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

REPEAT_<command list>**UNTIL**_<flow operand1>, (GT|LT|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 62.
Query response: <numeric data format>. (Returns the decimal weighing of the status byte 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|LIMILINE|AMPCOR|<user-defined trace>|<trace range>.
<trace register>::=integer from 0 to TRCMEM − 1.

SAVRCLF_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|LIMILINE|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>;

Enters the limit-line data in the upper and lower limit-line table or the mid/delta table as chosen by LIMIMODE.
<frequency>::=<number>|<us er-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>)|?;

Sets the date of the real-time clock of the analyzer.
<date>::=<number> in the YYMMDD format.
Query response: <numeric data format> representing YYMMDD.

SETTIME(_<time>)|?;

Sets the time of the real-time clock of the analyzer.
<time>::= <number> in the HHMMSS format.
Query response: <numeric data format> representing HHMMSS.

SMOOTH_<trace source>,<number of points>;

Smooths the specified trace according to the number of points specified for the running average.
<number of points>::=<number>|<trace element> |<predefined function>|<predefined variable> |<user-defined variable>.

SNGLS;

Selects the single-sweep mode.

SP[(_(<number>[HZ|KHZ|MHZ|GHZ])|UP|DN|EP)|?];

Changes the total displayed frequency range symmetrically about the center frequency.
Query response: <numeric data format>.

SPZOOM;

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_<destination>,<source>;

Computes the square root of the source and sends the result to the destination.

SRCALC(_(INT|XTAL|MTR))|?;

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.)
Query response: (INT|XTAL|MTR)<CR><LF><EOI>.

SRCNORM(_(OFF|ON|0|1))|?;

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>.

SRCPOFS(_(<number>[DB])|EP|DN|UP)|?;

Offsets the source power level. (Option 010 or 011 only.)
Query response: <numeric data format>.

SRCPSTP(_(<number>[DB])|EP|DN|UP|AUTO)|?;

Selects the source-power step size. (Option 010 or 011 only.)
Query response: <numeric data format>.

SRCPSWP(_(<number>[DB])OA|EP|DN|UP|OFF)|?;

Selects sweep range of source output. (Option 010 or 011 only.)
Query response: <numeric data format>.

SRCPWR(_(<number>[DB])OA|EP|DN|UP|OFF)|?;

Selects the source power level. (Option 010 or 011 only.)
Query response: <numeric data format>.

SRCTK(_(<number>)OA|EP|DN|UP)|?;

Adjusts tracking of source output with spectrum-analyzer sweep. (Option 010 or 011 only.)
Query response: <numeric data format>.

SRCTKPK;

Automatically adjust tracking of source output with spectrum-analyzer sweep.

SRQ_<number>;

Used by an external controller to simulate service requests to the analyzer.
<number>::=integer from 2 to 126.

SS(_(<number>[HZ|KHZ|MHZ|GHZ])|UP|DN|EP|AUTO)|?;

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

ST[(_([<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 003. 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>::=a|d|l|s|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>.

SWPCPL(_(SA|SR|OA))|?;

Selects either a stimulus-response (SR) or spectrum-analyzer (SA) auto-coupled sweep time. (Option 010 or 011 only.)
Query response: (SA|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|I|M|P))|?;

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|I|M|P)<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(_(ON|OFF|1|0))|?;

Enables the display of the time and date on the analyzer screen.
Query response: (ON|OFF)<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.
Query response: ((<number>[,<number>])|<A-block data format>| <I-block data format>|<data byte>[<data byte>]END)<CR><LF><EOI>.

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>(?|(,<trace length>);

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.
Query response: <A-block data format><CR> <LF><EOI>.

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 |MXMH|MINH)(A|B|C) <CR><LF><EOI>.

TS;

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

TWNDOW_<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;

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><CR><LF><EOI>.

VARDEF_<label>,<preset value>;

Defines a variable name and assigns an initial value to it. IP 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>.

VB(_(<number>[HZ|KHZ|MHZ|GHZ])|UP|DN|EP|AUTO)|?;

Specifies the video bandwidth of the post-detection filter.
Query response: <numeric data format>.

VBR(_<number>|UP|DN|EP|OA)|?;

Specifies the value which is multiplied by the resolution bandwidth to determine the automatic setting of video bandwidth.
Query response: <numeric data format>.

VIEW_(TRA|TRB|TRC);

Displays trace A, trace B, or trace C, and stops taking new data into the viewed trace.

XCH_<destination>,<destination>;

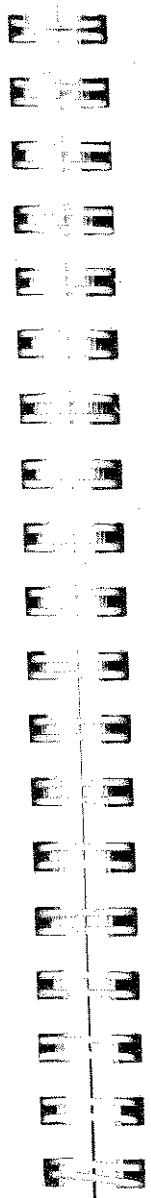
Exchanges the contents of the two parameters.

Characters and Secondary Keywords (Reserved Words) Summary

Element	Description
a	Amplitude correction factors.
A	Amp (unit) or A-block data field.
ABSHZ	Absolute Hz (unit).
ALL	All.
AMP	Amplitude.
AMPCOR	Amplitude correction.
AUTO	Auto-couple.
AVG	Average.
B	8-bit byte or binary format.
BW	Black and white.
CARD	Memory card.
COLOR	Color.
d	Downloadable programs.
DB	Decibel (unit).
DBM	Absolute decibel milliwatt (unit).
DBMV	Decibel millivolt (unit).
DBUV	Decibel microvolt (unit).
DELTA	Delta.
DISP	Display.
DLP	Downloadable program.
DM	Absolute decibel milliwatt (unit).
DMY	Day, month, year format.
DN	Decreases parameter one step size.
DUMP	Dump.
EP	Pauses program for data entry from front panel.
EQ	Equal to.
EXT	External trigger.
FETCH	Fetch.
FIXED	Fixed.
FFT	Fast Fourier transform.
FLAT	Flat.
FLATTOP	Flat top filter window.
FREE	Free run.
FREQ	Frequency.

