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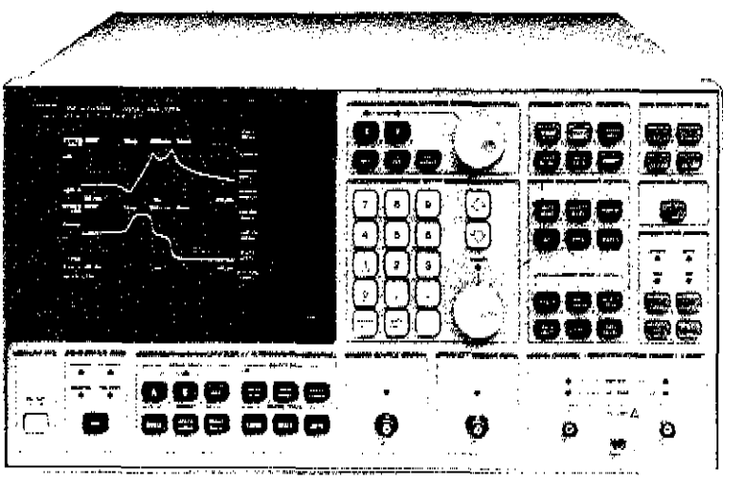
PERFORMANCE TEST MANUAL

3562A
DYNAMIC SIGNAL ANALYZER



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MANUAL CHANGES

Model Number: 3562A
Manual Part Number: 03562-90009

This supplement contains important information for correcting manual errors and for updating the manual to instruments containing improvements made after printing of the manual.

To use this supplement:

Make all ERRATA corrections

ERRATA

Page 1-9, change Output Level to:

Output Level: $\leq \pm 10$ Vpk (ac + dc) into a ≥ 10 kohm, <1000 pF load. Maximum current = 20 mA.

Page 1-9, change Pre-Trigger Delay to:

Pre-Trigger: The measurement can be based on data from 1 to 4095 samples in baseband and from 1 to 4094 samples in zoom prior to trigger conditions being met. Resolution is 1 sample (1/2048 of a time record).

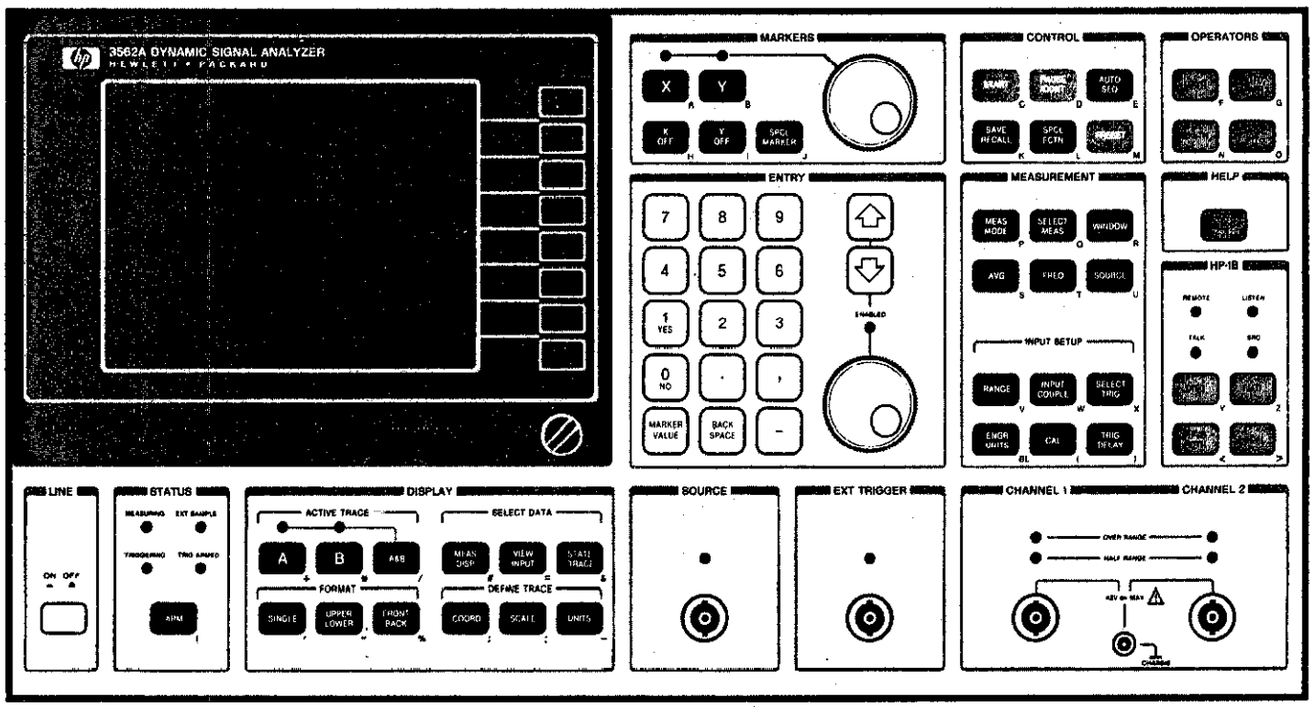
Page 2-6, 2-8, 2-16, 2-22, 2-24, 2-26, 2-33, 2-36, 2-41, 2-49, 2-53, 2-61, 2-64, 2-68, 2-74, 2-76, 2-81, 2-87, 2-92, change:

POWER UNITS	to	P SPEC UNITS

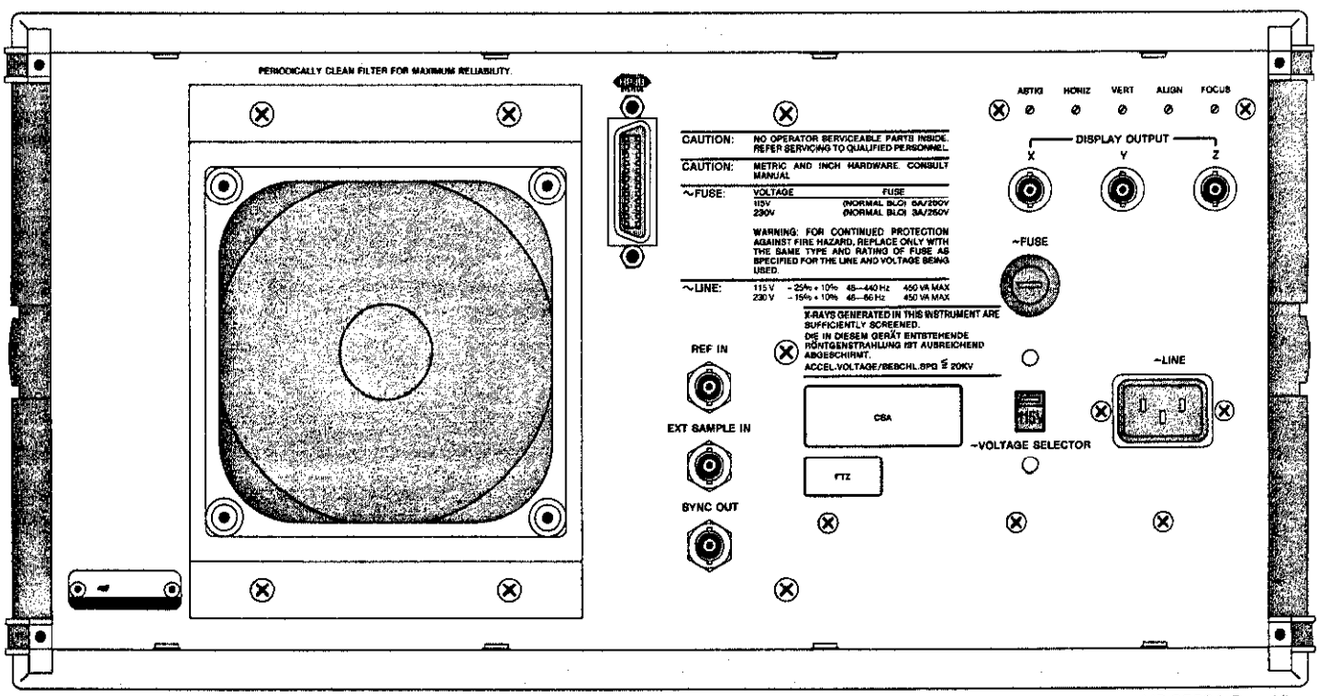
Page 2-11, 2-25, 2-26, 2-43, 2-56, 2-85, 2-86, 2-88. Change Vpk to V.

Page 2-57, change SELECT TRIG to:

SELECT
TRIG . . . .To trigger slope in table
. . . .To trigger type in table



HP 3562A Front View



HP 3562A Rear View

Figure 1-1 HP 3562A Front and Rear Views

1-9 SPECIFICATIONS

The 3562A specifications are listed in table 1-2. These specifications describe the instrument's warranted performance. Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance specifications. Supplemental characteristics are denoted as "typical, "nominal", or "approximately."

Table 1-2 **Specifications**

FREQUENCY

Measurement Range: 64 μHz to 100 kHz, both channels single- or dual channel operation.

Accuracy: ±0.004% of frequency reading

Resolution: Span/800; both channels, single- or dual- channel operation.

Spans:	Baseband	Zoom
# of spans	66	65
Minimum span	10.24 mHz	20.48 mHz
Maximum span	100 kHz	100 kHz
Time record (Sec)	800/Span	800/Span

Window Functions: Hanning, flat top, uniform, force, exponential, and user-defined.

Window Parameters:	Flat Top	Hanning	Uniform
Noise Equiv BW (% of span)	0.478	0.188	0.125
3 dB BW (% of span)	0.45	0.185	0.125
Shape Factor (60 dB BW/ 3 dB BW)	2.6	9.1	716

Typical Real Time Bandwidth:

Single-channel, single display	2.5 kHz
Single-channel, fast averaging	10 kHz
Dual-channel, single display	2 kHz
Dual-channel, fast averaging	5 kHz
Throughput to CS/80 disc	
Single-channel	10 kHz
Dual-channel	5 kHz

AMPLITUDE

Accuracy: Defined as full-scale accuracy at any of the 801 calculated frequency points. Overall accuracy is the sum of absolute accuracy, window flatness and noise level.

Absolute Accuracy:
Single channel (Channel 1 or Channel 2)
±0.15 dB ±0.015% of input range (+27 dBV to −40 dBV, input connections as specified in Cases 1 and 2 in figure 1-3)
±0.25 dB ±0.025% of input range (−41 dBV to −51 dBV, input connections as specified in Cases 1 and 2 in figure 1-3)

Table 1-2 (Cont'd) **Specifications**

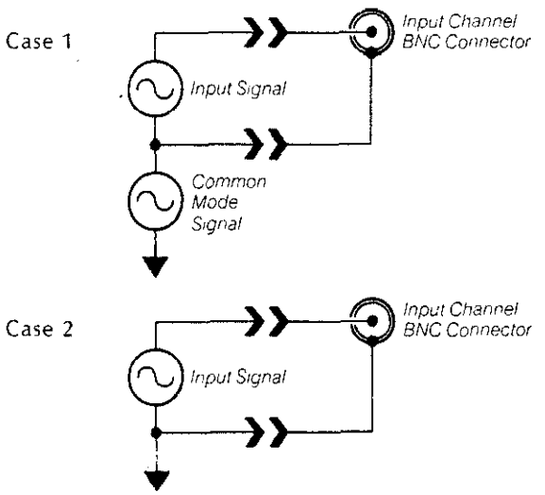
DC Response: Auto-Cal on

Input Range (dBVrms)	DC Level
+27 to −35	>30 dB below full scale
−36 to −51	>20 dB below full scale

Frequency Response Channel Match:
±0.1 dB, ±0.5 degree (input connections as specified in Cases 1 and 2 in figure 1-3)

Input Connections:

Cases 1 and 2 are the recommended input connections.



Cases 3 and 4 are input connections which degrade amplitude accuracy. For these cases, the amplitude accuracy previously specified must be modified with the accuracy adders. (See next paragraph)

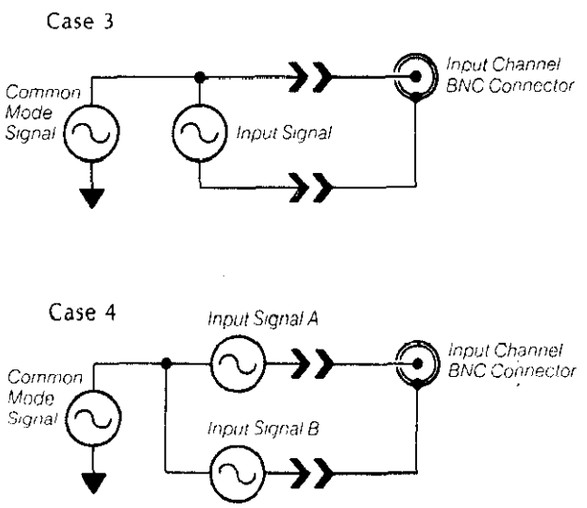


Figure 1-3 Input Connections

Table 1-2 (Cont'd) **Specifications**

Accuracy Adder: Single-channel, inputs connected as shown in Cases 3 and 4 in figure 1-3. Add ±0.35 dB and ±4.0 degrees to the absolute accuracy.

Accuracy Adder: Dual-channel measurements Add ±0.35 dB and ±4.0 degrees once for each input connected as shown in Cases 3 and 4 in figure 1-3.

Window Flatness:

Flat Top:	+0, −0.01 dB
Hanning:	+0, −1.5 dB
Uniform:	+0, −4.0 dB

Noise Floor: Flat top window, 50 Ω source impedance. −51 dBV range.
20 Hz to 1 kHz (1 kHz span) < −126 dBV (< −134 dBV/$\sqrt{\text{Hz}}$)
1 kHz to 100 kHz (100 kHz span) < −116 dBV (< −144 dBV/$\sqrt{\text{Hz}}$)

Dynamic Range: All distortion (intermodulation and harmonic), spurious and alias products ≥80 dB below full scale input range (16 averages <10 kΩ termination).

PHASE

Accuracy: Single Channel, input connections as specified in Cases 1 and 2 in figure 1-3.

< 10 kHz	±2.5 degrees
10 kHz to 100 kHz	±12.0 degrees

INPUTS

Input impedance: 1 MΩ ±5% shunted by <100 pF.

Input Coupling: The inputs may be ac or dc coupled; ac rolloff is <3 dB at 1 Hz.

Crosstalk: < −140 dB (50 Ω source, 50 Ω input termination, input connectors shielded)

Common Mode Rejection:

0 Hz to 66 Hz	80 dB
66 Hz to 500 Hz	65 dB

Common Mode Voltage: dc to 500 Hz

Input Range (dBV rms)	Maximum (ac + dc)
+27 to −12	±42.0 Vpk
−13 to −51	±18.0 Vpk*

* For the −43 to −51 dBV input ranges, common mode signal levels cannot exceed ± 18 Vpk or (Input Range) + (Common Mode Rejection), whichever is the lesser level.

Common Mode Voltage: 500 Hz to 100 kHz. The ac part of the signal is limited to 42 Vpk or (Input Range) + (10 dB), whichever is the lesser level.

Common Mode Distortion: For the levels specified, distortion of common-mode signals will be less than the level of the rejected common mode signal.

External Trigger Input Impedance: typically 50 kΩ ±5%

External Sampling Input: TTL compatible input for signals ≤256 kHz (maximum sample rate).

External Reference Input:
Input Frequencies: 1,2,5 or 10 MHz ±0.01% Amplitude Range: 0 dBm to +20 dBm (50 Ω)

Table 1-2 (Cont'd) **Specifications**

TRIGGER

Trigger Modes: Free run, input channel 1, input channel 2, and external trigger. Free run applies to all measurement modes. Input channel 1, input channel 2 and external trigger apply to the linear resolution mode, time capture mode, and time throughput measurements.

Trigger Conditions:
Free Run: A new measurement is initiated by the completion the previous measurement.

Input: A new measurement is initiated when the input signal to either Channel 1 or Channel 2 meets the specified trigger conditions, Trigger Level range is ±100% of Full Scale Input Range; Trigger Level is user selectable in steps of (Input Range in volts)÷128.

Source: Measurements are synchronized with the periodic signal types (burst random, sine chirp, and burst chirp).

External: A new measurement is initiated by a signal applied to the front panel Ext Trigger input. Trigger level range is ±10 Vpk; trigger level is user selectable in 80 mV steps.

Trigger Delay:
Pre-Trigger: The measurement can be based on data from 1 to 4096 samples (1/2048 to 2 time records) prior to trigger conditions being met. Resolution is 1 sample (1/2048 of a time record).

Post-Trigger: The measurement is initiated from 1 to 65,536 samples (1/2048 to 32 time records) after the trigger conditions are met. Resolution is 1 sample (1/2048 of a time record).

SOURCE

Band limited, band translated random noise, burst random, sine chirp, burst chirp, as well as fixed sine and swept sine signals are available from the front panel source output. DC Offset is also user-selectable.

Output Impedance: 50 Ωs ±5 Ωs.

Output Level: ≤±10 Vpk (ac + dc) into a ≥10 kΩ, <1000 pF load. Maximum current =50 mA.

AC Level: ±5 Vpk (≥10 kΩ, <1000 pF load)

DC Offset: ±10 Vpk in 100 mV steps. Residual offset at 0V offset ≤10 mV.

%In-Band Energy: (1 kHz span, 5 kHz center frequency)
Random Noise: 70%
Sine Chirp: 85%

Accuracy and Purity: Fixed or Swept Sine
Flatness: ±1 dB from 0 to 65 kHz
±1 dB, -1.5 dB from 65 kHz to 100 kHz
Distortion: (including subharmonics)

dc to 10 kHz	—60 dB
10 kHz to 100 kHz	—40 db

GENERAL

Specifications apply when AUTO CAL is enabled, or within 5° C and 2 hours of last internal calibration.

Ambient Temperature: 0 to 55° C.
Relative Humidity: ≤95% at 40° C.
Altitude: ≤4,572m (15,000 ft).

Table 1-2 (Cont'd) **Specifications**

Storage:
Temperature: −40 to +75° C
Altitude: ≤15,240m (50,000 ft)

Power:
115 Vac +10%, −25%, 48 to 440 Hz
230 Vac +10%, −15%, 48 to 66 Hz
450 VA maximum

Weight:
26 kg (56 lbs) net
35 kg (77 lbs) shipping

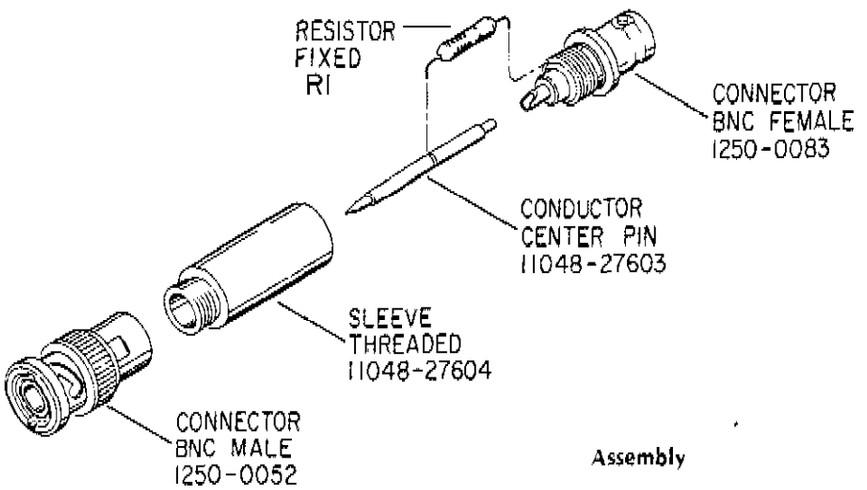
Dimensions:
222 mm (8.75 in) high
426 mm (16.25 in) wide
578 mm (22.75 in) deep

HP-IB:
Implementation of IEEE Std 488-1978
SH1 AH1 T5 TE0 L4 LE0 SR1 RL1 PP0 DC1 DT1 C0
Supports the 91XX and 794X families of HP disc drives as well as Hewlett-Packard Graphics Language (HP-GL) digital plotters.

1-10 RECOMMENDED TEST EQUIPMENT

The equipment required to test the HP 3562A is listed in table 1-3. Other equipment may be substituted for the recommended model if it meets or exceeds the listed critical specifications. When substitutions are made, the user may have to modify the performance procedures to accommodate the different operating characteristics.

Resistance	Tolerance	Power	-hp- Part Number
1 k Ω	1%	0.25 W	0757-0280
100 k Ω	1%	0.25 W	0757-0465



Assembly

1 Cut resistor leads to 12mm on each end

2 Solder one resistor lead to the center conductor of the BNC FEMALE connector

3 Solder the CONDUCTOR CENTER PIN to the other lead of the resistor

4 Screw the SLEEVE and the BNC MALE connector into place. Tighten securely.

Figure 1-4 Constructing a Feedthrough

Table 1-3 Recommended Test Equipment

Instrument	Critical Specifications	Recommended Model	Use *
AC Calibrator	10 Hz to 100 kHz; 1 mV to 10V Amplitude Accuracy: ±.1%	Fluke 5200A Alternative HP 745A	P,O
Frequency Synthesizer (2)	Frequency Range: 1 Hz to 100 kHz Frequency Accuracy: 10 ppm Amplitude Range: 40 Vp-p Amplitude Accuracy: 0.2 dB from 1 Hz to 100 kHz 1 dB from 100 kHz to 1 MHz	HP 3325A Opt 001 Opt 002 Alternative (1) HP 3326A Opt 002	P,O
Digital Voltmeter	5½ digit AC Voltage: 30 Hz to 100 kHz; 0.1 to 500V; ±0.1%; 1 M Ω input impedance dc Voltage: 1V to 1000V; ±0.1%	HP 3456A	P
Low Distortion Oscillator	Frequency Range: 1 Hz to 100 kHz Amplitude Range: 0.1 V to 1 Vrms Distortion: ≤ −80 dB (0.01%)	HP 339A Alternative HP 3326A	P
HP 3562A Service Kit	Digital Extender Brd (HP 03562-66540 Analog Extender Brd (HP 03562-66541) Input/Analog Ext Brd (HP 03562-66542) Common Mode Cable (HP 03562-61620) Input Extender Cable (HP 03562-61621) SMB to BNC adapter cable (HP 03585-61616)	HP 03562-84401	P,O
Feedthrough Terminations (2) (1)	 50 Ω: ±1% at dc 600 Ω: ±1% at dc	 HP 11048C Alternative: HP 10100C HP 11095A	P,O
Cables (2)	BNC to BNC: length ≤30 cm	HP 8120-1838 Alternative: HP 11170A	P,O
Adapters	BNC male to Dual Banana Female BNC (f) to dual banana BNC Tee (m)(f)(f)	Pomona Elect. Model 1296 HP 1251-2277 HP 1250-0781	P,O
Resistors (2) (1)	Value 1 kΩ Accuracy: 1% Power: 0.25W Value: 100 kΩ Accuracy: 1% Power: 0.25W	HP 0757-0280 HP 0757-0465	P

* P = Performance Tests, O = Operational Verification

SECTION II
PERFORMANCE TESTS

Contents

Tables

Figures

SECTION II
PERFORMANCE TESTS

2-1 INTRODUCTION

This section contains the operational verification and the performance tests. The operational verification provides a high level of confidence regarding instrument operation and should be used for incoming and after-repair inspections. The completion of all the performance tests verifies that the HP 3562A conforms to its published specifications. One or more of the performance tests should be done after some repairs. Refer to "Service," Section VIII, for this information.

Note: Tables and figures beginning with "(OV)" are used in the operational verification tests.

2-2 CALIBRATION CYCLE

To verify that the HP 3562A is meeting its published specifications, the performance tests must be done every twelve months.

PART A
OPERATIONAL VERIFICATION

2-3 INTRODUCTION

These tests check selected specifications in their worst case conditions to provide a high level of confidence regarding instrument operation. This brief verification procedure should be used for incoming and after-repair inspections. The operational verification takes approximately two hours to complete.

