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Willtek 8010

Hindsite RF Propagation Test Software

user's guide

version 2.20

Notice

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Ordering information

This guide is issued as part of the **Willtek 8010 Hindsite™ RF Propagation Test Software**. The ordering number for a published guide is M 294 825. The ordering number for the full product is M 897 825.

Safety notes

If the wheel transducer assembly is not securely fitted, it may become detached from the wheel and cause accident or injury.

On some vehicles, the wheel transducer may project beyond the bodywork of the vehicle and be considered a hazard to pedestrians or other road users. In this event, a curved protective cover should be fitted.

Operating the Hindsite software whilst driving the vehicle is hazardous and should be avoided.

Table of Contents

About This Guide

Purpose and scope

The purpose of this guide is to help you successfully use the Hindsite features and capabilities. This guide includes task-based instructions that describe how to install, configure, use, and troubleshoot the Hindsite. Additionally, this guide provides a description of Willtek's warranty, services, and repair information.

Assumptions

This guide is intended for novice and intermediate users who want to use Hindsite effectively and efficiently. We are assuming that you have basic computer, Microsoft Windows and mouse experience and are familiar with basic telecommunication concepts and terminology.

Related information

Use this guide in conjunction with the following information:

- Willtek 8300 Griffin user's guide if you are using Hindsite in conjunction with the Willtek 8300 Griffin Fast Measurement Receiver Series
- Willtek 8100 GPR user's guide if you are using Hindsite in conjunction with the Willtek 8100 GPR General Purpose Receiver Series

Technical assistance

If you need assistance or have questions related to the use of this product, call one of Willtek's technical assistance centers. You can also contact Willtek by e-mail at customer.support@willtek.com.

Table 1 Technical assistance centers

Region	Phone number	Fax number
UK	+44 (0) 20 8408 5720	+44 (0) 20 8397 6286
Europe, Middle East, Asia, Africa	+49 (0) 89 996 41 386 +49 (0) 89 996 41 227	+49 (0) 89 996 41 440
Americas	+1 317 595 2021 +1 866 WILLTEK	+1 317 595 2023

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 2 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **TYPEFACE**.	Press the **ON** switch.
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box.
Variables appear in this **<typeface>**.	Type the new **<hostname>**.
Book references appear in this **typeface**.	Refer to **Newton's Telecom Dictionary**
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [ ] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	`<password>`

Table 3 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive keystrokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 4 Symbol conventions

This symbol represents a general hazard.

This symbol represents a risk of electrical shock.

NOTE

This symbol represents a Note indicating related information or tip.

Table 5 Safety definitions

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Overview

1

This chapter provides a general description of the Hindsite. Topics discussed in this chapter include the following:

About Hindsite

Hindsite is a very powerful application able to gather, analyse, display, and record data from many devices at the same time. It is made up of an integrated set of Software Components, each of which contributes to the overall application.

What's new in version 2.20

Please see chapter "Changes from Earlier Releases" on page 135.

Features and capabilities

Overlay real topographical maps with geographical information system

Set up rapidly with dynamic equipment control and configuration wizard

Analyze data powerfully

Report and export easily and flexibly

Test capacity of new technologies like CDMA2000, GPRS, TETRA and UMTS using a benchmark standard

Options

Hindsite is a software product supporting any of the following measurement receivers:

- Griffin Fast Measurement Receiver 8301, order code M 100 501
- Griffin Fast Measurement Receiver 8302, order code M 100 502
- GPR General Purpose Receiver 8103A, order code M 100 603

The software can be used with the following hardware options:

- JRC GPS Option (GPS Receiver, Mag mount antenna, cables, manual and carrying case), order code M 248 622
- Trimble 455 GPS Option (PS receiver, dead reckoning heading sensor, cables, manual, carry case), order code M 248 623
- GPR Distance Option (WHK1, PPA 9306, cables, manual and carrying case), order code M 248 624
- SMR Distance Option (WHK1, cables, manual and carrying case), order code M 248 625
- Pedestrian Distance Option (Thrumeter, PPA 9306, Computer Tray, cables, manual and carrying case), order code M 248 626

Introduction

2

This chapter explains the basic ideas and terminology used in the rest of the manual. The topics discussed in this chapter are as follows:

About Hindsite

The purpose of Hindsite is to collect data from a selection of measuring instruments and to display the data in a useful way. The data can be viewed both while it is being gathered and later, once it is stored in files.

Basic terminology

This section will introduce some of the terminology used within Hindsite. The topics here are all covered in detail in the later sections of the manual.

Instrument

An instrument is a device that generates data to be recorded by Hindsite during a drive test. The obvious instruments are the GPR and Griffin series of measuring receivers and the Trimble or JRC Satellite Navigation Receivers. Hindsite also has instruments which are not so obvious, such as the event log which records any events raised by the instruments during a drive test, or markers where the data comes from you, the operator.

View

A view is a type of display of the data. Currently Hindsite has three views: graph, table and map. Each view appears as a separate window within the overall Hindsite window. You can have several views open at the same time.

Presentation

Hindsite uses the term presentation to refer to a collection of views. For example, if you arrange a table and a graph to show some particular feature of the data in a drive test this would be a presentation of that data. You can save the presentation within the drive test to return to it at a later time.

Configuration

A configuration is a collection of instruments and views that you prepare before doing a drive test. In the configuration you can specify the settings for each instrument and which views are to be shown during the drive test. You can have as many configurations as you wish and simply choose the one you need for any drive test. You could prepare configurations on one PC and send them to other PCs running Hindsite to ensure that they all use the same settings.

Field

A Hindsite field is a particular type of data, for example signal strength is a field, as is the 10% confidence value. Fields can be measured directly by the instruments or calculated by Hindsite. The Hindsite views all show data from fields, for example, when you choose what to display as a line on a graph you are choosing what field to display.

Hindsite will only allow you to choose the fields that will be available from the instrument settings that you have chosen. If a field is not available to you it is because you did not choose the correct instrument settings to produce the field. See Chapter 7 "Hindsite Fields" for more discussion about fields.

Drive test

A drive test is the act of measuring with Hindsite and results in a drive test results file.

Drive tests are run using a particular configuration file and data is written to a drive test results file. This file contains a copy of the configuration that was used for the drive test so you can always find out precisely what settings were used by the instruments. You cannot change the settings for the instruments.

The drive test results file also contains copies of the views that were in the configuration (in other words a copy of the presentation). You can change and then save the views within the drive test tesults file.

Known issues

The service for the wheel calibrator does not install for Windows 2000. This prevents distance-triggered runs with the GPR.

When installing under Windows NT and starting Hindsite for the first time, a message box appears stating 'unable to start Hindsite'. However Hindsite continues to load and is usable. Once Hindsite is licensed then this message no longer appears when you start Hindsite.

When working with the Griffin, it may happen that changing from dBm to dBµV does not change table and graph unit values.

Time-triggered route tracing is not supported by Hindsite.

Note

See also Chapter 8 “Maintenance and Troubleshooting”.

Installation

3

This chapter describes how to install the Hindsite. The topics discussed in this chapter are as follows:

Software requirements

Hindsite is designed to run on the 32-bit Microsoft Windows operating systems Windows 95, 98, NT, 2000, and XP.

Hardware requirements

Hindsite is a very powerful application able to gather, analyse, display and record data from many devices at the same time. To obtain the best performance from Hindsite you should run it on a powerful PC platform. Willtek recommends that the minimum specification of PC is one with a 400 MHz clock rate fitted with 64 megabytes of RAM. The size of hard disk depends on the volume of maps and data that you will need to store on it.

Installing the software

Two types of installation are supported – initial installation (for first-time use of Hindsite on a PC) and upgrade installation (installing a newer version over an older one).

Initial installation

1 Insert the Hindsite CD into the CD drive. The installation should start automatically (if autoinsert notification is switched on). If the installation does not start automatically, you can install Hindsite either by running **`setup.exe`** directly from the Windows Run menu or through the Windows Control Panel Add/Remove Programs utility.
To install Hindsite from the Windows Run menu, choose **Run** from the menu. You can then browse on the CD to find **`setup.exe`** or, if you know the drive letter for your CD, type **`x:setup`**, where x is the drive letter.
To install Hindsite via Control Panel, open Control Panel and then open Add/Remove and choose **Install**.
Installation is handled through the industry-standard InstallShield Wizard. This will be familiar to anybody who installs programs regularly. It will guide you through several pages. In most cases you need only click on the **Next** button.

2 On Page 1 of the installation (Welcome), follow the advice to close all other Windows applications.

3 On Page 2 (Identification), enter and confirm your name and organization. This will default to values you have used previously on this PC but you can change them if you wish.

4 On Page 3 (Installation Folder), you may specify any location for installation. The path to the folder will be created if necessary. The default should be acceptable in most cases.
Hindsite will now be installed.

5 The wizard might instruct you to restart your computer at the end of the installation. If it does, it is **essential** that you do so **before** running Hindsite.

6 Click **Finish** to install the Hindsite program.

7 Run **Start** > **Programs > Willtek > WheelInstall**. When it has finished, restart your computer again.

8 Once the installation is completed, and you have restarted your PC, you should follow the instructions below to license Hindsite.

Upgrade installation

If you already have Hindsite installed and are upgrading to a new release you can proceed as for the initial installation.

Willtek recommends that you use the same folder for the new Hindsite so as to overwrite the previous release. Willtek does not support two different versions of Hindsite on one PC at the same time and they might interact.

None of your data will be affected by installing a Hindsite upgrade.

Please run WheelInstall (from **Start** > **Programs > Willtek**) after running setup.exe.

Licensing Hindsite

It is a deplorable fact of the world today that software is often stolen, which means that Willtek has to protect Hindsite. Unfortunately, it means that you, the legal user, has to enter a licence key to enable you to use Hindsite. Willtek has tried to make the process as convenient as possible, but, to be secure, it has to be well-protected against attack.

The licences are issued for a particular computer but may be transferred easily to another computer if required.

Some demonstration files are installed with Hindsite and these can be viewed freely without any licences. Viewing of other files and recording of new data can only be done with the appropriate licence.

Currently Willtek issues two types of licence: one which enables full operation of Hindsite and one which only enables viewing of drive test result files. Willtek will only issue the type of licence that you have purchased.

Obtaining your licence

Once you have installed Hindsite on the PC on which you intend to use it, you must run the licence wizard and obtain a licence key from Willtek. You will need to be in contact with Willtek to obtain your key. You can use email, telephone or fax as convenient to contact Willtek's technical support; see section "Technical assistance" on page xiv.

To register for your warranty support you will have to supply Willtek with the following information at the same time as you request your licence key:

- Contact name
- Company
- Address
- Phone number
- Fax number
- Email address

You will need to quote your order number and, if you bought Hindsite through one of our distributors, the name of the distributor. If, for any reason, Willtek is not able to verify that you are the legitimate purchaser, Willtek will not issue a licence key. We are sorry if this happens to you, but we have had instances of people trying to obtain keys through deception and have to protect ourselves. The solution is to contact your distributor (or salesman if you bought Hindsite directly from Willtek) who will be able to arrange for a key to be issued to you.

Please note that Willtek will not reissue a licence once it has been issued to you, even for the same PC. You can transfer your licence from one PC to another as often as you wish.

Running the licence wizard

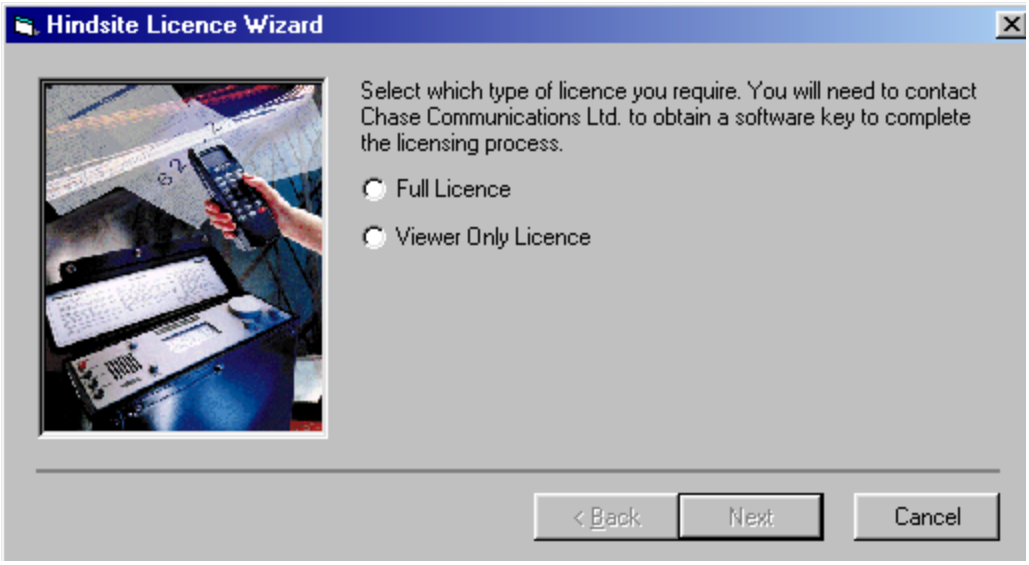
Note

Willtek recommends that you read the following sections carefully before licensing your copy of Hindsite.

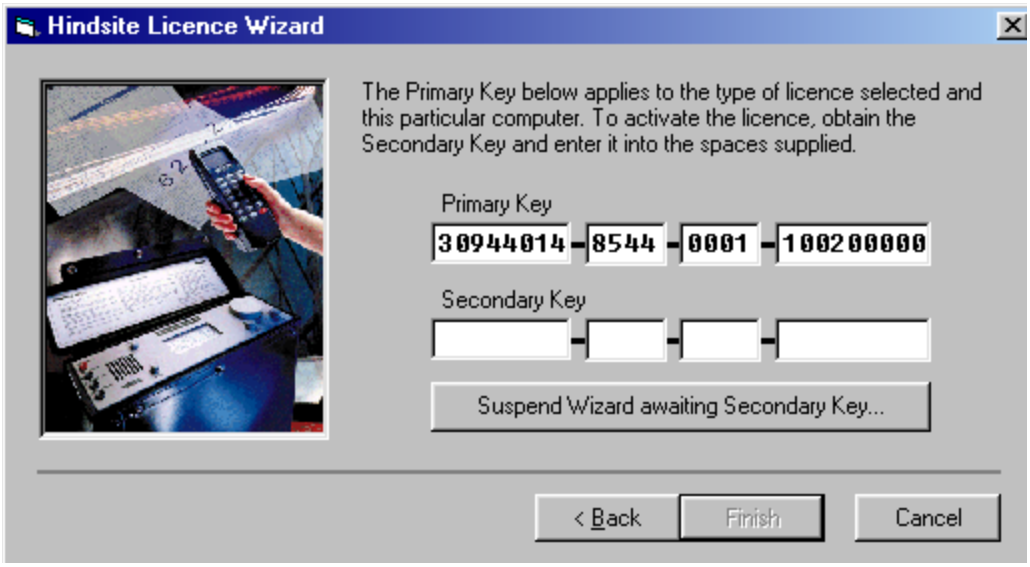
From the Tools menu, select Licence Wizard  . Hindsite will detect which licence, if any, is active on this computer and guide you through the steps necessary to obtain the licence you require.

New licence

If you have no licence the wizard will appear as follows:



Select which licence you have ordered and click **Next**.



A primary key will be displayed which must be sent to Willtek together with your proof of purchase and support registration details. The primary key contains, in an encrypted form, your licence type and a unique identifier for your machine (no private data is communicated to Willtek).

If you are in direct communication with Willtek technical support then obtain from them a secondary key and enter it immediately into the lower row of boxes (the same number of characters in the same groupings as in the primary key).

If there will be some delay before obtaining the secondary key, click the **Suspend Wizard awaiting Secondary Key...** button. The wizard will exit. You will not be able to use Hindsite until you get the secondary key.

When the secondary key has been obtained, start the licence wizard again as before and the wizard will redisplay the page for entering the secondary key as described above.

Once the secondary key has been entered, click the **Finish** button. You will now be able to use Hindsite.

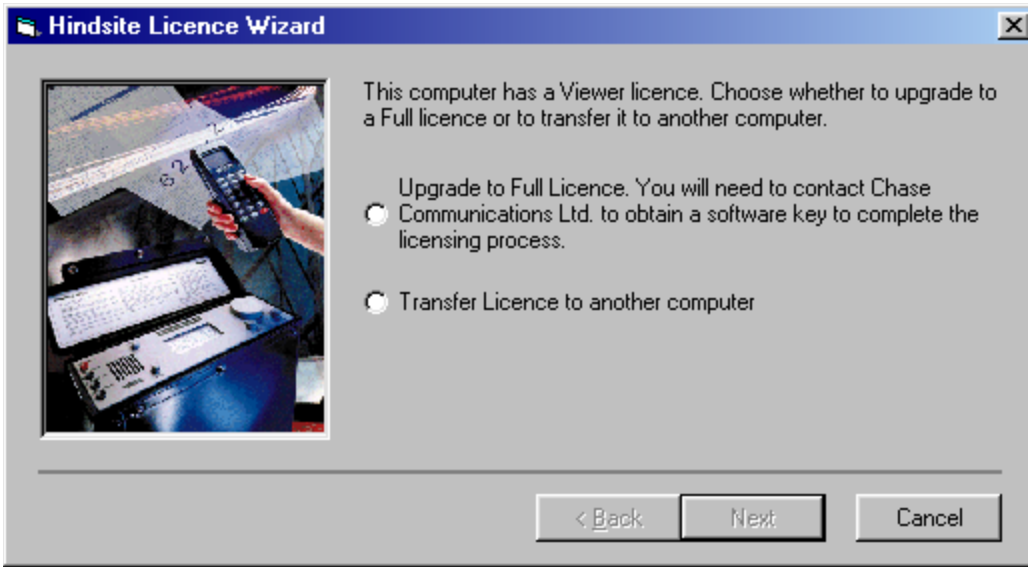
We will issue a secondary key, which must be entered in the appropriate boxes.

If you cannot obtain a secondary key immediately, click the **Suspend Wizard awaiting Secondary Key...** button. This will close the wizard and, the next time the wizard is started, will take you straight to this page with the same primary key.

When the secondary key has been entered, click **Finish** to complete the licensing process.

Upgrading from viewer to full licence

If you have a viewer licence and are going to upgrade to a full licence (or transfer the licence to another computer) the wizard will appear as shown below:



You may upgrade to a full licence or transfer the viewer licence to another computer. Select which you want and click **Next**.

If you are upgrading, the subsequent steps are identical to those above (under New Licence).

Transferring a licence

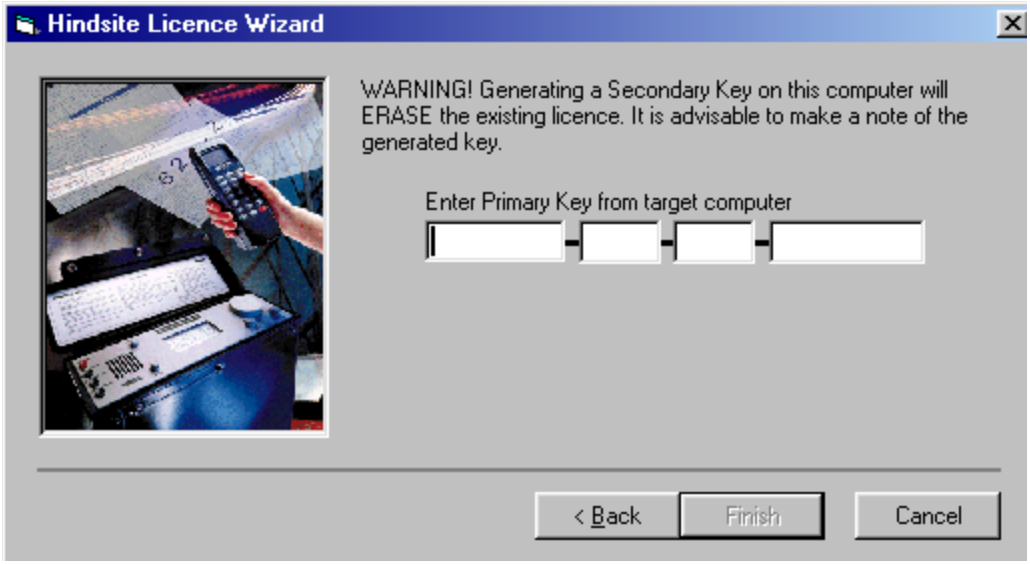
If subsequently you want to transfer your licence to another computer, you can do this without reference to Willtek.

The idea is that the original computer can act as a source of the secondary key instead of Willtek. In doing so, the original computer will delicense the copy of Hindsite on itself so that only one computer can hold a licence at any time. You can transfer the licence back to the original computer at a later time.

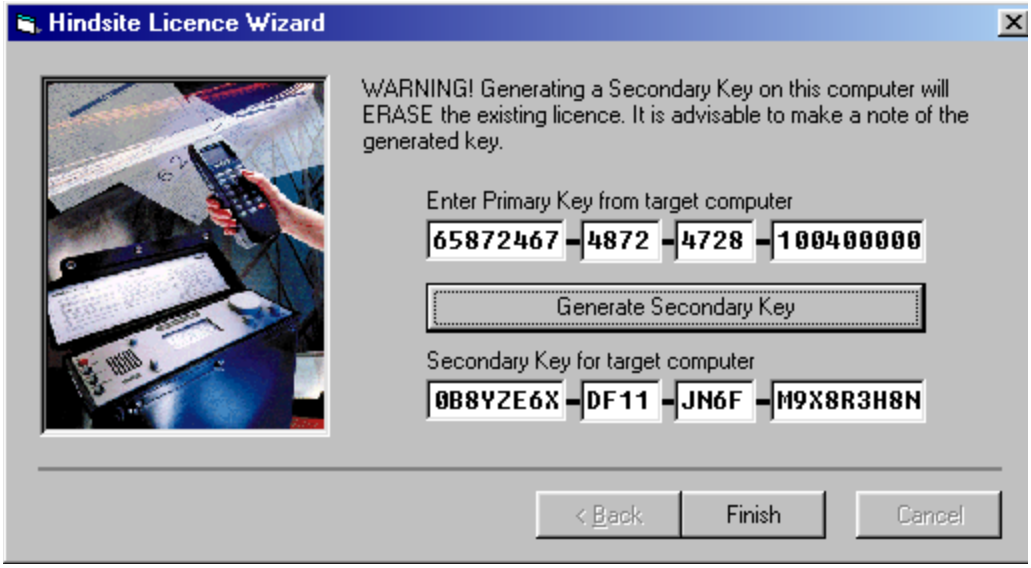
Note that you must have both the source and target computers in communication while transferring the licence as the keys incorporate the time and date. Once you generate a secondary key on the source computer then you must use it on the target computer immediately. If you rerun the licence wizard on the target computer then it will generate a different primary and so will need a different secondary key, but you will not be able to generate another secondary key on the source computer.

When you are ready, install Hindsite on the target machine as normal. Run Hindsite and start the licence wizard as described above in "Obtaining your licence" on page 9 until you reach the page that requests the secondary key.

Now run the licence wizard on the source computer but select **Transfer Licence(s)** on the opening page. Click **Next**.



Enter the primary key from the target computer. Once you have entered the complete key and Hindsite has checked that it is valid, the page will change to the following:



Note

The next step will display the secondary key (to be entered on the target computer) and simultaneously erase the licence from this computer. There is no way of undoing this.

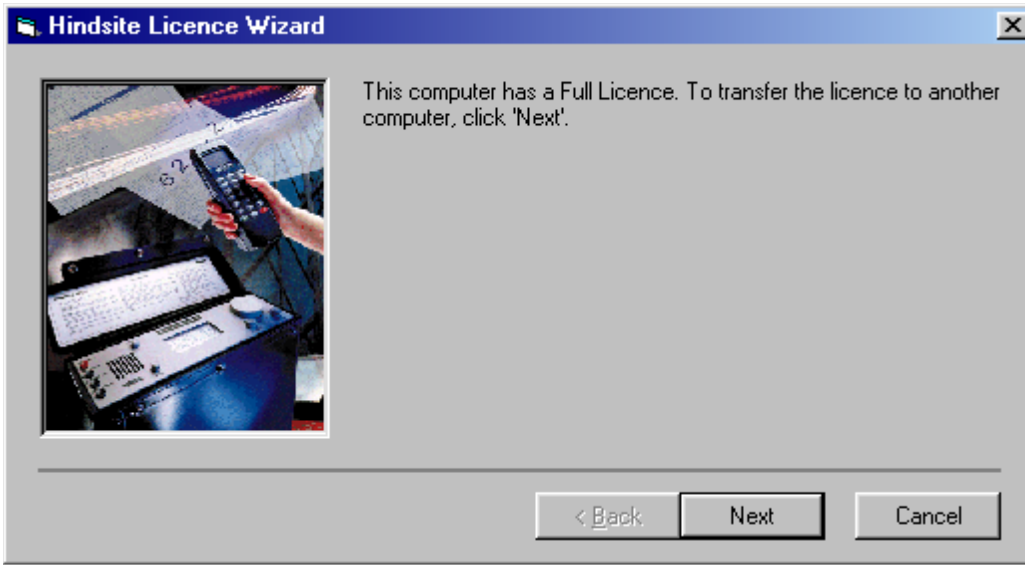
Please ensure that the primary key is entered correctly and that you are ready to copy the secondary key to the target computer immediately before continuing.

Click **Generate Secondary Key**. You are strongly advised to make a note of the secondary key.

Now type the secondary key into the target computer. When the target computer has been licenced successfully, click **Finish** to exit the wizard on the source computer. The copy of Hindsite on this computer will now be unlicensed.

Transferring a full licence

If you already have a full licence when you start the licence wizard then the only available action is to transfer the licence to another computer. To do this, click **Next** and then proceed as described above.



Installing maps

The installation process will copy some map files into a subfolder of the installation folder so that the demonstration run files may be viewed. The registered Hindsite maps folder will be set to this subfolder.

In order to use your own maps, you must copy them onto the hard disk in your PC and then set the maps folder (in the **Tools** > **Working Folders** menu, as explained on page 15) to point to them.

Note

You must not mix maps with different projections or formats in the same folder. If you do so it will cause problems with the display of maps.

You must not load your maps in the default subfolder with the demonstration maps.

The background maps can be presented to the map view in any form handled by the MapInfo product that it uses. In the folder specified to Hindsite for maps (see "Working folders" on page 15), the map view first searches for a .gst (geoset) file. If it finds one, it is loaded into the MapInfo product for display. Failing that, all the .tab (table) files in the folder are loaded in. The .gst and .tab files and any associated files (for example bitmaps) must be in the correct format for MapInfo products.

Configuring the software

Working folders

Once you have installed Hindsite you should select the folders in which you will store your data. Start Hindsite, then select Working Folders from the Tools menu.

You will be able to select default locations for the folders to hold your configuration and run (drive test result) files. You can also select the folder containing your maps.

Demo files

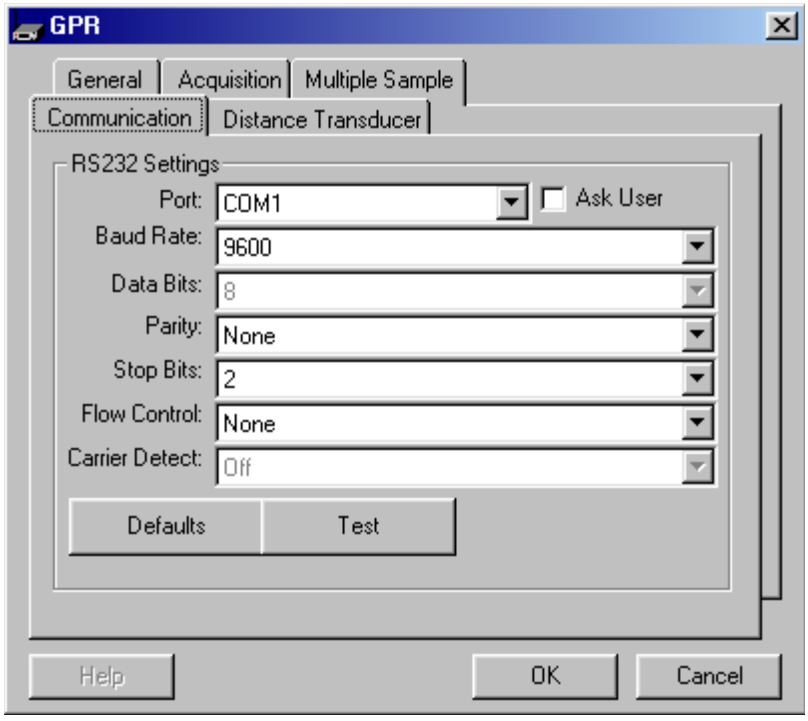
Some demonstration files are copied to your hard drive when Hindsite is installed. The drive test result files can be viewed even if Hindsite is not licensed. The demo files include some tiles of a map of the UK.

Some facilities are shared by many of the Hindsite components (instruments or views). Rather than repeat the same information in the chapters for each component the shared facilities are described in this appendix.

Communications settings

Some facilities are shared by many of the Hindsite components (instruments or views). Rather than repeat the same information in the chapters for each component the shared facilities are described here.

All of the instruments communicate with Hindsite via an RS-232 connection and their settings editor will contain the communications tab. You should ensure that the settings are suitable for the instrument and match the actual settings in the instrument.



This specifies the RS-232 settings to be used during a run. If the COM port number can be assured, it may be specified here. If it may vary from drive test to drive test (this configuration file could be used on more than one computer), you may specify that it is requested at run time.

RS-232 Settings...

Port

Select the required port number from the drop-down list.

Baud Rate

Select from the drop-down list.

Data Bits

Select from the drop-down list.

Parity

Select from the drop-down list.

Stop Bits

Select from the drop-down list.

Flow Control Select from the drop-down list.

Carrier Detect Select from the drop-down list.

Defaults To reset all the above values to their default values, click this button.

Test If the instrument is actually connected to the computer, you may test that the communications parameters have been specified correctly. Click the **Test** button and the instrument will be prepared for a run (although no measurements will be taken). If the communication fails, Hindsite will attempt to diagnose the problem for you.

