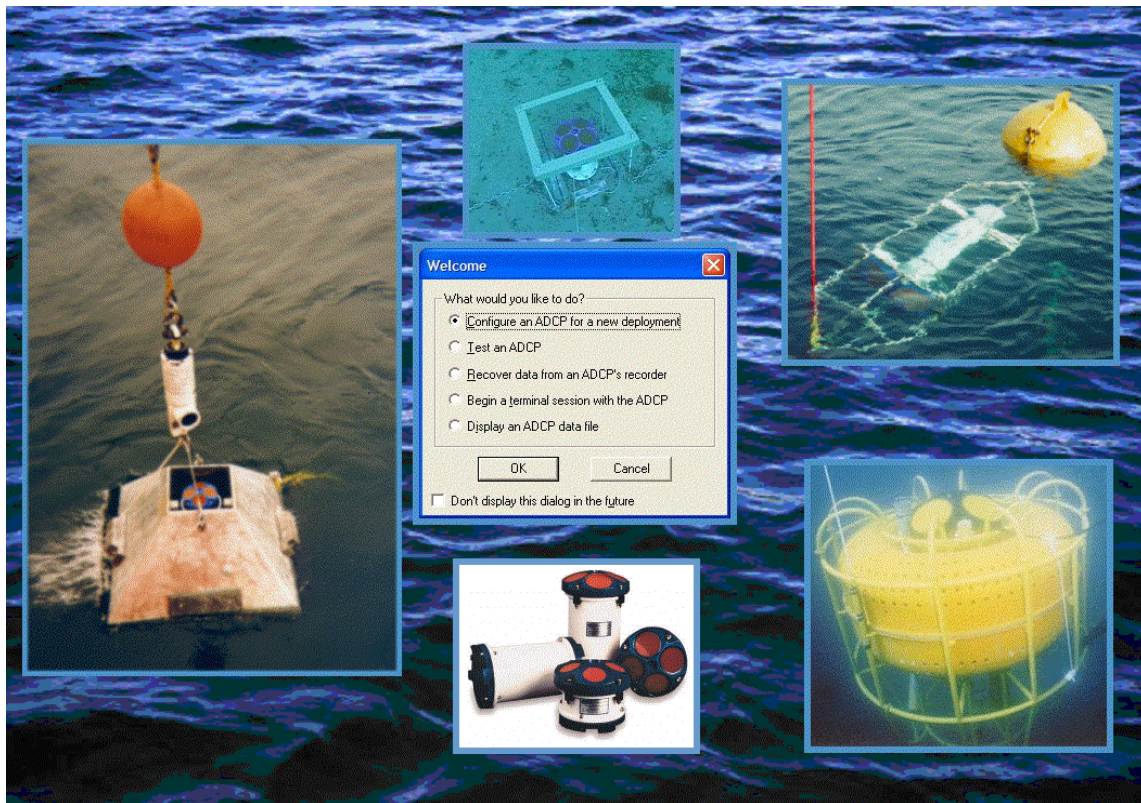
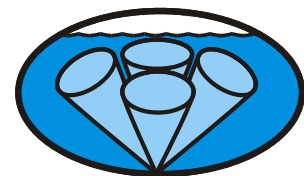


Self-Contained ADCP Applications WinSC and PlanADCP User's Guide



P/N 957-6159-00 (September 2003)



RD Instruments
Acoustic Doppler Solutions

Table of Contents

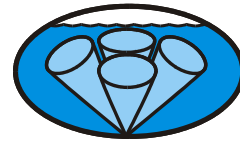
1	Introduction	1
1.1	System Requirements.....	1
1.2	Software Installation.....	2
1.3	Conventions Used in this Guide.....	3
2	Using WinSC	4
2.1	Starting WinSC	4
2.2	WinSC Shortcut Keys	5
2.3	Setup ADCP Communication.....	5
2.4	Changing the Communication Settings.....	7
3	Deployment Files	8
3.1	Saving Deployment Files	8
3.2	Opening Deployment Files.....	9
3.3	Importing a Command File.....	10
3.4	File Naming Conventions	11
3.5	Deployment Wizard.....	12
3.6	Self-Contained ADCP Deployments	16
4	Terminal Window	16
4.1	Test the ADCP	16
4.2	Send Commands to the ADCP	17
5	Recorder Functions.....	17
5.1	Check the Recorder Status.....	17
5.2	Recover Data.....	18
5.3	Erase the Recorder.....	19
6	View Recorded Data	20
7	PlanADCP	22
7.1	Starting PlanADCP	23
7.2	Using the PlanADCP Wizard.....	23
7.3	Making Changes to the Command File	33
7.4	Basic Hardware Setting	33
7.5	Advanced Command File Editing.....	34
7.6	Advanced Hardware Settings.....	38
7.7	Expert Screen	39
7.8	Manually Editing a Command File	41
7.9	Sample Printout of a Command File	42
8	Software History	44

List of Figures

Figure 1.	WinSC Welcome Screen	4
Figure 2.	Setting the Communication Port.....	6
Figure 3.	Setting the Communication Settings	6
Figure 4.	Communication Menu	7
Figure 5.	Save the Deployment File	9
Figure 6.	Opening a Deployment File	9
Figure 7.	Deployment Wizard Check List	10
Figure 8.	Importing a Command File	10
Figure 9.	Deployment Wizard - Planning	12
Figure 10.	Deployment Wizard – Setting the Clock	13
Figure 11.	Deployment Wizard – Compass Verification.....	13
Figure 12.	Deployment Wizard – Test the ADCP	14
Figure 13.	Deployment Wizard – Zero the Pressure Sensor	14
Figure 14.	Deployment Wizard – Erase the Recorder	15
Figure 15.	Deployment Wizard – Send the Commands.....	15
Figure 16.	Recover Data Screen	19
Figure 17.	Erase the Recorder	20
Figure 18.	Viewing Data with WinSC.....	21
Figure 19.	Using PlanADCP to Create a Command File	22
Figure 20.	Select the ADCP Type	23
Figure 21.	Select the Frequency	24
Figure 22.	Select if the ADCP is Using Batteries	24
Figure 23.	Select the Salinity.....	25
Figure 24.	Depth Range	26
Figure 25.	Depth Cell Size	27
Figure 26.	Deployment Type	26
Figure 27.	Data Storage	28
Figure 28.	Ensemble Time	28
Figure 29.	Deployment Length	29
Figure 30.	Finished (Stand-Alone Message Shown).....	29
Figure 31.	Save the Command File.....	30
Figure 32.	Back to WinSC	30
Figure 33.	Basic Screen (No Bottom Track)	31
Figure 34.	Basic Hardware Setting Screen.....	33
Figure 35.	PlanADCP Advanced Screen (with Bottom Track On)	34
Figure 36.	PlanADCP Advanced Screen (with Waves Gauge On).....	37
Figure 37.	Advanced Hardware Settings Screen.....	38
Figure 38.	Advanced Hardware Settings Screen with Lowered ADCP	38
Figure 39.	PlanADCP Expert Screen (no Bottom Track)	39
Figure 40.	PlanADCP Expert Screen (with Bottom Track On)	40
Figure 41.	PlanADCP Expert Screen (with Lowered ADCP).....	40
Figure 42.	Edit a Command File.....	41

List of Tables

Table 1:	WinSC Shortcuts.....	5
Table 2:	Command File Created Using PlanADCP	43



RD Instruments
Acoustic Doppler Solutions

WinSC and PlanADCP User's Guide

1 Introduction

This guide is an overview on using the Self-Contained ADCP Applications utility software provided with your system. The CD contains two major modules: *WinSC* and *PlanADCP*. The *WinSC* program works as a shell program to launch the *PlanADCP* program. The *PlanADCP* program allows the user to create a deployment configuration file. After creating a deployment configuration file (or loading an existing file) the *WinSC* program will continue with the testing, deployment, recovery of data, and quick view of the data.



NOTE. This guide covers *WinSC* version 1.29 and *PlanADCP* version 2.02.

1.1 System Requirements

WinSC and *PlanADCP* require the following:

- Windows 95®, Windows 98®, Windows NT 4.0® with Service Pack 4 installed, Windows 2000®, or Windows XP®
- Pentium class PC 233 MHz (350 MHz or higher recommended)
- 32 megabytes of RAM (64 MB RAM recommended)
- 6 MB Free Disk Space plus space for data files (A large, fast hard disk is recommended)
- One Serial Port (two or more High Speed UART Serial Port recommended)
- Minimum display resolution of 800 x 600, 256 color (1024 x 768 recommended)
- CD-ROM Drive
- Mouse or other pointing device

1.2 Software Installation

To install the Self-Contained ADCP Applications utility software, do the following.

- a. Insert the compact disc into your CD-ROM drive and then follow the browser instructions on your screen. If the browser does not appear, complete Steps “b” through “d.”
- b. Click the **Start** button, and then click **Run**.
- c. Type **<drive>:launch**. For example, if your CD-ROM drive is drive D, type **d:launch**.
- d. Follow the browser instructions on your screen.

Once, installed, you will have two shortcuts added to your Windows® **Start** menu, **RD Instruments** folder. The **WinSC** shortcut will start *WinSC*. **PlanADCP** will start the *PlanADCP* program.



NOTE. The default directory for installation of *WinSC* is C:\program files\RD Instruments\WinSC. The default directory for installation of *PlanADCP* is C:\program files\RD Instruments\PlanADCP.



NOTE. *PlanADCP* is launched through *WinSC*. Alternatively, you can run *PlanADCP* as a stand-alone module.

1.3 Conventions Used in this Guide

Conventions used in the *WinSC* and *PlanADCP* User's Guide have been established to help you learn how to use these programs quickly and easily.

Windows menu items are printed in bold: **File** menu, **Import Mission**. 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 (*WinSC*, *PlanADCP*) and file names (*dpl1_6.dpl*).

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

```
WorkHorse Broadband ADCP Version X.XX  
RD INSTRUMENTS (c) 1996-2002  
ALL RIGHTS RESERVED  
>
```

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).

2 Using WinSC

The program *WinSC* is designed to take a user from the planning stage through data recovery.

2.1 Starting WinSC

- a. In Windows, click **Start, Programs, RD Instruments, WinSC** (default location – use your installation settings if different). *WinSC* will start and display the **Welcome** screen.

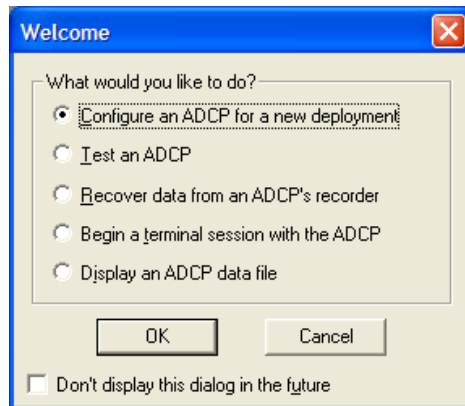


Figure 1. WinSC Welcome Screen

- b. The **Welcome** screen provides quick access to the most often used functions of *WinSC*. You may select one of the functions and click **OK** or click **Cancel** to begin using *WinSC*.
 - **Configure an ADCP for a new deployment** – This will create a new deployment file and start the deployment wizard (see [“Deployment Wizard,” page 12](#)).
 - **Test an ADCP** – this will start the testing portions of the deployment wizard (see [“Test the ADCP,” page 16](#)).
 - **Recover data from an ADCP's recorder** – This will open the recover data screen (see [“Recover Data,” page 18](#)).
 - **Begin a terminal session with the ADCP** – This will open a terminal window and allow you to “talk” to the ADCP (see [“Terminal Window,” page 16](#)).
 - **Display an ADCP data file** – This will open a raw data file and display the data (see [“View Recorded Data,” page 20](#)).



NOTE. If you do not want to see the Welcome message when *WinSC* starts, select the **Don't display this dialog in the future** box and click **OK**.

2.2 WinSC Shortcut Keys

Use the following keys to quickly do tasks.

Table 1: WinSC Shortcuts

Function	Shortcut
New deployment	Control-N
Open	Control-O
Recover Recorded Data	Control-Page Down
Terminal	Control-T
Save	Control-S
Print	Control-P
ADCP Setting	F5
Send a Break (Terminal mode only)	End

2.3 Setup ADCP Communication

Before you can establish communications with the ADCP for the first time, you must configure *WinSC*.



NOTE. These settings will be used when *WinSC* is started.

- Connect and power up the ADCP as shown in the appropriate [ADCP User's Guide](#).
- Start *WinSC*.
- At the **Welcome** screen, click **Begin a terminal session with the ADCP**. Click **OK**.



NOTE. If *WinSC* has not been configured, you will be prompted to set the communications settings. Click **Yes** to continue.

