



# HIGH-PERFORMANCE SATELLITE MODULATOR NS1000 & SATELLITE DEMODULATOR NS2000

## PRODUCT SHEET

### ULTIMATE TRANSMISSION EFFICIENCY

Broadcasters face increased demand for higher resolution video standards that require vastly more capacity. While satellite is the leading medium for video transmission and services worldwide, satellite spectrum comes at cost. NOVELSAT satellite broadcast solutions offer new levels of satellite transmission efficiency, driving higher volumes of video content at lower bandwidth cost. NOVELSAT NS1000 Modulator and NS2000 Demodulator incorporate multiple satellite transmission technologies, supporting the most bandwidth-efficient waveform, NOVELSAT NS4™, for providing very high-performance transmission and space segment efficiency, as well as supporting standard DVB-S, DVB-S2, and DVB-S2X.

### BEST-IN-INDUSTRY CONTENT PROTECTION

Piracy threats and unauthorized access to high value content are impacting media providers' revenues and profitability, and undermining media business models. Heightening content protection and security, NOVELSAT broadcast solutions utilize extensive security algorithms and mechanisms to provide secured media delivery. Utilizing NOVELSAT DRM with AES-256 encryption, together with a highly flexible entitlement management system and an automatic and dynamic key generation with over-the-air distribution, NOVELSAT NS1000 Modulator and NS2000 Demodulator deliver highest content protection, securing video and data connectivity.

### FLEXIBLE DUAL CHANNEL OPERATION

Designed to support multiple configurations and service options, NOVELSAT NS1000 Modulator and NS2000 Demodulator enable simultaneous operation of two channels. Any two services - video or data - can be combined over a single carrier, each with a different modulation scheme. Dual channel operation also supports the combination of ASI and Ethernet, easing migration to IP networks.

### TOTAL CONNECTIVITY

NOVELSAT broadcast solutions present multiple connectivity options through the capacity to provide satellite, ASI and IP transport stream inputs and outputs. Equipped with ASI and GbE interfaces as well as IF and L-band interfaces together with full local and remote control capability, NOVELSAT NS1000 Modulator and NS2000 Demodulator seamlessly integrate into any network and infrastructure.

### SUPERIOR RESILIENCY AND AVAILABILITY

Delivering near perfect availability and reliability, NOVELSAT broadcast solutions incorporate a comprehensive set of capabilities and features to effectively detect and mitigate various types of interferences and impairments and provide very high link robustness and resiliency. Featuring adaptive equalizers, error correction techniques, and pre-corrections algorithms, as well as high performance receiver technology, NOVELSAT NS1000 Modulator and NS2000 demonstrate superior resilience to phase noise, adjacent satellite interference, weather fluctuations, and any intentional or unintentional interferences and threats. NOVELSAT NS1000 Modulator and NS2000 also supports 1:1 and N:1 redundancy with automatic failover, ensuring very high system availability and service continuity.

### HIGHLIGHTS

- High performance and efficiency with NOVELSAT NS4™ technology
- DVB-S2 and DVB-S2X standard compliant
- High data rates of up to 425Mbps / 80Msps
- Dual channel mode
- TSolP support
- NOVELSAT DRM with AES-256 encryption / decryption
- NOVELSAT DDC™ - Dynamic Distortion Compensator for non-linear channels
- ACM operation



## NS1000 SATELLITE MODULATOR – SPECIFICATIONS

### BASEBAND

#### NS4™ / NS3™

**Inner Code:** LDPC

**Outer Code:** BCH

#### QPSK:

1/4, 13/45\*, 1/3, 2/5, 9/20\*, 1/2, 11/20\*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

#### 8PSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 16APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 32APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 64APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

**Frame Length:** 64800, 16200

#### Baseband ROF:

"SRRC like" 2% (NOVELSAT NS4™), 5%, 10%, 15%, 20%, 25%, 35%

#### DVB-S2/S2X

**Inner Code:** LDPC

**Outer Code:** BCH

**Code rates and modulation:**

#### QPSK:

1/4, 13/45\*, 1/3, 2/5, 9/20\*, 1/2, 11/20\*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

