

Quick Start Guide

Network Analyzer Tour

In this section, you explore the network analyzer mode of operation. Before starting this tour, verify that the 4395A is correctly installed (see chapter 2, “Installation Guide,” if you need additional information).

Before You Leave On The Tour

On this tour, you will learn how to make a basic network analyzer measurement by measuring the transmission characteristics of a bandpass filter.

Overview

The following is a short summary of the tour:

1. Preparing for a measurement
 - Turning ON the 4395A
 - Connecting the DUT
2. Setting up the 4395A
 - Selecting the analyzer type
 - Setting the active channel
 - Setting the input port
 - Setting the frequency range
 - Performing the automatic scaling
3. Making a calibration
4. Reading a measurement result
 - Reading a measured value by using marker
5. Printing out the measurement result
 - Configuring and connecting a printer
 - Making a hardcopy of the display

After you finish this tour, you will understand how to make a basic measurement in the network analyzer mode of operation.

Before You Leave On The Tour

Required Equipments

To perform all the steps in this tour, you must have the following equipments:

- 4395A Network/Spectrum/Impedance Analyzer
- Measurement Device:
 - This tour assumes the device under test (DUT) is a 70 MHz bandpass filter
- THRU (BNC female-to-female connector)
- Two BNC cables
- Test Set (use either of the following)
 - Transmission/Reflection (T/R) Test Set
 - Two N-to-BNC adapters
 - S-Parameter Test Set
 - Two APC7-to-N adapters
 - Two N-to-BNC adapters
- HP DeskJet Printer *
- Parallel Interface Cable *

* If you wish to test some other device, you will need to change particular measuring conditions, such as the frequency range, according to the general characteristics of the DUT.

* If you do not have an HP DeskJet printer and cable, skip step 5, “Printing Out the Measurement Results”.

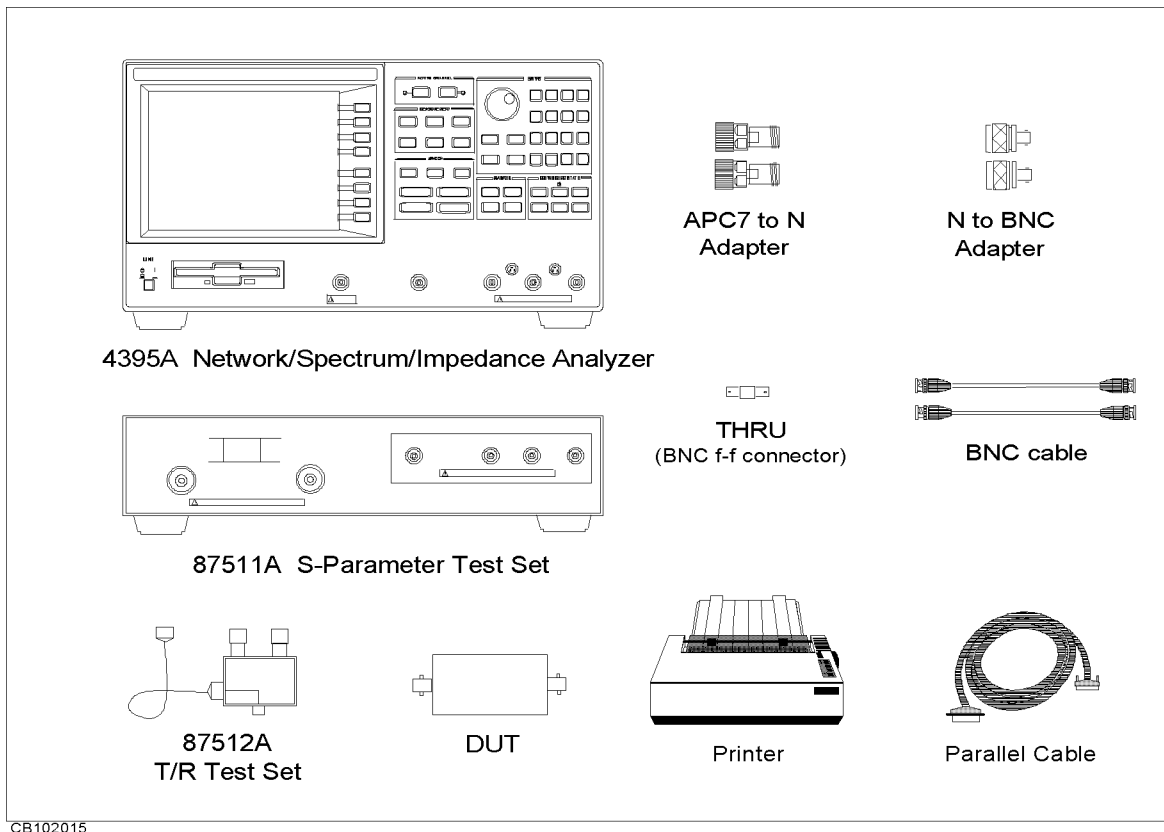
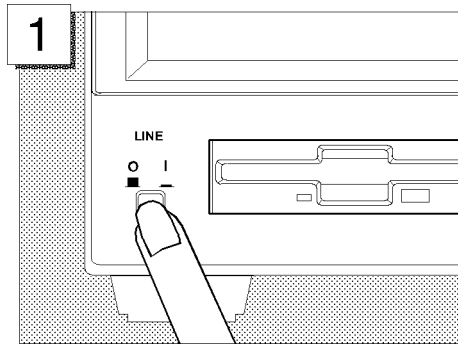


Figure 3-1. Required Equipment

Step 1: Preparing for the Measurement

You must set up the test set before you turn ON the 4395A. The setup procedure for the test set is described in “Connecting a Test Set for Network Analyzer Mode” in Chapter 2.

Turning ON the 4395A

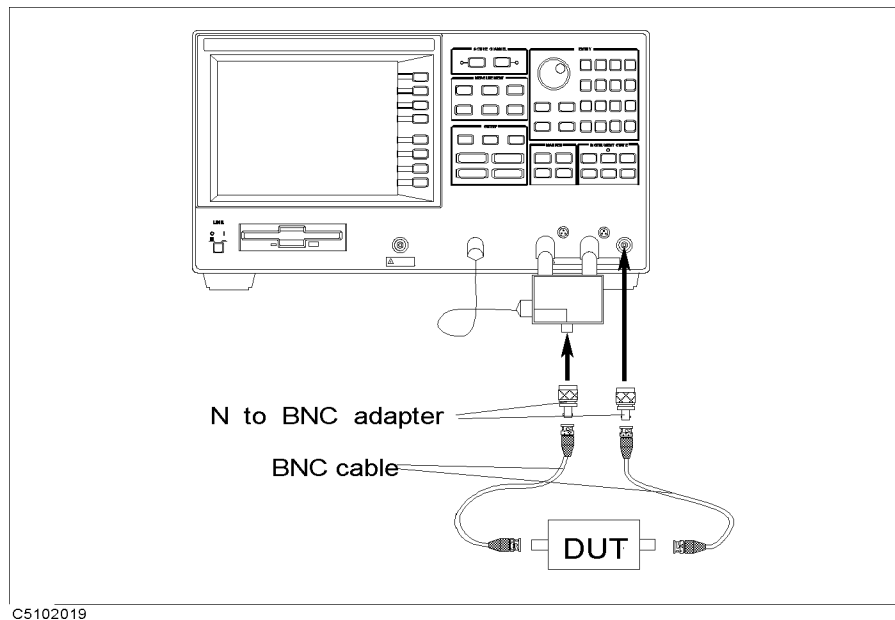


Press the LINE switch.

The 4395A performs a power on self-test. About 20 seconds later, the model name, revision number, and other information should appear on the LCD to indicate that the 4395A has normally started up.

Connecting the DUT

Connect the DUT as shown in Figure 3-2 or Figure 3-3.



C5102019

Figure 3-2. Transmission/Reflection Test Set Setup

Step 1: Preparing for the Measurement

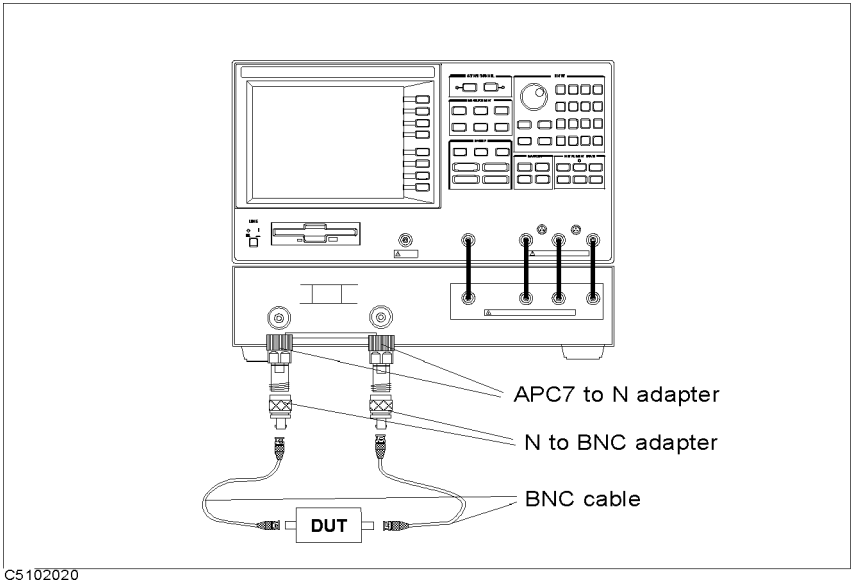


Figure 3-3. S-Parameter Test Set Setup

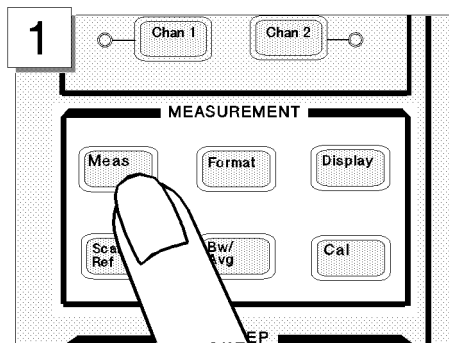
Step 2: Setting up the 4395A

Before you start the measurement, you must set up the 4395A to fit your measurement requirements. For example, you must set the frequency range of the measurement. In this step, you will set the following parameters:

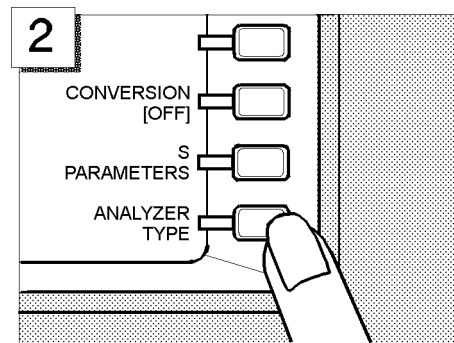
Analyzer type	Network analyzer mode
Active channel	Channel 1
Inputs	B/R or S_{21} (depending on the test set)
Format	Log magnitude (default)
Frequency Range	Center 70 MHz, Span 500 kHz

Setting the Analyzer Type

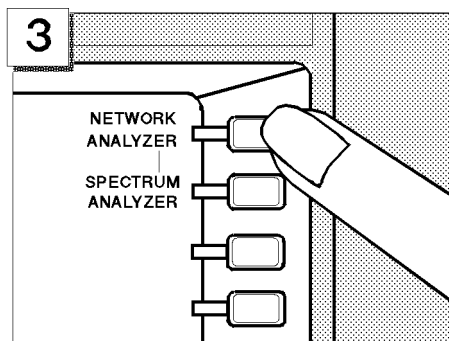
To use the 4395A in the network analyzer mode, you must set the analyzer type to the network analyzer mode after selecting the active channel.



In the MEASUREMENT block, press **Meas**.



Press **ANALYZER TYPE**.

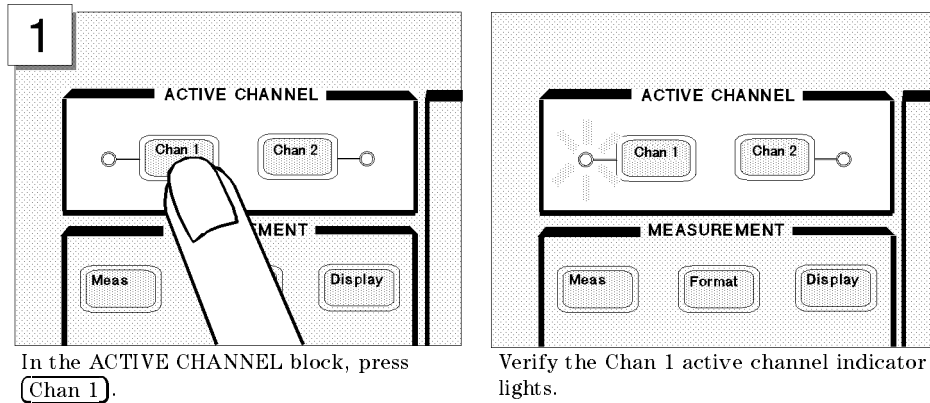


Press **NETWORK ANALYZER**.

Step 2: Setting up the 4395A

Setting the Active Channel

Because the 4395A has two measurement channels you can have two different measurement setups at the same time. To change the active channel to channel 1:



Note



Changing the analyzer type presets the 4395A for the active channel. If you want to keep the current measurement settings when changing the analyzer type, first set the other channel to active.

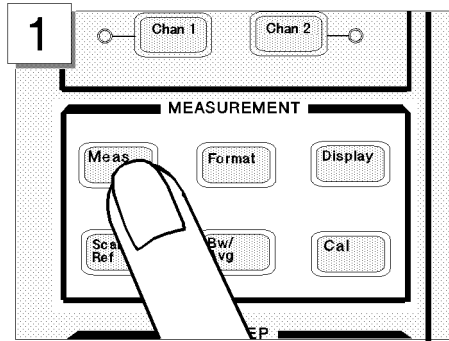
Selecting the Input

The 4395A uses three inputs for network measurements (R, A, and B). Usually, the R input is connected to the RF OUT signal directly, the A input measures the reflected signal from the DUT, and the B input measures the signal through the DUT.

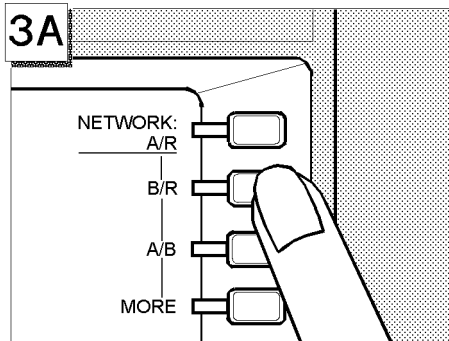
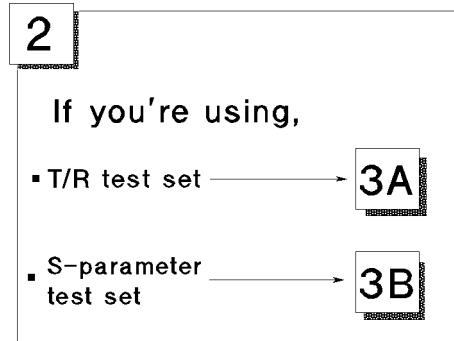
This example assumes you are using the T/R test set. Therefore, because you are going to measure the transmission characteristics of the DUT, select B/R to measure the ratio of B and R inputs.

When you use the S-parameter test set, you can measure the forward and reverse characteristics of a 2-port device without reconnecting the inputs. In that case, select S_{21} for a transmission measurement in the forward direction.

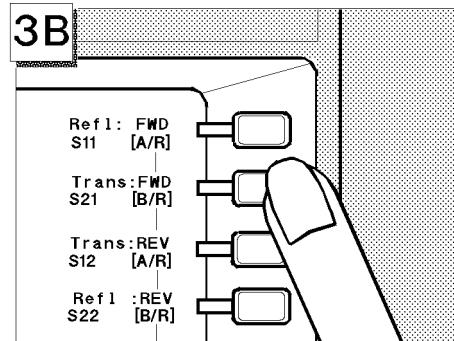
Step 2: Setting up the 4395A



In the MEASUREMENT block, press **Meas**.



Press **B/R**.

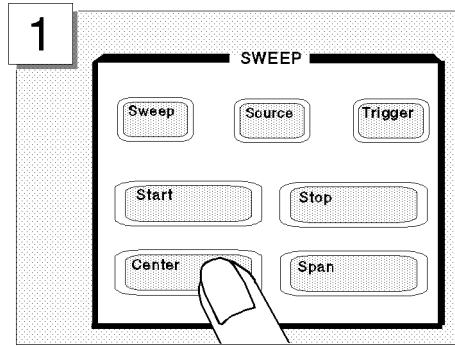


Press **Trans:FWD S21 [B/R]** to select B/R for the forward direction.

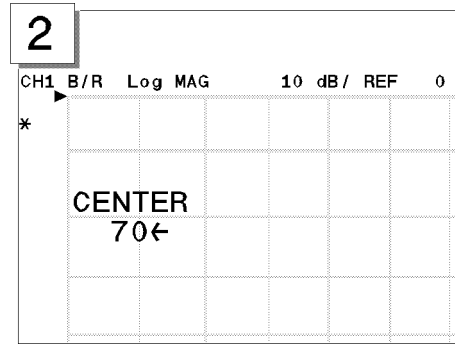
Setting the Frequency Range

To display the transmission characteristics of the 70 MHz bandpass filter, you should specify the frequency range for the measurement. In this example, set the 4395A to a 70 MHz center frequency with a 500 kHz span.

