



Shine Micro, INC.

ST162 SERIES AIS TEST SETS



USER MANUAL Rev 1.0

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Precautions

SAFETY INSTRUCTIONS



<p> WARNING</p> <p></p> <p>ELECTRICAL SHOCK HAZARD Do not open the equipment.</p> <p>Only qualified personnel should work inside the equipment.</p>	<p>Immediately turn off the power if the equipment is emitting smoke or fire.</p> <p>Continued use of the equipment can cause fire or electrical shock. Contact a Shine Micro agent for service.</p>
<p>Do not disassemble or modify the equipment. Fire, electrical shock or serious injury can result.</p>	<p>AVOID storing equipment in areas with temperatures below -30°C (-22°F) or above +70°C (158°F).</p>
<p>DO NOT place the test set where hot or cold air blows directly on it.</p>	<p>Always remove any dirt or moisture before closing the cover.</p>
<p>Avoid opening the battery compartments in the rain. Allowing moisture into the battery compartments can cause permanent damage to the unit.</p>	



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1 Introduction

1.1 Limited Warranty

Shine Micro warrants its products to be free from defects for one full year from the date of purchase. Shine Micro will, at its sole discretion, repair or replace any components that fail in normal use. Labor and material costs for such repairs or replacement will be free of charge during the term of the warranty. This warranty does not cover failures due to abuse, misuse, accidents, or unauthorized alterations or repairs.

1.2 Return Goods Authorization Policy

To obtain warranty service, call Shine Micro, Inc. at 360-437-2503 for a Returned Goods Authorization (RGA) number. The following RGA policy applies when returning units for repair or replacement:

1. Prior to requesting an RGA, please contact our technical support department at 360-437-2503. Our technicians may be able to remedy the situation without requiring the unit to be returned. If they are unable to resolve the issue, they will connect you to Customer Service to obtain an RGA number.
2. The following is mandatory to be included in return shipments of RGA product(s):
 - a. RGA number
 - b. Proof of purchase (a clear copy of the original invoice)

Notes:

1) A No Failure Found fee (NFF) will be assessed if a product is returned for repair and is found to be working properly. The \$75.00 NFF fee is subject to change without notice; please contact Shine Micro for the current NFF fee.

2) All returned units found to be outside of warranty, whether due to an expiration of time period or the warranty has been voided due to abuse, misuse, or otherwise unauthorized alteration, are subject to a Diagnostic fee. The \$155.00 Diagnostic fee is subject to change without notice; please contact Shine Micro for the current Diagnostic fee.

Please do not include accessories (i.e. cables, manuals, etc.) in your RGA shipment.

Failure to provide the above requirements and/or not specify problem(s) of the returned product(s) will result in delays to the repair/replacement of the product(s) being returned. Items returned without an RGA will be held in the receiving department until an RGA is completed.

3. All RGA shipments to Shine Micro must have the RGA # clearly marked on the label/box.
 - a. Collect shipments will not be accepted.
 - b. Shine Micro is not responsible for any loss/damage in transit.
4. If the preceding points 1., 2., and 3. are not fulfilled, the Service Department will not be able to process the RGA in a timely manner.



5. Shine Micro, Inc. will return the repaired/replaced unit to the customer using ground service unless a different shipment method is specified.
6. Shipping charges will be paid to Shine Micro by the customer unless a shipping account number has been provided.
 - a. Payment of shipping charges is to be made by credit card unless a net 30 account has been established.
 - b. Credit card payment processing information will be collected from the customer at the time the RGA is issued.
7. All RGA product(s) will be repaired or replaced at the discretion of Shine Micro, Inc. within the terms and limits of the warranty.
8. Improper shipment packaging, physical damage or alteration of product will void all warranties.
9. Under no circumstances will Shine Micro Inc. ship a replacement unit before the RGA unit is returned to Shine Micro, Inc.
10. Always refer to your RGA number when making inquiries.

Shipping Address

Shine Micro, Inc.
9405 Oak Bay Road suite A
Port Ludlow, WA 98365

Billing Address

Shine Micro, Inc.
PO Box 340
Port Gamble, WA 98364

Phone 1-360-437-2503
Fax 1-360-437-2483
Email info@shinemicro.com
Web www.shinemicro.com

Frequently Used Shipping Carriers

FedEx	1-800-GO-FEDEX	www.fedex.com
UPS	1-800-PICK-UPS	www.ups.com
USPS	1-800-ASK-USPS	www.usps.com
DHL	1-800-CALL-DHL	www.dhl.com



1.3 FCC Warning

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1.4 Industry Canada Warning

This device complies with Industry Canada license-exempt RSS standard RSS-210. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



2 Product Description & Design Features



ST162 series AIS Test Sets can be used to test AIS installations, whether it's AIS receivers in aircraft, AIS base stations, or AIS transponders. The ST162 series is capable of performing pre-mission checks, identifying malfunctioning systems, making on-channel noise measurements, performing field and bench tests, and installation quality comparisons.

The ST162 series AIS Test Sets are portable – powered exclusively through two C-Cell batteries, and feature a durable IP67 construction that protects the internal components against water, dust, and UV radiation even when the lid is open. Other features include an internal AIS antenna and GPS receiver.

Additional configuration options are available using the ST162 Configuration Manager. These options include:

- Program up to 100 custom messages
- Easily customize any combination of up to 10 ships, 1 AIS Aid to Navigation (AtoN), 1 Safety Related Message (SRM), 1 binary message, and 1 SART
- Program the Test Set's static data and choose to use the current GPS position or its internally set location
- Vary the unit's output power from -90 to -120 dBm at the EUT Port.



3 Technical Specifications

3.1 System Specifications

Designation:	Portable AIS Test Set for AIS Receivers
Data interface:	RS-232 at 115200 Baud (default) or Bluetooth Serial Port Profile at 115200 Baud (optional)
Power Requirements:	C Cell Batteries (X2)
Battery Life:	10 hours average
Temperature Range:	-30 to +70°C (Storage), -15 to +55°C (Operation)
Compass Safe Distance:	1 Meter

3.2 Navigation Specification

12 Channel IEC 61108-1 Compliant GNSS Receiver	
GPS ANT Port Impedance:	50 Ω

3.3 Dimensions and Weight

Length:	10.62 in.
Width:	9.68 in.
Height:	4.87 in.
Weight:	< 7.5 lbs.

3.4 Mechanical

Housing Material:	Polypropylene Copolymer
Material Finish:	Yellow
Water Resistant:	IP67

3.5 AIS Receiver Specifications

Number of Channels:	2
AIS1:	161.975 MHz
AIS2:	162.025 MHz
Channel BW:	25 KHz
AIS RX ANT Port Sensitivity:	-107 dBm
Input Impedance:	50 Ω
EUT Port Input Power Level:	25 W (maximum)



3.6 AIS Signal Generator Specifications

Modulation Type:	GMSK
AIS Data Rate:	9600 bits/s
Number of Channels:	1
Frequency:	161.975 MHz
Occupied BW:	25 KHz
Emission Type (ITU Class):	16KOFD
Signal Generator Output:	Less than 150 μ V/m @ 3 m
EUT Port Output:	-120 to -90 dBm (programmable)
EUT Port Impedance:	50 Ω
Transmit Interval:	0 to 255 seconds (programmable)
Maximum Duty Cycle:	50%
Frequency Accuracy:	+/- 2.5 ppm

3.7 Message Formats

Default messages:

Message 1:	Scheduled Position Report for Class A mobile equipment
Message 5:	Scheduled static and voyage related data

Other messages: Capable of simulating AIS messages 1, 2, 3, 5, 6, 8, 12, 14, 18, 19, 21, 24A and 24B

3.8 Connectors

RS-232:	IP67 DB9 female
AIS EUT:	Type N Jack
GPS Antenna:	TNC Jack

3.9 LED Indicators

- Power
- Bluetooth Status
- AIS Send
- GPS Locked
- Low Battery
- AIS RX

3.10 Switches

OFF/ON	Apply power to the unit
RX/RX+SEND/SEND:	Switch between Receive only, receive and send AIS messages and send only



4 Mechanical Installation

4.1 Unpacking and Inspecting Equipment

1. Inspect shipping box for visible damage such as crushing, puncture, or moisture. If damage has occurred during shipping report it immediately to the shipping carrier and to Shine Micro, Inc. including the tracking or other identifying number(s) of the shipment. Contact information for Shine Micro, Inc. and the shipping carriers used by Shine Micro, Inc. is included in the “Product Support Information” section of this manual.
2. Open the shipping box. If using a blade, take care to cut only as deeply as necessary to open the box as items may have settled near to interior box surfaces during shipment.
3. Carefully remove all items from the shipping box. Thoroughly check all packing materials for items that may have settled during shipment. Please recycle the shipping box and packing materials.
4. Compare unpacked items to the packing list to ensure receipt of all ordered equipment. Standard items include the ST162 and a CD (compact disk) containing this manual and additional software.
5. Inspect equipment for visible signs of damage including
 - a. Scratches, dents, dirt, corrosion, moisture, or damaged fasteners on enclosure.
 - b. Any marring of enclosure, serial nameplate, or other inscriptions on the unit.
 - c. Any dirty, bent, or broken connector pins

If damage has occurred during shipping report it immediately to the shipping carrier and to Shine Micro, Inc. including the tracking or other identifying number(s) of the shipment. Contact information for Shine Micro, Inc. and the shipping carriers used by Shine Micro, Inc. is included in the “Product Support Information” section of this manual. See Section 1.

4.2 Required Equipment:

- C Cell Batteries (X2)

4.3 Optional Equipment:

- Type N to X coaxial cable for EUT port (X denotes equipment under test connector)
- GPS Antenna
- AIS RX Antenna
- PC with RS-232 (or Optional Bluetooth)
- Standard RS-232 Cable with DB9 connectors
- USB to RS-232 Converter Cable



5 Operational Overview

5.1 VHF Antenna and Cable Considerations

The ST162 AIS Test Set has a VHF antenna built inside and is designed to test an AIS installation without the need for an external antenna. In addition direct connection to an AIS system without an antenna can also be performed by connecting directly to the AIS EUT port using coaxial cable with a Male Type N connector. The direct connect output power can be varied from -90 to -120 dBm for AIS receiver sensitivity testing. The attenuation can be set using the provided application, ST162 Configuration Manager. See Appendix C.

5.2 GPS Antenna and Cable Considerations

The ST162 AIS Test Set has an onboard GPS receiver for timing and position reporting. If an active GPS antenna is used, it must be designed to operate with $+3.3$ VDC supplied on the coaxial feed line. Connecting to a GPS antenna is optional. However, with a GPS signal, the unit will generate a position report simulating a ship at the location of the Test Set. In addition, with a GPS signal, the unit can be configured to store the current GPS location as the default message 1 location to be used when GPS is unavailable.

