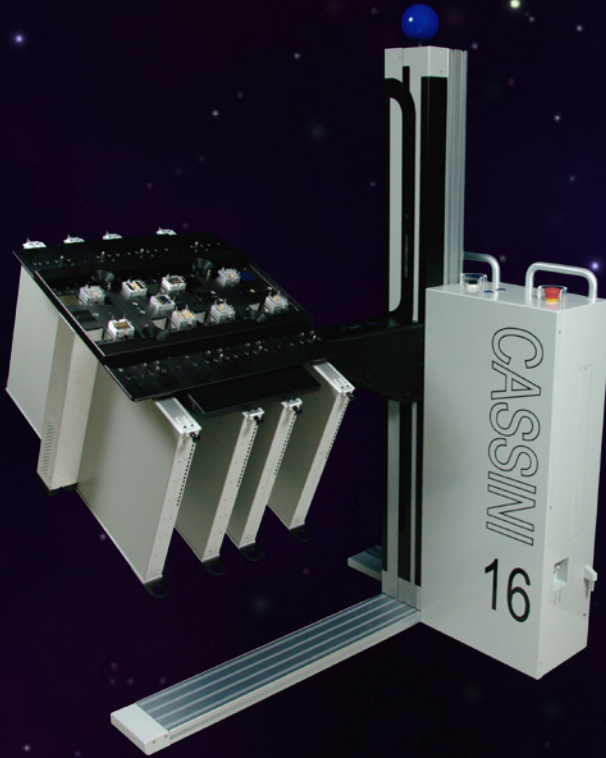# Roos Instruments

ROOS INSTRUMENTS
CASSINI
16

Modular ATE Systems

for the World's Most Advanced Technology

Fastest and Most Versatile Production ATE Cassini

Cassini marks a new direction in automated test towards a fully integrated, modular test system. The configurable architecture combines the performance and cost benefits of a lean, focused tester with the industry's widest test coverage. The Cassini test platform delivers unmatched application flexibility for RFICs, MMICs, SoCs, and multi-chip modules with unparalleled accuracy and speed.

Cassini 16

16 Test Instrument Slots

Minimal Test Floor Footprint

Precision Handler Docking

Instant Multi-site Scaling

Cassini Spyder

8 Test Instrument Slots

Move from Bench to Production

Fast Development Environment

Rapid Turnkey Deployment

Modular, Configurable, Scalable System Architecture

Bred from the same RF-centric foundation as its predecessor, Cassini puts all of the measurement resources into compact, swappable instruments that provide targeted test capability. Roos Instruments' graphical programming environment delivers seamless multi-functional and multi-instrument test in an automated production solution that you can shape to custom devices, adapt to changing technologies, and scale to meet demand.

Measure the Difference Test Instruments

At the heart of Cassini's configurable architecture are Test Instrument Modules (TIMs). These air-cooled, shielded instruments provide all of the source, receive, measure, and signal processing capability for a broad range of DC, digital, mixed-signal, RF, and millimeter wave applications.
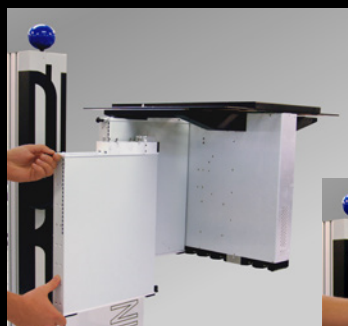
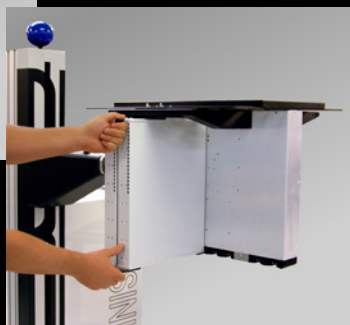DC, Digital, Mixed-Signal, RF, and mm-Wave Instruments

