

RACAL INSTRUMENTS



# Military and Aerospace Solutions

*The only test system you want*

*is the one that's made for you.*

**RACAL**



# About Us

**Racal Instruments** produced the world's first compact electronic frequency counter in the late 1950's, launching a broad line of instrument products for which Racal is still renowned. Since then, Racal has led the way in several product areas: general-purpose test equipment, automatic test equipment, VXIbus modules, communication test sets, laser diode and photonics test systems and burn-in stations, chassis, switching, and, most recently, turnkey system integration.

The global Automatic Test Equipment market continues to grow at an accelerating rate, and Racal Instruments remains at the forefront with the technology, engineering, products and system integration services to support the industry's most demanding customer needs. We are the leading integrators of test systems for communications, broadband, military and industrial customers. Some of the numerous application solutions developed by Racal include laser diode burn-in, jet engine testers, automotive testing, digital communications, and radar simulators.



The backbone of Racal Instruments' success relies heavily on the strength of our Engineering resources. Our company is committed to Engineering innovation and continues to apply the appropriate technology in our customer-centric system solutions. We back our Engineering resources with a corporate-wide concern for quality that begins with design and continues through manufacturing.

Our excellence in quality was recently recognized by Intel. We earned their coveted SCQI (Supplier Continuous Quality Improvement) award for the second consecutive year, a first for any test instrument company. We did it for Intel; let us prove what we can do for you.

## Why Racal Instruments

We have created the ideal business model enabling us to be your strategic partner as a turnkey solution provider to your demanding Aerospace and Defense test system requirements. Our structure ensures your operational readiness through sophisticated tactical and logistical support implementation.

## Anatomy of a Global Aerospace and Defense Test Systems Partner

### Broad Range Technical Expertise

Racal Instruments supplies a variety of test systems worldwide that meet diverse civil and military requirements, including: Advanced Weapons Systems, Avionics Equipment, Radar Systems, Digital/Radio Communications; Electrical Equipment, Jet Engine Testers, Optronics, and Electromechanical Equipment.

### Worldwide testing and logistics support

Count on Racal for comprehensive logistics support of field and factory operations as well as base workshops.

### First Line Maintenance

Racal provides the most cost-effective solution for operational readiness of test systems through establishing Built-In-Test (BIT) capability within first line test facilities.

### Mobile & Deployable Maintenance Shelters

Racal is a leading supplier of general-purpose portable, deployable and static test/support equipment. These test facilities contain the latest technology operator tools, such as interactive electronic technical manuals and on-the-job training packages, enabling technicians to deal with a variety of maintenance situations.

### Base/Depot Workshops

Racal supplies base workshops and factory-based production test facilities throughout the world, providing automatic and manual test systems, software, training and numerous other maintenance support services.

### Training & Personnel Services

Racal Instruments provides wide-ranging training services for test, maintenance and repair of electrical, electronic, electro-mechanical and optronics equipment on-site or at one of Racal's many training locations.

### Spares Provisioning

Racal can recommend the appropriate level of maintenance support for its customers. Racal has a wide range of service and maintenance agreements including on-site repairs and same day service.

### Manufacturing & Support Services

Racal is committed to providing users with the best possible after sales service. This is achieved through Total Quality Management and Continuous Improvement. Manufacturing and support services include: Custom designed test systems, Build-to-print manufacture, Standard & extended warranties, Calibration, Hardware maintenance and Software support, Technical assistance, On-site installation & commissioning, Training, and Asset management. For assistance with your technical application or for more information please email your request to: [info@racalstruments.com](mailto:info@racalstruments.com).

Our team of test solution experts has several hundred years of combined test instrument and system design experience across a wide range of industries and applications. Many of their fundamental design notes, ideas, and solutions have been collected and compiled into a collection of White Papers and Application Notes that are available for viewing and downloading from our website at <http://www.racalstruments.com/whitepapers>.

# Instrument White Papers

What follows is a brief summary of a few selections from this collection that address some of the typical issues you may be facing when designing your test system or considering what type of instrument approach best solves your current application requirements. Please use the direct url listed to view the full document with all illustrations, graphs, images, and any associated code.

