

## 0.5 to 20 GHz Ultra-Broadband Converters

### DC Series Model DC-0.5/20G



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.

### 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

### 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	
Input frequency	0.5–20 GHz
Level	to -35 dBm fully compliant
Impedance	50 ohms
Input VSWR	2.5:1 maximum
Noise figure	15 dB maximum at maximum gain
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
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 two tones 2 MHz apart at -38 dBm at 30 dB gain
LO spurious rejection	-80 dBm typical
Independent spurs	>60 dB
Frequency stability	±2 x 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	Offset from carrier dBc/Hz (typ.)
	100 Hz -68 dBc
	1 kHz -90 dBc
	10 kHz -96 dBc
	100 kHz -104 dBc
	1000 kHz -125 dBc

## General 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.

## Filter Selection Chart

Select the letter code from the following table of available IF filter bandwidth 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.

## 0.5 to 20 GHz Ultra-Broadband Downconverter

### General Specifications

#### Primary Power Requirements

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

#### Physical

Weight .....	33.1 pounds (15 kg) nominal
Overall dimensions .....	19" [48.3 cm] x 3.5" [8.98 cm] (2RU) x 22" [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 with 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

### Typical Rear Panel View