5.3 Data Connections

The standard ST162 AIS Test Set may only be configured through the RS-232 port.

If the ST162 has the optional Bluetooth module installed it may be configured to take commands from either the RS-232 port or the Bluetooth serial port. Data is always output on the RS-232 and the default shipping configuration of the unit is with RS-232 set to the command port. Bluetooth may be enabled using the provided application, ST162 Configuration Manager. The command to change the communication port will not take effect until a restart or until the power is cycled on the unit. The Bluetooth radio is only discoverable when the Bluetooth port is set to be the command port.

The RS-232 port may be connected to the host computer using a standard DB9 RS-232 data cable.

5.4 Power-Up Test

Power-Up Operation

Conditions: Place a C-Cell battery in each of the battery compartments with the + side toward the lid. Optionally, connect a GPS antenna with a TNC male connector to the "GPS ANT" bulkhead connector.

Upon power up the "PWR" LED will illuminate, indicating that power has been supplied to the unit. Within 5 seconds the unit will boot and begin sending the configured messages. The "AIS SEND" LED will blink with each AIS message sent. If a GPS antenna is connected, and with a good GPS signal, the "GPS LOCK" LED will illuminate when GPS lock is acquired, typically within 45 seconds. The "GPS LOCK" indicator illuminates at two intensities. The dimmer intensity indicates a weak GPS lock and the brighter intensity indicates a strong lock.

Low Battery Indicator

To indicate a low battery condition the GPS LOCK LED will flash when the low battery condition is reached. When the GPS LOCK LED begins flashing replace the batteries to ensure reliable operation.

Reset Procedure

Reset of the ST162 AIS Test Set may be accomplished in two ways:

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1. Turn the power off and reapply power.
2. Connect to the command serial port (default RS-232). Using the ST162 Configuration Manager open the com port. Verify that the unit's serial number is displayed in the unit information section. Open the "Reset" tab and click the "Restart" button. This will reset the unit without returning it to factory default configuration. In order to completely reset a Test Set back to factory default choose the "Reset to Factory Default" button. This will remove any static data configured in the unit. To reset the messages back to the factory default configuration click the "Restore Default Ships (1-5)" button.

5.5 Factory Default Messages

The ST162 AIS Test Set is shipped preloaded with 10 messages and will simulate 5 ships. In addition, the ST162 Test Set will generate a Message 1 and 5. The Shine Micro factory default messages are displayed on the label on the inside cover of the Test Set and below:

Table 1 - Default Messages

MSG	MMSI	ROT	SOG	Longitude	Latitude	COG	Heading
1	338060087	-128	current	current	current	current	511
MSG	MMSI	Ship Name	Call sign	IMO #	Type	Destination	
5	338060087	SHINE ST162 TEST SET	@@@@ @@@	0	0	TEST0 DEST	
MSG	MMSI	ROT	SOG	Longitude	Latitude	COG	Heading
1	338060088	-128	102.3	050°20.70' E	26° 07.74'N	360.0	511
1	338060089	-128	102.3	138°07.08' E	35°26.40' N	360.0	511
1	338060091	-128	102.3	081°31.48' W	30°07.69' N	360.0	511
1	338060092	-128	102.3	122°22.69' W	48°07.07' N	360.0	511
1	338060093	-128	102.3	158°01.75' W	21°11.15' N	360.0	511
MSG	MMSI	Ship Name	Call sign	IMO #	Type	Destination	
5	338060088	SHINE ST162 TEST1	@@@@ @@@	0	0	TEST1 MANAMA	
5	338060089	SHINE ST162 TEST2	@@@@ @@@	0	0	TEST2 ATSUGI	
5	338060091	SHINE ST162 TEST3	@@@@ @@@	0	0	TEST3 CECIL	
5	338060092	SHINE ST162 TEST4	@@@@ @@@	0	0	TEST4 COUPEVILLE	
5	338060093	SHINE ST162 TEST5	@@@@ @@@	0	0	TEST5 BARBERS	



6 Front Panel Indicators



Figure 1 - Front Panel ST162

1. C Cell battery compartments. For the best results install only high quality Alkaline or NiMH batteries. Take care to properly line up the threads on the cap and body of the compartments before installing the cap.
2. RX/SEND switch: This is a three position switch where you may select “RX” (only receive packets), “RX+SEND” (receive and send packets), or “SEND” (only send packets).
3. Power switch.
4. Power indicator. Illuminates when power is applied to the unit.
5. Bluetooth Status indicator: Illuminates when the Bluetooth is connected to a host. The Bluetooth is not enabled by default and can not be connected remotely until the unit is configured for Bluetooth control using the ST162 Configuration Manager. Note: The yellow blocked area should be kept free from obstructions for optimal Bluetooth performance.
6. AIS SEND indicator: Illuminates with each AIS packet output.
7. GPS LOCK indicator: Illuminates at ½ intensity with a weak GPS lock and at full intensity with a strong GPS lock. The GPS LOCK indicator is also used as a low battery indicator. When the batteries are getting low the GPS LOCK led will flash.
8. AIS RX indicator: Illuminates upon receipt of an AIS packet.
9. Serial Data RS-232 port: This is the default communication port for the ST162. NOTE: When the unit is configured for Bluetooth control the RS-232 port will still have data outputting. However the unit will not respond to commands over the port.
10. GPS ANT connector: Connect a GPS antenna with a male TNC connector. A GPS Puck antenna is included in the Quick Start Pack.



11. AIS EUT connector: Connect the AIS Equipment Under Test using a male Type N connector for direct connection to AIS receivers and transponders. This is ideal for field or lab testing of components or systems without an installed antenna.
12. AIS RX ANT connector: Connect an external receive antenna with a male Type N connector.
Caution! This is a low-level input designed to receive “off-the-air” signals. Under no circumstances connect a transmitter/transponder to this connector.



Appendix A - RS-232 Port

The Test Set's default communication port is set as RS-232; baud rate 115200, data bits 8, parity none, stop bits 1 and flow control none. The connector on the test set is a DB-9 female connector. A standard RS-232 DB9 serial cable can be used to communicate with the Test Set. The minimum required connections are listed in Table 2.

Table 2 – DB9 Pin Connections

DB-9 pin	Function*	Data direction
2	TXD	Transmit data (test set → computer)
3	RXD	Receive data (computer → test set)
5	GND	Signal ground

*As related to the Test Set



Appendix B – Bluetooth Serial Port (Optional)

Overview:

This appendix will illustrate how to configure a Bluetooth enabled lap top to communicate with the AIS Test Set.

Configuring Bluetooth Communication:

The ST162 can be configured to communicate over it's RS-232 serial port or it's Bluetooth serial port. The default configuration is with RS-232 set as the default communication port, however using the ST162 Configuration Manager the communication port can be switched to Bluetooth (Serial Setting Tab in Appendix C). Once the Test Set is set to Bluetooth, the Test Set can be discovered and connected through Window's device manager.

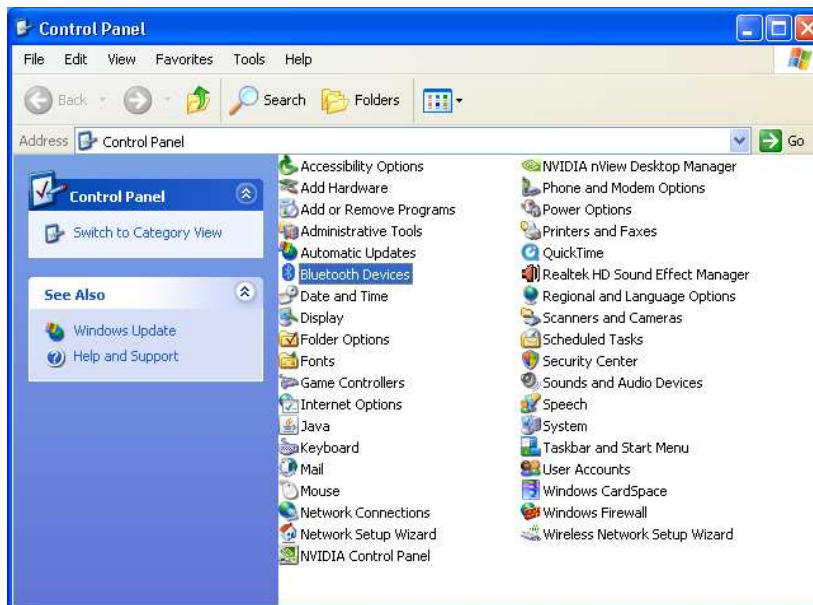


Figure 2 - Control Panel

Open Control Panel. This can be done on Windows XP by clicking start and selecting the Control Panel.

1. Open the Bluetooth Devices and click on the Add button.

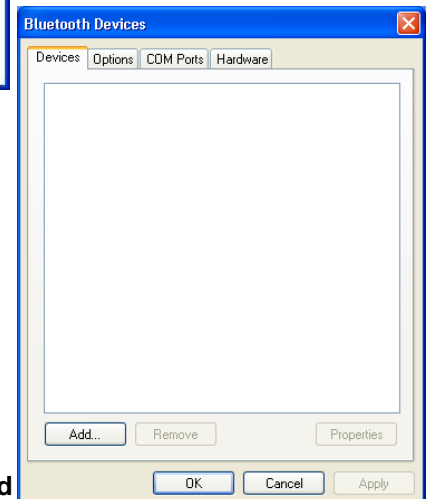
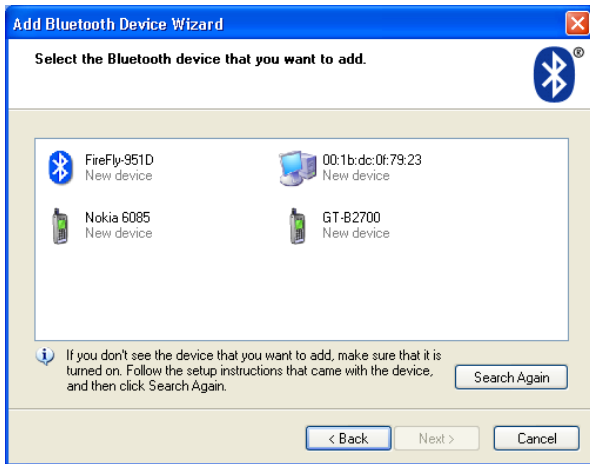


Figure 3 - Add



This will bring up the Add a Bluetooth Device Wizard. Click on the checkbox indicating that “My device is set up and ready to be found.” This will enable the Next button.

2. The wizard will search for available Bluetooth devices. The ST162’s Bluetooth radio is named “FireFly-XXXX” where XXXX is a 4 digit code unique to each radio. For this example the radio is named “FireFly-951D”. Select the device and click next.

