



## DC SERIES

Model DC-0.5/20G

# 0.5 TO 20 GHz ULTRA-BROADBAND DOWNCONVERTER



## FEATURES

- 0.5 to 20 GHz RF input
- 2 Hz tuning resolution
- Very low phase noise
- 1200  $\pm$ 250 MHz L-band output
- 70  $\pm$ 20 MHz, 140  $\pm$ 40 MHz and 160  $\pm$ 40 MHz selectable IF output
- Independent 42 dB gain programming in 1 dB steps of L-band and IF outputs
- Independent conversion sense programming of IF and L-band outputs
- Output IP<sup>3</sup> >25 dBm
- Remote/local programming via full keypad entry
- System parameters programmable via continuous-turn rotary control with self-contained push button selection switch

The DC-0.5/20G is a very high performance ultra-broadband 2 Hz step agile downconverter. This downconverter accepts RF signals from 0.5–20 GHz and provides one selectable IF output of either 70, 140 or 160 MHz and one L-band output at 1200 MHz. The frequency conversion sense of both the outputs can be independently programmed as inverted or noninverted. Independent gain programming of 42 dB in 1 dB steps is provided for both outputs. The superb phase noise makes this system ideal for most applications including the stringent requirements of high order QAM. All system parameters are locally programmable via the front panel keypad and rotary knob or remotely programmable via RS422/RS485/RS232.

## OPTIONS

- Built in self-test and diagnostic features
- Combination of up to eight different bandwidth IF filters centered at 70, 140 and 160 MHz
- Programmable 30 dB in 10 dB steps front end attenuator for high power input signals
- Ethernet programming



# SPECIFICATIONS

## INPUT CHARACTERISTICS

Frequency band .....	0.5–20 GHz
Input level .....	to -35 dBm
Impedance .....	50 ohms
Input VSWR .....	2.5:1 maximum

## OUTPUT CHARACTERISTICS

IF output (selectable from these IF bands)	
IF center frequency .....	70 MHz
3 dB bandwidth .....	±20 MHz minimum
Gain flatness .....	±0.4 dB typical, ±0.7 dB maximum
IF center frequency .....	140 MHz
3 dB bandwidth .....	±40 MHz minimum
Gain flatness .....	±0.6 dB typical, ±1.0 dB maximum
IF center frequency .....	160 MHz
3 dB bandwidth .....	±40 MHz minimum
Gain flatness .....	±0.8 dB typical, ±1.0 dB maximum
L-band output .....	1200 MHz
3 dB bandwidth .....	±250 MHz minimum
Gain flatness .....	±0.9 dB typical, ±1.4 dB maximum
Impedance .....	50 ohms
Output VSWR .....	2:1 maximum
Signal monitor .....	-20 dBc nominal
Frequency sense .....	Programmable

## TRANSFER CHARACTERISTICS

Conversion sense programming .....	Inverted or noninverted
Fine tuning step size .....	2 Hz
Tuning speed .....	<100 ms
Gain programming	
L-band and IF outputs .....	42 dB
Programming resolution .....	1 dB
Level stability .....	< ±0.5 dB/day maximum at constant temperature
Image rejection .....	60 dB minimum
LO leakage at input .....	-90 dBm maximum
Noise figure .....	15 dB maximum at maximum gain
Group delay variations .....	3 ns p-p, typical over 80% of 3 dB bandwidth, 6 ns p-p, maximum over 80% of 3 dB bandwidth (does not include group delay of the IF switchable filters)
IP <sup>3</sup> (output) .....	25 dBm minimum

## SPURIOUS OUTPUTS

Spurious-free dynamic range .....	60 dB
LO spurious rejection .....	-80 dBm typical, two tones at -38 dBm at 30 dB gain
Independent spurs .....	>60 dB
Frequency stability .....	±2 × 10 <sup>-8</sup> , 0 to 50°C fixed temperature after 24 hours power-on

## FREQUENCY REFERENCE

Reference LO .....	Internal, external or auto selectable	
External reference input .....	10 MHz, 0 dBm ±2 dBm	
Internal reference output .....	10 MHz, 0 dBm, ±2 dBm	
Phase noise .....	<u>Offset from carrier</u>	<u>dBc/Hz (typ.)</u>
	100 Hz	-68 dBc
	1 kHz	-90 dBc
	10 kHz	-96 dBc
	100 kHz	-104 dBc
	1000 kHz	-125 dBc

