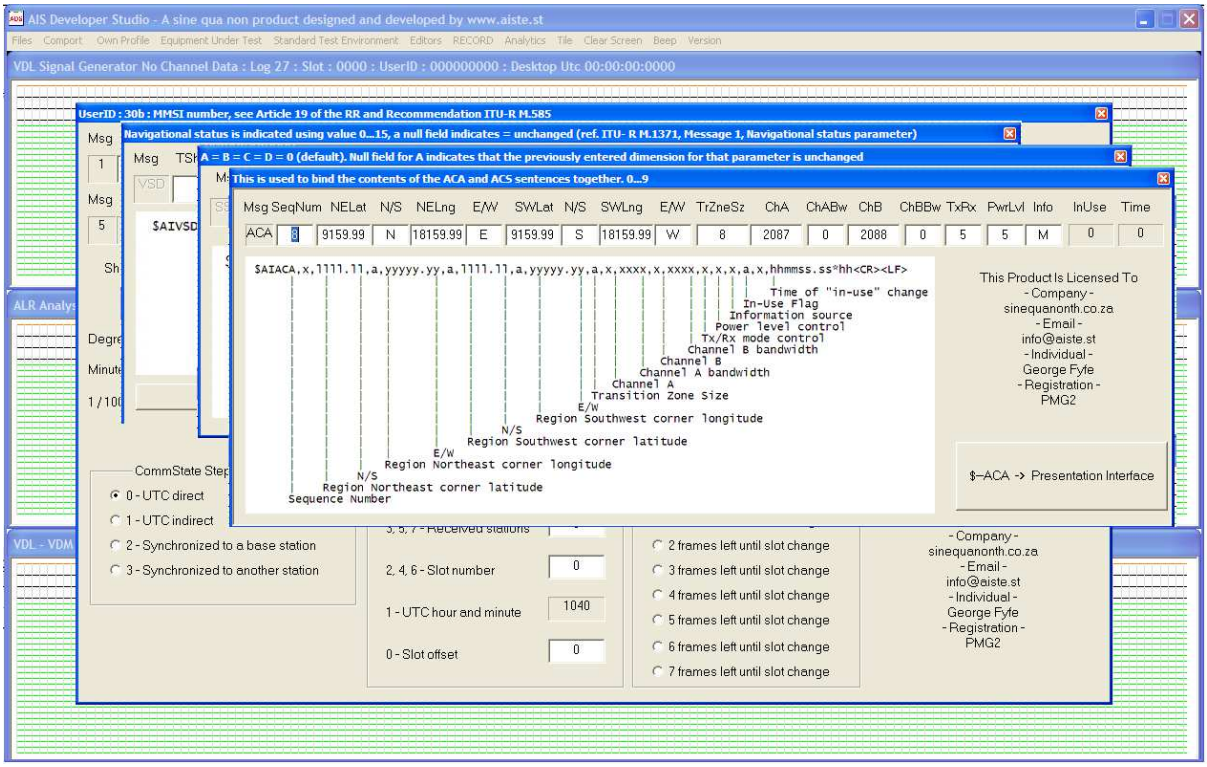

AIS Developer Studio

Release Version 1.0

ITU-R M.1371-5 Technology

OWN PROFILE
MODULE

NOTICE

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Objective

The objective for the use of the AIS Developer Studio is to create a general VDL environment using a PC and optional external RF signal generator / power pad. Where the choice of the base-band VDL / VDO and VDM data is easily analyzed and defined. As an AID to AIS

This product should only be used for the purposes intended by its developers and then only according to acceptable reference standards and operating procedures.

Any deviation from this may well be in conflict with competent regional authorities in your area.

The AIS Developer Studio and or Interface/s should not be used to alter the operational status of any AIS unit unless authorized by a competent authority.

Under no circumstances should the AIS Developer Studio and or Interface/s be used to create any signal content outside the scope of this document using any procedure or method offered by the AIS Developer Studio Interface.

AISTE.ST formerly Sine Qua Non would like to take this opportunity to congratulate you on the purchase of one of the AIS Developer Studio suite of products. We want to assure you that this product range is designed using over 22 Years of AIS experience and thoroughly tested to ensure your complete satisfaction.

A demonstration program is provided free of charge. AISTE.ST requires that the user download the demo program and documentation from www.aiste.st and validate it for their respective use prior to placing an order for the un-encumbered licensed version.

Limited Warranty.

Where software discrepancies are identified and or module operational bugs are found. These should immediately be brought to the attention of AISTE.ST. The warranty is limited to the rectification of the discrepancy or bug by software upgrade, and should not exceed the original operational and technical specification as defined by AISTE.ST in the respective AIS Developer Studio module.

If you have any questions, queries or customisation requests related to this product, please do not hesitate to contact us by email:

Physical Address:
28 Mustang Ave
Pierre Van Ryneveld
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28 Mustang Ave
Pierre Van Ryneveld
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Gauteng
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Email: support@aiste.st
info@sinequanonth.co.za

Website: www.aiste.st
www.sinequanonth.co.za

Telephone: +27 0722253467

Thanking you,

AISTE.ST

Installation

The installation of AIS Developer Studio is as follows. Obtain the latest version of ADSV2.exe and license.txt from www.aiste.st. Create a new folder. Save the downloaded files in the folder. Run the application. This will allow the unit to run in demo mode.

Certain modulation formats will not run in demo mode.

AIS Developer Studio is not freeware.

Once you have evaluated it for your purpose please purchase your license file from www.aiste.st. Save your purchased license.txt file in the above-mentioned folder. This will allow the application to run in full un-unencumbered mode.

The license file will provide full user registration details.

Registered users will receive support if any problems with AIS Developer Studio arise.

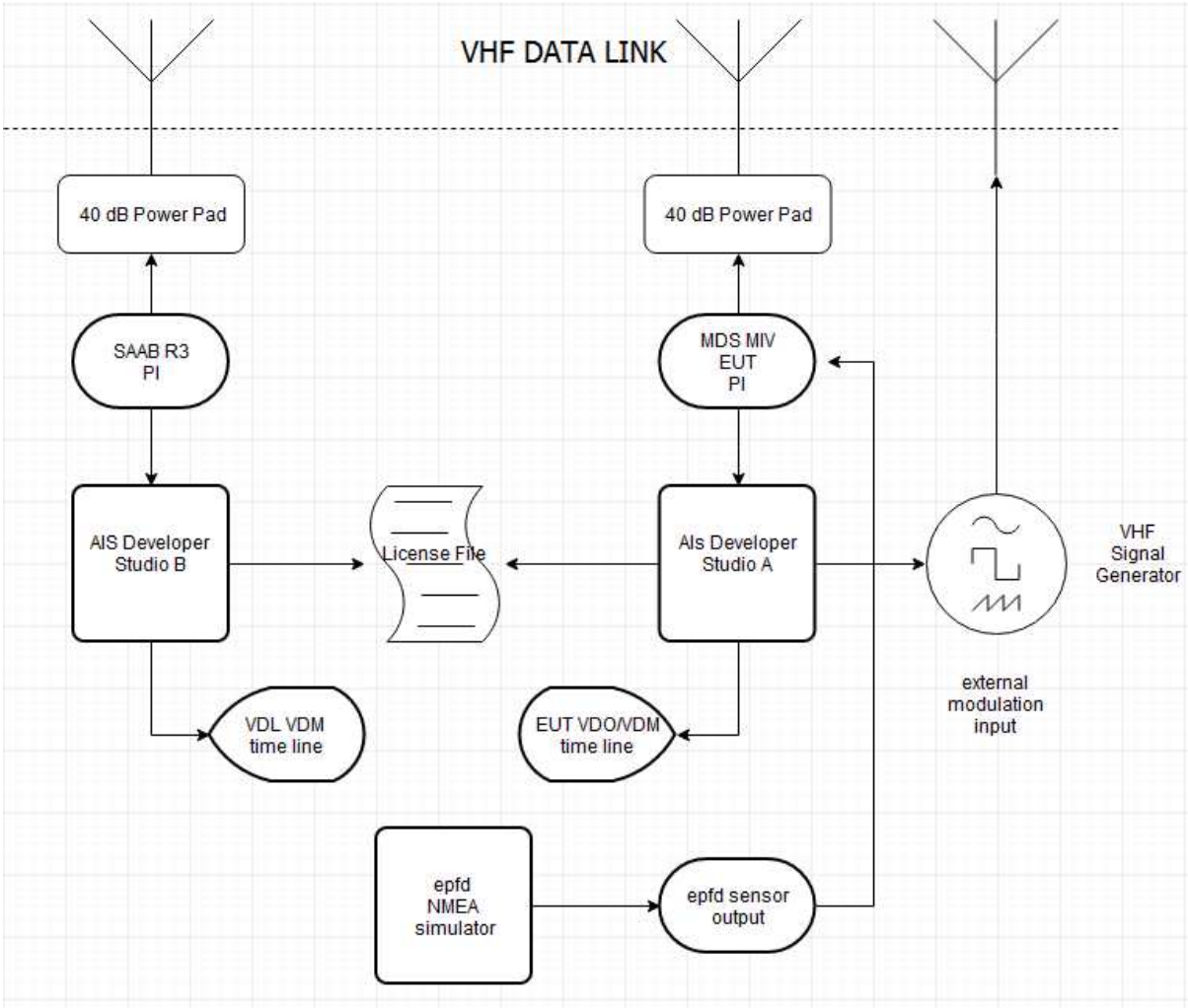
ALL requests for support should be addressed to support@aiste.st explaining any bug or discrepancy as well as a screenshot.

It is the intention of AISTE.ST through the current and further development of the AIS Developer Studio suite of components to continue to supply a cost effective method for development, production, integration and verification of protocols as used by AIS, ASM and VDE.

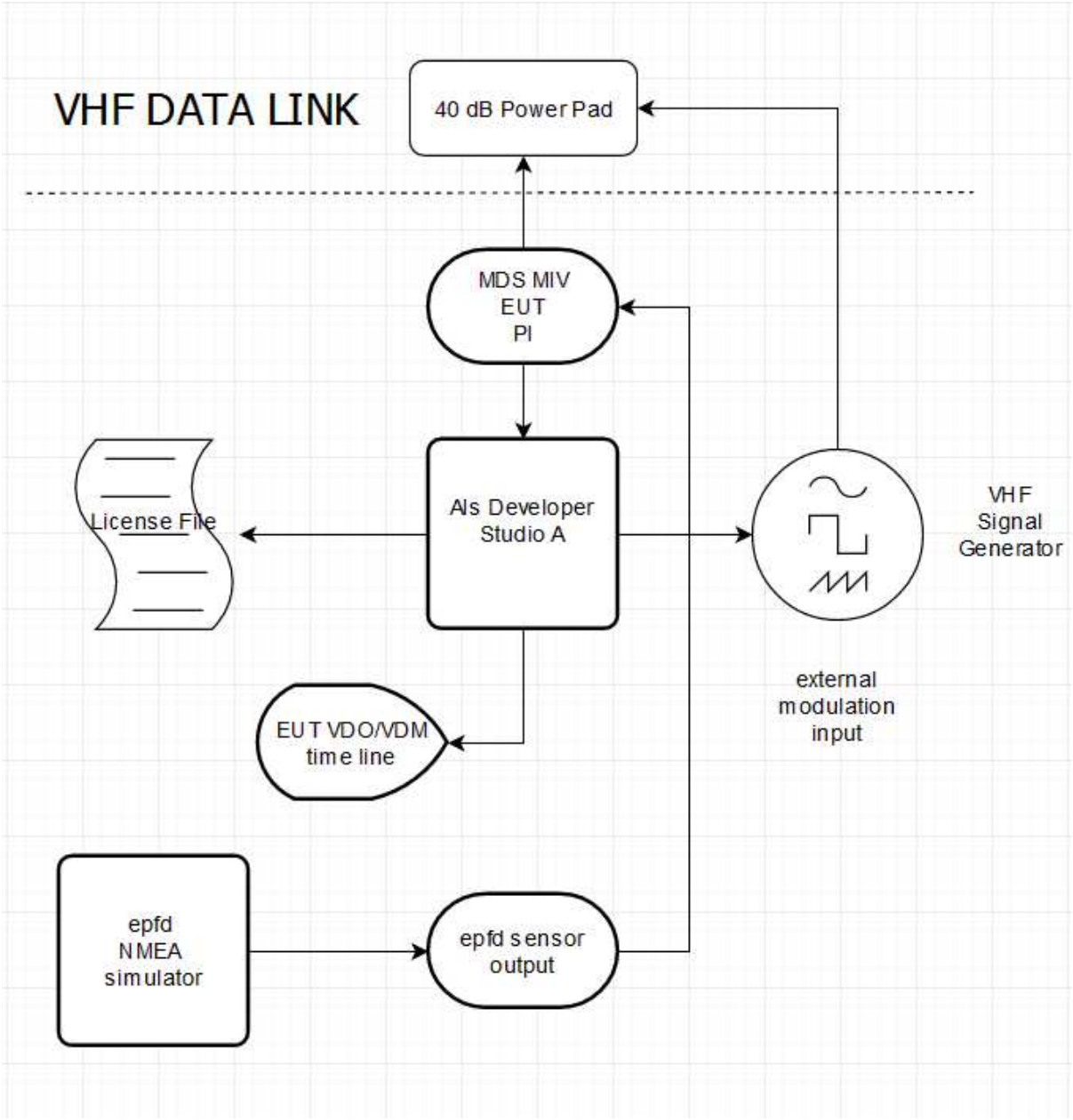
It is the intention of AISTE.ST to supply upgrades to the AIS Developer suite user group if and when they become available.

Users may subscribe to this upgrade service.