FRQ	Frequency.
GE	Greater than or equal to.
GHZ	Gigahertz (unit).
GT	Greater than.
GZ	Gigahertz (unit).
HANNING	Hanning filter window.
HI	Highest.
HPIB	HP-IB.
HZ	Hertz (unit).
I	I-block data field.
INIT	Initialize.
INT	Internal.
INTEGER	Integer.
IP	Instrument preset.
IST	Inverse sweep time.
K	Free-field ASCII format with no terminator.
KC	Free-field ASCII format with "CR" an "LF" terminator.
KHZ	Kilohertz (unit).
KL	Free-field ASCII format with "CR" an "END" terminator.
KZ	Kilohertz (unit).
l	Limit-line.
LAST	Last state.
LE	Less than or equal to.
LIMILINE	Limit-line.
LINE	Line trigger.
LLCMD	Limit-line command.
LOWER	Lower limit-line.
LT	Less than.
M	Measurement units.
MA	Milliamp (unit).
MDY	Month, day, year format.
MHZ	Megahertz (unit).
MS	Millisecond (unit).
MTR	Meter.
MV	Millivolts (unit).
MW	Milliwatt (unit).
MZ	Megahertz (unit).
NE	Not equal to.

NEG	Negative.
NH	Next highest peak.
NL	Next peak left.
NONE	No units.
NR	Next peak right.
NRM	Normal.
OA	Output amplitude.
OFF	Turn function off.
ON	Turn function on.
P	Parameter units.
PER	Period.
PKAVG	Peak average.
PKPIT	Peak pit.
POINT	Point.
POS	Positive.
PSN	Position.
RECALL	Recall operation.
RS232	RS-232 interface.
s	State.
SA`	Signal analysis.
SAVE	Save operation.
SC	Seconds (unit).
SLOPE	Slope.
SMP	Sample detection mode.
SP	Space.
SR	Stimulus response.
STATE	State register.
STEP	Step key ability.
STORE	Store.
SWT	Sweep time.
t	Trace.
TG	Tracking generator.
TRA	Trace A.
TRB	Trace B.
TRC	Trace C.
UA	Microamp (unit).
UNIFORM	Uniform filter window.
UP	Increases the parameter one step size.



UPLOW	Upper and lower limit-lines.
UPPER	Upper limit-line.
US	Microseconds (unit).
UV	Microvolts (unit).
UW	Microwatt (unit).
V	Volts (unit).
VID	Video trigger.
W	Watts or Word (for MDS command).
YTF	YIG-tuned filter.
XTAL	Crystal.
*	Asterisk (wildcard).
;	Semicolon (ASCII code 59).
,	Comma (ASCII code 44).
0	Off. Command argument.
1	On. Command argument.
50	50Ω.
75	75Ω.
?	Returns a query response containing the value or state of the associated parameter. The query response is followed by a carriage-return/line-feed.

A

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, ATTEN, LOG AMP, PEAKING, YTF. FREQ UNCAL appears

briefly during CAL FREQ. 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 FREQ & AMPTD routine. (U) (H)

CAL: cannot execute CALAMP
enter: 0 dB PREAMP GAIN
The preamp gain should be set to 0 dB before the CAL AMPTD routine is performed. The preamp gain is set by using EXT 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 AMPTD 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 DLY 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 AMPL 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 (FREQUENCY), −37 (Hz) before performing the CAL FREQ or CAL FREQ & AMPTD. (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 OVFL
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/OPERATION
An RS-232 operation was aborted due to an incorrect address or invalid operation. (U)

INVALID SAVEREG
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 FILE` or `DISPOSE USER MEM` 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 TWNDOW programming command. (U)

MEAS UNCAL
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 COUNTERLOCK 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 OVFL
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 8590B/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 UNLVL
Indicates that the source power is set higher or lower than the analyzer can provide (HP 8590B 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)

B

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.

% Modulation	Sideband Level Below Carrier (dB)	Sideband Level Below Carrier (dB)	% Modulation
1	46	10	63
2	40	20	20
10	26	30	6.3
20	20	40	2.0
30	16.5	50	0.63
40	14	60	0.2
12	60	70	0.063
70	9.1	80	0.02
80	7.9		
90	6.9		
100	6.0		

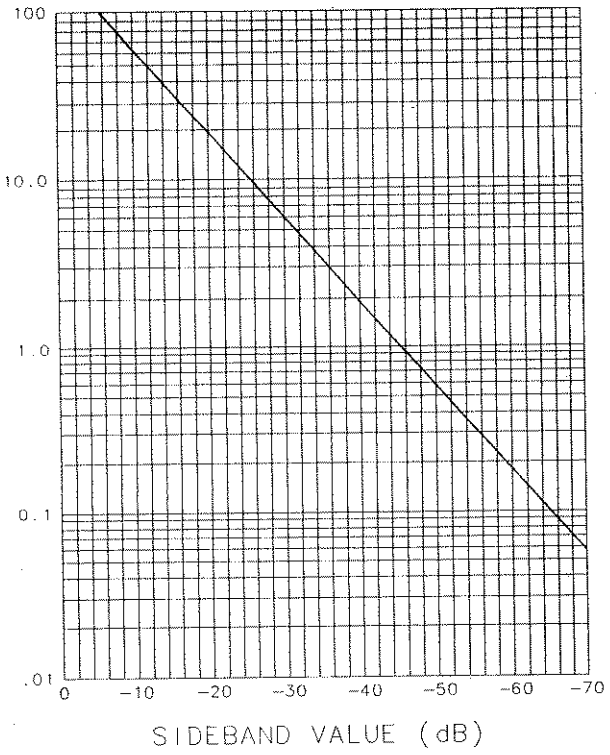


Figure B-1. Percent Modulation

Carrier and First Sideband Charts for Calibrating Deviation

Carrier Bessel NULL Order	t* = ΔF/f	First Sideband	t* = ΔF/f
1st	2.4048	1st	3.83
2nd	5.5201	2nd	7.02
3rd	8.6531	3rd	10.17
4th	11.7915	4th	13.32
5th	14.9309	5th	16.47
6th	18.0711	6th	19.62
7th	21.2116	7th	22.76
8th	24.3525	8th	25.90
9th	27.4935	9th	29.05
10th	30.6346		