Using Hindsite

4

This chapter describes the basic functionality of Hindsite. Topics discussed in this chapter are as follows:

Basic elements and usage

The Hindsite window interface

Windows applications have a number of standard interfaces that they can show to you, the user. The one chosen for Hindsite is called MDI or multiple document interface. This is the one used by many applications such as Word and Excel. Unfortunately, this interface does not quite meet the needs of an application such as Hindsite, which needs to show many different views of the same file. Willtek has had to use the MDI interface in a way which differs slightly from that which is conventionally used.

Each view is an MDI child window. When you close a view you do not close the whole file, only that view of it. To close the file (and hence all of its views) you must choose **Close** from the **File** menu.

If you maximize a view with the maximize button in the top right of its title bar, all of the views will be maximized and placed one on top of another. (This is the MDI standard way of handling multiple windows.) The minimize, restore and close buttons will move to the menu bar. If you then close the uppermost view, you will see another view under it. The one exception to this is the map view designated as background which remains maximized irrespective of the other views.

Overview of activities

When working with Hindsite you will find yourself tackling four main tasks:

- Preparing configurations
- Performing a drive test
- Analyzing the drive test results
- Exporting results

Each of these tasks will be overviewed below and expanded in the following sections and chapters of this manual.

Planning a drive test

When planning a drive test you will need to plan precisely what you need to measure and how best to do so. For example, you might have to choose between a range of instruments and navigation devices. You might or might not have maps available for the area, which will influence how you choose to navigate. You will need to decide what measurements to make and on which frequencies as well as practical issues such as which COM ports to use. Finally, you might need to prepare a written procedure to ensure that a sequence of drive tests are all carried out in the same way by the operator.

Experience with drive testing and Hindsite will allow you to make the best choices in different circumstances. The result, as far as Hindsite is concerned, of the planning phase is a configuration file containing all of the settings you have chosen.

Performing a drive test

Once you have planned a drive test actually doing the test should be an automatic process. However, even the best laid plans can be upset by road works and weather so Hindsite has facilities to help to monitor and track precisely what does happen.

Starting a drive test is as simple as opening the configuration and clicking on **Run**. You can choose what data is visible during the drive so that you can monitor whether it is going to plan or not. For example, you might show a graph of signal strength to give yourself confidence that the data is being collected.

Analyzing the drive test results

Having recorded your drive test results, you can then return to them time and time again to analyze the data in different ways. You can replay the drive in real or accelerated time to see again the sequence of events. Hindsite allows you to inspect parts of your data in great detail by zooming in or by changing the views themselves. Some of the data that you can see is the raw data as recorded but other data, such as carrier to interference ratio, is the result of Hindsite analyzing the raw data in different ways. Finally, you can export the raw or analyzed data in standard formats for input into other applications.

Toolbar shortcuts

References are made in this manual to menu items that should be selected to perform certain operations. For many of these menu items, a toolbar shortcut button is provided. Where this is the case, the button image will be shown in the manual. It should be noted that the toolbars are fully customizable and the customizations will be saved, so that a button might not be present if a previous user has changed the toolbars.

Licensing Hindsite

Two types of licence are available – full and viewer. The full licence enables you to perform all functions of Hindsite whereas the viewer licence disables the recording of data. Hindsite contains a licence wizard that will guide you through the steps necessary to obtain licences.

Licences are only valid for a particular computer. If you wish to transfer the licence to another computer, you can (through the licence wizard) but that will disable it on the original computer.

For demonstration purposes, some files are installed with Hindsite; these can be viewed freely with no licences.

Starting Hindsite

The installation process will have put a new item called 'Willtek' in the Programs section of the Start menu, this contains an icon for Hindsite. Click on the icon to start Hindsite.

When Hindsite starts it displays a message indicating the version of Hindsite being used, the current PC time and the current time zone setting as determined from Windows. These are shown so that you can check if they are correct for your current location before recording data. If these are incorrect and you wish to change them, close Hindsite and adjust the date and time through the Windows

control panel. If you have travelled across time zones with your PC, an incorrect setting could cause confusion between any times that you note from your watch (presumably local time) and the time logged by Hindsite from the PC clock.

Incorrect settings here can, under some circumstances, affect the time taken by the GPS receiver to acquire the satellites. The GPS system works to Universal Time (UT), the replacement for Greenwich Mean Time (GMT).

If you missed the initial message when Hindsite started you can see it again by selecting the **Help** > **About Hindsite** menu.

Once Hindsite is started, it waits for you to open a file or create a new configuration.

Closing files

Willtek recommends that you use the Close option on the File menu to close both configuration and drive test result files. This is because the changes that Willtek made to the conventional use of the Windows Multiple Document Interface could lead to confusion. The top-right 'cross' button on a window conventionally closes a document (or file). Willtek uses this button to close the view of the document but, since there can be many views of the same document, Willtek does not use it to close the whole document. This can lead you to think that you have closed a document when, in fact, you have only closed one view from it.

Creating configuration files

Configuration files contain details of which instruments are required for a particular type of drive test and their settings. We suggest that you store them in appropriately named folders for easy retrieval.

They can also contain views to be used as defaults during a drive test and when viewing its results.

Types of view

Hindsite features three types of view: graph, table and map. Each may be configured through its editor to show the data that is available in the results file.

All views behave just like any other window: they may be sized and shaped by dragging on their border.

Once you have added a view you can then change it in almost any way to suit your needs for analyzing the data. Refer to Chapter 6 “Managing Views” for details of how to change the appearance and content of views.

Base views

To save your time in setting up views, a selection of prepared base views are provided with the system. These are detailed under the descriptions of the various views.

Hindsite analyzes the settings in the configuration to decide on which base views can be used with the available data.

Only those views which can be used with the settings or data available will be shown. For example, if you have not measured on multiple frequencies the views showing carrier to interference ratio will not be available; they will be shown greyed.

You can easily add views of your data to the screen either by clicking on the tool button or via the **View > Presentation > Add View** menu.

Base graph views

Signal level graph 

The signal levels for the different percentages are plotted against distance or time. The default percentages are 10%, 50% and 90%. The horizontal axis is set at distance if it was recorded, otherwise time.

Confidence graph 

The confidence intervals for the signal levels stored in the results file or chosen in the configuration are plotted against distance or time. The horizontal axis is set at distance if it was recorded, otherwise time.

C/I graph 

If multiple frequencies have been chosen in the measuring instrument within the configuration, this will be available with a choice of any of the frequencies as the carrier, any other frequency as the interferer and a choice of threshold. Hindsite calculates the carrier to interference ratio and plots those C/I values above the threshold.

Base table views

All base tables contain, in the first column, the distance, time into run or time of day according to what is available. If positioning information is available, the second and third columns contain either longitude and latitude or Easting and Northing, again according to what was recorded.

Subsequent columns contain values according to the type of table.

To load a base table, select the **View** > **Presentation** > **Add View** menu. A submenu will drop down which will include an item for each table:

Percentage table 

The signal levels for the requested percentages are displayed across the right-hand columns.

Confidence table 

The confidence intervals for the signal levels stored in the results file or chosen in the configuration are displayed across the right-hand columns.

C/I table 

If multiple frequencies have been chosen in the measuring instrument within the configuration, this will be available with a choice of any of the frequencies as the carrier, any other frequency as the interferer and a choice of threshold. Hindsite calculates the carrier to interference ratios and tabulates those values above the threshold.

Best server table 

A best server table lists the best server chosen from the frequencies measured. It is only available if you have measured multiple frequencies. On every row of the table, the cell with the greatest signal level is colored red.

Event table 

The event table lists all the events reported by the instruments during the drive test. These events will include information as well as warnings of problems that occurred, such as loss of communications.

Composite coverage table 

A composite coverage table lists the highest signal strength and also the frequency (server) that it corresponds to. It is only available if you have measured multiple frequencies.

Base map views

Signal level map 

A signal level map plots the measured signal level against position. If multiple frequencies are being measured, the level for the first one is plotted. If percentages or confidence intervals are being recorded the first one is plotted. The route can be shown colored according to the level and it can be annotated with the actual measured values.

Best server map 

A best server map plots the best server chosen from the frequencies measured. It is only available if you have measured multiple frequencies. The route is colored according to the frequency (server) with the greatest signal level at that point, and it can be annotated with the frequency.

C/I map 

If multiple frequencies have been chosen in the measuring instrument within the configuration, this will be available with a choice of any of the frequencies as the carrier, any other frequency as the interferer and a choice of threshold. Hindsite calculates the carrier to interference ratios and plots those values above the threshold.

Composite coverage map 

A composite coverage map plots the highest measured signal level from the frequencies being measured. It is only available if you have measured multiple frequencies. The route is colored according to the highest signal level and is annotated with the frequency (server).

Using the GPR configuration wizard

Hindsite contains a configuration wizard that enables easy construction of a configuration file for use with a Willtek GPR series receiver. While within the wizard you can click on **<Back** to return to earlier steps. Once you have completed your selections from a page click **Next>** to move on to the next page. To start the wizard select the **File** > **New Configuration** menu  and choose to use the GPR configuration wizard. The wizard will start with its first page.

You can also use the wizard to edit an existing configuration as follows. First open the configuration you wish to change and then choose **Apply Wizard** from the configuration menu.

Page 1 - Model selection

Select the GPR model from the drop-down list.

If you are using the 8181 GPR Down Converter (1700 to 2500 MHz) then ensure that the **GFC Selected** check box is enabled.

Page 2 - Measurement mode

You must now choose between a single frequency - multiple sample run or a multiple frequency - single sample run.

In a single frequency - multiple sample run the GPR will take many samples on a single frequency and report the percentage levels or confidence intervals to Hindsite.

In a multiple frequency - single sample run the GPR will cycle around up to 10 frequencies taking a single sample on each one.

Choose the IF bandwidth to suit the radio system that you are measuring. In general, you should use the narrowest bandwidth for CW measurements.

If this is to be a pedestrian run, where you walk rather than drive the route, then enable the **Pedestrian Run** check box. This will change the distance units to cm.

Page 3 - Measurement details

This page will change depending on whether you have chosen to do a multiple sample or a single sample run.

Multiple sample run

This will show the frequency and the percentages chosen. These will be default values until you change them. To change the values click on the **Edit** button to bring up the multiple sample editor. Make the settings you wish and then click **OK**. (Refer to "Multiple Samples tab" on page 48 for instructions on these settings.)

Single Sample run

This will show a list of the frequencies chosen. This list will be empty until you add some. To add frequencies, click on the **Edit** button to bring up the single sample editor. Add the frequencies you wish and then click **OK**. (Refer to "Single Sample tab" on page 49 for instructions on these settings.)

Page 4 – Triggering and navigation

You can choose how to trigger the collection of data. The trigger can be either every x seconds or every y meters. The choice depends on what sort of measurements you wish to make. Note that the distance trigger will only work if you have a distance transducer connected to the parallel port of the PC via a PPA9306 adapter.

Once you have chosen the triggering mode choose how often to trigger the measurement.

If you have chosen to use distance triggering you must select a wheel transducer calibration. This is used by Hindsite to calculate how many pulses per meter your wheel transducer produces on your vehicle. Every vehicle should be calibrated, as the number of pulses per meter will depend on the wheel diameter.

To calibrate the vehicle immediately, first ensure that the wheel transducer is connected to the parallel port of the PC via a PPA9306 and then click on the **Calibrate…** button. Follow the instructions in "Calibration..." on page 52.

Note that distance transducers have a limited resolution and this can affect the spacing of triggers. This issue is addressed in the appendix "Applications of the Griffin" on page 105.

If you are going to use a GPS navigation receiver you should select it from the list of receivers, assign it to a COM port and set the communications parameters.

Page 5 – Views

When you move to the next page there will be a short delay whilst Hindsite analyzes the settings you have chosen and creates some compatible base views to be included in the configuration. It will then add all the views to the list.

You can choose to remove any view by selecting it and then clicking on the **Remove** button.

You can add a view from the toolbar by clicking on the tool button. If you hover over the tool button a tool tip will appear to let you know which view the tool button will add.

Page 6 – Notes

The sixth page allows you to enter any notes to remind yourself or other users about the purpose of the configuration.

Once you have entered any notes press **Finish** button to complete the configuration. You will be prompted for a file name to call the configuration. Once you have saved the configuration you can start a drive test immediately.

Manual configuration

To create a new configuration without using the wizard, first select the **File** > **New Configuration** menu  and then choose not to use the GPR configuration wizard. Choose a name and location for the new file. The name of the file will be displayed in the title bar of the Hindsite window and the configuration menu will be enabled.

Alternatively you can base the new configuration on an existing one. First open the existing configuration then choose **Save As** from the **File** menu. Give the configuration a new name and then modify it by removing or adding instruments or views as required.

Adding an instrument

To add an instrument to the configuration, select the **Configuration** > **Add Instrument** menu. A submenu of available instruments will be shown with those already in the configuration disabled. Select the instrument you require and its settings editor will be displayed with default settings shown (see "Using Measuring Instruments" on page 45 for details of individual instruments). Complete the settings and click the Editor's **OK** button to complete the addition of the instrument. Clicking the **Cancel** button will leave the configuration unchanged.

Removing an instrument

To remove an instrument from the configuration, select the **Configuration** > **Remove Instrument** menu. A submenu of instruments in the configuration will be shown. Select the instrument you wish to remove.

Changing an instrument's settings

To change the settings of an instrument already added to the configuration, select the **Configuration** > **Edit** menu. A submenu of the instruments in the configuration will be shown. Select the one you wish to change and its settings editor will be shown with its current settings (see "Using Measuring Instruments" on page 45 for details of individual instruments).

Make your changes and click the editor's **OK** button to store the changes. Clicking the **Cancel** button will leave the instrument unchanged.

Note

Once you have changed the settings of any instrument in the configuration, you MUST remove ALL of the views and replace them so that they are able to utilize the changed setting(s).

Adding a view

Select the **View** > **Presentation** > **Add View** menu. A submenu of all the available base views appears. Select the one required and it will appear in a default position and with a default size.

Move and size the view to give the appearance that you want for the configuration you are constructing.

Removing a view

Select the **View** > **Presentation** > **Remove View** menu. A submenu of **Views** in the configuration appears. Select the one you wish to remove.

A simpler way is to close the view's window by normal Windows operations.

Modifying a view's appearance

Select the **View** > **Presentation** > **Edit View** menu. A submenu of views in the configuration appears. Select the one you wish to modify and its settings editor will appear with its current settings (see separate sections for details of individual views).

Make your changes and click the editor's **OK** button to store the changes. Clicking the **Cancel** button will leave the view unchanged.

Opening a configuration file

Before a drive test can be run, a configuration file must be open. This will be the case after creating a configuration file but another one may be opened from the **File** > **Open Configuration...** menu  . Alternatively, a recently used one may be opened from the first section of the recent files on the **File** menu.

Modifying a configuration file

You can make whatever changes you wish to a configuration file and then save it under its original name or under a new name. If you are going to save it under a new name then it is a good idea to save it under the new name before changing it. This avoids accidentally overwriting the original configuration.

You can change the settings for the instruments and views or add or remove instruments or views.

Reinitializing views

If you change anything in a configuration then you must reinitialize all of the views to make them adopt the new settings. You do this by deleting each view and reinserting it.

Running a drive test

Once a suitable configuration file is opened, a drive test may be run. Running a drive test will create a single drive test results file. Contained within it is a copy of the configuration file used so that the settings for a drive test can be examined.

Ensure that all the configured instruments are connected correctly to the computer, that the aerials are attached and that you are fully prepared for the test.

Willtek strongly recommends that you close any unnecessary applications, as these will consume resources that might be needed by Hindsite.

If you are going to use a distance transducer, and the vehicle has not been calibrated you should calibrate it now (see "Wheel calibrator wizard" on page 65).

Create or open a configuration file as described in the previous section. Make any changes to the settings (not forgetting to reinitialize the views, see page 26) then, if you wish, save the modified file, for example, you might need to select the frequencies on which to measure.

Select the **Run** > **Record** menu  . What you see next will depend on whether you have changed the configuration or not. This can be confusing at first so take your time and read the titles for the dialog boxes.

If you have changed the configuration, you will see a dialog box asking whether you want to save the changes to the configuration. Click **Yes** to update the configuration file, **No** to leave it unchanged or **Cancel** to stop the run. Note that, even if you choose not to save the modified configuration, whatever changes you have made will be saved in the copy of the configuration inside the drive test results file. At this point the configuration file is closed and cannot be affected by subsequent changes.

You will then see the familiar Windows file save dialog where you can choose the destination for the drive test results file. You can change the destination folder or create a new folder in the usual way. You can then type a name for the new drive test results file or select an existing one to replace. If you have chosen to replace an existing file, you will be asked to confirm that you want to replace it.

The drive test results file is then created. This file is updated regularly during the drive test so that, should anything fail during the test, the data that you have already gathered is safe.

Preparing instruments

Once you have specified the file name for the results file, the drive test will start. Hindsite will first prepare the configured instruments. This may take a few seconds. Progress may be shown for some instruments as Hindsite transmits settings to the instruments.

If there is any problem communicating with an instrument, the preparation dialog will show what is wrong. If you can rectify the problem immediately, click the **Retry** button otherwise click the **Abort** button to terminate the drive test. Once you have overcome the problem, you can start the drive test again.

Sometimes an instrument gives a warning during the prepare phase, for example the GPR will report a low battery. Since this is only a warning and the instrument can work, you can press the **Ignore** button to ignore the problem and continue to start the drive test.

Recording data

Hindsite will automatically record all data, generally in its raw form, to the drive test results file. To guard against loss of data in the case of computer failure, Hindsite will ensure that data is actually recorded in the file (rather than just in memory) at frequent intervals.

You should ensure that sufficient free disk space exists before you start a drive test. If disk space is exhausted during a drive test, Hindsite will have no option but to terminate the drive test at that point. The amount of disk space required will depend upon which instruments are configured and their settings.

Willtek cannot give precise guidance on your disk space requirements since there are so many variables; it is probably better to run a few short, typical drive tests and extrapolate the resultant file sizes. Willtek recommends that you do not use a floppy disk as the destination for the drive test. It is preferable to record the file onto a hard disk and later to copy it to a floppy disk.

Status bar

During a drive test, the status bar at the bottom of the screen will contain two panels.

Left-hand panel

The left-hand panel will show the progress of the drive test. As each instrument is prepared and as each one is started, a message is displayed to that effect.

During data recording, a 'test running' message scrolls across the panel.

If the drive test is paused, a 'run paused' message flashes.

When the drive test is stopped, a 'run stopping' message flashes whilst any remaining data is copied from memory to the file. When this is complete, a 'run stopped' message is displayed.

Right-hand panel

If, during a run an instrument detects a problem, which may affect the accuracy of results, an explanatory message is displayed with a flashing red cross. In some cases, Hindsite will consider the problem to be such that the drive test has to be stopped and so will stop the drive test automatically. In other less serious cases you should take corrective action as quickly as possible.

After five seconds, the red cross will disappear and the text of the problem message will turn grey. This is to avoid confusion between a problem that is repeating regularly (which will cause the red cross to remain and the text to stay black) and a problem that has now gone away.

Inserting markers

During a run, Hindsite allows you to mark significant points on the map which are then linked to the measurements. This can be useful for annotating maps and measurement results, for example when passing a bridge, a tunnel or a skyscraper during drive testing.

The marker is set using an alphanumerical key; before the run, you can assign meanings to the individual keys using the marker icon on the Hindsite toolbar.

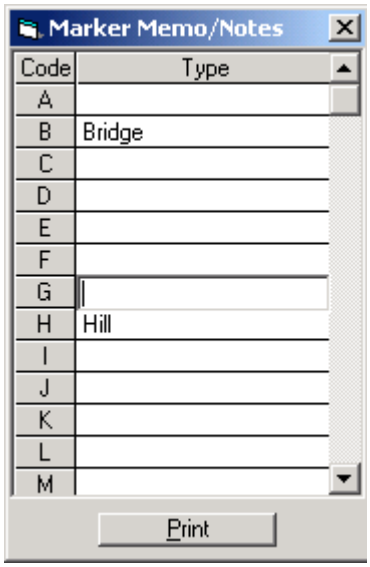
Markers appear on map views as a red cross and on graph views as an annotated red line. (You can turn off the display of markers on the graph view.) They do not appear directly on table views but you can include a marker column in a table view.

Note

Previous versions of Hindsite offered three different markers (position marker, suspect point marker, suspect region marker). On request by many users, these have been replaced by the new keyboard marker which makes operation even more comfortable.

Assigning meanings to keyboard markers

1 Click on the marker memo/notes icon  . A form box will open, listing the code keys and type.



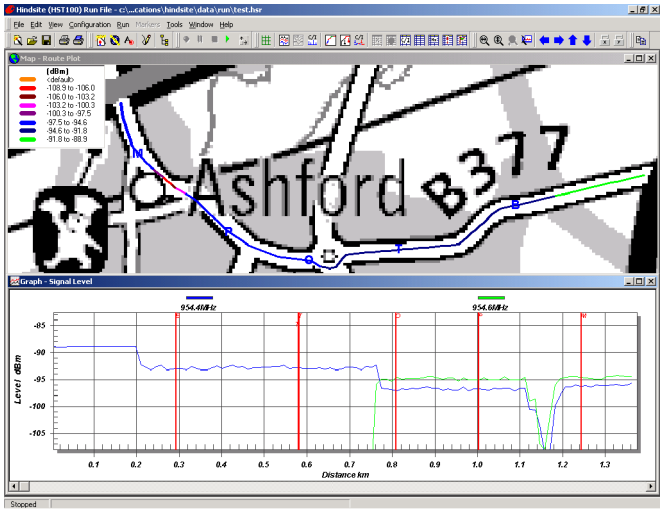
2 To add a description to a key, left-click in the white box next to the key and type in the description (for example, use B for bridge). The exception to this rule is W. This is treated as a constant and is a waypoint.

3 Continue this process to assign meanings to the keys.

4 If you want you can press the **Print** button to print the table.

5 To close the form box, push the **X** in the top right corner.
The box can be reopened and changed at anytime.

An example of a resulting graph is shown below.



Adding markers during a run

1 During a run push the corresponding character on the keyboard that gives the meaning to the event. Map and graph are updated automatically by displaying marker keys in their views.

2 Repeat the process for the duration of run.

Route tracing

The route tracing function can be used to map results with a route without using a GPS instrument. The procedures described here apply to out-door measurements; in-door route tracing is described in a section further below.

Waypoints can be used for route tracing when there is no navigational device and the run is distance triggered. See below for instructions how to add waypoints to a route.

Route tracing can be performed directly after a run.

Note

Waypoints are sequential and must be traced through in the correct order.

Note

Waypoints cannot be moved, but markers will be repositioned along a route trace.

Note

All views should be closed and reopened after a route trace so the correct information is displayed.

Note

All distance-triggered runs can be retraced by repeating the steps below.

Note

Route tracing can also be applied to run files created with previous versions of Hindsite.

Prerequisites:

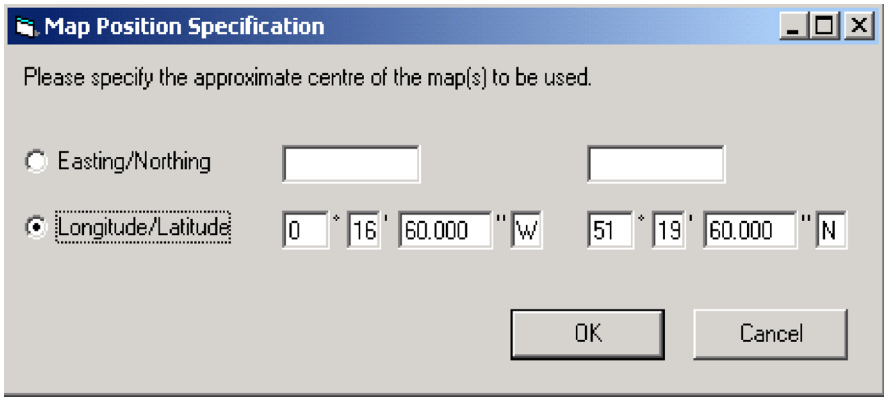
- A configuration file must be loaded with no GPS instrument.
- A map view must be opened before the start of a run.

Adding waypoints to a route during a run

1 Create a configuration that is distance or time-triggered.

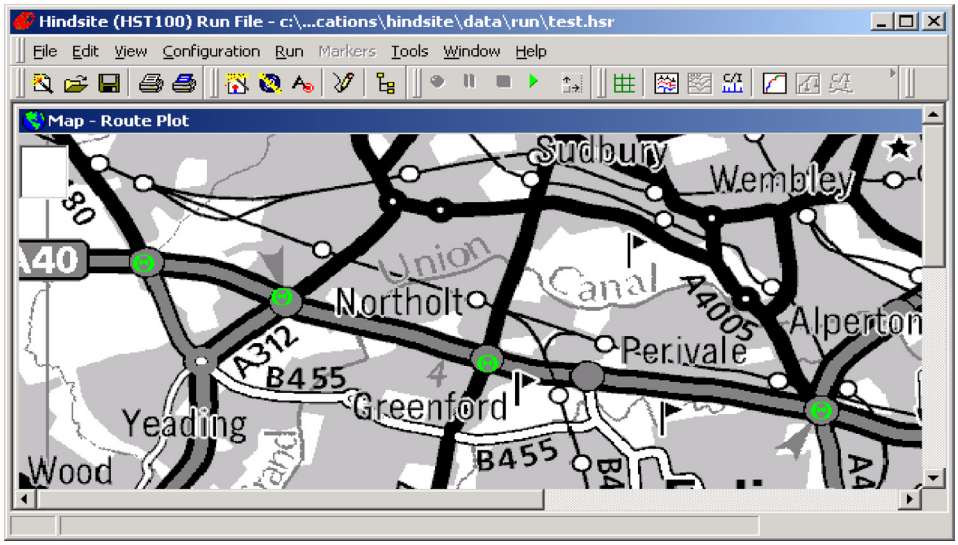
2 Open a map view and press the **Record** button.

3 After the Griffin or GPR have gone through preparation, a dialog box will appear asking for starting coordinates either using easting/northing or longitude/latitude. Select the desired option, enter your start coordinates and press **OK**.



As long as you have the necessary map(s) in the map folder, your general location will be displayed in the map view centered around the coordinates entered. The view can be manipulated with the pan and zoom icons.
It is a good idea to have the vehicle stationary during this preparation stage.

4 Waypoints are added by placing the mouse pointer where the waypoint is going to be placed and then **shift+left-click** to place the waypoint.
It is also possible to add keyboard markers during run.



At this stage there will only be waypoints visible on the map (see figure above).

5 When the run is complete press the **Stop** button.

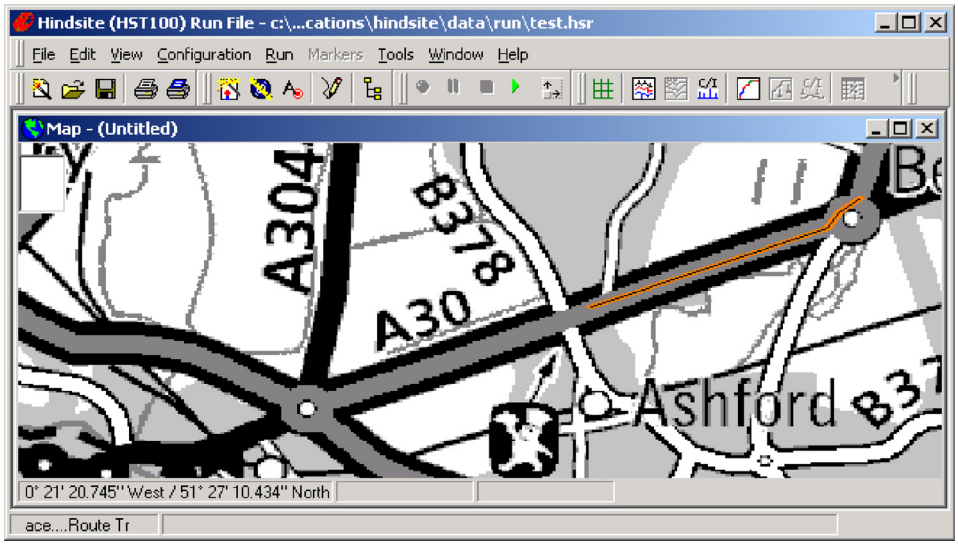
Route tracing with no waypoints in the run file

1 Open a distance or time-triggered run file and click on the route trace icon . This can be a normal run file or a previously route-traced file or even a run file that did use a navigational device. If the run file has views open, close them all down.

2 If the map has not been previously route-traced and there are no markers, a blank map view (untitled) and a dialog box will appear asking you for start coordinates either using easting/northing or longitude/latitude. Enter the start coordinates and press **OK**.
As long as you have the necessary map(s) for the location it will be displayed in the map view. The view can be manipulated with the pan and zoom icons. Apart from when the hand icon is selected, the mouse pointer will be seen as a cross hair.

3 Place the cross hair on the map where the run was started and **left-click**.

4 Place the mouse pointer on another position along the route and **left-click**. This will draw a straight line between the two points.



5 Continue this process until the end of the run position is reached.

6 Click the route trace icon again to end.
The map will now update itself and color the route plot according to the map legend that will be generated.