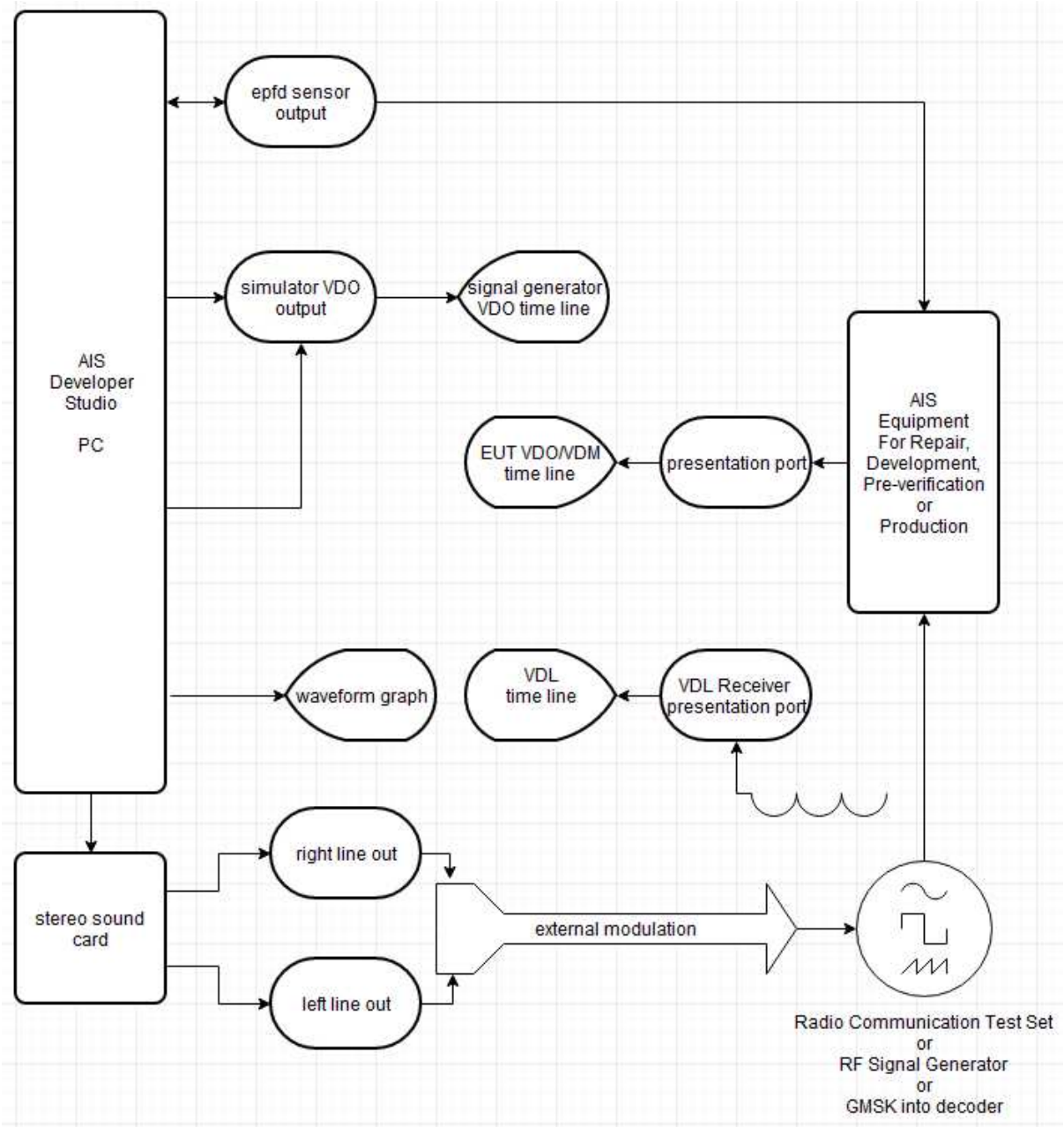
Verification set-up A



Verification set-up B



Verification set-up C



Method of measurement

Setup hardware as per Verification set-up A / B / C

Procedure

Initiate the following steps in order.

- Please follow order correctly.
- Once you have setup the signal generator modulation and created 5 separate identities you must save a system profile file.
- Save this file with a unique name so that you can re-use it and do not overwrite it.
- Step through all the following procedures.

WARNING

Many different signal generators and test sets are used to test radio communications transceivers. Some of these devices contain both signal generator and monitor receivers, which share a common output connector to the EUT path. If the signal generator is connected to the antenna connector to test the receiver, and the transmitter keys, then serious damage can result to the signal generator.

Higher quality instruments provide architectures with EUT reverse power protection. This circuitry will prevent damage to the signal source if a high RF power level is applied to its output connector from the EUT. Generally speaking…An AIS transmission may be to fast to correctly activate some of these protection circuit.

Make use of EXTERNAL RF POWER PADS.

Own Profile Overview

On application start up the “Own Profile data memory object is filled with the parameters obtained from the licence.txt file. These are system default values supplied by the client when they purchase an individual license file.

If the license file is correct it will allow opening and saving of files. Users may create unique contextual profiles for different evaluation scenarios.

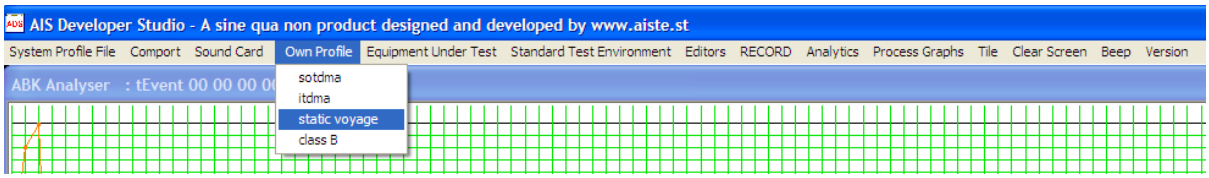
Own profile contextual information is data that is entered into the “Own Profile Dialog” and then saved as a ‘user. ads’ file. Either the user. ads profile data or the default license data is used to populate all RATDMA VDL packets.

The programmable signal generator module can send the user's profile and contextual information as part of the VDL message. You can use this information to provide a RATDMA customized VDL message.

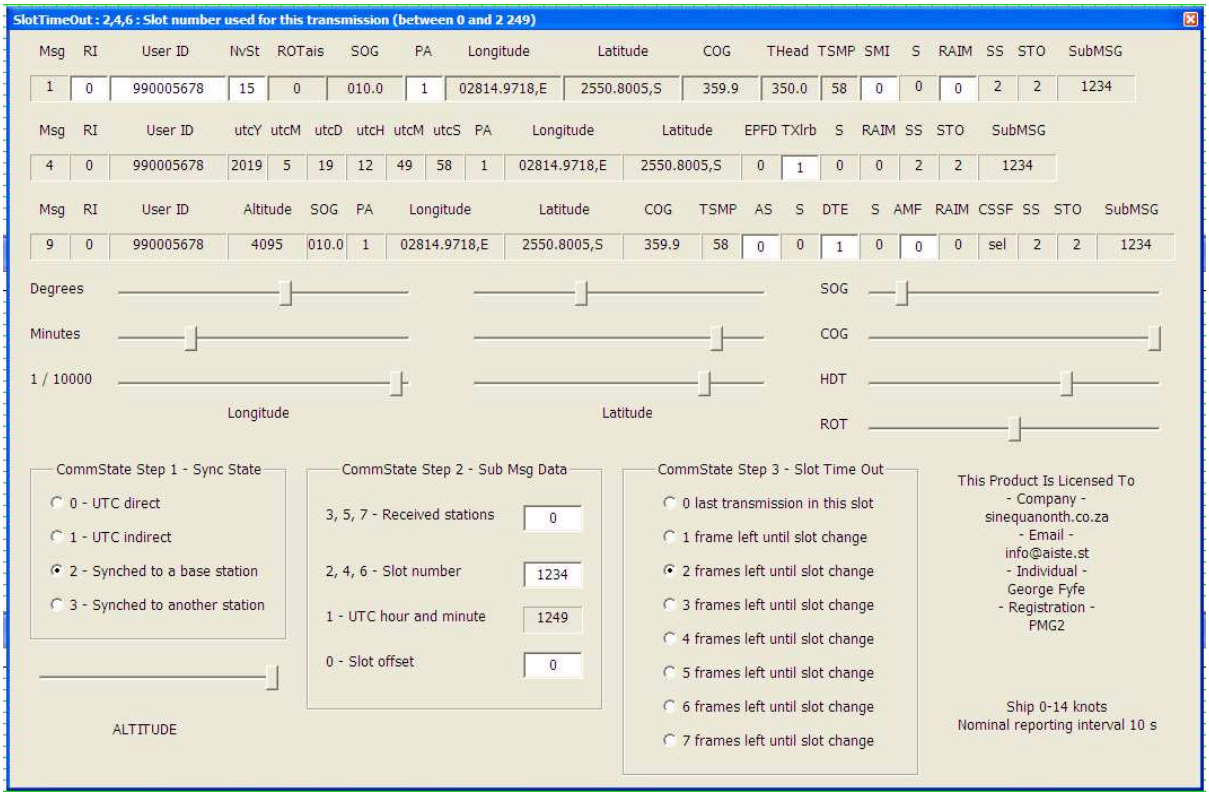
Interactive Text Tips

The “Own Profile” dialogs feature interactive text tips. Position the mouse pointer in the desired location and click the left mouse button to display its text tip. Enable Beep menu item if you want an audible indication of error data entry.

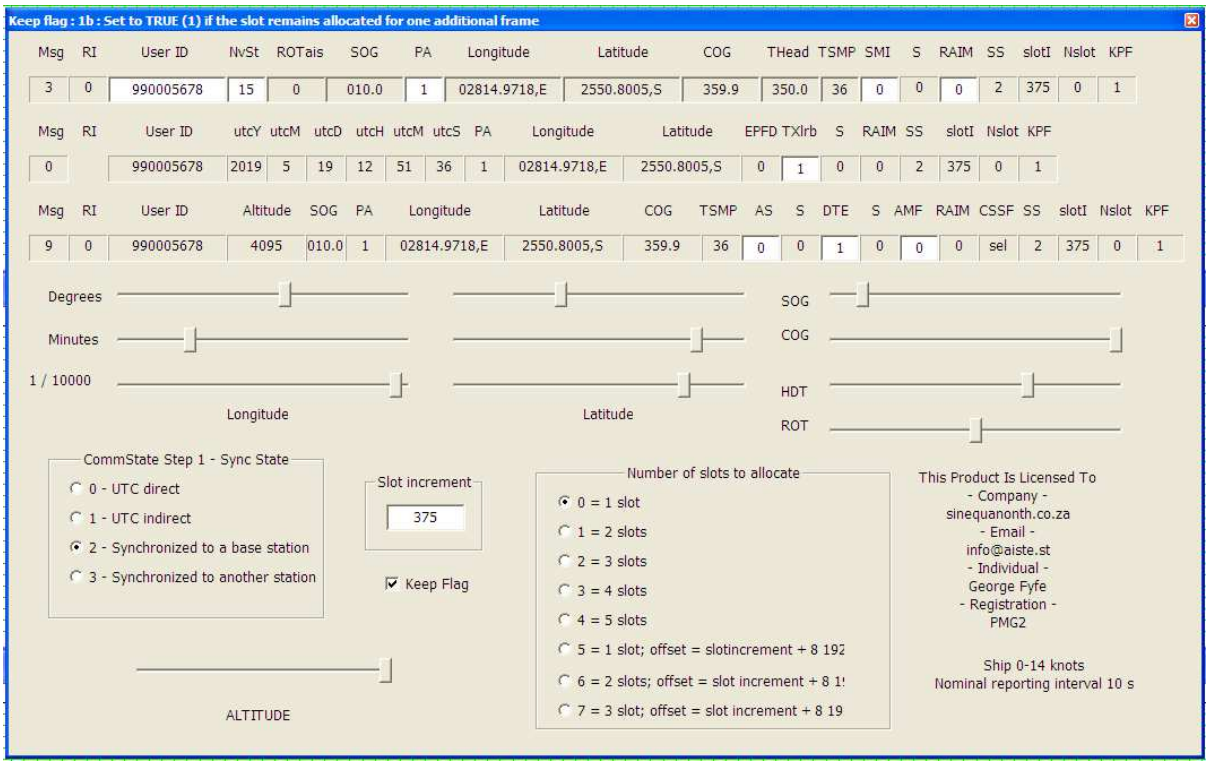
Own Profile Menu



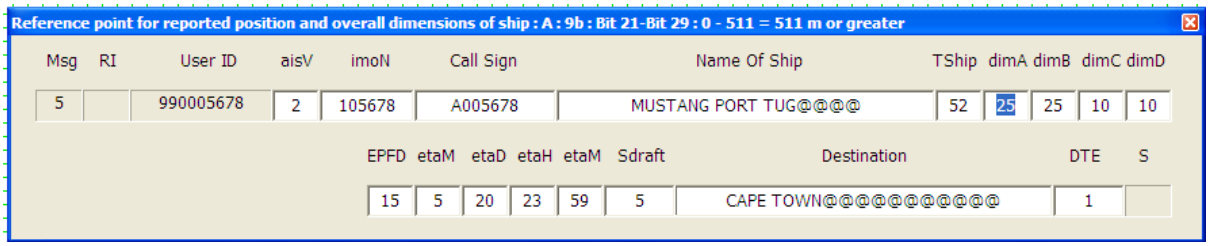
Sotdma



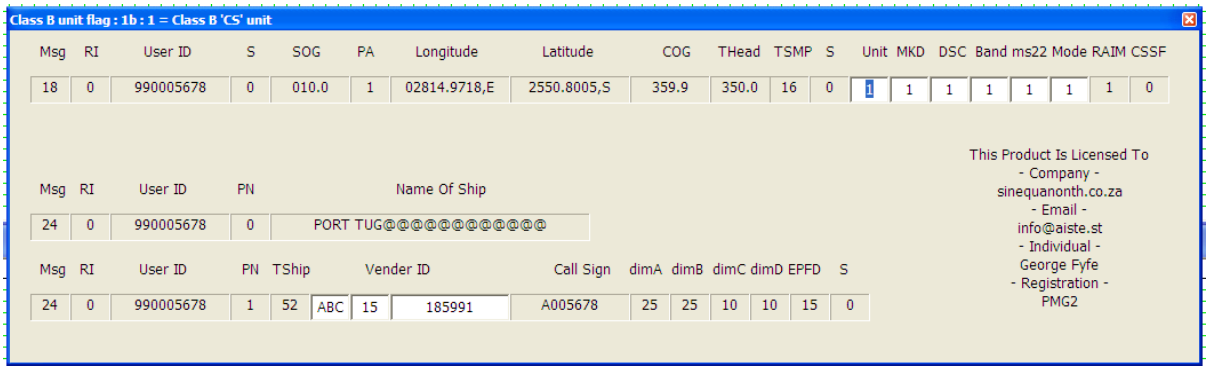
Itdma



Static and voyage



Class B



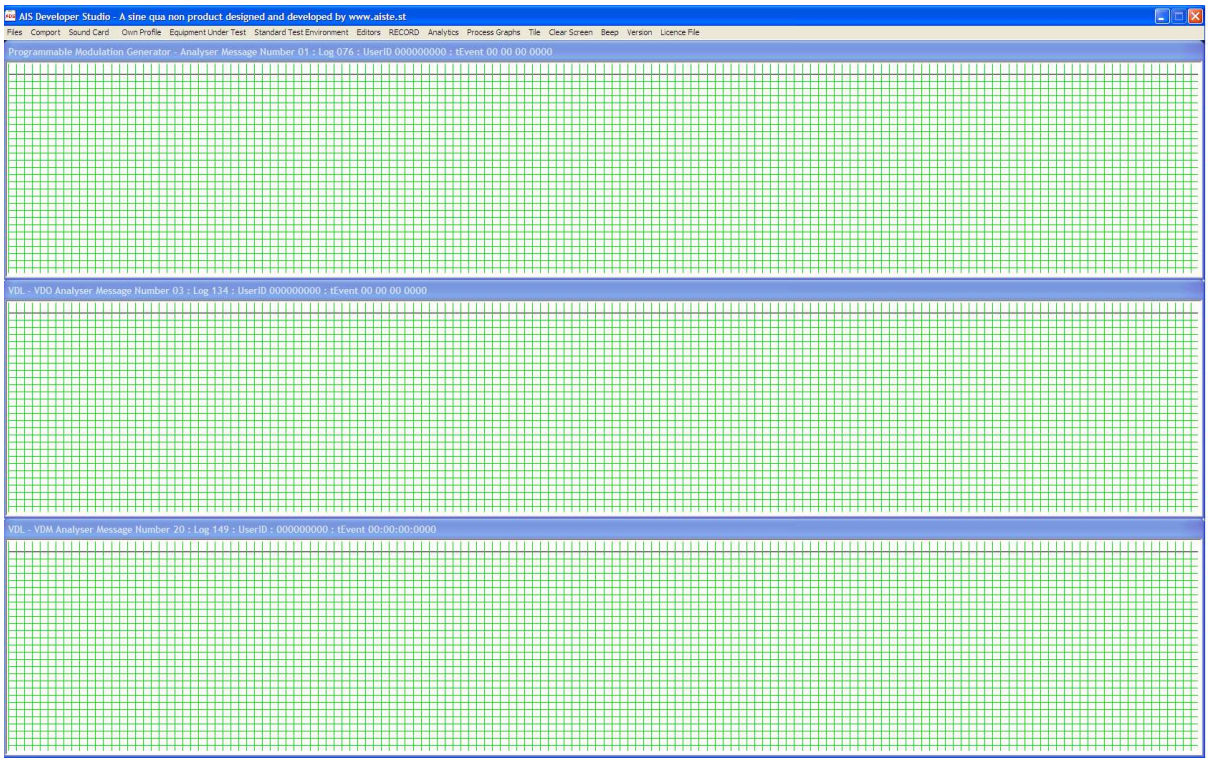
You must complete the set of “Own Profile Dialogs” in order to correctly populate all VDL AIS Packets.