* t=modulation index

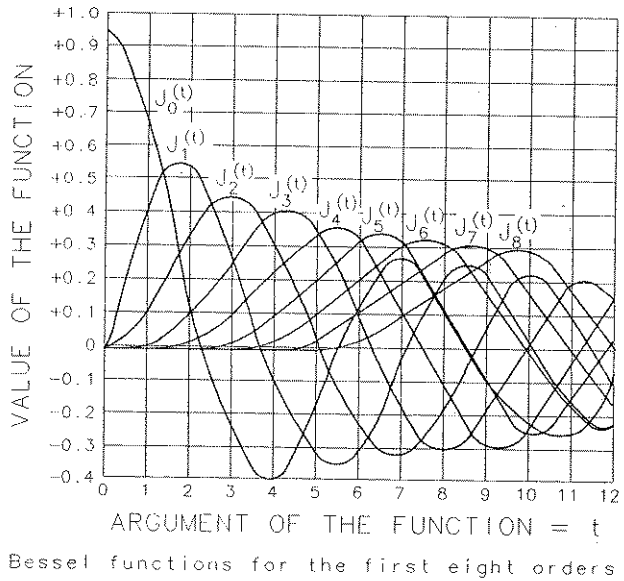


Figure B-2. Bessel Null Graph

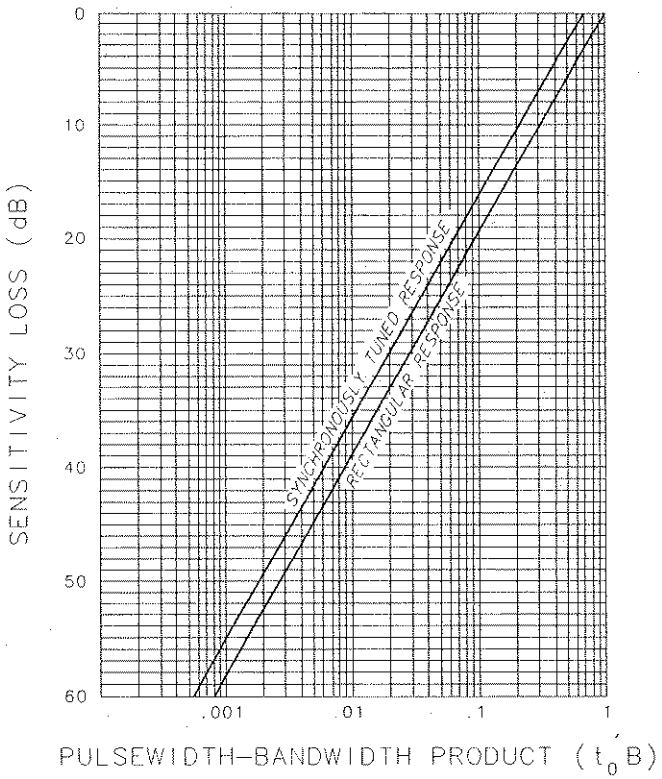


Figure B-3. Loss in Sensitivity (Pulsed RF versus CW)

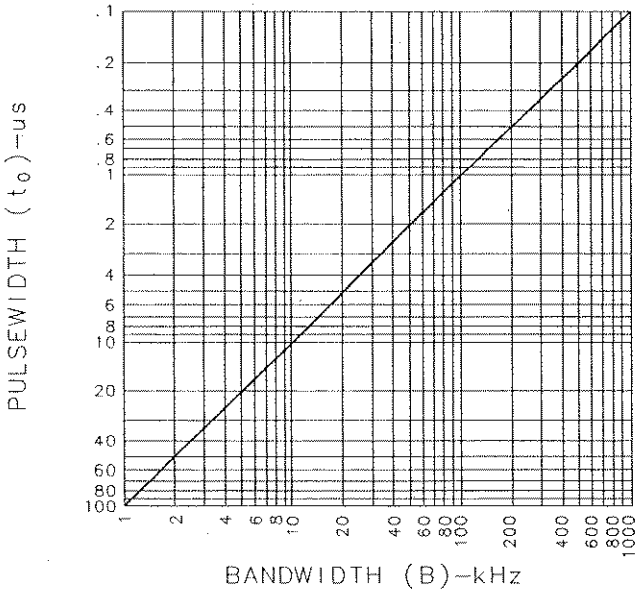


Figure B-4. RES BW Setting for Pulsed RF Computed from $t_0B = 0.1$

C

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 C-1. HP 8590B/8592B Programming Command to Key

Command	Name	Key
ABORT	Abort	
ABS	Absolute	
ACTDEF	Active Function	
ACTVF	Active Function	
ADD	Add	
AMB	Trace A Minus Trace B	A - B -> A ON OFF
AMBPL	Trace A Minus Trace B Plus Display Line	NORMLIZE ON OFF
AMPCOR	Amplitude Correction	
ANNOT	Annotation	ANNOTATN ON OFF
APB	Trace A Plus Trace B	
AT	Attenuation	ATTEN AUTO MAN
AUNITS	Amplitude Units	AMPTD UNITS
AUTO	Auto Couple	AUTO ALL
AVG	Average	
AXB	Exchange Trace A and Trace B	A <--> B
BIT	Bit	
BLANK	Blank Trace	BLANK A, BLANK B, BLANK C
BML	Trace B Minus Display Line	B - DL -> B
BTC	Transfer Trace B to Trace C	B -> C
BXC	Trace B Exchange Trace C	B <--> C