Route tracing with waypoints on the run file

1 Open a distance or time-triggered run file and click on the route trace icon . If any views are open, close them.

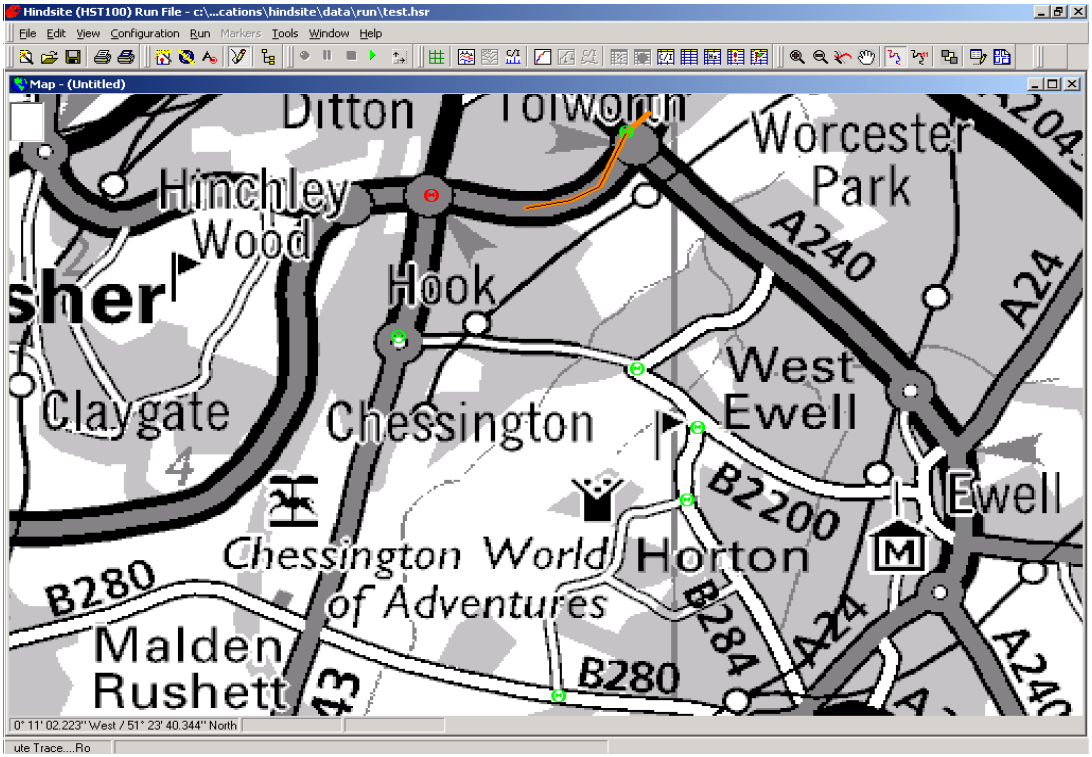
2 An untitled map view will open displaying a background map overlaid by waypoints. The view can be manipulated with the pan and zoom icons.

3 Place the mouse pointer on the map where the run was started and **left-click**.

4 Place the mouse pointer on another position along the route and **left-click**. This will draw a straight line between the two points.
The first waypoint that the route trace needs to go through will be highlighted in red. Once clicked on, the next waypoint in the sequence will highlight red.

Note

Remember to directly click on highlighted waypoints and not just pass through them when route tracing.



5 Continue this process until the end of the run position is reached and all waypoints have been clicked upon.

6 Click the route trace icon again to end.
The map will now update itself, and color the route plot according to the map legend that will be generated.

In-building route tracing

Hindsite can also be used to provide in-building coverage maps, which often do not use a Geoset coordinate system but rather coordinates relative to a corner of the map or a central point.

Waypoints are used to mark the route taken; so an in-building run file must contain waypoints.

Note

Waypoints are sequential and must be traced through in the correct order.

Note

Waypoints cannot be moved, but markers will be repositioned along a route trace.

Note

All views should be closed and reopened after a route trace so the correct information is displayed.

Note

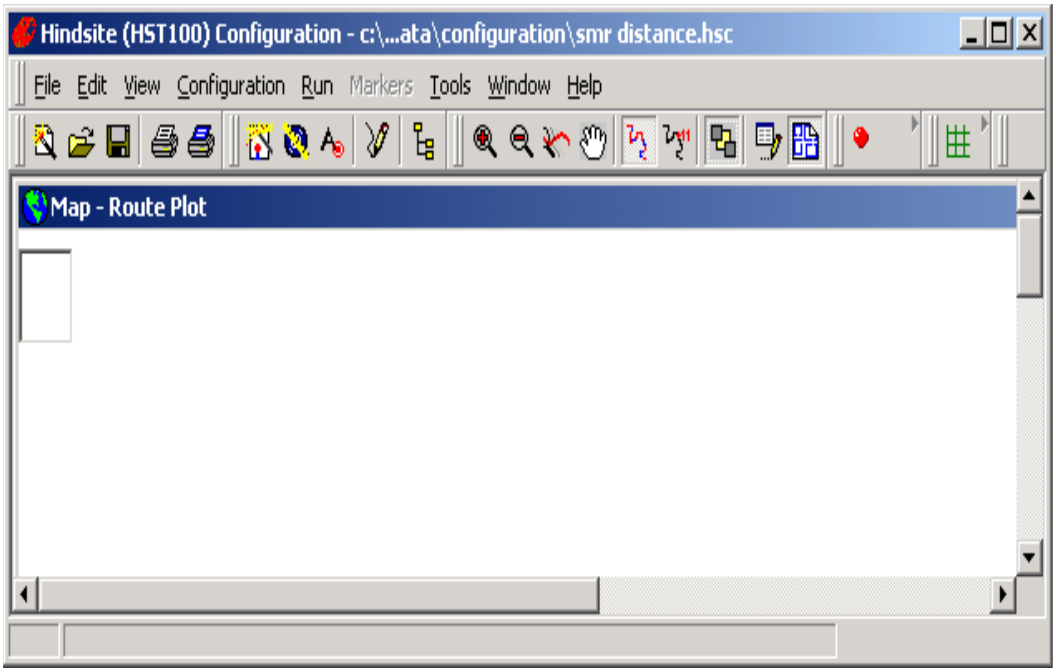
All distance or time-triggered runs can be retraced by repeating the steps below.

Managing an in-building plan run

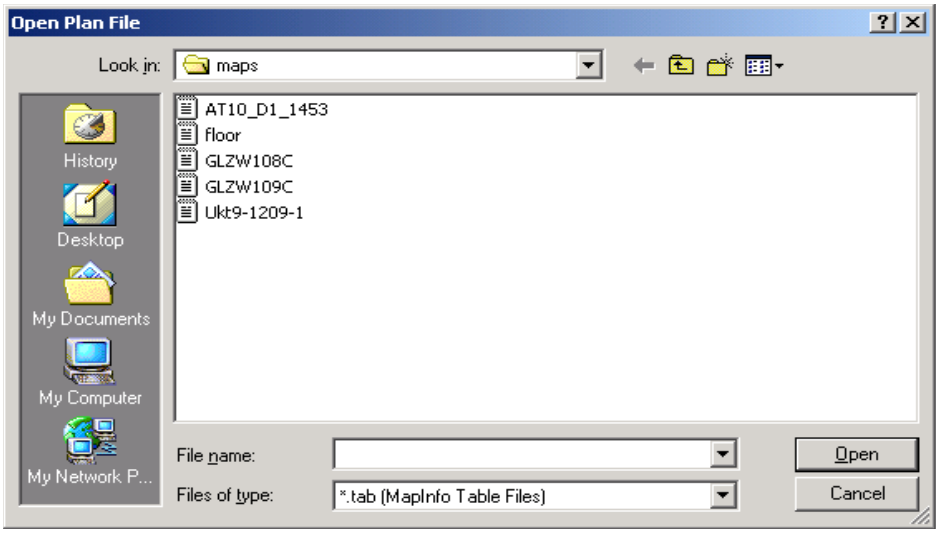
1 Create a configuration that is distance or time-triggered.

2 Open a map view and then click on the in-building icon  (this is found in the task bar and is only visible when a map view is open).

3 Push the record icon  .

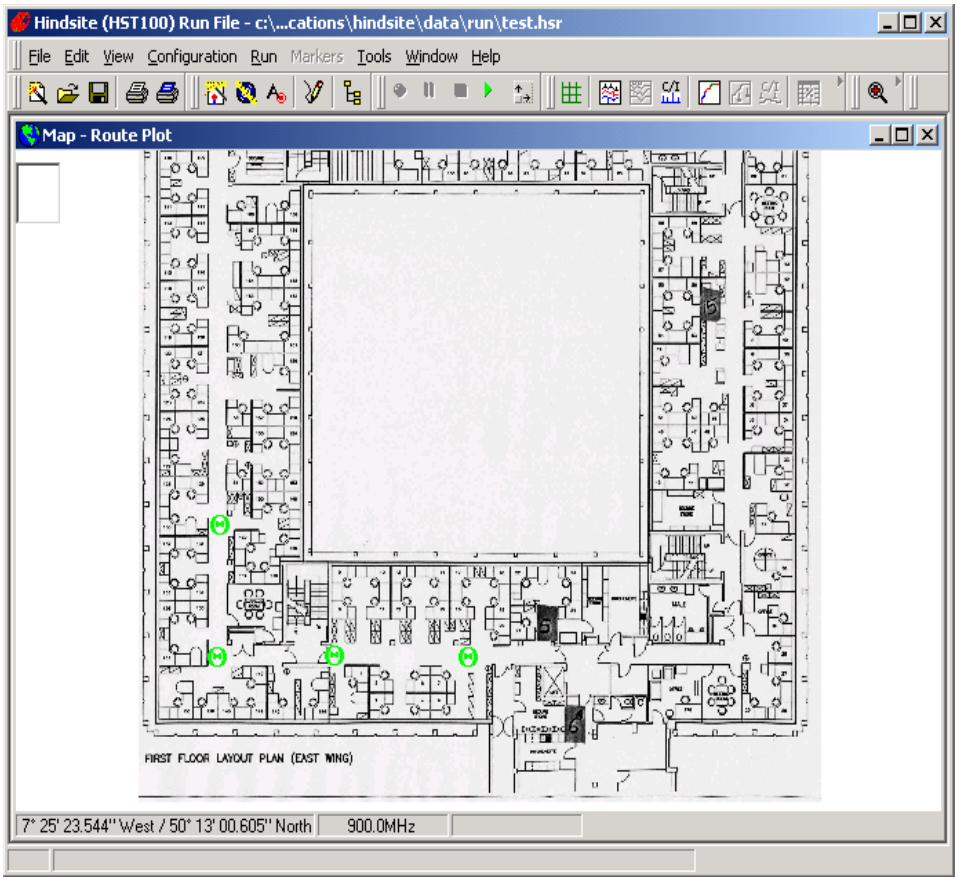


4 After the Griffin or GPR have gone through preparation, a dialog box will appear requesting a building plan to open. Select the appropriate tab file and press **OK**.



5 The building plan will now be visible in the map view. The map view can be manipulated by using the pan and zoom icons.

6 Waypoints are added by placing the mouse pointer where the waypoint is going to be placed and then **shift+left-click** to place the waypoint. It is also possible to add keyboard markers during the run.



At this stage there will only be waypoints visible on the map.

7 When the run is complete press the **Stop** button.

Route tracing an in-building run file

1 Open a distance-triggered run file. This can be a previous route-traced file.

2 Click on the route trace icon  .
An untitled map view will open displaying the in-building plan overlaid by waypoints. The view can be manipulated with the pan and zoom icons.

3 Place the mouse pointer on the plan where the run was started and **left-click**.

4 Place the mouse pointer on another position along the route and **left-click**. This will draw a straight line between the two points.
The first waypoint that the route trace needs to go through will be highlighted in red. Once clicked on, the next waypoint in the sequence will highlight red.

Note

Remember to directly click on highlighted waypoints and not just pass through them when route tracing.

5 Continue this process until the end of the run position is reached.

6 Click the route trace icon again to end.
The map view will now update itself, and color the route plot according to the map legend that is generated.

Pausing a drive test

Recording of data may be paused by selecting the **Run** > **Pause** menu  . No more data will be collected from instruments until the drive test is resumed. Data already received will be processed and stored in the file.

Note that, whilst the drive test is paused, some data might be lost. This might affect the integrity of the results.

Resuming a drive test

A paused drive test may be resumed by selecting the **Run** > **Pause** menu  again. Data collection will resume immediately.

Viewing data while running

The drive test will start by default with the views that were included in the configuration file. These views may be moved and resized freely whilst the drive test is running.

The appearance of views may be changed as described in Chapter 6 "Managing Views". All views will update their display of the data as frequently as they can, within the capabilities of the computer. It may well happen that, within this interval, a number of measurements have been taken. In this case, all the measurements since the last display will be added to the view so no readings will be missed.

Hindsite gives priority to recording data to file rather than displaying it on the views. This can lead to the views updating slowly if the computer is not powerful enough for the application.

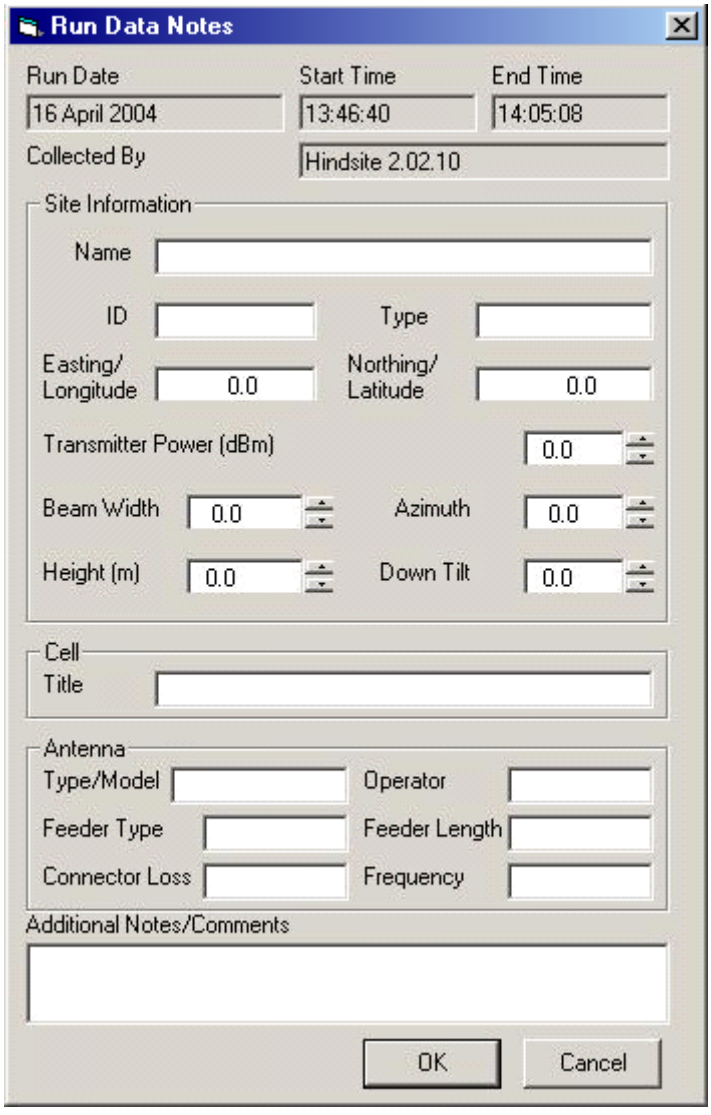
Stopping a drive test

Select the **Run/Stop** menu ■. Collection of data will cease immediately, all received data will be processed and written to the file, views will be updated finally and a run notes dialog will be displayed.

The Griffin instruments can contain a large buffer of data which might continue to be collected after you have stopped the drive test.

Editing run data notes

Run notes provide an opportunity for notes to be made about the drive test.



Details of the transmitter, cell and antenna of interest may be noted together with any free-form notes you require.

These details will be stored on the drive test results file and may be viewed subsequently. Any parameters will be included in an exported file if they are included in the target format.

Viewing drive test results

Results of a completed drive test may be viewed. They will be available immediately after running a drive test or after opening a drive test results file through the **File** > **Open Run File(s)...** menu. Alternatively, a recently used one may be opened from the second section of the recent files list on the **File** menu.

The drive test results file will be loaded and the views that were open when it was saved will be reopened.

Although the data itself cannot be changed in a drive test results file, the views of it may be changed freely. Any such changes made whilst viewing can be saved to the file when it is closed.

Manipulating views

All views in Hindsite operate in a similar way. When you select a view, the main view menu will be extended with further items to allow you to change the view that is selected. (The Windows title bar of the selected view is a different color to the other title bars.) These extra items will also be contained in extra toolbars that are shown and hidden by Hindsite as necessary.

You can move and resize views on the screen as you wish. You can change the appearance and contents of views by editing them with their editors. Details of how to manipulate views can be found in Chapter 6 "Managing Views".

Replaying a drive test

A drive test may be replayed at speeds ranging from the original recording speed to 1000 times the original. Select the **Run** > **Play** menu. A replay control will be shown:

The visible views will reset to show no data and then the drive test will be replayed, initially at the original rate.

Varying the rate of replay

If you wish to change the rate of replay, drop down the list at the left and select the rate you require. A selection of rates between real time and 1000 times original rate is available. The rate may be changed at any time during the replay.

Repositioning the current replay position

The position along the route may be changed at any time during the replay by dragging the slider to the left or the right. When the slider is dropped, the current position is adjusted to that point and the replay continues. The slider scale represents the elapsed time of the drive test, not distance.

Printing your results

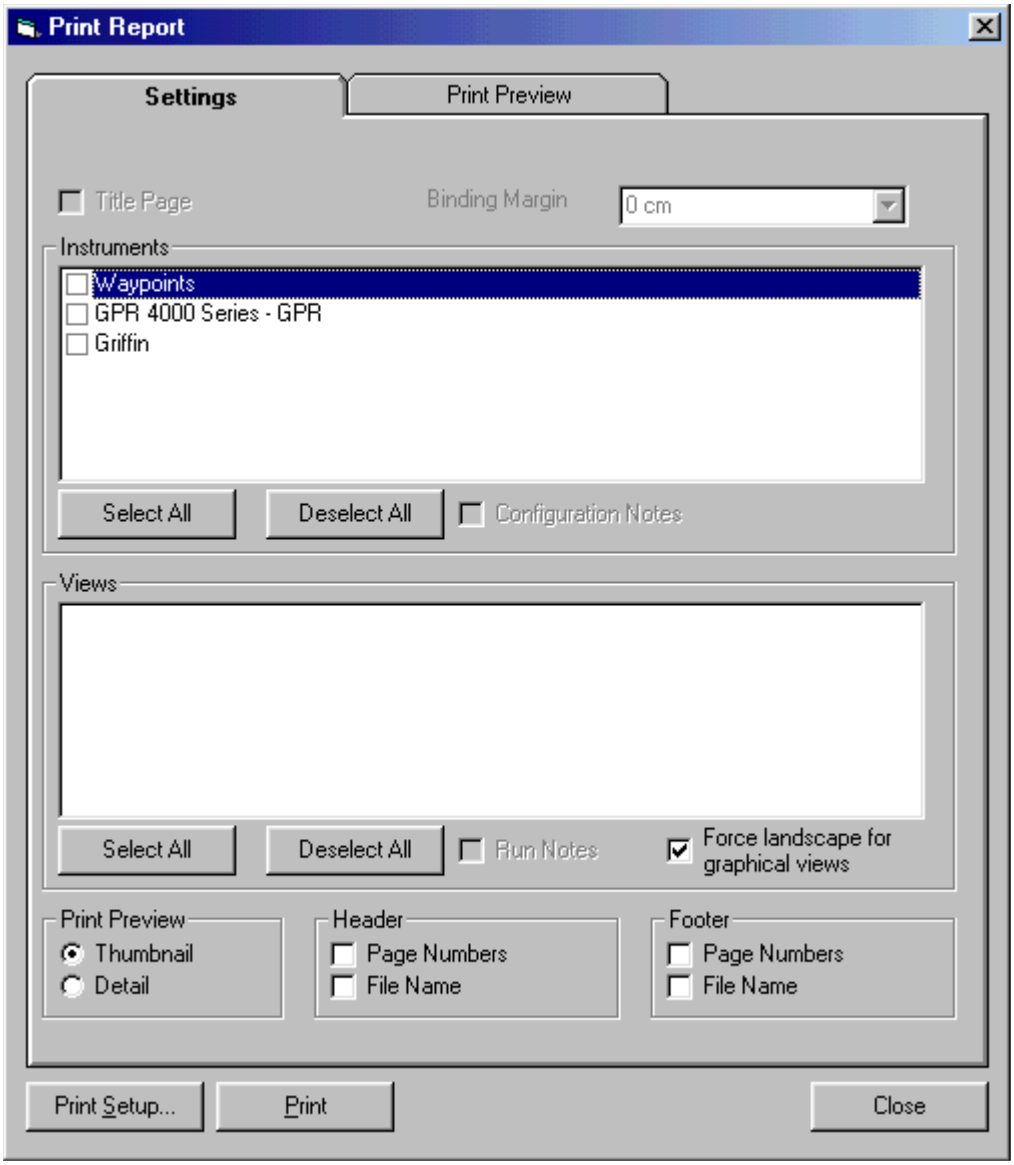
While viewing the results of your drive tests you can print reports in various formats. In addition, you can print the map at various scales (see "Printing the map" on page 83).

Print screen

To print an image of the screen precisely as you can see it, choose **File > Print Screen**.

Print...

To print a report of the results choose **File > Print...** This will bring up a dialog box with two tabs that allow you to select what to print and to control the format of the printing.



Settings tab

Instruments

The instruments box will list all of the instruments in the configuration. Click on the check box next to an instrument to include its settings in the report. You can use **Select All** and **Deselect All** to help you choose all or none of the instruments.

Results

The results box will list all of the views in the configuration. Click on the check box next to a view to include it in the report. You can use **Select All** and **Deselect All** to help you choose all or none of the views.

Normally the views are printed in portrait format. You can force the graphical views to be printed in landscape format by checking the **Force Landscape** box.

Header and footer

You can choose a combination of page numbers and or file name to be included in the header and footer printed on each page.

Print setup

Click on the **Print Setup** button to choose which printer to be used.

Print preview

Choose either **Thumbnail** to see a compressed image of each page of the document or **Detail** to see each page in a scrollable window.

Print Preview tab

When you select the Print Preview tab you will be able to see what the report will look like. If there are multiple pages you can move forwards and backwards through them by clicking on the **>>** or **<<** buttons.

Exporting your results

Hindsite allows you to export your data from a drive test results file in three different formats. To export the data you must first create a table view containing the data and then export it from there. The procedure is:

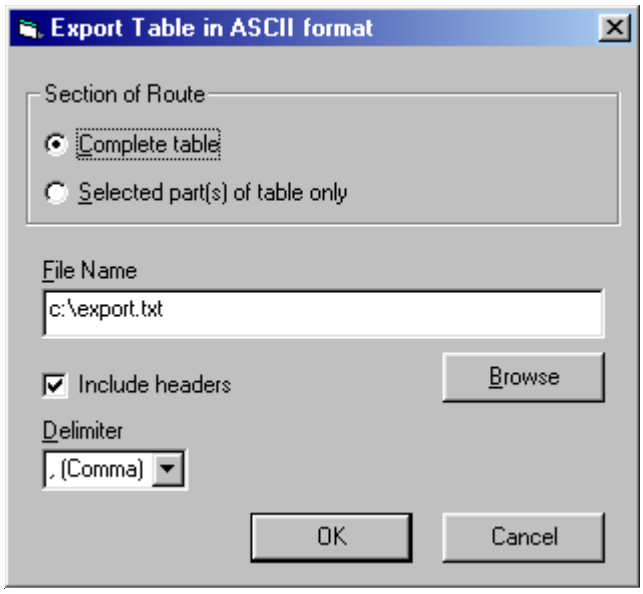
1 Open the drive test results file.

2 Add a table view containing the data that you want to export.

3 Right-click on the table view and select **Export** from the submenu.

Exporting in delimited ASCII format

Selecting ASCII format will show the following dialog.



Section of Route...

– Complete table

Choose this option to export all the data rows in the table.

– Selected part(s) of table only

Choose this option to export the selected row(s) only.

File name Enter the name required for the file. To find an existing location, click **Browse**.

Browse Shows a file open dialog to let you choose the destination of the file.

Include headers The column titles will be included as the first row exported if this box is checked.

Delimiter The character inserted between the cell values is specified here. You should choose the character to suit the application program that you will use to read the file.

Take care with the use of the comma character as a separator since this is used to indicate the position of the decimal point in some countries. This might mean that, when the file is read, the data is confused.

Exporting in PXF format

PXF (Planning eXchange Format) is suitable for use with some planning tools. It is similar to AXF format but with some variations.

Selecting PXF will show a Save File As dialog. Specify the name of the file to be output.

A progress bar will be shown as the file is written.

Exporting in Planet format

Planet format is suitable for use with the Planet planning tool from MSI.

Selecting Planet will show a Save File As dialog. Specify the name of the file to be output. Two files will be produced with the same name but different extensions.

A progress bar will be shown as the files are produced.

Exporting in Signia format

Signia format is suitable for use with the Aircom Asset planning tool.

Selecting Signia will show a Save File As dialog. Specify the name of the file to be output.

If there are multiple frequencies then a second dialog will appear asking you to select the frequency to be exported.

Two files will be produced with the same name but different extensions.

A progress bar will be shown as the files are produced.

Changing the coordinate system

Hindsite allows the user to convert between WGS-84 (longitude/latitude) in degrees, WGS-84 (longitude/latitude) decimal and local (easting/northing) coordinate systems. This can then be exported to other software packages.

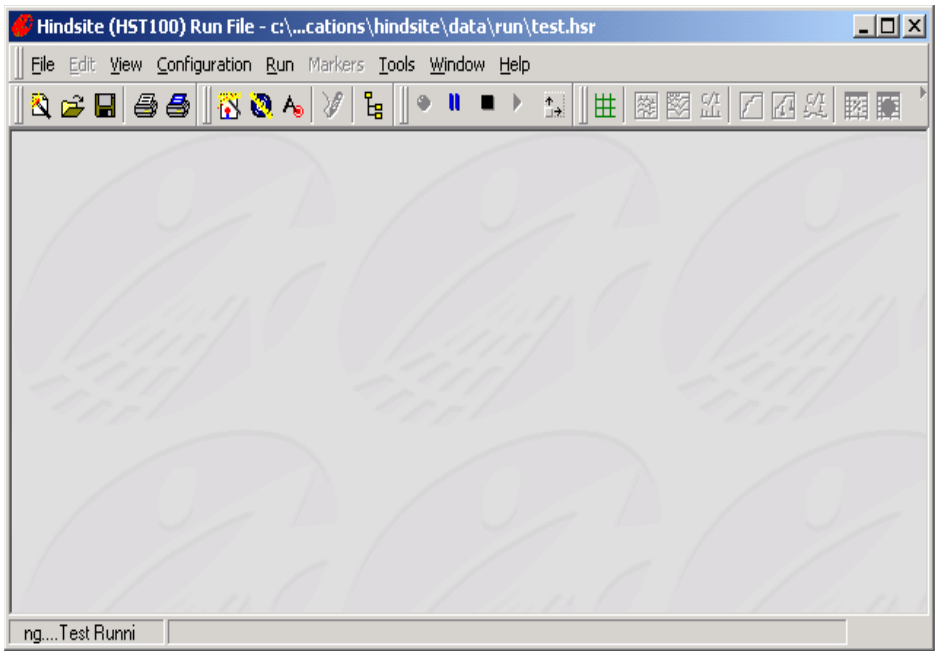
Hindsite records navigational data in longitude/latitude and by default displays all views in this form.

It is possible to show easting/northing during a run; however, this is not advisable as it can cause errors on lower specification systems.

Changing the coordinate system

1 Open a run file that has navigational data.

2 On the icon toolbar, push the coordinate system icon  .
A pull-down menu appears with three options: WGS-84 (Lat/Long), WGS-84 (Lat/Long) Decimal and Local (Easting/Northing). The name with the tick on the left-hand side is the current coordinate system.



3 Select an option.
All table and map views will be updated automatically. This can take up to a few minutes depending on the size of the run file.

Managing Hindsite

Working folders

The working folders are the default folders to hold your configuration and run (drive test result) files and your maps. You can change the default folders at any time, or simply select a different folder when you open or save a file.

Willtek recommends that you use folders to group your configurations and drive test result files into campaigns. This will make it easier for you to move the files between PCs and to back them up. The folders could be subfolders of the main working folders or completely separate ones.

The map folder must be set to the folder containing the correct maps before you open a configuration or drive test results file that needs to use the maps.

To change the default folders select **Tools > Working Folders** and then browse or type the paths to the folders.

Customizing the toolbars

To customize the Hindsite toolbar choose **Toolbars** from the view menu. You can then tick or untick any of the sets of tools that are available at that time. Tools that are not ticked will not be shown on the toolbar.

You can move each of the sets of tools to dock on any of the four edges of the Hindsite window or to float in the middle of the window. Simply drag the two vertical bars at the left of each set to wherever you want the tools to be.

Using Measuring Instruments

5

This chapter provides task-based instructions for using the Hindsite features. Topics discussed in this chapter are as follows:

Introduction

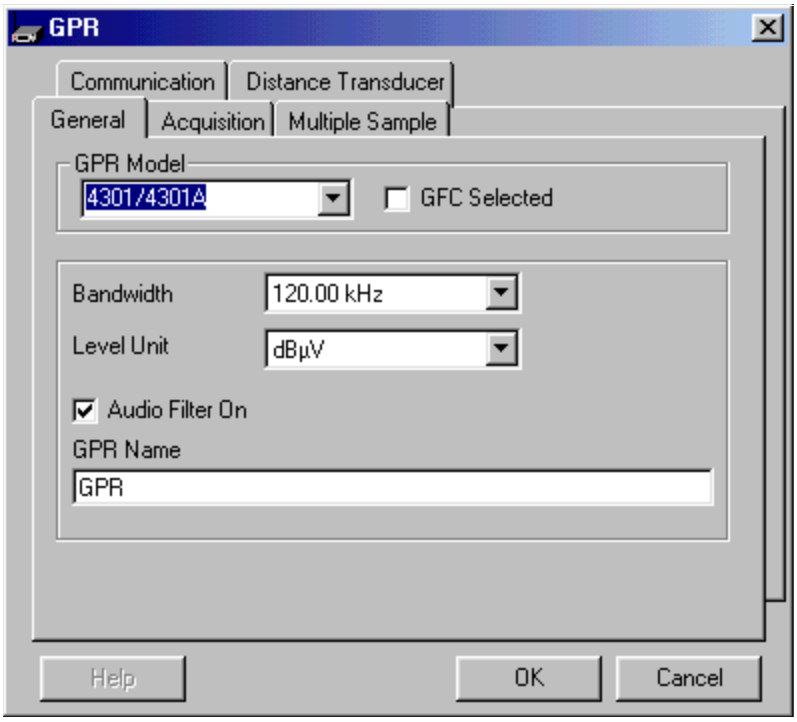
The present release of Hindsite is able to work with the Willtek GPR series of receivers, with or without the GPR Down Converter (1700 to 2500 MHz), and the Willtek Griffin series of receivers.

