



INTRODUCTION

Comtech EF Data's SLM-8650 satellite modem is the benchmark for fully versatile modem applications. Maximum flexibility allows the modem to communicate with most major satellite systems in the world. The modem meets the requirements for the Defense Satellite Communications System (DSCS).

The SLM-8650 implements advanced high-level modulations and coding techniques such as 8-PSK/16-QAM and Reed-Solomon FEC for superior performance.

FEATURES

- MIL-STD-188-165 compliant
- BPSK, OQPSK, QPSK, 8-PSK, or 16-QAM
- 4.8 kbps to 9.312 Mbps

APPLICATIONS

The SLM-8650 can be used on DSCS II, SKYNET, NATO-III, PANAMSAT, and all U.S. domestic satellites. Options extend the modem range to include EUTELSAT and INTELSAT satellite networks.

The SLM-8650 is especially useful when implementing tri-band terminals requiring both commercial and government communication access.

COMPATIBILITY

The SLM-8650 is interoperable with the OM-73, MD-1002, SLM-4650, LM-46/4046, and MD-945 within the data rate limitations of the modems involved. The INTELSAT/EUTELSAT open network capabilities provide interoperability with PTT earth stations worldwide.

DATA AND CLOCK

The SLM-8650 can derive timing from a standard 5 MHz station reference oscillator. A built-in plesiochronous elastic buffer can be used to remove Doppler shift from the data.

The data interface is MIL-STD-188 and meets the requirements for RS-422. G.703 data supports T1, T2, E1, and E2 formats.

OPEN NETWORK IDR, IBS, D&I

A new generation of non-tactical satellite terminals provides access to commercial satellite networks. The SLM-8650 can be equipped with the necessary baseband processors to operate with Intermediate Data Rate (IDR), INTELSAT Business Standard (IBS), or SMS earth stations worldwide. Connectivity with over 300 earth stations is established.

The open network mode also supports fractional T1 or E1 transmission Drop and Insert.

CUSTOM MODE

The custom mode provides total control of available modem resources. By selection of proper filter mask, modulation, FEC, and vector rotation, the SLM-8650 can be programmed to emulate practically any other proprietary modem.

UPLINK POWER CONTROL

The SLM-8650 can be equipped with optional Automatic Uplink Power Control (AUPC). In this application, overhead bits of the frame are utilized to establish a modem-to-modem link. Thresholds and limits can be set to automatically compensate for link fades. The AUPC mode requires the ASYNC selection as a modem type. This ASYNC mode allows for the AUPC and provides an additional asynchronous channel for site-to-site communications.

CONCATENATED CODING

Uncorrectable burst errors will occur as the threshold BER is approached. An optional Reed-Solomon FEC can be used to further correct the burst errors resulting in a BER of 1×10^{-10} at 5.0 dBm, E_b/N_0 . This allows for either extra link margin or the use of smaller antennas.



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System Specifications

Operating Frequency Range	50 to 180 MHz, in 100 Hz steps
Digital Interface	G.703, MIL-188/RS-422 and V.35 selectable
Digital Data Rate	4.8 kbps to 9.312 Mbps, in 1 bps steps
Symbol Rate	6 Ks/s to 6.3 Ms/s
Modulation Types	BPSK, QPSK, Offset QPSK (8-PSK or 16-QAM options)
Stability	5, 10, or 20 MHz at +5 dBm external reference $\pm 2 \times 10^{-7}$ internal reference
Energy Dispersal	CCITT, V.35, and others

Modulation Specifications

Output Power	-5 to -30 dBm, adjustable in 0.1 dB steps (+5 to -20 dBm optional)
Output Return Loss	17 dB
Output Impedance	50Ω
Spurious	-55 dBc measured in a 3 KHz bandwidth
Output Connector	TNC

Demodulation Specifications

Input Power:	
Desired Carrier	-30 to -55 dBm (≤ 2 Mbps) -30 to -45 dBm (> 2 Mbps)
Maximum Composite	-5 dBm or +40 dBc
Input Impedance	50 Ω
Input Connector	TNC
Carrier Acquisition Range	± 30 kHz, selectable
Input Return Loss	17 dB
Elastic Buffer	32 to 262,144 bits, selectable

Environmental And Physical Specifications

Prime Power	90 to 264 VAC, 47 to 63 Hz, 130W 38 to 64 VDC, 80W typical, 130W maximum
Mounting	19-in rack
Size	19W x 20D x 3.5H inches (2 RU) (48.2 x 50.8 x 8.9 cm)
Weight	<19 lbs. (8.6 kg)
Temperature, Operating	0 to 50°C (32 to 122° F)
Humidity	Up to 95%, non-condensing
Temperature, Storage (Non-operational)	-40C to +70°C (-40 to 158°F)

ESC Specifications

IDR:	
Voice/Data Orderwire	2 ADPCM (4 wire) or 64 kbps data channel
Data Orderwire	8 kbps (RS-422 Interface)
Backward Alarms	Form C contacts (4)
Total Overhead	96 kbps

IBS/D&I:

ASYNCR Data Orderwire	1/2000 x customer data rate
Backward Alarms	Form C contacts (1)
Total Overhead	1/15 x customer data rate

Available Options

Sequential Soft Decision Decoder	
Concatenated Reed-Solomon Codec	
Closed Network Overhead:	
Automatic Uplink Power Control (AUPC) Interface	
Asynchronous Channel Unit	
8-PSK/16-QAM	
Drop and Insert (D&I)	
Interface:	G.703
T1 (1.544 Mbps) or E1 (2.048 Mbps)	
n x 64 Kbps, n = 1-6, 8, 10, 12, 15, 16, 20, 24, 30	

BER Performance

Viterbi Decoder, QPSK				
<u>BER</u>	<u>1/2</u>	<u>3/4</u>	<u>7/8</u>	
10 ⁻³	4.2	5.2	6.4	
10 ⁻⁴	4.8	6.0	7.2	
10 ⁻⁵	5.5	6.7	7.9	
10 ⁻⁶	6.1	7.5	8.6	
10 ⁻⁷	6.7	8.2	9.2	
10 ⁻⁸	7.2	8.8	9.9	

Viterbi w/ R/S, QPSK

<u>BER</u>	<u>1/2</u>	<u>3/4</u>	
10 ⁻⁶	4.1	5.6	
10 ⁻⁷	4.2	5.8	
10 ⁻⁸	4.4	6.0	
10 ⁻¹⁰	5.0	6.3	

High Order Modulation:

	<u>8-PSK w/ R/S</u>		<u>16-QAM w/ R/S</u>		
<u>BER</u>	<u>2/3</u>	<u>5/6</u>	<u>BER</u>	<u>3/4</u>	<u>7/8</u>
10 ⁻⁴	5.5	7.5	10 ⁻⁴	7.9	9.3
10 ⁻⁵	5.8	7.8	10 ⁻⁵	8.1	9.6
10 ⁻⁶	6.2	8.2	10 ⁻⁶	8.4	9.8
10 ⁻⁷	6.5	8.6	10 ⁻⁷	8.6	10.0
10 ⁻⁸	6.7	8.8	10 ⁻⁸	8.8	10.3
10 ⁻⁹	6.9	9.3	10 ⁻⁹	9.0	10.5



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