Roos Instruments, Inc.

CASSINI

RF ATE System

Basic Operations

Training Seminar

Cassini Basic Seminar Outline

- **Operation and Troubleshooting**
- System Administration and Maintenance
- Basic test Plan Concepts
- Science of RF Measurement
- Device Definitions
- Example Application Development
- Test Fixture and Device Interface Design
- Test Design & Best Practice Test Optimization
- Application User Guides

Chapter 1 Outline

- **System Power On and Off**
- RF Fixture & DUT Board
- Docking with a Handler
- System Controller
- Guru Log-on, Applications
- Test Executives
- System Hardware
- Troubleshooting

RI ATE System Architecture

- Simple Direct Measurements
- Packaged or Wafer

Cassini Architecture

- Infrastructure
  - System Rack (Large or Small)
  - System Power Supply
  - System Controller with RIFL III
  - RF Test Head (8 or 16), Fixture and DUT Interface
- Rack Modules
  - System Receiver
  - RF Sources
- Test Instrument Modules (TIMs)
  - Testset (banded from 6 GHz to 120 GHz)
  - Digital, DC and RF Instruments

Operating the System

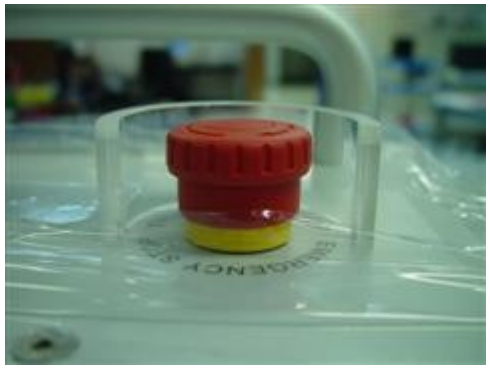
- System power up sequence
- Using Fixture and DUT Board
- Docking with a Handler
- Using the System Controller (RIFL, eCS)
- Start and Stop RI System software
- Using Guru and the RI System Software

Starting and Stopping the System

- Check all power cables are connected
- Turn the MAIN POWER to ON
  - Switch on PCU & 48V Distribution Panel
- Turn on system controller and monitor(s)
- Wait 20 minutes
- Fixture should NOT be connected
- Emergency Off

Power Supply Switches

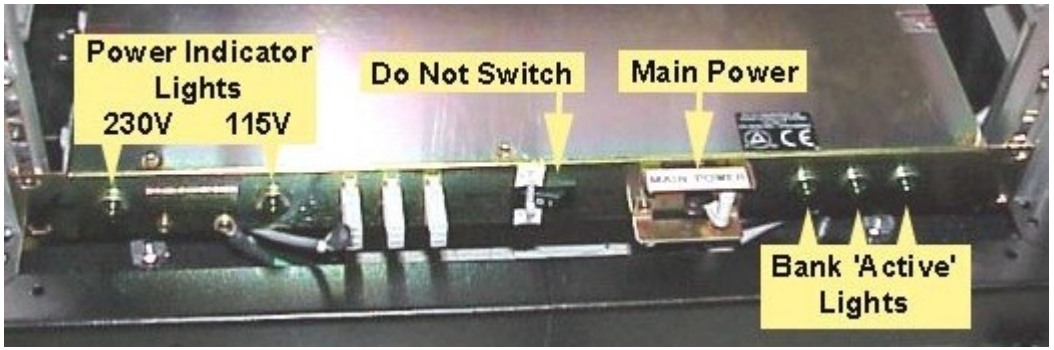
Cassini 16



Power Supply Switches

Small Cassini

Large Cassini



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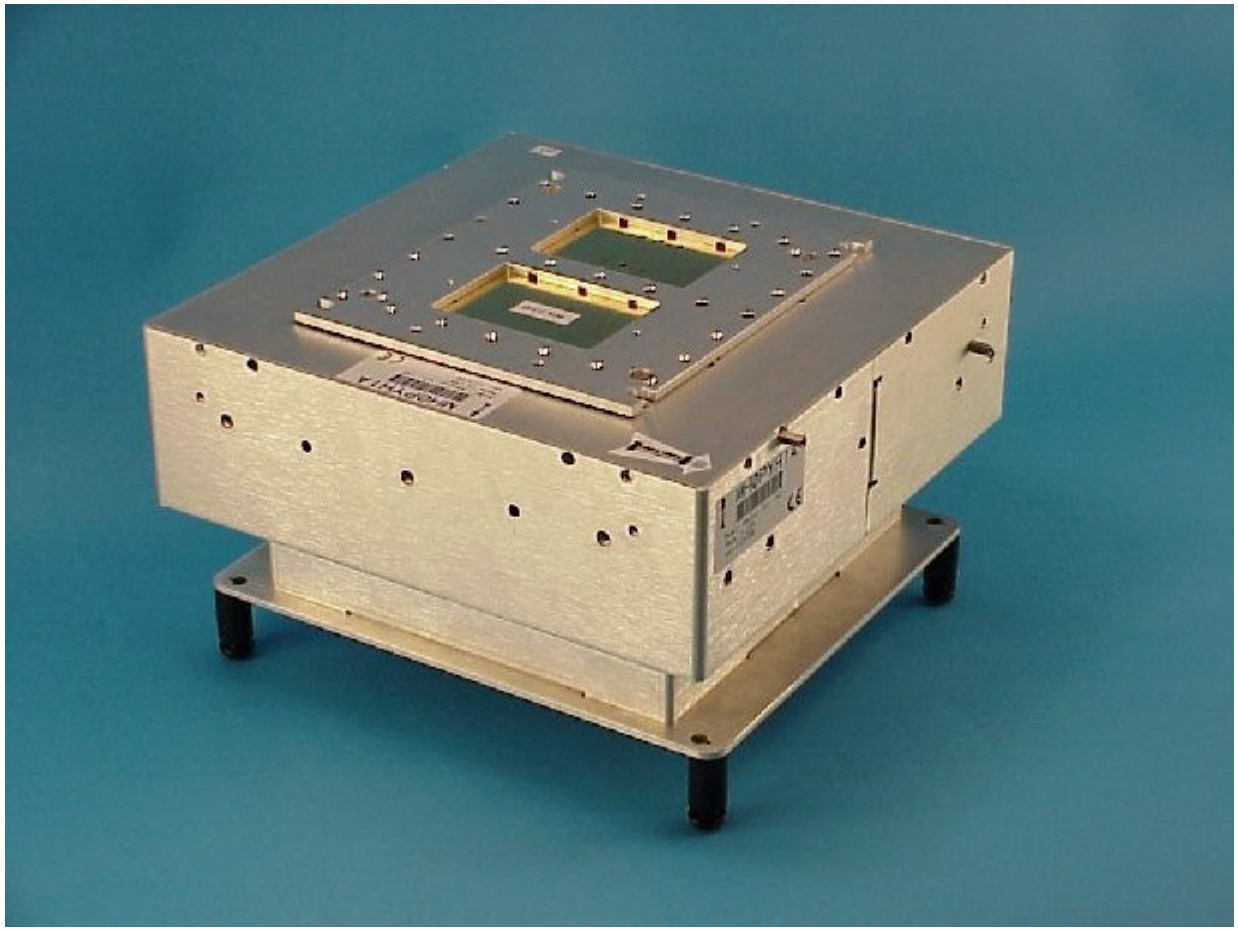
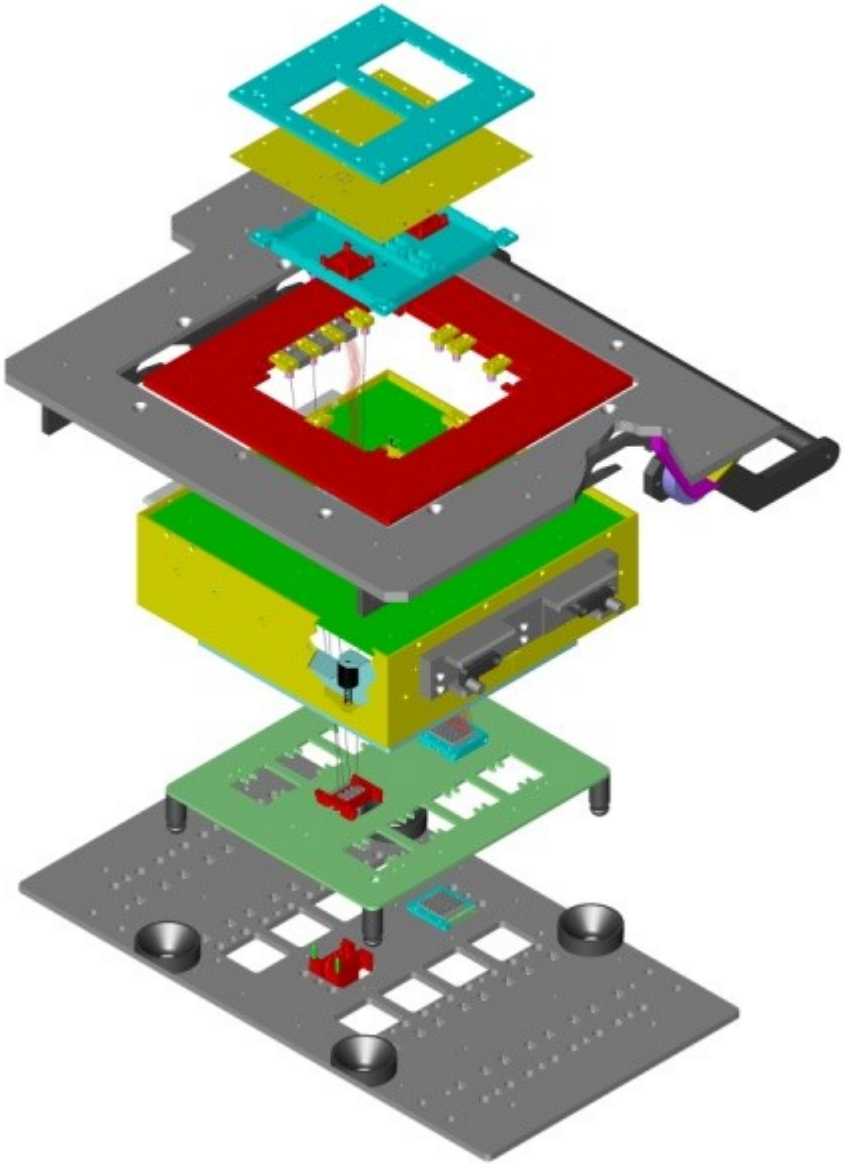
Using the RF Fixture & DUT Board



RF Fixture Layers



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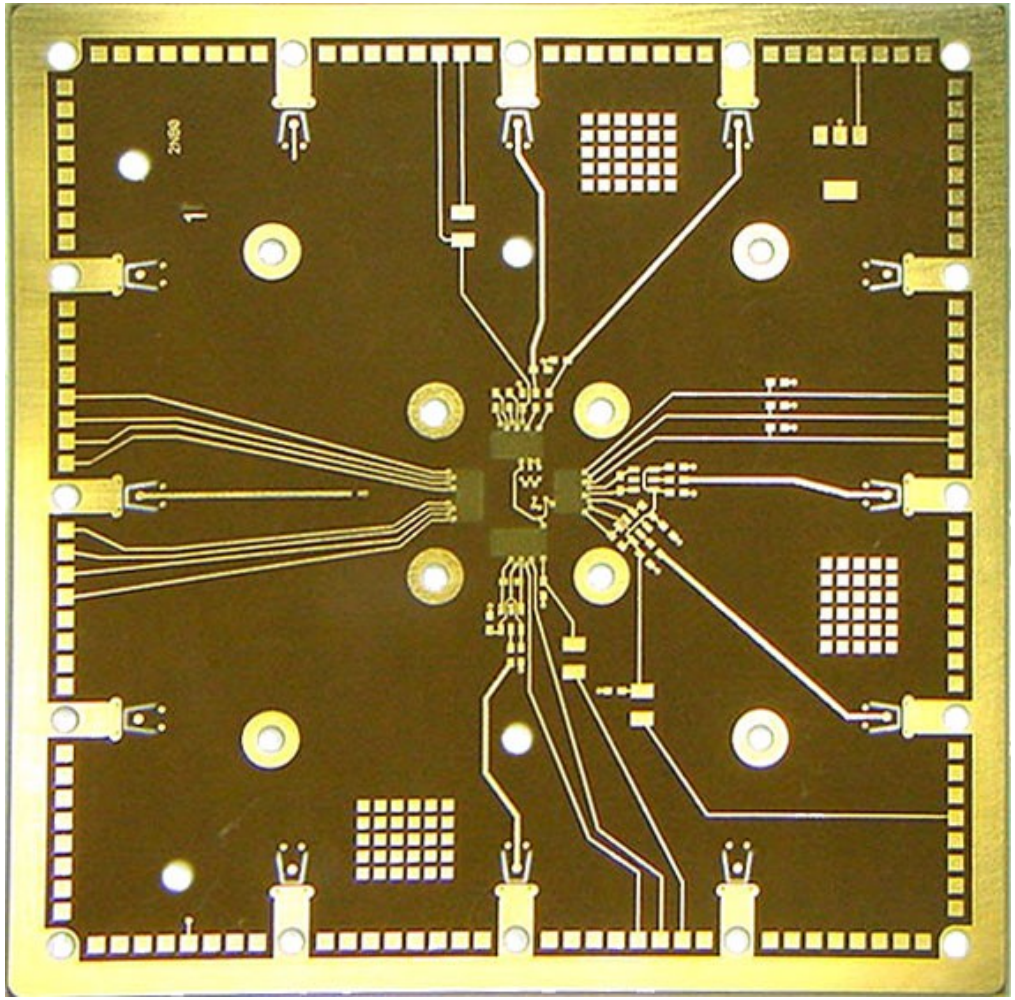
DUT Interface Board



