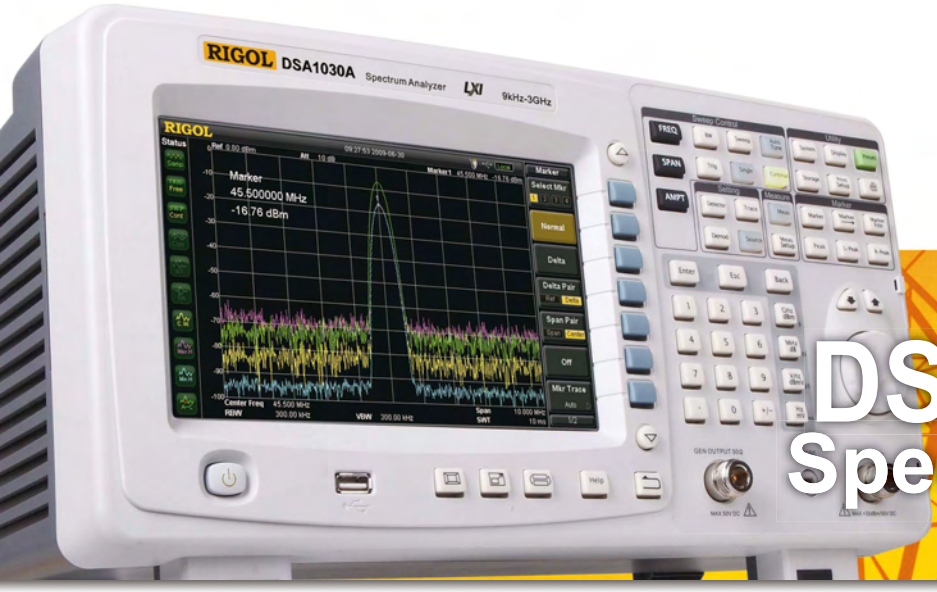
RIGOL
Beyond Measure

2010



DSA1000A series Spectrum Analyzer

- 9 kHz to 3 GHz Frequency Range
- -148 dBm Displayed Average Noise Level (DANL)
- -88 dBc/Hz@10 kHz Phase Noise (typ.)
- Total Amplitude Uncertainty <1.0 dB
- 10 Hz Minimum Resolution Bandwidth (RBW)
- Standard with Preamplifier
- 3 GHz Tracking Generator (optional)
- Built-in lithium battery that can provide 3 hours continuous operation (optional)
- Breadth of measurement functions and automatic settings provide ultimate flexibility
- 8.5 inch widescreen display with clear, vivid, and easy to use graphical interface
- Various interface options such as LAN\USB host, USB device, VGA or GPIB (optional)
- Compact design with a weight of only 13.7 lbs (without battery)

DSA1000A series is a compact and light spectrum analyzer with premium performance for portable applications. Our use of digital IF technologly guarantees reliability and performance to meet the most demanding RF applications.

Unique widescreen display, friendly interface and easy-to-use operations

The LCD display is an 8.5 inch widescreen with 800 x 480 high resolution and fine spectral lines for displaying large data sets (601 display points in normal and 761 points in full screen mode)

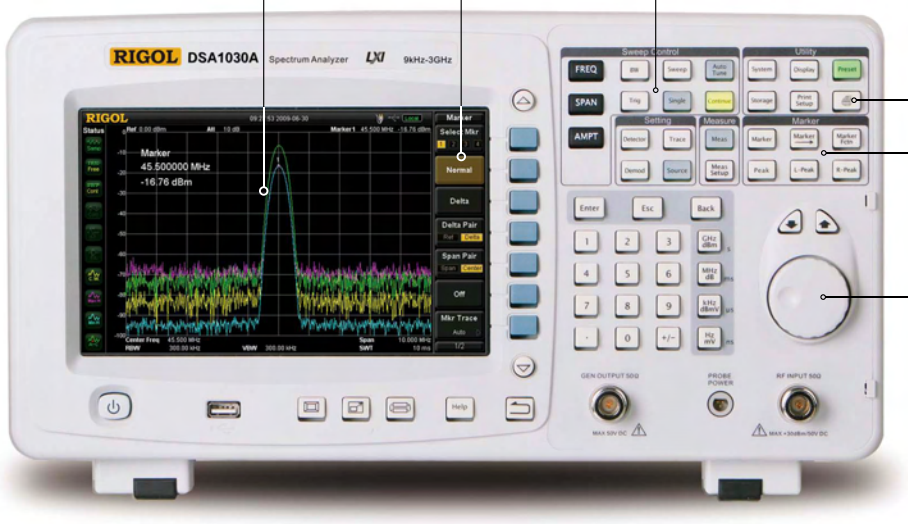
Special menu design keeps many of the operation menus in the same interface without paging

