8 GHz TO 20 GHz ULTRA-BROADBAND DOWNCONVERTER

DC SERIES MODEL DC-8/20G

FEATURES
• 8 GHz to 20 GHz RF input
• 2 Hz tuning resolution
• Very low phase noise
• 1200 ±250 MHz L-Band output
• 70 ±20 MHz, 140 ±40 MHz, and 160 ±40 MHz selectable IF output
• Independent 42 dB gain programming in 1 dB step of L-Band and IF outputs
• Independent conversion sense programming of IF and L-Band outputs
• Output IP3 > 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 MHz, 140 MHz and 160 MHz
• Programmable 30 dB in 10 dB steps front-end attenuator for high-power input signals
• Ethernet programming

The L3 Narda-MITEQ model DC-8/20G is a very high-performance, ultra-broadband 2 Hz step agile downconverter. This downconverter accepts RF signals from 8 GHz to 20 GHz and provides one selectable IF output of either 70 MHz, 140 MHz or 160 MHz and one L-Band output at 1200 MHz. The frequency conversion sense of both of outputs can be independently programmed as inverted or noninverted. Independent gain programming of 42 dB in 1 dB step 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 by the front panel keypad and rotary knob, or remotely programmable via RS-422/RS-485/RS-232.
### 8 GHz TO 20 GHz ULTRA-BROADBAND DOWNCONVERTER

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Input characteristics</th>
<th>Input frequency</th>
<th>8 GHz to 20 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>10 to -35 dBm fully compliant</td>
<td></td>
</tr>
<tr>
<td>Impedance</td>
<td>50 ohms</td>
<td></td>
</tr>
<tr>
<td>Input VSWR</td>
<td>2.5:1 maximum</td>
<td></td>
</tr>
<tr>
<td>Noise figure</td>
<td>15 dB maximum at maximum gain</td>
<td></td>
</tr>
</tbody>
</table>

**Output characteristics**

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

**Transfer characteristics**

| Conversion sense programming              | Inverted or noninverted |
| Fine tuning step size                     | 2 Hz                  |
| Tuning speed                              | < 100 ms              |
| Gain programming                          | 42 dB                 |
| L-Band and IF outputs                     | 42 dB                 |
| Programming resolution                    | 1 dB                  |
| Image rejection                           | 60 dB minimum         |
| LO leakage at input                       | -90 dBm maximum       |
| Group delay variations                    | 3 ns peak-to-peak, typical over 80% of 3 dB bandwidth, 6 ns peak-to-peak, maximum over 80% of 3 dB bandwidth (does not include group delay of the IF switchable filters) |
| IP3 (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^-6, 0 °C 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 |

<table>
<thead>
<tr>
<th>Phase noise</th>
<th>Offset from carrier</th>
<th>dBC/Hz (typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Hz</td>
<td>-68 dBc</td>
<td></td>
</tr>
<tr>
<td>1 kHz</td>
<td>-90 dBc</td>
<td></td>
</tr>
<tr>
<td>10 kHz</td>
<td>-96 dBc</td>
<td></td>
</tr>
<tr>
<td>100 kHz</td>
<td>-104 dBc</td>
<td></td>
</tr>
<tr>
<td>1000 kHz</td>
<td>-125 dBc</td>
<td></td>
</tr>
</tbody>
</table>
SPECIFICATIONS (CONTINUED)

Local Control
DC-8/20G ............................................................... 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 ................................................... RS-422, RS-485 and RS-232, Ethernet programming (optional)

OPTIONS

Missing option numbers are not applicable for this product.
DC1. Up to six switchable IF filters at 70 MHz, 140 MHz 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)

<table>
<thead>
<tr>
<th>Code</th>
<th>Bandwidth (MHz)</th>
<th>70 MHz</th>
<th>140 MHz</th>
<th>160 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.25</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.50</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>C</td>
<td>2.5</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>D</td>
<td>5.0</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>E</td>
<td>8.0</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>F</td>
<td>20.0</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>24.0</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>H</td>
<td>40.0</td>
<td>STD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>80.0</td>
<td>STD</td>
<td>STD</td>
<td>STD</td>
</tr>
</tbody>
</table>

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 10 Base-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-8/20G-DC1B-70F140ABCD160F-DC2-DC4

This means base unit DC-8/20G 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.
GENERAL SPECIFICATIONS

PRIMARY POWER REQUIREMENTS
Voltage ............................................................. 90 VAC to 250 VAC
Frequency ......................................................... 47 Hz to 63 Hz

PHYSICAL
Weight .............................................................. 33.1 lb. [15 kg] nominal
Overall dimensions ........................................... 19" [482.6 mm] x 3.5" [88.9 mm] (2RU) x 22" [558.8 mm] 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 RS-422/RS-485/RS-232
  Summary alarm ............................................. DE-25P
  External reference input ................................. BNC female
  Reference output .......................................... BNC female
  Ethernet ....................................................... RJ-45 (optional)
  Opto interface to DC-20/26.5G .......................... 10-pin header with ejector

ENVIRONMENTAL
Operating
  Temperature .................................................. 0 °C to 50 °C
  Full compliance temperature range ............ 10 °C 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 °C 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