



TSN101/X

SHF NAVAL SATELLITE TERMINAL TSN101/X

GENERAL

The TSN101/X is a Naval Satellite Terminal, providing voice and data communications through a FDMA PAMA channel at $16 \div 256$ kbps.

The Terminal consists of above deck equipment and below deck equipment.

The above deck equipment is basically constituted of antenna, RF Front end, pedestal and pedestal control unit; while the below deck equipment is constituted of the base band equipment, including satellite modem, access and switching equipment, antenna control unit. The Terminal is available in two versions:

Single Antenna version and Dual Antenna version.

The Single Antenna version is equipped with one antenna and one RF Front-end.

This version is suitable for installation wherein the satellite line-of-sight is not obstructed by the ship frame in quite all conditions.

The Dual Antenna version is equipped with two antennas and two RF Front-ends. It is suitable for installations whereas the above conditions cannot be met.

The Antenna is a 1 m diameter, offset, prime focus type one, protected by means of a radome and installed on a

motorized and stabilized pedestal.

The RF Front-end furnishes complete transmitter and receiver functions between the IF 70 MHz modem interface and the X Band antenna subsystem interface and is installed on antenna pedestal.

The below deck Base Band Section consists of the MSN 100 equipment.

It contains the Satellite Modem integrated with a Unit Level Circuit and Packet Switch, and provides, in a standard configuration, 5 off Analogue Voice interfaces, 2 off Asynchronous/Synchronous Data interfaces, 2 off Asynchronous Data interfaces, 2 off Ethernet 10 Mbps bridge interfaces and 1 trunk interface up to 2 Mbps, selectable in Eurocom, Transparent or ITU PCM/ISDN mode. Optionally, the user interfaces can be expanded, in a modular fashion, by the addition of User Interface boards. The integrated satellite modem unit provides a FDMA PAMA Traffic channel up to 256 kbps, in a 4 kbps step. A Viterbi and Reed Solomon code improves BER performances and optimises the Satellite Bandwidth.

The TSN101/X is fully interoperable with tactical switches belonging to the CD1xx family.

Eurocom, NATO STANAG, ITU-T and ETSI standards are supported. The local M&C function allows all the main Terminal operating parameters to be configured and controlled.

It is performed by a devoted processor for the RF Front End and by the Central Unit for the MSN100 equipment. In the Single Antenna version the M&C function is allowed through the furnished AS107 hand held terminal. In the Dual Antenna version the M&C function is allowed through software applications with graphical interface, hosted on a dedicated PC. The M&C software interface and the hosting PC can be provided also in the Single Antenna version as an option. A remote M&C function from a Network Control Centre can be provided optionally for both the versions. Powerful self-diagnostics greatly ease the field maintenance task. The Terminal is powered by an AC power source at 90 ÷ 240 Vac, 47 ÷ 63 Hz.

KEY FEATURES

Flexibility

- Easy tailorable on the base of ship characteristics
- Single or dual antenna configuration
- Comprehensive User and Network interfaces

Compactness and High Integration

- A single equipment providing User Interfaces, Switching Capabilities, Satellite Access
- A single board contains the Main Controller, the Switch and the User/Network Interfaces
- A single board contains the Satellite Modem

High Efficiency

- Three-axis stabilized antenna platform to compensate ship's motion
- Powerful Reed Solomon codec for Satellite/Terminal power optimisation
- Bandwidth optimisation thanks to high granularity of Satellite Channel Frame (down to 4 kbps step)
- High efficiency Voice coding scheme: down to 8 kbps CELP

Modularity

- User interfaces and Satellite Channel Access (modems) may be expanded by adding modules

MAIN FEATURES

- Transmit Band: 7.9 ÷ 8.4 GHz
- Receive Band: 7.25 ÷ 7.75 GHz
- EIRP saturation: 41 dBW at midband
- G/T: 12 dB/K at midband, 23°C, clear sky
- IF frequencies interface:
 - 70 ± 20 MHz, 100 Hz step size
- 125 kHz RF step size
- 1 off FDMA/PAMA Traffic Channel:
 - 16 ÷ 256 kbps user rate, in 4 kbps steps
 - Modulation: QPSK
 - FEC Viterbi K=7, rate 1/2, 3/4
 - Reed Solomon 126/112/7
- Local subscribers (voice, data, LAN)
- 1 off trunk interface configurable as:
 - Transparent with HDB3/AMI/V.11/V.28/V.35
 - Eurocom trunk to CD1xx family
 - Eurocom Gateway/EES Gateway
 - STANAG 4206
 - ITU-T E1 with selectable Euro ISDN/Qsig/R2/CAS protocol
- User interfaces in accordance with Eurocom, NATO and ITU/ETSI standards
- Local and Remote Monitor and Control
- Tolerated ship's motion:
 - Roll +/- 25° with 6 -12 s periods
 - Pitch +/- 15° with 6 -12 s periods
 - Yaw +/- 8° with 15 - 20 s periods
- Powered by AC source (90 ÷ 240 Vac, 47 ÷ 63 Hz)
- Designed for operation in marine ambient environments

