KMDC Dresden
Microwave & RF Design
Components & Systems
Test & Measurement
Dresden – Germany

K-NSC-4G-1

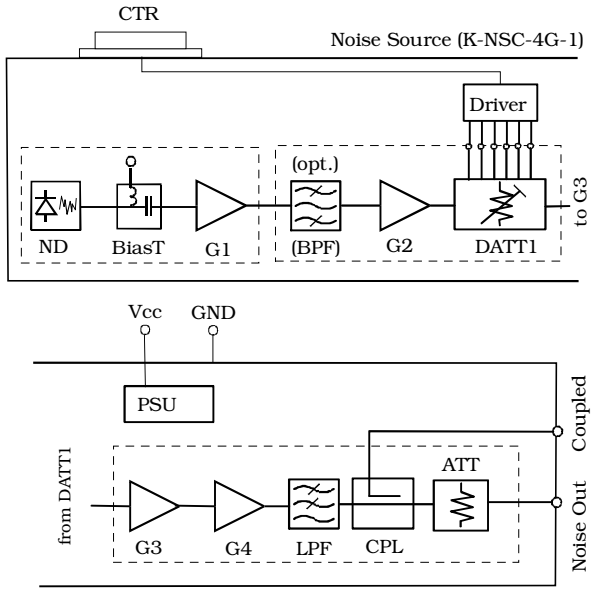
BROADBAND MICROWAVE WHITE NOISE SOURCE WITH DIGITAL LEVEL CONTROL

Typical Applications

The K-NSC-4G-1 is ideal for:

- noise source in radar applications
- digital modulation *BER* testing
- component noise performance tests
- general test and instrumentation

Block Diagram



Features

- broadband design: f=0.5-4 GHz
- high excess noise: ENR>70 dB
- flatness: <±1 dB typ.
- digital gain control range: 31 dB
- gain control step size: 0.5 dB
- serial or parallel control mode
- coupled port for monitor purposes
- extended range (12 GHz) or multiple output port versions available
- call for custom modifications

Electrical Specifications

Supply: Vcc=12V, *NPD*: noise power density, warm-up: completed, control mode: parallel

Parameter	Min.	Typ.	Max.	Unit	Remark
RF operating frequency f:	0.5		4	GHz	1)
Max. *NPD* at Noise_out:		−100		dBm/Hz	2)
Variation of *NPD* over f:		±1	±1.25	dB	
Coupled (monitor) port:		−20		dBc	3)
Port return loss *RL*:	15	20		dB	
Gain control range:		31		dB	4)
Gain control step size:		0.5		dB	
Supply voltage V_{cc}:	10	12	16	V	
Supply current:		270	300	mA	
Temp.-range:	0		50	°C	
Warm-up time:		15		min.	5)
Digital control:	0	3.3	5	V	

1) extended versions up to 12 GHz available upon request
2) default state without connected digital control, parallel or serial mode
3) relative to port Noise_out, alternative values available – please specify
4) minimum selectable noise level: NPD_{max}−31dB
5) stand-alone operation at room temperature

k_nsc_4G_1_v1
v1/dv2

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Absolute Maximum Ratings

Parameter	Min.	Typ.	Max.	Unit	Remark
Supply voltage V_{cc}:	0		16	V	
Reverse Power into Noise_out:			20	dBm	
Reverse Power into Coupled:			23	dBm	
Digital control:	0		5.5	V	

Ports and Interfaces

Name	Function	Parameter
Vcc	supply; diode, logic, active comp.	filtered feedthru
CTR	external digital gain control, TTL	filtered sub-D (f), 9 pins
GND	DC return path	case ground, solder pin
Noise_out	RF noise output	SMA female
Coupled	opt. monitor output for above	SMA female

Digital Control

There are two control modes possible via the interface port CTR. First, a 6-bit parallel word can be applied (permanently) setting the gain state from 0 through 31 dB in 0.5 dB steps. Second, a serial three wire bus can be used to program the device to the desired gain state (same range and step size). While the first method is straightforward for stand alone operation using a simple manual switch box, the latter option is better suited for larger test setups with several units connected to a common control bus.
Please specify mode upon order.

a) Parallel Control Mode

When the port CTR is left unconnected the unit automatically switches to max. noise power output upon application of supply voltage. Further, individual attenuator elements can be addressed as follows:

Pin	Signal	Comment
1	ATT_0.5dB	pull down externally to activate att. element
6	ATT_1dB	pull down externally to activate att. element
2	ATT_2dB	pull down externally to activate att. element
7	ATT_4dB	pull down externally to activate att. element
3	ATT_8dB	pull down externally to activate att. element
8	ATT_16dB	pull down externally to activate att. element
4	NC	-
9	GND	digital, analogue, case ground
5	NC	-

Note: Please specify if oposite logic is desired.

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b) Serial Control Mode

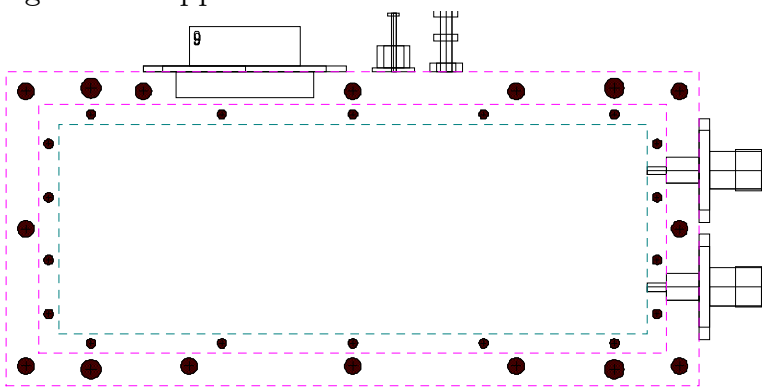
When the port CTR is left unconnected the unit automatically switches to max. noise power output upon application of supply voltage. Further, individual attenuator elements can be addressed as follows:

Pin	Signal	Comment
1	CLK	clock, externally, TTL level
6	Serial In (Data)	data word, TTL level
2	Latch Enable	enable, TTL level
7	NC	-
3	NC	-
8	NC	-
4	NC	-
9	GND	digital, analogue, case ground
5	NC	

The programming syntax will be provided to user when this control mode is selected.

Mechanical Construction

The following general mechanical layout is used for the module. The complete unit is incorporated in a dedicated milled RF enclosure with separate top and bottom shielding covers for very high EMI suppression.



Mechanical configuration of the module, milled aluminium enclosure, feedthru and ground pins, sub-D connector and SMA (f) ports.

The approx. dimensions are 106x48x19 mm^3 plus connectors.

Order Information

Please specify:

- K-NSC-4G-1/P for the standard frequency range and parallel control mode
- K-NSC-4G-1/S for the standard frequency range and serial control mode
- K-NSC-XG-1/X for a requested custom design and specify:
  -frequency range, coupled port relative level, alternative control schemes or other

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