2-4 HOW TO USE PART A

1. Start each operational verification test by setting the test equipment to the preset conditions listed in the "Initial Equipment Setup," paragraph 2-6.

2. There are two types of keys on the HP 3562A, hard keys and soft keys. In this section the hard keys are in bold text, and the soft keys are in regular text.

   For example:

   FREQ . . . . FREQ SPAN . . . . **10** kHz

   This example instructs you to press the hard key **FREQ** and the soft key FREQ SPAN. After pressing the soft key FREQ SPAN enter 10 kHz.

3. Refer to figure 2-1 for the position of the X and Y marker readings.

4. Record the results of each of the operational verification tests on the "Operation Verification Test Record," paragraph 2-16. This test record may be reproduced without written permission of Hewlett-Packard.

5. If the HP 3562A fails a test, use the "If Test Fails Check:" paragraph at the end of each test.

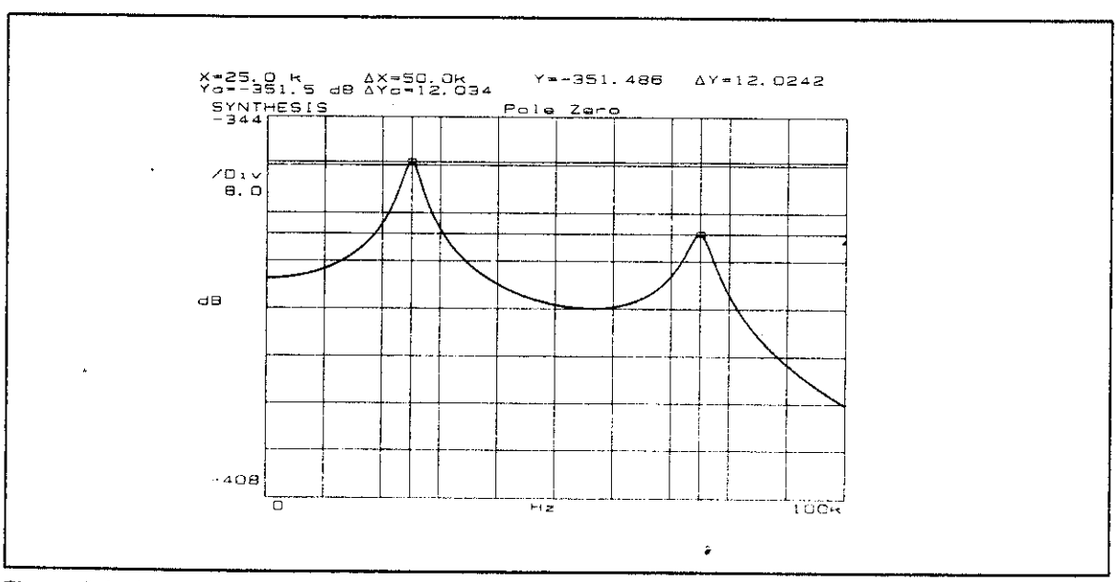


Figure 2-1 (OV) Marker Positions

2-5 REQUIRED TEST EQUIPMENT

The recommended test equipment is listed in table 1-4. If the recommended equipment is not available, a substitute may be used which meets or exceeds the required characteristics given in table 1-4.

2-6 INITIAL EQUIPMENT SETUP

When the recommended test equipment of table 1-4 is used to complete the operational verification, the instruments listed below must be set to the preset conditions listed before beginning the test. In each test, any unspecified parameters should be set to the following conditions:

HP 3325A frequency synthesizer

Function	. . . .	SINE WAVE (~)
Frequency	. . . .	1 kHz
Amplitude	. . . .	1 mVrms
Phase	. . . .	0 Degrees
dc Offset	. . . .	0V
Modulation	. . . .	OFF
Sweep	. . . .	OFF

Fluke 5200 ac calibrator

Frequency	. . . .	1 kHz
Amplitude	. . . .	.01 Vrms
Voltage Error %	. . . .	OFF
Vernier	. . . .	0
Mode	. . . .	OPER
Control	. . . .	LOCAL
Phase Lock	. . . .	OFF
Sense	. . . .	INTERNAL

2-7 SELF TEST

This test determines if the HP 3562A is operating correctly. No tests should be attempted until the instrument passes this test.

Required Test Equipment

None

Procedure

1. Press the HP 3562A keys as follows:

   SPCL FCTN . . . . SELF TEST

2. This test takes about 0.5 minutes to complete.

3. When "SELF TEST PASSES" is displayed in the lower right corner of the display, check PASS on the Operational Verification Test Record.

If Test Fails:

Go to "Fault Isolation Section", Section VII.

2-8 DC OFFSET

This test measures the level of the dc offset generated with auto cal on.

Required Test Equipment

(2) 50Ω feedthrough terminations . . . . HP 11048C

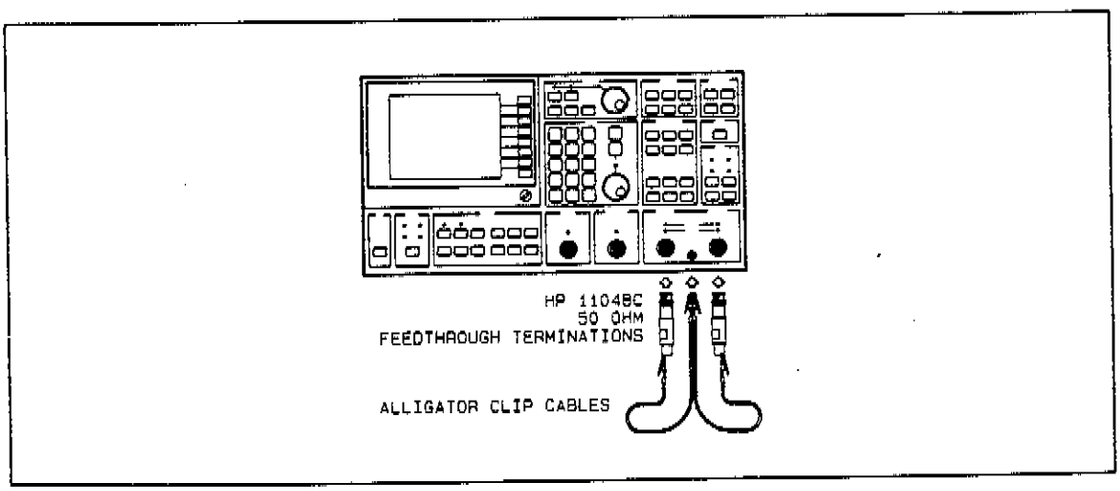


Figure 2-2 (OV) DC Offset Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-3 . Refer to "Initial Equipment Setup," section 2-6, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Amplitude	. . . .	1 Vrms
Frequency	. . . .	1 kHz
Function	. . . .	Sine Wave

AC Calibrator

Phase Lock	. . . .	ON
Sense	. . . .	INTERNAL
Mode	. . . .	OPER
Frequency	. . . .	1 kHz
Amplitude	. . . .	2.7698 Vrms

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
WINDOW	. . . .	FLAT TOP		
AVG	. . . .	4	. . . .	ENTER
	. . . .	STABLE		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

A & B

Table 2-1 (OV) Amplitude Accuracy and Flatness

HP 3562A Range Setting	Signal Frequency	ac Calibrator Amplitude	Specification Lower Limit	Specification Upper Limit
9 dBVrms	1 kHz	2.8184 Vrms	8.849 dBV	9.151 dBV
9 dBVrms	99 kHz	2.8184 Vrms	8.849 dBV	9.151 dBV
0 dBVrms	1 kHz	1.0000 Vrms	−.1513 dBV	.1513 dBV
0 dBVrms	99 kHz	1.0000 Vrms	−.1513 dBV	.1513 dBV
−13 dBVrms	1 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV
−13 dBVrms	99 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV

D. For each of the frequencies listed in table 2-1 perform steps 1 through 7:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	To range setting in table	
FREQ	. . . .	CENTER FREQ . . .	To signal frequency in table

2. Set the ac calibrator to the signal frequency.

3. Set the frequency synthesizer to the signal frequency.

4. Set the ac calibrator's amplitude.

5. Press the HP 3562A keys as follows:

START		
SPCL		
MARKER	. . . .	MRKR — PEAK

6. Record the Ya marker reading on the Operational Verification Test Record for CHAN 1.

7. Record the Yb marker reading on the Operational Verification Test Record for CHAN 2.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment Input Flatness Adjustment Input Attenuator Adjustments Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A30 Analog Source Board

2-10 AMPLITUDE AND PHASE MATCH

This test determines if the HP 3562A's amplitude and phase match between channel 1 and channel 2 are within the specified limits.

Required Test Equipment

BNC Tee HP 1250-0781

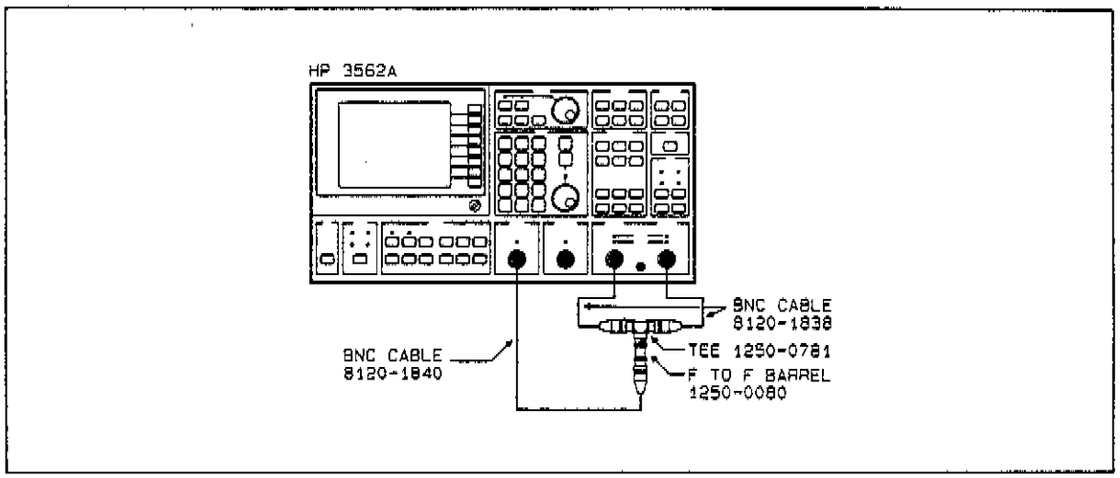


Figure 2-4 (OV) Amplitude and Phase Match Test Setup

Procedure

A. Connect the HP 3562A as shown in figure 2-4. The cables to channel 1 and channel 2 must be the same length.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET
CAL	. . . .	SINGLE CAL
INPUT **COUPLE**	. . . .	CHAN1 AC
	. . . .	CHAN2 AC
	. . . .	GROUND CHAN1
	. . . .	GROUND CHAN2

SELECT				
TRIG	. . . .	**0** Vpk		
	. . . .	SOURCE TRIG		
WINDOW	. . . .	UNIFRM		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
SOURCE	. . . .	PRIODC CHIRP		
MEAS **DISP**	. . . .	FREQ RESP		
SCALE	. . . .	X FIXD SCALE	. . . .	**.375, 100** kHz

C. Perform steps 1 through 6:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	**−47** dBVrms		
SOURCE	. . . .	SOURCE LEVEL	. . . .	**−49** dBVrms
SCALE	. . . .	Y FIXD SCALE	. . . .	**−.2, .2** dB
START				
Y	. . . .	**−.1, .1** dB		

2. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 1.

3. Press the HP 3562A keys as follows:

RANGE	. . . .	**0** dBVrms		
SOURCE	. . . .	SOURCE LEVEL. . .		**0** dBVrms
START				

4. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 2.

5. Press the HP 3562A keys as follows:

RANGE	. . . .	**10** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	**10** dBVrms
START			

6. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 3.

D. Perform steps 1 through 6:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	**−47** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	**−49** dBVrms
COORD	. . . .	PHASE	
START			
SCALE	. . . .	Y FIXD SCALE	**−1, 1** Degree
Y	. . . .	Y VALUE	**−.5, .5** Degree

2. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 4.

3. Press the HP 3562A keys as follows:

RANGE	. . .	**0** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	**0** dBVrms
START			

4. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 5.

5. Press the HP 3562A keys as follows:

RANGE	. . . .	**10** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	**10** dBVrms
START			
Y	. . . .	Y VALUE	**−.5, .5** Degree

6. If the measurement is within the marker band, check PASS on the Operation Verification Test Record for part 6.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment Input Flatness Adjustment Input Attenuator Adjustments Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A30 Analog Source Board

2-11 FREQUENCY ACCURACY

This test measures the frequency accuracy of the HP 3562A.

Required Test Equipment

Frequency Synthesizer	HP 3325A
50Ω feedthrough termination	HP 11048C

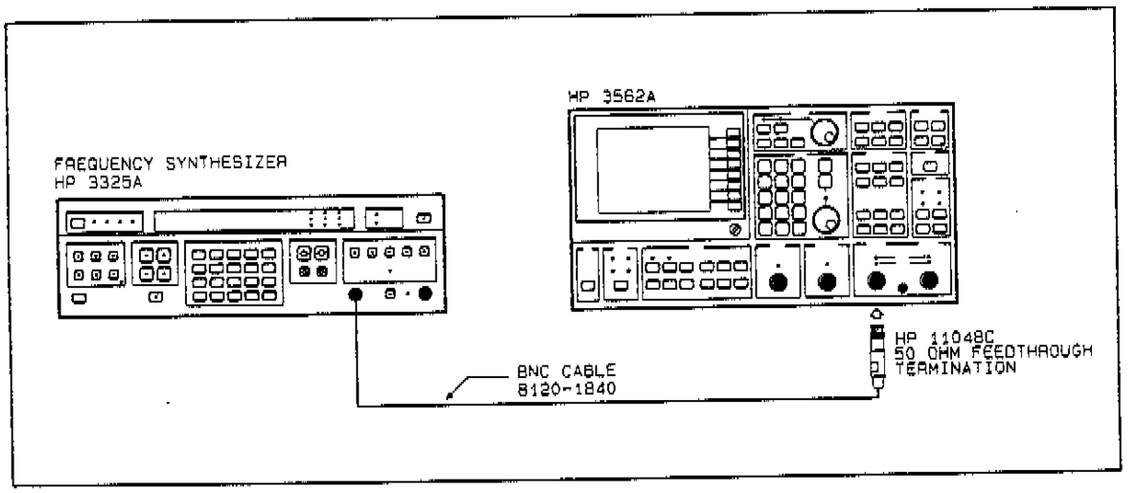


Figure 2-5 (OV) Frequency Accuracy Test Setup

Procedure

A. Connect the test equipment as shown in figure 2-5. Refer to "Initial Equipment Setup," section 2-6, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Frequency	. . . .	99 kHz
Amplitude	. . . .	1 Vrms
Function	. . . .	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	**0** dBVrms		
FREQ	. . . .	CENTER FREQ	. . . .	**99** kHz
AVG	. . . .	**2**	. . . .	ENTER
	. . . .	STABLE		
START				
X				

D. Record the X marker reading as the measured value on the Operational Verification Test Record.

If Test Fails Check:

Adjustments Section III	20.48 MHz Reference Adjustment
Troubleshooting Section VII	A31 Trigger Board

2-12 COMMON MODE REJECTION

This test measures the capability of the 3562A to ignore a signal which appears simultaneously and in phase at the high and low input of a single channel.

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
Common Mode Cable	. . . .	HP 03562-61620

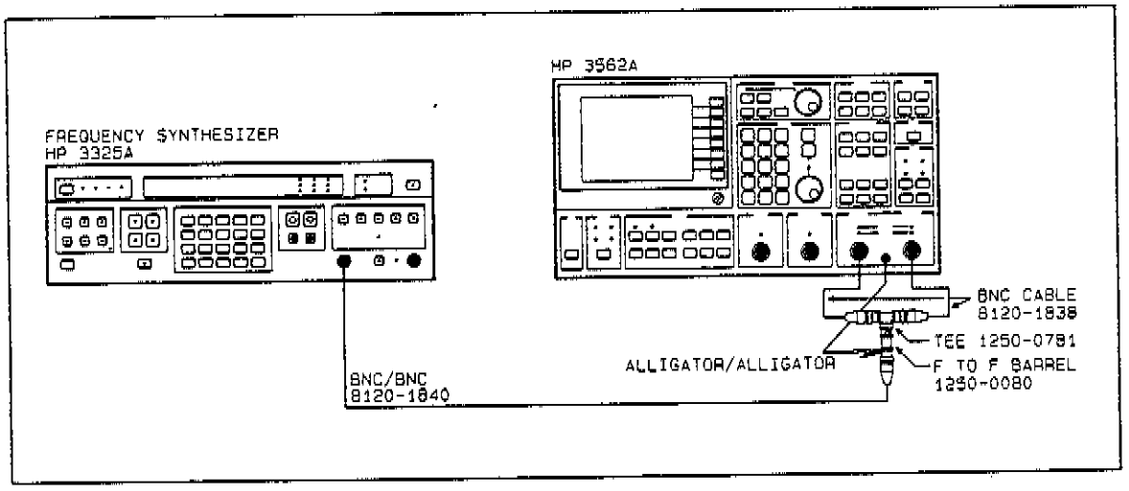


Figure 2-6 (OV) Common Mode Rejection Test Setup #1

Procedure

A. Connect the test instruments as shown in figure 2-6. Refer to "Initial Equipment Setup", paragraph 2-6, for unspecified parameters.

B. Set the frequency synthesizer as follows:

Function	. . . .	Sine Wave
High Voltage Output	. . . .	ON

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
WINDOW	. . . .	FLAT TOP		
A & B				
UNITS	. . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

Table 2-2 (OV) Common Mode Rejection

Signal Amplitude	Signal Frequency	Range Setting #1	Range Setting #2	Specification
5.680 Vrms	66 Hz	16 dBVrms	−8 dBVrms	≤80 dB
3.413 Vrms	500 Hz	11 dBVrms	−12 dBVrms	≤65 dB

D. For each of the frequencies listed in table 2-2 perform steps 1 through 9:

1. Set the Frequency Synthesizer as follows:

Amplitude	. . . .	To signal amplitude in table
Frequency	. . . .	To signal frequency in table

2. Press the HP 3562A keys as follows:

FREQ	CENTER FREQ	To signal frequency in table
RANGE	To range setting #1 in table	
START		
SPCL **MARKER**	MRKR → PEAK	

3. Record the Ya marker amplitude reading on the Operation Verification Test Record as the first measurement for CHAN 1.

4. Record the Yb marker amplitude reading on the Operation Verification Test Record as the first measurement for CHAN 2.

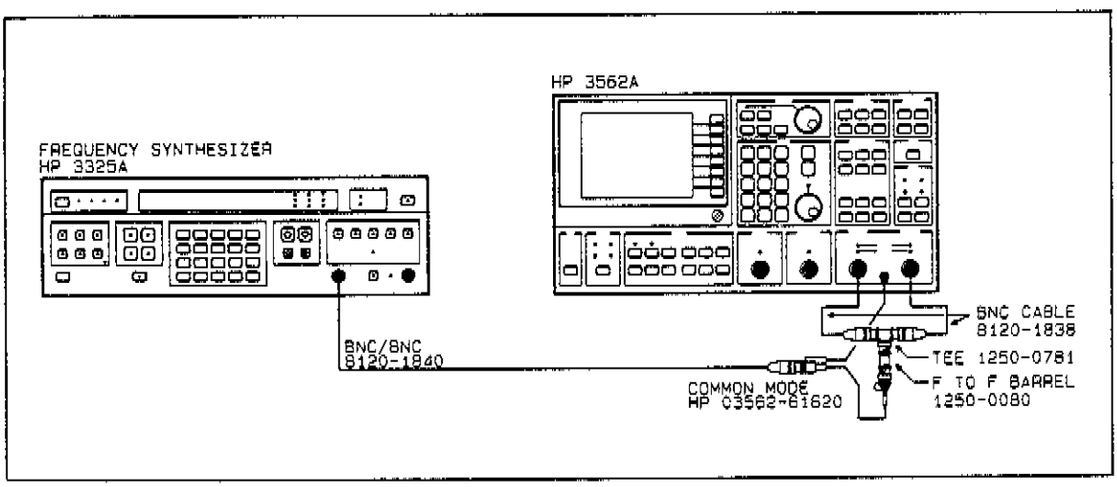


Figure 2-7 (OV) Common Mode Rejection Test Setup #2

5. Connect the test instruments as shown in figure 2-7.

6. Press the HP 3562A keys as follows:

RANGE	. . . .	To range setting #2 in table
START		
SCALE	. . . .	Y AUTO SCALE
X	. . . .	To signal frequency in table

7. When the average is complete, record the Ya amplitude reading on the Operation Verification Test Record as the second measurement for CHAN 1.

8. Record the Yb amplitude reading on the Operation Verification Test Record as the second measurement for CHAN 2.

9. Calculate the relative value for both channels:

First Measurement		Second Measurement		Relative Value
	−		=	

If Test Fails Check:

Adjustments Section III	Input dc Offset Adjustment Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A30 Analog Source

2-13 SINGLE CHANNEL PHASE ACCURACY

This test measures the phase accuracy of the HP 3562A relative to the phase of the trigger signal. The frequency synthesizer is used to input a square wave to one channel and the external trigger input.

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
50Ω feedthrough termination	. . . .	HP 11048C
2 BNC Tees	. . . .	HP 1250-0781

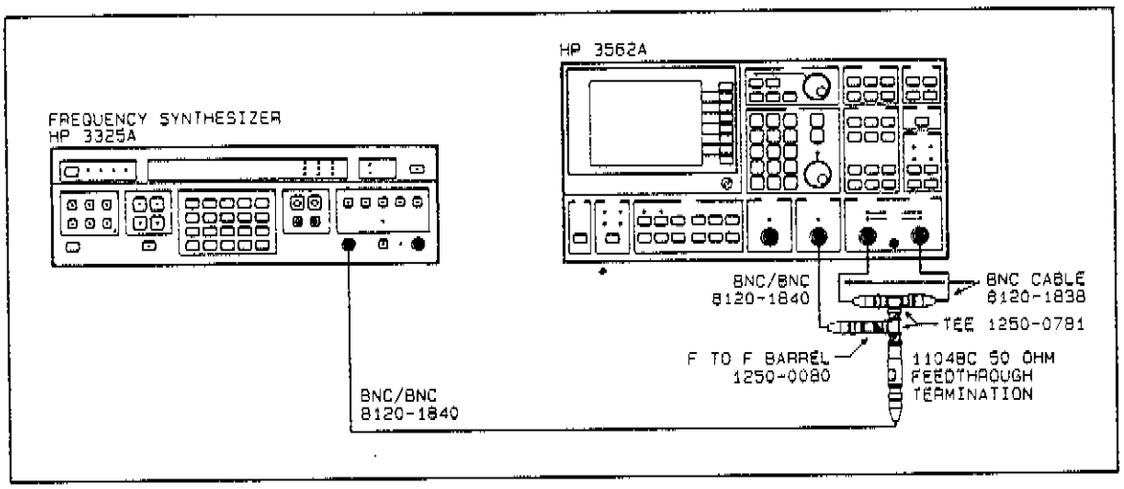


Figure 2-8 (OV) Single Channel Phase Accuracy Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-8. Refer to "Initial Equipment Setup," section 2-6, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Frequency	. . . .	9 kHz
Amplitude	. . . .	1 Vrms
DC Offset	. . . .	0 Vdc
Function	. . . .	Square Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
SELECT MEAS	. . . .	POWER SPEC		
AVG	. . . .	**5**	. . . .	ENTER
	. . . .	STABLE		
	. . . .	TIM AV ON		
WINDOW	. . . .	UNIFRM		
SELECT TRIG	. . . .	**0** Vpk		
	. . . .	EXT		
MEAS DISP	. . . .	FILTRD INPUT	. . . .	AVRG
			. . . .	LINEAR SPEC 1
B			. . . .	LINEAR SPEC 2
A & B				
COORD	. . . .	PHASE		
START				
X	. . . .	**9** kHz		

D. Record the Ya marker reading on the Operational Verification Test Record for CHAN 1.

E. Record the Yb marker reading on the Operational Verification Test Record for CHAN 2.

F. Set the frequency Synthesizer as follows:

Frequency	. . . .	99 kHz

G. Press the HP 3562A keys as follows:

SELECT		
TRIG	. . . .	CHAN1 INPUT
START		
X	. . . .	**99** kHz

H. Record the Ya marker reading on the Operational Verification Test Record for CHAN 1.

I. Record the Yb marker reading on the Operational Verification Test Record for CHAN 2.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A31 Trigger Board A6 Digital Filter Controller A1 Digital Source

2-14 NOISE AND SPURIOUS SIGNAL LEVEL

This test measures the level of the noise floor and any spurious signals generated within the HP 3562A.

