Quick Reference Guide

HP 8590 EM Series EMC Analyzer
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Introduction

This guide provides a quick reference for experienced analyzer users.

- Chapter 1 summarizes the front-panel features, and tells how to make a basic measurement and how to perform the self-calibration routines.
- Chapter 2 contains brief descriptions of the EMC analyzer functions.
- Chapter 3 contains the remote programming commands.
- Appendixes A, B, C, and D contain helpful charts and tables.
- Appendix E contains diagrams of the key menus for the HP 8590 EM Series EMC analyzers.

For additional instrument information, consult the HP 8590 EM Series EMC Analyzer User's Guide for your specific instrument.

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. An example of a softkey is **REF.LVL**. The labeled keys that are on the front panel of the analyzer are called front-panel keys. Pressing a front panel key changes the softkey labels or initiates functions. The front-panel keys appear in unshaded boxes in this guide. An example of a front-panel key is **(FREQUENCY)**.

**Caution**

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

This chapter provides an introduction to the EMC analyzer's front-panel features, an explanation of screen annotation, the procedure for making a basic measurement with the EMC analyzer, and the procedure for performing self-calibration routines. The EMC analyzer also supplies a spectrum analyzer operating mode with screen annotation described in "Spectrum Analyzer Mode Screen Annotation" at the end of this chapter.

Front-Panel Features

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

Refer to Figure 1-1.

1 Front-Panel Display is the area on the front-panel where information is provided to the user. That information includes:

   Active Function Block area. Functions appearing in this block include, for example, marker, span, center frequency, and reference level.

   Message Block area. This block is 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. (Press AUTO COUPLE, then AUTO ALL, to recouple functions.) The asterisk indicates that the display is not updated for new settings.

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

2 Softkeys are the unlabeled keys next to the screen.
3 **FREQUENCY**, **SPAN**, and **AMPLITUDE** are the three large dark-gray keys that activate the primary EMC analyzer tuning functions and access menus of related functions.

4 **SETUP** and **TEST** are the dark-gray keys that access menus of functions used to setup the instrument, then make fast and accurate EMC measurements.

5 **INSTRUMENT STATE** functions affect the state of the entire EMC analyzer. Self-calibration routines and special-function menus are accessed with these keys. The green **RESET** key resets the entire EMC analyzer state and can be used as a “panic” button when you wish to return to a known state.

6 **COPY** key prints or plots screen data. Use **CONFIG**, **Plot Config**, or **Print Config**, and **COPY DEV PRINT PLT** before pressing **COPY**.

1.2 **Getting Acquainted with the EMC Analyzer**
MEASUREMENT CONTROL functions access menus that allow you to make manual or automated quasi-peak average measurements, adjust the IF bandwidth, adjust the sweep time, store and manipulate trace data, demodulate signals, control the markers, control the instrument display, and make measurements.

WINDOWS functions include: (ON) to turn on the windows display mode, (NEXT) for switching between windows, and (ZOOM) for controlling the zone span and center frequency.

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

INPUT 500 is the signal input for the analyzer.

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

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

CAL OUT provides a calibration signal of 300 MHz at 87 dBµV.

VOL-INTEN changes the brightness of the screen display, and the volume of the speaker.

Memory card reader reads from a read-only (ROM) or random access (RAM) memory card. The memory card reader writes to a RAM card.

100 MHz COMB OUT is the output of the comb generator of the HP 8593EM and HP 8596EM EMC analyzers. The output is used to perform a CAL YTF.

RF OUT 50Ω is the output for the built-in tracking generator. Option 010 only.

TURNS turns the instrument on or off and performs an instrument check.
EMC Analyzer Screen Annotation

Figure 1-2 shows an example of screen annotation as it appears on the screen of the EMC analyzer. Table 1-1 lists the screen annotation features numerically and refers to Figure 1-2.

---

**Figure 1-2. EMC Analyzer Screen Annotation**

In Figure 1-2, item number 19 refers to the trigger and sweep modes of the EMC analyzer. The first letter ("F") indicates the EMC analyzer is in free-run trigger mode. The second letter ("S") indicates the EMC analyzer is in single-sweep mode. ("C") indicates the EMC analyzer is in continuous-sweep mode.

Item number 20 refers to the trace modes of the EMC analyzer. The first letter ("W") indicates the EMC analyzer is in clear-write mode. The second letter ("A") represents 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”).

The WINDOWS display mode splits the screen into two separate displays. Only one of these displays is active at a time. The currently active window will have a solid line around the graticule rather than a broken line. The complete annotation is not available for each window because of space limitations.

**Table 1-1. EMC Analyzer Screen Annotation**

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Item</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>reference level</td>
<td>16</td>
<td>threshold</td>
</tr>
<tr>
<td>2</td>
<td>active function block</td>
<td>17</td>
<td>corrections factors on</td>
</tr>
<tr>
<td>3</td>
<td>time/date and command line</td>
<td>18</td>
<td>amplitude correction factors on</td>
</tr>
<tr>
<td>4</td>
<td>screen title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>autorange</td>
<td>19</td>
<td>trigger</td>
</tr>
<tr>
<td>6</td>
<td>active and measurement detector</td>
<td>20</td>
<td>trace mode</td>
</tr>
<tr>
<td>7</td>
<td>external preamp</td>
<td>21</td>
<td>display line</td>
</tr>
<tr>
<td>8</td>
<td>marker</td>
<td>22</td>
<td>video average</td>
</tr>
<tr>
<td>9</td>
<td>softkeys</td>
<td>23</td>
<td>attenuator setting</td>
</tr>
<tr>
<td>10</td>
<td>frequency span or stop frequency</td>
<td>24</td>
<td>amplitude scale</td>
</tr>
<tr>
<td>11</td>
<td>sweep time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>frequency offset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>AVG bandwidth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>IF bandwidth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>center or stop frequency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1-2 shows the different screen annotation codes for trace, trigger, and sweep modes.

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

<table>
<thead>
<tr>
<th>Trace Mode</th>
<th>Trigger Mode</th>
<th>Sweep Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>W = clear-write (traces A/B/C)</td>
<td>F = free run</td>
<td>C = continuous</td>
</tr>
<tr>
<td>M = maximum hold (traces A/B)</td>
<td>L = line</td>
<td>S = single sweep</td>
</tr>
<tr>
<td>M = minimum hold (trace C)</td>
<td>V = video</td>
<td></td>
</tr>
<tr>
<td>V = view (traces A/B/C)</td>
<td>E = external</td>
<td></td>
</tr>
<tr>
<td>S = store-blank (traces A/B/C)</td>
<td>T = TV (Option 102 only)</td>
<td></td>
</tr>
</tbody>
</table>
Making a Basic Measurement

Basic measurements simply involve tuning the instrument to place a signal on the screen, then placing a marker on one or more signals, measuring those signals, and moving those signals to a list.

Caution

Do not exceed the maximum input power that is printed on the front panel of the EMC analyzer.

Let’s begin using the EMC 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.

1. Press **LinE** to turn the instrument on, and then press the green **PreSET** key.

2. Verify that the start frequency is set to 200 MHz and the stop frequency to 1.0 GHz. If not, the instrument has been configured as a spectrum analyzer. Press **EMC ANALYZER** and proceed with the next step.

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

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

4. Press **Test**. **MARKER** is now displayed in the active function block, and the **MARKER** softkey label appears in inverse video to indicate that the marker is the active function. Place the marker on a signal by pressing the down **▼** keys. Refer to Figure 1-3.
5. Press **MEASURE AT MKR**. In a short time, the measured marker values are displayed in the upper-right corner of the display.

6. Press **ADD TO LIST**. The measure-at-marker results are saved to an internal list. Signal Added is now displayed on the screen.

7. Press the up ▲ key one or more times to place the marker on a second signal.

8. Press **MEASURE AT MKR**, then **ADD TO LIST** to add the second signal to the internal list. Repeat the process and place a third signal in the internal list.

9. To display the list on the screen, press **More 1 of 3**, then the **SIG LIST ON OFF** softkey. The measure-at-marker results in the form of a list are displayed on the upper portion of the screen. Refer to Figure 1-4.

---

**Figure 1-3. Placing the Marker on a Signal**
10. The list can be graphed on screen in either log or linear frequency scales by pressing the Save/Rcl List softkey.

11. Press SAVE LOG GRAPH to view the signals in the list on a log graph. To clear the display's active function area, press the ENTER key (front-panel's lower-right corner). Refer to Figure 1-5.
Figure 1-5. Displaying the List as a Log Graph

**Note**

If the EMC analyzer is connected to either a printer or plotter:

- Press the **COPY** key to obtain a printed copy of the graph. Changing the configuration may be required, or

- Press the **OUTPUT** key to access the softkeys that will help you:
  - Define a report.
  - Define a list.
  - Add up to two pages of text using a keyboard.

12. To return the instrument to a known 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 EMC analyzer specifications:

1. The EMC analyzer should be stored at a constant temperature, within the operating temperature range, for at least 2 hours.
2. Turn on the EMC analyzer and allow the EMC analyzer to warm up for 30 minutes.

Note

Perform the EMC analyzer self-calibration routines only after the EMC analyzer has met the specified warm-up time. Do not attempt to make any calibrated measurements until the EMC analyzer self-calibration routines have been performed.

Self-Calibration Routines

Perform the following steps to self-calibrate the instrument:

1. Connect the CAL_OUT connector to the INPUT 50Ω connector, using an appropriate cable.
2. Press the following EMC analyzer keys: (CAL), CAL, FREQ & AMPTD.

Caution

To avoid losing the data when the EMC analyzer is turned off, press CAL STORE. CAL STORE stores the cal data in the area of EMC analyzer memory that is saved when the analyzer is turned off.

The frequency and amplitude self-calibration routines take approximately 9 minutes to finish, at which time the correction factors will be stored (when CAL_STORE is pressed) in the EMC analyzer’s memory.

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 self-calibration routines have successfully finished, 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. To retrieve correction factor data, press [CAL], More 1 of 4, CAL FETCH. 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 [H], [CAL], More 1 of 4, More 2 of 4, **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 EMC analyzer input.

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

If the self-calibration routines cannot be performed, see the EMC analyzer’s **HP 8590 EM Series EMC Analyzer User’s Guide**.
Performing the Tracking Generator Self-Calibration Routine (Option 010)

To meet the tracking generator specifications, allow the EMC analyzer to warm up for 30 minutes after being turned on before attempting to make any calibrated measurements. Be sure to calibrate the EMC analyzer and the tracking generator only after the EMC analyzer has met operating temperature conditions.

---

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

---

1. To calibrate the tracking generator, connect the tracking generator output to the EMC analyzer input connector, using an appropriate cable.

2. Press the following EMC analyzer keys: (CAL), More 1 of 4, More 2 of 4, CAL TRK GEN. TG SIGNAL NOT FOUND will be displayed if the tracking generator output is not connected to the EMC analyzer input. The cal process will take approximately 30 seconds.

3. Press (CAL), CAL STORE, to save this data in the area of EMC analyzer memory that is saved when the analyzer is turned off.
Spectrum Analyzer Mode Screen Annotation

Figure 1-6 shows an example of screen annotation as it appears on the screen of the EMC analyzer when in the SPECTRUM ANALYZER mode. Instrument modes are changed using the (MODE) front-panel key. Table 1-3 lists the screen annotation features numerically and refers to Figure 1-6.

![Figure 1-6. Spectrum Analyzer Mode Screen Annotation](image)

In Figure 1-6, item number 21 refers to the trigger and sweep modes of the spectrum analyzer. The first letter ("F") indicates the spectrum analyzer is in free-run trigger mode. The second letter ("S") indicates the spectrum analyzer is in single-sweep mode.

Item number 22 refers to the trace modes of the spectrum analyzer mode. The first letter ("W") indicates the spectrum analyzer is in clear-write mode. The second letter ("A") represents 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 1-6, the trace C trace mode is “SC,” indicating trace C (“C”) is in the store-blank mode (“S”).

The WINDOWS display mode splits the screen into two separate displays. Only one of these displays is active at a time. The currently active window will have a solid line around the graticule rather than a broken line. The complete annotation is not available for each window because of space limitations.

**Table 1-3. Spectrum Analyzer Mode Screen Annotation**

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

Table 1-4.
Screen Annotation for Trace, Trigger, and Sweep Modes

<table>
<thead>
<tr>
<th>Trace Mode</th>
<th>Trigger Mode</th>
<th>Sweep Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>W = clear-write (traces A/B/C)</td>
<td>F = free run</td>
<td>C = continuous</td>
</tr>
<tr>
<td>M = maximum hold (traces A/B)</td>
<td>L = line</td>
<td>S = single sweep</td>
</tr>
<tr>
<td>M = minimum hold (trace C)</td>
<td>V = video</td>
<td></td>
</tr>
<tr>
<td>V = view (traces A/B/C)</td>
<td>E = external</td>
<td></td>
</tr>
<tr>
<td>S = store-blank (traces A/B/C)</td>
<td>T = TV (Option 102 only)</td>
<td></td>
</tr>
</tbody>
</table>
EMC Analyzer Functions

This section lists the softkey and front-panel functions in alphabetical order. Next to each key label is a brief description of its function. For more detailed descriptions, refer to the HP 8590 EM Series EMC Analyzer User's Guide. All softkeys are shown in the menu diagram in Appendix E of this guide. The functions accessed by Service Diag and Service Cal are not included in this listing.

### Analyzer Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>% AM</td>
<td>determines the percent of amplitude modulation of the largest displayed signal and its two sidebands.</td>
</tr>
<tr>
<td>μA/m</td>
<td>selects μA/m as the transducer conversion units for the antenna amplitude-correction factors using magnetic field units.</td>
</tr>
<tr>
<td>μV/m</td>
<td>selects μV/m as the transducer conversion units for the antenna amplitude-correction factors using electric field units.</td>
</tr>
<tr>
<td>0–2.9 Gz</td>
<td>locks onto harmonic band 0. Harmonic band 0 uses low-pass filtering instead of bandpass preselection. It has a specified tuning range of 0 to 2.9 GHz. HP 8593EM, HP 8595EM, and HP 8596EM only.</td>
</tr>
<tr>
<td>BAND 0</td>
<td></td>
</tr>
<tr>
<td>2.75–6.5 Gz</td>
<td>locks onto harmonic band 1. Harmonic band 1 is preselected and has a specified tuning range of 2.75 GHz to 6.5 GHz. HP 8593EM, HP 8595EM, and HP 8596EM only.</td>
</tr>
<tr>
<td>BAND 1</td>
<td></td>
</tr>
<tr>
<td>12.4–19 Gz</td>
<td>locks onto harmonic band 3. Harmonic band 3 is preselected and has a specified tuning range of 12.4 to 19.4 GHz. HP 8593EM only.</td>
</tr>
<tr>
<td>BAND 3</td>
<td></td>
</tr>
<tr>
<td>19.1–22 Gz</td>
<td>locks onto harmonic band 4. Harmonic band 4 is preselected and has a specified tuning range of 19.1 to 22 GHz. HP 8593EM only.</td>
</tr>
<tr>
<td>BAND 4</td>
<td></td>
</tr>
</tbody>
</table>
120 kHz EMI BW

allows a 6 dB IF bandwidth of 120 kHz

150 kHz

presets the instrument to the predefined CISPR band B settings for EMC measurements.

-30 MHz

200 Hz EMI BW

allows a 6 dB IF bandwidth of 200 Hz.

200 MHz

presets the receiver to the predefined settings for EMC measurements.

-1 GHz

30 MHz

presets the receiver to the predefined settings for EMC measurements.

-300 MHz

3 dB POINTS

initiates an automatic 3 dB bandwidth measurement on the highest peak displayed on screen.

3rd ORD MEAS

initiates an automatic frequency and amplitude measurement on a third-order product. At least one of the fundamental tones and the third-order product must be displayed on the screen.

6 dB POINTS

initiates an automatic 6 dB bandwidth measurement on the highest peak displayed on the screen.

6.0-12.8 BAND 2

locks onto harmonic band 2. Harmonic band 2 is preselected and has a specified tuning range of 6.0 to 12.8 GHz. HP 8593EM, and HP 8596EM only.

9 kHz EMI BW

allows a 6 dB IF bandwidth of 9 kHz.

9 kHz

presets the instrument to the predefined CISPR band A settings for EMC measurements.

99% PWR BW

initiates an automatic measurement of the 99% power bandwidth of the largest signal displayed on the screen.

A = B

exchanges the contents of the trace A register with the trace B register and puts trace A in view mode.

A-B → A ON OFF

when ON is underlined, subtracts the data in trace B from the measured data in trace A.

A → C

copies trace A into trace C.

2.2 EMC Analyzer Functions
ABCDEF accesses the softkey menu for selecting screen title characters A through F.

Abort allows you to exit from an OUTPUT REPORT or an AUTO-MEASURE.

ADD TO LIST adds a signal to the internal signal list. The signal added is either for the last MEASURE AT MKR result or the measurement at the marker position after a stepped measurement. EMC analyzer mode only.

ALC INT EXT activates internal (INT) leveling or external (EXT) leveling. Only available in EMC Analyzer measurement mode. HP 8593EM, HP 8594EM, HP 8595EM, or HP 8596EM with Option 010 only.

ALC MTR INT XTAL activates the automatic leveling control (ALC) functions for internal (INT) leveling or external (XTAL or MTR) leveling. HP 8591EM with Option 010 only.

ALL DLP CARD saves all the downloadable programs and key definitions that are in analyzer memory onto the memory card. If the downloadable program was stored using a prefix, the file name for the downloadable program consists of d(prefix)_(register number). If no prefix was specified, the data is stored with the file name d_(register number).

Amp Cor accesses the menus for entering and editing the current amplitude-correction factors. This function is supplied to maintain compatibility with the HP 8590EL Series spectrum analyzers. The EM-series analyzers also include antenna, cable, and other amplitude correction factors.

AMP COR ON OFF turns the current amplitude-correction factors on and off.

AMPL SCL LOG LIN specifies whether the limit line is derived from a logarithmic or linear amplitude axis. Underline LIN to set the amplitude axis to linear or LOG to set the amplitude axis to logarithmic.

AMPLITUDE activates the reference level function and accesses the amplitude menu.
Amptd Units accesses a menu to select the desired amplitude units. Amplitude units can be selected by pressing, dBm, dBuV, dBuV, Volts, or Watts.

ANALOG+ ON OFF turns on the analog+ display mode. This is a digital implementation of an analog display, combining the advantages of both types of displays. Requires Option 101 or 301.

ANALYZER ADDRESS allows you to set the HP-IB address of the instrument. The address is set to 18 by pressing DEFAULT CONFIG. Changes to BAUD RATE for option 043.

ANNOTATE ON OFF turns the screen annotation on and off when accessed using the DISPLAY key. When accessed using the OUTPUT key, turns on and off the printing of the annotation.

ANTENNA CARD saves the current antenna amplitude-correction factors to a card. To save antenna data press, ANTENNA CARD. REGISTER # and PREFIX= are displayed on the screen. Use the data keys to enter the desired register number then press ENTER. The antenna data is then saved to a card.

Antenna Factors accesses a menu to turn on, recall, edit, or save antenna amplitude-correction factors. Antenna factors are conversion factors relating field strength to measured voltage.

ANTENNA ON OFF turns on or off antenna amplitude-correction factors.

Antenna Units accesses a menu of the transducer conversion units for the antenna-correction factors. This specifies the units of the physical attribute to which an antenna actually responds and which will be indicated on the display for reference level, display line level, threshold level, and marker readouts.

APND CAT ITEM starts the DLP editor function and allows the highlighted item from the catalog of analyzer memory to be appended to the end of the item that is currently in the analyzer's DLP editor memory.
**Caution**

To prevent damage to the input mixer, the power level at the input mixer must not exceed +30 dBm. To prevent signal compression, power at the input to the input mixer must be kept below −10 dBm.

**Note**

To protect the mixer from possible damage, 0 dB RF attenuation (no input power reduction to the mixer) can be selected only from the number/units keypad.

---

**ATTEN**

Sets the input attenuation in 10 dB increments. The instrument input attenuator, which is normally coupled (linked) to the reference level control, reduces the power level of the input signal at the input mixer. The attenuator is decoupled when AUTO is underlined. To set 0 dB, 0 then dB must be entered on the data entry keys.

**AUTO**

Couples the following functions:

- intermediate frequency bandwidth
- average video bandwidth attenuation
- sweep time
- center-frequency step
- average-video-bandwidth to intermediate-frequency-bandwidth ratio.

**AUTO CAL**

Turns the automatic calibration feature on or off.

**ON OFF**

Accesses the softkey menu of functions that can be coupled. (Coupled functions are functions that are linked: if one function is changed, the other function is changed.)

**AUTO-**

Finds all signals on the display that are above the margin and that meet signal criteria, then makes an EMC measurement using specified detectors. *EMC analyzer mode only.*

**MEASURE**

Enables and disables the automatic loading and execution of the file named “eAUTOEXEC” from a card. When enabled, the instrument, upon a power-up sequence, will search the card for an “eAUTOEXEC” file and if found will load and execute it.
**Autorange On/Off**

Turns the current state of the auto-range function on or off. When on, the auto-range function automatically adjusts RF attenuation or reference level (IF step-gain) in response to either an IF or RF overload condition detected during the previous sweep. **RF overload detection is only available when used with an HP 85420E Option 1EM, RF filter section.**

**Aux Conn Control**

Accesses the softkey menu used to control the auxiliary outputs and input. **Not available when used with an HP 85420E Option 1EM RF filter section.**

**AUX/User**

Accesses the softkey menu used for control of the auxiliary interface connector and user menu. The softkey also accesses the comb generator (**HP 8593EM, and HP 8596EM only**) and tracking generator functions (**Option 010**).

**AV Dwells Time**

Sets the measurement time when the average detector is measured. This key is used in conjunction with **MEASURE AT Mkr, RE-measure, AUTO-MEASURE, and MEAS STEPPED.**

**AV/IF BW Ratio**

Determines the automatic setting of averaging (video) bandwidth by multiplying the parameter by the intermediate frequency (IF) bandwidth.

Ratio values other than the values in the 1, 3, 10 sequence are rounded to the nearest permissible value.

**AVG BW AUTO MAN**

Specifies the averaging bandwidth, which is a post-detection, low-pass filter.

Frequency values other than the values in the 1, 3, 10 sequence are rounded to the nearest permissible value. Auto couples the AVG BW to the IF BW.

**AVG On/Off**

Toggles the average detector on and off. When on, the instrument is placed in linear amplitude detection, the detector is turned on, and the system settings are optimized to accurately measure the average amplitudes. **All except option 703.**

**B-DL → B**

Subtracts the display line from trace B and places the result in trace B. The B-DL → B function is a math operation.

**B → C**

Copies trace B into trace C.

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2.6 **EMC Analyzer Functions**
exchanges trace B and trace C. Trace B is set to the view mode.

 accesses the harmonic band menu and the band lock function.  
*HP 8593EM, HP 8595EM, and HP 8596EM only*

 allows you to set the data transmission speed.  
*Option 043 only.*

 stores the amplitude data for trace A and removes it from the screen.

 stores the amplitude data for trace B and removes it from the screen.

 stores the amplitude data for trace C and removes it from the screen.

 deletes all the files from the memory card.

 underlining ON locks the analyzer to the lowest frequency band  
(local oscillator harmonic number) containing the correct center frequency.  
*HP 8593EM, HP 8595EM, and HP 8596EM only*

 activates the IF bandwidth function and accesses the softkeys that control the bandwidth functions.

 saves cable amplitude-correction factors to a card. To save card  
amplitude-correction factors press, *CARD = CARD*, REGISTER #  
and PREFIX= are displayed on the screen. Use the data keys to  
turn on or off cable factors. Cable factors are conversion  
factors used to correct for cable insertion loss.

 accesses a menu to turn on, recall, edit, or save cable  
amplitude-correction factors. Cable factors are conversion  

 accesses the softkey menus used for the self-calibration,  
service-diagnostics, and service-calibration functions.

 initiates an amplitude self-calibration routine.

 accesses a menu to set the time of an automatic calibration.
CISPR BW
performs the portion of the amplitude calibration where the CISPR 6 dB bandwidths are calibrated.

CAL FETCH
retrieves stored self-calibration correction factors from the previous CAL STORE.

CAL FREQ
initiates a frequency self-calibration routine.

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

CAL STORE
stores the correction factors from the last calibration.

CAL TRK GEN
performs absolute amplitude, vernier, and tracking peak self-calibration routines. Connect the tracking generator output to the analyzer input. *Option 010 only.*

CAL YTF
generates the best slope and offset adjustment to calibrate the YIG-tuned filter (YTF) for each harmonic band. Connect COMB OUT to the analyzer input. *HP 8593EM, HP 8595EM, and HP 8596EM only.*

Card Config
accesses the softkey menu that allows you to catalog, format, and delete data from a memory card.

CATALOG ALL
 catalogs all the programs and variables stored in analyzer memory.

CATALOG CARD
 displays a catalog of the items stored on the memory card.

Catalog Internal
 accesses a menu that has the cataloging functions for analyzer memory.

CATALOG PREFIX
 catalogs all of the saved data with the specified prefix from either the memory card or the analyzer memory.

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

CATALOG VARIABLS
 catalogs all of the variables saved in analyzer memory.
CENTER FREQ activates the center-frequency function to allow the selection of frequency that will be at the center of the screen.

CF STEP AUTO MAN changes the step size for the center frequency function when using the step keys.

Change Prefix allows you to enter a prefix that can be used for saving and recalling data to and from the memory card, and for cataloging by the prefix.

Change Title allows you to write a 53-character screen title across the top of the screen.

CLEAR ANNOTATN clears the annotation editor of all text.

CLEAR MARK clears the mark from a signal on the signal list. EMC analyzer mode only.

CLEAR WRITE A erases any data previously stored in trace A and continuously displays any signals during the sweep of the analyzer.

CLEAR WRITE B erases any data previously stored in trace B and continuously displays any signals during the sweep of the analyzer.

CLEAR WRITE C erases any data previously stored in trace C and continuously displays any signals during the sweep of the analyzer.

CLR ALL MARKS clears the mark from all signals in the signal list. EMC analyzer mode only.

CNTL RES AUTO MAN allows the resolution of the marker counter to be selected manually or auto-coupled.

CNTL A 0 1 makes the auxiliary-interface control line A output high or low (TTL). Not available when the HP 85420E Option 1EM RF filter section in use.

