

OEM6™ Family Receivers

QUICK START GUIDE

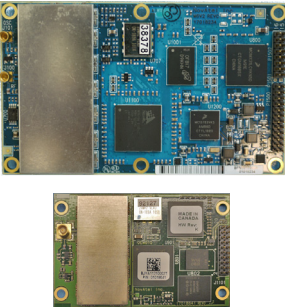
This guide provides the basic information you need to set up and begin using your new OEM6 family card. For more information on the installation and operation of your receiver, refer to the *OEM6 Family Installation and Operation User Manual* on the CD provided. This manual also contains technical specifications of the OEM6 family cards. To order a printed copy of the manuals, free of charge, follow the instructions given on the enclosed *User Manuals* postcard. The most up-to-date revisions of these manuals can be found at www.novatel.com | *Support* | *Firmware/Software and Manuals*.

The CD also contains NovAtel PC utilities, including CDU (Control and Display Unit), OEM6 Software Development Kit with OEM6 Sample Source Code, and Universal Serial Bus (USB) drivers with installation instructions.

BOX CONTENTS

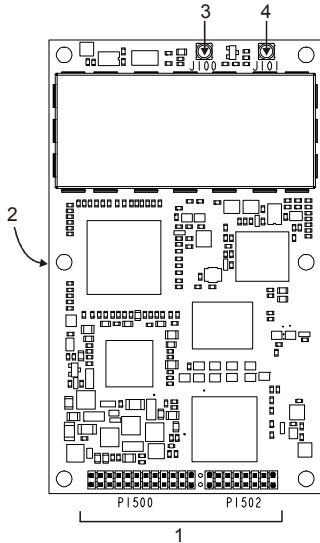
In addition to this *Quick Start Guide*, the following are provided with your OEM6 family receiver card:

- 1 ESD wrist strap
- 1 *OEM6 Family Quick Reference Guide*, which provides a summary of OEM6 commands and logs
- 1 postcard for requesting printed manuals
- 1 NovAtel CD



OEM6 FAMILY CARDS

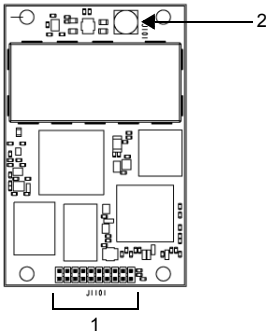
Figure 1 shows the OEM628 card and its connectors and indicators.



Ref. #	Description
1	Power/data/signal/CAN/Ethernet connectors
2	LED status indicator (on other side of board)
3	RF signal in/LNA power out
4	External oscillator input

Figure 1: Connector and Indicator Locations

Figure 2 shows the OEM615's connectors and indicators.



Ref. #	Description
1	Power/data/signal connector
2	RF signal in/LNA power out

Figure 2: Connector and Indicator Locations

ADDITIONAL EQUIPMENT REQUIRED

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

- A Microsoft Windows-based computer with an RS-232 DB-9, Ethernet or USB port
- A power supply of +3.3 VDC ± 5% with less than 100 mV ripple, capable of providing at least 1.5 W
- An enclosure to protect against environmental conditions and RF interference
- A wiring harness to provide power to the receiver and access to serial, GPIO, PPS, Event, USB, CAN, Ethernet and other signals
- A serial, USB or Ethernet cable
- A high-quality GNSS antenna, such as NovAtel's GPS-703-GGG
- An 50 ohm antenna cable with a male MMCX (OEM628) or MCX (OEM615) connector at the receiver end

NOTE: The OEM6 Development Kit enables all of the above functionality.

INSTALLING THE PC UTILITIES

1. Start the computer.
2. Insert the accompanying CD in the CD-ROM drive.
3. Select *Install the OEMV GPS PC Utilities* from the window that opens automatically. If the window does not open automatically when the CD is inserted, select *Run* from the *Start* menu and navigate to *Setup.exe* on the CD.
4. Follow the on-screen instructions to complete the software installation.

SETTING UP AN OEM6 FAMILY CARD

Complete the following steps below to connect and power your OEM6 family card. Refer to *OEM6 Family Installation and Operation User Manual* for additional information.

1. Install the OEM6 family card and the wiring harness in a secure enclosure to reduce environmental exposure and RF interference, making sure to protect against ESD.