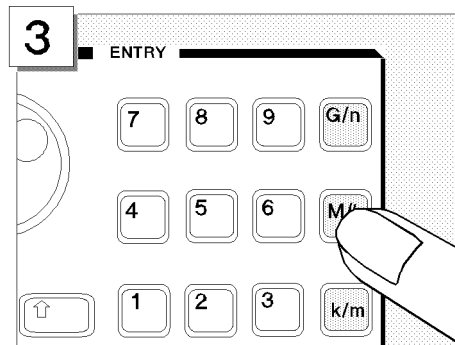
Step 2: Setting up the 4395A



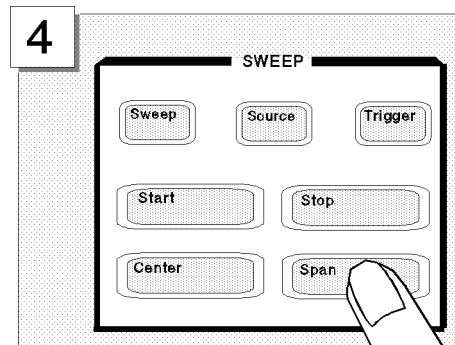
In the SWEEP block, press **Center**.



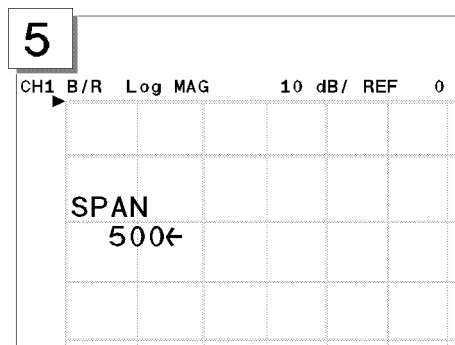
Press **7 0**.



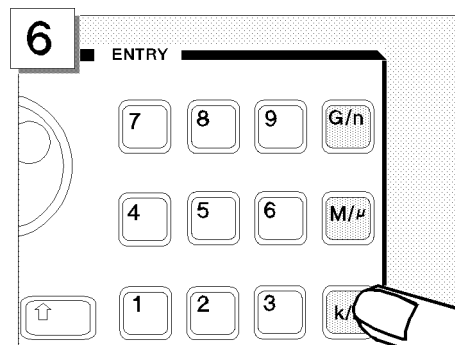
Press **M/μ**.



In the SWEEP block, press **Span**.



Press **5 0 0**.

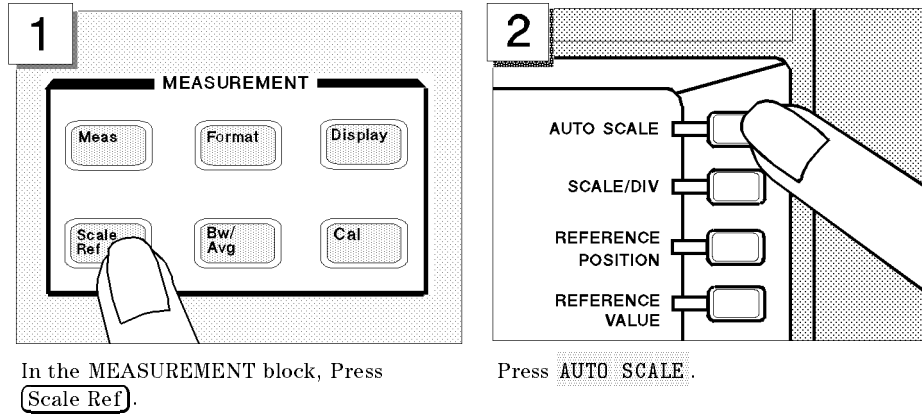


Press **k/m**.

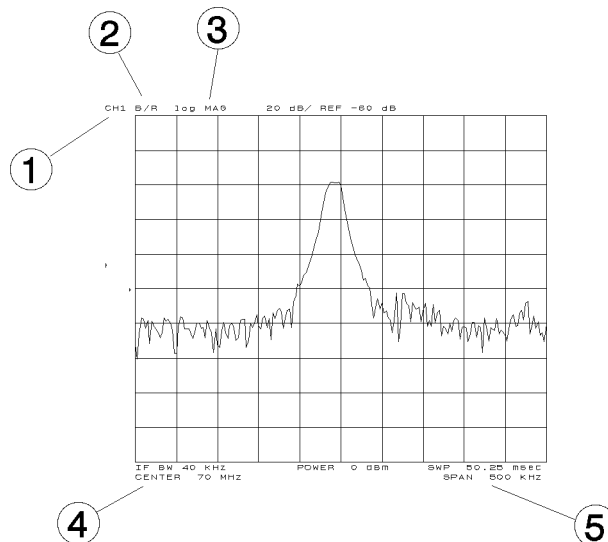
Performing the Automatic Scaling

Often, the trace obtained after specifying the frequency range is too large or too small vertically for the grid. However, by using the automatic scaling function, you can obtain the optimum vertical setting automatically.

Step 2: Setting up the 4395A



The transmission characteristics trace of the filter is displayed as shown below:



All the settings are displayed on the LCD.

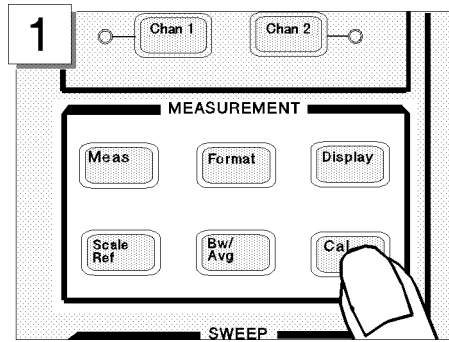
1. Active channel is set to channel 1.
2. Inputs are set to B/R.
3. Format is set to log magnitude mode.
4. Center frequency is set to 70 MHz.
5. Frequency span is set to 500 kHz.

Step 3: Making a Calibration

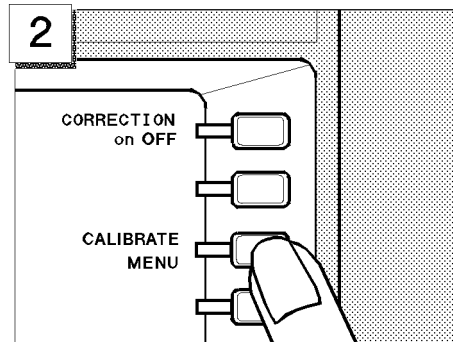
Step 3: Making a Calibration

To ensure accurate measurement results, calibrate the 4395A before making a measurement. Calibration reduces error factor due to uncertainty. In this example, you perform the response calibration to cancel a frequency response error. A THRU (BNC female-to-female connector) is necessary to perform a response calibration for the transmission measurement.

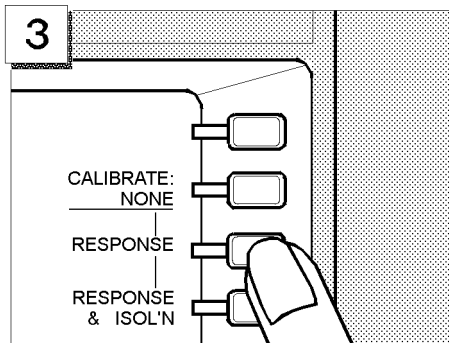
Performing a Response Calibration (for the Transmission Measurement)



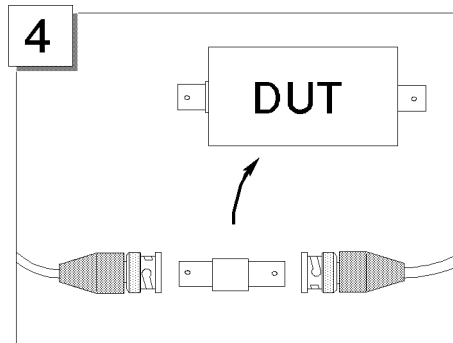
Press **Cal**.



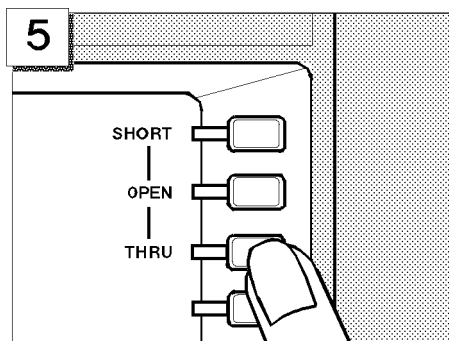
Press **CALIBRATE MENU**.



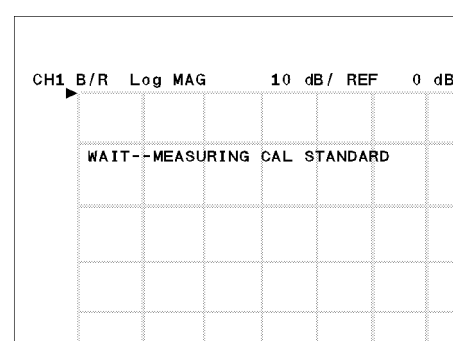
Press **RESPONSE**.



Disconnect the DUT then, connect the THRU.

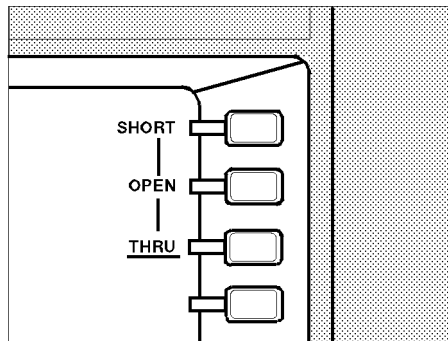


Press **THRU**.

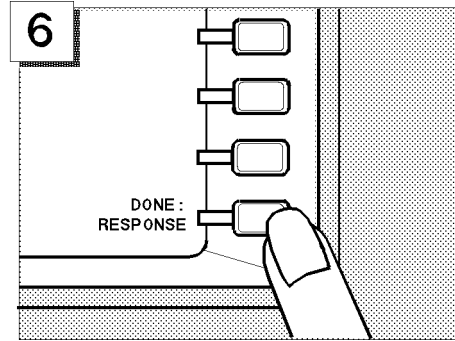


WAIT - MEASURING CAL STANDARD is displayed.

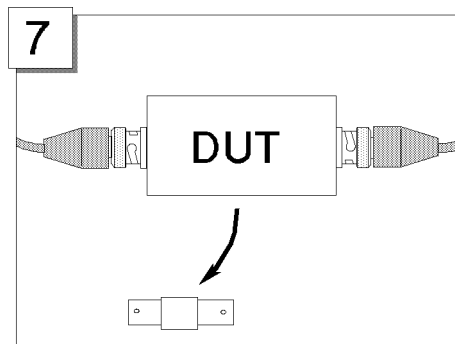
Step 3: Making a Calibration



The **THRU** softkey label is underlined when the measurement is completed.



Press **DONE: RESPONSE**.



Disconnect the **THRU** and reconnect the **DUT**.

“Cor” is displayed on the left side of the display to show that the frequency response error is corrected.

The measured value is now corrected for the frequency response error.

Note



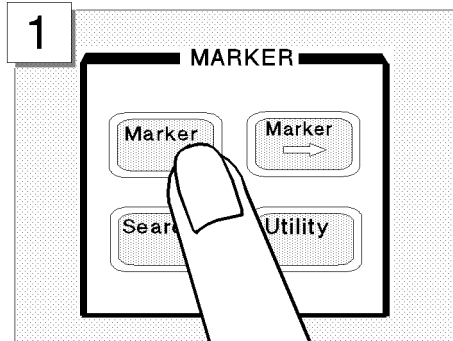
If the trace is changed, it requires an adjustment of the scale. Perform the automatic scaling again by pressing **(Scale Ref) AUTO SCALE**.

Step 4: Reading a Measurement Result

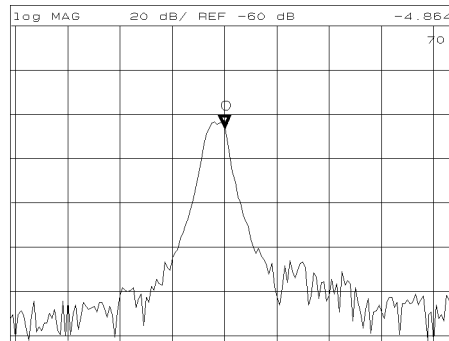
Step 4: Reading a Measurement Result

You may want to readout the measured values on the displayed trace. You can use the marker function for this purpose. The marker shows the frequency and response value at the marker point.

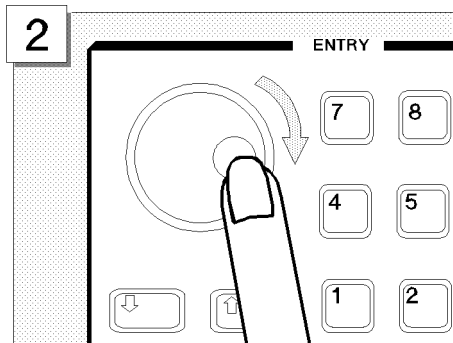
Reading a Measured Value by Using Marker



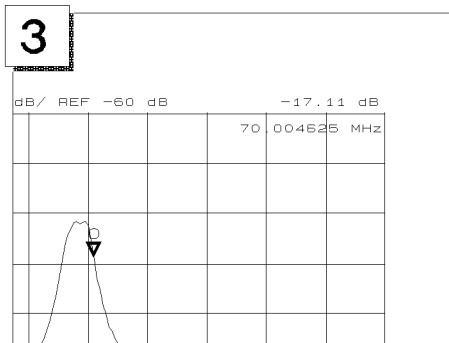
In the MARKER block, press **Marker**.



Verify a marker appears on the trace.

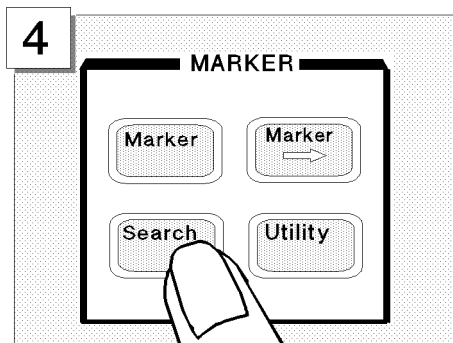


Turn the knob to the right to move the marker toward the right.

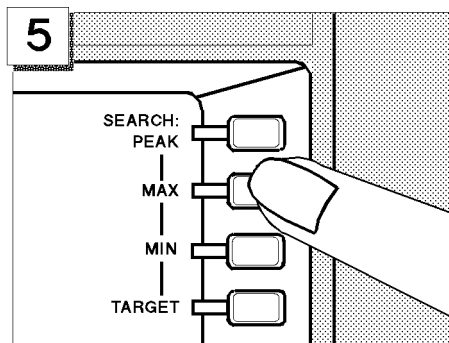


Read the values at the right top of the display.

The marker has a search function that makes it easier and faster to evaluate the trace results. For example, to search for the maximum value and its frequency on the trace:

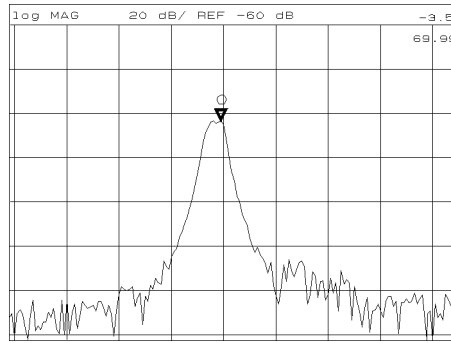


In the MARKER block, press **Search**.

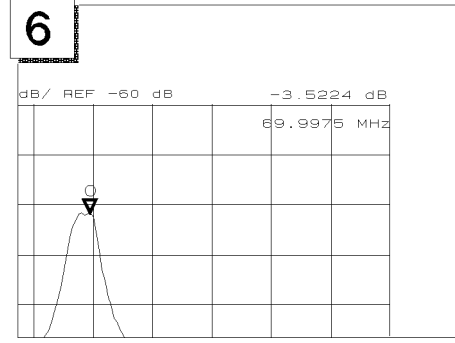


Press **MAX**.

Step 4: Reading a Measurement Result



The marker immediately moves to the maximum point on the displayed trace.



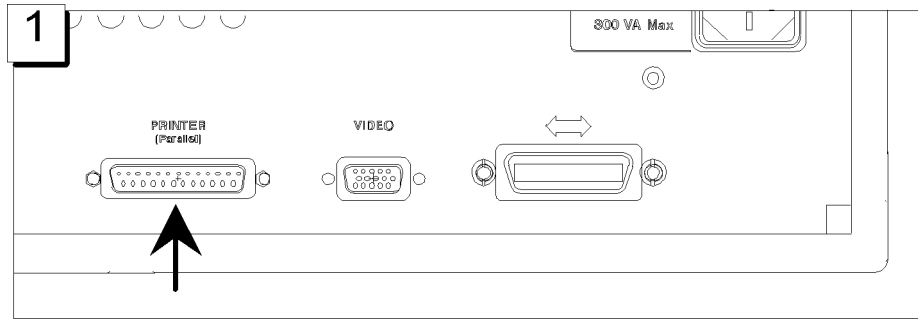
Read the frequency and response values displayed at the upper right of the display.

Step 5: Printing Out the Measurement Result

Step 5: Printing Out the Measurement Result

You may want a hardcopy of the measured results for a permanent record of the measurement. The 4395A can print out the data as a snapshot of the display or as a list of values without using any external controller.

Configuring and Connecting a Printer



Locate the parallel interface connector on the back of the 4395A.

Caution



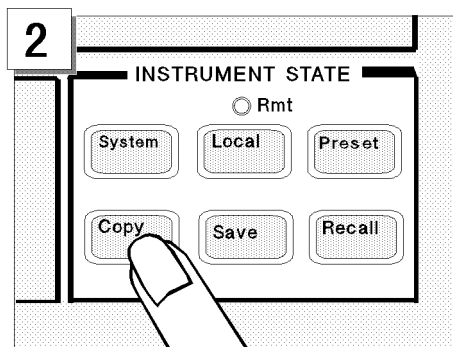
Do not connect a printer to “TEST SET - I/O INTERCONNECT”. Doing so could damage the printer.

