# WorkHorse
# Read This First

P/N 957-6151-00 (August 2002)

**RD Instruments**
*Acoustic Doppler Solutions*

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# WorkHorse Read This First

## 1 Introduction

Thank you for purchasing a RD Instruments (RDI) WorkHorse Broadband Acoustic Doppler Current Profiler (ADCP). This guide is designed to help first time ADCP users to get familiar with their system.

## 2 Getting Started

You are probably eager to get started, but take a moment to read a few words of guidance. We strongly recommend you read *all* of the provided documentation to learn the full capabilities of your WorkHorse ADCP.

The Reference Guides includes:

- **Read This First**. This guide is an introduction to the WorkHorse ADCP.
- **Installation Guide**. Use this guide to plan your installation requirements. This guide includes specifications and dimensions for the WorkHorse (including outline installation drawings).
- **Maintenance Guide**. This guide covers WorkHorse maintenance. Use this guide to make sure the WorkHorse is ready for a deployment.
- **Test Guide**. Use this guide to test the ADCP.
- **Troubleshooting Guide**. This guide includes a system overview and how to troubleshoot the WorkHorse. If the WorkHorse fails a built-in test or you cannot communicate with the system, use this guide to help locate the problem.

The WorkHorse User's Guide includes:

- These guides (one for Mariner, Monitor, Rio Grande, and Sentinel models) contain an overview of the WorkHorse hardware and software.

The Commands and Output Data Format Guide includes:

- This guide contains a reference for all commands and output data formats used by the WorkHorse. Use the *Command Quick Reference Card* to help remember the direct commands used by the WorkHorse.

The Documentation CD includes:

- The Documentation CD has Adobe Acrobat® Portable Document File (pdf) versions of all the user documentation. Use the electronic documentation to quickly search for information. See "Using the Documentation CD," page 12 for details on how to use Adobe's Acrobat Reader®.

The Reference Cards include:

- **Setup Cards**. The *Setup Cards* are designed for *first time users* to connect the ADCP and establish communications.
- **Command Quick Reference Card**. The *Command Quick Reference Card* is designed for *experienced* users to help remember the direct commands used by the WorkHorse.
- **Software Quick Reference Card(s)**. The *Software Quick Reference Cards* are designed to help *experienced* users remember the proper steps needed to deploy the WorkHorse for a deployment. First time users should read the appropriate ADCP and Software User's Guides before deploying the WorkHorse.

**NOTE.** Each software program has it's own user's guide and help file.

**NOTE.** When an addition or correction to the manual is needed, an Interim Change Notice (ICN) will be posted to our web site on the Customer Service page (www.rdinstrument.com). Please check our web site often.

# 3 What's New

Several new firmware versions, ADCP Feature Upgrades, and software programs have been released since the last update of the Workhorse Technical Manual.

## 3.1 Firmware Updates

The 8.xx series firmware has been frozen. Thus, new features will only be available to users with the 16.xx firmware. If you have a Workhorse ADCP with version 8.xx firmware and wish to upgrade to version 16.xx firmware, please check the following items.

Who should upgrade?

- Users planning to take advantage of new features (i.e. Waves).

What do you need to upgrade?

- The CPU board must have EEPROM Parts installed. The firmware upgrade program *WH16FW.exe* checks if the ADCP is capable of upgrading to version 16.xx firmware.

How do I upgrade?

a. Connect your ADCP to the computer.

b. Start the program *WH16FW.exe*. Click **Setup**. Click the **View README.TXT** button to view the Readme.txt file for details on what is new in version 16.xx firmware.

c. Click **Next** and follow the on-screen prompts.

d. If you are not able to install the version 16.xx firmware, contact Customer Service and arrange for a CPU board replacement.

e. After successfully upgrading the firmware, use *BBTalk* to test the ADCP.

