FlexPak6 Quick Start Guide

This guide provides the basic information you need to set up and begin using your new FlexPak6. For more detailed information on the installation and operation of your receiver, please refer to the user manuals provided on the accompanying CD. 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/. To order a printed copy of the manuals, free of charge, follow the instructions given on the enclosed *User Manuals* postcard.

The FlexPak6 provides a mini-AB USB connection and is capable of tracking GPS, GLONASS, Galileo, Compass, SBAS, and L-band.The USB drivers, along with installation instructions, are available in the USB Driver's directory of the CD provided. An installation program for NovAtel's PC Utilities, including the CDU (Control and Display Unit) user interface, and sample source code, are also on the CD.

BOX CONTENTS

In addition to this *Quick Start Guide*, the following is provided with your FlexPak6:

- 1 power adapter cable
- 1 null modem serial cable
- 1 USB cable
- 1 I/O cable
- 1 CD containing:
    - NovAtel's PC Utilities' installation program
    - Product documentation, including user manuals
- Quick Reference Guide
- User Manuals Postcard for requesting printed manuals

ADDITIONAL EQUIPMENT REQUIRED

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

- A Windows-based PC with an RS-232 DB-9 or USB port

- One of the following:
    1. A standard 12 V DC power outlet, or
    2. Power cable supplied with LEMO connector and 6-36 VDC power supply capable of at least 5 W.

⚠️ If you use an alternative power source, the 12V car adapter can be cut off from the power cable.The exposed wires can then be tied to a 6-36 VDC power supply capable of at least 5 W.

Since the 12 V car adaptor on the supplied adaptor cable incorporates a 6 A fuse, a user supplied 6 A slow blow fuse in a suitable holder must be used at the alternate power source to protect both the power supply and your warranty. The car adapter is not recommended for use if your power source is greater than 12 V. See *Step 4c*, in *Setting Up Your FlexPak6*, for an illustration of this process.

Be aware that the FlexPak provides an output voltage on pin 4 of COM2 (POUT). This output voltage is at the same level as the power source that you use to power the FlexPak. To ensure that any equipment you connect to COM2 will not be damaged, refer to the COM2 pinout in the *OEM6 Installation and Operation Guide* found on our Web site at http://www.novatel.com/support/firmware-software-and-manuals/.

The Ethernet ports are safety extra-low voltage (SELV) circuits only and are suitable for connection within a building only. Do not connect them to telephone-network voltage(TNV) cicuits.

- A quality GNSS antenna, such as one from NovAtel's 700 or ANT series. Contact your NovAtel representative for a full range of options
- An antenna cable with a TNC male connector at the receiver end, such as NovAtel's GPS-C016 model

SETTING UP YOUR FLEXPAK6

Complete the following steps to connect and power your FlexPak6:

1. Mount an antenna on a secure, stable structure with an unobstructed view of the sky.

2. Using a coaxial cable, connect the antenna to the ⊤ port, which is found on the front face of the FlexPak.
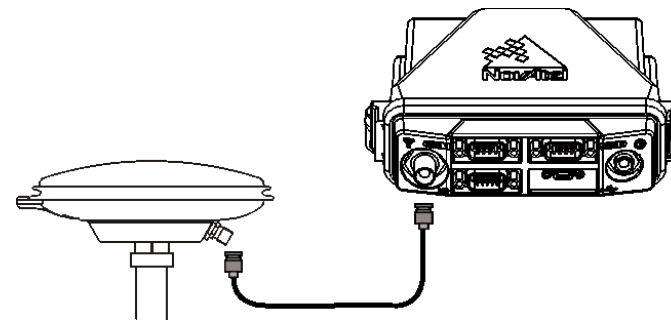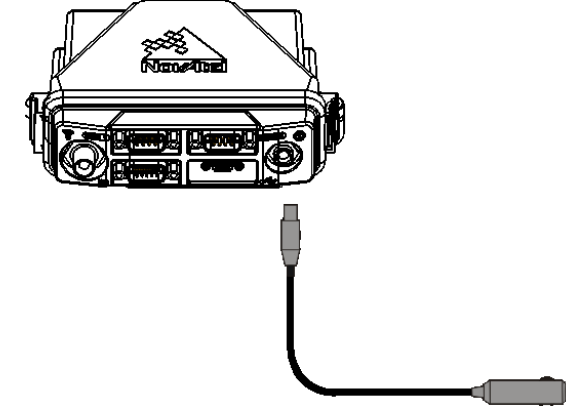