Required Test Equipment

(2) 50Ω feedthrough terminations . . . . HP 11048C

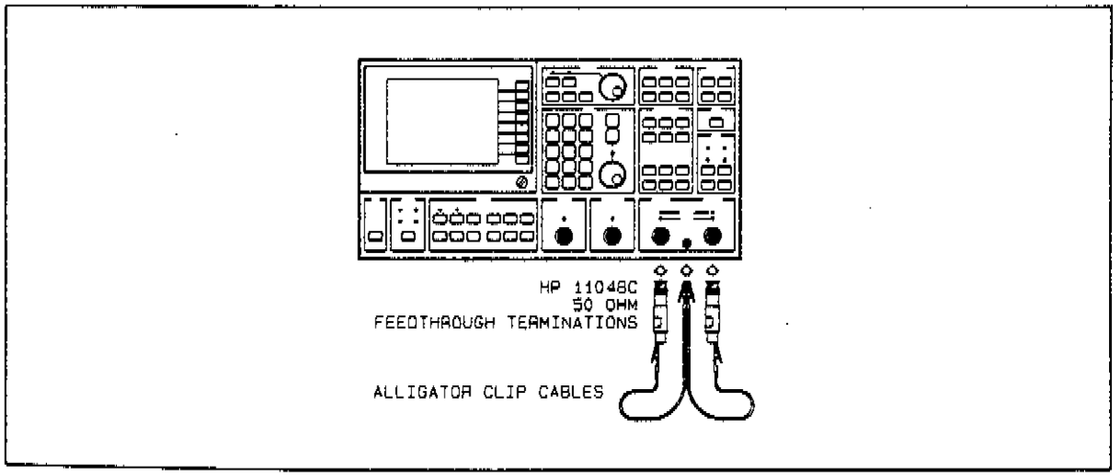


Figure 2-9 (OV) Noise and Spurious Signal Level Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-9. Keep the leads from the feed-through terminations to chassis ground as short as possible.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	−51 dBVrms		
INPUT COUPLE	. . . .	CHAN 1 AC		
	. . . .	CHAN 2 AC		
FREQ	. . . .	FREQ SPAN	. . . .	1 kHz
	. . . .	START FREQ	. . . .	20 Hz
AVG	. . . .	20	. . . .	ENTER
	. . . .	STABLE		
WINDOW	. . . .	UNIFRM		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

C. Perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

START		
SCALE	. . . .	Y AUTO SCALE
SPCL MARKER	. . . .	MRKR → PEAK

2. If the Ya marker reading is less than or equal to −131 dBVrms check PASS on the Operation Verification Test Record for CHAN 1.

3. Press the HP 3562A keys as follows:

B		
SCALE	. . . .	Y AUTO SCALE
SPCL MARKER	. . . .	MRKR → PEAK

4. If the Yb marker reading is less than or equal to −131 dBVrms check PASS on the Operation Verification Test Record for CHAN 2.

5. Press the HP 3562A keys as follows:

FREQ	. . . .	FREQ SPAN	. . . .	**10** kHz

Table 2-3 (OV) Spurious Signals

Start Frequency	Frequency Span	Specification
20 Hz	1 kHz	≤ −131 dBV
1 kHz	10 kHz	≤ −131 dBV
90 kHz	10 kHz	≤ −131 dBV

D. For the rest of the start frequencies in table 2-3 perform steps 1 through 4:

1. Press the HP 3562A keys as follows:

FREQ	. . . .	START FREQ	. . . .	To start frequency in table
A				
START				
SPCL MARKER	. . . .	MRKR → PEAK		

2. If the Ya marker reading is less than or equal to −131 dBVrms check PASS on the Operation Verification Test Record for CHAN 1.

3. Press the HP 3562A keys as follows:

B

SPCL
MARKER . . . . MRKR →
PEAK

4. If the Yb marker reading is less than or equal to −131 dBVrms check PASS on the Operation Verification Test Record for CHAN 2.

Table 2-4 (OV) Noise Level

Start Frequency	Frequency Span	Specification
20 Hz	1 kHz	≤ −134 dBV/$\sqrt{\text{Hz}}$
1 kHz	50 kHz	≤ −144 dBV/$\sqrt{\text{Hz}}$
50 kHz	50 kHz	≤ −144 dBV/$\sqrt{\text{Hz}}$

E. Press the HP 3562A keys as follows:

WINDOW . . . . FLAT TOP

UNITS . . . . POWER UNITS . . . . V/$\sqrt{\text{Hz}}$

F. For each of the start frequencies listed in table 2-4 perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

FREQ . . . . START FREQ . . . . To start frequency in table

. . . . FREQ SPAN . . . . To frequency span in table

START

2. When the average is complete, press the HP 3562A keys as follows:

A

SPCL
MARKER . . . . MRKR →
PEAK

3. If the Ya marker reading is less than or equal to the specification, check PASS on the Operation Verification Test Record for CHAN 1.

4. Press the HP 3562A keys as follows:

B

SPCL		
MARKER	. . . .	MRKR — PEAK

5. If the Yb marker reading is less than or equal to the specification, check PASS on the Operation Verification Test Record for CHAN 2.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter A5 Digital Filter A4 Local Oscillator

2-15 SOURCE AMPLITUDE ACCURACY AND FLATNESS

This test measures the amplitude accuracy and flatness of the HP 3562A source.

Required Test Equipment

None

Procedure

A. Connect the HP 3562A source to channel 1.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET
CAL	. . . .	SINGLE CAL
INPUT COUPLE	. . . .	GROUND CHAN 1
RANGE	. . . .	5 Vpk

MEAS MODE	. . . .	SWEPT SINE	. . . .	LINEAR SWEEP
SOURCE	. . . .	ON		
	. . . .	SOURCE LEVEL	. . . .	**4.47** Vpk
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS
FREQ	. . . .	STOP FREQ	. . . .	**65** kHz
START				

C. When the sweep is complete perform steps 1 and 2:

1. Press the HP 3562A keys as follows:

SCALE	. . . .	Y FIXD SCALE	. . . .	**9,11** dB

2. If the trace is between the 9 dB and the 11 dB limits, check PASS on the Operation Verification Test Record for the 0 to 65 kHz span.

D. Press the HP 3562A keys as follows:

FREQ	. . . .	START FREQ	. . . .	**65** kHz
START				

E. When the sweep is complete perform stage 1 and 2:

1. Press the HP 3562A keys as follows:

SCALE	. . . .	Y FIXD SCALE	. . . .	**8.5, 11** dB

2. If the trace is between the 8.5 dB and the 11 dB limits, check PASS on the Operation Verification Test Record for the 65 kHz to 100 kHz span.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A30 Analog Source Board

PART B
PERFORMANCE TESTS

2-17 INTRODUCTION

To verify the the HP 3562A is meeting its published specifications, the performance tests must be done in the order listed every twelve months. Use the "Operational Verification," part A, for incoming and after-repair inspections. The performance tests take approximately eight hours to complete.

2-18 HOW TO USE PART B

1. Start each performance test by setting the test equipment to the preset conditions listed in the "Initial Equipment Setup," paragraph 2-20.

2. There are two types of keys on the HP 3562A, hard keys and soft keys. In this section the hard keys are in bold text, and the soft keys are in regular test.

   For example:

   FREQ .... FREQ SPAN .... **10** kHz

   This example instructs you to press the hard key FREQ and the soft key FREQ SPAN. After pressing the soft key FREQ SPAN enter 10 kHz.

3. Refer to figure 2-10 for the position of the X and Y marker readings.

4. Record the results of each of the performance tests on the "Performance Test Record," paragraph 2-42. This test record may be reproduced without written permission of Hewlett-Packard.

5. If the HP 3562A fails a test, use the "If Test Fails Check:" paragraph at the end of each test.

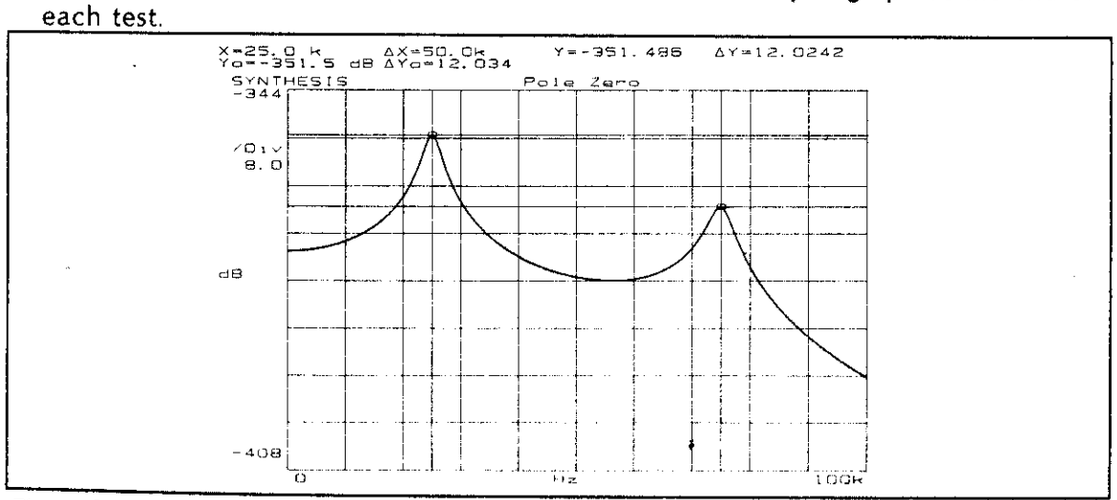


Figure 2-10 Marker Positions

2-19 REQUIRED TEST EQUIPMENT

The recommended test equipment is listed in table 1-4. If the recommended equipment is not available, a substitute may be used which meets or exceeds the required characteristics given in table 1-4.

2-20 INITIAL EQUIPMENT SETUP

When the recommended test equipment of table 1-4 is used to complete the performance tests, the instruments listed below must be set to the preset conditions listed before beginning the test. In each test, any unspecified parameters should be set to the following conditions:

HP 3325A Frequency Synthesizer

Function	SINE WAVE (~)
Frequency	1 kHz
Amplitude	1 mVrms
Phase	0 Degrees
dc Offset	0V
Modulation	OFF
Sweep	OFF

Fluke 5200 AC Calibrator

Frequency	1 kHz
Amplitude	.01 Vrms
Voltage Error %	OFF
Vernier	0
Mode	OPER
Control	LOCAL
Phase Lock	OFF
Sense	INTERNAL

HP 3456A Digital Voltmeter

Function	ac V (~V)
Range	AUTO
Trigger	INTERNAL
Sample Rate	MAXIMUM
High Resolution. . .	ON
Auto Cal	ON

2-21 SELF TEST

This test determines if the HP 3562A is operating correctly. No tests should be attempted until the instrument passes this test.

Required Test Equipment

None

Procedure

1. Press the HP 3562A keys as follows:

   SPCL FCTN . . . . SELF TEST

2. This test takes about 0.5 minutes to complete.

3. When "SELF TEST PASSES" is displayed in the lower right corner of the display, check PASS on the Performance Test Record.

If Test Fails:

Go to "Fault Isolation," Section VII.

2-22 DC OFFSET

This test measures the level of the dc offset generated within the HP 3562A with auto on.

Specification

For range settings between +27 dBV and −35 dBV the DC offset will be greater than 30 dB below the range setting. For range settings between −36 dBV and −51 dBV the offset will be greater than 20 dB below the range setting.

Required Test Equipment

(2) 50Ω feedthrough terminations . . . . . HP 11048C

Table 2-5 DC Offset

Range Setting	Specification
7 dBVrms	< −23 dBV
−35 dBVrms	< −65 dBV
−51 dBVrms	< −71 dBV

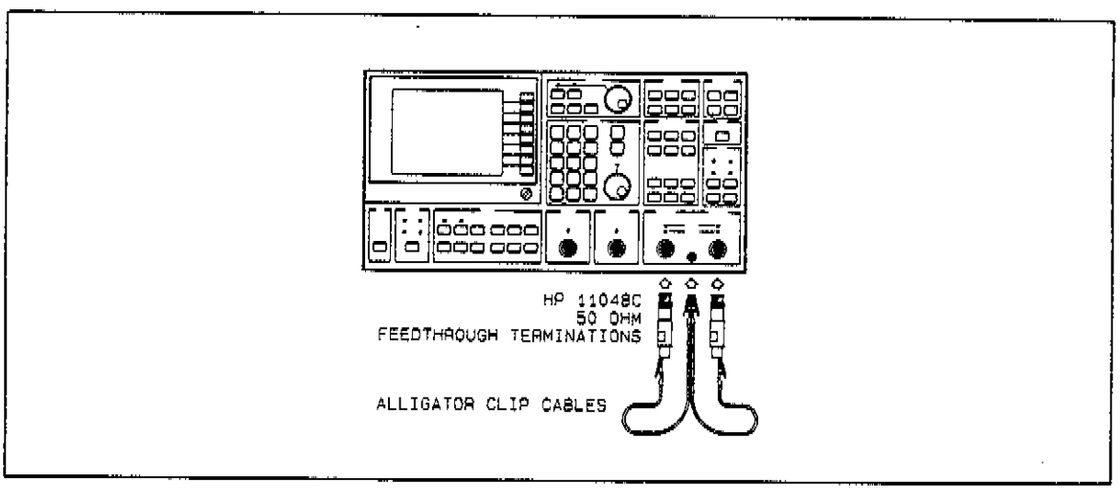


Figure 2-11 DC Offset Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-11. Keep the leads to chassis ground as short as possible.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	AUTO ON		
	. . . .	SINGLE CAL		
WINDOW	. . . .	UNIFRM		
AVG	. . . .	**2**	. . . .	ENTER
	. . . .	STABLE		
FREQ	. . . .	**1** kHz		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
A & B				
X	. . . .	**0** Hz		

C. For each of the range settings listed in table 2-5, perform steps 1 through 3:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	To range setting in table
START		

2. Record the Ya marker reading on the performance test record for the CHAN 1 measured value.

3. Record the Yb marker reading on the performance test record for the CHAN 2 measured value.

If Test Fails Check:

Adjustments Section III	Track and Hold Offset Adjustment Input DC Offset Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards

2-23 AMPLITUDE ACCURACY and FLATNESS

This test measures the amplitude accuracy and flatness of the HP 3562A using the amplitude reference of the ac calibrator.

Specification

If the measurement of a signal is between the BNC center conductor and BNC shell and the amplitude is equal to the range setting, the marker amplitude reading will not deviate from the actual signal amplitude by more than:

Range Setting	Accuracy
+27 dBV to −40 dBV	±0.15 dB ±0.015% Range Setting
−41 dBV to −51 dBV	±0.25 dB ±0.025% Range Setting

If the measurement of a signal includes a signal between the BNC shell and the chassis, the marker amplitude reading will not deviate from the actual signal amplitude by more than:

Range Setting	Accuracy
+27 dBV to −40 dBV	±0.50 dB ±.015% Range Setting
−41 dBV to −51 dBV	±0.60 dB ±.025% Range Setting

Required Test Equipment

Frequency Synthesizer	HP 3325A
AC Calibrator	Fluke 5200A
BNC Tee	HP 1250-0781

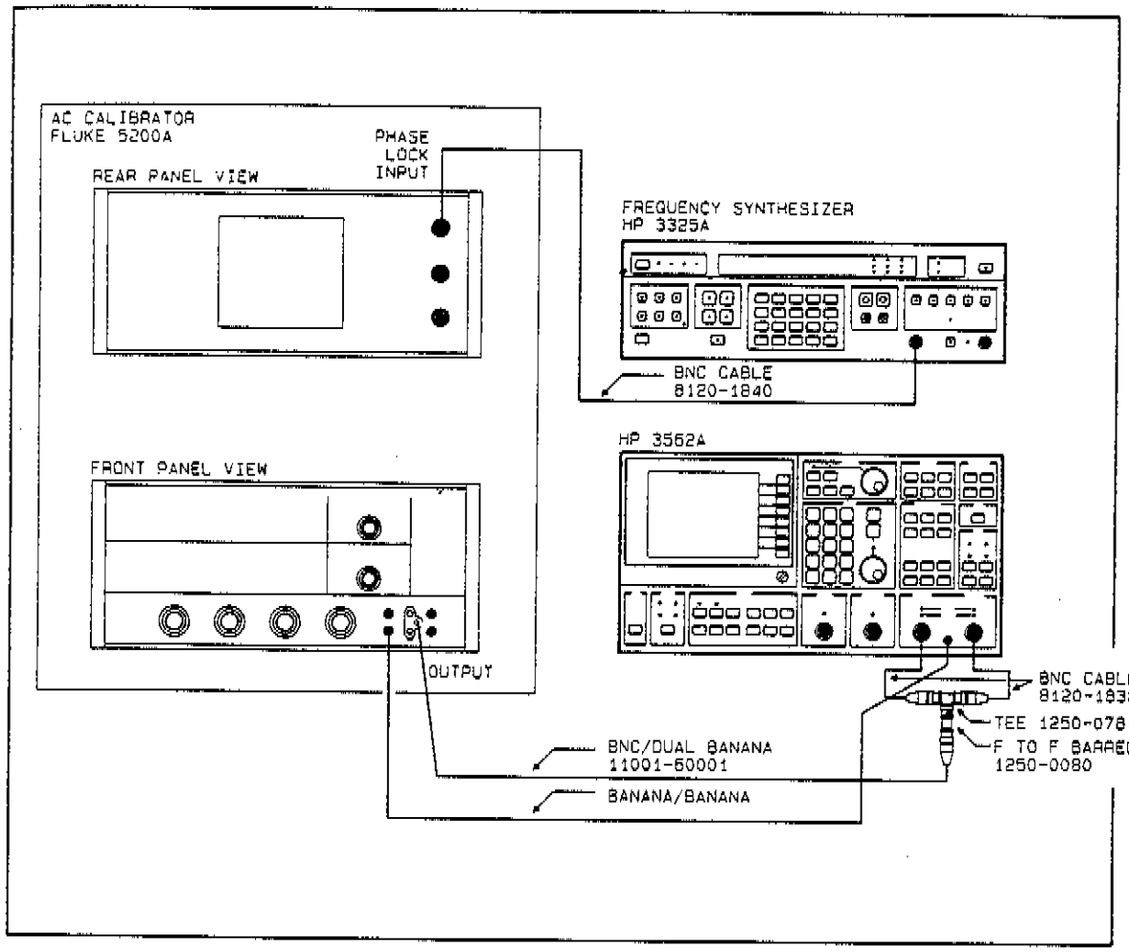


Figure 2-12 Amplitude Accuracy and Flatness Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-12. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Amplitude	. . . .	0.5 Vrms
Frequency	. . . .	1 kHz
Function	. . . .	Sine Wave

AC Calibrator

Phase Lock	. . . .	ON
Sense	. . . .	INTERNAL
Mode	. . . .	OPER
Frequency	. . . .	1 kHz
Amplitude	. . . .	2.8184 Vrms

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
INPUT COUPLE	. . . .	GROUND CHAN 1		
	. . . .	GROUND CHAN 2		
WINDOW	. . . .	FLAT TOP		
AVG	. . . .	4	. . . .	ENTER
	. . . .	STABLE		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

A & B

Table 2-6 Amplitude Accuracy and Flatness Measurement One

BNC shell grounded				
HP 3562A Range Setting	Signal Frequency	AC Calibrator Amplitude	Specification Lower Limit	Specification Upper Limit
9 dBVrms	1 kHz	2.8184 Vrms	8.849 dBV	9.151 dBV
9 dBVrms	99 kHz	2.8184 Vrms	8.849 dBV	9.151 dBV
−13 dBVrms	1 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV
−13 dBVrms	50 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV
−13 dBVrms	90 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV
−13 dBVrms	99 kHz	.22387 Vrms	−13.15 dBV	−12.85 dBV
−23 dBVrms	1 kHz	70.795 mVrms	−23.15 dBV	−22.85 dBV
−23 dBVrms	99 kHz	70.795 mVrms	−23.15 dBV	−22.85 dBV
−26 dBVrms	1 kHz	50.119 mVrms	−26.15 dBV	−25.85 dBV
−21 dBVrms	1 kHz	89.125 mVrms	−21.15 dBV	−20.85 dBV
−17 dBVrms	1 kHz	.14125 Vrms	−17.15 dBV	−16.85 dBV
−14 dBVrms	1 kHz	.19953 Vrms	−14.15 dBV	−13.85 dBV
−11 dBVrms	1 kHz	.28184 Vrms	−11.15 dBV	−10.85 dBV

D. For each of the frequencies listed in table 2-6 perform steps 1 through 7.

1. Press the HP 3562A keys as follows:

   RANGE . . . . To range setting in table

   FREQ . . . . CENTER FREQ . . . . To signal frequency in table

2. Set the ac calibrator to the signal frequency.

3. Set the frequency synthesizer to the signal frequency.

4. Set the ac calibrator's amplitude.

5. Press the HP 3562A keys as follows:

   START

   SPCL
   MARKER . . . . MRKR → PEAK

6. Record the Ya marker reading on the Performance Test Record for the measured value CHAN 1.

7. Record the Yb marker reading on the Performance Test Record for the measured value CHAN 2.

Table 2-7 Amplitude Accuracy and Flatness Measurement Two

BNC shell grounded				
HP 3562A Range Setting	Signal Frequency	AC Calibrator Amplitude	Specification Lower Limit	Specification Upper Limit
−51 dBVrms	1 kHz	2.8184 mVrms	−51.25 dBV	−50.75 dBV
−49 dBVrms	1 kHz	3.5481 mVrms	−49.25 dBV	−48.75 dBV
−47 dBVrms	1 kHz	4.4668 mVrms	−47.25 dBV	−46.75 dBV
−45 dBVrms	1 kHz	5.6234 mVrms	−45.25 dBV	−44.75 dBV
−43 dBVrms	1 kHz	7.0795 mVrms	−43.25 dBV	−42.75 dBV
−41 dBVrms	1 kHz	8.9125 mVrms	−41.25 dBV	−40.75 dBV
−39 dBVrms	1 kHz	11.220 mVrms	−39.25 dBV	−38.75 dBV

E. Repeat part D using table 2-7 for measurement two.

F. Press the HP 3562A keys as follows:

INPUT
COUPLE . . . . FLOAT
CHAN 1

. . . . FLOAT
CHAN 2

G. Reverse the banana plug connector at the ac calibrator so the high input signal goes to the BNC shell of HP 3562A's input channels. The BNC center conductor should be grounded for each channel.