## 3.2 Feature Upgrades

Feature Upgrades can be installed to enhance the operation of the ADCP. The feature upgrade installation program is used to install Bottom Tracking, Shallow Water Bottom Mode, Lowered ADCP (LADCP), Water Profiling (for Navigators), High-Resolution Water-Profiling mode, High Ping Rate, and Waves capabilities in a Workhorse ADCP. For more instructions on how to install the upgrades, see the Workhorse Commands and Output Data Format Guide.

## 3.3 Software

RDI has utility programs to help you set up, use, test, and trouble-shoot your Workhorse ADCP. Each program has a help file and printed User's Guide. The User's Guide is included in *.pdf format on the software CD.

**Table 1: WorkHorse Software Main Modules**

| Program Name | Description |
|---|---|
| *WinSC* | *WinSC* is the software package for Self-Contained ADCP setup, data collection, and data review. For detailed information on how to use *WinSC*, see the *WinSC and PlanADCP* User's Guide. |
| *PlanADCP* | *PlanADCP* lets you enter known or "best-guess" values for the various ADCP profiling parameters and shows predictions of expected results. For detailed information on how to use *PlanADCP*, see the *WinSC and PlanADCP* User's Guide. |
| *BBTalk* | Windows ADCP communication program. Use this program to "talk" to the ADCP and to run test script files. *BBTalk* is included on the RDI Tools CD. For detailed information on how to use *BBTalk*, see the RDI Tools User's Guide. |
| *WinADCP* | Gives users a visual display of the entire set of data. You can zoom in on a portion of the data for closer analysis and export data to text or MatLab files. For detailed information on how to use *WinADCP*, see the WinADCP User's Guide. |
| Documentation CD | The Documentation CD has an Adobe Acrobat® (*.pdf) electronic version of the WorkHorse Technical Manual. Use the Documentation CD to search for information. For detailed information on how to use Adobe Acrobat® and the Documentation CD, see "Using the Documentation CD," page 12. |

**NOTE.** See the appropriate ADCP User's Guide to see what software package to use for collecting data.

**NOTE.** The RDI Tools CD also has other utility programs to supplement data processing. For detailed information, see the RDI Tools User's Guide.

**NOTE.** As of December 2001, *BBTalk* has replaced the *DumbTerm* software program.

**NOTE.** As of August 2002, *PlanADCP* has replaced the *Plan* software program.

## 3.4 I/O Cable and AC Power Supply

Systems shipping after August 2002 include the new style I/O cable and the 48 VDC AC Power Adapter in place of the 24 VDC AC adapters. The AC Power adapter converts AC power into 48 VDC output for the WorkHorse input power. Increasing the input voltage to the ADCP from 24 VDC (standard AC adapter) to 48 VDC increases the transmitted power, and thus the range of the ADCP.

**NOTE.** Transmitted power increases or decreases depending on the input voltage. Higher voltage to the ADCP (within the voltage range of 20 to 60 VDC) will increase the transmitted power. The transmitted power is increased 6 DB if you double the input voltage from 24 VDC to 48 VDC. For a 300kHz WorkHorse ADCP, each additional DB will result in an increase in range of one default depth cell.

The higher input voltage is sufficient to override the internal battery voltage (i.e. the ADCP will draw all power from the AC adapter even if the battery is installed and connected).

**NOTE.** This change is not applicable to Rio Grande and Mariner systems.

# 4 Conventions Used in Manuals

Conventions used in the WorkHorse manuals have been established to help you learn how to use the WorkHorse quickly and easily.

Windows menu items are printed in bold: **File** menu, **Collect Data**. Items that need to be typed by the user or keys to press will be shown as **<F1>.** If a key combination were joined with a plus sign (**<ALT+F>**), you would press and hold the first key while you press the second key. Words printed in italics include program names (*BBTalk*) and file names (*default.txt*).

Code or sample files are printed using a fixed font. Here is an example:

```
WorkHorse Broadband ADCP
RD INSTRUMENTS (c) 1997-2002
ALL RIGHTS RESERVED
Firmware Version 16.xx
>
```

You will find two other visual aids that help you: Notes and Cautions.