Clear keyboard division and button layout bring better usability to the instrument

One-key for saving results

common shortcut key design including L-Peak and R-Peak enhance your working efficiency

designed with broad uses in mind, the knob gives users more freedom with parameter modification and cursor positioning



Advanced Performance and stability

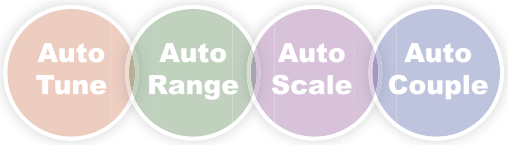
Stability and precision is the primary design goal of the Series DSA1000A. We started with an all digital IF core. With the minimum 10Hz resolution bandwidth, -88 dBc/Hz phase noise (typical) at 10 kHz offset, up to -148 dBm displayed average noise level (10 Hz RBW, standard preamplifier on) and less than 1.0 dB total amplitude error, the Series DSA1000A makes high precision measurements easier than ever whether the application calls for low noise or narrow resolution.

Breadth of measurement functions and automatic settings provide ultimate flexibility

DSA1000A provides a series of automatic setting functions such as Auto Tune, Auto Range, Auto Scale and Auto Couple that enable the analyzer to acquire signals and match parameters automatically, instead of the manual process used by a traditional analyzer. In addition, the User and Factory settings under the Preset function enable users to quickly and easily recall previous measurement settings.

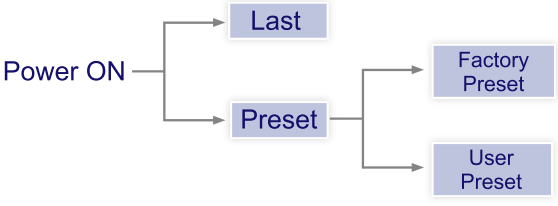
Incomparable Value

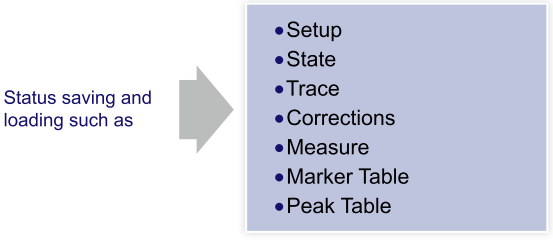
With the Series DSA1000A get a high quality spectrum analyzer without the price tag. This lowers the investment whether you are in stages related to research and development or manufacturing and maintenance. Don't let instrumentation costs dictate resource allocation. With our available calibration and maintenance training as well as firmware updates never regret a purchase because of total cost of ownership.



Benefits of Rigol's all digital IF design

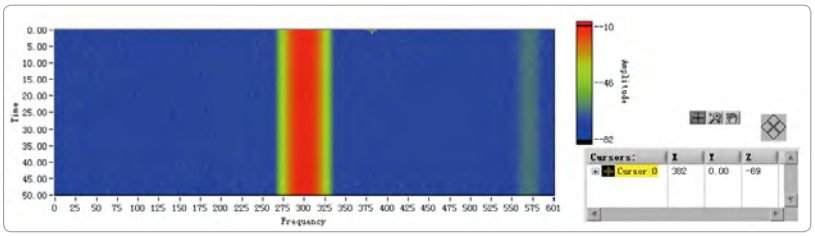
1. The ability to measure smaller signals: on the basis of this technology, the IF filter enables smaller bandwidth settings, which greatly reduce the displayed average noise level.
2. The ability to distinguish between small signals by frequency: using the IF filter with the smallest bandwidth setting it is possible to make out signals with a frequency difference of only 10 Hz.
3. High precision amplitude readings: this technology almost eliminates the errors generated by filter switching, reference level uncertainty, scale distortion, as well as errors produced in the process of switching between logarithmic and linear display of amplitude when using a traditional analog IF design.
4. Higher reliability: compared with traditional analog designs, the digital IF greatly reduces the complexity of the hardware, the system instability caused by channel aging, and the temperature sensitivity that can contribute to parts failure.
5. High measurement speed: the use of digital IF technology improves the bandwidth precision and selectivity of the filter, minimizing the scanning time and improving the speed of the measurement.