CNTL B 0 1 makes the auxiliary-interface control line B output high or low (TTL). Not available when the HP 85420E Option 1EM RF filter section in use.
CNTL C
01 makes the auxiliary-interface control line C output high or low (TTL). Not available when the HP 85420E Option 1EM RF filter section in use.

CNTL D
01 makes the auxiliary-interface control line D output high or low (TTL). Not available when the HP 85420E Option 1EM RF filter section in use.

COMB GEN ON OFF turns the internal comb generator on or off. HP 8593EM, and HP 8596EM only.

COMPLMNT MARKS complements all marked signals in the signal list. For example, if all the even numbered signals in the signal list are marked, pressing COMPLMNT MARKS, with mark all odd numbered signals instead.

CONF TEST initiates a variety of tests to check the major functions of the EMC analyzer.

COPY accesses the softkey menu used for printer and plotter configurations, time and date display functions, memory card configuration functions, disposing of user-defined variables and programs from analyzer memory, changing the analyzer address or the baud rate, displaying the installed options on screen, and changing the format of the MONITOR output.

COPY initiates an output of the screen data, without an external controller, to a previously specified graphics printer or plotter. The printer or plotter must have already been selected using COPY and either Plot Config or Print Config. Use COPY DEV PRNT PLT to choose between printing and plotting.

COPY DEV PRNT PLT changes between a printer and plotter.

COPY SCREEN sends a copy of the current display to the printer specified by Printer Config or the plotter specified by Plotter Config.

CORRECT ON OFF controls use of some correction factors. When ON is underlined, factory correction factors are used and CORR appears on the display. When OFF is underlined, correction factors are not used. This key is located under the CAL key.
Correctn Factors accesses a menu of correction factors used to create, edit, and view antenna, cable, and other amplitude-correction factors. This key is located under the SETUP key.

Correctn On Off turns antenna, cable, or other amplitude-correction factors on or off.

Couple AC DC specifies alternating-current (AC) or direct-current (DC) coupling at the instrument input. Selecting ac coupling blocks any dc voltage at the instrument input; however, the ac coupling also decreases the frequency range of the instrument. The input coupling is set to ac by an instrument preset. Amplitude specifications apply only when coupling is set to DC.

HP 8594EM, HP 8595EM, or HP 8596EM only.

CAUTION Do not use dc coupling if there is any dc voltage at the instrument input.

Crt Horz Position changes the horizontal position of the signal on the analyzer display. Press CAL STORE if you want the analyzer to use this position permanently.

Crt Vert Position changes the vertical position of the signal on the analyzer display. Press CAL STORE if you want the analyzer to use this position permanently.

Date Mode MDY DMY changes the display of the date from a month-day-year format to a day-month-year format.

dBm changes the amplitude units to dBm for the current setting (logarithmic or linear).

dBmV changes the amplitude units to dBmV for the current setting (logarithmic or linear).

dBμV changes the amplitude units to dBμV for the current setting (logarithmic or linear).

Default Cal Data accesses the factory-default correction factors.

Default Config resets the analyzer configuration to the state it was in when it was originally shipped from the factory and performs an instrument preset.
DEFAULT
SYNC

restores the factory default values of the horizontal and vertical synchronization constants for the rear panel MONITOR output.

Define
List

accesses a menu that specifies what elements of a table are output to the printer when OUTPUT REPORT is executed. If any of the elements are set to on, they will be included as part of the list portion of the report.

Define
Report

accesses a menu which specifies what elements of a report are output to the printer or the plotter. If any of the elements are set to on, they will be sent to the printer followed by a form feed. Only LOG ON OFF and LIN ON OFF can be used when outputting to a plotter. The report is generated by OUTPUT REPORT.

DELETE
ALL SIGS

deletes all signals from the signal list. EMC analyzer mode only.

DELETE
FACTORs

deletes all amplitude-correction factors for the current amplitude-correction (antenna, cable, or other) table.

DELETE
FILE

allows you to delete an item from analyzer memory or a file from the memory card.

DELETE
LIMIT

deletes the selected limit-line table.

DELETE
MARKED

deletes all marked signals from the signal list. Signals can be marked using MARK ALL SIGNALS, MARK SIGNAL, and Select Mark.

DELETE
POINT

deletes an amplitude-correction factor that was previously selected by SELECT POINT.

DELETE
SEGMENT

deletes the limit-line entry for the selected segment number.

DELETE
SIGNAL

deletes the current highlighted signal from the signal list. EMC analyzer mode only.

Delete
Signals

accesses a menu which deletes one or more signals from the signal list.
DELTA MEAS accesses the MEAS menu and turns on a delta marker.

DEMOD accesses the softkeys controlling demodulation functions, speaker volume, squelch level, FM gain, and dwell time. *All except Option 703.*

DEMOD allows selection of amplitude (AM) or frequency (FM) demodulation. *All except Option 703.*

DEMOD ON OFF turns the AM or FM demodulation on and off. *All except Option 703.*

DESK JET 310/550C selects either the HP DeskJet 310 or 550C for color printing. Use this function if you have one of these printers. Available under the **Config** key.

DESK JET 540 selects the HP DeskJet 540C for color printing. Use this function if you have this color printer. Available under the **Config** key.

DET accesses a menu which offers a selection of quasi-peak and average detector functions.

DETECTOR PK QP AV turns automatic measuring on or off for the peak, quasi-peak, and average detectors. Available under the **Setup** key.

DETECTOR PK SP NG selects between positive peak, sample, and negative peak detection. The NG (negative) peak detection is available for Option 101.

DETECTOR SMP PK selects between positive peak detection and sample detection. The NEG (negative) detector is available for Options 101, 102, and 301. Available under the **Det** Key.

DISPLAY accesses softkeys that include the **Hold** softkey and limit line functions, activate the display line softkey, threshold and analog+ display softkeys. It also allows title and prefix entry, as well as control of the display graticule and screen annotation.

DISPLAY CARD saves the current analyzer display image on the memory card for viewing later.

DISPLAY CNTL I displays the status of the auxiliary connector input (control line 1) on the analyzer screen (high = 1 or low = 0, in TTL).
Disposable
User Mem

DSP LINE
ON OFF

Dwell
Time

Edit

Ampl Cor

Edit

Annotation

Edit

Antenna

Edit

Cable

Edit

Cat Item

Edit

Done

Edit

Last

Edit

Limit

Edit

Limit

accesses the softkeys **ERASE MEM CARD**, **ERASE DLP MEM**, **ERASE STATEALL**, and **ERASE TRACEALL**.

activates an adjustable horizontal line that is used as a visual reference line.

sets the dwell time for the marker pause, during which demodulation can take place in nonzero span sweeps. All except Option 703.

accesses a menu to edit amplitude-correction factors.

accesses the annotation editor. The annotation editor allows entry of up to 1500 characters of text using an external keyboard. The annotation text can be stored to a card or printed using **OUTPUT REPORT**.

accesses a menu used to edit antenna amplitude-correction factors.

accesses a menu used to edit cable amplitude-correction factors.

starts the DLP editor functions and transfers the highlighted items from the catalog of analyzer memory to the editor buffer.

erases the limit-line table from the analyzer’s screen when accessed from the limit-line menu, and restores the menu accessed by the **Limit 1**, **Limit 2**, or **Limit Lines** softkeys.

When accessed from the amplitude-correction menu, the amplitude-correction factors table is erased from the analyzer’s screen.

starts the DLP editor function and allows the most recent item that was being edited, in the DLP editor buffer, to be accessed again.

allows you to edit the current limit-line tables. **Spectrum analyzer mode only**.

allows you to edit the current limit-line tables. **EMC analyzer mode only**.
EDIT LIST accesses a menu to edit signal list functions. *EMC analyzer mode only.*

EDIT LOWER allows you to view or edit the lower limit-line table. Up to 30 entries are allowed for the lower limit-line table. With the lower limit-line table format, the coordinates for the lower limit-line are specified, but none are specified for the upper limit line. Even if upper limit-line values exist or the values had been entered as an upper and lower limit-line table, the lower limit-line values are treated as a separate table from the upper limit-line values. The lower limit-line entries can have independent frequency (or time) and amplitude coordinates from upper limit-line table entries. *Spectrum analyzer mode only.*

EDIT MID/DELT allows you to view or edit the mid-point and delta limit-line tables simultaneously. *Spectrum analyzer mode only.*

EDIT OTHER accesses the menu used to edit correction factors for devices other than antennas and cables.

EDIT UP/LOW allows you to view or edit the upper and lower limit-line tables simultaneously. *Spectrum analyzer mode only.*

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

EDIT UPR LWR selects upper or lower limit-line tables. It switches to the limit-line table that is not currently being edited. *Spectrum analyzer mode only.*

Editor accesses the menu of downloadable program (DLP) editor keys.

EMC ANALYZER selects the EMC analyzer instrument mode of operation.

ENTER enters a numerical value that has been entered from the front panel using the keypad, step keys or knob.

EP LQ570 sets the screen dump to be compatible with an Epson LQ-570 compatible printer.

SML LRG sets the screen dump to be compatible with an Epson MX80 compatible printer.

SML LRG
allows you to dispose of the DLPs, all traces defined by TRDEF, and all VARDEF variables that are in EMC analyzer memory.

allows you to dispose of any data or programs stored on the memory card by formatting it.

allows you to purge all the user state registers 1 through 9.

allows you to purge all the user trace registers 0 through TRCMEM.

executes the programming commands displayed in the screen title area of the EMC analyzer.

returns the analyzer to the state it was in before the current catalog function was invoked.

exits the annotation editor.

exits the SAVE LIN GRAPH or SAVE LOG GRAPH report graph functions.

exits the MEAS STEPPED function.

clears the instrument configuration information from the screen written by the SHW INST CONFIG function.

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

adds a positive or negative preamplifier gain value, which is subtracted from the displayed signal. **EXTERNAL PREAMPG** is similar to the REF LVL OFFSET; however, with the **EXTERNAL PREAMPG**, the attenuation may be changed depending on the preamplifier gain entered. The preamplifier gain value is not affected by an instrument preset.
FAST STEP
ON OFF

determines how stepped measurements are made. When fast step is on and a limit-line margin is on and the peak detector amplitude is below the margin, no other detectors are measured. If the peak amplitude is above the margin, any other selected detector is also measured. *EMC analyzer mode only.*

FFT MEAS

activates a discrete fast Fourier transform based on the current setup.

FLAT

draws a zero-slope line between the coordinate point of the current segment and the coordinate point of the next segment.

FM GAIN

adjusts the FM deviation display. The top graticule is the positive deviation set by FM GAIN. The bottom graticule is the negative deviation set by FM GAIN. *All except Option 703.*

FORMAT CARD

formats a card in logical interchange format (LIF).

FREE RUN

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

FREQ OFFSET

allows the user to input a frequency offset value that is added to the frequency readout, to account for frequency conversions external to the EMC analyzer.

FREQ SCL LOG LIN

specifies whether the limit line is derived from a logarithmic or linear frequency axis. Underline LIN to set the frequency axis to linear or LOG to set the frequency axis to logarithmic.

FREQ STEP

sets the size of the frequency step for stepped measurements.

(FREQUENCY)

activates the center-frequency or start-frequency function and accesses the menu that has the frequency functions.

FRQ SCAN ON OFF

reduces the signal span at the marker to zero span by performing an automatic zoom. When FRQ SCAN ON OFF is off, the instrument is restored to its previous setting with the exception of the marker which is placed at the same frequency as the zero scan (span) frequency.

FULL SPAN

changes the instrument span to full span. The span can be limited if harmonic band lock (BND LOCK ON OFF) is set to ON (HP 8591EM, HP 8593EM, and HP 8595EM only).
selects Gauss as the transducer conversion units for the antenna amplitude-correction factors.

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

turns the screen graticule on and off.

deaetivates the active function and blanks the active function text from the display. No data can be accidentally entered using the knob, step keys, or data keys. Activating another function will turn off the hold function.

selects a black and white printer.

selects a black and white printer. Use this function if you have a black and white HP DeskJet printer. Available under the [Config] key.

specifies the intermediate frequency bandwidth. When MAN is underlined, the coupling between center frequency (EMC analyzer mode) and sweep time (spectrum analyzer mode) and intermediate frequency bandwidth is disabled. When AUTO is underlined, coupling is re-established.

limits tuning to values within the currently selected input path. For example, when input lock is on, and a stop frequency is selected out of the range of the currently selected input path, the actual stop frequency used will be the highest possible value allowed by the selected input path.

accesses a menu to specify the input signal routing path through the HP 85420E Option 1EM RF filter section and allows switching the 300 MHz calibrator signal so that it is routed to the RF input of the instrument. Available only when used with an HP 85420E Option 1EM RF filter section.

specifies the 9 kHz to 50 MHz input path (INPUT 1) as the signal routing path of the HP 85420E Option 1EM RF filter section. Available only when used with an HP 85420E Option 1EM RF filter section.
INPUT 2 20M-2.9G specifies the 20 MHz to 2.9 GHz input path (INPUT 2) as the signal routing path of the HP 85420E Option 1EM RF filter section. Available only when used with an HP 85420E Option 1EM RF filter section.

INPUT 2 BYPASS specifies the bypass input path (INPUT 2) as the signal routing path of the HP 85420E Option 1EM RF filter section. Available only when used with an HP 85420E Option 1EM RF filter section.

INPUT Z 50Ω 75Ω sets the input impedance for voltage-to-power conversions. The impedance you select is for computational purposes only, since the actual impedance of 50Ω is set by internal hardware. The preset value can be changed by using a service function. Select the computational input impedance by pressing INPUT Z 50Ω 75Ω or by entering 50 or 75 using the data keys.

INTERNAL STATE recalls the saved analyzer state from the selected state register.

Internal Trace accesses a softkey menu that allows you to either select the trace in which the trace data is to be recalled, recall the current limit-line tables.

LAST SPAN changes the frequency span of the instrument to the previous span setting.

LIMIT # ON OFF displays limit line #(#=number) when ON is underlined. # can be 1 or 2. EMC analyzer mode only.

Limit 1 accesses the menu for displaying, testing, deleting, and editing of limit 1 and its corresponding margin.

Limit 2 accesses the menu for displaying, testing, deleting, and editing of limit 2 and its corresponding margin.

Limit Lines accesses the limit-line menus under the (DISPLAY) key and (SETUP) key.

LIMIT LINES stores or recalls the current limit-line tables in analyzer memory.

LIMITS CARD saves the current limit-line data to a card.
allows you to choose fixed or relative type of limit lines. 
*Spectrum analyzer mode only.*

selects whether limit lines will be entered using frequency or 
sweep time to define the segments. *Spectrum analyzer mode 
only.*

turns on or off the generation of a linear graph of the signal 
list. The linear graph is sent to the printer or plotter when 
*OUTPUT REPORT* is executed.

turns on or off the linearity check, which modifies the input 
RF attenuation to determine if a measured signal level is 
undergoing compression.

powers up the instrument.

activates the trigger condition that allows the next sweep to be 
synchronized with the next cycle of the line voltage.

saves the current signal list to a card.

that enables or disables the generation of a tabular listing of a 
signal list. The listing is sent to a printer when *OUTPUT REPORT* 
is executed.

displays any portion of the limit lines that are currently within 
the display boundary of the spectrum analyzer. If Y (yes) is 
underlined the limit lines are displayed. If N (no) is underlined 
they are not displayed. If AUTO is underlined, the display of 
the limit lines is dependent on the limit test function. The limit 
lines will be displayed while the limit test function is turned on, 
otherwise they will be turned off. *Spectrum analyzer mode 
only.*

turns the limit-line testing and (if *LMT DISP AUTO* is selected) 
turns the display of the limit lines on and off. *Spectrum 
analyzer mode only.*

loads a file from the memory card into EMC analyzer memory.
places the analyzer in the local mode and enables front-panel control.

LOG ON OFF turns on or off the generation of a logarithmic graph of the signal list. The logarithmic graph is sent to the printer or plotter when OUTPUT REPORT is executed.

LOGF SPD STD FAST selects between optimizing the frequency accuracy or minimizing the scan time in log sweep. When “STD” is selected the frequency accuracy of the sweep is optimized. When “FAST” is selected the scan time of the sweep is minimized.

MAN TRK ADJUST allows the user to adjust the frequency of the tracking-generator oscillator manually. Option 010 only.

MARGIN # ON OFF sets the amplitude (in negative decibels) and display state for limit margin 1 or 2. The limit margin is a fixed amplitude relative to the limit line. EMC analyzer mode only.

MARK ALL DUPLICAT marks all signals which match their frequency with another signal in the signal list. EMC analyzer mode only.

MARK ALL SIGNALS marks all signals in the signal list. EMC analyzer mode only.

MARK LWR DUPLICAT marks all duplicate frequency signals in the list that are lower in peak amplitude. EMC analyzer mode only

MARK SIGNAL marks the highlighted signal in the signal list. EMC analyzer mode only

MARK TO END marks all signals after the highlighted signal, to the end of the list. EMC analyzer mode only

MARKER activates a single marker used to read out individual steps after a stepped measurement.

MARKER Δ activates a second marker at the position of the first marker and indicates the frequency and amplitude differences between the two markers.

MARKER CF changes the instrument settings so that the frequency at the marker becomes the center frequency.
<table>
<thead>
<tr>
<th>Marker Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF STEP</td>
<td>Changes the center-frequency step size to match the value of the active marker.</td>
</tr>
<tr>
<td>ON OFF</td>
<td>Turns the selected marker on or off. One of the four markers must first be selected by the SELECT 1 2 3 4 key.</td>
</tr>
<tr>
<td>REF LVL</td>
<td>Changes the instrument settings so that the amplitude at the active marker becomes the reference level.</td>
</tr>
<tr>
<td>ALL OFF</td>
<td>Turns off all of the markers, including markers used for marker track and demodulation. Marker annotation is also removed.</td>
</tr>
<tr>
<td>AMPTD</td>
<td>Keeps the active marker at the requested amplitude on the screen.</td>
</tr>
<tr>
<td>NORMAL</td>
<td>Activates a single frequency marker at the center frequency on the active trace if an onscreen marker is not already displayed.</td>
</tr>
<tr>
<td>Δ SPAN</td>
<td>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.</td>
</tr>
<tr>
<td>HIGH</td>
<td>Places the marker on the highest peak.</td>
</tr>
<tr>
<td>MINIMUM</td>
<td>Moves the active marker to the minimum detected amplitude value.</td>
</tr>
<tr>
<td>PK-PK</td>
<td>Finds and displays the frequency and amplitude differences between the highest and lowest trace points.</td>
</tr>
<tr>
<td>START</td>
<td>Changes the start frequency so that it is equal to the frequency of the active marker.</td>
</tr>
<tr>
<td>STOP</td>
<td>Changes the stop frequency so that it is equal to the frequency of the active marker.</td>
</tr>
<tr>
<td>TUNE SPN</td>
<td>Makes the marker the active function and modifies the behavior of the marker positioning functionality of the instrument when accessed through the data keys, knob, or stepkeys.</td>
</tr>
<tr>
<td>MAX HOLD A</td>
<td>Maintains the maximum level for each trace point of trace A.</td>
</tr>
<tr>
<td>MAX HOLD B</td>
<td>Maintains the maximum level for each trace point of trace B.</td>
</tr>
</tbody>
</table>
MAX/MIN ON OFF causes the analyzer to put trace B into max-hold mode and trace C into min-hold mode (trace A is active). When used with MAX/MIN VIEW, this function lets you discriminate between narrowband and broadband signals. Turning on this function turns off NORM A/B ON OFF.

MAX/MIN VIEW allows the user to view the MAX/MIN ON OFF function. All traces stop sweeping and the maximum and the minimum signals are displayed on the CRT. This key only appears when MAX/MIN ON is selected.

MAX MXR LVL lets you change the maximum input mixer level in 10 dB steps from -10 dBm to -100 dBm. The mixer level is equal to the reference level minus the attenuator setting. As the reference level changes, the input attenuator setting is changed to keep the power levels less than the selected level at the input mixer. Pressing (Preset) resets the maximum input mixer level to -10 dBm.

MEAS SNG CONT sets the stepped measurements for either single or continuous step mode.

MEAS STEPPED initiates a stepped measurement. The stepped measurement is taken between the specified start and stop frequencies in conjunction with the selected step size (FREQ STEP), step type (STEP LOG LIN), and step mode (MEAS SNG CONT). EMC analyzer mode only.

MEASURE AT MKR makes a measurement, using specified detectors, with the marker position as the measurement frequency. EMC analyzer mode only.

Measure Detector accesses a menu to select detectors for automatic measurements or the measurement time of the specified detectors.

MEM LOCKED locks all the current internal state and trace registers against further data storage.

MIN HOLD C updates trace C with the minimum level detected.

MK COUNT ON OFF turns on the marker counter when ON is underlined.
MK NOISE ON OFF reads out the average noise level, referenced to a 1 Hz noise power bandwidth, at the marker position.

MK PAUSE ON OFF stops the analyzer sweep at the marker position for the duration of the dwell time.

MK READ F T I P selects the marker readout to be displayed in signal frequency, sweep time, the inverse of the sweep time, or the period which is the inverse of the frequency.

MK TRACE AUTO ABC assigns a marker to a trace.

MK TRACK ON OFF moves the signal that is nearest to the active marker to the center of the screen and keeps the signal there.

MKR accesses the marker control softkeys which select the type and number of markers and turn them on and off. Markers are diamond-shaped characters that identify points of traces and allow the traces to be manipulated and controlled on the screen. During manual operation, four markers may appear on the display simultaneously; only one can be controlled at a time. The marker that is controlled is called the “active” marker. Pressing MKR activates the MARKER NORMAL softkey.

MKR accesses a menu of marker-to-functions such as,

MKR MARKER -- CF
MKR MARKER -- REF LVL
MKR MARKER -- CF STEP
MKR MARKER -- MINIMUM
MKR MARKER -- START
MKR MARKER -- STOP
MKR MARKER -- PK-PK
MKR MARKER -- SPAN

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

2.24 EMC Analyzer Functions
changes the softkey menus for the EMC analyzer and spectrum-analyzer modes of operation.

starts the DLP editor function, clearing the DLP editor memory to create a new item in the 2500 byte DLP editor memory. The item will not be in the user memory of the instrument until it is processed by the SAVE EDIT softkey. The DLP editor memory buffer remains intact when the instrument is preset and when it is powered off.

switches the active window between the two displayed windows.

pages through SHOW SETUP screens.

places the marker on the next highest peak. (Also see the PEAK EXCURS and THRESHLD ON OFF softkey descriptions.)

moves the marker to the next peak to the left of the current marker.

moves the marker to the next peak to the right of the current marker.

normalizes the input signal of the contents of trace B. Turning off this function turns off MAX/MIN ON OFF.

specifies that no conversion units are used for the antenna amplitude-correction factors.

subtracts trace B from trace A and adds the result to the display line. The result is displayed in trace A.

displays the display line and makes the display line function active. The trace data is normalized with respect to the display line even if the value of the display line is changed.

displays if no user menus have been defined by the user.

allows you to trigger on the NTSC video format. Options 101, 102, or 301 only.

activates the windows display mode and accesses the menu of window zone functions.
saves other two-port amplitude-correction factors to a card. To save other amplitude-correction factors press, OTHER — CARD. REGISTER # and PREFIX= are displayed on the screen. Use the data keys to enter the desired register number then press (ENTER). The other two-port amplitude-correction data is then saved to a card.

accesses a menu to turn on, recall, edit, or save other amplitude-correction factors for any two-port device, excluding antenna and cable factors, placed between the antenna and the instrument.

turns on or off other two-port amplitude-correction factors, excluding antenna and cable factors, placed between the antenna and the instrument.

accesses a menu to output reports to a plotter or a printer, or send a copy of the current display to the printer or plotter.

outputs a report to the specified plotter or printer.

enables or disables RF and IF overload status. RF overload detection is only available when used with an HP 85420E Option 1EM RF filter section.

selects a color printer.

allows you to trigger on the PAL video format. Options 101 and 102, or Option 301 only.

allows you to trigger on the PAL-M video format. Options 101 and 102, or Option 301 only.

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

sets the measurement time when the peak detector is measured. This key is used in conjunction with MEASURE AT MKR, Re-measure, AUTO-MEASURE, and MEAS STEPPED.
PK-PK MEAS initiates an automatic measurement of the frequency and amplitude differences of the highest and lowest signals displayed on the screen. Pressing PK-PK MEAS performs a routine that is similar to MARKER A and then moving the second marker to the lowest detected signal.

Plot Config accesses the menu used to address the plotter and to select plotter options.

PLOTTER ADDRESS changes the HP-IB address of the plotter. Except Option 043.

PLT LOC selects the position of the plotter output.

PLT MENU ON OFF allows the softkey labels to be plotted along with the analyzer display.

Plt Port Config access the menus used to select plotter options. See COPY for more information.

PLT PORT HP/IB PAR allows the selection between HP-IB or parallel plotter ports. Except for Option 043.

PLT PORT SER PAR allows the selection between serial or parallel plotter ports.

BAUD RATE appears in this menu only when serial is selected. Option 043 only.

PLTS/PG 1 2 4 allows you to plot a full-page, half-page, or quarter-page output.

PLT-LJT ON OFF allows you to plot a full-page, half-page, or quarter-page output to an HP LaserJet printer.

POWER ON IP LAST specifies a limit value for one coordinate point, so that a POINT segment specifies a limit value for a single frequency or time.

determines the state of the EMC analyzer when the analyzer is powered on for bands 1 through 4.

PREAMP ON OFF switches the system preamplifier in and out of the input path. The softkey acts as an on or off toggle switch. Not available when INPUT Z bypass is selected. Available only when used with an HP 85420E Option 1EM RF filter section.
**PRESEL** enables default preselector data to allow maximum frequency response without peaking the preselector. The CAL YTF routine should be performed before pressing **PRESEL, DEFAULT**. 
*HP 8593EM, HP 8595EM, and HP 8596EM only.*

**PRESEL PEAK** ideally centers the preselector on a given signal for the most accurate measurement of amplitude. The maximum response found for the frequency at the marker determines the future adjustment values that will be provided to the preselector. 
*HP 8593EM, HP 8595EM, and HP 8596EM only.*

**[PRESET]** provides a convenient starting point for making most measurements. The instrument preset function performs a processor test, but does not affect CAL data. Pressing **[PRESET]** clears both the input and output buffers. Amplitude-correction factors and limit-line testing is turned off.