Cross populating of dialogues results.

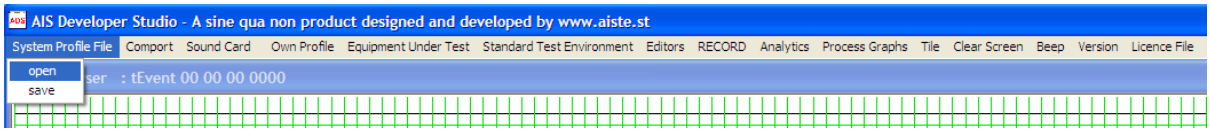
AIS messages using a communication state are STATIC and carry the values entered into the SOTDMA and ITDMA dialogs.

Start AIS Developer Studio

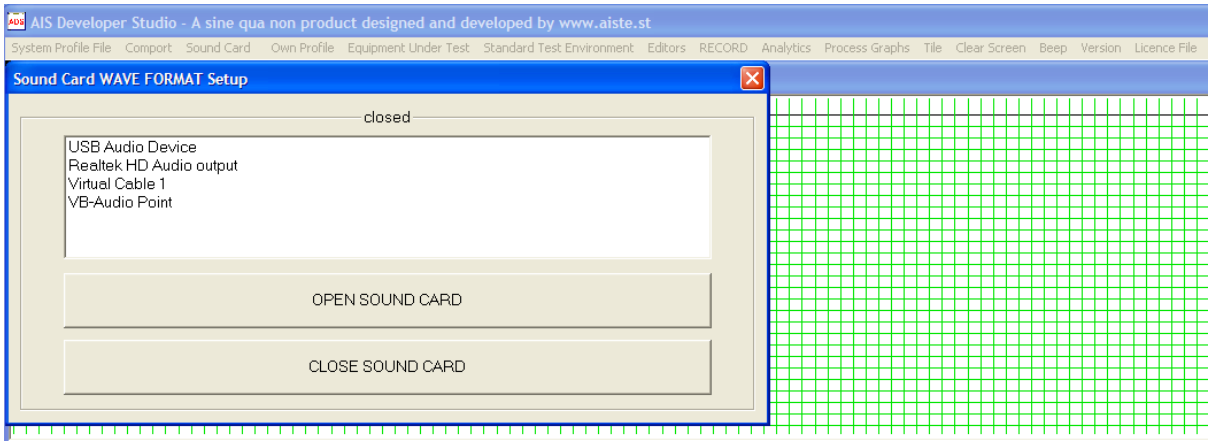
- Select and open license file
- AIS Developer Studio main time line window is displayed.



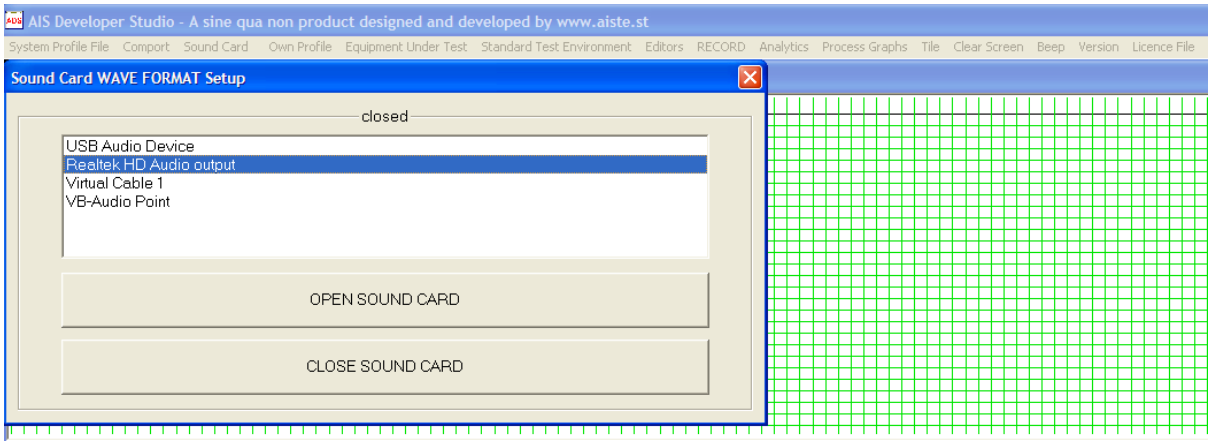
- If a “System Profile File” was previously created then select and open it.



- Select Sound Card Menu Item

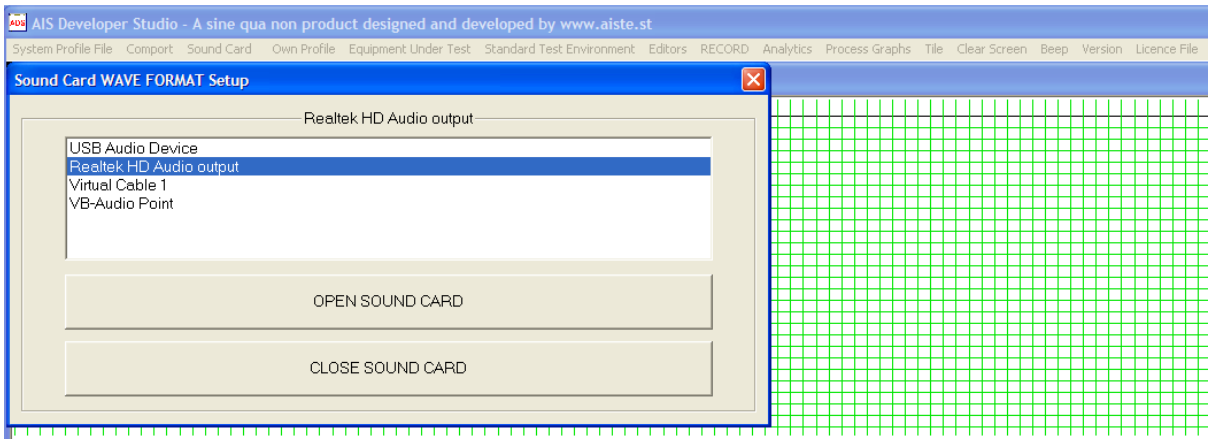


- A list of available devices will be shown.
- Dialogue device indication indicates, “closed”
- Select the “audio output device”. This will be different for every user and will depend on the internal / external soundcard/s in your system.



- Select your “Audio Output Device”
- Select “Open Sound Card”
- The dialogue will automatically close if the requested device could be opened.

If you want to view your selection re-select Sound Card Menu Item.



You can see that:

- Your previous selection is highlighted.
- If successfully opened the dialogue device string indicates the device you selected.

- Close the dialogue the conventional Windows way  or use the escape key.

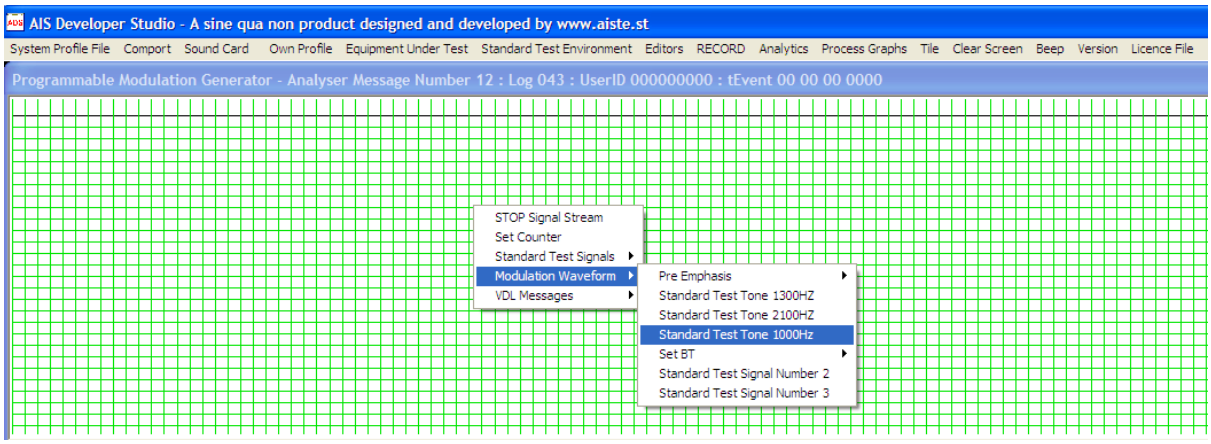
Set External Signal Generator Modulation / Deviation Level

Please read your Signal Generator Manual to find out the correct EXT modulation SETUP process for your instrument. It may be unique to your instrument.

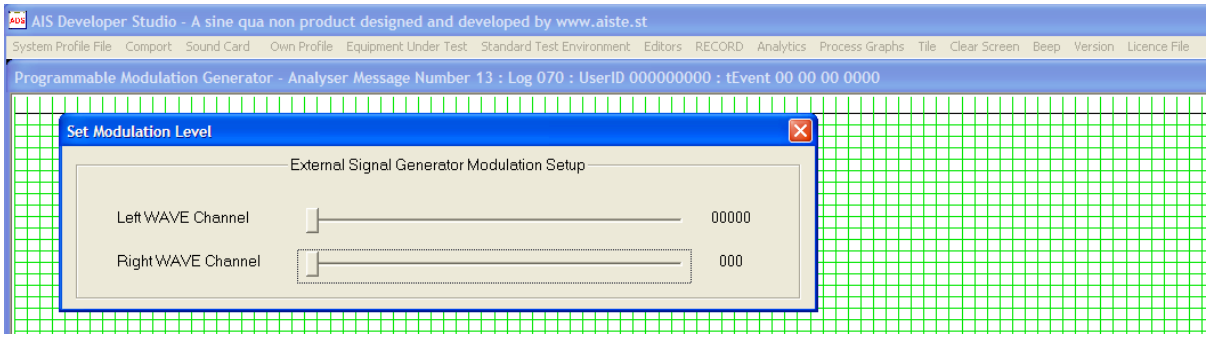
If you are unable to correctly setup your own instrument with the manufacturers manual then one of the following procedures may provide a nominally accurate 2.4KHZ deviation.

In FM, the depth of modulation is expressed as the modulation index (β), which is defined as the ratio of the deviation to the modulating frequency, or F_d/f_m. The FM process produces a large number of sidebands and, at certain values of β, the carrier will go to zero. The sidebands are described by mathematical entities called Bessel functions.

- Connect External Signal Generator Output to Spectrum Monitor.
- Setup Frequency = AIS1 / AIS2 / DSC; Span = 60 / 25Khz
- Select FM modulation as required.
- Right click mouse cursor in Programmable Modulation Time Line
- A context menu will be displayed.
- Select Modulation Waveform -> Standard Test Tone 1000HZ.



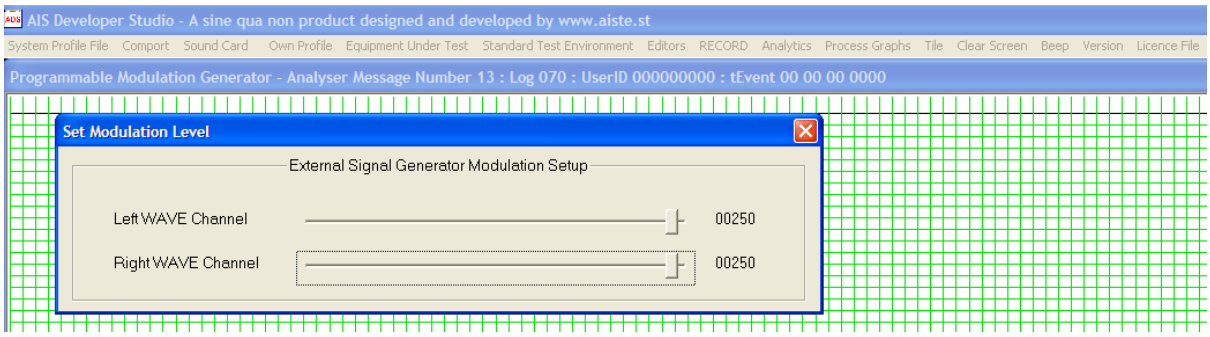
- Set the modulation frequency to 1KHz and zero level / deviation.



- Now slowly increase the level of the WAVE output channel / deviation that you connected to the Signal Generator EXT modulation in the “method” and you will see the carrier decrease to zero on the spectrum monitor. Leave the level at maximum null of the carrier.
- Reconnect Signal Generator to VDL “method”
- Save “System Profile File”

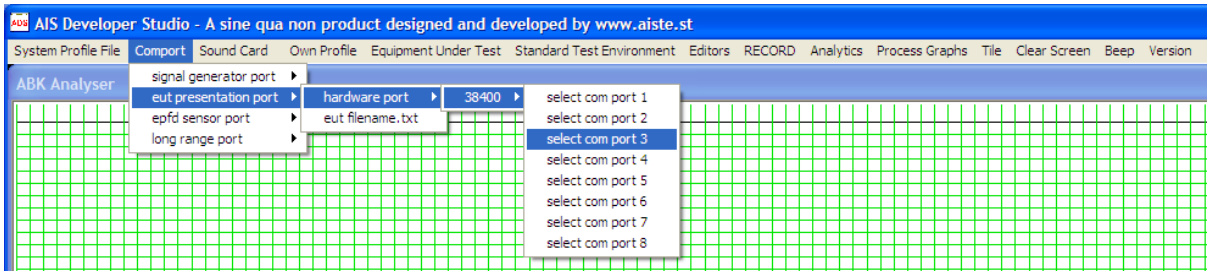
Alternatively if your Signal Generator has an automatic leveling EXT modulation setup, then set the Sound Card output level to just under maximum.

- This will allow the best signal to noise ratio from the sound card DAC.
- Adjust deviation on Signal Generator as required.

