

# SatExpander

## SE3000 ULTRA-HIGH DATA RATE SATELLITE MODEM

### PRODUCT SHEET

#### DESIGNED FOR HIGH-VOLUME, HIGH-VALUE SERVICES

SatExpander SE3000 is an ultra-high-performance modem designed for serving multiple telecom, broadcast, enterprise and government data-intensive applications. Exhibiting very high throughputs and efficiencies, the SE3000 satellite modem provides superior Point-to-Point and Point-to-Multi-Point connectivity for data and video services, under any condition, anywhere.

#### ULTIMATE TRANSMISSION EFFICIENCY

The ever-growing data consumption across users and locations drives demand for broadband connectivity and capacity. While satellite is the advantageous telecommunications solution for remote and hard-to-reach locations, as well as for mission-critical operations, satellite spectrum comes at cost. SatExpander satellite modems offer new levels of satellite transmission efficiency, driving higher volumes at lower bandwidth cost. SatExpander SE3000 modem incorporates multiple satellite transmission technologies, supporting the most bandwidth-efficient waveform, SatExpander NS4™, for providing very high-performance transmission and space segment efficiency, as well as supporting standard DVB-S, DVB-S2, and DVB-S2X. Exhibiting the world's highest spectral efficiency, the SE3000 modem exceeds 10 bit/Hz with SatExpander NS4™ waveform and SatExpander DUET™ CEC™ (carrier-echo-cancellation) band reuse technology.

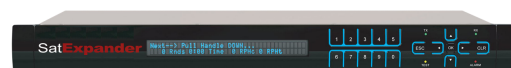
#### CARRIER CLASS PERFORMANCE AND CAPABILITIES

SatExpander SE3000 modem offers an expansive range of symbol rates and data rates, delivering up to 850Mbps on a single modem, using a single carrier over channel bandwidth of up to 84MHz.

The SE3000 offers a fully integrated IP solution incorporating routing capabilities, bandwidth management and advanced QoS mechanism. The SE3000 hierarchical QoS mechanisms and dynamic traffic shaping capabilities demonstrate smooth performance of real-time applications such as VoIP and video while insuring minimal jitter and low delay. With true transparent bridging (Layer 2) data remains fully intact from source to destination making it suitable for service providers and mobile network operators to provide full end-to-end services. In addition, the SE3000 can perform as an IP router (Layer3) reducing the need for additional equipment. SatExpander SE3000 also offers powerful options including embedded TCP acceleration, compression, and optimization, as well as GTP acceleration for cellular networks.

#### HIGHLIGHTS

- High performance and efficiency with SatExpander NS4™ technology
- DVB-S2 and DVB-S2X standard compliant
- SatExpander DUET™ bandwidth reuse technology
- High data rates of up to 850Mbps (bidirectional 425Mbps) with DUET™
- SatExpander DDC™ - Dynamic Distortion Compensator for non-linear channels
- NSPE IP Encapsulation
- Embedded TCP acceleration, compression & optimization
- IP routing/ switching/ bridging capabilities
- Advanced QoS
- ACM operation
- TSolP support
- SatExpander AES-256 encryption decryption
- 24V/48V integrated BUC feeder



## **BEST-IN-INDUSTRY BANDWIDTH REUSE TECHNOLOGY**

SatExpander SE3000 incorporates optional SatExpander DUET™ CeC (carrier-echo-cancellation) band reuse technology. Simultaneously using the same frequency band for both uplink and downlink carriers, the SE3000 modem doubles traffic at the same satellite bandwidth.

The all-digital, built-in echo canceller provides exceptional performance, delivering lossless uplink and downlink across all modulations and codes. Supporting very high SNR difference between uplink and downlink, SatExpander DUET™ offers expansive dynamic range for asymmetric connectivity as well as enhances transmission security by enabling carrier concealment through transmission below noise level.

## **EXTENSIVE SECURITY**

Heightening content protection and security, SatExpander SE3000 modem utilizes extensive security algorithms and mechanisms to provide secured connectivity. Utilizing SatExpander AES-256 encryption, together with automatic and dynamic key generation with over-the-air distribution, the SE3000 implements multi-layer content encryption, securing service, transport, and traffic. For restricting system access and protect remote and on-prem management connectivity, extensive secured management sessions are also provided.

## **TOTAL CONNECTIVITY**

Supporting a wide range of use cases and deployment scenarios, SE3000 presents multiple connectivity options through the capacity to provide a variety of data and video interfaces. For the satellite transmission, the SE3000 is equipped with IF and extended L-Band input and output interfaces and can power external BUC and LNB, offering a compact and cost-effective solution in a space-saving 1U package.

Designed to support multiple configurations and service options, SatExpander SE3000 modem also enables simultaneous operation of two channels. Any two services - data or video - can be combined over a single carrier, each with a different modulation scheme. Furthermore, the dual channel operation supports the combination of any two interfaces, easing migration of network technologies.

## **SUPERIOR RESILIENCY AND AVAILABILITY**

Delivering near perfect availability and reliability, SatExpander SE3000 modem incorporates a comprehensive set of capabilities and features to effectively detect and mitigate various types of interferences and impairments and provide very high link performance and robustness. Featuring adaptive equalizers, error correction techniques, and pre-corrections algorithms, SatExpander SE3000 modem demonstrates superior resilience to phase noise, adjacent satellite interference, inclined orbit variations, low elevation scenarios, weather fluctuations, and any intentional or unintentional interferences and threats. SatExpander SE3000 also supports 1:1 and N:1 redundancy with automatic failover, ensuring very high system availability and service continuity.



