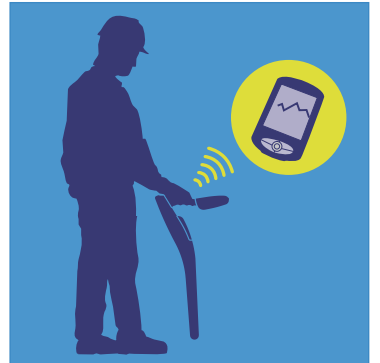


RD8000 SurveyCERT™

Real-time analysis software
for Pocket PCs and Desktop
systems



Operation Manual | Issue 3 | November 2009



Radiodetection
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Preface

Before you begin

Please read this user manual before installing RD8000 SurveyCERT™ to your PC or PDA.

Read your Pocket PC user documentation thoroughly before attempting to pair the RD8000 locator to your Pocket PC or similar device.

Note that this manual and all its contents are subject to change. Radiodetection products are under continuous development.

Radiodetection Limited reserves the right to modify the product without notice and some product changes may have taken place after this user manual was published.

Contact your local Radiodetection dealer or visit **www.radiodetection.com** for the latest information about the RD8000 product family, including this manual and the bundled software.

Important Notice

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Before using any RD8000 product (including RD8000 SurveyCERT™), the user should determine the suitability of the product for its intended use. The user assumes all risks and liability whatsoever in connection with such use.

Use of RD8000 SurveyCERT™ software is bound by license agreement, a copy of which is included in the RD8000 SurveyCERT™ download bundle.

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For more information go to **www.radiodetection.com** or contact your local Radiodetection representative.

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Section 1 – Introduction to RD8000 SurveyCERT™

1.1 Overview

RD8000 SurveyCERT™ is a Radiodetection software application for use with PCs or pocket PCs such as PDAs. Locate data can be sent from the RD8000 locator via Bluetooth, to either a PC or PDA, enabling the user to read and chart data in real-time or uploading a saved log file at a later date.

The PC version of RD8000 SurveyCERT is available as a desktop viewer using Microsoft® Windows® XP™ and Vista™. This version is optimized for larger screens but includes all the features of the PDA version, including the ability to import logged data from the locator via a *Bluetooth*® connection.

The PDA version is optimized for use on a VGA (or quarter VGA) PDA running Windows Mobile®. To maximise your experience of using RD8000 SurveyCERT, Radiodetection recommends using the software with a *Bluetooth*® and GPS enabled PDA.

RD8000 is designed to be a flexible platform that is interoperable with a broad range of industry applications.

If users are using a PC or PDA with GPS capability, RD8000 SurveyCERT can import GPS data and incorporate this information with the locate data sent from the RD8000 locator. Another application is the field of Geographic Information Systems (GIS). Broadly, GIS is a discipline dedicated to the analysis of spatial information that can be drawn from a wide range of sources, including GPS data, which is supported by RD8000 SurveyCERT™.

RD8000 SurveyCERT is a free of charge Radiodetection downloadable application which contains the following:

- This manual in PDF format
- RD8000 SurveyCERT™ for PC
- RD8000 SurveyCERT™ for PDA

Section 2 – Installing RD8000 SurveyCERT™ onto a PC or PDA

RD8000 SurveyCERT™ is a Radiodetection downloadable application and can be downloaded from the Radiodetection website by going to www.radiodetection.com/surveycert.

RD8000 SurveyCERT™ runs on either a desktop/laptop PC or a Windows Mobile powered PDA or smart phone.

2.1 System requirements

Pocket PC/PDA

RD8000 SurveyCERT has been tested on Windows Mobile up to version 6.1.

Bluetooth® wireless module.

GPS receiver (Optional).

PC

Microsoft® Windows® XP Professional with Service Pack 2.

Microsoft® Windows® Vista with Service Pack 1

USB Bluetooth® adapter*.

NOTE: Windows® XP 64bit is not supported at this time.

***NOTE: Some internal PC Bluetooth modules may not be compatible. Radiodetection recommends using a USB Bluetooth adapter.**

2.2 Installing RD8000 SurveyCERT™

When you install RD8000 SurveyCERT™ onto a PC, the following message may be displayed: “*You need to log in as Administrator*”. If this message is displayed, the installation of the program will not complete. You will need to log on as an Administrator or ask a user with Administration Rights to install the program on your behalf. Having successfully installed RD8000 SurveyCERT™, the Administrator will need to carry out the instructions in Section 9.3 if they wish users without Administrator Rights to use RD8000 SurveyCERT™.

NOTE: When RD8000 SurveyCERT™ is installed onto your PC, the PC/PDA versions and operation manual will be downloaded as a package.

1. RD8000 SurveyCERT™ can be installed using the link from: www.radiodetection.com/surveycert

2. When you click on the link to download RD8000 SurveyCERT™, a File Download Window will appear and you will have two choices:

Run: RD8000 SurveyCERT™ will automatically install.

