SATCOM SYSTEM
AERONAUTICAL SATELLITE EQUIPMENT AND SERVICES

USER MANUAL

SATCOM SATELLITE SYSTEM
SIERRA-MC LRU
P/N: R64-01A1ByCzDtSu

DOCUMENT REFERENCE 0193M993200-04
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CONTROLLED DOCUMENTATION

Document Change History

ISSUE	DATE	DCP	DESCRIPTION OF CHANGE
Rev. 01	28-Aug.-09	All	Initial release
Rev. 02	01-Dec.-09	All	Typing corrections
Rev. 03	01-May.-10	All	Add server configuration
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Document Approval

	Name	Signature	Date
Compiled by	D. TEYSSIER		**23/09/10**
Checked by	T. MARCHISET		**23/09/10**
Approved by	D. TEYSSIER		**23/09/10**

SAFETY WARNING

The following general safety precautions provided must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions, or with specific warnings in this manual, may violate the safety standards of design, manufacture and intended use of the equipment.

RADIATION WARNING

During transmission, this system radiates microwave power from all sides of the antenna unit. High levels of radio frequency radiation are considered harmful to health. Although no single value has been agreed upon by all countries, the American National Standards Institute (ANSI/LEEE C95.1-1992) recommends that personnel should not be exposed to radiation stronger than 1 mW per square centimeter at the frequencies used in this system. Accordingly, the operator of the system should ensure that no personnel should approach within fifty centimeters of the antenna when the system is transmitting.

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ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard	OEM	Original Equipment Manufacturer
AMM	Aircraft Maintenance Manual	P/N	Part Number
ARO	At Receipt of Order	PDR	Preliminary Design Review
ASM	Aircraft Schematics Manual	PO	Purchase Order
ATP	Acceptance Test Procedure	PTF	Proposition Tech.et Financière
ATR	Acceptance Test Receipt	QoS	Quality of Services
C/B	Circuit Breaker	RF	Radio Frequency
CDR	Critical Design Review	RC	Recuing Costs
CEM	Compatibilité Electromagnétique	SBD	Short Burst DATA
CoC	Certificate of Conformity	SoW	Scope of Work
COTS	Commercial Off The Shelf	S/N	Serial Number
CSQ	RF Signal Strength (Check Signal Quality)	STC	Supplemental Type Certificate
DDP	Declaration of Design and Performance	TBD	To Be Determined
DPS	Detailed Project Status	TCM	Technical Coordination Meeting
DO-160	Aeronautical Test Programs	TSO	Technical Standard Order
FAI	First Article Inspection	VPN	Virtual Private Network
GDOP	Geometric Dilution of Precision	WDM	Wiring Diagram Manual
MMI	Man Machine Interface		
IPC	Illustrated Parts catalog		
JAA	Joint Aviation Authority		
LRU	Line Replaceable Unit		
MPD	Maintenance Planning Document		
Mod	Modification		
NRC	Non Recurring Cost		

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INTRODUCTION

This manual can be used for following P/N: R64-01A1ByCzDtSu.

It provides general instructions on how to use SIERRA-MC SatCom (Satellite communication device) for telephony, DATA transmission and/or asset tracking/security.

It has been divided in 2 parts:

- Part 1: general information, how to use the SatCom
- Part 2: configuration and adjusting parameters of the SatCom

We strongly recommend all pages of this manual are read before any operation, to be able to utilize all available features and to quickly resolve initial issues that might arise at installation.

The LRU P/N R64-01AxByCzDtSu is a part of “Sierra Multi Channel” satellite communication system for access to the Thuraya and/or Iridium and/or Inmarsat Satellite Networks and/or GSM Network.
It also

The SIERRA-MC SatCom is compatible with standard cockpit and cabin telephony POTS interfaces (Plain Old Telephony System) and low/high audio impedance level.

The SIERRA-MC SatCom integrates a DHCP server and behaves like a gateway for DATA connexion.

The SIERRA-MC SatCom can be used with graphic color touch screen display “QUEBEC” via LAN to use telephony, DATA and SMS features.

The SIERRA-MC SatCom has high speed ARINC-429 compliant port and in/out configurable discrete.

The SIERRA-MC SatCom has a combined high precision US/GALILEO/GLONASS GPS.

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PART A

GENERAL INFORMATION ABOUT THE “SIERRA-MC” SATCOM

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A1.0 - SIERRA-MC SATCOM FEATURES

A1.1 - TELECOMMUNICATION SERVICES

A1.1.1 - Via THURAYA satellite network:

- Digital voice @ 4.8 Kbps
- Circuit Data @ 9.6 Kbps
- GmPRS Data up to 20 / 60 Kbps (up/down)
- G3 fax service
- SMS Services

A1.1.2 - Via IRIDIUM satellite network:

- Digital voice @ 2.4 Kbps
- Circuit DATA @ 2.4 Kbps
- Fax service (if available by Iridium)
- SMS Services in both TEXT and PDU mode
- SBD Services in both TEXT and PDU mode

A1.1.3 - Via GSM networks

- Single channel voice or DATA, Terminal class B, GPRS class 10
- Digital voice @ 4.8 Kbps
- Circuit DATA @ 9.6 Kbps
- GPRS GSM class 10 land based DATA up to 88 Kbps up/ 44Kbps down
- G3 fax service depending on bearer, if subscribed
- SMS Services

Note: GSM network is authorized to be used on the ground only and is not legal to be used when asset not on the ground. Over 1 meter above ground, you must turn off any GSM device as the signal may be available more than 8.000 feet and jam GSM network and/or aircraft electronic equipment.

Services can be combined through different hardware configurations, please refer to P/N list for SIERRA SatCom.

- Dual SAT Network Thuraya & Iridium
- Dual Satellite Network Thuraya AND Iridium
- Combined SAT and GSM Network with Thuraya AND Iridium

A1.2 – TRANSCEIVER FUNCTIONNALITIES

A1.2.A - STANDARD FUNCTIONNALITIES

- DATA Connection via RS232 or USB (Thuraya only) in Switch Circuit or GmPRS (Thuraya only) mode
- Constant Audio Level and Anti-Echo system
- VOX activated microphone input
- Automated PTT (Push To Talk) for UHF radio
- Alert and/or alarm signaling to ground by pushing a button
- Direct numbering by pressing a push button
- LED indicator
- Force network switch input for dual network transceiver
- SONALERT discrete output (Connector C4 – PIN “G”)

A1.2.B - OPTIONAL FUNCTIONNALITIES

- Remote configuration by SMS
- Excessive Gravitational Acceleration detection by integrated 3D sensor sending SMS with GPS position to the ground when specific G value is exceeded (can be used as crash detection)

- LED indicators dimming for night/day
- OOOI management by high precision GPS
- All functionalities in the manual noted with *

A1.3 - PBX FEATURES

A1.3.A - STANDARD SERVICES

- Internal call from cockpit / cabin
- Privacy functionality on external or internal calls
- Conference call
- Selection of handset ringing for incoming call (cockpit only, cabin only, etc…)
- Busy tone or call indication while intercom communication

A1.3.B - OPTIONAL FEATURES

By bonding two or more SIERRA-MC SatCom together, you can get additional services like:

- Additional channels for voice simultaneous calls
- Broader DATA channel
- Conference call with several users on the ground and in cabin and/or cockpit

A1.4 - GPS SERVICES

A1.4.A - STANDARD SERVICES

- Combined embedded chip US GPS/Galileo/GLONASS
- Thuraya GPS
- Encrypted GPS services
- Asset Tracking via GPS
- Remotely user configurable by SMS
- Geofencing: user defined area from where the asset should not get out
- Under fire button: send position to ground station or any mobile phone
- Alert button: send position to ground station or any mobile phone
- Mapping: display of position asset on geo/raster/satellite maps

A1.4.B - OPTIONAL SERVICES

- OOOI reporting using GPS
- High Precision 54 channels TRI GPS Positioning up to 1.5 m accuracy
- GPS position can be displayed and viewed on:
  - www.aerosoft.pro 3D mapping system with raster/digital/satellite maps on internet
  - general purpose computer connected with SIERRA-MC SatCom receiver and mapping software.

A1.5 - OTHER FEATURES

These services are proposed as option:

- AES-256 Encryption (available end 2010)
- Voice recognition

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A2.1 – C1 - 19-PIN CIRCULAR MALE CONNECTOR

C1 = 851 02E14 19P50 16, mating connector 851 06RC14 19S50

PIN	ASSIGMENT	I/O	NOTE	COMMENTS
H	**POWER SUPPLY IN - 28V DC**	I	**28 VDC POWER IN**	12-65 VDC – 3A external. fuse
K	ARINC 429 BUS – IN A	I		
J	ARINC 429 BUS – IN B	I		
L	ARINC 429 BUS – OUT A	O		
U	ARINC 429 BUS – OUT B	O		
T	RESERVED			
M	RESERVED			
N	GROUND NUMERIC AUDIO	GND		
G	**POWER SUPPLY - GROUND**	GND		
A	MODEM1 – LED L2	O	MODEM 1 STATUS	PULLED DOWN WHEN ACTIVATED (max 100 mA)
V	NETWORK 1 – LED L3	O	NETWORK 1 STATUS	
P	VAD	O	VOICE ACTIVITY DETECT. (PTT COMMAND)	
B	MODEM 2 – LED L4	O	MODEM 2 STATUS	
S	NETWORK 2 – LED L5	O	NETWORK 2 STATUS	
R	MODEM 3 – LED L6	O	MODEM 3 STATUS	
C	NETWORK 3 – LED L7	O	NETWORK 2 STATUS	
E	POWER OUT 8.0 VDC – GROUND	GND		
D	NIGHT/DAY DIMMER INFO	O	NIGHT = PULLED DOWN DAY = OPENNED	max 100 mA
F	POWER OUT 8.0VDC - 500mA	O		ACCESSORY DC POWER OUT

A2.1.1 –28 VDC POWER INPUT

LOCATION	C1 / PIN H	COMMENTS
NORMAL	27,5 VDC nominal 15 VDC minimum 49 VDC maximum	
ABNORMAL	12 VDC minimum 50 VDC maximum	
CURRENT	0,2 to 0,6 Amps max @ 27,5 Vdc	

A2.1.2 –VOICE ACTIVITY DETECTION

Used to trigger microphone/PTT on VHF/UHF radio

LOCATION	C1 / PIN P	COMMENTS
INPUT/OUTPUT	O	
SIGNAL TYPE	Pull down / Open	
LEVEL	Ground or open	From 1VDC to 28 VDC / 200mA

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The SIERRA-MC SatCom integrates functionalities for a 2 lines display P/N UN-DISP-01. This optional LCD display allows to show incoming SMS and manage them (delete, read, next).

For specific application and development, please contact SatCom System.