Figure 4 – Bluetooth Device Discovery

3. Select “Use the passkey found in the documentation”. Enter “1234” and click next.

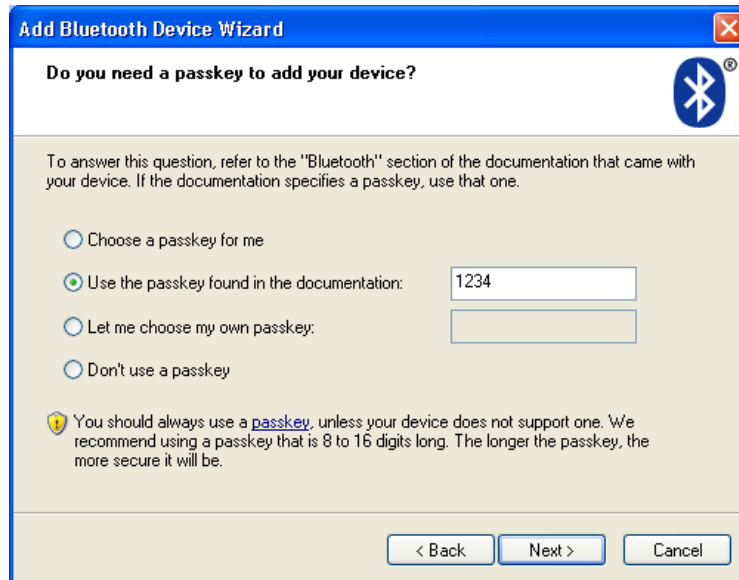


Figure 5 – Passkey Installation



Figure 6 - Bluetooth Com Port Installation

4. Next Windows will install the device. The ST162 will identify itself as a serial device. The operating system will assign an available com port to the device. The outgoing COM port is the port that will send and receive data. Don't use the Incoming port – this one is used for incoming data to the Bluetooth radio.

5. Once the device is installed on the host computer the com port will automatically be used without installing it again. To find the com port of a previously installed device open the Bluetooth Devices from

the control panel or from the desktop dock. Bluetooth devices installed will be listed.

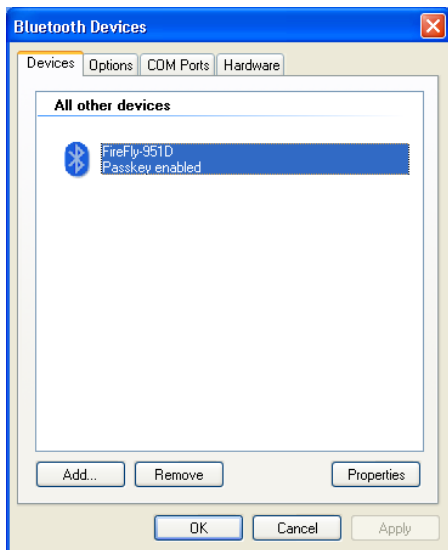


Figure 7 - Device Properties

6. Highlight the Test Set Bluetooth device and click Properties. Open the Services tab. This will list the services that the device supports. The Test Set only supports the Serial Port (SPP). This screen lists the com port registered to the device.

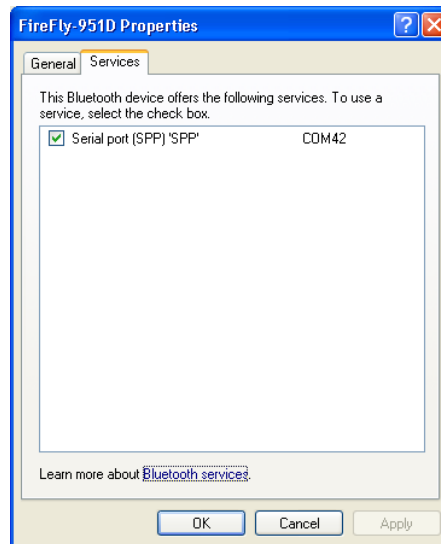


Figure 8 - Bluetooth Com Port



Appendix C – ST162 Configuration Manager

Test Set Customization

There are many customizable features available on the ST162. The test set by default sends both message 1 and 5 once every five seconds on AIS1. This simulates one ship to test the AIS receiver installation. The static characteristics of this simulated ship may be customized through the Test Set Static Data Tab. In addition, the GPS behavior of the unit may be customized, via the GPS Tab, to store the current GPS position as the unit's default position. A default position may be set to send instead of the current GPS position. No GPS lock is required to send the default position. This enables the GPS antenna to be optional during operation or to ensure a known sent position for the default ship sent.

Additional messages may be configured through the Custom Tab of the Graphical User Interface (GUI), ST162 Configuration Manager Utility, provided with the unit. The GUI will automatically open an .ini file to set an array of 5 ships or the user may configure up to 10 ships, 1 binary message, 1 AtoN, 1 safely related message, or 1 SART to be stored as an .ini file or just loaded to the test set. The option exists to choose any configuration file to load. In addition the messages currently being sent by a test set may be read and displayed using the Load Configuration File tab. Once the messages are read additional messages may be added or the messages may be modified and saved as a configuration file. The Load Configuration File tab allows the option to read and display an existing configuration file for editing.

The GUI also provides an interface to Reset the unit, through the Reset Tab, change the sent message power by 31 dB through the Attenuation Tab and/or switch between Blue tooth and RS-232 as the primary communication port, via the Serial Setting Tab.

Use of ST162 Configuration Manager

To use the customized features double click on the “ST162 Configuration Manager” executable included on the CD. This will launch the ST162 Configuration Manager interface program. The computer's available com ports will be displayed in the Connection drop down box. The Test Set's default shipping configuration is RS-232.

Choose the correct com port from the drop down menu and click the “Open” button available in the Connection group box. The Test Set will be queried for its version and static information. This information will be displayed in the Unit Information section see Figure . The Test Set outputs a VDO message (AIS transmitted message) with each message sent. The VDO message contains the encapsulated message data in NEMA 0183 v4.0 format representing the sent message. The Test Set will also output GPS sentences \$GPGGA, \$GPVTG, and \$GPZDA. These sentences are displayed in the console window of the ST162 Configuration Manager. To close the connection, click the “Close” button.

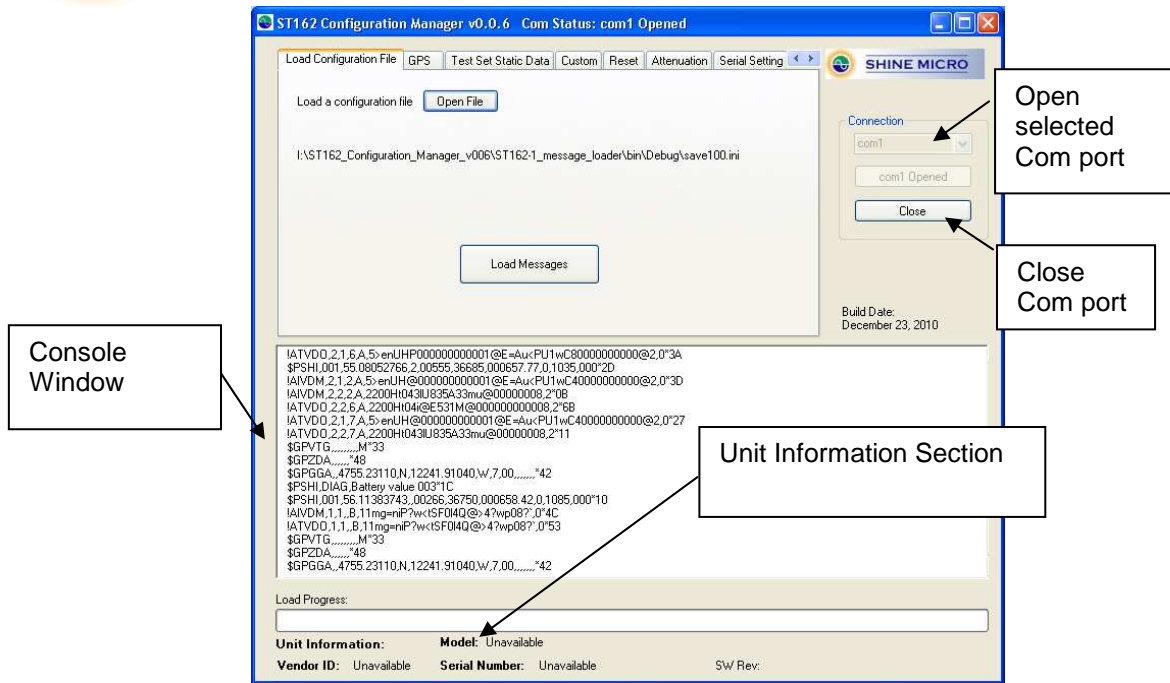


Figure 9 – ST162Configuration Manager Main Features

Tab: Load Configuration File

This tab allows the user to select an existing configuration file. Upon initialization of the program the provided set of default location (contained within the ST162.ini file provided with the program) are loaded into the PC program’s memory. Once the messages contained within a configuration file are loaded into the Test Set, the Test Set will permanently retain and send the last loaded data until the data is reloaded or until the “Remove Messages” button, available on the Reset Tab, is clicked.

To load a configuration file other than the default, ST162.ini file click the “Open File” button and browse to desired configuration file. See Figure . Shine Micro provides the default configuration file or the ST162 Configuration Manager may be used to create new, customized files.



Caution! Only one set of messages contained within a configuration file may be stored to the Test Set. Loading these messages will overwrite any other customized messages that may have been set on the unit.

Click “Load Messages” button to load the selected configuration file. The Load Progress Bar will display the status of the load operation. See Figure .