**NOTE.** This paragraph format indicates additional information that may help you avoid problems or that should be considered in using the described features.

**CAUTION.** This paragraph format warns the reader of hazardous procedures (for example, activities that may cause loss of data or damage to the ADCP).

# 5 WorkHorse Models and Options

The following section explains the different models and options available for WorkHorse ADCPs.

***WorkHorse Monitor*** – The WorkHorse Monitor is designed to measure real-time current profiles from temporary or permanent mounting in the ocean, near-shore, harbors, and lakes. The Monitor ADCP system consists of an ADCP, cables, RS-232-to-RS-422 converter, and software. The Monitor system requires the addition of a Windows® compatible computer to collect data.

***WorkHorse Sentinel*** – The WorkHorse Sentinel is designed for several-month autonomous current profile deployment from temporary or permanent mounting in the ocean, near-shore, harbors, and lakes. The Sentinel ADCP system consists of an ADCP, cables, battery pack, flash memory card, and software. Both battery capacity and memory can be increased with upgrades for longer deployments. The Sentinel can also be used for direct-reading current profile operation. The Sentinel system requires the addition of a Windows® compatible computer to configure the ADCP and replay collected data.

***WorkHorse Rio Grande*** – The WorkHorse Rio Grande is designed to measure real-time current profiles from temporary or permanent mounting in a vessel. The Rio Grande ADCP system consists of an ADCP with Bottom Track mode, High Resolution Water Profiling modes, cables, and software. The input power requirements for the Rio Grande are +12 VDC. The Rio Grande system requires the addition of a Windows® compatible computer to collect data.

**CAUTION.** Do not attempt to attach a Workhorse Monitor/Sentinel I/O cable or power supply to the Workhorse Rio Grande ADCP. The Workhorse Monitor and Sentinel ADCPs are 20 to 60 VDC systems. **The Workhorse Rio Grande uses 12 VDC only.**

**NOTE.** The Rio Grande End-Cap is red to differentiate it from the Monitor and Sentinel ADCPs. Do not swap end-caps between a Rio Grande and a Monitor/Sentinel. The pin-outs are different on both the I/O cable connector and the internal I/O cable.

***WorkHorse Mariner*** – The WorkHorse Mariner is designed to measure real-time current profiles from temporary or permanent mounting in a vessel. The Mariner ADCP system consists of a Monitor ADCP with Bottom Track mode, cables, Deck Box, Mounting Plate, and software. The Mariner system requires the addition of a Windows® compatible computer to collect data.

***WorkHorse Options***

- **Bottom Track** – You can use your WorkHorse ADCP from moving boats and ships with the Bottom Track Upgrade. Once the Bottom Track Upgrade is added, a WorkHorse ADCP can measure both water depth and boat velocity over the ground.
- **Shallow Water Bottom Track Mode 7** – You can use your WorkHorse 1200kHz ZedHed™ ADCP in water as shallow as 30cm.
- **High-Resolution Water Profiling Modes** – This upgrade allows you to collect water profiles using Water Modes 1, 5, 8, and 11.
- **High Ping Rate Water Mode** – This upgrade allows you to collect water profiles using Water Mode 12.
- **Waves** – This upgrade allows you to use the ADCP as a wave gauge.
- **External Batteries** – Adding external batteries can increase the deployment length for Sentinel ADCPs. Use an External Battery with a Monitor ADCP to provide backup power or for self-contained deployments.
- **High-Pressure Housing** – The standard WorkHorse housing allows deployment depths to 200 meters. High-pressure housings are available in depth rating of 500, 1000, 3000, and 6000 meters. See the Installation Guide outline installation drawings for dimensions and weights.
- **Spare boards kit** – Contains a complete set of spare printed circuit boards for a WorkHorse ADCP. The set does not include boards purchased as options such as the gyro/synchro board or the receiver board (not field replaceable).
- ***VmDas* Software** – Controls the ADCP and displays profile data through a personal computer.
- ***WinRiver* Software** – Controls the ADCP and displays discharge data and profile data through a personal computer.
- ***Waves* Software** – Controls the ADCP and displays waves data through a personal computer.

