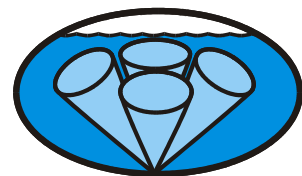


Long Ranger Test Guide



RD Instruments
Acoustic Doppler Solutions

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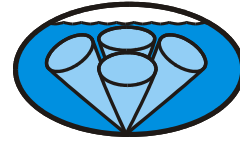
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Long Ranger Test Guide

1 Introduction

This guide explains how to test the Workhorse Long Ranger using the *WinSC* or *BBTalk* programs. These tests thoroughly check the Long Ranger in a laboratory environment, but are no substitute for a practice deployment. You should test the Long Ranger:

- When you first receive the Workhorse Long Ranger.
- Before each deployment or every six months.
- When you suspect instrument problems.
- After each deployment.

These test procedures assume all equipment is working. The tests can help you isolate problems to a major functional area of the Long Ranger. For troubleshooting information, see the [Troubleshooting Guide](#).



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.

2 Testing the Long Ranger with *WinSC*

Use the following steps to test the ADCP.

- a. Connect and power up the ADCP as shown in the [Long Ranger User's Guide](#).
- b. Start *WinSC* (for help on using *WinSC*, see the [WinSC and PlanADCP User's Guide](#)).
- c. 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-commands. The results of the tests will be printed to the screen and saved to the log file (*.scl).

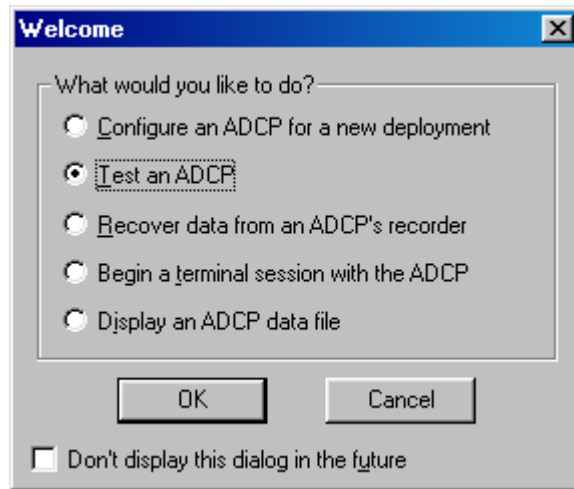


Figure 1. Using WinSC to Test an ADCP

3 Testing the Long Ranger with *BBTalk*

Use the following steps to test the ADCP.

- a. Interconnect and apply power to the system as described in the [Long Ranger User's Guide](#).
- b. Start the *BBTalk* program (for help on using *BBTalk*, see the [RDI Tools User's Guide](#)).
- c. Press <F2> and run the script file TestWH.txt. The TestWH.txt script file runs PS0, PS3, PA, PC2, and the PC1 tests. The results of the tests will be printed to the screen and saved to the log file WH_RSLTS.txt. The WH_RSLTS.txt file will be created in the same directory that *BBTalk* is running from.

4 Test Results

This section shows an example of the test result printout after running the *WinSC* tests or the *BBTalk* script file TestWH.txt.



NOTE. The built-in tests require you to immerse the transducer faces in water. If you do not, some of the tests may fail. Running the tests in air will not harm the ADCP.

