

High Power Output

USB Synthesized Signal Generator SSG-4000HP

50Ω -50 dBm to +20 dBm, 250-4000 MHz

The Big Deal

- High output power (+20 dBm max)
- Adjustable output power over a 70dB range
- Small, light weight
- Easy installation and operation
- USB HID device supplied with GUI installation and control software including an API DLL com object compatible with 32/64 Bit operating systems



Installation CD with Software included

Case Style: LV1715

Product Overview

Mini-circuits' SSG-4000HP (RoHS compliant) is a wideband Synthesized Signal Generator operating over the frequency range 250 to 4000 MHz. The signal generator is cased in a rugged metal shielded package (size of 8.37" x 8.5" x 2.15") and equipped with a N-type 50Ω connector at the RF output port. The signal generator is controlled through a USB 2.0 interface using unique user friendly GUI software allowing the user to select one of several different output modes including both frequency sweep and power sweep (up, down or bidirectional) options.

The SSG-4000HP is supplied along with a CD containing the graphical user interface control program featuring an API DLL com object. Also included are a 2.7ft. USB cable, and a power adapter, see page 8 for details. Longer USB cables and a mounting bracket are available as additional options.

Key Features

Feature	Advantages
Wide output power dynamic range	Dynamic range 70 dB, output power from -50dBm to +20dBm in 0.25dB steps
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device).
Multiple sweep options	The SSG-4000HP can be set to sweep either power or frequency up, down or bidirectionally.
24V _{DC} Operating voltage	The SSG-4000HP is powered using the supplied 24V AC/DC external power adaptor with three wire line cord (Use only grounded supply)
Software CD with program instructions for various operating systems	A CD containing programming instructions for Linux [®] and windows [®] operating systems (32 and 64 bit systems), a friendly Windows [®] Graphical User Interface (GUI) control program and DLL objects is included. The SSG-4000HP is compatible with 32/64-bit Windows [®] or Linux [®] operating systems, as well as LabVIEW [®] , Delphi [®] , C++, C#, Visual Basic [®] , and .NET software.



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50Ω -50 dBm to +20 dBm, 250-4000 MHz

Features

- High power output (+20 dBm max)
- Synthesized Signal Generator
- Adjustable output power, 70 dB range
- USB HID control interface (Plug and Play)
- Small, light weight
- Can sweep either frequency or power sweep up, down or bidirectionally
- Compatible with 32/64-bit Windows® or Linux® operating systems, as well as LabVIEW®, Delphi®, C++, C#, Visual Basic®, and .NET software¹
- Friendly Windows® Graphical User Interface
- Mounting bracket (Optional)



Installation CD with Software included

SSG-4000HP

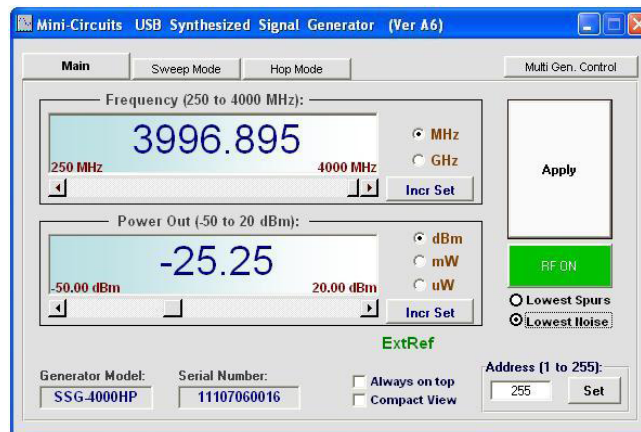
Model P/N	Description	Price	Qty.
SSG-4000HP	USB Signal Generator	\$1995.00 ea.	(1)
Included Accessories			
AC/DC-24-3W1	AC/DC 24V Adapter (see Ordering Information)		1
CBL-3W1-XX	AC power cord (see Ordering Information)		1
USB-CBL-AB-3+	2.7ft. USB cable		1
SSG-CD	Software CD		1

Applications

- Lab Test equipment
- Automated Test capability
- Production line testing
- Field testing

RoHS Compliant
See our web site for RoHS Compliance methodologies and qualifications

Mini-Circuits Control Program for USB Synthesized Signal Generators



Note 1: Windows and Visual Basic are registered trademarks of Microsoft Corporation. Linux is a registered trademark of Linus Torvalds. LabVIEW is a registered trademark of National Instruments Corp. Delphi is a registered trademark of Codegear LLC. Neither Mini-Circuits nor the Mini-Circuits SSG-4000HP Signal Generator are affiliated with or endorsed by the owners of the above referenced trademarks.