## VXIbus Systems in Military Applications

Racal Instruments has a long history of providing test and measurement instruments and systems to the aerospace and defense industries. As a founding member of the VXIbus Consortium, Racal has taken a lead in developing high-performance, modular solutions for a wide variety of applications. The company has introduced a large number of products that have found many uses in military applications. Racal Instruments has a global presence testing electronics for all branches of the military services, on land, at sea and in the air.

In 1987 the U.S. military served an ultimatum to the test and measurement industry requiring a standardized, modular platform. If industry did not develop a viable commercial standard, then the military would develop one, and industry would be forced to follow it if it wanted to continue to do business with its defense customers. Industry met the challenge and released the VXIbus standard in October 1987. This original document describes a modular, high-speed, bus architecture that was optimized for high-performance automated test equipment. It consolidated many of the system requirements into a defined, standard backplane facilitating the development and implementation of automatic test systems.

This paper explores several of the products, applications, and unique solutions that have been developed within the VXIbus community to meet the needs of rugged and complex military test systems.

*For the complete white paper see*

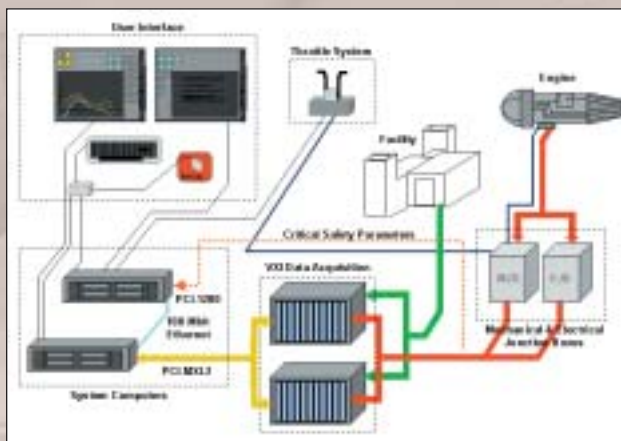
<http://www.racalstruments.com/whitepapers/VXIImilitary01.pdf>

## Custom Performance Test Systems Using Commercial Off-The-Shelf (COTS) Hardware and Software Platforms

The primary goal of any Automatic Test System (ATS) design is to provide the resources required to completely satisfy a targeted test requirement. Racal Instruments has taken this approach, and expanded it, to allow our test systems to continue to grow and adapt

to the reality of ever-changing test requirements, without sacrificing performance. Racal integrates our own industry leading test and measurement instruments and chassis, along with those from many other vendors, to provide flexible and scalable automatic test solutions. Innovative software techniques, such as the Racal Instrument Software Layer for Automatic Test Equipment (isolATE™), are implemented to allow our systems to adapt to new requirements without impacting legacy Test Program Software.

Racal Instruments has provided numerous test solutions for a wide range of applications including Flap/Slat Actuators, Engine Control Units, In-flight Entertainment Systems, Automotive Electronics, CPU Manufacturing, and many others. One ongoing project that exemplifies the Racal commitment to



Typical JETI Configuration

innovative and high-performance systems is the U.S Navy Jet Engine Test Instrumentation (JETI) system. The JETI effort melds both existing technologies and cutting edge software implementations to produce a highly effective test solution, which maximizes the use of available industry-standard architectures for both hardware and software.

*For the complete white paper see*

<http://www.racalstruments.com/whitepapers/VXIJETI01.pdf>

Racal Instruments provides a wide range of Test & Measurement (T&M) integrated system solutions, Test Program Sets (TPS), as well as Support Operations to the global Military and Aerospace community. By combining its Test Program Set (TPS) capability with its integration capability, Racal Instruments can decrease the time-to-test by providing full "Turnkey" solutions. Look to us to provide a total integrated test solution covering the following Test Program Software areas.

## RACAL INSTRUMENTS

# Your Total Military and Aerospace Test Solution Source

### Testability Analysis

We work with you to ensure new products are designed for test by:

- Formulating test strategies to meet your development, production, operating and maintenance scenarios
- Establishing the "Design-for-Test" functions
- Analyzing the test requirements, including Self-Test
- Defining the Repair Level Analysis (RLA) as well as the Test Facility

### Test Specification Generation

Racal Instruments assists you in preparing Production Test Specifications, Standard Serviceability Test (SST), Test Requirement Documents (TRD), Maintenance and other required test specifications.

