

GEC

NOMENCLATURE: FFT ANALYZER
PART NUMBER: SR760
MANUFACTURER: STANFORD RESEARCH

1.1 This instruction describes the steps necessary to perform the performance test of the Stanford Research model SR760 FFT Analyzer. The following tests are performed to the accuracies below:

SELF TESTS:	PASS/FAIL
DC OFFSET :	≤ -80 dBV at -30 dBV Input Range ≤ -70 dBV at -60 dBV Input Range
COMMON MODE REJECTION:	≤ -50 dB (Input Range ≥ 14 dB) ≤ -80 dB (Input Range < 14 dB) ≤ -80 dB (Input Range < -6 dB)
AMPLITUDE ACCURACY:	± 0.2 dB (or $\pm 2.33\%$)
AMPLITUDE LINEARITY:	± 0.2 dB $\pm 0.003\%$ Full Scale
AMPLITUDE FLATNESS:	± 0.15 dB
ANTI-ALIAS FILTER:	≤ -95 dB
FREQUENCY ACCURACY:	25 ppm
PHASE ACCURACY:	$\pm 3^\circ$
HARMONIC DISTORTION:	≤ -90 dB
NOISE:	≤ -160 dBV _{rms} /√Hz
SPURIOUS:	≤ -135 dB below 200 Hz ≤ -140 dB 200 Hz to 100 kHz

2.1 Operating Manual and Programming Reference for the SR760 FFT Spectrum Analyzer, Stanford Research Systems revision 1.2 (6/91).

[illegible]

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2.2 Service Manual for the 3562A Dynamic Signal Analyzer,
Hewlett Packard manual number 03562-90011.

3.0 **EQUIPMENT REQUIRED**

3.1 **STANDARDS**

3.1.1 Synthesizer/Level Generator, Hewlett Packard model 3335A.

3.1.2 Multifunction Standard, Datron model 4708.

3.1.3 Distortion Measurement Set, Hewlett Packard model 339A.

3.2 **ACCESSORIES**

3.2.1 BNC to Dual Banana cable, Hewlett Packard model 11001-60001
or equivalent.

3.2.2 50 Ohm Feedthru Termination, Hewlett Packard model 11048C or
equivalent.

3.2.3 600 Ohm Feedthru Termination, Hewlett Packard model 11095A
or equivalent.

3.2.4 Cable Assembly, BNC both ends, Hewlett Packard model 10502A
or equivalent. (3 required, 2 must be of equal length)

3.2.5 BNC TEE (m/f/f), Hewlett Packard model 1250-0781 or
equivalent.

3.2.6 Adapter, BNC (f/f), Pomona Electronics model 3283 or
equivalent.

4.0 **POWER REQUIRED**

4.1 115 VAC, 60 Hz, Single Phase.

5.0 **CALIBRATION INSTRUCTION**

IMPORTANT: Make a copy of the Data Sheet at the end of this
instruction prior to beginning.

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5.1 SELF TEST

NOTE: After each self test, record the PASS/FAIL result on the Data Sheet.

5.1.1 Preset the FFT by depressing the + key while turning the analyzer on. At power up, the RAM, ROM, DSP and A/D tests should all indicate OK.

5.1.2 Depress the following on the FFT:

MENU:	SYSTEM SETUP	<HARD KEY>
	More	<SOFT KEY>
	Test Hardware	<SOFT KEY>
	Keypad Test	<SOFT KEY>

5.1.3 Depress all the front panel keys until all of the boxes on the screen are filled in. Exit the screen and depress the following on the FFT:

Knob Test	<SOFT KEY>
Speed 2	<SOFT KEY>

5.1.4 Rotate the knob to verify rotation and direction. Depress the following:

Return	<SOFT KEY>
More	<SOFT KEY>
Memory Test	<SOFT KEY>
Main Mem	<SOFT KEY>
Begin Test	<SOFT KEY>

5.1.5 All the Main Memory chips should pass. After test is complete, depress the following:

Return	<SOFT KEY>
Video Mem	<SOFT KEY>
Begin Test	<SOFT KEY>

5.1.6 All the Video Memory chips should pass. After test is complete, depress the following:

Return	<SOFT KEY>
Return	<SOFT KEY>
DSP Test	<SOFT KEY>

5.1.7 Both DSP chips should report 0 errors. Enter the results of all the tests in the Data Sheet.



5.2.1 Preset the FFT by depressing the ← key while turning the analyzer on.

```

MENU:      MEAS           <HARD KEY>
            Window         <SOFT KEY>
            Flattop        <SOFT KEY>

```

MENU: **INPUT** <HARD KEY>
 Auto Offset: ON <SOFT KEY>

Input Range	<SOFT KEY>
-30	
dbV	<SOFT KEY>
Coupling: DC	<SOFT KEY>

```

MENU:      DISPLAY          <HARD KEY>
Marker Width:SPOT<SOFT KEY> (toggle to spot)