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Rev. OR
M130536
EDR-10559/3
SSG-4000HP
RAV
120418
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Electrical Specifications at +25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Units	
Output Frequency	-	250	-	4000	MHz	
Frequency Resolution	-	5	-	-	kHz	
Frequency accuracy	Using Internal Reference	-	±1	-	ppm	
Settling time	-	-	5	-	msec	
VSWR	250 - 2000 MHz	-	1.2	-	:1	
	2000 - 4000 MHz	-	1.85	-		
Output power range ²	-	-50	-	+20	dBm	
Power resolution (nom.)	-	-	0.25	-	dB	
Dynamic range	-	-	70	-	dB	
Output power accuracy	-	-	±0.25	-	dB	
RF output level	@RF OFF	-	-95	-	dBm	
Harmonics & Sub-Harmonics	PWR _{out} = -50 dBm	-	-50	-	dBc	
	PWR _{out} = -30 dBm	-	-67	-		
	PWR _{out} = 0 dBm	-	-46	-		
	PWR _{out} +10 dBm	-	-45	-		
	PWR _{out} +15 dBm	-	-38	-		
Non-Harmonic Spurious ³	@Frequency step size = 5 kHz	-	-53	-	dBc	
	@Frequency step size = 100 kHz	-	-63	-		
	@Frequency step size = 1 MHz	-	-80	-		
	@Frequency step size= 10 MHz	-	-95	-		
SSB Phase Noise ³	RF _{out} =250 MHz @Software mode: Lowest Spur / Lowest Noise	@ 100 Hz offset	-	-93 / -99	-	dBc/Hz
		@ 1 kHz offset	-	-103 / -113	-	
		@ 10kHz offset	-	-103 / -107	-	
		@ 100 kHz offset	-	-120 / -123	-	
		@ 1MHz offset	-	-147 / -147	-	
SSB Phase Noise ³	RF _{out} =1060 MHz @Software mode: Lowest Spur / Lowest Noise	@ 100 Hz offset	-	-83 / -86	-	dBc/Hz
		@ 1 kHz offset	-	-91 / -101	-	
		@ 10kHz offset	-	-91 / -94	-	
		@ 100 kHz offset	-	-110 / -112	-	
		@ 1MHz offset	-	-139 / -139	-	
SSB Phase Noise ³	RF _{out} =2600 MHz @Software mode: Lowest Spur / Lowest Noise	@ 100 Hz offset	-	-75 / -80	-	dBc/Hz
		@ 1 kHz offset	-	-84 / -93	-	
		@ 10kHz offset	-	-84 / -89	-	
		@ 100 kHz offset	-	-102 / -106	-	
		@ 1MHz offset	-	-132 / -133	-	
SSB Phase Noise ³	RF _{out} =4000 MHz @Software mode: Lowest Spur / Lowest Noise	@ 100 Hz offset	-	-72 / -76	-	dBc/Hz
		@ 1 kHz offset	-	-80 / -89	-	
		@ 10kHz offset	-	-82 / -88	-	
		@ 100 kHz offset	-	-101 / -106	-	
		@ 1MHz offset	-	-131 / -132	-	

Note 2 Max available power out degrades over the 3300-4000 MHz range to +17 dBm

Note 3: It is recommended to work in Lowest Spur mode when using frequency step size of up to 50 kHz and Lowest Noise mode for frequency step size greater than 50kHz. Working in Lowest Spur or Lowest Noise mode outside the recommended range may cause excessive Noise (in Lowest Spur mode) or excessive spurs (in Lowest Noise mode)

