R8000A Communications System Analyzer

The world's first portable, full-featured communications analyzer

General Dynamics is pleased to introduce a revolutionary product: The R8000 communications system analyzer. The R8000 utilizes leading-edge software defined radio technology to deliver a previously unimaginable result: a truly portable instrument with more functions than today's bench top analyzers.

Weighing only 14 pounds, the R8000 gives service technicians power and flexibility not previously available. This, combined with the unit's feature-packed spectrum analyzer, makes the R8000 ideal for taking to sites for infrastructure maintenance and interference measurement. The unit's bright 8.4" color LCD is well visible in sunlight and features wide viewing angles, making the R8000 your best choice for on-site work.

There has simply never been a communications analyzer that combines this level of portability and power. See how the R8000 can change the way you perform radio and radio system service forever.

GENERAL DYNAMICS
SATCOM Technologies

R8000 Series Communications System Analyzers

The Ultimate Radio Service Tool

A Compact and Lightweight Solution

You no longer need to lug multiple pieces of heavy equipment to perform service at remote locations. The R8000 has everything you need in one compact, 14 lb. package! Among the instruments included in the R8000 are:

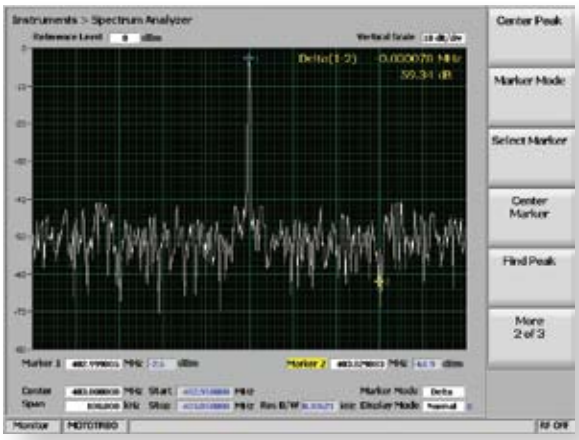
- **Spectrum Analyzer**
- **Signal Generator**
- **Sensitive Measurement Receiver**
- **Tracking Generator (optional)**
- **SINAD Meter**
- **Distortion Meter**
- **Modulation Scope**
- **Oscilloscope**
- **Frequency Error Meter**
- **Cable Fault Locator (optional)**
- **FM Deviation Meter**
- **AM Modulation Meter**
- **Receive Signal Strength Meter**
- **Broadband and Narrowband Power Meters**
- **Audio Counter**
- **Audio Generator**
- **AC / DC Voltmeters**
- **MOTOTRBO™ signal quality test (optional)**

MOTOTRBO is a registered trademark of Motorola, Inc.

Weight:	14 lbs.
Frequency Range:	250 kHz to 3GHz (1GHz standard, 3GHz optional)
Size:	9.4" high x 12.7" wide x 7.5" deep
Display:	8.4" LCD, visible in sunlight, with wide viewing angle
Spec. An. Noise Floor:	-120dBm
RF Input:	50W continuous, 150W maximum

Superior Spectrum Analyzer

The R8000 comes equipped with a spectrum analyzer comparable to those found on stand-alone instruments costing as much or more. With a noise floor below -120dBm, super-fast signal acquisition, 4 markers (2 standard), an available variable vertical scale down to 1dB per division, the R8000 is the ideal tool for tracking and measuring elusive interfering signals.

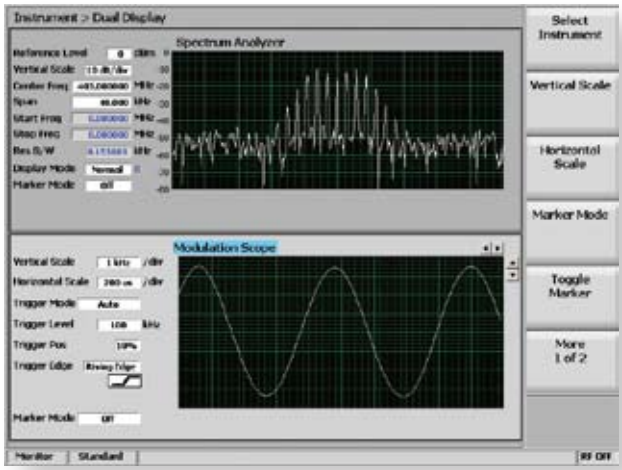


Upgradable and Expandable

The software-based architecture of the R8000 lets you add software options and upgrades in the field. So if your needs change down the line, simply order the feature or protocol you need, and program it into your unit via one of its 4 standard USB ports.