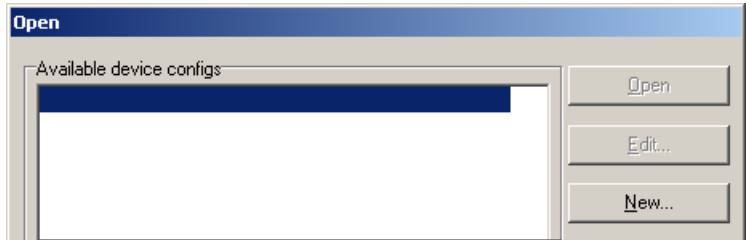
CAUTION: If you do not take the necessary precautions against Electrostatic Discharge (ESD), including the use of the ESD wrist strap provided, you may damage the OEM6 card and void your warranty.

2. Reconfigure the ports if necessary. COM1 can be configured as either RS-232 or RS-422.
3. Mount a GNSS antenna on a secure, stable structure that has an unobstructed view of the sky from horizon to horizon.
4. Connect the GNSS antenna to the OEM6 family card with a 50 ohm coaxial cable.
5. Connect a serial port on the receiver to a serial port on the computer with a null modem cable. You can also use a USB or Ethernet cable if your harness permits.
6. Connect a power supply to the OEM6 family card.
7. Plug in and/or turn on the power supply.

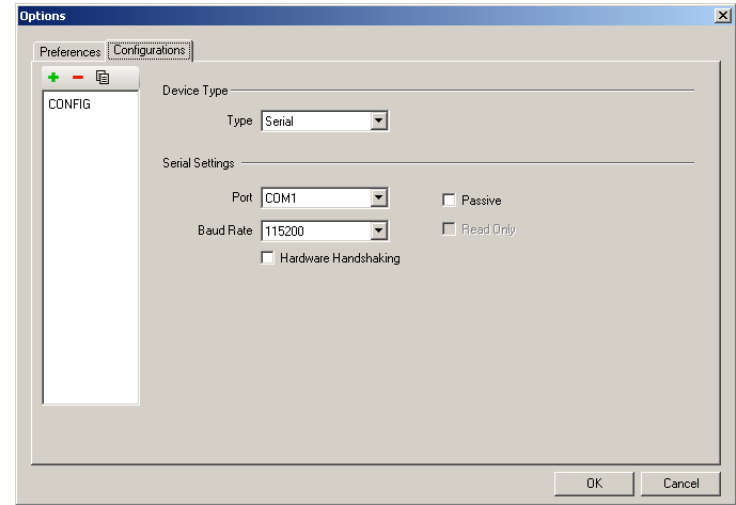
ESTABLISHING RECEIVER COMMUNICATION

To open communication with the receiver:

1. Open **NovAtel[®] CDU** from the *Start* menu. The default location is *Start | All Programs | NovAtel PC Software | NovAtel CDU*.
2. In the *Device* menu, select **Open**. If you have not configured any devices, the *Available device configs* table is empty.

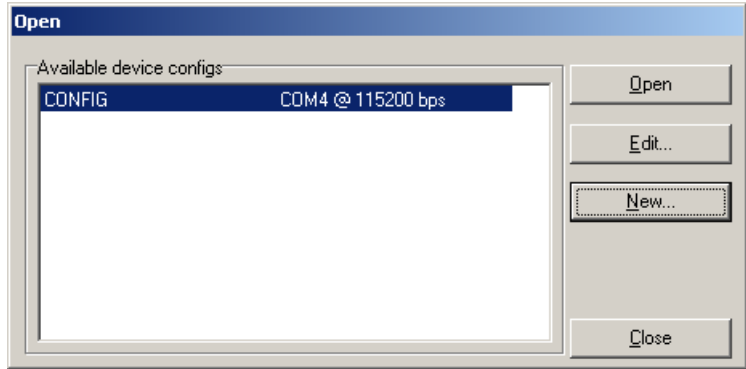


3. To enter a new configuration, click **New**. The *Options* screen opens with a default name for the new entry. Click the entry if you want to modify the name.