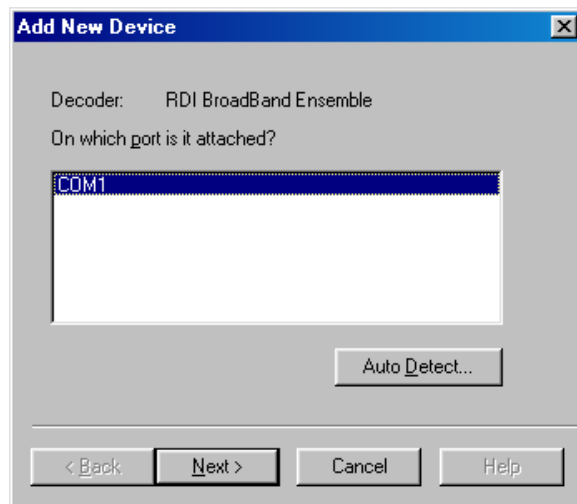


Figure 2. Setting the Communication Port

- d. Select the COM port that the ADCP is connected to (see [Figure 2](#)). If you are unsure of the setting, use **Auto Detect**.
- e. Select the baud rate, parity, and stop bits (see [Figure 3](#)). If you are unsure of the settings, use **Auto Detect**.

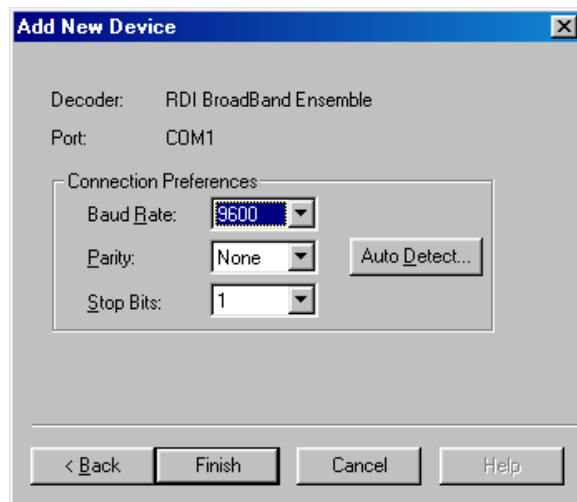


Figure 3. Setting the Communication Settings



NOTE. WinSC and the ADCP must both be using the same communications settings. See the CB-command in the [WorkHorse Command and Output Data Format Guide](#).

- f. Click **Finish**.
- g. On the **File** menu, click **Break** (you can also press the **End** key to send a break). You should see the wakeup message appear on the deployment log window. For example;

```
>>>>> Function starting 10/02/98 08:34:31 >>>>>

[BREAK Wakeup A]

WorkHorse Broadband ADCP Version x.xx
RD Instruments (c) 1996-1998
All rights reserved.
>
```

2.4 Changing the Communication Settings

Once you establish communications with the ADCP for the first time, *WinSC* uses the same settings for future communications. To change the settings, do the following.

- Connect and power up the ADCP as shown in the appropriate [ADCP User's Guide](#).
- Start *WinSC*.
- At the **Welcome** screen, click **Begin a terminal session with the ADCP**. Click **OK**.
- From the **ADCP** menu, click **Settings...F5**.

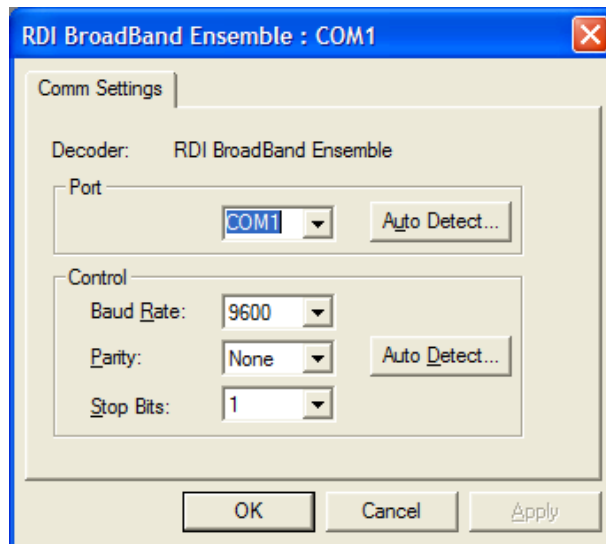


Figure 4. Communication Menu

- Select the COM port that the ADCP is connected to (see [Figure 4](#)). If you are unsure of the setting, use **Auto Detect**.
- Select the baud rate, parity, and stop bits. If you are unsure of the settings, use **Auto Detect**.



NOTE. *WinSC* and the ADCP must both be using the same communications settings. See the CB-command in the Command and Output Data Format Guide.

- g. On the **File** menu, click **Break** (you can also press the **End** key to send a break). You should see the wakeup message appear on the ADCP terminal window. For example;

```
[BREAK Wakeup A]

WorkHorse Broadband ADCP Version x.xx
RD Instruments (c) 1996-1998
All rights reserved.
>
```

3 Deployment Files

Deployment files keep track of what steps have been completed for the deployment. All files will be in the same directory using the deployment name. For example, if you save the deployment file as *Test1.dpl*, the deployment log file will be *Test1.scl*, and the first raw data file collected during this deployment will be *Test1000.000* (see [“File Naming Conventions,” page 11](#)). All files will be located in the folder named Test.

To create a new deployment file do *one* of the following.

- At the **Welcome** screen, click **Configure an ADCP for a new deployment**. This will create a new deployment file (default name *Dpl1_*) and start the deployment wizard. When you are ready, click **File, Save** to name the deployment file.
- On the **File** menu, click **New Deployment**. A deployment log file (default name *Dpl1_*) will open and the deployment wizard will start. When you are ready, click **File, Save** to name the deployment file.

3.1 Saving Deployment Files

Save the deployment file by clicking **File, Save As**. Enter a **New Directory Name** for the file that you have just created (the deployment file and directory name will match). This deployment file will save which steps have been completed in the Deployment Wizard and the path to the command file. You can use this same method in case you wish to create several different setup files for the same ADCP. As an example, you could create a command text file that has a 6-meter depth cell (bin) size. You might save this to a text file with the name *BIN6M.txt* and call the deployment file *Dpl_6.dpl*. You could then create another command file and *.dpl file with a 16-meter depth cell (bin) size with the same concept. Then when you want to actually use the proper command file you just have to select the *.dpl file you intend to use.

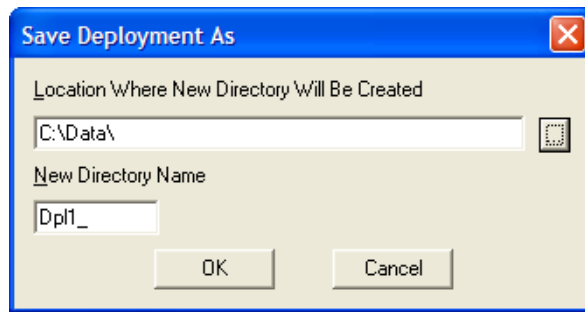


Figure 5. Save the Deployment File

3.2 Opening Deployment Files

To open a deployment file, on the **File** menu, click **Open**. On the **Files of Type** box, select **Deployments (*.dpl)** (see Figure 6). Select the deployment file to open and click **Open**.

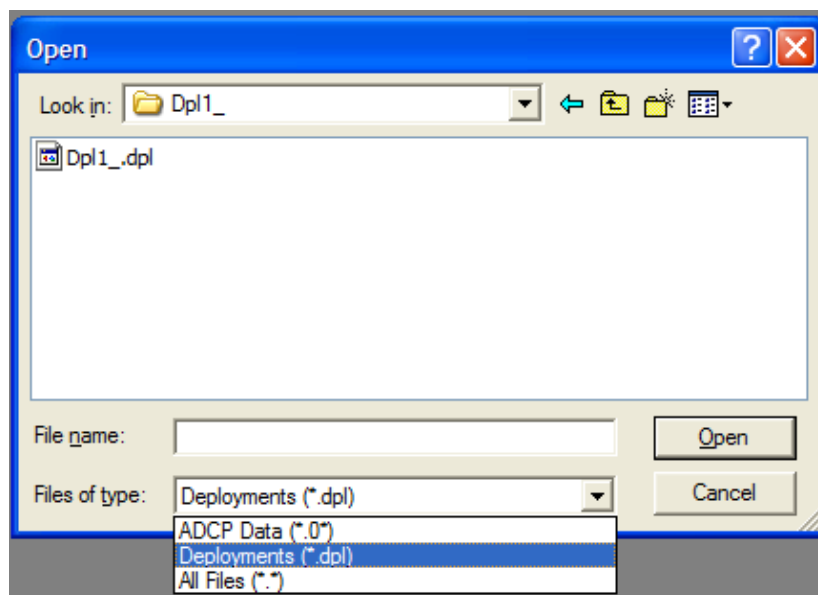


Figure 6. Opening a Deployment File

To see what steps have been completed using the Deployment Wizard, click the **Functions** menu. A check mark will be next to each completed item. In the example shown in Figure 7, page 10, the Planning step has been completed.

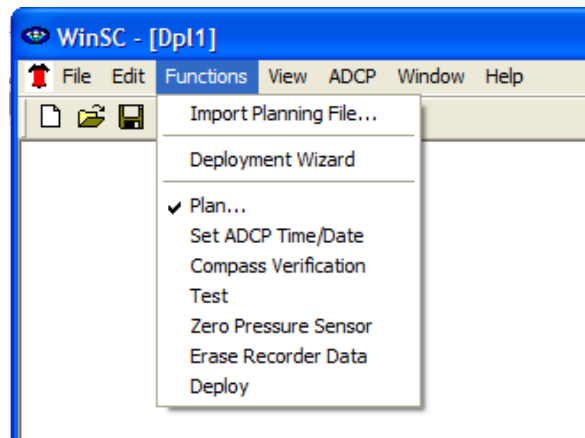


Figure 7. Deployment Wizard Check List

3.3 Importing a Command File

If you have a command file created from other deployments or software, you can import it into *WinSC*. The command file must be ASCII text only. Any line that is a comment must start with a semi-colon (;).

- a. On the **Functions** menu, click **Import Planning File**.
- b. *WinSC* will search for any command files created using *PlanADCP* (*.txt, *.cmd, and *.whp).
- c. Select the file and click **Open**.

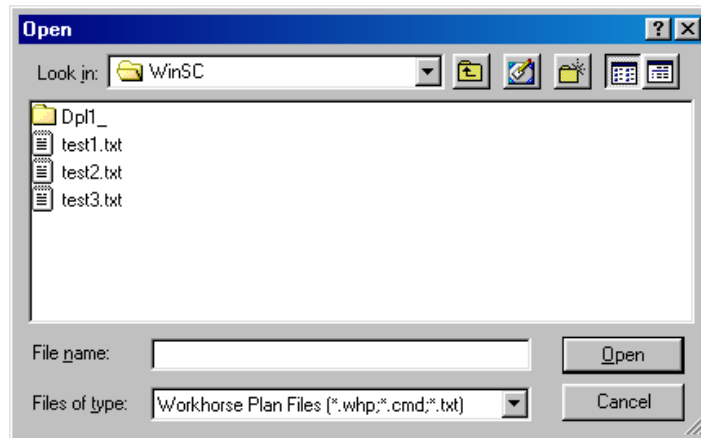


Figure 8. Importing a Command File

3.4 File Naming Conventions

The *WinSC* software gives you a complete record of information that might help you understand your data. To help you associate these files with your data, they use the same deployment name. Be careful not to lose these files!



NOTE. Choose and use Deployment Names carefully: they help you identify and organize all the data and log files associated with each deployment.

Raw Data files produced by *WinSC* have the following filename format:

DeployName000.nnn

Where:

DeployName	is a user-entered name for the deployment (Must be EXACTLY five characters)
000	is the deployment number (changes with each stop/restart),
nnn	is the recorder card number, which is incremented when the recorder card is full (.000 = card one, .001 = card two)

The file extensions have the following meaning:

DeployName.WHP	WorkHorse command file created by <i>Plan</i> .
DeployName.SCL	Deployment log file created by <i>WinSC</i> . This file contains all of the commands sent to the WorkHorse (from *.WHP) and the WorkHorse's system information before deployment.
DeployName.DPL	Binary deployment status file. This file keeps track of which steps were completed when using the deployment wizard.

3.5 Deployment Wizard

There are seven steps the deployment wizard helps lead you through; Planning, Setting the ADCP's clock, Compass Verification, Pre-Deployment Tests, and sending/verifying the commands to the ADCP. RDI highly recommends using the wizard each time you deploy the ADCP. The deployment wizard will start whenever a new deployment file is created. To use the deployment wizard, do the following.

