



This guide provides the basic information required to set up and begin using your new SMART-AG, a combined L1 GNSS receiver and antenna with Emulated Radar (ER) output. The SMART-AG also features optional Bluetooth® wireless connectivity and tilt compensation.

For more detailed information on the installation and operation of your receiver, refer to the SMART-AG and OEMV® user manuals. These manuals are available on NovAtel's website at:

www.novatel.com/support/firmware-software-and-manuals/

SMART-AG BOX CONTENTS

In addition to this quick start guide, the following are provided with your SMART-AG:

- 1 - CD containing:
 - An installation program for the NovAtel PC Utilities
 - Product documentation
- 1 - User Manual postcard for requesting printed manuals
- Mounting Plate
- 1 - SMART-AG cable for power and communications (NovAtel part number 01018256)

ADDITIONAL EQUIPMENT REQUIRED

The following additional equipment is required for a basic setup:

- A Windows-based PC with an RS-232 DB-9 port
- A battery connection (+8 to +36 V DC)

INSTALLING THE PC UTILITIES

Before setting up your SMART-AG, install NovAtel's *PC Utilities* on the Windows-based computer that you will use to communicate with it. This computer must have an RS-232 DB-9 port.

1. Start up the computer.
2. Insert the accompanying CD into the CD-ROM drive of the computer.

To access and download the most current version of our OEMV PC Utilities, go to the *Support* page of the NovAtel web site at www.novatel.com.

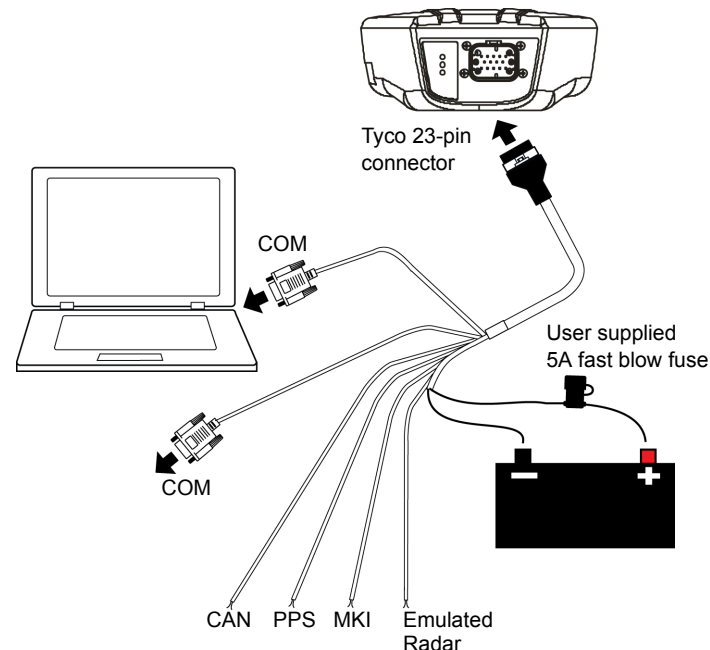
3. Select *Install the OEMV PC Utilities* from the window that is automatically displayed. If the window does not automatically open when the CD is inserted, select *Run* from the *Start* menu and select the *Browse* button to locate *Setup.exe* on the CD drive.
4. Install the PC Utilities by advancing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

SETTING UP YOUR SMART-AG

Complete the steps below to connect and power your receiver.

1. Mount the SMART-AG on a secure, stable structure with an unobstructed view of the sky.
2. Connect the SMART-AG cable to the SMART-AG.

3. Connect the SMART-AG to a DB-9 serial port on the PC.



4. Provide power to the SMART-AG as follows:
 - Connect the red wire of the cable (connector pin 14) to the positive side of a 12 or 24V vehicular power circuit (or equivalent) protected by a 5A fast blow fuse (user supplied). NovAtel recommends an automotive blade-type fuse, rated for 5A and with an operating voltage of more than 36V (recommended fuse part numbers are in the *SMART-AG User Manual*).
 - Connect the black wire of the cable (connector pin 9) to the negative side of the power circuit.
 - If a SMART-AG cable (NovAtel part number 01018256) is not used, a minimum wire size of 0.5 mm/ 20AWG is required.