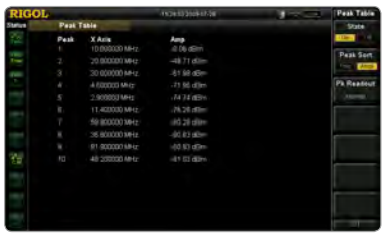


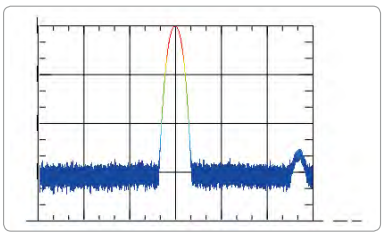


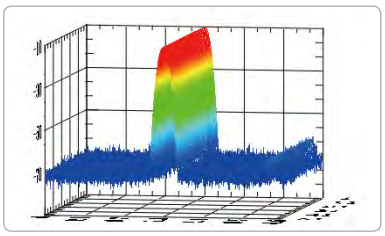
Breadth of measurement functions enhance value:

The Series DSA1000A has many measurement functions, including Time domain Power, Channel Power, Adjacent-channel Power, Occupied Bandwidth, Carrier to Noise Ratio, Harmonic Distortion, Intermodulation Distortion, Frequency Count, N dB, Noise Marker and so on, to meet the requirements of a broad set of user's measurements. In addition the software displays waterfall curves to expand the measurement capabilities to even more applications.









Flexible connectivity

With the available interfaces for the Series DSA1000A, remote control is easy through USB, LAN, or GPIB. Integrate a test system quickly with standard SCPI commands.

Compact and rugged design

The compact and rugged design makes the Series DSA1000A ideal for many portable and field applications. Spot tests are easier than ever with a small, light weight (13.7 lbs plus the battery) analyzer with 3 hour battery operation, easy carry system, and extra storage space (nonvolatile memory) onboard as well as the ability to store data directly to a USB flask device.

USB host	USB host is available to use a USB flash device to save the instrument settings and history data as well as for firmware updates
USB device	USB device is available for printing with a PictBridge printer, or to connect as a TMC instrument
LAN	LXI-C is standard and support for VISA control over ethernet is included
GPIB	Add a GPIB port with a USB-GPIB module (optional)
VGA	Connection for extending screen to an external monitor is provided for demonstrations and training

Specifications

Specifications are valid after 30 minute warm up time with a valid calibration.

Frequency

Frequency		
Frequency Range	DSA1030A	9 kHz to 3 GHz
Frequency Resolution		1 Hz
Internal Frequency Reference		
Reference Frequency		10 MHz
Aging Rate		<3 ppm/year
Temperature Drift	20℃ to 30℃	<3 ppm
Frequency Readout Accuracy		
Marker Resolution		span/(sweep points-1)
Marker Uncertainty		±(frequency indication × frequency reference uncertainty +1% × span + 10% × resolution bandwidth + marker resolution)
Marker Frequency Counter		
Resolution		1 Hz, 10 Hz, 100 Hz, 1 kHz
Uncertainty		± (frequency indication × frequency reference uncertainty + counter resolution)

Note: Frequency Reference Uncertainty = (aging rate × period since adjustment + temperature drift).

Frequency Span		
Range	DSA1030A	0 Hz, 100 Hz to 3 GHz
Uncertainty		±span / (sweep points-1)
SSB phase noise		
Carrier Offset	10 kHz	<-88 dBc/Hz typ.
	100 kHz	<-100 dBc/Hz typ.
	1 MHz	<-110 dBc/Hz typ.

Note: typical fc = 500 MHz, RBW≤1 kHz, sample detector, and trace average≥50.