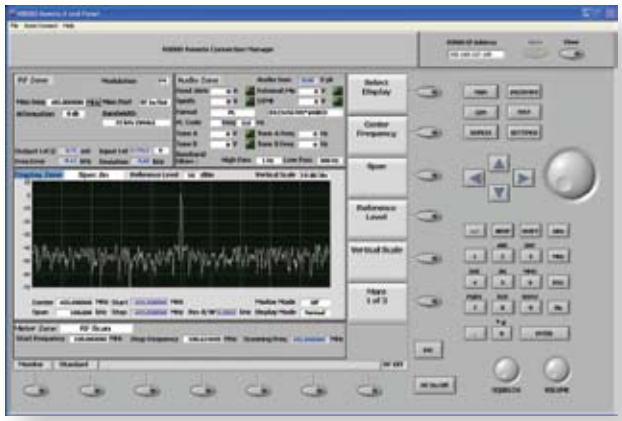
"DualScope"™ display lets you see carrier signal and demodulated audio simultaneously

Our DualScope display allows you to view the RF spectrum analyzer and modulation scope simultaneously, giving you the ability to analyze RF characteristics of the carrier signal and recovered audio from the same screen. The complete functionality of both instruments is available in DualScope mode, and all associated measurements are displayed. With DualScope, you no longer need to go back and forth from the spectrum analyzer to the modulation scope to see everything you need – it's all on one screen! DualScope is included with Enhanced Spectrum Analyzer/Oscilloscope option R8-ESA.



Operate the R8000 from your PC with optional Remote Control software

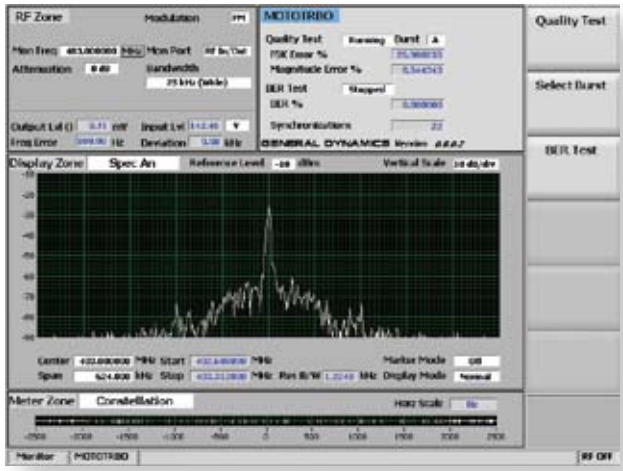
The R8000 virtual keyboard includes every key on the R8000 itself. Just assign an IP address to the unit, and operate every function of the box from a remote PC. Monitor channel activity, measure interference, track site performance, all from any networked PC with our remote control software installed.



MOTOTRBO test option

With the R8000, you can now test the digital signal quality of your MOTOTRBO radios. Simply put the analyzer in TRBO mode to test Bit Error Rate (BER), FSK and magnitude error, and receive audio quality.

The R8000's constellation display provides a quick graphic look at the FSK signals. Actual signal points are plotted against ideal IQ points. If the signal points line up with the ideal IQ points, the signal is good. If not, further investigation is required.



THE R8000 PREMIER PACKAGE

The Ultimate Radio Service Tool

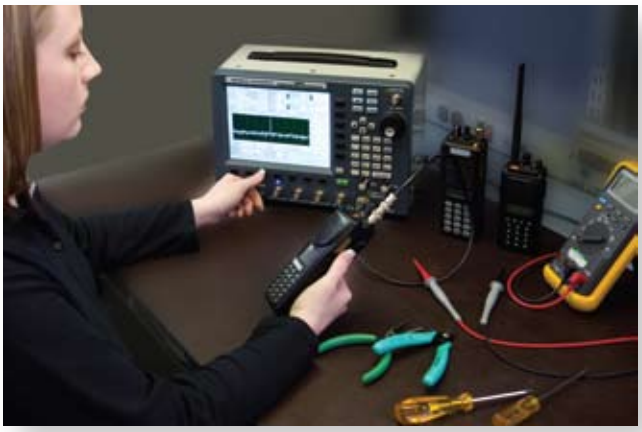
The R8000 *PREMIER PACKAGE* is the best value available in communications test equipment.