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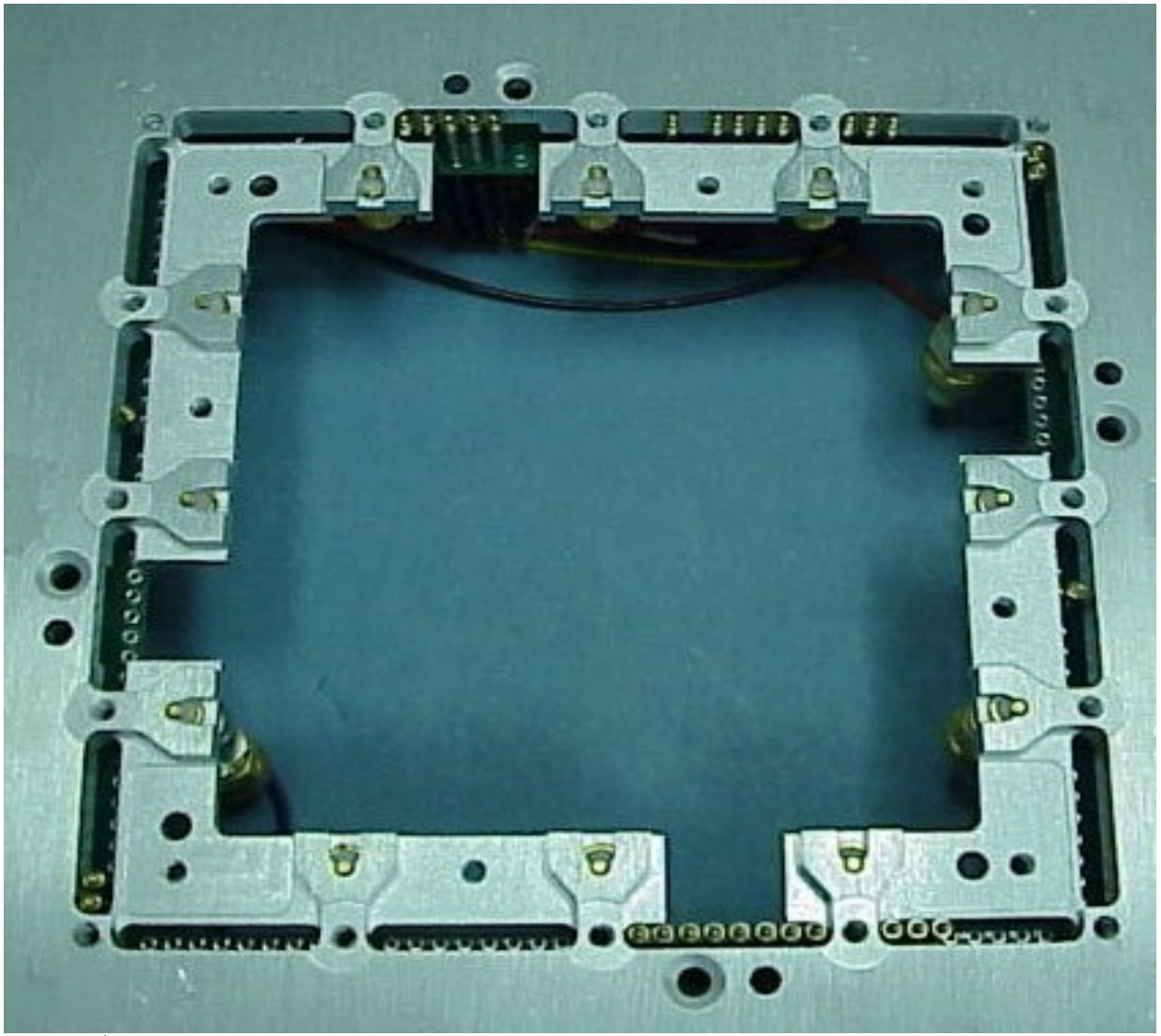
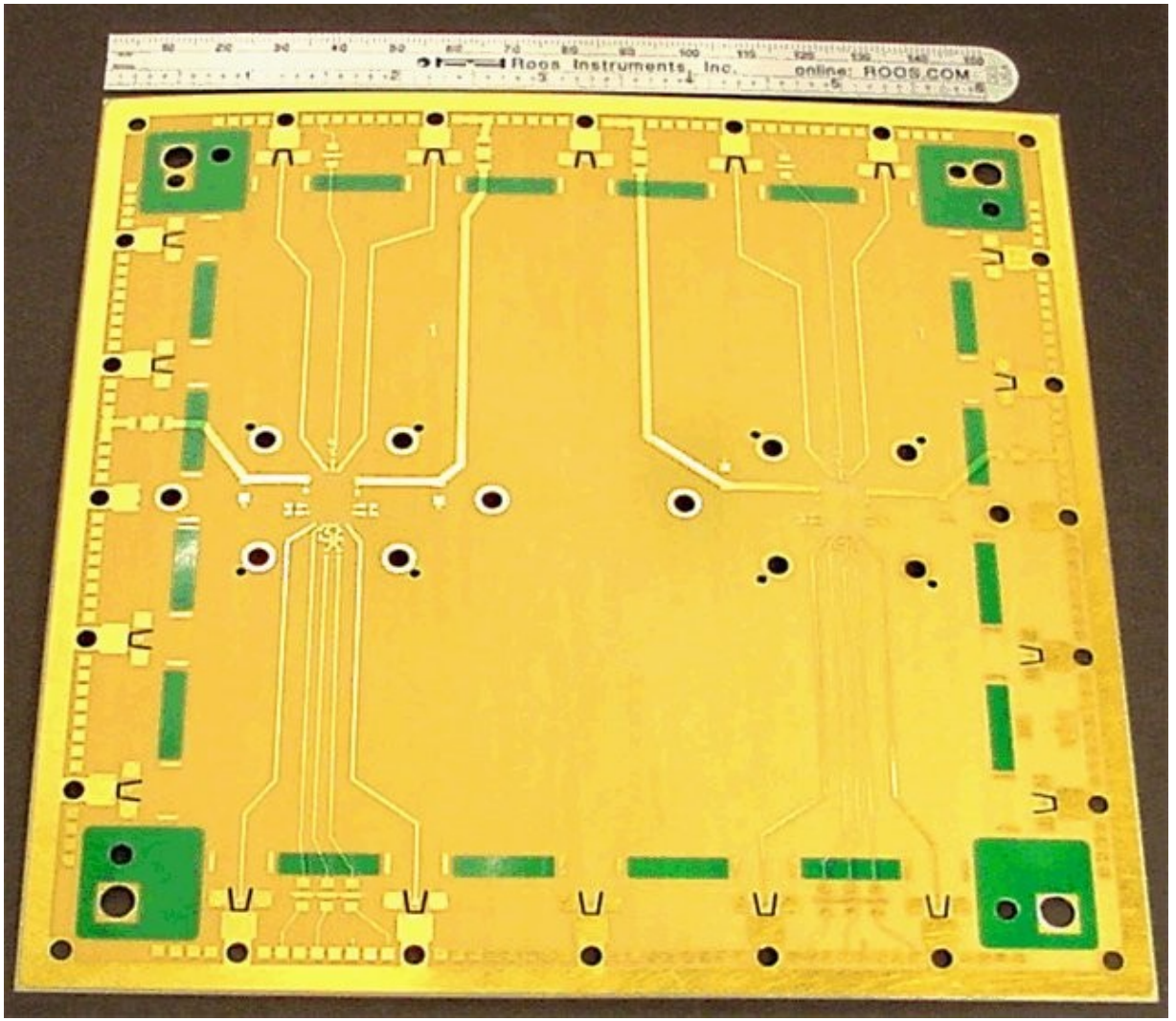
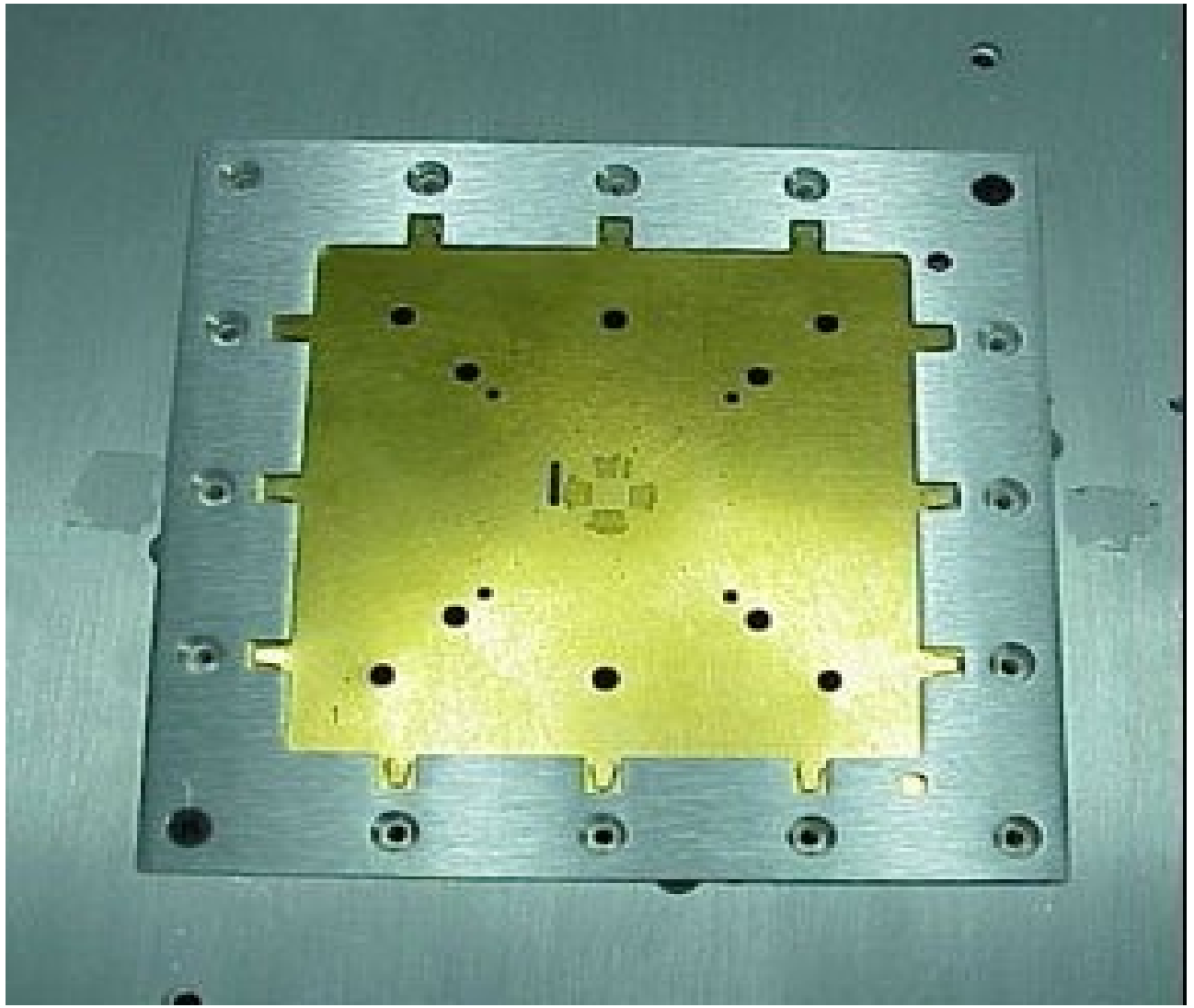
Fixture Top Plate



