2 Adjustment Procedures

Introduction

This chapter contains information on automated and manual adjustment procedures. Perform the automated procedures using the Agilent 85629B test and adjustment module (TAM). Never perform adjustments as routine maintenance. Adjustments should be performed after a repair or performance test failure. Refer to Table 2-1 to for which adjustments to perform.

Automated Procedures

Manual Procedures

NOTE Before performing any adjustments, allow the spectrum analyzer to warm up for at least 5 minutes.

Safety Considerations

Although this instrument has been designed in accordance with international safety standards, this manual contains information, cautions, and warnings which must be followed to ensure safe operation and to prevent damage to the instrument. Service and adjustments should be performed only by qualified service personnel.

WARNING

These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is being opened.

Adjustments in this section are performed with power supplied to the instrument and protective covers removed. There are voltages at many points in the instrument which can, if contacted, cause personal injury. Be extremely careful. Adjustments should be performed only by trained service personnel.

Power is still applied to this instrument with the LINE switch in the off position. Before removing or installing any assembly or printed circuit board, remove the line-power cord.

The power cord is connected to internal capacitors inside that may remain live for 5 seconds after the instrument has been disconnected from its source of supply.

Use a nonmetallic adjustment tool whenever possible.

Which Adjustments Should Be Performed?

Table 2-1 lists the manual adjustments that should be performed when an assembly is repaired or changed. It is important to perform the adjustments in the order indicated to ensure that the instrument meets its specifications.

Test Equipment

The equipment required for the manual adjustment procedures is listed in Table 2-1, "Related Adjustments," on page 51. Any equipment that satisfies the critical specifications given in the table may be substituted for the preferred test equipment.

If an Agilent 3335A is not available for performance tests, tests using alternate test equipment are available. See Chapter 2a, "Manual Adjustment Procedures: 3335A Source Not Available," on page 133.

Adjustable and Factory-Selected Components

Table 2-2 on page 54 lists the adjustable components by reference designation and name. For each component, the table provides a description and lists the adjustment number.

Refer to Table 2-3 on page 56 for a complete list of factory-selected components used in the instrument along with their functions. Factory-selected components are identified with an asterisk on the schematic diagrams.

Adjustment Tools

For adjustments requiring a nonmetallic tuning tool, use fiber tuning tool, part number 8170-0033.

Two different tuning tools may be necessary for IF bandpass adjustments, depending upon the type of tuning slug used in the slug-tuned inductors. If the tuning slug requires a slotted tuning tool, use part number 8710-1010. If the tuning slug requires a forked tuning tool, use part number 8710-0772.

Never try to force an adjustment control. This is especially critical when tuning variable capacitors or slug-tuned inductors. Required service accessories, with part numbers, are listed in Table 1-2 on page 33.

Instrument Service Position

Refer to Chapter 3, "Assembly Replacement," for information on removing the spectrum analyzer cover assembly and accessing all internal assemblies.

Table 2-1 Related Adjustments

Assembly Changed or Repaired	Perform the following related adjustments in the order listed	Adjustment Number
A1A1 keyboard	No related adjustment	
A1A2 RPG	No related adjustment	
A2 controller	16 MHz PLL adjustment	22
	Display adjustment (8561E and 8563E only) If EEROM from old A2 controller could not be used in new A2 or if EEROM must be replaced, also perform the following adjustments:	2
	LO distribution amplifier adjustment (8561E/EC)	8
	LO distribution amplifier adjustment (8563E/EC)	9
	Dual band mixer bias adjustment (8561E/EC)	10
	External mixer amplitude adjustment	18
	Switched YIG-tuned filter adjustment (8561E/EC)	20
	YIG-tuned filter/mixer adjustment (8563E/EC)	21
	Frequency response adjustment (8561E/EC)	11
	Frequency response adjustment (8563E/EC)	12
A3 interface	Display adjustment—fast zero span (8561E/8563E)	2
	Frequency response adjustment (8561E/EC)	11
	Frequency response adjustment (8563E/EC)	12
A4 log amp/cal osc	Display adjustment—fast zero span (8561E/8563E)	2
	Demodulator adjustment	16
	IF amplitude adjustment	4
	DC log amplifier adjustment	5
A5 IF	IF bandpass adjustment	3
	IF amplitude adjustment	4
A6 power supply	High voltage power supply adjustment (8561E and 8563E only)	1
	Display adjustment (8561E and 8563E only)	2
A6A1 HV module	High voltage power supply adjustment (8561E and 8563E only)	1
	Display adjustment (8561E and 8563E only)	2
A7 LO distribution amplifier	LO distribution amplifier adjustment (8561E/EC)	8

Table 2-1 Related Adjustments (Continued)

Assembly Changed or Repaired	Perform the following related adjustments in the order listed	Adjustment Number
	Frequency response adjustment (8561E/EC) (Or perform the frequency response performance test in the *Agilent Technologies 8560 E-Series and EC-Series Spectrum Analyzer Calibration Guide*. The adjustment must be performed if the performance test fails.)	11
A7 switched LO distribution amplifier	LO distribution amplifier adjustment (8563E/EC)	9
	Frequency response adjustment (8563E/EC) (Or perform the frequency response performance test in the *Agilent Technologies 8560 E-Series and EC-Series Spectrum Analyzer Calibration Guide*. The adjustment must be performed if the performance test fails.)	12
A8 dual band mixer	Dual band mixer bias adjustment (8561E/EC)	10
	Frequency response adjustment (8561E/EC)	11
A8 low band mixer	Frequency response adjustment (8563E/EC)	12
A9 input attenuator	Frequency response adjustment (8561E/EC) (Or perform the frequency response performance test in the *Agilent Technologies 8560 E-Series Spectrum Analyzer Calibration Guide*. The adjustment must be performed if the performance test fails.)	11
A9 input attenuator	Frequency response adjustment (8563E/EC) (Or perform the frequency response performance test in the *Agilent Technologies 8560 E-Series Spectrum Analyzer Calibration Guide*. The adjustment must be performed if the performance test fails.)	12
A10 SYTF	Switched YIG-tuned filter (SYTF) adjustment (8561E/EC)	20
	Frequency response adjustment (8561E/EC)	11
A10 RYTHM	YIG-tuned filter/mixer (RYTHM) adjustment (8563E/EC)	21
	Frequency response adjustment (8563E/EC)	12
A11 YTO	YTO adjustment	7
A13 2nd converter	Frequency response adjustment (8561E/EC)	11
	Frequency response adjustment (8563E/EC)	12
A14 frequency control	Display adjustment (fast zero span)	2
	YTO adjustment	7
	LO distribution amplifier adjustment (8561E/EC)	8
	LO distribution amplifier adjustment (8563E/EC)	9
	Frequency response adjustment (8561E/EC)	11
	Frequency response adjustment (8563E/EC)	12

Table 2-1 Related Adjustments (Continued)

Assembly Changed or Repaired	Perform the following related adjustments in the order listed	Adjustment Number
A15 RF	10 MHz reference adjustment (TCXO, Option 103)	15
	Calibrator amplitude adjustment	13
	External mixer bias adjustment	17
	Sampling oscillator adjustment	6
	Signal ID oscillator adjustment	19
	External mixer amplitude adjustment	18
	Frequency response adjustment (8561E/EC)	11
	Frequency response adjustment (8563E/EC)	12
A15U100 sampler	Sampling oscillator adjustment	6
A17 CRT driver	Display adjustment (8561E and 8563E)	2
A18V1 CRT	Display adjustment (8561E and 8563E)	2
A19 GPIB	No related adjustment	
A21 OCXO	10 MHz reference adjustment (OCXO)	14

Table 2-2 Adjustable Components

Reference Designator	Adjustment Name	Adjustment Number	Description
A2R152	16 MHz PLL ADJ	22	Adjusts the free-running frequency of the 16 MHz CPU clock.
A2R206	DGTL X GAIN	2	Adjusts the horizontal gain in the X line generator.
A2R209	SWEEP OFFSET	2	Adjusts the beginning of the trace to the leftmost vertical graticule line in fast-analog zero-span mode.
A2R215	DGTL Y GAIN	2	Adjusts the vertical gain in the Y line generator.
A2R218	VIDEO OFFSET	2	Adjusts the vertical position in fast-analog zero span to match the digital zero-span input.
A2R262	STOP BLANK	2	Adjusts the blanking at the end of a vector on the display.
A2R263	START BLANK	2	Adjusts the blanking at the start of a vector on the display.
A2R268	VIDEO GAIN	2	Adjusts the vertical gain in fast-analog zero span to match with the digital zero-span input.
A2R271	SWEEP GAIN	2	Adjusts the end of the trace to the rightmost vertical-graticule line in fast-analog zero-span mode.
A4C707	FM DEMOD	16	Adjusts the FM demodulation for a peak response.
A4R445	LIMITER PHASE	5	Adjusts Limiter Phase for peak response.
A4R531	LOG AMP TOS	5	Minimizes error to Top of Screen.
A4R826	CAL OSC AMPTD	4	Sets calibration oscillator output power (nominally −35 dBm). This power is injected into the IF during the AUTO IF ADJUST routines.
A4R544	LIN FIDELITY BOW	5	Minimizes Linearity Fidelity error.
A5L300	LC CTR 1	3	Adjusts center frequency of first stage of LC bandwidth filter to 10.7 MHz.
A5L301	LC CTR 2	3	Adjusts center frequency of first stage of LC bandwidth filter to 10.7 MHz.
A5L700	LC CTR 3	3	Adjusts center frequency of third stage of LC bandwidth filter to 10.7 MHz.
A5L702	LC CTR 4	3	Adjusts center frequency of fourth stage of LC bandwidth filter to 10.7 MHz.

Table 2-2 Adjustable Components (Continued)

Reference Designator	Adjustment Name	Adjustment Number	Description
A5R343	15 DB ATT	4	Adjusts the attenuation of the reference 15 dB attenuator for 15 dB between minimum and maximum attenuation.
A5T200	XTAL CTR 1	3	Adjusts center frequency of first stage of crystal bandwidth filter to 10.7 MHz.
A5T202	XTAL CTR 2	3	Adjusts center frequency of second stage of crystal bandwidth filter to 10.7 MHz.
A5T202	XTAL CTR 2	3	Adjusts center frequency of second stage of crystal bandwidth filter to 10.7 MHz.
A5T500	XTAL CTR 3	3	Adjusts center frequency of third stage of crystal bandwidth filter to 10.7 MHz.
A5T502	XTAL CTR 4	3	Adjusts center frequency of fourth stage of crystal bandwidth filter to 10.7 MHz.
A6R410	HV ADJ	1	Adjusts the voltage between A6TP405 and A6TP401 to the voltage marked on the A6A1 high voltage module.
A14R42	6.01 GHz	7	Adjusts the main coil tune driver current at a YTO frequency of 6.01 GHz (near the upper YTO frequency limit).
A14R76	FM SPAN	7	Adjusts the FM span accuracy by affecting the sensitivity of the FM coil driver.
A14R93	3.2 GHz	7	Adjusts the main coil fixed driver current at a YTO frequency of 3.2 GHz (near the lower YTO frequency limit).
A15C100	SMPL MATCH	6	Transforms the sampler input impedance to 50 ohms over the 285 to 297.2 MHz range.
A15C210	VCO RANGE	6	Adjusts the VCO tank capacitance so that 21V on the VCO tune line equals 298 MHz VCO frequency.
A15C629	SIG ID	19	Fine adjusts the 298 MHz SIG ID oscillator frequency to optimize its performance.
A15U302	10 MHz ADJ	15	Adjusts frequency of the temperature compensated crystal oscillator (TCXO) to 10 MHz.
A15R561	CAL AMPTD	13	Adjusts amplitude of the 300 MHz calibrator signal to −10.0 dBm.
A15R926	EXT BIAS ZERO	17	Adjusts zero bias point of external mixer bias.
A17R4	Z GAIN	2	Adjusts maximum intensity.

Table 2-2 Adjustable Components (Continued)

Reference Designator	Adjustment Name	Adjustment Number	Description
A17R11	CUTOFF	2	Adjusts intensity to turn off blanked lines.
A17R21	Z FOCUS	2	Adjusts focus for lines of different brightness.
A17R26	X FOCUS	2	Adjusts focus at the left and right corners of the display.
A17R34	COARSE FOCUS	2	Adjusts focus at the center of the display.
A17R55	X GAIN	2	Adjusts the horizontal-deflection amplifier gain.
A17R57	X POSN	2	Adjusts the CRT horizontal position.
A17R75	Y GAIN	2	Adjusts the vertical-deflection amplifier gain.
A17R77	Y POSN	2	Adjusts the CRT vertical position.
A17R90	TRACE ALIGN	2	Adjusts the display axis rotation.
A17R92	DDD	2	Adjusts focus of the center of the display.
A17R93	ASTIG	2	Adjusts for the spot roundness on the CRT display.

Table 2-3 Factory Selected Components

Reference Designator	Adjustment Number	Basis of Selection
A5C204	3	Selected to optimize center frequency of LC tank that loads the crystal.
A5C216	3	Selected to optimize center frequency of LC tank that loads the crystal.
A5C326	3	Selected to optimize LC pole center frequency.
A5C327	3	Selected to optimize LC pole center frequency.
A5C505	3	Selected to optimize center frequency of LC tank that loads the crystal.
A5C516	3	Selected to optimize center frequency of LC tank that loads the crystal.
A5C717	3	Selected to optimize LC pole center frequency.
A5C718	3	Selected to optimize LC pole center frequency.

Using the TAM

The 85629B TAM can be used to perform approximately half of the spectrum analyzer adjustment procedures. Table 2-4 lists the TAM adjustments and their corresponding manual adjustments.

The TAM adjustments do not include procedures for choosing factory-selected components. If an adjustment cannot be made and a factory-selected component must be changed, refer to the corresponding manual adjustment.

To select an adjustment, press **MODULE** to display the TAM main menu, then press **ADJUST**. Position the pointer next to the desired adjustment using either the knob or step keys. Press **EXECUTE**, then follow the instructions displayed on-screen.

Test Equipment

During the TAM adjustments, instructions for setting test equipment controls are displayed, with the exclusion of the two tests listed below. Test equipment for these adjustments are controlled automatically.

Test 10. Low Band Flatness
Test 11. High Band Flatness and YTF

Table 2-5 on page 59 lists the test equipment needed to perform each TAM adjustment. Required models must be used. Substitutions may be made for recommended models. Substitute sources must operate over the frequency ranges indicated. Recommended substitutes are listed in the configuration menu. If you must substitute the source with a user-defined model, the adjustments run faster using a synthesized source rather than an unsynthesized source.

NOTE When connecting signals from the Agilent 8340A/B (or any microwave source) to the adjustment setup, use a high-frequency test cable with minimum attenuation to 26.5 GHz. part number 8120-4921 is recommended for its ruggedness, repeatability, and low insertion loss.

Adjustment Indicator

To aid in making adjustments, the TAM displays an "Analog Voltmeter Display Box" along the left-hand side of the display. A horizontal line moves inside the box to represent the needle of an analog voltmeter. A digital readout appears below the box. Tick marks are often displayed on the inside edges of the box indicating the desired needle position. (The tick marks and needle are intensified when the needle is within this acceptable region.) During some adjustments, an arrow appears along the right edge of the box. This arrow always indicates the highest position the needle has reached. The arrow is useful when a component must be adjusted for a peak response; if the peak is overshot, the arrow indicates where the peak was. The component can be readjusted until the needle is at the same position as the arrow.

Table 2-4 TAM Adjustments

TAM Adjustment	Corresponding Manual Adjustment	Adjustment Number
1. IF bandpass, LC poles	IF bandpass adjustment	3
2. IF bandpass, crystal poles	IF bandpass adjustment	3
3. IF amplitude	IF amplitude adjustment	4
4. Limiter phase	DC log amplifier adjustments, A4 limiter phase	5
5. Linear fidelity	DC log amplifier adjustments, A4 linear fidelity	5
6. Log fidelity	DC log amplifier adjustments, A4 log fidelity	5
7. Sampling oscillator	Sampling oscillator adjustment	6
8. YTO	YTO adjustment	7
9. LO distribution amplifier	First LO distribution amplifier adjustment	8
10. Low band flatness	Frequency response adjustment	9
11. High band flatness and YTF	Frequency response adjustment	9
	YIG-tuned filter/mixer adjustment	17
12. Calibrator amplitude	Calibrator amplitude adjustment	10
13. 10 MHz reference oscillator	10 MHz reference adjustment – TCXO (Option 103)	12
14. External mixer bias	External mixer bias adjustment	14
15. External mixer amplitude	External mixer amplitude adjustment	15

Table 2-5 Required Test Equipment for TAM

Adjustment	Equipment Used	Required Model	Recommended Model
1. IF bandpass, LC poles	None		
2. IF Bandpass, crystal poles	None		
3. IF amplitude	Synthesizer/level generator Test cable (SMB to BNC) Manual probe cable	3335A 5001-8743	 85680-60093
4. Limiter phase	Synthesizer/level generator Test cable BNC	3335A	 10503A
5. Linear fidelity 6. Log fidelity	Synthesizer/level generator Test cable BNC Synthesizer/level generator Test cable BNC	3335A 3335A	 10503A 10503A
7. Sampling oscillator	Manual probe cable	5001-8743	
8. YTO	Frequency counter (3 to 6.8 GHz)		5342A, 5343A
9. LO distribution amplifier	Manual probe cable	5001-8743	
10. Low band flatness	Source (10 MHz to 2.9 GHz) Power meter Power sensor (10 MHz to 2.9 GHz) Power splitter (10 MHz to 2.9 GHz)		8340A/B, 8902A, 436A, 438A 8482A, 8481A 11667B
11. High band flatness and YTF	Source (2.8 to 26.5 GHz) Power meter Power sensor (2.8 to 26.5 GHz) Power splitter (2.8 to 26.5 GHz)		8340A 8902A, 436A, 438A 8485A 8902A, 436A, 438A
12. Calibrator amplitude	Power meter Power sensor (300 MHz)	 8482A, 8481A	
13. 10 MHz reference Oscillator	Frequency counter (9 to 11 MHz)		5342A, 5343A
14. External mixer bias	Manual probe cable	5001-8743	
15. External mixer amplitude	Power meter Power sensor (310.7 MHz, –25 to –35 dBm) Source (310.7 MHz, –30 dBm)		8902A, 436A, 438A 8481D, 8484A 8340A/B

1. High Voltage Power Supply Adjustment (8561E and 8563E)

Assembly Adjusted

A6 power supply

Related Performance Test

There is no related performance test for this adjustment.

Description

The high voltage power supply is adjusted to the voltage marked on the A6A1 HV module. The A6A1 HV module is characterized in the factory to ensure that the display filament voltage is set to 6.0 V rms when the +110 Vdc (nominal) supply is set to the voltage marked on the HV module.

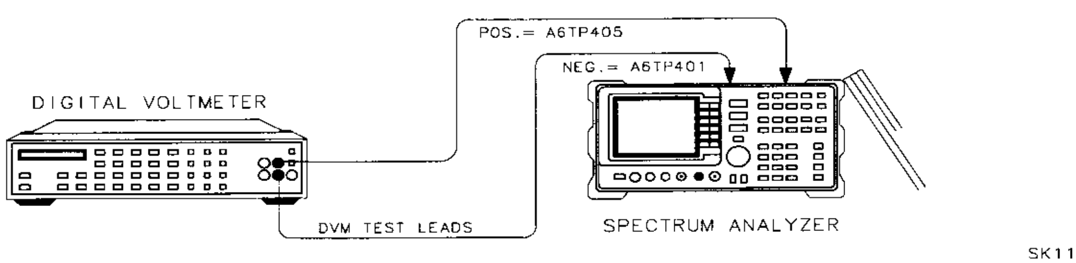
WARNING **To minimize shock hazard, use a nonmetallic adjustment tool when adjusting the A6 power supply**

The following procedure probes voltages that, if contacted, could cause personal injury or death.

NOTE Adjustment of the high voltage power supply should not be a routine maintenance procedure. Any adjustments should be done only if the A6 power supply, A6A1 HV module, or A18V1 CRT (display) is repaired or replaced.

You must perform the display adjustments after this adjustment if either the display or HV module has been replaced.