Note

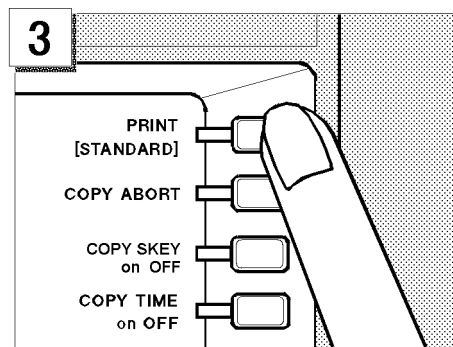


For more information about printer, see the chapter 12.

Making a Hardcopy of the LCD Display



Press **Copy**.



Press **PRINT [STANDARD]** to execute the printing.

Spectrum Analyzer Tour

In this section, you explore the spectrum analyzer mode of operation. Before starting this tour, verify the 4395A is correctly installed (see chapter 2, “Installation Guide,” if you need additional information).

Before You Leave On The Tour

On this tour, you will learn how to make a basic spectrum analyzer measurement by measuring the output signal of a signal generator.

Overview

The following is a short summary of the tour:

1. Preparing for a measurement
 - Turning ON the 4395A
 - Connecting the test signal source
2. Setting up the 4395A
 - Selecting the analyzer type
 - Setting the active channel
 - Selecting the input
 - Setting the frequency range
3. Making a Measurement
 - Reading the peak level using the marker
 - Setting the resolution bandwidth to see low level signals
 - Searching for harmonics using the search function
4. Saving and recalling the 4395A settings
 - Preparing the disk
 - Saving 4395A settings
 - Entering the file name
 - Recalling the 4395A settings

After you finish this tour, you will understand how to make a basic measurement in the spectrum analyzer mode of operation.

Spectrum Analyzer Tour

Required Equipments

To perform all the steps in this tour, you must have the following equipments:

- 4395A Network/Spectrum/Impedance Analyzer
- Test signal source (-20dBm , 20MHz , sine wave)**
- N to BNC Adapter ($50\ \Omega$)
- BNC cable
- 3.5 inch 2HD Blank Disk

** If you wish to test some other test signal, you will need to change particular measuring conditions, such as the frequency range, according to the general characteristics of the signal.

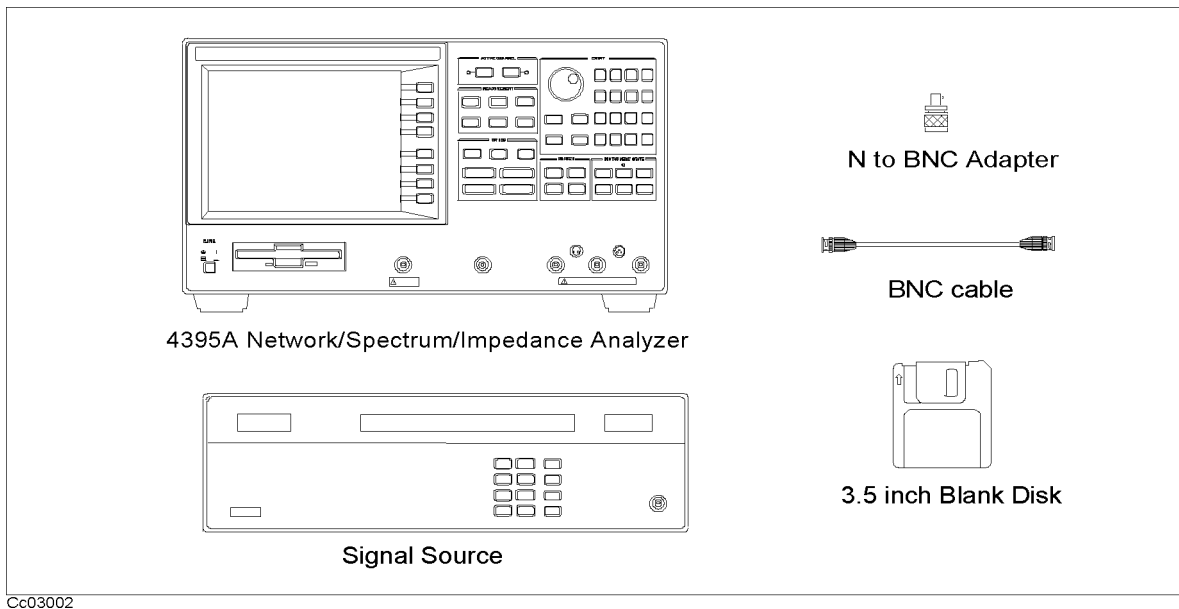
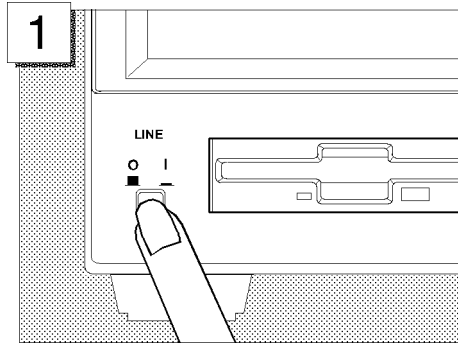


Figure 3-4. Required Equipments

Step 1: Preparing for a Measurement

Turning ON the 4395A

Verify the power source setting is correct before you turning ON the 4395A. If necessary, see chapter 2, “Installation Guide.”

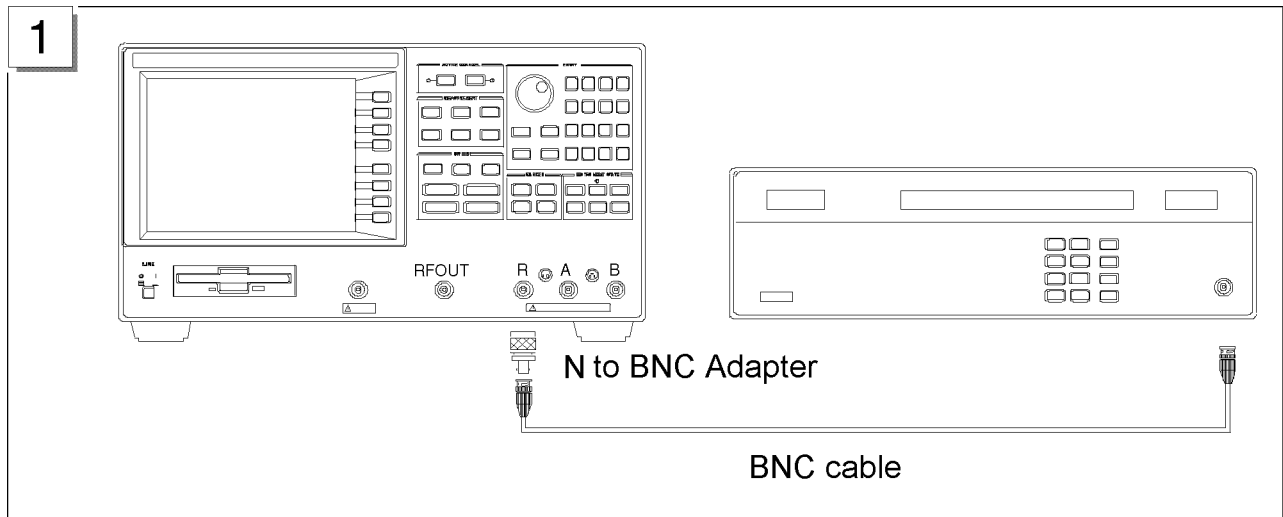


Press the LINE switch

The 4395A performs a power on self-test. About 20 seconds later, the model name, revision number, and other information should appear on the LCD to indicate that the 4395A has normally started up.

Connecting the DUT

Connect the test signal source (-20 dBm, 20 MHz) to Input R of the 4395A.



Step 2: Setting Up the 4395A

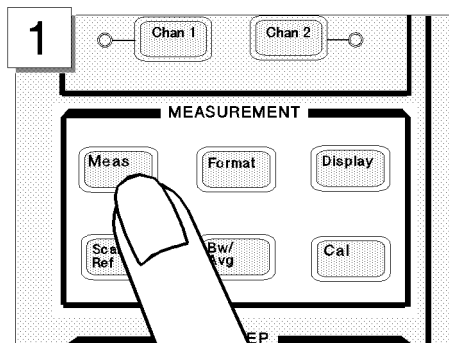
Step 2: Setting Up the 4395A

In this step, you will set the following parameters:

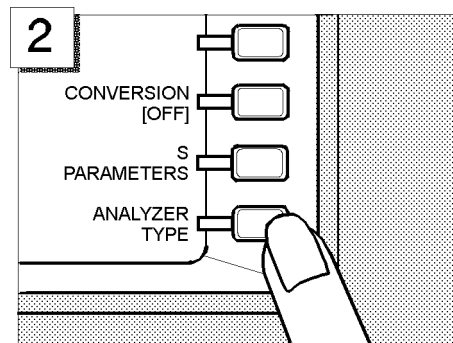
Active channel	Channel 2
Analyzer type	Spectrum analyzer mode
Input	R input
Frequency Range	0 Hz to 80 MHz

Setting the Analyzer Type

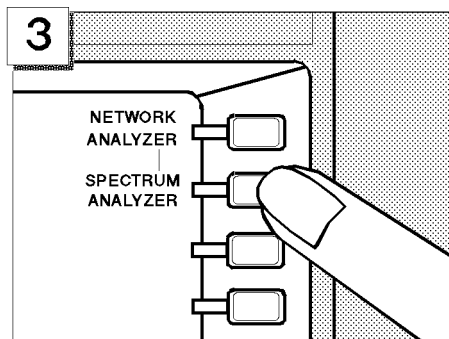
To use the spectrum analyzer mode, you must set the analyzer type to the spectrum analyzer mode after selecting an active channel.



In the MEASUREMENT block, press **Meas**.



Press **ANALYZER TYPE**.



Press **SPECTRUM ANALYZER**.

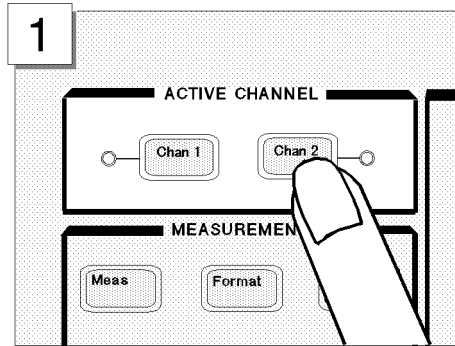
Note



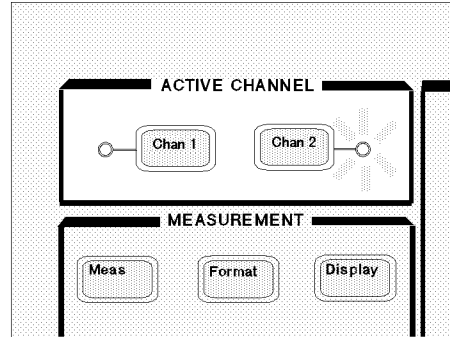
Changing the analyzer type presets the 4395A for the active channel. If you want to keep the current measurement settings when changing the analyzer type, first set the other channel to active.

Setting the Active Channel

The 4395A has two measurement channels. This allows you to have two different measurement setups. Other selections you make on the front panel affect only the active channel. To set the active channel to channel 2:



In the ACTIVE CHANNEL block, press **Chan 2**.



Verify the Chan 2 active channel indicator lights.

Note

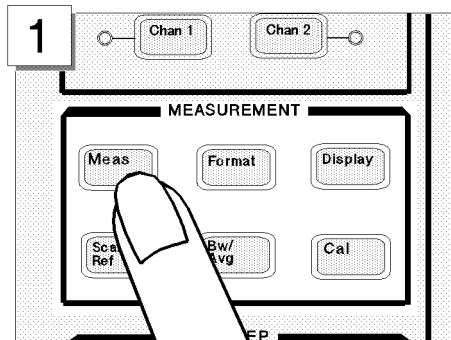


All selected settings are stored separately for each channel. You must select an active channel (1 or 2) before you can change the measurement setup for that channel.

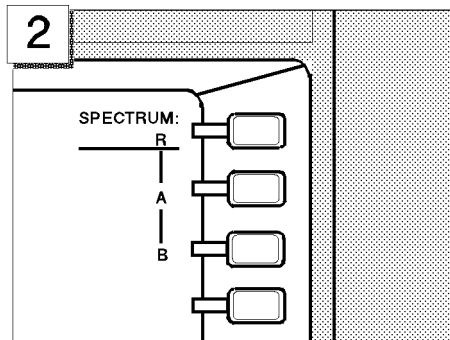
Selecting the Input

The 4395A has three inputs; R, A, and B. Any of the inputs (R, A, or B) can be used for a spectrum measurement.

In the spectrum analyzer mode, the R input is selected by default. In the following steps, you verify the R input is selected.



In the MEASUREMENT block, press **Meas**.

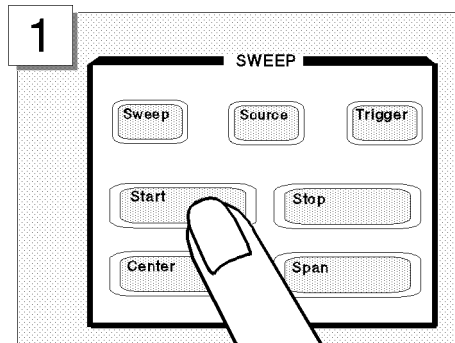


Verify the R in **SPECTRUM: R** is underlined. (This shows that the R input is selected for a spectrum analyzer measurement.)

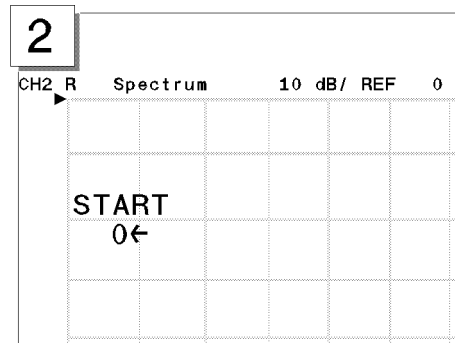
Step 2: Setting Up the 4395A

Setting the Frequency Range

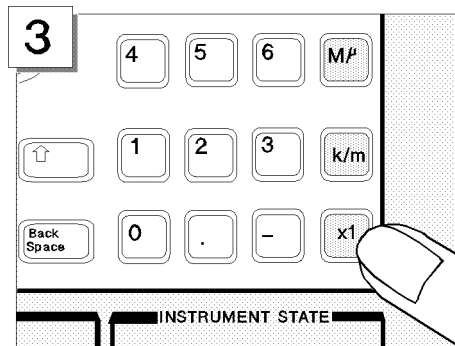
The CAL OUT signal (20 MHz at -20 dBm) is connected as test signal source. To see this signal on display, you must set the appropriate frequency range (in this case, 0 to 80 MHz):



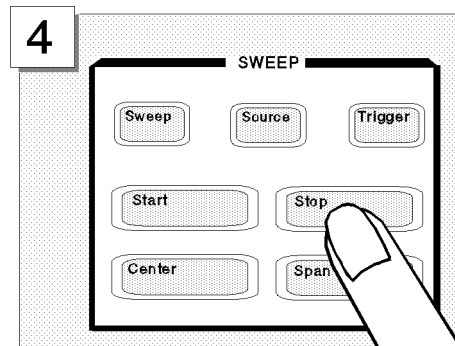
In the SWEEP block, press **(Start)**.



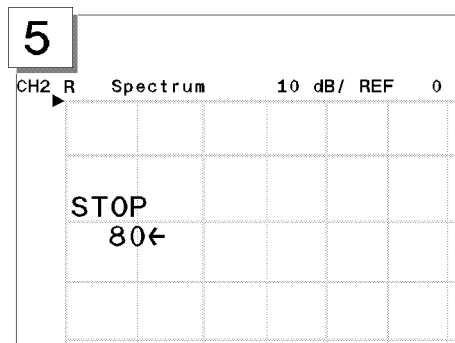
Press **(0)**.



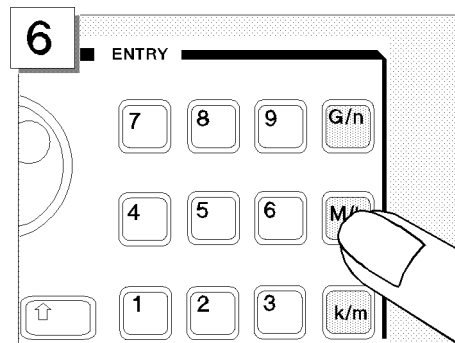
Press **(x1)**.



Press **(Stop)**.



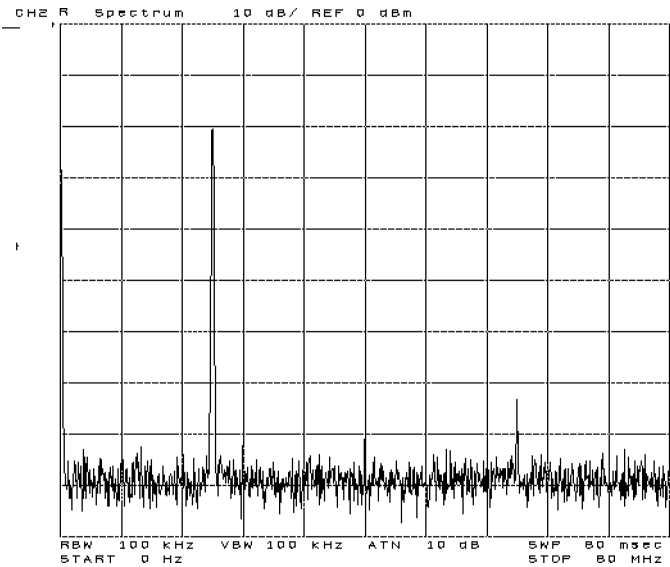
Press **(8) (0)**.