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
CAL	Calibration	(CAL) calibration functions
CAT	Catalog	CATALOG CARD
CF	Center Frequency	CENTER FREQ
CLRAVG	Clear Average	
CLRDSP	Clear Display	
CLRW	Clear Write	CLEAR WRITE A, CLEAR WRITE B, CLEAR WRITE C
CLS	Clear Status Byte	
CNF	Confidence Test	CONF TEST
CNTLA	Auxiliary Control Line A	CNTL A 0 1
CNTLB	Auxiliary Control Line B	CNTL B 0 1
CNTLC	Auxiliary Control Line C	CNTL C 0 1
CNTLD	Auxiliary Control Line D	CNTL D 0 1
CNTLI	Auxiliary Control Line Input	CNTLI
COMB	Comb	COMB GEN ON OFF
COMPRESS	Compress Trace	
CONCAT	Concatenate	
CONTS	Continuous Sweep	SWEEP CONT SGL (CONT)
CORREK	Correction Factors On	
CRTHPOS	Horizontal Position of CRT Display	CRT HORZ POSITION
CRTVPOS	Vertical Position of CRT Display	CRT VERT POSITION
CTA	Convert to Absolute Units	
CTM	Convert to Measurement Units	
DATEMODE	Date Mode	DATEMODE MDY DMY
DET	Detection Mode	DETECTOR SAMPL PK
DISPOSE	Dispose	DISPOSE USER MEM
DIV	Divide	
DL	Display Line	DSP LINE ON OFF
DONE	Done	
DSPLY	Display	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
DT	Define Terminator	
EE	Enable Entry	
EK	Enable Knob	
ENTER	Enter From HP-IB	
EP	Enter Parameter Function	
ERASE	Erase	
EXP	Exponent	
FA	Start Frequency	START FREQ
FB	Stop Frequency	START FREQ
FFT	Fast Fourier Transform	FFT MEAS
FOFFSET	Frequency Offset	FREQ OFFSET
FORMAT	Format Card	FORMAT CARD
FS	Full Span	FULL SPAN
FUNCDEF	Define Function	
GR	Graph	
GRAT	Graticule	GRAT ON OFF
HAVE	Have	
HD	Hold	(HOLD)
HN	Harmonic Number	
HNLOCK	Harmonic Lock Number	Band selection accessed by BAND LOCK
HNUNLK	Unlock Harmonic Number	BND LOCK ON OFF (OFF)
IB	Input B	
ID	Identify	
IF	If Then Else Endif	
INT	Integer	
INZ	Input Impedance	INPUT Z 50 75
IP	Instrument Preset	(PRESET)
KEYCLR	Key Clear	
KEYCMD	Key Command	
KEYDEF	Key Define	
KEYENH	Key Enhance	
KEYEXC	Key Execute	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
KEYLBL	Key Label	
LB	Label	
LF	Base Band Instrument Preset	
LG	Logarithmic Scale	SCALE LOG LIN (LOG)
LIMIDEL	Delete Limit-Line Table	PURGE LIMITS, NEW LIMIT
LIMIFAIL	Limits Failed	
LIMILINE	Limit Line Commands	SAVE LIMIT
LIMIMIRROR	Mirror Limit Line	
LIMIMODE	Limit-Line Entry Mode	EDIT UPPER, EDIT LOWER, EDIT UP/LOW, EDIT MID/DELT
LIMIREL	Relative Limit Lines	LIMITS FIX REL
LIMISEG	Enter Limit-Line Segment	SELECT SEGMENT, SELECT AMPLITUD
LIMITEST	Enable Limit Line Testing	LIMITS ON OFF
LN	Linear Scale	SCALE LOG LIN (LIN)
LOAD	Load	LOAD FILE
LOG	Logarithm	
M4	Marker Zoom	
MA	Marker Amplitude Output	
MDS	Measurement Data Size	
MDU	Measurement Data Units	
MEAN	Trace Mean	
MEASURE		
MEM	Memory Available	
MENU	Menu	
MF	Marker Frequency Output	
MIN	Minimum	
MINH	Minimum Hold	MIN HOLD C
MINPOS	Minimum Position	
MIRROR	Mirror Image	
MKA	Marker Amplitude	
MKACT	Activate Marker	
MKBW	Marker Bandwidth	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
MKCF	Marker to Center Frequency	MARKER -> CF
MKCONT	Marker Continue	
MKD	Marker Delta	MARKER DELTA
MKF	Marker Frequency	
MKMIN	Marker Minimum	MINIMUM -> MARKER
MKN	Marker Normal	MARKER NORMAL
MKNOISE	Marker Noise	MKNOISE ON OFF
MKOFF	Marker Off	MARKERS OFF
MKP	Marker Position	
MKPAUSE	Marker Pause	MKPAUSE ON OFF
MKPK	Marker Peak	(PEAK SEARCH), NEXT PEAK, NEXT PK RIGHT, NEXT PK LEFT
MKPX	Marker Peak Excursion	PEAK EXCURSN
MKREAD	Marker Readout	
MKRL	Marker to Reference Level	MARKER -> REF LVL
MKSP	Marker to Span	MKR Δ -> SPAN
MKSS	Marker to Step Size	MARKER -> CF STEP
MKSTOP	Marker Stop	
MKTRACE	Marker Trace	
MKTRACK	Marker Track	(SIGNAL TRACK)
MKTYPE	Marker Type	MARKER AMPTD
ML	Mixer Level	MAX MXR LEVEL
MOD	Modulo	
MODE	Mode	SPECTRUM ANALYZER
MOV	Move	
MPY	Multiply	
MSI	Mass Storage Is	INTRNL CRD
MXM	Maximum	
MXMH	Maximum Hold	MAX HOLD A, MAX HOLD B
NRL	Normalized Reference Level	
OA	Output Active Function Value	
OL	Output Learn String	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
ONCYCLE	On Cycle	
ONDELAY	On Delay	
ONEOS	On End of Sweep	
ONMKR	On Marker	
ONSRQ	On SRQ	
ONSWP	On Sweep	
ONTIME	On Time	
OP	Output Parameter	
OUTPUT	Output to HP-IB	
PA	Plot Absolute	
PD	Pen Down	
PDA	Probability Distribution of Amplitude	
PDF	Probability Distribution of Frequency	
PEAKS	Peaks	
PKPOS	Peak Position	
PLOT	Plot	(COPY) to a plotter
POWERON	Power-On State	
PP	Preselector Peak	PRESEL PEAK
PR	Plot Relative	
PREFX	Prefix	CHANGE PREFIX
PRINT	Print	(COPY) to a printer
PSTATE	Protect State	SAV LOCK ON OFF
PU	Pen Up	
PURGE	Purge File	DELETE FILE
PWRBW	Power Bandwidth	99% PWR BW
RB	Resolution Bandwidth	RES BW AUTO MAN, 9 kHz EMI BW, 120 kHz EMI BW
RCLS	Recall State	INTRNL -> STATE
RCLT	Recall Trace	INTRNL -> TRACE
RELHPIB	Release HP-IB	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
REPEAT	Repeat Until	
RETURN	Return	
RESETRL		
REV	Revision	
RL	Reference Level	REF LVL
RLPOS	Reference-Level Position	
RMS	Root Mean Square Value	
ROFFSET	Reference Level Offset	REF LVL OFFSET
RQS	Service Request Mask	
SAVEMENU	Save Menu	
SAVES	Saves State	STATE -> INTRNL
SAVET	Save Trace	INTRNL -> STATE
SAVRCLF	Save or Recall Flag	(SAVE) or (RECALL)
SAVRCLN	Save or Recall Number	
SAVRCLW	Save or Recall Data	STATE -> INTRNL, TRACE -> INTRNL
SEGDEL	Segment Delete	DELETE SEGMENT
SENTER	Segment Entry	EDIT UP/LOW, EDIT MID/DELTA
SER	Serial Number	SHOW OPTIONS
SETDATE	Set Date	SET DATE
SETTIME	Set Time	SET TIME
SMOOTH	Smooth Trace	
SNGLS	Single Sweep	(SGL SWP), SWEEP CONT SGL
SP	Span	SPAN
SPZOOM	Span Zoom	SPAN ZOOM
SQR	Square Root	
SRCALC	Source Leveling Control	ALC MTR INT XTAL
SRCNORM	Source Normalization	
SRCPOFS	Source Power Offset	SRC PWR OFFSET
SRCPSTP	Source Power-Level Step Size	SRC PWR STP SIZE
SRCPSWP	Source Power Sweep	PWR SWP ON OFF