Table 2-8 Amplitude Accuracy and Flatness Measurement Three

BNC center conductor grounded				
HP 3562A Range Setting	Signal Frequency	AC Calibrator Amplitude	Specification Lower Limit	Specification Upper Limit
8 dBVrms	1 kHz	2.4570 Vrms	7.499 dBV	8.501 dBV
8 dBVrms	99 kHz	2.4570 Vrms	7.499 dBV	8.501 dBV
−11 dBVrms	1 kHz	.27701 Vrms	−11.50 dBV	−10.50 dBV
−13 dBVrms	1 kHz	.21404 Vrms	−13.50 dBV	−12.50 dBV
−13 dBVrms	50 kHz	.21404 Vrms	−13.50 dBV	−12.50 dBV
−13 dBVrms	90 kHz	.21404 Vrms	−13.50 dBV	−12.50 dBV
−13 dBVrms	99 kHz	.21404 Vrms	−13.50 dBV	−12.50 dBV
−27 dBVrms	1 kHz	43.702 mVrms	−27.50 dBV	−26.50 dBV
−27 dBVrms	99 kHz	43.702 mVrms	−27.50 dBV	−26.50 dBV

H. Repeat part D using table 2-8 for measurement three.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment AC Offset and Reference Adjustment Input Flatness Adjustment Input Attenuator Adjustments Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A30 Analog Source Board

2-24 AMPLITUDE LINEARITY

This test measures the amplitude linearity of the HP 3562A by using the amplitude reference of the ac calibrator.

Specification

If the measurement of a signal is between the BNC center conductor and BNC shell and the amplitude is equal to the range setting, the marker amplitude reading will not deviate from the actual signal amplitude by more than:

Range Setting	Accuracy
+27 dBV to −40 dBV	±0.15 dB ±0.015% Range Setting
−41 dBV to −51 dBV	±0.25 dB ±0.025% Range Setting

If the measurement of a signal includes a signal between the BNC shell and the chassis, the marker amplitude reading will not deviate from the actual signal amplitude by more than:

Range Setting	Accuracy
+27 dBV to −40 dBV	±0.50 dB ±.015% Range Setting
−41 dBV to −51 dBV	±0.60 dB ±.025% Range Setting

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
AC Calibrator	. . . .	Fluke 5200A
BNC	. . . .	HP 1250-0781

Procedure

A. Connect the test instruments as shown in figure 2-13. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Frequency	. . . .	10 kHz
Amplitude	. . . .	1 Vrms

AC Calibrator

Frequency	. . . .	10 kHz
Amplitude	. . . .	10 Vrms
Phase Lock	. . . .	ON
Sense	. . . .	INTERNAL
Mode	. . . .	OPER

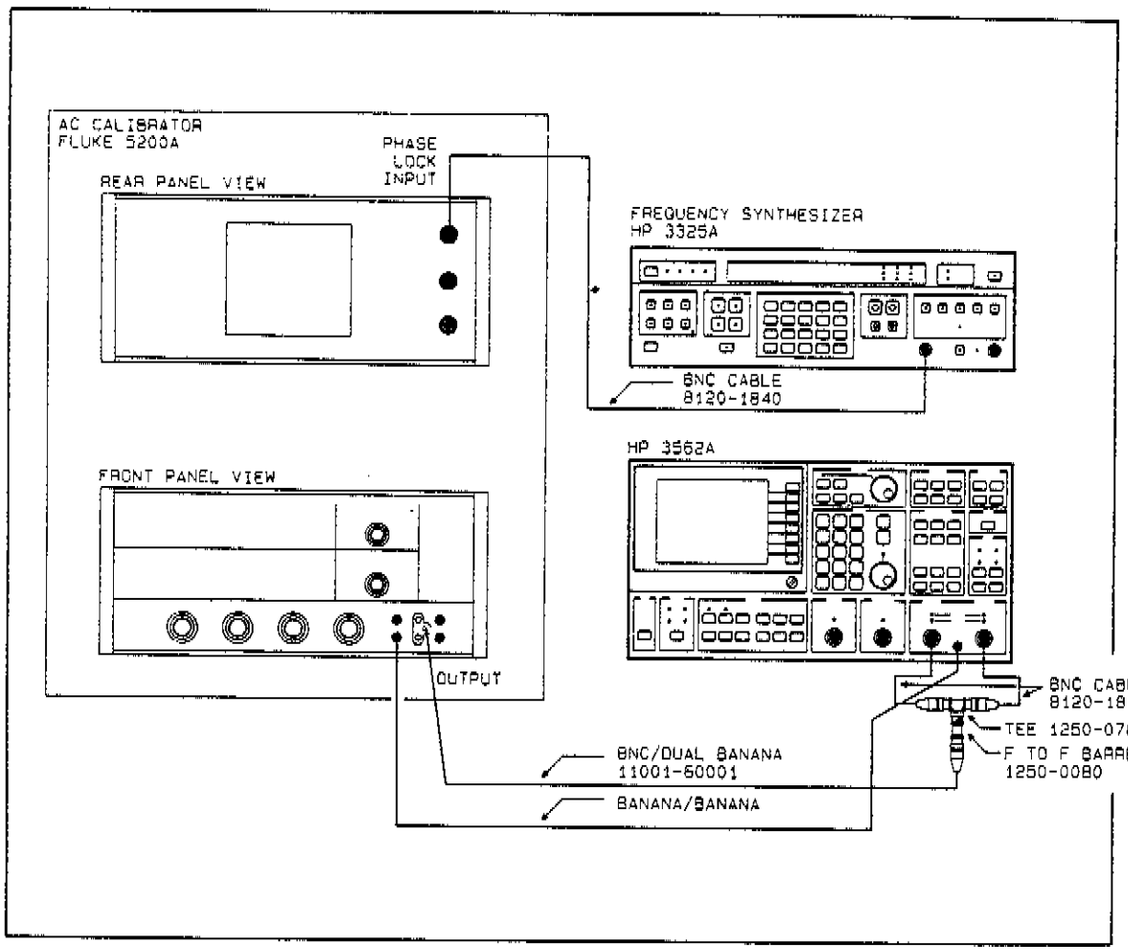


Figure 2-13 Amplitude Linearity Test Setup

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
WINDOW	. . . .	FLAT TOP		
AVG	. . . .	**4**	. . . .	ENTER
	. . . .	STABLE		
RANGE	. . . .	**21** dBVrms		
FREQ	. . . .	**10** kHz		
	. . . .	CENTER FREQ	. . . .	**10** kHz

INPUT
COUPLE . . . . GROUND
CHAN 1

. . . . GROUND
CHAN 2

UNITS . . . . POWER . . . . VOLTS
UNITS RMS

. . . . VOLTS

A & B

COORD . . . . MAG
(LIN)

Table 2-9 Amplitude Linearity

AC Calibrator Amplitude	Specification BNC shell grounded		Specification BNC center conductor grounded	
	Upper Limit	Lower Limit	Upper Limit	Lower Limit
10.00 Vrms	10.18 Vrms	9.827 Vrms	10.59 Vrms	9.439 Vrms
1.000 Vrms	1.019 Vrms	981.4 mVrms	1.061 Vrms	942.6 mVrms
100.0 mVrms	103.2 mVrms	96.79 mVrms	107.4 mVrms	92.91 mVrms
10.00 mVrms	11.67 mVrms	8.329 mVrms	12.09 mVrms	7.941 mVrms
3.1623 mVrms	4.717 mVrms	1.608 mVrms	4.850 mVrms	1.485 mVrms
1.000 mVrms	2.517 mVrms	−517.1 uVrms	2.559 mVrms	−555.9 uVrms

D. For each of the amplitudes listed in table 2-9 perform steps 1 through 4.

1. Set the ac calibrator's amplitude.

2. Press the HP 3562A keys as follows:

   START

   SPCL
   MARKER . . . . MRKR →
   PEAK

3. Record the Ya marker reading on the Performance Test Record for the measured value CHAN 1.

4. Record the Yb marker reading on the Performance Test Record for the measured value CHAN 2.

E. Press the HP 3562A keys as follows:

INPUT		
COUPLE	. . . .	FLOAT
		CHAN 1
	. . . .	FLOAT
		CHAN 2

F. Reverse the banana plug connector at the ac calibrator so the high input signal goes to the BNC shell of HP 3562A's input channels. The BNC center conductor should be grounded for each channel.

G. Repeat part D for BNC center conductor grounded.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment
	ADC Offset and Reference Adjustment
	Input Flatness Adjustment
	Input Attenuator Adjustments
	Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards
	A32, A34 Analog Digital Converter Boards
	A30 Analog Source Board

2-25 AMPLITUDE AND PHASE MATCH

This test determines if the HP 3562A's amplitude and phase match between channel 1 and channel 2 are within the specified limits.

Specification

BNC shell of both channels grounded:

The amplitude deviation between channels will be no more than ±0.1dB, and the phase deviation no more than ±0.5 degrees.

BNC center conductor of both channels grounded:

The amplitude deviation between channels will be no more than ±0.8dB, and the phase deviation no more than ±8.5 degrees.

Required Test Equipment

BNC TEE	. . . .	HP 1250-0781

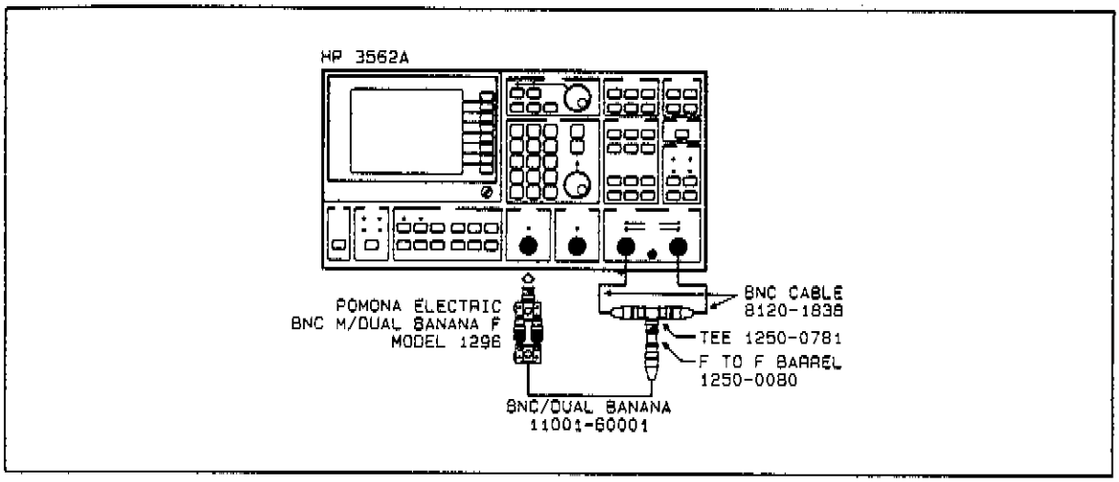


Figure 2-14 Amplitude and Phase Match Test Setup

Procedure

A. Connect the HP 3562A as shown in figure 2-14. The cables to channel 1 and channel 2 must be the same length.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET
CAL	. . . .	SINGLE CAL
INPUT **COUPLE**	. . . .	CHAN1 AC
	. . . .	CHAN2 AC
	. . . .	GROUND CHAN1
	. . . .	GROUND CHAN2
SELECT **TRIG**	. . . .	**0** Vpk
	. . . .	SOURCE TRIG

WINDOW	. . . .	UNIFRM		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
SOURCE	. . . .	PRIODC CHIRP		
MEAS **DISP**	. . . .	FREQ RESP		
SCALE	. . . .	X FIXD SCALE	. . . .	**.375, 100** kHz

C. Perform steps 1 through 6:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	**−47** dBVrms		
SOURCE	. . . .	SOURCE LEVEL	. . . .	**−49** dBVrms
SCALE	. . . .	Y FIXD SCALE	. . . .	**−.2, .2** dB
START				
Y	. . . .	**−.1, .1** dB		

2. If the measurement is within the marker band, check PASS on the Performance Test Record for part 1.

3. Press the HP 3562A keys as follows:

RANGE	. . . .	**0** dBVrms		
SOURCE	. . . .	SOURCE LEVEL	. . . .	**0** dBVrms
START				

4. If the measurement is within the marker band, check PASS on the Performance Test Record for part 2.

5. Press the HP 3562A keys as follows:

RANGE . . . . **10** dBVrms

SOURCE . . . . SOURCE LEVEL . . . . **10** dBVrms

START

6. If the measurement is within the marker band, check PASS on the Performance Test Record for part 3.

D. Perform steps 1 through 6:

1. Press the HP 3562A keys as follows:

RANGE . . . **−47** dBVrms

SOURCE . . . . SOURCE LEVEL . . . . **−49** dBVrms

COORD . . . . PHASE

START

SCALE . . . . Y FIXD
SCALE . . . . **−1, 1** Degree

Y . . . . Y VALUE . . . . **−.5, .5** Degree

2. If the measurement is within the marker band, check PASS on the Performance Test Record for part 4.

3. Press the HP 3562A keys as follows:

RANGE . . . . **0** dBVrms

SOURCE . . . . SOURCE LEVEL . . . . **0** dBVrms

START

4. If the measurement is within the marker band, check PASS on the Performance Test Record for part 5.

5. Press the HP 3562A keys as follows:

RANGE . . . . **10** dBVrms

SOURCE . . . . SOURCE LEVEL . . . . **10** dBVrms

START

Y . . . . Y VALUE . . . . **−.5, .5** Degree

6. If the measurement is within the marker band, check PASS on the Performance Test Record for part 6.

E. Reverse one of the banana plug connectors so the center conductor of each channel's BNC is grounded.

F. Perform steps 1 through 4:

1. Press the HP 3562A keys as follows:

INPUT COUPLE	. . . .	FLOAT CHAN1	
	. . . .	FLOAT CHAN2	
COORD	. . . .	MAG(dB)	
SCALE	. . . .	Y FIXD SCALE	. . . . **−1,1** dB
RANGE	. . . .	**−13** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	. . . . **−13** dBVrms
START			
Y	. . . .	Y VALUE	. . . . **−.8, .8** dB

2. If the measurement is within the marker band, check PASS on the Performance Test Record for part 7.

3. Press the HP 3562A keys as follows:

RANGE	. . . .	**8** dBVrms	
SOURCE	. . . .	SOURCE LEVEL	. . . . **8** dBVrms
START			

4. If the measurement is within the marker band, check PASS on the Performance Test Record for part 8.

G. Perform steps 1 through 4:

1. Press the HP 3562A keys as follows:

RANGE	. . . .	**−13** dBVrms		
SOURCE	. . . .	SOURCE LEVEL	. . . .	**−13** dBVrms
COORD	. . . .	PHASE		
START				
SCALE	. . . .	Y FIXD SCALE	. . . .	**−10, 10** Degree
Y	. . . .	Y VALUE	. . . .	**−8.5, 8.5** degree

2. If the measurement is within the marker band, check PASS on the Performance Test Record for part 9.

3. Press the HP 3562A keys as follows:

RANGE	. . . .	**8** dBVrms		
SOURCE	. . . .	SOURCE LEVEL	. . . .	**8** dBVrms
START				
Y	. . . .	Y VALUE	. . . .	**−8.5, 8.5** Degree

4. If the measurement is within the marker band, check PASS on the Performance Test Record for part 10.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment Input Flatness Adjustment Input Attenuator Adjustments Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A30 Analog Source Board

2-26 ANTI-ALIAS FILTER RESPONSE

Signals with frequencies greater than 156 kHz may be shifted down into the 100 kHz frequency range as a result of the HP 3562A's 256 kHz sample rate. This test measures the ability of the 100 kHz low pass anti-alias filter to reject frequencies 156 kHz and greater.

NOTE

The HP 3325A may produce some spurious signals in the 0 to 100 kHz span. Ignore signals at frequencies other than those listed in the table when performing this test.

Specification

All signals aliasing into the 0 to 100 kHz frequency span will be attenuated at least 80 dB below the range setting.

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
50Ω feedthrough termination	. . . .	HP 11048C
BNC Tee	. . . .	HP 1250-0781

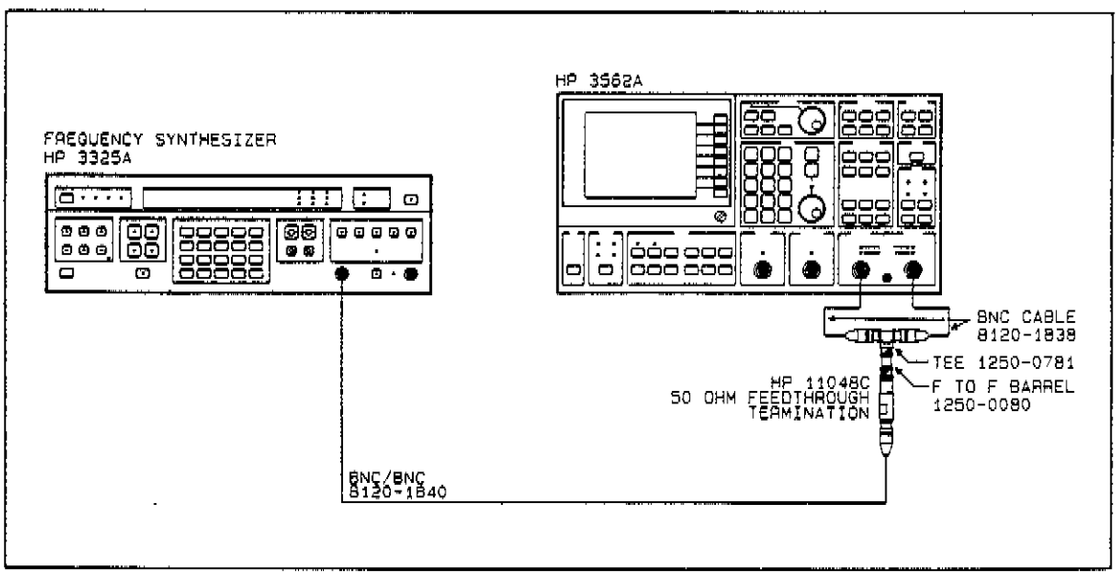


Figure 2-15 Anti-Alias Filter Response Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-15. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Amplitude	. . . .	1 Vrms
Frequency	. . . .	156 kHz
Function	. . . .	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	1 Vrms		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
WINDOW	. . . .	FLAT TOP		
INPUT COUPLE	. . . .	GROUND CHAN1		
	. . . .	GROUND CHAN2		
A & B				
UNITS	. . . .	POWER UNITS	. . .	VOLTS RMS
			. . . .	VOLTS

Table 2-10 Anti-Alias Filter

Signal Frequency	Alias Frequency
156 kHz	100 kHz
184 kHz	72 kHz
206 kHz	50 kHz
267 kHz	11 kHz

D. For each of the signal frequencies listed in table 2-10 perform steps 1 through 4:

1. Set the frequency synthesizer to the signal frequency in table.

2. Press the HP 3562A keys as follows:

   START

   X . . . . To alias frequency in table

3. If the Ya reading is less than or equal to −80 dB check PASS on the Performance Test Record for CHAN 1.

4. If the Yb reading is less than or equal to −80 dB check PASS on the Performance Test Record for CHAN 2..

If Test Fails Check:

Adjustments Section III	None
Troubleshooting Section VIII	A32, A34 Analog Digital Converter Boards

2-27 FREQUENCY ACCURACY

This test measures the frequency accuracy of the HP 3562A.

Specification

The frequency reading will not deviate from the actual signal frequency by more than 0.004%.

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
50Ω feedthrough termination	. . . .	HP 11048C

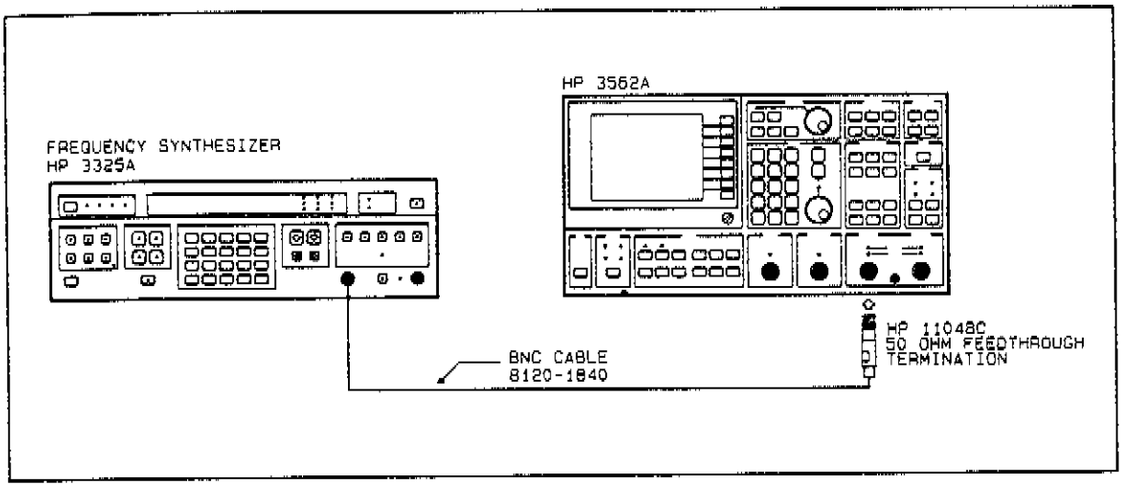


Figure 2-16 Frequency Accuracy Test Setup

Procedure

A. Connect the test equipment as shown in figure 2-16. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Frequency	. . . .	99 kHz
Amplitude	. . . .	1 Vrms
Function	. . . .	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	**0** dBVrms		
FREQ	. . . .	CENTER FREQ	. . . .	**99** kHz
AVG	. . . .	**2**	. . . .	ENTER
	. . . .	STABLE		
START				
X				

D. Record the X marker reading as the measured value on the Performance Test Record.

If Test Fails Check:

Adjustments Section III	20.48 MHz Reference Adjustment
Troubleshooting Section VIII	A31 Trigger Board

2-28 INPUT COUPLING INSERTION LOSS

This test measures the insertion loss at 1 Hz due to the ac coupling capacitors. The amplitude of a 1 Hz signal is measured in both ac and dc coupled modes. The insertion loss is calculated as:

$$\frac{\text{dc Coupled Amplitude}}{\text{ac Coupled Amplitude}} = \text{Insertion Loss}$$

Specification

The insertion loss at 1 Hz due to the ac coupling capacitors will be less than 3 dB (41.3%).