Press **(M/μ)**.

Verify the 20 MHz signal is displayed as shown below:

Step 2: Setting Up the 4395A

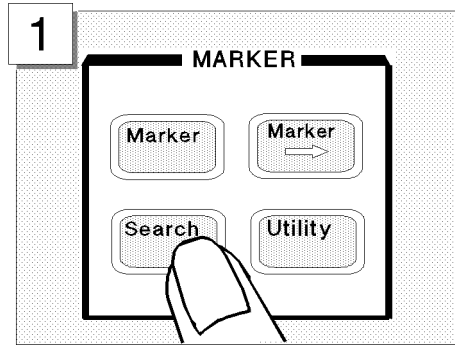


Step 3: Making a Measurement

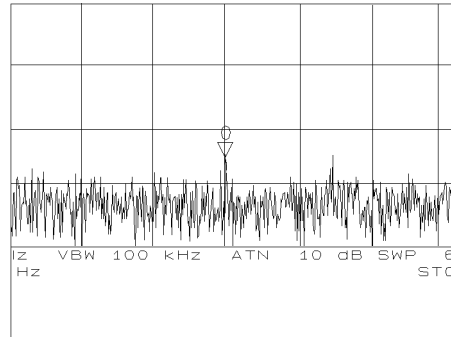
Step 3: Making a Measurement

Reading the Peak Level Using the Marker

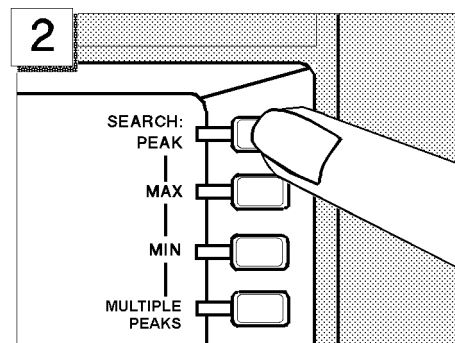
Let's try to read peak signal level by using the marker:



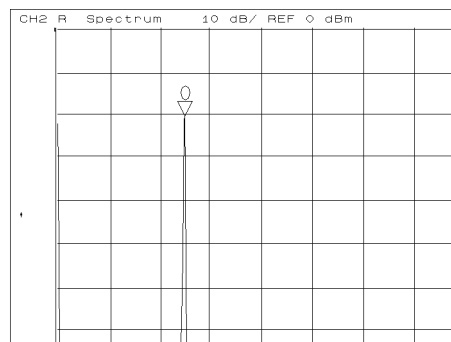
Press **Search**.



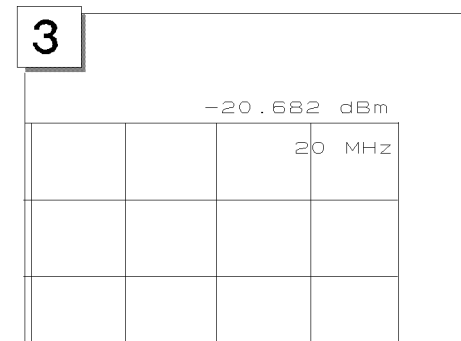
Marker appears on trace.



Press **SEARCH:PEAK**.



Marker moves to the top of the CAL OUT signal.



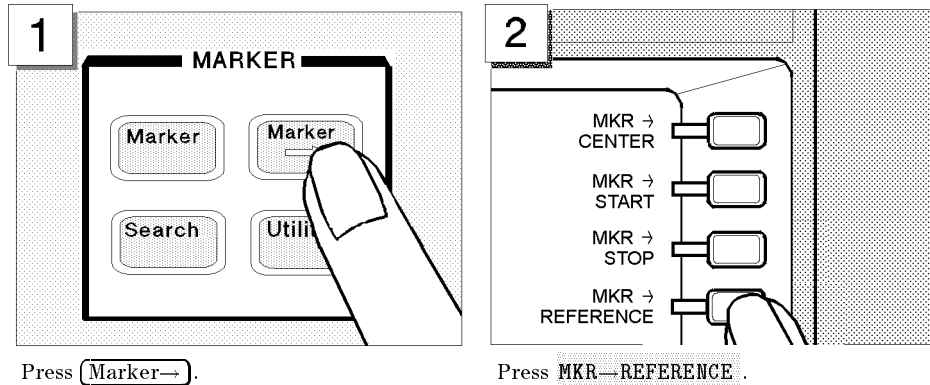
Read the marker value shown at the upper right of grid.

Step 3: Making a Measurement

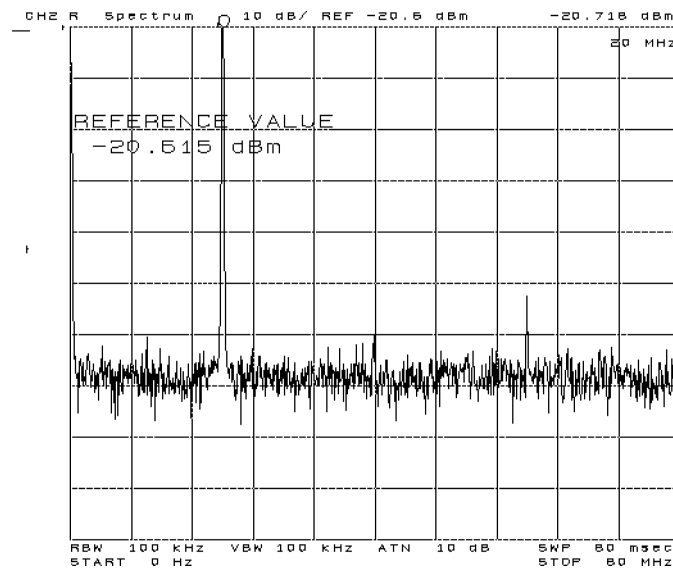
Setting the Resolution Bandwidth to See Low Level Signals

To see lower level signals that are approximately the same level as the noise floor, use a narrow resolution bandwidth (RBW) setting.

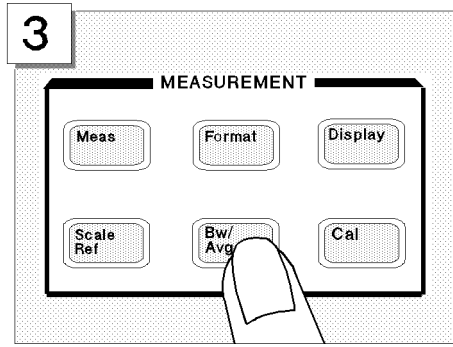
Before you set the RBW, set the maximum peak level as the reference level. This increases the visibility of the lower level signal. This technique is useful when you are measuring two signals and one is very close to the noise level.



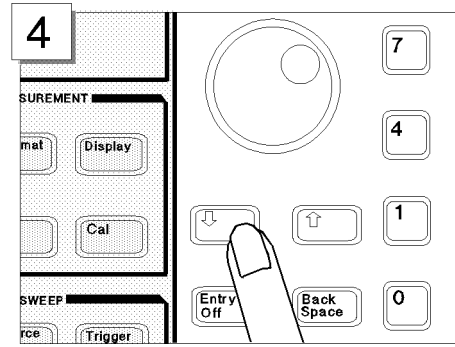
The trace moves upward to place the tip of the maximum peak at the top line of the grid.



Step 3: Making a Measurement

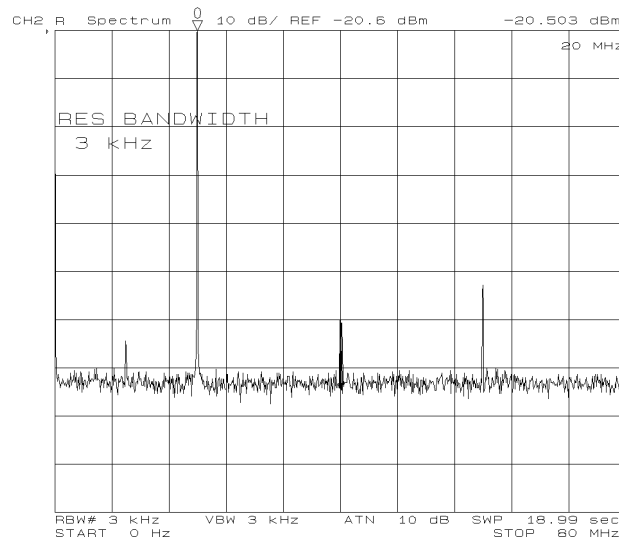


Press **Bw/Avg**.



Press **3** to narrow RBW setting to 3 kHz.

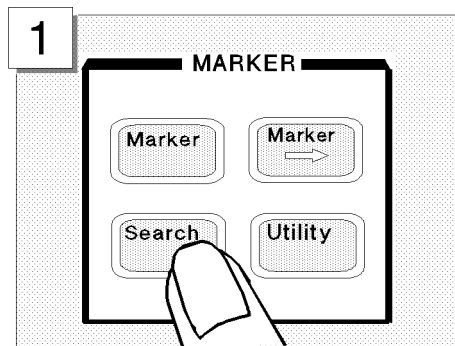
Now, with the noise floor level lowered by narrowing the resolution bandwidth, the second and third harmonics can be seen as shown below:



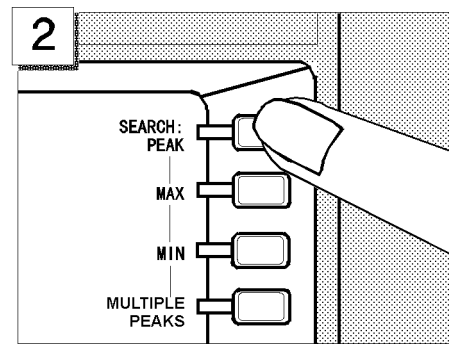
Step 3: Making a Measurement

Searching for Harmonics Using the Search Function

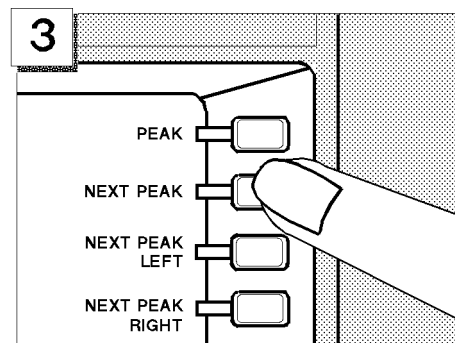
You can easily readout a harmonics' frequency and level by using the peak search function:



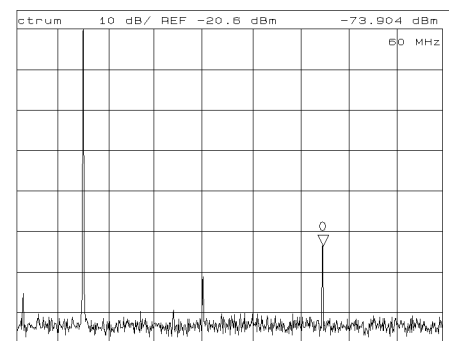
Press **Search**.



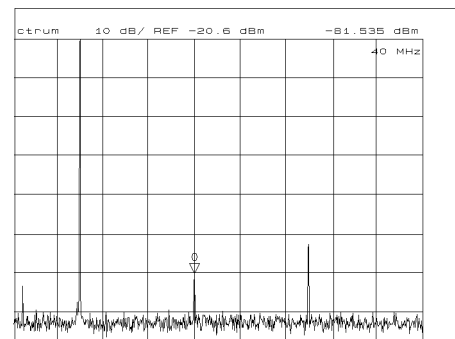
Press **SEARCH:PEAK**.



Press **NEXT PEAK**.



The marker moves to the third (or second) harmonic.



To move the marker to the second (or third) harmonic, press **NEXT PEAK** again.

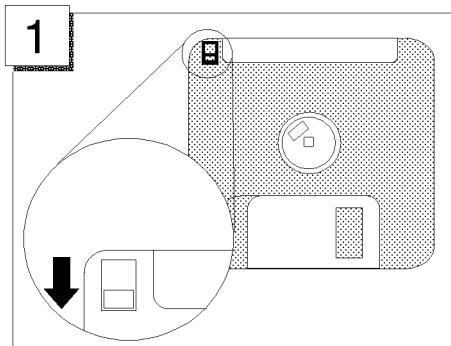
Step 4: Saving and Recalling 4395A Settings

Step 4: Saving and Recalling 4395A Settings

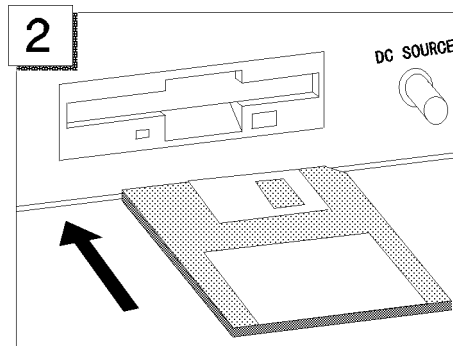
You can store the settings or measurement data on a 3.5 inch disk using the 4395A's disk drive. In this tour, you save and recall the settings that you selected previously in this tour.

Preparing the Disk

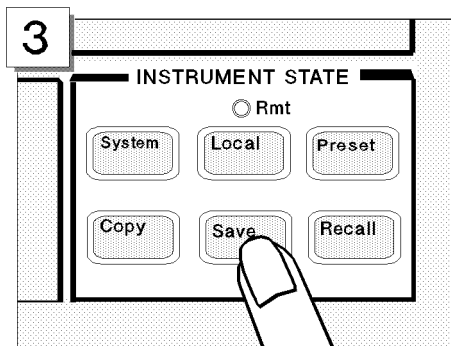
To use a disk, you must first initialize it by performing the following steps:



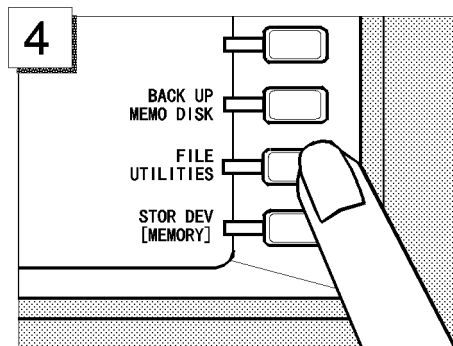
Verify the disk is not write protected.



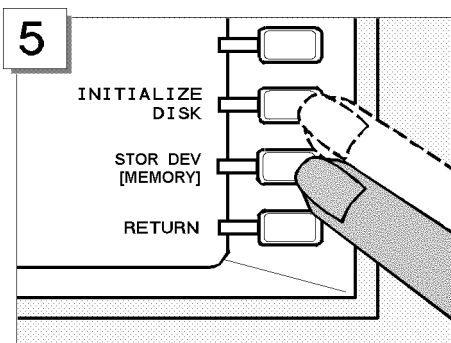
Insert the disk into the disk drive



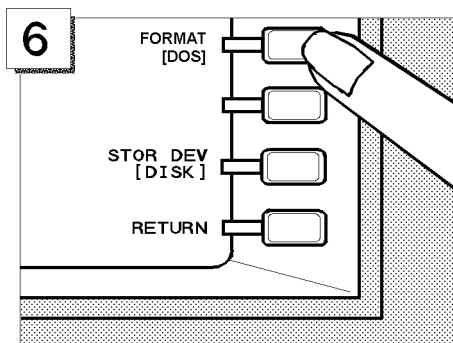
Press **Save**.



Press **FILE UTILITIES**.

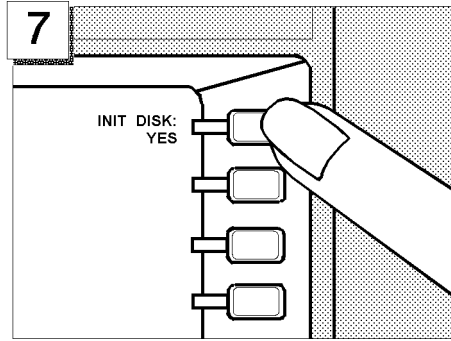


Toggle **STOR DEV [MEMORY]** to **[DISK]**, and press **INITIALIZE DISK**

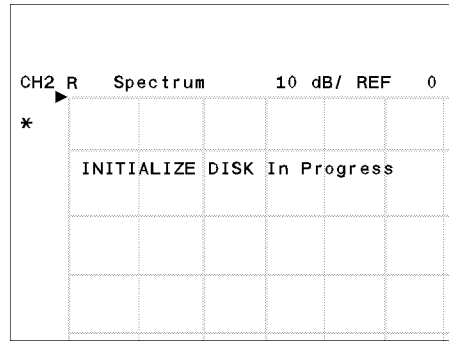


Toggle **FORMAT [DOS]** to **[LIF]**.

Step 4: Saving and Recalling 4395A Settings



Press **INIT DISK: YES**.



The message, "INITIALIZE DISK In Progress," is displayed. After the disk is initialized, this message is turned off.

Note



The 4395A can use either a LIF (Logical Interchange Format) or a MS-DOS (Disk Operating System) format disk.

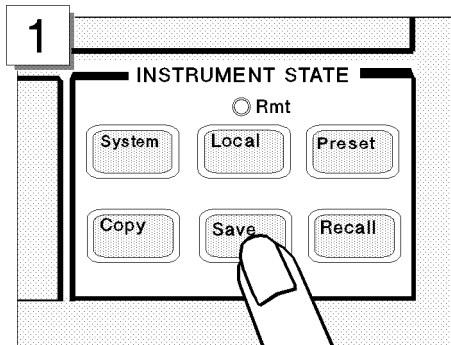
Note



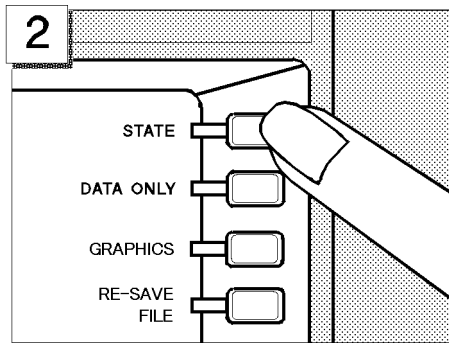
The 4395A can initialize a 1.44 MB 3.5 inch flexible disk only.