4. Select the device *Type* from the drop-down list. In most cases, the device type is *Serial*.

5. Select the *Port* that the OEM6 card is connected to.
6. Select the *Baud Rate*. Use *115200* if you are not sure.
7. Uncheck the *Passive* and *Hardware Handshaking* checkboxes.
8. Click **OK** to save the configuration. The new configuration appears in the *Available device configs* table:

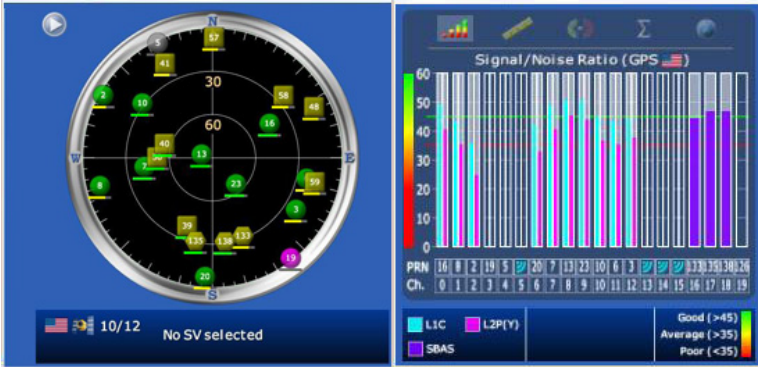


9. To open communications with the OEM6 card, select the configuration that you want to use in the *Available device configs* table. Then, click **Open**.

A progress box appears as CDU establishes a communication session with the receiver.

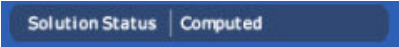
USING CDU

CDU provides access to 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 *Solution Status* field in CDU's *Position* window changes to *Computed*:



ENTERING COMMANDS

Commands can be sent to the receiver with the *Console* window under *View* in the menu bar. Enter commands in the text box at the bottom of the Console window.



Note the following when entering commands:

- Logs can be requested in three formats: ASCII (e.g., log bestposa), Abbreviated ASCII (e.g., log bestpos) and Binary (e.g., log bestposb). Abbreviated ASCII is the best format to use when you want to work with the receiver directly. For data collection, use ASCII or Binary.
- Press **Enter** to send the command string to the receiver. Commands are not case sensitive.

The *OEM6 Family Quick Reference Guide* provided with the receiver lists the available commands and the parameters they use.

LOGGING DATA

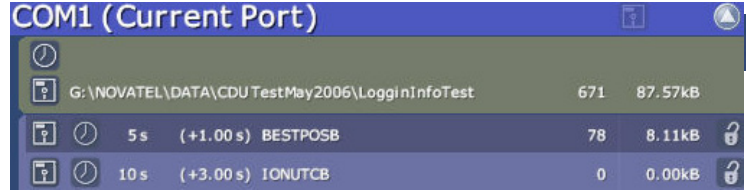
An extensive set of logs has been created to capture the data your OEM6 family card receives and processes. These logs can be directed to any of the OEM6 family card’s communication ports and can be automatically generated when new or changed data becomes available or at regular intervals. The available logs are listed in the *OEM6 Family Quick Reference Guide*.

To log data, use the LOG command. For example, to log the pseudorange position to COM2 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 *OEM6 Family Firmware Reference Manual (OM-20000129)* 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 the ports to which you want to send the data. In addition, you can specify a file in which to save the data.



ENABLING SBAS

All GPS-capable models of OEM6 family cards are capable of SBAS positioning. This positioning mode is enabled using the SBASCONTROL command, as follows:

```
SBASCONTROL ENABLE AUTO
```

Once enabled, the *Solution type* field shown in CDU's *Position* window should change from *Single* to *SBAS*, and you should see SBAS satellites in the *Constellation* window, as shown below. OEM6 family cards 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 L-BAND (OEM628 ONLY)

L-Band-equipped receivers allow you to achieve sub-meter accuracy. To use this positioning mode, you must first obtain a subscription to track the OmniSTAR L-band signal. Various OmniSTAR services are available - VBS, XP, HP and G2. To obtain a subscription, contact OmniSTAR as outlined on their Web site at www.omnistar.com. Before you contact OmniSTAR, have your OSN [OmniSTAR Serial Number, available using the LBANDINFO log] and manufacturer name [NovAtel] ready.