Save: you will be given the option to save RD8000 SurveyCERT™ to a destination of your choice. Once you select the destination, RD8000 SurveyCERT™ executable program will download to that destination. Once completed you will have the option to Run or Open Folder. At this stage RD8000 SurveyCERT™ has not been installed so you can either select Run and RD8000 SurveyCERT™ will automatically install or you can choose to Open Folder. When you open the folder RD8000 SurveyCERT™ executable file will be available. To install double click on this file.

It is recommended to install RD8000 SurveyCERT™ using the Run option. The Save option can be used if you wish to download the executable file and make copies to transfer onto other PCs or Laptops.

3. RD8000 SurveyCERT™ is now installed. The PC version of RD8000 SurveyCERT can be found by going to the Windows Start Menu and selecting: Programs > RD8000 SurveyCERT > RD8000 SurveyCERT PC. To transfer the PDA version of RD8000 SurveyCERT see section 2.3.

2.3 Installing RD8000 SurveyCERT™ onto a Pocket PC

Install RD8000 SurveyCERT onto your PC (see Section 2.2). The PDA version can be found by going to the Windows Start Menu and selecting:

Programs > RD8000 SurveyCERT > Link to RD8000 SurveyCERT PDA.

To install RD8000 SurveyCERT™ on your Pocket PC device, copy the RD8000 SurveyCERTPDA.exe file, by using Microsoft® ActiveSync utility. This utility is usually installed with your Pocket PCs application suite otherwise you can download ActiveSync for free from the Microsoft® website. Consult the documentation that accompanied your Pocket PC if you require more information.

Windows Vista users please note that you must synchronize your device using Windows Mobile Device Center.

Section 3 – Basic Operation

RD8000 SurveyCERT™ is designed for rapid data capture and analysis in the field. Most functions can be accessed quickly using the toolbar. These functions are identical on the PDA and PC versions of the software.

There are several layout differences to note. The PDA version displays the file manager in a popup window and the PC uses a split window that can be adjusted using regular window handlers.

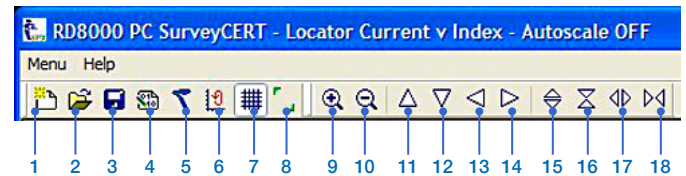
The PC version also features a Menu bar situated below the Title bar as with standard Windows applications. In the PDA version, the button is located on the Toolbar.

3.1 RD8000 SurveyCERT™ PC Version

Open RD8000 SurveyCERT™ from the Windows Start Menu. Press the Menu button to display the following options:

- Settings – opens the Settings window and the following can be accessed:
 - Grid – adjusts the number of longitude and latitude grid lines.
 - Color – adjusts background color.
 - Ports – allows users to adjust the *Bluetooth*® and GPS port settings of the application. These settings must match your PDA's *Bluetooth*® and GPS receiver ports; otherwise the application may be unable to communicate with the RD8000 locator and the GPS network.
 - Test – displays raw connection data as plain text in the main Window. Use this option to test or troubleshoot your *Bluetooth*® and GPS connections.
- X-Axis – Toggles between Index (Log) and Distance values on the x-axis.
- Restore – Restore the view to its original position and the toolbars to their default location.
- Autoscale – when On, forces the chart to automatically resize around the current data. Select Off to turn Autoscale off.
- Exit – Exits the program.

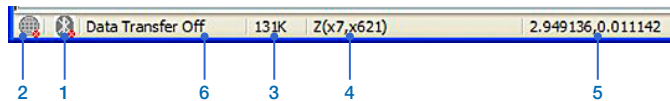
Toolbar



1. New – creates a new trace.
2. Open – opens an existing trace saved in the ENT file format.
3. Save – saves the current trace as an ENT file on your PC.
4. Logging Toggle – toggles between Waiting for Transfer or Data Transfer Off. To receive data from the RD8000 this must be set to Waiting for Transfer.
5. Locator Mode Toggle – changes the currently displayed locator mode.
6. Chart Toggle – toggles the different charts available to each Locator Mode (refer to Section 4).
7. Grid Toggle – displays a latitudinal/longitudinal grid in the main window.
8. Range Toggle – displays the latitudinal/longitudinal range in the main window.
9. Zoom In – zooms in at a selected point*.
10. Zoom Out – zooms out at a selected point*.
11. Page Up – moves the window one page up*.
12. Page Down – moves the window one page down*.
13. Page Left – moves the window one page left*.
14. Page Right – moves the window one page right*.
15. Vertical Stretch – zooms out along the Y axis*.
16. Vertical Shrink – zooms in along the Y axis*.
17. Horizontal Stretch – zooms out along X axis*.
18. Horizontal Shrink – zooms in along X axis*.

