NovAtel® PC Utilities

User Manual

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NovAtel PC Utilities User Manual

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Chapter 1 NovAtel PC Utilities

The NovAtel PC Utilities work with the NovAtel OEM6™, OEMV®, SPAN®, SMART, OEMStar™ and DL-products.

The NovAtel PC Utilities consist of the following applications:

- **NovAtel Connect™** - a utility used to control and monitor the operation of a NovAtel receiver
- **Connection Import Tool** - a utility used to import connection profiles created in previous versions of NovAtel Connect or the legacy utility CDU
- **Convert4** - a utility used to convert receiver data logs to various formats
- **NovAtel USB Utility** - a utility used to configure the USB drivers for NovAtel receivers
- **DL4Tool** - a utility for DL-4plus and DL-V3 receivers used to edit schedules, edit log groups, upload data and download data

1.1 Install the NovAtel PC Utilities from the CD

Install the NovAtel PC Utilities on a Windows® based computer.

1. Start the computer.
2. Insert the NovAtel CD in the drive.

> The latest NovAtel PC Utilities software can be downloaded from the NovAtel web site.
> See *Install the NovAtel PC Utilities from the Web Site* on page 4 for more information.

3. If the setup utility does not automatically run, double click the NovAtelConnect_X.X.X.exe file on the CD to begin installation.
4. Select Install NovAtel's PC Utilities from the list to install the complete suite of utilities.
5. Follow the steps to complete installation of the NovAtel PC Utilities.

1.2 Install the NovAtel PC Utilities from the Web Site

Install the NovAtel PC Utilities on a Windows based computer.

1. Start the computer.
2. Go to the Support | Firmware / Software and Manuals | Product Updates page of the NovAtel web site (www.novatel.com/support/firmware-software-and-manuals/firmware-software-updates/) and download the NovAtel Connect PC Utilities.
3. Extract the contents of the NovAtelConnect_xxx.zip file to a directory on the computer.
4. Open the NovAtelConnect_xxx folder.
5. Run the NovAtelConnect_xxx.exe file.
6. Follow the steps to complete installation of the NovAtel PC Utilities.

Chapter 2 NovAtel Connect™

NovAtel Connect provides a graphical interface to control and monitor the operation of the NovAtel receiver.

Once the receiver is physically installed, use NovAtel Connect to establish communications. NovAtel Connect establishes a communication session with the receiver and displays the progress. Once connected, the progress box disappears and several windows open, including the Console window. NovAtel Connect is now ready for use to view status information, enter commands or log data.

Detailed instructions for using NovAtel Connect are available from within the NovAtel Connect Help or the .chm file bundled with the software.

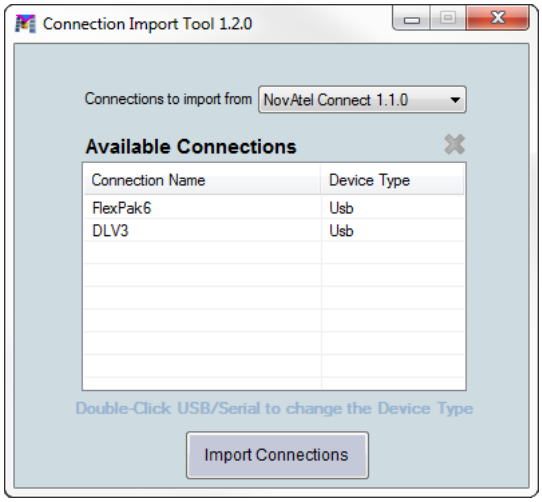
Chapter 3 Connection Import Tool

The Connection Import Tool is a utility for importing connection profiles created in previous versions of NovAtel Connect or CDU.

> For NovAtel Connect versions 1.2.0 and later, the install wizard provides an option to import previous configuration. When this option is selected, the Connection Import Tool is run as part of the install.

3.1 Import a Connection

1. Launch the Connection Import Tool from the Start menu. The default location is Start | All Programs | NovAtel Connect 1.x.x. The Import Connection Tool window appears.



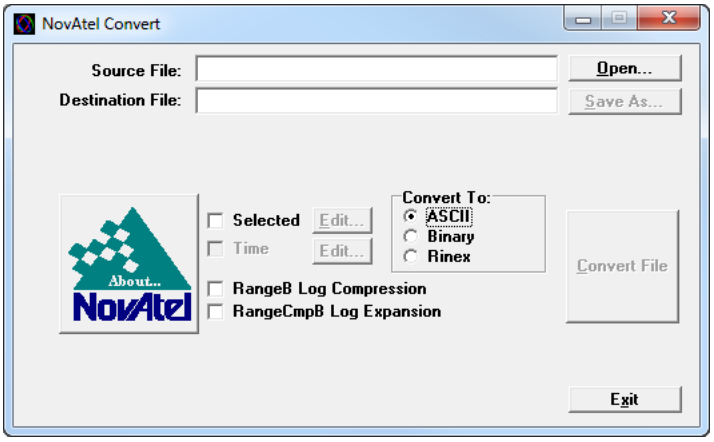
2. From the **Connections to import from** drop down list, select the previous NovAtel application from which to import the connections.
3. Select the connections to import into NovAtel Connect.
4. To change the Device Type for a connection, double click the **Device Type** field and then select **Serial** or **USB** from the drop down list that appears.
5. Click the **Import Connections** button.
   A window appears to confirm the connections were imported successfully.
6. Click the **OK** button.

Chapter 4 NovAtel Convert

Convert is used to select, filter and convert logs from large data files. Convert accepts ASCII, binary or GPS file formats and converts them to ASCII, binary or RINEX format.

4.1 Starting NovAtel Convert

1. Launch Convert from the Start menu. The default location is Start | All Programs | NovAtel Convert 1.x.x.
   The NovAtel Convert main window appears.



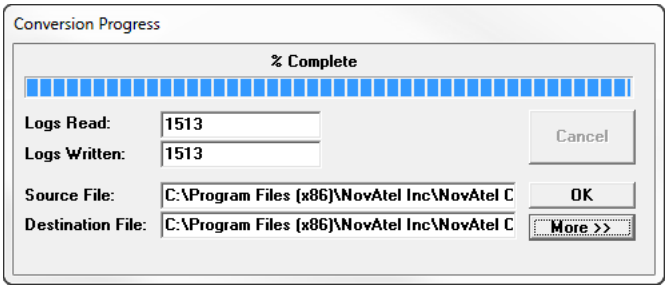
4.2 Convert Logs to ASCII Format

To convert GPS or binary logs to ASCII format:

1. Select the **ASCII** radio button under the Convert To section.
2. Click the **Open** button. The Open window appears.
3. Navigate to the folder that contains the file to convert. Select the file and click the **Open** button. The name and path of the selected file appears in the Source File field.
4. Click the **Save As** button.
5. Navigate to the folder where the ASCII file will be saved. Enter the name for the new ASCII file and click the **Save** button. The name and path of the ASCII file appears in the Destination File field.

> To convert only a portion of the log types contained in the log file, see *Select the Logs to Convert* on page 11.
>
> To convert the logs from a specific time period, see *Select the Time Period to Convert* on page 11.

6. Click the **Convert File** button. The Conversion Progress window appears.



For information about the specific logs converted, click the **More** button.

7. When the log conversion completes, click the **OK** button. The Convert main window appears.

4.3 Convert Logs to Binary Format

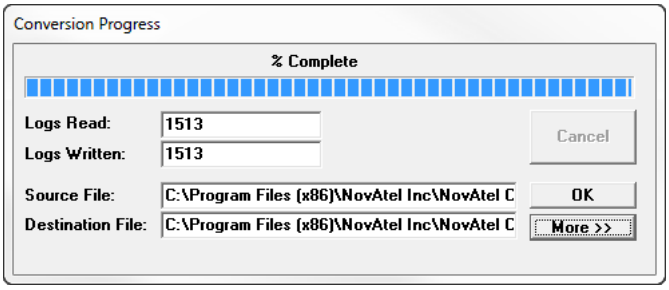
To convert GPS or ASCII logs to binary format:

1. Select the **Binary** radio button under the Convert To section.
2. Click the **Open** button. The Open window box appears.
3. Navigate to the folder that contains the file to convert. Select the file and click the **Open** button. The name and path of the selected file appears in the Source File field.
4. Click the **Save As** button. The Save As window appears.
5. Navigate to the folder where the binary file will be saved. Enter the name for the new binary file and click the **Save** button. The name and path of the binary file appears in the Destination File field.

To convert only a portion of the log types contained in the log file, see *Select the Logs to Convert* on page 11.

To convert the logs from a specific time period, see *Select the Time Period to Convert* on page 11.

6. Click the **Convert File** button. The Conversion Progress window appears.



For information about the specific logs converted, click the **More** button.

