FlexPak-V1, FlexPak-V1G and FlexPak-V2

QUICK START GUIDE

This guide provides the basic information you need to set up and begin using your new FlexPak-V1/V1G/V2. 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-V1/V1G/V2 provides a USB connection through its COM1 or COM2 port. The USB drivers, along with installation instructions, are available in the USB Drivers directory of the CD provided. An installation program for NovAtel's PC Utilities, including the **CDU** (Control and Display Unit) user interface, and the OEMV Software Development Kit, are also on the CD.

Each FlexPak receiver has 2 SBAS channels. FlexPak-V1G is a GLONASS model. There are FlexPak-V1 L-Band and FlexPak-V2 GLONASS models also available.

BOX CONTENTS

In addition to this *Quick Start Guide*, the following is provided with your FlexPak-V1/V1G/V2:

- 1 power adapter cable
- 1 null modem serial cable with a DB-9F (female) end
- 1 straight through serial cable with a DB-9M (male) end
- 1 USB serial cable
- 1 CD containing:
    - NovAtel's PC Utilities' installation program
    - Product documentation, including user manuals
    - The *OEMV Software Development Kit*
- OEMV Family 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 Deutsch connector and at least a 6 V DC power supply, 750 mA [1]
- A quality GNSS antenna, such as NovAtel's dual-frequency GPS-702, or ANT-532-C for airborne/high speed applications. For FlexPak-V1 L-Band corrections use the GPS-702L antenna or for GLONASS applications use the GPS-702GG antenna.
- An antenna cable with a TNC male connector at the receiver end, such as NovAtel's GPS-C016 model

SETTING UP YOUR FLEXPAK-V1/V1G/V2

Complete these steps to connect and power your FlexPak.

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.


---
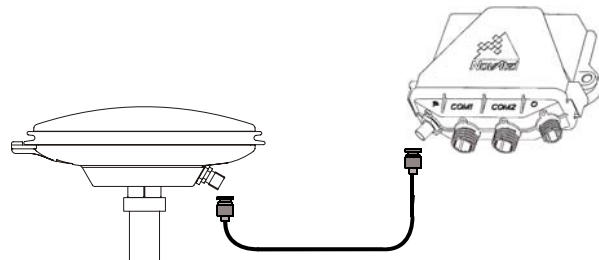
1. If an alternative power source is preferred, the 12V power adapter can be cut off from the power cable. The exposed wires can then be tied to a supply capable of at least 5 W. The use of a 3 A slow-blow fuse is recommended.

3. Connect the *COM1* port on the receiver to a DB-9, or USB, serial port on the PC. If you are using a USB connection, install the USB drivers available on the CD provided.
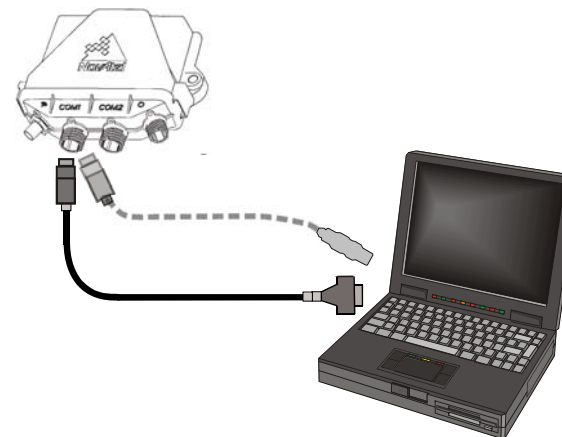
4. Connect the power cable connector to the *PWR* port. The threads of the Deutsch connector ratcheting mechanism fit tightly with that of the *PWR* port.
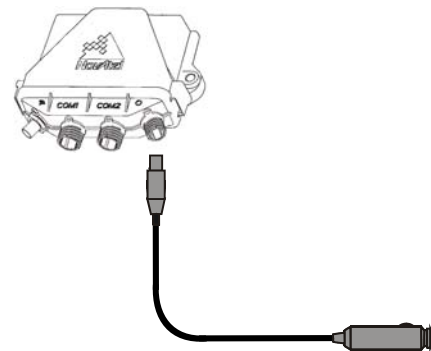
5. Plug in the adapter and/or connect and turn on the power supply. If there is an LED provided above the *PWR* port, the LED will be red when the FlexPak is properly powered.