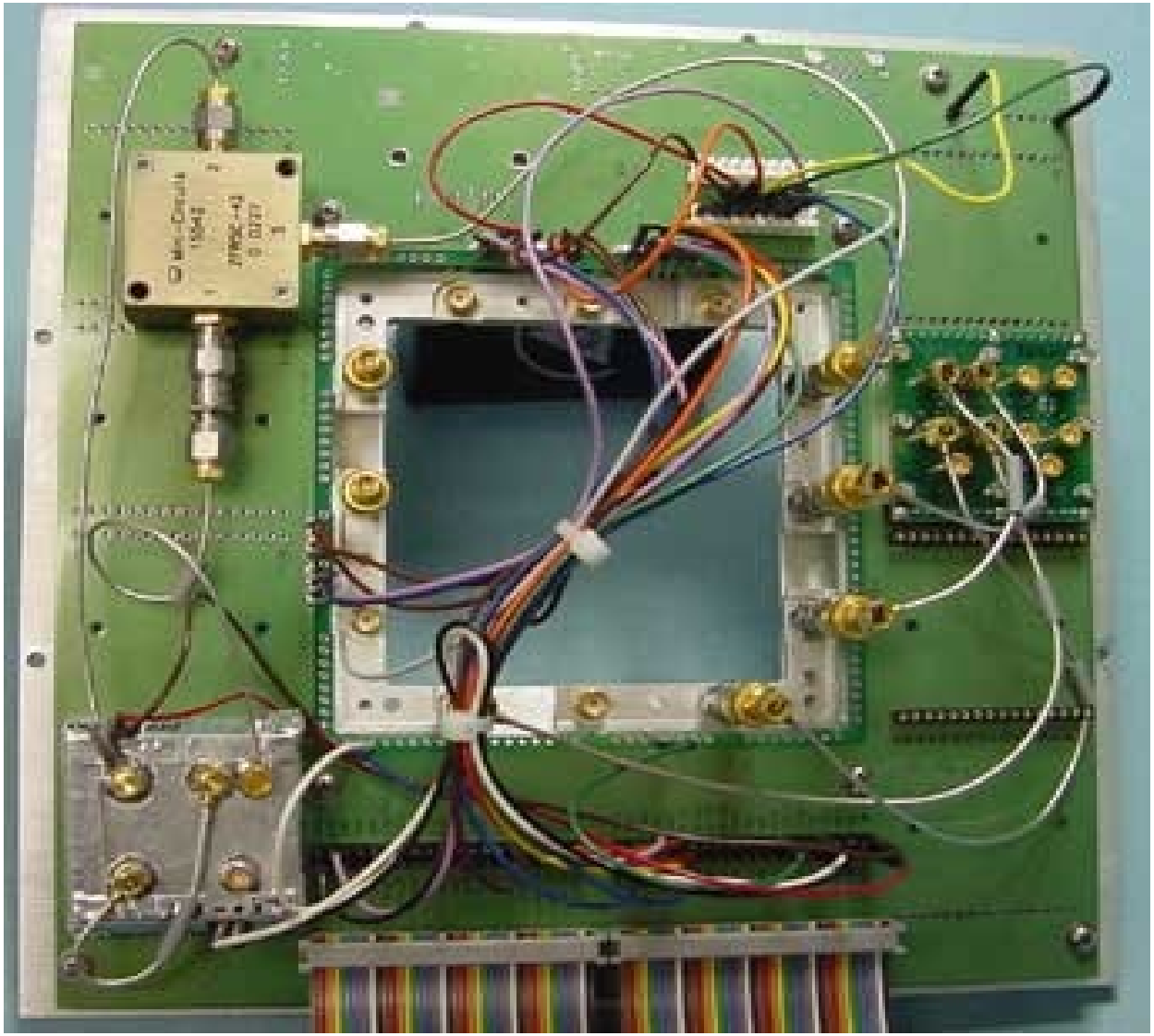
Dual Site DUT Interface Board



DUT Board Frame



Fixture Module Expansion



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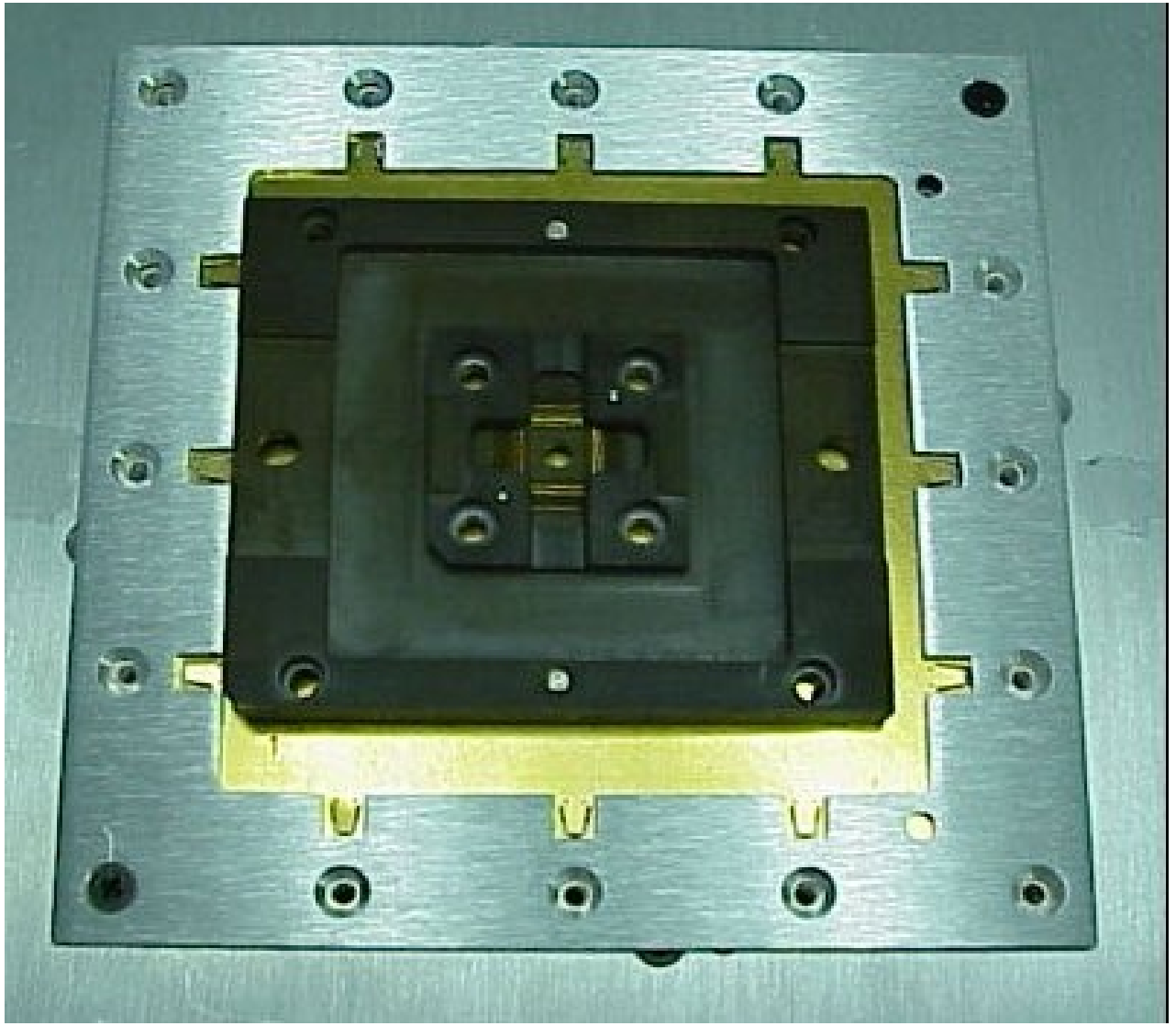
Socket in a Fixture



Docking with a Handler

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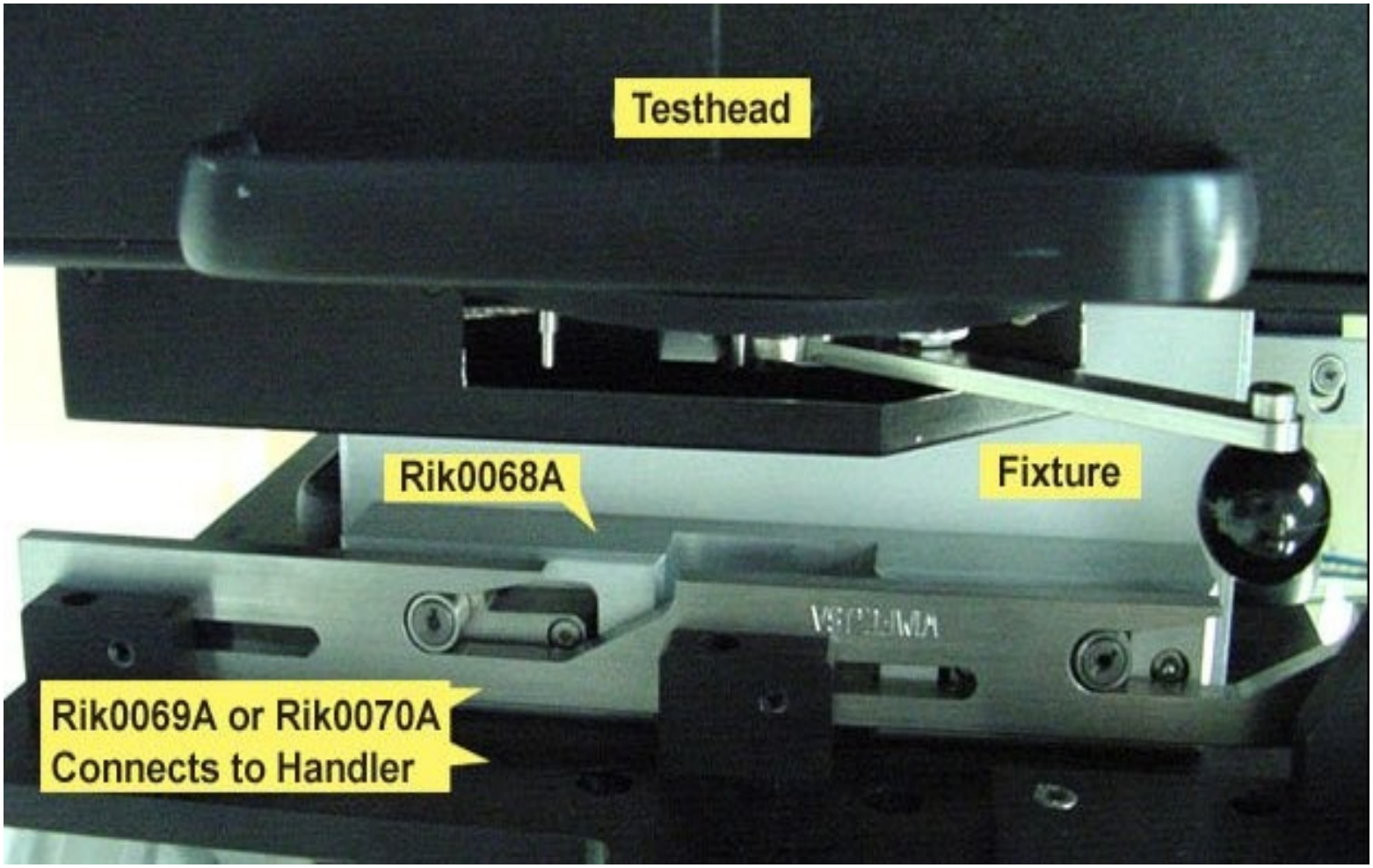
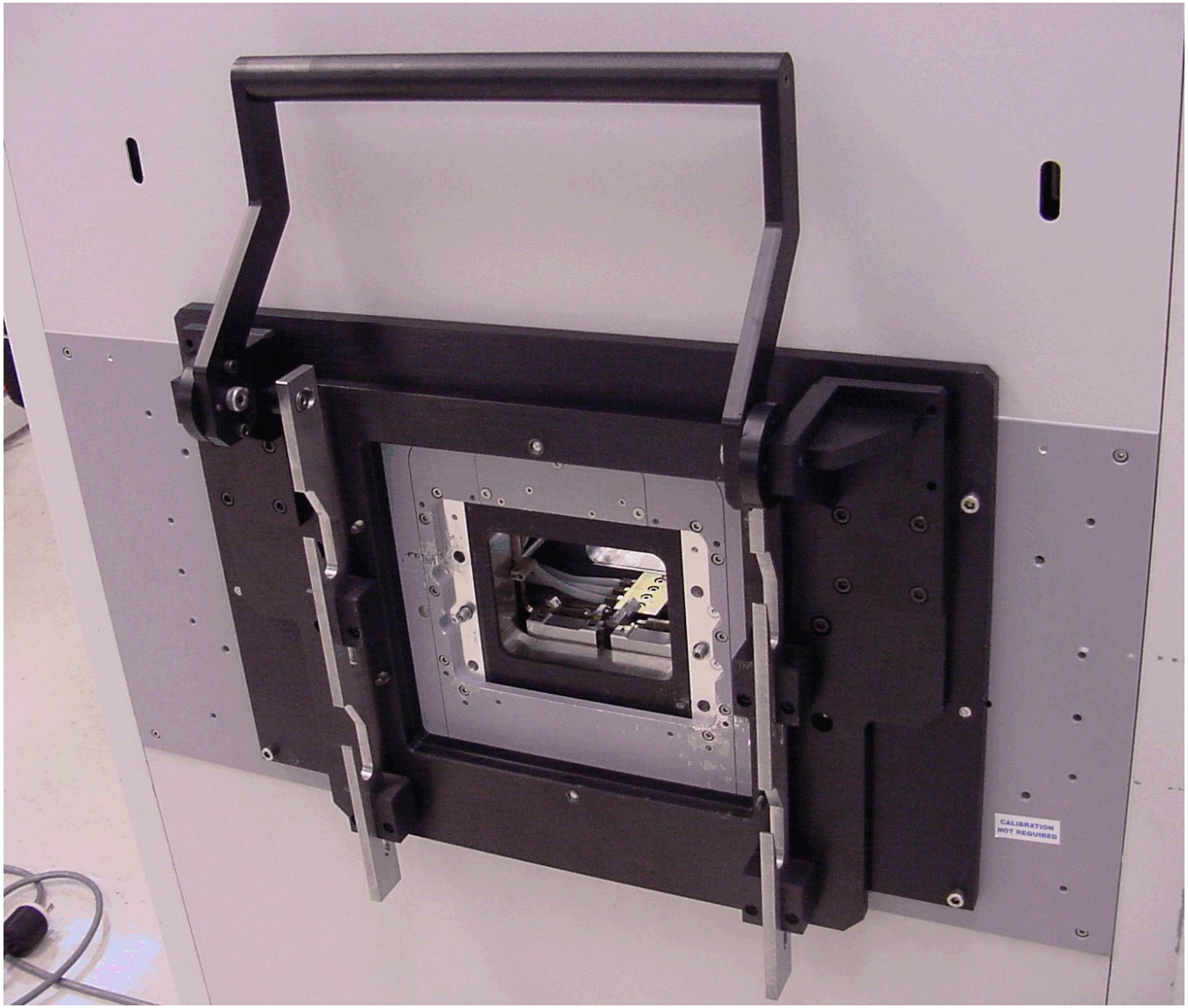
Handler Docking Option



Docking Plate



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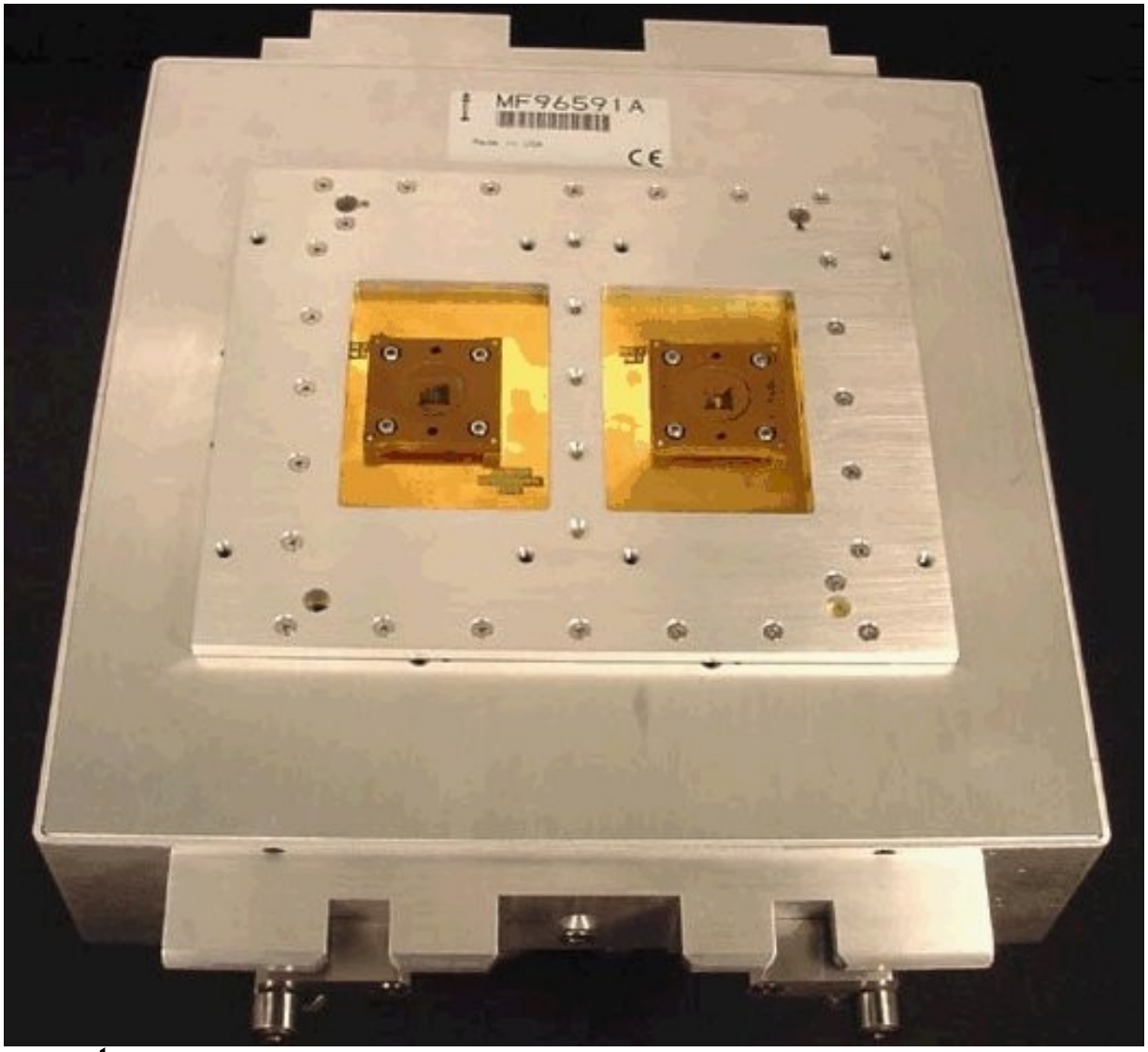
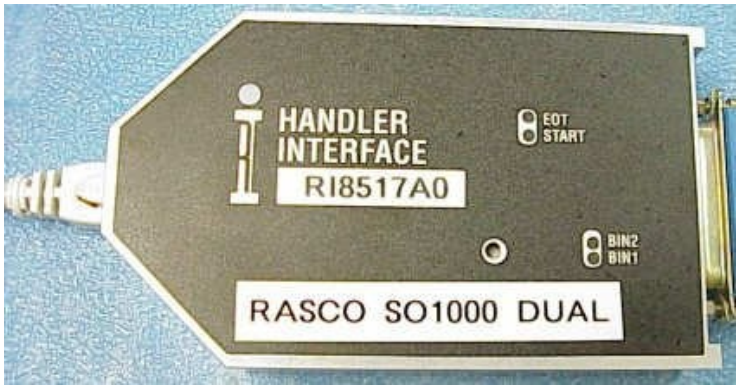
Dual Site Fixture