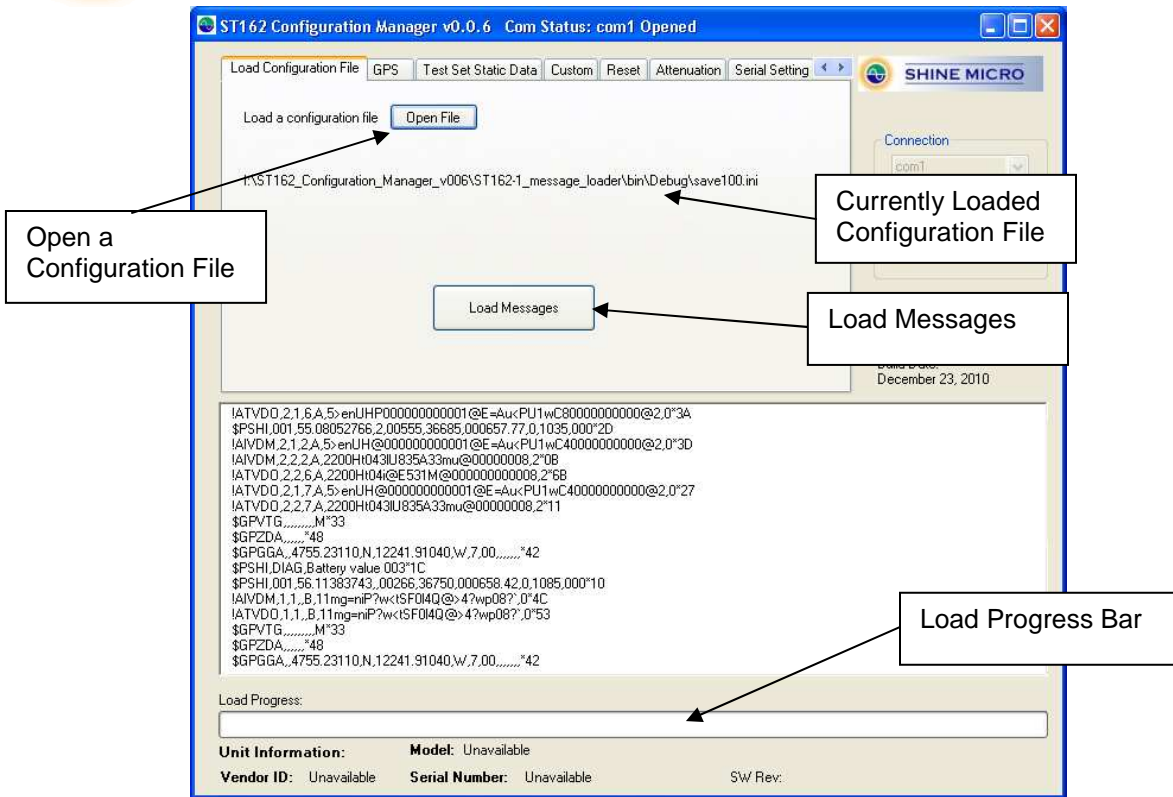


Figure 10 – Load Configuration File Tab

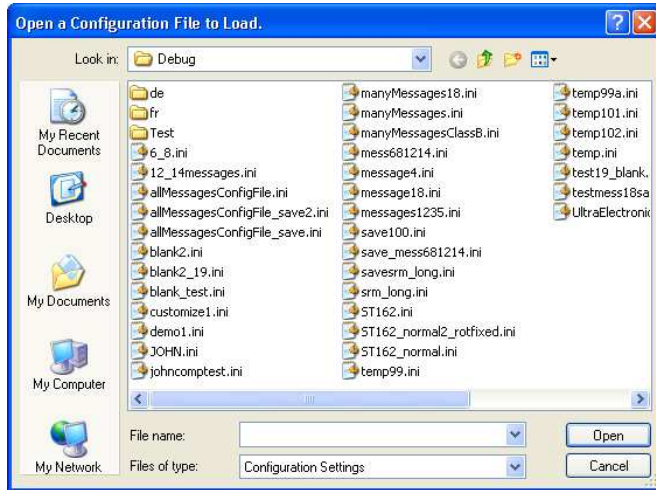


Figure 11 - Open a Configuration File Dialog Box



Once the messages have loaded a dialog box will indicate the message were successfully transferred to the Test Set. Click "OK" to continue.



Tab: GPS

There are several different GPS options. The default configuration of the Test Set is when the unit doesn't have a GPS lock the unit will send the unavailable position, 91°N 181°E. Once a GPS position has been stored to the Test Set this position will be used when GPS is unavailable. There are two options to store a position:

- 1 If the test set is connected to a GPS signal and the locked indicator is illuminated, the current GPS position may be stored as the Test Set's default ship's message 1 position.
- 2 The user may also choose to manually enter a fixed position to be stored as the Test Set's default ship's position. The field requires that the position be entered in degrees and decimal minutes. Once a valid position is entered the "Set Fixed Position" button will be enabled.

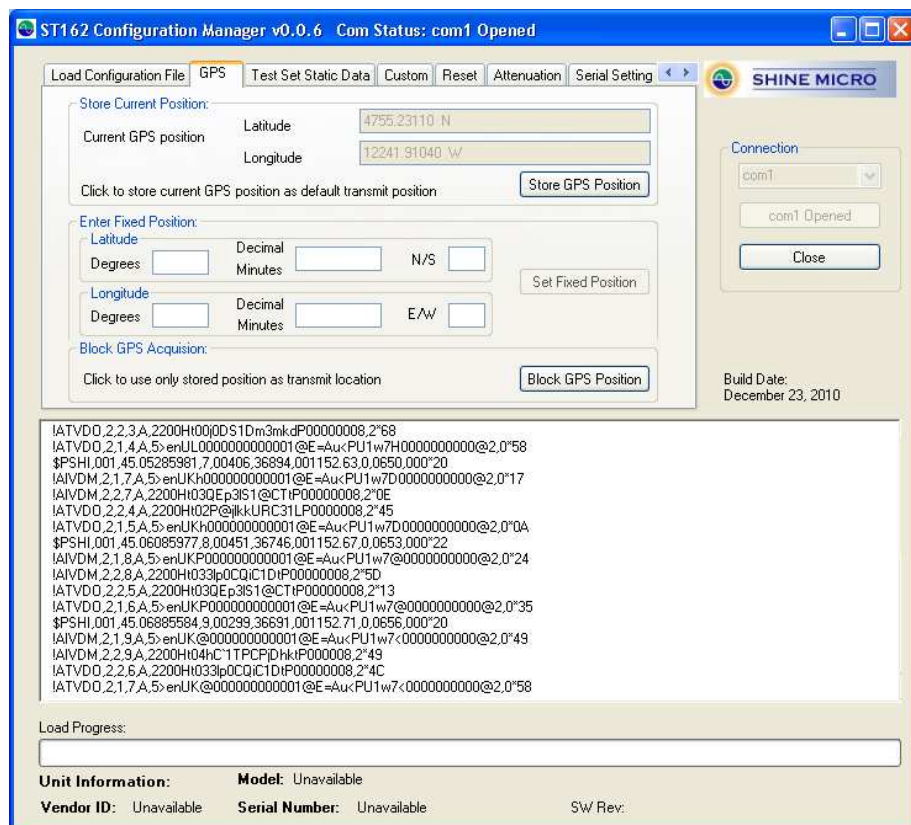


Figure 12 – GPS Tab



1. Store current position

When the unit has a GPS Lock (this is indicated with the “GPS LOCK” LED illuminated on the front panel) the unit’s current location may be stored as the default position. To do this click the “Store GPS Position” button. If the unit does not have GPS lock then an error will be displayed in the console output window. See Figure .

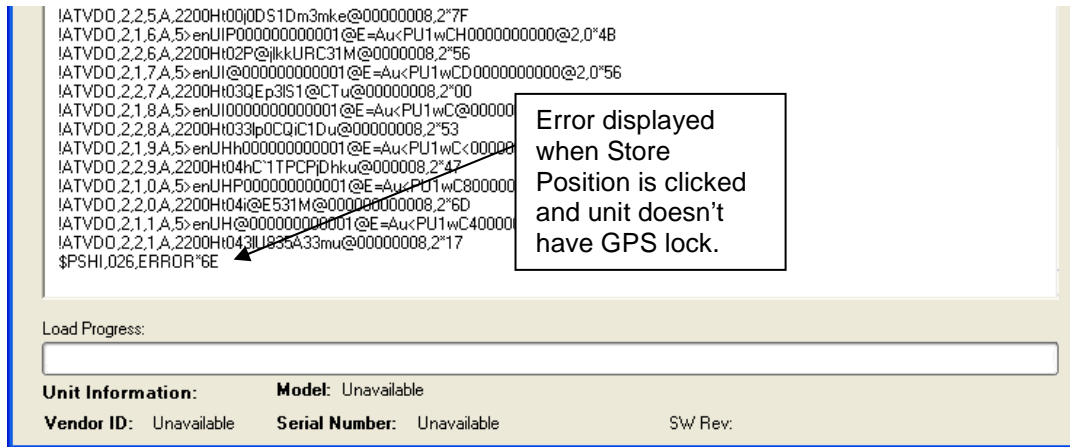


Figure 13 – Error displayed without GPS lock

2. Enter fixed position

This tab allows the user to enter a latitude and longitude. The expected format of the latitude and longitude is in degrees and decimal minutes.

3. Block GPS Acquisition

This allows the user to set the unit not to use the current GPS position for the default ship’s sent position. This setting is held in volatile RAM so cycling power will clear the unit and it will return to sending the unit’s current position if GPS is available or the default position if GPS is unavailable.



Tab: Test Set Static Data

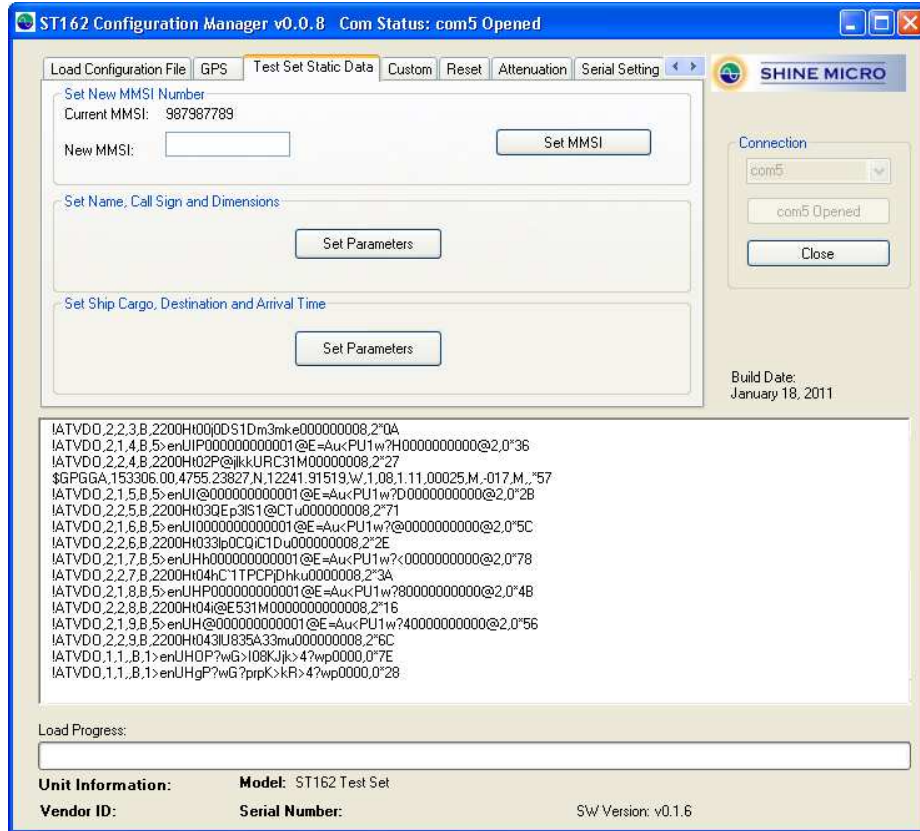


Figure 14- Test Set Static Data Tab

There are three sets of static data which may be set on the Test set:

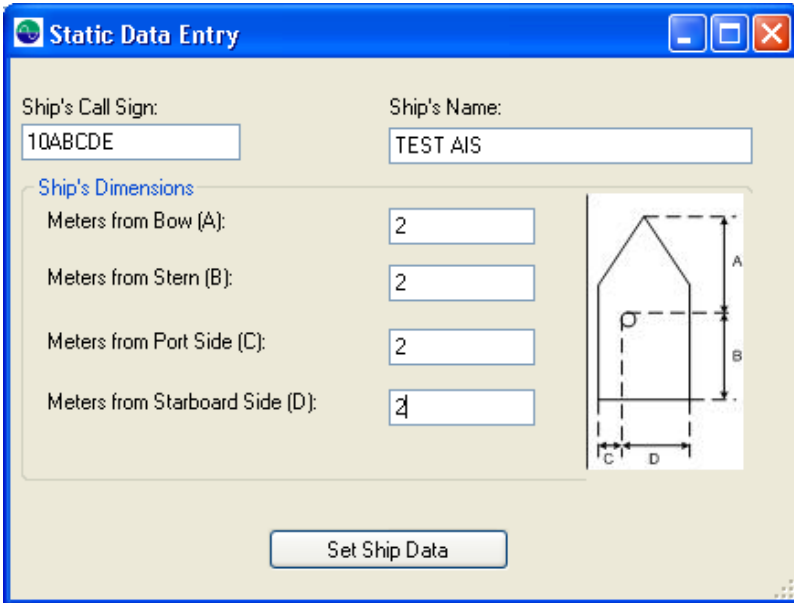
1. The MMSI number: The MMSI number is the assigned Maritime Mobile Service Identity which is a unit number used to identify vessels. This number may be used by the chart plotting software to identify the ship. The ST162's default MMSI number is 338060087.
2. The Ship's Static Data: The ship's static data includes the name, call sign, and ship dimensions. This data may be used by the chart plotting software to uniquely identify the ship. The ST162's default static data is: Call Sign – blank; Name – SHINE ST162 TEST SET; dimensions – 0.
3. The Ship's Voyage Static Data: The ship's voyage static data includes the type of ship and cargo, destination, the arrival date and time and the navigational status of the ship. This data may be used by the chart plotting software to uniquely identify the ship. The ST162's default voyage static data is: Type of Ship and Cargo – 0; destination – TEST0 DEST.



Set New MMSI Number:

To change the MMSI number, enter the desired MMSI number in the “New MMSI” field provided. The MMSI number is required to be 9 numerical digits. Click “Set MMSI” to set the new MMSI number.

Set Name, Call Sign and Dimensions:



To set the ship's static data click the “Set Parameters” button in the Set Name, Call Sign and Dimensions group box. This will bring up the Ship's “Static Data Entry” window. (Note if the connected communication port is not the command port and communication fails a dialog box will report that the ship's static data is unavailable). The current static data is populated in the fields if available. Change the data and click “Set Ship Data”

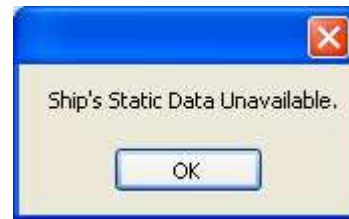


Figure 15 – Static Data Entry Screen

Set Ship Cargo, Destination and Arrival Time:

To set the ship's voyage static data click the “Set Parameters” button in the Set Ship Cargo, Destination and Arrival Time group box. This will bring up the “Set Voyage Static Data” window. The current data is populated in the fields. If the data is unavailable (the unit doesn't respond) then an information box reporting that the Ship's voyage static data is unavailable and the fields will be unpopulated.

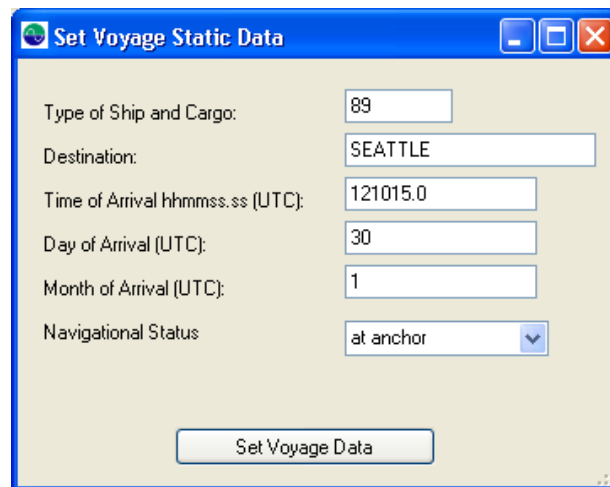


Figure 16 – Voyage Static Data Entry Screen



Tab: Custom

The ST162 Configuration Manager has the ability to simulate 10 ships, 1 SART, 1 binary message, 1 Safety Related Message (SRM) and 1 AIS Aid to Navigation (AtoN).



Caution! Only one set of customized messages may be stored to the Test Set. Loading these messages will overwrite any other customized messages that may have been set on the unit.

Choose from the drop down menu the number of desired ships and/or choose the desired messages by checking the check boxes.

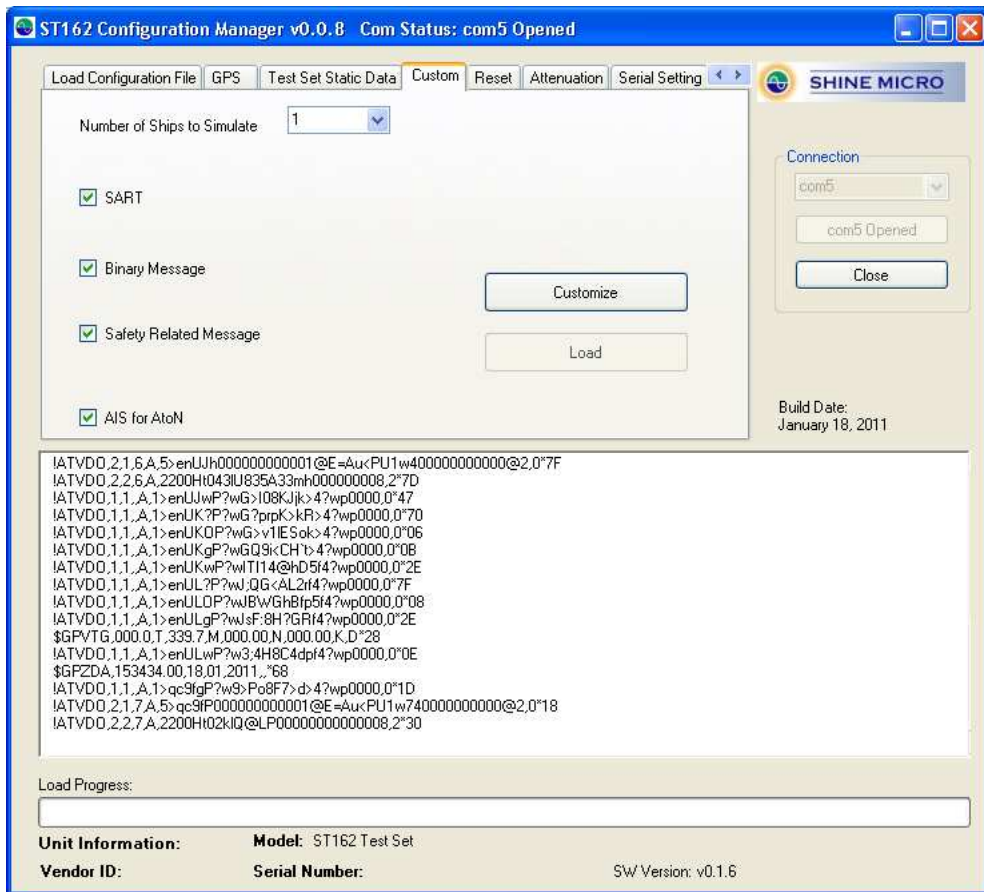


Figure 17 – Custom Message Data Entry Tab

Click on the “Customize” button. This will bring up a form in which to enter the message information.



Simulated Ships:

Enter the desired MMSI, ship name, location, destination, type of ship and cargo and the IMO number for the desired test vessel. The type of ship and cargo ITU-R M.1371-1 definitions are included as Table 3 and Table 4. The ship and cargo identifier is constructed by selecting the appropriate first and seconds digits from the tables. An example of a correct Type of Ship and Cargo for a Fishing Vessel would be 30. This will generate a ship position report and static and voyage related report for the simulated ship.

Figure 18 – Simulated Ships Data Entry

Table 3 - Ship Type And Cargo

First Digit	Second Digit
2 - WIG	0 - All ships of this type
3 - See Table 3	1 - Carrying DG, HS, or MP, IMO hazard or pollutant category A
4 - HSC	2 - Carrying DG, HS, or MP, IMO hazard or pollutant category B
5 - See Table 3	3 - Carrying DG, HS, or MP, IMO hazard or pollutant category C
6 - Passenger ships	4 - Carrying DG, HS, or MP, IMO hazard or pollutant category D
7 - Cargo ships	5 - Reserved for future use
8 - Tanker(s)	6 - Reserved for future use
9 - Other types of ship	7 - Reserved for future use
	8 - Reserved for future use
	9 - No additional information
HSC: High Speed Craft	
WIG: Wing-In-Ground	
DG: dangerous goods	
HS: harmful substances	
MP: marine pollutants	

Table 4 – Ship Type

Identifier	Special type of craft
30	Fishing
31	Towing
32	Towing and length of the tow exceeds 200 m or breadth exceeds 25 m
33	Engaged in dredging or underwater operations
34	Engaged in diving operations
35	Engaged in military operations
36	Sailing
37	Pleasure craft
38	Reserved for future use
39	Reserved for future use
50	Pilot Vessel
51	Search and rescue vessels
52	Tugs
53	Port Tenders
54	Vessels with anti-pollution facilities
55	Law enforcement vessels
58	Medical transports
59	Ships according to RR Resolution No. 18



The screenshot shows a window titled "Broadcast Binary Message Data Entry". It contains three input fields: "Source MMSI" with the value "338060091", "Application Identifier (enter in Hexadecimal Format):" with the value "12,12,", and "Binary Data in Hexadecimal Format:" with the value "12,34,56,78,9A,BC,DE,F1,". A "Complete" button is located at the bottom right.

Figure 19 – Binary Message Data Entry Screen

Binary Message:

If the Binary Message box is checked the "Broadcast Binary Message Data Entry" form will be displayed. Enter the MMSI number, application ID (in hexadecimal) and the binary message (in hexadecimal). The binary message is limited to 40 bytes of data and the Application Identifier is limited to 2 bytes of data. The data sent will be the same as the hexadecimal representation. This is sent as a message 14, Binary broadcast message.