* These functions are only available if Autoscale is disabled.

The Status Bar



The status bar on the bottom of the Main Window provides connection and co-ordinate information. The Status Bar includes the following indicators:

1. **Bluetooth® indicator** – indicates that a *Bluetooth®* connection is present. If this icon remains greyed out, check your connection settings. Please note that the *Bluetooth®* icon turns blue only when data is being transferred.
2. **GPS indicator** – indicates that a GPS connection is present. If this icon remains greyed out, check your connection settings. Please note that the GPS icon remains blue whilst there is a GPS fix.
3. **Locator Mode indicator** – indicates the RD8000 locator's current locator mode.
4. **Zoom indicator** – indicates the current x-axis and y-axis zoom settings.
5. **Position Indicator** – displays the graph co-ordinates when a point on the graph is selected.
6. **Log Indicator** – Indicates whether the PC is ready to log data from the RD8000.

3.2 File Manager (PC)

File Manager is the lower of the 2 main windows.

The File Manager displays the current active trace file along with any other trace files you choose to open. When you open the program, a temporary blank trace file is created, ready to receive data from the RD8000 Locator. This file by default is the current active trace.

When a trace is active it can be edited with new trace data logged from the RD8000 Locator.

The File Manager allows you to load multiple locate files and view them as an overlay on your current or active trace. You can open additional files by pressing the Open icon on the Toolbar and then selecting an existing ENT file from an earlier trace.

Once multiple files are open, you can define whether a file is visible on the main chart window, what color it is and whether the file is active or not. To adjust these settings right click the file name to display the context menu. From there you can Activate the file, delete it, display or hide it and change the color. You can only have one trace active but you may be able to display more than one trace.

3.3 RD8000 SurveyCERT™ PDA Version

Press the Menu button to display the following options:

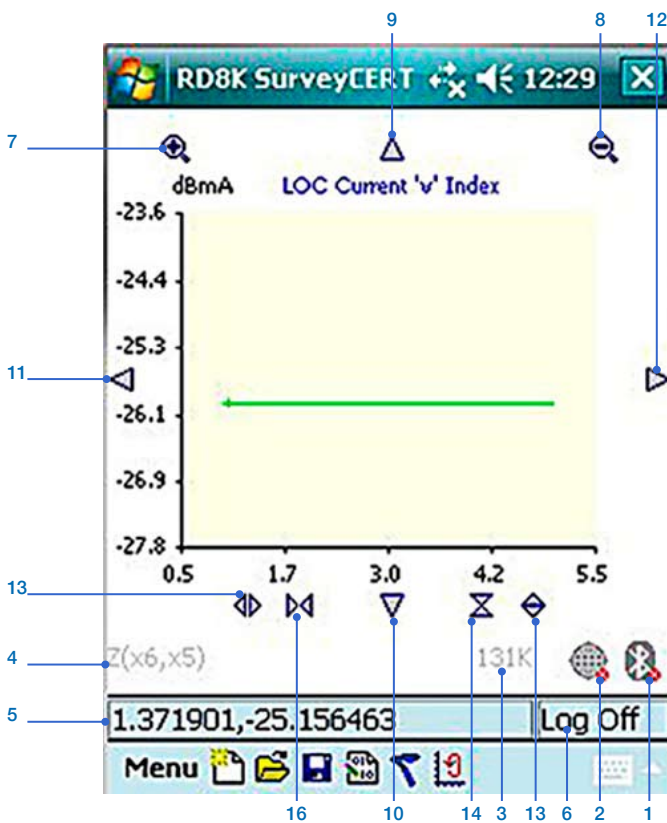
- Chart > Settings – opens the Settings window and the following can be accessed:
 - Grid – adjusts the number of longitude and latitude grid lines.
 - Colour – adjusts background color.
 - Ports – allows users to adjust the *Bluetooth®* and GPS port settings of the application. These settings must match your PDA's *Bluetooth®* and GPS receiver ports; otherwise the application may be unable to communicate with the RD8000 locator and the GPS network.
- Chart > X-Axis – adjusts the Index and Distance values on the x-axis.
- Chart > Autoscale – On, forces the chart to automatically resize around the current data. Select Off to turn Autoscale off.
- Help – displays the RD8000 SurveyCERT version
- Files – Opens the File Manager window
- Exit – Exits the program

PDA Toolbar



1. **New** – creates a new trace.
2. **Open** – opens an existing trace saved in the ENT file format.
3. **Save** – saves the current trace as an ENT file on your PDA.
4. **Logging Toggle** – Toggles between Log On or Log Off. To receive data from the RD8000 this must be set to Log On.
5. **Locator Mode Toggle** – changes the currently displayed locator mode.
6. **Chart Toggle** – toggles the different charts available to each Locator Mode (refer to Section 4).