Figure 2-1 High Voltage Power Supply Adjustment Setup



Equipment

Digital multimeter . . . . Agilent 3456A
DVM test leads . . . . Agilent 34118A

Procedure

WARNING **After disconnecting the ac power cord, allow capacitors in the high voltage supply to discharge for at least 30 seconds before removing the protective cover from the A6 power supply.**

1. Turn the spectrum analyzer off by pressing **LINE**. Disconnect the power cord and remove the spectrum analyzer cover. Fold down the A2 controller, A3 interface, A4 log amplifier/cal oscillator, and A5 IF assemblies. Remove the A6 power supply cover.
2. Position the spectrum analyzer as shown in Figure 2-1. Connect the negative DVM lead to A6TP401 and the positive DVM lead to A6TP405 (place the positive DVM lead on the inductor (L401) lead which is adjacent to the label that reads "U401"; a white square outlines the area on the PC board where this lead is inserted into the A6 board).
3. Set the 3456A controls as follows:

   Function. . . . . DC VOLTS
   Range . . . . 1000 VOLTS
4. Reconnect the power cord to the spectrum analyzer and press **LINE** to the on position.
5. Record the voltage marked on the A6A1 HV module.

   Voltage marked on A6A1 HV Module = ____________Vdc
6. Adjust A6R410 HV ADJ for a voltage equal to the voltage recorded in step 5.
7. Press **LINE** to turn the spectrum analyzer off and disconnect the power cord. Wait at least 30 seconds for the high voltage power supply capacitors to discharge.
8. Disconnect the DVM test leads from A6TP401 and A6TP405. Reinstall the power supply cover.

2. Display Adjustment (8561E and 8563E)

Assembly Adjusted

A2 controller A17 CRT driver

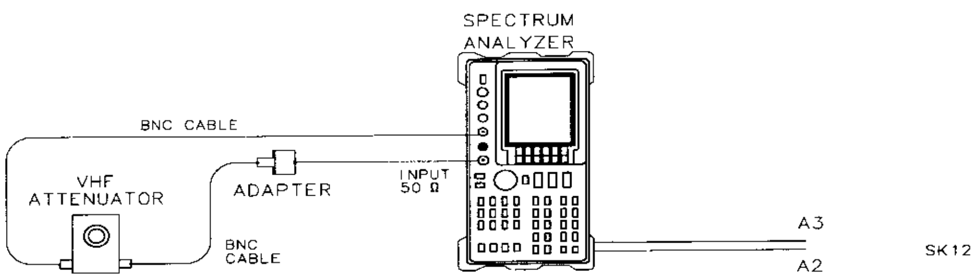
Related Performance Test

Sweep Time Accuracy (Sweep Times <30 ms)

Description

Coarse adjustment of the deflection amplifiers, Z-axis amplifiers, and line generators is done using the CRT adjust pattern. Fine adjustments use the graticule. The fast zero-span amplitude adjustments correct for differences between analog and digital display modes. The displayed sweep time accuracy is adjusted in the fast zero-span sweep adjustments.

Figure 2-2 **Display Adjustment Setup**



Equipment

10 dB VHF step attenuator 355D

Adapters
Type-N (m) to BNC (f) 1250-1476

Cables
BNC, 122 cm *(2 required)* 10503A

Procedure

NOTE If the A2 controller assembly is not part number 08563-60017, perform the 16 MHz PLL Adjustment in this chapter before proceeding with this adjustment.

1. Turn the spectrum analyzer off by pressing **LINE**. Remove the spectrum analyzer cover and fold out the A2 controller and A3 interface assemblies as illustrated in Figure 2-2. Connect the CAL OUTPUT to the INPUT. Adjustment locations are shown on the CRT neck for A17 adjustments and in Figure 2-4 on page 66 for the A2 adjustments.

Preliminary Adjustments

1. Set A17R55 X GAIN, A17R75 Y GAIN, A17R92 DDD, A17R93 ASTIG, A2R206 DGTL X GAIN, A2R215 DGTL Y GAIN, A2R262 STOP BLANK, and A2R263 START BLANK to midrange. Also set the rear-panel X POSN, Y POSN, and TRACE ALIGN to midrange.
2. Set A17R21 Z FOCUS, A17R26 X FOCUS, and A17R11 CUTOFF to midrange.
3. Set A17R4 Z GAIN fully clockwise.
4. Turn the spectrum analyzer on and allow it to warm up for at least 3 minutes. Adjust A17R11 CUTOFF until the display is visible and A17R34 COARSE FOCUS for best possible focus.

Cutoff Adjustment

5. Press **PRESET**, **DISPLAY**, **INTENSITY**, 255 **ENTER**, **STORE INTENSITY**, **MORE 1 of 2**, **FOCUS**, 127 **ENTER**, **STORE FOCUS**, then **GRAT ON OFF** (OFF). Adjust A17R11 CUTOFF until the retrace line between the bottom of trace A and the annunciators at the bottom of the display just disappears.

Deflection Adjustments

6. Press **GRAT ON OFF** (ON), **MORE 2 of 2**, **INTENSITY**, 80 **ENTER**, **STORE INTENSITY**, **CAL**, **MORE 1 of 2**, and **CRT ADJ PATTERN**. Fold up the A3 interface assembly to access the adjustments on the A2 controller assembly.
7. Refer to Figure 2-3 for locating the lines used for adjusting DGTL X GAIN and DGTL Y GAIN. Each of these lines is actually two lines adjusted for coincidence. The two lines will form an "X" if they are not adjusted properly.
8. Adjust A2R206 DGTL X GAIN until the two vertical lines near the left edge of the display converge to one single line.

9. Adjust A2R215 DGTL Y GAIN until the two horizontal lines near the top edge of the display converge to one single line.

10. Adjust A2R262 STOP BLANK and A2R263 START BLANK for the sharpest corners of the outer box in the test pattern. The intensity of the corners should be the same as the middle of the lines between the corners.

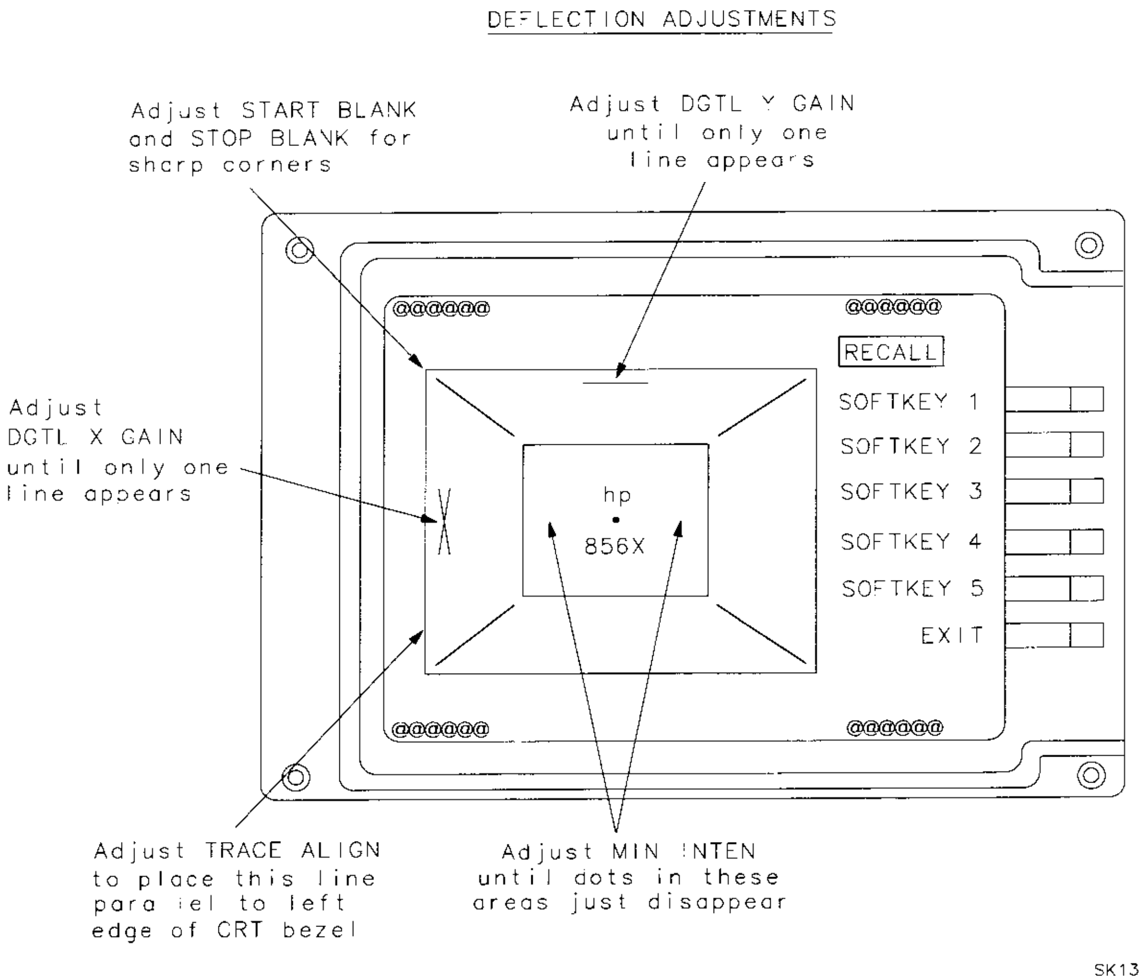
11. Adjust the rear-panel TRACE ALIGN until the leftmost line of the test pattern is parallel with the CRT bezel. See Figure 2-3.

12. Adjust the rear-panel X POSN and A17R55 X GAIN until the leftmost "@" characters and the softkey labels appear just inside the left and right edges of the CRT bezel.

13. Adjust the rear-panel Y POSN and A17R75 Y GAIN until the softkey labels align with their appropriate softkeys.

14. Press **PRESET**. If necessary, readjust STOP BLANK and START BLANK for the best-looking intersection of the graticule lines. This will be most noticeable along the center vertical and horizontal graticule lines.

Figure 2-3 CRT Adjust Pattern



Intensity Adjustments

15.Press **AMPLITUDE** then set the **REF LVL** to –70 dB and the **LOG dB/DIV** to 1. This should almost completely fill the screen with the noise floor. Press **SGL SWP**. Adjust A17R4 Z GAIN until the intensity at the center of the screen is about medium. It should be fully illuminated, but not so bright that it burns the screen (15 NITs on a photometer/radiometer).

16.Press **CAL**, **MORE 1 of 2**, and **CRT ADJ PATTERN**. Locate the dot just below the logo. Adjust A17R93 ASTIG for the smallest round dot possible.

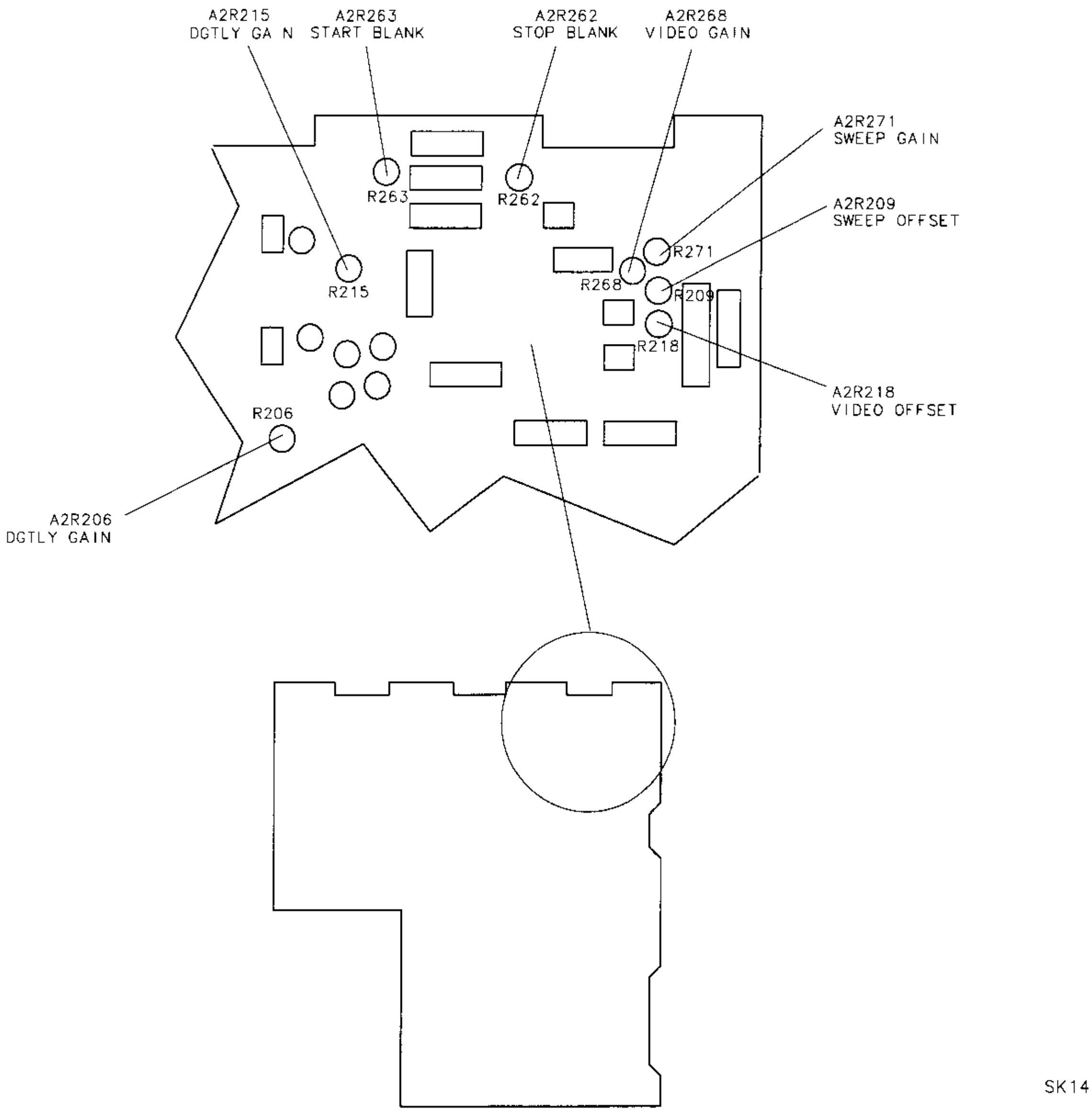
17.Adjust A17R34 COARSE FOCUS and A17R92 DDD for the best focus of the characters at the center of the screen.

18.Adjust A17R21 Z FOCUS for the best focus of the test pattern's outside box.

19. Adjust A17R26 X FOCUS for best focus of the "@" characters at the corners of the test pattern.

20. Repeat steps 17 through 20 to obtain the best overall focus quality.

Figure 2-4 **A2 Display Adjustment Locations**



Fast Zero Span Adjustments

1. Set A2R209 SWEEP OFFSET, A2R218 VIDEO OFFSET, and A2R268 SWEEP GAIN to midrange. Adjustment locations are shown in Figure 2-4 for these A2 adjustments.
2. Set the Agilent 355D to 30 dB attenuation.

3. Press **PRESET** on the spectrum analyzer, and connect the equipment as shown in Figure 2-2. Set the spectrum analyzer controls as follows:

   Center frequency .... 300 MHz
   Span .... 0 Hz
   Reference level .... –40 dBm
   Resolution bandwidth .... 1 kHz
   Video bandwidth.. 300 Hz
   Sweep time.. 50 ms

4. Press **MKR**, **MKR→**, **MARKER→ REF LVL**. If the marker is not at the top graticule, press **MARKER→ REF LVL** again.
5. Press **SAVE**, **SAVE STATE**, and **STATE 0**.
6. Set the sweep time to 10 ms.
7. Press **SAVE**, **SAVE STATE**, and **STATE 1**.
8. Adjust A2R209 SWEEP OFFSET to place the beginning of the trace at the leftmost vertical graticule line.
9. Adjust A2R271 SWEEP GAIN to place the end of the trace at the tenth vertical graticule line (one division from the right edge of the graticule).
10. Press **AMPLITUDE** and press the ⇑ key seven times.
11. Press **SAVE**, **SAVE STATE**, and **STATE 2**.
12. Set the sweep time to 50 ms. Press **SAVE**, **SAVE STATE**, and **STATE 3**.
13. Press **RECALL**, **RECALL STATE**, and **STATE 1**.
14. Switch between **STATE 1** and **STATE 2**. Adjust A2R268 and A2R218 so that the trace in state 1 is lined up with the top line of the graticule and the state 2 trace is lined up with the eighth graticule down from the top (counting the top line). Repeat until the traces align to within ±0.2 divisions.
15. Adjust A2R209 and A2R271 until the start of sweep is aligned to the leftmost vertical graticule line and the end of the sweep is aligned with the right most vertical graticule line.
16. Press **STATE 2** and **STATE 3**. The two traces should be aligned within ±0.1 divisions.
17. Press **STATE 0** and **STATE 1**. The two traces should be aligned within ±0.1 divisions.

3. IF Bandpass Adjustment

Assembly Adjusted

A5 IF assembly

Related Performance Test

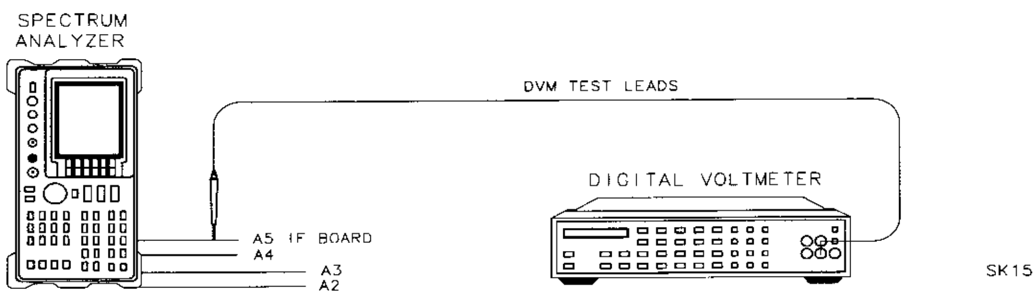
Resolution bandwidth accuracy and selectivity

Description

The center frequency of each IF bandpass filter pole is adjusted by DAC-controlled varactor diodes and an inductor (for the LC poles) or a transformer (for the crystal poles). The inductors and transformers are for coarse tuning and the varactors are for fine tuning by the microprocessor. The inductors and transformers are adjusted such that the varactor diodes are biased near the middle of their capacitance range. The varactor diode bias is measured with the DVM.

NOTE This procedure is not a routine adjustment. It should be performed only if repairs to the A5 IF assembly are made. If the entire A5 IF assembly is replaced, the assembly arrives pre-adjusted from the factory and requires no further adjustment.

Figure 2-5 **IF Bandpass Adjustment Setup**



Equipment

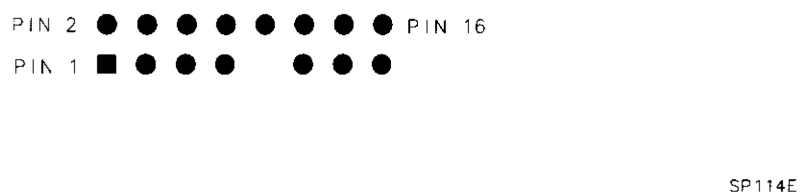
Digital voltmeter 3456A
DVM test leads.................................. 34118A
Special tuning tool (for slot-type tuning slugs) 8710-1010
Special tuning tool (for fork-type tuning slugs) 8710-0772

Procedure

1. Turn the spectrum analyzer off by pressing **LINE**. Disconnect the power cord. Remove the spectrum analyzer cover and fold down the A2 controller, A3 interface, A4 log amp, and A5 IF assemblies. Reconnect the power cord. Turn the spectrum analyzer on and allow it to warm up for at least 30 minutes.
2. Connect the negative DVM lead to pin 6 of A5J6. See Figure 2-5 and Figure 2-6. Set the Agilent 3456A controls as follows:

   Function. . . . . DC VOLTS
   Range . . . . .10 V
3. On the spectrum analyzer press **PRESET**, **SPAN**, 2, **MHz**, **CAL**, and **IF ADJ ON OFF** so OFF is underlined.

Figure 2-6 **TAM Connector Pin Locations**



LC Bandpass Adjustments

4. On the spectrum analyzer, press **ADJ CURR IF STATE**. Wait for the `IF ADJUST STATUS` message to disappear before continuing with the next step.
5. Read the voltage on A5TP5 (this is an empty-hole type of test point). If the voltage is less than +6.06 Vdc, turn A5L300 LC CTR 1 clockwise. If the voltage is greater than +6.26 Vdc, turn LC CTR 1 counterclockwise.
6. Repeat steps 4 and 5 until the voltage reads +6.16 Vdc ±100 mV.

