

SECTION I GENERAL INFORMATION

1-1. INTRODUCTION

1-2 This Operating and Service Manual contains instructions and other information you will need to install, operate, test and repair the HP Model 8750A Storage-Normalizer, shown with its accessories in Figure 1-1.

1-3. Supplied with this manual is an Operating Information Supplement. The Operating Information Supplement consists of the first three sections of this manual. It should be kept with the 8750A where it will be easily accessible to the measurement system operator.

1-4. DESCRIPTION

1-5. The Model 8750A Storage-Normalizer is a light, compact, easily stored or transported instrument, which can be used with a wide variety of HP network and spectrum analyzers (see Table 1-1) to furnish digitally-stored and normalized X and Y axes CRT displays. In network analyzer applications, the 8750A provides two channels for simultaneous displays of insertion loss, return loss, magnitude, phase, and other parameters. Each channel has a horizontal resolution of 256 points.

1-6. Used with a spectrum analyzer, the 8750A enables a stored trace and an occurring trace, or two stored traces, to be displayed simultaneously on the spectrum analyzer CRT. The normalized trace can also be displayed.

1-7. A Network Analyzer Interface Board Assembly (HP Part Number 08750-60005) and a Spectrum Analyzer Interface Board Assembly (HP Part Number 08750-60009) are supplied with each 8750A Storage-Normalizer. Only one of these boards is used at a time, either the Network Analyzer Interface Board or the Spectrum Analyzer Interface Board, depending on which kind of analyzer is in use. The interface board plugs into a socket inside the 8750A through a cutout in the 8750A's rear panel. The Network Analyzer Interface Board has two 2-position switches on it and the Spectrum Analyzer Interface Board has one. These switches are set by the test equipment operator before the test setup is connected to

adapt the 8750A to the test setup equipment signal polarities and signal requirements.

1-8. Additional Network Analyzer Interface Board Assemblies, each of which adapts the 8750A to a particular network analyzer instrument or combination of instruments, are available as equipment options. (For further information about 8750A equipment options, refer to paragraph 1-10.)

1-9. Also supplied with the 8750A is a Normalizer Interconnect Cable, HP Part Number 08750-60034. This cable is 60 cm (23-5/8 inches) long and provides a direct connection between the 8750A rear-panel NORMALIZER INTERCONNECT receptacle and compatible HP oscilloscope mainframes, network analyzers, and spectrum analyzers.

1-10 8750A EQUIPMENT OPTIONS

1-11. Option 001, BNC Interface Adapter Cable Assembly

1-12. Option 001 deletes the normally supplied Normalizer Interconnect Cable from the 8750A shipment and substitutes the BNC Interface Adapter Cable Assembly, HP Part Number 08750-60035. The optional Interface Adapter Cable Assembly consists of six coaxial cables, each with a male BNC connector on one end, all extending from a single multiple-contact connector which mates with the 8750A's rear-panel NORMALIZER INTERCONNECT receptacle. This cable assembly enables the 8750A to be combined with an oscilloscope for operation with spectrum analyzers that employ the HP Model 140T or 141T Display Section as the mainframe for the spectrum analyzer plug-in units.

1-13. Option 002, Standard Interconnect Cable Plus BNC Adapter Cable Assembly

1-14. When 8750A Option 002 is requested, the 8750A shipment includes both the standard Normalizer Interconnect Cable Assembly (HP Part Number 08750-60034), and the BNC Interface Adapter Cable Assembly (HP Part Number 08750-60035).

Table 1-1. Network and Spectrum Analyzer Systems Typically Used with 8750A Storage-Normalizer (1 of 2)

System Reference	Typical Systems (See Notes 1 and 2)	Retrofit Requirements by Serial Number Prefix (SNP) of Instrument (See Note 3)
1	<p style="text-align: center;">NETWORK ANALYZERS</p> <p>8755A/B Swept Amplitude Analyzer plugged into 182T or 180TR Display, with 8620A/B/C Sweep Oscillator</p> <p>Uses standard or Option 003 Interface Board Assembly.</p>	<p>182T with SNP 1529A or lower requires Retrofit Kit, 08750-60024.</p> <p>180TR with SNP 1640A or lower requires Retrofit Kit, 08750-60025.</p> <p>8755A requires Retrofit Kit 08755-60027.</p>
2	<p>8755A/B Swept Amplitude Analyzer plugged into 182T or 180TR Display, with 8690B Sweep Oscillator</p> <p>Uses standard Interface Board Assembly</p>	Retrofit requirements same as System 1 above.
3	<p>8410B Network Analyzer with 8412A Phase-Magnitude Display plug-in section, and 8620A/C Sweep Oscillator</p> <p>Uses standard or Option 003 Interface Board Assembly</p>	8412A with SNP 1625A or lower must be retrofitted at HP Service Center. Contact nearest HP office for further information.
4	<p>8410B Network Analyzer with 8412A Phase-Magnitude Display plug-in section, and 8690B Sweep Oscillator</p> <p>Uses standard Interface Board Assembly</p>	8412A retrofit requirements same as System 3 above.
5	<p>8407A Network Analyzer with 8412A Phase-Magnitude Display plug-in section, and 8601A Generator/Sweeper</p> <p>Uses standard Interface Board Assembly</p>	8412A retrofit requirement same as System 3 above.
6	<p>8505A Network Analyzer</p> <p>Uses standard Interface Board Assembly</p>	
7	<p>8754A Network Analyzer</p> <p>Uses standard or Option 004 Interface Board Assembly</p>	
8	<p style="text-align: center;">SPECTRUM ANALYZERS</p> <p>8557A 0.01-350 MHz Spectrum Analyzer plugged into 182T or 180TR Display</p>	8557A with SNP 1652A or lower requires Retrofit Kit 08557-60060. 182T and 180TR retrofit requirements same as System 1 above.
9	<p>8558B 0.1-1500 MHz Spectrum Analyzer plugged into 182T or 180TR Display</p>	8558B with SNP 1652A or lower requires Retrofit Kit 08558-60092. 182T and 180TR retrofit requirements same as System 1 above.

Table 1-1. Network and Spectrum Analyzer Systems Typically Used with 8750A Storage-Normalizer (2 of 2)

System Reference	Typical Systems (See Notes 1 and 2)	Retrofit Requirements by Serial Number Prefix (SNP) of Instrument (See Note 3)
10	SPECTRUM ANALYZERS (Continued) 8565A Spectrum Analyzer	
11	140T or 141T Display Section with 8552A/B Spectrum Analyzer IF Section plug-in, and one of the following: 8553B Spectrum Analyzer RF Section plug-in 8554B Spectrum Analyzer RF Section plug-in 8555A Spectrum Analyzer RF Section plug-in 8556A Spectrum Analyzer LF Section plug-in	8750A is not directly compatible with 140T or 141T. System requires BNC Adapter Cable Assembly, Option 001 or 002, and auxiliary oscilloscope display.
<p>NOTES:</p> <ol style="list-style-type: none"> All network analyzers listed in this table will interface with the 8750A through the Network Analyzer Interface Board Assembly (standard) supplied with the 8750A. This board contains two switches which are each set to one of two positions to adapt the 8750A to the particular network analyzer in use. Special interface boards, indicated as options, are specifically for interfacing the equipment they are listed with and the 8750A. They do not have any switches that require presetting and, therefore, reduce the possibility of operating problems related to human error. All spectrum analyzers listed in this table interface with the 8750A through the Spectrum Analyzer Interface Board Assembly supplied with the 8750A. The board contains a switch which is set to one of two positions, INV (inverting) or non-inverting, to adapt the 8750A to the output signal polarity of the spectrum analyzer in use. If no retrofit information is listed for an instrument, all instruments with that model number (and letter suffix) are compatible with the 8750A without retrofit, regardless of the instrument serial number. 		

1-15. Option 003, 8755/8410 Network Analyzer Interface Board

1-16 Option 003 adds the 8755/8410 Network Analyzer Interface Board Assembly (HP Part Number 08750-60032). This is a special 8750A Interface Board for two network analyzer systems commonly used with the 8750A. These two systems are: (1) the Model 8755A or 8755B Swept Amplitude Analyzer section plugged into a Model 180TR or 182T Display, and an external signal source; and (2) the Model 8410B Network Analyzer with a Model 8412A Phase-Magnitude Display plug-in section, and an external signal source. The option 003 Network Analyzer Interface Board is similar to the standard Network Analyzer Interface Board supplied with the 8750A, but because its application is specific rather than general, it has no

system adapter switches which must be preset by the operator.

1-17. Option 004, 8754A Network Analyzer Interface Board

1-18. Option 004 adds the 8754A Network Analyzer Interface Board Assembly (HP Part Number 08750-60031). This is a special 8750A Interface Board for interfacing the 8750A and the Model 8754A Network Analyzer. Like the Option 003 Interface Board, the Option 004 Board has no system adapter switches to be set by the operator. Therefore, its use simplifies the interfacing setup procedures and eliminates the possibility of an incorrectly set switch causing the measurement system to operate abnormally.

1-19. SUPPLEMENTAL PERFORMANCE CHARACTERISTICS

1-20. Supplemental performance characteristics for the 8750A Storage-Normalizer are listed in

Table 1-2. Supplemental performance characteristics are not specifications; they are merely the typical operating features of a normally functioning 8750A.

Table 1-2. Model 8750A Storage-Normalizer Supplemental Performance Characteristics

<p>Memory Resolution Horizontal: Two display memories, 256 data points per memory (0.4% of full scale, 8-bit word) Vertical: 9-bit display resolution (0.2% of full scale) plus a 50% non-viewable overrange both above and below full screen. The overrange capability is useful in storing and normalizing traces that exceed full scale.</p> <p>Input Horizontal Sweep Rate Maximum: 100 seconds Minimum: 10 milliseconds</p> <p>X-Y Recorder Outputs Horizontal Accuracy: 0V is within 20 mV of zero reference. Full scale is within $\pm 3\%$ of full scale reference. Vertical Accuracy: Full scale is within $\pm 3\%$ of full scale reference.</p> <p>Display Refresh Rate 6 ms nominal</p> <p>Video Detection Network Analyzer: Average detection (20 kHz) Spectrum Analyzer: Peak detection</p> <p>Analog/Digital Inputs Horizontal Input: Network Analyzer: 0 to 10V nominal Offset $\pm 0.5V$ Gain adjustable for 6 to 15V sweep ramp. Spectrum Analyzer: $\pm 5V$ nominal Offset $\pm 0.5V$ Gain adjustable for $\pm 4.5V$ to $\pm 5.5V$</p> <p>Vertical Input: Network Analyzer: Two ranges +1V to -1V; and +2V to -2V Offset $\pm 0.3V$ Gain adjustable approximately $\pm 20\%$ Spectrum Analyzer: 0 to +8V or 0 to -0.8V Offset $\pm 0.1V$ Gain adjustable $\pm 10\%$</p>	<p>Digital/Analog Output Horizontal Output: Network Analyzer and Spectrum Analyzers: Gain adjustable for 1 to 3V peak Offset adjustment +0.5 to -1.5V Vertical Output: Network Analyzer: Same as vertical input with $\pm 10\%$ adjustment range Spectrum Analyzer: Same as vertical input with $\pm 10\%$ adjustment range</p> <p>X-Y Recorder Outputs Sweep Time: 30 seconds per displayed trace Pen Lift: 0V minimum, 20V maximum. Maximum sink (pen down) current is 150 mA.</p> <p>Horizontal Range: 0V to 1V nominal Vertical Range: $\pm 4V$ nominal</p> <p>Interface Blanking In: Blanked = High (Typically 3.5V into 20K ohms impedance) Unblanked = Low (typically 0.5V) Blanking Out: Blanked = High (typically 3.5V at 4 mA max.) Unblanked = Low (typically 0.4V at 10 mA max.) or Blanked = Low (typically 0.4V at 10 mA max.) Unblanked = High (typically 3.5V at 0.3 mA max.)</p> <p>Power Requirements: 100, 120, 220 or 240 Vac +5% -10%; 48 to 440 Hz; ≤ 20 VA (≤ 20 watts)</p> <p>Dimensions: 212 mm wide, 88 mm high, 269 mm deep (8.4 in. x 3.5 in. x 10.6 in.)</p> <p>Weight: 2.72 kg (6 lbs) net; 4.99 kg (11 lbs) shipping</p>
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1-21. INSTRUMENTS COVERED BY MANUAL

1-22. Attached to the instrument is a serial number plate (Figure 1-2). The serial number is in two parts. The first four digits and the letter are the serial number prefix; the last five digits are the suffix. The prefix is the same for all identical instruments; it changes only when a change is made to the instrument. The suffix, however, is assigned sequentially and is different for each instrument. The contents of this manual apply to instruments with the serial number prefixes listed under SERIAL NUMBERS on the title page.

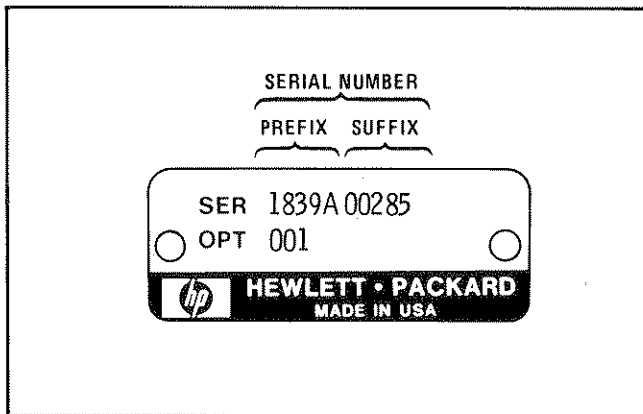


Figure 1-2. Typical Serial Number Plate

1-23. An instrument manufactured after the printing of this manual may have a serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates the instrument is different from those described in this manual. The manual for this newer instrument is accompanied by a yellow Manual Changes supplement. This supplement contains "change information" that explains how to adapt the manual to the newer instrument.

1-24. In addition to change information, the supplement contains instructions for correcting any errors in the manual. To keep this manual as current as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is identified with this manual's print date and part number, both of which appear on the manual's title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-25. For information concerning a serial number prefix that is not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

1-26. SAFETY CONSIDERATIONS

1-27. The 8750A Storage-Normalizer is a Safety Class 1 instrument (i.e., it is provided with a protective earth terminal). Before you operate it, or even connect its ac power cord, you should familiarize yourself with the safety labels on the 8750A chassis and the safety instructions in this manual.

1-28. Safety Symbols



Refer to Operating and Service Manual: This symbol on the instrument means the user must refer to the instrument's Operating and Service Manual to protect the instrument from damage.



Protective Earth Ground: Indicates protective earth ground terminal of the ac power source or the instrument. All exposed metal surfaces on the instrument *must* connect to a protective earth ground terminal.



Frame or Chassis Terminal: This symbol identifies a terminal that is normally common to all exposed metal surfaces on the instrument.

WARNING

The WARNING sign denotes a hazard to personnel. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION

The CAUTION sign denotes a hazard to the instrument. It calls attention to an operating or maintenance procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the instrument. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

1-29. Operating Safety

1-30. Operating personnel should *never* remove the top or bottom cover from the 8750A. The top

and bottom covers must be on the instrument, and the instrument must be properly grounded to ensure operator safety. Before you connect the instrument to the ac power source, verify that the ac line voltage outlet socket you are going to use is provided with a protective earth contact.

1-31. To avoid damage to the instrument, you must make sure the ac line voltage switch on the lower right side of the instrument's rear panel is set for the available ac line voltage, that the correct fuse (rating depends on ac line voltage level) is installed in the rear-panel fuse holder, and that the ac power cable you received with the instrument is the correct one for your application. Information about ac line voltage switch settings, fuses, and ac power cables is included in Section II, Installation, of this manual.

1-32. To avoid electrical shock, you must make sure the ac outlet socket you will be using has a protective earth (third) contact, and that this contact is actually grounded to earth. Grounding one conductor of a two-conductor outlet is not sufficient protection. If you have to use an extension cord, it must be a three-wire type with a protective grounding conductor. DO NOT use an extension cord without the grounding conductor. If you connect the ac power through an autotransformer to reduce the ac input voltage level, make sure the autotransformer's common terminal is

connected to the protective earth ground contact of the ac outlet socket.

1-33. Servicing Safety

1-34. Any procedure requiring one or both of the 8750A's protective covers to be removed **MUST BE PERFORMED ONLY BY QUALIFIED SERVICE PERSONNEL**. Service personnel should become thoroughly familiar with the CAUTIONS and WARNINGS in this manual before attempting an adjustment or repair. All CAUTIONS and WARNINGS must be complied with to prevent damage to the equipment or injury to personnel.

1-35. If at all possible, adjustment or repairs inside the instrument with ac power connected should be avoided. When power-on repairs or adjustments are unavoidable, they should be performed only by a skilled electronics technician who knows the hazard involved.

1-36. RECOMMENDED TEST EQUIPMENT

1-37. Equipment required for testing and troubleshooting the Model 8750A Storage-Normalizer is listed in Table 1-3. Other equipment may be substituted for the listed equipment provided it meets or exceeds the critical specifications given in the table.

Table 1-3. Recommended Test Equipment

Instrument	Critical Specifications	Recommended Model	Use*
Normalizer Interconnect Cable	No substitute Supplied with 8750A	HP 08750-60034	P, A, T
or Interconnect Cable (8750A Option 001)	No substitute	HP 08750-60035 or HP 08750-60014	P, A, T
Spectrum Analyzer or Network Analyzer System that will display a trace on CRT	Must be compatible with 8750A	Any compatible instru- ment or system, see Table 1-1 for typical systems.	P, A, T
X-Y Recorder	Sensitivity, X and Y \geq 10 mV/cm	HP 7047A	P
Digital Multimeter and Probe	DC Volts: 0 to 60V AC Volts: 0 to 300V Ohms: to 20 Megohms	HP 3465B/34112A	A, T
Dual DC Power Supply	DC Outputs: 2, 0 to 10V	HP 6205B	A, T
Dual Channel Oscilloscope	Freq Range: DC to 50 MHz	HP 1722A	A, T
10:1 Probe (2 required)	Division Ratio: 10:1 Shunt Cap.: 10 pF	HP 10004D	A, T
BNC Tee Connector	1 male-to-2 female	HP 1250-0781	P, A, T
Plastic Screwdriver (Two supplied with 8750A)	Non-conducting	HP 8710-0772	A
Adapter, Banana Plug-to-BNC	Dual Banana-to-female BNC	HP 1250-2277	A

* P = Performance Tests; T = Troubleshooting; A = Adjustment Procedure.

SECTION II INSTALLATION

2-1. INTRODUCTION

2-2. This section includes information about receiving inspection, preparation for use, and storage and shipment of the HP 8750A Storage-Normalizer.

2-3. RECEIVING INSPECTION

2-4. Inspect the 8750A's shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the 8750A and its accessories have been checked mechanically and electrically.

2-5. The contents of the shipment should match the shipping manifest. Use Figure 1-1 to identify the items you receive. Procedures for verifying that the 8750A is operating normally are contained in Section IV, Performance Tests.

2-6. If the contents of the shipment are incomplete, if there is mechanical damage or defect, or if the 8750A exhibits an electrical malfunction, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the carrier's inspection. The Hewlett-Packard office will arrange for repair or replacement without waiting for a claim settlement.

2-7. PREPARING THE 8750A FOR USE

WARNING

Operator personnel must not remove the covers from this instrument. Because there are dangerous voltages inside the 8750A, its covers must be removed **ONLY** by qualified maintenance service personnel who are aware of the hazards involved.

2-8. Interface Board Assemblies

2-9. Shipped with the 8750A Storage-Normalizer are the standard Network Analyzer Interface Board, the standard Spectrum Analyzer Interface Board, and any special Network Analyzer Interface Board that might have been ordered as an equipment option. When you receive the 8750A, one of the Interface Boards will already be plugged into it through the Interface Board slot in its rear panel. The other Interface Board or Boards, and the interconnect cable(s) will be in the accessory bag that accompanies the 8750A.

2-10. Make sure the Interface Board plugged into the 8750A is the appropriate one for your measurement system. (Normally, if an optional Network Analyzer Interface Board has been ordered with the 8750A, the instrument is shipped with the optional board plugged into it.) The Interface Board Assembly plugged into the 8750A is prevented from being dislodged from its receptacle by two screws that extend through the top and bottom of the Interface Board handle into the 8750A rear panel.

2-11. When you first connect the 8750A into your measurement system, you will have to "match" the 8750A — with its front and rear panel controls — to the network or spectrum analyzer you're using it with. You will also have to match the 8750A to the measurement system anytime you exchange one Interface Board Assembly for another, whether of the same kind or a different kind. Procedures for matching the 8750A to the network measurement and spectrum analyzer systems it is most commonly used with are contained in Section III, Operation.

NOTE

All interface Board Assemblies have the same reference designator: A5.

2-12. Power Requirements

2-13. The Model 8750A requires a power source of 100, 120, 220, or 240 Vac +5%–10%, 48 to 400 Hz single phase. Power consumption is less than 20 volt-amperes.

2-14. Line Voltage and Fuse Selection

WARNING

BEFORE THIS INSTRUMENT IS SWITCHED ON, its protective earth terminals must be connected to the protective conductor of the mains power cable (cord). The mains power cable plug shall only be inserted in a socket outlet provided with a protective earth contact. DO NOT defeat the earth-grounding protection by using an extension cable, power cable, or auto-transformer without a protective ground conductor. Failure to ground the instrument properly can result in serious personal injury.

CAUTION

BEFORE SWITCHING ON THIS INSTRUMENT, make sure it is adapted to the voltage of the ac power source. You must set the 8750A rear panel voltage selector switch correctly to adapt the 8750A to the power source. Failure to set the ac power input of the instrument for the correct voltage level could cause damage to the instrument when it is switched on.

2-15. Select the line voltage and fuse as follows:

- a. Measure the ac line voltage.
- b. Refer to Figure 2-1. At the instrument's rear panel ac power level switch, select the line voltage (100V, 120V, 200V, 240V) closest to the voltage you measured in step a. Line voltage must be within +5% or -10% of the voltage setting. If it is not, you must use an autotransformer between the ac source and the 8750A.
- c. Make sure the correct fuse is installed in the fuse holder. The required fuse rating depends on the ac line voltage, and is indicated next to the fuse holder. If you have set the ac power level selector switch to 100V or 120V to accommodate the ac input level, use a 250 mA, 250V fast-blow fuse (HP Part Number 2110-0004). If you have set the ac power level selector switch to 220V or 240V to

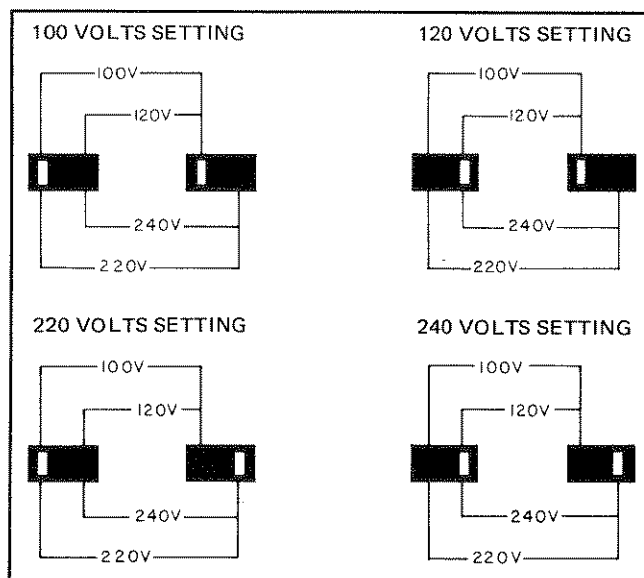


Figure 2-1. AC Power Level Selector Switch Positions

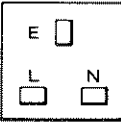

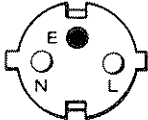
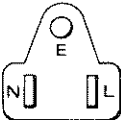
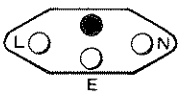
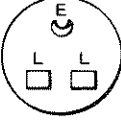
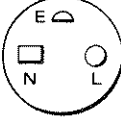

accommodate the ac input, use a 125 mA, 250V slow-blow fuse (HP Part Number 2110-0318).

2-16. Power Cable Connection

2-17. In accordance with international safety standards the 8750A is equipped with a three-wire power cable. When it is connected to an appropriate ac power line output, the third wire in this cable earth-grounds the 8750A. Styles of mains plugs available on power cables supplied with HP instruments are shown in Figure 2-2.

2-18. Normalizer Interconnect Cable Connections

2-19. The 60 cm standard Normalizer Interconnect Cable (HP Part Number 08750-60034) normally shipped with the 8750A connects directly between the 8750A and the network or spectrum analyzer it is used with. The two ends of the standard interconnect cable are identical. Connect one end to the NORMALIZER INTERCONNECT receptacle on the rear panel of the 8750A, and the other end to the NORMALIZER INTERCONNECT receptacle on the network or spectrum analyzer. If you are working with a spectrum analyzer that employs the HP 140T or 141T Display Section as a mainframe for the spectrum analyzer RF and IF plug-ins, you will have to use the Option 001 BNC Adapter Cable Assembly instead of the standard Normalizer Interconnect Cable (refer to paragraph 2-21).

