

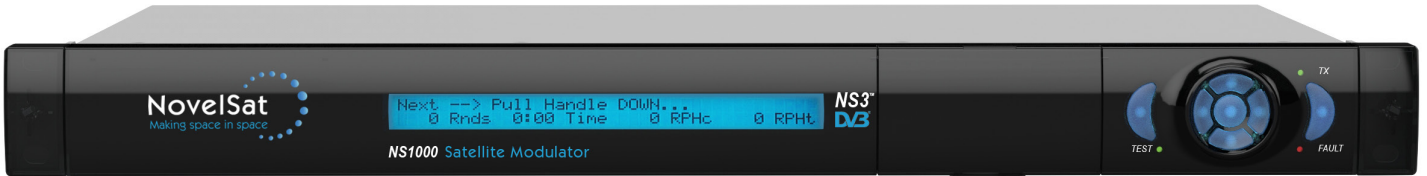


## Modulator NS1000

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**NovelSat**  
Making space in space

# Modulator NS1000



## Key Features

- Compatible with the innovative **NS3™** protocol
- DVB-S, DSNG, DVB-S2 (EN300-421, EN301-210, EN302-307) Compliant
- Data rate up to 300Mbit/sec.
- Powerful pre-distortion algorithm for saturated channels
- Optional dual channel mode
- L-Band output monitor output port mode 950MHz-1750MHz (optional extended L-Band 950MHz-2150MHz)
- IF output mode 50MHz-180MHz
- Monitor output port
- Optional 10MHz reference (In/Out)
- Dual ASI Input Interface
- Optional Dual 1Gb Ethernet Input Interface

## Related Products

NovelSat's Demodulator NS2000

### Additional information:

More information can be found at: [www.novelsat.com](http://www.novelsat.com) or contact [sales@novelsat.com](mailto:sales@novelsat.com)

## A New Standard for Broadcast Satellites

NovelSat's innovative NS1000 is a state-of-the-art modulator designed for high demand satellite transmission. NS1000 is the only system in the market featuring **NS3™** enhancement, delivering an average bandwidth saving of 20% when compared to the DVB-S2 standard (when used together with NovelSat's Demodulator).

The **NS3™** system advantage can be utilized in several different ways:

### Lower Satellite Bandwidth:

Average saving of 20% satellite bandwidth, vs. systems that use DVB-S2

### Higher Data Rate:

Increases transmitted data rate by an average of 20%

### Smaller Dish:

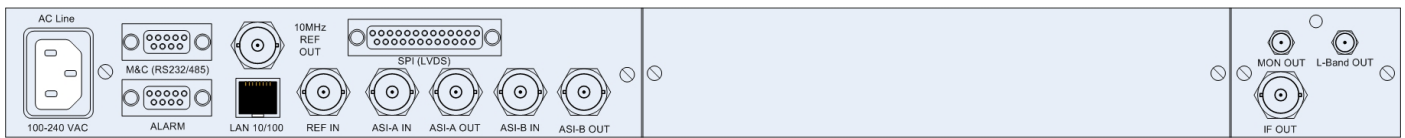
Reduction of dish size "replaces" the added bandwidth, achieving the same data rate using a smaller dish

The NS1000 supports **very high data rates of up to 300Mbits/sec using 72Msym/sec** transmission. The use of high data rate is supported in both DVB-S2 and **NS3™** modes of operations and can be used to transmit one carrier over a 72MHz transponder.

The NS1000 **Dual Channel option** enables **any** two inputs to be combined simultaneously, 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.

Dual Channel operation allows 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 **much higher SNR than DVB-S2**. Transmission 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	950-1750MHz (up to 2150MHz) ±1Hz
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
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 ±1Hz
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

### 10 MHz Clock

Stability	±1.0 ppm over 20°C to 70°C
Aging	±1.0 ppm/year

### 10 MHz Clock – High stability (Optional)

Stability	±10 ppb over 0°C to 70°C ±30 ppb over 20°C to 70°C
Aging	<± 0.5 ppb/day <± 75 ppb/year

### 10MHz Reference Clock Input/Output

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 (204,188, T=8)
Interleaving	(I=12)
Scrambling	
Frame Length	204, 188

### DVB-S2

Inner code	BCH
Outer Code	LDPC

### Code rates and modulation:

QPSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
8PSK	3/5, 2/3, 3/4, 5/6, 8/9, 9/10
16APSK	2/3, 3/4, 4/5, 5/6, 8/9, 9/10
32APSK	3/4, 4/5, 5/6, 8/9, 9/10
Frame Length	64800, 16200
Baseband ROF	SRRC 20%, 25%, 35%

### NS3™

Inner code	BCH
Outer Code	LDPC
Modulations	
QPSK, 8PSK, 16APSK, 32APSK, 64APSK	
Frame Length	64800, 16200
Baseband ROF	“SRRC 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
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%

