

Using OS/2 and RI Applications

Using OS/2 and RI Applications

- . **Mouse Basics**

 - Mouse Pointer**

 - Mouse Button 1 and Button 2**

- . **Using the Mouse**

 - Selecting an Object**

 - Opening an Object**

 - Moving an Object**

 - Copying an Object**

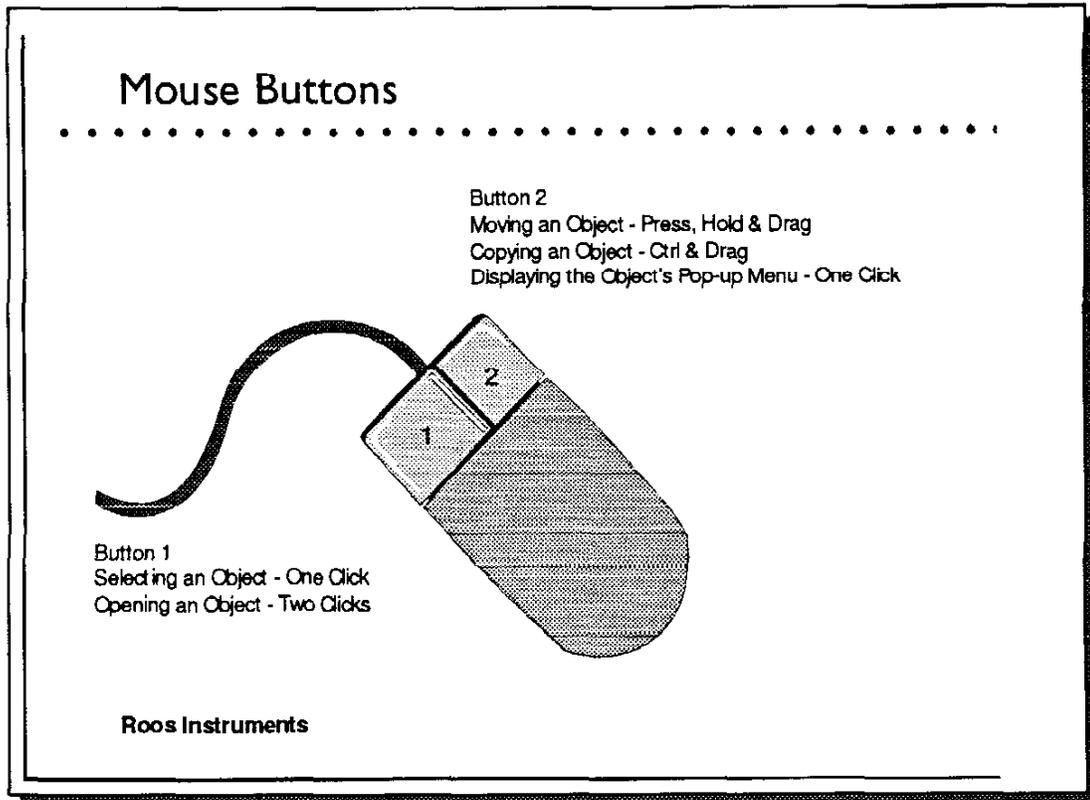
Roos Instruments

Before we go through the process of creating and running test plans we need to define some of the basic OS/2 and RI functions and terminology we will be using. For some of you this information is already familiar, for others it will be new. We will use this information repeatedly throughout the rest of the training material. Later during the hands-on-lab training you have an opportunity to try all of these features and functions yourself.

Mouse Basics and Using the Mouse

Please see the next slide for examples and description of Mouse basics and using the mouse.

Mouse Buttons and Functions



The mouse pointer (usually an arrow or crosshair symbol on the System Computer CRT screen) can be placed anywhere on the screen by moving the System Computer's PC mouse in the direction desired. The left button on the mouse is referred to as mouse button 1 and the right button on the mouse is referred to as mouse button 2.

To select [highlight] an object with the mouse, place the mouse pointer on the object and click [press and release quickly] mouse button 1.

To open an object with the mouse, place the mouse pointer on the object and double click [press and release quickly twice] mouse button 1.

To drag, or move an object on the screen with the mouse, place the mouse pointer on the object, then press and hold mouse button 2. Move the mouse in the direction desired, the object will move with the mouse.

To copy an object, place the mouse pointer on the object, press & hold the **Ctrl** key on the keyboard and press & hold mouse button 2. Move the mouse in the direction desired, a copy of the object will move with the mouse.

Using the Mouse (Continued)

Using OS/2 and RI Applications (Continued)

.....

- **Using the Mouse (Continued)**
 - Displaying the Object's Pop-up Menu**
 - Displaying an Open Window's Pop-up Menu**
 - Selecting the Active Window**
- **Window Basics**
 - Title Bar**
 - Menu Bar**
 - Scroll Bar**
 - Closing the Window**

Roos Instruments

To display an object's Pop-up Menu, place the mouse pointer on the object and click mouse button 2.

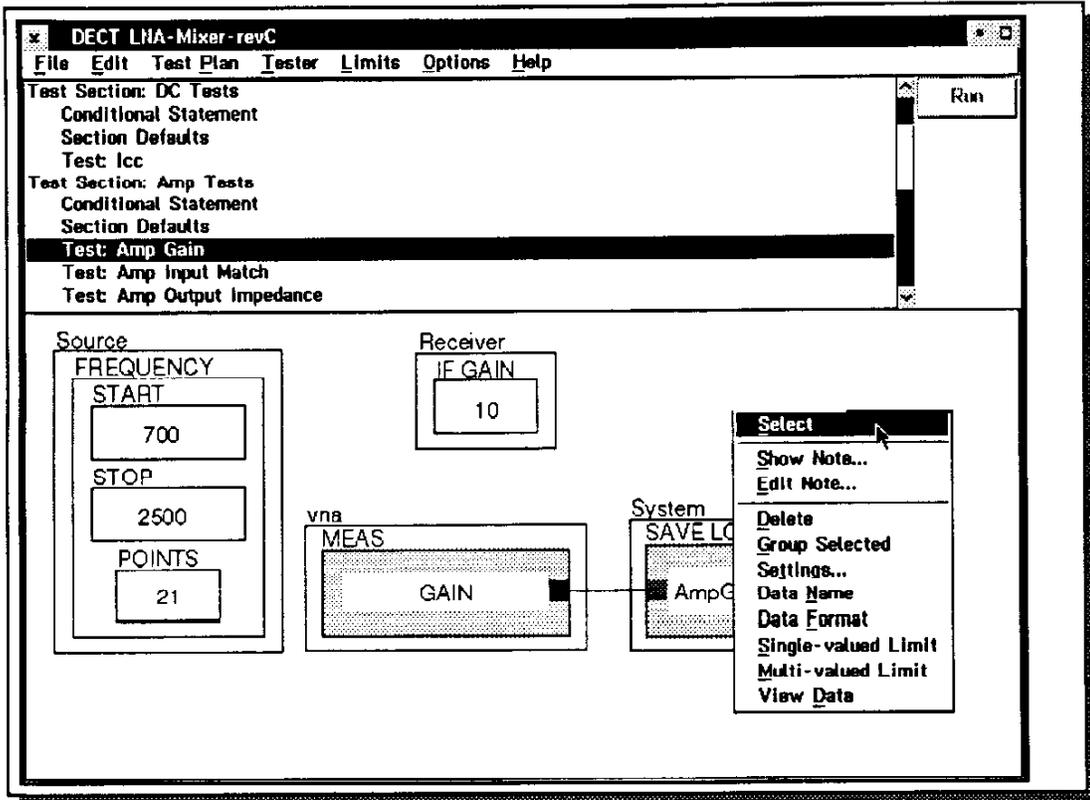
To display an open window's Pop-up Menu, place the mouse pointer on an open space in the window and click mouse button 2. (The mouse should be placed on the background and not on an object in the window.)

OS/2 permits multiple windows to be open at the same time, however only one window is active at a time. OS/2 identifies the active window by displaying a solid color in the Window's Title Bar. The title bar for all other open windows will be greyed. To select the active window, place the mouse pointer any where on the Window desired and click mouse button 1.

Window Basics

Please see the next slide for examples and description of Window basics.

Typical RI Application Window/Test Panel



The Title bar is an area at the top of each window that contains the title of the window.

Some windows have a menu bar just below the title bar. The menu bar displays a set of choices or a list of functions available to the user. To select a menu list, place the mouse pointer on the menu bar choice desired and click mouse button 1. A pull down menu list will be displayed. Greyed choices indicate invalid choices. To select a function from the menu list, place the mouse pointer on the function name/choice desired and click mouse button 1.

Some windows may have scroll bars displayed to the right of a column of text. To scroll the text up or down in the window, place the mouse pointer on the scroll bar, press and hold mouse button 1, then move the mouse up (away from you) to scroll the text up the window or move the mouse down (toward you) to scroll the text down the window.

To close a window, place the mouse pointer on the down arrow or miniaturized icon symbol in the upper left corner of the window (to the left of the menu bar) and double click mouse button 1.

Using OS/2 and RI Applications (Continued)

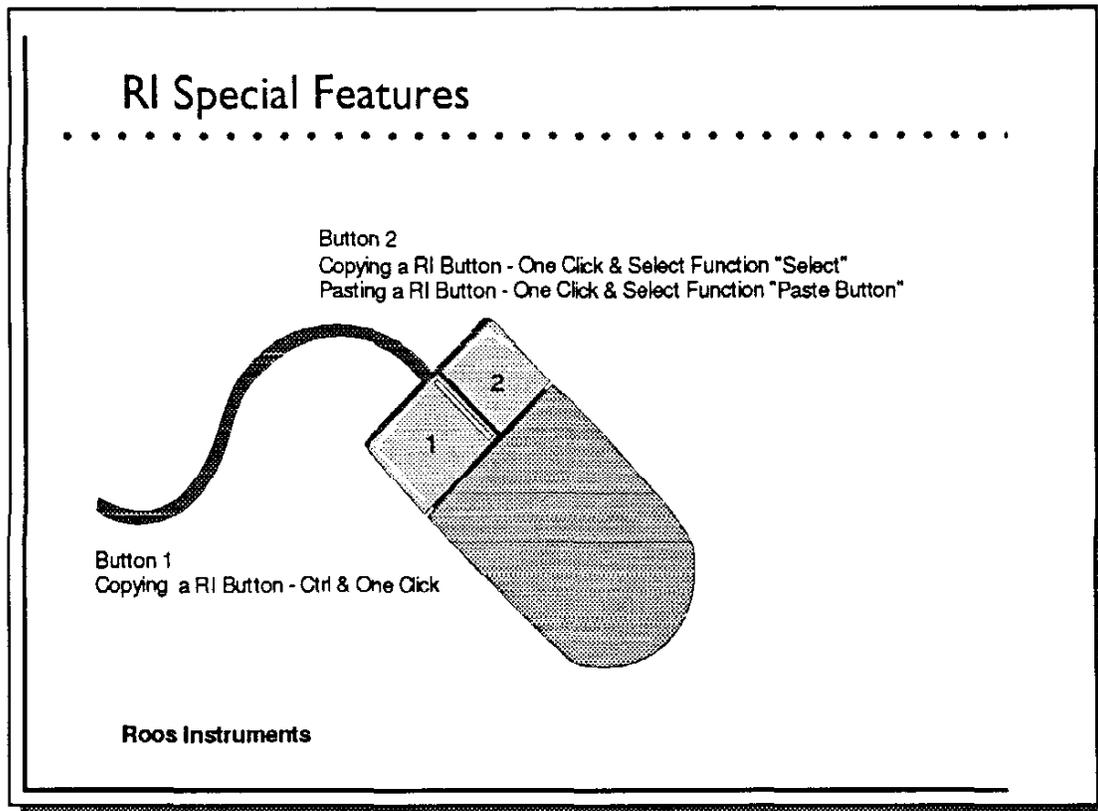
.....

- **RI Special Features**
 - Selecting and Copying a RI Button**
 - Pasting a RI Button**
 - RI Pop-up Dialog Box**
 - Buttons vs Keys**

Roos Instruments

Please see the next slide for examples and description of RI Special Features.

RI Special Features (Continued)



To copy a RI Button from a RI Test Plan panel or from a RI Tester Viewer panel (these panels will be discussed later), place the mouse pointer on the RI button desired, click mouse button 2 to display the button's pop-up menu. Select [highlight] the pop-up menu function: **Select**.

To paste a RI button into a test plan, place the mouse pointer on the test plan panel desired and click mouse button 2 to display the button's pop-up menu. Select [highlight] the pop-up menu function: **Paste Button**. (The button will be pasted on to the test panel at the location of the mouse pointer when mouse button 2 was clicked.)

RI software applications will display simple pop-up dialog boxes when a selection or decision is required by the user. The pop-up dialog box typically displays a message or a list of choices to select from. To select [highlight] a choice, place the mouse pointer on the choice desired and click mouse button 1. Next move the mouse pointer to the bottom of the window and select [highlight] the appropriate button choice.

To minimize confusion, we will refer to RI buttons on the System Computer CRT screen as buttons and keys on the System Computer's keyboard as keys. Thus if we say select the button **OK**, we are referring to the **OK** button on the CRT screen and when we say press the **Enter** key we are referring to the **Enter** key on the keyboard.

Getting Started Testing Devices

Getting Started Testing Devices

.....

- Turn on System Instruments & System Computer
- Select the RI Software Application
- Log-on to the System Computer
- Select a Test Executive
(Test Plan, Limit Files, Tester, Operator Interface, etc.)
- Enter Lot, Sub Lot and 1st Part Number
- Select the Start Button
- Displays Summary of Test Results
- Automatically Saves Results to System Data Base

Roos Instruments

The process for testing devices with the RI 7100A Microwave Test System is simple & fast.

- 1) Turn on the Test System instruments & the System Computer.
- 2) Open the RI Message Window.
Double clicking on the RI Software Application icon.
- 3) Log on to the system.
Select the menu choices: **System** and **Logon....**
Select your user log-on icon & enter your pass word.
- 4) Open the Production Test Executive Container Window.
Select the menu bar choices: **Test & Package Execs....**
- 5) Select a Test Executive from the Container presented. (Each test executive contains one or more test plans and limit files, a tester configuration and a custom configured operator interface.)
- 6) Select & Enter the lot and subplot names or numbers and the part number for the first part to be tested.
- 7) Select the **Start** button. The test system will automatically begin testing parts. The test results will be automatically saved to the Local SQL Data Base.

This entire process takes just a few minutes. You can change test executive files and run another test plan in a matter of seconds.

Developing Test Plans

Developing Test Plans

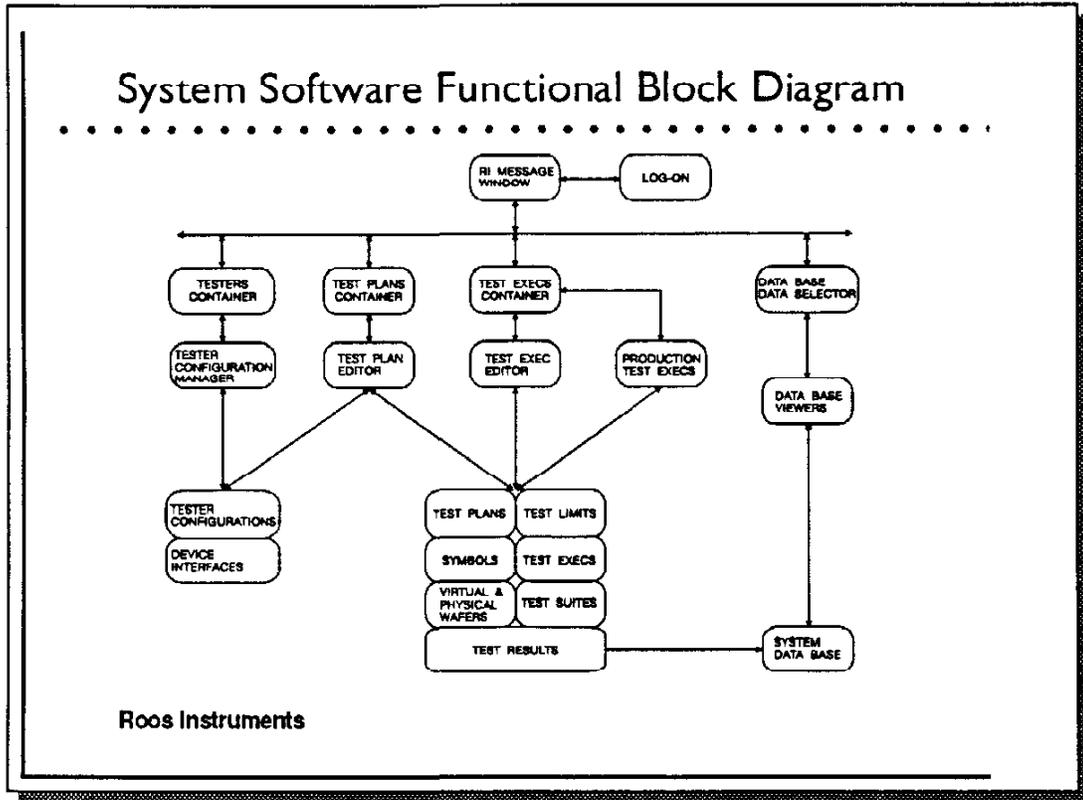
.....

- **Define the Test System Configuration**
- **Define the Device-Under-Test**
- **Create the New Test Plan & Individual Tests**
- **Optimize and Compile the Test Plan**
- **Run the Test Plan and View the Test Results**
- **Debug any Problems**
- **Save the Test Plan and the Limit Files**
- **Create the Test Executive**
- **Run the Test Executive**

Roos Instruments

As you can see the process of selecting and running a test plan is fairly simple. The process for creating test plans is a little more work. It involves defining the tester and the device-under-test, creating the overall test plan and the individual tests, compiling and optimizing the test procedure, running the test plan, viewing the data, debugging any problems, saving the test plan & limit files, and creating the test executive files.

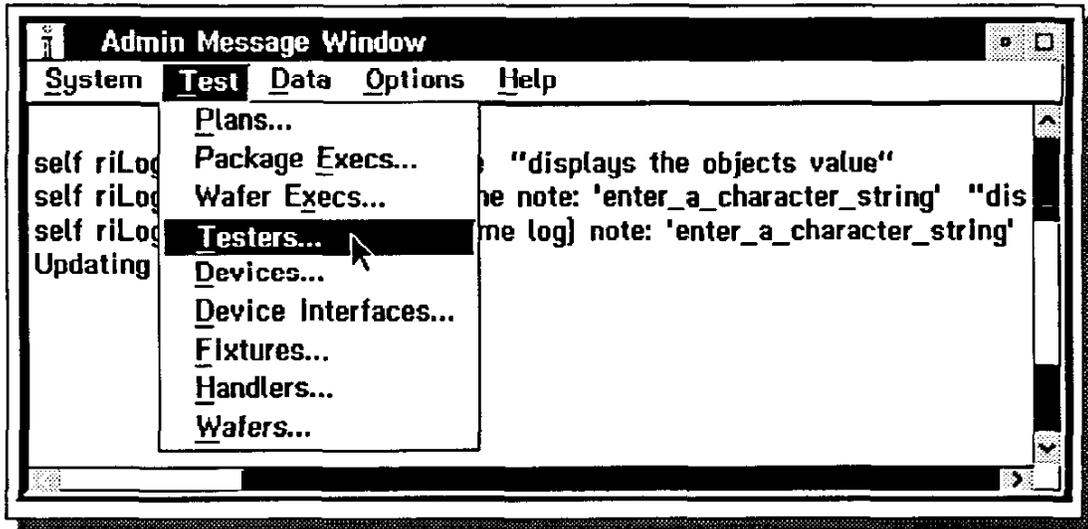
System Software Functional Block Diagram



Before we go through the process of creating a test plan, it would be helpful to first discuss the RI System Software's functional block diagram and the individual functional blocks (shown above.)

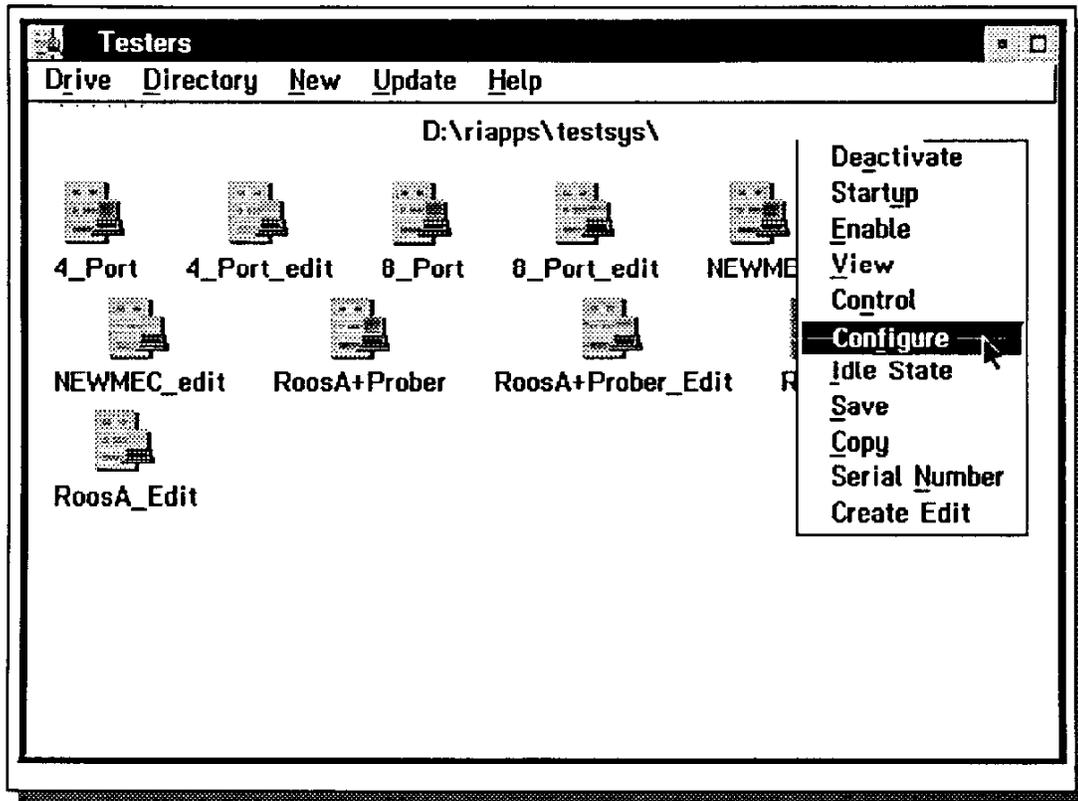
When you first turn on the System Computer and open the RI Application icon, the system computer will display the RI Message Window shown at the top of the functional block diagram. By using the RI Message Window's menu bar choices, you can select and open one or more of the top level application windows shown connected to the RI Message Window. Each window provides to the user a unique set of capabilities and functions. These windows also provide the user access to additional layers of application windows and access to the test system objects shown. We will now spend a few minutes and describe each of the application windows and the test system objects shown in the block diagram.

RI Message Window



The RI Message Window provides three basic functions. It provides the Log-on user interface, it offers the user access to the top level RI application windows, and as its name suggests, the RI Message Window displays messages sent by other RI application windows to the user. These messages include helpful hints, warning messages, test times, errors discovered, etc. Messages are displayed as a vertical running log with the last message received added to the bottom of the list. User prompts and selection requests are not displayed in the RI Message Window. They are instead presented in dialog boxes.

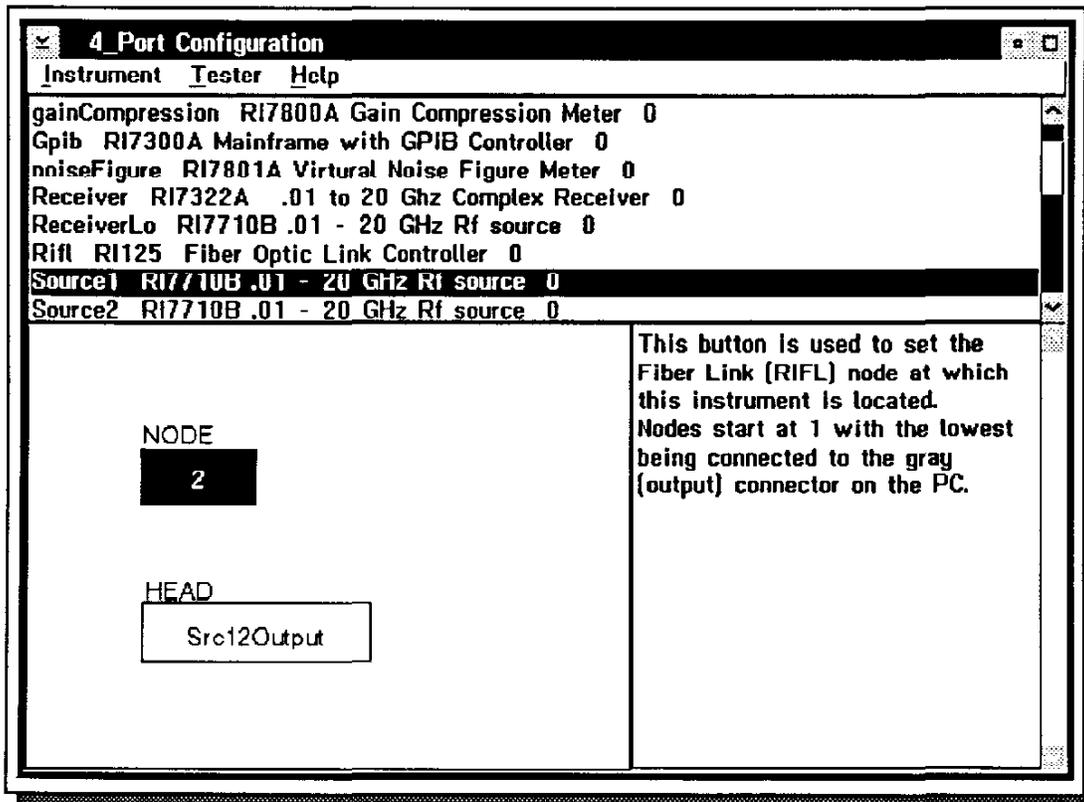
Testers Container Window



The Testers Container Window contains all of the tester configurations currently defined and provides the user access to the Tester Management Windows (Handler, Control, Configure & Idle State) and the Tester Management Functions (Activate or Deactivate, Startup, Enable, Save, Copy & Delete).

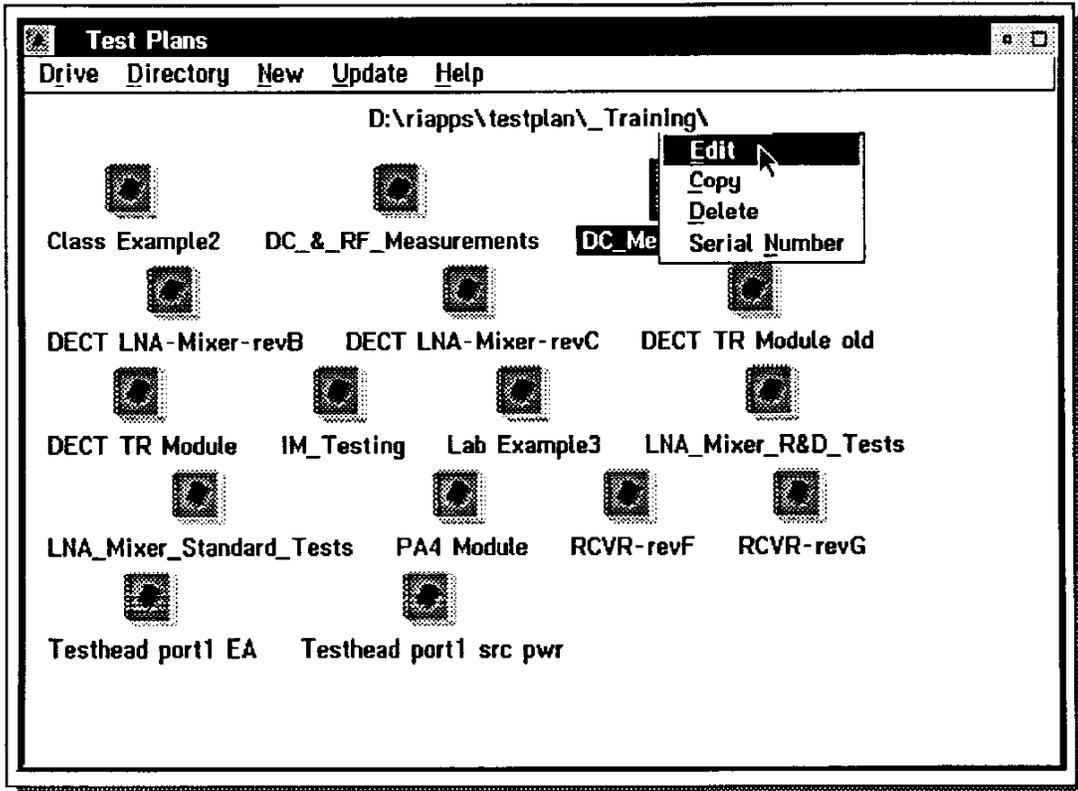
The Tester Container Window is opened by selecting the RI Message Window's menu bar choices **Test & Testers**.

Tester Configuration Manager



One of the Tester Management Windows you can select is **Configure**. Selecting this choice opens the Tester Configuration Manager. With the Tester Configuration Manager you can perform tasks such as defining the output characteristics of the RFIC Test Head, selecting the RF source to be used as the RF Stimulus Source, setting the RIFL node for the System Local Oscillator or viewing the calibration data for each instrument and signal path. During the lab portion of this training seminar you will have an opportunity to create a custom tester configuration.

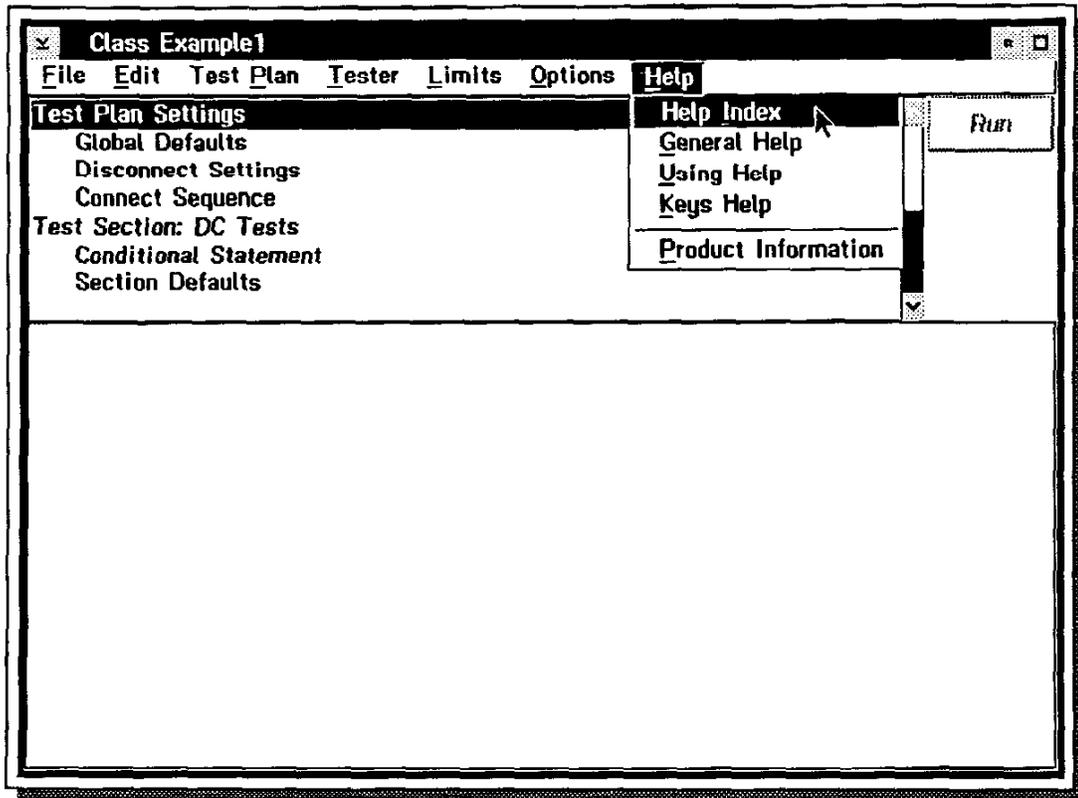
Test Plan Container Window



Creating and Managing Test Plans

To create and manage the test plans we first need to open the Test Plans Container Window and select a test plan or create a new test plan. (This window is opened by selecting the RI Message Window's menu bar choices **Test & Plans....**) The Test Plans Container Window contains all of the test plans currently defined and it enables you to create new test plans, copy existing test plans or delete existing test plans. (To create a new test plan just select the menu bar functions: **New & Test Plan**. The **Copy**, **Delete** & **Serial Number** functions are included in the test plan's pop-up menu, as shown above.) The Test Plan Container Window also provides you access to the Test Plan Editor Window. To open the Test Plan Editor Window, select the test plan's pop-up menu choice: **Edit**.

Test Plan Editor Window

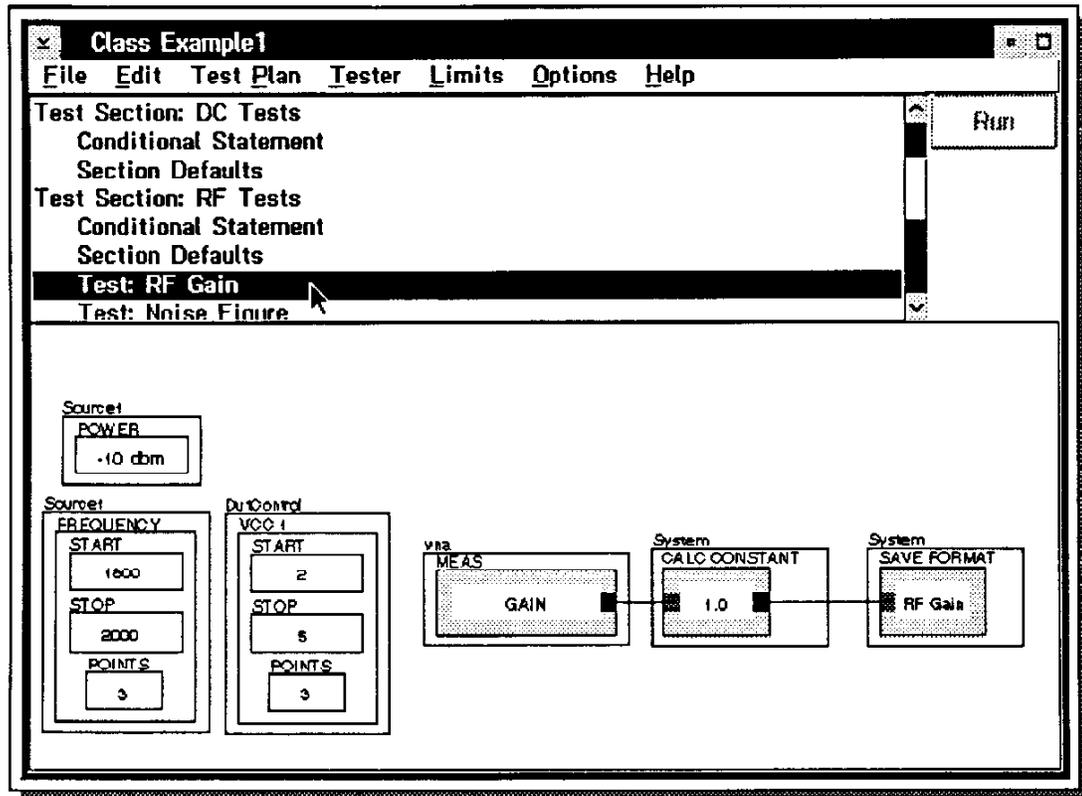


Editing a Test Plan

The Test Plan Editor window presents the user with a flexible, yet easy to use combination of pull down menu choices (**File**, **Edit**, **Test Plan**, **Tester**, **Limits**, **Options** and **Help**), simple graphical mouse operations such as copy, paste, move or delete, and keyboard entry functions for entering and modifying titles, settings, test points, etc. The test plan developer/user can use the Test Plan Editor to create, optimize, compile, run, debug, save and release test plans.

A test plan consists of a series of graphical panels with each panel containing a collection of objects we call **buttons**. Each button represents an action or procedure to be performed by the test including setting an instrument state, performing a measurement, performing a calculation, saving the test results in the local data base or prompting the user to perform some action.

Test Plan Editor Window (Continued)



Displaying and Editing Test Plans

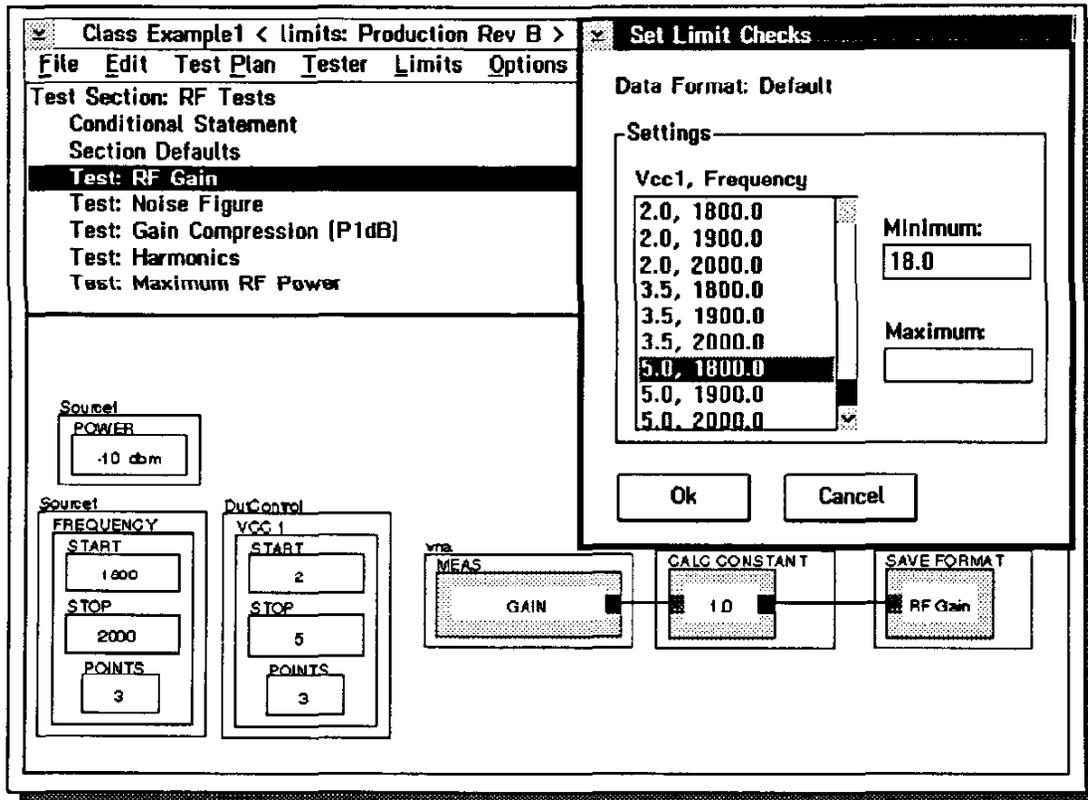
The Test Plan Editor contains two work areas for displaying and editing the test plan.

The upper area or Test Plan Outline Panel displays an outline of the test plan. Excluding the Test Plan Settings line and the Test Section Title lines, each line of the Test Plan Outline represents a graphical panel which the user can add buttons to, modify the buttons in or delete buttons from. (Panels can also be added to or deleted from the test plan outline by using the menu bar **Edit** choices.)

The lower working space or graphical test/settings panel displays the buttons associated with the line selected [highlighted] in the test plan outline. For example, the line **Test: RF Gain** is selected [highlighted] in the test plan outline shown above and the buttons which define the RF Gain test are shown in the lower graphical test panel.

You create tests in the test plan by copying buttons from the Tester Viewer Window or from other test panels, adding the buttons to the test/settings panel and modifying the button parameters. The software offers many different types of buttons to choose from.

Test Plan Editor Window (Continued)



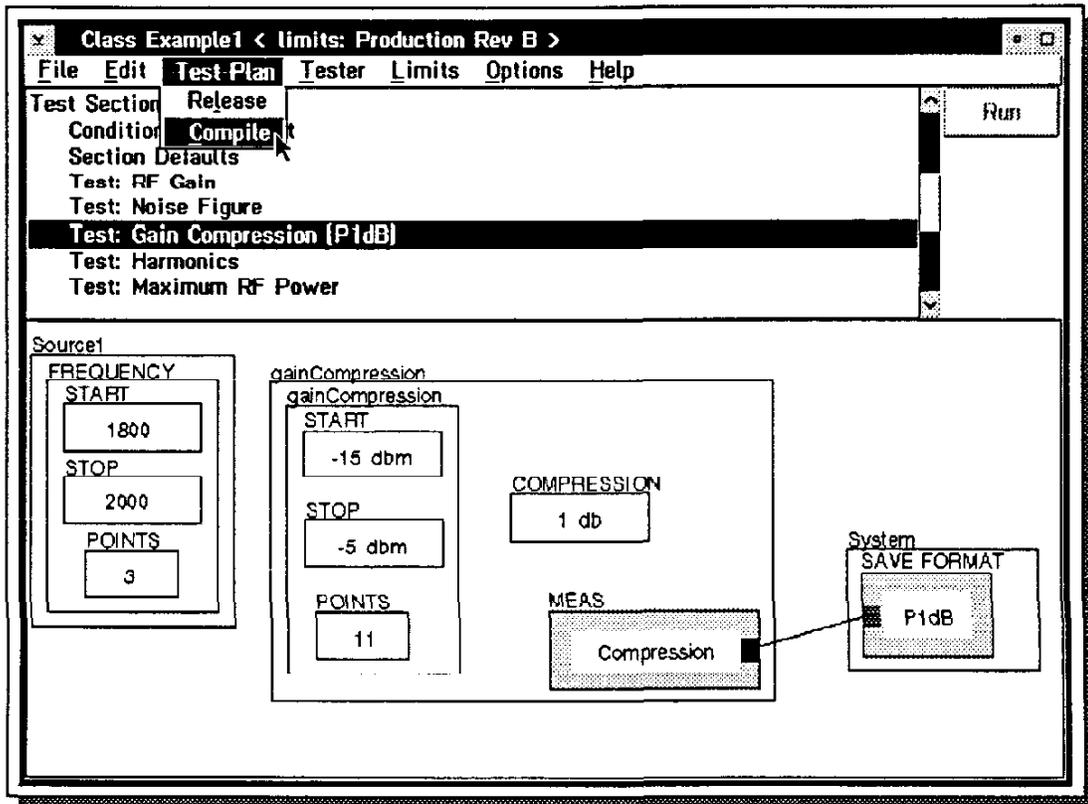
Adding Test Limit Files

In addition to adding buttons to the test panels, you can also add upper and/or lower test limit values for each test point in the test plan for grading and binning parts. The limit values are saved in a user defined limit file. Each test plan can have one or more user defined limit files associated with that specific test plan. (To run a test plan you would select and run the test plan file and the limit file desired.)

Adding Symbol Files

The Test Plan Editor will also accommodate the coding of classified test point data. The user can insert symbols in place of test point values (numeric symbols for numeric values and alphanumeric symbols for alphanumeric characters.) The system stores the actual test point values separately in a user defined symbol file. The test plan file and the symbol file are not merged until just prior to execution. The classified symbol files can be secured and access can be restricted. In addition, only summary information is displayed on the System Computer CRT screen during test execution.

Test Plan Editor Window (Continued)



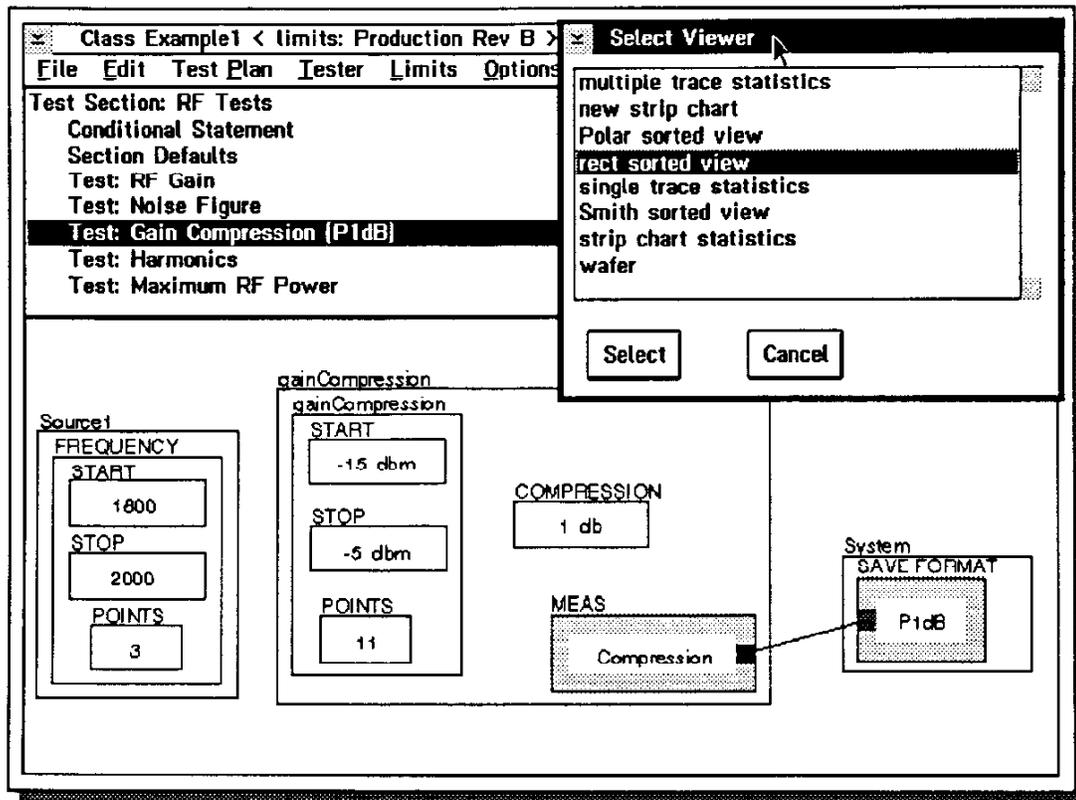
Optimizing and Compiling the Test Plan

After the test plan has been created, the user optimizes and compiles the test plan into a runnable test plan by selecting the menu bar choices **Test Plan** and **Compile**. The RI Test Plan Optimizer takes the uncompiled test plan and converts it into low level atomic measurement states (such as wave parameters for S parameters.) The Optimizer reorders these low level measurement states for the fastest execution time. (Slow operations such as frequency switching are minimized by the Optimizer by reordering the test states such that all of the measurements required for each frequency are performed first then the system is instructed to switch to the next frequency.) The optimized test sequence is then compiled into a runnable test plan.

Running a Test Plan

A runnable test plan can be run from the Test Plan Editor Window by selecting the **Run** button (upper right side of the test panel). Each time the test plan is run, the test results for each test are sent by the **System SAVE** data button in each test panel to the Local Data Buffer. (The System SAVE FORMAT button saves the data in a user specified format/units.) The test results are processed and sent on to the Local Data Base if the test plan has been released and the user has specified that the test results are to be saved.

Test Plan Editor Window (Continued)



Viewing the Test Results

The test results for each test can be displayed on one of several data viewers. To open a Data Viewer Window:

Place the mouse pointer on the System SAVE FORMAT button's Data Name and click mouse button 2 to display the button's pop-up menu.

