RF / MICROWAVE

PRODUCT CATALOG

Industry-Leading Precision Test & Measurement Instrumentation

2021-2022

BERKELEY NUCLEONICS CORPORATION

ABOUT | BERKELEY NUCLEONICS CORPORATION

Berkeley Nucleonics Corporation (BNC) is a manufacturer of test, measurement and nuclear instrumentation. Founded in 1963, the company grew out of the Lawrence Berkeley National Laboratory. As a technology provider, BNC offers RF and Microwave instrumentation that constantly disrupts traditional industries.

Our products offer advanced specifications, innovative packaging and GUI options, and an excellent overall customer experience.

In addition to a suite of unique product features, our support and customer service teams are available around the clock for onsite and web-based application help.

Our products are sold around the globe through a partner network and dozens of local representatives.

Divisions

Berkeley Nucleonics offers products for Nuclear Science, High Energy Physics, Industrial Test & Measurement and Academia.

Services

Berkeley Nucleonics along with engineering and manufacturing partners, guarantees the highest quality standards and manufacturing best practices are employed. This attention to quality and eye for detail has driven some of the most exciting products through development, routinely surpass specifications from alternative manufacturers. The company was founded on sound engineering principles and continues to address the industry's most challenging needs.

Logistics

BNC offers many options to address your specific logistical needs. We offer same-day demonstration shipments, local manufacturer's representatives who can perform site visits and product demonstrations on short notice, expedited case handling and shipping. We also offer several remote service tools for troubleshooting or on-site real-time services. We understand many applications are sensitive to delays and outshine our competitors with fast support and comprehensive servicing.

Maintenance & Repair

All Test and Measurement instruments are shipped with a 2-year warranty period. Additional warranty options and service agreement plans are available. Repair services are available locally or from the factory and continue for a minimum of 5 years after the product is obsolete. BNC routinely repairs T&M products which have been in use for several decades.

Technical & Logistic Support

Our regional distributors and manufacturer's representatives have trained and knowledgeable personnel to assist with product start-up, ongoing application support, and periodic troubleshooting. These local contacts also offer support with clarification of the application requirements, unit demonstrations, application notes and documentation, and first-tier technical support.

Calibration

All Test and Measurement instruments are fully calibrated and delivered with calibration certificates. The units are calibrated to published specifications and revision control ensures past calibration information is readily available. A NIST traceable standards lab provides any needed calibration support documentation for specific customer needs. Regular calibration is recommended and intervals are product specific.

Product Updates

Firmware and Client GUI software for our Test & Measurement instruments are continuously maintained and updated. They are available on our website and always no-cost to existing customers. In addition, we have numerous regional support offices with qualified service personnel who can offer product updating services.

Overview

PACKAGING SOLUTIONS AVAILABLE FOR ALL SIGNAL GENERATORS

Portable desktop enclosure with LCD - most compact and rugged when size and weight matter

For Synthesizer Modules - a shielded enclosure with connector panels and mounting holes

OEM Module Enclosure - a compact, shielded design for ultimate flexibility in system integration

19'' Rack Mount Enclosure - a 1U enclosure to reduce your footprint and keep systems standardized

19'' Rack Mount Enclosure - a 3U mounting kit to mount 2 portable units.

Frequency Synthesizers

LOW NOISE SYNTHESIZER MODELS UP TO 20 GHZ

GENERAL DESCRIPTION

The Model 825-M is a compact and agile signal synthesizer up to 20 GHz. It combines fast switching speeds with good phase noise and signal quality. The multi-channel version, the Model 825-M-X is available in 1,2,3, or 4 channel configurations in a standard 19''' 1U rack-mountable enclosure.

