

Vector – Frequently Asked Questions

GPS Reception and Performance

Q - How do I know what the GPS in the Vector is doing?

A - The GPS engine supports standard NMEA data messages. The \$GPGSV data message contains satellite tracking information. Because the GPS automatically tracks GPS satellites when powered, this will give you information on the tracking status. If your receiver has computed a position, this will be contained within the \$GPGGA data message

Q - Do I need to be careful when using the Vector to ensure it tracks properly?

A - For best performance, be careful to ensure that the hemisphere above the Vector antenna array is unobstructed for satellite tracking. The Vector, due to the availability of redundant satellites, will tolerate a certain amount of signal blockage. However, the more satellite signals that are blocked, the more impact this will have your positioning accuracy. Tracking fewer satellites will reduce positioning performance. If a satellite is obstructed, the obstruction may also contribute multipath into the position solution, which will also degrade performance.

Heading

Q - How should I mount the Vector?

A - CSI Wireless offers you the opportunity to pole-mount or fix-mount the system, for maximum flexibility. If you pole-mount your Vector, be sure to use the washer and lock nut supplied. Standard installation is along the centerline of the boat, with the arrow on the underside pointing towards the bow side.

Q - Should I turn on all the supplemental sensors?

A - Always turn on at least the tilt sensor, and the gyro. The magnetic sensor may be more cumbersome to use because it requires calibration. Its performance is also affected by the amount of metal objects around it. If, for example, the metallic signature changes, something metallic has been moved and a re-calibration is required.

SBAS Reception and Performance

Q - How do I know if I can receive a SBAS signal in my area?

A - Go to <http://gps.faa.gov/FAQ/index.htm> for WAAS (SBAS in North America) or to <http://www.esa.int/esaNA/> for EGNOS (SBAS service in Europe) signal coverage information.

Q - How do I know if the Vector antenna has acquired an SBAS signal?

A - The Vector enables you to request the output of the \$RD1 message that contains the SBAS bit error rate (BER) for both receiver channels. The BER value describes the rate of errors received from SBAS. Ideally, this should be zero. However, the Vector should provide good performance up to a 150 BER.

Q - How do I know if the Vector is outputting a differentially corrected position?

A - The Vector outputs the GGA message as the main positioning data message by default. This message contains a quality fix value that describes the GPS status. If this value is 2, the position is differentially corrected.

Q - Does it matter much if the Vector is frequently losing lock on SBAS, due to obstructions and the low satellite elevation angles at my location?

A - No, as long as the receiver is receiving a full set of corrections relatively often. Using CSI Wireless' exclusive COAST™ technology, the Vector will be able to perform well for up to 40 minutes with old correction data, depending on the degree of tolerable drift. To obtain a full set of corrections, the Vector receives the ionospheric map over a period of a few minutes. After that, if there is further data loss, the receiver can 'coast' until the next set of corrections is received.

Radiobeacon Reception and Performance

Q - How do I know if I can receive a radiobeacon signal in my area?

A - Go to our [radiobeacon listings](#) and our [DGPS coverage maps](#) on our Web site. To ensure you have the most up-to-date information, please contact your local Coast Guard authority, which manages the radiobeacon service.

Q - How do I know if the Vector antenna has acquired a radiobeacon signal?

A - The Vector's internal beacon sensor can output two signal quality values – signal strength (SS) and signal-to-noise ratio (SNR). By sending a request for the CS0 message with the \$PCSI,1<CR><LF> command, this information will tell you the quality of a signal lock.

Q - Does it matter much if the Vector is frequently losing lock on beacon signals due to a noisy environment or weak signals?

A - No, as long as the receiver is receiving a full set of corrections relatively often. Using CSI Wireless' exclusive COAST™ technology, the Vector PRO will be able to perform well for up to 40 minutes with old correction data, depending on the degree of tolerable drift. To obtain a full set of corrections, the radiobeacon receiver must be locked for a few seconds to a 200 bps station, depending on the number of satellite corrections to be transmitted. For a 100 bps modulation rate, it could six or more seconds, depending on the number of satellite corrections being sent. After that, if there is further data loss, the receiver can "coast" until the next set of corrections is received.

Power, Communication, and Configuration

Q - My Vector doesn't appear to be communicating. What do I do?

A - This could be due to one or more factors, so:

- Examine the power/data cable and its connector for signs of damage. The Vector may be powered incorrectly, or the conductor carrying power to the antenna may be damaged (open).
- Ensure you are properly powering the system with the correct voltage by measuring the voltage at the receiver-end of the power cable when the cable is connected to the power source.
- Ensure you have made a good connection to the power supply and the data interface is wired correctly.
- Ensure you are communicating at the correct baud rate.
- Consult the trouble-shooting section of the other devices' reference manuals to determine if there is a problem with that equipment.

Q - Am I able to configure the two serial ports with different baud rates?

A - Yes. The ports are independent. For example, you may have one port set to 4800 and the other to 19,200.

Q - Am I able to have the Vector output different NMEA messages through the two ports?

A -Yes. You may have different NMEA messages turned on for the two serial ports, and these NMEA messages may also be at different update rates.

Q - How can I determine what the Vector's current configuration?