Plug Type	Cable HP Part Number	C D	Plug Description	Cable Length (inches)	Cable Color	For Use In Country
250V 	8120-1351 8120-1703	0 6	Straight*BS1363A 90°	90 90	Mint Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Rhodesia, Singapore
250V 	8120-1369 8120-0696	0 4	Straight*NZSS198/ASC112 90°	79 87	Gray Gray	Australia, New Zealand
250V 	8120-1689 8120-1692	7 2	Straight*CEE7-Y11 90°	79 79	Mint Gray Mint Gray	East and West Europe, Saudi Arabia, Egypt So. Africa, India (unpolarized in many nations)
125V 	8120-1348 8120-1398 8120-1754 8120-1378 8120-1521 8120-1676	5 5 7 1 6 2	Straight*NEMA5-15P 90° Straight*NEMA5-15P Straight*NEMA5-15P 90° Straight*NEMA5-15P	80 80 36 80 80 36	Black Black Black Jade Gray Jade Gray Jade Gray	United States, Canada; Japan (100V or 200V), Mexico, Philippines, Taiwan
250V 	8120-2104	3	Straight*SEV1011 1959-24507 Type 12	79	Gray	Switzerland
250V 	8120-0698	6	Straight*NEMA6-15P			United States, Canada
220V 	8120-1957 8120-2956	2 3	Straight*DHCK 107 90°	79 79	Gray Gray	Denmark
250 V 	8120-1860	6	Straight*CEE22-VI (Systems Cabinet use)			

*Part number shown for plug is industry identifier for plug only. Number shown for cable is HP Part Number for complete cable including plug.
E = Earth Ground; L = Line; N = Neutral

Figure 2-2. AC Power Cables Available

NOTE

If you are going to use the 8750A with an HP 8505A Network Analyzer: In some HP 8505A Network Analyzers, the NORMALIZER INTERCONNECT receptacle has a metal insert in one of the unused coaxial cable connector holes. Remove this insert by poking it out from inside the 8505A before you connect the normalizer interconnect cable.

2-20. If your test setup includes an X-Y recorder, connect the recorder inputs to the RECORDER OUTPUT X, Y, and PEN connectors (BNC) on the rear panel of the 8750A.

2-21. Connections with Option 001 BNC Interface Adapter Cable Assembly

2-22. The BNC Interface Adapter Cable Assembly (HP Part Number 08750-60035) is supplied instead of the standard Normalizer Interconnect Cable (HP Part Number 08750-60034) when 8750A Option 001 is selected, and both the standard cable and the BNC Adapter Cable Assembly are supplied when 8750A Option 002 is selected. The primary purpose of the BNC Interface Adapter Cable Assembly is to permit use of the 8750A with an HP Model 140T or 141T Display Section and its two spectrum analyzer plug-in units. It also provides an easy means of connecting troubleshooting test equipment to the 8750A.

2-23. The BNC Interface Adapter Cable Assembly consists of six coaxial cables, each with a male BNC plug on one end, fanning out from a single multiple-contact plug that mates with the 8750A's rear-panel NORMALIZER INTERCONNECT receptacle. The 8750A signals carried on the six cables and the cable colors are shown in Figure 2-3. All six signals carried on this cable assembly are routed directly to or from the Interface Board plugged into the 8750A, and differ depending on whether the Interface Board in use is for a network analyzer or a spectrum analyzer. These differences are also shown in Figure 2-3.

2-24. The cable connections for operation of a spectrum analyzer system based on the HP Model 140T or 141T Display Section, and using the BNC Interface Adapter Cable Assembly, are shown in Section III, Operation, of this manual. Refer to the operating procedure applicable to the equipment you will be using in the test setup with the 8750A.

2-25. ENVIRONMENTAL CONSIDERATIONS

2-26. Environmental limitations for the 8750A are:

Temperature: 0°C to 55°C operating; -40°C to +75°C stored or in shipment.

Humidity: Up to 95% relative, whether operating, stored or in shipment.

Altitude (Barometric): 4572 meters (15,000 feet) operating; 15240 meters (50,000 feet) stored or in shipment.

2-27. PACKAGING**2-28. Original Packaging**

2-29. Containers and materials identical with those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also, mark the container FRAGILE to ensure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

2-30. Other Packaging

2-31. The following general instructions apply for repackaging with commercially available materials.

- a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the type of service required, return address, model number, and full serial number.)
- b. Use a strong shipping container.
- c. Use enough shock-absorbing material (3-to-4-inch layer) around all sides of the instrument to provide a firm cushion and prevent movement inside the container. Protect the control panel with cardboard.
- d. Seal the shipping container.
- e. Mark the shipping container FRAGILE to ensure careful handling.

2-32. ELECTRICAL CHECKOUT

2-33. To check the electrical performance of the 8750A, you can do one of the Functional Tests provided in Section IV of this manual.

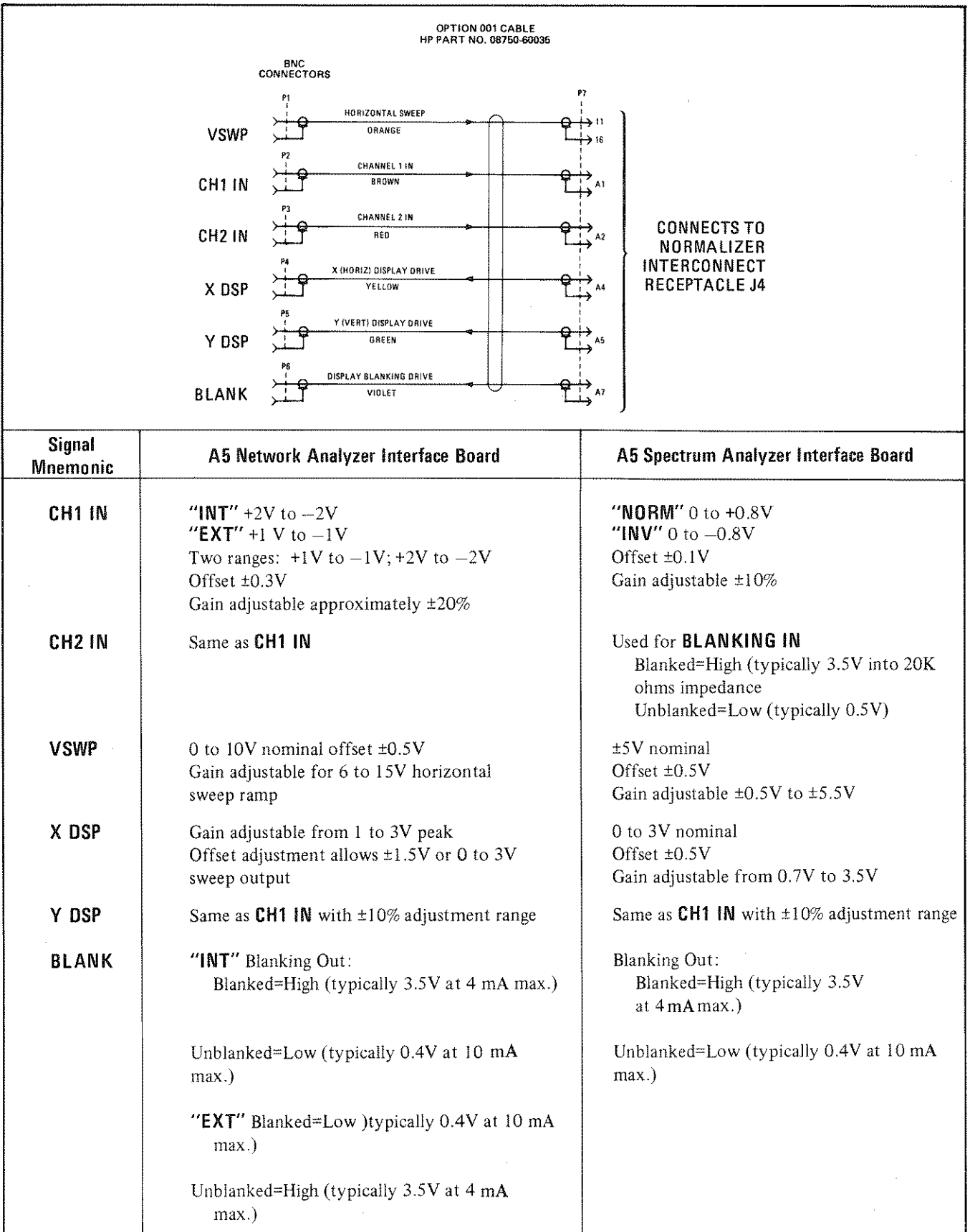


Figure 2-3. Option 001 BNC Interface Adapter Cable Assembly Wiring Diagram and Signal Identification

SECTION III OPERATION

3-1. INTRODUCTION

3-2. This section explains the functions and use of the 8750A Storage-Normalizer's controls, indicators, and connectors. Although it has several operating features, the primary purpose of the 8750A is to eliminate measurement variances introduced by the measurement system itself. To accomplish this, the 8750A "remembers" (stores) the signal that is produced when there is no device-under-test (DUT) connected into the measurement system. Then, when the DUT is connected, the 8750A subtracts from the DUT output all the characteristics of the original signal, leaving only those characteristics caused by the DUT's influence on the signal. This operation is called "signal normalizing."

3-3. The "normalizing" effect is such that if you "store" an input — a sine wave for example — and then normalize (Input minus memory mode) an identical sine wave input, the resulting output will appear on a CRT display as a straight line because the two signals (the remembered one and the newly input one) have cancelled each other.

CAUTION

If you use the 8750A with a storage oscilloscope, DO NOT use the oscilloscope in the conventional mode. Set the oscilloscope CRT controls for minimum persistence. Failure to decrease the oscilloscope trace persistence can result in the trace being "burnt" into the CRT screen.

3-4. 8750A CONTROLS, INDICATORS, AND CONNECTORS

3-5. Figure 3-1 identifies each 8750A front-panel control and indicator and explains its function. Rear-panel controls and connectors are identified and functionally defined in Figure 3-2.

3-6. 8750A AND MEASUREMENT SYSTEM INTERFACING

3-7. The 8750A Storage-Normalizer can be used in a wide variety of network measurement and spectrum analyzer systems. This versatility stems from its ability to be adapted to the voltage levels received from and required by the system in which it is operating; and these levels vary from system to system.

3-8. Because of differences in the basic instrumentation of the various systems compatible with the 8750A, different adaption procedures must be used for different systems. This section contains procedures for adapting the 8750A to the systems it is most often used with. These systems and the locations of the 8750A adaption procedures for them are listed in Table 3-1. For systems not covered in this section, the test setup and procedures given for the 140 Series Spectrum Analyzer can be used as a basic guide. Before you try to use the 8750A in a system that is not covered in this section, however, you should make sure the 8750A and the system are compatible by inquiring at your nearest Hewlett-Packard office.

WARNING

All interfacing adjustments are done with the 8750A's external controls. Operator personnel should not attempt any internal adjustments. The internal adjustments are set at the factory and should not be changed except as required after a repair, or as part of a periodic maintenance or calibration procedure. In no event should operator personnel remove a cover from this instrument while the ac power is connected. Because there are dangerous voltages inside the 8750A, even when its LINE power switch is set to OFF, it covers must be removed ONLY by qualified service personnel who are aware of the hazards involved.

3-9. After you have matched the 8750A to your measurement system, check its performance with the functional tests provided in Section IV, Performance Tests.

3-10. ADAPTING THE 8750A TO NETWORK MEASUREMENT SYSTEMS

3-11. General Information

3-12. All signals into or out of the 8750A Storage-Normalizer pass through the 8750A's Interface Board, which plugs into an internal socket through the slot in the 8750A's rear panel. There are two Interface Boards supplied as standard equipment with every 8750A. One of these is the Network Analyzer Interface Board; the other is the Spectrum Analyzer Interface Board. Make sure you use the correct one. (If you do inadvertently plug in the wrong Interface Board, it won't cause

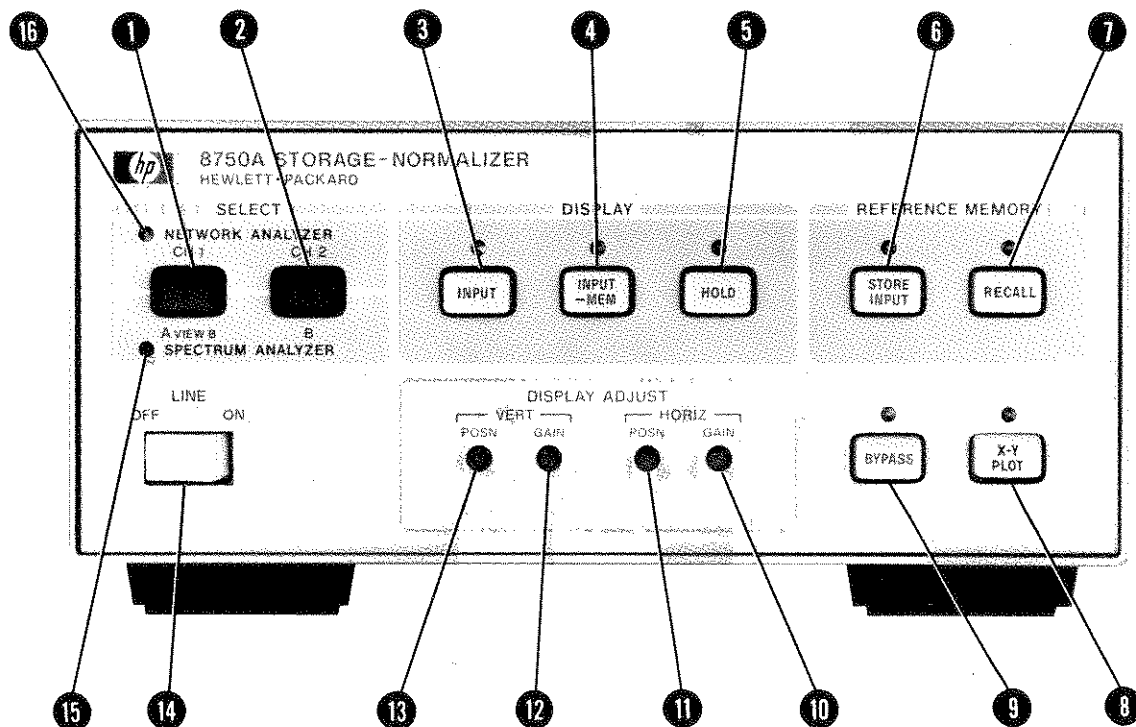
any damage; the instrument will just appear to be malfunctioning.)

3-13. There are also two optional Network Analyzer Interface Boards available: Option 003 and Option 004. Option 003 is exclusively for use with the 8755A/B Network Analyzer or the 8410B Network Analyzer. Option 004 is exclusively for use with the 8754A Network Analyzer. One of the first things you will be instructed to do in the adaption procedure is to set the switches on the Network Analyzer Interface Board. These switches, and their correct settings for different systems, are shown in Figure 3-3. The Interface Board shown in this illustration is the standard Network Analyzer Interface Board that always accompanies the 8750A. If you will be using an Option 003 or Option 004 Interface Board, you will not have any switches to set because the signals are already correctly routed through the Interface Board's printed wiring.

Table 3-1. 8750A Adaption Procedures Index

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FRONT PANEL



- 1** **SELECT CH 1/A VIEW B** pushbutton. When the 8750A is connected into a network analyzer system, pressing this pushbutton selects the channel 1 (channel A in some systems) output of the network analyzer for control by the 8750A DISPLAY and REFERENCE MEMORY pushbuttons. A light-emitting diode (LED) in the center of the pushbutton lights to indicate channel 1 is the channel currently responsive to pushbutton commands. Channel 2, in the meantime, is not shut off, but remains in whatever operating mode it was last put into with the DISPLAY and REFERENCE MEMORY pushbuttons while it was the channel under control.

When the 8750A is connected into a spectrum analyzer system, pressing this pushbutton selects the "A VIEW B" mode of operation. In the A VIEW B mode, the single signal from the spectrum analyzer is made to produce two traces on the display CRT. For ease of identification, one

of these traces is called the A trace and the other is called the B trace. The B trace is always used as a reference signal frozen on the CRT at some instant in time, while the A trace can be either transient or also frozen on the CRT.

To set up this mode of operation, first press the SELECT CH 2/B pushbutton, then press INPUT. This gives you control of an active B trace with the front panel pushbuttons. You can now freeze the B trace on the display by pressing HOLD. Next press the CH 1/A VIEW B pushbutton. At this point, the B trace is frozen on the CRT and the A trace is the active transient input.

The front panel pushbuttons now control the A trace without affecting the B trace. You can, therefore, use the pushbuttons to establish a particular A trace mode, depending on the kind of comparison you want to make between the A trace and the frozen B trace.

2 SELECT CH 2/B pushbutton. When the 8750A is connected into a network analyzer system, pressing this pushbutton selects the channel 2 (channel B in some systems) output of the network analyzer for control by the 8750A DISPLAY and REFERENCE MEMORY pushbuttons. A light-emitting diode (LED) in the center of the pushbutton lights to indicate channel 2 is the channel currently responsive to pushbutton commands. Channel 1, in the meantime, is not shut off, but remains in whatever operating mode it was last put into with the DISPLAY and REFERENCE MEMORY pushbuttons while it was the channel under control.

When the 8750A is connected into a spectrum analyzer system, pressing this pushbutton selects a single trace (called B) for the spectrum analyzer display and enables the trace to be controlled by the 8750A DISPLAY and REFERENCE MEMORY pushbuttons. Essentially, this is similar to the one-channel-at-a-time operation used with network analyzer systems.

3 INPUT pushbutton. Pressing this pushbutton causes the input signal from the channel selected with the SELECT pushbuttons to be temporarily stored in the 8750A's display memory. In this mode, the signal is constantly being entered into and retrieved from the display memory, and displayed on the system CRT. An LED above the pushbutton lights to indicate the 8750A is in the DISPLAY INPUT mode of operation.

4 INPUT-MEM pushbutton. Pressing this pushbutton causes the signal stored in the 8750A's reference memory (see STORE INPUT below) to be subtracted from the input signal being entered into its display memory. For most measurement procedures, the signal stored in the reference memory is the test signal as it appears without the DUT (device under test) in the measurement system; while the signal in the display memory is the test signal after it has been passed through the DUT. This pushbutton is used for "normalization." An LED above the pushbutton lights to indicate the 8750A is in the DISPLAY INPUT-MEM mode of operation.

5 HOLD pushbutton. Pressing this pushbutton causes the trace on the display CRT to "freeze" in the form it is in at the moment. The information displayed in this mode is the information entered into the 8750A display memory just before the pushbutton is pressed. This mode is used when a stable trace is required for some reason, such as waveform photography or easier observation of the signal characteristics. An LED above the pushbutton lights to indicate the 8750A is in the DISPLAY HOLD mode of operation.

6 STORE INPUT pushbutton. Pressing this pushbutton causes the signal at the input to the 8750A to be stored in its reference memory. The stored signal can be retrieved two ways: by pressing the INPUT-MEM pushbutton (see above) to provide a normalized signal trace on the display CRT, or by pressing the RECALL pushbutton (see below). An LED above the pushbutton lights to indicate the 8750A is in the REFERENCE MEMORY STORE INPUT mode of operation. This LED stays lit for the period required to store one complete horizontal sweep into the 8750A reference memory. At the end of this period, the LED turns off.

7 RECALL pushbutton. Pressing this pushbutton causes the signal stored in the reference memory (see STORE INPUT above) to be retrieved and displayed on the system display CRT. An LED above the pushbutton lights to indicate the 8750A is in the REFERENCE MEMORY RECALL mode of operation.

8 X-Y PLOT pushbutton. Pressing this pushbutton starts an X-Y plot of the trace or traces appearing on the display CRT at the moment the pushbutton is pressed. During the plot, the traces are "frozen" just as they are in the HOLD mode (see above). The outputs to the X-Y recorder are led out of the 8750A through the RECORDER OUTPUT X, Y, and PEN connectors on the rear panel. The plot rate is 30 seconds per each displayed trace. If there are two traces on the display, they will be drawn consecutively and each will require 30 seconds. When the X-Y PLOT pushbutton is pressed, the LED above it lights to indicate a plot

is in progress. When the plot is complete, the LED turns off and the 8750A returns to the mode it was in when the X-Y PLOT pushbutton was pressed. Pressing any pushbutton other than BYPASS or X-Y PLOT while a plot is in progress stops the plot. If a plot is started while the 8750A is in the BYPASS mode (see below), the display will show the real time input while the recorder continues to draw the "frozen" instantaneous display. If a plot is started while the 8750A is in a DISPLAY mode, the display sweeps at the plot rate of 30 seconds per trace. Thus, what you see on the CRT is a dot moving in concert with the plot.

- 9 **BYPASS pushbutton.** Pressing this pushbutton effectively removes the 8750A from the test setup, allowing the network or spectrum analyzer to operate as if the 8750A were not connected into the measurement system. An LED above the pushbutton lights to indicate the 8750A is in the BYPASS mode of operation.
- 10 **HORIZ (Horizontal) GAIN control.** Rotating this control adjusts the gain of the 8750A horizontal (X-axis) output amplifier. It is used to lengthen or shorten the CRT display trace as necessary to make it equal the edge-to-edge width of the display screen.
- 11 **HORIZ POSN (Horizontal Position) control.** Rotating this control adjusts the horizontal

position of the trace on the display CRT. The HORIZ GAIN and HORIZ POSN controls are used together to set the trace ends on the far left and far right graticule lines of the CRT screen.

- 12 **VERT (Vertical) GAIN control.** Rotating this control adjusts the gain of the 8750A vertical (Y-axis) output amplifier to increase or decrease the full-deflection vertical excursion of the trace on the CRT display.
- 13 **VERT POSN (Vertical Position) control.** Rotating this control adjusts the vertical position or center reference of the trace on the CRT display. The VERT GAIN and VERT POSN controls are used together to obtain a trace that at full vertical deflection extends 1/8-inch above the top graticule line on the CRT screen and 1/8-inch below the bottom graticule line.
- 14 **LINE OFF-ON switch.** This switch connects and disconnects the ac line power input to the 8750A rectifier circuits.
- 15 **SPECTRUM ANALYZER indicator.** This is an LED that lights when the Spectrum Analyzer Interface Board Assembly is plugged into the 8750A rear panel.
- 16 **NETWORK ANALYZER indicator.** This is an LED that lights when the Network Analyzer Interface Board Assembly is plugged into the 8750A rear panel.