**Print Config** accesses the softkey functions that are used to address the printer, select a black and white print or a color print and reset the printer.

**PRINTER ADDRESS** allows you to change the HP-IB address of the printer. *Except for Option 043.*

**PRINTER SETUP** resets the printer, sets the printer to 60 lines per page, and skips line perforations. This function enables you to obtain up to two printouts per page. The printer paper should be at the top of the form before using this function.

**Prt Port Config** accesses the menus used to select printer options. See **COPY** for more information.

**PRN PORT HPB PAR** allows the selection between HP-IB or parallel printer ports. *Except for Option 043.*

**PRN PORT SER PAR** allows the selection between serial or parallel printer ports. **BAUD RATE** appears in this menu only when serial is selected. *Option 043 only.*

**PRT MENU ON OFF** allows the softkey labels to be printed along with the analyzer display.

**pTesla** selects pTesla as the transducer conversion units for the antenna amplitude-correction factors.
PURGE AMP COR clears the current amplitude-correction table from internal memory.

PURGE LIMITS clears the current limit-line table from internal memory. *Spectrum analyzer mode only.*

PWR SWP ON OFF activates or deactivates the power-sweep function, which sweeps the output power of the tracking generator over the selected power-sweep range. *Option 010 only.*

QP ON OFF toggles the quasi-peak detector on and off. When on, the instrument is placed in linear amplitude detection, the detector is turned on, and the system settings are optimized to accurately measure the quasi-peak amplitudes. *All except Option 703.*

QP DWELL TIME sets the measurement time when the quasi-peak detector is measured. This key is used in conjunction with MEASURE AT MKR, Re-measure, AUTO-MEASURE, and MEAS STEPPED.

QP/AVG 10X OFF turns off the linear 10X gain stage in the quasi-peak and average detector signal path. *All except Option 703.*

RECALL AMP COR recalls an amplitude-correction factors table from the memory card.

RECALL ANTENNA recalls antenna-correction factors from a card. To recall antenna-correction data press, RECALL ANTENNA, use the step keys or knob to highlight the desired file, then press LOAD FILE.

RECALL CABLE recalls cable-correction factors from a card. To recall cable factors press, RECALL CABLE, use the step keys or knob to highlight the desired file, then press LOAD FILE.

Recall Card accesses a menu to recall instrument setups, signals lists, states, traces, display images, limit-line tables, and amplitude-correction factors from a card.

RECALL DISPLAY recalls display images from a card.
RECALL DLP
recalls a DLP from the memory card.

Recall Internal
accesses a menu to recall states, traces, and limit-line tables
from internal memory.

RECALL LIMITS
recalls limit-line tables from the memory card.

RECALL LIST
RECALL LIST use the step keys or knob to highlight the desired
file, then press LOAD FILE.

RECALL OTHER
recalls other two-port device factors from a card. To recall
other data press, RECALL OTHER use the step keys or knob to
highlight the desired file, then press LOAD FILE.

RECALL SETUP
recalls instrument setups from a card. To recall an instrument
setup press, RECALL SETUP use the step keys or knob to
highlight the desired file, then press LOAD FILE.

RECALL STATE
recalls, into analyzer memory, a state saved on the memory
card.

RECALL TRACE
RECALL TRACE use the step keys or knob to highlight the
desired file, then press LOAD FILE.

REF_LVL
allows the reference level to be changed. This function is
activated when (AMPLITUDE) is pressed. The reference level is
the amplitude power or voltage represented by the top graticule
line on the screen. Changing the value of the reference level
changes the absolute amplitude level (in dBu/V) of the top
graticule line. The reference level can be changed using the
data keys, knob, or step keys.
REF LVL adds an offset value to the displayed reference level. Offsets are entered by using the data keys. Entering an offset does not affect the trace or the attenuation value. Reference-level offsets are used when gain or loss occurs between a device under test and the instrument input.

REMEAS ALL SIGS remeasures all signals in the signal list. To remeasure each signal the algorithm spans down on the signal using the initial frequency listed in the table. When zero span is reached, up to three detectors can be used to measure the signal. These detectors are selected using DETECTOR PK QP AV. EMC analyzer mode only.

REMEAS MARKED remeasures marked signals in the signal list. To remeasure each signal the algorithm spans down on the signal using the initial frequency listed in the table. When zero span is reached, up to three detectors can be used to measure the signal. These detectors are selected using DETECTOR PK QP AV. EMC analyzer mode only.

REMEAS SIGNAL remeasures the signal specified in the signal list. To remeasure each signal the algorithm spans down on the signal using the initial frequency listed in the table. When zero span is reached, up to three detectors can be used to measure the signal. These detectors are selected using DETECTOR PK QP AV. EMC analyzer mode only.

RE- measure accesses a menu that remeasures one or more signals in the signal list.

RESTART restarts a stepped measurement. The stepped measurement is taken between the specified start and stop frequencies in conjunction with the selected step size (FREQ STEP), step type (STEP LOG LIN) and step mode (MEAS SNG CONT).

TITLE provides additional characters for the Change Title function.

SAVE AMP COR saves antenna amplitude-correction factors to a card.
SAVE ANTENNA saves antenna amplitude-correction data to a card. To save antenna data press, SAVE ANTENNA. REGISTER # and PREFIX are displayed on the screen. Use the data keys to enter the desired register number then press (ENTER). The antenna data is then saved to a card.

SAVE AUTOEXEC saves the current setup to a file named "AUTOEXEC" on the card. See AUTOEXEC ON OFF.

SAVE CABLE saves cable amplitude-correction data to a card.

Save Card accesses a menu to save instrument setups, signals lists, states, traces, display images, limit-line tables, and amplitude-correction factors to a card.

SAVE EDIT passes the text from the DLIP editor memory through the parser to execute as instrument commands. If the text (commands) is a valid user-defined function, it passes through the parser and into the instrument user memory. It will replace an existing user defined function of the same name.

Save Internal accesses a menu to save states, traces, and limit-line tables to internal instrument memory.

SAVE LIMITS saves the current limit-line tables to a card.

SAVE LIN GRAPH draws an EMC report graph on the display. SAVE LIN GRAPH draws a full-screen graticule, linear frequency-axis with limited annotation. The display image can then be saved to a card. EMC analyzer mode only.

SAVE LIST saves the current signal list to a card. EMC analyzer mode only.

SAVE LOCK ON OFF locks all the current internal state and trace registers against further data storage.

SAVE LOG GRAPH draws an EMC report graph on the display. SAVE LOG GRAPH draws a full-screen graticule, logarithmic frequency-axis with limited annotation. The display image can then be saved to a card. EMC analyzer mode only.

SAVE OTHER saves other two-port amplitude-correction factors to a card.

2.32 EMC Analyzer Functions
Save/Rcl List accesses a menu used to save and recall signal lists. Save/Rcl List also draws report graphs on the display. EMC analyzer mode only.

SAVE SETUP saves the current setup to a card.

(SAVE/RECALL) accesses softkey menus that allow you to save or recall data from the card or internal memory.

SCALE LOG LIN scales the vertical graticule divisions in logarithmic units when LOG is underlined. When LOG is the active function, the logarithmic units per division can be changed. Values may range from 0.1 to 20 dB per division. When LIN is underlined, the vertical scale is in linear mode which has a range of 1 kW to 1 pW. The reference-level value is set to the top of the screen and the bottom graticule becomes zero volts. (Each division of the graticule is one-eighth of the reference level in volts.)

SECAM-L triggers on the SECAM-L video formats. Requires Option 301, or both Options 101 and 102.

SELECT 1 2 3 4 selects one of the four possible markers.

SELECT AMPLITUDE allows you to enter the amplitude value for the displayed limit-line segment or the current amplitude-corrrection point.

Select Axis accesses a menu which allows the selection of the frequency and the amplitude scales for the limit line to be either logarithmic or linear.

SELECT DLT AMPL allows you to enter the delta amplitude value to create an upper and lower limit-line segment.

SELECT FREQ allows you to enter the frequency value for a limit-line segment or for an amplitude-correction point.

SELECT FRM LIST controls the cursor position in the signal list. EMC analyzer mode only.

SELECT LWR AMPL enters the amplitude value for the lower limit-line segment. Spectrum analyzer mode only.
SELECT MID-AMPL allows you to enter the middle amplitude value to create upper and lower limit-line segments.

SELECT POINT allows you to create or edit an amplitude-correction factor data point.

SELECT PREFIX allows you to select an already existing prefix of a cataloged file and changes the current prefix to this selected prefix.

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

SELECT TIME allows you to enter the time value for a limit-line segment. The time value is with respect to the sweep time. *Spectrum analyzer mode only.*

Select Type accesses the softkey menu used to select the limit-line type of segment.

SELECT UPR-AMPL enters the amplitude value for the upper limit-line segment. *Spectrum analyzer mode only.*

Select Mark accesses a menu that marks one or more signals on the signal list. *EMC analyzer mode only.*

Service Cal accesses several service calibration functions. The service calibration functions are designed for service use only. More detailed descriptions of the service functions are available in the service documentation. Service documentation can be obtained by ordering Option 915 through your HP Sales and Service office.

Service Diag accesses several service diagnostic functions. The service diagnostic functions are designed for service use only. More detailed descriptions of the service diagnostic functions are available in the service documentation. Service documentation can be obtained by ordering Option 915 through your HP Sales and Service office.

Set B&W Printer accesses the softkeys for setting up black and white HP and Epson compatible printers.

2.34 EMC Analyzer Functions
Set Colr Printer accesses the softkeys for setting up color HP printers.

SET DATE allows you to set the date of the real-time clock.

SET TIME allows you, when accessed from (CONFIG), to set the time of the real-time clock. When accessed from (CAL) allows you to set the time for the Cal at Time feature.

SETTINGS ON OFF turns on or off the generation of a tabular listing of current instrument settings. The listing will be sent to the printer when OUTPUT REPORT is executed.

(SETUP) accesses softkey functions that control the analyzer settings to be used in a measurement, such as frequency range, antenna correction factors, and limit lines.

SETUP CARD stores the settings of the instrument to the card. This includes: windows and the states and traces associated with them, limit lines, correction factors, and other settings.

(SCL SWF) changes the sweep control to single sweep if the analyzer is in the continuous sweep mode. If already in single sweep, another sweep is taken.

SHOW \( \Delta 1 \) PK QP AV specifies that any or all of the following are included in the list portion of the report: peak detector delta from limit 1, quasi-peak detector delta from limit 1, or average detector delta from limit 1.

SHOW \( \Delta 2 \) PK QP AV specifies that any or all of the following are included in the list portion of the report: peak detector delta from limit 2, quasi-peak detector delta from limit 2, or average detector delta from limit 2.

SHOW COR ON OFF specifies the total correction factors are included as part of the list portion of the report. The listing is sent to the printer upon receipt of an OUTPUT REPORT.

SHOW DET PK QP AV specifies that any or all of the following are included in the list portion of the report: the peak detector amplitude, quasi-peak detector amplitude, and the average detector amplitude. The listing is sent to the printer upon receipt of an OUTPUT REPORT.
**SHOW MRKR ON OFF**

specifies marks placed on signals that are marked in the signal list will be included as part of the list portion of the report.

**SHOW SETUP**

shows current settings of the instrument on the display. 

**SHOW INST CONFIG**

displays information about the configuration of the instrument including model number, serial number, and the firmware revision date. Also included are the specific devices installed; HP-IB interface, RS-232 interface, tracking generator (TG), quasi-peak detector (QPD), FM demodulator (Demod), precision frequency reference (oven), and narrow bandwidths (NBW).

**SIG LIST ON OFF**

turns on or off the signal list viewing functions. **EMC analyzer mode only.**

**Signal Marking**

accesses a menu to mark one or more signal on the signal list. **EMC analyzer mode only.**

**SLOPE**

draws a straight line between the coordinate point of the current segment and the coordinate point of the next segment.

**SORT BY DELT LIM**

sorts the internal signal list by delta from limit line. This list is sorted in descending order. The **VIEW ▲ OFF** softkeys select which limit and which detector to compare to the limit. **EMC analyzer mode only.**

**SORT BY AVG AMP**

sorts the internal signal list by average amplitude. This list is sorted in descending order. **EMC analyzer mode only.**

**SORT BY FREQ**

sorts the internal signal list by the frequency of the signals. The list will be sorted in ascending order. **EMC analyzer mode only.**

**SORT BY PK AMP**

sorts the internal signal list by peak amplitude. The list will be sorted by descending order. **EMC analyzer mode only.**

**SORT BY QP AMP**

sorts the internal signal list by quasi-peak amplitude. The list will be sorted by descending order. **EMC analyzer mode only.**

**Sort Signals**

accesses a menu to sort the internal signal list based on the softkey selected. **EMC analyzer mode only.**
(SPAN) or SPAN activates the SPAN function and accesses the frequency-span functions.

SPAN ZOOM finds the highest signal peak onscreen. If a marker is not already on the peak, it places a marker on it, turns on the marker-track function, and activates the span function.

SPEAKER ON OFF turns the internal speaker on and off. All except Option 703.

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

SQUELCH adjusts the squelch level. The squelch level mutes weak signals and passes strong signals. All except Option 703.

SRC ATN MAN AUTO allows you to select between automatic and manual adjustment of the tracking generator’s switching attenuator. Option 010 only.

SRC PWR OFFSET offsets the displayed power of the tracking generator (SRC). Option 010 only.

SRC PWR STP SIZE allows the user to set the step size of the source-power level, source-power offset, and power-sweep range functions. Option 010 only.

SRC PWR ON OFF activates (ON) or deactivates (OFF) the output power of the tracking generator (SRC). The power level can then be adjusted using the data keys, step keys, or knob. Option 010 only.

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

STATE CARD saves the current analyzer state on the memory card.

STATE INTRNL saves the current analyzer state in the selected state register.

STEP LOG LIN selects either a logarithmic or linear stepped measurement. The stepped measurement is initiated using the MEAS STEPPED softkey under the (TEST) key and taken between the specified start and stop frequencies in conjunction with the selected step size (FREQ, STEP), and step mode (MEAS, SNG, CONT).
STOP stops a stepped measurement.

STOP, FREQ sets the frequency at the right side of the graticule.

STUWXX accesses the softkey menu used for selecting screen title or prefix characters S through X.

SWEEP CONT SGL switches the instrument between continuous-sweep mode and single-sweep mode. If the instrument is in single-sweep mode, SGL is underlined.

SWEEP LOG LIN selects between a logarithmic and linear frequency axis.

SWEEP/TRIG accesses a menu that selects the sweep mode and trigger mode.

SWP CPLG SR SA selects a stimulus-response (SR) or spectrum analyzer (SA) auto-coupled sweep time.

SWP TIME AUTO MAN selects the length of time in which the analyzer sweeps the displayed frequency span. AUTO coupled sweep time to selected IF and AVG bandwidths so optimized speed and accuracy is achieved.

SYNC NRM NTSC changes the rear panel MONITOR output between normal synchronization constants or the NTSC video compatible format.

SYNC NRM PAL changes the rear panel MONITOR output between normal synchronization constants or the PAL video compatible format.

TABLE ADDRESS changes the HP-IB address of an automated turntable.

TABLE starts the turntable moving in a counter-clockwise direction, or stops the turntable from moving. EMC analyzer mode only.

CCW STOP TABLE starts the turntable moving in a clockwise direction, or stops the turntable from moving. EMC analyzer mode only.

CW STOP TEST provides control for measuring signals and manipulating lists of measured signals.

THRESHDLD ON OFF sets a lower boundary to the active trace. The threshold line "clips" signals that appear below the line when this function is on.

2.38 EMC Analyzer Functions
<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>accesses the softkey menu used to set and display the real-time clock.</td>
</tr>
<tr>
<td>Date</td>
<td></td>
</tr>
<tr>
<td>TIMEDATE ON OFF</td>
<td>turns the display of the real-time clock on and off.</td>
</tr>
<tr>
<td>TOWER ADDRESS</td>
<td>changes the HP-IB address of an automated tower.</td>
</tr>
<tr>
<td>TOWER DN STOP</td>
<td>starts the tower moving down or stops the tower from moving. <em>EMC analyzer mode only.</em></td>
</tr>
<tr>
<td>Tower Turntbl</td>
<td>accesses the menu of tower and turntable softkey functions. <em>EMC analyzer mode only.</em></td>
</tr>
<tr>
<td>TOWER UP STOP</td>
<td>starts the tower moving up or stops the tower from moving. <em>EMC analyzer mode only.</em></td>
</tr>
<tr>
<td>TOWER VERT. HOR</td>
<td>positions the tower either horizontally or vertically. <em>EMC analyzer mode only.</em></td>
</tr>
<tr>
<td>TRACE</td>
<td>accesses the trace softkeys that allow you to store and manipulate trace information.</td>
</tr>
<tr>
<td>TRACE A</td>
<td>selects the softkey menu used for trace A, trace B, or trace C functions.</td>
</tr>
<tr>
<td>TRACE B</td>
<td>sets up trace A for recalling previously-saved trace data into trace A or saving trace data from trace A.</td>
</tr>
<tr>
<td>TRACE B VW OFF</td>
<td>sets up trace B for recalling previously-saved trace data into trace B or saving trace data from trace B. <em>NORM A/B ON OFF</em> set to ON.</td>
</tr>
<tr>
<td>TRACE C</td>
<td>allows the viewing or blanking of Trace B. Only available with <em>NORM A/B ON OFF</em> set to ON.</td>
</tr>
<tr>
<td>Trace Card</td>
<td>sets up trace C for recalling previously-saved trace data into trace C or saving trace data from trace C. begins the process used to save trace data or limit-line tables on the memory card.</td>
</tr>
<tr>
<td>Trace Intrnl</td>
<td>accesses a softkey menu that allows you to select the item to be stored in analyzer memory.</td>
</tr>
</tbody>
</table>
Track displays softkey menus for use with a built-in tracking generator. Option 010 only.

TRACKING PEAK activates a routine that automatically adjusts the tracking adjustment to obtain the peak response of the tracking generator on the EMC analyzer display. Option 010 only.

Trigger accesses softkeys that let you select the trigger mode.

TUNE SLO-FAST makes center frequency the active function and, when FAST is underlined, increases the speed of the marker positioning and center frequency tuning functionality of the knob and step keys.

For marker positioning, the knob changes the marker position by four times the normal rate (FAST).

TV LINE # selects the line number of the video picture field. Options 101 and 102, or Option 301 only.

TV Standard allows the analyzer to trigger on NTSC, PAL, PAL-M, or SECAM-L video formats. Options 101 and 102, or Option 301 only.

TV SYNC selects the polarity of the modulation of the video format. Options 101 and 102, or Option 301 only.

NEG POS provides sweep triggering on the selected line of a video picture field. Options 101 and 102, or Option 301 only.

TRIG selects an even video field of an interlaced video format to trigger on. Options 101 and 102, or Option 301 only.

TV TRIG EVEN FLD selects an odd video field of an interlaced video format to trigger on. Options 101 and 102, or Option 301 only.

TV TRIG VERT INT selects a vertical interval to trigger on. Triggering occurs on the next pulse edge. Options 101 and 102, or Option 301 only.

User Menus accesses a menu available for your use for user-defined programs and key functions.
VERIFIED
TIMEBASE allows the time base digital-to-analog converter to be changed to verify that the time base performs to specification. \( \text{PRESET} \)
resets the time base to its original value. A pass code is required to access this function. VERIF** TIMEBASE** softkey function is not available for EMC analyzers with Option 004.

VID AVG initiates a digital averaging routine that averages displayed signals and noise.

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 selects which delta from the limit-line table is viewed by the display signal list.

VIEW OFF holds and displays the amplitude data that is in the trace A register.

VIEW B holds and displays the amplitude data that is in the trace B register.

VIEW C holds and displays the amplitude data that is in the trace C register.

VIEW CAL switches the 300 MHz calibrator signal so that it is routed internally to the input of the instrument. \textit{Available only when used with an HP 85420E Option 1EM RF filter section.}

VIEW PK QP AV toggles between the different detection modes, peak (PK), quasi-peak (QP), and average (AV). This function is only active if QP ON OFF or AVG ON OFF have been selected.

VIEW PK QP AV does not affect any other settings except the selected detector. \textit{All except Option 703}.

Volts changes the amplitude units to volts.

Watts changes the amplitude units to watts.

WINDOWS OFF turns off the windows display mode and returns to the normal full-sized instrument display.

YZ_# Spec accesses the softkey menu used for selecting the characters Y, Z, underscore (_), #, space, or for clearing the screen title.
ZERO SPAN changes the frequency span to zero and turns off marker track if it is on.

ZONE CENTER allows the zone markers to be moved in frequency without changing the zone span.

ZONE PK LEFT searches for the next frequency peak outside and to the left of the zone markers on the upper window trace and then moves the zone so that it is centered around the new peak.

ZONE PK RIGHT searches for the next frequency peak outside and to the right of the zone markers on the upper window trace and then moves the zone so that it is centered around the new peak.

ZONE SPAN allows the span of the zone markers to be changed without changing the center frequency.

ZOOM switches between the split-screen windows display and a full size display of the window that is currently active.
Programming Commands

Introduction
The following pages are a compilation of all current programming commands for the HP 8560 EM Series EMC analyzers. This chapter contains the following sections:

- How to use this chapter
  - Notation conventions
  - Syntax conventions
- The functional index
- The programming codes
- The summary of the characters and secondary keywords (reserved words)

How to Use This Chapter
To find a programming code that performs a particular function, refer to the “Functional Index,” which groups the commands according to 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.

| The “|” symbol 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 the group from which elements are to be chosen.

_ 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>.

::= Defines the element. For example, <a>::=<b><c> indicates that <a> can be replaced by the series of elements <b><c> in any statement where <a> occurs.

{} Braces indicates that whatever occurs within the braces can be included zero or more times.

Syntax Conventions

<A-block data field>::=

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

3.2 Programming Commands
<A-block data format>::=  
   #A<length><command list>

<character>::=  
   Spl"#&{}()+,-/0123456789;:ABCDEFGHIJKLMNOPQRSTUVWXYZ\|?-abcdefghijklnopqrstuvwxyz

<character string>::=
   List of characters

<command list>::=
   Any EMC analyzer command or list of commands separated by semicolons

<CR>::=
   Carriage return

<data byte>::=
   One 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>::=
  (<number> from 1 to 6, 601 to 1200|<trace element>|<predefined function>|<predefined variable>|<user-defined variable>)

<label>::=
  A string two to eleven characters long. 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

<numerical data format>::=
  <number><CR><LF><EOI>

<source>::=
  (TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined variable>|<predefined function>|<trace range>|<number>)

<source 1>::=
  (TRA|TRB|TRC|<user-defined trace>|<user-defined variable>|<predefined variable>|<predefined function>|<trace range>|<number>)

<source 2>::=
  (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>::=

3.4 Programming Commands
Any element (point) of trace A, trace B, trace C, or user-defined trace. Trace A, trace B, or 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

**ARNG**
- turns the autorange function on or off

**AT**
- specifies RF input attenuation

**AUNITS**
- specifies amplitude units for input, output, and display

**COUPLE**
- selects direct-current (dc) coupling or alternating-current (ac) coupling *(HP 8594EM, HP 8595EM, or HP 8596EM only)*

**INZ**
- specifies the value of input impedance expected at the active input port

**LG**
- specifies the vertical graticule divisions as logarithmic units, without changing the reference level

**LN**
- specifies the vertical graticule divisions as linear units, without changing the reference level

**ML**
- specifies the maximum signal level that is applied to the input mixer for a signal that is equal to or below the reference level

**NRL**
- sets the normalized reference level

**OVL**
- enables or disables overload detection

**PREAMP**
- switches the HP 85420E option 1EM preamplifier in and out of the input path

**PREAMPG**
- subtracts a positive or negative preamplifier gain value from the displayed signal

**PP**
- performs a preselector peak *(HP 8593EM, HP 8595EM, or HP 8596EM only)*

**RANGE**
- puts highest signal on display close to the reference level

**RESETRL**
- resets the reference level to its instrument preset level

**RL**
- specifies the amplitude value of the reference level

**ROFFSET**
- offsets all amplitude readouts without affecting the trace

**UNRANGE**
- restores reference level to the value set prior to RANGE command

**XUNITS**
- selects the transducer conversion units for the AMPCOR correction factors

3-6  Programming Commands
AUTO COUPLING
AUTO couples the active functions automatically

AUXILIARY CONTROL

BYPASS switches in and out of the bypass input path (accessible only if the HP 85420E Option 1EM RF filter section is present.)

CNTLA sets the control line A of the auxiliary interface high or low (Not accessible if the HP 85420E Option 1EM RF filter section is present.)

CNTLB sets the control line B of the auxiliary interface high or low (Not accessible if the HP 85420E Option 1EM RF filter section is present.)

CNTLC sets the control line C of the auxiliary interface high or low (Not accessible if the HP 85420E Option 1EM RF filter section is present.)

CNTLD sets the control line D of the auxiliary interface high or low (Not accessible if the HP 85420E Option 1EM RF filter section is present.)

CNTLI returns a “1” when the interface control line I of the auxiliary interface is high, and “0” if the line is low

COMB turns on or off the comb generator (HP 8593EM, or HP 8596EM only.)

DEMOD turns the demodulator on or off, and selects between AM, FM, or quasi-peak demodulation (All except Option 703.)

FMGAIN sets the total FM frequency deviation for full screen demodulation (All except Option 703.)

MEASURE determines the type of measurement: signal analysis, stimulus response, or signal normalization (Option 010 only.)

NRL sets the normalized reference level

RFIN specifies signal path through the RF filter section (accessible only if the HP 85420E Option 1EM RF filter section is present.)

RFINLK enables or disables tuning limits based on RF filter section input (accessible only if the HP 85420E Option 1EM RF filter section is present.)