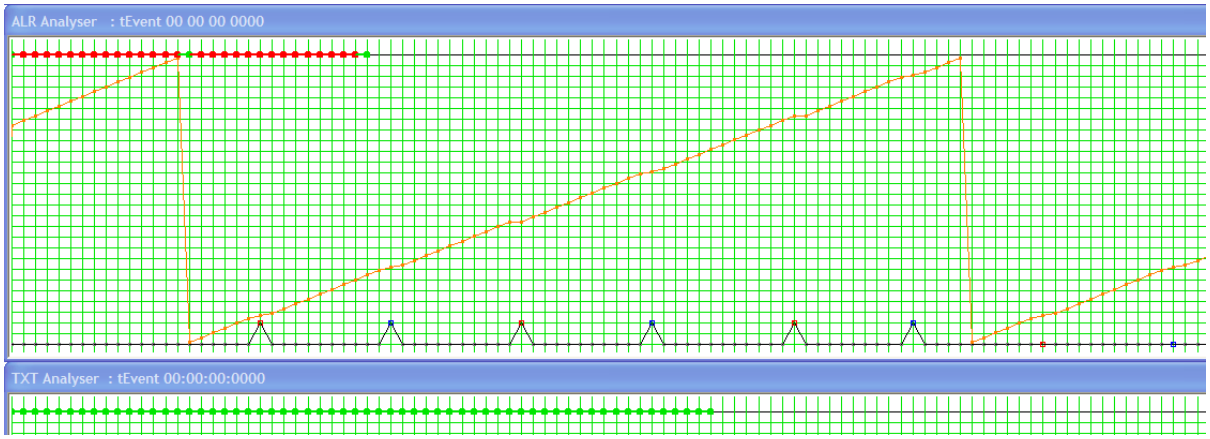


Alternatively make Use Of The IEC 61993 Transmission Mask for 25KHZ bandwidth as viewed on your Spectrum Monitor.

Open EUT Com Port

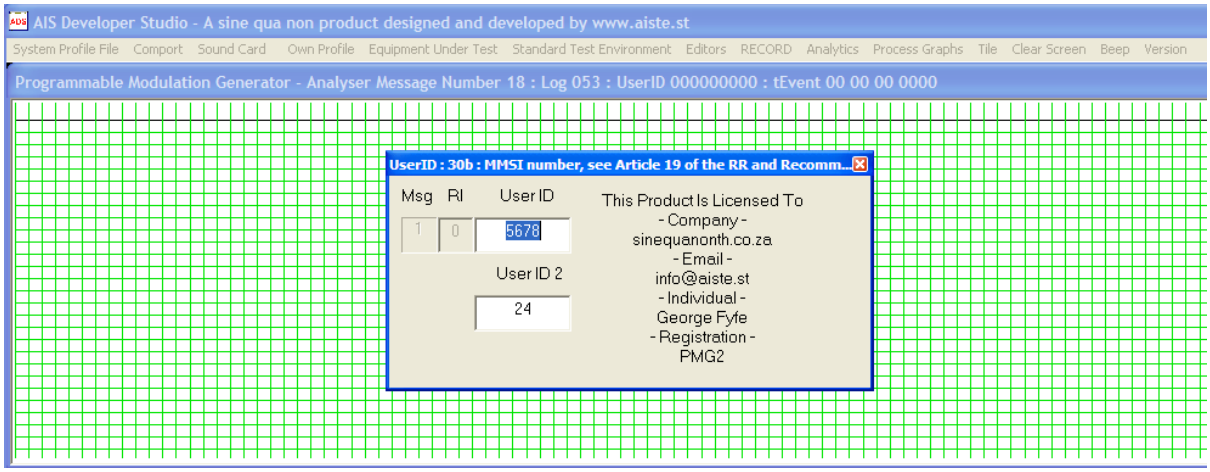


View EUT activity – EUT VDO or ADS(B) VDL VDM

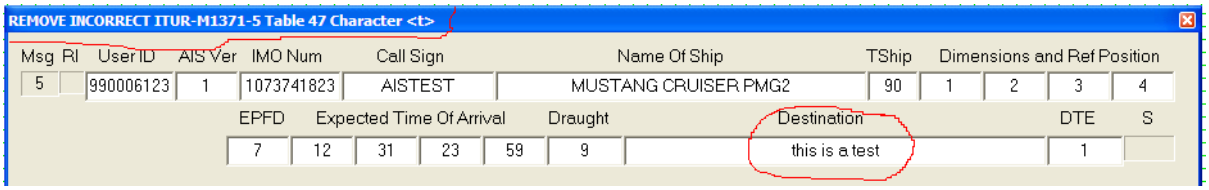


Select->Equipment Under Test

- Set User ID 1 and or User ID 2
- This is the EUT MMSI
- Close the dialogue the conventional Windows way  or use the escape key.

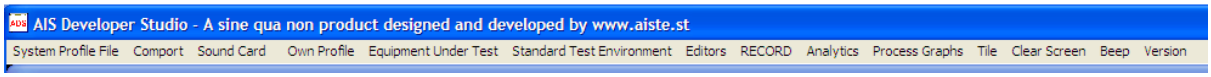


Interactive example - incorrect 6 Bit Text

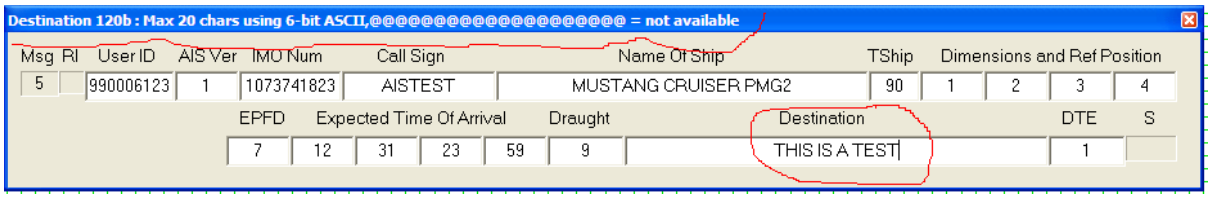


Incorrect lower case characters. <t> indicates first incorrect character. Error text message will remain until all incorrect characters are replaced or removed.

Enable “Beep” from time line window menu if you wish to have a audible indication of errors.



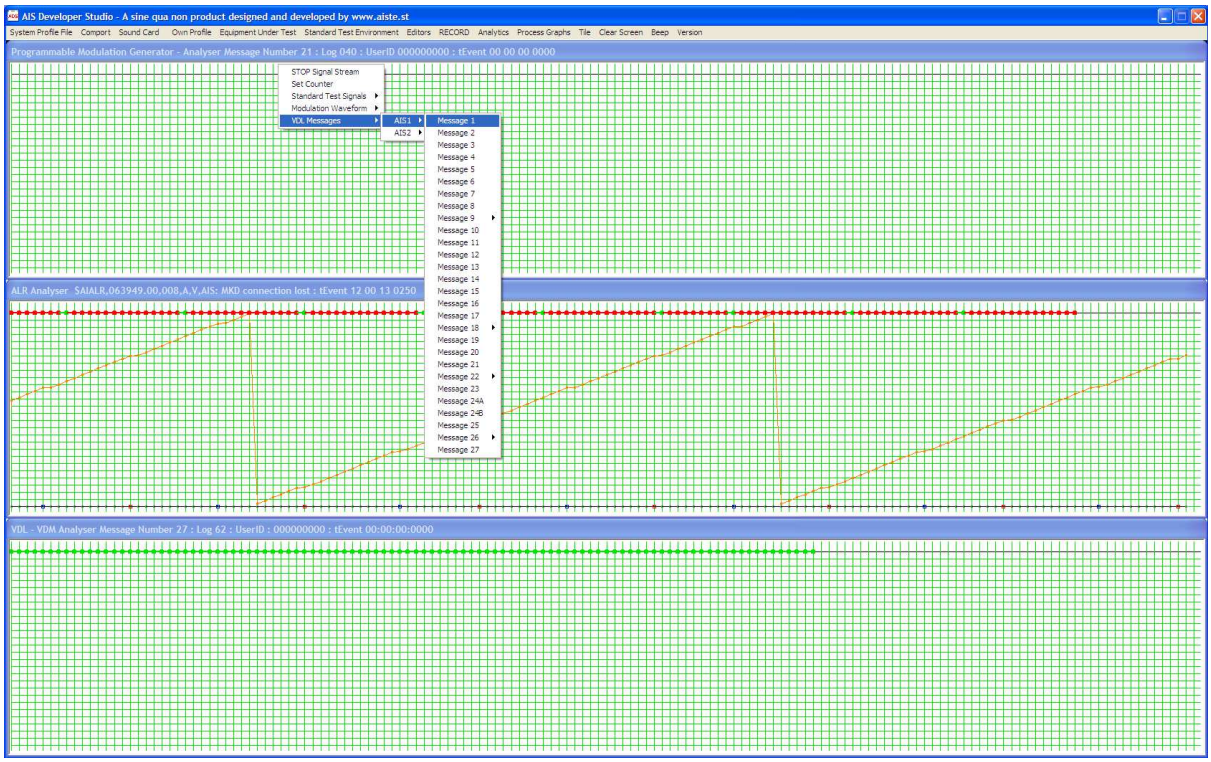
Interactive example - correct 6 Bit Text



Error text replaced with text tip.

Open Context Menu

- Right click mouse cursor in Programmable Modulation Time Line
- A context menu will be displayed.



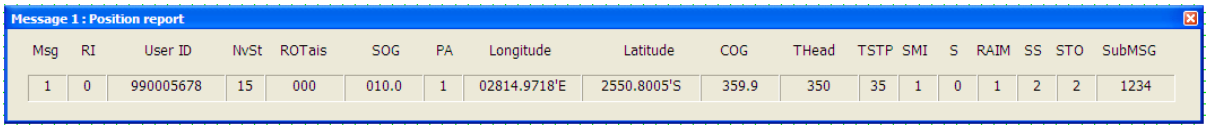
The selection of AIS1 or AIS2 will change the channel indication of the Programmable Modulation Generator VDO string.

Message 1 : Position report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Message 1 : Position report

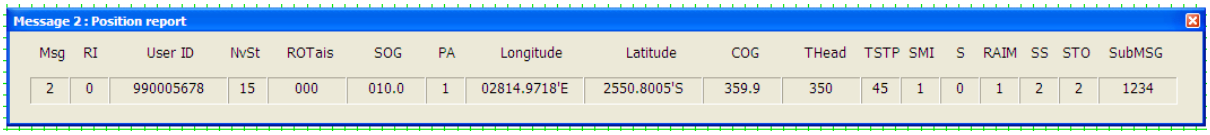
Msg	RI	User ID	NvSt	ROTais	SOG	PA	Longitude	Latitude	COG	THead	TSTP	SMI	S	RAIM	SS	STO	SubMSG
1	0	990005678	15	000	010.0	1	02814.9718'E	2550.8005'S	359.9	350	35	1	0	1	2	2	1234

Message 2 : Position report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Message 2 : Position report

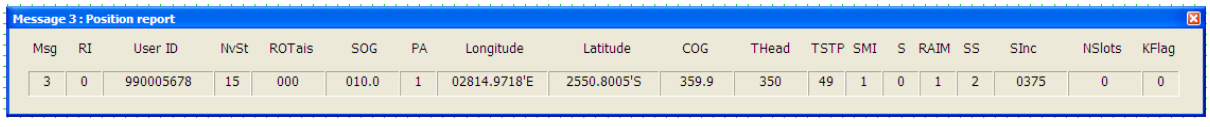
Msg	RI	User ID	NvSt	ROTais	SOG	PA	Longitude	Latitude	COG	THead	TSTP	SMI	S	RAIM	SS	STO	SubMSG
2	0	990005678	15	000	010.0	1	02814.9718'E	2550.8005'S	359.9	350	45	1	0	1	2	2	1234

Message 3 : Position report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Message 3 : Position report

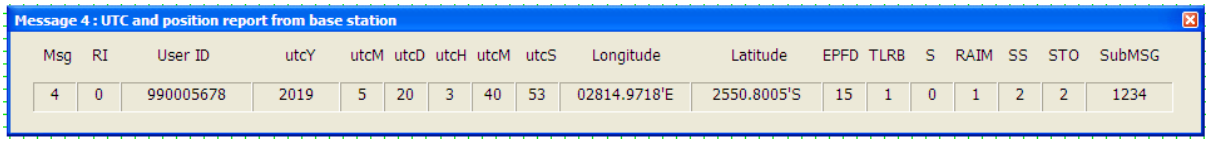
Msg	RI	User ID	NvSt	ROTais	SOG	PA	Longitude	Latitude	COG	THead	TSTP	SMI	S	RAIM	SS	SInc	NSlots	KFlag
3	0	990005678	15	000	010.0	1	02814.9718'E	2550.8005'S	359.9	350	49	1	0	1	2	0375	0	0

Message 4 : UTC and position report from base station

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Message 4 : UTC and position report from base station

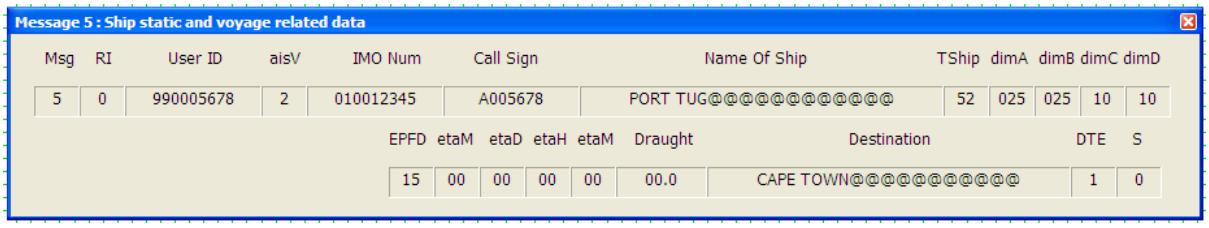
Msg	RI	User ID	utcY	utcM	utcD	utcH	utcM	utcS	Longitude	Latitude	EPFD	TLRB	S	RAIM	SS	STO	SubMSG
4	0	990005678	2019	5	20	3	40	53	02814.9718'E	2550.8005'S	15	1	0	1	2	2	1234

Message 5 : Ship static and voyage related data

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Message 5 : Ship static and voyage related data

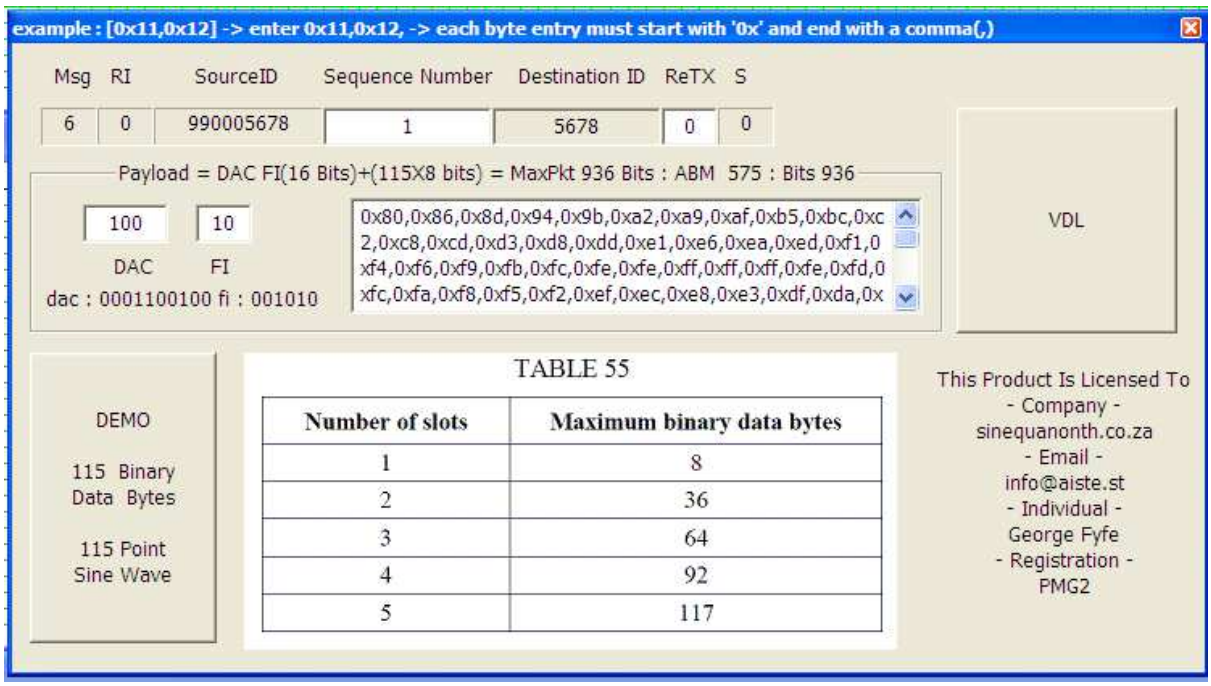
Msg	RI	User ID	aisV	IMO Num	Call Sign	Name Of Ship	TShip	dimA	dimB	dimC	dimD
5	0	990005678	2	010012345	A005678	PORT TUG@@@@@@@@@@@@@	52	025	025	10	10