- a. Connect and power up the WorkHorse as shown in the appropriate [ADCP User's Guide](#).
- b. Start *WinSC*.
- c. Start the Deployment Wizard by doing *one* of the following.
 - At the **Welcome** screen, click **Configure an ADCP for a New Deployment**. Click **OK**.
 - Click **File, New Deployment** (the deployment wizard will start automatically).
 - If you are working on an open deployment file (*.dpl), on the **Functions** menu, click **Deployment Wizard**.



NOTE. Choose and use Deployment Names (*.dpl) carefully: they help you identify and organize all the data and log files associated with each deployment.

- d. The first step is planning. When you click **Next**, the program *PlanADCP* will start. For more information on *PlanADCP*, see [“PlanADCP,” page 22](#). If you want to skip this step, check the **Skip** box, or click **Next** to begin using *Plan*.

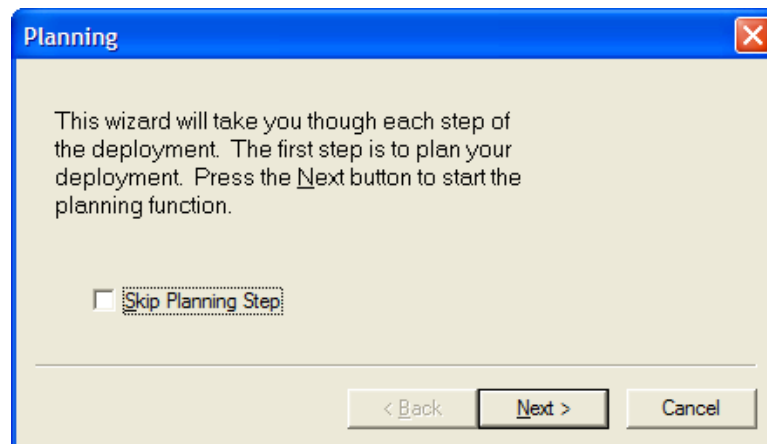


Figure 9. Deployment Wizard - Planning

- e. The second step will set the ADCP's clock to the computer's time and date using the TS-command. For more information on the TS-command, see the [WorkHorse Commands and Output Data Format Guide](#). If you want to skip this step, check the **Skip** box or click **Next** to begin setting the clock.

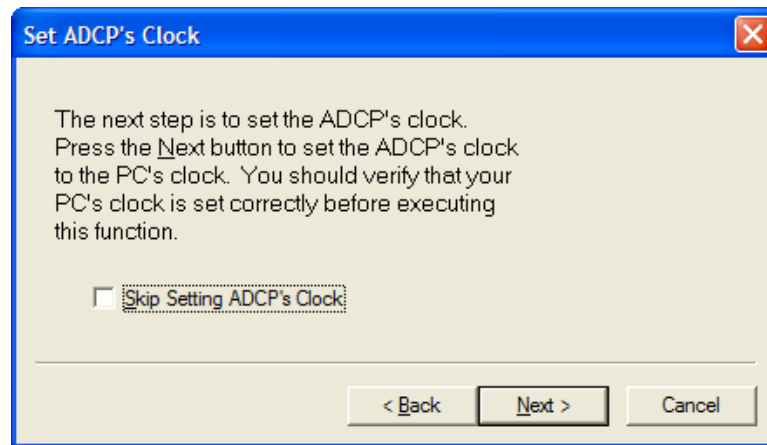


Figure 10. Deployment Wizard – Setting the Clock

- f. The third step will verify the compass using the AX-command. For more information on the AX-command, see the [WorkHorse Commands and Output Data Format Guide](#). If you want to skip this step, check the **Skip** box or click **Next** to begin verifying the compass.

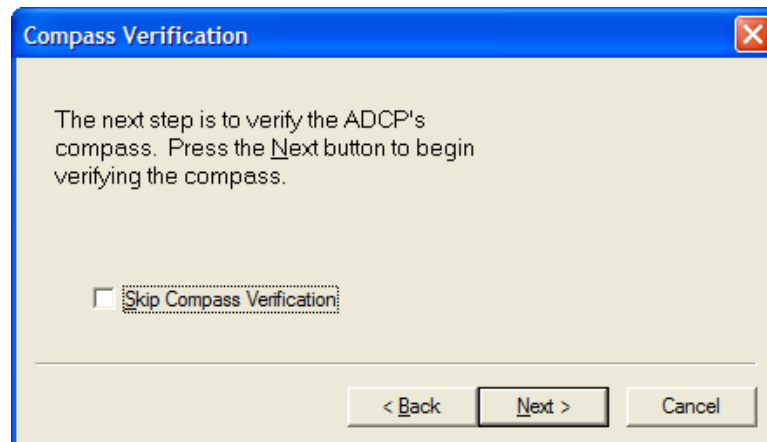


Figure 11. Deployment Wizard – Compass Verification

- g. The fourth step will run the pre-deployment tests Deploy?, System?, TS?, PS0, PA, PC2, RS, and PC1-commands. For more information on these commands, see the [WorkHorse Commands and Output Data Format Guide](#). If you want to skip this step, check the **Skip** box or click **Next** to begin the pre-deployment tests.

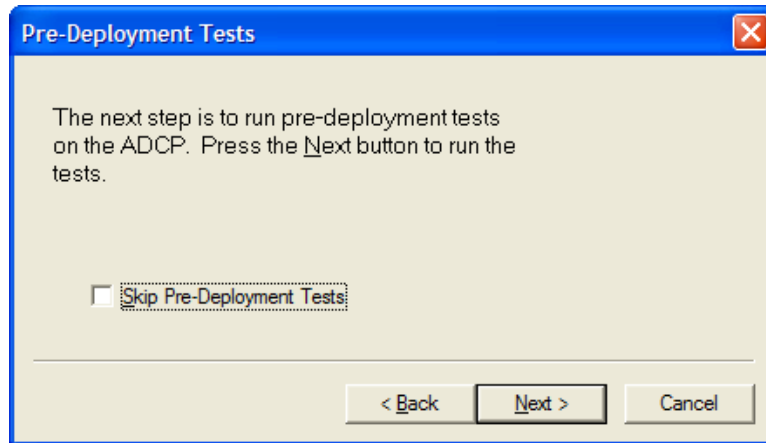


Figure 12. Deployment Wizard – Test the ADCP

- h. The fifth step will zero the pressure sensor using the AZ-command. For more information on the AZ-command, see the [WorkHorse Commands and Output Data Format Guide](#). If you want to skip this step, check the **Skip** box or click **Next** to zero the pressure sensor.

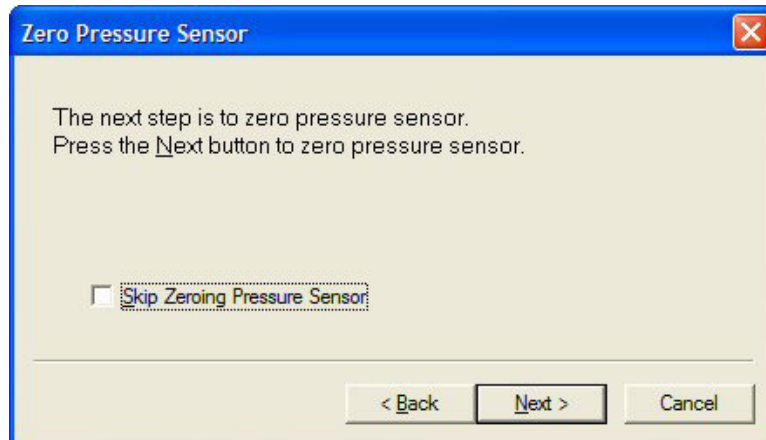


Figure 13. Deployment Wizard – Zero the Pressure Sensor

- i. The sixth step will erase the recorder using the RE-command. For more information on the RE-command, see the [WorkHorse Commands and Output Data Format Guide](#). If you want to skip this step, check the **Skip** box or click **Next** to erase the recorder.

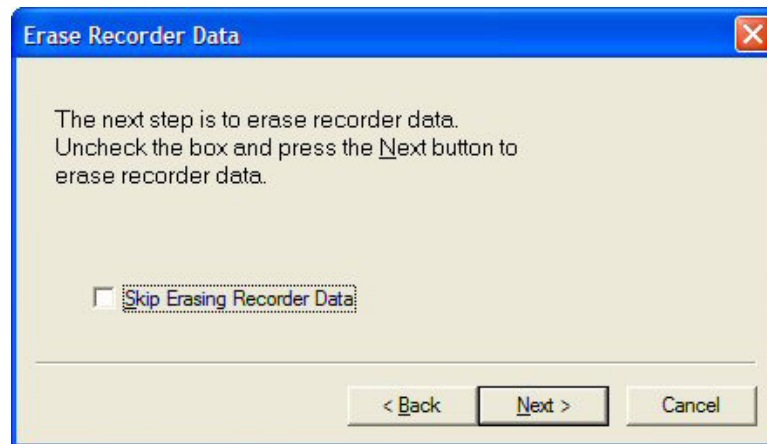


Figure 14. Deployment Wizard – Erase the Recorder

- j. The seventh and final step in the Deployment Wizard will send the commands from the command file to the ADCP. Click **Next** to send the commands. When the commands have been sent to the ADCP, you should see a message “*You have successfully deployed the ADCP.*” Click **OK**.



NOTE. If you have not saved the deployment file, you will be prompted to name the deployment. Choose and use Deployment Names carefully: they help you identify and organize all the data and log files associated with each deployment.

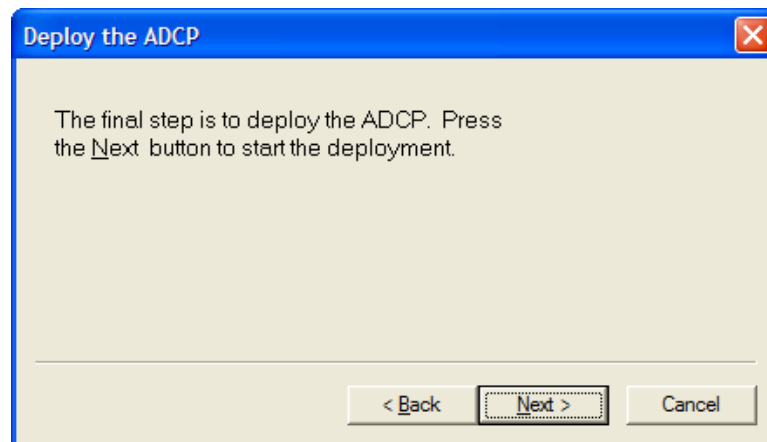


Figure 15. Deployment Wizard – Send the Commands

3.6 Self-Contained ADCP Deployments

Use the appropriate ADCP [User's Guide](#) to verify the ADCP is sealed and ready for deployment. Use the **Deployment Wizard** or on the **Functions** menu, click **Deploy**. The deployment commands will be sent to the ADCP.

Before deploying the ADCP, scroll through the deployment log file and look for error messages. Correct as needed and re-send the commands. Once the commands have been sent to the ADCP, proceed as follows.

- a. Disconnect the I/O cable and install the dummy plug on the ADCP's end-cap.



CAUTION

Do not send a break, any other command, or run any other programs once the commands have been sent to the ADCP or your commands will be over-written.

Disconnect the I/O cable before turning off power to the computer. Some computers may send a break signal out the serial ports when shutting down.

- b. Deploy the ADCP.

4 Terminal Window

The terminal window is used to send commands to the ADCP and view ADCP responses to *WinSC* functions.

4.1 Test the ADCP

Use the following steps to test the ADCP.

- a. Connect and power up the ADCP as shown in the appropriate [ADCP User's Guide](#).
- b. Start *WinSC*.
- c. To test the ADCP do *one* of the following.
 - At the **Welcome** screen, click **Test an ADCP**. Click **OK**. This will run the pre-deployment tests Deploy?, System?, TS?, PS0, PA, PC2, RS, and PC1 (see the [WorkHorse Commands and Output Data Format](#) guide for details on the test printouts). The results of the tests will be printed to the screen and saved to the log file (*.scl).
 - On the **File** menu, click **Test ADCP**. This will open an ADCP Terminal window and run the pre-deployment tests.

4.2 Send Commands to the ADCP

Use the terminal screen to send any command to the ADCP.

- Setup communications with the ADCP.
- On the **File** menu, click **Terminal**.
- On the terminal window's menu, click **File, Break** to wakeup the ADCP (the **END** key will also send a break). For every break sent, you should see the wakeup message.
- At the ">" prompt, type the name of the command to be run.

For example;

```
>CR1
[Parameters set to FACTORY defaults]
```

5 Recorder Functions

WinSC has the capability to check the status, recover data, and erase the recorder.

5.1 Check the Recorder Status

The recorder status function lists the files stored on the recorder in the form of a DOS directory listing. Each PC card is listed as a separate drive.