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
SRCPWR	Source Power	SRC PWR ON OFF
SRCTK	Source Tracking	MAN TRK ADJUST
SRCTKPK	Source Tracking Peak	TRACKING PEAK
SRQ	Force Service Request	
SS	Center Frequency Step Size	CF STEP AUTO MAN
ST	Sweep Time	SWP TIME AUTO MAN
STB	Status Byte Query	
STDEV	Standard Deviation of Trace Amplitudes	
STOR	Store	STATE -> CARD, TRACE -> CARD, ALL DLP -> CARD
SUB	Subtract	
SUM	Sum of Trace Amplitudes	
SUMSQR	Sum of Squared Trace Amplitude	
SWPCPL	Force Service Request	SWP CPLG SR SA
TA	Transfer A	
TB	Transfer B	
TDF	Trace Data Format	
TEXT	Text	
TH	Threshold	THRESHLD ON OFF
TIMEDATE	Time Date	
TIMEDSP	Time Display	TIMEDATE ON OFF
TITLE	Title	CHANGE TITLE
TRA	Trace Data Input/Output	
TRB	Trace Data Input/Output	
TRC	Trace Data Input/Output	
TRGRPH	Trace Graph	
TA	Transfer A	
TB	Transfer B	
TRCMEM	Trace Memory	
TRDEF	Trace Define	

Table C-1.
HP 8590B/8592B Programming Command to Key (continued)

Command	Name	Key
TRDSP	Trace Display	
TRGRPH	Trace Graph	
TRPRST	Trace Preset	
TRSTAT	Trace Status	
TM	Trigger Mode	(TRIG) functions
TRMATH	Trace Math	
TS	Take Sweep	
TWNDOW	Trace Window	
USTATE	User State	
VARDEF	Variable Definition	
VARIANCE	Variance of Trace Amplitudes	
VAVG	Video Average	VID AVG ON OFF
VB	Video Bandwidth	VID BW AUTO MAN
VBR	Video Bandwidth Ratio	VBW/RBW RATIO
VIEW	View Trace	VIEW A, VIEW B, VIEW C
XCH	Exchange	

D

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 D-1. HP 8590B/8592B Softkey Locations

Softkey Functions	Front-Panel Key Access
% AM	MEAS/USER
0-2.9 Gz BAND 0	SPAN
2.75-6.4 BAND 1	SPAN
3 dB POINTS	MEAS/USER
3rd ORD MEAS	MEAS/USER
6.0-12.8 BAND 2	SPAN
6 dB POINTS	MEAS/USER
9 kHz EMI BW	BW
12.4-19. BAND 3	SPAN
19.1-22 BAND 4	SPAN
99% PWR BW	MEAS/USER
120 kHz EMI BW	BW
A <--> B	TRACE
A - B -> A ON OFF	TRACE
ABCDEF	CONFIG, DISPLAY, or MEAS/USER
ABORT	AUX CTRL
A -> C	TRACE
ALC MTR INT XTAL	AUX CTRL

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
ALL DLP -> CARD	SAVE
AMPLTUD COR FACT	RECALL or SAVE
AMPTD UNITS	AMPLITUDE
ANALYZER ADDRESS	CONFIG
ANNOTATN ON OFF	DISPLAY
ATTEN AUTO MAN	AMPLITUDE or AUTO COUPLE
AUTO ALL	AUTO COUPLE
AUX CONN CONTROL	AUX CTRL
B & W PRINTER	CONFIG
BAND LOCK	SPAN
BAUD RATE	CONFIG
B -> C	TRACE
B <--> C	TRACE
B -- DL -> B	TRACE
BLANK A	TRACE
BLANK B	TRACE
BLANK C	TRACE
BLANK CARD	CONFIG
BND LOCK ON OFF	SPAN
CAL AMPTD	CAL
CAL FETCH	CAL
CAL FREQ	CAL
CAL FREQ & AMPTD	CAL
CAL MXR	CAL
CAL STORE	CAL
CAL TRK GEN	CAL
CAL YTF	CAL
CARD CONFIG	CONFIG
CARD -> DLP	RECALL
CARD -> STATE	RECALL

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
CARD -> TRACE	RECALL
CATALOG ALL	RECALL or SAVE
CATALOG AMP CORR	RECALL or SAVE
CATALOG CARD	RECALL or SAVE
CATALOG DLP	RECALL or SAVE
CATALOG INTRNL	RECALL or SAVE
CATALOG LMT LINE	RECALL or SAVE
CATALOG PREFIX	RECALL or SAVE
CATALOG REGISTER	RECALL or SAVE
CATALOG STATES	RECALL or SAVE
CATALOG TRACES	RECALL or SAVE
CATALOG VARIABLS	RECALL or SAVE
CENTER FREQ	FREQUENCY
CF STEP AUTO MAN	AUTO COUPLE or FREQUENCY
CHANGE PREFIX	CONFIG or DISPLAY
CHANGE TITLE	DISPLAY or MEAS/USER
CLEAR	CONFIG, DISPLAY, or MEAS/USER
CLEAR OFFSET	AUX CTRL
CLEAR WRITE A	TRACE
CLEAR WRITE B	TRACE
CLEAR WRITE C	TRACE
CNTL A 0 1	AUX CTRL
CNTL B 0 1	AUX CTRL
CNTL C 0 1	AUX CTRL
CNTL D 0 1	AUX CTRL
COMB GEN ON OFF	AUX CTRL
CONF TEST	CAL
CONTINUE	AUX CTRL
COPY DEV PRNT PLT	CONFIG

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
CORRECT ON OFF	CAL
CORRECT TO COMB	AUX CTRL
CRT HORZ POSITION	CAL
CRT VERT POSITION	CAL
DATEMODE MDY DMY	CONFIG
dBm	AMPLITUDE
dBmV	AMPLITUDE
dBuV	AMPLITUDE
DEFAULT CAL DATA	CAL
DEFAULT CONFIG	CONFIG
DELETE FILE	RECALL or SAVE
DELETE SEGMENT	MEAS/USER
DELTA MEAS	MEAS/USER
DETECTOR SAMPL PK	TRACE
DISPLAY CNTL 1	AUX CTRL
DISPOSE USER MEM	CONFIG
DSP LINE ON OFF	DISPLAY
EDIT DONE	MEAS/USER
EDIT FLATNESS	CAL
EDIT LIMIT	MEAS/USER
EDIT LOWER	MEAS/USER
EDIT MID/DELT	MEAS/USER
EDIT UP/LOW	MEAS/USER
EDIT UPPER	MEAS/USER
EDIT UPR LWR	MEAS/USER
EXECUTE TITLE	CAL
EXIT	CAL
EXIT CATALOG	RECALL or SAVE
EXIT SHOW	CONFIG
EXTERNAL	TRIG