***Mariner Options***

- **Deck Box** – Converts AC power input or 12 VDC input into 48 VDC output for the Mariner input power. Converts computer RS232 to RS422. Option: converts gyro analog input to a serial NMEA output (requires an optional gyro interface; must be purchased at time of order).
- **Gyrocompass (Gyro) Interface** – Connects the ship's gyro to the Deck Box (must be purchased at time of order).

- **Mounting Plate** – A bronze plate that helps mount the transducer head to a vessel. See the Installation Guide outline installation drawings for dimensions.

# 6 WorkHorse Care

This section contains a list of items you should be aware of every time you handle, use, or deploy your WorkHorse. *Please refer to this list often*.

## 6.1 General Handling Guidelines

- Never set the transducer on a hard or rough surface. **The urethane faces may be damaged.**
- Always remove the retaining strap on the end-cap underwater-connect cable and dummy plug when disconnecting them. **Failure to do so will break the retainer strap.**
- Do not apply any upward force on the end-cap connector as the I/O cable is being disconnected. **Stressing the end-cap connector may cause the ADCP to flood.** Read the Maintenance guide for details on disconnecting the I/O cable.
- Do not expose the transducer faces to prolonged sunlight. **The urethane faces may develop cracks.** Cover the transducer faces on the Workhorse if it will be exposed to sunlight.
- Do not expose the I/O connector to prolonged sunlight. **The plastic may become brittle.** Cover the connector on the Workhorse if it will be exposed to sunlight.
- Do not store the ADCP in temperatures over 75 degrees C. **The urethane faces may be damaged.** Check the temperature indicator inside the shipping case. It changes color if the temperature limit is exceeded.
- Store batteries in a **cool dry location** (0 to 21 degrees C).
- Do not store batteries inside the ADCP for extended periods. **The batteries may leak.**
- Vent the system before opening by loosing the end-cap. **If the ADCP flooded with batteries installed, there may be gas under pressure inside the housing.**
- Do not scratch or damage the O-ring surfaces or grooves. **If scratches or damage exists, they may provide a leakage path and cause the ADCP to flood.** Do not risk a deployment with damaged O-ring surfaces.
- Do not lift or support a WorkHorse by the external I/O cable. **The connector or cable will break.**

## 6.2 Assembly Guidelines

- Read the Maintenance guide for details on WorkHorse re-assembly. Make sure the housing assembly O-rings stay in their groove when you re-assemble the WorkHorse. Tighten the hardware as specified. **Loose, missing, stripped hardware, or damaged O-rings can cause the WorkHorse transducer to flood.**
- Place a light amount of DC-111 lubricant on the end-cap connector pins (rubber portion only). **This will make it easier to connect or remove the I/O cable and dummy plug.**
- Do not connect or disconnect the I/O cable with power applied. An exception to this is the external battery case. The external battery case connector is always "hot" when batteries are installed. When you connect the cable with power applied, you may see a small spark. **The connector pins may become pitted and worn.**
- Do not attach a Workhorse Monitor or Sentinel I/O cable or power supply to the Workhorse Rio Grande ADCP. The Workhorse Mariner, Monitor and Sentinel ADCPs are 24 VDC systems. **The Workhorse Rio Grande uses 12VDC only.**
- The WorkHorse I/O cable is *wet* mate-able, not *under water* mate-able.

