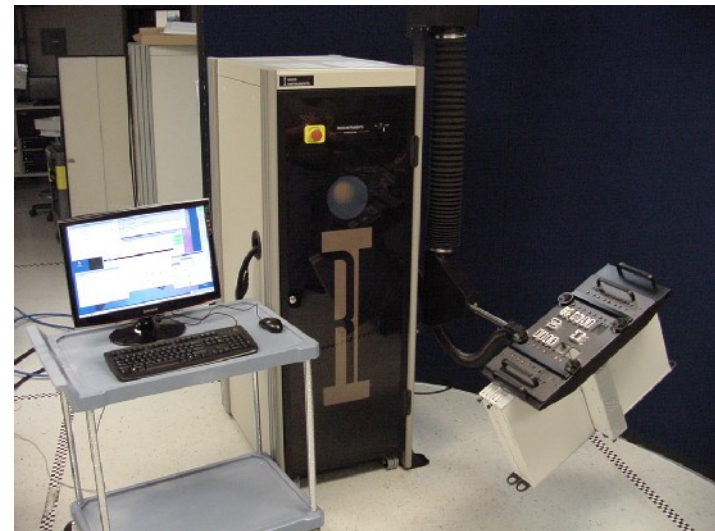


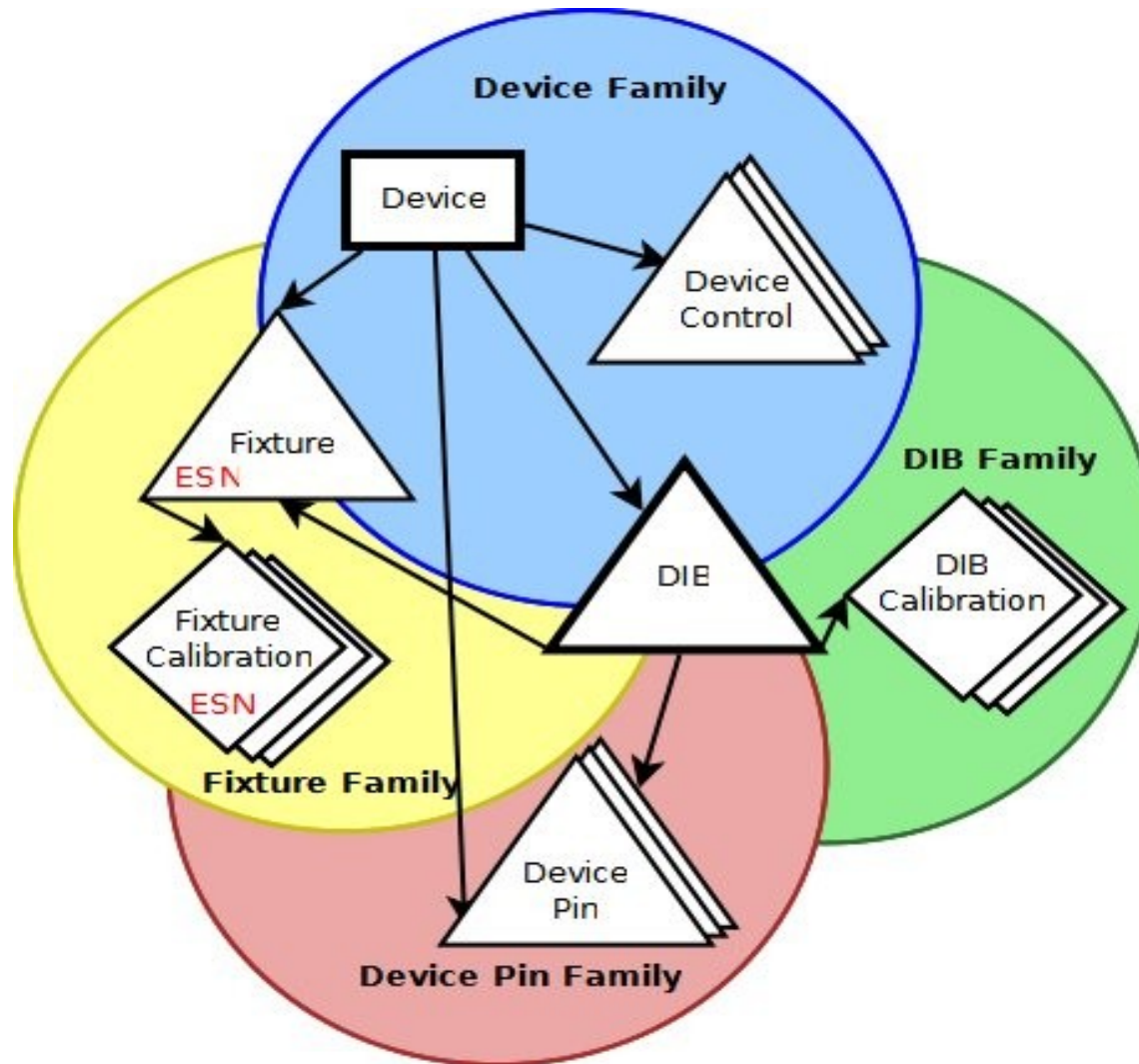


CASSINI RF/ Microwave ATE System Advanced Test Plan Concepts





Device Centric Testing Family Definitions





Connection the Device to the ATE

Create a Device Definition

Create a Device Pins Definition

Create a Fixture Definition

Create a Device Interface Board (DIB)

Create a Protocol Aware Device Control Definition



First Create a Device Definitions file

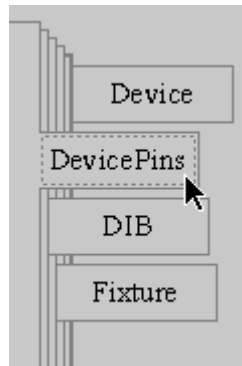
The screenshot shows the 'RI Device Connection Editor GFH3AR2A 28' application window. The main window has a menu bar with 'System' and 'Dev Conn'. Below the menu bar, there are fields for 'Device Title:' and 'Device Attributes:'. A table with columns 'Name' and 'Value' is visible. On the right side, there are buttons for 'Device', 'DIB', and 'Fixture'. In the foreground, a 'New Device' dialog box is open, containing the following fields:

- Device Title: Example Device001
- Device Family: Example Device001
- Category: RI_Demo
- Version: 1.0
- Status: alpha

At the bottom of the dialog box are 'OK' and 'Cancel' buttons. The main application window also shows a table with columns 'DIB Pin', 'State Name', and 'State Value'.

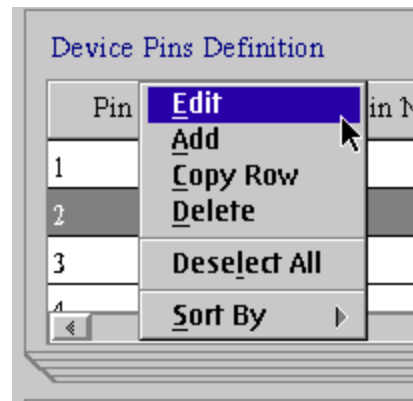


Create a Device Pins Definition



Device Pins Definition

Pin Identifier	Pin Name	Signal	Type	Description
1	RF1		RF	RF1
2	RF2		RF	RF2
3	RF3		RF	RF3
4	RF4		RF	RF4



Add/Edit Device Pin

Identifier: 2

Name: RF2

Signal:

Type: RF

Description: RF2

OK Cancel



Create a Test Fixture Definitions file

New Fixture

Fixture Title: Example Fixture001

Fixture Family: Example Fixture001

Multisite

Multisite: Yes No

Site Identifier:

Fixture Class Selection

- Cassini Matrix Fixture
- Cassini Passive Fixture
- Fixture for 12 Rf Dut Boards
- Fixture for 16 RF Rect Dut Boards
- Smart Fixture for 12Rf Square Dut Boards
- Smart Fixture for 20/25 Rf Square Dut Boards

Device Family: Example Device001

Tester: Demo_Cassini

Interface: Y0004V.A1 Smart Fixture

Serial Number: RIB1HVTS

Category: RI_Demo

Version: 1.0

Status: alpha

OK Cancel



Create a Device Interface Definitions file DIB or Load Board

The 'New DIB' dialog box contains the following fields and options:

- DIB Title:** Example DIB001
- DIB Family:** Example DIB001
- Multisite:** Yes No
- Site Identifier:** (empty text field)
- Device Family:** Example Device001
- Device Pins Family:** Example DevicePins001
- Fixture Family:** Example Fixture001
- Serial Number:** RIB1HVUT
- Category:** RI_Demo
- Version:** 1.0
- Status:** alpha

Buttons: **OK** and **Cancel**



Create a Protocol Aware Device Control Definition – Serial or Par

Editing Fixture Path Definition

Resource 1	Resource 2
Resource Name 1: Dpins1	Resource Name 2: Testhead40
Resource Model 1: Ri8535B	Resource Model 2: Ri8533C
Resource Location: T7	Resource Location: T4
Testhead Pin Name: D1-1	Fixture Pin Name: Lo Input
Physical Pin: D1-1	Physical Pin: Testhead40 Lo Input
Pin Description: Digital Pin D1-1	Pin Description: Local Osc Input

State

Name: []
Value: []
Default: Yes No

Switch: []

Calibration

Name: []
Type: []

Path Name: []
Description: []

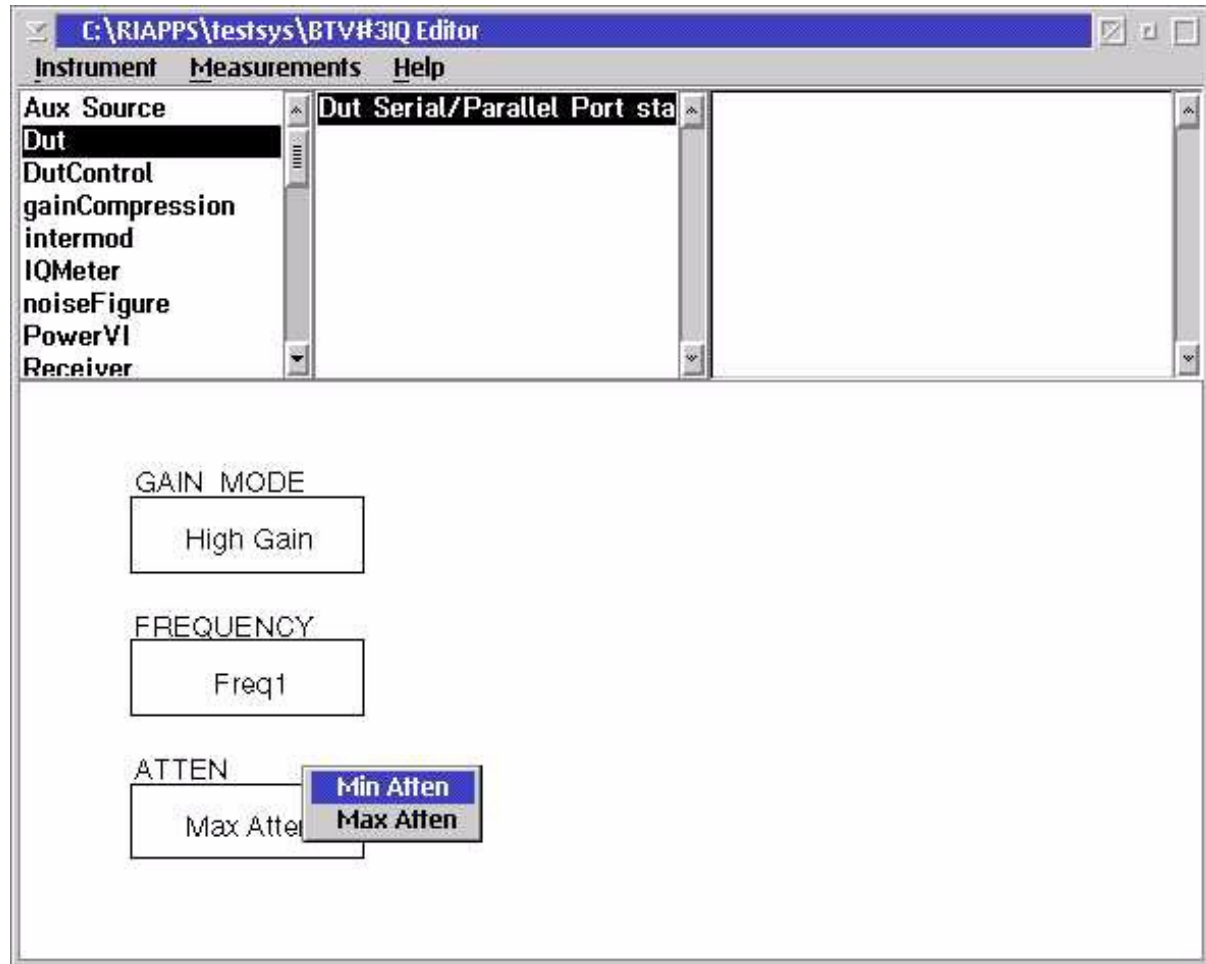


Dut Controlled by Serial or Parallel Port



DUT Serial Port

DUT Created
Put in Test Plan





DB Lines

Static digital control

Serial bus

Parallel bus

Leakage (low current) measurements

ESD diode check (force current)



Serial/Parallel Bus Control

DUT Defined or "Brute Force"