Main Window



1. Bluetooth® indicator – indicates that a Bluetooth® connection is present. If this icon remains greyed out, check your connection settings. Please note that the Bluetooth® icon turns blue only when data is being transferred.
2. GPS indicator – indicates that a GPS connection is present. If this icon remains greyed out, check your connection settings. Please note that the GPS icon remains blue whilst there is a GPS fix.
3. Locator Mode indicator – indicates the RD8000 locator's current locator mode.
4. Zoom indicator – indicates the current x-axis and y-axis zoom settings.
5. Position Indicator – displays the graph co-ordinates when a point on the graph is selected.
6. Log Indicator – Indicates whether the PDA is ready to log data from the RD8000.
7. Zoom In – Zooms in at a selected point*
8. Zoom Out – Zooms out at a selected point*

9. Page Up – Moves the window one page up*
10. Page Down – moves the window one page down*
11. Page Left – Moves the window one page left*
12. Page Right – Moves the window one page right*
13. Vertical Stretch – Zooms out along the Y axis*
14. Vertical Shrink – Zooms in along the Y axis*
15. Horizontal Stretch – zooms out along X axis*
16. Horizontal Shrink – Zooms in along X axis*

* These functions are only available if Autoscale is disabled.

3.4 File Manager (PDA)

File Manager for RD8000 SurveyCERT PDA version can be accessed as follows: Menu > Files.

The File Manager displays the current active trace file along with any other trace files you choose to open. When you open RD8000 SurveyCERT program, a temporary blank trace file is created, ready to receive data from the RD8000 locator. This file by default is the current active trace.

When a trace is active it can be edited with new trace data logged from the RD8000 locator.

The File Manager allows you to load multiple locate files and view them as an overlay on your current or active trace. You can open additional files by pressing the Open icon on the Toolbar and then selecting an existing ENT file from an earlier trace.

Once multiple files are open, you can define whether a file is visible on the main chart window, what color it is and whether the file is active or not. To adjust these settings highlight the file name and press down on the stylus to display the context menu. From there you can Activate the file, delete it, display or hide it and change the color.

Note: You can display more than one trace at a time but only one trace can be active. If more than one trace is to be displayed it is advisable to use different colors.

Section 4 – RD8000 SurveyCERT™ charts

The primary function of RD8000 SurveyCERT™ is to display locate data captured using the RD8000 locator. As such, both PC and PDA platforms are able to display graphs corresponding to the frequency selection modes on the RD8000 locator.

The following table shows what information is displayed by the various Locator Modes offered by the RD8000 locator.

The program allows users to import and chart survey data collected using the RD8000 locator using a compatible

PDA or PC. When used in the field with a *Bluetooth*® and GPS compliant device, the program will chart locate data in real-time using positional information. If using a PDA without a GPS receiver, the PDA will only log the receiver's data.

Once logged, you can send this data to a PC and use it with your company's preferred GIS platform.

Table 4.1 Locator Mode Charts

Mode	Available charts					
	Depth	Locate Current	Log Locate Current	dBuV	Phase	TSG
8KFF				•	•	•
POWER	•					•
CPS	•	•	•			•
CDFF				•	•	•
ACTIVE FREQUENCIES*	•	•	•			•
CD FREQUENCY PAIR*	•	•	•		•	•

Note: The list of available Active Frequencies, and CD Frequency Pairs is dependant on the locator model.

dBuV – This is the reading obtained when using the Radiodetection A-Frame to locate faults on cables and pipes and is in dB micro volts.

TSG (Time stamp Grid) – Displays time and positional information when GPS is active.

Section 5 – Pairing RD8000 with a PC or PDA

5.1 Pairing the devices

The RD8000 locator must be paired with either the PC or PDA before attempting to send data. The following procedure provides an example of how to pair the RD8000 locator to your PDA. For more information, consult your PDA's documentation. Please note: pairing on PDA's may differ and the example below may not be applicable to your particular PDA.

Setting the RD8000 into Pairing Mode

1. Press the On/Off key to switch on the locator.
2. Momentarily press the On/Off key to enter the menu.
3. Press the Up or Down key until BT is displayed and press the Antenna key once to enter the Bluetooth menu.
4. Press the Up or Down key until PAIR is displayed and press the Antenna key once to enter the pairing menu.
5. Press the Up or Down key until BT-PC is displayed.

Note: At this stage the RD8000 is ready to pair but will not actually start to pair until the 'f' key on the locator is pressed. It is advisable to set up the PDA, ready for pairing and when ready start the pairing process.