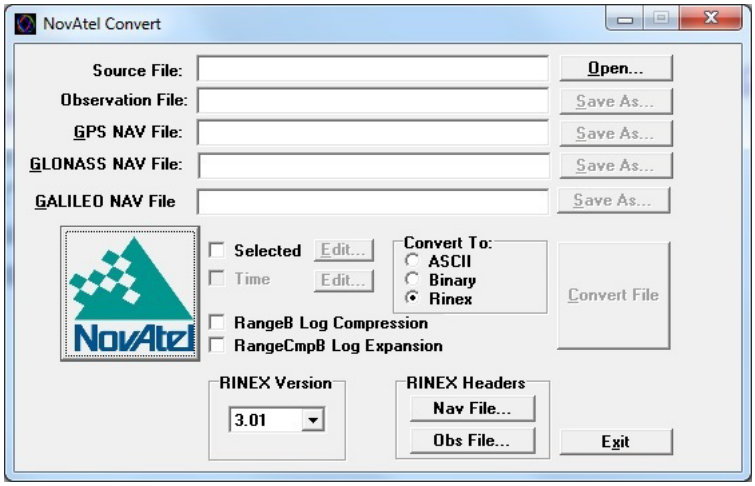
7. When the log conversion completes, click the **OK** button. The Convert main window appears.

4.4 Convert Logs to RINEX Format

RINEX is a broadly accepted format for GNSS data. For information about the RINEX format, see *RINEX Format* on page 13.

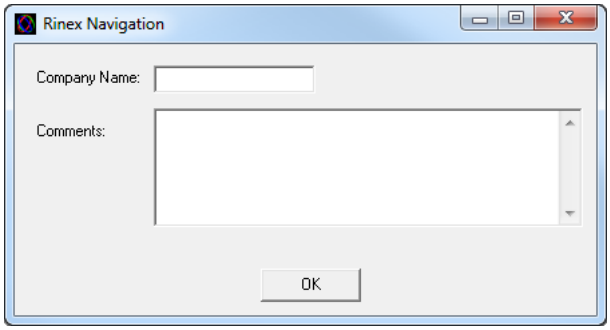
To convert GPS, binary or ASCII logs to RINEX format:

1. Select the **Rinex** radio button under the Convert To section. The Convert main window changes to show the additional RINEX options.

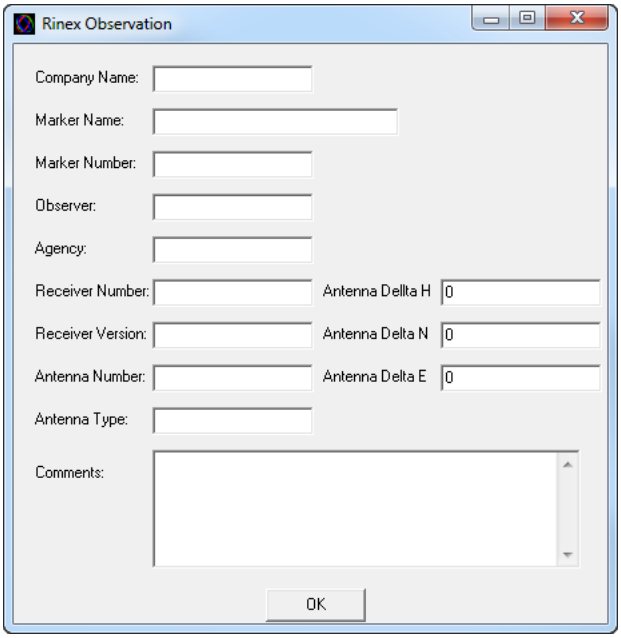


2. Click the **Open** button. The Open window appears.
3. Navigate to the folder that contains the file to convert. Select the file and click the **Open** button. The name and path of the selected file appears in the Source File field.
4. Click the **Save As** button beside the Observation File field. The Save As window appears.
5. Navigate to the folder where the RINEX Observation file will be saved. Enter the name for the new observation file and click the **Save** button. The name and path of the file appears in the Observation File field.
6. Click the **Save As** button beside the GPS NAV File field. The Save As window appears.
7. Navigate to the folder where the GPS navigation file will be saved. Enter the name for the new GPS navigation file and click the **Save** button. The name and path of the file appears in the GPS NAV File field.
8. Click the **Save As** button beside the GLONASS NAV File field. The Save As window appears.
9. Navigate to the folder where the GLONASS navigation file will be saved. Enter the name for the new GLONASS navigation file and click the **Save** button. The name and path of the file appears in the GLONASS File field.

10. To add comments to the navigation file header, click the **Nav File** button under the RINEX Headers section. The Rinex Navigation window appears.



11. Enter the information to add to the GPS and GLONASS navigation files and click the **OK** button. The Convert main window appears again.
12. To add comments to the observation file header, click the **Obs File** button under the RINEX Headers section. The Rinex Observation window opens.

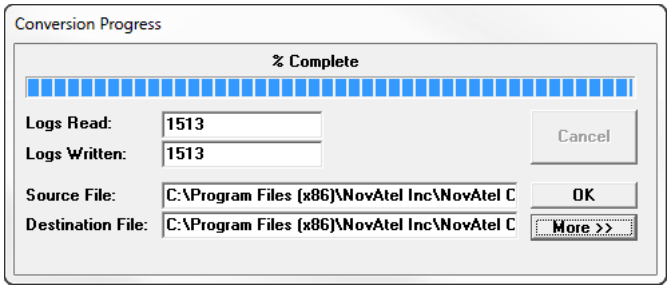


13. Enter the information to add to the observation file and click the **OK** button. The Convert main window appears again.
14. Click the **RINEX Version** drop down list and select the RINEX version used for the converted logs.

To convert only a portion of the log types contained in the log file, see *Select the Logs to Convert* on page 11.

To convert the logs from a specific time period, see *Select the Time Period to Convert* on page 11.

15. Click the **Convert File** button. The Conversion Progress window appears.



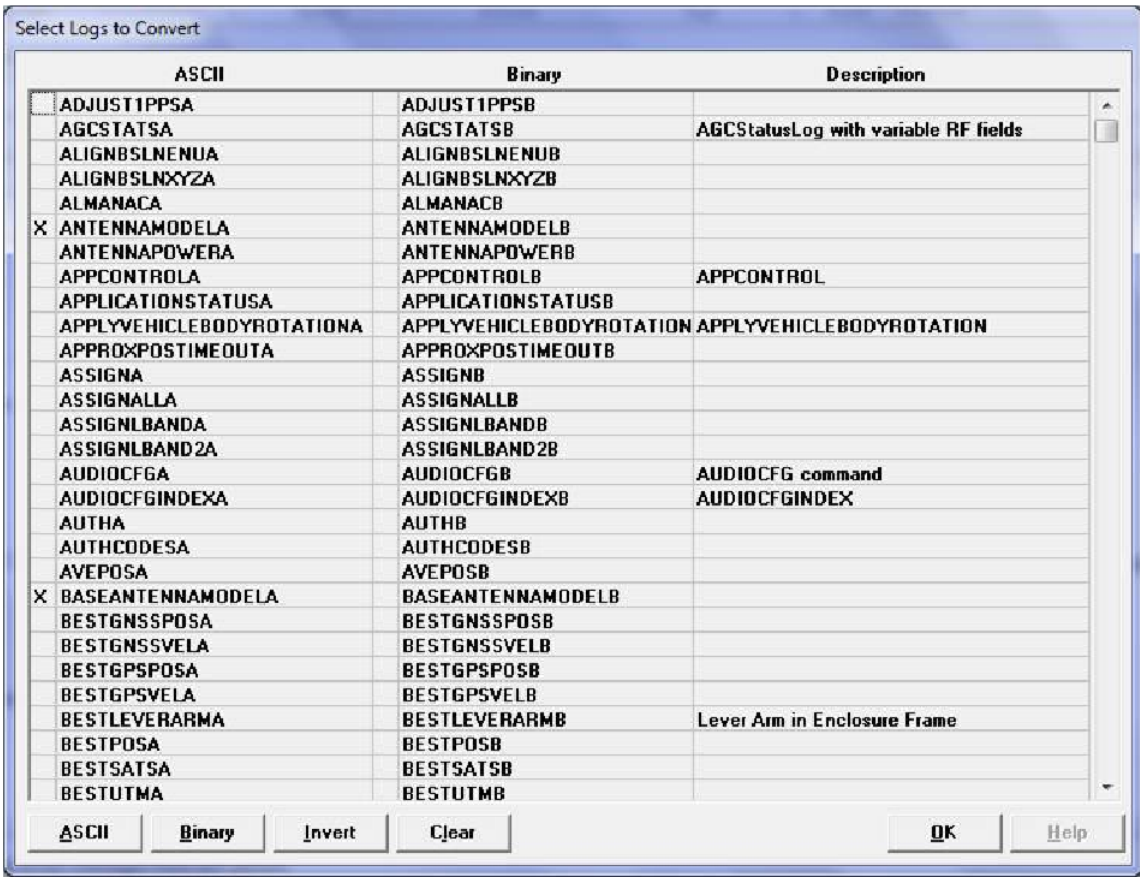
For information about the specific logs converted, click the **More** button.