True "VNA Grade" vector RF calibration

Fully synchronous system timebase

Real-time processing with embedded FPGAs
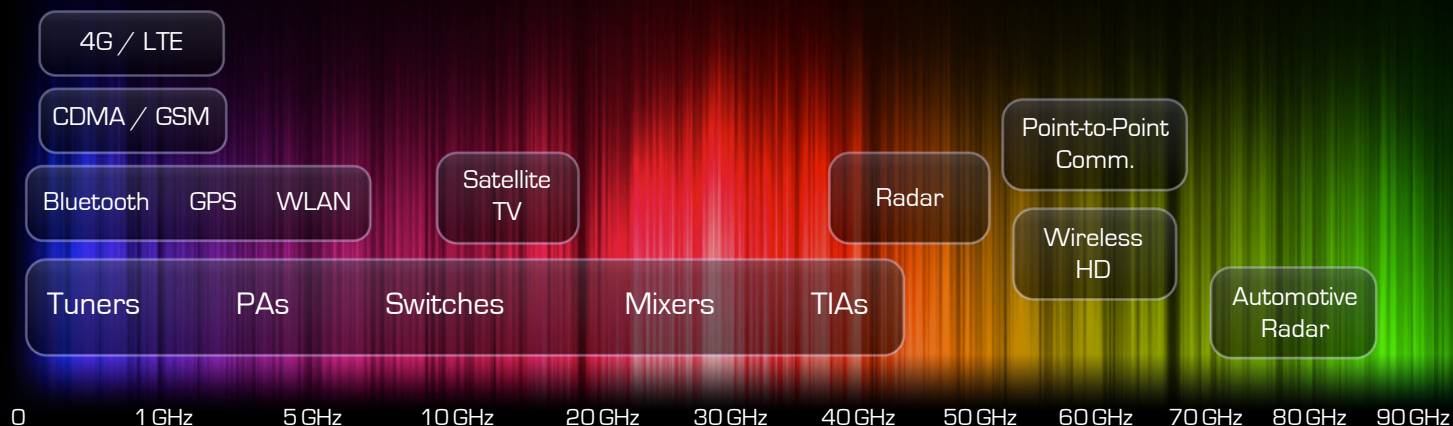

Each TIM incorporates a mechanical quick latch system for docking to Cassini's test head.

Universal test head slots let you create custom TIM arrangements. Connect multiple instruments together to form advanced test frameworks for more complex measurements.

Configure a test system in seconds

Cassini Spectrum Coverage Unlimited Test Capability

4G / LTE

CDMA / GSM

Bluetooth   GPS   WLAN

Satellite TV

Radar

Point-to-Point Comm.

Wireless HD

Tuners   PAs   Switches   Mixers   TIAs

Automotive Radar

0   1 GHz   5 GHz   10 GHz   20 GHz   30 GHz   40 GHz   50 GHz   60 GHz   70 GHz   80 GHz   90 GHz

Architect the Best Production Tests Cassini Fixtures

Fixtures carry the modular test architecture of Cassini into the DUT interface ecosystem. Housed in a durable enclosure is a configurable test resource environment and interchangeable pin mapping system that combine performance, portability, and flexibility. Integration with Cassini's software allow fixtures to add optional instrumentation that extend and enhance the capabilities of TIMs with a calibration layer that guarantees test accuracy right to the device pin.

Production Workbench Customize Test

All of the test functionality and capability of load boards have been re-engineered to take advantage of a configurable framework inside the fixture. Standardized interfaces, reusable components, and robust interconnects create a rapid-prototyping environment for easy design, debug, and upgrade. Within the fixture, another layer of test resources can be added to tailor solutions to a specific applications, a family of devices, or multiple test sites.
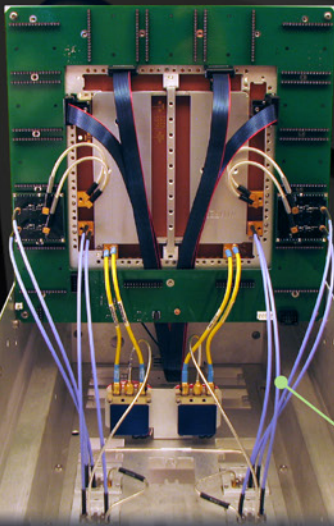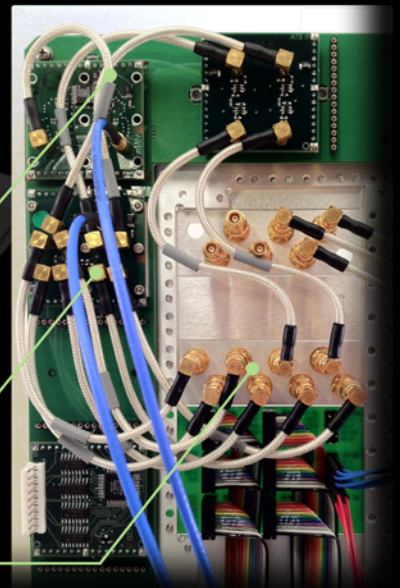
Hinge top design provides easy access for debug and development