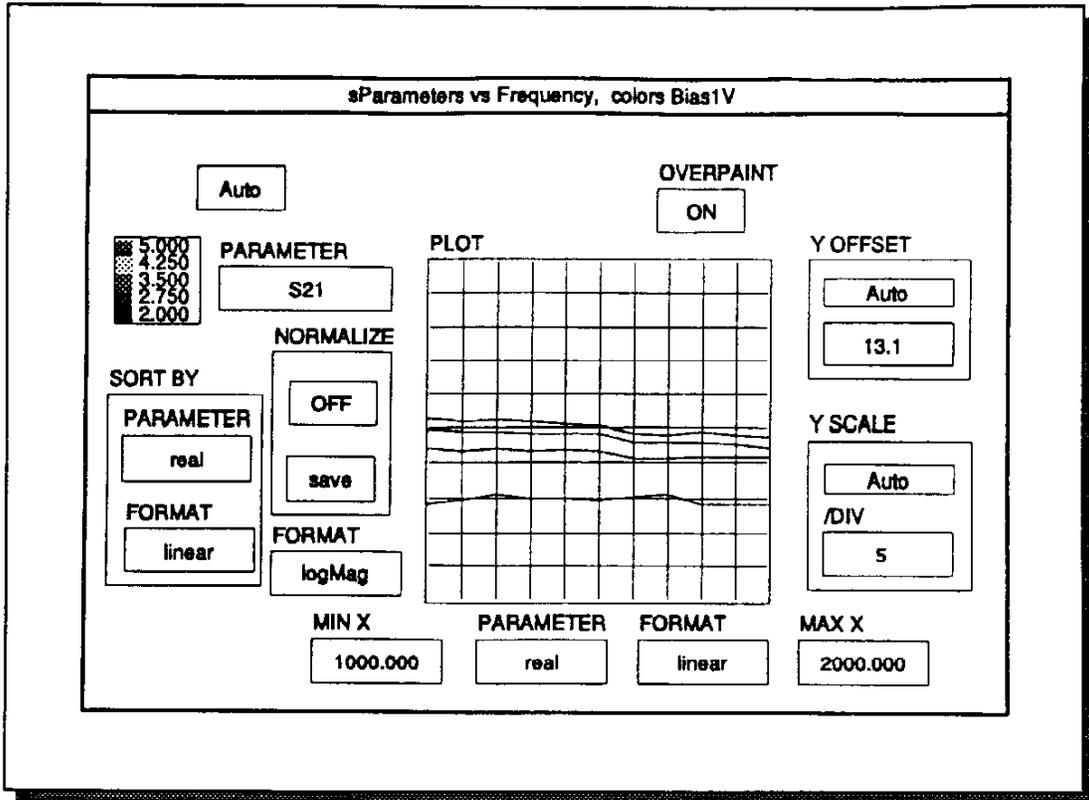
Select the View Data button with mouse button 1.

The Select Viewer window will be displayed.

Select [highlight] the data viewer desired and select the select button.

The data viewers offer the user several different display coordinates to view the data: (rectangular, polar, smith charts, multi-dimensional plots, etc.)

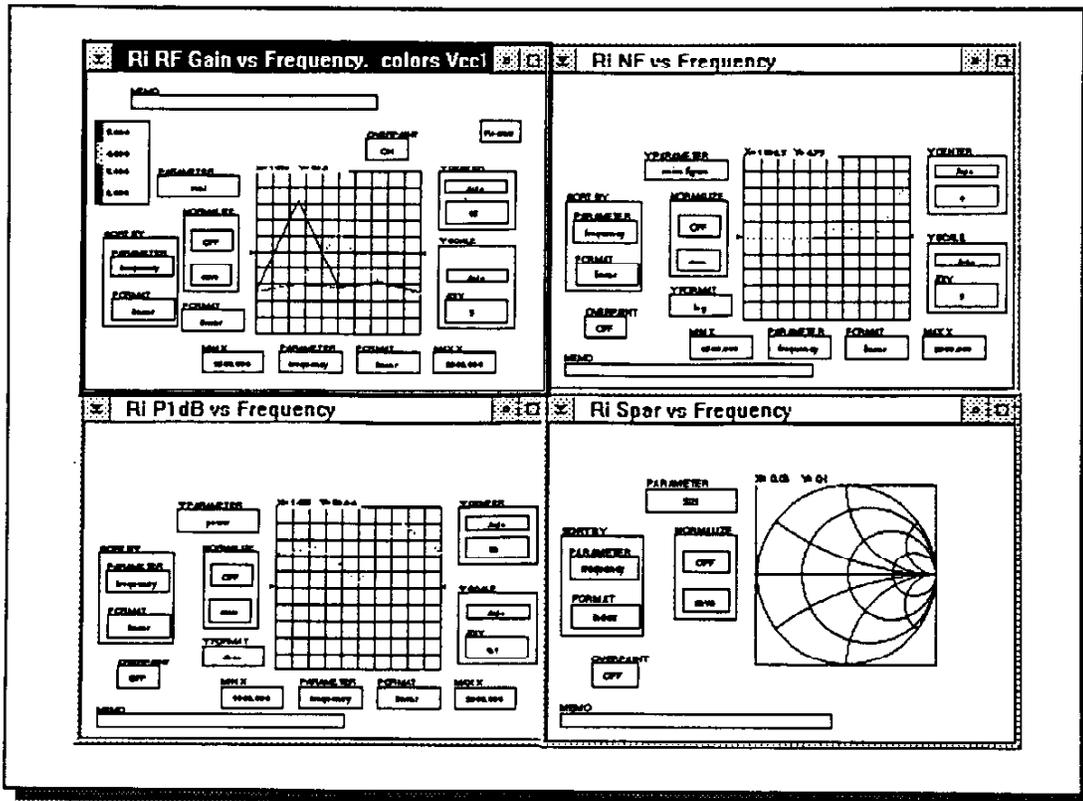
RI Data Viewers



The data viewers display the test data retrieved from the Local Data Buffer. In the data viewer example shown above, a multi-dimensional data viewer displays the S21 (forward gain of a device) vs. frequency & bias voltage.

The Y axis parameter is S21 in dB (log Magnitude format). The X axis parameter is Frequency in MHz (linear format). Each trace represents a different bias voltage from 2 Vdc to 5 Vdc. The Y axis scale factor is 5 dB per division and the Y offset (center line of the graph) is 13.1 dB.

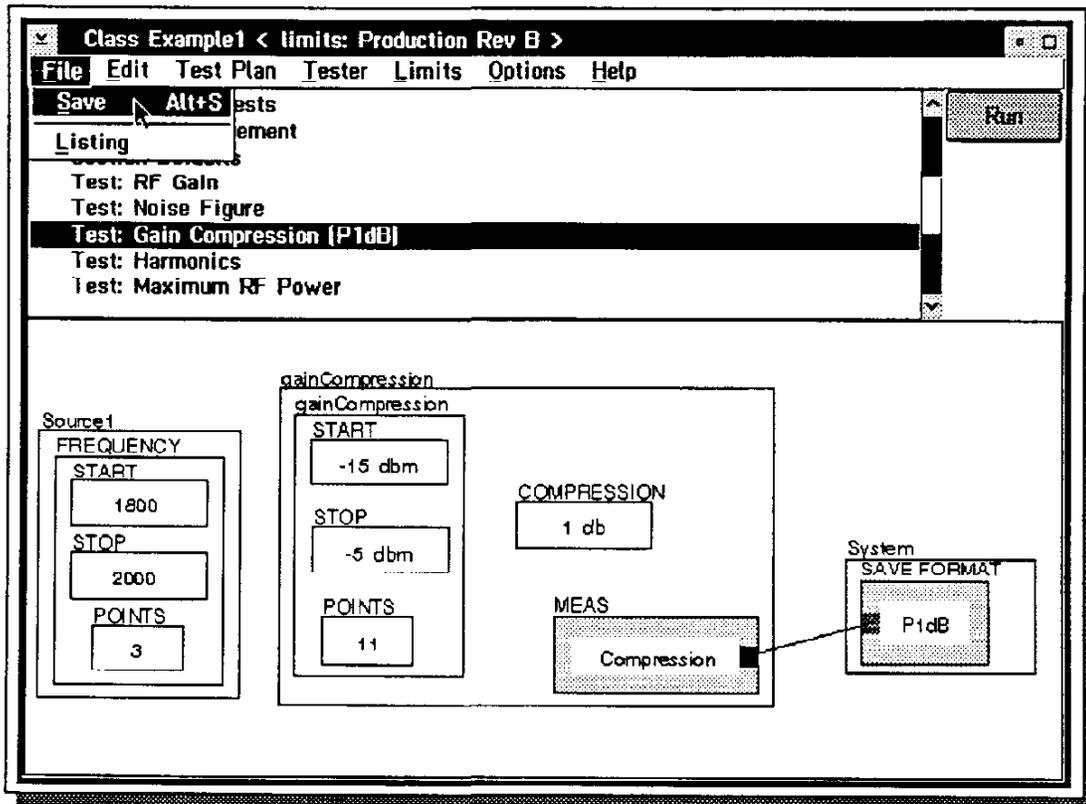
RI Data Viewers



Opening multiple Viewers and Selecting Parameters

Multiple data viewers can be opened at the same time and all of the open viewers will update each time the test plan is run so you can watch the test results from several different tests simultaneously. The user has full control over how the data is presented by the data viewer including selecting the x and y units, format (log, linear, index, etc.) and scaling. The data viewer offers several special features including auto scaling, overpaint, data normalizing, and displaying statistical parameters of the test data (such as mean, peak, avg, etc.) You will have a chance to use these features during the hands-on labs.

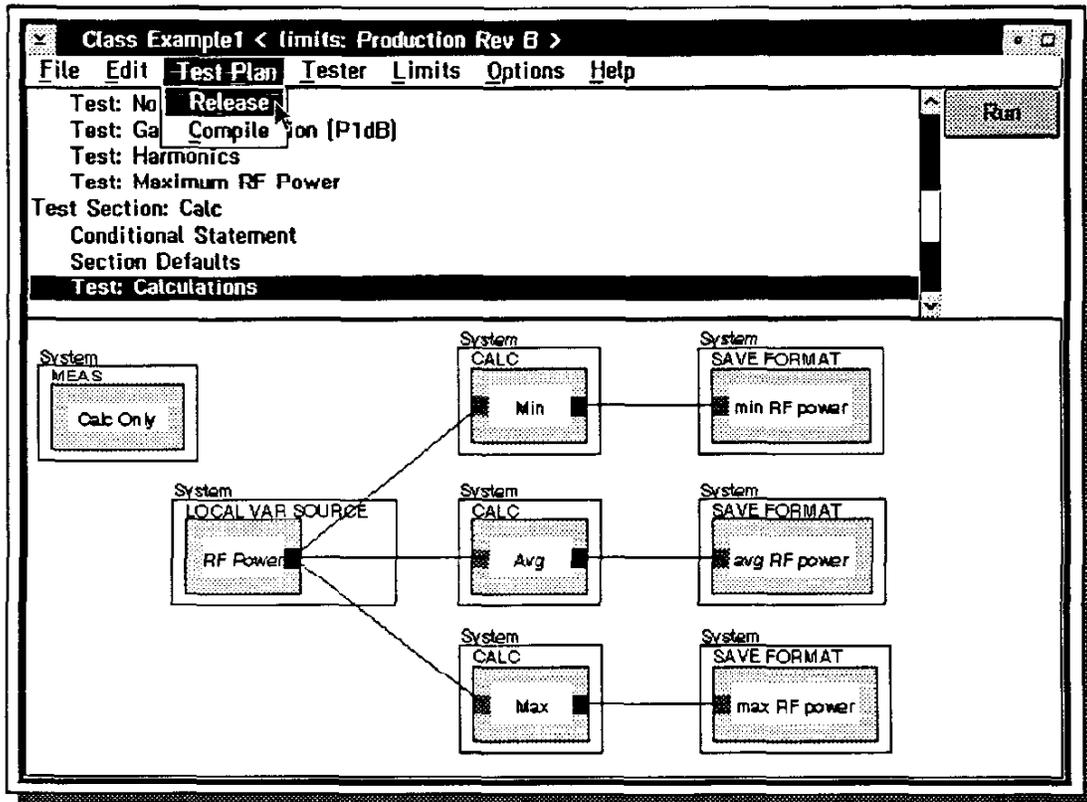
Test Plan Editor Window (Continued)



Saving a Test Plan

The user/test plan developer can save the test plan at any time by selecting the menu bar choices **File** and **Save**. The Test Plan Editor will save the test plan file on the local hard disc.

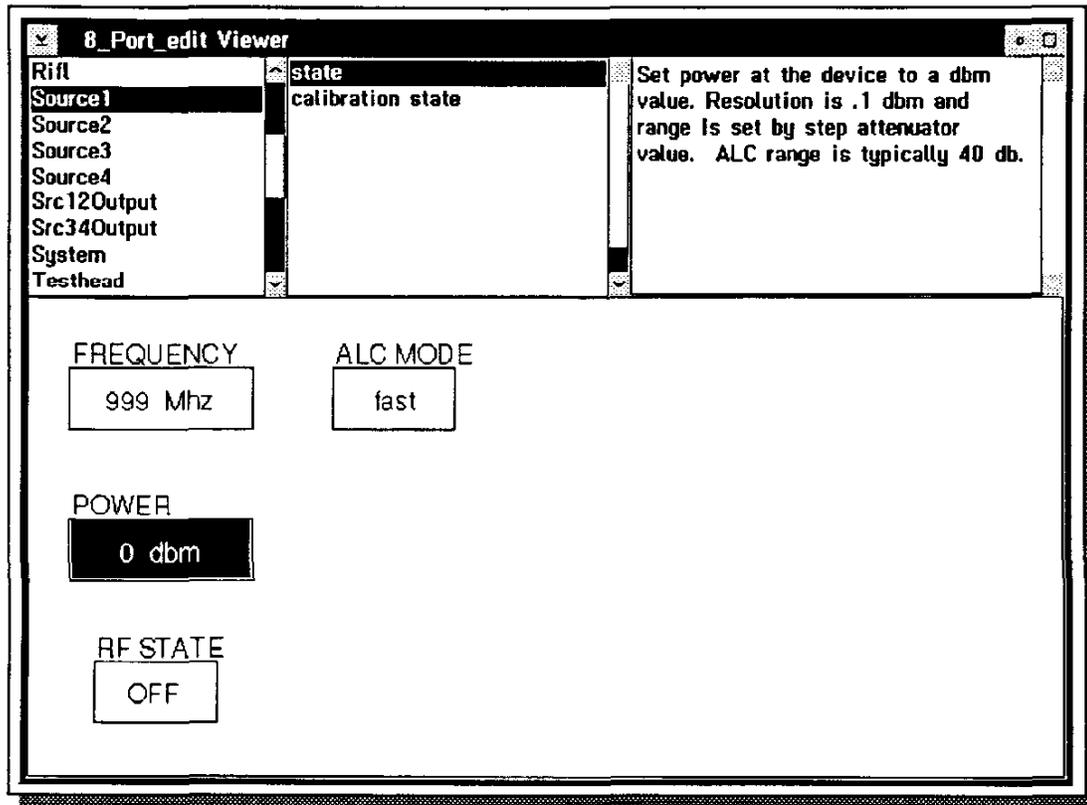
Test Plan Editor Window (Continued)



Releasing a Test Plan to Production

Once the test plan has been debugged and no further changes are to be made, the user can release the test plan to production by selecting the menu bar choices **Test Plan** and **Release**. The Release process consists of building the Data Tables in the Local Data Base, and tagging and saving the test plan as a released test plan. Once released, the test plan is unmodifiable and thus protected from any inadvertent changes. The released test plan can however be copied and the copied file can be modified, saved or released as a new test plan with a new file name.

RI Tester Viewer Window

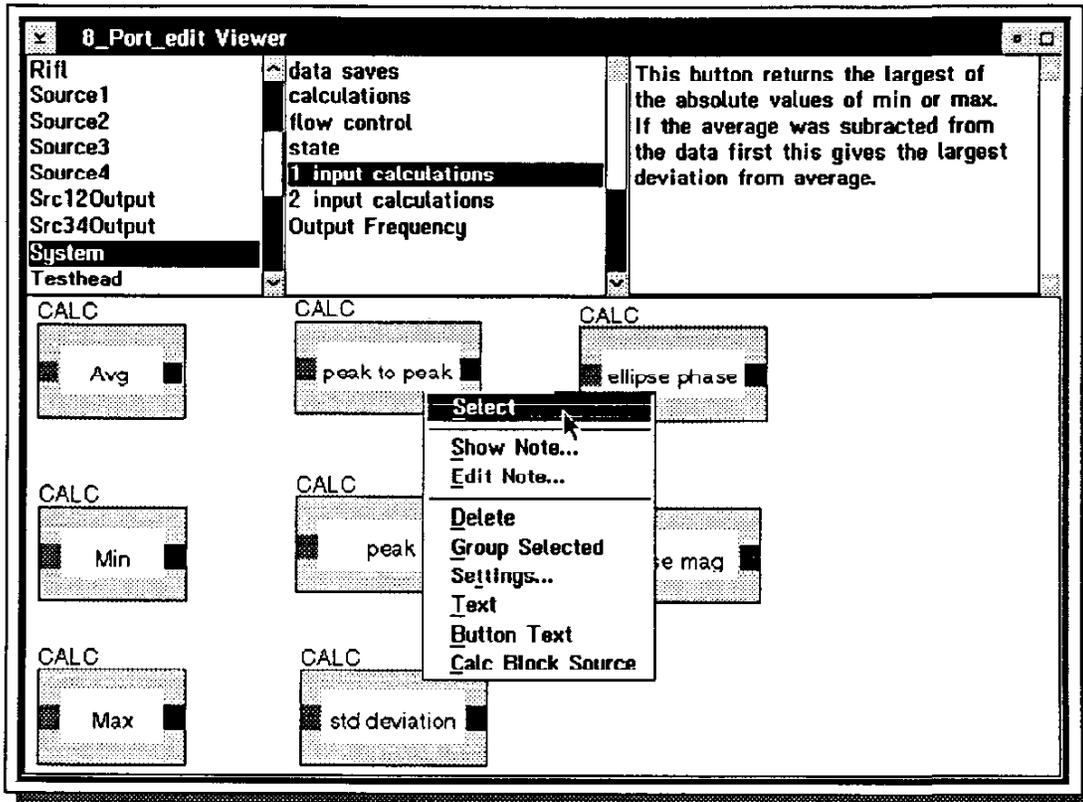


As previously mentioned, you create test plans by copying buttons from the Tester Viewer Window and pasting the buttons on to the test plan in the Test Plan Editor.

To open the Tester Viewer Window you select the Test Plan Editor's menu bar choices **Tester** and **View**. The Tester Viewer consists of four graphical panels: the Tester Instrument List (in the upper left corner), the Button Types List (to the right of the Instrument list), the Help Text Panel which displays a description of the button selected (in the upper right corner) and the buttons available for the instrument and button type selected (in the bottom half of the window.)

Each instrument in the tester configuration is listed in the Tester Instrument List. The Tester Instrument List also includes the title **System**. The **System** title is selected to display data save buttons, calculation buttons, and other misc buttons available.

RI Tester Viewer Window (Continued)



Buttons Available

The types of buttons available for each instrument, vary from instrument to instrument. The measurement instruments such as the System Receiver (listed as Receiver) contains measurement buttons for performing measurements, calibration buttons for performing internal calibration measurements and saving the calibration data, and state buttons for setting the instrument state. Other instruments such as the RF Stimulus Source (listed as Source1) contain state buttons for setting the source's RF frequency, RF power level, RF state, etc. To display the buttons associated with a specific instrument and button type, you select [highlight] the instrument title and then select [highlight] the button type. The Tester Viewer will display the buttons available. To copy a button place the mouse pointer on the button desired and click mouse button 2. Select the pop-up menu function **Select**.

Production Test Executives

RI Test Executives

.....

- **Defines the Entire Test Environment**
 - Custom Operator Interface**
 - Test Plans: Primary, Auxiliary & Continuity**
 - Limit Files: Base, Premium Grade & Continuity**
 - Binning Map/Criteria**
 - Retest Criteria**
 - Pause Test Criteria**
 - Special Fail Criteria**
 - Printing Test Results Summary Info**
 - Saving Test Results to System Data Base**

Roos Instruments

With the Package Test Exec Container Window and the Package Test Exec Editor Window, you can create simple, easy to use operator interfaces/test execs for testing devices in production. The entire test environment presented to a production operator is defined by these custom test execs you create. Each test exec includes the following information:

The Test Plan files to be executed.

The Test Limit files to be used.

The binning Map/criteria applied.

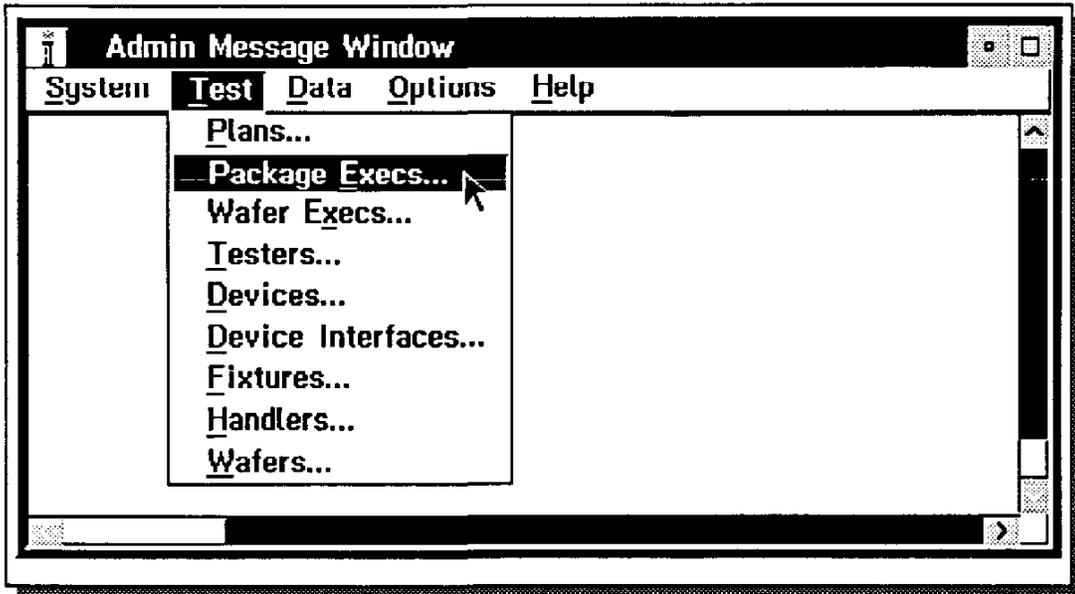
The Retest Criteria.

Conditions under which the testing should be paused (such as 5 consecutive device failures in a row.)

The types of data printed by the System Printer (none, lot summaries and/or subplot summaries.)

Saving the test results in the System Data Base.

Creating a Package Test Exec



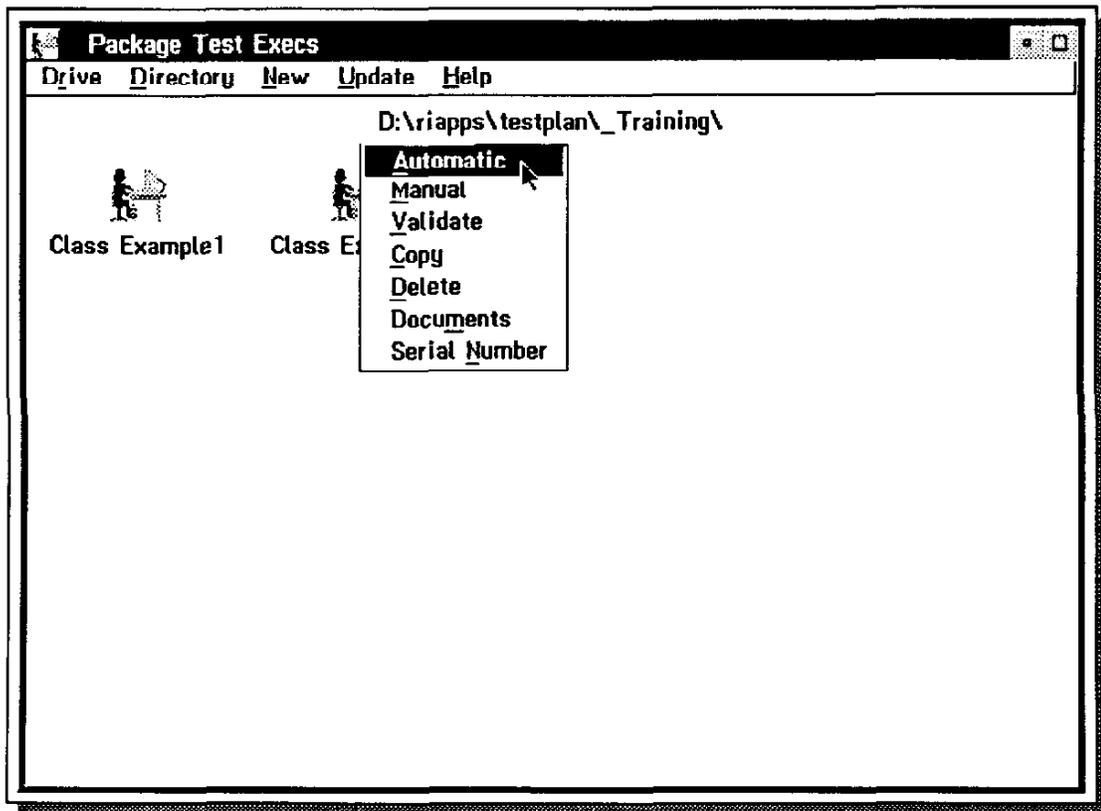
The process for creating a new test executive is very simple.

- 1) Open the Package Test Execs Container Window and create a new Test Exec.
- 2) Open the Automatic Package Test Executive Editor and customize the Test Exec you just created.
- 3) Run the Test Exec, verify that all of the changes have been made and save the customized Test Exec on the hard disc.

Opening the Package Test Execs Container Window

To open the Package Execs Container Window, select the RI Message Window's menu bar choices **Test** and **Package Execs**.

Creating a Package Test Exec (Continued)



Package Test Execs Container Window

The Package Test Execs Container Window performs 4 basic functions. It contains all of the Package Test Execs currently defined. It lets you create new Test Execs. It provides you access to the Test Exec functions: Copy, Delete, Validate, Documents & Serial Number and it provides you access to the **Automatic** and the **Manual** Test Exec Editor Windows.

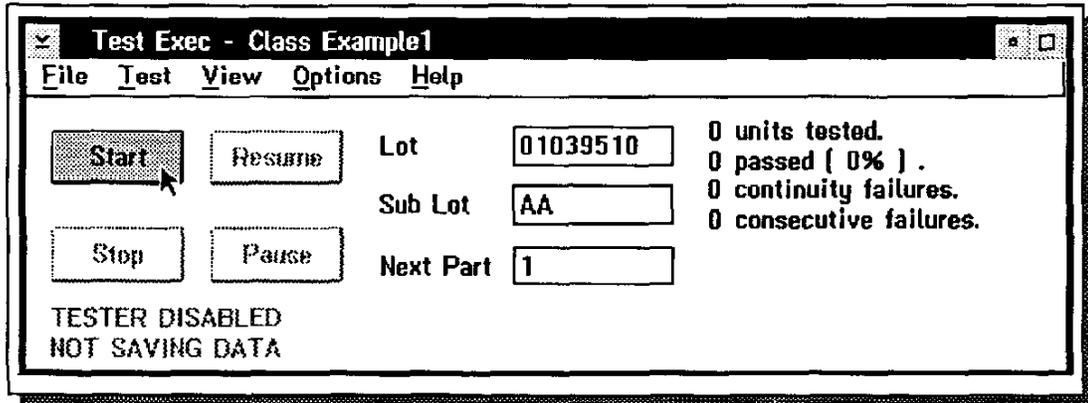
Creating a Package Test Exec

We can create a new Test Exec by selecting the Container Window's menu bar choices: **New** and **Test Exec**. The System Software will create the icon/object for a new Test Exec and place the icon/object in the container window with the name you select.

Opening the Package Test Exec Editor

After you create the test exec object you can use the Automatic Test Exec Editor or the Manual Test Exec Editor to define all of the characteristics of the test exec. To open the Automatic Test Exec Editor Window, select your test exec's pop-up menu choice: **Automatic**. (In the example shown above we are opening the Automatic Test Exec Editor Window for the Class_Example2 test exec.)

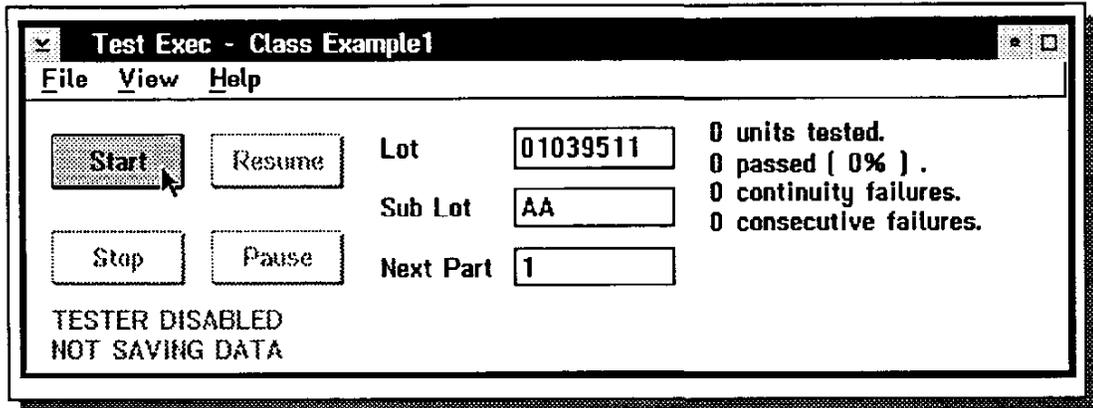
Automatic Package Test Executive Editor Window



The Package Test Executive Editor provides the test plan developer the capability to customize the entire test environment presented on the System Computer to the operator in production. Using the Editor's menu bar choices and functions, the test plan developer selects test plan files, selects test limit files and configures the custom operator interface/test executive to be used in production. The test plan developer saves the custom configured operator interface/production test executive, the names of the test plan files selected and the names of the test limit files selected, in a user defined test executive file.

A copy of the operator interface/production test executive you are creating is continuously displayed in the Editor's working panel (just below the menu bar) and updates each time you make a change. This custom configured operator interface can be used to test devices and to debug the custom operator interface/production test executive you are creating.

Automatic Package Test Executive/Operator Interface



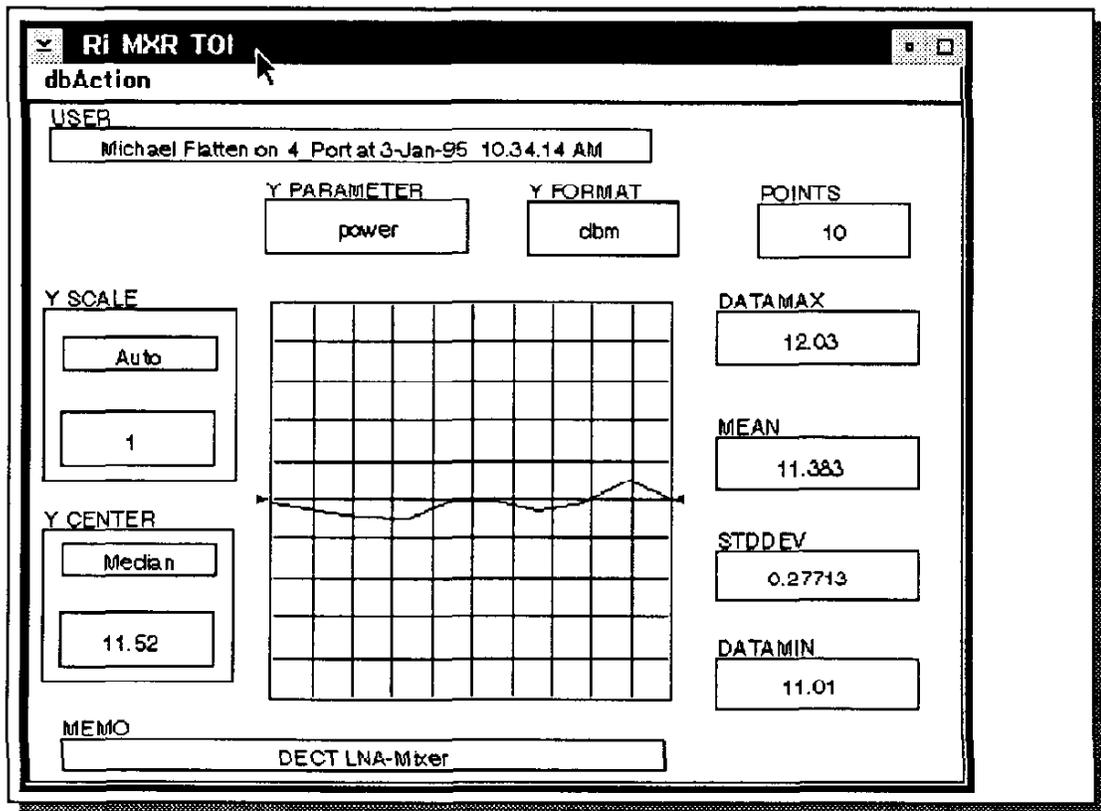
To perform automated testing in production the operator opens the Package Test Executive Container Window, selects and opens a test executive file, enters the lot#, subplot# and the starting part#, and selects the **Start** button.

The system will begin testing parts. (If you select the **Start** button without entering the lot, subplot and/or the starting part#, the system will leave the lot and subplot names blank and start at part number 1.) The summary information (in the upper right corner of the window) will be updated as each part is tested. To stop the testing you select the **Stop** or **Pause** button.

The operator can open test results histograms by selecting the view menu choice.

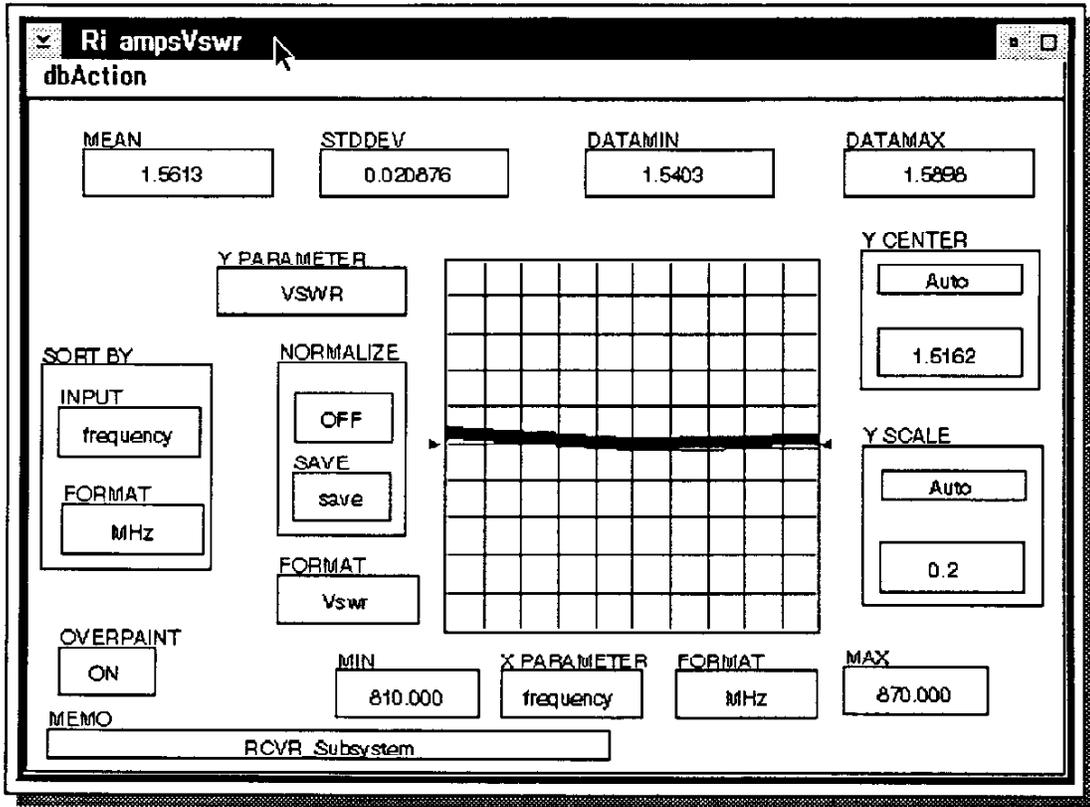
An example of an Automatic Package Test Exec/Operator Interface is shown above.

Data Base Viewers



After each part is tested by the Packaged Test Exec, the System Software automatically saves all of the test results in a local SQL Data Base. The System Software offers you easy-to-use software tools to extract, filter, plot and/or export the test data generated. Two examples of Data Base Viewers are shown in the slide above and the next slide.

Data Base Viewers



Building and Running a Test Plan

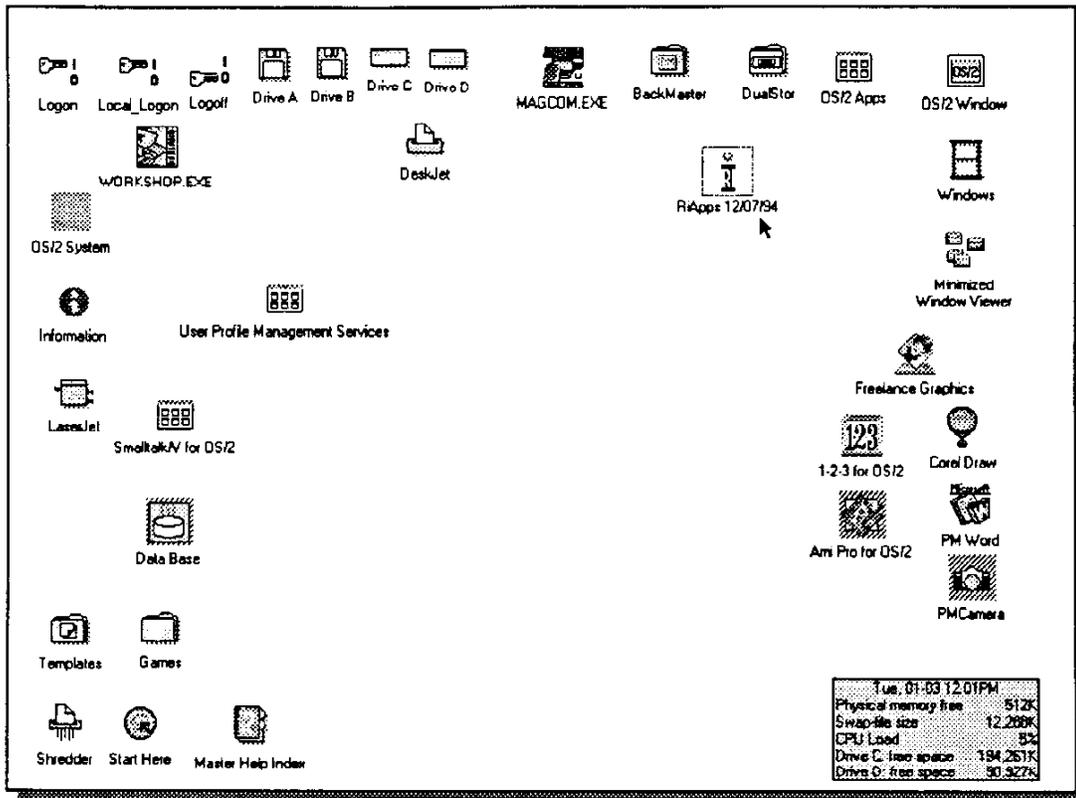
Building and Running a Test Plan

- **Start-Up**
- **Creating a New Test Plan**
- **Adding Test Sections and Tests**
- **Building a Test Panel**
- **Copying, Pasting and Moving Buttons**
- **Adding Additional Tests**
- **Optimizing, Compiling and Running the Test Plan**
- **Viewing the Test Results**
- **Adding Test Limits**
- **Saving and Releasing the Test Plan**

Fluor Instruments

We will now go through the basic steps of building and running a Test Plan. (Later during the hands-on-lab you will be asked to create a test plan using this process.)

Start-Up



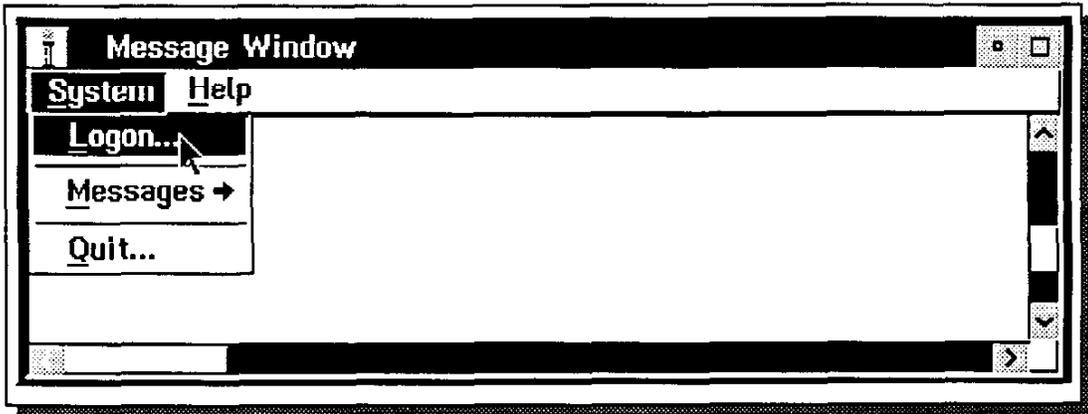
Basic Steps for starting up the Tester:

Turn on the System Instrumentation and the System Computer.

Open the **RI Application** object/icon. (Place the mouse pointer on the **RI** icon and double click mouse button 1.)

The System Computer will open and display the RI Message Window.

User Log-on

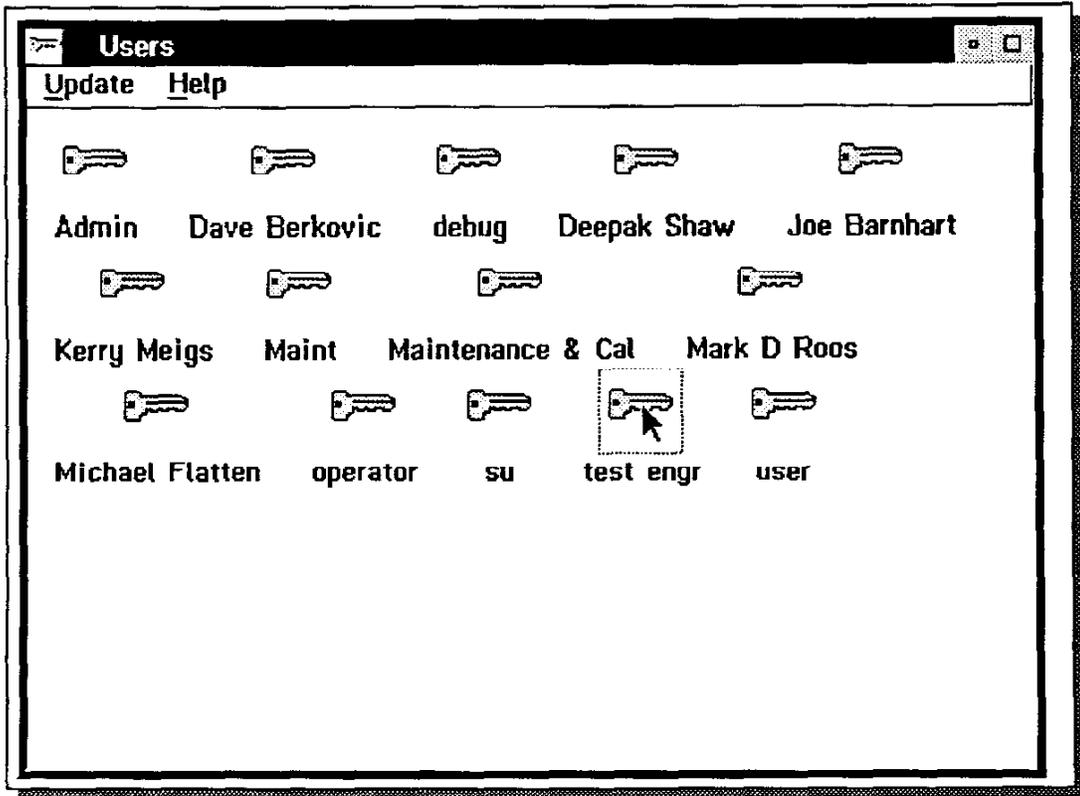


The Test System offers the user several levels of accessibility to the System Software depending on the type of user (system administrator, system programmer, test plan developer, test operator, etc.) To obtain the appropriate level of access the user must first log-on to the System Computer with their name and password or use one of the standard access names and passwords. (Talk to your Test System Administrator about adding your name and password to your test system.) If you do not log-on, the System Software will prevent you from running any test plans or test execs and will deny you access to the test data.

Basic Steps to log on to the System Computer:

Select the RI Message Window's menu bar choices: **System** and **Logon....**

User Log-on (Continued)

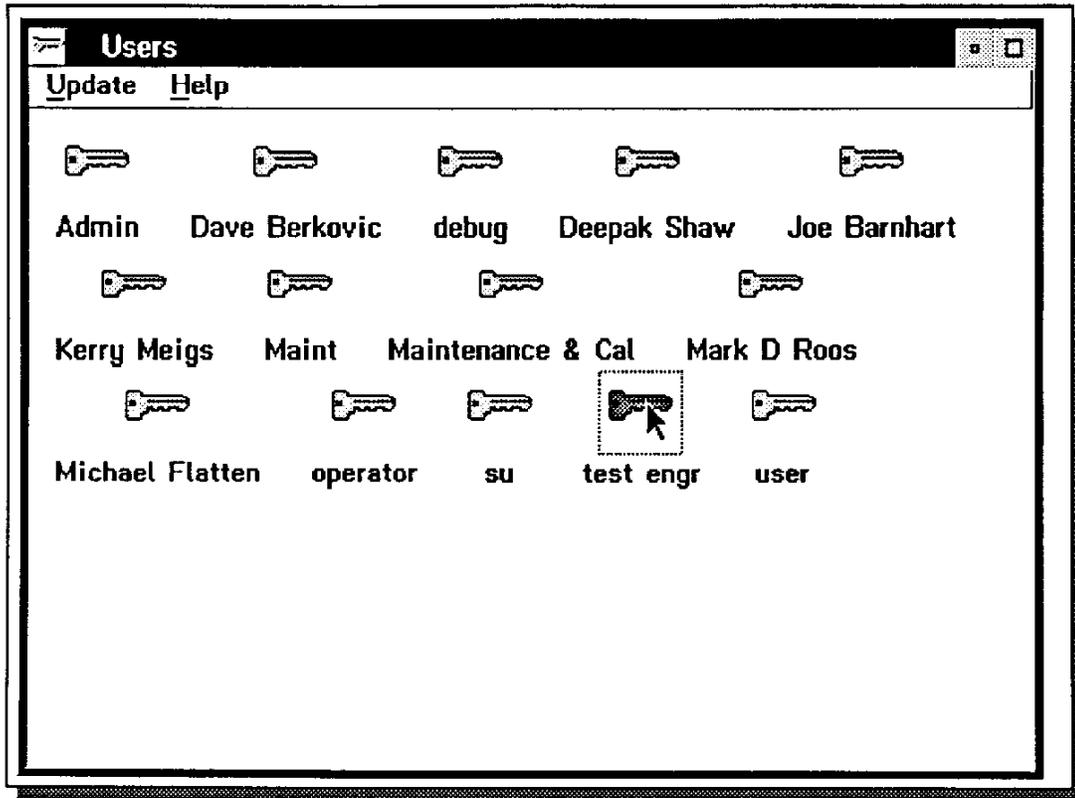


The System Computer will display the Users Container Window.

Place the mouse pointer on the appropriate user icon and double click mouse button 1.

Use the keyboard to enter your password. Select the OK button.

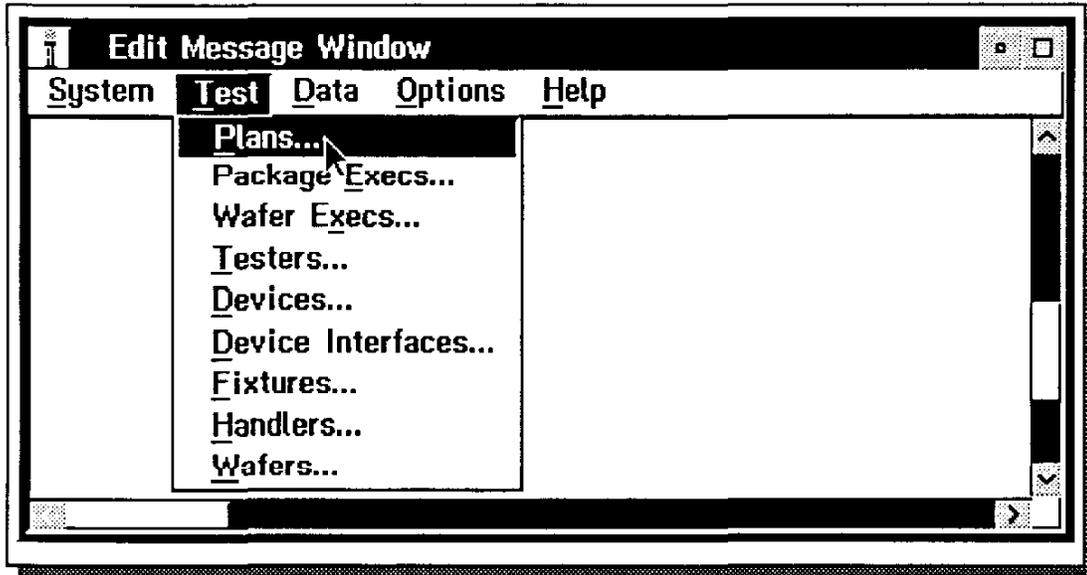
User Log-on (Continued)



The System Computer will change the user icon to red and add the word Admin or Edit to the title of the RI Message Window to indicate the level of access you now have.