16. When the log conversion completes, click the **OK** button. The Convert main window appears.

4.5 Select the Logs to Convert

To convert a subset of the logs available in the log file:

1. On the Convert main window, select the **Selected** check box. The **Edit** button is now available.
2. Click the **Edit** button. The Select logs to Convert window appears.



3. Select the check box beside the logs to convert.
   To select all ASCII logs, click the **ASCII** button.

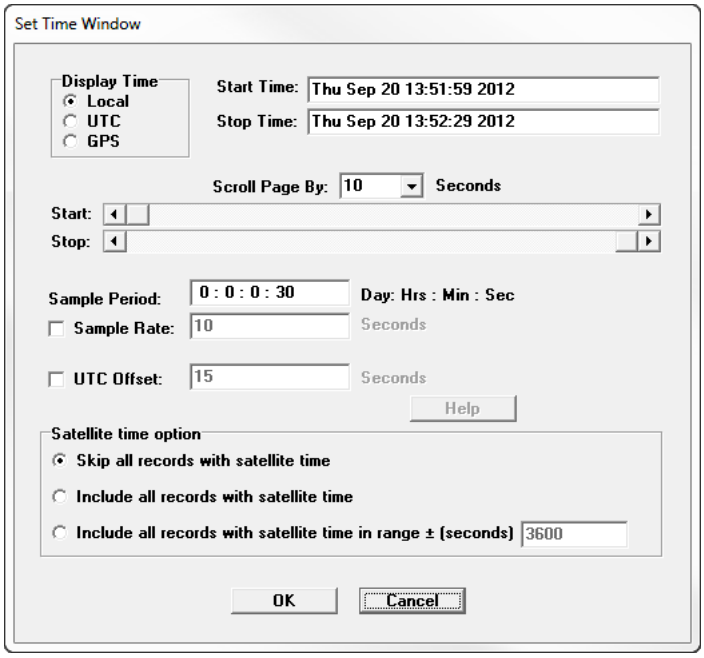
To select all binary logs, click the **Binary** button.
To change all selected logs to unselected and all unselected logs to selected, click the **Invert** button.
To clear the selection for all logs, click the **Clear** button.

4. Click the **OK** button to save the selections and return to the Convert main window.

4.6 Select the Time Period to Convert

To convert the log information from only a specific time period:

1. In the Convert main window, select the **Time** check box. The Edit button is now available.
2. Click the **Edit** button. The Set Time Window appears.



3. Use the radio buttons within the Display Time field to select the time format used for the Start Time and Stop Time.
4. Use the **Start** and **Stop** scale bars to set the time period to convert.
The times within the Start Time, Stop Time and Sample Period fields change to show the select time.
5. To set a sample rate, select the **Sample Rate** check box and enter the amount of time between samples that are converted.
6. To add a UTC time offset, select the **UTC Offset** check box and enter the UTC time offset.
7. Select a Satellite time option.
8. Click the **OK** button to save the settings and return to the Convert main window.

4.7 RINEX Format

The Receiver-Independent Exchange (RINEX[1]) format is a broadly accepted, receiver independent format for storing GNSS data. It features a non-proprietary ASCII file format that can be used to combine or process data generated by receivers made by different manufacturers.

The Convert utility can produce RINEX files from NovAtel receiver data files.

Although RINEX is intended to be a receiver independent format, there are many optional records and fields. Keep this in mind when combining NovAtel and non-NovAtel RINEX data.

When converting to RINEX, two files are produced: a RINEX observation file and a RINEX navigation file. Additional files are created for the navigation data files for other systems (e.g., GLONASS, Galileo). The default names of these files conform to the RINEX Version 2.10 and 3.0 recommended naming convention of ssssdddf.yyt, where:

ssss	4 character station name. Convert uses the first four characters of the <infile> parameter as the station ID
ddd	day of year
f	file sequence number within the day. Convert sets this to zero
yy	year
t	file type: o for the observation file, n for the GPS navigation file, g for the GLONASS navigation file, 1 for the Galileo navigation file

For best results, the NovAtel receiver input data file should contain the logs shown in the table below.

NovAtel Log	Recommended Trigger
RANGEA/B, or RANGECMPA/B	ontime 15
BESTPOSA/B, or PSRPOSA/B, or RTKPOSA/B, or MARKPOSA/B	once
IONUTCA/B	onchanged
RAWEPHEMA/B	onchanged
GLORAWEPHEMA/B	onchanged
GALEPHEMERISA/B	onchanged
VERSIONA/B [a]	once
SITEDEFA/B [b]	once

a. Information from this log overrides data entered in the Receiver Number, Type and Version fields using the OBS file button of the RINEX Headers section (refer to *Convert Logs to RINEX Format* on page 9*).*

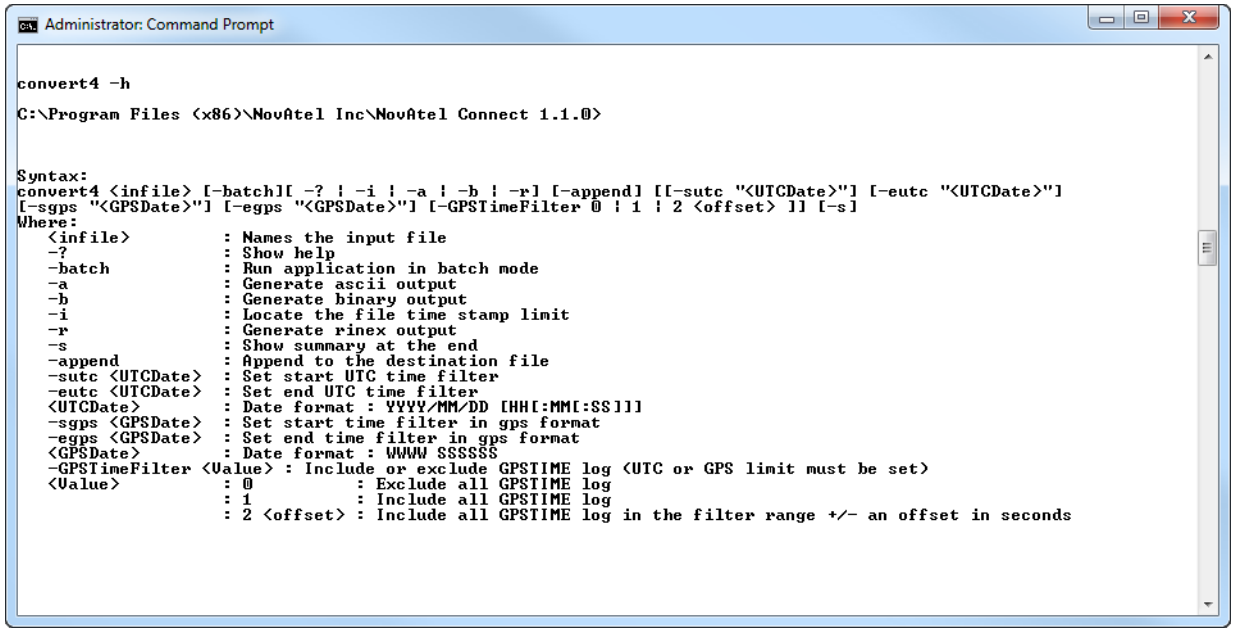
b. Available on DL-V3 receivers, refer to the *DL-V3 User Manual*. Information from this log overrides data entered into the Marker Name, Marker Number, Antenna Type and Antenna Delta H fields using the OBS file button of the RINEX Headers section.

1. For further information on RINEX Version 2.1 file descriptions, consult the U.S. National Geodetic Survey web site at www.ngs.noaa.gov/CORS/general_info.shtml.

4.8 Convert Command Line Switches

Convert supports several command line switches to facilitate batch processing. To access the Command Line Arguments window:

1. Launch a Command Prompt window from Start | All Programs | Accessories.
2. Browse to the directory where Convert is stored and type `CONVERT4 -h`
   The Convert Command Line Arguments window appears.



The name of the output file is the same as the input file when converting to ASCII or binary formats. The file extension, however, is altered to show the data format:

*.asc for ASCII

*.bin for binary

When converting to RINEX, the output files are named according to the RINEX Version 2.10/3.0 naming convention, as shown in *RINEX Format* on page 13.

The -batch arguments suppress the window display and convert the specified file automatically.

When converting to RINEX in batch mode, the format, navigation and observation file header information from the most recent interactive Convert session is used.