- Connect and power up the WorkHorse.
- Start *WinSC*.
- On the **File** menu, click **Recorder Status**. You should see a message similar to the following.

```
[BREAK Wakeup A]

WorkHorse Broadband ADCP Version x.xx
RD Instruments (c) 1996-1998
All rights reserved.
>RR
Recorder Directory:
Volume serial number for device #0 is 0000-010f

_RDI_000 000          105284 01-01-00    0:02:02a r  a [   2]
_RDI_001 000          83844 01-01-00    0:09:26a r  a [  54]
_RDI_002 000          72052 01-01-00    0:01:00a r  a [   95]
_RDI_003 000          216772 01-01-00    0:12:34a r  a [ 131]

_RDI_004 000          17916 12-31-99   11:59:20p r  a [ 237]
_RDI_005 000          71516 01-01-00    0:01:00a r  a [ 246]
_RDI_006 000          72052 01-01-00    0:01:00a r  a [ 281]
_RDI_007 000          72052 01-01-00    0:01:00a r  a [ 317]
_RDI_008 000          72588 01-01-00    0:01:00a r  a [ 353]
_RDI_009 000          72588 01-01-00    0:01:02a r  a [ 389]
_RDI_010 000          72052 02-29-00    0:01:00a r  a [ 425]
_RDI_011 000          40960 03-01-00    2:08:00a r  a [ 461]

DPL1_000 000          8268 10-01-98   11:25:38a r  a [ 481]
MINE_000 000          8268 10-01-98   11:43:12a r  a [ 486]
```

```
MINE_001 000                8268 10-01-98  11:48:54a r  a [ 491]

  Bytes used on device #0 = 994480
Total capacity   = 41760768 bytes
Total bytes used = 994480 bytes in 15 files
Total bytes free = 40749056 bytes

>CZ

Powering Down
```

5.2 Recover Data

Once you have recovered the WorkHorse, you should refer to the [Maintenance guide](#) for instructions on cleaning the ADCP exterior. Once the ADCP is clean, use *WinSC* to recover the data. *WinSC* reads the data from the WorkHorse's PC Card recorder and transfers the data to the computer's hard disk. You will be prompted for a directory name on the computer's hard drive where the data will be written. When data recovery is finished, your data files will be in sequential order (i.e., *000.000, *000.001 etc.).

- a. Connect and power up the WorkHorse.
- b. Start *WinSC*.
- c. At the **Welcome Screen** select **Recover Data from an ADCP's Recorder** or from the **File** menu, select **Recover Recorder Data**.
- d. Select the directory where the data will be written.



NOTE. WinSC will increase the baud rate set in the **Com Settings** window (see [“Changing the Communication Settings,” page 7](#)) to 115200 BAUD to reduce the download time.

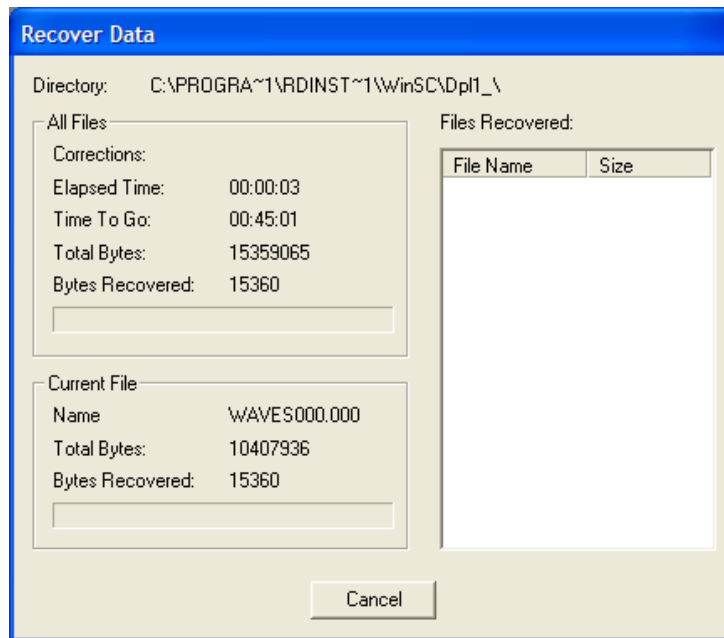


Figure 16. Recover Data Screen

5.3 Erase the Recorder

Once all data has been recovered, the recorder can be erased. *Once erased, the data is not recoverable.*

- Connect and power up the WorkHorse.
- Start *WinSC*.
- Recover the data (see [“Recover Data,” page 18](#)). Once erased, the data is not recoverable.
- On the **File** menu, click **Erase Recorder Data**.
- Type **ErAsE** (you must use the exact upper and lower case characters).
- Click **OK**.

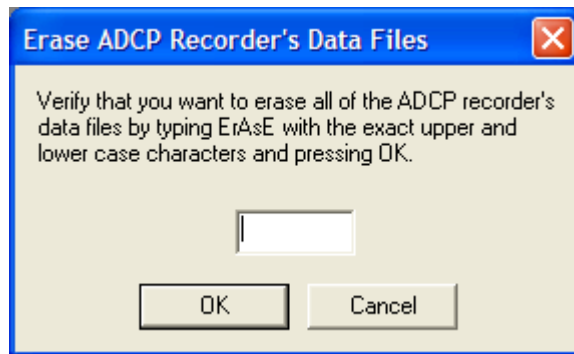


Figure 17. Erase the Recorder



CAUTION. Data is not recoverable after erasing.

6 View Recorded Data

WinSC may be used to view data.

- a. Recover the data.
- b. On the **File** menu, click **Open**.
- c. On the **Files of Type** box, select **ADCP Data (*.0*)**.
- d. Select the file and click **Open**. The data file will display all of the ensembles.

Viewing Options.

- To select a subsection of the data file, use the **View** menu, **Ensemble Selection**. To quickly select a section, hold the **Control** key while dragging the mouse over the area to be selected.
- To increase the contrast of the contoured plot, click inside the window to select it, then use the **View** menu **Contoured** button.
- To change the colors of the plot or other plot controls, click inside the window to select it, then use the **View** menu, **Properties**.
- To select the range of a contoured plot, click inside the window to select it, then use the **View** menu **Ranges** button.
- To increase the size of a window, click inside the window to select it, and then use the **Windows** menu **Maximize Pane** button. To view only the velocity windows, use the **Windows** menu **Maximize Velocity Panes** button. To return to viewing all windows, use the **Windows** menu **All Panes** button. To customize the size of a window, use the **Windows** menu **Split** button.

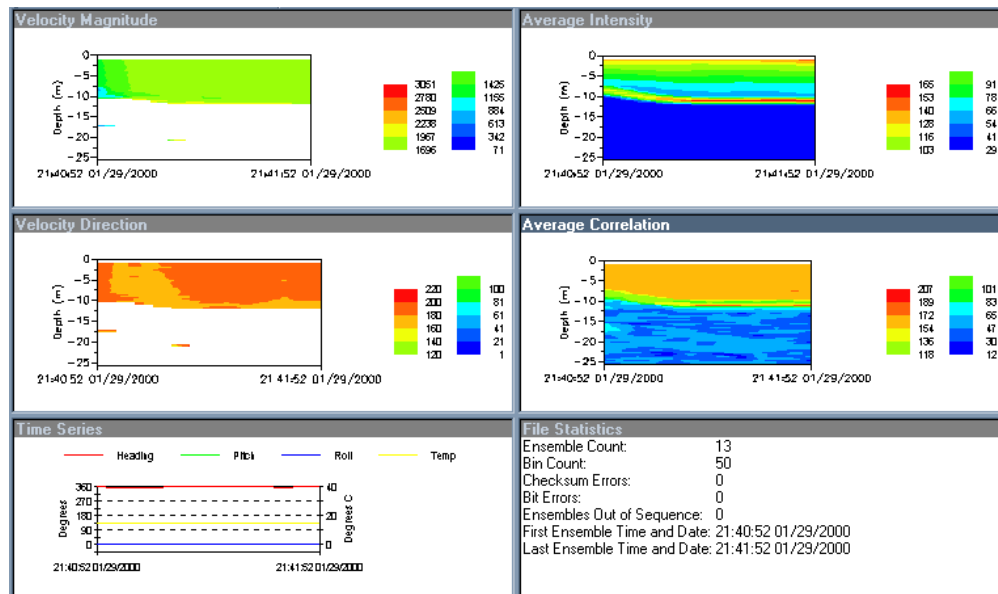


Figure 18. Viewing Data with WinSC

7 PlanADCP

PlanADCP lets you enter known or “best-guess” values for the various ADCP profiling parameters and shows predictions of expected results. This lets you play “what if?” with the input parameters to evaluate trade-offs you may have to make with regard to standard deviation, profiling range, and timing.

We strongly encourage you to develop your command files using the program *PlanADCP*. Using *PlanADCP* allows you to set the command values and see the result of your choices before deploying the ADCP. *PlanADCP* also adds some commands to ensure the ADCP is properly configured.

PlanADCP does not send commands to the ADCP (it is “called” by *WinSC* or can be run independently). Consequently, an ADCP is not needed to use this program. For more information about ADCP commands, see the [WorkHorse Commands and Output Data Format Guide](#).

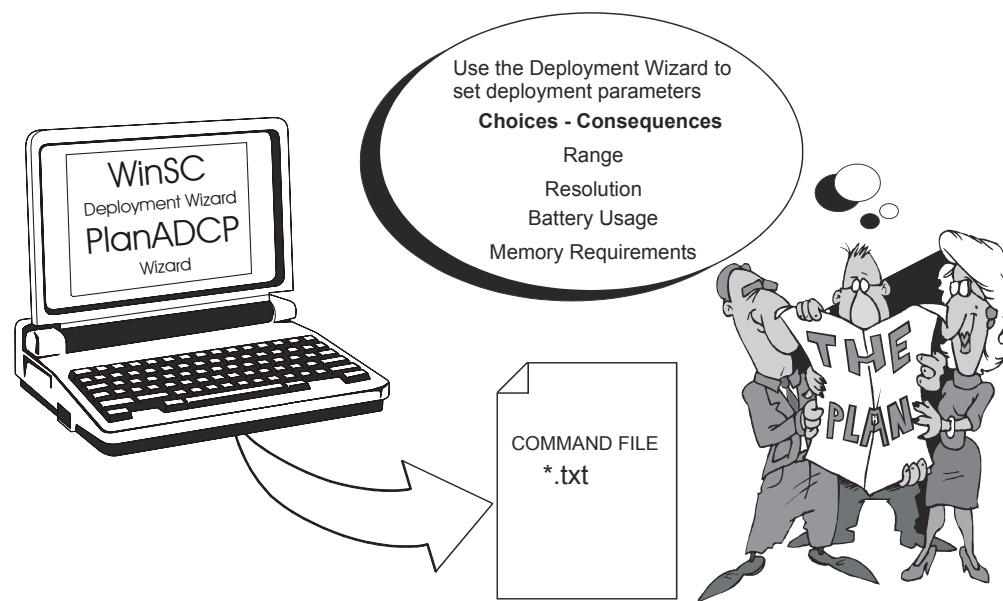


Figure 19. Using PlanADCP to Create a Command File



NOTE. *PlanADCP* is launched through *WinSC*. Alternatively, you can run *PlanADCP* as a stand-alone module.

7.1 Starting PlanADCP

WinSC's deployment wizard calls *PlanADCP* when the planning step is started (see “[Deployment Wizard](#),” page 12). *PlanADCP* can also be started from within *WinSC* by creating or opening a deployment file, then clicking **Functions, Plan**.

To start *PlanADCP* as a stand-alone module, in Windows, click **Start, Programs, RD Instruments, PlanADCP** (default location – use your installation settings if different). *PlanADCP* will start and if this is the first time *PlanADCP* is run, it will automatically start the wizard. The next time it is run, it will automatically open the last command file saved.

7.2 Using the PlanADCP Wizard

To create a command file, do the following steps.

- a. Start *PlanADCP*. If this is the first time *PlanADCP* is run, it will automatically start the wizard. The next time it is run, it will automatically open the last command file saved. To begin the wizard, select **File, New**.
- b. Select the type of ADCP you want to create a command file for. Click **Next**.