Return to the RI Message Window by selecting the RI Message Window's Title Bar.

Creating a New Test Plan



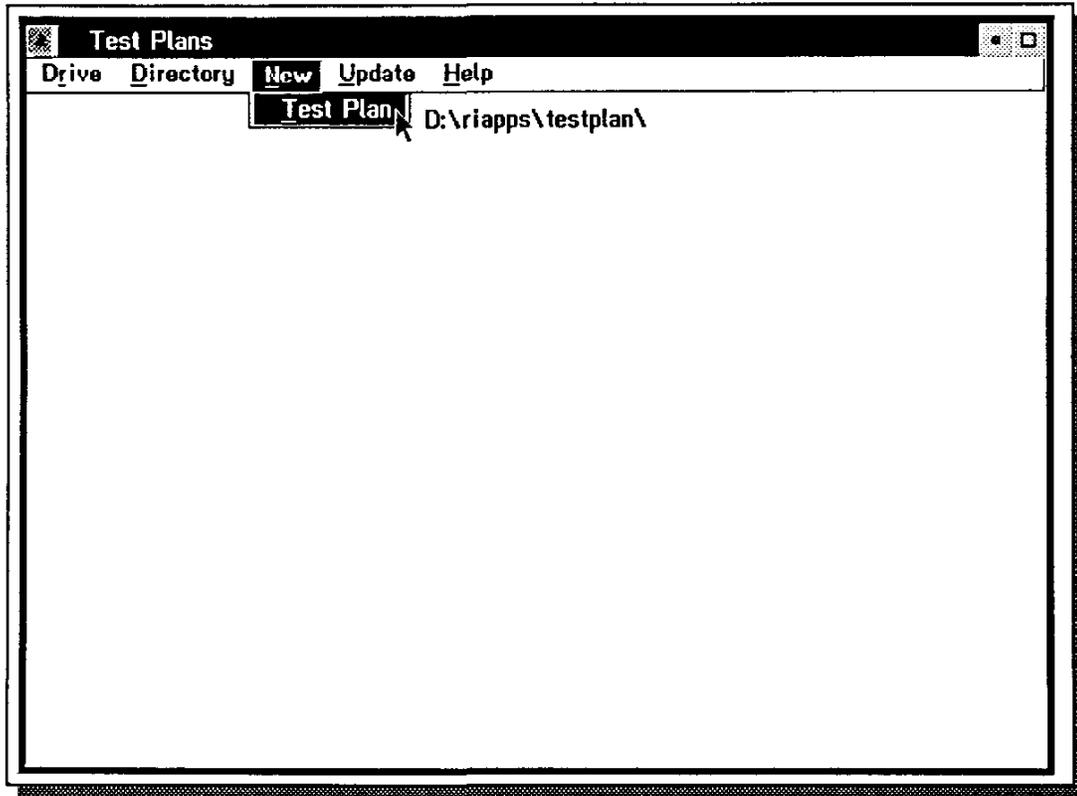
Use the following steps to create a new test plan.

Open the Test Plan Container Window

Select the RI Message Window's menu bar choices: **T**est and **P**lans....

The System Computer will open and display the Test Plan Container Window.

Creating a New Test Plan

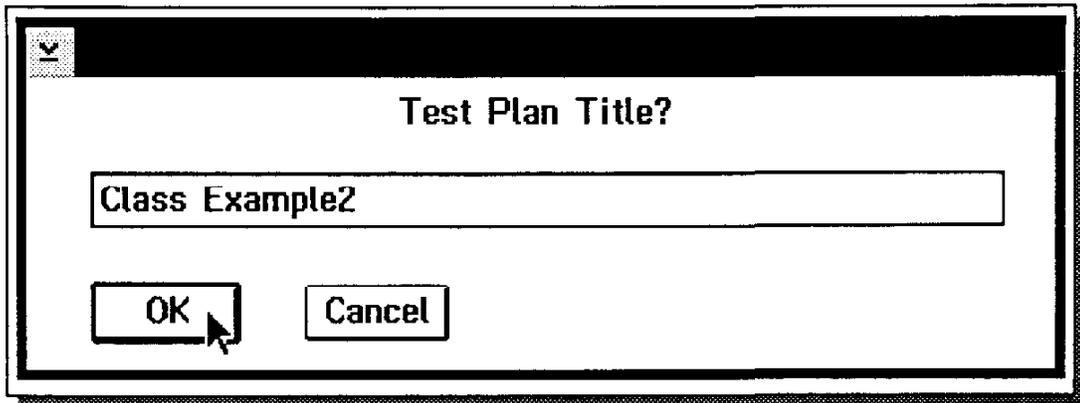


Create a New Test Plan

Select the Test Plan Container Window's menu bar choices **New** and **Test Plan**.

The System Computer will display the dialog box: **Test Plan Title?**.

Creating a New Test Plan



Select the Title of the New Test Plan

Enter the title of the new test plan.

Select the **OK** button or press the **Enter** key.

[**Class Example2** was entered as the Test Plan title in the example shown.]

The System Computer will display the dialog box: **System Definition**.

Creating a New Test Plan

The screenshot shows a dialog box titled "System Definition" with a dropdown arrow on the left. It contains four labeled fields, each with a pull-down menu:

- Device:** The pull-down menu is open, showing a list with "all duts" highlighted. A mouse cursor is pointing at the "all duts" entry.
- Interface Board:** The pull-down menu is open, showing a list with "Amp_Mixer" and "Amp_Mixer16".
- Fixture:** The pull-down menu shows "<None>".
- Tester:** The pull-down menu shows "<None>".

At the bottom of the dialog box are two buttons: "OK" and "Cancel".

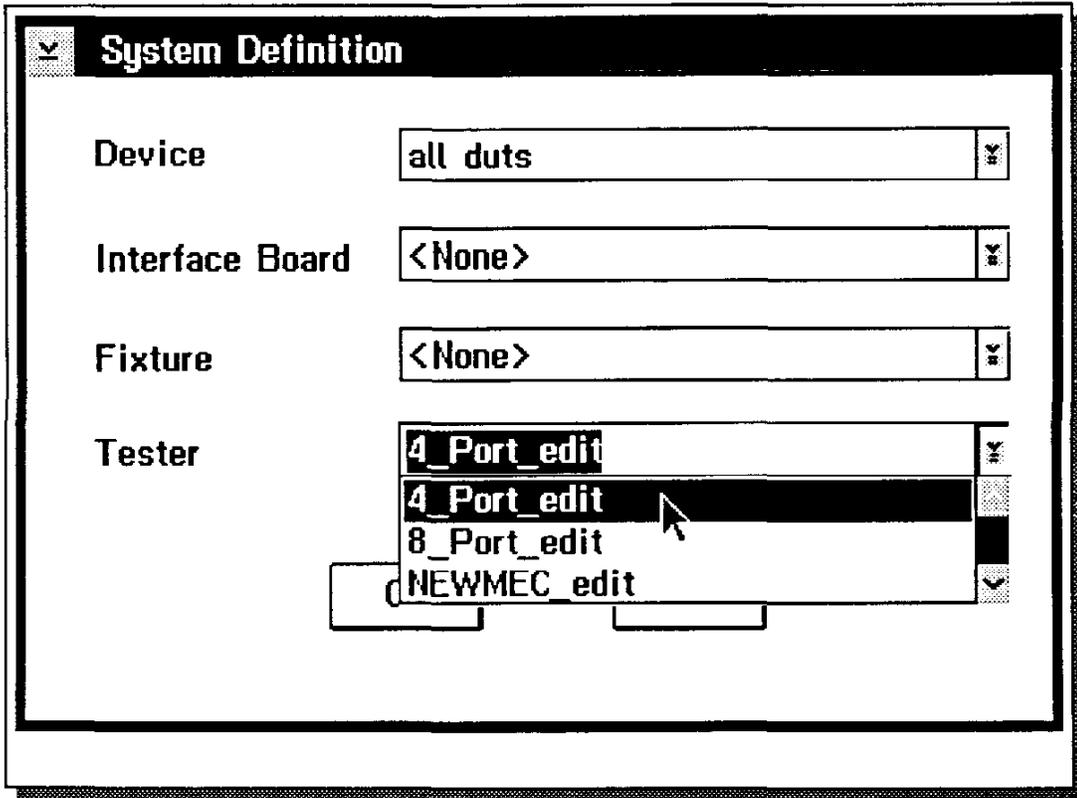
Select the Device Type

Select [highlight] the down arrow to the right of the **Device** entry field.

Select the device type from the pull down list presented.

[all duts was selected in the example shown.]

Creating a New Test Plan



The screenshot shows a dialog box titled "System Definition" with a dropdown arrow on the left. It contains four configuration fields:

- Device:** all duts
- Interface Board:** <None>
- Fixture:** <None>
- Tester:** A pull-down menu is open, showing a list of options: 4_Port_edit (highlighted), 4_Port_edit, 8_Port_edit, and NEWMEC edit. A mouse cursor is pointing at the second 4_Port_edit option.

Select the Edit Tester Configuration

Select [highlight] the down arrow to the right of the **Tester** entry field.

Select the Edit Tester Configuration from the pull down list presented.

[4_Port_edit was selected in the example shown.]

Creating a New Test Plan

System Definition

Device	all duts
Interface Board	<None> Universal Xmtr_Rcvr38 <None>
Fixture	<None>
Tester	4_Port_edit

OK Cancel

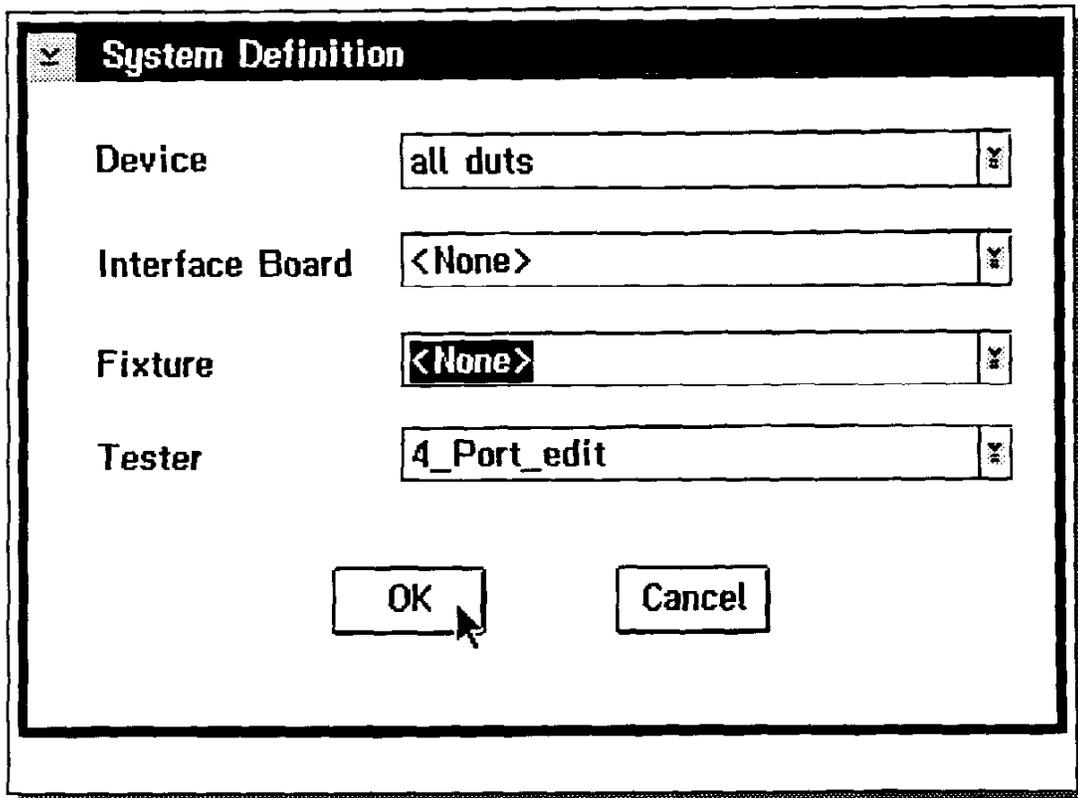
Select the Interface Board

Select [highlight] the down arrow to the right of the **Interface Board** entry field.

Select the **Interface Board Configuration** from the pull down list presented.

[None was selected in the example shown.]

Creating a New Test Plan



The image shows a dialog box titled "System Definition" with a dropdown arrow icon on the left. It contains four input fields, each with a dropdown arrow on the right:

- Device: all duts
- Interface Board: <None>
- Fixture: <None>
- Tester: 4_Port_edit

At the bottom of the dialog box are two buttons: "OK" and "Cancel". A mouse cursor is pointing at the "OK" button.

Select the Fixture

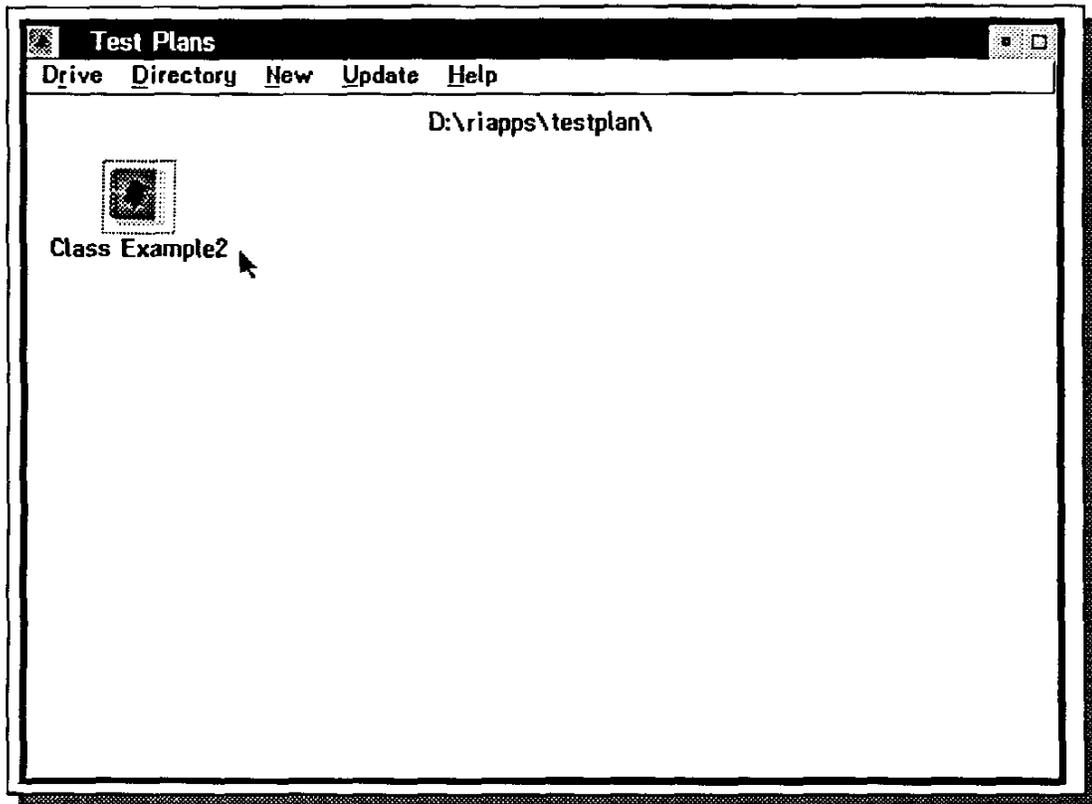
Select [highlight] the down arrow to the right of the **Fixture** entry field.

Select the Fixture Configuration from the pull down list presented.

[None was selected in the example shown.]

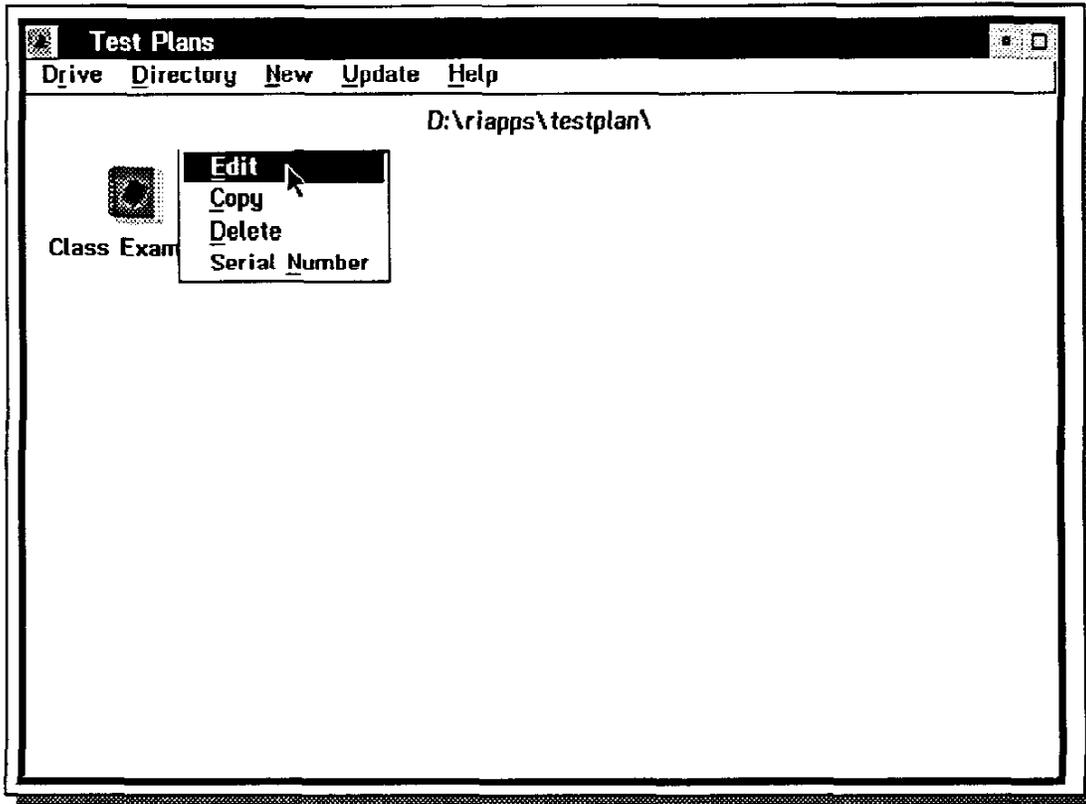
The System will again display the **Test Plans Container Window** and will add your new test plan object/icon to the window.

Opening the Test Plan Editor Window to Edit a Test Plan



Place the mouse pointer on your Test Plan and click mouse button 2. [Class Example2 was selected in the example shown.]

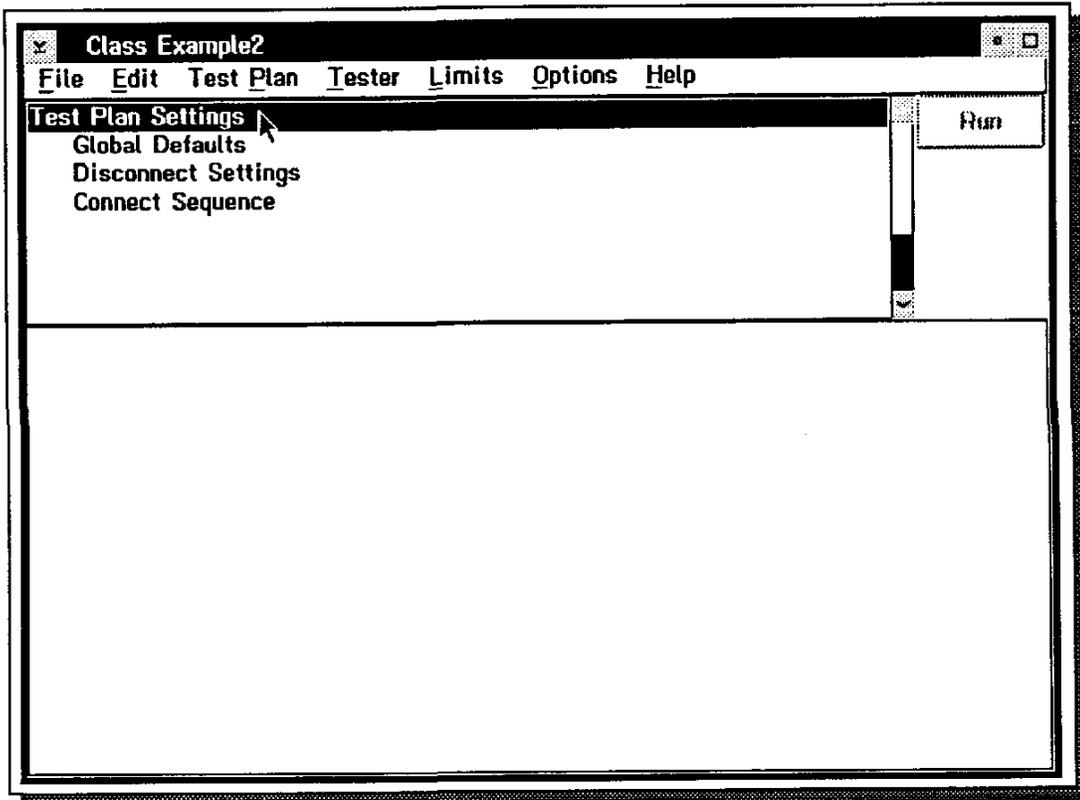
Opening the Test Plan Editor Window to Edit a Test Plan



Select the pop-up menu choice: **Edit**.

The System will open the Test Plan Editor Window for the test plan selected.

Test Plan Structure



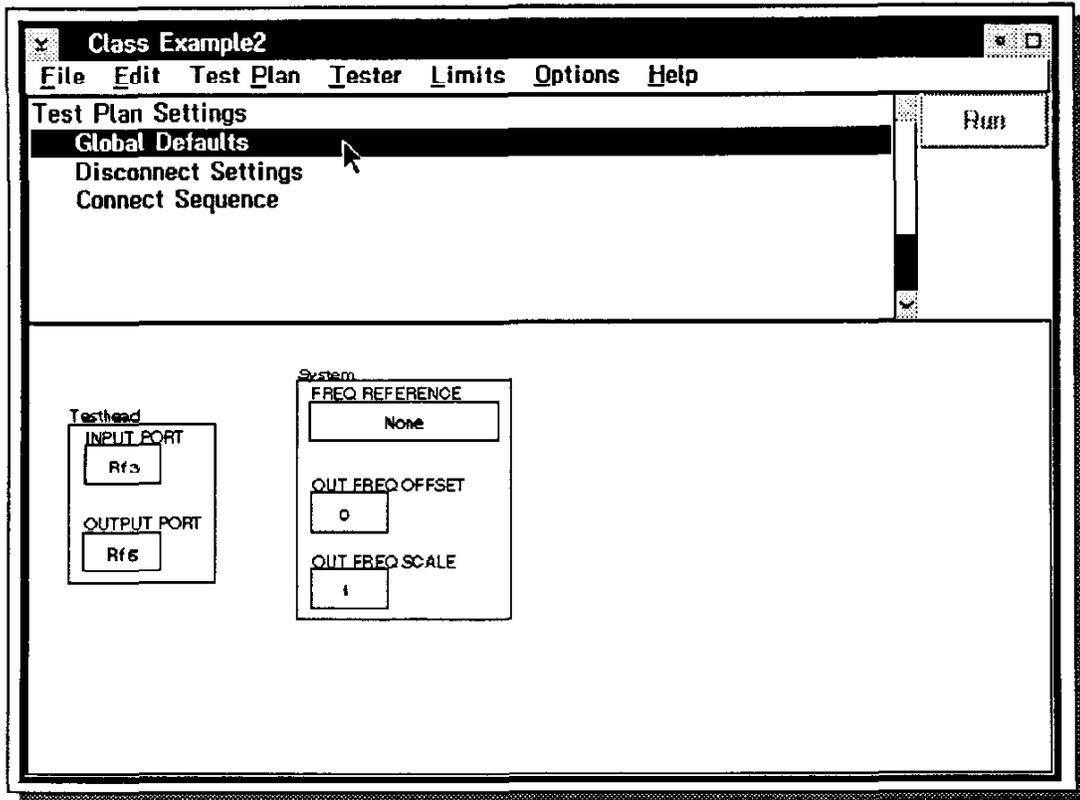
Title Bar & Test Plan Outline

The name of the new test plan will be displayed in the title bar. The first three lines of the new test plan outline will be displayed in the test plan outline panel.

The Test Plan Settings Line

The first line in the test plan outline is the test plan settings line or test plan header. The test plan header does not have a test/settings panel associated with it. If the Test Plan Settings line is selected [highlighted] in the test plan outline, the working space shown in the test/settings panel will always be blank.

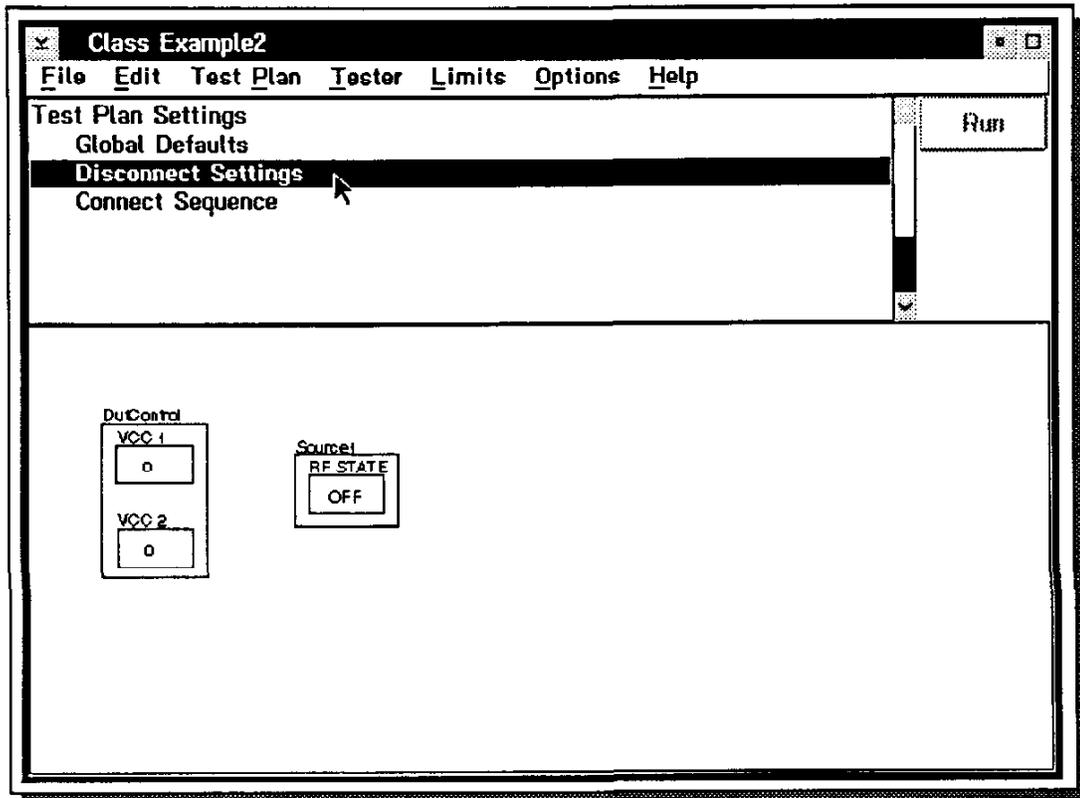
Test Plan Structure



The Test Plan Global Defaults

The second line in the test plan outline is the Test Plan's Global Defaults. The Global Defaults' test/settings panel is used to define the Test Plan's default settings for all of the instruments in the tester. This panel enables the user to specify settings once at the beginning of the test plan which are then used throughout the test plan, instead of having to specify these settings in each test panel. The Global Defaults settings are over-written by the settings specified in the Section Defaults panels, the Disconnect Settings panel and any test panel.

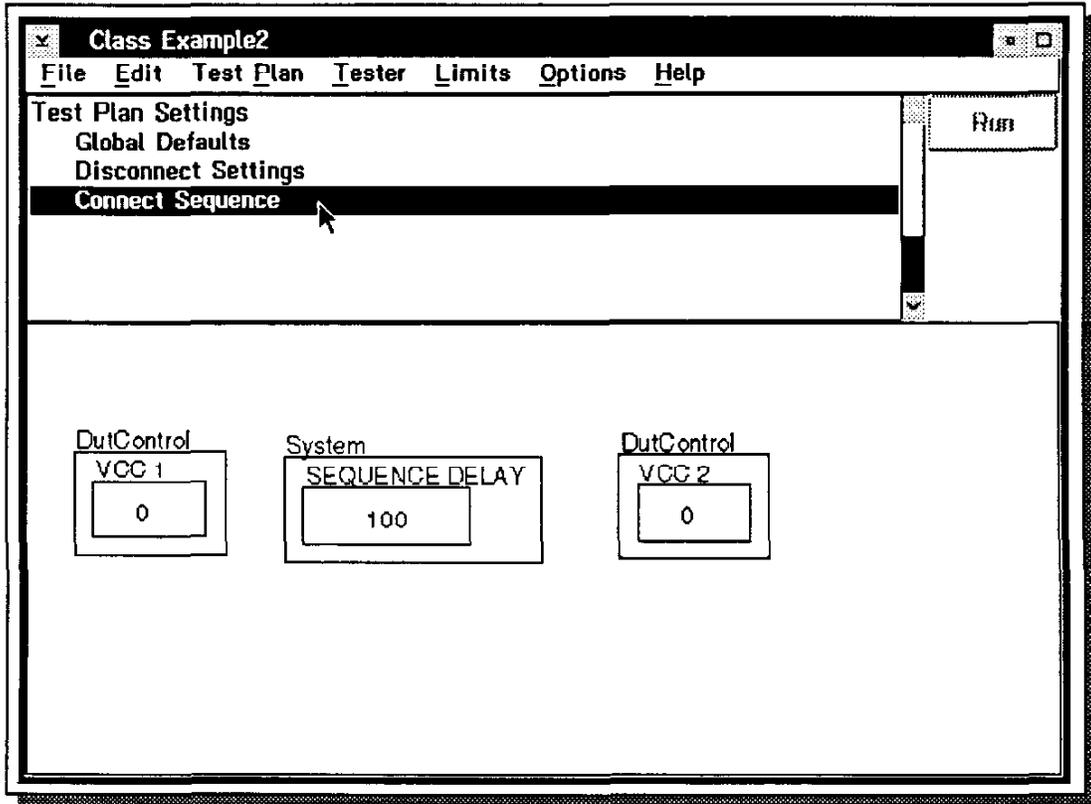
Test Plan Structure



The Disconnect Settings Panel

The third line in the test plan outline is the Disconnect Settings Panel. The Disconnect Settings Panel defines the specific state of all of the instruments in the tester at the moment the device-under-test is connected to and disconnected from the tester. The Disconnect Settings Panel enables the user to specify the initial settings of all of the instruments in the system. These instrument state/settings over-write all other settings including the Global Defaults settings. This panel provides the user the capability for example to turn off the DC and RF signals to the device-under-test just prior to connecting the device to the prober/device handler or just prior to disconnecting the device from the prober/device handler.

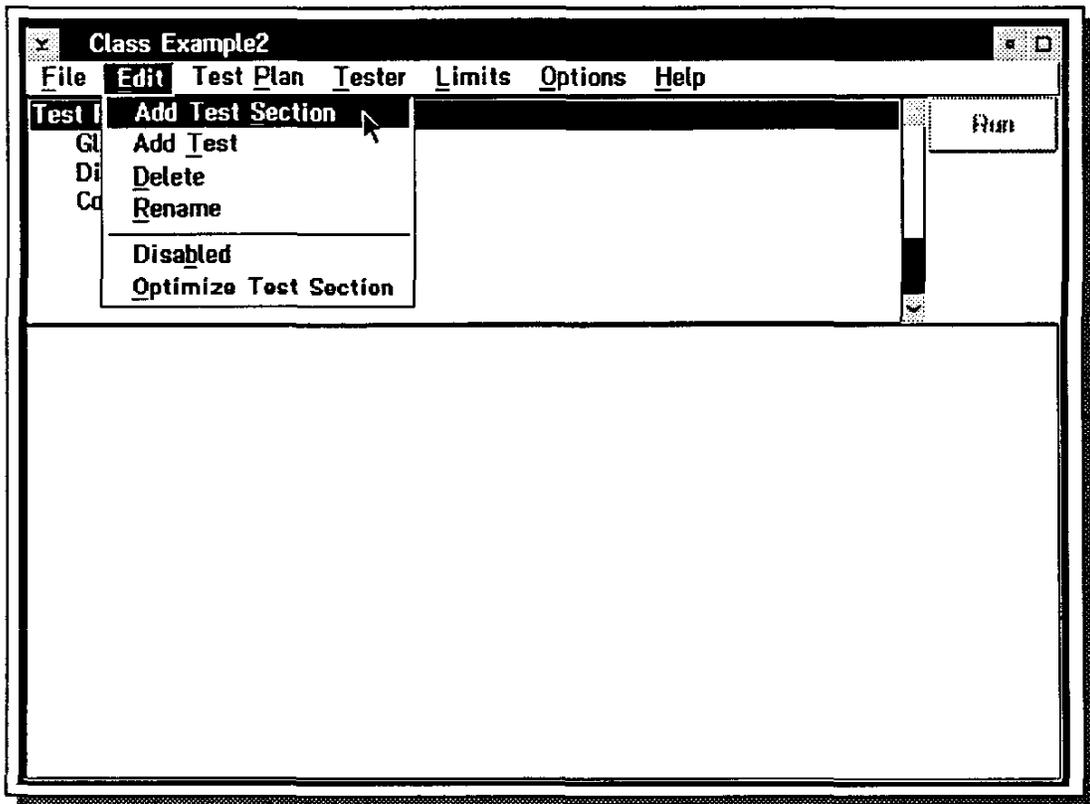
Test Plan Structure



The Connect Sequence Panel

The fourth line in the test plan outline is the Connect Sequence Panel. The Connect Sequence Panel defines the order in which settings are activated. The order of execution is from left to right. In the example shown the VCC1 supply is turned on 100 usec before the VCC2 supply is turned on. This sequence will be maintained through out the test plan. This panel only defines the order in which the sequence dependent instrument settings are performed. (The values for these settings must be defined elsewhere, either in the Global or Section Defaults or in the individual tests.)

Adding a Test Section

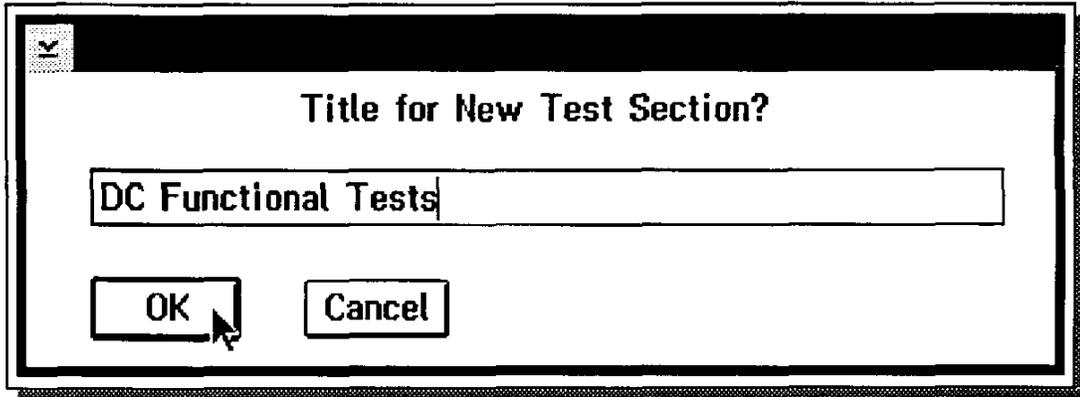


Each test plan must have at least one test section. To add a test section to the test plan, use the following steps.

Select [highlight] the **Test Plan Settings** line.

Select the menu bar choices: **Edit & Add Test Section**.

Adding a Test Section



Selecting the Title for the Test Section

The System will display the dialog box: **Title for New Test Section?**

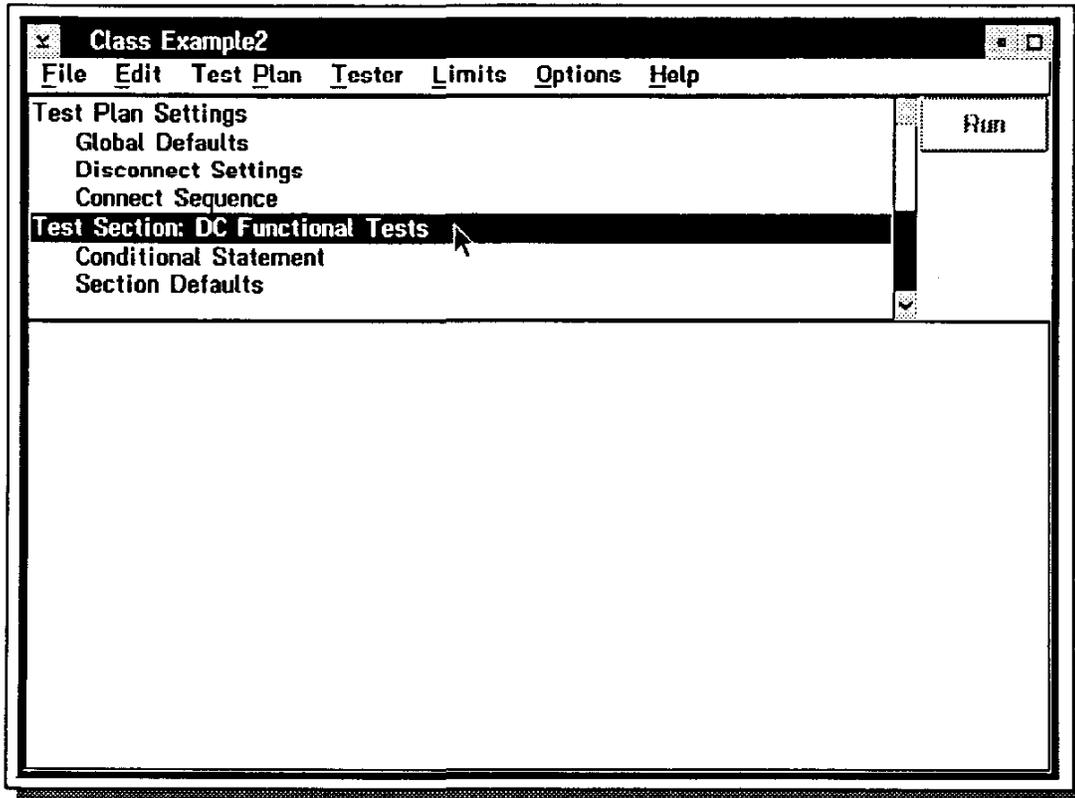
Enter the title of the new test section.

Select the **OK** button or press the **Enter** key.

[**DC Functional Tests** was entered as the title in the example shown.]

The System will again display the **Test Plan Editor Window**.

Adding a Test Section

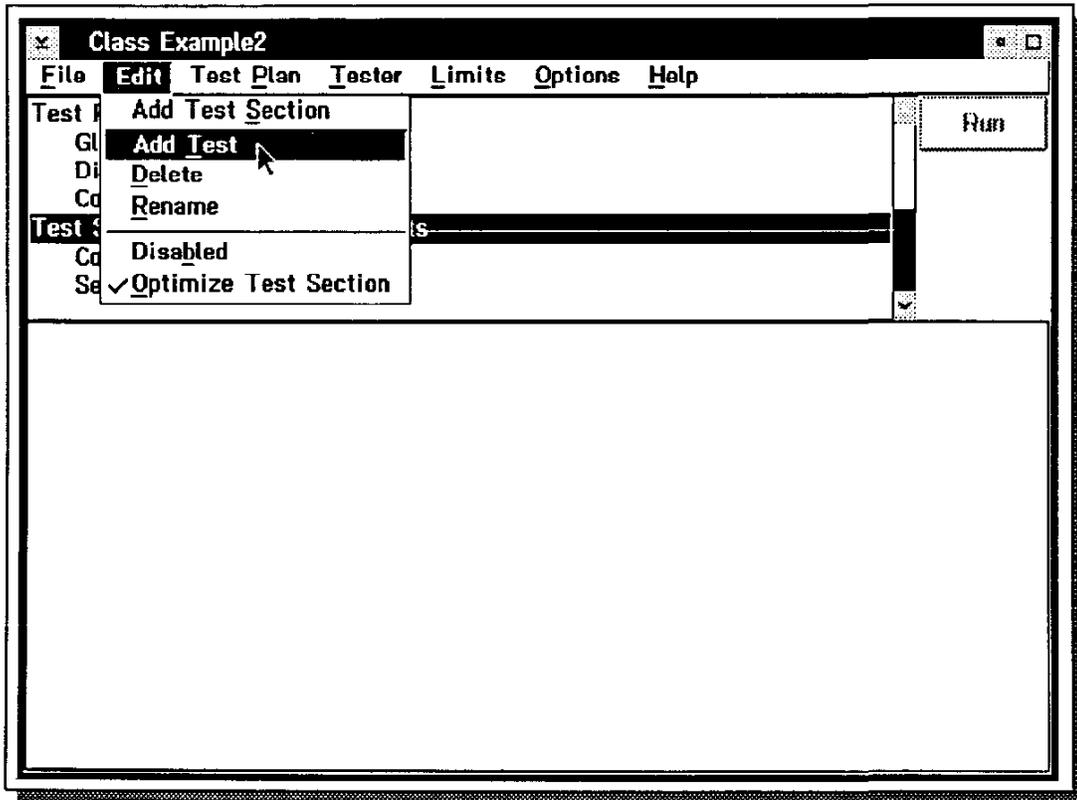


Test Section

Three lines will be added to the test plan outline for each new test section: the Test Section Header with the title of the test section, the test section Conditional Statement and the test Section Defaults. Test sections enable you to group together individual tests, to define conditional statements (logical statements for deciding if the tests in this test section should be performed or skipped), and to set default instrument settings for the tests in the test section. A typical use for adding a test section is to separate the functional tests from the characterization tests. The conditional statement is then used to instruct the tester to skip the characterization tests if the device fails the functional tests.

Please Note: The Test Plan Optimizer can only optimize the testing sequence for those tests within a test section. The Optimizer can not optimize across test section header labels. For this reason we recommend that the user add the minimum number of test sections needed.

Adding a Test to a Test Section

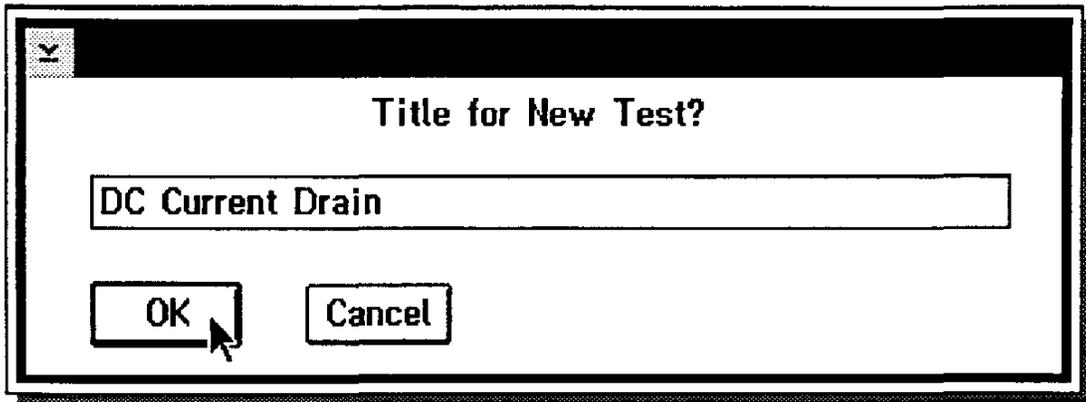


Each test section must have at least one test. To add a test to the test section, use the following steps.

Select [highlight] the Section Defaults line in the test plan outline.

Select the menu bar choices: **Edit** and **Add Test**.

Adding a Test to a Test Section



Adding a Title for a new Test

The System will display the dialog box: **Title for New Test?**.

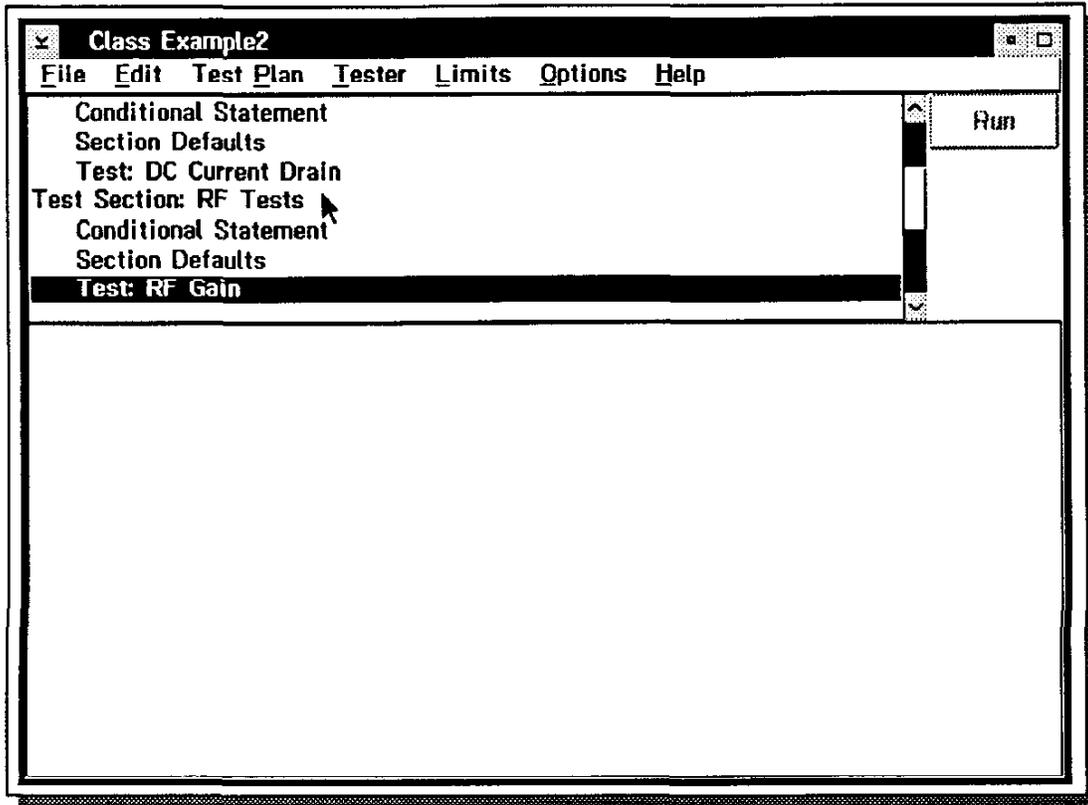
Enter the title of the new test.

Select the **OK** button or press the **Enter** key.

(**DC Current Drain** was entered as the test title in the example shown.)