Pairing with the PDA

Pair your Pocket PC to the RD8000 locator with your Pocket PCs *Bluetooth*[®] software. Note that the procedure for pairing your PDA differs with each model; consult the documentation that came with your PDA for more information. The following example should apply to most Pocket PCs running Windows Mobile.

1. From the Start menu on the PDA, select Settings, then select the Connections Tab and then select the *Bluetooth*[®] icon.
2. Ensure the *Bluetooth*[®] Radio is on and make the PDA visible to other devices
3. Select the Devices tab and scan for new partnerships.

4. At this stage set the RD8000 into pairing mode see section 5.1.
5. Create a partnership with the RD8000.
6. During pairing you may be asked for a password, if so enter 1234.
7. Select the COM Ports tab and make a New Incoming Port with the RD8000 (RD8K_xxxx where xxxx is the firmware version). Note the port number of the selected COM port.

Pairing with the PC

Note: Radiodetection strongly recommends that the user uses a Bluetooth USB dongle when using RD8000 SurveyCERT on a PC, rather than using the internal Bluetooth of the PC.

1. Set the RD8000 locator ready for pairing, see section 5.1.
2. Connect a USB *Bluetooth*[®] adapter that supports the Bluetooth Serial Port Profile into a USB port.
3. Select Start -> Control Panel and double click on 'Bluetooth Devices'.
4. Click on Add to run the 'Add Bluetooth Device Wizard'.
5. Tick 'My device is set up and ready to be found' and click Next to search for *Bluetooth*[®] devices.
6. At this stage set the RD8000 into pairing mode, see section 5.1.
7. A device named RD8K_xxxx should appear, if it doesn't make sure the RD8000 locator is in Pair Mode and click Search Again.
8. Select the RD8k_xxxx and click Next.
9. Tick 'Use the passkey found in the documentation', enter 1234 for the passkey and click Next to pair with the RD8000 locator.
10. Completing the Add Bluetooth Device Wizard will be displayed for a successful pairing.
11. Note the Incoming COM port assigned to the device and click Finish.

Section 6 – Sending data from the RD8000 to RD8000 SurveyCERT™

To send data from the RD8000 locator, the PC or PDA must be paired. See section 5.

6.1 Before sending Data from the RD8000

Before transferring data from your locator to RD8000 SurveyCERT™, you must carry out the following procedures:

Setting Data format of the RD8000

1. Press the On/Off key to switch on the unit.
2. Momentarily Press the On/Off key to enter the locator menu.
3. Press the Up or Down key until BT is displayed.
4. Press the Antenna key once to enter the BT menu and then press the Up or Down key until PROT is displayed.
5. Press the Antenna key once and then press the Up or Down key until PPP is displayed.
6. Press the 'f' key 3 times to take the locator back to the locate window.

Inserting Bluetooth Incoming Comm Port and selecting RD8000 model type

When pairing the RD8000 locator with either the PC or PDA the communication port that the Bluetooth is using needs to be inserted into a text file and also the RD8000 model type. Open RD8000 SurveyCERT™ on either the PC or PDA and a SurveyCertIni.txt file is created, once opened, close the RD8000 SurveyCERT™ program and locate the SurveyCertIni.txt file.

1. Open the SurveyCertIni.txt file in Notepad.
2. When the file is opened, find the line PORT#BLUETOOTH#PORTNUMBER#.
3. At the end of PORTNUMBER replace the # with the Bluetooth communications port that either the PC or the PDA is using for the RD8000 SurveyCERT™ program.
4. At the end of UNIT#MODEL#RD8000, enter the model type of the RD8000 that will be used to send data. This will be either PXL or PDL.
5. Save the file and exit; you may now reopen RD8000 SurveyCERT™.

6.2 Activate GPS (Optional)

If your PDA features an integrated or external GPS receiver you can log positional co-ordinates to your locate data gathered with the RD8000 locator. Note that GPS functions differ in each PDA so check your PDA's documentation if you need help establishing a link to the GPS network.

Before running RD8000 SurveyCERT, it is advisable to activate GPS on the PDA and once a fix is established the GPS controller program can be closed and RD8000 SurveyCERT™ can be opened.

If you are using the GPS with either your PC or PDA you will also need to insert the communication port number that the GPS is using by inserting the number in place of the #. The line in the SurveyCertIni.txt file is PORT#GPS#PORTNUMBER#. See section 6.1 for details.

6.3 Sending Data from the RD8000 to a PC

Once *Bluetooth*® and the optional GPS connections are established you can send data from the RD8000 to your PC using the following procedure:

1. Using your Bluetooth USB dongle connected to the USB communications port on the PC. Make sure that the RD8000 locator and PC have been paired and that the communication port that the Bluetooth dongle is using has been inserted into the SurveyCertIni.txt file. See section 5.1 and 6.1.
2. On your PC open the RD8000 SurveyCert™ PC program. This can be found in the Windows Start Menu > Programs > RD8000 SurveyCERT > RD8000 SurveyCERTPC.
3. Click on the Logging Toggle so that Waiting For Transfer is displayed at the bottom of the RD8000 SurveyCERT™ window. RD8000 SurveyCERT™ is now ready for data transfer from the RD8000 locator.
4. On the RD8000 locator you can either send data in real-time or send a set of logged data.

