

OEMSTAR™ Card

QUICK START GUIDE

This guide provides the basic information you need to set up and begin using your new OEMStar card. For more information on the installation and operation of your receiver, please refer to the OEMStar User Manuals. The technical specifications of the OEMStar cards are found the *OEMStar Installation and Operation User Manual*. The most up to date revisions of these manuals can be found on our Web site at <http://www.novatel.com/support/firmware-software-and-manuals/>.

WARNING: The LNA power pin (pin 1 of the 20-pin connector) can handle a maximum voltage of **5.25 VDC**.

Note: This is different from all other OEMV and SSII products which are equipped with a 5V voltage regulator on the board.



Failure to adhere to this warning, may result in your OEMStar card becoming permanently damaged and void your warranty.

WARNING: Pin 3 of the OEMStar is used for the USB D-signal.

Note: This is different from the Superstar II product which uses pin 3 (VBATT) for external battery backup. Superstar II users who want to integrate the OEMStar card into existing designs must not apply any external voltage to pin 3 and must remove the VBATT connection.



Failure to adhere to this warning, may result in your OEMStar card becoming permanently damaged and void your warranty.

AVAILABLE USER SUPPORT DOWNLOADS

In addition to this *Quick Start Guide*, the following user manuals are also available from our Web site at <http://www.novatel.com/support/firmware-software-and-manuals/> for your OEMStar card:

- The *OEMStar Quick Reference Guide*
- The *OEMStar Installation and Operation Manual*
- The *OEMStar Firmware Reference Manual*

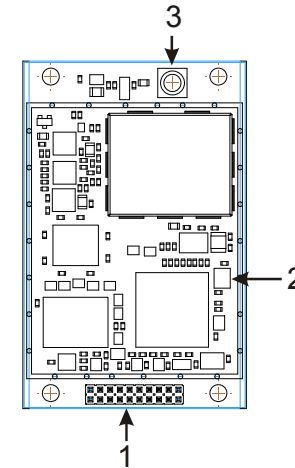
Installation programs for NovAtel's PC utilities like CDU (Control and Display Unit), sample source code and Universal Serial Bus (USB) drivers with their installation instructions are all available on our Web site at <http://www.novatel.com/support/firmware-software-and-manuals/firmware-software-updates/oemstar/>.

ADDITIONAL EQUIPMENT REQUIRED

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

- A Windows-based computing device with a RS-232 DB-9 or USB port
- A power supply between 3.3 and 5 VDC for the OEMStar capable of providing at least 2.5 W
- An enclosure to protect against environmental conditions and RF interference
- A wiring harness (see *Figure 2*) to provide power to the receiver and access to the data and strobe signals, with one or more DB-9 connectors for serial communication with a PC or other data communications equipment
- A null-modem cable (see *Figure 3*)
- A quality GNSS antenna, such as our ANT-35C50P1GLA-TW-N (see *Figure 4*)
- An antenna cable with a male MCX connector at the receiver end (see *Figure 5*)

Figure 1 shows the card, connectors and indicators.



Ref. #	Description
1	Power/data/signal connector
2	LED status indicator
3	RF signal in/LNA power out (OEMStar MCX)

Figure 1: Connector and Indicator Locations

☒ To create a common ground, tie together all digital grounds (GND) with the ground of the power supply.

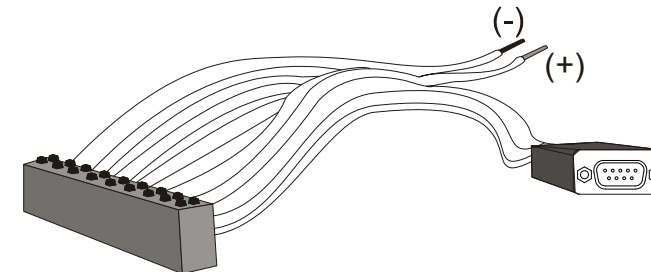


Figure 2: Example of a User-Supplied Wiring Harness

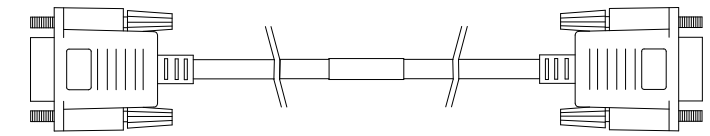


Figure 3: User-Supplied Null-Modem Cable Example

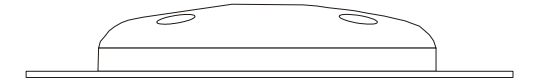


Figure 4: User-Supplied Antenna (ANT-35C50P1GLA-TW-N Example Shown)

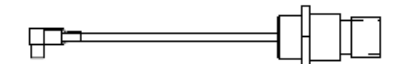



Figure 5: User-Supplied MCX to TNC Cable Example

SETTING UP YOUR OEMSTAR CARD

Complete the steps below to connect and power your OEMStar card. See the *OEMStar Installation and Operation User Manual* for more information on steps 2 through 5.