OPTIONS

Touch	Touch Screen (Desktop Enclosure)
Option 9K	Frequency Range Extension Down to 8 kHz
Option FS	Enhanced Switching Speed (includes Fast Protocol Port)
Option GPIB	GPIB Interface Port

MODELS

825-M, 825-M-X

COMPARISON / SPECIFICATIONS

	Model 825-M	**Model 825-M-X**
# of channels	1	1, 2,3,4
Frequency **Range** **Resolution** **Accuracy**	 8 kHz to 20 GHz 0.01 Hz 100ppb	 8 kHz to 20 GHz 0.01 Hz 100ppb
Output Power	+18 dBm	+18 dBm
Switching Speed	200 µs (5 µs with option FS)	200 µs (5 µs with option FS)
Phase Noise At 1 GHz	at 1 kHz: -120 dBc/Hz at 20 kHz: -130 dBc/Hz at 10 MHz: -155 dBc/Hz	at 1 kHz: -120 dBc/Hz at 20 kHz: -130 dBc/Hz at 10 MHz: -155 dBc/Hz
Remote Control	Ethernet, USB , GPIB	Ethernet, USB , GPIB
Modulation	Pulse	Pulse
Sweeps	List, Frequency	List, Frequency
Dimensions (W x L x H), Weight	**825-M:** 10.6'' x 4.1'' x 2.4'' in [270 x 105 x 60 mm] 2.2lbs (1.0kg)	**825 -M-X:** 16.8'' x 18.9'' x 1.7'' in [426 x 480 x 43 mm] 22lbs (10kg)

Frequency Synthesizers

LOW NOISE SYNTHESIZER ***MODELS UP TO 40 GHZ***

GENERAL DESCRIPTION

The 865M consists of low phase-noise synthesizers operating up to 40 GHz. The modules have a mHz frequency resolution and use a high-stability internal reference. The internal reference can be phase-locked to a programmable external reference. The modules have USB and LAN interfaces and can be controlled using SCPI 1999 command set. Operated with an external DC supply, they typically consume less than 10 W power.

Berkeley Nucleonics also offers multiple phase-coherent synchronous output configurations with up to 4 outputs.

Model 845-M

Model 865B-M-40-X

MODELS

845-M, 845-M-X, 865-M, 865B-M-40-X

KEY FEATURES

- Low phase noise
- Fast Switching
- FM chirps, Pulse
- Internal OCXO, external variable reference
- Single 6V DC supply

APPLICATIONS

- ATE
- LO for Frequency Converters
- Telecom / SatCom
- Embedded Systems
- OEM Microwave Signal Source

AVAILABLE OPTIONS - (* - Model 865B-M Option Exclusive)

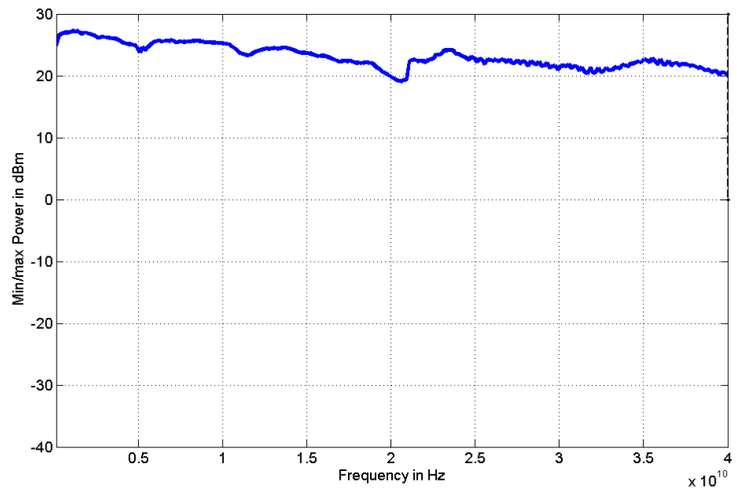
Option LN *	Enhanced close in phase noise and frequency stability	**Option VREF***	Variable External Reference
Option FS	Ultra-Fast Switching Speed	**Option GPIB**	GPIB Interface
Option ALC *	Automated Level Control	**Option FILT***	Enhanced Harmonic Rejection
Option PHS*	Phase Coherent Switching	**Option MOD**	Frequency Range Extension to 8kHz
Option FM*	Frequency / Phase Modulation	**Option HI***	Special High Isolation Enclosure