The screenshot shows a window titled "Broadcast Safety Related Message Entry". It contains two input fields: "MMSI:" with the value "338060092" and "Text:" with the value "TEST MESSAGE". A "Complete" button is located at the bottom right.

Figure 20 – Broadcast Safety Related Message Entry Screen

Safety Related Message (SRM):

If the Safety Related message box is checked the "Broadcast Safety Related Message Entry" form will be displayed. Enter the MMSI number and the message data, limited to 53 characters. This data will be sent as a message 14 Safety Related Broadcast Message.



AtoN:

If the AtoN box is checked the “AtoN Message Data Entry” form will be displayed. Enter the simulation data for the AtoN. A message 21 will be generated to simulate an AtoN.

Figure 21 – AtoN Data Entry Screen

SART Message:

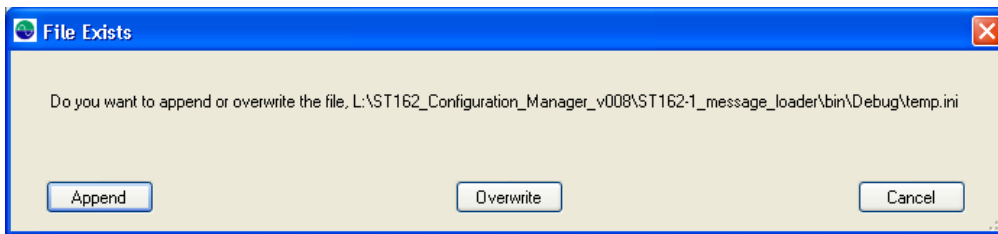
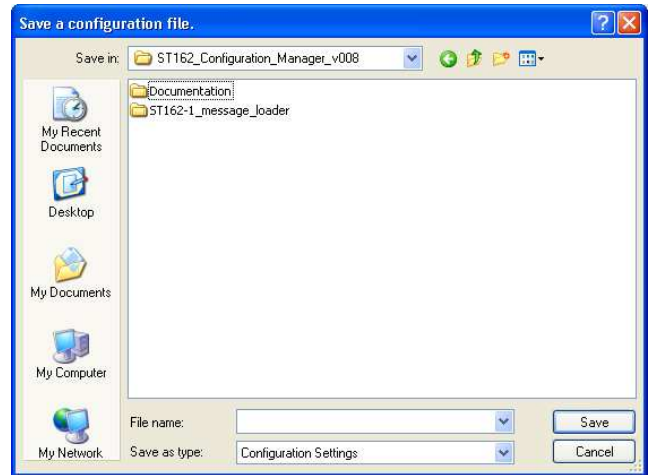
If the SART box is checked the “SART Message Entry” form will be displayed. The MMSI number is not selectable. Enter the desired test location. A SART test message sequence will be generated: Message 14 “SART TEST”, followed by three position reports, closed by a message 14 “SART TEST” on AIS 1. All message fields are populated in accordance with IEC 61097-14.

Figure 22 – SART Message Entry Screen



Once all selected messages have been entered a dialog box will be displayed prompting if you would like to save the messages created as a configuration file. Choose yes to save the message list configuration file to be loaded later to this test set or another test set.

Choosing yes will bring up a Windows Save File dialog box. Browse to the directory where the configuration file is to be saved. Type in a file name and click save.



If the file exists then a dialog box will be displayed giving you the option to Append the messages to the existing file, overwrite the file

or cancel the save operation. The Append option may be used add to an existing message list.

The "Load" button will be enable. Click on this button to load the customized messages created to the Test Set.

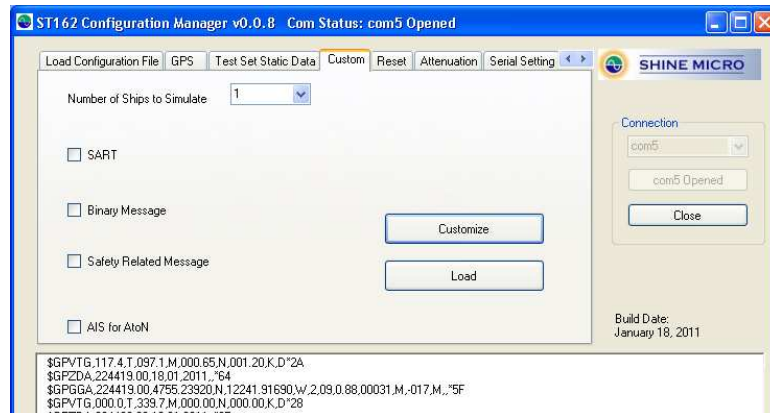


Figure 23 – Custom Message Load Button Enabled



Tab: Reset

The reset tab has four options: Remove All Ships (1-100), Restore Default Ships (1-5), Reset to Factory Defaults, and Restart.

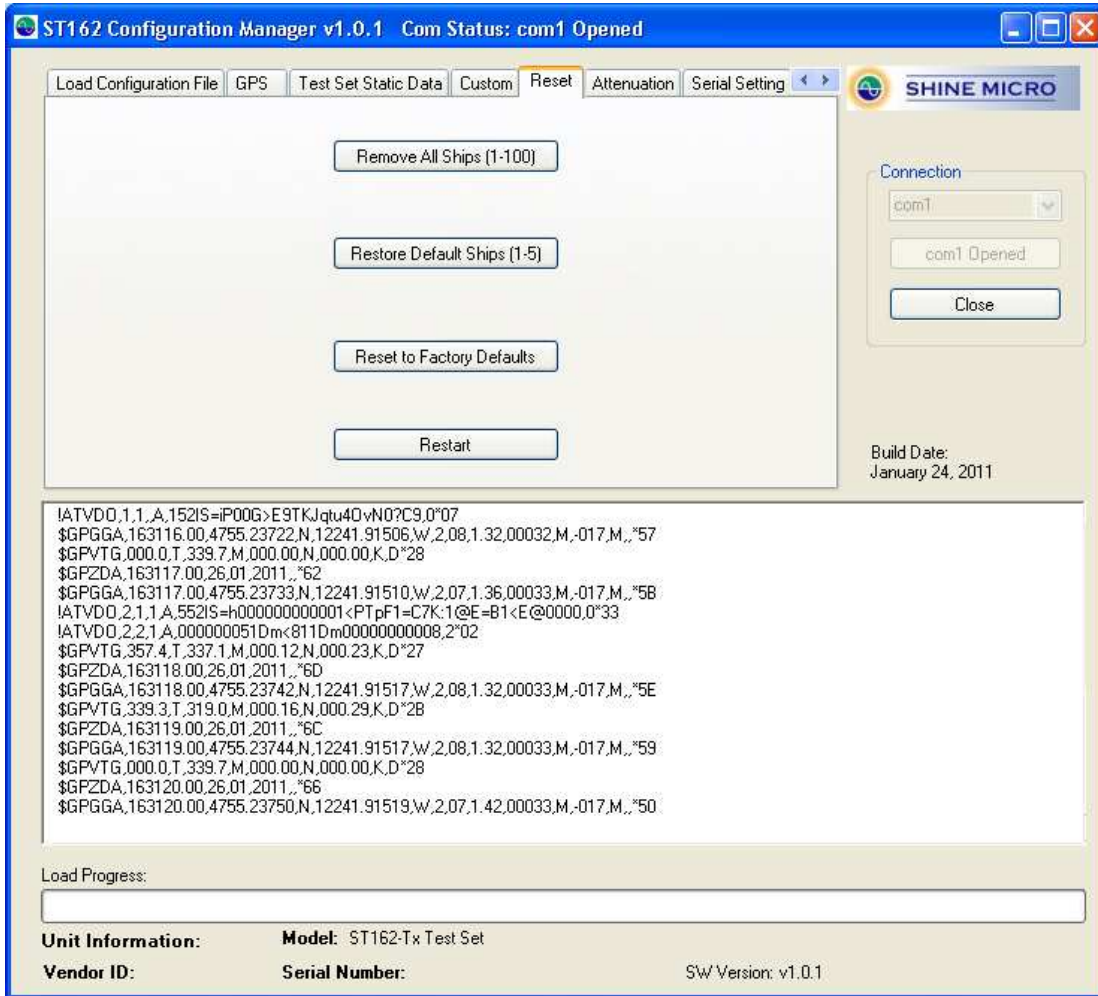


Figure 24 – Reset Tab



Caution! Removing the messages will remove any custom data messages sent to the unit. This will not affect the ST162 message 1 and 5, however any customized messages including the Shine Micro defaults will be removed and the test set will only send its message 1 and 5 with the current static data.



Caution! Resetting the unit to factory defaults will only reset the static data of the unit to factory defaults. To restore the custom message memory to factory default values choose the Restore Default Ships (1-5). Resetting to factory defaults will set the Test Set to RS-232 control.



Remove All Ships (1-100): This function will remove all messages 1 to 100 from the ST162 memory. The ST162 will still send its message 1 and 5 with the test set static data as configured every 5 seconds.

Restore Default Ships (1-5): This function will overwrite all messages 1 to 100 with the 10 factory default messages simulating 5 AIS ships. Any custom messages the test set is currently sending will be overwritten. The ST162's default message 1 and 5 will be unaffected by this function.

Reset to Factory Defaults: This function will reset the static data on the test set to factory defined defaults as outlined in REF. The command communication port will go to RS-232. This function will not change the custom messages 1-100.

Restart: This function provides a soft restart. Choose this option to restart the unit.

Table 5 - ST162 Static Data Default

Field	Factory Default Value
MMSI	338060087
Latitude	91°N
Longitude	181°S
Ship Name	SHINE ST162 TEST SET
Call Sign	<i>Blank</i>
Type of Ship and Cargo	0
Destination	TEST DEST0



Tab: Attenuation

The "Attenuation" tab allows the user to set the output attenuation of the sent packets. The output attenuation may be set from 0 to 31 dB. An attenuation setting of 0 will give the strongest signal strength. The bar graph indicates the signal level at the EUT port. The Signal at the EUT Port is -90 dBm at 0 Attenuation to -120 dBm at 31.