RLPOS selects the position of reference level
SPEAKER turns on or off the internal speaker *(All except Option 703.)*
SQLCH sets the squelch level *(All except Option 703.)*
SRCALC selects internal or external leveling for the tracking generator *(Option 010 only.)*
SRCAT attenuates the source output level *(Option 010 only.)*
SRCNORM subtracts trace B from trace A, adds the display line, and sends the result to trace A
SRCPOFS offsets the source power level readout *(Option 010 only.)*
SRCPSRP selects the source-power step size *(Option 010 only.)*
SRCPSWP selects sweep range of the source output *(Option 010 only.)*
SRCPWR selects the source power level *(Option 010 only.)*
SRCTK adjusts tracking of source output with EMC analyzer sweep *(Option 010 only.)*
SRCTKPK adjusts tracking of source output with EMC analyzer sweep *(Option 010 only.)*
SWPCPL selects a stimulus-response or EMC analyzer auto-coupled sweep time *(Option 010 only.)*

**BANDWIDTH**

AVBW specifies the averaging (video) bandwidth
IFBW specifies the IF (resolution) bandwidth
RB specifies the resolution bandwidth (alternate to IFBW)
AVG turns on or off video averaging
VB specifies the video bandwidth (alternate to AVBW)
VBR specifies coupling ratio of video (averaging) bandwidth to resolution (IF) bandwidth

**CALIBRATION**

AMPCOR applies amplitude corrections at specified frequencies
AMPLEN returns the number of frequency-amplitude correction factors that have been entered
AUTOCAL returns the status of the EMC analyzer automatic calibration feature
CAL initiates self-calibration routines
CALTIME allows you to set the time of day of an automatic calibration
CNF performs the confidence test
CORREK  returns a "1" if the correction factors are on, a "0" if they are off
CRTHPOS  specifies the horizontal position of the text and graticule on the EMC analyzer's display
CRTVPOS  specifies the vertical position of the text and graticule on the EMC analyzer's display

COMMAND TRIGGER
ONCYCLE  executes the list of EMC analyzer commands periodically
ONDELAY  executes the list of EMC analyzer commands after the time value has elapsed
ONEOS  executes the list of EMC analyzer commands after the end of the sweep
ONMKR  performs the list of EMC analyzer commands when the sweep reaches the marker position
ONMKRU  executes the list of EMC analyzer commands whenever the value or the units of the active marker are changed
ONPWRUP  executes the list of EMC analyzer commands once on power up
ONSREQ  executes the list of EMC analyzer commands whenever a service request occurs
ONSWP  executes the list of EMC analyzer commands at the beginning of the sweep
ONTIME  executes the list of EMC analyzer commands at the specified time
WAIT  suspends all EMC analyzer operation for the specified time duration

CONFIGURATION
BAUDRATE  specifies the baud rate of a EMC analyzer
CAT  returns the catalog information of either EMC analyzer memory or the memory card
Datemode  sets the format for displaying the real-time clock
DISPOSE  frees EMC analyzer memory that was previously allocated for user-defined operands
FORMAT  formats the memory card
LINCHK  determines whether a measured signal is undergoing compression
PLTPRT  selects which port to output plotter data from the analyzer
POWERON selects the EMC analyzer’s power on state
PREFIX specifies or changes the prefix used in save and recall operations
PRNPRIT selects which port to output printer data from the analyzer
SETDATE sets the date of the real-time clock
SETTIME sets the time of the real-time clock
SYNCCMODE selects either the horizontal and vertical synchronizing constants, or the synchronization rate for the internal monitor of the EMC analyzer and the video signal that is output to the MONITOR OUTPUT connector
TIMEDATE sets the time and date of the real-time clock
TIMEDSP turns on or off the display of the real-time clock

DISPLAY

ANLGPLU turns on or off the analog+ display mode (Option 101 or 301 only)
ANNOT turns on or off the screen annotation
DA accesses the current address of the display list
DL defines the level of the display line in the active amplitude units and displays the display line on the EMC analyzer screen
DOTDENS sets the dot density value in the analog+ display mode (Option 101 or 301 only)
DSPLY displays the value of a variable on the EMC analyzer screen
GRAT turns on or off the graticule
HD disables data entry via the EMC analyzer numeric keypad, knob, or step keys
PREFIX specifies the prefix
TH clips signal responses below the threshold level
SHOWSETUP shows the setup on the display
TITLE allows entry of a screen title

EMC MEASUREMENTS

AUTOAVG turns on and off the automatic measuring of the average detector (All except Option 703)
AUTOQPD turns on and off the automatic measuring of the quasi-peak detector (All except Option 703)
MEASALLSIGS  finds signals on the display, then makes an EMC measurement
MEASAVG     makes a measurement with peak and average detectors
             (All except Option 703.)
MEASFREQ    makes a measurement at the specified frequency
MEASPEAK    makes a measurement using the peak detector
MEASQPD     makes a measurement using the quasi-peak detector (All except Option 703.)
MEASRESULT  sends the results of the last EMC measurement to the controller
MEASSIG     makes a measurement using specified detectors
MEASTIMEAVG sets the average detector measurement time (All except Option 703.)
MEASTIMEPK  sets the peak detector measurement time
MEASTIMEQPD  sets the quasi-peak detector measurement time (All except Option 703.)
MEASWITHPP  automatically peaks the preselector before making an EMC measurement (HP 8593EM, HP 8595EM, or HP 8596EM only.)
REMEASSIG   remeasures one or more signals in the signal list

EMC OUTPUT
RPTDEF      specifies which report elements are output to a printer or plotter
TBLDEF      specifies which elements of a table are output to the printer

FREQUENCY
CF          specifies center frequency
FA          specifies the start frequency
FB          specifies the stop frequency
LOGSWEEPSPD optimizes the frequency accuracy (standard) or minimizes the scan time (fast) when the LOG frequency sweep type is activated
FOFFSET     specifies the frequency offset for all absolute frequency readouts such as center frequency
SS          specifies center-frequency step size
SWEETYTYPE  selects either logarithmic or linear frequency axis
GRAPHICS

CLRBOX clears a rectangular area on the EMC analyzer display
CLRDSR erases user-generated graphics and text
DA accesses the current address of the display list
DRAWBOX draws a rectangular box on the EMC analyzer display
DT defines any character as a label terminator
GETPLOT initiates output of the EMC analyzer display to a plotter
GETPRNT initiates output of the EMC analyzer display to a printer
GR graphs the given \( y \) coordinate while incrementing the \( x \) coordinate by 1
LB writes text at the current pen position
PA moves the pen to a vector location on the EMC analyzer
PD screen relative to the reference coordinates \((0,0)\)
PU instructs the EMC analyzer to plot vectors on the EMC
PR analyzer screen until a PU command is received
PRINT moves the pen to a new plot location on the EMC analyzer
TEXT screen relative to the current coordinates in display units
PRNTADRS prints screen data
PU allows you to set the HP-IB address of the printer
TEXT instructs the EMC analyzer not to plot vectors on the EMC
TEXT analyzer screen until a PD command is received
TRGRPH writes text on the EMC analyzer screen at the current pen

INFORMATION

ACTIVE returns a "0" if the given function is not active, a "1" if it
IS active
BIT places the state of a bit in the destination
BTTF returns the state of a bit
CLS clears all status bits
HAVE returns a "0" if a device or option is not installed
ID returns the EMC analyzer model number
MDU returns values for the EMC analyzer's baseline and
reference level
OP returns the coordinates of the lower-left and upper-right
corners of the EMC analyzer display
PARSTAT reports the status of the printer connected to the parallel port
PWR UPTIME returns the number of milliseconds that have elapsed since the EMC analyzer was turned on
REV returns the date code of the firmware revision number in YYMMDD format
RQS sets a bit mask for service requests
SER returns the serial number suffix of the EMC analyzer
SRQ the SRQ command is used by an external controller to simulate interrupts from the EMC analyzer
STB returns to the controller the decimal equivalent of the status byte

INPUT and OUTPUT

EE sends the controller the values entered on the EMC analyzer numeric keypad by the operator
EK allows data entry with the front-panel knob when the EMC analyzer is under remote control
ENTER allows the EMC analyzer to receive data from other devices on the HP-IB
EP sends values entered on the EMC analyzer number keyboard to the present active function value
OA returns the value of the active function
OL transmits information to the controller that describes the state of the EMC analyzer when the OL command is executed
OUTPUT allows the EMC analyzer to send data to other devices via remote or parallel ports
RELHPB releases EMC analyzer control of the HP-IB
TA returns trace A amplitude values from the EMC analyzer to the controller
TB transfers trace B amplitude values from the EMC analyzer to the controller
TDF formats trace information for return to the controller
TRA TRB TRC controls trace data input or output
LIMIT LINES

LMIAMPSCL specifies the limit-line amplitude definition as logarithmic or linear
LMIDEL deletes all segments in the current limit-line table
LMIDEFNTYP defines a limit-line type as SA or EMC
LMIIDISP controls when the limit line (or limit lines) are displayed
LMIFAIL returns a “0” if the last measurement sweep of trace A is equal to or within the limit-line bounds
LMIIFRQSCL specifies the limit-line frequency axis definition as logarithmic or linear
LMIIFT selects how the limit-line segments are placed on the EMC analyzer display: according to frequency, or according to the sweep time setting of the EMC analyzer
LMIHI allows you to specify a fixed trace as the upper limit line
LMIILINE outputs the current limit-line table definitions
LMIILNESTA displays the selected limit line
LMILO allows you to specify a fixed trace as the lower limit line
LMIIMARGAMP sets the amplitude in negative dB for the limit margin
LMIIMARGSTA displays the selected limit margin
LMIIMIRROR reflects the current definition about the amplitude axis at the largest frequency or the largest sweep time in the definition
LMIIMODE determines whether the limit-line entries are treated as upper amplitude values, lower amplitude values, upper and lower amplitude values, or mid-amplitude and delta values
LMIIMUM selects limit-line number 1 or 2 and its corresponding margin
LMIIREL specifies the current limit lines as fixed or relative
LMIISSEG adds new segments to the current frequency limit line in either the upper limit line or the lower limit line
LMIISESTGT adds new segments to the current sweep time limit line in either the upper limit line or the lower limit line
LIMITEST compares trace A with the current limit-line data
SEGDEL deletes the specified segment from the limit-line tables
SENDER enters the limit-line data in either the upper and lower limit-line tables or the mid and delta table for limit lines based on frequency
SENDERT enters the limit-line data in either the upper and lower limit-line table or the mid and delta table for limit lines based on sweep time
MARKER

FASTMRKR  increases the RPG speed of the marker
MDS       specifies measurement data size as byte or word
MF        returns the frequency (or time) of the on-screen active
          marker
MKA       specifies amplitude of the active marker
MKACT     specifies the active marker
MKACTV    makes the current active marker the active function
MKBW      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    resumes the sweep after execution of a MKSTOP command
MKD       activates the delta marker
MKF       specifies the frequency value of the active marker
MKFC      turns on or off marker frequency counter
MKFCR     sets the resolution of the marker frequency counter
MKMIN     moves active marker to minimum signal detected
MKN       activates and moves the marker to the specified frequency
MKNOISE   displays the average noise level at the marker
MKOFF     turns off either the active marker or all the markers
MKP       places the active marker at the given x-coordinate
MKPAUSE   pauses the sweep at the active marker for the duration of
          the delay period
MKPK      positions the active marker on a signal peak
MKPX      specifies the minimum signal excursion for the EMC
          analyzer's internal peak-identification routine
MKREAD    selects the type of active trace information displayed by
          the EMC analyzer marker readout
MKRL      sets the reference level to the amplitude value of the
          active marker
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
MKSTOP    stops the sweep at the active marker
MKTRACE   moves the active marker to a corresponding position in
          trace A, trace B, or trace C
MKTRACK moves the signal with an active marker to the center of the EMC analyzer display and keeps the signal peak at center screen.

MKTYPE changes the type of the current active marker.

M4 activates a single marker on the trace and enables the knob to change the position of the marker. The active function is then set to span.

RCVRMRKR modifies the behavior of the instrument's marker functionality so that it can retune the instrument.

MATH

ABS places the absolute value of the source values in the destination.

ADD adds the sources and sends the sum to the destination.

AVG averages the source and the destination.

BIT returns the state of a bit.

BITF returns the state of a bit.

CTA converts the source values from measurement units to the current absolute amplitude units and stores the result in the destination.

CTM converts the source values to measurement units and places the result in the destination.

DIV divides source 1 by source 2 and places the result in the destination.

EXP places the exponential of the source in the destination.

INT places the greatest integer that is less than or equal to the source value into the destination.

LOG takes the logarithm (base 10) of the source, multiplies the result by the scaling factor, then stores it in the destination.

MEAN returns the mean value of the given trace in measurement units.

MEANTH returns the mean value of the given trace above the threshold, in measurement units.

MIN compares source 1 and 2, point by point, and stores the lesser of the two in the destination.

MINPOS 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.

MOD stores the remainder from the division of source 1 by source 2 in the destination.
MPY multiplies the sources, point by point, and places the results in the destination.

MXM compares source 1 and source 2, point by point, sending the greater value of each comparison to the destination.

PDA sums the probability distribution of amplitude in the destination trace with the amplitude distribution function of the source trace.

PDF increments an element of the destination trace whenever the corresponding element of the source trace exceeds a threshold.

RMS returns the root mean square value of the trace in measurement units.

SQR places the square root of the source into the destination.

STDEV returns the standard deviation of the trace amplitude in measurement units.

SUB subtracts source 2 from source 1, point by point, and sends the difference to the destination.

VARIANCE returns the amplitude variance of the specified trace, in measurement units.

MEASURE/USER

FFT performs a discrete fast Fourier transform on the source trace array and stores the result in the destination array.

PWRBW computes the bandwidth around the trace center.

MODE

returns a “0” if the mode of operation is EMC analyzer or spectrum analyzer. A number other than “0” is returned if the operating mode (also called “personality”) is other than EMC analyzer or spectrum analyzer.

OPERATOR ENTRY

DN reduces the active function by the applicable step size.

EE enables front-panel number entry.

EK enables front-panel knob control.

EP enter parameter from front panel.

HD holds or disables entry and blanks active function readout.

UP increases the active function by the applicable step size.
PLOTTER

GETPLOT initiates output of the EMC analyzer display to a plotter. GETPLOT is meant to be used within a downloadable program.

PLOT initiates output of the EMC analyzer display to a plotter

PHTPRT selects which port to output plotter data from the analyzer

PRESET

IP performs an instrument preset

LF performs an instrument preset to the base band (band 0) (HP 8593EM, HP 8595EM, or HP 8596EM only)

POWERON selects the state the EMC analyzer will be in when it is turned on: IP (instrument preset) or LAST state

RESETRL resets the reference level to instrument preset value

PRINTER

GETPRNT initiates output of the EMC analyzer display to a printer. GETPRNT is meant to be used within a downloadable program.

PRINT initiates output of the EMC analyzer display to a printer

PRNPRT selects which port to output printer data from the analyzer

PRNTADRS sets the HP-IB address of the printer

PROGRAM FLOW

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

IF IF/THEN/ELSE/ENDIF forms a decision and branching construct

REPEAT REPEAT/UNTIL forms a looping construct

RETURN stops the operation of a user-defined command and returns program operation to the point where the user-defined function was called

WAIT suspends all EMC analyzer operation for the specified time duration
RECALL or SAVE

AUTOEXEC loads and executes a file called "eAUTOEXEC" on powerup
CAT displays directory information from either the specified or
the current mass storage device
LOAD loads a file from the memory card
MSI allows you to specify the current mass storage device
PREFIX specifies or changes the prefix used in save and recall
operations
PSTATE protects all of the EMC analyzer's user state and trace
registers from being changed
PURGE deletes the specified file from the current mass storage
device
RCLS recalls EMC analyzer state data from one of the nine state
registers in the analyzer's memory
RCIT recalls previously saved trace data, amplitude factors, or
limit-line data from the trace registers in EMC analyzer
memory
SAVES saves the currently displayed instrument state in EMC
analyzer memory
SAVET saves the selected trace data and state information or
limit-line tables in EMC analyzer memory
SARCLF specifies either a save or recall operation
SARCLN specifies the number to append to the prefix for a save or
recall operation, and initiates the transfer of data
SARCLW specifies the data to be transferred: trace A, trace B, trace
C, downloadable program, amplitude correction factors,
limit line, or state
STOR stores data on a RAM card

SIGNAL LIST

EDITANNOT enters the annotation editor
EXITANNOT exits the annotation editor
REMEASSIG remeasures one or more signals in the signal list
SIGADD adds a signal to internal signal list
SIGDEL deletes one or more signals from the signal list
SIGDLTVIEW selects which delta is viewed on the display signal list
SIGGRAPH draws an EMC report graph on display
SIGLEN queries current number of signals in the signal list
SIGLIST turns on or off signal list viewing and editing functions
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGMARK</td>
<td>marks one or more signals on the signal list</td>
</tr>
<tr>
<td>SIGPOS</td>
<td>controls the cursor position in the signal list</td>
</tr>
<tr>
<td>SIGRESULT</td>
<td>sends contents of an entry in the signal list to the controller</td>
</tr>
<tr>
<td>SIGSORT</td>
<td>sorts internal signal list</td>
</tr>
<tr>
<td>SIGUNMARK</td>
<td>unmarks one or more signals on the signal list</td>
</tr>
</tbody>
</table>

**SPAN**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS</td>
<td>sets the frequency span of the EMC analyzer to full span</td>
</tr>
<tr>
<td>HN</td>
<td>returns the harmonic number of the current harmonic band in which the EMC analyzer is tuning <em>(HP 8593EM, HP 8595EM, or HP 8596EM only).</em></td>
</tr>
<tr>
<td>HNLOCK</td>
<td>forces the EMC analyzer to use only the selected harmonic band <em>(HP 8593EM, HP 8595EM, or HP 8596EM only)</em></td>
</tr>
<tr>
<td>HNUNLK</td>
<td>unlocks the harmonic band <em>(HP 8593EM, HP 8595EM, or HP 8596EM only)</em></td>
</tr>
<tr>
<td>LSPAN</td>
<td>changes the EMC analyzer's span to the previous span setting</td>
</tr>
<tr>
<td>RECZOOM</td>
<td>zooms in on an signal at the marker by decreasing the span in steps, keeping the signal on screen, until zero span is reached. If no marker is present, one is placed on the highest signal before the zoom begins.</td>
</tr>
<tr>
<td>SP</td>
<td>changes the total displayed frequency range symmetrically about the center frequency</td>
</tr>
<tr>
<td>SPZOOM</td>
<td>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</td>
</tr>
</tbody>
</table>

**SWEEP**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTS</td>
<td>sets the EMC analyzer to the continuous sweep mode</td>
</tr>
<tr>
<td>LOGSWEEPSPD</td>
<td>optimizes the frequency accuracy (standard) or minimizes the scan time (fast) when the LOG frequency sweep type is activated</td>
</tr>
<tr>
<td>ST</td>
<td>specifies the time in which the EMC analyzer sweeps the displayed frequency range</td>
</tr>
<tr>
<td>SWEETYPE</td>
<td>selects either logarithmic or linear frequency axis</td>
</tr>
</tbody>
</table>
SYNCHRONIZATION

DONE allows you to determine when the EMC analyzer has started to execute all commands prior to and including DONE.

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

TRACE

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

AMBPL 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 EMC analyzer.

AXB exchanges trace A and trace B.

BLANK blanks trace A, trace B, or trace C and stops taking new data into the specified 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 clears the specified trace and enables trace data acquisition.

DET selects the EMC analyzer detection mode.

IB provides a method for putting values into trace B.

MAXMIN places trace B in max-hold mode and trace C in min-hold mode. Alternate sweeps use the peak and sample detector.

MERGE merges the source trace into the specified area of the destination trace.

MINH updates trace C elements with minimum level detected.

MOV copies the source values into the destination.

MXMH updates trace elements with maximum level detected.

PKPOS returns a value, which is the index of the maximum value in trace A, trace B, trace C, or user-defined trace.

TA returns trace A data.

TB returns trace B data.

TRA TRB TRC controls trace data input and output.

TRCMEM returns a nonnegative integer that indicates the total number of trace registers available for SAVET and RCLT.

TRDEF creates a user-defined trace.
TRDSP  turns on or off the display of trace A, B, or C without clearing the trace
TRGRPH  displays a compressed trace on the analyzer display
TRPRST  sets the trace operations to their preset values
TRSTAT  returns the status of traces A, B, and C: clear write, blank, view, minimum hold, or maximum hold
TWNDOw  creates a window trace array for the fast Fourier transform (FFT) function
VAVG    enables the video-averaging function, which averages trace points to smooth the displayed trace
VIEW    displays trace A, trace B, or trace C, and stops taking new data into the viewed trace

TRACE MATH

APB      adds trace A to trace B and sends the result to trace A
CLRAVG   restarts video averaging
COMPRESS reduces the number of trace elements while retaining the relative frequency and amplitude characteristics of the trace data
CONCAT   combines two traces
FFT      performs a discrete fast Fourier transform on the source trace array and stores the result in the destination array
LINFILL  fills linear interpolated data into the specified trace data points of a destination trace
MIRROR   displays the mirror image of a trace
PEAKS    sorts signal peaks by frequency or amplitude, stores the results in the destination trace, and returns the number of peaks found
SMOOTH   smooths the trace according to the number of points specified for the running average
SUM      returns the sum of the amplitudes of the trace elements in measurement units
SUMSQ    returns the sum of the squares of the amplitude of each trace element
TRMATH   executes a list of EMC analyzer commands at the end of each sweep
XCH      exchanges traces
TRIGGER

**ONEOS** performs the command list at the end of sweep

**ONSWP** performs the command list at beginning of sweep

**SGLS** selects single-sweep mode

**TM** specifies trigger mode

**TS** begins a new sweep

**TVLNE** sets the line number of the horizontal line of video on which to trigger (Options 101 and 102, or Option 301 only)

**TVSRM** specifies type of video frame to trigger on (Options 101 and 102, or Option 301 only)

**TVSTND** selects the triggering for NTSC, PAL, PAL-M, and SECAM-L formats (Options 101 and 102, or Option 301 only)

**TVSYNC** selects between negative and positive triggering for video frame formats (Options 101 and 102, or Option 301 only)

USER-DEFINED

**ABORT** aborts all user-defined functions

**ACTDEF** creates a user-defined active function

**DISPOSE** deletes user-defined functions

**ERASE** clears trace A and trace B, disposes of the contents of the user memory, and resets the state registers and the EMC analyzer to the instrument preset state

**FUNCDEF** defines a routine consisting of EMC analyzer commands, assigns the routine a label, and stores the routine and its label in analyzer memory

**KEYCLR** clears softkeys 1 through 6

**KEYCMD** allows you define the function and label of a softkey. The softkey label is updated whenever a softkey is pressed.

**KEYDEF** assigns a label and user-defined function to a softkey

**KEYENH** allows you to activate inverse video mode or underline part or all of the softkey label

**KEYEXEC** executes the specified, previously defined softkey

**KEYLBB** relabels a softkey without changing its function

**MEM** returns the amount of EMC analyzer memory available

**MENU** selects and displays the softkey menus on the EMC analyzer screen

**RETURN** returns from a user-defined function

**SAVEMENU** saves menu 1 under the specified menu number
TRDEF declares a user-defined trace
USTATE transmits information that has been stored in the EMC analyzer by the user
VARDEF creates a user-defined variable and assigns it a value

WINNEX makes the window that is currently not the active window, active
WINOFF turns off the windows display
WINON activates the windows display mode
WINZOOM expands the size of the active window so that it fills the entire EMC analyzer display
ZMKCNTR positions the zone marker at the specified frequency
ZMKPNL places the zone marker at the next signal peak that is left of the zone marker’s current position
ZMKPNR places the zone marker at the next signal peak that is right of the zone marker’s current position
ZMKSPAN allows you to change the width of the zone marker
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 values in the destination.

ACTDEF_<function name>,<delimiter><active function area label>,<delimiter><preset value>,(STEP|NONE|HZ|SEC|DB|DBM|V|A|SH|Z|INT),(<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|A|SH|Z|INT),<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|BAUDRATE|CF|COUPLE|CRTHPOS|CRTVPOS|DA|DET|DL|DOTDENS|FA|FB|FMGAIN|MEASTIMEAVG|MEASTIMEPK|
   MEASTIMEQPD|SIGPOS|GP|INZ|LG|MKA|MKD|MKFC|MKFRI|MKRC|
   MKPAUSE|MKPX|ML|MODE|MST|M4|NDB|NRL|PREAMPQ|PRNTADRS|RB|
   RCLS|ROFFSET|RL|RLPOS|S|AVRS|AVR|N|SETDATE|SETTIME|SP|SQLCH|
   SRCALC|SRCAT|SRCPOFS|SRCPSTP|SRCPSWP|SRCPWR|SRCPTK|SWPCLR|
   SS|ST|TH|TIME|DATE|TVSYNC|TVLINE|VAVG|VB|VBR|ZM|SPAN|ZMCNTR|
   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 EMC 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 EMC analyzer.
Query response: (ON|OFF)<CR><LF><EOI>

**AMPCOR(\_ANTENNA\_CAB\_OTHER\_USER)(\_?)(\_<frequency>(HZ|KHZ|MZH|GHZ|KZ|MGZ|GZ))(\_?<amplitude>(DB|HZ|KHZ|MZH|GHZ|KZ|MGZ|GZ))(\_<amplitude>(DB))(\_<amplitude>(LOG|LIN))(ON|OFF)?|ALL(\_<amplitude>(ON|OFF)?));

Compensates for frequency-dependent amplitude variations at the receiver input.

