FlexPak-G2-V1, FlexPak-G2-V1G, FlexPak-G2-V2, and FlexPak-G2-OEMStar

QUICK START GUIDE

This guide provides the basic information you need to set up and begin using your new FlexPak-G2. 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 website at http://www.novatel.com/Downloads/docupdates.html. To order a printed copy of the manuals, free of charge, follow the instructions given on the enclosed *User Manuals* postcard.

The FlexPak-G2 provides a Mini-B USB connection. 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.

Each FlexPak-G2 receiver tracks a different satellite combination, as follows:

- FlexPak-G2-OEMStar: Single frequency GPS + GLONASS + SBAS
- FlexPak-G2-V1: Single frequency GPS + SBAS + OMNISTAR VBS + CDGPS
- FlexPak-G2-V1G: Single frequency GPS + GLONASS + SBAS
- FlexPak-G2-V2: Dual frequency GPS + GLONASS + SBAS

BOX CONTENTS

In addition to this *Quick Start Guide*, the following is provided with your FlexPak-G2:

- 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
    - Sample source code
- 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:
    - A standard 12 V DC power outlet, or
    - Power cable supplied with LEMO connector and 6-18 V DC power supply, 750 mA.

⚠ If you use an alternative power source, a 12V car adapter can be cut off from the power cable. The exposed wires can then be tied to a 6-18Vsupply capable of at least 5 W.

Since the 12V car adaptor on the supplied adaptor cable incorporates a 6A fuse, a user supplied 6A slow blow fuse in a suitable holder must be used at the alternate power source to protect both the power supply and your warranty.

See Step 4, in *Setting Up Your FlexPak-G2*, for an illustration of this process.

- 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 FLEXPAK-G2

Complete these steps to connect and power your FlexPak-G2.

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.
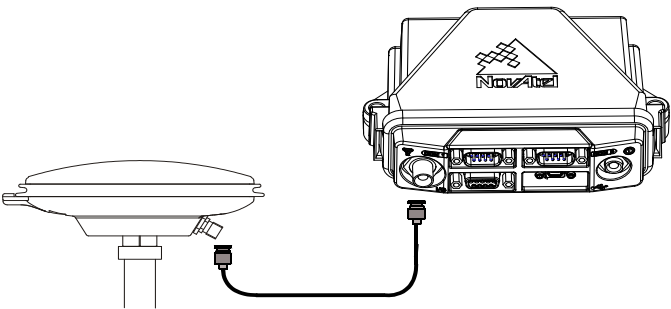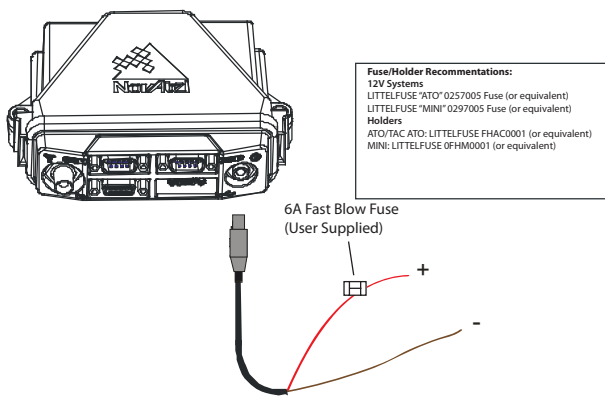