#### 8APSK:

5/9(L)\*, 26/45(L)\*

#### 8PSK:

3/5, 23/36\*, 2/3, 25/36\*, 13/18\*, 3/4, 5/6, 8/9, 9/10

#### 16APSK:

26/45\*, 3/5\*, 28/45\*, 23/36\*, 2/3, 25/36\*, 13/18\*, 3/4, 7/9\*, 4/5, 5/6, 77/90\*, 8/9, 9/10, 1/2(L)\*, 8/15(L)\*, 5/9(L)\*, 3/5(L)\*, 2/3(L)\*

#### 32APSK:

32/45\*, 11/15\*, 3/4, 7/9\*, 4/5, 5/6, 8/9, 9/10, 2/3(L)\*

#### 64APSK:

11/15\*, 7/9\*, 4/5\*, 5/6\*, 32/45(L)\*

**Frame Length:** 64800, 16200

#### Baseband ROF:

SRRC 20%, 25%, 35%  
(optional 5%, 10%, 15%)

\*DVB-S2X only

#### DVB-S/DSNG

**Inner code:** Convolution

**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)

**Frame length:** 204, 188

**Baseband ROF:** SRRC 25%, 35%

### OUTPUT INTERFACES

#### L-Band

**Connector:** SMA (F) 50 Ohm

**Frequency range:**

950-2150MHz in 1Hz steps

**Power level:** -30 /0 dBm in 0.1dB steps

**Power accuracy/ temp. stability:**

±0.5dB/±0.5dB

**Return loss:** >12 dB

**Spurious:** <-55dBc in band and out of band at max. power

**Phase noise:**

@100Hz -70dBc, @1KHz -80dBc,

@10KHz -85dBc, @100KHz -95dBc,

@1MHz -100dBc

#### IF

**Connector:** BNC (F) 75 Ohm

**Frequency range:** 70MHz±20MHz,

140MHz±40MHz in 1Hz steps

**Power level:** -30/0 dBm in 0.1dB steps

**Power accuracy/ temp. stability:**

±0.5dB/±0.5dB

**Return loss:** >20dB (50-90MHz)

**Spurious:**

<-65dBc/4KHz @ -10dBm

<-55dBc/4KHz @ -0dBm

**Phase noise:** Meets IESS-308

#### Monitoring

**Connector:** SMA (F) 50 Ohm

**Frequency:** Identical to L-Band/IF-Band frequencies

**Power level:** -40 dBm

**Return loss:** > 7dB

#### 10MHz Reference Clock I/O (Optional)

**Connector:** BNC (F) 50 Ohm

**Ref. input power level:**

-3dBm up to +7dBm

**Ref. output power level:** +7dBm Typical

**Waveform:** Sine wave

### INPUT INTERFACES

#### ASI

**2 ASI interfaces that can function in parallel**

**Connector:** BNC female with 75 Ohm coax

**Return loss:** (22-270 MHz) 18-20 dB

**Sensitivity:** 230 mVpp

**Max. input:** 950 mVpp

#### ASI Loopback

**Loopback on each ASI input**

**Connector:** BNC female with 75 Ohm coax

#### 10 MHz Clock

**Stability:** ±1.5 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

### ADDITIONAL INFORMATION

#### Monitor and Control Interfaces

**SW interfaces:**

Command line interface

Web based graphic user Interface

SNMP V3

Front panel

**Serial RS232/RS485:**

Female 9-Pin D-Sub connector

**Ethernet 10/100 BaseT interface**

Monitor and control

**Alarm interface:**

Female 9-Pin D-Sub connector

#### Optional Interfaces

**Dual Ethernet:** 10/100/1GbE

#### Dimensions

**Weight:** 3.5 Kg (7.7 lbs.)

**Size:** 19" W x 18" D x 1.75" H

48.3 x 45.7 x 4.45 cm

#### Power

100-240 VAC, 50-60Hz, 30 Watts Max.

