



Milltech Marine

AIS RECEIVER TROUBLESHOOTER

Correct AIS Receiver Operation

Your AIS Receiver and inline fuse have been tested at the factory before being shipped to you. The receiver has been certified to work correctly before it ships. We have had very few cases of a unit arriving at a customer in a state where it failed to operate, so if your unit is not working, it is likely there is a configuration or environmental issue that is causing the problem. This troubleshooter will hopefully help you to address these issues.

NOTE: Before connecting the AIS receiver to a computer or chartplotter, please ensure that the power is OFF to the AIS receiver while making the connection. Once you are sure that the wiring to the external device is correct, proceed with powering on the AIS receiver. Failure to follow these instructions can result in damage to the AIS receiver.

If your AIS Receiver is working properly, you should experience the following:

- You should see the two LEDs light momentarily when you apply 12vDC power to the unit.
- Normally, if an antenna is connected, you should see the red LED flash on and off at random intervals. This indicates radio signals are being received by the unit. It does not necessarily mean that these radio signals are AIS transponder signals; simply that there is radio reception of some type coming in on the AIS frequency.
- The green LED will flash each time a valid AIS sentence is sent out the serial connection. This LED flashes for a very short period of time for each sentence so it may be difficult to see the green flashes. If necessary, lower the room lights where the unit is installed and look directly at the LEDs – not at an angle. If you do not have a VHF antenna connected or if you are not close to shipping traffic with AIS equipped transponders, you will not see any activity on the green LED.
- Serial data is output from the unit at 38400 baud by default. The easiest way to confirm that the unit is outputting valid serial data is to:
 - Turn the power off to the unit.
 - Connect the serial cable that came with the unit to an operational serial port on a computer and run a terminal emulation package on the computer (e.g.

Hyperterminal on a Windows-based PC) and set the program for the correct COM port and 38400 baud.

- Turn on the power to the unit. The SR162 will output a diagnostic message to the terminal screen, the SR161 will not. This message will be similar to:
\$AI TXT, 01, 01, 91, FREQ, 2087, 2088*57

- If you have a VHF antenna attached and are close to shipping traffic, you should see raw AIS sentences similar to:

```
! AI VDM, 1, 1, , B, 19NWp8h00289HGt<ni i `L4JI 0<0k, 0*67
```

This may take several seconds to appear on the screen if you are far away from traffic or if there are only a few ships close by.

- If you are not close to shipping traffic and want to test your unit, enter <SPACE> then <ENTER> in the terminal window. You should see output similar to:

```
SR162 AIS Receiver  
RECE FRQ R1F1619750  
RECE FRQ R2F1620250  
INT RATE I38400
```

- If the above steps succeed, your AIS Receiver is working correctly.
- The next step is to configure your PC or Mac navigation software or your chartplotter to use the serial data stream from the AIS Receiver. Each software package and chartplotter is different so consult the documentation for your product to confirm the correct way to configure your package or plotter for receiving AIS data. Also, see the product documentation that came with the AIS Receiver for more information on wiring and installation. Remember that the AIS Receiver outputs serial data at 38400 baud.

If you are having trouble with your AIS Receiver, use the following diagnostic steps to determine what the issue is and to resolve your problem.

Troubleshooting Issues

If you experience issues with your AIS Receiver, check to see if the issue you have matches one of the symptoms below and follow the instructions to resolve the issue.

1. **Power does not seem to be getting to the unit.** I don't see any LED light activity when I turn the power on to the unit.
 - a. Start by checking there is 12vDC power on the power wires with a volt meter. Do not use 24vDC or 110vAC power with your AIS Receiver. You will damage the receiver.
 - b. Check to make sure the polarity of the power wires is correct (red is positive, black is negative ground).
 - c. Check the LEDs in a low light condition with no light directly shining on the unit. Look at the LEDs straight on – not at an angle.
 - d. Check the inline fuse to ensure it is not blown and replace it if necessary. If the fuse is blown you almost definitely have a power issue (e.g. too much power or power spikes due to fluctuations for example when you start your engine). Resolve the power issues before attempting to apply power to the unit again.
 - e. If you are sure you have a correct power configuration, turn the power off to the unit and wait one minute and reapply power. Do this several times if necessary. There is an internal relay built into the microprocessor that will trip

if too much power is applied to the unit. It will normally reset itself once the power is off and proper power is supplied to the unit.

- f. Double check to see if the unit is functioning correctly by connecting it to a computer and using a terminal emulation package to test serial output in case the LEDs have burnt out. If the LEDs have burnt out then the unit will need to be repaired or replaced.
- g. If none of these steps resolve this issue, it is likely that your unit has been damaged. The most common problems we have seen are damage from incorrect power wire installation, incorrect voltage, or damage from lightning. Your unit should be returned to the place where you bought it for replacement or repair. If the unit is still within the warranty period and the warranty conditions have been respected then the unit will be repaired or replaced without charge.

