



MICRO-TEL

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SG-811

MULTI-OCTAVE MICROWAVE SIGNAL GENERATOR WITH SWEEPER FUNCTIONS



FEATURES

- .01-18 GHz - Expandable to 40 GHz
- 1 MHz Frequency Resolution
- Calibrated Output to -120 dBm
- Internal Pulse Generator with Delay and 70 dB On-Off Ratio
- 60 dB Harmonic Output
- All Sweeper Functions
- Swept Pulsed Output

- Full RF Shielding
- Removable-Remotable RF Unit to Eliminate Transmission Loss
- IEEE-488 Bus or TTL Control
- Accessory Frequency Synthesizer
- Accessory High Power Amplifier
- RF Sample
- 12 VDC Operation

DESCRIPTION

The SG-811 replaces six or more conventional signal generators and is completely self-contained in a rugged, light-weight enclosure. In addition to a signal generator, the SG-811 uniquely also provides all the functions of a modern microwave sweeper; i.e., F_1 - F_2 , ΔF , and uninterrupted multi-octave sweep.

The basic SG-811 covers 2-18 GHz with internally leveled output; ten options allow the user to configure the SG-811 to meet specific requirements.

The SG-811 is ideal for test of broadband ECM equipment in laboratory, production,

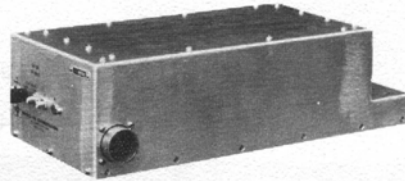
and field environments. The Remotable RF Unit is especially useful on antenna pattern ranges, as a test source for microwave receiving facilities and aircraft and shipboard ECM systems.

The FS-1000, with internal micro-processor, converts the SG-811 to fully synthesized, digitally-controlled operation. It is described in a separate data sheet.

The FE-811 Frequency Extender provides additional coverage from 18-40 GHz. The FE-811 can be synthesized and pulse-modulated.

Remote Operation

A standard feature is the Removable Remotable RF Unit which contains all RF components including options when specified. The RF Unit is fully shielded and normally operates within the mainframe. For remote operation up to 200 feet (further on special order), the RF Unit is removed from the cabinet and connected to it by the RCC-811 Remote Control Cable. All functions operate normally with the RF Unit remotod.



Power Output — Models A and B

The SG-811A and SG-811B differ only in the power output of the internal YIG oscillators — 7 and 15 milliwatts, respectively.

10 MHz to 2 GHz — Option 1

This option adds coverage from .01 to 2 GHz. Output from .01-18 GHz is from a single connector with manual switching at 2 GHz.

Calibrated Output Attenuator — Option 2/2A

This option offers the choice of a 70 dB (Option 2) or 110 dB (Option 2A) output attenuator adjustable in 10 dB steps. The attenuators are controlled manually at the front panel or digitally through a rear panel connector. This option, in conjunction with the standard continuous control, offers calibrated output to -80 or -120 dBm respectively. Attenuator accuracy is $\pm 4\%$ of the setting at 18 GHz. Output power is reduced by 2 dB, or less, and the variation in leveled output increases to ± 1.5 dB.

Filtered Output — Option 3/3A

The harmonic output of the YIG oscillators used in the SG-811 is 20 dB down. The addition of an automatically-tracked YIG filter reduces the harmonic output to 60 dB. Since the filter has a nominal insertion loss of 5 dB, it can be switched out when not in use. The filter is primarily for manually-tuned applications, but will track the swept output at increased insertion loss. Option 3 covers 2-18 GHz; Option 3A covers 0.4-18 GHz.

RF Sample — Option 4

This option provides a signal sample from 2-18 GHz at a nominal level of -10 dBm for frequency counters, synthesizers, and stabilizers. For output frequencies below 2 GHz, the 2-4 GHz oscillator is measured and offset by 2300 Mhz to display or control signal frequency. This offset is automatic in the FS-1000 Synthesizer.

