SMART-AG™

QUICK START GUIDE

This guide provides the basic information you need to set up and begin using your new SMART-AG, a combined L1 GNSS receiver and antenna with Emulated Radar (ER) output. 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-AG DEVELOPMENT KIT CONTENTS

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

- 1 CD containing:
  - An installation program for NovAtel's Control and Display Unit (**CDU**) graphical user interface software
  - Product documentation, including user manuals
- 1 User Manual postcard for requesting printed manuals
- Mounting Plate
- 1 SMART-AG cable for power and communications:

  The cable has two DB-9 connectors, see *Figure 1*. One can accommodate a PC/laptop 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 1* below for their pinouts. This cable is RoHS compliant and its part number is 01018256.

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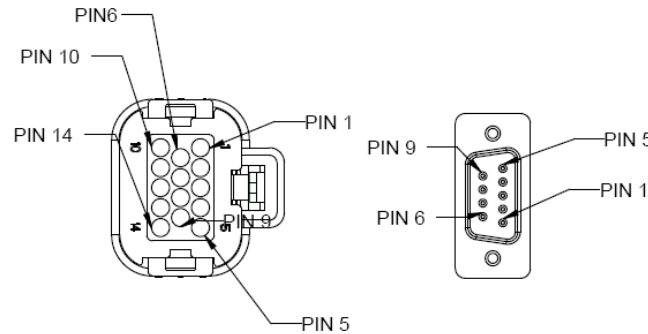
Figure 1: 14-pin and DB-9 Pin Numbers

Table 1: 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	MMI GND	5			MMI 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			MMI
Orange	PPS	12			PPS
-	NO CONNECT	13			
Red	PWR INPUT	14			BATT+

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 battery connection (+8 to +36 V DC)

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 to a DB-9 serial port on the PC.
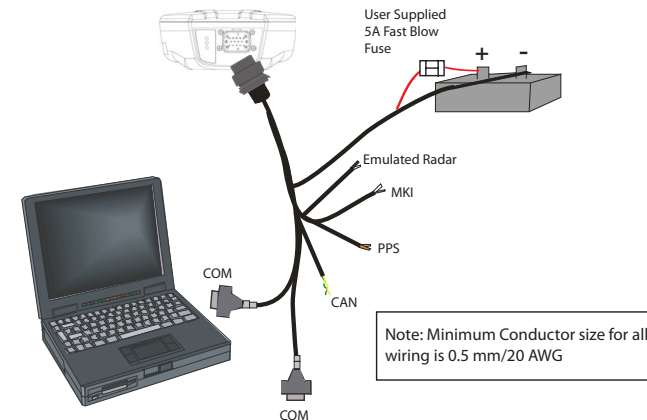
3. Connect power to the SMART-AG. The cable's red wire (connector pin 14) is to be connected to the positive side of a 12 or 24V vehicular power circuit (or equivalent) protected by a 5A fast blow fuse (user supplied). The cable's black wire (connector pin 9) is to be connected to the negative side of the power circuit. If a SMART-AG cable (NovAtel part number 01018256) is not used, a minimum wire size of 0.5 mm/ 20AWG must be used.

INSTALLING THE PC UTILITIES

Once the SMART-AG is connected to the PC and power supply, install NovAtel's *PC Utilities*.

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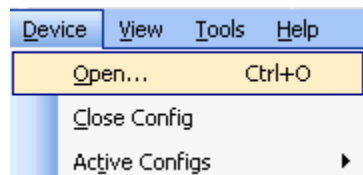

ESTABLISHING RECEIVER COMMUNICATION

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. The *Options | Configuration* dialog opens.

4. Use the ✚ button at the top of the configurations selection box to add a new configuration. To delete a configuration, select it from the list and click on the ➖ button. To duplicate an existing configuration, click on the 📄 button. You can select any name in the list and edit it to change it.
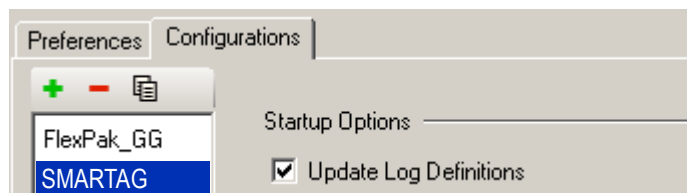
5. Select *Serial* from the *Type* list and select the PC/laptop port, that the DL-V3 is connected to, from the *Port* list.
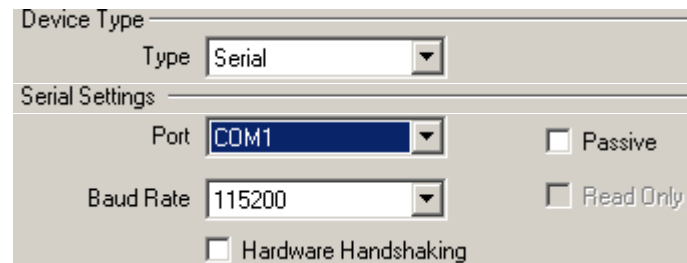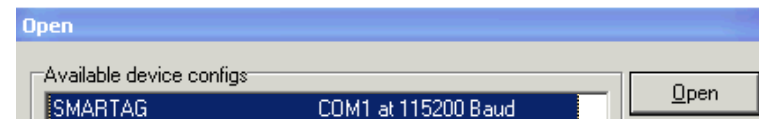

6. Select *115200* from the *Baud Rate* list.
7. Uncheck the *Hardware Handshaking* checkbox.
8. Select *OK* to save the new device settings.
9. Select the new configuration from the *Available device configs* area of the *Open* dialog.
10. Select the *Open* button to open SMART-AG communications.