```

5.2.5 Rotate the knob to place the marker at DC (0.0 kHz).
Depress the following:

```

MENU:      AVERAGE      <HARD KEY>
           Number Averages <SOFT KEY>
           100
           Enter          <SOFT KEY>
           Averaging: ON  <SOFT KEY>

```

ENTRY: AUTO SCALE <HARD KEY>

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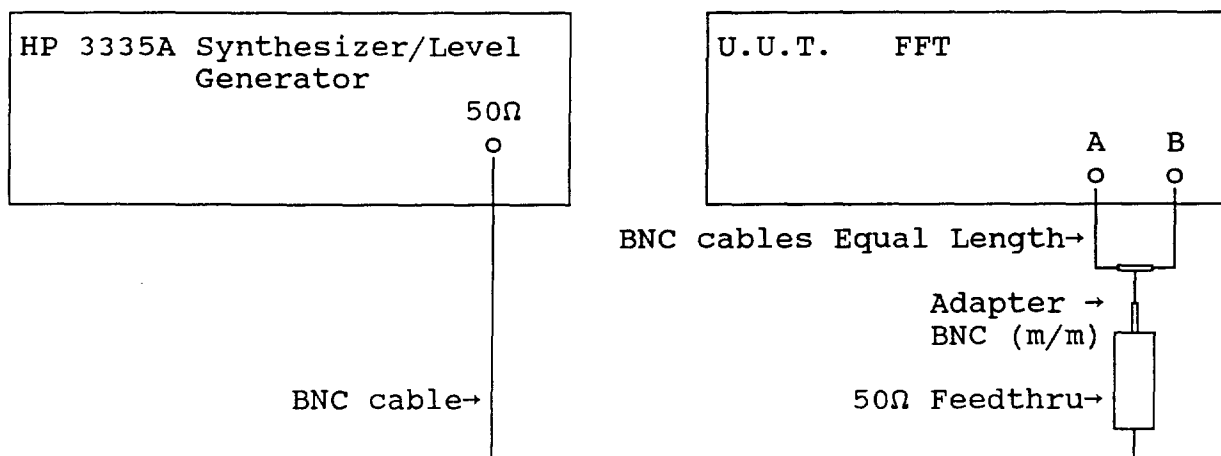
- 5.2.6 Record the marker reading on the Data Sheet. Depress the following:

MENU:	INPUT	<HARD KEY>
	Input Range	<SOFT KEY>
	-60	
	dbV	<SOFT KEY>
CONTROL:	START	<HARD KEY>
ENTRY:	AUTO SCALE	<HARD KEY>

- 5.2.7 Record the marker reading on the Data Sheet. Verify the DC Offset is below -80 dBV for the -30 dBV Input Range and -70 dBV for the -60 dBV Input Range. Remove the termination.

5.3 COMMON MODE REJECTION

- 5.3.1 Connect the equipment as shown:



- 5.3.2 Preset the FFT by depressing the + key while turning the analyzer on. Set the input range by depressing the following:

MENU:	MEAS	<HARD KEY>
	Window	<SOFT KEY>
	Flattop	<SOFT KEY>
MENU:	INPUT	<HARD KEY>
	Input Range	<SOFT KEY>
	14	
	dbV	<SOFT KEY>

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5.3.3 Set the controls on the Synthesizer as follows:

POWER ON
 FREQUENCY..... 1 kHz
 AMPLITUDE +13 dBm

5.3.4 Depress the following on the FFT:

MENU: **FREQ** <HARD KEY>
ENTRY: **SPAN** <HARD KEY> (depress until 1.56 kHz)

MENU: **AVERAGE** <HARD KEY>
 Number Averages <SOFT KEY>
 100
 Enter <SOFT KEY>
 Averaging: ON <SOFT KEY>

ENTRY: **AUTO SCALE** <HARD KEY>

MARKER: **MAX/MIN** <HARD KEY>

MARKER: **REF** <HARD KEY>

MENU: **INPUT** <HARD KEY>
 Input Source:A-B <SOFT KEY>

CONTROL: **START** <HARD KEY>

5.3.5 Record the marker reading on the Data Sheet. This is the CMRR for +14 dBV input range.

5.3.6 Set the HP 3335A Amplitude to +6 dBm.

5.3.7 Depress the following on the FFT:

MENU: **INPUT** <HARD KEY>
 Input Source:A <SOFT KEY>
 Input Range <SOFT KEY>
 -2 (or as required)
 dbv <SOFT KEY>