SMART-AG LEDS

The LEDs on the SMART-AG represent these categories:

Table 1: SMART-MR15 LED Behavior

Red	Yellow	Green	Condition
Off	Off	Off	Power is not available
On	Off	Off	Power available but no satellites are tracking yet
On	Flashing ^a	Off	Tracking at least one satellite but not a valid position
On	On	Off	Position valid in basic autonomous mode
On	On	Flashing ^a	An SBAS signal is being tracked but sufficient data for SBAS operation has not yet been received
On	On	On	Position valid in an enhanced accuracy mode (WAAS/EGNOS/MSAS/DGPS or RTK)

a. Flashing means that the LED is turning on and off at a 1 Hz rate - 0.5 seconds on and 0.5 seconds off.

SMART-AG CABLE

The SMART-AG cable (NovAtel part number 01018256) has two DB-9 connectors, see *Figure 1*. One can accommodate a computer serial (RS-232) communication port and the other can connect to a modem or radio transmitter to receive differential corrections (refer to your user-supplied modem or radio transmitter information for its connectors).

At the other end is a 14-pin connector, see *Figure 1*.

In addition, there are a number of bare wires where the outer insulation is cut away but the wires beneath are intact. See *Table 2* for the cable pinouts.

The SMART-AG cable provides a means of supplying power from a battery while operating in the field. The bare wires (red for positive and black for negative) can then be tied to a battery supply capable of at least 5 W.

The SMART-AG cable is RoHS compliant.

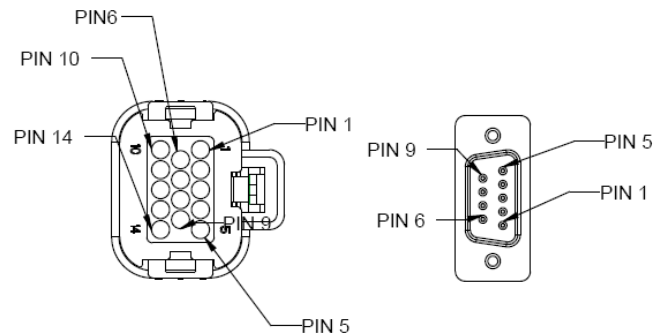


Figure 1: 14-pin and DB-9 Pin Numbers

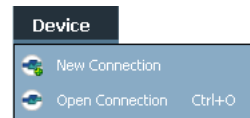
Table 2: SMART-AG Cable Wire Colors

Wire Color	Signal Name	14-pin (J1)	DB-9 (J2)	DB-9 (J3)	Label
Red	COM1_TXD	1	2		
White	COM1_RXD	2	3		
Red	COM2_TXD	3		2	
White	COM2_RXD	4		3	
Black	COM1 GND	5	5		
Black	COM2 GND	5		5	
White-Black	MKI GND	5			MKI GND
White-Black	ER GND	5			ER GND
White-Black	PPS GND	5			PPS GND
Yellow	CANI+	6			CANI+
Green	CANI-	7			CANI-
-	NO CONNECT	8			
Black	PWR RET (GND)	9			BATT-
Blue	EMD RADAR OUT	10			ER_OUT
White	MAN MARK IN	11			MKI
Orange	PPS	12			PPS
-	NO CONNECT	13			
Red	PWR INPUT	14			BATT+

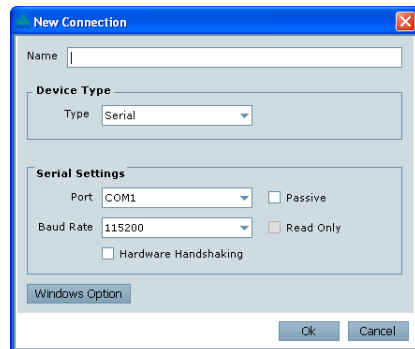
ESTABLISHING RECEIVER COMMUNICATION

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

1. Launch **Connect** from the *Start* menu folder specified during the installation process. The default location is *Start | All Programs | NovAtel PC Software | NovAtel Connect*.
2. Select New from the Device Menu.

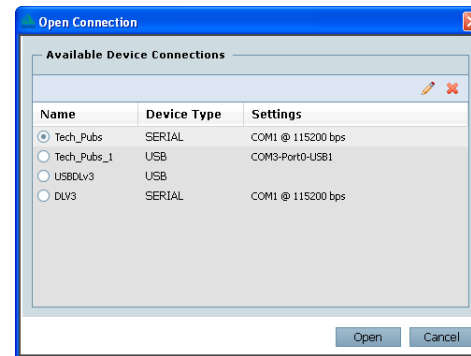


3. Enter a name for the Connection setup.



4. Select *Serial* from the *Type* list.
5. Select the computer port to which the SMART-AG is connected, from the *Port* list.
6. Set the COM port for the receiver to communicate through.
7. Select *115200* from the *Baud Rate* list.
8. Ensure the *Hardware Handshaking* box is not checked and click the *OK* button.