To send real-time data, press the graph key on the RD8000 locator and the Bluetooth icon on the locator will start to flash. As the data comes into the RD8000 SurveyCERT™ program the Bluetooth icon at the bottom

of the RD8000 SurveyCERT™ window will momentarily turn blue. If the locate data is successfully sent, the RD8000 will display 'OK' on the display. The whole process of transferring a single locate data will be approximately 3 seconds.

To send a log file from the RD8000 containing stored locate results carry out the following:

1. Enter the menu of the RD8000 locator by momentarily pressing the On/Off key.
2. Press the Up or Down key until LOG is displayed and press the Antenna key once to enter the LOG menu.
3. Press the Up or Down key until SEND is displayed and press the 'f' key once. All logged results will now be sent to the RD8000 SurveyCERT program one at a time. Each time logged data is received the Bluetooth icon on the RD8000 SurveyCERT window will turn blue. Once all logged data has been transferred, the RD8000 locator will display 'OK'.

6.4 Sending Data from the RD8000 to a PDA

Once *Bluetooth*® and the optional GPS connections are established you can send data from the RD8000 to your PDA using the following procedure:

1. Make sure that the RD8000 locator and PDA have been paired and that the communication port that the Bluetooth is using has been inserted into the SurveyCertIni.txt file. See section 5.1 and 6.1.
2. On your PDA open the RD8000 SurveyCERT™ PDA program.
3. Click on the Logging Toggle so that Log On is displayed at the bottom of the RD8000 SurveyCERT™ window. SurveyCERT™ is now ready for data transfer from the RD8000 locator.
4. On the RD8000 locator you can either send data in real-time or send a set of logged data.

To send real-time data, press the graph key on the RD8000 locator and the Bluetooth icon on the locator will start to flash. As the data comes into the RD8000 SurveyCERT™ program the Bluetooth icon at the bottom of the RD8000 SurveyCERT window will momentarily turn blue. If the locate data is successfully sent, the RD8000 will display 'OK' on the display. The whole process of transferring a single locate data will be approximately 3 seconds.

To send a log file from the RD8000 locator containing stored locate results carry out the following:

1. Enter the menu of the RD8000 locator by momentarily pressing the On/Off key.
2. Press the Up or Down key until LOG is displayed and press the Antenna key once to enter the LOG menu.
3. Press the Up or Down key until SEND is displayed and press the 'f' key once. All logged results will now be sent to the RD8000 SurveyCERT™ program one at a time. Each time logged data is received the Bluetooth icon on the RD8000 SurveyCERT™ window will turn blue. Once all logged data has been transferred, the RD8000 locator will display 'OK'.

6.5 Troubleshooting Log Connections and sending of data

To successfully transfer data from the RD8000 locator to RD8000 SurveyCERT on either the PC or PDA requires the user to carry out certain procedures and these procedures need to be followed carefully. Below is a check list of actions that should be carried out.

1. Download RD8000 SurveyCERT onto your PC. This will contain the PC and PDA versions of RD8000 SurveyCERT. See section 2.
2. Pair the RD8000 locator with either the PC or PDA, see section 5. It is strongly recommended to use a Bluetooth USB dongle when using RD8000 SurveyCERT on the PC.
3. When pairing make a note of the communications port that the Bluetooth is using for both the PC and PDA and insert this number into the SurveyCertIni.txt file. See section 6.
4. Make sure that when transferring data from the RD8000 locator to the PC or PDA, the Logging Toggle in the RD8000 SurveyCERT program is toggled so that 'Waiting for Transfer' is displayed at the bottom of the RD8000 SurveyCERT window on the PC version and Log On is displayed on the PDA version.
5. Bluetooth on the RD8000 has to be switched on to transfer data to RD8000 SurveyCERT.
6. The model type of the RD8000 needs to be inserted into the SurveyCertIni.txt file. See section 6.1.

Section 7 – Viewing data sent from the RD8000 locator

7.1 Real-time viewing

You can view the logged data as you record it in real time. This process occurs automatically when a recorded log is sent from the RD8000 locator to the PDA. Each data log will appear in the active trace window as a vector or point and the RD8000 SurveyCERT™ program will automatically switch to the same locator mode, dependant on the data that is being transferred.

You can compare an active trace to historical traces saved on your PDA, providing you with rapid analysis in the field. Refer to Section 4 for a list of supported charts and File Manager in Section 3.