The ASSIGNLBAND command allows you to set the OmniSTAR base station communication parameters. 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. If you are receiving OmniSTAR HP, the fifth field of the LBANDSTAT log should be 00c2, as shown in the following example:

```
LBANDSTAT COM1 0 81.0 FINESTEERING 1596
235136.000 00000000 d1c2 5968

<1557854678 48.98 1098.9 0.00 00c2 0000
153860 545 0 0000 0201 154019 68000000
00000000
```

To specify the correction source, use the PSRDIFFSOURCE command as shown in the following example:

```
PSRDIFFSOURCE OMNISTAR
```

otherwise it is left at the default AUTOMATIC.

✉ Refer to the *OEM6 Family Firmware Reference Manual* for more on individual L-Band, GLONASS 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 to centimetre level. The base station is the GNSS receiver that 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 that does not know its exact position but which 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. It is also possible to receive and use RTK corrections from established networks. SBAS and L-Band corrections can be acquired with one receiver and are exceptions to the base/rover concept, although neither are considered RTK positioning. Generally a link capable of data throughput at a rate of 19200 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, RTCAOBS2, RTCM, RTCMV3, CMR+ or CMR corrections. Below is an RTCA example (replace the latitude, longitude and height coordinates shown with those of your base):

Base

```
interfacemode com2 none rtca off
fix position 51.11358042 -114.04358013
1059.4105
log com2 rtcaobs2 ontime 1
log com2 rtcaref ontime 10
log com2 rtca1 ontime 5
log com2 rtcaephem ontime 10 1
```

Rover

```
interfacemode com2 rtca none off
```

RT-2™ and RT-20®, with AdVance® RTK, are real-time kinematic software products 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 and CMR messaging.

RT-2 and RT-20 are supported by GPS-only and GPS+GLONASS OEM6-based models. Also, RT-20 with GPS+GLONASS provides faster convergence.

✉ For more base/rover configurations, search the key words “rover base” at www.novatel.com | *Support* | *Helpdesk & Solutions* | *Search Known Solutions*.

USING OEM6 CAN BUS FUNCTIONALITY

OEM6 cards incorporate a CAN Bus controller which supports physical-layer signals and low-level messages specified in the appropriate sections of the J1939 and ISO11783 standards. Manufacturers can also specify messages specific to their application without violating these standards. To facilitate this, NovAtel provides an Application Program Interface (API). To obtain information about this API, contact NovAtel Customer Support.

The OEM628 and OEM615 cards have two CAN ports, CAN1 and CAN2. CAN1 and CAN2 both support applications up to 1 Mbps.

✉ There are no CAN transceivers on the OEM6 series receivers. The cards require external CAN transceivers and proper bus terminations.

ETHERNET CONNECTION (OEM628 ONLY)

The OEM628 receiver is equipped with a 10/100baseT Ethernet port that supports IPv4 Internet layer, TCP/IP transport, telnet and ping. Through the port, you can conduct remote debugging, accept MRTCA (modified RTCA) data, and download firmware. OEM6 family receivers are also equipped with NTRIP Version 2.0 client and server capability.

Instructions on configuring Ethernet and NTRIP are in application note APN-057 at www.novatel.com | *Support* | *Knowledge and Learning*.

EXTERNAL OSCILLATOR (OEM628 ONLY)

For applications requiring greater precision than that possible using the on-board 20 MHz voltage-controlled, temperature-compensated crystal oscillator (VCTCXO), you may need to connect the OEM628 card to an external, high-stability oscillator. The external oscillator can be either 5 MHz or 10 MHz.

To install, connect a cable from the external oscillator to the card’s external oscillator input. The receiver does not have to be powered down during this procedure. If you are handling the OEM628 directly, observe antistatic practices.

Once the external oscillator has been connected, issue the EXTERNALCLOCK command to define the clock model (for example, cesium, rubidium or ovenized crystal). If the input clock rate is 5 MHz, you must issue the EXTERNALCLOCK command to change the 10 MHz default rate.

POST PROCESSING

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

OEM6-based output is compatible with post-processing software from the Waypoint Products Group, NovAtel Inc. For details, see www.novatel.com | *Products* | *Waypoint Software*.

QUESTIONS OR COMMENTS

If you have any questions or comments regarding your OEM6 card, please contact NovAtel using one of these methods:

Email: support@novatel.com

Web: www.novatel.com

Phone: 1-800-NOVATEL (U.S. and Canada)
403-295-4900 (International)

Fax: 403-295-4901

 Quick Start Guide:   OEM6 Family Cards:  

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