Electrical Specifications at +25°C (Continued)

Parameter		Test Conditions	Min.	Typ.	Max.	Units
Aging		Using Internal Reference	-	1	-	ppm/yr
Reference In	Frequency	-	-	10	-	MHz
	Power	-	-3.5	-	+7.5	dBm
Reference Out	Frequency	-	-	10	-	MHz
	Freq. Accuracy	Using Internal Reference	-	±1	-	ppm
	Power	-	-	+7	-	dBm
	Aging	Using Internal Reference	-	1	-	ppm/yr
Trigger Out, Low		-	0	-	0.4	V
Trigger Out, High		-	2.4	-	3.3	
Trigger In, Low		-	0	-	0.8	
Trigger In, High		-	2.4	-	3.3	
Supply Voltage		-	22.8	24	25.2	V _{DC}
Supply Current		-	-	400	500	mA
USB current		-	-	0	-	mA

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature	0°C to +50°C
Storage Temperature	-20°C to +60°C
Power in @ Reference In	+10 dBm
Reverse Power(DC) @ Reference Out	25V _{DC}
Reverse Power(DC) @ RF Out	10V _{DC}
Trigger in Voltage	-0.3V _{DC} to +3.5V _{DC}

Permanent damage may occur if any of these limits are exceeded.

Connections

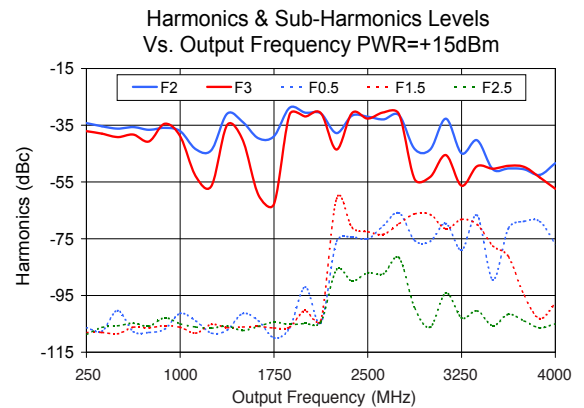
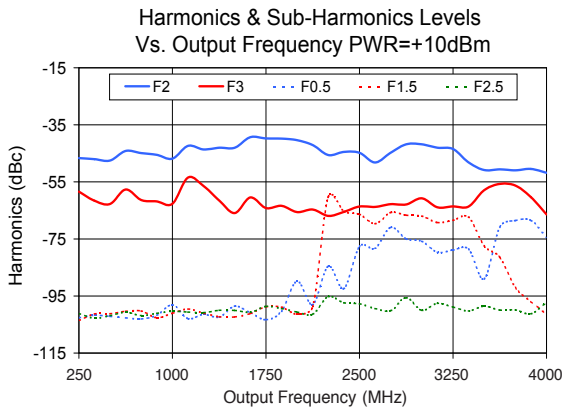
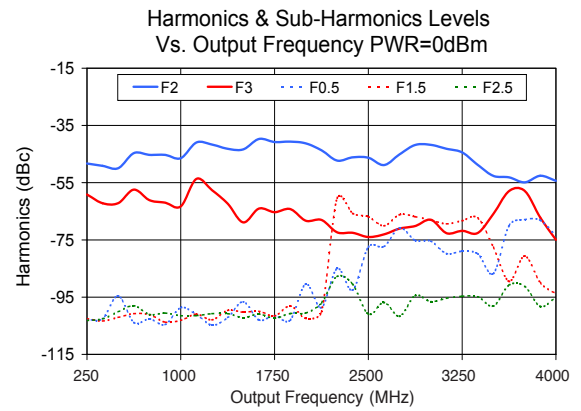
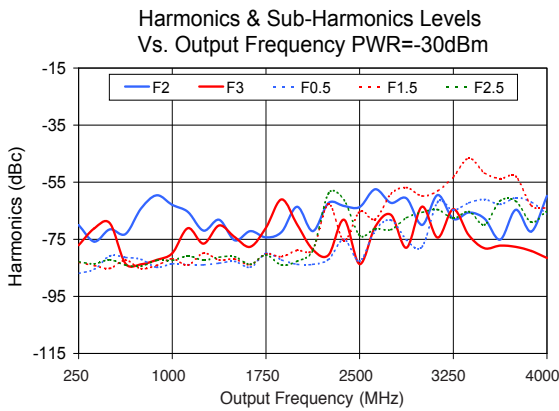
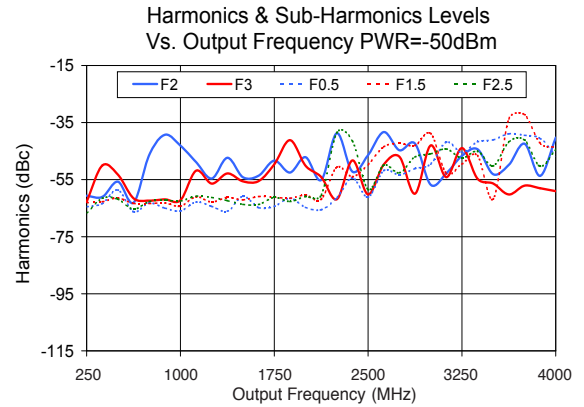
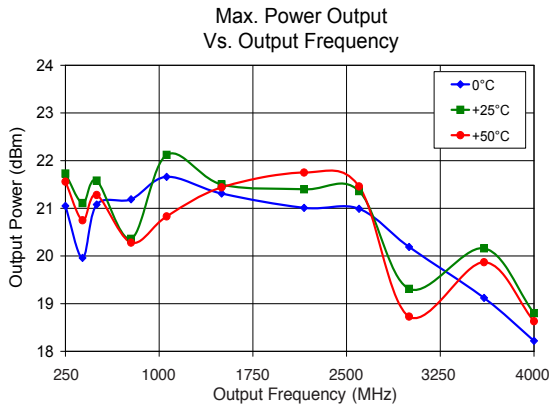
RF Input	(N Type-Female)
Ref. In	(BNC-Female)
Ref. Out	(BNC-Female)
Trigger In/Out	(BNC-Female)
Power In	(2.1 mm DC socket)
USB Port	(USB B female)