## 6.3 Deployment Guidelines

- Read the appropriate WorkHorse User's Guide and the Software User's Guides. **These guides have tutorials to help you learn how to use the ADCP.**
- WorkHorse Sentinel batteries are shipped inside the ADCP but not connected. **Connect the battery and seal the ADCP before deployment.**
- Align the compass whenever the battery pack or recorder module is replaced, or when any ferrous metals are relocated inside or around the WorkHorse housing. **Ferro-magnetic materials affect the compass.**
- The AC power adapter is not designed to withstand water. **Use caution when using on decks in wet conditions.**
- Avoid using ferro-magnetic materials in the mounting fixtures or near the Workhorse. **Ferro-magnetic materials affect the compass.**

# 7 Unpacking

When unpacking, use care to prevent physical damage to the transducer face and connector. Use a soft pad to protect the transducer. When handling any electronics modules, follow electrostatic discharge (ESD) prevention measures.

## 7.1 Inventory

You should have the following items.

- ADCP transducer
- I/O cable
- AC power adapter (Monitor and Sentinel only)
- Deck Box and mounting plate (Mariner only)
- Ship Kit (includes manuals, software (*WinSC* and *PlanADCP* (Sentinel only), *WinADCP*, *RDI Tools*, and Documentation CD), and power cords)
- Shipping crate (please save all foam for reshipping use)

## 7.2 Visual Inspection of the WorkHorse

Inspect the WorkHorse using the following table and Figure 1, page 11 and Figure 2, page 11. If you find any discrepancies, call RDI for instructions.

**Table 2: Visual Inspection Criteria**

| Item | Inspection Criteria |
|---|---|
| Transducer | Check the urethane face. There should be no gouges, dents, scrapes, or peeling (see Figure 1, page 11). |
| I/O connector | Check the I/O connector for cracks or bent pins (see Figure 2, page 11). |
| I/O Cable | Check the cable connectors for cracks or bent pins. |
| Deck Box (Mariner only) | Check the connectors on the rear panel for cracks or bent pins. |

**Figure 1. WorkHorse Transducer Face View**

**Figure 2. WorkHorse End-Cap Connector View**

**NOTE.** The Rio Grande End-Cap is Red to differentiate it from the Monitor and Sentinel End-Cap. The I/O cable pin-out arrangement is different between a Rio Grande and a Monitor/Sentinel.

**CAUTION.** Do not attach a Workhorse Monitor or Sentinel I/O cable or power supply to the Workhorse Rio Grande ADCP. The Workhorse Monitor and Sentinel ADCPs are 24 VDC systems. **The Workhorse Rio Grande uses 12 VDC only.**

**NOTE**. Refer to the appropriate ADCP User's Guide for instructions on how to connect and use the ADCP.

# 8 Using the Documentation CD

The documentation CD contains an electronic version of the WorkHorse Technical Manual. All of the files are in Adobe® Portable Document Format (*.pdf). To use these files, you must install the Acrobat version 5.0 Reader. This program is included on the documentation CD.

**NOTE.** If you have an earlier version of Acrobat Reader installed on your computer, please uninstall it prior to installing the version 5.0 Reader.

**Table 3: Acrobat Reader Toolbar**

| Tool | Description |
|---|---|
|  | Use these tools to visit Adobe's website. |
|  | Use these tools to open or print a pdf file. |
|  | Use the navigation pane button to turn on or off the table of contents or thumbnail pane. |
|  | Use the hand tool to move the page around so that you can view all the areas on it. |
|  | Zoom In/Out tool |
|  | Text select tool. Use this button to highlight text to be copied into another document. |
|  | Select the Graphics Select tool by holding down the mouse button on the text select tool and dragging to the graphics select tool. Use this button to select a graphic to be copied into another document. |
|  | Use these buttons to page through a document. |
|  | Use these buttons to return to a previous or next view. |
|  | Actual size tool. |
|  | Fit in window tool. |
|  | Fit width tool. |
|  | Rotates page 90 degrees. |
|  | Find tool. Find will search only the current open document. |
|  | Search tools. Use search to find information located in the WorkHorse Technical Manual. |

## 8.1 Opening PDF Documents

Do one of the following:

- Start Acrobat Reader. Choose **File**, **Open**. In the Open dialog box, select the filename, and click **Open**. Acrobat Reader documents have the extension *.pdf.
- Double-click the file icon in your file system.