Bandwidths		
Resolution Bandwidth (-3 dB)		10 Hz to 1 MHz, in 1-3-10 sequence
RBW Uncertainty		< 5%, nominal
Resolution Filter Shape Factor (60 dB: 3 dB)		< 5, nominal
Video Bandwidth (-3 dB)		1 Hz to 3 MHz, in 1-3-10 sequence

Amplitude

Measurement Range		
Range		DANL to +30 dBm
Maximum rated input level		
DC Voltage		50 V
CW RF Power	RF attenuation ≥ 20 dB	30 dBm (1W)
Max. Damage Level		40 dBm (10W)

Note: when input level >33 dBm, the protection switch will be on.

1dB gain compression		
Total power at input mixer	fc ≥ 50 MHz, preamplifier off	>0 dBm

Note:Mixer power level(dBm) = imput power(dBm) – input attenuation(dB).

Displayed Average Noise Level (DANL)		
0 dB RF Attenuation, RBW=100Hz, VBW=10Hz, Sample Detector, Trace Average ≥ 50		
DANL (Peamplifier Off)	100 kHz to 10 MHz	<-85 dBm-3 × (f/1 MHz)dB, typ. -125 dBm
	10 MHz to 2.5 GHz	<-127 dBm+3 × (f/1 GHz)dB, typ. -130 dBm
	2.5 GHz to 3 GHz	<-115 dBm
DANL (Peamplifier On)	100 kHz to 1 MHz	<-103 dBm
	1 MHz to 10 MHz	<-103 dBm-3 × (f/1 MHz)dB, typ. -143 dBm
	10 MHz to 2.5 GHz	<-103 dBm-3 × (f/1 MHz)dB, typ. -148 dBm
	2.5 GHz to 3 GHz	<-133 dBm

Level Display		
Logarithmic Level Axis		1 dB to 200 dB
Linear Level Axis		0 to Reference Level
Number of Display Points	Normal	601
	Full Screen	751
Number of Traces		3 + Math trace
Trace Detectors		Normal, Positive-peak, Negative-peak, Sample, RMS, Voltage Average
Trace Functions		Clear Write, Max Hold, Min Hold, Average, View, Blank
Units of Level Axis		dBm, dBmV, dBμV, nV, μV, mV, V, nW, μW, mW, W

Frequency Response		
10 dB RF attenuation, relative to 50 MHz, 20℃ to 30℃		
Frequency Response (Peamplifier Off)	100 kHz to 3 GHz	<0.7 dB
Frequency Response (Peamplifier On)	1 MHz to 3 GHz	<1.0 dB
Input Attenuation Switching Uncertainty		
Setting Range		0 to 50 dB, in 1 dB step
Switching Uncertainty	fc=50 MHz, relative to 10dB, 20℃ to 30℃	< (0.3 + 0.01 x attenuator setting) dB
Absolute Amplitude Uncertainty		
Uncertainty	fc=50 MHz, peak detector, preamplifier off, 10 dB RF attenuation, input signal=-10 dBm, 20℃ to 30℃	±0.4 dB
RBW Switching Uncertainty		
Uncertainty	10 Hz to 1 MHz, relative to 1 kHz RBW	<0.1 dB

Reference Level		
Range		-100 dBm to +30 dBm, in 1 dB step
Resolution	Log Scale	0.01 dB
	Linear Scale	4 digits
Level Measurement Uncertainty		
Level Measurement Uncertainty	95% confidence level, S/N>20 dB, RBW=VBW=1 kHz, preamplifier off, 10 dB RF attenuation, -50 dBm<reference level<0, 10 MHz<fc<3 GHz, 20 ºC to 30 ºC	<1.0 dB, nominal
RF Input VSWR		
10 dB RF Attenuation		
VSWR	100 kHz to 10 MHz	<1.8
	10 MHz to 2.5 GHz	<1.5
	2.5 GHz to 3 GHz	<1.8
Intermodulation		
Second Harmonic Intercept (SHI)		+35 dBm
Third-order Intermodulation (TOI)	fc >30 MHz	+7 dBm

Spurious Responses		
Image Frequency		<-60 dBc
Intermediate Frequency		<-60 dBc
Spurious Response, Inherent		<-88 dBm, typ.
Spurious Response, Others	Referenced to local oscillators, referenced to A/D conversion, referenced to subharmonic of first LO, referenced to harmonic of first LO	<-60 dBc
Input Related Spurious	Mixer level: -30 dBm	<-60 dBc, typ.