It includes all the capabilities of a standard R8000A, PLUS:

- **3GHz operation of all RF features**
- **Remote control software for operating the unit from a networked PC**
- **Tracking Generator for accurate tuning of cavities, duplexers, and filters**
- **Enhanced Spectrum Analyzer and Scope Package, including DualScope and 1dB vertical scale per division**
- **Cable Fault Locator**
- **Soft Carrying Case**

Whether you choose the *PREMIER PACKAGE*, or the standard R8000, you will own the new standard in communications test equipment. Nothing in the industry offers anything close to the combination of features, portability, expandability, and cost effectiveness of the R8000 by General Dynamics. And because it's a General Dynamics product, you know you can count on world-class reliability and after-sale support.

The software-based architecture of the R8000 will allow rapid introduction of new protocols and feature enhancements, and the product has been designed in such a way that these new features can be easily added to existing units. So you can be assured that your communications analyzer will always be upgradable should your needs so require.



Contact your local representative for a demonstration today! To find your General Dynamics test equipment representative, go to http://www.gdsatcom.com/ctereps.html

Specifications

OPERATING/DISPLAY MODES

AM/FM Monitor	Cable Fault Locator (Opt.)
AM/FM Generator	Frequency Counter
Audio Synthesizer	Frequency Error Meter
Spectrum Analyzer	Digital Voltmeter
Duplex Generator	Power Meter
Sweep Generator	Oscilloscope
Tracking Generator (Opt.)	Signal Strength Meter
DualScope (Opt.)	SINAD/Distortion Meter
AM Modulation Meter	FM Deviation Meter

GENERAL

Displayed Average Noise Level (DANL):	-120 dBm (50 Ohm input termination)
Dynamic Range:	80 dB
Input Related Spurious:	-60 dBc max
Residual Spurious (non-input related):	-70 dBm
POWER	
DC Power Requirements:	24VDC @ 5.0 A max (AC adapter included)
Battery Power:	Optional External Battery
Battery Operation:	1 hour minimum
MECHANICAL / ENVIRONMENTAL	
Weight:	<14 lbs (6.4 kg)
Diminensions:	9.4"(23.9 cm) high 12.7"(32.3 cm) wide 7.5"(19.1 cm) deep
Operating Temperature:	0º to 50º C
Storage Temperature:	-30º to +80º C
WARRANTY	
Standard Warranty:	One year
Three Year Service Plan:	Optional
Five Year Service Plan:	Optional

GENERATOR (Receiver Test)

Port Protection Limit:	50W for 30 seconds
Frequency Range:	250 kHz to 1 GHz
Extended Frequency Range (Optional):	250 kHz to 3 GHz
Frequency Resolution:	1 Hz
OUTPUT LEVEL GENERATE PORT	
Range:	+5 dBm to -95 dBm
Resolution:	0.1 dB
Accuracy:	±1 dB to 1GHz; ±2dB > 1 GHz
OUTPUT LEVEL RF I/O PORT	
Range:	-30 dBm to -130 dBm
Resolution:	0.1 dB
Accuracy:	±1 dB to 1GHz; ±2dB > 1 GHz
SPECTRAL PURITY	
Harmonic Spurious:	-20 dBc max
Non-Harmonic Spurious:	-35 dBc max
Residual FM:	20 Hz max, 300 Hz to 3 kHz
Residual AM:	1.0% max, 300 Hz to 3 kHz
SSB Phase Noise (20kHz Offset):	-75 dBc/Hz
FM MODULATION	
Deviation Accuracy:	5% of setting
Deviation Range:	0 to 75 kHz
Deviation Resolution:	10 Hz
Modulation Bandwidth:	5 Hz to 20 kHz
AM MODULATION:	
AM Depth Range:	0 to 90%
Resolution:	1% of setting
Modulation Bandwidth:	100 Hz to 10 kHz
Accuracy:	5% of setting
MODULATION TYPES	1 kHz Tone Private Line Digital Private Line Single Tone DTMF External Inputs from microphone and BNC

RECEIVER (Transmitter Test)