AMPCOR consists of three independent sets of correction data. The four data sets are: ANTENNA, CABLE, OTHER, and USER. Each data set may be turned on or off independently and the entire AMPCOR system may be turned on or off.
Query response: <frequency>, <amplitude>, <frequency>, <amplitude> <CR>, <LF>, <EOI>

**AMPLEN(\_ANTENNA\_CAB\_OTHER\_ALL)?**

Returns the number of frequency-amplitude correction factors that have been entered. The absolute value of the number that AMPLEN returns is the number of frequency-amplitude correction factors that have been entered. If no amplitude correction factors have been entered, AMPLEN returns a 0.
Query response: <numeric data format>

**ANLGPLUS(\_ON\_OFF)?(\_\_1\_0)?**

Turns on or off the Analog+ display mode. Option 101 or 301 only.
Query response: (ON|OFF)<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.
ARNG(_(ON|OFF)][_.(1|0)?];
  Allows the user to enable, disable, or query the current state of the
  instrument's auto-range function. When enabled, the auto-range function
  automatically adjusts RF attenuation or reference level (IF step-gain) in
  response to either an IF or RF overload condition detected during the
  previous sweep. RF load detection only available when used with the HP
  85420E Option IEM RF filter section.
  Query response: (ON|OFF)<CR><LF><EOI>

AT([_.<number>[DB]][_.EP][DN][UP][AUTO|CPL|UNCPL]?);
  Specifies the RF input attenuation. Default unit is dB.
  Query response: <numeric data format>

AUNITS(_(DBM|DBMV|DBU|V|W)?);
  Specifies the amplitude units for input, output, and display for the current
  amplitude setting (log or linear).
  Query response: (DBM|DBMV|DBU|V|W)<CR><LF><EOI>
(<active function>_.AUTO;
  Automatically couples the active functions. <active function>:=
  (AT|AVBW|DL|FBW|MKA|MKD|MKF|MKFCR|MKN|SRCPSWP|SRCPWR|SS|ST|TH|VAVG|VB|VBR)

AUTOAVG(_(ON|OFF)][_.(1|0)?];
  Turns on and off automatic measuring of the average detector. This affects
  which detectors are measured using the MEAS:STEPPED softkey or during
  the MEASFREQ, MEASSIG, REMEASSIG and MEASALLSIGS commands.
  Query response: (ON|OFF)<CR><LF><EOI>

AUTOCAL[?];
  Returns the status of the EMC analyzer automatic calibration feature. A "0"
  is returned if an automatic calibration is disabled, a "1" is returned if auto-
  cal is enabled.
  Query response: (0|1)<CR><LF><EOI>

AUTOEXEC(_(ON|OFF)][_.(1|0)?);
  Enables and disables the automatic loading and execution of the file named
  "eAUTOEEXEC" from a memory card. When enabled, the instrument, upon a
  power-up sequence, will search the memory card for an "eAUTOEEXEC" file
  and if found will load and execute it.
  Query response: (ON|OFF)<CR><LF><EOI>
AUTOQPD(ON|OFF)[L](1|0)?

Turns on and off automatic measuring of the quasi-peak detector. This affects which detectors are measured during the MEASSIG, RMEASSIG, and MEASALLSIGS commands.

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

AVBW([L]<number>|(HZ|KHZ|MHZ|GHZ|KZ|MZ|GZ)|EP|DN|UP|AUTO)?

Specifies the average (video) bandwidth, which is a post-detection, low-pass filter. The resolution bandwidth, video bandwidth, and sweep time are normally coupled to the span. Executing AVBW uncouples average video bandwidth from resolution bandwidth (it does nothing to the sweep-time, resolution-bandwidth, and span coupling). Executing AUTO recouples average video bandwidth to the resolution bandwidth.

Frequency values other than the values in the 1, 3, 10 sequence are rounded to the nearest permissible value.

Query response: <numeric data format>

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

Computes the average value of the source and the destination according to the following algorithm: Average = \( \frac{|\text{source}| - 1}{\text{ratio}} \times |\text{destination}| + |\text{source}| \)

\(<\text{ratio}>::=|\text{number}|<\text{user-defined variable}|<\text{predefined variable}>|<\text{predefined function}>|<\text{trace element}>\).

AXB;

Exchanges trace A and trace B.

BAUDRATE([L]<number>|EP)?;

Specifies the baud rate of an EMC analyzer.

Query response: <numeric data format>

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

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

\(<\text{destination}>::=|\text{user-defined variable}|<\text{predefined variable}>|<\text{trace element}>\).

\(<\text{source}>::=|\text{user-defined variable}|<\text{predefined variable}>|<\text{predefined function}>|<\text{trace element}>|<\text{number}>\).

\(<\text{bit number}>::=|\text{user-defined variable}|<\text{predefined variable}>|<\text{predefined function}>|<\text{trace element}>|<\text{number}>\).

BITF_<source>,<bit number>;

3-28 Programming Commands
Returns the state ("1" or "0") of a bit.
<source>::= (<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>);
<bit number>::= (<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>);

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.

BYPASS.(ON|OFF)[_.(1|0)?];
Switches in and out of the bypass input path for INPUT 2 of the optional RF filter section. BYPASS is only available when used with the HP 85420E Option 1 EM RF, filter section.
Query response: (ON|OFF)<CR><LF><EOI

CAL.(ALL|AMP|AUTO|OFF|AUTO|ON|DISP|DUMP|FREQ|FETCH|INIT|OFF|ON|STORE|TG|YIF);
Controls the calibration functions.

CALTIME([_.<hhmmss>];
Allows you to set the time of day that an automatic calibration of the instrument or system will execute. The CALTIME command will not enable or disable the AUTOCAL function. Where <hhmmss> stands for the hour (24-hour clock), minutes, and seconds when the cal is to be performed.

CAT.[(a|c|d|e|g|i|l|n|o|s|t|reg|prefix|on)]*[.INT|CARD];
Returns directory information from the specified mass storage device. The g, n, c, o, and e parameters denote data types and are used for cataloging the memory card. The g, n, c, o, and e data types represent the following:
a = amplitude correction factor data.
c = cable correction factors.
d = downloadable program.
e = all information.
g = signal list.
i = display image.
l = limit-line table.
n = antenna correction factors.
o = other correction factors.
s = instrument state.
t = trace data and instrument state.

"Reg," "prefix," or "on" parameters are used for cataloging EMC analyzer memory only. "Reg," "prefix," and "on" represent the following:

reg = catalogs the state and trace registers.
prefix = catalogs the EMC analyzer memory items by the prefix.
on = catalogs the on-event items in EMC analyzer memory.

Note that the data type, reg, prefix, or on is followed by the asterisk. The asterisk acts as a wild card. To catalog the memory card contents or all of EMC analyzer memory, omit the first parameter and use only 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.

CLRBOX[(_<x1>,<y1>,<x2>,<y2>[(A|T)]);

Clears a rectangular area from x1,y1 to x2,y2 on the EMC analyzer display. You can specify whether the annotation or the traces are to be cleared by specifying an "A" for the annotation plane or a "T" for the trace plane. If you do not specify the annotation or trace plane, both the annotation and trace planes are cleared.

<x1>:= positive integer in <display units>.
<y1>:= positive integer in <display units>.
<x2>:= positive integer in <display units>.
<y2>:= positive integer in <display units>.

CLRDSP;

Erases user-generated graphics.
CLRW\_TRB\_TRO;  
Clears the specified trace and enables trace data acquisition.

CLS;  
Clears all status bits.

CMDERRQ;  
Returns a list of illegal commands to the remote port, then clears all illegal commands from the EMC analyzer.

CNF;  
Performs the confidence test.

CNTLA\_ON\_OFF\_[0\_1]?;  
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. Not accessible if the HP 85420E Option 1EM RF filter section is present.  
Query response: (ON\_OFF)\_<CR>\_<LF>\_<EOI>

CNTLB\_ON\_OFF\_[0\_1]?;  
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. Not accessible if the HP 85420E Option 1EM RF filter section is present.  
Query response: (ON\_OFF)\_<CR>\_<LF>\_<EOI>

CNTLC\_ON\_OFF\_[0\_1]?;  
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. Not accessible if the HP 85420E Option 1EM RF filter section is present.  
Query response: (ON\_OFF)\_<CR>\_<LF>\_<EOI>

CNTLD\_ON\_OFF\_[0\_1]?;  
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. Not accessible if the HP 85420E Option 1EM RF filter section is present.  
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.  
Query Response: (0\_1)\_<CR>\_<LR>\_<EOI>
**COMB**(_(OFF|ON)][|][0|1]?;  
Turns the comb generator on or off. **HP 8593EM** or **HP 8596EM only**.  
Query response: (ON|OFF)<CR><LF><EOI>

**COMPRESS**<trace destination>,<trace source>,  
(AVG|NRM|NEG|POS|SMP|PK|AVG|PKPIT);  
Compresses the trace source to fill the trace destination according to the  
specified compression algorithm.

**CONCAT**<trace destination>,<source 1>,<source 2>;  
Concatenates source 1 and source 2 and sends the new trace array to the  
destination.

**CONT5S**;  
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>

**COUPLE**(_(AC|DC)?;  
Selects direct-current (dc) coupling or alternating-current (ac) coupling.  
**HP 8594EM**, **HP 8595EM**, or **HP 8596EM only**.  
Query response: (AC|DC)<CR><LF><EOI>

**CRTPOS**(_<number>|_(UP|DN)?;  
Specifies the horizontal position of the EMC analyzer display.  
<position> ::= integer from 1 to 34.  
Query response: <numeric data format>

**CRTVPPOS**(_<number>|_(UP|DN)?;  
Specifies the vertical position of the EMC 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 the 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>).

DA([<number>]?);
Accesses the current address of the display list.
Query response: <numeric data format>

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>

DEMOD_(AM|FM|QPD|ON|OFF);
Turns the demodulator on or off, and selects between AM or FM
demodulation. All except Option 703.

DET_(POS|SMP|QPD|NEG|AVG)|?
Selects the type of instrument detection (positive-peak, sample, quasi-peak,
negative, or average) and accesses service-diagnostic detection functions.
The negative (NEG) detector is available with Option 101 or 103 only.

- POS enables positive-peak detection, which displays the maximum video
  signal detected over a number of instantaneous samples for a particular
  frequency.
- NEG enables negative peak detection in sweep times of less than or equal to
  zoom.
- SMP enables sample detection, which uses the instantaneous video signal
  value. Video averaging and noise-level markers, when activated, activate
  sample detection automatically.
- QPD switches the active detector to the quasi-peak detector.
- AVG switches the active detector to the average detector.
Query response: (POS|SMP|QPD|AVG)<CR><LF><EOI>
DISPOSE\_{\text{(}ALL|\text{ONCYCLE}|\text{ONDLY}|\text{ONEOS}|\text{ONMKR}|\text{ONMKRU} |\text{ONSRQ}}\text{)}}\_\text{|<user-defined trace>|<user-defined variable>|}
\text{|<user-defined function>|<key number>|);
Frees EMC analyzer memory that has been allocated previously for user-defined functions. DISPOSE ALL clears all operands.
<key number> := 1 to 6, 601 to 1200.
DIV\_{\text{<destination>},<source 1>,<source 2>};
Divides source 1 by source 2 and places the result in the destination.
DL(\_\text{|<number>|[\text{(}DB|DM\text{)}]}\_\text{|(AUTO|EP|DN|UP|OFF|ON)}\text{|?});
Specifies a display line level that is displayed on the EMC analyzer display. 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 that was entered before DONE have been started.
Query response: 1<CR><LF><EOI>
DOTDENS(\_<number>\text{|?});
Sets the dot density value in the Analog+ display mode. Option 101 or 301 only
Query response: <numeric data format>
DRAWBOX(\_<x1>,<y1>,<x2>,<y2>,<x thickness>,<y thickness>;)
Draws a rectangular box from x1,y1 to x2,y2 on the EMC analyzer display. The parameters x thickness and y thickness allows you to specify the thickness of the borders that enclose the box.
<x1>: = positive integer in <display units>.
<y1>: = positive integer in <display units>.
<x2>: = positive integer in <display units>.
<y2>: = positive integer in <display units>.
<x thickness>: = positive integer in <display units>.
<y thickness>: = positive integer in <display units>.

3.34 Programming Commands
DSPLY,<display variable>,<field width>.<decimal places>;
Displays the value of a variable on the EMC analyzer screen.
<display variable>::=<number>|<user-defined variable>|<predefined variable>|<predefined function>|<trace element>.
<field width>::=an integer number.
<decimal places>::=an integer number.

DT,<character>;
Defines any character as the label terminator. The label terminator is used for the LB command.

EDITANNOT,(NEW|LAST|DUMP|LIST);
Enters the annotation editor (NEW or LAST) or sends the contents of the annotation buffer to a printer (LIST) or to a controller (DUMP). The NEW parameter clears the annotation editor of all text.

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

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

ENTER,<HP-IB address>,(K|B|W),<destination>;
Allows the EMC analyzer to receive data from other devices 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 EMC analyzer number keyboard to the current function.
ERASE;

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

EXITANNOT[_]<number>;

Exits from the annotation editor. The parameter specifies which menu to display on the screen and make active.

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

Converts log values to linear values. The exponential of the source is placed in the destination.

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

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

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

FASTMRKR(_<ON|OFF>[_]([1|0])?);

Increases the speed of the marker positioning and center frequency tuning functionality of the knob and step keys. For marker positioning, there is no effect unless RCVMRKR is also on. With FASTMRKR ON, the knob changes the marker position by four times the normal rate. For center frequency, regardless of the RCVMRKR setting, with FASTMRKR ON, the knob tuning is eight times the normal rate.
Query response: (ON|OFF)<CR><LF><EOI>

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

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

FFT_<destination>,<source>,<window>;

Performs a discrete fast Fourier transform on the source trace array and stores the result in the destination array. FFT weights the source trace with the function in the window trace. The transform is computed and the results are placed in the destination trace. <destination>:=<TR>||<TRB>||<TRC>|<user-defined trace>
  .<source>:=<TR>||<TRB>||<TRC>|<user-defined trace>
  .<window>:=<TR>||<TRB>||<TRC>|<user-defined trace>.

3-36  Programming Commands
FMGAIN[<number>|[HZ|KHZ|MHZ|GHZ]|?];
   Specifies the full screen range for FM gain. *All except Option 703.*
   Query response: <numeric data format>

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

FORMAT[<delimiter><label><delimiter>];
   Formats a memory card in the logical interchange format (LIF).
   <label>::=0 to 6 characters.

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

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

GETPLOT[<x1>,<y1>,<x2>,<y2>];
   Initiates output of the EMC analyzer display to a plotter. GETPLOT is meant
   to be used within a downloadable program.
   <x1>::=positive integer in <display units>.
   <y1>::=positive integer in <display units>.
   <x2>::=positive integer in <display units>.
   <y2>::=positive integer in <display units>.
GETPRNT[(BW|COLOR|MX80SM|MX80LG|LQ570SM|LQ570LG|DJCOLOR|
DJ540BW|DJ540CLR)][[(0|1|2|3|4|5|6|7|8)];

Initiates output of the EMC analyzer display to a printer. GETPRNT,
GETPRNT0, or GETPRNT BW outputs the screen data in monochrome
format. GETPRNT1 or GETPRNT COLOR outputs the screen data in
HP PaintJet printer format. GETPRNT2 or GETPRNT MX80SM outputs
the screen data in Epson MX80 small format. GETPRNT3 or GETPRNT
MX80LG outputs the screen data in Epson MX80 large format. GETPRNT4
or GETPRNT LQ570SM outputs the screen data in Epson LQ570 small
format. GETPRNT5 or GETPRNT LQ570LG outputs the screen data in Epson
LQ570 large format. GETPRNT6 or DJCOLOR outputs the screen data in
HP DeskJet color. GETPRNT7 or DJ540BW outputs the screen data in HP
DeskJet 540 monochrome. GETPRNT8 or DJ540CLR outputs the screen data
in HP DeskJet 540 color.

GR.<number>[,<number>];

Graphs the given y coordinate while incrementing the x coordinate by 1.

GRAT(_(OFF|ON))[_|0][1]?;

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

HAVE(_(HPIB|HPIBA|HPIBB|RS232|RS232A|RS232B|0|1|T|F|M|D|Q|P|D|C|N|T|
O|V|N|T|V|F|A|D|C|C|R|A|R|D|B|A|N|D|S|N|B|W|)];

Returns a “0” if the specified device is not installed. The HAVE parameters
correspond to the following devices:

- HPIB = HP-IB interface, or HP-IB and parallel interface
- HPIBA = HP-IB interface
- HPIBB = HP-IB and parallel interface
- RS232 = RS-232 interface or RS-232 and parallel interface (Option 043)
- RS232A = RS-232 interface
- RS232B = RS-232 and parallel interface (Option 043)
- IO = Either the HP-IB interface, RS-232 interface, or parallel interface
- TG = Tracking generator (Option 010)
- FMD = FM demodulator (Options 102 or 301)
- QPD = Quasi-peak detector
- CNT = Counter-lock
- OVEN = Precision frequency reference (Option 004)
- TV = TV synch trigger (Options 102 or 301)
- FADC = Fast ADC (Options 101 or 301)
CARD = Memory card reader
BANDS = Returns the number of frequency bands that the EMC analyzer has
NBW = Narrow bandwidths

Query Response: <numeric data format>

HD;
Disables data entry via the EMC 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 current harmonic band in which the EMC analyzer is tuning. HN returns a -1 if in multiband sweep. HP 8593EM, HP 8595EM, or HP 8596EM only.
Query response: <numeric data format>

HNLOCK[(-]<number>|_(EP|ON|OFF)]?;
Forces the EMC analyzer to use only the selected harmonic. HP 8593EM, HP 8595EM, or HP 8596EM only.
Query response: (ON|OFF)<CR><LF><EOI>

HNUNLK;
Unlocks the harmonic band. HP 8593EM, HP 8595EM, or HP 8596EM 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 EMC analyzer.
Query response: <character string><CR><LF><EOI>. The character string consists of the letters “HP,” and the model number.
**IF**<operand 1>, (GT|LT|EQ|NE|GE|LE), <operand 2><THEN(;)><command list><ELSE(;)<command list><ENDIF;>  

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

<operand 1>::=<number>|<user-defined variable>|<predefined variable>|<predefined function>|<trace element>.
<operand 2>::=<number>|<user-defined variable>|<predefined variable>|<trace element>.

**IFBW**<;><number>, [(HZ|KHZ|MHZ|GHZ|KZ|MZ|GZ)]<;><(EP|DN|UP|AUTO)|?];  

Specifies the intermediate frequency bandwidth.  
Query response: <numeric data format>

**INT**<destination>, <source>;  

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

**INZ**<;><(75|50|EP|OA)|?>;  

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

**IP**;  

Performs an instrument preset.

**KEYCLR**;  

Clears the user definitions for softkeys 1 through 6 (softkeys 1 through 6 are in menu 1).

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

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>::=<delimiter><command list><delimiter>.  
<menu label command string>::=<delimiter><command list><delimiter>.
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>,<inverse video condition>,<move enhancement condition>;
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>::=<delimiter><command list><delimiter>.
<move enhancement condition>::=<delimiter><command list><delimiter>.

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

KEYLBL _<key number>,<delimiter><key label><delimiter>;
Renames a key without changing its function.

LB _<character string><terminator>;
Writes text (label) at the current pen position using alphanumeric characters that have been specified in the character string.
<terminator>::=<character> specified in DT command.

LF;
Performs an instrument preset into base band (band 0). HP 8593EM, HP 8595EM, or HP 8596EM only.

LG _<number>[(DB|DM)][(EP|DN|UP)|?];
Specifies the size of the vertical graticule divisions as logarithmic units without changing the reference level. Default unit is dB. A query response of zero indicates a linear scale.
Query response: <numeric data format>
LI**MIAMPSCL**(_(_LIN||LOG)[_](0|1)?)

Specifies whether the limit line is derived from a logarithmic or linear amplitude axis. Use LIN or 0 to set the amplitude axis to linear and LOG or 1 to set the amplitude axis to logarithmic. The L**M**IMUM command must be issued prior to issuing the L**M**IAMPS**C**L command.
Query response: (LIN||LOG)<CR><LF><EOI>

LI**MID**EF**NT**YP(_(_SA|EMC)[_](0|1)?)

Defines limit line type. Use SA or O to set limit-line type to spectrum analyzer. Use EMC or 1 to set limit-line type to EMC analyzer.
Query response: (SA|EMC)<CR><LF><EOI>

LI**M**IDE**L**;

In spectrum analyzer mode, deletes all upper and lower segments in the current limit-line table and resets all limit-line settings. In EMC analyzer mode deletes the selected limit line table (L**M**IMUM).

LI**M**ID**I**SP(_(_ON|OFF|AUTO|UPPER|LOWER)?)

Controls when the limit lines are displayed.
Query response: (ON|OFF|AUTO|UPPER|LOWER)<CR><LF><EOI>

LI**M**IF**A**IL[?];

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.

LI**M**IFR**Q**SCL(_(_LIN||LOG)[_](0|1)?)

Specifies whether the limit line is derived from a logarithmic or linear frequency axis. Use LIN or 0 to set the frequency axis to linear and LOG or 1 to set the frequency axis to logarithmic. The L**M**IMUM command must be issued prior to issuing the L**M**IFR**Q**S**C**L command.
Query response: (LIN||LOG)<CR><LF><EOI>
**LIMIFT**<sub>_TIME|FREQ|_?_</sub>

Selects how the limit-line segments are defined: according to frequency, or according to the sweep time setting of the EMC analyzer.
Query response: (TIME|FREQ)<CR><LF><EOI>

**LIMILH**<sub>_TRA|TRB|TRC|<trace range>|<user-defined trace>_</sub>

Allows you to specify a fixed trace as the upper limit line or limit 1.

**LIMILINE**<sub>?</sub>

Outputs the current limit-line table definitions.

Spectrum analyzer query response: LIMIDEL;LIMILINE<number of segments>;LIMIREL_(ON|OFF); <segment> 
{<segment>;}LIMITEST_(ON|OFF);LIMIDISP_(AUTO|ON|OFF); <CR>, <LF>, <EOI> <segment>::=((SENDER|SENTERT)<frequency> |<time>), <upper value>, <lower value>, 
(SLOPE|FLAT|POINT);LIMIHDF_.(UPPER|LOWER); (LIMISEG|LIMISEGT) 
(<frequency>|<time>),<amplitude>,(SLOPE|FLAT|POINT);)

EMC analyzer query response: LIMIDFNTYP_emi;LIMILINE<number of segments>;LIMIREL_OFF; <limit line> {<limit line}>;<CR><LF><EOI> <limit line> := LIMINUM_(LIMIT_1|LIMIT_2);LIMIDEL;LIMIDFNTYP_emi; LIMIFRQSC_(LIN|LOG);LIMIAMPSCL_(LIN|LOG); <segment> 
{<segment>} LIMIMARGAMP <amplitude> DB; HD; LIMIMARGSTA_(ON|OFF);LIMILINESTA _.(ON|OFF);LIMITEST_(ON|OFF); 
<segment> := LIMISEG<frequency>._<amplitude>_DB,(SLOPE|FLAT|POINT);

**LIMILINEST**<sub>_A_(OFF|ON)](_0|1)|_?_</sub>

Displays the selected limit line. Setting LIMILINEST to off disables the display of the selected limit line. Setting LIMILINEST to on enables the display of the selected limit line. The LIMINUM command must be issued to select the limit line prior to issuing the LIMILINEST command.
Query response: (ON|OFF)<CR><LF><EOI>

**LIMILO**<sub>_TRA|TRB|TRC|<trace range>|<user-defined trace>_</sub>

Allows you to specify a fixed trace as the lower limit line or limit 2.
LIMIMARGAMP([_.]<number>)?

Sets the amplitude (in negative decibels) for the limit margin. The limit margin is a fixed amplitude relative to the limit line. The LIMINUM command must be issued to select the limit margin prior to issuing the LIMIMARGAMP command and a limit line must be defined for limit margin to be active.
Query response: <numeric data format>

LIMIMARGSTA([_.](OFF|ON)[_.](0|1))?;

Displays the selected limit margin. Setting LIMIMARGSTA to 0 or OFF disables the display of the selected limit margin. Setting LIMIMARGSTA to 1 or ON enables the display of the selected limit margin. The LIMINUM command must be issued to select the limit margin prior to issuing the LIMIMARGSTA command.
Query response: (ON|OFF)<CR><LF><EOI>

LIMIMIRROR;

Reflects the current definition about the amplitude axis at the largest frequency (for a limit line based on frequency) or the largest sweep time (for a limit line based on the sweep time) in the limit-line definition.

LIMIMODE([_.](UPPER|LOWER|UPLOW|DELTA))?;

Determines whether 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>

LIMINUM([_.](LIMIT_1|LIMIT_2))?;

Selects limit-line number 1 or 2 and its corresponding margin. This command must be issued prior to issuing any of the related commands listed above.
Query response: (LIMIT_1|LIMIT_2)<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>,[(FLAT|SLOPE|POINT)];

Adds new segments to the current frequency limit line in either 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>).

LIMISEGT_<time>,<amplitude>,[(FLAT|SLOPE|POINT)];

Adds new segments to the current sweep time limit line in either the upper limit line or the lower limit line.
<time>::=(<number>[(US|MS|SC)]|<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)][_](0|1)?);

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

LINCHK(_(ON|OFF)?);

Modifies the input RF attenuation to allow the user to determine if a measured signal level is undergoing compression. The LINCHK command is designed to be used with the Marker subsystem in order to measure a specific signal level at different RF attenuation values.
Query response: (ON|OFF)<CR><LF><EOI>

LINFILL_<destination trace>,<starting value>,<number of elements>,<ending value>;

Fills linear interpolated data into the specified trace data points of a destination trace. LINFILL uses the value of the starting value and the ending value to calculate the linear interpolation data (the values for ending value should be in measurement units). <number of elements> allows you to specify the number trace data points that are “filled in” with linear interpolation data. The number of elements field includes the starting element.
<destination trace>::=(TRA|TRB|TRC<user-defined trace>).
<starting value>::=(<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>).
<number of elements>::=(<number>|<predefined variable>|<user-defined variable>)
\[ variable|<\text{predefined function}>|<\text{trace element}>),\]
\[ <\text{ending value}>::=(<\text{number}>|<\text{predefined variable}>|<\text{user-defined variable}>|<\text{predefined function}>|<\text{trace element}>).\]

**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. Use the destination (TRA, TRB, TRC, or <user-defined trace>) when loading trace data.

\[ <\text{destination}>::=(\text{TRA}|\text{TRB}|\text{TRC}|<\text{user-defined trace}>).\]

**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.

\[ <\text{scaling factor}>::=(<\text{number}>|<\text{trace element}>|<\text{predefined function}>|<\text{predefined variable}>|<\text{user-defined variable}>).\]

**LOGSWEEPSPD(_(FAST|STD)[?]);**

Sets the log sweep speed to fast or standard whenever the LOG frequency sweep type is active. LOGSWEEPSPD is only in effect when the instrument is operating in the log frequency sweep mode, as set by the SWEETYPE command. It has no effect when a linear frequency sweep is active.

Query response: (FAST|STD)<CR><LF><EOI>

**LSPAN;**

Changes the EMC analyzer's span to the previous span setting.

**M4([_{]<number>[(HZ|KHZ|MHZ|GHZ)]](EP|DN|UP|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>
MAXMIN(_ON|OFF|VIEW)?

