SMART-V1/SMAINT-V1G ANTENNA™

QUICK START GUIDE

This guide provides the basic information you need to set up and begin using your new SMART-V1 or SMART-V1G. For more detailed information on the installation and operation of your receiver, please refer to the OEMV user manuals. The manuals and their latest updates may be found on our website at: http://www.novatel.com/support/docupdates.htm

SMART-V1/V1G BOX CONTENTS

Accompanying this quick start guide, the following are also provided with your SMART-V1/V1G:

• 1 User Manuals postcard for requesting printed manuals
• One of the optional cables detailed in the SMART-V1/V1G Optional Cable section earlier in this guide

ADDITIONAL EQUIPMENT REQUIRED

The additional equipment listed below is required for a basic setup:

• A Windows-based PC with an RS-232 DB-9 port
• A power supply and connection (+9 to +28 V DC)
• A Windows-based PC with an RS-232 DB-9 port

Table 1: Multi-Cables Bare Tagged Wire Colors

<table>
<thead>
<tr>
<th>Color</th>
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</thead>
<tbody>
<tr>
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<td>PWR</td>
<td>Green</td>
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</tr>
<tr>
<td>Orange</td>
<td>PWR2</td>
<td>Brown</td>
<td>GND</td>
</tr>
<tr>
<td>Blue</td>
<td>1 SHUT (PPS)</td>
<td>Black</td>
<td>GND</td>
</tr>
<tr>
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<td>Reserved</td>
<td></td>
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</tr>
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Table 1:  Multi-Cables Bare Tagged Wire Colors

Complete the steps below to connect and power your receiver.

1. Mount the SMART-V1/V1G on a secure, stable structure with an unobstructed view of the sky.
2. Position the multi-cables as shown in the following diagrams.
3. When connecting power to the SMART-V1 or SMART-V1G, it is recommended that you use a battery source. In this case, it is important that you tie together the bare wires tagged as GND2 (brown) and GND (black) to the battery’s negative terminal. Tie the bare wires tagged as PWR (red) and PWR2 (orange) to the battery’s positive terminal.

Guidelines for grounded and floating installations are shown in the following diagrams.

ADDITIONAL EQUIPMENT REQUIRED

The additional equipment listed below is required for a basic setup:

• A Windows-based PC with an RS-232 DB-9 port
• A power supply and connection (+9 to +28 V DC)
• One of the optional cables detailed in the SMART-V1/V1G Optional Cable section earlier in this guide

SETTING UP YOUR SMART-V1/V1G

Complete the steps below to connect and power your receiver.

1. Start up the PC.
2. Insert the accompanying CD in the CD-ROM drive of the computer.
3. Select Install the OEMV GPS PC Utilities from the window that is automatically displayed. If the window does not automatically open when the CD is inserted, select Run from the Start menu and select the Browse button to locate Setup.exe on the CD drive.
4. Install the PC Utilities by advancing through the steps provided in the NovAtel GPS PC Utilities setup program.

SMART-V1/V1G OPTIONAL CABLES

The SMART-V1 is available with a USB, CAN or RS-422 multi-connector cable (these have 7 open ends, see Table 1, or have no connectors, that is, all open-ended):

• USB (18-pin connector to 2 serial DB-9 connectors, 1 USB connector)
• CAN (18-pin connector to 2 serial DB-9 connectors, 1 CAN DB-9 connector)
• RS-422 (18-pin connector to 3 serial DB-9 connectors)

The SMART-V1G is available with the USB cable above.

INSTALLING THE PC UTILITIES

Once the SMART-V1/V1G is connected to the PC and power supply, install NovAtel’s PC Utilities.

1. Start up the PC.
2. Insert the accompanying CD in the CD-ROM drive of the computer.
3. Select Install the OEMV GPS PC Utilities from the window that is automatically displayed. If the window does not automatically open when the CD is inserted, select Run from the Start menu and select the Browse button to locate Setup.exe on the CD drive.
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WARNING: If you do not use a battery, you must tie together the bare wires tagged as GND2 (brown), GND (black) and DIGGND (green) to the DC power supply’s negative ground connector. Failure to tie the appropriate grounds, as explained in this section, may result in your SMART-V1/V1G becoming permanently damaged and void your warranty.