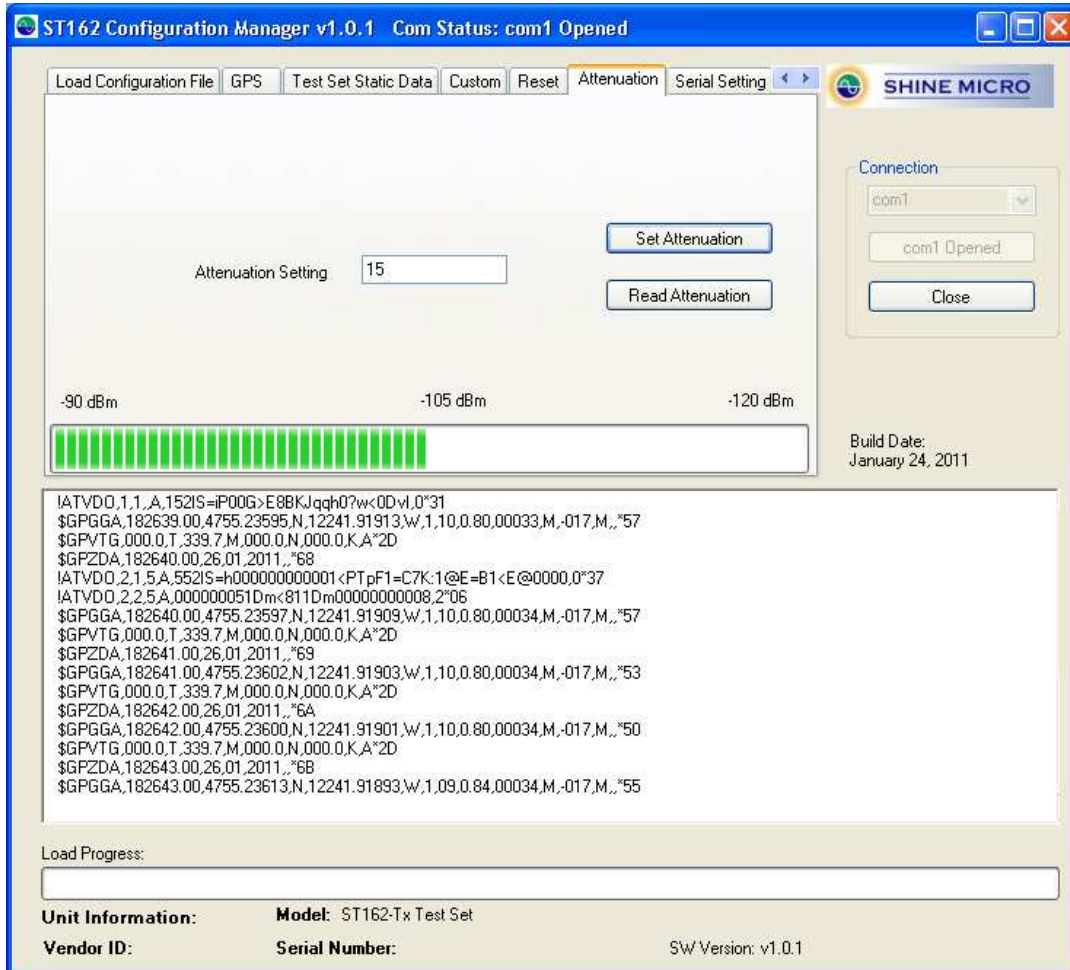


Figure 25 – Output Attenuation Tab



Tab: Serial Setting

The serial setting tab allows the user to set the serial control of the unit. RS-232 data will always be output but the Test Set will only accept commands from either the RS-232 or the Bluetooth port. The factory default setting is RS-232 control. If the ST162 has a Bluetooth module installed, then the unit may be switched to Bluetooth control. The ST162 will automatically sense if a Bluetooth module is installed on the unit. If it isn't installed, then the ST162 Configuration Manager will disable the ability to switch to Bluetooth control and display a message. See **Error! Reference source not found.**

For a Test Set with an installed Bluetooth, the Serial Setting tab will have the "Set Bluetooth Control Button" enabled and the Serial Info message will display that Bluetooth is available on this device, see Figure . To change from RS-232 to Bluetooth control click the "Set Bluetooth Control" button. This will change the current serial setting to Bluetooth, however the change will not take effect until the unit's power is cycled or the unit is restarted (by clicking the "Restart" button available on the Reset Tab). When the unit restarts it will be in Bluetooth control. RS-232 data will still be output, however the unit will not receive commands through the connection.

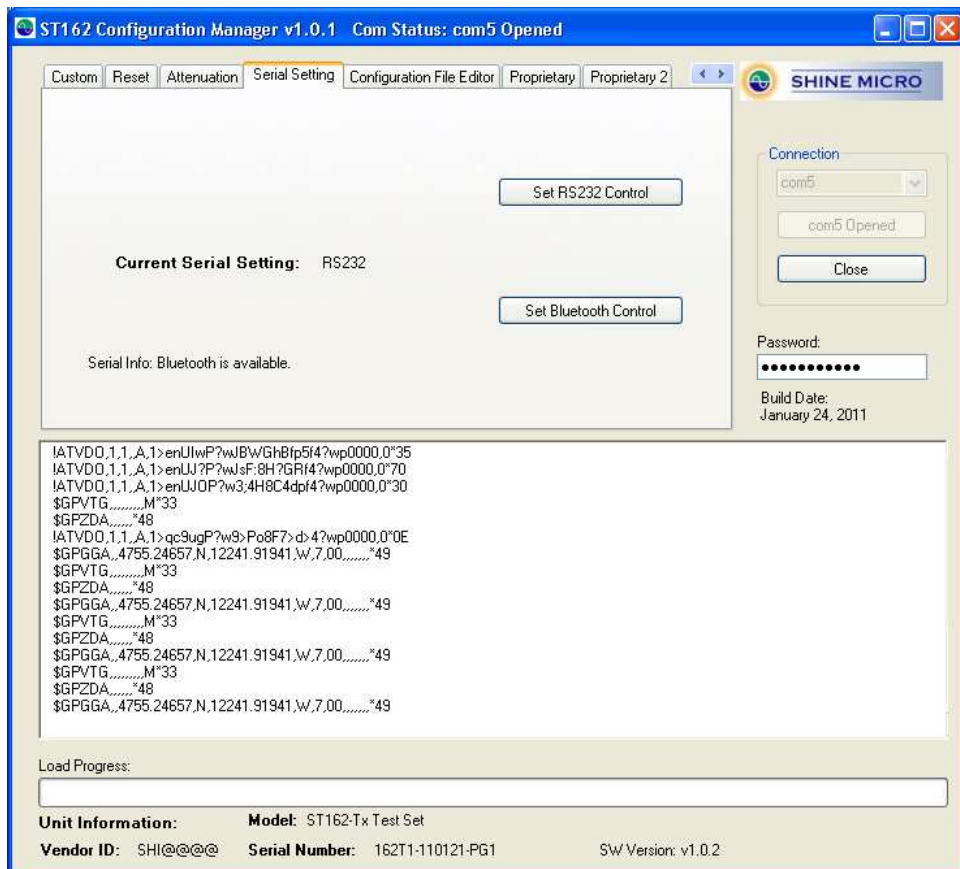


Figure 26 - Serial Setting Tab



Tab: Configuration File Editor

The Configuration File Editor provides an interface to view and edit a configuration file. There are two ways to edit a configuration file:

1. Click the “Load Editor” button to browse for an existing configuration file and open it to view the messages contained within the file.
2. The message memory from the ST162 may be read and displayed for editing by clicking on the “Read Test Set Messages” button. Once edits are complete the message list may be saved as a configuration file to load to the test set.

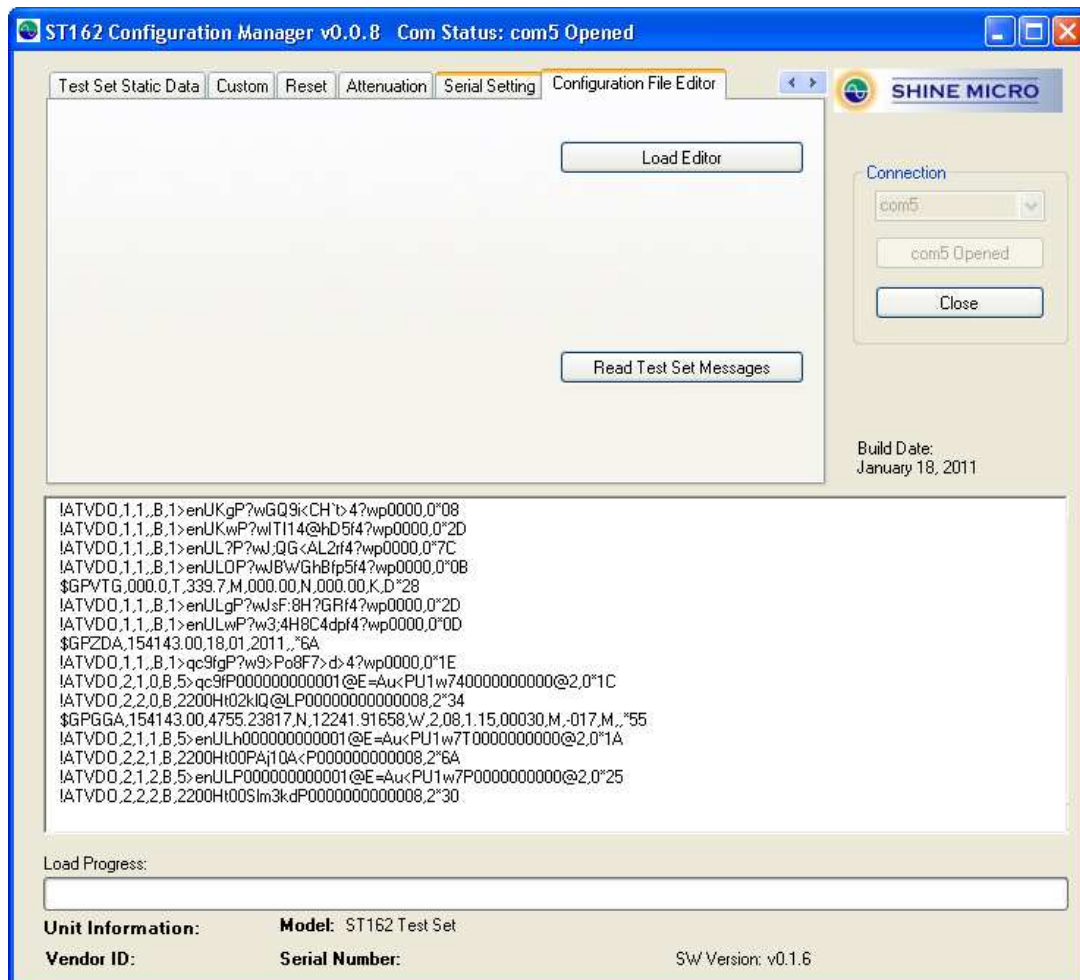


Figure 27 - Configuration File Editor



Message List Editor:

The Message List Editor provides a view of the messages being sent. The messages may be sorted, reordered, or modified. In addition additional messages may be added. The currently support message set includes: Messages 1, 2, 3, 5, 6, 8, 12, 14, 18, 19, 21, and 24.