DUT Defined Contained in Dut Instrument

Single Button Programming

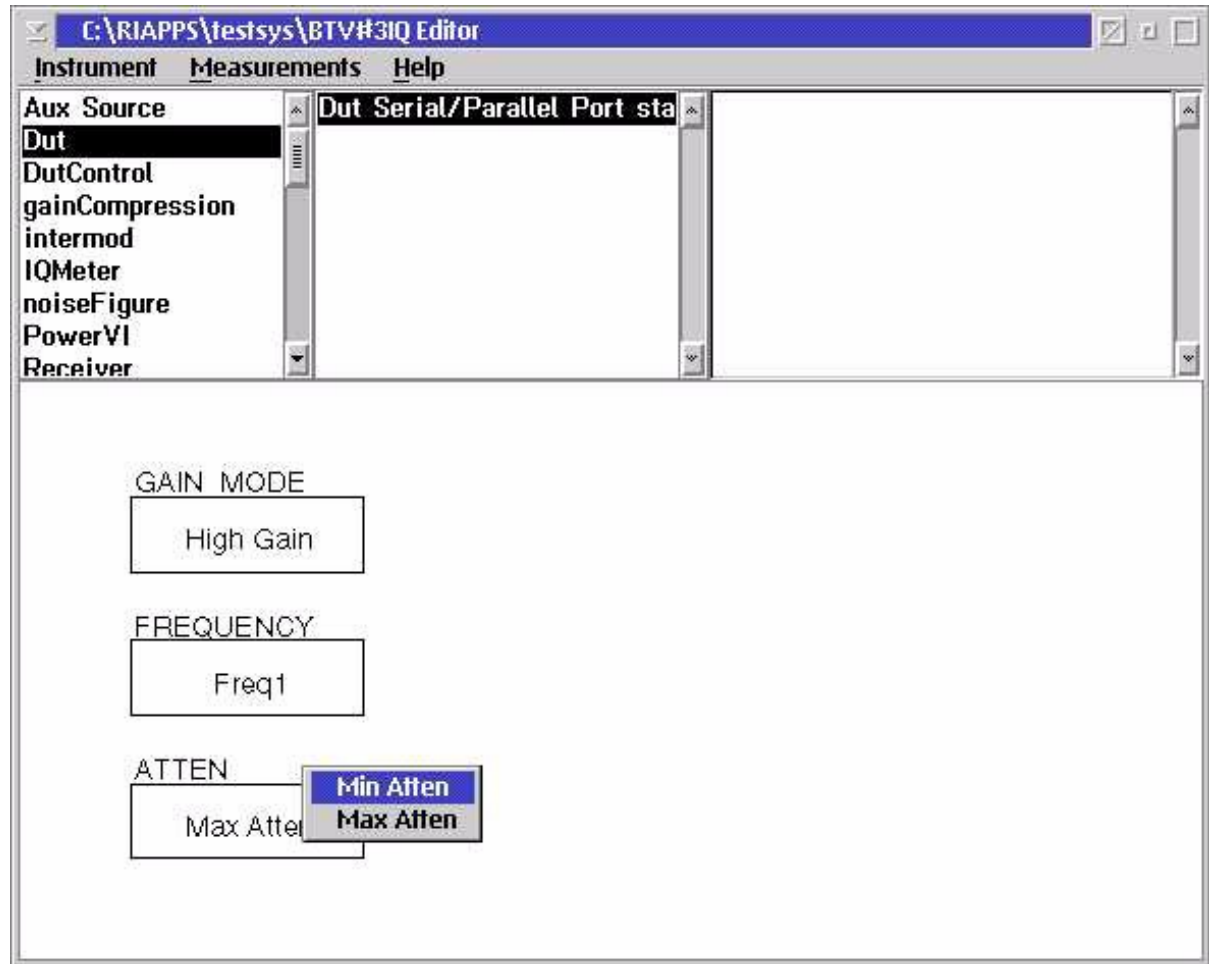
Allows Descriptive Names

DUT buttons created



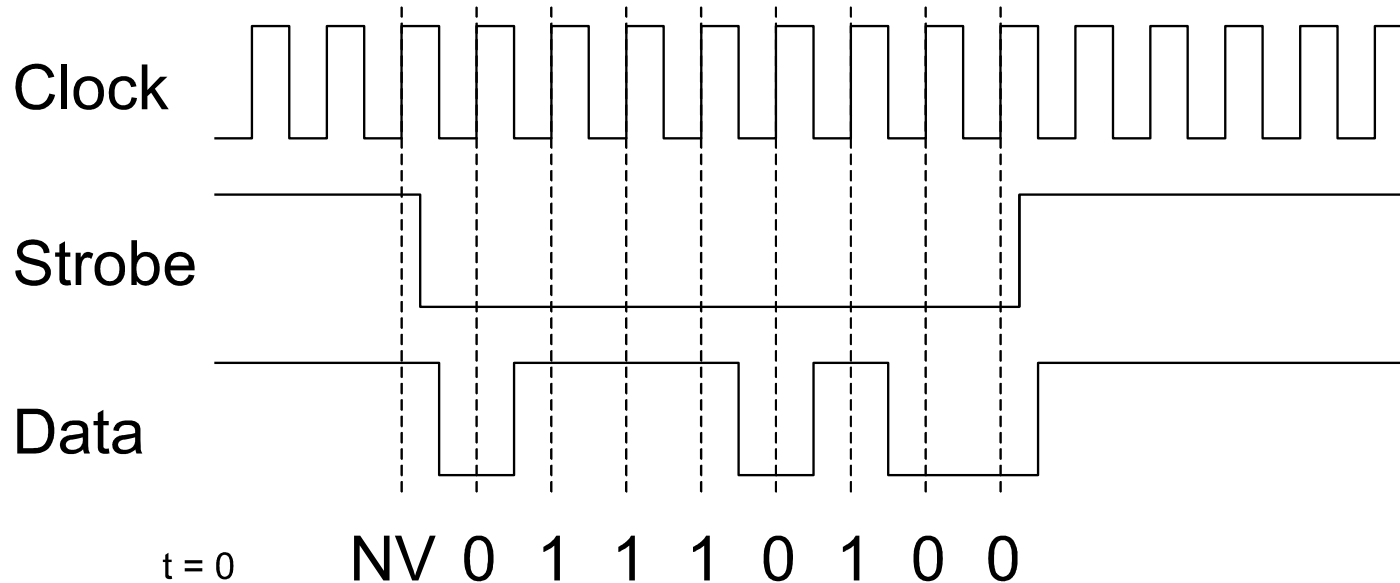
DUT Serial/ Parallel Device Control

DUT Created
Put in Test Plan





Serial Port Basics



Data: MSB First

Clock: Positive

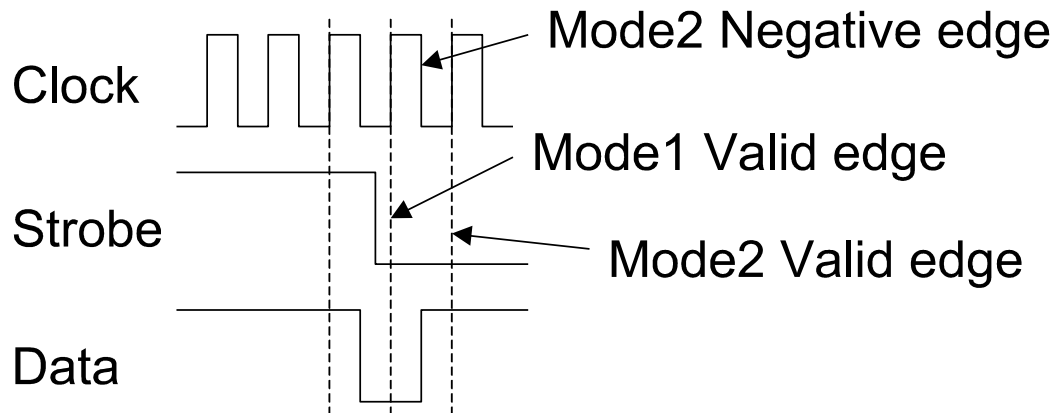
Strobe: Negative, Long

Data: 01110100 Binary

116 Integer



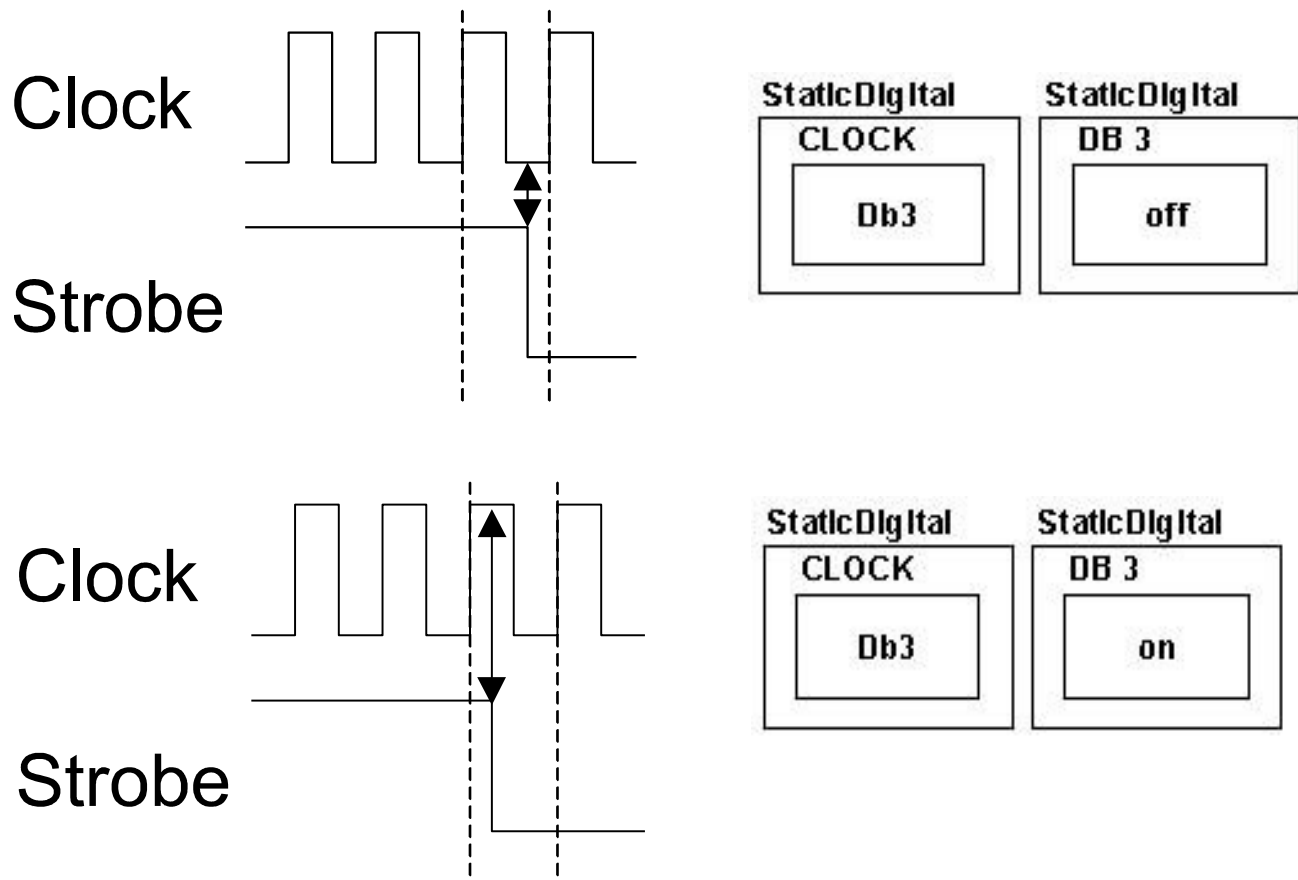
Testplan Serial Bus Control Initial Condition Setup



t = 0	NV 0 1	Mode1
	NVNV 0	Mode2 (requires negative edge after strobe, then clocks on positive)



Testplan Serial Bus Control Initial Condition Setup





Serial Port Basics

Fields

16 Bit Bus

Frequency Field

1st Bit: Bit 10

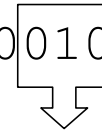
Size: 3 Bits

8 Potential States

Bit 1
MSB

Bit 16
LSB

0010000100101101



Freq 1 000

Freq 2 001

Freq 3 010

.

.

Freq 8 111



RI Serial Definitions

Bit order 1 thru N (no bit 0)

Bit 1 is MSB

Bit 1/MSB is on Left

Bit 1

Bit 16

MSB

LSB

0010000100101101



Serial Port Basics

Registers

Serial Bus can be Multiplexed into Registers

Bits are Allocated to Register "Address"

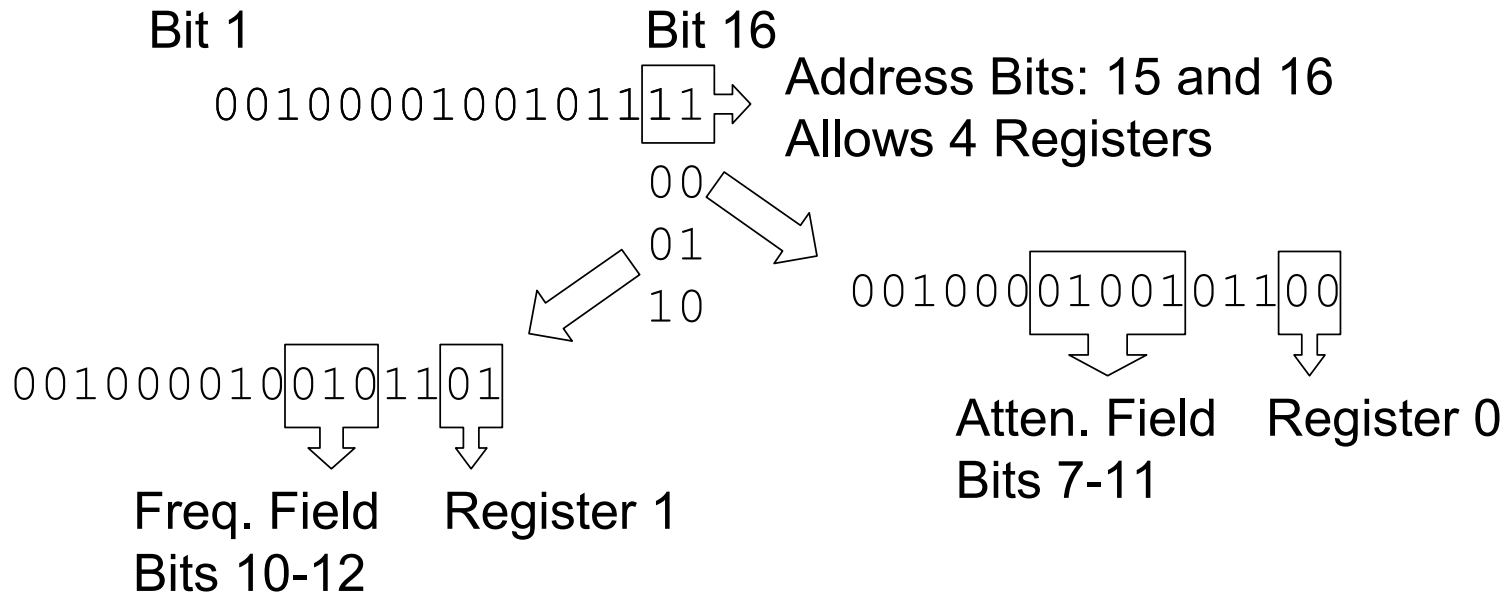
Specific Address Changes Field Definition