NOTE If the range for the LC CTR adjustment is insufficient, replace the appropriate factory-selected capacitor as listed in Table 2-6 on page 70. To determine the correct replacement value, center the LC CTR adjustment and press **ADJ CURR IF STATE**. After the `IF ADJUST STATUS` message disappears, read the DVM display. Choose a capacitor value from Table 2-7 on page 70, based on the DVM reading and the presently loaded capacitor value. Table 2-10 on page 72 lists a few capacitor part numbers.

CAUTION Turn the spectrum analyzer off by pressing **LINE** to the off position before removing or replacing any shield.

7. Move the positive DVM lead to A5TP6.
8. Adjust A5L301 LC CTR 2 by repeating steps 4 through 6.
9. Move the positive DVM test lead to A5TP2 (this is a resistor-lead type of test point).
10. Adjust A5L700 LC CTR 3 by repeating steps 4 through 6.
11. Move the positive DVM test lead to A5TP1 (this is a resistor-lead type of test point).
12. Adjust A5L702 LC CTR 4 using the procedure in steps 4 through 6.

Table 2-6 Factory-Selected LC Filter Capacitors

LC CTR Adjustment	Fixed Factory Select Capacitor
A5L300 LC CTR 1	A5C326
A5L301 LC CTR 2	A5C327
A5L700 LC CTR 3	A5C717
A5L702 LC CTR 4	A5C718

Table 2-7 LC Factory-Selected Capacitor Selection

DVM Reading (V)	Currently Loaded Capacitor Value (pF)						
	Replace **6.8** with:	Replace **8.2** with:	Replace **10** with:	Replace **12** with:	Replace **15** with:	Replace **18** with:	Replace **20** with:
0 to 1.5	*	*	*	*	*	*	*
1.5 to 2.5	18	18	*	*	*	*	*
2.5 to 3.5	15	15	18	18	*	*	*
3.5 to 4.5	10	12	15	15	18	*	*
4.5 to 5.5	8.2	10	12	15	18	*	*
5.5 to 6.5	No change	No change	No change	No change	No change	No change	No change
6.5 to 7.5	No change	No change	No change	No change	No change	No change	No change
7.5 to 8.5	*	6.8	8.2	10	12	15	18
8.5 to 9.5	*	*	6.8	8.2	12	15	18
9.5 to 10	*	*	6.8	8.2	10	12	15
* Indicates a condition that should not exist; suspect broken hardware.							

XTAL Bandpass Adjustments

13.On the spectrum analyzer, press **SPAN**, 1, **MHz**, and **CAL**.

14.Move the positive DVM test lead to A5TP7.

15.On the spectrum analyzer, press **ADJ CURR IF STATE**. Wait for the IF ADJUST STATUS message to disappear before continuing to the next step.

16.Read the voltage displayed on the DVM. If the voltage is less than +6.06 Vdc, turn A5T200 XTAL CTR 1 clockwise. If the voltage is greater than +6.26 Vdc, turn XTAL CTR 1 counterclockwise.

17.Repeat steps 15 and 16 until the voltage reads +6.16 Vdc ±100 mV.

NOTE If the range for the XTAL CTR adjustment is insufficient, replace the appropriate factory-selected capacitor as listed in Table 2-8. To determine the correct replacement value, center the XTAL CTR adjustment, and press **ADJ CURR IF STATE**. After the IF ADJUST STATUS message disappears, read the DVM display. Choose a capacitor value from Table 2-9 on page 72, based on the DVM reading and the presently loaded capacitor value. Table 2-10 on page 72 lists a few capacitor part numbers.

CAUTION Turn the spectrum analyzer off by pressing **LINE** to the off position before removing or replacing any shield.

18.Move the positive DVM test lead to A5TP8.

19.Adjust A5T202 XTAL CTR 2 using the procedure in steps 15 through 17.

20.Move the positive DVM test lead to A5TP3.

21.Adjust A5T500 XTAL CTR 3 using the procedure in steps 15 through 17.

22.Move the positive DVM test lead to A5TP4.

23.Adjust A5T502 XTAL CTR 4 using the procedure in steps 15 through 17.

Table 2-8 Factory-Selected XTAL Filter Capacitors

XTAL CTR Adjustment	Fixed Factory Select Capacitor
A5T200 XTAL CTR 1	A5C204
A5T202 XTAL CTR 2	A5C216
A5T500 XTAL CTR 3	A5C505
A5T502 XTAL CTR 4	A5C516

Table 2-9 XTAL Factory-Selected Capacitor Selection

DVM Reading (V)	Currently Loaded Capacitor Value (pF)					
	Replace **15** with:	Replace **18** with:	Replace **20** with:	Replace **22** with:	Replace **24** with:	Replace **27** with:
0 to 1.5	*	*	*	*	*	*
1.5 to 2.5	27	*	*	*	*	*
2.5 to 3.5	22	27	27	*	*	*
3.5 to 4.5	18	22	24	27	27	*
4.5 to 5.5	18	20	22	24	27	*
5.5 to 6.5	No change	No change	No change	No change	No change	No change
6.5 to 7.5	No change	No change	No change	No change	No change	No change
7.5 to 8.5	*	15	18	18	22	24
8.5 to 9.5	*	15	15	18	20	24
9.5 to 10	*	*	15	18	20	24
* Indicates a condition that should not exist; suspect broken hardware.						

Table 2-10 Capacitor Part Numbers

Capacitor Value (pF)	Part Number
6.8	0160-4793
8.2	0160-4792
10	0160-4791
12	0160-4790
15	0160-4789
18	0160-4788
20	0160-5699
22	0160-4787
24	0160-5903
27	0160-4786

4. IF Amplitude Adjustments

The IF amplitude adjustments consist of the cal oscillator amplitude adjustment and the reference 15 dB attenuator adjustment.

Assembly Adjusted

A4 log amp/cal oscillator A5 IF assembly

Related Performance Tests

IF Gain Uncertainty Scale Fidelity

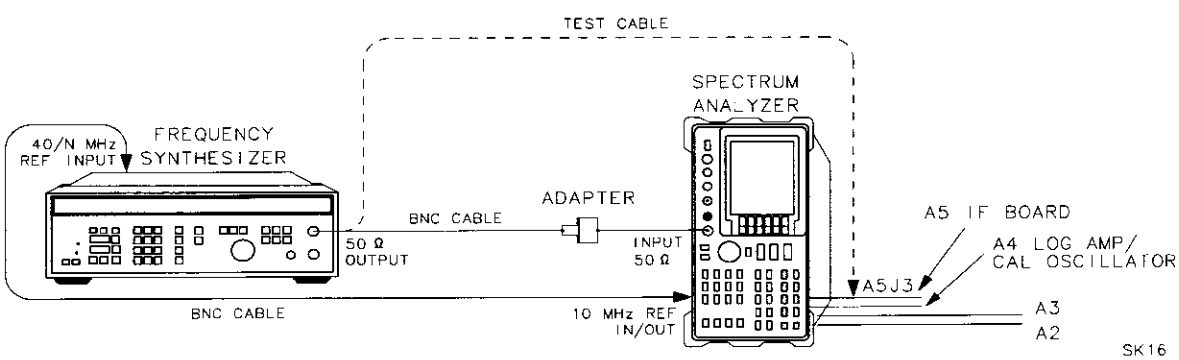
Description

This adjustment sets the output amplitude of the A4 log amp/cal oscillator and the absolute amplitude of the reference 15 dB attenuator.

The output of the A4 log amp/cal oscillator is adjusted so that a –55 dBm signal applied to the 10.7 MHz IF input on the A5 IF assembly (A5J3) causes a displayed signal of –60 dBm. The effect of this adjustment is visible only after the **ADJ CURR IF STATE** sequence is complete. **ADJ CURR IF STATE** causes the IF gain adjustment to use the "new" output amplitude from the A4 log amp/cal oscillator.

This procedure also sets the attenuator of the reference 15 dB attenuator so that a source amplitude change of 50 dB combined with a spectrum analyzer reference level change of 50 dB displays an amplitude difference of 50 dB.

Figure 2-7 **IF Amplitude Adjustment Setup**



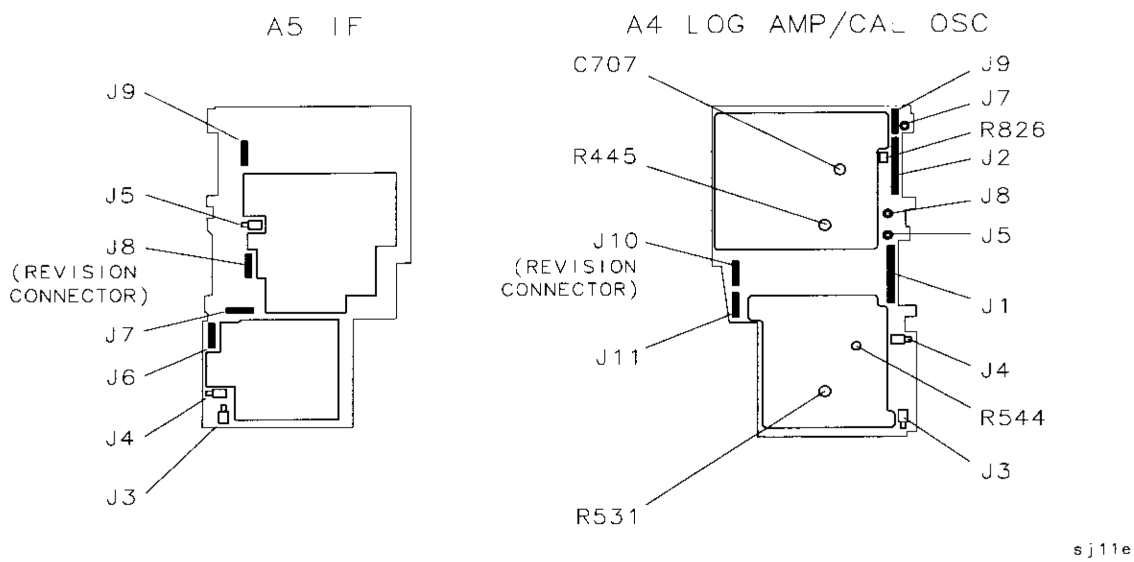
Equipment

Frequency synthesizer 3335A

Adapters
Type N (m) to BNC (f) 1250-1476

Cables
BNC, 122 cm (48 in) 10503A
Test cable 85680-60093

Figure 2-8 **IF Amplitude Adjustment Locations**



NOTE The 15 dB reference attenuator adjustment is preset at the factory and need not be done if the entire A5 IF assembly is replaced.

Procedure

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and place the spectrum analyzer in the service position as illustrated in Figure 2-7.
2. Disconnect W29, violet coax cable, from A5J3. Connect the test cable between A5J3 and the 50 Ω output of the 3335A. Press **LINE** to turn the spectrum analyzer on.

3. Set the spectrum analyzer controls as follows:

   Center frequency . . . . 10.7 MHz
   Span . . . . 200 kHz
   Reference level. . . . . –60 dBm
   Attenuator . . . . 0 dB
   dB/division . . . . 1 dB/DIV
   Resolution bandwidth . . . . 300 kHz
   Video bandwidth . . . . 100 Hz

   On the spectrum analyzer, press **MKR**, **CAL**, and **IF ADJ ON OFF** so OFF is underlined.

4. Set the 3335A controls as follows:

   Frequency . . . . 10.7 MHz
   Amplitude . . . . –55 dBm

5. Note the marker value. Ideally it should read –60 dBm ±0.1 dB.

6. If the marker reads below –60.1 dBm, rotate A4R826 CAL OSC AMPTD one-third turn clockwise for every 0.1 dB below –60 dBm. If the marker reads above –59.9 dBm, rotate A4R826 CAL OSC AMPTD one-third turn counter clockwise for every 0.1 dB above –60 dBm. See Figure 2-8 for the location of A4R826. A change in the displayed amplitude will not be seen until **ADJ CURR IF STATE** is pressed.

NOTE If A4R826 has inadequate range, refer to "Inadequate CAL OSC AMPTD Range" on page 472.

7. Press **ADJ CURR IF STATE**. After allowing the analyzer time to complete the adjustments, the displayed amplitude and marker reading should change.

8. Repeat steps 7 and 8 until the marker reads –60 dBm ±0.1 dB.

9. Disconnect the test cable from A5J3 and reconnect W29 to A5J3.

A5 Reference Attenuator Adjustment

10. Set the spectrum analyzer reference level to –60 dBm. If markers are displayed, press **MKR** and **MARKERS OFF**.

11. Set the 3335A **AMPLITUDE** to –60 dBm.

12. Connect a BNC cable between the 50 Ω output of the 3335A and the spectrum analyzer INPUT 50 Ω.

13. On the spectrum analyzer, press **CAL** and **REF LVL ADJ**. Use the front-panel knob or step keys to place the peak of the displayed signal 3 dB to 5 dB below the reference level.

14. Press **PEAK SEARCH** and **MARKER DELTA** on the spectrum analyzer. Set the spectrum analyzer reference level to –10 dBm.

15. Change the 3335A **AMPLITUDE** to –10 dBm.

16. Press **CAL** on the spectrum analyzer.

17. Note the ΔMKR amplitude. Ideally, it should read 50.00 dB ±0.1 dB.

18. If the ΔMKR amplitude is less than 49.9 dB, rotate A5R343 15 dB ATTEN one-half turn counterclockwise for each 0.1 dB below 50.00 dB. If the ΔMKR amplitude is greater than 50.1 dB, rotate A5R343 15 dB ATTEN one-half turn clockwise for each 0.1 dB above 50.00 dB. Do not adjust A5R343 more than five turns before continuing with the next step.

19. Press **ADJ CURR IF STATE** on the spectrum analyzer. Note the ΔMKR amplitude reading.

20. Repeat steps 11 through 20 until the ΔMKR amplitude reading is 50.00 dB ±0.1 dB.

A5 Adjustment Verification

21. On the spectrum analyzer, disconnect W29 from A5J3. Connect the test cable between A5J3 and the 50 Ω output of the 3335A.

22. Set the spectrum analyzer reference level to –10 dBm.

23. Set the 3335A **AMPLITUDE** to –5 dBm.

24. Press **MKR** and **MARKER NORMAL** on the spectrum analyzer.

25. The MARKER amplitude should read –10 dBm ±0.13 dB. If the reading is outside of this range, repeat steps 4 through 21.

26. On the spectrum analyzer, reconnect W29 to A5J3. Press **PRESET** and set the controls as follows:

    Center frequency . . . . 300 MHz
    Span . . . . 0 Hz
    Reference level . . . . –10 dBm
    Resolution bandwidth . . . . 300 kHz

27. Connect a BNC cable between the 8563E/EC CAL OUTPUT and INPUT 50 Ω.

28. On the spectrum analyzer, press **MKR CAL** and **REF LVL ADJ**.

29. Use the knob or step keys to adjust the REF LEVEL CAL setting until the MKR reads –10.00 dBm ±0.1 dB.

30. On the spectrum analyzer, press **STORE REF LVL**.

5. DC Log Amplifier Adjustments

There are three DC log adjustments: limiter phase, linear fidelity, and log fidelity.

Assembly Adjusted

A4 log amp/cal oscillator

Related Performance Tests

IF Gain Uncertainty
Scale Fidelity

Description

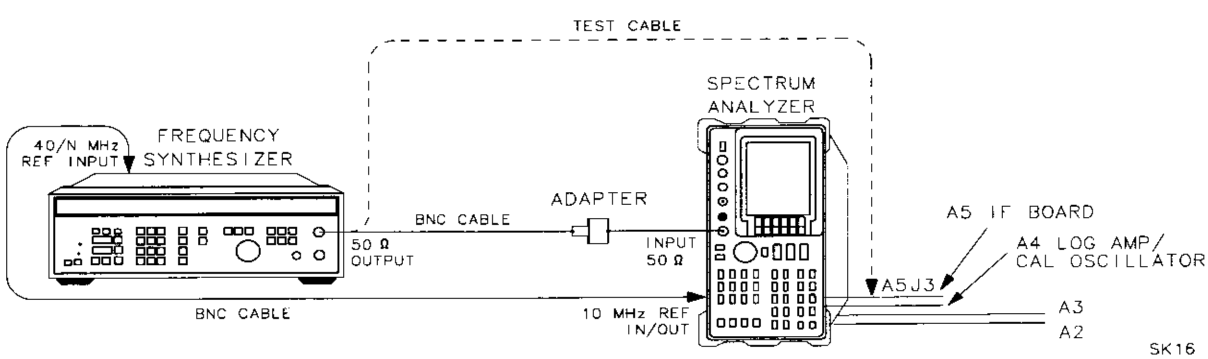
These three adjustments need only be done under the following conditions:

Limiter phase	Only if a repair is made to blocks F, G, H, I, or J.
Linear fidelity	Only if a repair is made to blocks C, D, F, G, H, I, J, K, O, IF gain accuracy, RBW switching, or log fidelity.
Log fidelity	Only if a repair is made to blocks D, F, H, K, IF gain accuracy, RBW switching, or log fidelity.

If multiple adjustments are required they should be done in the following order:

1. Limiter phase
2. Linear fidelity
3. Log fidelity

Figure 2-9 DC Log Adjustment Setup



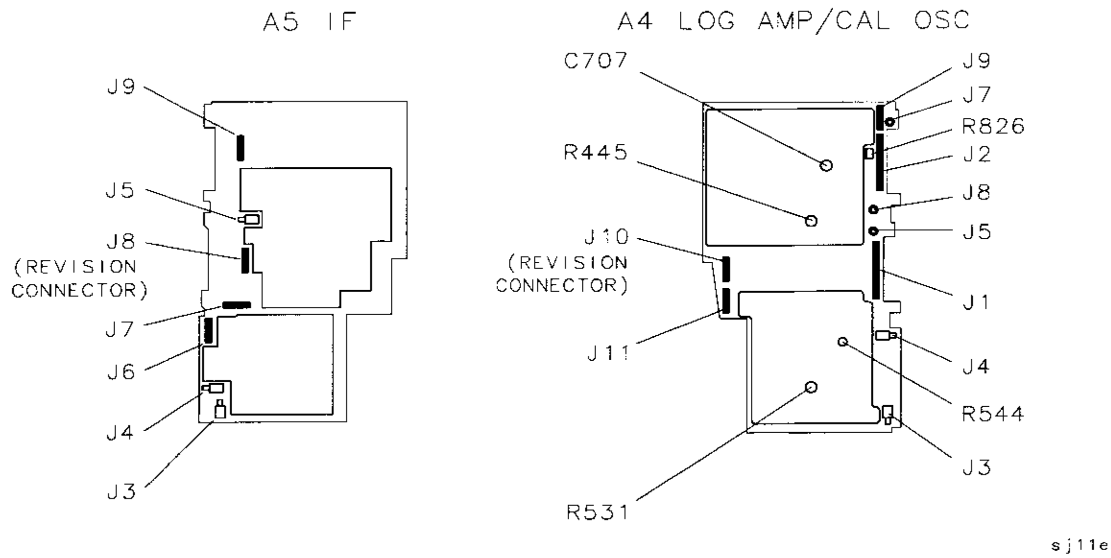
Equipment

Frequency synthesizer 3335A

Adapters
Type-N (m) to BNC (f) 1250-1476

Cables
BNC, 122 cm (48 in) 10503A
Test cable 85680-60093

Figure 2-10 DC Log Adjustment Locations



NOTE Adjustments should be made with all of the shields on and only after allowing at least a 20 minute warmup.

A4 Limiter Phase Adjustment

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and place the spectrum analyzer in the service position as illustrated in Figure 2-9. See Figure 2-10 for adjustment location.
2. Connect the Agilent 3335A 50 Ω output to the spectrum analyzer 50 Ω input. Press **LINE** to turn the spectrum analyzer on.

3. Set the spectrum analyzer controls as follows:

   Center frequency . . . . 15 MHz
   Span 0
   Reference level . . . . –10 dBm
   dB/division . . . . 1 dB/DIV
   Resolution bandwidth . . . . 300 kHz
   IF ADJ . . . . OFF

4. Set up the 3335A as follows:

   Frequency . . . . 15 MHz
   Amplitude . . . . –18 dBm

5. Press **CAL**, **ADJ CURR IF STATE**, wait for the analyzer to complete adjustments then press **MKR**.

6. Adjust A4R445 for maximum on-screen amplitude. Refer to Figure 2-10 for the location of A4R445.

A4 Linear Fidelity Adjustment

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and place the spectrum analyzer in the service position as illustrated in Figure 2-9. See Figure 2-10 for adjustment location.