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
EXT PREAMP	AMPLITUDE
FFT MEAS	MEAS/USER
FLAT	MEAS/USER
FLATNESS DATA	CAL
FORMAT CARD	CONFIG
FREE RUN	TRIG
FREQ OFFSET	FREQUENCY
FULL SPAN	SPAN
GHIJKL	CONFIG, DISPLAY, or MEAS/USER
GRAT ON OFF	DISPLAY
INPUT Z 50 75	AMPLITUDE
INTRNL CRD	RECALL or SAVE
INTRNL -> STATE	RECALL
INTRNL -> TRACE	RECALL
LIMIT LINES	MEAS/USER, SAVE or RECALL
LIMITS FIX REL	MEAS/USER
LIMITS ON OFF	MEAS/USER
LINE	TRIG
LOAD FILE	RECALL or SAVE
MAN TRK ADJUST	AUX CTRL
MARKER AMPTD	MKR
MARKER -> CF	MKR -> or PEAK SEARCH
MARKER -> CF STEP	MKR ->
MARKER DELTA	MKR or PEAK SEARCH
MARKER NORMAL	MKR
MARKER -> REF LVL	MKR ->
MARKERS OFF	MKR
MAX HOLD A	TRACE
MAX HOLD B	TRACE

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
MAX MKR LEVEL	AMPLITUDE
MIN HOLD C	TRACE
MINIMUM -> MARKER	MKR ->
MKNOISE ON OFF	MKR
MKPAUSE ON OFF	MKR
MKR Δ -> SPAN	MKR ->
MNOPQR	CONFIG, DISPLAY, or MEAS/USER
NEW LIMIT	MEAS/USER
NEXT PEAK	MKR -> or PEAK SEARCH
NEXT PK LEFT	MKR -> or PEAK SEARCH
NEXT PK RIGHT	MKR -> or PEAK SEARCH
NORMLIZE ON OFF	TRACE
NORMLIZE POSITION	TRACE
NO USER MENU	MEAS/USER
PAINTJET PRINTER	CONFIG
PEAK EXCURSN	MKR -> or PEAK SEARCH
PEAK MENU	MKR ->
PEAK SEARCH	AUX CTRL
PK-PK MEAS	MKR or MEAS/USER
PLOT CONFIG	CONFIG
PLOTTER ADDRESS	CONFIG
PLT _ _ LOC _ _	CONFIG
PLTS/PG 1 2 4	CONFIG
POINT	MEAS/USER
PRESEL DEFAULT	AMPLITUDE
PRESEL PEAK	AMPLITUDE
PRESET SPECTRUM	MODE or PRESET
PRINT CONFIG	CONFIG
PRINTER ADDRESS	CONFIG

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
PRINTER SETUP	CONFIG
PRT MENU ON OFF	CONFIG
PURGE LIMITS	MEAS/USER
PWR SWP ON OFF	AUX CTRL
RECALL LIMIT	MEAS/USER
REF LVL	AMPLITUDE
REF LVL OFFSET	AMPLITUDE
RES BW AUTO MAN	AUTO COUPLE or BW
RPG TITLE	DISPLAY or MEAS/USER
SAVE LIMIT	MEAS/USER
SAV LOCK ON OFF	SAVE
SCALE LOG LIN	AMPLITUDE
SELECT AMPLITUD	MEAS/USER
SELECT DLT AMPL	MEAS/USER
SELECT FREQ	MEAS/USER
SELECT LWR AMPL	MEAS/USER
SELECT MID AMPL	MEAS/USER
SELECT SEGMENT	MEAS/USER
SELECT TYPE	MEAS/USER
SELECT UPR AMPL	MEAS/USER
SERVICE CAL	CAL
SERVICE DIAG	CAL
SET ATTN ERROR	CAL
SET DATE	CONFIG
SET TIME	CONFIG
SHOW OPTIONS	CONFIG
SLOPE	MEAS/USER
SPAN	SPAN
SPAN ZOOM	SPAN
SPEAKER ON OFF	AUX CTRL

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
SPECTRUM ANALYZER	(MODE) or (PRESET)
SRC PWR OFFSET	(AUX CTRL)
SRC PWR ON OFF	(AUX CTRL)
SRC PWR STP SIZE	(AUX CTRL)
START FREQ	(FREQUENCY)
STATE -> CARD	(SAVE)
STATE -> INTRNL	(SAVE)
STOP FREQ	(FREQUENCY)
STUVWX	(CONFIG), (DISPLAY), or (MEAS/USER)
SWEEP CONT SGL	(SWEEP) or (TRIG)
SWP CPLG SR SA	(AUX CTRL)
SWP TIME AUTO MAN	(AUTO COUPLE) or (SWEEP)
THRESHLD ON OFF	(DISPLAY)
TIMEDATE	(CONFIG)
TIMEDATE ON OFF	(CONFIG)
TRACE A	(RECALL) or (SAVE)
TRACE A B C	(TRACE)
TRACE B	(RECALL) or (SAVE)
TRACE C	(RECALL) or (SAVE)
TRACE -> CARD	(SAVE)
TRACE -> INTRNL	(SAVE)
TRACK GEN	(AUX CTRL)
TRACKING PEAK	(AUX CTRL)
USER MENU(S)	(MEAS/USER)
VBW/RBW RATIO	(BW)
VID AVG ON OFF	(TRACE)
VID BW AUTO MAN	(AUTO COUPLE) or (BW)
VIDEO	(TRIG)
VIEW A	(TRACE)

Table D-1. HP 8590B/8592B Softkey Locations (continued)

Softkey Functions	Front-Panel Key Access
VIEW B	(TRACE)
VIEW C	(TRACE)
Volts	(AMPLITUDE)
Watts	(AMPLITUDE)
YZ #SPC CLEAR	(CONFIG), (DISPLAY), or (MEAS/USER)
ZERO SPAN	(SPAN)