CONTROL: **START** <HARD KEY>

MARKER: **MAX/MIN** <HARD KEY>

MARKER: **REF** <HARD KEY>

MENU: **INPUT** <HARD KEY>
 Input Source:A-B <SOFT KEY>

CONTROL: **START** <HARD KEY>

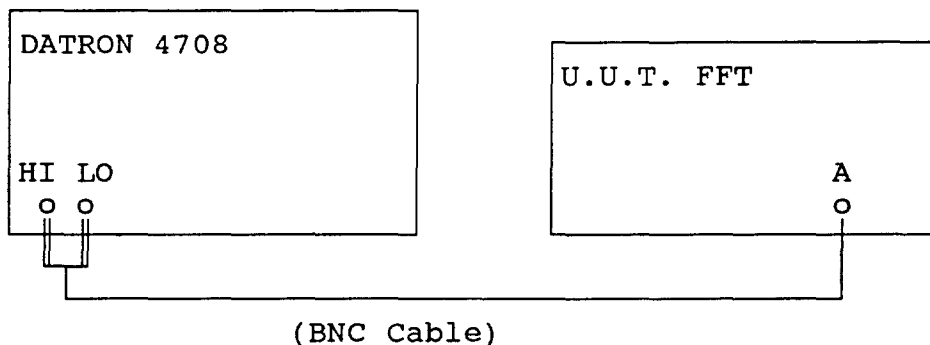
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- 5.3.8 Record the marker reading on the Data Sheet. This is the CMRR for -2 dBV Input Range.
- 5.3.9 Set the HP 3335A Amplitude to 0 dBm. Repeat para. 5.3.6 and 5.3.7 for an FFT Input Range of -8 dBV.
- 5.3.10 Verify all measured CMRR's are within the tolerances stated on the Data Sheet. Disconnect all equipment.

5.4 AMPLITUDE ACCURACY

- 5.4.1 Connect the equipment as shown:



NOTE: If the 4708 is not available, the 5200A may be substituted. Skip to para. 5.4.8 and set the 5200A and FFT to the values indicated on the data sheet (5.4A).

- 5.4.2 Set the controls on the 4708 as follows:

```

RESET
FUNCTION ..... VAC
AMPLITUDE ..... .707 mV
FREQUENCY ..... 1 kHz
OUTPUT ..... OFF

```

- 5.4.3 Preset the FFT by depressing the + key while turning the analyzer on. After the Preset is complete, depress the following on the FFT:

MENU:	MEAS	<HARD KEY>
	Window	<SOFT KEY>
	Flattop	<SOFT KEY>
MENU:	FREQ	<HARD KEY>
ENTRY:	SPAN	<HARD KEY> (depress until 1.56 kHz)
	Center Freq	<SOFT KEY>
	1	
	kHz	<SOFT KEY>

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MENU: **AVERAGE** <HARD KEY>
 Number Averages <SOFT KEY>
 100
 Enter <SOFT KEY>
 Averaging: ON <SOFT KEY>

5.4.4 Set the FFT Input Range by depressing the following:

MENU: **INPUT** <HARD KEY>
 Input Range <SOFT KEY>
 -56 (or as required)
 dbV <SOFT KEY>

5.4.5 Set the 4708 OUTPUT to +ON.

5.4.6 Depress the following on the FFT:

CONTROL: **START** <HARD KEY>

ENTRY: **AUTO SCALE** <HARD KEY>

MARKER: **MAX/MIN** <HARD KEY>

5.4.7 Record the marker reading on the Data Sheet.

5.4.8 Set the Input Range as per para. 5.4.5, and then set the 4708 Amplitude as shown in the following chart. Repeat para. 5.4.6 and 5.4.7 for each setting:

NOTE: If using the 5200A, use the values on the Data Sheet (5.4A).

INPUT RANGE	4708 AMPLITUDE
-46 dBV	2.509 mV
-38 dBV	6.302 mV
-30 dBV	15.830 mV
-14 dBV	99.881 mV
4 dBV	0.7934 V
10 dBV	1.5830 V
22 dBV	6.3021 V
34 dBV	25.0890 V