Minimum System Requirements

Parameter	Requirements
Interface	USB HID
Host operating system	32 Bit operating system: Windows 98 [®] , Windows XP [®] , Windows Vista [®] , Windows 7 [®] 64 Bit operating system: Windows Vista, Windows 7 [®] Linux[®] support: 32/64 Bit operating system
Hardware	Pentium [®] II or Better

Typical Performance Curves*

*at +25°C unless mentioned otherwise



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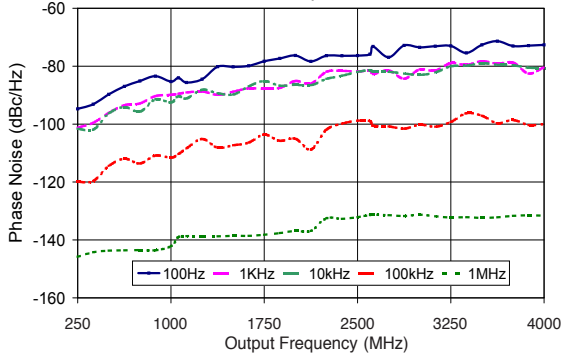
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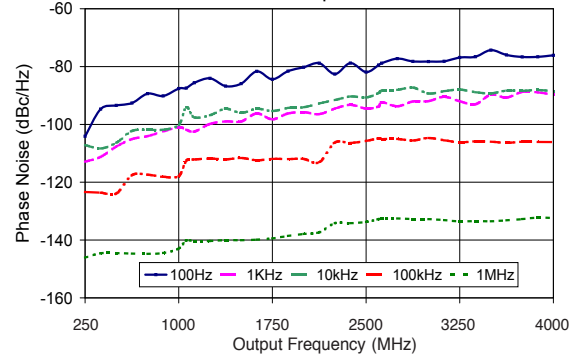
Typical Performance Curves* (continued)