Figure 3-1. 8750A Front-Panel Controls and Indicator

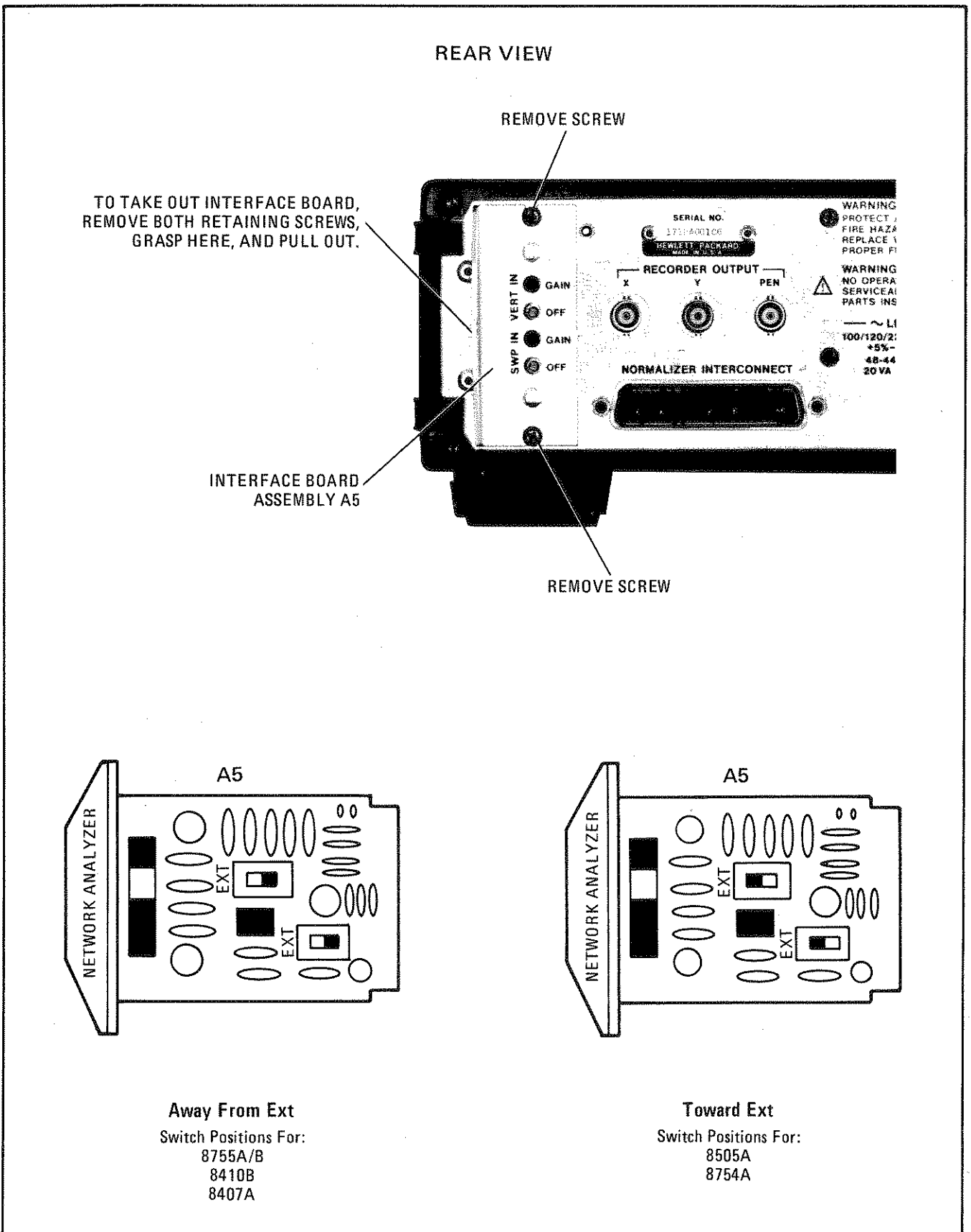
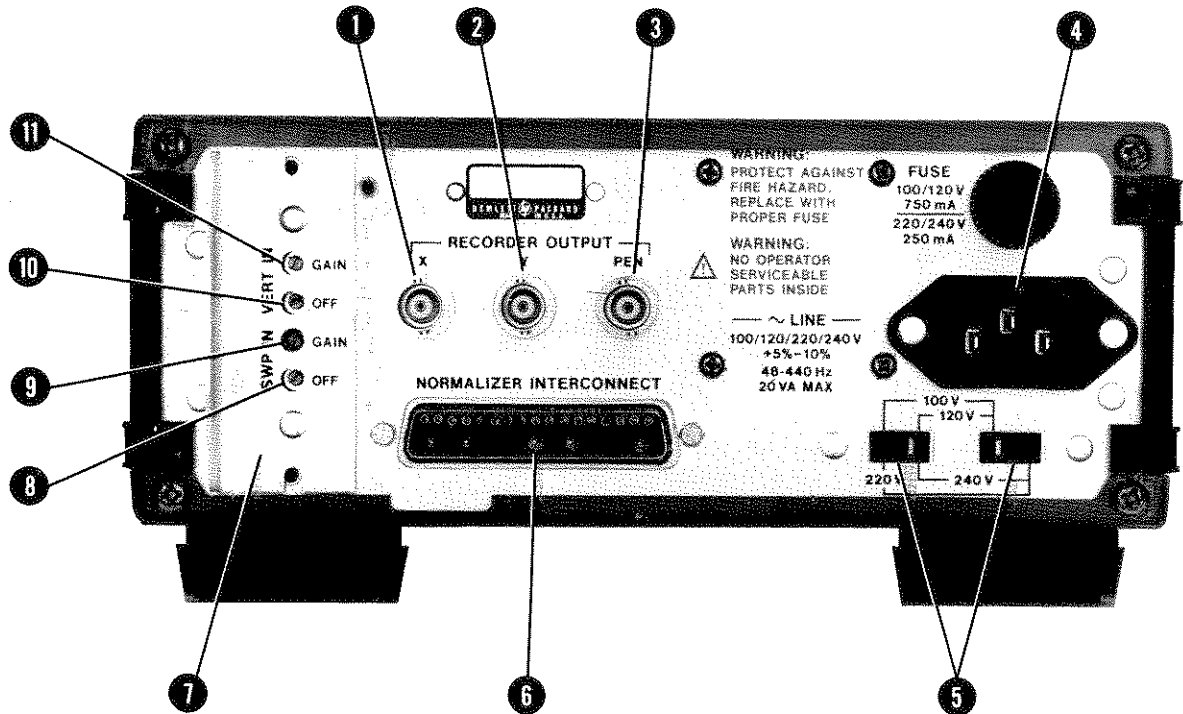


Figure 3-3. 8750A Network Analyzer Interface Board Switch Positions

REAR PANEL



- 1 **X RECORDER OUTPUT connector (J1).** This is a BNC (female) connection for the X channel of an X-Y recorder. The output range at this connector is 0 to +1 volt nominal.
- 2 **Y RECORDER OUTPUT connector (J2).** This is a BNC (female) connection for the Y channel of an X-Y recorder. The output range at this connector is -4 volts to +4 volts nominal.
- 3 **PEN RECORDER OUTPUT connector (J3).** This is a BNC (female) connection for the pen-lift coil of an X-Y recorder. This is an open-collector output. Maximum pen-up level is +20 volts and maximum pen-down sink current is 150 mA. The output is diode clamped at approximately +0.7 volt in the negative (pen-down), sink current direction.
- 4 **AC LINE power connector (J5).** This is a three-contact male receptacle for the ac power cable (supplied).

- 5 **AC Power Level Selector Switch Assembly (S1).** The two switches on this assembly are used to adapt the 8750A to the ac line voltage that will be connected to it.
- 6 **NORMALIZER INTERCONNECT connector (J4).** This is the receptacle for the interconnect cable (supplied) that connects the 8750A to the Network or Spectrum Analyzer.
- 7 **Plug-in Interface Board Assembly (A5).** This board assembly contains the circuits that interface the 8750A with the Network or Spectrum Analyzer. Two such board assemblies are supplied, one for use with Network Analyzers and one for use with Spectrum Analyzers. Optional Network Analyzer Interface Board Assemblies for use with specific Network Analyzers are available.

NOTE

Use plastic screwdriver, HP Part Number 8710-0772 (supplied with 8750A) or equivalent to adjust the Interface Board Assembly controls.

- 8 **SWP IN OFF (Sweep Input Offset) slotted control.** This control is used to adjust the offset or the horizontal sweep input from the network or spectrum analyzer to accommodate the requirements of the 8750A.
- 9 **SWP IN GAIN (Sweep Input Gain) slotted control.** This control is used to adjust the gain of the horizontal sweep input from the network or spectrum analyzer to accommodate the requirements of the 8750A.
- 10 **VERT IN OFF (Vertical Input Offset) slotted control.** This control is used to adjust the offset of the vertical input from the network or spectrum analyzer to accommodate the requirements of the 8750A.
- 11 **VERT IN GAIN (Vertical Input Gain) slotted control).** This control is used to adjust the gain of the vertical input from the network or spectrum analyzer to accommodate the requirements of the 8750A.

Figure 3-2. 8750A Rear-Panel Controls and Connector

3-14. 8755A Swept Amplitude Analyzer, 182T or 180TR Display, and 8620A/B/C Sweep Oscillator Network Analyzer System

Preliminary Procedures

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board, set the two slide switches away from EXT as shown in Figure 3-3. Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the system instruments into the test setup shown in Figure 3-4.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light. Allow 30 minutes warm-up before continuing.
- e. On the 8750A, press BYPASS.
- f. Set the Sweep Oscillator for FULL SWEEP. On the 8620A/B/C set the rear panel DISPLAY BLANKING switch to ON.

NOTE

CHANNEL 1 on the 8755B is CHANNEL A on the 8755A. CHANNEL 2 on the 8755B is CHANNEL B on the 8755A. DISPLAY REFERENCE POSITION pushbutton and slotted adjustment on the 8755B are labeled DISPLAY POSITION on the 8755A.

- g. On the 8755A/B Swept Amplitude Analyzer, set the controls as follows:

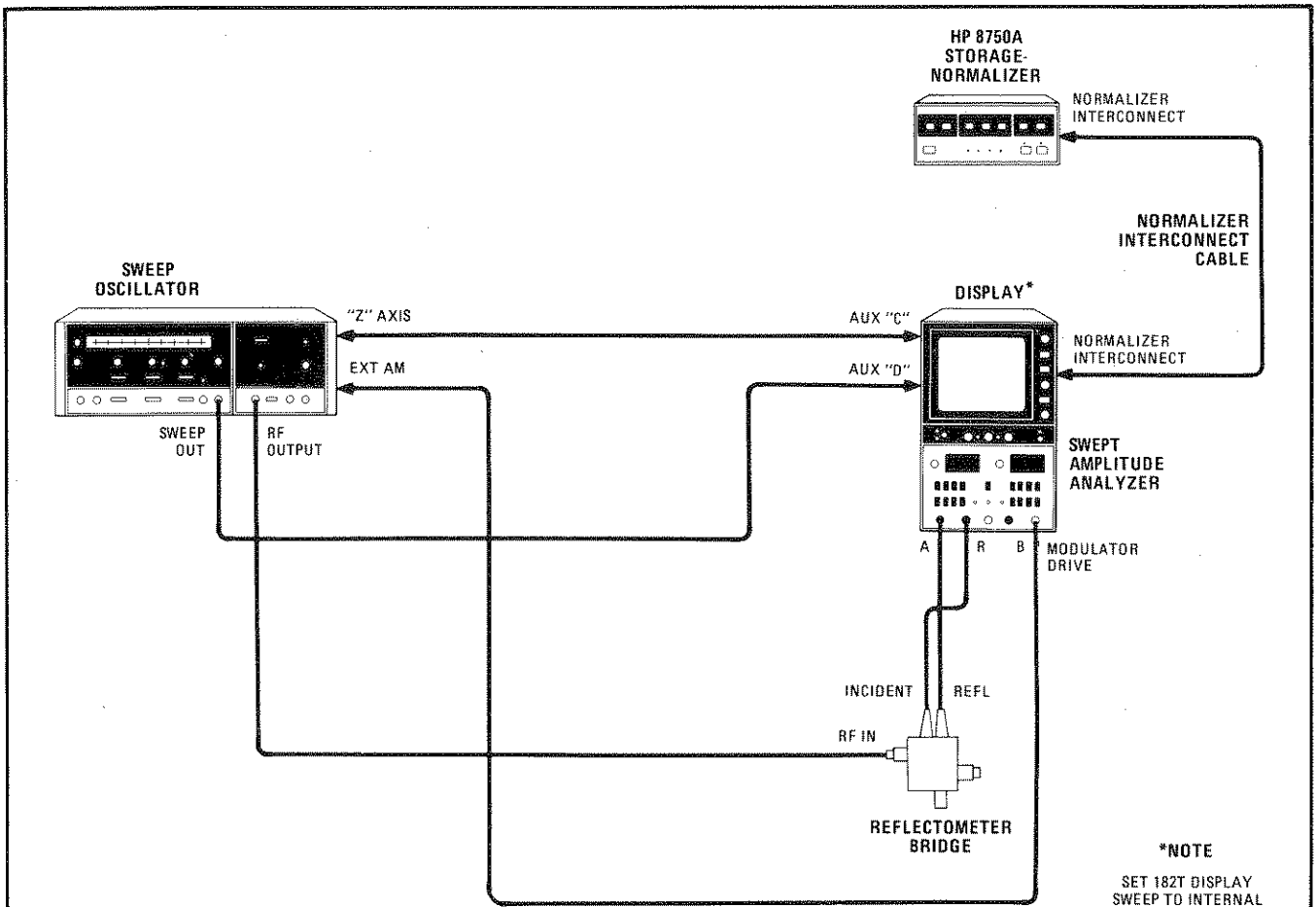
CHANNEL 1

Press DISPLAY REFERENCE POSITION pushbutton. Then place the trace on the center graticule line using the DISPLAY REFERENCE POSITION adjustment (slotted control next to DISPLAY REFERENCE POSITION pushbutton).

CHANNEL 2

Turn off channel 2 trace by pressing any CHANNEL 2 DISPLAY pushbutton part way in and popping all the pushbuttons out.

- h. On the 182T Display, adjust the HORIZONTAL POSITION control to center the trace horizontally on the CRT. If the two ends of the trace are not on the edge graticule lines, the 8755A/B horizontal sweep gain must be adjusted as follows: Remove the 8755A/B from the display. On 8755A/B Normalizer Interface Board A11, near the inside rear of the instrument, check that the Blanking Polarity switch is at the POS position. Adjust HORZ ADJ control on A11 for correct width on CRT. Clockwise increases trace width. This adjustment must be done by trial and error since the adjustment is made with the 8755A/B removed from the Display mainframe. Each time the 8755A/B is reinstalled, readjust the display HORIZONTAL POSITION control to center the trace. Repeat adjustment until both ends of the trace are over the edge graticule lines.
- i. (Omit this step if your sweep oscillator does not have intensity marker capability.) Set the sweep oscillator for INTENSITY markers. As shown in Figure 3-6A, set the START Marker one graticule line to the right of the far left graticule line. Set the STOP Marker one graticule line to the left of the far right graticule line. Adjust the CW marker off screen.



Equipment:

Sweep Oscillator	8620A/B/C
RF Plug-In	86290A*
Reflectometer Bridge	11666A
Swept Amplitude Analyzer	8755A/B**
Display	182T***
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

NOTE

On the A11 PC board inside the 8755A/B, set Blanking Polarity Switch to POS when using 8620A/B/C Sweep Oscillator. The A11 PC board is at the rear of the 8755A/B.

*Any RF Plug-In in the 0.04-18.0 GHz range can be substituted for the 86290A.

**8755A Analyzers must be modified for use with 8750A Storage-Normalizer. Refer to Service Note P-08755-60027.

***182T Displays (Serial Prefix 1529A and below) must be modified for use with 8750A Storage-Normalizer. Refer to Service Note P-08750-60024. A 180TR Display may be substituted for the 182T. 180TR Displays (Serial Prefix 1640A and below) must be modified for use with 8750A Storage-Normalizer. Refer to Service Note P-08750-60025.

Figure 3-4. 8755A/B, 182T or 180TR, 8620A/B/C, and 8750A Typical Network Analyzer System Test Setup

8750A Display Outputs Adjustments

- j. On the 8750A, press CH 1, then INPUT. If necessary, readjust the display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.

NOTE

When using the 86222B RF Plug-in, if you wish to use the crystal marker feature after you have adapted the 8750A to the system, you will have to adjust the 8750A front panel DISPLAY OUTPUTS horizontal controls as follows: With the 8750A in the INPUT mode, adjust HORIZ POSN so that the CRT trace starts one-half a minor division in from the far left graticule line. Then adjust HORIZ GAIN so that the CRT trace ends on the far right graticule line. You may now skip step k.

- k. At the 8750A front panel, adjust HORIZ POSN and HORIZ GAIN so the trace fills the CRT. Do not try to match the stored trace to the trace displayed in the BYPASS mode.
- l. On the 8750A, press BYPASS. Then on the 8755A/B adjust slotted DISPLAY REFERENCE POSITION control clockwise to move the CRT trace well off the top of the display graticule.
- m. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT-MEM. The trace should now be a horizontal straight line containing amplitude (pulse) markers. Place this trace on the center graticule line with the 8750A VERT POSN control.
- n. On the 8750A, press INPUT and adjust VERT GAIN so the CRT trace is just above the top graticule line. Press BYPASS and move the trace to the center graticule line using the slotted 8755A/B DISPLAY REFERENCE POSITION control. Do not try to match the stored and bypass traces.

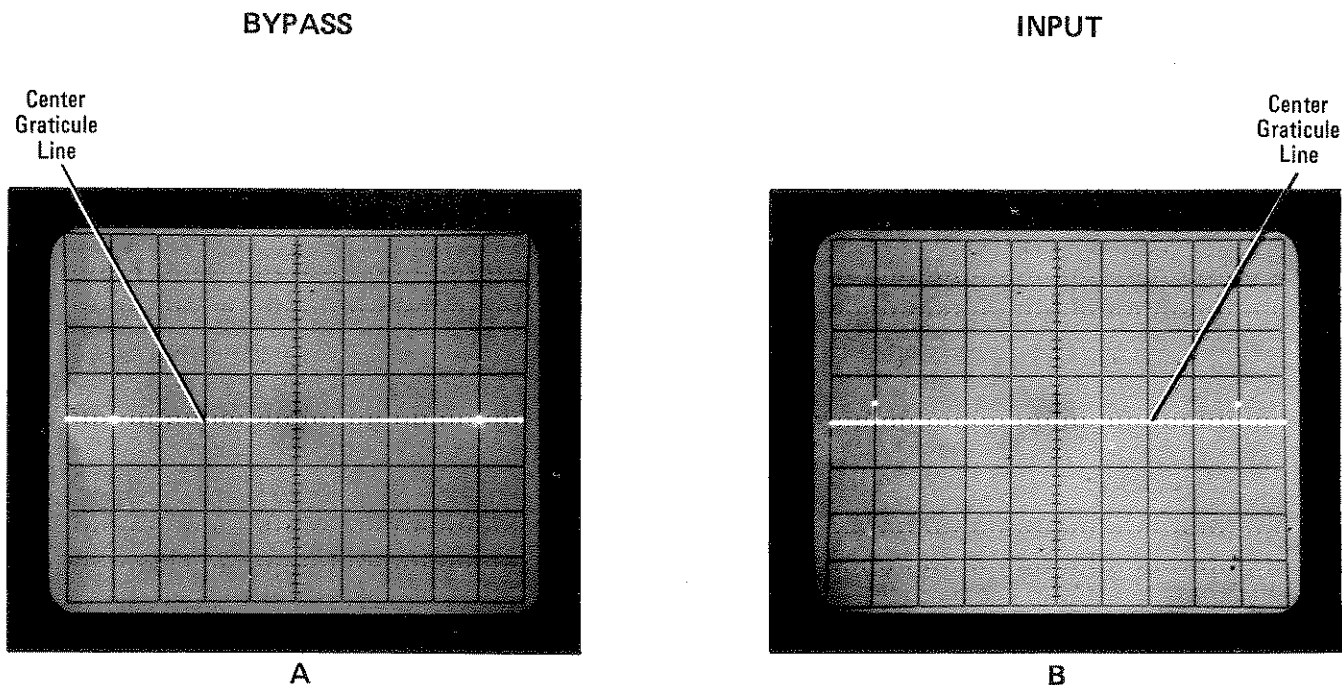


Figure 3-5. VERT IN GAIN (Vertical Input Gain) Adjustment

8750A Inputs Interface Adjustments

- o. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- p. On the 8750A, press BYPASS. On the 8755A/B adjust the slotted DISPLAY REFERENCE POSITION control to place the CRT trace three graticule lines above the center graticule line (see Figure 3-5A).
- q. On the 8750A, press INPUT. Then on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust VERT IN GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line. (See also Figure 3-5B.) Press BYPASS and adjust the trace back to the center graticule line. Repeat steps o through q until the vertical position of the CRT trace is the same in both the INPUT and BYPASS modes.
- r. If your sweep oscillator has z-axis intensity marker capability, verify that the intensity markers are adjusted in accordance with step i above (see also Figure 3-6A), then proceed to step s. If your sweep oscillator does not have z-axis intensity marker capability, proceed to step u.
- s. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to center the START marker pulse on the first graticule line to the right of the far left graticule line (see Figure 3-6B).

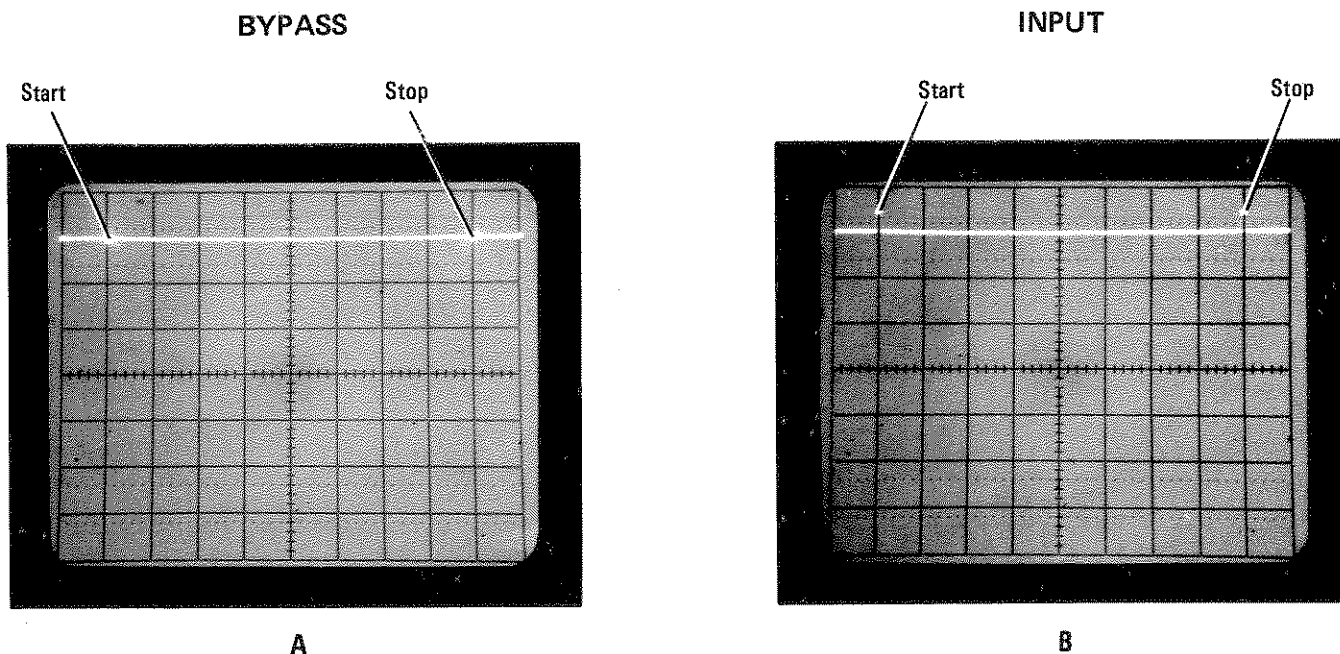


Figure 3-6. Adjustment of START/STOP Markers

- t. At the Network Analyzer Interface Board (plugged into the 8750A rear panel), adjust SWP IN GAIN (Sweep Input Gain) to center the STOP marker pulse on the first graticule line to the left of the far right graticule line. You may have to readjust the Interface Board SWP IN OFF to keep the START marker on its assigned graticule line. The purpose of these adjustments is to make the pulse-shaped markers of the INPUT mode appear at the same horizontal positions as the intensity-dot markers of the BYPASS mode. Proceed to step x.

- u. If the sweep oscillator does not have z-axis intensity marker capability, the system can still be calibrated by using the response of a frequency sensitive test device, such as a bandpass filter or wavemeter, as a frequency indicator. For instance, as described below in steps v and w, the skirts of a bandpass filter can be used in place of markers by adjusting the sweep width in BYPASS mode so the filter skirts cross the center horizontal graticule line one graticule line to the right of the far left graticule line and one graticule line to the left of the far right graticule line. See Figure 3-7.
- v. On the 8750A, press INPUT. Then on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to place the filter skirt on the first graticule line to the right of the far left graticule line as shown in Figure 3-7.

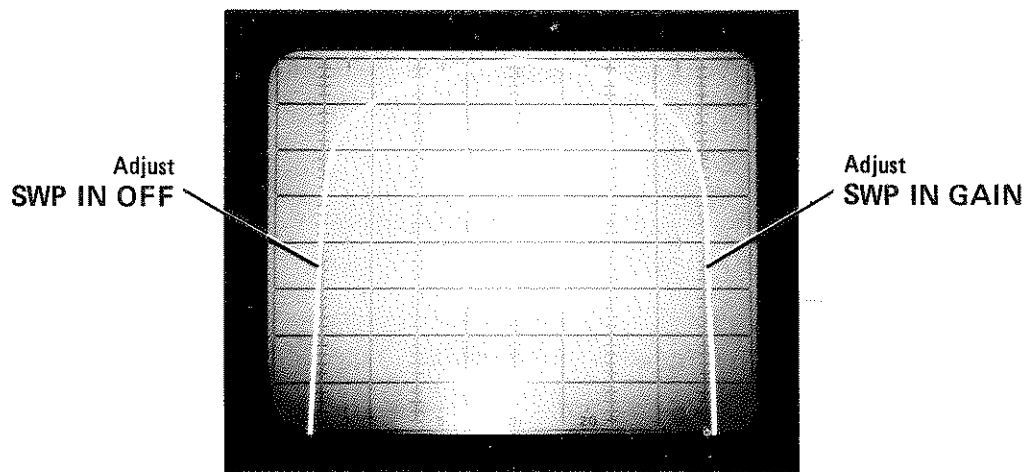


Figure 3-7. Adjustment of SWP IN OFF and SWP IN GAIN Using a Bandpass Filter

- w. At the Network Analyzer Interface Board, adjust SWP IN GAIN (Sweep Input Gain) to place the other filter skirt on the first graticule line to the left of the far right graticule line as shown in Figure 3-7. You may have to readjust the Interface Board SWP IN OFF to keep the left filter skirt on its assigned graticule line. The purpose of these adjustments is to make the horizontal position of the bandpass filter the same in the INPUT mode as it was in the BYPASS mode. Proceed to step x.
- x. The 8750A is now matched to the 8755A/B Swept Amplitude Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-15. 8410B/8412A Network Analyzer and 8620A/C Sweep Oscillator Network Analyzer System

Preliminary Procedures

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.

- b. On the Network Analyzer Interface Board, set the slide switches away from EXT (see Figure 3-3). Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the system equipment as shown in the test setup in Figure 3-8.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light. Allow 30 minutes warm-up before continuing.
- e. On the 8750A, press BYPASS.