5.4.9 Verify all measured amplitudes are within the tolerances stated on the Data Sheet for each Input Range.

5.4.10 Do not disconnect the equipment. Set will be used in the next test.

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5.5 AMPLITUDE LINEARITY

5.5.1 With the equipment set up as per para. 5.4.1, set the controls on the 4708 as follows:

AMPLITUDE 6.3021 V
FREQUENCY 1 kHz

5.5.2 Set the FFT Input Range by depressing the following:

MENU: **MEAS** <HARD KEY>
 Window <SOFT KEY>
 Flattop <SOFT KEY>

MENU: **INPUT** <HARD KEY>
 Input Range <SOFT KEY>
 22
 dbv <SOFT KEY>

CONTROL: **START** <HARD KEY>

ENTRY: **AUTO SCALE** <HARD KEY>

MARKER: **MAX/MIN** <HARD KEY>

5.5.3 Record the marker reading on the Data Sheet.

5.5.4 Repeat para. 5.5.2 for the following 4708 amplitudes:

4708 AMPLITUDE
1.1207 V
141.09 mV
22.361 mV
3.544 mV
0.707 mV

5.5.5 Verify all measured amplitudes are within the tolerances stated on the Data Sheet.

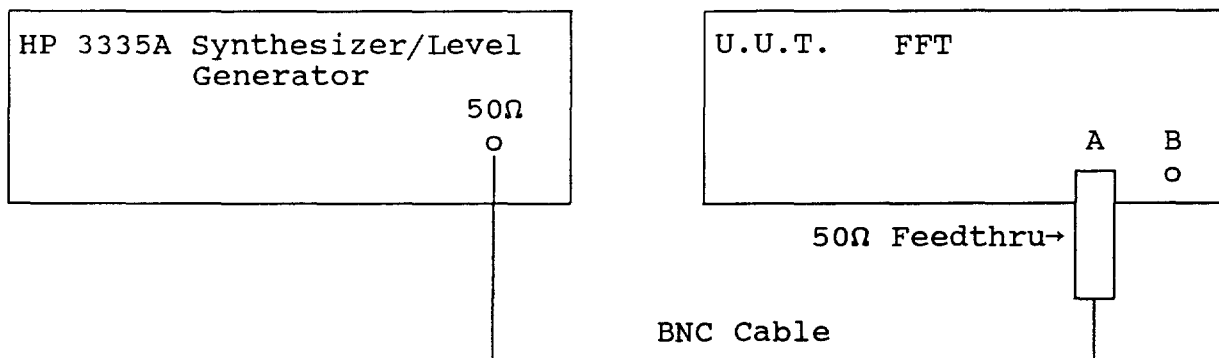
5.5.6 Disconnect all equipment.

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5.6 FLATNESS

5.6.1 Connect the equipment as shown:



5.6.2 Preset the FFT by depressing the + key while turning the analyzer on. After the Preset is complete, depress the following on the FFT:

MENU:	MEAS	<HARD KEY>
	Window	<SOFT KEY>
	Flattop	<SOFT KEY>
MENU:	FREQ	<HARD KEY>
ENTRY:	SPAN	<HARD KEY> (depress until 1.56 kHz)
	Center Freq	<SOFT KEY>
	1	
	kHz	<SOFT KEY>
MENU:	AVERAGE	<HARD KEY>
	Number Averages	<SOFT KEY>
	100	
	Enter	<SOFT KEY>
	Averaging: ON	<SOFT KEY>

5.6.3 Set the FFT Input Range by depressing the following:

MENU:	INPUT	<HARD KEY>
	Input Range	<SOFT KEY>
	14	
	dbV	<SOFT KEY>

5.6.4 Set the controls on the Synthesizer as follows:

POWER	 ON
FREQUENCY	 1 kHz
AMPLITUDE	 +13.0 dBm



- MARKER:** **REF▶** <HARD KEY>

- MARKER: MAX/MIN▶ <HARD KEY>**

- 5.6.9 Set the controls on the Synthesizer as follows:

```

FREQUENCY..... 1 kHz
AMPLITUDE ..... -10.0 dBm

```

- | | | |
|-----------------|-------------------|------------|
| CONTROL: | START | <HARD KEY> |
| ENTRY: | AUTO SCALE | <HARD KEY> |
| MARKER: | MAX/MIN▶ | <HARD KEY> |
| MARKER: | REF▶ | <HARD KEY> |

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- 5.6.11 Repeat para. 5.6.6 and 5.6.7 for the following frequencies:
24kHz, 48 kHz, 76 kHz and 99 kHz.
- 5.6.12 Verify all measured amplitudes are within the tolerances
stated on the Data Sheet for each Input Range.
- 5.6.13 Do not disconnect the equipment. This set up will be used
in the next test.

5.7 ANTI-ALIAS FILTER

- 5.7.1 With the equipment set up as per para. 5.6.1, Preset the FFT
by depressing the + key while turning the analyzer on.
After the Preset is complete, depress the following on the
FFT:

MENU:	MEAS	<HARD KEY>	
	Window	<SOFT KEY>	
	Flattop	<SOFT KEY>	
MENU:	FREQ	<HARD KEY>	
ENTRY:	SPAN	<HARD KEY>	(depress until 1.56 kHz)
	Center Freq	<SOFT KEY>	
	99		
	kHz	<SOFT KEY>	
MENU:	DISPLAY	<HARD KEY>	
	Marker Width Spot	<SOFT KEY>	(toggle to spot)
MENU:	INPUT	<HARD KEY>	
	Input Range	<SOFT KEY>	
	2		
	dbV	<SOFT KEY>	

- 5.7.2 Set the controls on the Synthesizer as follows:

FREQUENCY..... 99 kHz
AMPLITUDE +10.0 dBm

- 5.7.3 Depress the Marker: MAX/MIN key. Adjust the Synthesizer
Amplitude for a Marker Reading of 0.0 dBV $\pm$.2 dBV.
- 5.7.4 Depress the following on the FFT:

MENU:	AVERAGE	<HARD KEY>
	Number Averages	<SOFT KEY>
	100	
	Enter	<SOFT KEY>
	Averaging: ON	<SOFT KEY>

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5.7.4 Set the Synthesizer Frequency to **157 kHz**.