### Production Test Specifications

Our specialists prepare the test specifications for production performance verification tests for Unit Under Test (UUT). These include:

- Standard Serviceability Test (SST) Specifications & Test Requirement Documents (TRD)
- Maintenance Test Specifications and ATLAS Test Specifications



### Test Program Languages

Racal Instruments provides test programs written in all industry standard test languages, including: LabVIEW®, C, C++, SABRE, Rebate, Coral, Visual Basic, ATLAS, Mediator, and LabWindows CVI® in addition to the more specialized tools, such as GENIE, LASAR, Mentor Graphics "QUICK" Simulator, and Racal's isolATE™.

### Support Documentation

We include a complete documentation package with every turnkey test system solution that provides data for the test software, ITA and any other hardware items. We provide all of the documentation and data necessary to maintain and support the TPS including:

- Software & Hardware Design Documentation and Code Listings
- User Manuals with assembly drawings, schematics & Illustrated Parts Breakdown (IPB)

### Life Cycle Test Support

Racal Instruments provides support for all TPS throughout their required life cycle, including:

- Test program updating and modification
- Transfer of TPS to other ATE platforms
- Update of support and user documentation and, on-line HELP facilities

### Rehosting of Test Program Sets

We have over 40 years experience in the design and development of test equipment solutions. We provide Post Design Services (PDS) for our own equipment and assume responsibility for other test systems where the Original Equipment Manufacturer (OEM) has ceased its own long-term support. Test systems must support the Unit Under Test (UUT), for which they were originally designed, as long as required.

Racal Instruments has modified and updated many existing test systems. From this experience, we have devised methods and tools to ensure that today's TPS can be transferred/upgraded to whatever form may eventually be required on the original test system platform. If you have a test system which is obsolete and cannot be supported, protect your investment in developed test programs by coming to Racal Instruments first.

# Product Selection Guide



## 1261B VXI Chassis

- High Reliability; Ease of Maintenance
- Best Power and Cooling in VXI Chassis

Our fourth generation, high-performance, 13-slot VXI mainframe is now available with even more power - 1756W of available power and 1000W of total usable power @ 55°C. Couple the power with the fault-tolerant cooling system and the results are maximum performance and reliability at a competitive price. The **1261B** is equipped with independently pluggable power supply and fan assemblies. There are two choices for monitoring systems: Enhanced or Standard. The **1261B-LINEAR** is the perfect choice for low noise floor applications.

<http://www.racalstruments.com/vxi/1261bgif.htm>

<http://www.racalstruments.com/vxi/1261blinear.htm>



## 1264C/D Rack Mountable

### 1264C Portable

Our low-cost, C-size, VXI chassis contain performance features normally found only in high-end 13-slot chassis. The chassis include status indicators for all seven power supply rails and fan operation. The **1264C** uses a modular power supply assembly with a wireless interconnect system providing 800W of available power and 500W of usable power. Ideal for portable or limited space applications. The **1264C/D** is ideal for rackmount applications with limited space availability. Modules are recessed three inches behind the integral front door, allowing room for connectors and cable service loops using the built-in cable tray.

<http://www.racalstruments.com/vxi/1264c.htm>

<http://www.racalstruments.com/vxi/1264cd.htm>



## 1256 Switching System

- Modular, GPIB/RS-232 Control
- Front-Panel Control

Our **1256** Switching System is a low-cost GPIB/RS-232 platform that accepts up to eight (8) 1260-1XX plug-in switch cards, which were originally developed for the Adapt-a-Switch™ carrier. There is a wide variety of switch cards to choose from, including general purpose switch cards, digital test plug-ins, multiplexers, matrices, discrete, RF and power cards. There is an available plug-in to suit every need from DC to microwave. Extensive software capabilities include: Exclude Lists, Equate Lists, External Trigger, Scan Lists, Synchronization and Programmable Delay.