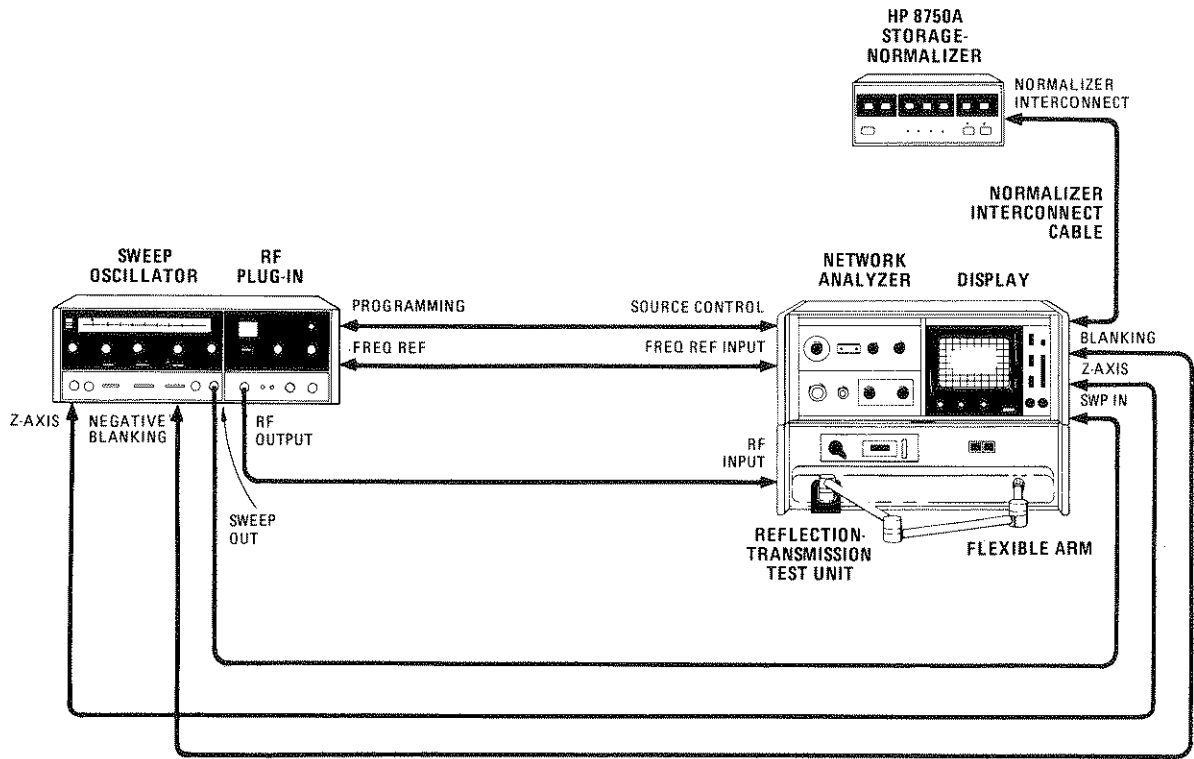
NOTE

What might appear as normalizing problems can occur when you are using the 86290A/B, 86222A/B, or any other multi-octave RF sweeper Plug-in assembly. In the 8750A input-minus-memory (INPUT -MEM) mode, large glitches may appear on the 8412A display. These glitches are related to the way the 8410B breaks and regains phase-lock during multi-octave sweeps. At these "breakpoints," the 8410B briefly stops the sweeper ramp and blanks the RF. The resultant glitches can be easily seen if you decrease the 8412A bandwidth to 0.1 kHz. With the 86290A/B Plug-In, the breakpoint is at about 4 GHz on either the 2.0 - 6.2 GHz or 2.0 - 18.0 GHz band. With the 86222A/B Plug-In, there are a number of breakpoints because of the plug-in's multi-octave frequency coverage.

The breakpoints are not necessarily repeatable in either time or in the amplitudes of the glitches they cause. For this reason, the glitches on the signal stored in the 8750A's reference memory, because they are fixed in both time and amplitude, may have different times and amplitudes than the breakpoint glitches on the active (INPUT) signal. Thus in the input-minus-memory (INPUT -MEM) mode, when the reference signal is subtracted from the input signal, the input breakpoint glitches and the "remembered" reference signal breakpoint glitches may not coincide. Since without coincidence, they cannot cancel each other, the active input glitches and the "remembered" reference glitches both appear on the CRT trace.

If you are faced with this problem, you can make it less bothersome by trying one or more of the following actions:

1. Whenever possible, do not sweep more than one octave of frequency.
2. Do not use the 8412A's 0.1 kHz Bandwidth Filter.
3. Use a slower sweep speed. This tends to improve the repeatability of the breakpoints.
4. For X-Y recording or CRT photography of an input-minus-memory trace, get the trace as glitch-free as you can, then freeze it on the CRT by putting the 8750A into the HOLD mode.



Equipment:

Sweep Oscillator	8620A/C
RF Plug-In	86290A*
Network Analyzer	8410B/8411A
Phase-Magnitude Display	8412A**
Reflection-Transmission Test Unit/2.0 to 12.4 GHz	8743A
Flexible Arm	11605A
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

NOTE

*Any RF Plug-In in the 2.0-12.4 GHz range can be substituted for the 86290A.

**8412A Displays (Serial Prefix 1625A and below) must be modified for use with the 8750A Storage-Normalizer. Refer to Service Note 8412A-6.

Figure 3-8. 8410B, 8412A, 8620A/C, and 8750A Typical Network Analyzer System Test Setup

- f. On the 8743A Reflection/Transmission Test Unit, set the FUNCTION switch to TRANSMISSION and connect a through section (HP 11605A Flexible Arm, for example) between the UNKNOWN port and the TRANSMISSION RETURN port. (If you're using the reflection mode, place a shorting plug on the UNKNOWN port and delete the through section.)
- g. Set the sweep oscillator for FULL SWEEP on a band that provides a reasonably flat trace (at 10 dB/division) on the center horizontal graticule line of the phase-magnitude display. On the 8620A/C, set the rear panel DISPLAY BLANKING switch to ON.
- h. On the Network Analyzer (8410B/8413A), set FREQ RANGE (GHz) switch to AUTO and adjust SWEEP STABILITY for a stable trace.
- i. Set the Network Analyzer controls for a magnitude display at 10 dB/DIV. Then, using the TEST CHANNEL GAIN (dB) and AMPLITUDE VERNIER, position the trace on the center graticule line. Adjust the 8412A HORIZONTAL GAIN and POSITION controls so the trace fills the CRT.
- j. (Omit this step if your Sweep Oscillator does not have intensity marker capability.) Set the sweep oscillator for INTENSITY markers. As shown in Figure 3-10, set the START marker one graticule line to the right of the far left graticule line. Set the STOP marker one graticule line to the left of the far right graticule line. Adjust the CW marker off the CRT screen.

8750A Display Outputs Adjustments

- k. On the 8750A, press CH 1, then INPUT. If necessary, readjust the display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.

NOTE

When using the 86222B RF Plug-in, if you wish to use the crystal marker feature after you have adapted the 8750A to the system, you will have to adjust the 8750A front panel DISPLAY OUTPUTS horizontal controls as follows: With the 8750A in the INPUT mode, adjust HORIZ POSN so the CRT trace starts one-half a minor division in from the far left graticule line. Then adjust HORIZ GAIN so that the CRT trace ends on the far right graticule line. You may now skip step l.

- l. At the 8750A front panel, adjust HORIZ POSN and HORIZ GAIN so the trace fills the CRT. Do not try to match the stored trace to the trace displayed in the BYPASS mode.
- m. On the 8750A, press BYPASS. Then on the 8410B, adjust the TEST CHANNEL GAIN (dB) so the CRT trace is well above the top graticule line. (You may have to increase the 8412A resolution at this point.)
- n. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT -MEM. The trace should now be a horizontal straight line containing amplitude (pulse) marker(s). Place this trace on the center graticule line with the 8750A VERT POSN control.
- o. On the 8750A, press INPUT and adjust the VERT GAIN so the CRT trace is just above the top graticule line. Press BYPASS and adjust the trace to the center graticule line. Do not try to match the stored and bypass traces.

8750A Input Interface Adjustments

- p. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- q. On the 8750A, press BYPASS. On the Network Analyzer, adjust TEST CHANNEL GAIN (dB) to place the CRT trace three graticule lines above the center graticule line (see Figure 3-9A).

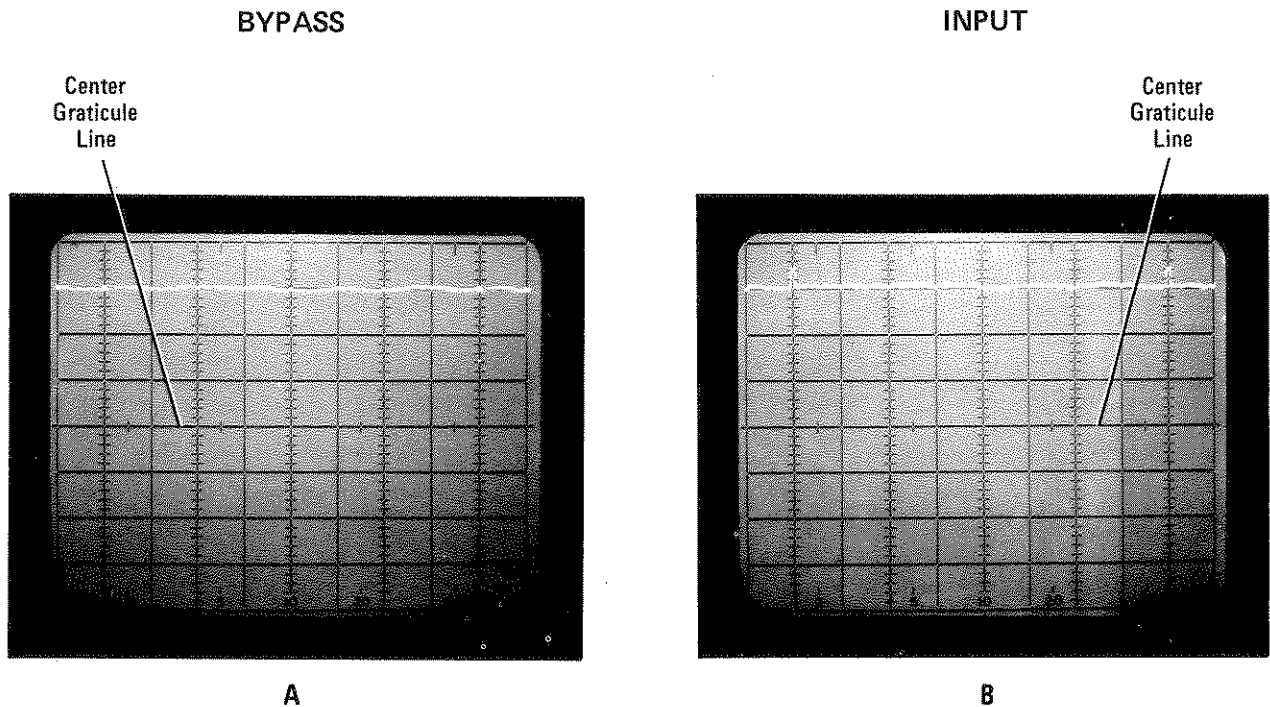


Figure 3-9. VERT IN GAIN (Vertical Input Gain) Adjustment

- r. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust VERT IN GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line (See Figure 3-9B). Press BYPASS and adjust the trace back to the center graticule line. Repeat steps p through r until the vertical position of the CRT trace is the same in both the INPUT and BYPASS modes.
- s. If your sweep oscillator has z-axis intensity marker capability, verify that the intensity markers are adjusted in accordance with step j above (see also Figure 3-10A). Then proceed to step t. If your sweep oscillator does not have z-axis intensity marker capability, proceed to step v.
- t. On the 8750A, press INPUT. Then on the Network Analyzer Interface Board (plugged into the 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to center the START marker pulse on the first graticule line to the right of the far left graticule line (see Figure 3-10B).
- u. At the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN GAIN (Sweep Input Gain) to center the STOP marker pulse on the first graticule line to the left of the far right graticule line. You may have to readjust the Interface Board SWP IN OFF to keep the START marker on its assigned graticule line. The purpose of these adjustments is to make the pulse-shaped markers of the INPUT mode appear at the same horizontal positions as the intensity-dot markers of the BYPASS mode. Proceed to step y.

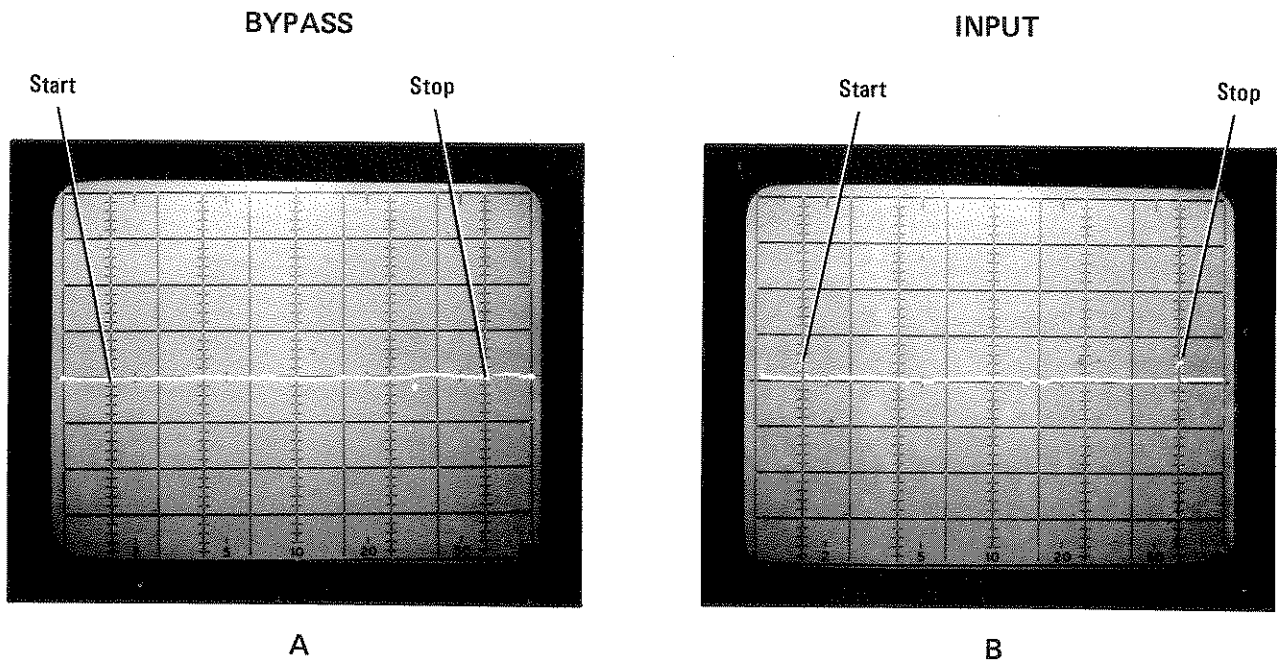


Figure 3-10. Adjustment of START and STOP Markers

- v. If the sweep oscillator does not have z-axis intensity marker capability, the system can still be calibrated by using the response of a frequency sensitive test device, such as a bandpass filter or wavemeter, as a frequency indicator. For instance, as described below in steps w and x, the skirts of a bandpass filter can be used in place of markers by adjusting the sweep width in BYPASS mode so the filter skirts cross the center horizontal graticule line one graticule line to the right of the far left graticule line and one graticule line to the left of the far right graticule line. See Figure 3-11.
- w. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to place the filter skirt on the first graticule line to the right of the far left graticule line as shown in Figure 3-11.
- x. At the Network Analyzer Interface Board, adjust SWP IN GAIN (Sweep Input Gain) to place the other filter skirt on the first graticule line to the left of the far right graticule line as shown in Figure 3-11. You may have to adjust the Interface Board SWP IN OFF to keep the left filter skirt on its assigned graticule line. The purpose of these adjustments is to make the horizontal position of the bandpass filter the same in the INPUT mode as it was in the BYPASS mode. Proceed to step y.
- y. The 8750A is now matched to the 8410B/8412A Network Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-16. 8505A Network Analyzer

Preliminary Procedures

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board, set the slide switches toward EXT (see Figure 3-3). Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the system equipment as shown in the test setup in Figure 3-12.

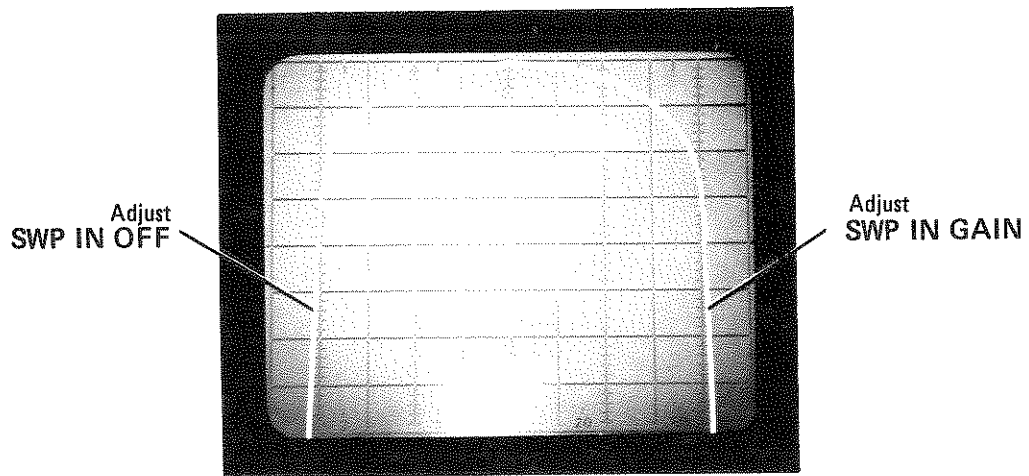


Figure 3-11. Adjustment of SWP IN OFF and SWP IN GAIN Using a Bandpass Filter

- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light.
- e. On the 8750A, press BYPASS.
- f. On the 8505A Network Analyzer set the controls as follows:

```

Source Converter
  OUTPUT LEVEL ..... -10 dBm
  OUTPUT LEVEL VERNIER ..... 0 dBm
  INPUT LEVEL dBm MAX ..... -10 dBm

Frequency Control
  RANGE ..... 5 - 1300 MHz
  MODE ..... LIN EXPAND
  WIDTH ..... CW + - ΔF
  SCAN TIME (SEC) ..... .1 - .01 SEC
  SCAN TIME VERNIER ..... CLOCKWISE
  TRIGGER ..... AUTO
  MARKERS ..... 2 POSITION

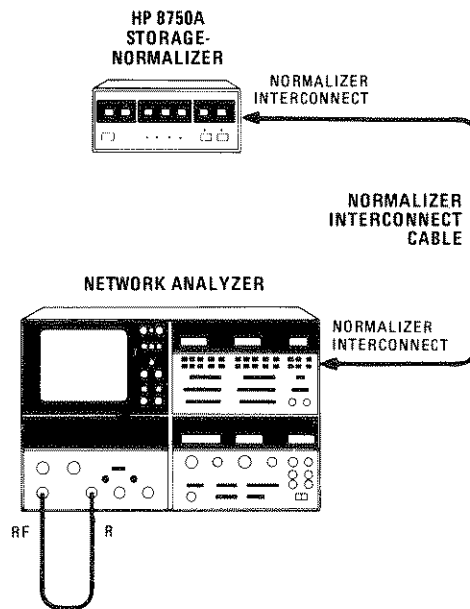
Signal Processor
CHANNEL 1
  INPUT ..... R
  MODE ..... MAG
  SCALE/DIV ..... 10 dB

CHANNEL 2
  MODE ..... OFF

ELECTRICAL LENGTH
  MODE ..... OFF

DISPLAY
  CH 1 ♦ ..... Adjust for a trace on center horizontal line
    
```

- g. On the 8505A, using the MARKER(S) ADJUST controls, position MARKER 1 one graticule line to the right of the far left edge. Position MARKER 2 one graticule line to the left of the far right edge. See Figure 3-14A.



Equipment:

Network Analyzer	8505A*
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

* If your 8505A Network Analyzer has serial number 1833A00770 or lower, its NORMALIZER INTERCONNECT receptacle must be modified in accordance with Hewlett-Packard Service Note 8505A-14 to accommodate the Normalizer Interconnect Cable plug.

Figure 3-12. 8505A Network Analyzer and 8750A Typical Test Set Up

8750A Display Outputs Adjustments

- h. On the 8750A press CH 1, then INPUT. If necessary, readjust the display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.
- i. At the 8750A front panel, adjust HORIZ POSN and HORIZ GAIN so the trace fills the CRT. Do not try to match the stored trace to the trace displayed in the BYPASS mode.
- j. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT-MEM. The trace should now be a horizontal straight line containing amplitude (pulse) markers. Place this trace on the center graticule line with the 8750A VERT POSN control.
- k. On the 8750A, press BYPASS. Then on the 8505A, adjust the DISPLAY CH 1 \blacklozenge control so the CRT trace is well above the top graticule line.
- l. On the 8750A, press INPUT and adjust the VERT GAIN so the CRT trace is just above the top graticule line. Press BYPASS and adjust the trace to the center graticule line. Do not try to match the stored and bypass traces.

8750A Inputs Interface Adjustments

- m. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- n. On the 8750A, press BYPASS. On the Network Analyzer, adjust the DISPLAY CH 1 \blacklozenge control to place the CRT trace three graticule lines above the center graticule line (see Figure 3-13A).

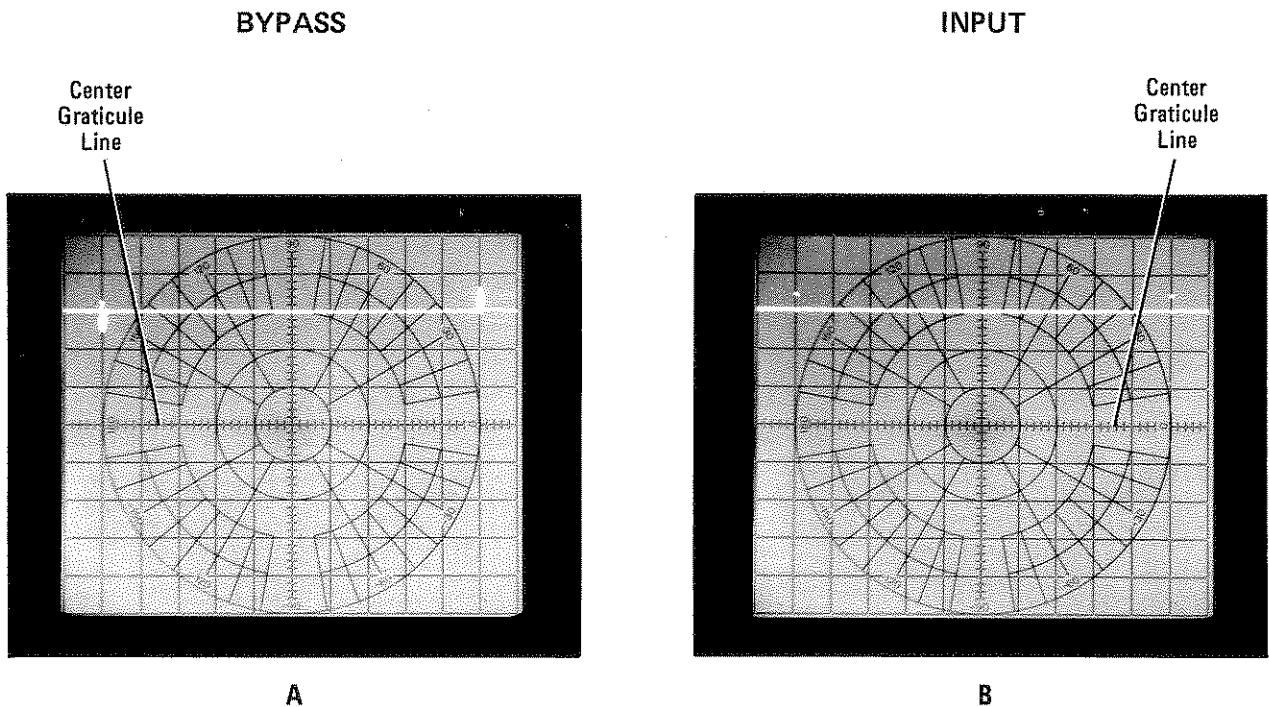


Figure 3-13. VERT IN GAIN (Vertical Input Gain) Adjustment.

- o. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust VERT GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line (See Figure 3-13B above). Press BYPASS and adjust the trace back to the center graticule line. Repeat steps d through o until the vertical position of the CRT trace is the same in both the INPUT and BYPASS modes.
- p. Verify that the markers are adjusted in accordance with step g above (see also Figure 3-14A).
- q. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to center the MARKER 1 pulse on the first graticule line to the right of the far left graticule (see Figure 3-14B).