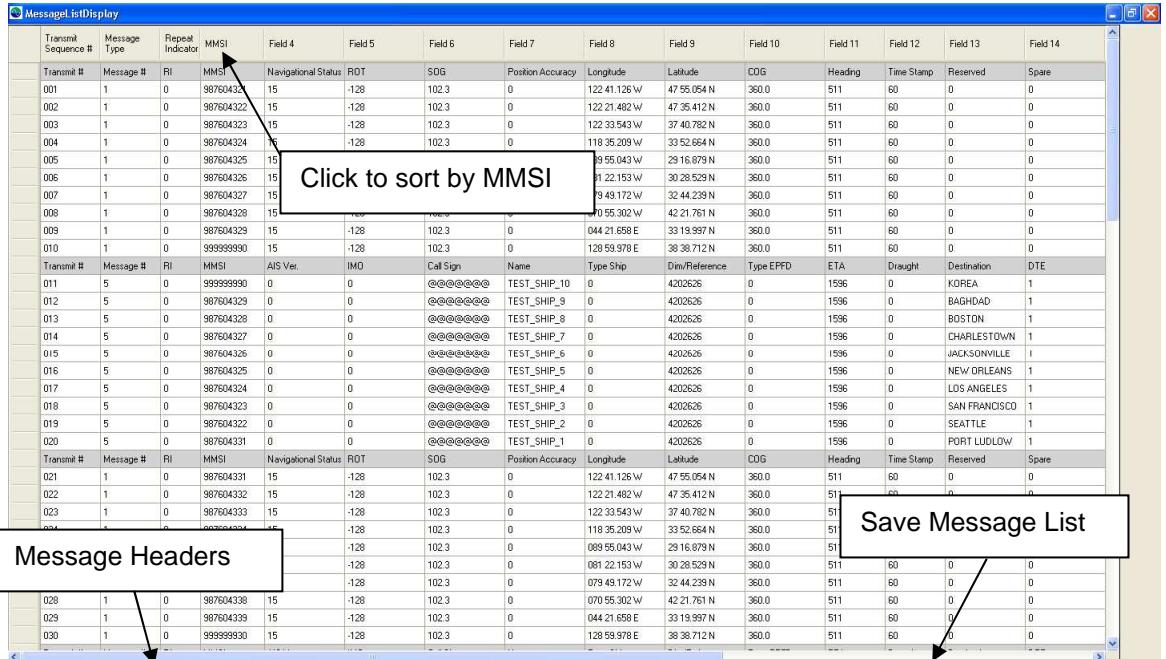


Figure 28 - Message List View

Sort:

The messages may be alphabetically sorted within the editor by clicking on the column header, which corresponds to the field to sort. See Figure . The editor loads the messages in the order that they will be sent. To see a view of the messages in ascending MMSI order, click on the column heading "MMSI". To sort descending click again. Once the messages are sorted in the desired order, click on the "Insert Message Headers" button to insert message header rows with the message type's unique descriptions. The sort function works for all field columns.

Add a Message:

To add a message select the row preceding the location in the message list that the new message is to be inserted and right click. This will bring up a selection menu to: "Add a New Message"; "Add A Blank Message"; or "Delete Selected Message". Click on the Add a New Message option. Choose a message number from the drop down menu.



This will insert a message with all settings set to “unavailable” values at message list position 0. The messages may be modified by double clicking on the message in the Message List Display. Double clicking on any message will open the message for editing in the Message Viewer and Editor.

Delete Selected Message:

To delete a message select the message to be removed and right click. Choose from the selection menu “Delete Selected Message”.

Add a Blank Message:

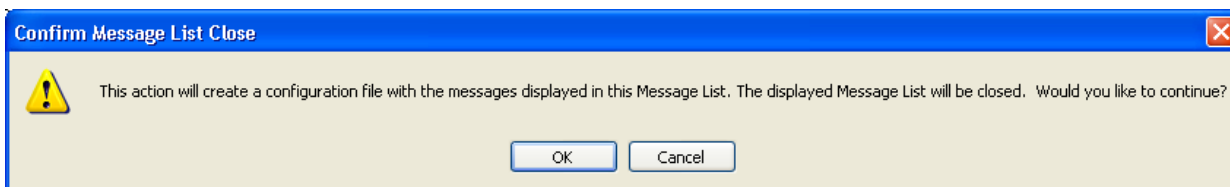
The option to add a blank message allows the user to customize the message frequency. There is a one slot (26.67 msec) delay between each message sent. To increase the delay between two consecutive messages add a blank message. An added message will always by default be inserted in transmit position 0. To change the position, double click on the message to open the Message Viewer and Editor.

Insert Message Headers:

The insert Message Headers button is located at the bottom of the Message List Viewer. See Figure . This option will preserve the current message sort and insert descriptive message headers for each message type. A new header is inserted describing the message fields when the message type changes. Use this option after sorting a message list by the desired field.

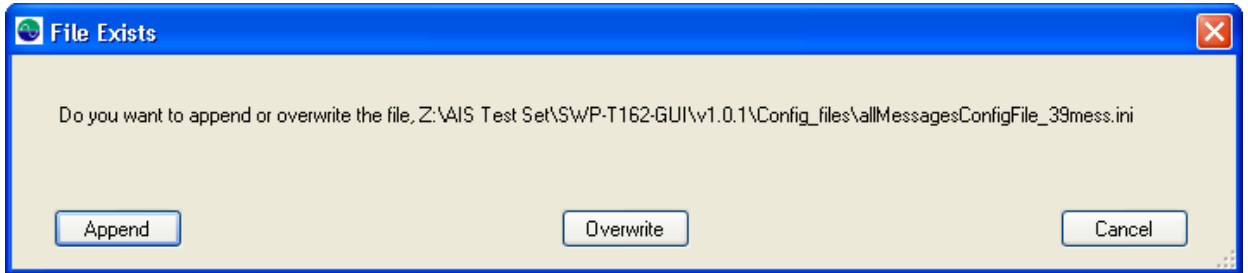
Save Message List as a Configuration File:

The option to save the current Message List as a configuration file allows the user to save current list as new configuration file to load to the test set. The Message List may be stored as a new configuration file, replace an existing configuration file, or it may be appended to an existing configuration file. The Message List is sorted by the transmit number prior to writing the file. After clicking the “Save Message List as a Configuration File” the message list will be sorted by the transmit number. The Message List is displayed as it will be saved. Any duplicate entries in the transmit order column will be sequentially renumber. The sorted list is displayed within the Message List Viewer and a dialog box is displayed.



Continuing with the save will close the Message List Viewer. Click “OK” to continue.

Next, a file save dialog box is displayed. Type the name to save the configuration file under in the File Name textbox. Click Save. If the file already exists the option is given to append to the existing file, overwrite the existing file or cancel to choose another file name.



Once the Message List is saved as a configuration file the Message Viewer will be closed.

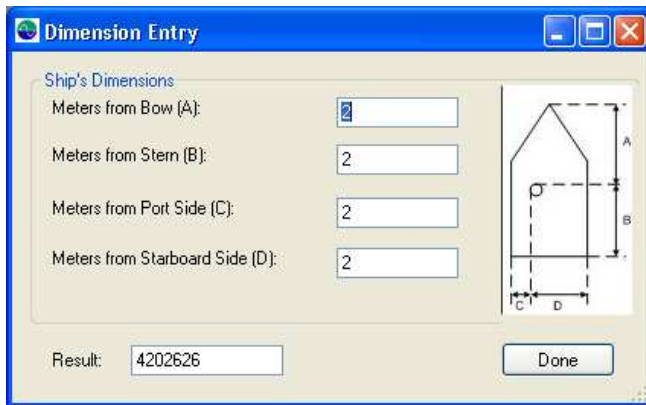


Caution: Canceling the save operation from the file save dialog box will close the current Message Viewer.

Message Viewer and Editor:

The Message Viewer and Editor provides an interface to view more detailed message information for each type of supported message. It also provides the editor to customize each AIS message. To access the Message Viewer and Editor double click on any message from the Message List Viewer. The Message Viewer will display the information for the selected message. See Figure for an example of a message 1 Message Viewer and Editor example and Figure for a message 5.

To edit the message simply enter the desired information in the boxes provided. All latitude and longitudes are displayed in degrees and decimal minutes. The message number cannot be changed. Once the message contains the desired information click "Next" to go the next message in the Message List Viewer; click "Previous" to go the message before the current message in the Message List Viewer or "Done" to close the Message Viewer and Editor and return to the Message List Viewer.



Messages 5, 21, and 24 part B all have a dimension field. The dimension is assigned as a A, B, C and D dimension. The dimension field is formed through a bitwise combination of the sizes. An interface is provided to create the dimension field, simply double click on the dimension textbox to launch the interface. See Figure .



Message Viewer and Editor

Transmit Number:	001	Course Over Ground:	360.0
Message Number:	1	0-359.9 degrees. 360.0 degrees = unavailable	
Repeat Indicator:	0	Heading:	511
MMSI:	338060088	0-359 degrees. 511 = unavailable	
Navigational Status:	15	Time Stamp:	60
Rate of Turn:	-128	RAIM-flag:	0
-127 to 127. -128 = unavailable		Communication State:	0
Speed Over Ground:	102.3		
0-102.2 knots. 102.3 knots = unavailable			
Position Accuracy:	0		

Latitude: Degrees 26, Decimal Minutes 7.740, N/S N
Longitude: Degrees 050, Decimal Minutes 20.700, E/W E

<< Previous Done NEXT >>

Back to the last message in the list Return to Message List Next message in the list

Figure 29 - The Message Viewer and Editor - Message 1 Example

Message Viewer and Editor

Transmit Number:	005	Type of Ship and Cargo:	0
Message Number:	5	Dimension/Reference:	4202626
Repeat Indicator:	0	Type of Electronic Fixing device:	0
MMSI:	338060088	ETA:	1596
AIS Version Indicator:	0	Draught:	0
IMD Number:	0	Destination:	TEST1 MANAMA
Call Sign:	@@@@@@@@	DTE:	1
Name:	SHINE ST162 TEST1		

<< Previous Done NEXT >>

Figure 30 - The Message Viewer and Editor - Message 5 Example



Appendix D - Troubleshooting

Unable to connect via Bluetooth:

If you are unable to connect to the Test Set via Bluetooth, try removing the Bluetooth device from the PC's "Bluetooth Devices" and then add it again as described in "Configuring Bluetooth Communication" above. If you are using a Bluetooth dongle via USB, you may need to remove the dongle and then plug it back in.

GPS LOCK LED Flashes:

The GPS LOCK LED strobes when the batteries are low. Replace the batteries.

New Batteries Installed but Test Set Won't Power Up:

Both batteries should be installed with the positive terminals facing up. Ensure the battery caps are securely tightened.