## SPECIFICATIONS (CONT.)

### LOCAL CONTROL

DC-0.5/20G ..... Via front panel keypad, LCD display and continuous-turn rotary control with self-contained push button selection switch

Programmable settings ..... Stored in nonvolatile memory

**ROTARY CONTROL** ..... System parameters programmable via continuous-turn rotary control with self-contained push button selection switch

**LOCAL ALARMS** ..... Power supply status  
 Three LO lock status  
 Fan failure  
 Programmable temperature warning  
 Programmable over temperature trip point

**REMOTE INTERFACE** ..... RS422, RS485 and RS232, Ethernet programming (optional)

## OPTIONS

**DC1.** Up to six switchable IF filters at 70, 140 or 160 MHz available.

**DC1A.** Up to two additional filters.

**DC1B.** Up to six additional filters.

Select the letter code from the following table of available IF filter bandwidths to form part number with this option (see sample part number below).

Code	Bandwidth (MHz)	70 MHz	140 MHz	160 MHz
A	0.25		X	
B	0.50		X	
C	2.5		X	
D	5.0		X	
E	8.0		X	
F	20.0	X		X
G	24.0		X	
H	40.0	STD	X	
J	80.0		STD	STD

STD = Included in standard model; X = Available optional bandwidths for corresponding IF frequencies.

**DC2.** Programmable front end 30 dB attenuator for high power input signals (RF input up to -5 dBm).

**DC3.** Ethernet programming  
 10/100 mB 10Base-T interface  
 Web-browser based configuration  
 SNMP 1.0 configuration  
 Alarm reporting via SNMP Trap  
 Telnet access  
 Password protection

**DC4.** DCBIT (Built in Test): Built in Microwave Self-Test

## ORDERING INFORMATION

Specify unit by its model number. Example of a full model number:  
 DC-0.5/20G-DC1B-70F140ABCD160F-DC2-DC4

This means base unit DC-0.5/20G features Option DC1B with IF Filter Bandwidth F available at 70 MHz and 160 MHz, and IF Filter Bandwidths A, B, C, and D available at 140 MHz (in addition to the IF Filter Bandwidths included in the base model.) The unit also features Options DC2 and DC4.

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## GENERAL SPECIFICATIONS

### PRIMARY POWER REQUIREMENTS

Voltage ..... 90–250 VAC  
Frequency ..... 47–63 Hz

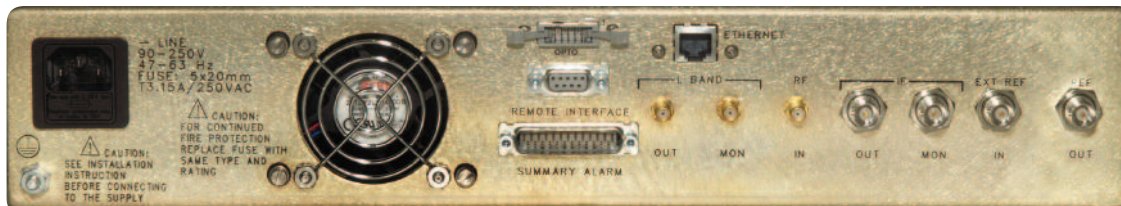
### PHYSICAL

Weight ..... 33.1 pounds (15 kg) nominal  
Overall dimensions ..... 19" x 3.5" (2RU) x 22" (48.3 cm x 8.98 cm x 55.9 cm) maximum  
Rear panel connectors  
RF ..... SMA female  
L-band output ..... SMA female  
IF ..... BNC female  
IF signal monitor ..... BNC female  
Remote interface ..... DEM-9S for RS422/485/232  
Summary alarm ..... DE-25P  
External reference input ..... BNC female  
Reference output ..... BNC female  
Ethernet ..... RJ45 (Optional)  
Opto interface to DC-20/26.5G and DC-20/40G ..... 10 pin header w/ejector

### ENVIRONMENTAL

Operating  
Temperature ..... 0 to 50°C  
Full compliance temperature range.. 10 to 40°C  
Relative humidity ..... Up to 95% at 30°C, noncondensing  
Atmospheric pressure..... Up to 10,000 feet (40,000 feet optional)  
Nonoperating  
Temperature ..... -30 to +70°C  
Relative humidity ..... Up to 95% at 40°C, noncondensing  
Atmospheric pressure..... Up to 40,000 feet  
Shock and vibration ..... Rough handling

## REAR PANEL VIEW



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