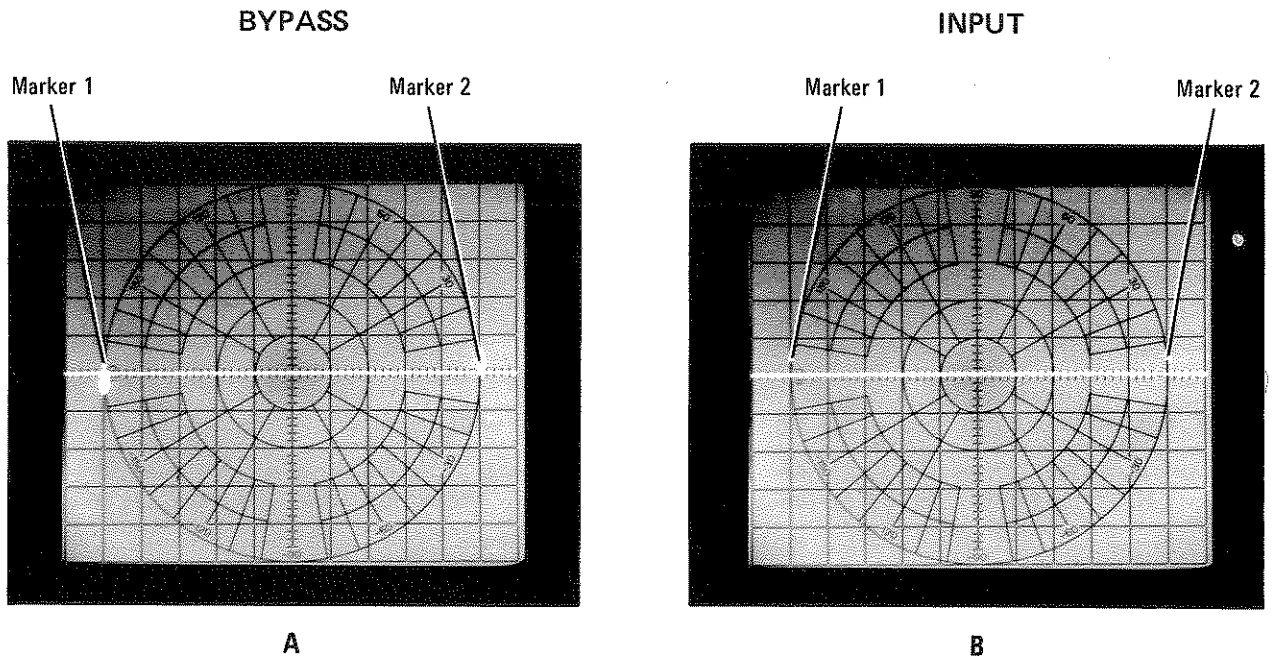


Figure 3-14. Adjustment of MARKER 1 and MARKER 2 Positions

- r. At the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN GAIN (Sweep Input Gain) to center the MARKER 2 pulse on the first graticule line to the left of the far right graticule line. You may have to readjust the Interface Board SWP IN OFF to keep MARKER 1 on its assigned graticule line. The purpose of these adjustments is to make the pulse-shaped markers of the INPUT mode appear at the same horizontal positions as the diamond markers of the BYPASS mode.
- s. The 8750A is now matched to the 8505A Network Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-17. 8410B/8412A Network Analyzer and 8690B Sweep Oscillator Network Analyzer System**Preliminary Procedures**

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board, set the slide switches away from EXT (see Figure 3-3). Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the equipment as shown in the test setup in Figure 3-15.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light.
- e. On the 8750A, press BYPASS.
- f. On the 8743A Reflection/Transmission Test Set, set the function switch for REFLECTION.
- g. On the 8690A/B, set the controls as follows:

SWEEP SELECTOR	.....	AUTO
SWEEP TIME	.....	.1 — .01 SEC
SWEEP TIME VERNIER	.....	Counterclockwise
FUNCTION	.....	START/STOP
AMPLITUDE MODE	.....	MARKER1/MARKER 2
BLANKING (rear panel)	.....	ON

Adjust POWER LEVEL so that REF CHAN LEVEL INDICATOR on 8410B is MIDRANGE. Using the 8690A/B START/STOP controls, set the oscillator on a band which provides a reasonably flat trace (at 10 db/div) on the CRT display. On the 8690A/B, adjust the MARKERS AMP slotted control until the amplitude markers become intensity dot markers.

- h. On the 8410B/8412A Network Analyzer, set the controls as follows:

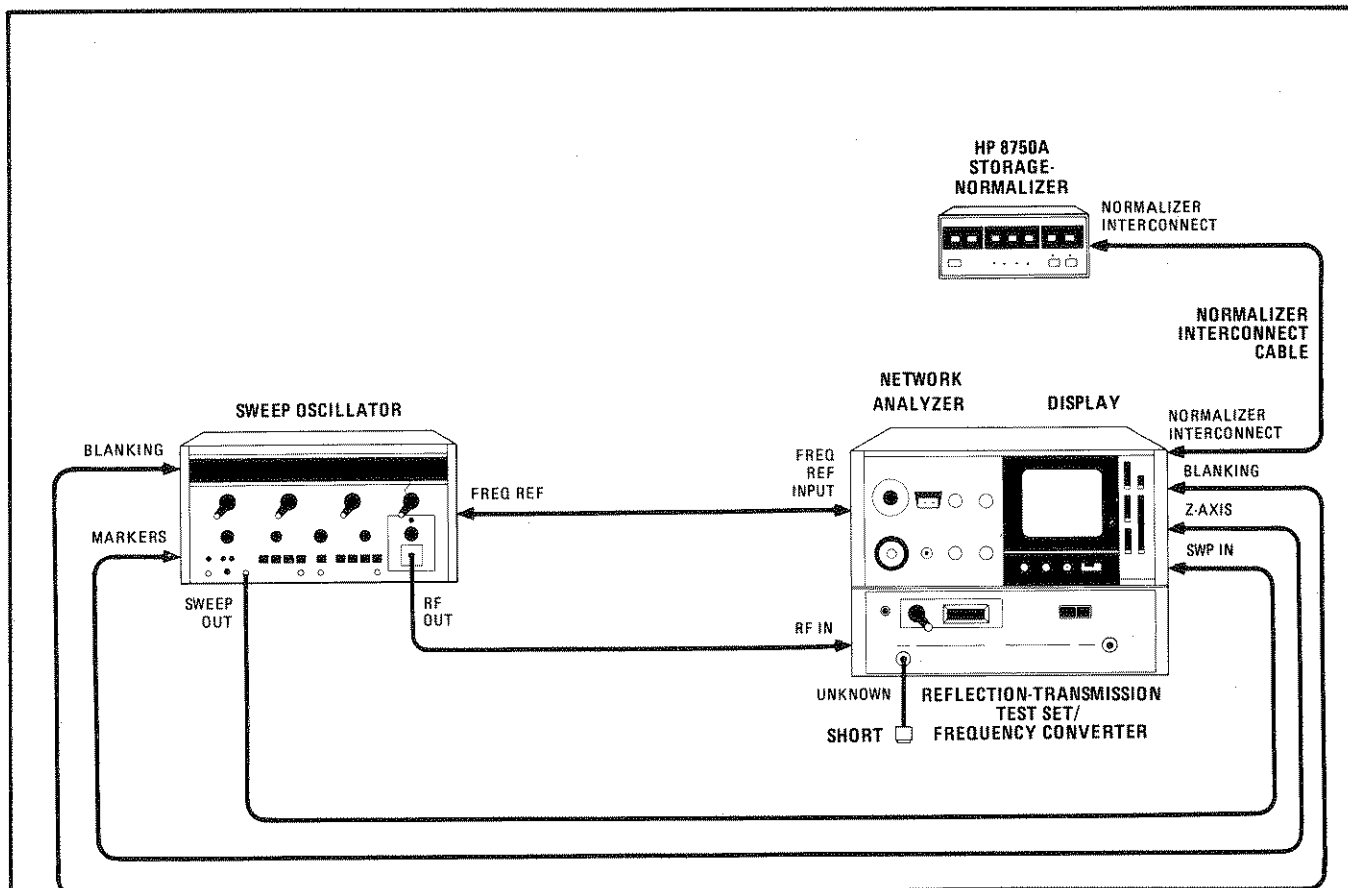
FREQ RANGE	.....	8.0 — 16.0 GHz (or range of RF Plug-in being used)
SWEEP STABILITY	.....	Adjust for a stable trace
MODE	.....	AMPL
AMPL dB/DIV	.....	10 dB/DIV

Adjust 8412A HORIZ POSITION and HORIZ GAIN so the CRT trace fills the display graticule. On the 8410B, using TEST CHANNEL GAIN and AMPL VERNIER, position the CRT trace on the center graticule line.

- i. On the 8412A, decrease CRT intensity enough so only the intensity markers are visible. Using 8690A/B MARKER 1 control, position the first marker one graticule line to right of the far left graticule line. Using 8690A/B MARKER 2 control, position the second marker one graticule line to the left of the far right graticule line. See Figure 3-17A.

8750A Display Outputs Adjustments

- j. On the 8750A, press CH 1 and INPUT. If necessary, readjust the Network Analyzer display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.



Equipment:

RF Plug-In	8694B*
Sweep Oscillator	8690B
Network Analyzer	8410B/8411A
Phase-Magnitude Display	8412A**
Reflection-Transmission Test Unit	8743A
Frequency Converter	11605A
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

NOTE

*Any RF Plug-In in the 2.0 – 12.4 GHz range can be substituted for the 8694B.

**8412A Displays (Serial Prefix 1625A and below) must be modified for use with the 8750A Storage-Normalizer. Refer to Service Note 8412A-6.

*Figure 3-15. 8410B, 8412A, 8690B, and 8750A
Typical Network Analyzer System Test Setup*

- k. At the 8750A front panel, adjust HORIZ POSN so the CRT trace starts one minor division to the right of the far left graticule line. Adjust front panel HORIZ GAIN so the CRT trace ends on the far right graticule line. These adjustments of the horizontal controls allow proper sweep interface adjustments later on. Repeated adjustments may be necessary to ensure that the trace starts one minor division to the right of the far left graticule line and ends on the far right graticule line. Do not try to match stored and bypass traces.

NOTE

If the STORE INPUT indicator (LED) stays lit for more than one sweep or continuously, it may mean the SWP IN OFF (Sweep Input Offset) is mis-adjusted or too near its threshold. To correct this problem, adjust SWP IN OFF until the STORE INPUT indicator (LED) goes off.

- l. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT-MEM. The trace should now be a horizontal straight line containing amplitude (pulse) markers. Place this trace on the center graticule line with the 8750A VERT POSN control.
- m. On the 8750A, press BYPASS. Then on the 8410B, adjust the TEST CHANNEL GAIN (dB) so the CRT trace is well above the top graticule line. (You may have to increase the 8412A resolution at this point.)
- n. On the 8750A, press INPUT and adjust the VERT GAIN so the CRT trace is just above the top graticule line. Press BYPASS and adjust the trace to the center graticule line. Do not try to match the stored and bypass traces.

8750A Inputs Interface Adjustments

- o. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- p. On the 8750A, press BYPASS. On the Network Analyzer, adjust TEST CHANNEL GAIN (dB) to place the CRT trace three graticule lines above the center graticule line (see Figure 3-16A).

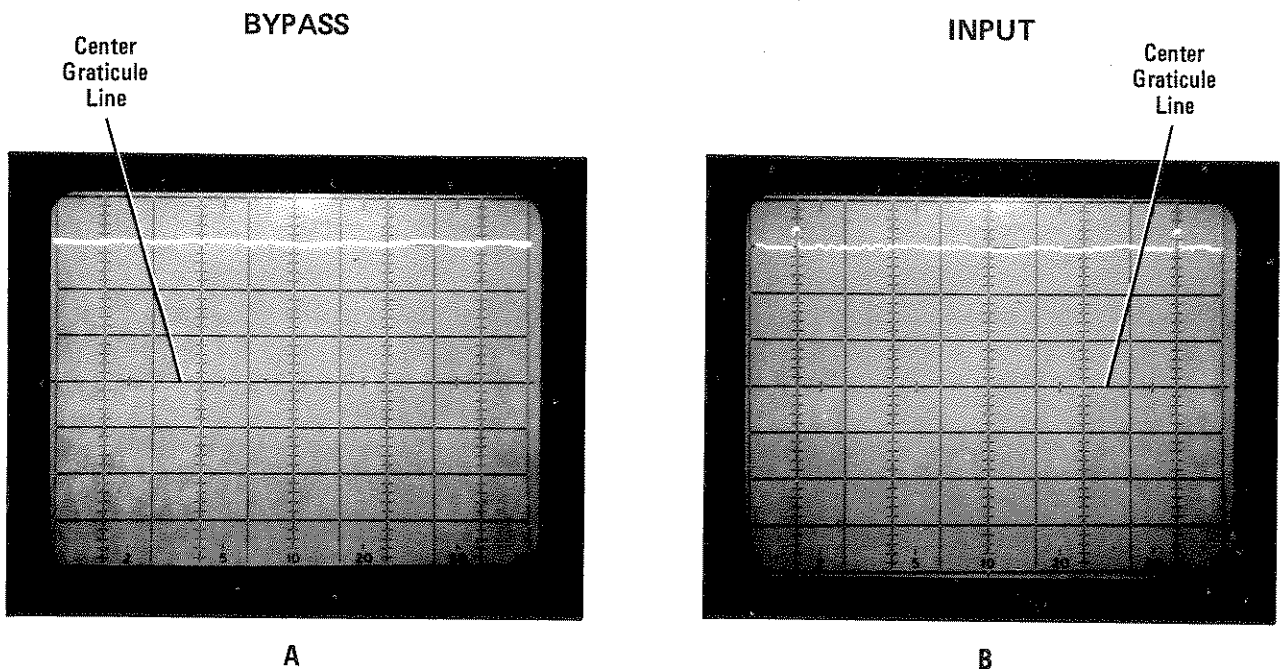


Figure 3-16. VERT IN GAIN (Vertical Input Gain) Adjustment

- q. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into the 8750A rear panel), adjust VERT GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line (See Figure 3-16B). Press BYPASS and adjust the trace back to the center graticule line. Repeat steps o through q until the vertical position of the CRT trace is the same in both the INPUT and BYPASS modes.
- r. Verify that the markers are adjusted in accordance with step i above (see also Figure 3-17A). Then proceed to step s.
- s. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to center the MARKER 1 pulse on the first graticule line to the right of the far left graticule line (see Figure 3-17B).

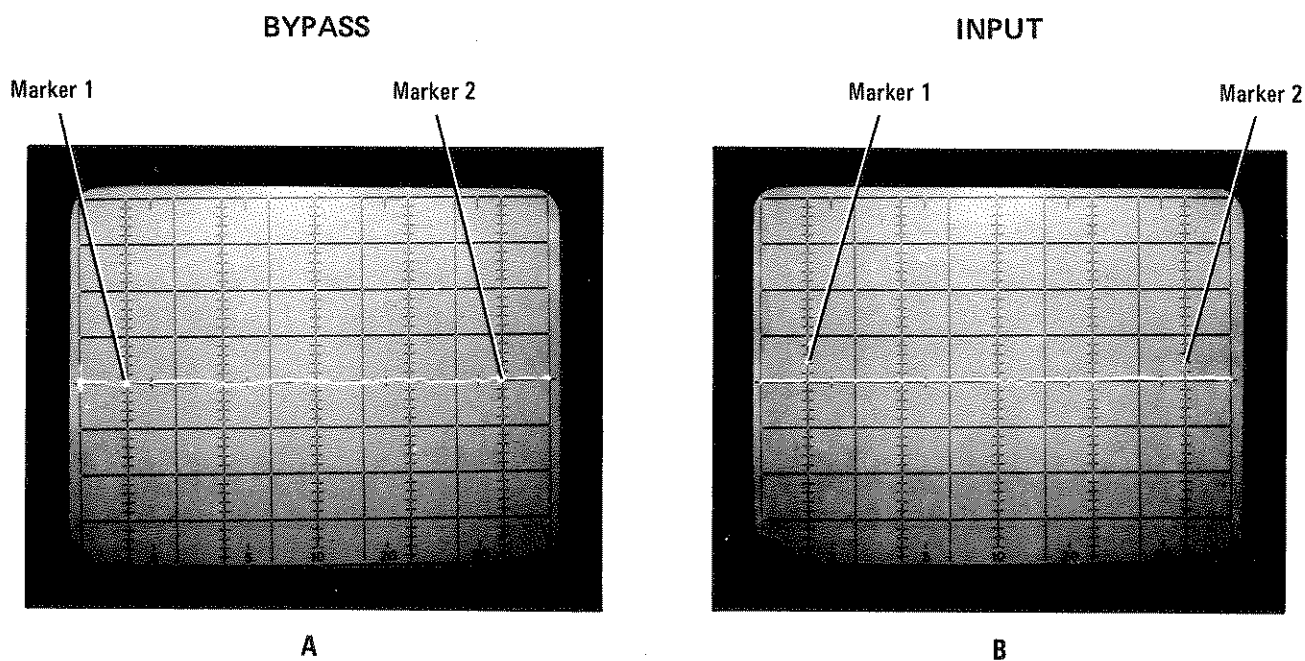


Figure 3-17. Adjustment of MARKER 1 and MARKER 2 Positions

- t. At the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN GAIN (Sweep Input Gain) to center the MARKER 2 pulse on the first graticule line to the left of the far right graticule line. You may have to readjust the Interface Board SWP IN OFF to keep MARKER 1 on its assigned graticule line. The purpose of these adjustments is to make the pulse-shaped markers of the INPUT mode appear at the same horizontal positions as the intensity dot markers of the BYPASS mode.
- u. The 8750A is now matched to the 8410B/8412A Network Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-18. 8755A/B Swept Amplitude Analyzer, 182T or 180TR Display, and 8690B Sweep Oscillator Network Analyzer System

Preliminary Procedures

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board, set the two slide switches away from EXT as shown in Figure 3-3. Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the instruments into the test setup shown in Figure 3-18.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light.
- e. On the 8750A, press BYPASS.
- f. On the 8690A/B, set the controls as follows:

SWEEP SELECTOR AUTO
 SWEEP TIME 1 - .1 SEC
 SWEEP TIME VERNIER CCW
 FUNCTION START/STOP

Adjust the POWER LEVEL for a stable trace.

NOTE

CHANNEL 1 on the 8755B is CHANNEL A on the 8755A. CHANNEL 2 on the 8755B is CHANNEL B on the 8755A. DISPLAY REFERENCE POSITION pushbutton and slotted adjustment on 8755B are labeled DISPLAY POSITION on the 8755A.

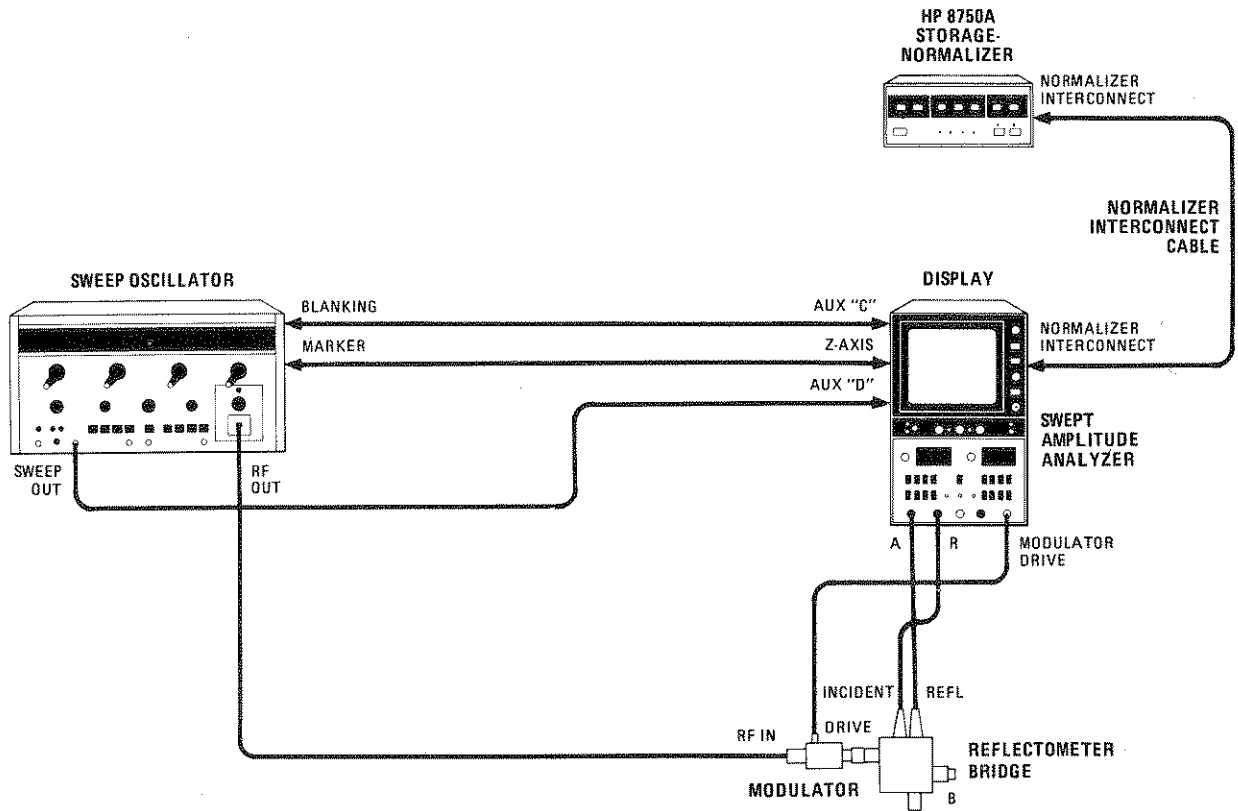
- g. On the 8755A/B, set the controls as follows:

CHANNEL 1

Press DISPLAY REFERENCE POSITION pushbutton. Then place the trace on the center graticule line using the DISPLAY REFERENCE POSITION adjustment (slotted control next to DISPLAY REFERENCE POSITION pushbutton).

CHANNEL 2

Turn off channel 2 trace by pressing any CHANNEL 2 DISPLAY pushbutton part way in to pop all the pushbuttons out.



Equipment:

RF Plug-in (For Sweep Oscillator)	8694B*
Sweep Oscillator	8690B
Reflectometer Bridge	11666A
Modulator	1165A/B
Swept Amplitude Analyzer	8755A/B**
Display	182T***
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

NOTE

On the A11 PC board inside 8755B, set BLANKING POLARITY switch to NEG. The A11 PC board is at the rear of the 8755B.

*Any RF Plug-In in the 0.04 – 18.0 GGz range can be substituted for the 8694B.

**8755A Analyzers must be modified for use with the 8750A Storage-Normalizer. Refer to Service Note P-08755-60027.

***182T Displays (Serial Prefix 1529A and below) must be modified for use with 8750A Storage-Normalizer. Refer to Service Note P-08750-60024. A 180TR Display may be substituted for 182T. 180TR Displays (Serial Prefix 1640A and below) must be modified for use with 8750A. Refer to Service Note P-08750-60025.

Figure 3-18. 8755A/B, 182T or 180TR, 8690B, and 8750A Typical Network Analyzer System Test Setup

- h. On the 182T Display, adjust the HORIZONTAL POSITION control to center trace horizontally on the CRT. If the two ends of the trace are not on the edge graticule lines, the 8755A/B horizontal sweep gain must be adjusted as follows: Remove the 8755A/B from the display. On Normalizer Interface Board A11, near the inside rear of 8755A/B, check that the Blanking Polarity switch is at the NEG position. Adjust the HORZ ADJ control on A11 for correct horizontal width on the CRT. Clockwise increases trace width. This adjustment must be done by trial and error since the adjustment is made with the 8755A/B removed from the Display Mainframe. Each time the 8755A/B is reinstalled, readjust the display HORIZONTAL POSITION control to center the trace. Repeat adjustment until both ends of the trace are just over the edge graticule lines.

8750A Display Outputs Adjustments

- i. On the 8750A, press CH 1 and INPUT. If necessary, readjust the Network Analyzer display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.
- j. On the 8750A, adjust HORIZ POSN so the CRT trace starts one minor division to the right of the far left graticule line. Adjust HORIZ GAIN so the CRT trace will end on the far right graticule line. These adjustments of the horizontal controls allow proper sweep interface adjustments later on. Repeated adjustment may be necessary to ensure the trace starts one minor division to the right of the far left graticule line and ends on the far right graticule line. Do not try to match stored and bypass traces.

NOTE

If the STORE INPUT indicator (LED) stays lit for more than one sweep or continuously, it may mean the SWP IN OFF (sweep input offset) is mis-adjusted or too near its threshold. To correct this problem adjust SWP IN OFF until the STORE INPUT indicator (LED) turns off.

- k. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT-MEM. The trace should now be a horizontal straight line. Place this trace on the center graticule line with the 8750A VERT POSN control.
- l. On the 8750A, press BYPASS. Then on the 8755A/B move the display trace well above the top graticule line using the slotted DISPLAY REFERENCE POSITION control.
- m. On the 8750A, press INPUT and adjust VERT GAIN so the CRT trace is just above the top graticule line. Press BYPASS and move the trace to the center graticule line using the slotted 8755A/B DISPLAY REFERENCE POSITION control. Do not try to match the stored and bypass traces.

8750A Inputs Interface Adjustments

- n. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- o. On the 8750A, press BYPASS. On the Network Analyzer, adjust the slotted DISPLAY REFERENCE POSITION control to place the CRT trace three graticule lines above the center graticule line (see Figure 3-19A).

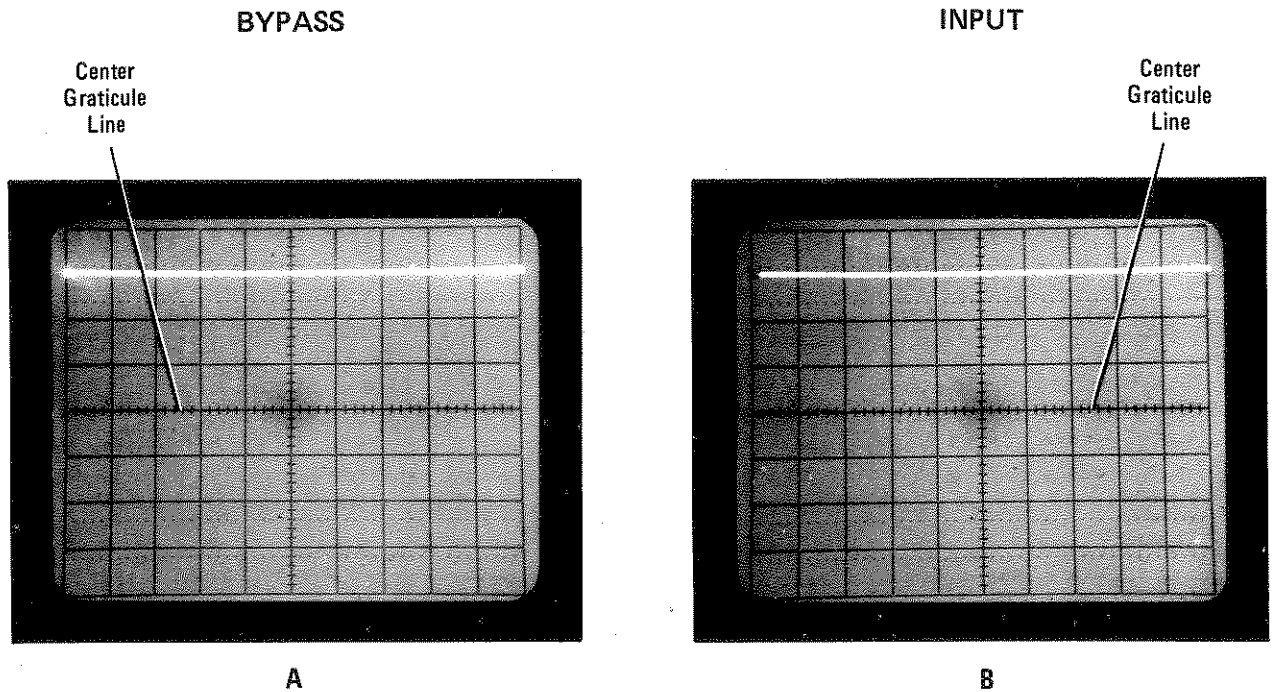


Figure 3-19. VERT IN GAIN (Vertical Input Gain) Adjustment

- p. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust VERT IN GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line (see Figure 3-19B). Press BYPASS and adjust the trace back to the center graticule line. Repeat steps o through p until the vertical position of the CRT trace is the same in both the INPUT and BYPASS modes.
- q. On the 8755A/B, press DISPLAY R. Using REFERENCE LEVEL dB (or OFFSET dB) thumbwheels, adjust the trace to center screen (at 10 dB/div).
- r. On the 8690A/B, adjust the START/STOP frequency controls for a reasonably flat trace. On the 8690A/B, press MARKER 1 and MARKER 2. Adjust MARKER AMP (slotted control) for sharp and stable markers. Using the START/STOP MARKER position controls, place the center of the markers one line in from the far left and right edges of the graticule (see Figure 3-20A).
- s. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN OFF (Sweep Input Offset) to center the MARKER 1 pulse on the first graticule line to the right of the far left graticule line (see Figure 3-10B).