Hander Interface Pod

- Plug and Play
- Configurable to work with any Handler
- Custom wiring by Customer



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Using System Controller and RIFL

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System Controller Functions

- User Interface
- System Management
- Test Plan Generation & Execution
- Measurement Control and Signal Processing
- Data Analysis

System Controller Contents

- x86 based Computer (embedded or tower)
- eCS Operating System
- RI System Software
- RIFL Bus (RI Fiber Link)
  - Three Generations (I,II,III)

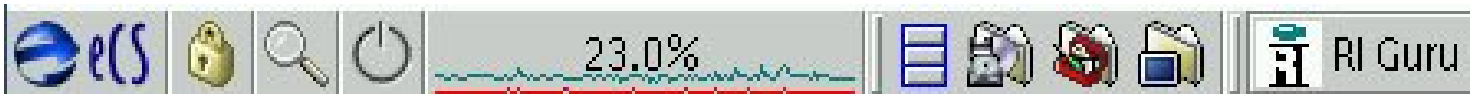
RIFL II and III

- Cassini & RI7100A Gen 3 RI ATE System Communication and Control
- RIFL II and RIFL III connectors
- RI Interface Dongle plugs into System Computer's Parallel Port
- RI Instrument Control thru RIFL II Decoder Module
- External GPIB control through RIFL II to GPIB Interface Pod
- Plug and Play auto configuration of RIFL Nodes
- Scheduled Timing and Event Control with 1 µsec resolution

History of RIFL

- 1st and 2nd Generation RI ATE System Communication and Control
- RI Fiber-optic Link (RIFL) Communication protocol
- RI Interface ISA PC Card Plugs into System Computer ISA Bus
- RI Instrument Control thru RIFL Decoder Modules
- External GPIB control through RIFL to GPIB Interface in the System Receiver

Using OS/2 on the System Controller



Activity Monitor
Displays processor activity as a Moving strip chart

OS2 Icon
Opens an OS2 (DOS) Window.

Drives Icon
Left click to expand Into sub-directory. RMBC to open window of that directory.

System Software

- Graphical User Interfaces
- Production Package Part Test Executive
- Viewers and Data Saving
- Handler Control
- On Screen Help

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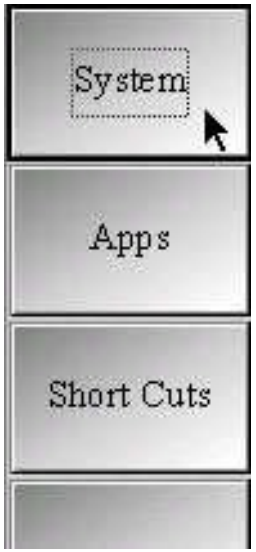
Start Up and Shut Down of RI System Software

To Log-on...

To Log-off...



Control with the Mouse and Keyboard

- System Control button
- Close button
- Max, Min buttons
- Window List

Mouse Basics

- Left Mouse Button
- Right Mouse Button

Mouse Shortcuts

- Copy RI Button ([CTRL] + Left)
- Select and Paste (Right)

OS/2 Utilities (Zip &Unzip)

- Long File Names & Extensions
- Zip/Unzip

Starting and Stopping RI System

- Click “Apps” or “Short Cuts” button
- System/Quit to exit
- Check that System is started
- Check that Fixture is docked

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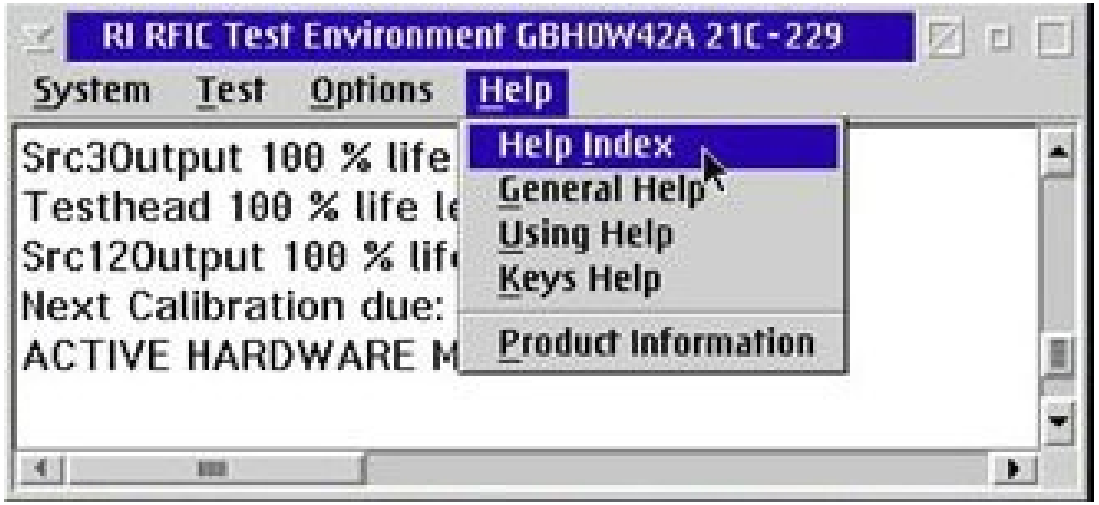
On-Screen Help

- Context sensitive help for each object
- Searchable help system for browsing
- Function key support for pointer location
- User notes are definable for every panel
- Hierarchical buttons with user definable notes

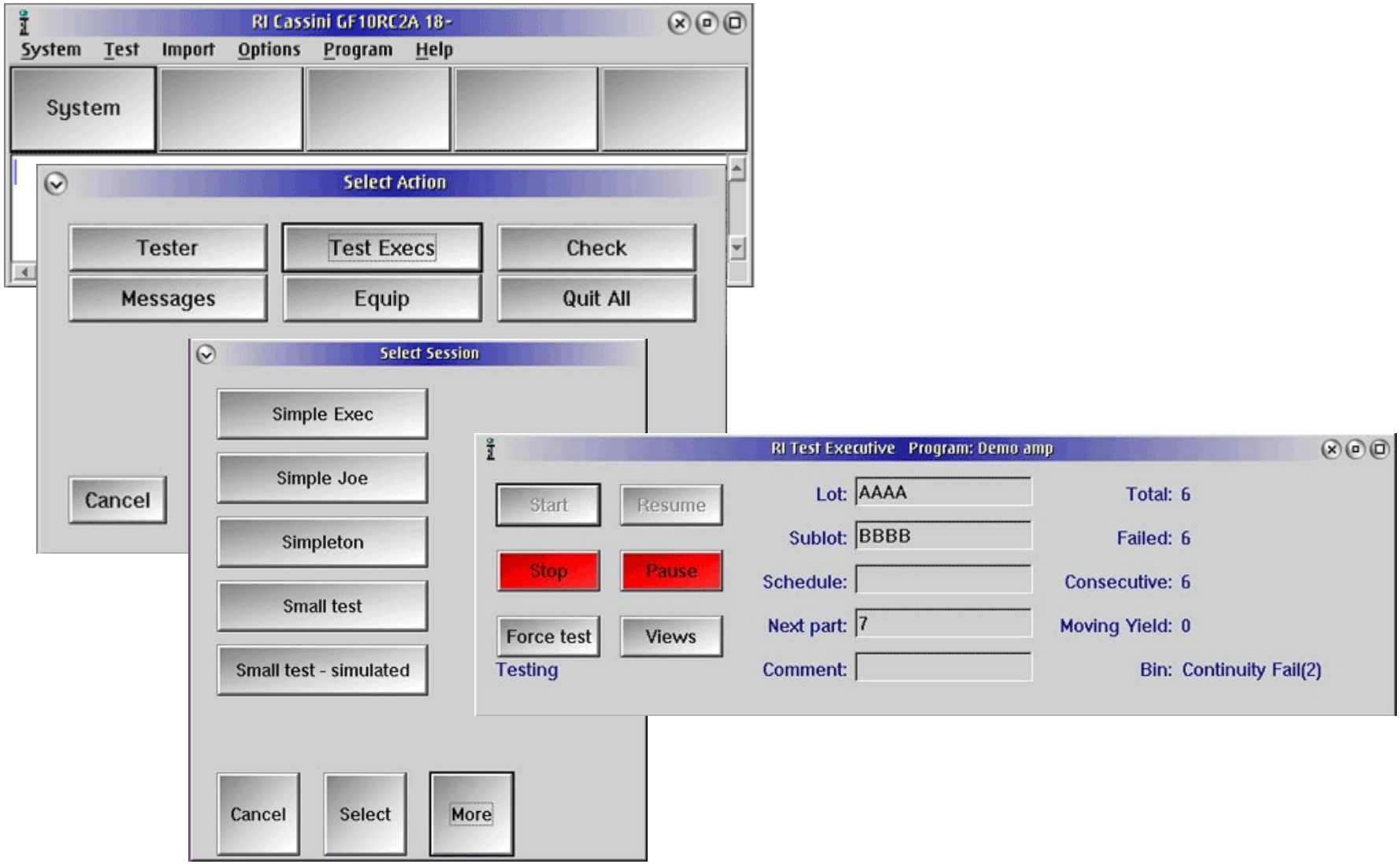


Testing Devices

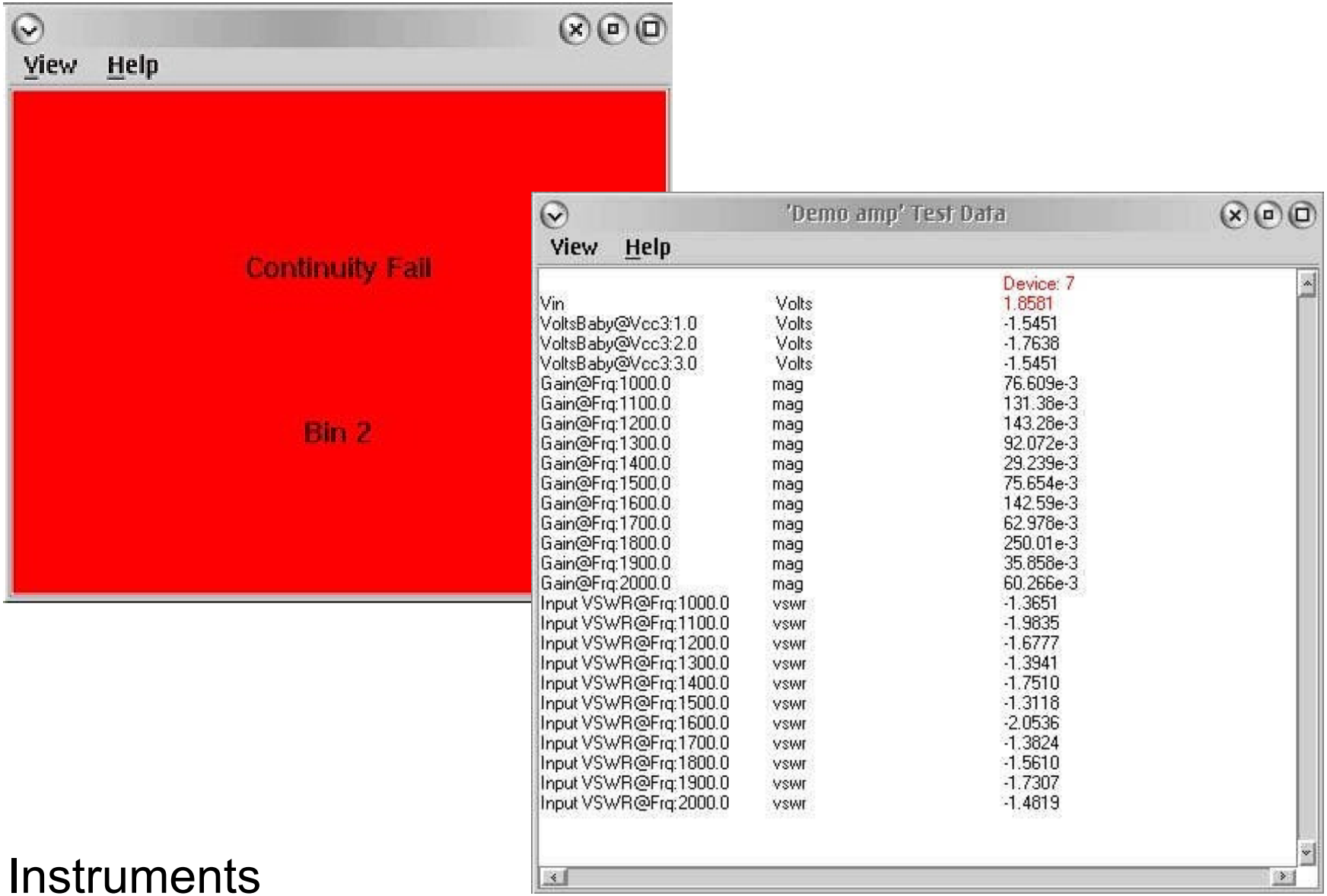
A. Testplan defines "what" to test
   1. Measurements performed
   2. Values of instruments during test
   3. Order of tests
   4. Values of limits checked for pass/fail

B. Test Exec defines "how" to test it
   1. Handler control and interaction
   2. Operator user interface
   3. Definition of bins (soft and hard)
   4. Logging of test data