EPFD	etaM	etaD	etaH	etaM	Draught	Destination	DTE	S
15	00	00	00	00	00.0	CAPE TOWN@@@@@@@@@@@@	1	0

Message 6 : Addressed binary message

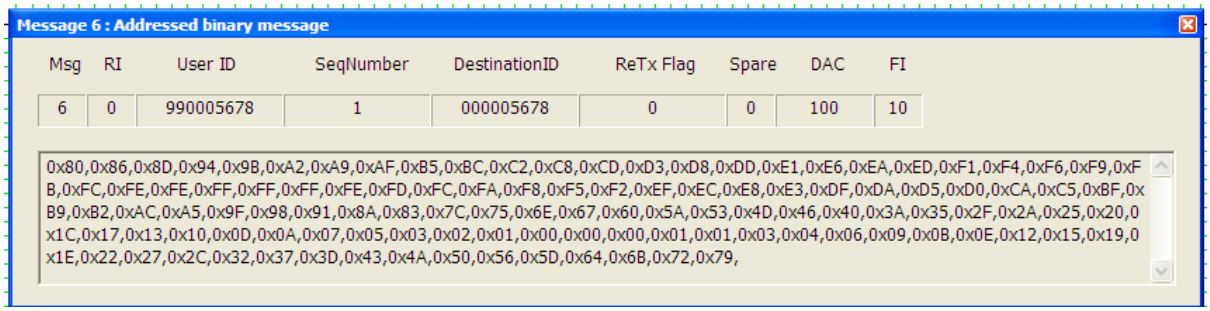
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



DEMO: Select
VDL: Select
NOTE: Binary editor supports cut and paste in correct format. [0xhh,]

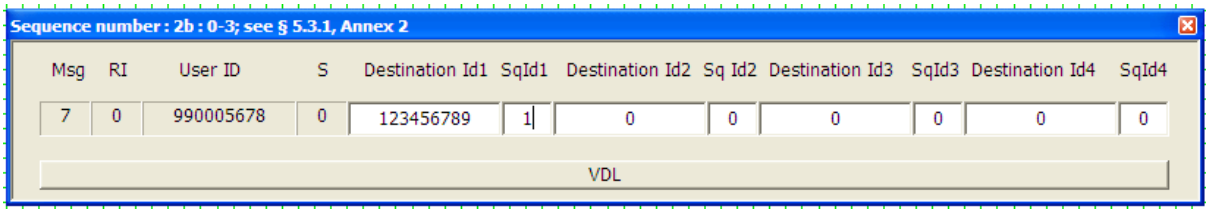
Received VDL - VDM Message Filter:



Message 7 : Binary acknowledge

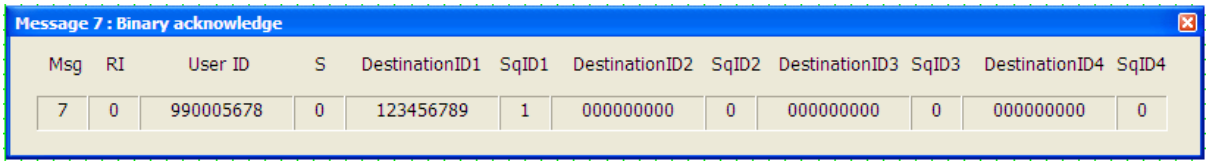
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Minimum Entry	
Destination ID1	MMSI number of first destination of this ACK
Sequence number for ID1	Sequence number of message to be acknowledged; 0…3

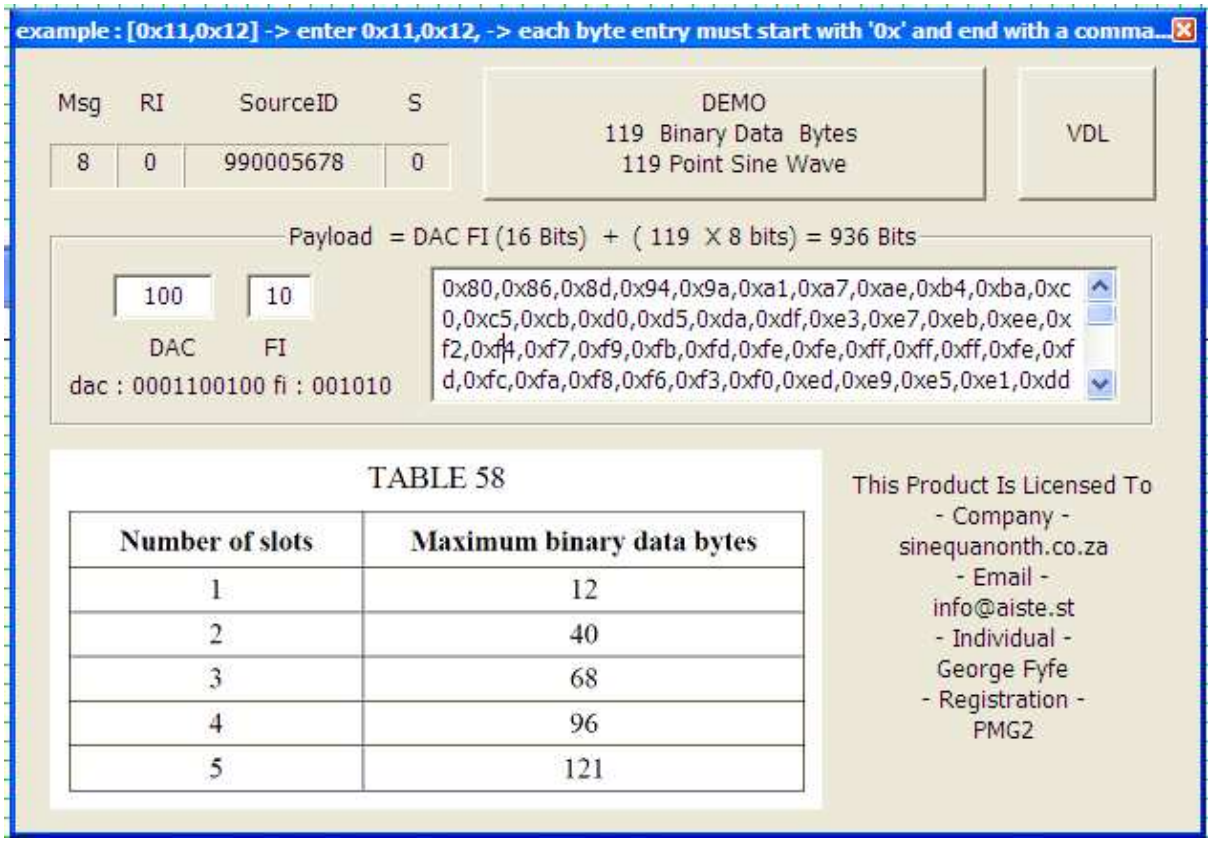
Received VDL - VDM Message Filter:



Message 8: Binary broadcast message

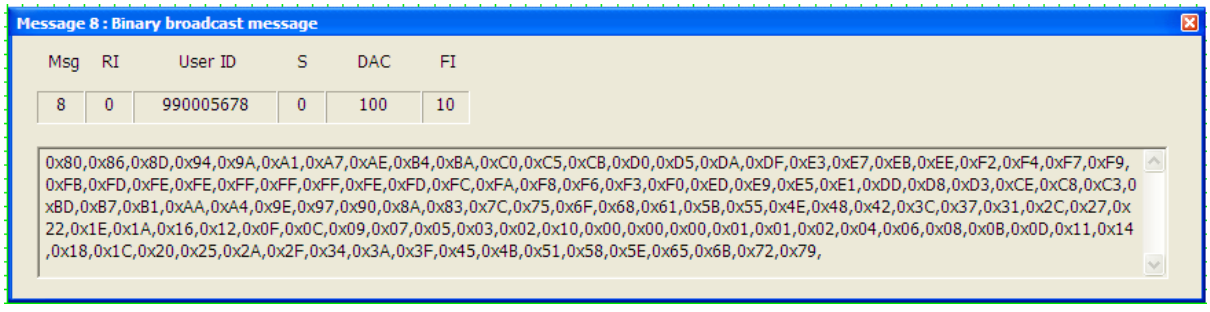
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



DEMO: Select
VDL: Select
NOTE: Binary editor supports cut and paste in correct format. [0xhh,]

Received VDL - VDM Message Filter:



Message 9 : Standard search and rescue aircraft position report SOTDMA

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item (Message 9->SOTDMA).

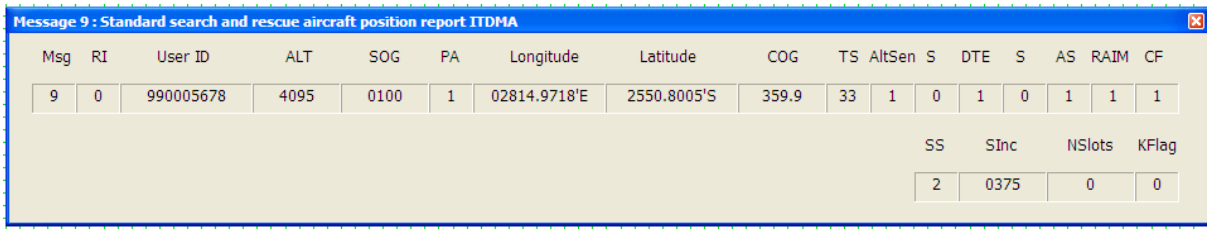
Received VDL - VDM Message Filter:

Message 9 : Standard search and rescue aircraft position report ITDMA

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item (Message 9->ITDMA).

Received VDL - VDM Message Filter:

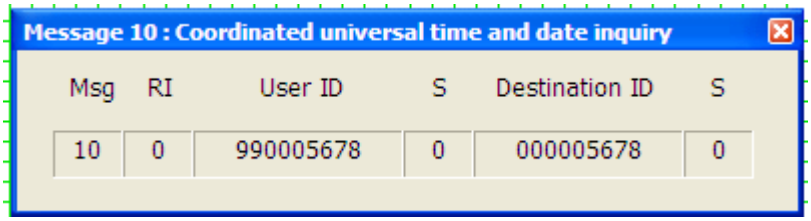


Message 10 : Coordinated universal time and date inquiry

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:

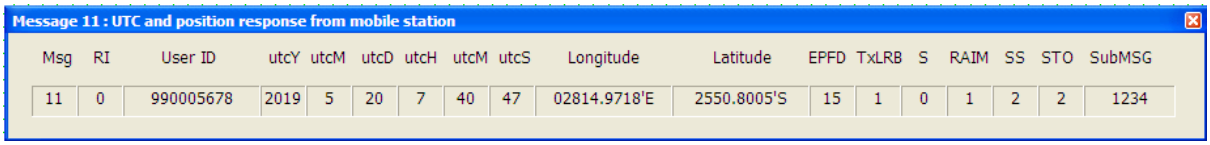


Message 11 : UTC and position response from mobile station

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

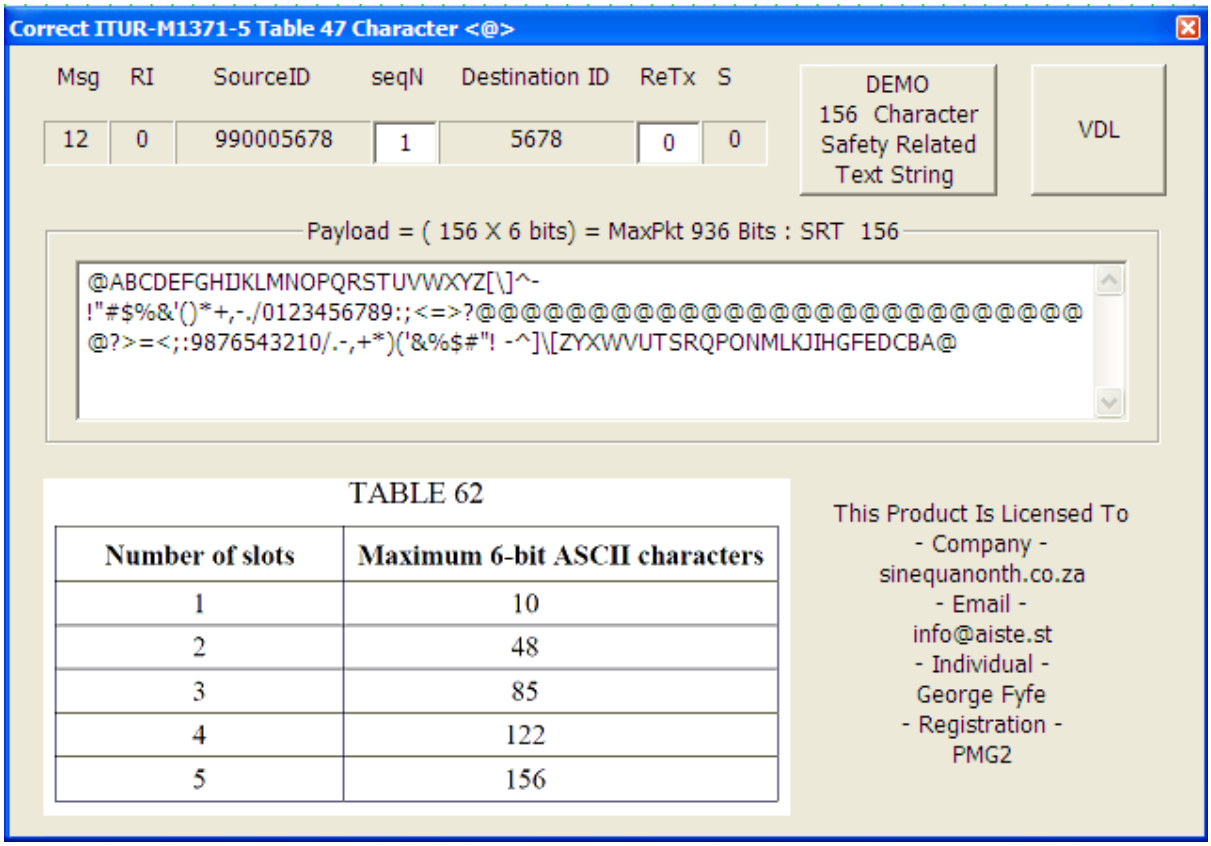
Received VDL - VDM Message Filter:



Message 12 : Addressed safety related message

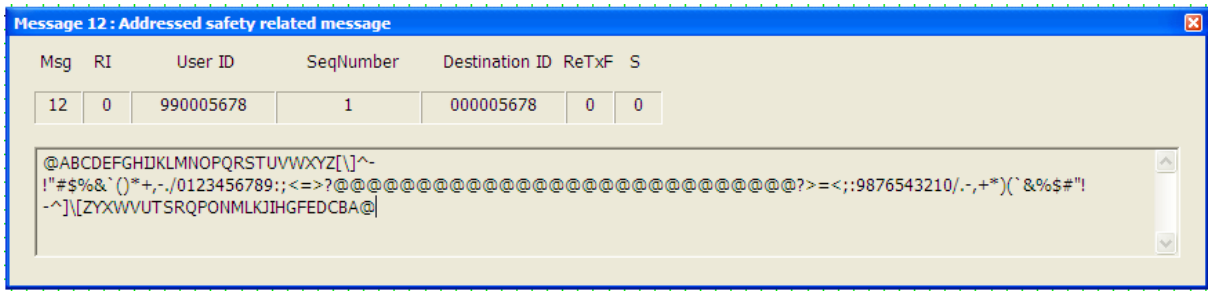
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



DEMO: Select
VDL: Select
NOTE1: Binary editor supports cut and paste in correct 6 bit format.
NOTE2: If you are going to paste text into the edit box, first switch the audible “fault” Beep on. It will indicate all non-accepted 6-bit characters.