4.1 Deploy Commands List

WinSC sends the ADCP the Deploy? command. This will show a list of the deployment commands and their current setting. For example;

```
deploy?
Deployment Commands:
RE ----- Recorder ErAsE
RN ----- Set Deployment Name

WD = 111 100 000 ----- Data Out (Vel,Cor,Amp; PG,St,P0; P1,P2,P3)
WF = 0088 ----- Blank After Transmit (cm)
WN = 030 ----- Number of depth cells (1-128)
WP = 00045 ----- Pings per Ensemble (0-16384)
WS = 0200 ----- Depth Cell Size (cm)
WV = 175 ----- Mode 1 Ambiguity Vel (cm/s radial)

BP = 000 ----- Bottom Track Pings per Ensemble

TE = 01:00:00.00 ----- Time per Ensemble (hrs:min:sec.sec/100)
TF = **/**/**, **: **: ** --- Time of First Ping (yr/mon/day, hour:min:sec)
TP = 01:20.00 ----- Time per Ping (min:sec.sec/100)
TS = 94/01/30,00:11:17 --- Time Set (yr/mon/day, hour:min:sec)

EA = +00000 ----- Heading Alignment (1/100 deg)
EB = +00000 ----- Heading Bias (1/100 deg)
ED = 00000 ----- Transducer Depth (0 - 65535 dm)
ES = 35 ----- Salinity (0-40 pp thousand)
EX = 11111 ----- Coord Transform (Xform: Type,Tilts,3 Bm,Map)
EZ = 1111101 ----- Sensor Source (C,D,H,P,R,S,T)

CF = 11111 ----- Flow Ctrl (EnsCyc;PngCyc;Binry;Ser;Rec)
CK ----- Keep Parameters as USER Defaults
CR # ----- Retrieve Parameters (0 = USER, 1 = FACTORY)
CS ----- Start Deployment
```

4.2 System Commands List

WinSC sends the ADCP the System? command. This will show a list of the system commands and their current setting. For example;

```
>system?
System Control, Data Recovery and Testing Commands:
AC ----- Output Active Fluxgate & Tilt Calibration data
AF ----- Field calibrate to remove hard/soft iron error
AR ----- Restore factory fluxgate calibration data
AX ----- Examine compass performance
AZ ----- Zero pressure reading

CB = 411 ----- Serial Port Control (Baud; Par; Stop)
CP # ----- Polled Mode (0 = NORMAL, 1 = POLLED)
CZ ----- Power Down Instrument

FC ----- Clear Fault Log
FD ----- Display Fault Log

OL ----- Display Features List

PA ----- Pre-Deployment Tests
PC1 ----- Beam Continuity
PC2 ----- Sensor Data
PS0 ----- System Configuration
PS3 ----- Transformation Matrices
```

```
RR ----- Recorder Directory
RF ----- Recorder Space used/free (bytes)
RY ----- Upload Recorder Files to Host
```

4.3 Time Set

WinSC sends the ADCP the TS? command. This will show the current setting of the real time clock. For example;

```
>TS?
TS = 98/06/17,07:31:27 --- Time Set (yr/mon/day,hour:min:sec)
>
```

4.4 Recorder Free Space

WinSC sends the ADCP the RS command. This will show the amount of used and free recorder space in megabytes. For example;

```
>RS
RS = 000,010 ----- REC SPACE USED (MB), FREE (MB)
>
```

4.5 Display System Parameters

This tells the ADCP to display specific information about your ADCP. Both *WinSC* and *BBTalk* run this test. For example:

```
>ps0
Instrument S/N: 0
Frequency: 78800 HZ
Configuration: 4 BEAM, JANUS
Match Layer: 10
Beam Angle: 20 DEGREES
Beam Pattern: CONVEX
Orientation: DOWN
Sensor(s): HEADING TILT 1 TILT 2 DEPTH TEMPERATURE PRESSURE
Pressure Sens Coefficients:
c3 = +0.000000E+00
c2 = +0.000000E+00
c1 = -2.500000E-03
Offset = +0.000000E+00

Temp Sens Offset: -0.20 degrees C

CPU Firmware: 16.21
Boot Code Ver: Required: 1.13 Actual: 1.13
DEMOM #1 Ver: ad48, Type: 1f
DEMOM #2 Ver: ad48, Type: 1f
PWRTIMG Ver: 85d3, Type: 6
Board Serial Number Data:
08 00 00 02 C9 20 A7 09 CPU727-2000-00H
4D 00 00 00 D4 97 37 09 PIO727-3000-03C
>
```

Verify the information is consistent with what you know about the setup of your system. If PS0 does *not* list all your sensors, there is a problem with either the communications to the transducer or a problem with the receiver board.

