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TRDI RiverRay #54988 Cheat Sheet

The RiverRay is a 600kHz acoustic doppler current profiler featuring phased array technology, auto adaptive set up and data collection, a velocity profiling range of 0.3 – 40 meters and wireless Bluetooth communications.



Assembly

The instrument must be installed in the well of the hull using the 2 large plastic knurled knobs. Note that one of the cables from the towing bridle **MUST** be attached to the instrument to protect against loss in the event the hull flips. The connection safety bolt is tagged on the instrument.

Spread the two outer hulls to an open position until the spring pins lock in the holes. Tighten the large molded lock bolts to secure the arms in position. Do not overtighten or the bolts will be damaged.

Battery Installation and Charging

The RiverRay operates from a rechargeable 12v sealed gel-cell battery which must be installed inside the centre boat under the access plate. Place the small block of foam above the battery (under the white screw cap) to prevent movement. Use the automatic charger to charge the battery as required.

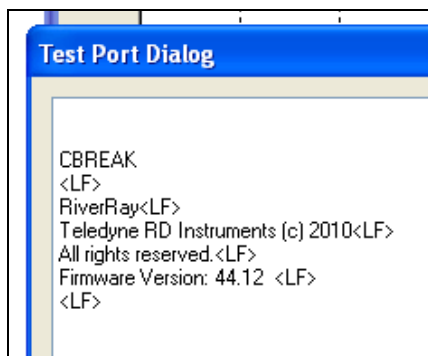
Bluetooth Connection

Two USB bluetooth adapters are included, a SENA adapter (with vertical antenna) for long range operation (recommended) and a small backup ASUS adapter for short range operation.

It is advisable to carefully read the installation instructions for the Bluetooth adapter – see USB stick.

To connect via Bluetooth, install the Bluetooth driver software included on the USB memory stick. Depending on the operating system, the laptop must be paired to the RiverRay to establish a Bluetooth connection. If Windows XP is installed on the laptop, then no pairing code is required. If Windows7 is installed, then the pairing code is '0' (i.e. a single zero).

The operating system will assign a com port to the Bluetooth adapter. This com port must entered in the WinRiverII program in the 'Configure/Peripherals' section. WinRiverII provides a port test to verify communication with the RiverRay.



The status lamp on the RiverRay will show blue to signify a Bluetooth connection exists.

More detail is available for configuring the Bluetooth connection in the pdf file, "RIVERRAY BLUETOOTH CONFIG - Feb 2012 v01" included on the USB stick.

RS232 Cable Connection

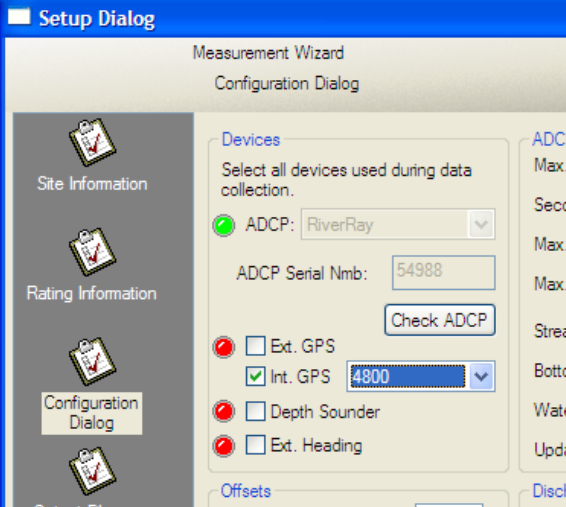
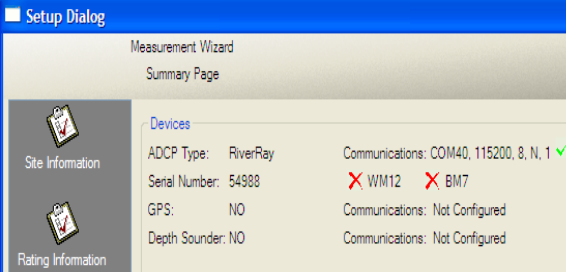

Connect the provided RS232 to the ADCP (**be careful as the connector only fits one way**). Connect the other end to the serial port on your PC or a RS232-to-USB adapter. Connect the positive and negative clamps on to a 12 volt battery. Check your settings to see what com port you will be using. Open WinRiver II software, go to the drop down menu (upper left corner). Click on Configure > Peripherals, the "Peripherals Configuration Dialog" box will open. Expand "Read Serial Raw ADCP Data", then click on "Port: ADCP Serial Port" and click the "Configure" button. Set Comm. Port as required in previous steps, Baudrate 115200, Databits 8, parity none, stopbits 1 and click "Ok". Click the "Test Port" button, if successful you should receive the same message in the screen shot above as when setting up a Bluetooth connection.