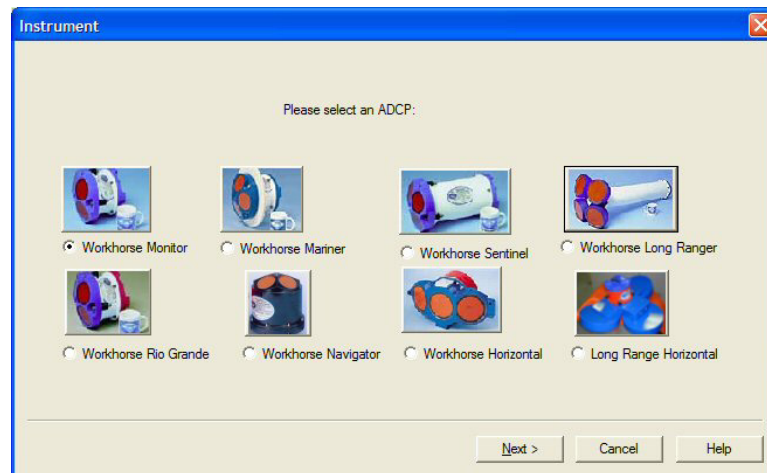


Figure 20. Select the ADCP Type

- c. Select the frequency of your ADCP. The default settings and consequences are based upon the ADCP frequency. Click **Next**.

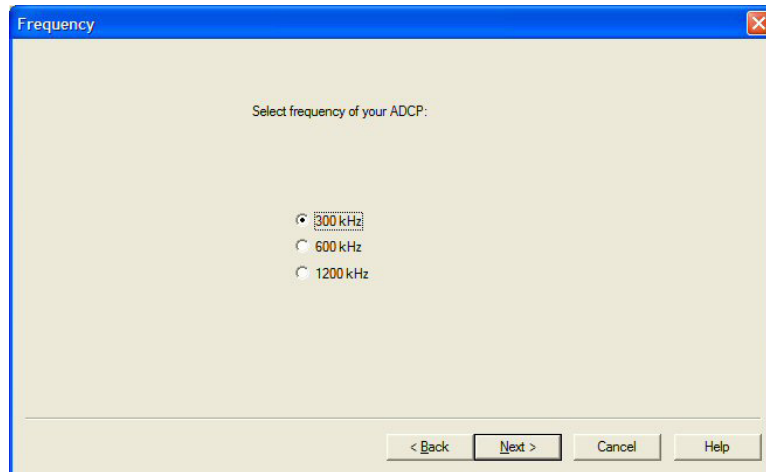


Figure 21. Select the Frequency

- d. Select if the ADCP has internal batteries. If you select **Yes**, then enter the number of battery packs you are going to use. Click **Next**.

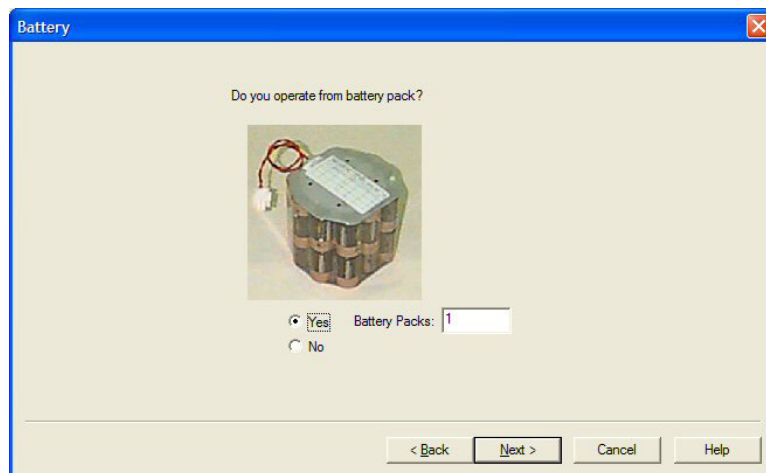


Figure 22. Select if the ADCP is Using Batteries

- e. Select **Ocean/Near Shore** or **River/Lake** to set the salinity. Water salinity affects the maximum range. Salt water is typically 35 ppt, fresh water is 0 ppt. Click **Next**.

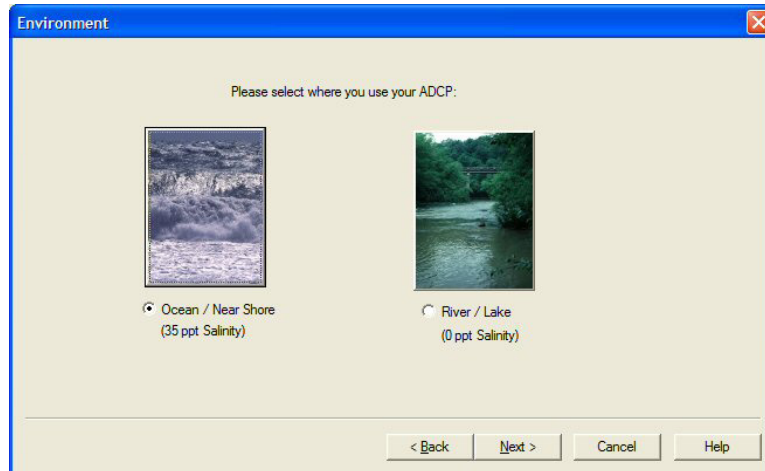


Figure 23. Select the Salinity

- f. Select the type of deployment – **Lowered ADCP**, **Waves Gauge**, **Moored (No Bottom Track)** or **Moving (Bottom Track Required)**. Click **Next**.
- If **Lowered ADCP** is selected (and your ADCP has that feature installed), then the LADCP commands will be added to the command file.
 - If **Waves Gauge** is selected (and your ADCP has that feature installed), then the Waves commands will be added to the command file.
 - If **Moving (Bottom Track Required)** is selected (and your ADCP has that feature installed), then the Bottom Track commands will be added to the command file.
 - If **Moored (No Bottom Track)** is selected, then no special commands will be added to the command file.



NOTE. Lowered ADCP, Wave Gauge, and Bottom Track are feature upgrades for WorkHorse Monitor and Sentinel ADCPs (see the WorkHorse Commands and Output Data Format guide). Bottom Track is not available for Long Ranger ADCPs.

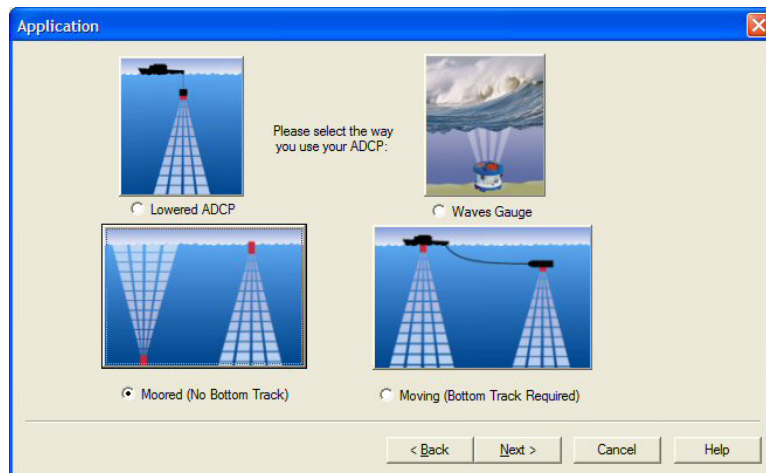


Figure 24. Deployment Type

- g. Select the depth range you wish to measure. The maximum depth range is dependent on the ADCP frequency, water salinity, water temperature, and the depth of the ADCP. Click **Next**.

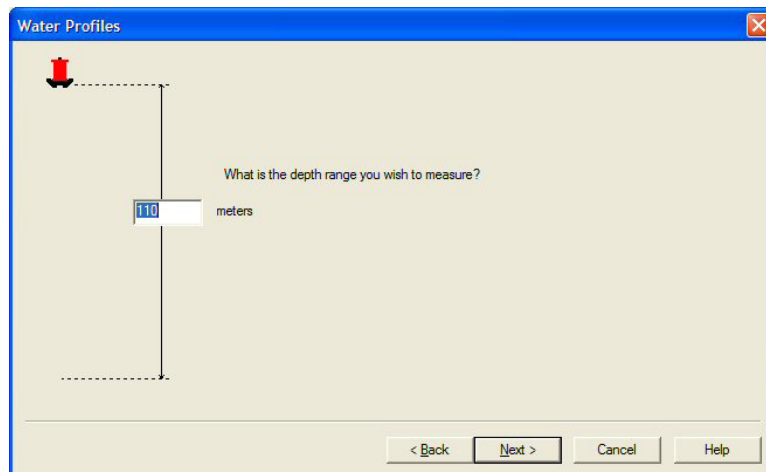


Figure 25. Depth Range

- h. Set the depth cell (bin) size. Adjust the depth cell (bin) size as necessary to get at least 10 depth cells (bins). A larger depth cell (bin) size decreases the standard deviation, but shallow water situations may need to use small depth cells (bins) to get more data points.

PlanADCP will set the number of depth cells (bins) so that the consequence *last depth cell (bin) range* is approximately 10% greater than the depth range set in the previous step. Click **Next**.

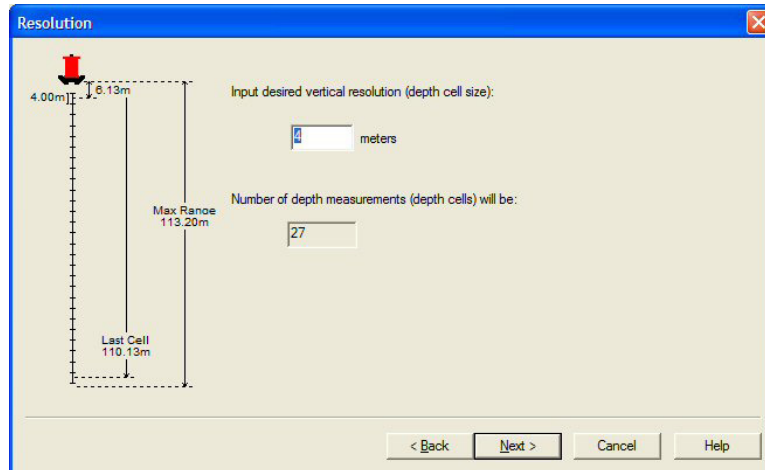


Figure 26. Depth Cell Size

- i. Select where to store the data. Data can be stored internally, sent out the serial port, or both. If you selected **Internally**, enter the amount of memory installed. Click **Next**.
- WorkHorse Sentinel ADCPs have 16-MB (standard) storage on the internal PC card recorder. This can be upgraded to 2 GB by installing two 1-GB cards.
 - WorkHorse real-time deployments usually store data on the computer's hard drive, but can have up to 2 GB on the internal PC card recorder for back-up use.

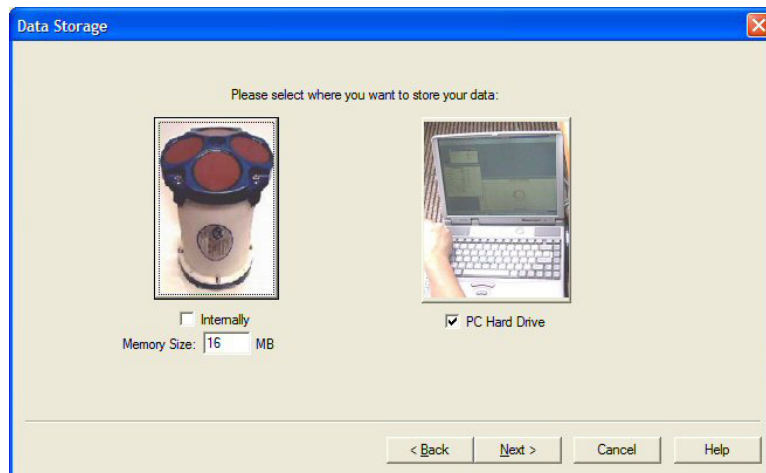


Figure 27. Data Storage

- j. Select how many ensembles per hour you want to record. Click **Next**.

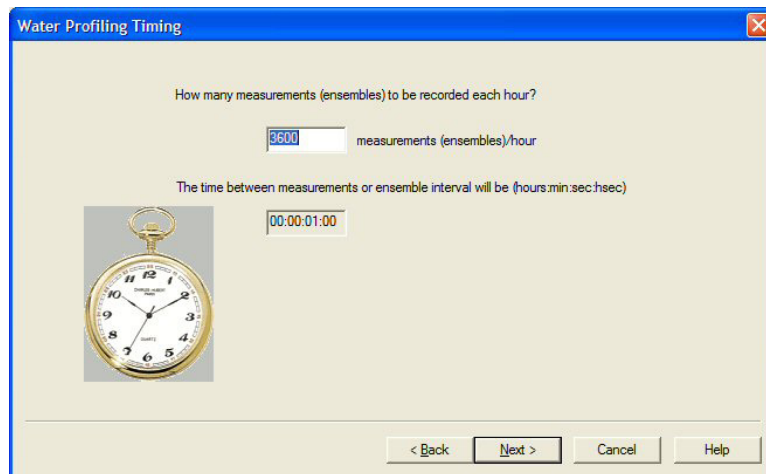


Figure 28. Ensemble Time

- k. Enter the expected duration of the WorkHorse deployment from the time of the first water profiling ping (either immediately or first ping date/time). This duration *does not* produce a command to instruct the WorkHorse to stop data collection; it is for estimating consequences only. This duration is used to estimate the following *consequences*:
- Battery usage.
 - Ensembles.
 - Storage required.

