Modulator NS1000

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Modulator NS1000

Key Features

- Compatible with the innovative NS3™ protocol.
- Data rates of up to 358Mbps.
- Powerful pre distortion algorithm for saturated channels.
- Dual channel mode.
- Extended L-Band 950MHz-2150MHz.
- IF output mode 50MHz-180MHz (either L-Band or IF).
- Monitor output port.
- Optional 10MHz reference (In/Out).
- Dual ASI Input Interface.
- Optional Dual Ethernet 1Gb Input Interface.
- ACM Support.

Related Products

NovelSat’s Demodulator NS2000

Additional information:

More information can be found at: www.novelsat.com
or contact sales@novelsat.com

A New Standard for Broadcast Satellites

NovelSat’s innovative NS1000 – a state-of-the-art modulator designed for high demand satellite transmission. NS1000 is the only system in the market that has NS3™ enhancement, delivering significantly higher spectral efficiency compared to the DVB-S2.

The NS3™ system has several marked advantages that set it off from the competition:

**Lower Satellite Bandwidth:**
Saving of 20% to 78% satellite bandwidth (over available DVB-S2 equipment in the market).

**Higher Data Rate:**
Increases transmitted data rate by over 100% (over available DVB-S2 equipment in the market).

**Smaller Dish:**
Reduction of dish size - achieving the same data rate using a smaller dish.

The NS1000 supports high data rates of up to 358Mbps using 70Msps. The use of high data rate is supported in both DVB-S2 and NS3™ modes of operations. NS1000 can also be used to transmit one carrier over a 72MHz transponder.

The NS1000 Dual Channel option enables any two inputs to be combined simultaneously over one carrier, each with a different modulation scheme using Variable Coding Modulation (VCM), one for each channel. This enables transmission quality that is dependent upon the interface content and the different receivers’ locations.

**Dual Channel** operation also enables the combination of Ethernet Stream and the ASI interface, easing migration to IP streaming while controlling the QoS of each stream.

**NS3™ mode** enables working at a higher SNR than DVB-S2. Transmissions Links with high SNR can gain more than 30% data rate compared to DVB-S2.
### Output Interfaces

**L-Band Output**
- **Connector**: SMA (F) 50 ohm
- **Frequency range**: 950-2150MHz in 1Hz steps
- **Power level**: -30/0 dBm ±0.1dB
- **Power accuracy / temp stability**: 0.5dB±0.5dB
- **Return loss**: >12dB
- **Spurious**: -55dBc in band and out of band at max power
- **Phase noise**: @100Hz-70dBc
  @1KHz-80dBc
  @10KHz-85dBc
  @100KHz-95dBc
  @1MHz-100dBc

**IF-Band Output**
- **Connector**: BNC (F) 75 Ohm
- **Frequency range**: 70MHz±20MHz, 140MHz±40MHz in 1Hz steps
- **Power level**: -30/0 dBm ±0.1dB
- **Power accuracy / temp stability**: 0.5dB±0.5dB
- **Return loss**: >12dB
- **Spurious**: -55dBc in band and out of band

**Monitoring Output**
- **Connector**: SMA (F) 50 Ohm
- **Frequency**: Identical to L-Band/IF-Band output frequencies
- **Power level**: -45 dBm
- **Return loss**: >7dB

**10MHz Reference Clock I/O (Optional)**
- **Connector**: BNC (F) 50 Ohm
- **Ref input power level**: -3dBm up to +7dBm (Default)
- **Ref output power level**: +7dBm
- **Waveform**: Sine wave

### Baseband

**DVB-S/DSNG**
- **Inner code**: Viterbi with code rate and modulations:
  - QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
  - 8PSK: 2/3, 5/6, 8/9
  - 16QAM: 3/4, 7/8
- **Outer Code**: Reed Solomon (203,188, T=8)
- **Interleaving**: (l=12)
- **Scrambling**: NS3™
- **Frame length**: 204, 188

**DVB-S2**
- **Inner code**: BCH
- **Outer Code**: LDPC
- **Code rates and modulation**:
  - QPSK: 1/4, 1/3, 2/5, 1/5, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
  - 8PSK: 3/5, 8/3, 3/4, 5/6, 8/9, 9/10
  - 16APSK: 3/4, 2/3, 4/5, 5/6, 8/9, 9/10
  - 32APSK: 3/4, 4/5, 5/6, 8/9, 9/10
- **Frame Length**: 64800, 16800

**Baseband ROF**
- **SRRT**: 20%, 25%, 35%

**NS3™**
- **Inner code**: BCH
- **Outer Code**: LDPC
- **Modulations**: QPSK, 8PSK, 16APSK 32APSK 64APSK
- **Frame Length**: 64800, 16800
- **Baseband ROF**: "SRRT like" 5%, 10%, 15%, 20%, 25%, 35%