Frequency Range:	250 kHz – 1GHz (3 GHz optional)
SENSITIVITY	
Narrowband FM:	2.0 uV for 10 dB EIA SINAD
Wideband FM:	10 uV for 10 dB EIA SINAD
AM:	10 uV for 10 dB EIA SINAD
RF I/O PORT	
VSWR:	< 1.20:1
Max Power:	50 W for 5 minutes 150 W for 30 seconds (30 sec. on, 5 min. off)
Absolute Max Power:	150 W
Alarm:	Internal temperature alarm
ANTENNA PORT	
Maximum Power:	0 dBm
Alarm:	+10 dBm
IF FILTERS:	6.25 kHz, 12.5 kHz, 25 kHz, 60 kHz, 200 kHz
FREQUENCY ERROR MEASUREMENT	
Type of Display:	Autoranging
Resolution:	1 Hz
FM DEVIATION MEASUREMENT	
Demodulation Range:	Up to ±5 kHz in Narrowband Up to ±75 kHz in Wideband
Accuracy:	±5% plus peak residual FM
Frequency Response:	Selectable per the following: Low Pass Filters: 300 Hz, 3 kHz, 20 kHz High Pass Filters: 5 Hz, 300 Hz, 3 kHz
Demodulated Output Level:	0.8 V peak per 1 kHz peak deviation in Narrowband and per 10 kHz deviation in Wideband
Demodulation Output Impedance:	100 ohms nominal
Deviation Alarm:	Audible, set via keypad in 100 Hz increments
AM MODULATION MEASUREMENTS	
Demodulation Range:	0 to 100%
Accuracy:	±5% for levels below 80%
Frequency Response:	Selectable per the following: Low Pass Filters: 300 Hz, 3kHz, 20kHz High Pass Filters: 5 Hz, 300 Hz, 3 kHz
Demodulated Output Level:	0.8 V peak per 10% AM Modulation
Output Impedance:	100 ohms nominal
RECEIVE SIGNAL STRENGTH LEVEL METER	
Frequency Range:	250 kHz – 1GHz (3 GHz optional)
Accuracy:	±2 dB
Sensitivity:	-120 dBm
BROADBAND POWER METER (T/R PORT)	
Frequency Range:	250 kHz – 1GHz (3 GHz optional
Measurement Range:	0.1 W to 150 W
Input Impedanace:	50 Ohms w/ max. VSWR of 1.5:1
Accuracy:	±10%
Protection:	Over temp alarms
FREQUENCY COUNTER	
Frequency Range:	5 Hz to 100 kHz
Period Counter Range:	5 Hz to 20 kHz
Input Level:	0.1 V rms min
SINAD METER	
Accuracy:	±1 dB @ 12 dB SINAD
Input Level:	0.1 V rms min

Specifications (Cont.)

RECEIVER (Transmitter Test) (Cont.)

DISTORTION METER	
Range:	1% to 20%
Distortion Accuracy:	The greater of: ±0.5% of distortion or ±10% of reading
Input Level:	0.1 V rms min
OPTIONAL DIGITAL DEMODULATION METERS	MOTOTRBO™

SPECTRUM ANALYZER

SWEEP	
Frequency Range:	250 kHz – 1GHz (3 GHz optional)
Frequency Resolution:	1 Hz
Span Accuracy:	5%
Update Rate:	~10 times per second (depending on span)
AMPLITUDE	
Level Accuracy:	±2 dB
Scales (dB/div):	1, 2, 5, 10
Log Linearity Accuracy:	< 0.1 dB
Reference Level Resolution:	1 dB
Reference Level Range:	+60 to -70 dB
Antenna Port Dynamic Range:	80 dB
T/R Port Dynamic Range:	80 dB
Typical Noise Floor Performance:	-120 dBm
Residual Phase Noise:	-75 dBc/Hz @ 10 kHz offset
RESOLUTION BANDWIDTH	40 Hz, 80 Hz, 160 Hz, 320 Hz, 640 Hz, 1280 Hz (auto selected)
Harmonic Spurious (Antenna Port, No Attenuation):	-20 dBc max
Non-Harmonic Spurious (Antenna Port, No Attenuation):	-60 dBc max
Residual Spurious (Input Terminated):	-70 dBm
Markers:	Delta, Absolute Level, and Frequency
Modes:	Standard, Average, Freeze, Max Hold, and Peak Hold