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
50Ω feedthrough termination	. . . .	HP 11048C
BNC Tee	. . . .	HP 1250-0781

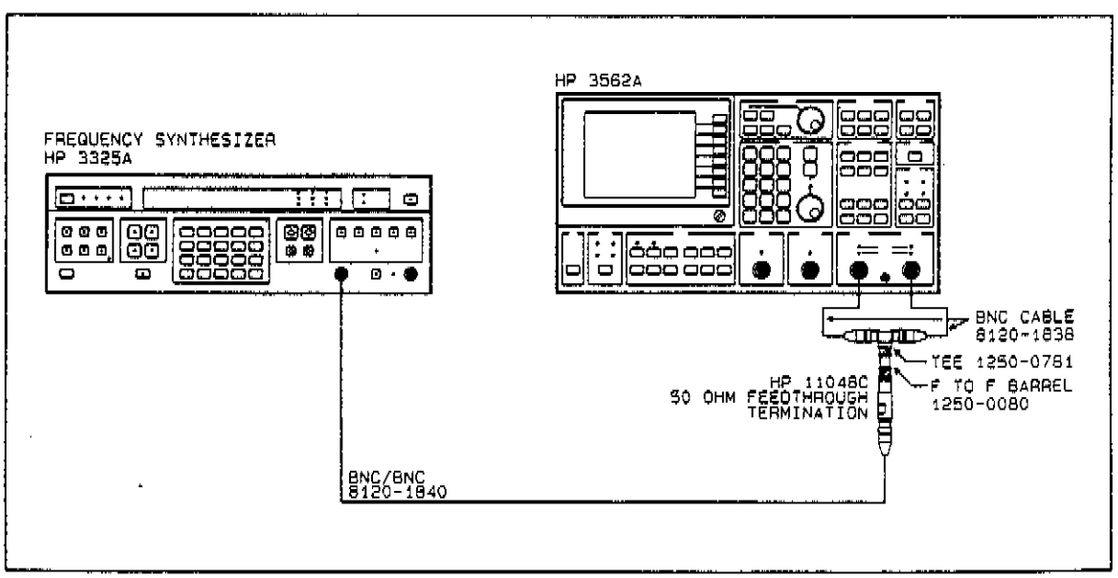


Figure 2-17 Input Coupling Insertion Loss Test Setup

Procedure

A. Connect the test equipment as shown in figure 2-17. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the frequency synthesizer initially as follows:

Frequency Synthesizer

Frequency	. . . .	1 Hz
Amplitude	. . . .	1 Vrms
Function	. . . .	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET				
CAL	. . . .	SINGLE CAL				
RANGE	. . . .	**1** Vrms				
FREQ	. . . .	FREQ SPAN	. . . .	**400** Hz		
WINDOW	. . . .	UNIFRM				
AVG	. . . .	**4**	. . . .	ENTER		
	. . . .	STABLE				
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS		
			. . . .	VOLTS		
INPUT COUPLE	. . . .	CHAN1 AC				
START						
X	. . . .	**1** Hz				
SAVE RECALL	. . . .	SAVE DATA #	. . . .	**1**	. . . .	ENTER
INPUT COUPLE	. . . .	CHAN1 DC				
START						
MATH	. . . .	DIV	. . . .	SAVED 1		

D. Record the Ya reading on the Performance Test Record for channel 1.

E. Press the HP 3562A keys as follows:

B

INPUT
COUPLE CHAN2
AC

START

SAVE
RECALL . . . . SAVE DATA # . . . . **2** . . . . ENTER

INPUT
COUPLE CHAN2
DC

START

MATH . . . . DIV . . . . SAVED 2

F. Record the Yb reading on the Performance Test Record for channel 2.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A33, A35 Input Boards

2-29 SINGLE CHANNEL PHASE ACCURACY

This test measures the phase accuracy of the HP 3562A relative to the phase of the trigger signal. The frequency synthesizer is used to input a square wave to one channel and the external trigger input.

Specification

When the BNC shell of a channel is grounded, the marker phase reading will not deviate from the actual phase of the signal relative to the trigger by more than:

Frequency Range	Phase Deviation
0 Hz to <10 kHz	±2.5 degrees
10 kHz to 100 kHz	±12.0 degrees

When the BNC center conductor of a channel is grounded, the marker phase reading will not deviate from the actual phase of the signal relative to the trigger by more than:

Frequency Range	Phase Deviation
0 to <10 kHz	±6.5 degrees
10 kHz to 100 kHz	±16.0 degrees

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
50Ω feedthrough termination	. . . .	HP 11048C
(2) BNC Tees	. . . .	HP 1250-0781

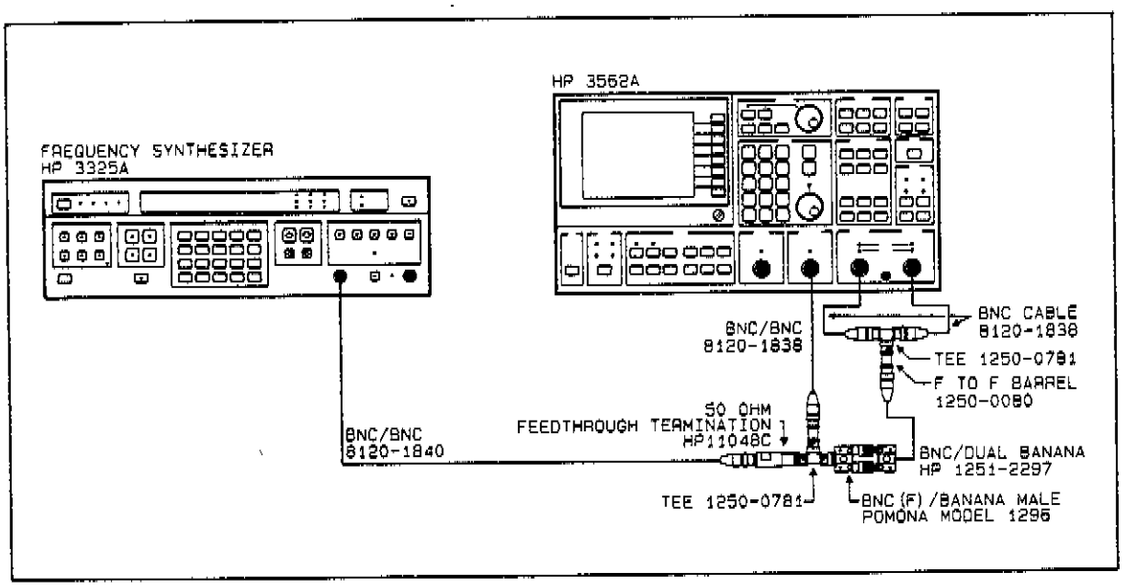


Figure 2-18 Single Channel Phase Accuracy Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-18. Refer to "Initial Equipment Setup", paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer

Frequency	. . . .	9 kHz
Amplitude	. . . .	1 Vrms
DC Offset	. . . .	0 Vdc
Function	. . . .	Square Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
SELECT MEAS	. . . .	POWER SPEC		
INPUT COUPLE	. . . .	GROUND CHAN1		
	. . . .	GROUND CHAN2		
AVG	. . . .	**5**	. . . .	ENTER
	. . . .	STABLE		
	. . . .	TIM AV ON		
WINDOW	. . . .	UNIFRM		
SELECT TRIG	. . . .	**0** Vpk		
MEAS DISP	. . . .	FILTRD INPUT	. . . .	AVRG
			. . . .	LINEAR SPEC 1
B				
			. . . .	LINEAR SPEC 2
A & B				
COORD	. . . .	PHASE		

Table 2-11 Single Channel Phase Accuracy

Signal Frequency	Trigger Slope	Trigger Type
9 kHz	POS	INPUT CHAN 1
9 kHz	POS	INPUT CHAN 2
9 kHz	POS	EXTERNAL
9 kHz	NEG	EXTERNAL
99 kHz	POS	INPUT CHAN 1
99 kHz	POS	INPUT CHAN 2
99 kHz	POS	EXTERNAL

D. For each of the frequencies listed in table 2-11 perform steps 1 through 4:

1. Set the frequency Synthesizer as follows:

   Frequency . . . . To signal frequency in table

2. Press the HP 3562A keys as follows:

   SELECT
   TRIG . . . . To trigger slope in table

   START

   X . . . . To signal frequency in table

3. Record the Ya marker reading on the Performance Test Record for CHAN 1 measured value, BNC shell grounded.

4. Record the Yb marker reading on the Performance Test Record for CHAN 2 measured value, BNC shell grounded.

E. Reverse one of the banana plug connectors so the center conductor of each channel's BNC is grounded.

F. Press the HP 3562A keys as follows:

   INPUT
   COUPLE . . . . FLOAT
   CHAN 1

   . . . . FLOAT
   CHAN 2

G. Repeat part D for the BNC center conductors grounded.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter Boards A31 Trigger Board A6 Digital Filter Controller A1 Digital Source

2-30 INPUT IMPEDANCE

This test measures the input impedance of the HP 3562A as a parallel resistance and capacitance. The digital multimeter is used to measure the input resistance directly. The input capacitance is then measured by inputting a 100 kHz signal from the frequency synthesizer. This equation is used to calculate the capacitance:

$$C = \frac{(Vin\text{-}1)}{(Vc)}\ 15.9\ pF - 1.59\ pF$$

Note

An LCR meter (HP 4261A, HP 4332A) can be used to measure the input capacitance directly.

Specification

Input Resistance (R) = 1 MΩ ±50 kΩ (5%)

Input Capacitance (C) = <100 pF

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
Digital Voltmeter	. . . .	HP 3456A
100 kΩ Resistor	. . . . .	HP 0757-0465
50Ω feedthrough termination	. . . .	HP 11048C

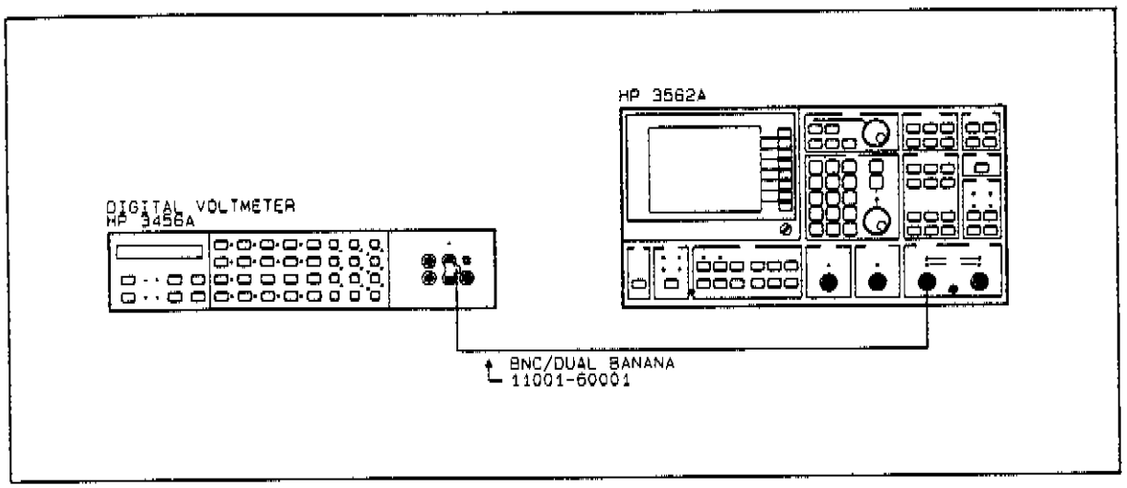


Figure 2-19 Input Resistance Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-19. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the digital voltmeter initially as follows:

Function	. . . .	2 WIRE OHM
Range	. . . .	AUTO
Trigger	. . . .	INTERNAL

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET
CAL	. . . .	SINGLE CAL
INPUT COUPLE	. . . .	GROUND CHAN 1
	. . . .	GROUND CHAN 2
RANGE	. . . .	**20** dBVrms

Table 2-12 Resistance Measurement

Range Setting	Specification	
	Lower Limit	Upper Limit
20 dBVrms	950 kΩ	1050 kΩ
0 dBVrms	950 kΩ	1050 kΩ
−13 dBVrms	950 kΩ	1050 kΩ

D. For each of the range settings listed in table 2-12 perform steps 1 and 2:

1. Press the HP 3562A keys as follows:

   RANGE . . . . To the range setting in table

2. Record the digital voltmeter reading on the Performance Test Record.

E. Change the BNC input connector to channel 2 and repeat part D.

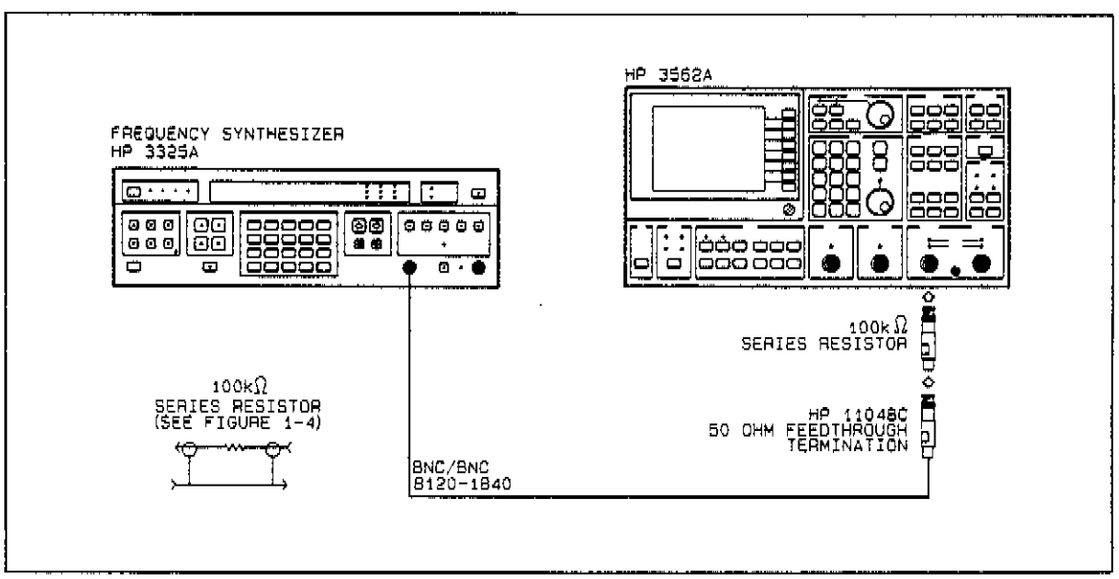


Figure 2-20 Input Capacitance Test Setup

F. Connect the test instruments as shown in figure 2-20.

G. Set the frequency synthesizer initially as follows:

Frequency . . . . 100 kHz

Amplitude . . . . 1 Vrms

H. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	AUTO OFF		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
INPUT COUPLE	. . . .	CHAN 1 AC		
	. . . .	CHAN 2 AC		
	. . . .	GROUND CHAN 1		
	. . . .	GROUND CHAN 2		
RANGE	. . . .	**0** dBVrms		
START				
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS
COORD	. . . .	MAG(LIN)		
X	. . . .	**100** kHz		

I. Record the Ya amplitude reading in the Vc position of the Performance Test Record for CHAN 1.

J. Perform steps 1 through 3:

1. Connect the 50Ω feedthrough to channel 2.

2. Press the HP 3562A keys as follows:

B		
START		
COORD	. . . .	MAG(LIN)

3. Record the Yb amplitude reading in the Vc position of the Performance Test Record for CHAN 2.

K. Remove the 100 kΩ resistor from the signal path and connect the BNC cable with the 50Ω termination directly to the HP 3562A's channel 1 input connector.

L. Perform steps 1 and 2:

1. Press the HP 3562A keys as follows:

A

START

2. Record the Ya amplitude reading in the Vin position of the Performance Test Record for CHAN 1.

M. Perform steps 1 through 3:

1. Connect the 50Ω feedthrough to channel 2.

2. Press the HP 3562A keys as follows:

B

START

3. Record the Yb amplitude reading in the Vin position of the Performance Test Record for CHAN 2.

N. Use the equation given on the Performance Test Record to calculate the input capacitance.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A33, A35 Input Boards

2-31 HARMONIC DISTORTION

This test measures the harmonic distortion generated in the HP 3562A when a full scale input is present.

Specification

The relative amplitude of all harmonics will be at least 80 dB below the fundamental amplitude.

Required Test Equipment

Low Distortion Oscillator	. . . .	HP 339A
600Ω feedthrough termination	. . . .	HP 11095A

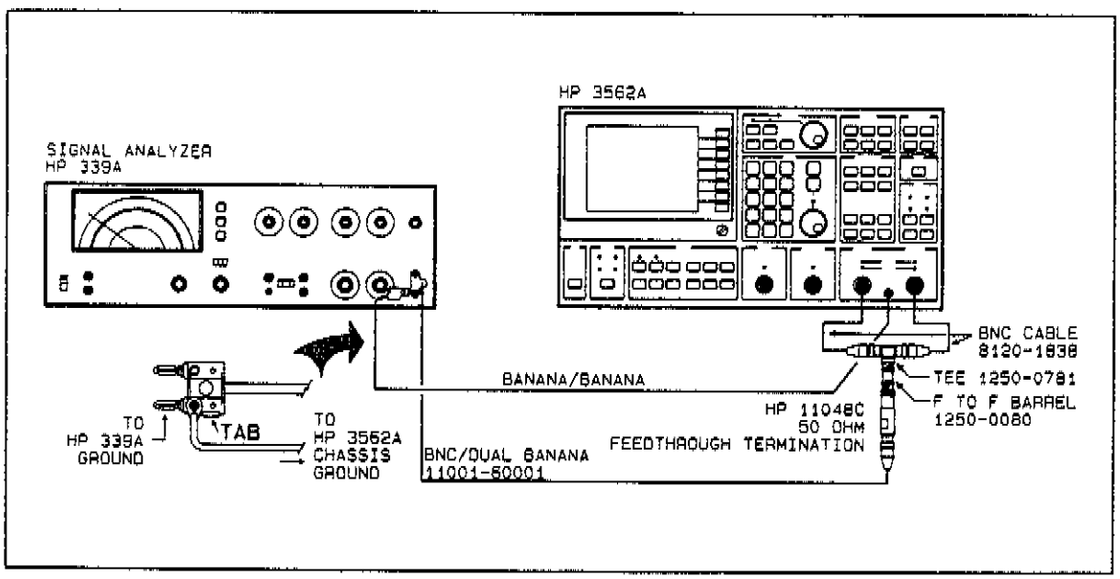


Figure 2-21 Harmonic Distortion Test Setup #1

Procedure

A. Connect the test instruments as shown in figure 2-21. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the low distortion oscillator initially as follows:

Frequency	. . . .	49 kHz
Amplitude	. . . .	1 Vrms

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	**0** dBVrms		
INPUT COUPLE	. . . .	CHAN 1 AC		
	. . . .	CHAN 2 AC		
	. . . .	GROUND CHAN 1		
	. . . .	GROUND CHAN 2		
WINDOW	. . . .	FLAT TOP		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

Table 2-13 Harmonic Frequencies

HP 339A Coarse Frequency	SIGNAL FREQUENCY	Harmonic Number	Harmonic Frequency
49 kHz	49500 Hz	2nd	99 kHz
32 kHz	33000 Hz	3rd	99 kHz
24 kHz	24750 Hz	4th	99 kHz
19 kHz	19800 Hz	5th	99 kHz

D. For each of the signal frequencies listed in table 2-13 perform steps 1 through 7:

1. Set the low distortion oscillator as follows:

Frequency	. . . .	To coarse frequency in table

2. Press the HP 3562A keys as follows:

FREQ	. . . .	CENTER FREQ	. . . .	To signal frequency in table
AVG	. . . .	AVG OFF		
START				
SINGLE				
X	. . . .	To signal frequency in table		

3. Adjust the low distortion oscillator's frequency vernier until it equals the signal frequency.

4. Adjust the low distortion oscillator's amplitude vernier until Ya = 0 dB ±0.1 dB.

5. Press the HP 3562A keys as follows:

A & B

AVG	. . . .	**4**	. . . .	ENTER
	. . . .	STABLE		
FREQ	. . . .	MAX SPAN		
START				
X	. . . .	**99** kHz		

6. Record the Ya marker amplitude reading on the Performance Test Record as the harmonic frequency amplitude for channel 1.

7. Record the Yb marker amplitude reading on the Performance Test Record as the harmonic frequency amplitude for channel 2.

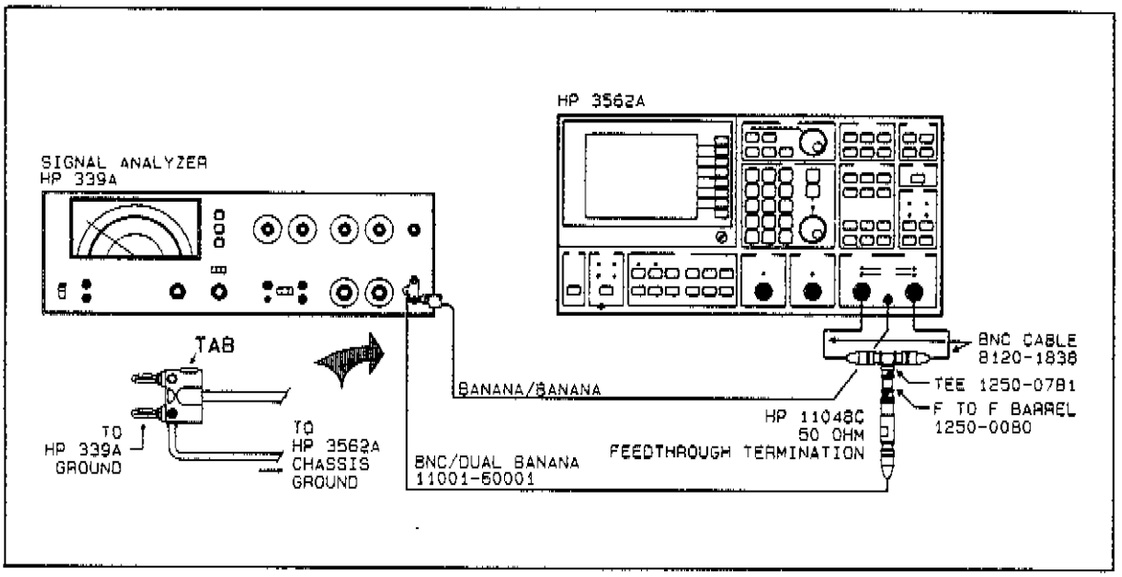


Figure 2-22 Harmonic Distortion Test setup #2

E. For measurement two, connect the test instruments as shown in figure 2-22. The chassis ground cable must go to the ground terminal of the low distortion oscillator.

F. Press the HP 3562A keys as follows:

INPUT		
COUPLE	. . . .	FLOAT
		CHAN 1
	. . . .	FLOAT
		CHAN 2

G. Repeat part D for measurement two.

If Test Fails Check:

Adjustments	2nd Pass Gain Adjustment
Section III	ADC Offset and Reference Adjustment
Troubleshooting	A33, A35 Input Boards
Section VII	A32, A34 Analog Digital Converter Boards

2-32 INTERMODULATION DISTORTION

This test measures the level of the intermodulation distortion products generated within the HP 3562A to the 4th order.

NOTE

The HP 3325A may produce some spurious signals in the 0 to 100 kHz span. Ignore signals at frequencies other than those listed in the tables when performing this test.

Specification

The amplitude of all intermodulation products will be at least 80 dB below the fundamental amplitude.