<http://www.racalstruments.com/vxi/1256.htm>



## 1255A/1255A+ Switching System

- GPIB/RS-232 Control
- DC to Light

The **1255A/1255A+** high-performance switch system takes advantage of the density offered by full-size, 1260 series, switch modules and by offering the capability of system expansion. This affordable system offers modules for applications ranging from DC to light, including RF/Microwave, digital, optical, signal, matrix, multiplexer and power. The system comes complete with both an internal IEEE-STD-488 and an RS-232 interface. The VXIplug&play compliant drivers make it an easy addition to any system.

[http://www.racalstruments.com/gen\\_tnm/gpib\\_sw.htm](http://www.racalstruments.com/gen_tnm/gpib_sw.htm)

## 1260-100 Adapt-a-Switch™ Platform

- Modular VXI Switch Carrier
- High Density

The revolutionary **Adapt-a-Switch™** Platform delivers unprecedented density and flexibility in a two-slot, C-size VXIbus module. The carrier accommodates up to six plug-in switch cards providing optimum switching solutions. The plug-ins are inserted easily and directly from the front panel of the carrier without removing the carrier module from the chassis, allowing ease of maintenance and upgradeability. Switching configurations are expandable through the use of a shared analog bus. Switching solutions include RF, microwave, signal, matrix and multiplexer as well as power and discrete.

[http://www.racalstruments.com/vxi/1260\\_100.htm](http://www.racalstruments.com/vxi/1260_100.htm)



## 1260 Series Switch Cards

- VXI Switching
- DC to Light

The **1260** Series of Switch Cards is the only product that provides you the convenience of message-based control for ease of programming and a register-based interface for high-speed control. Our family of full-size switch modules affords you switching solutions that include optical, RF, microwave, signal, matrix, multiplexers, power and discrete. So whatever your application, we have a solution. We are always adding to and refining our selection, so please visit our website for the latest information. In addition, if you don't see what you want, please contact us and we will be happy to discuss a custom solution with you.

<http://www.racalstruments.com/pdf/index.htm#switch>



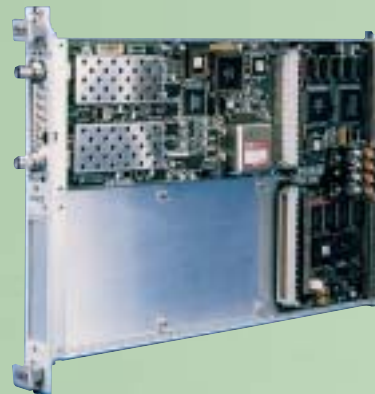
## Counters

- Universal Counter/Timers for VXI or GPIB
- Measure Frequencies up to 1.3GHz

Racal has the **Counter** solution for you whether you prefer VXI or GPIB. We have high-performance, 2- or 4- channel counters that come in a single C-size VXIbus slot (**2461C**) and GPIB/benchtop versions (**2201**). They provide eleven automatic measurement functions, including phase, pulse, peak, rise/fall time, time interval and ratio measurements. They are available with no oscillator, a temperature-compensated oscillator or an ovenized oscillator.

<http://www.racalstruments.com/vxi/2461c.htm>

<http://www.racalstruments.com/vxi/2201.htm>



## 4152A Digital Multimeter

- 6.5 Digit VXI DMM
- 1260 Series Scanner Compatible

The **4152A** is a "Test System" multimeter that supports limit testing, averaging, math and vector operations. It combines DC and AC current and voltage measurements as well as 2/4 wire Ohms, frequency and DC ratio measurements. At 6.5 digits, the 4152A can take up to 6 readings per second with up to 0.0019% accuracy, or, at 4.5 digits, the 4152A can take up to 1000 readings per second with up to 0.012% accuracy. The 4152A is able to store 500 readings in its memory. It can change ranges within a function at a rate of up to 65 per second and can change measurement functions at the rate of up to 30 per second.