### SPI

Connector	25 pin-D (F)
Power Level	LVDS
Rate DVB SPI Interface	max 27Mbps

## Monitor and Control Interfaces

<b>SW interfaces</b>	
<ul style="list-style-type: none"> <li>• Command Line Interface</li> <li>• Web Based Graphic User Interface</li> <li>• SNMP V3</li> <li>• Front Panel</li> </ul>	
<b>Serial RS232/RS485 Interface</b>	
Female 9-Pin D-Sub Connector	
<b>Ethernet</b>	
10/100 BaseT Interface to monitor and control	
<b>Alarm Interface</b>	
Female 9-Pin D-Sub Connector	

## Optional Interfaces

<ul style="list-style-type: none"> <li>• Dual 10/100/1000 Ethernet</li> <li>• G703</li> <li>• HSSI</li> </ul>	
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## Physical

Weight	3.5 Kg (7.7 pounds)
Size	19" W x 18" D x 1.75" H 48.3 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

Category	Option	Order Name	Option	Order Name	
Output Interface	L-band 950-1750MHz Extended L-band 950-2150MHz IF 50-180MHz	Default /RF1 /IF1			
Input Interface	Dual ASI SPI Dual GbE G703 HSSI	Default Default /HW1 /HW2 /HW3			
Input Channel	Single Channel Option CCM Single Channel Option VCM/ACM. Dual Channel VCM Option Dual Channel ACM Option	Default /CH1 /CH2 /CH3			
Modulation & Symbol Rate	DVB-S/DSNG QPSK/8PSK/16QAM 60Msps	Default	<b>NS3™</b> package		
	DVB-S/S2 QPSK 5Msps	Default	DVB-S/S2/NS3 QPSK 6Msps	/NS3-01	
	DVB-S/S2 QPSK 15Msps	/S2-02	DVB-S/S2/NS3 QPSK 18Msps	/NS3-02	
	DVB-S/S2 QPSK 30Msps	/S2-03	DVB-S/S2/NS3 QPSK 36Msps	/NS3-03	
	DVB-S/S2 QPSK 45Msps	/S2-04	DVB-S/S2/NS3 QPSK 54Msps	/NS3-04	
	DVB-S/S2 QPSK 70Msps	/S2-05	DVB-S/S2/NS3 QPSK 70Msps	/NS3-05	
	DVB-S/S2 QPSK/8PSK 5Msps	/S2-06	DVB-S/S2/NS3 QPSK/8PSK 6Msps	/NS3-06	
	DVB-S/S2 QPSK/8PSK 15Msps	/S2-07	DVB-S/S2/NS3 QPSK/8PSK 18Msps	/NS3-07	
	DVB-S/S2 QPSK/8PSK 30Msps	/S2-08	DVB-S/S2/NS3 QPSK/8PSK 36Msps	/NS3-08	
	DVB-S/S2 QPSK/8PSK 45Msps	/S2-09	DVB-S/S2/NS3 QPSK/8PSK 54Msps	/NS3-09	
	DVB-S/S2 QPSK/8PSK 60Msps	/S2-10	DVB-S/S2/NS3 QPSK/8PSK 70Msps	/NS3-10	
	DVB-S/S2 QPSK/8PSK/16APSK 5Msps	/S2-11	DVB-S/S2/NS3 QPSK/8PSK/16APSK 6Msps	/NS3-11	
	DVB-S/S2 QPSK/8PSK/16APSK 15Msps	/S2-12	DVB-S/S2/NS3 QPSK/8PSK/16APSK 18Msps	/NS3-12	
	DVB-S/S2 QPSK/8PSK/16APSK 30Msps	/S2-13	DVB-S/S2/NS3 QPSK/8PSK/16APSK 36Msps	/NS3-13	
	DVB-S/S2 QPSK/8PSK/16APSK 45Msps	/S2-14	DVB-S/S2/NS3 QPSK/8PSK/16APSK 54Msps	/NS3-14	
	DVB-S/S2 QPSK/8PSK/16APSK 60Msps	/S2-15	DVB-S/S2/NS3 QPSK/8PSK/16APSK 70Msps	/NS3-15	
	DVB-S/S2 QPSK/8PSK/16APSK/32APSK 5Msps	/S2-16	DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK 6Msps	/NS3-16	
	DVB-S/S2 QPSK/8PSK/16APSK/32APSK 15Msps	/S2-17	DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK 18Msps	/NS3-17	
	DVB-S/S2 QPSK/8PSK/16APSK/32APSK 30Msps	/S2-18	DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK 36Msps	/NS3-18	
	DVB-S/S2 QPSK/8PSK/16APSK/32APSK 45Msps	/S2-19	DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK 54Msps	/NS3-19	
	DVB-S/S2 QPSK/8PSK/16APSK/32APSK 60Msps	/S2-20	DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK 70Msps	/NS3-20	
				DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK/64APSK 6Msps	/NS3-21
				DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK/64APSK 18Msps	/NS3-22
				DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK/64APSK 36Msps	/NS3-23
				DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK/64APSK 54Msps	/NS3-24
			DVB-S/S2/NS3 QPSK/8PSK/16APSK/32APSK/64APSK 70Msps	/NS3-25	
Additional	Non-Linear Pre-Distortion 10MHz Reference Clock In/Out 10MHz High Stability	/PD /CL /HS			
Assistance	Level 1	/SP1			
	Level 2	/SP2			