From 1st Silicon to

High-performance cabling between TIMs and interface boards

Place resources close to the device: switching, amplifiers, parametric measure, DUT control, and more

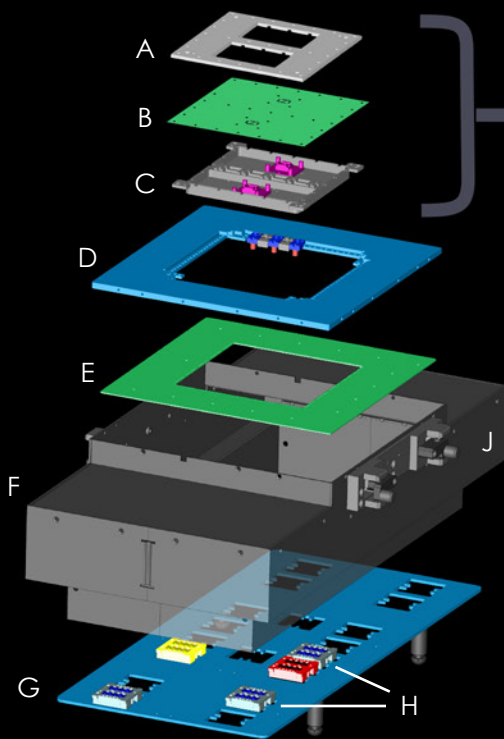**Soft-dock to Probers** and device evaluation boards with DC, Digital, Microwave, and Millimeter-wave inserts

All in One

Design for Test Fixture Anatomy

A. **Device Interface Clamp**: *Aluminum plate encapsulates DIB for added site isolation and structural support*

B. **Device Interface Board (DIB)**: *12 mil, 2-layer PCB for routing test resources to DUT*

C. **Pedestal Support**: *Precision-milled aluminum provides structural support for DIB during handler touchdown*

D. **Top Plate & Signal Launches**: *Fixture cover and mounting site for interchangeable RF / Digital and DC blocks*

E. **Fixture Carrier**: *PCB mounted to top plate for controlling additional test resources and instruments*

F. **Fixture Body**: *Rugged aluminum shell with hard-dock dampening; Houses cabling and signal routing*

G. **Bottom Plate**: *Locks to Cassini test head and provides universal TIM interface slots*

H. **Test head Blocks**: *Inserts for interfacing to Cassini test instruments bringing resources up to the fixture*

J. **Docking Ears**: *Machined-aluminum, precision alignment system for universal handler docking*

Launch Precision Measurement

The device interface components deliver a versatile and reliable signal mapping environment for any device package. The thin-layer PCB and aluminum reinforcement combine high frequency performance and production durability while simplifying the board design and reducing the cost of high-insertion wear replacement.

Production Test
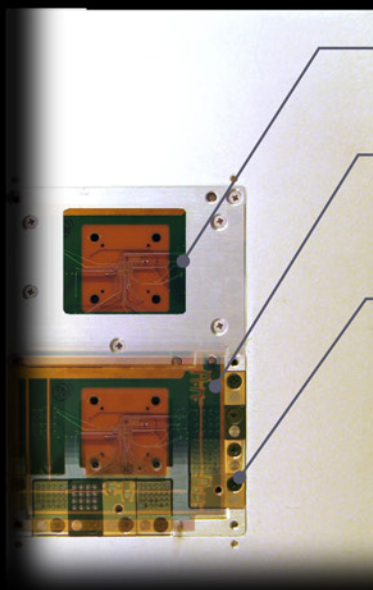
Clamp and PCB combo insure **better isolation** and **reduced parasitics**

PCB RF tabs provide **consistent contact** and **improved impedance matching** for unmatched performance up to 20 GHz

Interchangeable signal launches provide more than a 1000 high-speed digital and DC pins with over 100 calibrated RF ports

Environment

| DC | Digital | RF | Microwave | Millimeter Wave |

Building Bridges to Islands of Automation Guru™

Managing test setups, tester configurations, scaling up to production, and keeping consistency across the production floor can become an intricate and involved task. Guru provides the software tools to help manage this process so you can maximize productivity on Cassini, and simplify the logistics of production test.