Willtek 8100 GPR series

Hindsite is able to work with the Willtek GPR series of precision receivers. There is a number of models in the range with differing characteristics and frequency coverage.

This chapter details the use of the controls and facilities provided by Hindsite. Refer to the GPR manual for details of connecting the receivers, charging batteries etc.

General tab



GPR Model Select, from the drop-down list, the model of GPR that is to be used. It is important that this is correct as the model affects the settings that are available. If you choose the wrong model you will not be able to start the drive test until you choose the correct one.

GFC Selected Check this box if the Willtek 8181 GPR Down Converter (1700 to 2500 MHz) is fitted to the GPR.

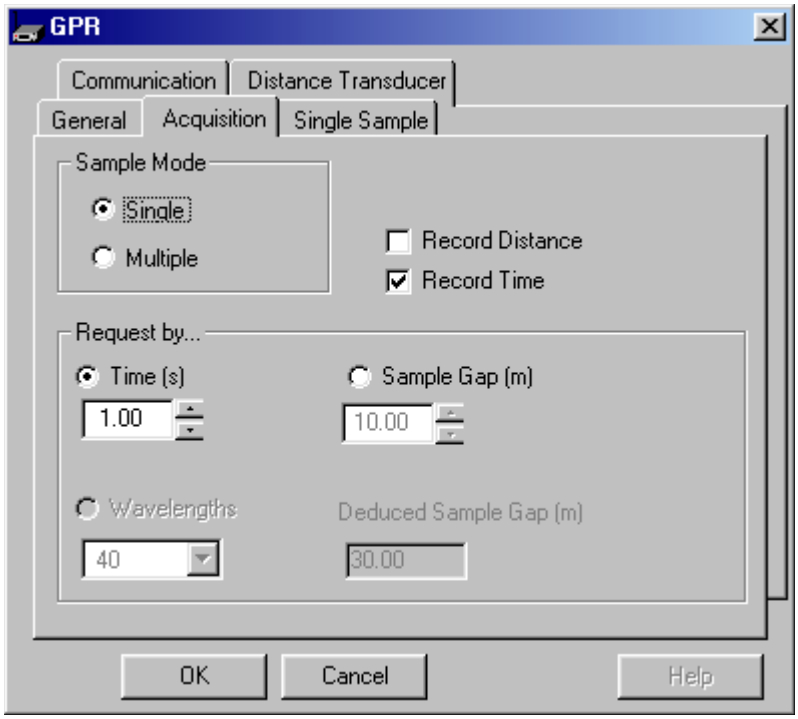
Bandwidth When the model has been correctly specified, select the required IF bandwidth from the drop-down.

Level Unit Select the required units for measurements from the drop-down.

Audio Filter On Check this box if the audio filter is to be switched on.

GPR Name You may specify here your own name for this instrument. This could, for example, be used to record its serial number or some identifying characteristic such as 'Mary's one'.

Acquisition tab



Sample Mode Select either Single or Multiple sampling mode. In Single sampling mode, a list of frequencies is specified which will be cycled through during a run. In Multiple sampling mode, a single frequency is specified which will be sampled continuously.

Depending upon which option is selected, the Sample tab is configured suitably.

Record Distance Check this box if you wish to record distance during the run.

Record Time Check this box if you wish to record elapsed time during the run.

Request by... You may specify the gap between measurements in a number of ways.

Time

If you wish to specify the measurement gap in terms of time, select this option and specify the time interval in seconds.

Sample Gap

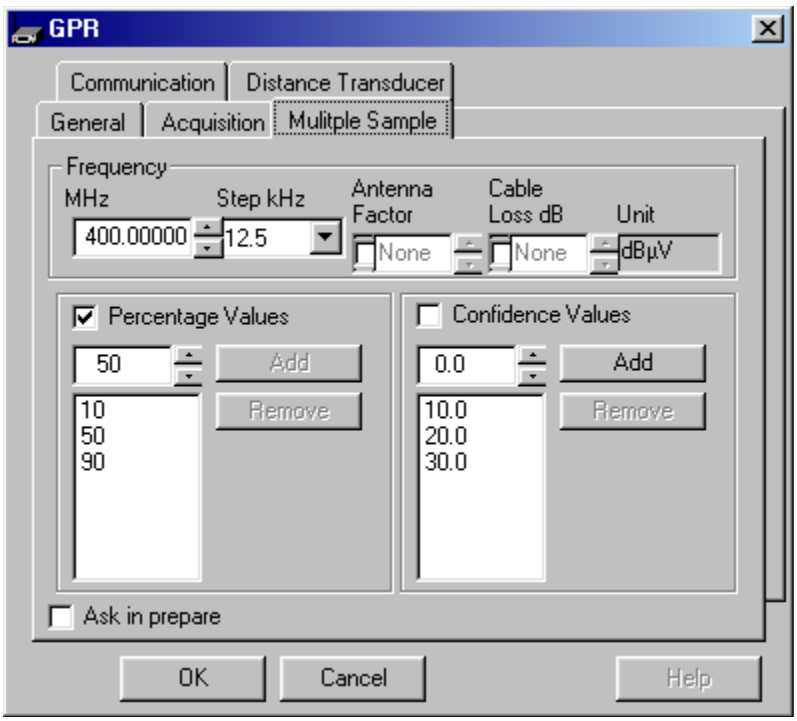
If you wish to specify the measurement gap in terms of distance, select this option and specify the distance interval in meters.

Wavelengths

If you wish to specify the measurement gap in wavelengths (multiple sampling only), select this option and specify the integral number of wavelengths. This will be translated into a distance according to the frequency selected on the Multiple Sample tab.

Multiple Samples tab

This will be available if multiple sampling has been selected on the Acquisition tab.



Frequency... Specify the RF frequency in MHz to be sampled. To adjust the value you may use the up/down arrows beside it. The amount by which the value will be adjusted is the current value in the Step box.

Step kHz

Specifies the amount (in kHz) by which the frequency will be adjusted when the up/down arrows are operated.

Antenna Factor

If you wish to apply an antenna factor to the measurements, check the box and select the required antenna factor. The units of measurement will be changed to include 'per metre'.

Cable Loss dB

If you wish to specify a loss for the cable connecting the antenna to the GPR, check the box and specify its value in dB. This value will be added to all readings from the GPR to correct the readings for the loss.

Unit

This will display the units of measurement. This is derived from the units specified on the General tab and whether an antenna factor has been specified on this tab.

Percentage Values

If you want percentage values to be recorded, check the box and specify up to 10 percentage values here. They should be entered in ascending order and can range from 1% to 99% in steps of 1%.

Add

If you wish to add a percentage to the list, specify its value in the box and click **Add**.

Remove

If you wish to remove a percentage from the list, select it in the list and click **Remove**.

Confidence Values

If you want confidence values to be recorded, check the box and specify up to 10 confidence values here. They should be entered in ascending order.

Add

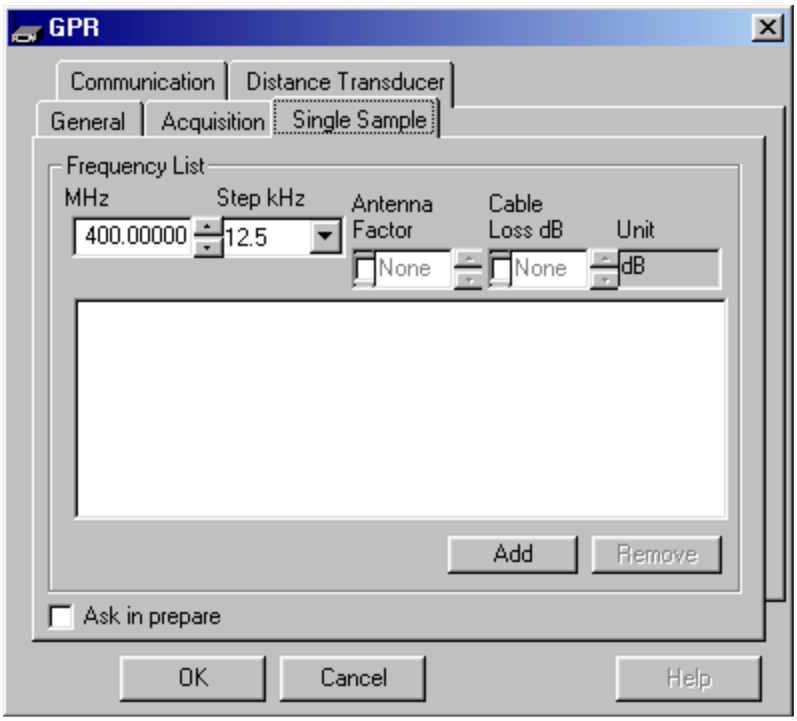
If you wish to add a confidence value to the list, specify its value in the box and click **Add**.

Remove

If you wish to remove a confidence value from the list, select it in the list and click **Remove**.

Single Sample tab

This will be available if single sampling has been selected on the Acquisition tab.



Frequency List... You may specify here a list of one to ten frequencies that are cycled around during a measurement run. To add to the list, specify a frequency, antenna factor and cable loss as required and click **Add**. To remove an item from the list, select it in the list and click **Remove**.

MHz

Specify a frequency in MHz to be added to the list. To adjust the value you may use the up/down arrows beside it. The amount by which the value will be adjusted is the current value in the Step box.

Step kHz

Specifies the amount (in kHz) by which the frequency will be adjusted when the up/down arrows are operated.

Antenna Factor

If you wish to apply an antenna factor to the measurements, check the box and select the required antenna factor. The units of measurement will be changed to include 'per metre'.

Cable Loss dB

If you wish to specify a loss for the cable connecting the antenna to the GPR, check the box and specify its value in dB. This value will be added to all readings from the GPR to correct for the loss.

Unit

This will display the units of measurement. This is derived from the units specified on the General tab and whether an antenna factor has been specified on this tab.

Add

Click this to add an entered frequency to the list.

Remove

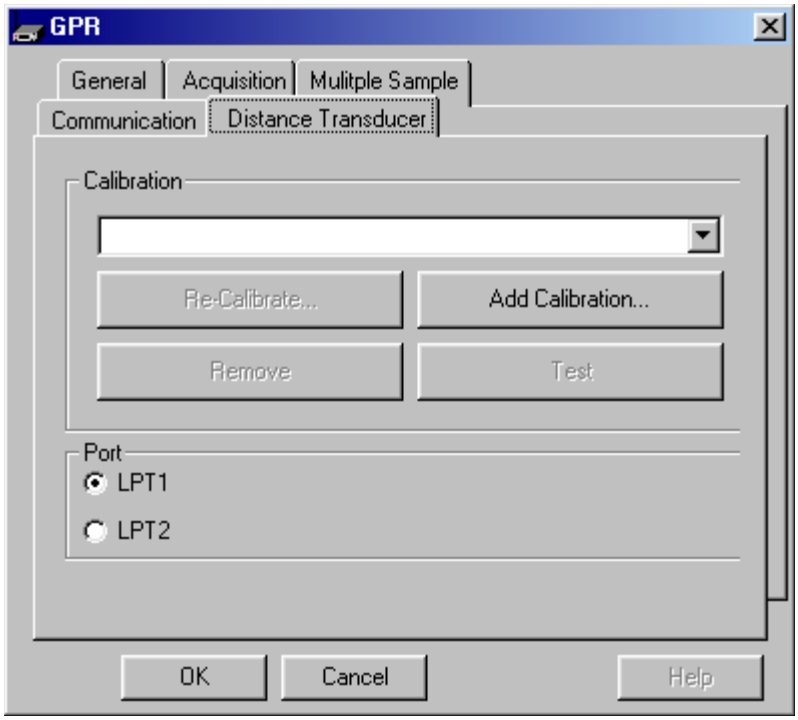
Click this to remove a selected frequency from the list.

Communication tab

You must set the appropriate parameters to communicate with the GPR. See "Communications settings" on page 15 and refer to the GPR manual for allowable settings.

The default settings, achieved when the GPR is reset, are 9600 baud, parity disabled, two stop bits and 8-bit data. If you have changed the baud rate, parity and stop bits the changes will be recorded in the GPR and will remain while the receiver is switched OFF. You will need to set the corresponding parameters in Hindsite to communicate with the GPR. If you have difficulty establishing communications, try resetting the GPR and using the default settings.

Distance Transducer tab



If measurement gaps are expressed in terms of distance, the vehicle to be used must be calibrated. The distance transducer that will be attached to the wheel during a run issues a number of pulses for every revolution of the wheel. The circumference of the wheel will affect the number of pulses reported to Hindsite for each meter travelled. To allow Hindsite to work in meters, a calibration must be chosen from a prepared set or a new one must be created.

You must connect the wheel transducer to the parallel port of the PC via a Willtek PPA 9306 before you can calibrate or use the wheel transducer.

Calibration... **Re-Calibrate...**

A vehicle should be recalibrated at regular intervals to cater for wear on the tyre and to check the distance transducer. Select the vehicle from the drop-down and click **Re-Calibrate**. The wheel calibrator wizard will be displayed. The new results will overwrite the old ones. See page 65 for details of using the wheel calibrator wizard.

Add Calibration...

To add a new vehicle to the set, click this button. The wheel calibrator wizard (below) will be displayed.

Remove

If you no longer require the calibration details of a vehicle, select it from the drop-down and click **Remove**.

Test

If you wish to check a vehicle calibration, select it from the drop-down and click **Test**. Hindsite will then show you a small dialog box listing the number of pulses seen, the distance travelled and the speed in meters per second. Click on the **Go** button to start the test. The parameters will update as you travel. Check that the distance travelled is correct and then click on **Stop** followed by **Exit** to end the test.

Port... **LPT1/LPT2**

Select the parallel port to which the distance transducer is attached via a PPA 9306.

Willtek Griffin series

Introduction

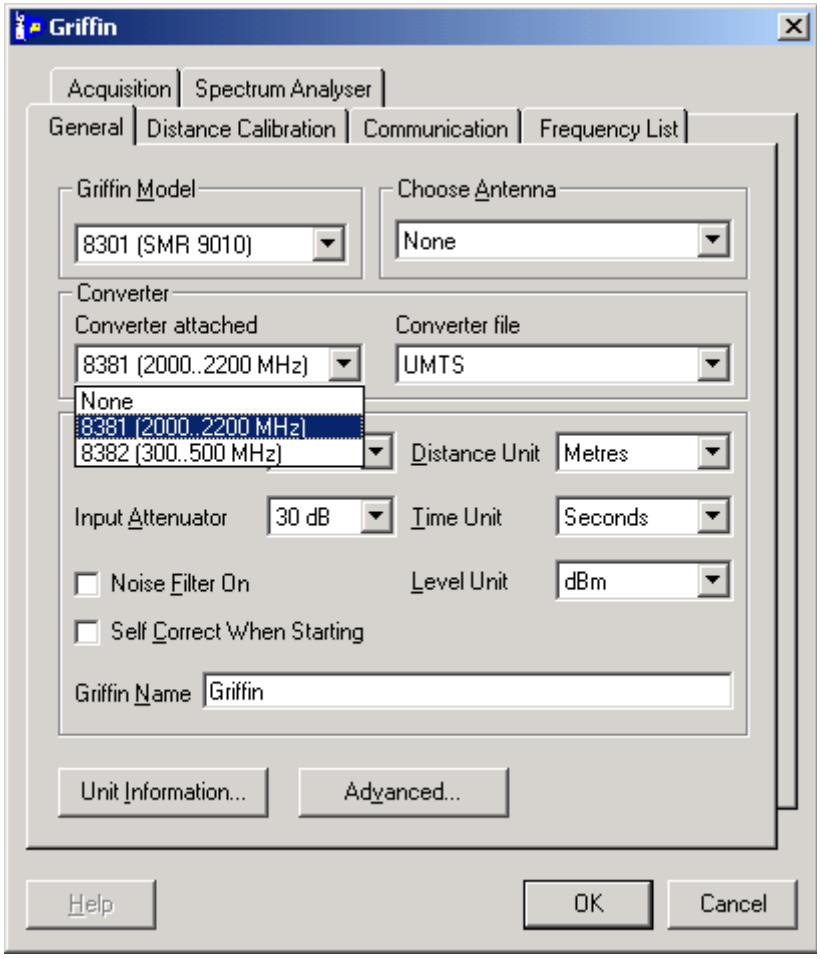
Hindsite is able to work with the 8300 Griffin series of precision receivers. There are two models in the range, the 8301 (formerly SMR 9010) operating from 800 MHz to 1000 MHz, and the 8302 (formerly SMR 9020) operating from 1700 MHz to 2000 MHz. Converters are available for the 8301 to operate in the 300 to 500 MHz and 2000 to 2200 MHz bands as well.

This chapter details the use of the controls and facilities provided by Hindsite. Refer to the Griffin manual for details of connecting the receivers, charging batteries etc.

The Willtek 8301 Griffin (or the SMR 9010) can also be used with an external converter, either the 8381 Griffin UMTS Down Converter (formerly GFC 4950) or the 8382 Griffin Up-Converter.

General tab

The General tab carries settings for the receiver.



Griffin Model Choose the model you will be using from the drop-down list. This will affect the frequencies that you can enter in the other tabs. If you choose the 8301 (SMR 9010) you should also indicate whether you will be using a converter (8381 Griffin UMTS Down Converter or 8382 Griffin Up-Converter). The frequencies allowed will depend on this choice (800 to 1000 MHz if no converter attached, 2000 to 2200 MHz if 8381 UMTS Down Converter attached, or 300 to 500 MHz if 8382 Up-Converter attached).

Converter file You can choose here the file of correction factors that applies to the converter being used (8381 Griffin UMTS Down Converter or 8382 Griffin Up-Converter). The converter file is supplied with the instrument on a floppy disk. It must be copied into the 'GFC Corrections' subfolder of the Hindsite installation folder to be used.

A dropdown list is given containing all files with a '.gfc' extension found in the 'GFC Corrections' folder.

Alternatively, if not specified here, you may choose it at run time.

Choose Antenna You can choose to use a file of antenna factors to convert the receiver readings from power (dBm or dBμV) to field strength (dBm/m or dBμV/m).

See "Antenna Factor Files" on page 111 for details of creating the antenna factor file.

IF Bandwidth (kHz) This allows you to set the IF bandwidth of the Griffin to either 200 kHz for GSM measurements or 15 kHz for CW measurements.

Input Attenuator This allows you to set a fixed attenuator rather than allow the Griffin to select the attenuator itself. You should choose the largest attenuator setting that is suitable for the expected range of signals. The setting of Hi Gain uses the 0 dB attenuator with an additional IF amplifier. This is most useful when measuring very low level signals with the 15 kHz IF bandwidth. The ranges of signals that can be measured are as follows:

- 30 dB: 0 dBm to –80 dBm
- 20 dB: –10 dBm to –90 dBm
- 10 dB: –20 dBm to –100 dBm
- 0 dB: –30 dBm to –110 dBm
- Hi Gain: –45 dBm to –125 dBm

Distance Unit You can choose to work in either meters or cm units. This setting affects the units of all the distances you can enter on the Acquisition tab.

Time Unit You can choose to work in either seconds or milliseconds. This setting affects the units of all the times you can enter on the Acquisition tab.

Level Unit You can choose to work in either dBm or dBµV units. This setting affects the units of all the levels you can enter on the Acquisition tab as well as the units displayed on graphs and in tables.

Noise Filter On This section of the dialog box allows you to enable or disable the noise filter. Refer to the Griffin manual for a discussion about using the noise filter.

Self Correct When Starting When you select this check box Hindsite will instruct the Griffin to perform a self-correction process at the start of every drive test. The Griffins feature sophisticated algorithms to correct for most imperfections in the receiver. To provide optimum accuracy over variations in temperature and over the extended period between calibrations, the receiver contains a built-in reference source. To get the best precision from the receiver you should enable the 'Self-Correct When Starting' check box.

Note that the self-correction process takes 20 seconds so you should press the **Start** button before you get to the actual place where you want to start the drive test.

It is not necessary to do the self-correction to make measurements but the receiver is only guaranteed to be within specification after the self-correction measurements are made.

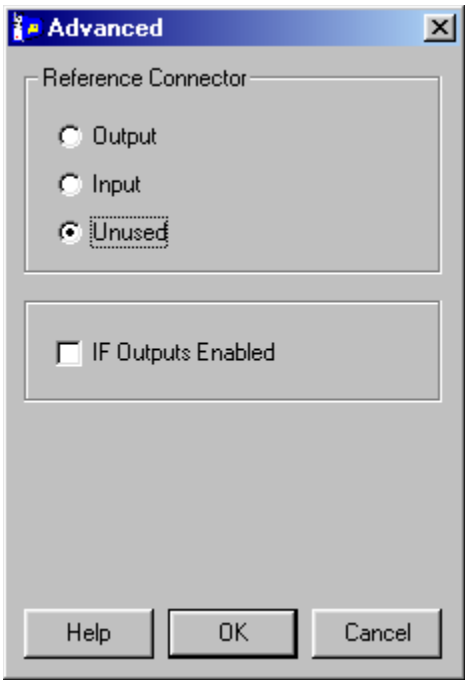
It is best to remove the antenna from the receiver while doing the self-correction measurements to avoid a strong signal from interfering with them.

The results of the self-correction measurements are kept until the receiver is switched off or reset. Simply changing the measurement mode or settings will not lose them.

Griffin Name You can give the Griffin a name to identify it. You could, for example, use it to record the serial number of the Griffin. The Griffin name is used in the **Configuration > Edit** menu (before starting a test), and in the **Configuration > View** menu (after loading a *.RUN file containing measurement results). It is also stored when exporting the configuration.

Unit Information Click on the **Unit Information** button to bring up a form showing information on the Griffin connected. This is gathered by Hindsite from the Griffin and includes such things as its serial number etc.

Advanced... To specify advanced settings, click **Advanced**. The following dialog will be shown.



Reference Connector...

The Griffin has an internal precision 10 MHz crystal reference which is used to tune the receiver. You can use this reference as an output from the receiver to ensure that other equipment is tuned to precisely the same frequency. Alternatively you can connect your own 10 MHz reference to the receiver which will then use it instead of the internal one. The reference needs CMOS/TTL levels and is AC-coupled within the Griffin.

To enable the reference output click on **Output**.

To use an external reference, first select **Input**, then connect a low-noise CMOS/TTL level reference to the reference input. If the Griffin is not able to use the external reference for any reason you will get 'Synthesizer out of Lock' messages.

In normal operation leave the Reference Connector set to Unused.

IF Outputs Enabled

To turn on the two IF outputs check this box. Leaving them off saves power when operating from batteries.

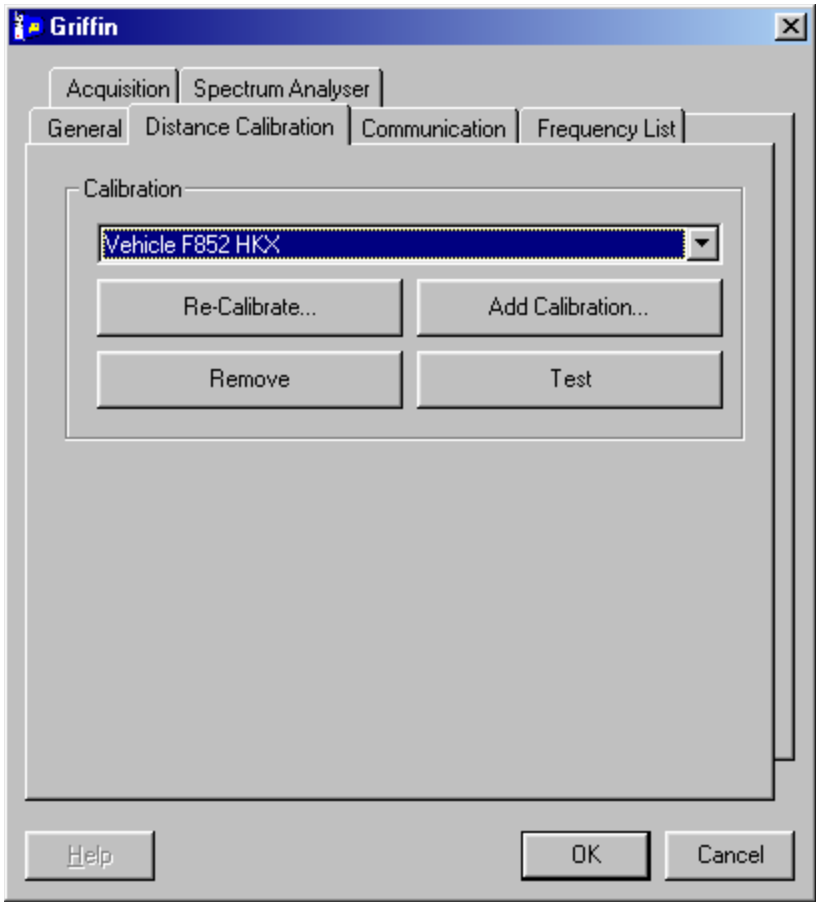
The outputs are the in-phase and quadrature components of an image reject mixer at 10.7 MHz. The effective bandwidth is far wider than the 15 or 200 kHz IF filters. To use these apply to Willtek for technical details of the circuitry necessary.

Distance Calibration tab

If measurement gaps are expressed in terms of distance, the vehicle to be used must be calibrated. The distance transducer that will be attached to the wheel during a run issues a number of pulses for every revolution of the wheel. The number of pulses reported to Hindsite will represent an actual distance only if the circumference of the wheel is known.

To this end, a calibration must be chosen from a prepared set or a new one must be created.

The distance transducer should be connected to the Wheel Enc. input of the Griffin.



Calibration...

Re-Calibrate...

A vehicle should be recalibrated at regular intervals to cater for wear on the tyre. Select the vehicle from the drop-down and click **Re-Calibrate**. The calibration wizard will be displayed. The new results will overwrite the old ones. See page 65 for details of using the wheel calibrator wizard.

Add Calibration...

To add a new vehicle to the set, click this button. The calibration wizard (see page 65) will be displayed.

Remove

If you no longer require the calibration details of a vehicle, select it from the drop-down and click **Remove**.

Test

If you wish to check a vehicle calibration, select it from the drop-down and click **Test**. Hindsite will then show you a small dialog box listing the number of pulses seen, the distance travelled and the speed in meters per second. Click on the **Go**

button to start the test. The parameters will update as you travel. Check that the distance travelled is correct and then click on **Stop** followed by **Exit** to end the test.

Communication tab

Refer to "Communications settings" on page 15 for a detailed discussion on this tab. You should make the settings as detailed below.

Griffin Communications Settings

Port

Select the COM port that you are going to use for the Griffin.

Baud Rate

The Griffin can operate from 2400 to 57,600 baud and you must set this to match the setting in the Griffin. Willtek recommends that you use the highest baud rate that your PC can support. Refer to the Griffin User Manual for instructions on setting the Griffin baud rate.

Data Bits

This must be set to 8.

Parity

This will usually be set to none, but the parity can be changed in the Griffin to odd, even or none.

Stop Bits

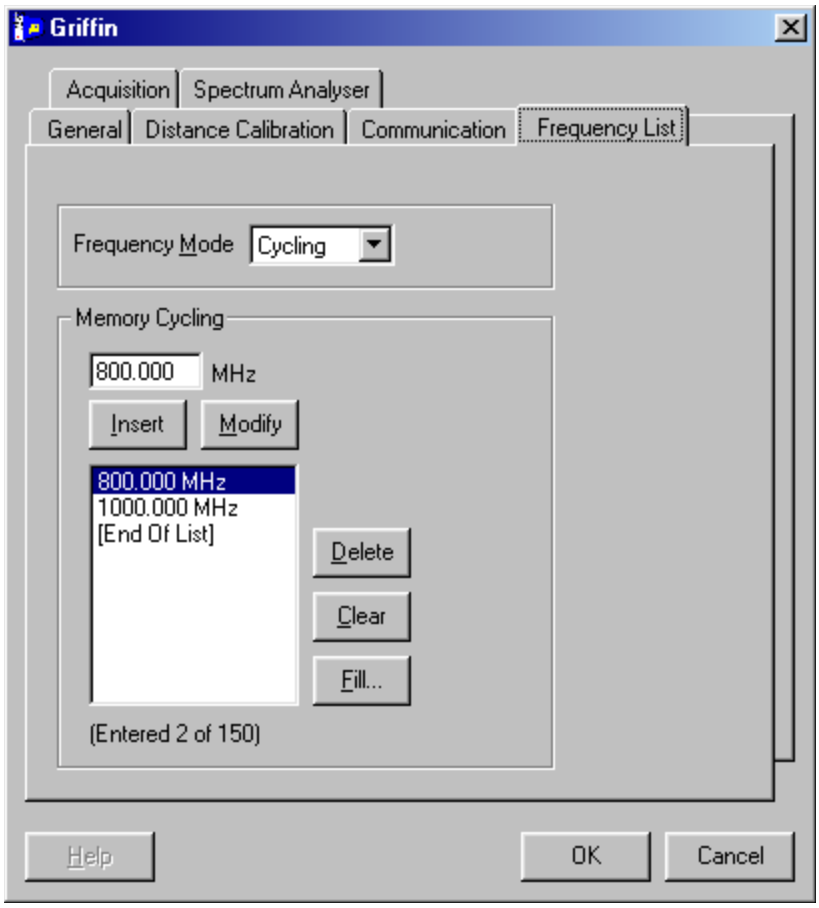
This must be set to 1.

Carrier Detect

This should be disabled.

Frequency List tab

This tab allows you to enter the frequencies upon which to measure. Currently Hindsite only supports the cycling mode in the Griffins. To perform a scan you should use the cycling mode with equally-spaced frequencies. To measure on just one frequency you should cycle on one frequency.