Saving 4395A Settings

In the following example, use "SATOUR" as the file name of the 4395A settings you want to save.



Press **Save**.



Press **STATE**.

The 4395A requests the file name you want to use for the saved settings.

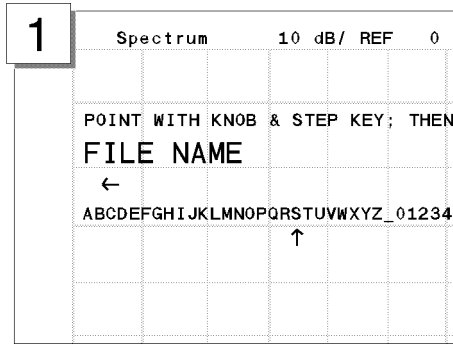
Entering the File Name

Note

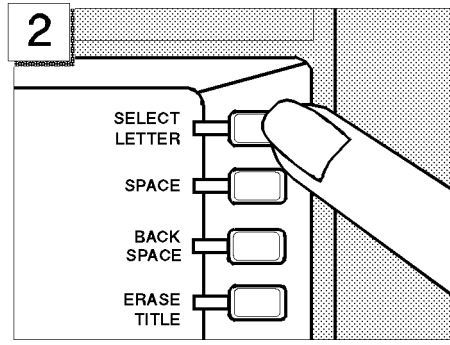


If a keyboard is connected, you can use it for file name entry. If not, use the front-panel controls as described in the following steps.

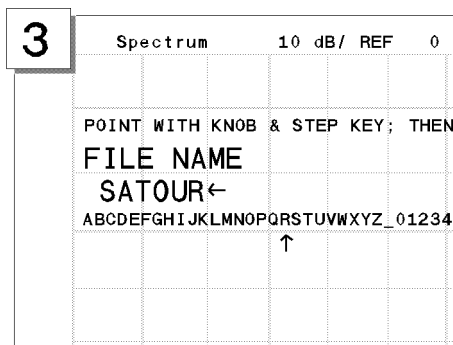
Step 4: Saving and Recalling 4395A Settings



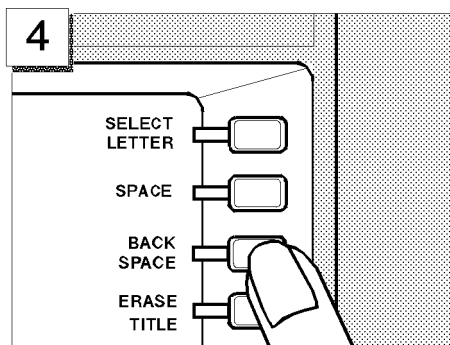
Turn the rotary knob to move the arrow below the first character, S.



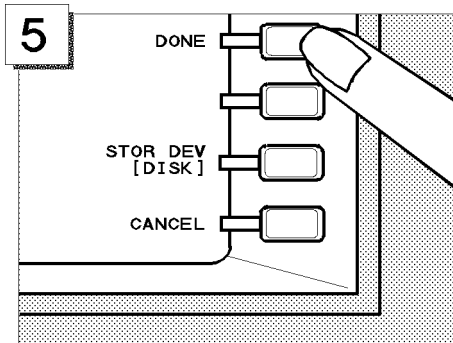
Press **SELECT LETTER**.



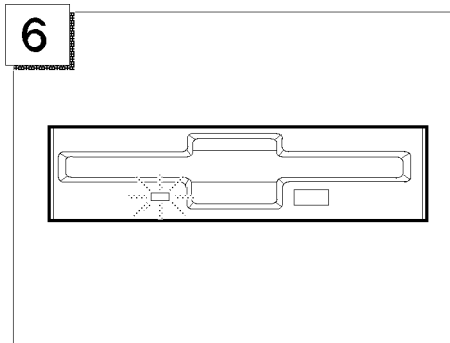
Keep entering characters until SATOUR is entered.



If you enter a wrong character, press **BACK SPACE** to erase the character.



To complete the file name entry, press **DONE**.



Verify the disk access indicator lights (this shows that the 4395A is saving the settings to the disk).

Note



The file name for a LIF format can be up to 10 characters long. However, with the 4395A, the last 2 characters are reserved for a suffix. Therefore, you can enter a file name of up to 8 characters. Either upper or lower case is recognized in the LIF format.

A file name for a MS-DOS(DOS) format consists of a file name and an extension. The file name can be up to 8 characters long and the extension contains up to 3 characters. A period separates the extension from the file name. The extension

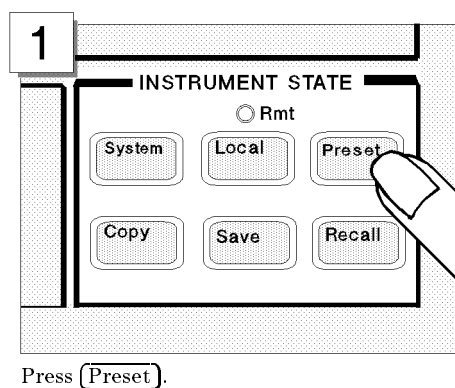
Step 4: Saving and Recalling 4395A Settings

part reserved by the 4395A. Therefore, you can enter a file name of up to 8 characters. The file name is not case sensitive in the DOS format.

Recalling the 4395A Settings

You can recall the file containing the saved 4395A settings anytime you want. This is true, even if you change the current 4395A settings. In this example, you will preset the 4395A and then recall the settings in the SATOUR file.

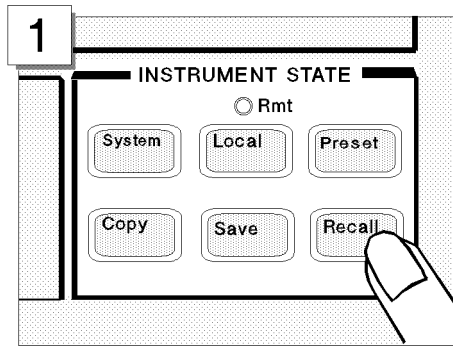
Presetting



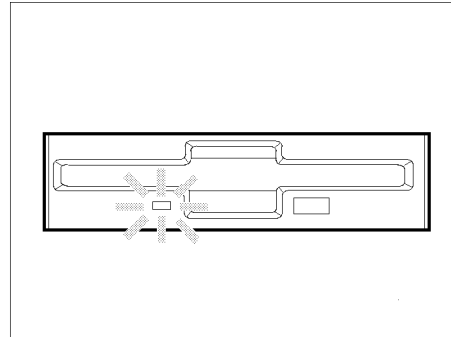
The 4395A is set to the preset conditions. However, the 4395A settings from the previous examples are stored in the SATOUR file on the disk.

Step 4: Saving and Recalling 4395A Settings

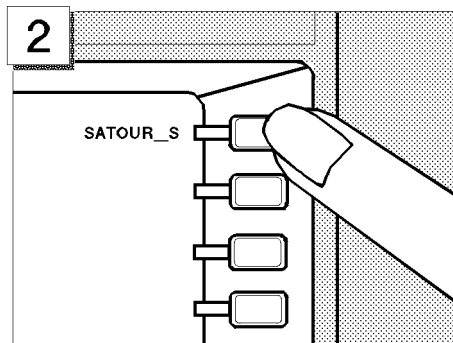
Recalling the SATOUR file.



Press **Recall**.



The disk access lamp lights.



The stored file is listed in the softkey label area. Press **SATOUR_S** to recall the 4395A settings that you saved.

Note



Suffix, “_S,” means the 4395A settings are saved. If you save the 4395A settings in a DOS format, an extension, “.sta,” is appended to the file name.

After the disk access lamp goes out, all 4395A settings that you set are recalled. You can verify them on the display. If you want to know what settings are saved, see chapter 8.

Impedance Analyzer Tour

In this section, you explore the impedance analyzer mode of operation. Before starting this tour, make sure that your 4395A is correctly installed (see chapter 1, “Installation and Setup Guide,” if you need additional information).

Note



Your 4395A must be equipped with option 010 to serve as an impedance analyzer. Otherwise, impedance analyzer mode is not available.

Before You Leave On The Tour

Through this tour, you will learn how to make a basic impedance analyzer measurement by measuring the impedance characteristics of a chip capacitor.

Overview

The following is a short summary of the tour:

1. Preparing for a measurement
 - Connecting the impedance test kit
 - Turning ON the 4395A
2. Setting up the 4395A
 - Selecting the analyzer type
 - Activating Channel 1
 - Setting the sweep parameters
 - Setting the output level
 - Setting the IF bandwidth
3. Calibrating the 4395A
 - OPEN calibration
 - SHORT calibration
 - LOAD calibration
4. Connecting and setting up a test fixture
 - Connecting the fixture
 - Setting the electrical length
 - Fixture compensation
5. Carrying out impedance measurement
 - Selecting the measurement parameters for Channel 1
 - Connecting the DUT
 - Performing the Automatic Scaling
6. Switching from Channel 1 to Channel 2
7. Selecting the measurement parameters for Channel 2
8. Dual channel display

Impedance Analyzer Tour

After you finish this tour, you will understand how to make a basic measurement in impedance analyzer mode. If you want to learn how to perform more complex tasks, refer to Chapters 5 through 9.

Required Equipments

To perform all the steps in this tour, you must have the following equipments:

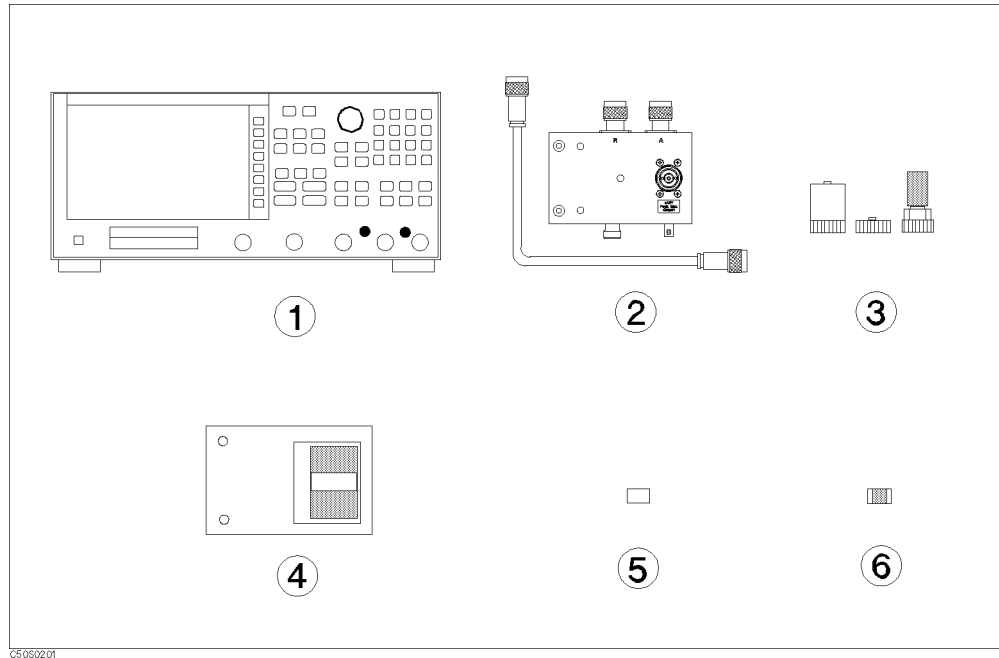


Figure 3-5. Required Equipments

1. 4395A Network/Spectrum/Impedance Analyzer with Option 010 equipped
2. 43961A Impedance Test Kit
3. Calibration kit (included in the 43961A)
4. Test fixture of your choice
5. Short device for the test fixture
6. DUT (chip capacitor)*

If you wish to test some other device instead of a chip capacitor, you will need to change particular measuring conditions, such as the frequency range, according to the general characteristics of the DUT.

Step 1: Preparing for the Measurement

Connecting the Impedance Test Kit

The 4395A requires the 43961A Impedance Test Kit to apply signals to, and measure the impedance characteristics of, a DUT (see Figure 3-6). To connect the 43961A Impedance Test Kit, follow these steps:

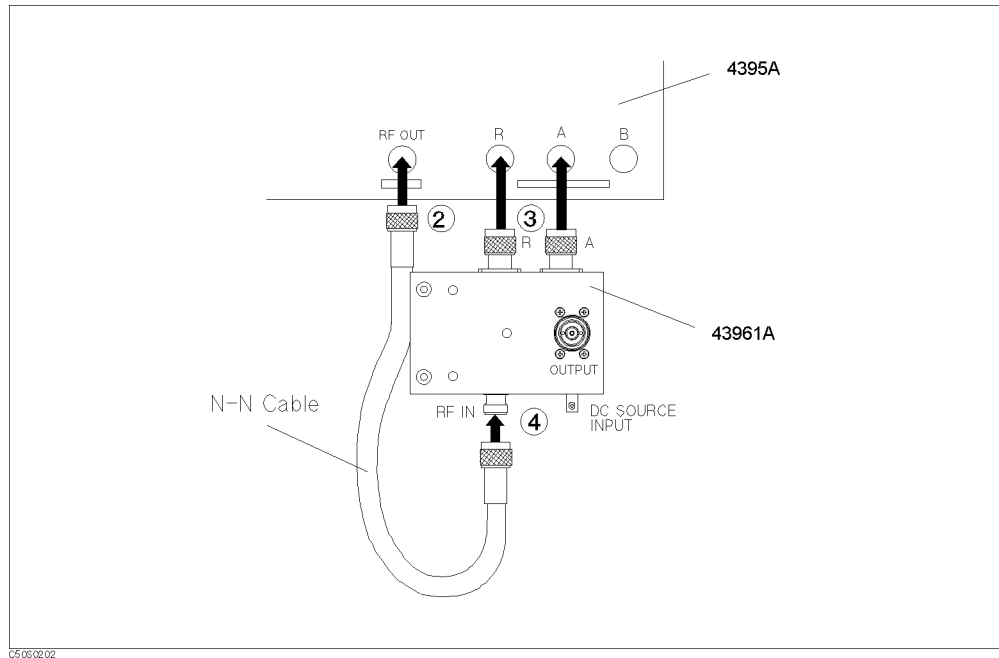


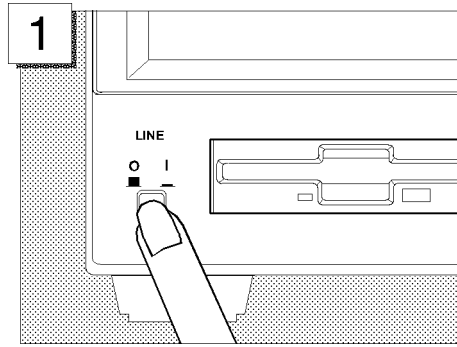
Figure 3-6. Connecting the Impedance Test Kit

1. Make sure that the power to the 4395A is OFF.
2. Connect the N-N cable to the 4395A's RF OUT port.
3. Make sure that the 43961A's APC7 connector sleeve is completely exposed.
4. Connect the two connectors of the 43961A to the R and A ports of the 4395A, by tightening the two connectors little by little alternately while holding the test kit.
5. Connect the other end of the N-N cable to the RF IN port of the 43961A.

Turning ON the 4395A

Verify the power source setting is correct before you turning ON the 4395A. If necessary, see chapter 2, "Installation Guide."

Impedance Analyzer Tour

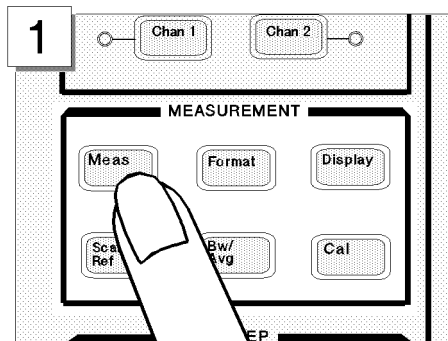


Press the power switch.

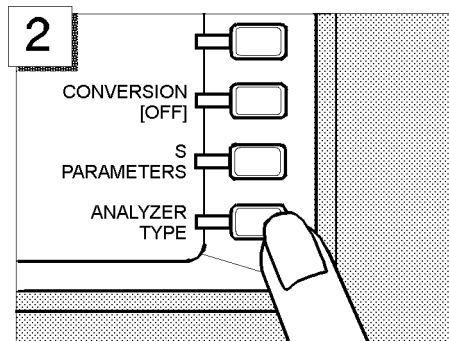
The 4395A performs a power on self-test. About 20 seconds later, the model name, revision number, and other information should appear on the LCD to indicate that the 4395A has normally started up.

Setting Up the 4395A Setting the Analyzer Type

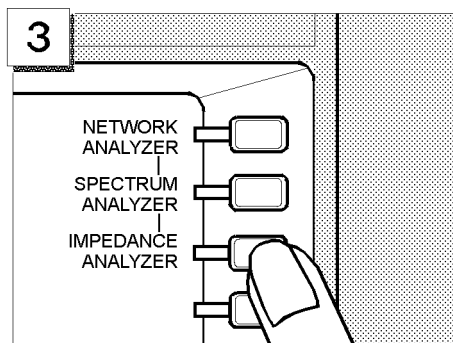
Available analyzer modes are listed in the menu under the **ANALYZER TYPE** softkey. You can use the 4395A as an impedance analyzer by selecting the corresponding analyzer mode from that menu. Follow these steps:



Press the **Meas** key in the MEASUREMENT block.



Choose **ANALYZER TYPE**.