2. Connect the 3335A 50 Ω output to the spectrum analyzer 50 Ω input. Press **LINE** to turn the spectrum analyzer on.

3. Press **PRESET AMPLITUDE**, **LINEAR**, **MORE 1 of 3**, **AMPTD UNITS,dBm**, **CAL**, **IF ADJ ON OFF**, (OFF).

4. Set the spectrum analyzer controls as follows:

   Center frequency . . . . 15 MHz
   Span . . . . 5 MHz
   Resolution bandwidth . . . . 300 kHz
   Reference level . . . . –10 dBm

5. Set up the 3335A as follows:

   Frequency . . . . 15 MHz
   Amplitude . . . . –10 dBm

6. Press **PEAK SEARCH**, **MARKER DELTA**.

7. Reduce the 3335A input power to –58 dBm.

8. If the delta marker amplitude reads –40 dB ±2 dB, no adjustment is necessary.

9. If the signal is lower on the screen than expected (delta marker amplitude reads less than –42dB) then adjust A4R544 (see Figure 2-10) for an even lower level and press **CAL**, **ADJ CURR IF STATE**. Allow sufficient time for the analyzer to complete the adjustment.

10.If the signal is higher on the screen than expected (delta marker amplitude reads greater than –38 dB) then adjust A4R544 for an even higher level signal and press **CAL, ADJ CURR IF STATE**. Allow sufficient time for the analyzer to complete the adjustment.

11.Repeat steps 5 through 10.

A4 LOG Fidelity Adjustment

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and place the spectrum analyzer in the service position as illustrated in Figure 2-9. See Figure 2-10 for adjustment location.
2. Connect the 3335 50 Ω output to the spectrum analyzer 50 Ω input. Press **LINE** to turn the spectrum analyzer on.
3. Press **PRESET**, **CAL**, **IF ADJ ON OFF** (OFF), **ADJ CURR IF STATE.**
4. Set the spectrum analyzer controls as follows:

   Center frequency .... 15 MHz
   Span 0
   Resolution bandwidth .... 300 kHz
   Reference level .... –10 dBm

5. Set up the 3335A as follows:

   Frequency .... 15 MHz
   Amplitude .... –10 dBm

6. Press **MKR, MARKER DELTA** on the spectrum analyzer.
7. Decrease the 3335A power to –26 dBm.
8. Calculate the error:

   $$\text{Error} = \text{delta marker reading} - 16\text{ dB}$$

9. If the error is less than ±0.2 dB, no adjustment is necessary.

10.Set the 3335A power to –10 dBm.

11.Adjust A4R531 (see Figure 2-10) to read two times the error. For example, if the calculated error is +0.75 dB, adjust A4R531 for a delta marker amplitude reading of +1.5 dB. Press **CAL, ADJ CURR IF STATE.**

12.Repeat steps 7 through 11.

6. Sampling Oscillator Adjustment

Assembly Adjusted

A15 RF assembly

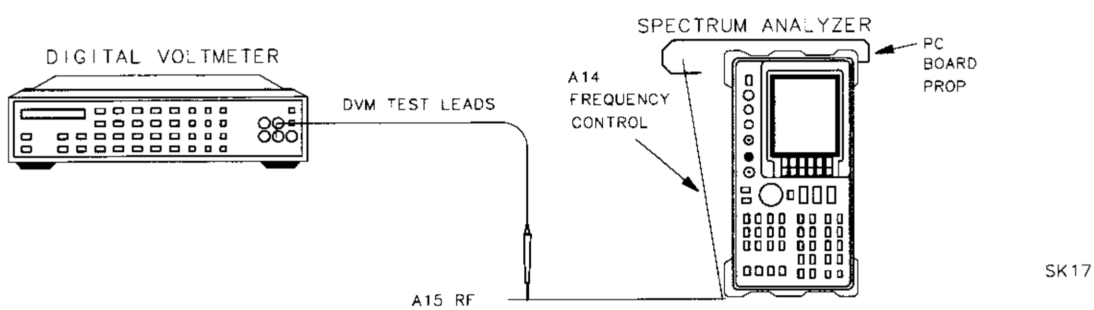
Related Performance Test

There is no related performance test for this adjustment procedure.

Description

The sampling oscillator tank circuit is adjusted for a tuning voltage of 5.05 Vdc when the sampling oscillator is set to 297.222 MHz. The voltage monitored is actually the tuning voltage divided by 4.05. The setting is then checked at other frequencies for the full tuning range of the sampling oscillator.

Figure 2-11 **Sampler Adjustment Setup**



Equipment

Digital voltmeter 3456A
DVM test leads 34118A

Procedure

1. Press **LINE** to turn the spectrum analyzer off and disconnect the line power cord. Remove the spectrum analyzer cover and fold down the A15 RF and A14 frequency control assemblies. Prop up the A14 frequency control assembly. Reconnect the line power cord and press **LINE** to turn the spectrum analyzer on. Connect the equipment as illustrated in Figure 2-11.

2. Press **PRESET** on the spectrum analyzer and set the controls as follows:

   Center frequency . . . . 2126 MHz
   Span . . . . 0 Hz

3. Set the 3456A controls as follows:

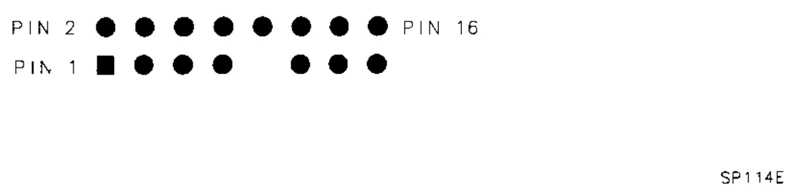
   Function . . . . DC VOLTS
   Range . . . . 10 V, MANUAL

Sampling Oscillator Adjustment

4. Connect the negative DVM test lead to A15J200 pin 6. Connect the positive DVM lead to A15J200 pin 13.

5. Adjust A15C210 VCO RANGE for a DVM reading of 5.05 V ±0.05 V.

Figure 2-12 TAM Connector Pin Locations



Sampler Match Adjustment

6. Connect the negative DVM test lead to A15J400 pin 6, and the positive DVM test lead to A15J400 pin 1.

7. Press **FREQUENCY** and set the spectrum analyzer center frequency to 2302.3 MHz. This sets the sampling oscillator to 291.667 MHz.

8. Adjust A15C100 SMPL MATCH to peak the voltage displayed on the DVM.

9. Record the displayed voltage in Table 2-11 as the displayed voltage for the sampling oscillator frequency of 291.667 MHz.

10. Press **FREQUENCY** on the spectrum analyzer. Use the keypad to set the spectrum analyzer center frequency to the frequencies listed in Table 2-11. At each listed frequency, record the displayed voltage in the table.

11. If the difference between the maximum and minimum voltages is less than 0.50 V, and all voltage readings are between +0.5 and +2.5 Vdc, proceed to step 15.

12. Locate the center frequency at which the voltage is lowest. Use the keypad to set the spectrum analyzer to this frequency.

13.Readjust SMPL MATCH to set the displayed voltage to 0.8 ±0.1 Vdc.

14.Set the spectrum analyzer center frequency to 2302.3 MHz and repeat steps 9 through 13.

15.Move the positive DVM test lead to A15J400 pin 3. Check that the measured voltage is the negative of the voltage at pin 1, within ±0.1 Vdc.

16.Disconnect the DVM probes from A15J400.

Table 2-11 Sampling Adjustments

Center Frequency (MHz)	Sampling Oscillator (MHz)	Displayed Voltage (Vdc)				
		1st Trial	2nd Trial	3rd Trial	4th Trial	5th Trial
2156.3	285.000					
2176.3	286.364					
2230.3	288.462					
2263.3	290.000					
2302.3	291.667					
2158.3	293.478					
2196.3	295.000					
2378.3	296.471					
2422.3	297.222					

7. YTO Adjustment

Assembly Adjusted

A14 frequency control assembly

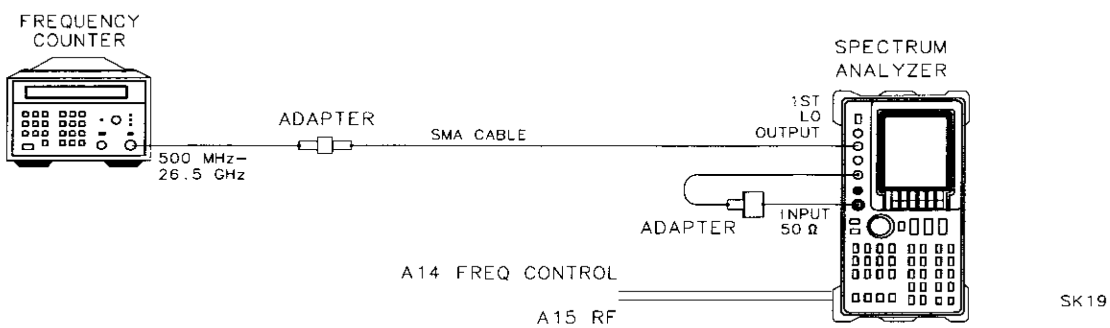
Related Performance Tests

Frequency Span Accuracy
Frequency Readout Accuracy and Frequency Count Marker Accuracy

Description

The YTO main coil adjustments are made with the phase-lock loops disabled. The YTO endpoints are adjusted to bring these points within the capture range of the main loop. The YTO FM coil is adjusted to place the 300 MHz CAL OUTPUT signal at the center vertical graticule in a 20 MHz span.

Figure 2-13 YTO Adjustment Setup



Equipment

Microwave frequency counter . . . . 5343A Option 001

Adapters
Type-N (m) to BNC (f) 1250-1476
Type-N (f) to APC 3.5 (f) *(Option 026 only)*. 1250-1745
APC 3.5 (f) to APC 3.5 (f). 5061-5311

Cables
BNC, 122 cm (48 in) 10503A
SMA, 61 cm (24 in). 8120-1578

Procedure

NOTE

This adjustment cannot be performed if preselected external mixer mode is selected.

The **SAVELOCK ON OFF** function must be OFF.

YTO Main Coil Adjustments

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and fold down the A15 RF and A14 frequency control assemblies.
2. Disconnect the 50 Ω termination from the 1ST LO OUTPUT. Connect the equipment as shown in Figure 2-13. Press **LINE** to turn the spectrum analyzer on.
3. Move the jumper on A14J23 from the NORM position (pins 1 and 2 jumpered) to the TEST position (pins 2 and 3 jumpered). See Figure 2-14 for the location on the A14 frequency control assemblies.
4. On the spectrum analyzer, press the following keys:

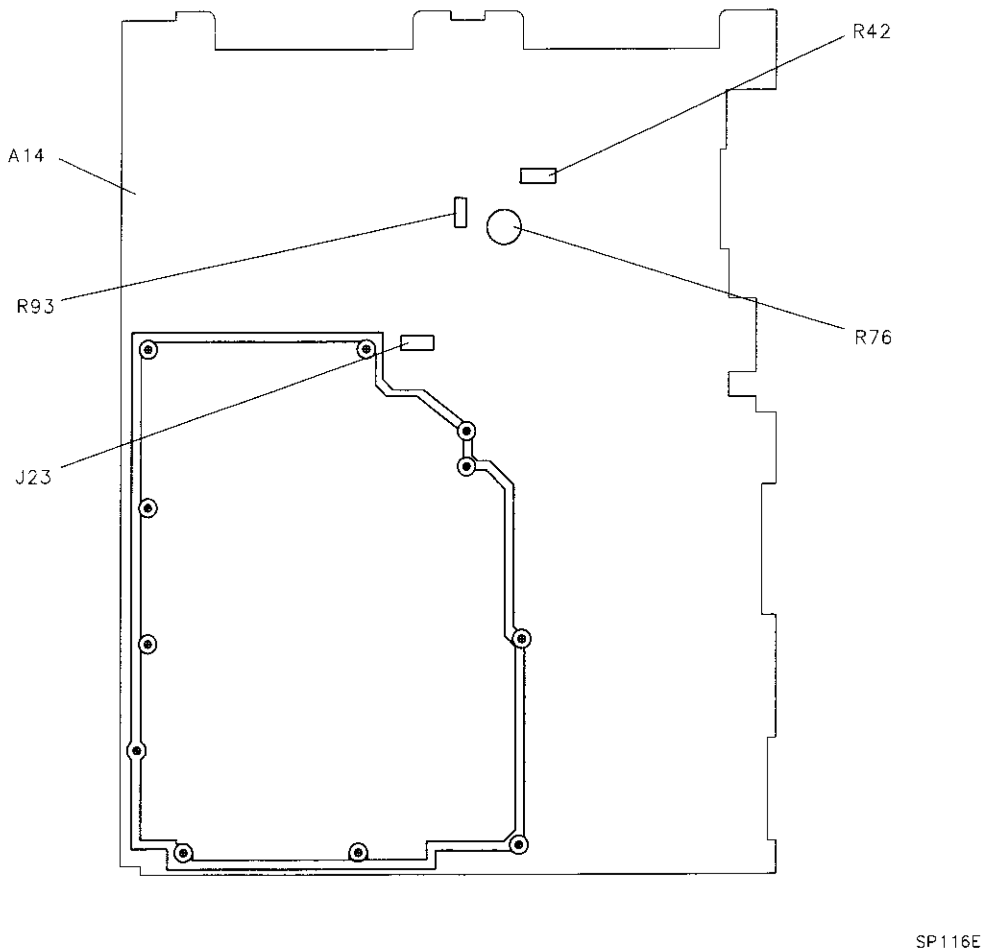
   CONFIG, **EXT MXR PRE UNPR**, (UNPR)**AUX CTRL**, **EXTERNAL MIXER**, **LOCK HARMONIC**, 6 Hz **SPAN**, **ZERO SPANFREQUENCY**, **CENTER FREQ**, 18.8893 GHz, **SGL SWPSAVE**, **SAVE STATE**, **STATE 0**
   FREQUENCY, 35.7493 GHz**SAVE**, **SAVE STATE**, **STATE 1**
   RECALL, **RECALL STATE**, **STATE 0**.

5. On the 5343A, press **SHIFT** 7 and set the controls as follows:

   Sample rate . . . . Fully counterclockwise
   10 Hz–500 MHz/500 MHz–26.5 GHz switch . 500 MHz–26.5 Ghz

6. Adjust A14R93 3.2 GHz for the appropriate frequency counter reading of 3.200 GHz ±1 MHz.
7. On the spectrum analyzer, press **STATE 1**.
8. Adjust A14R42 6.01 GHz for a frequency counter reading of 6.010 GHz ±1 MHz.
9. On the spectrum analyzer, press **STATE 0**.
10. Repeat steps 6 through 9 until both of these interacting adjustments meet their tolerances.

Figure 2-14 YTO Adjustment Locations



11.Place the jumper on A14J23 in the NORM position (pins 1 and 2 jumpered).

12.Disconnect the SMA cable from the 1ST LO OUTPUT jack and reconnect the 50 Ω termination on the 1ST LO OUTPUT.

YTO FM Coil Adjustments

13.On the spectrum analyzer, press **PRESET** and set the controls as follows:

Center frequency . . . . 300 MHz
Span . . . . 20 MHz

14.Adjust A14R76 FM SPAN until the 300 MHz CAL OUTPUT SIGNAL is aligned with the center vertical graticule line.

8. LO Distribution Amplifier Adjustment (8561E/EC)

Assembly Adjusted

A14 frequency control assembly

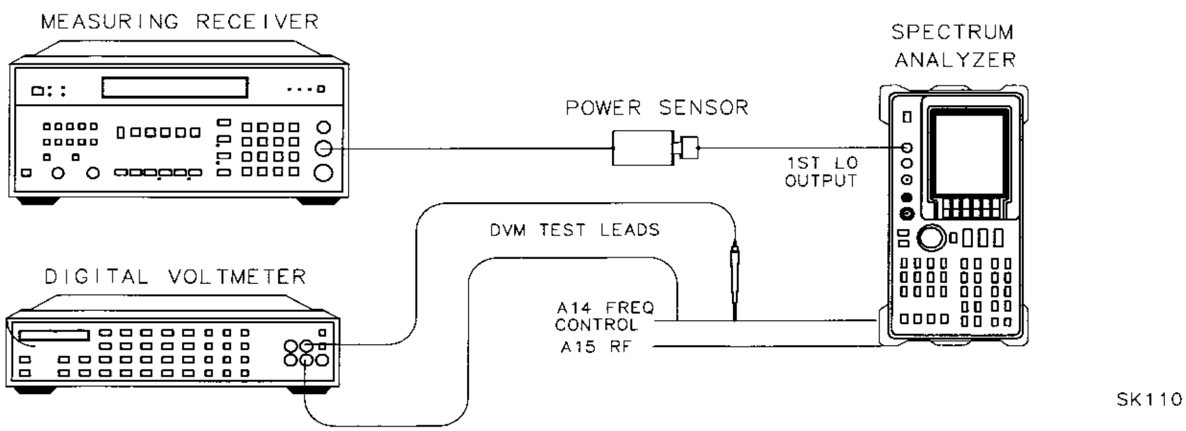
Related Performance Test

1ST LO OUTPUT Amplitude

Description

The gate bias for the A7 LO distribution amplifier assembly is adjusted to the value specified on A7. LO AMPTD is adjusted so that the LO SENSE voltage is 6 mV more negative than the value specified on the A7 LODA label.

Figure 2-15 1st LO Distribution Amplifier Adjustment Setup



Equipment

Measuring receiver 8902A
DVM. 3456A
Power sensor 8485A
DVM test leads 34118A

Adapters

Type-N (f) to APC (m) 1250-1750

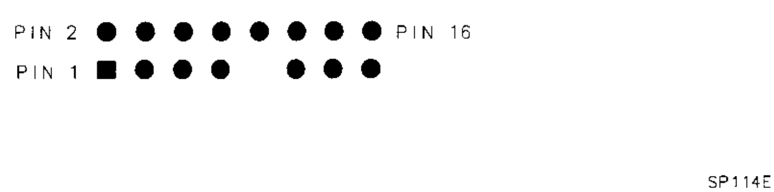
Procedure

1. Set the 8561E/EC **LINE** switch to off and disconnect the line cord. Remove the cover from the spectrum analyzer and fold down the A15 RF assembly and the A14 frequency control assembly. Reconnect the line cord.
2. Move the jumper on A2J12 from the WR PROT to the WR ENA position. The jumper is on the edge of the A2 assembly and can be moved without folding the board down.
3. Reconnect the line cord and turn on the spectrum analyzer.
4. Set the 8561E/EC controls as follows:

   Center frequency . . . . 1.45 GHz
   Span . . . . 0 Hz

5. On the 8561E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **LO LEVELS**, and **INT LO LEVEL**.
6. Use the knob or key pad to enter the value 32. This sets the LO power to a low level.
7. To set the gate bias, connect the positive lead of the DVM to A14J18 pin 15 and the negative lead to A14J18 pin 6. See the following figure for a pin location drawing.

Figure 2-16 TAM Connector Pin Locations



8. On the 8561E/EC, press **LO GATE LEVEL**.
9. Note the Gate Bias voltage printed on the A7 LO distribution amplifier label. Use the knob or keypad to change the displayed DAC value so the DVM reading is equal to the label voltage, ±10 mV.
10. To set the low band sense voltage, connect the positive lead of the DVM to A14J18 pin 13 and the negative lead to A14J18 pin 6.
11. On the 8561E/EC, press **INT LO LEVEL**. The message `DRIVE FOR BAND# 0` will be displayed.
12. Note the "LO Sense" voltage printed on the A7 LO distribution amp label. Use the knob or keypad, and press enter to change the displayed DAC value so the DVM reading is 6 mV more negative than the label voltage. For example, if the "LO Sense" voltage is −170 mV, change the displayed DAC value so the DVM reading is −176 mV.

13.Record the DAC value:

DAC value for 1.45 GHz = ____________

14.To set the band 1 sense voltage, set the 8561E/EC center frequency to 4.60 GHz.

15.On the Agilent 8561E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **LO LEVELS**, and **INT LO LEVEL**. The message `DRIVE FOR BAND# 1` will be displayed.

16.Use the knob or keypad to enter the DAC value for 1.45 GHz from the band 0 sense voltage adjustment above.