Allows Expansion of Serial Capability



Serial Port Basics

Registers





Programming Serial Port

Select Serial Type

Dut Defined/Local/I2C/I3C

Assign Static Digital Resources

Clock

Data

Strobe

Define Dut



Fast Serial Control

Standard Serial: 60 KB/Second

Fast Serial: Up to 2.5 MB/Second

Fast I2C: Up to 600 KB/Second

Specific Digital Resources

Read: DB 1 or 9, Write: DB 2 or 10

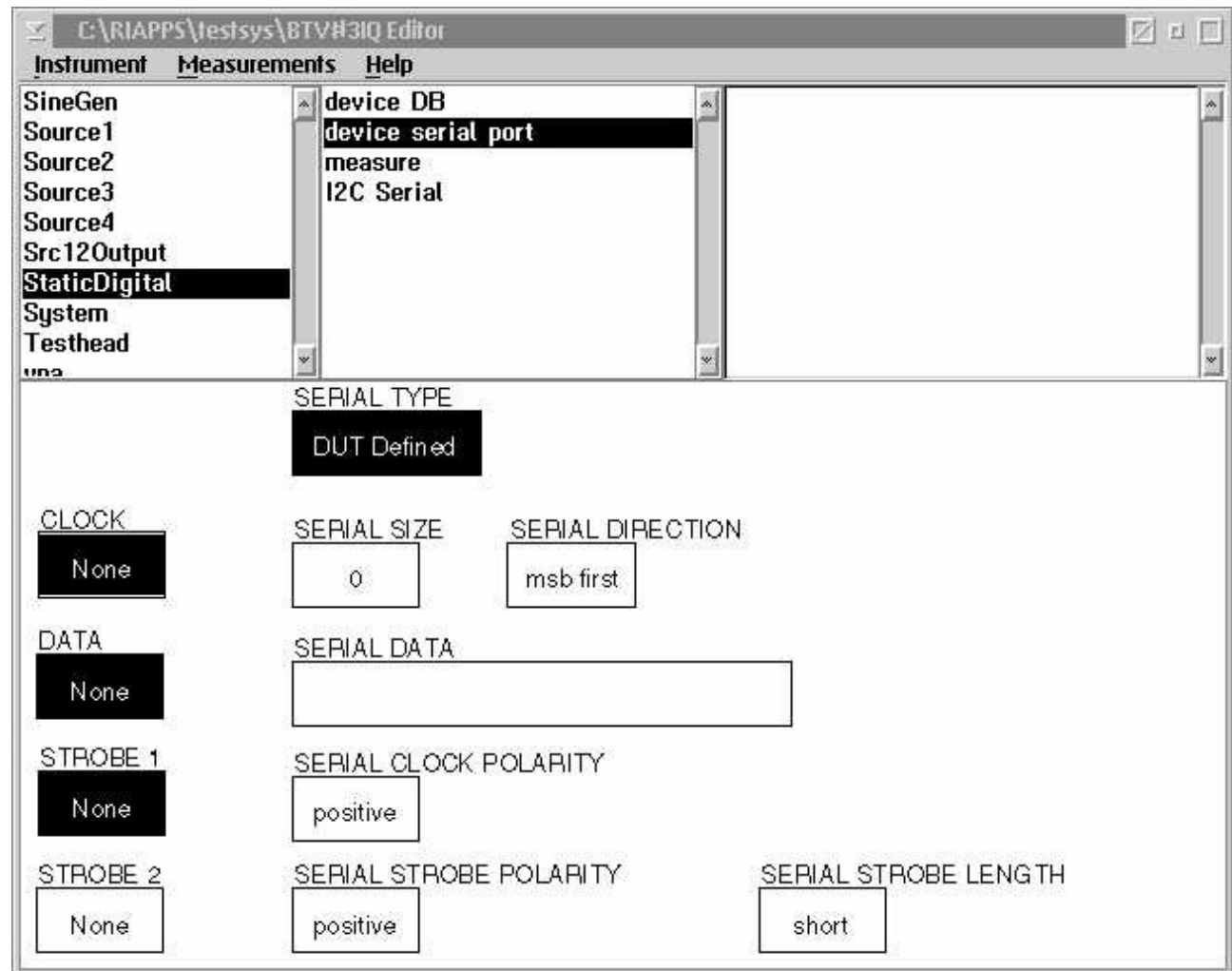
Clock; DB 3 or 11

Must be adjacent



Static Digital Resources

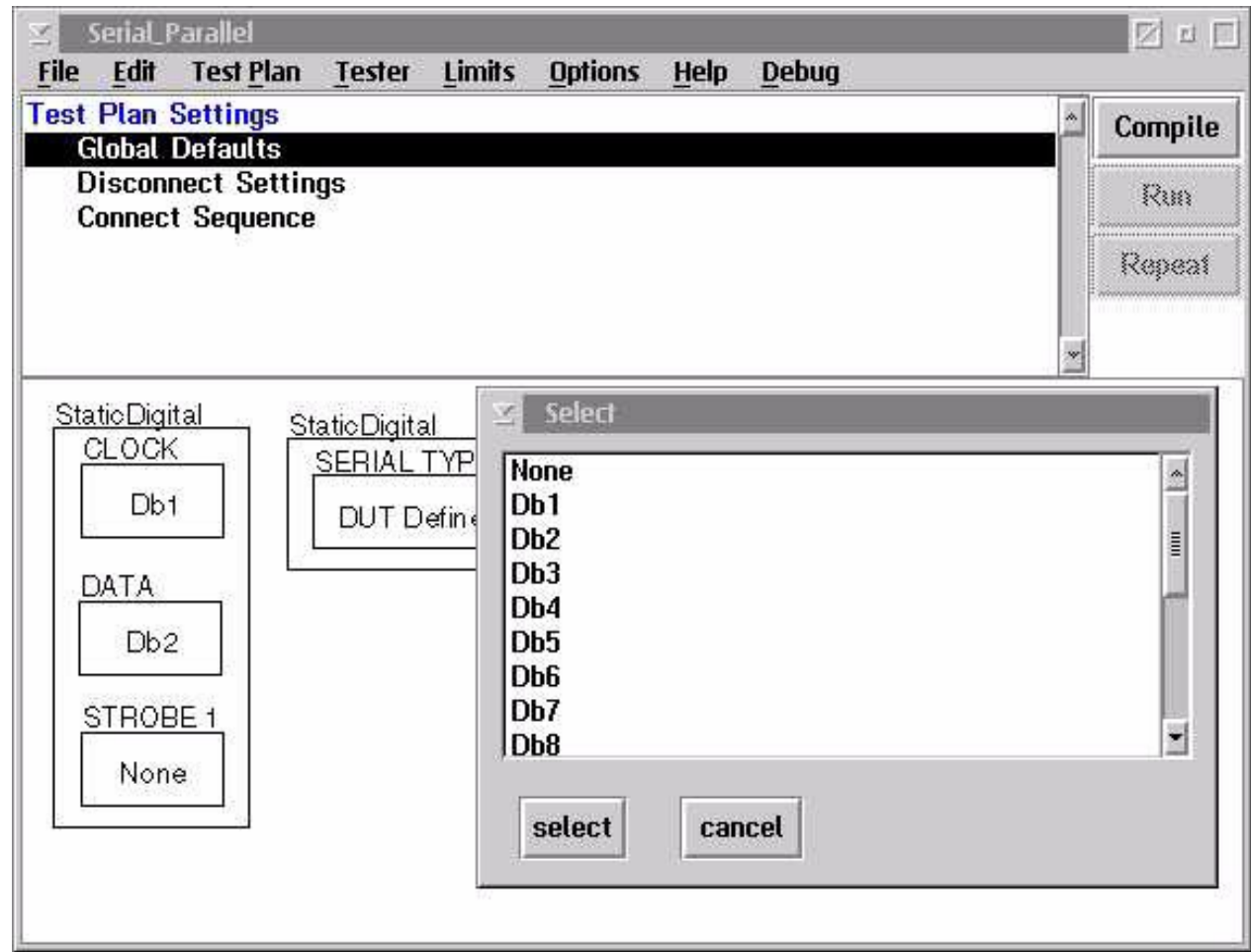
Type
Read
Clock
Data
Strobe





Static Digital Resources

Assign DB Lines





Serial Control

Creating Compound States

Compound States allow High Level Functional Buttons of many Registers

System Rounds Variable Input Data to the Nearest Valid State

Spread Sheet Data Import for Complex or Large Compound State Tables



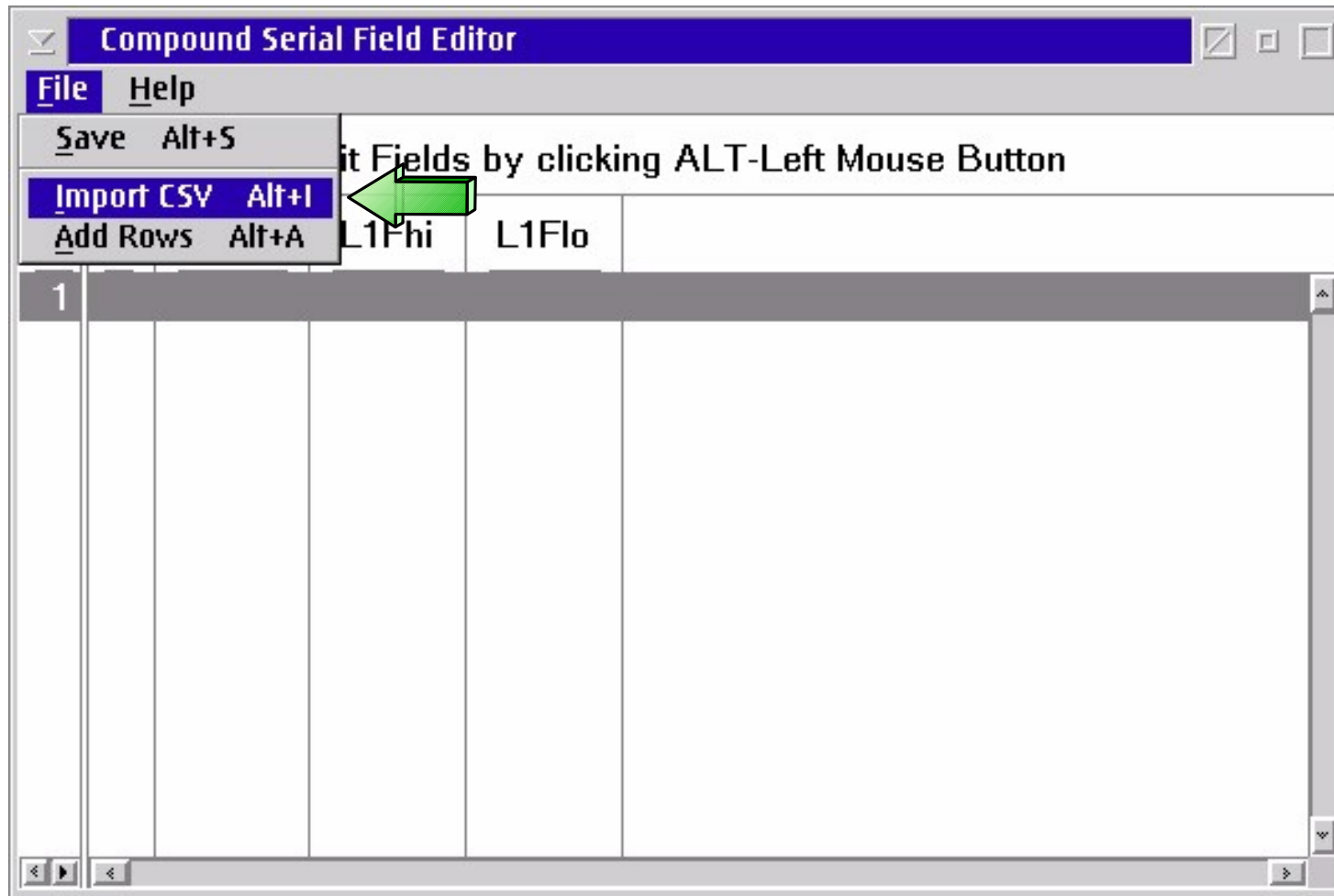
First Create a CSV file with Serial Data

```
FL01,LINx,LIFhi,LIFlo  
1088,68,0,0  
1088.25,68,0,1  
1088.5,68,0,2  
1088.75,68,0,3  
1089,68,1,0  
1089.25,68,1,1  
1089.5,68,1,2  
1089.75,68,1,3  
1090,68,2,0  
1090.25,68,2,1  
1090.5,68,2,2  
1090.75,68,2,3  
1091,68,3,0  
1091.25,68,3,1  
1091.5,68,3,2  
1091.75,68,3,3  
1092,68,4,0  
1092.25,68,4,1  
1092.5,68,4,2  
1092.75,68,4,3  
1093,68,5,0  
1093.25,68,5,1  
1093.5,68,5,2  
1093.75,68,5,3  
1094,68,6,0  
1094.25,68,6,1  
1094.5,68,6,2  
1094.75,68,6,3  
1095,68,7,0  
1095.25,68,7,1  
1095.5,68,7,2  
1095.75,68,7,3  
1096,68,8,0  
1096.25,68,8,1  
1096.5,68,8,2  
1096.75,68,8,3  
1097,68,9,0
```





Import the CSV Data into Compound Spread Sheet





First Row in CSV are Field Names, Each Row is a Compound State

Compound Serial Field Editor

File Help

Edit Fields by clicking ALT-Left Mouse Button

	ΓLO1	L1N _x	L1Γ _{hi}	L1Γ _{lo}
1	1088	68	0	0
2	1088.25	68	0	1
3	1088.5	68	0	2
4	1088.75	68	0	3
5	1089	68	1	0
6	1089.25	68	1	1
7	1089.5	68	1	2
8	1089.75	68	1	3
9	1090	68	2	0
10	1090.25	68	2	1
11	1090.5	68	2	2
12	1090.75	68	2	3
13	1091	68	3	0
14	1091.25	68	3	1
15	1091.5	68	3	2
16	1091.75	68	3	3
17	1092	68	4	0
18	1092.25	68	4	1
19	1092.5	68	4	2
20	1092.75	68	4	3
21	1093	68	5	0
22	1093.25	68	5	1
23	1093.5	68	5	2
24	1093.75	68	5	3
25	1094	68	6	0
26	1094.25	68	6	1
27	1094.5	68	6	2
28	1094.75	68	6	3
29	1095	68	7	0



Editing the Compound Data, Use Alt & Left Mouse Button

Compound Serial Field Editor

File Help

Edit Fields by clicking ALT-Left Mouse Button

	FLO1	L1Nx	L1Fhi	L1Flo
1	1088	68	0	0
2	1088.25	68	0	1
3	1088.5	68	0	2
4	1088.75	68	0	3
5	1089	68	1	0
6	1089.25	68	1	1
7	1089.5	68	1	2
8	1089.75	68	1	3
9	1090	68	2	0
10	1090.25	68	2	1
11	1090.5	68	2	2
12	1090.75	68	2	3
13	1091	68	3	0
14	1091.25	68	3	1
15	1091.5	68	3	2
16	1091.75	68	3	3
17	1092	68	4	0
18	1092.25	68	4	1
19	1092.5	68	4	2
20	1092.75	68	4	3
21	1093	68	5	0
22	1093.25	68	5	1
23	1093.5	68	5	2
24	1093.75	68	5	3
25	1094	68	6	0
26	1094.25	68	6	1
27	1094.5	68	6	2
28	1094.75	68	6	3
29	1095	68	7	0



Save the Compound Field Data

Compound Serial Field Editor

File Help

Save Alt+S

Import CSV Alt+I

Add Rows Alt+A

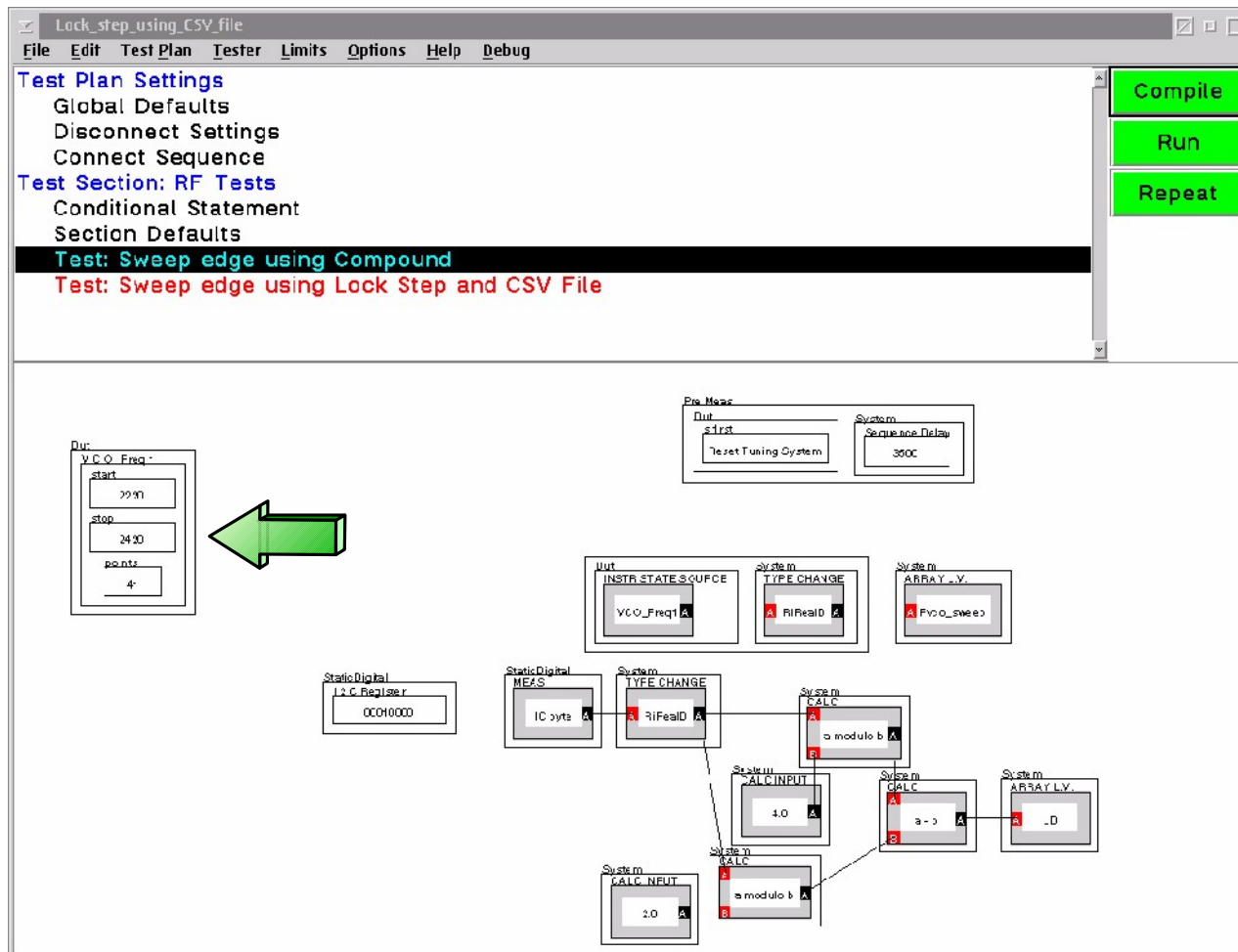
L1Nx L1Fhi L1Flo

by clicking ALT-Left Mouse Button

		L1Nx	L1Fhi	L1Flo
1	1088	68	0	0
2	1088.25	68	0	1
3	1088.5	68	0	2
4	1088.75	68	0	3
5	1089	68	1	0
6	1089.25	68	1	1
7	1089.5	68	1	2
8	1089.75	68	1	3
9	1090	68	2	0
10	1090.25	68	2	1
11	1090.5	68	2	2
12	1090.75	68	2	3
13	1091	68	3	0
14	1091.25	68	3	1
15	1091.5	68	3	2
16	1091.75	68	3	3
17	1092	68	4	0
18	1092.25	68	4	1
19	1092.5	68	4	2
20	1092.75	68	4	3
21	1093	68	5	0
22	1093.25	68	5	1
23	1093.5	68	5	2
24	1093.75	68	5	3
25	1094	68	6	0
26	1094.25	68	6	1
27	1094.5	68	6	2
28	1094.75	68	6	3
29	1095	68	7	0



Sweeping DUT Frequency using Compound Setting





DB Lines Description

Switch between Von. Voff, Open

16 lines, 2 banks

4 voltage supplies

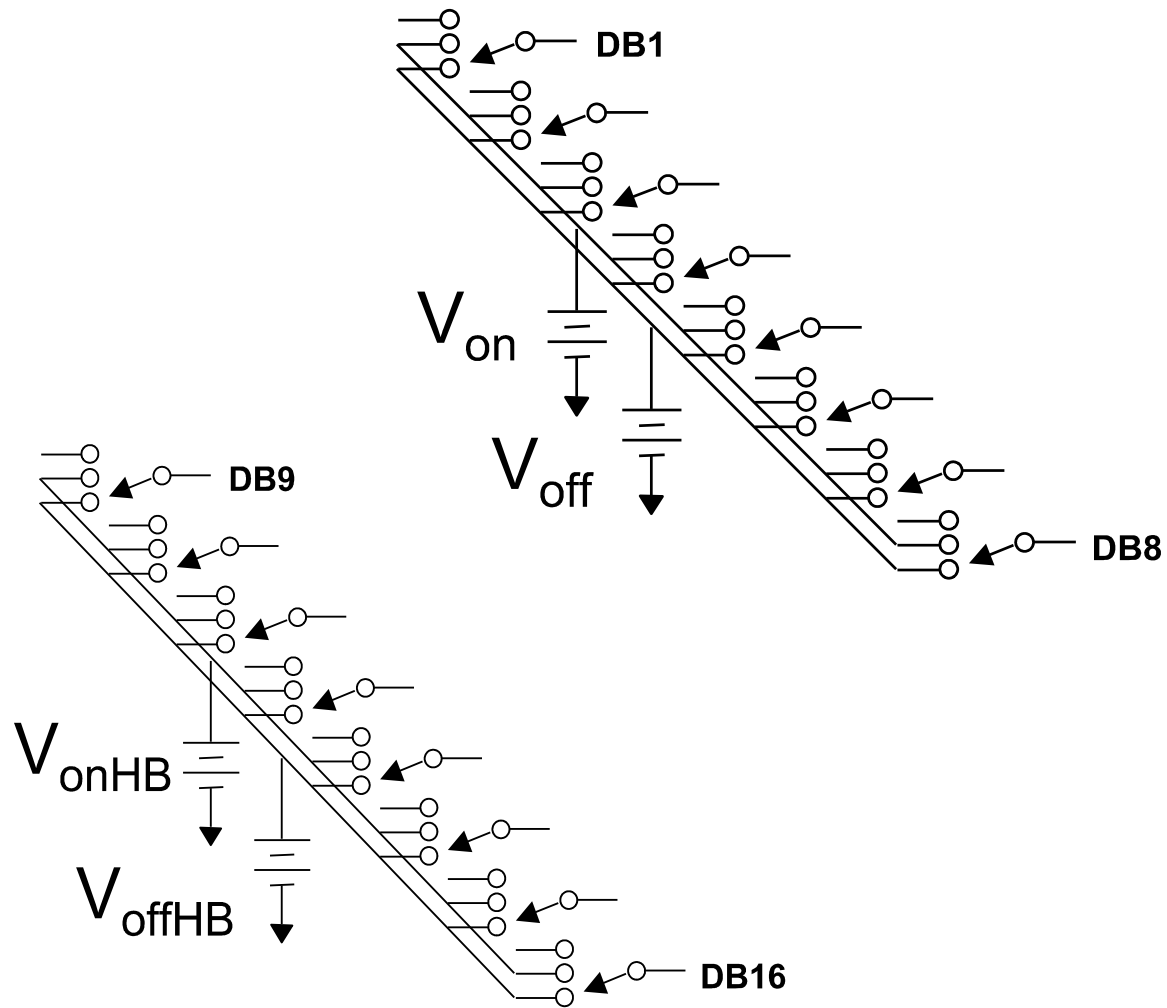
1 Precision Multimeter

2 mA limit

+/- 10V



Schematic





Measuring Leakage Current or ESD Diode Voltage with DB Lines

Select voltage or current measure mode

Set Opposing Limit (V or I Hard Limit)

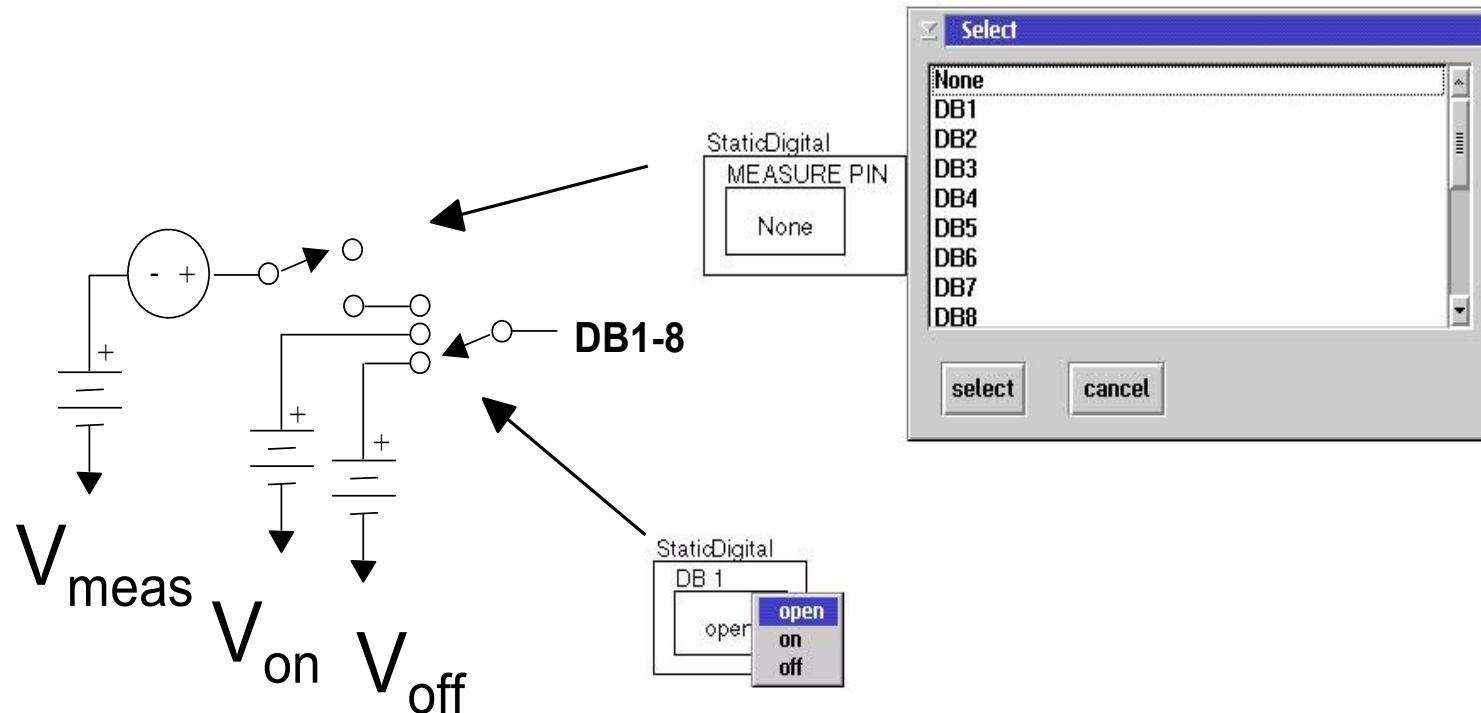
Set Measure Max. (sets Resolution)

Set DB pin to Open

Select DB pin to be Measured



How to Make Low Current Measurements using DB lines





Leakage Current Measurement

The screenshot shows the 'DB Current and Voltage Meas' software window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The main area is divided into a top section for test plan navigation and a bottom section for parameter configuration.