The Griffin's 150 memories are programmed with different frequencies. The Griffin goes through its memories making the same Measurement on each frequency. Unlike scanning mode, the frequencies can be at any spacing and in any order. This is most useful for measuring on specific frequencies.

You must enter the list of frequencies in the order they are to be measured.

A list of frequencies round which the Griffin will cycle are specified here. The frequencies may be specified individually with Insert, Modify and Delete or a series of frequencies may be specified with Fill.

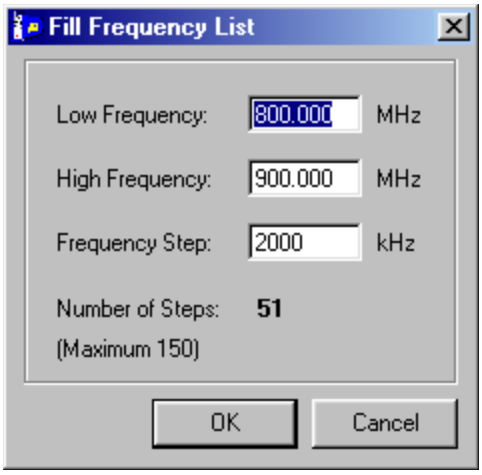
Insert To insert a frequency in the list, enter the value in the box (in MHz) and click **Insert**. The new value will be inserted in the list.

Modify To change the value of a frequency in the list, select the frequency in the list (its value will appear in the box), amend the value and click **Modify**. The value of the selected frequency will be changed.

Delete To delete a frequency from the list, select the frequency in the list and click **Delete**. The frequency will be removed.

Clear To remove all frequencies from the list, click **Clear**.

Fill... To scan across frequencies you should create a list with a series of equally-spaced frequencies. To do so click **Fill**. The following dialog will be shown.



Low Frequency

Enter the start frequency of the series.

High Frequency

Enter the end frequency of the series.

Frequency Step

Enter the increment to be applied to the series.

Number of Steps

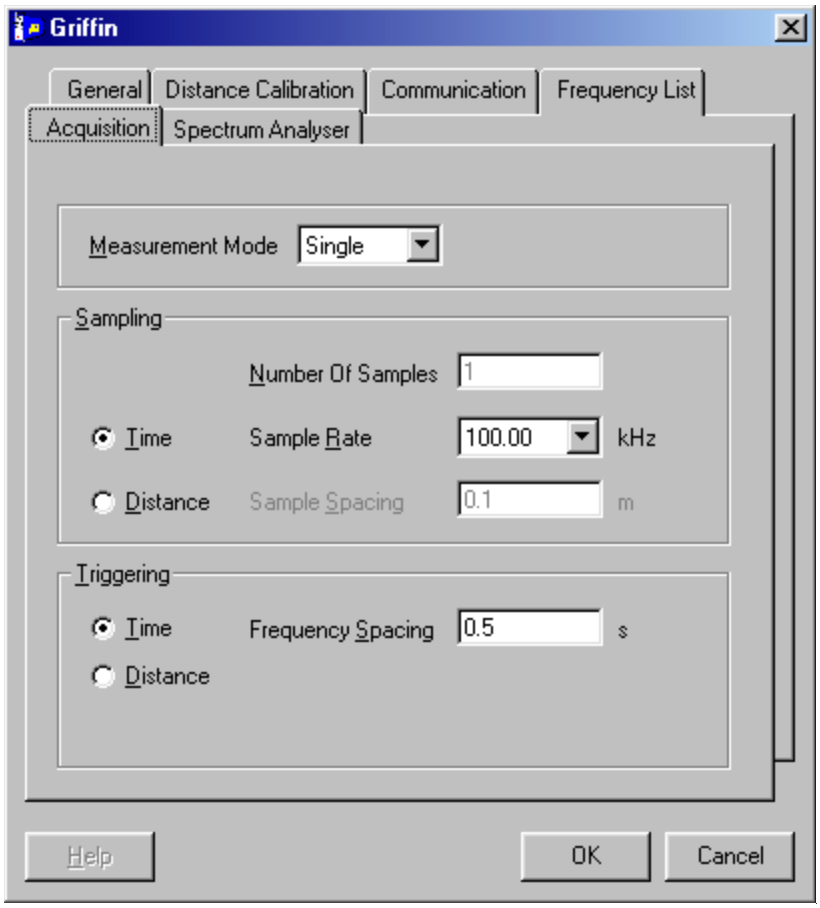
The number of frequencies in the series is shown as each of the above three values is entered. This must be less than the 150 memories available in the Griffin.

To finish

When the values have been entered, click **OK**. The series will be entered into the frequency list on the main editor tab.

Acquisition tab

The Acquisition tab allows you to control the way that the Griffin makes the measurements. The Griffin offers great flexibility in its measurements so choosing the best settings for any particular measurement can be confusing at first. Refer to "Applications of the Griffin" on page 105 for a discussion on setting these parameters.



Measurement Mode This allows you to choose what type of measurement the Griffin is to make.

Single

In Single mode a single sample is taken for each measurement. This is the fastest mode and allows up to 1000 frequencies to be measured per second.

Willtek recommends that you select time sampling at the 100 kHz rate when in single mode.

Min

The level measured is the minimum observed over the measurement period. This mode is particularly useful where you need to know that a minimum acceptable level is maintained. It can also be used to indicate the range of variation of a signal.

Mean

The level measured is the mean of all levels observed over the measurement period. This has the effect of filtering the signal to reduce sample to sample variations.

Max

The level measured is the maximum observed over the measurement period. This is most useful to indicate the range of variation of a signal over a period.

Histogram

The Griffin calculates a histogram from the observed levels. The histogram has a count for each dB value in its range, for example a count for –56 dBm, another for –57 dBm etc. Hindsite uses the histogram counts to calculate percentage values such as 10%, 50% and 90% values.

Autoranging is disabled during histogram measurements.

The minimum measurement period is 50 ms. You must ensure that the number of samples times the sample period (1/sample rate) is greater than 50 ms.

Sampling This controls how the Griffin samples the signal. You can choose whether to sample with equal times between samples or equal distances.

Number of Samples

Sets the number of samples to be used for mean, max, min or histogram measurements. You can use up to 65,535 samples. If you choose Single Measurement the number of samples will, of course, be 1.

Sample Rate

This is only available if you have chosen time sampling. You can set the sampling rate used by the Griffin. The maximum rate for mean measurements is 100 kHz, and 50 kHz for other measurements. You can use this to space the samples further apart in time.

Triggering This controls when the Griffin starts a measurement. The Griffin allows you to use distance or time to control the instant when it starts a measurement of the RF signal. This is called triggering as each measurement is triggered to start. Whether to use distance or time for the triggering depends on the type of measurement you are doing.

The Griffins do not measure continuously, they must be triggered to start a measurement. Once triggered the measurement will be completed and, at the end of the measurement, the Griffin will retune to the next frequency. It will then wait for a trigger to start the measurement on the new frequency. Thus when you set the triggering you are controlling when the Griffin will change frequency and this is why it is called the 'frequency spacing'.

Make sure that you are clear about the difference between triggering and sampling. Perhaps an example will help; you might choose to do a mean measurement where each measurement consists of 1000 samples. You might then choose to trigger the start of each measurement every time you have travelled 10 m along the road.

Frequency Spacing

The frequency spacing is the interval between triggers. You must choose this to be greater than the time taken to make the measurement or else the Griffin cannot complete one measurement before being triggered to start the next.

There is sometimes confusion over the meaning of frequency spacing. It is the spacing between frequency changes, not between the start of a cycle. Thus if you decide to cycle around five frequencies with a frequency spacing of 1 m, the cycle will take a total of 5 m to complete.

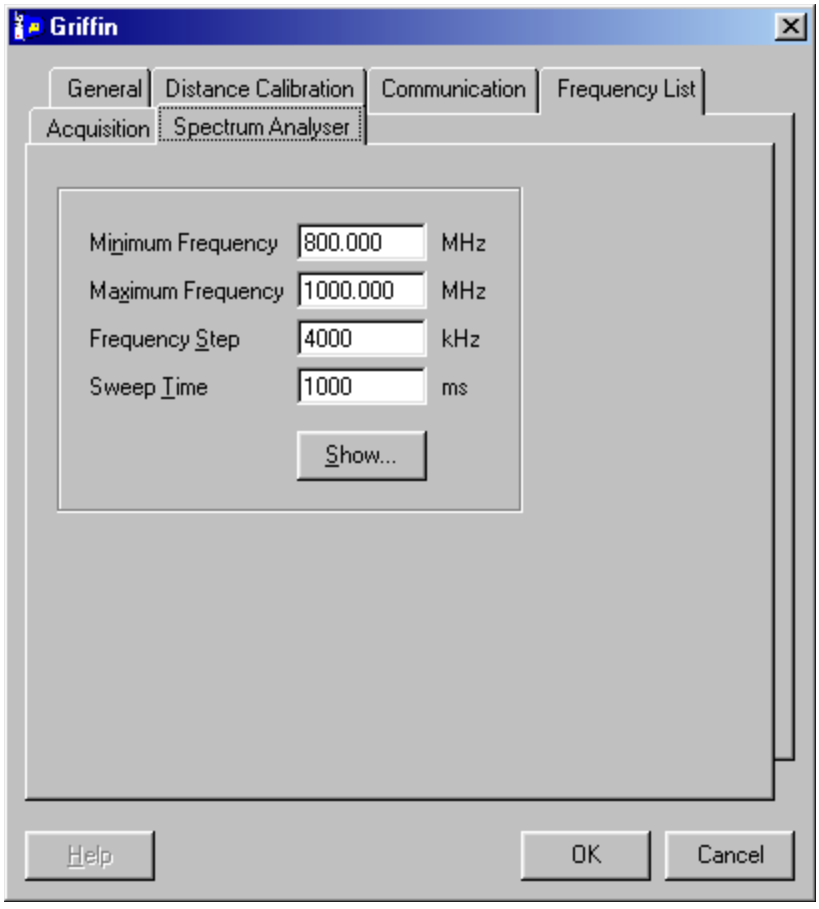
The maximum values that you can set depend on whether you have chosen time or distance triggering. In either case the maximum is set by the counter in the Griffin, which has a maximum value of 65,535 counts.

In time sampling and triggering the sample rate affects the total period available to you. Thus, if you choose a sample rate of 100 kHz each pulse lasts 10 µs so 65,535 pulses last 655.35 ms, which is the maximum you can set. If you choose a sample rate of 50 kHz each pulse lasts 20 µs so the maximum is about 1300 ms.

In distance sampling and triggering the sample spacing affects the total distance available to you. If you choose a sample spacing of 10 cm a divider in the Griffin is set to give one pulse output every 10 cm. (This is not precise, see "Applications of the Griffin" on page 105 for a discussion of some of the issues). The trigger divider is then working in units of 10 cm so 65,535 pulses cover 6.553 km, which is the maximum you can set.

Spectrum Analyser tab

The Spectrum Analyser tab allows you to use the Griffin as a spectrum analyzer to survey the RF environment in which you are about to work.



Minimum Frequency

Enter the start frequency of the sweep.

Maximum Frequency

Enter the end frequency of the sweep.

Frequency Step

Enter the increment to be used for the sweep.

Sweep Time

Enter the total time the sweep is to take. This will be used to set the amount of time the Griffin spends on each frequency. Remember that the Griffin can scan up to 1000 frequencies per second and your setting must allow sufficient time for the Griffin to scan. If you use times longer than the minimum possible the readings at each frequency will be averaged to reduce their noise.

Wheel calibrator wizard

The wizard takes you through the steps to make a calibration. You will be required to drive a significant, measurable distance whilst the wizard is in monitoring mode. You can measure the distance with the odometer in your car or, for better accuracy, you can use two points a known distance apart.

Before you start, ensure that the distance transducer is properly connected to your PC via a suitable interface and then start driving.

Start When you are ready to start the calibration, click **Start**. The next page of the wizard will be displayed.

Drive a measurable distance. For more reliable results do not drive too fast.

Pulses This will display the number of pulses being monitored as you drive.

Finish

When you have completed the measured distance, click **Finish**. The next page of the wizard will be displayed.

Enter the distance you travelled as accurately as possible and select the correct units (miles, yards or kilometers) from the drop-down list.

Choose a name under which to save the calibration details. Willtek recommends that you include a reference to the vehicle such as its registration (licence plate) number.

Managing Views

6

This chapter describes the different result views and their options. Sections described in this chapter are as follows:

Introduction

Hindsite shows the data to you through views. There are currently three views available in Hindsite, graph, table and map views. You can open as many views as will fit onto your screen at the same time and you can customize each one separately.

Linking between views

Map and graph views can be linked so that they show data from the same section of a route. When they are linked, if you change one of them the change is reflected in the others. For example, if you zoom in on the graph, a linked map will show the change in the section of the route by moving its route markers.

The route markers on a map appear as green bullets, one at each end of the section of the route. The route between the route markers (called a route section) will be shown in its normal colors and the sections outside of the route markers will be in pale yellow.

To move a route marker on a map click on the marker and it will change to a pin. Move the pin to where you want the route marker and then click again to place it. Any linked graphs will then update to show only the new section of the route.

You can link or unlink views by choosing **View** > **Presentation** > **Route Section Linkage** and then ticking or unticking the views that you wish to link. When you add a new view to a presentation it will be linked by default.

Table view

The table view consists of one or more columns of data that can be derived from any instrument used during the drive test.

Live data

If it is being viewed during a drive test, data is added to the bottom of the table, as it becomes available, and the last row of the table is kept visible. You can use the scroll bar on the right of the table to look at earlier data. If you do so that part of the data is kept visible and you cannot see the new, live, data being added. To restore the action of keeping the last row in view, scroll the table to the bottom.

Exporting data

The table view is used to export data. Refer to page 40 for details on the export facilities.

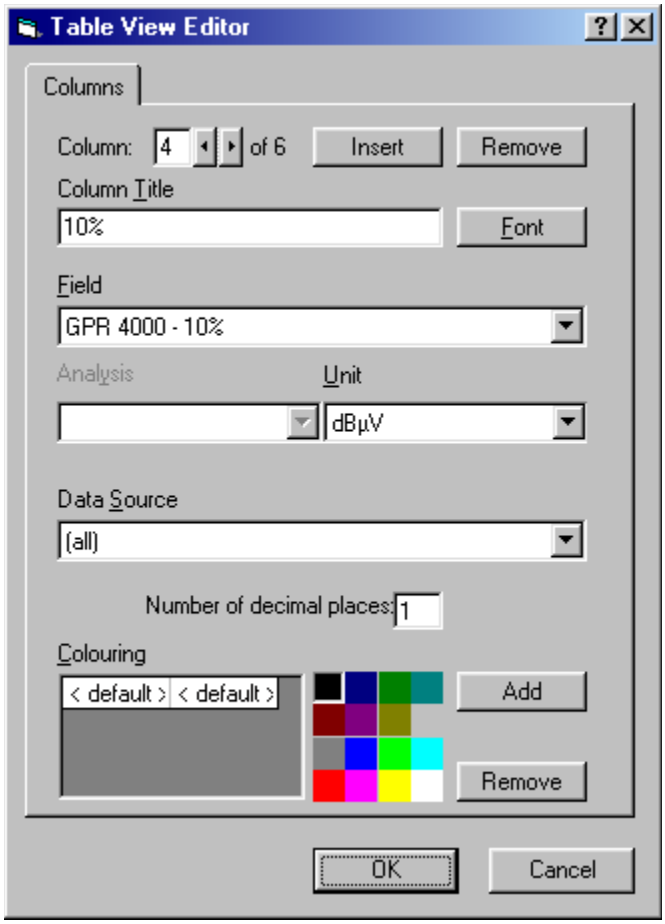
Copying data from a table view

If you wish to copy displayed data from the table to the Windows clipboard, select the rows you want to copy (the whole table is copied if no rows are selected). Right-click the table and select Copy from the submenu. You can then change to another Windows application and paste the data into it.

Using the table view editor

The table editor may be displayed by selecting the View/Presentation/Edit View menu and selecting View from the submenu.

Alternatively, you can right-click the mouse on the table view and then select the Properties menu item.



Column

The column that was right-clicked will be displayed, but others may be selected by means of the left/right arrows beside the column number.

Insert

To insert a column, click **Insert**. A blank column will be inserted before the selected column.

Remove

To remove the selected column, click **Remove**.

Column Title

A default title for the selected column will be displayed, dependent upon the data being displayed, but you may specify any other title. Be careful not to confuse other people by using a title that does not accurately reflect the data in the column.

Field

The data (or 'field') to be displayed in a column may be specified here. In the drop-down, all available data is shown (with its source instrument or analysis).

To limit the drop-down to a particular source of data, select that source from the data source drop-down (below).

Analysis

This is not available in this release of Hindsite.

Unit

The units in which the data is to be displayed may be specified here. Note that, if these units are not the same as those used when the data was recorded, Hindsite will have to convert them. On lower-performance PCs this might lead to a noticeable degradation in performance.

Data Source

When selecting the field (above), the choice may be limited to a particular source of data from this drop-down.

Number of decimal places

If the field chosen is nonintegral numeric field, you may specify the number of decimal places to be displayed.

Colouring

You may specify that data values in the column are displayed in particular colors according to the range in which the value falls. If the data is numeric, a minimum and maximum are specified. If the data is nonnumeric, discrete values will be specified.

A default range is always included which covers any value not otherwise specified.

Other ranges may be added and removed. You must ensure that the value you enter is a valid number and is within the expected range of signal strengths.

Note that, in a best server table, coloring is ignored and, within each row, the strongest signal(s) are colored red.

Add

To add a range, click **Add** and a blank row will be added to the table. Fill in the minimum and maximum of the range (or discrete value) and click the color you require from the palette.

Remove

To remove a range, position the cursor in the row concerned and click **Remove**. You may not remove the default range.

Graph view

The graph view consists of one or more traces plotted against specific X and Y-axes.

The X-axis value is that of a field that represents progress through the drive test (in other words, distance or time).

The Y-axis value is that of a field being measured.

Viewing live data

If live data is being viewed during a drive test, traces are extended to the right as data becomes available. The graph is scrolled to the left so that the current point is kept visible, unless the scroll bar is operated to bring another part of the graph into view, when that part is kept visible.

To restore the action of keeping the current point in view, the graph should be scrolled to the right.

Zooming the graph

The graph may be zoomed in or out as required. All zoom-ins are remembered and may be undone.

Zooming in

There are two methods of zooming in:

The incremental zoom-in button for the horizontal axis  and for the vertical axis  . When you click on either button a zoom-in of 20% is performed on the current center.

The manual zoom-in: Hold the mouse button down, draw a rectangle around the area of the graph you want to zoom-in on and release the mouse button.

Zooming out

There are two methods of zooming out:

Undo previous zoom-in button  . When you click on this button the previous zoom-in is discarded and the one before it (if any) becomes the previous zoom-in.

Full zoom-out button  . Click on this button to discard all previous zooms show the graph to its full extent.

Panning the graph

You can pan the graph in any orthogonal direction using the panning keys  . The zoom factor is retained.

Copying graph image to clipboard

Select the **Edit/Copy** menu  to copy an image of the graph to the clipboard. You can subsequently paste the image into another Windows application.

Editing specific parts of the graph

Also available from the **View** menu (and from the right-click menu) are specific parts of the overall editor. See the following section on the graph view editor for details of changing the graph.

Limit Displays the limit line editor from the Y-axis tab of the full editor.

X Axis Displays the (horizontal) X-axis tab from the full editor.

Y Axis Displays the (vertical) Y-axis tab from the full editor.

Traces Select, from submenu, the trace required, to display the trace editor from the traces tab of the full editor.

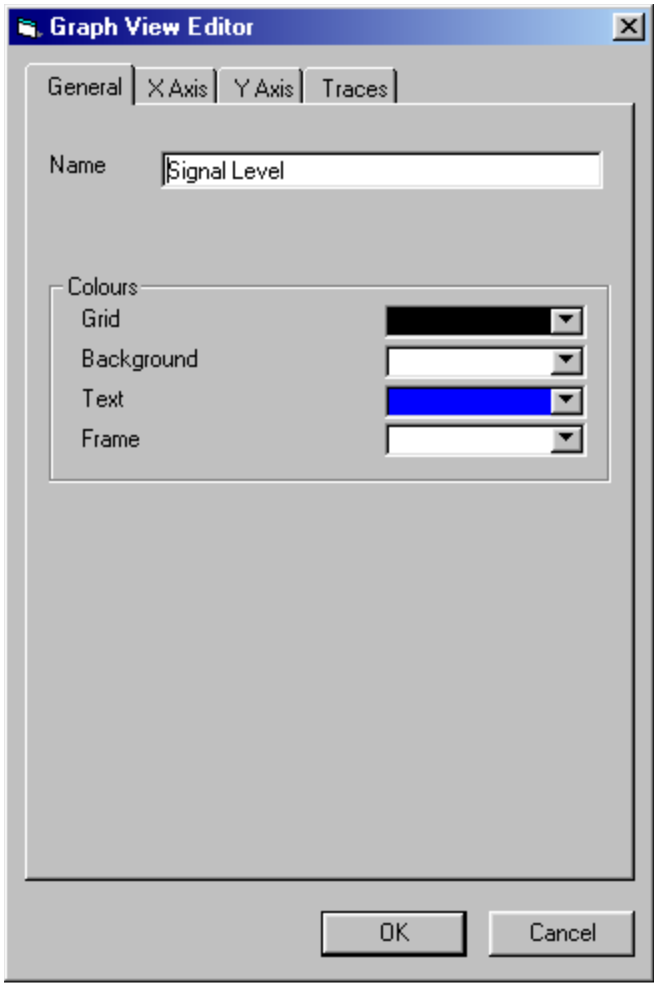
The legends for the traces may also be toggled here.

Using the graph view editor

The graph editor may be displayed by selecting the **View** > **All Properties** menu.

Alternatively, you can right-click the mouse on the graph view and then select the **Properties** menu item.

General tab This enables you to specify general characteristics of the graph view.



Name

Enter a name for this graph if you require.

Colours...

The colors of the items below may be changed.

– Grid

The X/Y grid.

– Background

The background of the area within the axes.

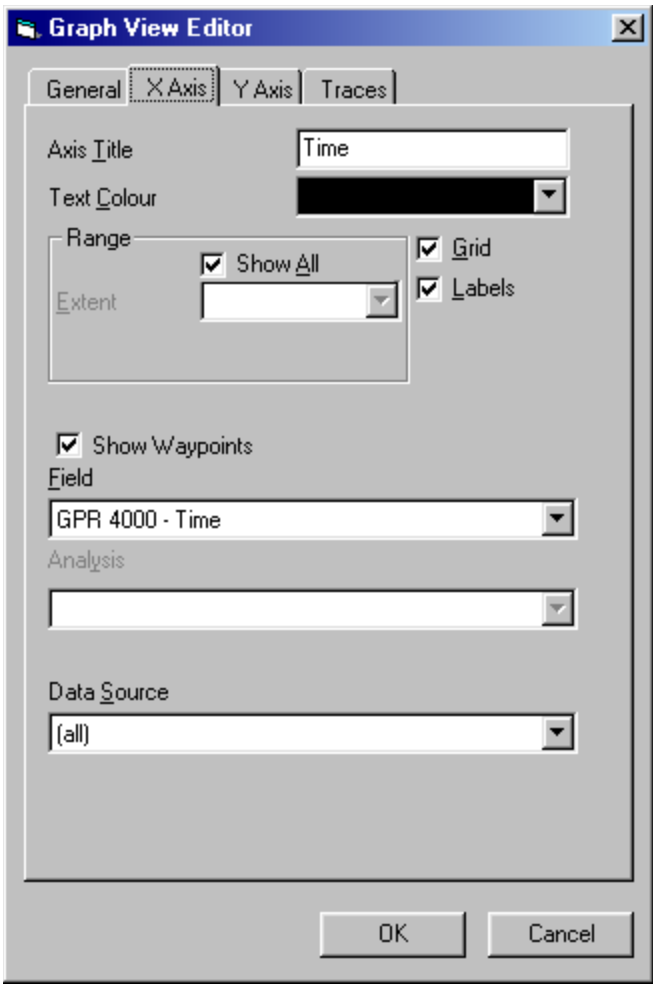
– Text

The legend and titling of the graph.

– Frame

The background of the area outside the axes.

X-Axis tab This enables you to change the characteristics of the X-axis.



Axis Title

You may enter your own axis title here. You can enter any text so take care not to confuse other people who might read it.

Text Colour

The color of the X-axis.

Range...

This specifies the visible range of the X-axis.

- Show All

Check this to show the complete drive test.

- Unit

Select the units to be used for the X-axis.

Grid

Check this box to show the X grid (vertical lines).

Labels

Check this box to display X-axis tick mark annotations.

Show Markers

Check this box to show markers on the graph.

Field

The data (or 'field') to be displayed as the X-axis is shown here. It cannot be changed.

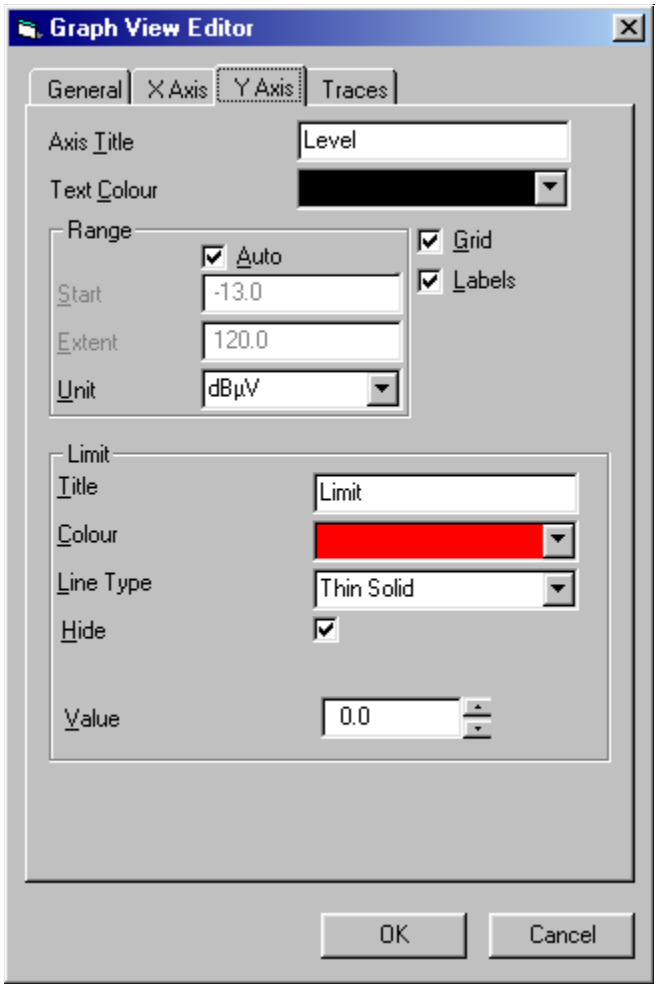
Analysis

This is not available in this release of Hindsite.

Data Source

The data source for the field is shown here. It cannot be changed.

Y-Axis tab



Axis Title

You may enter your own axis title here.

Text Colour

The color of the Y-axis.

Range...

You may specify here the extent of the Y-axis.

– Auto

Check this box if autoranging is required.

– Start

If not autoranging, this specifies the value of the Y-axis at the origin of the graph.

– Extent

If not autoranging, this specifies the value of the extent of the Y-axis (start + extent = top of graph).

– Unit

This specifies the units to be used for the Y-axis.

Grid

Check this box to show the Y-axis grid (horizontal lines).

Labels

Check this box to show the Y-axis tick mark annotations.

Limit...

Hindsite allows you to put a limit line on the graph for reference purposes. You can specify its details here.

– Title

Enter the name to be shown against the limit line.

– Colour

Select the color of the limit line.

– Line Type

Select the type of line required for the limit line.

– Hide

Check this box if you want to hide the limit line, clear it to show the limit line.

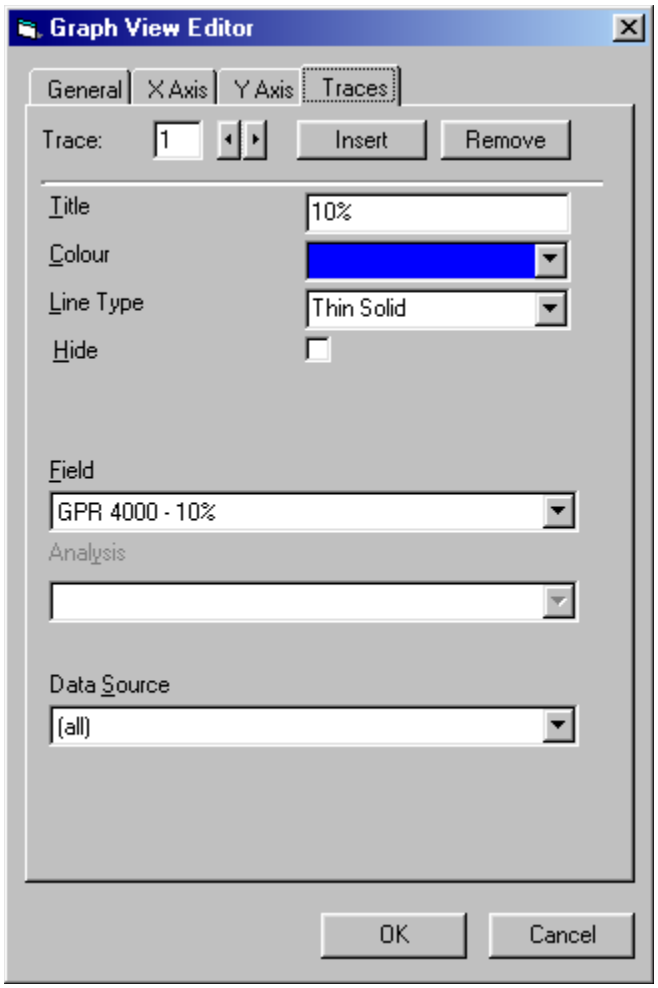
– Value

The value at which the limit line will be drawn.

