

Workhorse Monitor/Sentinel Technical Manual

Firmware version 8.30 and below

The current revision of the Workhorse Technical Manual is January 1998. If you have an older revision of the manual, you may visit our web site at www.rdinstruments.com and download a new version of the manual.

The Workhorse Technical Manual is available in the following formats.

- Windows® help file
- Adobe Acrobat® pdf file

Interim Changes as of 15 February, 2000

These are the most-recent corrections to the Workhorse Technical Manual. These changes will be documented in the next release of the Workhorse manual. The expected release date of the new manual is April 2000. Until then, please add the following corrections to bring your manual up-to-date.

Rev	Page	Correction
Apr96	1-2, 1-4, 1-6, and 1-7	The I/O cable has changed. The 25-to-9-pin adapter is no longer required.
Apr96	4-5	Add the following to section 4-4. Note: The factory compass calibration is done without the battery pack installed. You must perform the compass calibration (with the battery installed, if applicable) before deploying the ADCP.
Apr96	4-6	The compass calibration has changed. Please follow the prompts as shown on your screen. The new text is included in the Read Me First document.
Apr96	6-2	Add the following paragraph to Section 6-2: The desiccant pack inside the Workhorse is not tied to anything. A potential problem exists when the pack is jostled against the RS-422/RS-232 switch and changes the setting or places the switch in an in-between state. Verify the switch is fully in the correct position and try to wake up the ADCP again.
Apr96	6-6	Replaced the I/O cable wiring drawing with a new drawing. The power connection has been moved and the 24-pin connector has been replaced with a 9-pin connector. Also, remove all reference to RS-485.
Apr96	C-2	Remove the word "battery-backed" in Section C-1.2, par. 4. The commands are stored in RAM only. RAM is buffered from a temporary power loss by a capacitor.
Apr96	C-23	Time of First Ping command: Change the format to TFyy/mm/dd, hh:mm:ss (remove "ff", hundredths of seconds).
Apr96	N/A	Add Appendix Z - Internal Pressure Sensor to your manual if you have this option. This appendix is included in the Read This First document. Appendix-Z also documents changes to the the output data format.
Apr96	6-7	Replaced internal I/O cable wiring drawing with a new drawing. Where shown, "IN A" was changed to "OUT A", "IN B" to "OUT B", "OUT A" to "IN A", and "OUT B" to "IN B". Also, all references to "RS-485" were removed

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Apr96	6-4	Change section 6-2.6 step a to read: Connect a jumper between pin 2 to pin 6 and another jumper between pin 1 to pin 5 of the underwater connector at the Workhorse end of the cable.										
May97	N/A	All of the above corrections were made to the May 97 revision of the manual.										
May97	4-1	Delete the first sentence in the NOTE box.										
May97	4-5	Change step a to read: Remove the end-cap (see "End-cap Removal," page 4-1). Change step h to read: Install the end-cap (see "End-cap Replacement," page 4-3).										
May97	D-27	Add a note to the bottom of the page – NOTE: The PD8 command is designed for serial output only. No data is recorded to the internal recorder. Use this command for real-time applications only.										
May97	2-4	Change CONSEQUENCES - Last Bin Range to read: This is the vertical distance from the Workhorse transducer face to the middle of the last (furthest) measured bin or depth cell. It is determined from the number of bins x bin size + first bin range. If this number is displayed in RED, then the CHOICES are set to collect data further from the Workhorse transducer than this expected maximum range.										
May97	2-2	Add a note under CHOICES - Bin Size to read: Adjust the CHOICES "number of bins" and "bin size" until the CONSEQUENCE "last bin range" is approximately five percent greater than the "expected max range".										
May97	C-27	Change the example for the EB-command to read: A bottom-mounted ADCP is receiving heading from its internal compass. A magnetic declination map for the deployment area shows a declination of W3.5 (-3.5). To counteract the effects of this magnetic field, you must enter a heading bias value of -3.5. To convert -3.5 to an EB-command value, multiply the desired bias angle in degrees by 100: EB = -3.5 x 100 = -350 = EB-350										
Jan98	N/A	All of the above corrections were made to the January 98 revision of the manual.										
Jan98	2-3	Change step e, Magnetic Variation to read: Use the Heading Bias command (see EB-command, Appendix-C) to counteract the effects of magnetic declination on the internal Workhorse compass at the deployment site.										
Jan98	D-7	Figure D-6, change bytes 53-56 from Pressure Variance to Pressure Standard Deviation.										
Jan98	D-15	Change the description for byte 32 to read: This field reflects if the Speed of Sound Sensor is available. The bit pattern is the same as listed for the EZ-command (above).										
Jan98	A-5	The outline installation drawing 967-6001 shows the incorrect dimensions for the transducer head. Change the following dimensions: <table><thead><tr><th>"Old"</th><th>"New"</th></tr></thead><tbody><tr><td>34.5 [1.36]</td><td>39.4 [1.55]</td></tr><tr><td>50.1 [1.97]</td><td>56.6 [2.22]</td></tr><tr><td>66.0 [2.60]</td><td>71.0 [2.83]</td></tr><tr><td>70.0 [2.76]</td><td>73.2 [2.88]</td></tr></tbody></table>	"Old"	"New"	34.5 [1.36]	39.4 [1.55]	50.1 [1.97]	56.6 [2.22]	66.0 [2.60]	71.0 [2.83]	70.0 [2.76]	73.2 [2.88]
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Rev	Page	Correction
Jan98	A-5	The outline installation drawing 967-6002 shows the incorrect dimensions for the transducer head. Change the following dimensions: "Old" "New" 37.9 [1.75] 44.5 [1.75] 50.0 [2.00] 56.4 [2.22] 62.3 [2.45] 67.1 [2.64] 69.8 [2.75] 73.1 [2.88] 34.0 [1.34] 38.1 [1.50] 101.0 [3.98] 98.0 [3.86]