Test Plan Navigation:

- Connect Sequence
- Test Section: DC Tests
- Conditional Statement
- Section Defaults
- Test: Low level Current Test** (highlighted)
- Test: ESD Diode Check

Configuration Parameters:

- StaticDigital** MEASURE MODE: lmeas
- StaticDigital** MEASURE V FORCE: 3
- StaticDigital** CURRENT MEAS MAX: 1000 u
- StaticDigital** MEASURE I LIMIT: 1000 u
- StaticDigital** MEASURE PIN: DB1
- StaticDigital** DB 1: open
- StaticDigital** MEAS: Current A
- System** SAVE AMPS: Leakage current

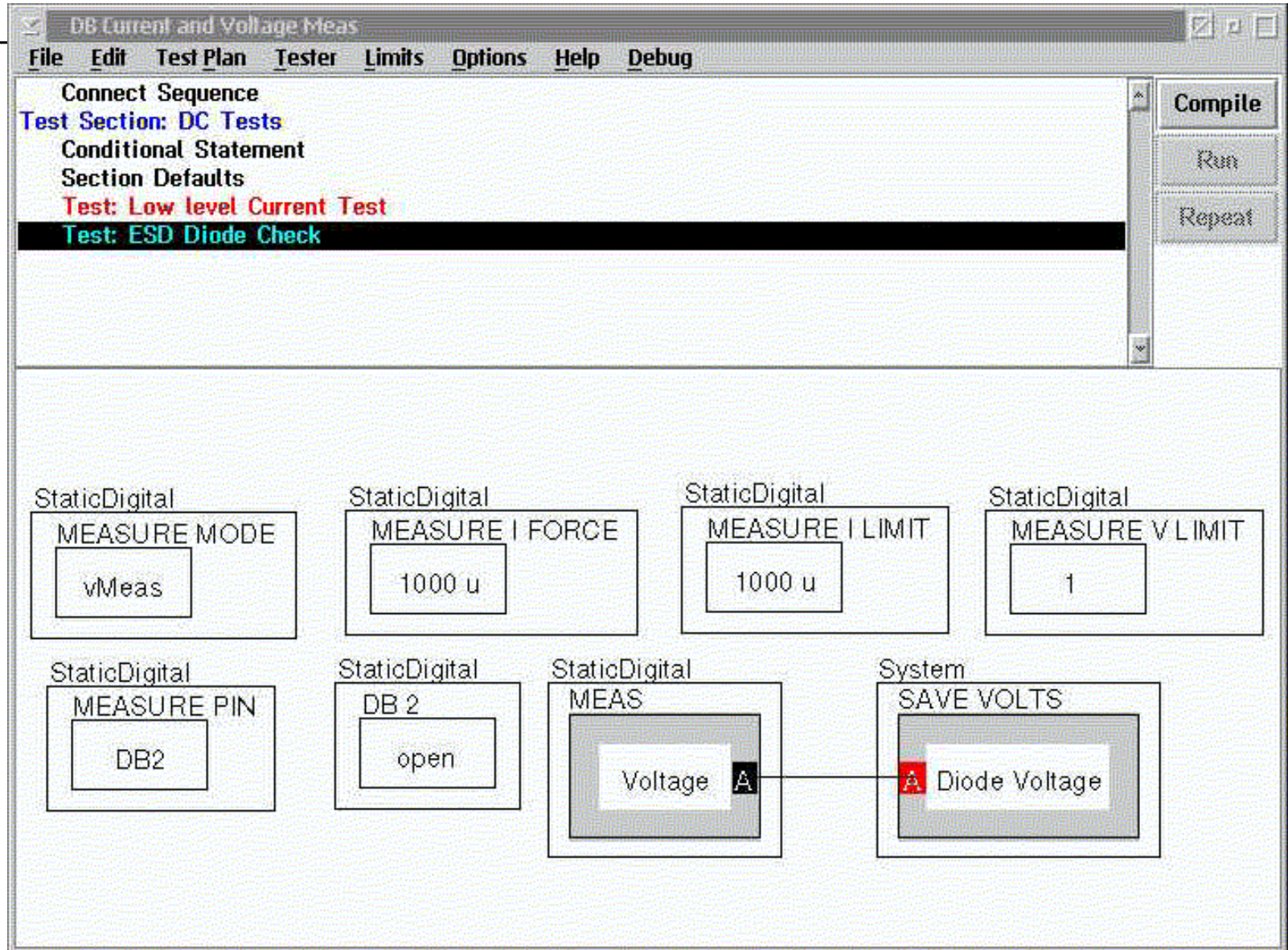
A connection line links the 'Current A' parameter in the 'MEAS' block to the 'Leakage current' parameter in the 'SAVE AMPS' block.

Buttons: Compile, Run, Repeat

NOTE



Diode Voltage Check





Setup The Tester to Measure a Device



Definitions - Tester Settings

Tester Idle State - Lowest Level Default

Global Defaults - Next Level Default

Test Plan Controlled

Disconnect Settings - Sequence Control

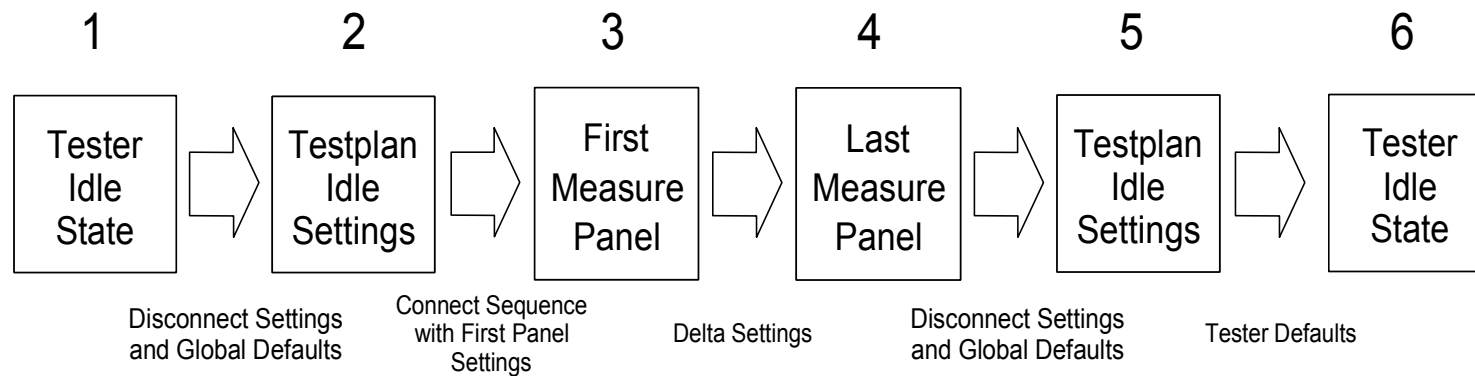
Highest Level Default

Test Plan Idle Settings - Combination of all
Condition Just Before Connect

Connect Sequence - Only Sequence Control
Must put all buttons here in Disconnect!

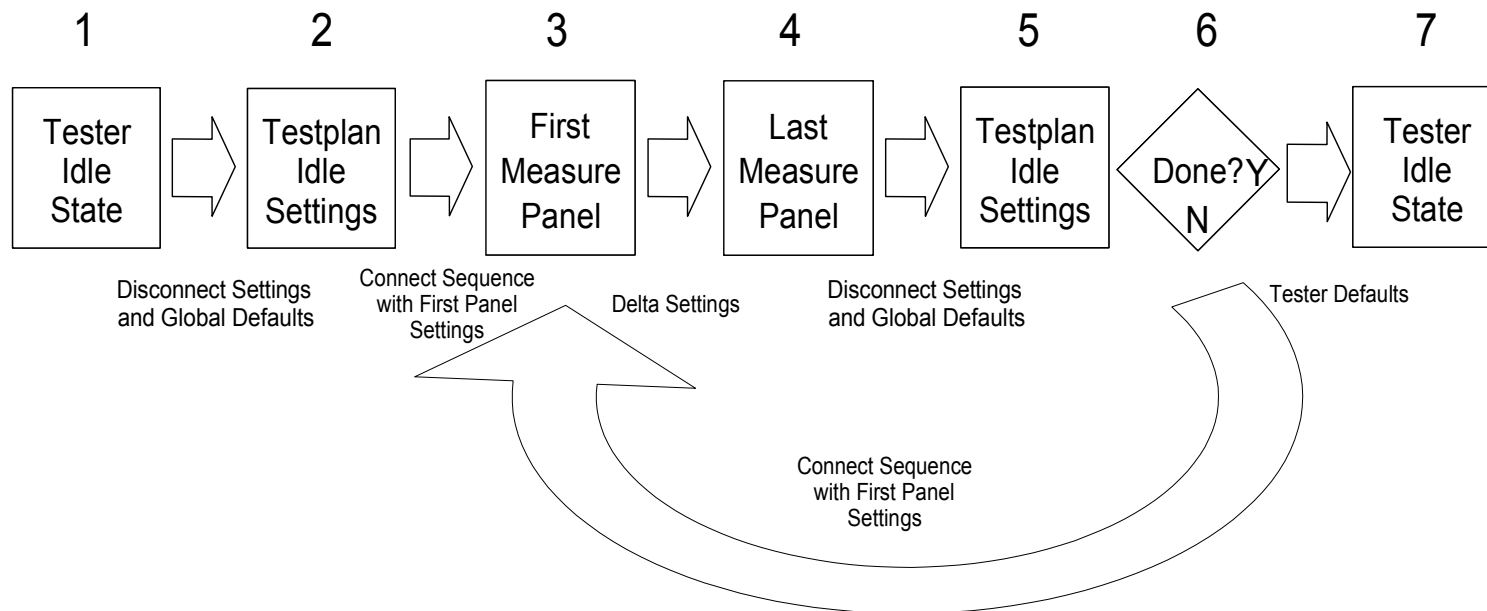


Test Plan Editor Run Time Sequence - Single Run





Test Plan Editor Run Time Sequence - Repeat/Test Exec





Global Defaults for Source 1, 2 & Settle

The screenshot displays the 'Global Defaults' section of the RFMD3100_F_offset_b software. The interface includes a menu bar (File, Edit, Test Plan, Tester, Limits, Options, Help, Debug) and a sidebar with buttons for 'Compile', 'Run', and 'Repeat'. The main area is divided into several sections:

- Test Plan Settings**
 - Global Defaults
 - Disconnect Settings
 - Connect Sequence
 - Test Section: DC Tests
 - Conditional Statement
 - Section Defaults
 - Test: Icc Idle High
 - Test: Icc Idle Low
- Receiver**
 - FREQUENCY: MASTER
 - Aux Source
 - CONFIG: Frequency
 - SCALE: 1
 - OFFSET: 0
 - RecLo: Fast Settle (ON)
- Source1**
 - Fast Settle: ON
 - Src12Output: Source 1 Attn: 10db
 - Src12Output: Source 1 Amp: ON
 - Src12Output: Source Output Mode: Aux + Src2 combined to src1
- Source2**
 - Frequency: 824 MHz
 - Power: 0 dbm
 - Rf State: OFF
 - Fast Settle: ON
- StaticDigital**
 - Woff: 0
 - Won: 2.8
 - Db 1: 0
- System**
 - Freq Reference: Source1
 - Out Freq Offset: 0
 - Out Freq Scale: 1
 - Averages: 8
- Testhead**
 - Input Port: Rf 3
 - Output Port: Rf 6
 - Rf 3: src1-noise
 - Rf 6: receive
 - Rec Attenuation: 30db
 - Source 1: Rf 3
 - Parameter: b2
- Aux Source**
 - Frequency: 824 MHz
 - Power: -2 dbm
 - Modulation: QPSK
 - Src12Output: Aux Power: -50 dbm
- DutControl**
 - Device Power 1: Vcc 3
 - Device Power 2: open
 - Vcc 3: 2.85
 - Vcc 4: 4.2
- PowerVI**
 - Power V 1: 3.2
 - Power I 1: 2
 - V 1 Output: ON
- Fixture**
 - Head Rf 3: DutRf3
 - Head Rf 6: DutRf6
 - Fixture Power: ON



Global Default Setting for

The screenshot displays the 'Test Plan Settings' window with the 'Global Defaults' section selected. The window includes a menu bar (File, Edit, Test Plan, Tester, Limits, Options, Help, Debug) and three action buttons: 'Compile', 'Run', and 'Repeat'. The 'Global Defaults' section lists various settings, including 'Disconnect Settings', 'Connect Sequence', and 'Test Section: DC Tests'. Below this, there are several sub-sections with their respective settings:

- Aux Source:** Frequency (824 MHz), Power (-2 dBm), Modulation (CDMA), Src12Output Aux Power (-50 dBm).
- DutControl:** Device Power 1 (Vec 3), Device Power 2 (open), Vec 3 (2.85), Vec 4 (4.2).
- PowerUI:** Power V 1 (3.2), Power I 1 (2), V 1 Output (ON).
- Receiver:** FREQUENCY (MASTER), Aux Source, CONFIG (Frequency), SCALE (1), OFFSET (0).
- RecLo:** Fast Settle (ON).
- Src12Output:** Source 1 Amp (ON), Source Output Mode (Aux + Src2 combined to src1), Fast Settle (ON).
- Source2:** Frequency (824 MHz), Power (0 dBm), Rf State (OFF), Fast Settle (ON).
- StaticDigital:** Voff (0), Von (2.8), Db 1 (off).
- System:** Freq Reference (Source2), Out Freq Offset (0), Out Freq Scale (1), Averages (8).
- Testhead:** Input Port (Rf 3), Output Port (Rf 6), Rf 3 (src1-noise), Rf 6 (receive), Rec Attenuation (30db), Source 1 (Rf 3), Parameter (b2).



Disconnect Settings Only

The screenshot shows a software window titled "Disconnect Settings Only". The window has a menu bar with "File", "Edit", "Test Plan", "Tester", "Limits", "Options", "Help", and "Debug". The "Test Plan Settings" section is expanded, showing "Global Defaults", "Disconnect Settings" (highlighted), "Connect Sequence", and "Test Section: GSM Transmit, LO Rejection, 4 points". Below this, there are "Conditional Statement" and "Section Defaults" sections, with three test entries: "Test: LO rejection, (+V,0)", "Test: LO rejection, (-V,0)", and "Test: LO rejection, (0 +V)". On the right side of the window, there are three buttons: "Compile", "Run", and "Repeat".

The main content area is divided into two sections: "Waveform" and "DutControl".