17.Set the Sense EXT value by pressing **EXT LO LEVEL**.

18.Use the knob or keypad to enter the DAC value for 1.45 GHz from the band 0 sense voltage adjustment above.

19.Save the adjustment values by pressing **PREV MENU**, **STORE DATA**, and **YES**.

20.Move the jumper on A2J12 from WR ENA back to the WR PROT position.

9. LO Distribution Amplifier Adjustment (8563E/EC)

Assembly Adjusted

A14 frequency control assembly

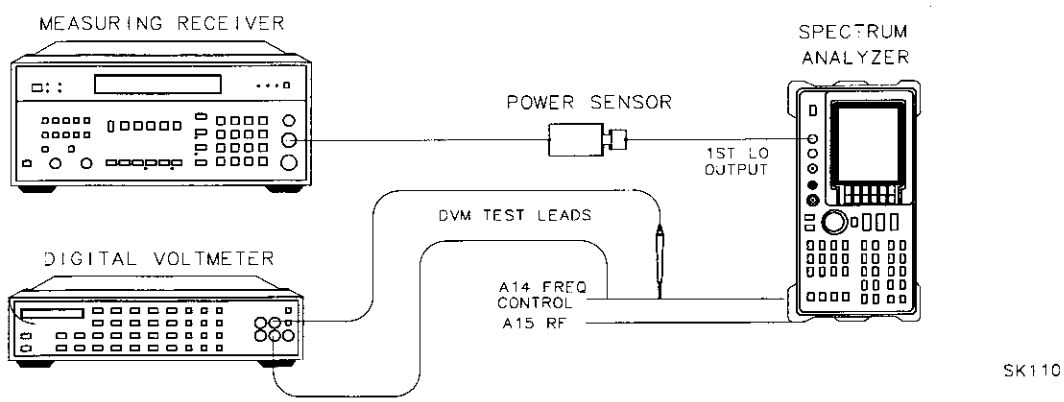
Related Performance Test

1ST LO OUTPUT Amplitude

Description

The gate bias and SENSE voltages for the A7 switched LO distribution amplifier is adjusted to the value specified on the label of A7.

Figure 2-17 First LO Distribution Amplifier Adjustment Setup



Equipment

DVM 3456A
DVM test leads 34118A

NOTE This procedure is only for the 8563E/EC.

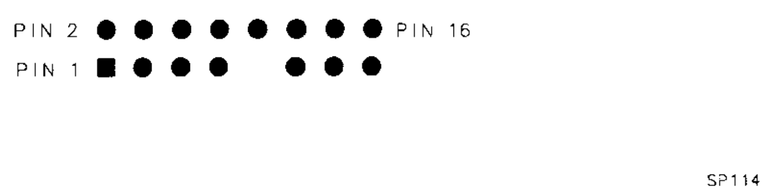
Procedure

1. Set the 8563E/EC **LINE** switch to off and disconnect the line cord. Remove the cover and fold down the A15 RF and A14 Frequency Control assemblies.
2. Move the jumper on A2J12 from the WR PROT to the WR ENA position. The jumper is on the edge of the A2 board assembly and can be moved without folding the board down.
3. Reconnect the line cord and turn on the spectrum analyzer.
4. Set the 8563E/EC controls as follows:

   Center frequency . . . . 1.45 GHz
   Span . . . . 0 Hz

5. On the 8563E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CALDATA**, **LO LEVELS**, and **INT LO LEVEL**.
6. Use the knob or keypad to enter the value 32. This sets the LO power to a low level.
7. To set the gate bias, connect the positive lead of the DVM to A14J18 pin 15 and the negative lead to A14J18 pin 6. See Figure 2-18 for a pin location drawing.

Figure 2-18 TAM Connector Pin Locations



8. On the 8563E/EC, press **LO GATE LEVEL**.
9. Note the Gate Bias voltage printed on the A7 LO distribution amp label. Use the knob or keypad to change the displayed DAC value so the DVM reading is equal to the label voltage, ±10 mV.
10. To set the low band sense voltage, connect the positive lead of the DVM to A14J18 pin 13 and the negative lead to A14J18 pin 6.
11. On the 8563E/EC, press **INT LO LEVEL**. The message `DRIVE FOR BAND# 0` will be displayed.
12. Note the "B0 EXT Sense" voltage printed on the A7 LO distribution amp label. Use the knob or keypad, and press enter, to change the displayed DAC value so the DVM reading is 6 mV more negative than the label voltage. For example, if the "BO EXT Sense" voltage is –170 mV, change the displayed DAC value so the DVM reading is –176 mV.

13.Record the DAC value:

DAC value for 1.45 GHz = ___________

14.To set the band 1 sense voltage, set the 8563E/EC center frequency to 4.60 GHz.

15.On the 8563E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **LO LEVELS**, and **INT LO LEVEL**. The message `DRIVE FOR BAND# 1` will be displayed.

16.Note the "B1 INT Sense" voltage printed on the A7 LO distribution amp label. Use the knob or keypad, and press enter, to change the displayed DAC value so the DVM reading is 6 mV more negative than the label voltage. For example, if the "B1 INT Sense" voltage is −170 mV, change the displayed DAC value so the DVM reading is −176 mV.

17.Record the DAC value:

DAC value for 4.60 GHz = ___________

18.To set the band 2 sense voltage, set the 8563E/EC center frequency to 9.46 GHz.

19.On the 8563E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **LO LEVELS**, and **INT LO LEVEL**. The message `DRIVE FOR BAND# 2` will be displayed.

20.Note the "B2 INT Sense" voltage printed on the A7 LO distribution amp label. Use the knob or keypad, and press enter, to change the displayed DAC value so the DVM reading is 6 mV more negative than the label voltage. For example, if the "B2 INT Sense" voltage is −170 mV, change the displayed DAC value so the DVM reading is −176 mV.

21.To set the band 3 sense voltage, press the step key ⇑ to select `DRIVE FOR BAND# 3`. Then set the band 3 sense voltage to the same value as band 1.

22.Use the knob or keypad to enter the DAC value for 4.60 GHz from the band 1 sense voltage adjustment above.

23.Set the "Sense EXT" value by pressing **EXT LO LEVEL**.

24.Use the knob or keypad to enter the DAC value for 1.45 GHz from the band 0 sense voltage adjustment above.

25.Save the adjustment values by pressing **PREV MENU**, **STORE DATA**, and **YES**.

26.Move the jumper on A2J12 from WR ENA back to the WR PROT position.

10. Dual Band Mixer Bias Adjustment (8561E/EC)

Assembly Adjusted

A14 frequency control assembly

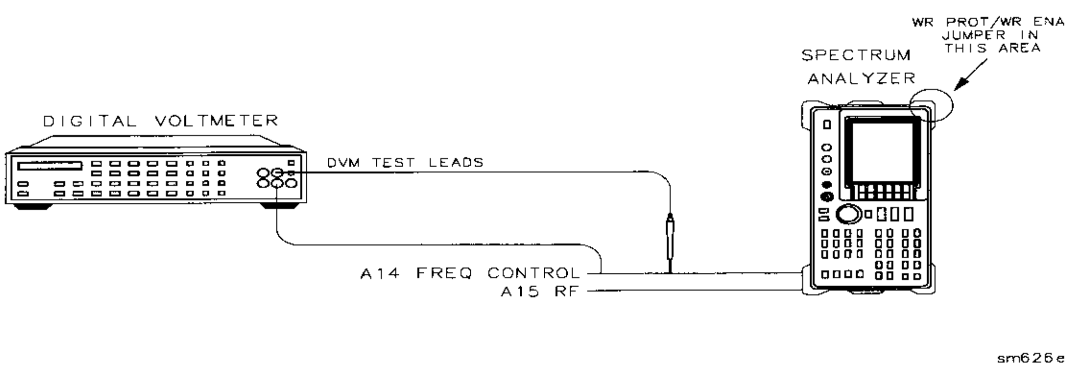
Related Performance Test

Frequency Response
Second Harmonic Distortion (>2.9 GHz)
Third Order Intermodulation Distortion (>2.9 GHz)

Description

The A8 Dual Band Mixer bias is set by a DAC on the A14 frequency control assembly. The DAC values for high band are stored in the EEROM on the A2 controller assembly. The EEROM is placed in its WR ENA (write-enable) mode and the DAC value is adjusted to yield the factory-derived bias for each band. The new DAC value is stored in the EEROM, then the EEROM is placed in WR PROT (write-protect) mode.

Figure 2-19 **Dual Band Mixer Bias Adjustment Setup**



Equipment

DVM 3456A
DVM test leads 34118A

Procedure

1. Connect the equipment as shown in Figure 2-19. Connect the positive DVM probe lead to A14J19 pin 13. Connect the ground lead to pin 6 of A14J19. Set the DVM to 10 Vdc range with 10 mV resolution.
2. Copy the bias voltages printed on the A8 dual band mixer label into Table 2-12 on page 118.
3. On the 8561E/EC, place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR ENA position. Press **PRESET**, **SPAN**, **ZERO SPAN**, **FREQUENCY**, 3, **GHz**. Press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **LO LEVELS** and **BAND 1 MIXER BIAS**. The current mixer bias DAC value for Band 1 should appear in the active function area on the display.
4. Adjust the DAC value, using only the front-panel knob or keypad, for a DVM reading within 50 mV of the Band 1 mixer bias voltage listed in Table 2-12 on page 118.
5. On the 8561E/EC, press **PREV MENU**, **STORE DATA** and **YES**.
6. Place the WR PROT/WR ENA jumper on the A2 controller assembly to the WR PROT position.

Band	Bias Voltage
1	____________

11. Frequency Response Adjustment (8561E/EC)

Assembly Adjusted

A15 RF assembly

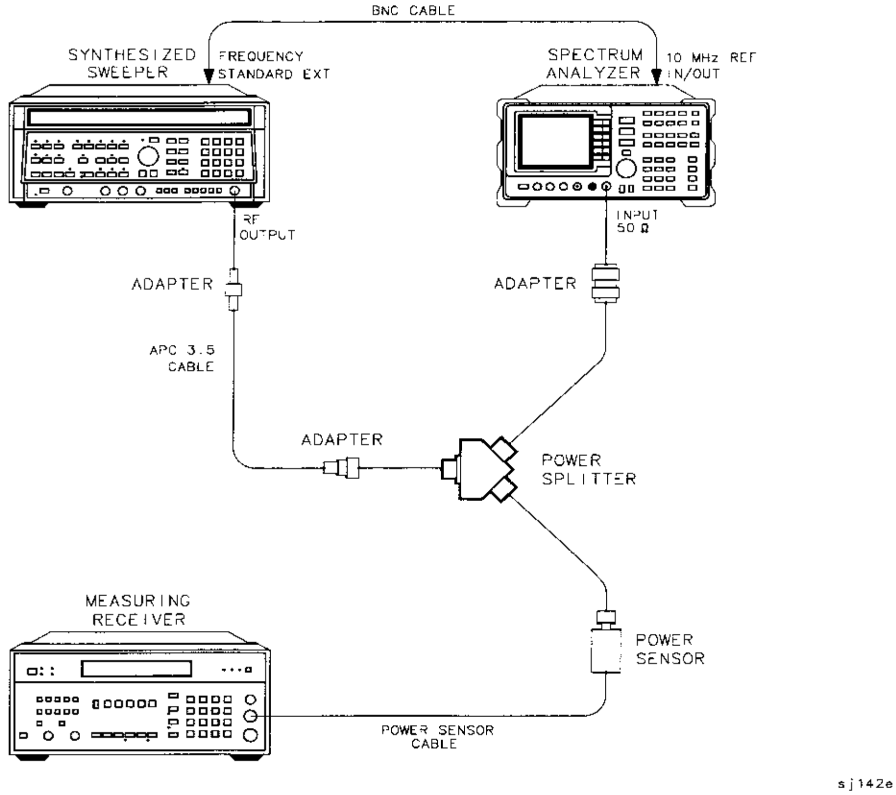
Related Performance Tests

Displayed Average Noise Level
Frequency Response

Description

A signal of the same known amplitude is applied to the spectrum analyzer at several different frequencies. At each frequency, the DAC controlling the flatness compensation amplifiers is adjusted to place the peak of the displayed signal at the same place on the screen. The preselector is centered at each frequency before setting the other DAC value. With firmware revisions greater than 920528, there are correction points at 2 MHz and 6 MHz. These points are outside the synthesized sweeper's frequency range. The DAC values for these two points are set to a fixed offset from the DAC value at 10 MHz. The DAC values are stored in EEROM.

Figure 2-20 **Frequency Response Adjustment Setup (8561E/EC)**



Equipment

Synthesized sweeper 8340A/B
Measuring receiver 8902A
Power sensor. 8482A
Power sensor. 8481A
Power splitter 11667A

Adapters

Type-N (m) to Type N (m) 1250-1475
Type-N (m) to APC 3.5 (m) 1250-1743
Type-N (f) to APC 3.5 (m) 1250-1750
Type-APC 3.5 (f) to APC 3.5 (f) 5061-5311

Cables

BNC, 122 cm (48 in). 10503A
APC 3.5, 91 cm (36 in) 8120-4921

Procedure

NOTE The YIG-tuned filter/mixer slope and offset adjustment must be correct before the high band part of the frequency response adjustment can be done.

1. Connect the equipment as shown in Figure 2-20. Do not connect the 8482A Power Sensor to the 11667B Power Splitter.
2. Zero and calibrate the 8902A/8482A combination in log mode (power levels read out in dBm) and connect the power sensor through an adapter to the power splitter.
3. Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR ENA position. The jumper is on the edge of the A2 board assembly and can be moved without folding the board down.
4. Press **PRESET** on the 8561E/EC and set the controls as follows:

   Center frequency . . . . 10 MHz
   Span . . . . 0 Hz
   Resolution bandwidth . . . . 300 kHz
   dB/division . . . . 2 dB

5. Press **INSTR PRESET** on the 8340A/B and set the controls as follows:

   CW . . . . 10 MHz
   Power level . . . . –4 dBm

6. Set ref level cal DAC to zero. Press **CAL**, **REF LVL ADJ** and use the knob to set the value to 0. Press **STORE REF LVL**.
7. On the Agilent 8561E/EC, press **MKR CAL MORE 1 OF 2 SERVICE CAL DATA**, then **FLATNESS**. The current value of the RF Gain DAC should be displayed in the active function area.
8. Enter the appropriate power sensor calibration factor into the 8902A.
9. Set the 8340A/B **CW** output to the frequency indicated in the active function area of the 8561E/EC display. Adjust the 8340A/B POWER LEVEL for a –10 dBm reading on the 8902A.
10. On the 8561E/EC, adjust the RF Gain DAC value using the front-panel knob or keypad until the marker reads –10 dBm ±0.10 dB. Each DAC count results in an amplitude change of approximately 0.01 dB.
11. On the 8561E/EC, press ⇑ to proceed to the next frequency.
12. Repeat steps 7 through 10 for all low-band frequencies ≥10 MHz.
13. If the firmware revision is later than 920528, perform steps 13 through 17. Otherwise, skip to step 18.

14.Press ⇑ until 10 MHz is displayed in the active function block. Record the RF gain DAC value at 10 MHz.

10 MHz RF gain DAC value ____________

15.Add 67 to the 10 MHz RF gain DAC value and record as the 2 MHz RF gain DAC value.

2 MHz RF gain DAC value ____________

16.Add 62 to the 10 MHz RF gain DAC value and record as the 6 MHz RF gain DAC value.

6 MHz RF gain DAC value ____________

17.Press ⇓ until 2 MHz is displayed in the active function block. Use the DATA keys to enter the 2 MHz RF gain DAC value recorded in step 15.

18.Press ⇑ until 6 MHz is displayed in the active function block. Use the DATA keys to enter the 6 MHz RF gain DAC value recorded in step 16.

19.Press **NEXT BAND** on the 8561E/EC.

20.Disconnect the 8482A from the 11667A. Connect the 8481A to the 8902A. Zero and calibrate the 8902A/8481A combination. Connect the 8481A to the 11667A power splitter.

21.Enter the appropriate power sensor calibration factor into the 8902A.

22.Set the 8340A/B **CW** output to the frequency indicated in the active function area of the 8561E/EC display.

23.Adjust the 8340A/B POWER LEVEL to place the signal midscreen on the Agilent 8561E/EC display.

24.On the 8561E/EC, press **PRESEL AUTO CTR**.

25.Adjust the 8340A/B POWER LEVEL for a −10 dBm reading on the 8902A.

26.On the 8561E/EC, adjust the RF gain DAC value using the knob or keypad until the marker reads −10 dBm ±0.10 dB.

27.On the 8561E/EC, press ⇓ to proceed to the next frequency.

28.Repeat steps 21 through 27 for the remaining frequencies in Band 1.

29.Press **PREV MENU STORE DATA**, then **YES** on the 8561E/EC.

30.Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR PROT position.

12. Frequency Response Adjustment (8563E/EC)

Assembly Adjusted

A15 RF assembly

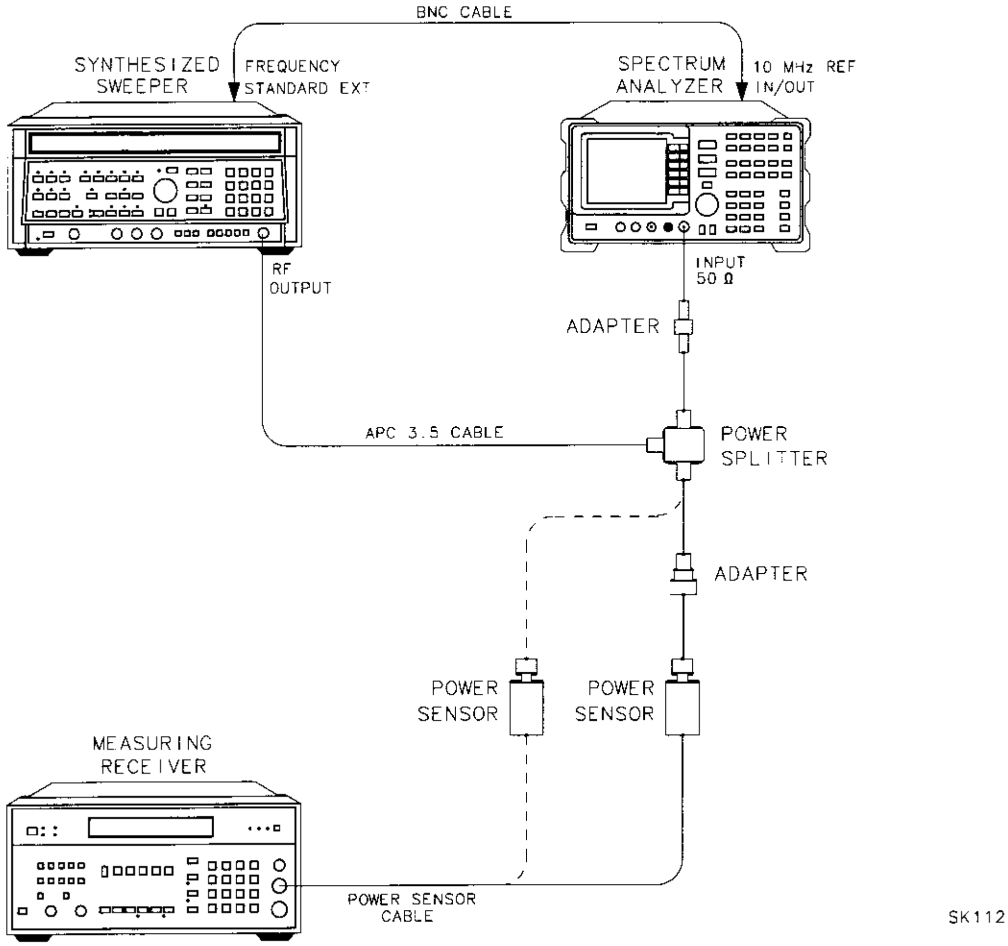
Related Performance Tests

Displayed Average Noise Level
Frequency Response

Description

A signal of the same known amplitude is applied to the spectrum analyzer at several different frequencies. At each frequency, the DAC controlling the flatness compensation amplifiers is adjusted to place the peak of the displayed signal at the same place on the screen. The preselector is centered at each frequency before setting the DAC value. With firmware revisions greater than 920528, there are correction points at 2 MHz and 6 MHz. These points are outside the synthesized sweeper's frequency range. The DAC values for these two points are set to a fixed offset from the DAC value at 10 MHz. The DAC values are stored in EEROM.