Chapter 5 USB Drivers

The NovAtel USB Driver Kit contains the following:

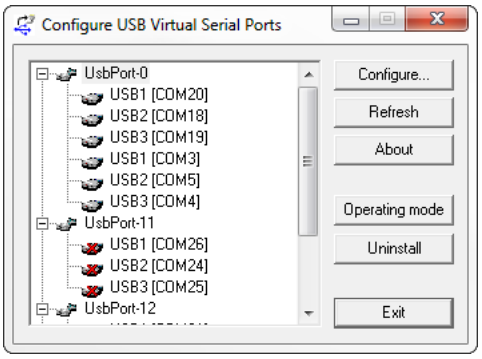
ngpsser.sys	Provides a virtual serial port for each USB port of the receiver.
ngpsusb.sys	Connects the virtual serial ports to the USB stack.
novatelusb.exe	This utility is used to control the Windows COM ports assigned to each USB port of the receiver. This utility can also be used to uninstall the drivers when a newer version is available. During installation, a shortcut appears in the Start menu under All Programs | NovAtel USB Drivers. The latest USB drivers are included with the NovAtel PC Utility installation files. See *NovAtel PC Utilities* on page 4 for information about obtaining and installing NovAtel PC Utilities.

The NovAtel USB drivers are compatible with Windows 7, Windows XP, Windows 2000 and Windows Server 2003.

These drivers are certified by Microsoft Windows Hardware Quality Lab (WHQL). Depending on the computer's Driver Signing Policy, Windows may refuse to install this driver or may display a warning. See *Windows Driver Signing* on page 16 for details.

5.1 Start the NovAtel USB Utility

1. Launch the NovAtel USB Utility from the Start menu. The default location is Start | All Programs | NovAtel USB Drivers. The NovAtel USB Utility main window appears.



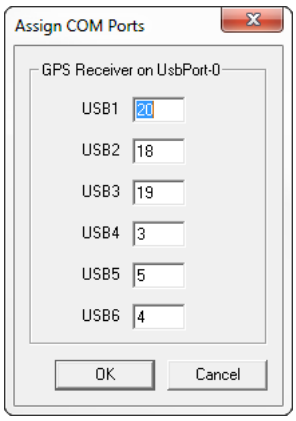
5.2 Configure the Virtual Serial Ports

The NovAtel USB Utility automatically assigns virtual serial ports to USB ports. The method used to assign these serial ports is determined by the operating mode. See *Change the Operating Mode* on page 16.

To change the virtual serial port assigned to a USB port:

1. From the NovAtel USB Utility main window, click the USB port to change.

2. Click the **Configure** button. The Assign COM Ports window appears.

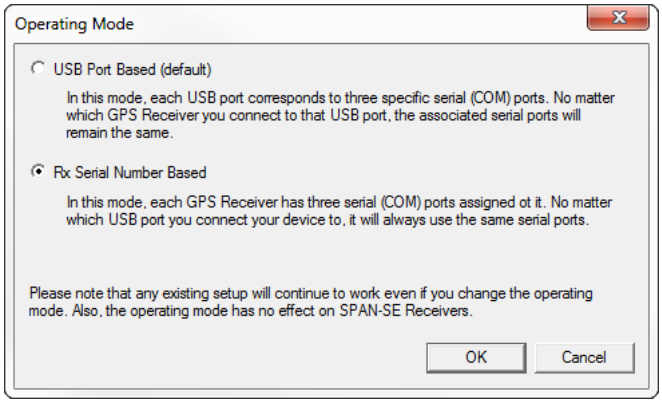


3. Change the virtual serial ports assigned to the USB ports.
4. Click the **OK** button.

5.3 Change the Operating Mode

The operating mode determines the method the NovAtel USB Utility uses to assign virtual serial ports to USB ports. To change the operating mode:

1. Click the **Operating Mode** button. The Operating Mode window appears.



2. Select the radio button of the operating mode to use and click the **OK** button.

5.4 Windows Driver Signing

The NovAtel USB drivers are digitally signed and officially supported on Windows 7 and Windows XP. They can also be installed on Windows 2000 and Windows Server 2003 but are not WHQL certified on those operating systems. Depending on how the computer is configured, Windows may ignore device drivers not digitally signed, display a warning when it detects device drivers not digitally signed (the default) or prevent installation of device drivers without digital signatures.

Driver signing is not required for Windows 7 or later.

To install NovAtel USB drivers, the computer policy must be either Ignore or Warn.

To change the Driver Signing Policy on the computer:

1. Open **System** in the **Control Panel**.
2. Select the **Hardware** tab.
3. Click **Driver Signing**.
4. Select either **Ignore** or **Warn** in the File signature verification box.
5. Click **OK** to accept the new policy.
6. Click **OK** again to close the System Properties window.
7. Unplug the NovAtel receiver USB cable, plug it back in and follow the installation instructions described in either *Windows XP Installation* on page 17 or *Windows 2000 Installation* on page 19.

5.5 Windows XP Installation

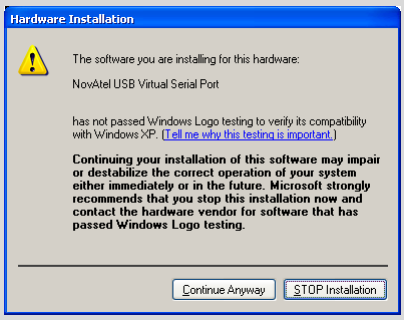
If upgrading drivers, uninstall older versions with the NovAtel USB Utility located in the Start Menu under All Programs | NovAtel USB Drivers.

After connecting the NovAtel GNSS receiver to a USB port on the computer, the Found New Hardware Wizard appears.

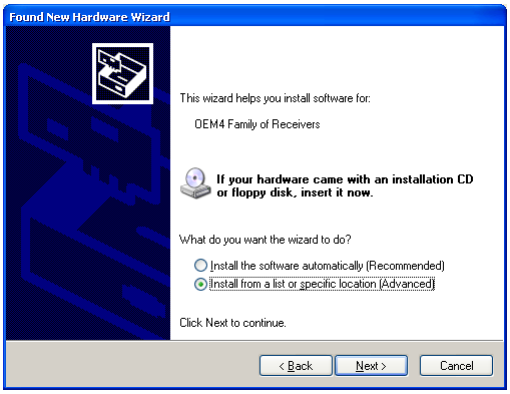
1. Click **No, not this time** then click **Next**.

The screens displayed in this section are from Windows XP and may vary depending on the operating system.

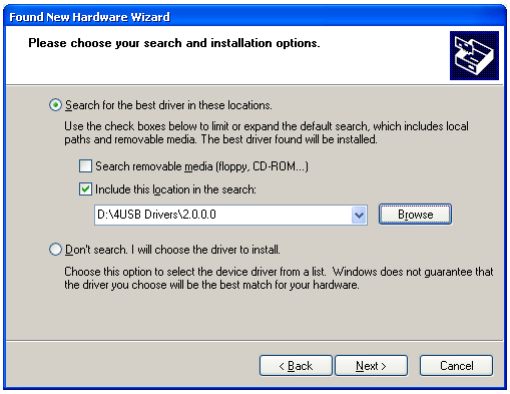
During the driver installation, a Windows Logo testing warning may appear if steps are skipped in the *Windows Driver Signing* on page 16. Our USB drivers are compatible with Microsoft Windows operating systems. Click **Continue Anyway** if the following warning appears:



2. Select **Install from a list or specific location (Advanced)** then click **Next**.



3. Clear **Search removable media** and select **Include this location in the search**. Browse to the USB driver install directory on the supplied NovAtel PC Utilities CD, then click **Next**.

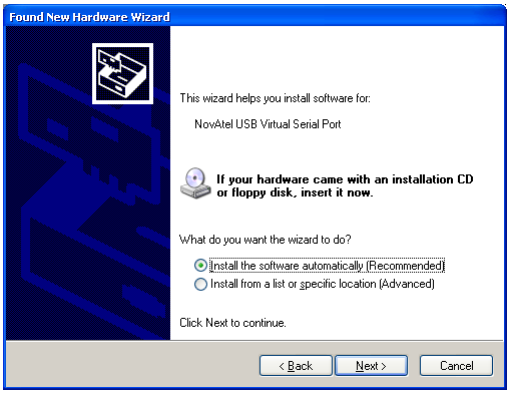


4. Click **Finish** to complete the driver installation.

After installing the NovAtel USB driver, Windows detects the NovAtel receiver's new virtual COM ports and begins to initialize them. As each port is detected, the Found New Hardware wizard appears.

Complete the following steps for each port:

1. Select **Install the software automatically (recommended)** then click **Next**.



2. Click **Finish**.

The new COM ports corresponding to the receiver's USB1, USB2 and USB3 ports are numbered sequentially following the existing ports in the computer and are ready to use with any existing application that communicates with the receiver's COM ports.

COM port number assignment is based on the computer's USB port. This allows receivers to be switched without Windows assigning new COM ports. If the receiver is connected to a different USB port, Windows detects the receiver's presence and assigns three new COM port numbers.

5.6 Windows 2000 Installation

If upgrading drivers, uninstall the older version using the NovAtel USB Utility located in the Start Menu under Programs | NovAtel USB Drivers.