845-M available in Option 1URM

COMPARISON / SPECIFICATIONS

	Model 845-M **Model 845-M-X**	**Model 865B-M-40-X**
# of channels	1, 2	1, 2, 3,4
Frequency **Range** **Resolution**	 0.01 to 20 GHz 0.001 Hz	 100 kHz to 40 GHz 0.00001 Hz
Accuracy	±100 ppb	±100 ppb (±20 ppb with option LN)
Output Power	+23 dBm	+20 dBm
Switching Speed	180 µs (25 µs with option FS)	500 µs (20 µs with option FS)
Phase Noise At 1 GHz	at 1 kHz: -118 dBc/Hz at 20 kHz: -128 dBc/Hz at 10 MHz: -150 dBc/Hz	at 1 kHz: -132 dBc/Hz at 20 kHz: -145 dBc/Hz at 10 MHz: -155 dBc/Hz
Remote Control	Ethernet, USB , GPIB (Optional)	Ethernet, USB, GPIB (Optional)
Modulation	FM/PM, Pulse, Chirp	FM/PM, Pulse, Chirp
Sweeps	List, Frequency	List, Frequency
Dimensions (W x L x H), Weight	**845-M:** 8.27 x 4.13 x 2.36 in [210 x 105 x 60 mm] < 2.2 lbs (1.0 kg) **845-M-X:** 16.93 x 18.11 x 1.69 in [430 x 460 x 43 mm] < 22lbs (10kg)	**865B-M-40-X** 16.93 x 18.11 x 1.69 in [430 x 460 x 43 mm] < 22lbs (10kg)

PERFRMANCE PLOTS



865B-M, Maximum Output Power (without option FILT)

Frequency Synthesizers

MULTI-CHANNEL MODELS UP TO 40 GHZ

GENERAL DESCRIPTION

The 855B series offers phase-coherent, multi-output, ultra-fast switching, and low phase noise signal generators with a frequency range from 300 kHz to 6, 12, 20, or 40 GHz. They are ideally suited for a wide range of applications where good signal quality and accurate power over a wide power range are required. Excellent phase noise is combined with good spurious and harmonic rejection and a leading-edge switching speed of 25 us.

A high-stability OCXO reference provides excellent frequency accuracy and stability. The generator accepts a wide range of external references, including the commonly used 10 and 100MHz for higher phase synchronization.

The 855B comes in a standard 19" 1U (up to 4 channels) and offers various control interfaces like USB, LAN, or GPIB. Each interface allows for easy and fast communication using SCPI 1999 command sets. Remote controls of the instrument can be quickly attained from any host system. A customer-supplied application programming interface (API) and programming examples for Matlab, Labview, C++, and other commercially available tools make test implementation very straight forward.

MODELS

855B-6, 855B-12, 855B-20, 855B-40

Model 855B-2C
(HI Option)

SPECIFICATIONS

	Model 855B	
Frequency		
Range	300 kHz to 6, 12, 20 or 40 GHz	
Resolution	0.001 Hz	
Power Range	– 30 to +25 dBm / – 90 to +23 dBm (with option PE4)	
Switching Speed	25 µs	
Phase Noise At 1 GHz	Standard Option at 10 Hz: -87 dBc/Hz at 1 kHz: -130 dBc/Hz at 20 kHz: -145 dBc/Hz at 100 kHz: -150 dBc/Hz	With LN option: at 10 Hz: -100 dBc/Hz
Remote Control	Ethernet, USB, GPIB (Optional)	
Modulation	Pulse, AM, FM, PM	
Sweeps	List, Frequency, Power, Phase	
Dimensions (W x L x H), Weight	19“ 1U enclosure: 16.8 x 18.1 x 1.7 in [426 x 460 x 43 mm] ≤ 22.05 lbs (10 kg)	

KEY FEATURES

- Very low phase noise
- 25 µs Fast switching
- Phase coherent switching option
- 2 to 4 phase coherent outputs

