

SatExpander

HIGH-PERFORMANCE SATELLITE MODULATOR AND DEMODULATOR



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. SatExpander satellite broadcast solutions offer new levels of satellite transmission efficiency, driving higher volumes of video content at lower bandwidth cost. SatExpander SE1000 Modulator and SE2000 Demodulator incorporate 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.

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, SatExpander broadcast solutions utilize extensive security algorithms and mechanisms to provide secured media delivery. Utilizing SatExpander 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, SatExpander SE1000 Modulator and SE2000 Demodulator deliver highest content protection, securing video and data connectivity.

FLEXIBLE DUAL CHANNEL OPERATION

Designed to support multiple configurations and service options, SatExpander SE1000 Modulator and SE2000 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

SatExpander 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, SatExpander SE1000 Modulator and SE2000 Demodulator seamlessly integrate into any network and infrastructure.

SUPERIOR RESILIENCY AND AVAILABILITY

Delivering near perfect availability and reliability, SatExpander 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, SatExpander SE1000 Modulator and SE2000 demonstrate superior resilience to phase noise, adjacent satellite interference, weather fluctuations, and any intentional or unintentional interferences and threats. SatExpander SE1000 Modulator and SE2000 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 SatExpander NS4™ technology
- DVB-S2 and DVB-S2X standard compliant
- High data rates of up to 425Mbps / 80Mpsps
- Dual channel mode
- TSolP support
- SatExpander DRM with AES-256 encryption / decryption
- SatExpanderDDC™ - Dynamic Distortion Compensator for non-linear channels
- Non-Linear Pre-Distortion technology (NLPD)
- ACM operation



SE1000 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% (SatExpander 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

SE2000 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% (SatExpander 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:

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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: $-70+10\log(F)/-20$ 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 \pm 20MHz,
140MHz \pm 40MHz in 1Hz steps

Signal Level: $-70+10\log(F)/-20$ 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 \pm 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: \pm 1.5 ppm over 0°C to 50°C

Aging: \pm 1.0 ppm/year

10 MHz Clock – High Stability (Optional)

Stability: \pm 10 ppb over 0°C to 50°C

Aging: \pm 0.5 ppb/day, \leq \pm 75 ppb/year

ADDITIONAL INFORMATION

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Storage humidity: Up to 95%

Non-Condensing