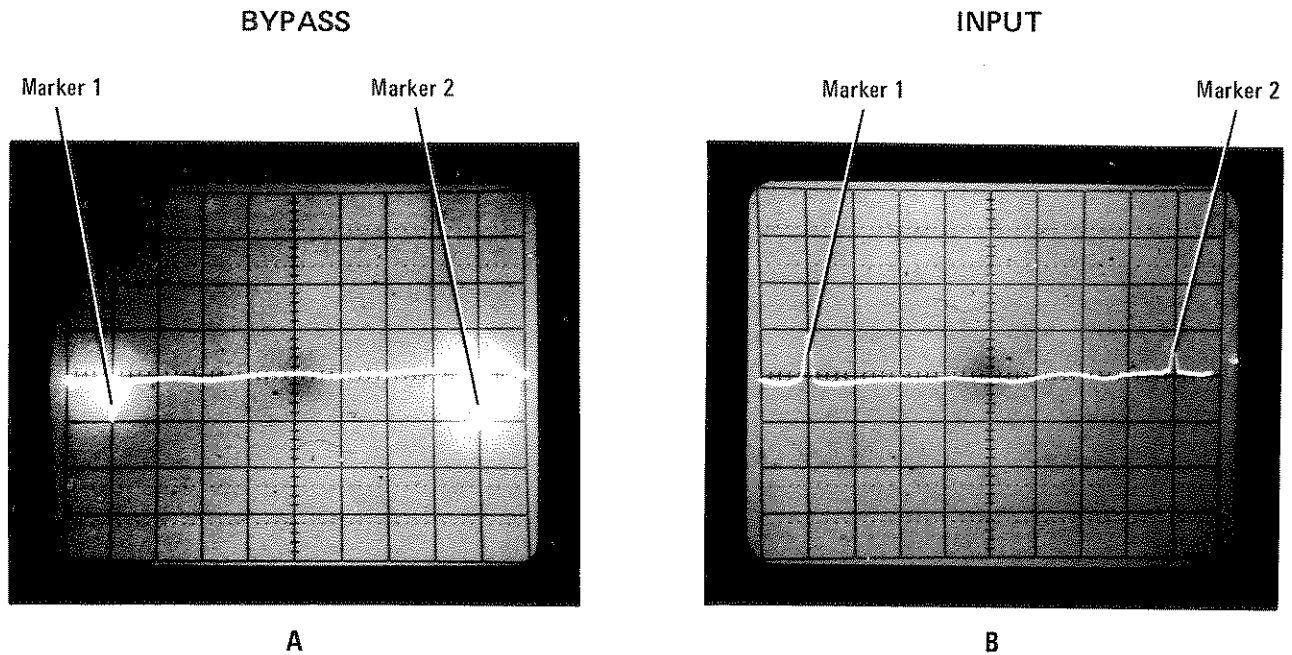


Figure 3-20. Adjustment of MARKER 1 and MARKER 2 Positions

- t. At the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust SWP IN GAIN (Sweep Input Gain) to center the MARKER 2 pulse on the first graticule line to the left of the far right graticule line. You may have to readjust the Interface Board SWP IN OFF to keep MARKER 1 on its assigned graticule line. The purpose of these adjustments is to make the pulse-shaped markers of the INPUT mode appear at the same horizontal positions as the markers of the BYPASS mode.
- u. The 8750A is now matched to the 8410B/8412A Network Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-19. 8407A/8412A Network Analyzer and 8601A Generator/Sweeper Network Analyzer System

Preliminary Procedures

- a. Make sure the 8750 ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board, set the two slide switches away from EXT as shown in Figure 3-3. Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the instruments into the test setup shown in Figure 3-21.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the NETWORK ANALYZER indicator (LED) should light.
- e. On the 8750A, press BYPASS.

- f. On the 8407A, set the controls as follows:

REF CHAN LEV ADJ Mid-position
 AMPLITUDE VERNIER Counterclockwise
 DISPLAY REFERENCE (slide switches) Set both 10 dB and
 1 dB switches 4 switch
 positions from top
 DISPLAY REFERENCE CAL Adjust both 10 dB and CRT
 thumbwheels until 0 dB readings
 appear in DISPLAY REFERENCE window

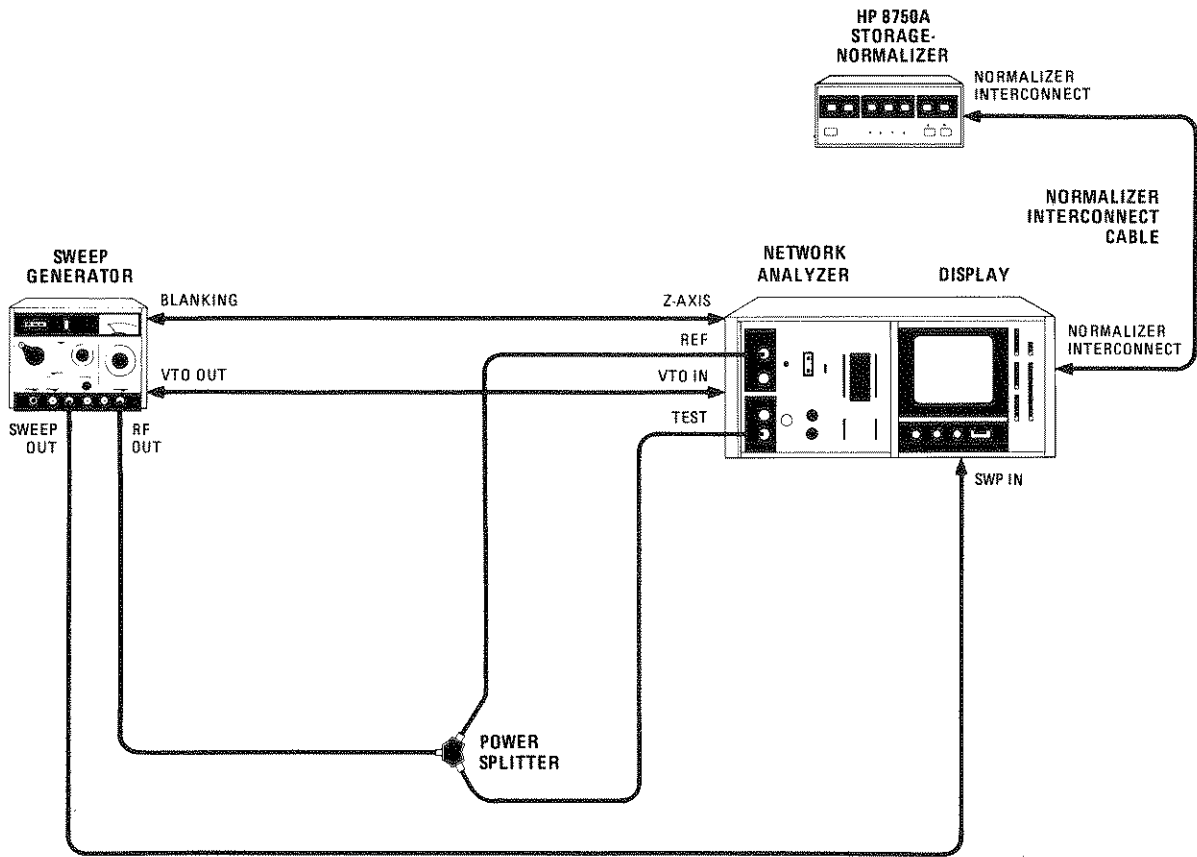
- g. On the 8601A set the controls as follows:

OUTPUT LEVEL -30 dBm
 OUTPUT LEVEL Vernier Adjust until 8407A REF CHAN LEV
 indicator is mid-range
 1 kHz MOD OFF
 SWEEP SYM
 RANGE 110 MHz
 RF Blanking and CRYSTAL CAL (rear panel) ON
 CRYSTAL CAL (front panel) ON
 SWEEP MODE FAST-FREE
 Manual-Sweep Speed Control Full Clockwise
 FREQUENCY Approx. 52.5 MHz
 SYM SWEEP WIDTH 10 MHz (Black)
 SYM SWEEP WIDTH Vernier Full clockwise

- h. On the 8412A set the controls as follows:

MODE AMPL (Blue)
 AMPL dB/DIV 10 dB
 HORIZ POSITION and HORIZ GAIN Adjust so trace fills the
 CRT

- i. On the 8601A, adjust Manual/Sweep Speed control counterclockwise until marker shapes are sharp and stable. Adjust FREQUENCY tuning control until markers are symmetrical about the center vertical line of the graticule. Adjust SYM SWEEP WIDTH vernier counterclockwise to position the markers one graticule line in from the left and right edges. Repeat adjusting FREQUENCY and SYM SWEEP WIDTH vernier until markers are in correct positions (see Figure 3-23A).



Equipment:

Sweep Generator	8601A
Network Analyzer	8407A
Display Plug-in	8412A*
Power Splitter	11652-60019
Storage-Normalizer	8750A
Normalizer-Interconnect Cable	08750-60008 or 08750-60034

NOTE

*8412A Displays (Serial Prefix 1625A and below) must be modified for use with 8750A Storage-Normalizer. Refer to Service Note 8412A-6.

*Figure 3-21. 8407A, 8412A, 8601A, and 8750A
Typical Network Analyzer System Test Setup*

8750A Display Outputs Adjustments

- j. On the 8750A, press CH 1 then INPUT. If necessary, readjust the Network Analyzer display intensity. There should be a trace on the display CRT. If there is not, set the four 8750A front panel DISPLAY ADJUST controls, and the four slotted adjustments on the Network Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.
- k. At the 8750A front panel, adjust HORIZ POSN and HORIZ GAIN so the trace fills the CRT. Do not try to match the stored trace to the trace displayed in the BYPASS mode.

NOTE

If the STORE INPUT indicator (LED) stays lit for more than one sweep or continuously, it may mean the SWP IN OFF (sweep input offset) is mis-adjusted or too near its threshold. To correct this problem adjust SWP IN OFF until the STORE INPUT indicator (LED) turns off.

- l. On the 8750A, press STORE INPUT. Make sure the STORE INPUT indicator (LED) turns off, then press INPUT-MEM. The trace should now be a horizontal straight line containing markers. Place this trace on the center graticule line with the 8750A VERT POSN control.
- m. On the 8750A, press BYPASS. Then on the 8407A/8412A adjust the CRT trace so it is well above the top graticule line, using the DISPLAY REFERENCE slide switches (you may have to increase 8412A resolution at this point).
- n. On the 8750A, press INPUT and adjust VERT GAIN so the trace is just above the top graticule line. Press BYPASS and move the trace to the center graticule line. Do not try to match the stored and bypass traces.

8750A Inputs Interface Adjustments

- o. On the 8750A, press INPUT. Adjust VERT IN OFF (Vertical Input Offset) on the Network Analyzer Interface Board (plugged into 8750A rear panel) for a trace on the CRT center graticule line.
- p. On the 8750A, press BYPASS. On the Network Analyzer, adjust DISPLAY REFERENCE slide switches to place the CRT trace three graticule lines above the center graticule line (see Figure 3-22A).
- q. On the 8750A, press INPUT. Then, on the Network Analyzer Interface Board (plugged into 8750A rear panel), adjust VERT IN GAIN (Vertical Input Gain) to place the CRT trace on the third graticule line above the center graticule line (see Figure 3-22B). Press BYPASS and adjust the trace back to the center graticule line. Repeat steps o through q until the vertical position of the trace is the same in both the INPUT and BYPASS modes.
- r. On the 8601A readjust the markers to their correct positions (as you did in step i).

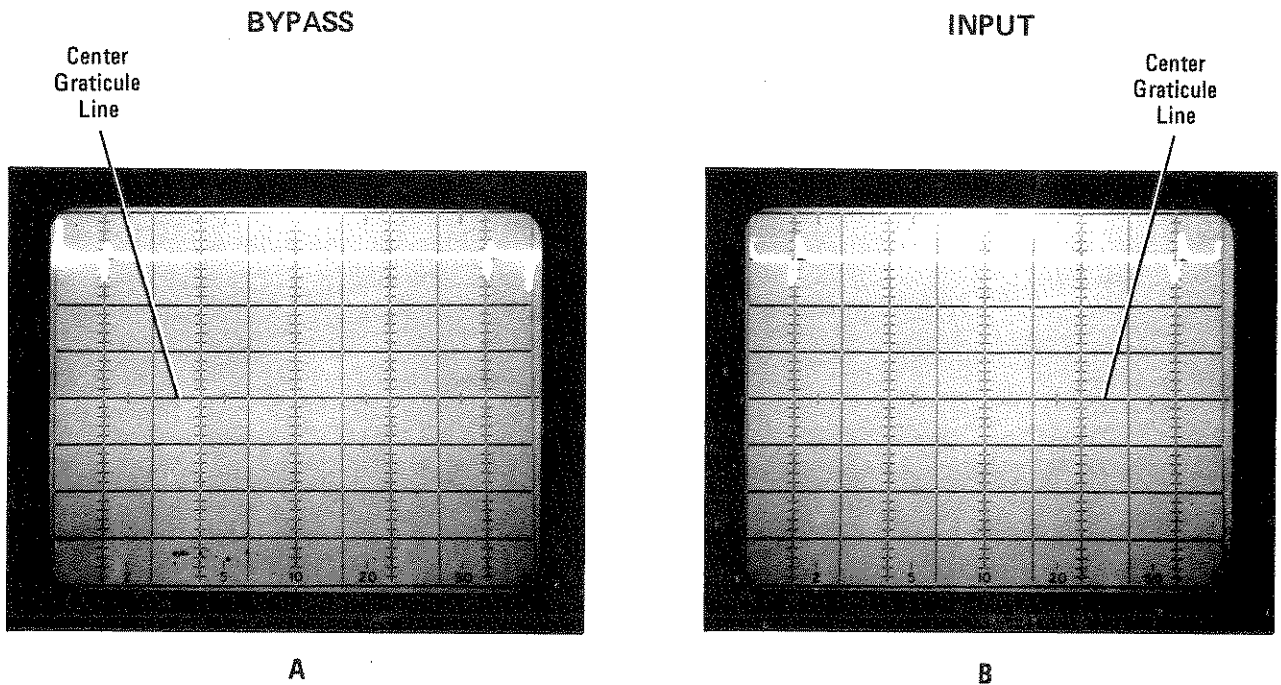


Figure 3-22. VERT IN GAIN (Vertical Input Gain) Adjustment

- s. On the 8750A, press INPUT. Then, adjust rear panel SWEEP IN OFF (Sweep Input Offset) to place the center of the left marker one graticule line to the right of the far left graticule line (see Figure 3-23B).

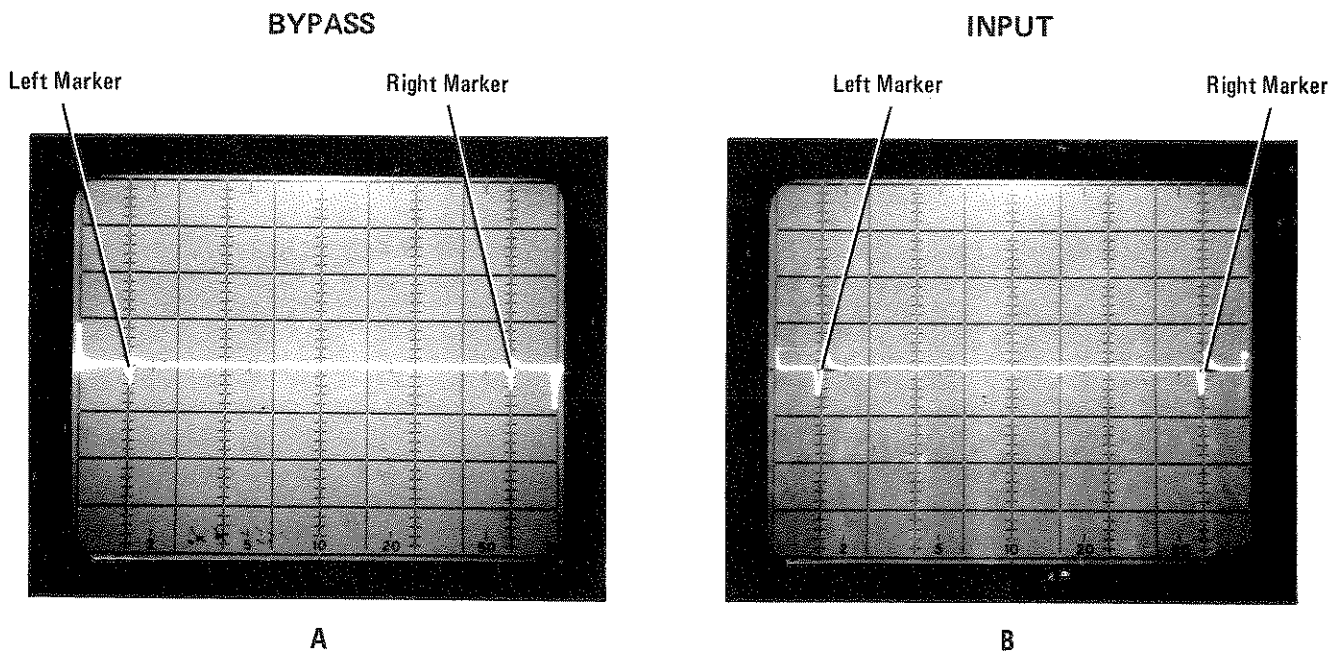


Figure 3-23. Adjustment of the Marker Positions

- t. On the 8750A, adjust rear panel SWP IN GAIN (Sweep Input Gain) to place the center of the right marker one graticule line to the left of far right graticule line. Press BYPASS. Repeat steps r through t until the INPUT and BYPASS traces are the same.
- u. The 8750A is now matched to the 8407A/8412A Network Analyzer. For a functional test of 8750A main features, refer to Section IV of this manual.

3-20. 8754A Network Analyzer

Preliminary Procedures

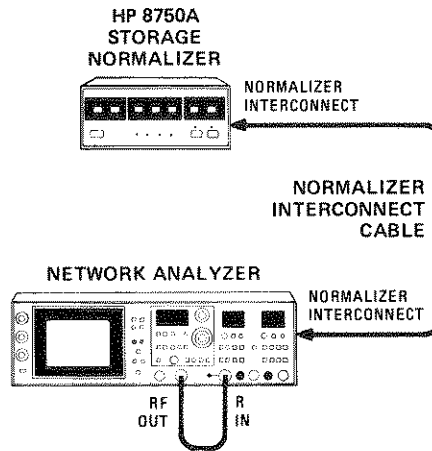
- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Network Analyzer Interface Board Assembly from the 8750A.
- b. On the Network Analyzer Interface Board Assembly, set the two slide switches to EXT as shown in Figure 3-3. (If you are using the Option 004 8754A Interface Board Assembly, ignore this instruction; there are no switches on the Option 004 Interface Board.) Plug the Interface Board Assembly into its socket through the slot in the 8750A rear panel.
- c. Connect the 8750A and the 8754A Network Analyzer as shown in Figure 3-24. Connect a coaxial cable between the RF OUTPUT and R INPUT connectors on the 8754A front panel. Set the 8754A OUTPUT dBm control to 0.
- d. Turn on the 8750A and 8754A LINE power switches. On the 8750A, the NETWORK ANALYZER indicator (LED) should light. Allow the equipment to warm up at least 30 minutes before going on with the following procedures.
- e. On the 8750A Storage-Normalizer, press BYPASS. At the 8750A front panel, set VERT POSN, VERT GAIN, HORIZ POSN, and HORIZ GAIN to mid-range. At the 8750A rear panel, set the Interface Board SWP IN OFF (Sweep Input Offset), SWP IN GAIN, and VERT IN OFF (Vertical Input Offset) controls to midrange. Set the VERT IN GAIN control fully clockwise.
- f. On the 8754A Network Analyzer, set the controls as follows:

TUNING	Approximately 400 MHz
CHANNEL 1 Measurement Select	B/R
CHANNEL 2 Measurement Select	OFF
REFERENCE POSITION CH1	Press pushbutton and adjust \blacklozenge control to move trace to center graticule line

- g. On the 8754A, adjust the front-panel HORIZ POSN and HORIZ GAIN screwdriver adjustments and the rear-panel TRACE ALIGN screwdriver adjustment to obtain a trace that extends from the far left graticule line of the CRT to the far right graticule line.
- h. On the 8754A, set SWEEP WIDTH MHz to 200 MHz, MARKERS MHz to 50 MHz. Adjust TUNING vernier control to set leading edge of 400 MHz marker on the center graticule line of the CRT. Adjust SWEEP WIDTH MHz vernier so the 350 MHz and 450 MHz markers move out to where their leading edges are on the first graticule lines (major division lines) in from the left and right edges of the CRT display, as shown in Figure 3-25.

8750A Display Outputs Adjustments

- i. On the 8750A, press CH 1 and INPUT. Adjust front-panel HORIZ POSN and HORIZ GAIN controls for a full-width trace on the CRT.
- j. On the 8750A, press STORE INPUT. After the STORE INPUT indicator (LED) turns off, press INPUT-MEM. Adjust the front panel VERT POSN controls to place the trace on the CRT center graticule line.



Equipment:

Network Analyzer	8754A
Storage-Normalizer	8750A
Normalizer Interconnect Cable	08750-60008 or 08750-60034

Figure 3-24. 8754A Network Analyzer and 8750A in Typical Test Setup

NOTE

If the STORE INPUT indicator stays lit for more than one sweep, or continuously, it might be because the Interface Board SWP IN OFF (Sweep Input Offset) is misadjusted or too near its threshold. To correct this problem, adjust the SWP IN OFF control to the point where the STORE INPUT indicator turns off.

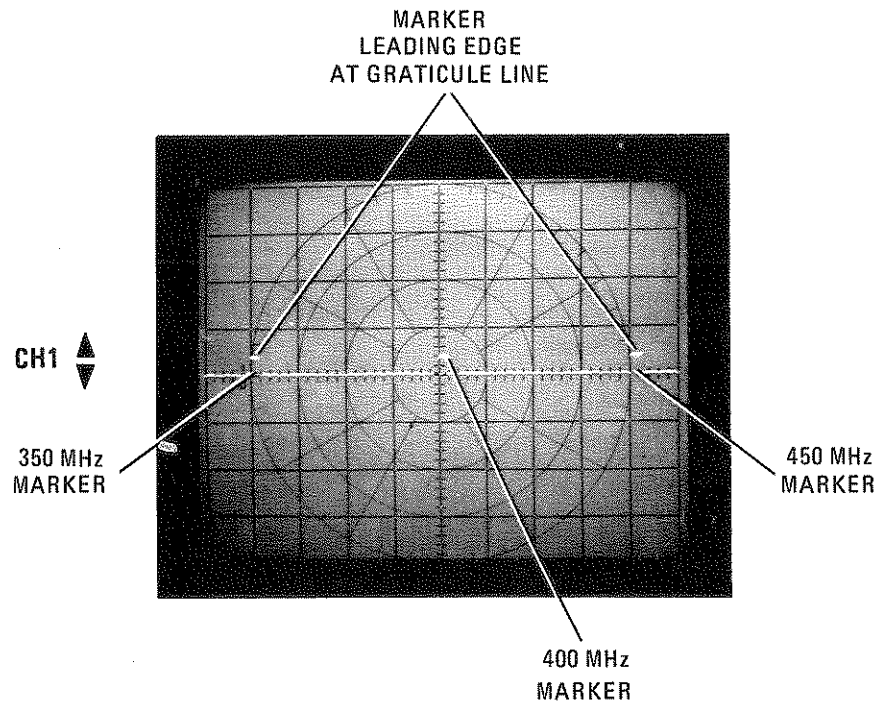


Figure 3-25. Positioning of Markers

- k. At the 8754A, use the REFERENCE POSITION CH 1 \blacklozenge control to move the trace well above the top graticule line.
- l. On the 8750A, press INPUT. Use the front panel VERT GAIN control to move the trace one minor division above the top graticule line. Press BYPASS, then move the trace back to the center graticule line with the CH 1 \blacklozenge control.