Note that the RiverRay can also be run via the 5 m serial com cable. The cable has red/black battery clips for supplying external power.

GPS

The end user can either connect an external GPS receiver or use the internal Garmin 17xHVS GPS receiver installed by ASL in the RiverRay. Note the GPS data from the internal unit is automatically interleaved in the RiverRay Bluetooth data stream and requires very little setup other than the baud rate (4800bps). An external GPS must be connected directly to the laptop.

USING THE INTERNAL GPS RECEIVER

 <p>The screenshot shows the 'Setup Dialog' window with the 'Configuration Dialog' tab selected. On the left, there are icons for 'Site Information', 'Rating Information', 'Configuration Dialog', and 'Output Filename'. The main area is titled 'Measurement Wizard Configuration Dialog'. Under 'Devices', it says 'Select all devices used during data collection.' and lists 'ADCP: RiverRay' with a green indicator. Below that, 'ADCP Serial Nmb: 54988' is shown with a 'Check ADCP' button. Further down, there are checkboxes for 'Ext. GPS' (unchecked), 'Int. GPS' (checked), 'Depth Sounder' (unchecked), and 'Ext. Heading' (unchecked). The 'Int. GPS' dropdown is set to '4800'. At the bottom, there are 'Offsets' fields.</p>	<p>The ASL RiverRay has a Garmin 17x_HVS receiver mounted in the hull.</p> <p>The RiverRay has the capability to interleave the Garmin GPS datastream into its Bluetooth datastream. This allows the WinRiver program to record GPS transect data without the client having to provide an external receiver.</p> <p>In the WinRiver Setup Dialog screen, select 'Int. GPS'. Note that there is no green indicator for the internal GPS.</p> <p>When using the internal GPS, be sure to set the baud rate to 4800.</p>
 <p>The screenshot shows the 'Setup Dialog' window with the 'Summary Page' tab selected. The left sidebar is the same. The main area is titled 'Measurement Wizard Summary Page'. It shows a summary of the configuration: 'ADCP Type: RiverRay', 'Serial Number: 54988', 'GPS: NO', 'Depth Sounder: NO', 'Communications: COM40, 115200, 8, N, 1' (with a green checkmark), 'WM12' (with a red X), 'BM7' (with a red X), and 'Communications: Not Configured' (twice).</p>	<p>Finish the Setup dialog to reach the Summary Screen.</p> <p>Note the GPS is shown as 'NO' (when the internal GPS is selected) as the datastream is not sampled until data acquisition starts.</p>
 <p>The screenshot shows two windows. The top window is 'GPS Tabular 1 - TRDI' displaying real-time GPS data: Latitude 48° 33.863701' N, Longitude 123° 24.813699' W, Number Invalid 0, Number of Sats 8, Sats Changes 1, Altitude 63.6 [m], Delta Altitude 0.0 [m], HDOP 1.2, Delta HDOP 0.2, Delta Time 1.0 [s], and Water Dir. BAD [°]. The bottom window is 'AcquireControl - TRDI' showing 'Raw Data' as 'NOT RECORDING' and 'ADCP Status' as 'PINGING'.</p>	<p>Select 'Acquire, Start Pinging'</p> <p>Set Clock as prompted.</p> <p>The GPS window should show lat/long data if there is a satellite lock.</p> <p>The Acquire Control will show 'PINGING'.</p>

Software

All required software (WinRiver2) and manuals are provided on the included USB memory stick.

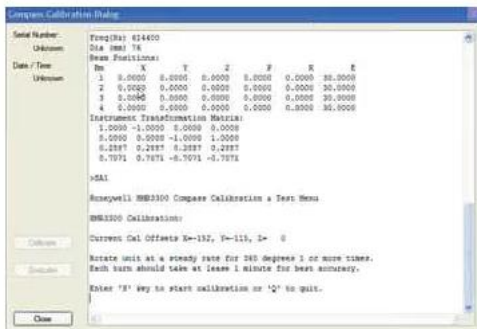
Data Collection

Use WinRiver2. On the **File** menu, click **New Measurement**. Enter the required information: Site, Rating, Config., Output Filename, etc. See manual for more information.