A2.2 – C2 - 19-PIN CIRCULAR FEMALE CONNECTOR

C2 = 851 02E14 19S50 16, mating connector 851 06RC14 19P50

PIN	ASSIGMENT	I/O	NOTE	COMMENTS
H	DISCRETE INPUT 1	I	SEND SMS INFORMATION: • GPS INFO • MESSSAGE • SPEED DIAL MAKE HANDSET RING (MHR) 2 STATES DISCRETE: • PULLED DOWN • PULLED UP	USER CONFIGURABLE PULL DOWN TO TRIGGER
K	DISCRETE INPUT 2	I		
J	DISCRETE INPUT 3	I		
L	DISCRETE INPUT 4	I		
U	DISCRETE INPUT 5	I		
T	DISCRETE INPUT 6	I		
M	DISCRETE INPUT 7	I		
N	DISCRETE INPUT 8	I		
G	DISCRETE INPUT 9	I		
A	DISCRETE INPUT 10	I		
V	FORCE NETWORK SWITCH 1	I		GSM MODE SELECTION
P	FORCE NETWORK SWITCH 2	I		SAT MODE SELECTION
B	OUTPUT 1	O	REMOTE CONTROL	USER CONFIGURABLE TRIGGERED = PULLED DOWN
S	OUTPUT 2	O		
R	OUTPUT 3	O		
C	OUTPUT 4	O		
E	OUTPUT 5	O		
D	OUTPUT 6	O		
F	OUTPUT 7	O		

A2.2.1 – GPS/MSG/SD/MHR/NC SIGNALS DESCRIPTION

LOCATION	C2 / PIN H, K, J L, U, T, M, N, G, A	COMMENTS
INPUT/OUTPUT	I/O	
SIGNAL TYPE	Pull down during 2 to 5 seconds	
LEVEL		

Those PIN are configurable by HTML pages or SMS to either:

- GPS: send GPS position via SMS to a specified phone number, with or without pre-defined message
- MSG: send a pre-defined message via SMS to a specified phone number
- SD: Speed Dial a specified phone number, stop communication when depressed again during 100ms
- MHR: Make Handset Ringing: pulling down the discrete makes selected handset ringing
- NC: Not Configured

A2.2.2 – FORCE SAT NETWORK

LOCATION	C2 / PIN V, P	COMMENTS
INPUT/OUTPUT	I	
SIGNAL TYPE	Pull down, opened	
LEVEL	Grounded or opened	

A2.3 – C3 - 19-PIN CIRCULAR FEMALE CONNECTOR

C3 = 851 02E14 19SW50 16, mating connector 851 06RC14 19PW50

PIN	ASSIGMENT	I/O	NOTE	COMMENTS
H	GIG/E BI_DA+ (Tx+)	D-I/O	LAN Port Gigabit Ethernet (backward compatible 100 Mbps / 10Mbps Tx/Rx, for noise immunity)	Local Area Networking IP Telephony inside the aircraft
K	GIG/E BI_DA- (Tx-)	D-I/O		
J	GIG/E BI_DB+ (Rx+)	D-I/O		
L	GIG/E BI_DB- (Rx-)	D-I/O		
U	GIG/E BI_DC+	D-I/O		
T	GIG/E BI_DC-	D-I/O		
M	GIG/E BI_DD+	D-I/O		
N	GIG/E BI_DD-	D-I/O		
R	100M/E Tx+	D-I/O	WAN Port	Uplink port to Internet (via EDGE/GPRS/HSDPA)
C	100M/E Tx-	D-I/O		
V	100M/E Rx+	D-I/O		
P	100M/E Rx-	D-I/O		
B	LAN-DATA	O	LAN Data Activity	Pulled down, open-drain (max 100 mA)
S	WAN-DATA	O	WAN Data Activity	Pulled down, open-drain (max 100 mA)
G	Reserved	RES	SatCom RESERVED	
A	USB GND	GND	External USB Host port (Max 250 mA)	(USB memory key, etc…)
E	USB D-	D-I/O		
D	USB D+	D-I/O		
F	USB VBUS	PWR		

A2.4 – C4 - 19-PIN CIRCULAR FEMALE CONNECTOR

C4 = 851 02E14 19SX50 16, mating connector 851 06RC14 19PX50

PIN	ASSIGMENT		I/O	NOTE	COMMENTS
H	RING 1		I/O	Analog Telephony	600 Ohms, -48V feed, 24mA loop current
K	TIP 1				
J	RS-232 TX	RS-485**	O	PC RX – FROM SATCOM TX	RS-232 Levels GPS Frames NMEA 0183
L	RS-232 RX		I	PC TX – FROM SATCOM RX	
U	PROG_RES_1		R*	SatCom Reserved – Internal Re-programming and Calibration	
T	PROG_RES_2		R*		
M	CONSOLE_RES+		D-R*	SatCom Reserved – Control Console	
N	CONSOLE_RES-		D-R*		
G	SONALERT		O	INCOMING CALL INDIC.	1s to ground - 2s open
A	AUDIO/MIKE IN		I	ANALOG AUDIO - 2200 Ohm – 5VDC BIAS	AUXILARY AUDIO - ADAPTABLE -
V	AUDIO/SPEAK OUT – PUBLIC-ADRESS		O	ANALOG AUDIO - 8-32 Ohm -500mW	
P	AUDIO/SPEAK OUT – HI		O	ANALOG AUDIO - 7,75V /600 Ohm	GENERAL AVIATION LEVEL/IMPEDANCY
B	AUDIO/SPEAK OUT - LO		GND		
S	AUDIO/MIKE IN - HI		I	ANALOG AUDIO 250 mV / 150 Ohm 13VDC BIAS	
R	AUDIO/MIKE IN - LO		GND		
C	USB GND		GND	Second External USB Host port (Max 250 mA) Available only if ARINC-429 is not used	(Bluetooth WiFi)
E	USB D-		D-I/O		
D	USB D+		D-I/O		
F	USB VBUS		PWR		

A2.4.1 – SONALERT/RINGER DRIVE

LOCATION	C4 / PIN G	COMMENTS
INPUT/OUTPUT	O	
SIGNAL TYPE	Square 1 second ON: PIN to ground 2 seconds OFF : PIN open	
LEVEL	Ground or open	From 1VDC to 28 VDC / 200mA

A2.4.2 – TIP/RING

LOCATION	C4 / PIN H, K	COMMENTS
INPUT/OUTPUT	Bidirectional	
TIP/RING POLARITY	Insensitive bidirectional signal	
TIP/RING IMPEDANCE	600 ohm	
CIRCUITY TYPE	Balanced	
DTMF SIGNALING	Standard DTMF frequencies	
RING TRIP CAPABILITY	500 to 800 ohm including load	
RINGING CAPABILITY	40 Vrms @ 500 Ohm	
RINGING VOLTAGE	60 Vrms no load	
RINGING SIGNAL TYPE	Sinus	
RINGING FREQUENCY	20Hz to 25Hz	

A2.5 – C5 GPS SIGNAL CONNECTOR

TYPE	SMA FEMALE	COMMENTS
IMPEDANCE	50 Ohm	
VOLTAGE	5 Vdc / 50mA max	ACTIVE ANTENNA ONLY

A2.6 – C6 SATELLITE SIGNAL CONNECTOR

TYPE	TNC FEMALE	COMMENTS
IMPEDANCE	50 Ohm	
VOLTAGE	N/A	

A2.7 – C7 SATELLITE SIGNAL CONNECTOR

TYPE	TNC FEMALE	COMMENTS
IMPEDANCE	50 Ohm	
VOLTAGE	N/A	

A2.8 – C8 GSM SIGNAL CONNECTOR

TYPE	BNC FEMALE	COMMENTS
IMPEDANCE	50 Ohm	
VOLTAGE	N/A	

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A3.0 - SIERRA-MC SATCOM CONFIGURATION

The SIERRA-MC SatCom is delivered with customers' parameter/configuration if they have requested it. Those parameters can be changed anytime using:

Most of the SIERRA-MC SatCom features can be configured via:

- HTTP pages, connecting a LAN cable to the unit and typing http://192.168.0.1 in a browser
- Sending MO (Mobile Originated) SMS from any cellular or from following website
  - https://sms.Thuraya.com/ for Thuraya network
  - http://www.Iridium.com/ then clicking "Send a Satellite Message » for Iridium network.
- DTMF (Dial Tone Multi-Frequency) codes dialing from the connected handset on the SatCom.

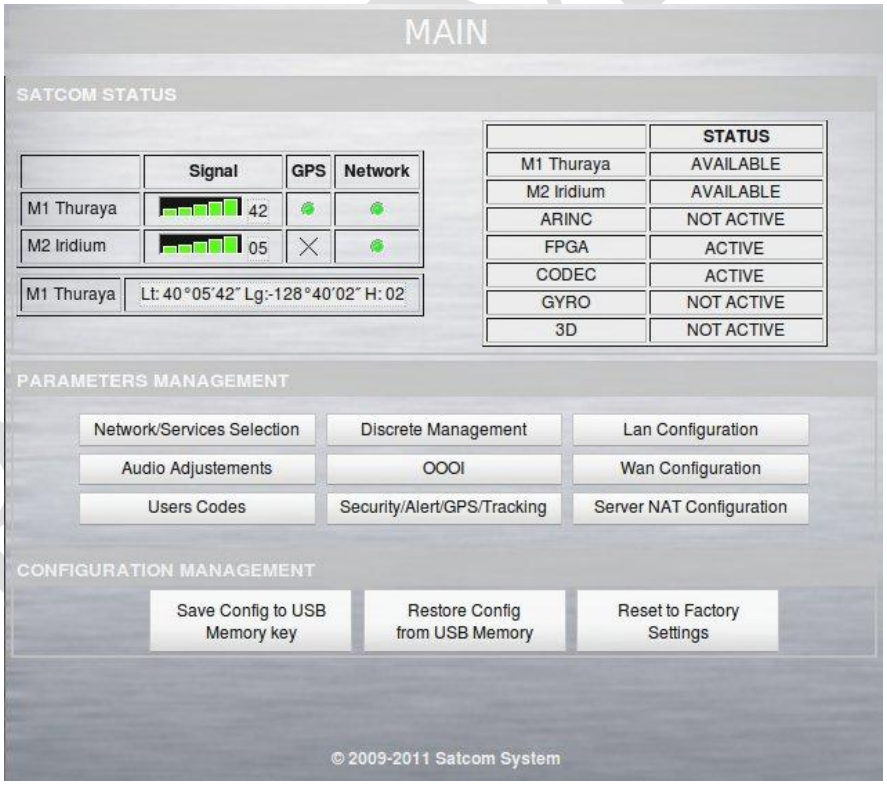
Part B of this manual explains in detail how to configure the SIERRA SatCom.

A3.1 – OVERVIEW OF HTTP CONFIGURATION PAGES

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, then type http://192.168.0.1/main.html (case sensitive) in a browser. You get access to the configuration/maintenance screen. Where you can:

- View state of main components
- Configure and manage the SatCom
- save and retrieve user specific configurations

Details for each feature are presented in the section B of this document:



A3.2 – OVERVIEW OF CONFIGURATION USING SMS MESSAGES*

Note: This functionality is optional; please contact your sales representative to activate it.