Interface Adjustments

- m. On the 8754A, press CHANNEL 2 B/R. Then press the REFERENCE POSITION CH 2 pushbutton and use the CH 1 \blacklozenge and CH 2 \blacklozenge controls to move the traces to the positions shown in Figure 3-26 (i.e., channel 1 on the center graticule line, channel 2 on the third graticule line above the center graticule line).

- n. On the 8750A, press CH 1, then INPUT, then CH 2, then INPUT again. With the Interface Board VERT IN OFF (Vertical Input Offset) control, place the channel 1 trace on the center graticule line. With the Interface Board VERT IN GAIN (Vertical Input Gain) control, place the channel 2 trace on the third graticule line above the center graticule line (see Figure 3-26). Repeat this procedure as often as necessary to get the channel 1 and channel 2 traces on the center and third graticule lines respectively.
- o. Refer to Figure 3-25. On the 8750A, adjust the Interface Board SWP IN OFF (Sweep Input Offset) so the leading edge of the 350 MHz marker is on the first graticule line in from the left side of the CRT screen. Adjust the SWP IN GAIN so the leading edge of the 450 MHz marker is on the first graticule line in from the right side of the CRT screen.

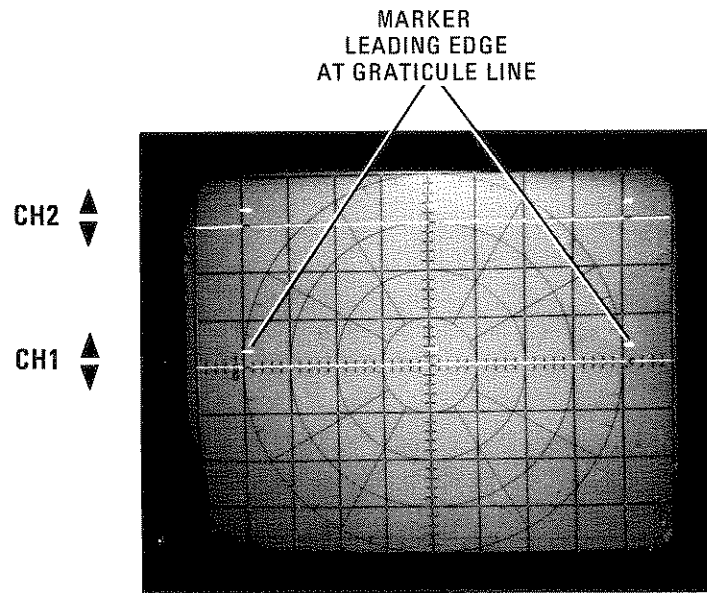


Figure 3-26. Positioning of Traces

- p. On the 8750A, press BYPASS. The traces and markers should appear within $\pm 1/2$ a minor division of the same positions they had in the INPUT mode of step o above. If the variation is more than $\pm 1/2$ a minor division, repeat steps n and o. Note that although the 8750A can be adjusted so the traces and markers position variation between the BYPASS and INPUT modes is even less than $\pm 1/2$ a minor division, this tolerance is well within the requirements for most applications.

NOTE

After you connect a device-under-test (DUT) into the measurement system, you may have to make some minute adjustments of the 8750A front panel controls to obtain the required BYPASS/INPUT trace similarity.

- q. The 8750A is now matched to the 8754A Network Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

3-21. ADAPTING THE 8750A TO SPECTRUM ANALYZER SYSTEMS

3-22. General Information

3-23. All signals into or out of the 8750A Storage-Normalizer pass through the 8750A's Interface Board, which plugs into an internal socket through the slot in the 8750A's rear panel. There are two Interface Boards supplied as standard equipment with every 8750A. One of these is the Network Analyzer Interface Board; the other is the Spectrum Analyzer Interface Board. Make sure you use the correct one. (If you do inadvertently plug in the wrong Interface Board, it won't cause any damage; the instrument will just appear to be malfunctioning.)

3-24. One of the first things you will be instructed to do in the adaption procedure is to set the switch on the Spectrum Analyzer Interface Board. This switch and its correct setting for different systems is shown in Figure 3-27.

3-25. 8557A or 8558B Spectrum Analyzer with 182T or 180TR Display Spectrum Analyzer System, or 8565A Spectrum Analyzer

Preliminary Procedures

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Spectrum Analyzer Interface Board from the 8750A.
- b. On the 8750A, set the switch on the Spectrum Analyzer Interface Board away from the INV (inverted) position as shown in Figure 3-27. Then plug the Spectrum Analyzer Interface Board into the 8750A rear panel.
- c. Connect the 8557A/8558B, or 8565A Spectrum Analyzer, and the 8750A Storage-Normalizer as shown in Figure 3-28.
- d. Turn on the ac line power to the 8750A and Spectrum Analyzer. On the 8750A, the SPECTRUM ANALYZER indicator (LED) should light. On the 8750A set the four front panel DISPLAY ADJUST and four rear panel slotted controls to mid-range.
- e. On the 8750A, press the front-panel BYPASS pushbutton.
- f. Perform control setup 1 or 2 below as applicable for your Spectrum Analyzer system.
 - 1. On the **8557A/182T** or **8558B/182T Spectrum Analyzer**, set the controls as follows:

REFERENCE LEVEL OPTIMUM INPUT	
(push knob in)	-30 dBm (Blue)
REFERENCE LEVEL	
(do not push knob in)	-30 dBm (shown in window)
10 dB/DIV-1dB/DIV-LINEAR	LINEAR
BASELINE CLIPPER	Full Counterclockwise
VIDEO FILTER	Full Counterclockwise
SWEEP TRIGGER	FREE
SWEEP TIME/DIV	AUTO
FREQ SPAN/DIV	1 MHz
RESOLUTION BW	1 MHz

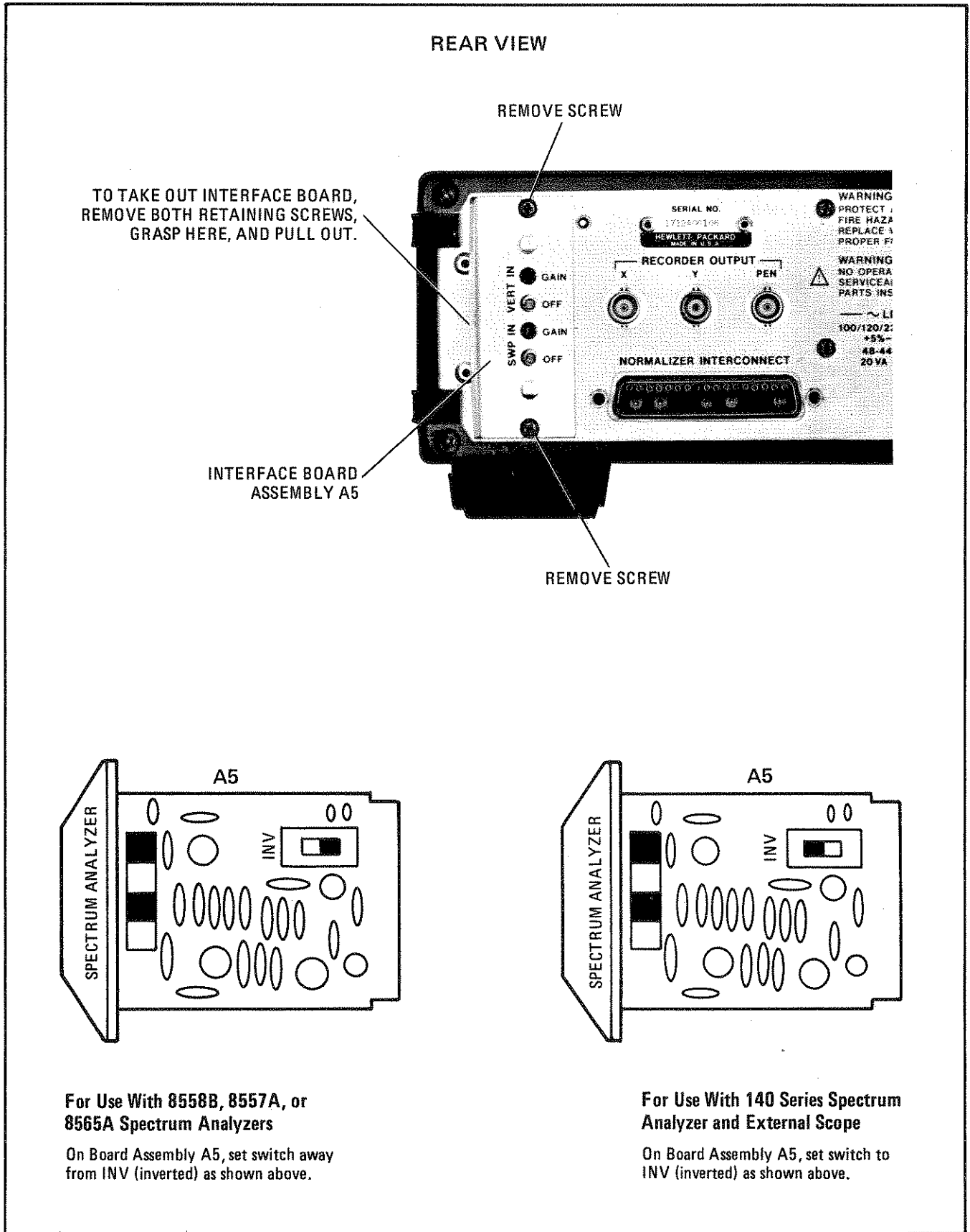
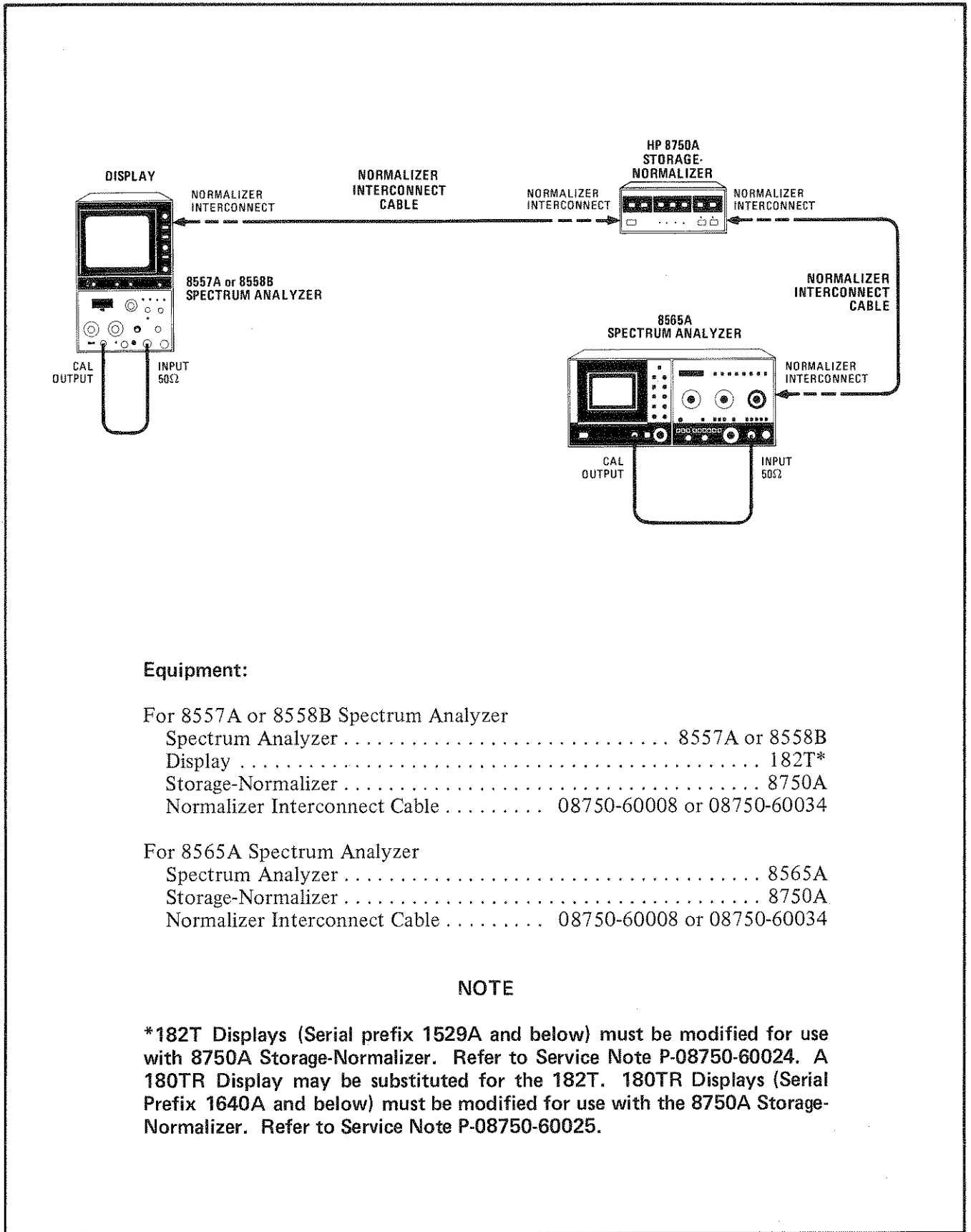


Figure 3-27. 8750A Spectrum Analyzer Interface Board Switch Positions



Equipment:

For 8557A or 8558B Spectrum Analyzer

- Spectrum Analyzer 8557A or 8558B
- Display 182T*
- Storage-Normalizer 8750A
- Normalizer Interconnect Cable 08750-60008 or 08750-60034

For 8565A Spectrum Analyzer

- Spectrum Analyzer 8565A
- Storage-Normalizer 8750A
- Normalizer Interconnect Cable 08750-60008 or 08750-60034

NOTE

*182T Displays (Serial prefix 1529A and below) must be modified for use with 8750A Storage-Normalizer. Refer to Service Note P-08750-60024. A 180TR Display may be substituted for the 182T. 180TR Displays (Serial Prefix 1640A and below) must be modified for use with the 8750A Storage-Normalizer. Refer to Service Note P-08750-60025.

Figure 3-28. 8557A or 8558B, 182T or 180TR, and 8750A Typical Network Analyzer System Test Setup; and 8565A Test Setup with 8750A

2. On the **8565A Spectrum Analyzer**, set the controls as follows:

Adjust the 8565A for normal settings. (Normal settings are color coded green).

FREQ BAND 0.01 – 1.8 GHz
 FREQ SPAN/DIV 1 MHz
 RESOLUTION BANDWIDTH 1 MHz
 INPUT ATTEN (Push knob in) 30 dB
 REFERENCE LEVEL
 (Do not push knob in) -10 dBm (shown in Window)
 AMPLITUDE SCALE LINEAR

Adjust the FREQUENCY TUNING knob to center the signal trace on the CRT (i.e., so the signal trace crosses the horizontal center graticule equal distances from the center point of the display grid) see Figure 3-31. Adjust REFERENCE LEVEL FINE control so that the top of the signal trace meets with the top graticule line of the display.

- g. **For the 8557A or 8558B only.** If the extreme ends of the trace are not on the edge graticule lines, the 8557A or 8558B HORIZ GAIN (horizontal gain) control on the rear panel must be adjusted as follows: Note the position of the trace, then remove the 8557A or 8558B from the display main-frame. On the rear panel of the 8557A or 8558B, adjust HORIZ GAIN control counterclockwise to compress the trace or clockwise to expand the trace. Reinstall the 8557A or 8558B into the display and check the trace. Readjust the HORIZONTAL POSITION control on the display to center the trace. The 8557A or 8558B adjustment may have to be done several times to get both ends of the trace over the edge graticule lines.

8750A Display Outputs Adjustments

NOTE

If you are using the 8565A Spectrum Analyzer and the range of the 8750A front panel HORIZ POSN and/or GAIN adjustments run out, the 8750A Front Panel Assembly will have to be modified. Refer to Service Note 8750A-2/8565A-3.

- h. On the 8750A, press B, then INPUT. Then adjust the front-panel HORIZ POSN and HORIZ GAIN controls to place the left end of the trace on the left graticule edge line, and the right end of the trace on the right graticule edge line. If the trace is down off the screen, adjust the 8750A VERT POSN and VERT GAIN controls as necessary to enable you to see it.
- i. On the 8750A, press BYPASS, and readjust the signal trace with the TUNING control so that it is centered on the display.
- j. On the 8750A, press B then INPUT. Press STORE INPUT. When STORE INPUT indicator (LED) turns off, press INPUT-MEM. The CRT trace should appear as shown in Figure 3-29. Adjust the 8750A VERT POSN control to place the CRT trace on the center graticule line. Next, set the 8750A VERT GAIN control full counterclockwise.
- k. On the 8557A, 8558B or 8565A, adjust the TUNING control slightly to obtain a trace that flattens at the top and bottom as shown in Figure 3-30.
- l. Adjust the 8750A VERT GAIN control to move both flat cutoff sections of the trace outside the top and bottom of the CRT graticule area (See Figure 3-30).

- m. On the 8750A, press BYPASS and recenter the signal trace on the display.

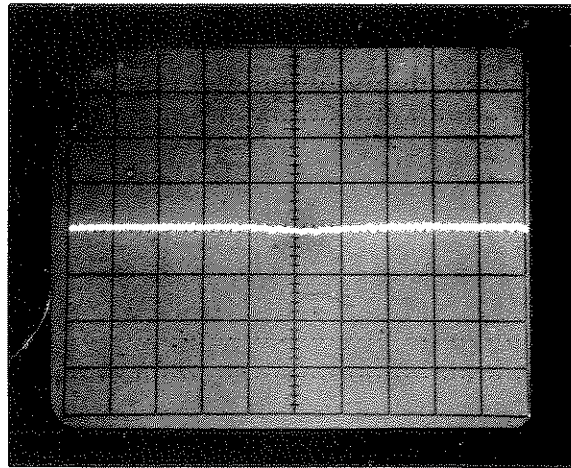


Figure 3-29. CRT Trace With Front-Panel VERT POSN Control Correctly Adjusted

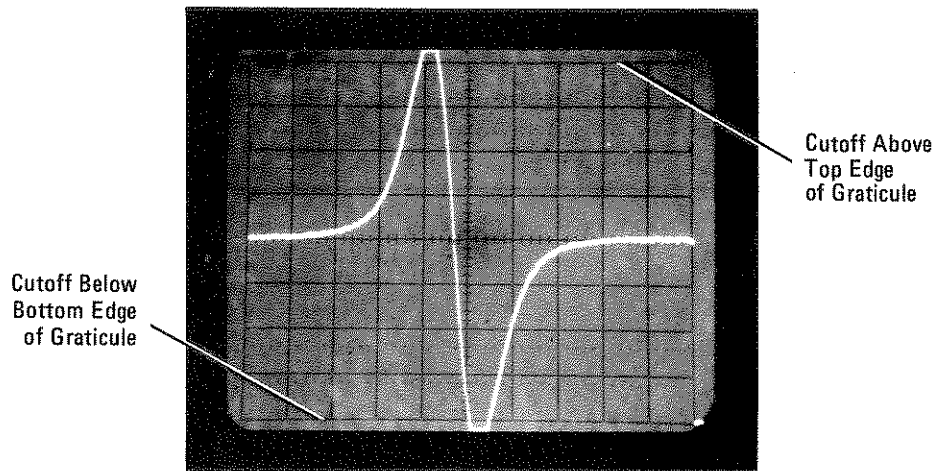


Figure 3-30. CRT Trace With Front-Panel VERT GAIN Control Correctly Adjusted

8750A Input Interface Adjustments

- n. On the 8750A, press B, then INPUT. Adjust rear panel VERT IN OFF (Vertical Input Offset) until the bottom of the signal trace meets with the bottom graticule line on the display (See Figure 3-31 below).

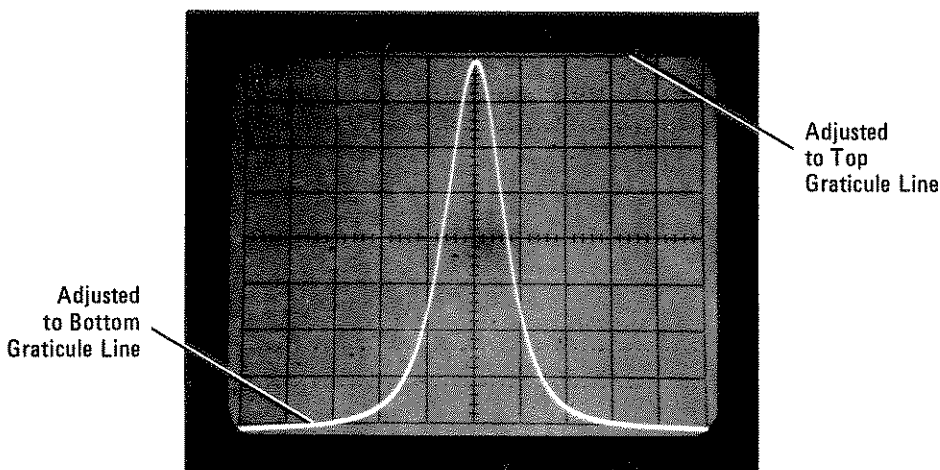


Figure 3-31. Spectrum Analyzer Calibration Signal Used to Adjust 8750A

- o. On the 8750A, adjust rear panel VERT IN GAIN (Vertical Input Gain) until the top of the trace meets with the top graticule line of the display (see Figure 3-31).
- p. Repeat steps n and o until the vertical position and gain does not change between INPUT and BYPASS modes.
- q. On the 8750A, press BYPASS. If necessary, recenter the trace on the display.
- r. On the 8750A, press INPUT. Adjust rear panel SWP IN OFF (Sweep Input Offset) until trace is centered (same centering procedure as for the bypass signal) on the display. It may be necessary to switch back to BYPASS and recenter the signal, then repeat the above.
- s. On the 8750A, press BYPASS. Recenter the signal trace and note where it crosses the center horizontal graticule line. Press INPUT. Adjust rear panel SWP IN GAIN (Sweep Input Gain) so the signal trace crosses the center horizontal graticule line at the same point it crossed it in the BYPASS mode. Repeat this step until the signal trace in the INPUT mode matches the signal trace in the BYPASS mode.
- t. The 8750A is now matched to the 8557A/182T, 8558B/182T, or 8565A Spectrum Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

NOTE

For most of the 8750A's operating modes, when it is used with a spectrum analyzer, the zero reference is at the top graticule line of the display CRT. In the Input-minus-memory (INPUT-MEM) mode, however, the zero reference is at the center graticule line because there is no practical way to set it at the top graticule line. If you remember this difference in zero reference locations, you should have no trouble operating the 8750A with a spectrum analyzer.

3-26. 140 Series Spectrum Analyzer with Separate Oscilloscope Spectrum Analyzer System**Preliminary Procedures**

- a. Make sure the 8750A ac LINE power switch is set to OFF, then remove the Spectrum Analyzer Interface Board Assembly from the 8750A.
- b. On the Spectrum Analyzer Interface Board, set the slide switch to INV (see Figure 3-27). Then plug the board into its socket through the slot in the 8750A rear panel.
- c. Connect the equipment as shown in the test setup in Figure 3-32. Set Spectrum Analyzer and oscilloscope controls as listed in the test setup.
- d. Turn on the ac line power to the equipment in the test setup. On the 8750A, the SPECTRUM ANALYZER indicator (LED) should light. Allow 30 minutes warm-up before proceeding.
- e. On the 8750A, press B, then press INPUT.
- f. On the 8750A, set the four front panel DISPLAY ADJUST controls and the four slotted SWP IN and VERT IN controls on the Spectrum Analyzer Interface Board (plugged into 8750A rear panel) to mid-range.
- g. On the Spectrum Analyzer, adjust the controls to display the calibration signal trace at the center of the Spectrum Analyzer CRT graticule.
- h. On the oscilloscope, set the X and Y input sensitivities to 0.1V/division and adjust the controls to display the output trace from the 8750A.

NOTE

If the trace on the oscilloscope is erratic, press A VIEW B, B, then INPUT on the 8750A.

8750A Display Output Adjustments

- i. On the 8750A, adjust the front panel HORIZ POSN and HORIZ GAIN controls to place the left end of the trace on the oscilloscope CRT's far left graticule line, and the right end of the trace on the far right graticule line. (Ignore position or content of the trace waveform in this step.) If the HORIZ POSN control runs out of range, adjust the horizontal position control on the oscilloscope to bring it into range.
- j. On the 8750A, press BYPASS.
- k. Tune the Spectrum Analyzer to place the calibration signal at the center of the Spectrum Analyzer display.

NOTE

If the STORE INPUT indicator (LED) stays lit for more than one sweep or continuously, it may mean the SWP IN OFF (Sweep Input Offset) is mis-adjusted or too near its threshold. To correct this problem, adjust SWP IN OFF until the STORE INPUT indicator (LED) turns off.