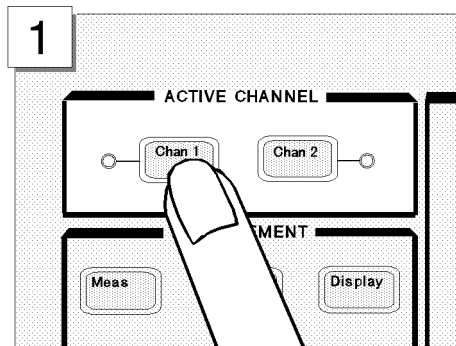
Choose **IMPEDANCE ANALYZER**.

Activating Channel 1

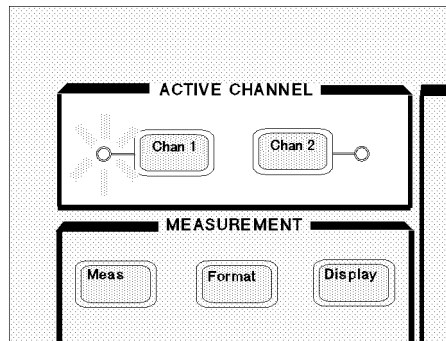
The 4395A has two channels, each of which can retain different measuring conditions. To demonstrate how effectively you can use these two channels to perform impedance measurement, this tour uses the following scenario:

1. Activate Channel 1, and set the parameters that apply to Channel 1
2. Switch to Channel 2, and set the parameters that apply to Channel 2 (see “Step 6: Switching from Channel 1 to Channel 2”)
3. Display both channels in parallel (see “Step 8: Dual Channel Display”)

First, activate Channel 1 through these steps:



Press the **Chan 1** key in the ACTIVE CHANNEL block.



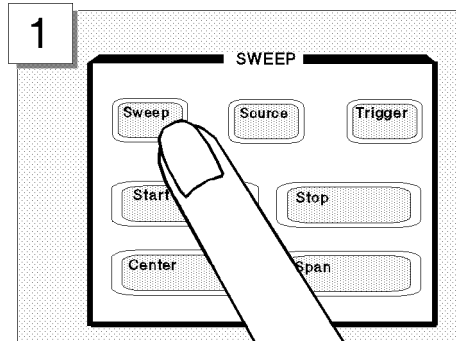
Make sure that the indicator lamp beside the **Chan 1** key is ON.

Impedance Analyzer Tour

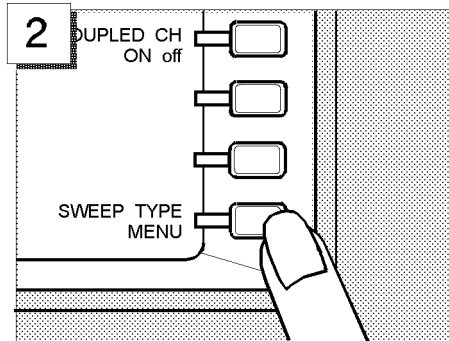
Setting the Sweep Parameters

This tour assumes that the frequency is being swept from 100 kHz to 500 MHz.

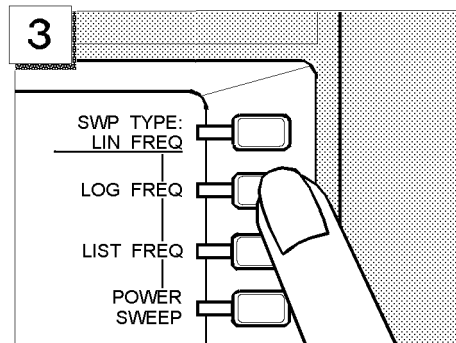
Follow these steps:



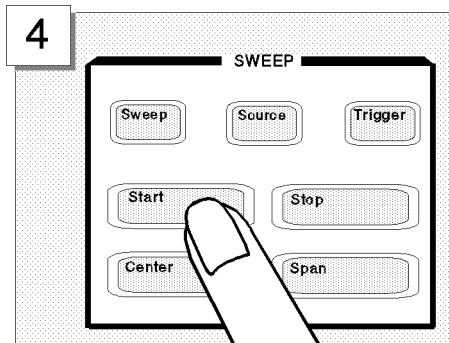
Press the **Sweep** key.



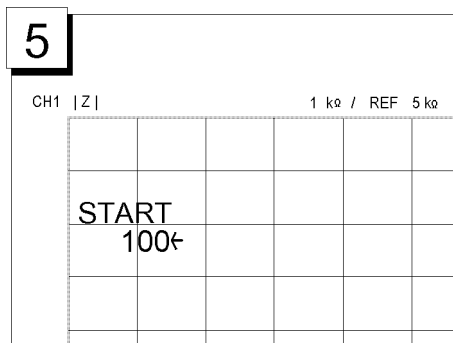
Choose **SWEEP TYPE MENU** to access the sweep type menu.



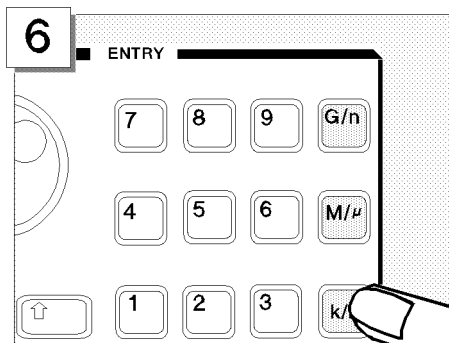
Choose **LOG FREQ** to have the 4395A accept log frequency settings.



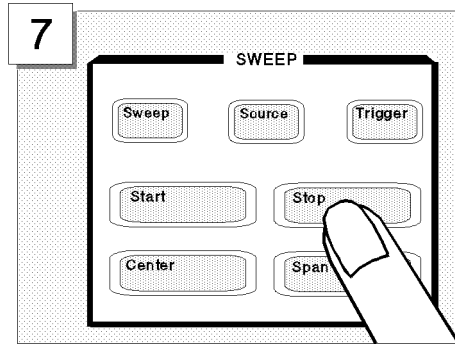
Press the **Start** key.



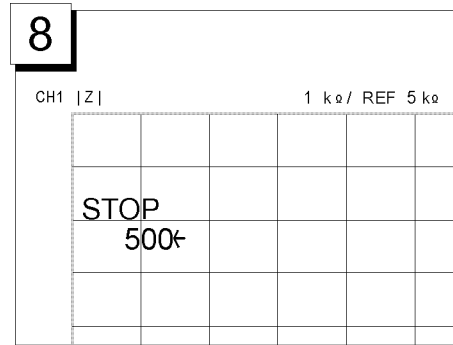
To specify the frequency at which to start the sweep, enter **1 0 0** using the numeric keys.



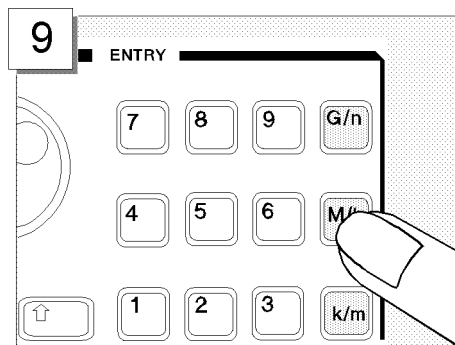
Press the **(k/m)** key to indicate that the unit is kHz.



Press the **STOP** key.



To specify the frequency at which to stop the sweep, enter **5 0 0** using the numeric keys.



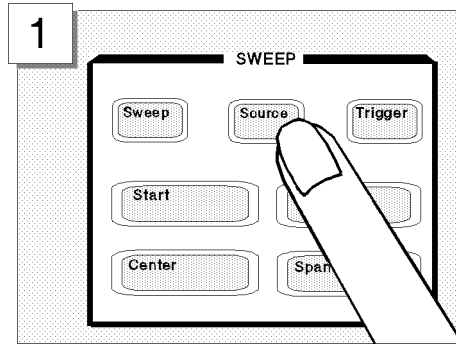
Press the **M/μ** key to indicate that the unit is MHz.

Setting the Output Level

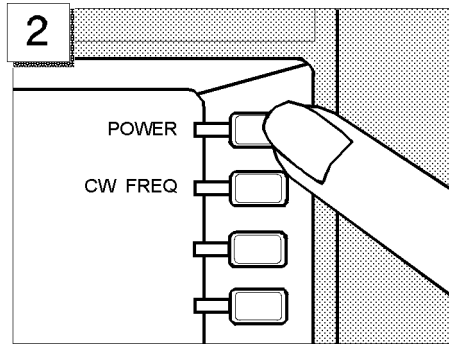
This tour assumes an output level of +0.5 dBm.

Follow these steps:

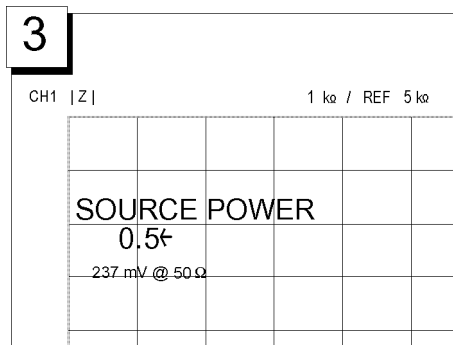
Impedance Analyzer Tour



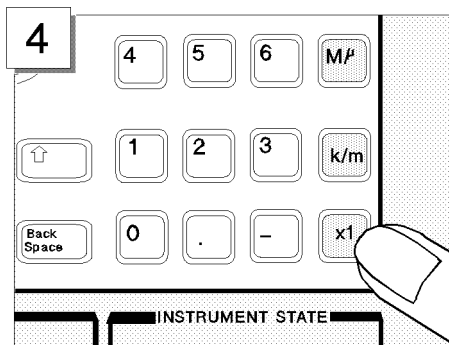
Press the **Source** key.



Choose **POWER**.



Enter **0** **.** **5** using the numeric keys.

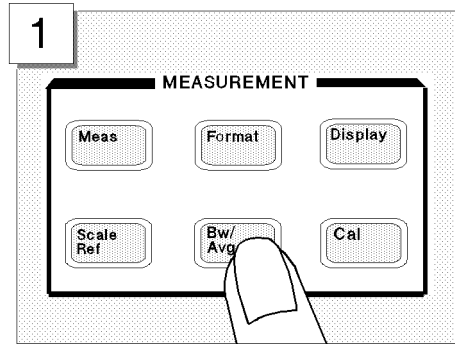


Press the **x1** key.

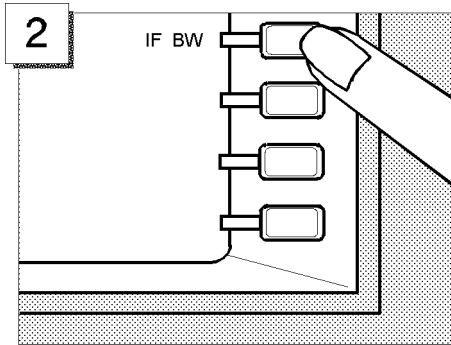
Setting the IF Bandwidth

This tour assumes an IF bandwidth of 300 Hz.

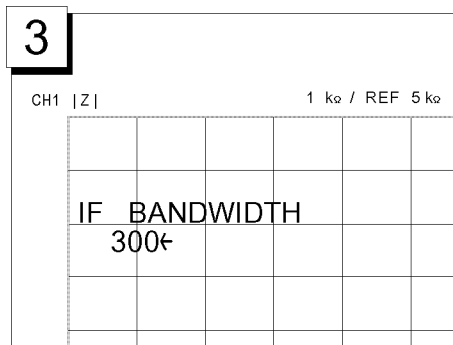
Follow these steps:



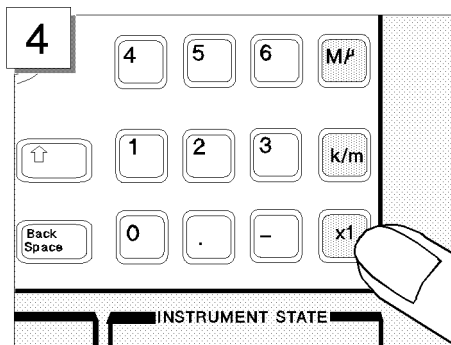
Press the **Bw/Avg** key.



Choose **IF BW**.



Enter **3 0 0** using the numeric key.



Press the **x1** key.

Note A smaller IF bandwidth reduces trace noise, but increases measuring time.

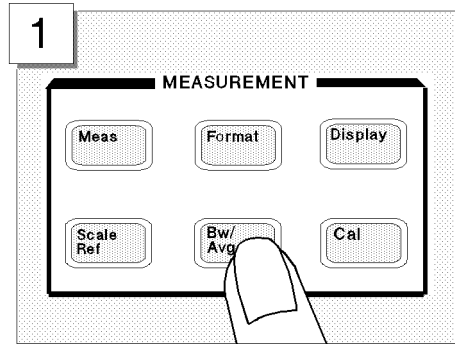


Setting the Averaging Factor

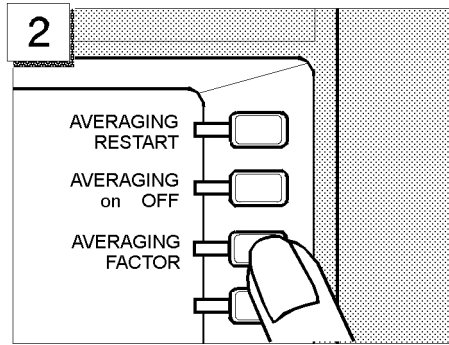
This tour assumes the averaging factor of 8.

Follow these steps:

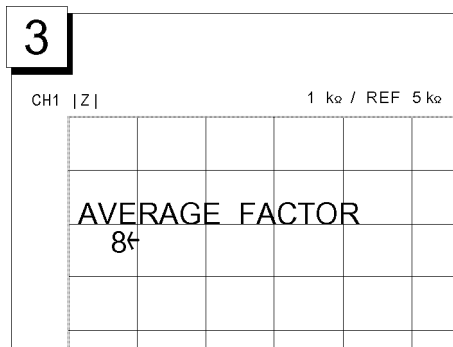
Impedance Analyzer Tour



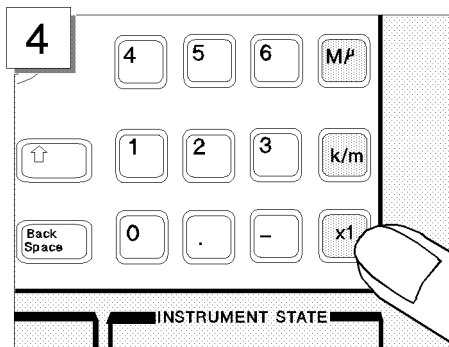
Press the **Bw/Avg** key.



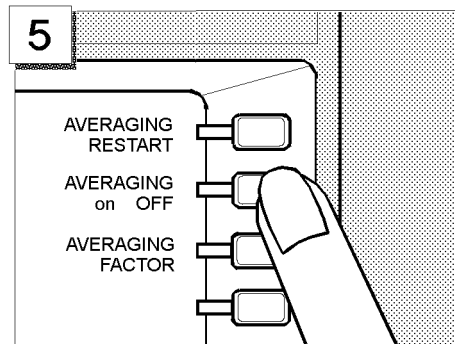
Choose **AVERAGING FACTOR**.



Enter **8** using the numeric key.



Press the **x1** key.



Toggle **AVERAGING on OFF** to **ON off**.

Note



When you perform impedance measurement with the 43961A, you must set IF bandwidth equal to or less than 300 Hz and averaging factor equal to or greater than 8.

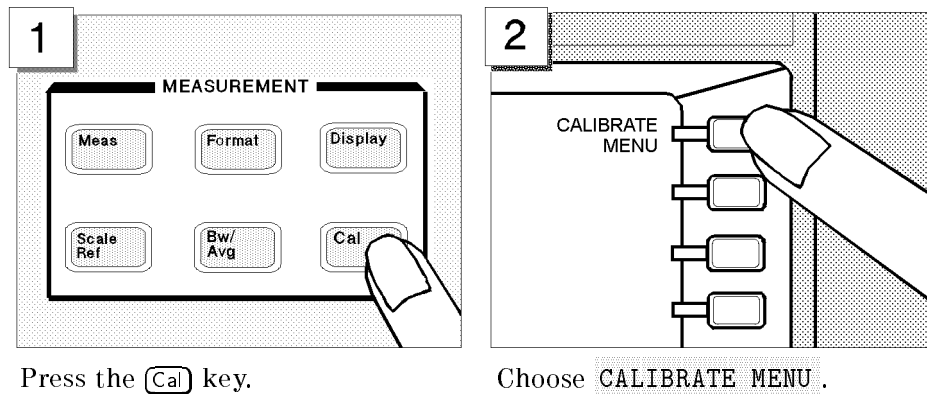
Step 3: Making a Calibration

Calibrating the 4395A in impedance analyzer mode requires that the 4395A be connected with the 43961A impedance test kit. A proper calibration is required for the 4395A to perform measurements within the guaranteed accuracy range.

For impedance analyzer mode, the 4395A must be calibrated for each of the following three circuit states:

- OPEN (0 S termination)
- SHORT (0 Ω termination)
- LOAD (50 Ω termination)

To calibrate the 4395A, access the calibration menu through these steps:



With the calibration menu displayed on the LCD screen, calibrate the 4395A for the OPEN, SHORT, and LOAD states in order.

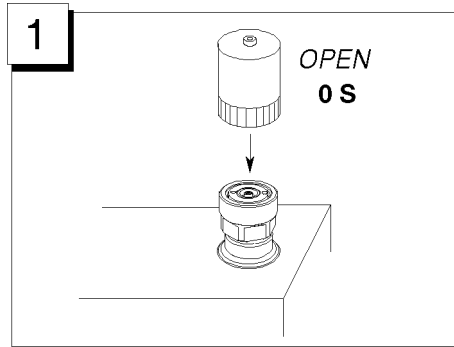
Note Be sure to use the calibration kit included in the 43961A package.