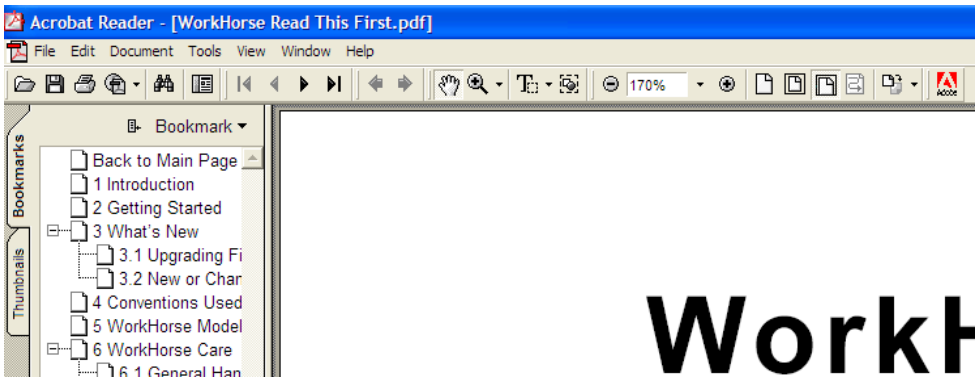


**Figure 3. Adobe Acrobat Reader Screen**

## 8.2 Viewing Documents

The minimum and maximum zoom levels available depend on the current page size. If you magnify a page to a size larger than the window, use the hand tool to move the page around so that you can view all the areas on it. Moving a PDF page with the hand tool is like moving a piece of paper on a desk with your hand.

***To Resize a Page to Fit the Window***:

Do one of the following:

- To resize the page to fit entirely in the window, click the **Fit in Window** button, or choose **View**, **Fit in Window**.
- To resize the page to fit the width of the window, click the **Fit Width** button, or choose **View**, **Fit Width**. Part of the page may be out of view.
- To resize the page so that its text and graphics fit the width of the window, choose **View**, **Fit Visible**. Part of the page may be out of view.

***To Increase Magnification***:

Do one of the following:

- Select the **Zoom-In** tool, and click the page.

- Select the **Zoom-In** tool, and drag to draw a rectangle, called a marquee, around the area to magnify.
- Click the **Magnification** button in the status bar, and choose a magnification level.

***To Decrease Magnification***:

Do one of the following:

- Select the **Zoom-Out** tool, and click the page.
- Select the **Zoom-Out** tool, and drag to draw a marquee the size you want the reduced page to be.
- Click the **Magnification** button in the status bar, and choose a magnification level.

**NOTE.** When the **Zoom-In** tool is selected, you can press **Ctrl** while clicking or dragging to **Zoom Out** instead of in. When the **Zoom-Out** tool is selected, press **Ctrl** to zoom in.

***To Return a Page to Its Actual Size***:

Click the **Actual Size** button, or choose **View**, **Actual Size**.

## 8.3 Paging Through a Document

Acrobat Reader provides buttons, keyboard shortcuts, and menu commands for paging through PDF documents.

***To Go to Another Page***:

Do one of the following:

- To go to the next page, click the **Next Page** button in the command bar or status bar, press the **Right Arrow key**, press **Ctrl** + **Down Arrow** key, or choose **Document**, **Next Page**.
- To go to the previous page, click the **Previous Page** button in the command bar or status bar, press the **Left Arrow** key, press **Ctrl** + **Up Arrow** key, or choose **Document**, **Previous Page**.
- To move down one line, press the **Down** Arrow key.
- To move up one line, press the **Up** Arrow key.

**NOTE.** The **Down** and **Up** Arrow keys move you one line at a time when you are not in Fit in Window view. In Single Page mode, these keys move you one page at a time if the page fills the entire screen.