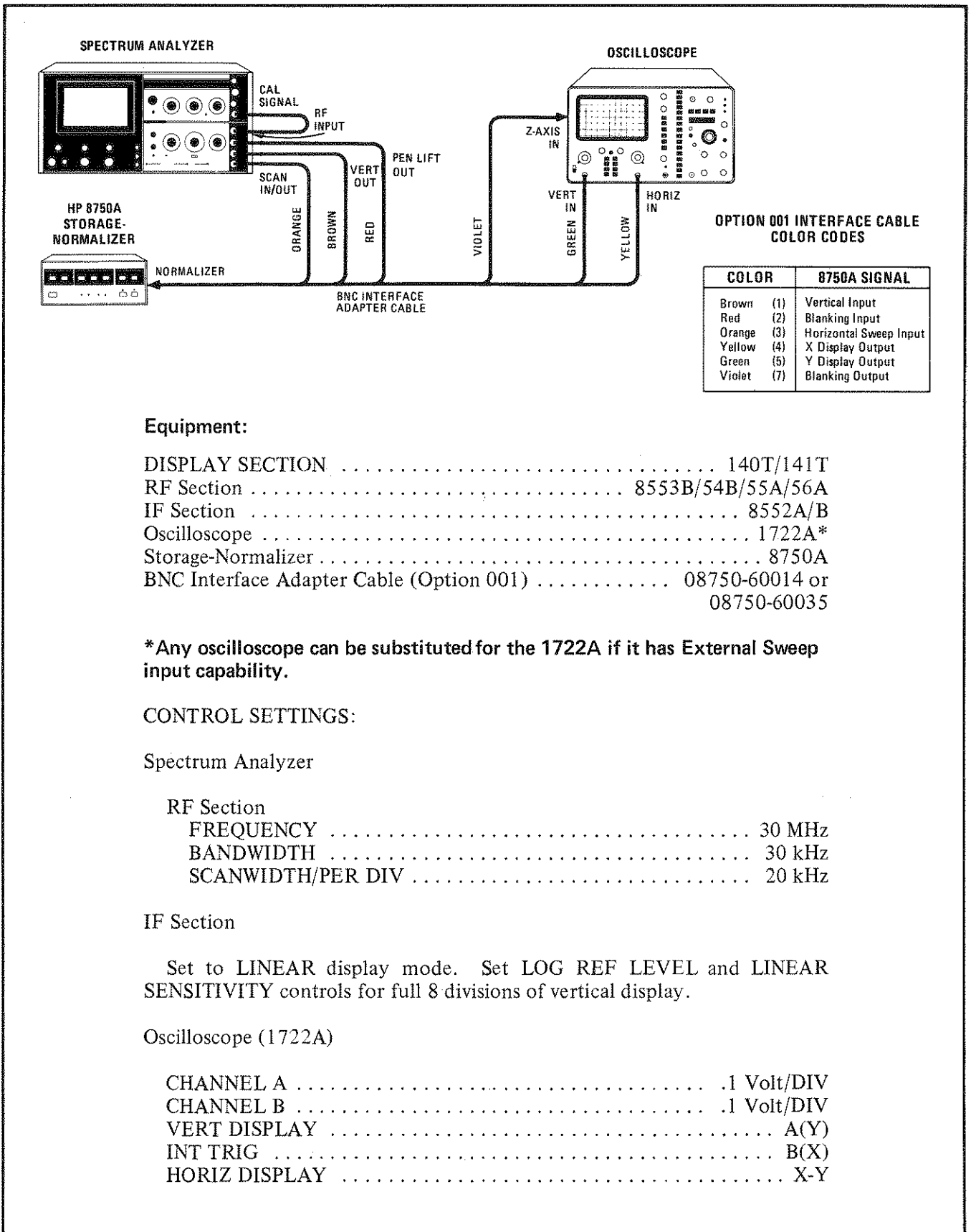


Figure 3-32. 140 Series Spectrum Analyzer and 8750A Typical Test Setup

- l. On the 8750A, press STORE INPUT then INPUT-MEM. The oscilloscope CRT trace should resemble the trace shown in Figure 3-33. Adjust the 8750A front panel VERT POSN control to place the oscilloscope CRT trace on the center graticule line. If the VERT POSN control runs out of range, change the vertical position control on the oscilloscope to bring it into range.

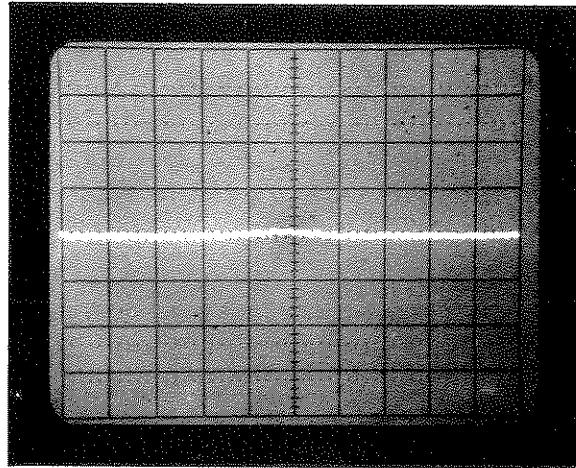


Figure 3-33. CRT Trace With Front-Panel VERT POSN Control Correctly Adjusted

- m. On the 8750A, turn the front panel VERT GAIN full counterclockwise.
- n. On the Spectrum Analyzer, adjust the TUNING control slightly to obtain a trace (on the oscilloscope CRT) that flattens on the top and bottom (see Figure 3-34).
- o. Adjust the 8750A front panel VERT GAIN control so both the top and bottom flat cutoff sections of the oscilloscope trace move outside the CRT graticule area on the top and bottom (see Figure 3-34).

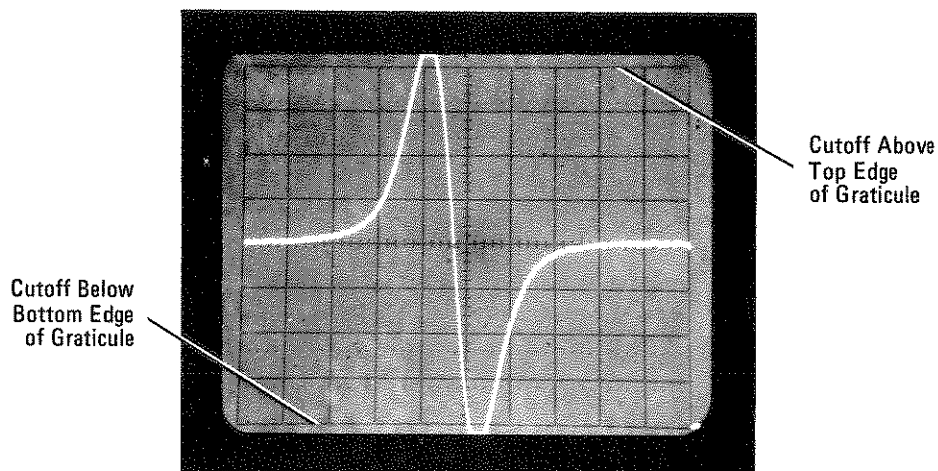


Figure 3-34. CRT Trace With Front-Panel VERT GAIN Control Correctly Adjusted

- p. Tune the Spectrum Analyzer to place the calibration signal at the center of the Spectrum Analyzer CRT display.

8750A Input Interface Adjustments

- q. On the 8750A, press B then INPUT. At the 8750A rear panel, adjust the VERT IN OFF (Vertical Input Offset) control to place the bottom of the oscilloscope CRT trace on the bottom graticule line, and adjust the VERT IN GAIN (Vertical Input Gain) control to place the top of the signal trace on the top graticule line (See Figure 3-35).

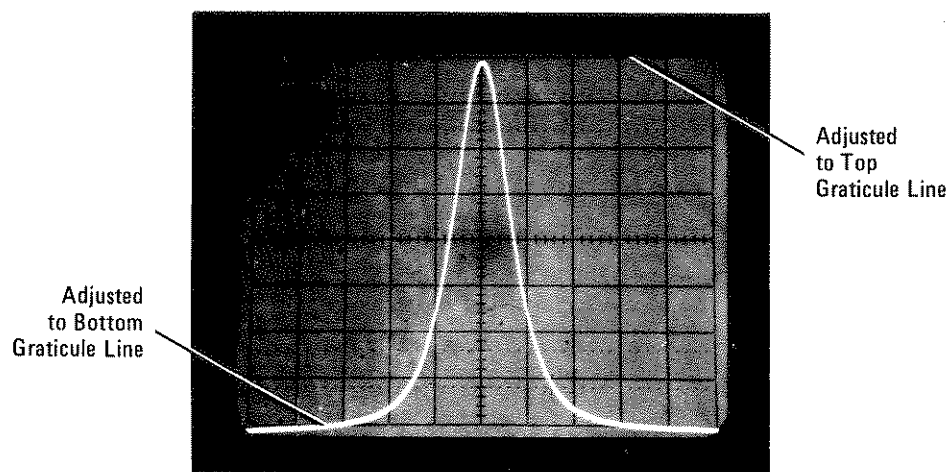


Figure 3-35. Spectrum Analyzer Calibration Signal Used to Adjust 8750A

- r. Tune the Spectrum Analyzer to place the calibration signal at the center of the Spectrum Analyzer display.
- s. At the 8750A rear panel, adjust the Interface Board SWP IN OFF (Sweep Input Offset) to center the signal on the oscilloscope CRT.
- t. On the Spectrum Analyzer, tune the calibration signal to the fourth graticule line to the right of the center line.
- u. At the 8750A rear panel, adjust the Interface Board SWP IN GAIN (Sweep Input Gain) control to place the calibration signal on the corresponding fourth graticule line of the oscilloscope CRT display.
- v. Tune the Spectrum Analyzer to place the calibration signal four divisions to the left of the center graticule line. The signal on the oscilloscope CRT should move to the corresponding fourth graticule line. If there is a discrepancy between the signal shown on the Spectrum Analyzer CRT and the oscilloscope CRT, center the Spectrum Analyzer signal display and repeat steps r through v.
- w. The 8750A is now matched to the 140 Series Spectrum Analyzer. For a functional test of the 8750A main features, refer to Section IV of this manual.

NOTE

For most of the 8750A's operating modes, when it is used with a Spectrum Analyzer, the zero reference is at the top graticule line of the display CRT. In the Input-minus-memory (INPUT-MEM) mode, however, the zero reference is at the center graticule line because there is no practical way to set it at the top graticule line. If you remember this difference in zero reference locations, you should have no trouble operating the 8750A with a Spectrum Analyzer.

3-27. X-Y PLOTTING WITH THE 8750A STORAGE-NORMALIZER

3-28. The 8750A has a built-in X-Y plot capability which enables the user to record the display on a standard X-Y recorder. The X axis plot output of the 8750A varies from zero to +1.0 volt and the Y axis plot output varies from -4 to +4 volts. The plot speed is fixed at approximately 30 seconds per trace.

NOTE

The 8750A Storage-Normalizer **MUST** be matched to the measurement system in which it will be used before you start the Recorder Adjustments. If the 8750A and the measurement system are not properly matched, you will not be able to adjust the recorder so it operates correctly.

3-29. RECORDER ADJUSTMENTS

3-30. Two reference points are used to adjust the recorder gains and offsets. One point is at 0-0 corresponding approximately to the start of the X axis and the center of the Y axis (see Figure 3-36). The second reference point is at the upper right corner of the CRT display and corresponds approximately to the maximum positive Y axis excursion at the right end of the X axis (see Figure 3-36).

NOTE

Before making any adjustments to the recorder, turn on the recorder and the 8750A and allow 45 minutes for the two instruments to stabilize.

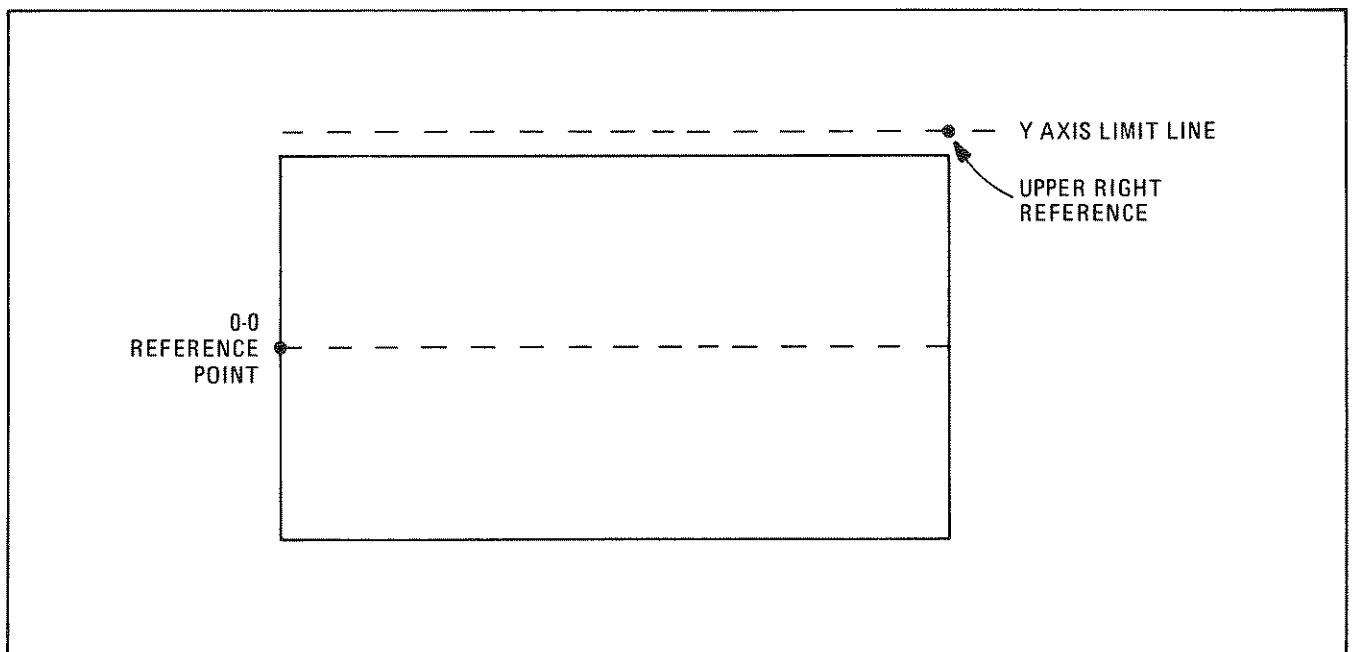


Figure 3-36. Recorder Reference Points

Recorder X Offset Adjustment

- a. Disconnect the X and Y inputs to the recorder.
- b. Set recorder X gain for 1 volt full scale.
- c. Adjust recorder X offset to position the pen over the left graph boundary. Drop the pen to mark this position.
- d. Connect the X input to the recorder and press Y-Y PLOT on the 8750A. Note where the actual trace starts relative to the 0-0 reference point. Then press INPUT to stop on the 8750A to stop the plot cycle, and disconnect the X input from the recorder.
- e. Adjust the recorder X offset to compensate for the difference between the 0-0 reference point and the actual starting point noted in step d (see Figure 3-37). Repeat steps d and e until the plot starts at the correct 0-0 reference point.

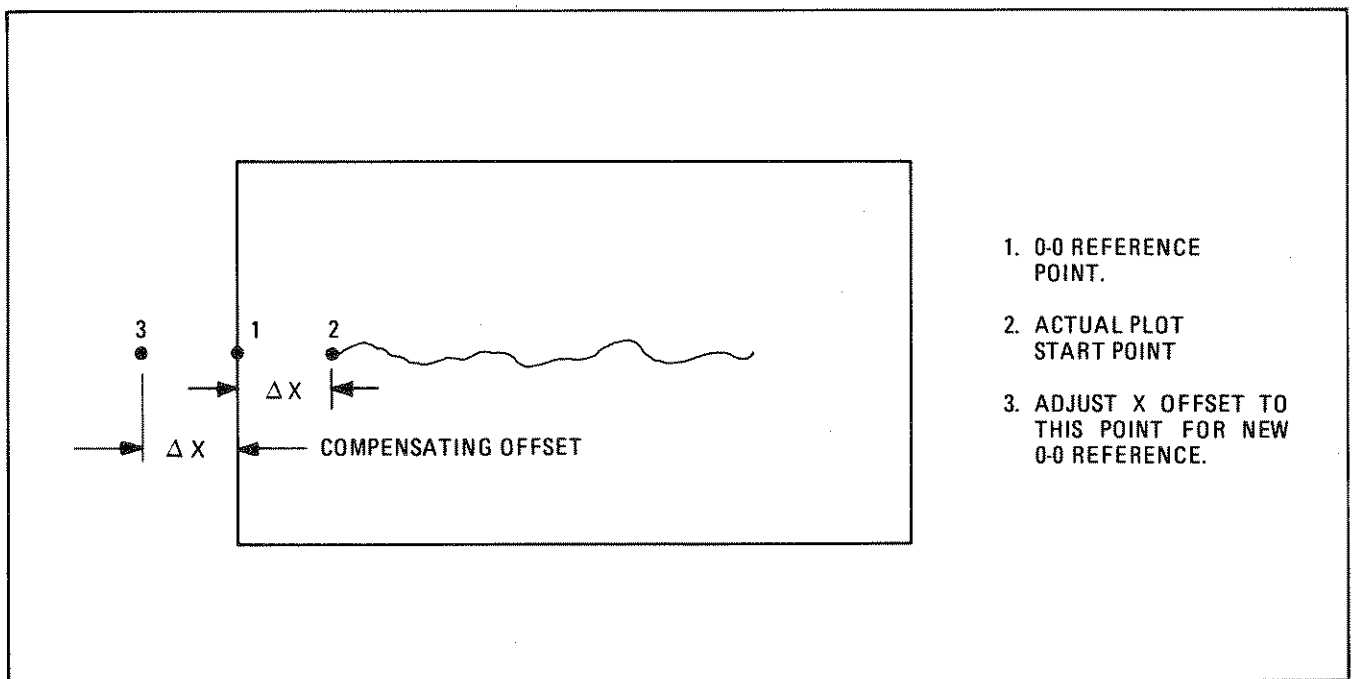


Figure 3-37. Recorder X Axis Offset Adjustment

Recorder X Gain Adjustment

- f. With the X axis input connected to the recorder, and the Y axis input disconnected, adjust the recorder X gain to place the pen at the right edge of the graph paper. Drop the pen to mark this spot.
- g. On the 8750A, press X-Y PLOT and note where the plot ends. Press INPUT to stop the plot cycle.
- h. Adjust the recorder X gain to compensate for the difference between the right-side reference point and the point where the plot actually ended (see Figure 3-38). Repeat steps f and g until the plot ends at the correct plot stop point.

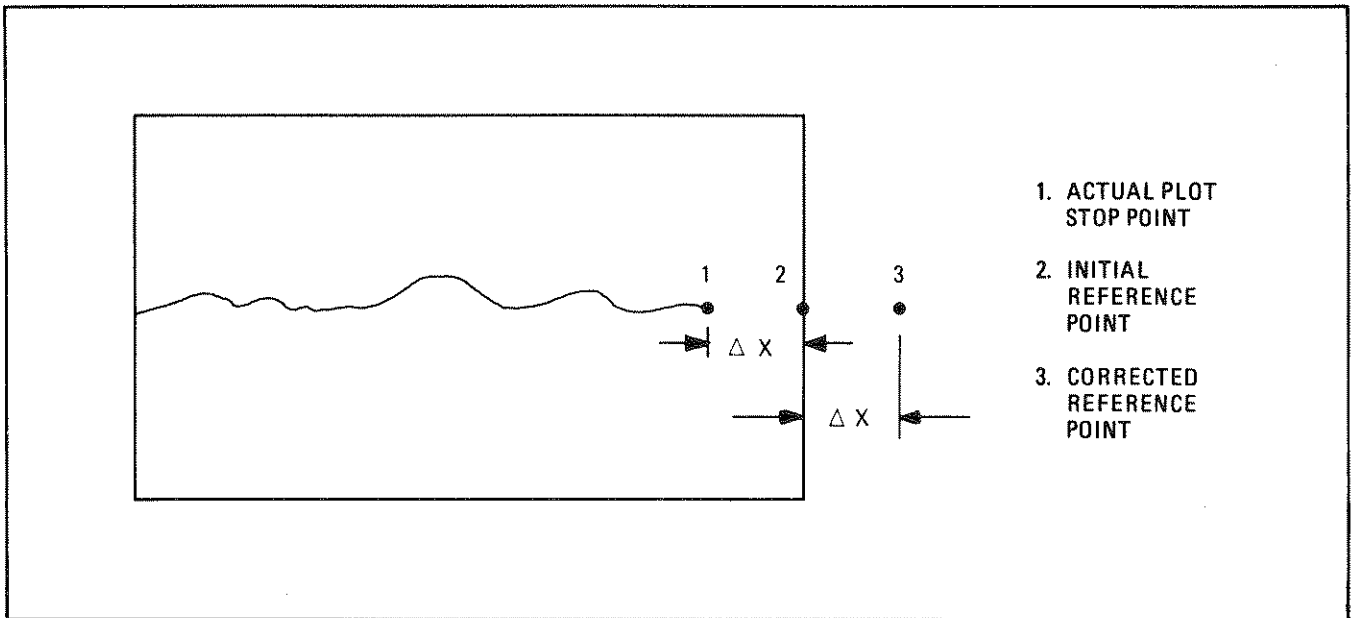


Figure 3-38. Recorder X Axis Gain Adjustment

Recorder Y Offset Adjustment

- i. Connect the X and Y inputs to the recorder.
- j. Adjust the recorder Y gain for approximately + and -4 volts full scale.
- k. Disconnect the Y input to the recorder. Then adjust the recorder Y offset to center the pen vertically.
- l. Reconnect the recorder Y input.
- m. Adjust the recorder Y gain so that the upper right reference point is just above the top edge of the graph paper. (This reference point corresponds to the "Initial Reference Point" indicated in Figure 3-39.)
- n. On the display, set up a line that corresponds to the top graticule line of the display. If you are using a network analyzer system, use the position line; if you are using a spectrum analyzer system, use the zero scan mode.
- o. On the 8750A, press X-Y PLOT.
- p. Adjust the recorder Y gain to place the pen trace on the top line of the graph paper. This can be done during the plot directly, or after the plot by comparing the plotted trace with the reference point and compensating for the difference (see Figure 3-39).

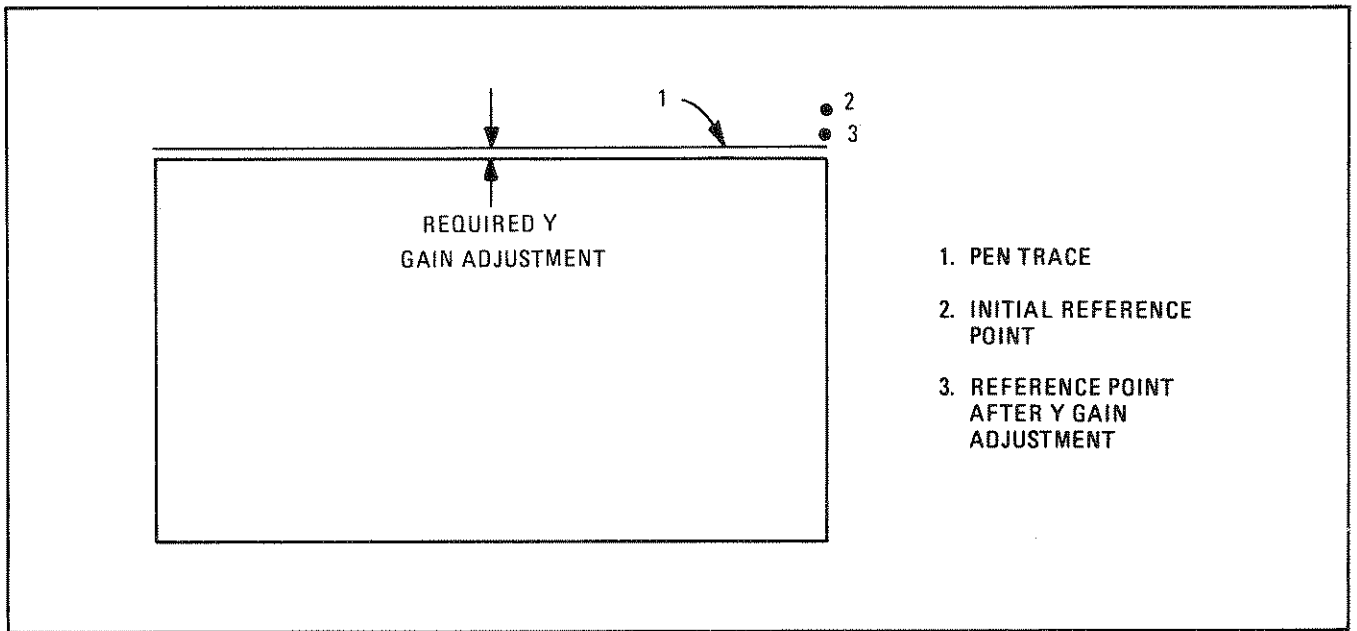


Figure 3-39. Recorder Y Axis Gain Adjustment

NOTE

After you have the recorder matched with the 8750A, **DO NOT** touch the recorder gain controls. If you want to increase the resolution of the input signal being plotted, do it with the controls on the measurement system network or spectrum analyzer. If you use the recorder gain controls, you will cause a mismatch between the recorder and the 8750A. For example: If you increase the recorder gain to expand an input signal, the recorder pen will probably hit the upper right stop when it tries to reach its rest position (+1 volt on X axis, +4 volts on Y axis). The pen will then vibrate at the stop as it tries to continue its upward movement. If the mismatch is great enough, it might result in damage to the recorder.

If you have **NOT** reset the recorder gain and you have the "pen return" problem described above, the 8750A's internal Y-Gain control and/or Triangle Offset control are probably out of adjustment. Adjustment of these controls is described in Section V, Adjustment, paragraphs 5-15 and 5-19.

WARNING

Operator personnel must not attempt to adjust the 8750A's internal adjustment controls. Internal controls adjustments, as described in Section V, are done with the 8750A top cover removed and ac power applied. Because dangerous voltages are exposed, these adjustments must only be performed by a qualified electronic technician who is aware of the hazards involved.