New or Changed Commands Brought About By Firmware Changes

Version	Description
8.13	Added combined hard and soft iron calibration under the "AF" command. Improved existing displays of hard iron calibration and compass performance examination "AX" command. Added capability to support an internal pressure sensor (adds 8 bytes to Variable Leader output). Changes were documented in the Jan 97 version of the Output Data Format booklet. Added two extra reserved bytes to Variable Leader output to be software. Changes were documented in the Jan 97 version of the Output Data Format booklet.
8.14	Added WU command to allow triangle weighting of pings in an ensemble. Added CPU serial number to fixed leader output. Changes were documented in the Jan 97 version of the Output Data Format booklet. Added CP polling mode command. Added CM master/slave ping synchronization.
8.15	Manual not affected by changes.
8.16	Added PD8 console ASCII output format. Added 'O' ("oh" not zero) menu entry for Feature Select options. Added OL command to list features. Added BP command on "Deploy?" menu if Bottom-Track is installed. Changed BX default for 300-kHz from 2500 to 2000.
8.17	Removed obsolete 'CA' and 'RT' commands. Added RDS3 capability to allow synchronization of ADCPs with other instruments. Includes new 'S' menu. The RD Instruments Sleepy Sensor Synchronization protocol allows a Workhorse to synchronize measurements with another Workhorse or any other instrument that adheres to the RDS3 specification. The implementation of RDS3 in the Workhorse adds a new 'S' menu with five new commands (see the Expert Command Guide help file for command descriptions).
8.18	Manual not affected by changes.
8.19	Added 300-baud communication mode to CB command (CB0xx).
8.20	Manual not affected by changes.

Version	Description
8.21	Revised command structure for DEPLOY and SYSTEM menus. Changed default for EZ command to calculate depth from pressure sensor instead of taking it from ED command. Changed output of pressure sensor variance in PD0-command to standard deviation.
8.22	Manual not affected by changes.
8.23	Manual not affected by changes.
8.24	Manual not affected by changes.
8.25	Changed the default error screening velocity (WE) from 1000 mm/s to 2000 mm/s.
8.26	Manual not affected by changes.
8.27	Manual not affected by changes.
8.28	Added PD9 format. See the Expert Command Guide for documentation on this output data format.
8.29	Manual not affected by changes.
8.30	Manual not affected by changes.

New or Changed Software

RD Instruments is pleased to announce that new Windows software has been released for Self-Contained applications. Unfortunately, our documentation has not been updated to reflect the new software. New documentation will be available soon. The Read Me First, Sentinel Setup Card, Sentinel User's Guide, Quick Reference Card, and Workhorse Technical Manual all refer to the DOS based software.

The DOS based software will still be included with your system, but we recommend that you install only the Windows based programs **WinSC** and **WinADCP**. These programs will give you all of the capabilities of our older DOS software plus additional data analysis capabilities. Each program includes a help file that documents the software.

WinSC uses Wizards[®] to do the following:

- Helps you to create a command file (DOS equivalent program PLAN).
- Communicate directly with the ADCP (DOS equivalent programs BBTALK, CONNECT, and RESET).
- Helps you to verify the ADCP's compass alignment (DOS equivalent programs BBTALK and TESTADCP).
- Tests the ADCP (DOS equivalent programs BBTALK and TESTADCP).
- Sends the commands from your command file to the ADCP and sets up the ADCP's recorder (DOS equivalent programs INITADCP and DEPLOY).
- Creates a deployment log file (DOS equivalent program DEPLOY).
- Starts the Workhorse pinging (DOS equivalent program DEPLOY).

- Recovers data and erases the recorder (DOS equivalent programs RECOVER, MEM-INFO, ERASEMEM).

WinADCP gives the user a visual sense of the entire set of data. It also allows the user to zoom in on a portion of the data for closer analysis. **WinADCP** replaces CHECKDAT, QUIKLOOK, and WATCH (playback of data portion).

How to Contact RD Instruments

Please report any documentation problems or errors to our Customer Service department:

RD Instruments

9855 Businesspark Ave.

San Diego, California 92131

(858) 693-1178

FAX (858) 695-1459

Internet - rdi@rdinstruments.com

Field Service - rdifs@rdinstruments.com

RD Instruments Europe

5 Avenue Hector Pintus

06610 La Gaude, France

+33(0) 493-110-930

+33(0) 493-110-931

rdi@rdieurope.com

rdifs@rdieurope.com

<http://www.rdinstruments.com>