NOTE: Please read the warranty conditions in the documentation that came with the product. The warranty does not cover failure due to incorrect installation issues so check the power leads to the unit before connecting the unit. Also, do not attempt to open the metal case for the unit. If the product is returned and the seal on the back is broken, you will not be eligible for repair or replacement under the warranty terms. There are no exceptions to this policy.

- 2. **Bad serial cable.** Everything seems to be working correctly and both LEDs are flashing but no serial data is output from the unit.
 - a. Try using the unit with a different serial cable to see if this resolves the problem. We have seen two instances of a bad serial cable resulting in no data reaching the computer. If everything works correctly with a different serial cable, contact your supplier for a replacement serial cable.
 - b. If you have access to another computer, try the unit with another computer. It is possible that the problem is with the serial port adapter not the cable. See the next step if the unit works correctly with another computer.
 - c. If this does not resolve the problem, proceed to the next step.
- 3. **Bad serial adapter.** Everything seems to be working correctly and both LEDs are flashing but no serial data is output from the unit.
 - a. It is possible the serial port is not working correctly or is set up incorrectly.
 - b. Check to make sure you have the baud rate set to 38400 baud.
 - c. Keep in mind that serial data will only be transmitted by the AIS Receiver if valid transponder signals are being received. If there is no AIS traffic, the unit will not output any serial data.
 - d. If you are using a USB to Serial Adapter such as the Keyspan unit, ensure that the drivers are installed on your computer. These drivers are included on the CD that comes with the Keyspan (or other) USB-Serial adapter. The AIS Receiver will not be recognized by the computer if the drivers are not correctly installed. If necessary, uninstall the drivers and install them again. Be sure to follow the driver installation instructions exactly.
 - e. If you have access to another computer, try the unit with another computer. It is possible that the serial port adapter is not working correctly on the first computer. If the AIS Receiver works correctly with the second computer then it is likely that you have a bad serial port. Either get the serial port repaired or use a USB to Serial Adapter to connect your AIS Receiver to your computer.
 - f. Try a different serial device (e.g. GPS) on the serial port with the correct baud rate for that device and see if you get valid data. If you see valid GPS data then the serial port is OK and the problem may be with the serial connection

from the AIS Receiver. We have only seen a couple of suspected case where the serial connector on the receiver was non-functional or the RS232 internal IC was damaged so this is not a common problem. If you suspect this is the case, contact support to discuss next steps.

4. **Serial data is garbled.** I am using a terminal emulator to test the unit but I am seeing garbled random data instead of valid AIS sentences.
 - a. The most likely issue is the baud rate is set incorrectly. Ensure that the baud rate for your application is set to 38400 baud.
 - b. It is possible that lightning or other environmental issues have caused the unit to re-program itself to another baud rate. We have seen this issue with a few customers. To determine if this has happened, try different baud rates with the terminal emulation package. You should see valid AIS data at one of the other baud rates. To switch the baud rate back to 38400 do the following:
 - i. Disconnect the antennas from the AIS Receiver.
 - ii. In the terminal emulation session, hit <SPACE> then <ENTER>. You should see something similar to the following on the screen:

```
SR162 AIS Receiver
RECE FRQ      R1F1619750
RECE FRQ      R2F1620250
INT RATE      I 4800
&
```

In this example, the baud rate is set to 4800 baud (see the "INT RATE" line).
 - iii. Enter the following in the terminal window:

```
I 38400
```
 - iv. Then enter "Q" to save the change.
 - v. Turn the power off to the AIS Receiver. Reset the baud rate in your terminal emulation package to 38400 baud. Turn the power on again to the AIS Receiver.
 - vi. The receiver should now be operating at the correct baud rate.
 - c. If these steps do not resolve the problem, it is possible the serial output processor has been damaged. Contact support to discuss next steps.
5. **I can't get Rose Point Coastal Explorer to work with my AIS Receiver.**
 - a. Ensure you are using Coastal Explorer Version 1.1 or later. Earlier versions do not support AIS.
 - b. Use the menu "Tools → Options → Instruments → Port Settings ..." to configure the serial COM port for your AIS Receiver.
 - c. There is a known problem with earlier versions of Coastal Explorer where the "Auto Detect" feature does not work when searching for a connected AIS Receiver. Be sure to get the latest upgrades for Coastal Explorer.
 - d. Manually set up the port for the AIS Receiver COM port. Be sure to select the correct COM port, set the interface to "NMEA 0183" and set the baud rate to 38400 baud. Check the "Listener" box and ensure that the "Talker" and "Repeater" boxes are unchecked. Select and click "Close" and then "OK". You can use the "Troubleshooter" feature to check the output of valid AIS sentences.
 - e. Coastal Explorer should be start displaying AIS targets if you are in range of AIS transponders.
6. **I can't get Nobeltec Visual Navigation Suite to work with my AIS Receiver.**
 - a. Ensure you are using Visual Navigation Suite Version 8.0 or later. Earlier versions do not support AIS.