APPLICATIONS

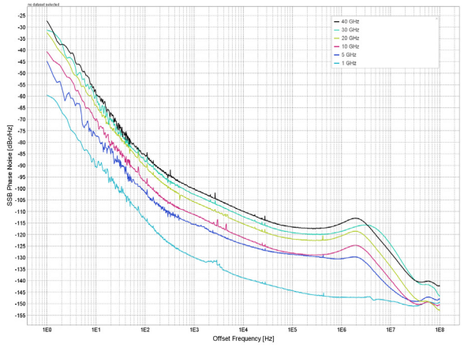
- Radar simulation
- Quantum computing
- High volume automated testing
- Phased array antenna / beamforming
- Electronic warfare

AVAILABLE OPTIONS

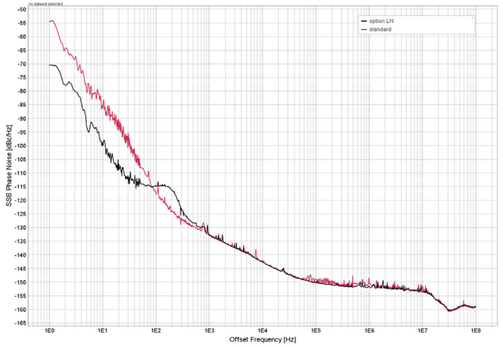
Option LN	Enhanced close in phase noise and frequency stability	**Option LN+**	Option LN with improved long term frequency stability
Option PE-4	Electrical step attenuator	**Option VREF**	Flexible External reference frequency support in range 1 to 250 MHz
Option PHS	Phase coherent switching	**Option GPIB**	GPIB interface
Option FS	Ultra-fast switching speed	**Option MOD**	Amplitude, Frequency, Phase Modulations

Option HI - High Isolation 19" 1U casing (Highly Improved Channel to Channel Isolation)

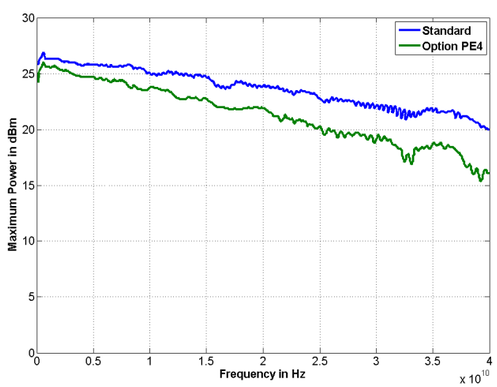
PERFORMANCE PLOTS



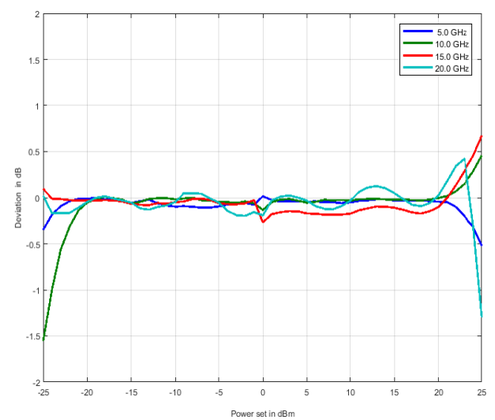
Model 855B, Phase Noise Max Output Power
(Without Option LN)



Model 855B, Phase Noise 1GHz and 20 dBm
(With and Without Option LN)



Model 855B-40, Maximum Output Power
(With and Without Option PE4)



Model 855B Level Linearity

Signal Generators

MODELS UP TO 26.5 GHZ

GENERAL DESCRIPTION

Our suite of RF signal generators comprises a set of very compact, portable signal generators with analog modulation models up to 26.5 GHz. A combination of good signal purity, fast switching speed, and wide dynamic range makes these units useful for a variety of applications.

Optionally, the instruments can be operated from an internal battery module.