Traces tab

In this tab, you can customize each trace individually. The top of the tab is used to select traces and insert and remove them as required.

Once a trace is selected, the lower part of the tab applies to that trace.



Trace

Either enter a trace number or use the left/right control to select one.

Insert

Click this button to insert a new trace, then complete the details of the trace in the lower part of the tab.

Remove

Click this button to remove the currently selected trace.

Title

Enter the name to be given to the trace. You can enter any text so take care not to confuse other people who might read it.

Colour

Select the color of the trace.

Line Type

Select the line type of the trace.

Hide

Check this box to hide the trace.

Field

The data (or 'field') to be displayed as the Y-axis may be specified here. In the drop-down list, all available data that is suitable is shown (with its source instrument or analysis).

To limit the drop-down list to a particular source of data, select that source from the Data Source drop-down (below).

Analysis

This is not available in this release of Hindsite.

Unit

The units in which the data is to be displayed may be specified here. Note that, if these units are not the same as those used when the data was recorded, conversion will have to be done with possible degradation in performance.

Data Source

When selecting the Field (above), the choice may be limited to a particular source of data from this drop-down.

Map view

The map view consists of a raster or vector map upon which is superimposed the route of the drive test. The route may be drawn in either monochrome or in colors where each color represents a different range of the data.

The map view can be made into a background view. This will occupy the whole of the Hindsite window but will always be behind other views, that is, all other views will appear on top of it. Only one view may be a background view at one time.

Note

Maps are only provided with Hindsite for demonstration purposes. You must provide your own maps to cover the area of your survey for Hindsite to use.

Map tiles

Maps are generally supplied in tiles of convenient sizes. Hindsite will join adjacent tiles together seamlessly to create one large map. If you do not have all of the tiles to cover the area where you are working, Hindsite will fill the gaps with a white background.

Hint: If you do not have any maps for the area where you are working, you can use the demo map tile shipped with Hindsite. You will only get a white background but you will be able to see the general shape of the route that you drive.

Zooming the map

The map may be zoomed in or out as required. Hindsite limits the amount that you can zoom in so that the map represents a distance of at least 1.5 meters wide.

Zooming in

There are two methods of zooming in:

The **View/Zoom In** menu or button  . A zoom-in of 20% is performed on the current center.

The manual zoom-in: Hold down the left mouse button, draw a rectangle around the area of the map you want to zoom-in on and release the mouse button.

Note that, if using a raster map, you may zoom in too far for any details of the map to be displayable and the background will be shown white. If this happens, zoom out until the map reappears.

Zooming out

There are two methods of zooming out:

The **View** > **Zoom Out** menu or button  . A zoom-out equivalent to an incremental zoom-in of 20% is performed.

The **View** > **Show Whole Route** menu or button  . The map is adjusted to show the whole route with a margin around it.

Panning the map

You can pan the graph in any direction using the panning button:

1. Push the panning key (hand icon)  . The mouse pointer will turn into a hand symbol when placed on the map view.
2. Click on the map, hold the mouse key and drag the map to a new position.
3. When the map shows the desired view, push the panning key  again. This will turn off the panning function.

Changing the plot type

The plot may be monochrome or color-coded and it may be annotated or not.

Monochrome/color-coded plots

The **View** > **Plot Type** > **Colour** menu  is a toggle. When on, the route is shown color-coded according to the current ranges. When off, the route is shown in the current default color.

Annotated route plots

The **View** > **Plot Type** > **Annotated** menu  is a toggle. When on, the route is annotated with values. As many nonoverlapping annotations as possible are shown. All values are signed: the center of the sign indicates the precise point to which the value applies.

Determining position on map

Whenever the mouse pointer is over the map, a display of its position in map terms (either longitude/latitude or easting/northing) is maintained in the status bar at the bottom of the map view. Easting and northing is shown for files imported from FSS, while latitude and longitude is shown for other files.

Determining the value at a point

When you hover the mouse pointer over a point on the route, its value will be displayed after a small pause.

If the map is showing signal strengths, the signal strength at that point will be shown. If the map is showing best server, the frequency of the best server is shown.

Setting the map as background

The **View** > **Background** menu or button  is a toggle. When it is on, the map will become full size within the Hindsite window and all other views will appear on top of it. When it is off, the map view behaves like any other view and can be moved and resized.

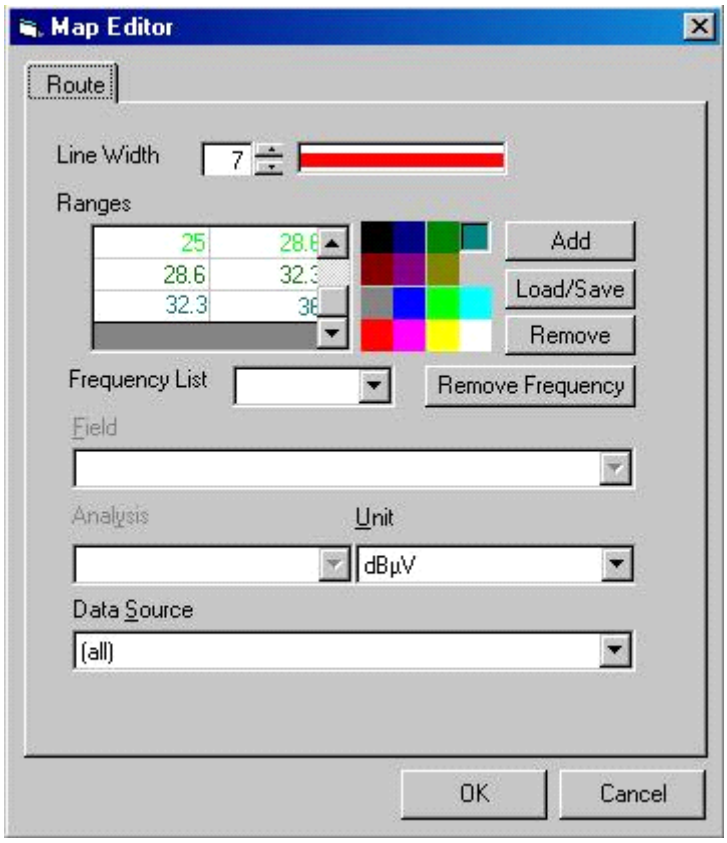
Setting grid size

The **Edit** > **Grid** menu is a toggle. To switch on an annotated coordinate grid, select a size from the submenu. To switch it off, select (**None**).

Using the map view editor

The map view may be edited by selecting the **View** > **Properties** menu or by right-clicking on the map and selecting **Properties** from the menu.

Route tab



Line Width

The width of the route line (in pixels) may be specified here. It must be in the range 1 to 7. The box beside the value shows a line of that width.

Ranges

The coloring of the line in a multicolored signal strength route plot may be specified here. If the value of signal strength is within one of the specified ranges, the line has that color at that point. If the value does not lie within any of the specified ranges, it adopts the default color.

Ranges may be inserted, modified and deleted. The default range may not be deleted.

To modify a value, select it and overtype it.

You must ensure that the value is a valid number and is within the expected range of signal strengths.

– Add

To insert a range, click the **Add** button. A blank row will be added to the bottom. Complete the row with minimum and maximum values and click the color required for the range.

– Load/Save

To save the current set of ranges and colors or load a previous presentation click this button. Another dialog box will open.

All presentations are saved in the Windows registry. If saving a presentation either type a new name into the box or select a previously saved one from the drop-down list and click **Save**. If you wish to load a presentation select the name from the drop-down list and press **Load**.

Note

The presentation does not store the level units, so make sure the correct level unit is set before loading the presentation.

– Remove

To remove a range, select the range in the table and click **Remove**.

– Frequency List

This is only available in the best server and composite coverage map.

The frequency list box contains the frequencies that are being analyzed in the current map view.

– Remove Frequency

This is only available in the best server and composite coverage map.

To remove a frequency from the current map view, select the frequency you wish to remove by selecting it from the frequency list box and then click **Remove**.

Field

The data (or 'field') to be displayed may be specified here. In the drop-down, all available data that is suitable is shown (with its source instrument or analysis).

To limit the drop-down to a particular source of data, select that source from the data source drop-down list (below).

Analysis

This is not available in this release of Hindsite.

Unit

The units in which the data is to be displayed may be specified here. Note that, if these units are not the same as those used when the data was recorded, Hindsite will have to convert them. On lower-performance PCs this might lead to a noticeable degradation in performance.

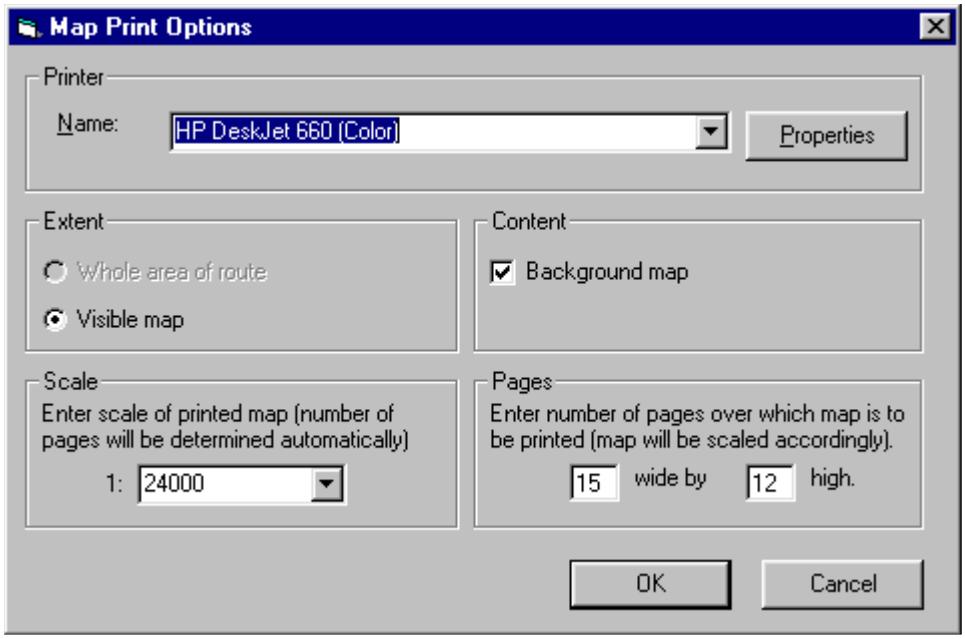
Data Source

When selecting the field (above), the choice may be limited to a particular source of data from this drop-down list.

Printing the map

There are three ways to print the map – as a screen image (**File** > **Print Screen**), as part of a report (**File** > **Print**) or as a scaled print. Refer to page 39 for details of printing the map as a screen image or report.

To print the map and route as a scaled print on a single sheet of paper, right-click the map and select **Print...** from the menu.



Printer Choose which printer to use and then, if necessary, adjust its properties by clicking on the **Properties** button.

Extent You can choose either to print the map as visible on the screen (which might be zoomed onto a small region) or a map that covers the whole of the drive test route.

Content If you untick the Background Map box then only the route will be printed.

Scale and Pages You can choose either a fixed scale for the map (when Hindsite will decide on the number of pages needed) or the number of pages (when Hindsite will decide on the appropriate scale).

Hindsite Fields

7

This chapter provides a detailed discussion of the various result fields available with the different instruments. Topics discussed in this chapter are as follows:

Introduction

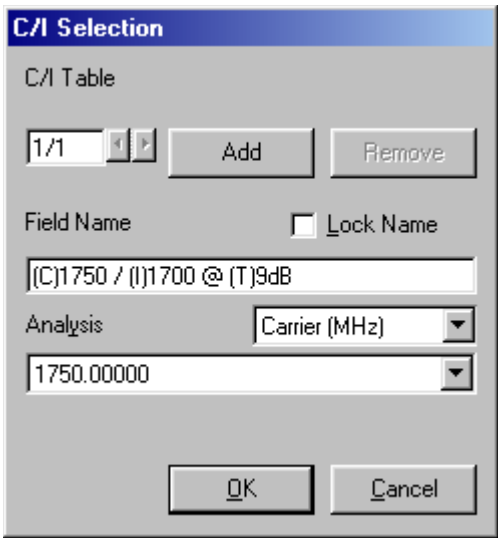
A Hindsite field is a particular type of data, for example signal strength is a field, as is the 10% value. There are two types of field, those that are measured directly by the instruments and those that are calculated by Hindsite. There is, in most cases, little difference between them, however, you are able to change the parameters of some of the calculated fields.

Some fields that are measured directly by one instrument might need to be calculated for another instrument. For example, the GPR produces percentage values directly whereas the Griffin produces histograms, which Hindsite must then analyze to derive the percentage values. Whether a particular field is calculated or produced directly by the instrument is sometimes confusing.

Calculated fields

Carrier to Interference Ratio field

The C/I field is calculated for all instruments. When you add a C/I field (or when you add a base view that contains a C/I field) you will be shown a dialog box to let you specify the calculation for the field.



A graph or table view can show several C/I ratios at the same time. You can select one of them to work with on the right of the dialog.

Hindsite creates the field name automatically to show how that field is calculated, for example the name

'(c)93.4 / (I)98.2 @ (T)-9dB'

means that the carrier is 93.4 MHz, the interferer is 98.2 MHz and the threshold is –9 dB.

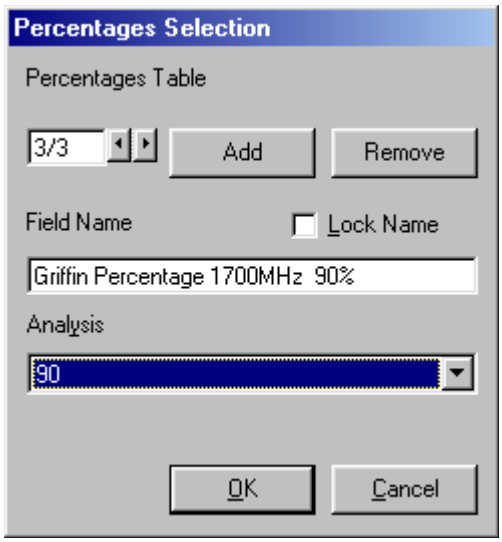
You can change the name by typing a new name to replace the automatic one. To prevent Hindsite from replacing your name with another automatic one when the field is edited, check the Lock Name box.

To change any of the parameters for the current field, first choose the parameter from the list (carrier, interferer or threshold) and then choose the new value from the list below. This list will show only those frequencies which are available and thresholds from 0 to –20 dB with a default of –9 dB.

To add a new field click on the **Add** button and then edit the field as necessary.

Percentage field

The percentage field is available for the Griffin instrument. It is calculated from a histogram measurement in the same way that the GPR calculates percentage values. When you add a percentage field to a view, you will have the option to select the percentage for which you want the value from the Analysis drop-down menu.

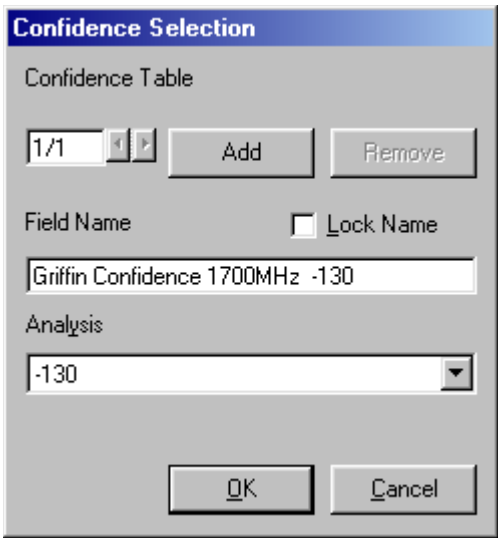


Hindsite creates the field name automatically to show how that field is calculated. You can change the name by typing a new name to replace the automatic one. To prevent Hindsite from replacing your name with another automatic one when the field is edited, check the Lock Name box.

To add a new field click on the **Add** button and then select the percentage you want from the drop-down list.

Confidence interval field

The confidence interval field is available for the Griffin instrument. It is calculated from a histogram measurement in the same way that the GPR calculates confidence intervals. When you add a confidence interval field to a view, you will have the option to select the level for which you want the value from the Analysis drop-down menu.

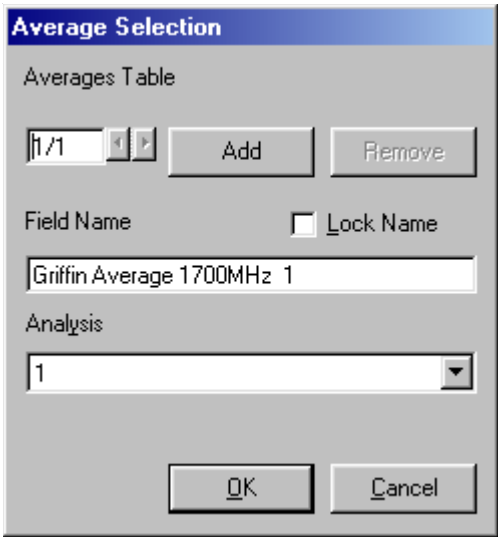


Hindsite creates the field name automatically to show how that field is calculated. You can change the name by typing a new name to replace the automatic one. To prevent Hindsite from replacing your name with another automatic one when the field is edited, check the Lock Name box.

To add a new field click on the **Add** button and then select the confidence interval you want from the drop-down list.

Average field

The average field is available for the Griffin instrument. It is calculated as the average over a selectable number of measurements. When you add an average field to a view, you will have the option to select the number of measurements to average over (1 to 1000) from the Analysis drop-down menu.



Hindsite creates the field name automatically to show how that field is calculated. You can change the name by typing a new name to replace the automatic one. To prevent Hindsite from replacing your name with another automatic one when the field is edited, check the Lock Name box.

To add a new field click on the **Add** button and then select the number of samples you want to average over from the drop-down list.

Making the right fields available

When you choose what data are to be shown by a view, you are actually choosing which fields to view. Hindsite will only allow you to choose the fields that will be available from the instrument settings that you have chosen. If a field is not available to you, it is because you did not choose the correct settings to produce the field.

If you change the settings on an instrument to make a field available to a base view you must delete the base view and then reinsert it to make the new field available.

When Hindsite creates the base views for a configuration it analyzes the settings you have chosen for the instruments and puts the available fields into the base views. For example, if you have chosen to measure across multiple frequencies Hindsite will create one column for each frequency into a table view.

Fields produced by measuring instruments

The following table lists all the fields that are produced by the GPR and Griffin measuring instruments. It also includes those fields that can be imported from files produced by the Willtek FSS field survey software using the GPR. Note that the fields available in any particular configuration or drive test will depend on the settings you chose for the instrument.

Table 1 Fields produced by measuring instruments

Field	FSS	GPR	Griffin
Antenna names	X		
Average			X
Bottom latitude	X		
Bottom northing	X		
Calibration	X		
Channel data AFD			X
Channel data histogram			X
Channel data LCR			X
Channel data max			X
Channel data mean			X
Channel data min			X
Channel data single	X	X	X

Table 1 Fields produced by measuring instruments

Field	FSS	GPR	Griffin
Channel data single max		X	
Channel data single min		X	
Confidence		X	X
Confidence names	X		
C to I		X	X
Date	X		
Datum easting	X		
Datum northing	X		
Distance	X	X	X
Distance units	X		
Easting	X		
End	X		
Event	X	X	X
Fix	X		
Frequency names	X		
Gain names	X		
Geodetic ellipsoid scale	X		
Geodetic X-offset	X		
Geodetic X-rotation	X		
Geodetic Y-offset	X		
Geodetic Y-rotation	X		
Geodetic Z-offset	X		
Geodetic Z-rotation	X		
GPR	X		
Latitude	X		
Left easting	X		
Left longitude	X		
Longitude	X		
Max confidence	X	X	
Max percentage		X	
Max signal	X		
Min confidence	X	X	
Min percentage		X	

Table 1 Fields produced by measuring instruments

Field	FSS	GPR	Griffin
Min signal	X		
Northing	X		
System time		X	X
Percent		X	X
Percentage names	X		
Position system	X		
Projection conversion	X		
Projection local easting	X		
Projection local northing	X		
Projection meridian	X		
Projection meridian scale	X		
Projection parallel	X		
Right easting	X		
Right longitude	X		
Run time	X	X	X
Samples	X	X	X
Scan data AFD			X
Scan data LCR			X
Scan data max			X
Scan data mean			X
Scan data min			X
Scan data single			X
Speed			
Spheroid flattening	X		
Spheroid semi-major axis	X		
Spheroid semi-minor axis	X		
Start time	X		
Title	X		
Top latitude	X		
Top morthing	X		
Total datum	X		
Total distance	X		
Total rooms	X		

Table 1 Fields produced by measuring instruments

Field	FSS	GPR	Griffin
Total waypoints	X		
Transport used	X		
Version	X		
Waypoint	X		
Waypoint suspect ID	X		
Waypoint type	X		

Fields produced by navigation instruments

The following table lists all the fields that are produced by the JRC and Trimble Navigation instruments. Note that some of the fields are optional and you can choose whether to include them in the instrument editor when you create the configuration.

Table 2 Fields produced by navigation instruments

Field	JRC	Trimble
Bottom latitude	X	X
Event	X	X
Fix	X	X
Heading	X	X
Height	X	X
Latitude	X	X
Left longitude	X	X
Longitude	X	X
System time	X	X
Right longitude	X	X
Speed	X	X
Top latitude	X	X
UTM	X	X

Fields produced by other instruments

The following table lists all the fields that are produced by other 'instruments'. Although called instruments within Hindsite these are really parts of the Hindsite software that produce the fields rather than actual devices connected to the PC. Note that not all of the fields will be present in all drive tests.

Table 3 Fields produced by other instruments

Field	W/P
Corrected distance	
Event	X
Route trace bottom latitude	
Route trace bottom north	
Route trace easting	
Route trace latitude	
Route trace left easting	
Route trace left longitude	
Route trace longitude	
Route trace northing	
Route trace right easting	
Route trace right longitude	
Route trace top latitude	
Route trace top northing	
Route trace type	
Waypoint	X
Waypoint bottom Y	X
Waypoint count	X
Waypoint left X	X
Waypoint notes	X
Waypoint ordinal	X
Waypoint right X	X
Waypoint suspect ID	X
Waypoint top Y	X
Waypoint type	X
Waypoint X	X
Waypoint Y	X

Description of all fields

The following table lists all the fields that are known to Hindsite with a brief comment where appropriate.

Some of these fields are included for possible future releases of Hindsite.

Table 4 Description of all fields

Field	Comments
Antenna names	Only from imported FSS files
Average	Calculated
Bottom latitude	
Bottom northing	
Calibration	
Channel data AFD	Griffin
Channel data histogram	Griffin
Channel data LCR	Griffin
Channel data max	Griffin
Channel data mean	Griffin
Channel data min	Griffin
Channel data single	Griffin
Channel data single max	Griffin
Channel data single min	Griffin
Confidence	
Confidence names	
Corrected distance	
C to I	Calculated
Date	
Datum easting	
Datum northing	
Distance	
Distance units	Always metric
Easting	
End	
Event	
Fix	

Table 4 Description of all fields

Frequency names
Gain names
Geodetic ellipsoid scale
Geodetic X-offset
Geodetic X-rotation
Geodetic Y-offset
Geodetic Y-rotation
Geodetic Z-offset
Geodetic Z-rotation
GPR
Heading
Height
Latitude
Left easting
Left longitude
Longitude
Max confidence
Max percentage
Max signal
Min confidence
Min percentage
Min signal
Northing
System time
Percent
Percentage names
Position system
Projection conversion
Projection local easting
Projection local northing
Projection meridian
Projection meridian scale
Projection parallel
Right easting

Table 4 Description of all fields

Right longitude	
Route trace bottom latitude	
Route trace bottom north	
Route trace easting	
Route trace latitude	
Route trace left easting	
Route trace left longitude	
Route trace longitude	
Route trace northing	
Route trace right easting	
Route trace right longitude	
Route trace top latitude	
Route trace top northing	
Route trace type	
Run time	
Samples	
Scan data AFD	Griffin
Scan data LCR	Griffin
Scan data Max	Griffin
Scan data mean	Griffin
Scan data min	Griffin
Scan data single	Griffin
Speed	
Spheroid flattening	
Spheroid semi-major axis	
Spheroid semi-minor axis	
Start time	
Title	
Top latitude	
Top northing	
Total datum	
Total distance	
Total tooms	
Total waypoints	

Table 4 Description of all fields

Transport used
UTM
Version
Waypoint
Waypoint bottom Y
Waypoint count
Waypoint left X
Waypoint notes
Waypoint ordinal
Waypoint right X
Waypoint suspect ID
Waypoint top Y
Waypoint type
Waypoint X
Waypoint Y

Maintenance and Troubleshooting

8

This chapter describes how to identify and correct problems related to the Hindsite. Topics discussed in this chapter are as follows:

Troubleshooting

Some typical problems that may arise when using Hindsite are listed below, together with solutions. If you are unable to resolve problems related to the Hindsite, refer to "Technical assistance" on page xiv.

Solving problems

If you experience difficulties using the Hindsite, refer to the related topic. Each topic describes problems and solutions that may be pertinent to your task. If you are unable to resolve your problem, please contact "Technical assistance" on page xiv.

Installing software

Problem Hindsite does not start properly after software installation. What's wrong with it?

Solution The files dwreg32.ocx and dwstg32.ocx sometimes do not self-register with Windows. A reinstallation sometimes works, otherwise you will have to register the files manually by the following procedure:

1 On the Windows task bar, select **Start** > **Command**.

2 Enter the following text:
`regsvr32 c:\windows\system\dwreg32.ocx`

3 Repeat the first two steps with the following text:
`regsvr32 c:\windows\system\dwstg32.ocx`

Licensing

Problem Why can I not get Hindsite to accept the license codes that I received from Willtek?

Solution In rare cases, the file scrrun.dll did not register with Windows. You can make up for this by following the procedure below:

1 On the Windows task bar, select **Start** > **Command**.

2 Enter the following text:
`regsvr32 c:\windows\system\scrrun.dll`

Confidence level exceeding 100%

Problem Hindsite delivers confidence values of more than 100%. How can this be?

Solution This is due to Windows booting up while the GPR is switched on and attached to the serial port. The following steps resolve the problem:

1 Reset the GPR and switch it off and on.

2 Restart the measurements.

Wheel calibration

Problem Why do I receive error messages when calibrating the wheel transducer?

Solution This may happen in conjunction with the Griffin when the communications port is not yet set up properly.

1 Set up the communications port for the Griffin; see "Communications settings" on page 15 and "Griffin Communications Settings" on page 58.

2 Restart the wheel calibration.

Keyboard markers

Problem Hindsite added multiple keyboard markers when I tried to define a single one. What went wrong?

Solution This happens when the key is depressed too long. The sensitivity of the keys can be changed in the Windows settings.

Local coordinates

Problem The local coordinates option is disabled; how can change the coordinate system now?

Solution Please ensure that the name of the first .TAB file in the map folder does not end with a digit.

Problem How can I avoid getting error messages when I change local coordinates?

Solution An error message appears when you try changing local coordinates while configuring Hindsite. Change the coordinates during a measurement run only.

Route tracing

Problem After a route trace has been performed, the views do not reflect the current status?

Solution Close all views and reopen them so the modified data can be displayed.

Communications problems

If you experience problems communicating with the instruments try checking that

- the cables are properly attached at both ends
- every instrument is connected to the correct port as used in the configuration
- the communications settings in Hindsite and in the instruments match
- the power supply to the instruments is reliable

Map problems

Most map problems are due to incorrect selection of the folder containing the maps, invalid files within the folder or invalid map file formats. Try reinstalling the maps into a new folder and setting Hindsite to use the new folder. Ensure that the maps are in valid MapInfo format and include the .TAB files.

Performance problems

If you are running Hindsite on a PC that does not have sufficient processing power or memory you might run into problems where the PC is not able to keep up with the amount of work that it has to do. The best solution is to upgrade to a more powerful PC. If this is not possible you could try changing your configuration to reduce the amount of work that Hindsite must do. Try:

- removing any unnecessary views
- reducing the number of measurements that must be processed per second
- closing any other applications
- disabling any virus protection software from checking the Hindsite files

Plotter/printer driver interactions

Some users have reported problems where plotter or printer drivers installed on the PC interfere with Hindsite's use of the parallel port. At this time Willtek is still investigating this situation, so cannot offer any particular advice apart from to try to remove the driver to test if it is causing a problem. Please report your findings to Willtek.

Parallel port problems

Some users have reported problems with using the parallel port and found that it worked when changed to unidirectional (ECP) mode. Our experience is that it works in both bidirectional (EPP) and unidirectional modes. This might be an issue that depends on the make of PC being used or its settings.

Diagnosing problems during a drive test

If you suspect problems during a drive test try adding an events table. This will show you if any instrument had a problem during the run, for example, if a navigation instrument lost lock.

Willtek technical support

If you are unable to overcome the problems yourself you can contact Willtek Technical Assistance Center (see "Technical assistance" on page xiv). An email is the most effective way of asking for support. You should include the configuration file, drive test results file and any Hindsite log file that was produced along with a complete description of the problem and your PC.

The Hindsite log file is automatically recorded in the Hindsite folder with the name 'HindsiteNNNN' and an extension of '.LOG'. NNNN is a number which is updated each time Hindsite is started.

Log files which do not contain problem reports are deleted automatically by Hindsite, but those which do contain reports are not deleted. You should check the Hindsite folder occasionally and delete any redundant log files. Hindsite should not be running while you delete the log files.

Applications of the Griffin

A

This appendix describes how the Griffin can be used with Hindsite. The topics discussed in this appendix are as follows:

Distance resolution issues

When making measurements at relatively short distances some issues can arise from the resolution of the distance transducer used. This section will explain these issues.

A distance transducer produces a pulse every time the vehicle moves through a set distance. This distance will depend on the size of the vehicle's wheel and the number of pulses per revolution. Typically this distance is about 2 cm when the distance transducer has 100 pulses per revolution. You can find out the resolution of your system by noting the number of pulses recorded during the vehicle calibration process and dividing this into the distance you travelled. (Note that you should express the distance in cm to get the resolution in cm).