Required Test Equipment

(2) Frequency Synthesizers	. . . .	HP 3325A
(2) 50Ω feedthrough terminations	. . . .	HP 11048C
(2) 1 kΩ resistors	. . . .	HP 0757-0465
(2) BNC Tee	. . . .	HP 1250-0781

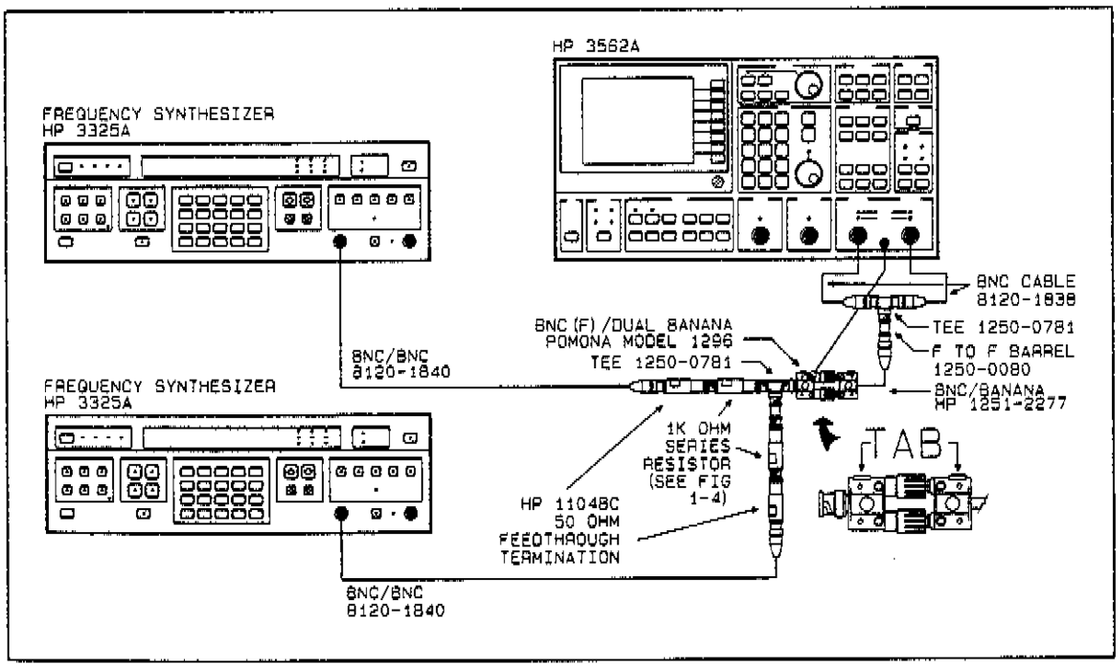


Figure 2-23 Intermodulation Distortion Test Setup #1

Procedure

A. Connect the test instruments as shown in figure 2-23. Keep the connecting cables as short as possible. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Frequency Synthesizer #1

Frequency	20 kHz
Amplitude	1 Vrms
Function	Sine Wave

Frequency Synthesizer #2

Frequency	26 kHz
Amplitude	1 Vrms
Function	Sine Wave

C. Perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

PRESET	RESET	
CAL	SINGLE CAL	
RANGE	**2** Vrms	
INPUT COUPLE	GROUND CHAN 1	
	GROUND CHAN 2	
WINDOW	FLAT TOP	
FREQ	CENTER FREQ	**20** kHz
UNITS	POWER UNITS	VOLTS RMS
		VOLTS
A & B		
X	**20** kHz	

2. Adjust the amplitude of frequency synthesizer #1 until Ya = 0 dB ± 50 mdB.

3. Press the HP 3562A keys as follows:

   X . . . . **26** kHz

4. Adjust the amplitude of frequency synthesizer #2 until Ya = 0 dB ± 50 mdB.

5. Press the HP 3562A keys as follows:

   AVG . . . . **16** . . . . ENTER

   . . . . STABLE

   SCALE . . . . Y FIXD
   SCALE . . . . **−100, .1** dB

Table 2-14 Intermodulation Distortion Measurement One

Fundamental Frequencies F1	Fundamental Frequencies F2	Harmonic Frequency
20 kHz	26 kHz	6 kHz
20 kHz	26 kHz	14 kHz
20 kHz	26 kHz	12 kHz
20 kHz	26 kHz	8 kHz

D. For each of the harmonic frequencies listed in table 2-14 perform steps 1 through 3:

1. Press the HP 3562A keys as follows:

   FREQ . . . . CENTER FREQ . . . . To harmonic frequency in table

   START

   X . . . . To harmonic frequency in table

2. If the Ya marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement one, channel 1 with the BNC shell grounded.

3. If the Yb marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement one, channel 2 with the BNC shell grounded.

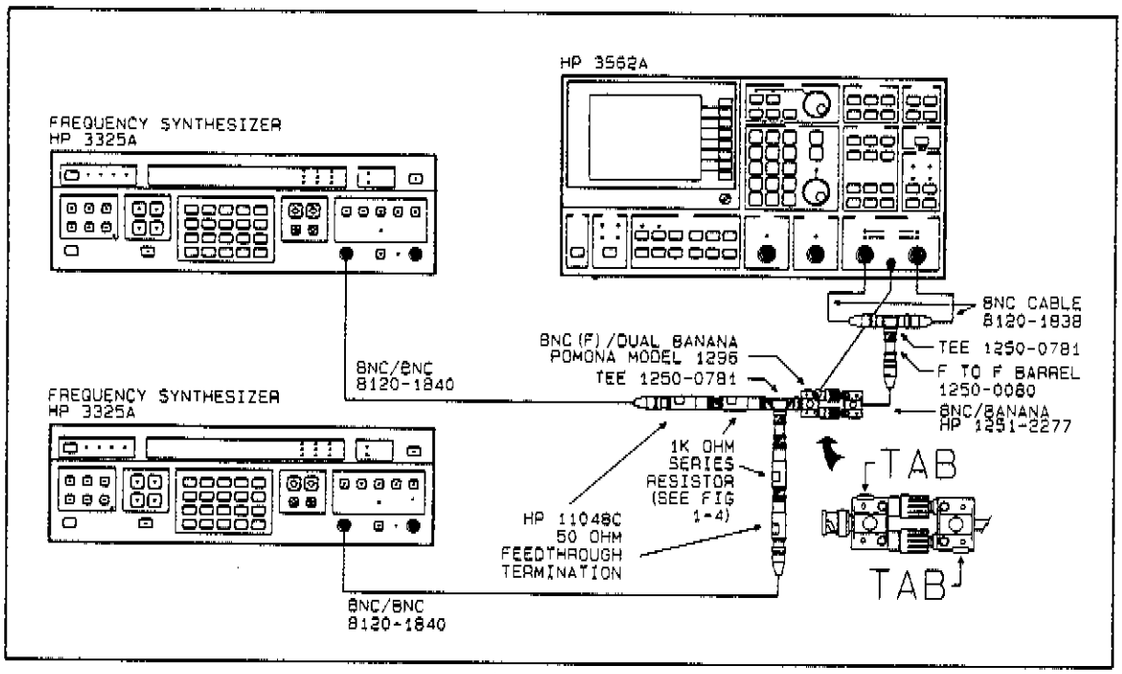


Figure 2-24 Intermodulation Distortion Test Setup #2

E. Perform steps 1 and 2:

1. Connect the test instruments as shown in figure 2-24 so the center conductor of each channel's BNC is grounded.

2. Press the HP 3562A keys as follows:

INPUT
COUPLE . . . . FLOAT
CHAN 1

. . . . FLOAT
CHAN 2

F. For each of the harmonic frequencies listed in table 2-14 perform steps 1 through 3:

1. Press the HP 3562A keys as follows:

FREQ	. . . .	CENTER FREQ	. . . . To harmonic frequency in table
START			
X	. . . .	To harmonic frequency in table	

2. If the Ya marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement one, channel 1 with the BNC center conductor grounded.

3. If the Yb marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement one, channel 2 with the BNC center conductor grounded.

G. Connect the test instruments as shown in figure 2-23.

H. Set the test instruments as follows:

Frequency Synthesizer #1

Frequency . . . . 89 kHz

Frequency Synthesizer #2

Frequency . . . . 99 kHz

I. Perform steps 1 through 5:

1. Press the HP 3563A keys as follows:

AVG	. . . .	AVC OFF	
FREQ	. . . .	CENTER FREQ	. . . . **89** kHz
START			
X	. . . .	**89** kHz	

2. Adjust the amplitude of frequency synthesizer #1 until Ya = 0 dB ±50 mdB.

3. Press the HP 3562A keys as follows:

FREQ	. . . .	CENTER FREQ	. . . . **99** kHz
X	. . . .	**99** kHz	

4. Adjust the amplitude of frequency synthesizer #2 until Ya = 0 dB ±50 mdB.

5. Press the HP 3562A keys as follows:

AVG . . . . STABLE

Table 2-15 Intermodulation Distortion Measurement Two

Fundamental Frequencies F1	Fundamental Frequencies F2	Harmonic Frequency
89 kHz	99 kHz	10 kHz
89 kHz	99 kHz	79 kHz
89 kHz	99 kHz	20 kHz
89 kHz	99 kHz	69 kHz

J. For each of the harmonic frequencies listed in table 2-15 perform steps 1 through 3:

1. Press the HP 3562A keys as follows:

FREQ . . . . CENTER FREQ . . . . To harmonic frequency in table

START

X . . . . To harmonic frequency in table

2. If the Ya marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement two, channel 1 with the BNC shell floating.

3. If the Yb marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement two, channel 2 with the BNC shell floating.

K. Connect the test instruments as shown in figure 2-24 so the center conductor of each channel's BNC is grounded.

L. For each of the harmonic frequencies listed in table 2-15 perform steps 1 through 3:

1. Press the HP 3562A keys as follows:

FREQ . . . . CENTER FREQ . . . . To harmonic frequency in table

START

X . . . . To harmonic frequency in table

2. If the Ya marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement two, channel 1 with the BNC center conductor grounded.

3. If the Yb marker reading is less than or equal to −80 dB, check PASS on the Performance Test Record for measurement two, channel 2 with the BNC center conductor grounded.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32; A34 Analog Digital Converter Boards

2-33 NOISE AND SPURIOUS SIGNAL LEVEL

This test measures the level of the noise floor and any spurious signals generated within the HP 3562A.

Specification

When the input is terminated with a 50Ω load, the amplitude of all spurious signals must be at least 80 dB below the range setting. When using a flat top window and a 50Ω load, the average noise level must be less than:

Frequency	Noise Level
20 Hz to 1 kHz	-134 dBV/$\sqrt{\text{Hz}}$
1 kHz to 100 kHz	-144 dBV/$\sqrt{\text{Hz}}$

Required Test Equipment

(2) 50Ω feedthrough terminations . . . . HP 11048C

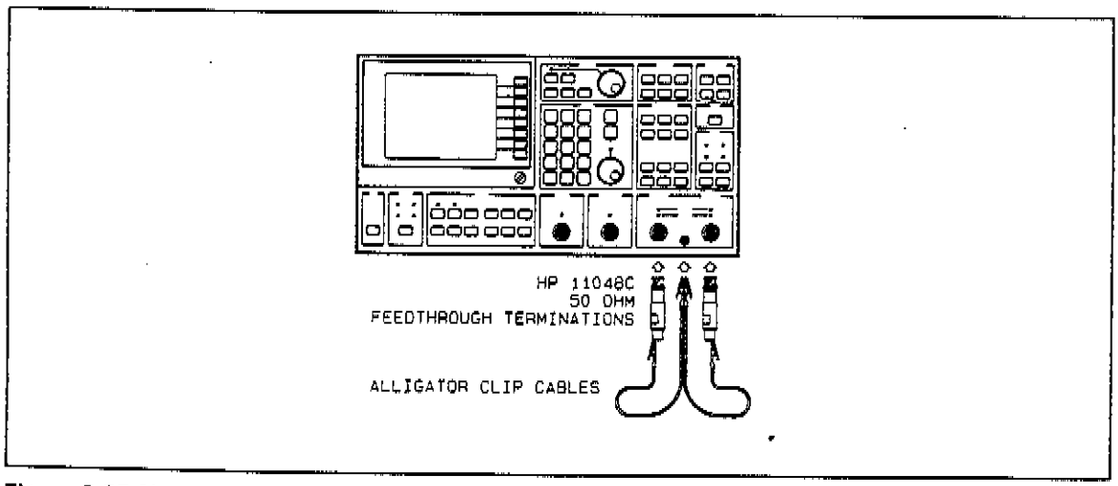


Figure 2-25 Noise and Spurious Signal Level Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-25. Keep the leads from the feedthrough terminations to chassis ground as short as possible.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
RANGE	. . . .	**−51** dBVrms		
INPUT COUPLE	. . . .	CHAN 1 AC		
	. . . .	CHAN 2 AC		
FREQ	. . . .	FREQ SPAN	. . . .	**1** kHz
	. . . .	START FREQ	. . . .	**20** Hz
AVG	. . . .	**20**	. . . .	ENTER
	. . . .	STABLE		
WINDOW	. . . .	UNIFRM		
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

C. Perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

START		
SCALE	. . . .	Y AUTO SCALE
SPCL MARKER	. . . .	MRKR — PEAK

2. If the Ya marker reading is less than or equal to −131 dBV check PASS on the Performance Test Record for CHAN 1.

3. Press the HP 3562A keys as follows:

   B

   SCALE . . . . Y AUTO SCALE

   SPCL MARKER . . . . MRKR → PEAK

4. If the Yb marker reading is less than or equal to −131 dBV check PASS on the Performance Test Record for CHAN 2.

5. Press the HP 3562A keys as follows:

   FREQ . . . . FREQ SPAN . . . . **10** kHz

Table 2-16 Spurious Signals

Start Frequency	Frequency Span	Specification
20 Hz	1 kHz	≤ −131 dBV
1 kHz	10 kHz	≤ −131 dBV
10 kHz	10 kHz	≤ −131 dBV
20 kHz	10 kHz	≤ −131 dBV
30 kHz	10 kHz	≤ −131 dBV
40 kHz	10 kHz	≤ −131 dBV
50 kHz	10 kHz	≤ −131 dBV
60 kHz	10 kHz	≤ −131 dBV
70 kHz	10 kHz	≤ −131 dBV
80 kHz	10 kHz	≤ −131 dBV
90 kHz	10 kHz	≤ −131 dBV

D. For the rest of the start frequencies in table 2-16 perform steps 1 through 4:

   1. Press the HP 3562A keys as follows:

      FREQ . . . . START FREQ . . . . To start frequency in table

A

START

SPCL
MARKER . . . . MRKR →
PEAK

2. If the Ya marker reading is less than or equal to −131 dBV check PASS on the Performance Test Record for CHAN 1.

3. Press the HP 3562A keys as follows:

B

SPCL
MARKER . . . . MRKR →
PEAK

4. If the Yb marker reading is less than or equal to −131 dBV check PASS on the Performance Test Record for CHAN 2.

Table 2-17 Noise Level

Start Frequency	Frequency Span	Specification
20 Hz	1 kHz	≤ -134 dBV/$\sqrt{\text{Hz}}$
1 kHz	50 kHz	≤ -144 dBV/$\sqrt{\text{Hz}}$
50 kHz	50 kHz	≤ -144 dBV/$\sqrt{\text{Hz}}$

E. Press the HP 3562A keys as follows:

WINDOW . . . . FLAT TOP

UNITS . . . . POWER UNITS . . . . V/$\sqrt{\text{Hz}}$

F. For each of the start frequencies listed in table 2-17 perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

FREQ . . . . START FREQ . . . . To start frequency in table

. . . . FREQ SPAN . . . . To frequency span in table

START

2. When the average is complete, press the HP 3562A keys as follows:

   A

   SPCL
   MARKER . . . . MRKR →
   PEAK

3. If the Ya marker reading is less than or equal to the specification, check PASS on the Performance Test Record for CHAN 1.

4. Press the HP 3562A keys as follows:

   B

   SPCL
   MARKER . . . . MRKR →
   PEAK

5. If the Yb marker reading is less than or equal to the specification, check PASS on the Performance Test Record for CHAN 2.

If Test Fails Check:

Adjustments Section III	2nd Pass Gain Adjustment ADC Offset and Reference Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A32, A34 Analog Digital Converter A5 Digital Filter A4 Local Oscillator

2-34 CROSS TALK

The cross talk test measures the amount of energy in one channel that has been coupled across from the other channel. This is accomplished by placing a high signal level on one channel and then measuring the relative signal amplitude on the other channel.

Specification

When a 50Ω termination is used, the cross talk between channels will be at least 140 dB below the input signal level.

Required Test Equipment

Frequency Synthesizer	HP 3325A
50Ω feedthrough termination	HP 11048C

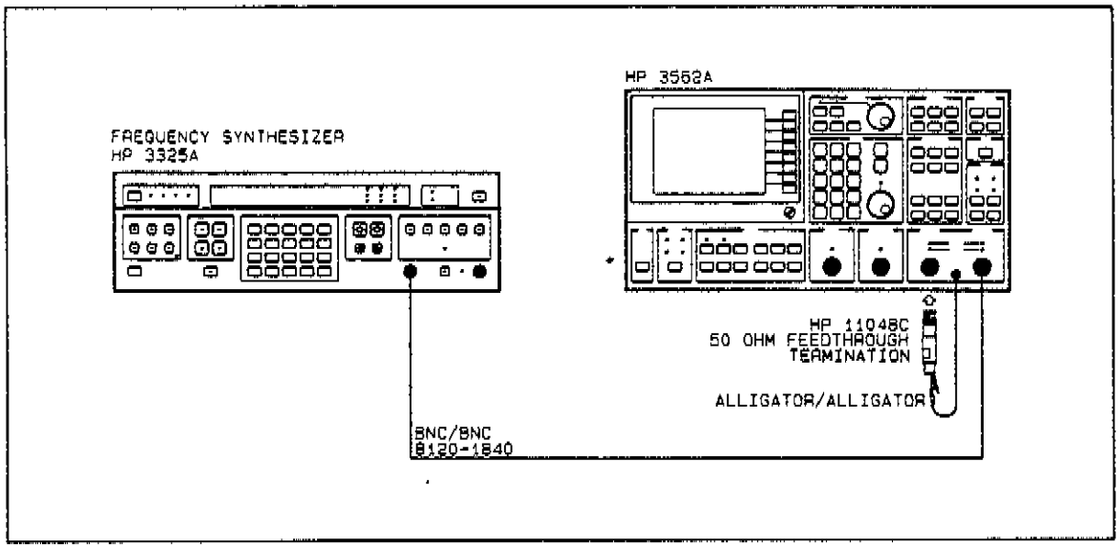


Figure 2-26 Cross Talk Channel 1 Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-26. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the frequency synthesizer as follows:

Amplitude	. . . .	14 Vrms
High Voltage Output	. . . .	ON
Frequency	. . . .	100 kHz
Function	. . . .	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET	
CAL	. . . .	SINGLE CAL	
FREQ	. . . .	CENTER FREQ	**99** kHz
WINDOW	. . . .	FLAT TOP	
AVG	. . . .	**16** ENTER	
	. . . .	STABLE	
START			
A & B			
X			

SCALE . . . . Y FIXD
SCALE . . . . **−140,23** dB

B
Y

D. Using the marker knob, move the Y marker to the center of the X marker dot and press the HP 3562A keys as follows:

HOLD Y
UPPER

A

E. Using the marker knob, move the Y marker to the center of the X marker dot.

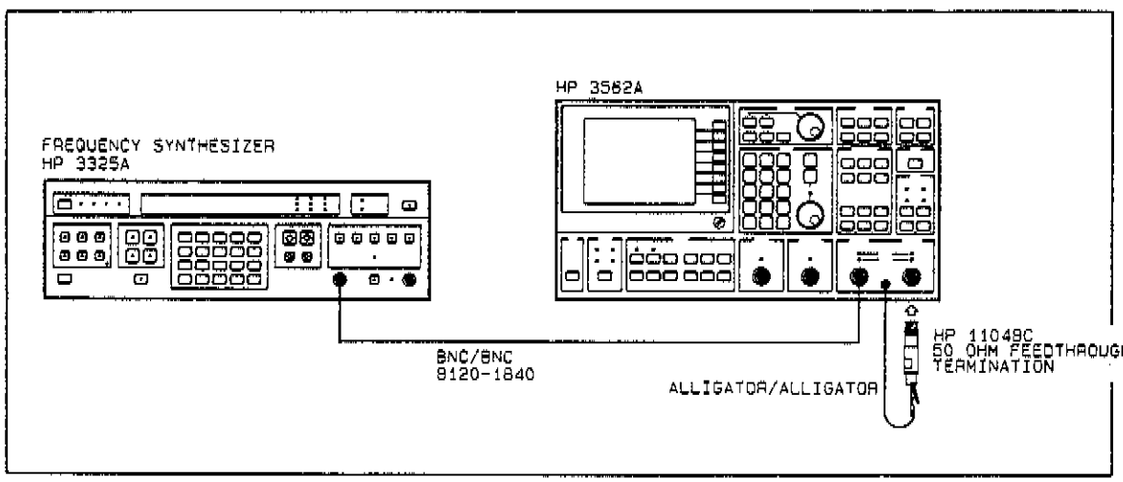


Figure 2-27 Cross Talk Channel 2 Test Setup

F. If the delta Y is greater than or equal to 140 dB, check PASS on the Performance Test Record for channel 1.

G. Connect the test instruments as shown in figure 2-27.

H. Press the HP 3562A keys as follows:

Y OFF

START

A

SPCL
MARKER . . . . MRKR →
PEAK

Y

I. Using the marker knob, move the Y marker to the center of the X marker dot and press the HP 3562A keys as follows:

HOLD Y
UPPER

B

J. Using the marker knob, move the Y marker the center of the X marker dot.

K. If the delta Y is greater than or equal to 140 dB, check PASS on the Performance Test Record for channel 2.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A33, A35 Input Boards

2-35 COMMON MODE REJECTION

This test measures the capability of the 3562A to ignore a signal which appears simultaneously and in phase at the high and low input of a single channel.

Specification

When a common mode signal is input to a single channel, the relative value compared to the amplitude of the input single will be:

Frequency	Specification
0 Hz to 66 Hz	≤80 dB
66 Hz to 500 Hz	≤65 dB

Required Test Equipment

Frequency Synthesizer	. . . .	HP 3325A
Common Mode Cable	. . . .	HP 03562-61620

Procedure

A. Connect the test instruments as shown in figure 2-28. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the frequency synthesizer as follows:

Function	. . . .	Sine Wave
High Voltage Output	. . . .	ON

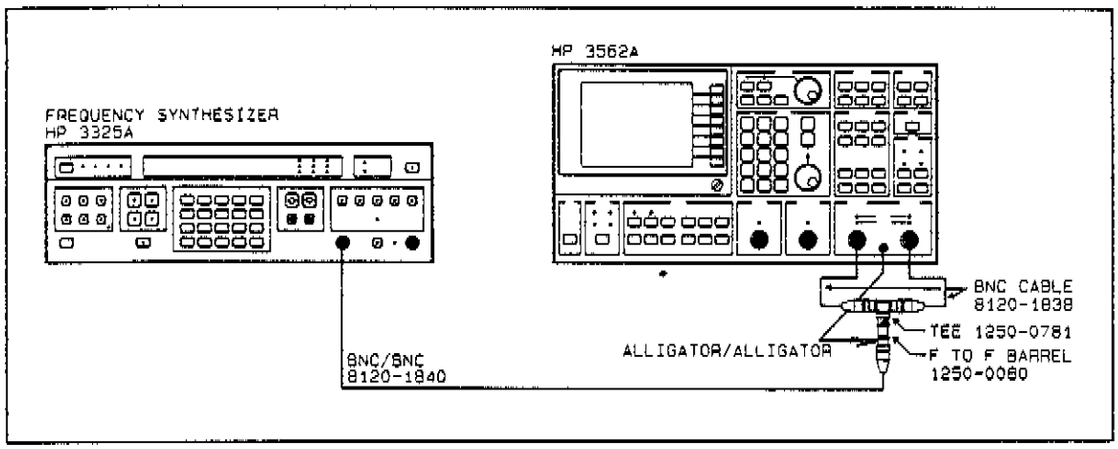


Figure 2-28 Common Mode Rejection Test Setup #1

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
AVG	. . . .	**16**	. . . .	ENTER
	. . . .	STABLE		
WINDOW	. . . .	FLAT TOP		
A & B				
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS

Table 2-18 Common Mode Rejection

Signal Amplitude	Signal Frequency	Range Setting #1	Range Setting #2	Specification
5.680 Vrms	66 Hz	16 dBVrms	−8 dBVrms	≤80 dB
3.413 Vrms	500 Hz	11 dBVrms	−12 dBVrms	≤65 dB

D. For each of the frequencies listed in table 2-18 perform steps 1 through 9:

1. Set the Frequency Synthesizer as follows:

Amplitude	. . . .	To signal amplitude in table
Frequency	. . . .	To signal frequency in table

2. Press the HP 3562A keys as follows:

FREQ	CENTER FREQ	To signal frequency in table
RANGE	To range setting #1 in table	
START		
SPCL		
MARKER	MRKR → PEAK	

3. Record the Ya marker amplitude reading on the Performance Test Record as the first measurement for CHAN 1.

4. Record the Yb marker amplitude reading on the Performance Test Record as the first measurement for CHAN 2.

5. Connect the test instruments as shown in figure 2-29.

6. Press the HP 3562A keys as follows:

RANGE	To range setting #2 in table
START	
SCALE	Y AUTO SCALE
X	To signal frequency in table

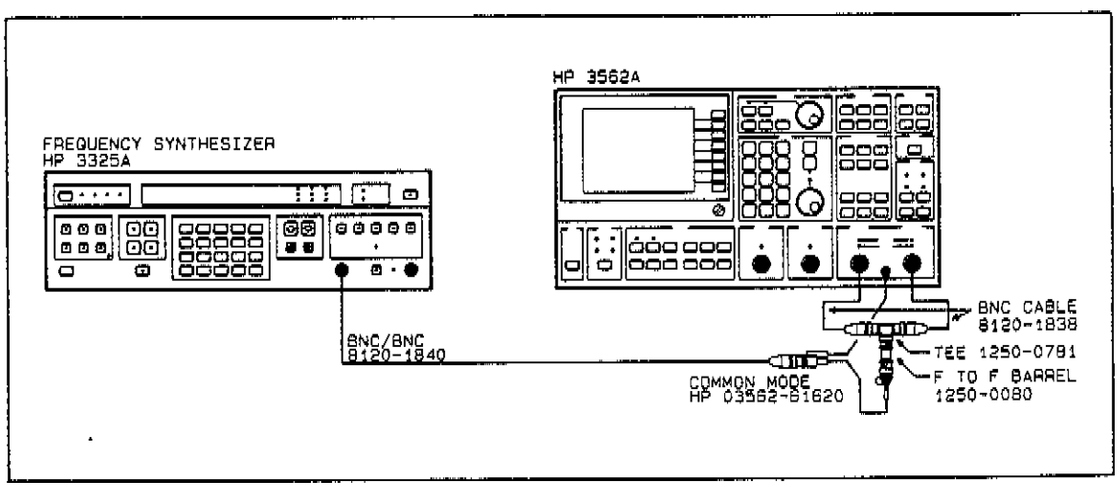


Figure 2-29 Common Mode Rejection Test Setup #2

7. When the average is complete, record the Ya amplitude reading on the Performance Test Record as the second measurement for CHAN 1.