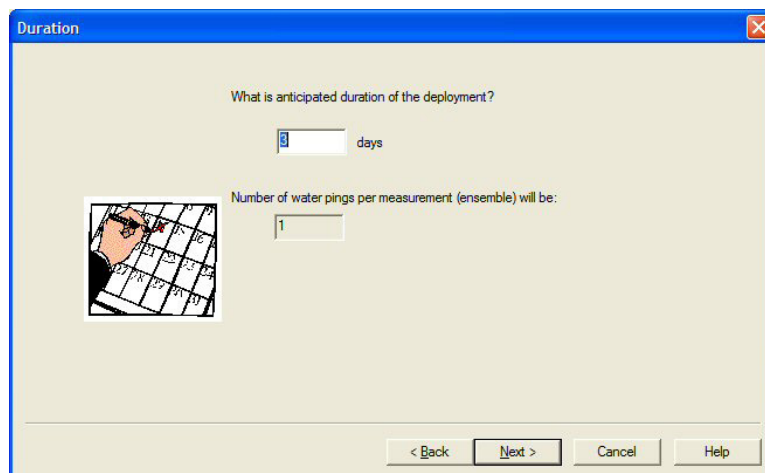


Figure 29. Deployment Length

1. The wizard is now finished. Click **Finish**.

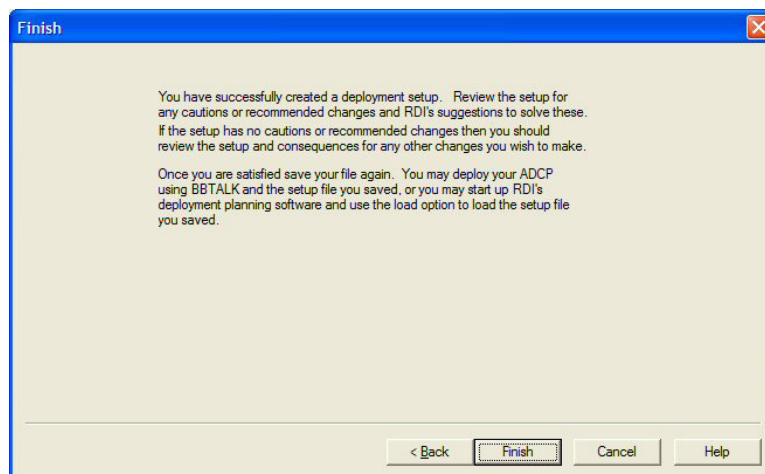


Figure 30. Finished (Stand-Alone Message Shown)



NOTE. The message in the **Finish** screen is slightly different based on whether or not *PlanADCP* was run from *WinSC* or as a stand-alone program.

- m. Name the command file and click **Save** to save the command file. *PlanADCP* will automatically add the extension *.txt to the file.

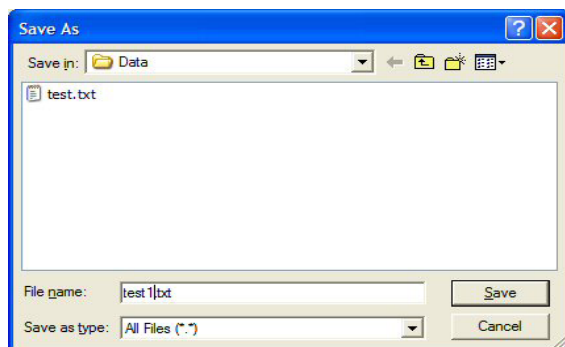


Figure 31. Save the Command File



NOTE. When *PlanADCP* is “called” from *WinSC*, the **Save** dialog will not appear. Click **BacktoSC** when you are done editing the command file to return to *WinSC* (see Figure 32). *PlanADCP* will pass the setup information to *WinSC*. In *WinSC*, save the deployment file (see “Saving Deployment Files,” page 8).

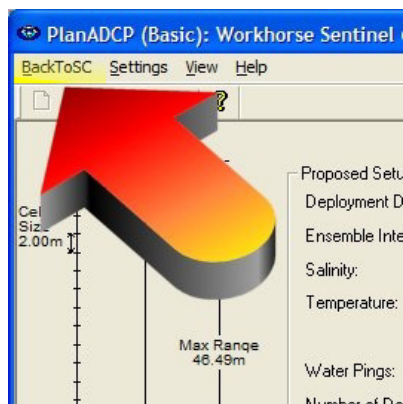


Figure 32. Back to WinSC

- n. The *PlanADCP* (Basic) Screen opens using the settings you selected with the wizard (see [Figure 33, page 31](#)).

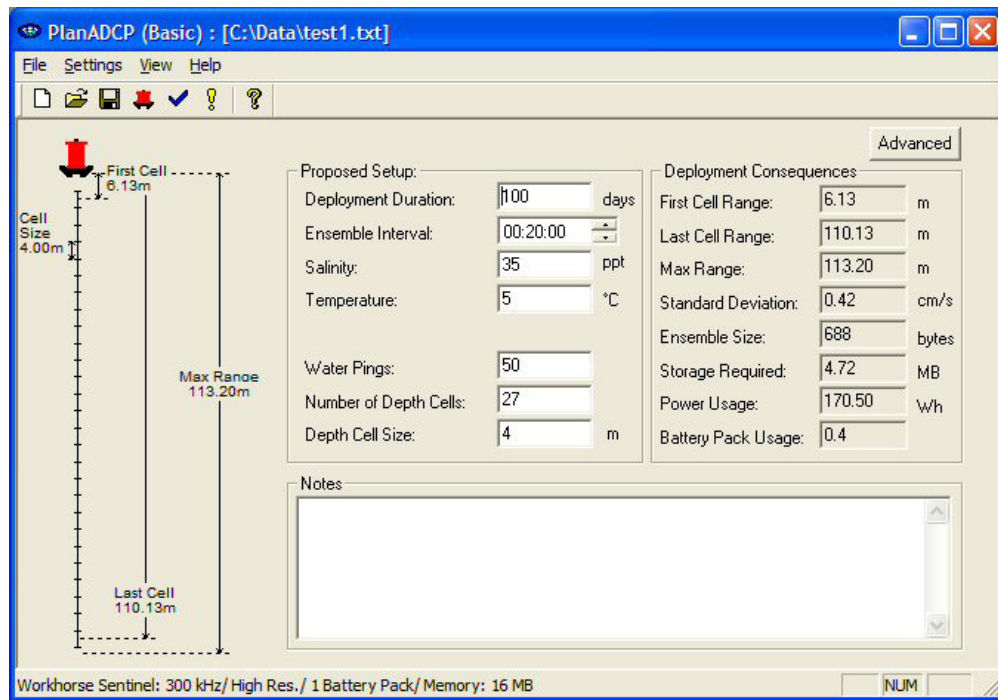


Figure 33. Basic Screen (No Bottom Track)



NOTE. The Basic screen reflects all of your input during the wizard and is the minimal setup you need to use to collect good data.

- o. Review the following consequences.
 - **First Cell Range** – The range from the transducer face to the middle of the first depth cell (bin). The depth cell (bin) size and the WF (blank) command in the command file primarily affect where it is located.
 - **Last Cell Range** – The last depth cell range is determined from the number of depth cells (bins), depth cell size, and first depth cell range.
 - **Max Range** – The maximum profiling range is dependent on the ADCP frequency, water salinity, water temperature, and the depth of the ADCP.
 - **Standard Deviation** – Shows the expected standard deviation of the velocity data stored in each ensemble being collected by the ADCP. Most users will want to minimize this value so that they obtain the best data possible (i.e. data containing the least amount of noise). Standard deviation is dependent on depth cell (bin) size, the number of pings in an ensemble, the water mode, and the ambiguity velocity.

- **Ensemble Size** – Shows the size in bytes of the each ensemble that is either transmitted or recorded by the WorkHorse ADCP.
- **Storage Required** – Shows the amount of storage space required in megabytes (MB) to record the data generated by the WorkHorse over the duration of the deployment. This value should be compared to the free space available on the internal WorkHorse PC card recorder and/or free space on the Computer logging the data transmitted to the serial interface. Free space on the WorkHorse internal recorder can be determined by using the RS or RF command. To convert MB to bytes, multiply the number by 1,048,576 (1024*1024).
- **Battery Usage** – When **Battery Packs** is selected in the Wizard or the **Basic Hardware Settings** screen, the **Battery Usage** will reflect how many battery packs are required. *PlanADCP* uses 450 watt-hours per battery of capacity to determine the battery usage.

When **Power Supply** is selected in the Wizard or the **Basic Hardware Settings** screen, the **Battery Usage** will reflect how many watt-hours are needed for the deployment.



NOTE. The WorkHorse ADCP uses alkaline battery packs designed by RD Instruments. Our battery packs are rated to 450 watt-hours from 0 to 40 degrees C.

If you are using your own battery packs, then select **Power Supply** on the **Basic Hardware Settings** screen to see how many watt-hours are needed for the deployment (see “Basic Hardware Setting,” page 33).

- p. Move the cursor to the **Notes** section. Use the area to include notes about the command file or deployment.
- q. If you make any changes to the input parameters, resave the file. On the **File** menu, click **Save** to save the command file.

7.3 Making Changes to the Command File

The **Basic** screen is visible first when using the wizard or when you load an existing file. The **Basic** screen reflects all of your input during the wizard and is the minimal setup you need to use to collect good data.

The **Advanced** screen allows you to set system settings that are specific to your deployment site. Setting items in this screen incorrectly can bias your data, however, these things can be corrected easily in post processing.

The **Expert** screen allows you to view the commands. Editing or adding commands to the command file may not be reflected in the consequences. Therefore, we strongly recommend that you do not change or add any commands unless you are fully familiar with the impact of those changes.



CAUTION. Editing or adding commands to the command file will allow you to set items that if set incorrectly can cause your data to be bad and uncorrectable even in post processing.

7.4 Basic Hardware Setting

On the **Settings** menu, click **Hardware Settings**. From the **Basic Hardware Settings** screen, you can change the ADCP type, frequency, power management, data storage, and whether or not Bottom Track is output.

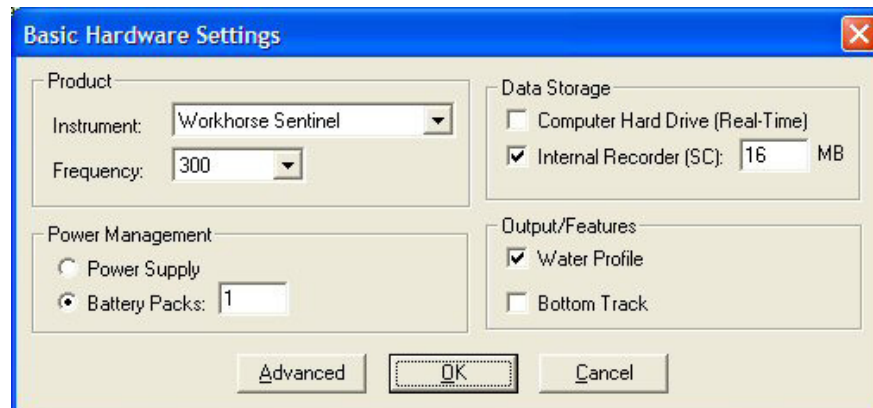


Figure 34. Basic Hardware Setting Screen

7.5 Advanced Command File Editing

On the *PlanADCP* (Basic) Screen (see [Figure 33, page 31](#)), click the **Advanced** button to bring up the **Advanced** setting screen.

The screenshot shows the 'PlanADCP (Advanced)' window with the title bar indicating the file path '[C:\Data\test1.txt]'. The window has a menu bar (File, Settings, View, Help) and a toolbar. It is divided into several sections:

- Environmental Setup:**
 - Transducer Depth: 0 m
 - Salinity: 35 ppt
 - Magnetic Variation: 0 °
 - Temperature: 5 °C
- Deployment Timing Setup:**
 - Duration: 100 days
 - Ensemble Interval: 00:20:00.00
 - Ping Int. (Auto): 00:00:00.79
 - ☒ Ping Immediately After Deployment
- Profiling Setup:**
 - Pings Per Ensemble: 50
 - Number of Depth Cells: 27
 - Depth Cell Size: 4 m
 - Mode: 1
- Bottom Tracking Setup:**
 - Pings Per Ensemble: 1
 - Max. Working Range: 200 m
 - Mode: 5
- Deployment Consequences:**
 - First Cell Range: 6.13 m
 - Last Cell Range: 110.13 m
 - Max Range: 113.20 m
 - Standard Deviation: 0.42 cm/s
 - Ensemble Size: 775 bytes
 - Storage Required: 5.32 MB
 - Power Usage: 195.10 Wh
 - Battery Pack Usage: 0.4
- Notes:** A text area at the bottom right.