- b. Use the menu "Tools → Options → Ports: Configure" to configure the serial COM port for your AIS Receiver.
 - c. It is recommended to not use the "GPS/Port Setup Wizard" to detect your AIS device.
 - d. Manually set up the port for the AIS Receiver COM port. Be sure to check the correct COM port. Then click on the "Configure This Input Port ..." box. Select the correct "Port Speed" at the bottom of the dialog box. Select and click "OK" and then "Apply". You can use the "View Data" feature to check the output of valid AIS sentences.
 - e. Select the "Targets" tab and ensure that "Display AIS Targets" is set to "Yes".
 - f. Visual Navigation Suite should be start displaying AIS targets if you are in range of AIS transponders.
7. **The AIS Receiver is not working with my chartplotter.** I am connecting my AIS Receiver to a chartplotter. However, my chartplotter does not seem to recognize the AIS Receiver.
- a. Ensure that your chartplotter supports AIS data. Only recent chartplotter models support AIS. It is possible your model will support AIS with a ROM upgrade. Contact your chartplotter manufacturer to confirm that AIS data is supported by your model or if an upgrade is available.
 - b. Ensure that the baud rate for the inbound NMEA port on the chartplotter is set to 38400 baud. This is sometimes referred to as a "high speed serial" setting (e.g. on some Garmin models).
 - c. In some cases, the chartplotter will not display any indication that AIS is working except to display vessels on the screen if you are in range of transponders. Be sure to test your chartplotter in an area where transponder signals can be received.
 - d. If your chartplotter supports AIS but does not support NMEA inbound data at 38400 baud, then you will need to change the baud rate on the AIS Receiver to match the supported baud rate on the chartplotter. This is usually 4800 baud. To change the baud rate on the AIS Receiver to 4800 baud do the following:
 - i. Disconnect the antennas from the AIS Receiver.
 - ii. Connect the AIS Receiver to a computer running a terminal emulation package such as Hyperterminal and set it to the correct COM port and correct baud rate (38400).
 - iii. In the terminal emulation session, hit <SPACE> then <ENTER>. You should see something similar to the following on the screen:


```

SR162 AIS Receiver
RECE FRQ    R1F1619750
RECE FRQ    R2F1620250
INT RATE    I 38400
&
```
 - iv. Enter the following in the terminal window to switch the unit to 4800 baud:


```

I 4800
```
 - v. Hit <ENTER> and then "Q" to save the change.
 - vi. Turn the power off to the AIS Receiver. Reset the baud rate in your terminal emulation package to 4800 baud. Turn the power on again to the AIS Receiver. Hit <SPACE> then <ENTER> to ensure that the new baud rate is active.
 - vii. The receiver should now be operating at the new baud rate. Reconnect it to the chartplotter and test for AIS functionality.
 - viii. If this does not resolve the issue, continue to the next step.

8. **Bad serial connection wiring.** I am connecting my AIS Receiver to a chartplotter. I have wired the bare leads from pins 2 (data) and 5 (ground) on the AIS Receiver to the NMEA input on my chartplotter but it does not recognize the AIS Receiver.
- a. The most common problem here is incorrect wires have been used to connect the AIS Receiver to the chartplotter. Use an Ohm meter to ensure that the wire connected to pin 2 of the AIS Receiver serial output is connected to the terminal on the chartplotter for NMEA "data in" and pin 5 from the AIS Receiver is connected to the ground terminal on the chartplotter. Do not connect pin 3 to any connection on the chartplotter. If you are using the cable that came with your Smart Radio AIS Receiver and have cut it to expose the bare wires, the RED or BROWN wire is normally connected to pin 2 or data out and the GREEN or YELLOW wire is normally connected to pin 5 or ground. **HOWEVER**, please double check this with an Ohm meter before connecting your equipment together. We can not guarantee this color coding is correct as serial cable manufacturers do not follow a color coding standard. Connecting the wrong wires can damage your AIS Receiver, your chartplotter or both.
 - b. Double check your wiring again! We have had about a dozen cases where customers insist the wiring is correct and on re-examination, it was found that the wiring was not done correctly. The most common problem is the wires to pins 2 and 5 are not correct. When looking at a DB9 male serial connector with the pins facing you, pin 2 is the second from the left on the top row and pin 5 is the pin furthest to the right on the top row. The most common problem is assuming pin 5 is the left most pin and pin 2 is second from the right.
 - c. If the wiring is correct, double check that your chartplotter in fact supports AIS, that is has the latest ROM upgrades and that you are in range of AIS transponder broadcasts.
 - d. If you are connecting an AIS receiver to a Raymarine chartplotter and it randomly reboots after some time, this is a known problem with Raymarine chartplotters. Please contact Raymarine for a resolution to this problem.

If these steps do not resolve your problem, please contact technical support at info@milltechmarine.com or by contacting your reseller.

If you are reporting a problem with your AIS Receiver, please attempt the above steps first and indicate where the unit fails. Please provide as much detail as possible with your problem report.