5.7.5 Depress the following on the FFT:

CONTROL: START <HARD KEY>

ENTRY: AUTO SCALE <HARD KEY>

5.7.6 The Marker amplitude at 99 kHz must be ≤ -95 dBV. Record the amplitude on the Data Sheet.

5.7.7 For each Synthesizer Frequency shown below, perform the following steps:

1. Set controls on the FFT as follows:

MENU: FREQ <HARD KEY>
Center Freq <SOFT KEY>
(Enter value in chart)
kHz <SOFT KEY>

2. Set the Synthesizer Frequency as shown in chart.

3. Depress **CONTROL: START** on the FFT. Verify marker is at the Center Frequency as stated in the chart and the amplitude is below -95 dBV.

FFT CENTER FREQ.	SYNTHESIZER FREQ.	ALIAS FREQ.	MAX LEVEL
72 kHz	184 kHz	72 kHz	≤ -95 dBV
50 kHz	206 kHz	50 kHz	
11 kHz	267 kHz	11 kHz	

5.7.8 Do not disconnect the equipment. This set up will be used in the next test.

5.8 FREQUENCY ACCURACY

5.8.1 With the equipment set up as per para. 5.6.1, Preset the FFT by depressing the + key while turning the analyzer on.

5.8.2 Set the controls on the Synthesizer as follows:

FREQUENCY..... 10 kHz
AMPLITUDE +6.0 dBm

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5.8.3 Depress the following on the FFT:

MENU:	MEAS	<HARD KEY>	
	Window	<SOFT KEY>	
	Flattop	<SOFT KEY>	
MENU:	FREQ	<HARD KEY>	
ENTRY:	SPAN▼	<HARD KEY>	(depress until 12.5 kHz)
	Center Freq	<SOFT KEY>	
	10		
	kHz	<SOFT KEY>	
MENU:	INPUT	<HARD KEY>	
	Input Range	<SOFT KEY>	
	-2		
	dbV	<SOFT KEY>	
CONTROL:	START	<HARD KEY>	
ENTRY:	AUTO SCALE	<HARD KEY>	
MARKER:	MAX/MIN▶	<HARD KEY>	

5.8.4 Wait for the spectrum to settle. Record the Marker Frequency on the Data Sheet.

5.8.5 Do not disconnect the equipment. This set up will be used in the next test.

5.9 PHASE ACCURACY

5.9.1 With the equipment set up as per para. 5.6.1, set the controls on the Synthesizer as follows:

FREQUENCY.....	10 kHz
AMPLITUDE	+6.0 dBm

5.9.2 Preset the FFT by depressing the + key while turning the analyzer on.

5.9.3 Set the controls on the FFT as follows:

MENU:	MEAS	<HARD KEY>
	Window	<SOFT KEY>
	Flattop	<SOFT KEY>
MENU:	INPUT	<HARD KEY>
	Trigger Menu	<SOFT KEY>
	Trigger: Internal	<SOFT KEY>
ENTRY:	AUTO SCALE	<HARD KEY>

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```

MENU:      DISPLAY          <HARD KEY>
          Format: UP/DN      <SOFT KEY>
          Marker Width:SPOT<SOFT KEY> (toggle to spot)

```

MARKER: MAX/MIN▶ **<HARD KEY>**

CONTROL: ACTIVE TRACE <HARD KEY>

MENU: **DISPLAY** <HARD KEY>
 Marker Width:SPOT<SOFT KEY> (toggle to spot)

MARKER: MAX/MIN▶ <HARD KEY>

MENU:	MEAS	<HARD KEY>
	Display Menu	<SOFT KEY>
	Phase	<SOFT KEY>

CONTROL: ACTIVE TRACE <HARD KEY>

MARKER: **MODE** <HARD KEY>
 Linked Markers:ON<SOFT KEY>

```

MENU:      AVERAGE      <HARD KEY>
           Number Averages <SOFT KEY>
           100
           Enter          <SOFT KEY>
           Averaging Type <SOFT KEY> (select Vector)
           Averaging: ON  <SOFT KEY>

```

5.9.4 Record the Phase reading of the lower trace. The nominal value is 0° with a tolerance of $\pm 3^\circ$.

5.9.5 Depress the following on the FFT:

```

MENU:      INPUT           <HARD KEY>
            Trigger Menu      <SOFT KEY>
            Trigger Slope:    <SOFT KEY> (Select Falling Edge)

```

CONTROL: START <HARD KEY>

5.9.6 Record the Phase reading of the lower trace. The nominal value is $+180^\circ$ with a tolerance of $\pm 3^\circ$ (where the maximum is -177°).

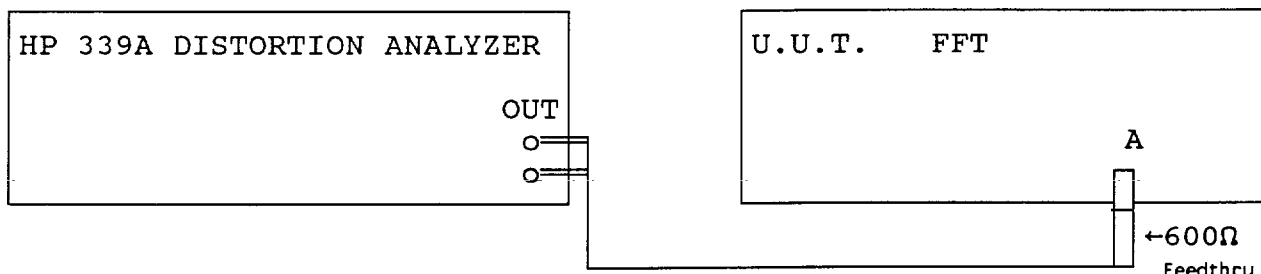
5.9.7 Disconnect all equipment.

5.10 HARMONIC DISTORTION

5.10.1 Preset the FFT by depressing the ← key while turning the analyzer on.

5.10.2 Connect the equipment as shown on the next page:

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5.10.3 Set the controls on the HP 339A as follows:

POWER	ON
FUNCTION	OSC LEVEL
METER RESPONSE	NORM
INPUT RANGE	.1 V
FREQUENCY	24 kHz
OSCILLATOR LEVEL	.1 V
OSC LEVEL VERNIER	Adjust for 0.7 V on meter

5.10.4 Depress the following on the FFT:

MENU:	MEAS	<HARD KEY>
	Window	<SOFT KEY>
	Flattop	<SOFT KEY>
MENU:	INPUT	<HARD KEY>
	Input Range	<SOFT KEY>
	-16	
	dbV	<SOFT KEY>
MENU:	FREQ	<HARD KEY>
ENTRY:	SPAN	<HARD KEY> (depress until 3.125 kHz)
	Center Freq	<SOFT KEY>
	24	
	kHz	<SOFT KEY>
MARKER:	MAX/MIN	<HARD KEY>

5.10.5 Adjust the HP 339A amplitude vernier for a marker amplitude of -20 dBV $\pm$.2 dBV.

5.10.6 Depress the following on the FFT:

MENU:	AVERAGE	<HARD KEY>
	Number Averages	<SOFT KEY>
	100	
	Enter	<SOFT KEY>
	Averaging: ON	<SOFT KEY>
CONTROL:	START	<HARD KEY>

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- 5.10.7 After the average is complete, depress the following on the FFT:

MARKER: **MAX/MIN** ▶ <HARD KEY>
MARKER: **REF** ▶ <HARD KEY>

MENU: **ANALYZE** <HARD KEY>
 Harmonic <SOFT KEY>
 Next Harmonic → <SOFT KEY>

CONTROL: **START** <HARD KEY>

- 5.10.8 After the average is complete, record the delta marker value on the data sheet for the first harmonic.

NOTE: "Harm.= Under Range" may be displayed on the FFT screen. This is displayed when the harmonics are not displayed on a single range and can be ignored.

- 5.10.9 Depress the following on the FFT and record the delta marker value on the data sheet for the second harmonic.

Next Harmonic → <SOFT KEY>
CONTROL: **START** <HARD KEY>

- 5.10.10 Repeat para. 5.10.9 for the third harmonic.

- 5.10.11 All harmonics must be ≤ -90 dB. Disconnect all equipment.

5.11 NOISE

- 5.11.1 Preset the FFT by depressing the + key while turning the analyzer on.

- 5.11.2 Connect a 50 Ω termination to input A.

- 5.11.4 Depress the following on the FFT:

MENU: **MEAS** <HARD KEY>
 Window <SOFT KEY>
 Flattop <SOFT KEY>

MENU: **INPUT** <HARD KEY>
 Input Range <SOFT KEY>
 -60 <SOFT KEY>
 dbV <SOFT KEY>

MENU: **FREQ** <HARD KEY>

ENTRY: **SPAN**▼ <HARD KEY> (depress once for 50kHz)
 Start Freq <SOFT KEY>
 1 <SOFT KEY>
 KHz <SOFT KEY>

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MENU: **MEAS** <HARD KEY>
 Measure Menu <SOFT KEY>
 PSD <SOFT KEY>
 Return <SOFT KEY>
 Units Menu <SOFT KEY>
 dBVrms <SOFT KEY>
 Return <SOFT KEY>
 Window Menu <SOFT KEY>
 Flattop <SOFT KEY>
 Return <SOFT KEY>

MENU: **SCALE** <HARD KEY>
 Top REF <SOFT KEY>
 -150
 dbV/√Hz <SOFT KEY>
 Y/DIV <SOFT KEY>
 5
 dB <SOFT KEY>

MENU: **AVERAGE** <HARD KEY>
 Number Averages <SOFT KEY>
 100
 Enter <SOFT KEY>
 Averaging:ON <SOFT KEY>

CONTROL: **START** <HARD KEY>

5.11.5 After the average is complete, depress the **MAX/MIN** KEY and record the value on the data sheet.

5.11.6 Depress the following on the FFT:

MENU: **FREQ** <HARD KEY>
 Start Freq <SOFT KEY>
 50
 KHz <SOFT KEY>

CONTROL: **START** <HARD KEY>

5.11.7 After the average is complete, depress the **MAX/MIN** KEY and record the value on the data sheet.

5.12 SPURIOUS SIGNALS

5.12.1 With the 50 Ω termination connected to input A, preset the FFT by depressing the + key while turning the analyzer on.

5.12.2 Depress the following of the FFT:

MENU: **MEAS** <HARD KEY>
 Window <SOFT KEY>
 Flattop <SOFT KEY>



5.12.3 After the average is complete, depress the **AUTO SCALE** key and the **MAX/MIN** key. Record the value on the data sheet.