Received VDL - VDM Message Filter:

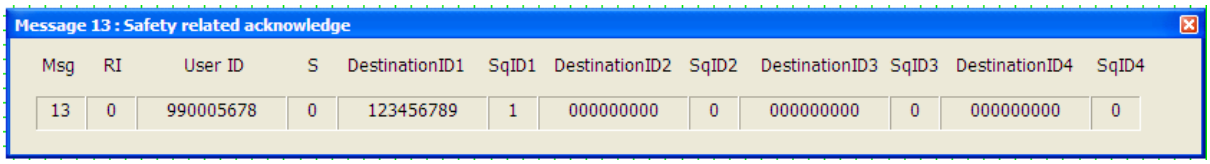


Message 13: Safety related acknowledge

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

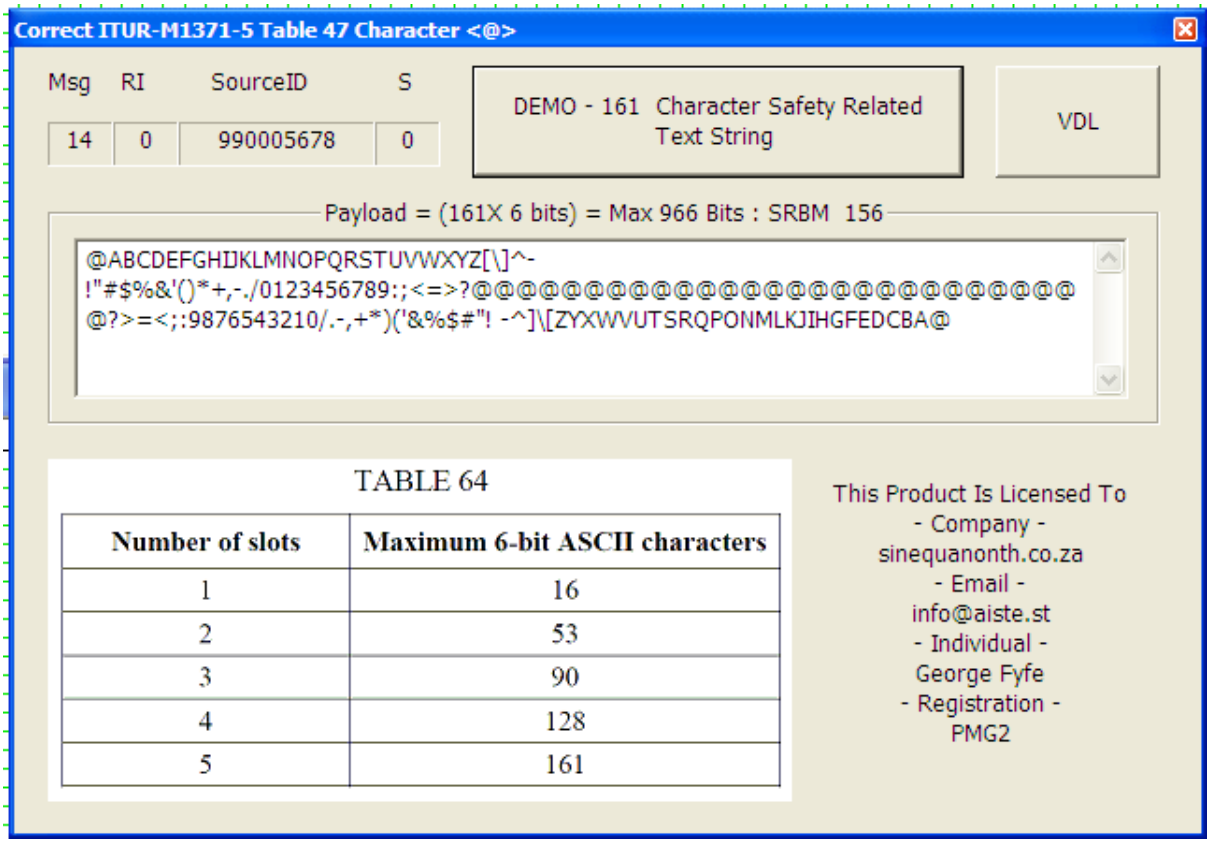
Received VDL - VDM Message Filter:



Message 14: Safety related broadcast message

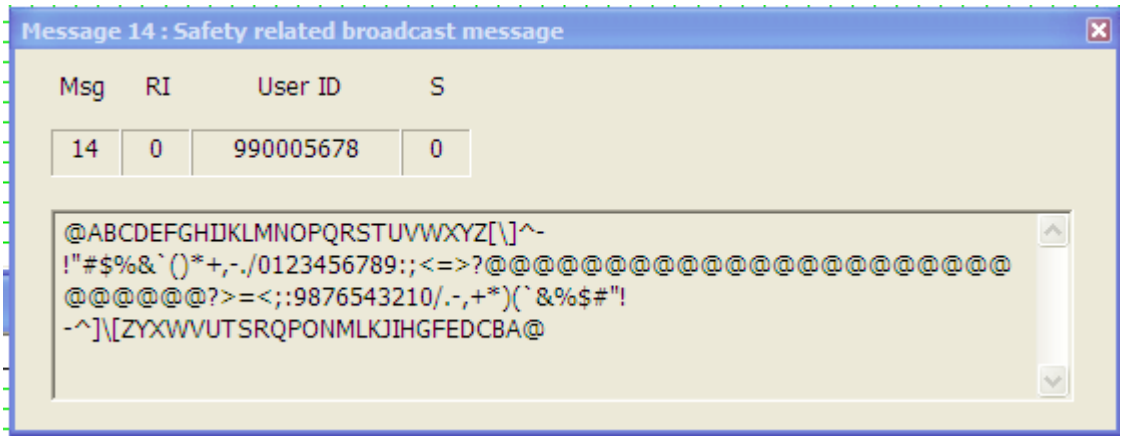
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



DEMO: Select
VDL: Select
NOTE1: Binary editor supports cut and paste in correct 6 bit format.

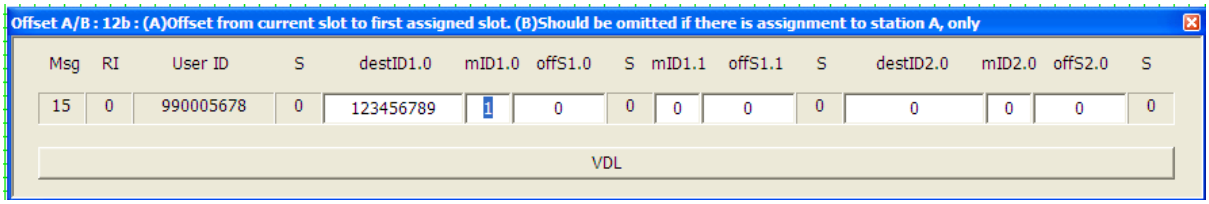
Received VDL - VDM Message Filter:



Message 15: Interrogation

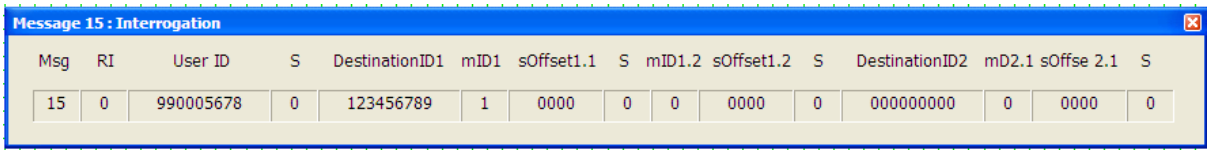
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Minimum Entry	
Destination ID1	MMSI number of first interrogated station
Message ID1	First requested message type from first interrogated station

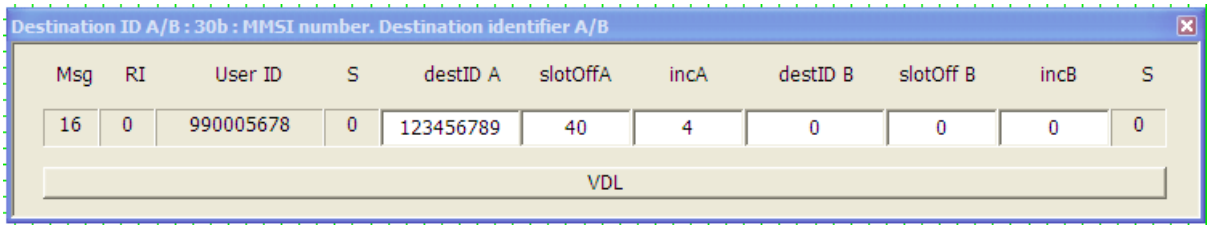
Received VDL - VDM Message Filter:



Message 16 : Assigned mode command

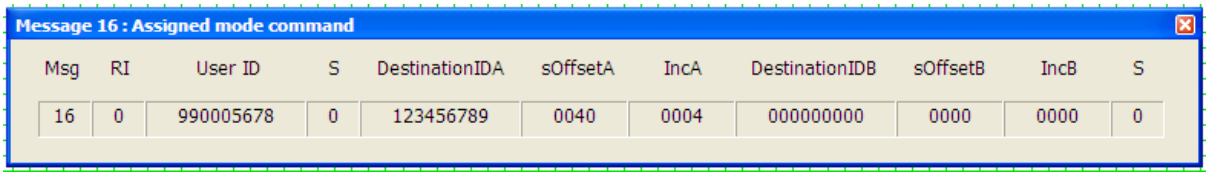
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Minimum Entry	
Destination ID A	MMSI number. Destination identifier A
Offset A	Offset from current slot to first assigned slot
Increment A	Increment to next assigned slot
Please Read M.1371-5 and or view the tech tips in the Dialog title bar to understand this message	

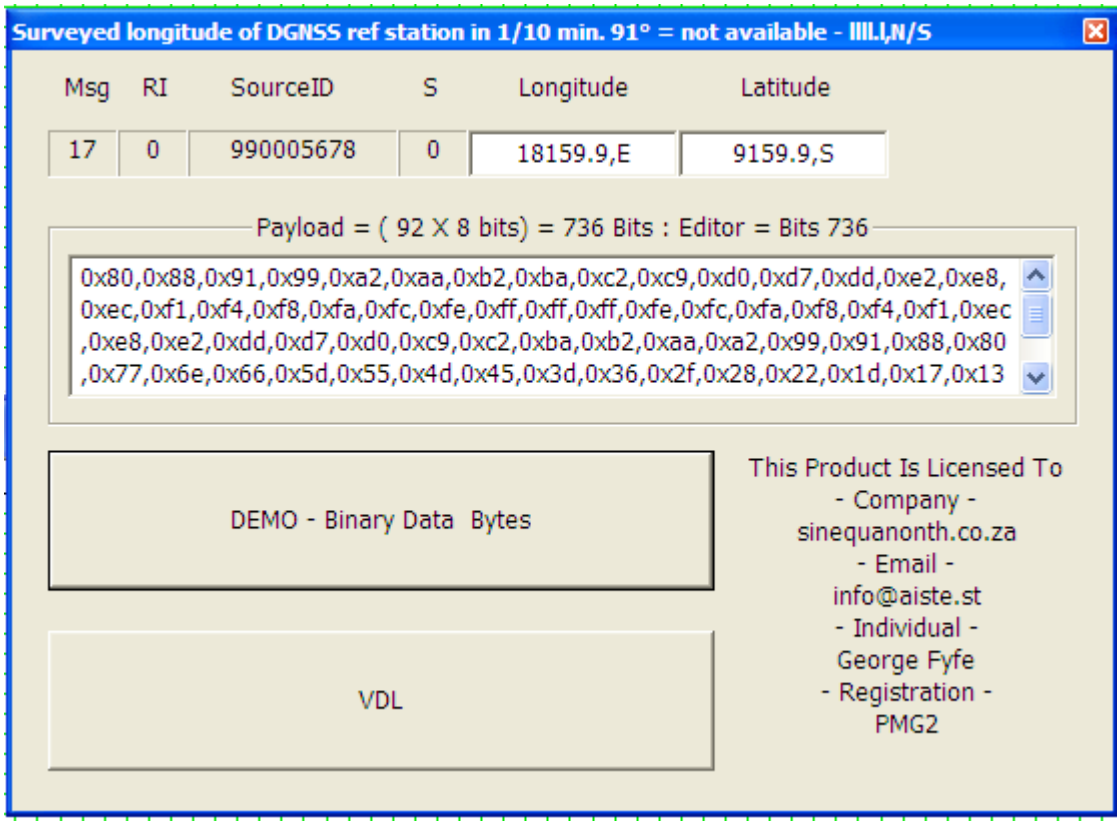
Received VDL - VDM Message Filter:



Message 17: Global navigation-satellite system broadcast binary message

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



DEMO: Select
VDL: Select
Binary editor supports formatted (0xhh,) cut and paste Differential correction data.