Normally when a vehicle engine is started, power can dip to around 9.6 VDC or even cut-out to ancillary equipment.
ESTABLISHING RECEIVER COMMUNICATION

To open a serial port to communicate with the receiver, complete the following.

1. Launch CDU from the Start menu folder specified during the installation process. The default location is Start | Programs | NovAtel OEMV | OEMV PC Software.
2. Select Open... from the Device menu.
3. Select the New... button in the Open dialog box.
4. Enter a name for the new device configuration in the Name field of the New Config dialog box.
5. Select the Settings button.
6. Select the PC serial port the SMART-V1/V1G is connected to from the PC Port drop-down list.
7. Select 57600 from the Baud Rate list.
8. Uncheck the Use hardware handshaking checkbox.
9. Select OK to save the settings.
10. Select the OK button to close the New Config dialog box and create the new device configuration.
11. Select the new configuration from the Available device configs list in the Open dialog box.
12. Select the Open button to open communications with the SMART-V1/V1G.

As CDU establishes the communication session with the receiver, a progress box is displayed.

Once CDU is connected, the progress box disappears and several windows open, including the Console window. CDU is now ready to be used to view status information, enter commands, or log data.

USING CDU

CDU provides access to key information about your receiver and its position. The information is displayed in windows accessed from the View menu. For example, select Position Window from the View menu to display the position solution of the receiver. To show details of the GPS and geostationary (SBAS) satellites being tracked, select the GPS Tracking Status Window from the View menu. Select Help from the main menu for more details on CDU, its windows and features.
DETERMINING WHEN THE POSITION IS VALID
When the receiver has a valid position, the Solution Status field in CDU's Position window shows Computed.

ENTERING COMMANDS
The SMART-V1/V1G uses a comprehensive command interface. Commands can be sent to the receiver using the Console window in CDU, which is opened from the View menu. Enter commands in the text box at the bottom of the Console window.

LOGGING DATA
An extensive collection of logs has been created to capture the data your SMART-V1/V1G receives and processes. These logs can be directed to a SMART-V1/V1G port (COM1, COM2 or USB) and can be automatically generated when new or changed data becomes available or at regular intervals. The available logs are listed in the OEMV Family Quick Reference Guide.

To log data, use the LOG command. For example, to log the pseudorange position to COM 2 every 30 seconds, enter the following:

```
LOG COM2 PSRPOS ONTIME 30
```

Logs can be generated in one of three formats: ASCII, Abbreviated ASCII, or Binary. Refer to the OEMV Family Firmware Reference Manual (OM-20000094) for information on the LOG command, specifying the output format, and the detailed contents of each log.

The following information is important when entering commands:
- Commands can be entered in three formats: ASCII (log bestposa), Abbreviated ASCII (log bestpos), or Binary (log bestposb).
- Abbreviated ASCII is the best format to use when you wish to work with the receiver directly. For data collection, use ASCII or Binary.
- Press Enter to send the command string to the receiver.
- The commands are not case sensitive.

The OEMV Family Quick Reference Guide provided with the receiver lists the available commands and the parameters they use for the Abbreviated ASCII format. The SMART-V1/V1G models are also capable of SBAS positioning. This positioning mode is enabled using the SBASCONTROL command. The following commands are typically used to enable WAAS (North America) and EGNOS (Europe) systems:

```
SBASCONTROL ENABLE WAAS
SBASCONTROL ENABLE EGNOS
```

Once enabled, the Position Type field shown in CDU's Position window should change from Single to WAAS and you may see SBAS satellites in the Constellation window.