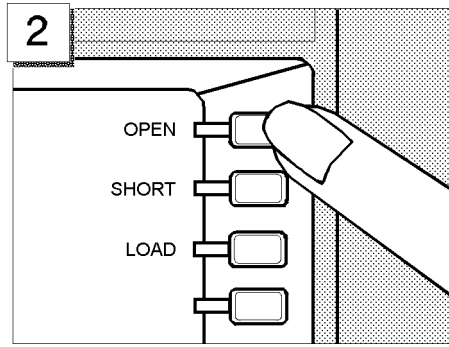
OPEN Calibration

Follow these steps:

Impedance Analyzer Tour

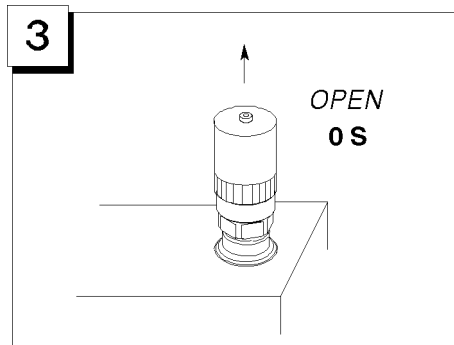


Connect the 0 S termination to the 43961A's OUTPUT port.



Choose OPEN.

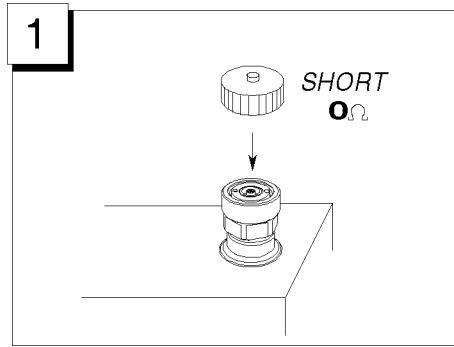
Wait until the OPEN softkey's label is underlined to indicate that the OPEN calibration is complete.



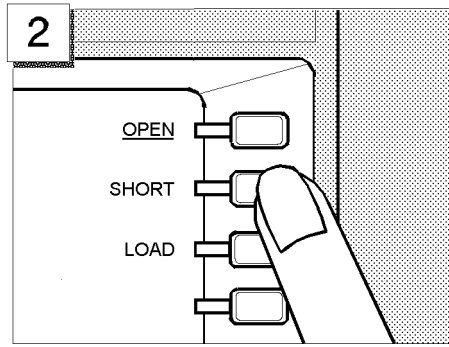
Remove the 0 S termination.

SHORT Calibration

Follow these steps:

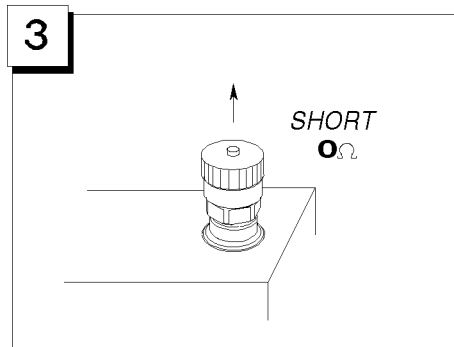


Connect the 0 Ω termination to the 43961A's OUTPUT port.



Press **SHORT**.

Wait until the **SHORT** softkey's label is underlined to indicate that the SHORT calibration is complete.

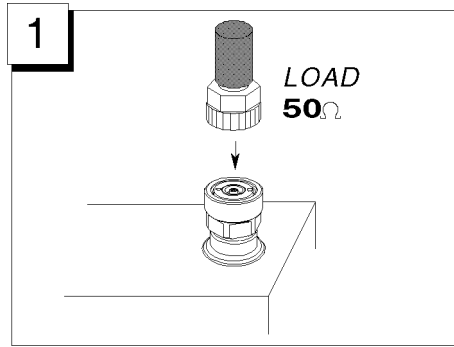


Remove the 0 Ω termination.

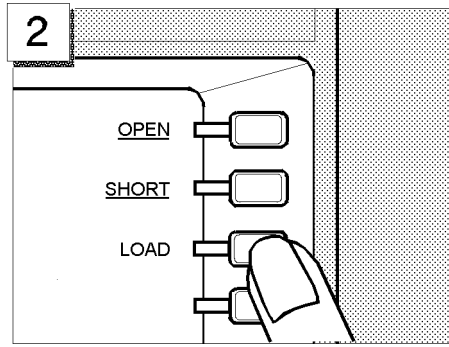
LOAD Calibration

Follow these steps:

Impedance Analyzer Tour

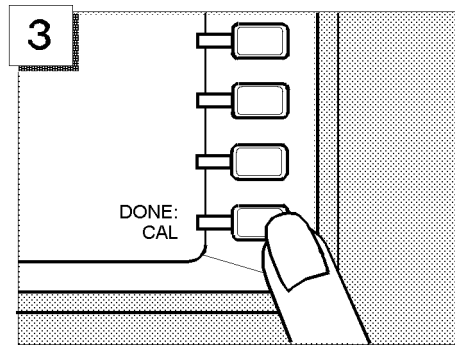


Connect the 50 Ω termination to the 43961A's OUTPUT port.

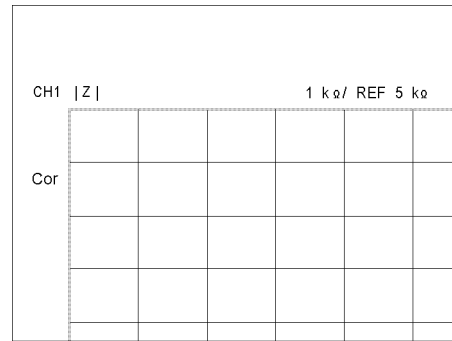


Press LOAD.

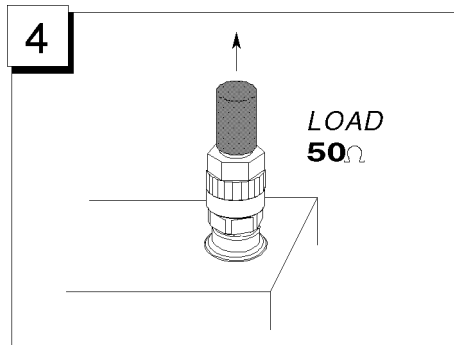
Wait until the LOAD softkey's label is underlined to indicate that the LOAD calibration is complete.



Choose DONE: CAL.



Make sure that a "Cor" marker is displayed at the left-hand edge of the screen.



Remove the 50 Ω termination.

Step 4: Connecting and Setting Up a Test Fixture

Connecting the fixture

This tour does not assume any specific test fixture. You can use a test fixture of your choice. For how to connect your test fixture to the impedance test kit, refer to the documentation that comes with the test fixture. A typical test fixture can be installed in such a procedure as shown below:

1. Turn the OUTPUT port APC-7 connector of the impedance test kit.
2. Make sure that the connecting sleeve is completely retracted.
3. Set the test station's mount post to the pair of holes located at one corner of the test fixture.
4. Turn the fixing ring counterclockwise until it is fully tightened.
5. Connect the impedance test kit's OUTPUT port to the connector located on the back side of the test fixture.

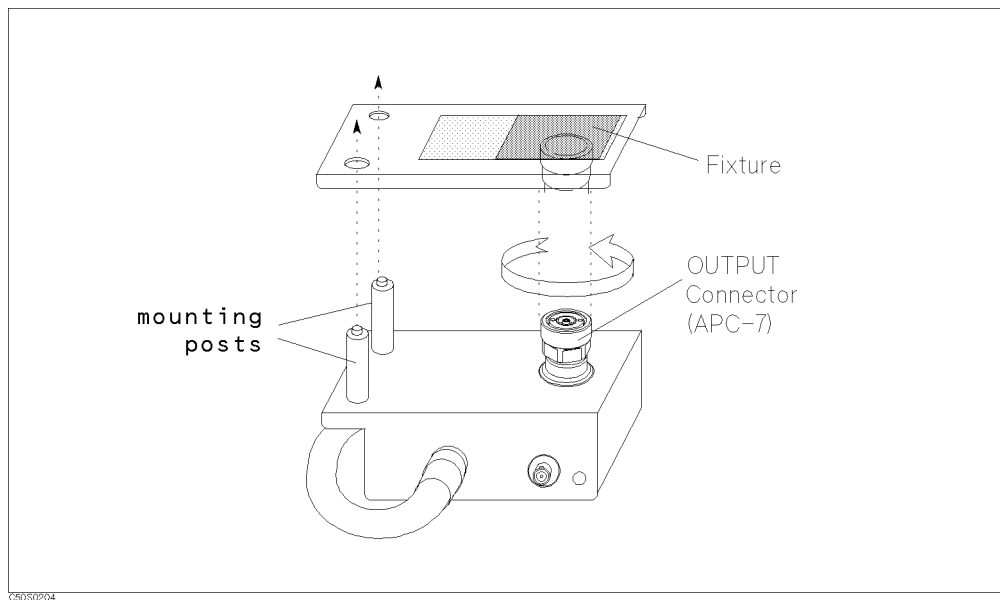


Figure 3-7. Connecting the test fixture

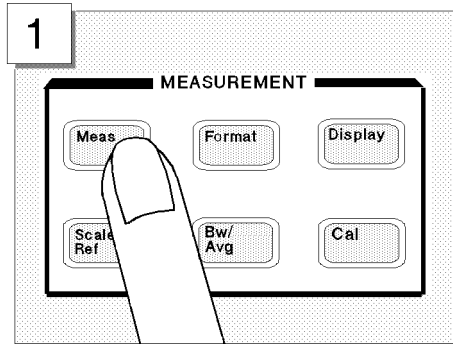
Setting the Electrical Length

Connecting a test fixture adds an extra electrical length to the test circuit. This electrical length, which is specific to the test fixture you use, must be known to the 4395A so that it can compensate for the extra electrical length and eliminate errors due to phase shifts.

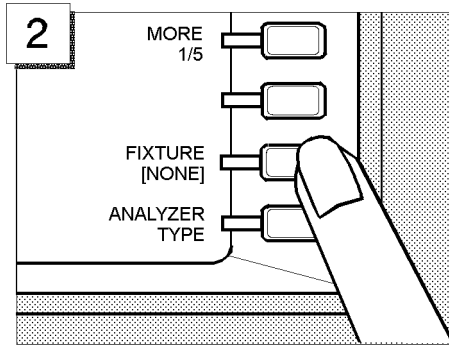
The 4395A incorporates a database of Agilent test fixtures with their own electrical lengths.

For example, if the model number of your test fixture is 16192, you would set the electrical length as follows:

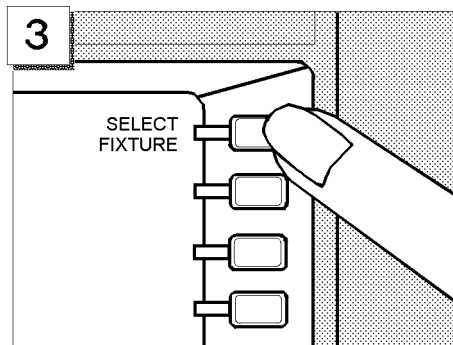
Impedance Analyzer Tour



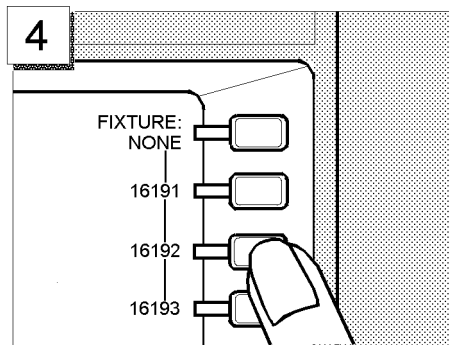
Press the **Meas** key.



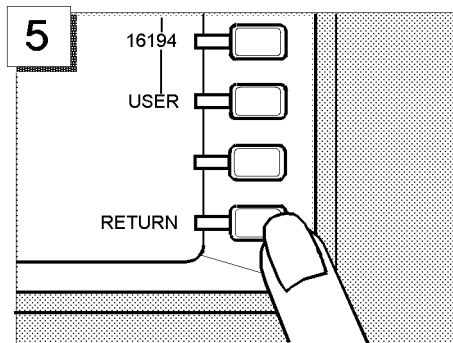
Choose **FIXTURE**.



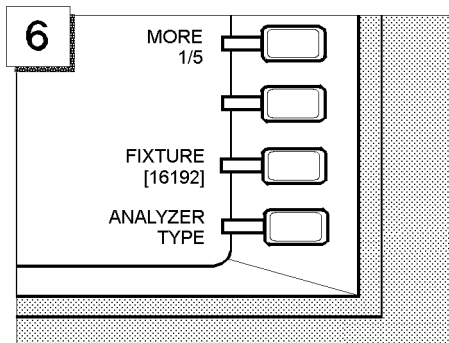
Choose **SELECT FIXTURE**.



Select **16192**.



Press **RETURN** twice.



Make sure that the **FIXTURE** label on the screen is followed by your selected model number (16192, in this case).

Fixture Compensation

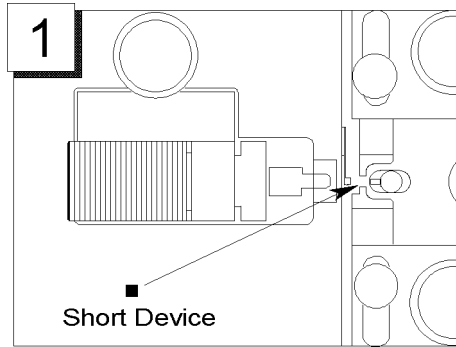
Fixture compensation is a process that calibrates the 4395A with a test fixture installed, thereby eliminating errors produced between the test fixture electrode and the impedance test kit's OUTPUT port. Normally, the 4395A must be fixture-compensated for the OPEN and SHORT circuit states. It can optionally be fixture-compensated for the LOAD state.

Note

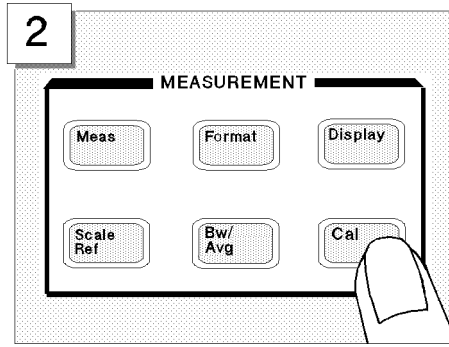


For how to connect standards, refer to the documentation that comes with the test fixture you use.

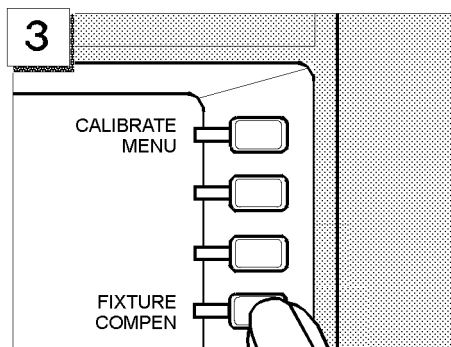
Impedance Analyzer Tour



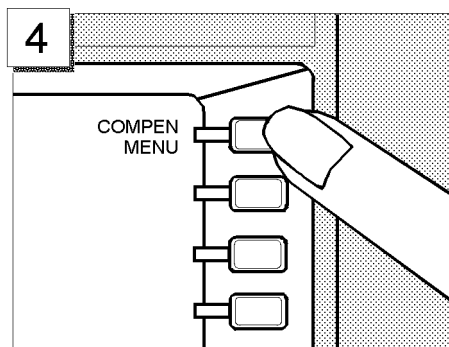
Connect the appropriate short device to the fixture.



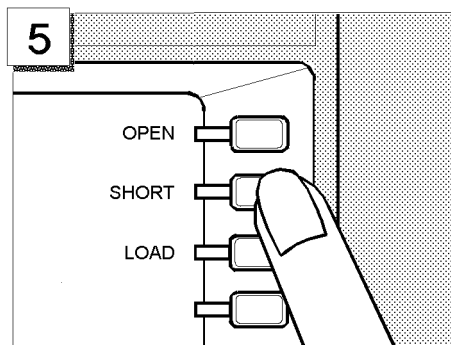
Press the **Cal** key.



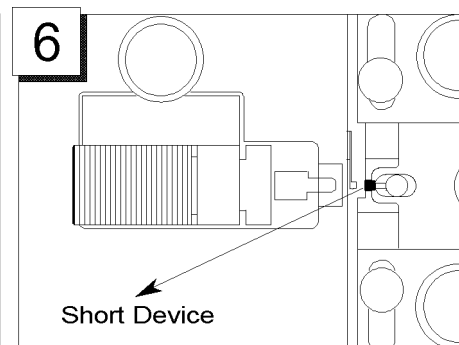
Choose **FIXTURE COMPEN**.



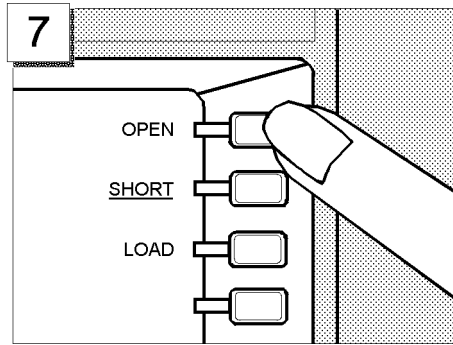
Choose **COMPEN MENU**.



Choose **SHORT**.
Wait until the **SHORT** softkey's label is underlined to indicate that the SHORT compensation is complete.

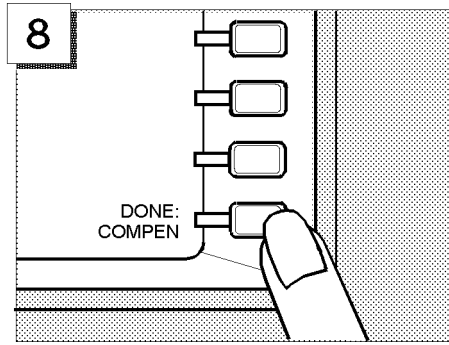


Remove the short device to put the circuit into the OPEN state.