A - The \$JSHOW<CR><LF> command will request the configuration information from the Vector's internal GPS engine. Its output response will be similar to this:

```
$>JSHOW,BAUD,19200
```

```
$>JSHOW,BIN,1,5.0
```

```
$>JSHOW,BAUD,4800,OTHER
```

```
$>JSHOW,ASC,GPGGA,1.0,OTHER
```

```
$>JSHOW,ASC,GPVTG,1.0,OTHER
```

```
$>JSHOW,ASC,GPGSA,1.0,OTHER
```

```
$>JSHOW,ASC,GPZDA,1.0,OTHER
```

You should also query each heading feature of the Vector, such as the magnetic and tilt aiding, to determine its settings. Use their associated commands.

Q - How can I be sure the configuration will be saved for the subsequent power cycle?

A - The surest method is to query the receiver – issuing a \$JSHOW<CR><LF> command. Then issue a \$JSAVE<CR><LF> command. Wait for the receiver to indicate the save is complete.

Q - What is the best software tool to use to communicate with and configure the Vector?

A - PocketMAX PC or HyperTerminal, although you may have your own preferences. PocketMAX is available for download from the CSI website at:

www.csi-wireless.com/products/software.shtml

PocketMAX PC runs on laptop and PC computers running the Microsoft Windows 95 or higher operating system.

This software offers you the following flexibility:

- Tune your beacon and WAAS receivers
- Monitor beacon and WAAS reception
- Configure GPS message output and port settings
- Configure and monitor heading, time constants, etc.
- Record various types of data

HyperTerminal software, which is available on all Windows operating systems, useful because it enables you to easily configure the Vector by directly typing commands into the terminal window. The output from the Vector is shown simultaneously. Ensure when using HyperTerminal that it is configured to use the correct PC communication port and baud rate, and that the local echo feature is on so you can see what you type.

External Corrections

Q - My Vector doesn't appear to be using corrections from an external correction source. What is the problem?

A - This could be due to one or more factors, so:

- Ensure the corrections are of an RTCM SC-104 protocol.
- Check whether the baud rates of the port used by the Vector match those of the external correction source.
- Ensure that the external correction source is using an 8 data bit, no parity, and 1 stop bit serial port configuration.
- Inspect the cable connection to ensure there is no damage
- Check the cables' pin-out information to ensure the "transmit" line of the external correction source is connected to the "receive" line of the Vector PRO's serial port, and the signal grounds are connected.

Installation

Q - Does it matter where I mount the Vector?

A - Yes. It should have an open hemisphere of sky for optimum satellite tracking. Also, the position it computes is referenced to the center of the primary GPS antenna, so that antenna should be in the location for which you want a position. Often, this is the center line of a vessel.

Q - I have a vessel with lots of metal, including masts, outriggers, etc. How will this affect the Vector's performance?

A - It depends to some extent on where the Vector is mounted. Try to ensure that metal objects are well below the antennas' horizon. The antennas will still be somewhat sensitive to the signals reflected from below. But ensuring that the metal's reflective surfaces are below the antenna will maximize performance. Metallic surfaces reflect a delayed signal to the antenna, which can cause cycle slips in the RTK solution for satellites being tracked, and reduce the integrity of the heading system. Consider these multipath signals when deciding where to mount the Vector.

General

Q - Do you recommend radiobeacon or SBAS differential services?

A - It depends to some degree on the size of your vessel, and on whether you will use your Vector for positioning as well as heading. If you plan to use it for positioning, you may need to depend on radiobeacon corrections. If you are not planning to use it for positioning, you will likely find that either radiobeacon or SBAS will meet your needs. Please remember that SBAS services are currently transmitting under an initial or temporary operational capability declaration (ie - "test mode"). Use caution when positioning with SBAS services until they are granted full, long-term operational capability status.

Q - Are the SBAS services reliable for differential operation?

A - SBAS services have been achieving excellent results. However, because both WAAS (for North America) and EGNOS (for Europe) are still in "test" mode, they are not to be used as sole means of navigation. Also, because they are still in "test" mode, there may be periods of outage or times when the signal should not be used. Please go to <http://gps.faa.gov/FAQ/index.htm> to learn the WAAS and EGNOS broadcast schedules.

Q - Can CSI Wireless' COAST™ technology work with corrections from an external source?

A - Yes. The Vector will operate in a similar fashion with the COAST™ technology as it will when using SBAS or beacon corrections. However, SBAS corrections can be separated into distinct

error components, which enables the Vector to anticipate how errors will change over the “coasting” period – with more consistent accuracy, and for a longer period, than regular RTCM range corrections.

Troubleshooting

Q - What do I do initially if I have a problem with the operation of the Vector?

A - Try to isolate the source of the problem. Problems usually fall into one of the following categories. There is also a detailed troubleshooting section available in the Vector User manual, which should help to eliminate basic operation and installation problems. Review each in detail so you can remove it from your list of potential sources

- Power, communication, and configuration
- GPS reception and performance
- Beacon reception and performance
- SBAS reception and performance
- External corrections
- Installation

Support and Repairs

Q - How should I solve a problem I cannot isolate?

A - Contact your dealer first. The dealer’s product experience will likely be able to help you isolate the problem. If not either you or the dealer should contact a CSI Wireless Technical Service Representative using the information at the bottom of this page.

Q - Can I contact CSI Wireless directly regarding technical problems?

A - Yes. However, we generally recommend that you speak to your dealer first. Your dealer has the most experience using the product in your specific environment.

CSI Wireless Technical Support is available from 8:00 AM to 5:00 PM Mountain Time, Monday to Friday, at:

Phone: 403-259-3311

Fax: 403-259-8866

E-mail: techsupport@csi-wireless.com