Guru is . . .

the first of its kind, integrating Cassini's software environment to a database and networking backbone that enhances the user work flow with a host of powerful features:

Tools for locating and organizing files, test resources, and offloading data

Automated file versioning, expiration, and backup system

Control the release of test programs and software updates to production

Guru Manages Test Logistics

With tools to manage every step in the test development process, Guru simplifies the process from device evaluation to full scale production test.

Software Sandboxes

Experiment with new features without affecting production

Distribution Control

Release applications and updates incrementally

User Permissions

Control the production interface view and file access

Calibration Data

Device Setups

Instrument Resources

Guru

Fixture Definitions

System Backups

Guru Networks a Communications Hub

Cassini's features are enhanced by Guru's integrated networking capabilities that provide a dedicated and secure link between multiple Cassini, servers, and third-party services. With data flow and permission controls built in, Guru makes sharing test data easy and reliable.

Files are digitally signed and verified between Gurus

Guru works with existing network security

Automatic data encryption

Test Plans

User Access

Production Releases
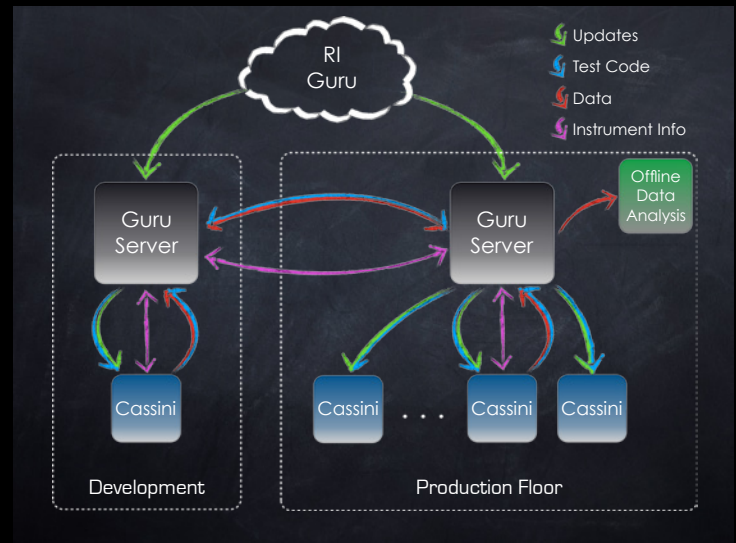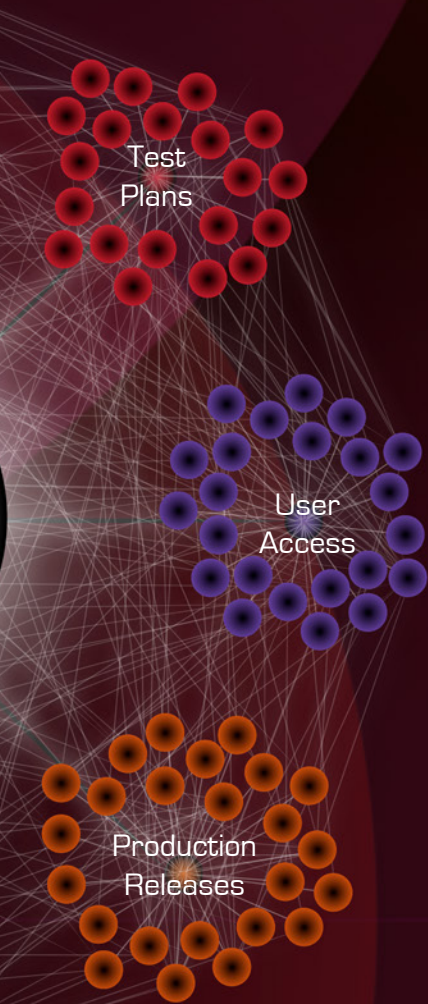
Support multiple Cassini, test floors, and off-site development

Guru Knows Where Everything Goes

Backed by a database scheme, Guru manages file directories and storage space automatically. Users can create tests and link resources while Guru keeps track of any dependences for easy organization and quick deployment to production.