8. Record the Yb amplitude reading on the Performance Test Record as the second measurement for CHAN 2.

9. Calculate the relative value for both channels:

First Measurement − Second Measurement = Relative Value

If Test Fails Check:

Adjustments Section III	Input dc Offset Adjustment Calibrator Adjustment
Troubleshooting Section VII	A33, A35 Input Boards A30 Analog Source

2-36 EXTERNAL REFERENCE TEST

This test determines if the external reference input will lock on to an external signal that is within the specified range.

Specification

The HP 3562A will lock to external signals of 1, 2, 5, and 10 MHz ±0.01%. The amplitude of the signal must be between 0 dBm and +20 dBm.

Required Test Equipment

Frequency Synthesizer . . . . HP 3325A

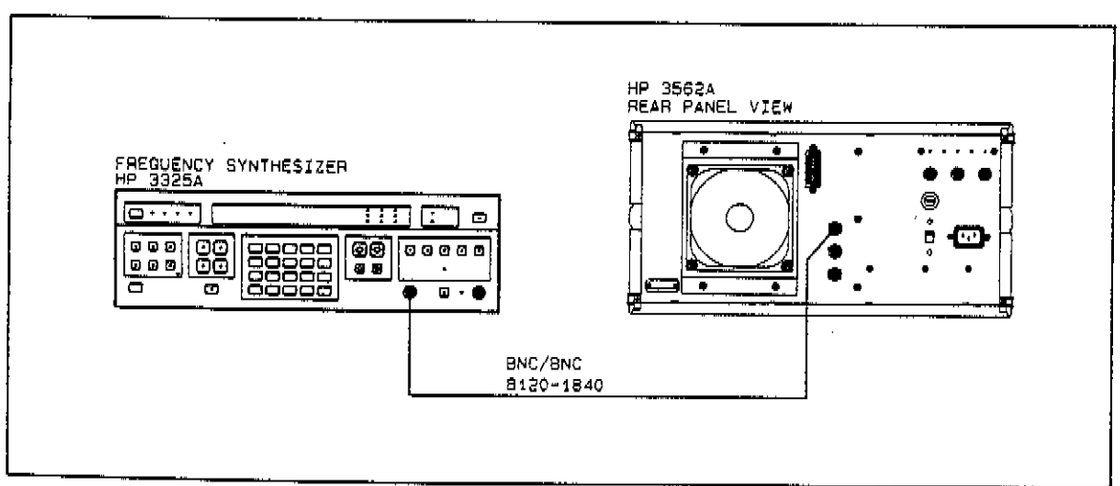


Figure 2-30 External Reference Test Setup

Procedure

A. Connect the HP 3562A as shown in figure 2-30. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set frequency synthesizer as follows:

Frequency	1.000 MHz
Amplitude	0 dBm
Function	Sine Wave

C. Press the HP 3562A keys as follows:

PRESET	RESET
CAL	SINGLE CAL

D. Perform steps 1 through 3:

1. Press "FREQ" on the 3325A.
2. Using the modify arrows on the 3325A, slowly decrease the frequency in 100 Hz steps until the 'Source Not Locked' message is displayed.
3. Record the frequency value on the Performance Test Record.

E. Set the Frequency Synthesizer as follows:

Frequency	10.000 MHz

F. Perform steps 1 through 3:

1. Press "FREQ" on the 3325A.
2. Using the modify arrows on the 3325A, slowly increase the frequency in 1 kHz steps until the 'Source Not Locked' message is displayed.
3. Record the frequency value on the Performance Test Record.

If Test Fails Check:

Adjustments Section III	20.48 MHz Reference Adjustment
Troubleshooting Section VIII	A31 Trigger Board

2-37 SOURCE RESIDUAL OFFSET

This test measures the level of residual offset generated by the source at the 0V offset setting.

Specification

The source residual offset will be no more than 10 mV at the 0V offset setting.

Required Test Equipment

Digital Voltmeter . . . . HP 3456A

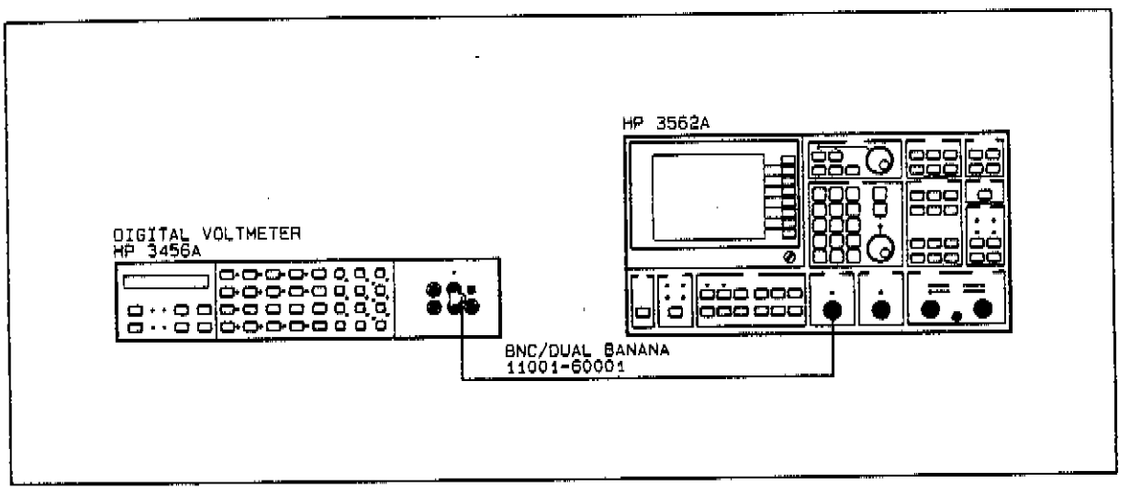


Figure 2-31 Source Residual Offset Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-31. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the digital voltmeter as follows:

Function	. . . .	dc (⎓V)
Trigger	. . . .	Internal
Range	. . . .	Auto

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET	
CAL	. . . .	SINGLE CAL	
SOURCE	. . . .	SOURCE LEVEL	**1** Vpk
	. . . .	FIXED SINE	**100** kHz

D. Record the digital voltmeter reading on the Performance Test Record for the 1V setting.

E. Press the HP 3562A keys as follows:

SOURCE	. . . .	SOURCE LEVEL	5 Vpk

F. Record the digital voltmeter reading on the Performance Test Record for the 5V setting.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A30 Analog Source Board

2-38 SOURCE AMPLITUDE ACCURACY AND FLATNESS

This test measures the amplitude accuracy and flatness of the HP 3562A source.

Specification

The amplitude reading will not deviate from the source amplitude setting by more than 1 dB (12.2%) when terminated into 1 MΩ for frequencies between 0 Hz and 65 kHz, and +1 dB, −1.5 dB for frequencies between 65 kHz and 100 kHz.

Procedure

A. Connect the HP 3562A source to channel 1.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
INPUT COUPLE	. . . .	GROUND CHAN 1		
RANGE	. . . .	5 Vpk		
MEAS MODE	. . . .	SWEPT SINE	. . . .	LINEAR SWEEP
SOURCE	. . . .	ON		
	. . . .	SOURCE LEVEL		4.47 Vpk

UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS
FREQ	. . . .	STOP FREQ	. . . .	**65** kHz
START				

C. When the sweep is complete perform steps 1 and 2:

1. Press the HP 3562A keys as follows:

SCALE	. . . .	Y FIXD SCALE	. . . .	**9,11 dB**

2. If the trace is between the 9 dB and the 11 dB limits, check PASS on the Performance Test Record, for the 0 to 65 kHz span.

D. Press the HP 3562A keys as follows:

FREQ	. . . .	START FREQ	. . . .	**65** kHz
START				

E. When the sweep is complete perform steps 1 and 2:

1. Press the HP 3562A keys as follows:

SCALE	. . . .	Y FIXD SCALE	. . . .	**8.5, 11** dB

2. If the trace is between the 8.5 dB and the 11 dB limits, check PASS on the Performance Test Record for the 65 kHz to 100 kHz span.

If Test Fails Check:

Troubleshooting Section VIII	A30 Analog Source Board

2-39 SOURCE OUTPUT RESISTANCE

This test measures the output impedance of the analog source as a parallel resistance.

Specification

The output impedance of the source is 50 ±5Ω.

Required Test Equipment

50Ω feedthrough termination	. . . .	HP 11048C
BNC cable	. . . .	HP 11170A

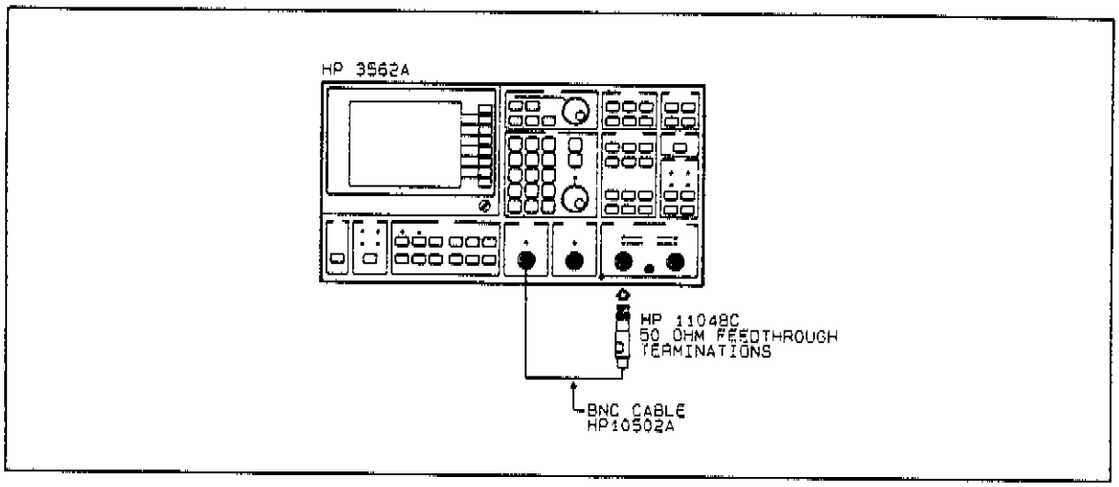


Figure 2-32 Source Output Resistance Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-32.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET	
CAL	. . . .	SINGLE CAL	
INPUT COUPLE	. . . .	GROUND CHAN 1	
RANGE	. . . .	5 Vpk	
MEAS MODE	. . . .	SWEPT SINE	. . . . LINEAR SWEEP
SOURCE	. . . .	ON	
	. . . .	SOURCE LEVEL	5 Vpk
START			

C. When the sweep is complete press the HP 3562A keys as follows:

SAVE RECALL	. . . .	SAVE DATA #	. . . . 1 . . . ENTER

D. Remove the 50Ω termination from the signal path and connect the output of the source directly to channel 1.

E. Press the HP 3562A keys as follows:

START

F. When the sweep is complete press the HP 3562A keys as follows:

MATH	. . . .	DIV	. . . .	SAVED 1
SCALE	. . . .	Y FIXD		
		SCALE	. . . .	**5.58, 6.44** dB

G. If the trace is between the 6.44 dB and the 5.58 dB limits, check PASS on the Performance Test Record.

If Test Fails Check:

Adjustments	None
Troubleshooting Section VIII	A30 Analog Source Board

2-40 SOURCE DISTORTION

This test measures the level of any spurious signals generated by the HP 3562A source.

Specification

When the source is set between dc and 10 kHz, the distortion will be at least 60 dB below the signal level. When the source is set between 10 kHz and 100 kHz, the distortion will be at least 40 dB below the signal level.

Required Test Equipment

None

Procedure

A. Connect the HP 3562A source to channel 1.

B. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE		
		CAL		
INPUT				
COUPLE	. . . .	CHAN 1		
		AC		
	. . . .	GROUND		
		CHAN 1		

WINDOW . . . . FLAT TOP

AVG . . . . 4 . . . . ENTER

. . . . STABLE

SCALE . . . . X FIXD SCALE . . . . . .375, 100 kHz

Table 2-19 Source Distortion

Range Setting	Source Amplitude	Source Frequency	Delta Y Value
25 mVpk	25 mVpk	10 kHz	60 dB
5 Vpk	5 Vpk	10 kHz	60 dB
25 mVpk	25 mVpk	99 kHz	40 dB
5 Vpk	5 Vpk	99 kHz	40 dB

C. For each of the range settings listed in table 2-19 perform steps 1 through 5:

1. Press the HP 3562A keys as follows:

Y OFF

RANGE . . . . To range setting in table

SOURCE . . . . SOURCE LEVEL . . . . To source amplitude in table

. . . . FIXED SINE . . . . To source frequency in table

START

SCALE . . . . Y AUTO SCALE

SPCL MARKER . . . . MRKR — PEAK

Y

2. Using the marker knob, move the Y marker to the center of the X marker dot.

3. Press the HP 3562A keys as follows:

Y . . . . HOLD Y UPPER

4. Using the marker knob, move the Y marker until the delta Y reading equals the delta Y value in the table.

5. If there is no distortion above the lower Y marker line, check PASS on the Performance Test Record.

If Test Fails Check:

Adjustments Section III	Source dc Offset Adjustment
Troubleshooting Section VII	A30 Analog Source Board A4 Local Oscillator Board

2-41 SOURCE ENERGY MEASUREMENT

This test measures the in-band energy of the HP 3562A noise source using the power marker function of the HP 3562A and a true rms voltmeter.

Specification

The percentage in-band energy of the random noise will be at least 70%. The percentage in-band energy of the chirp will be at least 85%.

Required Test Equipment

Digital Voltmeter	. . . .	HP 3456A
BNC Tee	. . . .	HP 1250-0781

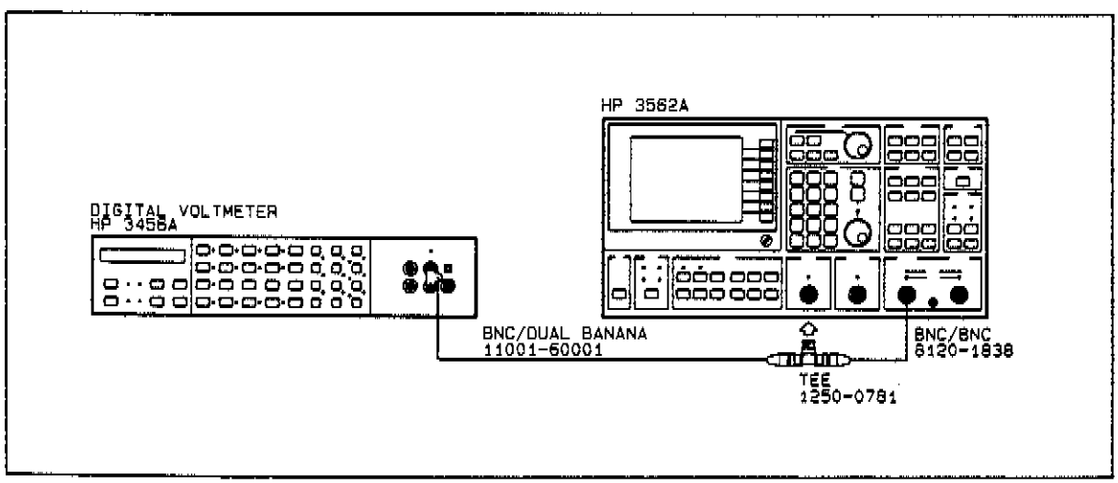


Figure 2-33 Source Energy Measurement Test Setup

Procedure

A. Connect the test instruments as shown in figure 2-33. Refer to "Initial Equipment Setup," paragraph 2-20, for unspecified parameters.

B. Set the test instruments initially as follows:

Digital Voltmeter

Function	. . . .	ac V (~V)
Trigger	. . . .	Internal

C. Press the HP 3562A keys as follows:

PRESET	. . . .	RESET		
CAL	. . . .	SINGLE CAL		
INPUT COUPLE	. . . .	GROUND CHAN 1		
WINDOW	. . . .	UNIFRM (NONE)		
RANGE	. . . .	**1** Vrms		
SOURCE	. . . .	**1** Vrms		
FREQ	. . . .	FREQ SPAN	. . . .	**1** kHz
	. . . .	CENTER FREQ	. . . .	**5** kHz
AVG	. . . .	**160**	. . . .	ENTER
	. . . .	STABLE		
START				
UNITS	. . . .	POWER UNITS	. . . .	VOLTS RMS
			. . . .	VOLTS
COORD	. . . .	MAG(LIN)		
SPCL MARKER	. . . .	POWER		

D. Perform steps 1 through 3:

1. Take at least 160 averages by pressing the HP 3456A keys as follows:

MATH

2

RDGS
STORE

2. After the "RDGS STORE" annunicator turns off, press the HP 3456A keys as follows:

HOLD

RDGS
STORE

RECALL

0

3. Record the voltmeter average on the Performance Test Record.

E. Record the HP 3562A power measurement on the Performance Test Record.

F. Press the HP 3562A keys as follows:

SOURCE	. . . .	PRIODC CHIRP
SELECT		
TRIG	. . . .	SOURCE
		TRIG
START		
SPCL		
MARKER	. . . .	POWER

G. Repeat parts D and E.

H. The percentage in-band energy for random noise and chirp are calculated using the following formula:

$$\frac{\sqrt{\text{HP 3562A Reading}}}{\text{Voltmeter Reading}} \times 100 = \text{percentage in-band energy}$$

If Test Fails Check:

Adjustments	None
Troubleshooting Section VII	A30 Analog Source Board A1 Digital Source Board A4 Local Oscillator Board

2-42 PERFORMANCE TEST RECORD

2-21 Self Test	PASS	

2-22 DC Offset			
Range Setting	Measured Value		Specification
	CHAN 1	CHAN 2	
7 dBV			< −23 dBV
−35 dBV			< −65 dBV
−51 dBV			< −71 dBV

2-23 Amplitude Accuracy and Flatness
Measurement One

BNC shell grounded

Range Setting	Signal Frequency	Specification		Measured Value	
		Lower Limit	Upper Limit	CHAN 1	CHAN 2
9 dBV	1 kHz	8.849 dBV	9.151 dBV		
9 dBV	99 kHz	8.849 dBV	9.151 dBV		
−13 dBV	1 kHz	−13.15 dBV	−12.85 dBV		
−13 dBV	50 kHz	−13.15 dBV	−12.85 dBV		
−13 dBV	90 kHz	−13.15 dBV	−12.85 dBV		
−13 dBV	99 kHz	−13.15 dBV	−12.85 dBV		
−23 dBV	1 kHz	−23.15 dBV	−22.85 dBV		
−23 dBV	99 kHz	−23.15 dBV	−22.85 dBV		
−26 dBV	1 kHz	−26.15 dBV	−25.85 dBV		
−21 dBV	1 kHz	−21.15 dBV	−20.85 dBV		
−17 dBV	1 kHz	−17.15 dBV	−16.85 dBV		
−14 dBV	1 kHz	−14.15 dBV	−13.85 dBV		
−11 dBV	1 kHz	−11.15 dBV	−10.85 dBV		

2-23 Amplitude Accuracy and Flatness
Measurement Two

BNC shell grounded

Range Setting	Signal Frequency	Specification		Measured Value	
		Lower Limit	Upper Limit	CHAN 1	CHAN 2
−51 dBV	1 kHz	−51.25 dBV	−50.75 dBV		
−49 dBV	1 kHz	−49.25 dBV	−48.75 dBV		
−47 dBV	1 kHz	−47.25 dBV	−46.75 dBV		
−45 dBV	1 kHz	−45.25 dBV	−44.75 dBV		
−43 dBV	1 kHz	−43.25 dBV	−42.75 dBV		
−41 dBV	1 kHz	−41.25 dBV	−40.75 dBV		
−39 dBV	1 kHz	−39.25 dBV	−38.75 dBV		

2-23 Amplitude Accuracy and Flatness Measurement Three

BNC center conductor grounded

Range Setting	Signal Frequency	Specification		Measured Value	
		Lower Limit	Upper Limit	CHAN 1	CHAN 2
8 dBV	1 kHz	7.499 dBV	8.501 dBV		
8 dBV	99 kHz	7.499 dBV	8.501 dBV		
−11 dBV	1 kHz	−11.50 dBV	−10.50 dBV		
−13 dBV	1 kHz	−13.50 dBV	−12.50 dBV		
−13 dBV	50 kHz	−13.50 dBV	−12.50 dBV		
−13 dBV	90 kHz	−13.50 dBV	−12.50 dBV		
−13 dBV	99 kHz	−13.50 dBV	−12.50 dBV		
−27 dBV	1 kHz	−27.50 dBV	−26.50 dBV		
−27 dBV	99 kHz	−27.50 dBV	−26.50 dBV		

2-24 Amplitude Linearity

Signal Frequency = 10 kHz Range Setting = 10 Vrms

BNC shell grounded

Amplitude	Specification		Measured Value	
	Upper Limit	Lower Limit	CHAN 1	CHAN 2
10.00 Vrms	10.18 Vrms	9.827 Vrms		
1.000 Vrms	1.019 Vrms	981.4 mVrms		
100.0 mVrms	103.2 mVrms	96.79 mVrms		
10.00 mVrms	11.67 mVrms	8.329 mVrms		
3.1623 mVrms	4.717 mVrms	1.608 mVrms		
1.000 mVrms	2.517 mVrms	−517.1 μVrms		

BNC center conductor grounded

10.00 Vrms	10.59 Vrms	9.439 Vrms		
1.000 Vrms	1.061 Vrms	942.6 mVrms		
100.0 mVrms	107.4 mVrms	92.91 mVrms		
10.00 mVrms	12.09 mVrms	7.941 mVrms		
3.1623 mVrms	4.850 mVrms	1.485 mVrms		
1.000 mVrms	2.559 mVrms	−555.9 μVrms		

2-25 Amplitude and Phase Match						
BNC shell grounded						
Range Setting	Part	PASS	Amplitude Specification	Part	PASS	Phase Specification
−49 dBV	1		±0.1 dB	4		±0.5°
0 dBV	2		±0.1 dB	5		±0.5°
10 dBV	3		±0.1 dB	6		±0.5°
BNC center conductor grounded						
−13 dBV	7		±0.8 dB	9		±8.5°
8 dBV	8		±0.8 dB	10		±8.8°

2-26 Anti-Alias Filter Response				
Signal Frequency	Alias Frequency	PASS CHAN 1	PASS CHAN 2	Specification
156 kHz	100 kHz			≤ −80 dB
184 kHz	72 kHz			≤ −80 dB
206 kHz	50 kHz			≤ −80 dB
267 kHz	11 kHz			≤ −80 dB