Locating Test Plans

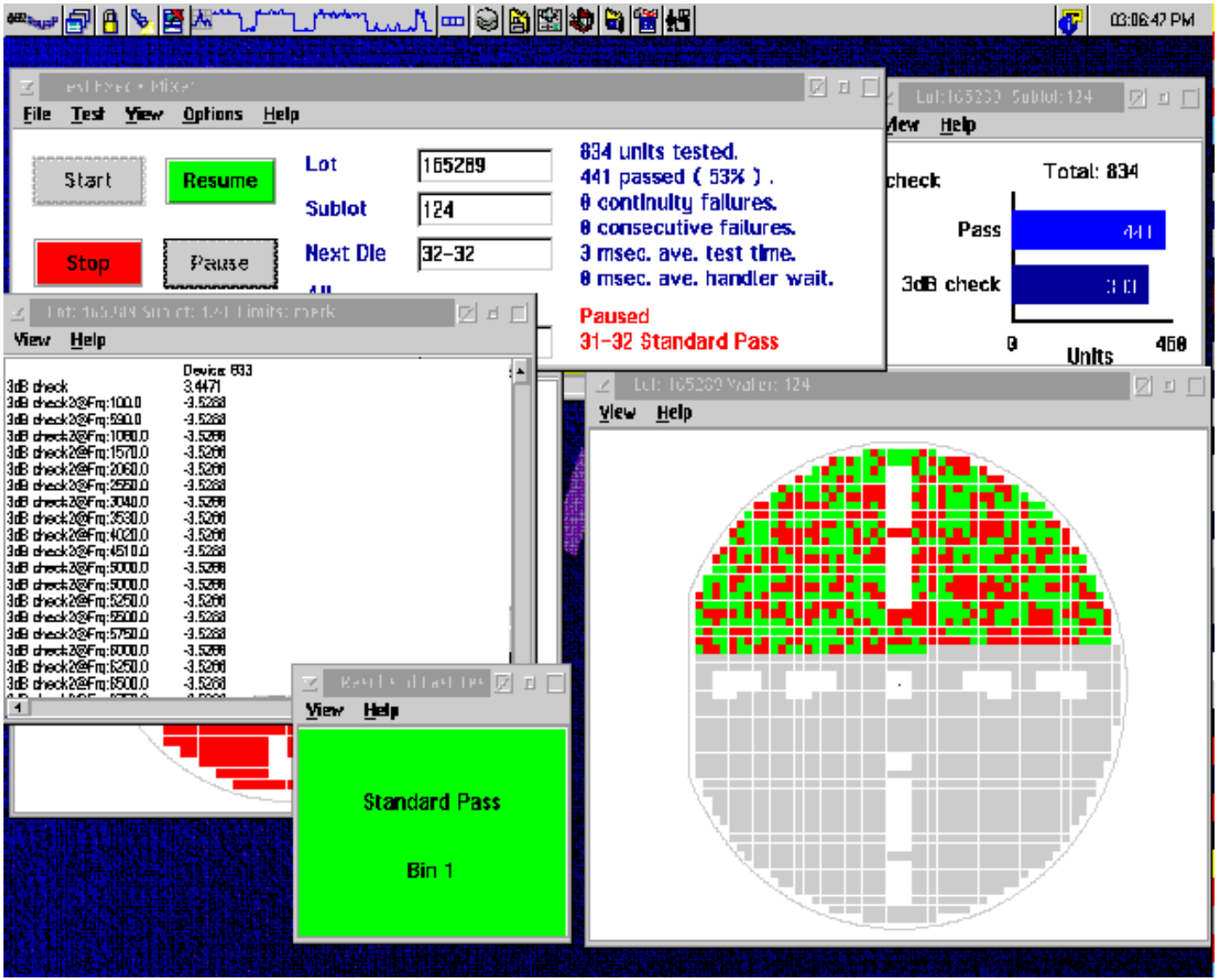


Test Executive Results



		Device: 7
Vin	Volts	1.8581
VoltsBaby@Vcc3:1.0	Volts	-1.5451
VoltsBaby@Vcc3:2.0	Volts	-1.7638
VoltsBaby@Vcc3:3.0	Volts	-1.5451
Gain@Frq:1000.0	mag	76.609e-3
Gain@Frq:1100.0	mag	131.38e-3
Gain@Frq:1200.0	mag	143.28e-3
Gain@Frq:1300.0	mag	92.072e-3
Gain@Frq:1400.0	mag	29.239e-3
Gain@Frq:1500.0	mag	75.654e-3
Gain@Frq:1600.0	mag	142.59e-3
Gain@Frq:1700.0	mag	62.978e-3
Gain@Frq:1800.0	mag	250.01e-3
Gain@Frq:1900.0	mag	35.858e-3
Gain@Frq:2000.0	mag	60.266e-3
Input VSWR@Frq:1000.0	vswr	-1.3651
Input VSWR@Frq:1100.0	vswr	-1.9635
Input VSWR@Frq:1200.0	vswr	-1.6777
Input VSWR@Frq:1300.0	vswr	-1.3941
Input VSWR@Frq:1400.0	vswr	-1.7510
Input VSWR@Frq:1500.0	vswr	-1.3118
Input VSWR@Frq:1600.0	vswr	-2.0536
Input VSWR@Frq:1700.0	vswr	-1.3824
Input VSWR@Frq:1800.0	vswr	-1.5610
Input VSWR@Frq:1900.0	vswr	-1.7307
Input VSWR@Frq:2000.0	vswr	-1.4819

Wafer Probe Exec



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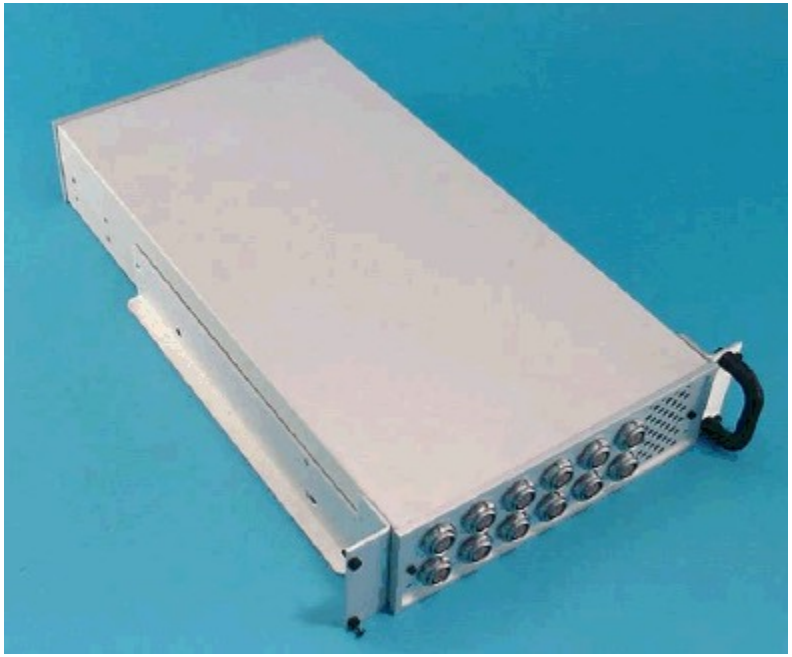
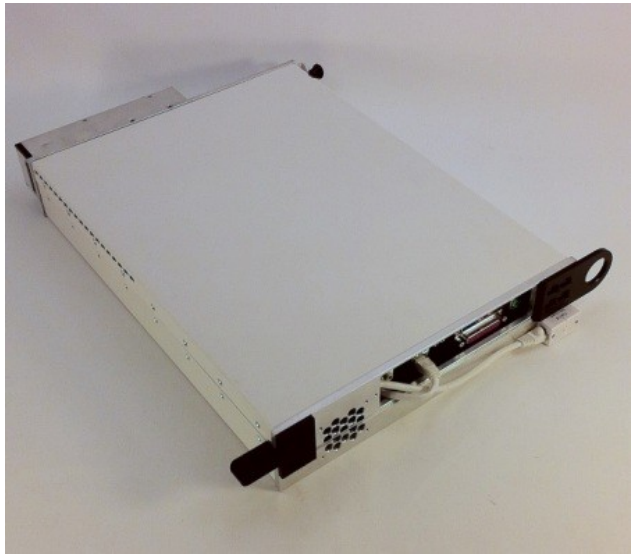
Cassini Architecture

- Infrastructure
  - System Rack (Large or Small)
  - System Power Supply
  - System Controller with RIFL II
  - RF Test Head, Fixture and DUT Interface
- Rack Modules
  - System Receiver
  - RF Sources
- Test Instrument Modules (TIMs)
  - Testset
  - DC and RF Instruments

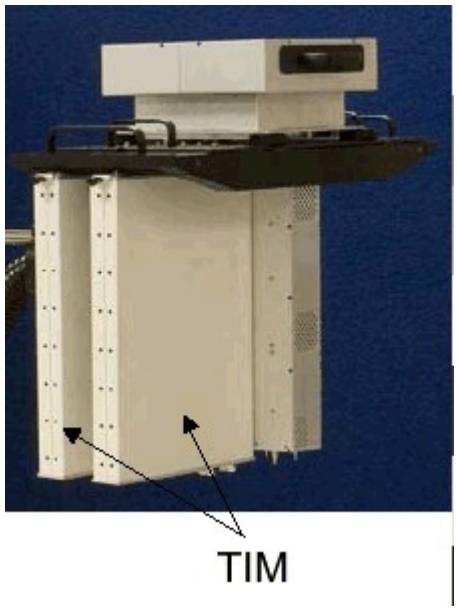
Cassini Infrastructure

- Cassini Small or Large
- RIFL Hub
- System Controller





Test Head Configurations (TIMs)



8 Slot

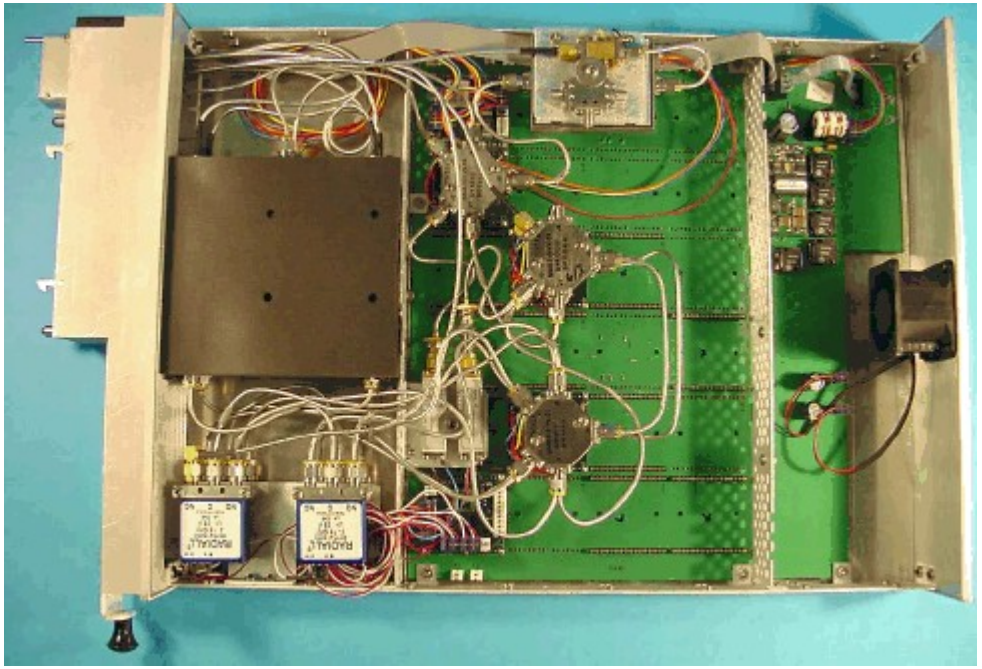
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot

16 Slot

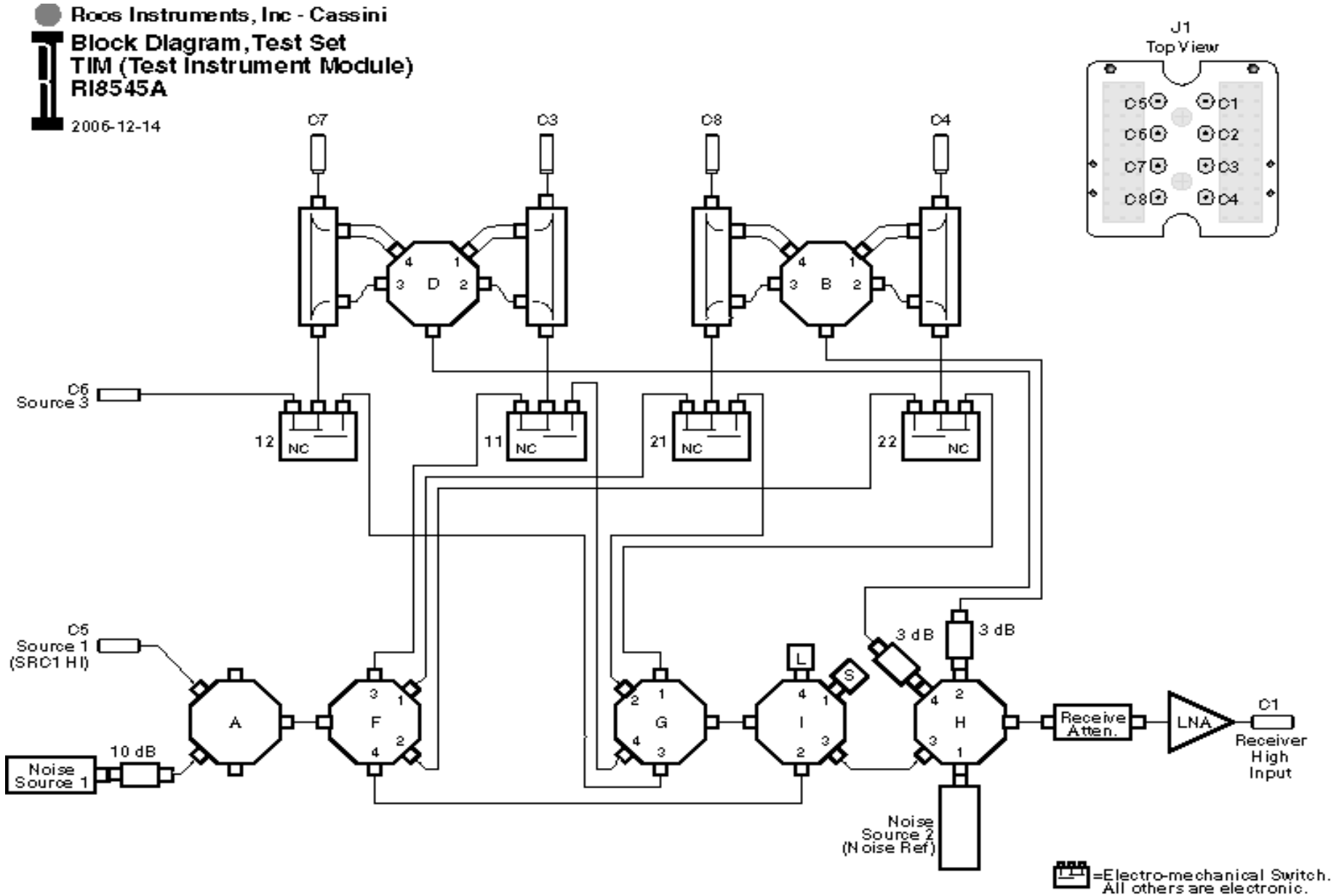
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot
TIM Slot	TIM Slot