All SMS messages are structured as follows:

MESSAGE FORMAT	AA9999-008899999999999-*A-B-C-99*

MESSAGE	MEANING	TYPE	LENGTH
AA	Parameter name to be set	ALPHA	2 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
008899999999999	Phone number to receive AKN (with 00 before country code) - Optional	NUM	15 DIGIT
A	*Parameter A*	*ALPHA*	*1 CHAR*
B	*Parameter B*	*ALPHA*	*1 CHAR*
C	*Parameter C*	*ALPHA*	*1 CHAR*
99	*Parameter D, etc…*	*NUM*	*2 DIGIT*

A3.2.1 – How to require a parameter from the SIERRA-MC SatCom Unit

Send MO SMS or from website message with information in black:

MESSAGE FORMAT	AA9999-008899999999999

One will receive SMS to indicated mobile phone number (008899999999999) with current configuration parameters.

A3.2.2 – How to remotely set a parameter of the SIERRA-MC SatCom Unit

Send MO SMS or from website message with information in black plus user defined parameters in bold/italic:

MESSAGE FORMAT	AA9999-008899999999999- ***ABC99***

You will receive acknowledgement SMS to indicated mobile phone number (008899999999999) with updated/current configuration parameters.

Note: if SMS message is sent from:

- ***Thuraya or Iridium website (indicated as website in following pages), you must indicate phone number as required on line 3 (0088999999999) to be able to receive acknowledgement on mobile phone.***
- ***mobile phone (MO), mobile phone number is detected automatically so one can skip to input 008899999999999 phone number, unless you want acknowledgement to be received by another mobile phone. Only 1 acknowledgement SMS is sent.***

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A4.1 – INITIALIZATION SEQUENCE/ANNONCIATORS

At power up, all LED on SIERRA-MC SatCom front panel or remote user annonciators panel are AMBER steady during 40 seconds.

After 40 seconds, LED will show status of the SatCom:

- NETWORK LED 1 INDICATION : MODEM 1 (Thuraya or Iridium)
- NETWORK LED 2 INDICATION : MODEM 2 (Thuraya or Iridium)
- NETWORK LED 3 INDICATION : MODEM 3 (GSM) – FAULTY COMPONENT (Steady RED).

Each LED on the SIERRA-MC SatCom has 2 colors, amber and green, except LED3 has RED as well.

In case a MoDem is not present (please refer to P/N) or failed (refer to troubleshooting sections), LED indicator will not light up.

STEP	INITIALIZATION SEQUENCE	LED INDICATOR
1	Powering up	AMBER 5 times per second
2	Initialization	AMBER 4 times per second
3	GPS init (Thuraya only)	AMBER 3 times per second
4	Registering on network	AMBER 2 times per second
5	Registered on network	GREEN Flashing (see below)

If the indicator remains on step 2 (AMBER LED flashing 4 times per second), this indicates hardware failure
If the indicator remains on step 3 (AMBER LED flashing 3 times per second) more than 2 minutes, this indicates network problem (RF cable or out of coverage). Please refer to section B12 for troubleshooting.

LED will indicate different patterns:

SERVICES IN USE		TIMING – EACH STEP 100ms									
CHANNEL AVAILABLE	Flashes off 1 times 100ms per s.	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
VOICE CALL	Flashes off 2 times 100ms per s.	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF
SENDING SMS	Green Flashes off 4 times 100ms per s. + Amber once per second	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
DATA/FAX IN USE	Flashes off 5 times 100ms per s.	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
INCOMING CALL	Flashes red/green every 100ms per s.	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
WEAK RF SIGNAL*	Flashes off 1 times 100ms per s. + Amber once twice per second	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF

* THURAYA CSQ less than 29 (max. 42), IRIDIUM CSQ less than 2 (max. 5), GSM CSQ less than 10 (max. 22).

LED #3 indicates faulty component when steady RED. Please refer to section B12.1.

A4.2 – PLACING VOICE CALLS

A4.2.1 - DIALING VOICE CALL FROM A HANDSET

When taking the phone off the hook; you will hear a continuous 440Hz tone indicating the line is available. You can then dial your number with "# " key at the end. (Ex: 008821623101001#)

After dialing, the green LED flashes and 220 Hz tone every second indicating the call is forwarded. After 20 to 50 seconds, one can get:

- a ringing tone indicating the called party is reached
- a busy tone and a voice message indicating the called party is busy
- a voice message in English and/or Arabic and/or French for Thuraya network and in English only for the other networks indicating either the called party cannot be reached or the dialed number does not exist or is not activated.

To use other functionalities on "ROMEO" handsets, please refer to document ref. 0291M993200-01 - USER MANUAL - ROMEO SERIES.

A4.2.2 - DIALING VOICE CALL FROM NAT PTA-12

Press “HOOK OFF” button on the PTA-12, you will hear a continuous 440Hz tone indicating the line is available. You can then dial your number with “# “ key at the end. (Ex: 008821623101001#)

After dialing, the green LED flashes and 220 Hz tone every second indicating the call is forwarded. After 20 to 50 seconds, one can get:

- a ringing tone indicating the called party is reached
- a busy tone and a voice message indicating the called party is busy
- a voice message in English and/or Arabic and/or French for Thuraya network and in English only for the other networks indicating either the called party cannot be reached or the dialed number does not exist or is not activated

To redial, press “OFF HOOK” button first, then “REPEAT” button.

A4.2.3 - DIALING VOICE CALL FROM A “HECO” HANDSET

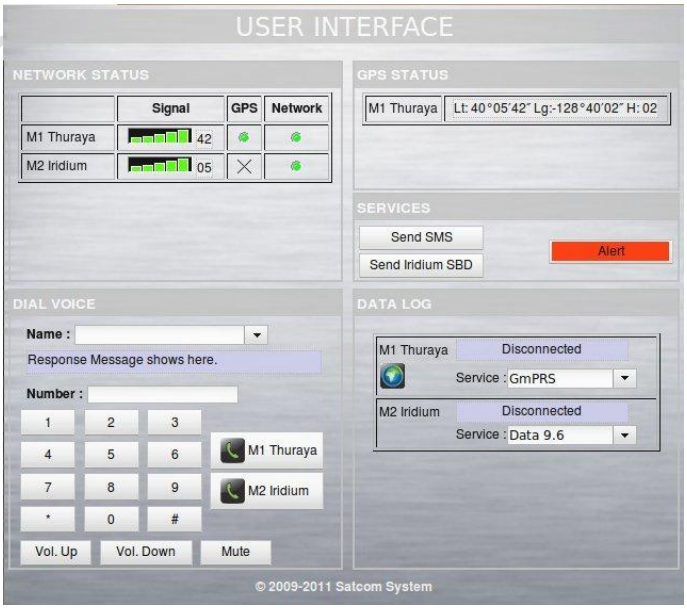
When taking the phone off the hook; you will hear a continuous 440Hz tone indicating the line is available. You can then dial your number without “#“ key at the end. (Ex: 008821623101001) and then press the “SEND” button.

After dialing, the green LED flashes and 220 Hz tone every second indicating the call is forwarded. After 20 to 50 seconds, one can get:

- a ringing tone indicating the called party is reached
- a busy tone and a voice message indicating the called party is busy
- a voice message in English and/or Arabic and/or French for Thuraya network and in English only for the other networks indicating either the called party cannot be reached or the dialed number does not exist or is not activated

A4.2.4 - DIALING VOICE CALL FROM A HTTP INTERFACE

Connect a LAN cable between to the SIERRA-MC SatCom unit and the computer, then type http://192.168.0.1/UserInterface.html (case sensitive) in a browser. You get access to the user interface.



Enter Name of you correspondent (if you think part of the names already entered in the directory) or dial number on keypad.

Then press the button of the network you want to use (The interface will show only networks available for calls, for instance DIAL TO THURAYA instead of DIAL TO MOD1).

After dialing, the green LED flashes and 220 Hz tone every second indicating the call is forwarded. After 20 to 50 seconds, one can get:

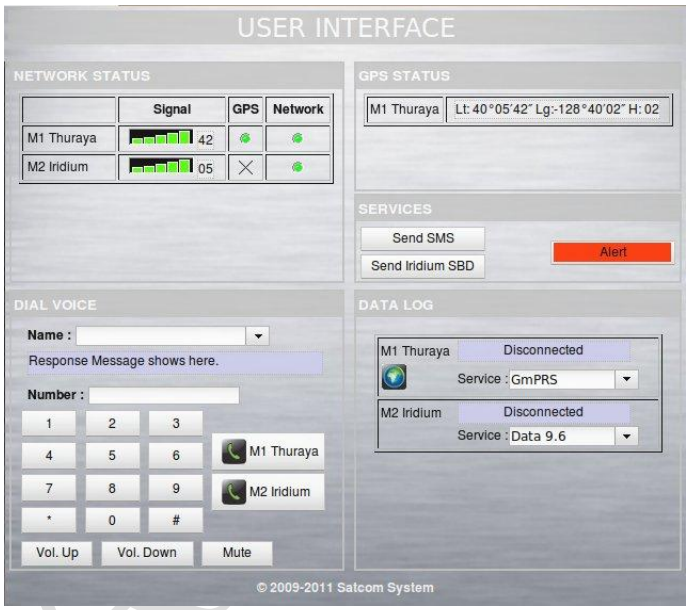
- a ringing tone indicating the called party is reached
- a busy tone and a voice message indicating the called party is busy, as well as a popup window showing “BUSY LINE”
- a voice message in English and/or Arabic and/or French for Thuraya network and in English only for the other networks indicating either the called party cannot be reached or the dialed number does not exist or is not activated

A4.3 – SEND AND RECEIVE SMS - SBD

SMS can be sent either using discrete functionalities, remote display or HTTP interface. The SIERRA-MC SatCom can be connected to an optional display management via LAN bus allowing to display, browse and delete incoming SMS.

A4.3.1 – SENDING SMS FROM THE HTTP INTERFACE

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, then type http://192.168.0.1/UserInterface.html (case sensitive) in a browser. You get access to the user interface.



Then press either:

- "AUTO": default MoDem defined into "CONFIGURATION" HTTP page will be used to send the SMS
- Other available MoDem

When the SMS is sent a popup window will show up.

You can also send pre-formatted messages:

"ALERT": will send GPS position + ALERT message to pre-defined number (entered in configuration see section B 8.0)

A4.2.2 – SEND SMS FROM DISCRETE BUTTONS

Simple push buttons connected to connector C2 PIN with discrete signals functions can generate SMS for information and/or positioning and/or alert services.

Configuration of such buttons is indicated section B 6.0.

A4.2.3 – SENDING SBD FROM THE HTTP INTERFACE – IRIDIUM ONLY

"SBD" stands for Short Burst Data. This service is available on Iridium network only and must be activated. You can send or receive a string up to 1870 characters.