3. Connect the *COM1* or *USB* port on the receiver to the *USB* or serial port on your PC. If you are using a USB connection, install the USB drivers available on the CD provided.
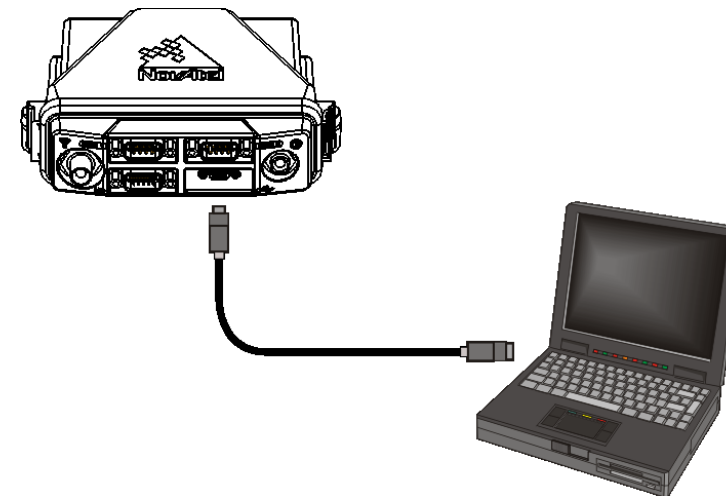
4. Connect the power cable connector to the ⏻ port. Line up the red mark on the power cable connector with the red mark on the receiver's PWR port and insert power cable.
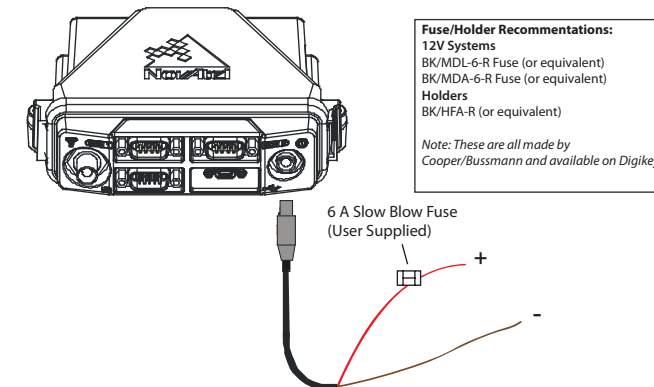

For an alternative power source:
- a) Cut the 12 V car adapter from the power cable.
- b) Tie the exposed wires to a 6-36 VDC supply capable of at least 5 W.

✉️ Be sure to connect the red and orange or green wires to the positive side of supply and connect the black and brown or white wires to the negative side of supply.

- c) Use a user supplied 6 A slow blow fuse at the alternate power source to protect the power supply wiring and your warranty.

Fuse/Holder Recommentations:
12V Systems
BK/MDL-6-R Fuse (or equivalent)
BK/MDA-6-R Fuse (or equivalent)
Holders
BK/HFA-R (or equivalent)

Note: These are all made by Cooper/Bussmann and available on Digikey

6 A Slow Blow Fuse (User Supplied)

5. Plug in the adapter and/or turn on the power supply. The power LED will be red when the FlexPak is properly powered.

INSTALLING THE PC UTILITIES

Once the FlexPak6 is connected to the PC, antenna, 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 NovAtel's 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 then the *Browse* button to locate *Setup.exe* on the CD drive.

✉ Please go to the *Support* page of our Web site at www.novatel.com to access and download the most current versions of our OEMV PC Utilities.

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 steps. See also *Using CDU*, later in this guide.

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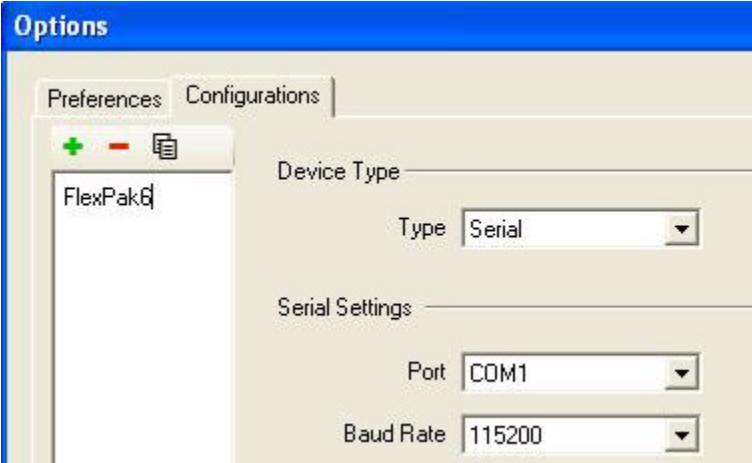2. Select *Open....* from the *Device* menu.

3. Select the *New...* button in the *Open* dialog box.
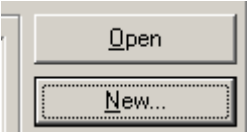
4. Click ➕ at the top of the configurations selection box to add a new configuration. To delete a configuration, select it from

the list and click ➖. To duplicate an existing configuration, click 📄.