Model 845

MODELS

835-4, 835-6
845-12, 845-20, 845-26

COMPARISON / SPECIFICATIONS

	Model 835-4 Model 835-6	Model 845-12 Model 845-20 Model 845-26
Frequency		
Range	9 kHz to 4.0 or 6.1 GHz	100 kHz to 12, 20 or 26 GHz
Resolution	0.001 Hz	0.001 Hz
Power		
Range	-30 to +18 dBm -120 to +17 dBm (with option PE3)	-20 to +15 dBm -90 to +22 dBm (with option HP)
Resolution	0.01 dB	0.01 dB
Switching Speed	400 µs	400 µs (40 µs with option FS)
Phase Noise At 1 GHz	at 10 Hz: -80 dBc/Hz at 1 kHz: -117 dBc/Hz at 100 kHz: -130 dBc/Hz at 10 MHz: -150 dBc/Hz	at 10 Hz: -80 dBc/Hz at 1 kHz: -117 dBc/Hz at 100 kHz: -128 dBc/Hz at 10 MHz: -150 dBc/Hz
Remote Control	Ethernet, USB, GPIB (Optional)	
Modulation	AM, FM, PM, Pulse, Chirp, (AVIO - Model 835 Option Only)	
Sweeps	List, Frequency, Power	
Dimensions (W x L x H), Weight	6.77 x 10.63 x 4.21 in [172 x 270 x 106 mm] ≤ 6 lbs (2.5 kg)	

KEY FEATURES

- Frequency Range from 9 kHz to 26.5 GHz
- Adjustable Output Power from -90 dBm to +25 dBm
- Frequency and Power Switching Time Down to 40 µs
- USB, LAN, GPIB Interface

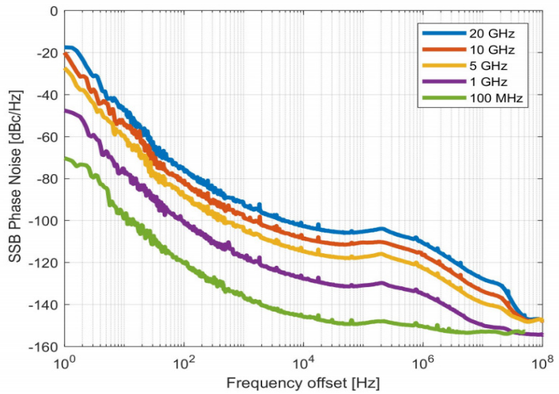
APPLICATIONS

- ATE
- R&D Low Noise Signal Source
- Signal Simulation
- Aerospace & Defense
- Low Noise Microwave Source for R&D

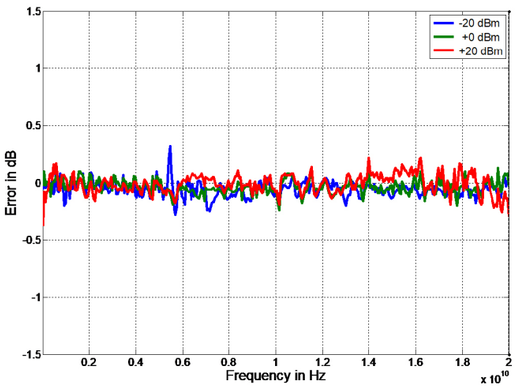
AVAILABLE OPTIONS - (* - Model 845 Option Exclusive)

Option 9K *	Frequency range extension to 9 kHz	**Option LO**	Removes all built-in modulation capabilities if not needed
Option HP *	Higher output power up to +25dBm	**Option B3**	Adds an internal rechargeable battery module
Option PE3	Extended power range down to -90	**Option 1URM**	Modifies form-factor to a 19" rack-mountable 1U enclosure
Option FS *	Enhances the switching speed	**Option GPIB**	GPIB interface