Typical Testset TIM

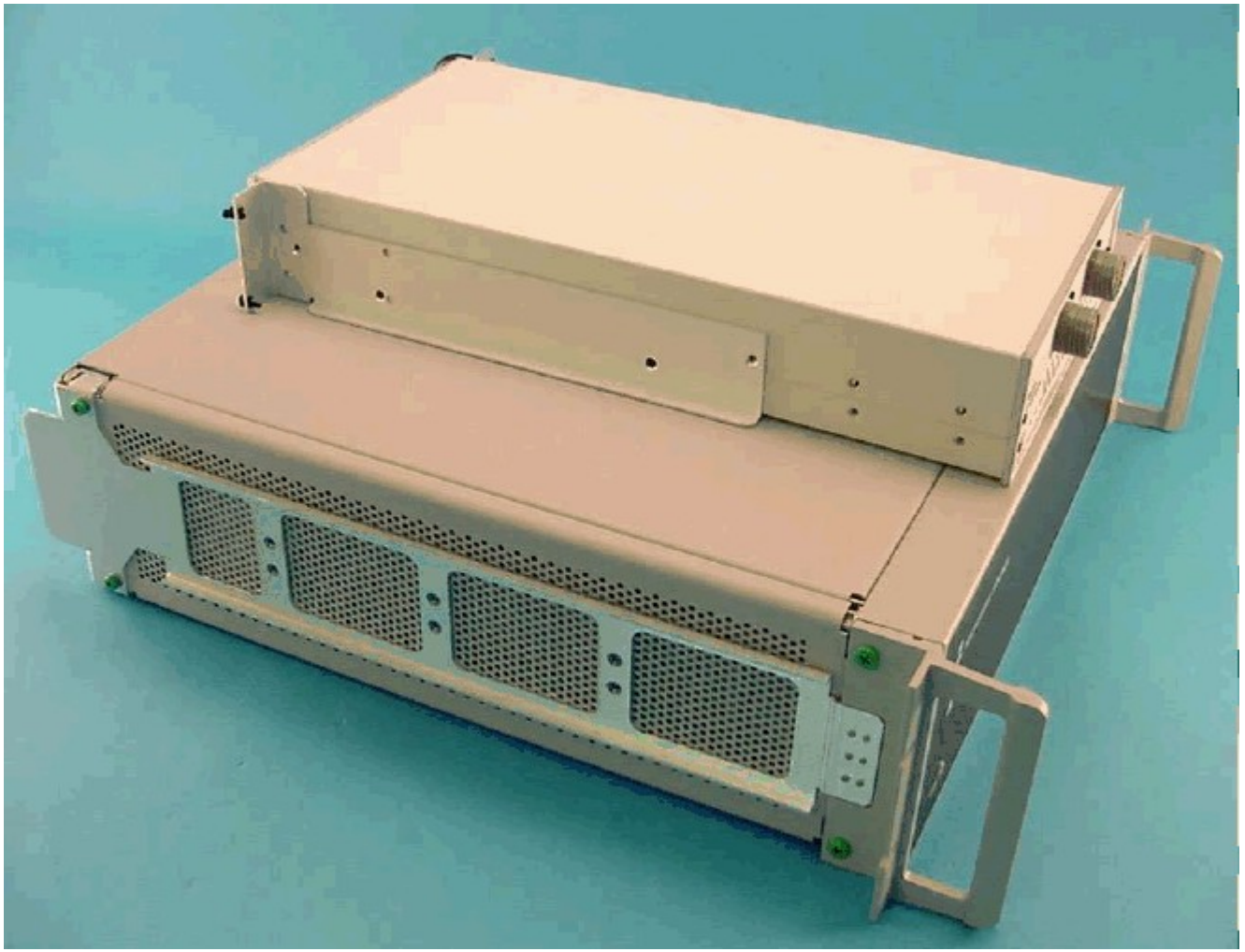
- 4 ports
- External CW Synthesizer
- External DMSG
- External Receiver
- 20 GHz RF Testset
- Same Hardware as RI7100A RF



Typical Testset TIM



Cassini Receiver



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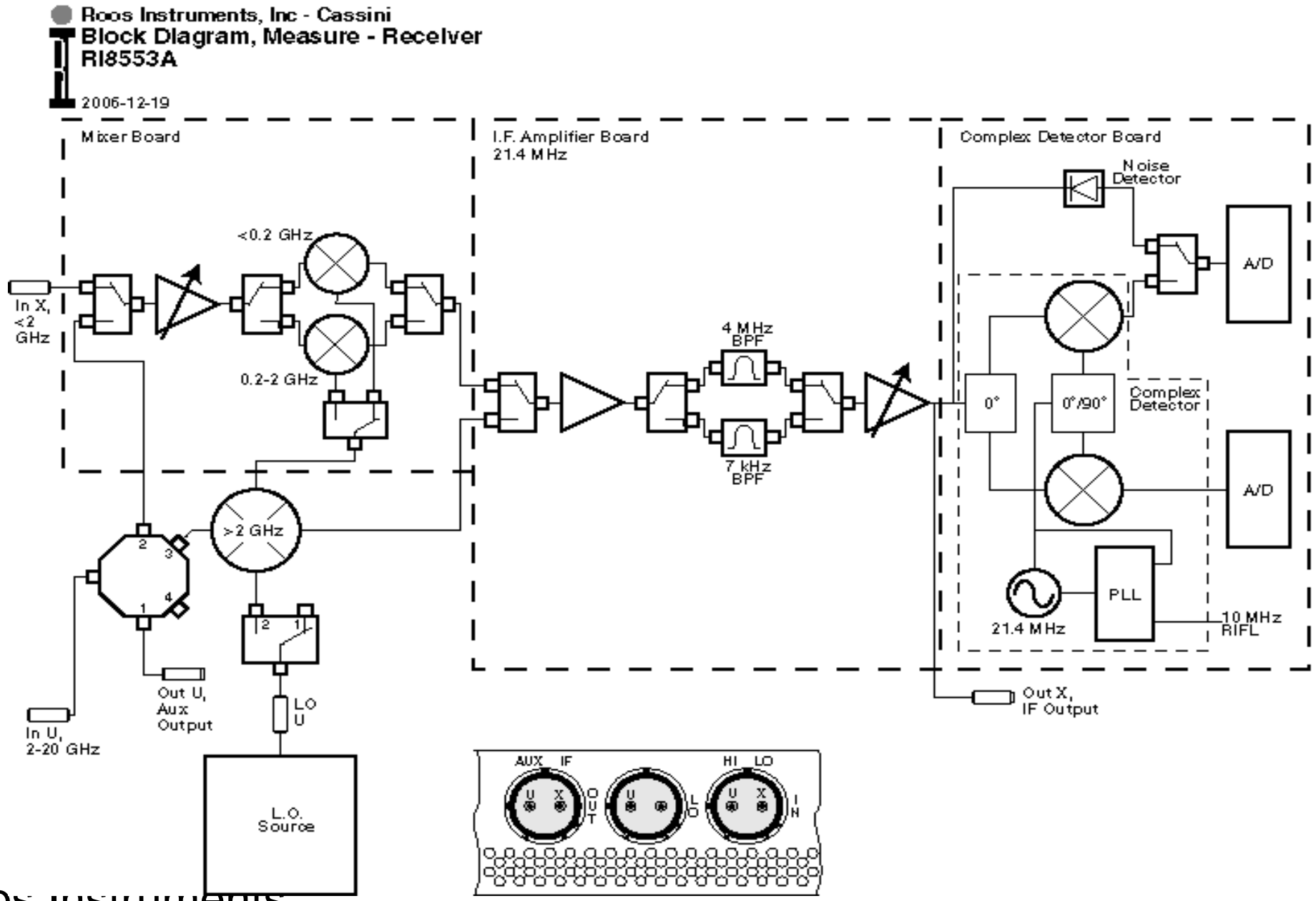
Cassini Receiver



RF Sources

Functions:

- RF Signal Conditioning
- Combine RF Intermodulation Tones
- Test Head DC, Control Bus and RF Cable Routing

Contains:

- Six Plug-in RF Slots
- Attenuator/Amplifier/Combiner Module
- 0.01-6 GHz; Up to +10 dBm
- 0.1-4 GHz; Up to +22 dBm
- Auxiliary Source Amplitude Control Module
- GPIB Control Pod for external equipment
- RI High Speed Control Bus Hub (RIFL II)
- System Receiver

Source and Amp Attenuator

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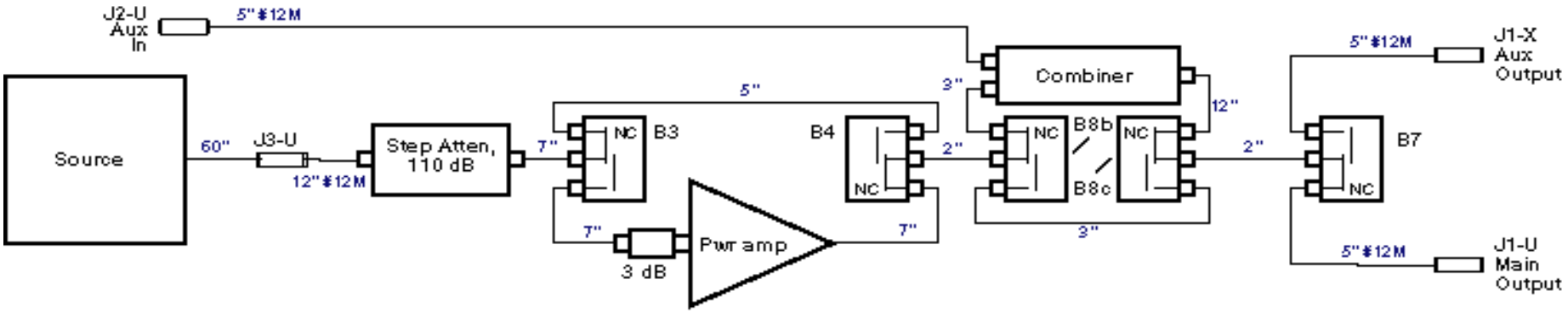
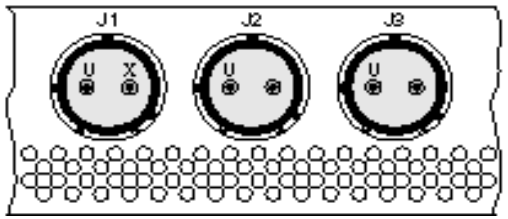
Source and Amp Attenuator

Roos Instruments, Inc - Cassini
Block Diagram, Source/Amp Attenuator
RI8555A

2006-12-14





Unless otherwise noted, all cables are SMA, and all cables are M-M.

Device Power TIM

- 16 Bit DC & Pulsed Bias (Force & Sense)
  - Three Unipolar 3A VI's
  - Eight Bipolar 200mA VI's
  - Two, 3X8 Channel Matrix
- 16 Bit DUT Digital Control (Serial & Parallel)
  - Switchable 2mA Bipolar VI
- 12 Bit Voltage Measures Lines
  - Eight 50 K Samples/sec, Single or Differential
- Analog Stimulus & Measurement (Including I & Q Tones)
  - 2 channel 10 or 40 MHz 12 Bit Arbs
  - 2 channel 90 MHz Digitizer
  - 40 MHz DDS Sine wave Source

Device Power / DUT Controller

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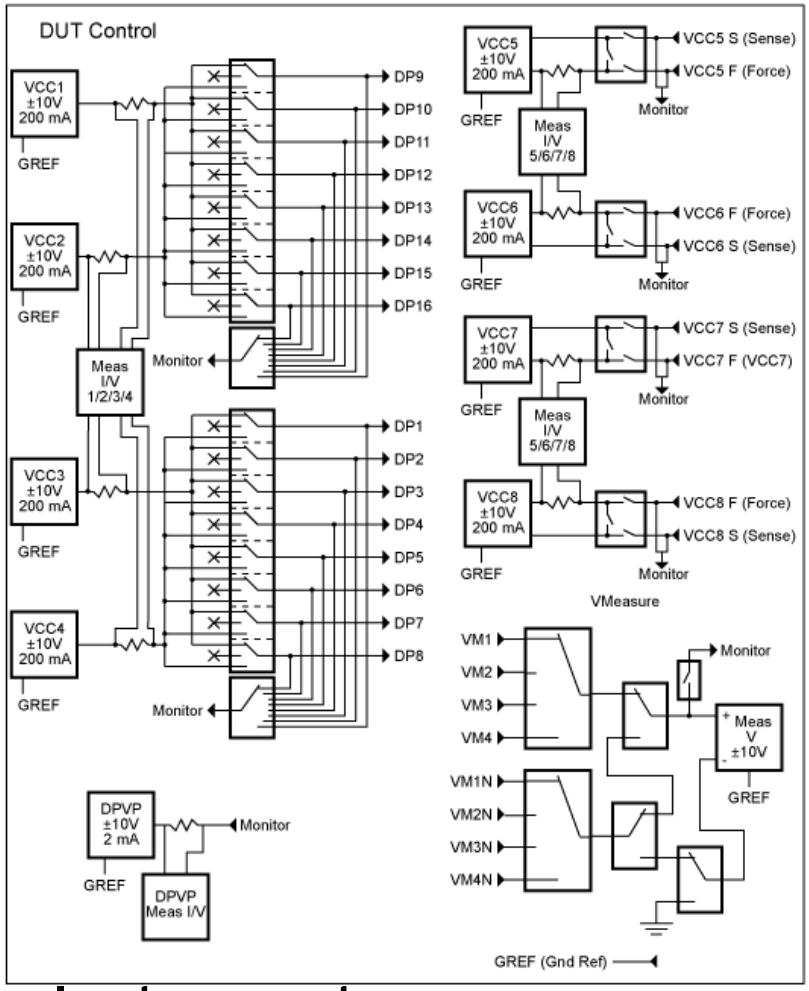
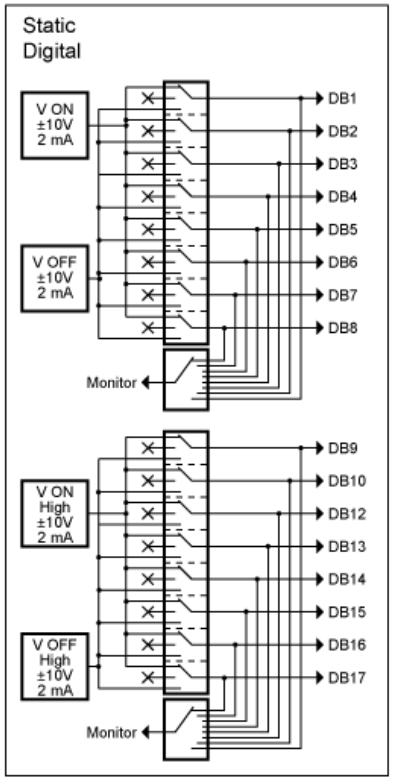
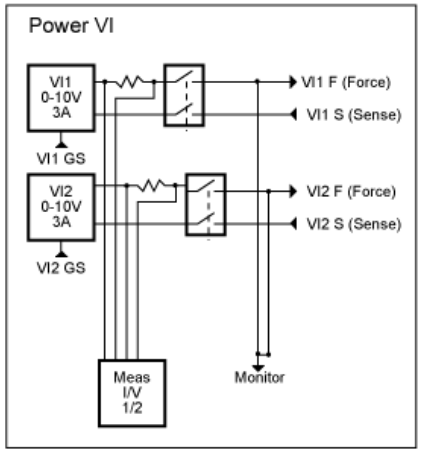
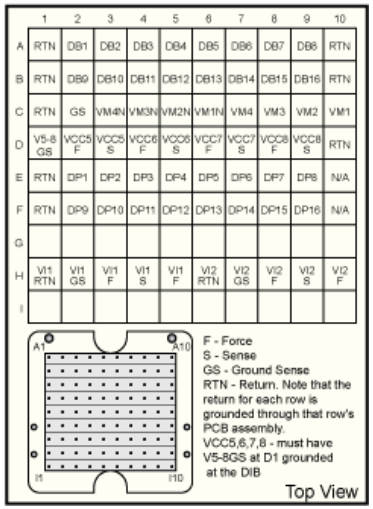
Device Power
RI8546A
2008-03-27

Notes:
1) GS are the ground references. They should be grounded at the DUT.
2) VI RTN are the high current return for VIs.
They should be grounded at the DUT with heavy wire.
4) Values are for reference only.
Refer to specifications for complete performance values.