```

MENU:      FREQ                <HARD KEY>
            Start Freq          <SOFT KEY>
            390
            Hz                  <SOFT KEY>

```

5.12.5 Repeat para. 5.12.3.

```

750 (or as required)
Hz <SOFT KEY>
CONTROL: START <HARD KEY>

```

5.12.8 Set the span to 12.5 kHz by depressing the **SPAN▲**.

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START FREQUENCIES	FREQUENCY SPAN
1 KHz	12.5 KHz
10 KHz	12.5 KHz
20 KHz	12.5 KHz
30 KHz	12.5 KHz
40 KHz	12.5 KHz
50 KHz	12.5 KHz
60 KHz	12.5 KHz
70 KHz	12.5 KHz
80 KHz	12.5 KHz
87.5 KHz	12.5 KHz

NOTE: If the spurious signal test fails, repeat the span tested to see if it repeats. If it does, depress the following on the FFT:

MARKER:	CENTER▶	<HARD KEY>
ENTRY:	SPAN▼	<HARD KEY> (depress until 1.25 kHz)
CONTROL:	START	<HARD KEY>

If the spurious signals continues, then it is not noise and the test fails.

5.13 Calibration is complete.

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DATA SHEET

5.1 SELF TEST

TEST	PASS	FAIL
POWER ON		
KEY PAD		
KNOB		
MAIN MEMORY		
VIDEO MEMORY		
DSP TEST		

5.2 DC OFFSET

INPUT RANGE	MARKER READING (dBV)	MAX
-30 dBV		≤ -80 dBV
-60 dBV		≤ -70 dBV

5.3 COMMON MODE REJECTION

INPUT RANGE	MARKER READING (dB)	MAX
+14 dBV		≤ -50 dB
-2 dBV		≤ -80 dB
-8 dBV		≤ -90 dB

5.4 AMPLITUDE ACCURACY using the 4708

INPUT RANGE	4708 AMPLITUDE	MIN dBV	MARKER READING dBV	MAX dBV
-56 dBV	0.707 mV	-60.20		-59.80
-46 dBV	2.509 mV	-49.20		-48.80

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5.4 AMPLITUDE ACCURACY using the 4708

INPUT RANGE	4708 AMPLITUDE	MIN dBV	MARKER READING dBV	MAX dBV
-38 dBV	6.302 mV	-41.20		-40.80
-30 dBV	15.830 mV	-33.20		-32.80
-14 dBV	99.881 mV	-17.20		-16.80
4 dBV	0.7934 V	0.80		1.20
10 dBV	1.5830 V	6.80		7.20
22 dBV	6.3021 V	18.80		19.20
34 dBV	25.089 V	30.80		31.20

5.4A AMPLITUDE ACCURACY using the 5200A

INPUT RANGE	5200A AMPLITUDE	MIN dBV	MARKER READING dBV	MAX dBV
-44 dBV	2.509 mV	-49.20		-48.80
-36 dBV	6.302 mV	-41.20		-40.80
-30 dBV	15.830 mV	-33.20		-32.80
-14 dBV	99.881 mV	-17.20		-16.80
4 dBV	0.7934 V	0.80		1.20
10 dBV	1.5830 V	6.80		7.20
22 dBV	6.3021 V	18.80		19.20
34 dBV	25.089 V	30.80		31.20

METROLOGY PROCEDURES



5.5 AMPLITUDE LINEARITY

4708 AMPLITUDE	MIN dBV	MARKER READING dBV	MAX dBV
6.3021 V	18.80		19.20
1.1207 V	3.80		4.20
141.09 mV	-14.20		-13.80
22.361 mV	-30.25		-29.75
3.544 mV	-46.70		-45.30