3. Connect the *COM1* or *USB* port on the receiver to the *USB* or serial port on the PC. If you are using a USB connection, install the USB drivers available on the CD provided.
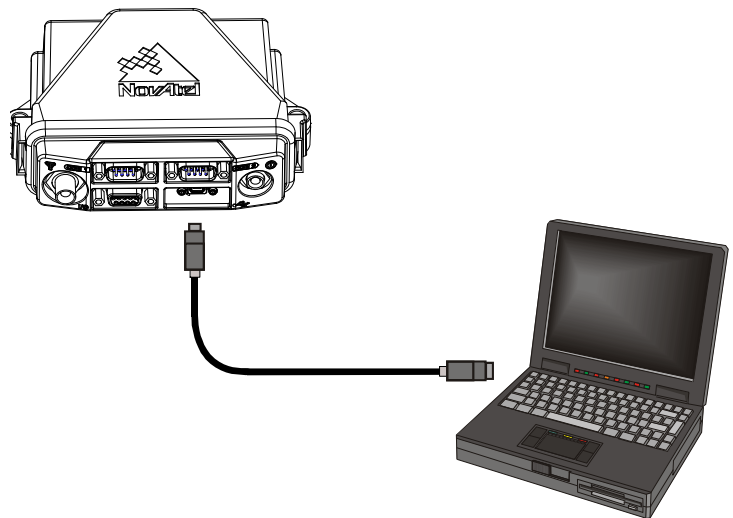
4. Connect the power cable connector to the *PWR* port. Line up the red mark on one power cable connector with the red mark on the receiver's PWR port and insert power cable.
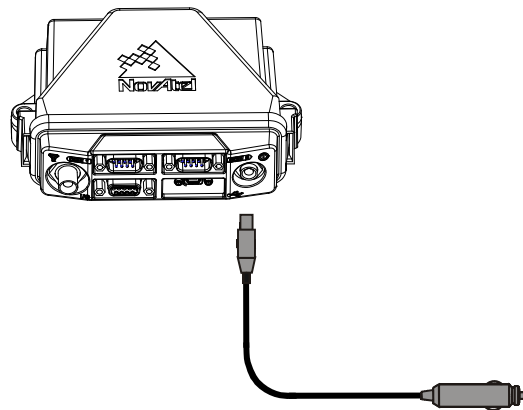
For an alternative power source:
a) Cut a 12V car adapter from the power cable.
b) Tie the exposed wires to a 6-18V supply capable of at least 5 W.
  *Be sure to connect the red and orange wires to the positive side of supply and connect the black and brown wires to the negative side of supply.
c) Use a user supplied 6A slow blow fuse at the alternate power source to protect the power supply wiring and your warranty.

Fuse/Holder Recommentations:
12V Systems
LITTELFUSE "ATO" 0257005 Fuse (or equivalent)
LITTELFUSE "MINI" 0297005 Fuse (or equivalent)
Holders
ATO/TAC ATO: LITTELFUSE FHAC0001 (or equivalent)
MINI: LITTELFUSE 0FHM0001 (or equivalent)

6A Fast Blow Fuse
(User Supplied)

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

6. Installing the PC Utilities

Once the FlexPak-G2 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.

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. See also *Using CDU*, later in this guide.
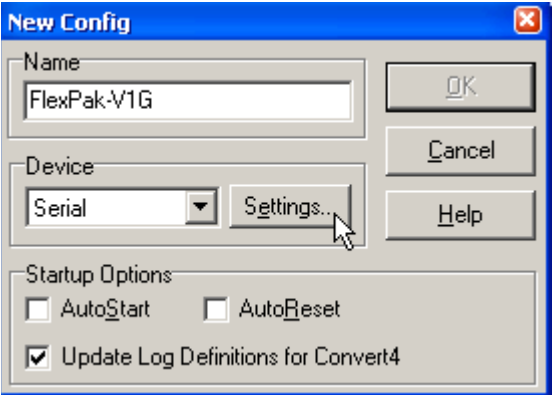
1. Launch **CDU** from the *Start* menu folder specified during the installation process. The default location is *Start | Programs | NovAtel PC Software*.

2. Select *Open....* from the *Device* menu.
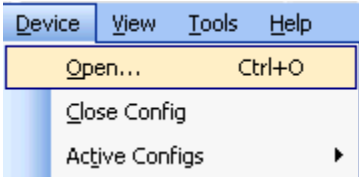
3. Select the *New...* button in the *Open* dialog box.
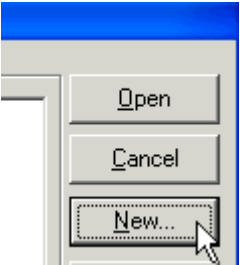
4. Enter a name for the new device configuration in the *Name* field of the *New Config* dialog box.

5. Select the *Settings* button.

6. Select the PC serial port the FlexPak is connected to from the *PC Port* drop-down list.

7. Select *57600* from the *Baud Rate* list.

8. Uncheck the *Use hardware handshaking* checkbox.

9. Select *OK* to save the settings.
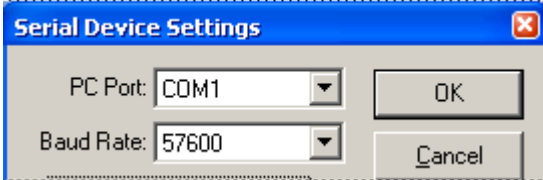
10. Select the *OK* button to close the *New Config* dialog box and create the new device configuration.