Waveform

WF 2 Amplitude	WF 3 Amplitude
0	0
WF 2 Offset	WF 3 Offset
0	0
WF 2 Phase	WF 3 Phase
0	0

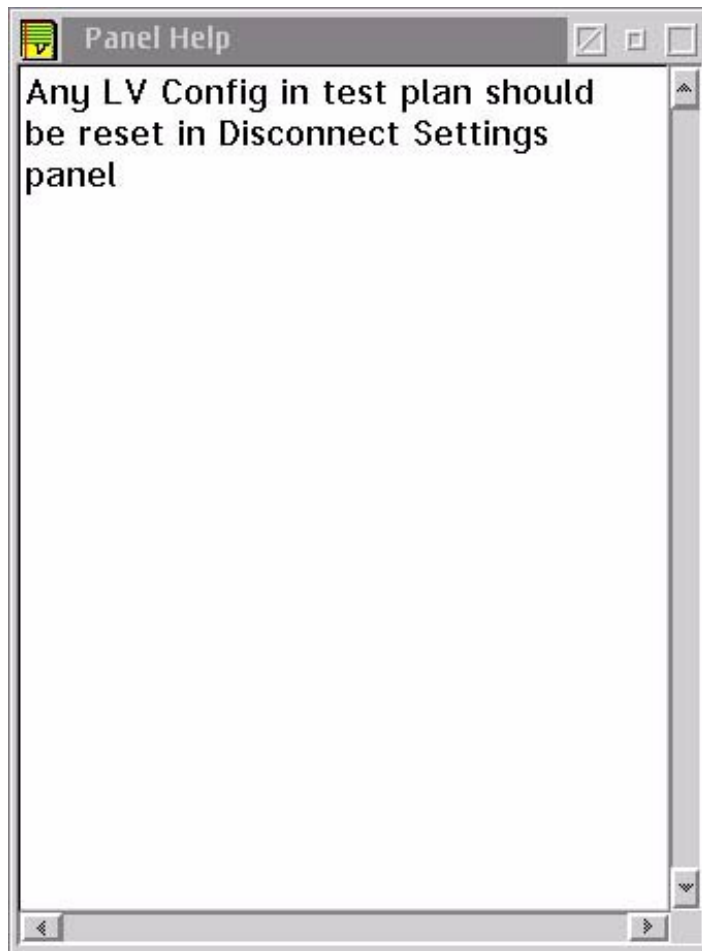
DutControl

Vcc 5
0

NOTE



Disconnect Settings Panel Must include all Parameters set by Local Variable in Test Plan





Connect Sequence: Left to Right

File Edit Test Plan Tester Limits Options Help Debug

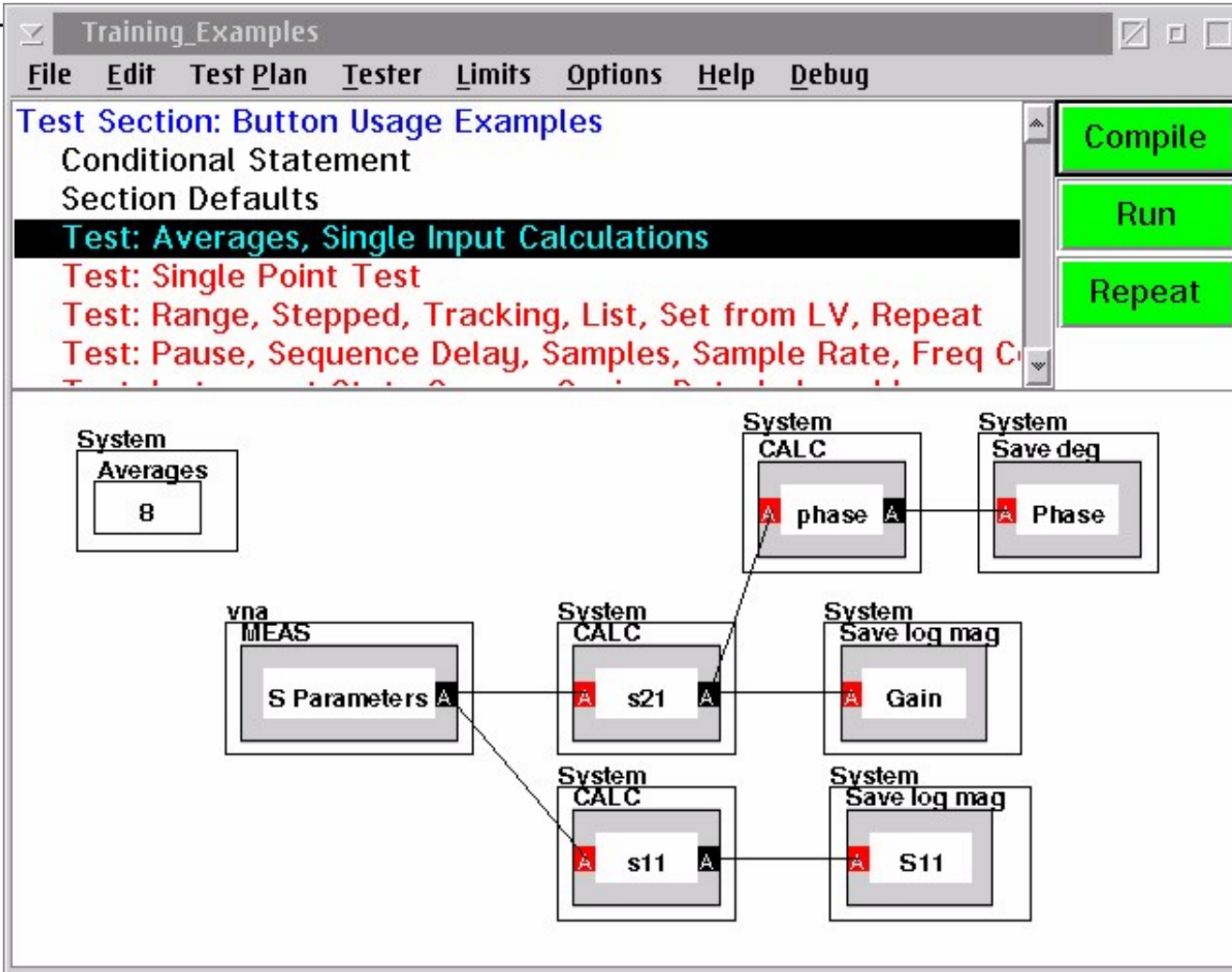
Test Plan Settings
Global Defaults
Disconnect Settings
Connect Sequence
Test Section: Continuity Tests (Unoptimized)
Conditional Statement
Section Defaults
Test: Conn_AGCOUT2
Test: Conn_AGCOUT1
Test: Conn_AGCCTR1

Compile
Run
Repeat

DutControl Device Power 1 Vcc 4	DutControl Device Power 2 Vcc 4	DutControl Device Power 3 Vcc 4	DutControl Device Power 4 Vcc 4	DutControl Device Power 5 Vcc 4	DutControl Device Power 6 Vcc 4	
DutControl Device Power 7 Vcc 4	DutControl Device Power 8 Vcc 3	DutControl Device Power 9 Vcc 2	DutControl Device Power 1 0 Vcc 2	DutControl Device Power 1 2 open	DutControl Device Power 1 3 open	
DutControl Device Power 1 4 open	DutControl Device Power 1 5 open	DutControl Device Power 1 6 open	DutControl Vcc 1 5	DutControl Vcc 2 5	DutControl Vcc 3 5	DutControl Vcc 4 5
DutControl Vcc 5 5	DutControl Vcc 6 5					



Averages, One Input Calculations





Simple Test at 1 Frequency

Training_Examples

File Edit Test Plan Tester Limits Options Help Debug

Test Section: Button Usage Examples

Conditional Statement

Section Defaults

Test: Averages, Single Input Calculations

Test: Single Point Test

Test: Range, Stepped, Tracking, List, Set from LV, Repeat

Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C

Compile

Run

Repeat

Source1

Frequency

1000 Mhz

Receiver

MEAS

Power

System

Save dbm

Pout_at_1000_MHz



Using Button 2 Functions

The screenshot shows the 'Training_Examples' software window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The test plan list on the left includes:

- Test: Averages, Single Input Calculations
- Test: Single Point Test (highlighted)
- Test: Range, Stepped, Tracking, List, Set from LV, Repeat
- Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
- Test: Instrument State Source, Saving Data Indexed by
- Test: Calc Input, 2 Input Calcs, LV Sav
- Test: Gro Post Measure, Lock Step, Measure

On the right side of the window, there are three green buttons: Compile, Run, and Repeat. A context menu is open over the test plan list, with the 'Range' option selected. The menu items are:

- Select
- Inspect
- Edit Note...
- Delete
- Group Selected
- Settings...
- Range (highlighted)
- Stepped
- List
- Symbolic
- Symbolic Default
- Tracking
- Set from LV
- Set from Array LV
- Edit Actions...
- Configuration Name

The main workspace contains a block diagram with the following components:

- Source1: Frequency 1000 MHz
- Power: A
- System: Save dbm, Pout_at_1000_MHz

Connections are shown between the Power block and the System block.

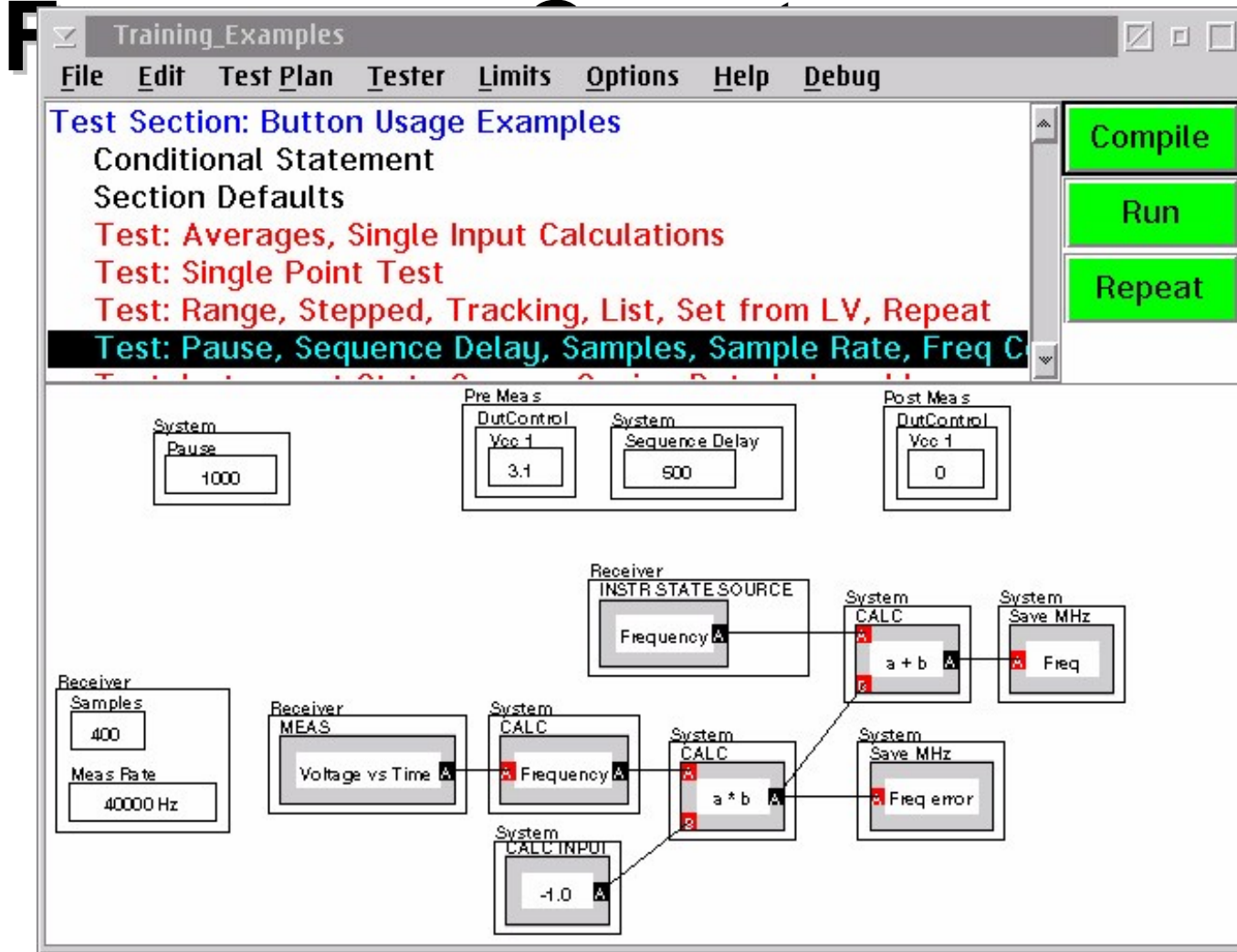


Range, Stepped, Tracking, List, Set from LV and Repeat

The screenshot shows the 'Training_Examples' software interface. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The main window displays a test plan titled 'Button Usage Examples' with several sections: 'Conditional Statement', 'Section Defaults', 'Test: Averages, Single Input Calculations', 'Test: Single Point Test', 'Test: Range, Stepped, Tracking, List, Set from LV, Repeat' (highlighted in black), and 'Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C'. On the right side, there are three green buttons: 'Compile', 'Run', and 'Repeat'. Below the menu, a block diagram shows the test setup. It includes a 'Source1' block with 'Frequency' set to '1000 Mhz'. Below it, another 'Source1' block has 'Frequency' with 'start' at '1000 Mhz' and 'stop' at '1200 Mhz', and 'points' set to '6'. To its right is a 'Power' block with 'start' at '-10 dbm', 'step size' at '1 dbm', and 'points' at '6'. Further right is a 'Source2' block with 'Power' set to 'Master', 'config' set to 'Power', 'scale' at '1', and 'offset' at '-5'. To the right of that is a 'Source3' block with 'Frequency' set to a list: '1000', '1100', '1200', '1300', '1400', '1500'. Below these are 'DutControl' blocks for 'Vcc 3' and 'Vset', and a 'System' block for 'Repeat' set to '5'. At the bottom, there is a 'Receiver' block labeled 'MEAS' with 'Power' selected, and a 'System' block labeled 'Save dbm' with 'Pout_sweep ps' selected. A red arrow points from the 'Power' block to the 'Save dbm' block.



Pause, Pre/Post Measure, Sequence Delay, Samples, Sample Rate, Voltage vs Time &



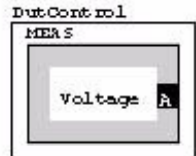
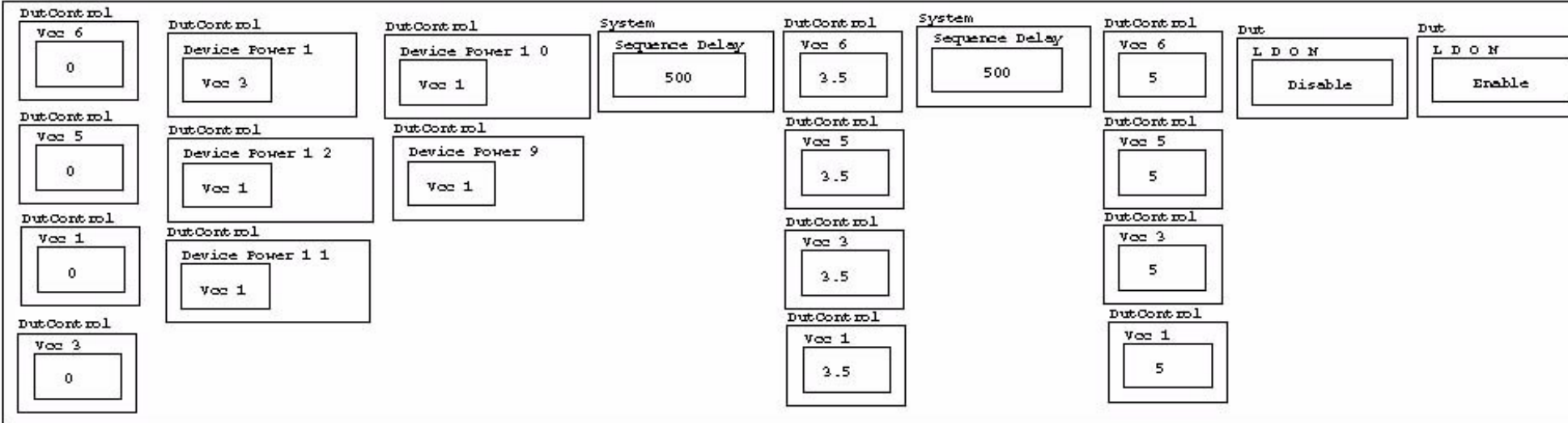


PreMeasure Sequence Left to Right only

Test: icc_ina00
Test: icc_ina35
Test: icc_mix1
Test: icc_vga_norm35
Test: icc_vga_hi35
Test: icc_mix2fga_norm
Test: icc_mix2fga_hi

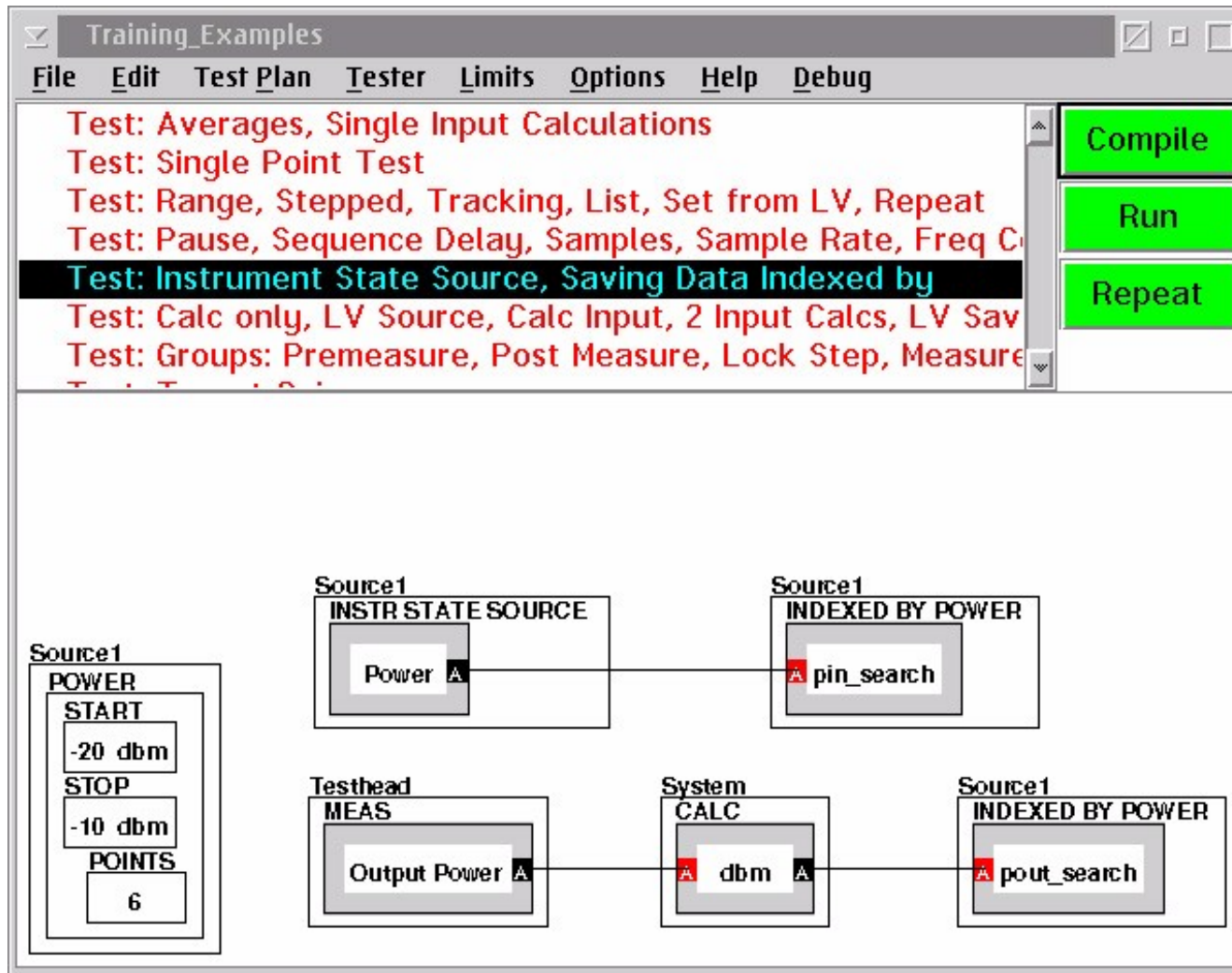
Compile
Run
Repeat

PRE MEAS





Sweep Power and Save Data Indexed by Sweep Parameter





Changing the Owner of the Button

The screenshot shows the 'Training_Examples' software window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The test plan list on the left includes:

- Test: Averages, Single Input Calculations
- Test: Single Point Test
- Test: Range, Stepped, Tracking, List, Set from LV, Repeat
- Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
- Test: Instrument State Source, Saving Data Indexed by**
- Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV Sav
- Test: Groups: Premeasure, Post Measure, Lock Step, Measure

On the right, there are three green buttons: Compile, Run, and Repeat. Below the list is a block diagram with the following components:

- Source1 POWER**: START (-20 dbm), STOP (-10 dbm), POINTS (6)
- Source1 INSTR STATE SOURCE**: Power A
- Source1 INDEXED BY POW**: pin_search A
- Testhead MEAS**: Output Power A
- System CALC**: dbm A
- Source1**: pout_search A

A context menu is open over the 'pin_search' button, with the following options:

- Select
- Inspect
- Edit Note...
- Delete
- Group Selected Settings...
- Change Owner**
- Change All Owners
- Ungroup
- Paste Button
- Edit Actions...