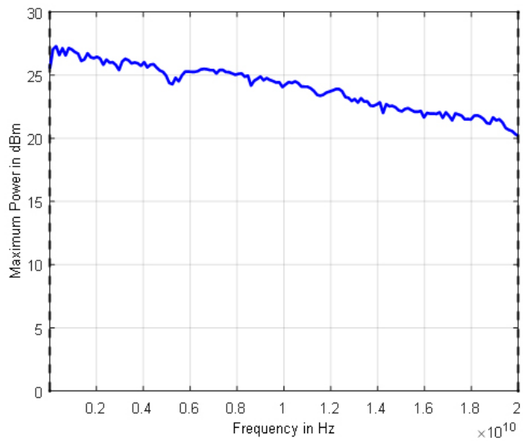
PERFORMANCE PLOTS



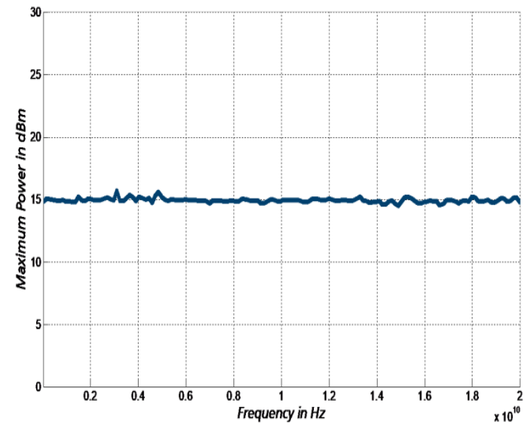
Model 845, SSB phase noise



Model 845, output power accuracy



Model 845, maximum output power (option HP)



Model 845, maximum output power (standard)

Signal Generators

HIGH-PERFORMANCE ULTRA LOW PHASE NOISE
MODELS UP TO 40 GHZ

GENERAL DESCRIPTION

The 865 series represents the set of highest performance ultra low phase noise signal generator models up to 40 GHz. Unrivaled signal purity combined with our fastest switching designs and high output power makes these models suitable for the most demanding measurement tasks.

Model 865

MODELS

865-6, 865-12.75, 865-20, 865-26, 865-40

COMPARISON / SPECIFICATIONS

	Model 865	
Frequency **Range** **Resolution**	 100 kHz to 6, 12.75, 20, 26 or 40 GHz 0.001 Hz	
Power Range	-120 to +25 dBm (with option PE4, PE2, PE, and No Option)	
Switching Speed	500 µs (30 µs with option FS)	
Phase Noise At 1 GHz	Standard: at 10 Hz: -87 dBc/Hz at 1 kHz: -130 dBc/Hz at 20 kHz: -145 dBc/Hz at 100 kHz: -150 dBc/Hz	with option LN: at 10 Hz: -95 dBc/Hz at 1 kHz: -125 dBc/Hz at 20 kHz: -140 dBc/Hz at 100 kHz: -145 dBc/Hz
Remote Control	Ethernet, USB, GPIB (Optional)	
Modulation	AM, FM, PM, Pulse (Optional)	
Sweeps	List, Frequency, Power, Phase	
Dimensions (W x L x H), Weight	6.69 x 12.44 x 4.33 in [170 x 316 x 110 mm] ≤ 8 lbs 2.5 kg	

KEY FEATURES

- Excellent signal purity: ultra-low phase noise and low spurious
- Combination of highest output power and fastest switching
- Powerful touch-display control
- Portable, external battery modules available

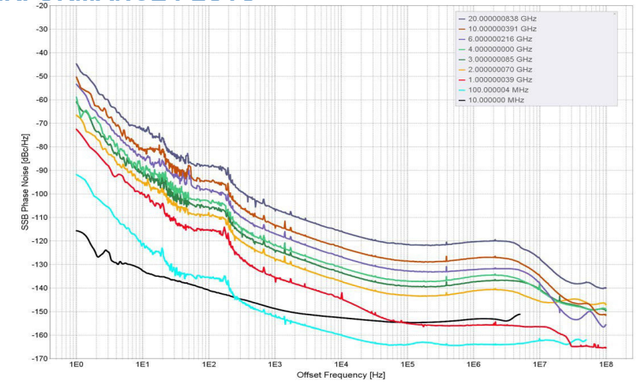
APPLICATIONS

- ATE
- R&D Low Noise Signal Source
- Signal Simulation
- Product Testing
- Service and Maintenance
- Aerospace and Defense