1. Install the OEMStar card and the wiring harness in a secure enclosure to reduce environmental exposure and RF interference, making sure to protect against ESD.

 **CAUTION: If you do not take the necessary precautions against Electrostatic Discharge (ESD), including using a suitable ESD wrist strap, you may damage the OEMStar card and void your warranty.**

2. Reconfigure the ports if necessary. COM1 and COM2 ports on the OEMStar card support only LVTTTL voltage level. You must provide the RS-232 translation circuit in order to connect the ports to a PC.
3. Mount a GNSS antenna on a secure, stable structure with an unobstructed view of the sky.
4. Connect the GNSS antenna to the OEMStar card using a coaxial cable.
5. Connect a serial port on the receiver to a serial port on the PC, or other computing device, using a null modem cable.
6. Connect a power supply to the OEMStar card.
7. Plug in and/or turn on the power supply.

INSTALLING THE PC UTILITIES

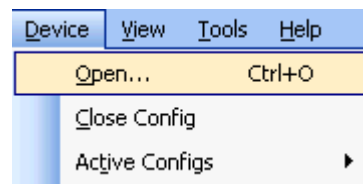
Once the OEMStar card is connected to the PC, antenna, and power supply, install NovAtel's PC Utilities.

1. Start up the PC.
2. Go to <http://www.novatel.com/support/firmware-software-and-manuals/firmware-software-updates/oemstar/> and download the latest versions of the PC Utilities.
3. Install the PC Utilities by advancing through the steps provided in the *NovAtel PC Utilities* setup program.

ESTABLISHING RECEIVER COMMUNICATION

To open communication with the receiver, follow these steps.

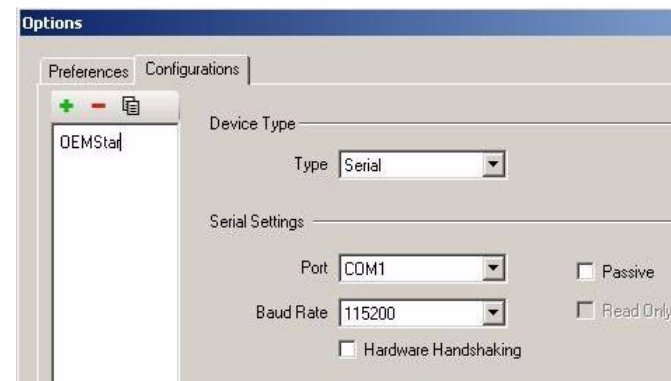
1. Launch CDU from the *Start* menu folder specified during the installation process. The default location is *Start | All Programs | NovAtel PC Software 3.x.x | NovAtel CDU*
2. Select *Open....* from the *Device* menu.



3. Select the *New...* button in the *Open* dialog box.

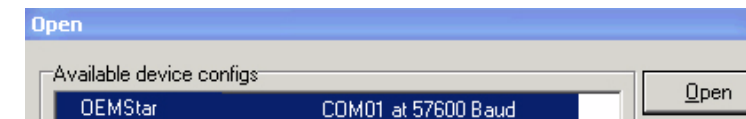


4. Select the PC serial port the OEMStar card is connected to from the *Port* drop-down list.



5. Select desired rate from the *Baud Rate* list.
6. Ensure the *Use hardware handshaking* checkbox is unchecked.
7. Select *OK* to save the settings.

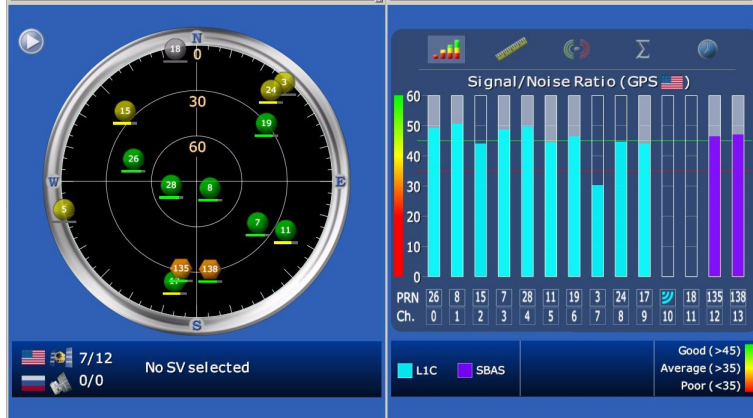
8. Select the *OK* button to close the dialog box and create the new device configuration.
9. Select the new configuration from the *Available device configs* list in the *Open* dialog box.
10. Select the *Open* button to open communications with the OEMStar card.