As **CDU** establishes the communication session with the receiver, it displays a progress box. Once **CDU** is connected, the progress box disappears and several windows open, including the *Console* window. **CDU** is now ready for use 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 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 **CDU**, its windows and features.
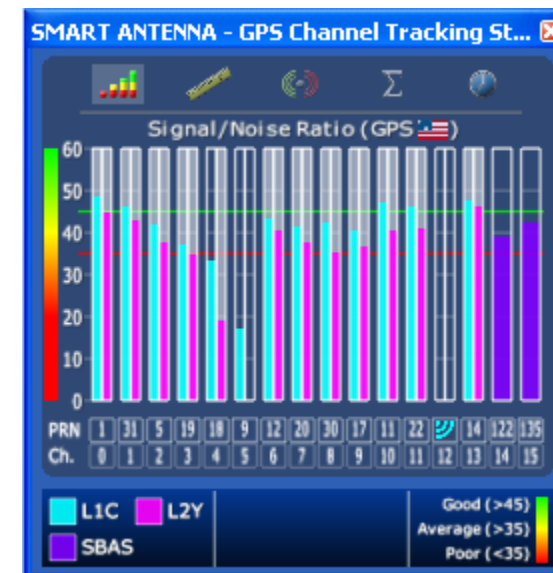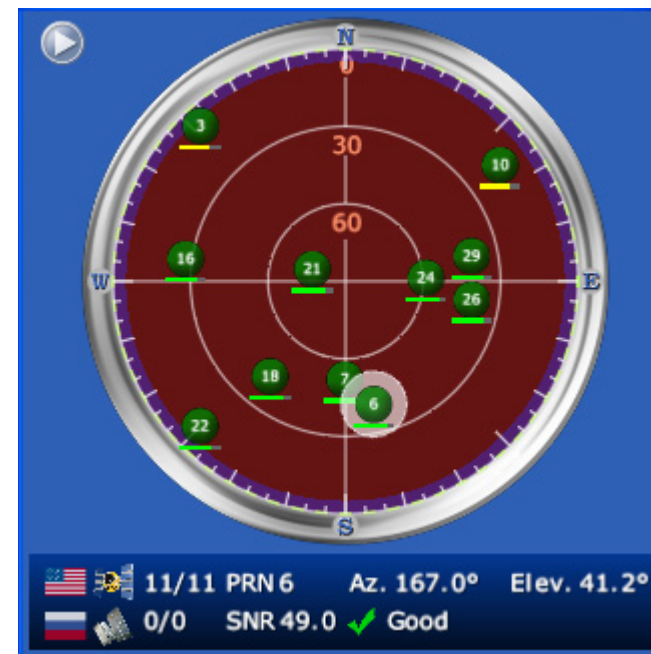
SMART-AG LEDS

The LEDs on the SMART-AG represent these categories:

| Red 🔋	Yellow 🛰	Green ✓	Condition
Off	Off	Off	Power is not available
On	Off	Off	Power available but no satellites are tracking yet
On	Flashing	Off	Tracking at least one satellite but not a valid position
On	On	Off	Position valid in basic autonomous mode
On	On	Flashing	*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)

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-AG 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.


```
[COM1]

log com1 version                          Enter
```
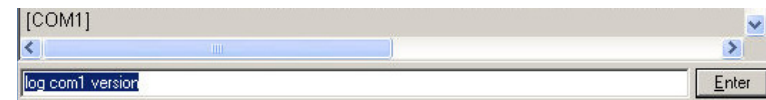
The following information is important when entering commands:

- Commands can be entered in three formats:
  - ASCII (log bestposa)
  - Abbreviated ASCII (log bestpos)
  - 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.

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, 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.

If you prefer, **CDU** 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.

ENABLING SBAS POSITIONING

To enable SBAS positioning, enter the following command:

```
sbascontrol enable
```

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

```
pdpfilter enable

pdpmode relative auto
```

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 1* on *Page 1*. 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.

NEMA 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 when a SETCANNAME command is entered, and after a SAVECONFIG, 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 outputs an emulated RADAR signal. The enclosure outputs ER via the bare wires labeled ER GND and ER_OUT on the SMART-AG cable. See *Table 1* on *Page 1* for the pin-out details of this cable. Also see the *RADARCFG command* on *Page 63* 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.

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)

403-295-4900 (International)

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