Figure 2-21 **Frequency Response Adjustment Setup (8563E/EC)**



Equipment

Synthesized sweeper 8340A/B
Measuring receiver 8902A
Power sensor. 8482A
Power sensor. 8485A
Power splitter 11667B

Adapters

Type-N (m) to Type N (m) 1250-1475
Type-N (m) to APC 3.5 (m) 1250-1743
Type-N (f) to APC 3.5 (m) 1250-1750
Type APC 3.5 (f) to APC 3.5 (f) 5061-5311

Cables

BNC, 122 cm (48 in). 10503A
APC 3.5, 91 cm (36 in) 8120-4921

Procedure

NOTE The YIG-tuned filter/mixer slope and offset adjustment must be correct before the high band part of the frequency response adjustment can be done.

1. Connect the equipment as shown in Figure 2-21. Do not connect the 8482A power sensor to the 11667B power splitter.
2. Zero and calibrate the 8902A/8482A combination in log mode (power levels read out in dBm) and connect the power sensor through an adapter to the power splitter.
3. Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR ENA position. The jumper is on the edge of the A2 board assembly and can be moved without folding the board down.
4. Press **PRESET** on the 8563E/EC and set the controls as follows:

   Center frequency . . . . 10 MHz
   Span . . . . 0 Hz
   Resolution bandwidth . . . . 300 kHz
   dB/division . . . . 2 dB

5. Press **INSTR PRESET** on the 8340A/B and set the controls as follows:

   CW frequency . . . . 10 MHz
   Power level . . . . –4 dBm

6. Set ref level cal DAC to zero. Press **CAL**, **REF LVL ADJ** and use the knob to set the value to 0. Press **STORE REF LVL.**
7. On the 8563E/EC, press **MKR**, **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, then **FLATNESS**. The current value of the RF Gain DAC should be displayed in the active function area.
8. Enter the appropriate power sensor calibration factor into the 8902A.
9. Set the 8340A/B **CW** output to the frequency indicated in the active function area of the 8563E/EC display. Adjust the 8340A/B POWER LEVEL for a –10 dBm reading on the 8902A.
10. On the 8563E/EC, adjust the RF gain DAC value using the front-panel knob or keypad until the marker reads –10 dBm ±0.10 dB. Each DAC count results in an amplitude change of approximately 0.01 dB.
11. On the 8563E/EC, press ⇑ to proceed to the next frequency.
12. Repeat steps 7 through 10 for all low-band frequencies ≥10 MHz.

13.If the firmware revision is later than 920528, perform steps 13 through 17. Otherwise, skip to step 18.

14.Press ⇑ until 10 MHz is displayed in the active function block. Record the RF gain DAC value at 10 MHz.

10 MHz RF gain DAC value ____________

15.Add 67 to the 10 MHz RF gain DAC value and record as the 2 MHz RF gain DAC value.

2 MHz RF gain DAC value ____________

16.Add 62 to the 10 MHz RF gain DAC value and record as the 6 MHz RF gain DAC value.

6 MHz RF gain DAC value ____________

17.Press ⇓ until 2 MHz is displayed in the active function block. Use the DATA keys to enter the 2 MHz RF gain DAC value recorded in step 15.

18.Press ⇑ until 6 MHz is displayed in the active function block. Use the DATA keys to enter the 6 MHz RF gain DAC value recorded in step 16.

19.Press **NEXT BAND** on the 8563E/EC.

20.Disconnect the 8482A and its adapter from the 11667B. Connect the 8485A to the 8902A. Zero and calibrate the 8902A/8485A combination. Connect the 8485A to the 11667B power splitter.

21.Enter the appropriate power sensor calibration factor into the 8902A.

22.Set the 8340A/B **CW** output to the frequency indicated in the active function area of the 8563E/EC display.

23.Adjust the 8340A/B POWER LEVEL to place the signal midscreen on the 8563E/EC display.

24.On the 8563E/EC, press **PRESEL AUTO CTR**.

25.Adjust the 8340A/B POWER LEVEL for a –10 dBm reading on the 8902A.

26.On the 8563E/EC, adjust the RF gain DAC value using the knob or keypad until the marker reads –10 dBm ±0.10 dB.

27.On the 8563E/EC, press ⇑ to proceed to the next frequency.

28.Repeat steps 21 through 27 for the remaining frequencies in band 1.

29.On the 8563E/EC, press **NEXT BAND** to proceed to band 2.

30.Repeat steps 21 through 27 for the remaining frequencies in band 2.

31.On the 8563E/EC, press **NEXT BAND** to proceed to band 3.

32.Repeat steps 21 through 27 for the remaining frequencies in band 3.

33.Press **PREV MENU**, **STORE DATA**, then **YES** on the 8563E/EC.

34.Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR PROT position.

13. Calibrator Amplitude Adjustment

Assembly Adjusted

A15 RF assembly

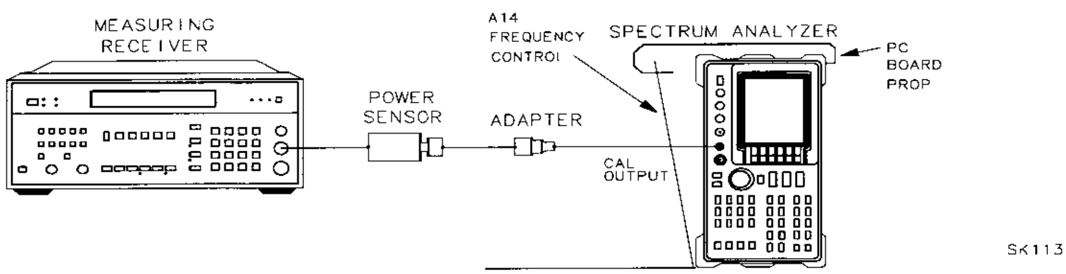
Related Performance Test

Calibrator Amplitude and Frequency Accuracy

Description

The CAL OUTPUT amplitude is adjusted for –10.00 dBm measured directly at the front panel CAL OUTPUT connector.

Figure 2-22 Calibrator Amplitude Adjustment Setup



Equipment

Measuring receiver 8902A
Power sensor. 8482A

Adapters
Type-N (f) to BNC (m) 1250-1477

Procedure

NOTE The spectrum analyzer should be allowed to warm up for at least 30 minutes before performing this adjustment.

1. Place the spectrum analyzer in the service position shown in Figure 2-22. Prop the A14 frequency control board assembly in the service position.
2. Zero and calibrate the 8902A/8482A combination in log display mode. Enter the power sensor's 300 MHz cal factor into the 8902A.

3. Connect the 8482A through an adapter directly to the spectrum analyzer CAL OUTPUT connector.
4. Adjust A15R561 CAL AMPTD for a –10.00 dBm reading on the 8902A display.

14. 10 MHz Reference Adjustment — OCXO

Assembly Adjusted

A21 OCXO assembly

NOTE Replacement oscillators are factory adjusted after a complete warmup and after the specified aging rate has been achieved. Thus, readjustment should typically not be necessary after oscillator replacement and is generally not recommended.

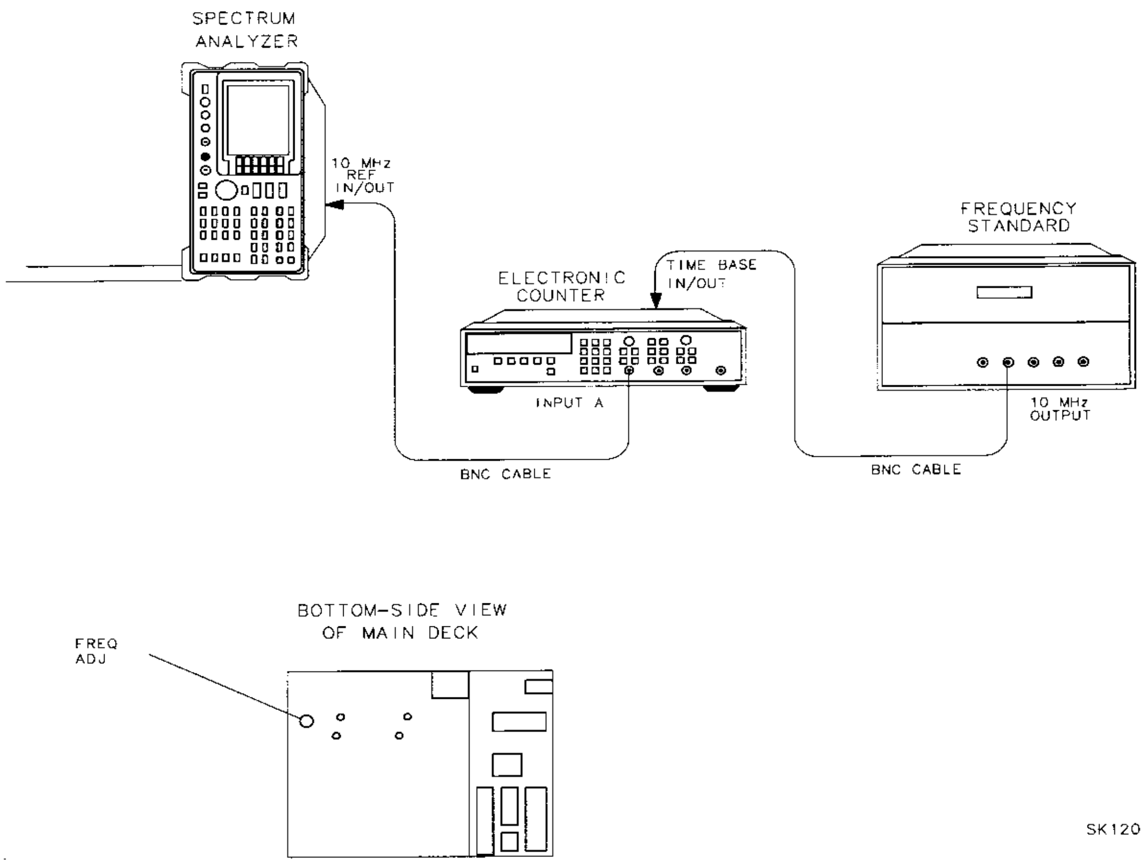
Related Performance Test

10 MHz Reference Accuracy

Description

The frequency of the internal 10 MHz frequency reference is compared to a known frequency standard and adjusted for minimum frequency error. This procedure does not adjust the short-term stability or long-term stability of the A21 10 MHz ovenized crystal oscillator (OCXO). Stability is determined by the characteristics of the particular oscillator and the environmental and warmup conditions to which it has been recently exposed. The spectrum analyzer must be on continuously for at least 24 hours immediately prior to oscillator adjustment to allow both the temperature and frequency of the oscillator to stabilize.

Figure 2-23 10 MHz Reference Adjustment Setup and Adjustment Location



Equipment

Frequency counter. 5334A/B
Frequency standard . . . . 5061B Cesium Beam Standard
(or any 10 MHz frequency standard with accuracy <±1 X 10^{-10})

Cable

BNC, 122 cm *(2 required)* 10503A

Procedure

NOTE Failure to allow a 24 hour minimum warmup time for OCXO frequency and temperature stabilization may result in oscillator misadjustment.

1. Connect equipment as shown in Figure 2-23 as follows:

   a. Press **LINE** to turn the spectrum analyzer on. After the automatic power-on adjustment sequence is complete, press **PRESET** to ensure that the frequency reference is set to internal.

b. Allow the spectrum analyzer to remain powered on continuously for at least 24 hours to ensure that the A21 OCXO temperature and frequency stabilize.

NOTE If the reference is set to **10 MHz EXT**, press **10 MHz INT**. Allow the 24 hour warmup for the OCXO before continuing. When the 10 MHz reference is set to **10 MHz EXT**, the OCXO is not operating or warmed up.

c. Connect the frequency standard to the frequency counter rear panel TIMEBASE IN/OUT connector.

d. Connect a BNC cable between the spectrum analyzer rear panel 10 MHz REF IN/OUT connector and INPUT A on the frequency counter.

2. Set the frequency counter controls as follows:

Function/data	FREQ A
Input	A
×10 Attenuator	OFF
AC	OFF (DC coupled)
50 ΩZ	OFF (1 MΩ input impedance)
Auto Trigger	ON
100 kHz filter A	OFF
INT/EXT switch (rear panel)	EXT

3. Select a 1 second gate time on the 5334A/B frequency counter by pressing **GATE TIME**, 1, **GATE TIME**.
4. To offset the displayed frequency by −10.0 MHz, press MATH, **SELECT/ENTER**, **CHX/EEX**, 10, **CHS/EEX**, 6, **SELECT/ENTER**, **SELECT/ENTER**. The frequency counter should now display the difference between the frequency of the INPUT A signal and 10.0 MHz with a displayed resolution of 0.010 Hz (10 MHz).
5. Locate the FREQ ADJ control on the spectrum analyzer. This control is accessible through the center deck of the spectrum analyzer. See Figure 2-23.
6. Remove the dust-cap screw.
7. Use a nonconductive adjustment tool to adjust the FREQ ADJ control on the A21 OCXO for a frequency counter reading of 0.00 Hz.
8. On the 5334A/B frequency counter, select a 10-second gate time by pressing **GATE TIME**, 10, **GATE TIME**. The frequency counter should now display the difference between the frequency of the INPUT A signal and 10.0 MHz with a resolution of 0.001 Hz (1 mHz).
9. Wait at least two gate periods for the frequency counter to stabilize, then adjust the FREQ ADJ control on A21 OCXO for a stable frequency counter reading of 0.000 Hz ±0.010 Hz.
10. Replace the dust-cap screw to A21 OCXO.

15. 10 MHz Reference Adjustment — TCXO (Option 103)

Assembly Adjusted

A15 RF assembly

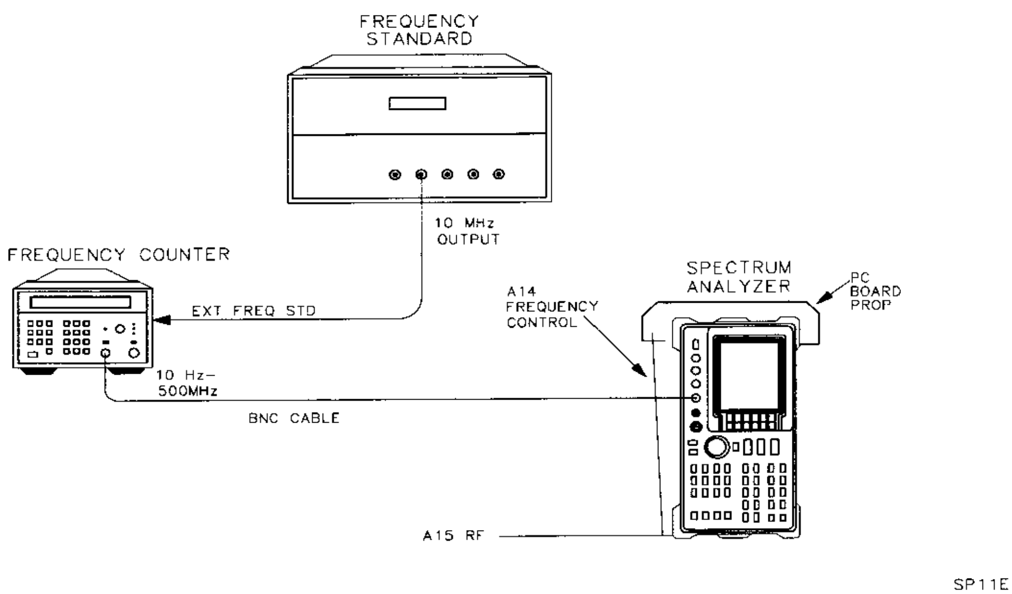
Related Performance Test

10 MHz Reference Output Accuracy (Option 103)

Description

The frequency counter is connected to the analyzer CAL OUTPUT. The CAL OUTPUT is locked to the 10 MHz frequency reference which yields better effective resolution. The temperature-compensated crystal oscillator (TCXO) is adjusted for a frequency counter reading of 300 MHz.

Figure 2-24 **10 MHz Reference Adjustment Setup — TCXO**



Equipment

Microwave frequency counter . . . . 5343A Option 001
Frequency standard . . . . 5061B Cesium Beam Standard
(or any 10 MHz frequency standard with accuracy $<\pm 1 \times 10^{-10}$)

Cables
BNC, 122 cm *(2 required)* 10503A

Procedure

NOTE Allow the spectrum analyzer to warm up for at least 30 minutes before performing this adjustment.

1. Connect the equipment as shown in Figure 2-24. Prop up the A14 frequency control assembly.
2. Set the frequency counter controls as follows:

   Sample rate . . . . Midrange
   50 Ω–1 MΩ switch . . . . 50 Ω
   10 Hz–500 MHz/500 MHz–26.5 GHz switch . . . 10 Hz–500 MHz

3. Press **AUX CTRL, REAR PANEL**. Verify that the 10 MHz reference is set to **10 MHz INT**.

NOTE When the 10 MHz reference is set to **10 MHz EXT**, the TCXO is not operating and warmed up. If the reference is set to **10 MHz EXT**, set the reference to **10 MHz INT** and allow 30 minutes for the TCXO to warm up.

4. Remove dust cap from A15U302, TCXO. The dust cap is toward the rear of the spectrum analyzer.
5. Adjust 10 MHz ADJ on A15U302 for a frequency counter reading of 300.000000 MHz ±30 Hz.
6. Replace the dustcap on A15U302.

16. Demodulator Adjustment

Assembly Adjusted

A4 log amplifier/cal oscillator assembly

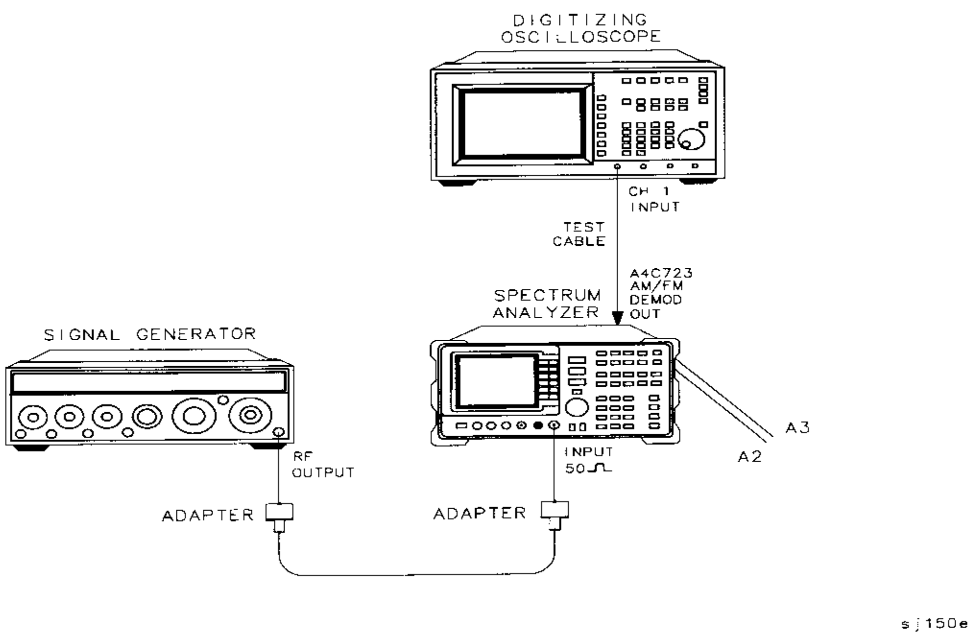
Related Performance Test

There is no related performance test for this adjustment.

Description

A 5 kHz peak-deviation FM signal is applied to the INPUT 50 Ω. The detected audio is monitored by an oscilloscope. FM DEMOD is adjusted to peak the response displayed on the oscilloscope.