OSCILLOSCOPE

VERTICAL INPUT	
Input Impedance:	1 Meg Ohm / 600 Ohm (Selectable)
Range:	±100 VDC, ±70 Vrms AC
Accuracy:	5% of full scale
Bandwidth:	0 to 50 kHz
HORIZONTAL SWEEP	
Range:	20 uSec to 1 Sec / div. (Selectable)
TRIGGER SELECTION	Normal, Auto (Free Running), Single Sweep
SPECIAL FUNCTIONS	
Markers:	Delta Voltage, Delta Frequency, Delta Period

AUDIO MODULATION SYNTHESIZER

Modulation Types:	1 kHz tone, Private Line, Digital Private Line, Single Tone, DTMF, Two-Tone Paging, 5/6 Tone Paging, International Select V, 20 Tone General Sequence, Tone Remote Control, External inputs from both a supplied microphone and BNC input.
Modulation Output Amplitude Flatness:	5 Hz to 20 kHz ±1 dB
Modulation Output Level:	Programmable to ±8 V peak
1 kHz Tone Distortion:	Not to exceed 1% THD
External Mod In Input Impedance:	600 Ohms

TRACKING GENERATOR

Frequency Range:	250 kHz – 1GHz (3 GHz optional)

DIGITAL VOLTMETER (DVM)

Input Impedance:	1 M Ohm
Voltage Range:	1 V, 10 V, 70 V full scale
Frequency Range:	50 Hz to 20 kHz
DC Accuracy:	1% full scale ±1 LSB
AC Accuracy:	5% full scale ±1 LSB

TIMEBASE

Output Frequency:	10 MHz
Stability:	Aging: ±0.1 ppm / year Temp.: ±0.01 ppm
Output Level:	Minimum 0 dBm into 50 Ohms
Warm Up:	3 minutes: within ±0.1 ppm

DISPLAY

FRONT PANEL DISPLAY	
Resolution:	800 x 600
Size:	8.4" (21.3 cm) Full Color LCD
EXTERNAL DISPLAY	VGA

REMOTE INTERFACE (Optional Feature)

Remote Front Panel	Available over Ethernet

Ordering Information

Item #	Description
R8000A	Communications System Analyzer, 1GHz
R8000A-Premier	Premier Package, w/ highlighted options (*)

Accessories included with every unit:

- Antenna
- Microphone
- Power Cord
- Oscilloscope Probe
- Users Manual CD

Options	Description
*R8-3G	3GHz Operation
*R8-Remote	Remote Control Software
*R8-TG	Tracking Generator
*R8-ESA	Enhanced Spec. An./ Oscilloscope
*R8-CF	Cable Fault Locator
*R8-SC	Soft Carrying Case
R8-TC	Transit Case
R8-TRBO	MOTOTRBO™ test package
R8-3Y	Three Year Service Plan
R8-5Y	Five Year Service Plan

1) *Bright 8.4" Color LCD with wide viewing angles*
2) *User-Friendly, softkey driven operation*
3) *Tuning Knob for quick and easy changes of numeric entries: Digital precision with an analog feel*
4) *Off-the-air antenna port for sensitive receiver measurements*
5) *VGA, Ethernet, Key Loader, and additional USB ports*
6) *One-touch mode keys take you directly to the instrument you need*
7) *Escape Key returns user to previous screen for easy navigation*

Service, maintenance and technical support

For support on General Dynamics test equipment contact:

United States:
General Dynamics SATCOM Technologies, Inc.
3750 W. Loop 281
Longview, TX 75604
Phone: (480) 441-0664

Canada:
Navair, Inc.
6375 Dixie Road
Mississauga, Ontario
Canada, L5T2E7
Phone: (800) 668-7440

Japan and Korea:
Nextec Japan Ltd.- Nextec High Tech Center
10-8 Mitsuzawanakamachi, Kanagawa Ward
Yokohama City, Japan 221-0851
Phone: +81-45-410-2287

Australia and New Zealand:
Australian Support Center
Motorola Australia Pty. Ltd.
10 Wesley Court
Tally Ho Business Park
East Burwood, VIC 3151
Australia
Phone: +61-3-9847-7725

Asia and the Pacific Rim (excluding Japan), Europe, Latin America, Middle East, and Africa:
General Dynamics SATCOM Technologies, Inc.
3750 W. Loop 281
Longview, TX 75604
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