Causes the analyzer to put trace B into max-hold mode and trace C into min-hold mode (trace A is active). As the analyzer sweeps, the maximum and minimum signal levels are stored in traces B and C. Alternate sweeps use the peak and sample detector. While the maximum and minimum level for narrowband signals remain the same, broadband signals have different maximum and minimum levels. The results may also be viewed. When in VIEW, all traces stop sweeping and the maximum or minimum signals are displayed on the CRT.

Query response: (0|1|2)<CR><LF><EOI> Where:

- 0 indicates OFF.
- 1 indicates ON.
- 2 indicates VIEW.

MDS(_B|W)?;

Formats binary measurements by selecting the measurement data size as an 8-bit byte (B) or a two-byte word (W).

Query response: (B|W)<CR><LF><EOI>

MDU[?];

Returns values for the EMC analyzer’s baseline and reference level.

Query response: <number>,<number>,<number>,
<number>,<DBM|DBMV|DBUV|V|W><CR><LF><EOI>

MEAN_<trace source>?;

Returns the mean value of a trace in measurement units.

Query response: <numeric data format>

MEANTH_<trace source>?;

Returns the mean value of a trace above the threshold, in measurement units.

Query response: <numeric data format>
MEASALLSIGS;
Finds all signals on the display and makes an EMC measurement using
specified detectors. Each signal is tuned in sequence, the span is reduced
in steps to zero span, and a maximum of three detectors are measured.
The detectors used are chosen using AUTOAVG, and AUTOQPD commands.
Measurement time is determined by MEASTIMEPK, MEASTIMEQPD, and
MEASTIMEAVG commands. After each signal is measured it is added to the
signal list.

MEASAVG;
Makes a measurement with the peak and average detectors, using the
marker position as the measurement frequency. It spans down on the
signal located at the marker, then in zero span, measures the average
detector using the measurement time set by the MEASTIMEAVG command.
The result of the measurement can be obtained using the MEASRESULT
command. *All except Option 703.*

MEASFREQ[...]<number>[HZ|KHZ|MHZ|GHz|KHz|Mz|Gz]];
Makes a measurement by tuning directly to the specified frequency in
zero span. Then, it measures the detectors specified by AUTOQPD and
AUTOAVG commands. Measurement time is determined by MEASTIMEPK,
MEASTIMEQPD, AND MEASTIMEAVG commands. The result of the
measurement can be obtained by using the MEASRESULT command.

MEASPEAK;
Makes a measurement using the peak detector with the marker position
as the measurement frequency. First, it spans down on the signal located
at the marker, then in zero span, measures the peak detector using the
measurement time set by the MEASTIMEPK command. The result of the
measurement can be obtained by using the MEASRESULT command.

MEASQPD;
Makes a measurement with the peak and quasi-peak detector using the
marker position as the measurement frequency. First, it spans down on the
signal located at the marker, then in zero span, measures the quasi-peak
detector using the measurement time set by the MEASTIMEQPD command.
The result of the measurement can be obtained by using the MEASRESULT
command. *All except Option 703.*
MEASRESULT[?];

Sends the results of the last EMC measurement to the controller. The measurements are performed using MEASSIG, REMEASSIG, MEASPEAK, MEASQPD, or MEASAVG commands and their corresponding front-panel keys (if any). If no measurement has been performed, an ASCII NULL with EOI asserted is sent.

Query response: <frequency>, [<peak amplitude>], [<QF amplitude>], [<avg amplitude>], [<reserved>], [<reserved>], [<total AMP COR>], [<span>], [<reserved>]<CR><LF><EOI>

MEASSIG;

Makes a measurement using specified detectors with the marker position as the measurement frequency. The detectors used are chosen from the AUTOAWG and AUTOQPD commands. The result of the measurement can be obtained by using the MEASRESULT command.

MEASTIMEAVG([.]<number>[(US|MS|SC)|EP]?)

Sets the measurement time when the average detector is measured in conjunction with MEASAVG, MEASSIG, MEASFREQ, MEASALLSIGS, and REMEASSIG commands. All except Option 703.

Query response: <numeric data format>

MEASTIMEPK([.]<number>[(US|MS|SC)|EP]?)

Sets the measurement time when the peak detector is measured in conjunction with MEASPEAK, MEASSIG, MEASFREQ, MEASALLSIGS, and REMEASSIG commands.

Query response: <numeric data format>

MEASTIMEQPD([.]<number>[(US|MS|SC)|EP]?)

Sets the measurement time when the quasi-peak detector is measured in conjunction with MEASQPD, MEASSIG, MEASFREQ, MEASALLSIGS, and REMEASSIG commands.

Query response: <numeric data format>

MEASURE([.](SA|SR|NRM)?)

Determines what kind of measurements the EMC analyzer makes: signal analysis (SA), stimulus response (SR), or signal normalization (NRM).

Query response: (SA|SR|NRM)<CR><LF><EOI>
MEASWITHPP(ON|OFF)|1|0));
  Automatically peaks the preselector, for signals above 2.75 GHz, prior to making an EMC measurement. The EMC measurements affected are: Measure At Marker, Stepped Measurements, Signal List Remeasure, and Auto Measure. With MEASWITHPP ON, a Preselector Peak (PP) is done prior to measuring with any of the three detectors. With MEASWITHPP OFF, no preselector peak is done. *HP 8593EM, HP 8595EM, or HP 8596EM only.*
  Query response: (ON|OFF)<CR><LF><EOI>

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

MENU(<number>?)
  Displays the selected softkey menu on the EMC analyzer screen.
  <menu number> ::= integer value of 1, or 101 to 200.
  Query response: <numeric data format>

MERGE,<destination trace>,<destination start>,<destination end>,<source trace>,<source start>
  Merges the source trace into the specified area of the destination trace.
  <destination trace> ::= <trace source>.
  <destination start> ::= (<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>).
  <destination end> ::= (<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>).
  <source trace> ::= <trace source>.
  <source start> ::= (<number>|<predefined variable>|<user-defined variable>|<predefined function>|<trace element>).

MF?;
  Returns the frequency (or time) of the on-screen active marker.
  Query response: <numeric data format>. Query response depends on the setting of TDF and MDS

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_<trace source>[?];
  Returns a value that is the x-axis position (in <display units>) of the
  minimum amplitude value in trace A, trace B, trace C, or user-defined trace.
  Query response: <numeric data format>

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

MKA(_<number>,<EP|DN|UP|AUTO>)[?];
  Specifies the amplitude of the active marker (in the current amplitude units).
  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: <numeric data format>

MKACTV;
  Makes the current active marker the active function.

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).
  Query response: <numeric data format>

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>]<EP|DN|UP>);
  Places a second marker at the specified frequency away from the active
  marker. Frequency value may be positive or negative. Default unit is Hz.
MKF([_]<number>[(HZ|KHZ|MHZ|GHz)][_EP]?);
   Specifies the frequency of the active marker. Default unit is Hz.
   Query response: <numeric data format>

MKFC([_](OFF|ON)|[_](0|1));
   Turns on or off the marker frequency counter.

MKFCR([_]<number>[(HZ|KHZ|MHZ|GHz)]|(_DN|UP|EP|AUTO)?);
   Sets the resolution of the marker frequency counter.
   Query response: <numeric data format>

MKMIN;
   Moves the active marker to the minimum value detected.

MKN([_]<number>[(HZ|KHZ|MHZ|GHz)]|(_EP|DN|UP)?);
   Activates and moves the marker to the specified frequency.
   Query response: <numeric data format>

MKNOISE([_](OFF|ON)|[_](0|1)?);
   Returns the average value of 32 buckets around the marker, compensated
   for detection mode, and normalized to a 1 Hz bandwidth.
   Query response: (ON|OFF)<CR><LF><EOI>

MKOFF([_]*ALL*);
   Turns off either the active marker or, if the ALL parameter is specified, all of
   the markers.

MKP([_]<x coordinate>?);
   Moves the active marker to the given x-coordinate.
   <coordinate> ::= <number> | predefined variable | user-defined variable | predefined function | trace element >.
   Query response: <numeric data format>

MKPAUSE([_]<number>[(US|MS|SC)]|(_EP|DN|UP|AUTO|OA)?);
   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.
   Query response: <numeric data format>

3.52 Programming Commands
MKPX (L<number>[DB] (EP][DN][UP][?];
   Specifies the minimum signal excursion for peak identification. Default unit is dB.
   Query response: <numeric data format>

MKREAD (FRQ][SWT][IST][PER][FFT][?];
   Selects the type of active trace information to be displayed by the EMC analyzer marker readout. The MKREAD parameters are as follows:
   FRQ is marker frequency.
   SWT is sweep time.
   IST is inverse sweep time.
   PER is period.
   FFT is fast Fourier transform readout.
   Query response: (FRQ][SWT][IST][PER][FFT]<CR><LF><EOI>

MKRL;
   Sets reference level to the same level as the active marker amplitude.

MKSP;
   Sets the values of the start and stop frequencies to the same values as the delta markers.

MKSS;
   Sets the center-frequency step-size to be the same as 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 (OFF][ON][?];
   Turns the marker signal track on or off.
   Query response: (ON)[OFF]<CR><LF><EOI>

MKTYPE (PSN][AMP][FIXED][DELTA][?];
   Specifies the type of active marker to be used.
   Query response: (PSN][FIXED][AMP]<CR><LF><EOI>
ML([number])(DB|DM)|{(EP|DN|UP)}?

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 EMC analysis. A number other that “0” is returned if the operating mode is other than EMC analyzer. 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})?;

Allows you to specify the current mass storage device as the EMC analyzer memory (INT) or a memory card (CARD).
Query response: (CARD|INT)<CR><LF><EOI>

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

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.

NRL([number]|DB|EP)?;

Sets the normalized trace data with respect to the display line.
Query response: <numeric data format>
OA[?];
Sends the value of the active function to the controller.
Query response: <numeric data format>
Query response depends on the setting of TDF and MDS.

OL[?];
Returns the coded instrument state information to the controller in 202 8-bit bytes.
Query response: (1|0)<CR><LF><EOI>

ONCYCLE(_<time value>,<string data field>|?);
Periodically executes the string data field. <time value> indicates how often
the ONCYCLE command is executed.
<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. The time
value represents the time left until event occurs.
<time value>:=<number>|<user-defined variable> in seconds.
Query response: <time value>,<A-block data format><CR><LF><EOI>

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>

ONMKRU(_<delimiter><command list><delimiter>|?);
Executes the list of EMC analyzer commands whenever the value or the
units of the active marker are changed.
Query response: <A-block data format><CR><LF><EOI>

ONPWRUP(_<delimiter><command list><delimiter>|?);
Executes the list of EMC analyzer commands once on power up.
ONSREQ(, <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 YYMMDHHMMSS
format.
Query response: digits representing YYMMDHHMMSS, <A-block data
format><CR><LF><EOI>

OP(?
Returns the dimensions of the lower-left and upper-right EMC analyzer
display.
Query response: -40,-22,471,233<CR><LF><EOI>

OUTPUT _,<format>,<output data>
Allows the EMC analyzer to send data to other devices on the HP-IB, RS-232,
or parallel interfaces.
<address> ::= ([_]<number> | (_<predefined variable>|<user-defined
variable> |_<predefined function> | <trace element>))
<format> ::= (K|B|KC|KL|F<field width>.<decimal places>[C]).
The <format> parameters represent the following:

- **K** = Outputs in free-field ASCII format with no terminator.
- **B** = Outputs in a free-field format with no terminator, but in a single 8-bit
  byte.
- **KC** = Outputs in free-field ASCII with carriage return and line feed
  terminator.
- **KL** = Outputs in free-field ASCII with line feed and an EOI terminator.
- **F** = Outputs an ASCII number with the field width and decimal places
  specified. If a "C" follows the number representing decimal places, a carriage
  return and line feed will terminate the output.
<field width> ::= integer number.
<decimal places> ::= integer number.
<output data> ::= ( [<predefined variable> | <user-defined variable> | <predefined function> | <trace element> | <delimiter> { <data byte> | <delimiter> <delimiter> } <delimiter> ] | <A-block data field> ; | <1-block data field> )

OVLD(OFF)ON[(A|B|C)?]?;

Enables disables RF and IF overload status and returns overload status.
OVLD returns a 16-bit integer value upon every execution of the command.
Query response: <number data format>

PA_(PD|PU)[_]<x coordinate>[_]<y coordinate>[_],[(PD|PU)[_]<x coordinate>[_]<y coordinate>];

Draws vectors to the specified x and y coordinates. PU and PD determine whether the vectors are displayed.
<x coordinate> ::= positive integer in <display units>.
<y coordinate> ::= positive integer in <display units>.

PARSTAT;

Returns a number representing the parallel status bit.

Bit 0 = 1 = printer busy
Bit 1 = 1 = paper end
Bit 2 = 1 = select (on line)
Bit 3 = 0 = printer error
Bit 4 = 1 = byte out if set by ACK
Bit 5 = ACK line low = printer has accepted byte, ACK line high = printer has not accepted byte.

For Option 043:

Bit 0 = ignore
Bit 1 = ignore
Bit 2 = ignore
Bit 3 = 0 = printer error
Bit 4 = 1 = select (on line)
Bit 5 = 1 = paper end
Bit 6 = ACK line low = printer has accepted byte, ACK line high = printer has not accepted byte
Bit 7 = 0 = printer busy = 1 = printer not busy
PD;
Instructs the EMC analyzer to plot vectors on the EMC 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 that are in the source trace by amplitude or frequency and then returns the number of peaks found to the controller. PEAKS also sends the sorted results to the destination trace.
Query response: <numeric data format>

PKPOS_ <trace source>[?];
Returns the x-axis position of the maximum value of the trace.
Query response: <numeric data format>

PLOT [ [ <x1> , <y1> , <x2> , <y2> ] ];
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.
<x1> := <y1> := <number> that represents plotter dependent values that specify the lower-left plotter dimension.
<x2> := <y2> := <number> that represents plotter dependent values that specify the upper-right plotter dimension.
PLTPT(_<number)_?);
   Setting the plot port to a port inconsistent with the installed hardware
   option is ignored. Select PLTPT 0 for an HP-IB port.

   0 = HP-IB port
   1 = serial port
   2 = parallel port
   3 = serial port for Option 043
   4 = parallel port

POWERON(_<IP_LAST>_)?;
   Selects the state that the EMC analyzer will be in when it is turned on: the
   IP state (same state as when an instrument preset command is given) or last
   state (the state the EMC analyzer was in when it was turned off).
   Query response: (IP_LAST)<CR><LF><EOI>

PP;
   Peaks the preselector. HP 8593EM, HP 8595EM, or HP 8596EM only.

PR_([PD|PU])_?_<x coordinate>:_<y coordinate>:_<x coordinate>:_<y coordinate>_;
   Specifies a new plot location on the EMC analyzer screen relative to its
   current coordinates.
   <x coordinate>::= positive integer in <display units>.
   <y coordinate>::= positive integer in <display units>.

PREAMP(_<OFF|ON>_?);
   Switches the system preamplifier in and out of the input path.
   Query response: (ON|OFF)<CR><LF><EOI>

PREAMPG(_<number>[_DB]_[EP]_?);
   Adds or subtracts the preamplifier gain from the displayed signal.
   Query response: <numeric data format>

PREFIX_<_delimiter>_<prefix>_<_delimiter>;
   Specifies or changes the prefix used in save and recall operations.
   <prefix>::= 0 to 6 characters, A through Z and the underscore (the
   underscore cannot be the first character of the prefix).
PRINT(_(BW|COLOR|EXPBW|EXPCLR|MX80SM|MX80LG|LQ570SM|LQ570LG|DJCOLOR|EXPDCLR)[1][0:1 2 3 4 5 6 7 8 9]);

Initiates an 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 HP PaintJet printer format.

PRNPRT(_.<number>);?

Setting the print port to a port inconsistent with the installed hardware option is ignored. Select PRNPRT0 for an HP-IB port.

0 = HP-IB port
1 = serial port
2 = parallel port
3 = serial port for Option 043
4 = parallel port

PRNTADR(_.<number>);?

Allows you to set the HP-IB address of the printer.
Query response: <numeric data format>

PSTATE(_.(OFF|ON))[1][0:1];

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

PWRBW._.<trace source>,<percentage>;

Computes the combined power of all signal responses in the source and returns the bandwidth that contains the specified percentage of the total power. Positions markers at both the beginning and the end of the interval. 
<percentage> ::= (<number>|<user-defined variable>|<predefined variable>|<predefined function>|<trace element>).
Query response: <numeric data format>

PU;

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

PURGE._.<delimiter><file name><delimiter>;

Deletes the file name from the current mass storage device.
<file name> ::= a valid file name.
PWRUPTIME;
Returns the number of milliseconds that have elapsed since the EMC
analyzer was turned on.
Query response: <numeric data format>

QPGAIN_(OFF|ON)[_,](0|1);
Turns on or off the linear 10x gain stage in the quasi-peak and average
detector signal path.

RANGE_(PK|QP|AV);
Puts the highest signal on the display close to the reference level. The
parameter specifies whether the range is for the peak, quasi-peak, or
average detector. For the peak detector, reference level is adjusted until
the highest signal over the current frequency range is on the display. For
the quasi-peak and average detectors, the quasi-peak/average gain stage
is adjusted as necessary. The old reference level is saved away until a
matching UNRANGE command is given. RANGE QP and RANGE AV require
the detector to be selected and the amplitude scale to be linear.

RB([_,]<number>[(HZ|KHZ|MHZ|GHZ)]|_(EP|DN|UP|AUTO)?);
Specifies the resolution (IF) bandwidth. Default unit is Hz.
Query response: <numeric data format>

RCLS_[_,]<number>;
Recalls the previously saved state stored in registers 1 through 9.
<number>::=(1|2|3|4|5|6|7|8|9).

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

RCVRMRKR_(OFF|ON)[_,](0|1)?;
Modifies the behavior of the instrument's marker positioning functionality
when accessed through the front-panel numeric keypad, knob, or step-keys.
Query response: (ON|OFF)<CR><LF><EOI>
RECFZOOM(_(OFF|ON0)[_](0|1)?);

Zooms in on a signal at the marker by decreasing the span in steps, keeping
the signal on screen, until zero span is reached. If no marker is present, one
is placed on the highest signal before the zoom begins.
Query response: (OFF|ON)<CR><LF><EOI>

RELIPIB;

Discontinues EMC analyzer control of HP-IB.

REMEASSIG[(_(<number>|ALL|MARKED)];

Remeasures one or more signals in the signal list. If there is no parameter
given, the signal at the signal list cursor will be remeasured. A number
parameter specifies the signal number to be remeasured. An ALL parameter
specifies that all signals in the list will be remeasured. A MARKED
parameter specifies that only those signals marked will be remeasured. To
remeasure each signal the algorithm spans down on the signal using the
initial frequency listed in the table. When zero span is reached, up to three
detectors can be used to measure the signal. These detectors are selected
using the AUTOAVG and AUTOQPD commands.

REPEAT_<command list>UNTIL_<flow operand1>_(GT|LT|EQ|NE|GE|LE),<flow
operand2>;

Forms a looping construct. All commands following the REPEAT command
are executed until the comparison specified after the UNTIL command is
true.

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

The following are used for comparing the operands:

GT Greater than
LT Less than
LE Less than or equal to
GE Greater than or equal to
EQ Equal to
NE Not equal to

3-62 Programming Commands
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 same point that the operation was at when the user-defined function was called.

REV[?];

Returns the firmware revision number of the EMC analyzer being used.
Query response: <numeric data format> The number is in the YYMMDD format.

RFIN(_(LF[LFCAL][HF][HFCAL][HFBYP][HFCALBYP])?);

Specifies the input signal routing path though the RF Filter section.
Query response:
(LF[LFCAL][HF][HFCAL][HFBYP][HFCALBYP][NONE]<CR><LF><EOL>

RFINL[(_(OFF[ON])|(0|1))?];

Selects if frequency tuning is limited to values within the currently selected input path. For example, if RFINL is ON, and a stop frequency is selected out of the range of the currently selected input path, the actual stop frequency used will be the highest possible value allowed by the selected input path. This command is only valid when the RF filter section is present.
Query response: (ON|OFF)<CR><LF><EOL>

RL(_<number>([DB][DM])|(EP[DIN][UP])?);

Specifies the amplitude value of the reference level.
Query response: <numeric data format>

RLPOS(_<number>([EP][DN][UP][OA])?);

Selects the position of reference level.
Query response: <numeric data format>

RMS_<trace source>?;

Returns the root mean square value of the trace, in measurement units.
Query response: <numeric data format>

ROFFSET(_<number>[DB][EP]?);

Offsets all amplitude readouts without affecting the trace.
Query response: <numeric data format>
RPTDEF_.(ANNOT|LOG|LIN|TABLE|SETUP)._(OFF|ON);

Specifies which elements of a report are output to the printer or the plotter. If any of the elements are set to on, they will be sent to the printer followed by a form feed. The sequence sent is: ANNOT, LOG, LIN, TABLE, SETUP. Only LOG and LIN can be sent to the plotter. The report is generated by OUTPUT REPORT.

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 that 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 EMC 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);

Specifies whether a save or recall operation is to be executed.

SAVRLCN_._<register number>|EP);

Appends number to prefix for save and recall operations.
<register number>::= integer number.

SAVRLCW_(TRA|TRB|TRC|DLP|STATE|LIMILINE|AMPCOR|ANTENNA|CABLE|
OTHER|ALL|SIGNAL);

Specifies the data to be transferred—trace A, trace B, trace C, downloadable program, state, limit-line values, or antenna amplitude correction factors, cable correction factors, other correction factors, setups, or signals lists.

3-64 Programming Commands
SEGDEL\[\text{\textless segment number\textgreater}\];

Deletes the specified segment from the limit-line tables.
\texttt{\textless segment number\textgreater}::=(\texttt{\textless number\textgreater} | \texttt{\textless user-defined variable\textgreater}).

SENDER\[\text{\textless frequency\textgreater}\],\texttt{\textless upper or mid value\textgreater},\texttt{\textless lower or delta value\textgreater},\texttt{\textless segment type\textgreater};

Enters the limit-line data in the upper and lower limit-line table or the mid and delta table for limit lines based on frequency.

\texttt{\textless frequency\textgreater}::=(\texttt{\textless number\textgreater} | HZ | KHZ | MHz | GHz) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless upper or mid value\textgreater}::=(\texttt{\textless number\textgreater} | (DB | DM)) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless lower or delta value\textgreater}::=(\texttt{\textless number\textgreater} | (DB | DM)) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless segment type\textgreater}::=(SLOPE | FLAT | POINT).

SENR\[\text{\textless time\textgreater}\],\texttt{\textless upper or mid value\textgreater},\texttt{\textless lower or delta value\textgreater},\texttt{\textless segment type\textgreater};

Enters the limit-line data in the upper and lower limit-line table or the mid and delta table for limit lines based on sweep time.

\texttt{\textless time\textgreater}::=(\texttt{\textless number\textgreater} | (US | MS | SC)) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless upper or mid value\textgreater}::=(\texttt{\textless number\textgreater} | (DB | DM)) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless lower or delta value\textgreater}::=(\texttt{\textless number\textgreater} | (DB | DM)) | \texttt{\textless user-defined variable\textgreater} | \texttt{\textless predefined variable\textgreater} | \texttt{\textless trace element\textgreater}).

\texttt{\textless segment type\textgreater}::=(SLOPE | FLAT | POINT).

SER\[\text{?}\];

Returns the last 5 digits of the serial number of the EMC analyzer.
Query response: \texttt{\textless numeric data format\textgreater} Represents serial number.

SETDATE\[\text{\textless date\textgreater}\];

Sets the date of the real-time clock of the EMC analyzer.
\texttt{\textless date\textgreater}::=(\texttt{\textless number\textgreater} in the YYMMD format.
Query response: \texttt{\textless numeric data format\textgreater}, representing YYMMD

SETTIME\[\text{\textless time\textgreater}\];

Sets the time of the real-time clock of the EMC analyzer.
\texttt{\textless time\textgreater}::=(\texttt{\textless number\textgreater} in the HHMMS format.
Query response: \texttt{\textless numeric data format\textgreater}, representing HHMMS.
SHOWSETUP,(0|1|2|3|4);

Shows the current settings of the instrument on the display. This includes existing filenames, correction-factor data, limit-line data, frequency settings, trace data, and so on. SHOWSETUP consists of four pages of information. SHOWSETUP 1 displays the first page, SHOWSETUP 2 displays the second page, and so on. A SHOWSETUP of 0 turns the setup display OFF.

SIGADD;

Adds a signal to the internal signal list. The signal must have been previously measured using the MEASAVG, MEASSIG, MEASFREQ, MEASQPD, or MEASPEAK commands.

SIGDEL([<number>|[ALL][MARKED]));

Deletes one or more signals from the signal list. If there is no parameter given, the signal at the cursor will be deleted. An integer parameter specifies a signal number to delete from the list. An ALL parameter deletes all signals from the list. A MARKED parameter deletes only those signals that are marked from the list.

SIGDLTAVIEW,(NONE|PKLX|PKLY|QPLX|QPLY|AVLX|AVLY)?

Selects which delta from the limit-line table is viewed by the display signal list. The choices are:

- peak to limit 1 (PKLX)
- peak to limit 2 (PKLY)
- quasi-peak to limit 1 (QPLX)
- quasi-peak to limit 2 (QPLY)
- average to limit 1 (AVLX)
- average to limit 2 (AVLY)

Query response: (NONE|PKLX|PKLY|QPLX|QPLY|AVLX|AVLY)<CR><LF><EOI>

SIGGRAPH,(OFF|LOG|LIN);

Draws an EMC report graph on the display. The graph can either be on a logarithmic or a linear scale.

SIGGRAPH LOG or LIN draws a full screen graticule, either logarithmic or linear frequency axis with limited annotation. On the graticule, drop lines for peak amplitude signals with cross-bars for quasi-peak and average amplitude readings are drawn. The start and stop frequencies are defined based on the frequencies in the signal list.
SIGLEN[?];
Queries the current number of signals in the signal list.
Query response: <numeric data format>

SIGLIST(_(OFF[ON][_01]?);
 Turns on or off the signal list viewing and editing functions.
Query response: (ON|OFF)<CR><LF><EOI>

SIGMARK[_ (ALL|COMP|DUP|LOWE|HIGHEST|BELOW]<number>));
 Marks one or more signals on the signal list. If there is no parameter
 specified, the signal at the cursor will be marked (see SIGPOS command).
An integer parameter specifies a signal number in the list to be marked.
An ALL parameter specifies all signals in the list will be marked. A COMP
parameter compliments all marked signals in the list. A DUP parameter
marks all signals that are duplicated in the list. A LOWER parameter marks
all duplicate signals in the list that are lower in peak amplitude. A HIGHEST
parameter marks the ten highest signals in the list. A BELOW parameter
marks all signals below the signal currently pointed to in the signal list.