TECHNICAL SPECIFICATIONS

SYSTEM PERFORMANCES

Unit Level Circuit and Packet Switch

Channel sampling rate:	4/8/16/32 kbps SW selectable
Multichannel (loop/trunk/gateway) interface:	Eurocom/Transparent V.28/V.11/V.35/HDB3/AM (up to 64 slots) trunk
A/D Conversion:	CVSD, 16/32 kbps (Eurocom D/1 IA8) ADPCM, 16/32 kbps (ITU-T G.726) CELP, 8 kbps (ITU-T G.729)
Data processing:	Eurocom data classes 1, 2, 3, 4 (Eurocom D/1 IA9)
Local user Voice traffic:	4 off ACB analogue telephone 1 off CACB analogue line for external PABX
Data traffic:	2 off data interfaces, V.11/V.28/V.35 Synchronous (up to 256 kbps) Asynchronous (up to 115.2 kbps) 2 off data interfaces, V.28 Asynchronous (up to 115.2 kbps) 2 Ethernet, 10 Mbps

RF Module, Antenna and FDMA modem

Transmit band:	7.9 ÷ 8.4 GHz
Receive band:	7.25 ÷ 7.75 GHz
EIRP:	41 dBW at midband
G/T:	12 dB/K at midband, 23°C, clear sky
Antenna type:	Offset Prime Focus
Reflector size:	1 m
Antenna steerability:	Azimuth: 0 ÷ 360 degrees, unlimited Elevation: -15 to +120 degrees Cross level: + / - 28 degrees
Antenna Platform Type:	Three Axes (elevation, cross-level, azimuth train) Closed Loop Servo Stabilized with unlimited azimuth capability
Antenna polarisation:	RHCP (Tx) LHCP (Rx)
Number of Traffic Channels:	1 off (FDMA PAMA 16 ÷ 256 kbps)
Modulation type:	QPSK
FEC:	Viterbi K=7: rate 1/2, 3/4 Reed Solomon: 126,112,7
IBS Overhead:	IESS 309 compliant
Operating Mode:	Continuous Mode

BER Performance

Continuous Mode VITERBI	BER	1/2	3/4	7/8
	10-3	4.2	5.4	6.5
	10-4	4.8	6.0	7.2
	10-5	5.5	6.7	7.9
	10-6	6.2	7.5	8.6
	10-7	6.7	8.2	9.2
	10-8	7.3	8.8	10.0

Continuous Mode RS + VITERBI	BER	1/2	3/4
	10-6	4.2	5.6
	10-7	4.3	5.8
	10-8	4.5	6.0
	10-10	5.0	6.3

MANAGEMENT

Local Control	ITU T V.28; asynchronous serial line, ASCII XON/XOFF protocol, up to 19.2 kbps AS107 handheld control terminal
Network management interface:	ITU-T V.28; asynchronous serial line, binary protocol, 9.6 kbps
Remote Control facility:	via data switched connection
Self-diagnostics:	power-on self-test/on-line BITE
General Alarm:	floating relay contact pair

ENVIRONMENTAL CONDITIONS

Operating Temperature:

Above Deck Equipment:	- 30 to + 55 °C
Below Deck Equipment:	0 to + 40 °C

Storage Temperature:

Above Deck Equipment:	- 40 to + 70 °C
Below Deck Equipment:	- 20 to + 60 °C

Relative Humidity:

Above Deck Equipment:	up to 100%
Below Deck Equipment:	up to 95% (not condensing)

Wind (operating):

160 km/h

PRIMARY POWER

AC Power Source

Voltage:	90 ÷ 240 Vac
Frequency:	47 ÷ 63 Hz
Power Consumption:	2000 W maximum

PHYSICAL (SINGLE ANTENNA CONFIGURATION)

Overall dimensions

Below Deck Equipment:	19" x 23 RU maximum (Dual Antenna conf.: 19" x 26 RU)
Above Deck Equipment (Antenna Radome):	Height: 66" maximum Diameter: 61" maximum
Overall weight	
Below Deck Equipment:	75 kg
Above Deck Equipment:	300 kg

For more information please email infomarketing@selex-es.com
Selex ES S.p.A - A Finmeccanica Company

This publication is issued to provide outline information only and is supplied without liability for errors or omissions. No part of it may be reproduced or used unless authorized in writing.
We reserve the right to modify or revise all or part of this document without notice.