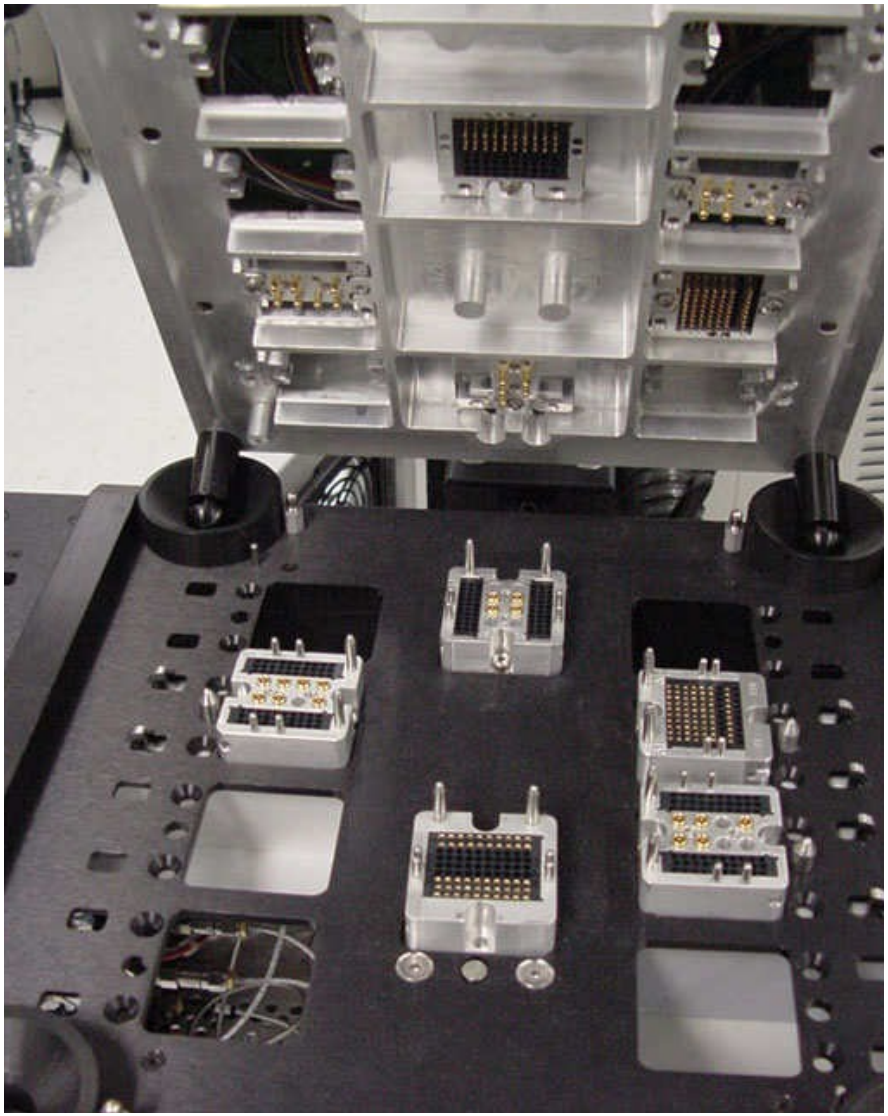








RF Blind Mate Port Connections



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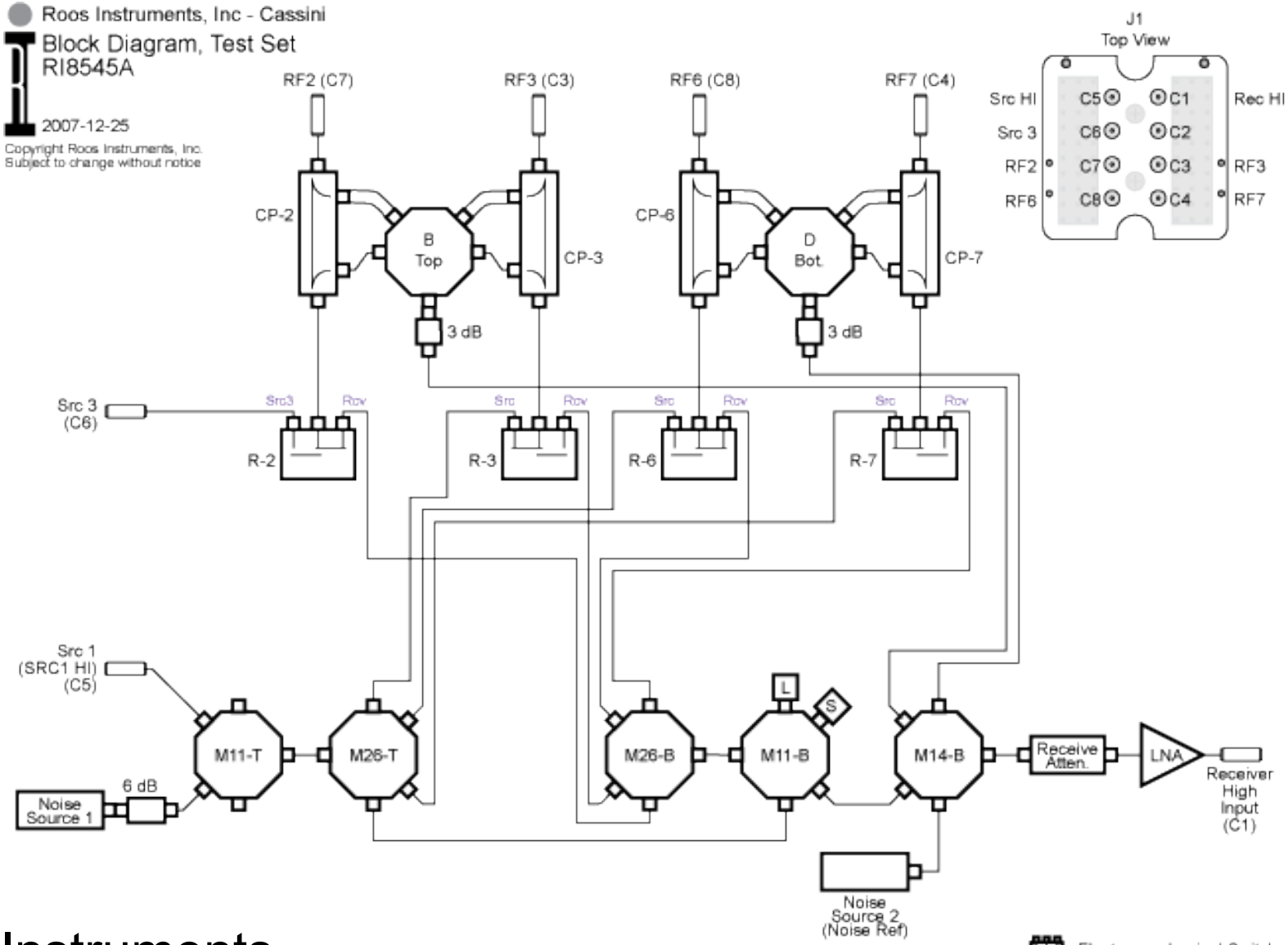
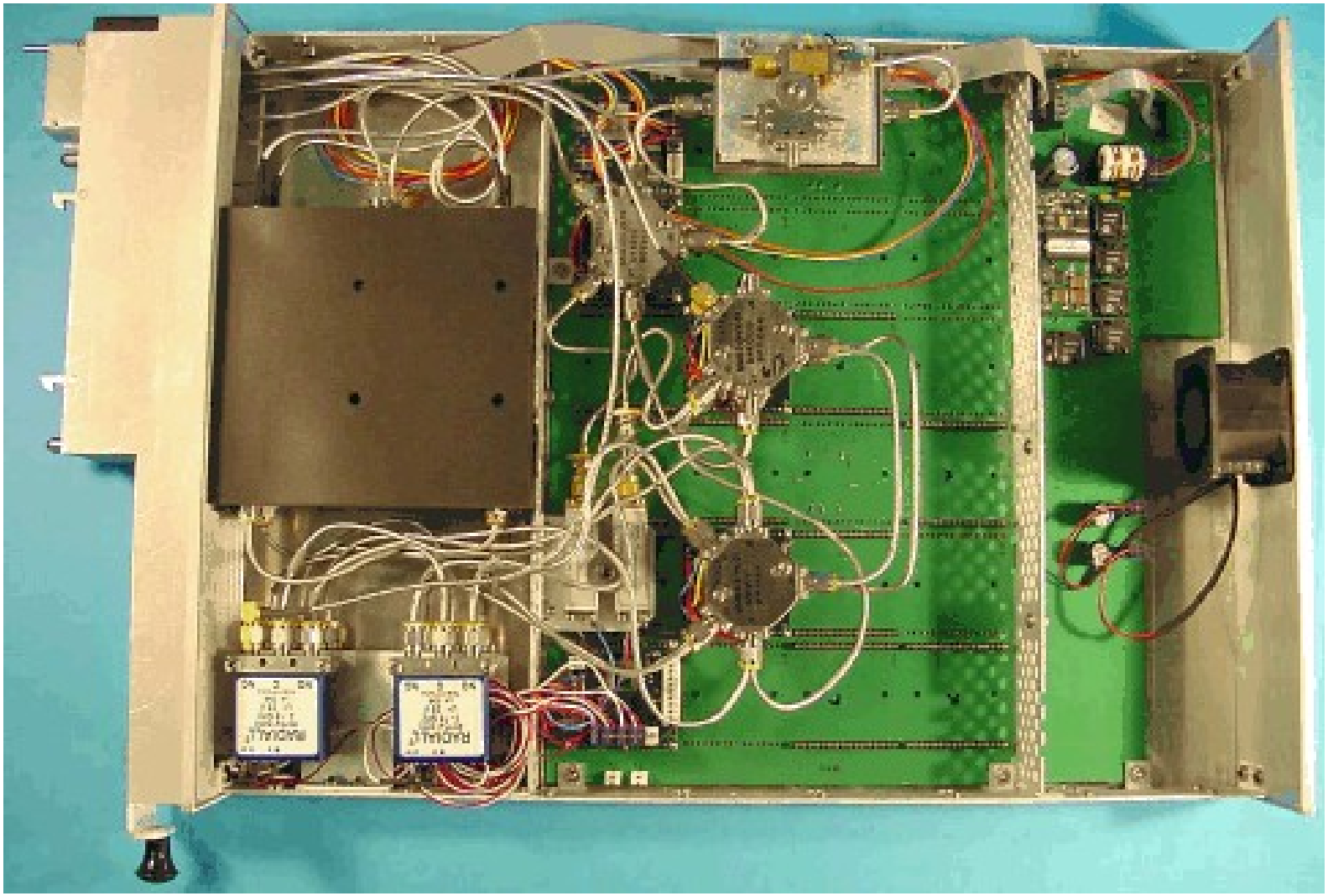
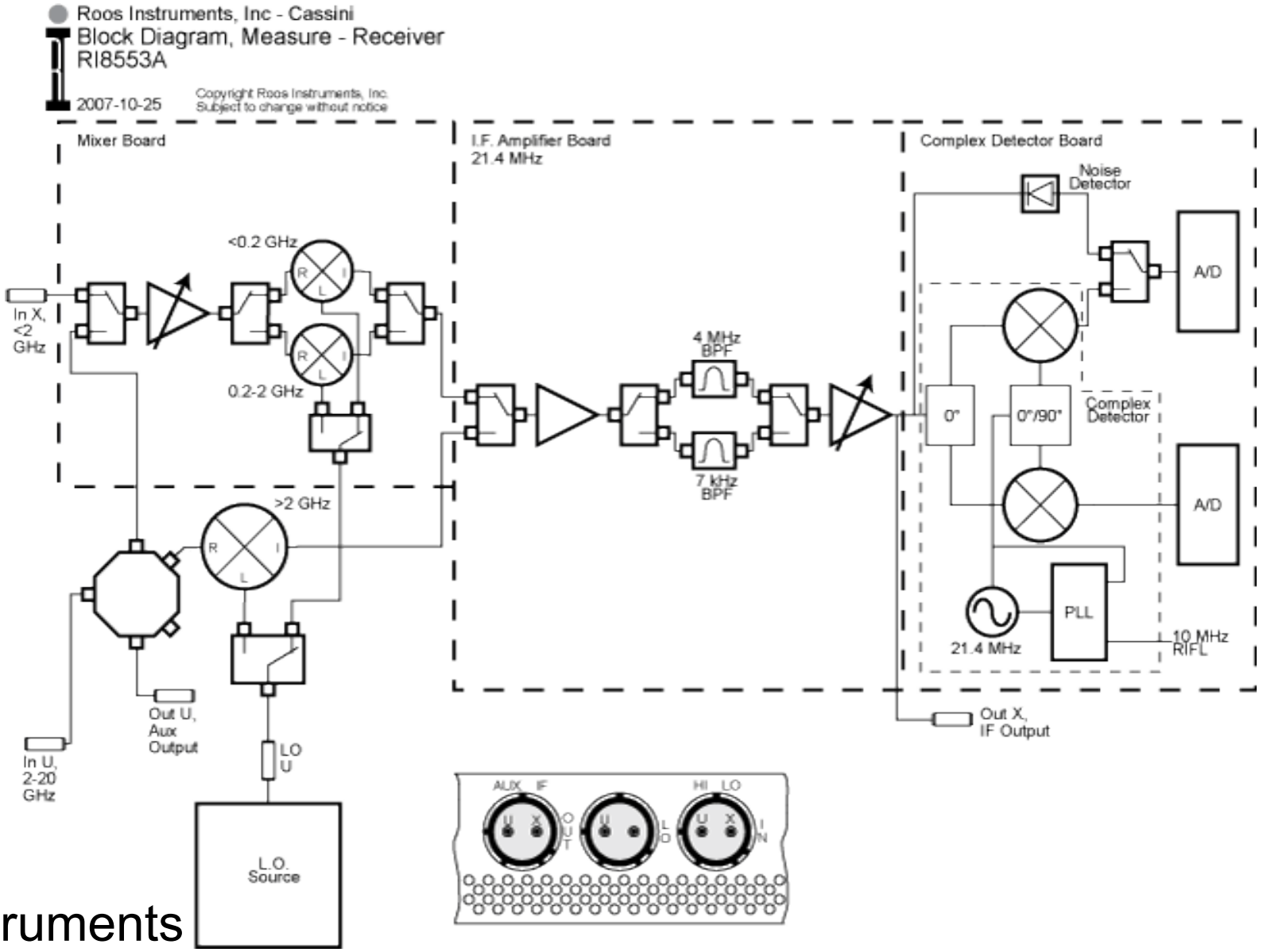
Testset Block Diagram