Changing the Owner to Source 1

The screenshot shows a software window titled "Training_Examples" with a menu bar (File, Edit, Test Plan, Tester, Limits, Options, Help, Debug). The main area contains a list of test configurations:

- Test: Averages, Single Input Calculations
- Test: Single Point Test
- Test: Range, Stepped, Tracking, List, Set from LV, Repeat
- Test: Pause, Sequence Delay, Samples, Sample Rate, Freq
- Test: Instrument State Source, Saving Data Indexed by**
- Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV S
- Test: Groups: Premeasure, Post Measure, Lock Step, Meas

Below the list is a block diagram showing the test setup:

- Source1 POWER**: START (-20 dbm), STOP (-10 dbm), POINTS (6)
- Source1 INSTR STATE SOURCE**: Power A
- Source1 INDEXED BY POW**: pin_search
- Testhead MEAS**: Output Power A
- System CALC**: dbm A

A context menu is open over the diagram, listing various test components:

- None
- Dut
- DutControl
- gainCompression
- intermod
- IQMeter
- noiseFigure
- Oscilloscope
- PowerVI
- Receiver
- RecLo
- SineGen
- Source 1**
- Source2
- Source3
- Src12Output
- Src3Output
- StaticDigital
- System
- Testhead
- vna
- Waveform



Selecting the Sort by Index

The screenshot shows the 'Training_Examples' software window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The test plan list on the right contains several entries, with 'Test: Instrument State Source, Saving Data Indexed by' highlighted. Below the list are 'Compile', 'Run', and 'Repeat' buttons.

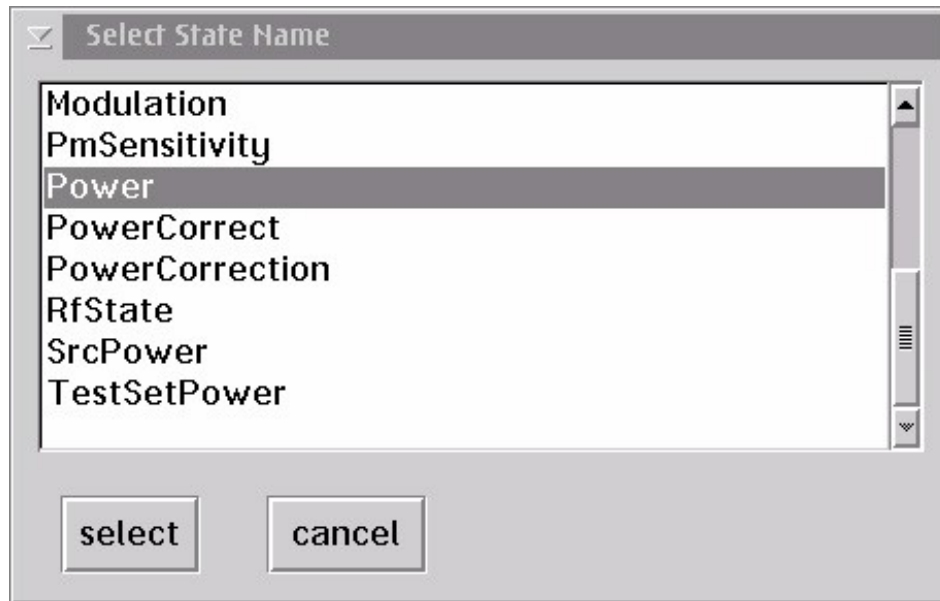
The main workspace displays a block diagram with the following components and connections:

- Source1 POWER**: A block containing 'START' (-20 dbm), 'STOP' (-10 dbm), and 'POINTS' (6).
- Source1 INSTR STATE SOURCE**: A block containing 'Power'.
- Source1 INDEXED BY**: A block containing 'pin_search'.
- Testhead MEAS**: A block containing 'Output Power'.
- System CALC**: A block containing 'dbm'.
- INDEXED BY POWER**: A block containing 'pout_search'.

Connections: 'Source1 INSTR STATE SOURCE' is connected to 'Source1 INDEXED BY'. 'Testhead MEAS' is connected to 'System CALC'. 'System CALC' is connected to 'INDEXED BY POWER'. A context menu is open over the 'INDEXED BY POWER' block, with 'Sort Index' selected.

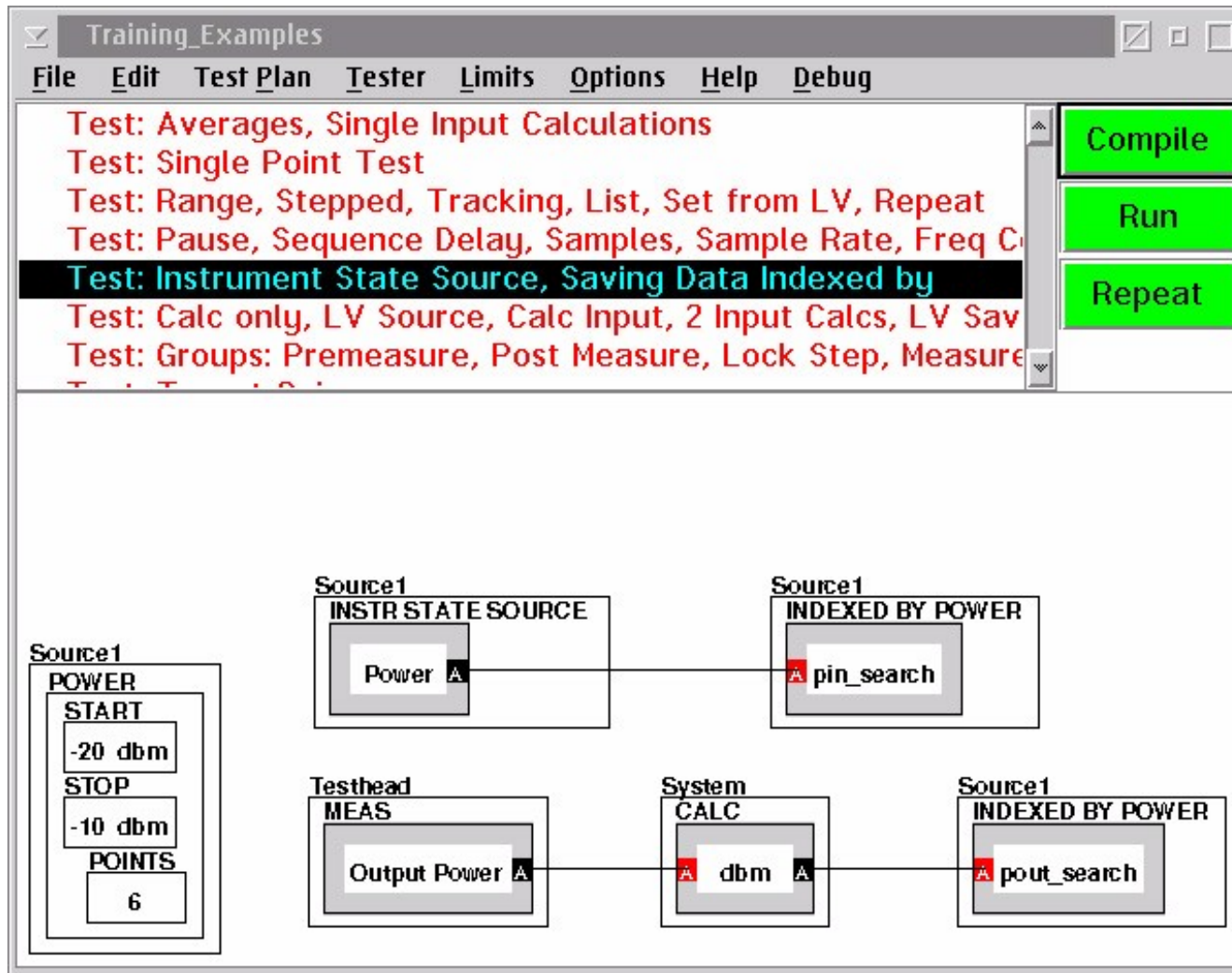


Selecting the Parameter Power as the Sort by Index



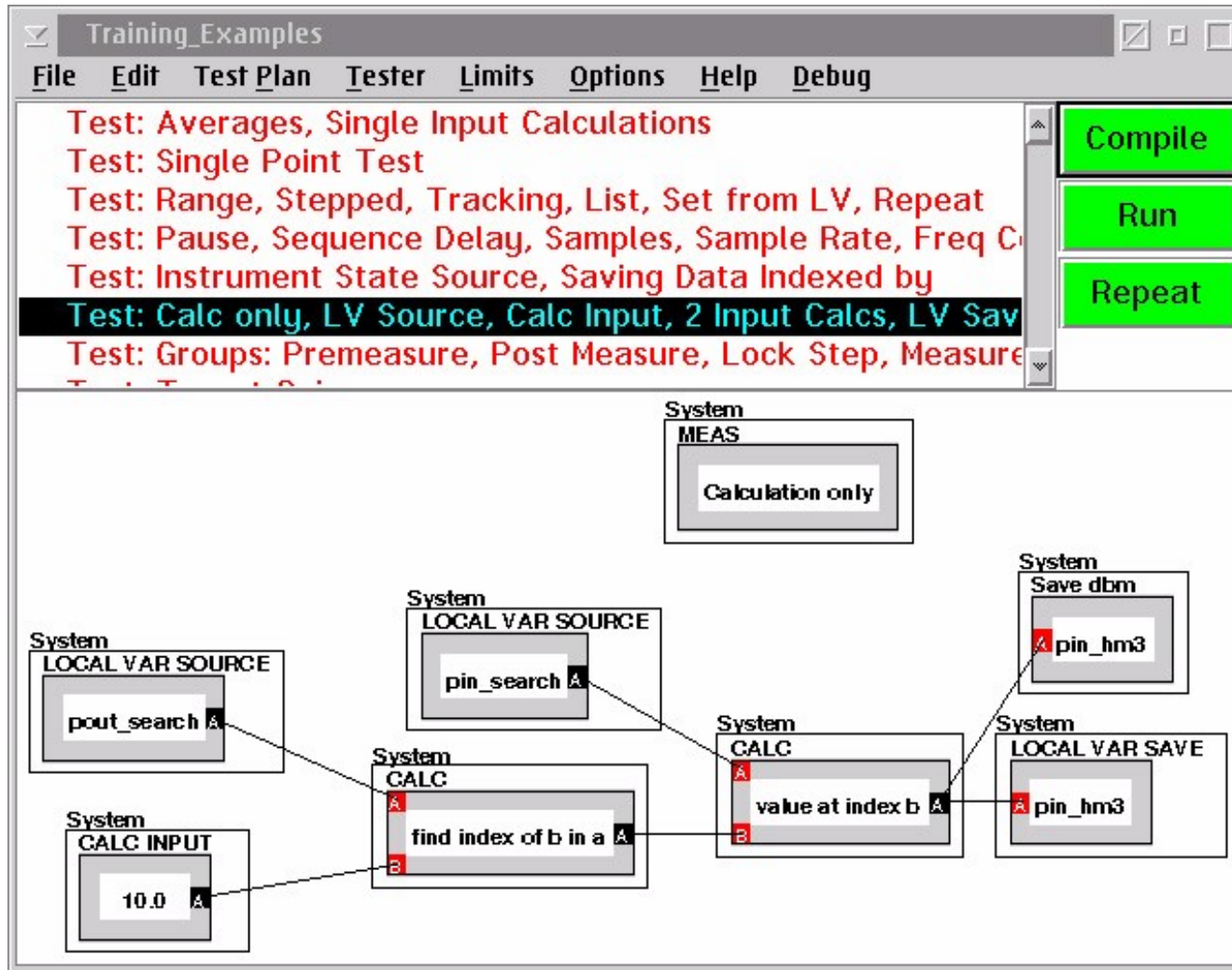


Data Save Button is now Owned by Source 1 & Indexed by Power





Calc Only, Local Variable Source, 2 Input Calcs & LV Save





Pre Measure, Post Measure, Lockstep & Measure Groups

Training_Examples

File Edit Test Plan Tester Limits Options Help Debug

Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
Test: Instrument State Source, Saving Data Indexed by
Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV Sav
Test: Groups: Premeasure, Post Measure, Lock Step, Measure
Test: Target Gain
Test: Array LV Save, P1dB_sweep
Test: Array LV Source, 2 Input Calcs of Arrays, Calc P1dB

Compile
Run
Repeat

Pre Meas

DutControl	System
Voc 1	Sequence Delay
3.1	1000

Post Meas

DutControl
Voc 1
0

Lock Step Configs

System	Dut	Dut	Dut	Dut	Dut
Index	INT 1(8-1)	INT 1(0)	Fractn 1(17-11)	Fractn 1(10-3)	Fractn 1(2-0)
1	29	1	32	0	0

System	Dut	Dut	Dut	Dut	Dut
Index	INT 1(8-1)	INT 1(0)	Fractn 1(17-11)	Fractn 1(10-3)	Fractn 1(2-0)
2	11	0	16	0	0

Measure

Testhead	Receiver	System
Parameter	MEAS	Save dbm
a1	Power	Pin

Testhead	Receiver	System
Parameter	MEAS	Save dbm
b2	Power	Pout



Select and Group Buttons

The screenshot shows the 'Training_Examples' application window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The main area contains a list of tests in red text:

- Test: Averages, Single Input Calculations
- Test: Single Point Test
- Test: Range, Stepped, Tracking, List, Set from LV, Repeat
- Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
- Test: Instrument State Source, Saving Data Indexed by
- Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV Sav
- Test: Groups: Premeasure, Post Measure, Lock Step, Measure

Below the list is a table of data:

System	Out	Out	Out	Out	Out
Index 1	INT f(8-1) 29	INT f(0) 1	Fractn f(17-14) 32	Fractn f(10-3) 0	Fractn f(2) 0
Index 2	INT f(8-1) 11	INT f(0) 0	Fractn f(17-14) 16	Fractn f(10-3) 0	Fractn f(2) 0

At the bottom, there are two diagrams. Each diagram shows a 'Measure' block containing a 'Testhead' (Parameter a1 or b2) and a 'Receiver' (MEAS Power). This is connected to a 'System' block (Save dbm) which has a 'Pin' or 'Pout' output.

A context menu is open over the diagram, listing the following actions:

- Deselect
- Inspect
- Edit Note...
- Delete
- Group Selected**
- Settings...
- Change Owner
- Change All Owners
- Ungroup
- Paste Button
- Edit Actions...



Selecting the Group Function

The screenshot shows the 'Training_Examples' software window. The menu bar includes File, Edit, Test Plan, Tester, Limits, Options, Help, and Debug. The main text area lists several test functions in red, with the last one, 'Test: Groups: Premeasure, Post Measure, Lock Step, Measure Loop', highlighted in green. To the right of the text are buttons for 'Compile', 'Run', and 'Repeat'. Below the text is a diagram of a test setup. It consists of two rows of blocks. The top row has a 'Pre Meas' block with 'OutControl' (Voc: 1, 3.1) and 'System' (Sequence Delay, 1000), followed by a 'Post Meas' block with 'OutControl' (Voc: 1, 0). The middle row has two identical sets of blocks: 'System' (Index, 1) and 'Out' (I.N.T. 1/(8-1), 29), 'Out' (I.N.T. 1/0, 1), 'Out' (Fractn 1/(17-11), 32), 'Out' (Fractn 1/(10-3), 0), and 'Out' (Fractn 1/2, 0). The bottom row has two identical 'Measure' blocks. Each 'Measure' block contains a 'Testhead' (Parameter, a1 or b2), a 'Receiver' (MEAS, Power), and a 'System' (Save dbm, Pin or Pout).