After connecting the NovAtel GNSS receiver to a USB port on the computer, the Found New Hardware wizard appears.

1. Click **Next** (see the example screens and notes in *Windows XP Installation* on page 17).
2. Select **Search for a suitable driver for my device** field then click **Next**.
3. Select **Specify a location** then click **Next**.
4. Navigate to USB Drivers\Install on the supplied NovAtel PC Utilities CD.
5. Click **OK**.
6. Click **Next.**
7. Click **Finish** to complete the driver installation.

After installing the drivers, Windows detects the NovAtel receiver's new virtual COM ports and begins to initialize them. New COM ports, corresponding to the receiver's USB1, USB2 and USB3 ports, are numbered sequentially following the existing computer ports and are ready to use with any existing application that communicates with the receiver's COM ports.

COM port number assignment is based on the computer's USB port. This allows receivers to be switched without Windows assigning new COM ports. If the receiver is connected to a different USB port, Windows detects the receiver's presence and assigns three new COM port numbers.

Chapter 6 DL4Tool

The DL4Tool is a powerful program for editing receiver groups and schedules, uploading these to a DL-4plus or DL-V3 receiver and downloading data from the compact flash card to a computer.

For DL-V3 receivers, functionality similar to the DL4Tool is available from the NovAtel Explorer tool within NovAtel Connect. Refer to the NovAtel Connect help for information about using NovAtel Explorer.

NovAtel Explorer can also be used with the SPAN-SE receiver.

Receiver Groups

Receivers can collect several types of data. A receiver group is a file that tells the receiver what type of data to collect, at what rate the data should be collected and where the data should be stored (for example, the compact flash card). Use the POWERUP group for manual data collection and other groups for associating with a schedule.

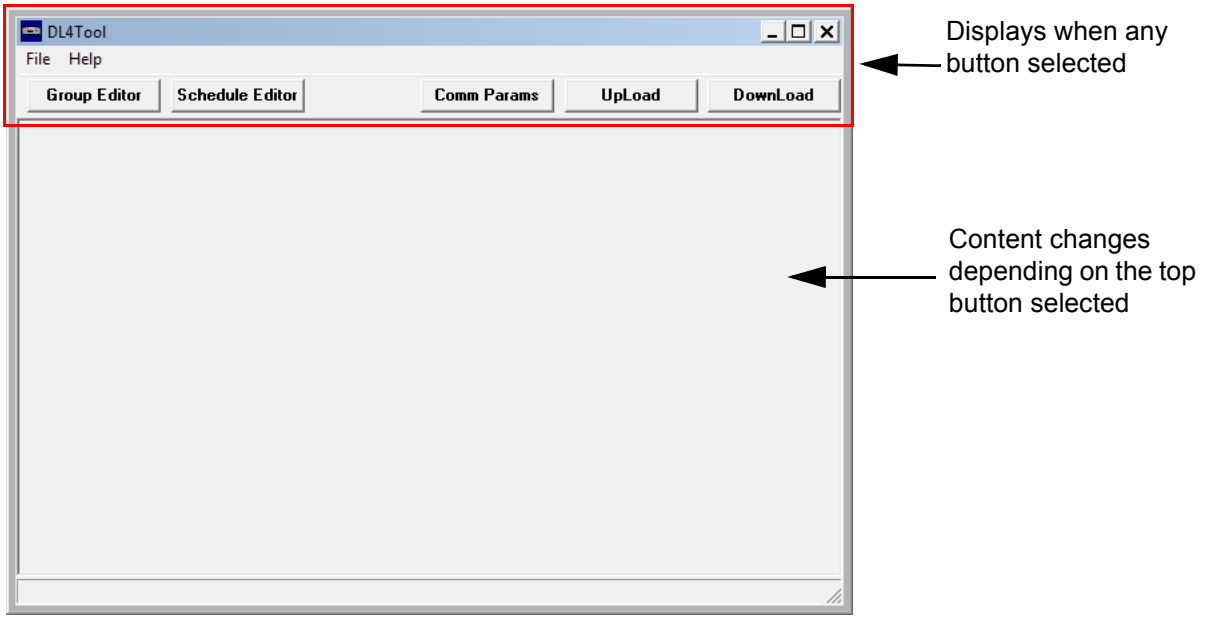
Schedules

A schedule is user defined settings that tell the receiver a specific time to start and end data collection. Associating a group with a schedule determines what types of data are collected during the scheduled time.

For more information about receiver groups and schedules, refer to the *DL-V3 User Manual* (OM-20000119) available on our website at www.novatel.com/support/firmware-software-and-manuals/product-manuals-and-doc-updates/oemv-family/.

6.1 Starting DL4Tool

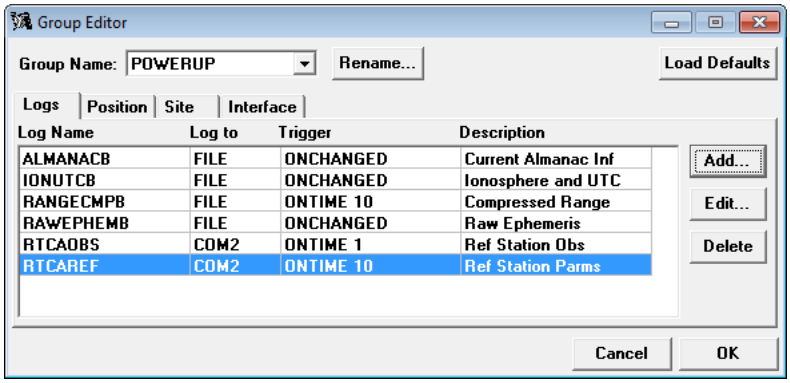
1. Launch DL4Tool from the Start menu. The default location is Start | All Programs | NovAtel Connect 1.x.x | DL4Tool. The DL4Tool main window appears.



6.2 Edit Receiver Groups

To schedule the DL-4plus or DL-V3 receiver to automatically start logging data at a specific time, create a receiver group, include it in a schedule and transfer it to the receiver. When configuring your receiver, define the receiver group settings to determine the type of information the receiver collects. These receiver groups consist of the log type, the data destination, the interval and a description for each log within the group.

To view the Group Editor window, click the **Group Editor** button..



The Group Editor window displays the current settings for a receiver group. These settings are shown on four tabs.

- **Logs**
  From the Logs tab view and change the logs associated with this receiver group.
- **Position**
  From the Position tab view and change the position information for the receiver.
- **Site**
  From the Site tab view and change the site information for the receiver.
- **Interface**
  From the Interface tab view and change the communication interface settings for the receiver.

The **Group Name** drop down list indicates the receiver group currently being viewed. To change the receiver group, click the **Group Name** drop down list and select the receiver group to view.

There are two types of receiver groups available in the DL4Tool:

- preset receiver groups
  For a list of preset receiver groups, see *Preset Receiver groups* on page 27.
- user defined receiver groups.
  The default name for user defined receiver groups is LOGGROUPx, where x is a number from 1 to 5.

Clicking the **Load Defaults** button changes the configuration of the preset receiver groups to the default settings. The user defined groups are not changed.

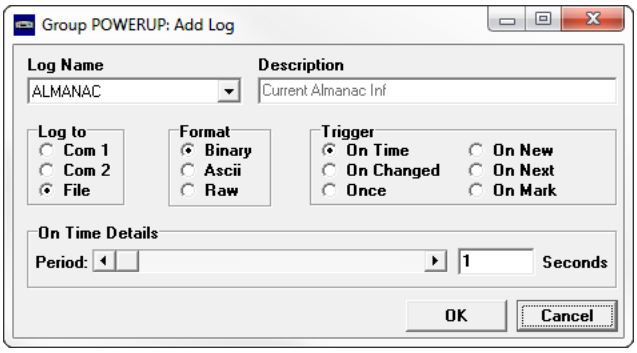
6.2.1 Change a Receiver Group Name

1. Click the **Group Name** drop down list and select the receiver group to change.
2. Click the **Rename** button. The Change Group Name window appears.
3. Enter the new name for the group.
   The new group name must be unique.
   The group name is converted to all uppercase letters.

4. Click the **OK** button.

6.2.2 Add a Log to a Receiver Group

1. From the Group Editor window, click the **Group Name** drop down list and select the receiver group to add a log to.
2. Click the **Logs** tab.
3. Click the **Add** button. The Add Log window appears.



4. Click the **Log Name** drop down list and select the log to add.
The log description appears in the Description box.
5. In the **Log to** box, select a destination for the log.
   - Select **Com 1** to send this log through the COM1 port of the receiver.
   - Select **Com 2** to send this log through the COM2 port of the receiver.
   - Select **File** to save this log to the compact flash card installed in the receiver.