#### Environmental

**Operating temp:** 0 to 50°C

**Storage temp:** -40°C to 70°C

**Operating humidity:** Up to 85%

Non-Condensing

**Storage humidity:** Up to 95%

Non-Condensing

## NS2000 SATELLITE DEMODULATOR – SPECIFICATIONS

### BASEBAND

#### NS4™ / NS3™

**Inner Code:** LDPC

**Outer Code:** BCH

#### QPSK:

1/4, 13/45\*, 1/3, 2/5, 9/20\*, 1/2, 11/20\*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

#### 8PSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 16APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 32APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

#### 64APSK:

2/5, 13/30, 7/15, 1/2, 8/15, 17/30, 3/5, 19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

**Frame Length:** 64800, 16200

#### Baseband ROF:

“SRRC like” 2% (NOVELSAT NS4™), 5%, 10%, 15%, 20%, 25%, 35%

### DVB-S2/S2X

**Inner Code:** LDPC

**Outer Code:** BCH

**Code rates and modulation:**

#### QPSK:

1/4, 13/45\*, 1/3, 2/5, 9/20\*, 1/2, 11/20\*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

#### 8APSK:

5/9(L)\*, 26/45(L)\*

#### 8PSK:

3/5, 23/36\*, 2/3, 25/36\*, 13/18\*, 3/4, 5/6, 8/9, 9/10

#### 16APSK:

26/45\*, 3/5\*, 28/45\*, 23/36\*, 2/3, 25/36\*, 13/18\*, 3/4, 7/9\*, 4/5, 5/6, 77/90\*, 8/9, 9/10, 1/2(L)\*, 8/15(L)\*, 5/9(L)\*, 3/5(L)\*, 2/3(L)\*

#### 32APSK:

32/45\*, 11/15\*, 3/4, 7/9\*, 4/5, 5/6, 8/9, 9/10, 2/3(L)\*

#### 64APSK:

11/15\*, 7/9\*, 4/5\*, 5/6\*, 32/45(L)\*

**Frame Length:** 64800, 16200

#### Baseband ROF:

SRRC 20%, 25%, 35%  
(optional 5%, 10%, 15%)

\*DVB-S2X only

### INPUT INTERFACES

#### L-Band

**Connector:** F-Type (F) 75 Ohm

**Frequency Range:** 950-2150MHz  
in 1Hz steps

**Level:** -70+10log(F)/-20 dBm (F in MBAUD)

**Composite power:** < -20dBm

**Max. input level:** 0 dBm

**Return loss:** >10 dB

#### IF

**Connector:** BNC (F) 75 Ohm

**Frequency Range:** 70MHz ±20MHz,  
140MHz±40MHz in 1Hz steps

**Signal Level:** -70+10log(F)/-20 dBm  
(F in MBAUD)

**Composite power:** < -20dBm

**Max. input level:** 0 dBm

**Return loss:** >10 dB

#### LNB Power Control

**Voltage:** 11.5-14 V (Vert. Pol.),  
16-19V (Horiz. Pol.)

**Band select:** 22KHz ±4KHz

**Max. Current:** 350mA

#### 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

### OUTPUT INTERFACES

#### ASI

2 ASI interfaces that can function in parallel

**Connector:** BNC female with 75 Ohm coax

#### 10 MHz Clock

**Stability:** ±1.5 ppm over 0°C to 50°C

**Aging:** ±1.0 ppm/year

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

**Stability:** ±10 ppb over 0°C to 50°C

**Aging:** ±0.5 ppb/day, <± 75 ppb/year

### ADDITIONAL INFORMATION

#### Monitor and Control Interfaces

##### SW interfaces:

Command line interface

Web based graphic user Interface

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Front panel

##### Serial RS232/RS485:

Female 9-Pin D-Sub connector

##### Ethernet 10/100 BaseT interface

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#### Optional Interfaces

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**Operating humidity:** Up to 85%

Non-Condensing

**Storage humidity:** Up to 95%

Non-Condensing