Built-in File Versioning keeps a complete test development history
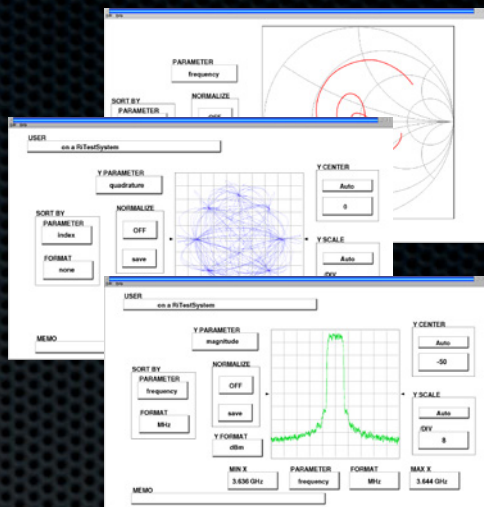
Never lose test plans or data with **Automatic Network Backups**

Group shared test resources with **User-Defined Guru Tags**

**Search, Filter, and Organize Files** quickly and efficiently

Making the Complex Simple Cassini Expert System

Accurate and repeatable measurements are made not only by using the right equipment, but by employing the right practices. To facilitate this, the Cassini software dynamically builds its test resources and function library from the connected instruments and interconnections. This expert system brings the synergy of an integrated tester environment to Cassini by streamlining multi-instrument test and modular expansion to create a simple, more powerful work flow. Ultimately this enables a user to design and execute sophisticated microwave measurements accurately and reliably every time.

# Advancing Test Software State-Based Approach

Under the surface of Cassini is a fundamentally different interaction of software and hardware that is enabling a host of powerful features never before possible in an ATE system. Cassini uses an event-driven control flow to generate a dedicated, run-time state machine to drive its instrumentation. This offers two very unique modalities in the tester: interactive instrument control for test development and a fast execution engine in production.
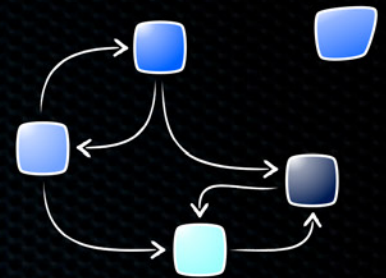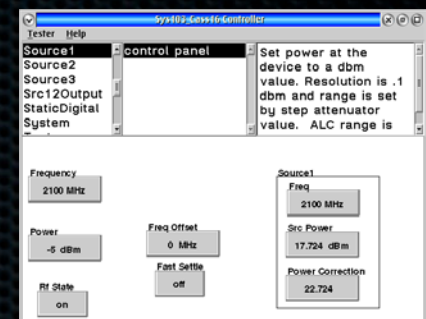
Intuitive, Dynamic, Powerful Graphical Programming

Use test sections to create meaningful organization

Interact with devices natively in a protocol-aware programming environment
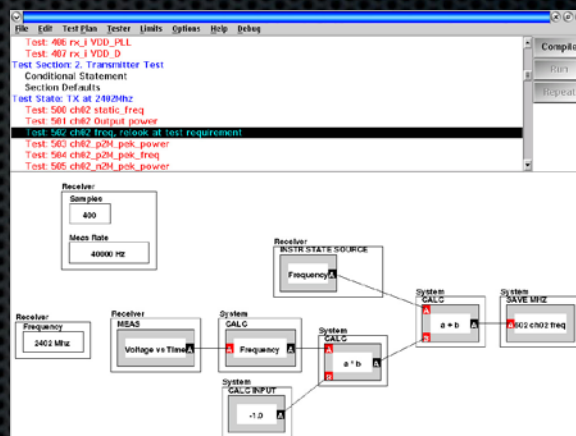
Build measurements in test panels by linking instrument function and control blocks in a logic flow

Freeze, inspect and manipulate tests during execution with interactive instrument control

Unleash State Machine Speed Accelerated Test

In production, the state machine is executed across Cassini's instruments uninterrupted and unimpeded by the system. This results in better performance, consistent measurements, and the industry's fastest test times.