INSTALLING THE PC UTILITIES

Once the FlexPak 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 the OEMV GPS 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 OEMV | OEMV PC Software*.
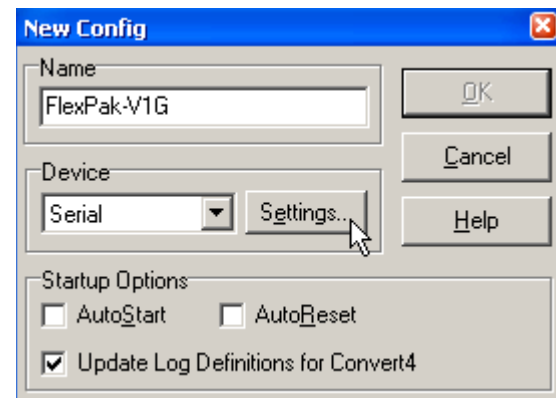
2. Select *Open....* from the *Device* menu.
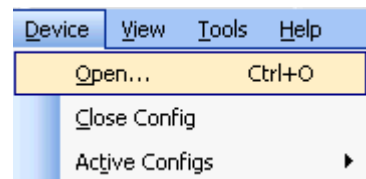
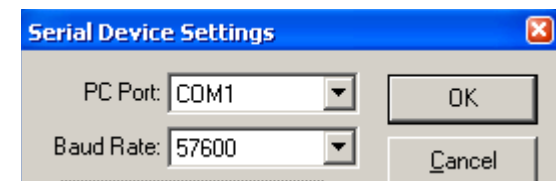3. Select the *New...* button in the *Open* dialog box.

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.
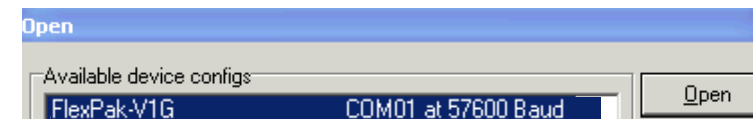
As **CDU** establishes the communication session with the receiver, a progress box is displayed.

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 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 shows *Computed.*

ENTERING COMMANDS

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

FlexPak-V1G - Constellation

11/11 PRN 6   Az. 176.6°   Elev. 70.7°
0/5   SNR 50.6 ✓ Good

FlexPak-V1G - GPS Channel Tracking Status

Signal/Noise Ratio (GPS)

	Good (>45)
L1C L2Y	Average (>35)
SBAS	Poor (<35)

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 *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.

COM1 (Current Port)

	G:\NOVATEL\DATA\CDUTestMay2006\LogginInfoTest	671	87.57kB
5 s	(+1.00 s) BESTPOSB	78	8.11kB
10 s	(+3.00 s) IONUTCB	0	0.00kB

ENABLING SBAS POSITIONING

FlexPak-V1/V1G/V2 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*.

FlexPak-V1G - Position

Latitude	51.116782382° ±	0.99m
Longitude	-114.038866020° ±	0.71m
Height (MSL)	1063.098m±	1.90m
Solution type	WAAS	
Iono correction	Multi-frequency	

ENABLING L-BAND POSITIONING (FlexPak-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 should be 00c2:

```
lbandstata com1 0 43.5 finesteering 1295
149951.671 00000000 976f 34461;
1547546977 46.18 4541.0 0.00 00c2 00f0 ...
```

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

```
PSRDIFFSOURCE OMNISSTAR      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-V1 only), GLONASS (FlexPak-V1G or FlexPak-V2) 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.

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 and L-Band corrections can be accomplished with one receiver and are exceptions to the base/rover concept. Generally a link capable of 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, 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 rtcm off
fix position 51.11358042 -114.04358013
1059.4105
log com2 rtcm3 ontime 10
log com2 rtcm22 ontime 10 1
log com2 rtcm1819 ontime 1
log com2 rtcm1 ontime 5
```

Rover

```
interfacemode com2 rtcm 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 *OEMV 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.

OEMV-based output is compatible with post-processing software from the Waypoint Products Group, NovAtel Inc. For details, visit our website 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

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