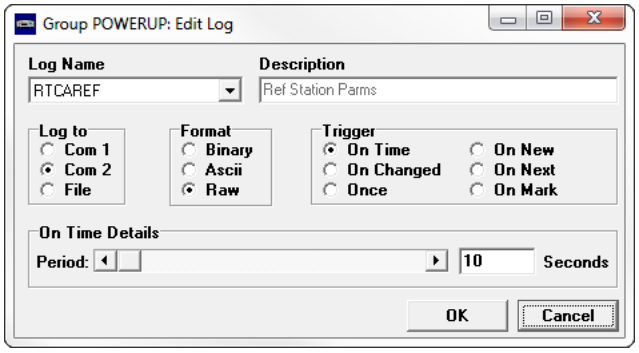
   If this receiver group is intended for use with a stand alone receiver, select **File** so that data file information can be saved.
6. In the **Format** box, select a output format for the log.
Choose the **Raw** option if transmitting differential corrections.
7. In the **Trigger** box, select the trigger setting for the log.
The Trigger settings determine when and how often the receiver collects the log information.

Trigger	Description
On Time	The log is collected at a regular time interval. The time interval used is set in the *Seconds* box. To change the time interval, select the number in *Seconds* box and enter a new time interval. Alternately, use the *Period* scale bar to change the time.
On Changed	The log is collected when any information in that log changes.
Once	The current log is collected.
On New	The log is collected when the message is updated (not necessarily changed).
On Next	The next log is collected.
On Mark	The log is collected when the receiver detects a pulse on the Mark (Event) input.

8. Click the **OK** button.
The new log is added to the receiver group and the Group Editor window appears.

6.2.3 Edit a Log in a Receiver Group

1. From the Group Editor window, click the **Group Name** drop down list and select the receiver group to change.
2. Click the **Logs** tab.
3. Click the log you want to edit.
4. Click the **Edit** button. The Edit Log window appears.



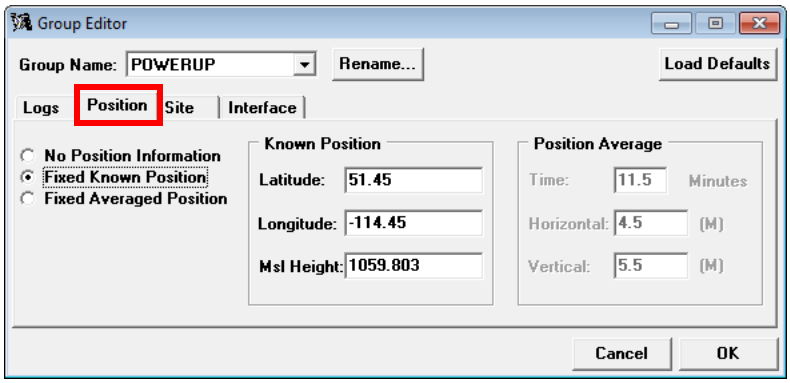
5. Change the settings for the log. See *Add a Log to a Receiver Group* on page 22 for details about the settings.
6. Click the **OK** button to accept the changes and return to the Group Editor window.

6.2.4 Remove a Log from a Receiver Group

1. From the Group Editor window, click the **Group Name** drop down list and select the receiver group to change.
2. Click the **Logs** tab.
3. Click the log you want to delete.
4. Click the **Delete** button.
   The log is removed from the receiver group.

6.2.5 Change the Position Settings

1. From the Group Editor window, click the **Group Name** drop down list and select the receiver group to change.
2. Click the **Position** tab.



3. Select one of the position information settings.

   - **No Position Information**

     The Known Position and Position Average edit boxes are inactive.

   - **Fixed Known Position**

     You **must** enter the approximate position information for the receiver in the Known Position edit boxes.
     Enter the **Latitude** in degrees. The valid range is -90 to + 90 degrees.
     Enter the **Longitude** in degrees. The valid range is -360 to +360 degrees.
     Enter the **Msl Height** in metres (Mean Sea Level). The valid range is -1000 to +20000000 metres.

   - **Fixed Average Position**

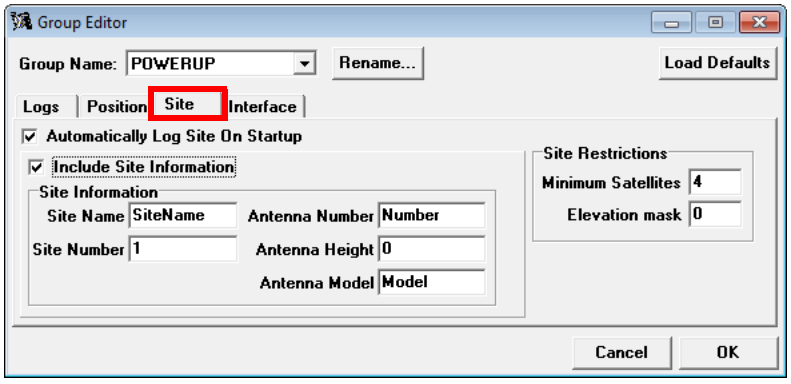
     The Position Average edit boxes are active.
     Enter the criteria at which the position averaging stops. Position averaging stops when a certain time period expires, the standard deviation for the horizontal axis is met or the standard deviation for the vertical axis is met.
     Enter the maximum time period for position averaging in the **Time** box. The valid range is 1.5 to 60 minutes.
     Enter the standard deviation criteria for the horizontal axis in the **Horizontal** box. The valid range is 0 to 100 metres.
     Enter the standard deviation criteria for the vertical axis in the **Vertical** box. The valid range is 0 to 100 metres. The typical standard deviation range is from 10 cm (3.9 inches) to 5 m (16.4 feet).

4. Click the **OK** button.

6.2.6 *Change the Site Settings*

Change the site settings to control whether site information is automatically logged on startup and specify the site information. To change the site settings:

1. From the Group Editor main window, click the **Group Name** drop down list and select the receiver group to change.
2. Click the **Site** tab.



3. Choose a setting for the **Automatically Log Site On Startup** check box.

   Clear the **Automatically Log Site On Startup** check box to set the group mode to Kinematic. Use this setting when the GPS antenna is moving. Kinematic data collection requires only short periods of data observations. Operational constraints include starting from or determining a known baseline and tracking a minimum of four satellites. One receiver is statically located at a control site, while others are moved between sites to be measured.

Select the **Automatically Log Site On Startup** check box to set the group mode to Static. A `SITE ENTER` command is executed at receiver startup and the site is configured with the parameters from the Site Information section or a default site name.
Use this setting when the GPS antenna is stationary. GPS data collection involves simultaneous observations between stationary receivers. Post-processing computes the vector between sites.

Refer to the DL-V3 User Manual or DL-4plus User Manual for details about the `SITE ENTER` command.

4. Choose a setting for the **Include Site Information** check box.

   Clear the **Include Site Information** check box to configure the receiver with a default site name.

   Select the **Include Site Information** check box to configure the receiver with the parameters in the Site Information section.

Antenna Model	Enter the model number for the antenna
Antenna Height	Enter the vertical antenna height above ground
Antenna Number	Enter the serial number of the antenna
Site Number	Enter a number for this site
Site Name	Enter a site name If this field is left blank, the log file name is used as the site name.

   The group definition issued during the group upload includes the `GROUPANTHEIGHT`, `GROUPANTSN`, `GROUPANTTYPE`, `GROUPSITENAME` and `GROUPSITENUMBER` (refer to the DL-V3 User Manual or DL-4plus User Manual for details on these commands).

5. If required for the application, edit the following fields:

Minimum Satellites	Select a number from 1 to 9 for the minimum number of satellites. The default is 4.
Elevation Mask	Choose an integer value for the elevation mask angle between 0 and 90 degrees. The default is 0.

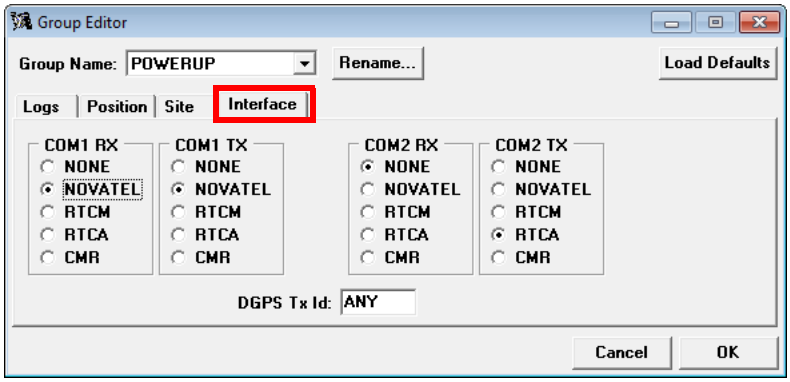
6. Click the **OK** button.

6.2.7 Change the Communication Interface Settings

Use the Interface tab to specify what type of data a particular port on the DL-4plus or DL-V3 receiver transmits and receives. The receive type (RX) specifies the type of data accepted on the port. The transmit type (TX) specifies the type of data to generate. For example, set the receive type on a port to **RTCA** to accept RTCA differential corrections.