Figure 2-25 **Demodulator Adjustment Setup**



Equipment

AM/FM signal generator. 8640B
Oscilloscope 54501A

Adapters

Type-N (m) to BNC (f) *(2 required)*1250-1476
Type-N (f) to APC 3.5 (f) *(Option 026 only)*1250-1745

Cables

BNC, 122 cm (48 in) 10503A
Oscilloscope probe 10432A

Procedure

1. Press **LINE** to turn the spectrum analyzer off. Place the spectrum analyzer in the service position as illustrated in Figure 2-25.
2. Connect the oscilloscope probe from the oscilloscope channel 1 input to probe A4C723 (the end closest to A4U707) as in Figure 2-26. Press **LINE** to turn the spectrum analyzer on. Connect the Agilent 8640B RF OUTPUT to the spectrum analyzer INPUT 50 Ω.
3. Set the 8640B controls as follows:

   Range MHz . . . . 61 to 128
   Frequency . . . . 100.000 MHz
   Output level . . . . −10 dBm
   RF . . . . ON
   AM . . . . OFF
   FM . . . . INT
   Modulation frequency . . . . 1000 Hz
   Peak deviation . . . . 5 kHz
   Scale FM . . . . (k/MHz)

4. Adjust the 8640B FM deviation vernier for a full-scale reading on the meter. Set the FM to off.
5. Set the oscilloscope controls as follows:

   Channel 1 . . . . on
   Channel 2 . . . . off
   Channel 1 . . . . 50 mV/division
   Channel 1 . . . . ac
   Channel 1 . . . . BW lim
   Time base . . . . 1.0 ms/division
   Trigger . . . . auto
   Trigger source 1
   Trigger level . . . . 0.0 V

6. On the spectrum analyzer, press **PRESET**, then set the controls as follows:

   Center frequency . . . . 100 MHz
   Span . . . . 5 MHz
   Reference level . . . . −10 dBm
   Resolution bandwidth . . . . 100 kHz

7. On the spectrum analyzer press:

   PEAK SEARCH, MARKER →CF SPAN, ZERO SPAN
   AUX CTRL, AM/FM DEMOD, FM DEMOD ON OFF(ON)
   CAL, IF ADJ ON OFF (OFF)**TRIG**, and **SWEEP CONT SGL** (SGL).

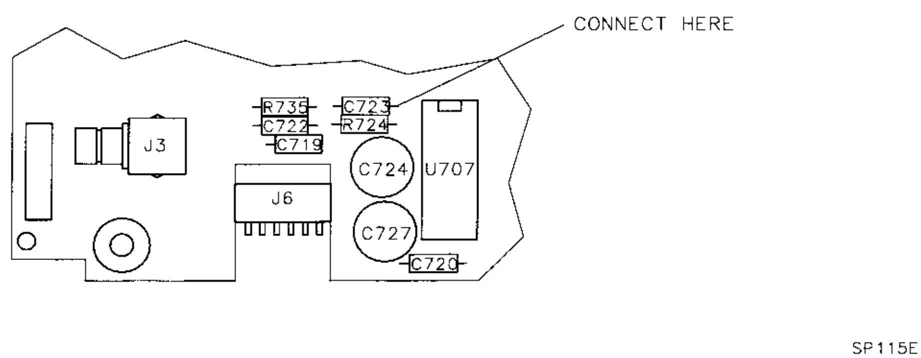
   Set the volume control to midrange.

8. A 1 kHz sine wave should be observed on the oscilloscope. Rotate the volume knob on the front panel of the spectrum analyzer until the amplitude of the 1 kHz signal is at about 150 mV (3 divisions on the oscilloscope.)

9. Adjust A4C707 FM DEMOD for a maximum peak-to-peak response on the oscilloscope.

10. Press **LINE** to turn the spectrum analyzer off. Disconnect the test cable from A4C723.

Figure 2-26 **Demodulator Adjustment Locations**



17. External Mixer Bias Adjustment

Assembly Adjusted

A15 RF assembly

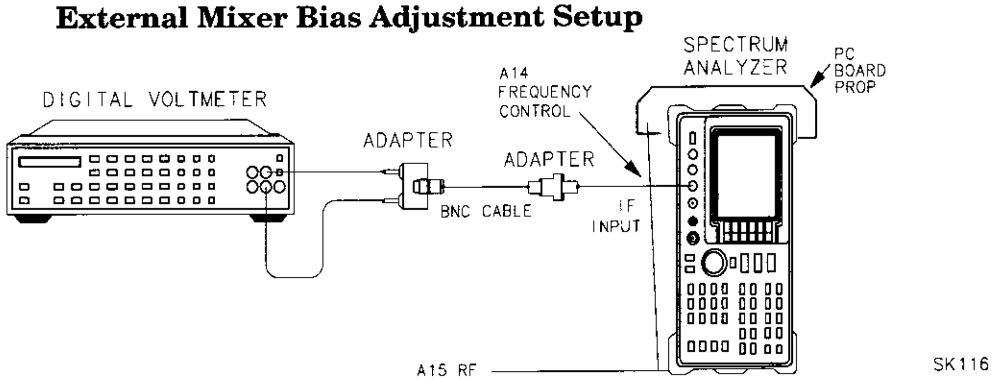
Related Performance Test

There is no related performance test for this adjustment.

Description

A voltmeter is connected to the spectrum analyzer IF INPUT with the external mixer bias set to off. The bias is adjusted for a 0 Vdc output.

Figure 2-27 **External Mixer Bias Adjustment Setup**



Equipment

DVM 3456A

Adapters
Type BNC (f) to SMA (m). 1250-1200
Type BNC (f) to dual banana plug 1251-2816

Cables
BNC, 122 cm (48 in) 10503A

Procedure

1. Press **LINE** to turn the spectrum analyzer off, and disconnect the ac power cord. Remove the spectrum analyzer cover and connect the equipment as illustrated in Figure 2-27. Fold down the A15 RF assembly. Reconnect the power cord and set the **LINE** switch to on.

2. Set the 3456A controls as follows:

   Function . . . . DC VOLTS
   Range . . . . 0.1 V
   Resolution . . . . 100 mV

3. On the spectrum analyzer press **AUX CTRL**, **EXTERNAL MIXER**, **BIAS**, then **BIAS OFF**.

4. Adjust A15R926 EXT BIAS ZERO for a DVM reading of 0.000 Vdc ±12.5 mV.

18. External Mixer Amplitude Adjustment

Assembly Adjusted

A15 RF assembly

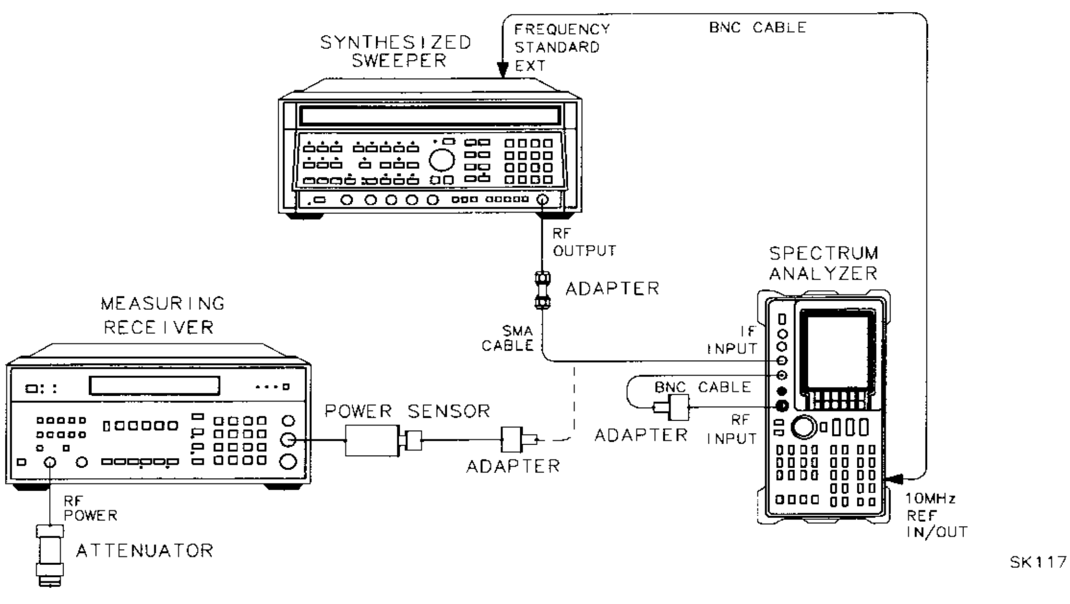
Related Performance Test

IF Input Amplitude Accuracy

Description

The slope of the flatness compensation amplifiers is determined. The user-loaded conversion losses for K-band are recorded and reset to 30 dB. A 310.7 MHz signal is applied to the power sensor and the power level of the source is adjusted for a –30 dBm reading. The signal is then applied to the IF INPUT. The flatness compensation amplifiers are then adjusted (via DACs) to place the displayed signal at the reference level.

Figure 2-28 External Mixer Amplitude Adjustment Setup



Equipment

Synthesized sweeper 8340A/B
Measuring receiver 8902A
Power sensor. 8481D
50 MHz reference attenuator 11708A
(supplied with 8481D)

Adapters

Type-N (f) to SMA (f) 1250-1772
Type-N (m) to BNC (f) 1250-1476
Type APC 3.5 (f) to APC 3.5 (f) 5061-5311

Cables

BNC, 122 cm (48 in) 10503A
SMA, 61 cm (24 in) 8120-1578

Procedure

1. Press **LINE** to turn the spectrum analyzer off and disconnect the power cord. Remove the spectrum analyzer cover and reconnect the power cord.
2. Set up the equipment as illustrated in Figure 2-28. Do not connect the SMA cable to the spectrum analyzer.
3. Move the WR PROT/WR ENA jumper on the A2 controller assembly to the WR ENA position. The jumper is on the edge of the A2 board assembly and can be moved without folding the board down.
4. Press **LINE** to turn the spectrum analyzer on. On the spectrum analyzer, press **CONFIG**, **EXT MXR PRE UNPR**, (UNPR), **AUX CTRL**, **EXTERNAL MIXER**, **AMPTD CORRECT**, then **CNV LOSS VS FREQ**.
5. Press ⇑ or ⇓ to display the conversion loss value for each frequency listed in Table 2-12. Record any conversion loss reading *not equal* to 30 dB in Table 2-12 at the appropriate frequency.
6. If all conversion loss values equal 30 dB, skip to step 7, otherwise continue to step a.
   a. Refer to Table 2-12 and press ⇑ or ⇓ to select a frequency at which the conversion loss value does not equal 30 dB.
   b. Use the spectrum analyzer front-panel keys to set the conversion loss value to 30 dB.
   c. Repeat steps a and b for all frequencies having a conversion loss value other than 30 dB.
7. Press **INSTR PRESET** on the 8340A/B and set the controls as follows:

   CW frequency . . . . 310.7 MHz
   Power level . . . . −30 dBm

Table 2-12 **Conversion Loss Data**

Frequency (GHz)	Conversion Loss (dB) (≠30 dB)
18	
20	
22	
24	
26	
27	

8. Connect the 8481D to the 11708A attenuator already connected to the 8902A RF power connector. Zero and calibrate the 8902A/8481D combination in log mode. Enter the power sensor 50 MHz cal factor into the 8902A. Connect the power sensor, through an adapter, to the SMA cable.

9. Adjust the 8340A/B **POWER LEVEL** until the power displayed on the 8902A reads −30 dBm ±0.05 dB.

10. On the spectrum analyzer, press **CAL, MORE 1 OF 2, SERVICE CAL DATA, 3RD IF AMP**, then **CAL 3RD AMP GAIN**.

11. Wait until the message ADJUSTMENT DONE appears in the active function block and press **EXT MXR REF CAL.**

12. Disconnect the SMA cable from the power-sensor/adapter and connect the cable to the spectrum analyzer IF INPUT.

13. Use the spectrum analyzer front-panel knob, step keys, or keypad to change the amplitude of the displayed signal until the marker reads 0 dBm ±0.17 dB.

14. Press **PREV MENU, STORE DATA**, and **YES** on the spectrum analyzer.

15. Place the WR PROT/ WR ENA jumper on the A2 controller assembly in the WR PROT position.

NOTE The following steps should only be performed if you need to replace the 30 dB conversion loss values to those recorded in Table 2-12.

16. Press **AUX CTRL, EXTERNAL MIXER, AMPTD CORRECT**, then **CNV LOSS VS FREQ** on the spectrum analyzer.

17. Press ⇑ or ⇓ to select frequencies where the conversion loss value was recorded in Table 2-12.

18. Use the spectrum analyzer front panel keys to enter the conversion loss values recorded for the frequency.

19. Signal ID Oscillator Adjustment

Assembly Adjusted

A15 RF assembly

Related Performance Test

There is no related performance test for this adjustment.

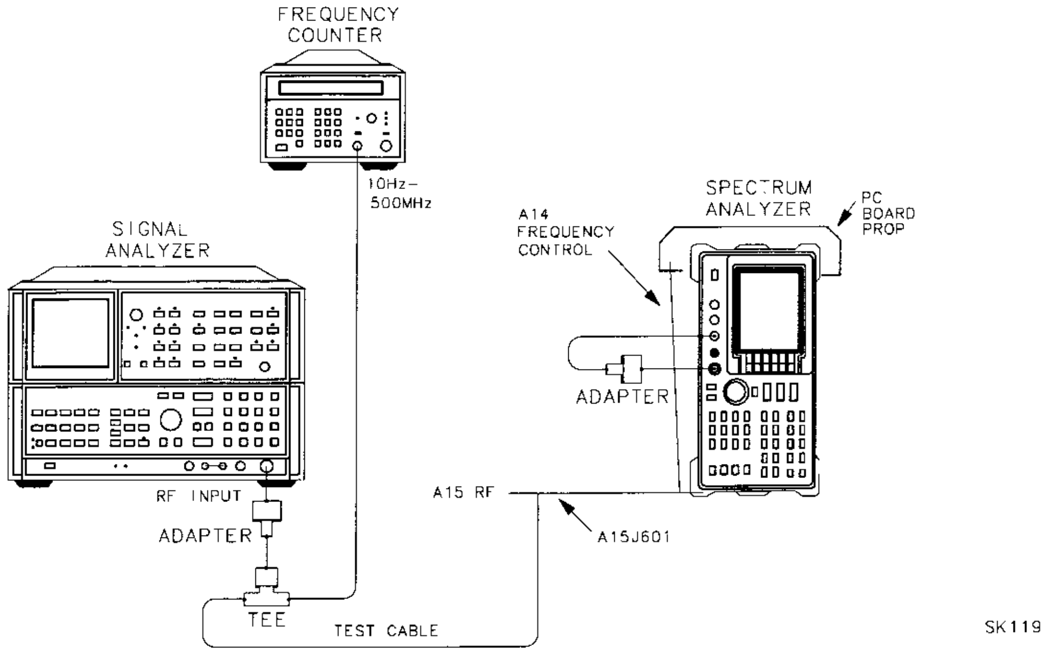
Description

NOTE This adjustment applies only to spectrum analyzers with A15 RF assembly 08563-60083 or earlier (serial prefix 3517A and below). Later A15 RF assemblies have no 298 MHz adjustment. This procedure is required for spectrum analyzers with a serial prefix less than 3310A (standard and all options), or from 3310A through 3517A with Option 008 installed.

The frequency range of the 298 MHz signal ID oscillator is determined by counting the 10.7 MHz IF as A15C629 is rotated through its range of adjustment. The SIG ID oscillator is then set to the frequency determined by the following equation:

$$\text{Oscillator frequency} = 12.7\ \text{MHz} + \left(\frac{\text{Oscillator frequency range}}{4}\right)$$

Figure 2-29 **Signal ID Oscillator Adjustment Setup**



Equipment

Microwave frequency counter 5343A
Spectrum analyzer 8566A/B

Adapters

Type-N (m) to BNC (f) *(2 required)* 1250-1476
BNC tee (f, m, f) 1250-0781

Cables

BNC, 122 cm (48 in) *(2 required)* 10503A
Test cable, BNC (m) to SMB (f) 85680-60093

Procedure

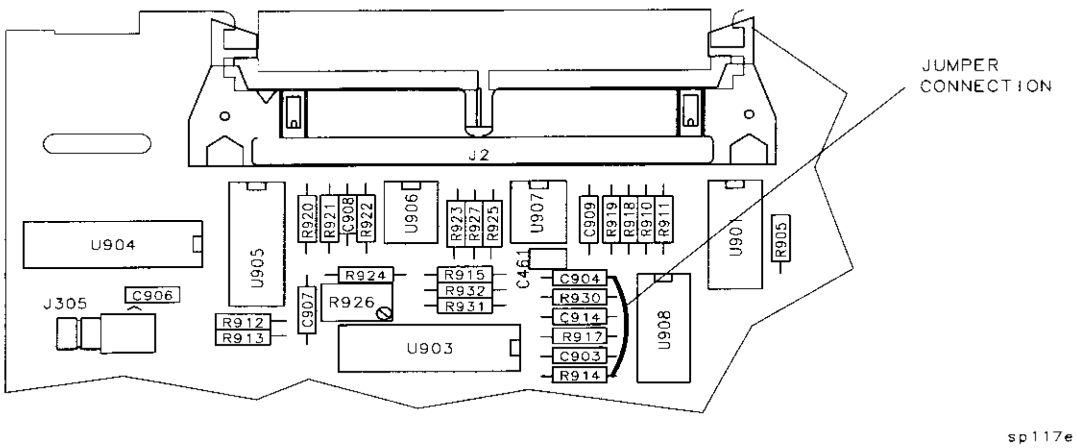
1. Press **LINE** to turn the spectrum analyzer off. Disconnect the power cord, and remove the spectrum analyzer cover. Fold down the A15 RF and A14 frequency control assemblies. Prop up the A14 frequency control assembly.
2. Connect the spectrum analyzer CAL OUTPUT to the INPUT 50 Ω using an adapter. Disconnect the W29 cable from A15J601 (10.7 MHz IF out) and connect the SMB end of the test cable to A15J601. Connect the rest of the equipment as shown in Figure 2-29.
3. Remove the four screws holding the brace on the A15 RF assembly (near J2.)

4. Connect a jumper between the leads of A15R914 and A15C904 (the ends near U908.) See Figure 2-30 for the location of the components.
5. Reconnect the power cord and press **LINE** to turn the spectrum analyzer on. After the power-on sequence is complete, set the spectrum analyzer controls as follows:

   Center frequency . . . . 300 MHz
   Span . . . . 0 Hz

6. Press **CAL**, **IF ADJ ON OFF** so OFF is underlined, and **SGL SWP**.

Figure 2-30 Signal ID Oscillator Adjustment Jumper Location



7. Press **INSTR PRESET** on the 8566A/B and set the controls as follows:

   Center frequency . . . . 12.7 MHz
   Span . . . . 500 kHz

8. Set the 5343A controls as follows:

   Sample rate . . . . Fully counterclockwise
   50 Ω–1 MΩ switch . . . . 50 Ω
   10 Hz–500 MHz/500 MHz–26.5 GHz switch . . . . 10 Hz–500 Mhz

9. If no signal is displayed on the 8566A/B, adjust A15C629 SIG ID until a signal is displayed.

NOTE If the 298 MHz SIG ID oscillator is severely mistuned, it might be necessary to widen the span on the 8566A/B to see the IF signal.

10. Rotate A15C629 SIG ID slightly while observing the 8566A/B display.

NOTE The nominal counted frequency should be 12.7 MHz, not 10.7 MHz.

11. While observing the 8566A/B display, adjust A15C629 SIG ID for the highest obtainable frequency, with less than 3 dB decrease in amplitude from maximum. Read this frequency from the frequency counter and record as $F_{3\ dB\ HIGH}$.

$F_{3\ dB\ HIGH}$ = ____________MHz

12. Observe the 8566A/B display as you adjust A15C629 SIG ID for the lowest obtainable frequency, with less than 3 dB decrease in amplitude from maximum. Record the frequency counter reading as $F_{3\ dB\ LOW}$.

$F_{3\ dB\ LOW}$ = ____________MHz

13. Calculate the difference between $F_{3\ dB\ HIGH}$ and $F_{3\ dB\ LOW}$, then divide results by four. Enter the result as F_{OFFSET}.

F_{OFFSET} = ____________MHz

14. Add F_{OFFSET} to $F_{3\ dB\ LOW}$ recorded in step 10 and record the result as F_{SIGID}.

F_{SIGID} = ____________MHz

15. Adjust A15C629 for a frequency counter reading equaling F_{SIGID}. The final adjusted frequency must equal 12.7 MHz ±50 kHz.