Click on "Send SBD to", a popup will appear. Enter your text and correspondent number. You can insert current GPS position.

Then press "SEND". First IRIDUM available MoDem will be used to send the SDB.

When the SBD is sent a popup window will show up.

A4.4 – USING DATA

A4.4.1 - SERVICES

The SIERRA-MC SatCom allows to connect a computer to so one can connect to the Internet or a corporate network from virtually anywhere in the world, allowing you to browse the web, send and receive email and transfer files.

Following services are available if subscribed:

NETWORK	TYPE	SPEED	CHARGED	DIAL	LAN	RS232
THURAYA	DATA SWITCH CIRCUIT	9.6 Kbps	Per minute	1722	X	X
	POINT TO POINT CIRCUIT	9.6 Kbps	Per minute	THIRD PARTY TERMINAL	X	X
	GmPRS	Up to 60 Kbps	Per MB	*99#	X	X
IRIDIUM	DIAL UP DATA	2.4 Kbps	Per minute	001-480-555-5555	X	X
	DIRECT INTERNET DATA	10 Kbps*	Per minute		X	X
GSM	HSPDA	Down 7,2 Mbps Up 384 Kbps	Check with your provider		X	X
	WCDMA	Up to 384 Kbps	Check with your provider		X	X
	EDGE	Down 236 Kbps Up 118 Kbps	Check with your provider		X	X
	GPRS	Down 85 Kbps Up 42 Kbps	Check with your provider		X	X

* Depending on content. Graphics and images will result in lower effective throughput.

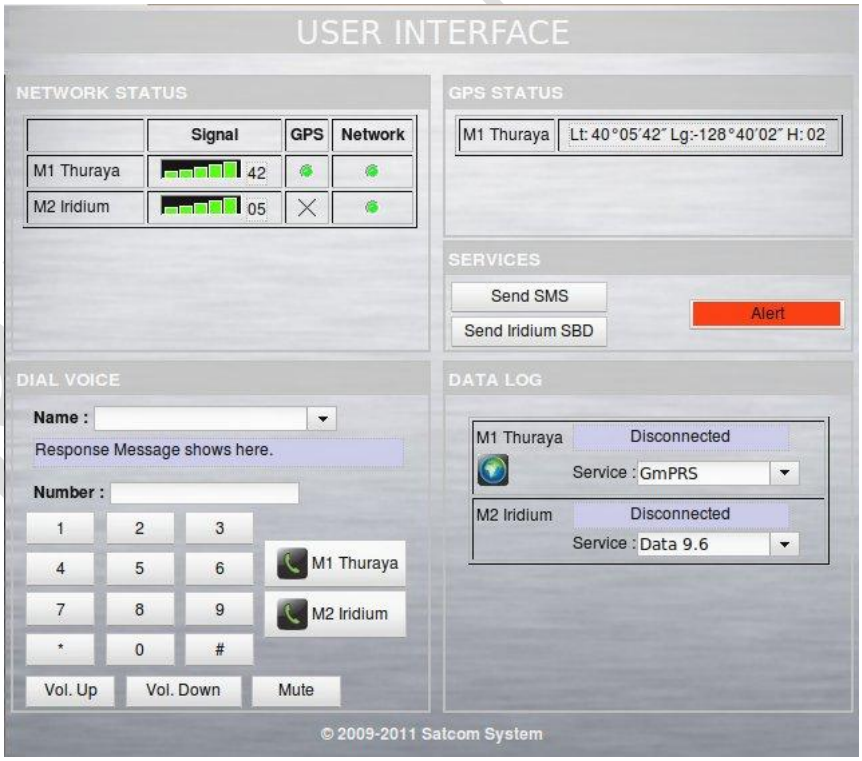
Cable length is limited to 5 meters using USB and 15 meters using RS-232. It is possible to use repeaters for longer cables.

A4.4.2 - USING DATA SERVICES

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, then type http://192.168.0.1/UserInterface.html (case sensitive) in a browser. You get access to the user interface.

On the right of the panel, into "DATA LOG" section, you will have available networks/services.

Note: if the option "GmPRS always on" has been configured (see section B), Thuraya GmPRS services are available as soon as the SIERRA-MC SatCom is powered on.



A4.5 - SEND AND RECEIVE FAX - THURAYA/GSM ONLY

A4.5.1 - SERVICES

- Fax services must be separately subscribed for Thuraya (9.6 Kbps group 3 – Version 2) and/or Iridium (2.4 Kbps Group 1). Iridium Fax has never been used by SatCom System and is not guaranteed to work on Iridium Network.
- Fax services, only from optional RS-232 (Thuraya and Iridium) and CANNOT be used through TIP/RING, which is analog audio only and not analog fax.
- You can use HotFax V6.0 from http://www.smithmicro.com/ for Thuraya
- To use RS-232 Fax or TIP/RING Fax, you must use a specific adaptor.

Note: for FAX/DATA use with RS-232 and/or Bluetooth, please refer to specific documentation.

PART B

CONFIGURATION OF THE "SIERRA-MC" SATCOM

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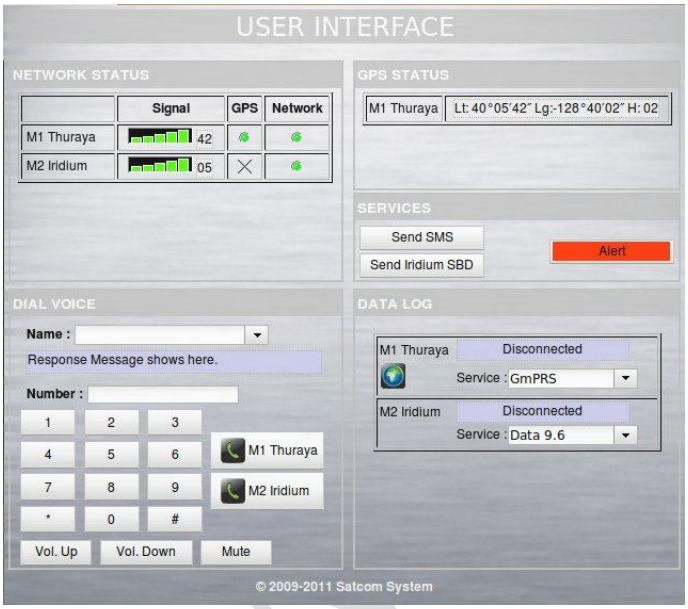
B1.0 – CONFIGURATION MAIN MENU

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, and then type http://192.168.0.1/main.html (case sensitive) in a browser. You get access to the configuration main menu interface.



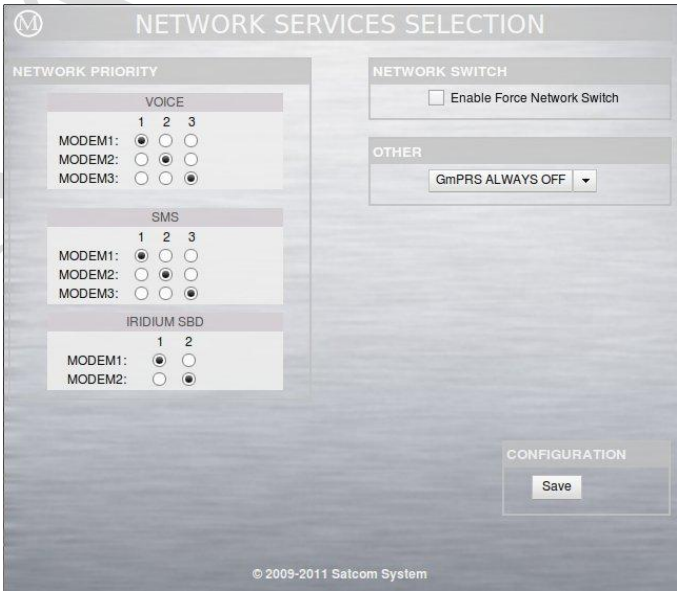
B2.0 - NETWORK SERVICES SELECTION

B2.1 - SERVICE DESCRIPTION

This feature is used to select network with a preferred order for voice, SMS and SBD.

On the right, if you have "GmPRS ALWAYS ON", on power ON the SIERRA-MC SatCom goes automatically on GmPRS mode and remains in this mode all the time. The Audio calls must be passed on the second channel if available.

Note1: The network selection to SAT or GSM can be forced by type (SAT or GSM) by physical switch (C2 PIN V AND PIN P)
Note2: The MoDem selection to MODEM1 or MODEM2 can be forced by physical switch (C2 PIN N, pulled down or opened).
Note2: When preferred MoDem selected 1 has no signal strength and go to register on MoDem selected 2, it will not go back to MoDem selected 1, unless reset of SatCom unit.



B2.2 - CONFIGURATION VIA SMS*

MESSAGE FORMAT	PN9999-008899999999999-*X-Y-999-99*

MESSAGE	MEANING	TYPE	LENGTH
PN	Prefered Network	ALPHA	2 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
008899999999999	Phone number to receive AKN (with 00 before country code)	NUM	15 DIGIT
X	*I=Iridium - T=Thuraya - E=External MoDem*	*ALPHA*	*1 CHAR*
Y	*P=Prefered - E=Exclusive*	*ALPHA*	*1 CHAR*
999	*Number of trials from 0 to 255(for Y = Prefered configuration only)*	*NUM*	*1-3 DIGIT*
99	*Period in minutes between 2 trials –from 3 to 60 minutes (for Y = P only)*	*NUM*	*1-2 DIGIT*

Examples:

- Sending “PN9999-I-E”, will configure the system to use exclusively Iridium network
- Sending “PN9999-003377777777-T-P-6-15”, will configure the system to use Thuraya network preferred and trying to log on Thuraya first at power on. If the SIERRA-MC SatCom cannot log on Thuraya, then it log on Iridium trying every 15 minutes and 6 times to come back on Thuraya.
  003377777777 mobile will receive following configuration acknowledgement message from SatCom:
  “S/N9999-PREFERED NETWORK=THURAYA, IN CASE REGISTERING ON OTHER NETWORK, SATCOM WILL TRY TO REGISTER EVERY 15 MINUTES ON PREFERED NETWORK, 6 TIMES”

B2.3 - CONFIGURATION VIA DTMF

To set configuration VIA DTMF, pick up the phone then dial configuration sequence:

MESSAGE	SET CONFIGURATION TO
*776*47#	Iridium Preferred
*776*87#	Thuraya Preferred
*776*43#	Iridium Exclusive
*776*83#	Thuraya Exclusive

No acknowledgement will be received.
To check configuration, either use SMS or software interface.
Changed parameter will remain in configuration memory.

It is not possible to set parameters of trial to register on preferred network with DTMF. Trial and timing values will be reset to previous values.