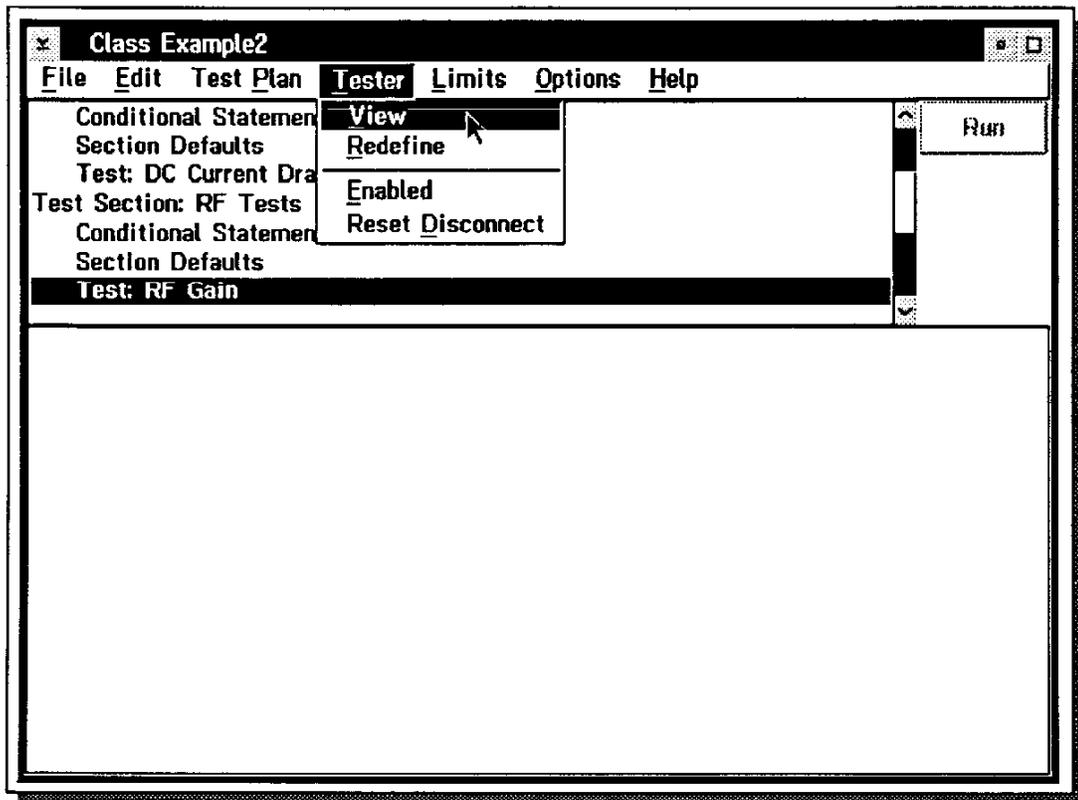
The Test Plan Editor will add the line **Test: DC Current Drain** to the test plan outline and provide a blank test panel for the test buttons.

Adding Additional Tests and Test Sections



In the example shown we went ahead and added an additional test section (RF Tests) and added another test to the test plan outline (RF Gain) using the same process we just followed. We can go back at any time and modify any of the previous lines or test/settings panels by just selecting [highlighting] the line desired in the test plan outline and using the menu bar **Edit** choices. We can also add additional tests to the first test section by selecting the line **Test: DC Current Drain** and again selecting the menu bar choices **Edit** and **Add Test**. The new test will be added after the line selected.

Building a Test



To create the RF Gain test we need to add buttons to its test panel. The process is simple. We will go through the process of copying and pasting the GAIN measurement button to the test panel as an example of the process.

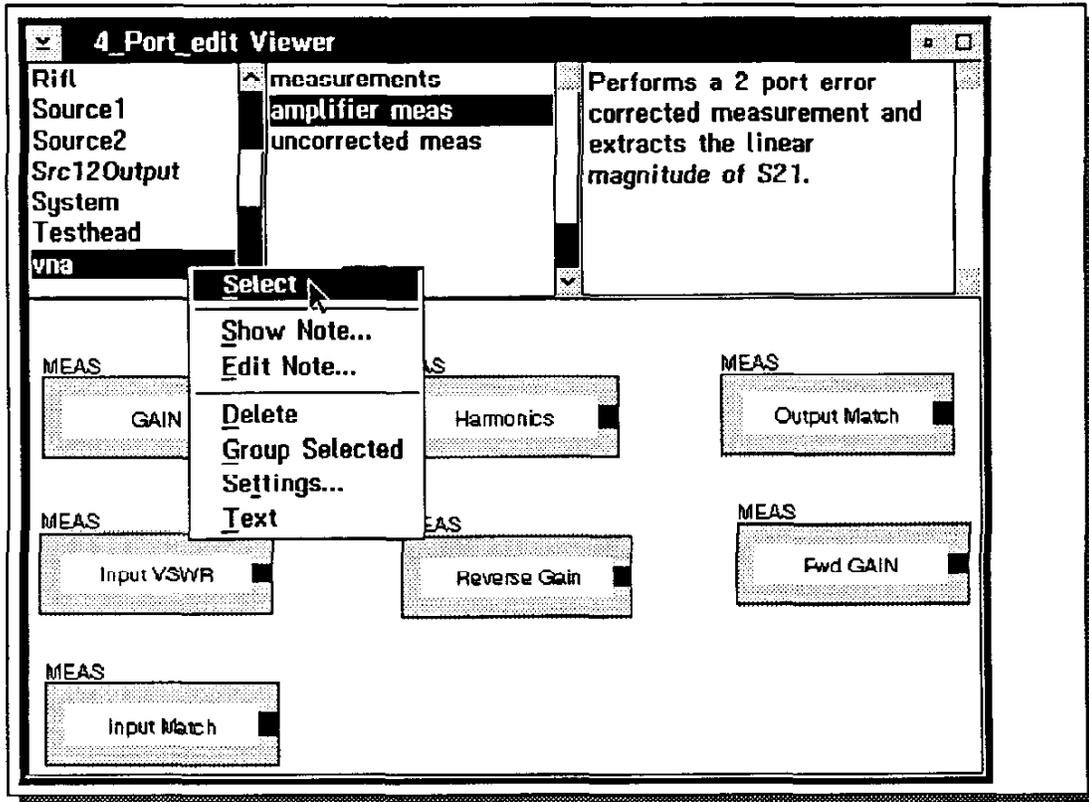
Open the Tester Viewer Window

Select the menu bar choices **Tester** and **View**.

(If the Tester Viewer window is already open on the computer screen, just select the title bar on the Tester Viewer window or any other location on the window to make it the active window.)

The System will display the Tester Viewer window.

Building a Test



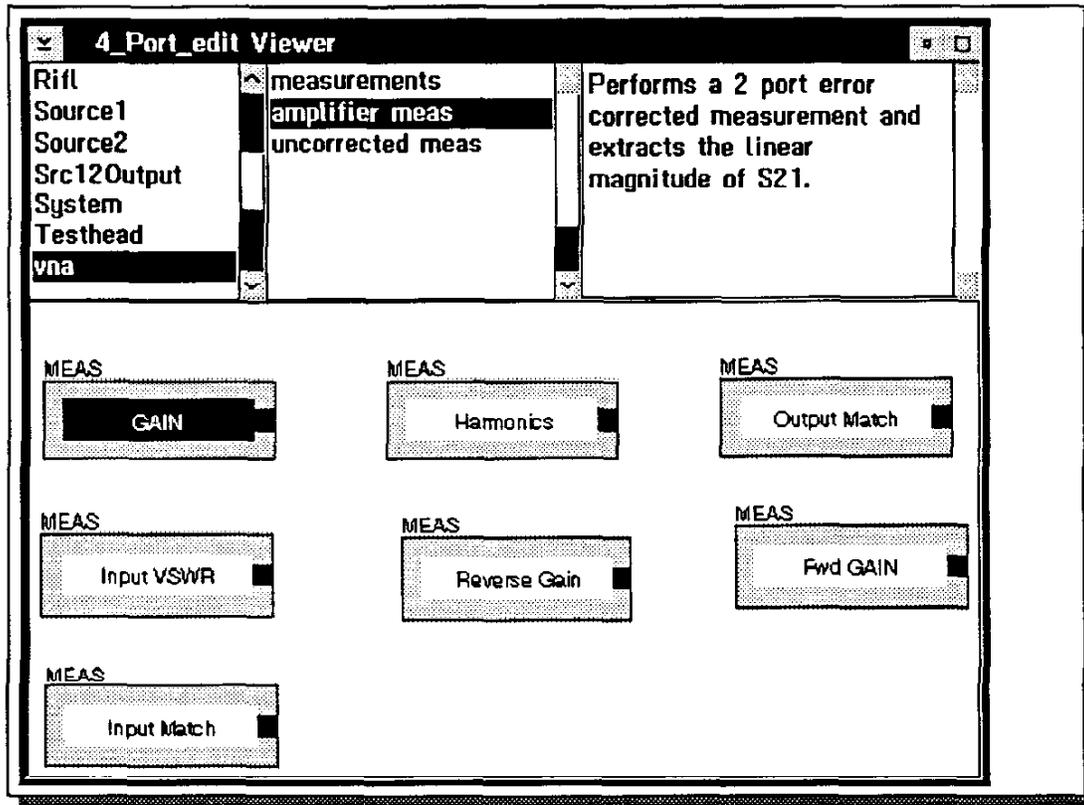
Select and Copy the Button Desired

Scroll down the instrument list and select the *vna* instrument.

Select the *amplifier meas* button type.

Copy the **MEAS GAIN** button. (Place the mouse pointer on the MEAS GAIN button, click mouse button 2 and select the pop-up menu function **Select**.)

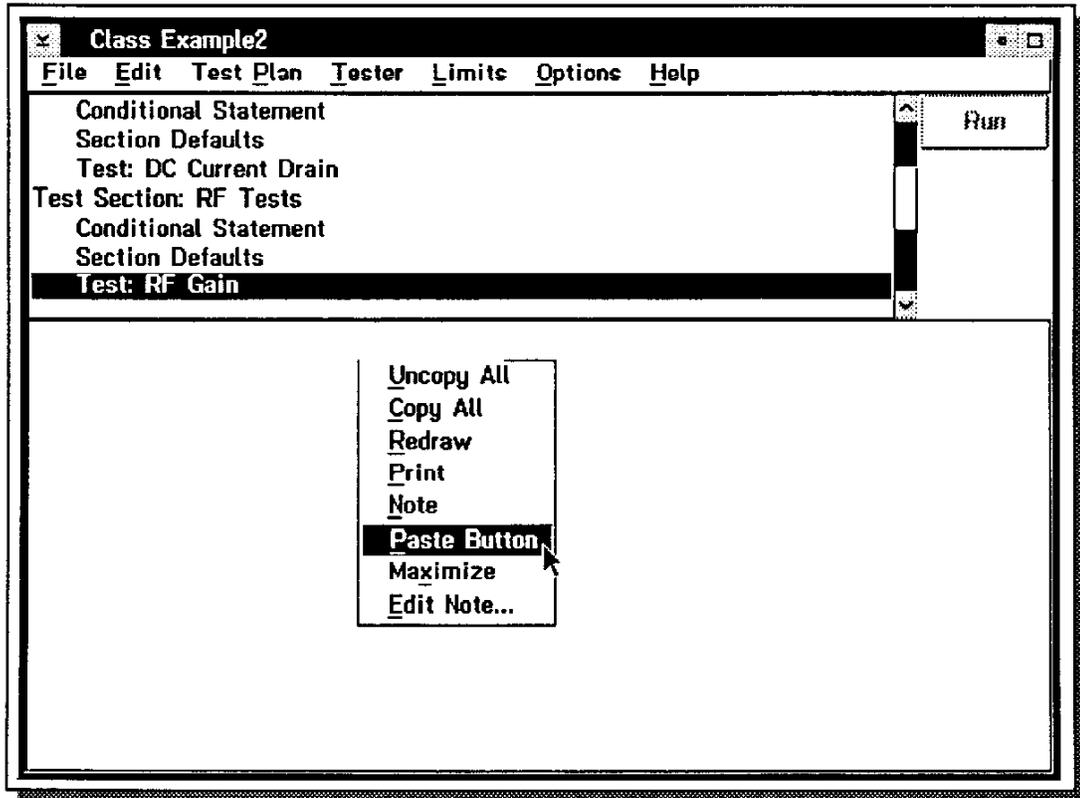
Building a Test



Select [Highlight] the Button Desired

The Tester Viewer Window will indicate that you have selected and copied the **GAIN** measurement button by highlighting the button.

Building a Test

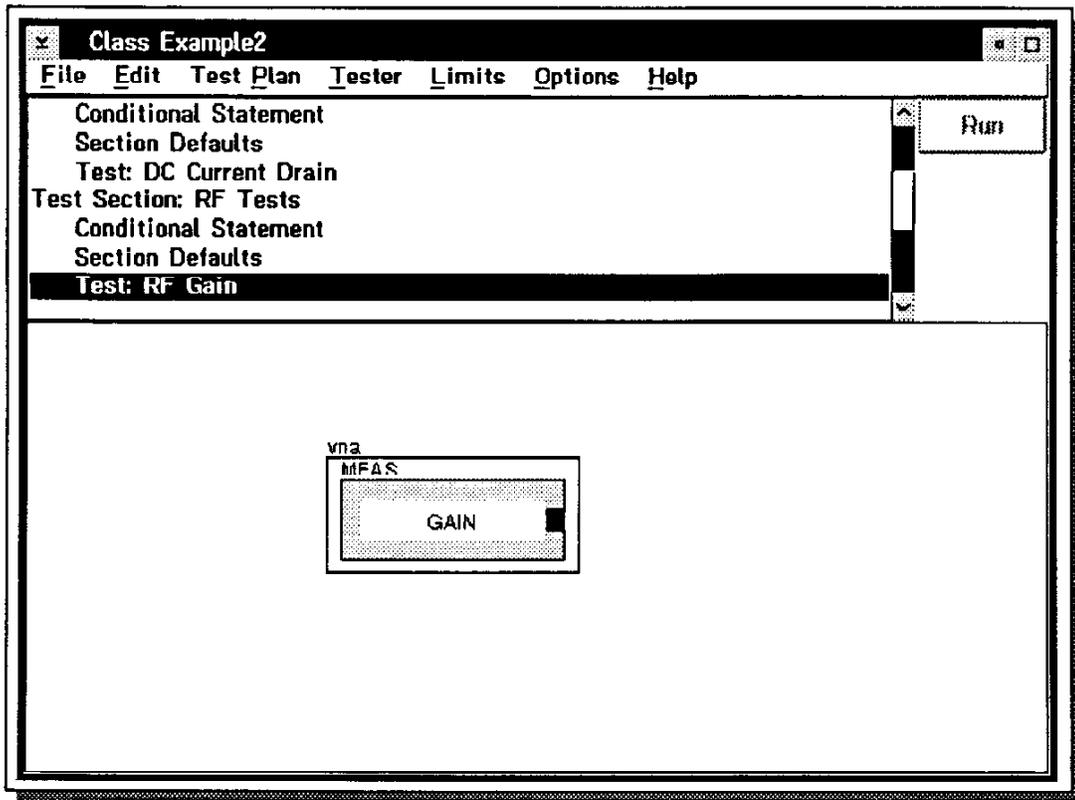


Paste the Button into the Test Panel

Change the active window back to the Test Plan Editor window. (Select the title bar on the Test Plan Editor window or any other location on the window to make it the active window.)

Paste the button on to the test panel. (Place the mouse pointer at the location desired on the test panel, click mouse button 2 and select the pop-up menu function **Paste Button**.)

Building a Test



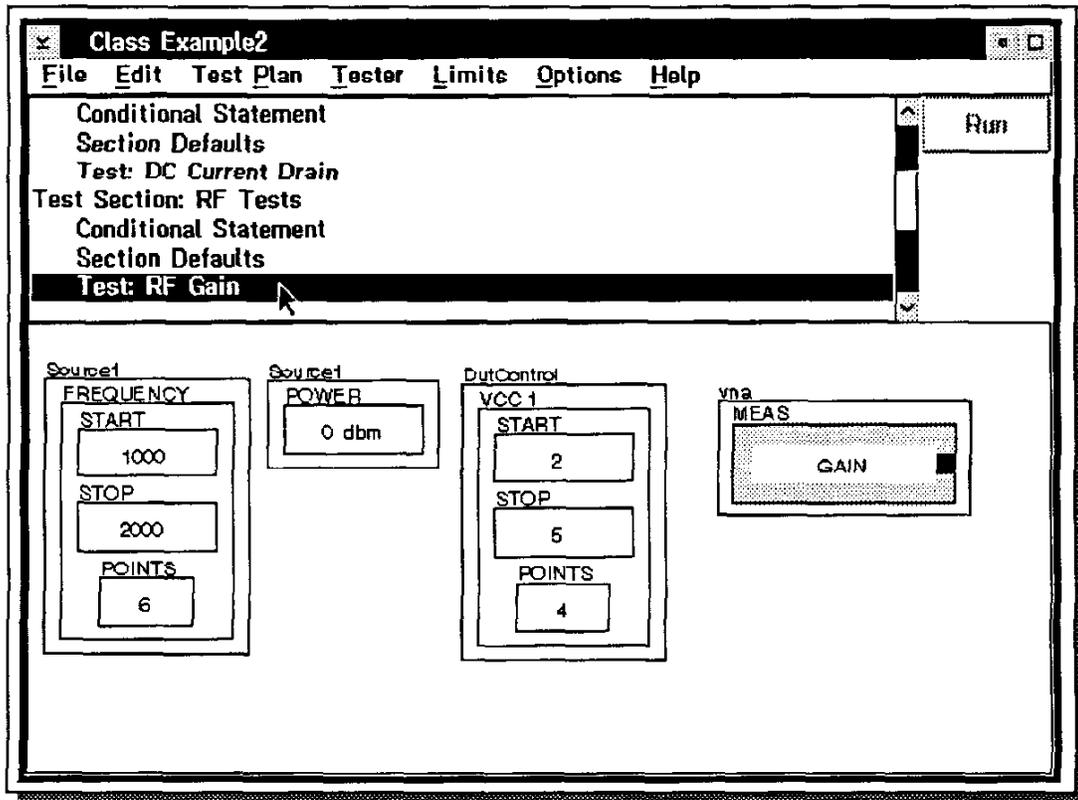
Changing the Position of the Button in the Test Panel

To change the position of the button in the test panel, place the mouse pointer on the button, press and hold mouse button 2 and drag the test button to the location desired. Release the mouse button when finished.

Copying, Pasting and Moving Buttons

The process for copying, pasting and moving other buttons is the same. Go to the Tester Viewer Window, select the instrument, select the button type, copy the button, return to the Test Plan Editor, paste the button in the test panel desired and move the button where you want it.

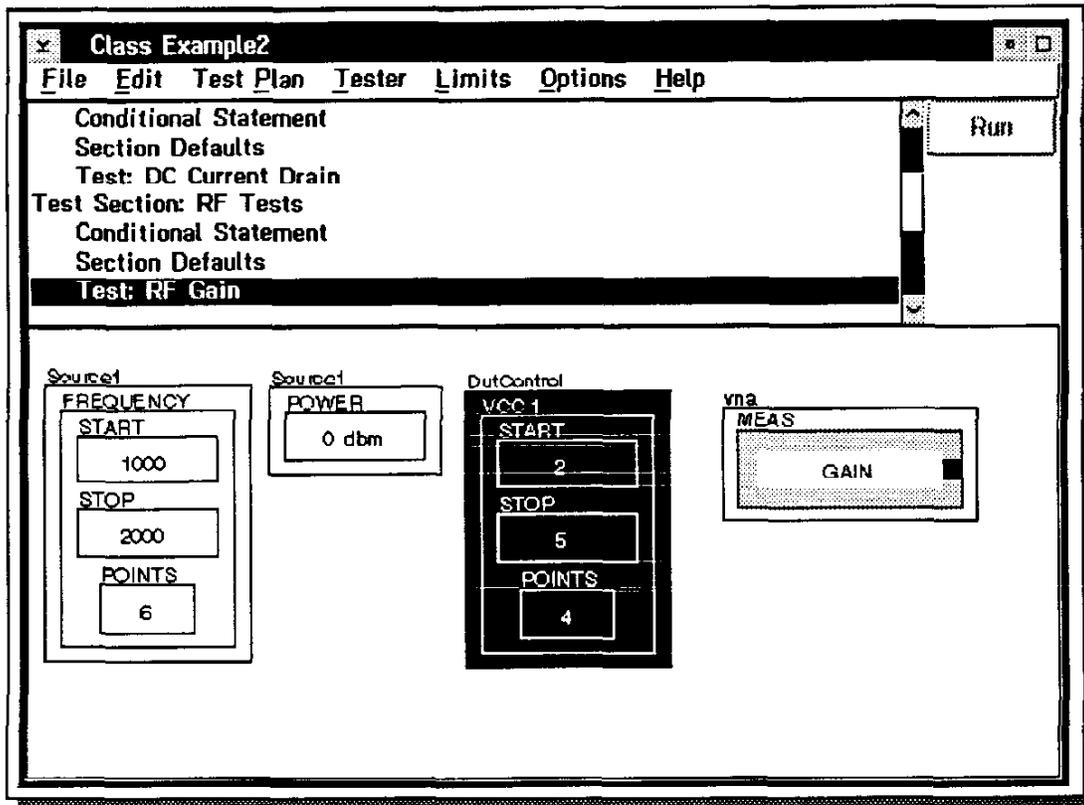
Adding Multiple Settings Buttons to a Test



The RI 7500A System Software offers many different buttons for each of the physical and virtual instruments in the system. In the example shown we have gone ahead and added a source frequency button, a source power level button and a DC supply voltage button for VCC1. The system offers many different single test point buttons such as the Source POWER settings button shown. You can then create multiple test point buttons such as the Source FREQUENCY settings button and the DutCtl VCC1 supply voltage settings button by using the Range function. (We will be discussing the Range function later in the hands-on lab.)

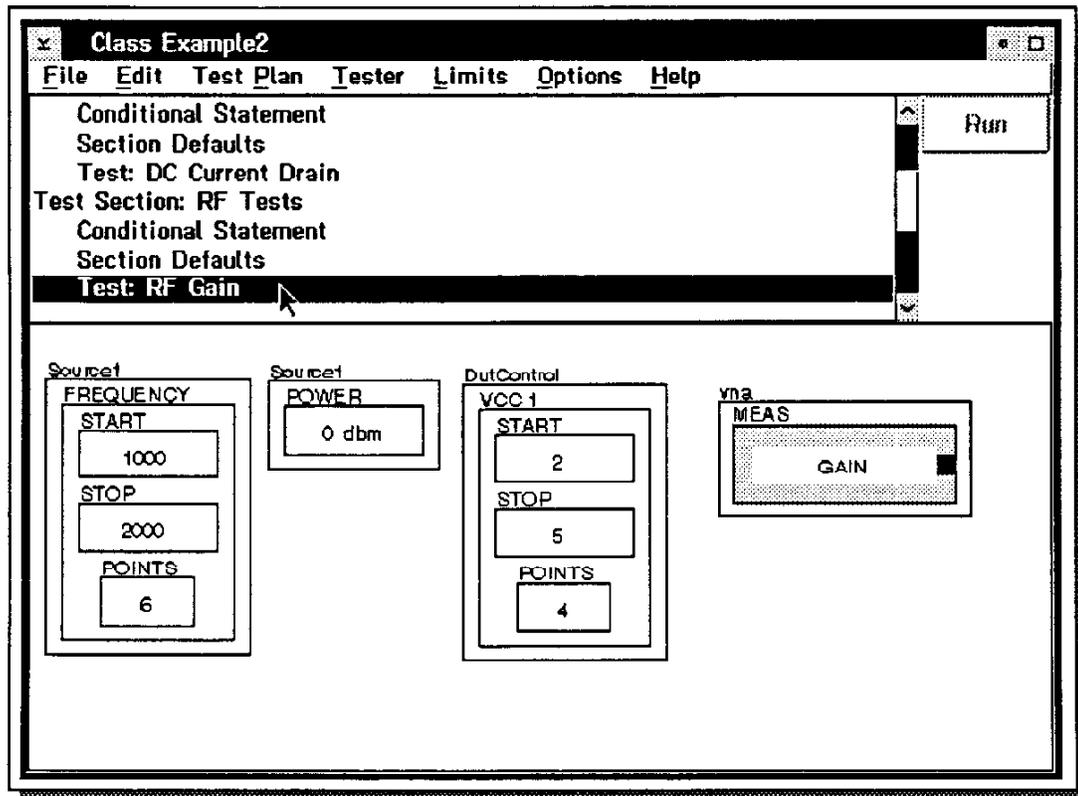
As you can see several buttons can be added to the same test panel. The system performs the GAIN measurement for each combination of the test points specified by the settings buttons. In the example shown the vna will perform the GAIN measurement for 24 different test conditions (6 freq x 4 voltage levels x 1 power level.)

Settings Buttons are a Collection of Buttons



Each of the settings buttons shown is actually a collection of objects or buttons which have been grouped together. For example the DutClit VCC1 settings button shown consists of five buttons: a START voltage button, a STOP voltage button, a POINTS button, a VCC1 settings button and a DutClit button. The START, STOP and POINTS buttons have been grouped together inside the VCC1 settings button, which in turn is inside the DutClit Instrument (owner) button. Combined together they create a START/STOP/POINTS VCC1 DutClit settings button. The DutClit and VCC1 buttons are called group buttons. The DutClit button is an instrument owner button and the VCC1 button is a settings group button.

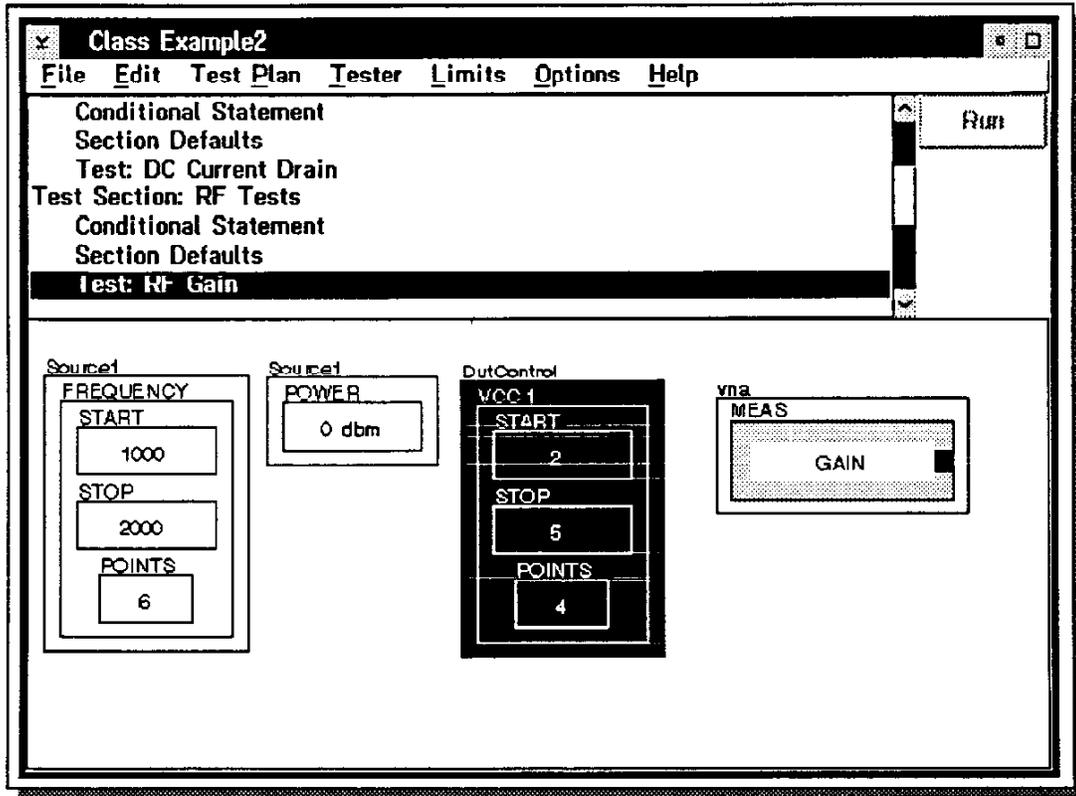
Adding Multiple Settings Buttons to a Test



The RI 7500A System Software offers many different buttons for each of the physical and virtual instruments in the system. In the example shown we have gone ahead and added a source frequency button, a source power level button and a DC supply voltage button for VCC1. The system offers many different single test point buttons such as the Source POWER settings button shown. You can then create multiple test point buttons such as the Source FREQUENCY settings button and the DutCtl VCC1 supply voltage settings button by using the Range function. (We will be discussing the Range function later in the hands-on lab.)

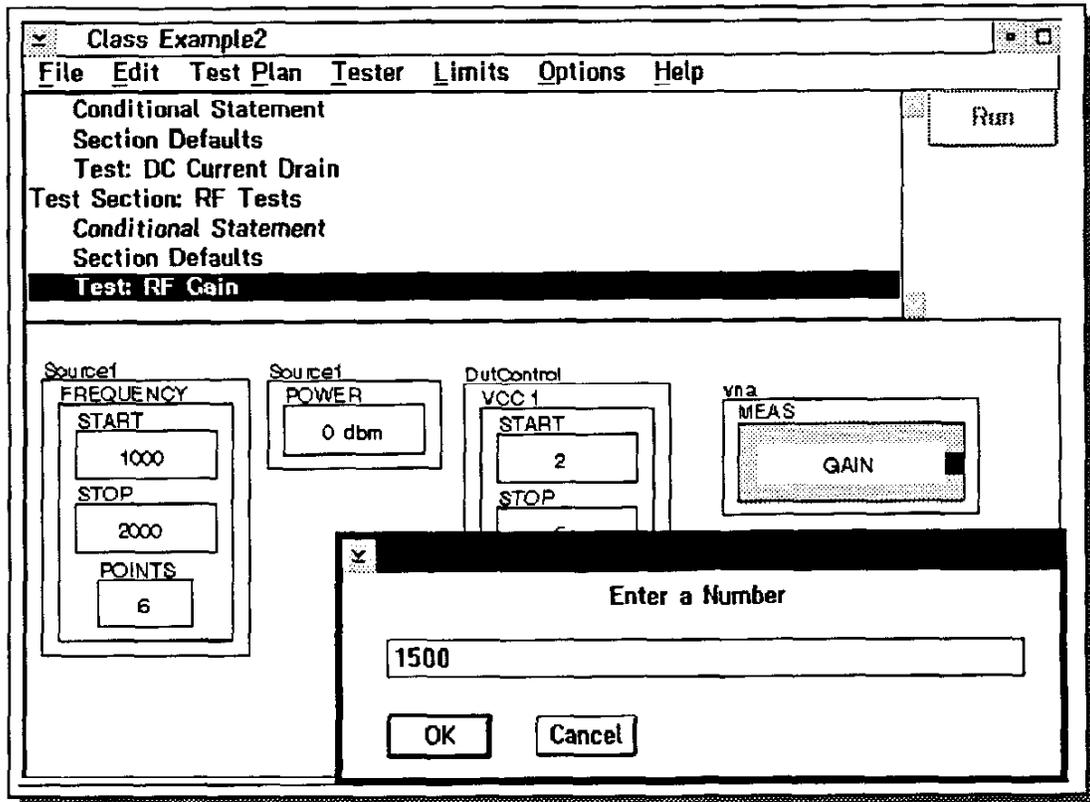
As you can see several buttons can be added to the same test panel. The system performs the GAIN measurement for each combination of the test points specified by the settings buttons. In the example shown the vna will perform the GAIN measurement for 24 different test conditions (6 freq x 4 voltage levels x 1 power level.)

Settings Buttons are a Collection of Buttons



Each of the settings buttons shown is actually a collection of objects or buttons which have been grouped together. For example the DutClit VCC1 settings button shown consists of five buttons: a START voltage button, a STOP voltage button, a POINTS button, a VCC1 settings button and a DutClit button. The START, STOP and POINTS buttons have been grouped together inside the VCC1 settings button, which in turn is inside the DutClit instrument (owner) button. Combined together they create a START/STOP/POINTS VCC1 DutClit settings button. The DutClit and VCC1 buttons are called group buttons. The DutClit button is an instrument owner button and the VCC1 button is a settings group button.

Modifying Button Settings



To modify the value of one of the settings in a settings button, we need to select and modify the specific internal button desired. For example to change the start frequency value in the Source1 FREQUENCY settings button you:

Place the mouse pointer on the **START** button inside the Source1 FREQUENCY settings button and click mouse button 1.

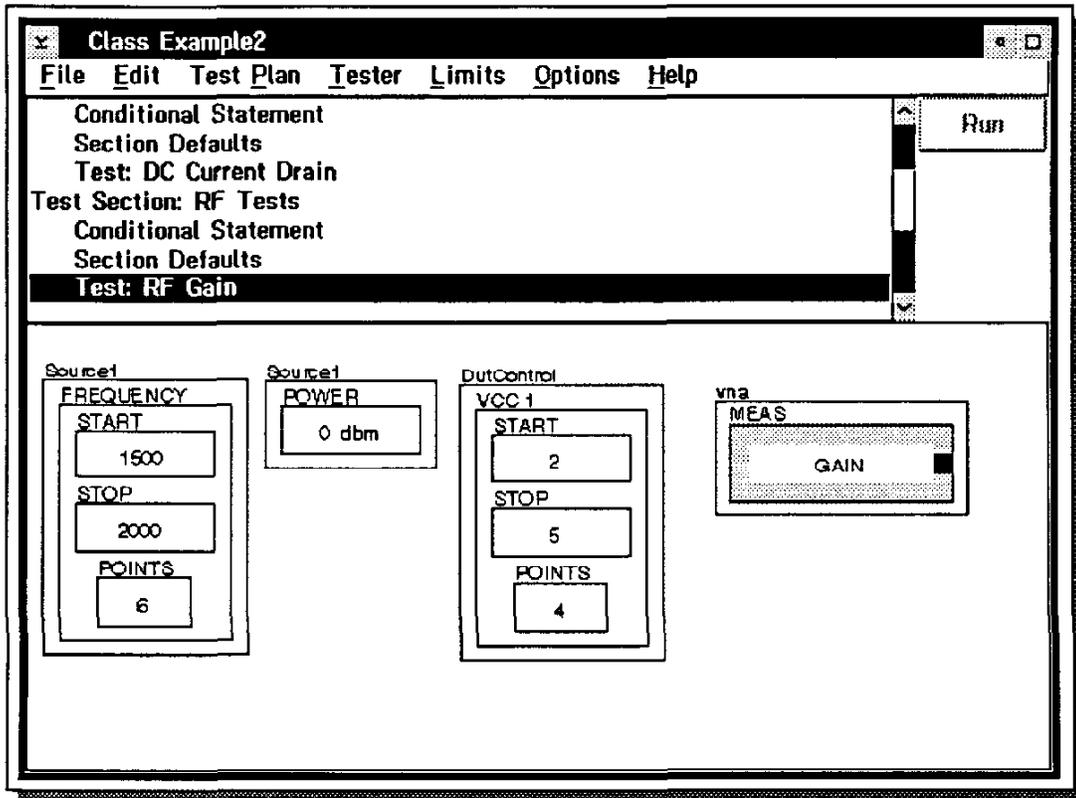
The system will display the dialog box: **Enter a Number**.

Enter the new value desired.

Press the **Enter** key or select the **OK** button.

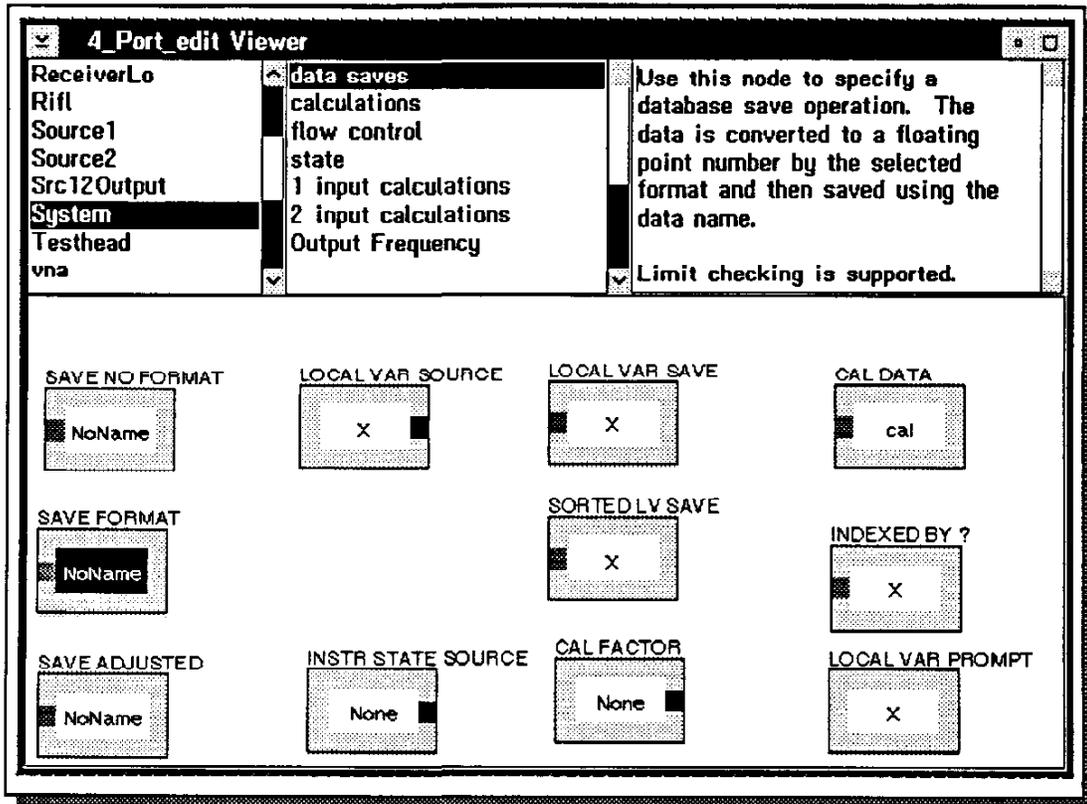
[1500 was entered in the example shown.]

Modifying Button Settings



The new value will be displayed in the START FREQUENCY settings button.

Adding the DATA SAVE Button



To save the test results data to the Local Data Base you must add (copy and paste) one of **SAVE DATA** buttons to each test panel and connect the **MEAS** button with the **SAVE DATA** button. To copy one of the **SAVE DATA** buttons:

Go to the Tester Viewer window.

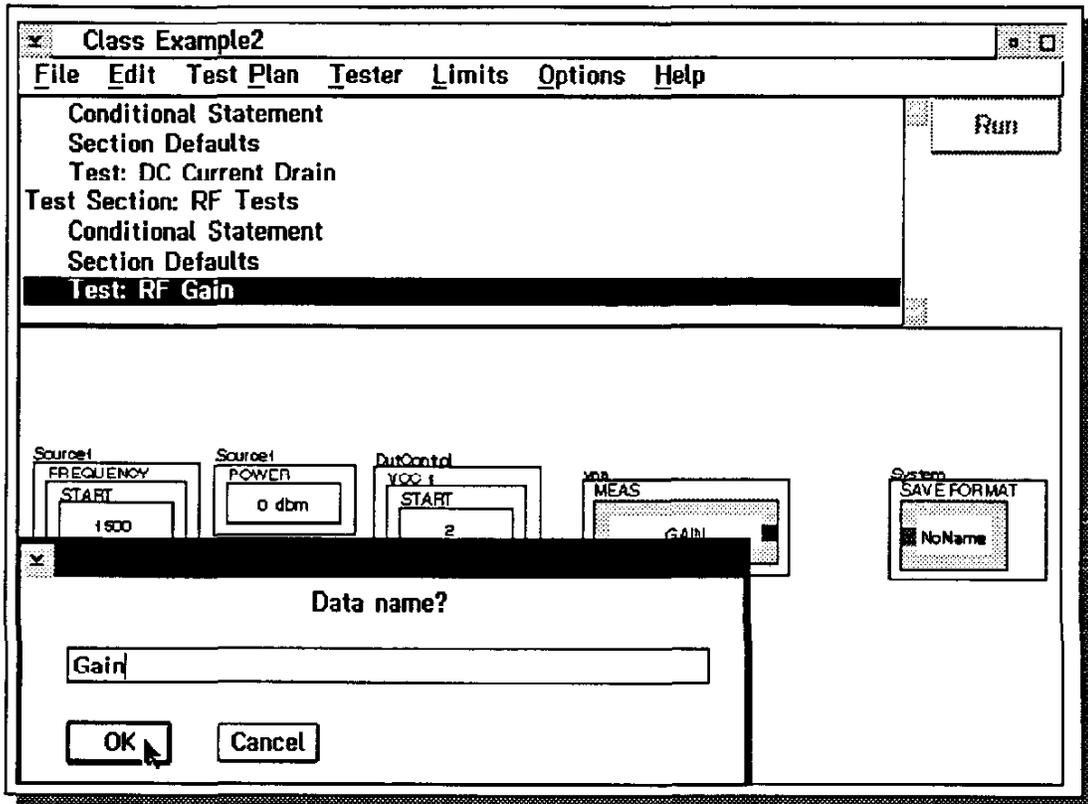
Select the **System** choice from the Instrument list.

Select the **data saves** choice from the Button Type list.

Select and copy one of the **SAVE DATA** buttons shown (**SAVE NO FORMAT**, **SAVE FORMAT** or **SAVE ADJUSTED**).

Return to the Test Plan Editor and paste the **SAVE DATA** button to the right of the other buttons.

Modifying the *data name*



Each **SAVE DATA** button in a test plan must have a unique data name. (The data name is used by the histograms in the Package Test Executive/Operator Interface and as the column name in the data tables of the Data Base.)

To select the **Data Name** for the **SAVE DATA** button:

Place the mouse pointer on the **SAVE DATA** button's **Data Name** and click mouse button 2.
(The default data name for the **SAVE FORMAT** Data Save button is **NoName**.)

Select the menu choice **Data Name**.

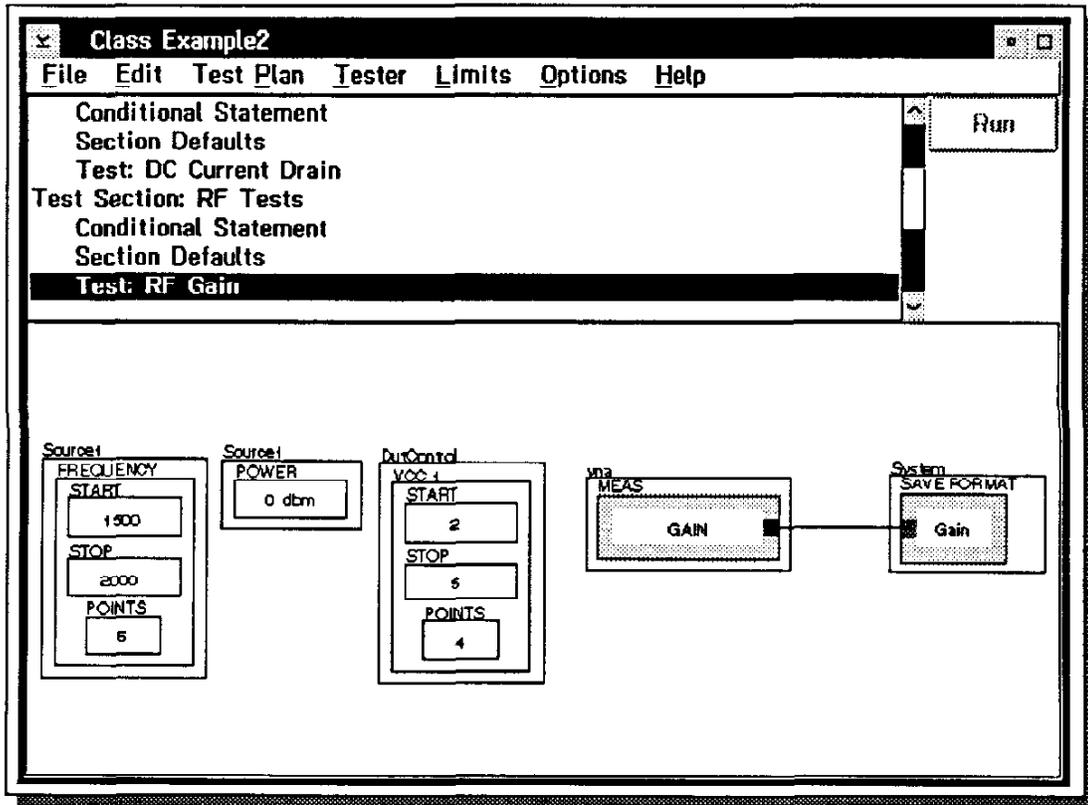
The Test Plan Editor will display the dialog box: **Data name?**

Enter the Data Name desired.

Select the **OK** button or press the **Enter** key.

The Test Plan Editor will update the Data Save button's **Data Name**.

Connecting the MEAS & SAVE DATA Buttons



In the example above, the line connecting the **MEAS** button and the **System SAVE FORMAT** button indicates that the test result data is being transferred from the **MEAS GAIN** button to the **SAVE DATA** button. To create this connection:

Place the mouse pointer on the sending data port of the **MEAS GAIN** button (the small black square on the right side of the **MEAS GAIN** button.)

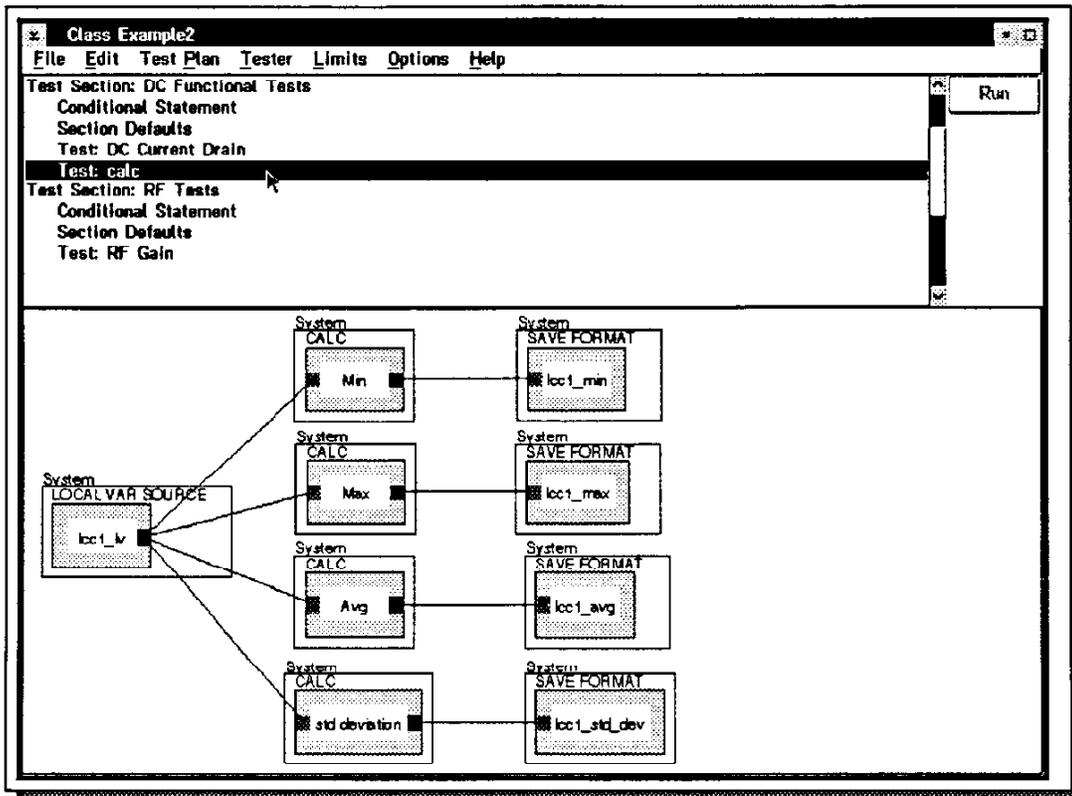
Press and hold mouse button 2.

Drag the outline of the black square over to and on top of the **SAVE DATA**'s data receive port (the small red square on the left side of the **System SAVE FORMAT** button.)

The Test Plan Editor will display a line connected between the two buttons as shown above.

To disconnect the buttons, repeat the process again. The connecting and disconnecting process can also be started from the reverse direction, by starting at the **System SAVE FORMAT** button's receive data port and connecting it to the **MEAS GAIN** button's data output port.

Adding a *CALC* Button

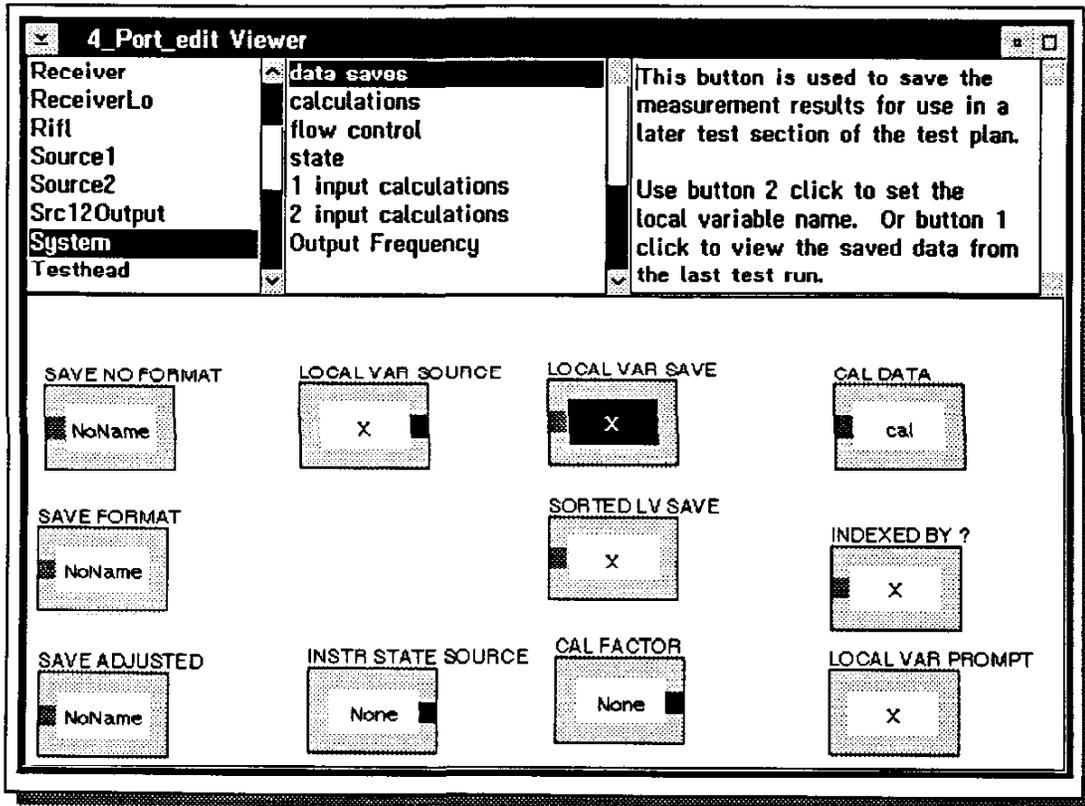


If you want to mathematically manipulate the test data (perform a calculation on the data) before the data is sent to the data base, you can insert a general purpose **CALC** button and connect the lines as shown above. The process for connecting the buttons is the same as previously described.