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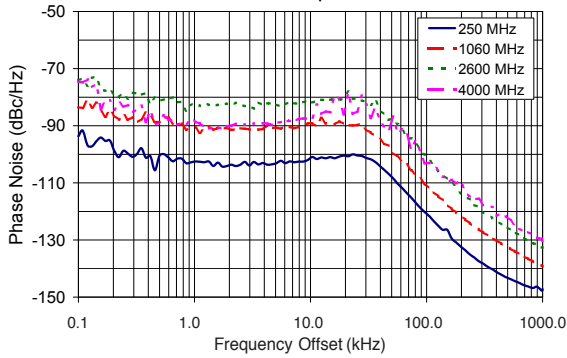
Phase Noise Vs. Frequency
at 5kHz Freq. Resolution



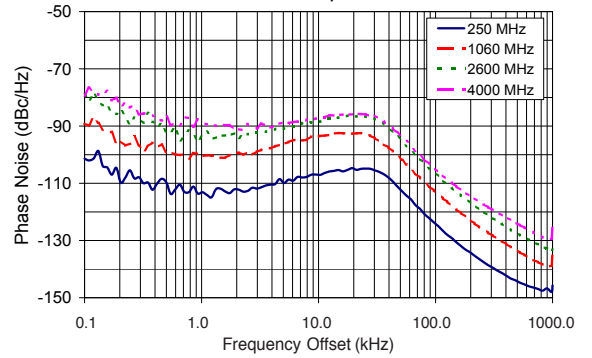
Phase Noise Vs. Frequency
at 1MHz Freq. Resolution



Phase Noise over Frequencies
at 5kHz Freq. Resolution



Phase Noise over Frequencies
at 1MHz Freq. Resolution



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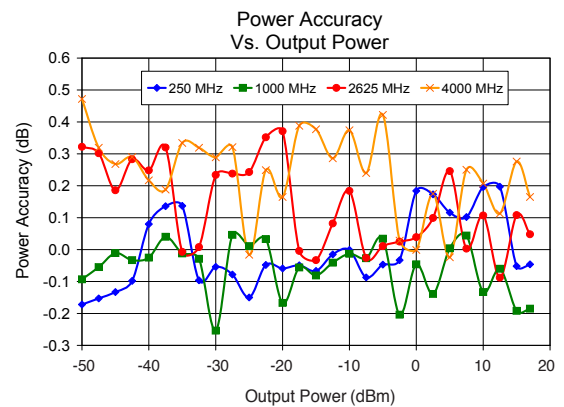
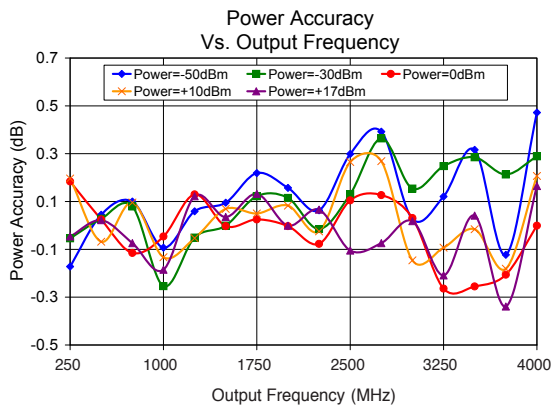
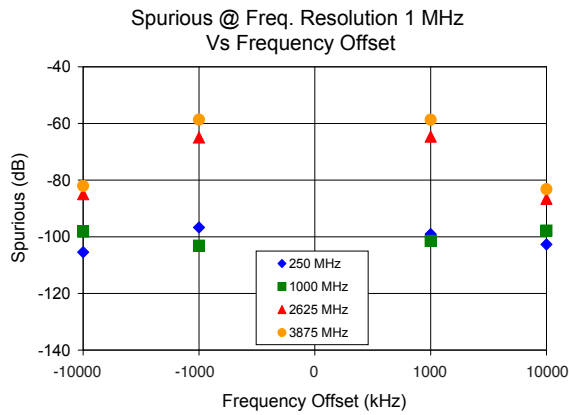
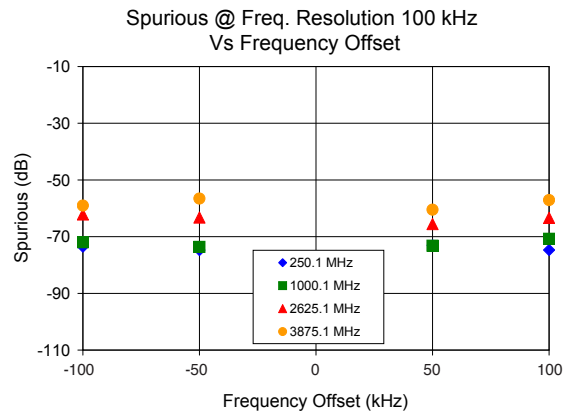
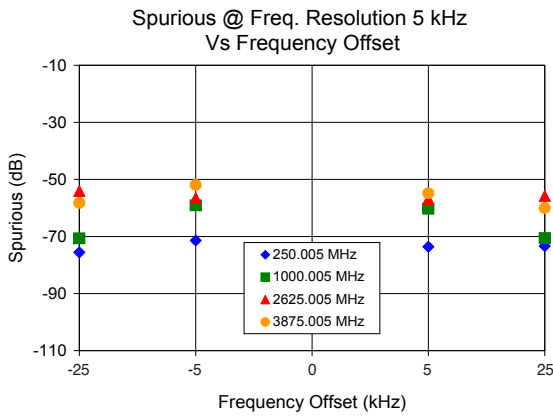
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Typical Performance Curves* (continued)