Internal Pulse Generator — Option 5

Option 5 adds a self-contained pulse generator with adjustable pulse width from 0.1 to 100 usec, PRF from 100 to 10,000 Hz, and delay from .05 to 200 ms. Rise and fall times are less than 20 nanoseconds. On-Off ratio is 70 dB. Option 5 has a nominal insertion loss of 3 dB and is switched out when not in use. Means are provided to calibrate the pulse output amplitude. A sync pulse, external triggering, and external pulsing are included.

Digital Control — IEEE 488 — Option 6/6A

If BCD digital frequency control is required, Option 6 adds a D-A Converter. Option 6A provides the same control in the IEEE 488 format for frequency as well as other functions. All digital input signals terminate in a rear panel connector.

12-Volt DC Input — Option 7

The SG-811 may be operated from a positive DC source of 11.5 to 14.0 volts, as well as the standard AC voltages.

Protective Cover — Option 8

The cover fits over the front of the unit to protect the front panel controls. It is held by snap catches and provides storage for the line cord, a waveguide-to-coax adapter, and several coax adapters.

Offset Power Control — Option 9

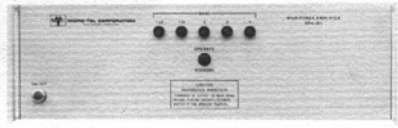
A front panel control provides manual offset of the DBM meter to compensate for cable loss between the RF Output jack and the device under test.

Provision for 18 to 40 GHz — Option 10

This option adds necessary components and circuits to the mainframe to accommodate the external 18 to 26 GHz and 26 to 40 GHz RF Unit. Contact the factory for specifications and prices for the FE-811 Frequency Extender.

High Power Output -- HPA-811

The HPA-811 uses TWT amplifiers above 2 GHz and solid-state amplifiers below 2 GHz. Leveling occurs at the output of the multiplexed amplifiers which are automatically selected by the SG-811 band selector. Depending on options, power outputs range from 200 to 1000 milliwatts from .01 to 18 GHz. Specific requirements should be discussed with the factory.



Synthesized Frequency Control -- SG-811/FS-1000

The FS-1000 converts the SG-811 to a microprocessor-controlled, synthesized signal generator over the full frequency range. Tuning is accomplished by a keyboard, external digital signals including IEEE bus, or manual optical encoder. Programmed sweeps and frequency selection can be entered by the keyboard. Residual FM is reduced to less than 50 Hz. Switching time is typically less than 30 milliseconds. Resolution is 10 kHz or 100 Hz. All manual functions of the SG-811 are retained, and the FS-1000 is easily connected or disconnected.