Training_Examples

File Edit Test Plan Tester Limits Options Help Debug

Test: Averages, Single Input Calculations
Test: Single Point Test
Test: Range, Stepped, Tracking, List, Set from LV, Repeat
Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
Test: Instrument State Source, Saving Data Indexed by
Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV Sav
Test: Groups: Premeasure, Post Measure, Lock Step, Measure Loop

Compile
Run
Repeat

Pre Meas
OutControl
Voc: 1
3.1
System
Sequence Delay
1000
Post Meas
OutControl
Voc: 1
0

System
Index
1
Out
I.N.T. 1/(8-1)
29
Out
I.N.T. 1/0
1
Out
Fractn 1/(17-11)
32
Out
Fractn 1/(10-3)
0
Out
Fractn 1/2
0

System
Index
2
Out
I.N.T. 1/(8-1)
11
Out
I.N.T. 1/0
0
Out
Fractn 1/(17-11)
16
Out
Fractn 1/(10-3)
0
Out
Fractn 1/2
0

Measure
Testhead
Parameter
a1
Receiver
MEAS
Power
System
Save dbm
Pin
Measure
Testhead
Parameter
b2
Receiver
MEAS
Power
System
Save dbm
Pout

Delete
Group
Pre Measure
Post Measure
Lock Step
Measure
Calculate
Measure Loop



Creates Lockstep Group

Training_Examples

File Edit Test Plan Tester Limits Options Help Debug

Test: Pause, Sequence Delay, Samples, Sample Rate, Freq C
Test: Instrument State Source, Saving Data Indexed by
Test: Calc only, LV Source, Calc Input, 2 Input Calcs, LV Sav
Test: Groups: Premeasure, Post Measure, Lock Step, Measure
Test: Target Gain
Test: Array LV Save, P1dB_sweep
Test: Array LV Source, 2 Input Calcs of Arrays, Calc P1dB

Compile
Run
Repeat

Pre Meas

DutControl	System
Voc 1	Sequence Delay
3.1	1000

Post Meas

DutControl
Voc 1
0

Lock Step Configs

System	Out	Out	Out	Out	Out
Index	IHT f(8-1)	IHT f(0)	Fractn f(17-11)	Fractn f(10-3)	Fractn f(2-0)
1	29	1	32	0	0
2	11	0	16	0	0

Measure

Testhead	Receiver	System
Parameter	MEAS	Save dbm
a1	Power	Pin

Measure

Testhead	Receiver	System
Parameter	MEAS	Save dbm
b2	Power	Pout



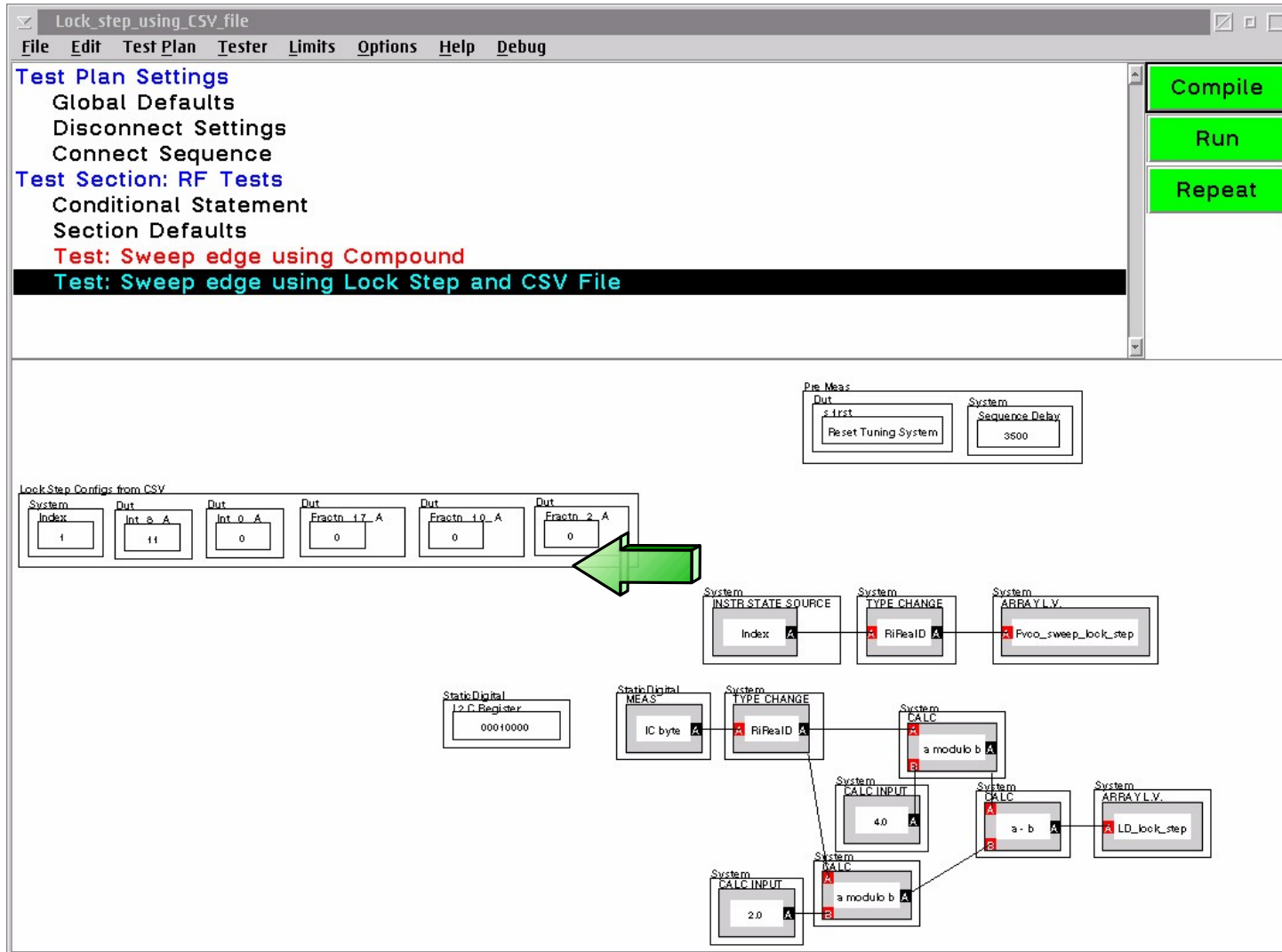
Lock Step Using CSV File

Spread Sheet Data Import for Complex or Large
Lock Step Tables

All Points in the First Column must be Unique



Sweeping DUT Frequency using Lock Step with CSV file Data





Importing CSV Data into Lock Step

The screenshot displays the ROOS Instruments software interface. The title bar reads "Lock_step_using_CSV_file". The menu bar includes "File", "Edit", "Test Plan", "Tester", "Limits", "Options", "Help", and "Debug".

The left sidebar shows the following structure:

- Test Plan Settings
 - Global Defaults
 - Disconnect Settings
 - Connect Sequence
- Test Section: RF Tests
 - Conditional Statement
 - Section Defaults
 - Test: Sweep edge using Compound
 - Test: Sweep edge using Lock Step and CSV File**

On the right side, there are three green buttons: "Compile", "Run", and "Repeat".

The main workspace contains a test plan diagram. A context menu is open over a component, with the "Import CSV" option highlighted. The menu items are:

- Select
- Inspect
- Edit Note...
- Delete
- Group Selected Settings...
- Change Owner
- Change All Owners
- Ungroup
- Paste Button
- Import CSV**
- show CSV
- Edit Actions...

The diagram shows various components such as "Pre_Meas", "System", "RIPealID", "TYPE CHANGE", "ARRAY LV.", "Static Digital", "IC byte", "CALC", and "LD_lock_step". A green arrow points from the "Import CSV" option to the main workspace.



Lock Step with CSV Data

First Row in CSV is Data, not Field Name

Lock step state Editor

File Help

Edit Fields by clicking ALT-Left Mouse Button

	Index	Int_8_A	Int_0_A	Fractn_17_A	Fractn_10_A	Fractn_2_A	
1	1	11	0	0	0	0	
2	2	10	1	15	241	0	
3	3	10	1	31	225	0	
4	4	10	1	47	209	0	
5	5	10	1	63	193	0	
6	6	10	1	47	209	0	
7	7	10	1	31	225	0	
8	8	10	1	15	241	0	
9	9	10	1	0	0	0	
10	10	10	0	15	241	0	
11	11	10	0	31	225	0	
12	12	10	0	47	209	0	
13	13	10	0	63	193	0	
14	14	10	0	47	209	0	
15	15	10	0	31	225	0	
16	16	10	0	15	241	0	
17	17	10	0	0	0	0	
18	18	9	1	15	241	0	
19	19	9	1	31	225	0	
20	20	9	1	47	209	0	
21	21	9	1	63	193	0	
22	22	9	1	47	209	0	
23	23	9	1	31	225	0	
24	24	9	1	15	241	0	
25	25	9	1	0	0	0	
26	26	9	0	15	241	0	
27	27	9	0	31	225	0	



Editing Lock Step Editor Panel

Click ALT and Left Mouse Button

Lock step state Editor

File Help

Edit Fields by clicking ALT-Left Mouse Button

	Index	Int_8_A	Int_0_A	Fractn_17_A	Fractn_10_A	Fractn_2_A
1	1	11	0	0	0	0
2	2	10	0	15	241	0
3	3	10	1	31	225	0
4	4	10	1	47	209	0
5	5	10	1	63	193	0
6	6	10	1	47	209	0
7	7	10	1	31	225	0
8	8	10	1	15	241	0
9	9	10	1	0	0	0
10	10	10	0	15	241	0
11	11	10	0	31	225	0
12	12	10	0	47	209	0
13	13	10	0	63	193	0
14	14	10	0	47	209	0
15	15	10	0	31	225	0
16	16	10	0	15	241	0
17	17	10	0	0	0	0
18	18	9	1	15	241	0
19	19	9	1	31	225	0
20	20	9	1	47	209	0
21	21	9	1	63	193	0
22	22	9	1	47	209	0
23	23	9	1	31	225	0
24	24	9	1	15	241	0
25	25	9	1	0	0	0
26	26	9	0	15	241	0
27	27	9	0	31	225	0



Creating Array Local Variables

The screenshot shows the 'Training_Examples' software window with a menu bar (File, Edit, Test Plan, Tester, Limits, Options, Help, Debug) and a list of test items. The selected test is 'Test: Array LV Save, P1dB_sweep'. To the right are 'Compile', 'Run', and 'Repeat' buttons.

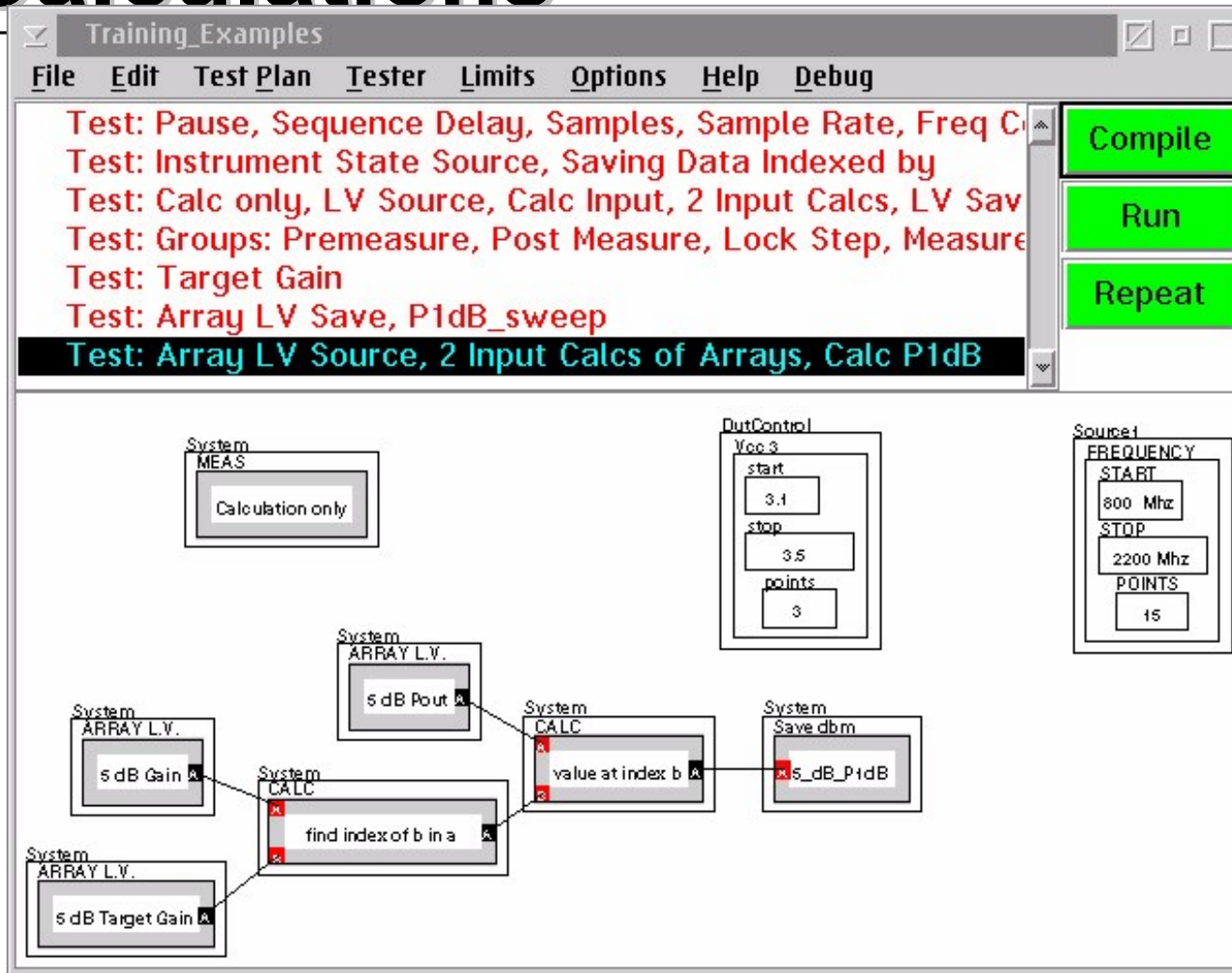
The block diagram below shows the test setup:

- Receiver MEAS:** Contains a 'Power' block.
- Source1 INSTR STATE SOURCE:** Contains a 'Power' block.
- System CALC:** Two blocks, each containing a 'dbm' block.
- System CALC:** A central block containing an 'a - b' block.
- System ARRAY L.V.:** Two blocks, one containing '5 dB Pout' and the other '5 dB Gain'.
- DutControl Vec 3:** Contains 'start' (3.1), 'stop' (3.5), and 'points' (3).
- Source1 POWER:** Contains 'START' (5 dbm), 'STOP' (-5 dbm), and 'POINTS' (11).
- Source1 FREQUENCY:** Contains 'START' (800 Mhz), 'STOP' (2200 Mhz), and 'POINTS' (15).

Connections in the diagram: The 'Power' block in Receiver MEAS is connected to the 'dbm' block in the top System CALC. The 'Power' block in Source1 INSTR STATE SOURCE is connected to the 'dbm' block in the bottom System CALC. Both 'dbm' blocks are connected to the 'a - b' block in the central System CALC. The 'a - b' block is connected to the '5 dB Gain' block in the bottom System ARRAY L.V. block.



Array Local Variables Calculations





Overview

Tester Viewer Panels

Device Control

Advanced Test Plan Buttons

Generic GPIB Instruments



Generic GPIB Instruments

Creating a new GPIB instrument
Configuring GPIB instrument
Using the Instrument in the testplan



Creating GPIB instrument

From the RI System message window, use menu
Test --> Instruments

From the Instruments Window, use menu
Instrument --> Add Instrument

Select "GPIB Instrument"

Enter the Title of the new instrument

Enter the Name of new instrument

Enter the GPIB Address



Configuring GPIB instrument

Activate the GPIB instrument then Startup the tester

Configure the active tester and select the GPIB instrument

GPIB address

Startup GPIB command string



Click here to type page title

The screenshot shows a software window with the following content:

- Window Title: D:\RIAPPS\testSys\Demo Configuration
- Menu: Instrument Tester Help
- Instrument List:
 - Aux Sig Gen, Agilent E4438C Transient 0
 - DutControl, Ri7420C Dut Control 0
 - Fixture, Cables Transient 9
 - gainCompression, RI7800D Gain Compression Meter 0
 - intermod, RI7805C Intermod Inst 0
 - IQMeter, Ri7806A IQ Meter 0
 - noiseFigure, RI7801B Noise Figure Meter 0
- GPIB field: 14
- StartUp field: (empty)



Using GPIB Instrument in the testplan

State button

Initialize

Write, Write 2, Write 3, Write 4

Read Size

Read Command

Measure Button

MEAS Read String

MEAS Read Number



Click here to type page title

D:\RIAPPS\testSys\Demo Editor

Instrument Measurements Help

Aux Sig Gen state
DutControl measure
Fixture
gainCompres
intermod
IOMeter

Write

Write 2

Write 3

Write 4

Initialize

Read Size
20

Read Command



Click here to type page title

D:\RIAPPS\testSys\Demo Editor

Instrument Measurements Help

Aux Sig Gen state
DutControl measure
Fixture
gainCompres
intermod
IOMeter

Read a string from the GPIB instrument, using the ReadCommand command string.

MEAS
Read String A

MEAS
Read Number A



Overview

Tester Viewer Panels

Device Control

Advanced Test Plan Buttons

Generic GPIB Instruments

Questions?