Sweep

Sweep Time Range	100 Hz ≤ Span ≤ 3 GHz	10 ms to 3000 s
	Span = 0 Hz	20 μs to 3000 s
Sweep Time Uncertainty	100 Hz ≤ Span ≤ 3 GHz	5%, nominal
	Span = 0 Hz	0.5%, nominal
Sweep Mode		Continuous, single

Trigger Functions

Trigger		
Trigger Source		Free run, Video, Extemal
External Trigger Level		5V TTL level

Tracking Generator (Option for DSA1030A)

TG Output		
Frequency Range		9 kHz to 3 GHzr
Output Level		-20 dBm to 0 dBm, in 1 dB steps
Output Flatness	10 MHz to 3 GHz, referenced to 50 MHz	±3 dB

Inputs and Outputs

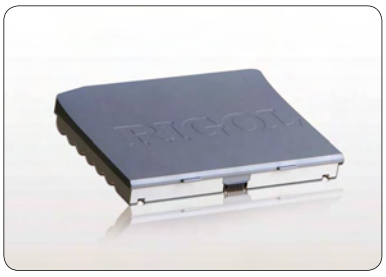
RF Input		
Impedance		50 Ω
Connector		N female
TG out		
Impedance		50 Ω
Connector		N female
Probe Power		
Voltage/Current		+15 V, <10% at 150 mA
		-12.6 V, <10% at 150 mA
10MHz REF In / 10 MHz REF Out / External Trigger In		
Connector		BNC female
10 MHz REF Amplitude		0 dBm to 10 dBm
Trigger Voltage		5 V TTL level
USB		
	USB Host	
Connector		B plug
Protocol		Version2.0
	USB Device	
Connector		A plug
Protocol		Version2.0
VGA		
Connector		VGA compatible, 15-pin mini D-SUB
Resolution		800×600, 60 Hz

General Specifications

Display		
Type		TFT LCD
Resolution		800×480
Size		8.5”
Colors		65536
Printer Supported		
Protocol		PictBridge
Remote Control		
USB		USB TMC
LAN Interface		10/100 Base-T, RJ-45
IEC/IEEE bus (GPIB)	with opt. USB-GPIB	IEEE488.2
Mass Memory		
Mass Memory		Flash disk (internal),
		USB Disk (not supplied)
Data Storage Space	Flash disk (internal)	1 G Bytes
Power Supply		
Input Voltage Range, AC		100 V to 240 V, norminal
AC supply frequency		45 Hz to 440 Hz
Input Voltage Range, DC		10 V to 18 V, norminal
Power Consumption		Typ. 35 W,Max 60 W with all options.
Operation Time at DC Power Supply		About 3 hours
Temperature		
Operating temperature range		5℃ to 40℃
Storage temperature range		-20℃ to70℃
Dimensions		
	(W × H × D)	399 mm × 223 mm × 159 mm
		(15.7 inches× 8.78 inches × 6.26 inches)
Weight		
	Without battery pack	6.2 kg (13.7 lbs)
	With battery pack	7.4 kg (16.3 lbs)

Options and Accessories

Rack Mount Kit (DSA1000-RMSA)



Battery option(BAT)

Soft Carring Bag(DSA1000-SCBA)

USB to GPIB Converter(USB-GPIB)

Desk Mount Instrument Arm(ARM)

Ordering Information

	Description	Order Number
Model	Spectrum Analyzer, 9 kHz to 3 GHz (with preamplifier)	DSA1030A
Standard Accessories	Front Panel Cover	
	Quick Guide (Hard Copy)	
	CDROM (User Guide, Programming Guide)	
	USB Cable	
	Power Cable	
Options	3 GHz Tracking Generator (for DSA1030A)	DSA1030-TG3
	USB to GPIB Interface Converter for Instrument	USB-GPIB
	11.1 V, 147 Wh Li-ion Battery Pack	BAT
Optional Accessories	Rack Mount Kit	DSA1000-RMSA
	Front Panel Cover	DSA1000-FPCS
	Soft Carrying Bag	DSA1000-SCBA
	Desk Mount Instrument Arm	ARM
Orderable Manuals (Hard Copy)	Quick Guide, Chinese	QGD010
	Quick Guide, English	QGD011
	User Guide, Chinese	UGD010
	User Guide, English	UGD011
	Programming Guide, Chinese	PGD010
	Programming Guide, English	PGD011

RIGOL

For further information, please contact RIGOL local distributors.