11. Select the new configuration from the *Available device configs* list in the *Open* dialog box.

12. Select the *Open* button to open communications with the FlexPak.
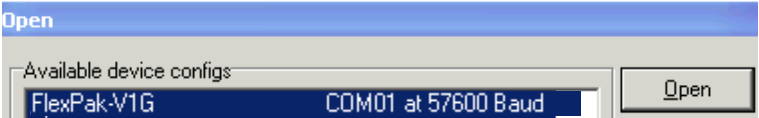
As **CDU** establishes the communication session with the receiver, a progress box is displayed.

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.
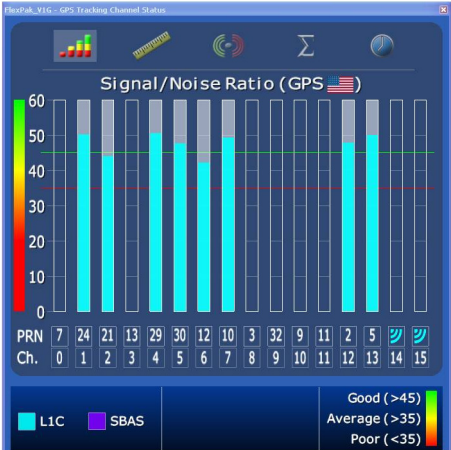
Select *Help* from the main **CDU** menu for more details on its windows and features.

DETERMINING WHEN THE POSITION IS VALID

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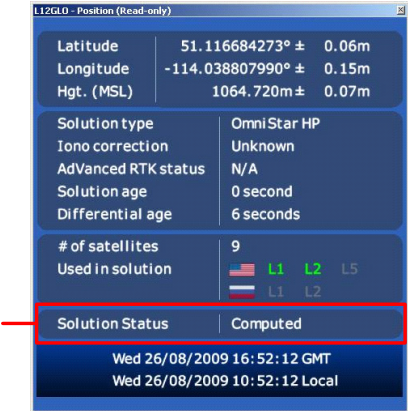
ENTERING COMMANDS

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.

```
[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 the *Enter* key to send the command string to the receiver.

- The 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 *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.
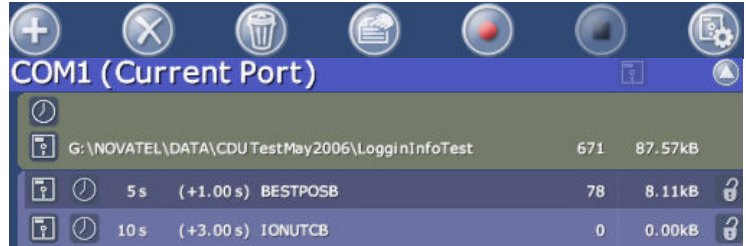
ENABLING SBAS POSITIONING

FlexPak-G2 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 WAAS
SBASCONTROL ENABLE EGNOS
```

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 (FlexPak-G2-V1 only)

L-Band equipped receivers allow you to achieve sub-meter accuracy. To use this positioning mode, you must enable L-band tracking to the Canada-Wide Differential GPS (CDGPS) or OmniSTAR signal. A subscription to OmniSTAR is required to use the OmniSTAR service (visit http://www.omnistar.com and have your receiver's serial number ready). The CDGPS signal is free and available without subscription over North America (visit http://www.cdgps.com).

The ASSIGNLBAND command allows you to set OmniSTAR or CDGPS 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 CDGPS, 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;
1547546977 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        or,
PSRDIFFSOURCE CDGPS
```

otherwise it is left at the default AUTOMATIC.

✉ Refer to the *OEMV Family Firmware Reference Manual* for more on individual L-Band (FlexPak-G2-V1 only), GLONASS (FlexPak-G2-V1G or FlexPak-G2-V2) or SBAS commands and logs.

REAL-TIME KINEMATIC (RTK) POSITIONING (FlexPak-G2-V1, FlexPak-G2-V1G and FlexPak-G2-V2)

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 NovAtel 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 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 RTCM 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 rtcaobs 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 (OEMV-2) and RT-20 (OEMV-1, OEMV-1G and OEMV-2), all 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 messaging.

RT-2 and RT-20 are supported by GPS-only and GPS+GLONASS OEMV-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 Database at:

http://www.novatel.com/support/knowledgedb.htm

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_pps.htm

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 - FlexPak-G2-V1/G2-V1G/G2-V2/G2-OEMStar