At the bottom of the window, a status bar displays: 'WorkHorse Sentinel: 300 kHz/High Res./ 1 Battery Pack/Memory: 16 MB/ Bottom Track' and a 'NUM' button.

Figure 35. PlanADCP Advanced Screen (with Bottom Track On)



CAUTION. The **Advanced** screen allows you to set system settings that are specific to your deployment site. Setting items in this screen incorrectly can bias your data, however, these things can be corrected easily in post processing.

Environmental Setup

- **Transducer Depth** – The ADCP uses depth in its speed of sound calculations. Some ADCPs may be equipped with an internal pressure sensor. If a pressure sensor is not available, then the ADCP will use this manual depth setting.
- **Salinity** – Fresh water is 0ppt and salt water is typically 35ppt. Salinity is used to calculate the speed of sound. The speed of sound is used by the ADCP to scale the velocity data properly. If you use 0ppt when you deployed in 35ppt water, then your data will have a 3% velocity estimate error.
- **Magnetic Variation** – The WorkHorse ADCP uses a flux-gate compass that measures magnetic north. You must set the mag-

netic offset in order to obtain true north referenced velocity data directions.

- **Temperature** – Temperature is the largest effect on the speed of sound calculation. Enter the average temperature the WorkHorse ADCP itself will see over its entire deployment. This temperature will also be used to calculate the maximum range of the system as temperature also affects the absorption of the sound in the water.

Deployment Timing Setup

- **Duration** – Enter the expected duration of the WorkHorse deployment. This duration *does not* produce a command to instruct the WorkHorse to stop data collection; it is for estimating consequences only.
- **Ensemble Interval** – This sets the (minimum) interval over which the WorkHorse will collect and average the pings per ensemble and record data.
- **Ping Interval** – Selecting the **Auto** box will evenly space the pings throughout the ensemble. Un-checking the **Auto** box allows you to manually enter the time between pings. As an example, you can manually set this time to squeeze all of the pings together at the beginning of your ensemble instead of spacing them evenly over your entire ensemble. Please note that most users use the automatic function.
- **Ping Immediately After Deployment** – Select whether to start the deployment immediately or delayed. Uncheck the box and entering a date and time in this field enables a delay from the start of a deployment to the first water profiling ping. When enabled, the WorkHorse will begin collecting velocity data at the date and time specified by the first ping date and time. The WorkHorse will sleep from the time the commands are sent to the WorkHorse until the first ping date and time.



NOTE. Use *WinSC* or *BBTalk* (see the RDI Tools User's Guide) to make sure the ADCP date and time are set to the computer's time (see "Deployment Wizard," page 12).

Profiling Setup

- **Pings Per Ensemble** – Adjust the number of pings to get the desired Standard Deviation. The pings are uniformly time-spaced over the ensemble interval if **Auto** is selected in the **Ping Interval** box. To increase the expected accuracy of the velocity

measurement (reduce the Standard Deviation), you can increase either pings per ensemble, depth cell (bin) size or both.

- **Number of Depth Cells** – Sets how many depth cells (bins) are used. You should always have enough depth cells to collect data over the profiling range you desire. The **Max Range** field provides the maximum range the system will profile. The **Last Cell Range** field provides the last range that you have setup the system to collect. To increase the **Last Cell Range** enter more depth cells or increase the depth cell size.



NOTE. RD Instruments recommends setting the number of depth cells so that you collect 10% more range than the **Max Range** field indicates. Collecting more than this typically does not provide you any more velocity data.

- **Depth Cell Size** – Set the depth cell (bins) size.
- **Mode** – Sets the Water Mode. For more information on Water Modes, see the [WorkHorse Commands and Output Data Format guide](#).

Bottom Tracking Setup – (Only visible if Bottom Track is selected)

- **Pings Per Ensemble** – Sets the number of Bottom Track pings.
- **Nominal Range** – Sets the maximum tracking depth in Bottom-Track mode.
- **Mode** – Sets the Bottom Track mode. For more information on Bottom Track Modes, see the [WorkHorse Commands and Output Data Format guide](#).

Waves Setup – (Only visible if Waves Gauge is selected)

- **Burst Duration** – Sets the period of time the ADCP will ping at a high ping rate (“burst”), wait for a set period of time, and then repeat the process.
- **Time Between Bursts** – Sets the time between bursts.
- **Collect Motion Data (Moored)** – Select this option if you want to collect extra sensor (Pitch and Roll) data.

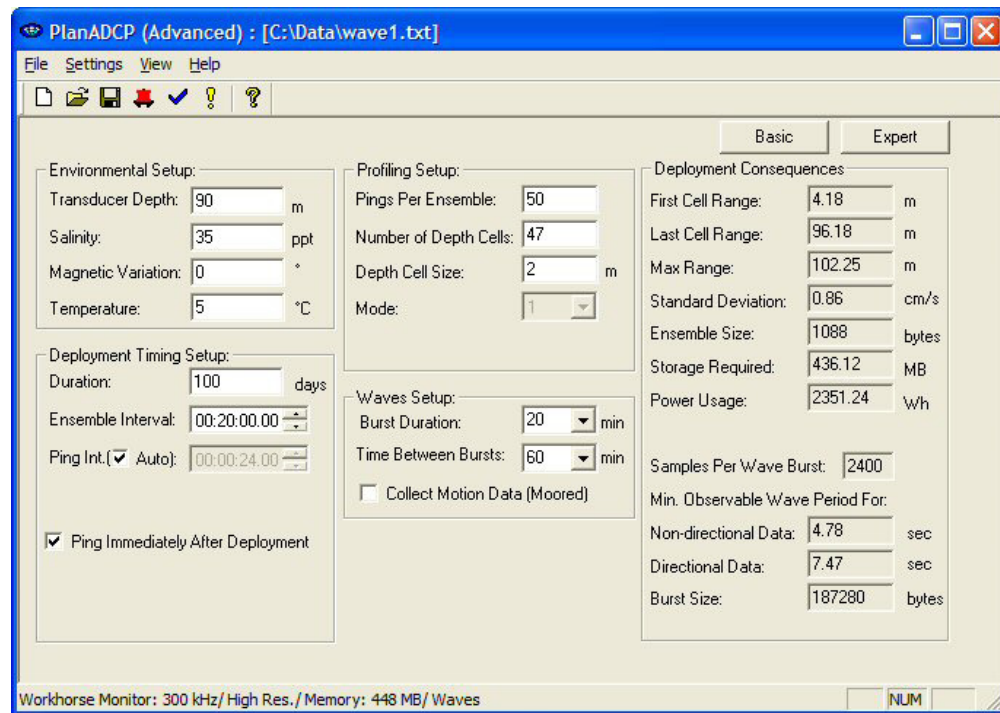


Figure 36. PlanADCP Advanced Screen (with Waves Gauge On)

7.6 Advanced Hardware Settings

While in the **Advanced Settings** screen, on the **Settings** menu, click **Hardware Settings**. From the **Advanced Hardware Settings** screen, you can change the ADCP type, frequency, power management, data storage, Mode, and whether or not Bottom Track is output. If you are going to use **High Resolution Water Modes**, **High Rate Pinging Mode**, or **Shallow Bottom Mode** (and your ADCP has that feature installed) check the appropriate box.

It is recommended to set the **LADCP** and **Wave Gauge** features through the Wizard (**File**, **New** menu selection). If **LADCP** is checked, select if you want the command file to be for the **Master** or **Slave** ADCP.

Select the **Mode**. The **Long Range** (LR) mode allows the ADCP to profile farther, but the standard deviation is increased by as much as 2.5 times.

For Long Ranger ADCPs, select the **Power** mode. This sets the transmit power to **High** or **Low**.

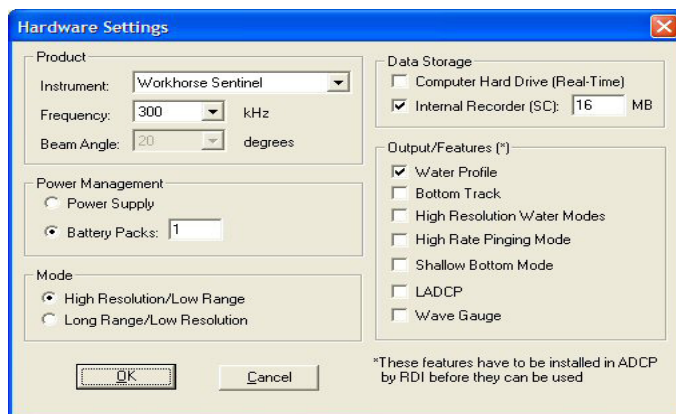


Figure 37. Advanced Hardware Settings Screen

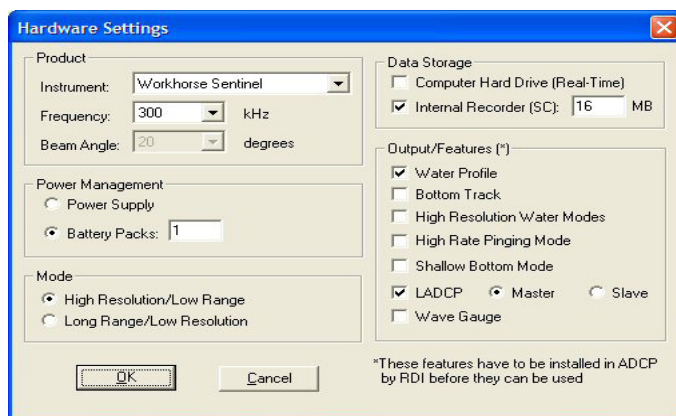


Figure 38. Advanced Hardware Settings Screen with Lowered ADCP

7.7 Expert Screen

To view the Expert screen, click the **Expert** button while on the Advanced screen. The Expert screen allows you to view the commands. If you are an expert user you can change or add commands. To return to the Advanced screen, click the **Advanced** button.



CAUTION. If you are an expert user you can change or add commands. Be aware that some special commands could affect power consumption or other parameters. PlanADCP will **not** make adjustments to the consequences.

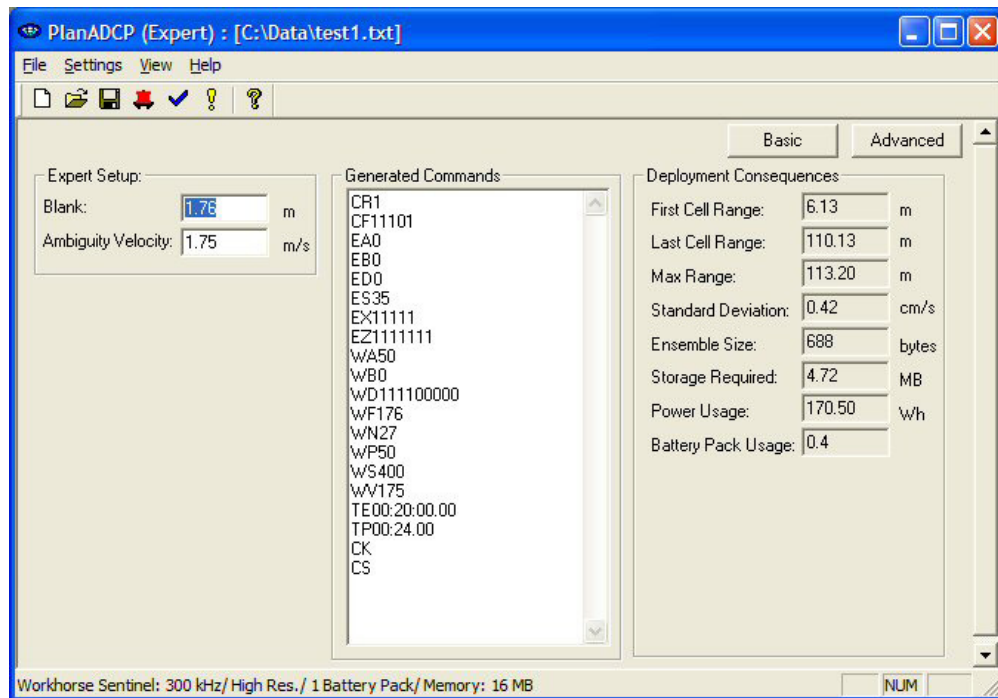


Figure 39. PlanADCP Expert Screen (no Bottom Track)