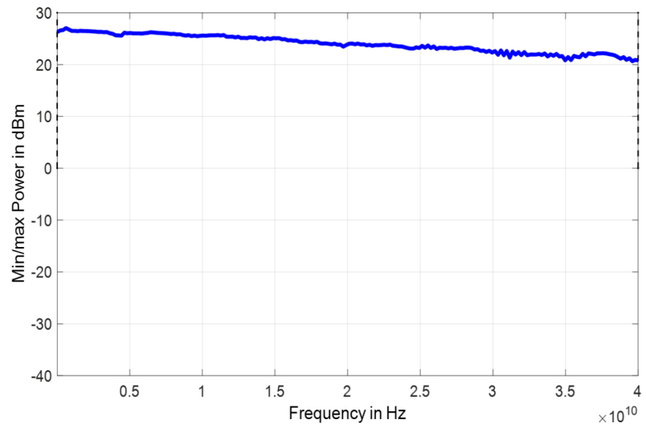
AVAILABLE OPTIONS

Option FS	Ultra fast switching speed	**Option MOD**	Add analog modulations
Option PE/ PE2 / PE4	-Extended power range down to -90 or -120 dBm, mechanical step attenuator -Extended power range down to -90 dBm, electrical step attenuator module	**Option LN**	Enhanced close-in phase noise, improved frequency stability
Option 8K	Frequency range extension to 8 kHz	**Option EB**	Add exteneral battery pack
Option FILT	Enhanced Harmonic Rejection	**Option VREF**	Variable External Reference
Option GPIB	Add GPIB Interface	**Option 1URM**	19" 1U rack enclosure

PERFORMANCE PLOTS



Model 865
SSB phase noise (standard)



Model 865
Maximum output power
0.01 to 40 GHz

Signal Source Analyzers

SIGNAL SOURCE ANALYZERS MODELS UP TO 40 GHZ

GENERAL DESCRIPTION

The 7000 series is a fully contained signal source analyzer with models from 5 MHz up to 7, 26 or 40 GHz. It offers an indispensable set of measurement functions for evaluating signal sources ranging from VHF to microwave frequencies but also active and passive non-self oscillating devices like amplifiers, or frequency dividers. A mixed-signal system architecture with a FPGA cross-spectrum engine enables very fast signal processing and ultra-low phase noise sensitivity.

Built-in programmable power supplies and low-noise tuning voltages make the unit extremely flexible and easy to use.

The full set of functions includes:

- amplitude noise and absolute and residual phase noise measurements of continuous-wave and pulse-modulated signals
- time stability measurements including Allan deviation
- cross-spectrum FFT analysis with 100 MHz bandwidth
- transient measurements
- oscillator test bench
- spectrum analysis and monitoring

MODELS

7070, 7300, 7340

SPECIFICATIONS

	7000 Series
Frequency Range	Model 7070: 5 MHz to 7 GHz Model 7300: 5 MHz to 26 GHz Model 7340: 5 MHz to 40 GHz
Input Power Range	-15 to +20 dBm
Analysis Range	0.01 Hz to 100 MHz
Phase Noise Sensitivity	see performance plot on the next page
Dimensions (W x L x H), Weight	18.4 x 13.5 x 6.1 in [467.5 x 342 x 154 mm] 22lbs (10 kg)
Measurements Supported	Phase noise (absolute & additive, CW, pulsed or burst-mode), amplitude noise (CW & pulsed), jitter, frequency counter, Allan deviation, transients of frequency / power / phase, spectrum monitoring, VCO test bench