B2.4 - SELECTION VIA HARDWARE

Using switch on PIN 24 of C2, the system will be forced to a network ignoring the configuration in memory, unless the toggle button is in the middle position

When PIN 24 is:

- Not connected = The network configuration stored in memory is used.
- Pulled down / Ground = Thuraya network
- Pulled up / 5VDC = Iridium network

B2.5 - DEFAULT FACTORY SETTING

DEFAULT FACTORY SETTING has configuration set as follows:

PART NUMBER	COMMERCIAL NAME	SERVICES	DEFAULT FACTORY SETTING
R64-01A1B0C0D0Su R64-01A2B0C0D0Su	SIERRA-MC-T SIERRA-MC-2T	THURAYA SERVICES	THURAYA EXCLUSIVE
R64-01A0B1C0D0Su R64-01A0B2C0D0Su	SIERRA-MC-I SIERRA-MC-2I	IRIDIUM SERVICES	IRIDIUM EXCLUSIVE
R64-01A1B1C0D0Su	SIERRA-MC-TI (DUAL NETWORK)	THURAYA AND/OR IRIDIUM SERVICES	THURAYA PREFERED

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B3.0 – AUDIO ADJUSTMENT

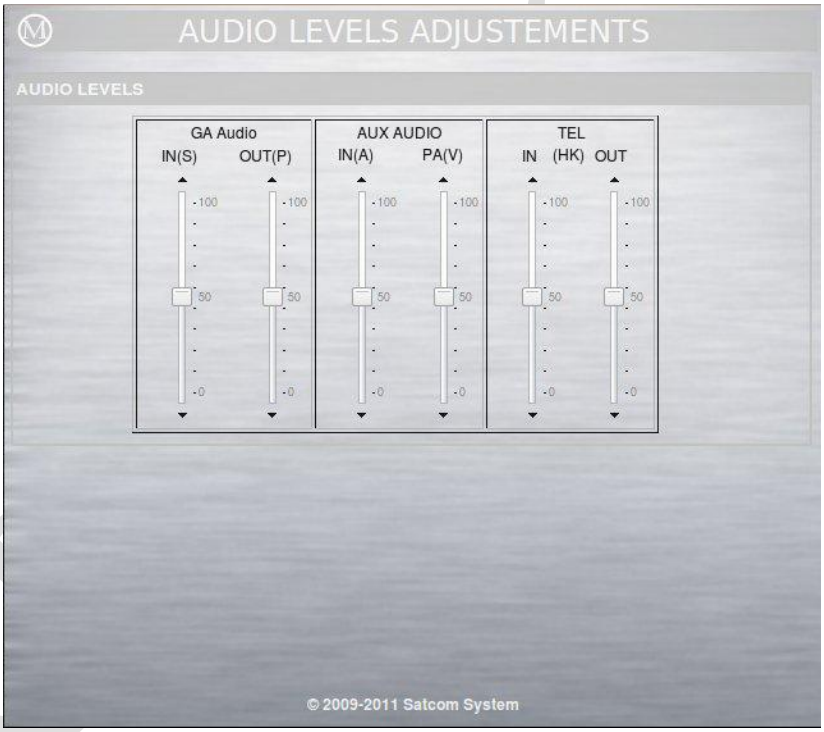
Audio Levels can be adjusted via HTTP address and can be done while voice or DATA call is in progress.

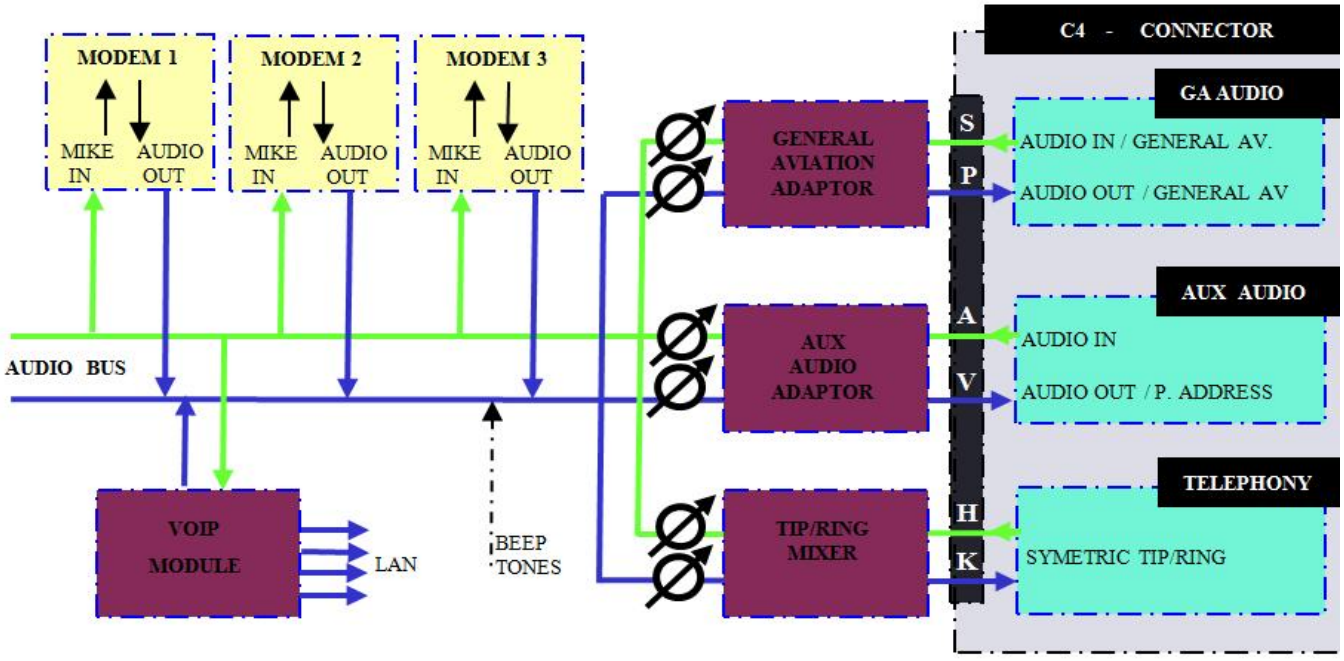
WARNING: it is not recommended to adjust audio level without technical assistance, as this can result in noise generation, echoes, Larsen effect, or no audio at all. In that case, proceed to DEFAULT FACTORY SETTING procedure according section B11.2 of this manual.

B3.1 - ADJUSTABLE AUDIO LEVELS

Following audio level can be adjusted:

- GA Audio: AUDIO IN/OUT is respectively PIN S and P on connector C4. This bus is adapted at General Aviation Standard HZ.
- AUX Audio: AUDIO IN OUT is respectively PIN A and V on connector C4.
  PA means “PUBLIC ADRRESS” and can be used to adjust audio out volume up to 500mW. Other levels can be adapted on request.
- TEL interface, PIN H and K, is symmetric TIP/RING also named POTS, is the analog two wire line to connect any regular handset or our ROMEO handset. It is used to adjust earpiece and microphone volume from/to the handset.





B3.2 - VOICE ACTIVITY DETECTION - OPTIONNAL

These levels can be adjusted to trigger a PUSH TO TALK button (PIN P/C1; VAD DISCRETE OUT) and must be adjusted while run up in order to take in consideration ambient noise.

It is not recommended to adjust VAD level without technical assistance, as this can result in noise generation, echoes, Larsen effect, or no audio at all.

Following audio Voice Activity Detection can be adjusted:

NAME	DESCRIPTION	NOTE	REF	MIN	MAX
TH act	Voice Activity Detection threshold	Triggers on adjusted level	GGG	000	254
TH Inact	Non-Activity Voice Detection threshold	HHH value must be < to GGG	HHH	000	254
Prolong	Time of sound prolongation of Voice Activity Detection by 4ms increment	Delay after triggering on TH Inact.	III	001	254
Inhib	Minimum time of sound inhibition of Voice Activity Detection by 4ms increment	Delay before triggering on TH act.	JJJ	001	254

VAD is used to cancel ambient noise and/or to trigger via PIN P/C1 a Push To Talk. This allows using a VHF or UHF radio with regular handsets without using manual PTT.

NAME	DESCRIPTION	NOTE	REF	MIN	MAX
Check Box	Use VAD during call – VAD activation	Help for VAD level adjustment	20	NO	YES
Check Box	Observe VAD on AMBER LED		21	NO	YES

B3.3 - DEFAULT FACTORY SETTING

Given as indication only, may vary from S/N to S/N

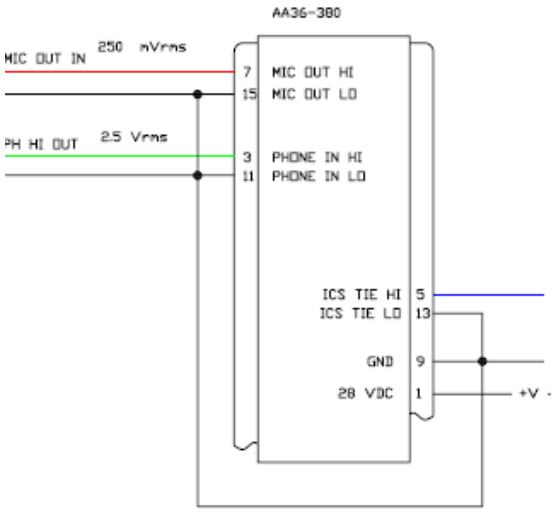
REF	FACTORY VALUES %	
	IN	OUT
MOD 1	50	50
MOD 2	50	50
MOD 3	50	50
AUDIO	50	50
PA	N/A	50
TEL 1/2	50	50

B3.4 - USING NAT AA36 TIE ADAPTOR

This adaptor allows to use ICS from the transceiver for intercom communication and/or satellite communication though the ICS.

RED: C4, PIN S MIKE IN - HI 250 mV / 150o
BLACK: C4, PIN R MIKE IN - LO

GREEN: C4, PIN P SPEAK OUT – HI 7,75V /600o
BLACK: C4 PIN B SPEAK OUT - LO



B4.0 – RESERVED

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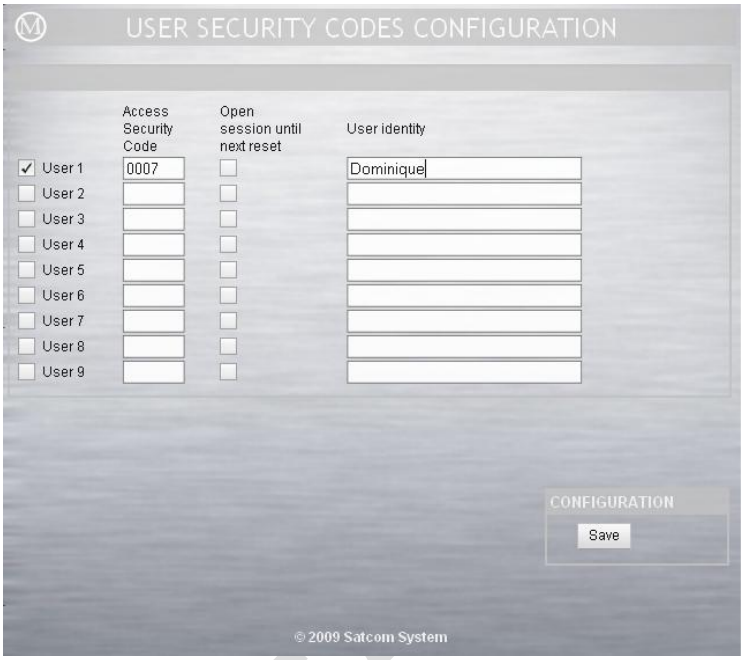
B5.0 – USER SECURITY CODES – OPTIONNAL

B5.1 - SERVICE DESCRIPTION

- Allows to set 4 digits PIN security codes to access voice calls for up to 9 users.
- This function does not generate any report or statistic on usage, but can be used as security only to avoid anybody to place calls, allows several defined persons to place calls
- It will generates an SMS with information on call duration, called party, time of the call if the function is activated for each individual (optional service)



This function:

- can be remotely turned ON and OFF and configured via SMS
- can be locally turned ON and OFF and configured via HTML configurations.