As CDU establishes a 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 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 GNSS and geostationary (SBAS) satellites being tracked, select a *Tracking Status Window* (GPS or GLONASS) 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 *POSITION VALID* or *PV* signal pin of the DIN connector changes to a logic level high (LVTTL). In addition, the *Solution Status* field in CDU's *Position* window shows *Computed*.



ENTERING COMMANDS

The OEMStar cards use 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.



The following information is important when entering commands:

- Commands can be entered in three formats: ASCII (log bestposa), Abbreviated ASCII (log bestpos), and 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 the *Enter* key to send the command string to the receiver.
- The commands are not case sensitive.

The *OEMStar Quick Reference Guide* provided with the receiver lists the available commands and the parameters they use for the *Abbreviated ASCII* format.

LOGGING DATA

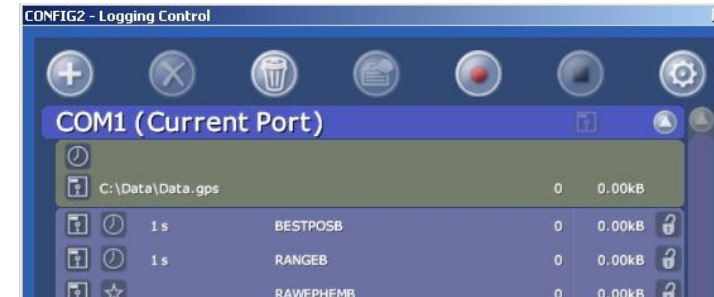
An extensive collection of logs has been created to capture the data your OEMStar card receives and processes. These logs can be directed to any of the OEMStar card's serial ports and can be automatically generated when new or changed data becomes available or at regular intervals. The available logs are listed in the *OEMStar 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 *OEMStar Firmware Reference Manual (OM-20000126)* 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

The OEMStar card is capable of SBAS positioning. This positioning mode is enabled using the `SBASCONTROL` command. These commands are typically used to enable WAAS (North America) and EGNOS (Europe) respectively:

```
SBASCONTROL ENABLE WAAS
```

```
SBASCONTROL ENABLE EGNOS
```

Latitude	51.11678752°	1.52m
Longitude	-114.03886846°	1.35m
Hgt. (MSL)	1063.102m±	2.01m
Solution type	SBAS	
Iono correction	GNSS Broadcast	
AdVanced RTK status	N/A	

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



✉ Refer to the *OEMStar Firmware Reference Manual* for more on individual commands and logs.

USING REAL-TIME KINEMATIC (RTK) CORRECTIONS

OEMStar uses RTCM 2.3, RTCM 3.0, RTCA, Trimble CMR and Trimble CMR+ corrections to achieve a DGPS solution. These 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.

The OEMStar supports GPS only and GPS+GLONASS RTK correction transmissions to achieve a DGPS solution.

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 corrections can be accomplished with one receiver and are exceptions to the base/rover concept. Generally a link capable of at least 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 RTCA, RTCM 2.3, RTCM 3.0, Trimble CMR+ or Trimble CMR corrections. Below is an RTCM example (replace the latitude, longitude and height coordinates shown with those of your base):

Base: OEMStar or other receiver

```
interfacemode com2 none rtkcm off
fix position 51.11358042 -114.04358013
1059.4105
```

GPS only DGPS base:

```
log com2 rtkcm1 ontime 5
```

GPS+GLONASS DGPS base:

```
log com2 rtkcm1 ontime 5
```

```
log com2 rtkcm31 ontime 5,1
```

Rover: OEMStar (DGPS position only)

```
interfacemode com2 rtkcm none off
rtksource rtkcm any
psrdiffsource rtkcm any
```

Alternative rover:

```
interfacemode com2 rtkcm none off
rtksource rtkcm any
psrdiffsource rtkcm any
```

-
1. Refer to the GPGST log's usage box in the *OEMStar Firmware Reference Manual* for a definition of RMS and other statistics.
2. For more base/rover configurations, refer to our Web page at <http://www.novatel.com/support/knowledge-and-learning/>
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POST PROCESSING

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

OEMStar output is compatible with post-processing software from the Waypoint Products Group, NovAtel Inc. For details, visit our Web site at:

<http://www.novatel.com/products/waypoint-software/>

QUESTIONS OR COMMENTS

If you have any questions or comments regarding your OEMStar card, 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)

Fax: 403-295-4901



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