Testset Internals



Receiver Diagram



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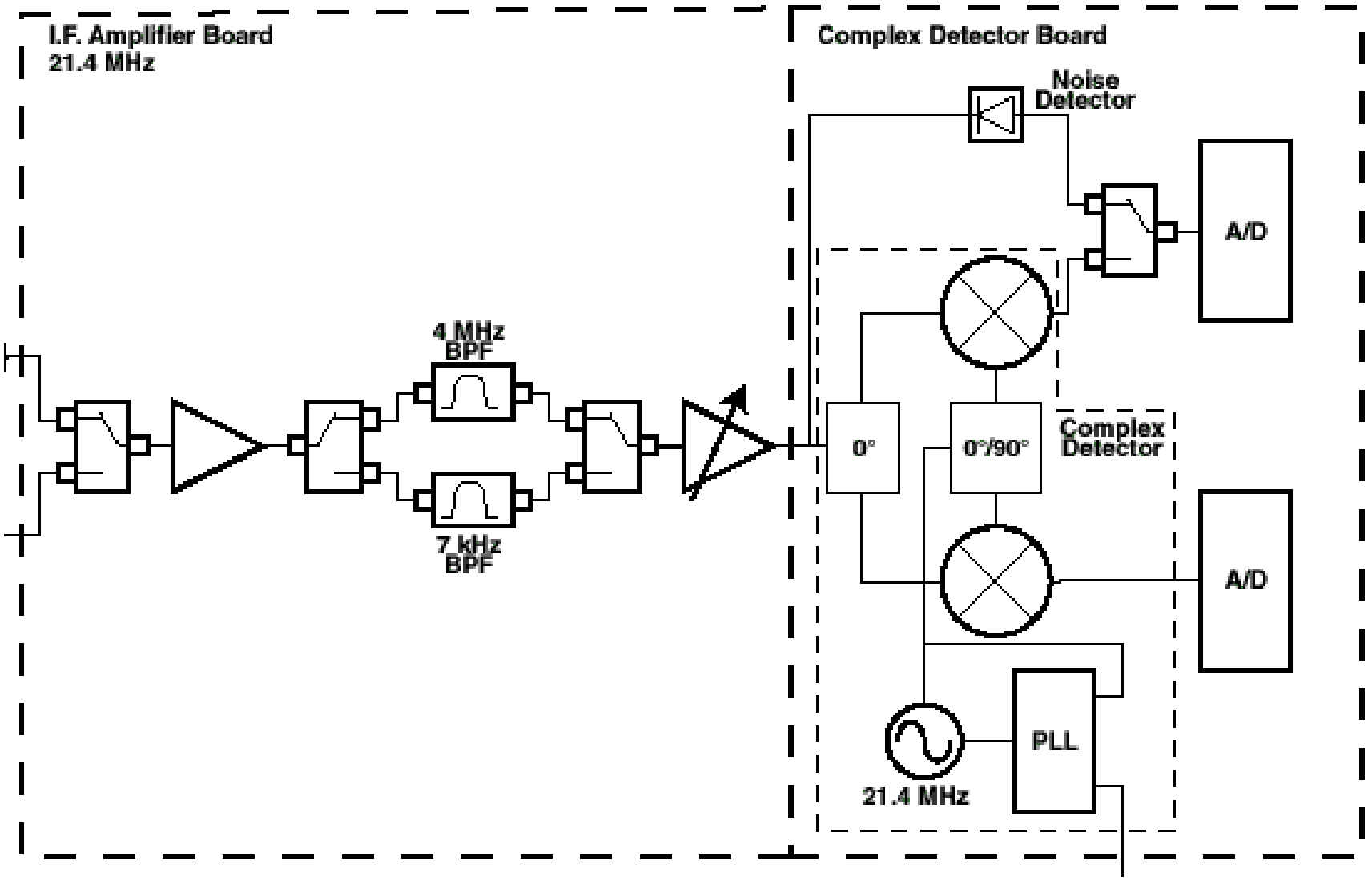
Two Receivers in One



System Block Diagram

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Block Diagram

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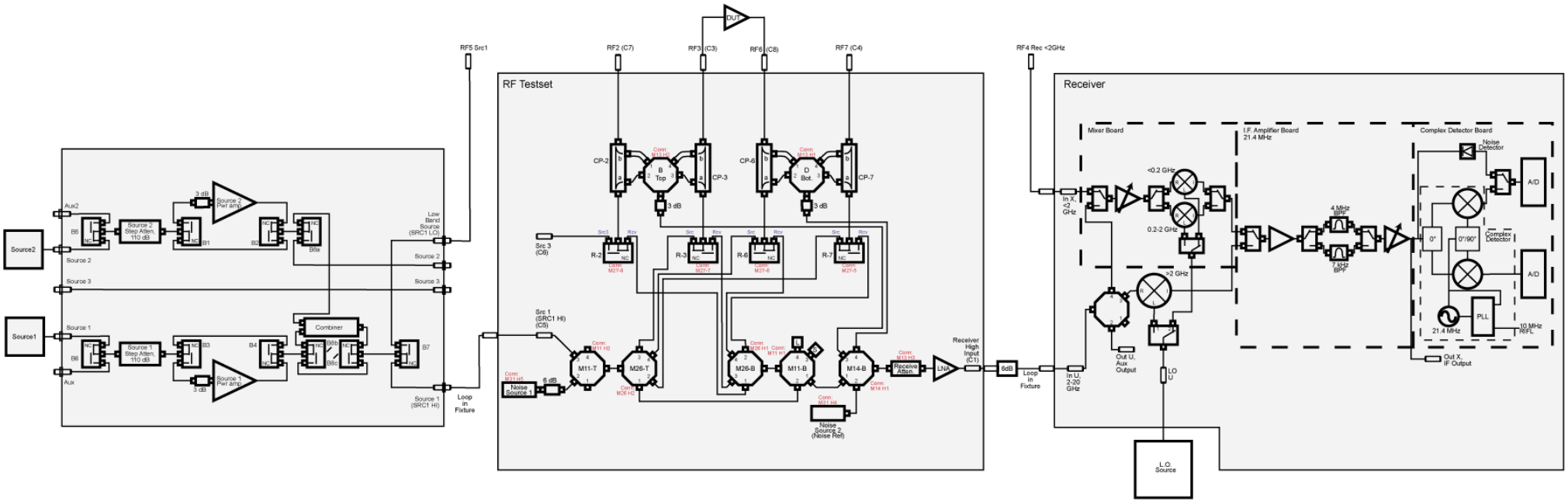
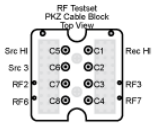
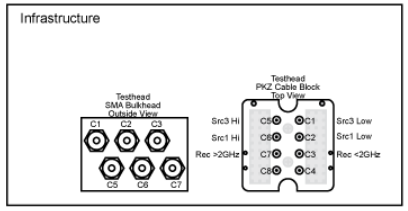
Typical 2-Source Large Cassini Configuration

2008-06-17





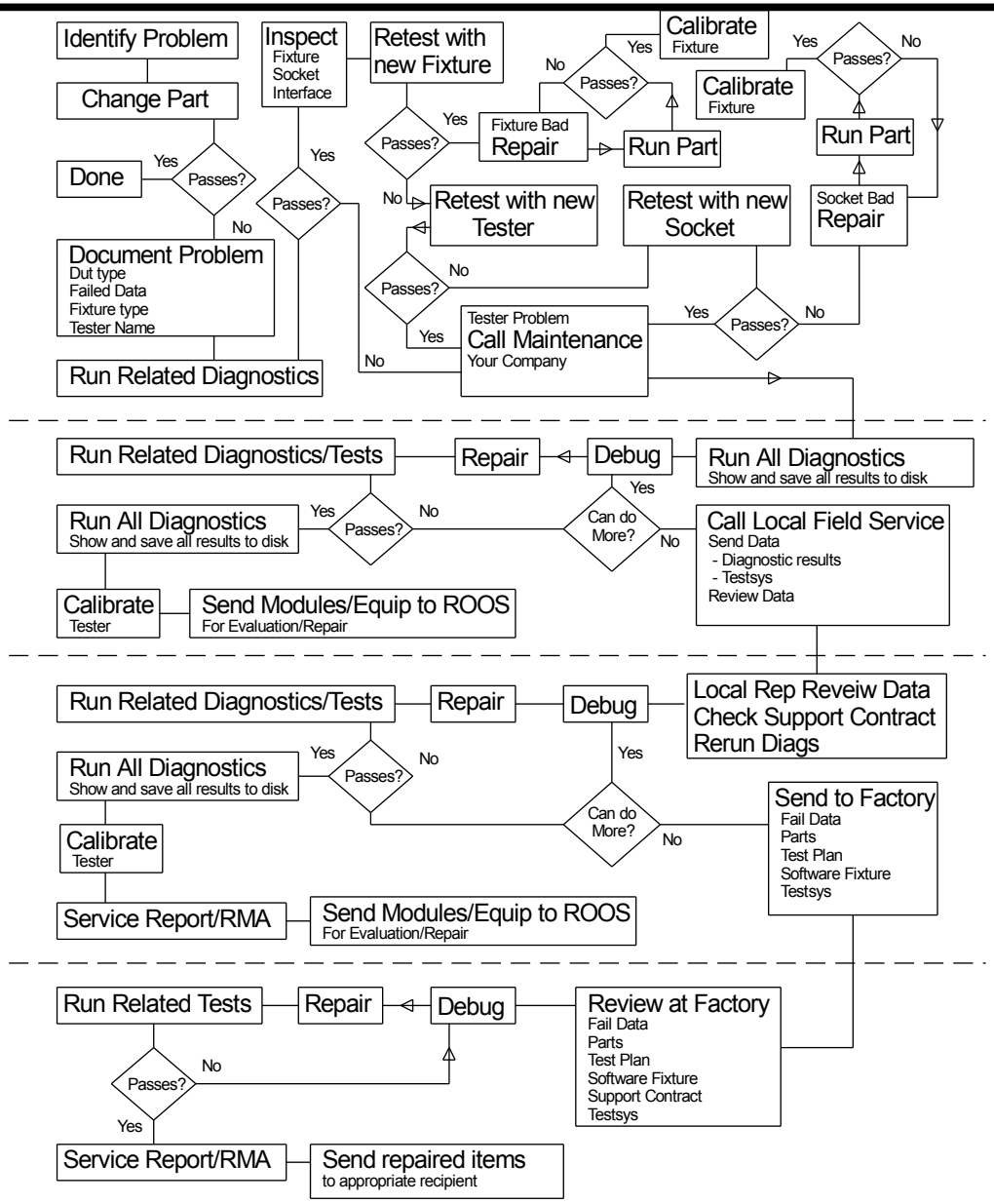


=Electro-mechanical Switch.
All others are electronic.

Chapter 1 Outline

- System Power On and Off
- RF Fixture & DUT Board
- Docking with a Handler
- System Controller
- Guru Log-on, Applications
- Test Executives
- System Hardware
- **Troubleshooting**

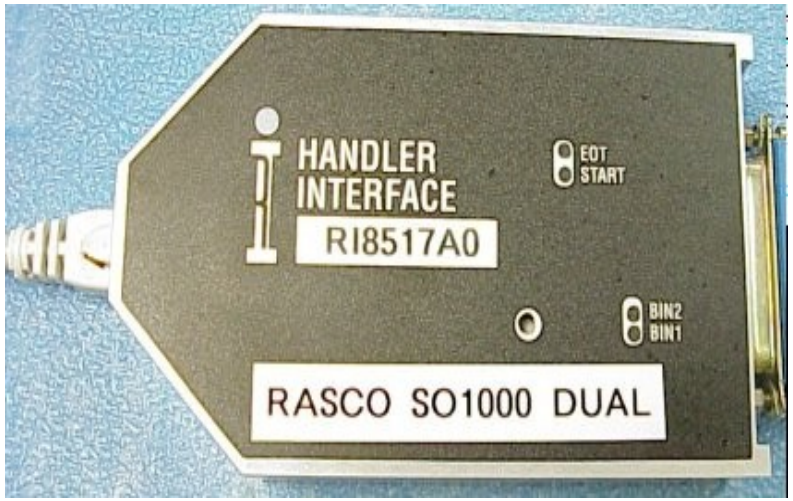
System Troubleshooting



Roos Instruments

Handler Issues

- Handler cable wiring
- Handler Pod defines unique settings for handler
- Signals exchanged by handler and system
  - Start Test
  - End Test
  - Bin Part



Fixture Issues

- Auto-detection depends on serial number
- Fixture and DUT I/F have serial chip
- If both are new, Fixture must be "taught" before DUT IF
- Connector Hygiene

GPIB Instrument Issues

- GPIB cable length limit
- Don't extend GPIB cables to make a longer run
- Instrument made "inactive" if it fails at Startup
- GPIB instruments must have a unique address
- GPIB address must match stored address in Tester software object

LAB A

Report to Training Systems

Become comfortable operating RI System Software by running a Test Executive

Chapter Review

- System Power On and Off
- RF Fixture & DUT Board
- Docking with a Handler
- System Controller
- Running Test Plans
- Viewing Test Measurement Data
- System Hardware
- Troubleshooting

Preview Next Chapter
Administration and Maintenance

- Overview of Guru, Applications
- Guru Log-on, User Privileges
- Guru Browser to Manage Guru Objects
- Guru Address Book, Update Guru Connections
- Software Updates and Patches
- System Networking and Data Logging
- Guru System Restore, Sync, and Log
- System Software Backups
- Guru Agents, Transferring Test Data
- System Software Errors & Recovery
- Monitor Error and Warning Messages
- Exchanging Cassini Modules
- Maintenance (Daily, Monthly, Annual PMC)

Questions?

Any Questions from this Chapter?