SIGPOS(_<number>_<EP|DN|UP)?;
 Controls and queries the cursor position in the signal list.
Query response: <numeric data format>

SIGRESULT[?];
 Sends the contents of an entry in the signal list to the controller. The signal
entry which is sent is determined by first issuing the SIGPOS command. If
the signal list is empty or the SIGPOS is outside the range of the signals
within the list, an ASCII NULL with EOI asserted
Query response: <frequency>, {<peak amplitude>}, {<QP amplitude>},
{<avg amplitude>}, {<reserved>}, {<reserved>}, {<total AMP COR>},
{<signal marked>}, {<reserved>}, {<reserved>}<CR><LF><EOI>

SIGSORT_(FREQ|PEAK|QP|AVG|PKL|PKLY|QPLX|QPLY|AVLX|AWLY);
 Sorts the internal signal list based on the field selected by the parameter.
The fields to chose from are:
- frequency of the signals (FREQ)
- peak amplitude (PEAK)
- quasi-peak amplitude (QP)
- average amplitude (AVG)
- peak delta from limit 1 (PKLX)
- peak delta from limit 2 (PLKY)
- qp delta from limit 1 (QPLX)
- qp delta from limit 2 (QPLY)
- average delta from limit 1 (AVLX)
- average delta from limit 2 (AVLY)

For the FREQ parameter, the list will be sorted in ascending order. For all other parameters, the list will be sorted in descending order.

**SIGUNMARK[<number>|ALL];**

Unmarks one or more signals on the signal list. If there is no parameter selected, the signal at the cursor will be unmarked (see SIGPOS command). An integer parameter specifies a signal number to be unmarked from the signal list. An ALL parameter unmarks all signals in the signal list.

**SMOOTH [trace source],<number of points>;**

Smoothes 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)|[EP|DN|UP]|?;**

Changes the total displayed frequency range symmetrically about the center frequency.

Query response: <numeric data format>

**SPEAKER_OFF|ON][<number>];**

Turns the internal speaker on or off. All except Option 763.

**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.

**SQLCH[<number>]|?;**

Sets the squelch threshold by setting the squelch level.

Query response: <numeric data format>

**SQR_<destination>,<source>;**

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

**SRCALC**([INT|XTAL|MTR|EXT]?)

Selects internal or external leveling for use with the built-in tracking generator.

*Option 010 for the HP 8591EM* Use INT for internal leveling, XTAL for external leveling, MTR for external leveling with an HP meter.

*Option 010 for the HP 8593EM, HP 8594EM, HP 8595EM, or HP 8596EM:* Use INT for internal leveling, EXT for external leveling.

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

**SRCAT**([_]<number>[DB]_[EP|DN|UP|AUTO|ON]?)

Attenuates the source output level. *Option 010 only.*

Query response: <numeric data format>

**SRCNORM**([OFF|ON]([O[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 EMC analyzer.

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

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

Offsets the source power level. *Option 010 only.*

Query response: <numeric data format>

**SRCPSSTP**([_]<number>[DB]_[EP|DN|UP|AUTO]?)

Selects the source-power step size. *Option 010 only.*

Query response: <numeric data format>

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

Selects sweep range of source output. *Option 010 only.*

Query response: <numeric data format>

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

Selects the source power level. *Option 010 only.*

Query response: <numeric data format>

**SRCTK**([_]<number>[DB]_[EP|DN|UP|OA]?)

Adjusts tracking of source output with EMC analyzer sweep. *Option 010 only.*

Query response: <numeric data format>
SRCTKPK;
Adjusts the tracking of source output with EMC analyzer sweep. Option 010 only

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

SS(<number>)[(Hz|kHZ|MHz|GHz)][(EP|DN|UP|AUTO)?];
Sets the center frequency step size. Default unit is Hz.
Query response: <numeric data format>

ST(<number>)[(US|MS|SC)][(EP|DN|UP|AUTO|OA)?];
Specifies the time in that the EMC analyzer sweeps the displayed frequency range.
Query response: <numeric data format>

STB?;
Returns the decimal equivalent of the bits that are set in the status byte.
Query response: <numeric data format>

STDEV_<trace source>?;
Returns the standard deviation of the trace amplitudes in the specified trace.
Query response: <numeric data format>

STOR_<file type>,<delimiter><file name><delimiter>[,<source>];
Stores an individual function on the memory card. Use trace A, trace B, trace C, or user-defined trace when storing trace data. Use an asterisk as the source parameter when storing downloadable programs.
The <file type> can be an a, c, d, e, g, i, l, n, o, s or t. The <file type> parameters represent the following:

a = amplitude correction factor data.
c = cable correction factors.
d = downloadable program.
e = all information.
g = signal list.
i = display image.
l = limit-line table.

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n = antenna correction factors.
o = other correction factors.
s = instrument state.
t = trace data and instrument state.
<file name>::= 1 to 6 characters. The first character should specify the file type.
<source>::=(TRA|TRB|TRC|<user-defined trace>|<user-defined variable>)[<prefix>]*<key number> [.<key number>].
<prefix>::= A valid prefix.

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

SUM_<trace source>?
Returns the sum of the amplitudes of each trace element, in measurement units.
Query response: <numeric data format>

SUMSQRT_<trace source>?
Returns the sum of the squares of the amplitude of each trace element, in measurement units.
Query response: <numeric data format>

SWEepyT<e>pe(_L<in>|L<og>)?
Selects the frequency axis stimulus and graticule display. When LIN is selected, the frequency axis is linear. When LOG is selected, the frequency axis is logarithmic.
Query response: (LOG|LIN)<CR><LF><EOI>

SWITCHAVG;
Turns on and off the average detector and adjusts system gains for maximum accuracy. Because of the slow charge and discharge characteristics of this detector, it is best used in a fixed tuned (zero span) fashion or in narrow spans. All except Option 703.

SWITCHQP;
Turns on and off the quasi-peak detector and adjusts system gains for maximum accuracy. Because of the slow charge and discharge characteristics of this detector, it is best used in a fixed tuned (zero span) fashion or in narrow spans. All except Option 703.
SWPCPL,(SA|SR|OA)?;
Selects either a stimulus-response (SR) or EMC analyzer (SA) auto-coupled sweep time. *Option 010 only*
Query response: (SA|SR)<CR><LF><EOI>

SYNCMODE,(NORMAL|NTSC15|PAL15|LOAD15);
Selects either the horizontal and vertical synchronizing constants, or the synchronization rate for both the internal monitor of the EMC analyzer and the video signal that is output to the MONITOR OUTPUT connector on the rear panel of the EMC analyzer.

TA[?];
Transfers the 401 amplitude values of trace A to the controller.
Query response: <numeric data format>
Query response depends on the setting of TDF and MDS.

TB[?];
Transfers the 401 amplitude values of trace B to the controller.
Query response: <numeric data format>
Query response depends on the setting of TDF and MDS.

TBLDEF,(MARK|DET PK|DAPK|DBPK|DETQP|DAPQ|DBQP|DETA|DAAV|DBAV|COR),(OFF|ON);
Specifies which elements of a table are output to the printer upon receipt of OUTPUT REPORT. If any of the elements are set to on, they will be included as part of the list portion of the report. Each element will be its own labeled column. The sequence of columns is: signal marked (MARK), peak detector (DET PK), peak delta from limit 1 (DAPK), peak delta from limit 2 (DBPK), quasi-peak detector (DETQP), average detector (DETA), average delta from limit 1 (DAAV), average delta from limit 2 (DBAV), and total correction factors (COR).

TDF,(A|B|L|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 L = returns L-block data field.
- TDF M = returns values in <display units>.
- TDF P = returns absolute measurement units.
Query response: (A|B|L|M|P)<CR><LF><EOI>

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

TH(,_)<number>[(DB|DM)|(_(AUTO|EP|DN|UP))];
  Clips signal responses below the specified threshold level. Default unit is
  dBm. Default level is seven major divisions below the reference level.
  Query response: <numeric data format>

TIMEDATE(,_<time date value>|?);
  Sets the time and date for the EMC analyzer's real-time clock, in the
  YYMMDDHHMMSS format.
  <time date value>:: = <number> in the YYMMDDHHMMSS format.
  Query response: <numeric data format>, in the YYMMDDHHMMSS format.

TIMEDSP(,_<OFF|ON>[_{0|1}]?);
  Enables the display of the time and date on the EMC 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|TV>)?;
  Implements the selected trigger mode: free (FREE), video (VID), line (LINE),
  external (EXT), or television (TV). TV trigger is available with Options 101
  and 102, or Option 301 only.
  Query response: (FREE|VID|LINE|EXT|TV)<CR><LF><EOI>

(TRA|TRB|TRC)((<number>,[1<number>])< A-block data field>|?<I-block
  data field>)
  Provides a method for returning or storing trace values.
  Query response: ((<number>,[1<number>])<A-block data format>|<I-block
  data format>|<data byte>|<data byte>|END)<CR><LF><EOI>

TRCMEM[?];
  Returns the total number of registers available for SAVET and RCIT.
  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).

**TRGRPH**<address>,<x position>,<y position>,<expanding factor>,<trace source>);

Displays a compressed (see "COMPRESS") trace anywhere on the EMC analyzer display. The x and y positions orient the trace positions.

<address>:=integer.

<x position>:=integer from 0 to 4000.

<y position>:=integer from 0 to 8000.

<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 EMC 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: (BLANK|CLRW|VIEW|MxMH)A;(BLANK|CLRW|VIEW|MxMH)B;(BLANK|CLRW|VIEW|MxMH)C;<CR><LF><EOI>

**TS**;

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

**TVLINE**(_<number>|(_UP|DN|EP)|?);

Sets the line number of the horizontal line of video on which to trigger.

Options 101 and 102, or Option 301 only.

<line number>:=integer from 1 to 1021.

Query response: <numeric data format>
**TVSFRM**(._EVEN|ODD|BOTH|VERTICAL|)?;

Selects the type of video frame to trigger on. *Options 101 and 102, or Option 301 only.*
Query response: (EVEN|ODD|VERTICAL)<CR><LF><EOI>

**TVSTND**(._NTSC|PALM|PAL|SECAM-L|)?;

Selects the triggering for NTSC, PAL, PAL-M, or SECAM-L formats. *Options 101 and 102, or Option 301 only.*
Query response: (NTSC|PALM|PAL|SECAM-L)<CR><LF><EOI>

**TVSYNC**(._NEG|POS|);

Selects the polarity of video modulation to trigger on. *Options 101 and 102, or Option 301 only.*

**TWNDOW**<trace destination>,(UNIFORM|HANNING|FLATTOP);

Formats trace information for fast Fourier analysis.

- **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.

**UNRANGE**(._PK|QP|AVG|);

Restores the reference level, to the value that was set, prior to the last matching RANGE command.

**UP**;

Increases the value of the active function by the applicable step size.

**USTATE**(._A-block data field|)?;

Transmits information that has been stored in the EMC 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.
Query response: <numeric data format>

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

VB([HZ|KHZ|MHZ|GHZ].(EP|DN|UP|AUTO)?)
Specifies the video bandwidth of the post-detection filter.
Query response: <numeric data format>

VBR([number].(EP|DN|UP|OA)?)
Specifies the value that 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.

WAIT([number].(MS|SC)|.<predefined variable>|<user-defined variable>|<predefined function>|<trace element>));
Suspends all EMC analyzer operation for the specified time duration.

WINNEXT;
When using the windows display mode, you can use WINNEXT to select the upper or lower window as the active window.

WINOFF;
Turns off the windows display mode.

WINON;
Activates the windows display mode and the zone marker.

WINZOOM;
When using the windows display mode, you can use WINZOOM to either expand the size of the active window so that it fills the entire EMC analyzer

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displays, or display both the upper and lower windows on the EMC analyzer display.

**XCH**<destination>,<destination>;
Exchanges the contents of the two parameters.

**XUNITS**<NONE|UVM|UAM|PT|G>;
Selects the transducer conversion units for the AMPCOR antenna correction factors. This specifies the units of the physical attribute to which an antenna actually responds and which will be indicated on the display for reference level, display line level, threshold level, and marker readouts.

**ZMKCNR**<number><HZ|KHZ|MHZ|GHZ>;
Positions the zone marker at the specified frequency.
Query response: <numeric data format>

**ZMKPKNL**;
Places the zone marker at the next signal peak that is left of the zone marker's current position.

**ZMKPKNR**;
Places the zone marker at the next peak to the right of the zone marker's current position.

**ZMKSPAN**<number><HZ|KHZ|MHZ|GHZ>;
Allows you to change the width of the zone marker.
Query response: <numeric data format>
## Characters and Secondary Keywords (Reserved Words) Summary

<table>
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<td>,</td>
<td>Comma (ASCII code 44)</td>
</tr>
<tr>
<td>*</td>
<td>Asterisk (used as a wildcard)</td>
</tr>
<tr>
<td>;</td>
<td>Semicolon (ASCII code 59)</td>
</tr>
<tr>
<td>?</td>
<td>Returns a query response containing the value or state of the associated parameter.</td>
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<td>0</td>
<td>Off (command argument)</td>
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<tr>
<td>1</td>
<td>On (command argument)</td>
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<td>50</td>
<td>50Ω</td>
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<tr>
<td>75</td>
<td>75Ω</td>
</tr>
<tr>
<td>A</td>
<td>Amp (unit) or A-block data field</td>
</tr>
<tr>
<td>a</td>
<td>Amplitude correction factors</td>
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<tr>
<td>ABSIZ</td>
<td>Absolute Hz (unit)</td>
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<tr>
<td>AC</td>
<td>Alternating current</td>
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<td>ALL</td>
<td>All</td>
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<td>AM</td>
<td>Amplitude modulation</td>
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<td>AMP</td>
<td>Amplitude</td>
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<tr>
<td>AMPCOR</td>
<td>Amplitude correction</td>
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<tr>
<td>AUTO</td>
<td>Auto couple or set to automatic</td>
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<tr>
<td>AVG</td>
<td>Average</td>
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<tr>
<td>B</td>
<td>8-bit byte or binary format</td>
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<tr>
<td>BOTH</td>
<td>Both odd and even frames trigger</td>
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<tr>
<td>BW</td>
<td>Black and white</td>
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<tr>
<td>c</td>
<td>Cable amplitude correction factors</td>
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<td>CARD</td>
<td>Memory card</td>
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<td>Color</td>
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<td>CPL</td>
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<td>d</td>
<td>Downloadable programs</td>
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<tr>
<td>DB</td>
<td>Decibel (unit)</td>
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<tr>
<td>DBM</td>
<td>Absolute decibel milliwatt (unit)</td>
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<tr>
<td>DBMV</td>
<td>Decibel millivolt (unit)</td>
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<tr>
<td>DBUV</td>
<td>Decibel microvolt (unit)</td>
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<tr>
<td>DC</td>
<td>Direct current</td>
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<td>DELTA</td>
<td>Delta</td>
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<td>DISP</td>
<td>Display</td>
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<td>DLP</td>
<td>Downloadable program</td>
</tr>
<tr>
<td>DM</td>
<td>Absolute decibel milliwatt (unit)</td>
</tr>
</tbody>
</table>
DMY  Day, month, year format
DN  Decreases parameter one step size
DUMP  Dump
e  Setup file
EDGE  Triggers on the edge of the trigger input
EP  Pauses program for data entry from analyzer front panel
EQ  Equal to
EVEN  Even video frame
EXT  External trigger
FADC  Fast analog-to-digital converter (ADC)
FETCH  Fetch
FIXED  Fixed
FLAT  Flat
FLATTOP  Flat top filter window
FM  Frequency modulation
FMD  Frequency modulation demodulator
FMV  Frequency modulation detection
FREE  Free run
FREQ or FRQ  Frequency
G  Gauss
g  Signal list file
GATE  Gate
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
i  Display image file
INIT  Initialize
INT  Internal or 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)
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<th>Abbreviation</th>
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<td>Last state</td>
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<td>LE</td>
<td>Less than or equal to</td>
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<td>LEVEL</td>
<td>Level gating</td>
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<td>LIMILINE</td>
<td>Limit line</td>
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<td>MHZ</td>
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<td>MS</td>
<td>Millisecond (unit)</td>
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<td>MTR</td>
<td>Meter</td>
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<td>MV</td>
<td>Millivolts (unit)</td>
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<td>MW</td>
<td>Milliwatt (unit)</td>
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<td>MZ</td>
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<td>NE</td>
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<td>NEG</td>
<td>Negative</td>
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<td>NH</td>
<td>Next highest peak</td>
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<td>NL</td>
<td>Next peak left</td>
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<tr>
<td>NONE</td>
<td>No units</td>
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<td>NR</td>
<td>Next peak right</td>
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<td>NRM or NORMAL</td>
<td>Normal</td>
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<td>State file</td>
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<td>SAVE</td>
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<tr>
<td>US</td>
<td>Microseconds (unit)</td>
</tr>
<tr>
<td>UV</td>
<td>Microvolts (unit)</td>
</tr>
<tr>
<td>UVM</td>
<td>Microvolts per meter</td>
</tr>
<tr>
<td>UW</td>
<td>Microwatt (unit)</td>
</tr>
<tr>
<td>V</td>
<td>Volts (unit)</td>
</tr>
<tr>
<td>VERTICAL</td>
<td>Vertical triggering</td>
</tr>
<tr>
<td>VID</td>
<td>Video trigger</td>
</tr>
<tr>
<td>W</td>
<td>Watts or word (for MDS command)</td>
</tr>
<tr>
<td>XTAL</td>
<td>Crystal</td>
</tr>
<tr>
<td>YTF</td>
<td>YIG-tuned filter</td>
</tr>
</tbody>
</table>
EMC Analyzer Error Messages

Error Messages
The EMC 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 EMC analyzer hardware is probably broken.
- User-created error messages appear when the EMC analyzer is used incorrectly. They are usually generated during remote operation (entering programming commands using either a controller or the external keyboard).
- Informational messages provide information indicating the EMC 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).

\( \phi \) LOCK OFF
Indicates slow YTO tuning. This message may appear if the EMC analyzer is using default correction factors. If this message appears constantly, perform the CAL FREQ routine to try to eliminate this message. \( \phi \) LOCK OFF appears briefly during the CAL FREQ routine, during instrument preset, or when the frequency value is changed; this is normal and does not indicate a problem. (U) and (H)

ADC-2V FAIL
Indicates a hardware failure. (H)

ADC-GND FAIL
Indicates a hardware failure. (H)
ADC-TIME FAIL
Indicates a hardware failure. (H) and (U)

CAL: . .
During the self-calibration routine, messages may appear on the display to indicate how the calibration routines are progressing. For example, sweep, freq, span, MC delay, FM coil, and atten can appear on the EMC analyzer display. LOCK OFF appears briefly during the CAL FREQ self-calibration routine; this is normal and does not indicate a problem. (M)

CAL: . . : done Press CAL STORE to save
Indicates that the self-calibration routine is finished and that you should press CAL STORE. (M)

CAL: cannot execute CALAMP enter: 0 dB PREAMP GAIN
The preamplifier gain should be set to 0 dB before the CAL AMPTD routine is performed. The preamplifier gain is set by using EXTERNAL PREAMP. This message also sets SRQ 110. (U)

CAL: DATA NOT STORED CAL AMP NEEDED
The correction factors are corrupt and cannot be stored. You need to perform the CAL AMPTD or the CAL FREQ & AMPTD routine before trying to store the correction factors. This message also sets SRQ 110. (U)

CAL: FM SPAN SENS FAIL
The EMC 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. This message also sets SRQ 110. (H)

Cal harmonic >= 5.7 GHz NOT found
Indicates that the CAL YTF routine for an HP 8595EM cannot find a harmonic of the 300 MHz calibration signal. If this happens, ensure that the CAL OUT connector is connected to the EMC analyzer input, perform the CAL FREQ & AMPTD routine, and then perform the CAL YTF routine again. (U) and (H)

CAL: MAIN COIL SENSE FAIL
The EMC analyzer could not set up span sensitivity of the main coil. If this message appears, press [FREQUENCY], 37, (H), CAL, More 1 of 4, More 2 of 4, DEFAULT: CAL DATA; and perform the CAL FREQ routine again. (H)
CAL: NBW 200 Hz notch amp failed
Indicates that the 200 Hz resolution bandwidth is not the correct shape for the calibration routine. (H)

CAL: NBW 200 Hz notch failed
Indicates that the 200 Hz resolution bandwidth is not the correct shape for the calibration routine. (H)

CAL: NBW 200 Hz width failed
Indicates that the 200 Hz resolution bandwidth is not the correct bandwidth for the calibration routine. (H)

CAL: NBW gain failed
Indicates that one of the resolution bandwidths is not the correct amplitude for the calibration routine. (H)

CAL: NBW width failed
Indicates that one of the resolution bandwidths is not the correct width for the calibration routine. (H)

CAL: PASSCODE NEEDED
Indicates that the function cannot be accessed without the pass code. For the DEFAULT CAL DATA function, enter the passcode by pressing \textit{FREQUENCY}, \texttt{-37, (HE)}. (M)

CAL: RES BW AMPL FAIL
The relative insertion loss of the resolution bandwidth is incorrect. This message also sets SRQ 110. (H)

CAL SIGNAL NOT FOUND
Indicates the calibration signal (CAL OUT) cannot be found. Check that the CAL OUT and the EMC analyzer input connectors are connected with an appropriate cable. If the calibration signal is connected to the EMC analyzer input but cannot be found, press \textit{FREQUENCY}, \texttt{-37, (HE), (CAL), More 1 of 4}, \texttt{More 2 of 4}, DEFAULT CAL DATA. If the calibration signal still cannot be found, press \textit{FREQUENCY}, \texttt{-37, (HE)} and perform the CAL FREQ or CAL FREQ & AMPTD self-calibration routines. This message also sets SRQ 110. (U) and (H)

CAL: SPAN SENS FAIL
The self-calibration span sensitivity routine failed. This message also sets SRQ 110. (H)
CAL: USING DEFAULT DATA
Indicates that the calibration data is corrupt and the default correction factors are being used. Interruption of the self-calibration routines or an error can cause this problem. (M)

CAL YTF FAILED
Indicates that the CAL YTF routine could not be successfully completed. If this message appears, ensure that the CAL OUT connector (for the HP 8595EM) or 100 MHz COMB OUT connector (for the HP 8593EM or HP 8596EM) is connected to the EMC analyzer input, then perform the CAL YTF routine again. (U) and (H)

CAL: ZERO FAIL.
The EMC analyzer could not set up the tuning sensitivity of the main coil. If this message appears, press (FREQUENCY), (CAL) More 1 of 4, More 2 of 4, DEFAULT CAL DATA, and perform the CAL FREQ routine again. (H)

Cannot BYPASS Input 1
An attempt was made to execute the BYPASS command while the signal path is routed through INPUT 1 of the RF filter section. Only INPUT 2 of the RF filter section can be bypassed. Requires the HP 85420 E Option 1EM RF filter section.