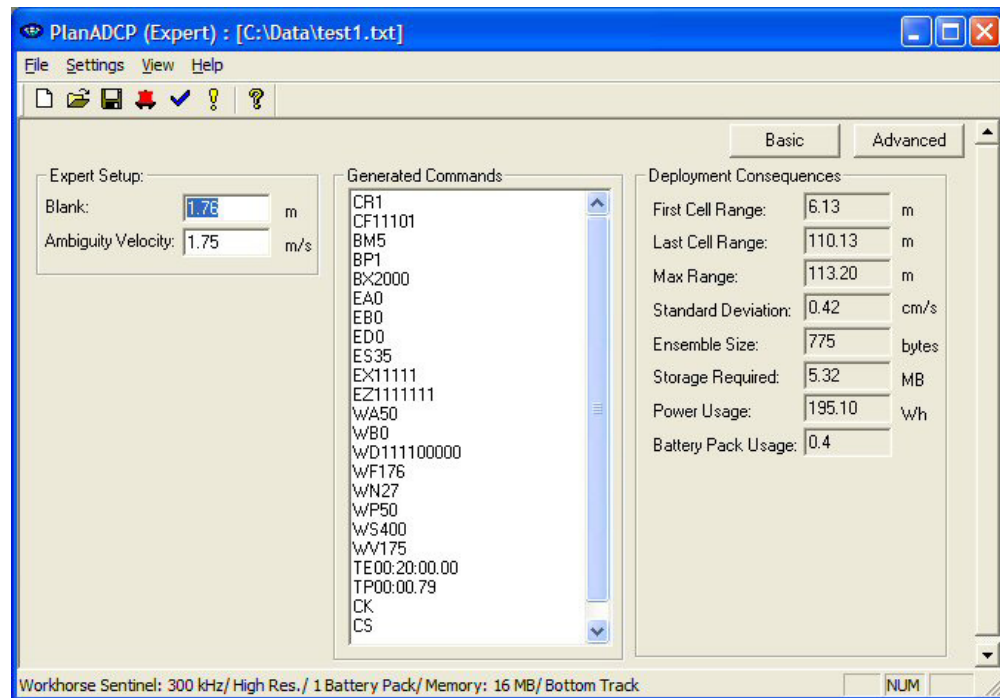


Figure 40. PlanADCP Expert Screen (with Bottom Track On)

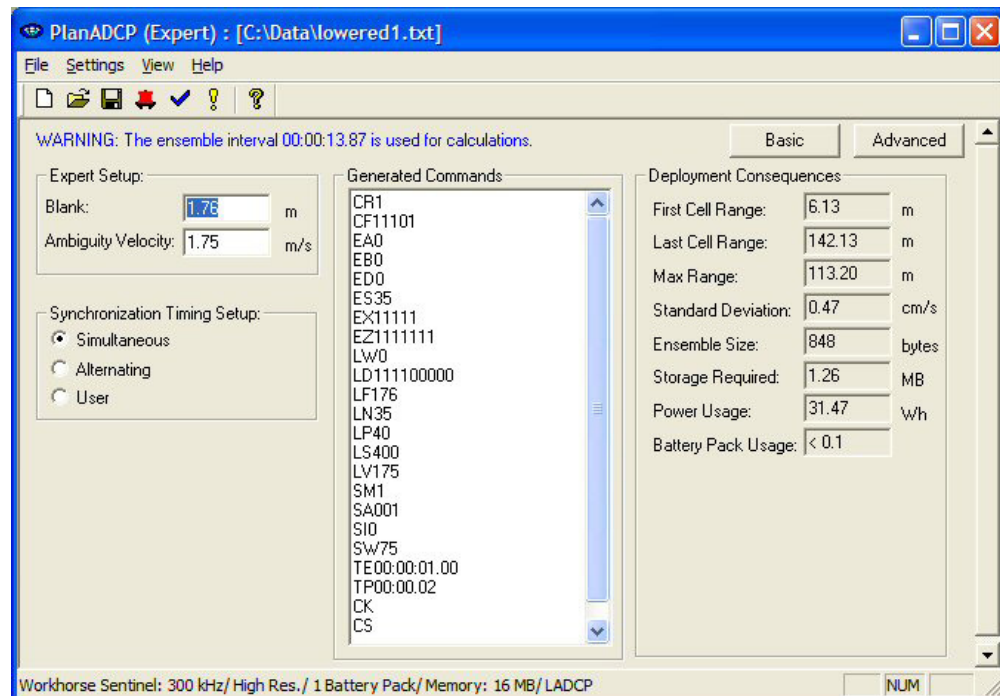


Figure 41. PlanADCP Expert Screen (with Lowered ADCP)

7.8 Manually Editing a Command File

To manually edit the command file in *Notepad*®, do the following.

- a. On the **File** menu, click **Edit**.
- b. Select the command file and click the **Edit** button.

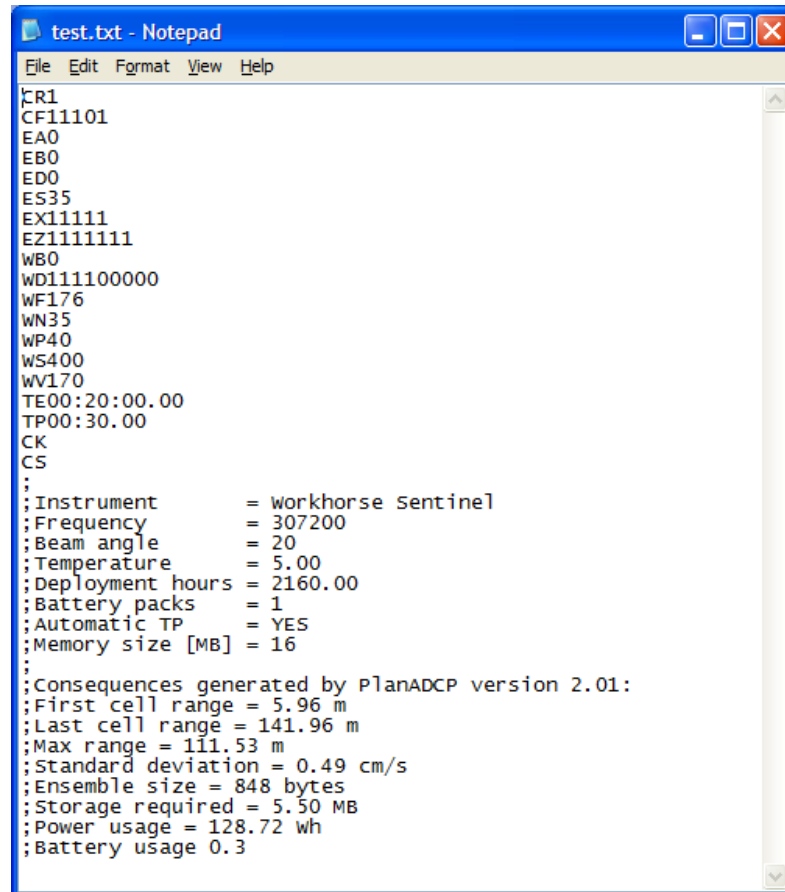


Figure 42. Edit a Command File

- c. Make changes to the command file as needed.
- d. In *Notepad*, on the **File** menu, click **Save**. Exit *Notepad* to return to *PlanADCP*.



NOTE. Editing or adding commands to the command file may not be reflected in the consequences. Therefore, we strongly recommend that you do not change or add any commands unless you are fully familiar with the impact of those changes.



CAUTION. Editing or adding commands to the command file will allow you to set items that if set incorrectly can cause your data to be bad and uncorrectable even in post processing.

7.9 Sample Printout of a Command File

Once you have entered all of your choices using *PlanADCP* and saved the file, you can view the command file using the Expert screen or on the **File** menu, select **Edit** (see [“Manually Editing a Command File,”](#) page 41). Lines beginning with a semicolon (;) are comments. The sample command file shown below is for a 300kHz Sentinel WorkHorse without Bottom Track and using the default settings for all screens.

```
CR1
CF111101
EA0
EB0
ED0
ES35
EX11111
EZ1111111
WB0
WD111100000
WF176
WN27
WP150
WS400
WV170
TE00:20:00.00
TP00:08.00
CK
CS
;
;Instrument      = Workhorse Sentinel
;Frequency       = 307200
;Beam angle     = 20
;Temperature    = 5.00
;Deployment hours = 2160.00
;Battery packs  = 1
;Automatic TP   = YES
;Memory size [MB] = 16
;
;Consequences generated by PlanADCP version 2.01:
;First cell range = 5.96 m
;Last cell range = 109.96 m
;Max range = 111.53 m
;Standard deviation = 0.25 cm/s
;Ensemble size = 688 bytes
;Storage required = 4.46 MB
;Power usage = 439.59 Wh
;Battery usage 1.0
```

The commands shown in [Table 2, page 43](#) explain each command set or added by *PlanADCP*. These commands directly affect the range of the ADCP, standard deviation (accuracy) of the data, and battery usage. [Table 2, page 43](#) explains the commands used in the sample command file for a 300kHz Sentinel WorkHorse without Bottom Track.

Table 2: Command File Created Using PlanADCP

Command	Choices	Description
CR1	Sets factory defaults	This is the first command sent to the ADCP to place it in a "known" state.
CF11101	Flow control	Record data internally on the PC card recorder.
EA00000	Heading alignment	Use beam-3 as the heading alignment.
EB00000	Heading bias	Magnetic variation.
ED0000	Transducer depth	Manually set depth of the transducer. If a pressure sensor is installed, the ED-command will be used only if the depth sensor fails.
ES35	Salinity	Salinity of water is set to 35 (saltwater).
EX11111	Coordinate transformations	Sets Earth coordinates, use tilts, allow 3-beam solutions, and allow depth cell (bin) mapping to ON.
EZ1111111	Sensor source	Calculate speed of sound from readings, use pressure sensor (if installed), internal compass, internal tilt sensor, and transducer temperature sensor.
WB0	Bandwidth mode	Sets the ADCP to the Broadband mode.
WD111 100 000	Data out	Sets the ADCP to collect velocity, correlation magnitude, echo intensity, and percent-good data. Status data is not used.
WF0176	Blank after transmit	Moves the location of the first depth cell 176 cm away from the transducer head.
WN27	Number of depth cells	Number of depth cell (bin)s is set to 27.
WP150	Number of pings	Number of pings is set to 150
WS0400	Depth cell size	Depth cell (bin) size is set to 4 meters.
WV170	Ambiguity velocity	Sets the maximum relative horizontal velocity between water-current speed and WorkHorse speed to 170 cm/s.
TE00:20:00.00	Time per ensemble	Ensemble interval is set to 20 minutes.
TP00:08.00	Time between pings	Plan automatically sets the time between pings to spread the pings evenly throughout the ensemble.
CK	Keep parameters as user defaults	If power is lost and then restored, all commands will be restored as last sent. Sent right before the CS-command.
CS	Start pinging	Last command sent to begin collecting data.

8 Software History

WinSC Software History

Version 1.28

- Changed name of the software from *SC* to *WinSC*
- Maximized child frame on startup.
- Fixed the following problem: when message “Press any key to start taking data...” or “Press any key to continue” appears in the document window when the “Function Executing” modal dialog window is displayed, then pressing the <ENTER> key actually aborts the operation. The new “Continue” button is added that passes enter key to document window.

Version 1.29

- Fixed problem with displaying graphics.
- Fixed problem with COM ports > COM9. They were not shown in the list of the available ports.
- Fixed problem with slow updates of terminal window.
- Change icon to show four beams.
- Added the AZ command in the wizard to zero the pressure sensor.
- Added step in the wizard to erase memory.
- Added warning if the recorder is not empty when starting deployment.
- Added warning if files already exist in download directory.

PlanADCP Software History

Version 2.01 - Initial Release.

Version 2.02

- Added ability to enter blank in expert menu.
- Added mode 12 sub-pings options.
- Added ability to enter ambiguity velocity in expert menu.
- Added feature list to Advanced Settings Menu.
- Fixed problem with reading TF command properly.
- Fixed problem with maximum profiling range for Long Ranger.

- Fixed problem with low / high power setting: range would not change.
- Added LADCP support.
- Add ability to view all the warnings and cautions.
- Fixed problem with restoring battery packs information from file.
- Added planning options for various WH Horizontal ADCPs.
- Added "Advanced" button in Basic Hardware Settings.
- Added "Back" button in last page of the Wizard.
- Added Waves support.
- Added ability to edit commands in Expert View.
- Added decoding of CL command and implementing it in the model.
- Changed voltage for Rio Grande to 12 V.
- Added display of the hardware settings to the status bar.
- Changed default mode 1 ambiguity velocity from 170 to 175 cm/s.
- Generate CL command for Workhorse Horizontal systems.
- Change the display format for the first ping time to 24-hour standard.

NOTES