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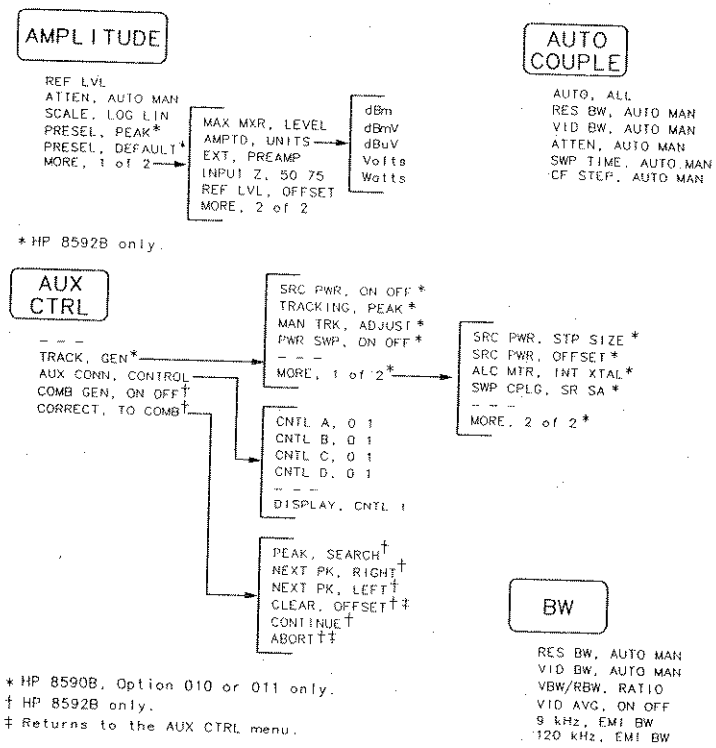
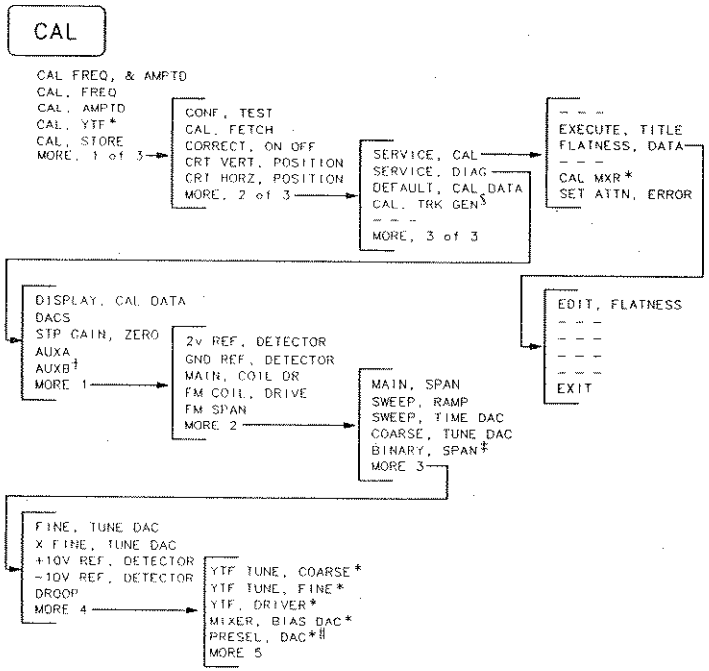
HP 8590B/8592B SPECTRUM ANALYZER MODE MENU

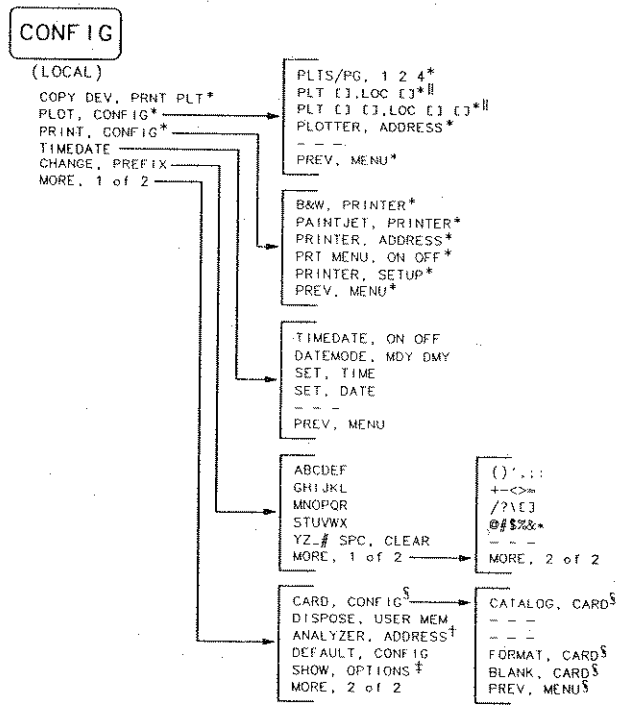


HP 8590B/8592B Spectrum Analyzer Mode Menus



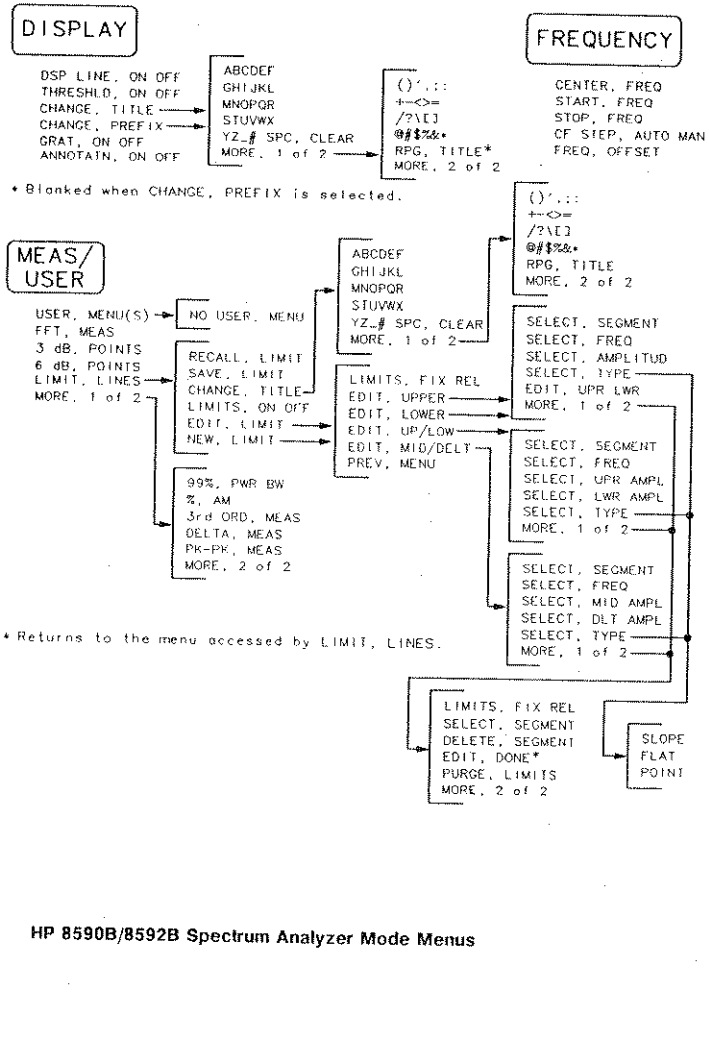
* HP 8592B only.
† HP 8590B only.
‡ Changes to YTF, SPAN for HP 8592B.
§ HP 8590B, Option 010 or 011 only.
‖ Changes to ALC, TEST for an HP 8590B with Option 010 or 011.