1. From the Group Editor window, click the **Group Name** drop down list and select the receiver group to change.

2. Click the **Interface** tab.



3. Select the type of data the receiver generates or receives.

- None The port does not accept or generate data.
- NOVATEL The port accepts or generates NovAtel commands and logs.
- RTCM The port accepts or generates RTCM corrections.
- RTCA The port accepts or generates RTCA corrections.
- CMR The port accepts or generates CMR corrections.

When NONE is chosen, the specified port is disabled from interpreting any input or output data. Therefore, no commands or differential corrections are decoded by the specified port.

Disabling responses is important for applications where data is required in a specific form and the introduction of extra bytes can cause problems. For example, RTCA, RTCM or CMR. Disabling a port prompt is also useful when the port is connected to a modem or other device that responds with data the receiver does not recognize.

4. In the **DGPS Tx Id** box, enter the base station ID the receiver uses when transmitting corrections.

   The valid range for the base station ID depends on the type of data selected for the ports.

   RTCA any four character string containing only alpha (a-z) or numerical (0-9) characters

   RTCM a number from 0 to 1023

   CMR a number from 0 to 31

   The default entry for the **DGPS Tx Id** box is ANY. The ANY option forces the message to revert to its default base ID. The ANY defaults are:

   RTCA - AAAA

   RTCM - 0

   CMR - 0

5. Click the **OK** button.

6.2.8 Preset Receiver groups

The DL4Tool includes several preset receiver groups. These groups are used to quickly and easily setup schedules. The following sections outline each of the preset groups including the group name, the logs within the group and the interval options.

If the preset receiver groups do not appear in the Group Name list, click the **Load Defaults** button to return them to the list.

6.2.8.1 POWERUP

Use this group in a schedule when you are working with a receiver that is an RTK base and to post-process the data. This group may also be used for all manual data collection on the receiver.

Type of Information	Description
almanacb onchanged	current almanac
ionutcb onchanged	ionospheric and UTC clock parameters
rangecmpb ontime 10.0	compressed channel range measurements
rawephemb onchanged	raw ephemeris
rtcaobs ontime 1.0	base station GPS data received every second
rtcaref ontime 10.0	base station position received every 10 seconds
The first four types of information (almanac, ionutc, rangecmp and rawephem) are typically used for post-processing and are logged to the compact flash card. The last two (rtcaobs and rtcaref) are typically used for an RTK base station and are transmitted out of COM2.	

6.2.8.2 STATIC

Use this group when collecting static and rapid static data. All data is stored on the compact flash card.

Type of Information	Description
almanacb onchanged	current almanac
ionutcb onchanged	ionospheric and UTC clock parameters
rangecmpb ontime 10.0	compressed channel range measurements
rawephemb onchanged	raw ephemeris

6.2.8.3 DGPS_BASE

Use this group for a DGPS base receiver sending L1 code-only RTCM messages. All data is sent to the COM2 port.

Type of Information	Description
RTCM1 ontime 1.0	RTK differential corrections received every second

6.2.8.4 CMR_BASE

Use this group when the receiver is an RTK base working with rover receivers that support the CMR format. All data is sent to the COM2[1] port.

Type of Information	Description
cmrobs ontime 1.0	Trimble format base station GPS data received every second
cmrref ontime 10.0	Trimble format base station position received every 10 seconds
cmrdesc ontime10.0	Trimble format base station description received every 10 seconds

6.2.8.5 RTCM_1819

Use this group when the receiver is an RTK base working with rover receivers that support the RTCM1819 format, including OEM4-G2 receivers. All data is sent to the COM2 port[1 2].

Type of Information	Description
RTCM1819 ontime 1.0	RTK differential observations and positions received every second
RTCM3 ontime 10.0	RTK differential observations and positions received every 10 seconds

6.2.8.6 RTK_BASE

Use this group when working with an RTK base receiver and post processing is NOT required. All data is sent to the COM2 port[1].

Type of Information	Description
rtcaobs ontime 1.0	base station GPS data received every second
rtcaref ontime 10.0	base station position received every 10 seconds

1. The version of RTCM used may need to be modified to either version 2.1 or 2.2. The RTCM version can be modified through a terminal session.
2. The base station coordinates must be entered or the option for a base station's coordinates selected to be computed (based on meeting standard deviation or time interval criteria).

6.3 Edit Schedules

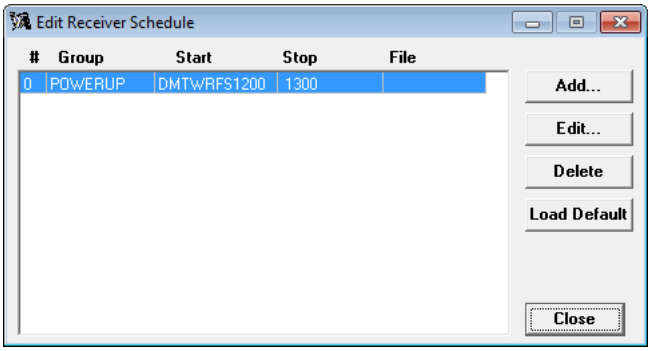
The Schedule Editor is used to establish a data collection session on the receiver. After creating the schedule on the computer, transfer it to the receiver. For more information, see *DL4Tool Receiver Communications* on page 32.

You can schedule up to seven days worth of data logging at a time, with up to 36 sessions per day. Start and stop times must be provided with a resolution of 1 minute. The minimum time interval per logging session is 5 minutes.

The scheduling feature is designed for use with receivers operating in stand alone mode.

To open the Edit Receiver Schedule window:

1. Click the **Schedule Editor** button.



If the Schedule Editor button is not active, select File | Activate Scheduling from the top of the main window.

The Edit Receiver Schedule window has five columns.

#	Automatically generated number. The number of sessions per day cannot exceed 36.
Group	Displays the name of the receiver group used in the session.
Start	Displays the start time of the session.
End	Displays the end time of the session.
File	Displays the file location where the data is to be sent.

The Start and Stop times are specified in *ddddddhhmm* format, where *ddddddd* represents up to 7 days of the week, *hh* represents the hour (in 24-hour notation) and *mm* represents the minute. Multiple days of the week are allowed only in the Start time and indicate that this schedule entry represents an event that repeats on the specified days of the week. The day of the week can not be specified in the Stop time for repeating events. If a day of the week is not specified in Start, the event repeats every day. If the Stop time is less than the Start time, the event wraps over to the next day. ddddddd consists of the combination of different character codes, each representing a day of the week as follows:

Table 1: Character Code for Days of Week

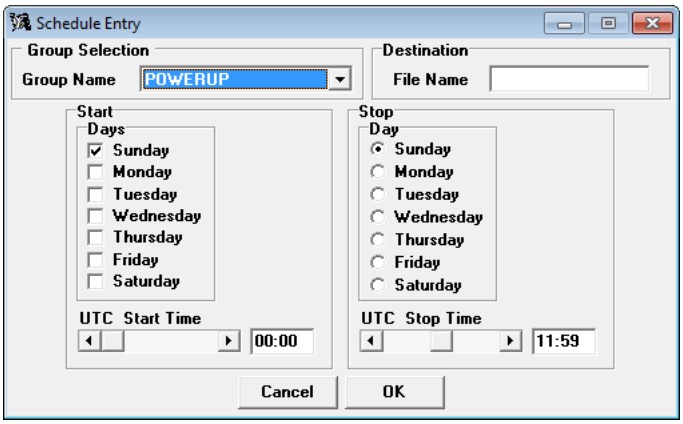
Weekday	Character Code	Weekday	Character Code
Sunday	D	Thursday	R
Monday	M	Friday	F
Tuesday	T	Saturday	S
Wednesday	W		

The following are examples of valid Start and Stop times:

Start	Stop	Abbreviation
07:00	18:00	event starts at 07:00 and ends at 18:00 every day
MWRF10:00	11:00	event starts at 10:00 and ends at 11:00 every Monday, Wednesday, Thursday and Friday
M02:05	F12:15	event starts at 02:05 on Monday and ends at 12:15 on Friday
T14:00	13:00	event starts at 14:00 every Tuesday and ends at 13:00 every Wednesday
D18:30	D15:30	event starts Sunday at 18:30 and continues until the next Sunday at 15:30

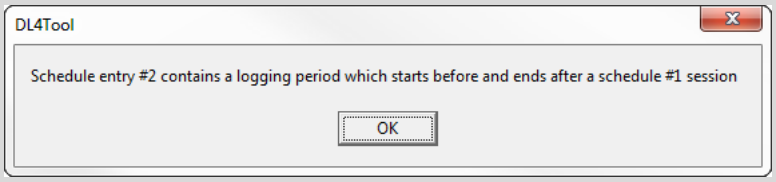
6.3.1 Add a Schedule

1. Click the **Add** button. The Schedule Entry window appears.



2. Click the **Group Name** drop down list and select the receiver group used with this schedule. For information about receiver groups, see *Edit Receiver Groups* on page 21.
3. In the **Start** box, select the day or days to start scheduling.
   If multiple Start days is selected, the schedule runs on all of the selected days from the Start Time to the Stop Time.
   If a day is not selected, the schedule runs every day of the week from the Start Time to the Stop Time.
4. Use the **UTC Start Time** scale bar to set the time the schedule starts.
   A Start Time cannot be entered using the UTC Start Time box.
   The time system is based on UTC (Coordinated Universal Time).
5. In the **Stop** box, select the day on which the schedule stops.
   If multiple Start days or no Start days are selected, the Stop Day options are inactive.
6. Use the **UTC Stop Time** scale bar to set the time the schedule stops.
   A Stop Time cannot be entered using the UTC Stop Time box.
   The time system is based on UTC (Coordinated Universal Time).
7. To assign a file name for the information collected by this schedule, enter the name in the **File Name** box. The name must begin with an alpha character (A-Z) and may be up to 8 characters long. The remaining characters may be digits (0-9) or alpha characters.
   If a file name is not assigned, the file name is assigned by the receiver. See *Receiver Auto-Generated File Names* on page 31.
8. Click the **OK** button to add the new schedule.