9. From the *Device* menu select Open Connection.

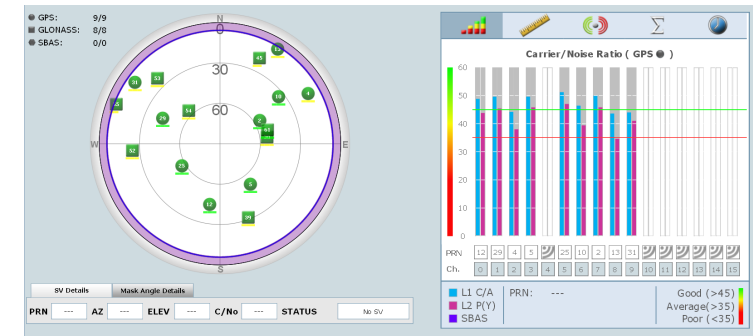


10. Select the *Open* button to open SMART-AG communications.

Connect establishes the communication session with the receiver and displays the progress. Once connected, the progress box disappears and several windows open, including the *Console* window. Connect is now ready for use to view status information, enter commands or log data.

USING NOVATEL CONNECT

Connect 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 GNSS and geostationary (SBAS) satellites being tracked, select the a *Tracking Status Window* from the *View* menu. Select *Help* from the main menu for more details on **Connect**, its windows and features.



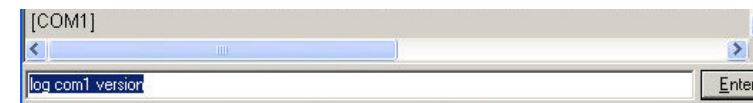
DETERMINING WHEN THE POSITION IS VALID

When the receiver has a valid position, the *Solution Status* field in **Connect's** *Position* window shows *Computed*.



ENTERING COMMANDS

The SMART-AG uses a comprehensive command interface. Commands can be sent to the receiver using the *Console* window in **Connect**, which is opened from the *View* menu. Enter commands in the text box at the bottom of the *Console* window.



The *OEMV Family Quick Reference Guide*, provided on the CD and available on the NovAtel website, provides comprehensive information about available commands. The *SMART-AG User Manual* provides information on a subset of these commands; in particular, the ones commonly used on the SMART-AG.

SAVECONFIG COMMAND

If you change the configuration of a function and want to save the new settings for your next session, use the SAVECONFIG command.



When using **Connect** to configure your receiver, ensure all of the graphical windows are closed before you issue the SAVECONFIG command.

CONFIGURING THE COMMUNICATION PORT

Use the COM command to configure the communication port through the command line. For example, to set COM port 2 to 9600 bps, no parity, 8 data bits, 1 stop bit, no handshaking, echo off, and break detection on, enter the following:

```
com com2 9600 n 8 1 n off on
```

NMEA LOGS

To configure the receiver output through the command line:

1. Ensure the communication port is configured:
2. Select and configure the NMEA string that you want to output. For example, to log gpgga (position system fix data and undulation) at 2 Hz, enter the following:

```
log gpgga ontime 0.5
```

ENABLING SBAS POSITIONING

To enable SBAS positioning, enter the following command:

```
sbascontrol enable
```

Once enabled, the *Solution type* field shown in the **Connect Position** window changes from *Single* to *SBAS*, and you may see SBAS satellites in the *Constellation* window. SMART-MR10 will track available SBAS satellites, including WAAS, EGNOS and other SBAS systems.

Latitude	51.116695592° ±	0.82m
Longitude	-114.038813659° ±	0.69m
Hgt. (MSL)	1062.639m ±	1.95m
Solution type	SBAS	

ENABLING GL1DE®

To enable **GL1DE**, enter the following commands:

```
pdpfilter enable
```

```
pdpmode relative auto
```

ENABLING Bluetooth WIRELESS TECHNOLOGY

Bluetooth wireless technology is configured on the SMART-AG COM3 internal port and is enabled by default.

To disable *Bluetooth* wireless technology:

```
btcontrol disable
```

To enable *Bluetooth* wireless technology:

```
btcontrol enable
```

For detailed information about the configuration and enabling of *Bluetooth* wireless technology on the SMART-AG, refer to *Chapter 5 Bluetooth Configuration* in *SMART-AG User Manual*.