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Accessories Included



USB Cable: USB type A plug to USB type B plug

- MCL P/N: USB-CBL-AB-3+ (2.7ft.)



AC/DC 24V_{DC} Power Adaptor with three wire power cord (grounded)

(I_{max} =2.5A, Operating Temp. 0°C to +40°C)

- MCL P/N: AC/DC-24-3W1

When ordering the SSG-4000HP select one of the power cords below. See page 10 for details.

Power cords Available:



- MCL P/N: CBL-3W1-US



- MCL P/N: CBL-3W1-EU



- MCL P/N: CBL-3W1-UK

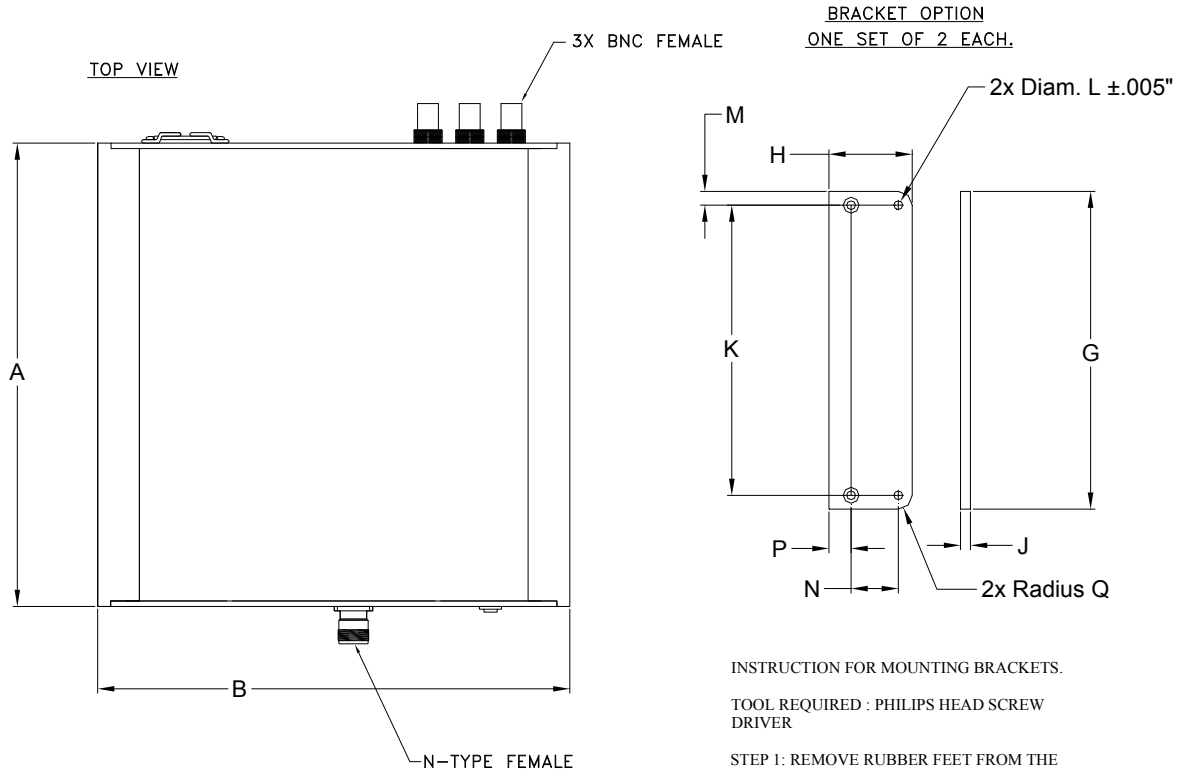


- MCL P/N: CBL-3W1-AU



- MCL P/N: CBL-3W1-IL

Outline Drawing LV1715



INSTRUCTION FOR MOUNTING BRACKETS.

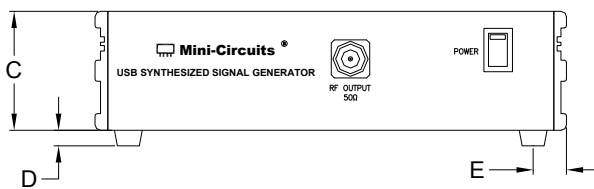
TOOL REQUIRED : PHILIPS HEAD SCREW DRIVER

STEP 1: REMOVE RUBBER FEET FROM THE BOTTOM OF UNIT.

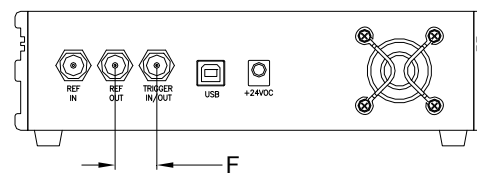
DO NOT DISCARD THE FASTENERS .

STEP 2: MOUNT THE BRACKETS WITH THE FASTENERS REMOVED IN STEP 1, USING THE COUNTER BORE HOLES IN BRACKET.

FRONT VIEW



BACK VIEW