EDGE, WCDMA, and custom modulation loop-back measurements in real-time: EVM, PAR, ACPR

Scattering parameters from 200 MHz to 40 GHz with 0.1dB of precision

IP3, IMD, TOI sweeps in less than 1 ms

Automated Test Optimization Synapse™

Synapse is an automated test optimizer that utilizes state information to improve code execution and reorganize measurements on Cassini's instruments for the fastest tests.
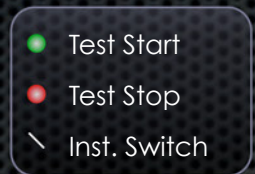
Eliminate code redundancy

User control of optimization in the test plan

View execution time of commands and measurements

Guarantee the fastest tests on any instrument configuration

Test Start
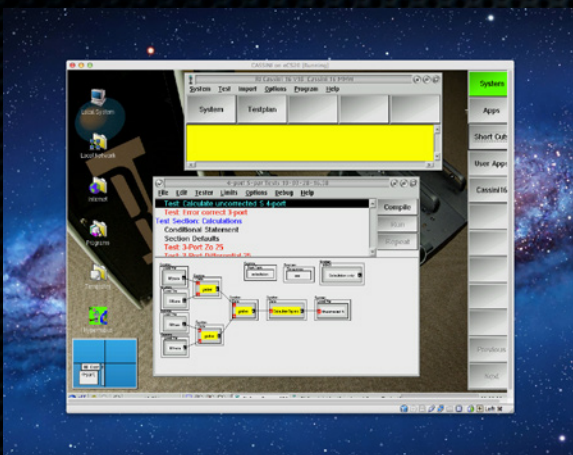
Test Stop

Inst. Switch

Standard Test Execution

Synapse Test Execution

Simulating Cassini on a Virtual Machine

Full emulation of Cassini's software environment

Load any instrument and system configuration into a virtual Cassini

Offline test plan development and debug

Export simulated test plans to a Cassini anywhere in the world through Guru

Accelerated RF Test SyRF Core™

Microwave TIMs incorporate Roos Instruments' proprietary SyRF(System RF) Core technology, providing unparalleled measurement speed and unmatched test accuracy up to 90 GHz. The innovative universal-channel vector RF architecture enables functional microwave test for a wide range of applications.

Universal Functionality:

Multi-Port S-Parameters

Mod. / Demod. Test

Distortion Measure

Spectral Analysis

Real-time measurement with FPGA-powered DSP

Dual-channel, complex digitizer
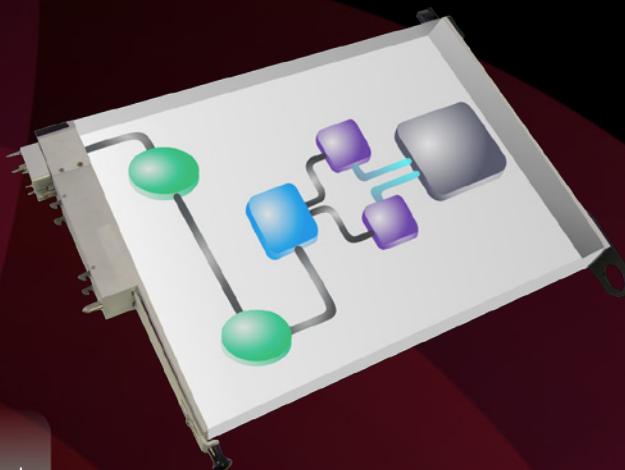
Sub-microsecond frequency lock with 0.1 mHz precision

Ultra linear, ultra precise synchrodyne receiver

A New Test Roadmap Future-Ready System

Cassini has changed the production test dynamic by enabling a platform that can adapt and scale its capabilities at an absolute minimum cost across the widest frequency range of any ATE. By fusing 20 years of test system integration with a flexible instrument architecture, Cassini delivers a test solution that can scale its application features vertically to meet future benchmarks, and horizontally to capture emerging markets and disruptive technology.