2-27 Frequency Accuracy			
Signal Frequency	Specification Lower Limit	Upper Limit	Measured Value
99,000 Hz	98.996 kHz	99.004 kHz	

2-28 Input Coupling Insertion Loss			
Channel 1		Channel 2	
Insertion Loss	Specification	Insertion Loss	Specification
	<3 dB		<3 dB

2-29 Single Channel Phase Accuracy						
BNC shell grounded						
Signal Frequency	Trigger		Specification		Measured Value	
	Slope	Type	Lower Limit	Upper Limit	CHAN 1	CHAN 2
9 kHz	POS	CHAN 1	−92.5°	−87.5°		
9 kHz	POS	CHAN 2	−92.5°	−87.5°		
9 kHz	POS	EXT	−92.5°	−87.5°		
9 kHz	NEG	EXT	87.5°	92.5°		
99 kHz	POS	CHAN 1	−102°	−78.0°		
99 kHz	POS	CHAN 2	−102°	−78.0°		
99 kHz	POS	EXT	−102°	−78.0°		

BNC center conductor grounded						
Signal Frequency	Trigger		Specification		Measured Value	
9 kHz	POS	CHAN 1	−96.5°	−83.5°		
9 kHz	POS	CHAN 2	−96.5°	−83.5°		
9 kHz	POS	EXT	−96.5°	−83.5°		
9 kHz	NEG	EXT	83.5°	96.5°		
99 kHz	POS	CHAN 1	−106°	−74.0°		
99 kHz	POS	CHAN 2	−106°	−74.0°		
99 kHz	POS	EXT	−106°	−74.0°		

2-30 Input Impedance

Resistance Measurement

Range Setting	Specification Lower Limit	Specification Upper Limit	Measured Value CHAN 1	Measured Value CHAN 2
20 dBV	950 kΩ	1050 kΩ		
0 dBV	950 kΩ	1050 kΩ		
−13 dBV	950 kΩ	1050 kΩ		

Capacitance Measurement

Channel 1		Channel 2	
Vin =	Vrms	Vin =	Vrms
Vc =	Vrms	Vc =	Vrms

$$C = \left[\left(\frac{Vin}{Vc} - 1\right)\right] \quad 15.9\ pF - 1.59\ pF$$

Measured Value CHAN 1	Measured Value CHAN 2	Specification
pF	pF	<100 pF

2-31 Harmonic Distortion

Measurement One

Signal Frequency	Measured Channel 1 Harmonic Frequency Amplitude	Measured Channel 2 Harmonic Frequency Amplitude	Specification
49500 Hz			≤ −80 dB
33000 Hz			≤ −80 dB
245750 Hz			≤ −80 dB
19800 Hz			≤ −80 dB

Measurement Two

Signal Frequency	Measured Channel 1 Harmonic Frequency Amplitude	Measured Channel 2 Harmonic Frequency Amplitude	Specification
49500 Hz			≤ −80 dB
33000 Hz			≤ −80 dB
24750 Hz			≤ −80 dB
19800 Hz			≤ −80 dB

2-32 Intermodulation Distortion Measurement One				
BNC shell grounded	Channel 1		Channel 2	
Harmonic Frequency	**PASS**	Specification	**PASS**	Specification
6 kHz		≤ −80 dB		≤ −80 dB
14 kHz		≤ −80 dB		≤ −80 dB
12 kHz		≤ −80 dB		≤ −80 dB
8 kHz		≤ −80 dB		≤ −80 dB
BNC center conductor grounded	Channel 1		Channel 2	
Harmonic Frequency	**PASS**	Specification	**PASS**	Specification
6 kHz		≤ −80 dB		≤ −80 dB
14 kHz		≤ −80 dB		≤ −80 dB
12 kHz		≤ −80 dB		≤ −80 dB
8 kHz		≤ −80 dB		≤ −80 dB

2-32 Intermodulation Distortion Measurement Two				
BNC shell floating	Channel 1		Channel 2	
Harmonic Frequency	**PASS**	Specification	**PASS**	Specification
10 kHz		≤ −80 dB		≤ −80 dB
79 kHz		≤ −80 dB		≤ −80 dB
20 kHz		≤ −80 dB		≤ −80 dB
69 kHz		≤ − 80 dB		≤ −80 dB
BNC center conductor grounded	Channel 1		Channel 2	
Harmonic Frequency	**PASS**	Specification	**PASS**	Specification
10 kHz		≤ −80 dB		≤ −80 dB
79 kHz		≤ −80 dB		≤ −80 dB
20 kHz		≤ −80 dB		≤ −80 dB
69 kHz		≤ −80 dB		≤ −80 dB

2-33 Noise and Spurious Signal Level				
Spurious Signals				
Start Frequency	Frequency Span	**PASS** CHAN 1	**PASS** CHAN 2	Specification
20 Hz	1 kHz			≤ −131 dBV
1 kHz	10 kHz			≤ −131 dBV
10 kHz	10 kHz			≤ −131 dBV
20 kHz	10 kHz			≤ −131 dBV
30 kHz	10 kHz			≤ −131 dBV
40 kHz	10 kHz			≤ −131 dBV
50 kHz	10 kHz			≤ −131 dBV
60 kHz	10 kHz			≤ −131 dBV
70 kHz	10 kHz			≤ −131 dBV
80 kHz	10 kHz			≤ −131 dBV
90 kHz	10 kHz			≤ −131 dBV
Noise Level				
Start Frequency	Frequency Span	**PASS** CHAN 1	**PASS** CHAN 2	Specification
20 Hz	1 kHz			≤ −134 dBV/$\sqrt{\text{Hz}}$
1 kHz	50 kHz			≤ −144 dBV/$\sqrt{\text{Hz}}$
50 kHz	50 kHz			≤ −144 dBV/$\sqrt{\text{Hz}}$

2-34 Cross Talk		
PASS Channel 1	**PASS** Channel 2	Specification
		≥140 dB

2-35 Common Mode Rejection				
	First Measurement − Second Measurement = Relative Value			
Signal Frequency	First Measurement CHAN 1	Second Measurement CHAN 1	**Measured Value** CHAN 1	Specification
66 Hz				≥80 dB
500 Hz				≥65 dB
Signal Frequency	First Measurement CHAN 2	Second Measurement CHAN 2	**Measured Value** CHAN 2	Specification
66 Hz				≥80 dB
500 Hz				≥65 dB

2-36 External Reference Test		
Frequency	**Measured Value**	Specification
1 MHz		<999.90 kHz
10 MHz		>10.001 MHz

2-37 Source Residual Offset			
Voltage Range Setting	Specification Lower Limit	Upper Limit	**Measured Value**
1 Vpk	−10 mVpk	10 mVpk	
5 Vpk	−10 mVpk	10 mVpk	

2-38 Source Amplitude Accuracy and Flatness	
0 Hz to 65 kHz	**PASS**
65 kHz to 100 kHz	**PASS**

2-40 Source Distortion			
Source Amplitude	Source Frequency	PASS	Specification
25 mVpk	10 kHz		≥60 dB
5 Vpk	10 kHz		≥60 dB
25 mVpk	99 kHz		≥40 dB
5 Vpk	99 kHz		≥40 dB

2-41 Source Energy Measurement

Random Noise:

HP 3562A Reading $(\sqrt{\quad})$ _____
Voltmeter Average ( )

X 100 = _____ ≥70%
% in-band energy

Periodic Chirp:

HP 3562A Reading $(\sqrt{\quad})$ _____
Voltmeter Average ( )

X 100 = _____ ≥85%
% in-band energy

How to clean air filter

The cooling fan's air filter is located on the rear panel. To service the filter, remove the power cable and remove the four knurled nuts that hold the filter to the rear panel. Clean the filter using a solution of warm water and a mild soap or replace the filter. The air filter should be cleaned every 30 days.

Cleaning Solvents

Unplug the instrument power cord before cleaning any portion of the instrument. Use only non-abrasive, non-corrosive cleansers. A solution of warm water and mild soap is recommended.

1-9 SPECIFICATIONS

The 3562A specifications are listed in table 1-3. These specifications describe the instrument's warranted performance. Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance specifications. Supplemental characteristics are denoted as "typical, "nominal", or "approximately".

Table 1-3 **Specifications**

FREQUENCY

Measurement Range: 64 μHz to 100 kHz, both channels single or dual channel operation.

Accuracy: ±0.004% of frequency reading

Resolution: Span/800, both channels, single or dual channel operation.

Spans:	Baseband	Zoom
# of spans	66	65
Minimum span	10.24 mHz	20.48 mHz
Maximum span	100 kHz	100 kHz
Time record (Sec)	800/Span	800/Span

Window Functions: Hanning, flat top, uniform, force, exponential, and user-defined.

Window Parameters:	Flat Top	Hanning	Uniform
Noise Equiv BW (% of span)	0.478	0.188	0.125
3 dB BW (% of span)	0.45	0.185	0.125
Shape Factor (60 dB BW/ 3 dB BW)	2.6	9.1	716

Typical Real Time Bandwidth:	
Single channel, single display	2.5 kHz
Single channel, fast averaging	10 kHz
Dual channel, single display	2 kHz
Dual channel, fast averaging	5 kHz
Throughput to CS/80 disc	
Single channel	10 kHz
Dual channel	5 kHz

Table 1-3 **Specifications cont.**

AMPLITUDE

Accuracy: Defined as full-scale accuracy at any of the 801 calculated frequency points. Overall accuracy is the sum of absolute accuracy, window flatness and noise level.

Absolute Accuracy:
Single channel (Channel 1 or Channel 2)
±0.15 dB ±0.015% of input range (+27 dBV to −40 dBV, input connections as specified in Cases 1 and 2 in figure 1-3)
±0.25 dB ±0.025% of input range (−41 dBV to −51 dBV, input connections as specified in Cases 1 and 2 in figure 1-3)

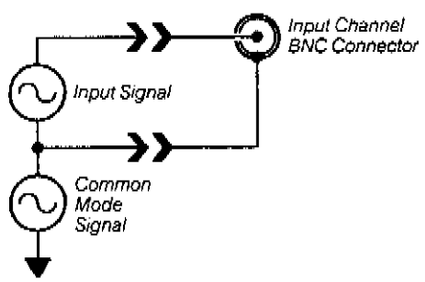
DC Response: Auto-Cal on

Input Range (dBVrms)	DC Level
+27 to −35	>30 dB below full scale
−36 to −51	>20 dB below full scale

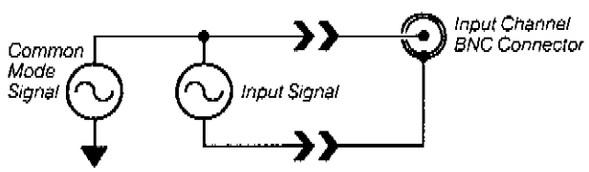
Frequency Response Channel Match:
±0.1 dB, ±0.5° (input connections as specified in Cases 1 and 2 in figure 1-3)

Input Connections:
Cases 1 and 2 are the recommended input connections.

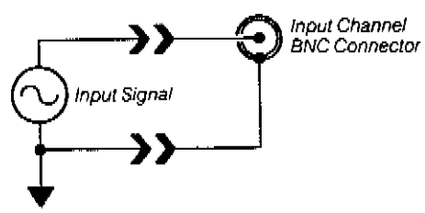
Case 1



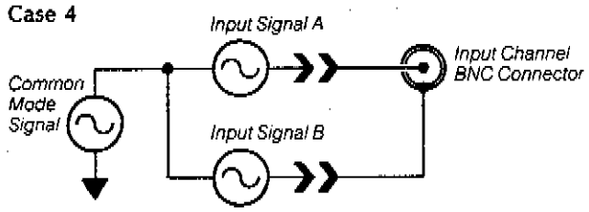
Case 3



Case 2



Case 4



Cases 3 and 4 are input connections which degrade amplitude accuracy. For these cases, the amplitude accuracy previously specified must be modified with the accuracy adders. (See next paragraph)

Figure 1-3 Input Connections

Table 1-3 **Specifications cont.**

Accuracy Adder: Single channel, inputs connected as shown in Cases 3 and 4 in figure 1-3. Add ±0.35 dB and ±4.0° to the absolute accuracy.

Accuracy Adder: Dual channel measurements Add ±0.35 dB and ±4.0° once for each input connected as shown in Cases 3 and 4 in figure 1-3.

Window Flatness:

Flat Top:	+0, −0.01 dB
Hanning:	+0, −1.5 dB
Uniform:	+0, −4.0 dB

Noise Floor: Flat top window, 50Ω source impedance. −51 dBV range
20 Hz to 1 kHz (1 kHz span) < −126 dBV (< −134 dBV/$\sqrt{Hz}$)
1 kHz to 100 kHz (100 kHz span) < −116 dBV (< −144 dBV/$\sqrt{Hz}$)
Dynamic Range: All distortion (intermodulation and harmonic), spurious and alias products ≥ 80 dB below full scale input range (16 averages <10 kΩ termination).

PHASE

Accuracy: Single Channel, input connections as specified in Cases 1 and 2 in figure 1-3.

< 10 kHz	±- 2. 5°
10 kHz to 100 kHz	±- 12 .0°

INPUTS

Input impedance: 1 MΩ ±5% shunted by <100 pF.

Input Coupling: The inputs may be ac or dc coupled; ac rolloff is <3 dB at 1 Hz.

Crosstalk: < −140 dB (50Ω source, 50Ω input termination, input connectors shielded)

Common Mode Rejection:

0 Hz to 66 Hz	80 dB
66 Hz to 500 Hz	65 dB

Common Mode Voltage: dc to 500 Hz

Input Range (dBV rms)	Maximum (ac + dc)
+27 to −12	±42.0 Vpk
−13 to −51	±18.0 Vpk*

*For the −43 to −51 dBV input ranges, common mode signal levels cannot exceed ±18 Vpk or (Input Range) + (Common Mode Rejection), whichever is the lesser level.

Common Mode Voltage: 500 Hz to 100 kHz. The ac part of the signal is limited to 42 Vpk or (Input Range) + (10 dB), whichever is the lesser level.

Table 1-3 **Specifications cont.**

Common Mode Distortion: For the levels specified, distortion of common mode signals will be less than the level of the rejected common mode signal.

External Trigger Input Impedance: typically 50 kΩ ±5%

External Sampling Input: TTL compatible input for signals ≤256 kHz (maximum sample rate).

External Reference Input:
Input Frequencies: 1,2,5 or 10 MHz ±0.01%
Amplitude Range: 0 dBm to +20 dBm (50Ω)

TRIGGER

Trigger Modes: Free run, input channel 1, input channel 2, and external trigger. Free run applies to all measurement modes. Input channel 1, input channel 2 and external trigger apply to the linear resolution mode, time capture mode, and time throughput measurements.

Trigger Conditions:
Free Run: A new measurement is initiated by the completion the previous measurement.

Input: A new measurement is initiated when the input signal to either Channel 1 or Channel 2 meets the specified trigger conditions, trigger level range is ±100% of full scale input range; trigger level is user selectable in steps of (Input Range in volts)/128.

Source: Measurements are synchronized with the periodic signal types (burst random, sine chirp, and burst chirp).

External: A new measurement is initiated by a signal applied to the front panel Ext Trigger input. Trigger level range is ±10 Vpk; trigger level is user selectable in 80 mV steps.

Trigger Delay:
Pre-Trigger: The measurement can be based on data from 1 to 4095 samples in baseband and from 1 to 4094 samples in zoom prior to trigger conditions being met. Resolution is 1 sample (1/2048 of a time record).

Post-Trigger: The measurement is initiated from 1 to 65,536 samples (1/2048 to 32 time records) after the trigger conditions are met. Resolution is 1 sample (1/2048 of a time record).

SOURCE

Band limited, band translated random noise, burst random, sine chirp, burst chirp, as well as fixed sine and swept sine signals are available from the front panel source output. DC Offset is also user-selectable.

Output Impedance: 50Ω Nominal

Output Level: Between -10Vpk and +10 Vpk (ac + dc) into a load ≥10 kΩ, <1000 pF. Maximum current = 20 mA.

AC Level: ±5 Vpk (≥10 kΩ, <1000 pF load)

DC Offset: ±10 Vpk in 100 mV steps. Residual offset at 0V offset ≤10 mV.
%In-Band Energy: (1 kHz span, 5 kHz center frequency)
Random Noise: 70%
Sine Chirp: 85%

Accuracy and Purity: Fixed or Swept Sine
Flatness: ±1 dB from 0 to 65 kHz
+1 dB, −1.5 dB from 65 kHz to 100 kHz
Distortion: (including subharmonics)

dc to 10 kHz	−60 dB
10 kHz to 100 kHz	−40 dB

Table 1-3 **Specifications cont.**

GENERAL

Specifications apply when AUTO CAL is enabled, or within 5° C and 2 hours of last internal calibration.

Ambient Temperature: 0 to 55 °C.
Relative Humidity: ≤95% at 40 °C.
Altitude: ≤4,572m (15,000 ft).

Storage:
Temperature: −40 to +75 °C.
Altitude: ≤15,240m (50,000 ft).

Weight:
26 kg (56 lbs) net
35 kg (77 lbs) shipping

Power:
115 Vac +10%, −25%, 48 to 440 Hz
230 Vac +10%, −15%, 48 to 66 Hz
450 VA maximum

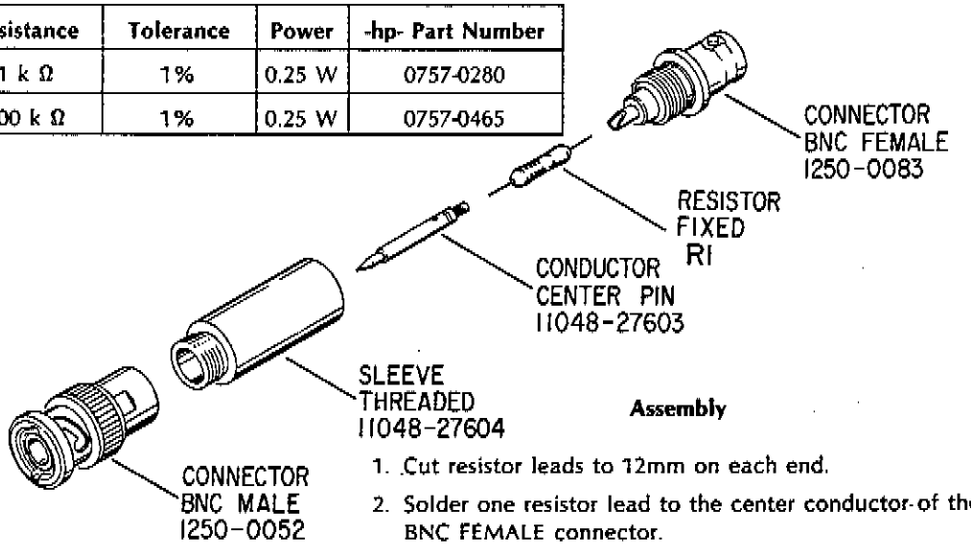
Dimensions:
222 mm (8.75 in) high
426 mm (16.25 in) wide
578 mm (22.75 in) deep

HP-IB:
Implementation of IEEE Std 488-1978
SH1 AH1 T5 TE0 L4 LE0 SR1 RL1 PP0 DC1 DT1 C0
Supports the 91XX and 794X families of HP disc drives as well as Hewlett-Packard Graphics Language (HP-GL) digital plotters.

1-10 RECOMMENDED TEST EQUIPMENT

The equipment required to maintain the HP 3562A is listed in table 1-4. Other equipment may be substituted for the recommended model if it meets or exceeds the listed critical specifications. When substitutions are made, the user may have to modify the performance and adjustment procedures to accommodate the different operating characteristics.

Resistance	Tolerance	Power	-hp- Part Number
1 k Ω	1%	0.25 W	0757-0280
100 k Ω	1%	0.25 W	0757-0465



Assembly

1. Cut resistor leads to 12mm on each end.
2. Solder one resistor lead to the center conductor of the BNC FEMALE connector.
3. Solder the CONDUCTOR CENTER PIN to the other lead of the resistor.
4. Screw the SLEEVE and the BNC MALE connector into place. Tighten securely.

Figure 1-4 Constructing a Feedthrough

Table 1-4 Recommended Test Equipment

Instrument	Critical Specifications	Recommended Model	Use*
AC Calibrator	10 Hz to 100 kHz; 1 mV to 10V Amplitude Accuracy: ±.1%	Fluke 5200A Alternative HP 745A Datron 4200	P,O
Frequency Synthesizer (2)	Frequency Range: 1 Hz to 100 kHz Frequency Accuracy: 10 ppm Amplitude Range: 40 Vp-p Amplitude Accuracy: 0.2 dB from 1 Hz to 100 kHz 1 dB from 100 kHz to 1 MHz	HP 3325A Opt 001 Opt 002 Alternative (1) HP 3326A Opt 002	P,O
Digital Voltmeter	5½ digit AC Voltage: 30 Hz to 100 kHz; 0.1 to 500V; ±0.1%; 1 MΩ input impedance dc Voltage: 1V to 1000V; ±0.1%	HP 3456A	P,T,F
Low Distortion Oscillator	Frequency Range: 1 Hz to 100 kHz Amplitude Range: 0.1 V to 1 Vrms Distortion: ≤ −80 dB (0.01%)	HP 339A Alternative HP 3326A	P
Oscilloscope	Bandwidth: >50 MHz Two Channel; External Trigger	HP 1980B Alternative HP 1740	A,T,F
Signature Analyzer	Maximum Clock: >25 MHz Clock Set up Time: <20 ns	HP 5006A Alternative HP 5005A HP 5005B	T
Variable AC Power Supply	Voltage Range: 80 to 120 Vac Frequency Range: 60 Hz Voltage Accuracy: ±2%	**	T
Triple Output DC Power Supply	Voltage Range: +15 to −15 Vdc, 0 to +6 Vdc Power: 13 watts	HP 6235A Alternative: HP 6236A	T
Counter	Frequency Range: 0 Hz to 100 MHz External Frequency Standard Input: 10 MHz 10 MHz	HP 5335A Alternative: HP 5238B Opt 010	A

* P = Performance Tests, A = Adjustments, O = Operational Vertification, F = Fault Isolation, T = Troubleshooting

** No specific model number is recommended,any variable AC power supply which meets the listed critical specifications may be used.

Table 1-4 Recommended Test Equipment cont.

Instrument	Critical Specifications	Recommended Model	Use*
Probe, Oscilloscope	Impedance: 10 MΩ Division Ratio: 10:1 Maximum Voltage: 500 Vdc	HP 10014A Alternatives: HP 10016B HP 10004A HP 10005D	A,F, T
HP 3562A Service Kit	Digital Extender Brd (HP 03562-66540) Analog Extender Brd (HP 03562-66541) Input/Analog Ext Brd (HP 03562-66542) Common Mode Cable (HP 03562-61620) Input Extender Cable (HP 03562-61621) SMB to BNC adapter cable (HP 03585-61616)	HP 03562-84401	P,A,O F,T
Feedthrough Terminations (2) (1)	 50Ω: ±1% at dc 600Ω: ±1% at dc	 HP 11048C Alternative: HP 10100C HP 11095A	P,O
Cables (2)	BNC to BNC: length ≤30 cm	HP 8120-1838 Alternative: HP 11170A	P,O
Adapters	BNC female to Banana male BNC (f) to dual banana male BNC Tee (m)(f)(f)	Pomona Elect. Model 1296 HP 1251-2277 HP 1250-0781	P,O
Resistors (2) (1)	Value 1 kΩ Accuracy: 1% Power: 0.25W Value: 100 kΩ Accuracy: 1% Power: 0.25W	HP 0757-0280 HP 0757-0465	P

* P = Performance Tests, A = Adjustments, O = Operational Verification, F = Fault Isolation, T = Troubleshooting