Activation of this functionality locks the SIERRA-MC SatCom for outgoing calls only (PBX functionalities are available without entering security code).

The 4 digit PIN user code must be entered followed by both * and # key. If no user code is entered and a number is dialed directly followed by # key, the user will get the continuous tone permanently as he did not compose number.
After 5 trails of wrong user PIN number, the SIERRA-MC SatCom goes in reset.

B5.2 - CONFIGURATION VIA SMS

MESSAGE FORMAT	USC9999-008899999999999-N-*X-Y-9999-ABCDEFGSIJKLMNOP*

MESSAGE	MEANING	TYPE	LENGTH
USC	User Security Code	ALPHA	3 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
008899999999999	Phone number to receive AKN (with 00 before country code)	NUM	15 DIGIT
N	User number 1 to 9 - 0 will will de-activate all security codes	NUM	1 DIGIT
X	*Activation Y= Yes /N= No*	*ALPHA*	*1 CHAR*
Y	*Open session until next power OFF/ON Y= Yes /N= No*	*ALPHA*	*1 CHAR*
9999	*User security Code*	*NUM*	*4 DIGIT*
ABCDEFGSIJKLMNOP	*User identity*	*ALPHA*	*30 CHAR*

- Sending “USC9999--0”, will de-activate all user Security Codes.
- Sending “USC 9999-003377777777-1-Y-Y-1234- Jean-Marc”, will activate for Jean-Marc security code. When he wants to place a call, he will key in once only 1234 before the number he wants to dial. 003377777777 mobile will receive following configuration acknowledgement message from SatCom: “S/N9999-SECURITY CODE FOR “Jean-Marc” (USC N#1) IS ACTIVATED FOR WHOLE CESSION, HIS PERSONAL SECURITY CODE IS 1234”.

B5.3 - DEFAULT FACTORY SETTING

Is set by default to all “OFF” and all fields blank.

Note: This functionality is implemented as an option, please contact your sales representative to activate and refer to specific manual Doc. Ref. 0591M993200-01.

B6.0 –DISCRETE MANAGEMENT – OPTIONNAL

B6.1 - SERVICE DESCRIPTION

These signals can be used if a panel with push buttons is installed. Only one wire from the SIERRA-MC SatCom is needed per discrete to operate properly. Pulling down the discrete activates the function.

Default configuration for discrete is input and pulling down. They can be configured as output (for remote application purposes for instance) or input analog. Please contact us if you need such configuration parameters.

B6.2 - CONFIGURATION VIA SMS*

MESSAGE FORMAT	DSC9999-008899999999999-N-*Y-008899999999999–MESSAGE*

MESSAGE	MEANING	TYPE	LENGTH
DSC	Discrete Signal Configuration	ALPHA	2 CHAR
9999	SatCom security Code	NUM	4 DIGIT
0088999999999999	Phone number where AKN SMS will be sent	NUM.	15 DIGIT
N	Discrete number – 0 will de-activate all discretes	NUM	1-2 DIGIT
Y	*Type : S = Speed Dial G= GPS M=Message only N = Not Conf.*	*ALPHA*	*1 CHAR*
008899999999999	*Phone number where SMS will be sent, or speed dial number*	*NUM.*	*15 DIGIT*
MESSAGE	*Text message*	*ALPHA*	*116 CHAR*

- Sending “DSC9999--1-N”, will de-activate discrete N#1.
- Sending “DSC9999--0”, will de-activate all discretes.
- Sending “DSC9999-003377777777-2-G-003367589876-UNDER FIRE”, will activate discrete 2 to send following message when pulled down for more than 2 seconds: “S/N9999-DATE:12/04/07-08:12:03UTC-GPS:43d32’09”54N-001d26’91”22E-0132kts-164d-00200m-UNDER FIRE”. 003377777777 mobile will receive following message from SatCom: “S/N9999-DISCRETE N#2 CONFIGURED FOR “GPS+MSG” TO 003367589876 WITH MSG ”UNDER FIRE””.
- Sending “DSC9999-003377777777-3-S-003367589876”, will activate discrete 3 to hook-off and dial 003367589876 message when pulled down for more than 2 seconds. Pulling down same button during 2 seconds same discrete again will hook-on. 003377777777 mobile will receive following configuration acknowledgement message from SatCom: “S/N9999-DISCRETE N#3 CONFIGURED FOR “SPEED DIAL” TO 003367589876”.

B6.3 - DEFAULT FACTORY SETTING

Is set by default to all “OFF” and all fields blank.

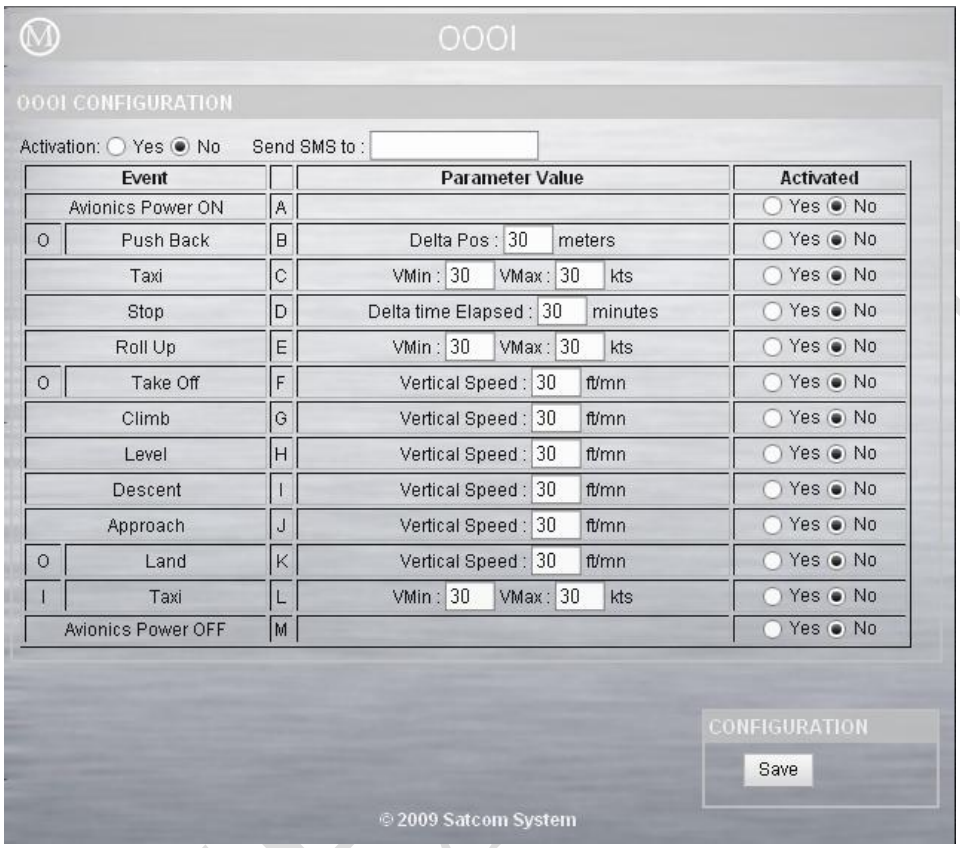
B7.0 – OOOI MANAGEMENT SYSTEM – OPTIONNAL

B7.1 - SERVICE DESCRIPTION

- Allows to track asset and give flight phase information without any physical discrete wired to the aircraft.
- At the end of each flight, a SMS is generated and send to the specified phone number.

This function:

- can be remotely turned ON and OFF and configured via SMS
- can be locally turned ON and OFF and configured via HTML pages.



Parameters description:

	EVENT	DESCRIPTION	UNIT	VALUE	
				MAX	MAX
A	Avionics on	Give UTC time of power up	Y/N		
B	Push-Back	Detects change of position indicating push-back from apron.	Meters	2	99
C	Taxi	Indicates speed range within aircraft is considered as taxi	Kts	2	99
D	Stop	Elapsed time after aircraft is considered as before entering runway	Minutes	1	99
E	Roll-up	Speed within the aircraft is considering as roll on runway	Kts	1	9999
F	Take-Off	Vertical speed above which the aircraft is considered as taking off	Ft/mn	1	9999
G	Climb	Vertical speed above which the aircraft is considered as climbing	Ft/mn	1	9999
H	Level	Vertical speed range where the aircraft is considered as level	Ft/mn	1	9999
I	Descent	Vertical speed above which the aircraft is considered as in descent	Ft/mn	1	9999
J	Approach	Vertical speed above which the aircraft is considered as approaching	Ft/mn	1	9999
K	Land	Indicates speed under which aircraft is considered as landed	Kts	1	9999
L	Taxi	Indicates speed range within aircraft is considered as taxi	Kts	2	99

The SMS is sent when K is detected with more than 2minutes AND L=0. If SIERRA-MC SatCom unit is powered off before, the SMS shall remain in memory and be sent at next power on.

B7.2 - CONFIGURATION VIA SMS*

MESSAGE FORMAT	OOOI9999-008899999999999-*A-AY-BBY-CC/CCY-DDY-EE/EEY-FFFFY-GGGGY-HHHY-IIIIY-JJJJY-KKKKY-LL/LLY-MY -008899999999999*

MESSAGE	MEANING	TYPE	LENGTH
OOOI	OOOI	ALPHA	2 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
0088999999999999	Phone number where AKN SMS will be sent	NUM.	15 DIGIT
A	*Activation Y= Yes /N= No*	*ALPHA*	*1 CHAR*
AY-BBY-CC/CCY-DDY-EE/EEY-FFFFY-GGGGY-HHHY-IIIIY-JJJJY-KKKKY-LL/LLY-MY	*Parameters value.* *See description above.*	*ALPHA*	*90 CHAR*
008899999999999	*SMS phone number to send OOOI information to*	*NUM*	*15 DIGITS*

Examples:

- Sending “OOOI9999-N”, will de-activate OOOI.
- Sending “OOOI 9999-003377777777-Y-AY-05Y-01/10Y-02Y-10/99Y-0130Y-1200Y-0200Y-1000Y-0600Y-0160Y-01/10Y-MY”, will send OOOI information after every flight to 00336785993 and 003377777777 mobile will receive following configuration acknowledgement message from SatCom: “S/N9999-OOOI ACTIVATED-PARAMETERS=AY-05Y-01/10Y-02Y-10/99Y-0130Y-1200Y-0200Y-1000Y-0600Y-0160Y-01/10Y-MY”.