The **CALC** button can be copied from the Tester Viewer by selecting **System** from the Instrument list, selecting **calculations** from the button type list and copying the **CALC** button displayed. Other calculation buttons are also available. (See **System & 1 Input calculations** and **2 Input calculations**.)

We refer to this series of connected buttons as a Data Flow Diagram, Data Flow Architecture or Data Flow Model.

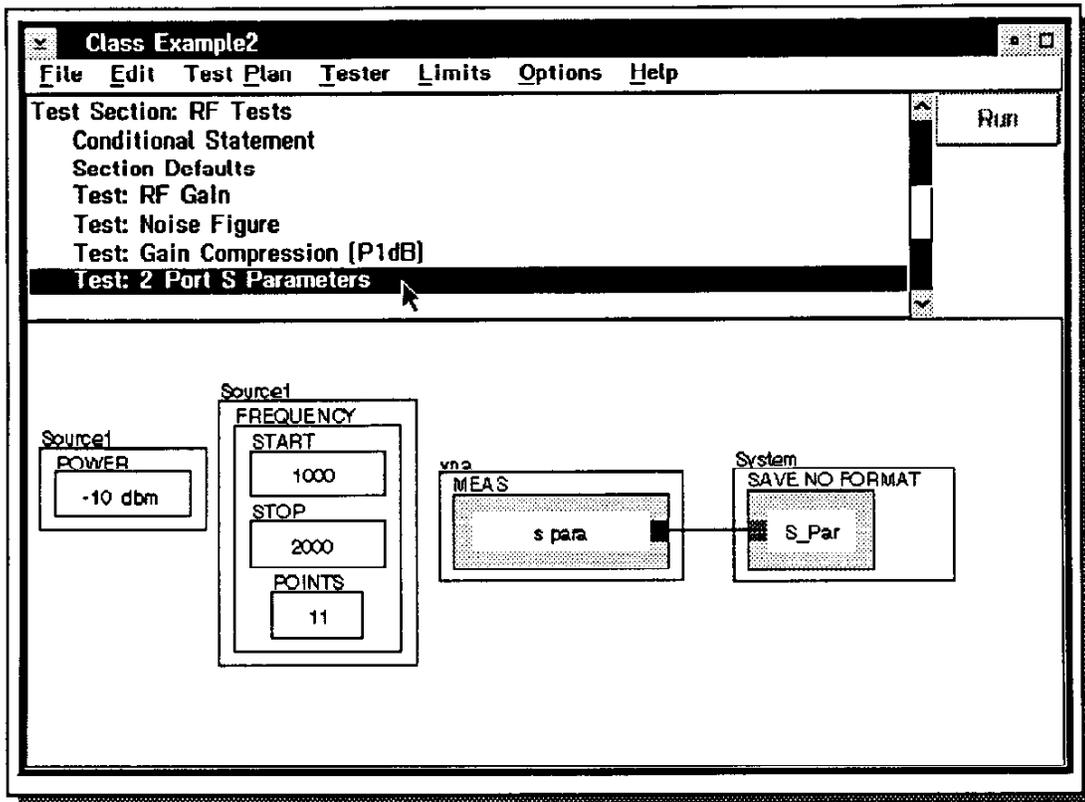
LOCAL VAR SAVE & LOCAL VAR SOURCE



The Tester Viewer also offers other buttons for saving data including a **LOCAL VAR SAVE** button for saving data in a local variable. You can use the **LOCAL VAR SAVE** button with a **LOCAL VAR SOURCE** button to transfer test results from one test panel, to another test panel. (The **LOCAL VAR SAVE** button and the **LOCAL VAR SOURCE** buttons must have the same data name.)

The test results sent by the **LOCAL VAR SAVE** button to the **LOCAL VAR SOURCE** button can be combined with the test results in another test panel to create custom test results.

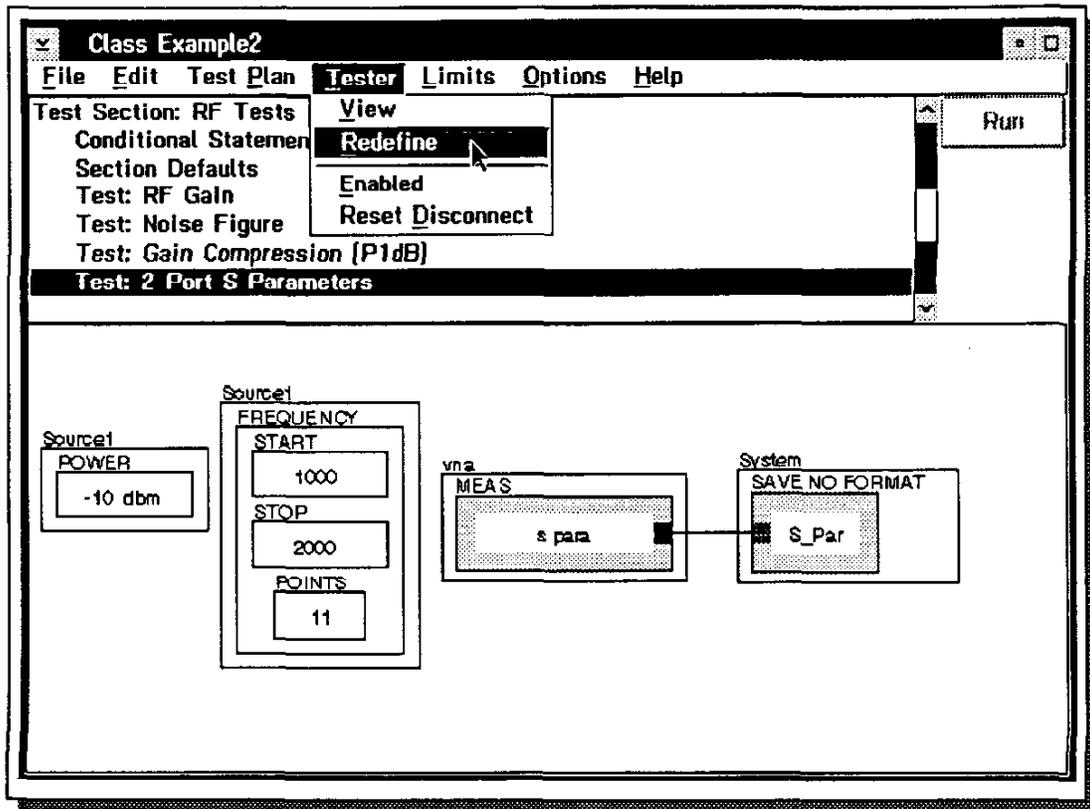
Adding Additional Tests



We can create additional tests by repeating the process we have been discussing. In the example shown we have added a Noise Figure test, a Gain Compression (P1dB) test and a 2 Port S Parameter test (S11, S12, S21, S22). It takes just a matter of minutes for even an inexperienced user to create all of these tests.

With all of the test panels now specified we are ready to use the Test Plan Optimizer to optimize and compile the test plan into a runnable test plan.

Selecting an Edit Tester Configuration



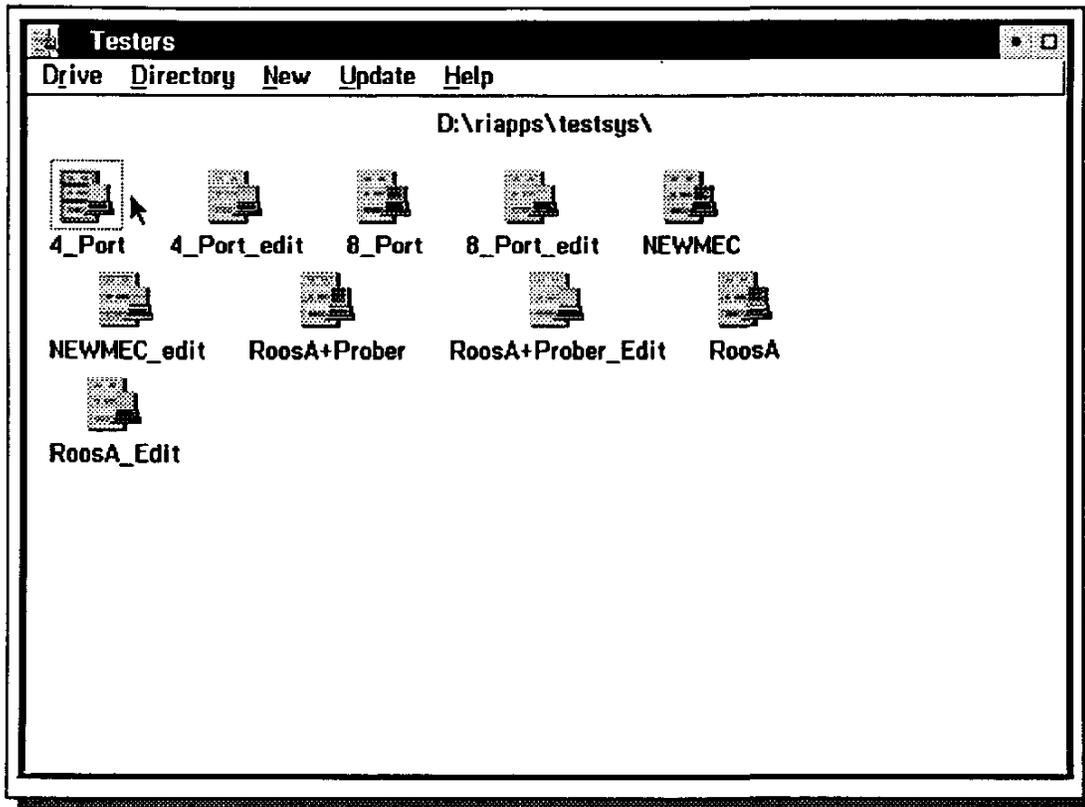
Before we proceed with the compile and optimize process, it would be helpful to spend a few minutes and discuss the different tester configurations you can use to create the runnable test plan.

The test plans you create are intended to be run on the RI 7100A Microwave Test System you have purchased. We refer to this tester as the *Physical Tester* or the *Target Tester*. (If you have more than one RI 7100A Test System with different instrument configurations or interface configurations, we refer to the specific physical test system you intend to run this test plan on as the *Target Tester*.) A tester configuration file is provided with your RI 7500A Test System Software Packages which defines the characteristics of the physical tester you purchased. This configuration is labeled the *Active Tester Configuration*. An *Edit Tester Configuration* is also provided with the System Software. We selected the *Edit Tester Configuration*, 4_Port_edit, when we first created the test plan: Class Example2. You create your test plan with the *Edit Tester* and you compile your test plan against the *Active Tester*. To change the *Edit Tester Configuration*, use the following steps.

Select the menu bar choices: **Tester & Redefine**.

Select the **Edit Tester** desired and select the **OK** button.

Active and Edit Tester Configurations



To view the tester configurations available and to manage the tester configurations, use the following steps.

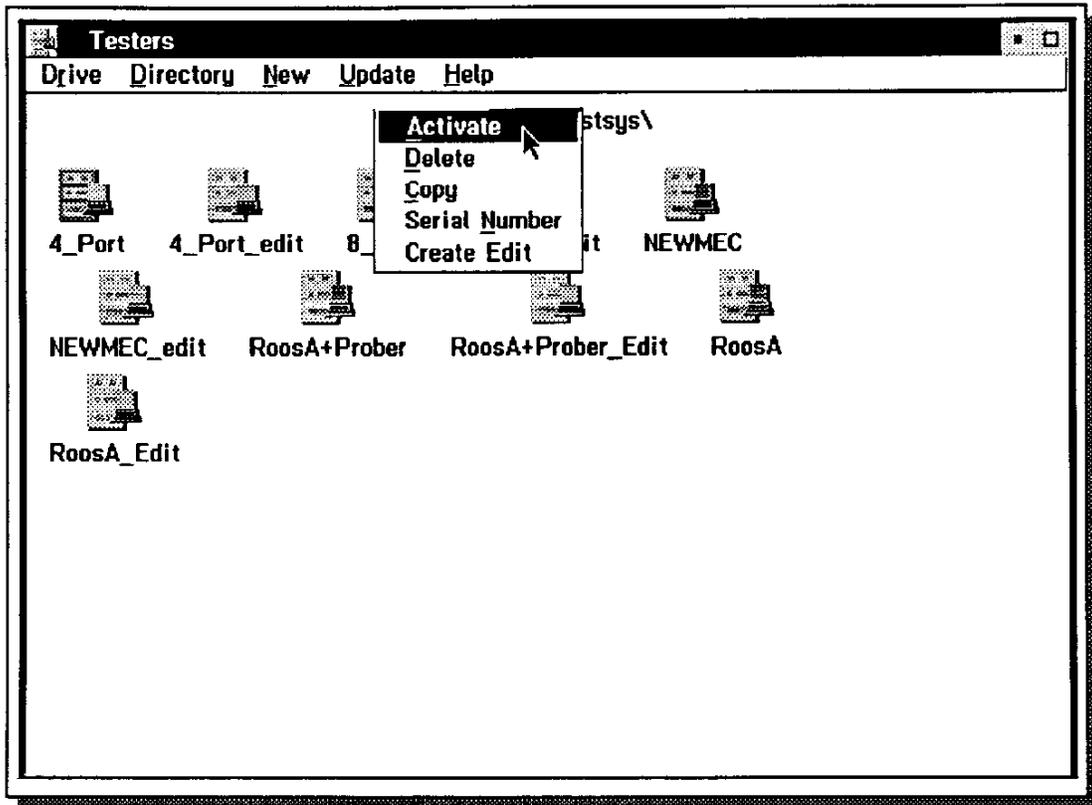
Select the RI Message Window's menu bar choices **Test & Testers...**

The System Computer will open the Testers Container Window and display the tester configurations available.

The Tester Configuration Manager allows you to modify the tester configurations (including the Active Tester Configuration) and/or create new tester configurations. However only one tester configuration can be the *Active* Tester Configuration at a time. The other system configurations are either *Edit* Tester Configurations or deactivated *Active* Testers.

The active tester configuration icon is displayed in red, the edit tester configuration icons are displayed in blue and the deactivated Active testers are displayed in blue. In the example shown above **4_Port** is the active tester configuration.

Activating a Tester Configuration



To change a Tester to the Active Tester, use the following steps.

Place the mouse pointer on the Tester you wish to activate.

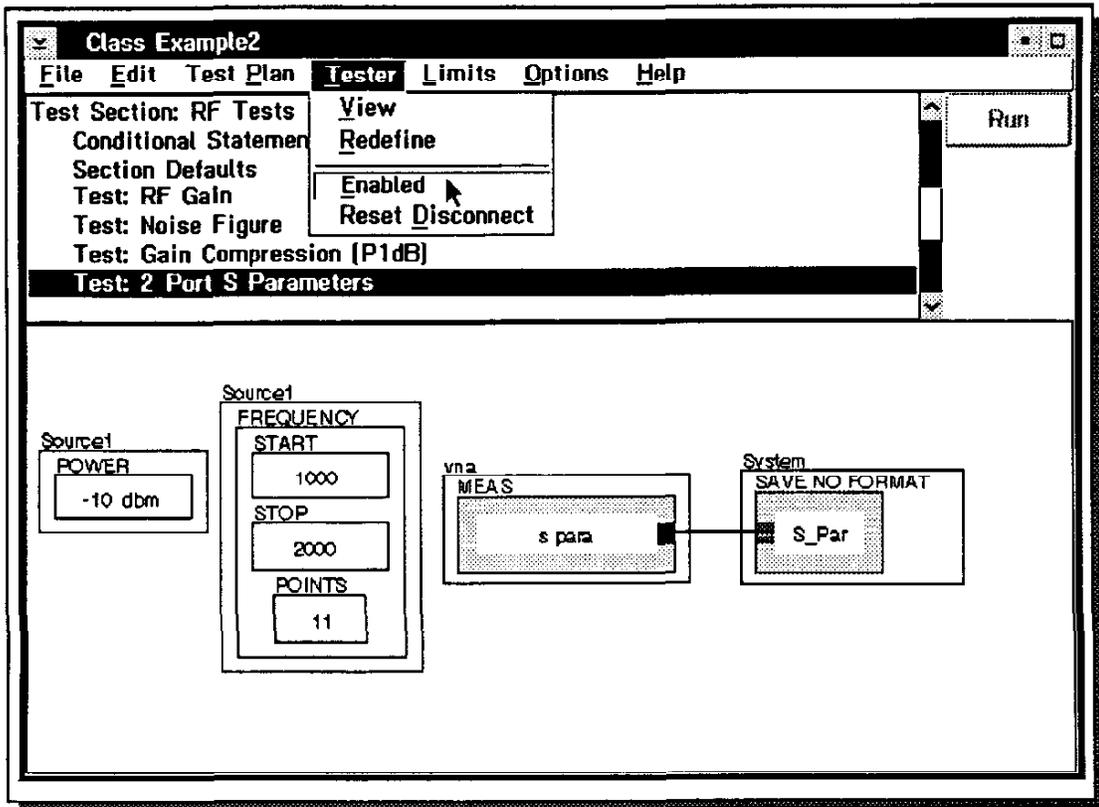
Click mouse button 2 and select the pop-up menu choice **Activate**.

The Tester selected will become the Active Tester (icon will turn red) and the old Active Tester will be deactivated (icon will turn blue).

Return to the Test Plan Editor Window. (Select the title bar on the Test Plan Editor Window or any other location on the window to make it the active window.)

Only a user with Admin privileges (or higher) can change, delete or create a tester.

Simulation Mode



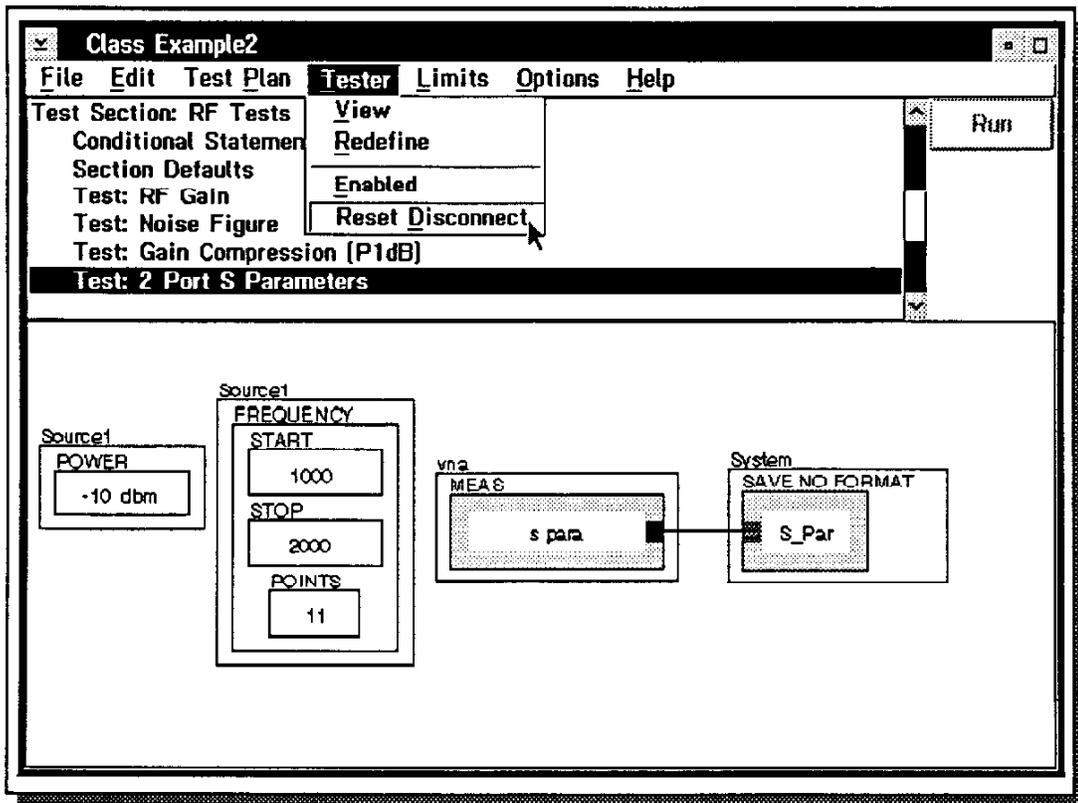
You can compile and optimize and even run a test plan without being connected to the tester hardware and/or the device-under-test if the tester is in Simulation mode. In Simulation mode the RIFL interface (and the system hardware) is disabled and the System Computer uses an internal random number generator to create the test results data. Simulation mode is especially useful for creating test plans off-line. To place the system in Simulation mode use the following steps:

Select the menu bar choice: **Tester**.

If a check mark is displayed to the left of the **Enabled** function, the hardware is Enabled. Select the **Enabled** function to remove the check mark and disable the RIFL Interface & the hardware. The System is now in Simulation Mode.

If the **Enabled** function does not have a check mark preceding it, then the hardware is already disabled and the system is in Simulation Mode. Close the Tester pull down menu by selecting any location outside of the pull down menu.

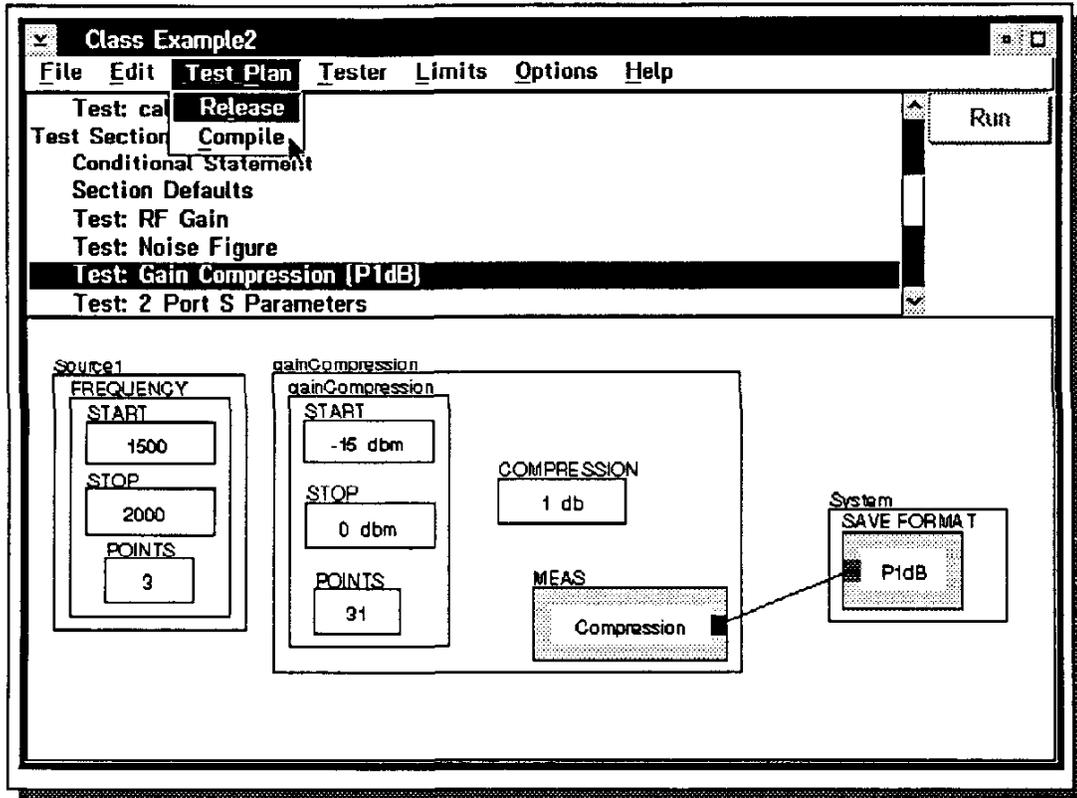
Resetting the System to the Reset Disconnect State



Reset Disconnect

You can reset the tester to its disconnect state at any time by selecting the menu choices: **Tester & Reset Disconnect**.

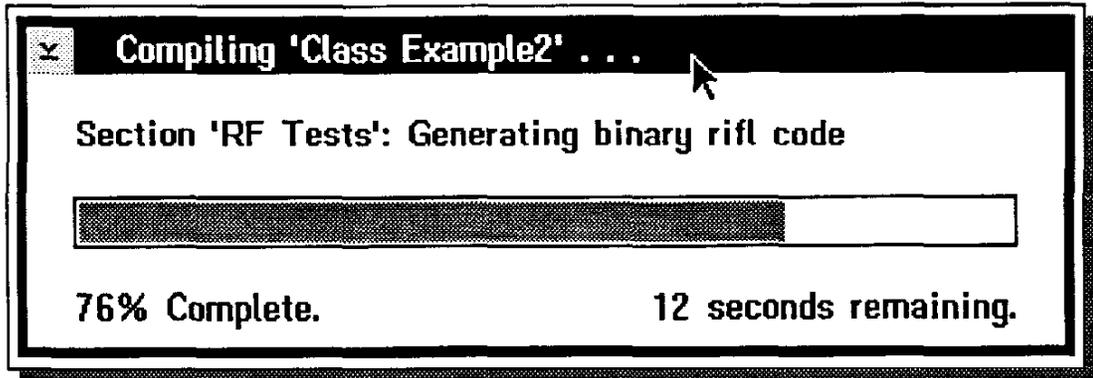
Creating a Runnable Test Plan



To create a runnable test plan we need to compile and optimize the test plan. If we intend to run this test plan on the physical tester we must optimize and compile the test plan with the appropriate *Active Tester Configuration*. (Be sure that the current *Active* tester is the physical tester configuration.) To link the test plan to the active tester, and optimize & compile the test plan, use the following procedure:

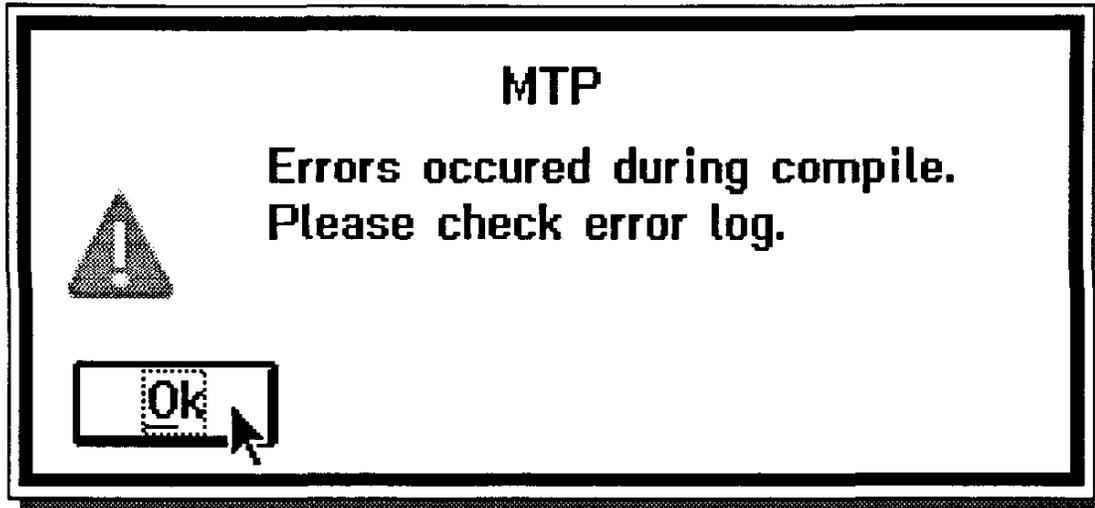
Select the Test Plan Editor's menu bar choices: **Test Plan** and **Compile**.

Compiling the Test Plan



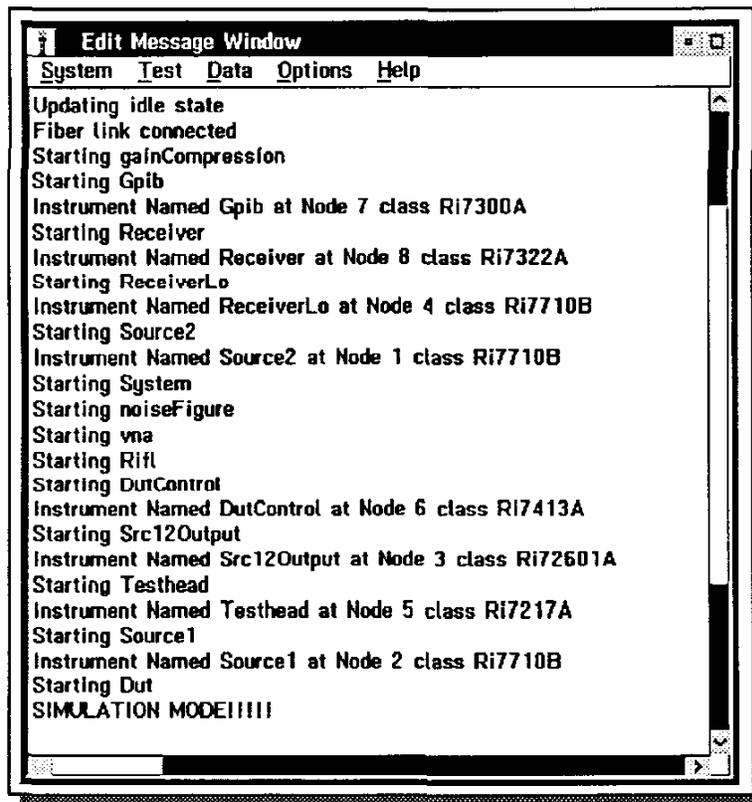
During the optimize and compile process the system will display the Compiling Dialog Box shown above.

Debugging a Test Plan



If a error is discovered during the compile process, the system will beep and display a Error Dialog Box as shown above. The errors discovered will be displayed in the RI Message Window.

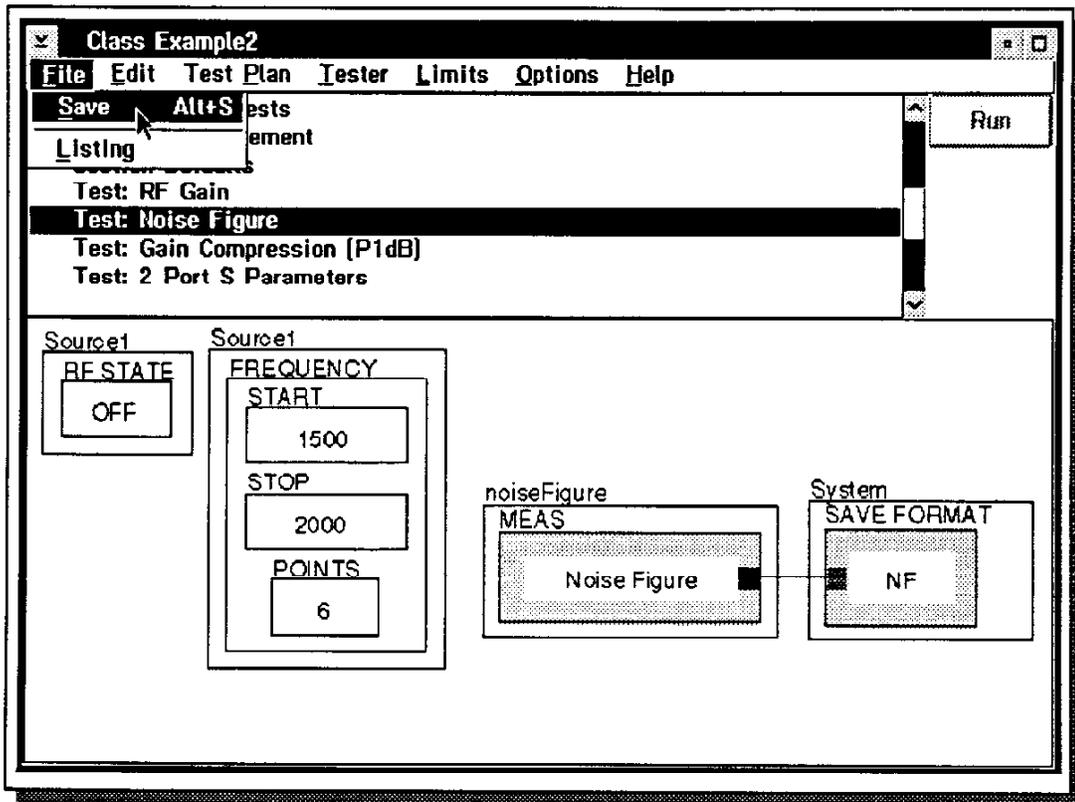
Starting-up the System Instruments and Updating the Tester Idle State



After the test plan is optimized and compiled into a runnable test plan, the System Software will start up all of the instruments and place each instrument into an idle state.

Please Note: The instrument buttons in the Tester Viewer panel are the idle states for each instrument. Generally the idle state for the source instruments is with the output off and 0 dB of attenuation. The Test Head and the System Receiver are left in a protected mode and the Noise Source is off.

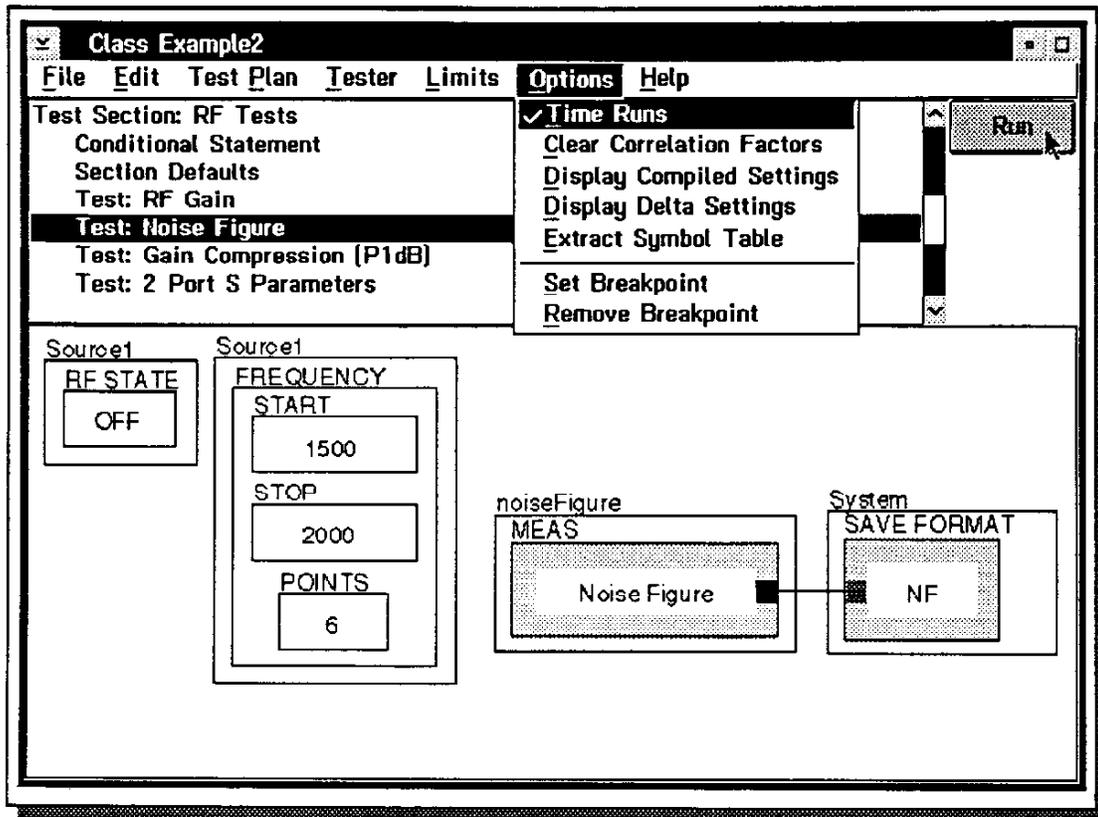
Saving the Test Plan



This is a good time to stop and save the test plan. Changes you make to a test plan are not saved by the system unless you execute a save request by selecting the Test Plan Editor's menu choices: **File** and **Save**.

We recommend that you save the test plan from time to time while you are creating and debugging your test plan.

Running the Test Plan

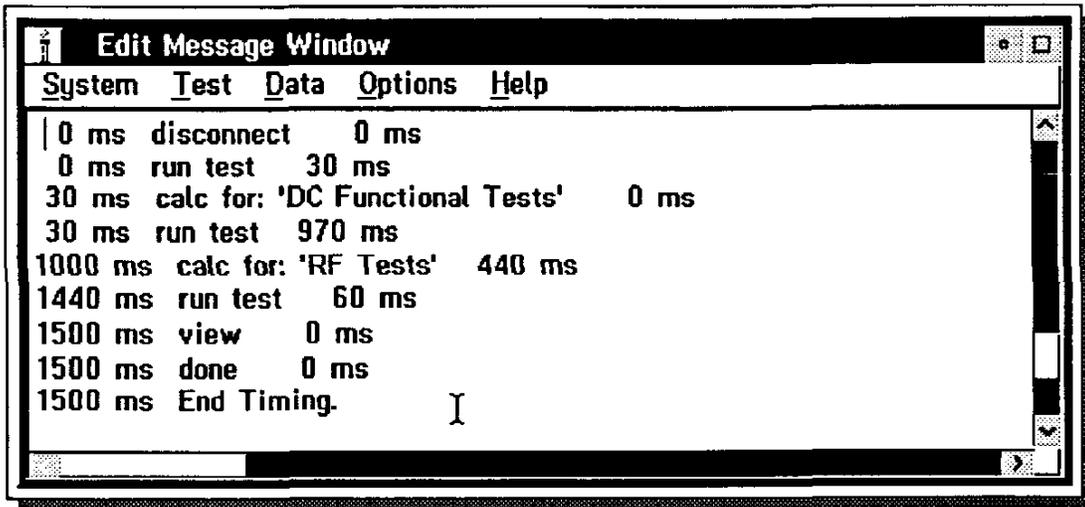


Assuming that your System Computer is either connected up to the active tester or you are in simulation mode, you can run your test plan by selecting the **Run** button. The time required to run the test plan and save the test results is very short (a few seconds for most test plans.)

The system will beep and display a message in the RI Message Window if it encounters an error or warning condition. If you selected the menu bar choices: **Options & Time Runs**, the RI Message Window will beep and display the time required to perform each of the following:

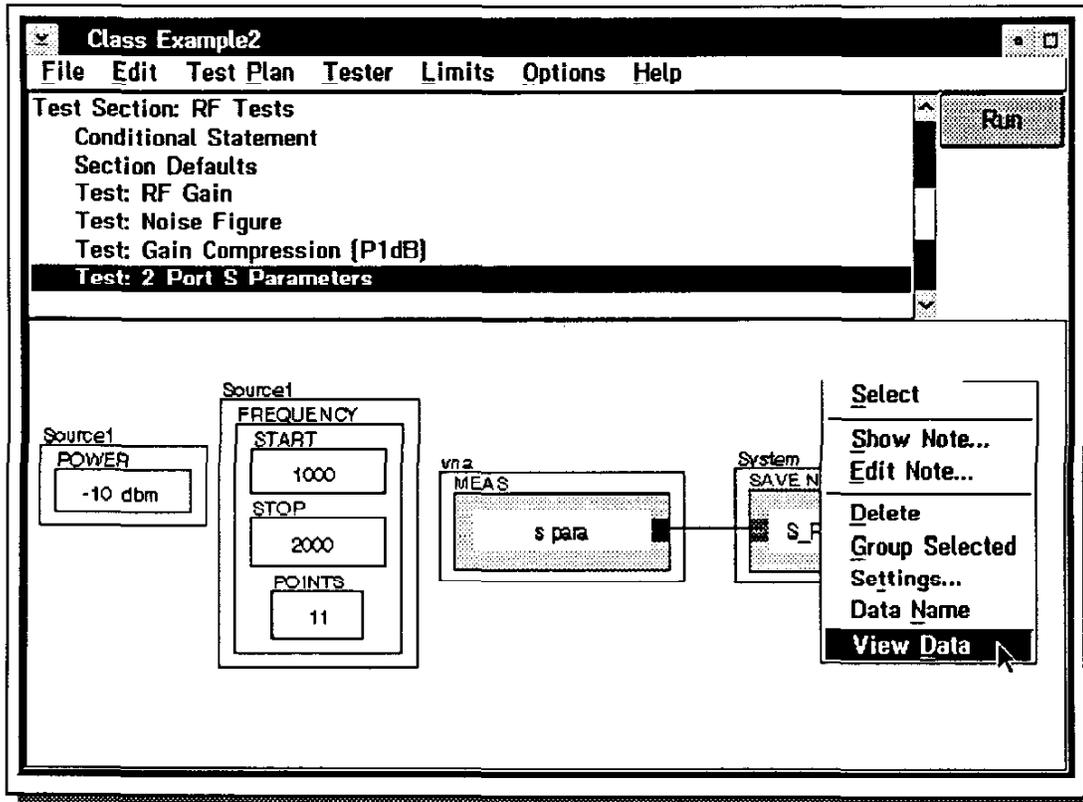
- Connect up the device under test.
- Run the tests in each test section.
- Post processing calculations.
- Update any data viewers which are open.

Running the Test Plan



The slide above shows an example of the information provided by the RI Message Window when you select Option & Time Run and then run the test plan.

Viewing the Test Results



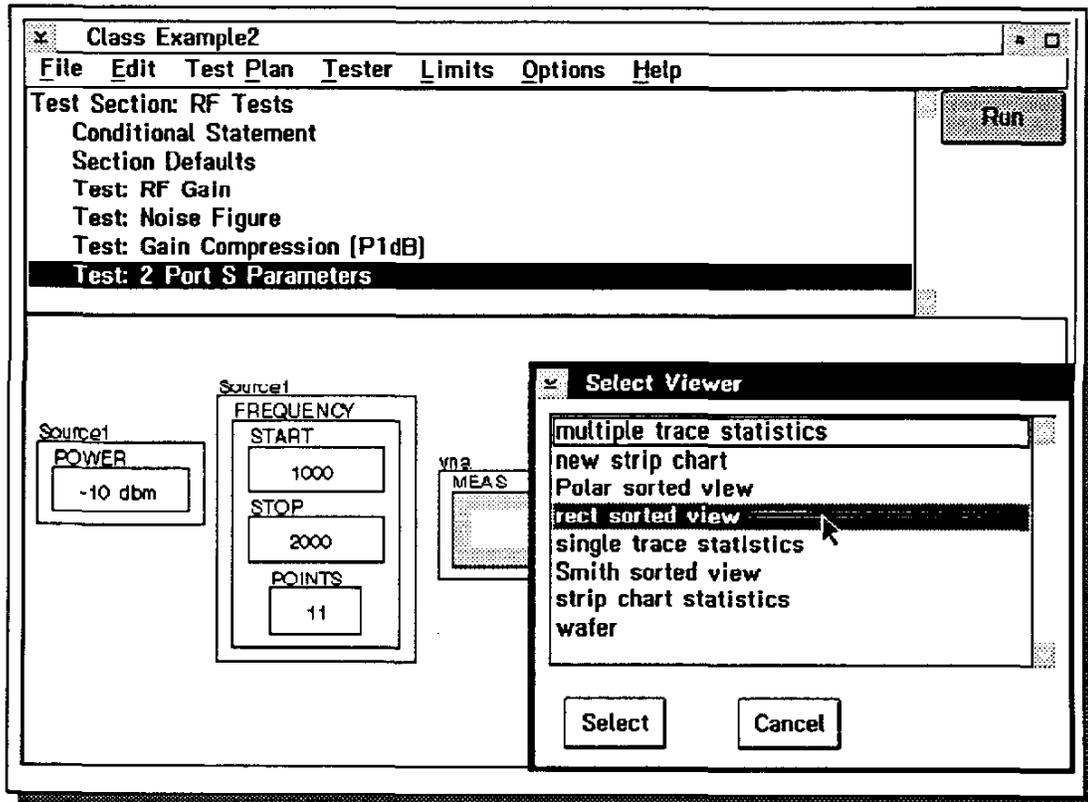
To open a Data Viewer window and view the test results data generated, use the following steps:

Select a test panel.

The Data Viewer uses several pieces of information from the test plan selected. Specifically the Data Viewer will set its SORT BY PARAMETER and the X axis PARAMETER equal to the name of the instrument settings button in the test panel (in the example shown the Data Viewer would use the setting name *Frequency*.) The Data Viewer will also set its X axis minimum value and its X axis maximum value equal to the start and stop points in the instrument settings button.

Place the mouse pointer on the SAVE DATA button's **Data Name** and click mouse button 2. Select the pop-up menu choice: **View Data**.

Viewing the Test Results



The System Computer will display the dialog box: **Select Viewer** and display a list of data viewer choices.

To display the data in polar coordinates select the data viewer: **Polar sorted view**.

To display the data on a smith chart select the data viewer: **Smith sorted view**.

To display the data on a 2 dimensional X & Y axis plot select the data viewer: **rect sorted view**.

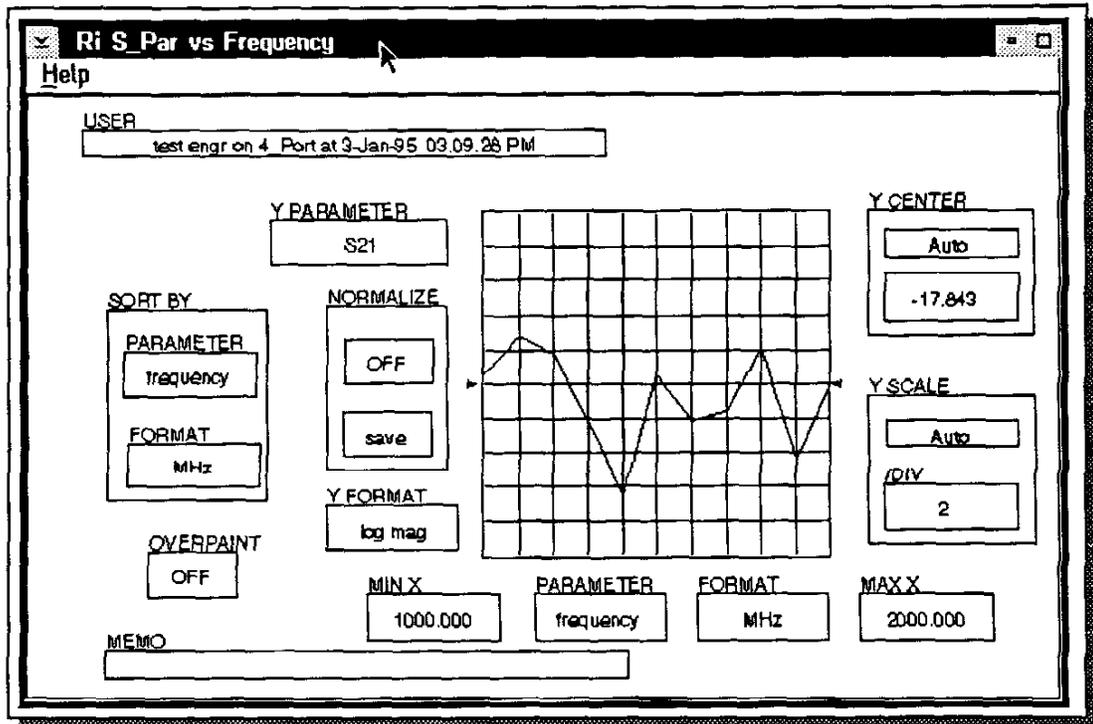
(The **single trace statistics** & **multiple trace statistics** viewers and the **strip chart statistics** & the **new strip chart** data viewers are special and will be discussed later.)

Select the **Select** button.