5. Select *Serial* from the *Device Type* drop-down list.
6. Select the PC serial port the FlexPak is connected to from the *PC Port* drop-down list.
7. Select *115200* from the *Baud Rate* list.
8. Cancel *Hardware Handshaking*.
9. Select *OK* to save the new device settings.
10. Select the new configuration from the *Available device configs* area of the *Open* dialog.
11. Select the *Open* button to open FlexPak6 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 a *Tracking Status Window* (*GPS* or *GLONASS*) from the *View* menu.
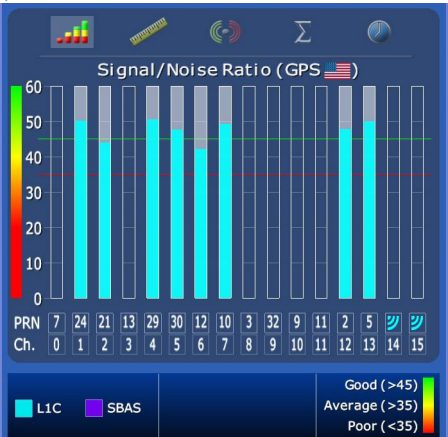
Select *Help* from the main CDU menu for more details on its windows and features.

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

NovAtel receivers use a comprehensive command interface. Commands can be sent to the FlexPak 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
  - Abbreviated ASCII
  - Binary

✉ 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.
- Commands are not case sensitive.

The *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 FlexPak receives and processes. These logs can be directed to any of the FlexPak'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 *OEM6 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 *Firmware Reference Manual* 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.
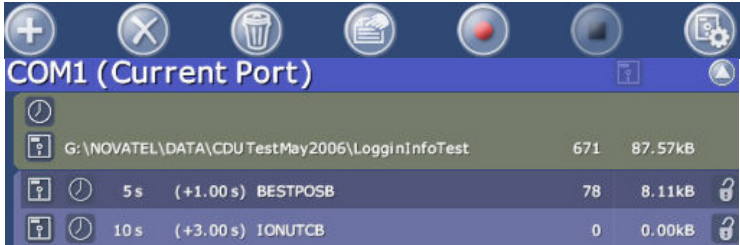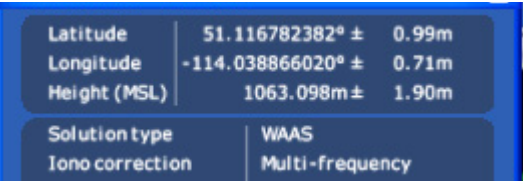

ENABLING SBAS POSITIONING

FlexPak6 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) respectively:

```
sbascontrol enable egnos
sbascontrol enable waas
```

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 L-BAND POSITIONING

L-Band equipped receivers allow you to achieve sub-metre accuracy. To use this positioning mode, you must enable L-band tracking to the OmniSTAR signal. A subscription to OmniSTAR is required to use the OmniSTAR service (visit http://www.omnistar.com and have your receiver's L-band serial number, found in the `LBANDINFO` log, ready).

The `ASSIGNLBAND` command allows you to set an 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
```

For example, if you are receiving OmniSTAR VBS, the fifth field after the header, which is the L-band status, will be 0082:

```
lbandstata com1 0 43.5 finesteering 1295
149951.671 00000000 976f 34461;
1536782000 46.18 4541.0 0.00 0082 00f0 ...
```

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

```
psrdiffsource omnistar
```

otherwise it is left at the default `AUTO`.

✉ Refer to the *OEM6 Family Firmware Reference Manual* for more information about 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. 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.

A data link is needed between the base station and rover station (two receivers) in order for the rover to receive corrections. The data link must support the throughput needed to receive complete correction messages. A data rate of at least 9600 bits per second with less than 4.0 s latency is recommended.

Once your base and rover are set up, you can configure them for RTCA, RTCM, RTCMV3, CMR+ or CMR corrections. An RTCA example follows (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 (enter your own lat, lon, hgt)
log com2 rtcaobs2 ontime 1
log com2 rtcaref ontime 10
log com2 rtca1 ontime 5
log com2 rtcaephem ontime 10 1 (optional)
```

Rover

```
interfacemode com2 rtca none off
```

RT-2, RT-20 and 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 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.

✉ 1. Refer to the `GPGST` log's usage box in the *Firmware Reference Manual* for a definition of RMS and other statistics.

2. For more base/rover configurations, search the key words "rover base" on our Knowledge and Forums database at:

   http://support.novatel.com/home

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.

Output from NovAtel receivers 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 FlexPak, please contact NovAtel using one of these methods:

Email: support@novatel.ca

Web: www.novatel.com

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

Fax: 403-295-4901

Quick Start Guide - FlexPak6

GM-14915106   Rev 1   2011/07/03