20. Switched YIG-Tuned Filter (SYTF) Adjustment (8561E/EC)

Assembly Adjusted

A14 frequency control assembly

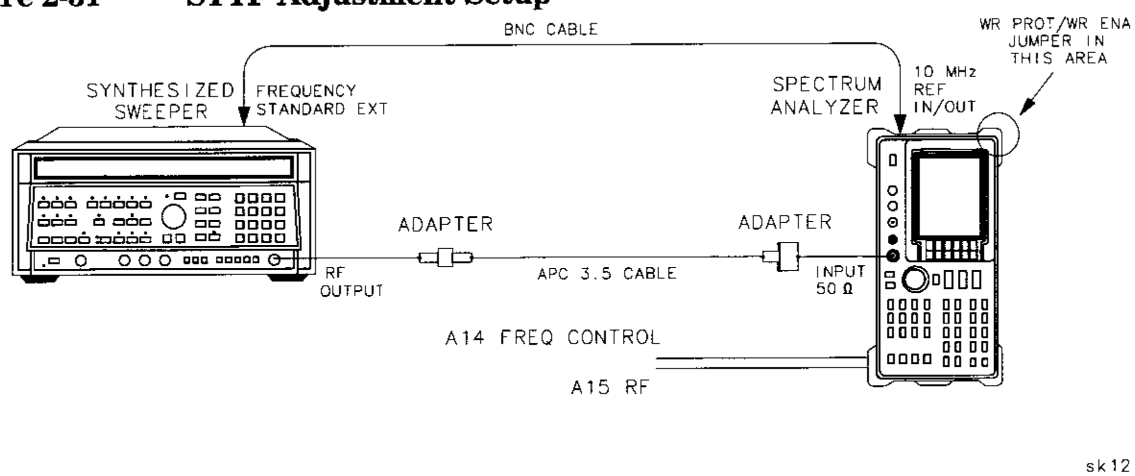
Related Performance Test

Image, Multiple, and Out-of-Band Responses
Second Harmonic Distortion
Frequency Response

Description

The slope and offset of the A10 SYTF tuning voltage are set by DACs on the A14 Frequency Control assembly. The offset DAC value is optimized at a low frequency and the slope DAC value is optimized at a high frequency.

Figure 2-31 **SYTF Adjustment Setup**



Equipment

Synthesized Sweeper 8340A/B

Adapters

Type-N (m) to APC 3.5 (f) 1250-1744
Type APC 3.5 (f) to APC 3.5 (f) 5061-5311

Cables

APC 3.5, 91 cm (36 in) 8120-4921

Procedure

1. Set the 8561E/EC **LINE** switch to off and disconnect the line cord. Remove the spectrum analyzer cover and connect the line cord. Connect the equipment as illustrated in Figure 2-31. Set the **LINE** switch on.
2. Move the WR PROT/WR ENA jumper on the A2 controller assembly to the WR ENA position.
3. Press **PRESET** on the 8561E/EC and set the controls as follows:

   Center frequency . . . . 3.0 GHz
   Span . . . . 0 Hz

4. On the Agilent 8561E/EC, press **CAL**, **IF ADJ OFF**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **PRESEL ADJ**, then **PRESET ALL DACS**.
5. Press **INSTR PRESET** on the 8340A and set the controls as follows:

   CW. . . . . 3.0 GHz
   Power level. . . . . –10 dBm
   Frequency standard switch (rear panel). . . . . EXT

6. Press **PRESEL OFFSET** on the 8561E/EC. Use the front-panel knob to peak the displayed trace. Record the offset DAC value below:

   Offset at 3.0 GHz = ____________

7. Set the 8561E/EC center frequency and the Agilent 8340A **CW** to 6.0 GHz.
8. On the 8561E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **PRESEL ADJ**, then **PRESEL OFFSET**. Key in the offset value noted in step 6.
9. Press **PRESEL SLOPE** on the 8561E/EC. Use the front-panel knob to peak the displayed trace. Record the slope DAC value below:

   Slope at 6.0 GHz = ____________

10. Set the 8561E/EC center frequency and the 8340A **CW** to 3.0 GHz.
11. On the 8561E/EC, press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **PRESEL ADJ**, then **PRESEL SLOPE**. Key in the slope value noted in step 9.
12. Repeat steps 6 through 11 until both SLOPE and OFFSET are peaked. Adjust the OFFSET only at 3.0 GHz and the SLOPE only at 6.0 GHz.
13. Press **PREV MENU**, **STORE DATA**, and **YES** on the 8561E/EC.
14. Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR PROT position.
15. On the 8561E/EC, press **RECALL**, **MORE 1 OF 2**, **FACTORY PRSEL PK**, **SAVE**, then **SAVE PRESEL PK**.

21. YIG-Tuned Filter/Mixer (RYTHM) Adjustment (8563E/EC)

Assembly Adjusted

A14 frequency control assembly

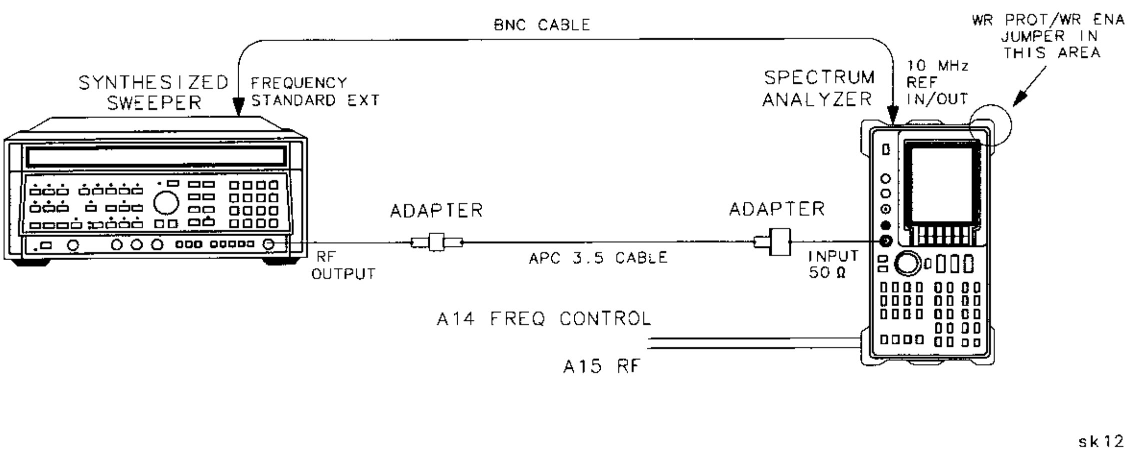
Related Performance Tests

Image, Multiple, and Out-of-Band Responses
Second Harmonic Distortion
Frequency Response

Description

The slope and offset of the A10 RYTHM tuning voltage are set by DACs on the A14 frequency control assembly. The offset DAC value is optimized at a low frequency and the slope DAC value is optimized at a high frequency.

Figure 2-32 RYTHM Adjustment Setup



Equipment

Synthesized sweeper 8340A/B

Adapters

Type-N (m) to APC 3.5 (f) 1250-1744
Type APC 3.5 (f) to APC 3.5 (f) 5061-5311

Cables

APC 3.5, 91 cm (36 in) 8120-4921

Procedure

1. Set the 8563E/EC **LINE** switch to off and disconnect the line cord. Remove the spectrum analyzer cover, fold down the A14 and A15 board assemblies, and connect the line cord. Connect the equipment as illustrated in Figure 2-32. Press **LINE** to turn the spectrum analyzer on.
2. Move the WR PROT/WR ENA jumper on the A2 controller assembly to the WR ENA position. The jumper is on the edge of the A2 board assembly and can be moved without folding the board down.
3. Press **PRESET** on the 8563E/EC and set the controls as follows:

   Center frequency . . . . 4.0 GHz
   Span . . . . 0 Hz

4. On the 8563E/EC, press **CAL, IF ADJ ON OFF** so OFF is underlined, **MORE 1 OF 2, SERVICE CAL DATA, PRESEL ADJ**, then **PRESET ALL DACS.**
5. Press **INSTR PRESET** on the 8340A and set the controls as follows:

   CW. . . . . 4.0 GHz
   Power level. . . . . –10 dBm
   Frequency standard switch (rear panel). . . . . EXT

6. Press **PRESEL OFFSET** on the 8563E/EC. Use the front-panel knob to peak the displayed trace. Record the offset DAC value below:

   Offset at 4.0 GHz = ____________

7. Set the 8563E/EC center frequency and the 8340A **CW** to 12.16 GHz.
8. On the 8563E/EC, press **CAL, MORE 1 OF 2, SERVICE CAL DATA, PRESEL ADJ**, then **PRESEL OFFSET**. Key in the offset value noted in step 6.
9. Press **PRESEL SLOPE** on the 8563E/EC. Use the front-panel knob to peak the displayed trace. Record the slope DAC value below:

   Slope at 12.16 GHz = ____________

10. Set the 8563E/EC center frequency and the 8340A **CW** to 4.0 GHz.
11. On the 8563E/EC, press **CAL MORE 1 OF 2 SERVICE CAL DATA PRESEL ADJ**, then **PRESEL SLOPE**. Key in the slope value noted in step 9.
12. Repeat steps 6 through 11 until both SLOPE and OFFSET are peaked. Adjust the OFFSET only at 4.0 GHz and the SLOPE only at 12.16 GHz.
13. Press **PRESEL OFFSET**. Press ⇑ to display OFFSET FOR BAND #2. Key in the offset value recorded in step 6.

14. Press **PRESEL SLOPE**, then press ⇑ on the 8563E/EC until SLOPE FOR BAND #3 is displayed. Key in slope value noted in step 9.
15. Set the 8563E/EC **CENTER FREQ** and the 8340A **CW** frequency to 13.3 GHz.
16. Press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **PRESEL ADJ**, then **PRESEL OFFSET**. (Press ⇑, if necessary, until OFFSET FOR BAND #3 is displayed.)
17. Use the data entry knob to peak the displayed trace.
18. Set the 8563E/EC **CENTER FREQ** and the 8340A **CW** frequency to 25.2 GHz.
19. Press **CAL**, **MORE 1 OF 2**, **SERVICE CAL DATA**, **PRESEL ADJ**.
20. Press **PRESEL SLOPE**. Use the front panel data knob to peak the displayed trace.
21. Set the 8553E **CENTER FREQ** and the 8340A **CW** frequency to 13.3 GHz.
22. Repeat steps 16 through 21 until both the slope and offset are peaked. Adjust the OFFSET only at 13.3 GHz and the SLOPE at 25.2 GHz.
23. Press **PREV MENU**, **STORE DATA**, and **YES** on the 8563E/EC.
24. Place the WR PROT/WR ENA jumper on the A2 controller assembly in the WR PROT position.
25. On the 8563E/EC, press **RECALL**, **MORE 1 OF 2**, **FACTORY PRSEL PK**, **SAVE**, then **SAVE PRESEL PK**.

22. 16 MHz PLL Adjustment

NOTE This adjustment applies only to spectrum analyzers with A2 controller assemblies other than 08563-60017.

Assembly Adjusted

A2 controller assembly

Related Performance Tests

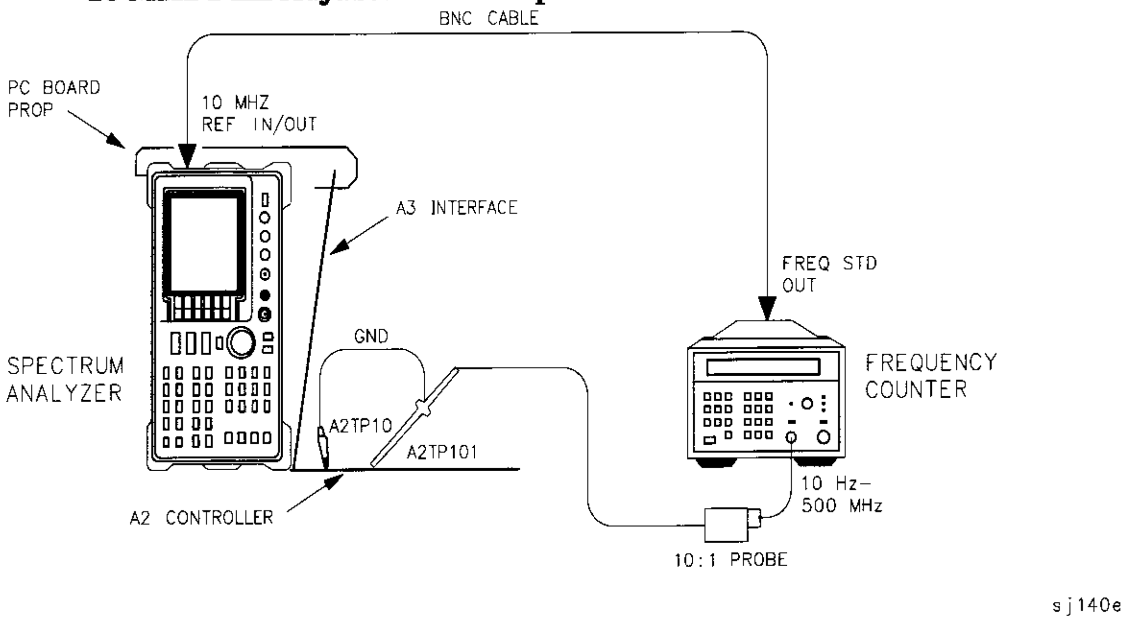
Sweep Time Accuracy
Gate Delay Accuracy and Gate Length Accuracy
Delayed Sweep Accuracy
Fast Sweep Time Accuracy (Option 007)

Description

In spectrum analyzers with serial prefix numbers greater than or equal to 3310A, the 16 MHz CPU clock is phase locked to the 10 MHz reference. The output of the 16 MHz PLL's loop integrator is adjusted for a clock frequency of approximately 14.4 MHz with the loop unlocked. This ensures that the CPU will still function and the display annotation will be distorted but readable, even if the 10 MHz reference to A2 is absent.

NOTE If necessary, perform the display adjustments after performing the following adjustment.

Figure 2-33 **16 MHz PLL Adjustment Setup**



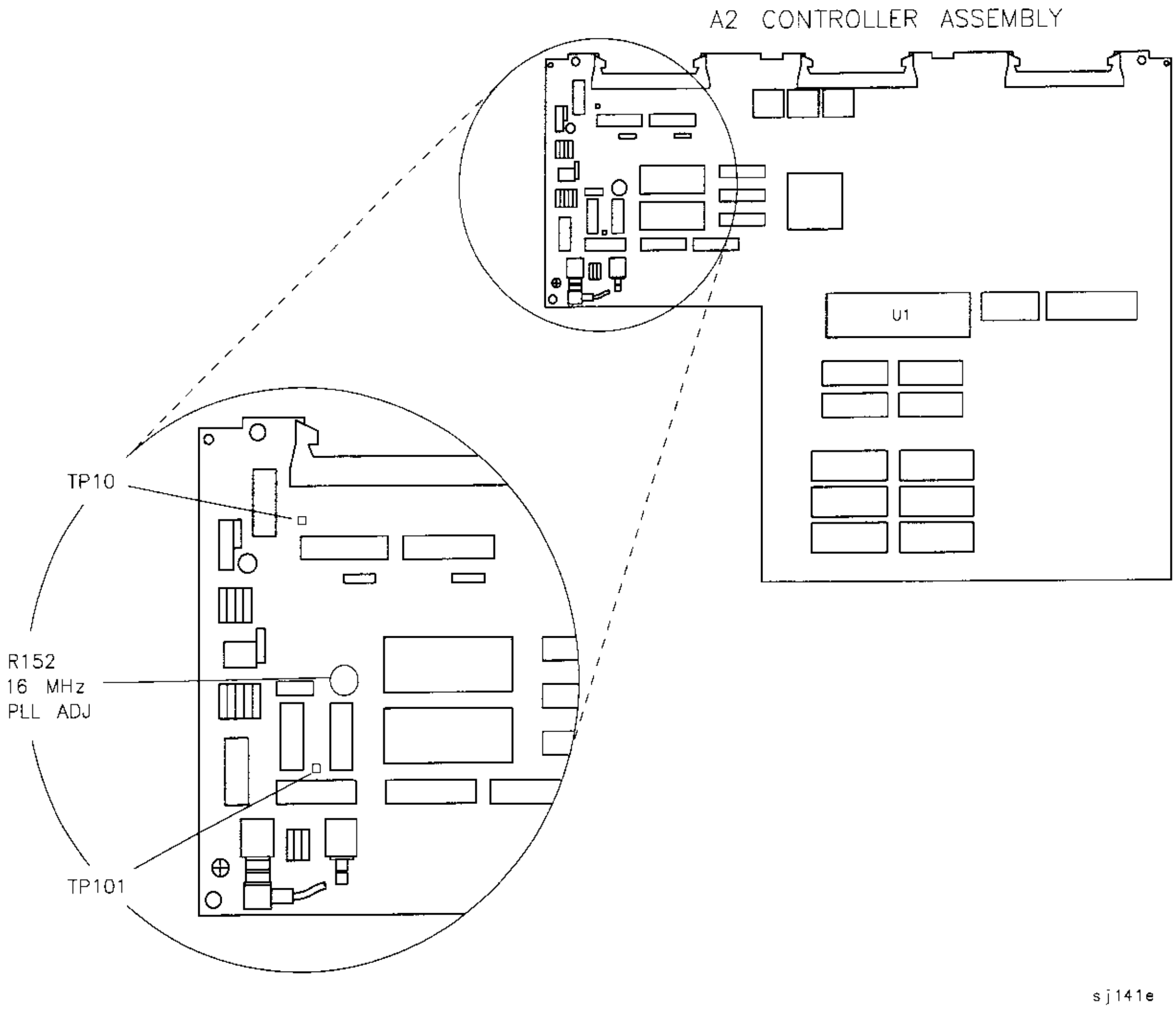
Equipment

Microwave frequency counter........................5343A
10:1 probe 10432A

Procedure

1. Press **LINE** to turn the spectrum analyzer off. Remove the spectrum analyzer cover and fold out the A2 controller and A3 interface assemblies. Use a pc board prop to hold up the A3 interface assembly, as shown in Figure 2-33.
2. Connect the equipment as shown if Figure 2-33. The 10:1 probe's ground lead connects to A2TP10 and the probe's tip connects to A2TP101.
3. The 16 MHz PLL adjustment location is shown in Figure 2-34.

Figure 2-34 16 MHz PLL Adjustment Location



4. Press **LINE** to turn the spectrum analyzer on. Wait until the spectrum analyzer power-on adjustments have completed.
5. Set the microwave frequency counter as follows:

   Sample rate . . . . Fully counterclockwise
   10 Hz–500 MHz/500 MHz–26.5 GHz switch . . . . 10 Hz–500 Mhz
   50 Ω/1 MΩ switch. . . . . 1 MΩ

6. On the spectrum analyzer, press **AUX CTRL**, **REAR PANEL**, and **10 MHz EXT**.
7. Disconnect W22 (10 MHz frequency counter) from A2J8. The display will probably appear distorted and error messages may appear. Ignore the error messages.
8. Adjust A2R152 (16 MHz PLL ADJ) until the microwave frequency counter reads 14.4 MHz ±200 KHz.

9. Reconnect W22 to A2J8. The microwave frequency counter should read 16 MHz. If the counter reads 16 MHz and the display is still distorted, perform the display adjustments in “2. Display Adjustment (8561E and 8563E)” on page 62.

10. On the spectrum analyzer, press **CAL**, **REALIGN LO and IF** to clear any error messages.

23. 600 MHz Reference Adjustment (serial prefix 3406A and above)

Assembly Adjusted

A15 RF assembly

Related Performance Test

There is no related performance test for this adjustment.

Description

The 100 MHz VCXO and the tripler are adjusted for a maximum signal level at 600 MHz. A spectrum analyzer is used to monitor the amplitude of the 600 MHz signal while performing these adjustments.

Equipment

Spectrum analyzer. 8566A/B

Procedure

1. Press **LINE** to turn the spectrum analyzer off, disconnect the power cord, and remove the spectrum analyzer cover. Fold down the A15 RF and A14 frequency control assemblies. Prop up the A14 frequency control assembly.
2. Disconnect W33, gray/brown coax cable, from A15J701.
3. Connect the signal at A15J701 to the input of the 8566A/B spectrum analyzer.
4. Reconnect the power cord and press **LINE** to turn the spectrum analyzer on.
5. Set the center frequency of the 8566A/B to 600 MHz and set the frequency span and resolution bandwidth of the 8566A/B for the best display of the 600 MHz signal.
6. Set the peak of the 600 MHz signal near the top graticule line on the 8566A/B display and set to 1 dB per division.
7. Adjust A15 C750, VCXO Adjust, for maximum amplitude.
8. Adjust A15 C751 Tripler Adjust, for maximum amplitude. The level, after proper adjustment, should be between –3 and +4.8 dBm (typically 0 to +1 dBm).
9. Reconnect W33 to A15J701.