7.2 Desktop viewing

Away from the field, you have the option to view one or more traces on a desktop or laptop computer using the RD8000 SurveyCERT™ PC viewer. The desktop viewer provides you with the same analysis tools but utilizes the desktop's larger screen environment. Refer to Section 4 for a list of supported charts and File Manager in Section 3.

7.3 Raw data view

If required, you can view the raw data log in a plain text editor or any spreadsheet application that supports CSV plain text import. Microsoft® Excel® and Open Office Calc are both capable of importing CSV data. This allows you to format the data for use in GIS applications such as ESRI ArcGIS or MapInfo Professional.

Section 8 – ESRI ArcGIS

This section provides an example of how to format the R8000 data log for export into ESRI ArcGIS.

The RD8000 locator stores data as comma-separated variables (CSV); the data is then saved as a plain text file with a .ENT extension. The CSV format allows you to import the tabular data to ArcView where you can then convert the data to a shape file and manipulate the trace as a map layer.

Note that there are several methods for using the RD8000 data in your GIS environment; the method outlined here is intended as an example workflow only.

8.1 Formatting the ENT file

The ENT file is saved in CSV format with a .ENT extension. Before importing the data into ArcView you must add table headers to the data and give the file a CSV extension. You can do this manually in any plain text editor or in a spreadsheet application that supports the CSV format. The example uses Microsoft® Excel® 2003 and 2007, however the process should be similar in older versions of Excel® and Open Office Calc.

Formatting in Excel

1. Copy the ENT file from your PDA or the RD8000 locator to your computer using *Bluetooth*® or ActiveSync (Pocket PC only).
2. Open Microsoft® Excel® and create a new spreadsheet.
3. In Excel® 2003 and earlier, select Data -> Get External Data -> Import Text File.
4. In Excel 2007, select the Data tab and click From Text.
5. When the Import File dialogue box appears, choose All Files from the Type of Files drop-down box. Next, navigate to the ENT file, select it and press Import.
6. Excel will then display a Text Import Wizard.
7. On the first screen, select the Delimited radio button. Next, choose which row you want the data to begin at. Row 2 is recommended as you will need to add the header columns. For file origin, the default value is usually correct.

8. Press Next.
9. In Screen 2, select Comma as the delimiter and deselect all other delimiters. You should now see a preview of your formatted data.
10. Press Next.
11. Screen 3 allows you to change the cell type of each column. In almost all applications, it is sufficient to leave the default General cell type.
12. Press Finish.
13. Excel will now import your data beginning at the row you selected. If you chose Row 2, you will have an empty row in which to add the headers. If you specified Row 1 then you will have to insert a new row above your data.

Adding headers

ArcView and other ESRI programs require that headers are added to CSV files. The ENT file does not include headers and so they must be added manually. Alternatively, you could create a template with the headers in place or you could automate the process using VBA.

Note that you can give the headers any name you wish, however for ESRI programs they must be in CAPS and contain no spaces.

Although the headers are not logged with the file, RD8000 SurveyCERT™ always logs the data in the same format using pre-existing headers within the RD8000 locator. These headers are detailed in Section 9.

Once you have added headers you should then save the data as a CSV file. You are now ready to import the data to ArcView using the following procedure.

8.2 Importing data to ArcGIS

1. Open ArcMap. You can add the data to a new map project or to an existing one. If you have existing map data for your survey area, you can overlay one or more RD8000 location datasets into your project for analysis.
2. To import the data go to Tools -> Add XY data.
3. Select Choose File and select your formatted CSV file using the file browser.
4. Once the file is selected you must then specify your X and Y fields using the drop down menus. The menus will list the headers you added in Excel. Choose the headers most applicable to your application (usually the Longitude and Latitude data).
5. Next select the projection appropriate to your survey.
6. Press Done, ArcMap will now import the data as a layer in your project.
7. You can now save the layer as a shape file by right-clicking the layer and selecting Data -> Export Data. Choose a file name for the new shape file and ensure the Import check box is selected. Press Save.

Your map will now contain a new shape file layer that you can manipulate according to your requirements. You can now safely discard the CSV layer and save your project.

Section 9 – Appendix

9.1 ENT file format

This appendix provides developers with detailed information on the RD8000 SurveyCERT™ data format. The RD8000 stores locate information as comma separated variables using a plain text file with the extension, ENT.

These variables are formatted according to predefined headers that carry data specific to the RD8000 locator's trace information. The file also contains GPS header information based on the NMEA specification. Note if a GPS receiver is not used during the survey, the GPS value data will default to NULL or 0 values.

The headers are implied and are not included in the ENT file. This allows developers to define custom headers that best suits their host application.

Table 9.1 (overleaf) displays header information in the Data column. The Values column lists the type of data contained in each entry with an explanation where applicable.