- To move down one screen, press **Page Down** or **Return**.
- To move up one screen, press **Page Up** or **Shift** + **Return**.

- To go to the first page, click the **First Page** button in the command bar or status bar, press the **Home** key, or choose **Document**, **First Page**.
- To go to the last page, click the **Last Page** button in the command bar or the status bar, press the **End** key, or choose **Document**, **Last Page**.

***To Retrace Your Viewing Path***:

Do one or more of the following:

- To retrace your path within a PDF document, click the **Go to Previous View** button in the command bar, or choose **Document**, **Go Back** for each step back. Alternatively, click the **Go to Next View** button, or choose **Document**, **Go Forward** for each step forward.
- To retrace your viewing path through other PDF documents, choose **Document**, **Go Back Doc** for each step back or **Document**, **Go Forward Doc** for each step forward. Alternatively, hold down **Shift**, and click the **Go Back** or **Go Forward** button. This command opens the other PDF documents if the documents are closed.

## 8.4 Using Find

You can use the Find command to find a complete word or part of a word in the *current* PDF document. Acrobat Reader looks for the word by reading every word on every page in the file, including text in graphics.

***To Find a Word Using the Find Command***:

a. Click the **Find** button, or choose **Edit**, **Find**.

b. Enter the text to find in the text box.

c. Select search options if necessary:

- **Match Whole Word** Only finds only occurrences of the complete word you enter in the text box. For example, if you search for the word stick, the words tick and sticky will not be highlighted.
- **Match Case** finds only words that contain exactly the same capitalization you enter in the text box.
- **Find Backwards** starts the search from the current page and goes backwards through the document.

d. Click **Find**. Acrobat Reader finds the next occurrence of the word.

***To Find the Next Occurrence of the Word***:

Do one of the following:

- Choose Edit, Find Again.
- Reopen the **Find** dialog box, and click **Find Again** (the word must already be in the **Find** text box).

## 8.5 Using Search

The Acrobat **Search** command allows you to perform full-text searches of PDF document collections (i.e. the WorkHorse Technical Manual), whereas the Acrobat **Find** command allows you to search only a single document. The **Search** command also provides powerful tools for limiting and expanding a search. Opening a PDF document associated with an index automatically makes the index searchable.

***To Select an Index***:

Choose **Edit**, **Search**, **Select Indexes** to list the currently available indexes and to add or delete indexes, and then do one of the following in the **Index Selection** dialog box:

- To add an index to the available indexes list, click **Add**, navigate to the file named *index.pdx*, and double-click on the index file.

**NOTE.** The index file (*index.pdx*) is in the same folder as the pdf files.

- To remove an index, select the index name, click **Remove**, and then click **OK**.
- To select or deselect an index, select the box for the index, and then click **OK**. Indexes that are grayed out are currently unavailable for searching.

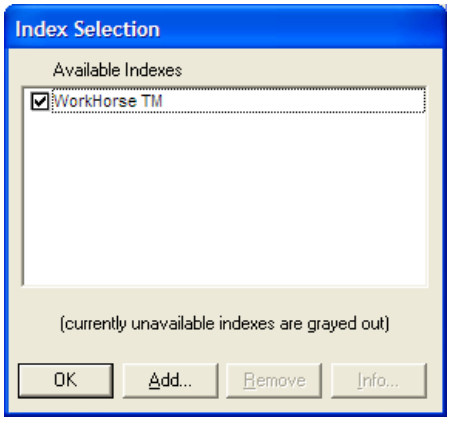


**Figure 4. Selecting the Index**

***Using the Search Command***

The **Search** command allows you to perform a search on PDF documents. You can search for a simple word or phrase, or you can expand your search query by using wild-card characters and operators. You can use the search options to further refine your search.

***To Perform a Full-Text Search***:

a. Choose **Edit**, **Search**, **Query**.

b. Type the text you want to search for in the **Find Results Containing Text** box: The text that you type in can be a single word, a number, a term, or a phrase.

c. To clear the search dialog box and redefine the search, click **Clear**.