### Input Interfaces

**ASI Input**
- **2 ASI interfaces that can function in parallel.**
- **Connector**: BNC female with 75 Ohm coax
- **Return loss**: 18-20 dB
- **Sensitivity**: 230 mVpp
- **Max input**: 950 mVpp

**ASI Output (Loopback)**
- **Loopback on each of the ASI input**
- **Connector**: BNC female with 75 Ohm coax
- **Power Level**: 800 mVpp ±10%

**10 MHz Clock**
- **Stability**: ±1.0 ppm over 0degC to 50degC
- **Aging**: ±1.0 ppm/year

**10 MHz Clock – High stability (Optional)**
- **Stability**: ±10 ppb over 0degC to 70degC
- **Aging**: <±0.5 ppb/day
- **<±75 ppb/year**

### Monitor and Control Interfaces

**SW interfaces**
- Command Line Interface
- Web Based Graphic User Interface
- SNMP V3
- Front Panel

**Serial RS232/RS485 Interface**
- Female 9-Pin D-Sub Connector
- Ethernet 10/100 BaseT Interface to monitor and control the modulator

**Alarm Interface**
- Female 9-Pin D-Sub Connector

**Optional Interfaces**
- Dual Ethernet 10/100/1G

### Physical
- **Weight**: 3.5 Kg (7.7 pounds)
- **Size**: 19” W x 18” D x 1.75” H
- **3.53 x 45.7 x 4.45 cm**

### Environmental
- **Prime Power**: 100-240 VAC, 50-60Hz, 30 Watts Maximum
- **Operating Temp**: 0 to 50°C
- **Operating Humidity**: Up to 85% Non-Condensing
- **Storage Temp**: -40°C to 70°C
- **Storage Humidity**: Up to 95% Non-Condensing
# Modulator NS1000 Ordering Information

<table>
<thead>
<tr>
<th>Category</th>
<th>Option</th>
<th>Order Name</th>
<th>NS3™ Order Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Interface</td>
<td>Extended L-Band 950-2150MHz</td>
<td>Default</td>
<td>/RF1</td>
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<tr>
<td></td>
<td>IF 50-180MHz</td>
<td>/RF2</td>
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<td>IF + L-Band</td>
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<tr>
<td>Input Interface</td>
<td>Dual ASI</td>
<td>Default</td>
<td>/HW1</td>
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<td></td>
<td>Dual GbE</td>
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<tr>
<td>Input Channel</td>
<td>One Channel Option</td>
<td>Default</td>
<td>/CH1</td>
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<tr>
<td></td>
<td>Dual Channel Option</td>
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</table>

### Modulation & Symbol Rate

#### DVB-S/S2/DSNG

<table>
<thead>
<tr>
<th>Order Name</th>
<th>Argument</th>
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</thead>
<tbody>
<tr>
<td>DVB-S/S2/DSNG QPSK/8PSK/16QAM 60Msps</td>
<td>/S2-00</td>
</tr>
<tr>
<td>DVB-S/S2 QPSK 5Msps</td>
<td>/S2-01</td>
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<tr>
<td>DVB-S/S2 QPSK 15Msps</td>
<td>/S2-02</td>
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<tr>
<td>DVB-S/S2 QPSK 30Msps</td>
<td>/S2-03</td>
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<td>DVB-S/S2 QPSK 45Msps</td>
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<td>DVB-S/S2 QPSK 60Msps</td>
<td>/S2-05</td>
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<tr>
<td>DVB-S/S2 QPSK/8PSK 5Msps</td>
<td>/S2-06</td>
</tr>
<tr>
<td>DVB-S/S2 QPSK/8PSK 15Msps</td>
<td>/S2-07</td>
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<tr>
<td>DVB-S/S2 QPSK/8PSK 30Msps</td>
<td>/S2-08</td>
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<tr>
<td>DVB-S/S2 QPSK/8PSK 45Msps</td>
<td>/S2-09</td>
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<td>DVB-S/S2 QPSK/8PSK 60Msps</td>
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<td>/S2-24</td>
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<tr>
<td>DVB-S/S2 QPSK/8PSK/16APSK/32APSK/64APSK 70Msps</td>
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### Additional Options

- ACM 10MHz Ref Clock In/Out
- 10MHz High Stability

<table>
<thead>
<tr>
<th>Assistance Level</th>
<th>Option</th>
</tr>
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<tbody>
<tr>
<td>Level 1</td>
<td>AC</td>
</tr>
<tr>
<td>Level 2</td>
<td>CL, HS</td>
</tr>
</tbody>
</table>

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