HP 8590B/8592B Spectrum Analyzer Mode Menus

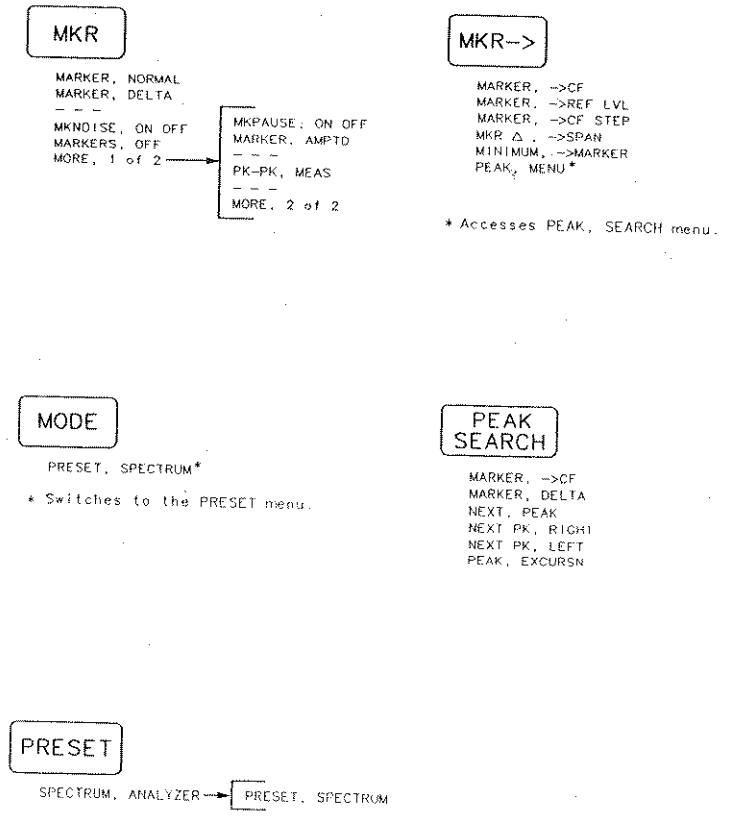


* Option 021 or 023 only.
† Option 021 only. Changes to BAUD, RATE for Option 023.
‡ Change to EXIT, SHOW when SHOW, OPTIONS is pressed.
§ Option 003 only.
‖ Appears if 2 or 4 plots per page are selected.

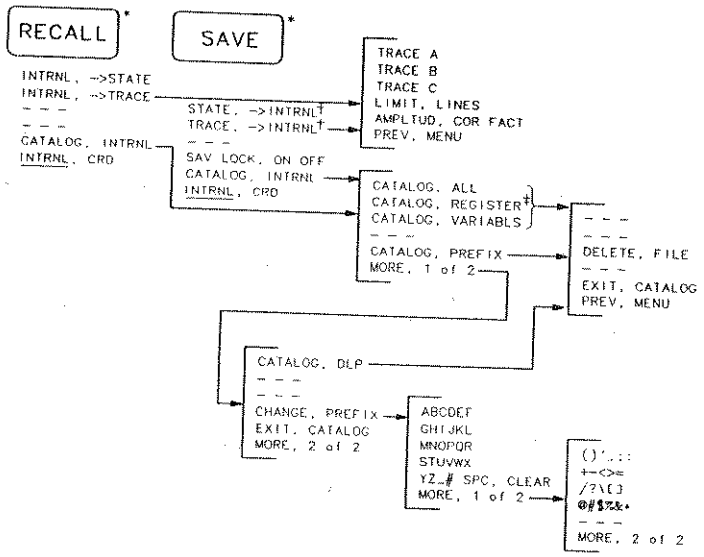
HP 8590B/8592B Spectrum Analyzer Mode Menus



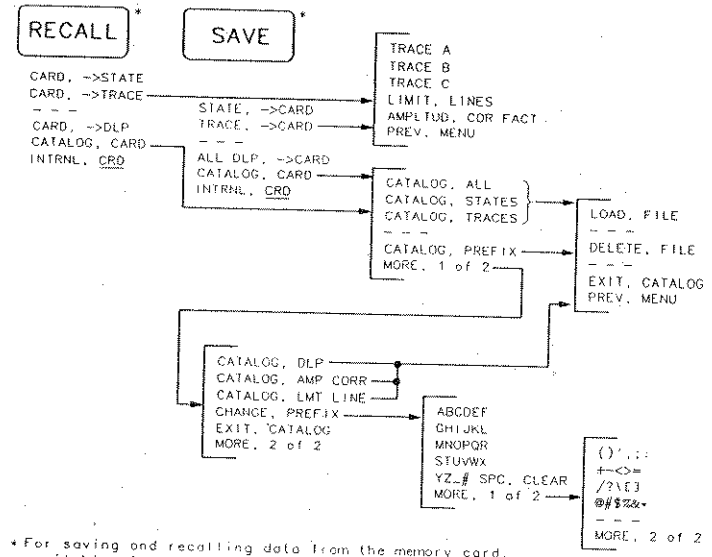
HP 8590B/8592B Spectrum Analyzer Mode Menus



HP 8590B/8592B Spectrum Analyzer Mode Menus



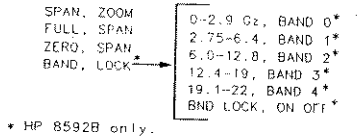
* For saving and recalling data from analyzer memory.
† Becomes MEM, LOCKED when SAV LOCK is on.
‡ CATALOG, REGISTER accesses LOAD, FILE instead of DELETE, FILE.



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

SIGNAL TRACK

SPAN



* HP 8592B only.

SWEEP

SWP TIME, AUTO MAN
SWEEP, CONT SGL

TRACE

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

- VID AVG, ON OFF
- DETECTOR, SAMPL PK
- NORMLIZE, ON OFF
- NORMLIZE, POSITION
- A <---> B
- MORE, 2 of 3 →
  - A–B -> A, ON OFF
  - B–DL -> B
  - B <---> C
  - A -> C
  - B -> C
  - MORE, 3 of 3

* Changes to MIN, HOLD C when trace C is selected.

TRIG

SWEEP, CONT SGL
FREE RUN
VIDEO
LINE
EXTERNAL

HP 8590B/8592B Spectrum Analyzer Mode Menus