Choose **OPEN**.

Wait until the **OPEN** softkey's label is underlined to indicate that the OPEN compensation is complete.



Choose **DONE: COMPEN**.

CH1	Z						1 k Ω / REF 5 k Ω
Cmp							

Make sure that a “Cmp” marker is displayed in place of the “Cor” marker.

Step 5: Carrying Out Impedance Measurement

Selecting the Measurement Parameters for Channel 1

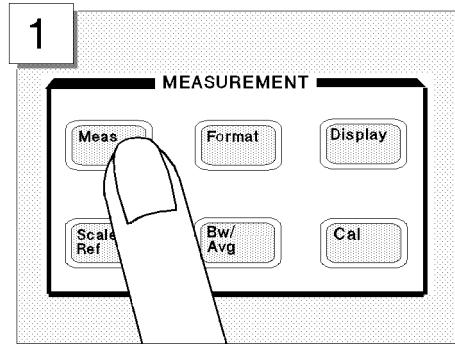
To begin impedance measurement, the 4395A must know which characteristics it should measure and how it should report the measured values. This tour assumes that the following measurement parameters are specified for Channel 1.

Characteristic Absolute value of impedance ($|Z|$)
value

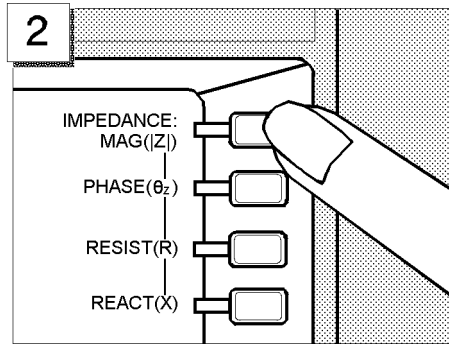
Format Log

To set the parameters listed above, follow these steps:

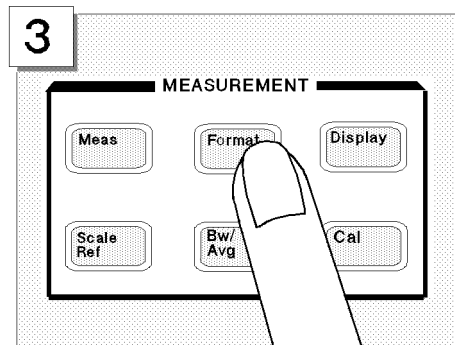
Impedance Analyzer Tour



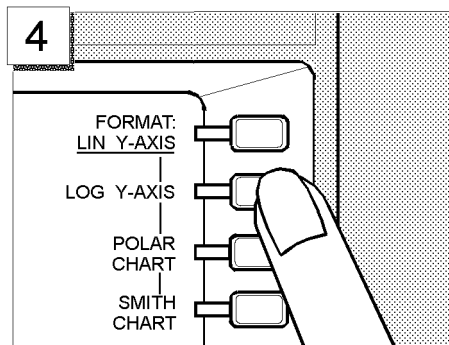
Press the **Meas** key.



Choose **IMPEDANCE: MAG (|Z|)**.



Press the **Format** key.



Choose **LOG Y-AXIS**.

These settings are applied to Channel 1, which has been the active channel in the scenario of this tour. Note that, in Steps 6 and 7, you will switch from Channel 1 to Channel 2, and assign different settings to Channel 2.

Connecting the DUT

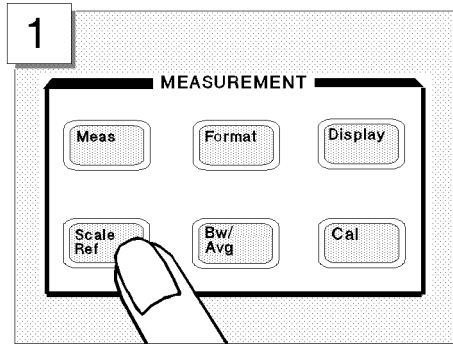
How to connect a DUT differs depending on which test fixture you use. For more information, refer to the documentation that comes with your test fixture.

As soon as you have connected the DUT, the 4395A will measure and display the impedance characteristics.

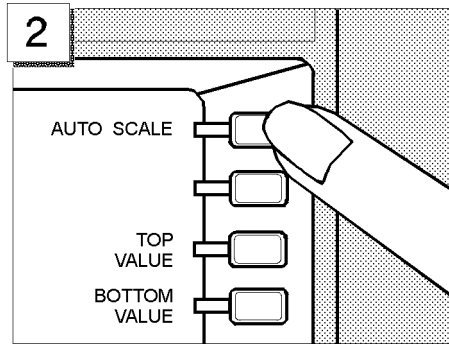
Performing the Automatic Scaling

Often, the trace obtained after specifying the frequency range is too large or too small vertically for the grid. However, by using the automatic scaling function, you can obtain the optimum vertical setting automatically.

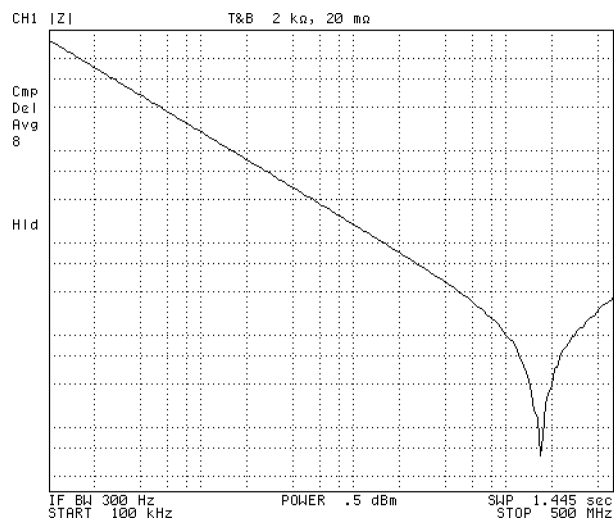
Follow these steps:



Press the **Scale Ref** key.



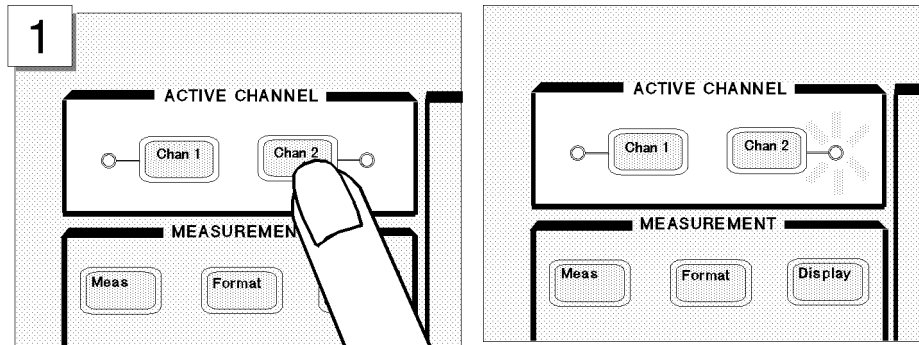
Choose **AUTO SCALE**.



Impedance Analyzer Tour

Step 6: Switching from Channel 1 to Channel 2

All the settings you have made so far are assigned to Channel 1. Now, activate Channel 2 instead of Channel 1.



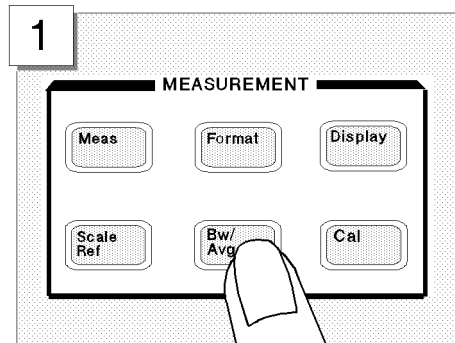
Press the **Chan 2** key in the ACTIVE CHANNEL block.

Make sure that the indicator lamp beside the **Chan 2** key is ON.

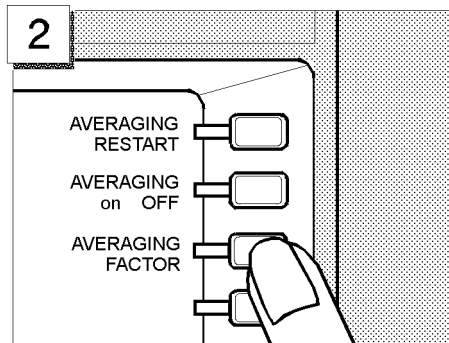
Setting the Averaging Factor for Channel 2

This tour assumes the averaging factor of 8.

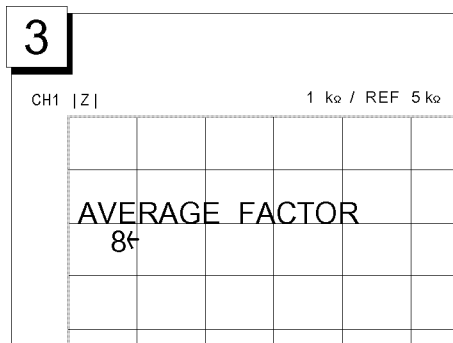
Follow these steps:



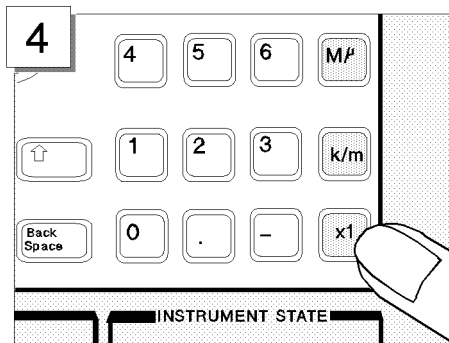
Press the **Bw/Avg** key.



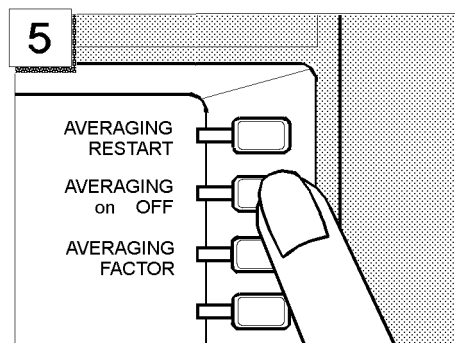
Choose **AVERAGING FACTOR**.



Enter **8** using the numeric key.



Press the **x1** key.



Toggle **AVERAGING on OFF** to **ON off**.

Impedance Analyzer Tour

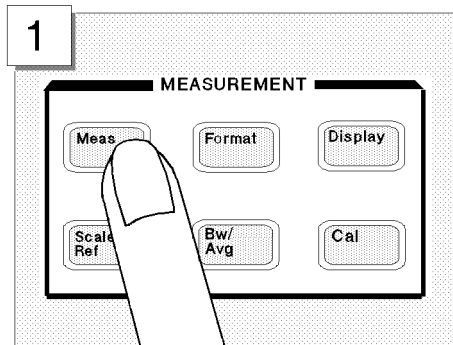
Step 7: Selecting the measurement parameters for Channel 2

This tour assumes that the following measurement parameters be specified for Channel 2.

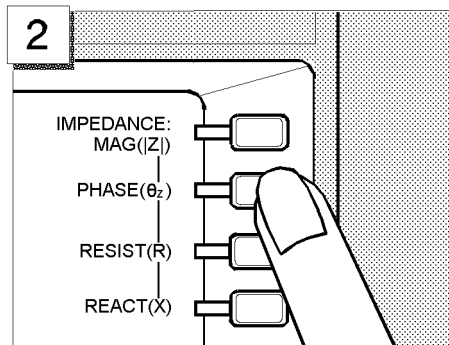
Characteristic Phase (θ_z)
value

Format Linear

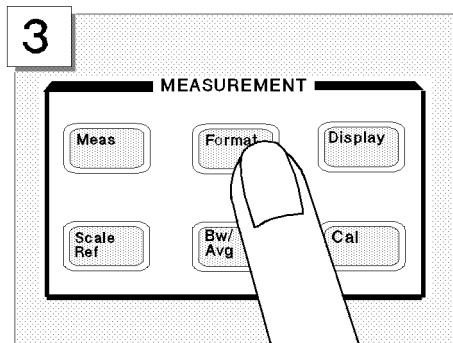
To set the parameters listed above, follow these steps:



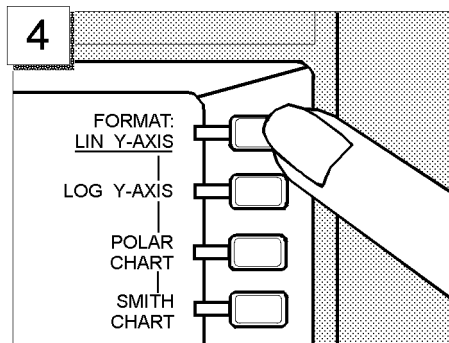
Press the **Meas** key.



Choose **PHASE: θ_z** .

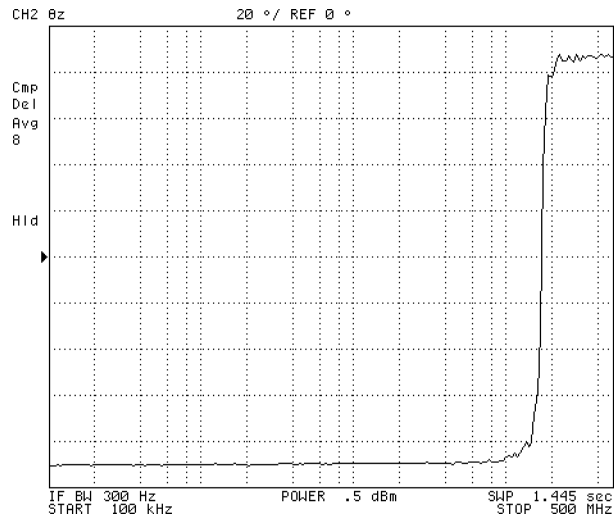


Press the **Format** key.



Choose **LIN Y-AXIS**.

Impedance Analyzer Tour



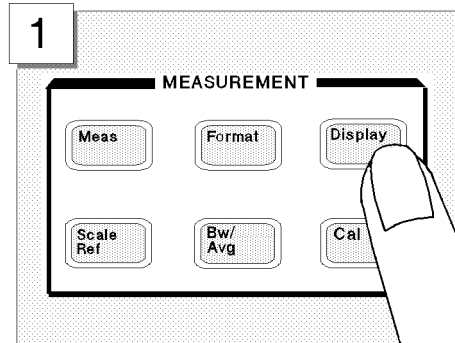
Now both Channels 1 and 2 are assigned specific settings. You can not only have one of the two channels displayed at a time, but also have both channels displayed in parallel, as you will learn in the next step.

Impedance Analyzer Tour

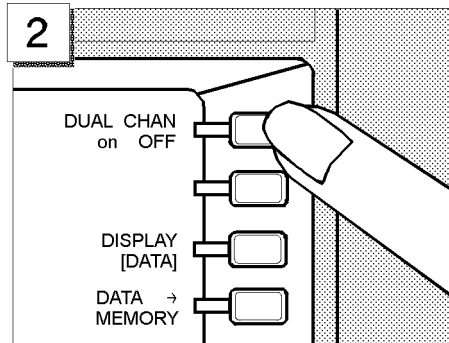
Step 8: Dual Channel Display

The 4395A provides a feature that displays the measurement results for both channels at the same time. This feature is called “dual channel display.”

Follow these steps:

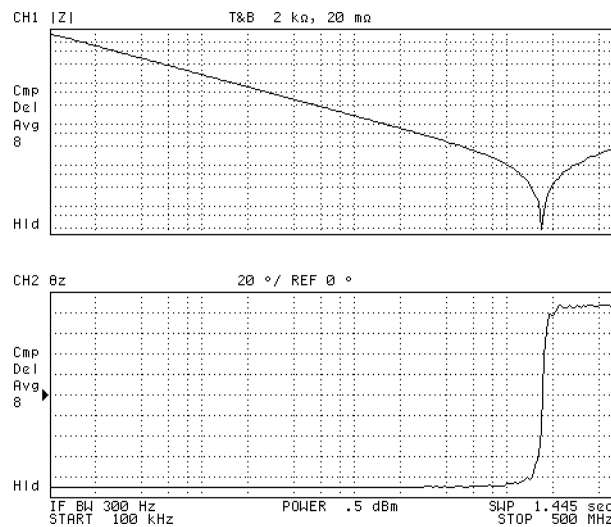


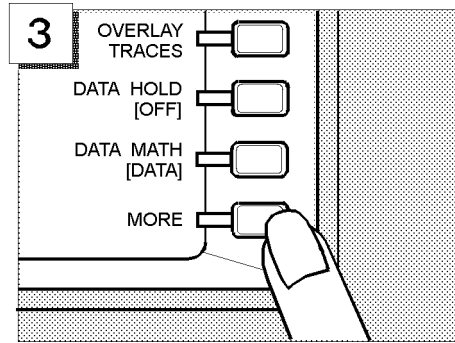
Press the key.



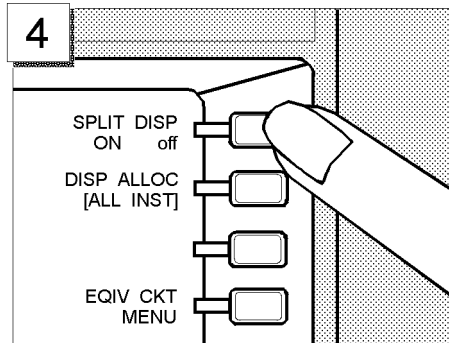
Choose **DUAL CHAN** on **OFF** so that the label changes to **DUAL CHAN ON off**.

The screen is split into upper and lower halves. The upper half shows the absolute impedance value while the lower half shows the phase.





Choose **MORE**.



Choose **SPLIT DISP ON off** so that the label changes to **SPLIT DISP on OFF**.

Two graphs are merged into a single coordinate plane.