<http://www.racalstruments.com/vxi/4152a.htm>



## Waveform Generators

- High Speed; Multi-Channel
- Waveform Creation Software Included

We have a complete family of waveform generators and synthesizers providing from 1-to-3 channel capacity, from 50MS/s to 500MS/s rates and from 64K to 8M memory. Four of them with their typical applications are as follows:

**3151A** – simulate long, complex signals like tape and disk drive read heads, video and radar pulses

**3153** – drive AM, FM and pulse inputs or I-Q inputs of an RF or microwave signal generator, 3 channel

**3162A** – simulate wideband IF signals for RF up-conversion

**3162B** – simulate wideband I-Q signals

<http://www.racalstruments.com/vxi/3151a.htm>

<http://www.racalstruments.com/vxi/3153.htm>

<http://www.racalstruments.com/vxi/3162a.htm>

<http://www.racalstruments.com/vxi/3162b.htm>



## 3271 RF Signal Generator

- RF Power up to 25dBm; Frequency up to 2.4GHz
- Low Phase Noise

The **3271** has two built-in oscillators which can be used to modulate the RF output signal to create complex avionics waveforms. AM, FM, PM, FSK, 4FSK and Pulse Modulation are built into the 3271. I-Q modulation capability can be added using an external I-Q modulator module, such as Racal Model 3153 above, which enables the 3271 to simulate QPSK or DMA signals for telecom applications. The standard 3271 can be used to test pagers, RF modems and RF security devices and systems.

<http://www.racalstruments.com/vxi/3271.htm>

## 6062 A/D & D/A Converter

- High-Speed Source Measurement
- Up to 8 Channels

The unique design of the **6062** allows the configuration of a 4-channel or 8-channel instrument with mixed A/D and D/A inputs and outputs, independently or synchronously triggered. Each channel's 64K of channel memory can be updated in real time. With D/A sample rates up to 2.5MS/s, A/D sample rates up to 250kHz, isolated output of +/- 25V, and standard output of +/- 10V (with Option 06), the 6062 is versatile and reliable. It can be used to simulate transducers, automotive timing signals, pacemaker or defibrillator signals, or as a multi-channel function generator.

<http://www.racalstruments.com/vxi/6062.htm>



**Racal Instruments is proud  
of our commitment to customer satisfaction.  
We routinely design and manufacture modified standard  
product offering as well as design and produce  
application-specific test instruments.**

**For additional information on how we can  
provide your test solution, please contact us at 800.722.2528  
or e-mail us at [Sales@RacalATE.com](mailto:Sales@RacalATE.com).**





## Racal Instruments Sales and Service spans the globe.

Racal Instruments' products are built to world-class standards and are backed by world-class service. We provide you with the assurance of global, 24 x 7 service support through our extensive network of factory and field based engineers and service technicians, as well as our integrated network of support centers that have ready access to locally stocked parts. When you purchase any of our products, you have access to a flexible range of services that provide total solution coverage and ensure minimum life-cycle costs and maximum productivity.

We offer a 24-hour helpdesk line for after-sales support. The helpdesk can be reached at [helpdesk@racalstruments.com](mailto:helpdesk@racalstruments.com) or by telephone at +1 800.722.3262, +44 (0) 8706.080134 or +852 2405.5500.

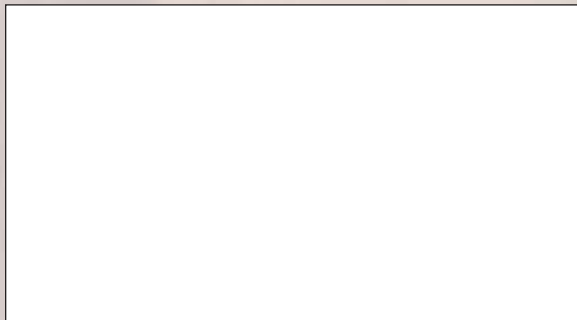
For additional information on our wide variety of service programs including calibration, extended warranties, preventive maintenance, installation, and training programs, visit our website at [www.racalstruments.com](http://www.racalstruments.com), or contact our professional service team.

Racal Instruments' products and services are sold through a network of factory direct sales engineers, agents, distributors, and representatives. To find your local contact, please visit <http://www.racalstruments.com/world2.htm> or contact us directly by e-mail or telephone as noted below.

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*Racal Instruments has a policy of continuous development.  
Please see our website for all of our latest information:  
<http://www.racalstruments.com>*



**Intel SCQI Award Winner**  
We did it for Intel...  
We can do it for you!