ENABLING SBAS POSITIONING

ENABLING L-BAND POSITIONING
L-Band equipped receivers allow you to achieve sub-meter accuracy. To use this positioning mode, you must enable L-band tracking to the Canada-Wide Differential GPS (CDGPS) or OmniSTAR signal. A subscription to OmniSTAR is required to use the OmniSTAR service (visit http://www.omnistar.com) and have your receiver’s serial number ready. The CDPs signal is free and available without subscription over North America (visit http://www.cdgps.com).

The ASSIGNLBand command allows you to set OmniSTAR or CDPs base station communication parameters and to start tracking L-Band satellites. It should include a relevant frequency and data rate. The frequency assignment can be made in Hz or KHz. For example:

```
Hz: assignlband omnistar 1536782000 1200
KHz: assignlband omnistar 1536782 1200
```

A value entered in Hz is rounded to the nearest 500 Hz.

To confirm you are tracking an L-Band signal, log the L-Band status information by entering: `log lbandstat`. For example, if you are receiving CDPs, the fifth field after the header should show 06c2:

```
lbandstatus com1 0 43.5 finesteering 1295 149951.671 00000000 976f 34461; 154756977 46.18 4541.0 0.00 00c2 00f0 ...
```

To specify the correction source, use the PSRDIFFSOURCE command as shown in the examples below:

```
PSRDIFFSOURCE OMNISTAR or, PSRDIFFSOURCE CDPs otherwise it is left at the default AUTOMATIC.
```

Refer to the OEMV Family Firmware Reference Manual for more details on individual L-Band or SBAS commands and logs.
REAL-TIME KINEMATIC (RTK) POSITIONING

Corrections can be transmitted from a base station to a rover station to improve position accuracy. The base station is the GNSS receiver which is acting as the stationary reference. It has a known position and transmits correction messages to the rover station. The rover station is the GNSS receiver which does not know its exact position and can receive correction messages from a base station to calculate differential GNSS positions.

In most cases you need to provide a data link between the base station and rover station (two NovAtel receivers) in order to receive corrections. SBAS and L-Band corrections can be accomplished with one receiver and are exceptions to the base/rover concept. Generally a link capable of data throughput at a rate of 9600 bits per second, and less than 4.0 s latency, is recommended.

Once your base and rover are set up, you can configure them for RTCM, RTCMV3 or CMR corrections. An RTCM example follows (replace the latitude, longitude and height coordinates shown in the FIX command line with those of your base):

**Base**
```
interfacemode com2 none rtcm off
fix position 51.11358042 -114.04358013 1059.4105
log com2 rtcm3 ontime 10
log com2 rtcm22 ontime 1 1
log com2 rtcm1819 ontime 1
log com2 rtcm1 ontime 5
```

**Rover**
```
interfacemode com2 rtcm none off
```

RT-20, with AdVance RTK, is a real-time kinematic software product developed by NovAtel. Optimal RTK performance is achieved when both the base and rovers are NovAtel products. However, AdVance RTK will operate with equipment from other manufacturers when using RTCM messaging.

RT-20 is supported by GPS-only and GPS+GLONASS models. Also, RT-20 with GPS+GLONASS provides faster convergence.

Refer to the GPGST log’s usage box in the OEMV Firmware Reference Manual for a definition of RMS and other statistics.

USING THE CAN BUS

A CAN Bus is a serial bus that provides services for processes, data and network management. There is a CAN Bus capable model of the SMART-V1 with its own multi-cable. CAN Bus functionality is controlled through NovAtel’s optional API software available through Customer Service. The API header file (*.h), in the API folder after installation, includes documentation on using the CAN Bus.

POST PROCESSING

Post-mission data processing refers to when the GPS data collected by the receiver is processed after the entire data-collection session is complete.

OEMV-based output is compatible with post-processing software from the Waypoint Products Group, NovAtel Inc. For details, visit our website at:


QUESTIONS OR COMMENTS

If you have any questions or comments regarding your SMART-V1 or SMART-V1G please contact NovAtel using one of these methods:

- Email: support@novatel.com
- Web: [www.novatel.com](http://www.novatel.com)
- Phone: 1-800-NOVATEL (U.S. & Canada) 403-295-4900 (International)

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