Cannot engage phase lock with current CAL FREQ data
Indicates that the CAL FREQ routine needs to be performed before phase locking can be turned on. (U)

Comb harmonic at _ _ _ GHz NOT found
Indicates that the CAL YTF routine for the EMC analyzer cannot find a harmonic of the comb generator at frequency displayed. If this happens, ensure that the 100 MHz OOMB OUT connector (for an HP 8593EM or HP 8596EM) or the CAL OUT connector (for an HP 8595EM) is connected to the EMC analyzer input with a low-loss, short cable before the CAL YTF routine is performed. (U) and (H)

COMB SIGNAL NOT FOUND
The comb signal cannot be found. Check that 100 MHz COMB OUT is connected to the EMC analyzer input. The comb generator is available with the HP 8593EM or HP 8596EM only. (U) and (H)

CMD ERR: _ _ _
The specified programming command is not recognized by the EMC analyzer. Press ANNOTATE ON OFF to clear. (U)
CONF TEST FAIL
Indicates that the confidence test failed. If this happens, ensure that the CAL OUT connector is connected to the EMC analyzer input, perform the CAL FREQ & AMPTD routine, and then perform the confidence test again. This message also sets SRQ 110. (H) and (U)

EMPTY DLP MEM
Indicates that the user-defined items (user-defined functions, user-defined variables, user-defined traces, user-defined softkeys) and any personalities (for example, the HP 85712B EMC measurement personality) in the EMC analyzer’s memory have been deleted. If the message is continuously displayed at power up, it may indicate a hardware failure. See the EMC analyzer’s Service Guide for more information. (U)

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 EMC analyzer’s service guide. (H)

File type incompatible
Indicates that the selected file is not a display image file. The file name for a display image file is always preceded by an “i.” (U)

FREQ UNCAL
If the FREQ UNCAL message appears constantly, it indicates a YTO-tuning error. If this message appears constantly, perform the CAL FREQ routine. FREQ UNCAL appears briefly during the CAL FREQ routine; this is normal and does not indicate a problem. (U) and (H) (U) and (H)

Function not available in current Mode
Indicates that the function that you have selected can only be used with the EMC analyzer mode. You can use the [MODE] key to select the EMC analyzer mode. (U)

Function not available with analog display
Indicates that the function that you have selected is not compatible with the Analog+ display mode. To use the function, you must first turn off the Analog+ display mode with ANALOG+ ON OFF. (U)

INTERNAL LOCKED
The EMC analyzer’s internal trace and state registers have been locked. To unlock the trace or state registers, press SAV LOCK ON OFF so that OFF is underlined. For remote operation, use PSTATE OFF. (U)
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 entered in increasing order. See the description for the AMPCOR programming command for more information. (U)

INVALID BLOCK FORMAT: IF STATEMENT
An invalid block format appeared within the IF statement. See the description for the IF THEN ELSE ENDIF programming command for more information. (U)

INVALID CARD
Indicates one of the following conditions: the memory card is write-protected (check the position of the switch on the memory card), the memory card is a read-only memory (ROM) card, or a memory card has not been inserted. (U)

INVALID CARD: BAD MEDIA
Indicates the formatting routine (FORMAT CARD) for the memory card could not be completed. See the description for INVALID CARD above for more information about the possible causes of this message. (U) and (H)

INVALID CARD: DATA ERROR
Indicates the data could not be retrieved from the memory card. (U) and (H)

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: TYPE
Indicates one of the following conditions: the memory card is write-protected (check the position of the switch on the memory card), the memory card is a read-only memory (ROM) card, or a memory card has not been inserted. (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 DET: FM or TV option only
Indicates that the selected detector cannot be used until the appropriate option is installed in the EMC analyzer. (U)

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

INVALID <file name> NOT FOUND
Indicates that the specified file could not be loaded into EMC analyzer memory or purged from memory because the file name cannot be found. (U)

INVALID FILENAME _ _ _
Indicates the specified file name is invalid. A file name is invalid if there is no file name specified, if the first letter of the file name is not alphabetic, or if the specified file type does not match the type of file. See the description SAWRCLW or STOR programming command for more information. (U)

INVALID FILE: NO ROOM
Indicates that there is insufficient space available on the memory card to store the data. (U)

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

INVALID HP-IB OPERATION REN TRUE
The HP-IB operation is not allowed. (This is usually caused by trying to print or plot when a controller is on the interface bus with the EMC analyzer.) To use the EMC analyzer print or plot functions, you must disconnect any other controllers on the HP-IB. If you are using programming commands to print or plot, you can use an HP BASIC command instead of disconnecting the controller. (U)

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

INVALID KEYLBL: _ _ _
Indicates that the specified key label contains too many characters. A key label is limited to 8 printable characters per label line. (U)

INVALID KEYNAME: _ _ _
The specified key name is not allowed. (The key name may have conflicted with an EMC analyzer programming command.) To avoid this problem, 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 RANGE: Stop < Start
Indicates that the first trace element specified for a range of trace elements is larger than the ending trace element. When specifying a trace range the starting element must be less than the ending element. For example, TRA[2,300] is legal but TRA[300,2] is not. (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 can occur if there is not enough EMC analyzer memory for the REPEAT UNTIL declaration, or if the REPEAT UNTIL declaration exceeds 2047 characters. (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. When used within a downloadable program (DLP), the maximum number of REPEAT UNTIL statements that can be nested is 20. (U)

INVALID RS-232 ADRS/OPERATION
An RS-232 operation was aborted due to an invalid operation. (U)

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

INVALID SCRMVE
Indicates the EMC analyzer may have a hardware failure. See the EMC analyzer's service guide (option 915) for more information. (II)

INVALID START INDEX
Indicates that the first trace element specified for a range of trace elements is not within the trace range of the specified trace. (U)

INVALID STOP INDEX
Indicates that the ending trace element specified for a range of trace elements is not within the trace range of the specified trace. (U)
INVALID STORE DEST:  _ _ _
The specified destination field is invalid. (U)

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

INVALID TRACENAME:  _ _ _
Indicates the specified trace could not be saved because the trace name is not allowed. To avoid this problem, 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 VALUE PARAMETER:  _ _ _
The specified value parameter is invalid. (U)

INVALID VARDEF:  _ _ _
The specified variable name is not allowed. To avoid this problem, 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 description for the TWNDOW programming command. (U)

LOST SIGNAL
For the HP 8593EM or HP 8596EM, this message indicates that the cable from the 100 MHz COMB OUT connector to the EMC analyzer input is defective or has become disconnected during the CAL YTF routine. For the HP 8595EM, this message indicates that the cable from the CAL OUT connector is defective or has been disconnected during the CAL YTF routine. Be sure to use a short, low-loss cable to connect the signal to the EMC analyzer input when performing the CAL YTF routine. (U)

LO UNLVL
Indicates that the EMC analyzer's local oscillator distribution amplifier is not functioning properly. (H)

Marker Count Reduce SPAN
Indicates the resolution bandwidth to span ratio is too small to use the marker count function. Check the span and resolution bandwidth settings. (U)

Marker Count Widen RES BW
Indicates that the current resolution bandwidth setting is too narrow to use with the marker counter function. The marker counter function can be in
narrow resolution bandwidths (bandwidths that are less than 1 kHz) with the following procedure:

1. Place the marker on the desired signal.
2. Increase the resolution bandwidth to 1 kHz and verify the marker is on the signal peak.
3. If the marker is on the signal peak, the marker count function can be used in either the 1 kHz resolution bandwidth or the original narrow resolution bandwidth setting. If the marker is not on the signal peak, it should be moved to the signal peak and the marker counter function should not be used with a resolution bandwidth setting of less than 1 kHz. (U)

**MEAS UNCAL**
The measurement is uncalibrated. Check the sweep time, span, and bandwidth settings, or press [AUTO COUPLE], [AUTO ALL]. (U)

**MEMORY OVERFLOW; ERASE DLP MEM and reload**
This message indicates that too many user-defined items (functions, variables, key definitions), or downloadable programs have been loaded into EMC analyzer memory. If this message appears, use ERASE DLP MEM and then load the user-defined item or downloadable program into EMC analyzer memory. (U)

**No card found**
Indicates that the memory card is not inserted. (U)

**No points defined**
Indicates the specified limit line or amplitude correction function cannot be performed because no limit line segments or amplitude correction factors have been defined. (U)

**OVEN COLD**
Indicates that the EMC analyzer has been powered up for less than 5 minutes. (The actual temperature of the precision frequency oven is not measured.) (Option 004 only.) (M)

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

**PASSCODE NEEDED**
Indicates that the function cannot be accessed without the pass code. (U)
**POS-PK FAIL**
Indicates the positive-peak detector has failed. (H)

**RCVR Limits not allowed in SA mode**
This error is encountered when an attempt is made to enable limit-line display, limit-margin display, or limit testing of limits defined in Receiver mode when the instrument is operating in Signal Analysis mode. To correct the problem, either purge the limits or switch to Receiver mode. (U)

**REF UNLOCK**
Indicates that the frequency reference is not locked to the external reference input. Check that the 10 MHz REF OUT connector is connected to the EXT REF IN connector, or, when using an external reference, that an external 10 MHz reference source of sufficient amplitude is connect to the EXT REF IN connector. (U) and (H)

**Required option not installed**
Some EMC analyzer functions require that an option be installed in the EMC analyzer. See the description for the function in the HP 8590 EM Series EMC Analyzer User's Guide for more information about which option is required. (U)

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

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

**RF Filter Section Absent**
This message is displayed if the bypass command is executed when the RF filter section is not connected to, or is not communicating with, the EMC analyzer. (U) and (H)

**RFFS Error: COMMAND**
The RF filter section has received a command that it does not recognize. Assure that there is no cable connected to the RF filter section Service Bus interface. If the condition persists, and there is no cable connected to the RF filter section Service Bus interface, contact your HP representative. Requires the HP 85420E Option 1EM RF filter section. (U)

**RFFS Error: HARDWARE**
The RF filter section has experienced a hardware failure. If the condition persists after presetting the instrument or cycling power, contact your HP representative. Requires the HP 85420E Option 1EM RF filter section. (H)
RFFS Error: **TIMEOUT**
Communication failure between the EMC analyzer; and the RF filter section. Check power to the RF filter section and check that the AUX interface cable is properly connected between both instruments. *Requires the HP 85420E Option 1EM RF filter section.* (U) (H)

**RFFS Service Bus Active**
This message appears in the active function area of the EMC analyzer; display when an external controller communicates with the RF filter section via the RF filter section Service Bus interface. *Requires the HP 85420E Option 1EM RF filter section.* (H)

**RF PRESEL ERROR**
Indicates that the preselector peak routine cannot be performed. *Requires the HP 85420E Option 1EM RF filter section.* (H)

**RF PRESEL TIMEOUT**
Indicates that the preselector peak routine cannot be performed. *Requires the HP 85420E Option 1EM RF filter section.* (H)

**SA Limits not allowed in RCVR mode**
This error is encountered when an attempt is made to enable limit-line display, limit-margin display, or limit testing of limits defined in spectrum analyzer mode when the instrument is operating in EMC analyzer mode. To correct the problem, either delete the limits or switch to spectrum analyzer mode. (U)

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

**SETUP ERROR**
Indicates that the span, channel bandwidth, or channel spacing are not set correctly for the adjacent channel power or channel power measurement. (U)

**Signal Not Found**
Indicates the PEAK ZOOM routine did not find a valid signal. (U)

**SMPLR UNLK**
Indicates that the sampling oscillator circuitry is not functioning properly. If this message appears, check that the external frequency reference is correctly connected to the EXT REF INPUT. (U) and (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 A of the HP 8590 EM Series EMC Analyzer User’s Guide. (M)

STEP GAIN/ATTN FAIL
Indicates the step gain has failed. (H)

Stop at marker not available with negative detection
Indicates that the marker counter cannot be used when negative peak detection is selected. To use the marker counter, turn off negative peak detection with DETECTION PK SP. NG. (U)

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 EMC analyzer input connector with an appropriate cable. (U)

TG UNVOL
This message can indicate the following: that the source power is set higher or lower than the EMC analyzer can provide, that the frequency span extends beyond the specified frequency range of the tracking generator, or that the calibration data for the tracking generator is incorrect. See “Stimulus-Response Measurements” in Chapter 4 of the HP 8590 EM Series EMC Analyzer User’s Guide for more information. (U)

Trace A is not available
Indicates that trace A is in the store-blank mode and cannot be used for limit-line testing. Use CLEAR WRITE A or VIEW A to change trace A from the store-blank mode to the clear write mode, and then turn on limit-line testing. (U)

UNDF KEY
The softkey number is not recognized by the EMC analyzer. (U)

USING DEFAULTS self cal needed
Indicates that the current correction factors are the default correction factors and that the CAL FREQ & AMPTD routine needs to be performed. For the HP 8593EM, HP 8595EM, or HP 8596EM, CAL YTF routine needs to be performed also. (U)
VID-BW FAIL
Indicates the video bandwidths have failed. (H)

YTF is not available
The YTF is only available for the HP 8593EM, HP 8595EM, and HP 8596EM. (U)
Nonrecoverable System Errors

Certain situations can create error conditions from which the main processor cannot recover. In the event that the processor detects a nonrecoverable error, the instrument will be initialized, the display will be blanked, and special error messages will be written to the display.

The following is a sample nonrecoverable system error message display.

<table>
<thead>
<tr>
<th>System Error 4, HP 850XEM, SN 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15:20 FEB 8, 1995, Rev: 952058</td>
</tr>
<tr>
<td>SR: 0000  PC: 00FFB370  00FF6F1E: 00003000</td>
</tr>
<tr>
<td>D0: 00000000  A6: 00FF2B38  00FF6F22: 00000000</td>
</tr>
<tr>
<td>D1: 00000000  A1: 00FF803E  00FF6F26: 00000000</td>
</tr>
<tr>
<td>D2: 00FF2B38  A2: 00FF803C  00FF6F2A: 00FF803E</td>
</tr>
<tr>
<td>D3: 00FF803E  A3: 00FF2B2E  00FF6F2E: 000031B1</td>
</tr>
<tr>
<td>D4: 000037D  A4: 00FF2B2F  00FF6F32: 00004065E</td>
</tr>
<tr>
<td>D5: 00FF80E8  A5: 00FC6348  00FF6F36: 0004EDE8</td>
</tr>
<tr>
<td>D6: 00FFB39A  A6: FFFFFFFE  00FF6F3A: 00FF8000</td>
</tr>
<tr>
<td>D7: 00FFB392  A7: 00FF6F1E  00FF6F3E: 00FF88AE</td>
</tr>
</tbody>
</table>

When a nonrecoverable error message is displayed, the instrument will only respond to the front-panel COPY and PRESET keys. If you have a printer configured and connected to the instrument, and if no remote controller is currently connected to the I/O port through which the printer is connected, you can generate a hardcopy of the diagnostic part of the error message by pressing the front-panel COPY key.

In order to resume instrument operation following a nonrecoverable system error, press the front-panel PRESET key. The instrument will resume operation from its preset state.
Among the conditions which can contribute to the occurrence of a nonrecoverable system error are:

- Hardware failure of the main processor
- Hardware failure of system memory available to the main processor
- Errors in the primary system control program
- Attempted execution of unsupported system commands

Nonrecoverable system errors may occur when attempting to load an improper file type into the machine. For example, loading a file with an incorrect format into a limit line or amplitude correction table may generate this error.

If nonrecoverable system errors occur regularly, contact your HP representative.
AM, FM, and Pulsed RF Reference Charts

This appendix contains charts and graphs that are helpful when you are performing amplitude modulation, frequency modulation, or pulsed RF measurements.

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 the two signals, which is equal to the modulating frequency. The following table and graph help you to determine amplitude modulation information.

<table>
<thead>
<tr>
<th>% Modulation</th>
<th>Sideband Level Below Carrier (dB)</th>
<th>Sideband Level Below Carrier (dB)</th>
<th>% Modulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46</td>
<td>10</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>26</td>
<td>30</td>
<td>6.3</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>40</td>
<td>2.0</td>
</tr>
<tr>
<td>30</td>
<td>16.5</td>
<td>50</td>
<td>0.63</td>
</tr>
<tr>
<td>40</td>
<td>14</td>
<td>60</td>
<td>0.2</td>
</tr>
<tr>
<td>12</td>
<td>60</td>
<td>70</td>
<td>0.063</td>
</tr>
<tr>
<td>70</td>
<td>9.1</td>
<td>80</td>
<td>0.02</td>
</tr>
<tr>
<td>80</td>
<td>7.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure B-1. Percent Modulation
<table>
<thead>
<tr>
<th>Carrier Bessel NULL Order</th>
<th>$t^* = \Delta F/f$</th>
<th>First Sideband</th>
<th>$t^* = \Delta F/f$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>2.4048</td>
<td>1st</td>
<td>3.83</td>
</tr>
<tr>
<td>2nd</td>
<td>5.5201</td>
<td>2nd</td>
<td>7.02</td>
</tr>
<tr>
<td>3rd</td>
<td>8.6531</td>
<td>3rd</td>
<td>10.17</td>
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* $t =$ modulation index
Bessel functions for the first eight orders

Figure B-2. Bessel Null Graph
Figure B-3. Loss in Sensitivity (Pulsed RF versus CW)
Figure B-4. IF BW Setting for Pulsed RF Computed from $t_o B = 0.1$
Cross Reference of Programming Command to Key Function

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

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Table C-1.
Cross Reference of Programming Command to Key Function
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Cross Reference of Programming Command to Key Function
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Cross Reference of Programming Command to Key Function (continued)

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C.10  Cross Reference of Programming Command to Key Function
Table C-1.
Cross Reference of Programming Command to Key Function
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### Table C-1.
**Cross Reference of Programming Command to Key Function**
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Cross Reference of Programming Command to Key Function
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Table C-1.
Cross Reference of Programming Command to Key Function

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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. The reference to “SA mode” in the table refers to the EMC analyzer's spectrum analyzer mode.

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<td>WINDOWS OFF</td>
<td>([ON])</td>
</tr>
<tr>
<td>X</td>
<td>([CONFIG], [SAVE/RECALL])</td>
</tr>
<tr>
<td></td>
<td>([DISPLAY], [CAL]),</td>
</tr>
<tr>
<td></td>
<td>or ([SETUP]) (SA mode)</td>
</tr>
<tr>
<td>X PINE TUNE DAC</td>
<td>[CAL]</td>
</tr>
<tr>
<td>Y</td>
<td>([CONFIG], [SAVE/RECALL])</td>
</tr>
<tr>
<td></td>
<td>([DISPLAY], [CAL]),</td>
</tr>
<tr>
<td></td>
<td>or ([SETUP]) (SA mode)</td>
</tr>
<tr>
<td>YTF DRIVER</td>
<td>[CAL]</td>
</tr>
<tr>
<td>YTF SPAN</td>
<td>[CAL]</td>
</tr>
<tr>
<td>YTF TUNE COURSE</td>
<td>[CAL]</td>
</tr>
<tr>
<td>YTF TUNE FINE</td>
<td>[CAL]</td>
</tr>
<tr>
<td>YZ # Spc Clear</td>
<td>([CAL], [CONFIG]),</td>
</tr>
<tr>
<td></td>
<td>([DISPLAY], [SAVE/RECALL]),</td>
</tr>
<tr>
<td></td>
<td>or ([SETUP]) (SA mode)</td>
</tr>
</tbody>
</table>
### Table D-1. Softkey Locations (continued)

<table>
<thead>
<tr>
<th>Softkey</th>
<th>Front-Panel Access Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>(CONFIG), (SAVE/RECALL)</td>
</tr>
<tr>
<td></td>
<td>(DISPLAY), (CAL),</td>
</tr>
<tr>
<td></td>
<td>or (SETUP) (SA mode)</td>
</tr>
<tr>
<td>ZERO SPAN</td>
<td>SPAN</td>
</tr>
<tr>
<td>ZONE CENTER</td>
<td>ON</td>
</tr>
<tr>
<td>ZONE PK LEFT</td>
<td>ON</td>
</tr>
<tr>
<td>ZONE PK RIGHT</td>
<td>ON</td>
</tr>
<tr>
<td>ZONE SPAN</td>
<td>ON</td>
</tr>
</tbody>
</table>
Key Menus

This chapter contains the key menu diagrams for the HP 8590 EM Series EMC analyzers. The menus are documented for the:

- HP 8591EM
- HP 8593EM
- HP 8594EM
- HP 8595EM
- HP 8596EM

Each front-panel key is listed alphabetically. The softkeys accessed by a front-panel key are shown below the front-panel key.

Note

Some of the softkeys in the key menus are model or option specific and may not appear on your EMC analyzer.
AMPLITUDE

1. After selecting this softkey, pressing any digit, 0 through 9, brings up the appropriate amplitude terminator menu.
2. HP 8593EM, 8595EM, and 8596EM only.
3. HP 8594EM, 8595EM, and 8596EM only.

AUTO COUPLE

AUTO ALL
IF BW AUTO MAN
AVG BW AUTO MAN
ATTEN AUTO MAN
SWP TIME AUTO MAN
OF STEP AUTO MAN

autocoupl
1. Option 010 only.
2. Not available when used with HP 85420E, Option 1EM, RF Filter Section.
3. HP 8593EM or HP 8596EM only.
4. Available only when LIN is selected for the SWEEP LOG LIN softkey.

Key Menus  E3
1. Appears only when PLTS/PGL 2 or 4 is selected.
2. Changes to BAUD RATE for Option 043.
3. Changes to EXIT SHOW when selected.
4. Changes to MEM LOCKED when SAVE LOCK is on.
5. Changes to PRIN PORT SER PAR for Option 043.
6. Changes to PULN PORT SER PAR for Option 043.
7. Except option 043.

**Key Menus**
## DEMOD

- DEMOD ON OFF
- DEMOD AM FM
- SPEAKER ON OFF
- SQUELCH
- FM GAIN
- DWELL TIME

1. All except Option 703.

## DET

- GP ON OFF
- AVG ON OFF
- VIEW PK QP AV
- GP/AVG 10X OFF
- DETECTOR SMP PK

1. All except Option 703.
2. Changes to DETECTOR PK SP NG when Option 101 or 301 is installed.

Key Menus 67
DISPLAY hardkey—in EMC ANALYZER mode only

The DISPLAY hardkey has different Limit Lines softkey menus between the EMC analyzer and spectrum analyzer modes.

1. After selecting this softkey, pressing any digit, 0 through 9, brings up the appropriate amplitude terminator menu.
2. Does not operate if SWEEP LOG is selected. Requires Option 101 or 301.
DISPLAY hardkey—in SPECTRUM ANALYZER mode only

The DISPLAY hardkey has different Limit Lines softkey menus between the EMC analyzer and spectrum analyzer modes.

1. After selecting this softkey, pressing any digit, 0 through 9, brings up the appropriate amplitude terminator menu.
2. Does not operate if SWEEP LOG is selected. Requires Option 101 or 301.
3. Specifies amplitude for UPR LWR or MID DLT limit lines, respectively.
1. Does not operate if ANALOG + on.
2. Available only for HP 8593EM, HP 8595EM, or an HP 8596EM.
3. Available only for an HP 85420E, Option 1EM, RF Filter Section.
4. HP 8595EM or 8596EM.
5. HP 8593EM only.
MKR

MARKER NORMAL
MARKER Δ
MARKER AMPTD 1
SELECT 1 2 3 4
MARKER # ON OFF
More 1 of 3

MK TRACK ON OFF
MK COUNT ON OFF
MK TRACE AUTO ABC
MK READ F T I P
MARKER ALL OFF
More 2 of 3

MK NOISE ON OFF
MK PAUSE ON OFF
CNT RES AUTO MAN
More 3 of 3

1. After selecting this softkey, pressing any digit, 0 through 9, brings up the appropriate amplitude terminator menu.

MKR→

MARKER -> HIGH
MARKER -> CF
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 3

PEAK EXCURSION
MARKER -> REF LVL
MARKER -> CF STEP
MARKER -> MINIMUM
MARKER -> PK-PK
More 2 of 3

MARKER -> START
MARKER -> STOP
MARKER Δ
MARKER Δ SPAN
DSP LINE ON OFF
More 3 of 3

Key Menus   E11
MODE

EMC ANALYZER
SPECTRUM ANALYZER

OUTPUT

COPY SCREEN
OUTPUT REPORT
Define Report
Define List
EDIT ANNOTATN

ANNOTATN ON OFF
LOG ON OFF
LIN ON OFF
UST ON OFF
SETTINGS ON OFF
Previous Menu

SHOW DET PK QP AV
SHOW Δ1 PK QP AV
SHOW Δ2 PK QP AV
SHOW COR ON OFF
SHOW MRK ON OFF
Previous Menu

CLEAR ANNOTATN

EXIT EDIT

E12 Key Menus
1. Changes to MEM LOCKED when SAV LOCK ON.
SETUP hardkey—in EMC ANALYZER mode only

The SETUP hardkey has different Limit Lines softkey menus between the EMC analyzer and spectrum analyzer modes.

1. Available only when EDIT ANTENNA is selected.
2. Requires HP 85420E, Option 1EM, RF Filter Section.
SETUP hardkey—in SPECTRUM ANALYZER mode only

The SETUP hardkey has different Limit Lines softkey menus between the EMC analyzer and spectrum analyzer modes.

1. Available only when EDIT ANTENNA is selected.
2. Requires HP 85420E. Option HEM/RF filter section.
3. Specified amplitude for LPR/LWR or MID/DEL limit the respectively.
**Key Menus**

**SGL SWP**

**SPAN**
- SPAN
- SPAN ZOOM
- FULL SPAN
- ZERO SPAN
- LAST SPAN

**SWEEP/TRIG**

<table>
<thead>
<tr>
<th>SWP TIME AUTO MAN</th>
<th>SWEEP CONT SGL</th>
<th>TV LINE #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>FREE RUN VIDEO</td>
<td>TV TRIG ODD FLD</td>
</tr>
<tr>
<td>SWEEP LOG LIN</td>
<td>LINE</td>
<td>TV TRIG EVEN FLD</td>
</tr>
<tr>
<td>LOGF SPD STD FAST</td>
<td>EXTERNAL</td>
<td>TV TRIG VERT INT</td>
</tr>
<tr>
<td>1</td>
<td>TV TRIG 2</td>
<td>TV SYNC NEG POS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TV Standard</td>
</tr>
</tbody>
</table>

1. Available only when LOG is selected on the SWEEP LOG LIN softkey.
2. Only when Option 102 or 301 is installed.
1. Not available in spectrum analyzer mode.
2. Each time this softkey is pressed, it changes sequentially as follows:
   - VIEW PK ∆ LIM 1
   - VIEW PK ∆ LIM 2
   - VIEW AVG ∆ LIM 1
   - VIEW AVG ∆ LIM 2
   - VIEW ∆ OFF

3. Available when SIG LIST is on.
4. Only available if VIEW ∆ is not off.

Key Menus  E17
### TRACE

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEAR WRITE A 1</td>
<td></td>
</tr>
<tr>
<td>MAX HOLD A 2</td>
<td></td>
</tr>
<tr>
<td>VIEW A 1</td>
<td></td>
</tr>
<tr>
<td>BLANK A 1</td>
<td></td>
</tr>
<tr>
<td>TRACE A B C</td>
<td></td>
</tr>
<tr>
<td>More 1 of 4</td>
<td></td>
</tr>
<tr>
<td>NORM A/B ON OFF</td>
<td></td>
</tr>
<tr>
<td>TRACE B VW OFF 3</td>
<td></td>
</tr>
<tr>
<td>MAX/MIN ON OFF</td>
<td></td>
</tr>
<tr>
<td>MAX/MIN VIEW 4</td>
<td></td>
</tr>
<tr>
<td>More 2 of 4</td>
<td></td>
</tr>
<tr>
<td>VD AVG ON OFF</td>
<td></td>
</tr>
<tr>
<td>DETECTOR SMP PK 5</td>
<td></td>
</tr>
<tr>
<td>NORMALIZE ON OFF</td>
<td></td>
</tr>
<tr>
<td>NORMALIZE POSITION</td>
<td></td>
</tr>
<tr>
<td>A &lt;--&gt; B</td>
<td></td>
</tr>
<tr>
<td>More 3 of 4</td>
<td></td>
</tr>
<tr>
<td>A-B -&gt; A ON OFF</td>
<td></td>
</tr>
<tr>
<td>B-DL -&gt; B</td>
<td></td>
</tr>
<tr>
<td>B &lt;--&gt; C</td>
<td></td>
</tr>
<tr>
<td>A -&gt; C</td>
<td></td>
</tr>
<tr>
<td>B -&gt; C</td>
<td></td>
</tr>
<tr>
<td>More 4 of 4</td>
<td></td>
</tr>
</tbody>
</table>

1. Change to B or C when TRACE B or C is selected, respectively.
2. Changes to MAX HOLD B when trace B is selected and to MIN HOLD C when trace C is selected.
3. Only available when NORM A/B ON.
4. Only available when MAX/MIN ON.
5. Changes to DETECTOR PK SP NG for Option 101 or 301 only.

### WINDOWS

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ZONE CENTER, ZONE SPAN, ZONE PK RIGHT, ZONE PK LEFT, PEAK EXCURSION, WINDOWS OFF</td>
</tr>
<tr>
<td>NEXT</td>
<td>(If windows are on, activates alternate windows.)</td>
</tr>
<tr>
<td>ZOOM</td>
<td>(Toggles between split-screen and full-size display, if windows are on.)</td>
</tr>
</tbody>
</table>
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3
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