Add capability exactly when it's needed

Portable Instruments, Fixtures, Test Code, and Calibration

Instant multi-site scalability
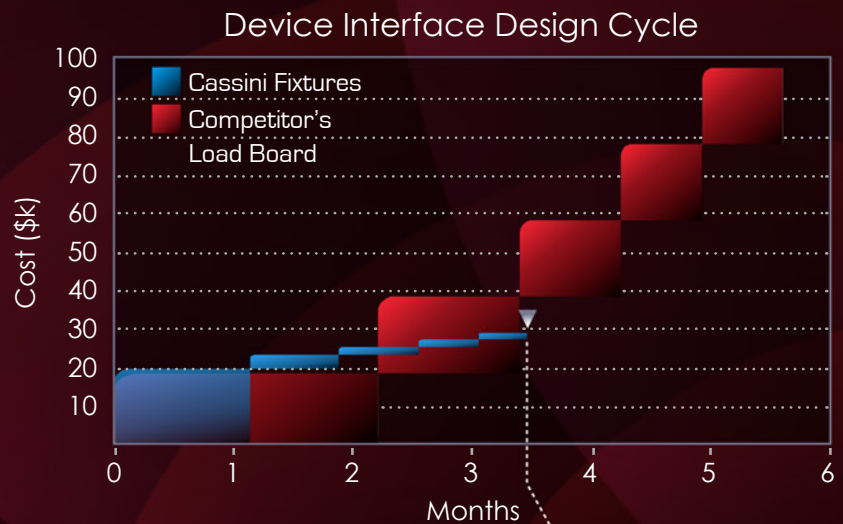
Do More, Use Less Energy Efficiency

With an incredibly low power use of 400W/h, Cassini's energy footprint is below most household appliances. The power reduction along with air-cooled instruments result in lower operating temperatures, improved instrument stability, and longer product life.

Winner of the Silicon Valley Power Environmental Innovator Award

Break Free of the Re-Spin Cycle Fixture Advantage

The discrete components and configurable environment of fixtures offer the benefit of rapid, low cost redesign and component reuse compared to traditional load board re-spins. The progressive cost and time savings of iterative fixture development delivers both high-performance and cost-effective custom solutions for both single and multi-site solutions.

Device Interface Design Cycle

- Cassini Fixtures
- Competitor's Load Board

Cost ($k) vs Months

Faster Time to First Device Tested

The example above compares the development cycles of a typical load board design versus a Cassini fixture with DC, digital, and multi-port RF capability over five design iterations. The incremental cost and time advantages of fixture design evolution delivers performance improvements at a minimum of expense.

Maximizing Uptime World Class Support

World-wide support

No specialized training for operators or service personnel

No software licenses required

Regular software updates and feature releases

Industry leading MTBF of 5500+ hours

Quick field servicing and upgrades with swappable TIMs

Single annual system calibration

No test setup or system disassembly for repairs

Configure Cassini

Infrastructures	Description	Transceiver	Power Amplifier	System on a Chip	Automotive Radar	Cellular Infrastructure	Military Aerospace
Cassini 16	16 TIM Test head; Computer with RI Software		●	●	●		●
Cassini 8	8 TIM Test head; Computer with RI Software	●				●	
Auxiliary Rack	Expansion Rack for Additional Equipment		●		●		●

Test Instruments

Test Instruments	Description	Transceiver	Power Amplifier	System on a Chip	Automotive Radar	Cellular Infrastructure	Military Aerospace
DC Supply & Parametric	4 Independent DC Supplies; Multiplex to 8 Channels	●	●	●	●	●	●
Waveform	Dual ARB Signal Generator and Waveform Capture	●				●	
High Speed Digital	120/80/40/20 Pin Multi-Vector & Scan up to 100 MHz	●		●		●	●
Cassini 16	1 kHz - 6 GHz Digitally Modulated RF Source	●				●	
RF / Microwave Source [1]	10 MHz - 20 GHz Digitally Modulated RF Source		●		●		●
RF Test & Measure	10 kHz - 12GHz Time / Frequency / Power / VNA			●			
RF / Microwave Receiver	50 MHz - 20 GHz Time & Frequency Domain Capture	●	●	●		●	
Microwave Test Set	100 MHz - 20 GHz Power Measure / Multi-Port VNA						●
Sub mm-Wave Test Set	4 GHz - 40.5 GHz Power Measure / Multi-Port VNA	●	●				
mm-Wave Test Set [2]	75 GHz - 81 GHz Power Measure / Multi-Port VNA				●	●	●
RF Combiner	0 - 20 GHz RF Mixing for Multi-tone Applications		●				
Phase Noise	120 dB Dynamic Range, Direct Phase Noise Measure					●	

[1] Requires Auxiliary Rack in Cassini 16 configuration
[2] Custom frequency band TIMs from 40 GHz to 110 GHz

For more information visit our website: http://www.roos.com
or contact a sales representative:

sales@roos.com

Roos Instruments

2285 Martin Ave.
Santa Clara, CA 95050
+1 - 408 - 748 - 8589

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