The System Computer will open the data viewer and display the test results.

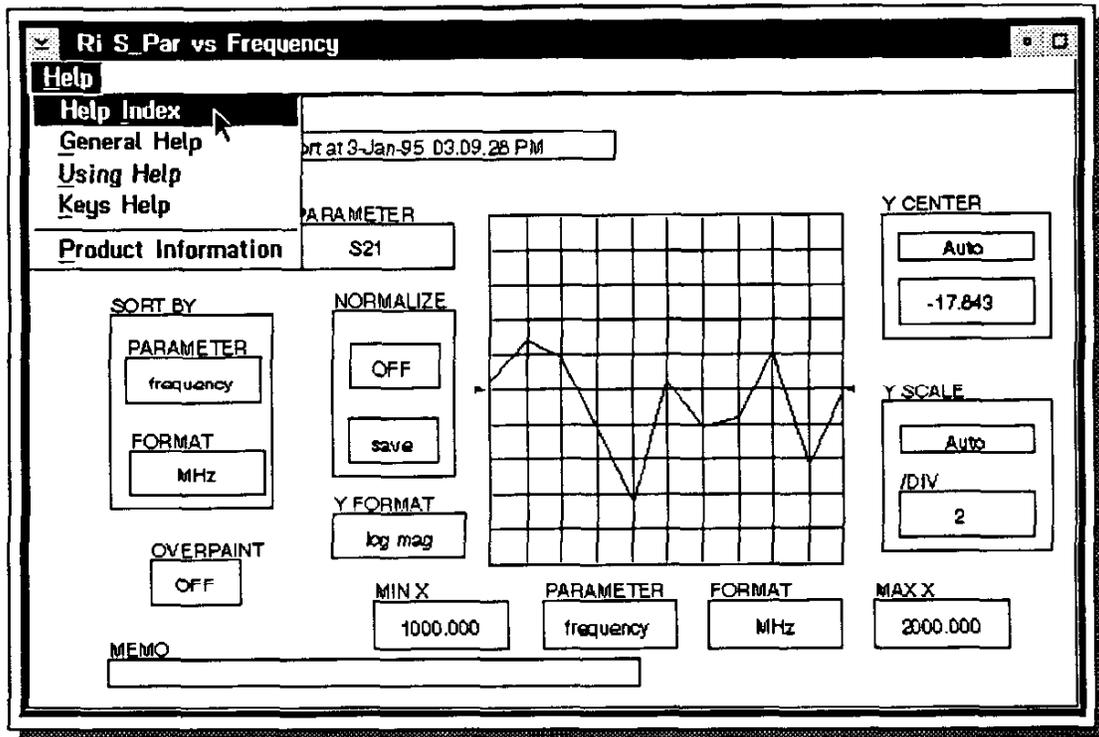
In the example shown we selected **rect sorted view** to display the results in X & Y coordinates.

Using the Data Viewers



The Data Viewer will display in its title bar the SAVE DATA button's Data Name and the name of the instrument settings button. The test results are displayed in the test results plot in the middle of the viewer. We can select and set the parameters, formats and order in which the data is to be presented with the Data Viewer buttons provided.

On Screen Help



On Screen Help Text

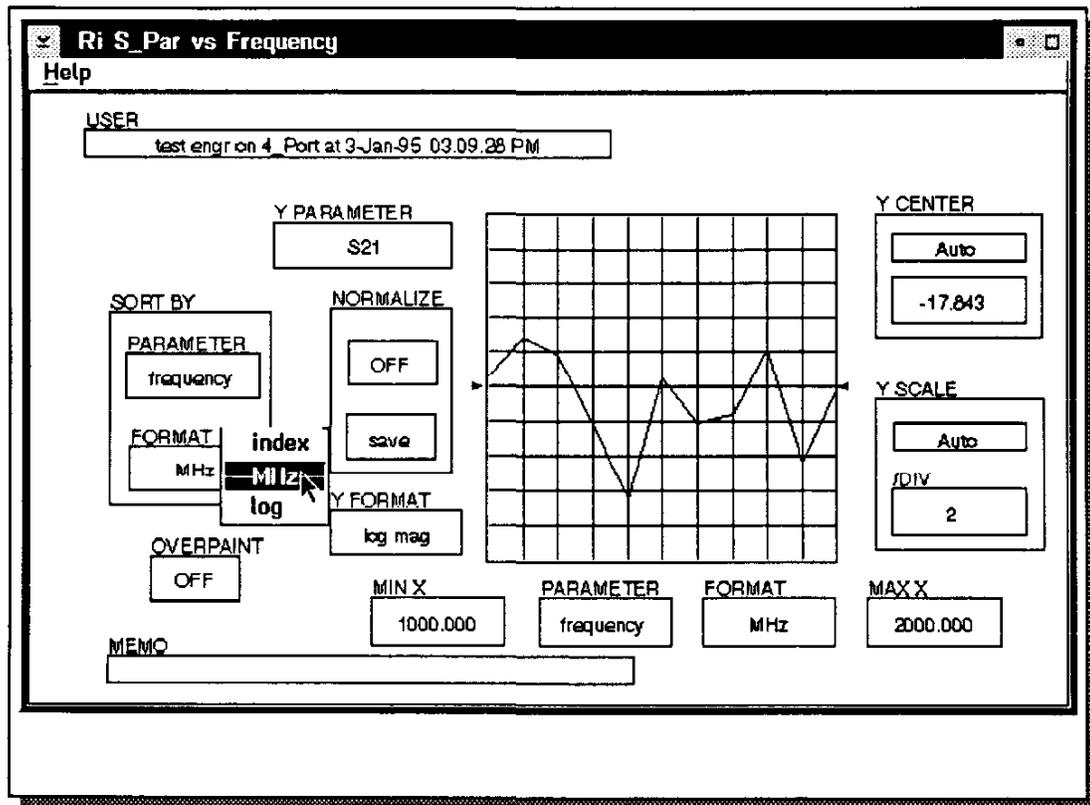
If you can not remember the purpose of a button or you need a simple reminder:

Place the mouse pointer on the button desired and click mouse button 2. Select the menu choice: **Show Note...**

The Data Viewer window will display a Help Text Panel and reference information about the button selected. Each button has a dedicated Help Text Panel.

The Data Viewer also offers extensive on-screen reference information with the **Help Menu Bar** function.

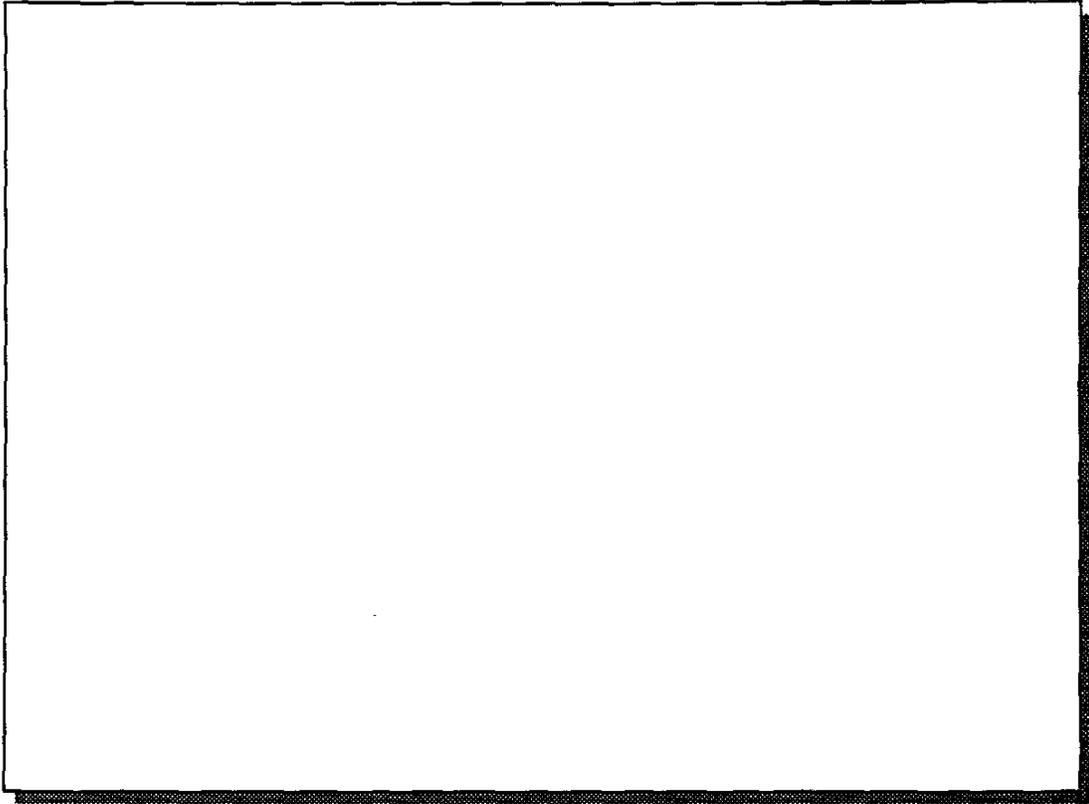
SORT BY Buttons



On the left side of the data viewer panel are the **SORT BY** buttons: **PARAMETER** and **FORMAT**. These buttons are used to select and display the sorting criteria. The **PARAMETER** button, as the name suggests, displays the parameter which will be sorted through. The **SORT BY PARAMETER** is automatically set equal to the instrument settings parameter in the test panel (ie. the name of the start/stop/# of steps button in the test panel selected and is typically RF frequency.)

The **SORT BY FORMAT** button is used to select the order or format in which the data is presented. The data viewer can display the results in linear (MHz), log or index format.

SORT BY Buttons



(Text continued from previous slide.)

To select the sorting format:

Select the **FORMAT** button inside the **SORT BY** button. (Place the mouse pointer on the **FORMAT** button and click mouse button 1.)

Select the format desired: **Index**, **MHz** or **log**.

To display the test results linearly from point to point, select the pop-up menu choice: **MHz**. (The test points will be connected from point to point by straight lines starting from the left side of the plot and going to the right side of the plot.)

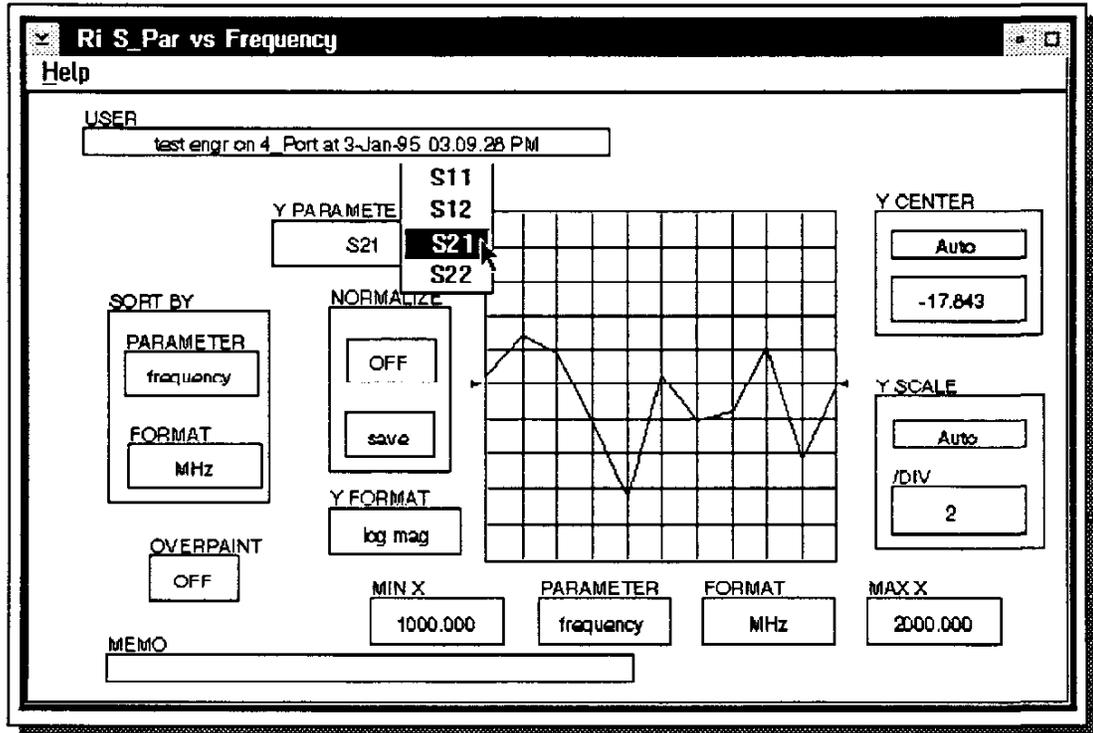
To display the test results in the order in which the measurements were made, select the pop-up menu choice: **Index**. (The test points will be connected from point to point by straight lines starting with the first point measured and connecting to the next point measured. This order may or may not be linear, depending on the test sequence selected by the Test Plan Optimizer for minimum test time.)

To display the test results logarithmically from point to point, select the pop-up menu choice: **log**. (The test points will be connected from point to point by straight lines starting from the left side of the plot and going to the right side of the plot.)

The System Computer will automatically update the data viewer.

In the example shown **MHz** format was selected.

Y Axis PARAMETER Button



The **Y PARAMETER** button is to the right of the **SORT BY** buttons and to the left of the test results plot. It is used to select the measurement parameter data you want displayed along the Y axis of the test results plot. In the example shown we selected a data viewer from the *2 Port S Parameters* test panel and selected the measurement parameter S21. The data viewer is displaying the measurement results for the S21 measurements performed by this test panel. (The S parameter **MEAS** button in the test panel, instructed the system to measure all four 2 port S parameters (S11, S12, S21 & S22) of the device under test.)

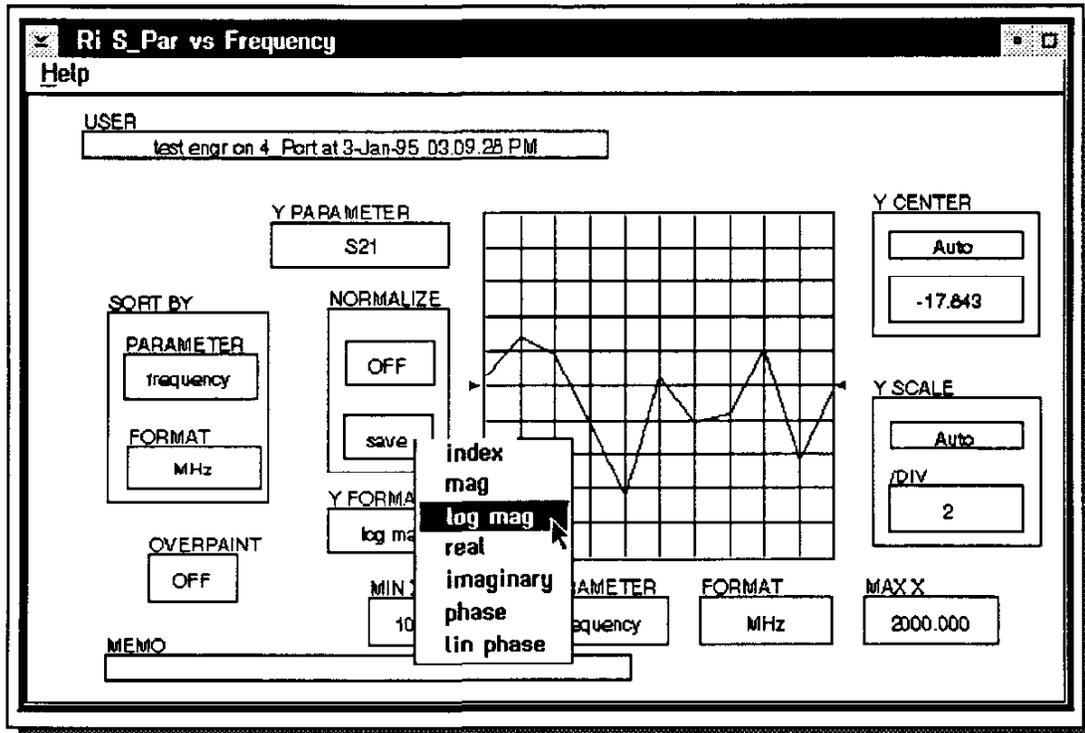
To select and display the test results for the other measurements performed in the test panel, use the following steps:

- Select the **Y PARAMETER** button.

- Select the measurement desired from the pop-up menu displayed.

- The data viewer window will display the test results for the **Y PARAMETER** selected.

Y Axis FORMAT Button



The **Y FORMAT** button below the **Y PARAMETER** button and to the left of the test results plot is the Y axis format button. It is used to select the units and format of the Y axis data.

To select the Y axis format, use the following steps:

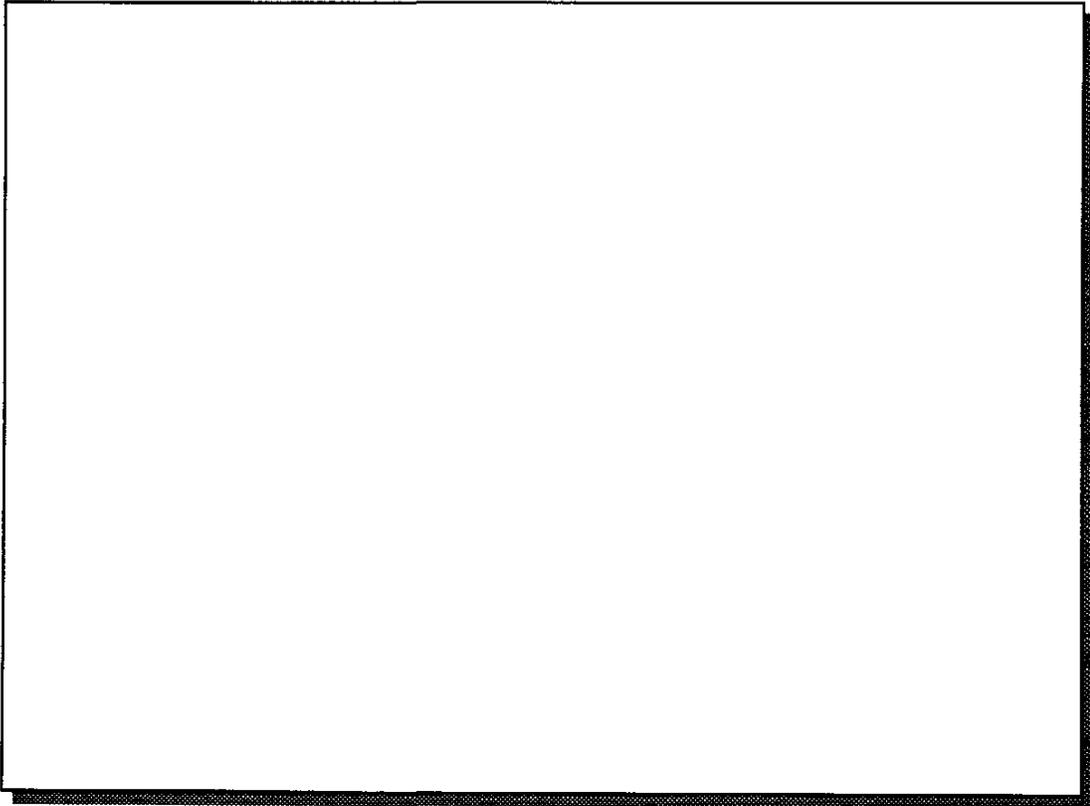
- Select the **Y FORMAT** button.

- Select the format desired from the pop-up menu displayed.

- The data viewer window will automatically update the test results display.

The formats offered depend on the measurement parameter selected in the Y axis parameter button. For example, if we had selected the noise figure test panel, the measurement results would be displayed in linear, log or index format. (Log format displays the test results dB. Linear format displays the test results in linear units. Index format displays the test point number (1, 2, 3, 4, etc) along the y axis instead of the test results.)

Y Axis FORMAT Button (Continued)



(Text continued from previous slide.)

For the S21 measurements shown on the previous slide, the format choices are different. The format choices offered include:

mag displays the magnitude of S21 in linear units.

log mag displays the magnitude of S21 in logarithmic units.

real displays the real part of S21 in linear units.

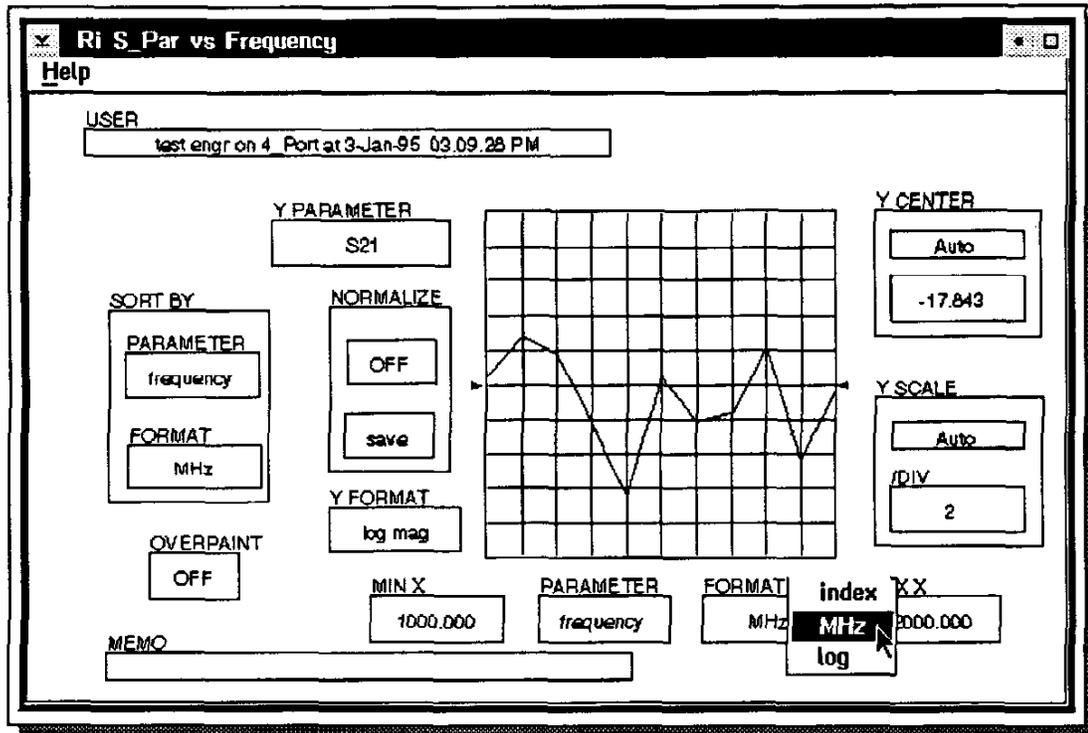
Imaginary displays the imaginary part of S21 in linear units.

phase displays the S21 phase term (-180 to +180 degrees.)

In Phase displays the S21 phase term (0 to N x 360 degrees.)

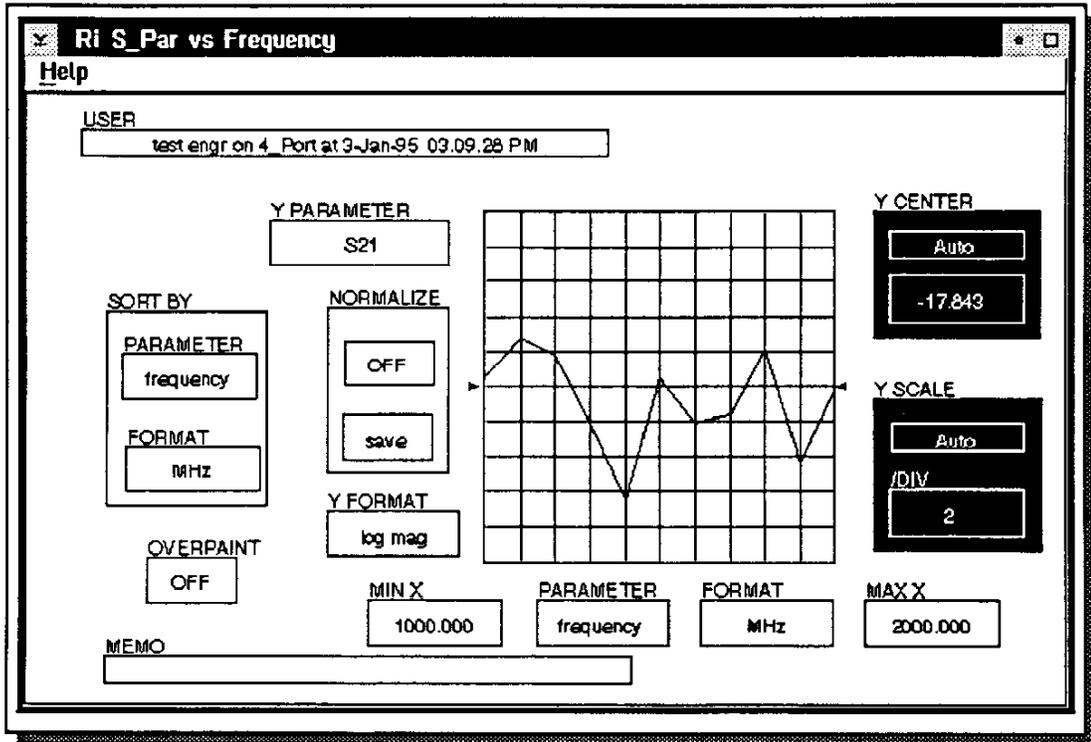
Index displays the test point number of each measurement instead of the test results.

X Axis PARAMETER & FORMAT Button



The **PARAMETER** button and the **FORMAT** button below the test results plot are used to select the X axis measurement parameter and the X axis format. The process for setting the X axis **PARAMETER** button and the X axis **FORMAT** button is the same as the process for setting the Y axis **PARAMETER** and **FORMAT** buttons, select the button and select the choice desired. The X axis minimum value (MIN X) and the X axis maximum value (MAX X) are set automatically by the System Computer using the X axis **PARAMETER** and **FORMAT** selections and the instrument settings button in the test panel.

Y Center and Y SCALE Buttons



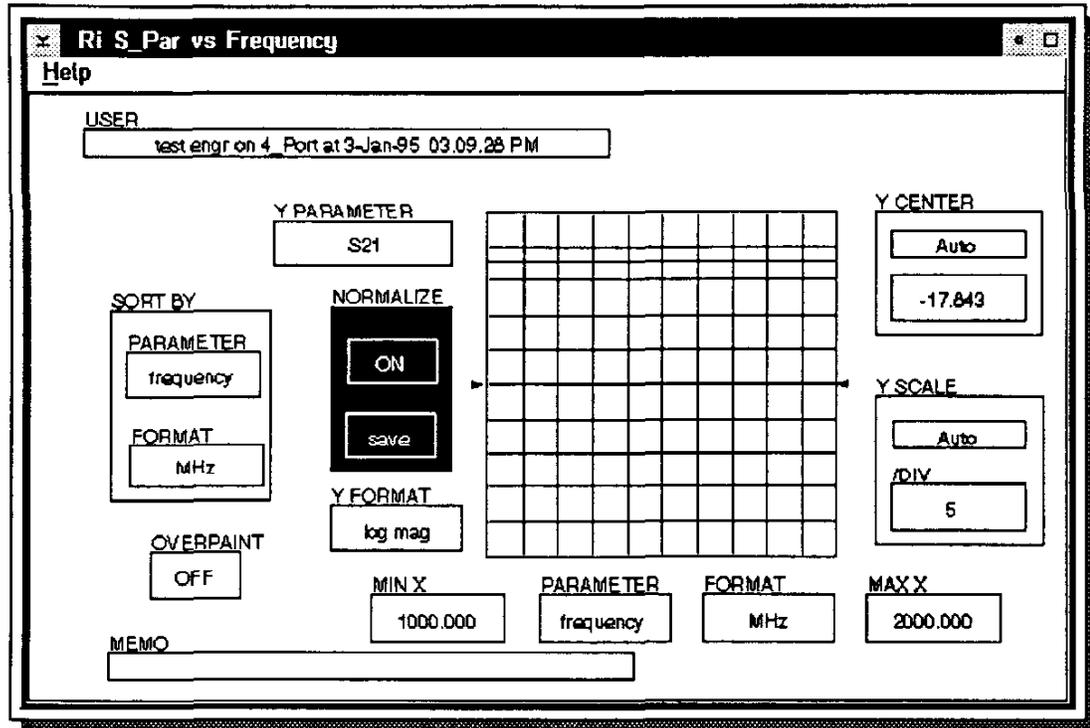
On the right side of the test results plot are the **Y CENTER** button and the **Y SCALE** button.

The **Y SCALE** button sets the Y axis scaling. You can either select [highlight] the **Auto** button inside the **Y SCALE** button and let the System Computer automatically set the Y axis scaling value or you can select [highlight] the **/DIV** button and enter a scaling factor. The scaling factor you enter is the spacing between each Y axis grid line (or division) on the test results plot. If you select the **Auto** button, the Data Viewer will display the scaling factor selected by the System Computer in the **/DIV** button.

The **Y CENTER** button sets the Y axis center line. Two small arrows, one on each side of the test results plot identify the Y axis center line. The **Y CENTER** buttons operate the same way as the **Y SCALE** buttons, you either select [highlight] the **Auto** button inside the **Y CENTER** button and let the System Computer automatically set the Y axis center line value or you can select [highlight] the value button below the **Auto** button and enter the Y axis center line value desired. If you select the **Auto** button the Data Viewer will display the center line value selected by the System Computer in the center line value button.

The test results plot automatically updates each time you make a button selection.

NORMALIZE Buttons



The NORMALIZE buttons enable you to save the test results currently displayed on the test results plot, and to display succeeding test result traces relative to the test results data saved. (The System Computer calculates the difference between the test results you saved and the succeeding test results, and displays the relative difference on a point by point basis.)

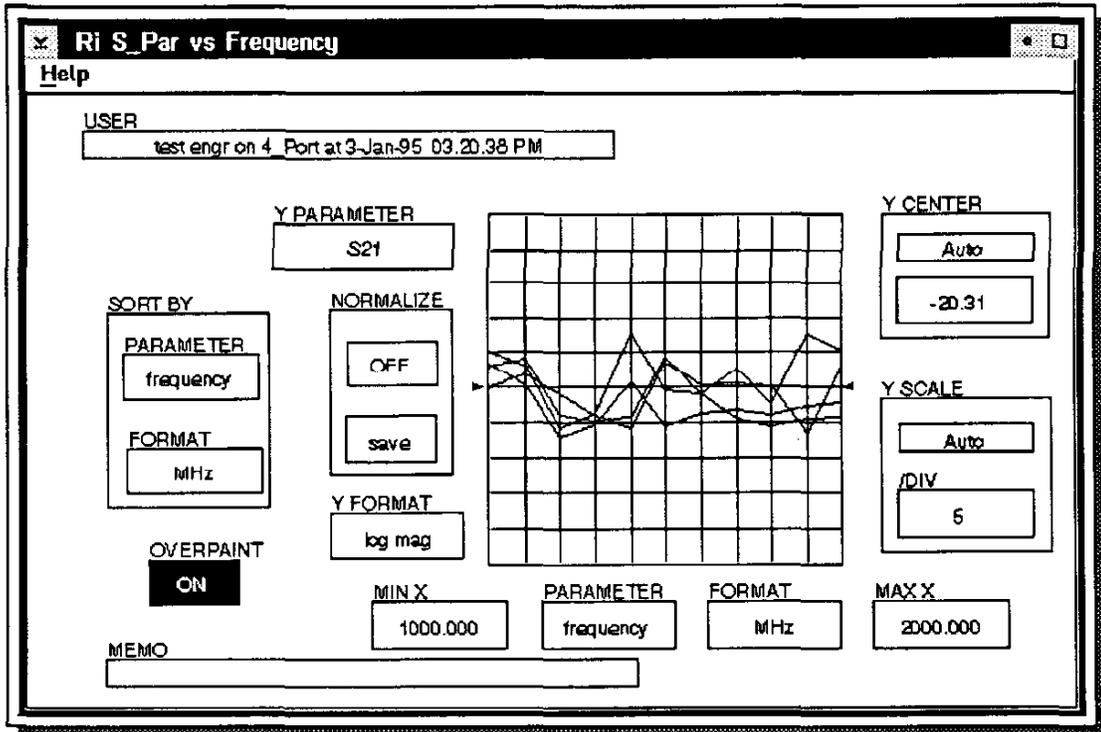
The procedure for saving the current test results and normalizing the test results plot is the following:

- Select [highlight] the **save** button in the **NORMALIZE** button to save the current test results.
- Select [highlight] the **OFF** button in the **NORMALIZE** button to change its state to **ON**. This turns on the normalize function and normalizes the current test results. (The test results plot will display a flat horizontal line along the Y axis.)
- Run the test plan again to display the new test results relative to the test results previously saved.

To turn off the normalization:

- Select [highlight] the **ON** button to change its state back to **OFF**. The new test results will be displayed unnormalized.

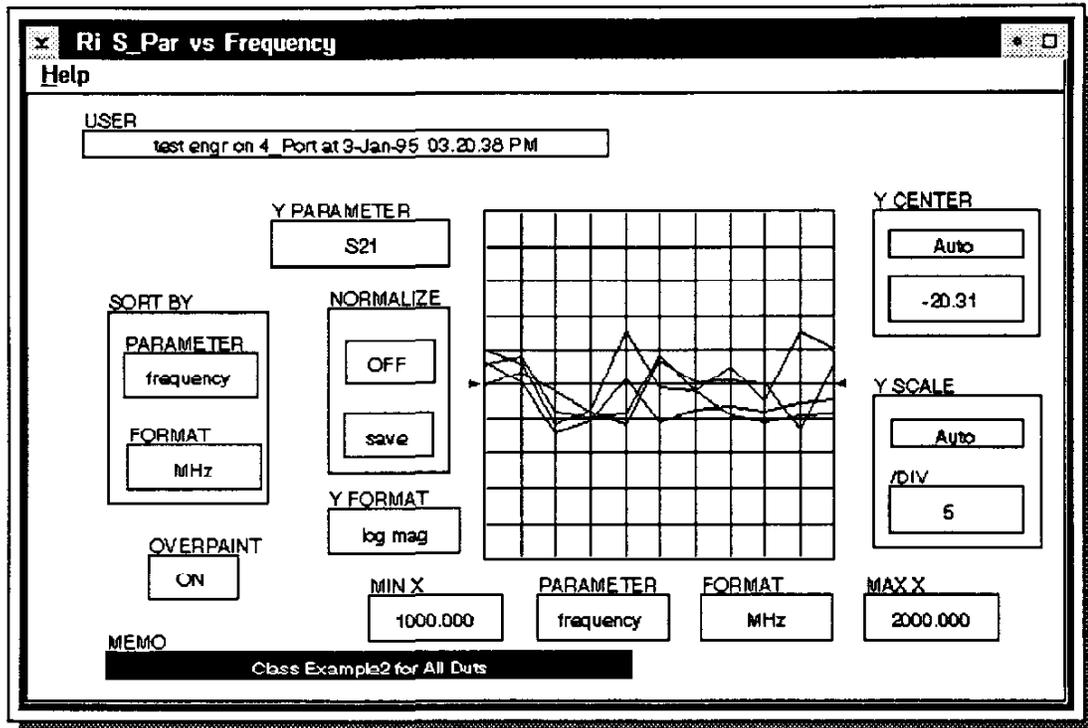
OVERPAINT Button



The OVERPAINT button provides you some unique capabilities. With the OVERPAINT button OFF, each time you run the test plan, the Data Viewer will erase the test results plot and draw the new test results. With the OVERPAINT button ON, each time you run the test plan the Data Viewer will add (overpaint) an additional test result trace onto the same test results plot.

The OVERPAINT button is a toggle function. Each time the OVERPAINT button is selected [highlighted] it switches from ON to OFF or OFF to ON.

MEMO Button



The **MEMO** button provides you the capability to add text or comments to each plot. To enter text to the **MEMO** button:

Select [highlight] the **MEMO** button.

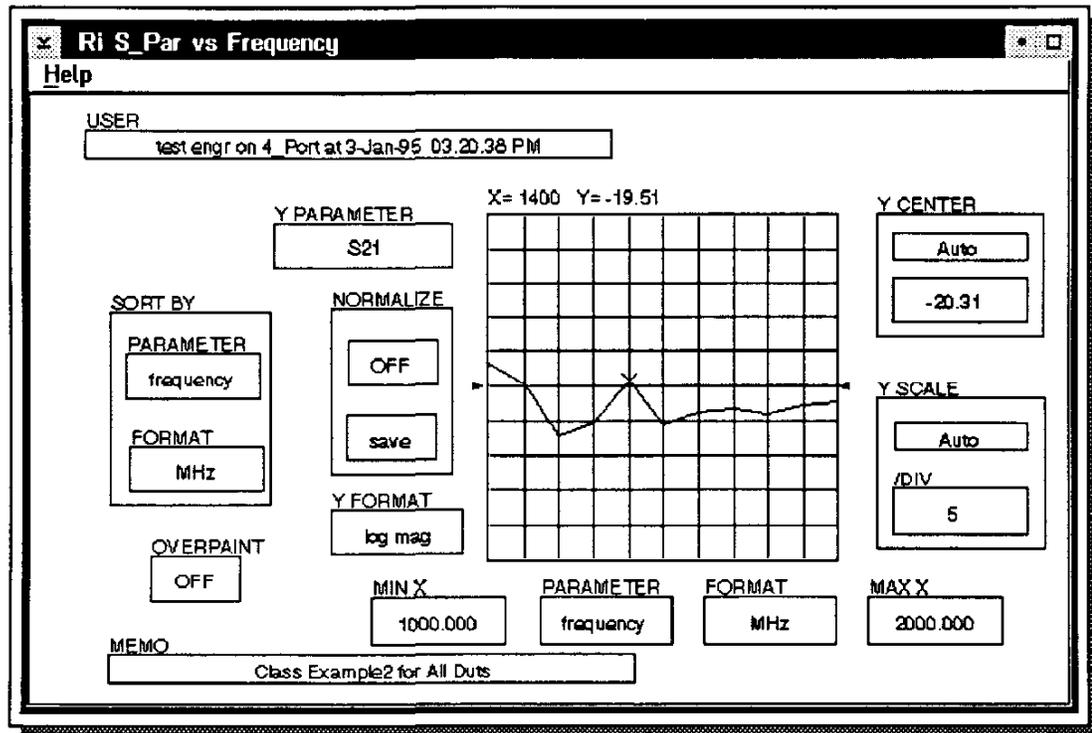
The Data Viewer will display the dialog box: **Enter Text**.

Enter the text desired using the keyboard.

Select the **OK** button or press the **Enter** key.

The System Computer will display the text in the **MEMO** button.

Displaying the X & Y Coordinates of a point on the Test Results Plot



You can use the mouse pointer to identify the X and Y coordinates of a point on the test results plot. The process is simple:

Place the tip of the mouse pointer at the location of the plot you want to identify.

Click mouse button 1.

The Data Viewer will display the X & Y coordinates selected just above the upper left corner of the test results plot.

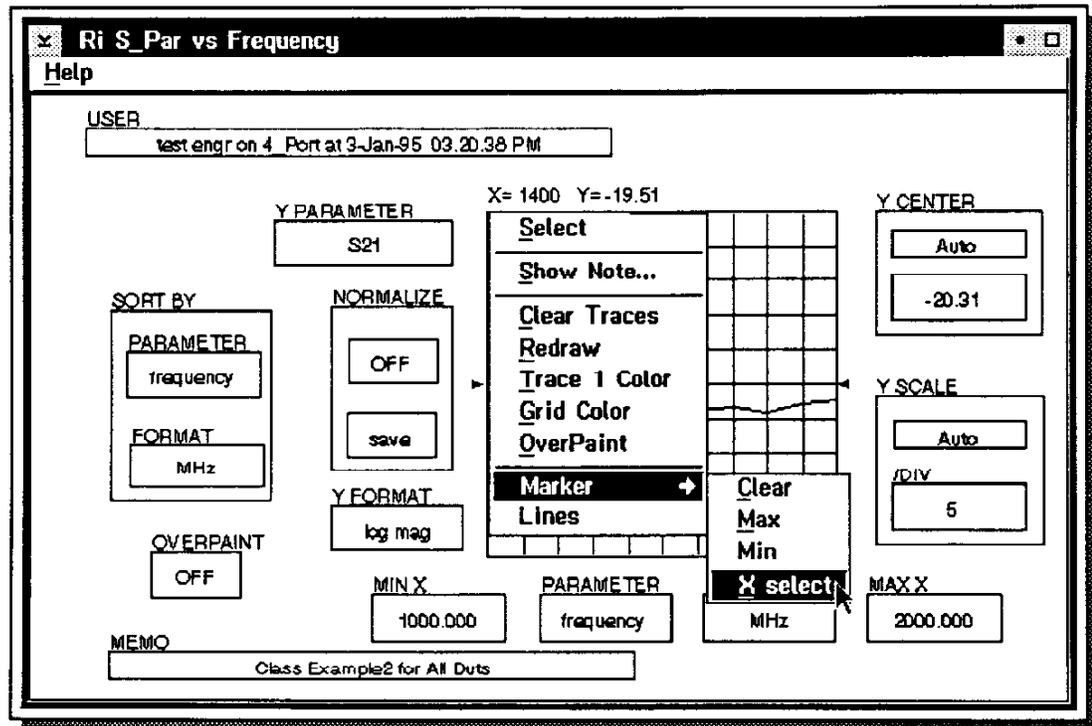
You can also use the mouse pointer to identify the difference between two points on the test results plot. The process is again simple:

Place the tip of the mouse pointer at the location of the plot you want to identify.

Press and hold mouse button 1. Drag the mouse pointer to the other point on the plot. Release mouse button 1.

The Data Viewer will display, just above the upper left corner of the test results plot, the difference between the two points selected (in delta X & delta Y coordinates).

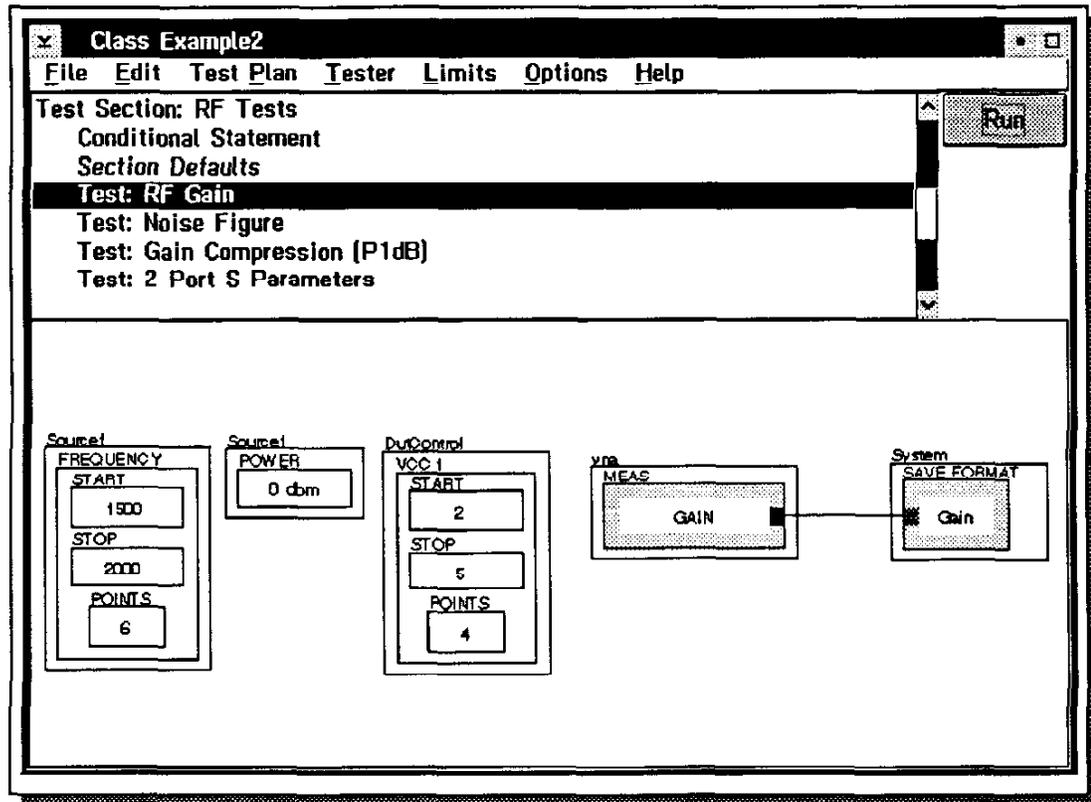
Special Mouse Button 2 Functions



The Data Viewer also offers the following special mouse button 2 functions:

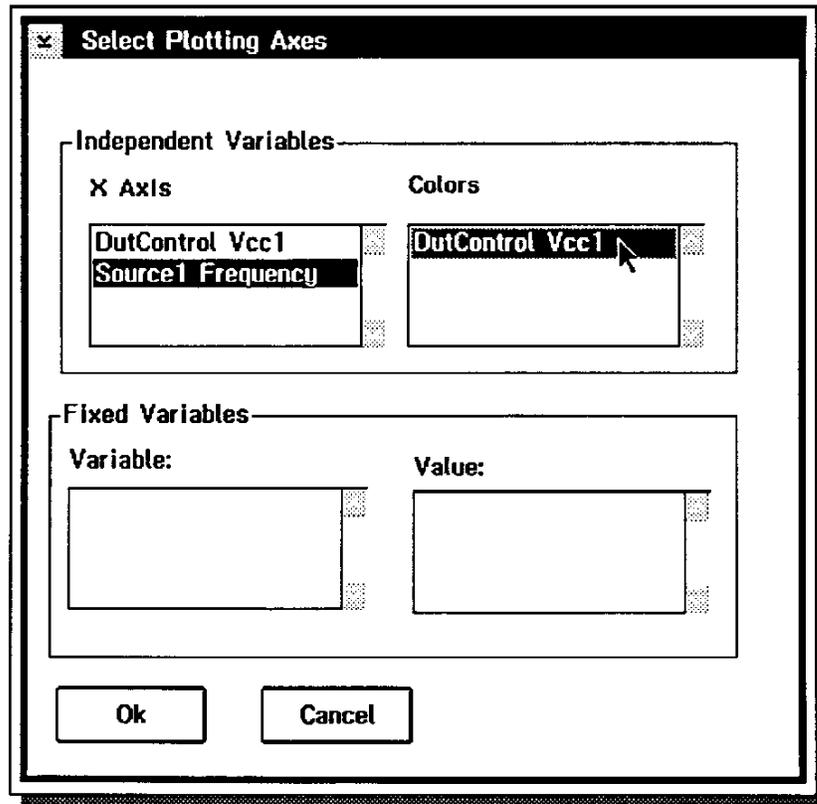
- | | |
|----------------------|---|
| Clear Traces | Clears all of the test results traces from the test results plot. |
| Redraw | Redraws the last test results trace. |
| Trace 1 color | Displays a list of colors which the Data Viewer can use to display the test results data. The user selects the color desired. The next test results trace to be drawn will use the new color selected. |
| Grid color | Displays a list of colors which the Data Viewer can use to display the x and y axis grid lines. The user selects the color desired and the grid lines are immediately updated. |
| ZoomOut | Removes the buttons in the Data Viewer window and proportionally expands the test results plot to cover the space available. |
| ZoomIn | Returns the Data Viewer buttons and returns the test results plot to its normal size. |
| Lines | A toggle Function. The <u>L</u> ines function lets you display the measurement points with lines connecting the points or without lines (just x marks to identify each point.) |
| Marker | <p>Clear - Clears all Markers.</p> <p>Max - Places the Marker on the highest Y value measured</p> <p>Min - Places the Marker on the lowest Y value measured.</p> <p>X select - Places the Marker on the Y value which corresponds to the X axis value selected.</p> |

Multi-Dimensional Data Viewers



It is easy to add buttons to a test panel and to create test results which are a function of more than one instrument setting (parameter). In the example shown the RF Gain measurements are a function of both the RF frequency settings button and the VCC voltage settings button. To display the results for this test plan the RI 7500A System Software Packages offer a Multi-Dimensional Data Viewer. The Multi-Dimensional Data Viewer is similar to the data viewer we have been discussing except that it uses different colored test result traces to distinguish between different parameter values.

Opening a Multi-Dimensional Data Viewer



To open a Multi-Dimensional Data Viewer and view the multi-dimensional test results generated, use the following steps:

Select a test panel with 2 or more multi-test point settings buttons such as the test panel in the previous slide.

Place the mouse pointer on the SAVE DATA button's **data name** and click mouse button 2.