SPECIFICATIONS

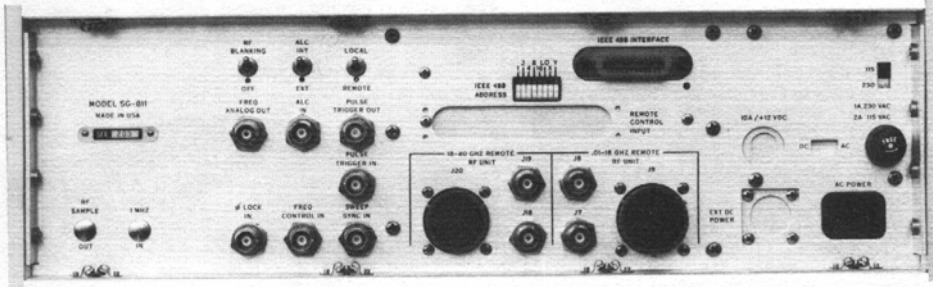
Frequency Bands - GHz	.01-2	2-18	2-4	4-8	8-12	12-18
Accuracy	+20MHz	+1%			+0.5%	
Resolution				1 MHz		
Resetability				+2 MHz		
Stability MHz/°C	.4	2.5	.5	.5	1.0	1.5
Analog Output			0 to +10 volts per band			
External Control			0 to +10 volts per band			
Harmonic Output			20 dB			
Harmonic Output w/Opt. 3/3A			60 dB			
Non-Harmonic Output	20 dB		60 dB			
Residual AM - 100 kHz BW			50 dB			
Peak Residual FM - kHz	10	50	10	15	20	30
Levelled Power Output						
SG-811A mw ±1 dB	10	7	8	8	8	7
SG-811B mw ±1 dB	16	12	15	15	15	12
Leveling - GHz	.01-2	2-18	2-4	4-8	8-12	12-18
Maximum Variation ± dB	.5	.7	.5	.5	.5	.5
[See Page 2 for effect of options on power output and leveling.]						
Output Power Control	Range		Accuracy			
Standard	20 dB Continuous		+0.2 dB			
Option 2	70 dB (10 dB steps)		±4%			
Option 2A	110 dB (10 dB steps)		±4%			
Blanking Output	+10 volts; coincides with RF blanking at 20 dB					
Markers	3 provided; -15 volts					
RFI	-90 dBm per cm ²					
Tuning Modes						
Band	Sweeps entire range selected - 5 markers.					
F ₁ -F ₂	Sweeps between selected frequencies from .01-2 and 2-18 GHz - 3 markers.					
ΔF	Sweeps 0-10% of band about any five selected frequencies.					
CW/Manual	Manually tune or preset five frequencies.					
Sweep Rate	.03 to 100 seconds.					
Sweep Modes	Internal; External-Sync; Single Sweep.					
Horizontal Output	-5 to +5 volts					

SPECIFICATIONS Cont'd.

Modulation Frequency: .1-10 kHz; External/Internal
 AM: .1 volt/dB into 10K ohms
 FM: 3 volts peak-to-peak for 0 to +5 MHz deviation
 Pulse (Option 5): .1-100 us pulse width; 70 dB on-off ratio
 20 ns rise/fall; .05-200 ms delay
 External: +5 volts into 50 ohms

Size - Weight 5-1/4 x 17 x 18 inches - 40 pounds

Power Required 115/230 volts, 50-400 Hz (12 VDC w/Option 7)



ORDERING INFORMATION

SG-811A	1.9-18 GHz - 7 mw	Please
SG-811B	1.9-18 GHz - 15 mw	
Option R	Rack Mount	See
Option 1	Adds .01-2 GHz Coverage	
Option 2	70 dB Output Attenuator	
Option 2A	110 dB Output Attenuator	Latest
Option 3	60 dB Tracked Filter - 1.9-18 GHz	
Option 3A	60 dB Tracked Filter - .40-18 GHz	
Option 4	RF Sample	Price
Option 5	Pulse Generator 70 dB On-Off Ratio	
Option 6	Digital Frequency Control	
Option 6A	Digital Control IEEE 488	
Option 7	12 VDC Input	List
Option 8	Protective Cover	
Option 9	Offset Power Level	
Option 10	Provision for 18-40 GHz Coverage	For
RCC-811	Cable for Remote RF Assembly	
C-811	Fitted Fiberglass Carrying Case	Price
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FS-1000 - Frequency Synthesizer - .01 to 18 GHz (to 40 GHz with FE-811)		And
Option R	Rack Mount	
Option 1	100 Hz Resolution	
Option 2	Parallel BCD control (replaces IEEE-488)	New
Option 3	Manual Tuning with Optical Encoder	
RCC-1000	Cable for Remote RF Head (200 ft. max.)	
C-1000	Fitted Fiberglass Carrying Case	Option
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FE-811 - Frequency Extender - 18 to 40 GHz		Information
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HPA-811 - High Power Amplifier	Contact Factory	

WARRANTY:

All Micro-Tel products are unconditionally warranted for a period of one year except for physical damage, provided the equipment is returned to the plant in Baltimore.

January 1980