0.707 mV	-64.10		-57.20

5.6 FLATNESS

INPUT RANGE	4708 FREQUENCY	MIN dB	MARKER READING dB	MAX dB
14 dBV	24 kHz	-0.15		+0.15
	48 kHz	-0.15		+0.15
	76 kHz	-0.15		+0.15
	99 kHz	-0.15		+0.15
-14 dBV	24 kHz	-0.15		+0.15
	48 kHz	-0.15		+0.15
	76 kHz	-0.15		+0.15
	99 kHz	-0.15		+0.15

METROLOGY PROCEDURES



5.7 ANTI-ALIAS FILTER

FFT CENTER FREQUENCY	SYNTHESIZER FREQUENCY	MARKER READING dBV	MAX LEVEL
99 kHz	157 kHz		≤ -95 dBV
72 kHz	184 kHz		
50 kHz	206 kHz		
11 kHz	267 kHz		

5.8 FREQUENCY ACCURACY

MIN FREQ.	MARKER READING (Hz)	MAX FREQ.
99.99975 kHz		10.00025 kHz

5.9 PHASE ACCURACY

TRIGGER SLOPE	MIN PHASE	MARKER READING	MAX PHASE
RISING	-3.0°		+3.0°
FALLING	+177.0°		-177.0°

5.10 HARMONIC DISTORTION

HP 339A FREQUENCY	HARMONIC	MARKER READING dBV	MAX LEVEL
24 kHz	FIRST (48 kHz)		≤ -90 dBV
	SECOND (72 kHz)		
	THIRD (96 kHz)		

METROLOGY PROCEDURES



5.11 NOISE

START FREQ.	FREQ. SPAN	MARKER READING (dBVrms/√Hz)	MAX
1 kHz	50 kHz		-160 dBVrms/√Hz
50 kHz	50 kHz		-160 dBVrms/√Hz

5.12 SPURIOUS

START FREQ.	FREQ. SPAN	MARKER READING (dBV)	MAX
5 Hz	390 Hz		-135 dBV
390 Hz	390 Hz		-140 dBV
750 Hz	390 Hz		-140 dBV
1 kHz	12.5 kHz		-140 dBV
10 KHz	12.5 kHz		-140 dBV
20 kHz	12.5 kHz		-140 dBV
30 KHz	12.5 kHz		-140 dBV
40 kHz	12.5 kHz		-140 dBV
50 KHz	12.5 kHz		-140 dBV
60 kHz	12.5 kHz		-140 dBV
70 KHz	12.5 kHz		-140 dBV
80 kHz	12.5 kHz		-140 dBV
87.5 KHz	12.5 kHz		-140 dBV

METROLOGY PROCEDURES



CALIBRATION INSTRUCTION

SPECIFICATIONS FOR CALIBRATION STANDARDS			
NOMENCLATURE	VENDOR	MODEL	ACCURACY SPECIFICATIONS
MULTIFUNCTION STANDARD	DATRON	4708	1 year @ 23°C ± 5°C <u>AC VOLTAGE at 1KHz:</u> <u>Ranges: ±(ppmOUT + ppmFS)</u> 10 mV - 100 mV: 60 + 20 + 5μV 1 V - 10 V: 40 + 5 100 V: 50 + 5
SYNTHESIZER/ LEVEL GENERATOR	HP	3335A	Absolute Level Accuracy: ± 0.05 dB Flatness: ±0.7 dB 1 kHz to 25 MHz Frequency Stability: <1x10 ⁻⁷ / year
DISTORTION MEASUREMENT SET	HP	339A	Oscillator Distortion: 10 Hz - 20 kHz: < -93 dB

METROLOGY PROCEDURES



REVISION	DESCRIPTION	DATE	APPROVAL
A	Added the following to every test: MENU:MEAS <HARD KEY> Window <SOFT KEY> Flattop <SOFT KEY> Para. 5.2.7: Changed specs: "Verify the DC Offset is below -80 dBV for the -30 dBV Input Range and -70 dBV for the -60 dBV Input Range." Para. 5.2.12: Added "Averaging Type <SOFT KEY> (select Vector)" Data Sheet DC OFFSET: Changed Spec.	7/2/93	<i>Charles W. Brown</i>