

# Professional DVB-S/S2 Modulator

## SMD 989



The SENCORE SMD 989 DVB-S/S2 professional modulator is ideal for single or multi-stream MPEG Transport Stream modulation. Leveraging the latest modulation technology, the SMD provides high-value solution with unmatched signal quality.

Tighter "S2+" roll-off factors and Multistream support with Variable Coding and Modulation (VCM) ensures the SMD will be ready for the future of S2 modulation. Integrated processing features such as TR 101 290 error checking and BISS scrambling make the SMD the most versatile modulator available for video applications.

The optional, built-in L-Band upconverter enables the SMD 989 to provide an IF or L-band output. This eliminates the need for multiple pieces of equipment and provides a compact solution for facilities housing multiple modulators or for insertion into L-band inter-facility links.

The chassis has two bays allowing for a variety of configurations, including two independent modulators for density, redundant power supplies for reliability, or DC BUC power for truck installs.

## APPLICATIONS

- **News Gathering**  
Quick to boot, easy-to-use, robust platform  
Support for stored presets  
Built-in BISS scrambling  
Support for up-and-coming advanced modulation features (multistream, VCM, 16APSK/32APSK)
- **Uplink Facility Deployment**  
State-of-the-art S2 and "S2+" modulation technology  
Unmatched MER and PCR restamp accuracy  
TR 101 290 failover for redundant encoder support  
Available dual power supply option for high reliability  
High modulation efficiency with 8/16/32APSK modes  
Full control and monitoring via SNMP
- **Advanced Modulation/Retransmission Use Cases**  
Support for up to six streams of multistream transmission  
VCM mode for variable-level protection  
Higher-order modulation for high-throughput signals

## KEY FEATURES

- Two-bay chassis to support a variety of options
- Super-efficient "S2+" roll-off filter support
- Ability to modulate 1 to 6 multistream transport streams on a single carrier (single-box multistream solution)
- L-band and IF outputs
- Optional diplexed 10MHz and DC power on L-band
- Front panel and web GUI for easy configuration
- ASI and IP inputs
- Available with dual, redundant power supply

# SPECIFICATIONS

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### INPUTS

#### SWITCHING

Automatic failover and failback between any two inputs  
Triggered on transport stream sync loss or TR 101 290 P1 thresholds

#### ASI

Connector: 4x BNC  
Impedance: 75Ω  
Packet format: Auto detect 188/204 byte  
TS Bitrate: 0.5 Mbps - 160 Mbps

#### IP

Capacity: 6x Transport Streams  
Ports: 1 GbE port  
Connector Type: RJ45 10/100/1000 - Auto Negotiating  
Input Format: UDP or RTP  
IP Encapsulation: 1 to 7 TS packets per IP packet  
Addressing: Unicast and Multicast  
IGMP Compatibility: Version 1, 2, and 3  
Per TS Bitrate: 0.5 Mbps - 160 Mbps

#### REFERENCE

External Reference Input: 10 Mhz/50Ω BNC  
Reference Input Return Loss: >15 dB  
Reference Input Level: -3dBm to 7dBm  
Internal Reference: Ovenized Internal 10MHz Oscillator  
Reference Output Source: Internal or Reconditioned External  
Reference Output Level: +5dBm  
Reference Output Return Loss: >25 dB

### MODULATION

#### DVB-S/DSNG

Modulation format & FEC rate: QPSK: 1/2, 2/3, 3/4, 5/6, 7/8  
8PSK: 2/3, 5/6, 8/9  
16QAM: 3/4, 7/8  
Baud rate range: 0.5 - 45 Mbaud  
Roll-off Factor: 0.20, 0.25, 0.30  
Spectral Inversion: On / Off

#### DVB-S2/S2+

Signal Format: CCM / VCM  
Modulation Format & FEC Rate: 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  
Baud rate range: 0.5 - 45 Mbaud  
Roll-off Factor: 0.05, 0.10, 0.15, 0.20, 0.25, 0.35  
Multi Stream Support: 1-6 transport streams per output  
Spectral Inversion: On / Off  
FEC Frames: Normal (64,800) / Short (16,200)

### PROCESSING

#### TS ANALYSIS

Analysis Engines: 2x (Primary and Backup Inputs)  
Error Checking: Full TR 101 290 P1 Analysis with User-Settable Thresholds

#### BISS SCRAMBLING

Supported Modes: BISS 1 or BISS E with Injected ID  
Scrambling Capability: Single Key, Single TS Scrambling  
Supported Bitrates: 0.5 - 145 Mbps

### OUTPUTS

#### IF OUTPUT

Frequency: 52-145 MHz (1 Hz steps)  
Level: -30 dBm to -5 dBm (0.2 dB steps)  
Connector: 75Ω BNC  
Return Loss: >20 dB  
Spurious Signal Level: -55dBc @ -10dBm  
Phase Noise/Internal Reference (typical dBc/Hz @ 70/140 MHz):  
10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz  
-70 dBc -70 dBc -90 dBc -95 dBc -105 dBc -115 dBc

#### L-BAND OUTPUT

Frequency: 950-2150 MHz (1 KHz steps)  
Level: -30 dBm to 5 dBm (0.1 dB steps)  
Connector: 50Ω SMA  
Return Loss: >15 dB  
Monitoring Output: -20 dBc @ main frequency  
Spurious Signal Level: -55dBc @ -10dBm  
Phase Noise/Internal Reference (typical dBc/Hz @ 950-1750 MHz):  
10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz  
-65 dBc -75 dBc -85 dBc -90 dBc -90 dBc -115 dBc

#### DIPLEXED L-BAND OUTPUT

Connector: 50Ω SMA  
Reference on L-Band: 10 MHz  
Reference Source: Internal or external (auto detect)  
Reference Level: +5 dBm  
DC Power on L-Band: 24VDC @ 3.1A (optional)  
48VDC @ 1.6A (optional)  
DC Power Source: Integrated or external supply  
DC Power Control: On/Off switching (internal supply)

#### MANAGEMENT

Connector: RJ-45 10/100 - Auto Negotiating  
Protocols: HTTP and SNMP  
User Interfaces: Full control via web GUI  
Full control via front panel  
Automation Interfaces: Full status and control via SNMP  
Configurable SNMP traps  
Web services access to main GUI  
Contact Closure Alarms: 2 form C relays  
Connector: 9-pin sub-D female  
Alarms supported: User configurable to any alarm(s)

#### DIMENSIONS/POWER

Height: 1RU, 1.75" (5cm)  
Width: 17.4" (44.2 cm)  
Depth: 23" (58 cm)  
Power: 100-240 AC 50/60 Hz  
-48 VDC (optional)

Supply Type: Integrated supply (standard)  
Dual, hot-swappable, redundant load sharing supplies (optional)

#### ENVIRONMENTAL CONDITIONS

Operating Temp: 0° to 45°C  
Storage Temp: -40°C to 65°C  
Relative Operating Humidity: <95% (non-condensing)