Set the ADCP clock. On the **Acquire** menu, click **Execute ADCP test, Pressure sensor test**.

On the **Acquire** menu, click **Compass Calibration**.

- Compass seems more sensitive to sources of interference than previous ADCP's
- "S" to start and being slowly rotating
- Smoothly rotate 360 degrees taking 2 to 3 minutes (> 40 – 50 data points on screen)
- If slow rotation is not possible, do multiple rotations



Enter: 'A' to Accept new X and Y CAL offsets and zero Z Cal Offset.

Recommended for flat calibration.

'P' to Accept new X, Y and Z CAL offsets.

Use only if pitch and roll varied during calibration.

'R' to Restore previous offsets, X=784, Y=-392, Z=0

'F' to set Factory default CAL offsets, X=0, Y=0, Z=0

New X and Y Cal Offsets accepted.

Clearing Z offset.

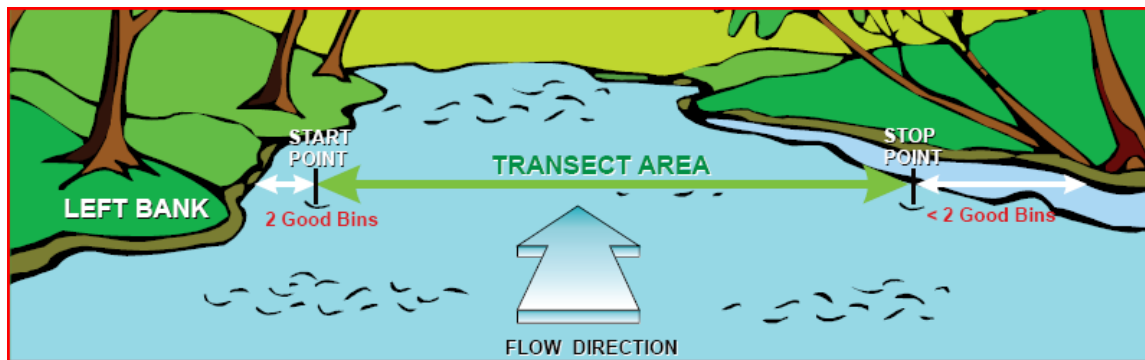
Cal complete. Offsets: X=-217, Y=-434, Z=0

Conduct **Moving Bed Test**.

Determine Start and End points. Run Transects. On the **Acquire** Menu, click on **Start Pinging**, then **Start Transect**. Press F5 to stop recording.

Step by Step Data Collection

1. Open or create a measurement file.
2. Press **F4** to start pinging.
3. At the start/stop position, press **F5** to start the transect.
4. Enter the starting distance from the shore.
5. Select **Left** or **Right** bank.
6. Wait for 10 shore ensembles.
7. Move across the river.
8. At the stop/start position, wait for 10 shore ensembles.
9. Press **F5** to end the transect.
10. Enter the ending distance from the shore.
11. Repeat steps 3 through 10 to collect at least four transect that agree with each other within 5% of the mean of all the samples.



Specifications:

Technical Specifications

Water Velocity Profiling			
Operation mode	Broadband or pulse-coherent, automatic		
Velocity range	±5m/s (default), ±20m/s max.		
Profiling range ¹	0.4m to 40m		
Accuracy	±0.25% of water velocity relative to ADCP, ±2mm/s		
Resolution	1mm/s		
Number of cells	automatic, 25 typical, 200 max.		
Cell size:	automatic, 10cm min.		
Surface cell range ²	25cm		
Data output rate	1-2 Hz (typical)		
Bottom Tracking:			
Operation mode	Broadband		
Velocity range	±9.5m/s		
Maximum depth	70m (@15°C, fresh water)		
Accuracy	±0.25% of bottom velocity relative to ADCP, ±2.5mm/s		
Resolution	1mm/s		
Depth Measurement:			
Range	0.3m to 70m (@15°C, fresh water)		
Accuracy	1% (with uniform water temperature and salinity profile)		
Resolution	1mm		
Standard Sensors:			
Sensor	Temperature	Tilt (solid state)	Compass (solid state)
Range	-5° to 45°C	± 15°	0-359.99°
Accuracy	± 0.4°C	± 0.5°	± 2°
Resolution	0.01°C	0.01°	0.01°

¹Minimum range assumes one good cell (10cm), range measured from the transducer surface.

²Distance measured from the center of the first cell to the transducer surface.