## SatExpander SE3000 PROFESSIONAL HIGH-DATA RATE SATELLITE MODEM – SPECIFICATIONS

### BASEBAND

#### NS4™ / NS3™

##### QPSK:

1/4, 1/3, 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

##### 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, 33/5, 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:

19/30, 2/3, 32/45, 3/4, 4/5, 5/6, 8/9, 9/10

**Frame Length:** 16200, 64800

##### ROF SRRC:

SRRC 2% (NS4™ only), 5%, 10%, 15%, 20%, 25%, 35%

#### DVB-S2/2X

##### 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:** 16200, 64800

##### ROF:

SRRC 5%, 10%, 15%, 20%, 25%, 35%

\*DVB-S2X only

### MODULATOR RF INFRASTRUCTURE

#### L-Band / IF Band

##### Connector:

L-Band: SMA (F) 50 Ohm or N-type (F) 50 Ohm, 10MHz ref out, +2V4/+48V/120W (opt)

IF Band: BNC (F) 75 Ohm

##### Freq. range / Set resolution:

L-Band: 950-2150MHz / 10Hz step

IF Band: 50-180MHz / 10Hz step

##### Power level / Set resolution:

-30 to 0dBm / 0.1dB

**Power accuracy:** ± 0.5dB @ 25degC

##### Power stability:

±0.5dB @ 25degC for 24 hours

±0.5dB over temperature

**Monitor port tower:** 40dBm ±5dB

**Return loss:** >14dB (optional 18dB)

##### Spurious / Tx On/Off:

55dBc/4KHz in band and out of band

##### Phase noise:

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

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

@1MHz-100dBc, RMS < 0.5deg

### DEMODULATOR RF INFRASTRUCTURE

#### L-Band / IF Band

##### Connector:

L-Band: F-Type (F) 75 Ohm

IF Band: BNC (F) 75 Ohm

##### Freq. range / Set resolution:

L-Band: 950-2150MHz / 10Hz steps

IF Band: 50-180MHz / 10Hz step

**Signal level:** -70+10log(F) (F in Msps)

Max: -20dBm

**Composite power:** <-20 dBm

**Return loss:** L-Band: >12dB

IF Band: >10dB

**Max. input level:** 0dBm

**LNB control (L-Band): Voltage:**

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

**Band select:** 22KHz ±4KHz, 10MHz ref out

**Max. current:** 350mA

### ADDITIONAL INFORMATION

#### Features

##### Maximum rate:

Bidirectional 850Mbps (2x425Mbps)

**Symbol rate:** 0.1-110Msps

DVB-S, NS4™ DVB-S2, DVB-S/S2 with

5% ROF, DVB-S2X, DVB-DSNG & S2/S2X/

NS3™/NS4™ compliant

**FEC:** DVB-S: CC/RS, DVB-S2/NS3™/NS4™:

LDPC/BCH

SatExpander DUET™ CeC™ (Carrier-echo-

Cancellation) technology

##### IP Enhancements:

Bridge mode (Layer 2)/ VLAN switching

(Layer 2)/ Router mode (Layer 3)

IP Encapsulation (NSPE)

QoS (Quality of Service)

Embedded WAN Acceleration (TCP

Acceleration, Compression & Optimization)

**ACM** – Adaptive Coding & Modulation, Up to

1dB/Sec / PtMP configuration

**AUPC** – Automatic Uplink Power Control

**DDC** – Dynamic Distortion Compensator

**OTA – Over The Air:** M&C, Software

Upgrade

TS over IP / Support for SMPTE 2022-1/2

standards

DVB-Carrier ID (CID) compliant

Clock Extension with E1 interface.

**Configuration Retention:** Non-volatile memory;

Returns upon power up

**Layer-2 bridge:** Ethernet over satellite

(compatible with IPv6/VLAN/MPLS)

**Layer-3 router function:** IPv4 over satellite

#### Software Interfaces

Command line interface

Web based GUI

SNMP V3

#### Management and Control Interfaces

Front panel

Serial RS232

Ethernet 10/100

#### Data Interfaces

GbE 10/100/1000

SFP

2 x ASI input & output

TSolP Support

1 to 4 x E1/T1, E3/T3 -G.703 OC-3/STM-1

#### 10MHz Reference

##### 10MHz Out:

**Stability:** ± 1.0 ppm over 0°C to 50°C (standard)

±0.03ppm over 0°C to 50°C (option)

##### Aging:

± 1.0 ppm/year (standard)

± 0.075 ppm/year (option)

**Power:** 5dBm ± 2dB

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

##### 10MHz In:

**Max Power:** < 20dBm

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

#### Power

100-240 VAC, 50-60Hz, -48VDC (Option)

#### Mechanical

**Weight:** 4Kg

**Size:** 9" W x 18" D x 1.75" H

48.3cm x 45.7cm x 4.45 cm

#### Environmental

**Operating temp.:** 0 to 50°C

**Operating humidity:**

Up to 85% Non-Condensing

**Storage humidity:**

Up to 95% Non-Condensing

#### Certification

EMC:EN55022,EN55024,EN61000-3-2/3,

FCC CFR 47 -part 15

Safety: CB, CE,

IEC 60950-1: 2005 (2nd Ed)+Am 1:2009

All registered trademarks are the property of their respective companies. This brochure is being provided for informational purposes only. The details contained in this document, including product and feature specifications, are subject to change without notice and shall not bind SatExpander to a specific product or set of features related thereto. DVB is a registered trademark of the DVB Project.

For more information visit [www.SatExpander.com](http://www.SatExpander.com)