Overlapping time intervals cannot be specified. All scheduled entries rely on day-of-week and UTC time references. If a time span conflicts with another schedule, the following error message appears.



6.3.2 Receiver Auto-Generated File Names

If the *File Name* field is left blank in the Schedule Entry window, the DL-4plus or DL-V3 receiver gives the session an auto-generated filename. The file name is composed of an eight-character base followed by a period and a three character extension.

Table 2: Auto-Generated File Name Conventions

Filename (####$$$%.PDC)	Comments
####	Characters 1 through 4 are the last four digits of the DL-4plus or DL-V3 receiver serial number
$$$	Characters 5 through 7 are the UTC day-of-year (001 - 366)
%	Character 8 is the session id, an alphanumeric character in sequence 0, 1, 2, ..., 9, A, B, C, ..., Z and starting with 0 for the first session of a UTC day. Character 8 is selected when the session is started. The software looks at the files that are already on the compact flash card and selects the first character in the sequence 0,1,2,...,9,A,B,C,...,Z that produces a filename which does not already exist on the compact flash card. For example, if there are 10 scheduled sessions on a particular day, but you turn the receiver ON during the 7th session with a blank compact flash card, the last digit for the file created for this session is 0. If this procedure does not come up with an available file name, a completely random filename is generated
PDC	The file name extension is PDC

For example, if a receiver has the serial number CGN95450087, the date is January 25 and it is the 15th saved schedule on the compact flash card, the file would then have the name 0087025E.PDC.

In an exceptional case, a filename conflict may occur that prevents the receiver from creating a file with the desired name. In that case, the receiver creates a filename where first character is a tilde (“~”), followed by a 7-digit random number, and a *.PDC extension (for example, ~9368412.PDC).

6.3.3 Edit a Schedule

1. Select the schedule to edit.
2. Click the **Edit** button. The Schedule Entry window appears.
3. Make the required changes to the schedule. The details of the Schedule Entry window are described in *Add a Schedule* on page 30.
4. Click the **OK** button.

6.3.4 Delete a Schedule

1. Select the schedule to delete.

2. Click the **Delete** button.

6.3.5 Load Default

To ensure that only the default POWERUP schedule is active, click the **Load Default** button.

6.4 DL4Tool Receiver Communications

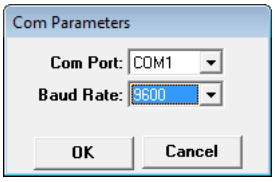
To use the DL4Tool utility to manage and transfer files between the compact flash card on the receiver and the computer.

Connect the receiver to the computer using the instructions in the *DL-V3 User Manual* or *DL-4plus User Manual*.

6.4.1 Set the Communication Parameters

To set the parameters for the communication port on the computer:

1. Click the **Comm Params** button. The Com Parameters window appears.



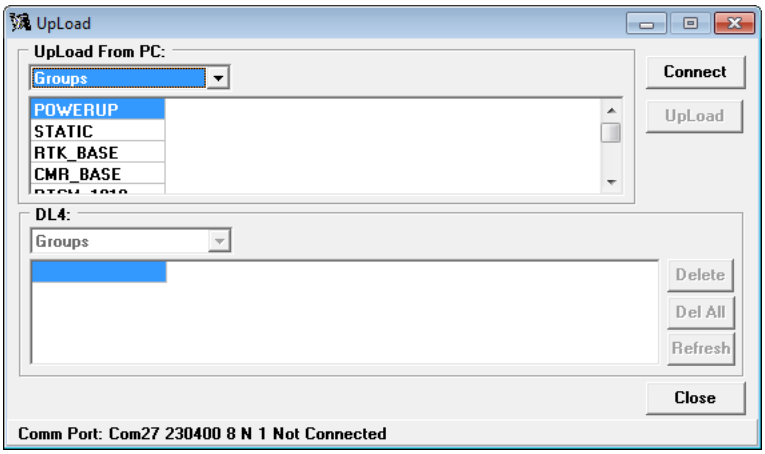
2. From the **Com Port** drop down list, select the computer communication port connected to the receiver. The default is COM1.
3. From the **Baud Rate** drop down list, select the baud rate set on the receiver. The default is 9600.

> When connected to the receiver using the USB port, the baud rate is ignored by the USB drivers and the baud rate is set as fast as possible. The current highest baud rate shown in DL4Tool is 230400.

4. Click the **OK** button.

6.4.2 Upload a Group to the Receiver

1. Click the **Upload** button in the main DL4Tool window. The Upload window appears.



2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the computer and the receiver.
3. In the **UpLoad From PC** box, click the group to upload to the receiver.
4. Click the **Upload** button. When the selected group is finished loading onto the receiver, the group appears in the DL4 box.

6.4.3 Upload a Schedule to the Receiver

1. Click the **Upload** button in the main DL4Tool window. The Upload window appears.
2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the computer and the receiver.
3. Click the **UpLoad From PC** drop down list and select **Schedule**.
4. In the **UpLoad From PC** box, click the schedule to upload to the receiver.

   Only one complete schedule table is transferred. Individual schedule entries cannot be selected. Any groups used in the schedule table must be uploaded first.
5. Click the **Upload** button. When the selected schedule is finished loading onto the receiver, the schedule appears in the DL4 box.

   When a new schedule is transferred from the computer to the receiver, the schedule currently on the receiver is overwritten.

6.4.4 Remove Groups from the Receiver

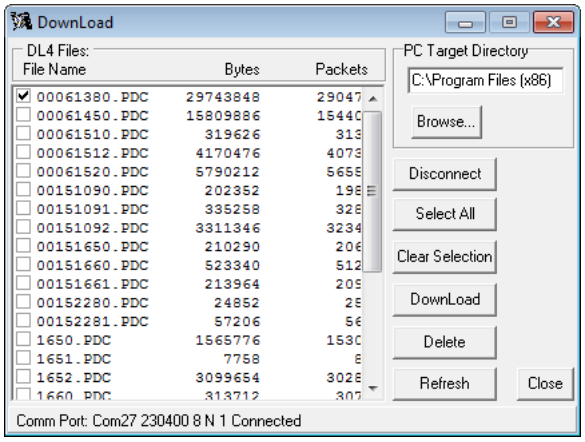
1. Click the **Upload** button in the main DL4Tool window. The Upload window appears.
2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the computer and the receiver.
3. In the **DL4** box, click the group or groups to remove from the receiver.
4. Click the **Delete** button. To remove all of the groups from the receiver, click the **Del All** button. A confirmation window appears.
5. Click the **Yes** button.

6.4.5 Remove a Schedule from the Receiver

1. Click the **Upload** button in the main DL4Tool window. The Upload window appears.
2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the computer and the receiver.
3. Click the **UpLoad From PC** drop down list and select **Schedule**.
4. Click the **Del All** button.

6.4.6 Download File from the Receiver to the Computer

1. Click the **Download** button in the main DL4Tool window. The Download window appears.



2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the receiver and the computer.

   The Download window box displays the files stored on the connected receiver in the DL4 Files panel.

3. Click the **Browse** button.
4. Navigate to the directory to store the files and click the **OK** button.
5. Select the check box beside the file or files to download.
6. Click the **Download** button.

6.4.7 Delete a File from the Receiver

1. Click the **Download** button in the main DL4Tool window. The Download window appears.
2. Click the **Connect** button to establish a connection with the receiver. Once connected, this button changes to a **Disconnect** button. A status line at the bottom of the window displays the current state of the connection and/or transfer between the receiver and the computer.

   The Download window displays the files stored on the connected receiver in the DL4 Files panel.

3. Select the check box beside the file or files to delete.
4. Click the **Delete** button.
   A confirmation window appears.
5. Click the **Yes** button.