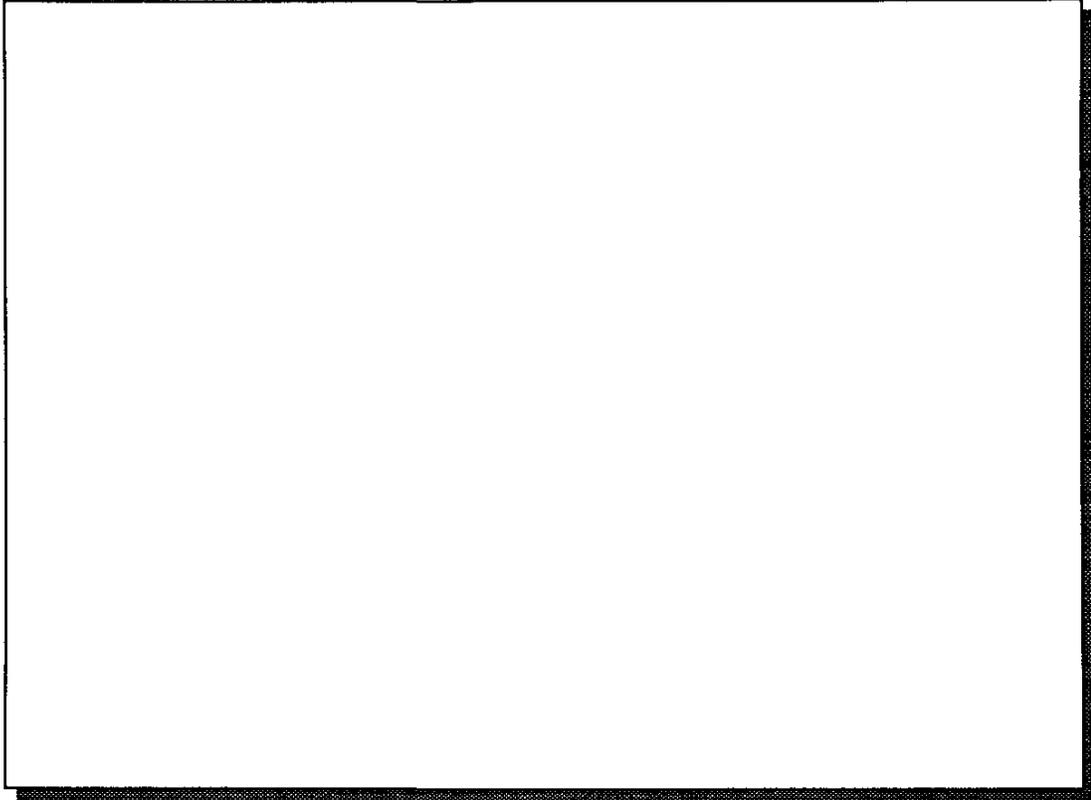
Select the pop-up menu choice: **View Data**.

The System Computer will display the dialog box: **Selecting Plotting Axes**.

Select [highlight] the parameter you want to use for the X axis parameter. [In the example shown **Source1 Frequency** was selected.]

Select [highlight] the parameter you want displayed using different colored trace lines. [In the example shown **DutControl Vcc1** was selected.] A different colored Gain measurement trace will be displayed on the test results plot for each test setting of VCC1 specified in the test panel.

Opening a Multi-Dimensional Data Viewer (Continued)



(Text continued from previous slide.)

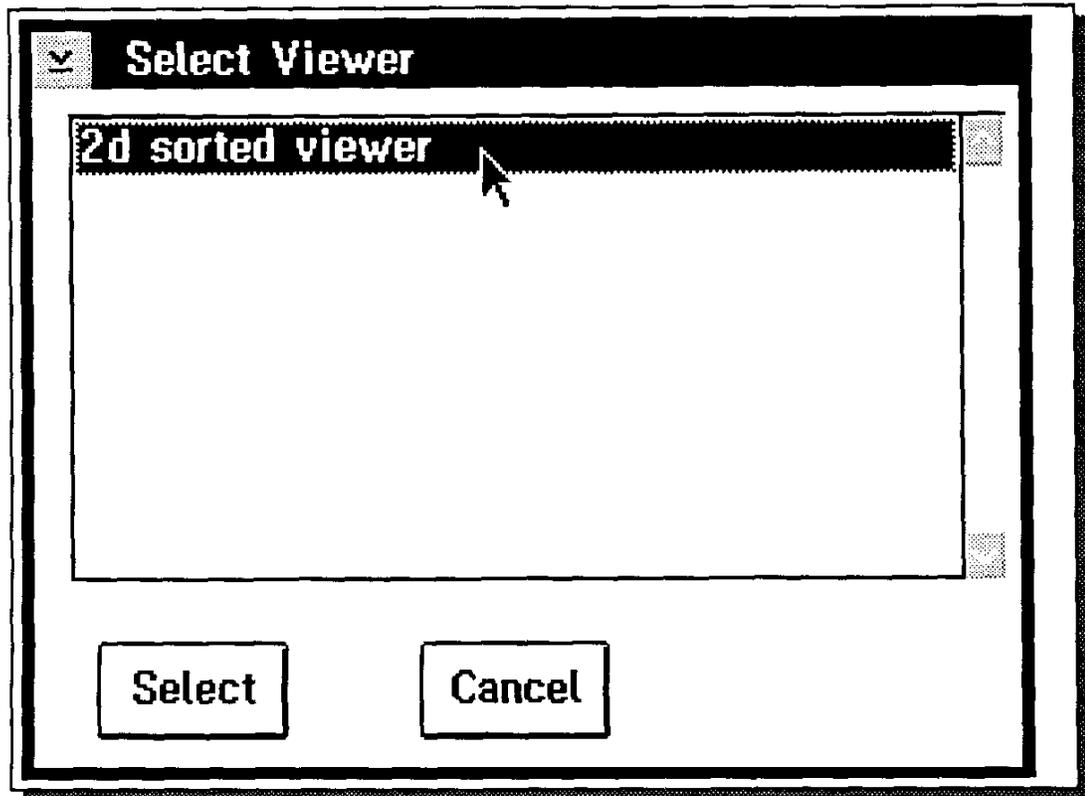
Individually select each of the remaining setting parameters listed in the **Fixed Variables** ,
Variable: display field.

Set each of these remaining parameters equal to a constant by selecting [highlighting] a test
point **Value:** associated with each parameter. (You can only have two independent
variables displayed at one time. The remaining parameters must be set to a constant value.)

Select the **OK** button.

The System Computer will display the dialog box: **Select Viewer.**

Opening a Multi-Dimensional Data Viewer

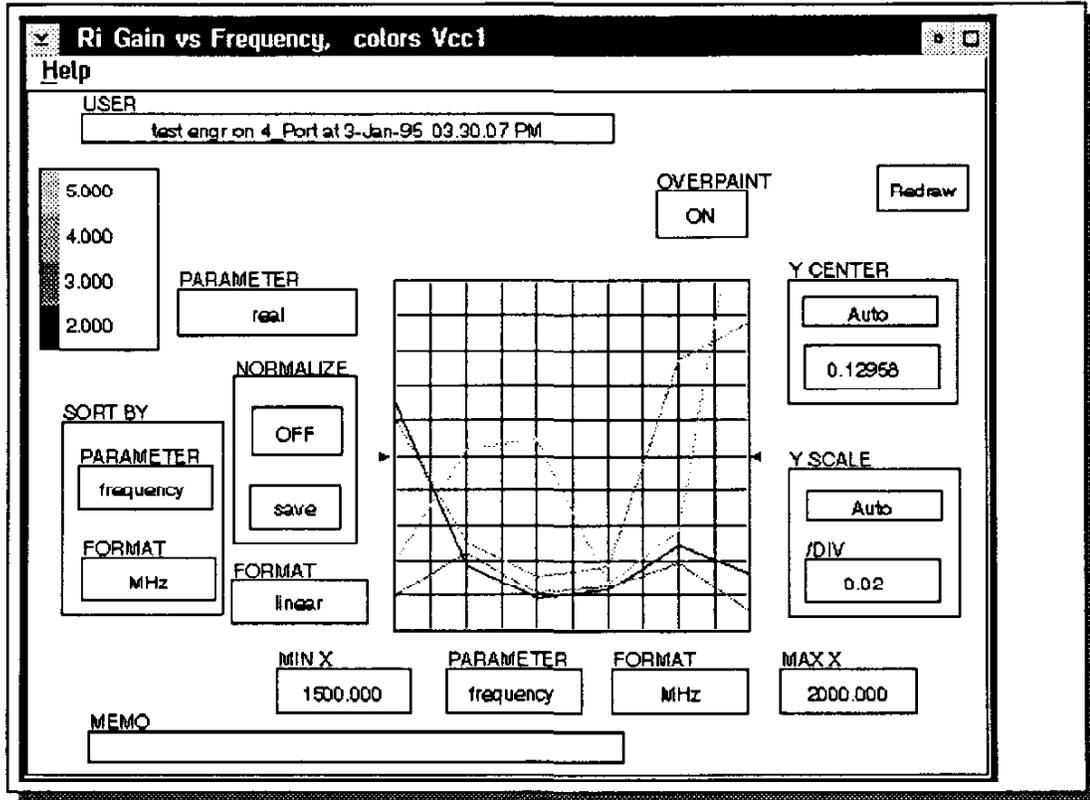


Select [highlight] the **2d sorted viewer** choice.

Select the **select** button.

The System Computer will open the Multi-Dimensional Data Viewer and display the test results.

Using a Multi-Dimensional Data Viewer



The Multi-Dimensional Data Viewer will display in the title bar the data name from the SAVE DATA button, the settings selected for the X axis parameter and the setting selected to be represented by multiple colored traces. The viewer is very similar to the X & Y coordinate data viewer we have been discussing. The new buttons added are the **color bar** button and the **Redraw** button.

Color Bar Button

The **color bar** button, in the example shown is used to select and display the test results vs Source1 Frequency for the VCC1 test point settings (VCC1= 5, 4, 3 & 2 volts). The System Computer will initially display the test results for the highest setting tested. (In the example shown the data viewer will display the test results for VCC1=5 volts.) To select and display the test results for another setting value just select the colored square and/or the setting valued desired in the color bar button. The data viewer will display the new colored trace selected.

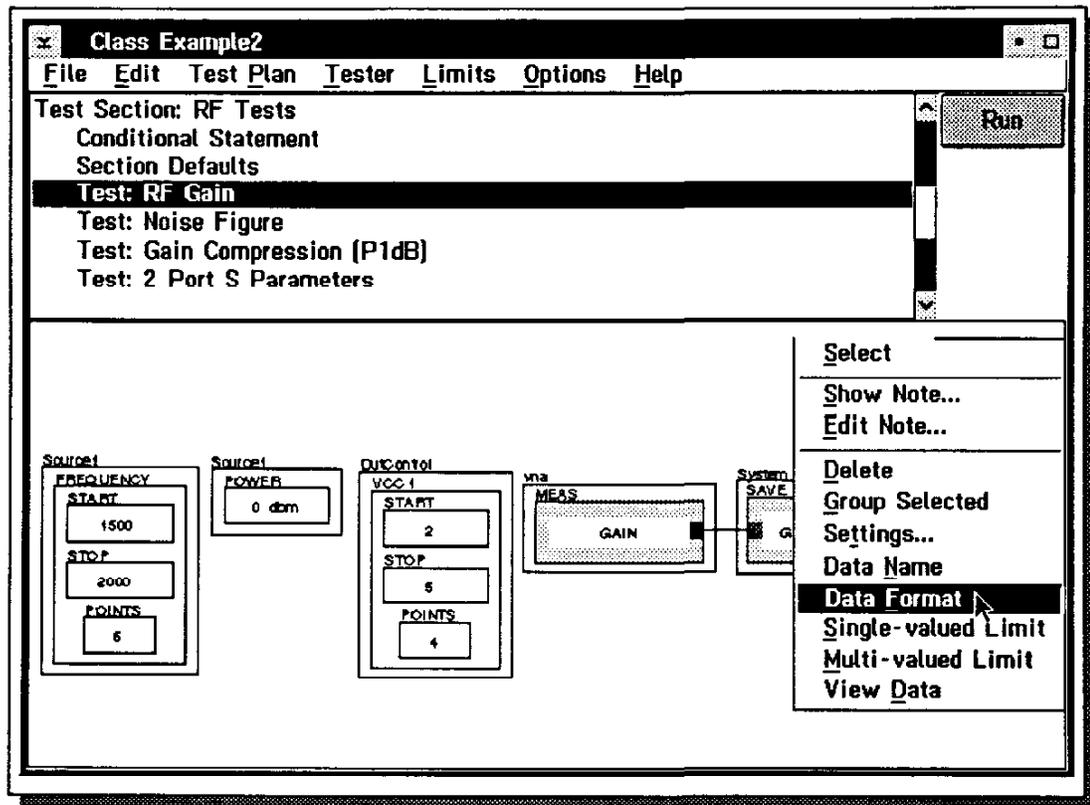
Redraw Button

To display all of the traces on the screen simultaneously use the OVERPAINT (ON) function and select each of the different colors in the color bar button or select the **Redraw** button which will redraw all of the test result traces in sequential order.

To Close a Data Viewer

To close the data viewer place the mouse pointer on the down arrow in the upper left corner of the data viewer window and double click mouse button 1.

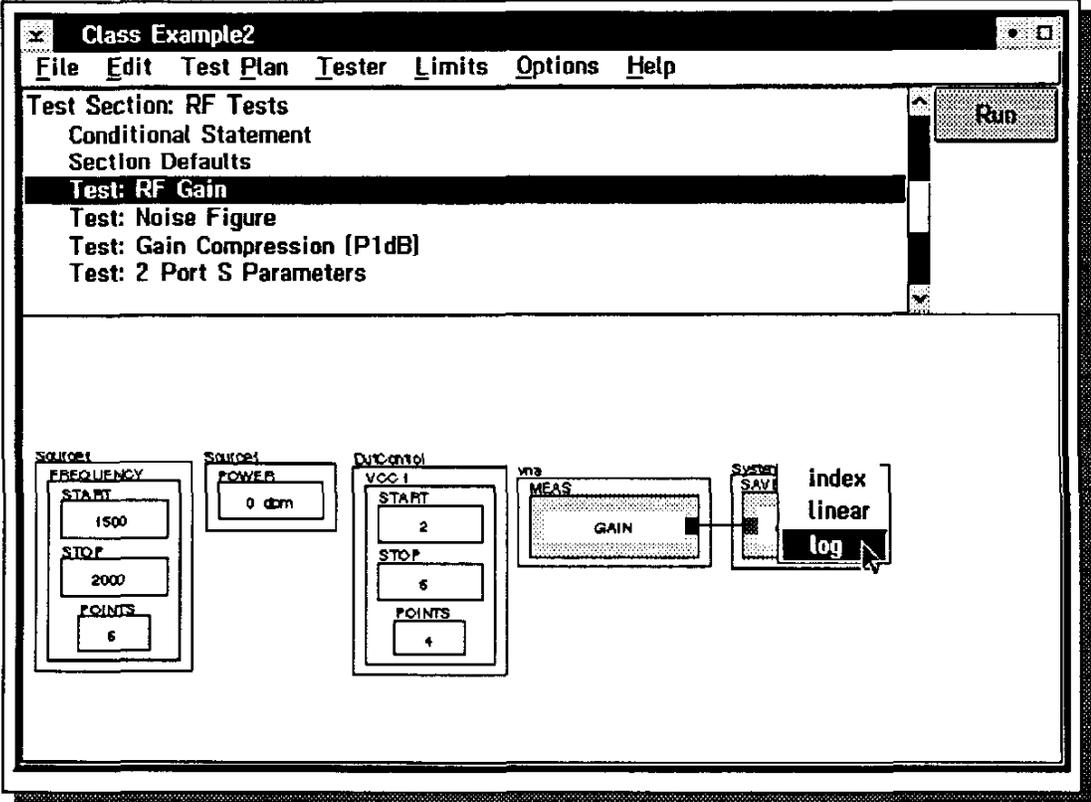
Selecting the Data Format



You can specify the data format/units used by the data base to save the data. The data format you select is also used by the user specified test limits. (We will be discussing the test limits features in a few minutes.) To select the data format, use the following steps:

- Place the mouse pointer on the SAVE DATA button's data name and click mouse button 2.
- Select the pop-up menu choice: **Data Format**.

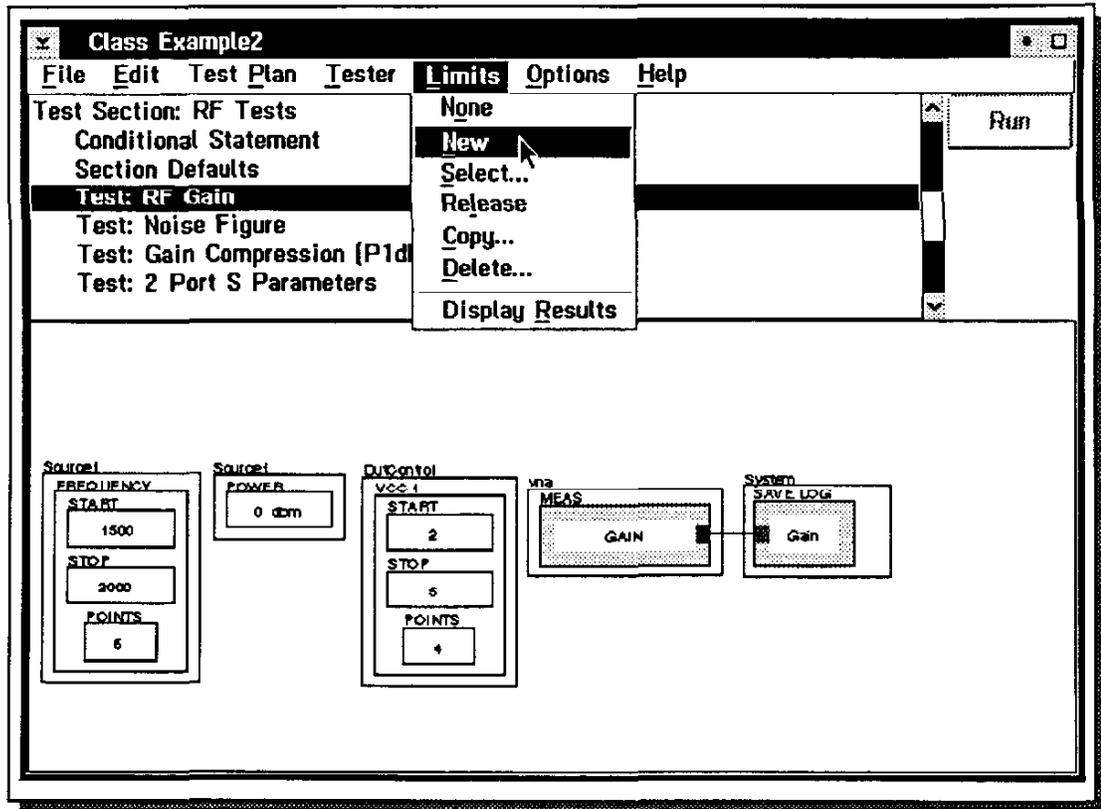
Selecting the Data Format



The System Computer will display the format choices. In the example shown the format choices offered for Gain measurements are index, linear and log (dB).

Select the format desired. In the example shown, Gain measurements will be saved in log (dB) format.

Adding Test Limits to the Test Panels



After you have compiled and run the test plan at least once you can add upper and/or lower test limit values to each DATA SAVE button. Each test plan can have one or more sets of test limits associated with the test plan.

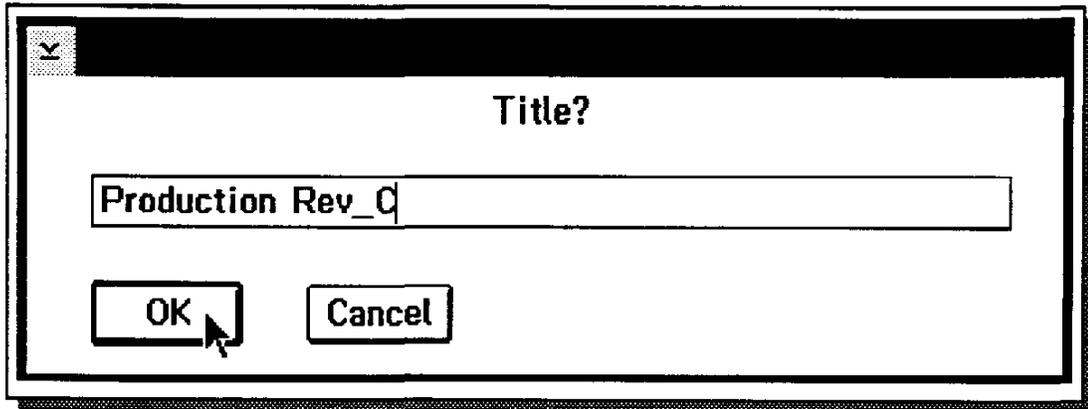
To add test limits to the test plan you must first either open an existing set of test limits or created a new set of test limits.

To create a new set of test limits:

Select the Test Plan Editor's menu choices: **Limits** and **New**.

The Test Plan Editor will display the dialog box: **Title?**.

Adding Test Limits to the Test Panels



Enter a title for the new set of test limits.

Select the **OK** button or press the **Enter** key.

The System Computer will open the new set of test limits and display the Test Plan Editor again.

To open an existing set of test limits which you have previously created for this test plan:

Select the Test Plan Editor's menu choices **Limits** and **Select...**

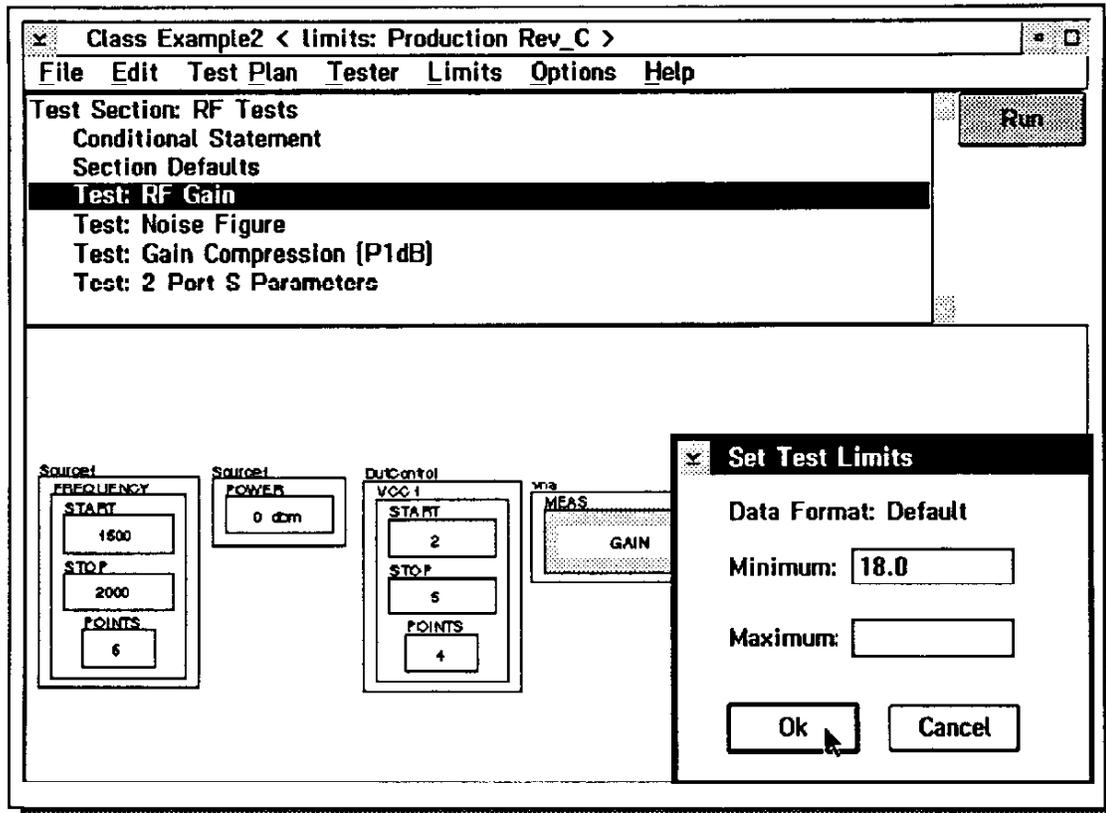
The Test Plan Editor will display the dialog box: **Select Test Limits**.

Select the test limits desired.

Select the **select** button.

The System Computer will open the test limits selected.

Adding Test Limits



You can add test limits to each of the DATA SAVE buttons in your test plan. To add test limits to a SAVE DATA button:

Select [highlight] the test panel desired from the Test Plan Outline.

Place the mouse pointer on the **Data Name** in the SAVE DATA button and click mouse button 2.

Select the menu choice: **Single-valued Limit**.

The Test Plan Editor will display the dialog box: **Set Test Limits** (see lower right CRT display.)

Select the small entry field to the right of the word **Minimum** and enter the lower test limit desired.

Select the small entry field to the right of the word **Maximum** and enter the upper test limit desired.

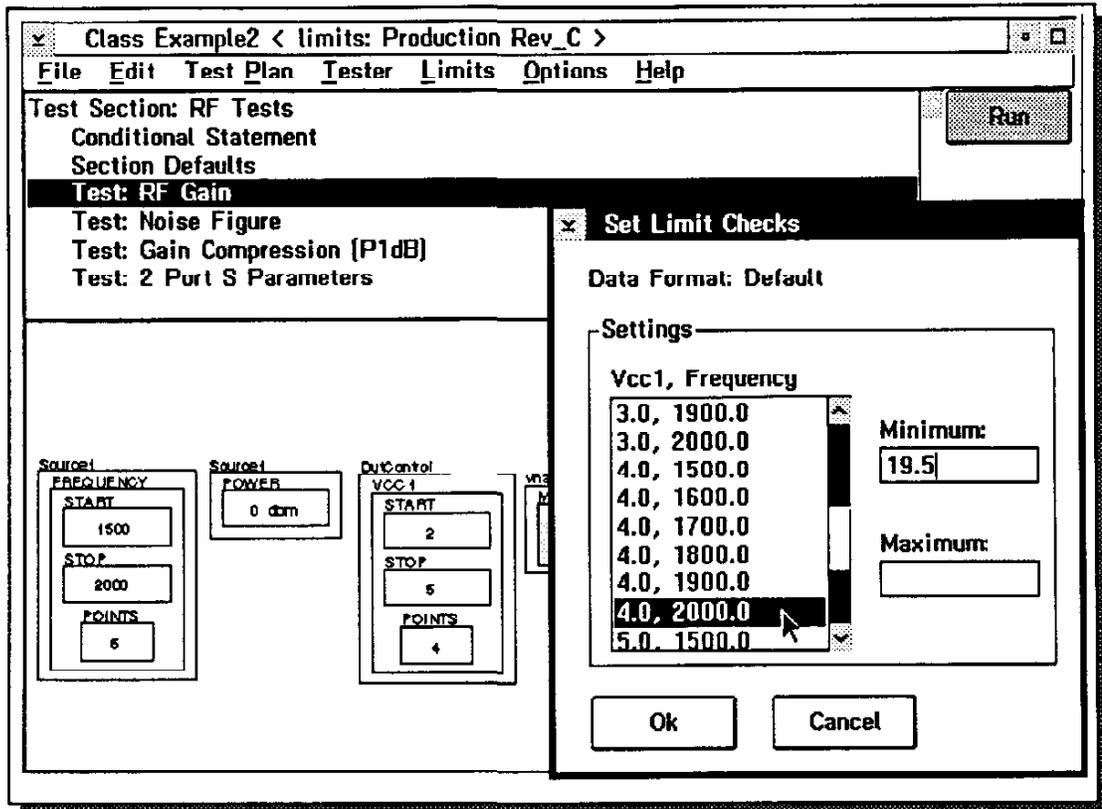
[In the example shown the minimum test limit value was set at 18 dB of gain. (Remember we had previously set the data format to be log.)]

Select the **OK** button.

The test limits will be added to the test panel and the Test Plan Editor window will become active again.

This process can be repeated for all of the other SAVE DATA buttons.

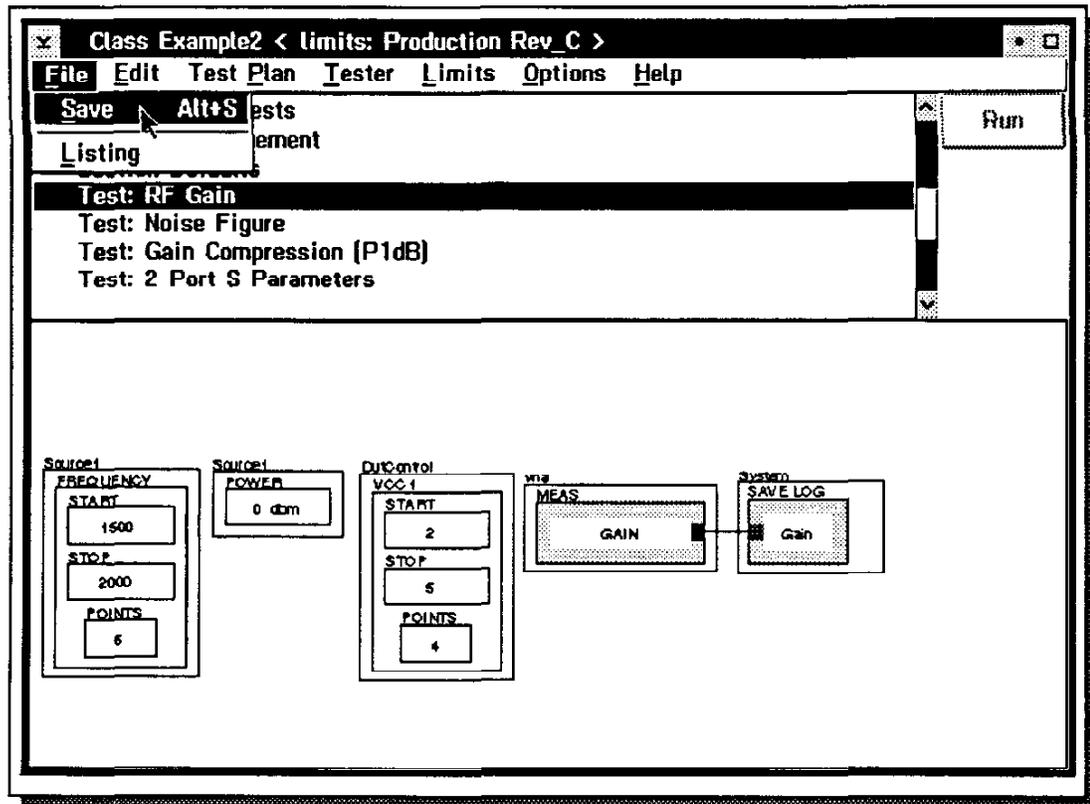
Adding Test Limits



You can also individually select test limits for each test point in each test by selecting the **Multi-valued Limit** menu choice instead of the **Single-valued Limit** choice, and then selecting the test points you wish to change and entering the minimum and maximum test limits as shown above.

The test system only performs the test limit checks for those upper or lower test limits which have a value. Blank limit values are ignored.

Saving the Test Limit File



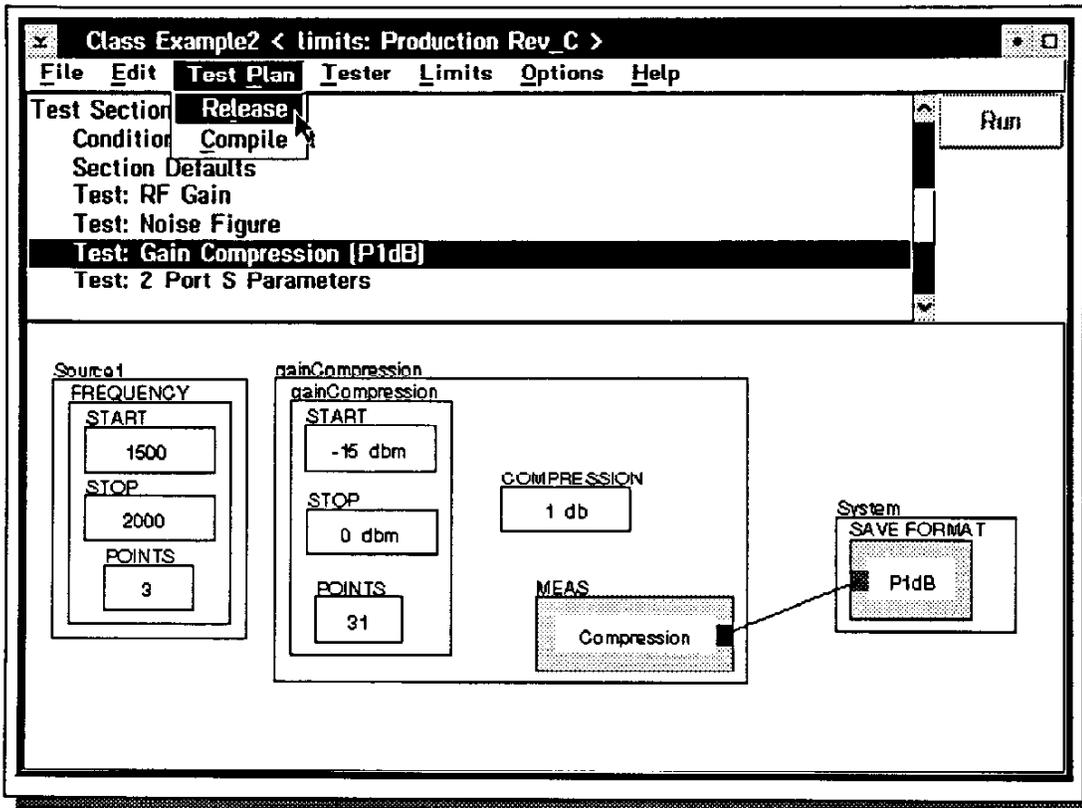
After you enter the test limit values desired you need to save the test limits with the test plan. To save the test limits and the test plan:

Select the Test Plan Editor's menu choices: **File** and **Save**.

The **Save** command saves the test limits with the test plan.

The System Computer tags the test limits with the name of the test plan it was created from. When you open a test plan and select a set of test limits using the menu choices: **Limits** and **Select...**, only those test limits created by this test plan will be listed.

Releasing the Test Plan



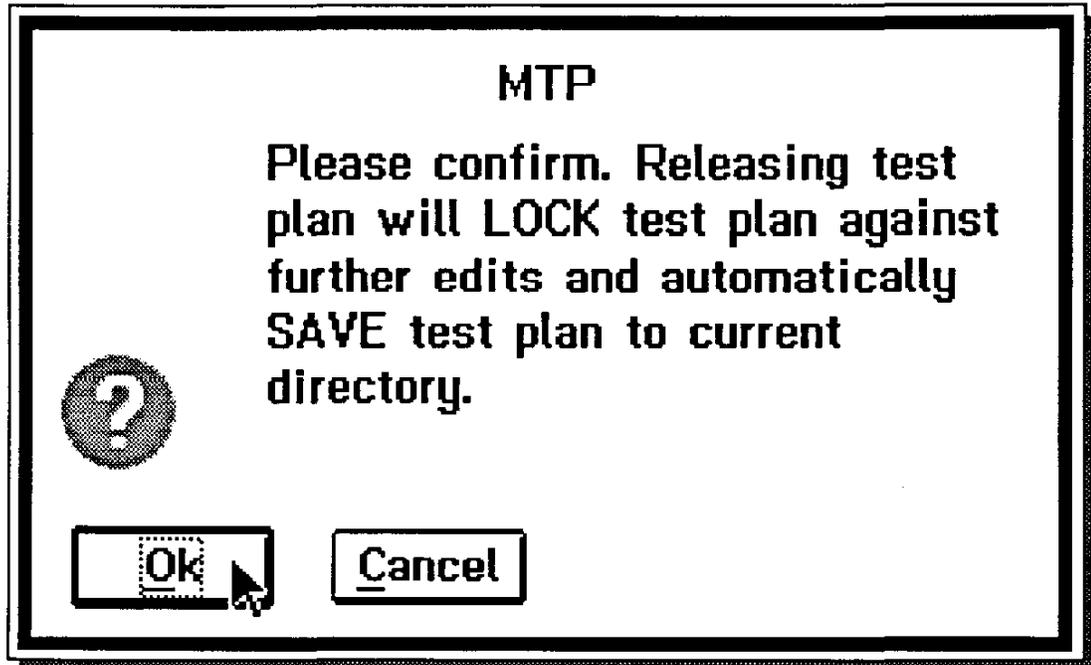
After you have created, run and debugged the test plan and created the test limits, you can perform the release process. When you release a test plan the System Computer tags the test plan as a released test plan and time stamps the file. The System Computer then builds the data tables for the test results in the System Data Base and saves a copy of the test plan and its instrument settings/states in the Data Base. The test plan is now protected from any further changes. (However the test plan can be copied and the copy can be modified and saved under a new name.)

The process for releasing a test plan is:

Select the Test Plan Editor's menu bar choices: **Test Plan** and **Release**.

The System Computer must be connected to the SQL Data Base.

Releasing the Test Plan



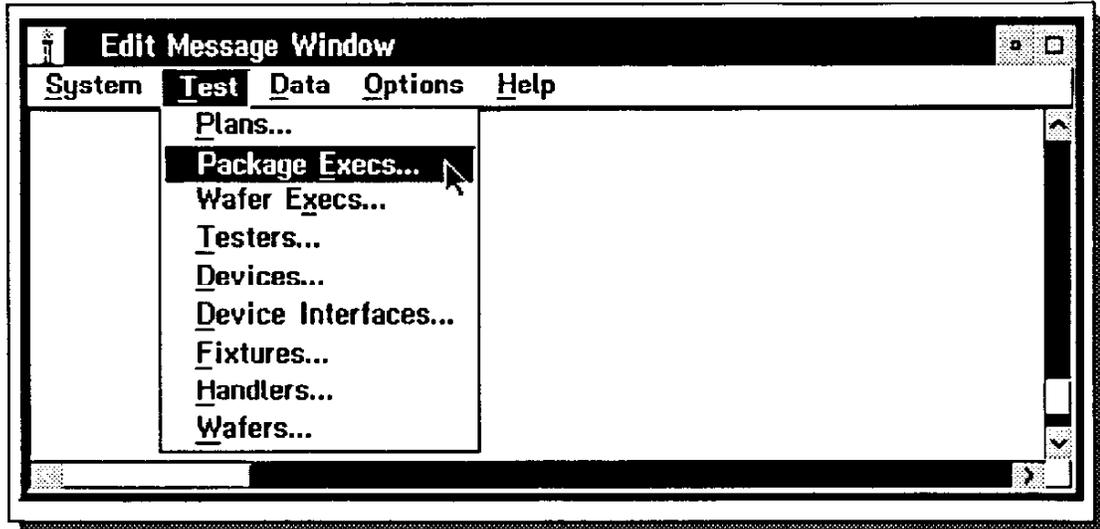
The Test Plan Editor will display the dialog box:

Please Confirm. Releasing test plan will LOCK test plan against further edits and automatically saves test plan to current directory.

Select the **OK** button.

The System Computer will now perform the release process.

Running Test Plans in Production



To speed up testing in production the RI 7500A System Software offers a Test Executive Editor, a simplified Test Operator Interface and custom test executives. Using the Test Executive Editor, the test plan developer creates custom configured test executives. The operator in production then loads and executes these test executives using the simplified Test Operator Interface.

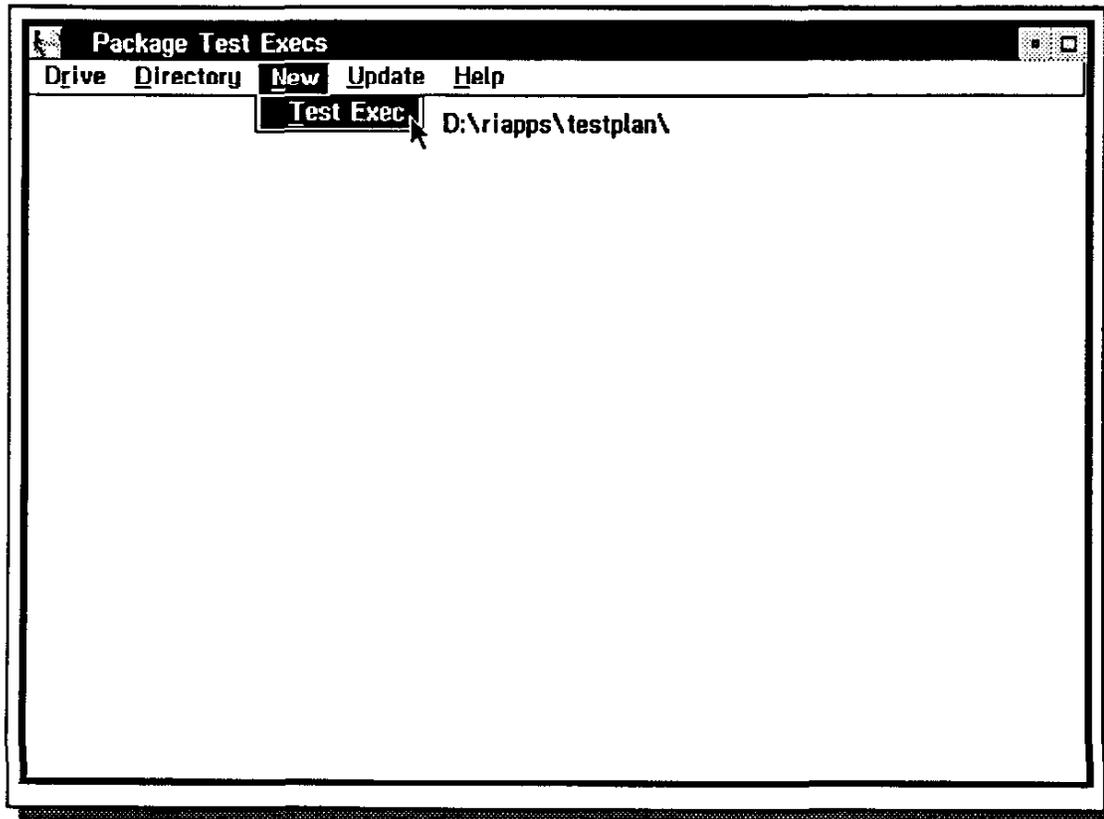
Each test executive contains a custom configured operator interface, and one or more test plans and one or more sets of test limits. To run a test exec, the operator selects a test executive from the Test Execs Container Window, and enters the lot, subplot and part number. The rest of the information required to run a test plan is included in the test executive selected.

The Test Executive Editor can also be used to execute test executives and test devices in production if desired. The Test Operator Interface is actually a simplified version of the Test Executive Editor. (The Test Operator Interface does not contain the Editor's pull down menu choices which are necessary to customize the operator interface or to create new test executives.)

Opening the Package Test Execs Container Window

To open the Package Test Execs Container Window, select the RI Message Window's menu choices: **Test** and **Package Execs....** The System Computer will open and display the Package Test Execs Container window.

Creating a New Package Test Exec

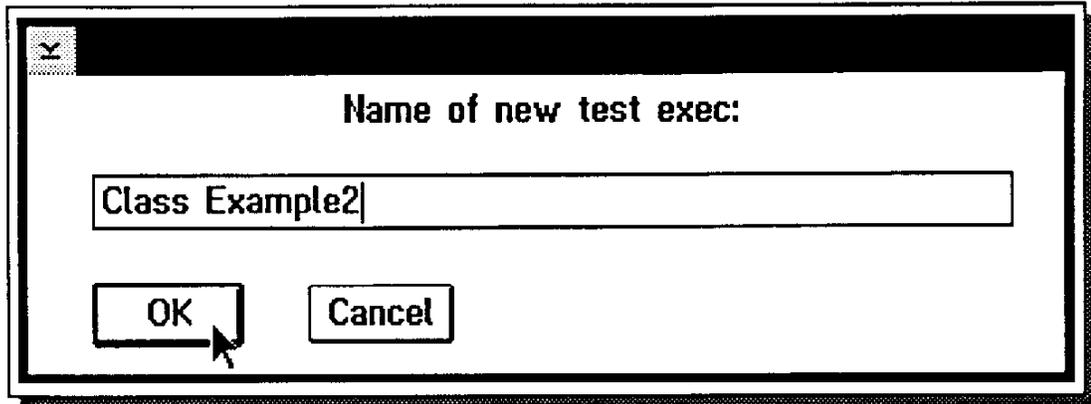


To create a new Package Test Exec:

Select the menu bar choices: **New** and **Test Exec.**

The System Software will open the Dialog Box: **Name of new test exec.**

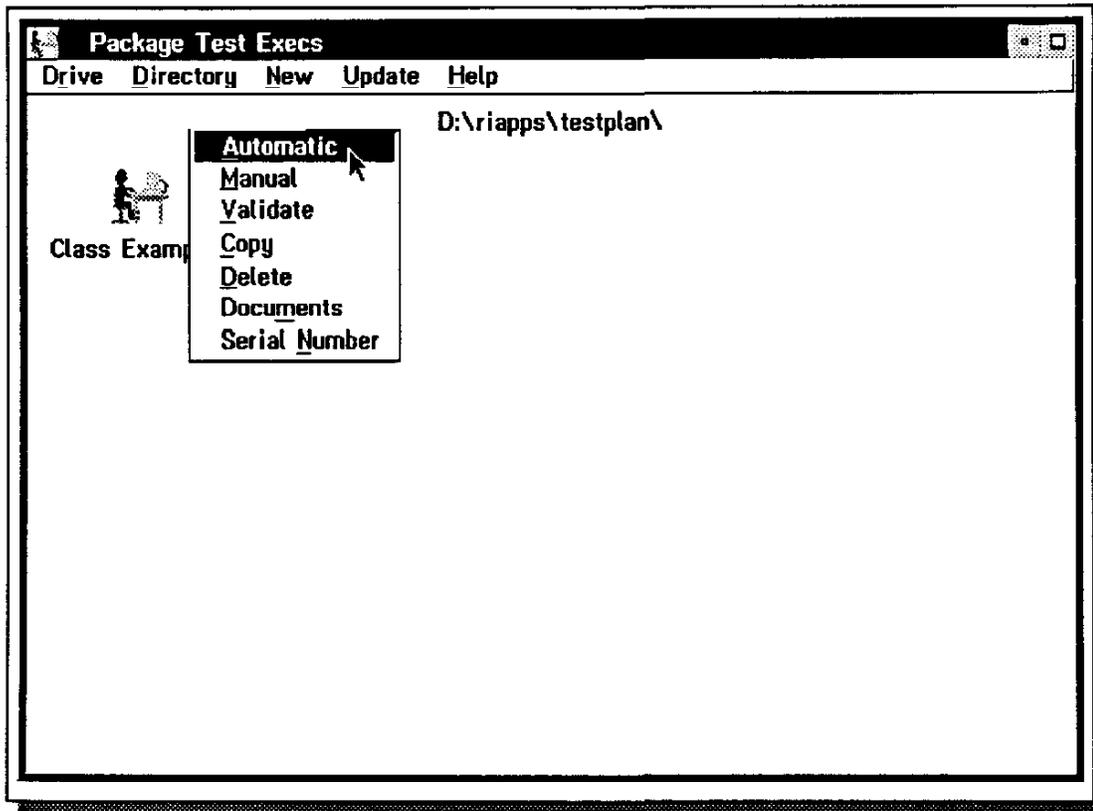
Selecting the Name of the New Package Test Exec



Enter the name for the new test exec and select the **OK** button.

The Package Execs Container Window will add the new Test Exec to its container window.

Opening the Automatic Package Test Exec Editor

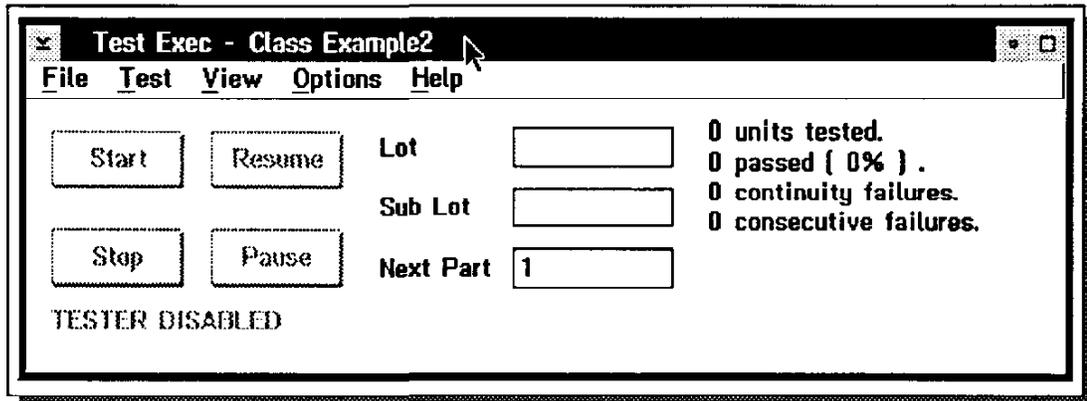


To open the Automatic Package Test Execs Editor Window:

Place the mouse pointer on the new Test Exec and click mouse button 2.