KEY FEATURES

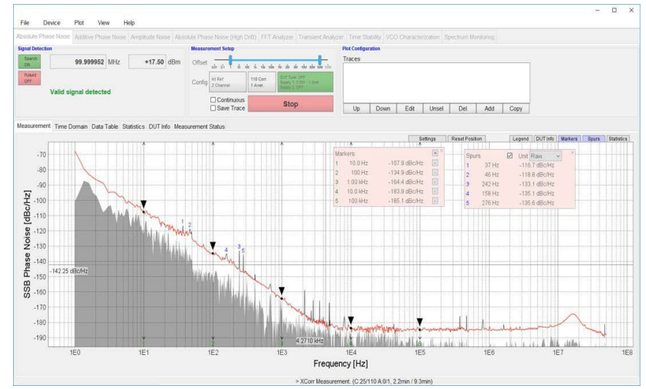
- All-in-one compact measurement system
- Measurements down to -190 dBc/Hz
- Offset range from 0.01 Hz to 100 MHz
- Highest flexibility & dynamic range by selectable internal or external references
- Programmable low noise power supplies
- Powerful GUI and programming interface
- External battery pack option

APPLICATIONS

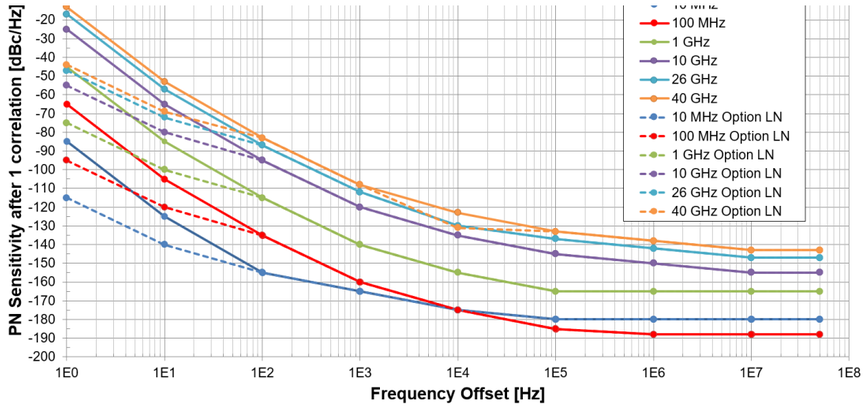
- High-speed production testing of phase noise
- VCO testing
- Additive phase noise characterization of amplifiers, transmitters, mixers
- Ultra-low phase noise crystal oscillator analysis
- Time stability analysis of clocks
- Aerospace and Defense

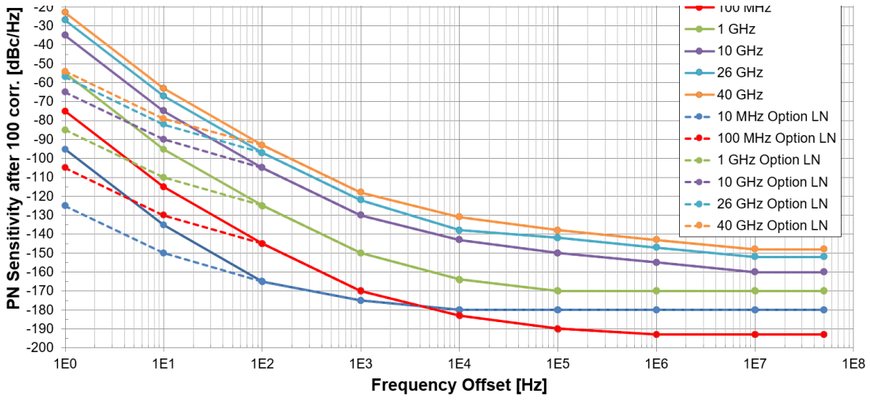
AVAILABLE OPTIONS

Option AM	Amplitude Noise Measurement
Option LN	Ultra-Low Noise Internal Sources
Option PULSE	Pulsed Signal Measurment
Option APN	Additive Phase Noise Measure-ment
Options NPS	Narrow Pulse Low Duty Cycle
Option VCO	VCO Characterization
Option TSTAB	Time Stability Analysis
Option GPIB	GPIB Interface Added
Option RM	Makes the PNT a Rackmountable Unit



7000 Series GUI





RF AND MICROWAVE

2021-2022 PRODUCT CATALOG

Authorized Manufacturer's Representative

Additional Catalogs Available

Digital & Pulse Delay Generators
Nuclear Sciences

Enroll at Berkeley Nucleonics Academy

https://academy.berkeleynucleonics.com

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