9.2 PDA Resolution

By default the PDA is set to display at VGA resolution (640 x 480 pixels). If your PDA does not support this screen size you have the option to change the size of the application to quarter VGA. This option cannot be set in the application itself; to do so you must edit the program's settings file using the following procedure:

1. First shut down the PDA application.
2. Locate the SurveyCERTIni.txt file on your PDA. Note this file is created at first runtime and is usually stored in the location of the exe file.
3. Open this file in any plain text editor.
4. Find the line: SCREEN#RESOLUTION#FULL
5. Change to: SCREEN#RESOLUTION#QUARTER and be sure to use all caps.
6. Save and close the file.
7. Re-launch the PDA program; the window size should now fit you PDA screen.

9.3 Setting locator model

The ini file should be set to reflect your locator model.

1. Open the ini file in Notepad or any plain text editor
2. Find the line: UNIT#MODEL#<string>
3. Replace the string, if present, with your correct model type i.e. either:
 - a. RD8000PXL
 - b. RD8000PDL

9.3 Administrator

The following steps are intended for use by system administrators who have installed RD8000 SurveyCERT™ on behalf of users who have fewer rights than themselves.

1. Go to Installation Folder (default is C:\Program Files\Radiodetection Ltd\RD8000 SurveyCERT)
2. Ensure that the end user has Read/Write access to the following files:
 - a. <Installation Folder>\SurveyCertIni.txt
and the following directory
 - b. <Installation Folder>
by performing the following steps (may vary due to OS and system setup):
 - i. Select each file or folder in turn.
 - ii. Right-Click and select Properties from drop-down menu.
 - iii. Select security tab.
 - iv. Press Advanced button.
 - v. Press Edit...
 - vi. Select Read & Write permissions for user and press OK.

Table 9.1 ENT data format

Col #	Data	Values	Comments
RD8000 logging data			
1	File Index	<Integer>	
2	Locator mode	<String>	Specifies the locate mode when reading was taken
3	Distance	<Float>	Distance in metres between logs with a GPS fix. Distance calculated with respect to first log position
4	Locate Depth	<Float>	Depth in meters
5	Locate Current	<Float>	Current in mA
6	Phase	<Float>	Phase in degrees
7	Signal	<Float>	Signal level in dB μ V
8	Signal strength	<Float>	0.0 to 1.0 Full Scale
9	Gain	<Integer>	Gain in dB
10	Frequency	<Integer>	Locate Frequency in Hz
11	Protocol	<Integer>	Locator Protocol Id
12	Compass	<Integer>	Angle in indicated on RD8000 compass (0 to 359) in degrees
13	Arrows	0 – No Left/Right Arrow Data 1-5 – Left Arrow (Max 1 to Min 5) 6 – Mid Scale 7-11 – Right Arrow (Max 11 to Min 7)	Arrow Indicator
14	Antenna	0 – Peak 1 – Vertical Null 2 – Single 3 – All 4 – None 5 – Accessory 6 – A-Frame 7 – Peak Null	Locator Antenna Mode
15	Accessory	0 – None 1 – A-Frame 2 – Omni Probe 3 – Single Probe 4 – Single Antenna 5 – CD Clamp 6 – CD Stethoscope 7 – Double Antenna 8 – Standard Stethoscope 9 – Unknown Accessory	Locator Accessory
16	Sonde/Line	0 – Line Depth 1 – Sonde Depth	
17	Battery	0 – High 1 – Medium 2 – Medium to Low 3 – Low 4 – Very Low	Locator Battery Level

18	Volume	0 – Off 1 – Minimum 2 – Medium 3 – Maximum	Locator Volume
19	GPS UTC	<Double>	GPS Universal Time Code
20	GPS Latitude	<Double>	Latitude in degrees
21	GPS Latitude Direction	0 – Unknown 1 – North 2 – South 3 – West 4 – East	
22	GPS Longitude	<Double>	Longitude in degrees
23	GPS Longitude Direction	0 – Unknown 1 – North 2 – South 3 – West 4 – East	
24	GPS Fix Quality	0 – None 1 – GPS 2 – DGPS 3 – PPS 4 – Kinematic 5 – RTK 6 – Estimated 7 – Manual 8 – Simulation	Specifies the type of precision used
25	GPS Number of Satellites	<Integer>	
26	GPS Horizontal Dilution	<Double>	
27	GPS Altitude	<Double>	Altitude in meters
28	GPS Altitude Units	0 – Invalid 1 – Meters	
29	GEO ID Height	<Double>	
30	GEO ID Units	0 – Invalid 1 – Meters	
31	DGPS Time since Update	<Integer>	Time in seconds
32	DGPS Station ID	<Integer>	
33	Time	0 – System 1 – GPS	Specifies if the time is set by the GPS network or by the GPS receiver's internal clock
34	Day	Integer	Day of Month (1-31)
35	Month	Integer	Month of Year (1-12)
36	Year	Integer	4 Digit Year

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