4.6 Instrument Transformation Matrix

PS3 sends information about the transducer beams. Only the *BBTalk* script file *TestWH.txt* runs this test. The Long Ranger uses this information in its coordinate-transformation calculations; for example, the output may look like this:

```
ps3
Beam Width: 3.7 degrees

Beam      Elevation      Azimuth
1         -70.14         269.72
2         -70.10         89.72
3         -69.99         0.28
4         -70.01        180.28

Beam Directional Matrix (Down):
0.3399  0.0017  0.9405  0.2414
-0.3405 -0.0017  0.9403  0.2410
-0.0017 -0.3424  0.9396 -0.2411
0.0017  0.3420  0.9398 -0.2415

Instrument Transformation Matrix (Down):      Q14:
1.4691 -1.4705  0.0078 -0.0067      24069 -24092      127 -109
-0.0068  0.0078 -1.4618  1.4606      -111 127 -23950 23930
0.2663  0.2657  0.2657  0.2661      4363 4354 4353 4359
1.0367  1.0350 -1.0359 -1.0374      16985 16957 -16972 -16996
Beam Angle Corrections Are Loaded.
>
```

If the WorkHorse has beam angle errors, they are reflected in the instrument transformation matrix and the Beam Directional matrix. This matrix, when multiplied by the raw beam data gives currents in the x , y , z , and e directions.

4.7 Pre-deployment Test

This diagnostic test checks the major WorkHorse modules and signal paths. Both *WinSC* and *BBTalk* run this test. For example, the output may look like this:

```
>PA
PRE-DEPLOYMENT TESTS
CPU TESTS:
  RTC.....PASS
  RAM.....PASS
  ROM.....PASS
RECORDER TESTS:
  PC Card #0.....DETECTED
    Card Detect.....PASS
    Communication.....PASS
    DOS Structure.....PASS
    Sector Test (short).....PASS
  PC Card #1.....DETECTED
    Card Detect.....PASS
    Communication.....PASS
    DOS Structure.....PASS
    Sector Test (short).....PASS
DSP TESTS:
  Timing RAM.....PASS
  Demod RAM.....PASS
  Demod REG.....PASS
```

```
FIFOs.....PASS
SYSTEM TESTS:
XILINX Interrupts... IRQ3  IRQ3  IRQ3  ...PASS
Receive Loop-Back.....PASS
Wide Bandwidth.....PASS
Narrow Bandwidth.....PASS
RSSI Filter.....PASS
Transmit.....PASS
SENSOR TESTS:
H/W Operation.....PASS
```

4.8 Display Heading, Pitch, Roll, and Orientation

The PC2 test displays heading, pitch angle, roll angle, up/down orientation and attitude temperature in a repeating loop at approximately 0.5-sec update rate. Any key pressed exits this command and returns the user to the command prompt. Both *WinSC* and *BBTalk* run this test.

```
Press any key to quit sensor display ...
Heading   Pitch    Roll    Up/Down   Attitude Temp   Ambient Temp   Pressure
301.01°   -7.42°   -0.73°   Up        24.35°C         22.97°C       0.0 kPa
300.87°   -7.60°   -0.95°   Up        24.36°C         22.97°C       0.0 kPa
300.95°   -7.60°   -0.99°   Up        24.37°C         22.97°C       0.0 kPa
300.71°   -7.61°   -0.96°   Up        24.37°C         22.98°C       0.0 kPa
300.69°   -7.61°   -0.96°   Up        24.35°C         22.98°C       0.0 kPa
300.76°   -7.60°   -0.98°   Up        24.38°C         22.97°C       0.0 kPa
```

4.9 Beam Continuity

The PC1 tests the beam continuity by measuring the quiescent Receiver Signal Strength Indicator (RSSI) levels. There must be a change of more than 30 counts when the transducer face is rubbed. Both *WinSC* and *BBTalk* run this test.

```
BEAM CONTINUITY TEST
When prompted to do so, vigorously rub the selected
beam's face.
If a beam does not PASS the test, send any character to
the ADCP to automatically select the next beam.
```

```
Collecting Statistical Data...
  52  48  50  43
```

```
Rub Beam 1 = PASS
Rub Beam 2 = PASS
Rub Beam 3 = PASS
Rub Beam 4 = PASS
```