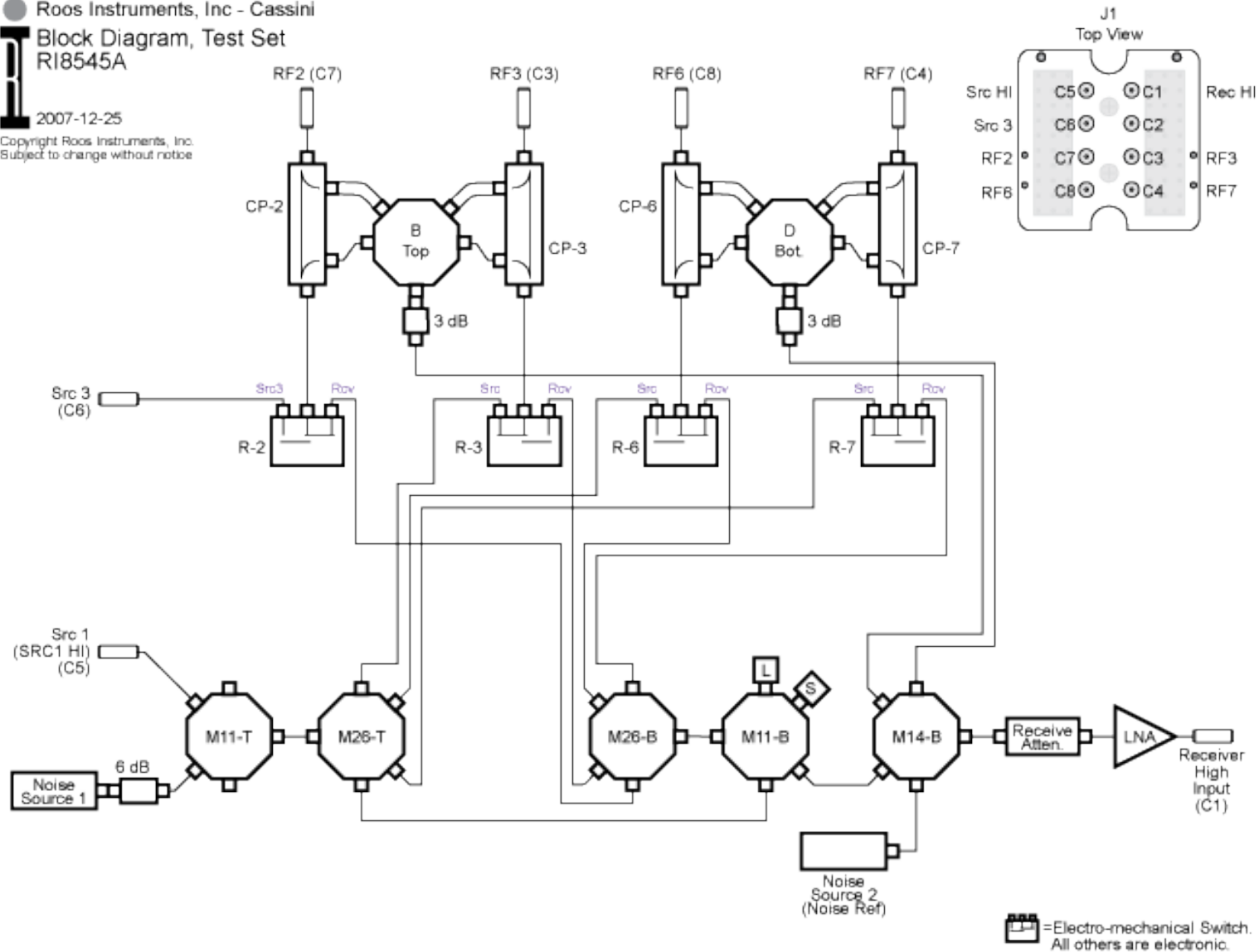
Testset Block Diagram

Roos Instruments, Inc - Cassini

Block Diagram, Test Set
RI8545A

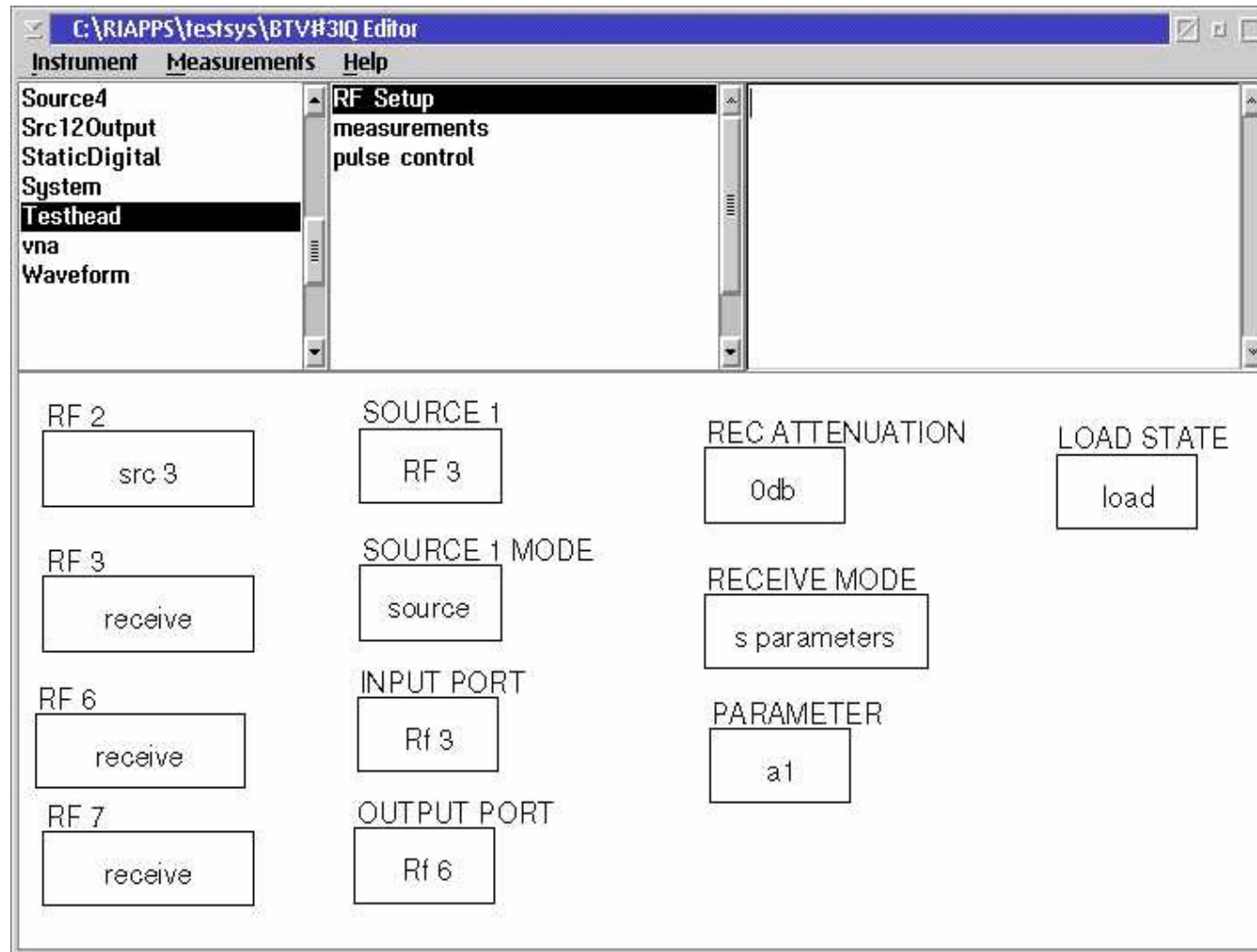
2007-12-25

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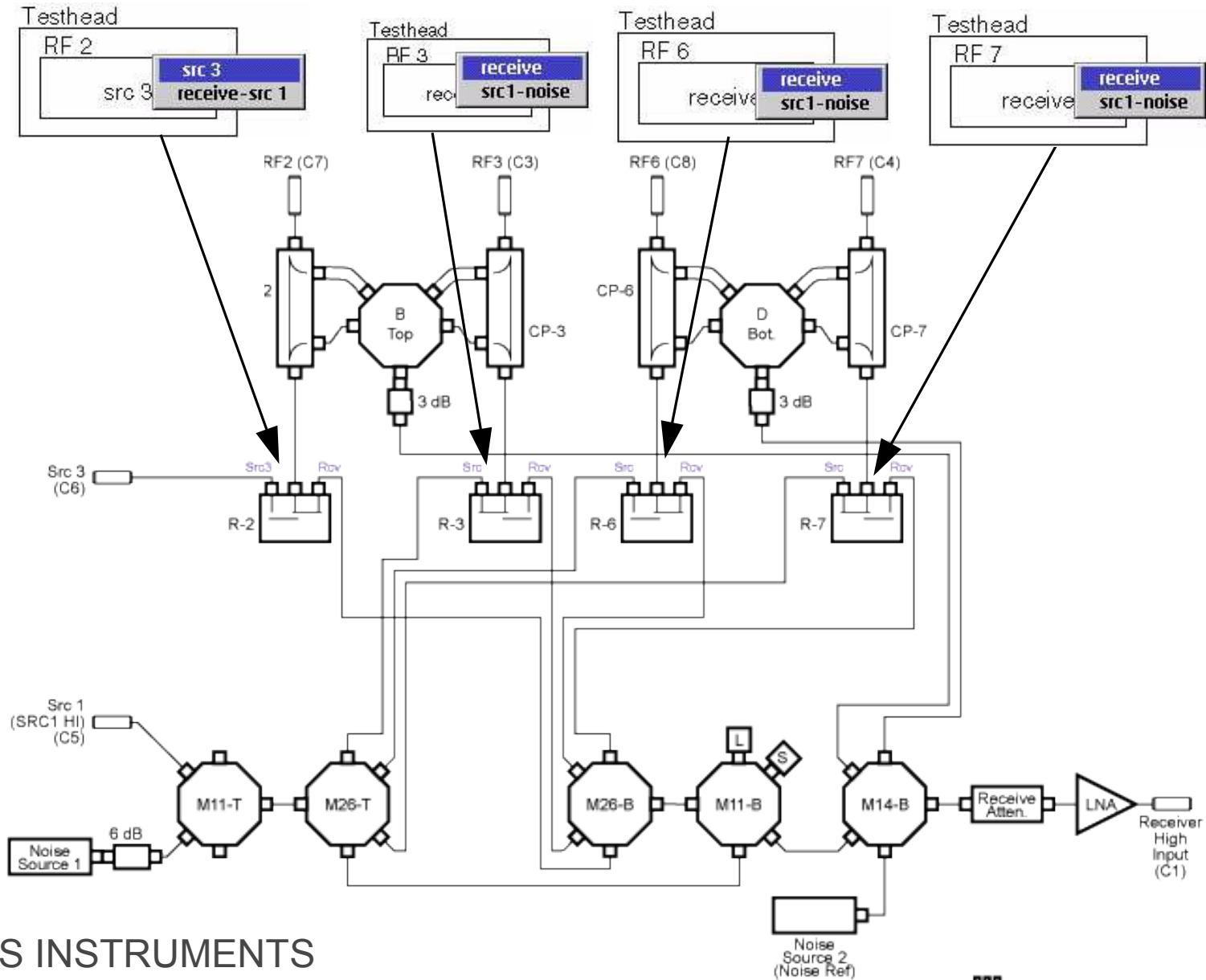


Testhead & Testset Editor



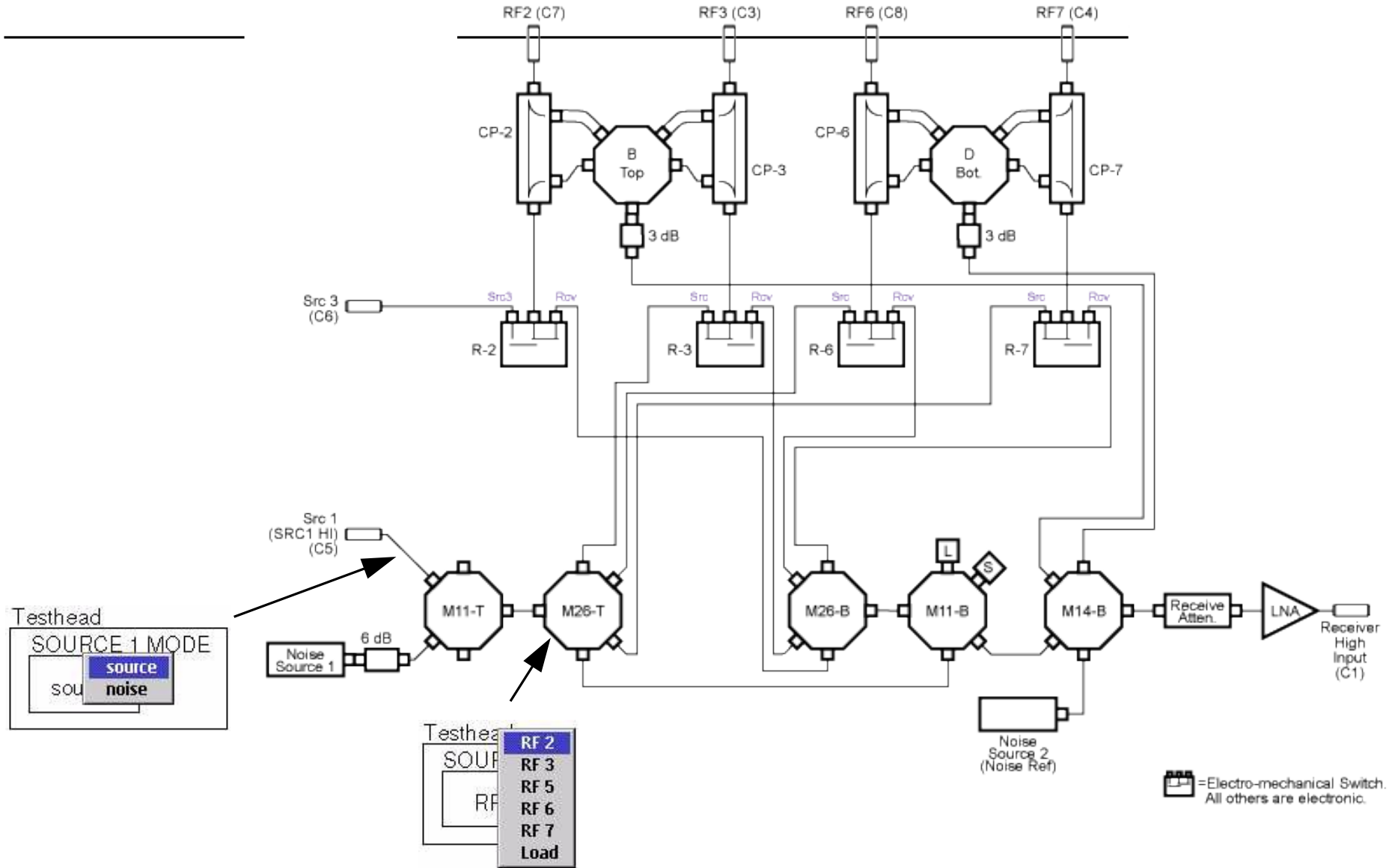


Port Set-up



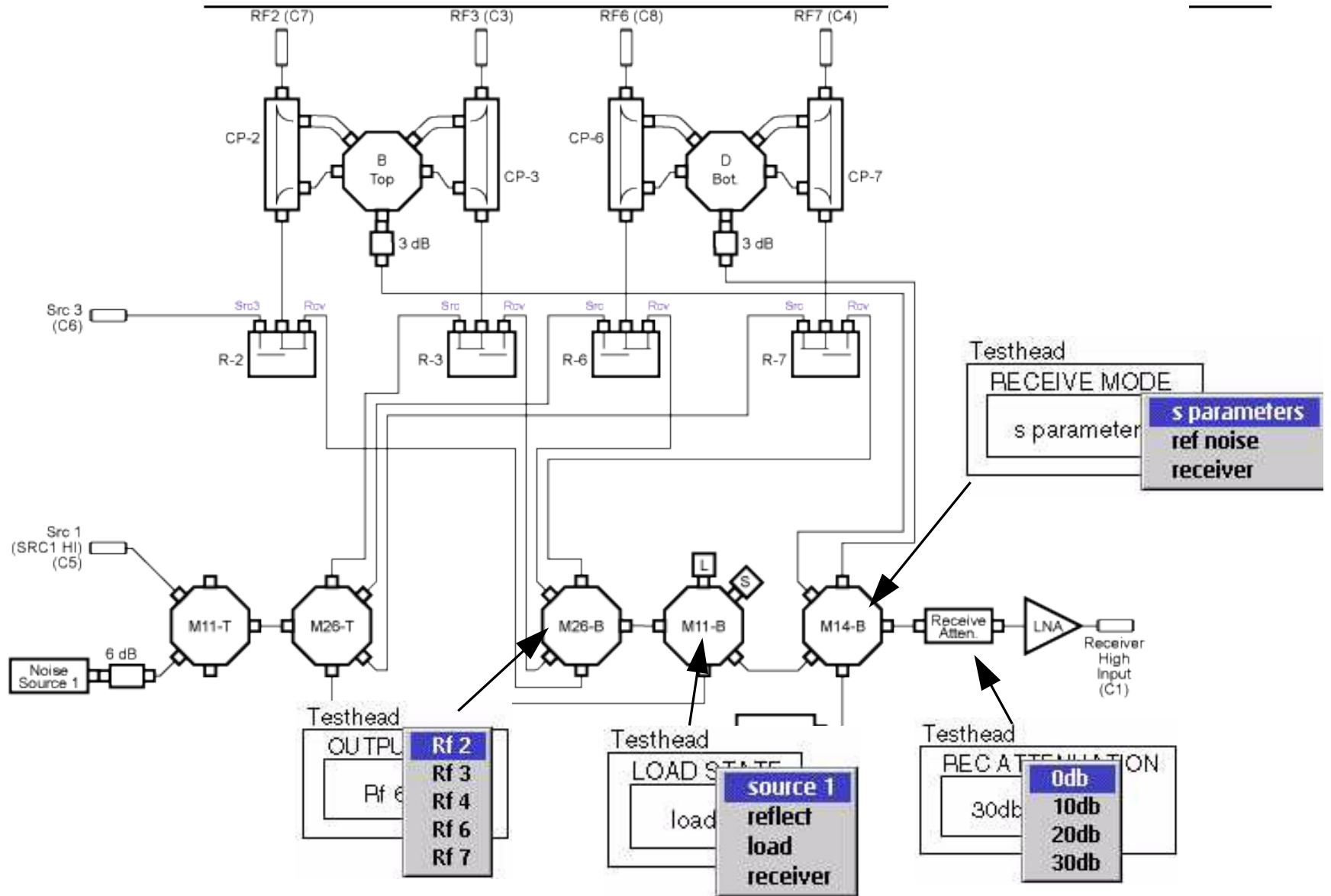


Stimulus





Receive





Sampled Waves