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAMS
8.37	8.50	2.15	0.28	0.60	0.75	5.74	1.50	0.18	5.240	0.158	0.25	0.850	0.40	0.25	1900
212.60	215.9	54.6	7.1	15.2	19.05	145.8	38.1	4.6	133.1	4.0	6.35	21.6	10.2	6.35	



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Ordering Information

Model	Description
SSG-4000HP	USB Synthesized Signal Generator

Included Accessories	Description
AC/DC-24-3W1	AC/DC 24V Power Adapter
CBL-3W1-XX	AC power cord <i>(Select one power cord from below with each Signal Generator)</i>
SSG-CD	Installation CD
USB-CBL-AB-3+	2.7 ft. USB Cable

AC Power Cords	Description
CBL-3W1-US	US Power Cord
CBL-3W1-EU	EU Power Cord
CBL-3W1-UK	UK Power Cord
CBL-3W1-AU	AU Power Cord
CBL-3W1-IL	IL Power Cord

Optional Accessories	Description
USB-CBL-AB-3+ (spare)	2.7 ft. USB Cable
USB-CBL-AB-7+	6.8 ft. USB Cable
USB-CBL-AB-11+	11 ft. USB Cable
BKT-280-07+	Bracket (set of two each)

Calibration

Model	Description
CALSSG-4000HP	Calibration Service


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