The Griffin receivers count pulses to measure the distance travelled. Since each pulse represents a set distance, the resolution of the distance that can be measured by the Griffin depends on the distance transducer.

When the Hindsite software calculates the number of pulses to count between samples or measurements it will divide the distance required by the distance resolution. This can result in a rounding error where the distance required is not an integral multiple of the distance resolution. For example, if you ask for samples every 5 cm when you have a distance resolution of 2 cm Hindsite will calculate the number of pulses as 5 / 2 = 2.5 and will round this up to 3. Thus the actual distance between samples will be 3 x 2 cm = 6 cm.

Following this example, if the measurement is to take the mean of 100 samples, the actual distance covered will be 6 x 100 = 600 cm, compared to the 5 x 100 = 500 cm that might be expected from the values entered. If you had selected a frequency spacing of 550 cm, the Griffin would be unable to make the measurements as it would need to change the frequency before it had completed the 100 samples. The solution in this example is to set the frequency spacing to greater than 600 cm.

Time to retune and take measurements

When considering measurement times it is important not to forget the retuning and autoranging time.

The Griffin takes 1 ms to tune from one frequency to another and to autorange. For example, if you ask for a mean measurement of 200 samples taken at 100 kHz, the time spent making the measurement would be 2 ms, and the time spent changing frequency would be 1 ms. The Griffin could cycle around 10 frequencies in 30 ms.

This 1 ms time is always present, even if the Griffin is working on one frequency, since the time is required for autoranging.

The time to take measurements will limit the maximum speed at which you can travel for any given settings. For example, suppose that you chose to do a mean measurement over 19 ms with a frequency spacing of 0.3 m. The total time

needed for each measurement would be 20 ms. If you travel the 0.3 m in less than 20 ms the Griffin does not have long enough to complete one measurement process before it must start the next. The maximum speed that you could travel at is 0.3 m in 20 ms or 15 m/s or 54 km/h.

Sampling and triggering

First we must explain the relationship between triggering and sampling in the Griffins. The Griffins do not measure continuously, they must be triggered to start a measurement. Once triggered the measurement will be completed and, at the end of the measurement, the Griffin will retune to the next frequency. It will then wait for a trigger to start the measurement on the new frequency. Thus when you set the triggering you are controlling when the Griffin will change frequency and this is why it is called the 'frequency spacing' on the Acquisition tab.

Once a measurement is started by a trigger, the Griffin will gather a number of samples to make the measurement. The samples are all equally-spaced in either time or distance. So, if you choose 100 samples at a sampling rate of 100 kHz it will take 1 ms to gather them. Alternatively, if you choose 100 samples at 12 cm spacing it will take 1200 cm to gather them.

Hindsite allows you to control separately the sampling and triggering processes in the Griffin. You can use any combination of time and/or distance for them. Selecting the appropriate modes depends on the information that you need.

If you choose to use a mixture of time and distance you can run into situations where the Griffin cannot complete one measurement before the trigger arrives for the next measurement. This can also happen if you drive too fast for the particular settings you have chosen. One obvious example is if you chose sampling based on distance and triggering based on time. When you stop the sampling will stop but triggering will continue.

Distance vs. time sampling

The Griffin allows you to use distance or time to control the instants when it samples the RF signal. This is possible because the distance transducer is connected directly to the Griffin. Whether to use distance or time for the sampling depends on the type of measurement you are doing.

Using distance will give you samples equally-spaced in distance, whatever speed you travel at. When you stop no samples will be taken. There are two limitations to consider. The first is the resolution of the distance transducer used, which is addressed in elsewhere in this appendix. The other is the maximum rate of pulses that the Griffin can handle (8 kHz). This limits the maximum speed for a given distance transducer.

Distance sampling is more appropriate where you wish to make a measurement with samples spread over a given distance. This is similar to Lee, where the samples are spread over 40 λ (Hindsite does Lee in a different way).

Time sampling is more appropriate either where you wish to measure the time characteristics of the signal or where you wish to use it as a filter. Time sampling has the advantage of allowing more samples to be taken in a given time period than is possible with distance sampling.

Measuring the time characteristics of the signal

If you are interested in the time characteristics of the signal, such as the fade statistics measured every 400 ms, you would use time sampling to make the measurement. This is often more useful to assess how a human perceives the performance of the system as, for example, it puts more weight on an area of low signal and low speed.

Filtering the signal

You can use the mean measurement mode of the Griffin to act as a filter to give a better measurement of the signal. For example, you could take the mean of 100 samples at 100 kHz (which lasts 1 ms) instead of a single sample. The mean would reduce the random noise on the measurement, but of course takes longer to measure. You would not be able to travel as fast as when taking a single sample. Taking the mean is broadly similar to using a low-pass filter with a bandwidth that depends on the period over which you take the mean. Using time sampling, the bandwidth of the filter is a constant whatever speed you drive at.

Distance vs. time triggering

The Griffin allows you to use distance or time to control the instants when it starts a measurement of the RF signal. This is called triggering as each measurement is triggered to start. Whether to use distance or time for the triggering depends on the type of measurement you are doing.

Using distance will give you measurements equally-spaced in distance, whatever speed you travel at. When you stop no new measurement will start.

Distance triggering is more appropriate where you wish to make measurements equally-spaced in distance. This is similar to Lee, where a measurement is started every 40 λ (Hindsite does Lee in a different way).

Time triggering is more appropriate either where you wish to measure the time characteristics of the signal.

Cycling or scanning considerations

The thing to remember when cycling or scanning is that the frequency spacing parameter will be the same for each frequency. Thus if you decide to cycle round 8 frequencies with a frequency spacing of 32 cm, any particular frequency will be measured every 8 x 32 cm = 256 cm.

To make a measurement on all 8 frequencies in 32 cm you would have to set a frequency gap of 4 cm. This might bring in resolution issues as discussed in this appendix.

Histogram considerations

When measuring histograms, the Griffin has a lot of calculation to do and there are lots of data to send to the PC. These factors limit the number of histograms that can be completed per second to a maximum of 20. You must take care when choosing the settings for the histogram that you observe this limit even when travelling at your maximum speed. In general, it is a good idea to use as many samples as possible for a histogram as that way you will get the most accurate statistics.

Data buffer issues

The Griffin has a 16 kilobyte buffer, which it uses to store results on their way to the PC. If the measurements being made by the Griffin produce more data than can be passed over the data link to the PC then the data buffer will gradually fill up. This usually shows itself as a delay between when you stop a drive test and the test actually stopping. It is important to ensure that the baud rate you have chosen for the data link is adequate to carry the amount of data that your measurements will produce.

Lee sampling

Many people use the Lee sampling criterion or variations on the same theme. With Hindsite and the Griffin you can have some flexibility in how you do this form of sampling.

Do not confuse the word sampling in 'Lee sampling' and as used by the Griffin sampling. They are not always the same.

Averaging in the Griffin

If you are working on a single frequency, you can use the following settings:

- Measurement Mode = Mean
- Sampling = Distance
- Number of Samples = y
- Sample Spacing = x
- Triggering = Distance
- Frequency Spacing = x times y + a margin

You must choose y to be the number of samples to average, that is calculate the mean, (40 for Lee) and the sample spacing as above. The frequency spacing must be great enough to cover a distance of x times y, so it should be set to slightly greater, x times (y+1) is generally suitable.

You do not need to use the averaging facility within Hindsite and you cannot change the number of samples at a later date.

Averaging in Hindsite

Alternatively you can use the following settings:

- Measurement Mode = Single
- Sampling = Time
- Sample Rate = 100 kHz
- Triggering = Distance
- Frequency Spacing = x

You must calculate x to be the required sample spacing, for example with Lee it is about 0.8 λ. You must be careful about resolution issues as this is only 12 cm, which could have a significant rounding error.

You must now use the averaging facility within Hindsite to average the required number of samples (40 for Lee). You can change the number of samples you average over at any later date as all the raw samples will be stored by Hindsite.

This is the preferred way to work if you wish to measure on several frequencies at the same time and over the same area. You would need to change x to be the distance divided by the number of frequencies. For example to measure on two frequencies in the example above you would set a distance of 6 cm.

Guide to avoiding problems

There are some principles that, if you follow, should avoid most of the problems in setting the Acquisition tab.

Things to avoid

Using distance triggering with time sampling.

Using distance sampling with short distances compared to the resolution of your distance transducer.

Using sampling or triggering settings that mean the Griffin is triggered at the same instant that the measurement is finished.

Things to do

Check the distance transducer resolution and calculate the impact of your distance settings.

Plan the measurements that you need thinking both in terms of time and distance. Remember to allow for 1 ms for the Griffin to retune between frequencies.

To achieve the maximum number of frequencies per second use single sampling as it is much faster than mean.

Antenna Factor Files

B

This appendix describes the syntax for antenna factor files, which can be used to compensate the frequency-dependent antenna loss or gain.

You can convert your measurements from signal strength in dBm or dBμV to field strength in dBm/m or dBμV/m. To do so you must prepare a file containing the antenna factors for your antenna as a function of frequency. The file must be in a folder called 'Antenna' located in the Hindsite folder. You should give each file a name that allows you to identify the antenna. The extension of the file is not used by Hindsite so can be anything you wish.

The format of the file is as follows:

```
Frequency(Hz)    [Tab]  Antenna Factor(dB)

Frequency(Hz)    [Tab]  Antenna Factor(dB)

Frequency(Hz)    [Tab]  Antenna Factor(dB)
```

For example,

```
1700000000        +10.5

1950000000        +11.5

2000000000        +12.7
```

The frequencies must be in ascending order and there must not be a blank line at the start of the file.

You can put just one frequency in the file and then its antenna factor will be used at all frequencies.

You can use as many lines as you wish but, unless the antenna varies very quickly over frequency, one every 10 or 20 MHz will probably be sufficient. When the measurement frequency lies between two of the frequencies in the file Hindsite uses linear interpolation between the factors to calculate the factor for the measurement frequency. If the antenna factor of the antenna does not vary much between the two points then linear interpolation will give an accurate result. If it does vary much, then you should add more points to retain the accuracy.

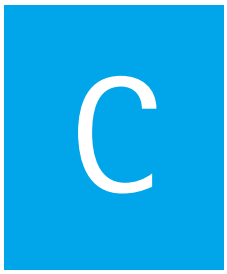
If the measurement frequency is above the maximum frequency in the file, then the antenna factor for the maximum frequency is used. (Hindsite does not extrapolate the antenna factors). Conversely, if the measurement frequency is below the minimum frequency in the file, then the antenna factor for the minimum frequency is used.

If the file is not in the expected format, then no antenna factor is applied. Willtek recommends that you check that the factors are being applied properly before making measurements using the antenna factors file.

The antenna factor is added to the reading from the instrument. This has the effect of changing the units of the reading from dB to dB/m, so for example, readings in dBm would be changed to dBm/m.

The antenna factor can either use a comma or a stop as the decimal point character.

Converting FSS Run Files



This appendix describes how FSS run files can be converted to Hindsite drive test result files.

Run files produced by Willtek's Field Surveying Software (FSS) can be converted to Hindsite drive test result files. These must be FSS version 8 files.

Within Hindsite, select the **File** > **Import FSS File...** menu  . Select, from the dialog, the file you wish to convert, click **OK** and then choose, in the subsequent dialog, a name to be given to the converted file.

Click **OK** again and the file will be converted. The converted file may then be treated as any other drive test results file except that, due to some missing information, the file cannot be replayed by Hindsite.

Options and Hardware Configurations

D

This appendix describes useful options and the various supported hardware configurations of Hindsite. Topics include:

Introduction

There are many different hardware configurations for Hindsite covered in this appendix. These are supplied by Willtek as combinations of options. You can choose which configuration best suits your measurement needs and then order the required options to complete that configuration. The first section of this appendix describes the options and the second section describes how to assemble the systems.

Options

Wheel kits

A wheel kit consists of a distance transducer and the parts necessary to fix it to the wheel of a vehicle. The distance transducer mounts onto a wheel plate. The wheel plate mounts onto a set of clamping sockets which clamp onto the wheel nuts which hold the wheel onto the vehicle. Each wheel plate has slots in it to suit wheel nuts at different radii.

Willtek can supply wheel plates to suit vehicles with four, five or six wheel nuts, and clamping sockets to fit the majority of standard wheel nuts.

The standard wheel kits fit most common sizes of wheel used on motor cars. Alternative sizes of socket and wheel plate are available on request as follows:

Table 5

Item	Description
WHC22	Set of five 22 mm AF clamping sockets
WHC22	Set of five 26 mm AF clamping sockets
WHC26	Set of five 27 mm AF clamping sockets
WHC27	Five-slot wheel plate, large, 75-97R
WHP5L	Six-slot wheel plate, 49-89R

Carefully read the assembly instructions and the "Safety notes" on page ii before using a wheel kit.

WHK1

The standard wheel kit (WHK1) supplied for use with the GPR options consists of:

Table 6

Item	Description
WHT2A	Distance transducer (100 pulses per revolution)
WHC17	Set of five 17 mm AF clamping sockets
WHC19	Set of five 19 mm AF clamping sockets

Table 6

Item	Description
WHC21	Set of five 21 mm AF clamping sockets
WHP4	Four-slot wheel plate, 46-74R
WHP5S	Five-slot wheel plate, small, 46-74R

WHK5 The standard wheel kit (WHK5) supplied for use with the Griffin options consists of:

Table 7

Item	Description
WHT5	Distance transducer (500 pulses per revolution)
WHC17	Set of five 17 mm AF clamping sockets
WHC19	Set of five 19 mm AF clamping sockets
WHC21	Set of five 21 mm AF clamping sockets
WHP4	Four-slot wheel plate, 46-74R
WHP5S	Five-slot wheel plate, small, 46-74R

GPR Distance Option

This option adds distance input to Hindsite when used with a GPR series receiver. It allows you to make measurements spaced accurately apart in distance. When combined with option HST-GPS455/GPR, it also allows you to improve the accuracy of your navigation with dead reckoning.

This option comprises:

Table 8

Item	Description
WHK1	Wheel kit, containing a distance transducer (WHT2A) and wheel mounting plates.
PPA9306	Interface box
IL2713	Vehicle power lead for the GPR
IL2937	Serial data lead for the GPR
IL5300	PPA power-in and pulses-out cable
IL8317	Four-way power distribution cable

To complete the system you will also need a GPR series receiver.

HST-PPA/GPR

This option (available on request only) adds distance input to Hindsite when used with a GPR series receiver. This option is **only** suitable for use when upgrading an earlier FSS system where you already have a WK1 wheel kit, IL2713 cable and IL2937 cable.

This option comprises:

Table 9

Item	Description
PPA9306	Interface box
IL5300	PPA power-in and pulses-out cable
IL8317	Four-way power distribution cable

To complete the system you will also need:

Table 10

Item	Description
WHK1 (or alternative)	Wheel kit, containing a distance transducer (WHT2A) and wheel mounting plates.
GPR series receiver	
IL2713	Vehicle power lead for the GPR
IL2937	Serial data lead for the GPR

With this system you can also use a JRC JLR3310 (Willtek option HST-GPS3310), Trimble Placer 455 (Willtek option HST-GPS455/GPR) or NMEA-compatible navigation receiver for which you would need suitable leads.

SMR Distance Option

This option adds distance input to Hindsite when used with an SMR (Griffin) series receiver. It allows you to make measurements spaced accurately apart in distance. When combined with option HST-GPS455/SMR, it also allows you to improve the accuracy of your navigation with dead reckoning.

This option comprises:

Table 11

Item	Description
WHK5	Wheel kit, containing a distance transducer (WHT5) and wheel mounting plates.
IL8317	Four-way power distribution cable

To complete the system you will also need:

Table 12

Item	Description
Griffin series receiver	
IL8119	Vehicle power lead for the Griffin (supplied with the Griffin)
G994203	Serial data lead for the Griffin (supplied with the Griffin)

With this system you can also use a JRC JLR3310 (option HST-GPS3310), Trimble Placer 455 (option HST-GPS455/SMR) or NMEA-compatible navigation receiver for which you would need suitable leads.

Trimble 455 GPS Option

This option adds the Trimble Placer 455 GPS navigation receiver to Hindsite when used with a GPR receiver. To use the Placer 455 in dead reckoning mode you **must** have option GPR Distance Option as well.

This option comprises:

Table 13

Item	Description
Placer 455 receiver	
MagMount Antenna	Complete with lead
Heading sensor	
Trimble manual	
Trimble 30511	T-lead from Placer to MDT and RTCM connectors.
IL5544/1	RS-232 cable
IL5545	Modified Trimble interconnection lead 30513
IL5599	Power lead for Placer modified from Trimble lead 30514

To complete the system for use with a GPR receiver you will also need:

Table 14

Item	Description
HST-DT/GPR	Hindsite distance option for the GPR
GPR series receiver	

HST-GPS455/SMR

This option, available on special request only, adds the Trimble Placer 455 GPS navigation receiver to Hindsite when used with a Griffin receiver. To use the Placer 455 in dead reckoning mode you **must** have option HST-DT/SMR as well.

This option comprises:

Table 15

Item	Description
Placer 455 receiver	
MagMount Antenna	Complete with lead
Heading sensor	
Trimble manual	
Trimble 30511	T-lead from Placer to MDT and RTCM connectors.
IL5544/1	RS-232 cable
IL8312	Modified Trimble interconnection lead 30513
IL5599	Power lead for Placer modified from Trimble lead 30514

To complete the system for use with an SMR (Griffin) receiver you will also need:

Table 16

Item	Description
HST-DT/SMR	Hindsite distance option for the SMR
Griffin series receiver	
IL8119	Vehicle power lead for the Griffin (supplied with the Griffin)
G994203	Serial data lead for the Griffin (supplied with the Griffin)

JRC GPS Option

This option is no longer available as the JLR3310 is obsolete. This section is retained for people who already have a JLR3310 and would like to use it with Hindsite.

You can use the receiver with either a GPR series or an SMR (Griffin) series receiver. You can use it with either option HST-DT/SMR or HST-DT/GPR to get distance inputs as well.

This option used to comprise of:

Table 17

Item	Description
JLR3310	Part of Willtek part no. 790603
MagMount Antenna	Part of Willtek part no. 790603
JLR3310 manual	Part of Willtek part no. 790603
Floppy disk with JRC software	Part of Willtek part no. 790603
IL2713*	Vehicle power lead for the GPR
IL2937*	Serial data lead for the GPR
IL4731	Modified JRC lead with RS-232 data and RTCM connectors.
IL8317*	Four-way power distribution cable
Velcro strip	To be used to mount the receiver

Those items marked with a * are still available from Willtek as accessories.

HST-GPS35PC

This option, available on special request only, adds the Garmin GPS35PC GPS navigation receiver to Hindsite. You can use this option with either a GPR series or Griffin series receiver. You can use it with either option HST-DT/SMR or HST-DT/GPR to get distance inputs as well.

This option comprises:

Table 18

Item	Description
GPS35PC	Part of Willtek part no. 790606
MagMount	Willtek part no. 790607
GPS35PC manual	Part of Willtek part no. 790606
IL2713	Vehicle power lead for the GPR
IL2937	Serial data lead for the GPR
IL8317	Four-way power distribution cable

HST-PEDO/GPR

This option, available on special request only, adds the Willtek Pedometer to Hindsite when used with a GPR receiver.

This option comprises:

Table 19

Item	Description
PPA9306	Interface box
IL4885	Pedometer
IL4861	Combined serial and parallel data lead from the PPA to the computer
IL4862	Data lead from the PPA to the GPR
IL4890	Computer carrying tray with straps

Hardware configurations

Vehicle power

All of the Hindsite systems can be powered from a vehicle 12 V supply. To provide a convenient way of connecting several pieces of equipment to the vehicle's supply, Willtek provides a lead, IL8317, which plugs into the cigar lighter socket of a vehicle and has four cigar lighter sockets as outlets.

Although there seem to be few problems reported, the cigar lighter socket was not designed to be a reliable connector for electronic equipment. Therefore, to ensure maximum reliability, Willtek recommends that a well-engineered and fused supply is built into the vehicle and used to power the Hindsite system.

Willtek recommends that you start the vehicle before turning the Hindsite system on. This avoids any problems due to large voltage drops during starting.

Powering the PC

To power the PC from the vehicle supply usually needs an adapter. Some adapters can be connected to the vehicle supply, others need an inverter to convert the 12 V DC to 120 or 240 V AC. Where Willtek supplies the PC Willtek can also supply the necessary adapters. In other cases, please refer to the PC supplier or manufacturer for advice and suitable adapters.

System differences

Each of the Hindsite hardware configurations has differences from the others. This section addresses the main differences that apply to many of the systems.

Systems with distance measuring ability

Systems with distance input allow you to specify the spacing of your measurements in terms of distance or time. Additionally, the system with the Griffin receiver allows you to specify the sample spacing in terms of distance.

When using distance input with the GPR series of receivers the system includes a PPA9306 interface box to condition the pulses from the distance transducer before they are input to the PC. The PC counts the pulses and triggers a measurement in the GPR at the appropriate time.

When using distance input with the Griffin series of receivers the system does not need a PPA9306 as the pulse conditioning and counting is done inside the Griffin.

Systems without distance measuring ability

Without distance measuring ability you are only able to specify the spacing of your measurements in terms of time. The only differences between the systems that use the GPR or Griffin are the power and data leads for the receivers. These leads are supplied with the receivers rather than with any of the Hindsite options.

Systems with JRC JLR3310 GPS receiver

There are four variants of Hindsite system using the JRC JLR3310 navigation receiver, two for the GPR series of measuring receivers and two for the SMR (Griffin) series of measuring receivers. With each measuring receiver, there is a system with, and a system without distance measuring ability.

The navigation receiver is supplied with a lead, IL4731, which connects power to the receiver and data to the serial port of the PC.

The JLR3310 is able to accept differential corrections via a connector on lead IL4731. Willtek does not supply the leads or data receiver for differential corrections as these vary from country to country. Please refer to the JLR3310 manual for information about connecting a differential receiver.

The following table lists the Hindsite options required to complete these systems.

Table 20

System	Options Required
GPR with distance	JRC GPS Option and GPR Distance Option
GPR without distance	JRC GPS Option
Griffin with distance	JRC GPS Option and HST GPR Distance Option
Griffin without distance	JRC GPS Option

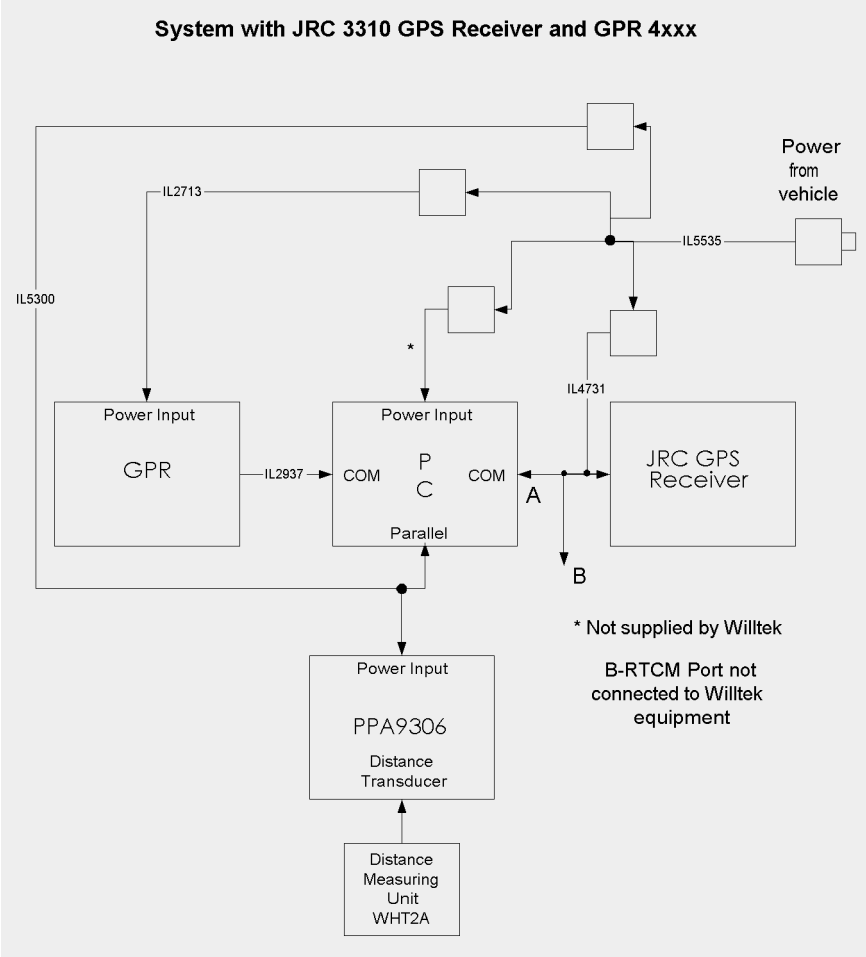
Note

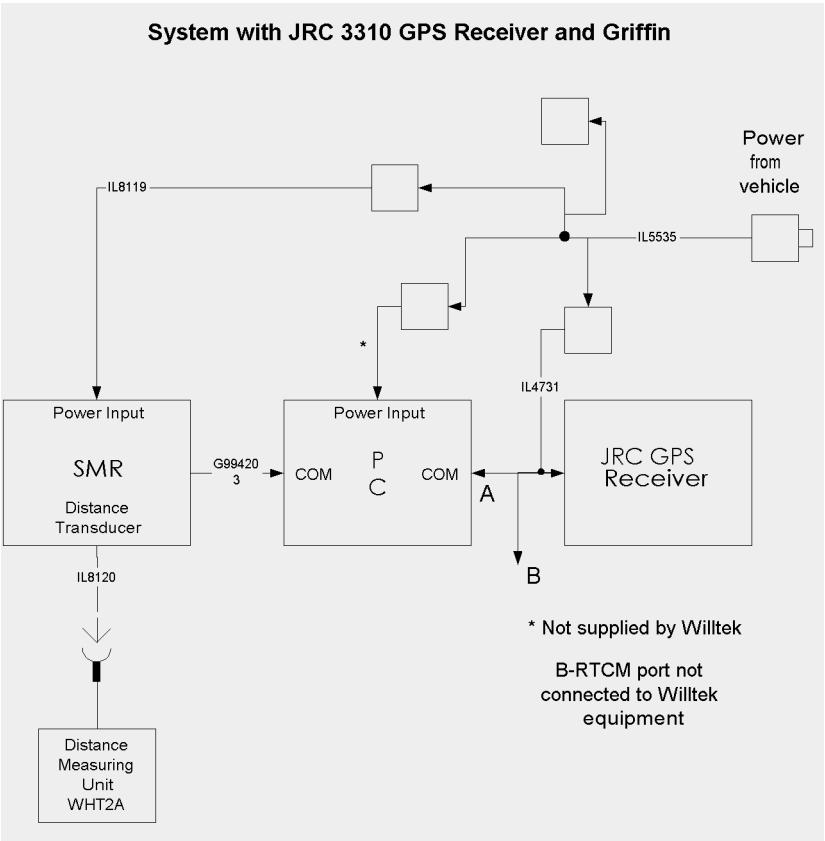
The JRC GPS Option is no longer available.

Connect your chosen system as shown in the following figures.

For a GPR system without distance omit the WHT2A, PPA9306 and IL5300 items.

For a Griffin system without distance omit the WHT5.


System with JRC 3310 GPS Receiver and GPR 4xxx
Power from vehicle
IL2713
IL5535
IL5300
*
IL4731
Power Input
GPR
IL2937
Power Input
COM
P
C
COM
Parallel
A
B
JRC GPS Receiver
* Not supplied by Willtek
B-RTCM Port not connected to Willtek equipment
Power Input
PPA9306
Distance Transducer
Distance Measuring Unit WHT2A


System with JRC 3310 GPS Receiver and Griffin
Power from vehicle
IL8119
IL5535
*
IL4731
Power Input
SMR
Distance Transducer
G99420 3
Power Input
COM
P
C
COM
A
B
JRC GPS Receiver
IL8120
* Not supplied by Willtek
B-RTCM port not connected to Willtek equipment
Distance Measuring Unit WHT2A

Systems with NMEA compatible navigation receivers

There are four variants of Hindsite system using an NMEA compatible navigation receiver, two for the GPR series of measuring receivers and two for the SMR (Griffin) series of measuring receivers. With each measuring receiver, there is a system with, and a system without distance measuring ability.

Willtek does not supply any NMEA compatible navigation receivers, but does supply a serial data lead, IL4860, which can be used to connect the receiver to the PC.

The following table lists the Hindsite options required to complete these systems.