B7.3 - DEFAULT FACTORY SETTING

Is set by default to “OFF” and values as indicated on the screen.

Note: This functionality is optional; please contact your sales representative to activate it.

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B8.0 – SECURITY ALERT – GPS TRACKING - OPTIONNAL

B8.1 – SECURITY ALERT - SERVICE DESCRIPTION

This feature uses integrated 3D motion detector from 1 to 5 G into the 3 directions, X, Y and Z vectors.

It allows detecting unusual attitude of aircraft. For instance if 3.5 G is reached, this might indicate something unusual happening like asymmetric turn or spin.

Every second, a Modulo calculation is done and in case on X, Y or Z axe the indicated acceleration is exceed, a SMS is send to first number, then to second number, then to third number. SMS are send as long as specified G continues to be exceeded and then every 8 seconds.

This feature is user configurable in terms of number of G, low/stall speed or overspeed/never exceed speed values.

In case of one or combination of value exceeded, the SIERRA-MC SatCom sends automatically a SMS to control center showing GPS position and parameters, allowing control center to contact aircraft and/or to request more information by SMS to check situation and confirm OK.. Control center has last available position of aircraft in case of worst scenario, making search and rescue mission easier.

B8.2 - SECURITY ALERT - CONFIGURATION VIA SMS*

MESSAGE FORMAT	EG9999-008899999999999-*X-Y-T-0088999999999999-0088999999999999-0088999999999999-ABCDEF…*

MESSAGE	MEANING	TYPE	LENGTH
EGS	Exceed G and/or low-VNE speed	ALPHA	2 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
0088999999999999	Phone number where AKN SMS will be sent	NUM.	15 DIGIT
X	*Activation Y= Yes /N= No*	*ALPHA*	*1 CHAR*
Y	*Number of G from 0 to 5*	*NUM*	*2 DIGIT*
Z	*Minimum speed/stall speed in Kts*	*NUM*	*3 DIGIT*
T	*Maximum speed/never exceed speed in Kts*	*NUM*	*3 DIGIT*
0088999999999999	*First phone number where SMS will be sent*	*NUM.*	*15 DIGIT*
0088999999999999	*Second phone number where SMS will be sent*	*NUM.*	*15 DIGIT*
0088999999999999	*Third phone number where SMS will be sent*	*NUM.*	*15 DIGIT*
MESSAGE	*Text message*	*ALPHA*	*40 CHAR*

- sending “EGS9999--1-N”, will de-activate functionality.
- sending “EGS9999-003377777777-Y-34 -120-440-003367589876-000407081203-00132164002-ATTITUDE/SPEED WARNING”, will activate and configure the SatCom.
  - 003377777777 mobile will receive following configuration acknowledgement message from SatCom: “S/N 9999 - G DETECTION ACTIVATED WITH G=3.4 – LOW SPEED=120Kts – VNE=440Kts - MESSAGE= ATTITUDE/SPEED WARNING”.
- In case of alert, following message will be send to 003367589876, 000407081203 and 00132164002 mobile phones: “S/N9999-DATE:12/04/07-08:12:03 UTC-GPS: 43°32’09”N-001°26’91”E- 0098kts-164°-00200ft - ATTITUDE/SPEED WARNING WITH 3.4 G EXEEDED AND LOW SPEED=98 KTS” if 3.4 G’s is exceeded either in X, Y or Z axis and speed lower than 120 Kts.

B8.3 - SECURITY ALERT - DEFAULT FACTORY SETTING

Is set by default to all “OFF” and all fields blank.

Note: This functionality is implemented as an option, please contact your sales representative to activate it.

B8.4 - GPS TRACKING - SERVICE DESCRIPTION

Allows to track asset at a user defined period interval (from 1 second to 1 day) with a user defined precision (HDOP) down to 1,5 meters with optional high precision GPS.

This function:

- can be remotely turned ON and OFF and configured via SMS
- can be locally turned ON and OFF and configured via HTML pages.

Current position and flight history can be viewed on our tracking system at http://www.aerosoft.pro.

B8.5 - GPS TRACKING - CONFIGURATION VIA SMS*

MESSAGE FORMAT	TS9999-008899999999999-*A-99999-9999-008899999999999*

MESSAGE	MEANING	TYPE	LENGTH
TS	Tracking System	ALPHA	2 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
008899999999999	Phone number to receive AKN (with 00 before country code)	NUM	15 DIGIT
A	*Activation Y = Yes / N= No*	*ALPHA*	*1 CHAR*
99999	*GPS acquisition period (Range: 1 to 32400 seconds (9 hours) with 15 seconds increment).*	*NUM*	*1 TO 5 DIGITS*
9999	*Maximum period to send SMS (range from 0 to 1440 minutes24 hours/). 0 = send SMS as soon as GPS position is acquired.*	*NUM*	*1 TO 5 DIGITS*
008899999999999	*SMS phone number to send GPS positions to*	*NUM*	*15 DIGITS*

Examples:

- Sending “TS9999-N”, will de-activate the tracking services
- Sending “TS9999-003377777777-Y-240-0-00336785993”, activate the service to send position information every 240 seconds to 00336785993 and 003377777777 mobile will receive following configuration acknowledgement message from SatCom:
  “S/N9999-TRACKING ACTIVATED. ACQUIRE AND SEND POSITION EVERY 240 SECONDS TO 0088999999999”.
  0088999999999 will received this message type every 240 seconds:
  “DATE:12/04/07-08:12:03UTC-GPS:43d32’09”54N-001d26’91”22E-0132kts-164d-00200m”.

B8.6 - GPS TRACKING - DEFAULT FACTORY SETTING

Is set by default to “NO”

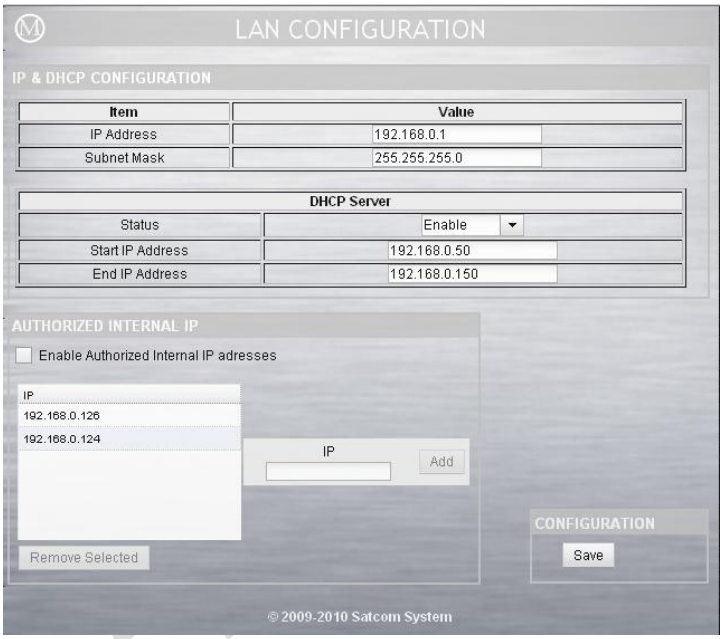
Note: This functionality is optional; please contact your sales representative to activate it.

B9.0 – SERVER CONFIGURATION

This section describes how to configure the SIERRA-MC SatCom in order to use server capabilities for DATA mode. The SIERRA-MC SatCom can be compared with the box you have at home to connect on Internet. SIERRA-MC SatCom uses very similar features.

Note: all parameters remains even after power off/power on.

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, and then type http://192.168.0.1/LanConfiguration.html (case sensitive) in a browser. You get access to the LAN configuration main menu interface.



You can assign any permanent IP address to the SIERRA-MC SatCom and give the range of IP addresses when DHCP server is activated.

Note: if you change SIERRA-MC SatCom IP address, you will have to put the new IP address to access to configuration pages. For example, if you set IP address to 192.100.100.100, to, youwill have to type http://192.100.100.100/main.html (case sensitive) access to configurations pages in a browser instead of http://192.168.0.1/main.html (default factory address).

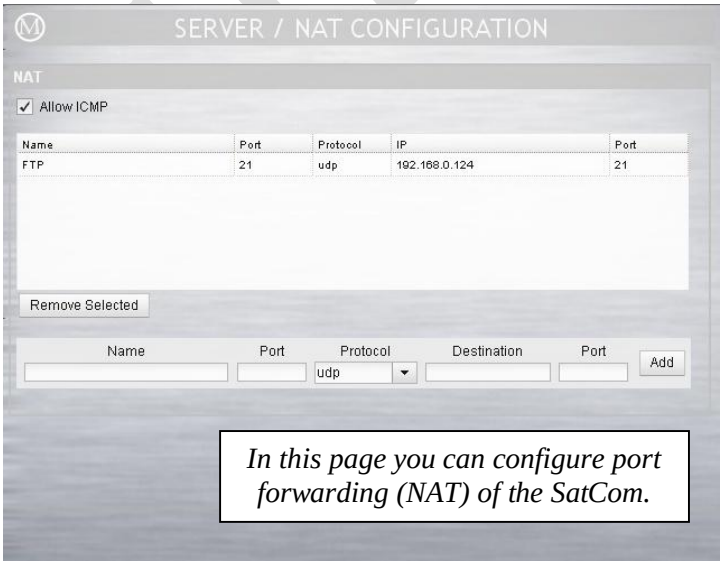
The section "Authorized Internal IP" on the LAN Configuration page allows defining authorized access to the SIERRA-MC SatCom from the internal network.

To enable this mode, check "Enable Authorized Internal IP addresses".

Add the chosen IP into the textbox "IP" then click the button "Add". You can add as many IP addresses as you want to define your restricted area.
The configuration is set immediately when you click "Add", so make sure that the IP address from the computer you use to configure is the first to be inserted.

Note: If "Enable Authorized Internal IP Addresses" has been checked but no IP address has been inserted then the system switch back automatically to non restricted mode.

Note: The IP addresses inserted must be from the same range than the SIERRA-MC IP address. (eg: if the SIERRA-MC address is 192.168.0.1 the IP addresses inserted must be from the range 192.168.0.x)



In this page you can configure port forwarding (NAT) of the SatCom.

Connect a LAN cable to the SIERRA-MC SatCom unit and the computer, and then type http://192.168.0.1/ServerNATConfiguration.html (case sensitive) in a browser. You get access to the server configuration main menu interface.