USING THE CAN BUS

A CAN Bus is a serial bus that provides services for processes, data and network management. There is CAN Bus capability through the SMART-AG cable, see *Table* on *Page 1*.

NMEA 2000 is a CAN standard created by the National Marine Electronics Association and designed to support networking in marine applications. It functions over a longer physical distance, and supports more physical nodes than ISO 11783. The relationship between NMEA2000 and SAE J1939 is that J1939 is the standard, while the NMEA 2000 group has added some new messages (called PGNs or Parameter Group Numbers) and added a new, additional transport protocol called FastPacket. NMEA2000 compliant, for all intents and purposes, means J1939 compliant *plus* support for new NMEA2000 messages. In other word, one cannot have NMEA2000 without J1939 support as well. J1939 is additionally “harmonized” with ISO 11783, a standard for the agriculture industry.

The CAN module is generally not user-interactive. It is activated by entering the command SETCANNAME 305. If this is followed by entering the SAVECONFIG command, the CAN module is activated immediately on all subsequent start-ups. The module supports NMEA2000 Parameter Group Message (PGN): PGN 129029 GNSSPositionData, PGN 129025 GNSSPositionRapidUpdate, and PGN 129026 COGandSOGRapidUpdate.

EMULATED RADAR (ER)

The SMART-AG provides an emulated ground speed RADAR pulse output. The enclosure outputs ER via the bare wires labeled ER GND and ER_OUT on the SMART-AG cable. See *Table* on *Page 1* for the pin-out details of this cable. Also see *Appendix B.5 RADARCFG* of the *SMART-AG User Manual*.

The ER outputs a logic high of 6.3 V minimum and logic low of 1.5 V maximum with a rise and fall time of less than 1 ms. Its output references battery GND when output is logic low and provides logic low output until its speed is greater than 1 km/Hr.

It provides an output frequency that represents 26.11 Hz/km/Hr with an effective range from 1 km/Hr to 55 km/Hr and uses 2D velocity for near-horizontal applications.

TERRAIN COMPENSATION

The optional SMART-AG Terrain Compensation feature corrects for errors in position caused by rolling of the vehicle. The SMART-AG senses the vehicle’s roll angle and, with the user-entered “height above ground”, compensates the position output to give the position under the vehicle rather than at the antenna. Once configured, corrected positions are sent to host equipment. See the *Appendix B.4 \$PMDT* of the *SMART-AG User Manual*.

For proper operation, SMART-AG requires proper installation, accurate height setting and levelling of the tilt sensor.

LOGGING DATA

An extensive collection of logs has been created to capture the data your SMART-AG receives and processes. These logs can be directed to a SMART-AG port (COM1 or COM2) 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
```

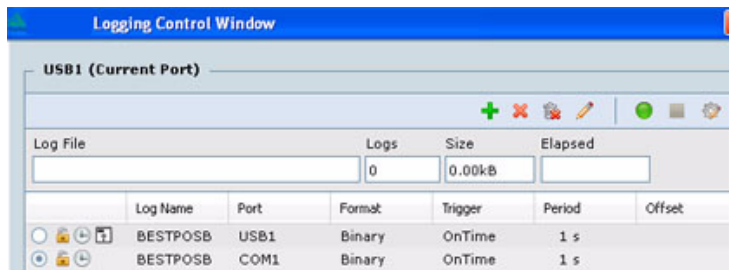
When requesting logs, you can request the output data in three formats:

- ASCII
- Abbreviated ASCII
- Binary

Abbreviated ASCII is the best format to use when you want to work with the receiver directly and review individual log contents visually.

Refer to the *OEMV Family Firmware Reference Manual (OM-2000094)* for information on the `LOG` command, specifying the output format, and the detailed contents of each log.

If you prefer, **Connect** provides a graphical interface for configuring data logging. Select *Logging Control Window* from the *Tools* menu. In the *Logging Control* window, you can select which logs to capture and choose to which ports to send the data. In addition, you can specify a file in which to save the data.



When logging data through Connect, close all unused graphical windows to save COM port throughput and receiver CPU usage.

QUESTIONS OR COMMENTS

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

Email: support@novatel.com

Web: www.novatel.com

Phone: 1-800-NOVATEL (U.S. & Canada)

1-800-668-2835

1-403-295-4900 (International)

Fax: 1-403-295-4901



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