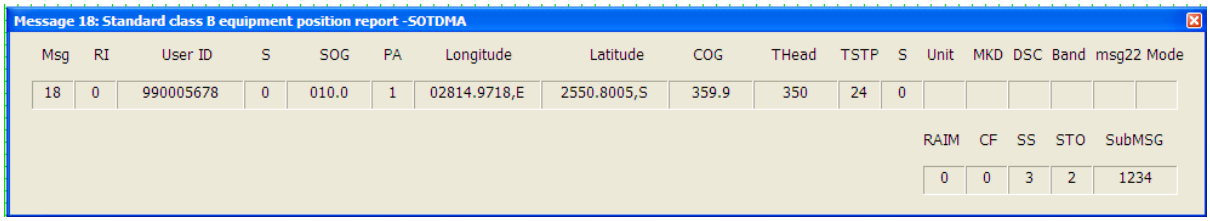
Received VDL - VDM Message Filter:

Message 18: Standard class B equipment position report -SOTDMA

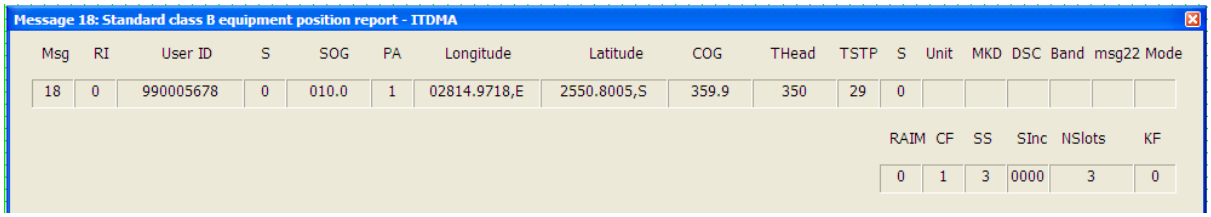
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

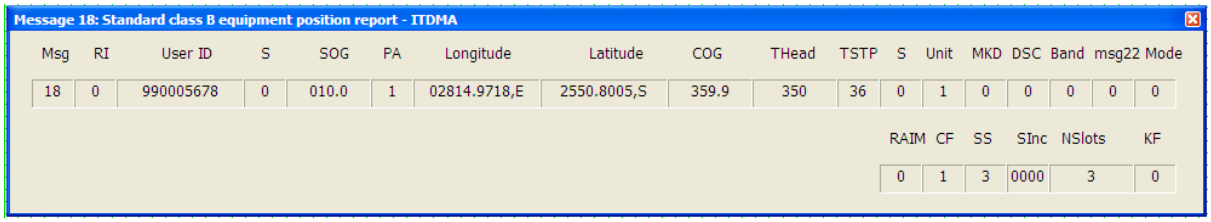
Received VDL - VDM Message Filter:



Received VDL - VDM Message Filter:



Received VDL - VDM Message Filter:

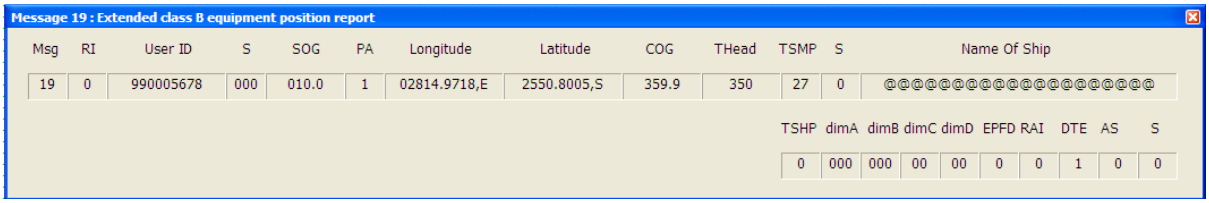


Message 19 : Extended class B equipment position report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

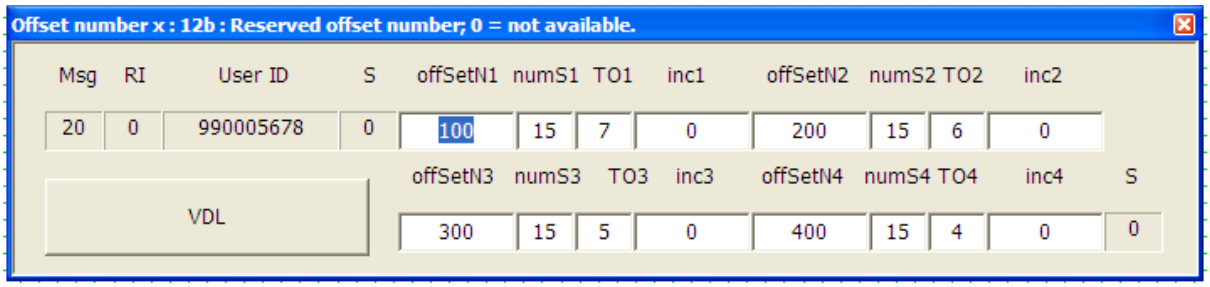
Received VDL - VDM Message Filter:



Message 20: Data link management message

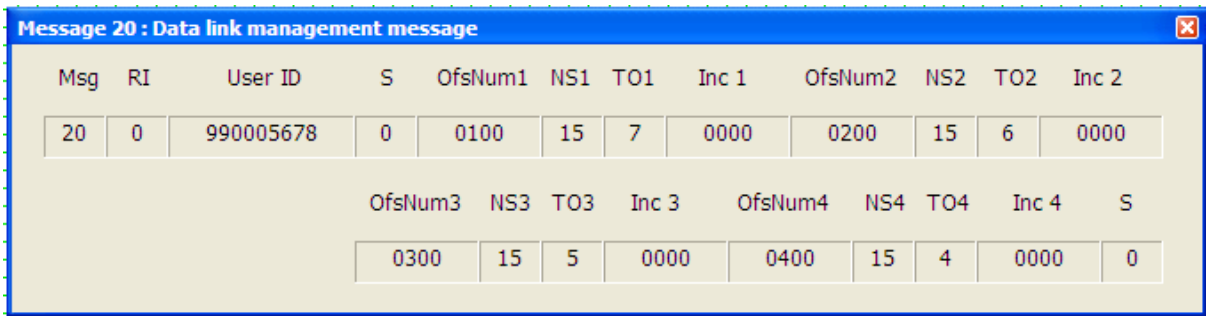
Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Minimum Entry	
Offset number 1	Reserved offset number; 0 = not available
Number of slots 1	Number of reserved consecutive slots: 1 - 15; 0 = not available
Time-out 1	Time-out value in minutes; 0 = not available.
Increment 1	Increment to repeat reservation block 1; 0 = not available.

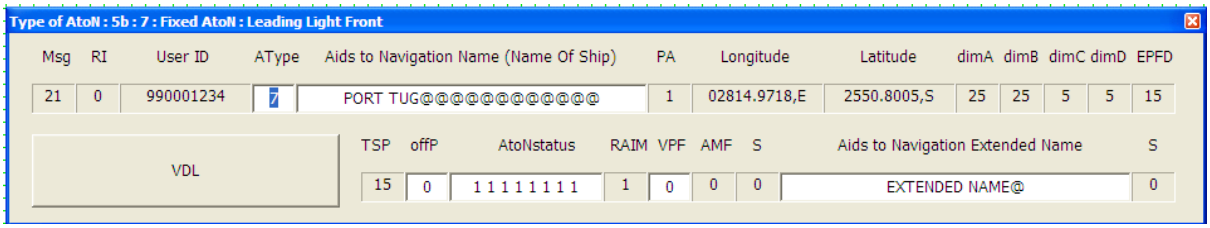
Received VDL - VDM Message Filter:



Message 21 : Aids-to-navigation report

Generate:

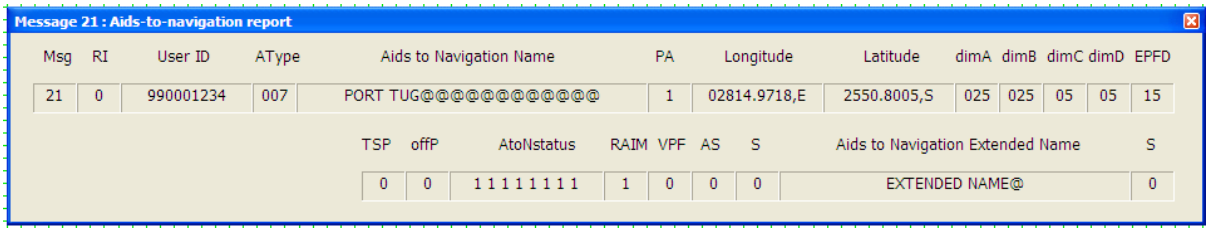
Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



AtoN Status should be entered in a binary fashion with either a space or a comma delimiter.

Eg. 1 0 1 0 1 0 1 0
1,0,1,0,1,0,1,0,

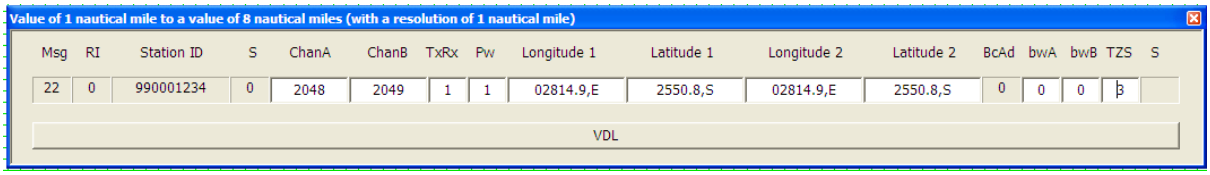
Received VDL - VDM Message Filter:



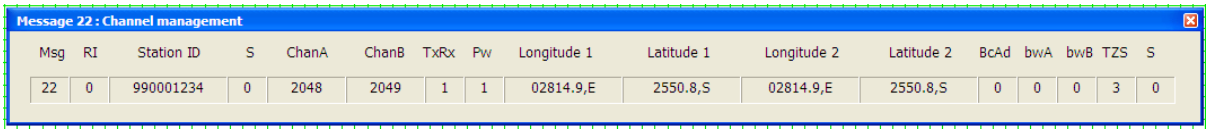
Message 22 : Channel management - Geographical

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



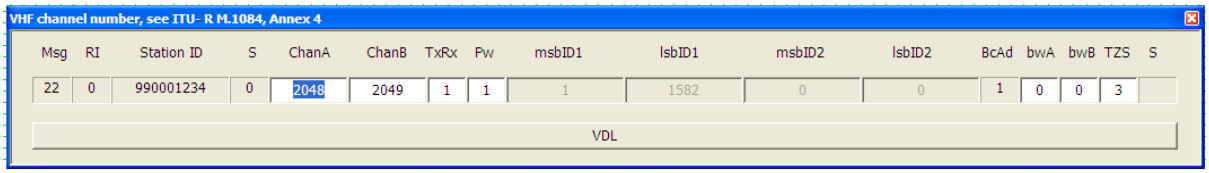
Received VDL - VDM Message Filter:



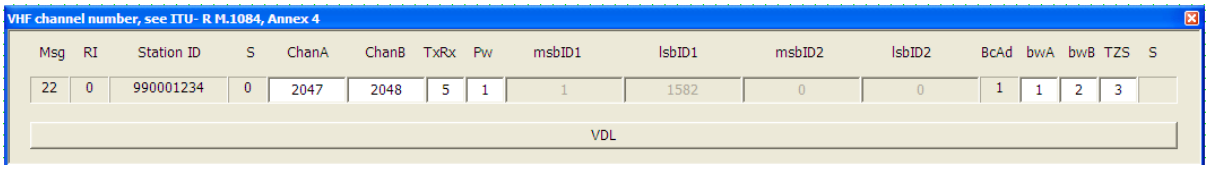
Message 22 : Channel management - Addressed

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



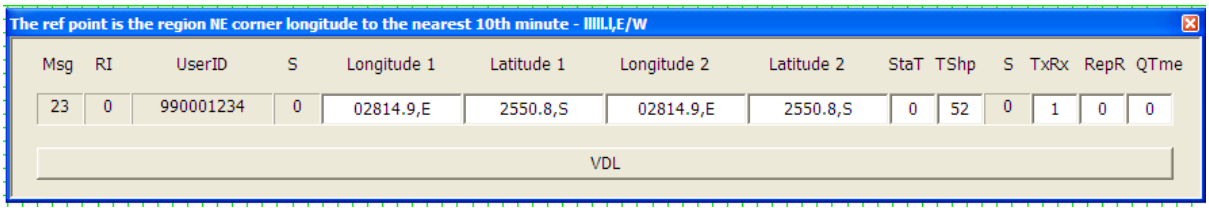
Received VDL - VDM Message Filter:



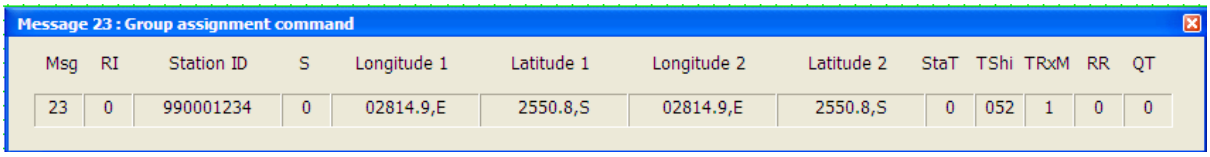
Message 23 : Group assignment command

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Received VDL - VDM Message Filter:

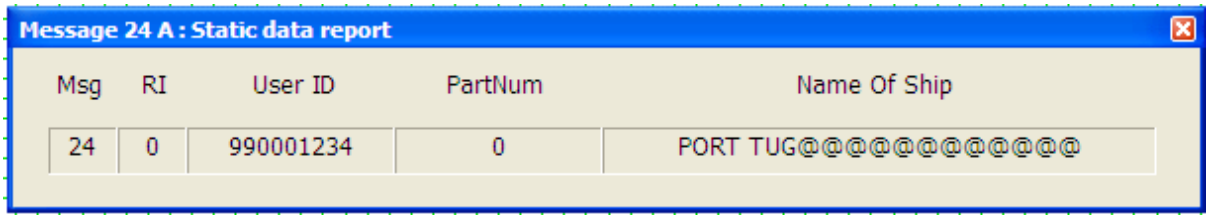


Message 24 A : Static data report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:

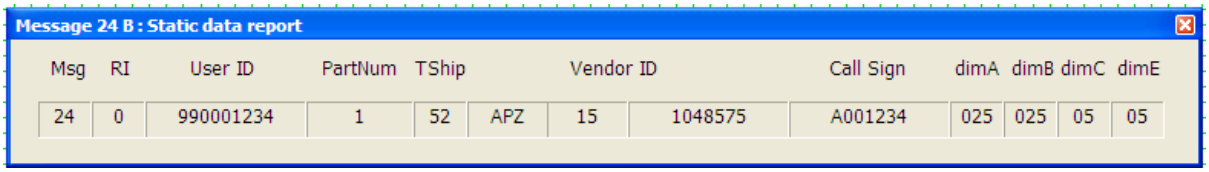


Message 24 B : Static data report

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

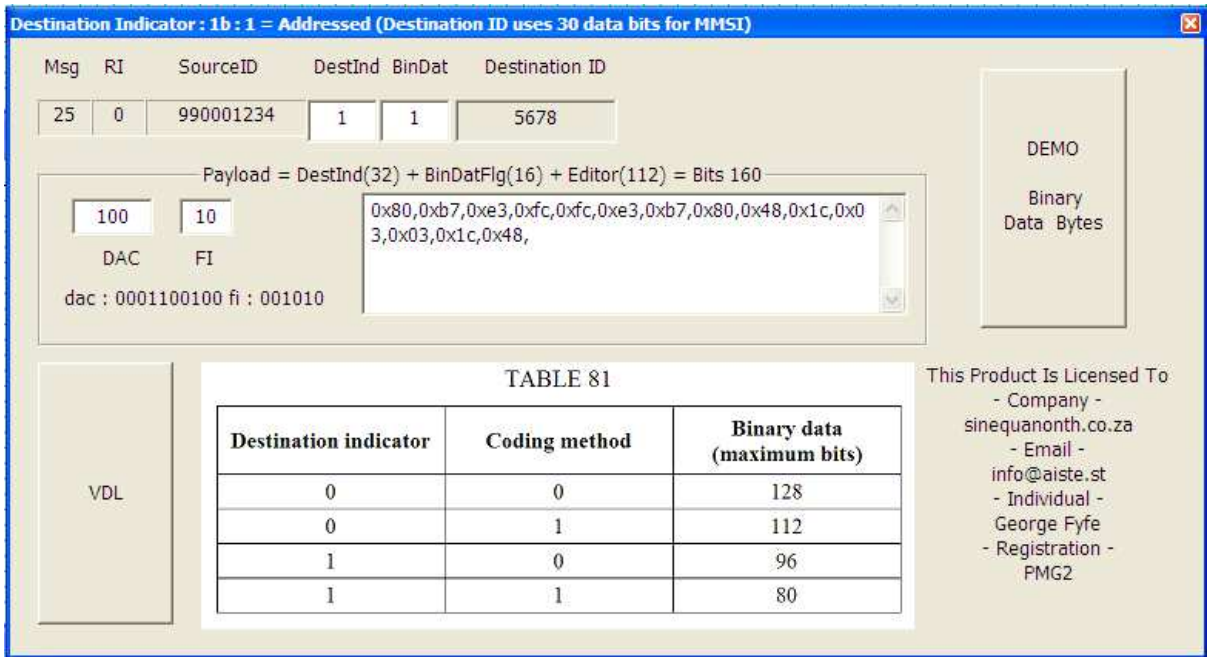
Received VDL - VDM Message Filter:



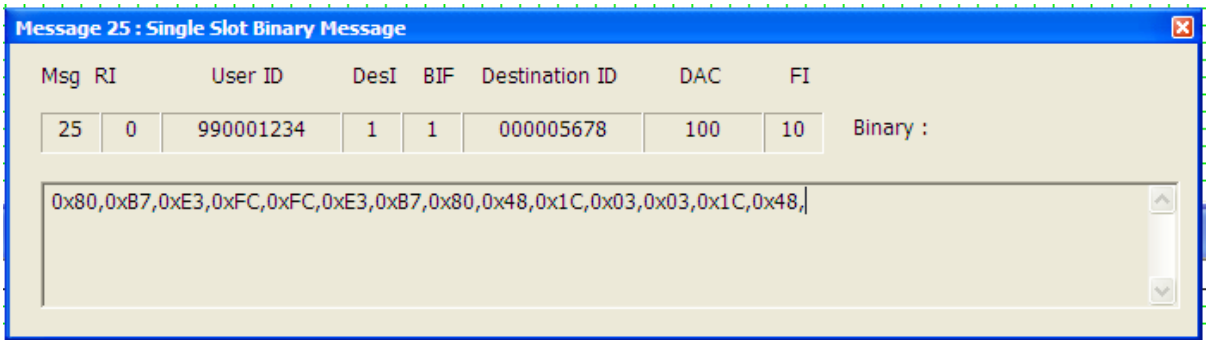
Message 25 : Single Slot Binary Message

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



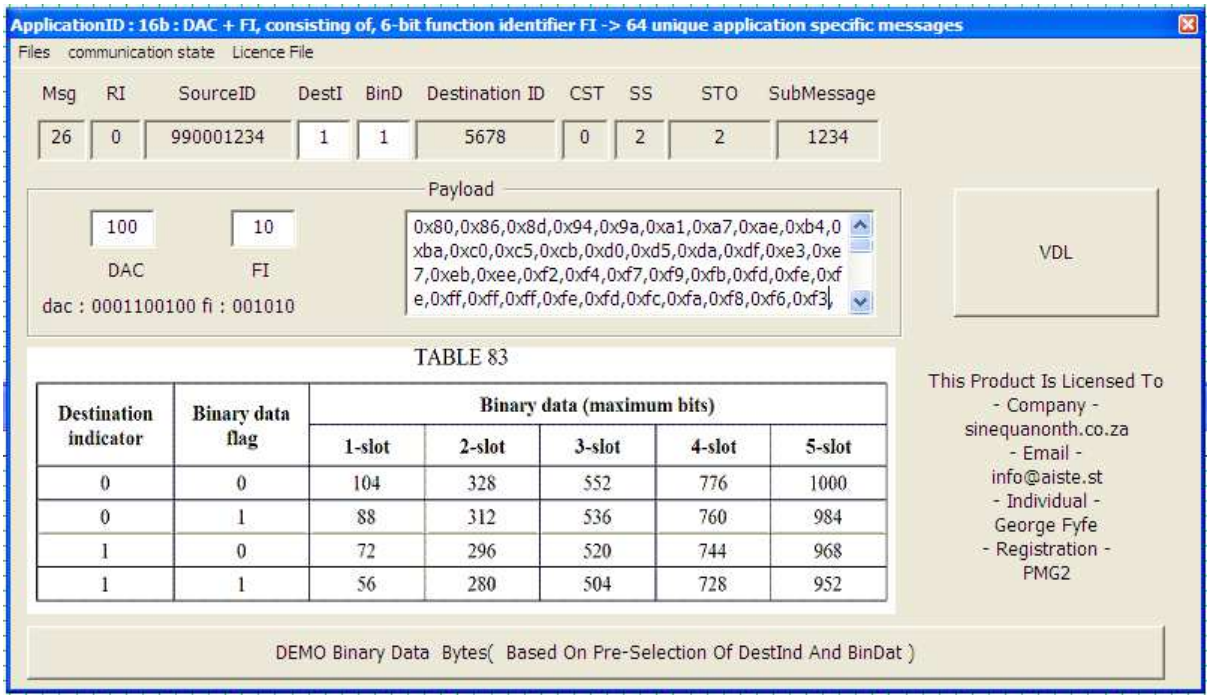
Received VDL - VDM Message Filter:



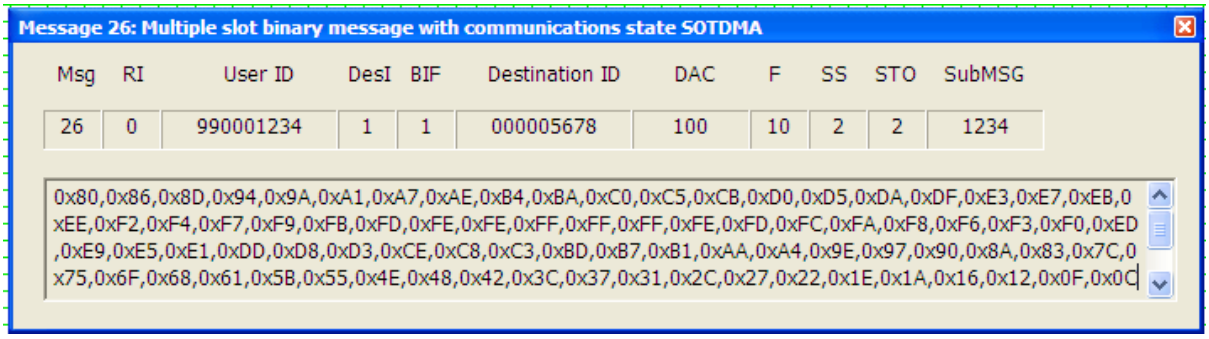
Message 26: Multiple slot binary message with communications state SOTDMA

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



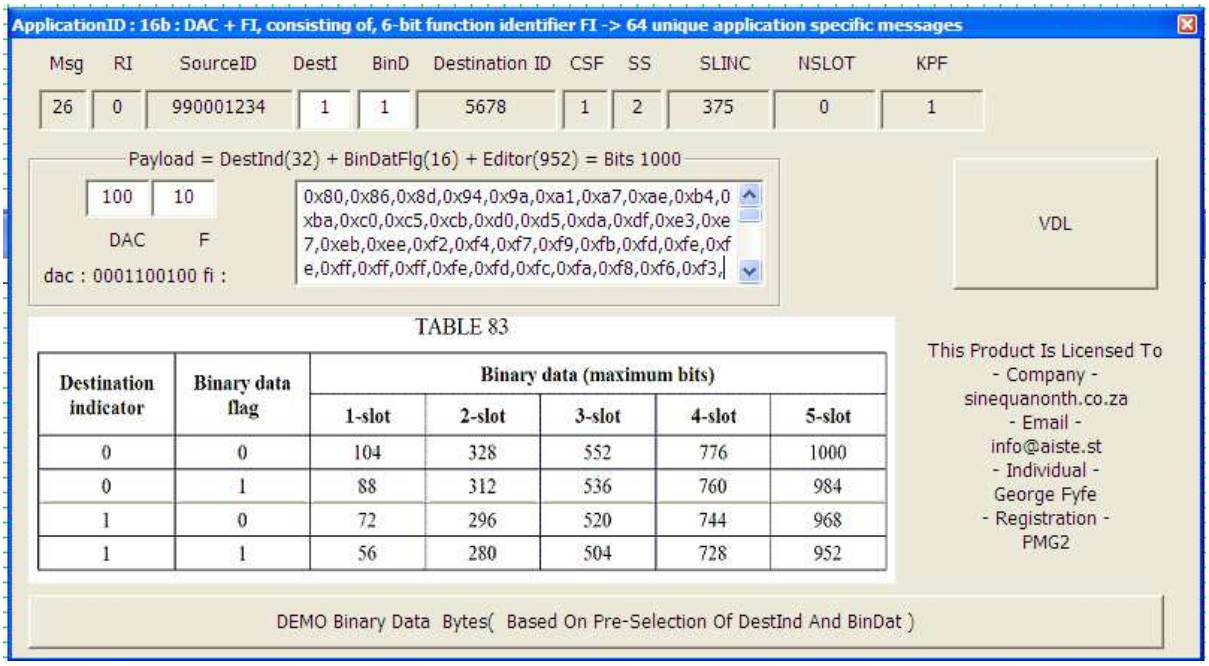
Received VDL - VDM Message Filter:



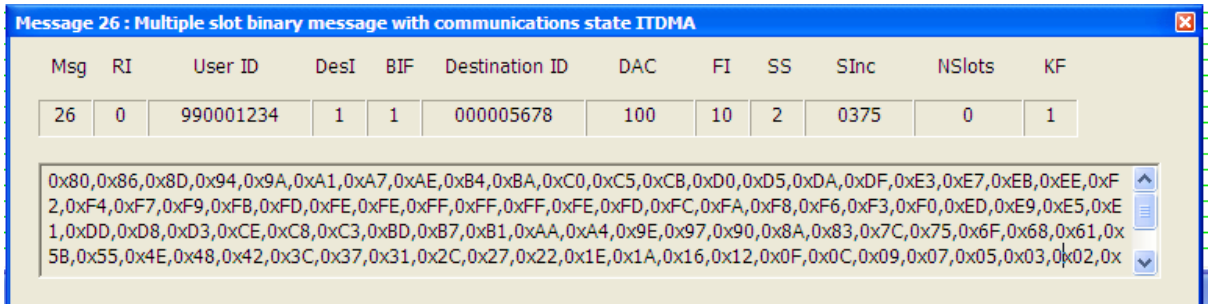
Message 26: Multiple slot binary message with communications state ITDMA

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.



Received VDL - VDM Message Filter:

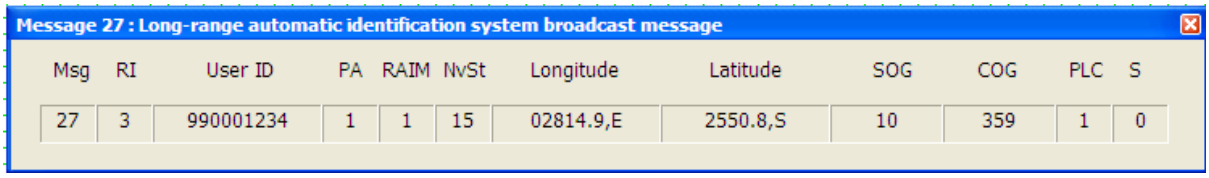


Message 27 : Long-range automatic identification system broadcast message

Generate:

Right click mouse cursor in Programmable Modulation Time Line.
A context menu will be displayed.
Left click mouse to select item.

Received VDL - VDM Message Filter:



Abbreviations

The following is a list of abbreviations used in the AIS Developer Studio Suite

1pps	1 pulse per second
ACK	Acknowledge
AIS	Automatic Identification System
AIS1	Automatic Identification System channel 1 (161.975 MHz)
AIS2	Automatic Identification System channel 2 (162.025 MHz)
ANT	Antenna
BER	Bit Error Rate
BIT	Built In Self Test
BS	Base Station
BT	Bandwidth Time product
COG	Course over Ground
DBR	Differential Beacon Receiver
DSC	Digital Selective-Calling
DTE	Data Terminal Equipment
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
EPFS/D	Electronic Position Fixing System/Device
ETA	Estimated Time of Arrival
GPS	Global Positioning System
HDLC	High-level Data Link Control
IEC	International Electro-technical Commission
IO	Input-Output
ITU	International Telecommunication Union
KDU	Keyboard Display Unit
LR	Long Range
MMSI	Maritime Mobile Service Identities
PMG	Programmable Modulation Generator
PA	Power Amplifier
PC	Personal Computer
PER	Packet Error Rate
PI	Presentation Interface
RF	Radio Frequency
ROT	Rate of Turn
RX	Receive
SOG	Speed over Ground
TDMA	Time Division Multiple Access
TX	Transmit
UTC	Coordinated Universal Time
VDL	VHF Data Link
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio
ADS	AIS Developer Studio V2
NTP	Network Time Protocol
SNTP	Simple Network Time Protocol
ADS	AIS Developer Studio

Reference Documents

List of standards and specifications

Document Number	Title
IEC 61162-1	Maritime Navigation and Radio Communication Equipment and Systems - Digital Interfaces: Part 1 - Single Talker and Multiple Listeners.
IEC 61162-2	Maritime Navigation and Radio Communication Equipment and Systems - Digital Interfaces: Part 2 - Single Talker and Multiple Listeners High Speed Transmission.
IEC 61993-2 IEC 62287 IEC 62320	Universal Shipborne Automatic Identification System (AIS).
ITU-R M.1084-2	Interim solutions for improved efficiency in the use of Band 156-174Mhz by stations in the Maritime Mobile Service.
ITU-R M.1371-5	Technical characteristics for a universal ship-borne automatic identification system using time division multiple access in the maritime mobile band.
ITU-R M.493	Digital Selective Calling (DSC) system for use in the Maritime Mobile Service.
ITU-R M.823-2	Technical characteristics of differential transmissions for global navigation satellite systems from maritime radio beacons in the frequency band 283.5 - 315 kHz in region 1 and 285-325 kHz in regions 2 and 3.
ITU-R M.825-3	Characteristics of a transponder system using DSC techniques for use with vessel traffic services and ship-to-ship identification.
ITU Manual	ITU Manual for use by the Maritime mobile and Maritime Mobile-Satellite Services.
IEC 61108-1	Global navigation satellite systems (GNSS) - Part 1: Global positioning system (GPS) - Receiver equipment - Performance standards, methods of testing and required test results.
IEC/EN 60945	Maritime Navigation and Radio communication equipment and systems – General requirements-methods of testing and required results

List of Related Software and Manuals

Module	Description	Part number
AIS Developer Studio Software for Windows. Verified to run on WINXP and WIN10	A Windows based application for configuring and testing various AIS products. Various levels of user access available dependent on licence.	ADSV2.exe

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