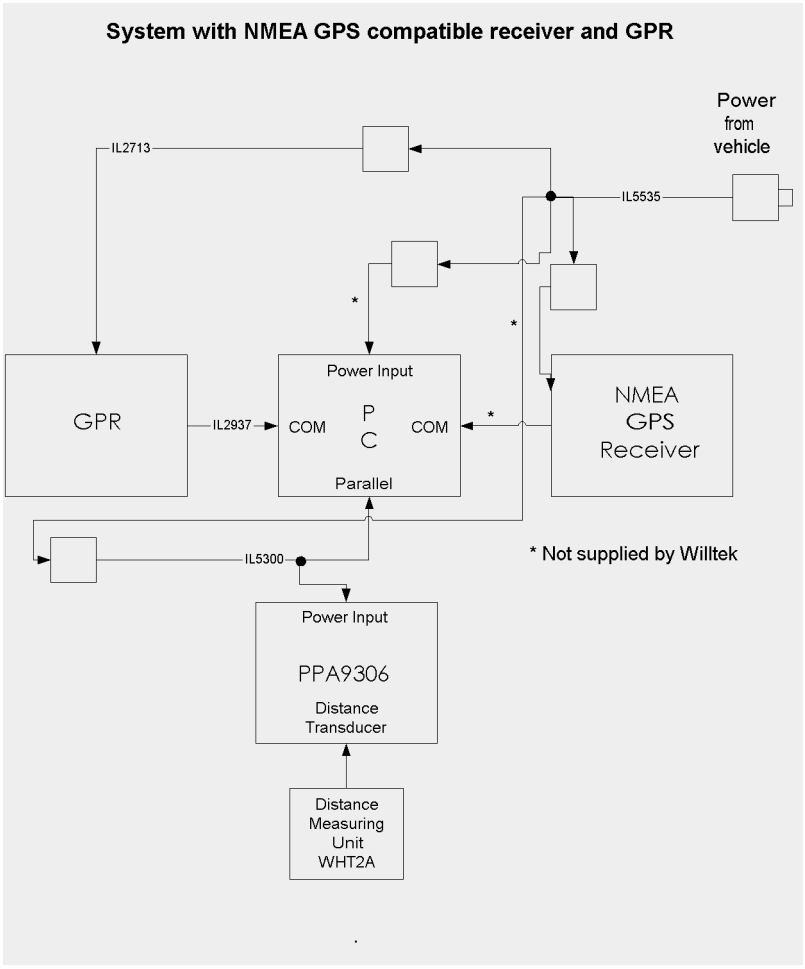
Table 21

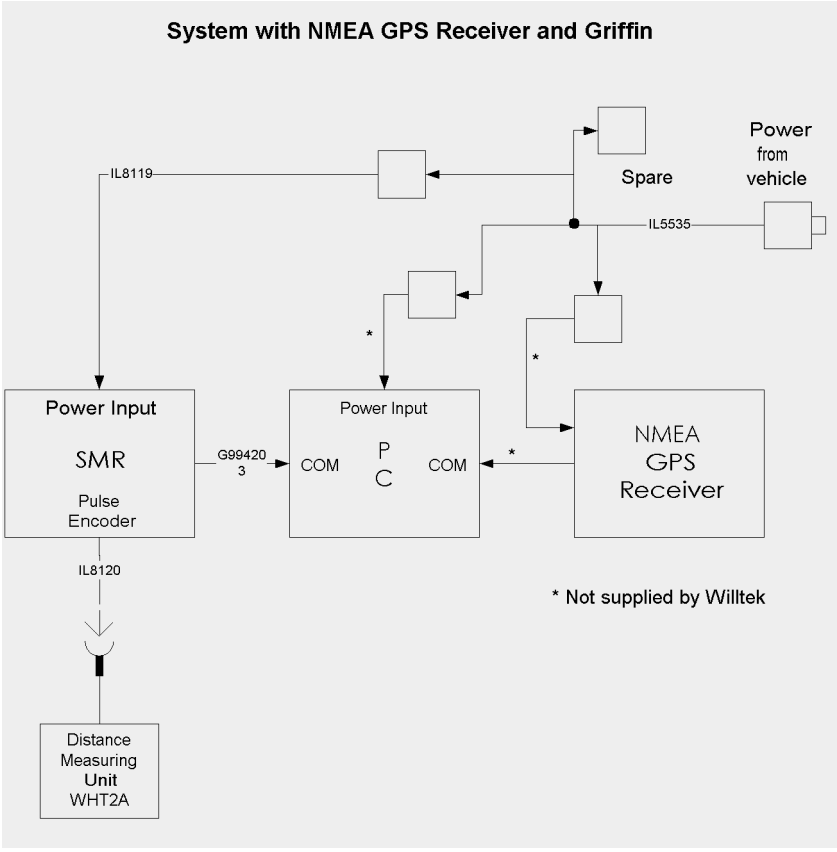
System	Options required
GPR with distance	GPR Distance Option
GPR without distance	IL5535 (multiway power lead)
Griffin with distance	SMR Distance Option
Griffin without distance	IL5535 (multiway power lead)

Connect your chosen system as shown in the following figures.

For a GPR system without distance omit the WHT2A, PPA9306 and IL5300 items.

For a Griffin system without distance omit the WHT5.


System with NMEA GPS compatible receiver and GPR
Power from vehicle
IL2713
IL5535
*
*
GPR
IL2937
Power Input
COM
P C
COM
Parallel
*
NMEA GPS Receiver
IL5300
* Not supplied by Willtek
Power Input
PPA9306
Distance Transducer
Distance Measuring Unit WHT2A


System with NMEA GPS Receiver and Griffin
Power from vehicle
Spare
IL8119
IL5535
*
*
Power Input
SMR
Pulse Encoder
G99420 3
Power Input
COM
P C
COM
*
NMEA GPS Receiver
IL8120
* Not supplied by Willtek
Distance Measuring Unit WHT2A

Systems with JRC GPS35PC GPS receiver

There are four variants of Hindsite system using the Garmin GPS35PC navigation receiver, two for the GPR series of measuring receivers and two for the SMR (Griffin) series of measuring receivers. With each measuring receiver, there is a system with, and a system without distance measuring ability.

The following table lists the Hindsite options required to complete these systems.

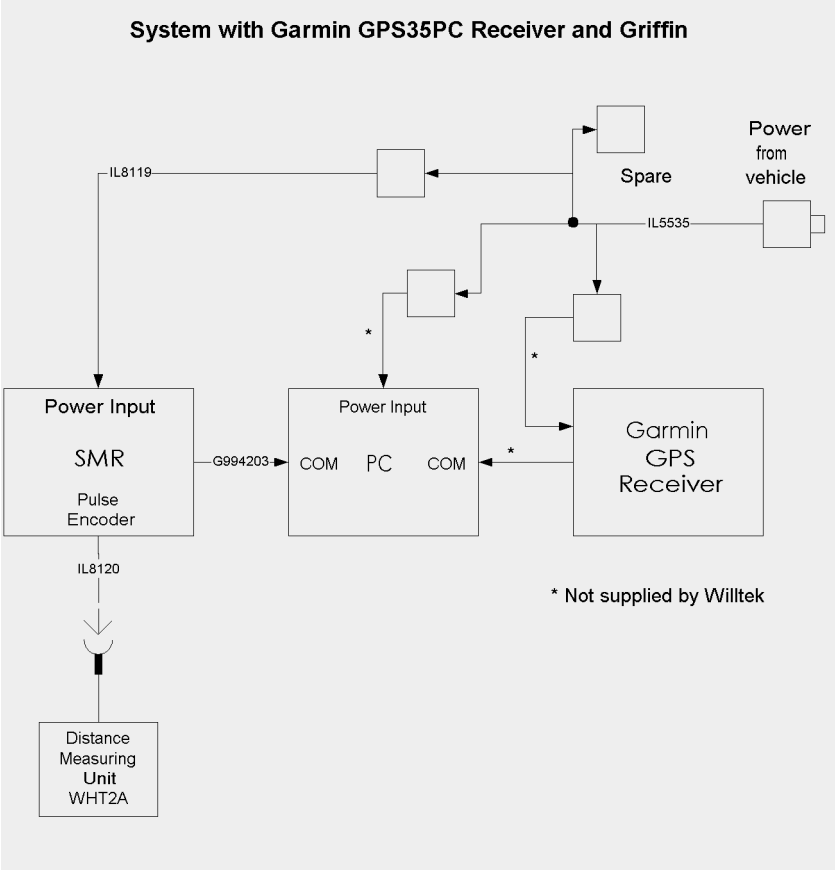
Table 22

System	Options required
GPR with distance	HST-GPS33PC and GPR Distance Option
GPR without distance	HST-GPS35PC
Griffin with distance	HST-GPS35PC and SMR Distance Option
Griffin without distance	HST-GPS35PC

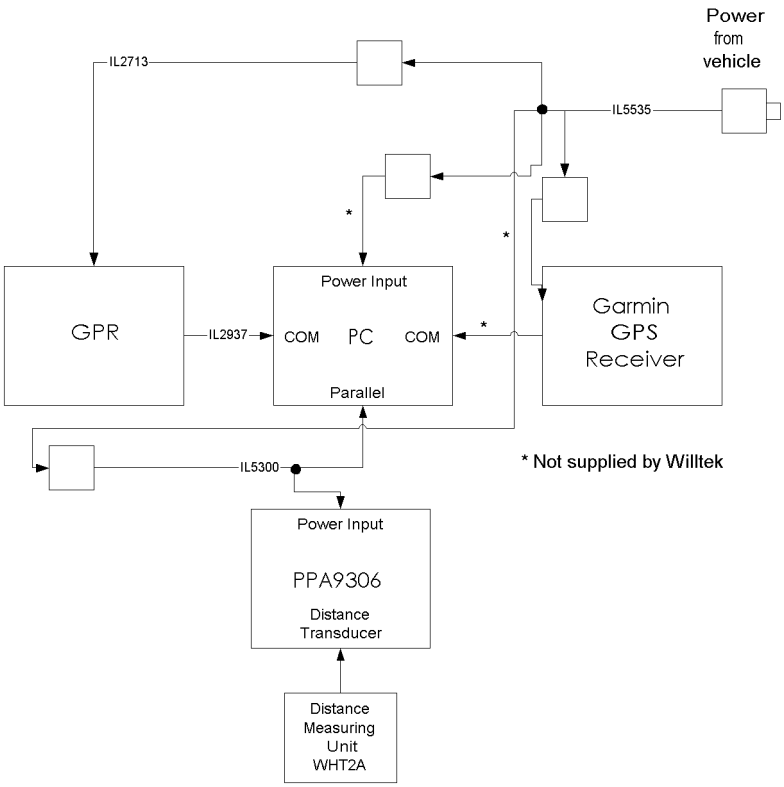
Connect your chosen system as shown in the following figures.

For a GPR system without distance omit the WHT2A, PPA9306 and IL5300 items.

For a Griffin system without distance omit the WHT5.



System with Garmin GPS35PC Receiver and GPR



Systems with Trimble Placer 455 GPS receiver

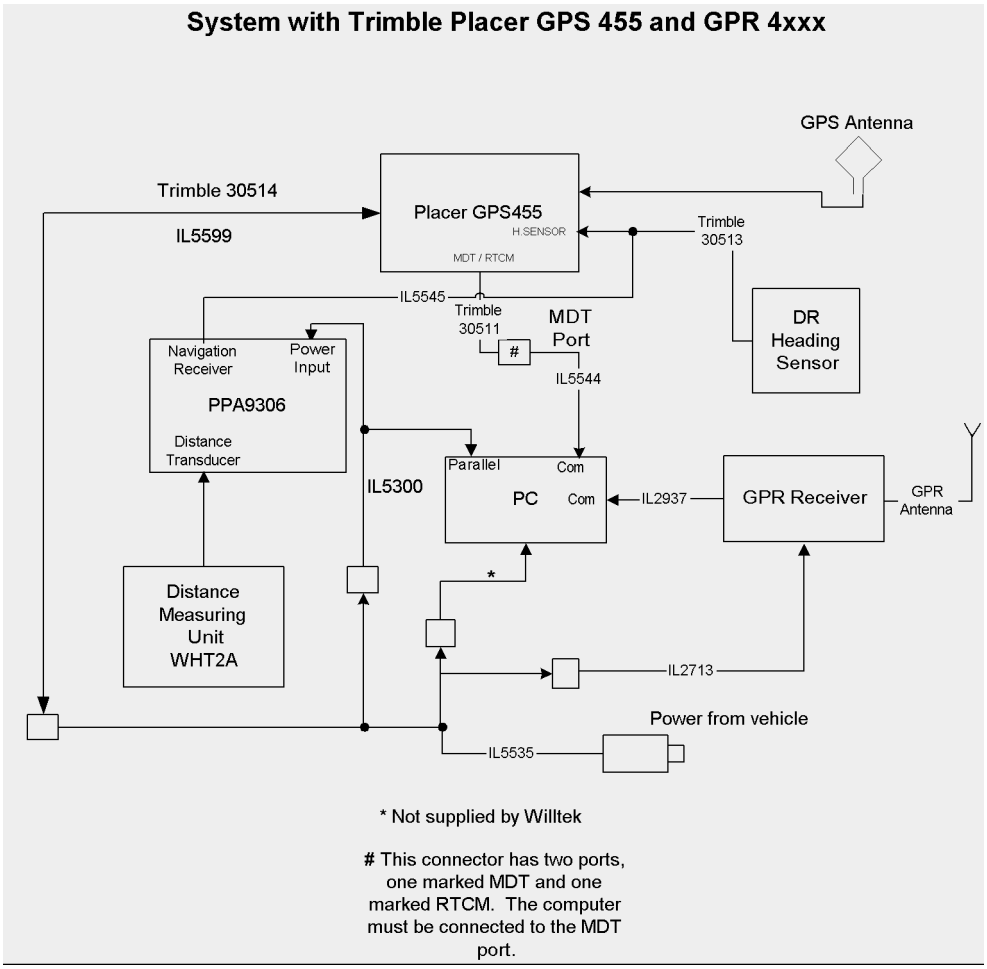
There are two variants of Hindsite system using the Trimble Placer 455 navigation receiver, one for the GPR series of measuring receivers and one for the SMR (Griffin) series of measuring receivers. Both systems have distance measuring ability.

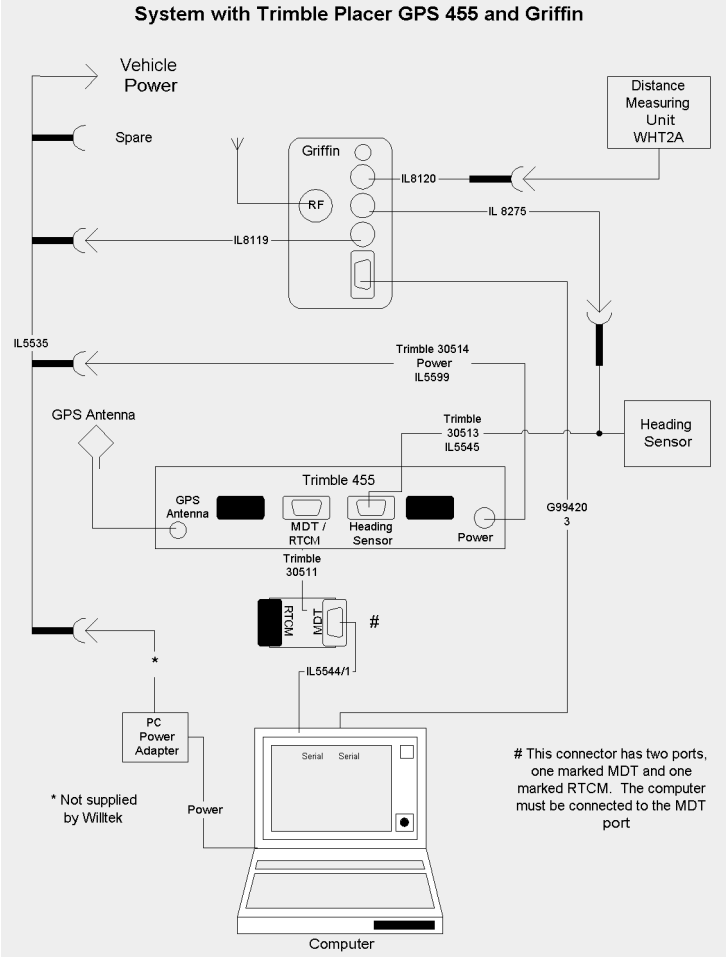
The system for use with an GPR series of receivers includes the PPA9306 interface box. The system for use with an SMR (Griffin) series of receiver does not need the PPA9306.

The following table lists the Hindsite options required to complete these systems.

Table 23

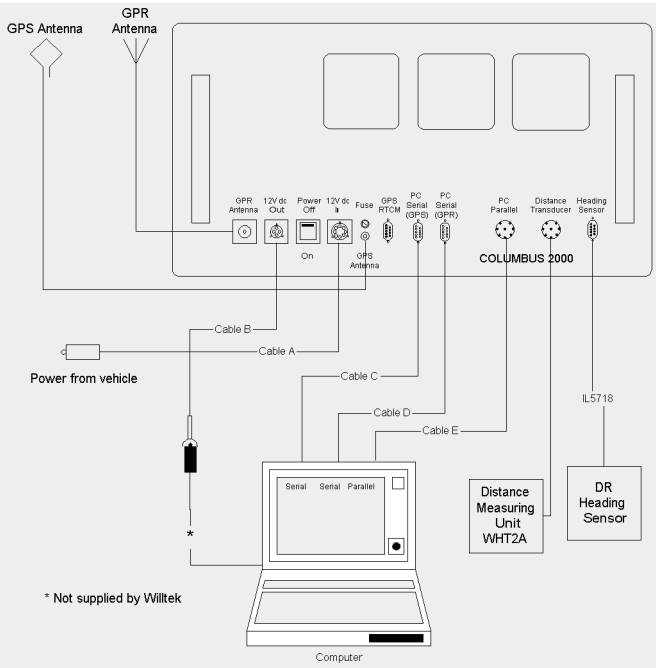
System	Options required
GPR	Trimble 455 GPR Option and GPR Distance Option
Griffin	HST-GPS455/SMR and SMR Distance Option


System with Trimble Placer GPS 455 and GPR 4xxx
GPS Antenna
Trimble 30514
IL5599
Placer GPS455
H.SENSOR
MDT / RTCM
Trimble 30513
IL5545
Trimble 30511
MDT Port
#
DR Heading Sensor
Navigation Receiver
Power Input
PPA9306
Distance Transducer
IL5544
IL5300
Parallel
Com
PC
Com
IL2937
GPR Receiver
GPR Antenna
*
Distance Measuring Unit WHT2A
IL2713
Power from vehicle
IL5535
* Not supplied by Willtek
# This connector has two ports, one marked MDT and one marked RTCM. The computer must be connected to the MDT port.


System with Trimble Placer GPS 455 and Griffin
Vehicle Power
Spare
Griffin
RF
IL8120
IL 8275
IL8119
Distance Measuring Unit WHT2A
IL5535
Trimble 30514 Power IL5599
GPS Antenna
Trimble 30513 IL5545
Heading Sensor
Trimble 455
GPS Antenna
MDT / RTCM
Heading Sensor
Power
G994203
Trimble 30511
RTCM
MDT
#
*
IL5544/1
PC Power Adapter
Serial Serial
* Not supplied by Willtek
Power
This connector has two ports, one marked MDT and one marked RTCM. The computer must be connected to the MDT port
Computer

Columbus 2000 System

The Columbus 2000 system, also know as FSS 888, was originally supplied to work with the FSS software. It packages a Trimble Placer 455, PPA9306 and interconnecting cables into one box that also houses a GPR receiver. The Columbus 2000 will work unmodified with the Hindsite software. It is only suitable for use with a GPR series receiver.



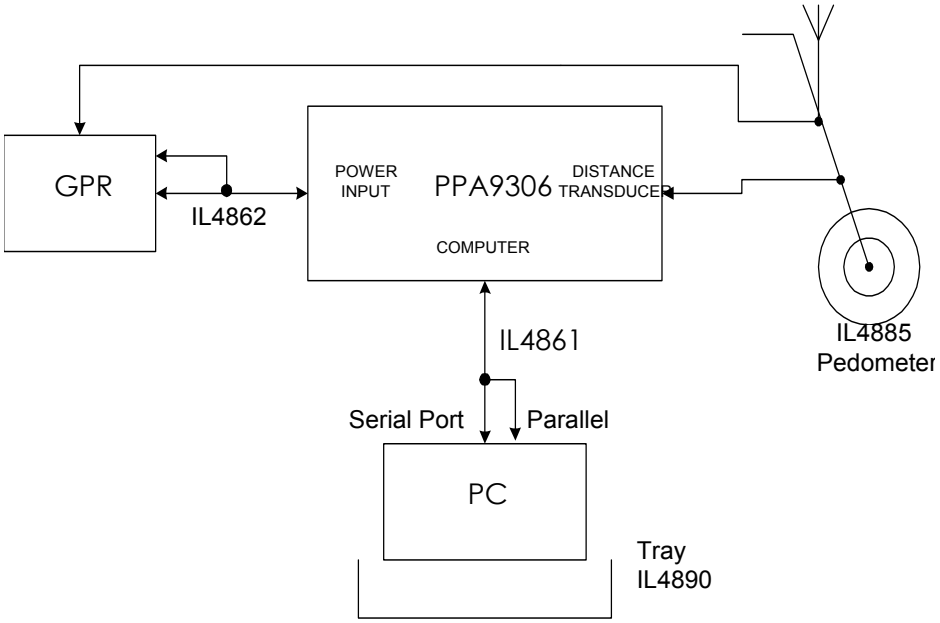
Cable	1.8m System	3.5m System
A	IL4061	IL5717
B	IL5719/1	IL5719/2
C	IL5544/1	IL5544/2
D	IL2937	IL5716
E	IL5715/1	IL5715/2

Columbus 2000 Interconnection Diagram

Pedometer system

The pedometer system is designed for surveys in shopping malls and similar places. At present this is not suitable for use with the Griffin series of receivers. The PPA9306 can be housed in the converter portion of a GPR+converter leather case.

System with Pedometer and GPR



Adapting older systems

If you have a distance transducer and wheel kit that you would like to use with a new Griffin receiver, then you will need adapter leads. There are two leads available with suitable connectors at each end.

Table 24

Adapter	Function
IL8120	Distance transducer (WHT2A) to Griffin Pulse Enc. input.
IL8275	Modified Trimble 455 cable to Griffin Pulse Enc. input.

Fitting the Wheel Transducer

E

This appendix describes how to set up the wheel transducer.

Follow the steps below to install the wheel transducer:

1. Fit clamping sockets to the wheel plate on the opposite side from the studs. This is achieved by holding a clamping socket in one hand and carefully removing the screw along with both large and small washers. Pass the screw through the wheel plate and screw it back into the clamping socket. Both washers should be under the head of the screw. Do not tighten at this stage. Repeat for each clamping socket.
2. Fit above assembly onto one of the vehicle's rear wheels, ensuring **all** of the clamping sockets fit **right down** over the wheel nuts.
3. Fit the circular plate on the wheel transducer to the studs of the wheel plate and **tighten fully.**
4. Fit the 'G' clamp to a convenient position on the wheel arch and lead the cable into the vehicle.
5. Ensure that **all** screws are **tight** and that the assembly is **secure** before each run.
6. Read the safety warnings at the beginning of this manual before using a vehicle with the wheel transducer fitted.

Changes from Earlier Releases

This appendix contains the change history of Hindsite.

Introduction

Willtek has a programme for continuous improvement of Hindsite, adapting it to meet evolving measurement needs and requests from customers. As a result of this programme, each release of Hindsite incorporates changed features. This appendix outlines the most significant changes made to the Hindsite system in recent releases; it does not list every change.

Release 2.20, June 2004

New features

Decimal degrees added to the coordinate system choice.

Time-triggered route tracing now available.

Map legends can now be saved and loaded (range and color presentations).

Signia format export facility used by Aircom Asset tool.

Upgrade of Run Data Notes.

Composite coverage map and table added.

The ability to add distance to time-triggered runs based on GPS coordinates. Accurate to within 10%.

In multiple frequency runs, the ability to remove a frequency from either the Best Server or Composite Coverage map views.

Selectable COM ports now up to 12.

Level Detect on GPR now automatically set to 5 ms.

New demo files added.

New fields added; Best Signal, Best Frequency, GPS Distance.

Problems resolved

Route trace button disabled during configuration and run.

Shortcut key for close is now Ctrl-F4.

Spectrum analyzer tab for Willtek 8300 Griffin disabled.

Fixed error 2006 which related to database for menu items and icons.

Release 2.10, March 2003

Changes made Willtek 8382 Up-Converter has been added to the converter list.

Compatibility Hindsite is fully compatible with Windows 2000 and Windows XP now.

Release 2.00, July 2002

Changes made A new, general-purpose marker replaces the markers from previous versions (position marker, suspect point marker, suspect region marker).

In-building plans can be imported now.

Outdoor and in-building route tracing allow mapping of results to routes.

Changing the coordinate system between WGS-84 and local coordinates is supported now.

Reliability The reliability of Hindsite has been improved in many ways.

Compatibility There are no compatibility issues.

Release 1.30, July 2001

Changes made

GPR Down Converter added Allowance is now made for a 8181 GPR Down Converter (1700 to 2500 MHz) (formerly GFC 4950) being attached to a 8301 Griffin Fast Measurement Receiver (formerly SMR 9010).

Garmin GPS35PC hardware option added This GPS navigation receiver is now available as a Hindsite option.

JRC GPS3310 option obsolete This GPS receiver is now obsolete so it is no longer offered as an option with Hindsite. (Existing receivers will continue to be supported until July 2002.)

Reliability Various changes have been made to improve the reliability of Hindsite.

Compatibility The configuration and result files have not been changed so there should be no compatibility issues.

Release 1.20, December 2000

Changes made

Performance Various changes have been made to improve the performance and reliability of Hindsite. These are, in general, not obvious to the user but impact on most areas.

Options Some of the hardware options have been changed as a result of a decision by Willtek to handle them in a different way. This has resulted in two versions of most options, one dedicated to the GPR and the other to the Griffin receiver. The pedometer options are new.

Licence The licensing system has been simplified and changed to offer three versions of Hindsite - Demo, Viewer and Full.

Installation Installation on NT4 is now automatic so there is no longer a need for a patch.

Compatibility

The configuration and result files have not been changed so there should be no compatibility issues.

The changes to the hardware options have created the potential for incompatible connectors but suitable adapter leads are available from Willtek. (See section "Options" on page 116).

Warranty and Repair

G

This chapter describes the customer services available through Willtek. Topics discussed in this chapter include the following:

Warranty information

Willtek warrants that all of its products conform to Willtek's published specifications and are free from defects in materials and workmanship for a period of one year from the date of delivery to the original buyer, when used under normal operating conditions and within the service conditions for which they were designed. This warranty is not transferable and does not apply to used or demonstration products.

In case of a warranty claim, Willtek's obligation shall be limited to repairing, or at its option, replacing without charge, any assembly or component (except batteries) which in Willtek's sole opinion proves to be defective within the scope of the warranty. In the event Willtek is not able to modify, repair or replace nonconforming defective parts or components to a condition as warranted within a reasonable time after receipt thereof, the buyer shall receive credit in the amount of the original invoiced price of the product.

It is the buyer's responsibility to notify Willtek in writing of the defect or nonconformity within the warranty period and to return the affected product to Willtek's factory, designated service provider, or authorized service center within thirty (30) days after discovery of such defect or nonconformity. The buyer shall prepay shipping charges and insurance for products returned to Willtek or its designated service provider for warranty service. Willtek or its designated service provider shall pay costs for return of products to the buyer.

Willtek's obligation and the customer's sole remedy under this hardware warranty is limited to the repair or replacement, at Willtek's option, of the defective product. Willtek shall have no obligation to remedy any such defect if it can be shown: (a) that the product was altered, repaired, or reworked by any party other than Willtek without Willtek's written consent; (b) that such defects were the result of customer's improper storage, mishandling, abuse, or misuse of the product; (c) that such defects were the result of customer's use of the product in conjunction with equipment electronically or mechanically incompatible or of an inferior quality; or (d) that the defect was the result of damage by fire, explosion, power failure, or any act of nature.

The warranty described above is the buyer's sole and exclusive remedy and no other warranty, whether written or oral, expressed or implied by statute or course of dealing shall apply. Willtek specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. No statement, representation, agreement, or understanding, oral or written, made by an agent, distributor, or employee of Willtek, which is not contained in the foregoing warranty will be binding upon Willtek, unless made in writing and executed by an authorized representative of Willtek. Under no circumstances shall Willtek be liable for any direct, indirect, special, incidental, or consequential damages, expenses, or losses, including loss of profits, based on contract, tort, or any other legal theory.

Equipment return instructions

Please contact your local service center for Willtek products via telephone or web site for return or reference authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- Serial number, product type, and model.
- Warranty status. (If you are unsure of the warranty status of your instrument, include a copy of the invoice or delivery note.)
- Detailed description of the problem or service requested.
- Name and telephone number of the person to contact regarding questions about the repair.
- Return authorization (RA) number or reference number.

If possible, return the equipment using the original shipping container and material. Additional Willtek shipping containers are available from Willtek on request. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit. Willtek is not liable for any damage that may occur during shipping. The customer should clearly mark the Willtek-issued RA or reference number on the outside of the package and ship it prepaid and insured to Willtek.

End-User License Agreement

This appendix describes the conditions for using the software.

All copyrights in and to the software product are owned by Willtek Communications or its licensors. The software is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties.

This end-user license agreement grants you the right to use the software contained in this product subject to the following restrictions. You may not:

(i) use the software and/or any copy of the software in different computers concurrently, unless the software is an update that has been downloaded from the Internet at www.willtek.com;

(ii) copy the software, except for archive purposes consistent with your standard archive procedures;

(iii) transfer the software to a third party apart from the entire product;

(iv) modify, decompile, disassemble, reverse engineer or otherwise attempt to derive the source code of the software;

(v) export the software in contravention of applicable export laws and regulations of the country of purchase;

(vi) use the software other than in connection with operation of the product.

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Publication History

Revision	Comment
0207-200-A	New general-purpose marker. In-building plans can be imported. Outdoor and in-building route tracing for mapping. Coordinate system change between WGS-84 and local coordinates supported.
0303-210-A	8382 Griffin Up-Converter supported now. Hindsite is fully compatible with Windows 2000 and Windows XP.
0406-220-A	New features: Composite coverage map and table; time-triggered route tracing; Signia format; decimal degrees coordinate system. Extended map view editor.

Willtek Worldwide Offices

West Europe/Middle East/Africa

Willtek Communications GmbH
Gutenbergstr. 2–4
85737 Ismaning
Germany

info@willtek.com

Willtek Communications SARL
Aéropôle – Bâtiment Aéronef
Rue de Copenhague – BP 9001
95728 Roissy CDG Cédex
France

willtek.fr@willtek.com

Willtek Communications Ltd.
Roebuck Place, Roebuck Road
Chessington
Surrey KT9 1EU
United Kingdom

willtek.uk@willtek.com

North America/Latin America

Willtek Communications Inc.
7369 Shadeland Station Way, Suite 200
Indianapolis, IN 46256
USA

willtek.us@willtek.com

Asia Pacific

Willtek Communications
22, Malacca Street
#09-00, Royal Brothers Building
Raffles Place
Singapore 048980

willtek.ap@willtek.com

Manual ident no. M 294 825
Manual version 0406-220-A
English

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