***To View a Document Returned From a Search***:

a. Double-click the document name to open the document.

b. Use the **Search** buttons on the tool bar to view all the matches for your query.

c. Review the search results that automatically appear in the text box: To highlight the next occurrence of a match in the document, click **Next Highlight**. To highlight the previous occurrence of a match in a document, click **Previous Highlight**.

d. To highlight the first occurrence of a match in the next document listed or previous document listed, **Shift-click Next Highlight** or **Previous Highlight**.

e. To view any other document listed, select **Search Results** to redisplay the list, and then double-click the document name.

## 8.6 Copying Text and Graphics

You can select text or a graphic in a PDF document, copy it to the Clipboard, and paste it into a document in another application such as a word processor.

**NOTE.** If a font copied from a PDF document is not available on the system displaying the copied text, the font cannot be preserved. A default font is substituted.

***To Select Text and Copy It to the Clipboard***:

Select the **Text Select** tool, and do one of the following:

- To select a line of text, select the first letter of the sentence or phrase and drag to the last letter.

- To select all the text on the page, choose **Edit**, **Select All**. To de-select the text and start over, click anywhere outside the selected text.

Choose **Edit**, **Copy** to copy the selected text to the Clipboard.

***To Copy Graphics to the Clipboard***:

Select the **Graphics Select** tool by holding down the mouse button on the text select tool and dragging to the graphics select tool, or press **Shift-V** as necessary to cycle through the group of tools. The cursor changes to the cross-hair icon.

Drag a rectangle around the graphic you want to copy. To deselect the graphic and start over, click anywhere outside the selected graphic.

Choose **Edit**, **Copy** to copy the graphic to the Clipboard.

**NOTE.** The graphic is copied using the *.wmf file format.

# 9 How to Contact RD Instruments

If you have technical problems with your instrument, contact our field service group in any of the following ways:


**RD Instruments**

9855 Businesspark Ave.
San Diego, California 92131
(858) 693-1178
FAX (858) 695-1459
Sales - rdi@rdinstruments.com
Field Service - rdifs@rdinstruments.com

**RD Instruments Europe**

5 Avenue Hector Pintus
06610 La Gaude, France
+33(0) 492-110-930
+33(0) 492-110-931
rdi@rdieurope.com
rdifs@rdieurope.com

Web: www.rdinstruments.com

# 10 Warranty

Solely for the benefit of the original buyer, RD Instruments (RDI) warrants all new products of its manufacture to be free from defects in material and workmanship. RDI will replace or repair free of charge, F.O.B. at its factory in San Diego, California or other location designated by RDI, any part or parts returned to it within one year of original delivery, which RDI's examination shall show to have failed under normal use and service.

For those parts or components of a product which RDI does not manufacture itself but which are acquired from other vendors, the duration on times of this warranty given above shall not exceed those of the vendor's warranties for such parts or components.

This warranty applies to all goods manufactured by RDI and is included in the Terms and Conditions contained in sales documents of RDI which Terms and Conditions set forth the provisions that govern all sales made by RDI. This warranty also applies to all other activities performed by research, design, design and development, joint development, field engineering, field testing and operation training and is the ONLY WARRANTY GIVEN FOR THE SALE OF PRODUCTS OR SERVICES. NO WARRANTIES IMPLIED IN LAW, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT WILL RDI BE LIABLE FOR CONSEQUENTIAL DAMAGES RESULTING FROM THE PURCHASE OR USE OF RDI PRODUCTS, OR RESULTING FROM ANY DELAYS OR FAILURE OF PERFORMANCE OR RDI UNDER ANY AGREEMENT, OR RESULTING FROM ANY SERVICES FURNISHED BY RDI.

This warranty may not be modified, amended, or otherwise changed except in writing and properly executed by an officer of RDI.

# NOTES