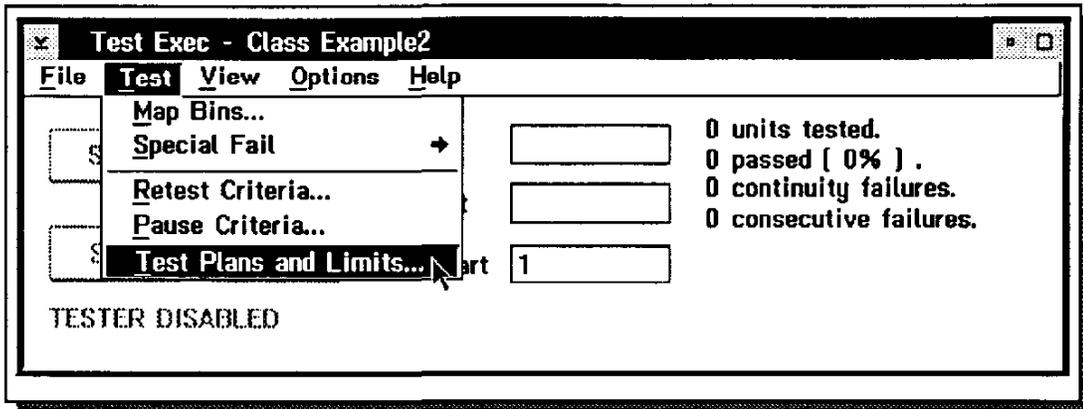
Select the pop-up menu choice: **Automatic**.

Test Executive Editor



The Test Executive Editor contains a title bar and menu choice bar. Below the menu bar is the user configurable operator interface. (This operator interface is exactly the same as the Test Operator Interface). The operator interface contains four buttons for starting, stopping, pausing and resuming a test plan, and entry fields for entering lot, subplot and part number information.

Customizing the Test Executive/Operator Interface



The Process for customizing the operator interface and creating the test executive is relatively simple:

- Select the Test Plans and the Test Limits to be included in the Test Executive.
- Select the Criteria for performing a Continuity Test.
- Select Special Fail Limit Checks.
- Select the Retest Criteria (conditions under which the part should be retested.)
- Select the binning map/criteria to be applied.
- Select the Pause Criteria (conditions under which the testing should be stopped).
- Select the Summary Information printed by the System Printer.
- Select if the test results are to be saved in the Data Base.
- Run the test plan to verify everything is working correctly.
- Save all of the above in a test executive.

We will go through these basic steps, and later during the hands-on-lab you will be asked to create a test executive using this process.

After you create the test executive, you will be ready to test parts in production.

Select the menu bar choices: **Test** and **Test Plans and Limits....** The System Computer will display the dialog box: **Select Test Plans and Limits.**

Selecting Test Plans & Limit Files

Select Test Plans and Limits

Primary

Test Plan: Class Example2

Base Limits: [None]

Premium Grade Limits: [None]

Save Data

Auxiliary

Test Plan: [None]

Percentage to run: 0

Save Data

Continuity

Test Plan: [None]

Limits: [None]

Test: Initially After Fail

Save Data

OK Cancel

Select the **down arrow** button to the right of the small edit field for Primary Test Plan.

A list of all of the test plans will be displayed.

Use the **scroll bar** on the right of the list to find the test plan desired.

Select a Test Plan from the list.

[In the example shown the test plan **Class Example2** was selected.]

Select the down arrow button to the right of the edit field for **Base Limits**.

Use the scroll bar on the right of the list to find the test limits desired.

Select the test limits desired from the list.

[In the example shown on the next page, **Production Rev_C** was selected.]

To add a second set of limits to be applied to the test plan select the down arrow button to the right of the edit field for **Premium Grade Limits** and select an additional set of test limits.

[We did not add a 2nd set of test limits in the example shown.]

To add a second test plan to be run at the same time as the Primary Test Plan select the down arrow button to the right of edit field for **Auxiliary Test Plan** and select an additional test plan.

Selecting Test Plans & Limit Files (Continued)

Select Test Plans and Limits

Primary

Test Plan: Class Example2

Base Limits: Production Rev_C

Premium Grade Limits: [None]

Save Data

Auxiliary

Test Plan: Process Tests

Percentage to run: 5

Save Data

Continuity

Test Plan: [None]

Limits: [None]

Test: Initially After Fail

Save Data

OK Cancel

All of the devices will be tested using the Primary Test Plan and binned based on the limit files selected. If an Auxiliary Test Plan is selected, you can set the percentage of devices to be tested by the Auxiliary Test Plan from 0 to 100% using the up/down arrow buttons for the **Percentage to run** entry field. The test system will randomly select which devices are tested using the percentage entered.

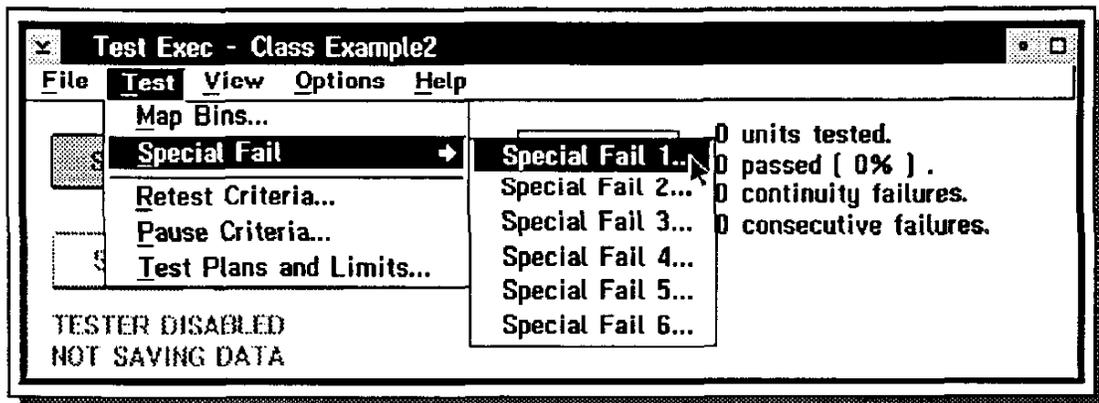
We can also add a **Continuity Test Plan** and **Continuity Test Limits**. The Continuity Test Plan can be run before the other test plans or after a part fails a Base Limit value.

You can enable or disable the saving of test results data to the Data Base by selecting the **Save Data** buttons displayed with the Primary, Auxiliary and Continuity Test Plan entry fields. You must release your test plan to production before you can send data to the System Data Base. (When you release your test plan, the System Computer builds the data tables for the test results in the System Data Base and saves a copy of the test plan and its instrument settings/states in the Data Base. The test plan is then protected and can not be modified.)

Select the **OK** button.

The Test Executive Editor will become the active window again. The name of the primary test plan will be added to the title bar.

Selecting the Special Fail Limit Checks

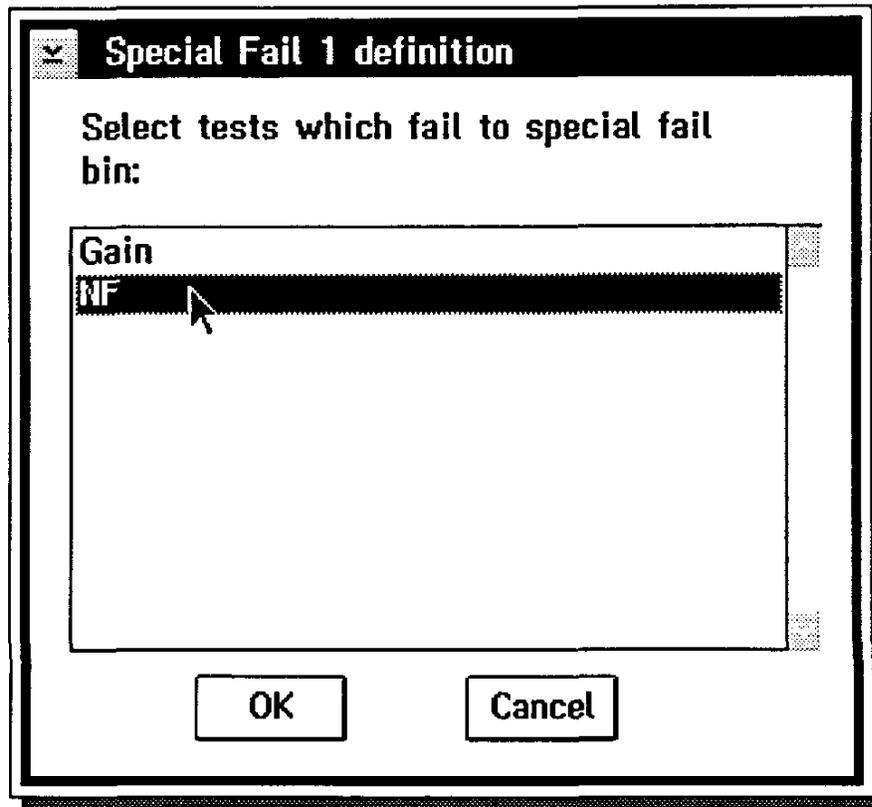


You can specify that certain limit checks are Special Fail Limit Checks. If a device fails a Special Fail Limit Check value, the part is assigned a Special Fail Bin Number. To select the Special Fail Limit Checks:

Select the menu bar choices: **Test**, **Special Fail** and one of the six special fail choices (**Special Fail 1-6...**).

The System Computer will display the dialog box: **Special Fail N definition**.

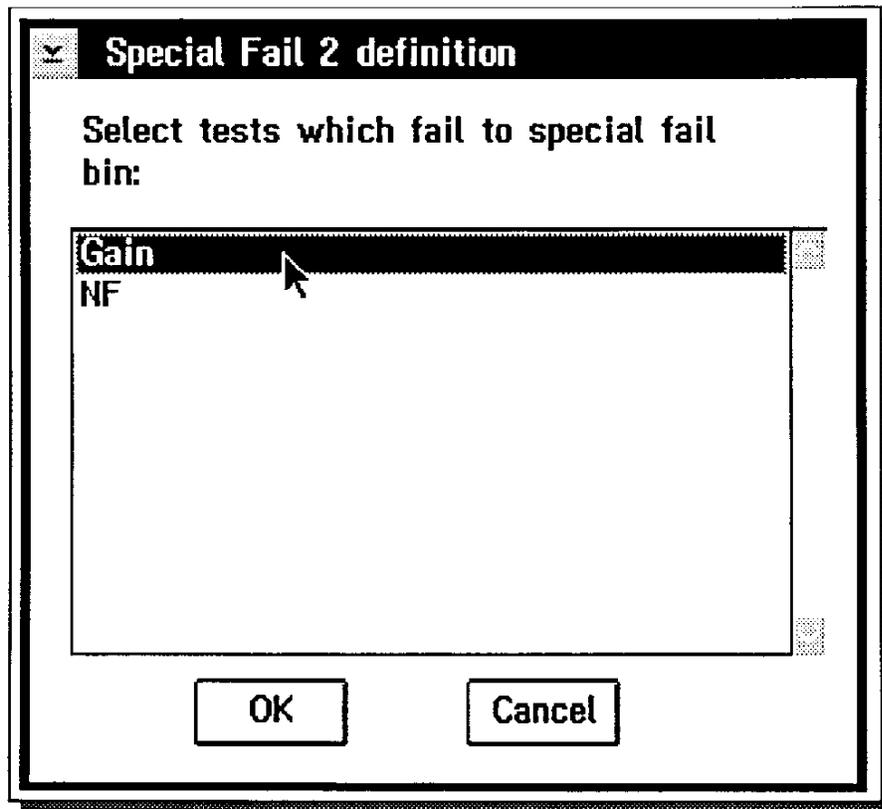
Selecting the Special Fail Limit Checks



Select [highlight] the **Data Name(s)** for the test limit check(s) you want to designated as a Special Fail Limit Check for the special fail category selected. (The Data Names selected will be reverse highlighted by the System Computer.)

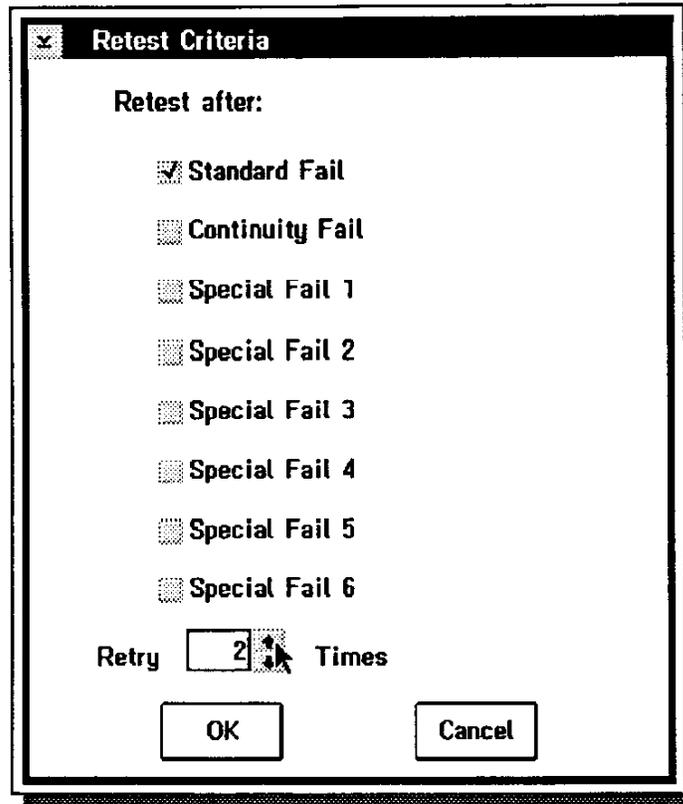
Select the **OK** button to return to the Test Executive Editor Window.

Selecting the Special Fail Limit Checks



You can repeat this process for five other Special Fail Limit categories.

Selecting the Retest Criteria



If a part fails one of the Continuity Test Limits, Basic Test Limits and/or one of the Special Test Limits, the test system can be instructed to retest the part. You can also select the number of times the part is retested before it is assigned a fail bin number. To select the Retest Criteria:

Select the menu bar choices **Test** and **Retest Criteria**....

The System Computer will display the **Retest Criteria** dialog box.

Select the Retest Criteria (**Continuity Fail**, **Standard Fail** and/or **Special Fail**) buttons desired. (More than one choice can be active at a time.)

Select the **up arrow** or **down arrow** buttons to the right of the Retry entry field to set the number of times the test plan can be repeated before the part is assigned a fail bin number.

Select the **OK** button to return to the Test Executive Editor Window.

Selecting the Binning Map/Binning Criteria

Category	Bin
Standard Pass	2
Premium Pass	1
Standard Fail	3
Continuity Fail	6
Special Fail 1	4
Special Fail 2	5
Special Fail 3	2
Special Fail 4	2
Special Fail 5	2
Special Fail 6	2

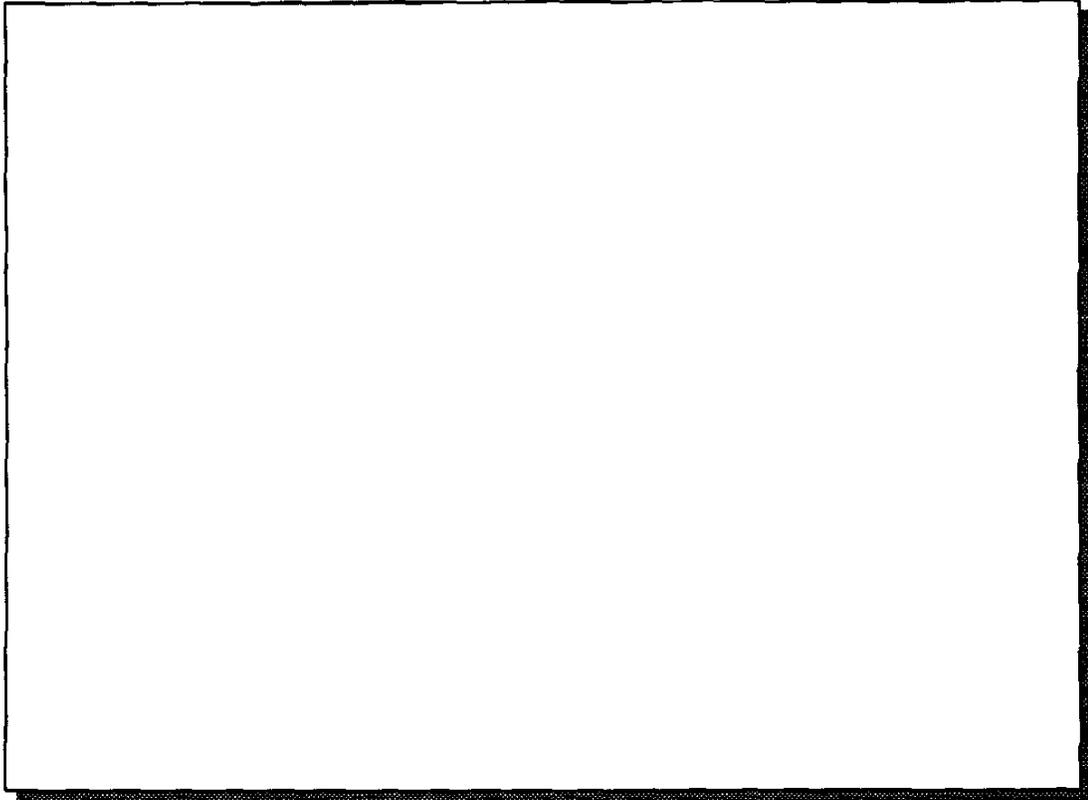
OK Cancel

The software offers a very easy to use method for creating a bin map and for selecting the binning criteria. You can specify individual bin numbers for ten binning categories:

- Standard Pass Bin
- Premium Pass Bin
- Standard Fail Bin
- Continuity Fail Bin
- Special Fail Bins 1 through 6

To create the bin map select the menu bar choices: **Test** and **Map Bins**. The Test Executive Editor will display the dialog box: **Map Bins**. The dialog box lists the ten binning categories. Each binning category has a small entry field to its right containing the bin number associated with the category.

Selecting the Binning Map/Binning Criteria



(Text continued from previous slide.)

The test system assumes the parts are good. If the device passes the Premium Grade Limit values the part is considered to be a premium part and is assigned the Premium Pass Bin number. If the part fails one of the Premium Grade Limit values and passes all of the Base Limit values, the part is considered a good part and is assigned the Standard Pass Bin number. If the device fails at least one Base Limit value, the part is assigned the Standard Fail Bin number or one the Special Fail Bin numbers (depending on which test limit check was not met). If the part fails a Continuity Test Limit value, the part is assigned the Continuity Fail Bin number even if the Continuity Test Plan is performed as a result of the part failing a Base Limit value or a Special Limit value.

The bin numbers can be increased or decreased by selecting the **up/down arrows** to the right of each bin number. The bin number will increment or decrement by 1 for each mouse button 1 click.

When you have finished modifying the bin numbers, select the **OK** button. The System Computer will return to the Test Executive Editor Window.

Selecting the Pause Criteria

Pause Test Criteria

Stop test after:

units have been TESTED or

units have PASSED or

consecutive units have FAILED or

units have FAILED CONTINUITY.

OK Cancel

The test system offers several criteria for pausing testing. To set the Pause Criteria use the following procedure:

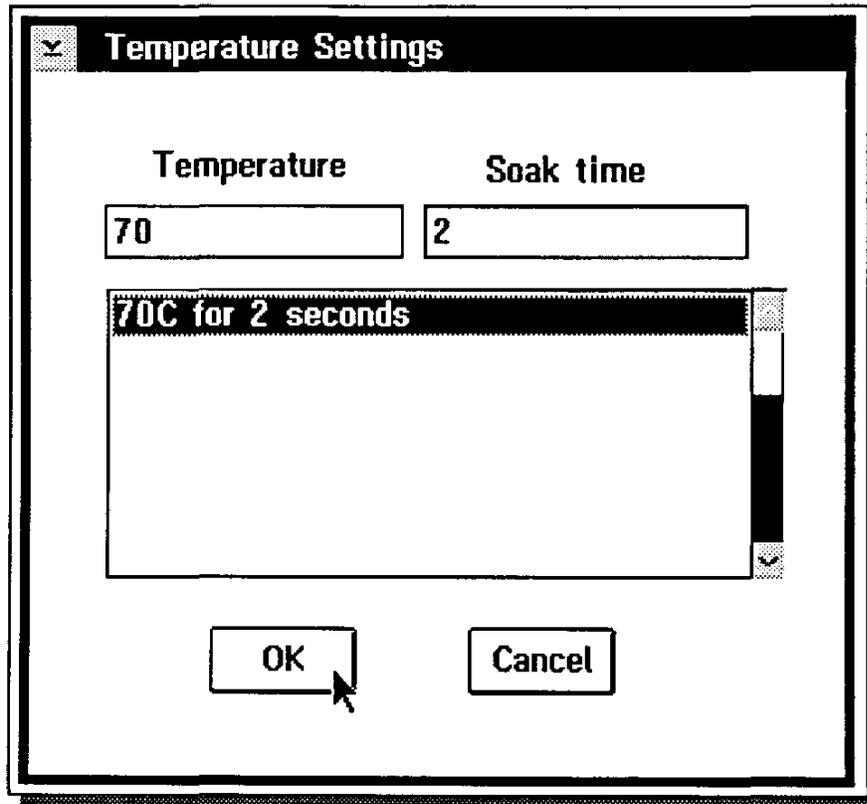
Select the menu bar choices **Test** and **Pause Criteria**. The System Computer will display the dialog box: **Pause Test Criteria**. Four choices are offered for pausing the testing process:

- Stop the test after a specified number of devices have been tested,
- Stop the test after a specified number of devices have passed the test limits
- Stop the test after a specified number of consecutive devices have failed the test limits.
- Stop the test after a specified number of devices have failed the test limits.

To activate one of the criteria, select the entry field to the left of the criteria and enter the valued desired. More than on criteria can be active at a time. [5 consecutive failures was selected in the example shown.]

Select the **OK** button to return to the Test Executive Editor window.

Setting Temperature Soak Time and Temperature



The screenshot shows a dialog box titled "Temperature Settings" with a dropdown arrow on the left. It contains two input fields: "Temperature" with the value "70" and "Soak time" with the value "2". Below these fields is a list box containing the text "70C for 2 seconds". At the bottom of the dialog are two buttons: "OK" and "Cancel". A mouse cursor is pointing at the "OK" button.

To select the soak time and temperature:

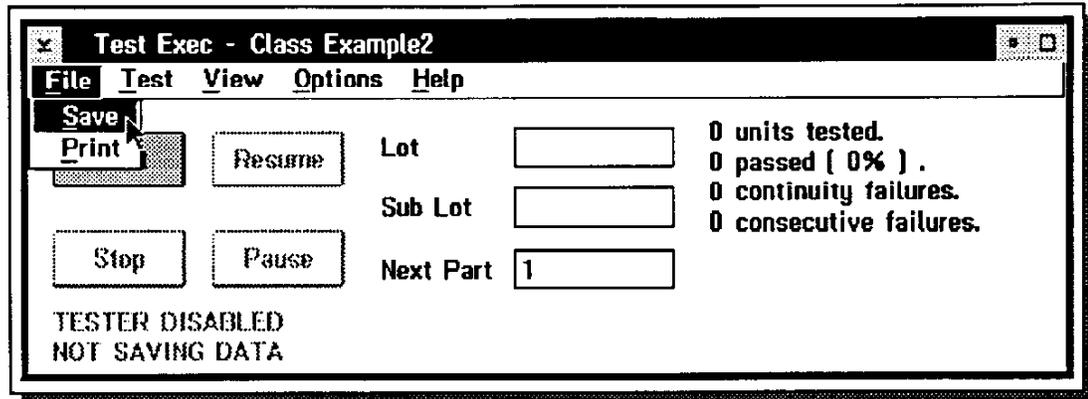
Select the entry field below the Temperature title and enter the temperature in degrees centigrade.

Next select the entry field below the Soak time title and enter the soak time in seconds.

Select the **OK** button.

The System Computer will add the new setting to the temperature/time settings list below the entry points, and return to the Test Executive Editor.

Saving the Test Executive File



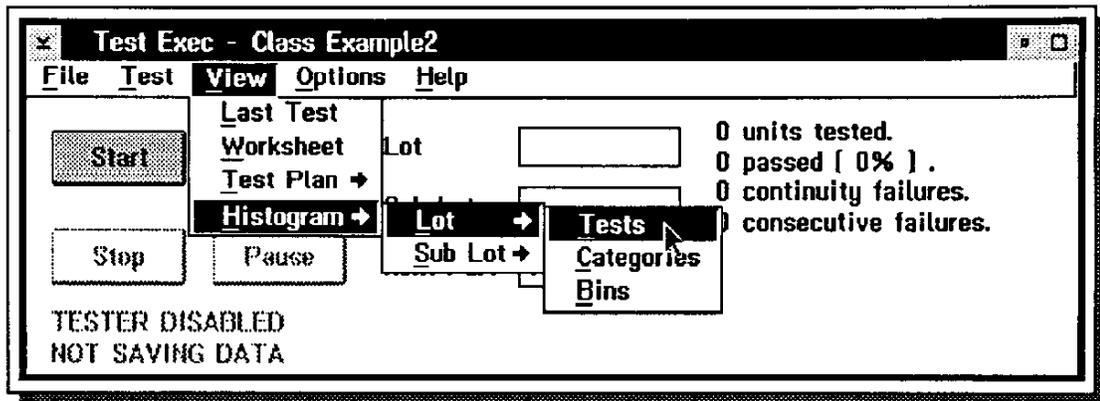
We have now completed the customization of the operator interface and we are ready to save this operator interface (OI), the test plans and the limit files we have selected, into a test executive file to be used by the Test Operator Interface.

To create and save a test executive file:

Select the menu bar choices: **File** and **Save**.

The System Computer will save the test executive on to the local hard disc.

Plotting Summary Information



The System Software offers you several data viewer windows for displaying Histograms of the test results summary information. You can select and open one or more of the data viewer windows at the same time. The viewer choices offered are the following:

Lot Tests: Displays the number of parts, in the Lot selected, which have passed each limit file and the number of parts which have failed each specific limit check value.

Lot Categories: Displays the number of parts, in the lot selected, which have been assigned to each bin category (Standard Pass, Premium Pass, Standard Fail, Special Fail 1, Continuity Fail, etc.)

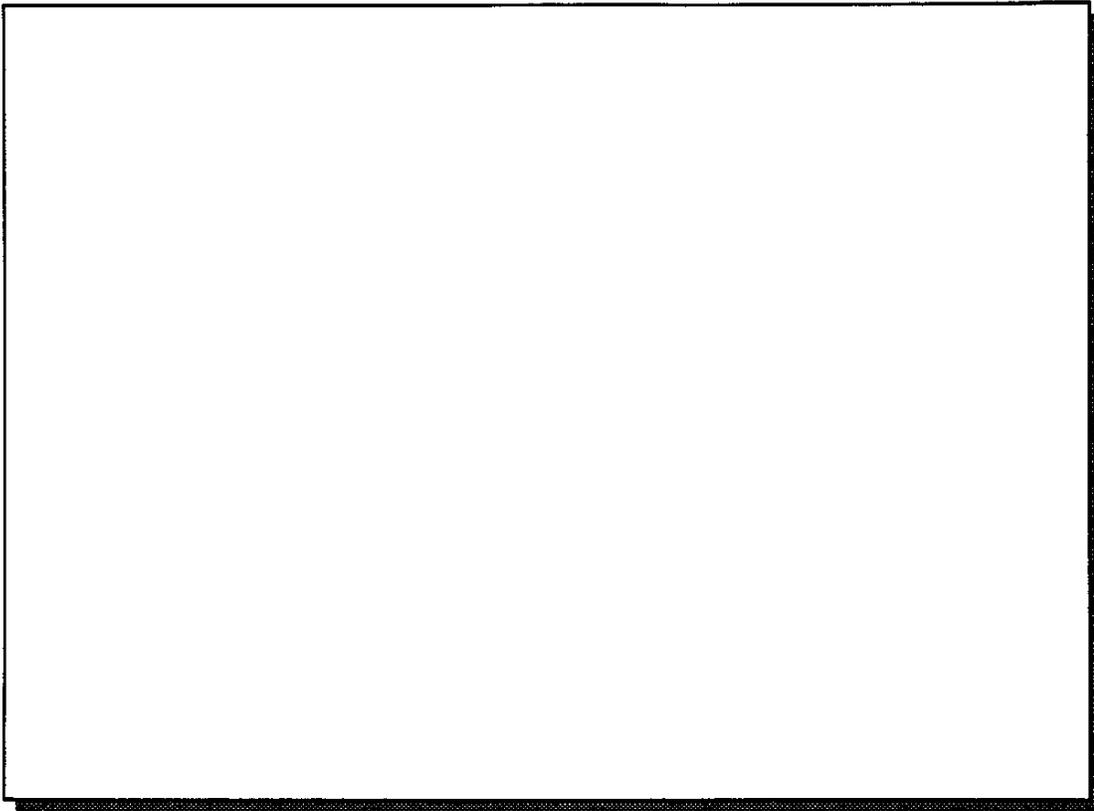
Lot Bins: Displays the number of parts, in the lot selected, which have been assigned to each bin number.

Sub Lot Tests: Displays the number of parts, in the sub lot selected, which have passed each limit file and the number of parts which have failed each specific limit check value.

Sub Lot Categories: Displays the number of parts, in the sub lot selected, which have been assigned to each bin category (Standard Pass, Premium Pass, Standard Fail 1, Special Fail, Continuity Fail, etc.)

Sub Lot Bins: Displays the number of parts, in the sub lot selected, which have been assigned to each bin number.

Plotting Summary Information



(Text continued from previous slide.)

To select and display the test results summary plots.

Select the Test Executive Editor's menu bar choices: **View** and **Histogram**.

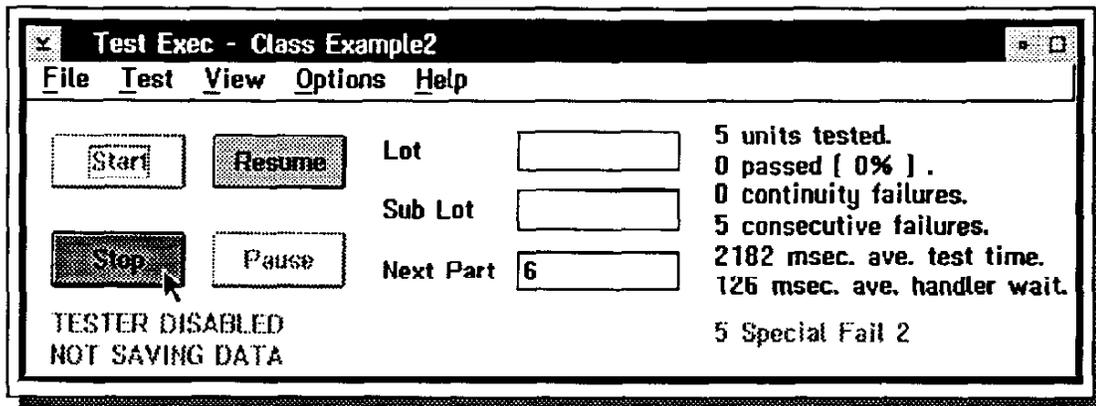
The System Computer will display the sub menu choices: **Lot and Sub Lot**. Select one of the sub menu choices. The System Computer will display another level of menu choices: **Tests, Categories and Bins**.

Select [highlight] one of these sub menu choices.

The System Computer will open the Data Viewer selected. The name of the Data Viewer and the Lot or Sub Lot name will be provided in the title bar. The Data Viewer will update each time a part is tested.

Repeat the steps if you want to open other Data Viewers.

Running the Test Executive



To run the Test Executive from the Test Executive Editor window:

Select the green **Start** button.

The System Computer will load the test plans selected, link them to the active tester, optimize & compile the test plans and load the limit files selected.

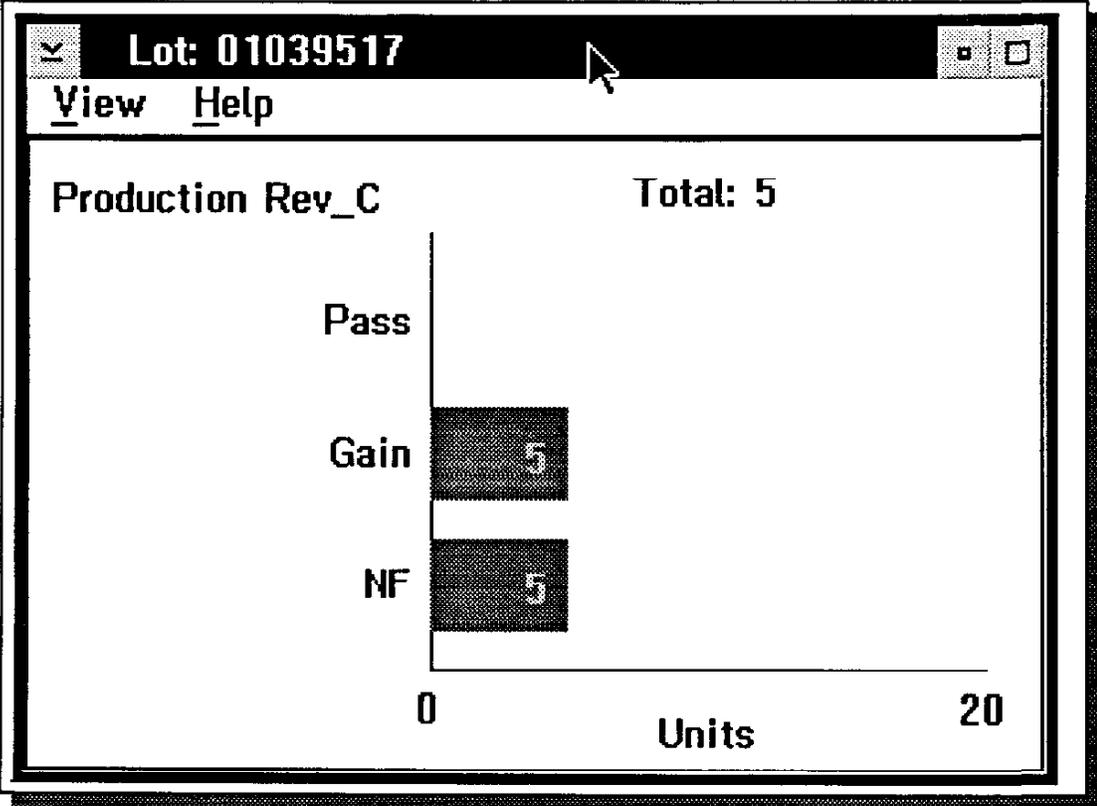
The test summary information (in the upper right side of the window) will update after each device is tested.

Select the red **Stop** button or the red **Pause** button to stop testing.

Use the green **Start** button to start testing again or use the green **Resume** button to continue testing again.

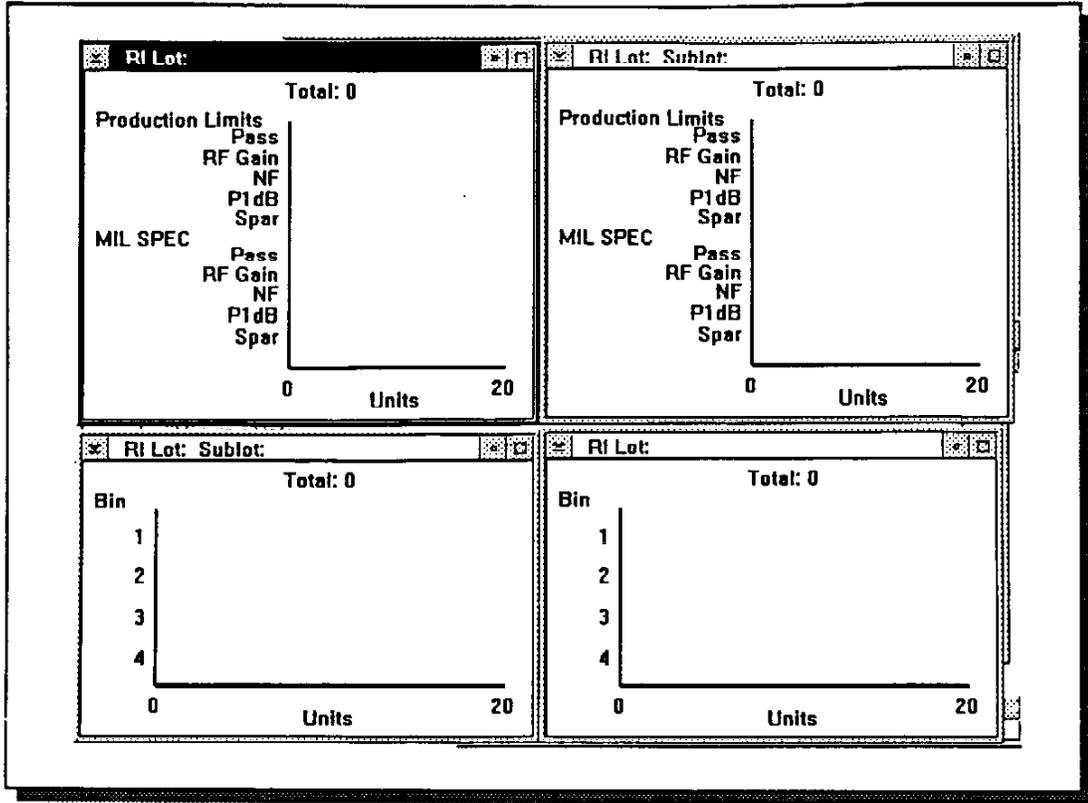
You are now ready to test parts in production.

Displaying the Summary Information



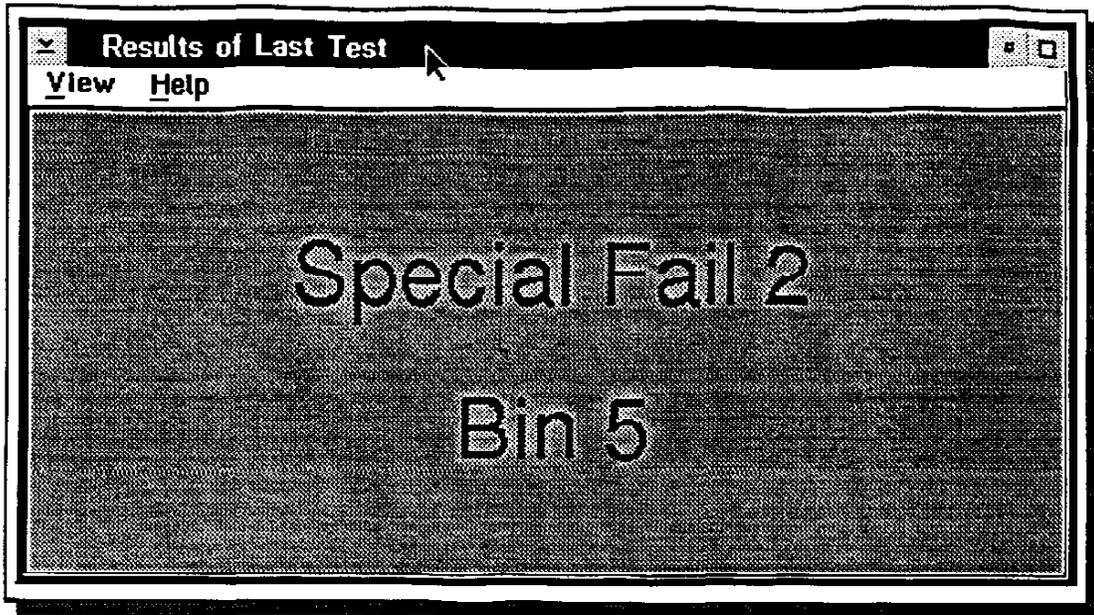
The slide above is an example of a Lot Tests Histogram Viewer Window. The Y axis names **Gain & NF** are the Data Names for the SAVE DATA buttons with limit checks in the test plan selected.

Viewing Multiple Histogram Viewers Simultaneously



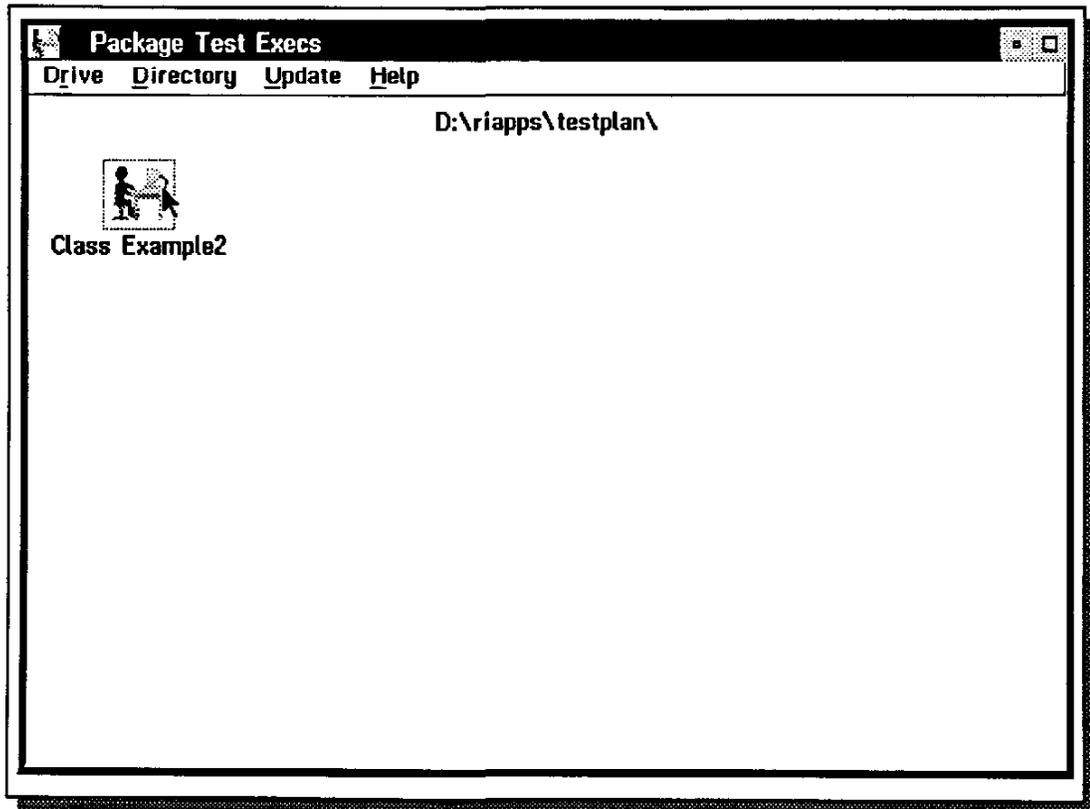
You can open and view several Histogram Viewers simultaneously, as shown above. The Histograms shown, starting in the upper left corner and going clockwise, are Lot Tests, Sublot Tests, Lot Bins and Sublot Bins.

Viewing the Results of the Last Part Tested



You can also open a viewer window which displays the overall test results for the last part tested. One of the benefits of this screen is that it provides a large visual display of the testing status (the window turns solid Green if the last part passed all of the standard test limits, the window turns red if the last part fails a standard test limit, plus other colors to indicate if the last part failed a special fail limit or a continuity test limit. The window also displays the bin the part will be sent to.

Opening the Operator Test Interface/Package Test Exec



The process for testing devices in production with the Test Operator Interface is simple and fast. Assuming the Test Executives have been created and the test system and the System Computer have been turned on, the process for testing devices is the following. (If we assume that we just created the Test Executive and the Test Executive Editor Window is still active, we would return to the RI Message Window and skip steps 1 thru 4 below.)

- 1) Open the RI Message Window by double clicking on the RI Apps icon.
- 2) Select the RI Message Window's menu bar choices: **System** and **Logon...**
- 3) The System Computer will display the Users Container Window.
- 4) Select the **Operator** logon icon and enter the pass word. Select the **OK** button. Return to the RI Message Window
- 5) Select the menu bar choices: **Test & Package Execs** (opens the Package Test Execs Container Window..)
- 6) Select and open a test executive by placing the mouse pointer on the test exec desired and double clicking mouse button 1.

Operator Test Interface/Package Test Exec

The screenshot shows a window titled "Test Exec - Class Example2" with a menu bar containing "File", "View", and "Help". The interface includes four control buttons: "Start", "Resume", "Stop", and "Pause". To the right of these buttons are three input fields: "Lot" with the value "01039517", "Sub Lot" with the value "BB", and "Next Part" with the value "1". Further to the right, the test summary statistics are displayed: "0 units tested.", "0 passed (0%) .", "0 continuity failures.", and "0 consecutive failures.". At the bottom left of the window, the status "TESTER DISABLED" and "NOT SAVING DATA" is shown.

Start	Resume	Lot	01039517	0 units tested.
Stop	Pause	Sub Lot	BB	0 passed (0%) .
		Next Part	1	0 continuity failures.
				0 consecutive failures.

TESTER DISABLED
NOT SAVING DATA

Notice that the Operator Interface only offers the user three menu choices, **Help** for help text, **View** to open the Histogram Viewers and the Last Test Viewer, and **File** to print the Test Exec Window. To start testing parts:

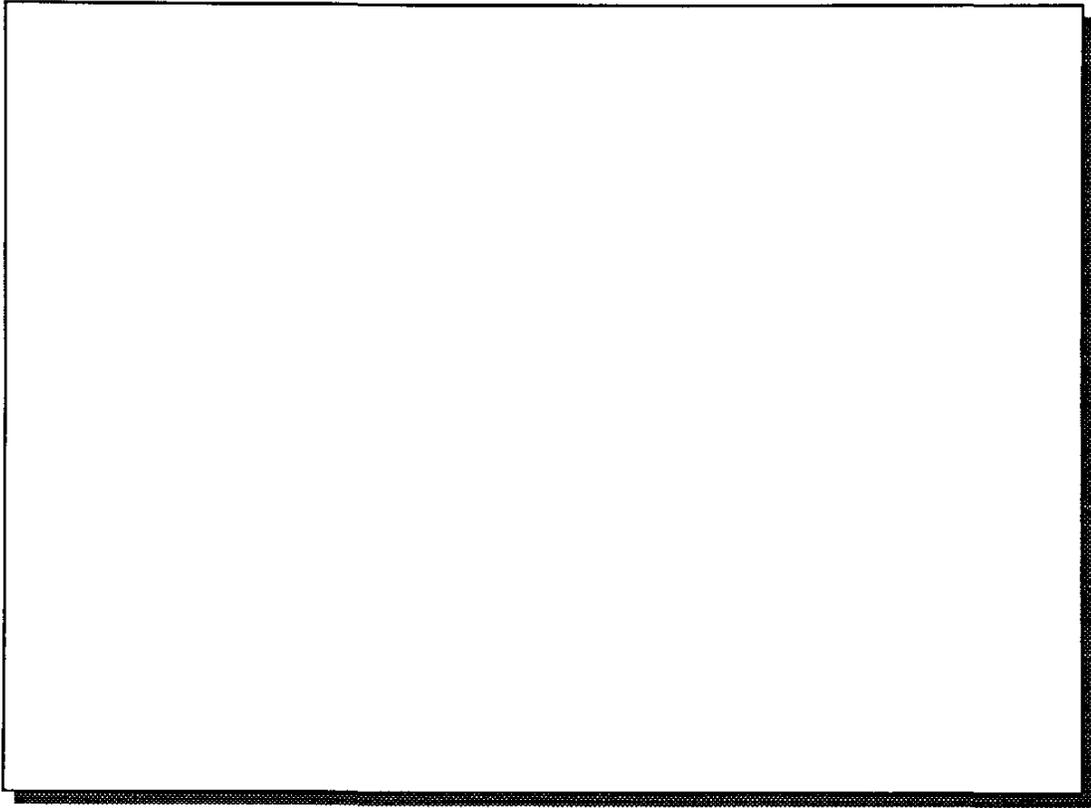
Select & Enter the lot#, subplot# and the part# for the first part the be tested.

Select the **Start** button. The test system will automatically begin testing parts. The Operator Interface will update the test summary data each time a new part is tested. The test results will be automatically saved to the Local SQL Data Base.

Select the **Stop** or **Pause** button to stop or pause testing.

Select the **Start** button to continue testing.

Hands-on Lab Time



You will now have an opportunity to create your own test plans and test execs.

Good Luck.