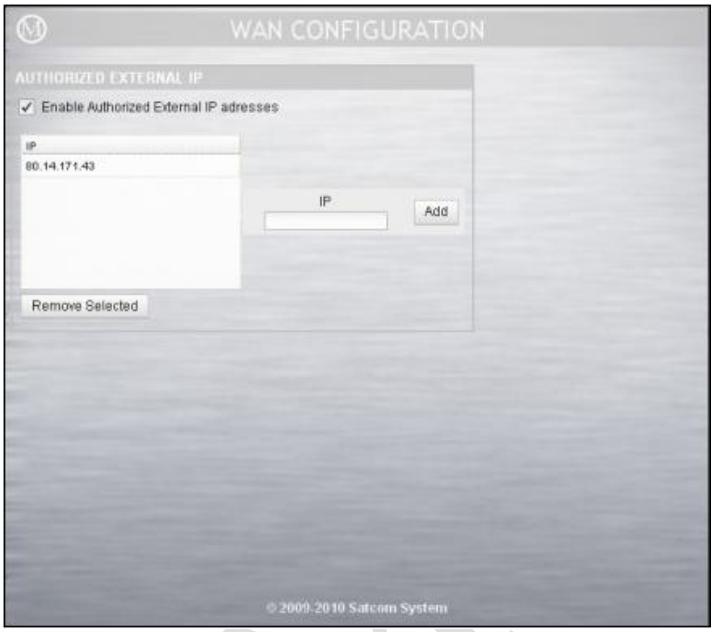
The checkbox "Allow ICMP" allows ICMP DATA “echo” type INPUT and OUTPUT.

The section "Authorized External IP" on the WAN Configuration page allows defining restricted access to the external DATA network.
The IP listed are the only reachable IP from the SIERRA-MC.

To enable this mode, check "Enable Authorized External IP addresses".

Add the chosen IP into the textbox "IP" then click the button "Add". You can add as many IP addresses as you want in your restricted area.
The configuration is set immediately when you click "Add".

Note: 1.If "Enable Authorized External IP Addresses" has been checked but no IP address has been inserted, then the system switch back automatically to none restricted mode.

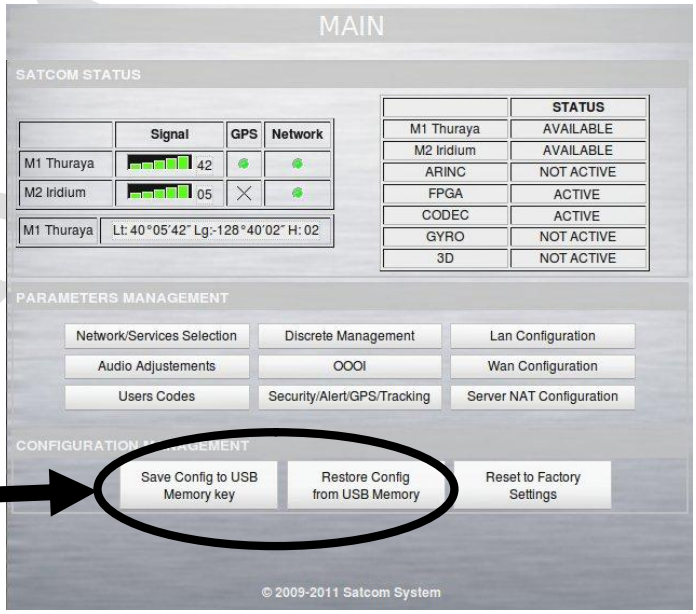


B10.0 – SYSTEM PARAMETERS MANAGEMENT

B10.1 - SERVICE DESCRIPTION

This functionality save all parameters of the equipment into a file on a computer, so one can manages either to upload these specific parameters into another equipment to get same behavior. It allows also for OEM to manage configuration parameters for each S/N.

Using “Restore config from” and “Save config to” buttons will save the configuration parameters in a file or from SIERRA-MC SatCom on external USB memory key.



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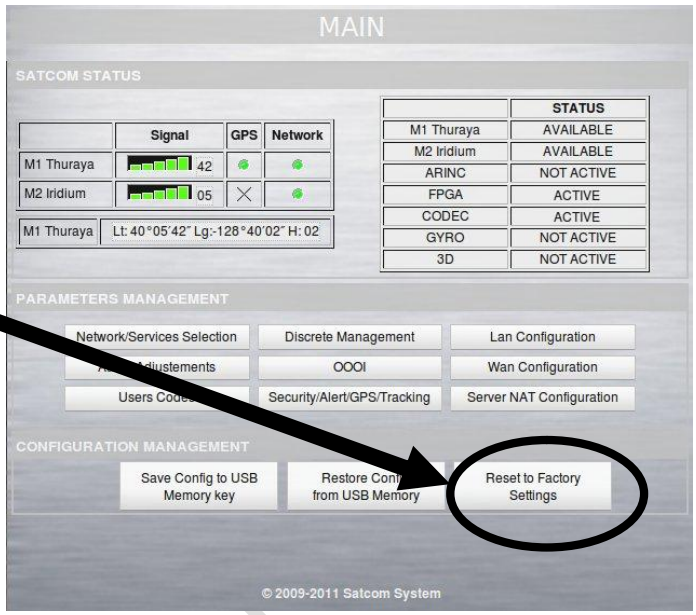
B11.0 – SET OR RESET TO FACTORY SETTINGS

B11.1 - SERVICE DESCRIPTION

This functionality reset all parameters to factory settings.

Click on button “RESET TO FACTORY SETTINGS” on the right buttons and confirm.



B11.2 – RESET TO FACTORY DEFAULT SETTINGS VIA SMS*

MESSAGE FORMAT	RFS9999-008899999999999

MESSAGE	MEANING	TYPE	LENGTH
RFS	Reset to Factory Settings	ALPHA	3 CHAR
9999	SIERRA-MC SatCom security Code	NUM	4 DIGIT
0088999999999999	Phone number where AKN SMS will be sent	NUM.	15 DIGIT

- Sending “RFS9999-003377777777”, will reset the SIERRA-MC SatCom to factory values. 003377777777 mobile will receive following message from SatCom:
  “S/N 9999 - SATCOM PARAMETERS HAS BEEN RESET TO DEFAULT FACTORY SETTINGS”

B12.0 – TROUBLESHOOTING TOOLS

B12.1 - MAINTENANCE INTERFACE

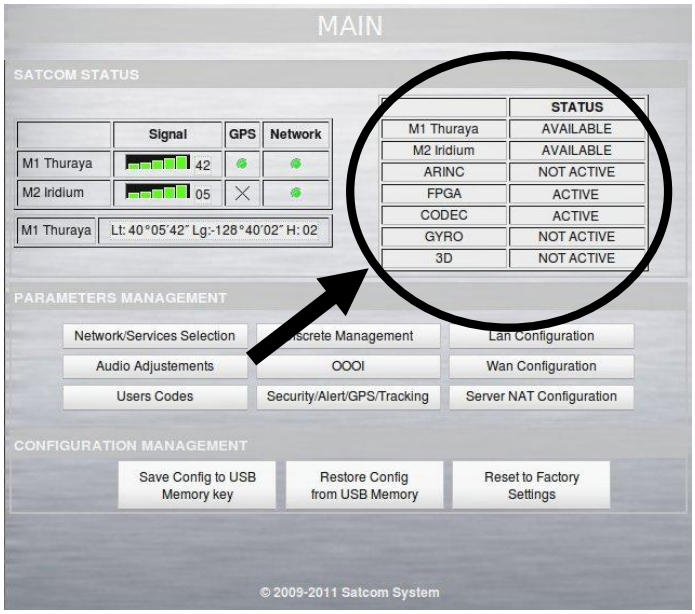
This interface will provide indication about:

- Hardware failure
- Satellite signal strength
- GPS signal acquisition, etc…

Connect a LAN cable between to the SIERRA-MC SatCom unit and the computer, then type http://192.168.0.1/main.html (case sensitive) in a browser. You get access to the configuration/maintenance screen. Where you can view state of main components.

This page is refreshed permanently every 5 seconds and gives real-time status of main component.

Please refer also to document ref. 0192P050000-01 (Acceptance Test Procedure) section 2.



B12.2 - BENCH TEST

A bench test is available for testing SatCom, see document ref. 0192D990900-01 for bench test description, document ref. 0192P050000-01 (Acceptance Test Procedure).

B13.0 – TROUBLESHOOTING LEVEL 1 & 2

B13.1 - LEVEL 1 TROUBLESHOOTING

Level 1 is on site checking interfaces and monitoring:

1 – SIERRA-MC SatCom do not light up (Control LED do not light up):

- Check breaker and that you have minimum 12 VDC and maximum 50 VDC on the power cable.
- Check proper PIN powered on the circular connector.
- Check LED 3, should not be into steady RED state. If so, please refer to B12.1.

2 – SIERRA-MC SatCom does not log on network

- Check RF cables properly installed, not bent, proper antennaP/N installed.
- Check signal strength connecting a computer on the LAN and going to page http://192.168.0.1/main.html (case sensitive) :
  1. Avionics off, engine off, rotor/prop off
  2. Avionics on, engine off, rotor/prop off
  3. Avionics on, engine on, rotor/prop off
  4. Avionics on, engine on, rotor/prop on

  Check signal every seconds during 5 minutes for the 4 configurations.
  Signal must be constantly between 40 and 42 for Thuraya and 3 to 5 for Iridium on the 4 configurations.
  If not check for interferences with on board equipment and shadowing effects.
- Check antenna SWR, into uplink frequencies (Thuraya: 1626.5 / 1660.5 MHz, Iridium 1621.35 / 1626.5 MHz) at :
  - antenna TNC connector
  - end of RF cable, antenna connected, at the TNC connector going to the SatCom.

  Measurements must show less than 1.3 value. If more than 1.5 corrections must be applied.
- RF cable must have a loss of less than 2.5 db into the whole band spectrum (Thuraya: 1525 / 1660.5 MHz, Iridium 1621.35 / 1626.5 MHz)
- Thuraya unit must have GPS signal to initialize properly, GPS connector (SMA) on the unit must give 5VDC. If it do not give 5VDC, a breaker is out, due probably to inverting RF cables during installation. SIERRA-MC SatCom must go into maintenance.
- Check with Service Provider activation of service and AirTime credit available for the unit providing phone number and SIERRA-MC SatCom S/N.

3 - Check satellite coverage:

- Thuraya coverage is Europe, Middle East, Africa and China; do not cover USA and Canada. Check the antenna has proper view on the satellite and there is no obstruction between the antenna ant the satellite.
- Iridium coverage is global and should work anytime, unless inside hangar or similar situation.

B13.2 - LEVEL 2 TROUBLESHOOTING

Level 2 is done by testing faulty SIERRA-MC SatCom on bench test using documentation ref. 0191P050000-01 (Acceptance Test Procedure).

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